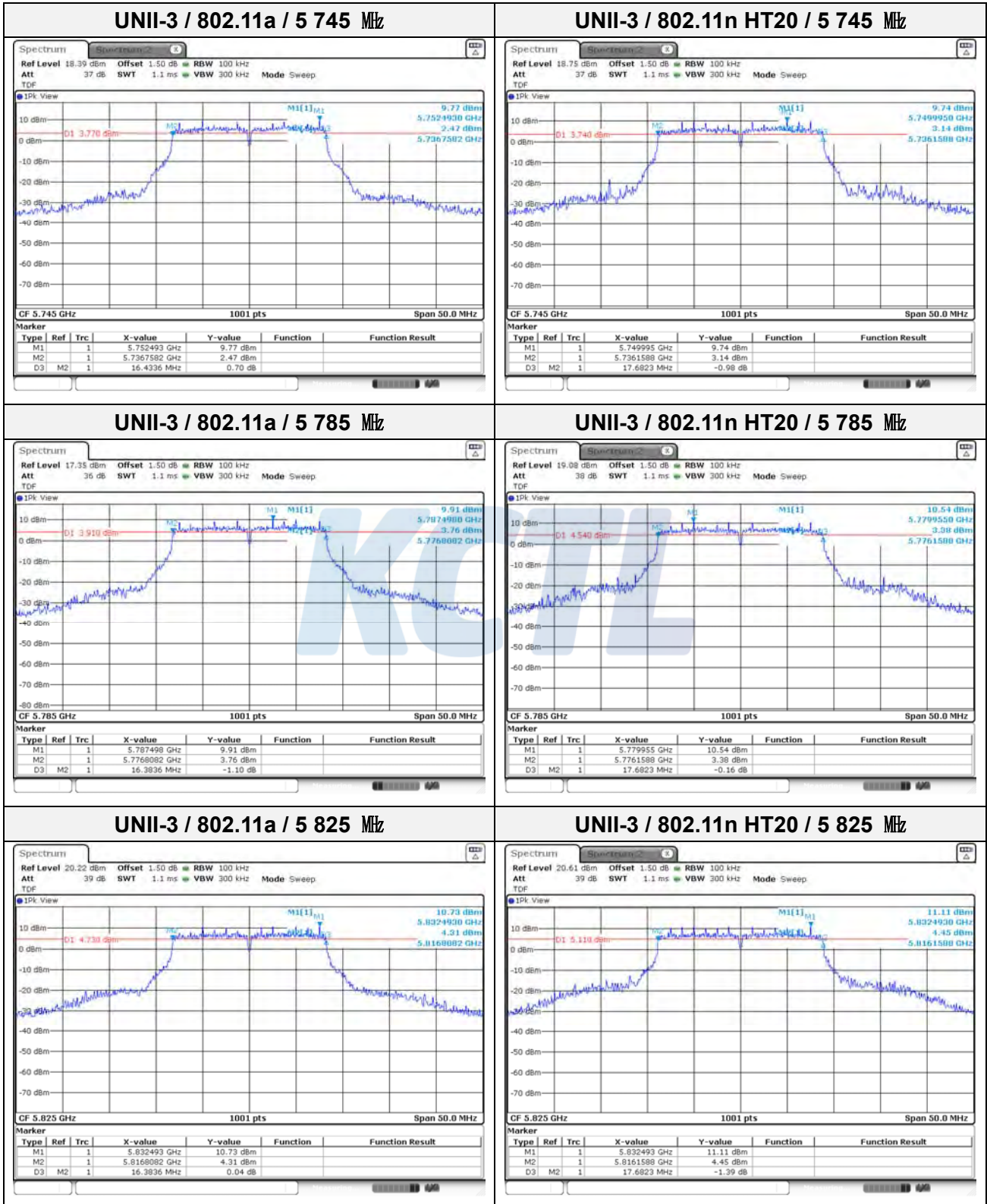
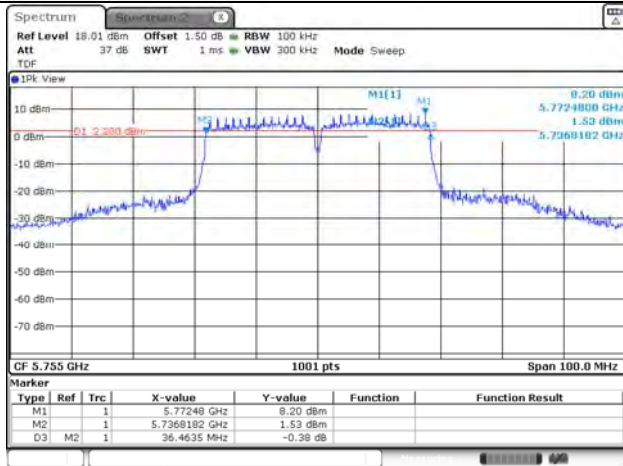


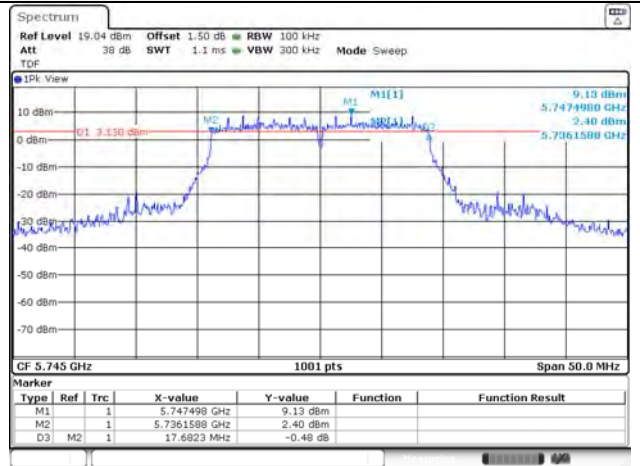
**ANT 0**



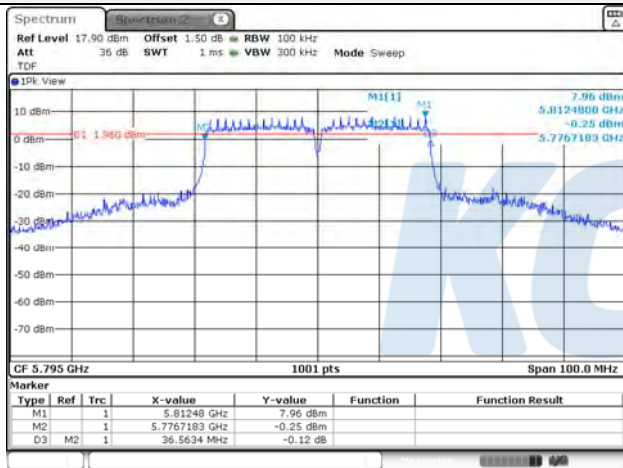
**UNII-3 / 802.11n HT40 / 5 755 MHz**



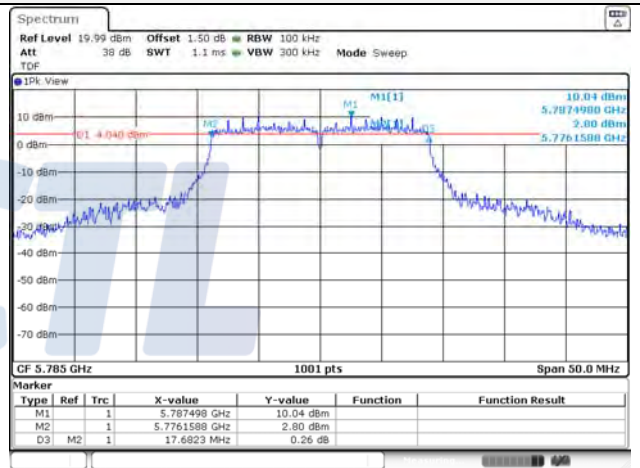
**UNII-3 / 802.11ac VHT20 / 5 745 MHz**



**UNII-3 / 802.11n HT40 / 5 795 MHz**

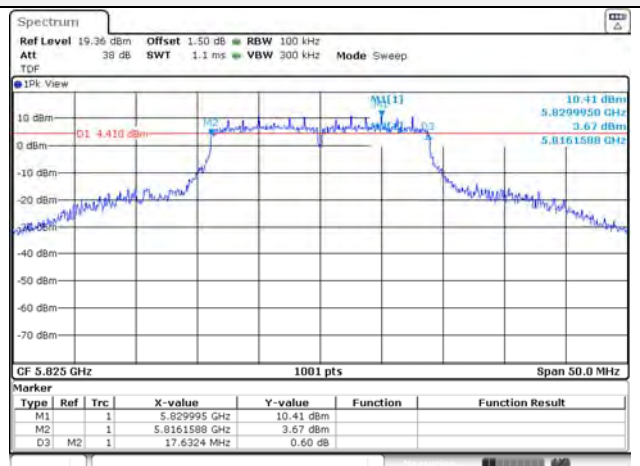


**UNII-3 / 802.11ac VHT20 / 5 785 MHz**

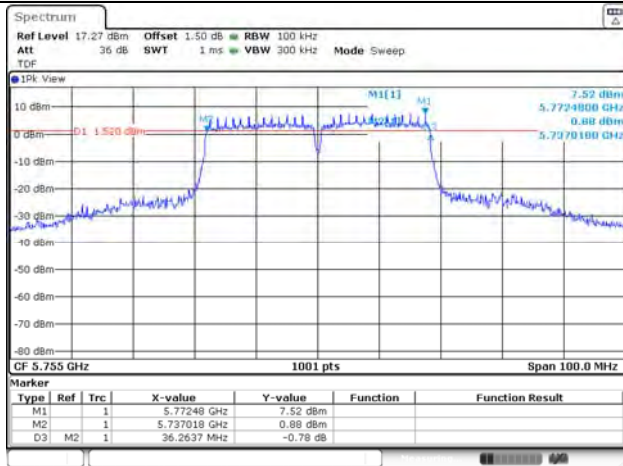


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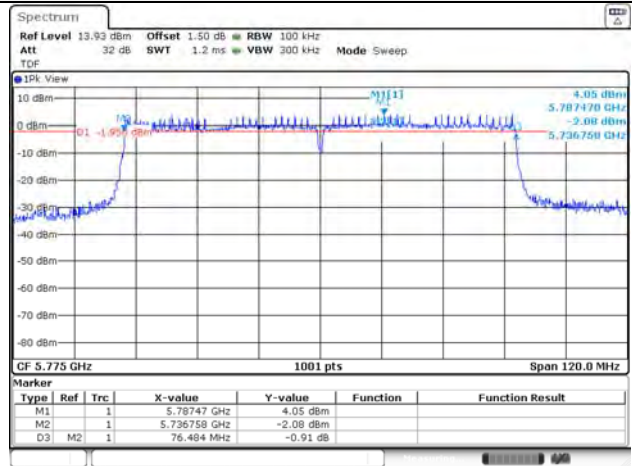
**UNII-3 / 802.11ac VHT20 / 5 825 MHz**



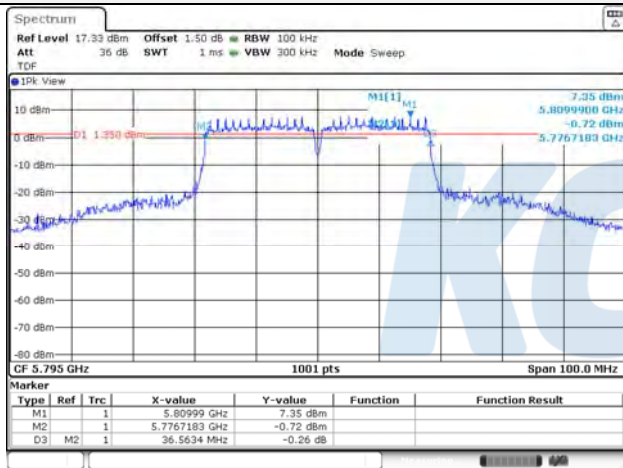
**UNII-3 / 802.11ac VHT40 / 5 755 MHz**



**UNII-3 / 802.11ac VHT80 / 5 775 MHz**

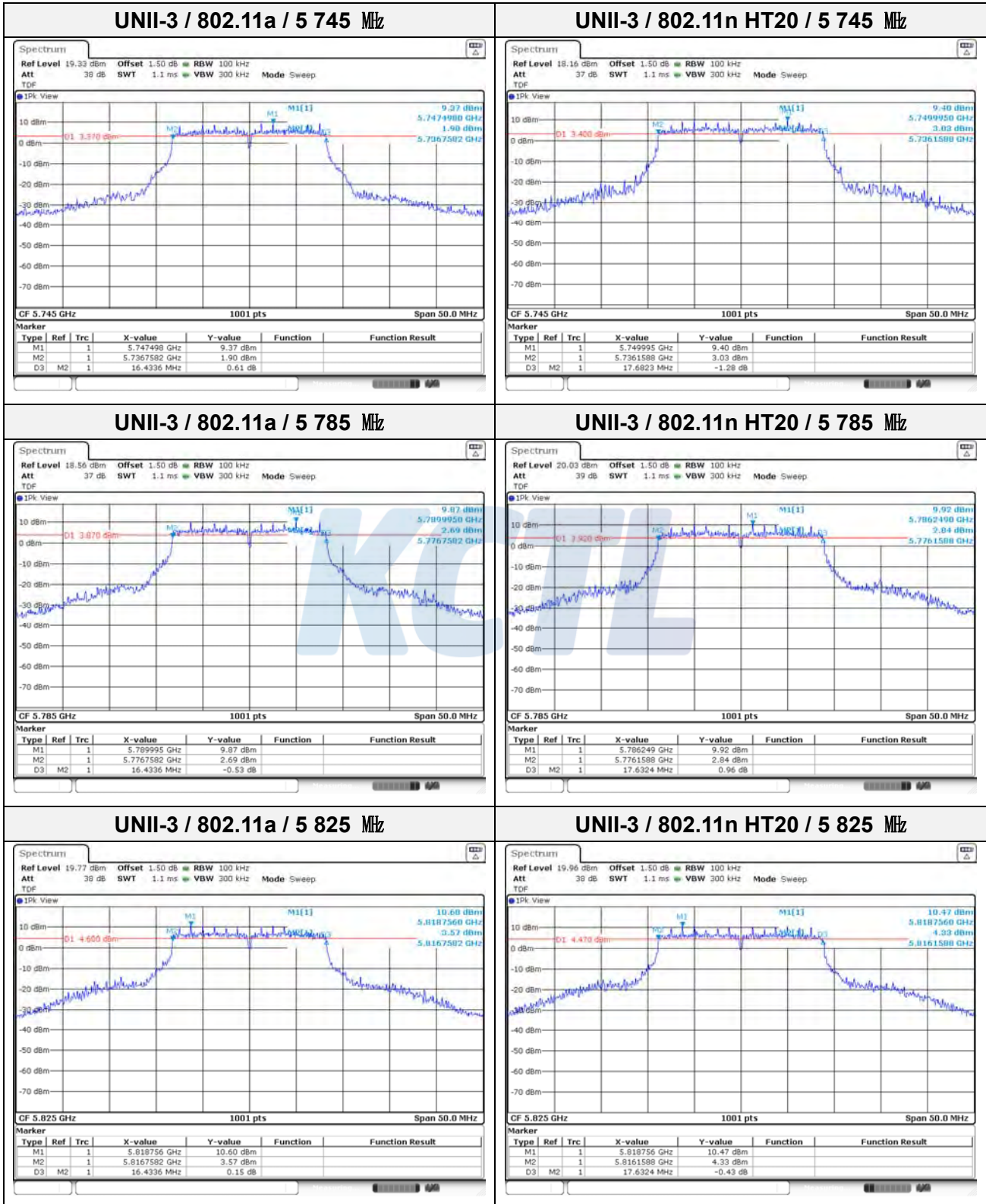


**UNII-3 / 802.11ac VHT40 / 5 795 MHz**

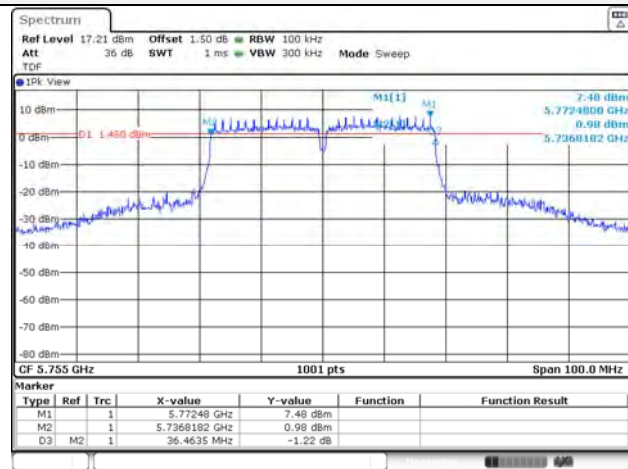


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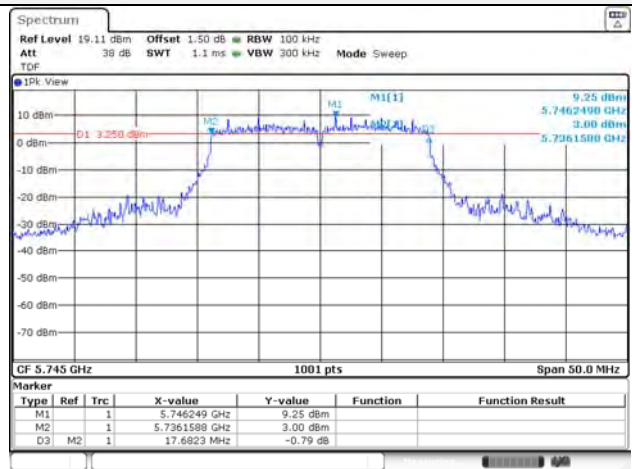
**ANT 1**



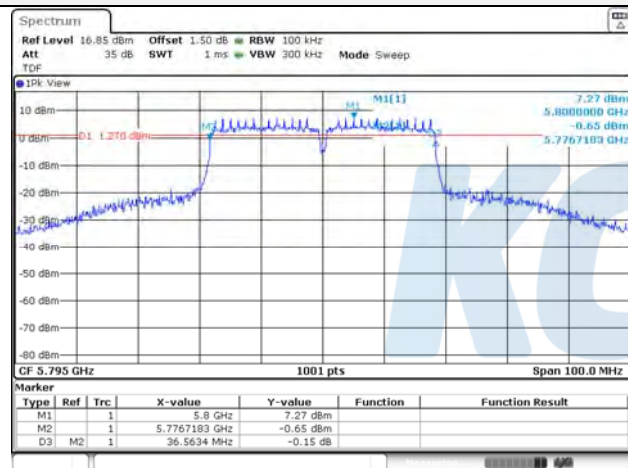
**UNII-3 / 802.11n HT40 / 5 755 MHz**



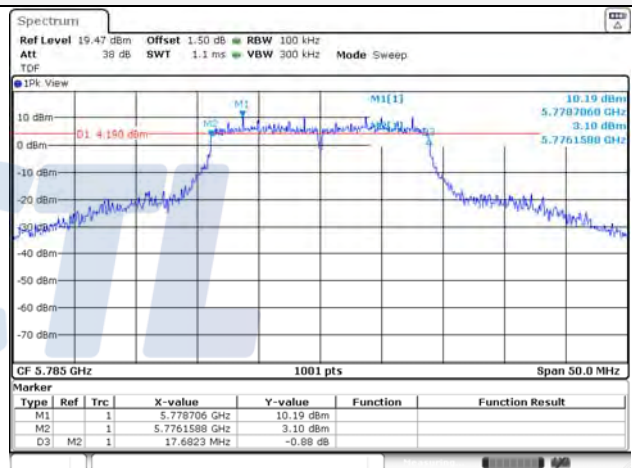
**UNII-3 / 802.11ac VHT20 / 5 745 MHz**



**UNII-3 / 802.11n HT40 / 5 795 MHz**

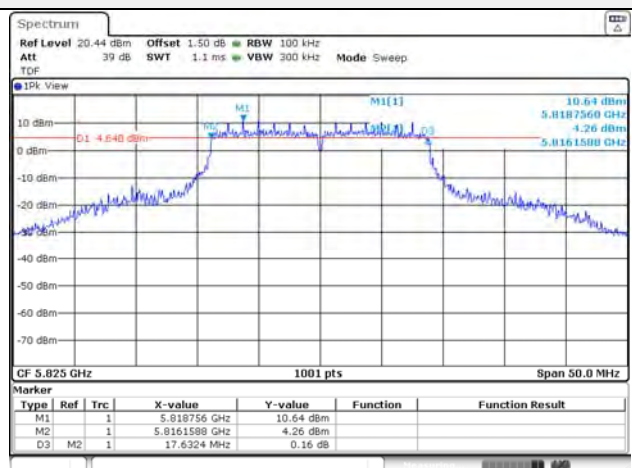


**UNII-3 / 802.11ac VHT20 / 5 785 MHz**

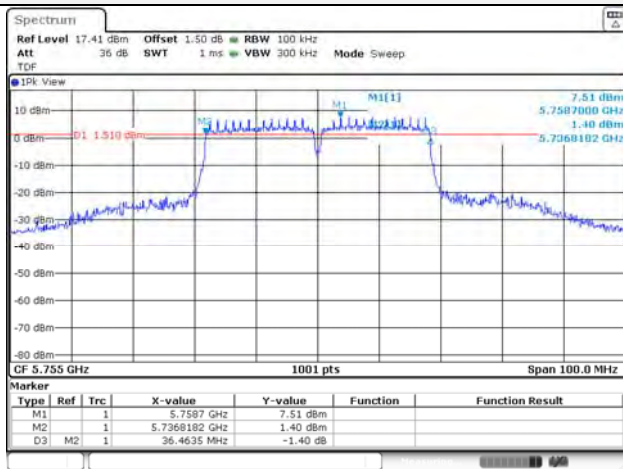


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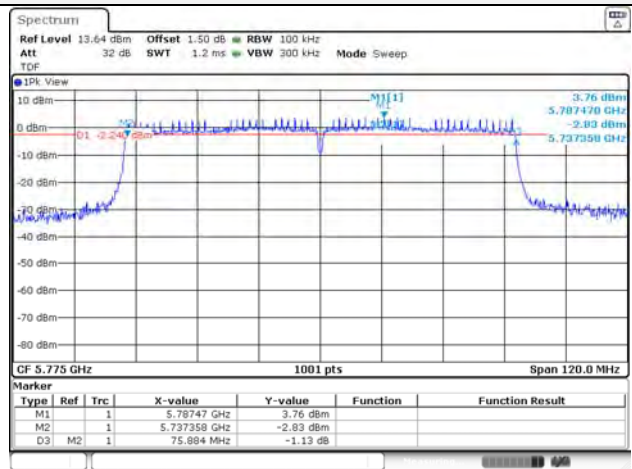
**UNII-3 / 802.11ac VHT20 / 5 825 MHz**



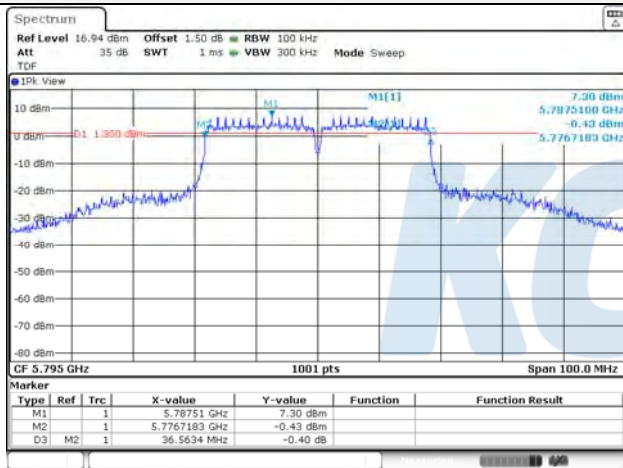
**UNII-3 / 802.11ac VHT40 / 5 755 MHz**



**UNII-3 / 802.11ac VHT80 / 5 775 MHz**

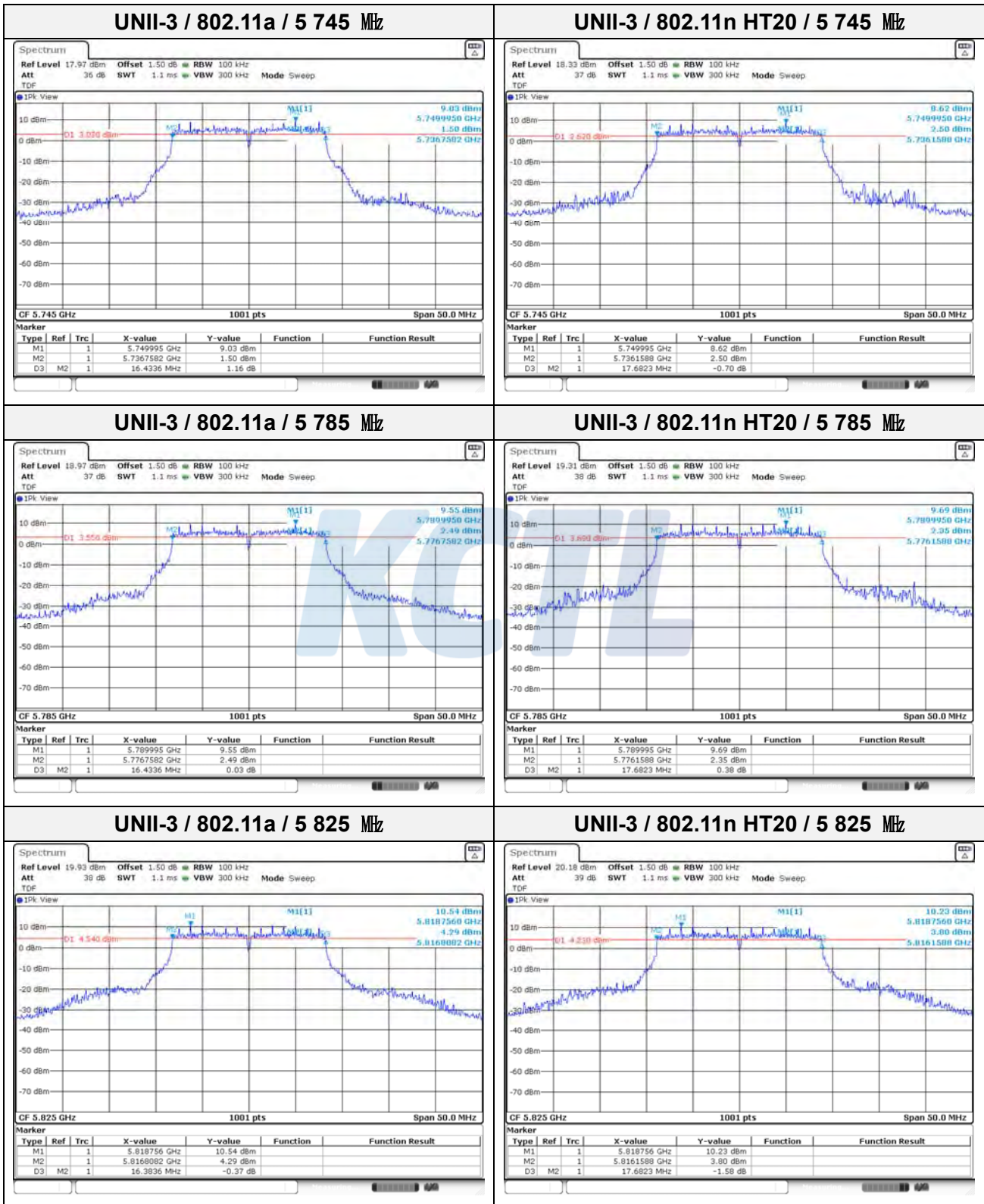


**UNII-3 / 802.11ac VHT40 / 5 795 MHz**

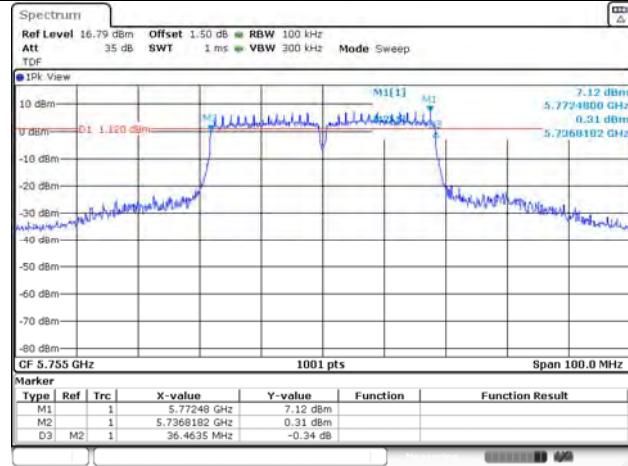


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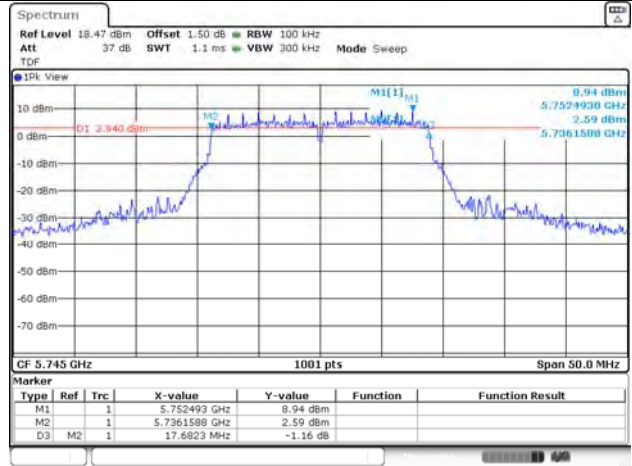
**ANT 2**



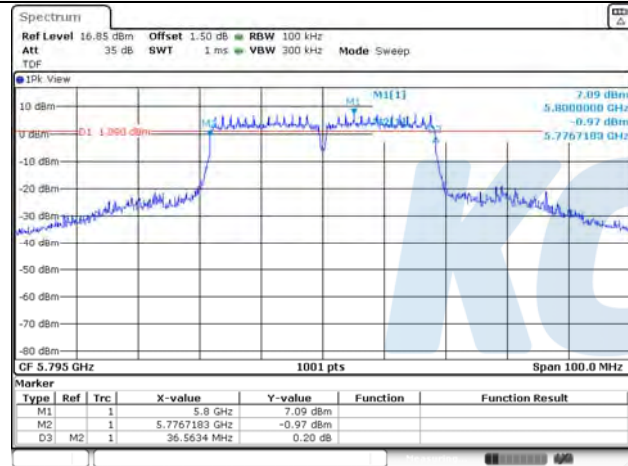
**UNII-3 / 802.11n HT40 / 5 755 MHz**



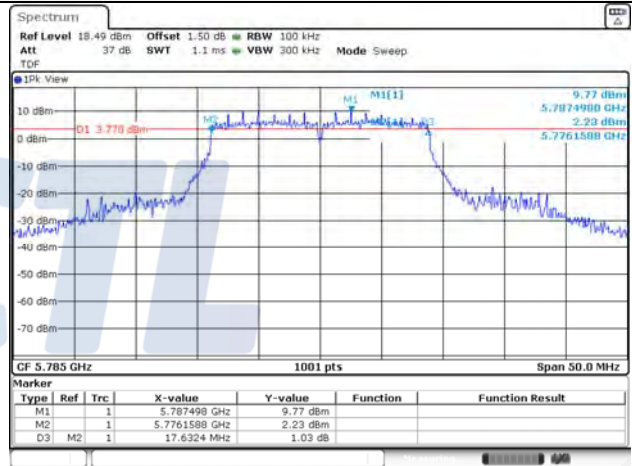
**UNII-3 / 802.11ac VHT20 / 5 745 MHz**



**UNII-3 / 802.11n HT40 / 5 795 MHz**

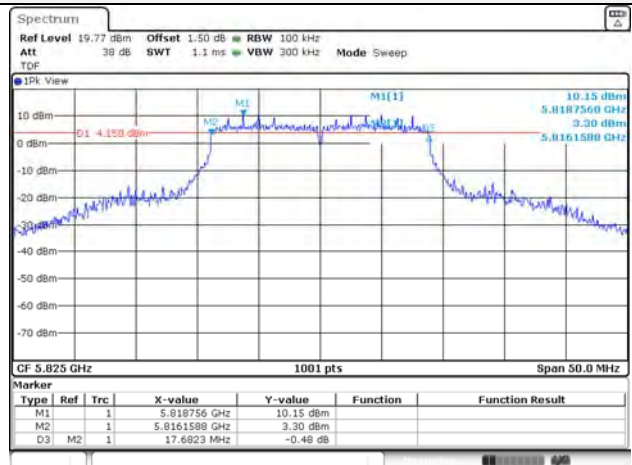


**UNII-3 / 802.11ac VHT20 / 5 785 MHz**



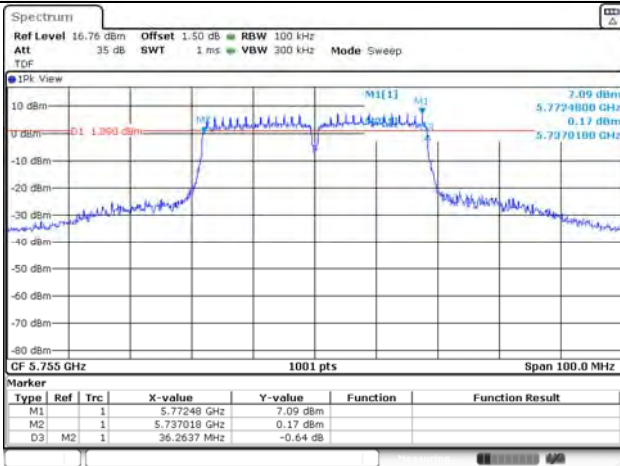
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**UNII-3 / 802.11ac VHT20 / 5 825 MHz**

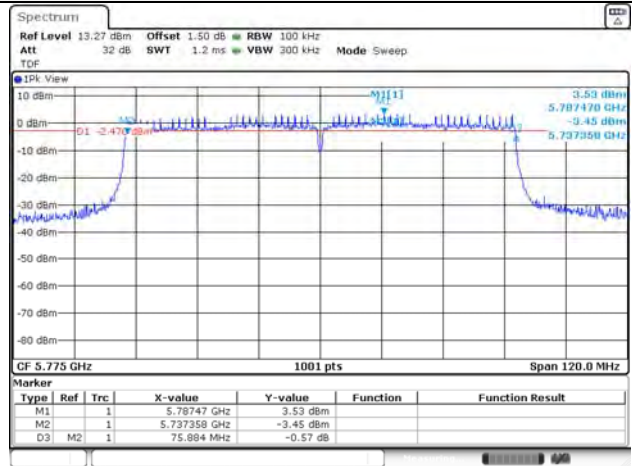




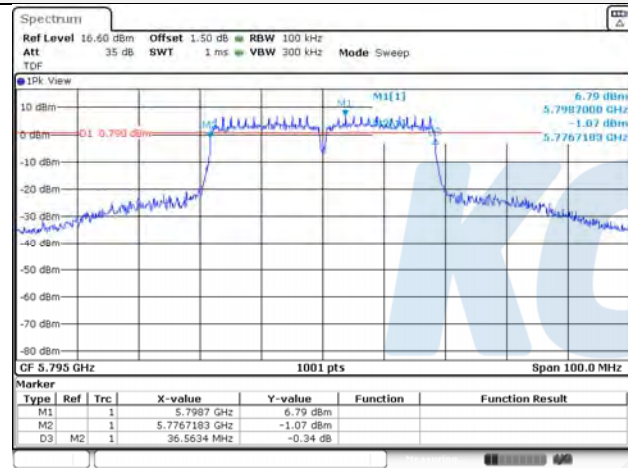
**UNII-3 / 802.11ac VHT40 / 5 755 MHz**



**UNII-3 / 802.11ac VHT80 / 5 775 MHz**

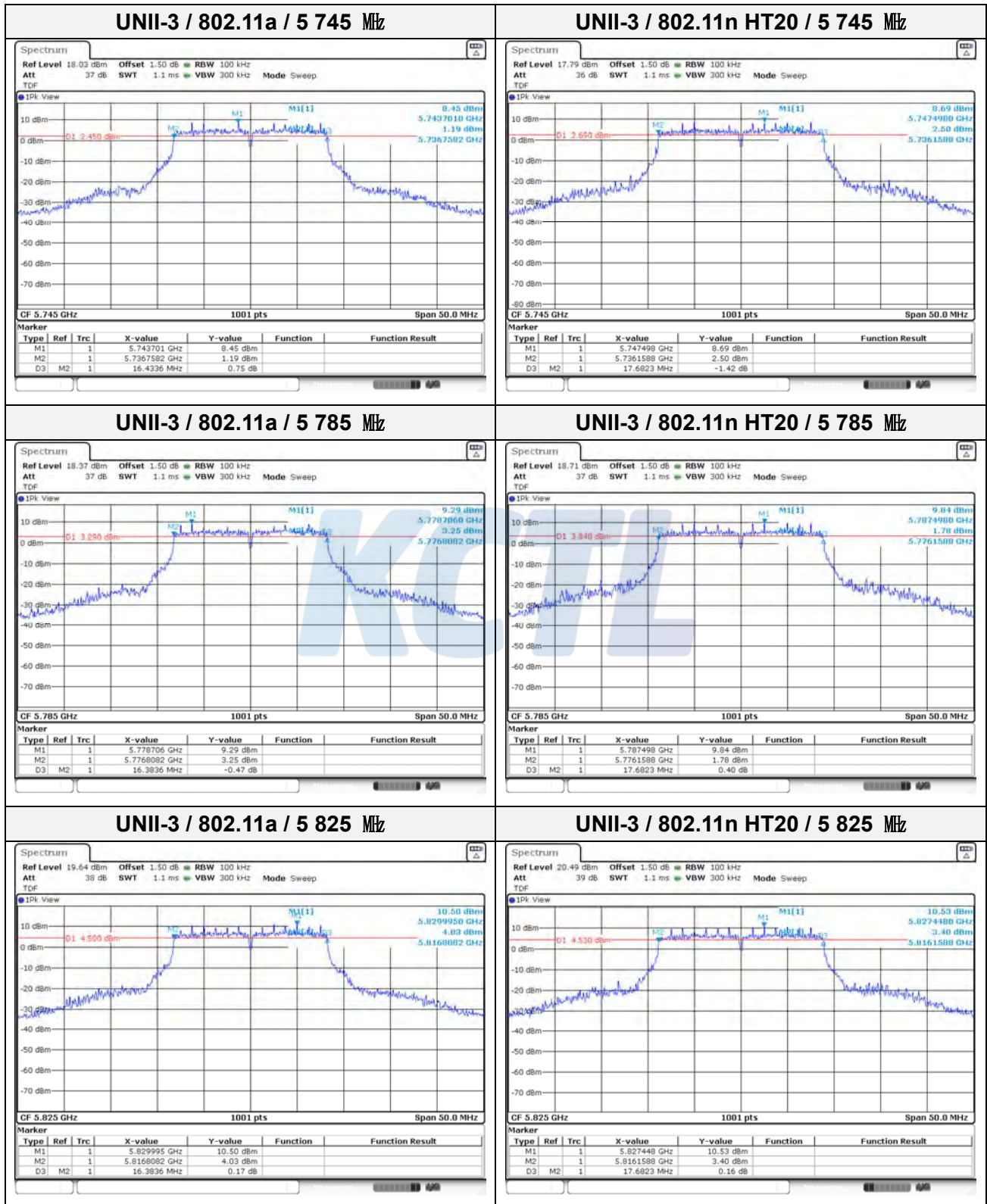


**UNII-3 / 802.11ac VHT40 / 5 795 MHz**

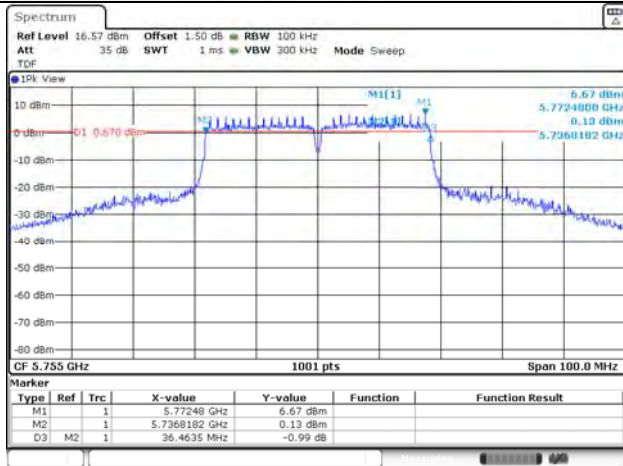


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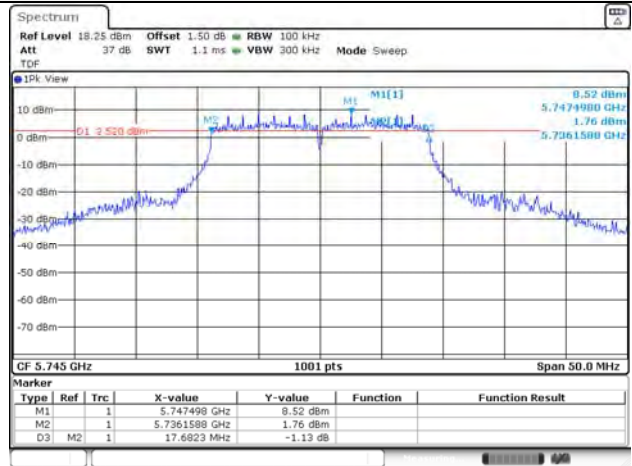
**ANT 3**



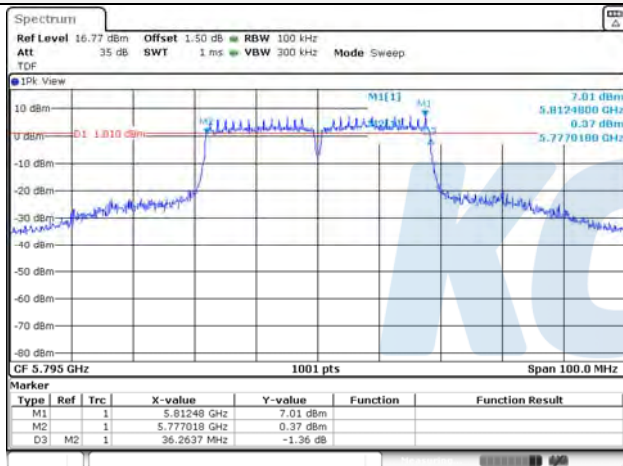
**UNII-3 / 802.11n HT40 / 5 755 MHz**



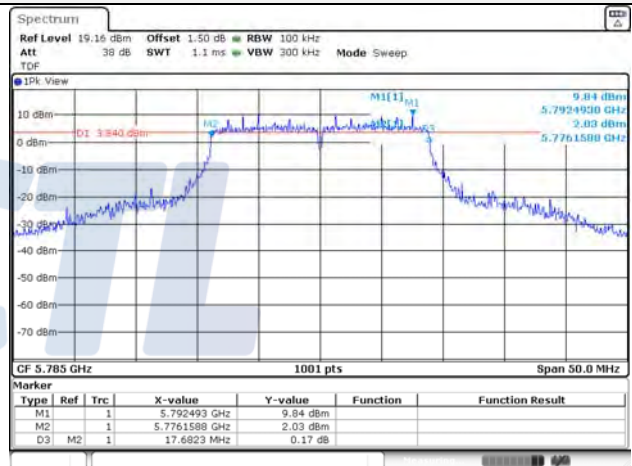
**UNII-3 / 802.11ac VHT20 / 5 745 MHz**



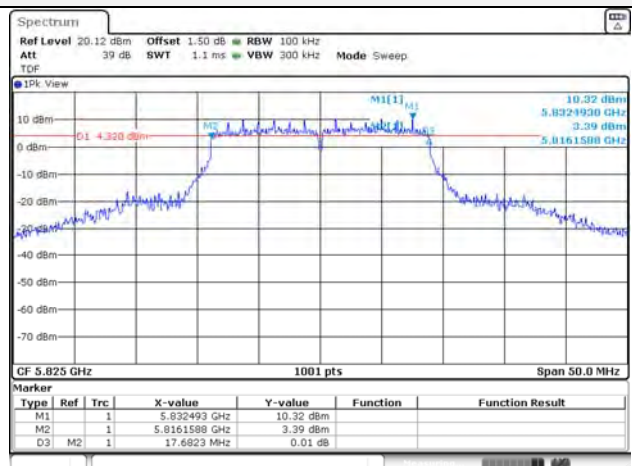
**UNII-3 / 802.11n HT40 / 5 795 MHz**



**UNII-3 / 802.11ac VHT20 / 5 785 MHz**

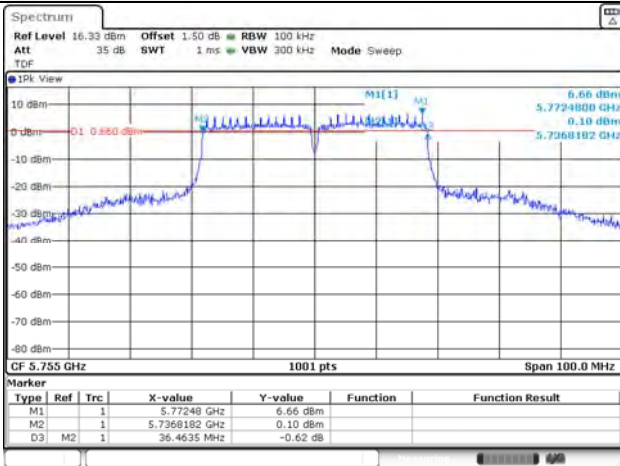


**UNII-3 / 802.11ac VHT20 / 5 825 MHz**

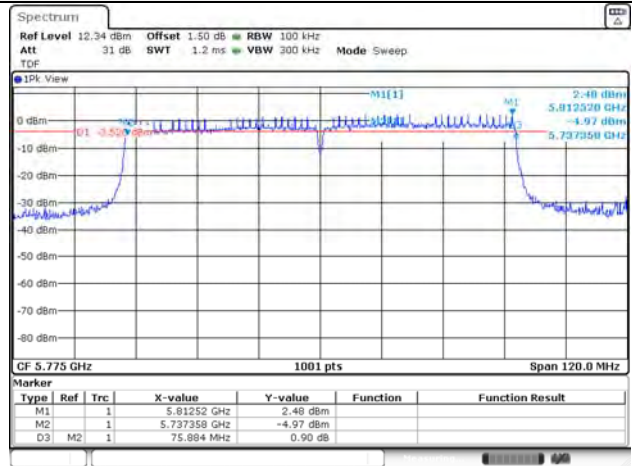


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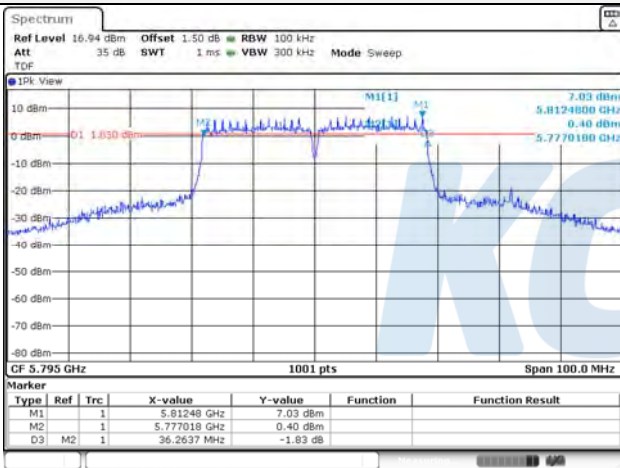
**UNII-3 / 802.11ac VHT40 / 5 755 MHz**



**UNII-3 / 802.11ac VHT80 / 5 775 MHz**



**UNII-3 / 802.11ac VHT40 / 5 795 MHz**



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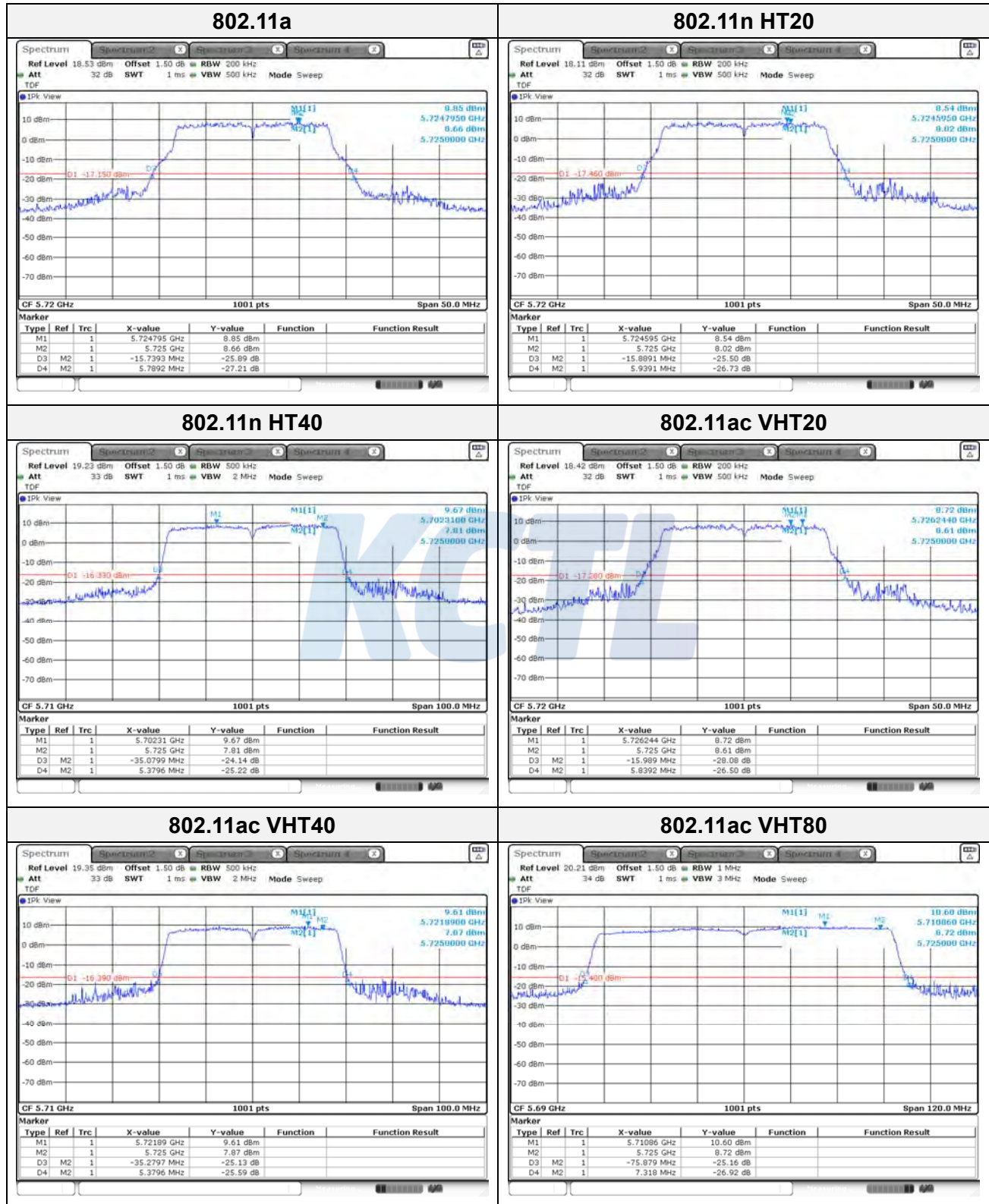
**7.5. Straddle channel****26dB bandwidth**

| Test mode      | Band    | Frequency (MHz) | 26dB Bandwidth (MHz) |       |       |       |
|----------------|---------|-----------------|----------------------|-------|-------|-------|
|                |         |                 | ANT0                 | ANT1  | ANT2  | ANT3  |
| 802.11a        | UNII-2C | 5 720           | 15.74                | 15.64 | 15.74 | 15.69 |
| 802.11n HT20   |         |                 | 15.89                | 15.69 | 15.79 | 15.84 |
| 802.11ac VHT20 |         |                 | 15.99                | 15.79 | 16.04 | 15.74 |
| 802.11a        | UNII-3  | 5 720           | 5.79                 | 5.69  | 5.74  | 5.74  |
| 802.11n HT20   |         |                 | 5.94                 | 5.89  | 5.89  | 5.99  |
| 802.11ac VHT20 |         |                 | 5.84                 | 5.94  | 5.89  | 6.14  |
| 802.11n HT40   | UNII-2C | 5 710           | 35.08                | 35.18 | 35.08 | 35.68 |
| 802.11ac VHT40 |         |                 | 35.28                | 35.58 | 35.18 | 35.18 |
| 802.11n HT40   | UNII-3  | 5 710           | 5.38                 | 5.28  | 5.28  | 5.48  |
| 802.11ac VHT40 |         |                 | 5.38                 | 5.48  | 5.48  | 6.88  |
| 802.11ac VHT80 | UNII-2C | 5 690           | 75.88                | 76.00 | 76.00 | 76.24 |
|                | UNII-3  | 5 690           | 7.32                 | 6.60  | 6.60  | 6.48  |

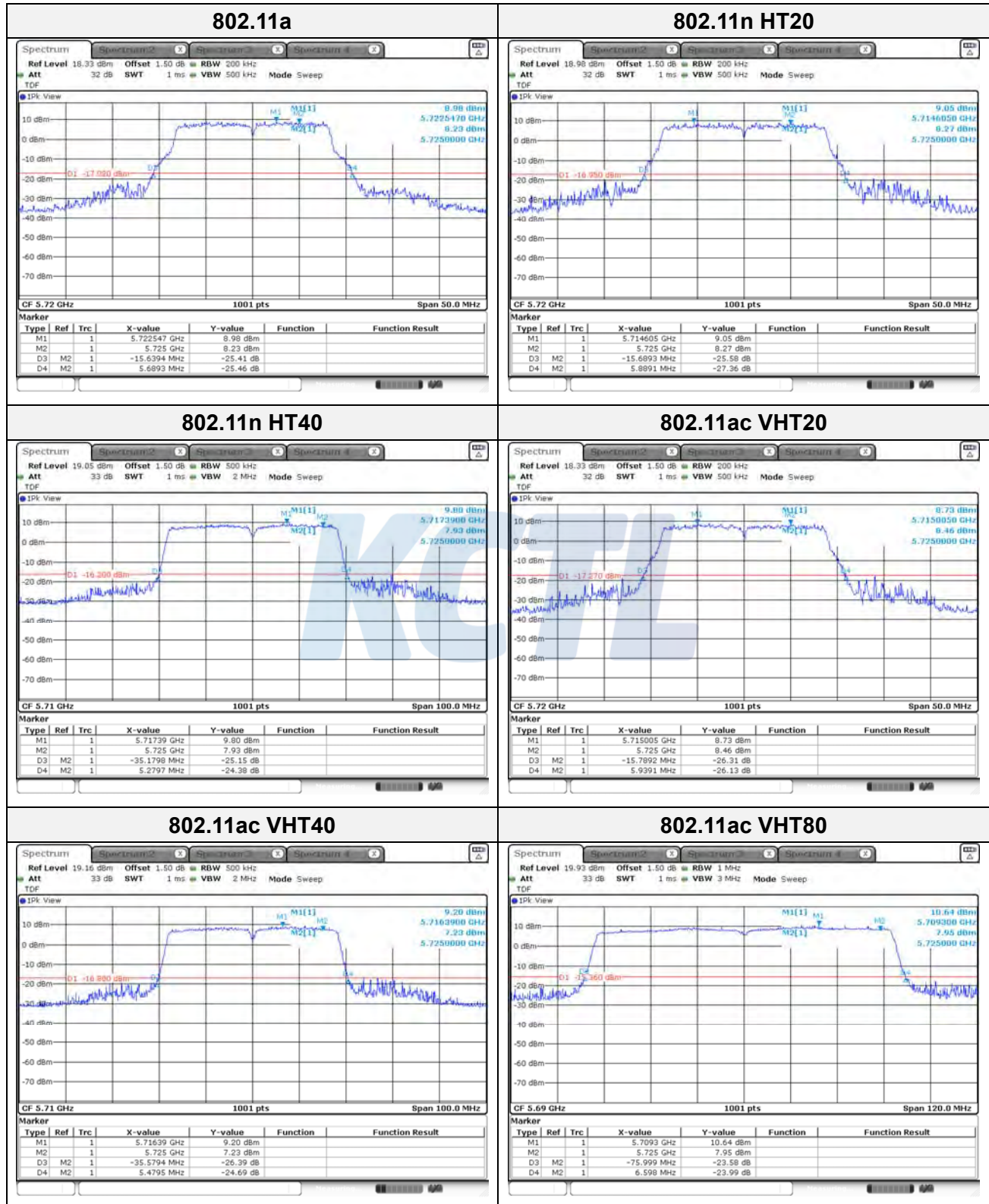
**Notes:**

1. [UNII-2C] 26dB Bandwidth = 5 725 MHz – Measured Frequency[MHz]
2. [UNII-3] 26dB Bandwidth = Measured Frequency[MHz] – 5 725 MHz

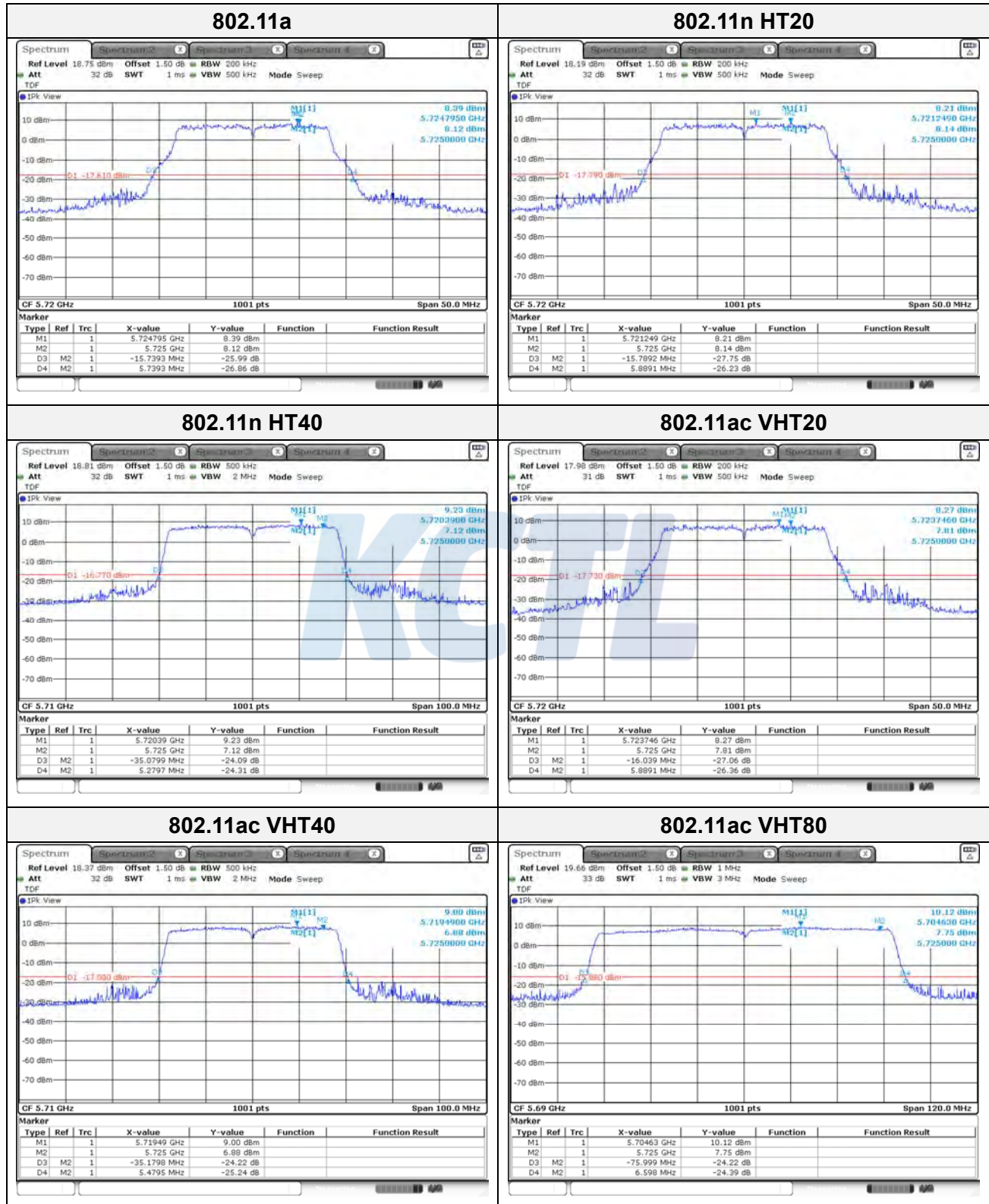
**ANT 0**



**ANT 1**

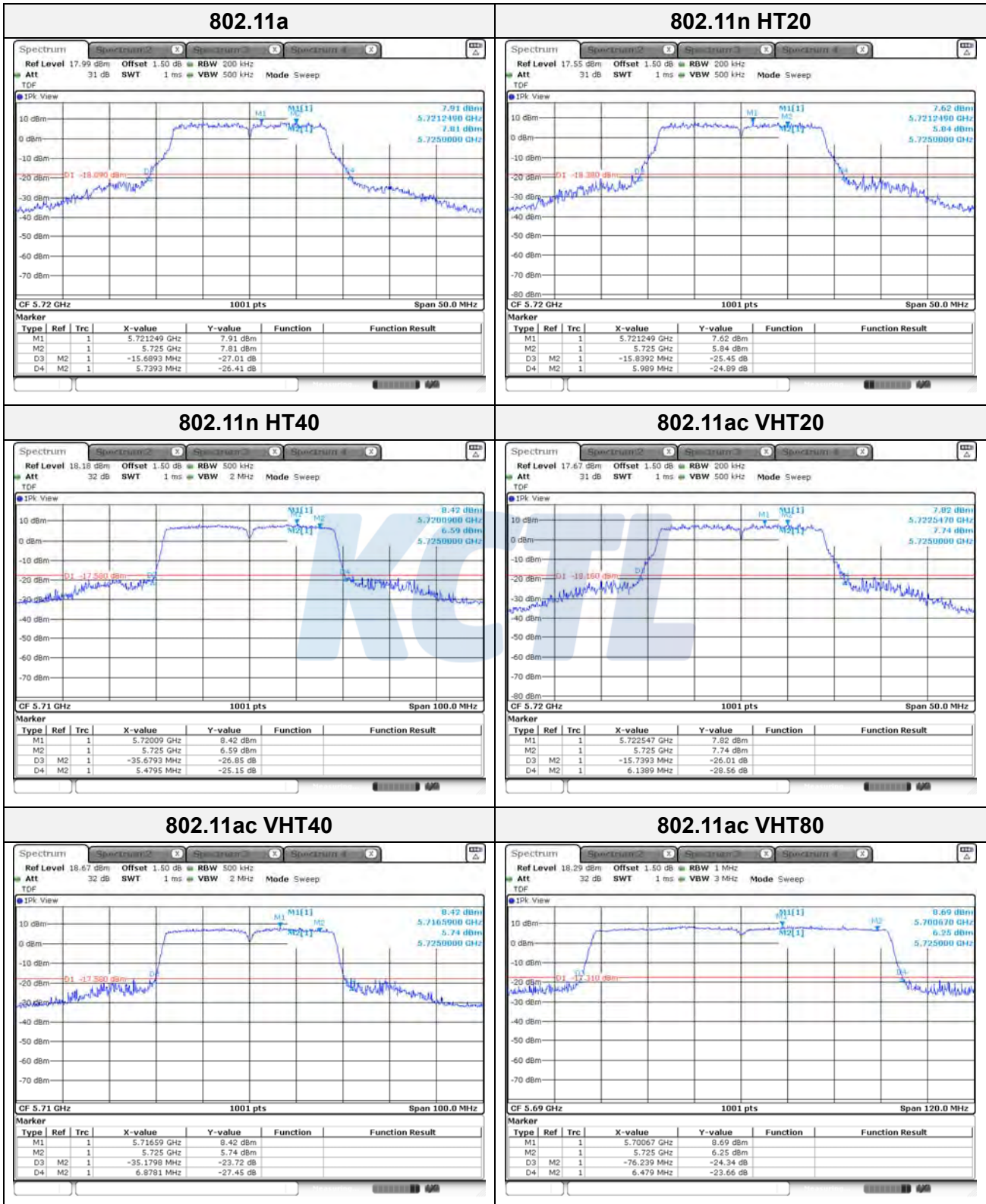


**ANT 2**





**ANT 3**



**6dB bandwidth**

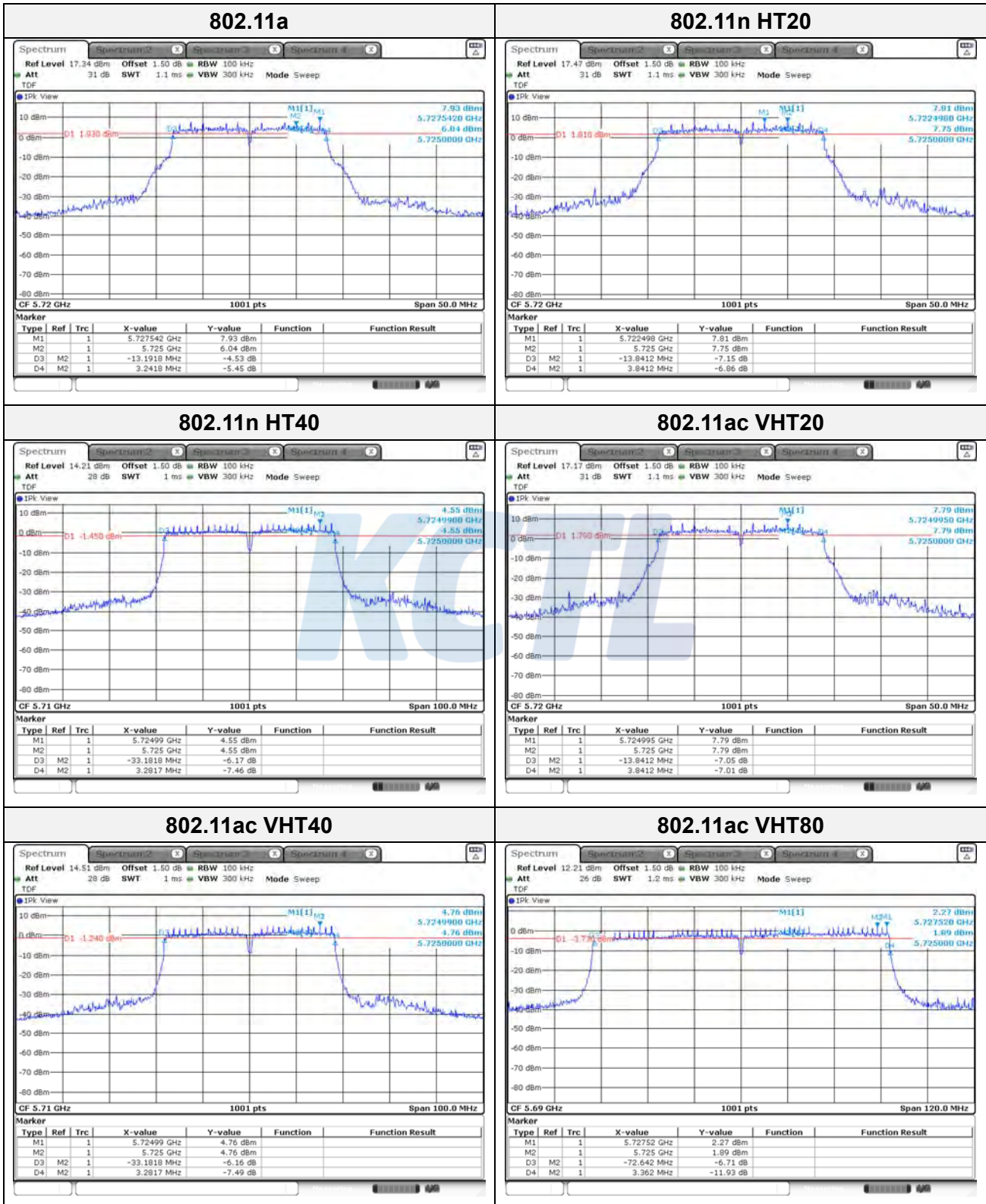
| Test mode      | Band   | Frequency (MHz) | 6dB Bandwidth (MHz) |      |      |      | Limit (MHz) |
|----------------|--------|-----------------|---------------------|------|------|------|-------------|
|                |        |                 | ANT0                | ANT1 | ANT2 | ANT3 |             |
| 802.11a        | UNII-3 | 5 720           | 3.24                | 3.24 | 3.24 | 3.24 | 0.5         |
| 802.11n HT20   |        |                 | 3.84                | 3.84 | 3.84 | 3.84 | 0.5         |
| 802.11ac VHT20 |        |                 | 3.84                | 3.84 | 3.84 | 3.84 | 0.5         |
| 802.11n HT40   | UNII-3 | 5 710           | 3.28                | 3.28 | 3.28 | 3.28 | 0.5         |
| 802.11ac VHT40 |        |                 | 3.28                | 3.28 | 3.28 | 3.28 | 0.5         |
| 802.11ac VHT80 | UNII-3 | 5 690           | 3.36                | 3.36 | 3.24 | 3.36 | 0.5         |

**Notes:**

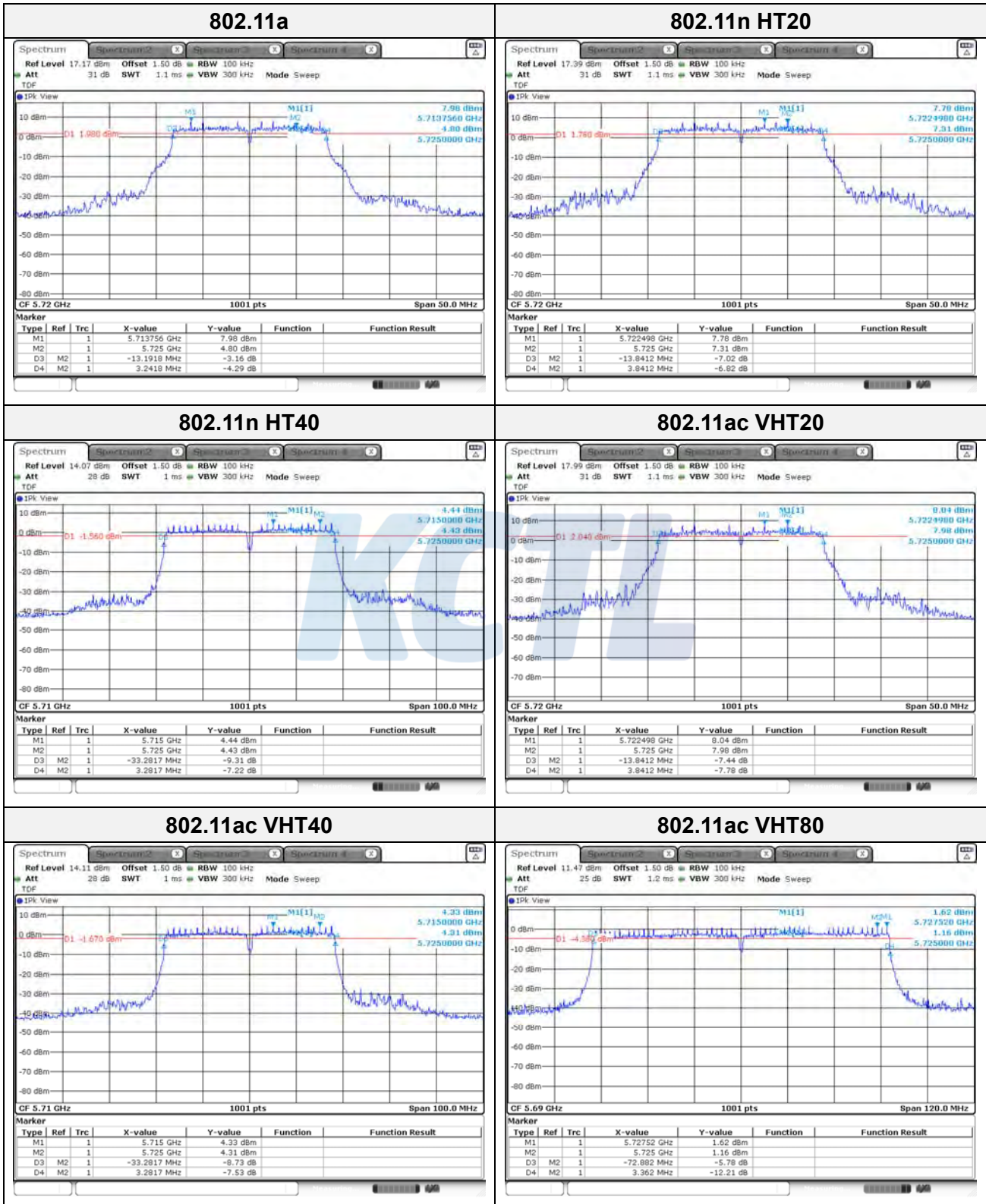
1. 6dB Bandwidth = Measured Frequency[MHz] – 5 725 MHz

**KCTL**

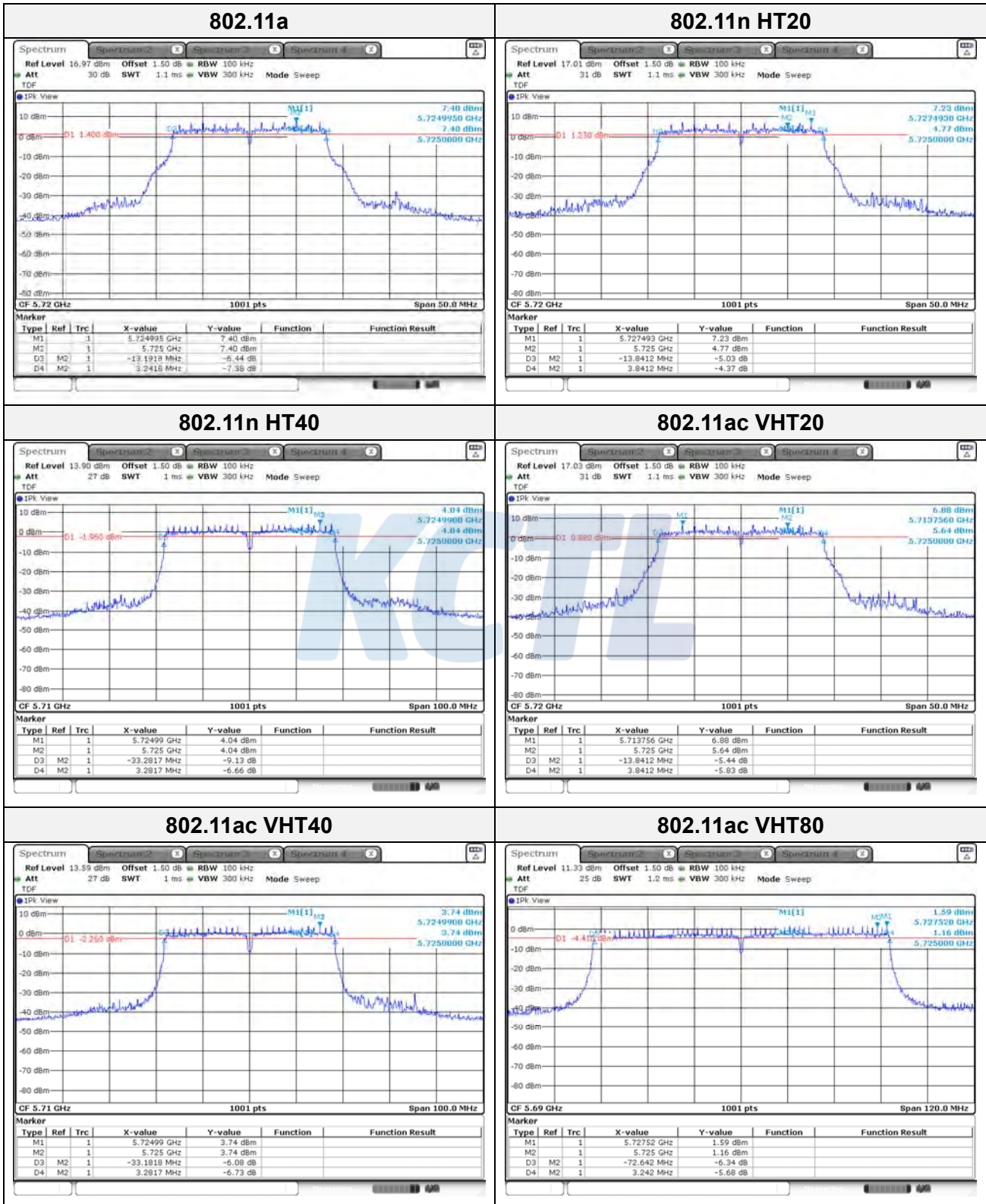
**ANT 0**



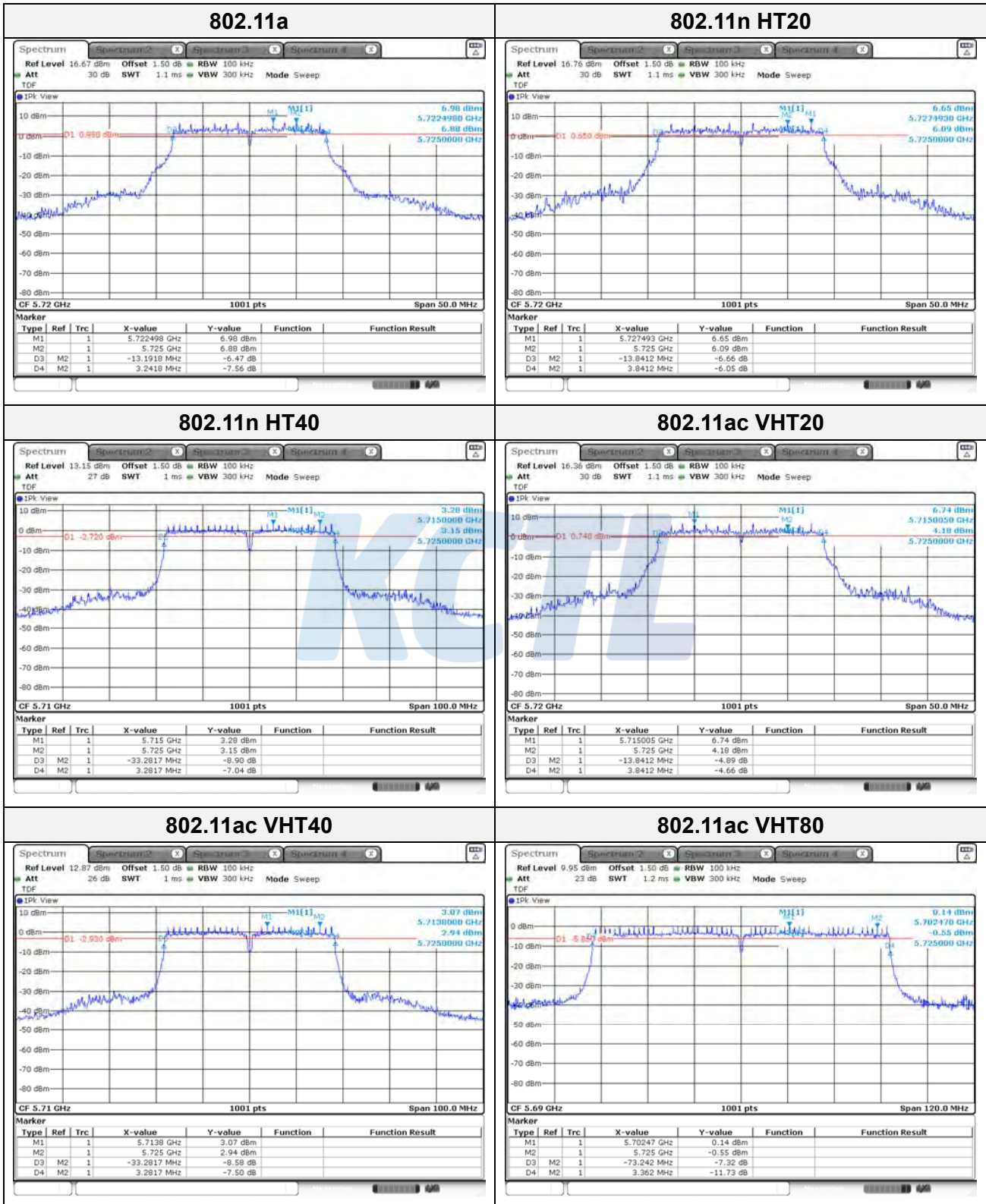
**ANT 1**



**ANT 2**



**ANT 3**



**Output Power**  
**-SISO**

| Test mode      | Band    | Frequency (MHz) | Measured output power |       |       |       |          |              |       |       | Limit (dBm) |       |
|----------------|---------|-----------------|-----------------------|-------|-------|-------|----------|--------------|-------|-------|-------------|-------|
|                |         |                 | Reading (dBm)         |       |       |       | DCF (dB) | Result (dBm) |       |       |             |       |
|                |         |                 | ANT0                  | ANT1  | ANT2  | ANT3  |          | ANT0         | ANT1  | ANT2  |             | ANT3  |
| 802.11a        | UNII-2C | 5 720           | 16.95                 | 17.19 | 16.83 | 16.29 | 0.22     | 17.17        | 17.41 | 17.05 | 16.51       | 24.00 |
| 802.11n HT20   |         |                 | 17.37                 | 17.90 | 17.53 | 17.20 | 0.22     | 17.59        | 18.12 | 17.75 | 17.42       |       |
| 802.11ac VHT20 |         |                 | 18.46                 | 18.37 | 17.67 | 17.55 | -        | 18.46        | 18.37 | 17.67 | 17.55       |       |
| 802.11a        | UNII-3  | 5 720           | 10.86                 | 10.95 | 10.78 | 10.07 | 0.22     | 11.08        | 11.17 | 11.00 | 10.29       | 30.00 |
| 802.11n HT20   |         |                 | 11.74                 | 12.35 | 11.87 | 11.45 | 0.22     | 11.96        | 12.57 | 12.09 | 11.67       |       |
| 802.11ac VHT20 |         |                 | 12.94                 | 12.61 | 12.08 | 11.79 | -        | 12.94        | 12.61 | 12.08 | 11.79       |       |
| 802.11n HT40   | UNII-2C | 5 710           | 17.71                 | 17.58 | 17.28 | 16.59 | 0.44     | 18.15        | 18.02 | 17.72 | 17.03       | 24.00 |
| 802.11ac VHT40 |         |                 | 18.03                 | 18.11 | 17.37 | 17.03 | 0.13     | 18.16        | 18.24 | 17.50 | 17.16       |       |
| 802.11n HT40   | UNII-3  | 5 710           | 7.80                  | 7.64  | 7.31  | 6.33  | 0.44     | 8.24         | 8.08  | 7.75  | 6.77        | 30.00 |
| 802.11ac VHT40 |         |                 | 8.04                  | 8.05  | 7.37  | 6.57  | 0.13     | 8.17         | 8.18  | 7.50  | 6.70        |       |
| 802.11ac VHT80 | UNII-2C | 5 690           | 17.96                 | 17.77 | 17.46 | 16.45 | 0.27     | 18.23        | 18.04 | 17.73 | 16.72       | 24.00 |
|                | UNII-3  | 5 690           | 5.28                  | 4.78  | 4.33  | 2.61  | 0.27     | 5.55         | 5.05  | 4.60  | 2.88        | 30.00 |

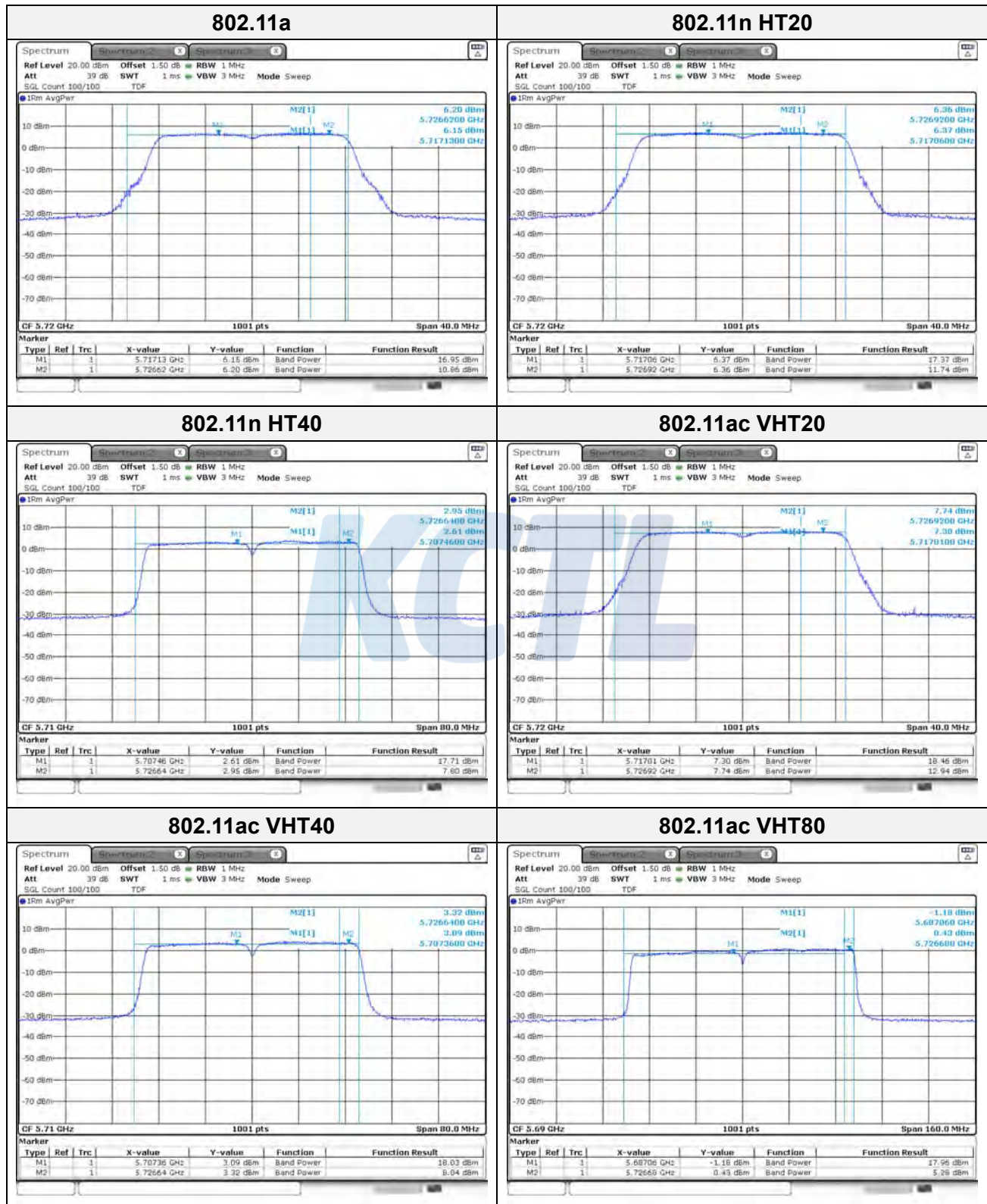
**-MIMO**

| Test mode      | Band    | Frequency (MHz) | Measured output power |       |       |       |          |              | Limit (dBm) |
|----------------|---------|-----------------|-----------------------|-------|-------|-------|----------|--------------|-------------|
|                |         |                 | Reading (dBm)         |       |       |       | DCF (dB) | Result (dBm) |             |
|                |         |                 | ANT0                  | ANT1  | ANT2  | ANT3  |          |              |             |
| 802.11a        | UNII-2C | 5 720           | 13.51                 | 13.62 | 13.24 | 13.15 | 0.22     | 19.63        | 24.00       |
| 802.11n HT20   |         |                 | 13.25                 | 13.56 | 12.42 | 12.89 | 0.22     | 19.29        |             |
| 802.11ac VHT20 |         |                 | 13.54                 | 13.58 | 12.47 | 12.83 | -        | 19.15        |             |
| 802.11a        | UNII-3  | 5 720           | 7.32                  | 7.48  | 6.79  | 6.79  | 0.22     | 13.35        | 30.00       |
| 802.11n HT20   |         |                 | 7.52                  | 7.90  | 6.79  | 7.02  | 0.22     | 13.57        |             |
| 802.11ac VHT20 |         |                 | 7.96                  | 7.85  | 6.76  | 7.02  | -        | 13.45        |             |
| 802.11n HT40   | UNII-2C | 5 710           | 16.74                 | 16.64 | 15.65 | 15.60 | 0.44     | 22.65        | 24.00       |
| 802.11ac VHT40 |         |                 | 17.09                 | 17.03 | 16.60 | 16.17 | 0.13     | 22.89        |             |
| 802.11n HT40   | UNII-3  | 5 710           | 6.82                  | 6.36  | 5.35  | 5.23  | 0.44     | 12.45        | 30.00       |
| 802.11ac VHT40 |         |                 | 7.16                  | 6.80  | 6.57  | 5.82  | 0.13     | 12.77        |             |
| 802.11ac VHT80 | UNII-2C | 5 690           | 16.95                 | 16.69 | 16.41 | 15.64 | 0.27     | 22.74        | 24.00       |
|                | UNII-3  | 5 690           | 4.13                  | 3.62  | 3.28  | 1.89  | 0.27     | 9.60         | 30.00       |

**Note.**

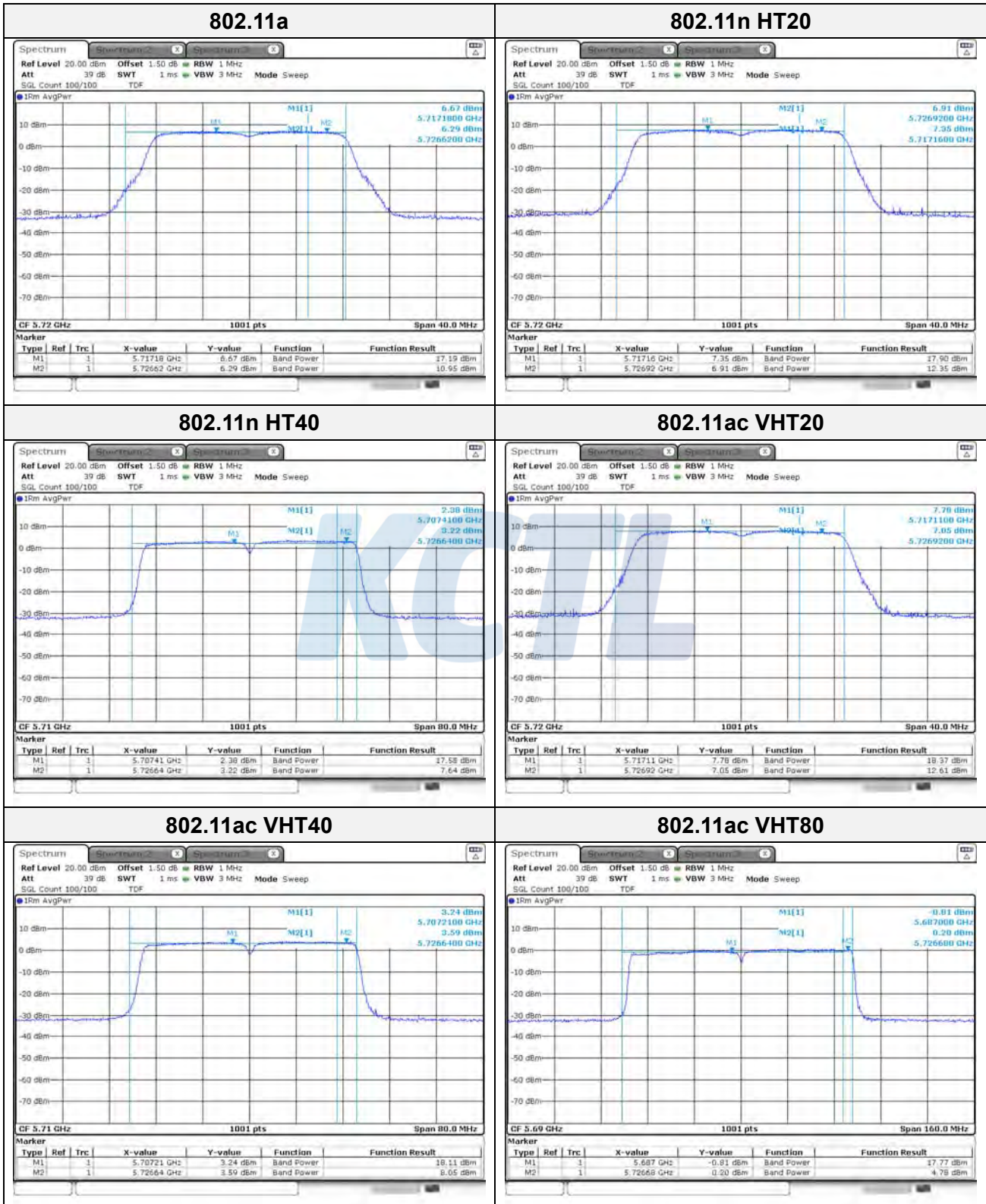
1. Result(dB m) = 10log(10<sup>(ANT 0/10)</sup> + 10<sup>(ANT 1/10)</sup> + 10<sup>(ANT 2/10)</sup> + 10<sup>(ANT 3/10)</sup>) + Duty Cycle Factor (dB)

**SISO ANT 0**

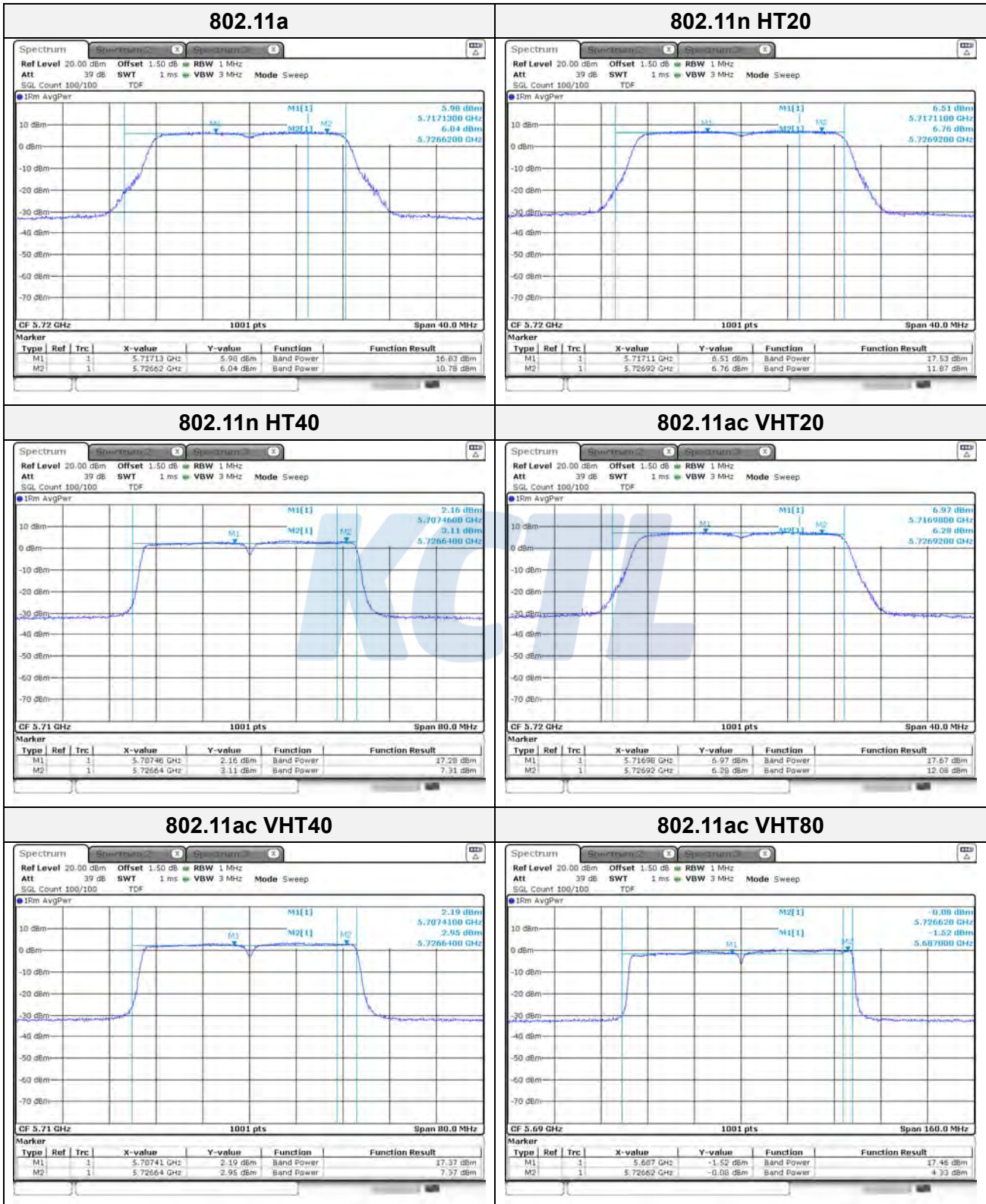




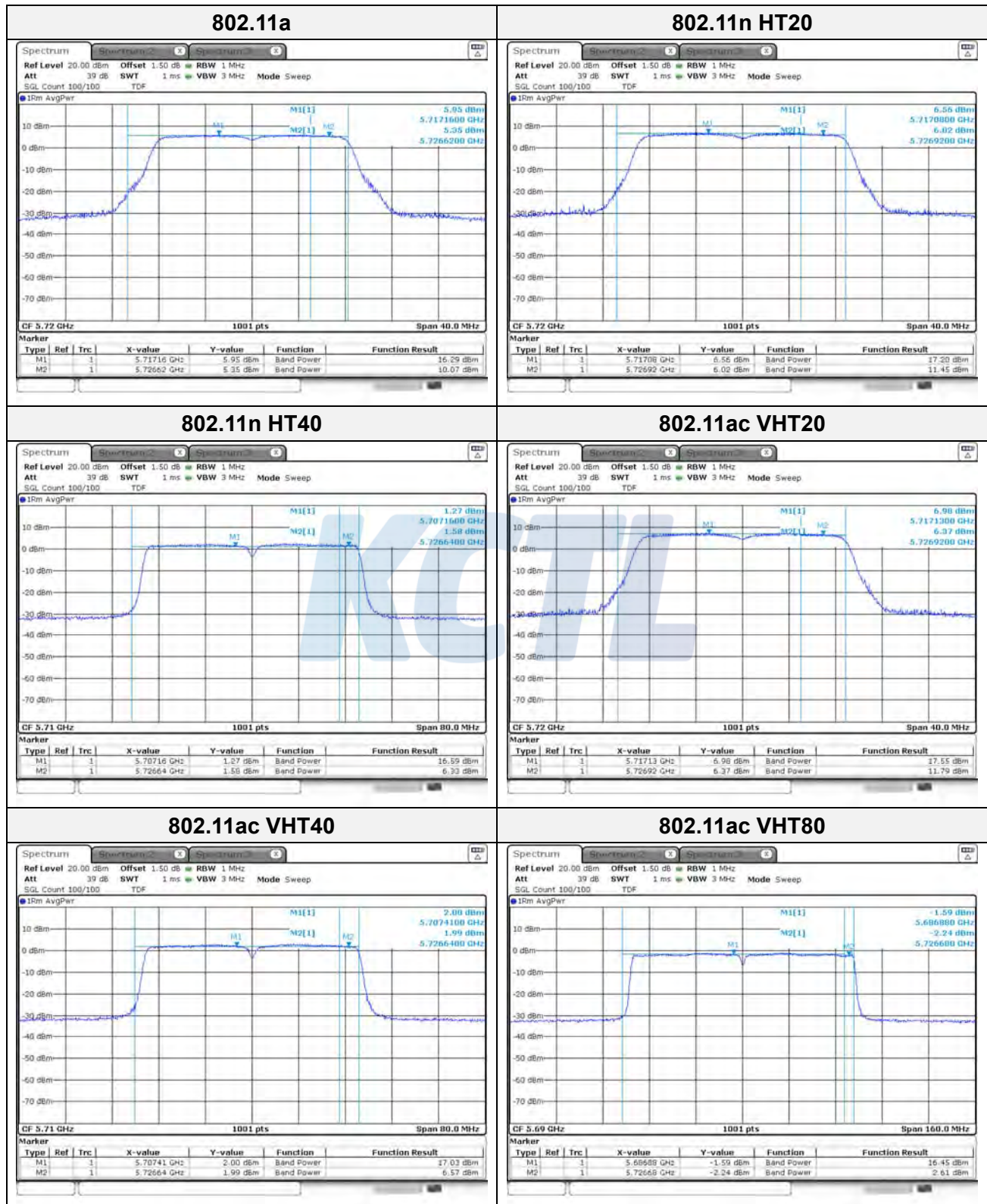
**SISO ANT 1**



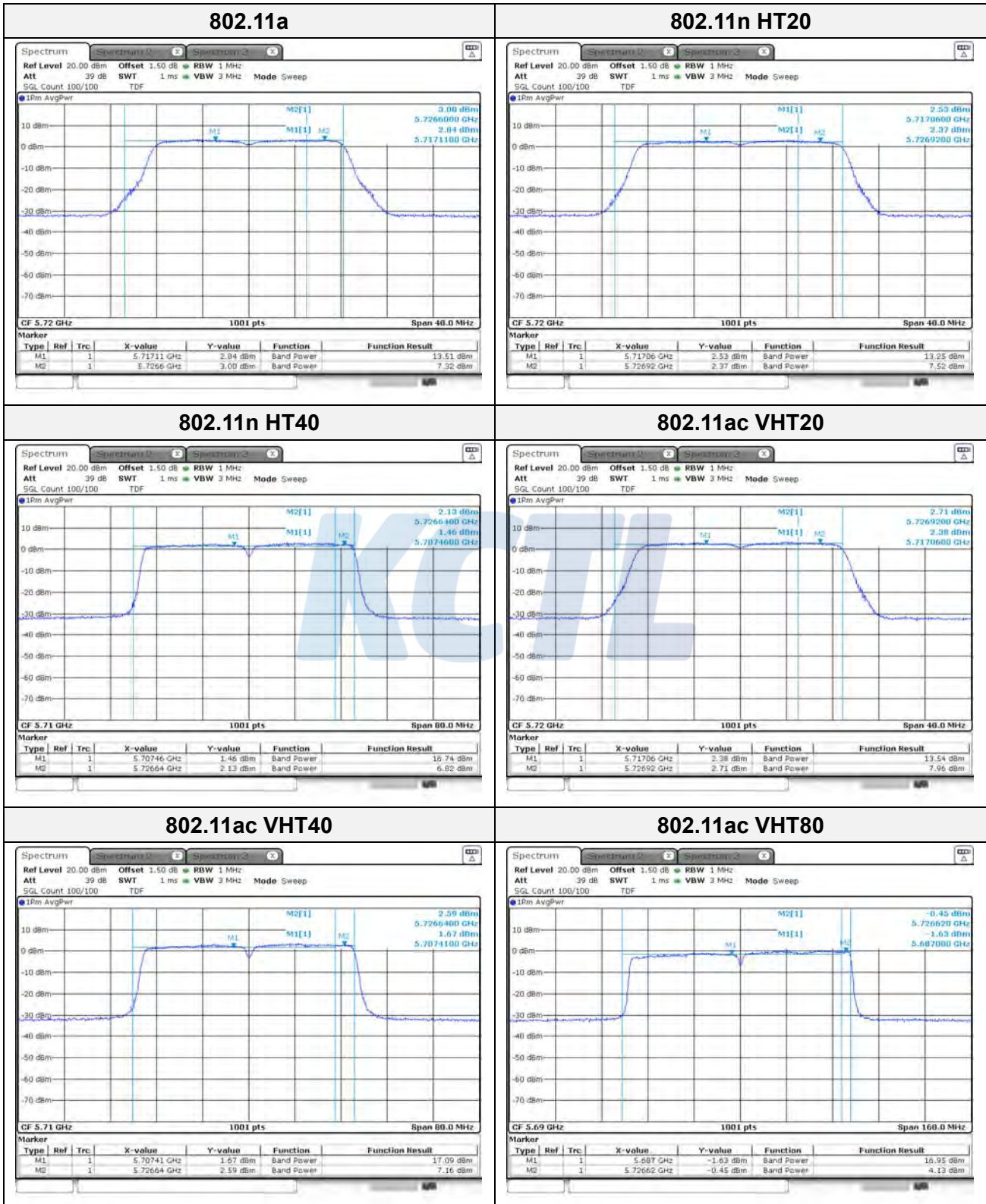
**SISO ANT 2**



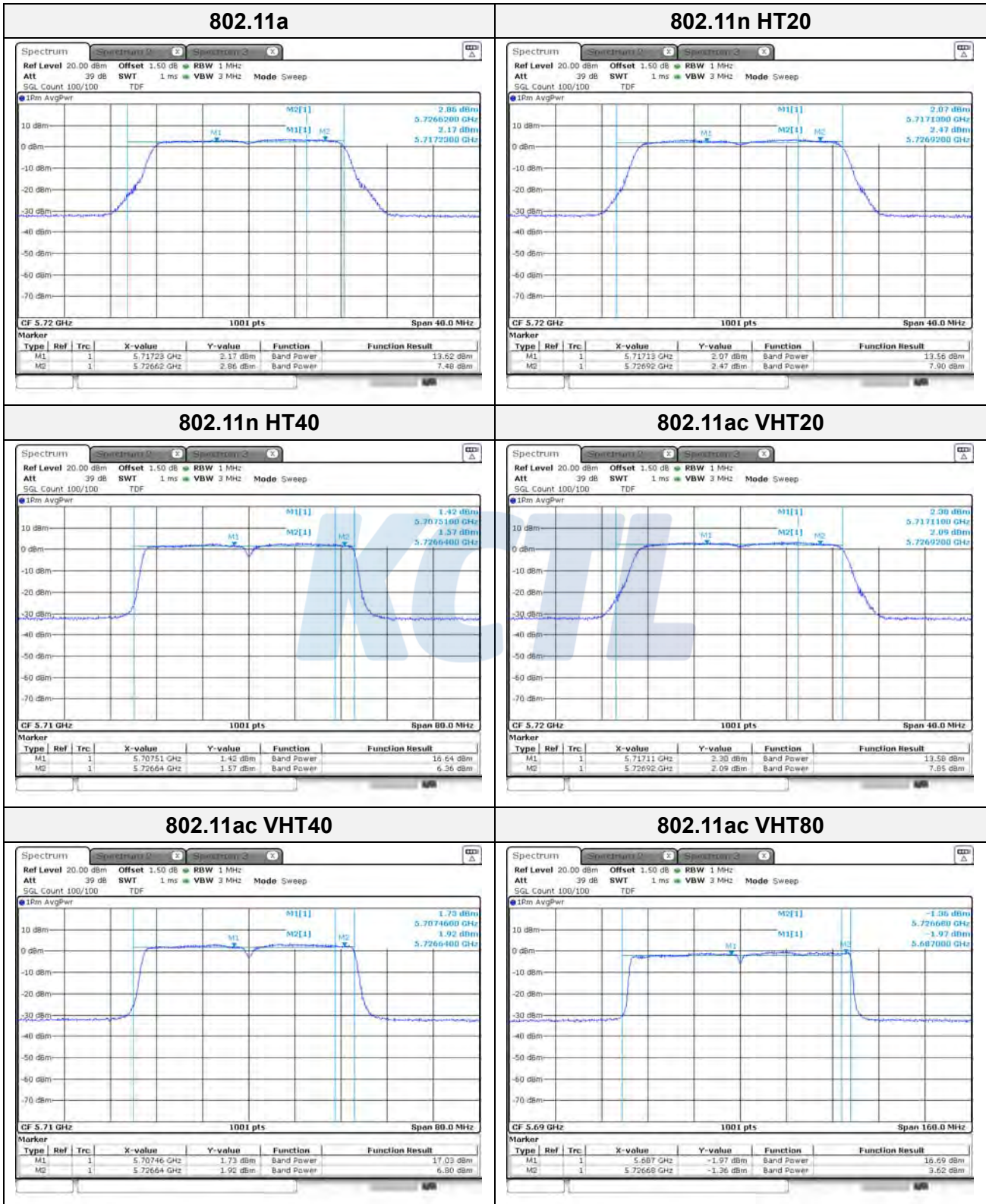
**SISO ANT 3**



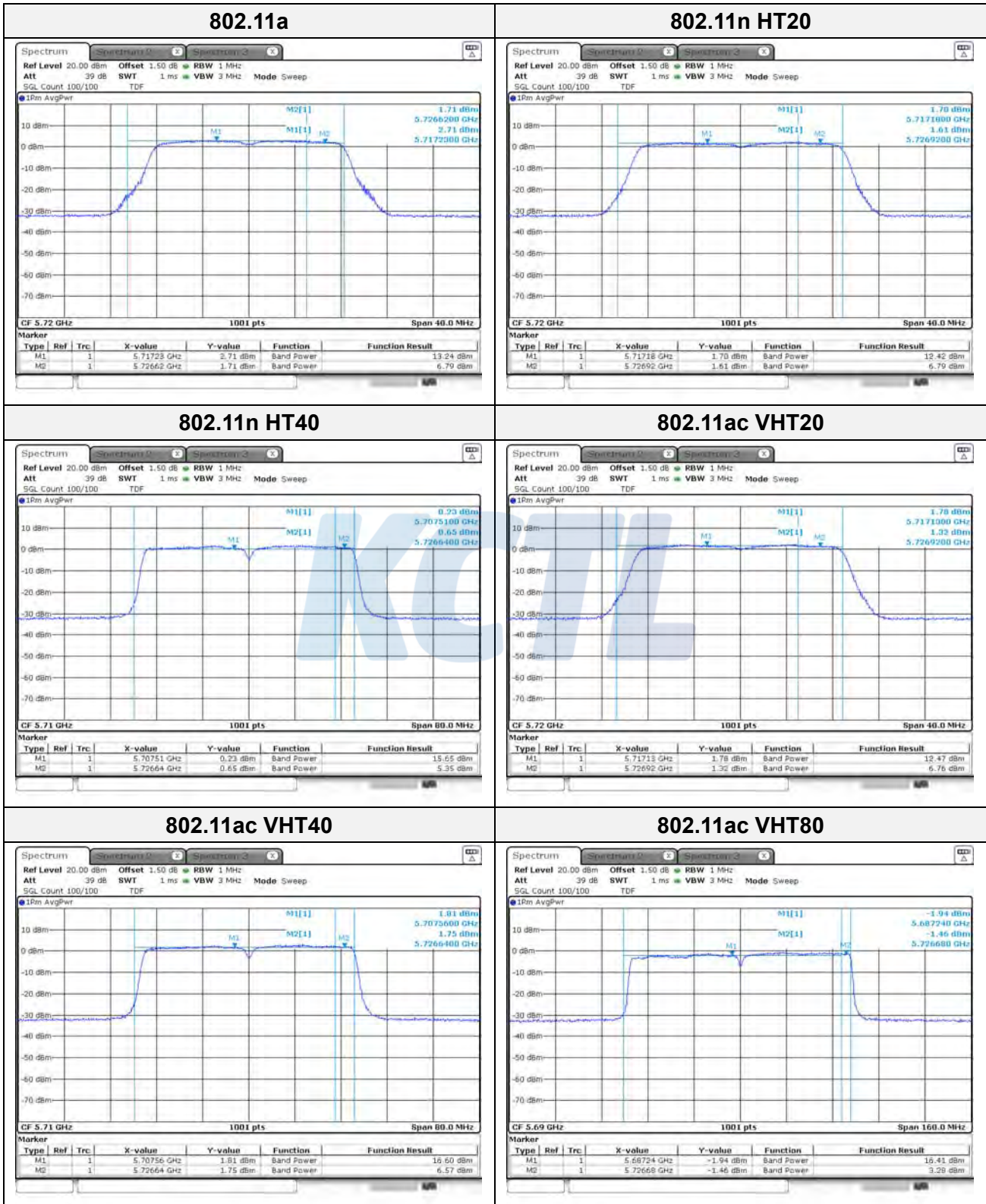
**4TX MIMO ANT 0**



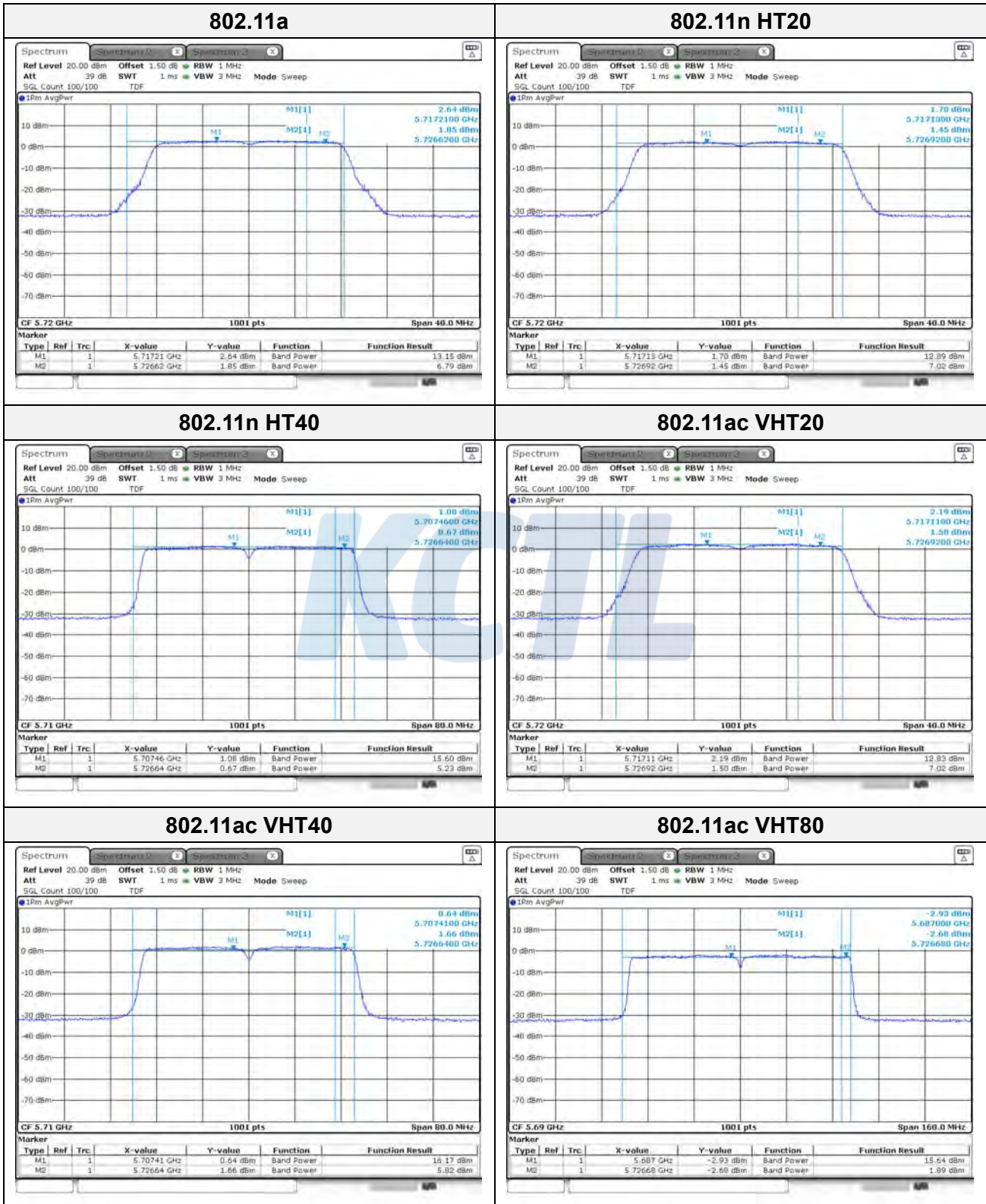
**4TX MIMO ANT 1**



**4TX MIMO ANT 2**



**4TX MIMO ANT 3**



**Power Spectral Density**  
**-SISO**

| Test mode      | Band    | Frequency (MHz) | Measured PSD (dBm/MHz) |      |      |      | DCF (dB) | Maximum PSD (dBm/MHz) |      |      |      | Limit (dBm/MHz) |
|----------------|---------|-----------------|------------------------|------|------|------|----------|-----------------------|------|------|------|-----------------|
|                |         |                 | ANT0                   | ANT1 | ANT2 | ANT3 |          | ANT0                  | ANT1 | ANT2 | ANT3 |                 |
| 802.11a        | UNII-2C | 5 720           | 7.17                   | 7.10 | 6.71 | 6.04 | 0.22     | 7.39                  | 7.32 | 6.93 | 6.26 | 11.00           |
| 802.11n HT20   |         |                 | 7.05                   | 7.79 | 7.05 | 7.00 | 0.22     | 7.27                  | 8.01 | 7.27 | 7.22 |                 |
| 802.11ac VHT20 |         |                 | 8.21                   | 8.21 | 7.41 | 7.07 | -        | 8.21                  | 8.21 | 7.41 | 7.07 |                 |
| 802.11n HT40   |         | 5 710           | 4.28                   | 3.96 | 3.55 | 2.61 | 0.44     | 4.72                  | 4.40 | 3.99 | 3.05 |                 |
| 802.11ac VHT40 |         |                 | 4.47                   | 4.05 | 3.40 | 3.07 | 0.13     | 4.60                  | 4.18 | 3.53 | 3.20 |                 |
| 802.11ac VHT80 |         |                 | 5 690                  | 1.26 | 0.66 | 0.28 | -0.70    | 0.27                  | 1.53 | 0.93 | 0.55 |                 |

| Test mode      | Band   | Frequency (MHz) | Measured PSD (dBm/ 500 kHz) |       |       |       | DCF (dB) | Maximum PSD (dBm/ 500 kHz) |       |       |       | Limit (dBm/500 kHz) |
|----------------|--------|-----------------|-----------------------------|-------|-------|-------|----------|----------------------------|-------|-------|-------|---------------------|
|                |        |                 | ANT0                        | ANT1  | ANT2  | ANT3  |          | ANT0                       | ANT1  | ANT2  | ANT3  |                     |
| 802.11a        | UNII-3 | 5 720           | 3.91                        | 4.12  | 3.65  | 3.36  | 0.22     | 4.13                       | 4.34  | 3.87  | 3.58  | 30.00               |
| 802.11n HT20   |        |                 | 3.99                        | 4.87  | 3.99  | 4.17  | 0.22     | 4.21                       | 5.09  | 4.21  | 4.39  |                     |
| 802.11ac VHT20 |        |                 | 5.16                        | 5.06  | 4.63  | 4.25  | -        | 5.16                       | 5.06  | 4.63  | 4.25  |                     |
| 802.11n HT40   |        | 5 710           | 0.95                        | 0.85  | -0.10 | -0.80 | 0.44     | 1.39                       | 1.29  | 0.34  | -0.36 |                     |
| 802.11ac VHT40 |        |                 | 1.03                        | 0.73  | 0.37  | -0.36 | 0.13     | 1.16                       | 0.86  | 0.50  | -0.23 |                     |
| 802.11ac VHT80 |        |                 | 5 690                       | -1.71 | -2.15 | -2.92 | -4.15    | 0.27                       | -1.44 | -1.88 | -2.65 |                     |



**-MIMO**

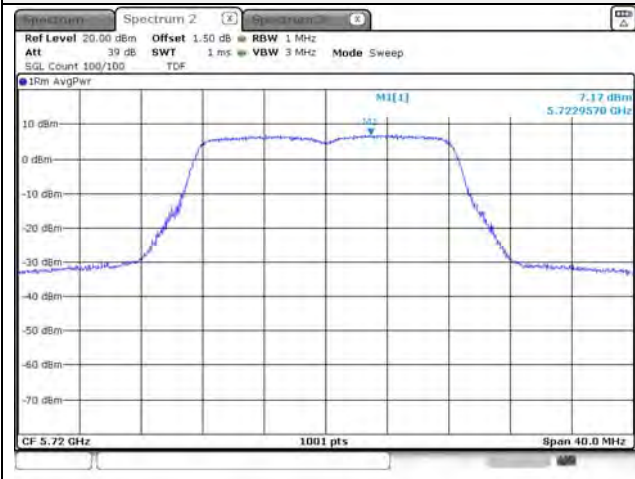
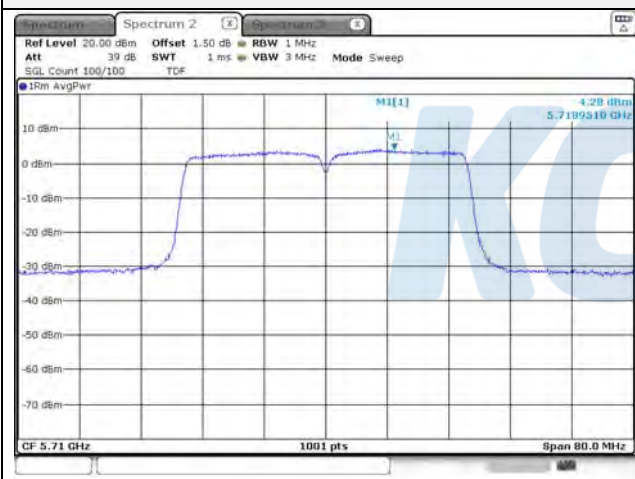
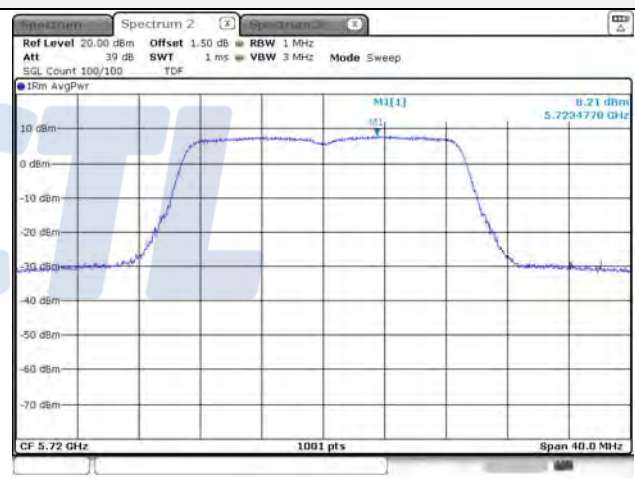
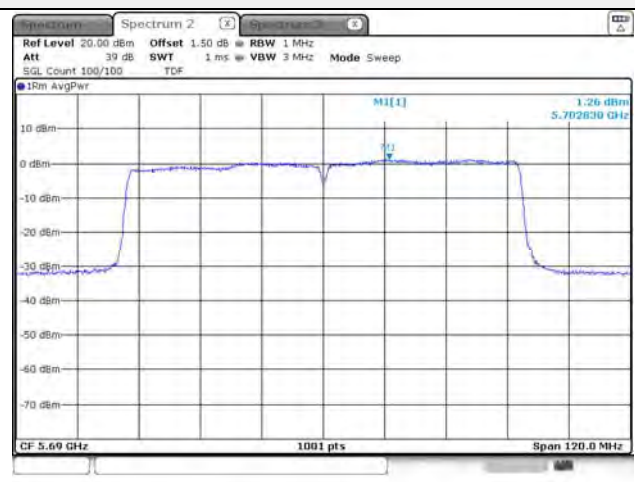
| Test mode      | Band    | Frequency (MHz) | Measured PSD (dBm/MHz) |      |       |       | DCF (dB) | Maximum PSD (dB m/MHz) | Limit (dBm/MHz) |
|----------------|---------|-----------------|------------------------|------|-------|-------|----------|------------------------|-----------------|
|                |         |                 | ANT0                   | ANT1 | ANT2  | ANT3  |          |                        |                 |
| 802.11a        | UNII-2C | 5 720           | 2.47                   | 2.45 | 1.86  | 2.04  | 0.22     | 8.45                   | 11.00           |
| 802.11n HT20   |         |                 | 2.40                   | 2.39 | 1.43  | 1.89  | 0.22     | 8.29                   |                 |
| 802.11ac VHT20 |         |                 | 2.47                   | 2.45 | 1.43  | 2.27  | -        | 8.20                   |                 |
| 802.11n HT40   |         | 5 710           | 2.64                   | 2.34 | 1.87  | 1.67  | 0.44     | 8.60                   |                 |
| 802.11ac VHT40 |         |                 | 2.62                   | 2.37 | 1.87  | 1.79  | 0.13     | 8.33                   |                 |
| 802.11ac VHT80 |         |                 | 5 690                  | 0.01 | -0.59 | -0.81 | -1.84    | 0.27                   |                 |

| Test mode      | Band   | Frequency (MHz) | Measured PSD (dBm/ 500 kHz) |       |       |       | DCF (dB) | Maximum PSD (dBm / 500 kHz) | Limit (dBm / 500 kHz) |
|----------------|--------|-----------------|-----------------------------|-------|-------|-------|----------|-----------------------------|-----------------------|
|                |        |                 | ANT0                        | ANT1  | ANT2  | ANT3  |          |                             |                       |
| 802.11a        | UNII-3 | 5 720           | -0.30                       | -0.17 | -0.39 | -0.31 | 0.22     | 5.95                        | 30.00                 |
| 802.11n HT20   |        |                 | -0.41                       | -0.10 | -0.89 | -0.75 | 0.22     | 5.71                        |                       |
| 802.11ac VHT20 |        |                 | -0.42                       | 0.10  | -1.17 | -0.26 | -        | 5.61                        |                       |
| 802.11n HT40   |        | 5 710           | -0.71                       | -0.67 | -1.00 | -1.77 | 0.44     | 5.44                        |                       |
| 802.11ac VHT40 |        |                 | -0.58                       | -0.57 | -0.93 | -1.34 | 0.13     | 5.31                        |                       |
| 802.11ac VHT80 |        |                 | 5 690                       | -3.15 | -4.06 | -4.18 | -5.76    | 0.27                        |                       |

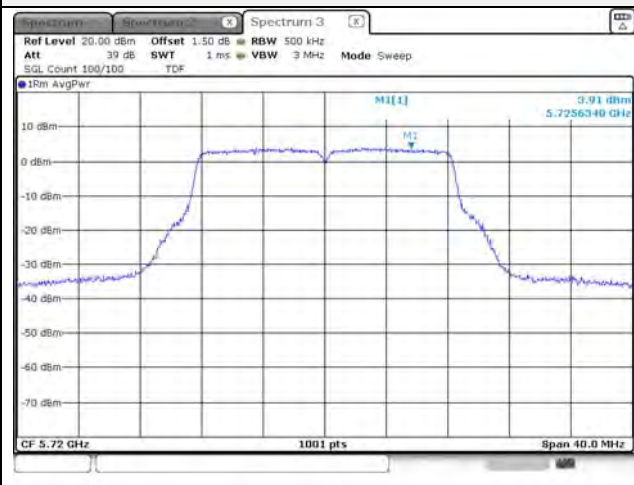
**Notes:**

1. Maximum PSD calculation

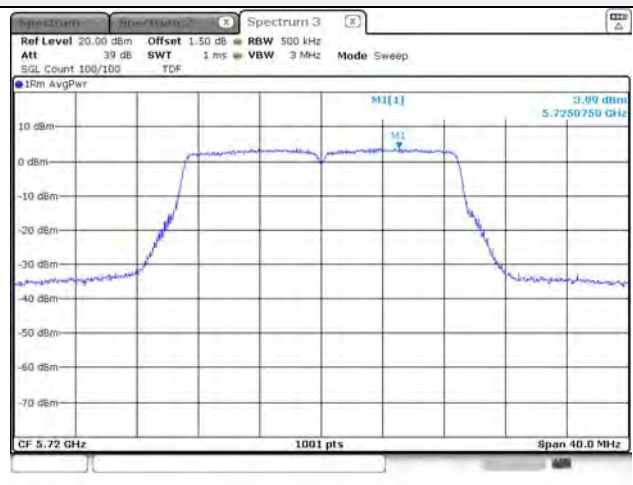
- Maximum PSD =  $10\log(10^{(ANT\ 0/10)} + 10^{(ANT\ 1/10)} + 10^{(ANT\ 2/10)} + 10^{(ANT\ 3/10)}) + \text{Duty Cycle Factor (dB)}$

**SISO ANT 0****UNII-2C / 802.11a****UNII-2C / 802.11n HT20****UNII-2C / 802.11n HT40****UNII-2C / 802.11ac VHT20****UNII-2C / 802.11ac VHT40****UNII-2C / 802.11ac VHT80**

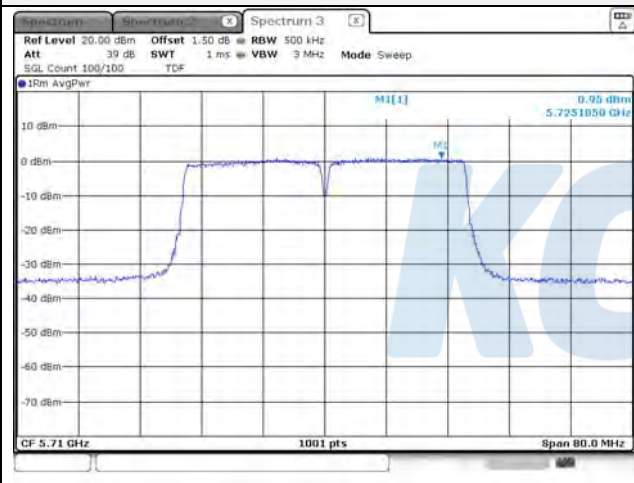
**UNII-3 / 802.11a**



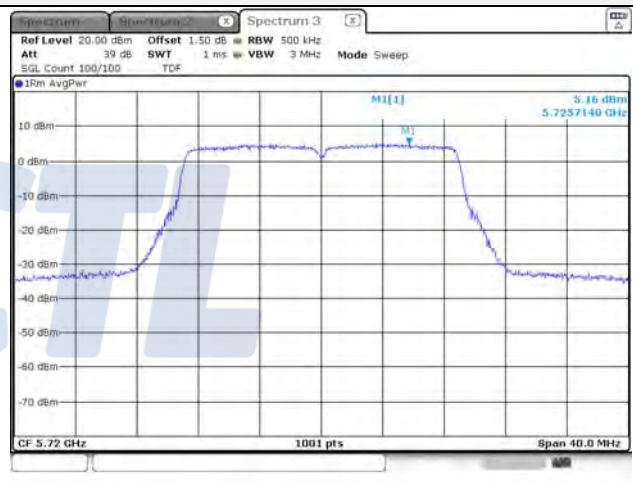
**UNII-3 / 802.11n HT20**



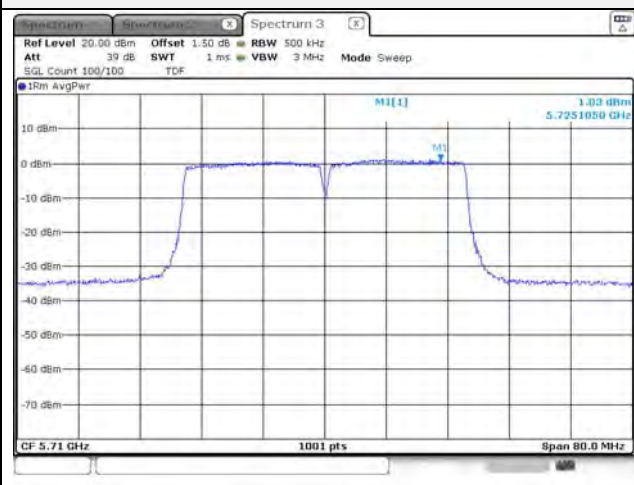
**UNII-3 / 802.11n HT40**



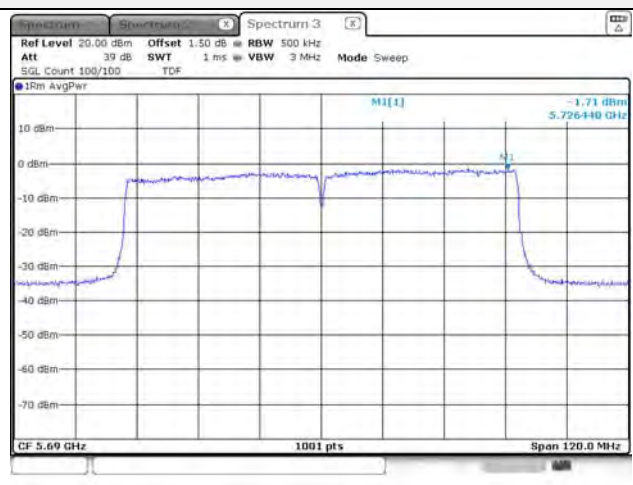
**UNII-3 / 802.11ac VHT20**



**UNII-3 / 802.11ac VHT40**

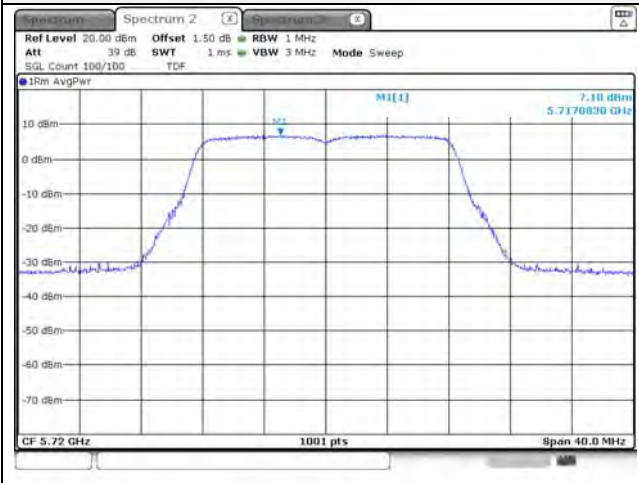


**UNII-3 / 802.11ac VHT80**

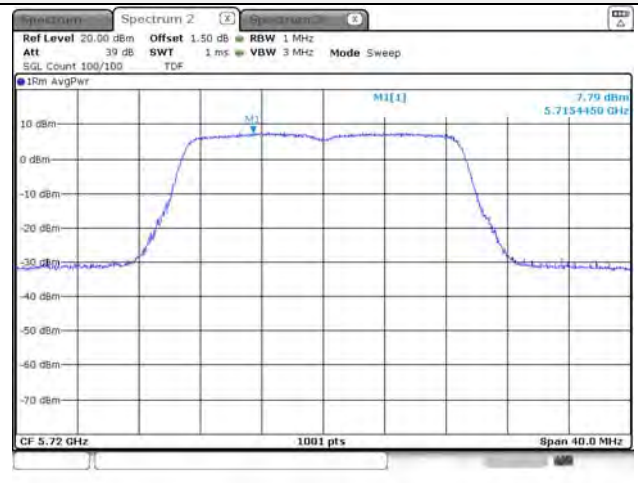


**SISO ANT 1**

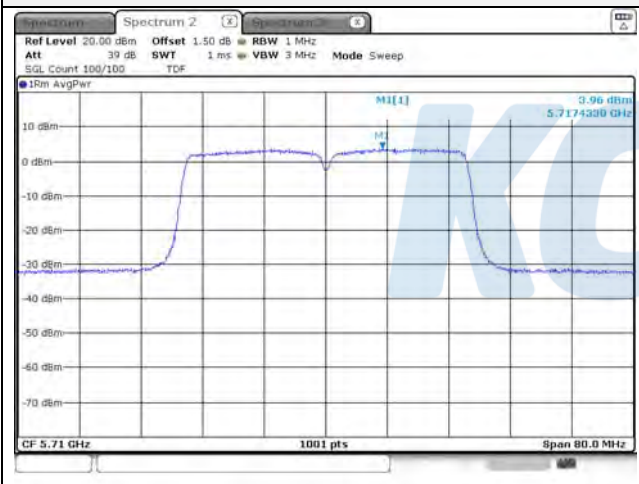
**UNII-2C / 802.11a**



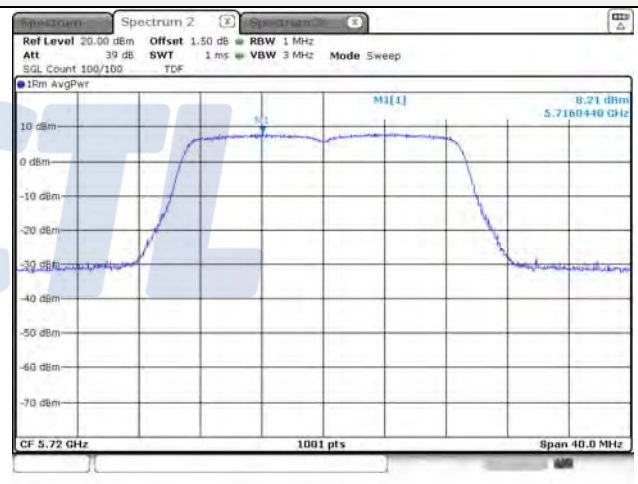
**UNII-2C / 802.11n HT20**



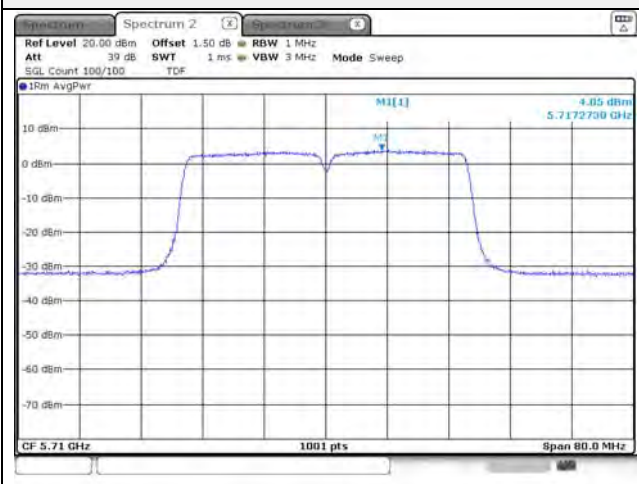
**UNII-2C / 802.11n HT40**



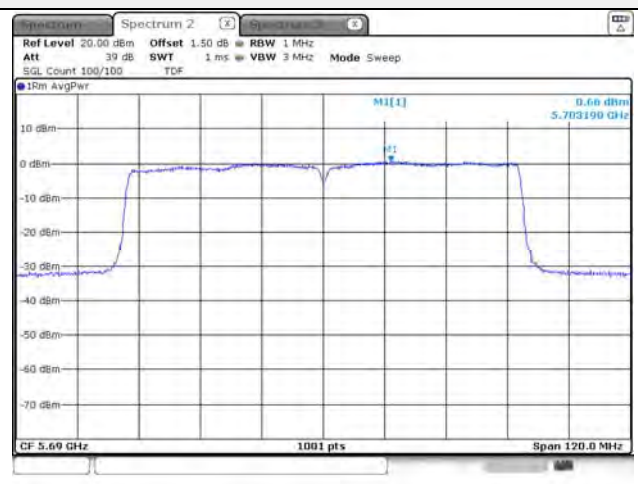
**UNII-2C / 802.11ac VHT20**



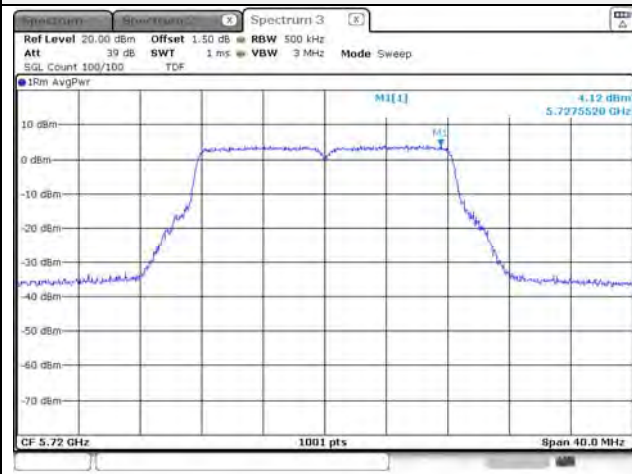
**UNII-2C / 802.11ac VHT40**



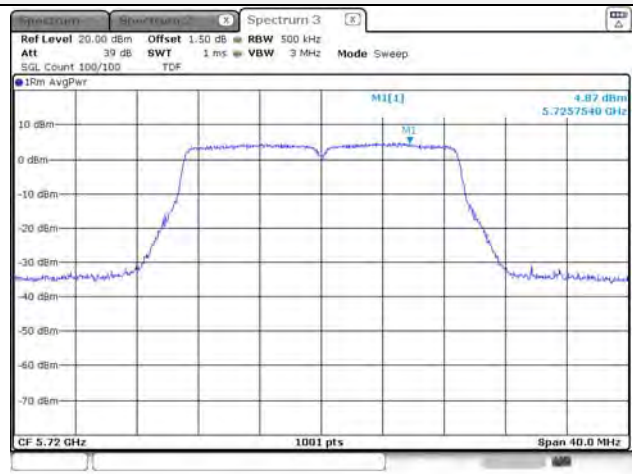
**UNII-2C / 802.11ac VHT80**



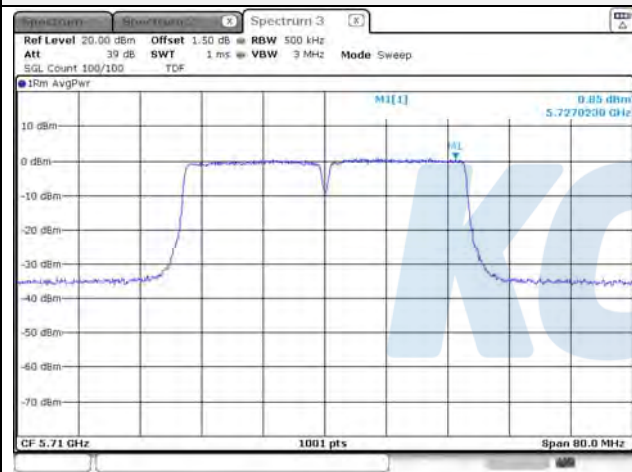
**UNII-3 / 802.11a**



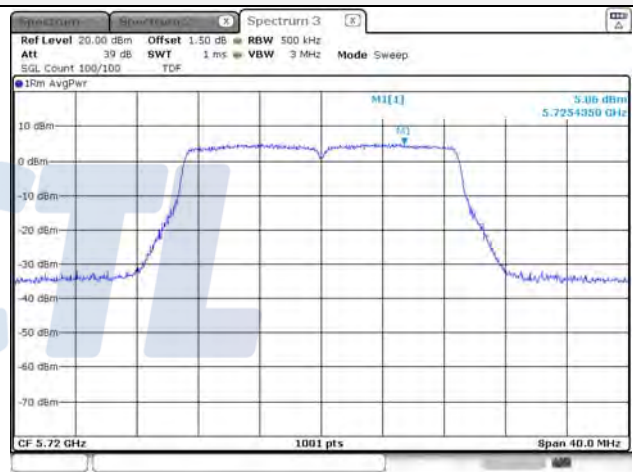
**UNII-3 / 802.11n HT20**



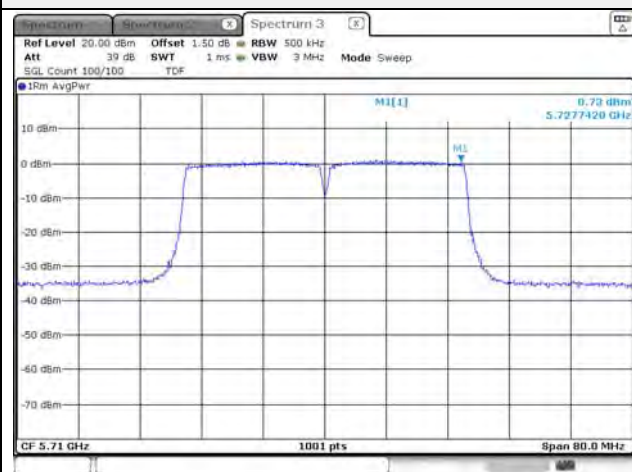
**UNII-3 / 802.11n HT40**



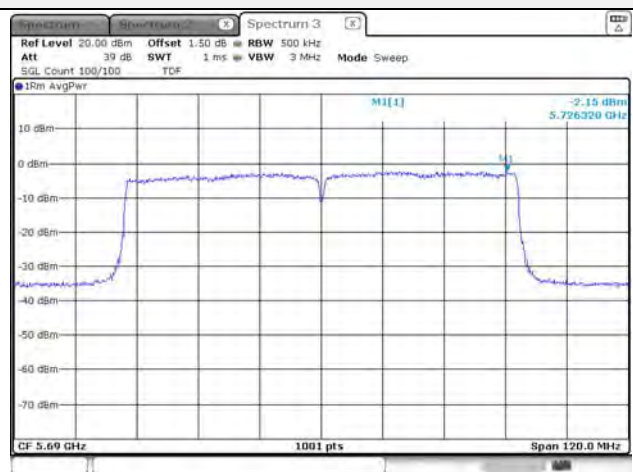
**UNII-3 / 802.11ac VHT20**



**UNII-3 / 802.11ac VHT40**



**UNII-3 / 802.11ac VHT80**

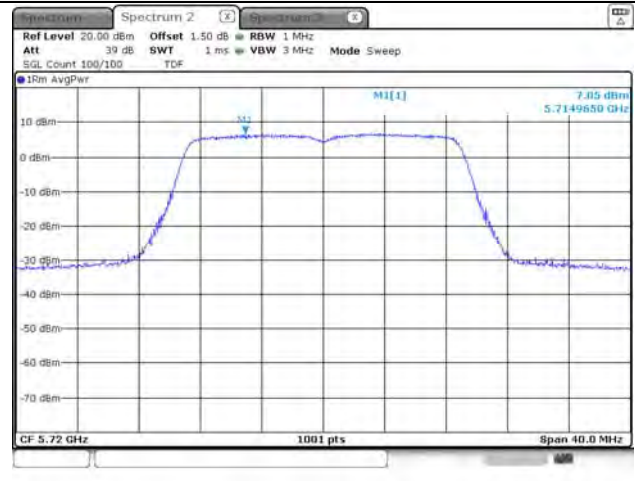


**SISO ANT 2**

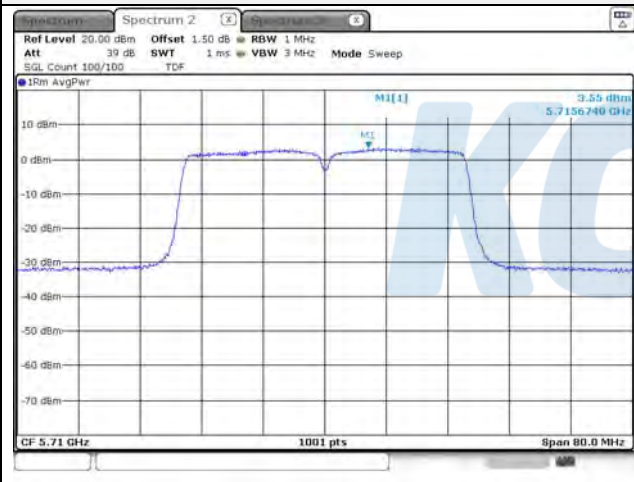
**UNII-2C / 802.11a**



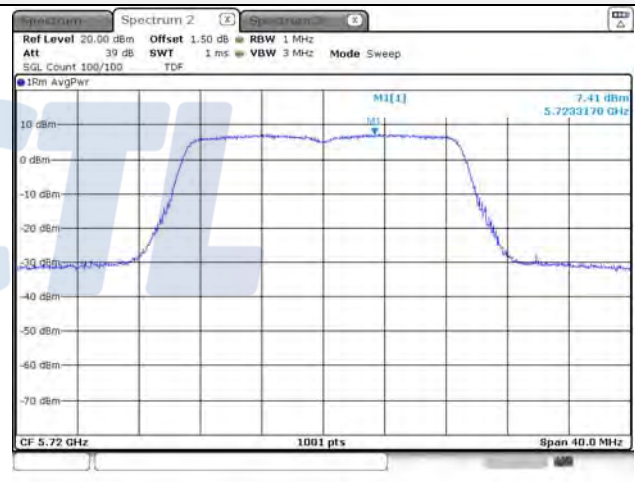
**UNII-2C / 802.11n HT20**



**UNII-2C / 802.11n HT40**



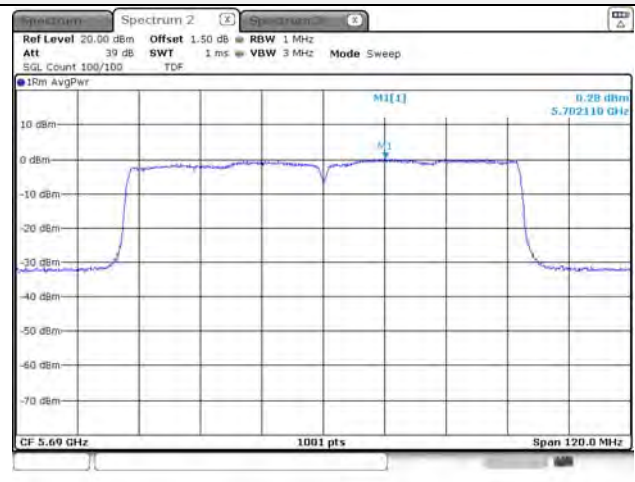
**UNII-2C / 802.11ac VHT20**



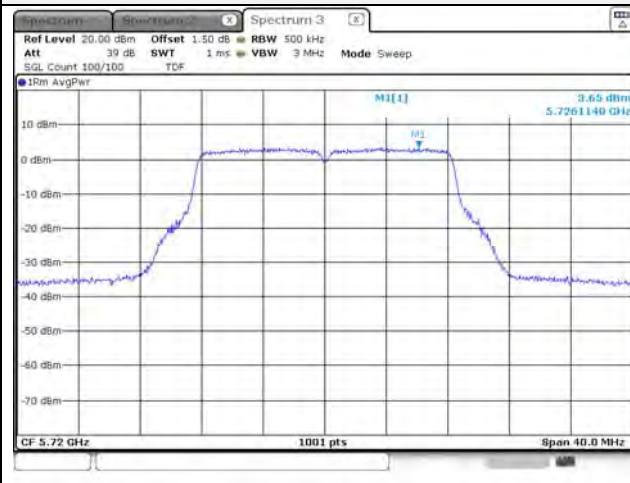
**UNII-2C / 802.11ac VHT40**



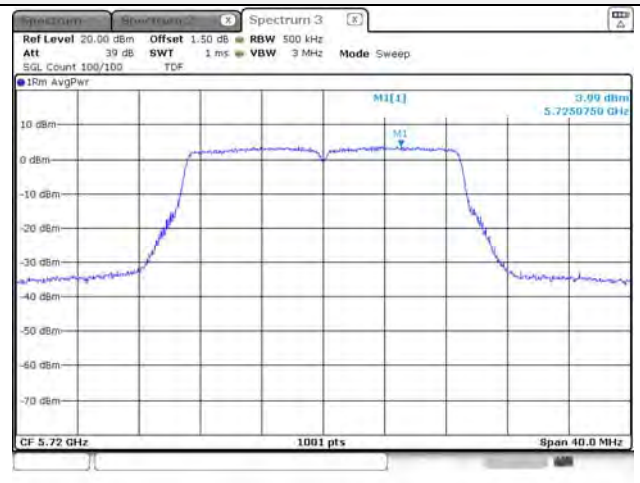
**UNII-2C / 802.11ac VHT80**



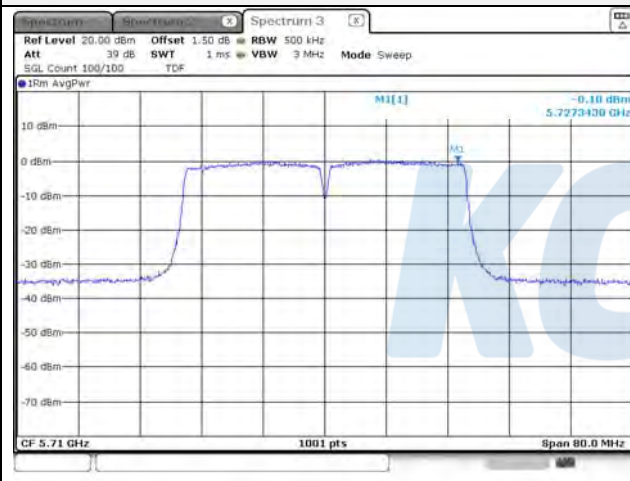
**UNII-3 / 802.11a**



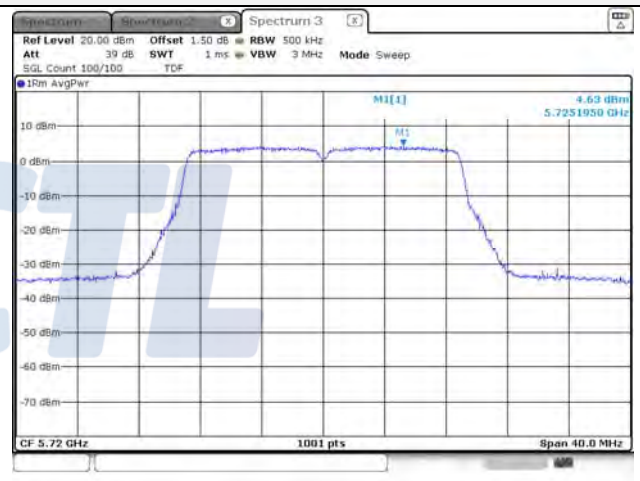
**UNII-3 / 802.11n HT20**



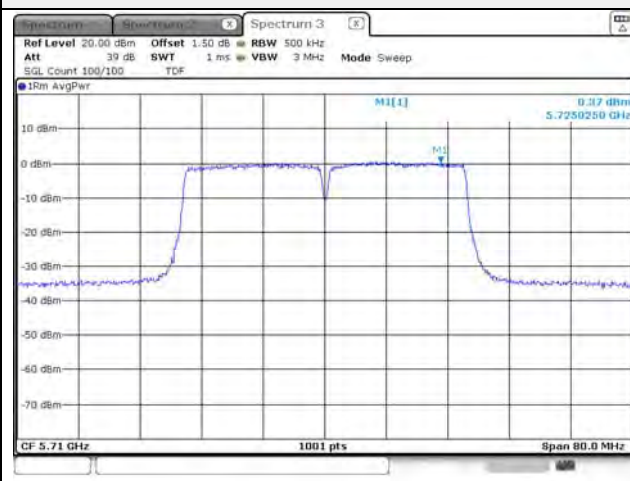
**UNII-3 / 802.11n HT40**



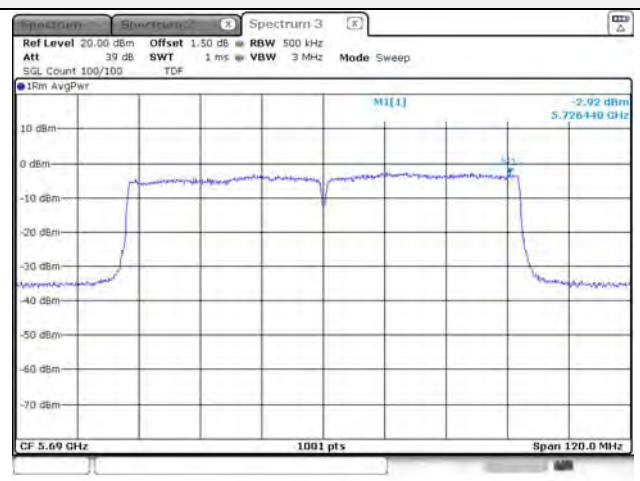
**UNII-3 / 802.11ac VHT20**



**UNII-3 / 802.11ac VHT40**



**UNII-3 / 802.11ac VHT80**



**SISO ANT 3**

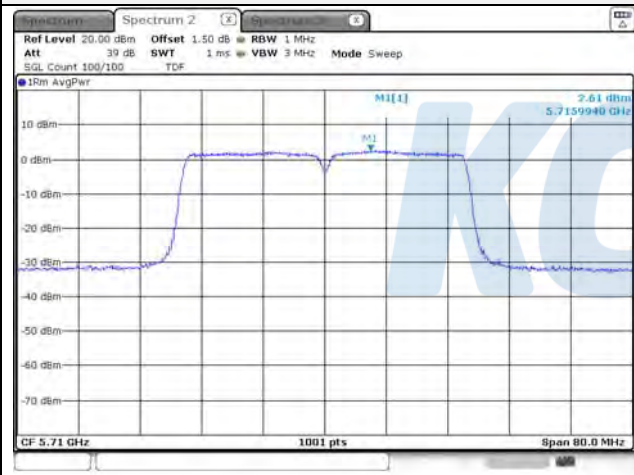
**UNII-2C / 802.11a**



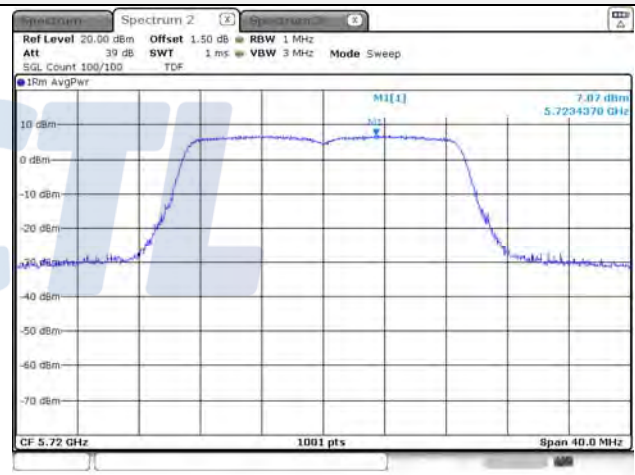
**UNII-2C / 802.11n HT20**



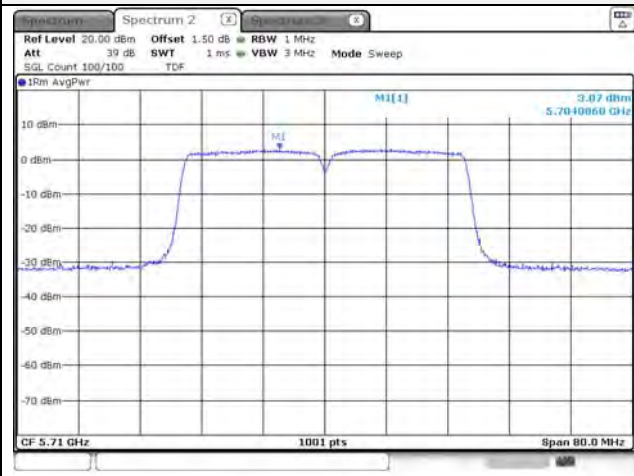
**UNII-2C / 802.11n HT40**



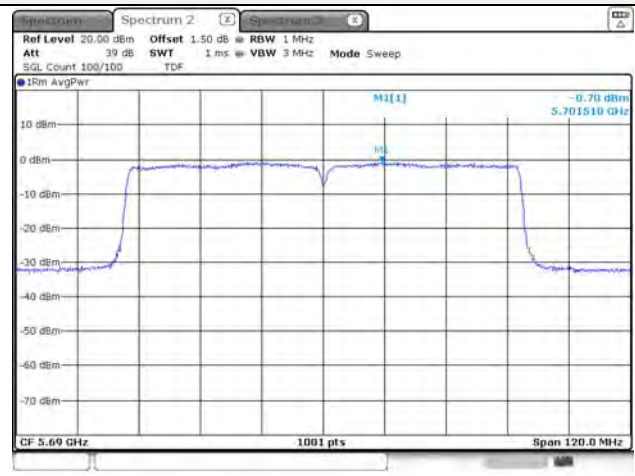
**UNII-2C / 802.11ac VHT20**



**UNII-2C / 802.11ac VHT40**

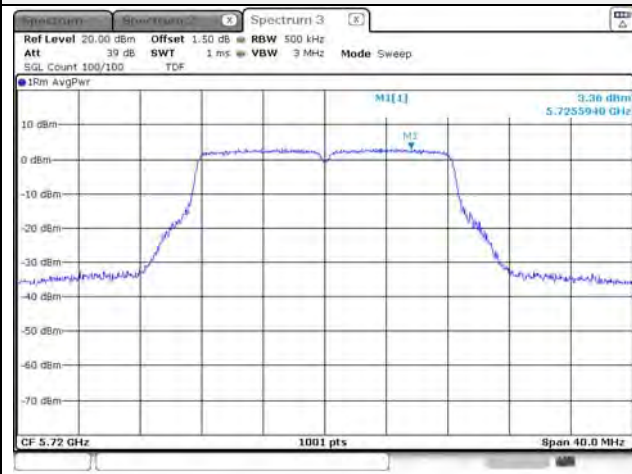


**UNII-2C / 802.11ac VHT80**

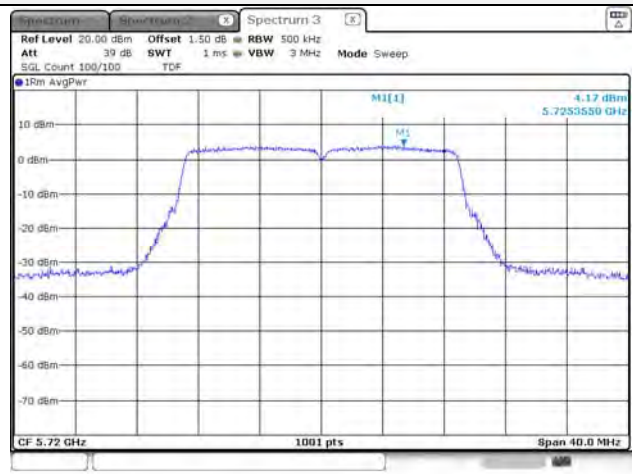




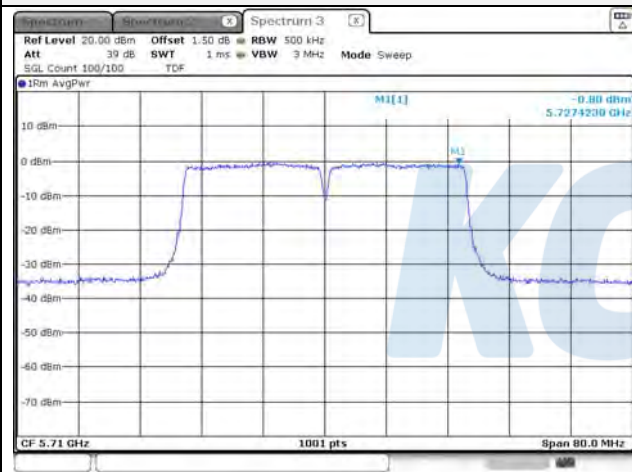
**UNII-3 / 802.11a**



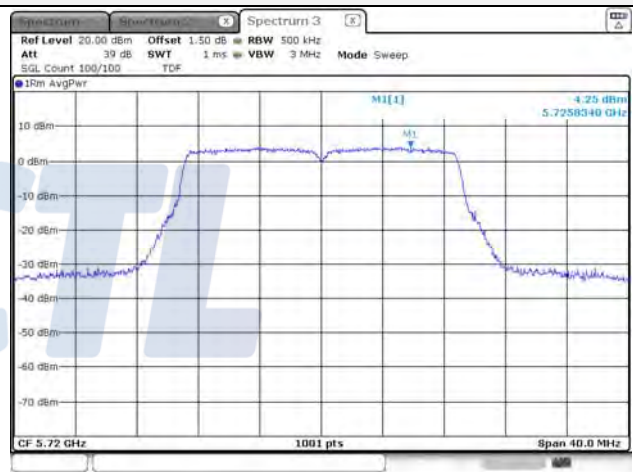
**UNII-3 / 802.11n HT20**



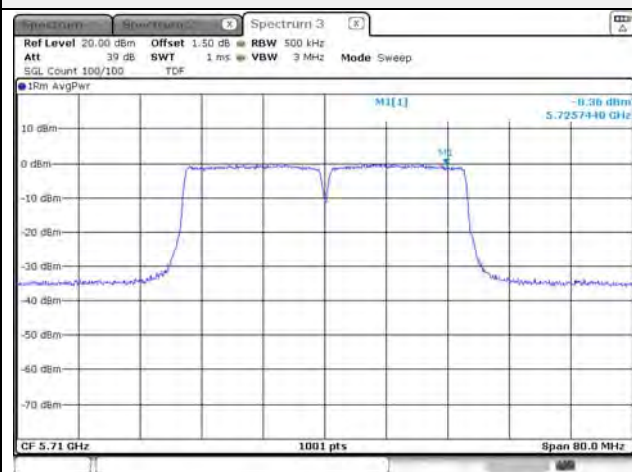
**UNII-3 / 802.11n HT40**



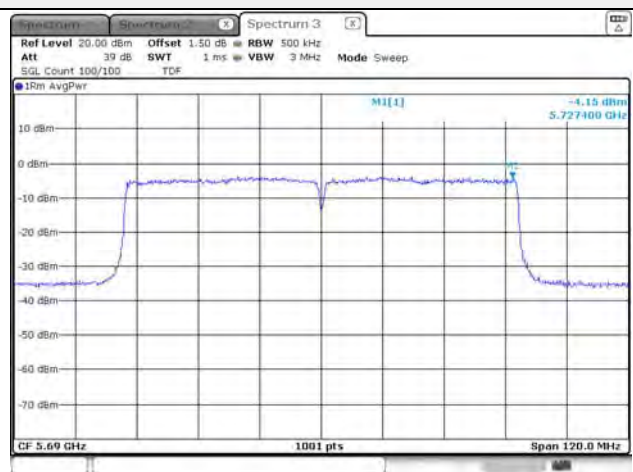
**UNII-3 / 802.11ac VHT20**



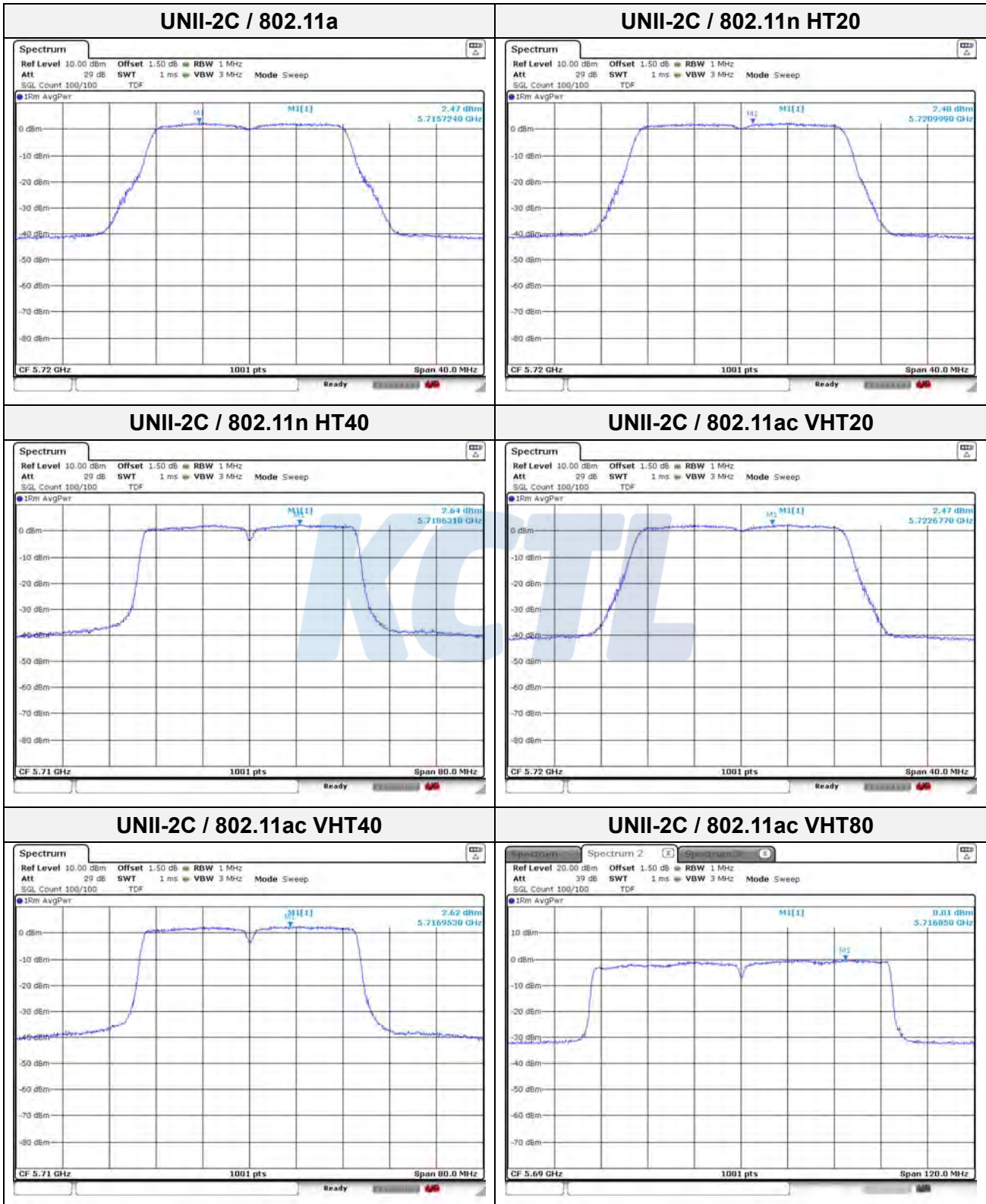
**UNII-3 / 802.11ac VHT40**



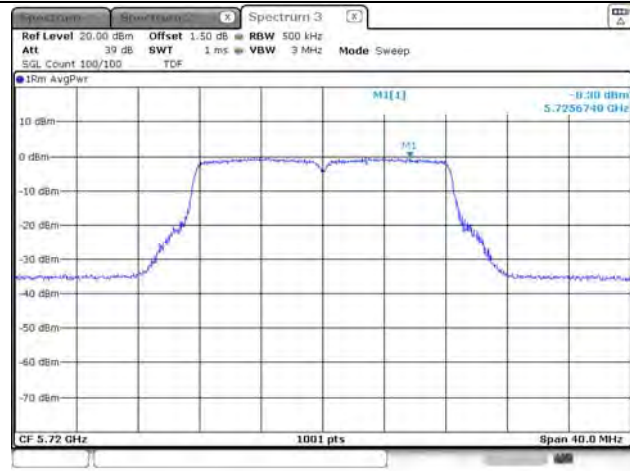
**UNII-3 / 802.11ac VHT80**



**4TX MIMO ANT 0**



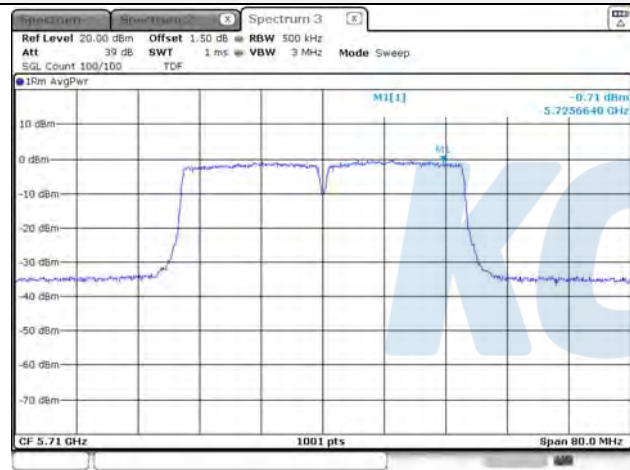
**UNII-3 / 802.11a**



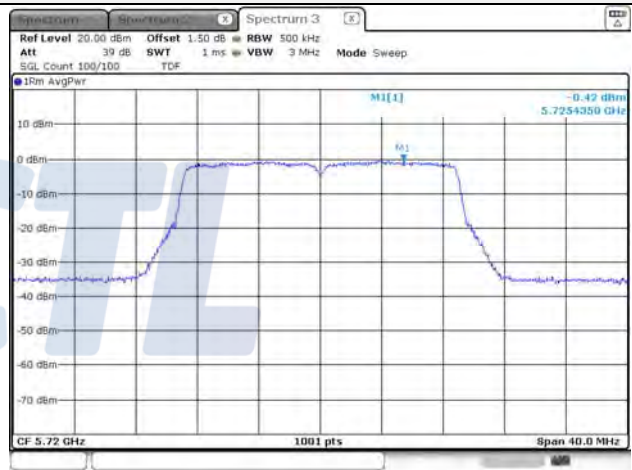
**UNII-3 / 802.11n HT20**



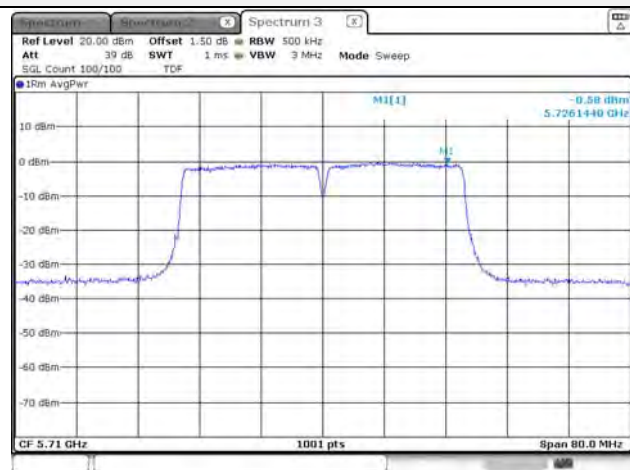
**UNII-3 / 802.11n HT40**



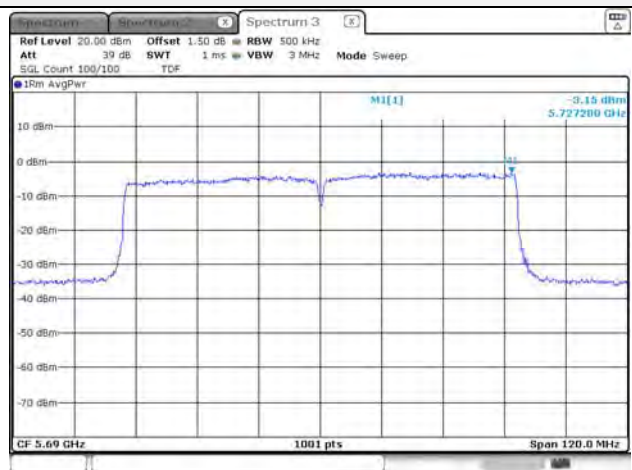
**UNII-3 / 802.11ac VHT20**



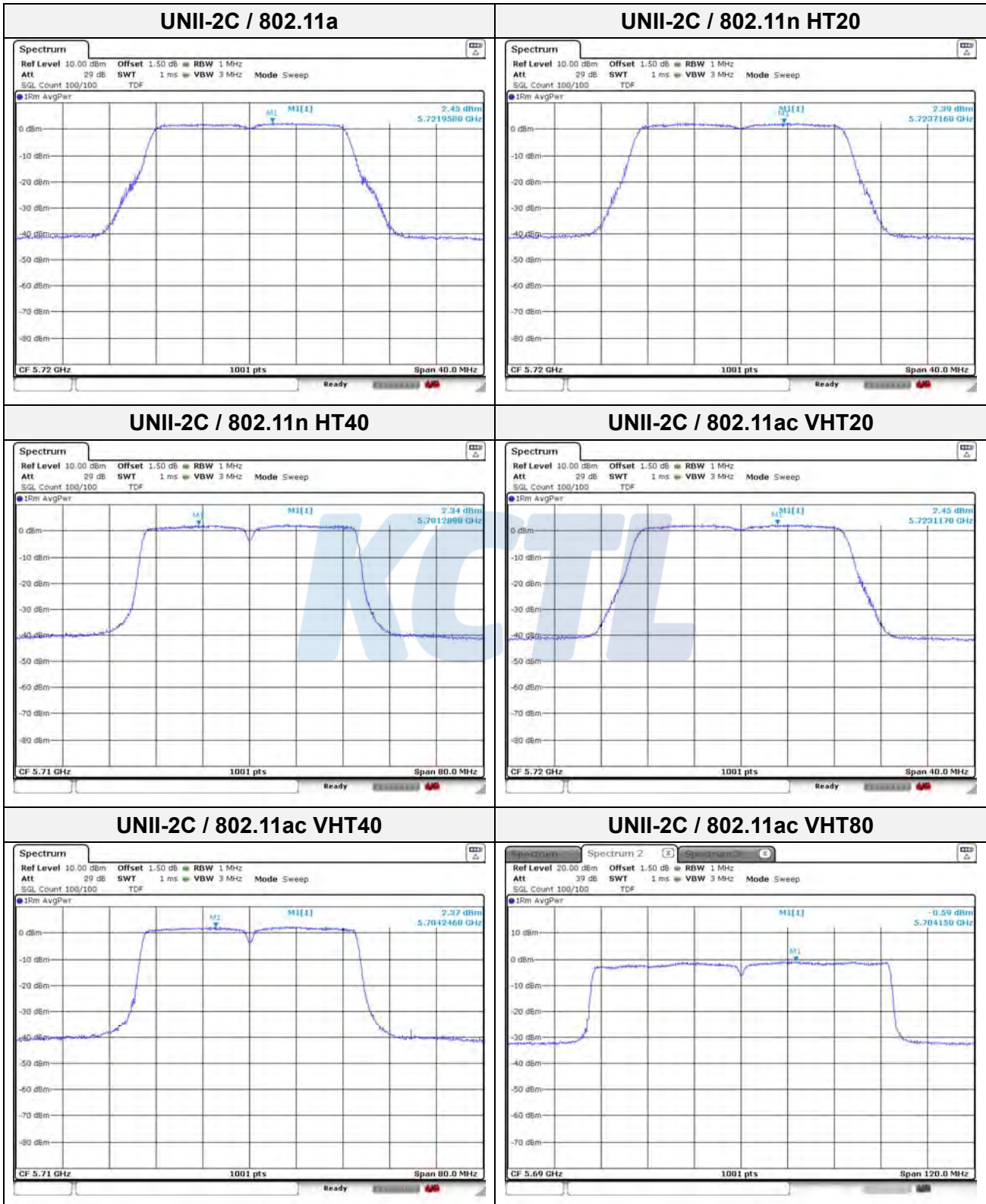
**UNII-3 / 802.11ac VHT40**



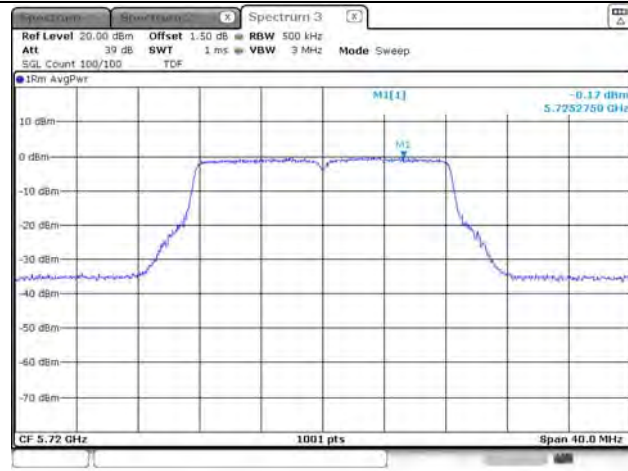
**UNII-3 / 802.11ac VHT80**



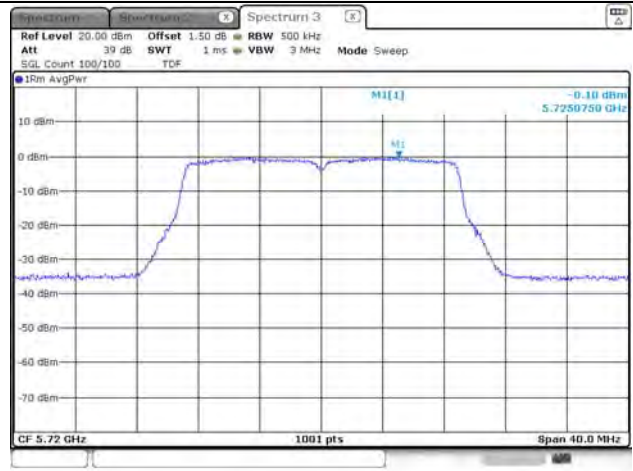
**4TX MIMO ANT 1**



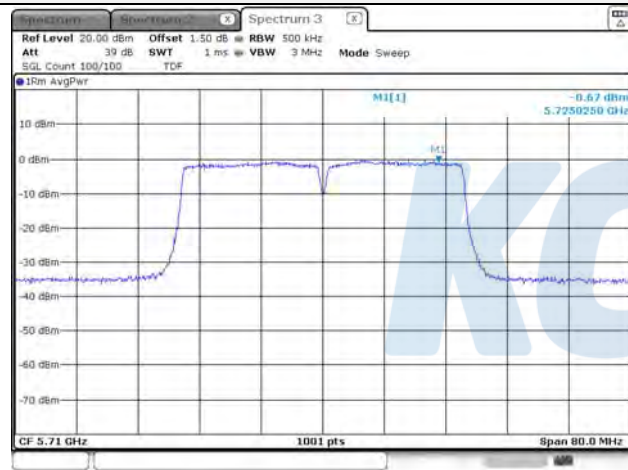
**UNII-3 / 802.11a**



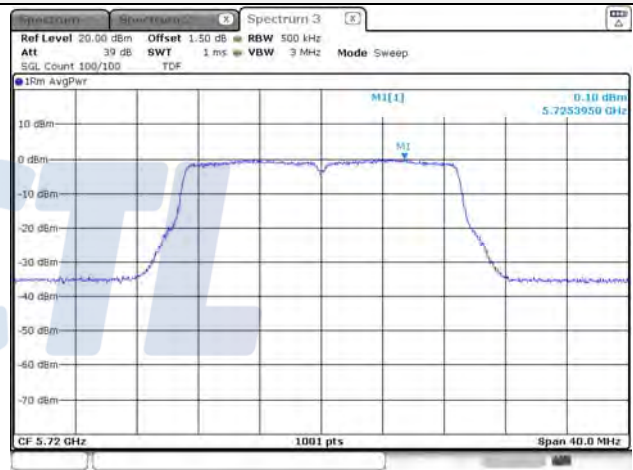
**UNII-3 / 802.11n HT20**



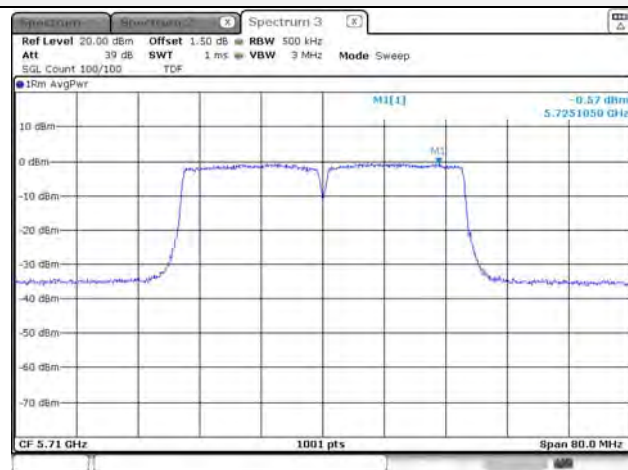
**UNII-3 / 802.11n HT40**



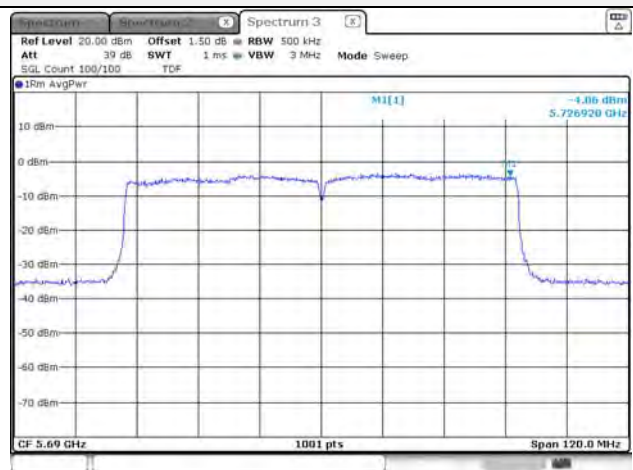
**UNII-3 / 802.11ac VHT20**



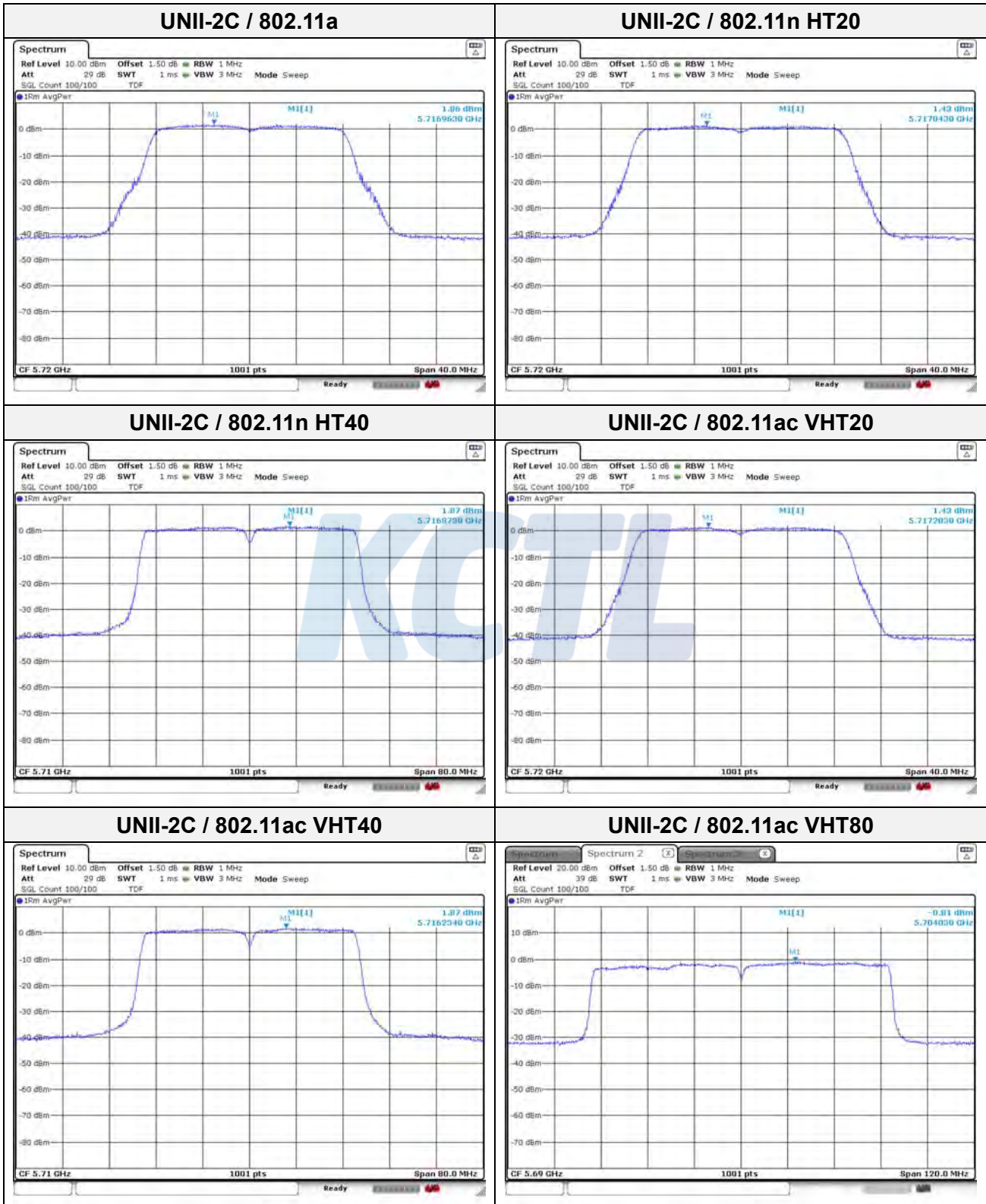
**UNII-3 / 802.11ac VHT40**



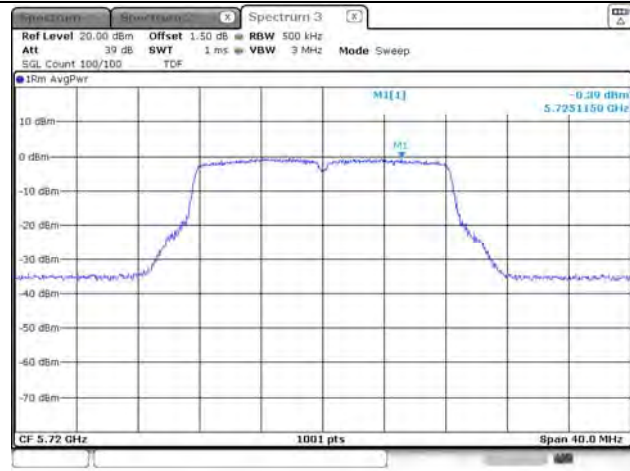
**UNII-3 / 802.11ac VHT80**



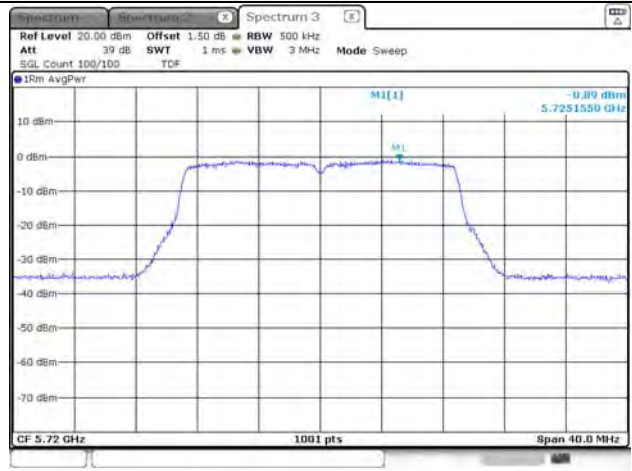
**4TX MIMO ANT 2**



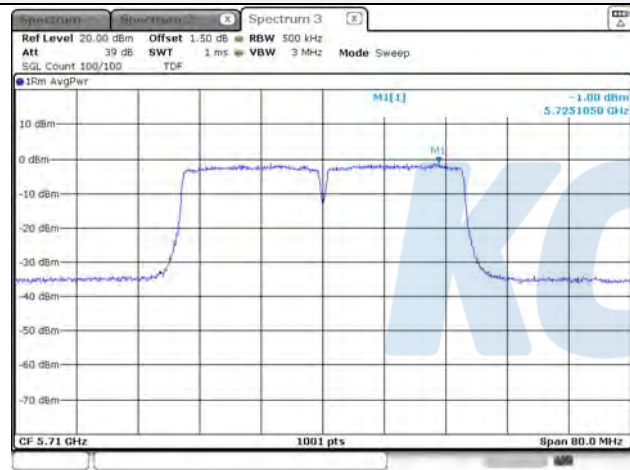
**UNII-3 / 802.11a**



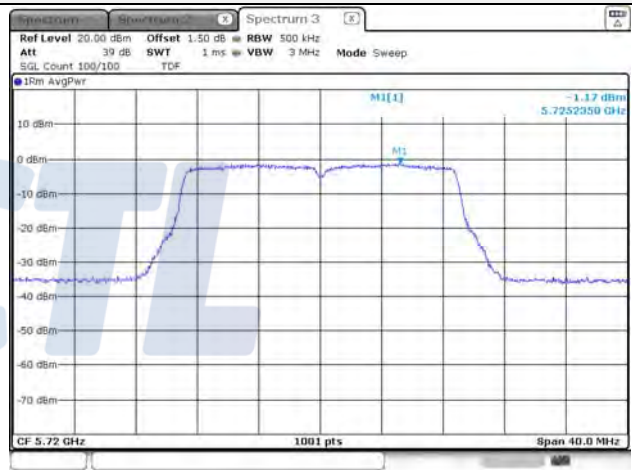
**UNII-3 / 802.11n HT20**



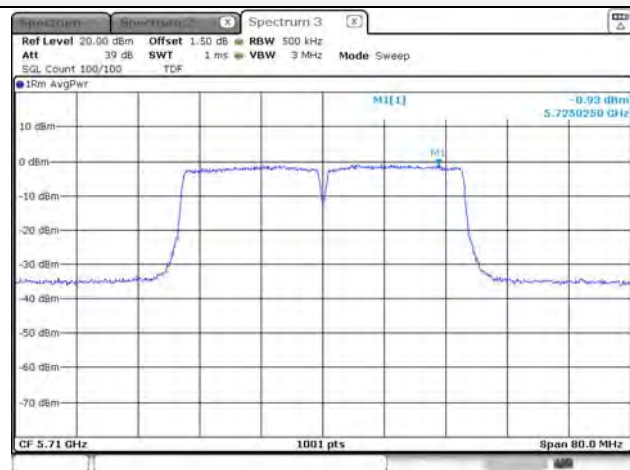
**UNII-3 / 802.11n HT40**



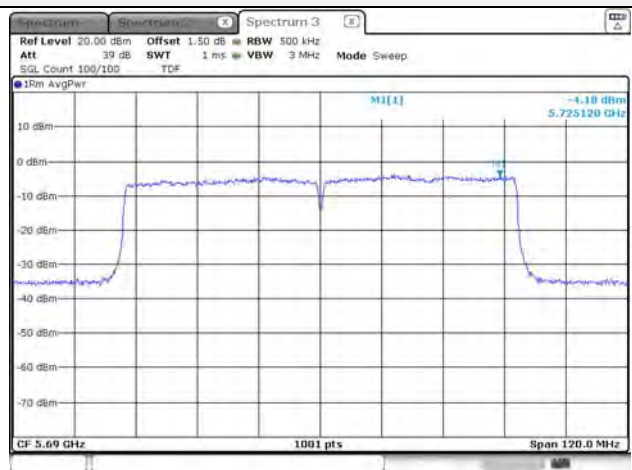
**UNII-3 / 802.11ac VHT20**



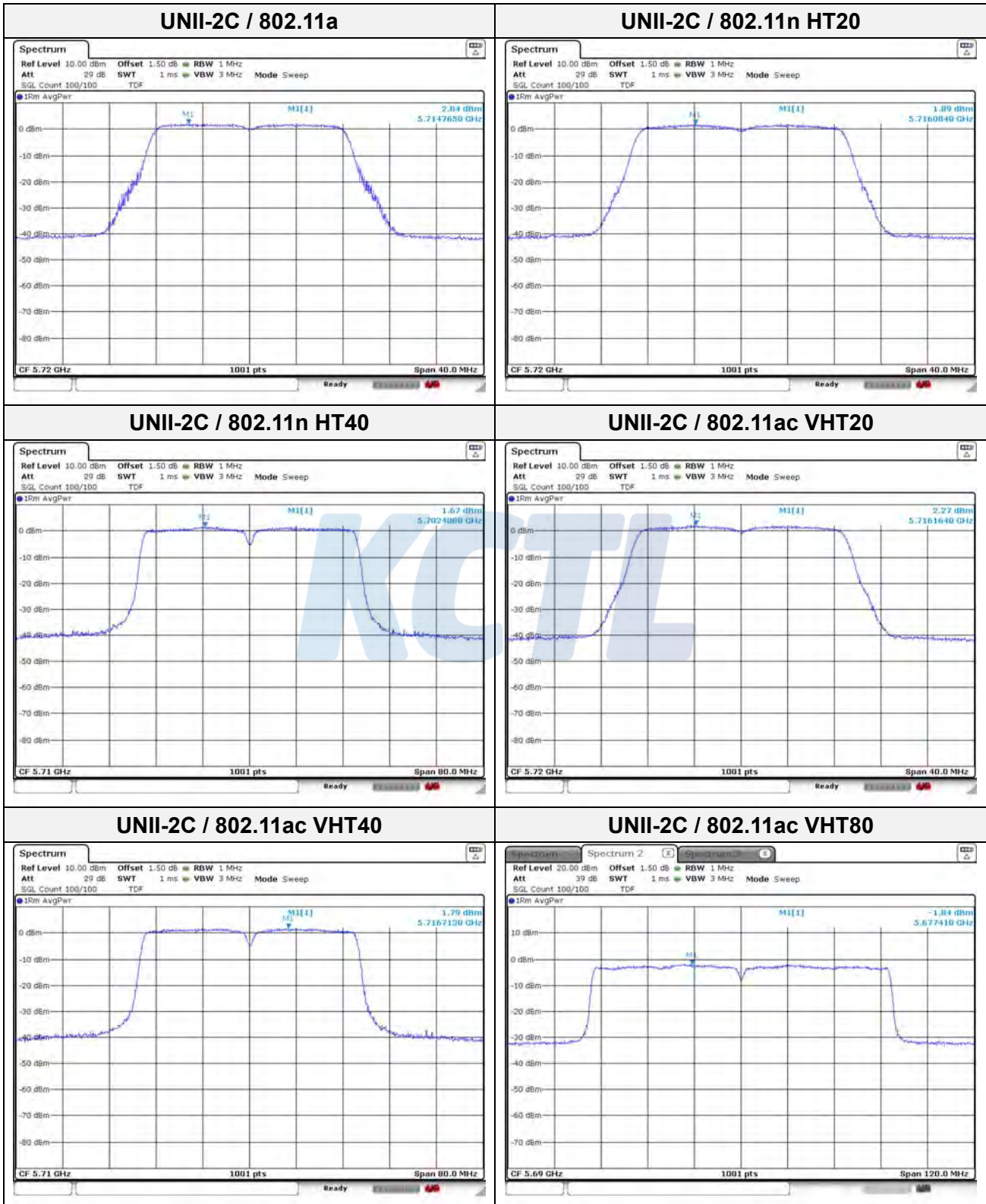
**UNII-3 / 802.11ac VHT40**



**UNII-3 / 802.11ac VHT80**

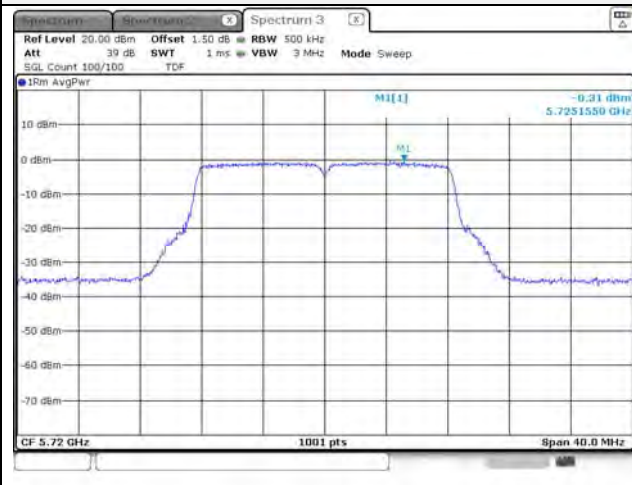


**4TX MIMO ANT 3**

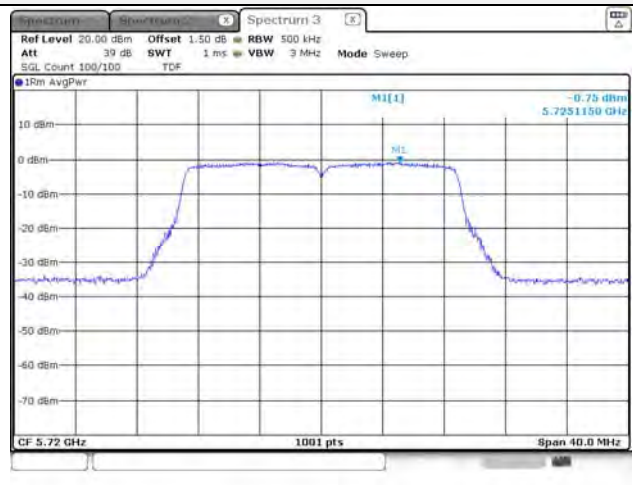




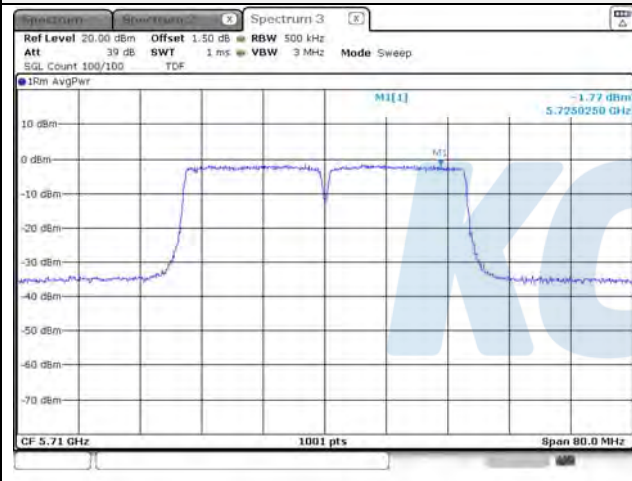
**UNII-3 / 802.11a**



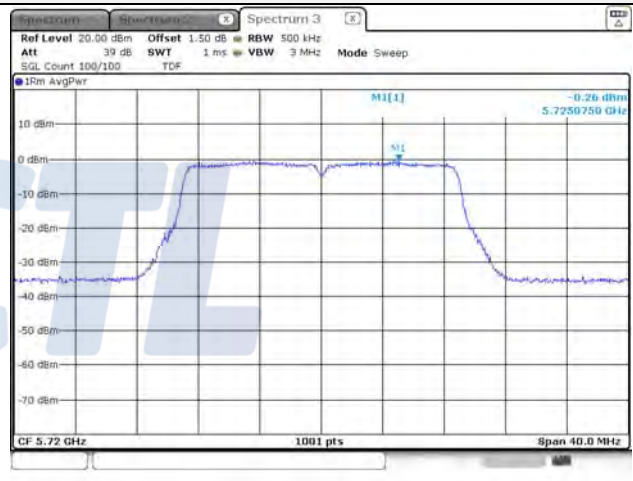
**UNII-3 / 802.11n HT20**



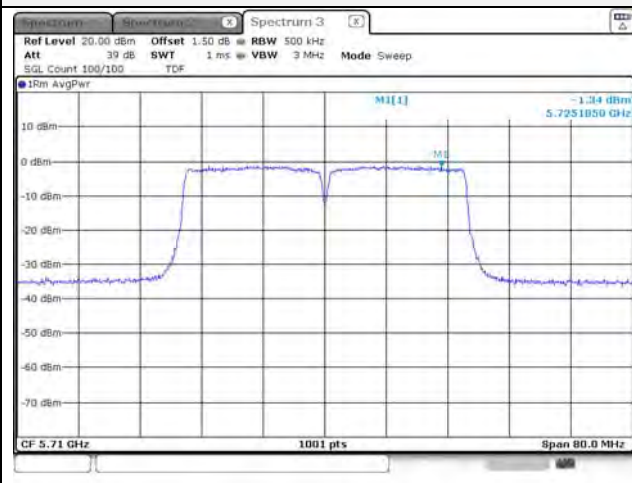
**UNII-3 / 802.11n HT40**



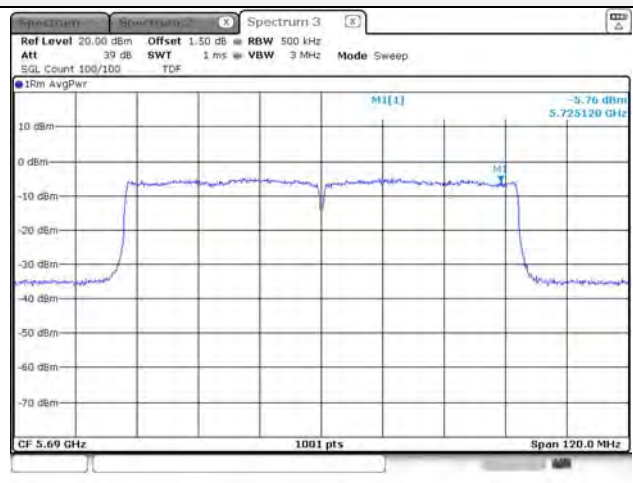
**UNII-3 / 802.11ac VHT20**



**UNII-3 / 802.11ac VHT40**

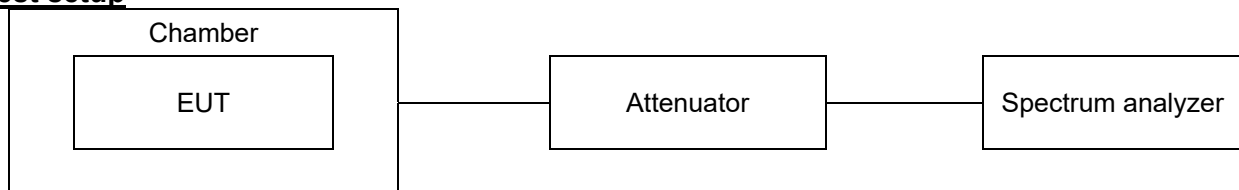


**UNII-3 / 802.11ac VHT80**



## 7.6. Frequency Stability

### Test setup



### Limit

N/A

### Test procedure

ANSI C63.10-2013, clause 6.8.1

### Test settings

The frequency stability of the carrier frequency of the intentional radiator shall be maintained all conditions of normal operation as specified in the user manual. The frequency stability shall be maintained over a temperature variation of specified in the user manual at normal supply voltage, and over a variation in the primary supply voltage of specified in the user manual of the rated supply voltage at a temperature of 20 °C. For equipment that is capable only of operating from a battery, the frequency stability tests shall be performed using a new battery without any further requirement to vary supply voltage.

1. The EUT was placed inside the environmental test chamber.
2. The temperature was incremented by 10 °C intervals from lowest temperature.
3. Each increase step of temperature measured the frequency.
4. The test temperature was set 20 °C and the supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.
5. While maintaining a constant temperature inside the environmental chamber, turn the EUT on and record the operating frequency at startup, and at 2 minutes, 5 minutes, and 10 minutes after the EUT is energized. Four measurements in total are made.

**Test results**

**Test mode : 802.11a UNII-1 5 180 MHz**

| Voltage | Voltage | TEMP     | Maintaining time | Measure frequency | Frequency deviation | Deviation |
|---------|---------|----------|------------------|-------------------|---------------------|-----------|
| [%]     | [V]     | [°C]     |                  | [Hz]              | [ppm]               | [%]       |
| 100     | 12      | +22(Ref) | Startup          | 5 179 982 425     | -17.57              | -0.000 34 |
|         |         |          | 2 minutes        | 5 179 982 431     | -17.57              | -0.000 34 |
|         |         |          | 5 minutes        | 5 179 982 457     | -17.54              | -0.000 34 |
|         |         |          | 10 minutes       | 5 179 982 466     | -17.53              | -0.000 34 |
|         |         | -30      | Startup          | 5 180 043 701     | 43.70               | 0.000 84  |
|         |         |          | 2 minutes        | 5 180 043 635     | 43.63               | 0.000 84  |
|         |         |          | 5 minutes        | 5 180 043 572     | 43.57               | 0.000 84  |
|         |         |          | 10 minutes       | 5 180 043 488     | 43.49               | 0.000 84  |
|         |         | -20      | Startup          | 5 180 032 701     | 32.70               | 0.000 63  |
|         |         |          | 2 minutes        | 5 180 032 632     | 32.63               | 0.000 63  |
|         |         |          | 5 minutes        | 5 180 032 533     | 32.53               | 0.000 63  |
|         |         |          | 10 minutes       | 5 180 032 498     | 32.50               | 0.000 63  |
|         |         | -10      | Startup          | 5 180 024 835     | 24.83               | 0.000 48  |
|         |         |          | 2 minutes        | 5 180 024 812     | 24.81               | 0.000 48  |
|         |         |          | 5 minutes        | 5 180 024 796     | 24.80               | 0.000 48  |
|         |         |          | 10 minutes       | 5 180 024 770     | 24.77               | 0.000 48  |
|         |         | 0        | Startup          | 5 180 012 967     | 12.97               | 0.000 25  |
|         |         |          | 2 minutes        | 5 180 012 932     | 12.93               | 0.000 25  |
|         |         |          | 5 minutes        | 5 180 012 915     | 12.91               | 0.000 25  |
|         |         |          | 10 minutes       | 5 180 012 894     | 12.89               | 0.000 25  |
|         |         | 10       | Startup          | 5 180 003 647     | 3.65                | 0.000 07  |
|         |         |          | 2 minutes        | 5 180 003 621     | 3.62                | 0.000 07  |
|         |         |          | 5 minutes        | 5 180 003 607     | 3.61                | 0.000 07  |
|         |         |          | 10 minutes       | 5 180 003 583     | 3.58                | 0.000 07  |
|         |         | 20       | Startup          | 5 179 983 681     | -16.32              | -0.000 32 |
|         |         |          | 2 minutes        | 5 179 983 703     | -16.30              | -0.000 31 |
|         |         |          | 5 minutes        | 5 179 983 722     | -16.28              | -0.000 31 |
|         |         |          | 10 minutes       | 5 179 983 731     | -16.27              | -0.000 31 |
|         |         | 30       | Startup          | 5 179 983 803     | -16.20              | -0.000 31 |
|         |         |          | 2 minutes        | 5 179 983 811     | -16.19              | -0.000 31 |
|         |         |          | 5 minutes        | 5 179 983 835     | -16.16              | -0.000 31 |
|         |         |          | 10 minutes       | 5 179 983 846     | -16.15              | -0.000 31 |
|         |         | 40       | Startup          | 5 179 973 657     | -26.34              | -0.000 51 |
|         |         |          | 2 minutes        | 5 179 973 782     | -26.22              | -0.000 51 |
|         |         |          | 5 minutes        | 5 179 973 812     | -26.19              | -0.000 51 |
|         |         |          | 10 minutes       | 5 179 973 835     | -26.16              | -0.000 51 |
|         |         | 50       | Startup          | 5 179 963 408     | -36.59              | -0.000 71 |
|         |         |          | 2 minutes        | 5 179 963 435     | -36.56              | -0.000 71 |
|         |         |          | 5 minutes        | 5 179 963 466     | -36.53              | -0.000 71 |
|         |         |          | 10 minutes       | 5 179 963 483     | -36.52              | -0.000 70 |
| 85      | 10.2    | 22       | Startup          | 5 179 982 435     | -17.56              | -0.000 34 |
|         |         |          | 2 minutes        | 5 179 982 456     | -17.54              | -0.000 34 |
|         |         |          | 5 minutes        | 5 179 982 468     | -17.53              | -0.000 34 |
|         |         |          | 10 minutes       | 5 179 982 488     | -17.51              | -0.000 34 |
| 115     | 13.8    | 22       | Startup          | 5 179 982 443     | -17.56              | -0.000 34 |
|         |         |          | 2 minutes        | 5 179 982 465     | -17.53              | -0.000 34 |
|         |         |          | 5 minutes        | 5 179 982 473     | -17.53              | -0.000 34 |
|         |         |          | 10 minutes       | 5 179 982 493     | -17.51              | -0.000 34 |

**Test mode : 802.11a UNII-2A 5 260 MHz**

| Voltage | Voltage | TEMP     | Maintaining time | Measure frequency | Frequency deviation | Deviation |
|---------|---------|----------|------------------|-------------------|---------------------|-----------|
| [%]     | [V]     | [°C]     |                  | [Hz]              | [ppm]               | [%]       |
| 100     | 12      | +22(Ref) | Startup          | 5 259 979 654     | -20.35              | -0.000 39 |
|         |         |          | 2 minutes        | 5 259 979 663     | -20.34              | -0.000 39 |
|         |         |          | 5 minutes        | 5 259 979 684     | -20.32              | -0.000 39 |
|         |         |          | 10 minutes       | 5 259 979 703     | -20.30              | -0.000 39 |
|         |         | -30      | Startup          | 5 260 041 028     | 41.03               | 0.000 78  |
|         |         |          | 2 minutes        | 5 260 040 983     | 40.98               | 0.000 78  |
|         |         |          | 5 minutes        | 5 260 040 966     | 40.97               | 0.000 78  |
|         |         |          | 10 minutes       | 5 260 040 942     | 40.94               | 0.000 78  |
|         |         | -20      | Startup          | 5 260 030 835     | 30.83               | 0.000 59  |
|         |         |          | 2 minutes        | 5 260 030 821     | 30.82               | 0.000 59  |
|         |         |          | 5 minutes        | 5 260 030 803     | 30.80               | 0.000 59  |
|         |         |          | 10 minutes       | 5 260 030 787     | 30.79               | 0.000 59  |
|         |         | -10      | Startup          | 5 260 019 931     | 19.93               | 0.000 38  |
|         |         |          | 2 minutes        | 5 260 019 909     | 19.91               | 0.000 38  |
|         |         |          | 5 minutes        | 5 260 019 891     | 19.89               | 0.000 38  |
|         |         |          | 10 minutes       | 5 260 019 882     | 19.88               | 0.000 38  |
|         |         | 0        | Startup          | 5 260 010 653     | 10.65               | 0.000 20  |
|         |         |          | 2 minutes        | 5 260 010 633     | 10.63               | 0.000 20  |
|         |         |          | 5 minutes        | 5 260 010 624     | 10.62               | 0.000 20  |
|         |         |          | 10 minutes       | 5 260 010 608     | 10.61               | 0.000 20  |
|         |         | 10       | Startup          | 5 260 000 812     | 8.12                | 0.000 02  |
|         |         |          | 2 minutes        | 5 260 000 786     | 7.86                | 0.000 01  |
|         |         |          | 5 minutes        | 5 260 000 753     | 7.53                | 0.000 01  |
|         |         |          | 10 minutes       | 5 260 000 741     | 7.41                | 0.000 01  |
|         |         | 20       | Startup          | 5 259 990 230     | -9.77               | -0.000 19 |
|         |         |          | 2 minutes        | 5 259 990 247     | -9.75               | -0.000 19 |
|         |         |          | 5 minutes        | 5 259 990 283     | -9.72               | -0.000 18 |
|         |         |          | 10 minutes       | 5 259 990 294     | -9.71               | -0.000 18 |
|         |         | 30       | Startup          | 5 259 979 831     | -20.17              | -0.000 38 |
|         |         |          | 2 minutes        | 5 259 979 858     | -20.14              | -0.000 38 |
|         |         |          | 5 minutes        | 5 259 979 873     | -20.13              | -0.000 38 |
|         |         |          | 10 minutes       | 5 259 979 882     | -20.12              | -0.000 38 |
|         |         | 40       | Startup          | 5 259 970 931     | -29.07              | -0.000 55 |
|         |         |          | 2 minutes        | 5 259 970 958     | -29.04              | -0.000 55 |
|         |         |          | 5 minutes        | 5 259 970 988     | -29.01              | -0.000 55 |
|         |         |          | 10 minutes       | 5 259 971 002     | -29.00              | -0.000 55 |
|         |         | 50       | Startup          | 5 259 960 755     | -39.24              | -0.000 75 |
|         |         |          | 2 minutes        | 5 259 960 783     | -39.22              | -0.000 75 |
|         |         |          | 5 minutes        | 5 259 960 797     | -39.20              | -0.000 75 |
|         |         |          | 10 minutes       | 5 259 960 821     | -39.18              | -0.000 74 |
| 85      | 10.2    | 22       | Startup          | 5 259 979 563     | -20.44              | -0.000 39 |
|         |         |          | 2 minutes        | 5 259 979 581     | -20.42              | -0.000 39 |
|         |         |          | 5 minutes        | 5 259 979 624     | -20.38              | -0.000 39 |
|         |         |          | 10 minutes       | 5 259 979 642     | -20.36              | -0.000 39 |
| 115     | 13.8    | 22       | Startup          | 5 259 979 631     | -20.37              | -0.000 39 |
|         |         |          | 2 minutes        | 5 259 979 652     | -20.35              | -0.000 39 |
|         |         |          | 5 minutes        | 5 259 979 668     | -20.33              | -0.000 39 |
|         |         |          | 10 minutes       | 5 259 979 687     | -20.31              | -0.000 39 |

**Test mode : 802.11a UNII-2C 5 500 MHz**

| Voltage | Voltage | TEMP     | Maintaining time | Measure frequency | Frequency deviation | Deviation |
|---------|---------|----------|------------------|-------------------|---------------------|-----------|
| [%]     | [V]     | [°C]     |                  | [Hz]              | [ppm]               | [%]       |
| 100     | 12      | +22(Ref) | Startup          | 5 499 988 412     | -11.59              | -0.000 21 |
|         |         |          | 2 minutes        | 5 499 988 523     | -11.48              | -0.000 21 |
|         |         |          | 5 minutes        | 5 499 988 564     | -11.44              | -0.000 21 |
|         |         |          | 10 minutes       | 5 499 988 603     | -11.40              | -0.000 21 |
|         |         | -30      | Startup          | 5 500 049 696     | 49.70               | 0.000 90  |
|         |         |          | 2 minutes        | 5 500 049 665     | 49.66               | 0.000 90  |
|         |         |          | 5 minutes        | 5 500 049 632     | 49.63               | 0.000 90  |
|         |         |          | 10 minutes       | 5 500 049 624     | 49.62               | 0.000 90  |
|         |         | -20      | Startup          | 5 500 039 681     | 39.68               | 0.000 72  |
|         |         |          | 2 minutes        | 5 500 039 657     | 39.66               | 0.000 72  |
|         |         |          | 5 minutes        | 5 500 039 623     | 39.62               | 0.000 72  |
|         |         |          | 10 minutes       | 5 500 039 612     | 39.61               | 0.000 72  |
|         |         | -10      | Startup          | 5 500 028 964     | 28.96               | 0.000 53  |
|         |         |          | 2 minutes        | 5 500 028 944     | 28.94               | 0.000 53  |
|         |         |          | 5 minutes        | 5 500 028 927     | 28.93               | 0.000 53  |
|         |         |          | 10 minutes       | 5 500 028 912     | 28.91               | 0.000 53  |
|         |         | 0        | Startup          | 5 500 019 668     | 19.67               | 0.000 36  |
|         |         |          | 2 minutes        | 5 500 019 631     | 19.63               | 0.000 36  |
|         |         |          | 5 minutes        | 5 500 019 618     | 19.62               | 0.000 36  |
|         |         |          | 10 minutes       | 5 500 019 603     | 19.60               | 0.000 36  |
|         |         | 10       | Startup          | 5 500 008 969     | 8.97                | 0.000 16  |
|         |         |          | 2 minutes        | 5 500 008 932     | 8.93                | 0.000 16  |
|         |         |          | 5 minutes        | 5 500 008 923     | 8.92                | 0.000 16  |
|         |         |          | 10 minutes       | 5 500 008 902     | 8.90                | 0.000 16  |
|         |         | 20       | Startup          | 5 499 999 681     | -3.19               | -0.000 01 |
|         |         |          | 2 minutes        | 5 499 999 702     | -2.98               | -0.000 01 |
|         |         |          | 5 minutes        | 5 499 999 725     | -2.75               | -0.000 01 |
|         |         |          | 10 minutes       | 5 499 999 745     | -2.55               | 0.000 00  |
|         |         | 30       | Startup          | 5 499 988 932     | -11.07              | -0.000 20 |
|         |         |          | 2 minutes        | 5 499 988 961     | -11.04              | -0.000 20 |
|         |         |          | 5 minutes        | 5 499 988 989     | -11.01              | -0.000 20 |
|         |         |          | 10 minutes       | 5 499 989 002     | -11.00              | -0.000 20 |
|         |         | 40       | Startup          | 5 499 979 683     | -20.32              | -0.000 37 |
|         |         |          | 2 minutes        | 5 499 979 723     | -20.28              | -0.000 37 |
|         |         |          | 5 minutes        | 5 499 979 742     | -20.26              | -0.000 37 |
|         |         |          | 10 minutes       | 5 499 979 766     | -20.23              | -0.000 37 |
|         |         | 50       | Startup          | 5 499 969 733     | -30.27              | -0.000 55 |
|         |         |          | 2 minutes        | 5 499 969 761     | -30.24              | -0.000 55 |
|         |         |          | 5 minutes        | 5 499 969 786     | -30.21              | -0.000 55 |
|         |         |          | 10 minutes       | 5 499 969 798     | -30.20              | -0.000 55 |
| 85      | 10.2    | 22       | Startup          | 5 499 988 325     | -11.67              | -0.000 21 |
|         |         |          | 2 minutes        | 5 499 988 378     | -11.62              | -0.000 21 |
|         |         |          | 5 minutes        | 5 499 988 424     | -11.58              | -0.000 21 |
|         |         |          | 10 minutes       | 5 499 988 531     | -11.47              | -0.000 21 |
| 115     | 13.8    | 22       | Startup          | 5 499 988 524     | -11.48              | -0.000 21 |
|         |         |          | 2 minutes        | 5 499 988 627     | -11.37              | -0.000 21 |
|         |         |          | 5 minutes        | 5 499 988 657     | -11.34              | -0.000 21 |
|         |         |          | 10 minutes       | 5 499 988 724     | -11.28              | -0.000 21 |

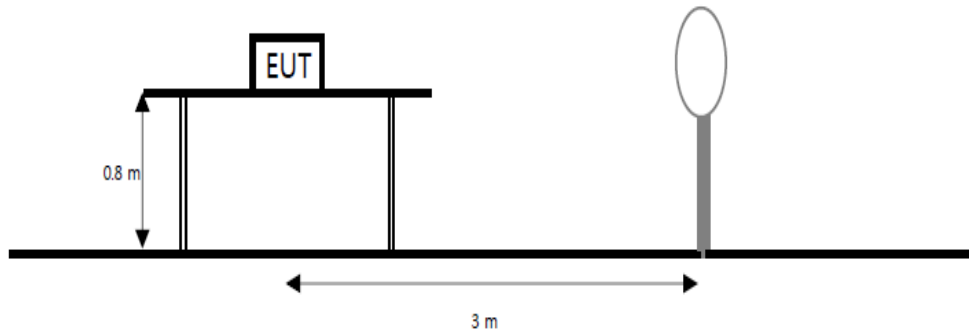
**Test mode : 802.11a UNII-3 5 745 MHz**

| Voltage | Voltage | TEMP     | Maintaining time | Measure frequency | Frequency deviation | Deviation |
|---------|---------|----------|------------------|-------------------|---------------------|-----------|
| [%]     | [V]     | [°C]     |                  | [Hz]              | [ppm]               | [%]       |
| 100     | 12      | +22(Ref) | Startup          | 5 744 974 503     | -25.50              | -0.000 44 |
|         |         |          | 2 minutes        | 5 744 974 581     | -25.42              | -0.000 44 |
|         |         |          | 5 minutes        | 5 744 974 639     | -25.36              | -0.000 44 |
|         |         |          | 10 minutes       | 5 744 974 724     | -25.28              | -0.000 44 |
|         |         | -30      | Startup          | 5 745 036 025     | 36.02               | 0.000 63  |
|         |         |          | 2 minutes        | 5 745 035 864     | 35.86               | 0.000 62  |
|         |         |          | 5 minutes        | 5 745 035 823     | 35.82               | 0.000 62  |
|         |         |          | 10 minutes       | 5 745 035 767     | 35.77               | 0.000 62  |
|         |         | -20      | Startup          | 5 745 024 751     | 24.75               | 0.000 43  |
|         |         |          | 2 minutes        | 5 745 024 723     | 24.72               | 0.000 43  |
|         |         |          | 5 minutes        | 5 745 024 709     | 24.71               | 0.000 43  |
|         |         |          | 10 minutes       | 5 745 024 687     | 24.69               | 0.000 43  |
|         |         | -10      | Startup          | 5 745 015 821     | 15.82               | 0.000 28  |
|         |         |          | 2 minutes        | 5 745 015 803     | 15.80               | 0.000 28  |
|         |         |          | 5 minutes        | 5 745 015 764     | 15.76               | 0.000 27  |
|         |         |          | 10 minutes       | 5 745 015 748     | 15.75               | 0.000 27  |
|         |         | 0        | Startup          | 5 745 006 254     | 6.25                | 0.000 11  |
|         |         |          | 2 minutes        | 5 745 006 227     | 6.23                | 0.000 11  |
|         |         |          | 5 minutes        | 5 745 006 203     | 6.20                | 0.000 11  |
|         |         |          | 10 minutes       | 5 745 006 187     | 6.19                | 0.000 11  |
|         |         | 10       | Startup          | 5 744 995 781     | -4.22               | -0.000 07 |
|         |         |          | 2 minutes        | 5 744 995 812     | -4.19               | -0.000 07 |
|         |         |          | 5 minutes        | 5 744 995 843     | -4.16               | -0.000 07 |
|         |         |          | 10 minutes       | 5 744 995 858     | -4.14               | -0.000 07 |
|         |         | 20       | Startup          | 5 744 984 771     | -15.23              | -0.000 27 |
|         |         |          | 2 minutes        | 5 744 984 793     | -15.21              | -0.000 26 |
|         |         |          | 5 minutes        | 5 744 984 812     | -15.19              | -0.000 26 |
|         |         |          | 10 minutes       | 5 744 984 827     | -15.17              | -0.000 26 |
|         |         | 30       | Startup          | 5 744 975 623     | -24.38              | -0.000 42 |
|         |         |          | 2 minutes        | 5 744 975 637     | -24.36              | -0.000 42 |
|         |         |          | 5 minutes        | 5 744 975 645     | -24.35              | -0.000 42 |
|         |         |          | 10 minutes       | 5 744 975 677     | -24.32              | -0.000 42 |
|         |         | 40       | Startup          | 5 744 966 813     | -33.19              | -0.000 58 |
|         |         |          | 2 minutes        | 5 744 966 838     | -33.16              | -0.000 58 |
|         |         |          | 5 minutes        | 5 744 966 859     | -33.14              | -0.000 58 |
|         |         |          | 10 minutes       | 5 744 966 871     | -33.13              | -0.000 58 |
|         |         | 50       | Startup          | 5 744 955 715     | -44.28              | -0.000 77 |
|         |         |          | 2 minutes        | 5 744 955 734     | -44.27              | -0.000 77 |
|         |         |          | 5 minutes        | 5 744 955 748     | -44.25              | -0.000 77 |
|         |         |          | 10 minutes       | 5 744 955 762     | -44.24              | -0.000 77 |
| 85      | 10.2    | 22       | Startup          | 5 744 974 403     | -25.60              | -0.000 45 |
|         |         |          | 2 minutes        | 5 744 974 481     | -25.52              | -0.000 44 |
|         |         |          | 5 minutes        | 5 744 974 602     | -25.40              | -0.000 44 |
|         |         |          | 10 minutes       | 5 744 974 726     | -25.27              | -0.000 44 |
| 115     | 13.8    | 22       | Startup          | 5 744 974 603     | -25.40              | -0.000 44 |
|         |         |          | 2 minutes        | 5 744 974 681     | -25.32              | -0.000 44 |
|         |         |          | 5 minutes        | 5 744 974 768     | -25.23              | -0.000 44 |
|         |         |          | 10 minutes       | 5 744 974 846     | -25.15              | -0.000 44 |

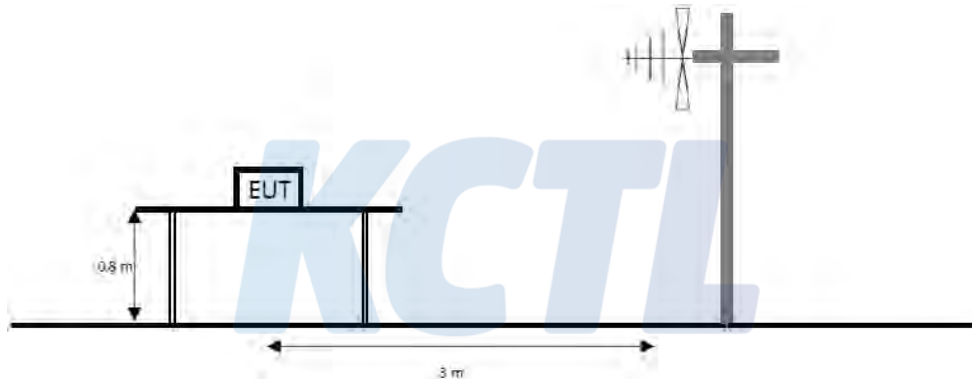
## 7.7. Spurious Emission, Band Edge and Restricted bands

### Test setup

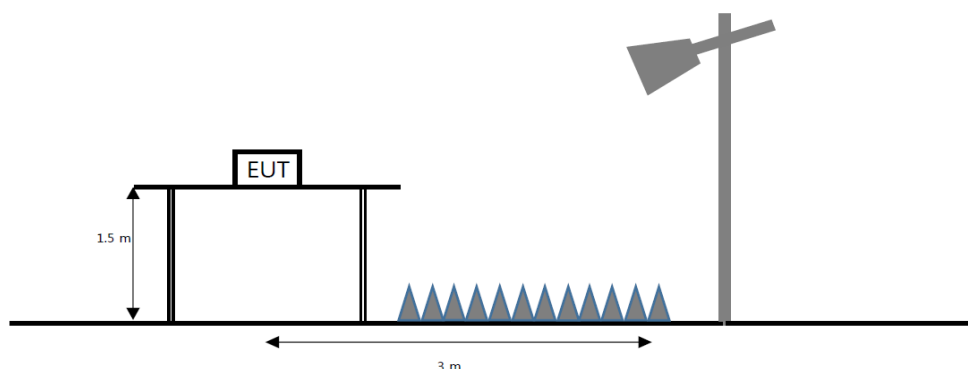
The diagram below shows the test setup that is utilized to make the measurements for emission from 9 kHz to 30 MHz Emissions



The diagram below shows the test setup that is utilized to make the measurements for emission from 30 MHz to 1 GHz emissions.



The diagram below shows the test setup that is utilized to make the measurements for emission from 1 GHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz emissions, whichever is lower.



**Limit**

According to section 15.209(a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

| Frequency (MHz) | Field strength ( $\mu\text{V}/\text{m}$ ) | Measurement distance (m) |
|-----------------|---|--------------------------|
| 0.009 - 0.490   | 2 400/F(kHz)                              | 300                      |
| 0.490 - 1.705   | 24 000/F(kHz)                             | 30                       |
| 1.705 - 30      | 30  | 30                       |
| 30 - 88         | 100**                                     | 3                        |
| 88 - 216        | 150**                                     | 3                        |
| 216 - 960       | 200**                                     | 3                        |
| Above 960       | 500                                       | 3                        |

\*\*Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54–72 MHz, 76–88 MHz, 174–216 MHz or 470–806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., Section 15.231 and 15.241.

According to section 15.205(a) and (b), only spurious emissions are permitted in any of the frequency bands listed below:

| MHz                   | MHz                   | MHz               | GHz           |
|-----------------------|-----------------------|-------------------|---------------|
| 0.009 - 0.110         | 16.42 - 16.423        | 399.9 - 410       | 4.5 - 5.15    |
| 0.495 - 0.505         | 16.694 75 - 16.695 25 | 608 - 614         | 5.35 - 5.46   |
| 2.173 5 - 2.190 5     | 16.804 25 - 16.804 75 | 960 - 1 240       | 7.25 - 7.75   |
| 4.125 - 4.128         | 25.5 - 25.67          | 1 300 - 1 427     | 8.025 - 8.5   |
| 4.177 25 - 4.177 75   | 37.5 - 38.25          | 1 435 - 1 626.5   | 9.0 - 9.2     |
| 4.207 25 - 4.207 75   | 73 - 74.6             | 1 645.5 - 1 646.5 | 9.3 - 9.5     |
| 6.215 - 6.218         | 74.8 - 75.2           | 1 660 - 1 710     | 10.6 - 12.7   |
| 6.267 75 - 6.268 25   | 108 - 121.94          | 1 718.8 - 1 722.2 | 13.25 - 13.4  |
| 6.311 75 - 6.312 25   | 123 - 138             | 2 200 - 2 300     | 14.47 - 14.5  |
| 8.291 - 8.294         | 149.9 - 150.05        | 2 310 - 2 390     | 15.35 - 16.2  |
| 8.362 - 8.366         | 156.524 75 - 156.525  | 2 483.5 - 2 500   | 17.7 - 21.4   |
| 8.376 25 - 8.386 75   | 25                    | 2 690 - 2 900     | 22.01 - 23.12 |
| 8.414 25 - 8.414 75   | 156.7 - 156.9         | 3 260 - 3 267     | 23.6 - 24.0   |
| 12.29 - 12.293        | 162.012 5 - 167.17    | 3 332 - 3 339     | 31.2 - 31.8   |
| 12.519 75 - 12.520 25 | 167.72 - 173.2        | 3 345.8 - 3 358   | 36.43 - 36.5  |
| 12.576 75 - 12.577 25 | 240 - 285             | 3 600 - 4 400     | Above 38.6    |
| 13.36 - 13.41         | 322 - 335.4           |                   |               |

The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in section 15.209. At frequencies equal to or less than 1 000 MHz, compliance with the limits in section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1 000 MHz, compliance with the emission limits in section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in section 15.35 apply to these measurements.

According to section 15.407(b), undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

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



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

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

**KCTL**

**Test procedure**ANSI C63.10-2013 Section 6.4.6  
KDB 558074 D01 V05r02**Test settings****Peak field strength measurements**

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = as specified in table
3. VBW  $\geq$  (3 $\times$ RBW)
4. Detector = peak
5. Sweep time = auto
6. Trace mode = max hold
7. Allow sweeps to continue until the trace stabilizes

**Table. RBW as a function of frequency**

| Frequency           | RBW                |
|---------------------|--------------------|
| 9 kHz to 150 kHz    | 200 Hz to 300 Hz   |
| 0.15 MHz to 30 MHz  | 9 kHz to 10 kHz    |
| 30 MHz to 1 000 MHz | 100 kHz to 120 kHz |
| > 1 000 MHz         | 1 MHz              |

**Average field strength measurements****Trace averaging with continuous EUT transmission at full power**

If the EUT can be configured or modified to transmit continuously (D  $\geq$  98%), then the average emission levels shall be measured using the following method (with EUT transmitting continuously):

1. RBW = 1 MHz (unless otherwise specified).
2. VBW  $\geq$  (3 $\times$ RBW).
3. Detector = RMS (power averaging), if [span / (# of points in sweep)]  $\leq$  (RBW / 2). Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If this condition cannot be satisfied, then the detector mode shall be set to peak.
4. Averaging type = power (i.e., rms):
  - 1) As an alternative, the detector and averaging type may be set for linear voltage averaging.
  - 2) Some instruments require linear display mode to use linear voltage averaging. Log or dB averaging shall not be used.
5. Sweep time = auto.
6. Perform a trace average of at least 100 traces.

**Trace averaging across ON and OFF times of the EUT transmissions followed by duty cycle correction**

If continuous transmission of the EUT (D  $\geq$  98%) cannot be achieved and the duty cycle is constant (duty cycle variations are less than  $\pm 2\%$ ), then the following procedure shall be used:

1. The EUT shall be configured to operate at the maximum achievable duty cycle.
2. Measure the duty cycle D of the transmitter output signal as described in 11.6.
3. RBW = 1 MHz (unless otherwise specified).
4. VBW  $\geq$  [3  $\times$  RBW].
5. Detector = RMS (power averaging), if [span / (# of points in sweep)]  $\leq$  (RBW / 2). Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If this

condition cannot be satisfied, then the detector mode shall be set to peak.

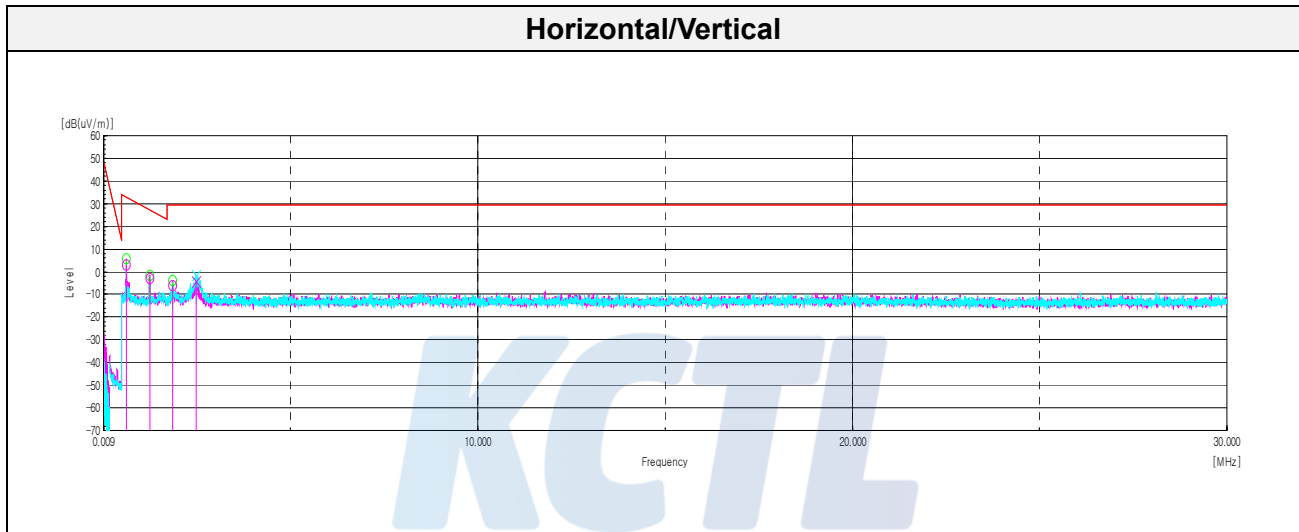
6. Averaging type = power (i.e., rms):
  - 1) As an alternative, the detector and averaging type may be set for linear voltage averaging.
  - 2) Some instruments require linear display mode to use linear voltage averaging. Log or dB averaging shall not be used.
7. Sweep time = auto.
8. Perform a trace average of at least 100 traces.
9. A correction factor shall be added to the measurement results prior to comparing with the emission limit to compute the emission level that would have been measured had the test been performed at 100% duty cycle. The correction factor is computed as follows:
  - 1) If power averaging (rms) mode was used in step f), then the applicable correction factor is  $[10 \log (1 / D)]$ , where D is the duty cycle.
  - 2) If linear voltage averaging mode was used in step f), then the applicable correction factor is  $[20 \log (1 / D)]$ , where D is the duty cycle.
  - 3) If a specific emission is demonstrated to be continuous ( $D \geq 98\%$ ) rather than turning ON and OFF with with the transmit cycle, then no duty cycle correction is required for that emission.

**Notes:**

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection and frequency above 1 GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 1 kHz ( $\geq 1/T$ ) for Average detection (AV) at frequency above 1 GHz. (where T = pulse width)
2.  $f < 30$  MHz, extrapolation factor of 40 dB/decade of distance.  $F_d = 40 \log(D_m/D_s)$   
 $f \geq 30$  MHz, extrapolation factor of 20 dB/decade of distance.  $F_d = 20 \log(D_m/D_s)$   
Where:  
 $F_d$  = Distance factor in dB  
 $D_m$  = Measurement distance in meters  
 $D_s$  = Specification distance in meters
3. Factors(dB) = Antenna factor(dB/m) + Cable loss(dB) + or Amp. gain(dB) + or  $F_d$ (dB)
4. The worst-case emissions are reported however emissions whose levels were not within 20 dB of respective limits were not reported.
5. Average test would be performed if the peak result were greater than the average limit.
6. <sup>1)</sup> means restricted band.
7. According to part 15.31(f)(2), an extrapolation factor of 40 dB/decade is applied because measured distance of radiated emission is 3 m.
8. Below 30 MHz frequency range, In order to search for the worst result, all orientations about parallel, perpendicular, and ground-parallel were investigated then reported. when the emission level was higher than 20 dB of the limit, then the following statement shall be made: "No spurious emissions were detected within 20 dB of the limit."
9. Radiated test is performed at the highest power of 802.11HT\_n20 and 802.11VHT\_ac20.  
(SISO: 802.11HT\_n20 / MIMO: 802.11VHT\_ac20)
10. Radiated test is performed at the highest power of 802.11HT\_n40 and 802.11VHT\_ac40.  
(SISO, MIMO: 802.11HT\_n40)

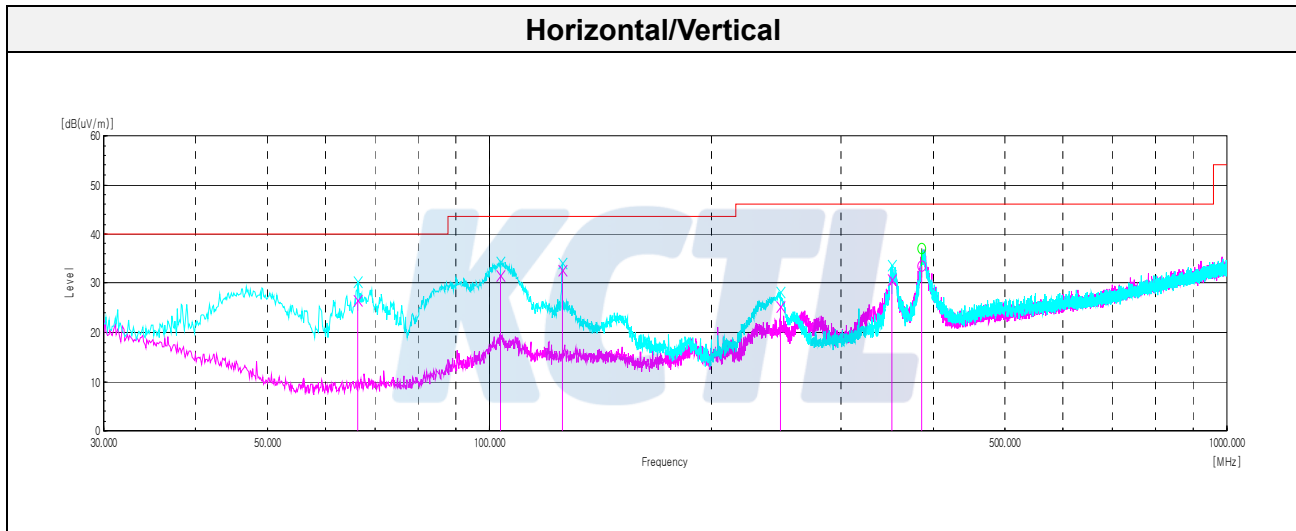
**Test results (Below 30 MHz) – Worst case: 802.11a\_UNII 3\_MIMO Highest frequency**

| Frequency<br>(MHz)     | Pol.<br>(V/H) | Reading<br>(dB( $\mu$ V)) | Amp. + Cable<br>(dB) | Antenna<br>Factor<br>(dB) | DCF<br>(dB) | Result<br>(dB( $\mu$ V/m)) | Limit<br>(dB( $\mu$ V/m)) | Margin<br>(dB) |
|------------------------|---------------|---------------------------|----------------------|---------------------------|-------------|----------------------------|---------------------------|----------------|
| <b>Quasi peak data</b> |               |                           |                      |                           |             |                            |                           |                |
| 0.62                   | H             | 55.00                     | 20.00                | -32.20                    | -           | 2.80                       | 32.70                     | 29.90          |
| 1.24                   | H             | 49.20                     | 20.01                | -32.14                    | -           | -2.93                      | 27.20                     | 30.13          |
| 1.85                   | H             | 45.90                     | 20.04                | -32.06                    | -           | -6.12                      | 29.50                     | 35.62          |
| 2.48                   | V             | 47.80                     | 20.07                | -31.96                    | -           | -4.09                      | 29.50                     | 33.59          |

**Horizontal/Vertical**

**Test results (Below 1 000 MHz) – Worst case: Worst case: 802.11a\_UNII 3\_MIMO Highest frequency**

| Frequency<br>(MHz)     | Pol.<br>(V/H) | Reading<br>(dB( $\mu$ V)) | Amp. + Cable<br>(dB) | Antenna<br>Factor<br>(dB) | DCF<br>(dB) | Result<br>(dB( $\mu$ V/m)) | Limit<br>(dB( $\mu$ V/m)) | Margin<br>(dB) |
|------------------------|---------------|---------------------------|----------------------|---------------------------|-------------|----------------------------|---------------------------|----------------|
| <b>Quasi peak data</b> |               |                           |                      |                           |             |                            |                           |                |
| 66.38                  | V             | 36.40                     | 12.53                | -29.78                    | -           | 26.65                      | 40.00                     | 13.35          |
| 103.48                 | V             | 35.30                     | 17.49                | -29.12                    | -           | 31.57                      | 43.50                     | 11.93          |
| 125.55                 | V             | 39.70                     | 18.39                | -28.80                    | -           | 32.69                      | 43.50                     | 10.81          |
| 248.01                 | V             | 42.00                     | 18.50                | -27.31                    | -           | 25.19                      | 46.00                     | 20.81          |
| 351.31                 | V             | 32.70                     | 20.65                | -26.26                    | -           | 30.69                      | 46.00                     | 15.31          |
| 385.51                 | H             | 33.40                     | 21.38                | -25.97                    | -           | 33.01                      | 46.00                     | 12.99          |

**Horizontal/Vertical**

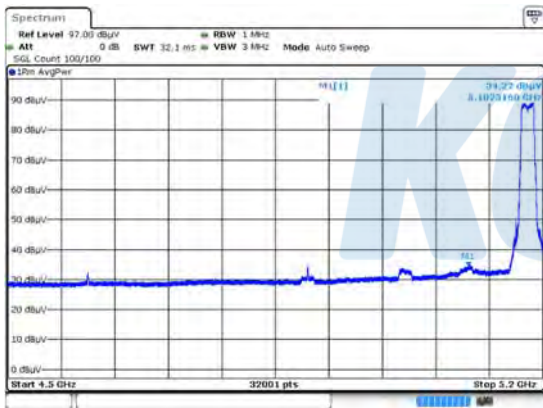
**Test results (Above 1 000 MHz)**

**802.11a UNII 1 ANT 0**

**Lowest Channel (5 180 MHz)**

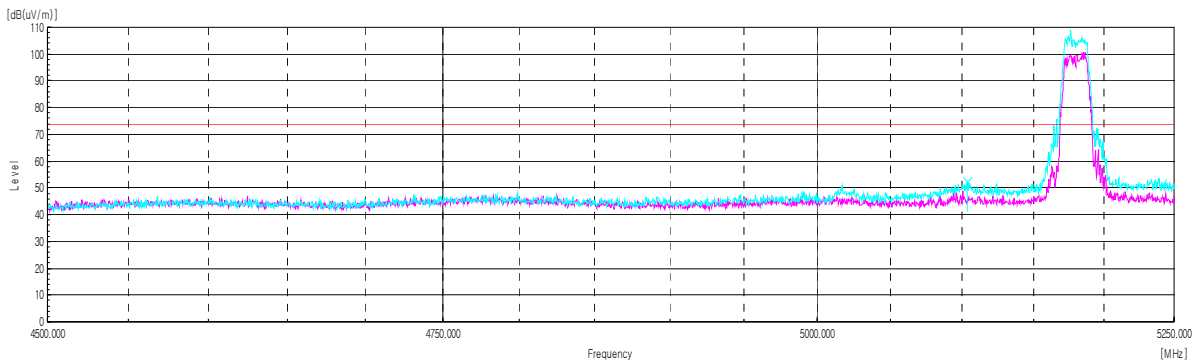
| Frequency               | Pol.  | Reading  | Antenna Factor | Amp. + Cable | DCF  | Result     | Limit      | Margin |
|-------------------------|-------|----------|----------------|--------------|------|------------|------------|--------|
| (MHz)                   | (V/H) | (dB(μV)) | (dB)           | (dB)         | (dB) | (dB(μV/m)) | (dB(μV/m)) | (dB)   |
| <b>Peak data</b>        |       |          |                |              |      |            |            |        |
| 5 102.32 <sup>1)</sup>  | V     | 41.77    | 34.24          | -23.91       | -    | 52.10      | 74.00      | 21.90  |
| 6 906.99                | V     | 63.44    | 35.60          | -50.74       | -    | 48.30      | 68.20      | 19.90  |
| 10 356.55               | H     | 57.55    | 37.60          | -47.95       | -    | 47.20      | 68.20      | 21.00  |
| 15 540.78 <sup>1)</sup> | H     | 40.90    | 40.42          | -41.12       | -    | 40.20      | 74.00      | 33.80  |
| <b>Average Data</b>     |       |          |                |              |      |            |            |        |
| 5 102.32 <sup>1)</sup>  | V     | 34.22    | 34.24          | -23.91       | 0.22 | 44.77      | 54.00      | 9.23   |

**Average data (5 102.32 MHz)**

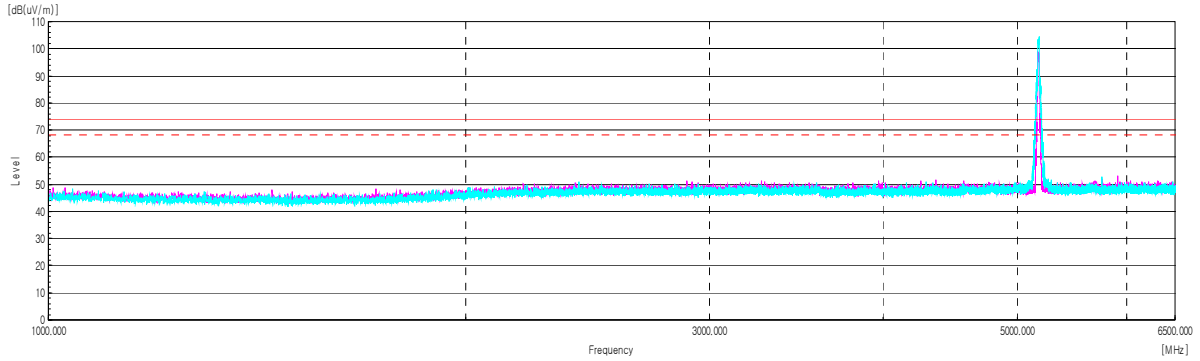


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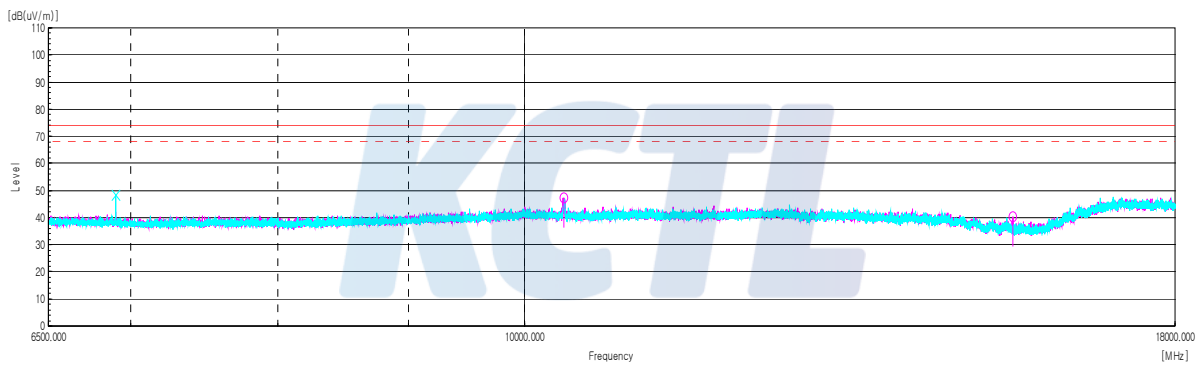
**Horizontal/Vertical for Band-edge**



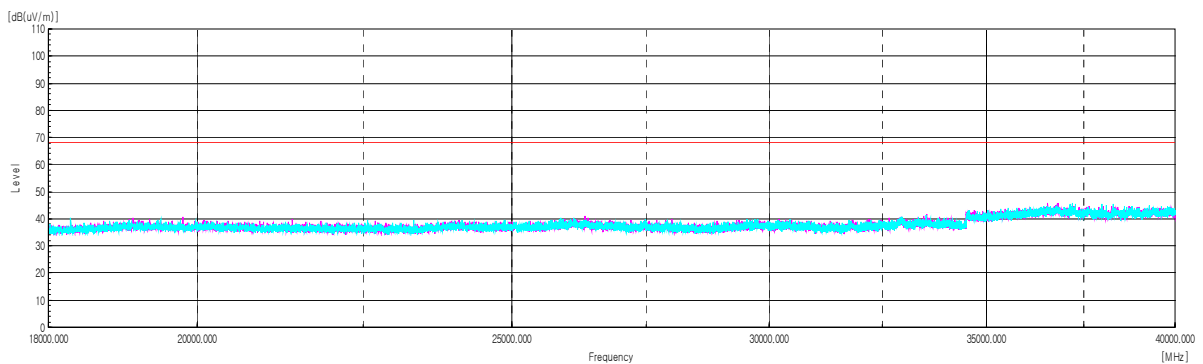
**Horizontal/Vertical for 1 GHz ~ 6.5 GHz**



**Horizontal/Vertical for 6.5 GHz ~ 18 GHz**



**Horizontal/Vertical for 18 GHz ~ 40 GHz**



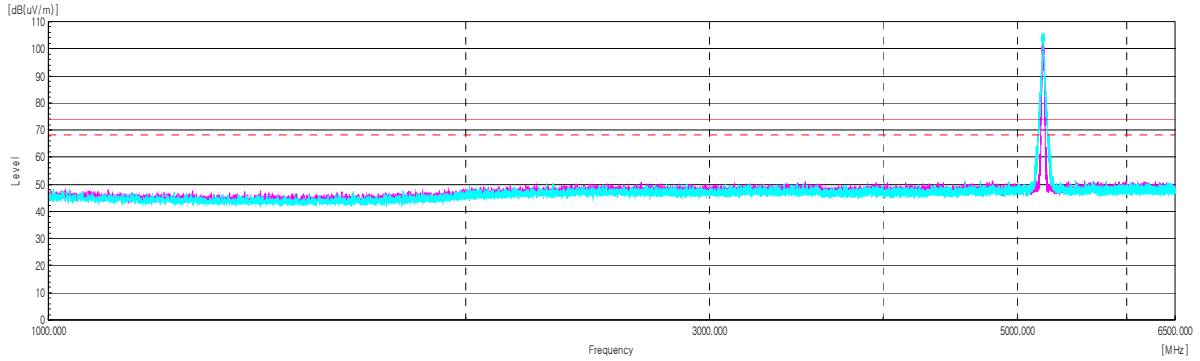
**Middle Channel (5 220 MHz)**

| Frequency<br>(MHz)   | Pol.<br>(V/H) | Reading<br>(dB( $\mu V$ )) | Antenna<br>Factor<br>(dB) | Amp. + Cable<br>(dB) | DCF<br>(dB) | Result<br>(dB( $\mu V/m$ )) | Limit<br>(dB( $\mu V/m$ )) | Margin<br>(dB) |
|--|---------------|----------------------------|---------------------------|----------------------|-------------|-----------------------------|----------------------------|----------------|
| <b>Peak data</b>   |               |                            |                           |                      |             |                             |                            |                |
| 6 960.03   | V             | 62.25                      | 35.60                     | -50.75               | -           | 47.10                       | 68.20                      | 21.10          |
| 10 440.25  | H             | 60.20                      | 37.60                     | -47.90               | -           | 49.90                       | 68.20                      | 18.30          |
| 15 657.70 <sup>1)</sup>  | H             | 48.01                      | 40.46                     | -40.57               | -           | 47.90                       | 74.00                      | 26.10          |
| <b>Average Data</b>  |               |                            |                           |                      |             |                             |                            |                |
| No spurious emissions were detected within 20 dB of the limit. |               |                            |                           |                      |             |                             |                            |                |

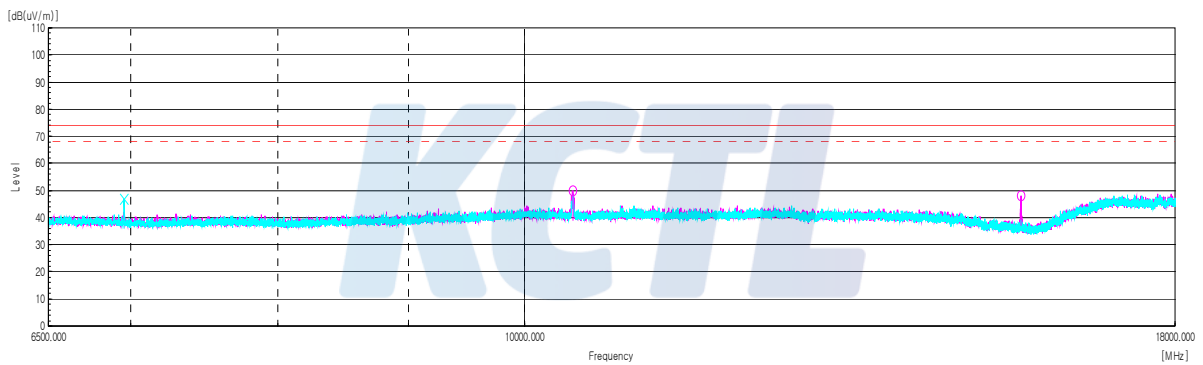
**KCTL**



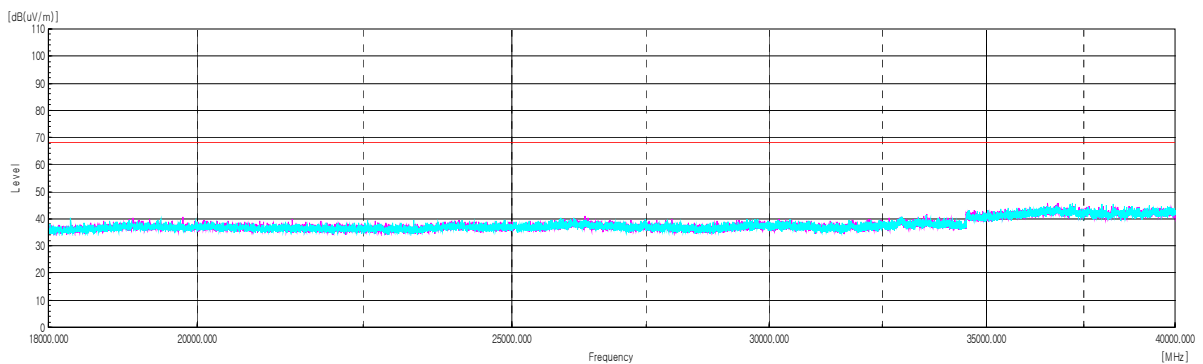
**Horizontal/Vertical for 1 GHz ~ 6.5 GHz**



**Horizontal/Vertical for 6.5 GHz ~ 18 GHz**



**Horizontal/Vertical for 18 GHz ~ 40 GHz**

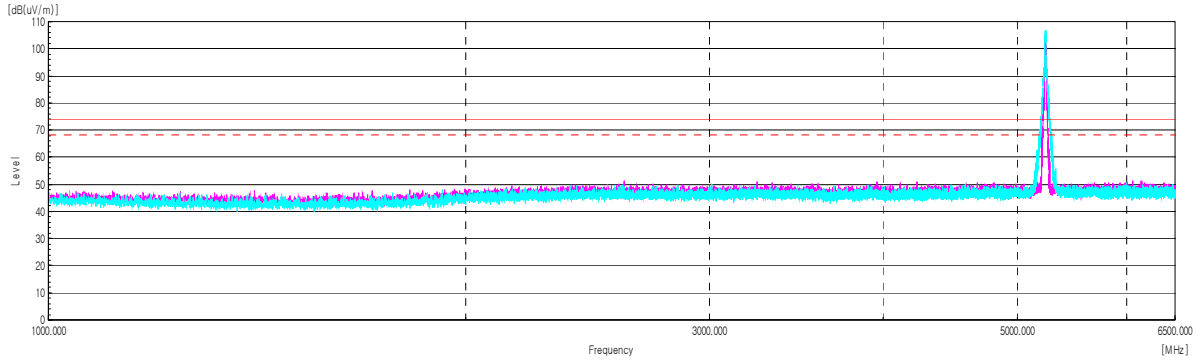


**Highest Channel (5 240 MHz)**

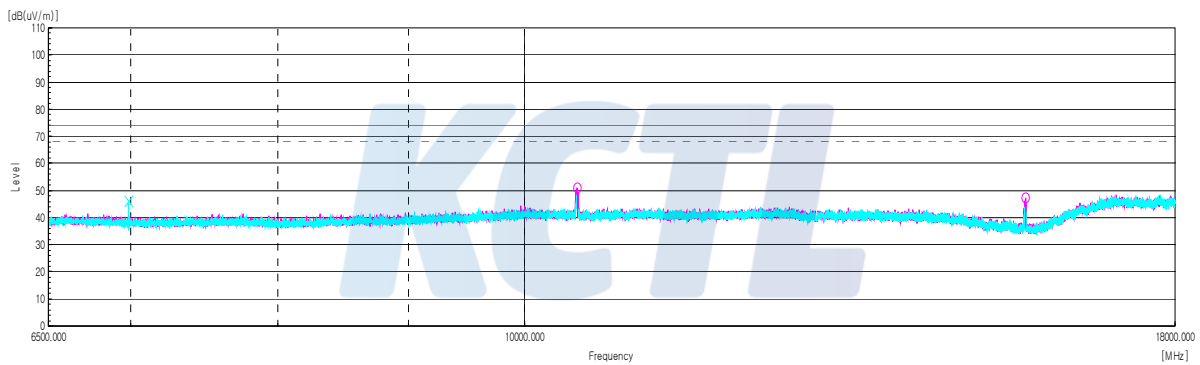
| Frequency<br>(MHz)   | Pol.<br>(V/H) | Reading<br>(dB( $\mu V$ )) | Antenna<br>Factor<br>(dB) | Amp. + Cable<br>(dB) | DCF<br>(dB) | Result<br>(dB( $\mu V/m$ )) | Limit<br>(dB( $\mu V/m$ )) | Margin<br>(dB) |
|--|---------------|----------------------------|---------------------------|----------------------|-------------|-----------------------------|----------------------------|----------------|
| <b>Peak data</b>   |               |                            |                           |                      |             |                             |                            |                |
| 6 986.86   | V             | 61.56                      | 35.60                     | -50.76               | -           | 46.40                       | 68.20                      | 21.80          |
| 10 485.61  | H             | 61.27                      | 37.60                     | -47.87               | -           | 51.00                       | 68.20                      | 17.20          |
| 15 727.34 <sup>1)</sup>  | H             | 47.05                      | 40.49                     | -40.24               | -           | 47.30                       | 74.00                      | 26.70          |
| <b>Average Data</b>  |               |                            |                           |                      |             |                             |                            |                |
| No spurious emissions were detected within 20 dB of the limit. |               |                            |                           |                      |             |                             |                            |                |

**KCTL**

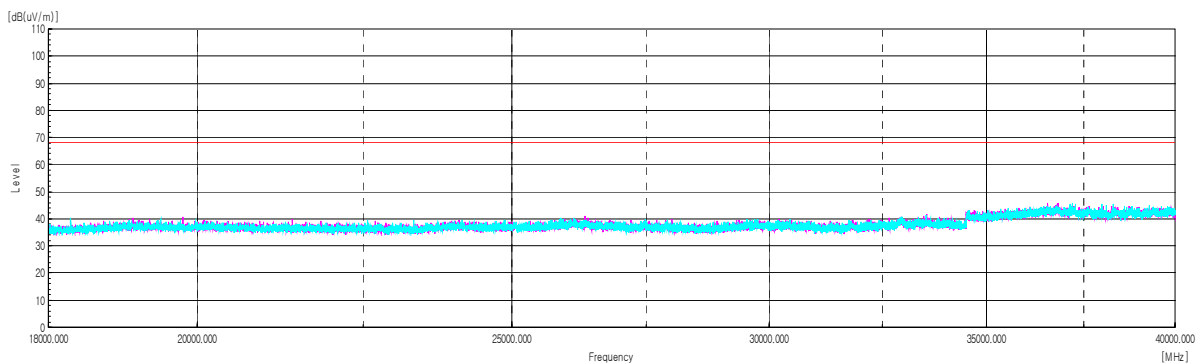
**Horizontal/Vertical for 1 GHz ~ 6.5 GHz**



**Horizontal/Vertical for 6.5 GHz ~ 18 GHz**



**Horizontal/Vertical for 18 GHz ~ 40 GHz**

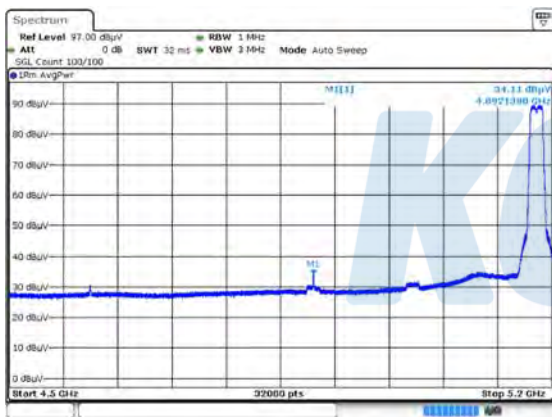


**802.11a UNII 1 ANT 1**

**Lowest Channel (5 180 MHz)**

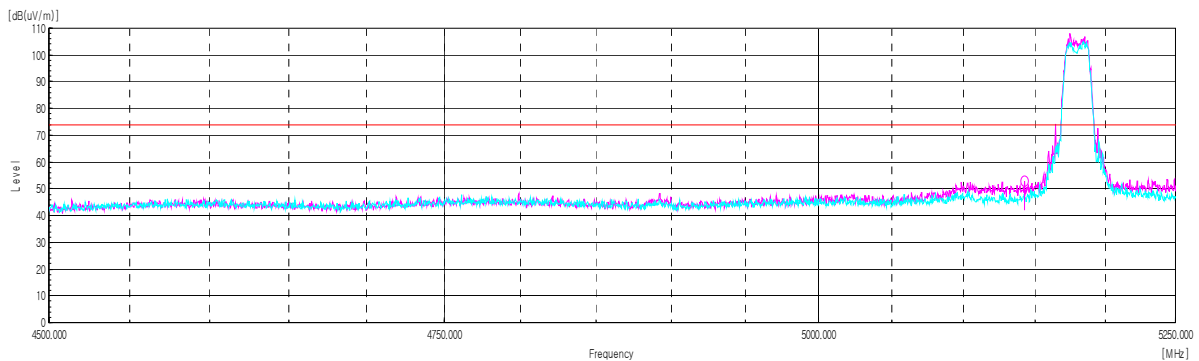
| Frequency               | Pol.  | Reading         | Antenna Factor | Amp. + Cable | DCF  | Result            | Limit             | Margin |
|-------------------------|-------|-----------------|----------------|--------------|------|-------------------|-------------------|--------|
| (MHz)                   | (V/H) | (dB( $\mu V$ )) | (dB)           | (dB)         | (dB) | (dB( $\mu V/m$ )) | (dB( $\mu V/m$ )) | (dB)   |
| <b>Peak data</b>        |       |                 |                |              |      |                   |                   |        |
| 4 892.14 <sup>1)</sup>  | H     | 43.00           | 34.12          | -24.22       | -    | 52.90             | 74.00             | 21.10  |
| 6 906.36                | H     | 64.14           | 35.60          | -50.74       | -    | 49.00             | 68.20             | 19.20  |
| 10 359.74               | V     | 57.94           | 37.60          | -47.94       | -    | 47.60             | 68.20             | 20.60  |
| 15 548.45 <sup>1)</sup> | H     | 37.56           | 40.42          | -41.08       | -    | 36.90             | 74.00             | 37.10  |
| <b>Average Data</b>     |       |                 |                |              |      |                   |                   |        |
| 4 892.14 <sup>1)</sup>  | H     | 34.11           | 34.12          | -24.22       | 0.22 | 44.23             | 54.00             | 9.77   |

**Average data (4 892.14 MHz)**

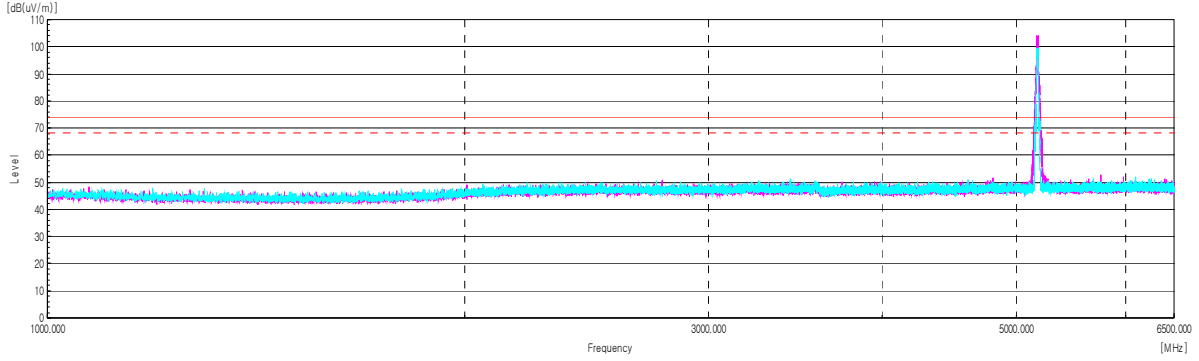


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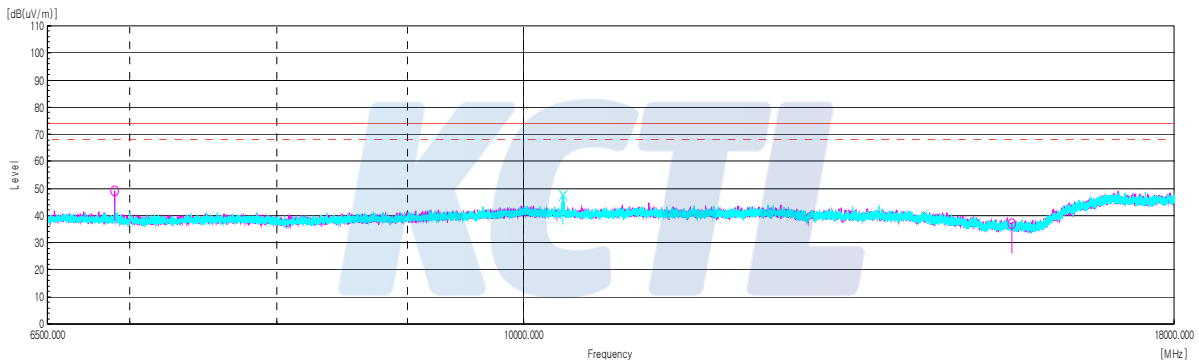
**Horizontal/Vertical for Band-edge**



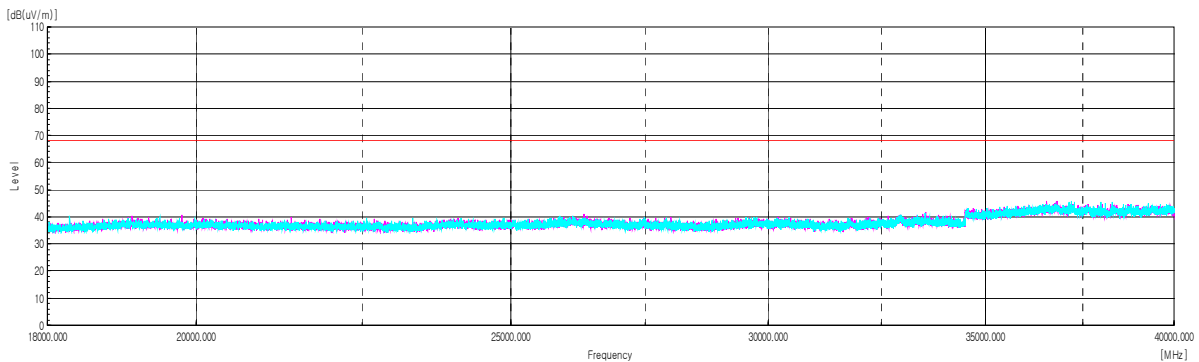
**Horizontal/Vertical for 1 GHz ~ 6.5 GHz**



**Horizontal/Vertical for 6.5 GHz ~ 18 GHz**



**Horizontal/Vertical for 18 GHz ~ 40 GHz**

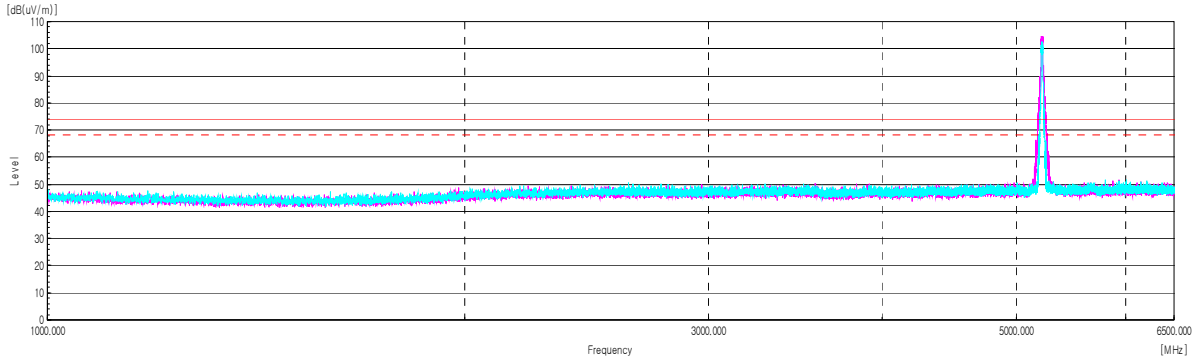


**Middle Channel (5 220 MHz)**

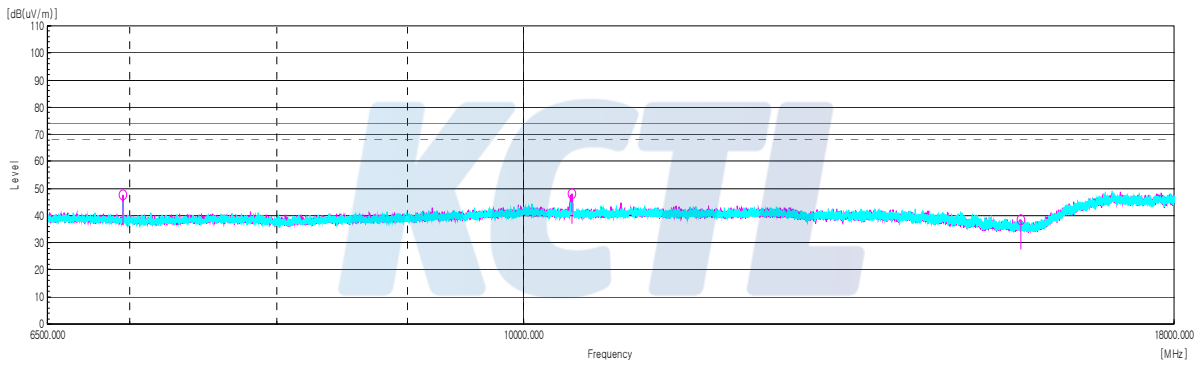
| Frequency<br>(MHz)   | Pol.<br>(V/H) | Reading<br>(dB( $\mu V$ )) | Antenna<br>Factor<br>(dB) | Amp. + Cable<br>(dB) | DCF<br>(dB) | Result<br>(dB( $\mu V/m$ )) | Limit<br>(dB( $\mu V/m$ )) | Margin<br>(dB) |
|--|---------------|----------------------------|---------------------------|----------------------|-------------|-----------------------------|----------------------------|----------------|
| <b>Peak data</b>   |               |                            |                           |                      |             |                             |                            |                |
| 6 960.03   | H             | 62.85                      | 35.60                     | -50.75               | -           | 47.70                       | 68.20                      | 20.50          |
| 10 442.80  | H             | 58.39                      | 37.60                     | -47.89               | -           | 48.10                       | 68.20                      | 20.10          |
| 15 671.12 <sup>1)</sup>  | H             | 38.74                      | 40.47                     | -40.51               | -           | 38.70                       | 74.00                      | 35.30          |
| <b>Average Data</b>  |               |                            |                           |                      |             |                             |                            |                |
| No spurious emissions were detected within 20 dB of the limit. |               |                            |                           |                      |             |                             |                            |                |

**KCTL**

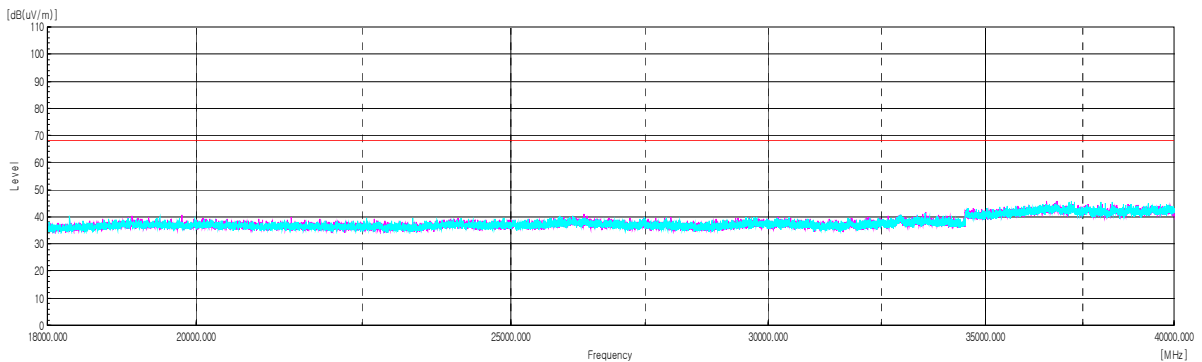
**Horizontal/Vertical for 1 GHz ~ 6.5 GHz**



**Horizontal/Vertical for 6.5 GHz ~ 18 GHz**



**Horizontal/Vertical for 18 GHz ~ 40 GHz**



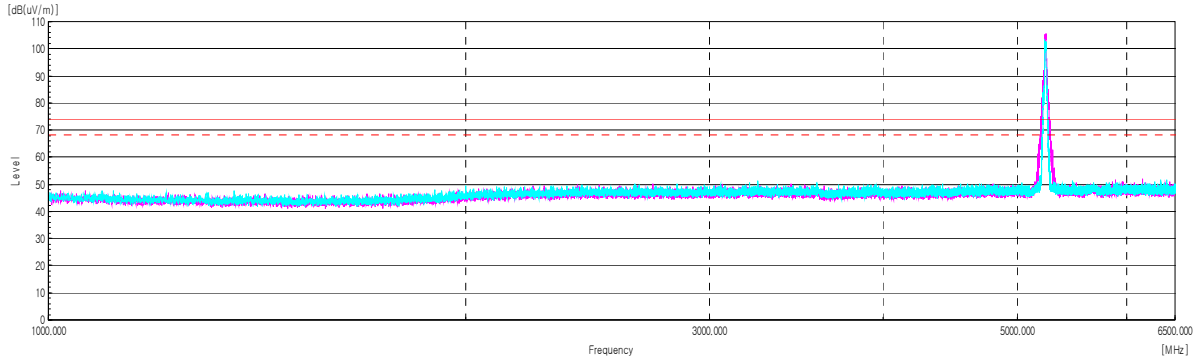
**Highest Channel (5 240 MHz)**

| Frequency<br>(MHz)   | Pol.<br>(V/H) | Reading<br>(dB( $\mu V$ )) | Antenna<br>Factor<br>(dB) | Amp. + Cable<br>(dB) | DCF<br>(dB) | Result<br>(dB( $\mu V/m$ )) | Limit<br>(dB( $\mu V/m$ )) | Margin<br>(dB) |
|--|---------------|----------------------------|---------------------------|----------------------|-------------|-----------------------------|----------------------------|----------------|
| <b>Peak data</b>   |               |                            |                           |                      |             |                             |                            |                |
| 6 986.86   | H             | 61.46                      | 35.60                     | -50.76               | -           | 46.30                       | 68.20                      | 21.90          |
| 10 486.25  | H             | 61.17                      | 37.60                     | -47.87               | -           | 50.90                       | 68.20                      | 17.30          |
| 15 714.57 <sup>1)</sup>  | H             | 40.31                      | 40.49                     | -40.30               | -           | 40.50                       | 74.00                      | 33.50          |
| <b>Average Data</b>  |               |                            |                           |                      |             |                             |                            |                |
| No spurious emissions were detected within 20 dB of the limit. |               |                            |                           |                      |             |                             |                            |                |

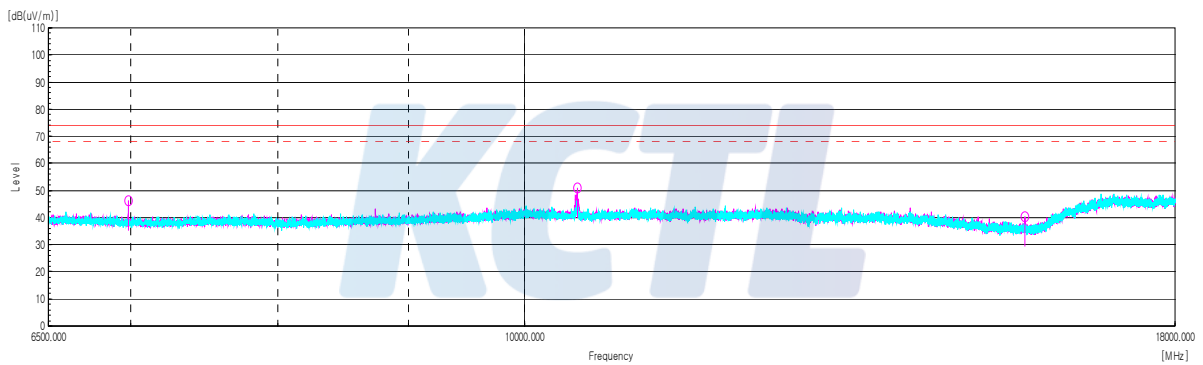
**KCTL**



**Horizontal/Vertical for 1 GHz ~ 6.5 GHz**



**Horizontal/Vertical for 6.5 GHz ~ 18 GHz**



**Horizontal/Vertical for 18 GHz ~ 40 GHz**

