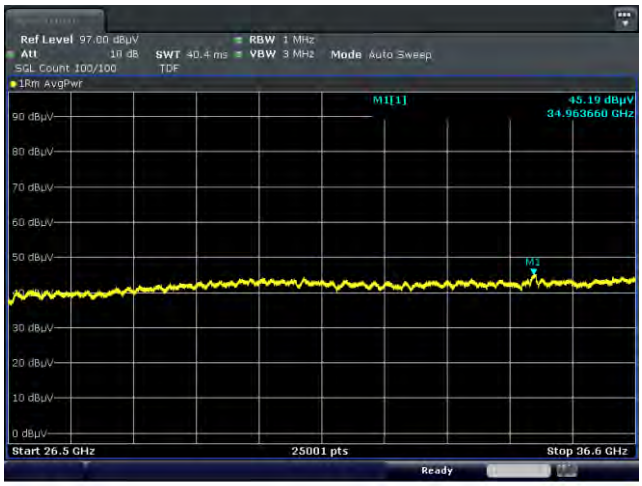
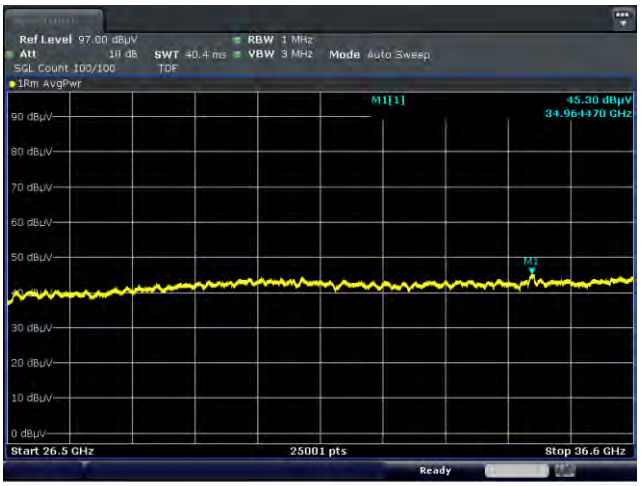
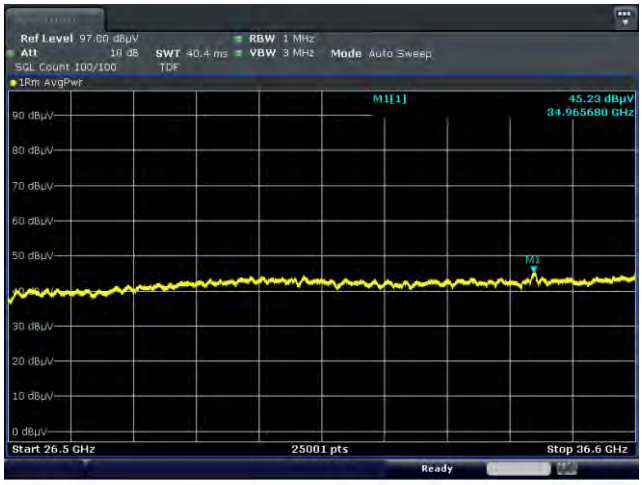
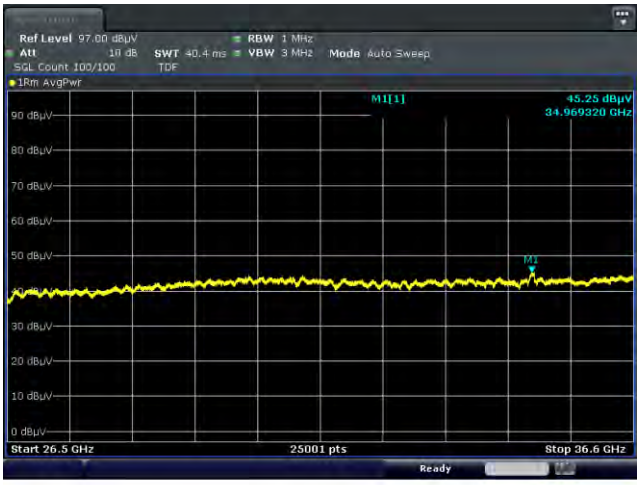
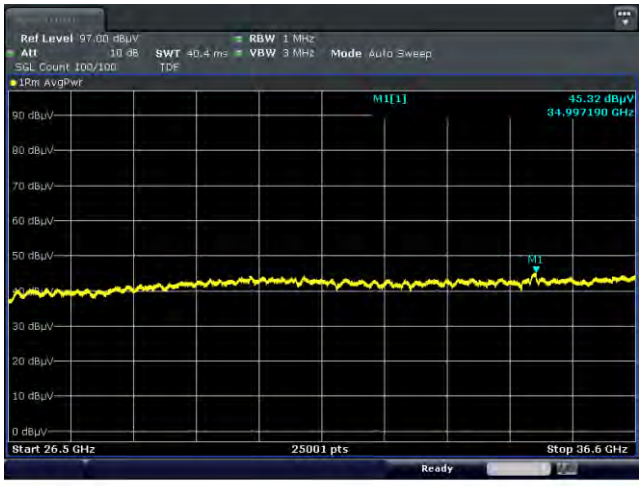
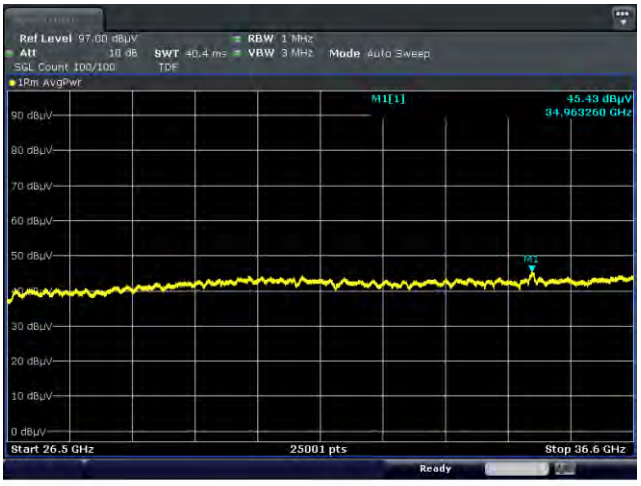
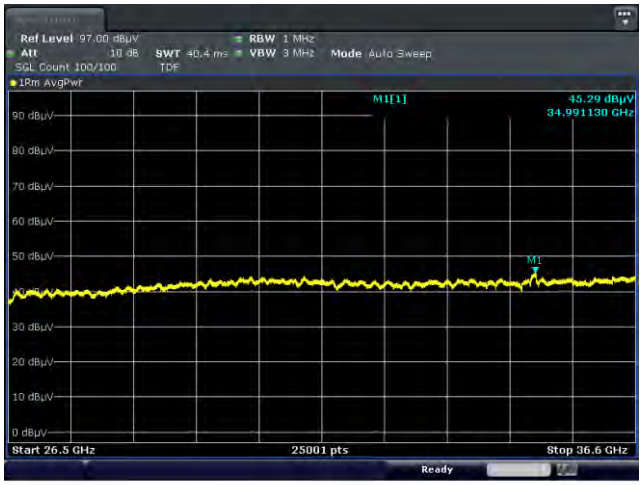
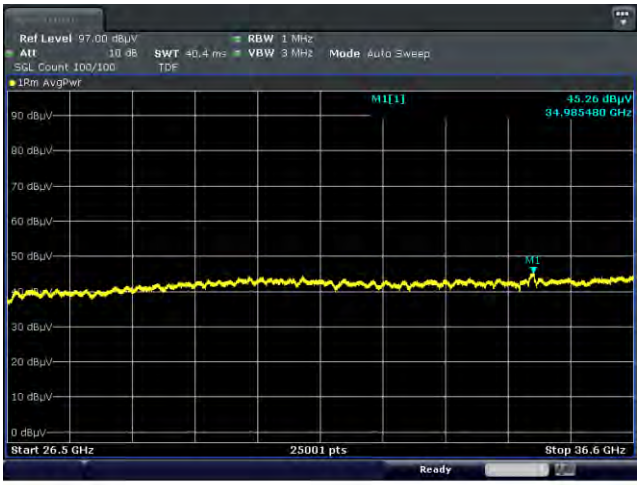
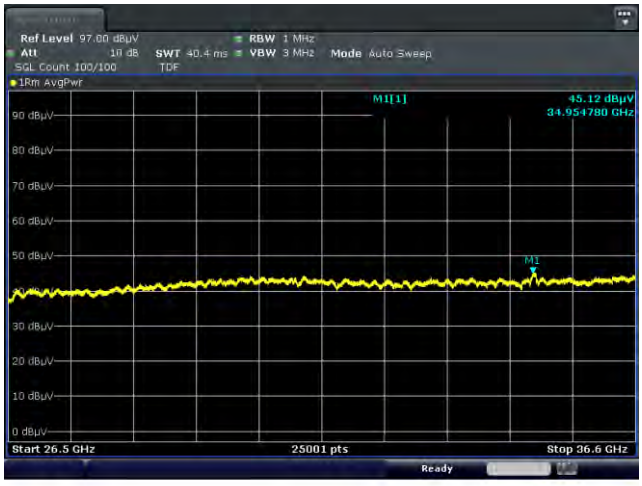
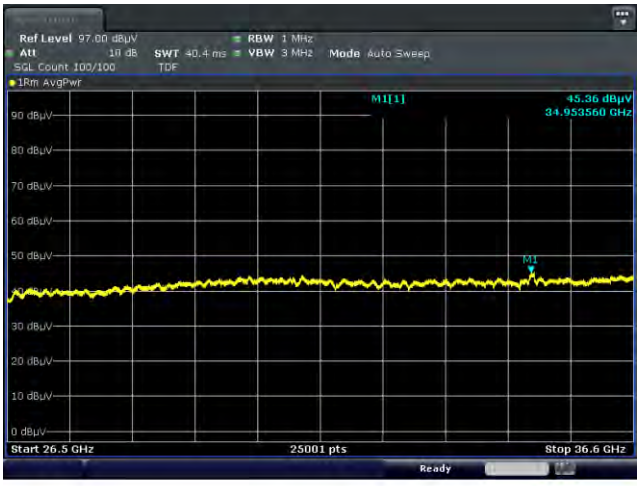
| Antenna 1(K patch), n260 50 MHz 1 CC SISO [26.5 GHz ~ 36.6 GHz] | |
|---|---|
| **Low Channel Pol. H** | **Low Channel Pol. V** |
|  |  |
| **Middle Channel Pol. H** | **Middle Channel Pol. V** |
|  |  |
| **High Channel Pol. H** | **High Channel Pol. V** |
|  |  |

| Antenna 1(K patch), n260 50 MHz 1 CC MIMO [26.5 GHz ~ 36.6 GHz] | |
|---|---|
| **Low Channel Pol. H** | **Low Channel Pol. V** |
|  |  |
| **Middle Channel Pol. H** | **Middle Channel Pol. V** |
|  |  |
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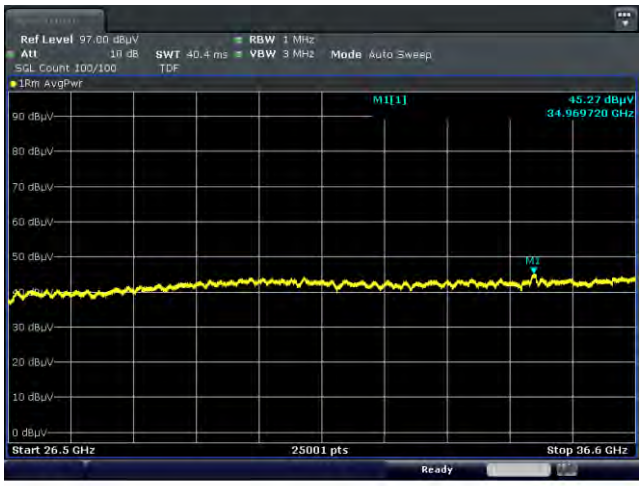
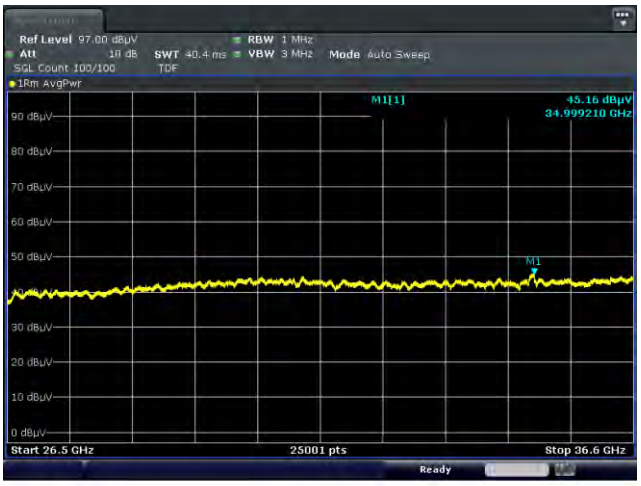
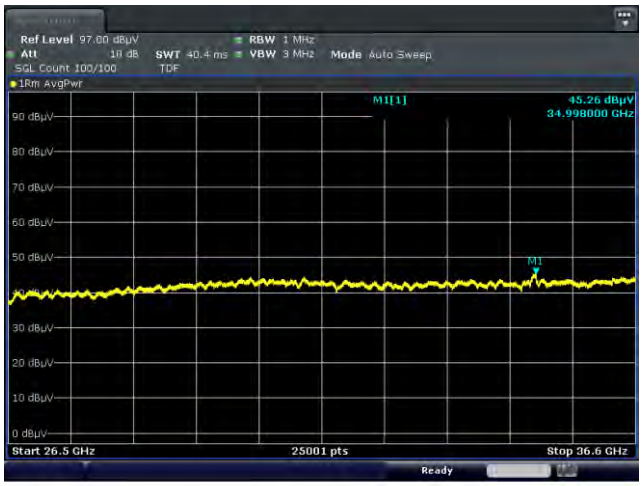
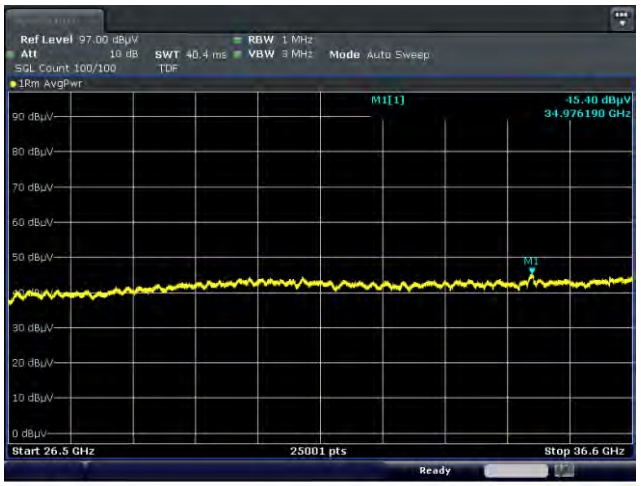
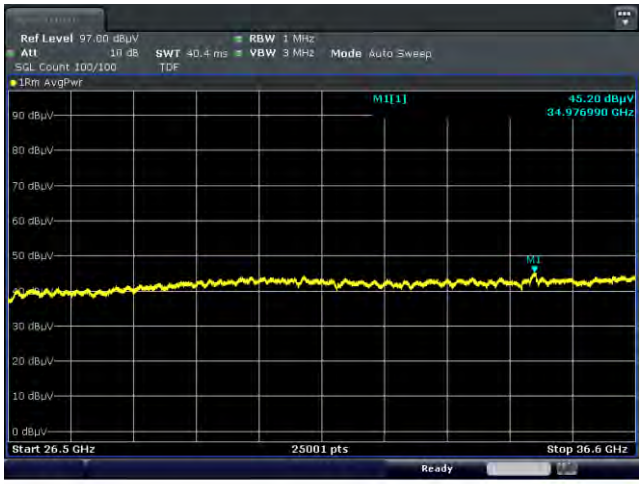
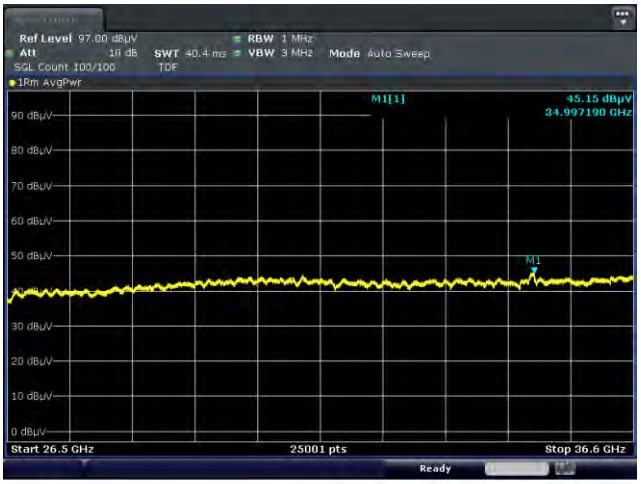
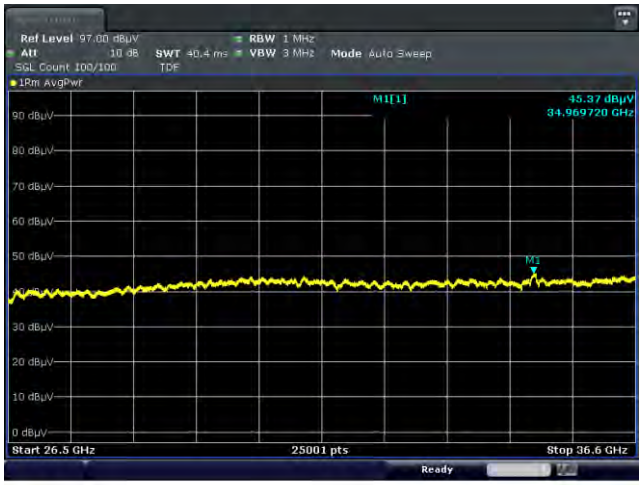
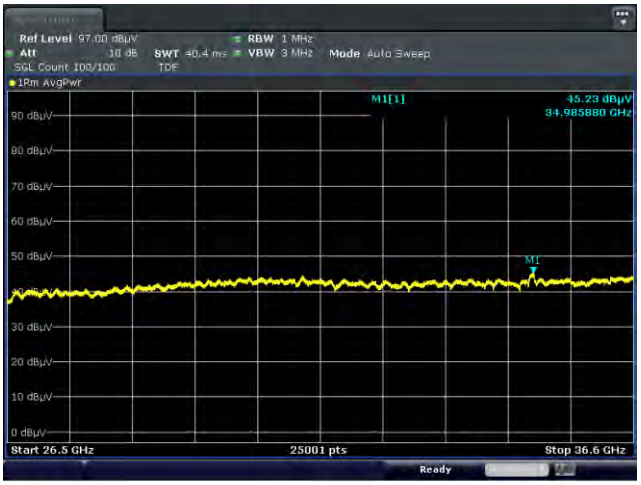
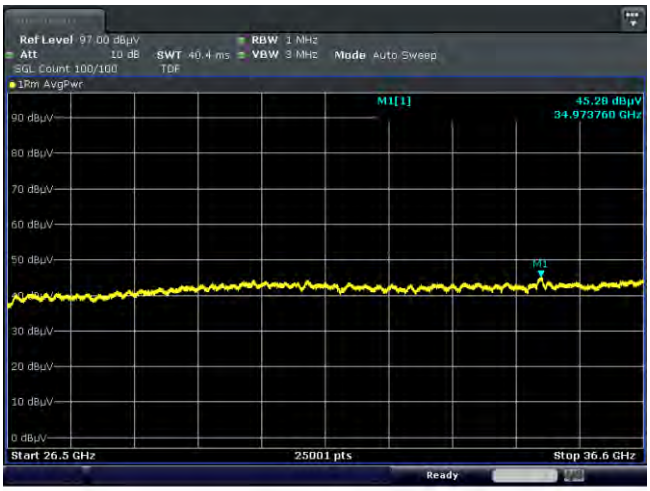
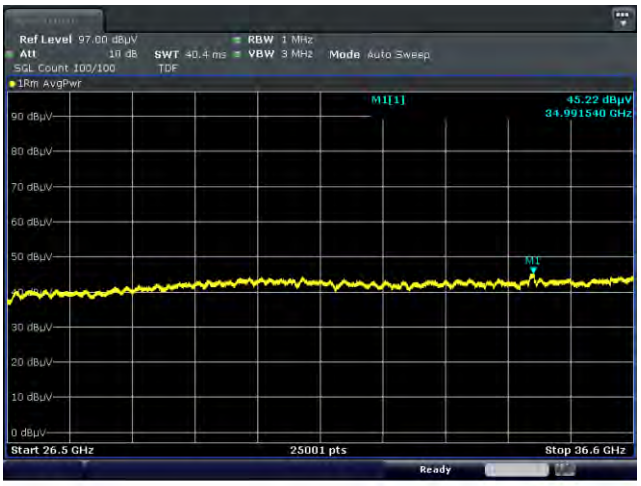
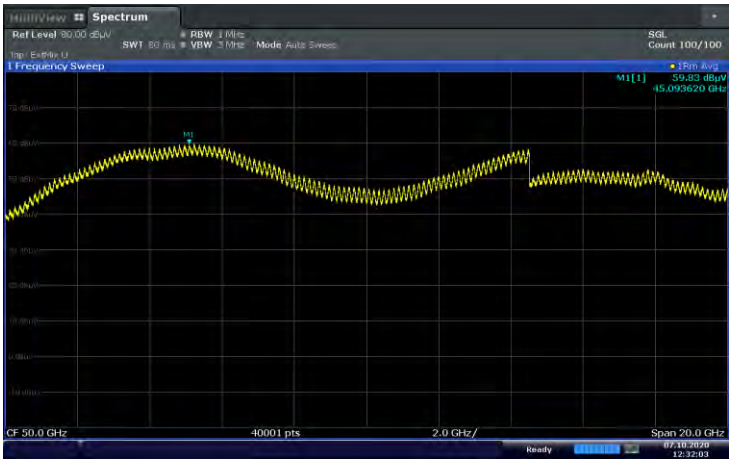
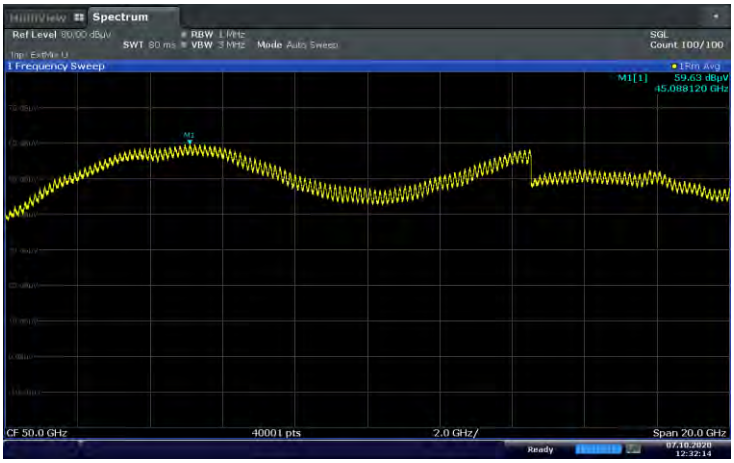
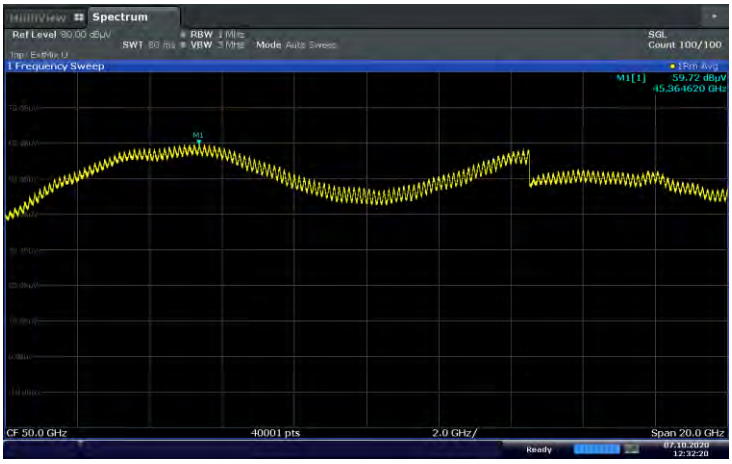
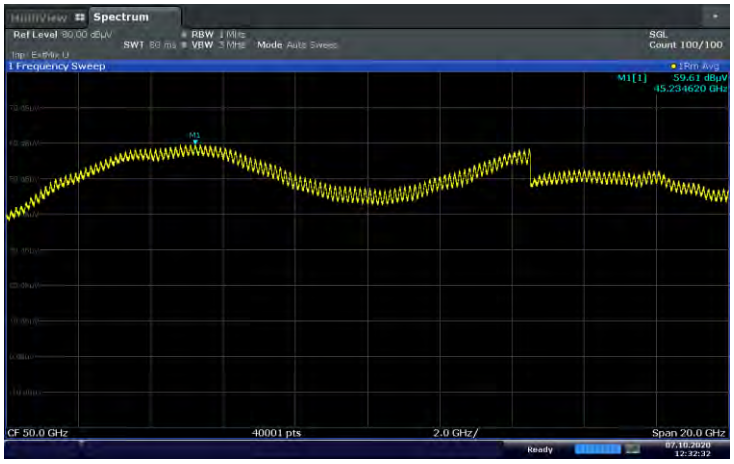
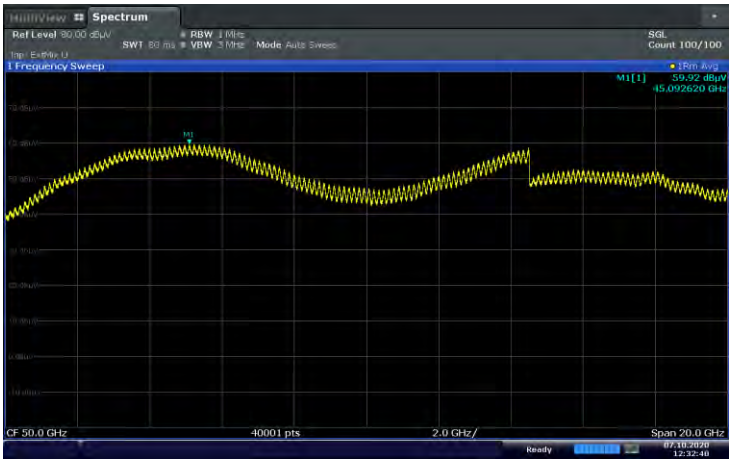
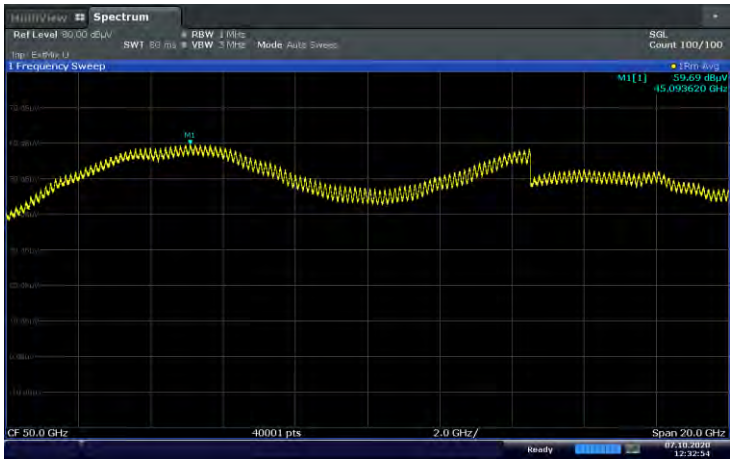
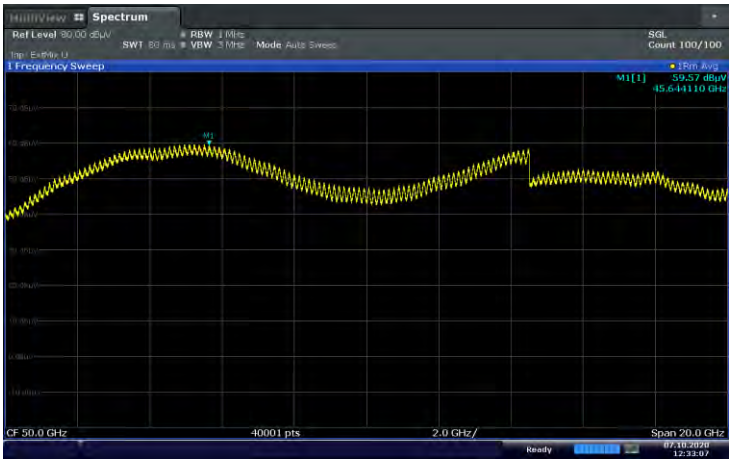
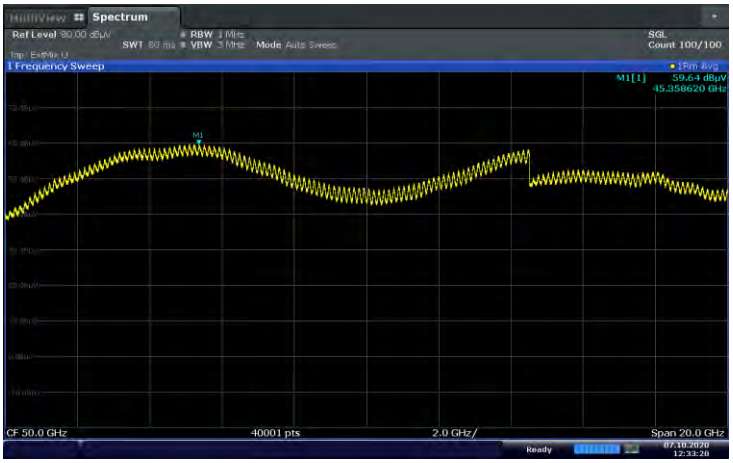
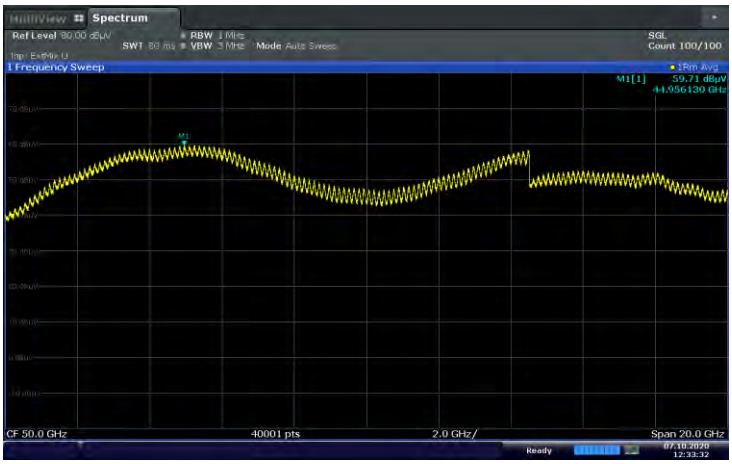
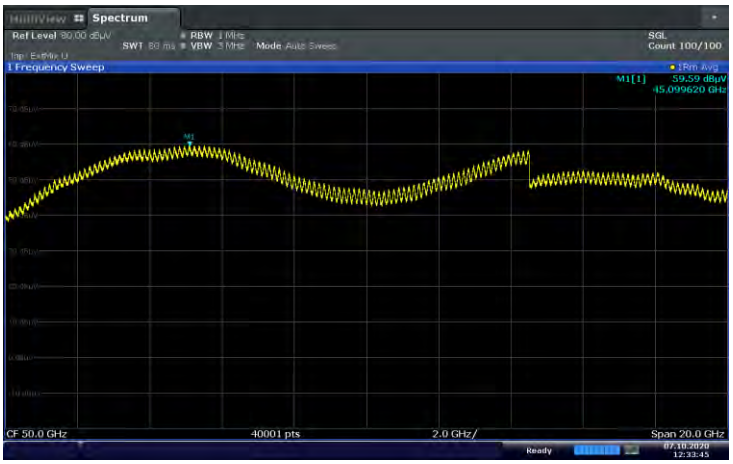
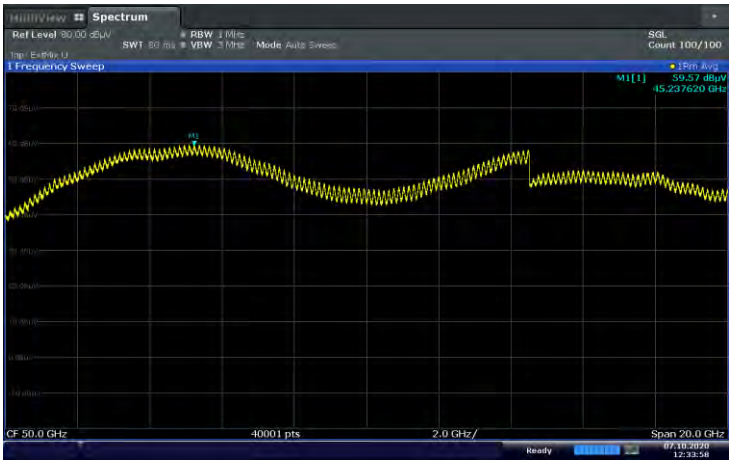
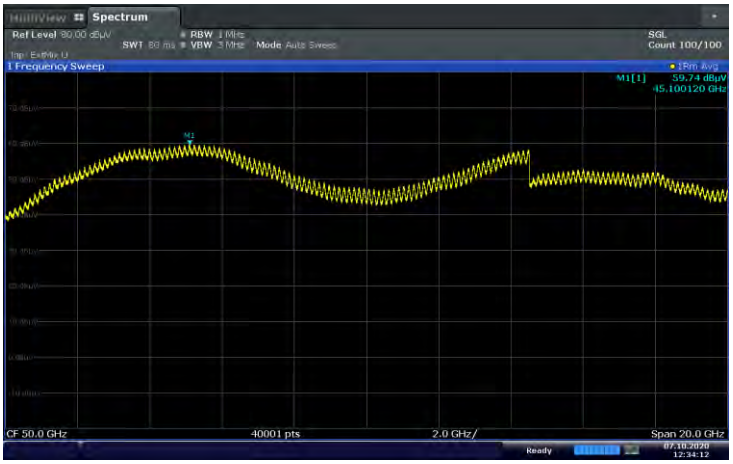
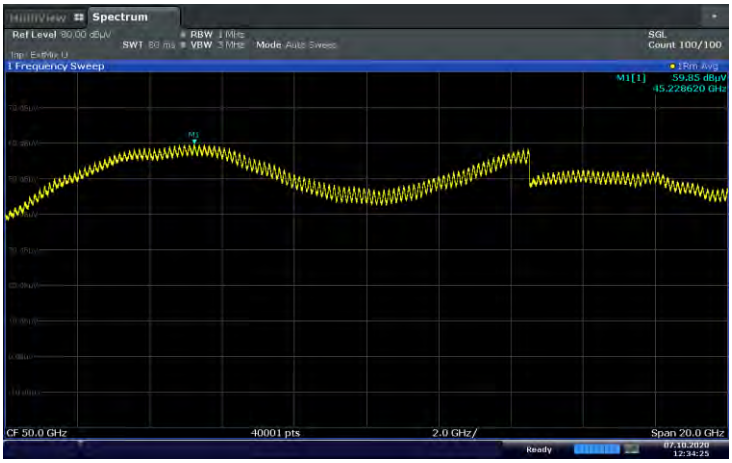
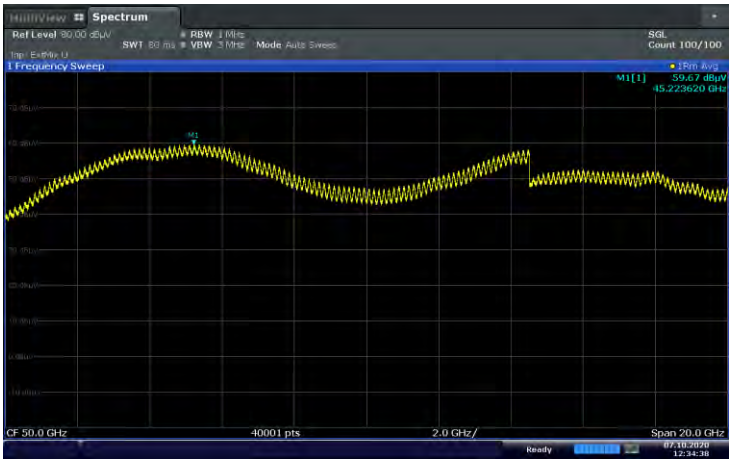
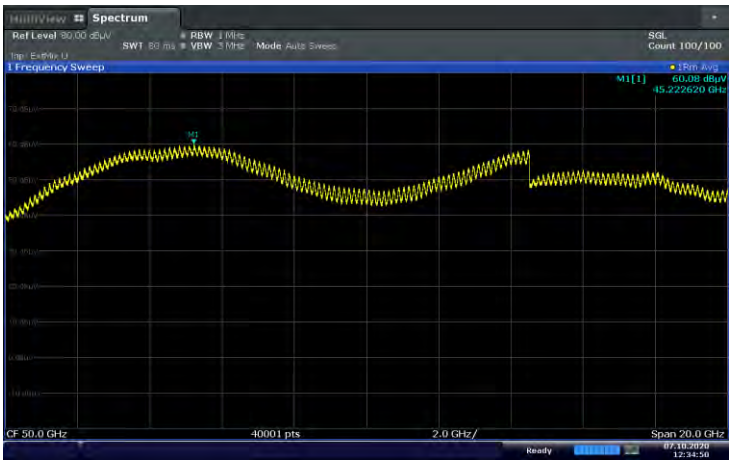
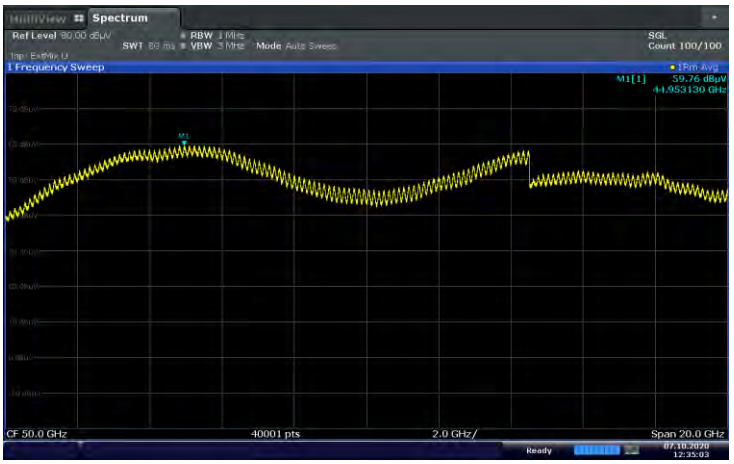
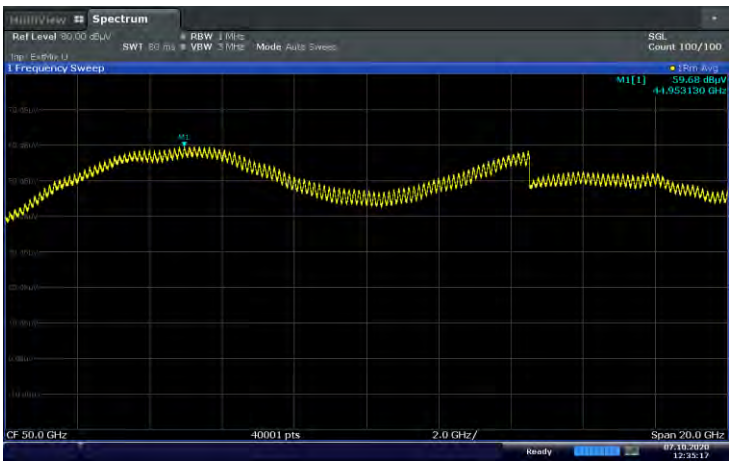
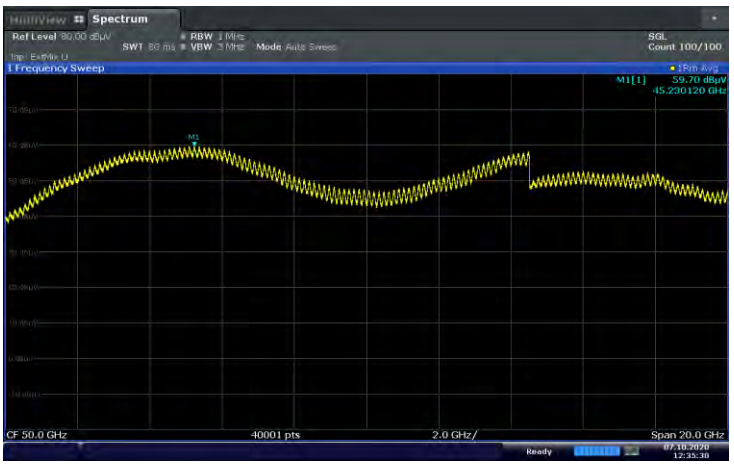
|  |  |

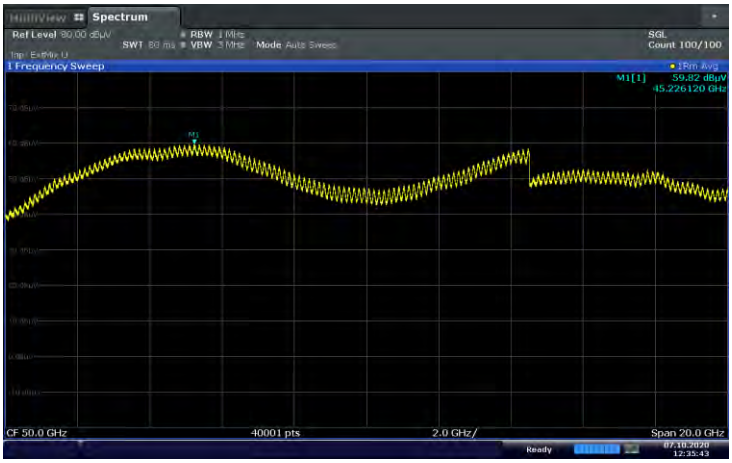
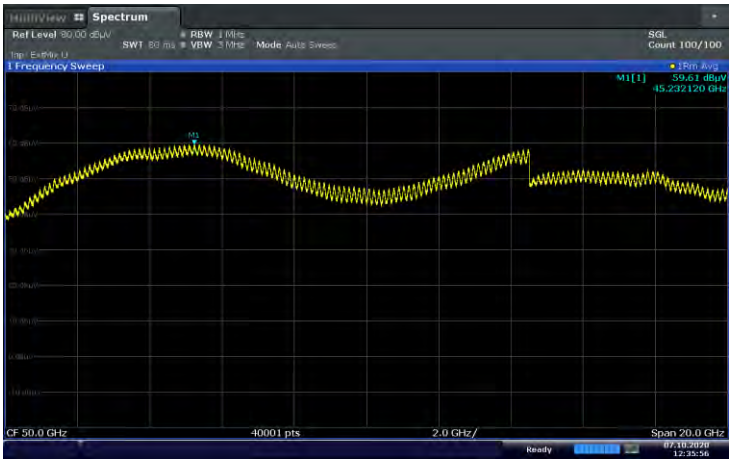
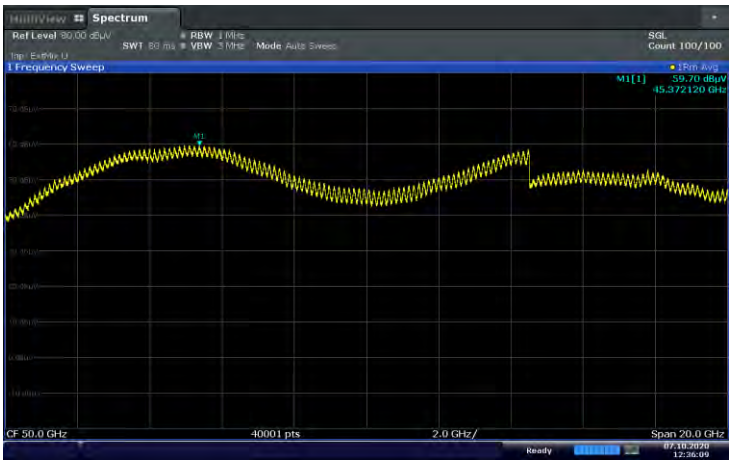
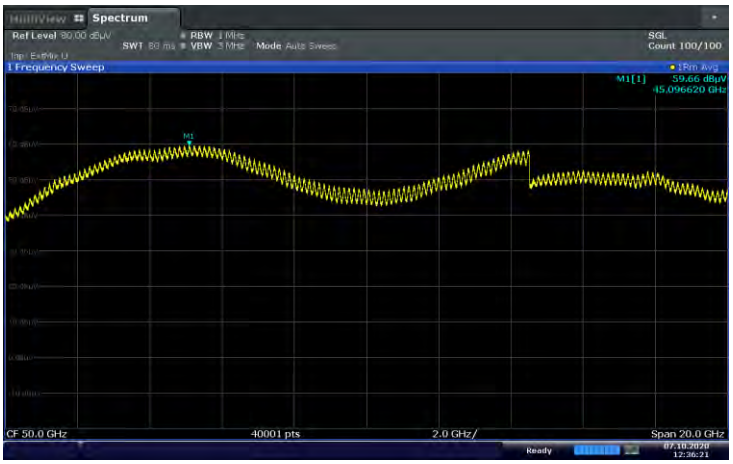
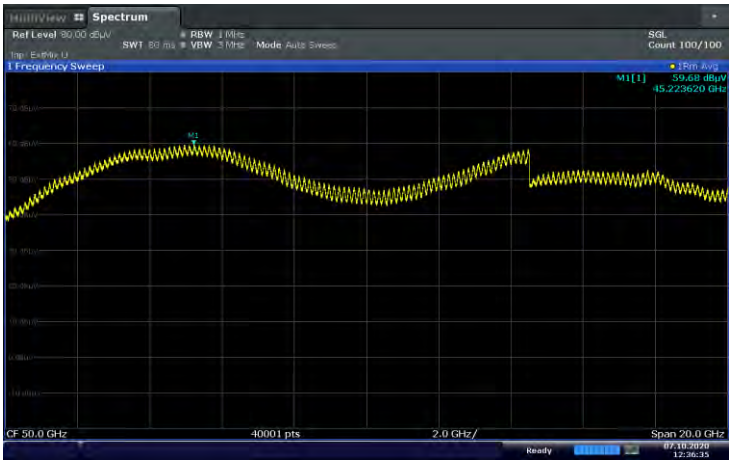
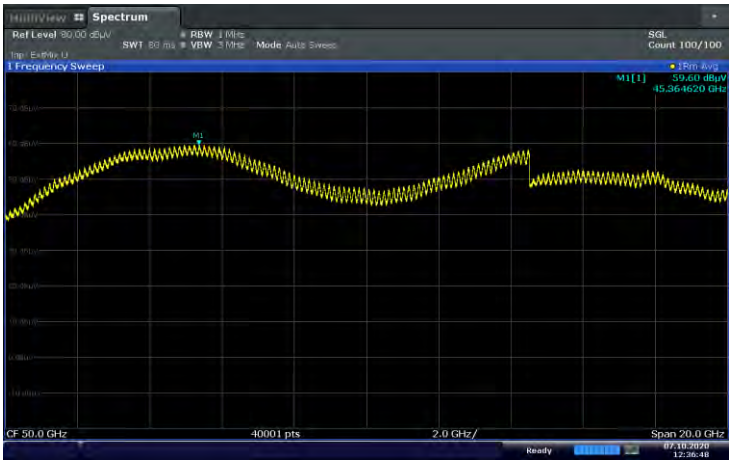
| Antenna 1(K patch), n260 100 MHz 1 CC SISO [26.5 GHz ~ 36.6 GHz] | |
|---|---|
| **Low Channel Pol. H** | **Low Channel Pol. V** |
|  |  |
| **Middle Channel Pol. H** | **Middle Channel Pol. V** |
|  |  |
| **High Channel Pol. H** | **High Channel Pol. V** |
|  |  |

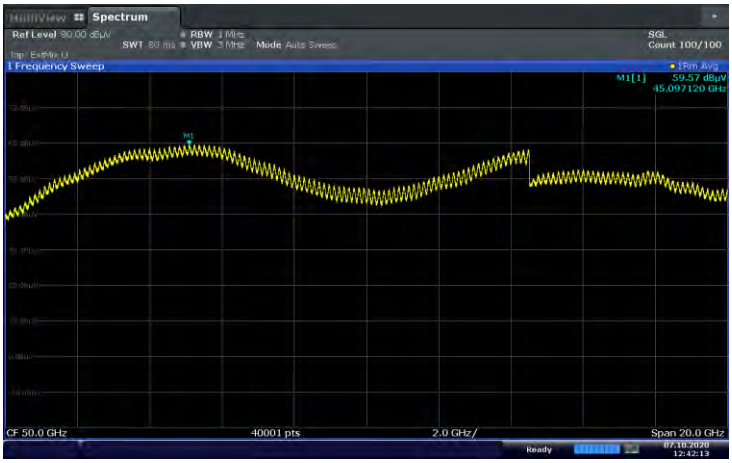
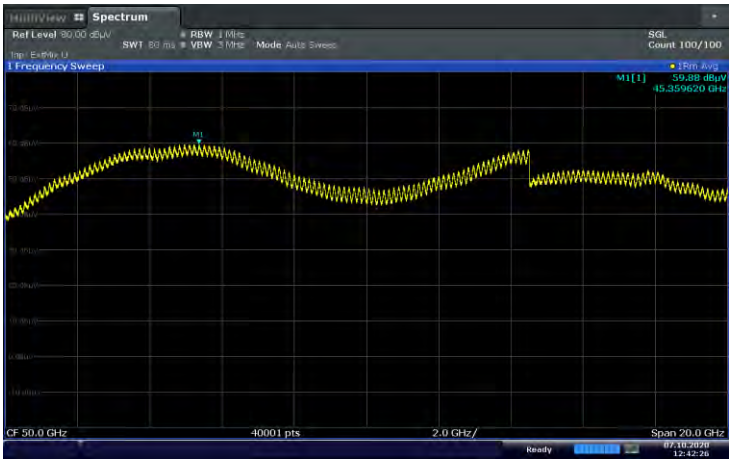
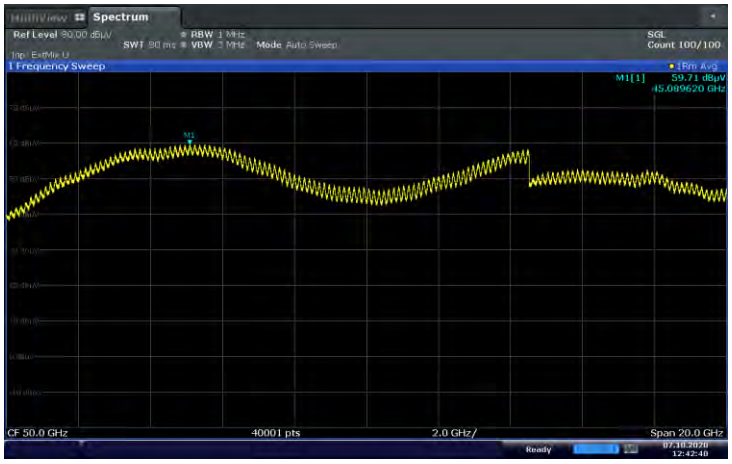
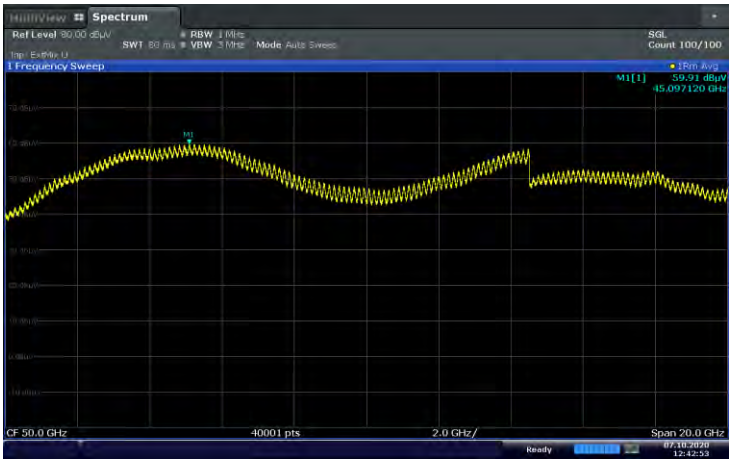
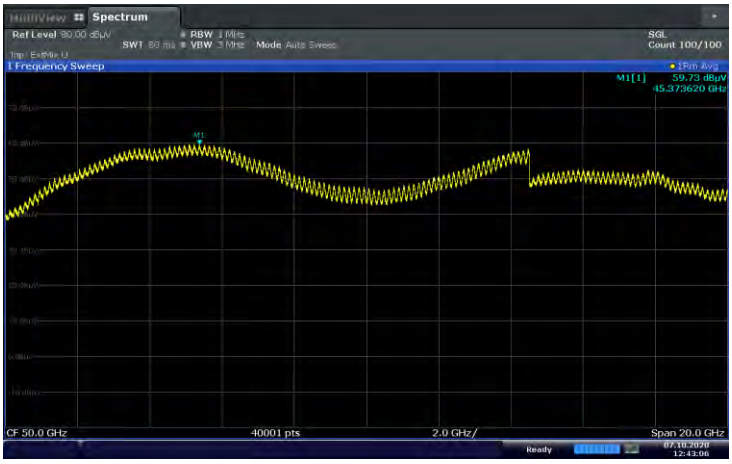
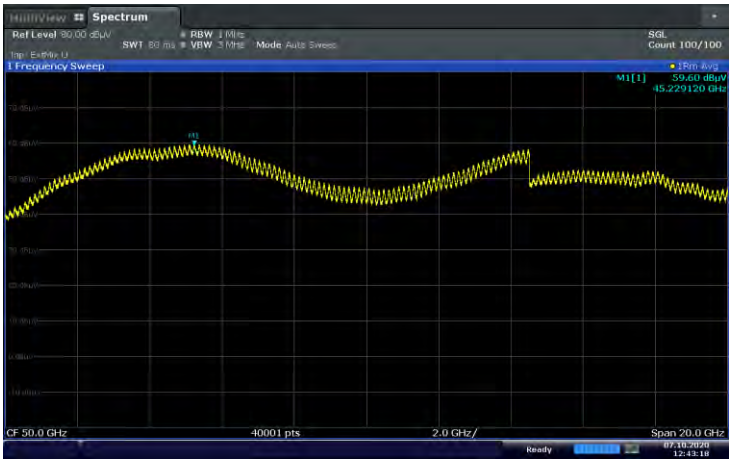
| Antenna 1(K patch), n260 100 MHz 1 CC MIMO [26.5 GHz ~ 36.6 GHz] | |
|---|---|
| **Low Channel Pol. H** | **Low Channel Pol. V** |
|  |  |
| **Middle Channel Pol. H** | **Middle Channel Pol. V** |
|  |  |
| **High Channel Pol. H** | **High Channel Pol. V** |
|  |  |

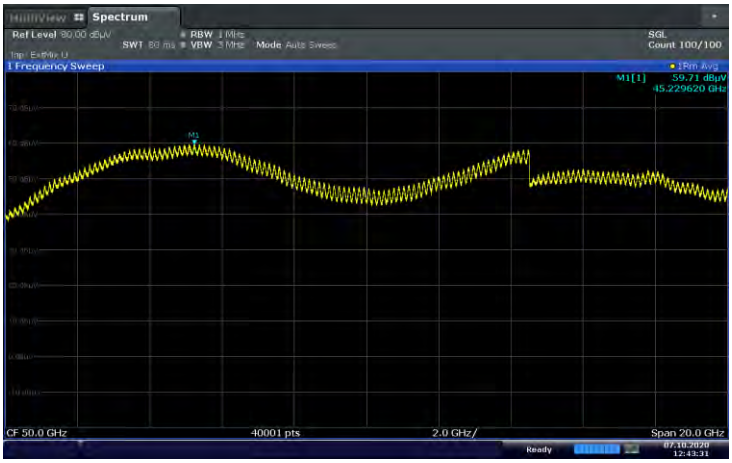
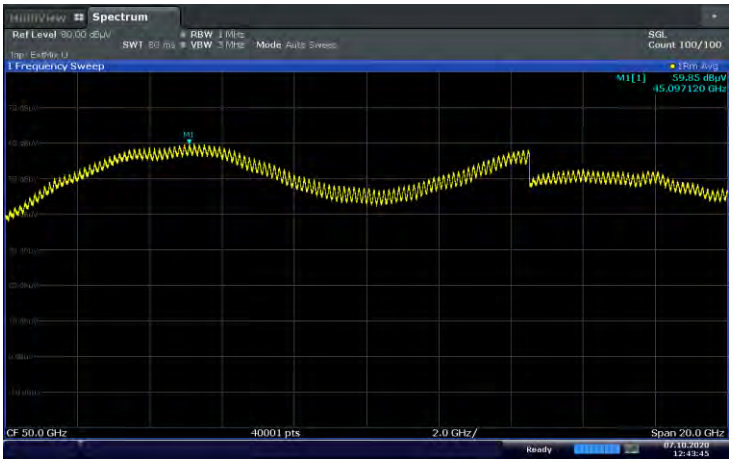
| Antenna 0(L patch), n260 50 MHz 1 CC SISO [40 GHz ~ 60 GHz] | |
|---|---|
| **Low Channel Pol. H** | **Low Channel Pol. V** |
|  |  |
| **Middle Channel Pol. H** | **Middle Channel Pol. V** |
|  |  |
| **High Channel Pol. H** | **High Channel Pol. V** |
|  |  |

| Antenna 0(L patch), n260 50 MHz 1 CC MIMO [40 GHz ~ 60 GHz] | |
|---|---|
| **Low Channel Pol. H** | **Low Channel Pol. V** |
|  |  |
| **Middle Channel Pol. H** | **Middle Channel Pol. V** |
|  |  |
| **High Channel Pol. H** | **High Channel Pol. V** |
|  |  |

| Antenna 0(L patch), n260 100 MHz 1 CC SISO [40 GHz ~ 60 GHz] | |
|---|---|
| **Low Channel Pol. H** | **Low Channel Pol. V** |
|  |  |
| **Middle Channel Pol. H** | **Middle Channel Pol. V** |
|  |  |
| **High Channel Pol. H** | **High Channel Pol. V** |
|  |  |

| Antenna 0(L patch), n260 100 MHz 1 CC MIMO [40 GHz ~ 60 GHz] | |
|---|---|
| **Low Channel Pol. H** | **Low Channel Pol. V** |
|  |  |
| **Middle Channel Pol. H** | **Middle Channel Pol. V** |
|  |  |
| **High Channel Pol. H** | **High Channel Pol. V** |
|  |  |

| Antenna 1(K patch), n260 50 MHz 1 CC SISO [40 GHz ~ 60 GHz] | |
|---|---|
| **Low Channel Pol. H** | **Low Channel Pol. V** |
|  |  |
| **Middle Channel Pol. H** | **Middle Channel Pol. V** |
|  |  |
| **High Channel Pol. H** | **High Channel Pol. V** |
|  |  |

| Antenna 1(K patch), n260 50 MHz 1 CC MIMO [40 GHz ~ 60 GHz] | |
|---|---|
| **Low Channel Pol. H** | **Low Channel Pol. V** |
|  |  |
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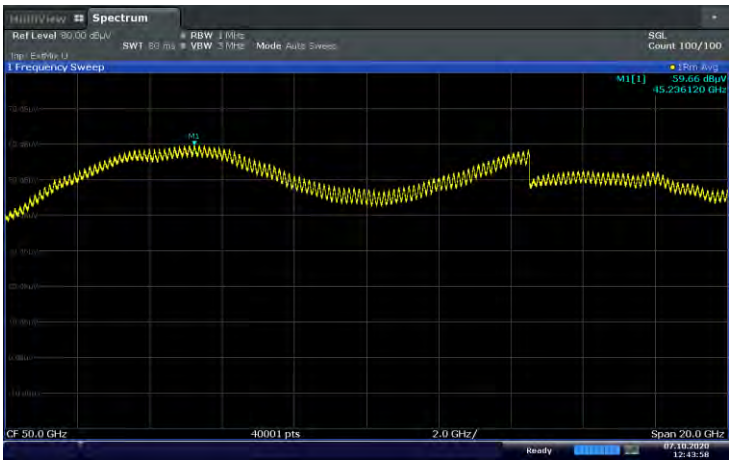
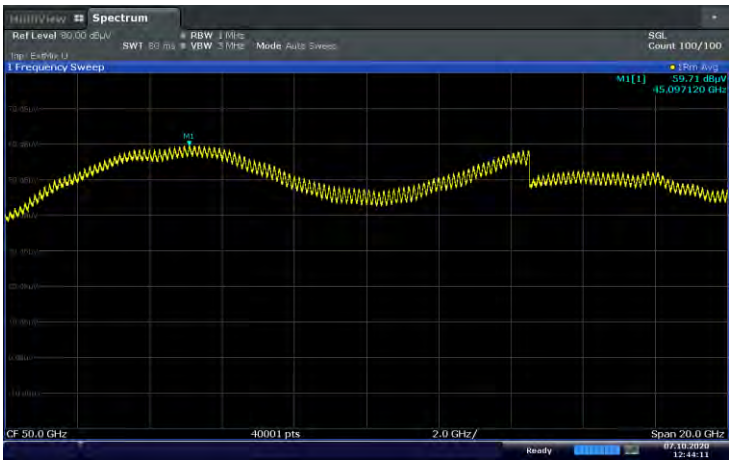
|  |  |
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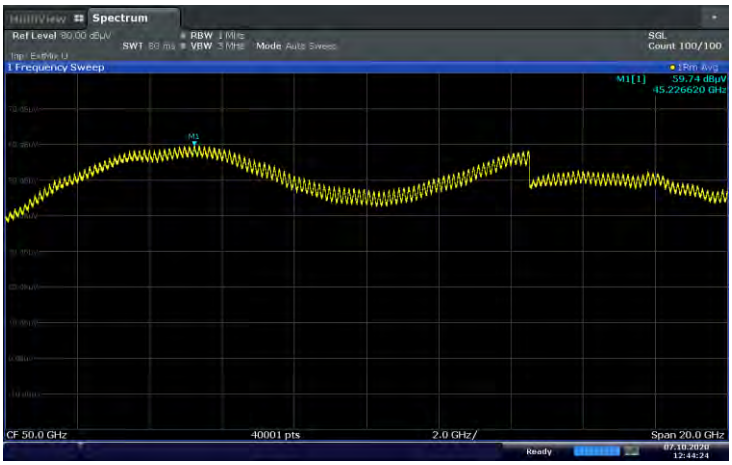
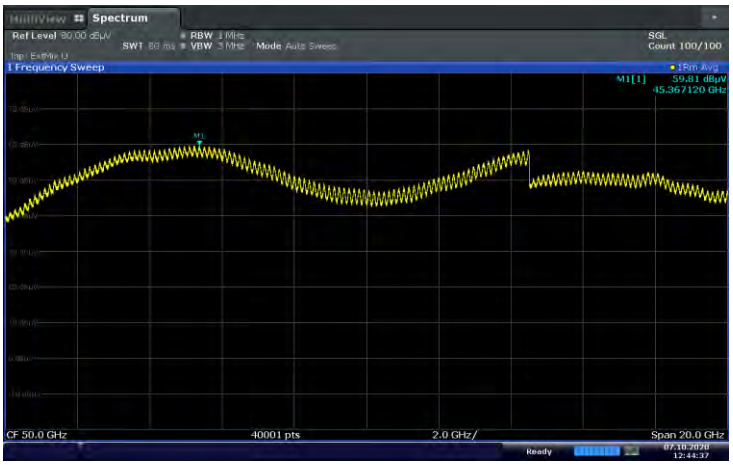
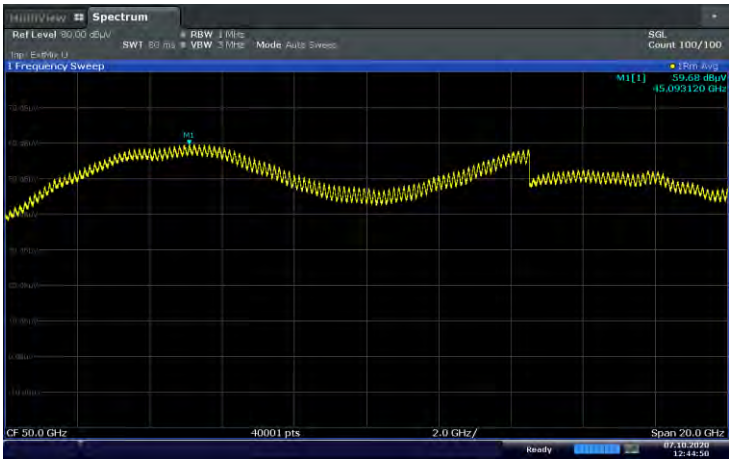
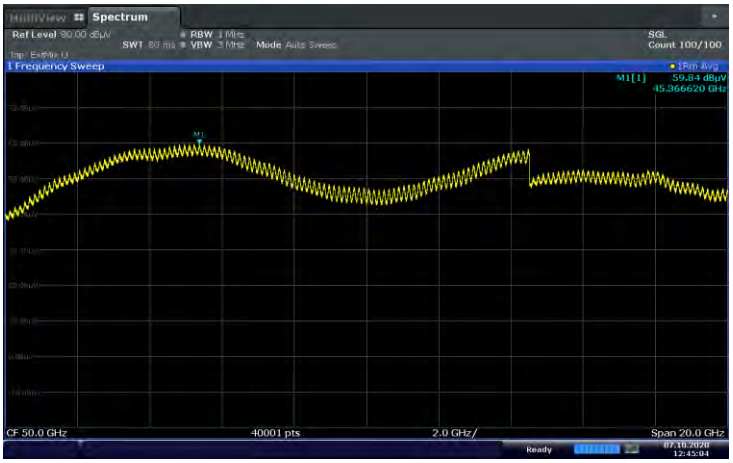
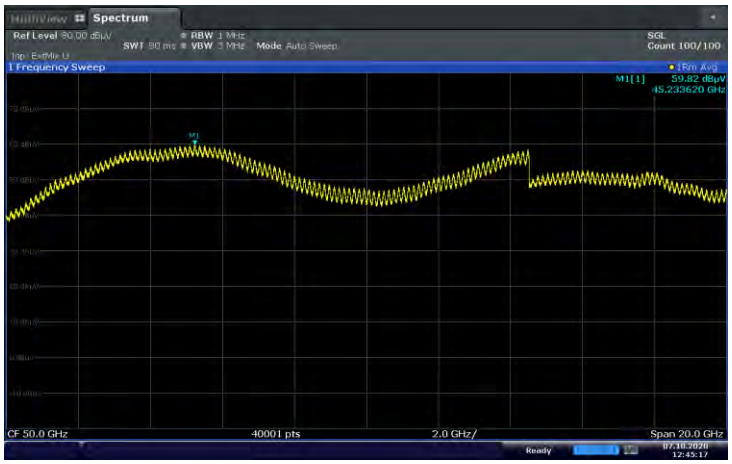
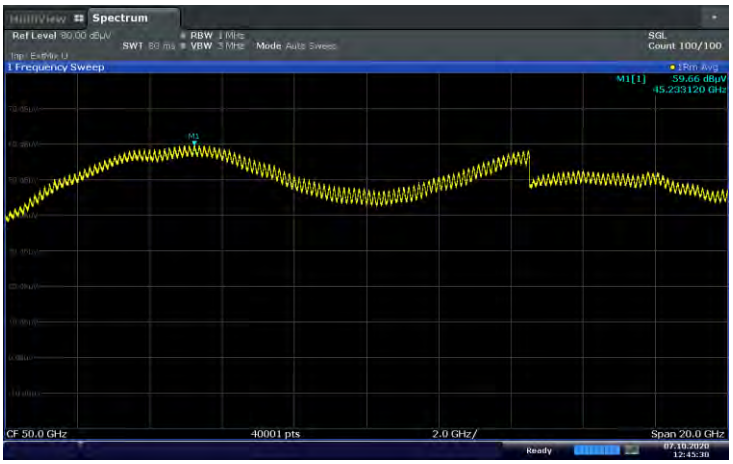
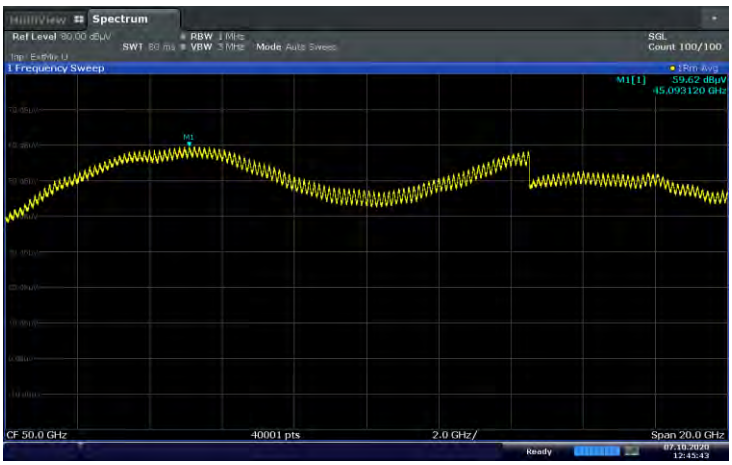
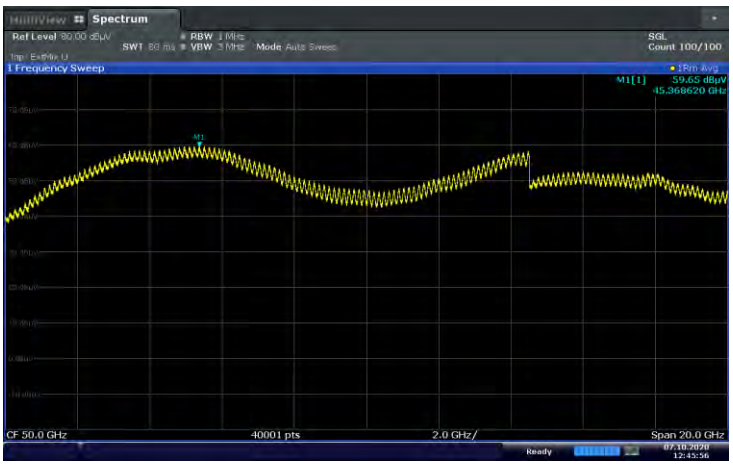
|  |  |

| Antenna 1(K patch), n260 100 MHz 1 CC SISO [40 GHz ~ 60 GHz] | |
|---|---|
| **Low Channel Pol. H** | **Low Channel Pol. V** |
|  |  |
| **Middle Channel Pol. H** | **Middle Channel Pol. V** |
|  |  |
| **High Channel Pol. H** | **High Channel Pol. V** |
|  |  |

| Antenna 1(K patch), n260 100 MHz 1 CC MIMO [40 GHz ~ 60 GHz] | |
|---|---|
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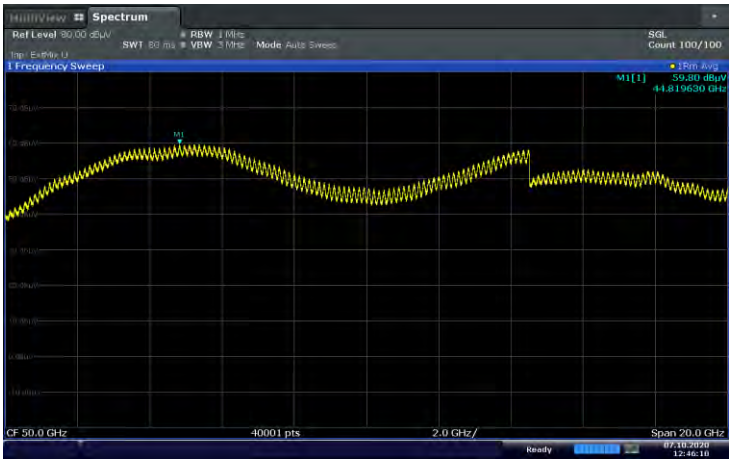
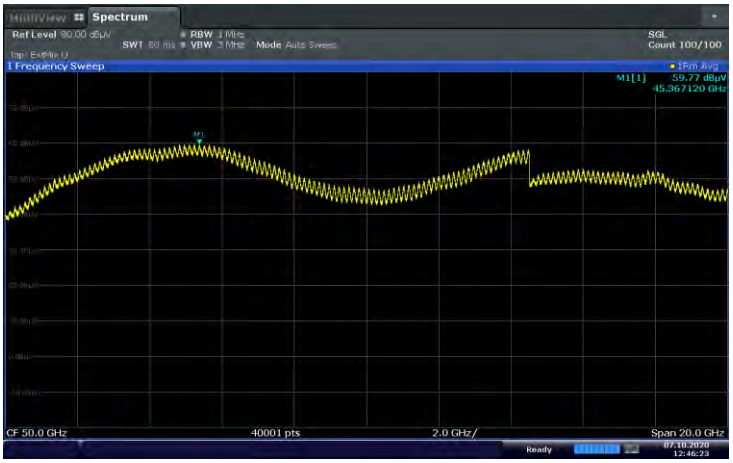
|  |  |
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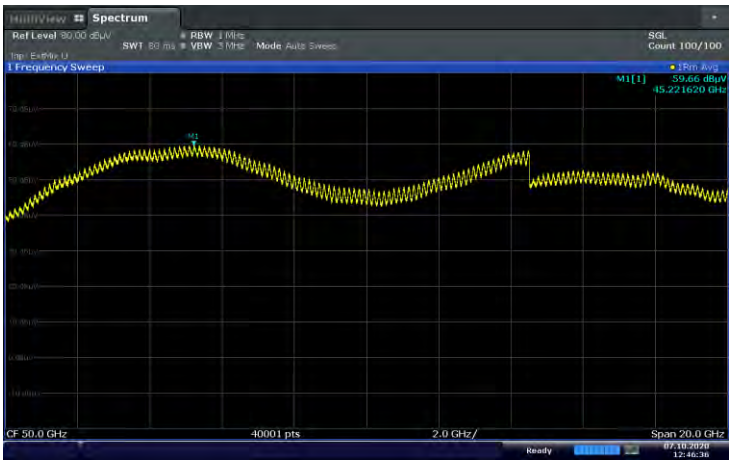
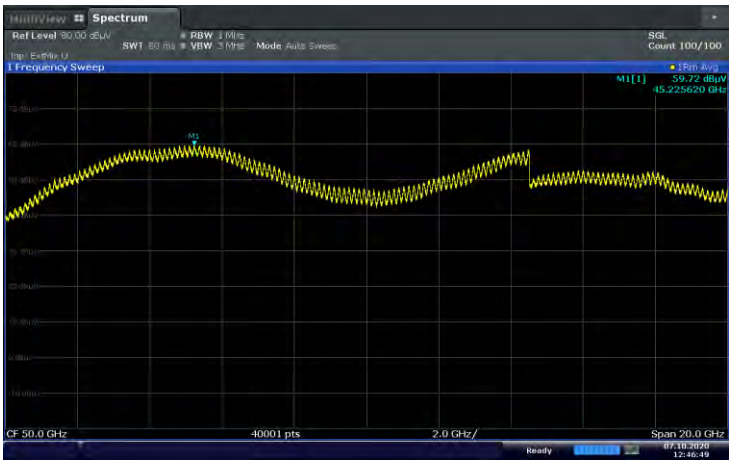
|  |  |
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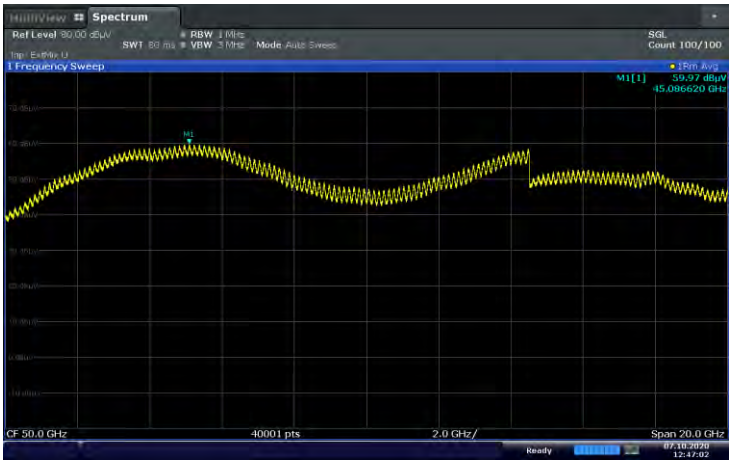
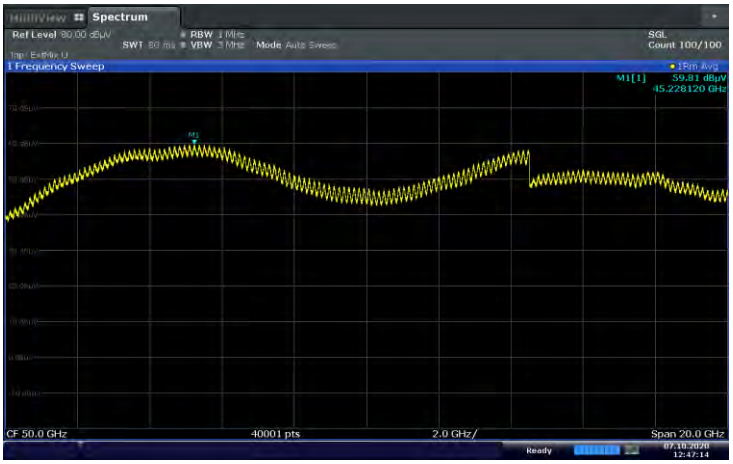
|  |  |

| Antenna 0(L patch), n260 50 MHz 1 CC SISO [60 GHz ~ 90 GHz] | |
|---|---|
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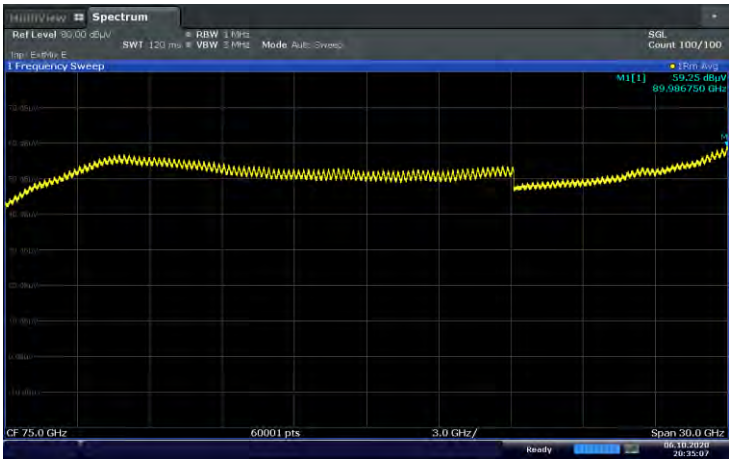
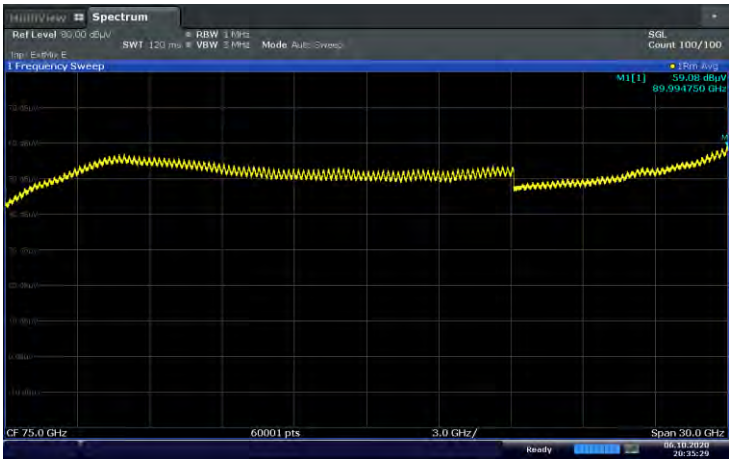
|  |  |
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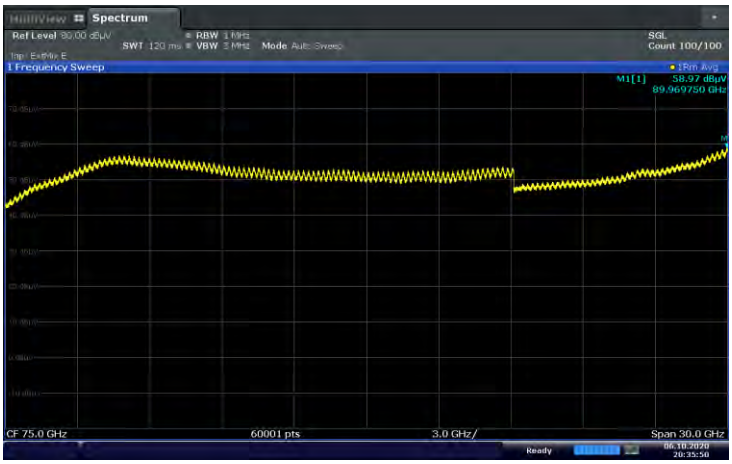
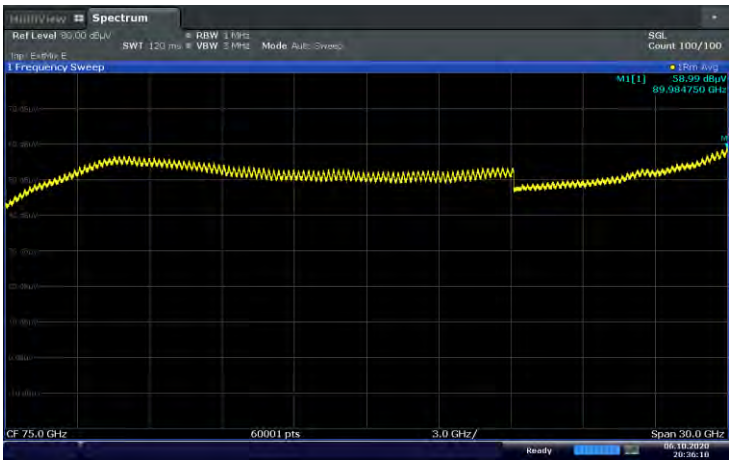
|  |  |
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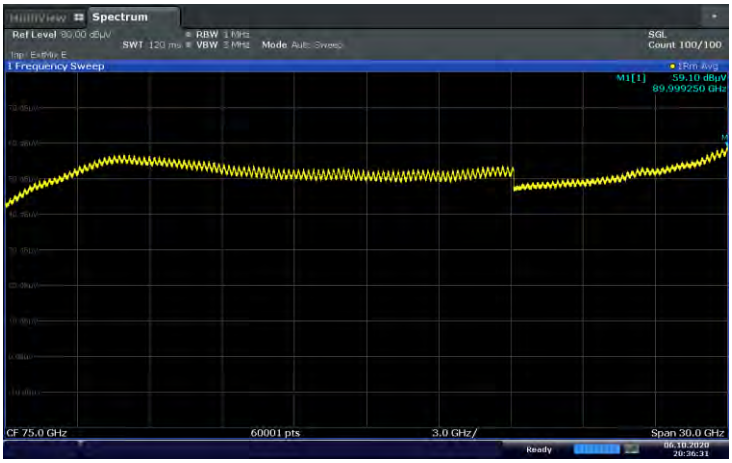
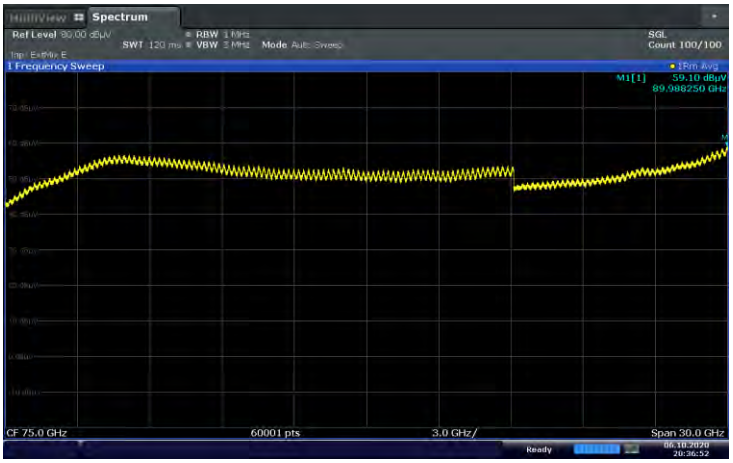
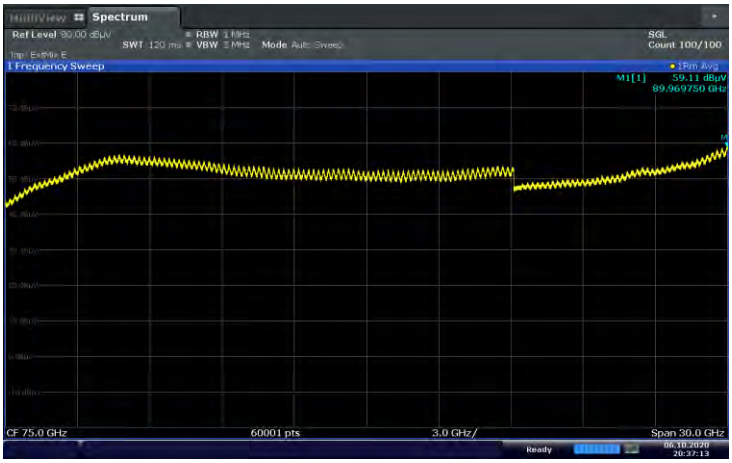
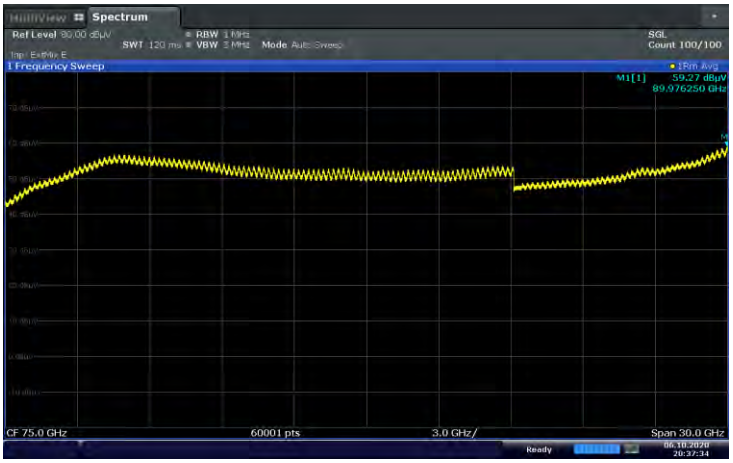
|  |  |

| Antenna 0(L patch), n260 50 MHz 1 CC MIMO [60 GHz ~ 90 GHz] | |
|---|---|
| **Low Channel Pol. H** | **Low Channel Pol. V** |
|  |  |
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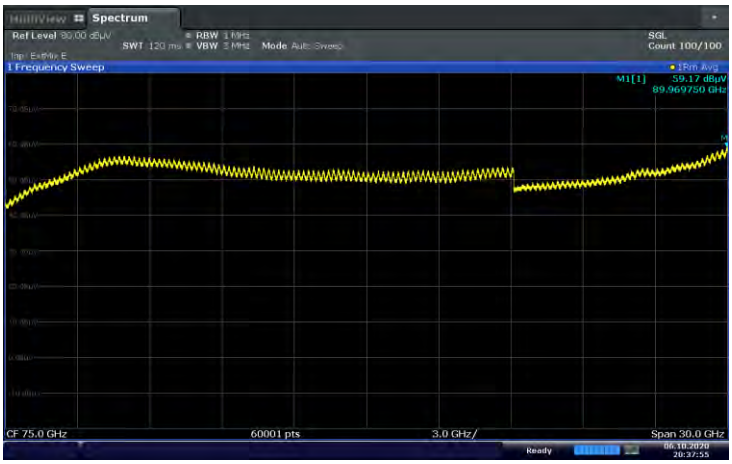
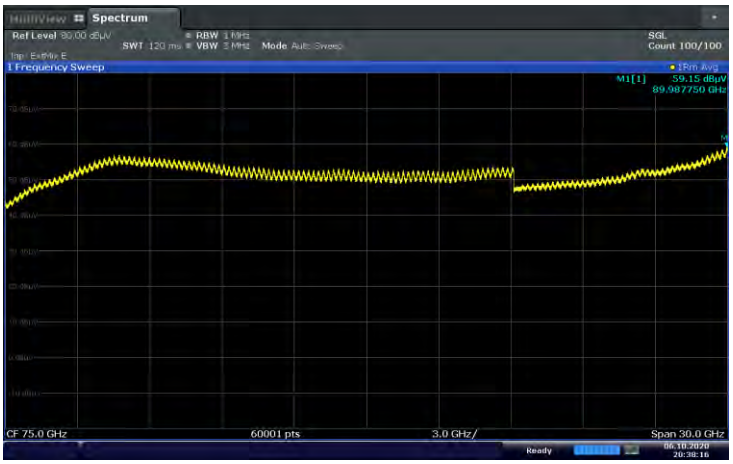
|  |  |
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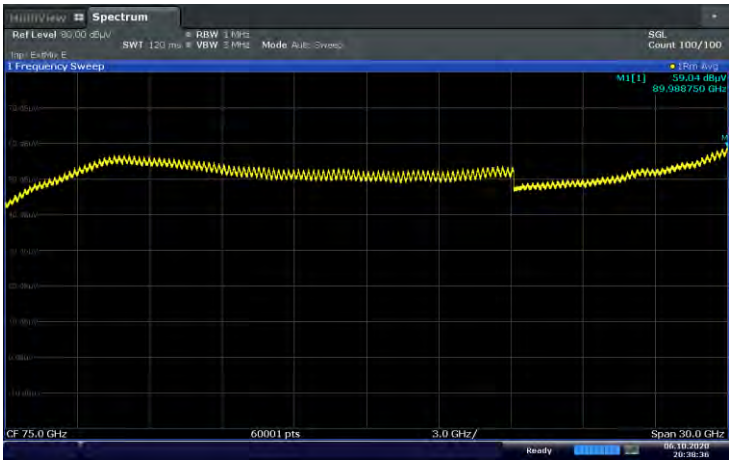
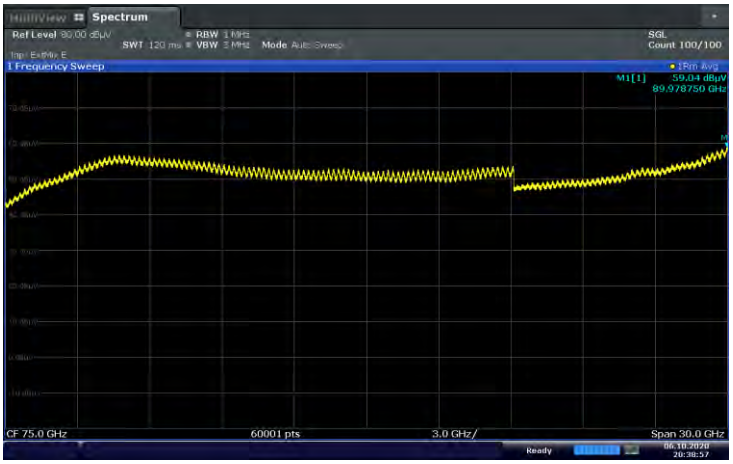
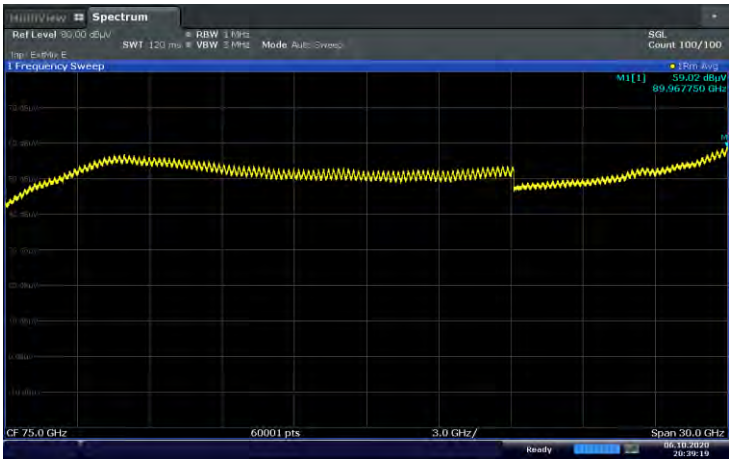
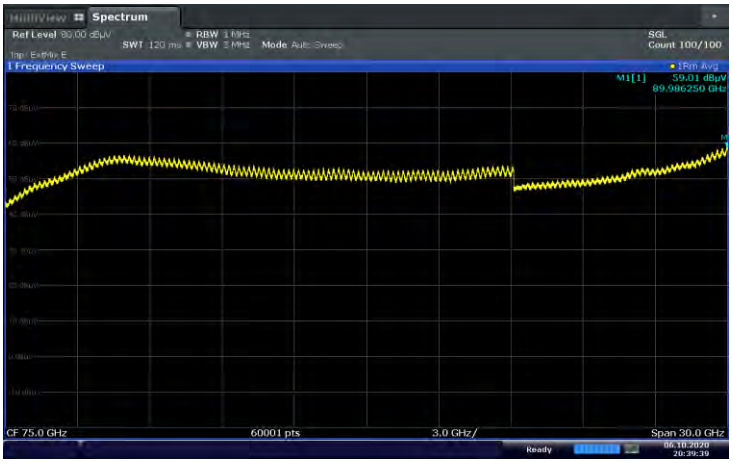
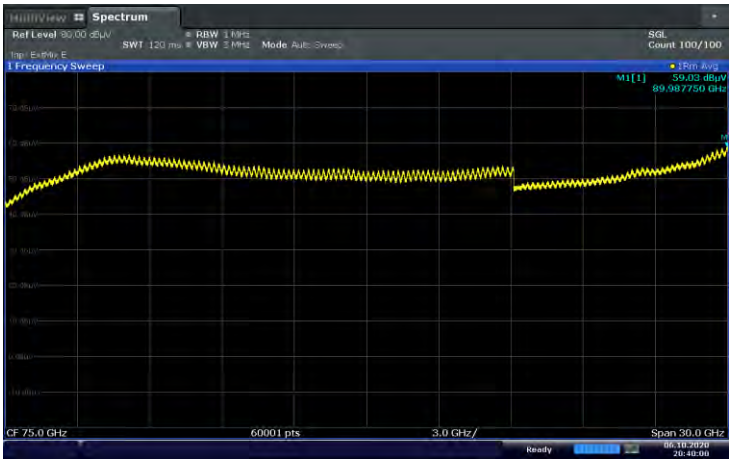
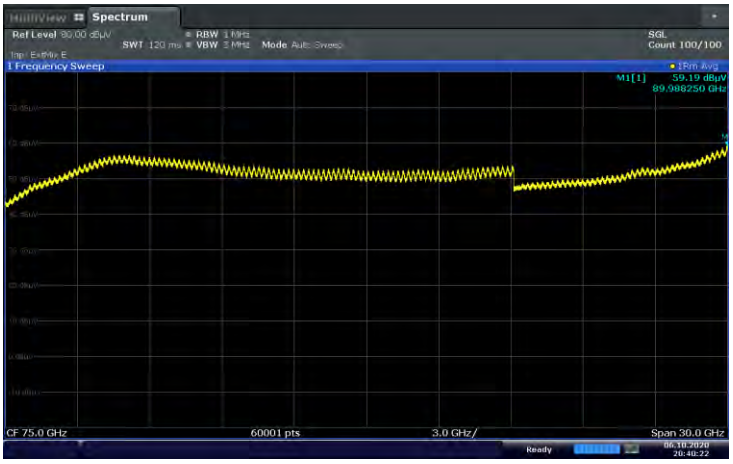
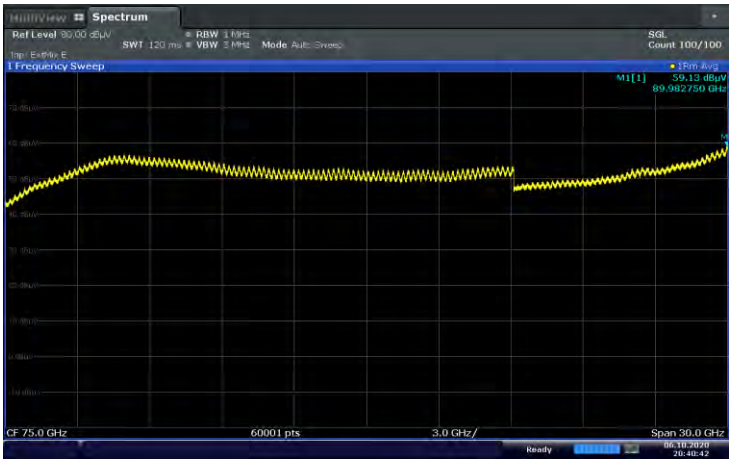
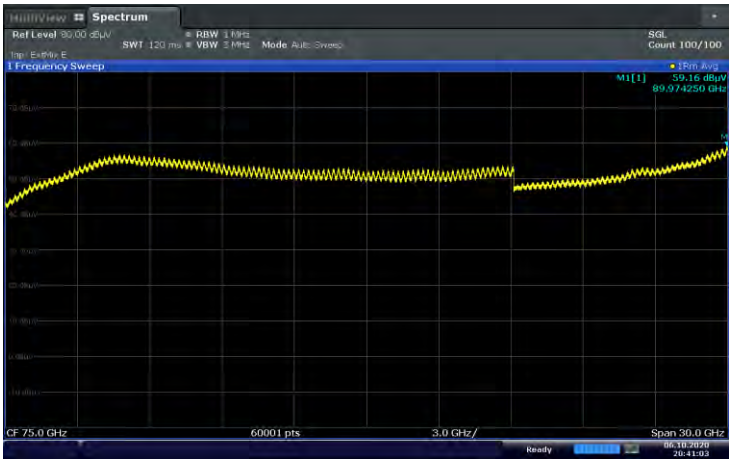
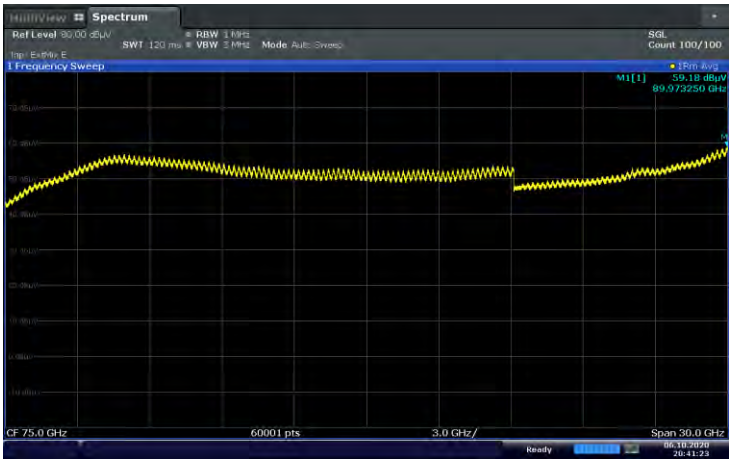
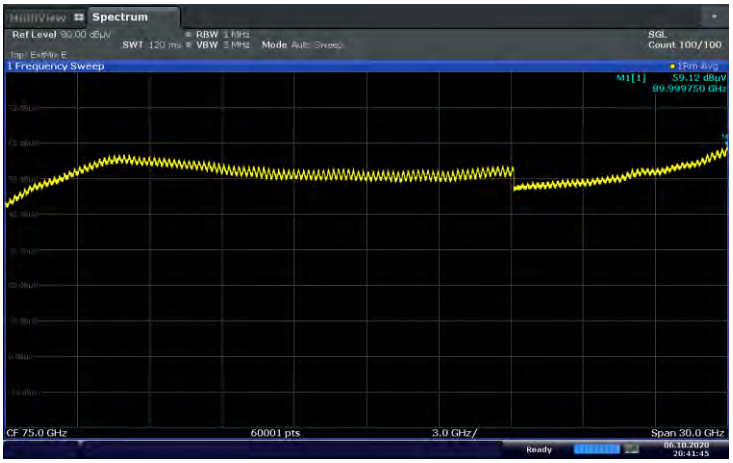
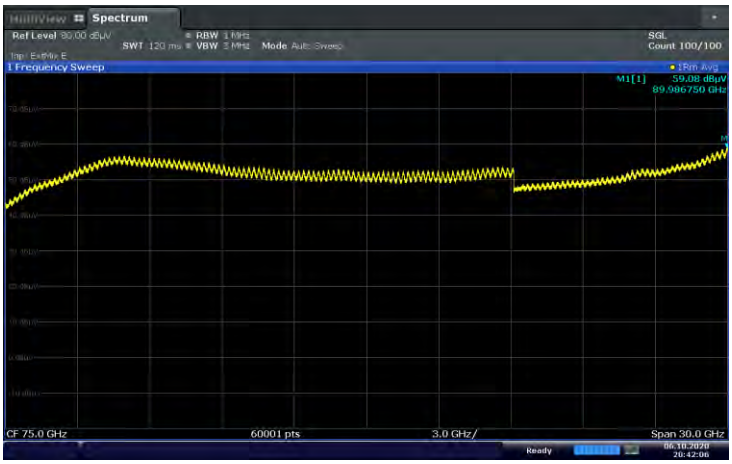
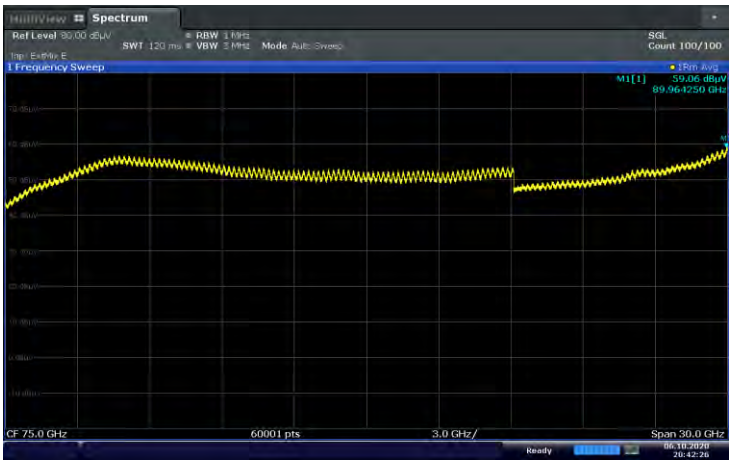
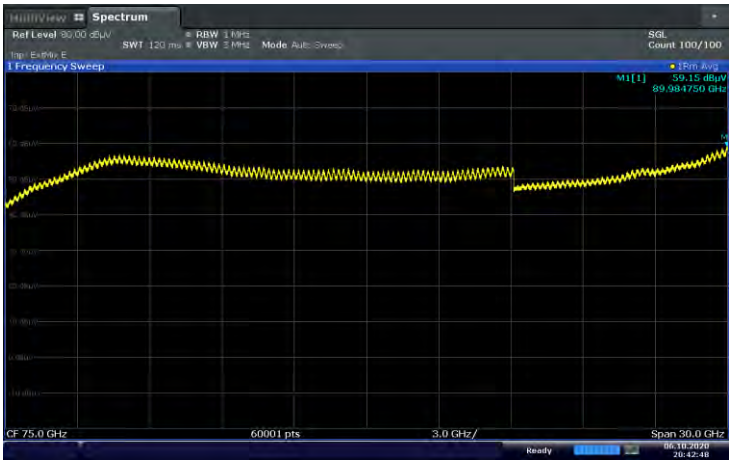
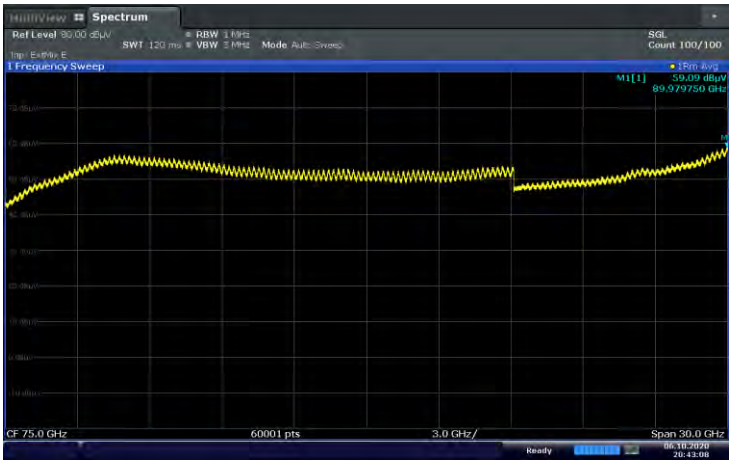
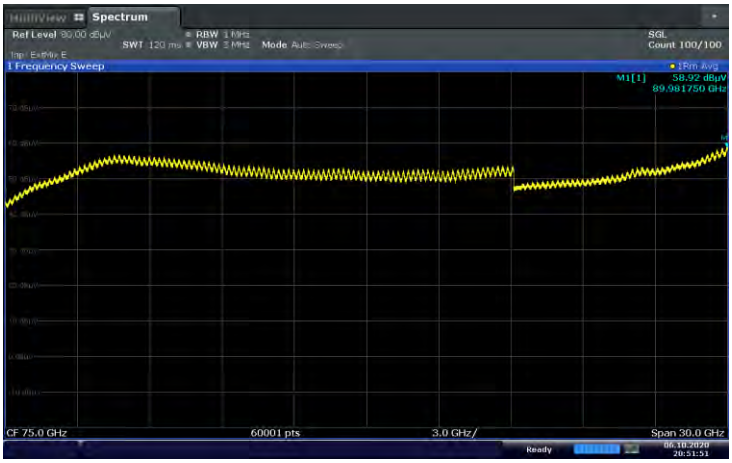
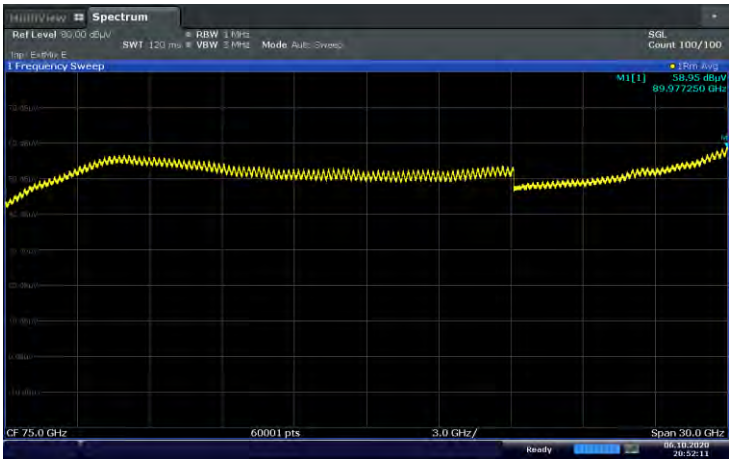
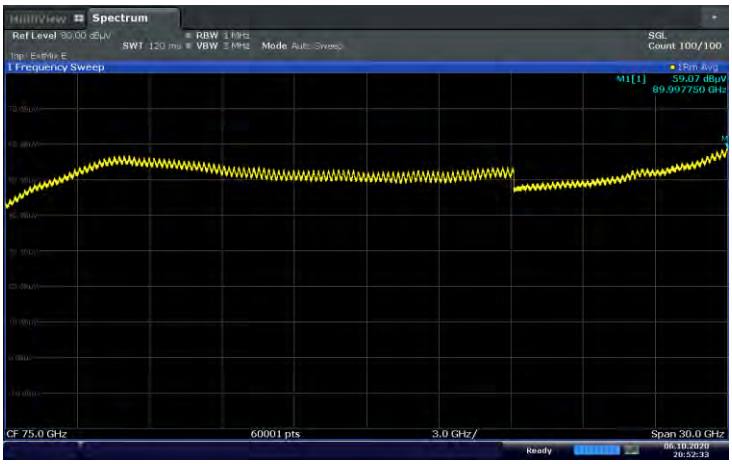
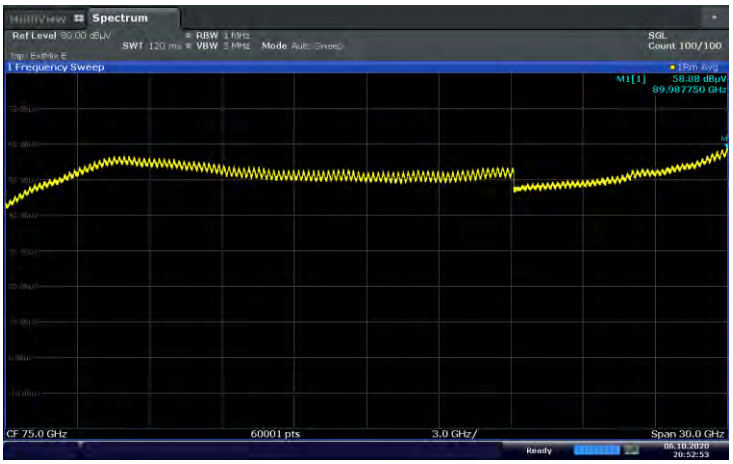
|  |  |

| Antenna 0(L patch), n260 100 MHz 1 CC SISO [60 GHz ~ 90 GHz] | |
|---|---|
| **Low Channel Pol. H** | **Low Channel Pol. V** |
|  |  |
| **Middle Channel Pol. H** | **Middle Channel Pol. V** |
|  |  |
| **High Channel Pol. H** | **High Channel Pol. V** |
|  |  |

| Antenna 0(L patch), n260 100 MHz 1 CC MIMO [60 GHz ~ 90 GHz] | |
|---|---|
| **Low Channel Pol. H** | **Low Channel Pol. V** |
|  |  |
| **Middle Channel Pol. H** | **Middle Channel Pol. V** |
|  |  |
| **High Channel Pol. H** | **High Channel Pol. V** |
|  |  |

| Antenna 1(K patch), n260 50 MHz 1 CC SISO [60 GHz ~ 90 GHz] | |
|---|---|
| **Low Channel Pol. H** | **Low Channel Pol. V** |
|  |  |
| **Middle Channel Pol. H** | **Middle Channel Pol. V** |
|  |  |
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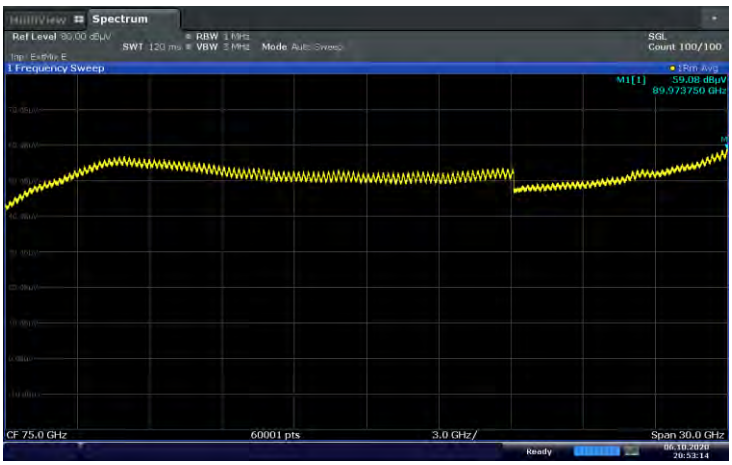
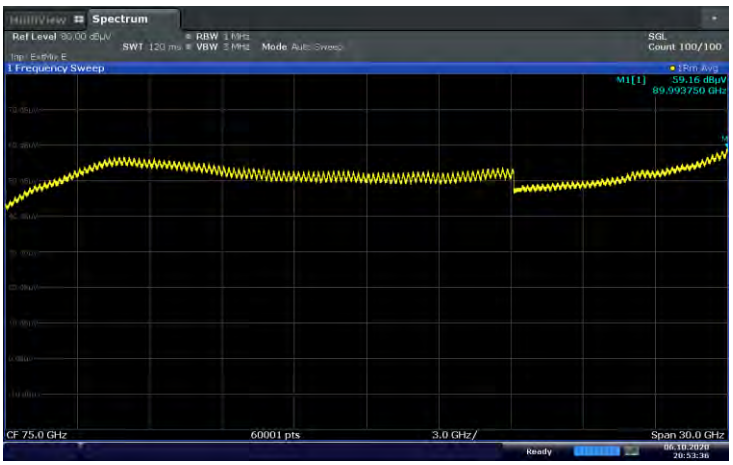
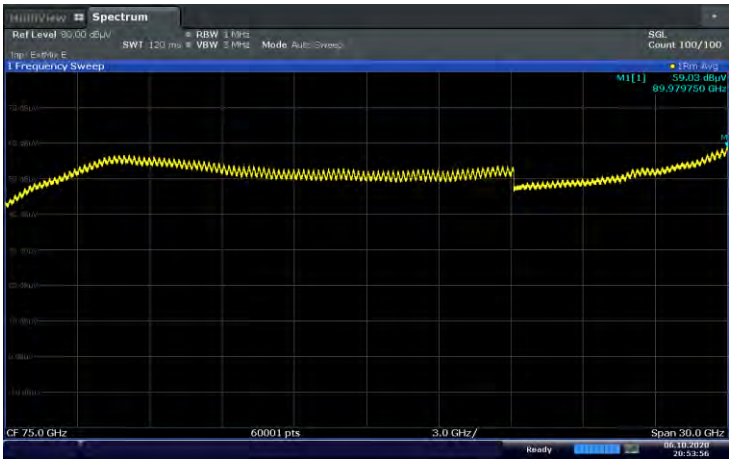
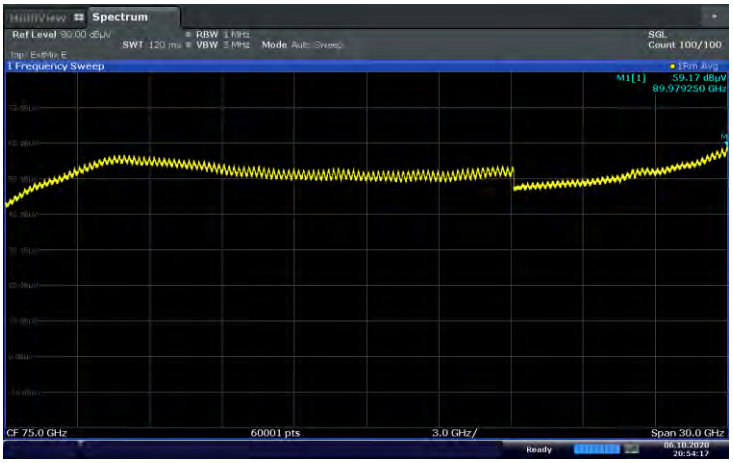
|  |  |

| Antenna 1(K patch), n260 50 MHz 1 CC MIMO [60 GHz ~ 90 GHz] | |
|---|---|
| **Low Channel Pol. H** | **Low Channel Pol. V** |
|  |  |
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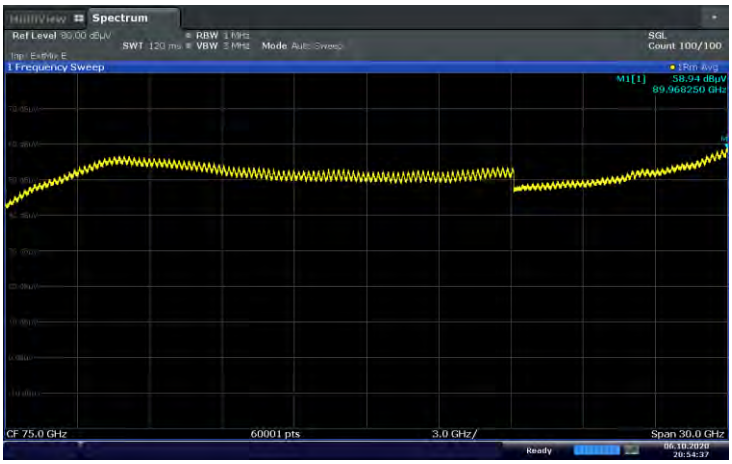
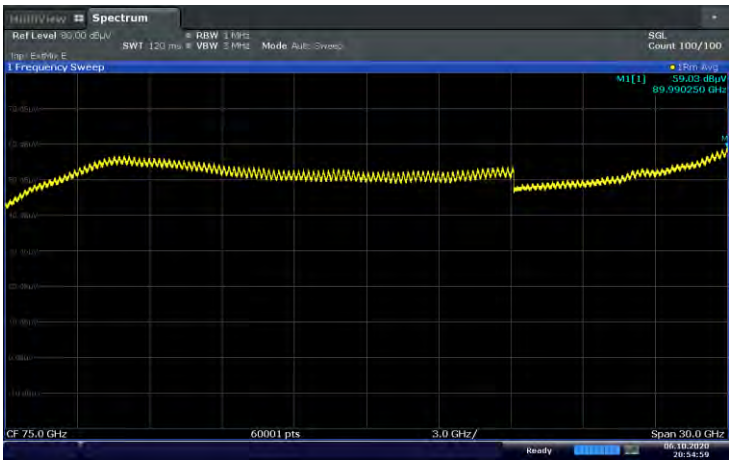
|  |  |
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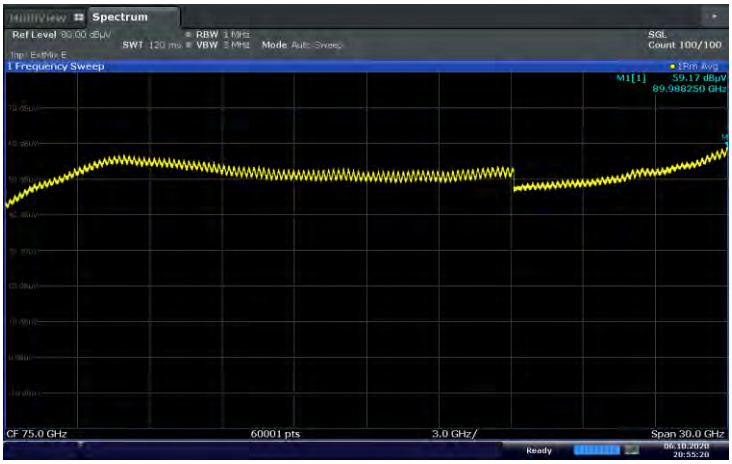
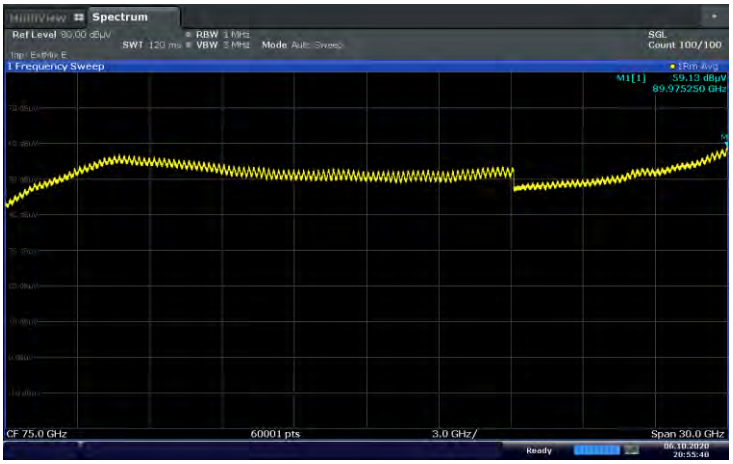
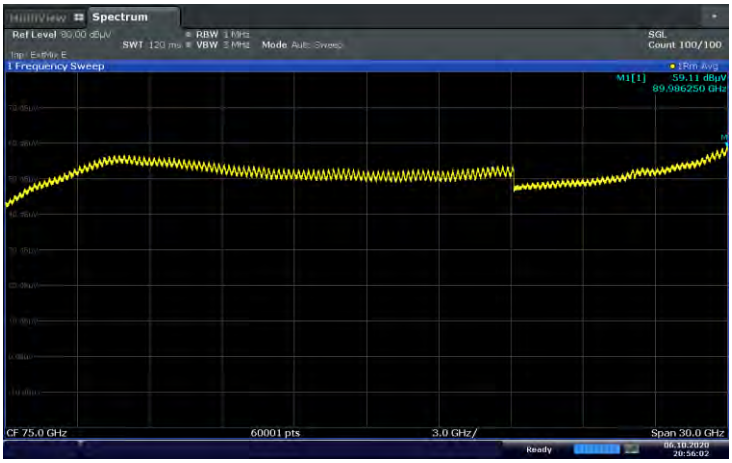
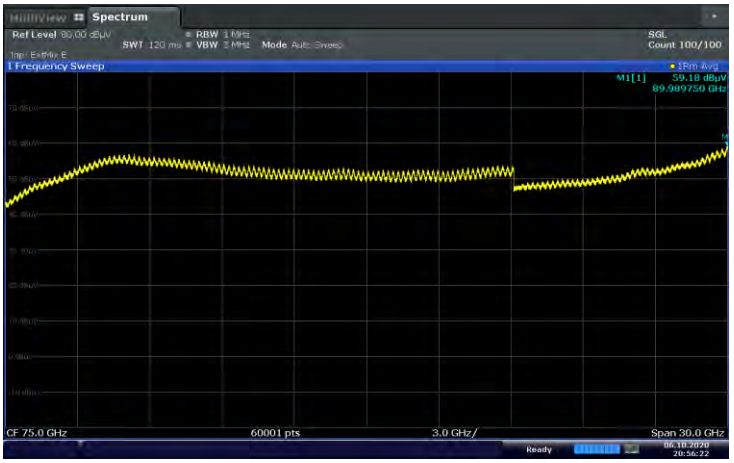
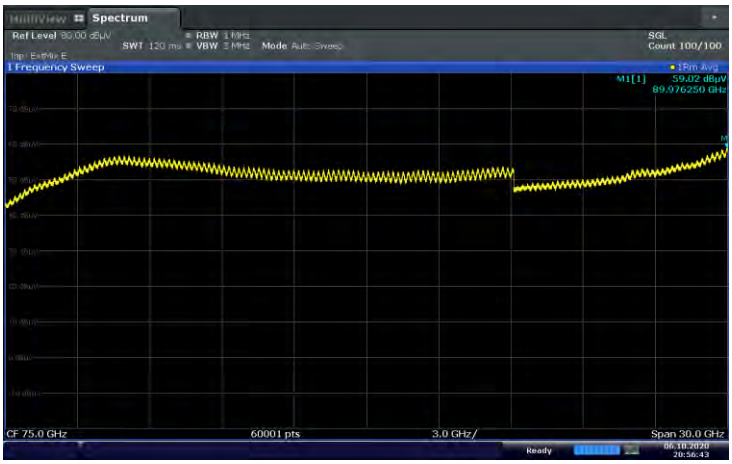
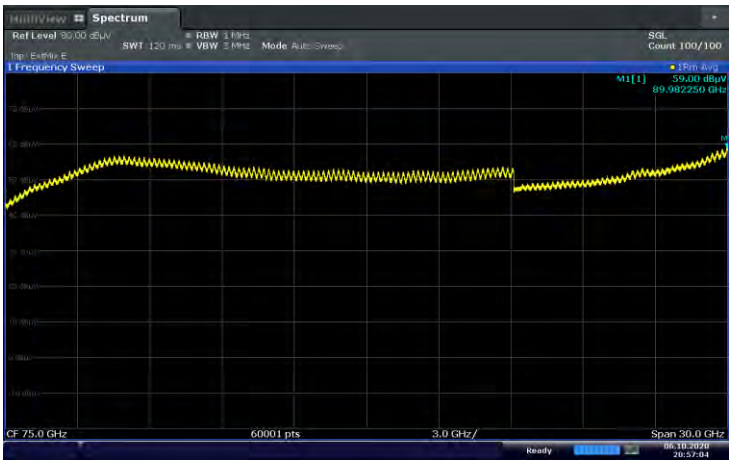
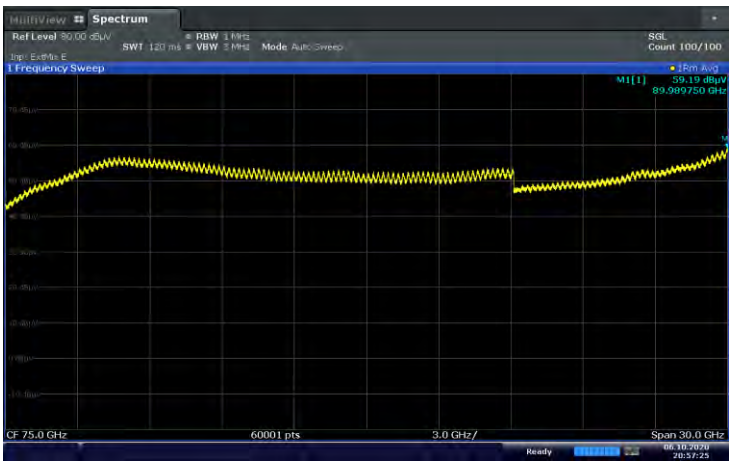
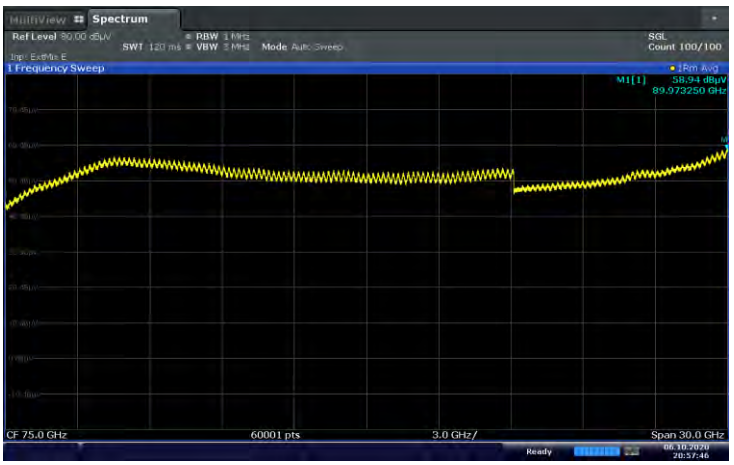
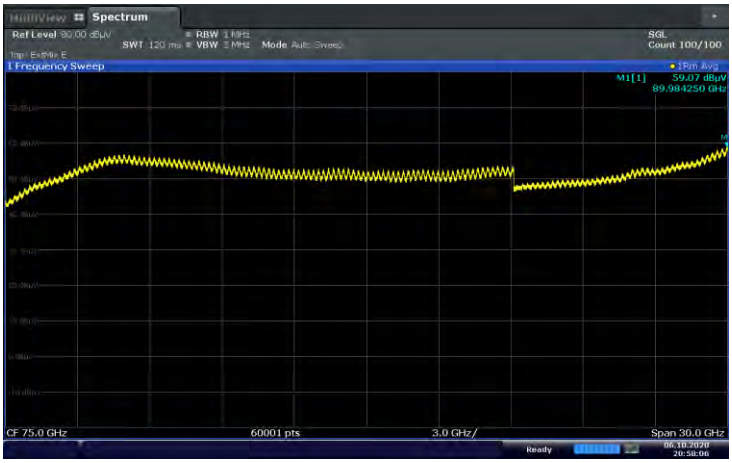
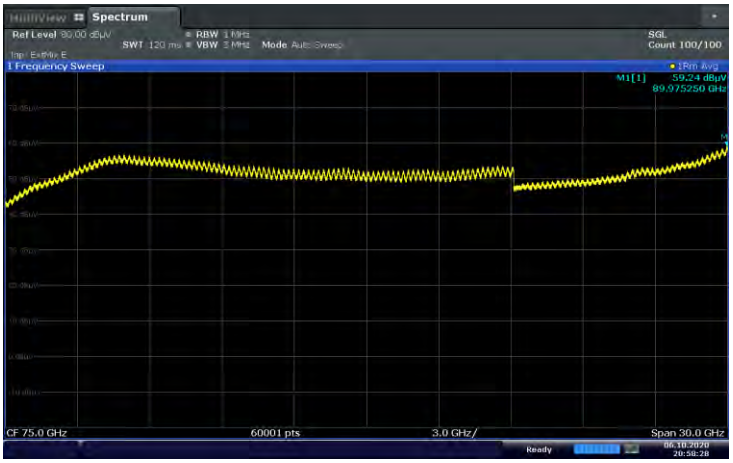
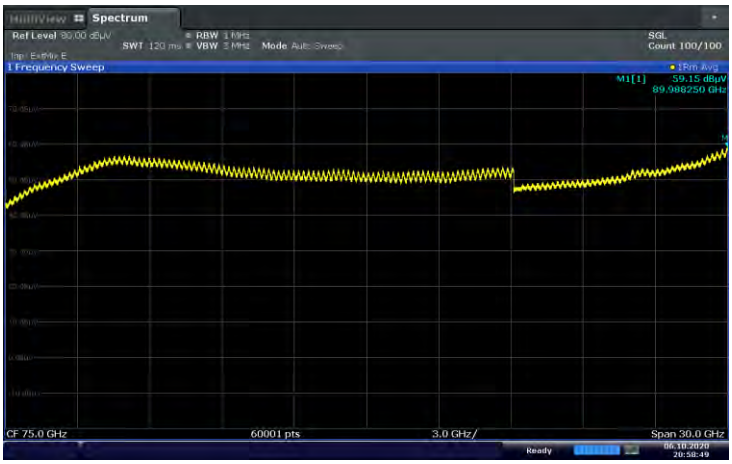
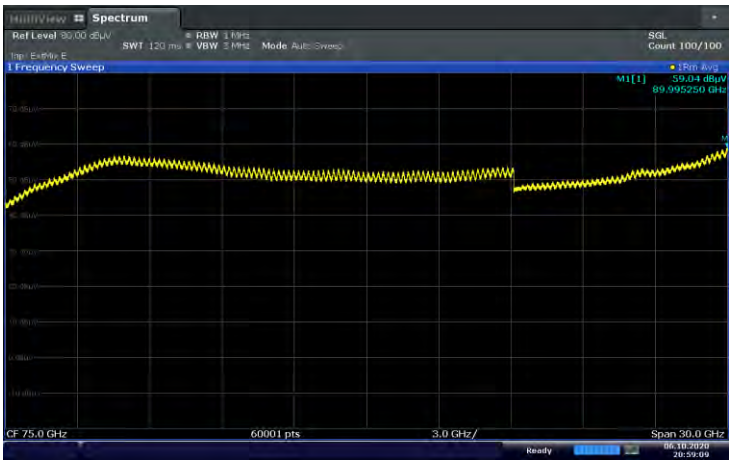
|  |  |

| Antenna 1(K patch), n260 100 MHz 1 CC SISO [60 GHz ~ 90 GHz] | |
|---|---|
| **Low Channel Pol. H** | **Low Channel Pol. V** |
|  |  |
| **Middle Channel Pol. H** | **Middle Channel Pol. V** |
|  |  |
| **High Channel Pol. H** | **High Channel Pol. V** |
|  |  |

| Antenna 1(K patch), n260 100 MHz 1 CC MIMO [60 GHz ~ 90 GHz] | |
|---|---|
| **Low Channel Pol. H** | **Low Channel Pol. V** |
|  |  |
| **Middle Channel Pol. H** | **Middle Channel Pol. V** |
|  |  |
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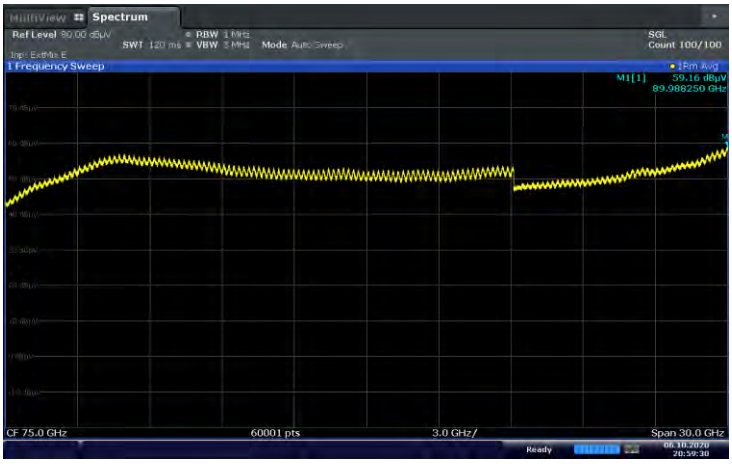
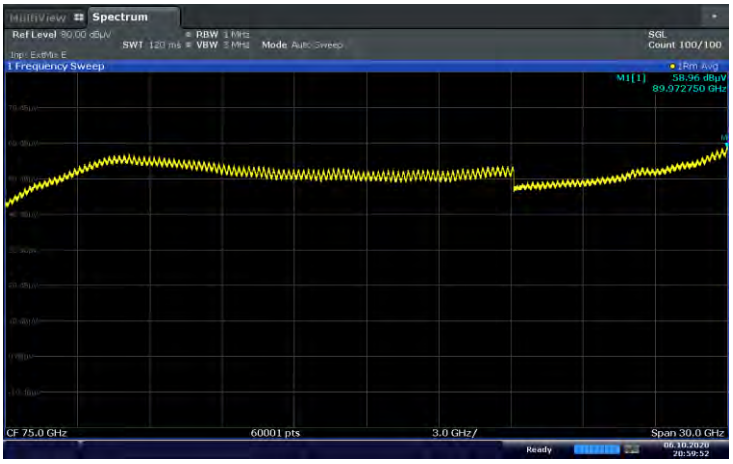
|  |  |

| Antenna 0(L patch), n260 50 MHz 1 CC SISO [90 GHz ~ 140 GHz] | |
|---|---|
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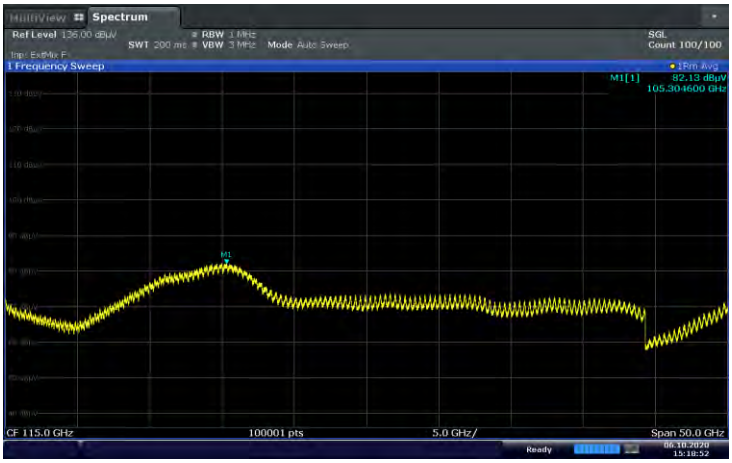
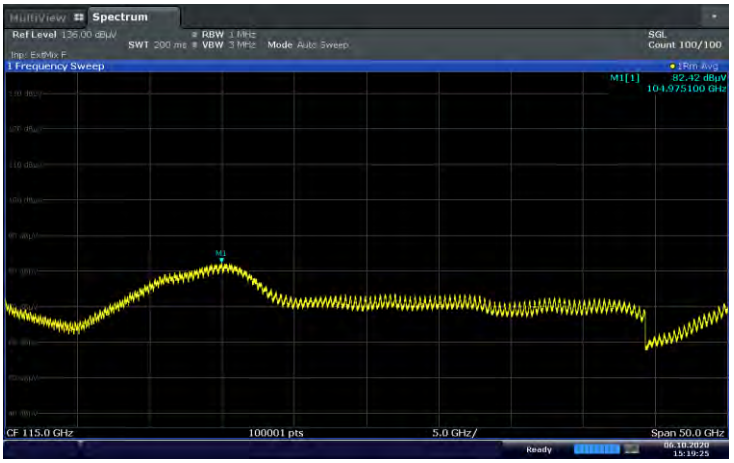
|  |  |
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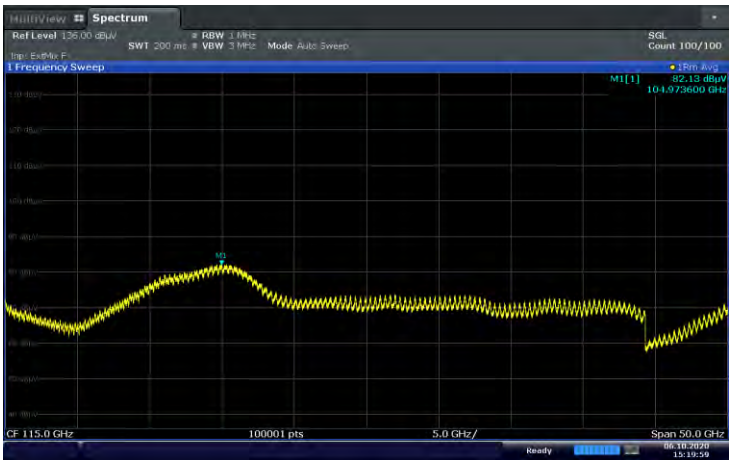
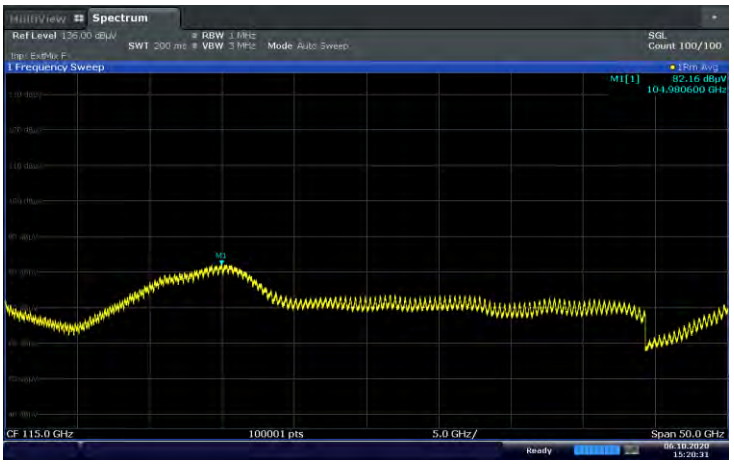
|  |  |
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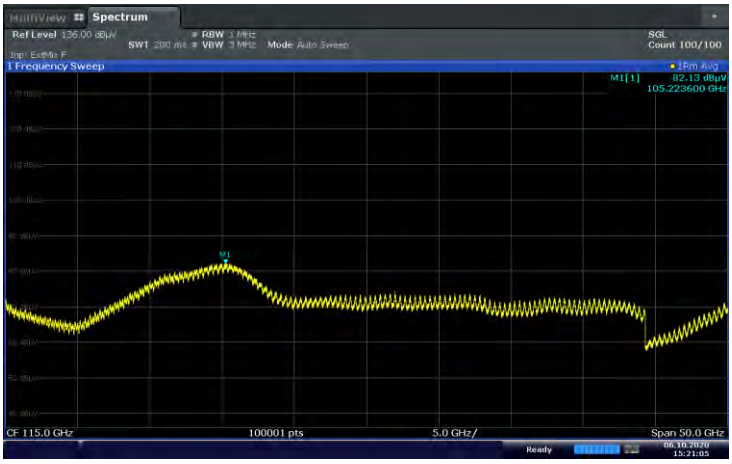
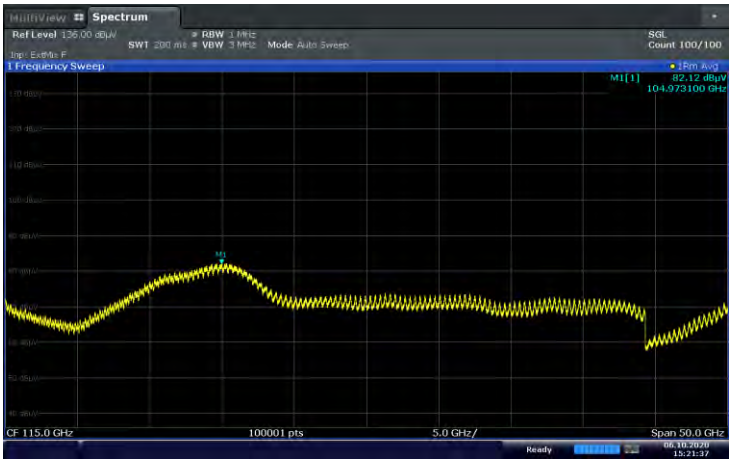
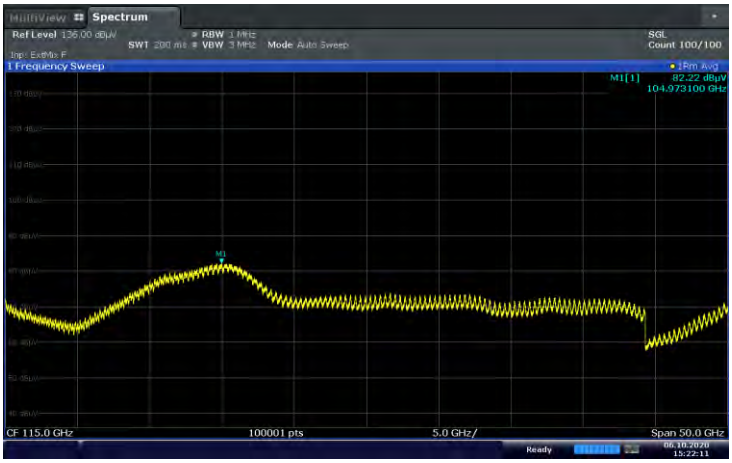
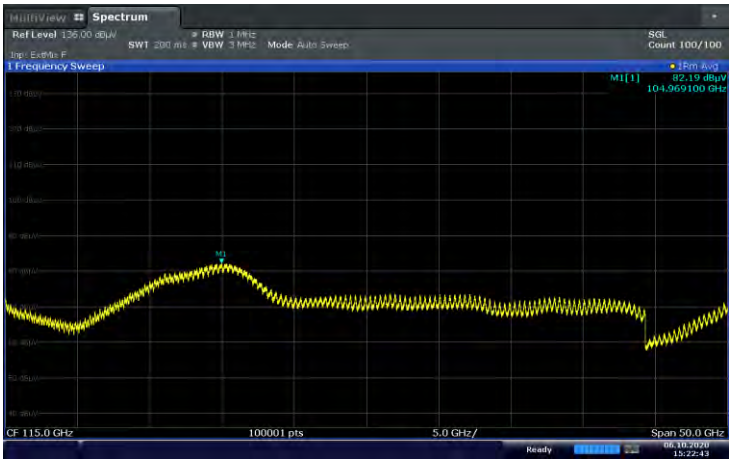
|  |  |

| Antenna 0(L patch), n260 50 MHz 1 CC MIMO [90 GHz ~ 140 GHz] | |
|---|---|
| **Low Channel Pol. H** | **Low Channel Pol. V** |
|  |  |
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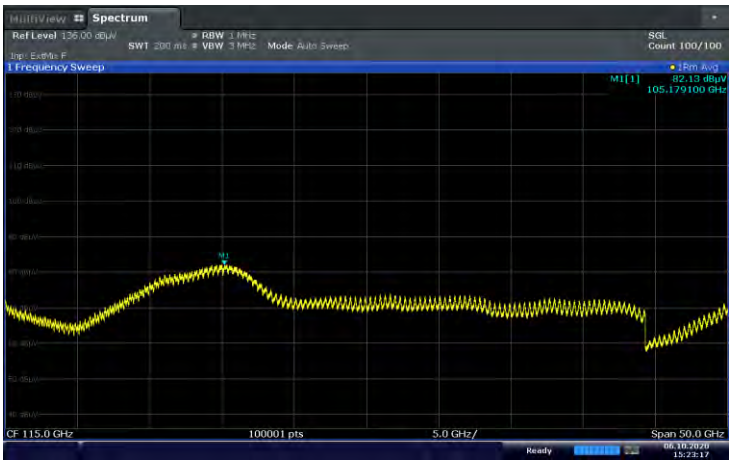
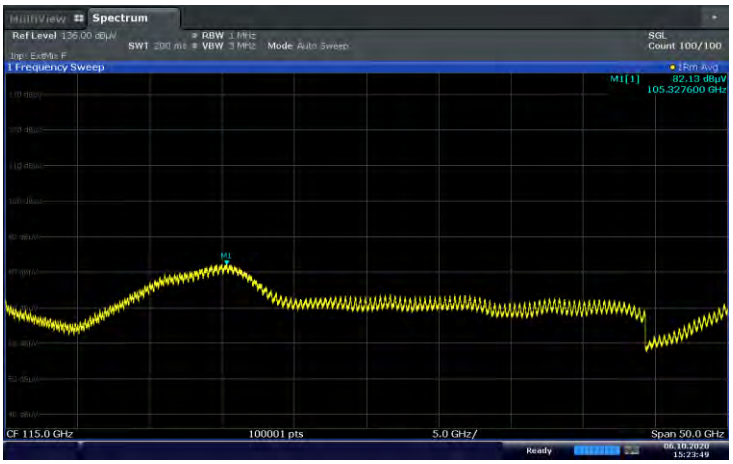
|  |  |
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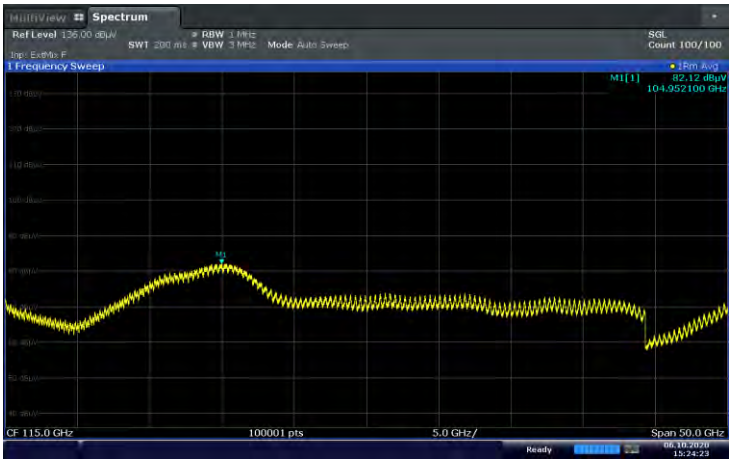
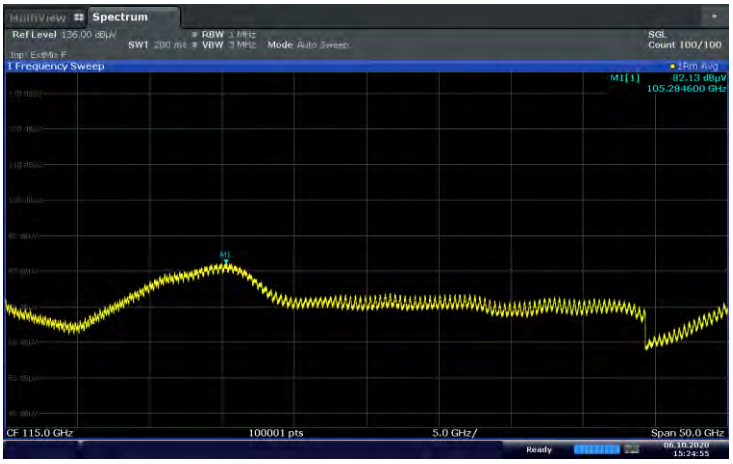
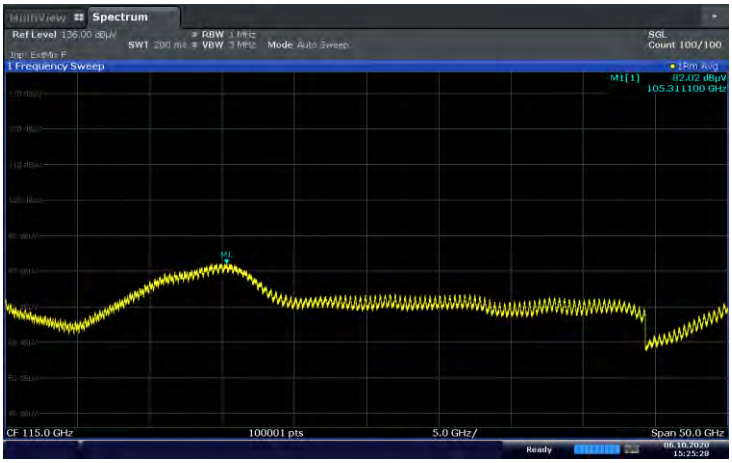
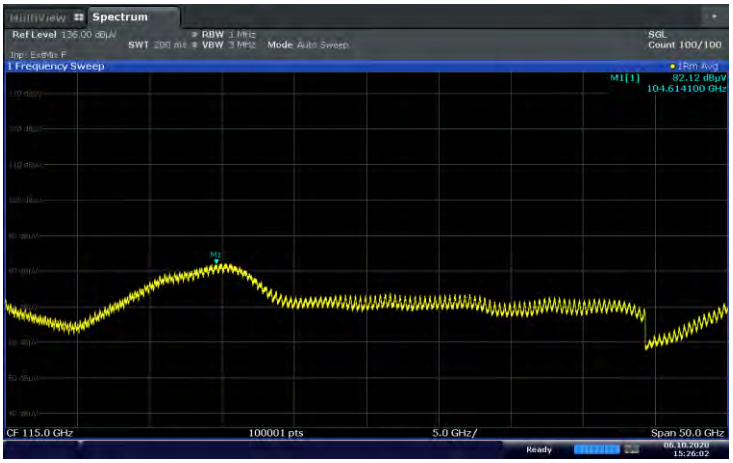
|  |  |

| Antenna 0(L patch), n260 100 MHz 1 CC SISO [90 GHz ~ 140 GHz] | |
|---|---|
| **Low Channel Pol. H** | **Low Channel Pol. V** |
|  |  |
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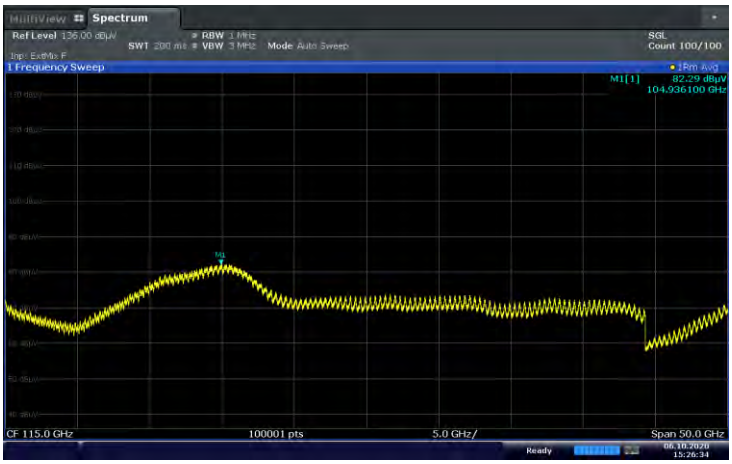
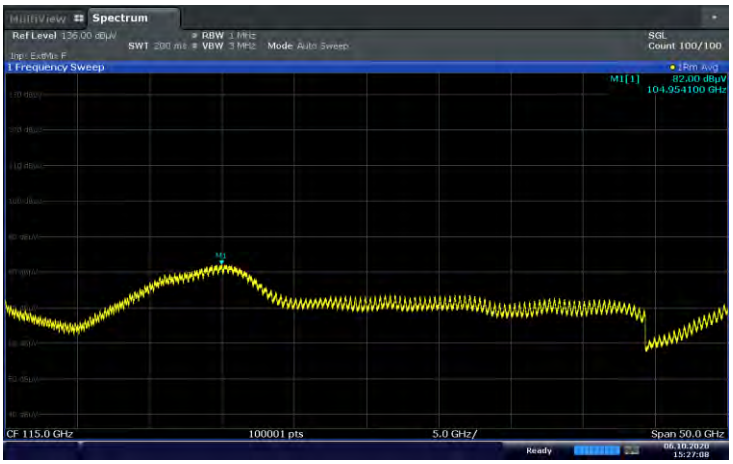
|  |  |
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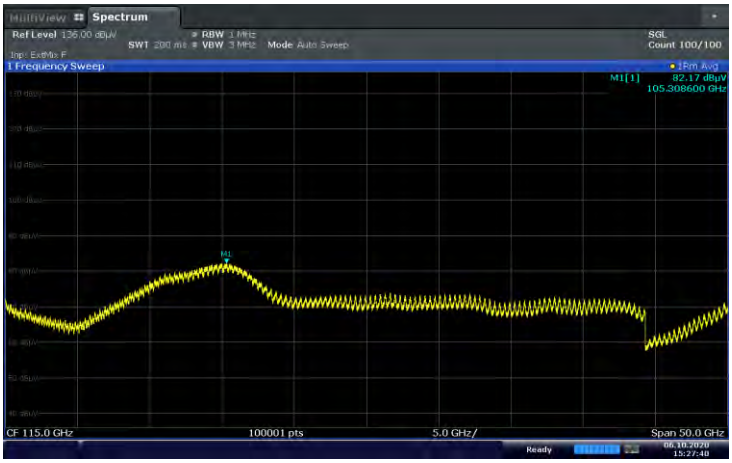
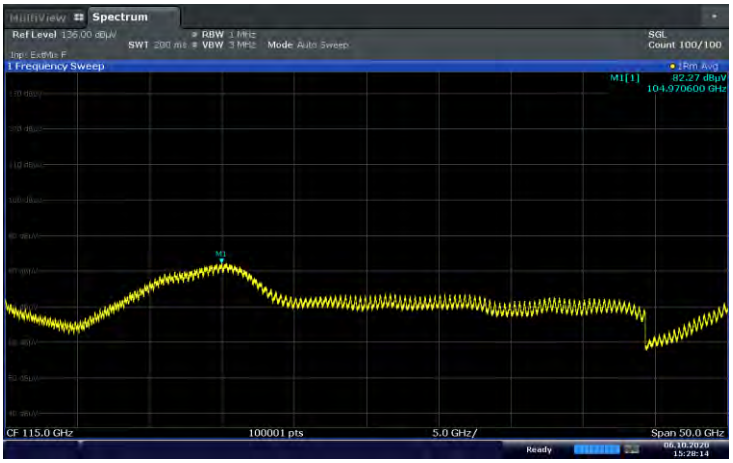
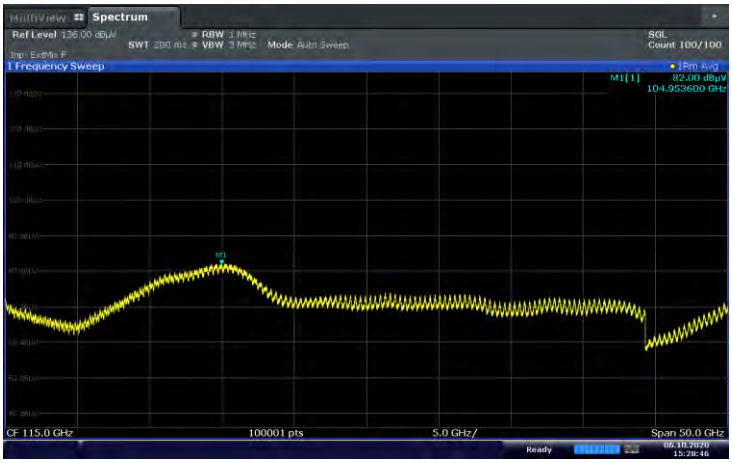
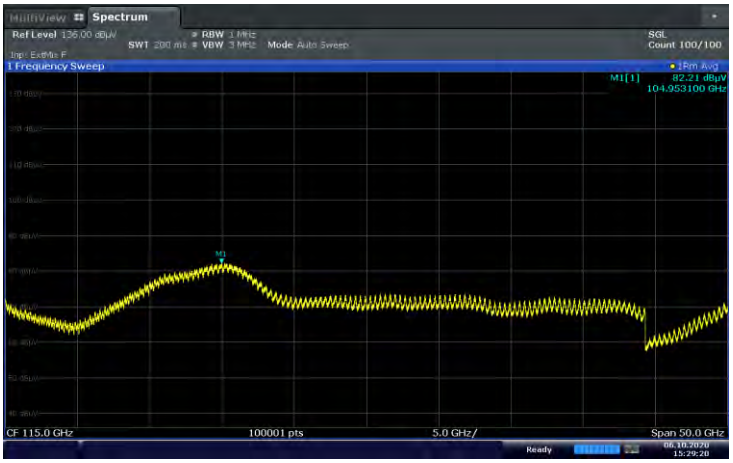
|  |  |

| Antenna 0(L patch), n260 100 MHz 1 CC MIMO [90 GHz ~ 140 GHz] | |
|---|---|
| **Low Channel Pol. H** | **Low Channel Pol. V** |
|  |  |
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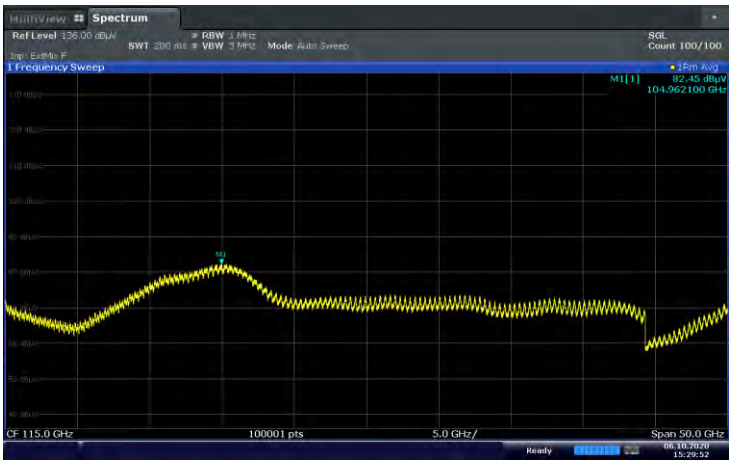
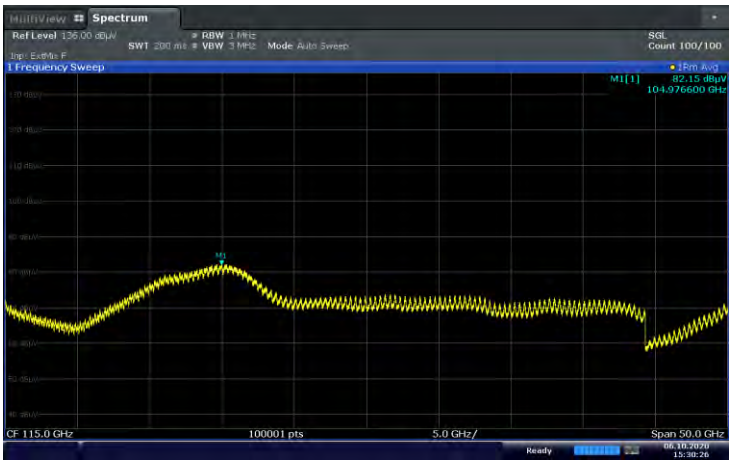
|  |  |
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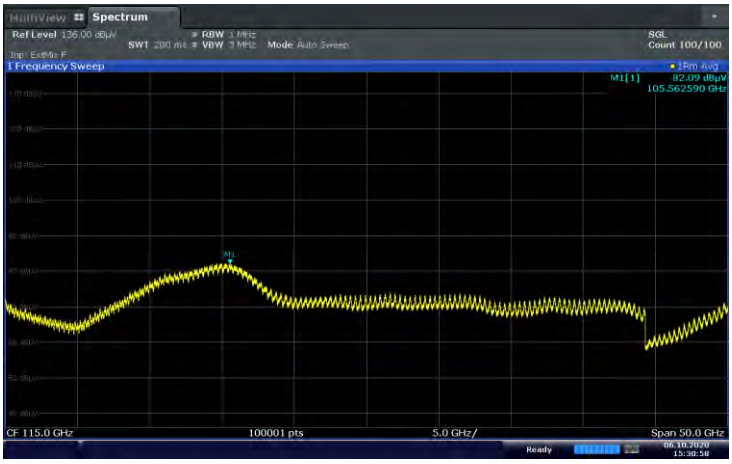
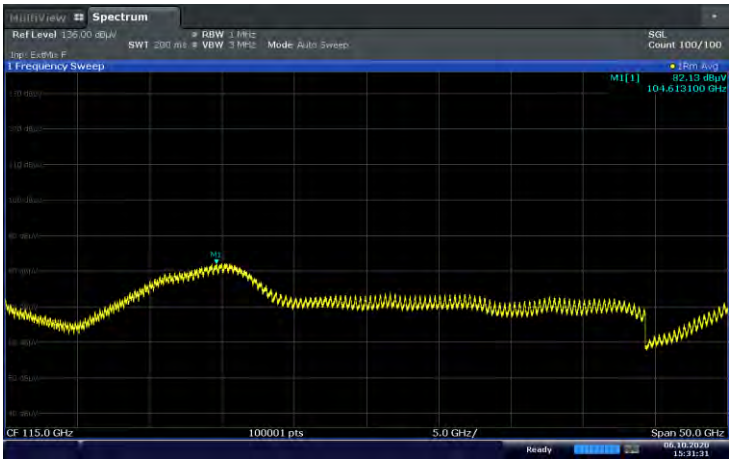
|  |  |

| Antenna 1(K patch), n260 50 MHz 1 CC SISO [90 GHz ~ 140 GHz] | |
|---|---|
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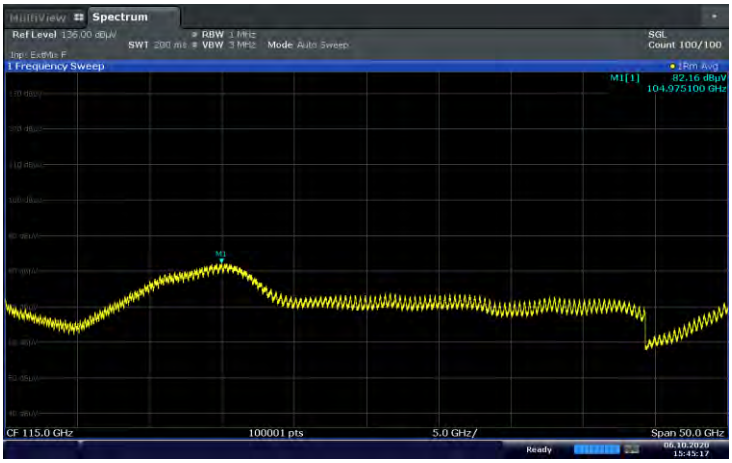
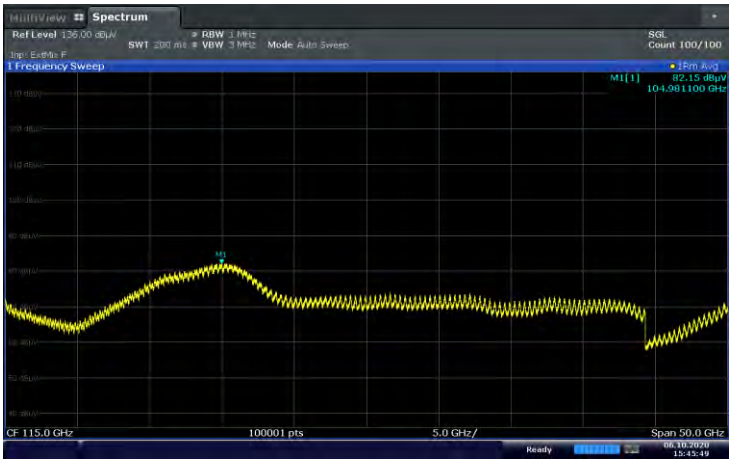
|  |  |
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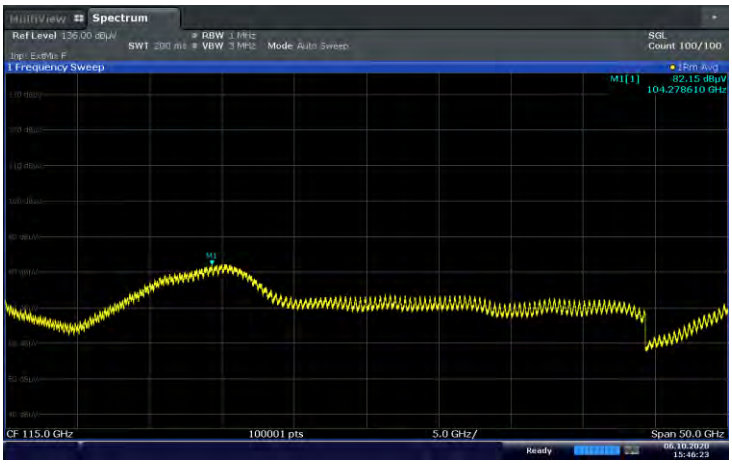
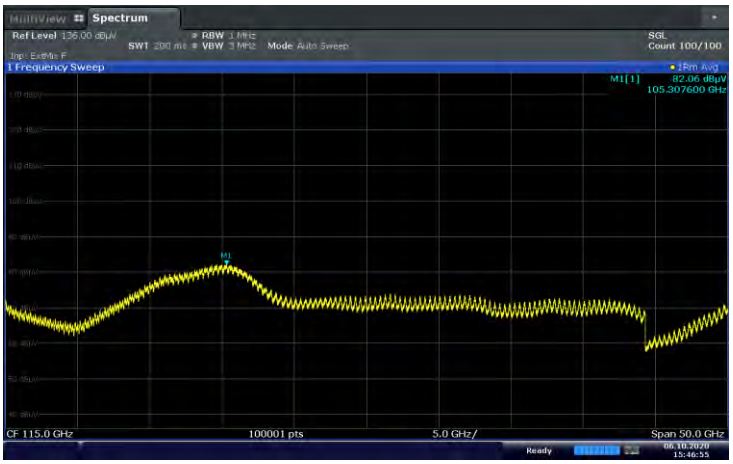
|  |  |
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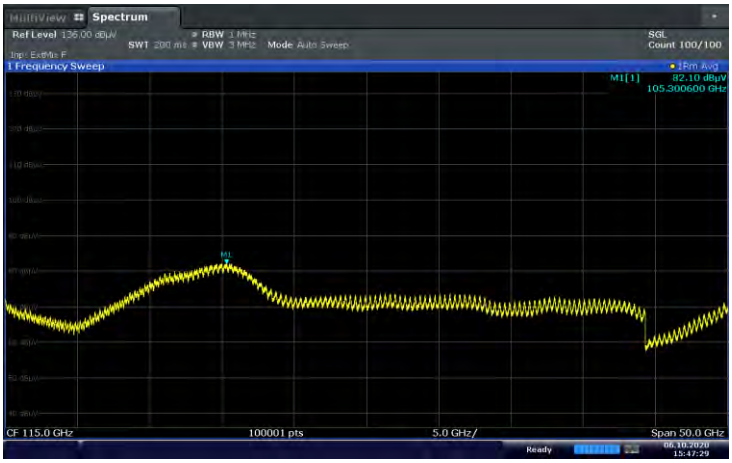
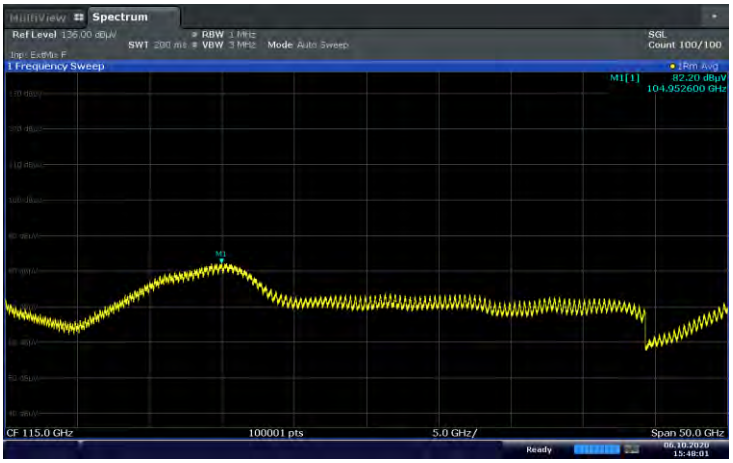
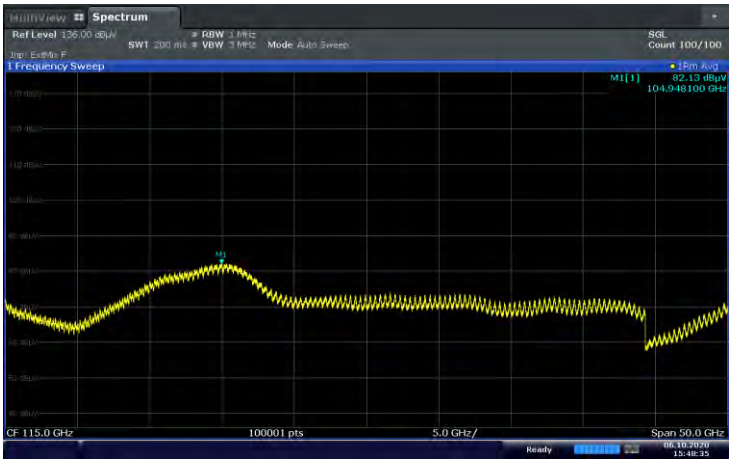
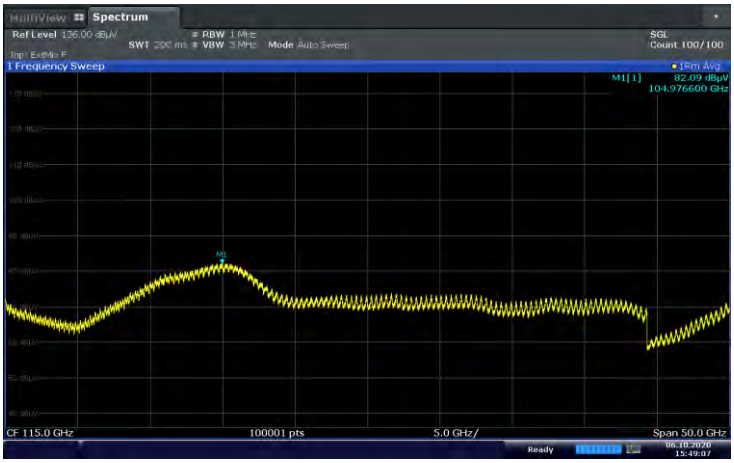
|  |  |

| Antenna 1(K patch), n260 50 MHz 1 CC MIMO [90 GHz ~ 140 GHz] | |
|---|---|
| **Low Channel Pol. H** | **Low Channel Pol. V** |
|  |  |
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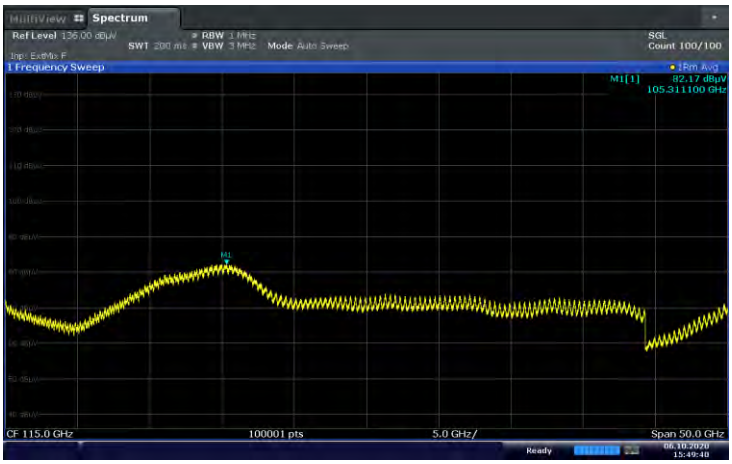
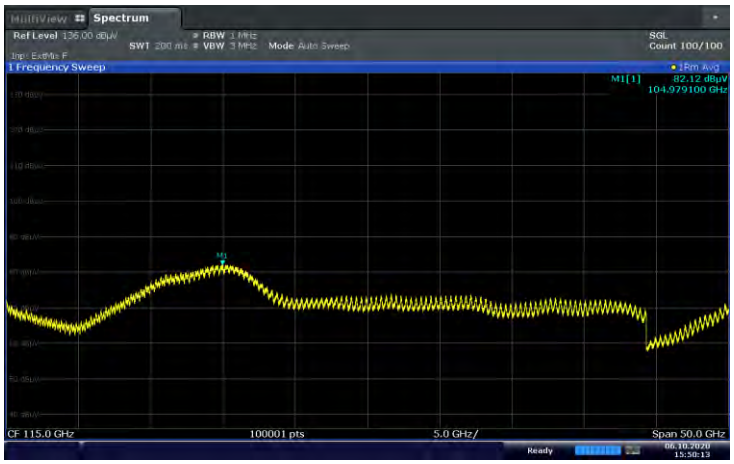
|  |  |
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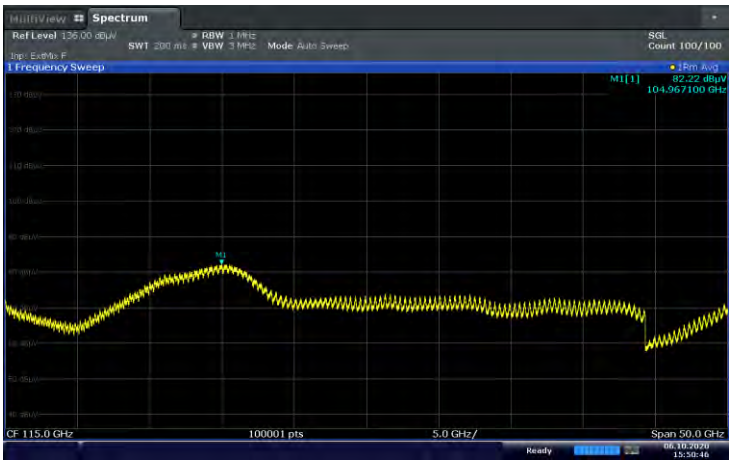
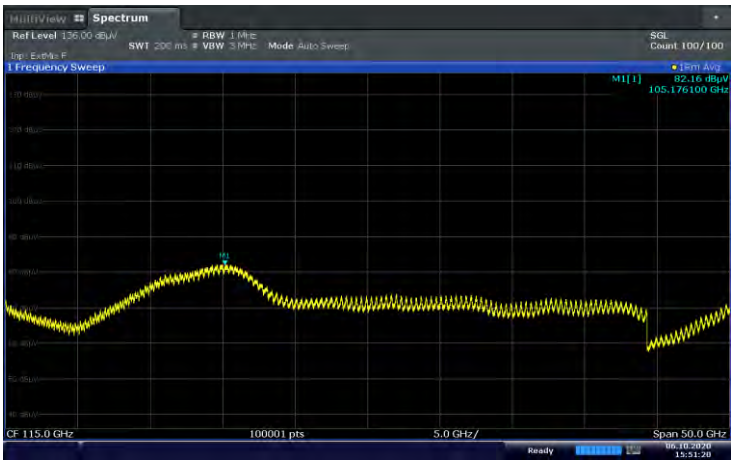
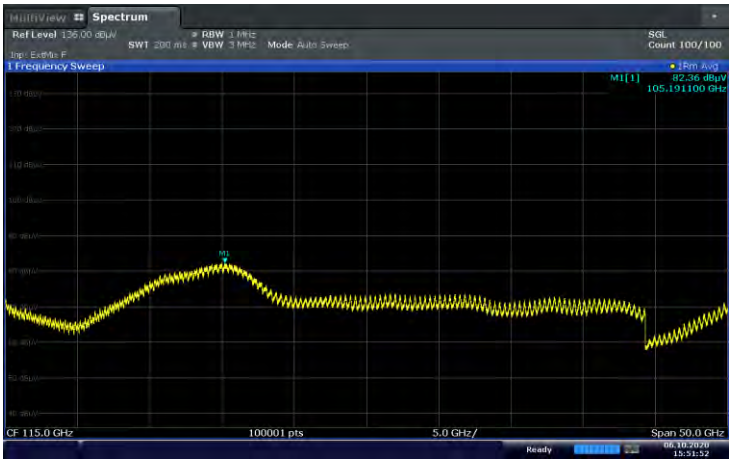
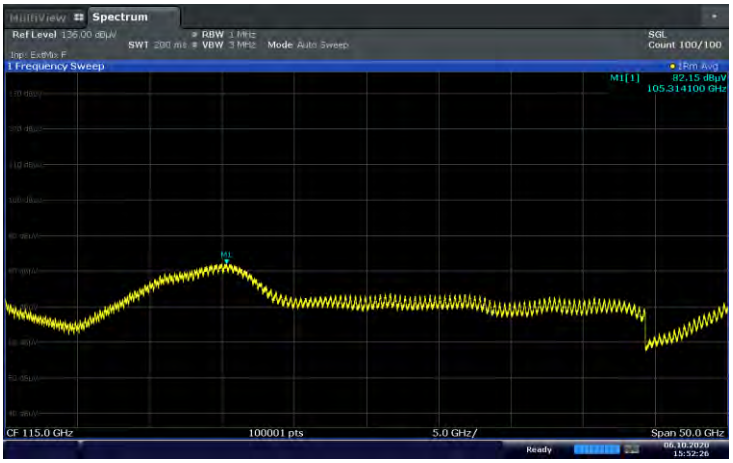
|  |  |

| Antenna 1(K patch), n260 100 MHz 1 CC SISO [90 GHz ~ 140 GHz] | |
|---|---|
| Low Channel Pol. H | Low Channel Pol. V |
|  |  |
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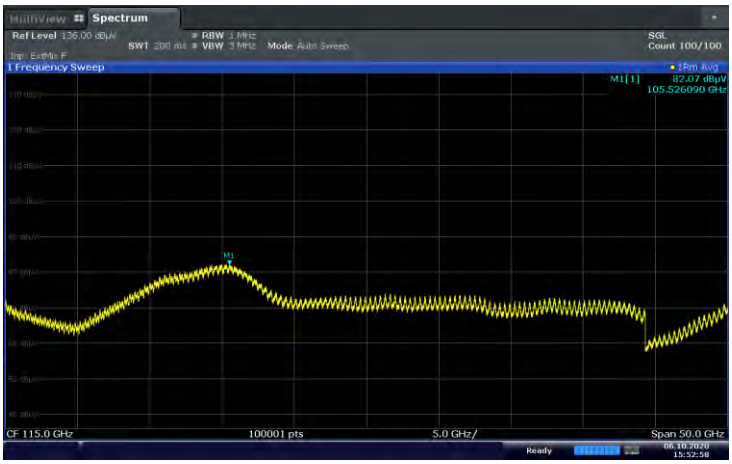
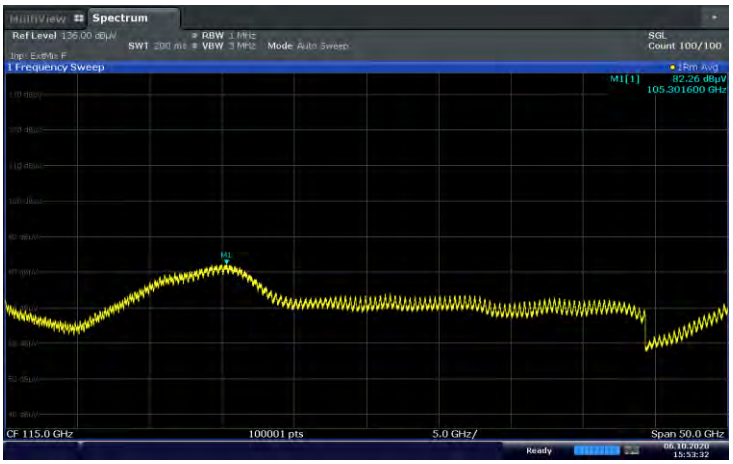
|  |  |
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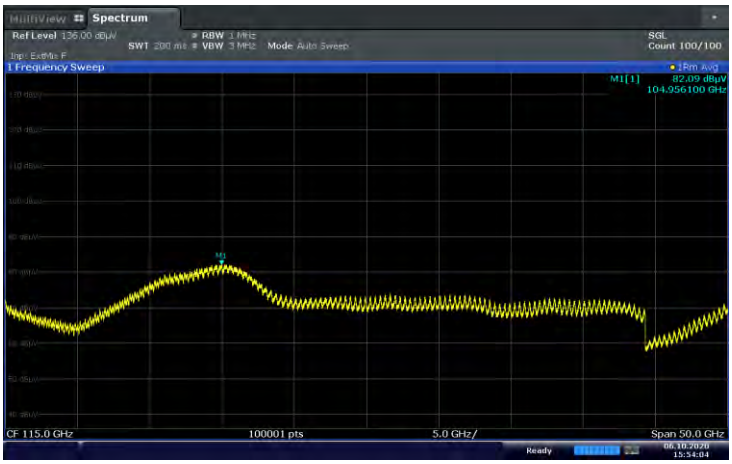
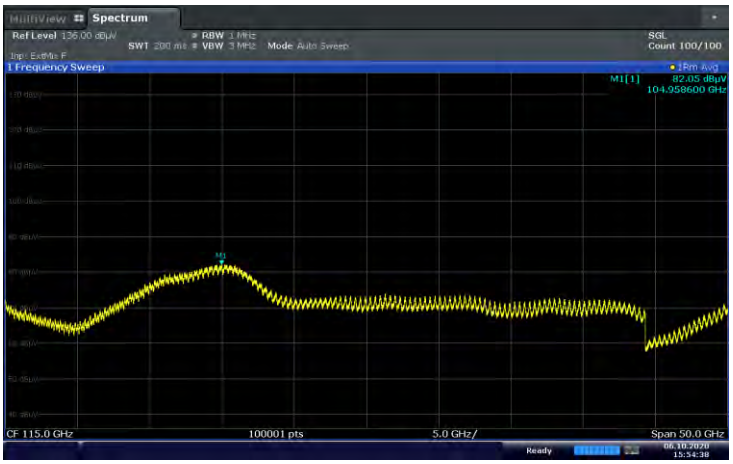
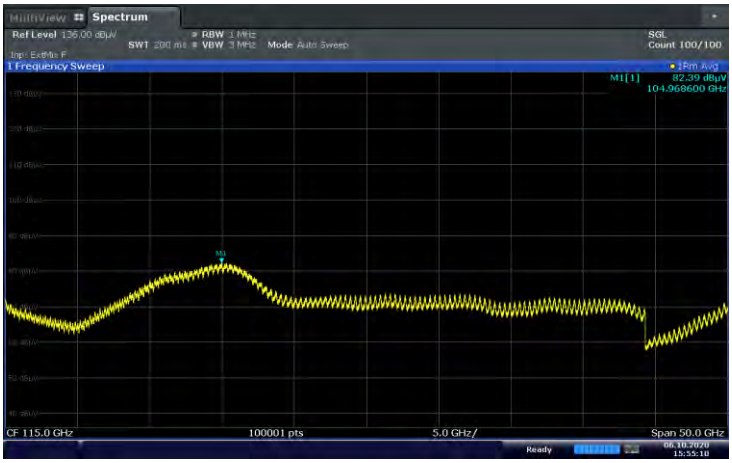
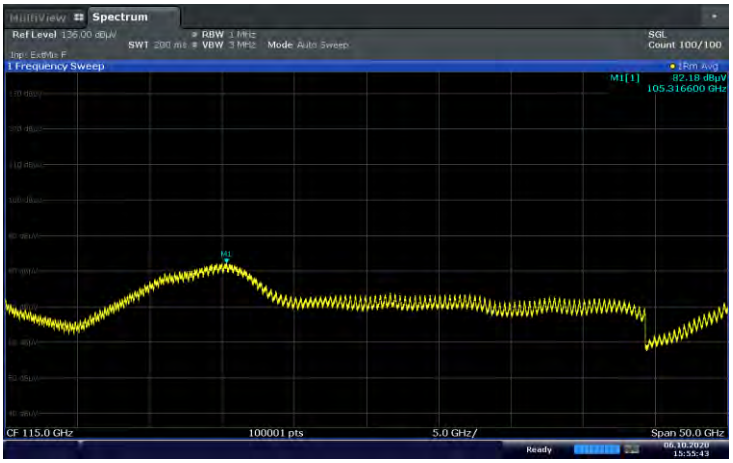
|  |  |

| Antenna 1(K patch), n260 100 MHz 1 CC MIMO [90 GHz ~ 140 GHz] | |
|---|---|
| **Low Channel Pol. H** | **Low Channel Pol. V** |
|  |  |
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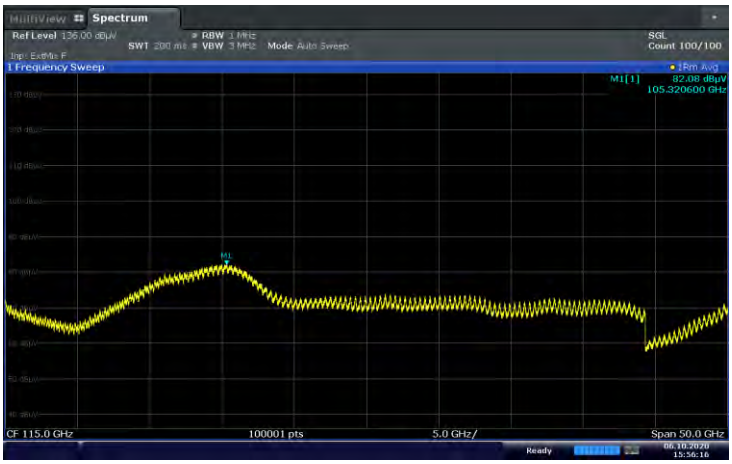
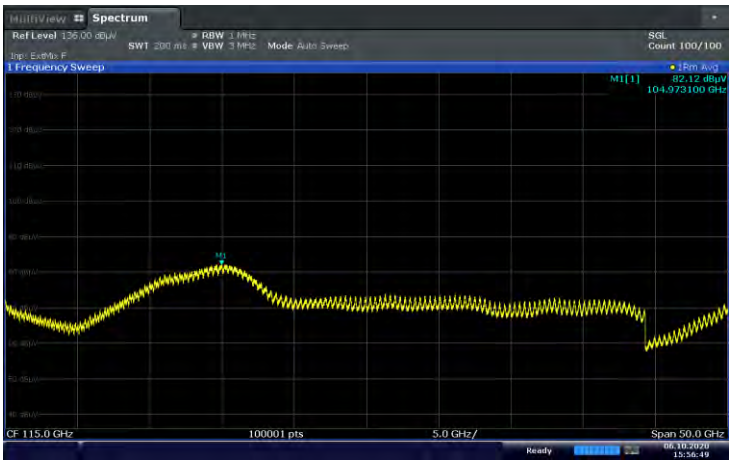
|  |  |
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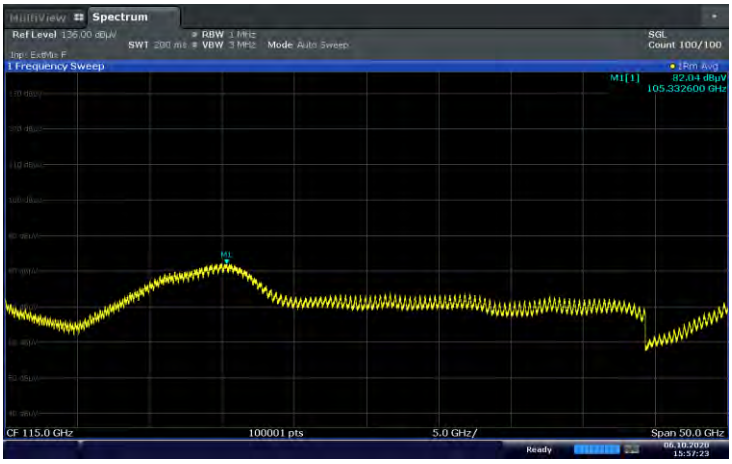
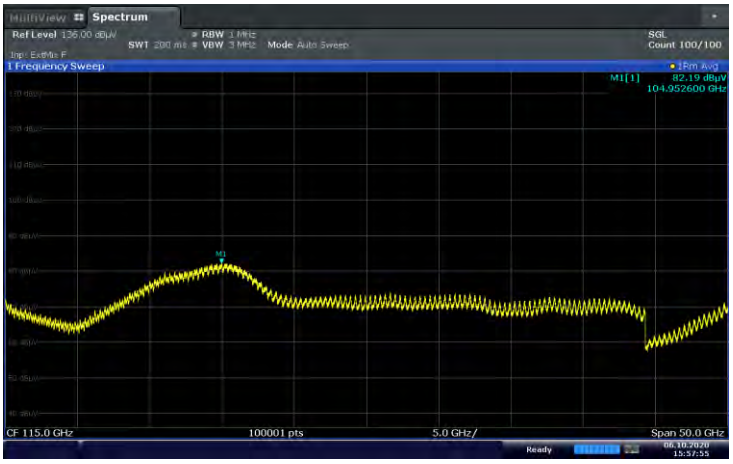
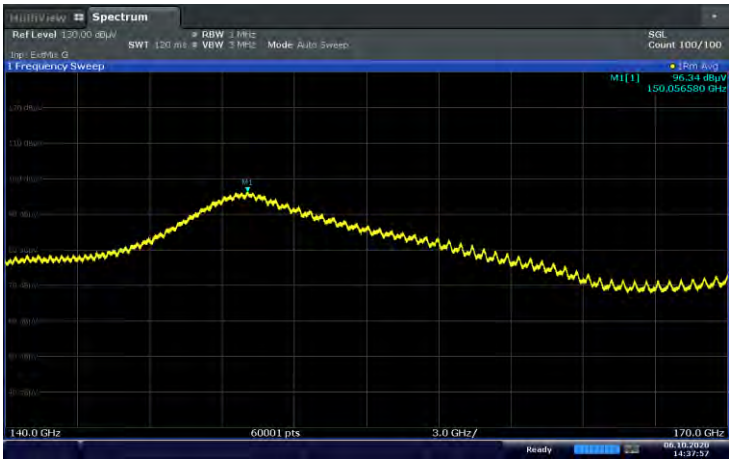
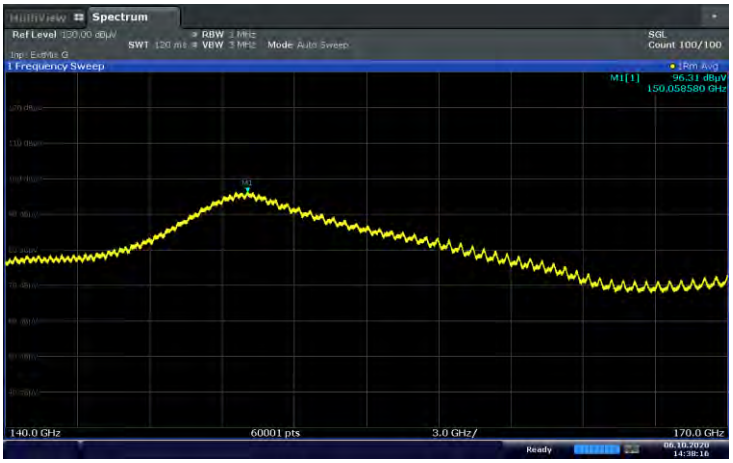
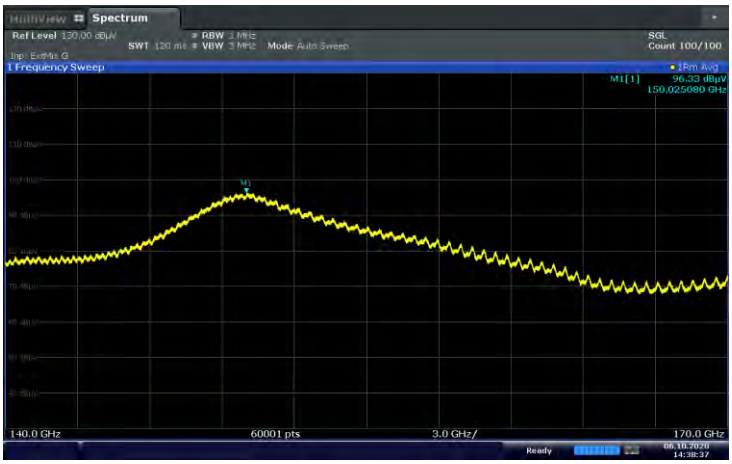
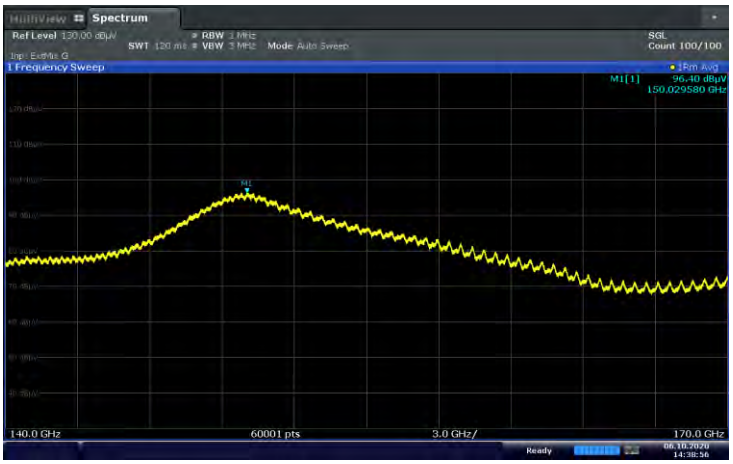
|  |  |

| Antenna 0(L patch), n260 50 MHz 1 CC SISO [140 GHz ~ 170 GHz] | |
|---|---|
| **Low Channel Pol. H** | **Low Channel Pol. V** |
|  |  |
| **Middle Channel Pol. H** | **Middle Channel Pol. V** |
|  |  |
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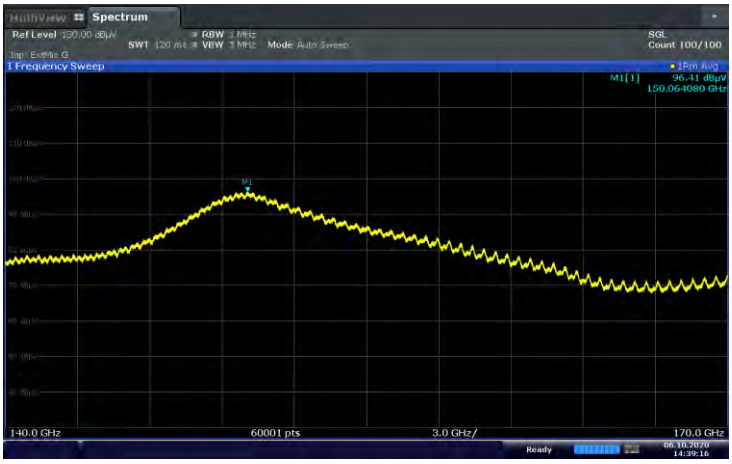
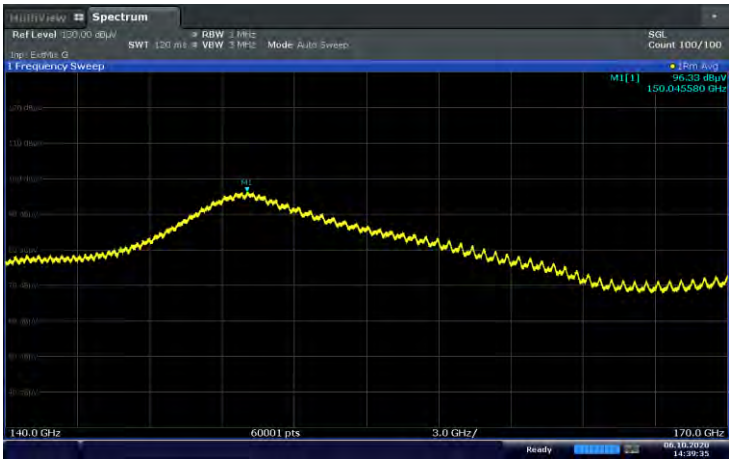
|  |  |

| Antenna 0(L patch), n260 50 MHz 1 CC MIMO [140 GHz ~ 170 GHz] | |
|---|---|
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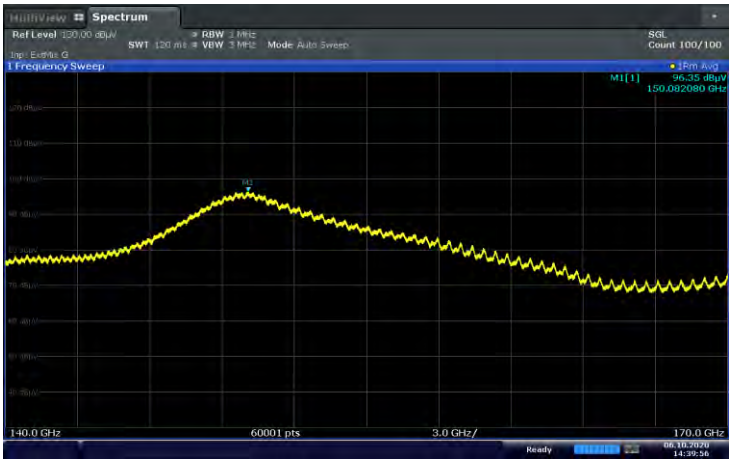
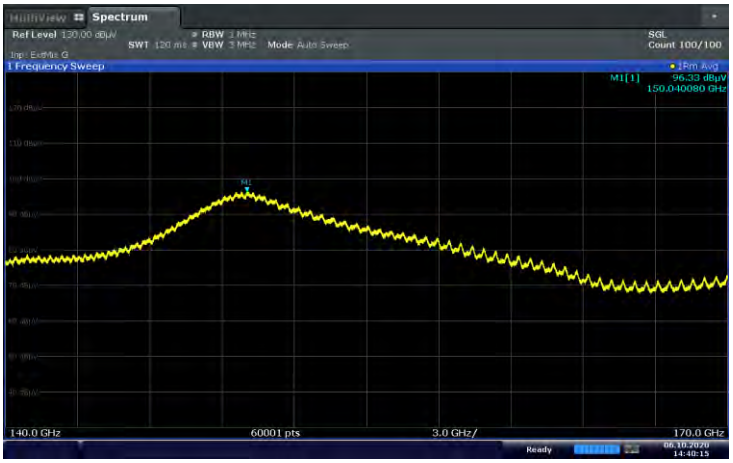
|  |  |
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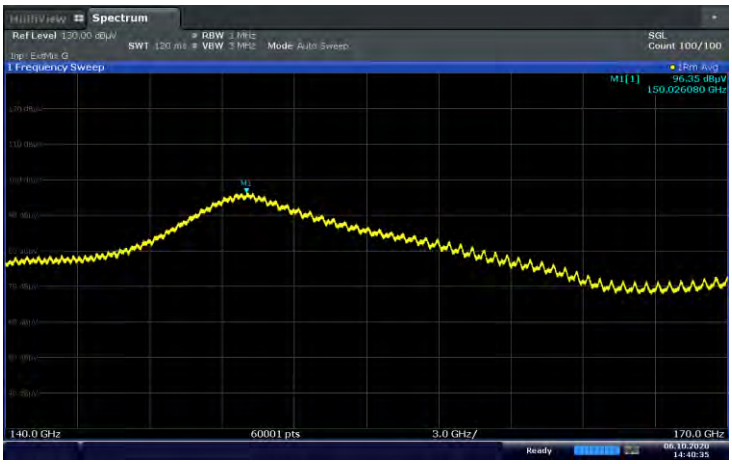
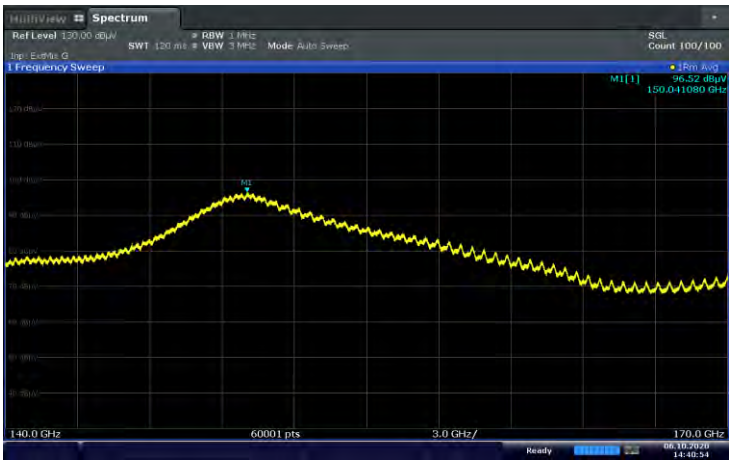
|  |  |
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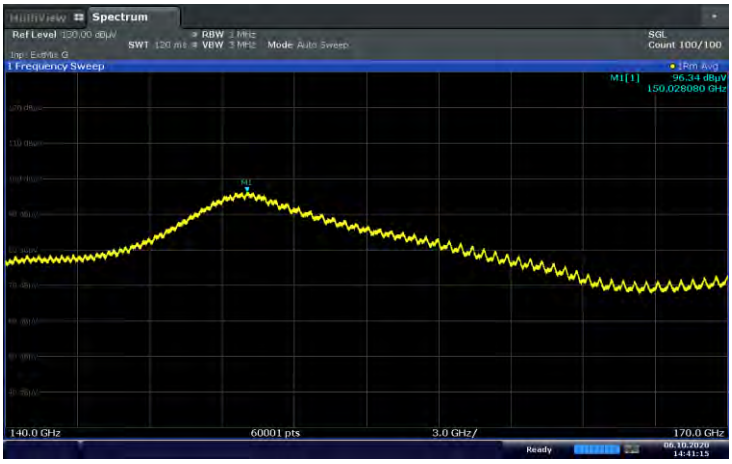
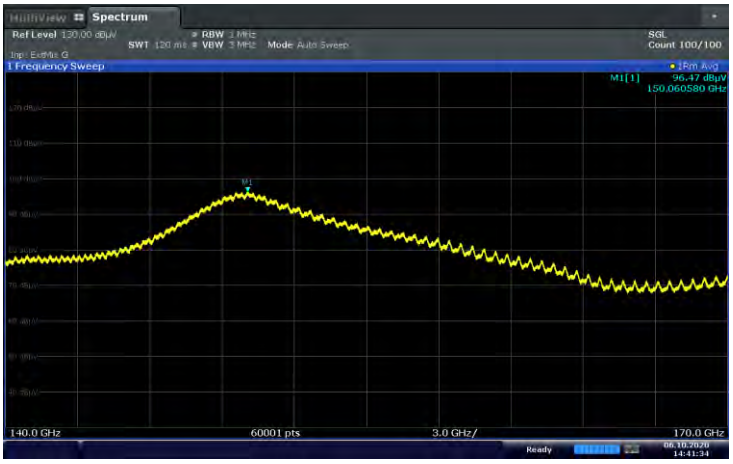
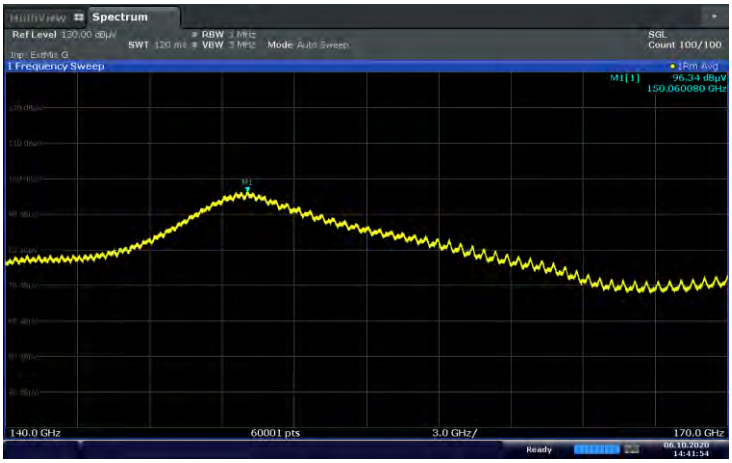
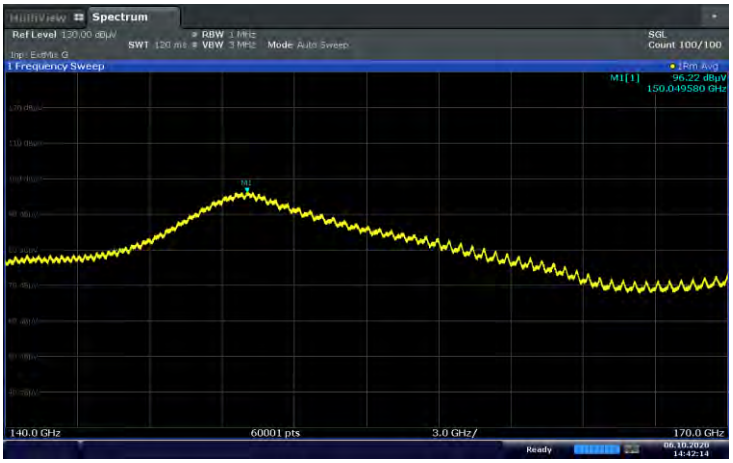
|  |  |

| Antenna 0(L patch), n260 100 MHz 1 CC SISO [140 GHz ~ 170 GHz] | |
|---|---|
| **Low Channel Pol. H** | **Low Channel Pol. V** |
|  |  |
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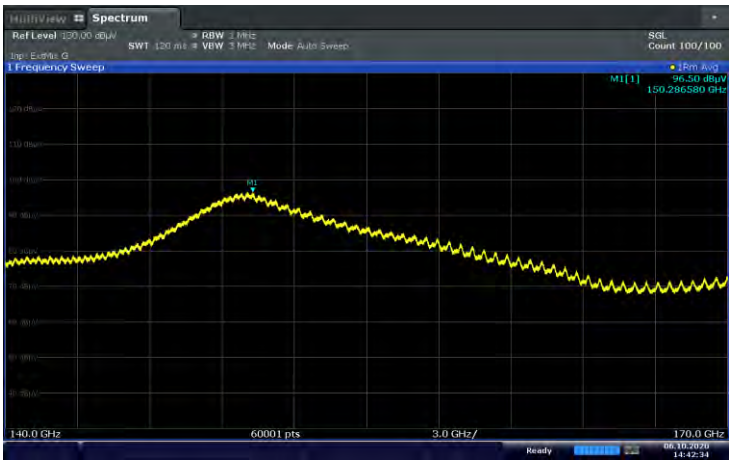
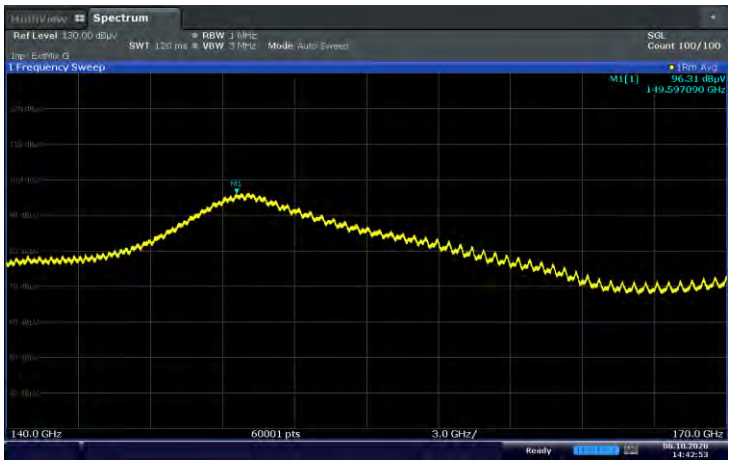
|  |  |
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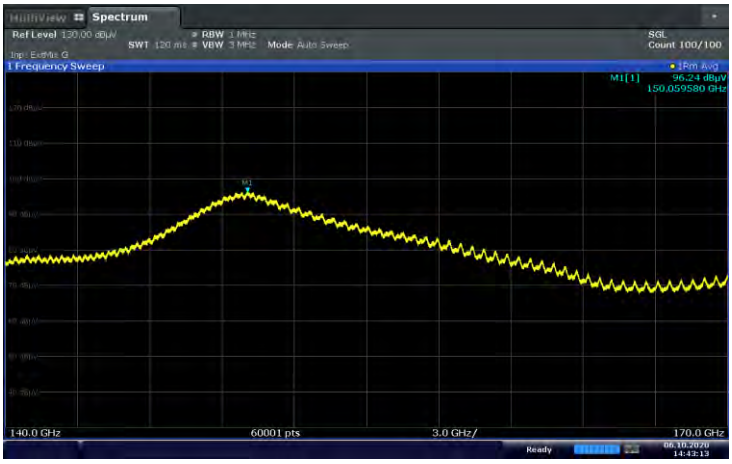
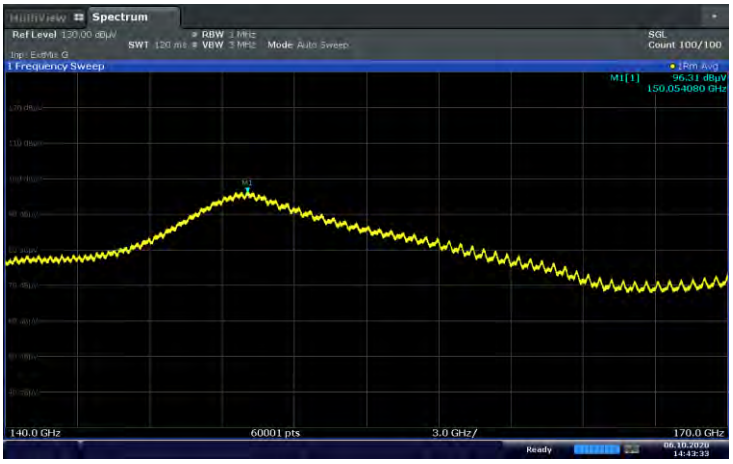
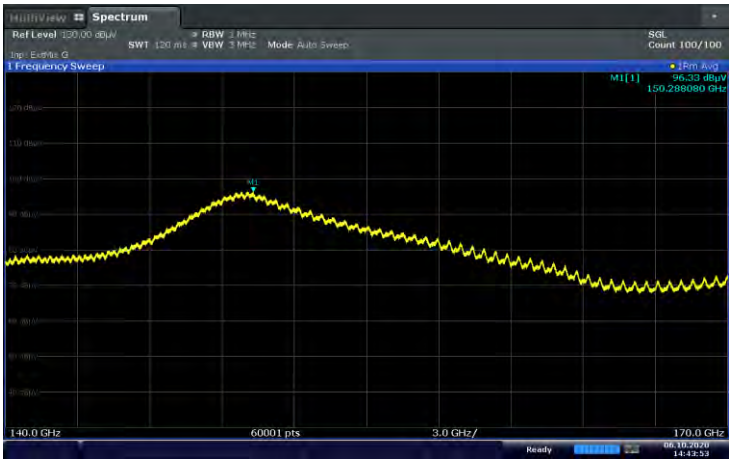
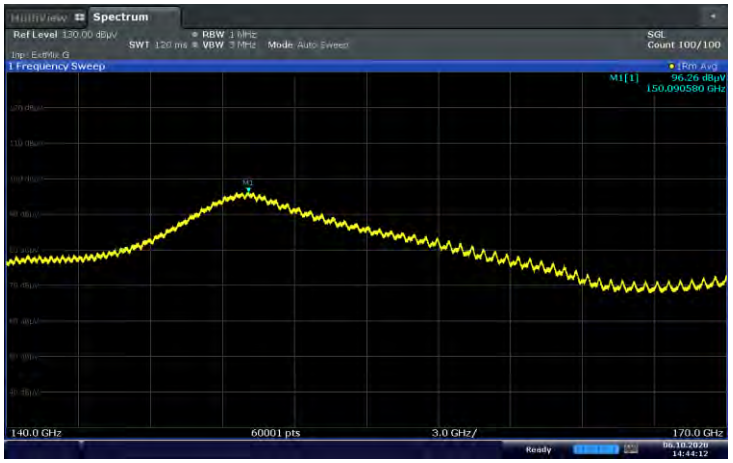
|  |  |

| Antenna 0(L patch), n260 100 MHz 1 CC MIMO [140 GHz ~ 170 GHz] | |
|---|---|
| **Low Channel Pol. H** | **Low Channel Pol. V** |
|  |  |
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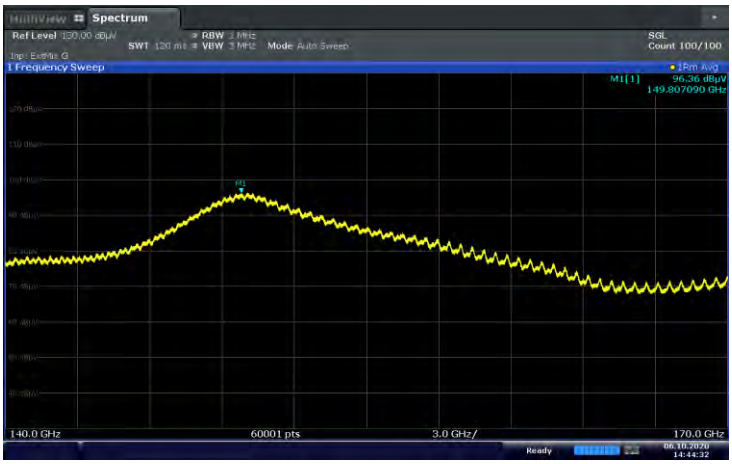
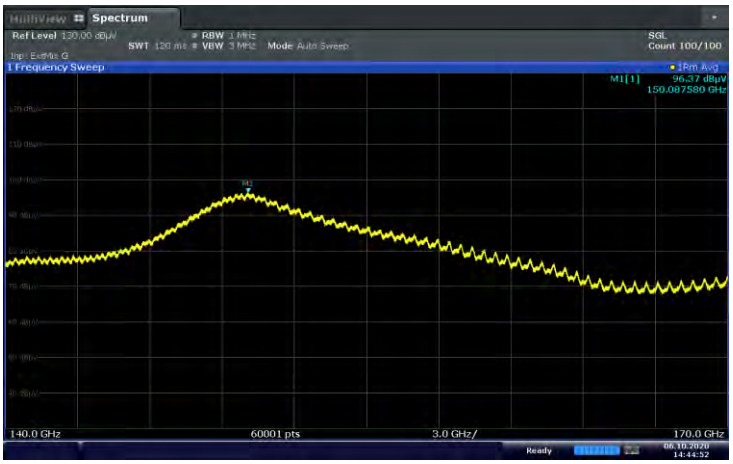
|  |  |
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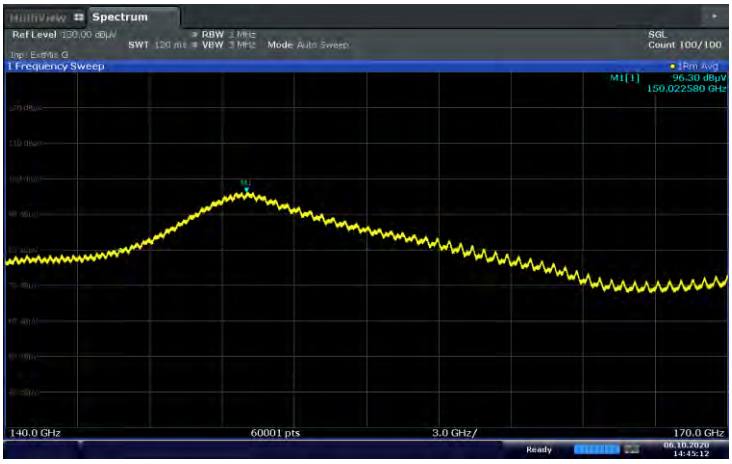
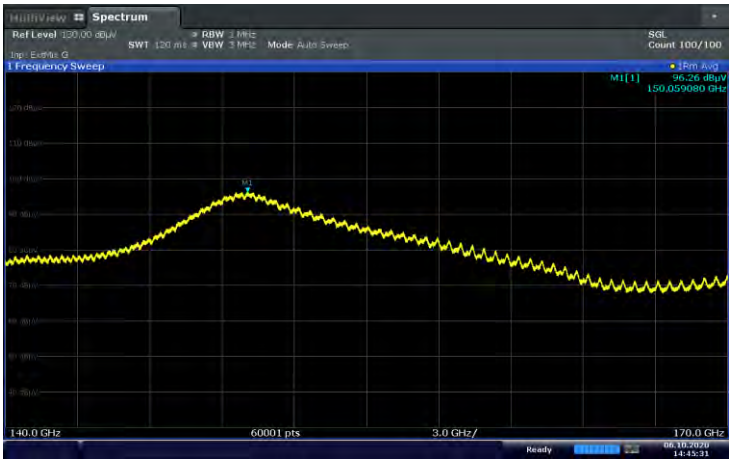
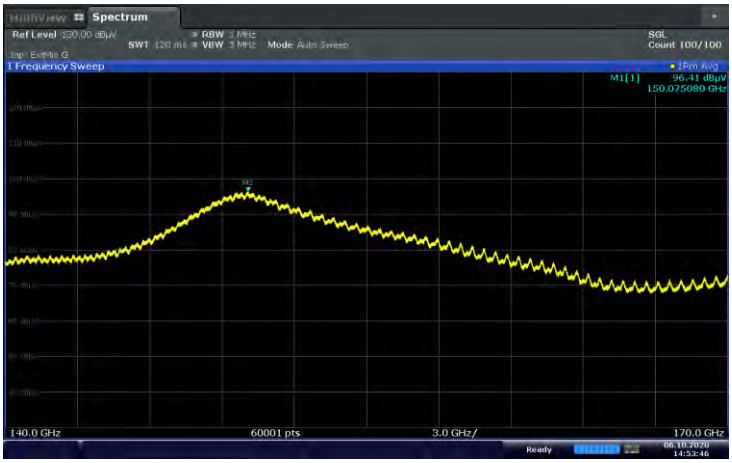
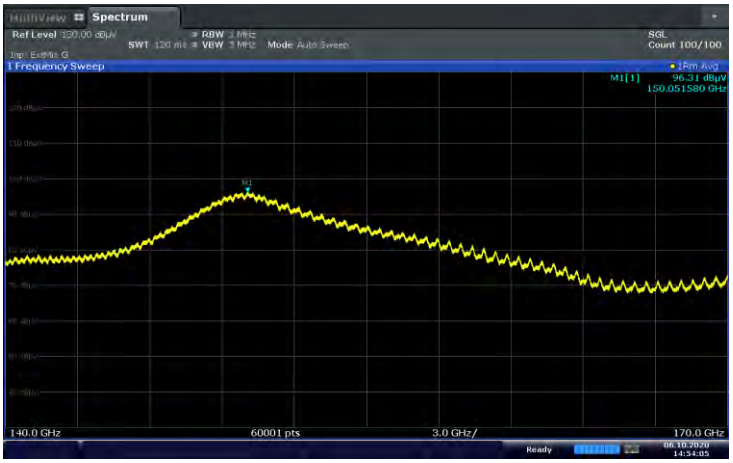
|  |  |

| Antenna 1(K patch), n260 50 MHz 1 CC SISO [140 GHz ~ 170 GHz] | |
|---|---|
| **Low Channel Pol. H** | **Low Channel Pol. V** |
|  |  |
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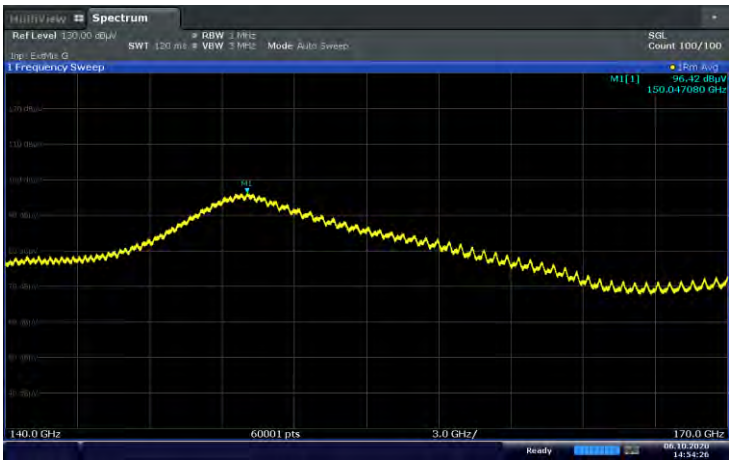
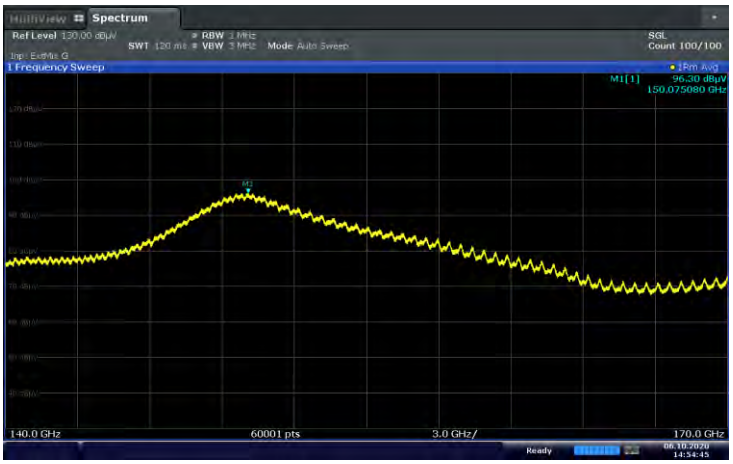
|  |  |
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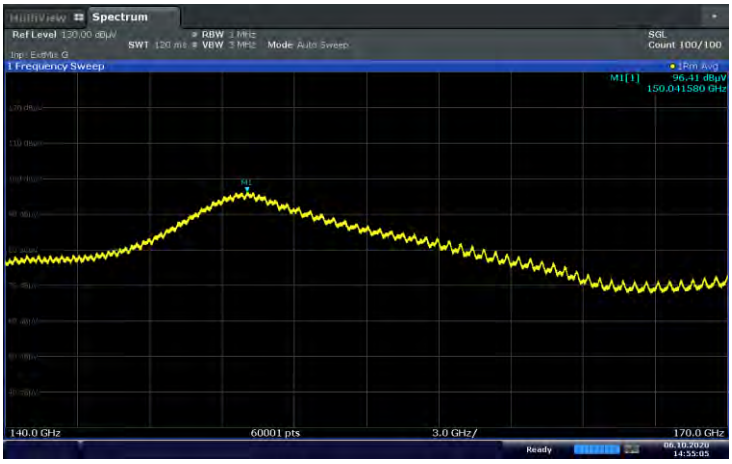
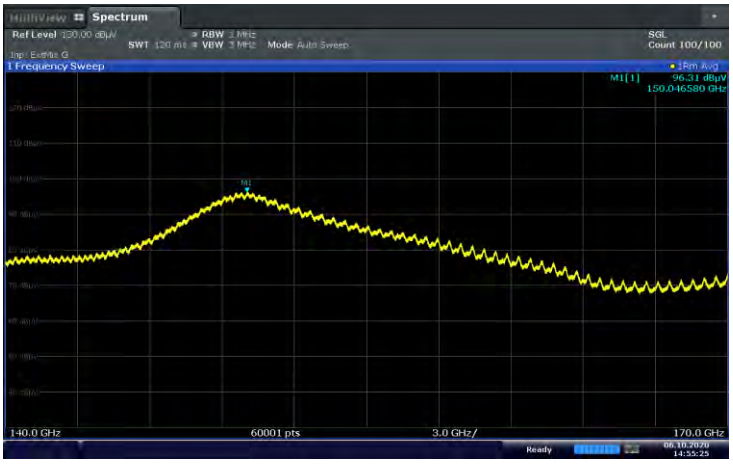
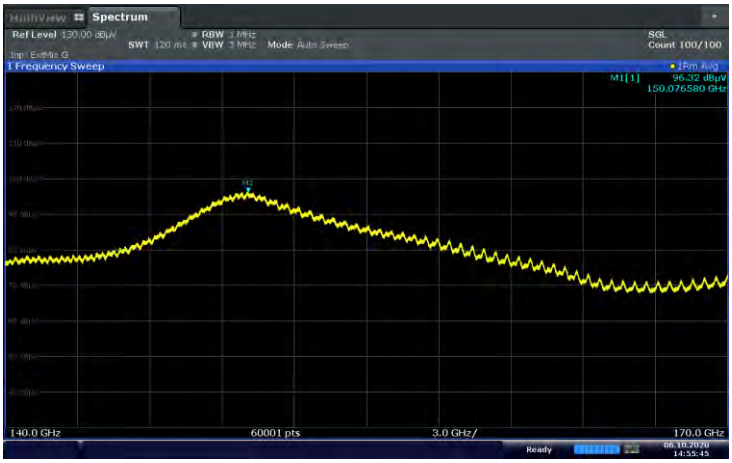
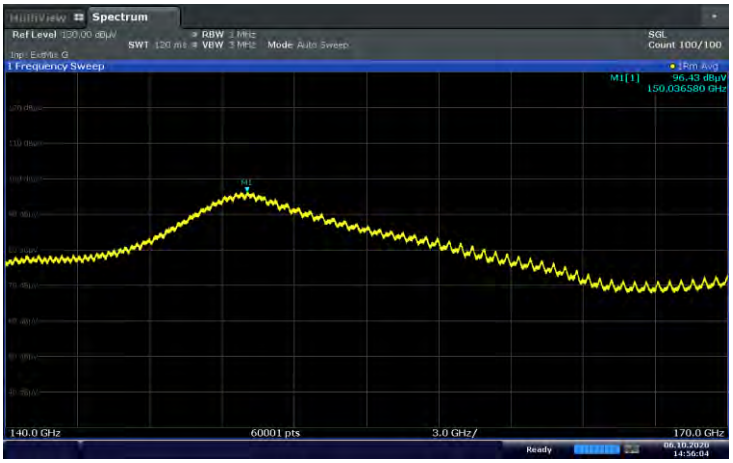
|  |  |

| Antenna 1(K patch), n260 50 MHz 1 CC MIMO [140 GHz ~ 170 GHz] | |
|---|---|
| **Low Channel Pol. H** | **Low Channel Pol. V** |
|  |  |
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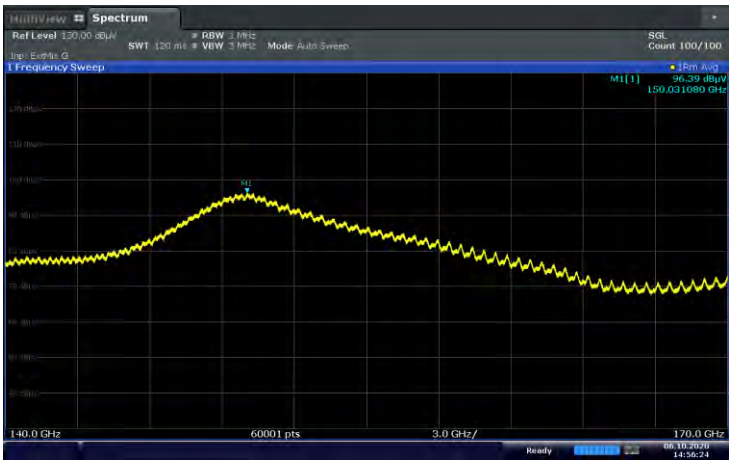
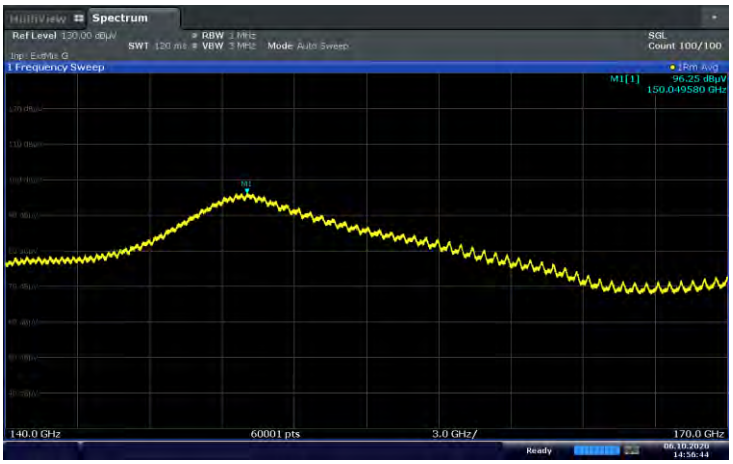
|  |  |
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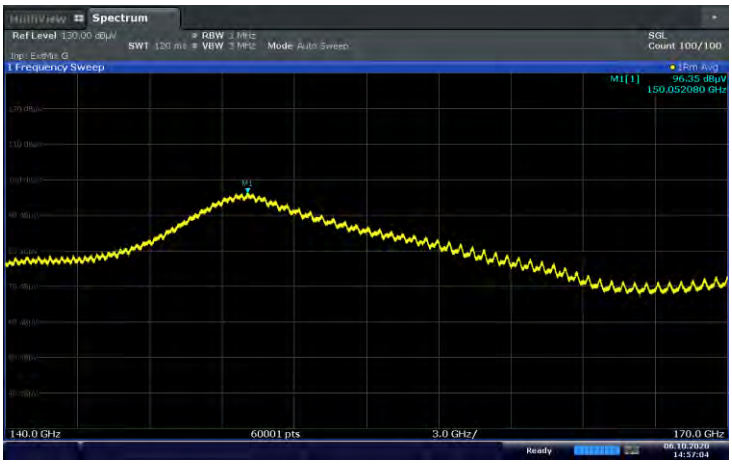
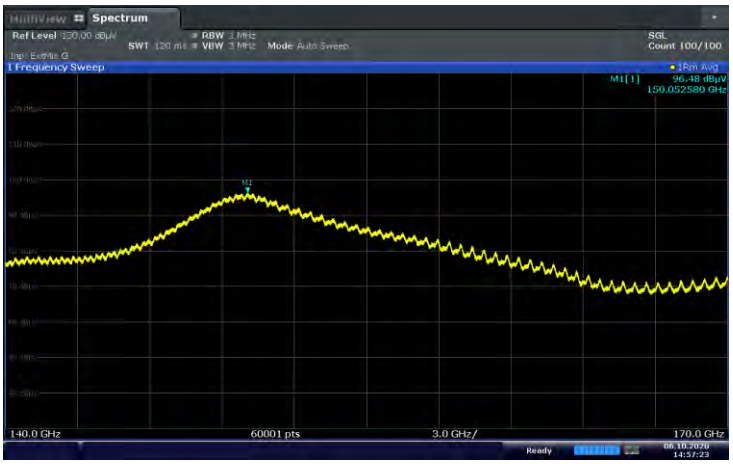
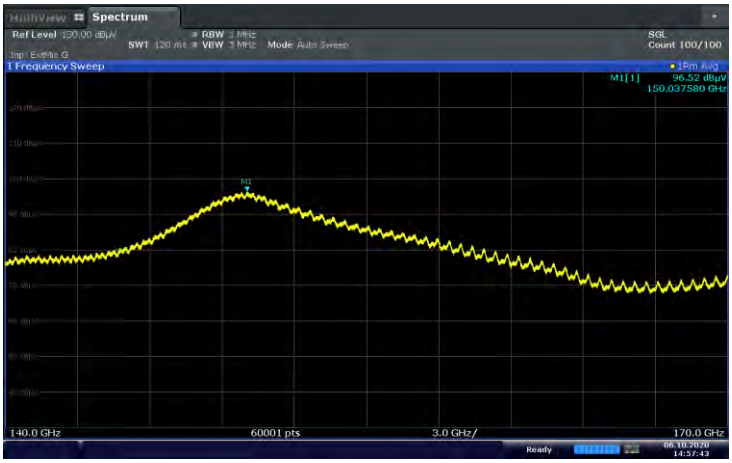
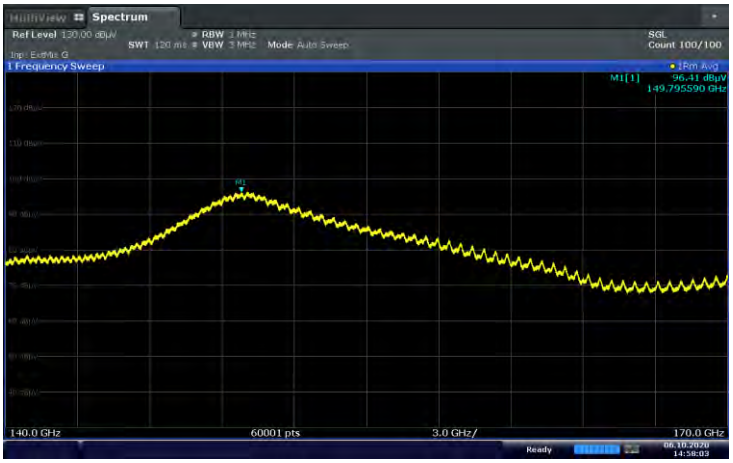
|  |  |

| Antenna 1(K patch), n260 100 MHz 1 CC SISO [140 GHz ~ 170 GHz] | |
|---|---|
| Low Channel Pol. H | Low Channel Pol. V |
|  |  |
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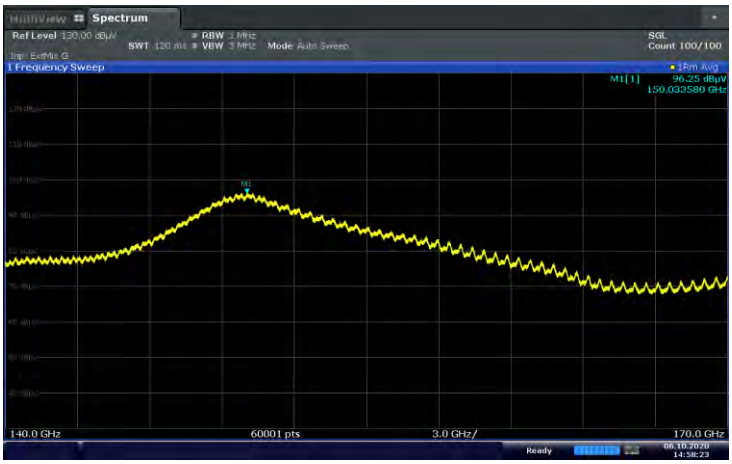
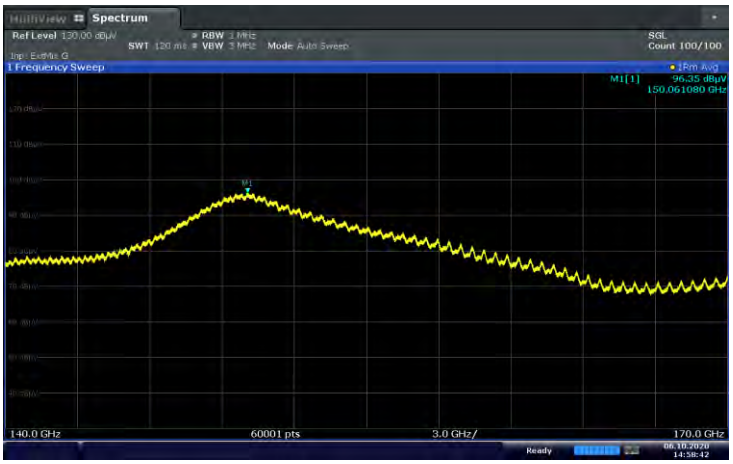
|  |  |
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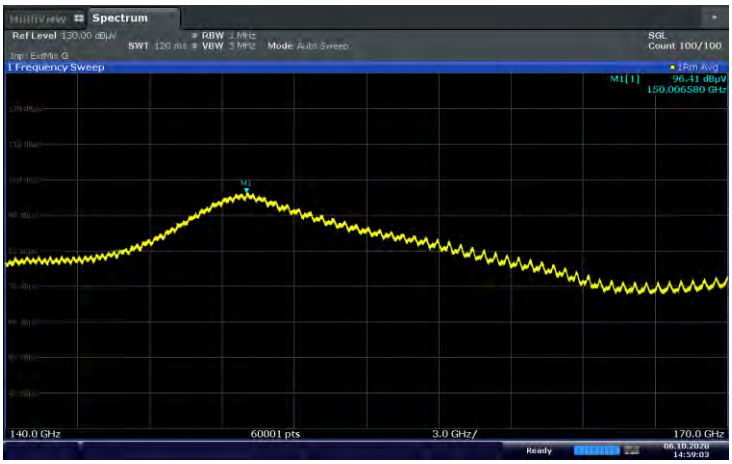
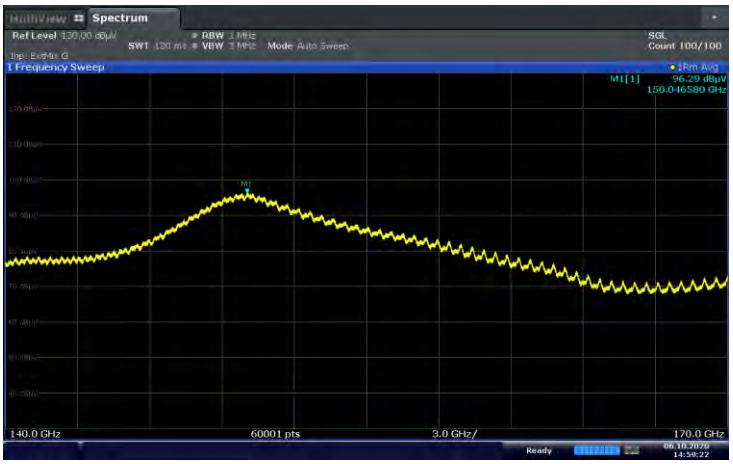
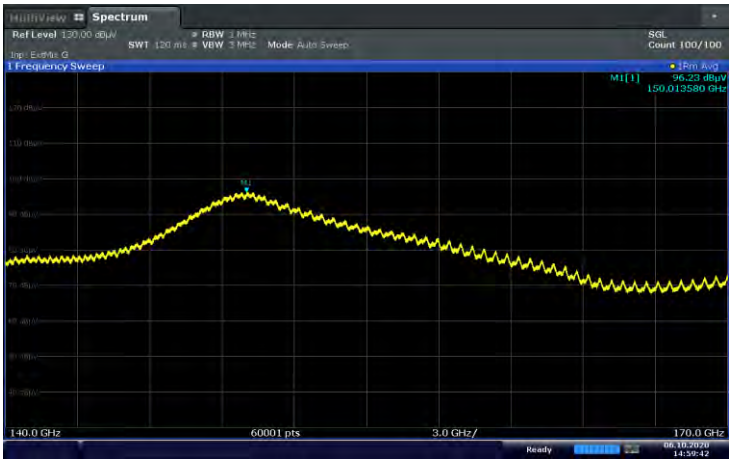
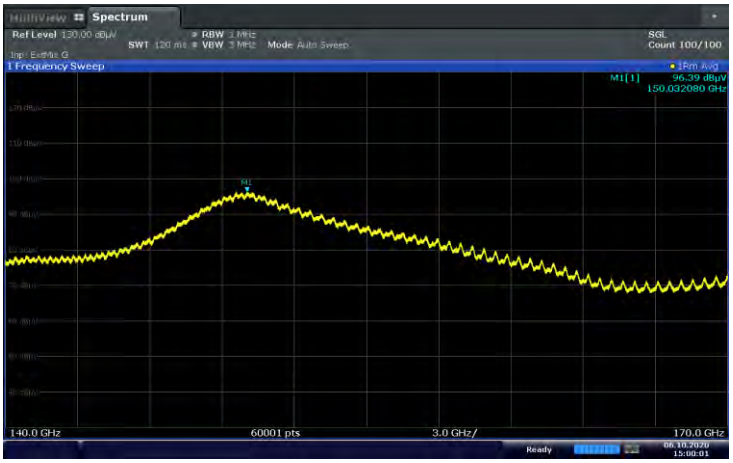
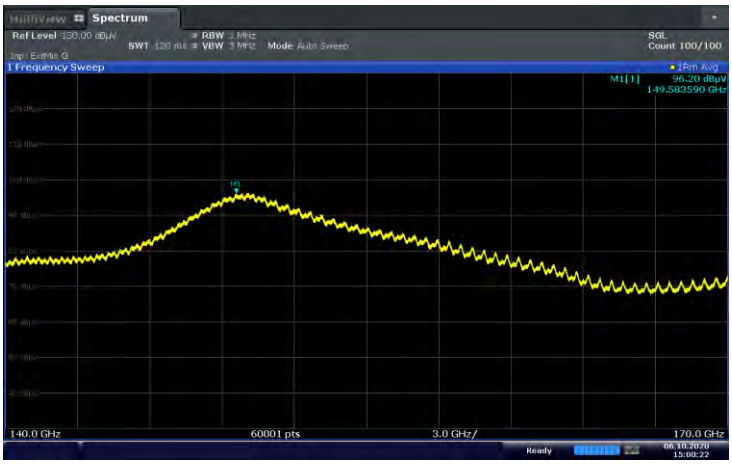
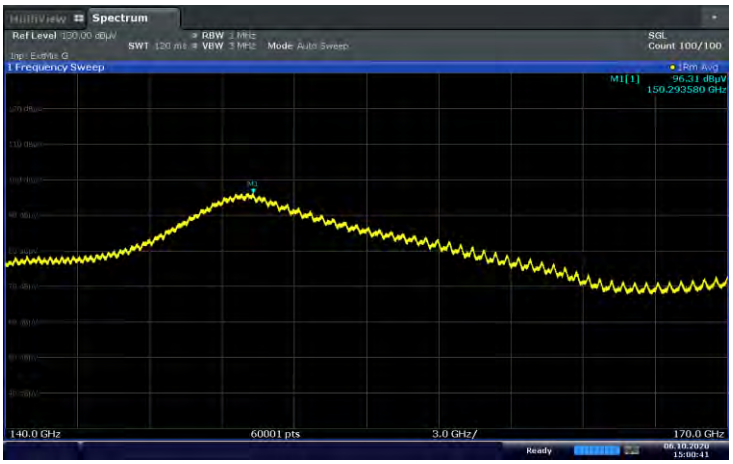
|  |  |

| Antenna 1(K patch), n260 100 MHz 1 CC MIMO [140 GHz ~ 170 GHz] | |
|---|---|
| **Low Channel Pol. H** | **Low Channel Pol. V** |
|  |  |
| **Middle Channel Pol. H** | **Middle Channel Pol. V** |
|  |  |
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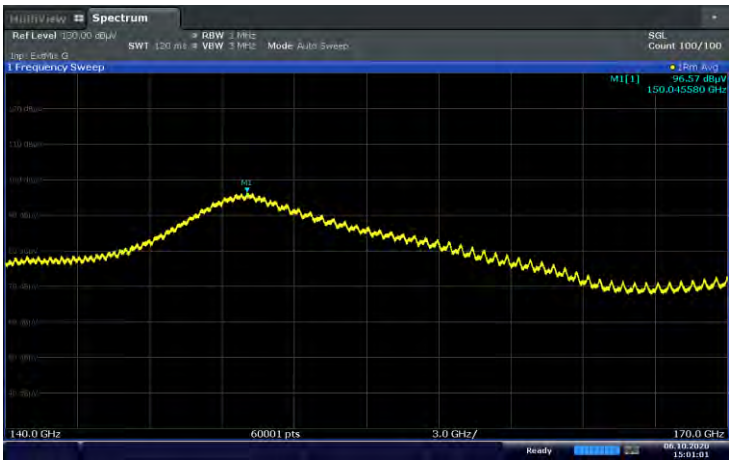
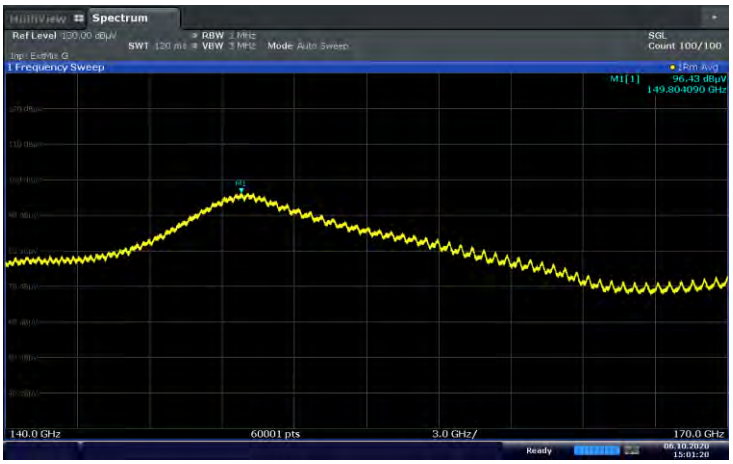
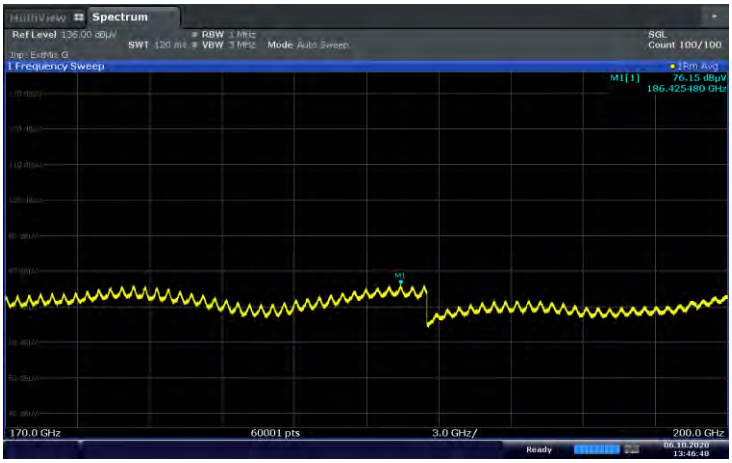
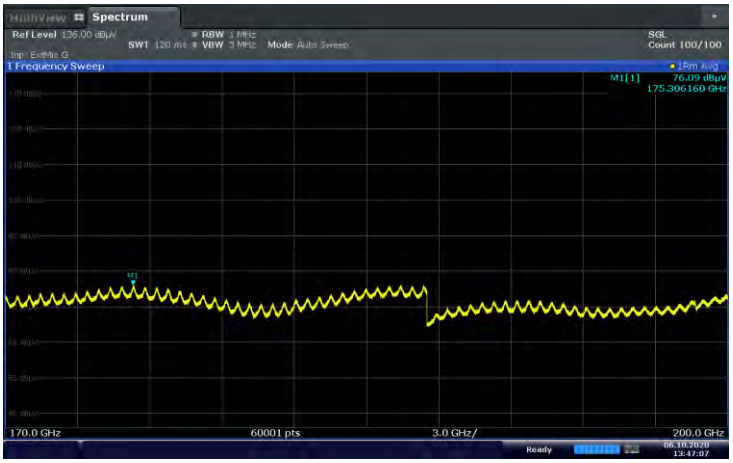
|  |  |

| Antenna 0(L patch), n260 50 MHz 1 CC SISO [170 GHz ~ 200 GHz] | |
|---|---|
| **Low Channel Pol. H** | **Low Channel Pol. V** |
|  |  |
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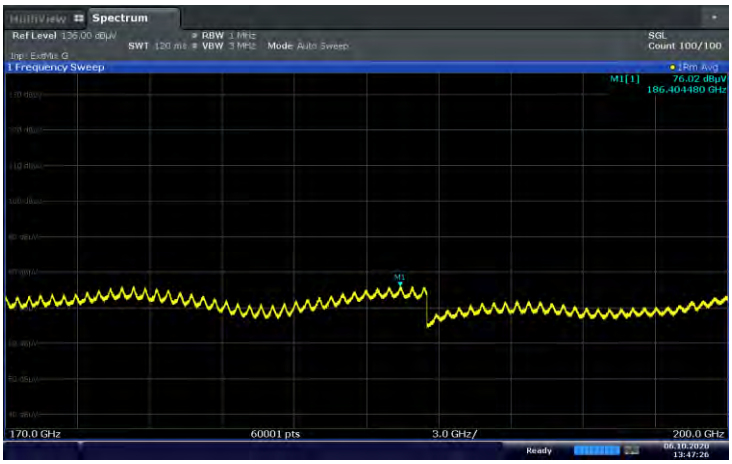
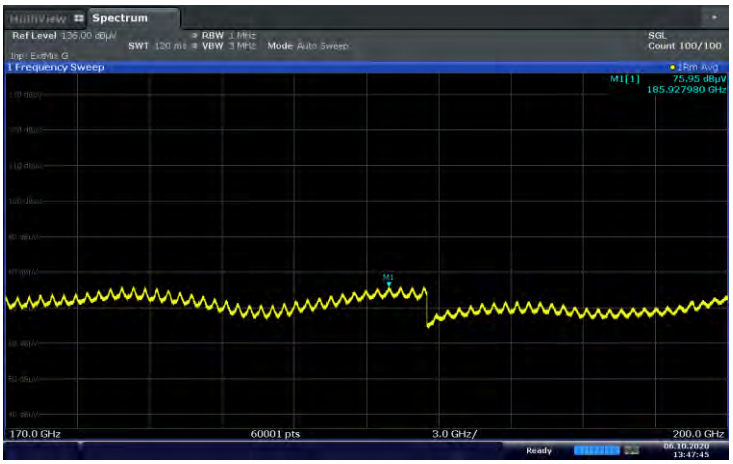
|  |  |
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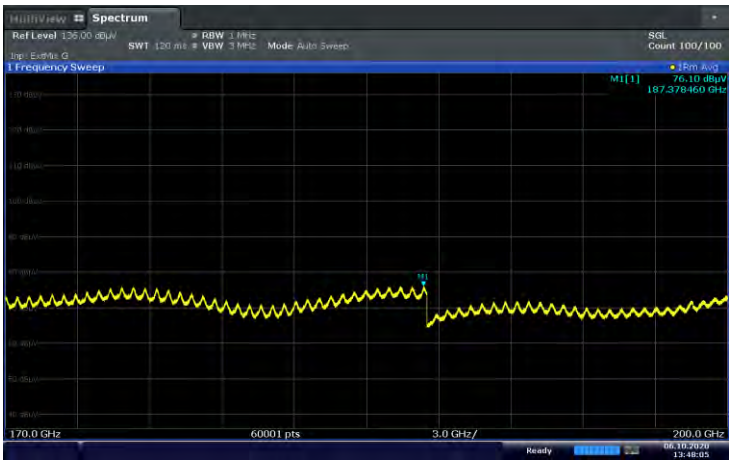
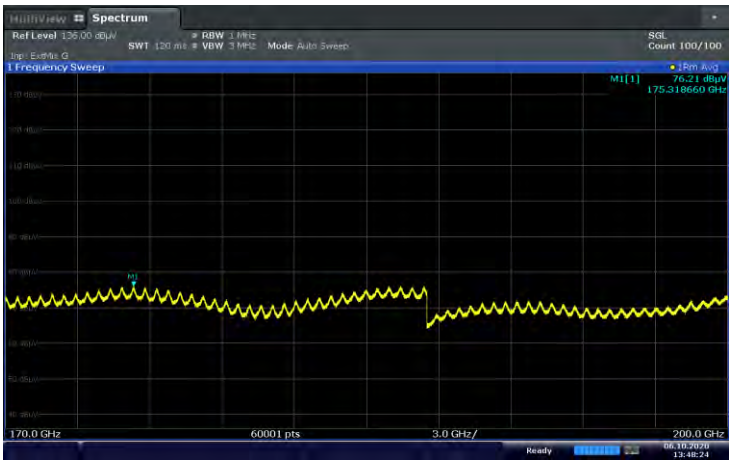
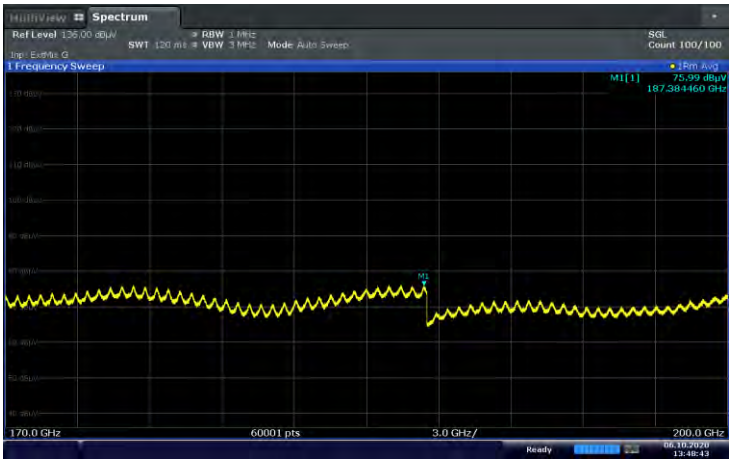
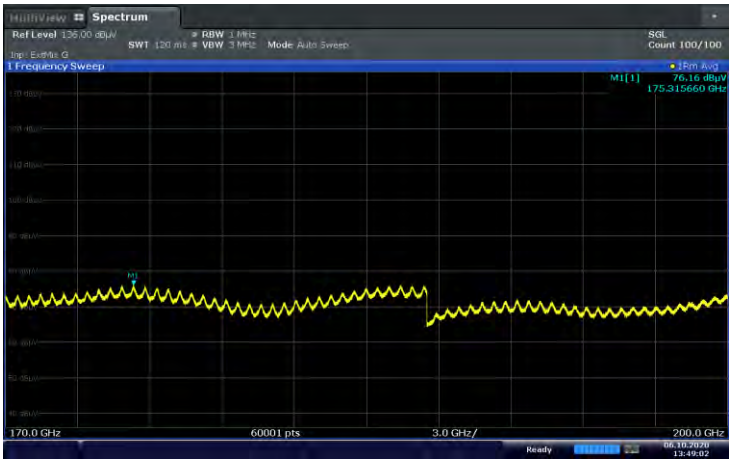
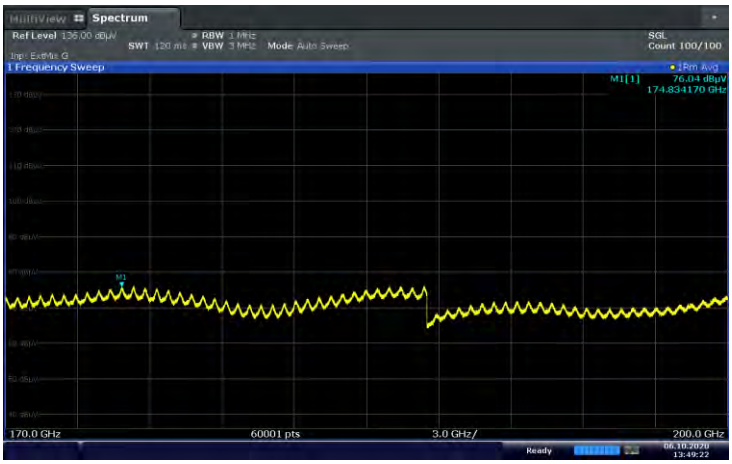
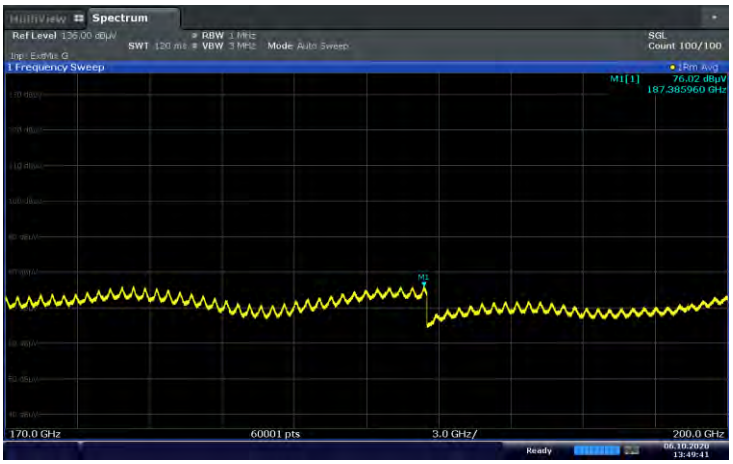
|  |  |

| Antenna 0(L patch), n260 50 MHz 1 CC MIMO [170 GHz ~ 200 GHz] | |
|---|---|
| **Low Channel Pol. H** | **Low Channel Pol. V** |
|  |  |
| **Middle Channel Pol. H** | **Middle Channel Pol. V** |
|  |  |
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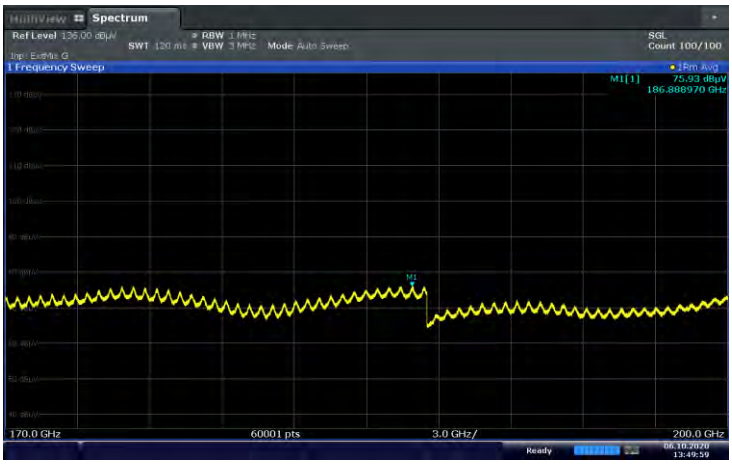
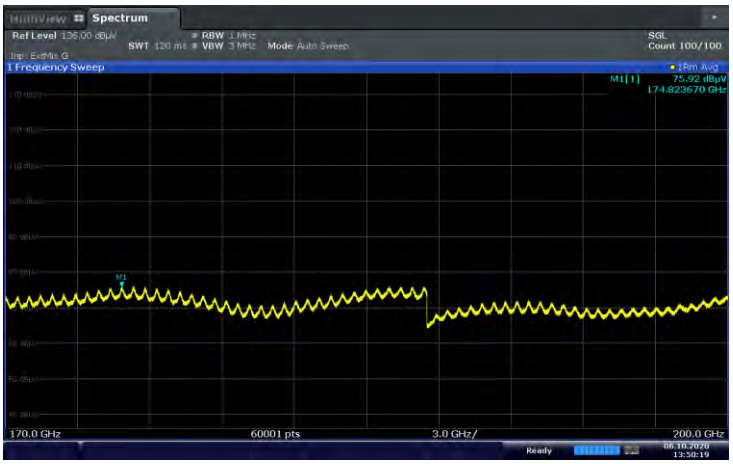
|  |  |

| Antenna 0(L patch), n260 100 MHz 1 CC SISO [170 GHz ~ 200 GHz] | |
|---|---|
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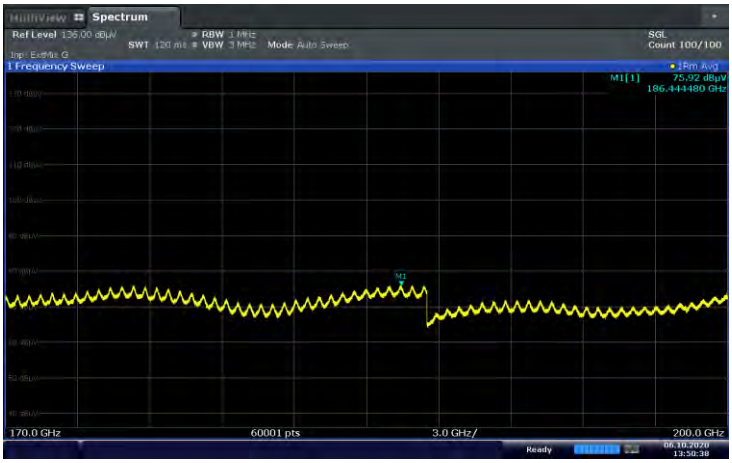
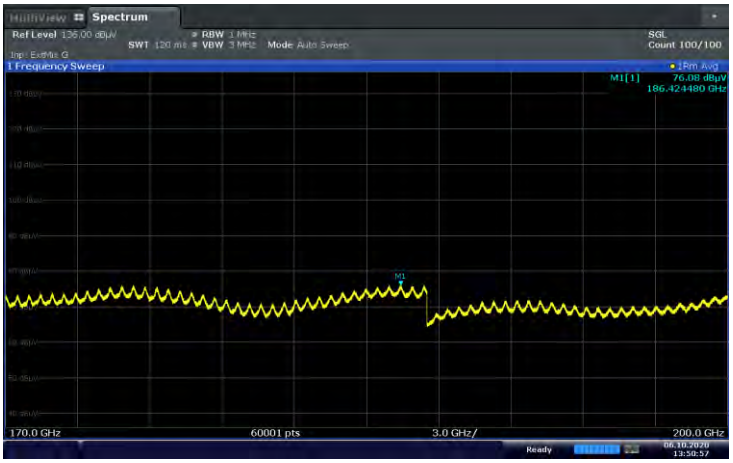
|  |  |
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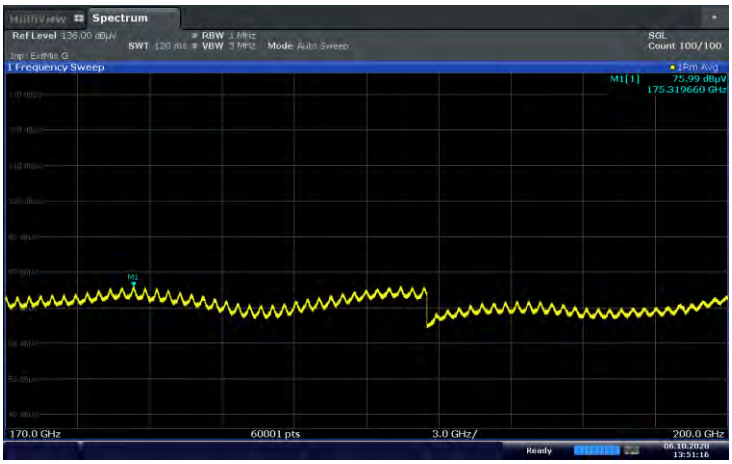
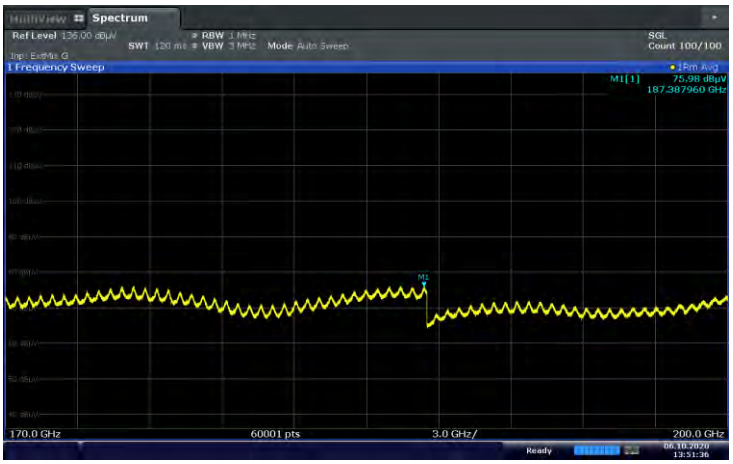
|  |  |
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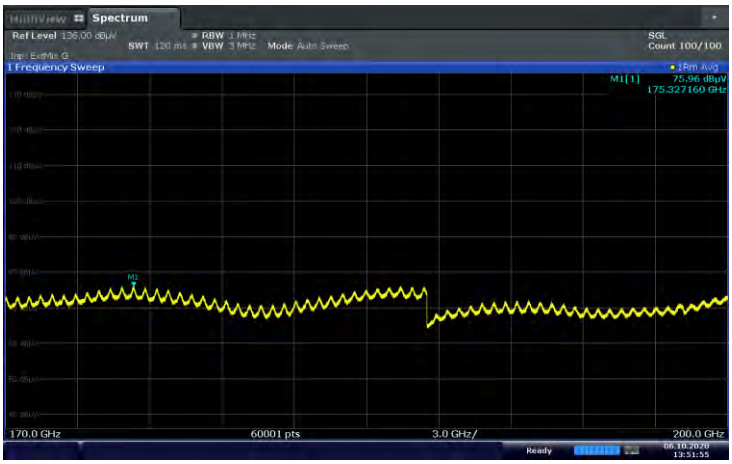
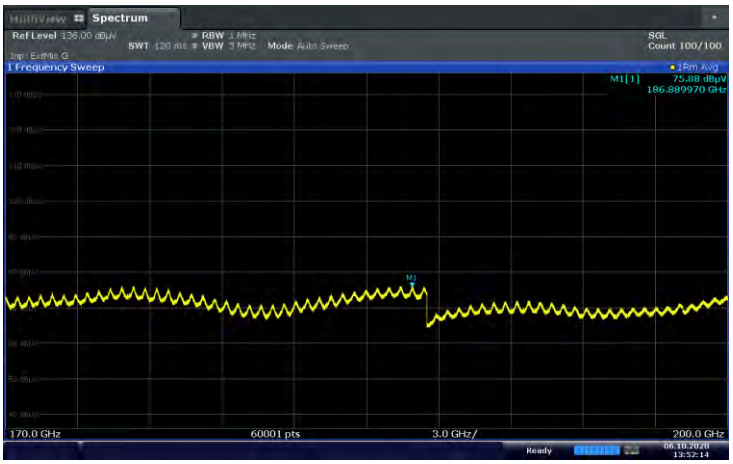
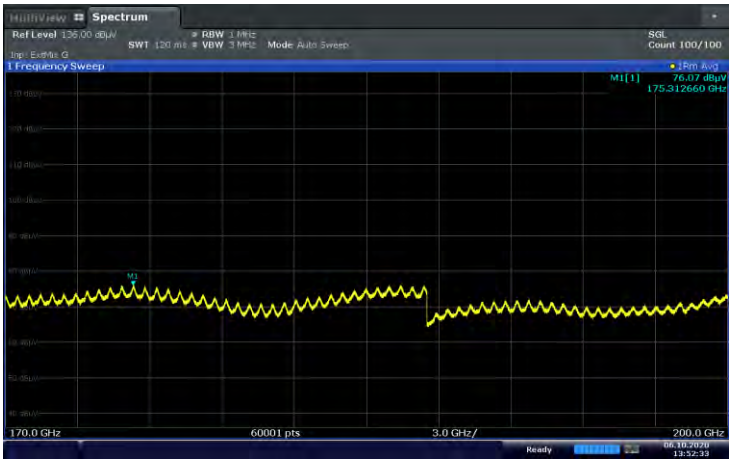
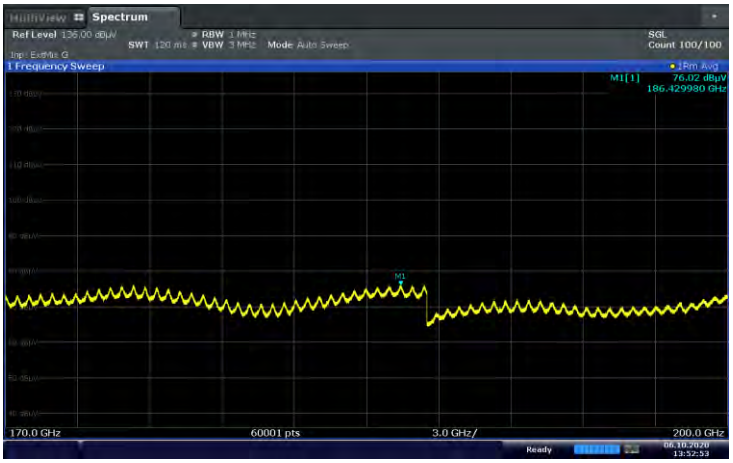
|  |  |

| Antenna 0(L patch), n260 100 MHz 1 CC MIMO [170 GHz ~ 200 GHz] | |
|---|---|
| Low Channel Pol. H | Low Channel Pol. V |
|  |  |
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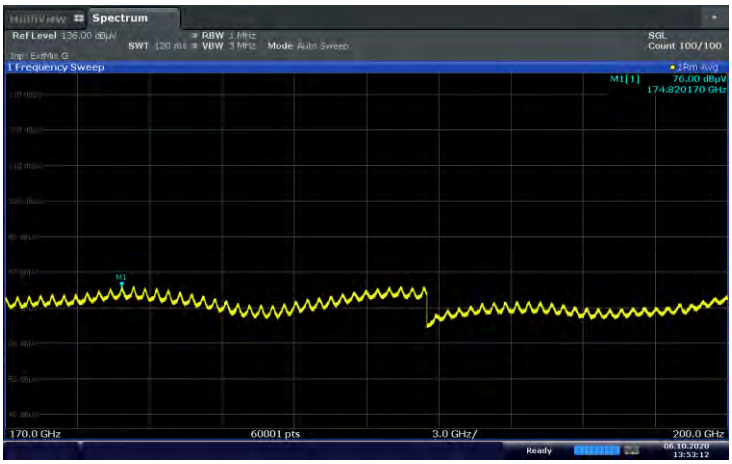
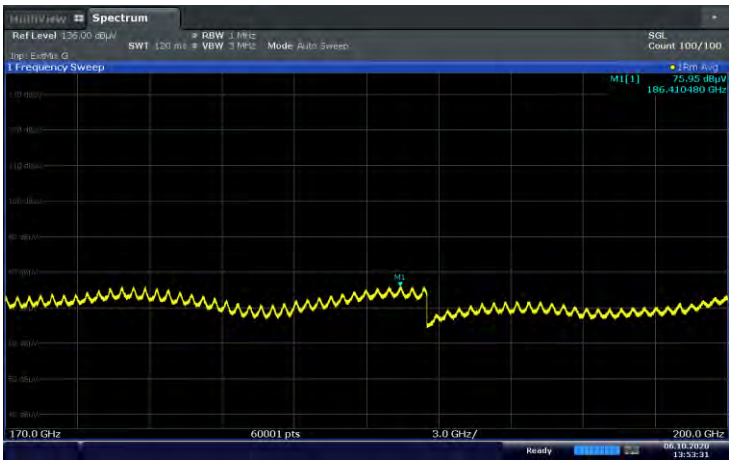
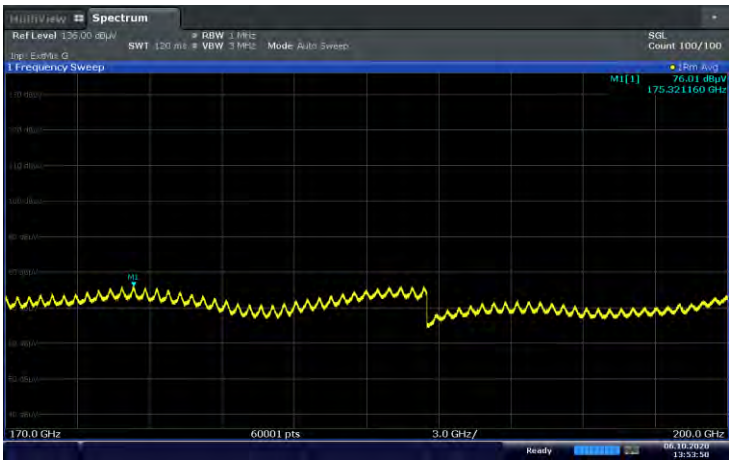
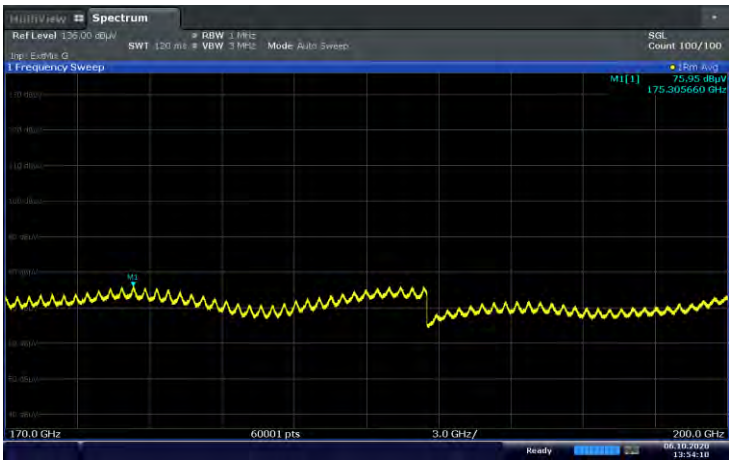
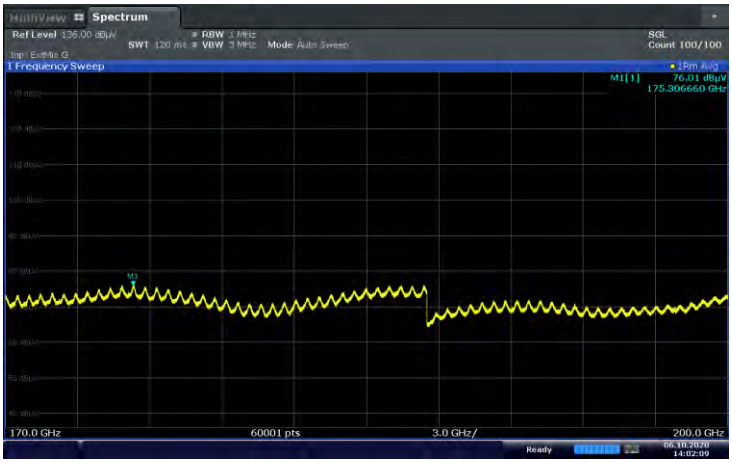
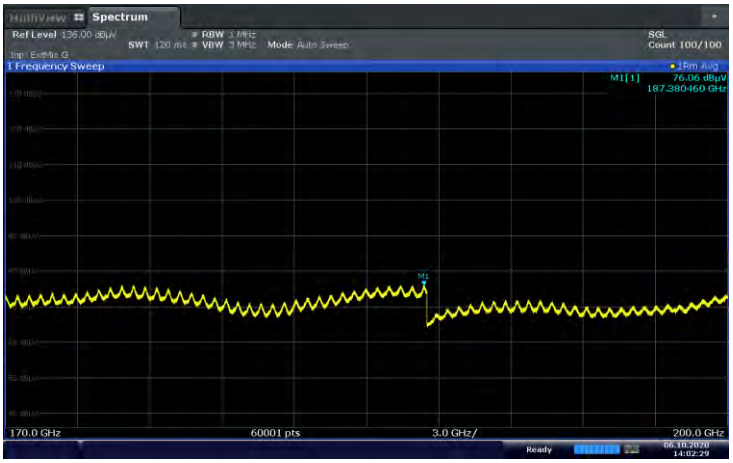
|  |  |
| High Channel Pol. H | High Channel Pol. V |
|  |  |

| Antenna 1(K patch), n260 50 MHz 1 CC SISO [170 GHz ~ 200 GHz] | |
|---|---|
| **Low Channel Pol. H** | **Low Channel Pol. V** |
|  |  |
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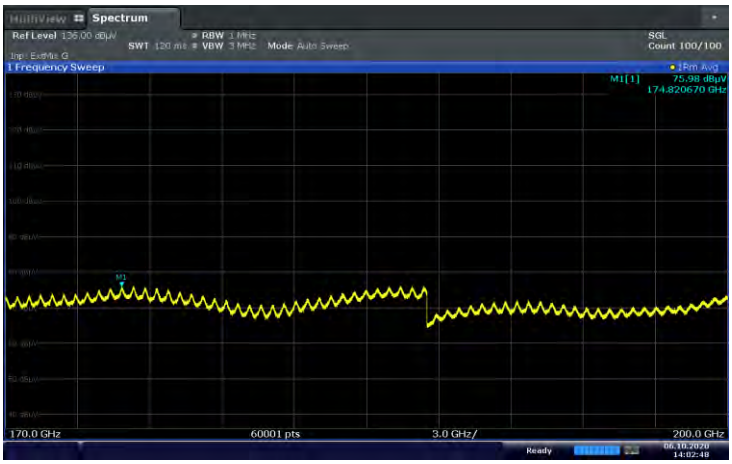
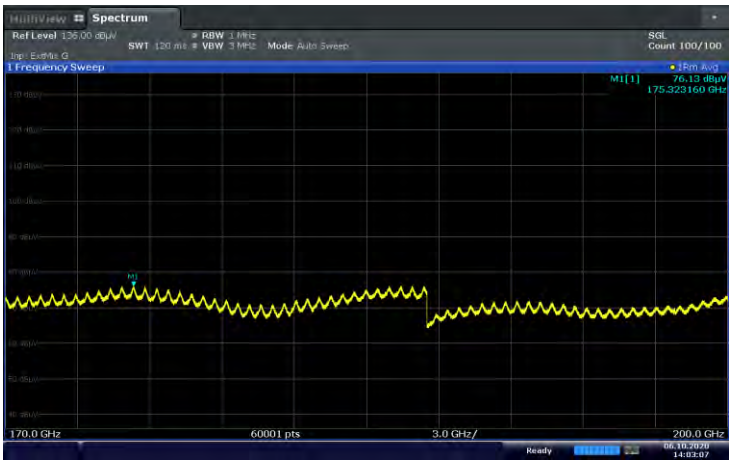
|  |  |
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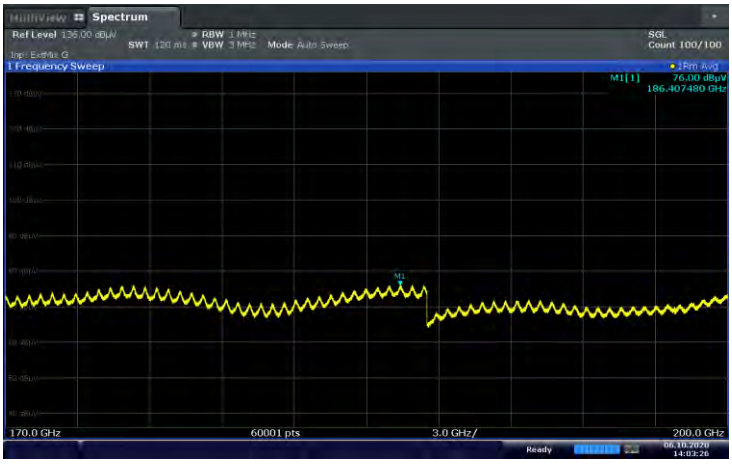
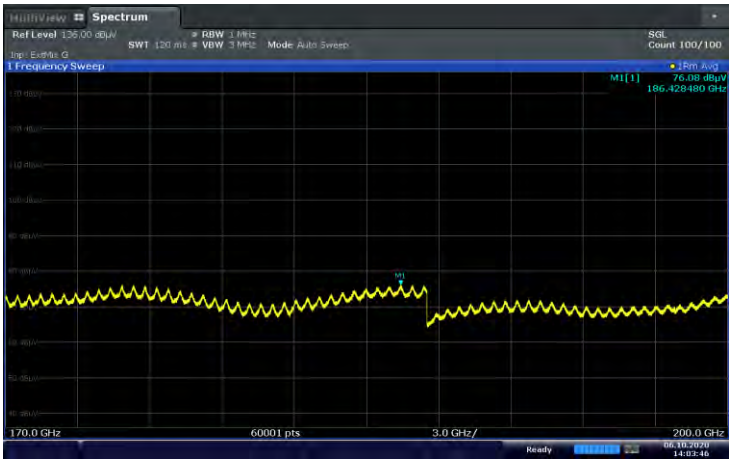
|  |  |

| Antenna 1(K patch), n260 50 MHz 1 CC MIMO [170 GHz ~ 200 GHz] | |
|---|---|
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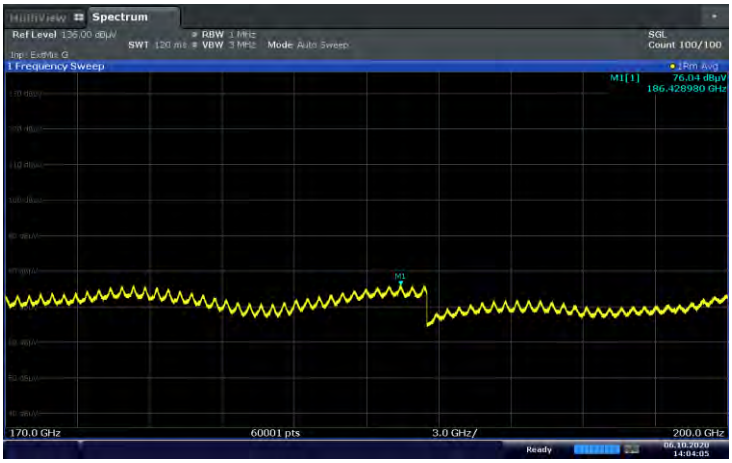
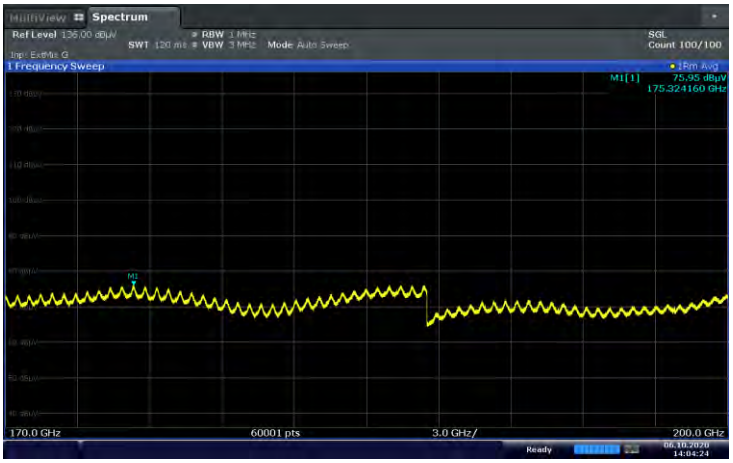
|  |  |
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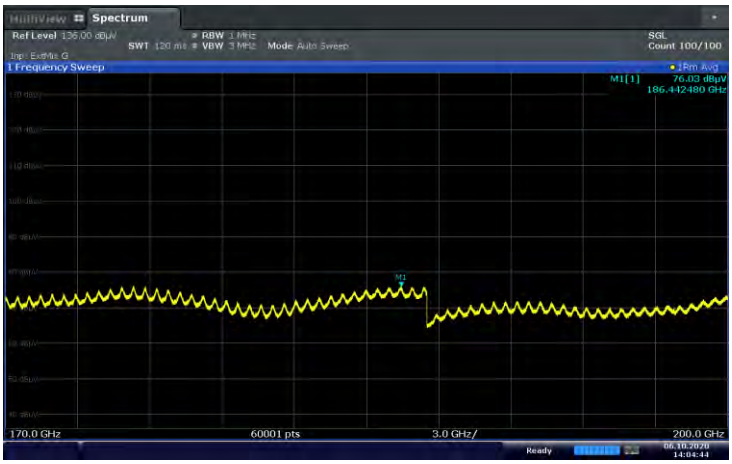
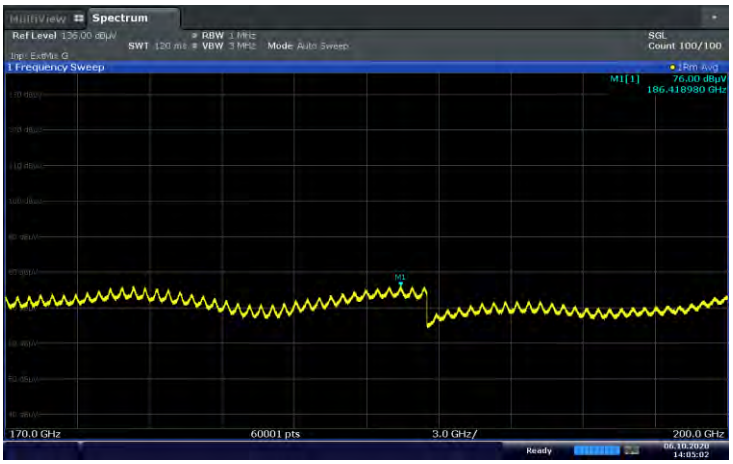
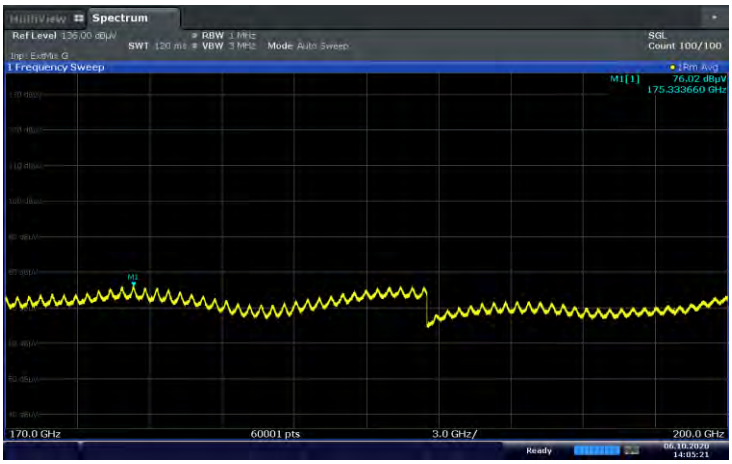
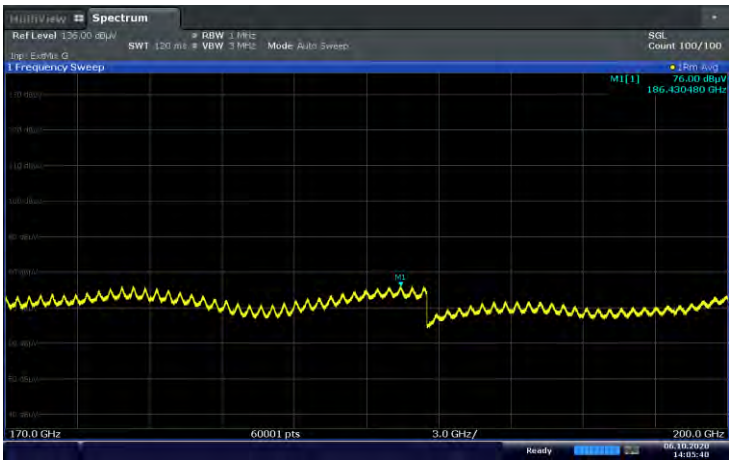
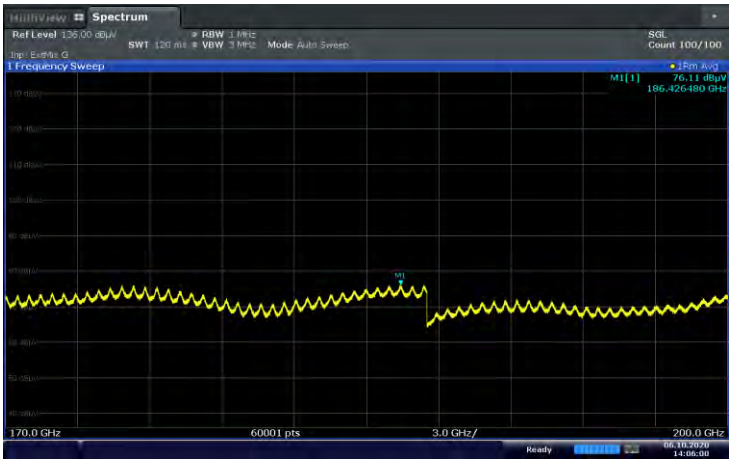
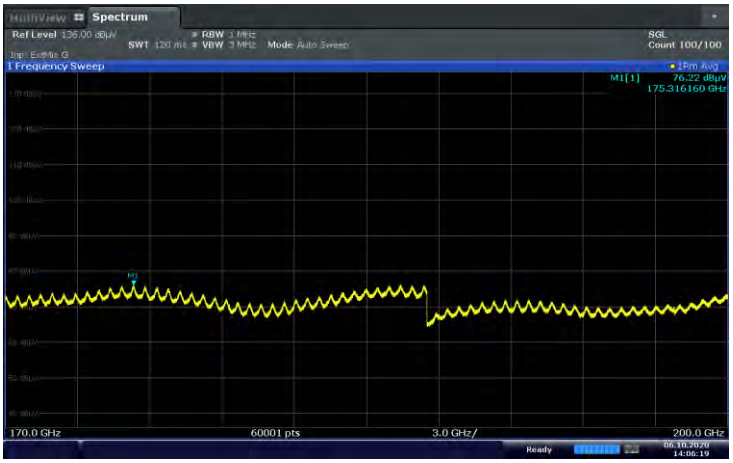
|  |  |
| **High Channel Pol. H** | **High Channel Pol. V** |
|  |  |

| Antenna 1(K patch), n260 100 MHz 1 CC SISO [170 GHz ~ 200 GHz] | |
|---|---|
| Low Channel Pol. H | Low Channel Pol. V |
|  |  |
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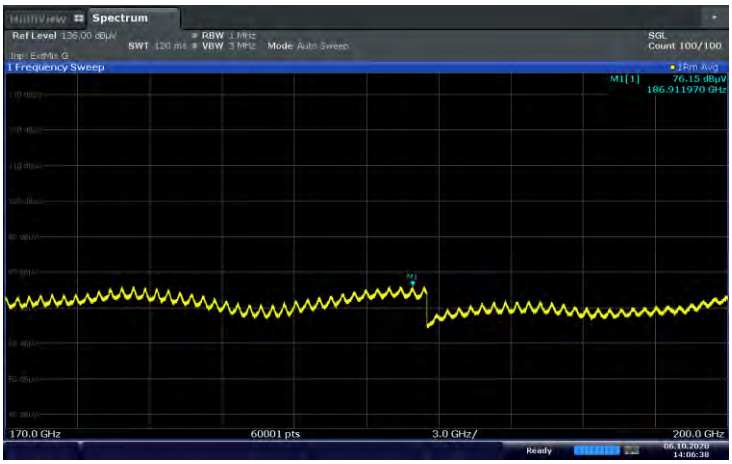
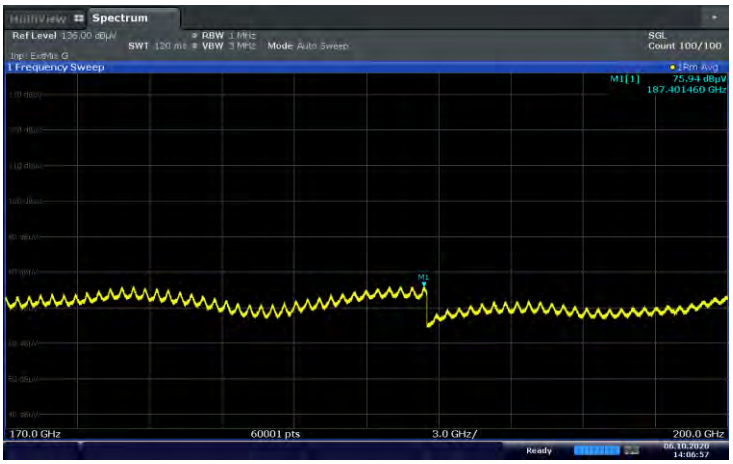
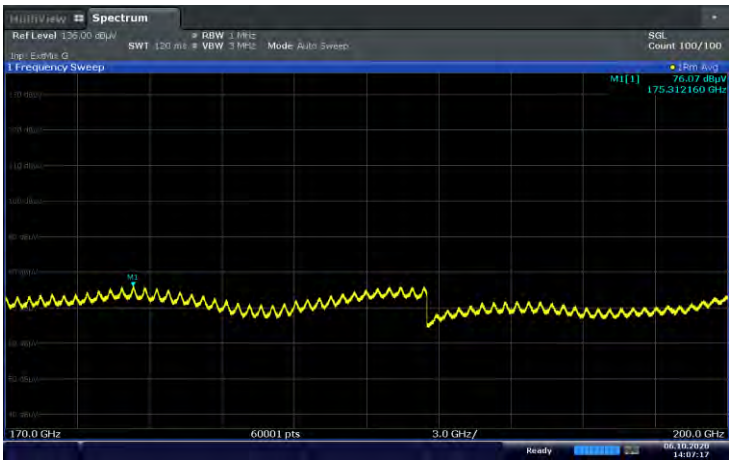
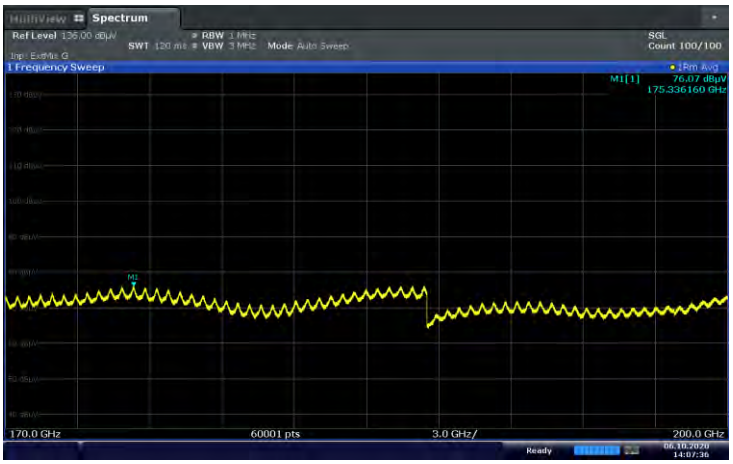
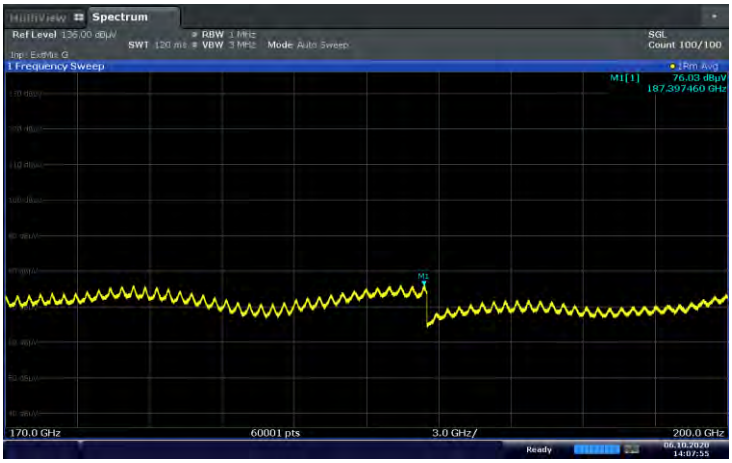
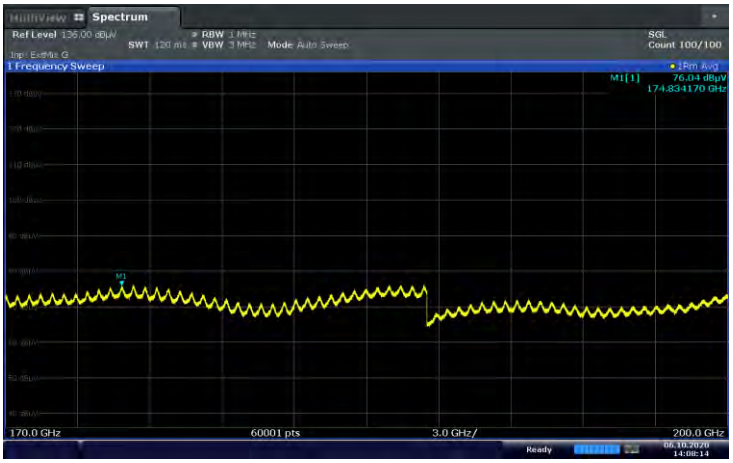
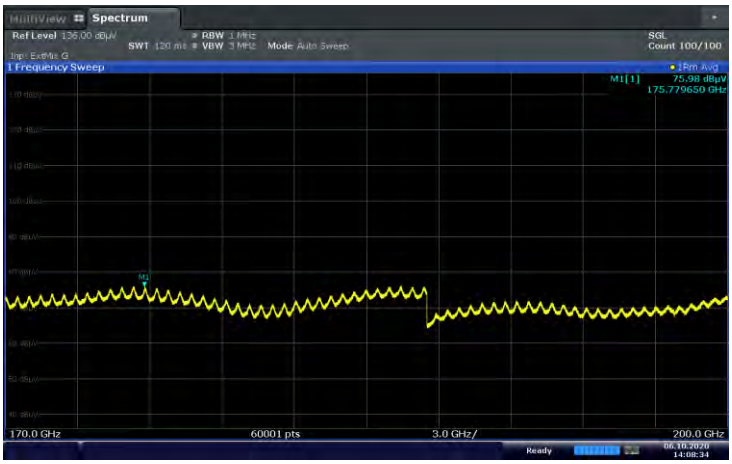
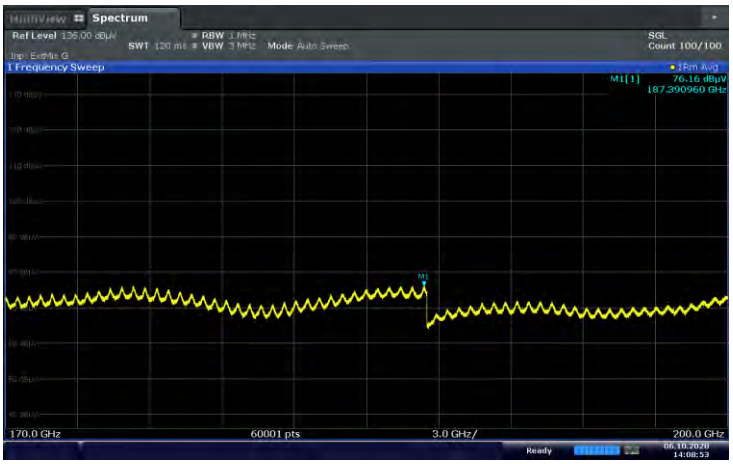
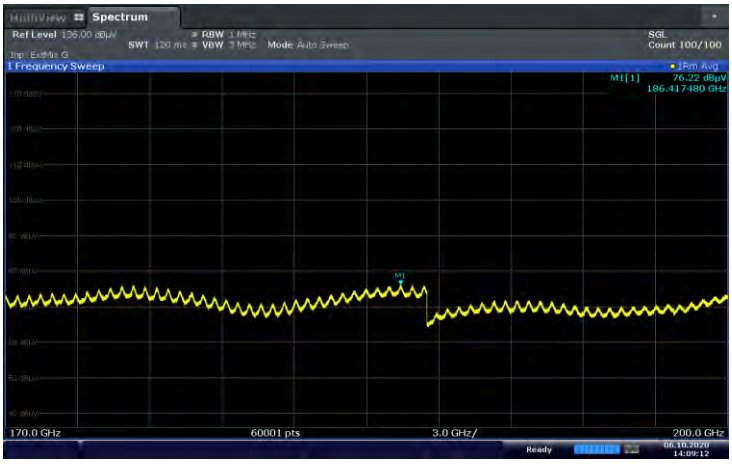
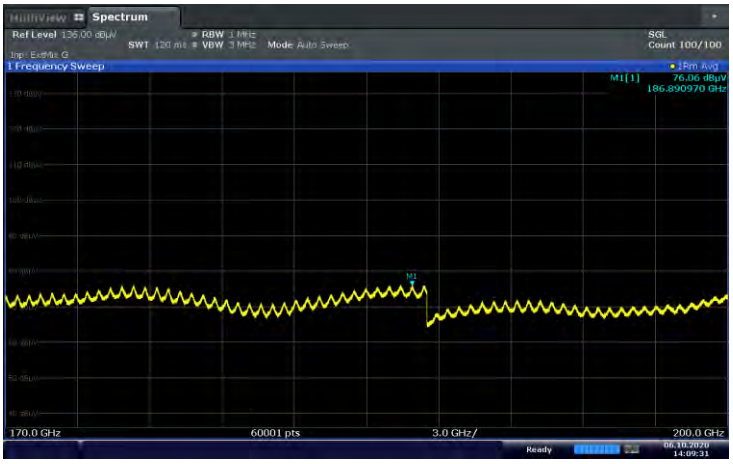
|  |  |
| High Channel Pol. H | High Channel Pol. V |
|  |  |

| Antenna 1(K patch), n260 100 MHz 1 CC MIMO [170 GHz ~ 200 GHz] | |
|---|---|
| **Low Channel Pol. H** | **Low Channel Pol. V** |
|  |  |
| **Middle Channel Pol. H** | **Middle Channel Pol. V** |
|  |  |
| **High Channel Pol. H** | **High Channel Pol. V** |
|  |  |

## 5.5. FREQUENCY STABILTY

**FCC Rules**

**Test Requirements:**

**§ 2.1055 Measurements required: Frequency stability.**

(a) The frequency stability shall be measured with variation of ambient temperature as follows:

(1) From −30° to + 50° centigrade for all equipment except that specified in paragraphs (a) (2) and (3) of this section.

**Test Procedures:**

The measurement is performed in accordance with Section 5.6.4 and 5.6.5 of ANSI C63.26.

5.6.4 Frequency stability over variations in temperature

a) Supply the EUT with a nominal 60 Hz ac voltage, dc voltage, or install a new or fully charged battery in the EUT.

b) If possible a dummy load should be connected to the EUT because an antenna near the metallic walls of an environmental test chamber could affect the output frequency of the EUT. If the EUT is equipped with a permanently attached, adjustable-length antenna, the EUT should be placed in the center of the chamber with the antenna adjusted to the shortest length possible.

c) Turn on the EUT, and tune it to the center frequency of the operating band.

d) Couple the transmitter output to the measuring instrument through a suitable attenuator and coaxial cable. If connection to the EUT output is not possible, make the measurement by connecting an antenna to the measuring instrument with a suitable length of coaxial cable and placing the measuring antenna near the EUT (e.g., 15 cm away).

*NOTE—An instrument that has an adequate level of accuracy as specified by the procuring or regulatory authority is the recommended measuring instrument.*

e) Adjust the location of the measurement antenna and the controls on the measurement instrument to obtain a suitable signal level (i.e., a level that will not overload the measurement instrument, but is strong enough to allow measurement of the operating or fundamental frequency of the EUT). Adjust the detector bandwidth and span settings to achieve a resolution capable of accurate frequency measurements over the applicable frequency stability limits.

f) Turn the EUT off, and place it inside the environmental temperature chamber. For devices that have oscillator heaters, energize only the heater circuit.

g) Set the temperature control on the chamber to the highest temperature specified in the regulatory requirements for the type of device, and allow the oscillator heater and the chamber temperature to stabilize. Unless otherwise instructed by the regulatory authority, this temperature should be 50 °C.

h) While maintaining a constant temperature inside the environmental chamber, turn on the EUT and allow sufficient time for the EUT temperature to stabilize.

i) Measure the frequency.

j) Switch off the EUT, but do not switch off the oscillator heater.

k) Lower the chamber temperature to the next level that is required by the standard and allow the temperature inside the chamber to stabilize. Unless otherwise instructed by the regulators, this temperature step should be 10 °C.

l) Repeat step h) through step k) down to the lowest specified temperature. Unless otherwise instructed by the regulators, this temperature should be −30 °C. When the frequency stability limit is stated as being sufficient such that the fundamental emissions stay within the authorized bands of operation, a reference point shall be established at the applicable unwanted emissions limit using a RBW equal to the RBW required by the unwanted emissions specification of the applicable regulatory standard. These reference points measured using the lowest and highest channel of operation shall be identified as $f_L$ and $f_H$ respectively. The worst-case frequency offset determined in the above methods shall be added or subtracted from the values of $f_L$ and $f_H$ and the resulting frequencies must remain within the band.

m) Omitted

5.6.5 Frequency stability when varying supply voltage

a) Couple the transmitter output to the measuring instrument through a suitable attenuator and coaxial cable. If connection to the EUT output is not possible make the measurement by connecting an antenna to the measuring instrument with a suitable length of coaxial cable and placing the measuring antenna near the EUT (e.g., 15 cm away)

b) Supply the EUT with nominal ac or dc voltage. The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided. Effects on frequency of transmitter keying (except for broadcast transmitters) and any heating element cycling at the nominal supply voltage and at each extreme also shall be shown.

c) Turn on the EUT, and couple its output to a frequency counter or other frequency-measuring instrument.

d) Tune the EUT to the center frequency of the operating band. Adjust the location of the measurement antenna and the controls on the measurement instrument to obtain a suitable signal level (i.e., a level that will not overload the measurement instrument, but is strong enough to allow measurement of the operating or fundamental frequency of the EUT). Adjust the detector bandwidth and span settings to achieve a resolution capable of accurate frequency measurements over the applicable frequency stability limits.

*NOTE—An instrument that has an adequate level of accuracy as specified by the procuring or regulatory authority is the recommended measuring instrument.*

e) Measure the frequency.

f) Unless otherwise specified, vary primary supply voltage from 85% to 115% of the nominal value for other than hand carried battery equipment.

g) For hand carried, battery powered equipment, reduce the primary ac or dc supply voltage to the battery operating end point, which shall be specified by the manufacturer.

h) Repeat the frequency measurement.

NOTE—For band-edge compliance, it can be required to make these measurements at the low and high channel of the operating band.

**Note:**

1) The results of the frequency stability test shown above the frequency deviation measured values are very small and similar trend for each path, so we are attached only the worst case data.
2) We were performed the test using call simulator

**Test Results:**

Reference: Voltage = DC 3.88 V

Antenna 0(L patch), n261

Low Frequency = 27 534.84 MHz

| Voltage (%) | Power (VDC) | Temp. (℃) | Frequency (Hz) | Frequency Error (Hz) | Deviation (Hz) | ppm |
|---|---|---|---|---|---|---|
| 100% | 3.88 | +20(Ref) | 27534 840 000 | 4.758 | 0.000 | 0.00000 |
| | | -30 | 27534 840 003 | 2.792 | -1.966 | -0.00260 |
| | | -20 | 27534 840 008 | 7.603 | 2.845 | 0.00376 |
| | | -10 | 27534 840 007 | 6.873 | 2.115 | 0.00280 |
| | | 0 | 27534 840 006 | 5.852 | 1.094 | 0.00145 |
| | | +10 | 27534 840 002 | 2.426 | -2.331 | -0.00308 |
| | | +30 | 27534 840 005 | 5.486 | 0.729 | 0.00096 |
| | | +40 | 27534 840 007 | 6.601 | 1.844 | 0.00244 |
| | | +50 | 27534 840 005 | 5.176 | 0.418 | 0.00055 |
| HIGH | 4.40 | +20 | 27534 840 003 | 2.932 | -1.826 | -0.00242 |
| LOW | 3.65 | +20 | 27534 840 007 | 6.507 | 1.750 | 0.00231 |

High Frequency = 28 319.52 MHz

| Voltage (%) | Power (VDC) | Temp. (℃) | Frequency (Hz) | Frequency Error (Hz) | Deviation (Hz) | ppm |
|---|---|---|---|---|---|---|
| 100% | 3.88 | +20(Ref) | 28319 520 000 | 6.121 | 0.000 | 0.00000 |
| | | -30 | 28319 520 000 | 0.337 | -5.784 | -0.00765 |
| | | -20 | 28319 520 007 | 6.670 | 0.549 | 0.00073 |
| | | -10 | 28319 520 005 | 5.097 | -1.024 | -0.00135 |
| | | 0 | 28319 520 002 | 1.744 | -4.377 | -0.00579 |
| | | +10 | 28319 520 009 | 9.455 | 3.335 | 0.00441 |
| | | +30 | 28319 520 008 | 7.507 | 1.386 | 0.00183 |
| | | +40 | 28319 520 007 | 6.770 | 0.649 | 0.00086 |
| | | +50 | 28319 520 002 | 2.019 | -4.102 | -0.00543 |
| HIGH | 4.40 | +20 | 28319 520 006 | 5.991 | -0.130 | -0.00017 |
| LOW | 3.65 | +20 | 28319 520 007 | 6.660 | 0.539 | 0.00071 |

Antenna 1(K patch), n261

Low Frequency = 27 534.84 MHz

| Voltage (%) | Power (VDC) | Temp. (℃) | Frequency (Hz) | Frequency Error (Hz) | Deviation (Hz) | ppm |
|---|---|---|---|---|---|---|
| 100% | 3.88 | +20(Ref) | 27534 840 000 | 2.415 | 0.000 | 0.00000 |
| | | -30 | 27534 840 001 | 0.709 | -1.706 | -0.00226 |
| | | -20 | 27534 840 003 | 2.624 | 0.209 | 0.00028 |
| | | -10 | 27534 840 004 | 3.801 | 1.386 | 0.00183 |
| | | 0 | 27534 840 007 | 6.663 | 4.248 | 0.00562 |
| | | +10 | 27534 840 007 | 6.586 | 4.171 | 0.00552 |
| | | +30 | 27534 840 010 | 9.851 | 7.436 | 0.00984 |
| | | +40 | 27534 840 004 | 3.947 | 1.533 | 0.00203 |
| | | +50 | 27534 840 006 | 6.314 | 3.899 | 0.00516 |
| HIGH | 4.40 | +20 | 27534 840 002 | 1.643 | -0.772 | -0.00102 |
| LOW | 3.65 | +20 | 27534 840 007 | 6.751 | 4.336 | 0.00574 |

High Frequency = 28 319.52 MHz

| Voltage (%) | Power (VDC) | Temp. (℃) | Frequency (Hz) | Frequency Error (Hz) | Deviation (Hz) | ppm |
|---|---|---|---|---|---|---|
| 100% | 3.88 | +20(Ref) | 28319 520 000 | 7.750 | 0.000 | 0.00000 |
| | | -30 | 28319 520 004 | 4.137 | -3.614 | -0.00478 |
| | | -20 | 28319 520 001 | 0.840 | -6.910 | -0.00914 |
| | | -10 | 28319 520 005 | 5.001 | -2.750 | -0.00364 |
| | | 0 | 28319 520 004 | 3.761 | -3.990 | -0.00528 |
| | | +10 | 28319 520 009 | 9.434 | 1.684 | 0.00223 |
| | | +30 | 28319 520 002 | 2.214 | -5.536 | -0.00733 |
| | | +40 | 28319 520 000 | 0.364 | -7.387 | -0.00977 |
| | | +50 | 28319 520 003 | 3.426 | -4.324 | -0.00572 |
| HIGH | 4.40 | +20 | 28319 520 006 | 6.004 | -1.746 | -0.00231 |
| LOW | 3.65 | +20 | 28319 520 008 | 7.515 | -0.235 | -0.00031 |

Antenna 0(L patch), n260

Low Frequency = 37 027.32 MHz

| Voltage (%) | Power (VDC) | Temp. (℃) | Frequency (Hz) | Frequency Error (Hz) | Deviation (Hz) | ppm |
|---|---|---|---|---|---|---|
| 100% | 3.88 | +20(Ref) | 37027 320 000 | 5.966 | 0.000 | 0.00000 |
| | | -30 | 37027 320 007 | 7.351 | 1.385 | 0.00183 |
| | | -20 | 37027 320 003 | 3.088 | -2.878 | -0.00381 |
| | | -10 | 37027 320 010 | 9.816 | 3.850 | 0.00509 |
| | | 0 | 37027 320 005 | 5.090 | -0.876 | -0.00116 |
| | | +10 | 37027 320 002 | 2.059 | -3.907 | -0.00517 |
| | | +30 | 37027 320 004 | 3.589 | -2.377 | -0.00315 |
| | | +40 | 37027 320 002 | 2.353 | -3.612 | -0.00478 |
| | | +50 | 37027 320 007 | 7.026 | 1.060 | 0.00140 |
| HIGH | 4.40 | +20 | 37027 320 009 | 8.951 | 2.985 | 0.00395 |
| LOW | 3.65 | +20 | 37027 320 007 | 7.159 | 1.193 | 0.00158 |

High Frequency = 39 966.24 MHz

| Voltage (%) | Power (VDC) | Temp. (℃) | Frequency (Hz) | Frequency Error (Hz) | Deviation (Hz) | ppm |
|---|---|---|---|---|---|---|
| 100% | 3.88 | +20(Ref) | 39966 240 000 | 7.899 | 0.000 | 0.00000 |
| | | -30 | 39966 240 009 | 9.353 | 1.454 | 0.00192 |
| | | -20 | 39966 240 004 | 3.716 | -4.183 | -0.00554 |
| | | -10 | 39966 240 003 | 2.645 | -5.254 | -0.00695 |
| | | 0 | 39966 240 003 | 3.144 | -4.755 | -0.00629 |
| | | +10 | 39966 240 004 | 4.019 | -3.881 | -0.00513 |
| | | +30 | 39966 240 004 | 4.425 | -3.475 | -0.00460 |
| | | +40 | 39966 240 004 | 3.520 | -4.379 | -0.00579 |
| | | +50 | 39966 240 003 | 3.131 | -4.768 | -0.00631 |
| HIGH | 4.40 | +20 | 39966 240 000 | 0.324 | -7.576 | -0.01002 |
| LOW | 3.65 | +20 | 39966 240 002 | 1.891 | -6.008 | -0.00795 |

Antenna 1(K patch), n260

Low Frequency = 37 027.32 MHz

| Voltage (%) | Power (VDC) | Temp. (℃) | Frequency (Hz) | Frequency Error (Hz) | Deviation (Hz) | ppm |
|---|---|---|---|---|---|---|
| 100% | 3.88 | +20(Ref) | 37027 320 000 | 8.948 | 0.000 | 0.00000 |
| | | -30 | 37027 320 003 | 2.979 | -5.969 | -0.00790 |
| | | -20 | 37027 320 009 | 8.663 | -0.285 | -0.00038 |
| | | -10 | 37027 320 007 | 7.319 | -1.628 | -0.00215 |
| | | 0 | 37027 320 006 | 6.324 | -2.624 | -0.00347 |
| | | +10 | 37027 320 008 | 8.378 | -0.569 | -0.00075 |
| | | +30 | 37027 320 005 | 5.306 | -3.642 | -0.00482 |
| | | +40 | 37027 320 002 | 2.406 | -6.541 | -0.00865 |
| | | +50 | 37027 320 009 | 8.859 | -0.089 | -0.00012 |
| HIGH | 4.40 | +20 | 37027 320 009 | 9.354 | 0.407 | 0.00054 |
| LOW | 3.65 | +20 | 37027 320 004 | 3.539 | -5.408 | -0.00716 |

High Frequency = 39 966.24 MHz

| Voltage (%) | Power (VDC) | Temp. (℃) | Frequency (Hz) | Frequency Error (Hz) | Deviation (Hz) | ppm |
|---|---|---|---|---|---|---|
| 100% | 3.88 | +20(Ref) | 39966 240 000 | 0.003 | 0.000 | 0.00000 |
| | | -30 | 39966 240 008 | 8.457 | 8.454 | 0.01119 |
| | | -20 | 39966 240 000 | 0.276 | 0.272 | 0.00036 |
| | | -10 | 39966 240 006 | 5.583 | 5.580 | 0.00738 |
| | | 0 | 39966 240 006 | 6.057 | 6.053 | 0.00801 |
| | | +10 | 39966 240 008 | 7.886 | 7.883 | 0.01043 |
| | | +30 | 39966 240 009 | 8.891 | 8.887 | 0.01176 |
| | | +40 | 39966 240 002 | 2.013 | 2.009 | 0.00266 |
| | | +50 | 39966 240 001 | 1.270 | 1.266 | 0.00168 |
| HIGH | 4.40 | +20 | 39966 240 005 | 5.187 | 5.184 | 0.00686 |
| LOW | 3.65 | +20 | 39966 240 009 | 9.168 | 9.164 | 0.01213 |

## 6. MIXER VERIFICATION CERTIFICATE & CHECK

열 람 용

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# 교 정 성 적 서

## CALIBRATION CERTIFICATE

경기도 이천시 마장면 서이천로 578번길 74
TEL : 031-645-6900, FAX : 031-645-6969

KOREA LABORATORY ACCREDITATION SCHEME KOLAS CALIBRATION NO KC20-011

성적서발급번호(Certificate No) : IC-2020-68829
교 정 번 호(Calibration No) : C-2020-080148



**1. 의뢰자** (Client)
- 기관명 (Name) : (주)에이치시티
- 주소 (Address) : 경기도 이천시 마장면 서이천로 578번길 74

**2. 측정기** (Calibration Subject) ◇ 등록번호 : 288234
- 기기명 (Description) : WR-19 HARMONIC MIXER
- 제작회사 및 형식(Manufacturer and Model Name) : OML / M19HWD
- 기기번호 (Serial Number) : 160429-1

**3. 교정일자** (Date of Calibration) : 2020.09.09 **차기교정예정일자** : 2021.09.09 (The due date of next Calibration)

**4. 교정환경** (Environment)
- 온도(Temperature) : ( 23.0 ± 0.6 ) ℃ - 습도(Humidity) : ( 50 ± 2 ) % R.H.
- 교정장소 (Location) : 고정표준실(Permanent Calibration Lab) (주소: 경기도 이천시 마장면 서이천로 578번길 74)

**5. 측정표준의 소급성** (Traceability) ◇Field code : 40641(RF SPECTRUM ANALYZER)

**교정방법 및 소급성 서술** (Calibration method and/or brief description)

상기 기기는 고주파 스펙트럼 분석기의 교정절차(HCT-CS-125-40641)에 따라 국가측정표준기관으로부터 측정의 소급성이 확보된 아래의 표준장비를 이용하여 교정 되었음.

**교정에 사용한 표준장비 명세** (List of used standards/specifications)

| 기기명 (Description) | 제작회사 및 형식 (Manufacturer and Model Name) | 기기번호 (Serial Number) | 차기교정예정일자 (The due date of next Calibration) | 교정기관 (Calibration laboratory) |
|---|---|---|---|---|
| EXG ANALOG SIGNAL GENERATOR | KEYSIGHT N5173B | MY53270544 | 2021/06/23 | (주)에이치시티 |
| EPM SERIES POWER METER | AGILENT E4419B | GB42420565 | 2020/11/02 | (주)에이치시티 |
| POWER SENSOR | AGILENT 8487A | MY41092450 | 2021/01/15 | Keysight Technologies |
| POWER SENSOR | KEYSIGHT V8486A | MY56330017 | 2021/01/03 | Keysight Technologies |
| WR-19 MULTIPLIER SOURCE MODULE | OML S19MS-A | 160516-1 | 2021/09/09 | (주)에이치시티 |

**6. 교정결과** (Calibration result) : **교정결과 참조** (Refer to attachment)

**7. 측정불확도** (Measurement uncertainty) : **교정결과 참조** (Refer to attachment)
신뢰수준 약 95 %, $k$ = 2 ( Confidence level about 95 %, $k$ = 2 )

| 확 인 (affirmation) | 작성자 (Measurements performed by) 성명 (Name) 박 민 지 | 승인자 (Approved by) 직위 (Title) 기술책임자(Technical Cal. Manager) (정) 성명 (Name) 이 승 찬 (서명) |
|---|---|---|

위 성적서는 국제시험기관인정협력체(International Laboratory Accreditation Cooperation) 상호인정협정(Mutual Recognition Arrangement)에 서명한 한국인정기구(KOLAS)로부터 공인 받은 분야의 교정결과입니다.

**2020. 09. 10**

한국인정기구 인정
Accredited by KOLAS, Republic of KOREA

**㈜에이치시티 대표이사**
***President*, HCT Co., Ltd.**

㈜ 이 성적서는 측정기의 정밀정확도에 영향을 미치는 요소(과부하, 온도, 습도 등)의 급격한 변화가 발생한 경우에는 무효가 됩니다.
※ 고객전용사이트(http://www.callab.co.kr)에서 성적서의 진위여부 확인이 가능합니다.
※ 성적서의 원본은 상단에 HCT홀로그램이 들어간 위변조 방지 용지에 인쇄되어 발급되며, 원본 복사시에는 복사본이라는 표시가 처리됩니다.

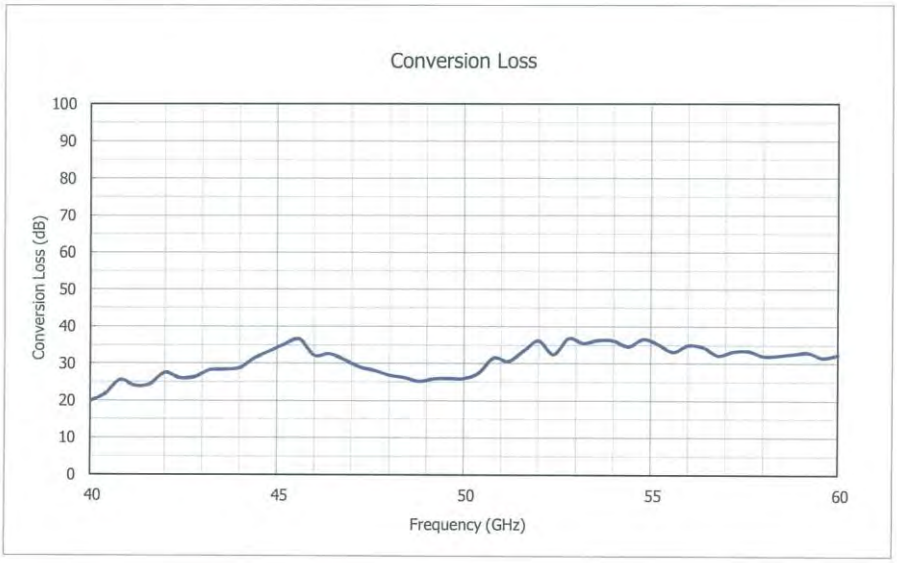
F-02P-02-008 (Rev.02)

# 교 정 결 과
## CALIBRATION RESULT

성적서발급번호(Certificate No) : IC-2020-68829
교 정 번 호(Calibration No) : C-2020-080148



1. Conversion Loss Graph




Note 1) R&S FSW (SN 104544)와 함께 교정된 결과임
Note 2) 측정 조건 : RF = -25 dBm, Harmonic Order = 4, L.O. Level = 15.5 dBm, Bias Value = 5.70 mA

F-02P-02-008 (Rev.02)

# 교 정 결 과

## CALIBRATION RESULT

성적서발급번호(Certificate No) : IC-2020-68829
교 정 번 호(Calibration No) : C-2020-080148



2. Conversion Loss Data

| Frequency (GHz) | Conversion Loss (dB) | Measurement Uncertainty (dB) | Frequency (GHz) | Conversion Loss (dB) | Measurement Uncertainty (dB) |
|---|---|---|---|---|---|
| 40.0 | 19.8 | 0.8 | 50.4 | 27.4 | 0.8 |
| 40.4 | 21.7 | 0.8 | 50.8 | 31.4 | 0.8 |
| 40.8 | 25.5 | 0.8 | 51.2 | 30.5 | 0.8 |
| 41.2 | 23.9 | 0.8 | 51.6 | 33.4 | 0.8 |
| 41.6 | 24.4 | 0.8 | 52.0 | 36.1 | 0.8 |
| 42.0 | 27.5 | 0.8 | 52.4 | 32.4 | 0.8 |
| 42.4 | 26.0 | 0.8 | 52.8 | 36.7 | 0.8 |
| 42.8 | 26.3 | 0.8 | 53.2 | 35.4 | 0.8 |
| 43.2 | 28.2 | 0.8 | 53.6 | 36.3 | 0.8 |
| 43.6 | 28.3 | 0.8 | 54.0 | 36.1 | 0.8 |
| 44.0 | 28.7 | 0.8 | 54.4 | 34.6 | 0.8 |
| 44.4 | 31.4 | 0.8 | 54.8 | 36.5 | 0.8 |
| 44.8 | 33.3 | 0.8 | 55.2 | 35.2 | 0.8 |
| 45.2 | 35.1 | 0.8 | 55.6 | 33.1 | 0.8 |
| 45.6 | 36.5 | 0.8 | 56.0 | 34.9 | 0.8 |
| 46.0 | 32.1 | 0.8 | 56.4 | 34.4 | 0.8 |
| 46.4 | 32.6 | 0.8 | 56.8 | 32.1 | 0.8 |
| 46.8 | 30.9 | 0.8 | 57.2 | 33.2 | 0.8 |
| 47.2 | 29.0 | 0.8 | 57.6 | 33.4 | 0.8 |
| 47.6 | 28.1 | 0.8 | 58.0 | 32.0 | 0.8 |
| 48.0 | 26.8 | 0.8 | 58.4 | 32.1 | 0.8 |
| 48.4 | 26.2 | 0.8 | 58.8 | 32.5 | 0.8 |
| 48.8 | 25.2 | 0.8 | 59.2 | 32.9 | 0.8 |
| 49.2 | 25.8 | 0.8 | 59.6 | 31.5 | 0.8 |
| 49.6 | 26.0 | 0.8 | 60.0 | 32.3 | 0.8 |
| 50.0 | 25.9 | 0.8 | - | - | - |

끝.

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# 교 정 성 적 서
## CALIBRATION CERTIFICATE

경기도 이천시 마장면 서이천로 578번길 74
TEL : 031-645-6900, FAX : 031-645-6969

KOREA LABORATORY ACCREDITATION SCHEME KOLAS CALIBRATION NO KC20-011

성적서발급번호(Certificate No) : IC-2020-68830
교 정 번 호(Calibration No) : C-2020-080149



**1. 의뢰자** (Client)
- 기관명 (Name) : (주)에이치시티
- 주소 (Address) : 경기도 이천시 마장면 서이천로 578번길 74

**2. 측정기** (Calibration Subject) ◇ 등록번호 : 288235
- 기기명 (Description) : WR-12 HARMONIC MIXER
- 제작회사 및 형식(Manufacturer and Model Name) : OML / M12HWD
- 기기번호 (Serial Number) : 160419-1

**3. 교정일자** (Date of Calibration) : 2020.09.09 **차기교정예정일자** : 2021.09.09 (The due date of next Calibration)

**4. 교정환경** (Environment)
- 온도(Temperature) : ( 23.0 ± 0.6 ) ℃ - 습도(Humidity) : ( 50 ± 2 ) % R.H.
- 교정장소 (Location) : 고정표준실(Permanent Calibration Lab) (주소: 경기도 이천시 마장면 서이천로 578번길 74)

**5. 측정표준의 소급성** (Traceability) ◇Field code : 40641(RF SPECTRUM ANALYZER)

**교정방법 및 소급성 서술** (Calibration method and/or brief description)

상기 기기는 고주파 스펙트럼 분석기의 교정절차(HCT-CS-125-40641)에 따라 국가측정표준기관으로부터 측정의 소급성이 확보된 아래의 표준장비를 이용하여 교정 되었음.

**교정에 사용한 표준장비 명세** (List of used standards/specifications)

| 기기명 (Description) | 제작회사 및 형식 (Manufacturer and Model Name) | 기기번호 (Serial Number) | 차기교정예정일자 (The due date of next Calibration) | 교정기관 (Calibration laboratory) |
|---|---|---|---|---|
| EXG ANALOG SIGNAL GENERATOR | KEYSIGHT N5173B | MY53270544 | 2021/06/23 | (주)에이치시티 |
| EPM SERIES POWER METER | AGILENT E4419B | GB42420565 | 2020/11/02 | (주)에이치시티 |
| POWER SENSOR | KEYSIGHT V8486A | MY56330017 | 2021/01/03 | Keysight Technologies |
| POWER SENSOR | KEYSIGHT W8486A | MY56370005 | 2020/12/30 | Keysight Technologies |
| WR-12 MULTIPLIER SOURCE MODULE | OML S12MS-A | 160419-1 | 2021/09/09 | (주)에이치시티 |

**6. 교정결과** (Calibration result) : **교정결과 참조** (Refer to attachment)

**7. 측정불확도** (Measurement uncertainty) : **교정결과 참조** (Refer to attachment)
신뢰수준 약 95 %, $k$ = 2 ( Confidence level about 95 %, $k$ = 2 )

| 확 인 (affirmation) | 작성자 (Measurements performed by) | 승인자 (Approved by) |
|---|---|---|
| | 성명 (Name) 박 민 지 | 직위 (Title) 기술책임자(Technical Cal. Manager) (정)<br>성명 (Name) 이 승 찬 (서명) |

위 성적서는 국제시험기관인정협력체(International Laboratory Accreditation Cooperation) 상호인정협정(Mutual Recognition Arrangement)에 서명한 한국인정기구(KOLAS)로부터 공인 받은 분야의 교정결과입니다.

**2020. 09. 10**

한국인정기구 인정
Accredited by KOLAS, Republic of KOREA

**㈜에이치시티 대표이사**
***President*, HCT Co., Ltd.**

㈜ 이 성적서는 측정기의 정밀정확도에 영향을 미치는 요소(과부하, 온도, 습도 등)의 급격한 변화가 발생한 경우에는 무효가 됩니다.
※ 고객전용사이트(http://www.callab.co.kr)에서 성적서의 진위여부 확인이 가능합니다.
※ 성적서의 원본은 상단에 HCT홀로그램이 들어간 위변조 방지 용지에 인쇄되어 발급되며, 원본 복사시에는 복사본이라는 표시가 처리됩니다.

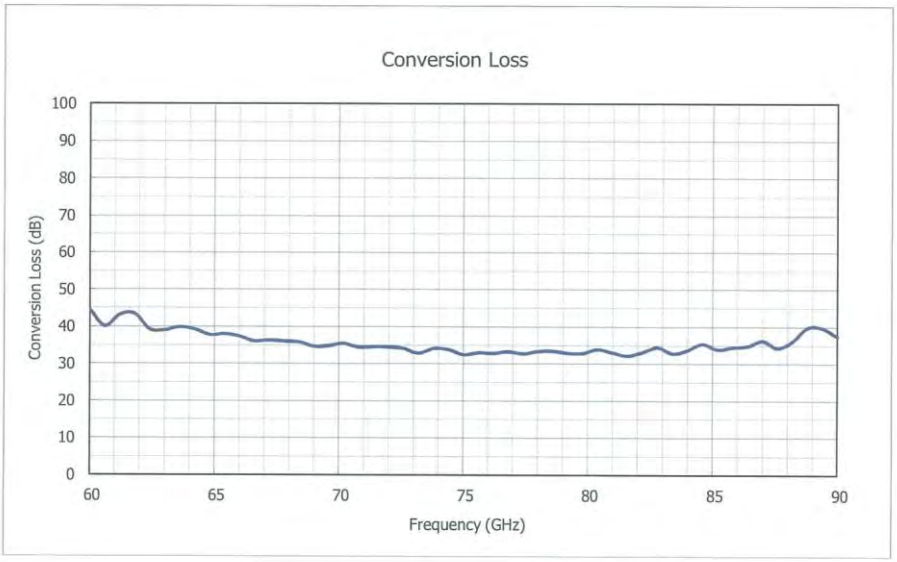
F-02P-02-008 (Rev.02)

# 교 정 결 과
## CALIBRATION RESULT

성적서발급번호(Certificate No) : IC-2020-68830
교 정 번 호(Calibration No) : C-2020-080149



1. Conversion Loss Graph




Note 1) R&S FSW (SN 104544)와 함께 교정된 결과임
Note 2) 측정 조건 : RF = -25 dBm, Harmonic Order = 6, L.O. Level = 17 dBm, Bias Value = 4.98 mA

F-02P-02-008 (Rev.02)

# 교 정 결 과
## CALIBRATION RESULT

성적서발급번호(Certificate No) : IC-2020-68830
교 정 번 호(Calibration No) : C-2020-080149



2. Conversion Loss Data

| Frequency (GHz) | Conversion Loss (dB) | Measurement Uncertainty (dB) | Frequency (GHz) | Conversion Loss (dB) | Measurement Uncertainty (dB) |
|---|---|---|---|---|---|
| 60.0 | 44.49 | 0.89 | 75.6 | 32.95 | 0.82 |
| 60.6 | 40.08 | 0.89 | 76.2 | 32.82 | 0.82 |
| 61.2 | 43.11 | 0.89 | 76.8 | 33.25 | 0.82 |
| 61.8 | 43.39 | 0.89 | 77.4 | 32.70 | 0.82 |
| 62.4 | 39.27 | 0.89 | 78.0 | 33.35 | 0.82 |
| 63.0 | 39.01 | 0.89 | 78.6 | 33.45 | 0.82 |
| 63.6 | 39.85 | 0.89 | 79.2 | 32.85 | 0.82 |
| 64.2 | 39.28 | 0.89 | 79.8 | 32.83 | 0.82 |
| 64.8 | 37.77 | 0.89 | 80.4 | 33.86 | 0.82 |
| 65.4 | 37.98 | 0.89 | 81.0 | 32.98 | 0.82 |
| 66.0 | 37.32 | 0.89 | 81.6 | 32.15 | 0.82 |
| 66.6 | 36.03 | 0.89 | 82.2 | 33.14 | 0.82 |
| 67.2 | 36.27 | 0.89 | 82.8 | 34.43 | 0.82 |
| 67.8 | 36.01 | 0.89 | 83.4 | 32.78 | 0.82 |
| 68.4 | 35.78 | 0.89 | 84.0 | 33.70 | 0.82 |
| 69.0 | 34.65 | 0.89 | 84.6 | 35.37 | 0.82 |
| 69.6 | 34.81 | 0.89 | 85.2 | 33.87 | 0.82 |
| 70.2 | 35.41 | 0.89 | 85.8 | 34.48 | 0.82 |
| 70.8 | 34.42 | 0.89 | 86.4 | 34.79 | 0.82 |
| 71.4 | 34.55 | 0.89 | 87.0 | 36.20 | 0.82 |
| 72.0 | 34.50 | 0.89 | 87.6 | 34.31 | 0.82 |
| 72.6 | 34.09 | 0.89 | 88.2 | 36.05 | 0.82 |
| 73.2 | 32.81 | 0.89 | 88.8 | 39.77 | 0.82 |
| 73.8 | 34.08 | 0.89 | 89.4 | 39.68 | 0.82 |
| 74.4 | 33.83 | 0.89 | 90.0 | 37.36 | 0.82 |
| 75.0 | 32.43 | 0.82 | - | - | - |

끝.

F-02P-02-008 (Rev.02)

열 람 용



# Measurement Report

74, Seoicheon-ro 578beon-gil, Majang-myeon,
Icheon-si, Gyeonggi-do, Korea 17383
Tel :82-31-645-6900, www.hct.co.kr

보고서번호(Report No) : IC-2020-68832 
측 정 번 호(Measurement No) : C-2020-080151

**1. 의뢰자** (Client)
- 기관명 (Name) : (주)에이치시티
- 주소 (Address) : 경기도 이천시 마장면 서이천로 578번길 74

**2. 대상품목** (Measurement Item) ◇ HCT 등록번호 : 288237
- 기기명 (Description) : WR-05 HARMONIC MIXER
- 제작회사 및 형식(Manufacturer and Model Name) : OML / M05HWD
- 기기번호 (Serial Number) : 160419-1

**3. 측정일자** (Measurement date) : 2020.09.09

**4. 측정환경** (Environment)
- 온도(Temperature) : ( 23.0 ± 0.6 ) ℃ - 습도(Humidity) : ( 50 ± 2 ) % R.H.

**5. 측정방법** (Measurement method used)

상기 기기는 고주파 스펙트럼 분석기의 교정절차(HCT-CS-125-40641)에 따라 국가측정표준기관으로부터 측정의 소급성이 확보된 아래의 아래의 표준장비와 자체 점검된 장비를 이용하여 점검 되었음.

**측정에 사용한 표준장비 명세** (List of used standards/specifications)

| 기기명 (Description) | 제작회사 및 형식 (Manufacturer and Model Name) | 기기번호 (Serial Number) | 차기교정예정일자 (The due date of next Calibration) | 교정기관 (Calibration laboratory) |
|---|---|---|---|---|
| EXG ANALOG SIGNAL GENERATOR | KEYSIGHT N5173B | MY53270544 | 2021/06/23 | (주)에이치시티 |
| ERICKSON POWER METER | VDI PM5 | 394V | 측정 | (주)에이치시티 |
| WR-05 MULTIPLIER SOURCE MODULE | OML S05MS-A | 160419-1 | 측정 | (주)에이치시티 |
| | | | | |
| | | | | |

**6. 측정결과** (Messurement result) **: 측정결과 참조** (Refer to attachment)

㈜ 이 측정결과는 의뢰자가 제시한 시료 및 시료명에만 한정됩니다.
The messuremen results shown in this report refer only to the sample(s) measured unless otherwise stated.

| 확 인 (Affirmation) | 작성자 (Tested by) 성명 (Name) : 박 민 지 | 승인자 (Approved by) 직위 (Title) 기술책임자(Technical Manager) 성명 (Name) 이 승 찬 (서명) |
|---|---|---|

이 성적서는 ILAC MRA 서명 기관인 KOLAS(Korea Laboratory Accreditation Scheme)와 A2LA (American Laboratory for Laboratory Accreditation)의 인정과 무관합니다. This calibration certificate is Not an accredited report by KOLAS(Korea Laboratory Accreditation Scheme) and A2LA(American Association for Laboratory Accreditation), a ILAC MRA signatory.

**2020. 09. 10**

HCT ㈜에이치시티 대표이사
*President*, HCT Co., Ltd.

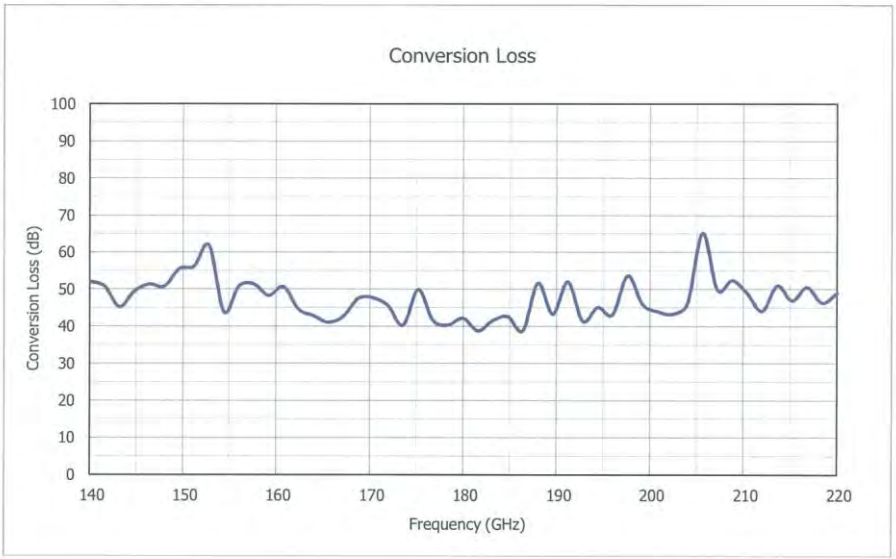
㈜ 측정결과는 측정기의 정밀정확도에 영향을 미치는 요소(과부하, 온도, 습도 등)의 급격한 변화가 발생한 경우에는 무효가 됩니다. If any significant instability or other adverse factor(overload, temperature, humidity etc.) manifests itself before, during or after calibration, and is likely to affect the validity of the calibration.

F-02P-02-010 (Rev.01)

# MEASUREMENT RESULT

보고서번호(Report No) : IC-2020-68832 페이지(page) : 2 of 3
측 정 번 호(Measurement No) : C-2020-080151

1. Conversion Loss Graph




Note 1) R&S FSW (SN 101256)와 함께 교정된 결과임
Note 2) 측정 조건 : RF = -25 dBm, Harmonic Order = 16, L.O. Level = 17 dBm, Bias Value = 0.00 mA
Note 3) 110 GHz 초과 대역의 전력에 대해 국제적인 소급표준이 없으므로 HCT에서 자체 점검된 기준기로 점검되었음.
- In the absence of power standards above 110 GHz, power measurements above 110 GHz are to confirm operation functionality and traceable only to HCT.

F-02P-02-010 (Rev.01)

# MEASUREMENT RESULT

보고서번호(Report No) : IC-2020-68832 페이지(page) : 3 of 3
측 정 번 호(Measurement No) : C-2020-080151

2. Conversion Loss Data

| Frequency (GHz) | Conversion Loss (dB) | Measurement Uncertainty (dB) | Frequency (GHz) | Conversion Loss (dB) | Measurement Uncertainty (dB) |
|---|---|---|---|---|---|
| 140.0 | 52.0 | 0.86 | 181.6 | 38.7 | 0.86 |
| 141.6 | 50.8 | 0.86 | 183.2 | 41.5 | 0.86 |
| 143.2 | 45.2 | 0.86 | 184.8 | 42.5 | 0.86 |
| 144.8 | 49.4 | 0.86 | 186.4 | 38.8 | 0.86 |
| 146.4 | 51.3 | 0.86 | 188.0 | 51.5 | 0.86 |
| 148.0 | 50.8 | 0.86 | 189.6 | 43.2 | 0.86 |
| 149.6 | 55.5 | 0.86 | 191.2 | 51.9 | 0.86 |
| 151.2 | 56.1 | 0.86 | 192.8 | 41.3 | 0.86 |
| 152.8 | 61.8 | 0.86 | 194.4 | 45.0 | 0.86 |
| 154.4 | 43.8 | 0.86 | 196.0 | 43.1 | 0.86 |
| 156.0 | 50.8 | 0.86 | 197.6 | 53.6 | 0.86 |
| 157.6 | 51.4 | 0.86 | 199.2 | 45.9 | 0.86 |
| 159.2 | 48.2 | 0.86 | 200.8 | 43.9 | 0.86 |
| 160.8 | 50.6 | 0.86 | 202.4 | 43.2 | 0.86 |
| 162.4 | 44.5 | 0.86 | 204.0 | 46.0 | 0.86 |
| 164.0 | 42.8 | 0.86 | 205.6 | 65.1 | 0.86 |
| 165.6 | 41.0 | 0.86 | 207.2 | 49.8 | 0.86 |
| 167.2 | 42.6 | 0.86 | 208.8 | 52.3 | 0.86 |
| 168.8 | 47.5 | 0.86 | 210.4 | 48.9 | 0.86 |
| 170.4 | 47.6 | 0.86 | 212.0 | 44.0 | 0.86 |
| 172.0 | 45.4 | 0.86 | 213.6 | 50.9 | 0.86 |
| 173.6 | 40.2 | 0.86 | 215.2 | 46.9 | 0.86 |
| 175.2 | 49.8 | 0.86 | 216.8 | 50.5 | 0.86 |
| 176.8 | 41.5 | 0.86 | 218.4 | 46.3 | 0.86 |
| 178.4 | 40.3 | 0.86 | 220.0 | 48.9 | 0.86 |
| 180.0 | 42.1 | 0.86 | - | - | - |

끝.

F-02P-02-010 (Rev.01)

열 람 용



# Measurement Report

74, Seoicheon-ro 578beon-gil, Majang-myeon,
Icheon-si, Gyeonggi-do, Korea 17383
Tel :82-31-645-6900, www.hct.co.kr

보고서번호(Report No) : IC-2020-68833 
측 정 번 호(Measurement No) : C-2020-080152

**1. 의뢰자** (Client)
- 기관명 (Name) : (주)에이치시티
- 주소 (Address) : 경기도 이천시 마장면 서이천로 578번길 74

**2. 대상품목** (Measurement Item) ◇ HCT 등록번호 : 366196
- 기기명 (Description) : WR-08 HARMONIC MIXER
- 제작회사 및 형식(Manufacturer and Model Name) : OML / M08HWD
- 기기번호 (Serial Number) : 160419-1

**3. 측정일자** (Measurement date) : 2020.09.09

**4. 측정환경** (Environment)
- 온도(Temperature) : ( 23.0 ± 0.6 ) ℃ - 습도(Humidity) : ( 50 ± 2 ) % R.H.

**5. 측정방법** (Measurement method used)

상기 기기는 고주파 스펙트럼 분석기의 교정절차(HCT-CS-125-40641)에 따라 국가측정표준기관으로부터 측정의 소급성이 확보된 아래의 아래의 표준장비와 자체 점검된 장비를 이용하여 점검 되었음.

**측정에 사용한 표준장비 명세** (List of used standards/specifications)

| 기기명 (Description) | 제작회사 및 형식 (Manufacturer and Model Name) | 기기번호 (Serial Number) | 차기교정예정일자 (The due date of next Calibration) | 교정기관 (Calibration laboratory) |
|---|---|---|---|---|
| EXG ANALOG SIGNAL GENERATOR | KEYSIGHT N5173B | MY53270544 | 2021/06/23 | (주)에이치시티 |
| ERICKSON POWER METER | VDI PM5 | 394V | 측정 | (주)에이치시티 |
| WR-08 MULTIPLIER SOURCE MODULE | OML S08MS-A | 160419-1 | 측정 | (주)에이치시티 |
| | | | | |
| | | | | |

**6. 측정결과** (Messurement result) **: 측정결과 참조** (Refer to attachment)

㈜ 이 측정결과는 의뢰자가 제시한 시료 및 시료명에만 한정됩니다.
The messuremen results shown in this report refer only to the sample(s) measured unless otherwise stated.

| 확 인 (Affirmation) | 작성자 (Tested by) | 승인자 (Approved by) |
|---|---|---|
| | 성명 (Name) : 박 민 지 | 직위 (Title) 기술책임자(Technical Manager) |
| | | 성명 (Name) 이 승 찬 (서명) |

이 성적서는 ILAC MRA 서명 기관인 KOLAS(Korea Laboratory Accreditation Scheme)와 A2LA (American Laboratory for Laboratory Accreditation)의 인정과 무관합니다. This calibration certificate is Not an accredited report by KOLAS(Korea Laboratory Accreditation Scheme) and A2LA(American Association for Laboratory Accreditation), a ILAC MRA signatory.

**2020. 09. 10**

HCT ㈜에이치시티 대표이사
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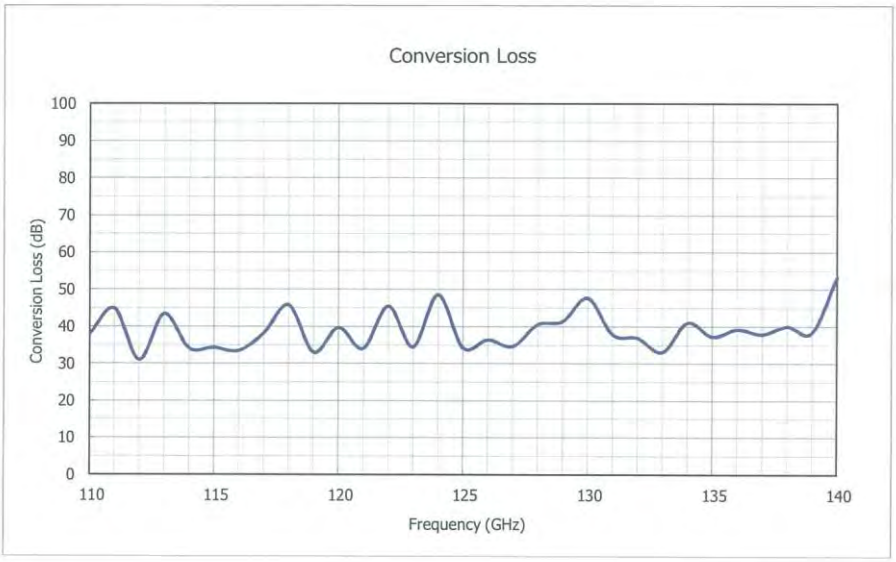
F-02P-02-010 (Rev.01)

# MEASUREMENT RESULT

보고서번호(Report No) : IC-2020-68833 페이지(page) : 2 of 3
측 정 번 호(Measurement No) : C-2020-080152

1. Conversion Loss Graph




Note 1) R&S FSW (SN 104544)와 함께 교정된 결과임
Note 2) 측정 조건 : RF = -25 dBm, Harmonic Order = 10, L.O. Level = 17 dBm, Bias Value = 0.01 mA
Note 3) 110 GHz 초과 대역의 전력에 대해 국제적인 소급표준이 없으므로 HCT에서 자체 점검된 기준기로 점검되었음.
- In the absence of power standards above 110 GHz, power measurements above 110 GHz are to confirm operation functionality and traceable only to HCT.

F-02P-02-010 (Rev.01)

# MEASUREMENT RESULT

보고서번호(Report No) : IC-2020-68833 페이지(page) : 3 of 3
측 정 번 호(Measurement No) : C-2020-080152

2. Conversion Loss Data

| Frequency (GHz) | Conversion Loss (dB) | Measurement Uncertainty (dB) | Frequency (GHz) | Conversion Loss (dB) | Measurement Uncertainty (dB) |
|---|---|---|---|---|---|
| 110.0 | 37.8 | 0.82 | 126.0 | 36.4 | 0.82 |
| 111.0 | 44.8 | 0.82 | 127.0 | 34.6 | 0.82 |
| 112.0 | 31.0 | 0.82 | 128.0 | 40.5 | 0.82 |
| 113.0 | 43.4 | 0.82 | 129.0 | 41.4 | 0.82 |
| 114.0 | 34.1 | 0.82 | 130.0 | 47.6 | 0.82 |
| 115.0 | 34.3 | 0.82 | 131.0 | 37.8 | 0.82 |
| 116.0 | 33.5 | 0.82 | 132.0 | 36.9 | 0.82 |
| 117.0 | 38.1 | 0.82 | 133.0 | 33.1 | 0.82 |
| 118.0 | 45.8 | 0.82 | 134.0 | 41.0 | 0.82 |
| 119.0 | 33.0 | 0.82 | 135.0 | 37.2 | 0.82 |
| 120.0 | 39.7 | 0.82 | 136.0 | 39.2 | 0.82 |
| 121.0 | 34.0 | 0.82 | 137.0 | 37.9 | 0.82 |
| 122.0 | 45.4 | 0.82 | 138.0 | 40.0 | 0.82 |
| 123.0 | 34.5 | 0.82 | 139.0 | 38.4 | 0.82 |
| 124.0 | 48.5 | 0.82 | 140.0 | 53.3 | 0.82 |
| 125.0 | 34.2 | 0.82 | - | - | - |

끝.

F-02P-02-010 (Rev.01)

## 7. Annex A_EUT AND TEST SETUP PHOTO

Please refer to test setup photo file no. as follows;

| No. | Description |
|---|---|
| 1 | HCT-RF-2010-FC005-P |