



HERMON LABORATORIES

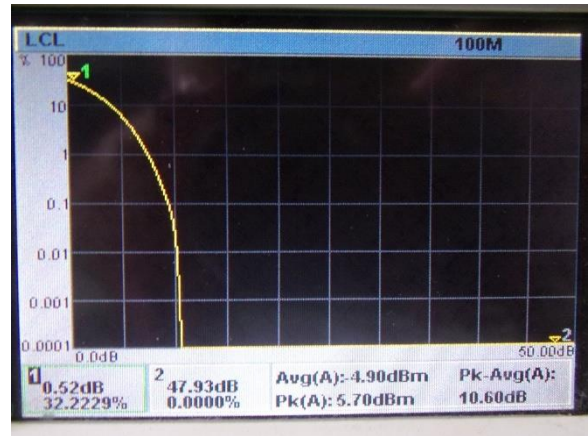
|   |                                |                               |                      |
|---|--------------------------------|-------------------------------|----------------------|
| <b>Test specification:</b> Section 96.41(g), Peak-to- average power ratio |                                |                               |                      |
| <b>Test procedure:</b> Section 96.41(g)                                   |                                |                               |                      |
| <b>Test mode:</b> Compliance  |                                |                               | <b>Verdict:</b> PASS |
| <b>Date(s):</b> 08-Feb-22   |                                |                               |                      |
| <b>Temperature:</b> 24.3. °C  | <b>Relative Humidity:</b> 48 % | <b>Air Pressure:</b> 1010 hPa | <b>Power:</b> 48 VAC |
| <b>Remarks:</b>   |                                |                               |                      |

Modulation: 64QAM

LCL

A

|         |         |   |
|---------|---------|---|
| 10%     | 4.23dB  | Ⓜ |
| 1%      | 7.50dB  |   |
| 0.1%    | 9.36dB  |   |
| 0.01%   | 10.12dB |   |
| 0.001%  | 10.36dB |   |
| 0.0001% | 10.47dB |   |

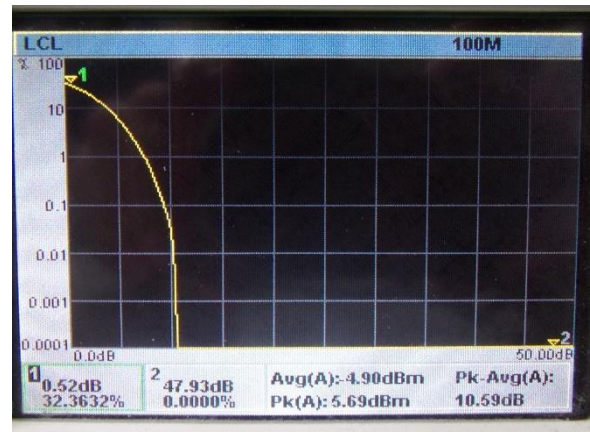


Modulation: 256QAM

LCL

A

|         |         |   |
|---------|---------|---|
| 10%     | 4.21dB  | Ⓜ |
| 1%      | 7.55dB  |   |
| 0.1%    | 9.36dB  |   |
| 0.01%   | 10.22dB |   |
| 0.001%  | 10.39dB |   |
| 0.0001% | 10.50dB |   |





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|   |                                |                               |                      |
|---|--------------------------------|-------------------------------|----------------------|
| <b>Test specification:</b> Section 96.41(g), Peak-to- average power ratio |                                |                               |                      |
| <b>Test procedure:</b> Section 96.41(g)                                   |                                |                               |                      |
| <b>Test mode:</b> Compliance  |                                |                               | <b>Verdict:</b> PASS |
| <b>Date(s):</b> 08-Feb-22   |                                |                               |                      |
| <b>Temperature:</b> 24.3. °C  | <b>Relative Humidity:</b> 48 % | <b>Air Pressure:</b> 1010 hPa | <b>Power:</b> 48 VAC |
| <b>Remarks:</b>   |                                |                               |                      |

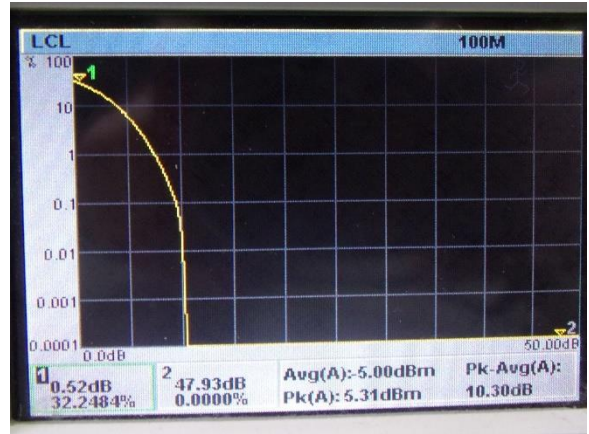
Plot 7.2.8 Peak-to-average power ratio test results at mid frequency

CHANNEL SPACING: 40 MHz  
 ANTENNA PORT: 1  
 Modulation: QPSK

LCL

A

|         |         |  |
|---------|---------|--|
| 10%     | 4.20dB  |  |
| 1%      | 7.51dB  |  |
| 0.1%    | 9.46dB  |  |
| 0.01%   | 10.06dB |  |
| 0.001%  | 10.18dB |  |
| 0.0001% | 10.25dB |  |

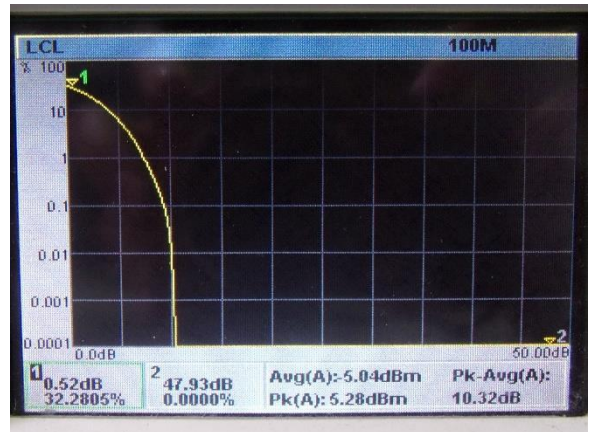


Modulation: 16QAM

LCL

A

|         |         |  |
|---------|---------|--|
| 10%     | 4.23dB  |  |
| 1%      | 7.48dB  |  |
| 0.1%    | 9.32dB  |  |
| 0.01%   | 10.02dB |  |
| 0.001%  | 10.19dB |  |
| 0.0001% | 10.29dB |  |





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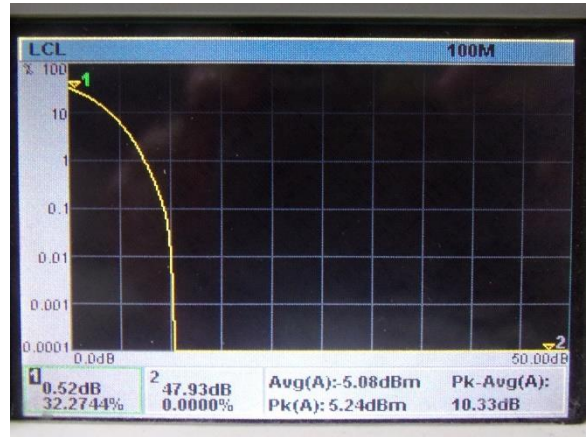
|   |                                |                               |                      |
|---|--------------------------------|-------------------------------|----------------------|
| <b>Test specification:</b> Section 96.41(g), Peak-to- average power ratio |                                |                               |                      |
| <b>Test procedure:</b> Section 96.41(g)                                   |                                |                               |                      |
| <b>Test mode:</b> Compliance  |                                |                               | <b>Verdict:</b> PASS |
| <b>Date(s):</b> 08-Feb-22   |                                |                               |                      |
| <b>Temperature:</b> 24.3. °C  | <b>Relative Humidity:</b> 48 % | <b>Air Pressure:</b> 1010 hPa | <b>Power:</b> 48 VAC |
| <b>Remarks:</b>   |                                |                               |                      |

Modulation: 64QAM

LCL

A

|         |         |    |
|---------|---------|----|
| 10%     | 4.23dB  | ✍️ |
| 1%      | 7.46dB  |    |
| 0.1%    | 9.30dB  |    |
| 0.01%   | 10.00dB |    |
| 0.001%  | 10.20dB |    |
| 0.0001% | 10.25dB |    |

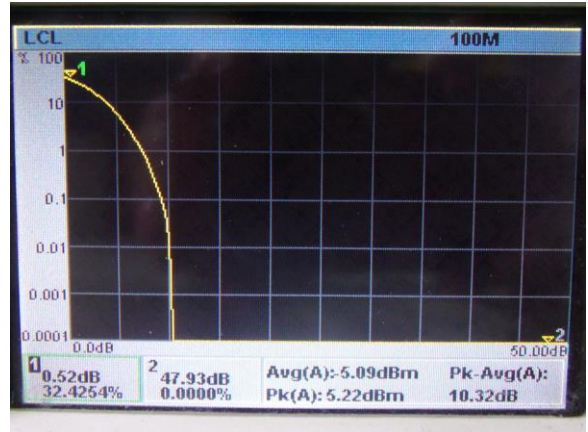


Modulation: 256QAM

LCL

A

|         |         |    |
|---------|---------|----|
| 10%     | 4.23dB  | ✍️ |
| 1%      | 7.51dB  |    |
| 0.1%    | 9.32dB  |    |
| 0.01%   | 10.05dB |    |
| 0.001%  | 10.19dB |    |
| 0.0001% | 10.26dB |    |





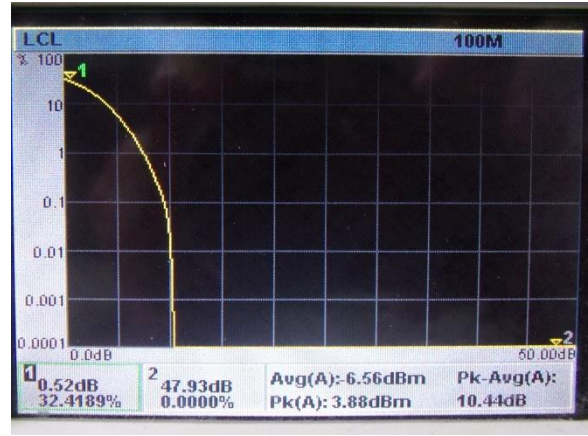
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|   |                                |                               |                      |
|---|--------------------------------|-------------------------------|----------------------|
| <b>Test specification:</b> Section 96.41(g), Peak-to- average power ratio |                                |                               |                      |
| <b>Test procedure:</b> Section 96.41(g)                                   |                                |                               |                      |
| <b>Test mode:</b> Compliance  |                                | <b>Verdict:</b> PASS          |                      |
| <b>Date(s):</b> 08-Feb-22   |                                |                               |                      |
| <b>Temperature:</b> 24.3. °C  | <b>Relative Humidity:</b> 48 % | <b>Air Pressure:</b> 1010 hPa | <b>Power:</b> 48 VAC |
| <b>Remarks:</b>   |                                |                               |                      |

Plot 7.2.9 Peak-to-average power ratio test results at high frequency

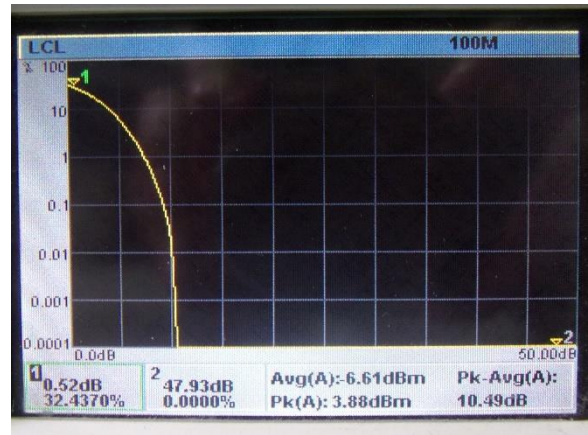
CHANNEL SPACING: 40 MHz  
 ANTENNA PORT: 1  
 Modulation: QPSK

|   |         |         |   |
|---|---------|---------|---|
| A | 10%     | 4.21dB  | Ⓝ |
|   | 1%      | 7.51dB  |   |
|   | 0.1%    | 9.44dB  |   |
|   | 0.01%   | 10.05dB |   |
|   | 0.001%  | 10.24dB |   |
|   | 0.0001% | 10.32dB |   |



Modulation: 16QAM

|   |         |         |   |
|---|---------|---------|---|
| A | 10%     | 4.23dB  | Ⓝ |
|   | 1%      | 7.45dB  |   |
|   | 0.1%    | 9.25dB  |   |
|   | 0.01%   | 10.08dB |   |
|   | 0.001%  | 10.31dB |   |
|   | 0.0001% | 10.41dB |   |





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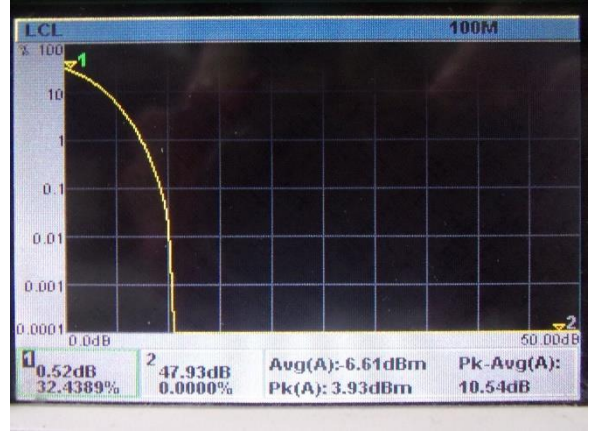
|   |                                |                               |                      |
|---|--------------------------------|-------------------------------|----------------------|
| <b>Test specification:</b> Section 96.41(g), Peak-to- average power ratio |                                |                               |                      |
| <b>Test procedure:</b> Section 96.41(g)                                   |                                |                               |                      |
| <b>Test mode:</b> Compliance  | <b>Verdict:</b> PASS           |                               |                      |
| <b>Date(s):</b> 08-Feb-22   |                                |                               |                      |
| <b>Temperature:</b> 24.3. °C  | <b>Relative Humidity:</b> 48 % | <b>Air Pressure:</b> 1010 hPa | <b>Power:</b> 48 VAC |
| <b>Remarks:</b>   |                                |                               |                      |

Modulation: 64QAM

LCL

A

|         |         |   |
|---------|---------|---|
| 10%     | 4.23dB  | ✍ |
| 1%      | 7.47dB  |   |
| 0.1%    | 9.24dB  |   |
| 0.01%   | 10.08dB |   |
| 0.001%  | 10.31dB |   |
| 0.0001% | 10.40dB |   |



Modulation: 256QAM

LCL

A

|         |         |   |
|---------|---------|---|
| 10%     | 4.22dB  | ✍ |
| 1%      | 7.53dB  |   |
| 0.1%    | 9.22dB  |   |
| 0.01%   | 9.99dB  |   |
| 0.001%  | 10.26dB |   |
| 0.0001% | 10.35dB |   |





|   |                                |                               |                      |
|---|--------------------------------|-------------------------------|----------------------|
| <b>Test specification: Section 2.1049, Occupied bandwidth</b> |                                |                               |                      |
| <b>Test procedure:</b> 47 CFR, Section 2.1049                 |                                |                               |                      |
| <b>Test mode:</b> Compliance                                  |                                | <b>Verdict:</b> PASS          |                      |
| <b>Date(s):</b> 14-Feb-22                                     |                                |                               |                      |
| <b>Temperature:</b> 24 °C                                     | <b>Relative Humidity:</b> 52 % | <b>Air Pressure:</b> 1012 hPa | <b>Power:</b> 48 VAC |
| <b>Remarks:</b>   |                                |                               |                      |

### 7.3 Occupied bandwidth test

#### 7.3.1 General

This test was performed to measure transmitter occupied bandwidth. Specification test limits are given in Table 7.3.1.

Table 7.3.1 Occupied bandwidth limits

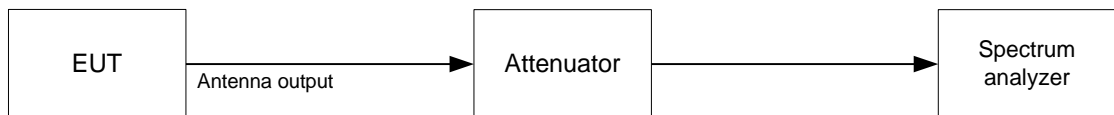
| Assigned frequency, MHz | Modulation envelope reference points*, % | Maximum allowed bandwidth, MHz |
|-------------------------|--|--------------------------------|
| 3550 - 3700             | 99                                       | 10 / 20 / 40 MHz               |

\* - Modulation envelope reference points are provided in terms of attenuation below the unmodulated carrier.

#### 7.3.2 Test procedure

- 7.3.2.1 The EUT was set up as shown in Figure 7.3.1, energized and its proper operation was checked.
- 7.3.2.2 The EUT was set to transmit the unmodulated carrier and the reference peak power level was measured.
- 7.3.2.3 The EUT was set to transmit the normally modulated carrier.
- 7.3.2.4 The transmitter occupied bandwidth was measured with spectrum analyzer as a frequency delta between the reference points on modulation envelope and provided in Table 7.3.2 and the associated plots.

Figure 7.3.1 Occupied bandwidth test setup





|  |                                |                               |                      |
|--|--------------------------------|-------------------------------|----------------------|
| <b>Test specification: Section2.1049, Occupied bandwidth</b> |                                |                               |                      |
| <b>Test procedure:</b> 47 CFR, Section 2.1049                |                                |                               |                      |
| <b>Test mode:</b> Compliance                                 |                                | <b>Verdict: PASS</b>          |                      |
| <b>Date(s):</b> 14-Feb-22                                    |                                |                               |                      |
| <b>Temperature:</b> 24 °C                                    | <b>Relative Humidity:</b> 52 % | <b>Air Pressure:</b> 1012 hPa | <b>Power:</b> 48 VAC |
| <b>Remarks:</b>  |                                |                               |                      |

Table 7.3.2 Occupied bandwidth test results

DETECTOR USED: Peak hold  
RESOLUTION BANDWIDTH: 1 – 5% of the OBW  
VIDEO BANDWIDTH: > RBW  
MODULATION ENVELOPE REFERENCE POINTS: 99%

| Carrier frequency, MHz        | Occupied bandwidth, MHz | Limit, MHz | Margin, MHz | Verdict |
|-------------------------------|-------------------------|------------|-------------|---------|
| <b>Channel spacing 10 MHz</b> |                         |            |             |         |
| <b>Modulation QPSK</b>        |                         |            |             |         |
| 3555.0                        | 8.674                   | 10.0       | -1.326      | Pass    |
| 3625.0                        | 8.661                   | 10.0       | -1.339      | Pass    |
| 3695.0                        | 8.656                   | 10.0       | -1.344      | Pass    |
| <b>Modulation 16QAM</b>       |                         |            |             |         |
| 3555.0                        | 8.669                   | 10.0       | -1.331      | Pass    |
| 3625.0                        | 8.674                   | 10.0       | -1.326      | Pass    |
| 3695.0                        | 8.656                   | 10.0       | -1.344      | Pass    |
| <b>Modulation 64QAM</b>       |                         |            |             |         |
| 3555.0                        | 8.641                   | 10.0       | -1.359      | Pass    |
| 3625.0                        | 8.666                   | 10.0       | -1.334      | Pass    |
| 3695.0                        | 8.656                   | 10.0       | -1.344      | Pass    |
| <b>Modulation 256QAM</b>      |                         |            |             |         |
| 3555.0                        | 8.641                   | 10.0       | -1.359      | Pass    |
| 3625.0                        | 8.634                   | 10.0       | -1.366      | Pass    |
| 3695.0                        | 8.621                   | 10.0       | -1.379      | Pass    |



|  |                                |                               |                      |
|--|--------------------------------|-------------------------------|----------------------|
| <b>Test specification: Section2.1049, Occupied bandwidth</b> |                                |                               |                      |
| <b>Test procedure:</b> 47 CFR, Section 2.1049                |                                |                               |                      |
| <b>Test mode:</b> Compliance                                 |                                | <b>Verdict: PASS</b>          |                      |
| <b>Date(s):</b> 14-Feb-22                                    |                                |                               |                      |
| <b>Temperature:</b> 24 °C                                    | <b>Relative Humidity:</b> 52 % | <b>Air Pressure:</b> 1012 hPa | <b>Power:</b> 48 VAC |
| <b>Remarks:</b>  |                                |                               |                      |

Table 7.3.3 Occupied bandwidth test results (continue)

DETECTOR USED: Peak hold  
 RESOLUTION BANDWIDTH: 1 – 5% of the OBW  
 VIDEO BANDWIDTH: > RBW  
 MODULATION ENVELOPE REFERENCE POINTS: 99%

| Channel spacing 20 MHz |        |      |        |      |
|------------------------|--------|------|--------|------|
| Modulation QPSK        |        |      |        |      |
| 3560.0                 | 18.193 | 20.0 | -1.807 | Pass |
| 3625.0                 | 18.188 | 20.0 | -1.812 | Pass |
| 3690.0                 | 18.197 | 20.0 | -1.803 | Pass |
| Modulation 16QAM       |        |      |        |      |
| 3560.0                 | 18.238 | 20.0 | -1.762 | Pass |
| 3625.0                 | 18.248 | 20.0 | -1.752 | Pass |
| 3690.0                 | 18.253 | 20.0 | -1.747 | Pass |
| Modulation 64QAM       |        |      |        |      |
| 3560.0                 | 18.253 | 20.0 | -1.747 | Pass |
| 3625.0                 | 18.252 | 20.0 | -1.748 | Pass |
| 3690.0                 | 18.243 | 20.0 | -1.757 | Pass |
| Modulation 256QAM      |        |      |        |      |
| 3560.0                 | 18.178 | 20.0 | -1.822 | Pass |
| 3625.0                 | 18.168 | 20.0 | -1.832 | Pass |
| 3690.0                 | 18.183 | 20.0 | -1.817 | Pass |
| Channel spacing 40 MHz |        |      |        |      |
| Modulation QPSK        |        |      |        |      |
| 3570.0                 | 37.785 | 40.0 | -2.215 | Pass |
| 3625.0                 | 37.775 | 40.0 | -2.225 | Pass |
| 3680.0                 | 37.745 | 40.0 | -2.255 | Pass |
| Modulation 16QAM       |        |      |        |      |
| 3570.0                 | 37.785 | 40.0 | -2.215 | Pass |
| 3625.0                 | 37.775 | 40.0 | -2.225 | Pass |
| 3680.0                 | 37.765 | 40.0 | -2.235 | Pass |
| Modulation 64QAM       |        |      |        |      |
| 3570.0                 | 37.785 | 40.0 | -2.215 | Pass |
| 3625.0                 | 37.775 | 40.0 | -2.225 | Pass |
| 3680.0                 | 37.775 | 40.0 | -2.225 | Pass |
| Modulation 256QAM      |        |      |        |      |
| 3570.0                 | 37.785 | 40.0 | -2.215 | Pass |
| 3625.0                 | 37.765 | 40.0 | -2.235 | Pass |
| 3680.0                 | 37.765 | 40.0 | -2.235 | Pass |

Reference numbers of test equipment used

|         |         |         |  |  |  |  |
|---------|---------|---------|--|--|--|--|
| HL 4355 | HL 4366 | HL 6143 |  |  |  |  |
|---------|---------|---------|--|--|--|--|

Full description is given in Appendix A.



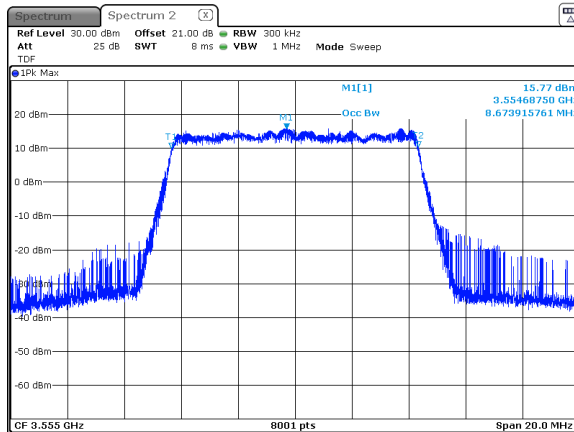


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|  |                                |                               |                      |
|--|--------------------------------|-------------------------------|----------------------|
| <b>Test specification: Section2.1049, Occupied bandwidth</b> |                                |                               |                      |
| <b>Test procedure:</b> 47 CFR, Section 2.1049                |                                |                               |                      |
| <b>Test mode:</b> Compliance                                 |                                | <b>Verdict:</b> PASS          |                      |
| <b>Date(s):</b> 14-Feb-22                                    |                                |                               |                      |
| <b>Temperature:</b> 24 °C                                    | <b>Relative Humidity:</b> 52 % | <b>Air Pressure:</b> 1012 hPa | <b>Power:</b> 48 VAC |
| <b>Remarks:</b>  |                                |                               |                      |

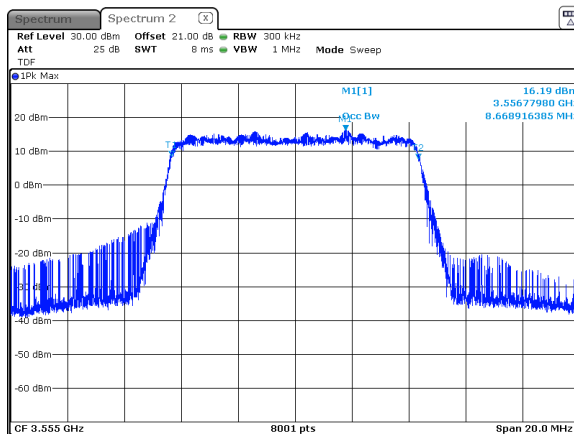
Plot 7.3.1 Occupied bandwidth test result at low frequency

MODULATION: QPSK  
CHANNEL SPACING: 10 MHz  
ANTENNA CHAIN: 1



Plot 7.3.2 Occupied bandwidth test result at low frequency

MODULATION: 16QAM  
CHANNEL SPACING: 10 MHz  
ANTENNA CHAIN: 1



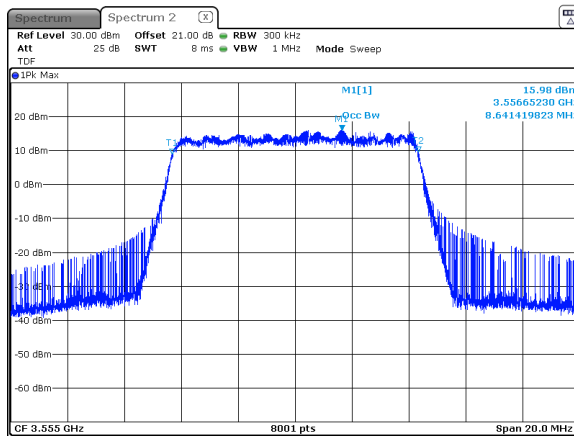


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|  |                                |                               |                      |
|--|--------------------------------|-------------------------------|----------------------|
| <b>Test specification: Section2.1049, Occupied bandwidth</b> |                                |                               |                      |
| <b>Test procedure:</b> 47 CFR, Section 2.1049                |                                |                               |                      |
| <b>Test mode:</b> Compliance                                 |                                | <b>Verdict:</b> PASS          |                      |
| <b>Date(s):</b> 14-Feb-22                                    |                                |                               |                      |
| <b>Temperature:</b> 24 °C                                    | <b>Relative Humidity:</b> 52 % | <b>Air Pressure:</b> 1012 hPa | <b>Power:</b> 48 VAC |
| <b>Remarks:</b>  |                                |                               |                      |

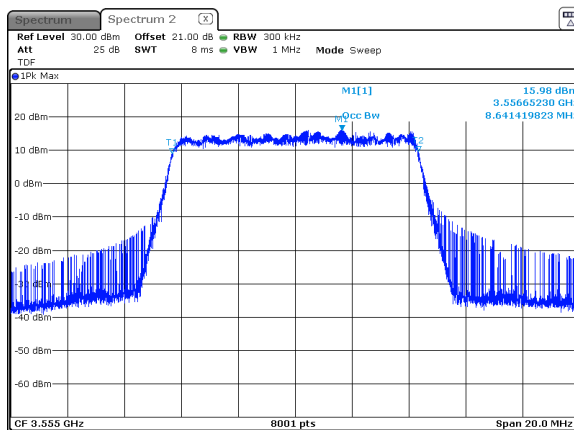
Plot 7.3.3 Occupied bandwidth test result at low frequency

MODULATION: 64QAM  
CHANNEL SPACING: 10 MHz  
ANTENNA CHAIN: 1



Plot 7.3.4 Occupied bandwidth test result at low frequency

MODULATION: 256QAM  
CHANNEL SPACING: 10 MHz  
ANTENNA CHAIN: 1



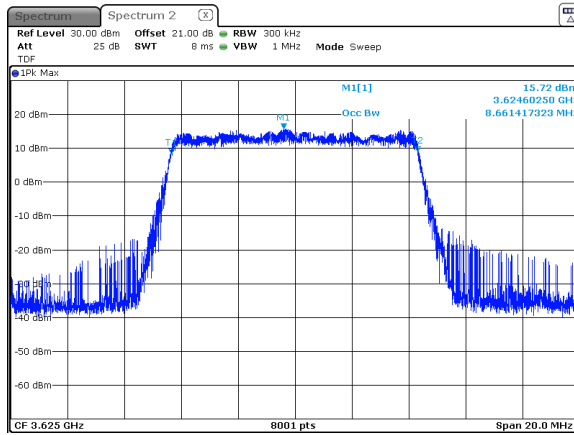


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|  |                                |                               |                      |
|--|--------------------------------|-------------------------------|----------------------|
| <b>Test specification: Section2.1049, Occupied bandwidth</b> |                                |                               |                      |
| <b>Test procedure:</b> 47 CFR, Section 2.1049                |                                |                               |                      |
| <b>Test mode:</b> Compliance                                 |                                | <b>Verdict:</b> PASS          |                      |
| <b>Date(s):</b> 14-Feb-22                                    |                                |                               |                      |
| <b>Temperature:</b> 24 °C                                    | <b>Relative Humidity:</b> 52 % | <b>Air Pressure:</b> 1012 hPa | <b>Power:</b> 48 VAC |
| <b>Remarks:</b>  |                                |                               |                      |

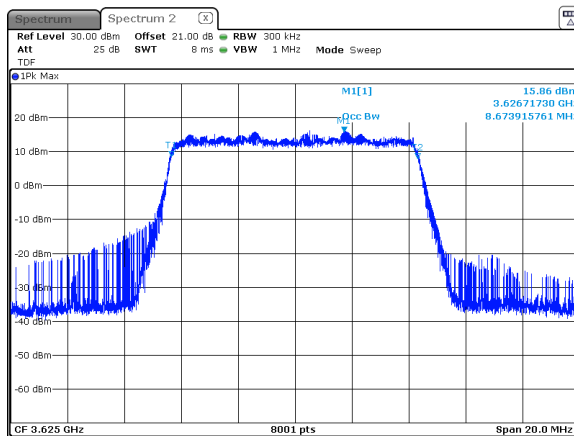
Plot 7.3.5 Occupied bandwidth test result at mid frequency

MODULATION: QPSK  
 CHANNEL SPACING: 10 MHz  
 ANTENNA CHAIN: 1



Plot 7.3.6 Occupied bandwidth test result at mid frequency

MODULATION: 16QAM  
 CHANNEL SPACING: 10 MHz  
 ANTENNA CHAIN: 1



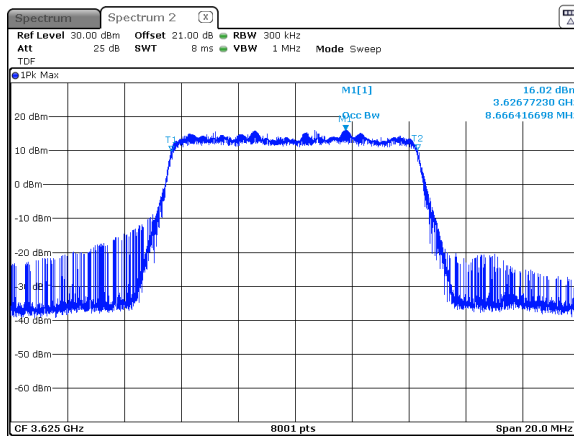


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|  |                                |                               |                      |
|--|--------------------------------|-------------------------------|----------------------|
| <b>Test specification: Section2.1049, Occupied bandwidth</b> |                                |                               |                      |
| <b>Test procedure:</b> 47 CFR, Section 2.1049                |                                |                               |                      |
| <b>Test mode:</b> Compliance                                 |                                | <b>Verdict:</b> PASS          |                      |
| <b>Date(s):</b> 14-Feb-22                                    |                                |                               |                      |
| <b>Temperature:</b> 24 °C                                    | <b>Relative Humidity:</b> 52 % | <b>Air Pressure:</b> 1012 hPa | <b>Power:</b> 48 VAC |
| <b>Remarks:</b>  |                                |                               |                      |

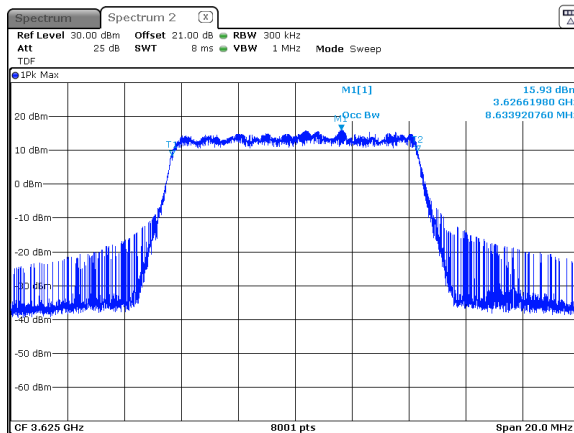
Plot 7.3.7 Occupied bandwidth test result at mid frequency

MODULATION: 64QAM  
CHANNEL SPACING: 10 MHz  
ANTENNA CHAIN: 1



Plot 7.3.8 Occupied bandwidth test result at mid frequency

MODULATION: 256QAM  
CHANNEL SPACING: 10 MHz  
ANTENNA CHAIN: 1



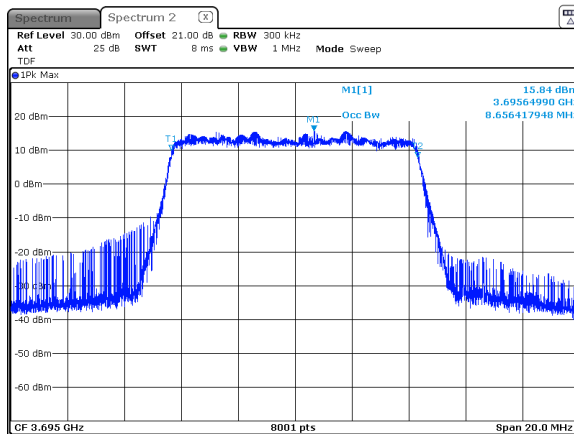


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|  |                                |                               |                      |
|--|--------------------------------|-------------------------------|----------------------|
| <b>Test specification: Section2.1049, Occupied bandwidth</b> |                                |                               |                      |
| <b>Test procedure:</b> 47 CFR, Section 2.1049                |                                |                               |                      |
| <b>Test mode:</b> Compliance                                 |                                | <b>Verdict:</b> PASS          |                      |
| <b>Date(s):</b> 14-Feb-22                                    |                                |                               |                      |
| <b>Temperature:</b> 24 °C                                    | <b>Relative Humidity:</b> 52 % | <b>Air Pressure:</b> 1012 hPa | <b>Power:</b> 48 VAC |
| <b>Remarks:</b>  |                                |                               |                      |

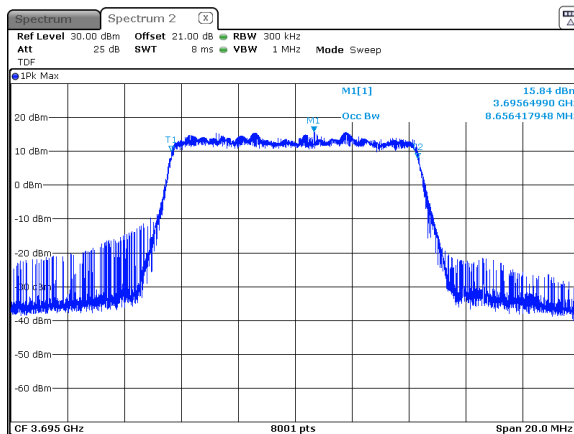
Plot 7.3.9 Occupied bandwidth test result at high frequency

MODULATION: QPSK  
CHANNEL SPACING: 10 MHz  
ANTENNA CHAIN: 1



Plot 7.3.10 Occupied bandwidth test result at high frequency

MODULATION: 16QAM  
CHANNEL SPACING: 10 MHz  
ANTENNA CHAIN: 1



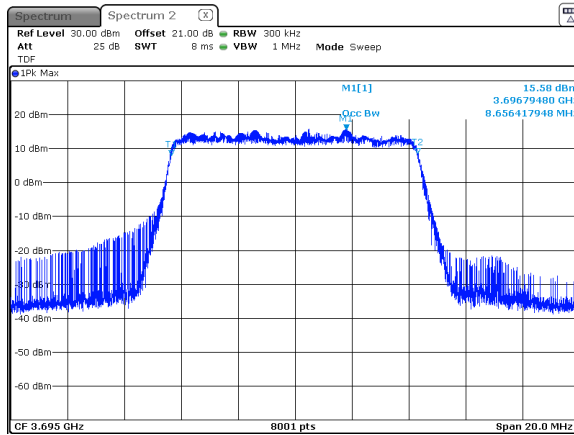


HERMON LABORATORIES

|  |                                |                               |                      |
|--|--------------------------------|-------------------------------|----------------------|
| <b>Test specification: Section2.1049, Occupied bandwidth</b> |                                |                               |                      |
| <b>Test procedure:</b> 47 CFR, Section 2.1049                |                                |                               |                      |
| <b>Test mode:</b> Compliance                                 |                                | <b>Verdict:</b> PASS          |                      |
| <b>Date(s):</b> 14-Feb-22                                    |                                |                               |                      |
| <b>Temperature:</b> 24 °C                                    | <b>Relative Humidity:</b> 52 % | <b>Air Pressure:</b> 1012 hPa | <b>Power:</b> 48 VAC |
| <b>Remarks:</b>  |                                |                               |                      |

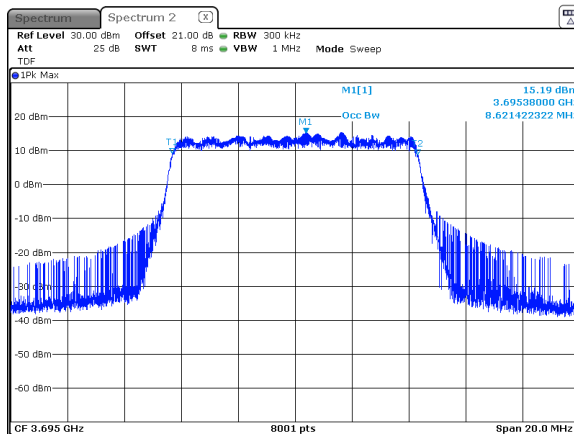
Plot 7.3.11 Occupied bandwidth test result at high frequency

MODULATION: 64QAM  
CHANNEL SPACING: 10 MHz  
ANTENNA CHAIN: 1



Plot 7.3.12 Occupied bandwidth test result at high frequency

MODULATION: 256QAM  
CHANNEL SPACING: 10 MHz  
ANTENNA CHAIN: 1



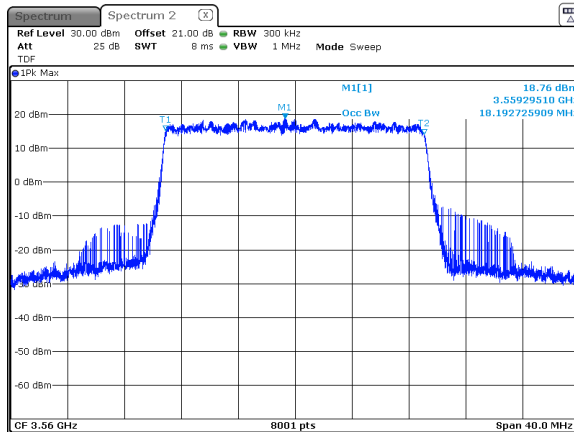


HERMON LABORATORIES

|  |                                |                               |                      |
|--|--------------------------------|-------------------------------|----------------------|
| <b>Test specification: Section2.1049, Occupied bandwidth</b> |                                |                               |                      |
| <b>Test procedure:</b> 47 CFR, Section 2.1049                |                                |                               |                      |
| <b>Test mode:</b> Compliance                                 |                                | <b>Verdict:</b> PASS          |                      |
| <b>Date(s):</b> 14-Feb-22                                    |                                |                               |                      |
| <b>Temperature:</b> 24 °C                                    | <b>Relative Humidity:</b> 52 % | <b>Air Pressure:</b> 1012 hPa | <b>Power:</b> 48 VAC |
| <b>Remarks:</b>  |                                |                               |                      |

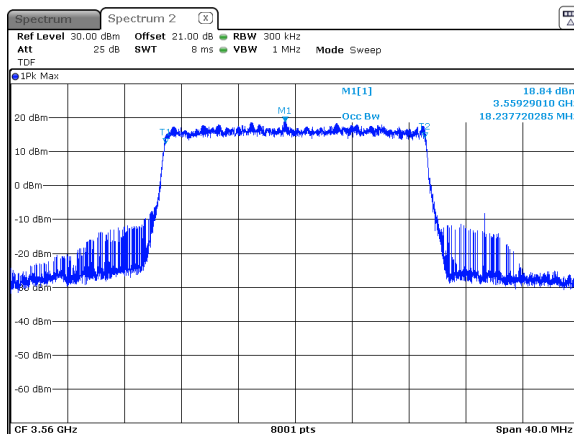
Plot 7.3.13 Occupied bandwidth test result at low frequency

MODULATION: QPSK  
CHANNEL SPACING: 20 MHz  
ANTENNA CHAIN: 1



Plot 7.3.14 Occupied bandwidth test result at low frequency

MODULATION: 16QAM  
CHANNEL SPACING: 20 MHz  
ANTENNA CHAIN: 1

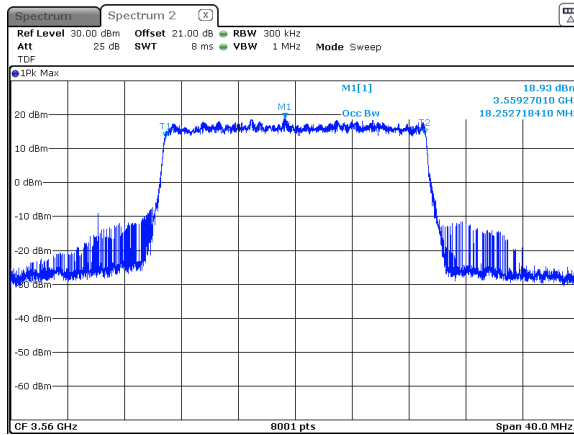




|  |                                |                               |                      |
|--|--------------------------------|-------------------------------|----------------------|
| <b>Test specification: Section2.1049, Occupied bandwidth</b> |                                |                               |                      |
| <b>Test procedure:</b> 47 CFR, Section 2.1049                |                                |                               |                      |
| <b>Test mode:</b> Compliance                                 |                                | <b>Verdict:</b> PASS          |                      |
| <b>Date(s):</b> 14-Feb-22                                    |                                |                               |                      |
| <b>Temperature:</b> 24 °C                                    | <b>Relative Humidity:</b> 52 % | <b>Air Pressure:</b> 1012 hPa | <b>Power:</b> 48 VAC |
| <b>Remarks:</b>  |                                |                               |                      |

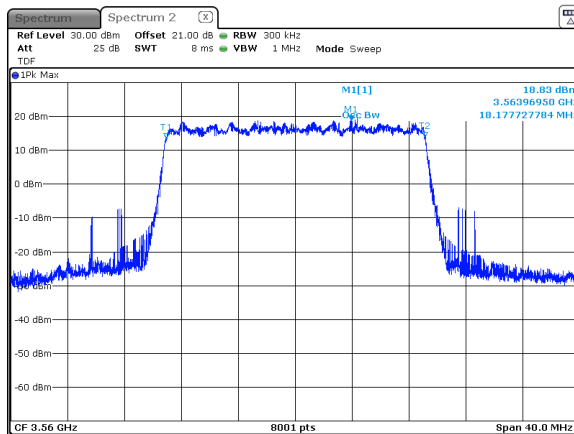
Plot 7.3.15 Occupied bandwidth test result at low frequency

MODULATION: 64QAM  
CHANNEL SPACING: 20 MHz  
ANTENNA CHAIN: 1



Plot 7.3.16 Occupied bandwidth test result at low frequency

MODULATION: 256QAM  
CHANNEL SPACING: 20 MHz  
ANTENNA CHAIN: 1





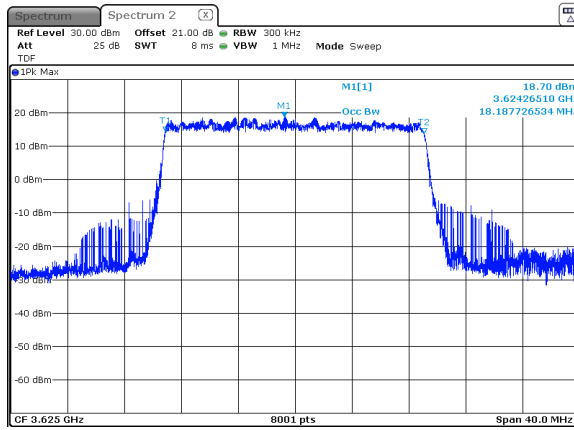


HERMON LABORATORIES

|  |                                |                               |                      |
|--|--------------------------------|-------------------------------|----------------------|
| <b>Test specification:</b> Section2.1049, Occupied bandwidth |                                |                               |                      |
| <b>Test procedure:</b> 47 CFR, Section 2.1049                |                                |                               |                      |
| <b>Test mode:</b> Compliance                                 |                                | <b>Verdict:</b> PASS          |                      |
| <b>Date(s):</b> 14-Feb-22                                    |                                |                               |                      |
| <b>Temperature:</b> 24 °C                                    | <b>Relative Humidity:</b> 52 % | <b>Air Pressure:</b> 1012 hPa | <b>Power:</b> 48 VAC |
| <b>Remarks:</b>  |                                |                               |                      |

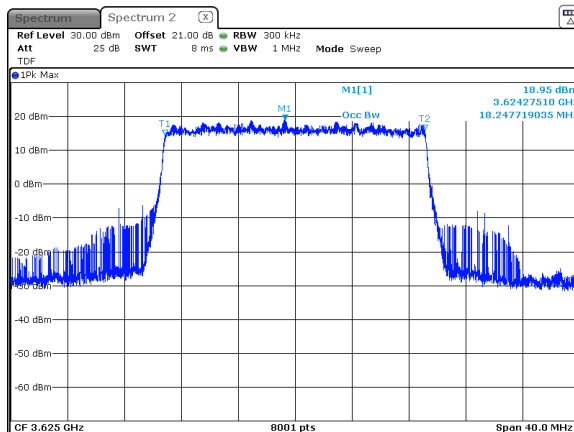
Plot 7.3.17 Occupied bandwidth test result at mid frequency

MODULATION: QPSK  
CHANNEL SPACING: 20 MHz  
ANTENNA CHAIN: 1



Plot 7.3.18 Occupied bandwidth test result at mid frequency

MODULATION: 16QAM  
CHANNEL SPACING: 20 MHz  
ANTENNA CHAIN: 1



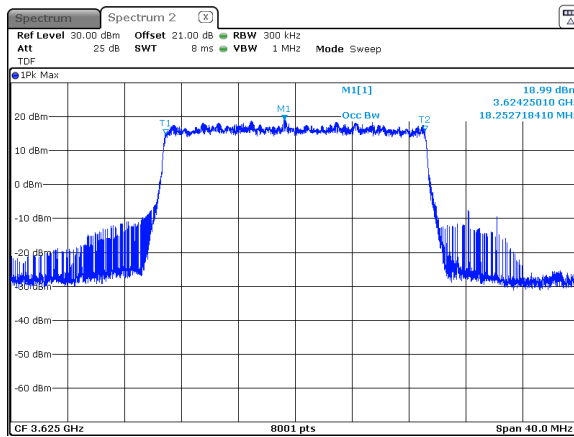


HERMON LABORATORIES

|  |                                |                               |                      |
|--|--------------------------------|-------------------------------|----------------------|
| <b>Test specification:</b> Section2.1049, Occupied bandwidth |                                |                               |                      |
| <b>Test procedure:</b> 47 CFR, Section 2.1049                |                                |                               |                      |
| <b>Test mode:</b> Compliance                                 |                                | <b>Verdict:</b> PASS          |                      |
| <b>Date(s):</b> 14-Feb-22                                    |                                |                               |                      |
| <b>Temperature:</b> 24 °C                                    | <b>Relative Humidity:</b> 52 % | <b>Air Pressure:</b> 1012 hPa | <b>Power:</b> 48 VAC |
| <b>Remarks:</b>  |                                |                               |                      |

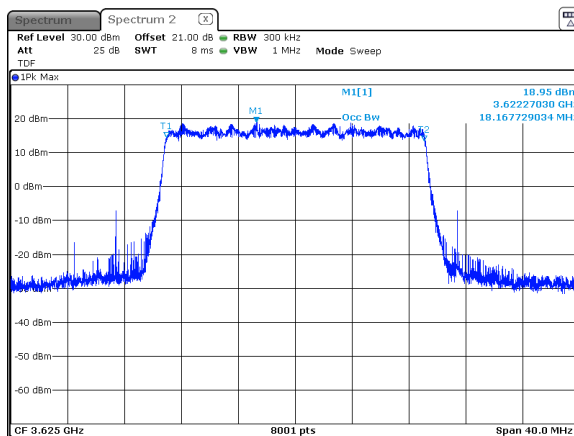
Plot 7.3.19 Occupied bandwidth test result at mid frequency

MODULATION: 64QAM  
CHANNEL SPACING: 20 MHz  
ANTENNA CHAIN: 1



Plot 7.3.20 Occupied bandwidth test result at mid frequency

MODULATION: 256QAM  
CHANNEL SPACING: 20 MHz  
ANTENNA CHAIN: 1



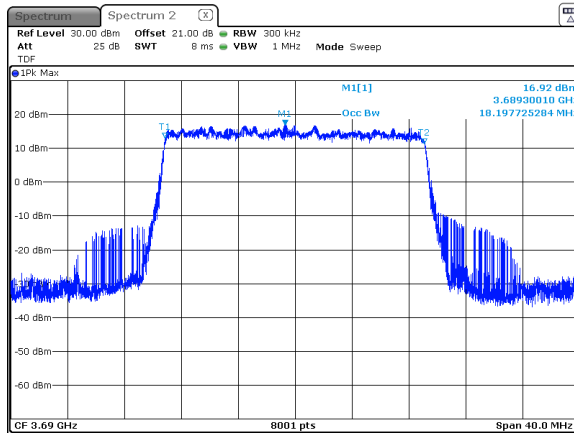


HERMON LABORATORIES

|  |                                |                               |                      |
|--|--------------------------------|-------------------------------|----------------------|
| <b>Test specification: Section2.1049, Occupied bandwidth</b> |                                |                               |                      |
| <b>Test procedure:</b> 47 CFR, Section 2.1049                |                                |                               |                      |
| <b>Test mode:</b> Compliance                                 |                                | <b>Verdict:</b> PASS          |                      |
| <b>Date(s):</b> 14-Feb-22                                    |                                |                               |                      |
| <b>Temperature:</b> 24 °C                                    | <b>Relative Humidity:</b> 52 % | <b>Air Pressure:</b> 1012 hPa | <b>Power:</b> 48 VAC |
| <b>Remarks:</b>  |                                |                               |                      |

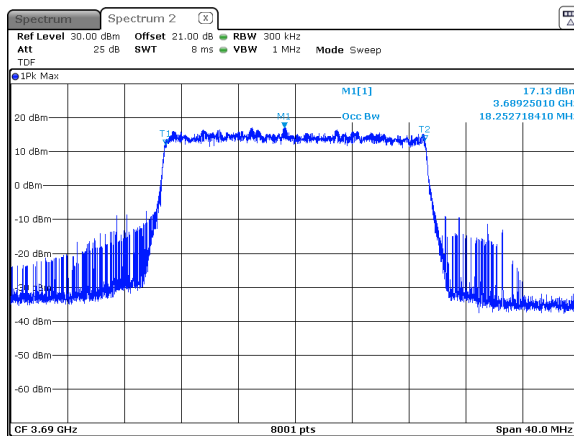
Plot 7.3.21 Occupied bandwidth test result at high frequency

MODULATION: QPSK  
CHANNEL SPACING: 20 MHz  
ANTENNA CHAIN: 1



Plot 7.3.22 Occupied bandwidth test result at high frequency

MODULATION: 16QAM  
CHANNEL SPACING: 20 MHz  
ANTENNA CHAIN: 1



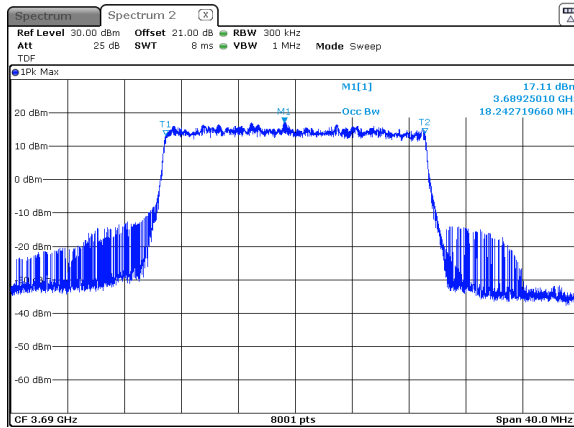


HERMON LABORATORIES

|  |                                |                               |                      |
|--|--------------------------------|-------------------------------|----------------------|
| <b>Test specification: Section2.1049, Occupied bandwidth</b> |                                |                               |                      |
| <b>Test procedure:</b> 47 CFR, Section 2.1049                |                                |                               |                      |
| <b>Test mode:</b> Compliance                                 |                                | <b>Verdict: PASS</b>          |                      |
| <b>Date(s):</b> 14-Feb-22                                    |                                |                               |                      |
| <b>Temperature:</b> 24 °C                                    | <b>Relative Humidity:</b> 52 % | <b>Air Pressure:</b> 1012 hPa | <b>Power:</b> 48 VAC |
| <b>Remarks:</b>  |                                |                               |                      |

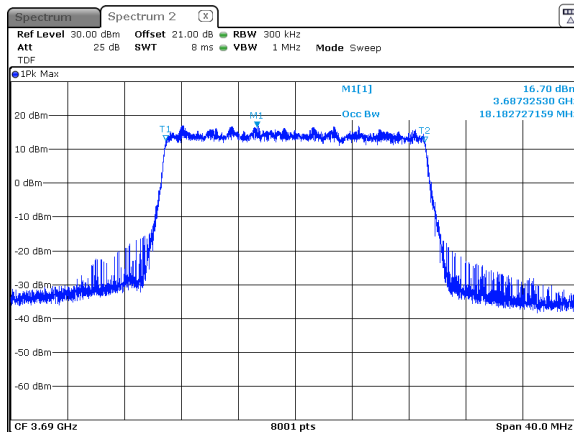
Plot 7.3.23 Occupied bandwidth test result at high frequency

MODULATION: 64QAM  
CHANNEL SPACING: 20 MHz  
ANTENNA CHAIN: 1



Plot 7.3.24 Occupied bandwidth test result at high frequency

MODULATION: 256QAM  
CHANNEL SPACING: 20 MHz  
ANTENNA CHAIN: 1



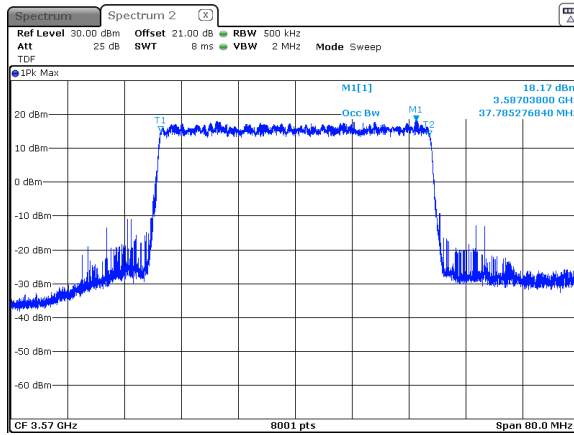


HERMON LABORATORIES

|  |                                |                               |                      |
|--|--------------------------------|-------------------------------|----------------------|
| <b>Test specification: Section2.1049, Occupied bandwidth</b> |                                |                               |                      |
| <b>Test procedure:</b> 47 CFR, Section 2.1049                |                                |                               |                      |
| <b>Test mode:</b> Compliance                                 |                                | <b>Verdict:</b> PASS          |                      |
| <b>Date(s):</b> 14-Feb-22                                    |                                |                               |                      |
| <b>Temperature:</b> 24 °C                                    | <b>Relative Humidity:</b> 52 % | <b>Air Pressure:</b> 1012 hPa | <b>Power:</b> 48 VAC |
| <b>Remarks:</b>  |                                |                               |                      |

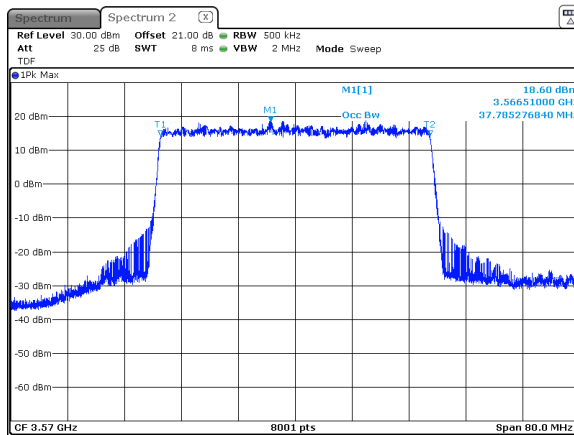
Plot 7.3.25 Occupied bandwidth test result at low frequency

MODULATION: QPSK  
CHANNEL SPACING: 40 MHz  
ANTENNA CHAIN: 1



Plot 7.3.26 Occupied bandwidth test result at low frequency

MODULATION: 16QAM  
CHANNEL SPACING: 40 MHz  
ANTENNA CHAIN: 1



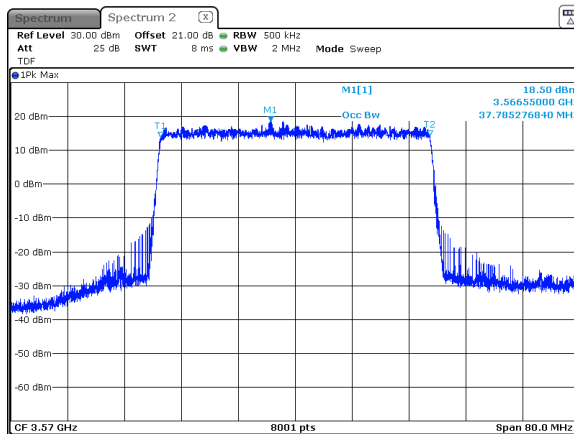


HERMON LABORATORIES

|  |                                |                               |                      |
|--|--------------------------------|-------------------------------|----------------------|
| <b>Test specification: Section2.1049, Occupied bandwidth</b> |                                |                               |                      |
| <b>Test procedure:</b> 47 CFR, Section 2.1049                |                                |                               |                      |
| <b>Test mode:</b> Compliance                                 |                                | <b>Verdict:</b> PASS          |                      |
| <b>Date(s):</b> 14-Feb-22                                    |                                |                               |                      |
| <b>Temperature:</b> 24 °C                                    | <b>Relative Humidity:</b> 52 % | <b>Air Pressure:</b> 1012 hPa | <b>Power:</b> 48 VAC |
| <b>Remarks:</b>  |                                |                               |                      |

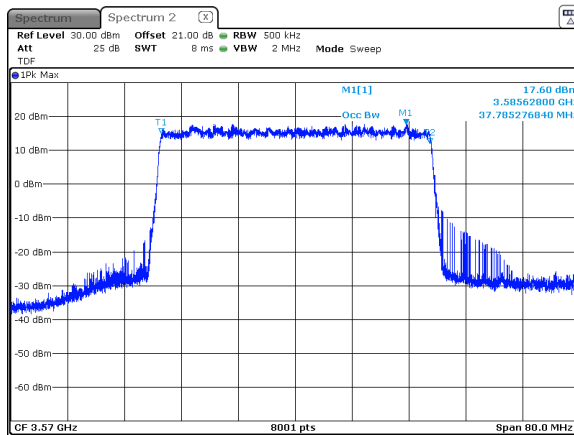
Plot 7.3.27 Occupied bandwidth test result at low frequency

MODULATION: 64QAM  
CHANNEL SPACING: 40 MHz  
ANTENNA CHAIN: 1



Plot 7.3.28 Occupied bandwidth test result at low frequency

MODULATION: 256QAM  
CHANNEL SPACING: 40 MHz  
ANTENNA CHAIN: 1



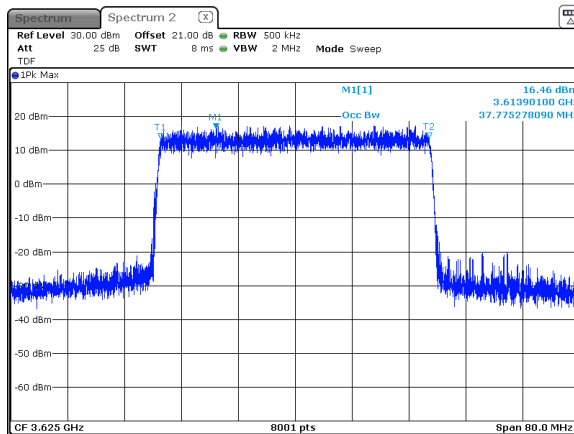


HERMON LABORATORIES

|  |                                |                               |                      |
|--|--------------------------------|-------------------------------|----------------------|
| <b>Test specification: Section2.1049, Occupied bandwidth</b> |                                |                               |                      |
| <b>Test procedure:</b> 47 CFR, Section 2.1049                |                                |                               |                      |
| <b>Test mode:</b> Compliance                                 |                                | <b>Verdict:</b> PASS          |                      |
| <b>Date(s):</b> 14-Feb-22                                    |                                |                               |                      |
| <b>Temperature:</b> 24 °C                                    | <b>Relative Humidity:</b> 52 % | <b>Air Pressure:</b> 1012 hPa | <b>Power:</b> 48 VAC |
| <b>Remarks:</b>  |                                |                               |                      |

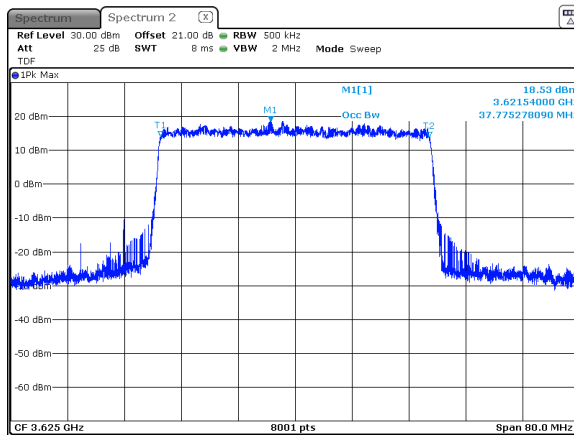
Plot 7.3.29 Occupied bandwidth test result at mid frequency

MODULATION: QPSK  
CHANNEL SPACING: 40 MHz  
ANTENNA CHAIN: 1



Plot 7.3.30 Occupied bandwidth test result at mid frequency

MODULATION: 16QAM  
CHANNEL SPACING: 40 MHz  
ANTENNA CHAIN: 1



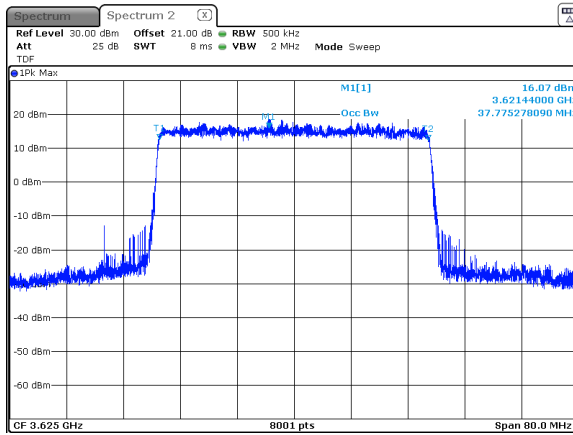


HERMON LABORATORIES

|  |                                |                               |                      |
|--|--------------------------------|-------------------------------|----------------------|
| <b>Test specification: Section2.1049, Occupied bandwidth</b> |                                |                               |                      |
| <b>Test procedure:</b> 47 CFR, Section 2.1049                |                                |                               |                      |
| <b>Test mode:</b> Compliance                                 |                                | <b>Verdict:</b> PASS          |                      |
| <b>Date(s):</b> 14-Feb-22                                    |                                |                               |                      |
| <b>Temperature:</b> 24 °C                                    | <b>Relative Humidity:</b> 52 % | <b>Air Pressure:</b> 1012 hPa | <b>Power:</b> 48 VAC |
| <b>Remarks:</b>  |                                |                               |                      |

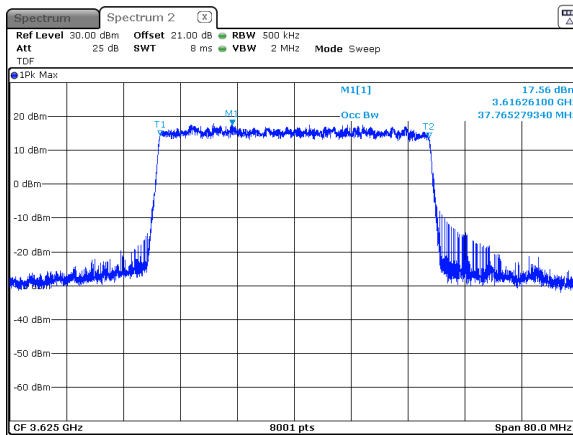
Plot 7.3.31 Occupied bandwidth test result at mid frequency

MODULATION: 64QAM  
CHANNEL SPACING: 40 MHz  
ANTENNA CHAIN: 1



Plot 7.3.32 Occupied bandwidth test result at mid frequency

MODULATION: 256QAM  
CHANNEL SPACING: 40 MHz  
ANTENNA CHAIN: 1





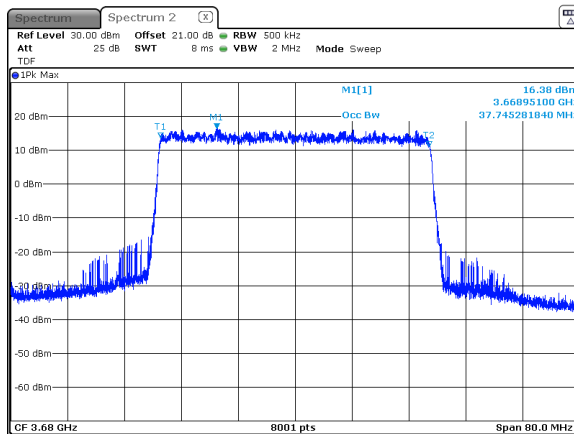


HERMON LABORATORIES

|  |                                |                               |                      |
|--|--------------------------------|-------------------------------|----------------------|
| <b>Test specification: Section2.1049, Occupied bandwidth</b> |                                |                               |                      |
| <b>Test procedure:</b> 47 CFR, Section 2.1049                |                                |                               |                      |
| <b>Test mode:</b> Compliance                                 |                                | <b>Verdict:</b> PASS          |                      |
| <b>Date(s):</b> 14-Feb-22                                    |                                |                               |                      |
| <b>Temperature:</b> 24 °C                                    | <b>Relative Humidity:</b> 52 % | <b>Air Pressure:</b> 1012 hPa | <b>Power:</b> 48 VAC |
| <b>Remarks:</b>  |                                |                               |                      |

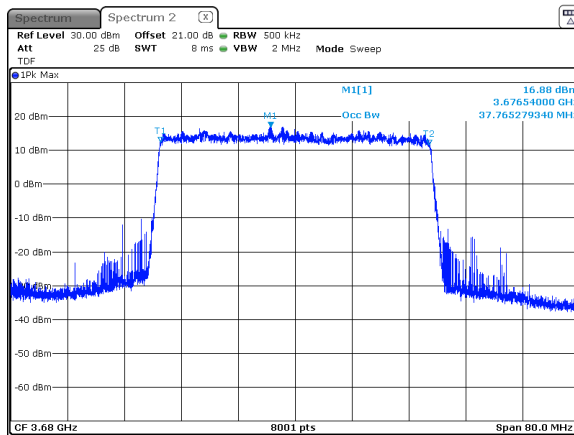
Plot 7.3.33 Occupied bandwidth test result at high frequency

MODULATION: QPSK  
CHANNEL SPACING: 40 MHz  
ANTENNA CHAIN: 1



Plot 7.3.34 Occupied bandwidth test result at high frequency

MODULATION: 16QAM  
CHANNEL SPACING: 40 MHz  
ANTENNA CHAIN: 1



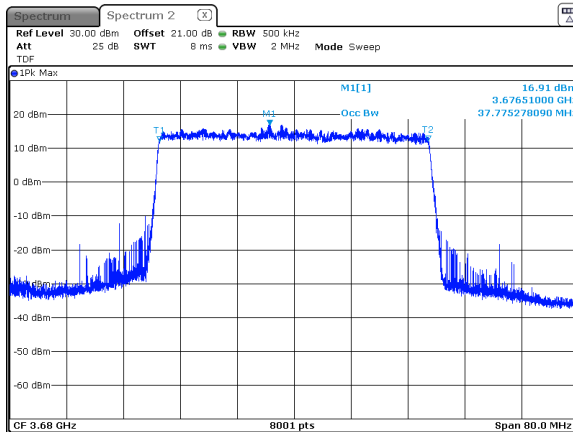


HERMON LABORATORIES

|  |                                |                               |                      |
|--|--------------------------------|-------------------------------|----------------------|
| <b>Test specification:</b> Section2.1049, Occupied bandwidth |                                |                               |                      |
| <b>Test procedure:</b> 47 CFR, Section 2.1049                |                                |                               |                      |
| <b>Test mode:</b> Compliance                                 |                                | <b>Verdict:</b> PASS          |                      |
| <b>Date(s):</b> 14-Feb-22                                    |                                |                               |                      |
| <b>Temperature:</b> 24 °C                                    | <b>Relative Humidity:</b> 52 % | <b>Air Pressure:</b> 1012 hPa | <b>Power:</b> 48 VAC |
| <b>Remarks:</b>  |                                |                               |                      |

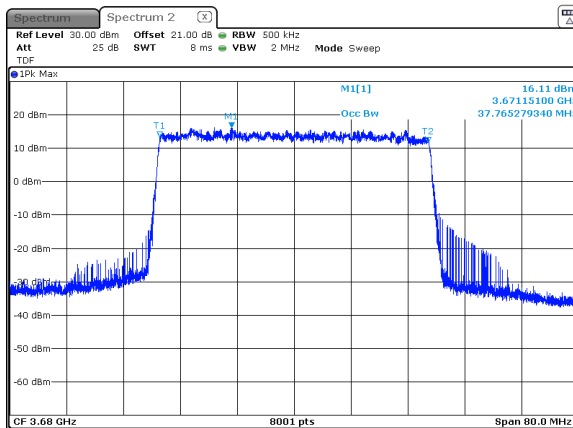
Plot 7.3.35 Occupied bandwidth test result at high frequency

MODULATION: 64QAM  
CHANNEL SPACING: 40 MHz  
ANTENNA CHAIN: 1



Plot 7.3.36 Occupied bandwidth test result at high frequency

MODULATION: 256QAM  
CHANNEL SPACING: 40 MHz  
ANTENNA CHAIN: 1





|  |                                |                               |                      |
|--|--------------------------------|-------------------------------|----------------------|
| <b>Test specification: Section 96.41(e), Emission mask</b> |                                |                               |                      |
| <b>Test procedure:</b> Section 96.41(e)(3)                 |                                |                               |                      |
| <b>Test mode:</b> Compliance                               |                                | <b>Verdict: PASS</b>          |                      |
| <b>Date(s):</b> 15-Feb-22                                  |                                |                               |                      |
| <b>Temperature:</b> 24.2 °C                                | <b>Relative Humidity:</b> 49 % | <b>Air Pressure:</b> 1010 hPa | <b>Power:</b> 48 VAC |
| <b>Remarks:</b>  |                                |                               |                      |

## 7.4 Emission outside the fundamental test

### 7.4.1 General

This test was performed to measure Emission outside the fundamental at RF antenna connector. Specification test limits are given in Table 7.4.1.

Table 7.4.1 Emission outside the fundamental limits

| Frequency displacement from frequency block | Limit*, dBm/MHz | RBW, kHz |
|---|-----------------|----------|
| <b>Channel Spacing 10 MHz</b>               |                 |          |
| 0 – 1 MHz                                   | - 13            | 100      |
| 0 – 10 MHz                                  | - 13            | 1000     |
| 10 – 20 MHz                                 | - 25            | 1000     |
| Above 3530 MHz and below 3720 MHz           | - 25            | 1000     |
| Below 3530 MHz and above 3720 MHz           | - 40            | 1000     |
| <b>Channel Spacing 20 MHz</b>               |                 |          |
| 0 – 1 MHz                                   | - 13            | 200      |
| 0 – 10 MHz                                  | - 13            | 1000     |
| 10 – 20 MHz                                 | - 25            | 1000     |
| Above 3530 MHz and below 3720 MHz           | - 25            | 1000     |
| Below 3530 MHz and above 3720 MHz           | - 40            | 1000     |
| <b>Channel Spacing 40 MHz</b>               |                 |          |
| 0 – 1 MHz                                   | - 13            | 400      |
| 0 – 10 MHz                                  | - 13            | 1000     |
| 10 – 20 MHz                                 | - 25            | 1000     |
| Above 3530 MHz and below 3720 MHz           | - 25            | 1000     |
| Below 3530 MHz and above 3720 MHz           | - 40            | 1000     |

\* - Limit at each antenna connector (amount of antennas N = 4)

### 7.4.2 Test procedure

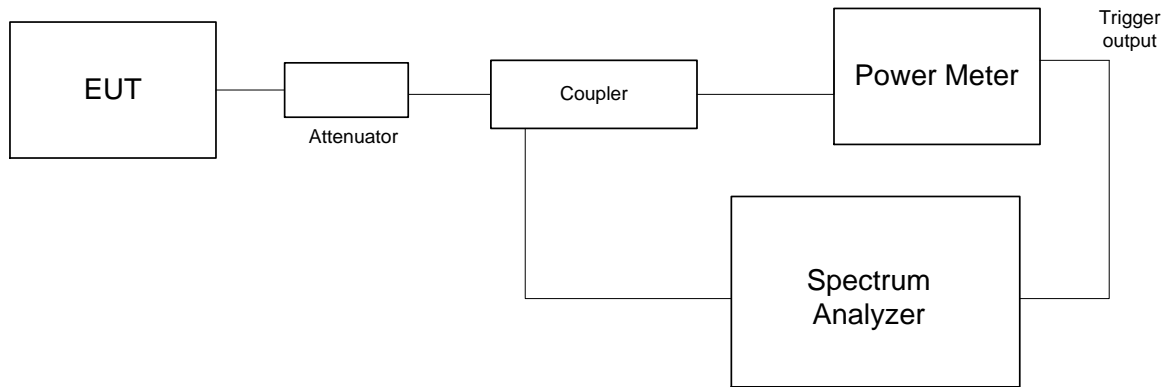
7.4.2.1 The EUT was set up as shown in Figure 7.4.1, energized and its proper operation was checked.

7.4.2.2 The Emission outside the fundamental was measured with spectrum analyzer as provided in Table 7.4.2, Table 7.4.3 and the the associated plots.



|  |                                |                               |                      |
|--|--------------------------------|-------------------------------|----------------------|
| <b>Test specification: Section 96.41(e), Emission mask</b> |                                |                               |                      |
| <b>Test procedure:</b> Section 96.41(e)(3)                 |                                |                               |                      |
| <b>Test mode:</b> Compliance                               |                                | <b>Verdict: PASS</b>          |                      |
| <b>Date(s):</b> 15-Feb-22                                  |                                |                               |                      |
| <b>Temperature:</b> 24.2 °C                                | <b>Relative Humidity:</b> 49 % | <b>Air Pressure:</b> 1010 hPa | <b>Power:</b> 48 VAC |
| <b>Remarks:</b>  |                                |                               |                      |

Figure 7.4.1 Emission outside the fundamental test setup





|  |                                |                               |                      |
|--|--------------------------------|-------------------------------|----------------------|
| <b>Test specification: Section 96.41(e), Emission mask</b> |                                |                               |                      |
| <b>Test procedure:</b> Section 96.41(e)(3)                 |                                |                               |                      |
| <b>Test mode:</b> Compliance                               |                                | <b>Verdict: PASS</b>          |                      |
| <b>Date(s):</b> 15-Feb-22                                  |                                |                               |                      |
| <b>Temperature:</b> 24.2 °C                                | <b>Relative Humidity:</b> 49 % | <b>Air Pressure:</b> 1010 hPa | <b>Power:</b> 48 VAC |
| <b>Remarks:</b>  |                                |                               |                      |

**Table 7.4.2 Emission outside the fundamental test results**

ASSIGNED FREQUENCY RANGE: 3550.0 –3700.0 MHz  
 DETECTOR USED: Average (gated)  
 VIDEO BANDWIDTH: ≥ Resolution bandwidth  
 NUMBER OF CHAINS: 2  
 ANTENNA PORT: Worst case  
 CHANNEL SPACING: 10MHz

| Frequency MHz                    | Band edge | SA reading over 1 chain, dBm | Total band edge*, dBm | RBW, kHz | Limit, dBm | Margin, dB | Verdict |
|----------------------------------|-----------|------------------------------|-----------------------|----------|------------|------------|---------|
| <b>QPSK</b>                      |           |                              |                       |          |            |            |         |
| <b>Low frequency 3555.0 MHz</b>  |           |                              |                       |          |            |            |         |
| 3530.00                          | Low       | -57.21                       | -54.21                | 1000     | -40        | -14.21     | Pass    |
| 3540.00                          | Low       | -46.61                       | -43.61                | 1000     | -25        | -18.61     |         |
| 3549.00                          | Low       | -26.69                       | -23.69                | 1000     | -13        | -10.69     |         |
| 3550.00                          | Low       | -35.80                       | -32.80                | 100      | -13        | -19.80     |         |
| 3560.00                          | High      | -34.23                       | -31.23                | 100      | -13        | -18.23     |         |
| 3561.00                          | High      | -28.84                       | -25.84                | 1000     | -13        | -12.84     |         |
| 3570.00                          | High      | -42.74                       | -39.74                | 1000     | -25        | -14.74     |         |
| 3720.00                          | High      | -57.03                       | -54.03                | 1000     | -40        | -14.03     |         |
| <b>Mid frequency 3625.0 MHz</b>  |           |                              |                       |          |            |            |         |
| 3530.00                          | Low       | -57.51                       | -54.51                | 1000     | -40        | -14.51     | Pass    |
| 3610.00                          | Low       | -45.29                       | -42.29                | 1000     | -25        | -17.29     |         |
| 3619.00                          | Low       | -26.08                       | -23.08                | 1000     | -13        | -10.08     |         |
| 3620.00                          | Low       | -33.61                       | -30.61                | 100      | -13        | -17.61     |         |
| 3630.00                          | High      | -33.96                       | -30.96                | 100      | -13        | -17.96     |         |
| 3631.00                          | High      | -27.54                       | -24.54                | 1000     | -13        | -11.54     |         |
| 3640.00                          | High      | -43.68                       | -40.68                | 1000     | -25        | -15.68     |         |
| 3720.00                          | High      | -57.26                       | -54.26                | 1000     | -40        | -14.26     |         |
| <b>High frequency 3695.0 MHz</b> |           |                              |                       |          |            |            |         |
| 3530.00                          | Low       | -57.48                       | -54.48                | 1000     | -40        | -14.48     | Pass    |
| 3680.00                          | Low       | -44.26                       | -41.26                | 1000     | -25        | -16.26     |         |
| 3689.00                          | Low       | -29.49                       | -26.49                | 1000     | -13        | -13.49     |         |
| 3690.00                          | Low       | -35.30                       | -32.30                | 100      | -13        | -19.30     |         |
| 3700.00                          | High      | -36.79                       | -33.79                | 100      | -13        | -20.79     |         |
| 3701.00                          | High      | -28.44                       | -25.44                | 1000     | -13        | -12.44     |         |
| 3710.00                          | High      | -45.67                       | -42.67                | 1000     | -25        | -17.67     |         |
| 3720.00                          | High      | -57.12                       | -54.12                | 1000     | -40        | -14.12     |         |



|  |                                |                               |                      |
|--|--------------------------------|-------------------------------|----------------------|
| <b>Test specification: Section 96.41(e), Emission mask</b> |                                |                               |                      |
| <b>Test procedure:</b> Section 96.41(e)(3)                 |                                |                               |                      |
| <b>Test mode:</b> Compliance                               |                                | <b>Verdict: PASS</b>          |                      |
| <b>Date(s):</b> 15-Feb-22                                  |                                |                               |                      |
| <b>Temperature:</b> 24.2 °C                                | <b>Relative Humidity:</b> 49 % | <b>Air Pressure:</b> 1010 hPa | <b>Power:</b> 48 VAC |
| <b>Remarks:</b>  |                                |                               |                      |

Table 7.4.3 Emission outside the fundamental test results (continue)

ASSIGNED FREQUENCY RANGE: 3550.0 –3700.0 MHz  
DETECTOR USED: Average (gated)  
VIDEO BANDWIDTH: ≥ Resolution bandwidth  
NUMBER OF CHAINS: 2  
ANTENNA PORT: Worst case  
CHANNEL SPACING: 10MHz

| Frequency MHz                    | Band edge | SA reading over 1 chain, dBm | Total band edge*, dBm | RBW, kHz | Limit, dBm | Margin, dB | Verdict |
|----------------------------------|-----------|------------------------------|-----------------------|----------|------------|------------|---------|
| <b>256 QAM</b>                   |           |                              |                       |          |            |            |         |
| <b>Low frequency 3555.0 MHz</b>  |           |                              |                       |          |            |            |         |
| 3530.00                          | Low       | -57.32                       | -54.32                | 1000     | -40        | -14.32     | Pass    |
| 3540.00                          | Low       | -47.60                       | -44.60                | 1000     | -25        | -19.60     |         |
| 3549.00                          | Low       | -26.69                       | -23.69                | 1000     | -13        | -10.69     |         |
| 3550.00                          | Low       | -36.61                       | -33.61                | 100      | -13        | -20.61     |         |
| 3560.00                          | High      | -35.00                       | -32.00                | 100      | -13        | -19.00     |         |
| 3561.00                          | High      | -29.17                       | -26.17                | 1000     | -13        | -13.17     |         |
| 3570.00                          | High      | -44.16                       | -41.16                | 1000     | -25        | -16.16     |         |
| 3720.00                          | High      | -57.46                       | -54.46                | 1000     | -40        | -14.46     |         |
| <b>Mid frequency 3625.0 MHz</b>  |           |                              |                       |          |            |            |         |
| 3530.00                          | Low       | -57.57                       | -54.57                | 1000     | -40        | -14.57     | Pass    |
| 3610.00                          | Low       | -46.15                       | -43.15                | 1000     | -25        | -18.15     |         |
| 3619.00                          | Low       | -26.67                       | -23.67                | 1000     | -13        | -10.67     |         |
| 3620.00                          | Low       | -36.92                       | -33.92                | 100      | -13        | -20.92     |         |
| 3630.00                          | High      | -35.25                       | -32.25                | 100      | -13        | -19.25     |         |
| 3631.00                          | High      | -27.79                       | -24.79                | 1000     | -13        | -11.79     |         |
| 3640.00                          | High      | -44.85                       | -41.85                | 1000     | -25        | -16.85     |         |
| 3720.00                          | High      | -57.34                       | -54.34                | 1000     | -40        | -14.34     |         |
| <b>High frequency 3695.0 MHz</b> |           |                              |                       |          |            |            |         |
| 3530.00                          | Low       | -57.66                       | -54.66                | 1000     | -40        | -14.66     | Pass    |
| 3680.00                          | Low       | -45.17                       | -42.17                | 1000     | -25        | -17.17     |         |
| 3689.00                          | Low       | -29.69                       | -26.69                | 1000     | -13        | -13.69     |         |
| 3690.00                          | Low       | -35.45                       | -32.45                | 100      | -13        | -19.45     |         |
| 3700.00                          | High      | -36.42                       | -33.42                | 100      | -13        | -20.42     |         |
| 3701.00                          | High      | -28.71                       | -25.71                | 1000     | -13        | -12.71     |         |
| 3710.00                          | High      | -46.31                       | -43.31                | 1000     | -25        | -18.31     |         |
| 3720.00                          | High      | -56.98                       | -53.98                | 1000     | -40        | -13.98     |         |

\* - SA Reading over 1 chain = Max SA reading (Chains #1&amp;2)

\*\* - Total band edge = Maximum SA Reading over 1 chain + 10\*log(N) = SA reading +3 dB

\*\*\* - Margin = Total band edge – Specification limit



|  |                                |                               |                      |
|--|--------------------------------|-------------------------------|----------------------|
| <b>Test specification: Section 96.41(e), Emission mask</b> |                                |                               |                      |
| <b>Test procedure:</b> Section 96.41(e)(3)                 |                                |                               |                      |
| <b>Test mode:</b> Compliance                               |                                | <b>Verdict: PASS</b>          |                      |
| <b>Date(s):</b> 15-Feb-22                                  |                                |                               |                      |
| <b>Temperature:</b> 24.2 °C                                | <b>Relative Humidity:</b> 49 % | <b>Air Pressure:</b> 1010 hPa | <b>Power:</b> 48 VAC |
| <b>Remarks:</b>  |                                |                               |                      |

**Table 7.4.4 Emission outside the fundamental test results**

ASSIGNED FREQUENCY RANGE: 3550.0 –3700.0 MHz  
 DETECTOR USED: Average (gated)  
 VIDEO BANDWIDTH: ≥ Resolution bandwidth  
 NUMBER OF CHAINS: 2  
 ANTENNA PORT: Worst case  
 CHANNEL SPACING: 20MHz

| Frequency MHz                    | Band edge | SA reading over 1 chain, dBm | Total band edge*, dBm | RBW, kHz | Limit, dBm | Margin, dB | Verdict |
|----------------------------------|-----------|------------------------------|-----------------------|----------|------------|------------|---------|
| <b>QPSK</b>                      |           |                              |                       |          |            |            |         |
| <b>Low frequency 3560.0 MHz</b>  |           |                              |                       |          |            |            |         |
| 3530.00                          | Low       | -51.60                       | -48.60                | 1000     | -40        | -8.60      | Pass    |
| 3540.00                          | Low       | -40.36                       | -37.36                | 1000     | -25        | -12.36     |         |
| 3549.00                          | Low       | -30.50                       | -27.50                | 1000     | -13        | -14.50     |         |
| 3550.00                          | Low       | -33.24                       | -30.24                | 200      | -13        | -17.24     |         |
| 3570.00                          | High      | -32.71                       | -29.71                | 200      | -13        | -16.71     |         |
| 3571.00                          | High      | -30.59                       | -27.59                | 1000     | -13        | -14.59     |         |
| 3580.00                          | High      | -41.46                       | -38.46                | 1000     | -25        | -13.46     |         |
| 3720.00                          | High      | -51.51                       | -48.51                | 1000     | -40        | -8.51      |         |
| <b>Mid frequency 3625.0 MHz</b>  |           |                              |                       |          |            |            |         |
| 3530.00                          | Low       | -51.63                       | -48.63                | 1000     | -40        | -8.63      | Pass    |
| 3605.00                          | Low       | -39.34                       | -36.34                | 1000     | -25        | -11.34     |         |
| 3614.00                          | Low       | -31.20                       | -28.20                | 1000     | -13        | -15.20     |         |
| 3615.00                          | Low       | -32.72                       | -29.72                | 200      | -13        | -16.72     |         |
| 3635.00                          | High      | -32.74                       | -29.74                | 200      | -13        | -16.74     |         |
| 3636.00                          | High      | -32.33                       | -29.33                | 1000     | -13        | -16.33     |         |
| 3645.00                          | High      | -40.07                       | -37.07                | 1000     | -25        | -12.07     |         |
| 3720.00                          | High      | -51.58                       | -48.58                | 1000     | -40        | -8.58      |         |
| <b>High frequency 3690.0 MHz</b> |           |                              |                       |          |            |            |         |
| 3530.00                          | Low       | -51.77                       | -48.77                | 1000     | -40        | -8.77      | Pass    |
| 3670.00                          | Low       | -38.89                       | -35.89                | 1000     | -25        | -10.89     |         |
| 3679.00                          | Low       | -32.82                       | -29.82                | 1000     | -13        | -16.82     |         |
| 3680.00                          | Low       | -31.68                       | -28.68                | 200      | -13        | -15.68     |         |
| 3700.00                          | High      | -32.44                       | -29.44                | 200      | -13        | -16.44     |         |
| 3701.00                          | High      | -33.81                       | -30.81                | 1000     | -13        | -17.81     |         |
| 3710.00                          | High      | -41.84                       | -38.84                | 1000     | -25        | -13.84     |         |
| 3720.00                          | High      | -50.84                       | -47.84                | 1000     | -40        | -7.84      |         |



|  |                                |                               |                      |
|--|--------------------------------|-------------------------------|----------------------|
| <b>Test specification: Section 96.41(e), Emission mask</b> |                                |                               |                      |
| <b>Test procedure:</b> Section 96.41(e)(3)                 |                                |                               |                      |
| <b>Test mode:</b> Compliance                               |                                | <b>Verdict: PASS</b>          |                      |
| <b>Date(s):</b> 15-Feb-22                                  |                                |                               |                      |
| <b>Temperature:</b> 24.2 °C                                | <b>Relative Humidity:</b> 49 % | <b>Air Pressure:</b> 1010 hPa | <b>Power:</b> 48 VAC |
| <b>Remarks:</b>  |                                |                               |                      |

**Table 7.4.5 Emission outside the fundamental test results (continue)**

ASSIGNED FREQUENCY RANGE: 3550.0 –3700.0 MHz  
 DETECTOR USED: Average (gated)  
 VIDEO BANDWIDTH: ≥ Resolution bandwidth  
 NUMBER OF CHAINS: 2  
 ANTENNA PORT: Worst case  
 CHANNEL SPACING: 20MHz

| Frequency MHz                    | Band edge | SA reading over 1 chain, dBm | Total band edge*, dBm | RBW, kHz | Limit, dBm | Margin, dB | Verdict |
|----------------------------------|-----------|------------------------------|-----------------------|----------|------------|------------|---------|
| <b>256 QAM</b>                   |           |                              |                       |          |            |            |         |
| <b>Low frequency 3560.0 MHz</b>  |           |                              |                       |          |            |            |         |
| 3530.00                          | Low       | -51.32                       | -48.32                | 1000     | -40        | -8.32      | Pass    |
| 3540.00                          | Low       | -41.06                       | -38.06                | 1000     | -25        | -13.06     |         |
| 3549.00                          | Low       | -30.98                       | -27.98                | 1000     | -13        | -14.98     |         |
| 3550.00                          | Low       | -33.78                       | -30.78                | 200      | -13        | -17.78     |         |
| 3570.00                          | High      | -32.62                       | -29.62                | 200      | -13        | -16.62     |         |
| 3571.00                          | High      | -30.94                       | -27.94                | 1000     | -13        | -14.94     |         |
| 3580.00                          | High      | -41.10                       | -38.10                | 1000     | -25        | -13.10     |         |
| 3720.00                          | High      | -51.35                       | -48.35                | 1000     | -40        | -8.35      |         |
| <b>Mid frequency 3625.0 MHz</b>  |           |                              |                       |          |            |            |         |
| 3530.00                          | Low       | -51.79                       | -48.79                | 1000     | -40        | -8.79      | Pass    |
| 3605.00                          | Low       | -39.42                       | -36.42                | 1000     | -25        | -11.42     |         |
| 3614.00                          | Low       | -31.06                       | -28.06                | 1000     | -13        | -15.06     |         |
| 3615.00                          | Low       | -33.18                       | -30.18                | 200      | -13        | -17.18     |         |
| 3635.00                          | High      | -34.30                       | -31.30                | 200      | -13        | -18.30     |         |
| 3636.00                          | High      | -32.48                       | -29.48                | 1000     | -13        | -16.48     |         |
| 3645.00                          | High      | -40.93                       | -37.93                | 1000     | -25        | -12.93     |         |
| 3720.00                          | High      | -51.66                       | -48.66                | 1000     | -40        | -8.66      |         |
| <b>High frequency 3690.0 MHz</b> |           |                              |                       |          |            |            |         |
| 3530.00                          | Low       | -51.81                       | -48.81                | 1000     | -40        | -8.81      | Pass    |
| 3670.00                          | Low       | -37.01                       | -34.01                | 1000     | -25        | -9.01      |         |
| 3679.00                          | Low       | -31.69                       | -28.69                | 1000     | -13        | -15.69     |         |
| 3680.00                          | Low       | -33.22                       | -30.22                | 200      | -13        | -17.22     |         |
| 3700.00                          | High      | -32.93                       | -29.93                | 200      | -13        | -16.93     |         |
| 3701.00                          | High      | -33.36                       | -30.36                | 1000     | -13        | -17.36     |         |
| 3710.00                          | High      | -41.49                       | -38.49                | 1000     | -25        | -13.49     |         |
| 3720.00                          | High      | -51.18                       | -48.18                | 1000     | -40        | -8.18      |         |

\* - SA Reading over 1 chain = Max SA reading (Chains #1&2)

\*\* - Total band edge = Maximum SA Reading over 1 chain + 10\*log(N) = SA reading +3 dB

\*\*\* - Margin = Total band edge – Specification limit





|  |                                |                               |                      |
|--|--------------------------------|-------------------------------|----------------------|
| <b>Test specification: Section 96.41(e), Emission mask</b> |                                |                               |                      |
| <b>Test procedure:</b> Section 96.41(e)(3)                 |                                |                               |                      |
| <b>Test mode:</b> Compliance                               |                                | <b>Verdict: PASS</b>          |                      |
| <b>Date(s):</b> 15-Feb-22                                  |                                |                               |                      |
| <b>Temperature:</b> 24.2 °C                                | <b>Relative Humidity:</b> 49 % | <b>Air Pressure:</b> 1010 hPa | <b>Power:</b> 48 VAC |
| <b>Remarks:</b>  |                                |                               |                      |

**Table 7.4.6 Emission outside the fundamental test results**

ASSIGNED FREQUENCY RANGE: 3550.0 –3700.0 MHz  
 DETECTOR USED: Average (gated)  
 VIDEO BANDWIDTH: ≥ Resolution bandwidth  
 NUMBER OF CHAINS: 2  
 ANTENNA PORT: Worst case  
 CHANNEL SPACING: 40MHz

| Frequency MHz                    | Band edge | SA reading over 1 chain, dBm | Total band edge*, dBm | RBW, kHz | Limit, dBm | Margin, dB | Verdict |
|----------------------------------|-----------|------------------------------|-----------------------|----------|------------|------------|---------|
| <b>QPSK</b>                      |           |                              |                       |          |            |            |         |
| <b>Low frequency 3570.0 MHz</b>  |           |                              |                       |          |            |            |         |
| 3530.00                          | Low       | -48.54                       | -45.54                | 1000     | -40        | -5.54      | Pass    |
| 3540.00                          | Low       | -38.53                       | -35.53                | 1000     | -25        | -10.53     |         |
| 3549.00                          | Low       | -28.16                       | -25.16                | 1000     | -13        | -12.16     |         |
| 3550.00                          | Low       | -25.99                       | -22.99                | 500      | -13        | -9.99      |         |
| 3590.00                          | High      | -27.17                       | -24.17                | 500      | -13        | -11.17     |         |
| 3591.00                          | High      | -26.79                       | -23.79                | 1000     | -13        | -10.79     |         |
| 3600.00                          | High      | -28.95                       | -25.95                | 1000     | -25        | -0.95      |         |
| 3720.00                          | High      | -51.41                       | -48.41                | 1000     | -40        | -8.41      |         |
| <b>Mid frequency 3625.0 MHz</b>  |           |                              |                       |          |            |            |         |
| 3530.00                          | Low       | -50.51                       | -47.51                | 1000     | -40        | -7.51      | Pass    |
| 3595.00                          | Low       | -32.88                       | -29.88                | 1000     | -25        | -4.88      |         |
| 3604.00                          | Low       | -29.85                       | -26.85                | 1000     | -13        | -13.85     |         |
| 3605.00                          | Low       | -24.93                       | -21.93                | 500      | -13        | -8.93      |         |
| 3645.00                          | High      | -29.33                       | -26.33                | 500      | -13        | -13.33     |         |
| 3646.00                          | High      | -32.53                       | -29.53                | 1000     | -13        | -16.53     |         |
| 3655.00                          | High      | -33.94                       | -30.94                | 1000     | -25        | -5.94      |         |
| 3720.00                          | High      | -50.58                       | -47.58                | 1000     | -40        | -7.58      |         |
| <b>High frequency 3680.0 MHz</b> |           |                              |                       |          |            |            |         |
| 3530.00                          | Low       | -51.77                       | -48.77                | 1000     | -40        | -8.77      | Pass    |
| 3650.00                          | Low       | -38.02                       | -35.02                | 1000     | -25        | -10.02     |         |
| 3659.00                          | Low       | -32.98                       | -29.98                | 1000     | -13        | -16.98     |         |
| 3660.00                          | Low       | -27.45                       | -24.45                | 500      | -13        | -11.45     |         |
| 3700.00                          | High      | -29.00                       | -26.00                | 500      | -13        | -13.00     |         |
| 3701.00                          | High      | -33.81                       | -30.81                | 1000     | -13        | -17.81     |         |
| 3710.00                          | High      | -38.90                       | -35.9                 | 1000     | -25        | -10.9      |         |
| 3720.00                          | High      | -49.82                       | -46.82                | 1000     | -40        | -6.82      |         |



|  |                                |                               |                      |
|--|--------------------------------|-------------------------------|----------------------|
| <b>Test specification: Section 96.41(e), Emission mask</b> |                                |                               |                      |
| <b>Test procedure:</b> Section 96.41(e)(3)                 |                                |                               |                      |
| <b>Test mode:</b> Compliance                               |                                | <b>Verdict: PASS</b>          |                      |
| <b>Date(s):</b> 15-Feb-22                                  |                                |                               |                      |
| <b>Temperature:</b> 24.2 °C                                | <b>Relative Humidity:</b> 49 % | <b>Air Pressure:</b> 1010 hPa | <b>Power:</b> 48 VAC |
| <b>Remarks:</b>  |                                |                               |                      |

**Table 7.4.7 Emission outside the fundamental test results (continue)**

ASSIGNED FREQUENCY RANGE: 3550.0 –3700.0 MHz  
 DETECTOR USED: Average (gated)  
 VIDEO BANDWIDTH: ≥ Resolution bandwidth  
 NUMBER OF CHAINS: 2  
 ANTENNA PORT: Worst case  
 CHANNEL SPACING: 40MHz

| Frequency MHz                    | Band edge | SA reading over 1 chain, dBm | Total band edge*, dBm | RBW, kHz | Limit, dBm | Margin, dB | Verdict |
|----------------------------------|-----------|------------------------------|-----------------------|----------|------------|------------|---------|
| <b>256 QAM</b>                   |           |                              |                       |          |            |            |         |
| <b>Low frequency 3570.0 MHz</b>  |           |                              |                       |          |            |            |         |
| 3530.00                          | Low       | -48.87                       | -45.87                | 1000     | -40        | -5.87      | Pass    |
| 3540.00                          | Low       | -31.61                       | -28.61                | 1000     | -25        | -3.61      |         |
| 3549.00                          | Low       | -28.65                       | -25.65                | 1000     | -13        | -12.65     |         |
| 3550.00                          | Low       | -26.70                       | -23.70                | 500      | -13        | -10.70     |         |
| 3590.00                          | High      | -26.18                       | -23.18                | 500      | -13        | -10.18     |         |
| 3591.00                          | High      | -28.22                       | -25.22                | 1000     | -13        | -12.22     |         |
| 3600.00                          | High      | -28.82                       | -25.82                | 1000     | -25        | -0.82      |         |
| 3720.00                          | High      | -51.29                       | -48.29                | 1000     | -40        | -8.29      |         |
| <b>Mid frequency 3625.0 MHz</b>  |           |                              |                       |          |            |            |         |
| 3530.00                          | Low       | -50.24                       | -47.24                | 1000     | -40        | -7.24      | Pass    |
| 3595.00                          | Low       | -33.61                       | -30.61                | 1000     | -25        | -5.61      |         |
| 3604.00                          | Low       | -30.18                       | -27.18                | 1000     | -13        | -14.18     |         |
| 3605.00                          | Low       | -25.31                       | -22.31                | 500      | -13        | -9.31      |         |
| 3645.00                          | High      | -27.38                       | -24.38                | 500      | -13        | -11.38     |         |
| 3646.00                          | High      | -31.93                       | -28.93                | 1000     | -13        | -15.93     |         |
| 3655.00                          | High      | -34.20                       | -31.20                | 1000     | -25        | -6.20      |         |
| 3720.00                          | High      | -50.62                       | -47.62                | 1000     | -40        | -7.62      |         |
| <b>High frequency 3680.0 MHz</b> |           |                              |                       |          |            |            |         |
| 3530.00                          | Low       | -51.79                       | -48.79                | 1000     | -40        | -8.79      | Pass    |
| 3650.00                          | Low       | -38.77                       | -35.77                | 1000     | -25        | -10.77     |         |
| 3659.00                          | Low       | -32.85                       | -29.85                | 1000     | -13        | -16.85     |         |
| 3660.00                          | Low       | -27.99                       | -24.99                | 500      | -13        | -11.99     |         |
| 3700.00                          | High      | -28.07                       | -25.07                | 500      | -13        | -12.07     |         |
| 3701.00                          | High      | -33.23                       | -30.23                | 1000     | -13        | -17.23     |         |
| 3710.00                          | High      | -39.35                       | -36.35                | 1000     | -25        | -11.35     |         |
| 3720.00                          | High      | -50.00                       | -47.00                | 1000     | -40        | -7.00      |         |

\* - SA Reading over 1 chain = Max SA reading (Chains #1&2)

\*\* - Total band edge = Maximum SA Reading over 1 chain + 10\*log(N) = SA reading +3 dB

\*\*\* - Margin = Total band edge – Specification limit

**Reference numbers of test equipment used**

|         |         |         |         |         |         |         |         |
|---------|---------|---------|---------|---------|---------|---------|---------|
| HL 3301 | HL 3302 | HL 4355 | HL 4366 | HL 3818 | HL 4366 | HL 3903 | HL 3901 |
|---------|---------|---------|---------|---------|---------|---------|---------|

Full description is given in Appendix A.



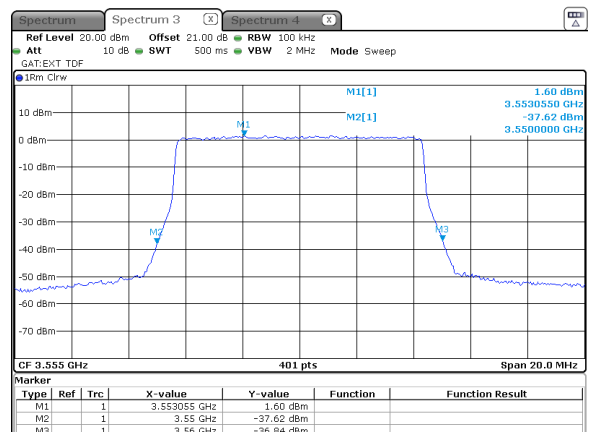
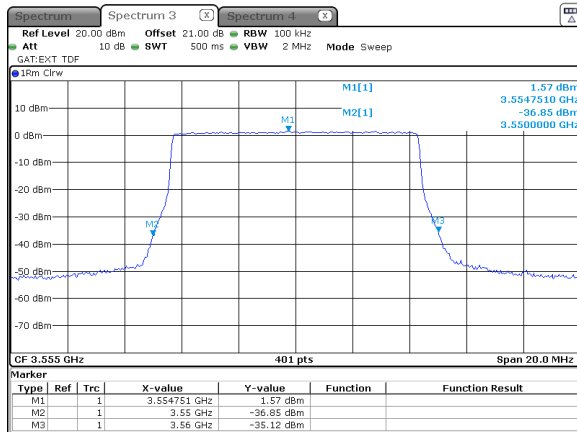
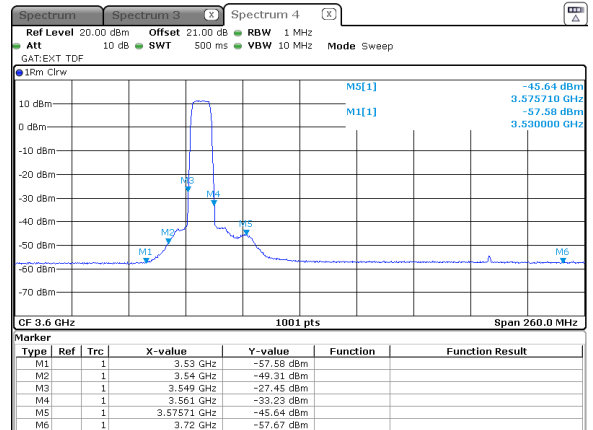
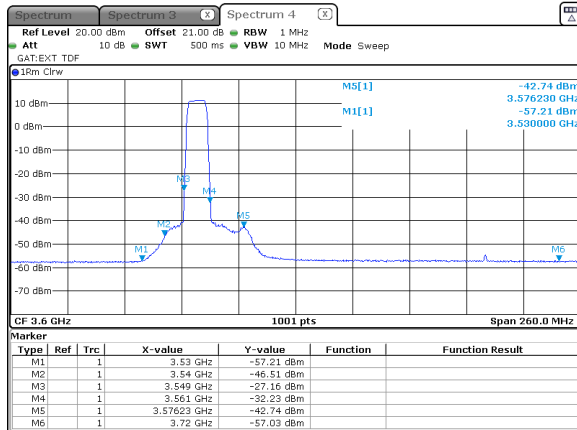
HERMON LABORATORIES

|  |                                |                               |                      |
|--|--------------------------------|-------------------------------|----------------------|
| <b>Test specification:</b> Section 96.41(e), Emission mask |                                |                               |                      |
| <b>Test procedure:</b> Section 96.41(e)(3)                 |                                |                               |                      |
| <b>Test mode:</b> Compliance                               |                                | <b>Verdict:</b> PASS          |                      |
| <b>Date(s):</b> 15-Feb-22                                  |                                |                               |                      |
| <b>Temperature:</b> 24.2 °C                                | <b>Relative Humidity:</b> 49 % | <b>Air Pressure:</b> 1010 hPa | <b>Power:</b> 48 VAC |
| <b>Remarks:</b>  |                                |                               |                      |

Plot 7.4.1 Emission outside the fundamental test results at low carrier frequency

CHANNEL SPACING:  
ANTENNA CHAIN:  
Modulation: QPSK

10 MHz  
1  
Modulation: 256QAM





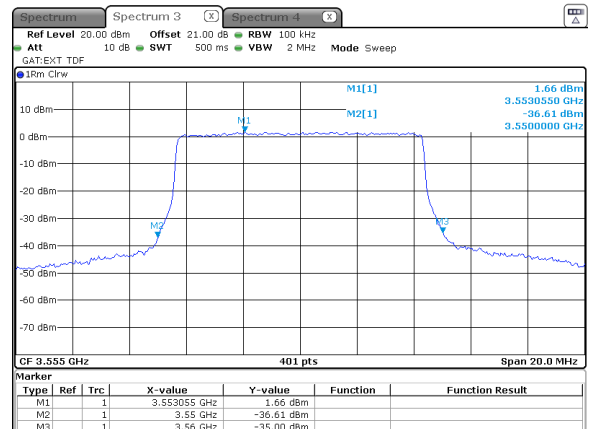
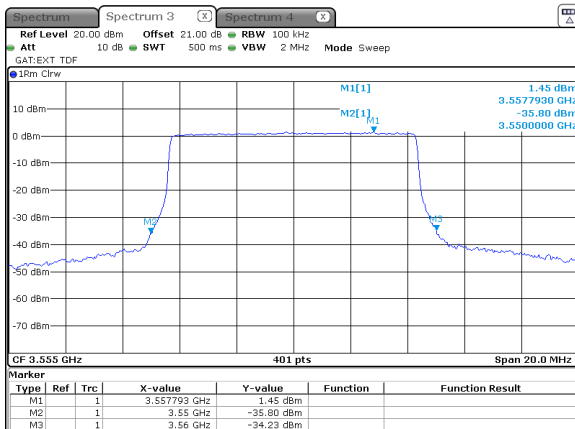
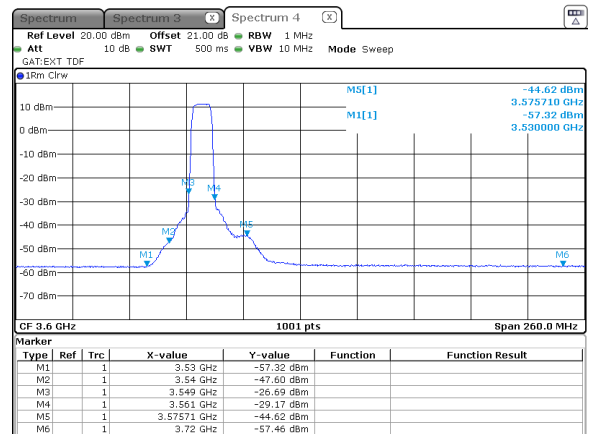
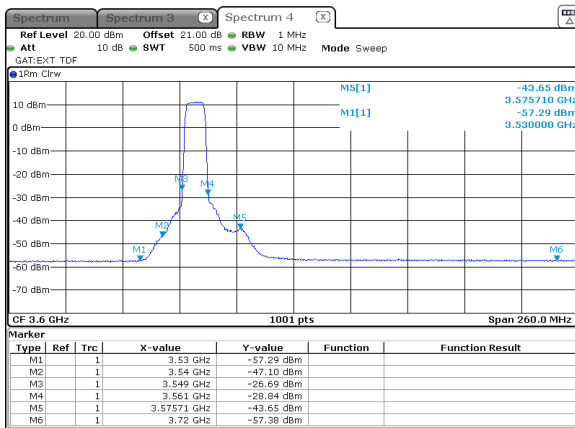
HERMON LABORATORIES

|  |                                |                               |                      |
|--|--------------------------------|-------------------------------|----------------------|
| <b>Test specification:</b> Section 96.41(e), Emission mask |                                |                               |                      |
| <b>Test procedure:</b> Section 96.41(e)(3)                 |                                |                               |                      |
| <b>Test mode:</b> Compliance                               | <b>Verdict: PASS</b>           |                               |                      |
| <b>Date(s):</b> 15-Feb-22                                  |                                |                               |                      |
| <b>Temperature:</b> 24.2 °C                                | <b>Relative Humidity:</b> 49 % | <b>Air Pressure:</b> 1010 hPa | <b>Power:</b> 48 VAC |
| <b>Remarks:</b>  |                                |                               |                      |

Plot 7.4.2 Emission outside the fundamental test results at low carrier frequency

CHANNEL SPACING:  
ANTENNA CHAIN:  
Modulation: QPSK

10 MHz  
2  
Modulation: 256QAM





HERMON LABORATORIES

|  |                                |                               |                      |
|--|--------------------------------|-------------------------------|----------------------|
| <b>Test specification:</b> Section 96.41(e), Emission mask |                                |                               |                      |
| <b>Test procedure:</b> Section 96.41(e)(3)                 |                                |                               |                      |
| <b>Test mode:</b> Compliance                               |                                | <b>Verdict:</b> PASS          |                      |
| <b>Date(s):</b> 15-Feb-22                                  |                                |                               |                      |
| <b>Temperature:</b> 24.2 °C                                | <b>Relative Humidity:</b> 49 % | <b>Air Pressure:</b> 1010 hPa | <b>Power:</b> 48 VAC |
| <b>Remarks:</b>  |                                |                               |                      |

Plot 7.4.3 Emission outside the fundamental test results at mid carrier frequency

CHANNEL SPACING:  
ANTENNA CHAIN:  
Modulation: QPSK

10 MHz  
1  
Modulation: 256QAM

