

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                       |                      |                             |                          |               |                              |                                                                                                                            |                  |                                     |                     |          |                              |             |                            |                                                            |                       |                   |                            |                                                                         |                       |                          |                          |                                                                  |                          |          |                           |          |                                |                  |                                                                              |             |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------------------------|--------------------------|---------------|------------------------------|----------------------------------------------------------------------------------------------------------------------------|------------------|-------------------------------------|---------------------|----------|------------------------------|-------------|----------------------------|------------------------------------------------------------|-----------------------|-------------------|----------------------------|-------------------------------------------------------------------------|-----------------------|--------------------------|--------------------------|------------------------------------------------------------------|--------------------------|----------|---------------------------|----------|--------------------------------|------------------|------------------------------------------------------------------------------|-------------|
|  <b>MOTOROLA SOLUTIONS</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |    <br>CERTIFICATE 2518.08<br>MS ISO/IEC 17025<br>TESTING<br>SAMM NO. 0825 |                      |                             |                          |               |                              |                                                                                                                            |                  |                                     |                     |          |                              |             |                            |                                                            |                       |                   |                            |                                                                         |                       |                          |                          |                                                                  |                          |          |                           |          |                                |                  |                                                                              |             |
| <b>MOTOROLA PENANG ADV. COMM. LABORATORY</b><br><b>Motorola Solutions Malaysia Sdn. Bhd.</b><br><b>Plot 2A Medan Bayan Lepas,</b><br><b>Mukim 12, S.W.D. 11900 Bayan Lepas,</b><br><b>Penang, Malaysia.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>FCC / ISED TEST REPORT</b><br><b>Report Revision : Rev.A</b>                                                                                                                                                                                                                                                                                                                                                       |                      |                             |                          |               |                              |                                                                                                                            |                  |                                     |                     |          |                              |             |                            |                                                            |                       |                   |                            |                                                                         |                       |                          |                          |                                                                  |                          |          |                           |          |                                |                  |                                                                              |             |
| <table><tr><td><b>Date/s Tested</b></td><td>: 18-Sep-2020 - 11-Dec-2020</td></tr><tr><td><b>Report Issue Date</b></td><td>: 15-Dec-2020</td></tr><tr><td><b>Manufacturer/Location</b></td><td>: Motorola Solutions Malaysia Sdn Bhd<br/>Plot 2A, Medan Bayan Lepas, Mukim 12 SWD,<br/>11900, Bayan Lepas, Penang, Malaysia</td></tr><tr><td><b>Requestor</b></td><td>: MOHAMAD SHAFIQ HANIF BIN AB WAHID</td></tr><tr><td><b>Product Type</b></td><td>: Mobile</td></tr><tr><td><b>Product Version (PMN)</b></td><td>: XPR 5550e</td></tr><tr><td><b>Model Number (HVIN)</b></td><td>: AAM28QPN9RA1AN (PMUE3649C)<br/>(IC MODEL: PMUE3649CBMNAA)</td></tr><tr><td><b>Frequency Band</b></td><td>: 2.412-2.462 GHz</td></tr><tr><td><b>Max RF Output Power</b></td><td>: 802.11b - 17.8 mWatts<br/>802.11g - 13.2mWatts<br/>802.11n - 8.3 mWatts</td></tr><tr><td><b>Applicant Name</b></td><td>: Motorola Solutions Inc</td></tr><tr><td><b>Applicant Address</b></td><td>: 8000 West Sunrise Boulevard,<br/>Fort Lauderdale, Florida 33322</td></tr><tr><td><b>FCC Registrations</b></td><td>: 461337</td></tr><tr><td><b>ISED Registrations</b></td><td>: MY0001</td></tr><tr><td><b>Firmware Version (FVIN)</b></td><td>: R02.20.02.0002</td></tr></table> <p><b>The equipment was tested accordance to the requirement listed below:</b></p> <table><tr><td><b>(2.4GHz Wifi)</b><br/><b>47CFR Part 15C</b><br/><b>ISED RSS 247 Issue 2</b></td><td><b>PASS</b></td></tr></table> |                                                                                                                                                                                                                                                                                                                                                                                                                       | <b>Date/s Tested</b> | : 18-Sep-2020 - 11-Dec-2020 | <b>Report Issue Date</b> | : 15-Dec-2020 | <b>Manufacturer/Location</b> | : Motorola Solutions Malaysia Sdn Bhd<br>Plot 2A, Medan Bayan Lepas, Mukim 12 SWD,<br>11900, Bayan Lepas, Penang, Malaysia | <b>Requestor</b> | : MOHAMAD SHAFIQ HANIF BIN AB WAHID | <b>Product Type</b> | : Mobile | <b>Product Version (PMN)</b> | : XPR 5550e | <b>Model Number (HVIN)</b> | : AAM28QPN9RA1AN (PMUE3649C)<br>(IC MODEL: PMUE3649CBMNAA) | <b>Frequency Band</b> | : 2.412-2.462 GHz | <b>Max RF Output Power</b> | : 802.11b - 17.8 mWatts<br>802.11g - 13.2mWatts<br>802.11n - 8.3 mWatts | <b>Applicant Name</b> | : Motorola Solutions Inc | <b>Applicant Address</b> | : 8000 West Sunrise Boulevard,<br>Fort Lauderdale, Florida 33322 | <b>FCC Registrations</b> | : 461337 | <b>ISED Registrations</b> | : MY0001 | <b>Firmware Version (FVIN)</b> | : R02.20.02.0002 | <b>(2.4GHz Wifi)</b><br><b>47CFR Part 15C</b><br><b>ISED RSS 247 Issue 2</b> | <b>PASS</b> |
| <b>Date/s Tested</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | : 18-Sep-2020 - 11-Dec-2020                                                                                                                                                                                                                                                                                                                                                                                           |                      |                             |                          |               |                              |                                                                                                                            |                  |                                     |                     |          |                              |             |                            |                                                            |                       |                   |                            |                                                                         |                       |                          |                          |                                                                  |                          |          |                           |          |                                |                  |                                                                              |             |
| <b>Report Issue Date</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | : 15-Dec-2020                                                                                                                                                                                                                                                                                                                                                                                                         |                      |                             |                          |               |                              |                                                                                                                            |                  |                                     |                     |          |                              |             |                            |                                                            |                       |                   |                            |                                                                         |                       |                          |                          |                                                                  |                          |          |                           |          |                                |                  |                                                                              |             |
| <b>Manufacturer/Location</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | : Motorola Solutions Malaysia Sdn Bhd<br>Plot 2A, Medan Bayan Lepas, Mukim 12 SWD,<br>11900, Bayan Lepas, Penang, Malaysia                                                                                                                                                                                                                                                                                            |                      |                             |                          |               |                              |                                                                                                                            |                  |                                     |                     |          |                              |             |                            |                                                            |                       |                   |                            |                                                                         |                       |                          |                          |                                                                  |                          |          |                           |          |                                |                  |                                                                              |             |
| <b>Requestor</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | : MOHAMAD SHAFIQ HANIF BIN AB WAHID                                                                                                                                                                                                                                                                                                                                                                                   |                      |                             |                          |               |                              |                                                                                                                            |                  |                                     |                     |          |                              |             |                            |                                                            |                       |                   |                            |                                                                         |                       |                          |                          |                                                                  |                          |          |                           |          |                                |                  |                                                                              |             |
| <b>Product Type</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | : Mobile                                                                                                                                                                                                                                                                                                                                                                                                              |                      |                             |                          |               |                              |                                                                                                                            |                  |                                     |                     |          |                              |             |                            |                                                            |                       |                   |                            |                                                                         |                       |                          |                          |                                                                  |                          |          |                           |          |                                |                  |                                                                              |             |
| <b>Product Version (PMN)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | : XPR 5550e                                                                                                                                                                                                                                                                                                                                                                                                           |                      |                             |                          |               |                              |                                                                                                                            |                  |                                     |                     |          |                              |             |                            |                                                            |                       |                   |                            |                                                                         |                       |                          |                          |                                                                  |                          |          |                           |          |                                |                  |                                                                              |             |
| <b>Model Number (HVIN)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | : AAM28QPN9RA1AN (PMUE3649C)<br>(IC MODEL: PMUE3649CBMNAA)                                                                                                                                                                                                                                                                                                                                                            |                      |                             |                          |               |                              |                                                                                                                            |                  |                                     |                     |          |                              |             |                            |                                                            |                       |                   |                            |                                                                         |                       |                          |                          |                                                                  |                          |          |                           |          |                                |                  |                                                                              |             |
| <b>Frequency Band</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | : 2.412-2.462 GHz                                                                                                                                                                                                                                                                                                                                                                                                     |                      |                             |                          |               |                              |                                                                                                                            |                  |                                     |                     |          |                              |             |                            |                                                            |                       |                   |                            |                                                                         |                       |                          |                          |                                                                  |                          |          |                           |          |                                |                  |                                                                              |             |
| <b>Max RF Output Power</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | : 802.11b - 17.8 mWatts<br>802.11g - 13.2mWatts<br>802.11n - 8.3 mWatts                                                                                                                                                                                                                                                                                                                                               |                      |                             |                          |               |                              |                                                                                                                            |                  |                                     |                     |          |                              |             |                            |                                                            |                       |                   |                            |                                                                         |                       |                          |                          |                                                                  |                          |          |                           |          |                                |                  |                                                                              |             |
| <b>Applicant Name</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | : Motorola Solutions Inc                                                                                                                                                                                                                                                                                                                                                                                              |                      |                             |                          |               |                              |                                                                                                                            |                  |                                     |                     |          |                              |             |                            |                                                            |                       |                   |                            |                                                                         |                       |                          |                          |                                                                  |                          |          |                           |          |                                |                  |                                                                              |             |
| <b>Applicant Address</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | : 8000 West Sunrise Boulevard,<br>Fort Lauderdale, Florida 33322                                                                                                                                                                                                                                                                                                                                                      |                      |                             |                          |               |                              |                                                                                                                            |                  |                                     |                     |          |                              |             |                            |                                                            |                       |                   |                            |                                                                         |                       |                          |                          |                                                                  |                          |          |                           |          |                                |                  |                                                                              |             |
| <b>FCC Registrations</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | : 461337                                                                                                                                                                                                                                                                                                                                                                                                              |                      |                             |                          |               |                              |                                                                                                                            |                  |                                     |                     |          |                              |             |                            |                                                            |                       |                   |                            |                                                                         |                       |                          |                          |                                                                  |                          |          |                           |          |                                |                  |                                                                              |             |
| <b>ISED Registrations</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | : MY0001                                                                                                                                                                                                                                                                                                                                                                                                              |                      |                             |                          |               |                              |                                                                                                                            |                  |                                     |                     |          |                              |             |                            |                                                            |                       |                   |                            |                                                                         |                       |                          |                          |                                                                  |                          |          |                           |          |                                |                  |                                                                              |             |
| <b>Firmware Version (FVIN)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | : R02.20.02.0002                                                                                                                                                                                                                                                                                                                                                                                                      |                      |                             |                          |               |                              |                                                                                                                            |                  |                                     |                     |          |                              |             |                            |                                                            |                       |                   |                            |                                                                         |                       |                          |                          |                                                                  |                          |          |                           |          |                                |                  |                                                                              |             |
| <b>(2.4GHz Wifi)</b><br><b>47CFR Part 15C</b><br><b>ISED RSS 247 Issue 2</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <b>PASS</b>                                                                                                                                                                                                                                                                                                                                                                                                           |                      |                             |                          |               |                              |                                                                                                                            |                  |                                     |                     |          |                              |             |                            |                                                            |                       |                   |                            |                                                                         |                       |                          |                          |                                                                  |                          |          |                           |          |                                |                  |                                                                              |             |
| <p>This report shall not be reproduced without written approval from an officially designated representative of the Motorola Penang Adv. Comm. Laboratory. The results and statements contained in this report pertain only to the device(s) evaluated.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                       |                      |                             |                          |               |                              |                                                                                                                            |                  |                                     |                     |          |                              |             |                            |                                                            |                       |                   |                            |                                                                         |                       |                          |                          |                                                                  |                          |          |                           |          |                                |                  |                                                                              |             |
| <p>Prepared By:</p> <br><hr/> <b>GAN BOON TEONG</b><br><b>Test Personnel</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <p>Approved Signatory:</p><br><br><hr/> <b>VINCENT FOONG CHUEN KIT</b><br><b>Responsible Engineer</b>                                                                                                                                                                                                                                                                                                                 |                      |                             |                          |               |                              |                                                                                                                            |                  |                                     |                     |          |                              |             |                            |                                                            |                       |                   |                            |                                                                         |                       |                          |                          |                                                                  |                          |          |                           |          |                                |                  |                                                                              |             |

## Table of Contents

|                                                            |     |
|------------------------------------------------------------|-----|
| 1.0. General Information.....                              | 3   |
| 1.1. Channel number and frequency information: .....       | 3   |
| 2.0. Summary of Test Results .....                         | 4   |
| 3.0. Measurement Uncertainty .....                         | 4   |
| 4.0. Equipment List.....                                   | 5   |
| 5.0. Test Mode Applicability and Test Channel Detail ..... | 6   |
| 6.0. Transmitter Test Parameters.....                      | 9   |
| 6.1. 6dB Channel Bandwidth.....                            | 9   |
| 6.1.1. Test Setup .....                                    | 9   |
| 6.1.2. Test Limits: .....                                  | 9   |
| 6.1.3. Test Data:.....                                     | 10  |
| 6.2. Conducted RF Output Power .....                       | 16  |
| 6.2.1. Test Setup .....                                    | 16  |
| 6.2.2. Test Limits: .....                                  | 16  |
| 6.2.3. Test Data:.....                                     | 17  |
| 6.3. Duty Cycle of the test signal .....                   | 20  |
| 6.3.1. Test Setup .....                                    | 20  |
| 6.3.2. Test Data .....                                     | 21  |
| 6.4. Maximum Peak Power Spectral Density .....             | 24  |
| 6.4.1. Test Setup .....                                    | 24  |
| 6.4.2. Test Limits .....                                   | 24  |
| 6.4.3. Test Result .....                                   | 25  |
| 6.5. Conducted Spurious Emission .....                     | 28  |
| 6.5.1. Test Setup .....                                    | 28  |
| 6.5.2. Test Limits: .....                                  | 28  |
| 6.5.3. Test Result .....                                   | 28  |
| 6.6. Band edge Conducted Spurious Emission .....           | 43  |
| 6.6.1. Test Setup .....                                    | 43  |
| 6.6.2. Test Limits: .....                                  | 43  |
| 6.6.3. Test Result .....                                   | 44  |
| 6.7. Radiated Emission within restricted Bands .....       | 47  |
| 6.7.1. Test Setup .....                                    | 47  |
| 6.7.2. Test Limits: .....                                  | 48  |
| 6.7.3. Test Data:.....                                     | 49  |
| 6.8. AC Powerline Conducted Emission.....                  | 103 |
| 6.8.1. Test Setup .....                                    | 103 |
| 6.8.2. Test Limits: .....                                  | 103 |
| 6.8.3. Test Result .....                                   | 104 |

### REVISION HISTORY

| Revision History | Description    | Date        | Originator     |
|------------------|----------------|-------------|----------------|
| Rev. A           | Initial Report | 15-Dec-2020 | Gan Boon Teong |

## 1.0. General Information

### EUT Description:

|                           |                                     |
|---------------------------|-------------------------------------|
| <b>Technologies</b>       | 2.4GHz Wi-Fi                        |
| <b>TX Frequency range</b> | 2412MHz – 2462MHz                   |
| <b>Modulation Type</b>    | DSSS, OFDM                          |
| <b>Connector type</b>     | PROGRAMMING, TEST & ALIGNMENT CABLE |
| <b>Antenna type</b>       | INVERTED FANTENNA                   |

### 1.1. Channel number and frequency information:

There are two bandwidth systems.

For 20MHz Bandwidth systems (802.11b, 802.11g, 802.11n), use channel 1 ~ channel 11

For 40MHz Bandwidth systems (802.11n), use channel 3 ~ channel 9

| Channel | Frequency | Channel | Frequency |
|---------|-----------|---------|-----------|
| 1       | 2412      | 7       | 2442      |
| 2       | 2417      | 8       | 2447      |
| 3       | 2422      | 9       | 2452      |
| 4       | 2427      | 10      | 2457      |
| 5       | 2432      | 11      | 2462      |
| 6       | 2437      |         |           |

The EUT contains following accessory devices and data cable:

| Item                                                          | Brand    | Model or P/N     |
|---------------------------------------------------------------|----------|------------------|
| IMPRES 4-WAY NAVIGATION KEYPAD MICROPHONE WITH ENHANCED AUDIO | MOTOROLA | 690-RMN5127C-3   |
| 13 WATT EXTERNAL SPEAKER                                      | MOTOROLA | 12613-RSN4002A-1 |
| POWER CABLE TO BATTERY, 6M (20 FT.), 20 AMP (1- 45W)          | MOTOROLA | 1175-HKN4192B-2  |
| EMERGENCY FOOTSWITCH                                          | MOTOROLA | RLN5929A-C2      |
| MOBILE PWR CABLE 10 FT, 14 AWG, 15A                           | MOTOROLA | HKN4137          |

### General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, the EUT is to comply with the requirements of the following standards:

**FCC 47 CFR Part 15 Subpart C**  
**KDB 558074 D01 15.247 Meas Guidance v05**  
**ANSI C63.10-2013**

### Deviation from standard

Not applicable as no deviation from standard test method

### Modifications to EUT

A pigtail was soldered out of the EUT for RF conducted measurements. The EUT used for EMC testing was not modified

### Selection of test modes

Some reports may contain a limited number of test points/modes, in which case all channels and modulations were evaluated and the worst case performance is presented in the report

### Generic Option Board

All radiated tests are performed with the generic option board activated in the EUT.

## 2.0. Summary of Test Results

| FCC Clause                 | IC Clause      | Test Item                                 | Result | Remark                                                                                                                  | Serial number tested   | Tested by              |
|----------------------------|----------------|-------------------------------------------|--------|-------------------------------------------------------------------------------------------------------------------------|------------------------|------------------------|
| 15.247 (a)(2)              | RSS-247 5.2(a) | DTS & 99% Channel Bandwidth               | Pass   | Highest 99% OCB:<br>802.11b: 13.471 MHz(13M5G1D)<br>802.11g: 16.772 MHz(16M8D1D)<br>802.11n: 17.934 MHz(17M9D1D)        | 511TWX2286             | Gan                    |
| 15.247 (b)(3)              | RSS-247 5.4(d) | Conducted RF Output Power (Average)       | Pass   | Highest output power:<br>802.11b: 12.464 dBm (17.64 mW)<br>802.11g: 10.828 dBm(12.10 mW)<br>802.11n: 9.183 dBm(8.29 mW) | 511TWX2286             | Gan                    |
| 15.247(e)                  | RSS-247 5.2(b) | Maximum Power Spectral Density            | Pass   | Meet the limit requirement.                                                                                             | 511TWP7148             | Gan                    |
| 15.247(d)                  | RSS-247 5.5    | Conducted Spurious Emissions              | Pass   | Worst case emission:<br>802.11b: -37.89 dBm<br>802.11g: -39.00 dBm<br>802.11n: -39.09 dBm                               | 511TWP7148             | Gan                    |
| 15.247 (d)                 | RSS-247 5.5    | Band edge Conducted Spurious Emission     | Pass   | Worst case emission:<br>802.11b: -42.20 dBm<br>802.11g: -42.33 dBm<br>802.11n: -43.63 dBm                               | 511TWP7148             | Gan                    |
| 15.205, 15.209, 15.247 (d) | RSS-247 5.5    | Radiated Emission within Restricted Bands | Pass   | Worst case emission:<br>802.11b: 47dBuV/m<br>802.11g: 47.29dBuV/m<br>802.11n: 47.97dBuV/m                               | 511TWP7151, 511TWX2293 | Nazrin& Qawiman& Fendi |
| 15.207                     | RSS-Gen 8.8    | AC Power Line Conducted Emission          | NA     | Not applicable. Device not connected to AC.                                                                             | NA                     | NA                     |
| 15.203                     |                | Antenna requirement                       | NA     | Internal antenna is not accessible to the enduser                                                                       | NA                     | NA                     |

NA → Not Available

## 3.0. Measurement Uncertainty

| Measurement                               | Frequency        | Expended Uncertainty (k=1.96) (±dB) |
|-------------------------------------------|------------------|-------------------------------------|
| AC Power Line Conducted Spurious Emission | 150KHz ~ 30MHz   | 3.43                                |
| Radiated Emissions up to 1 GHz            | 30MHz ~ 200MHz   | 4.25                                |
|                                           | 200MHz ~ 1000MHz | 4.25                                |
| Radiated Emissions above 1 GHz            | 1GHz ~ 18GHz     | 4.94                                |
|                                           | 18GHz ~ 25GHz    | 4.94                                |
| Conducted Spurious Emissions              | 9kHz ~ 12.75GHz  | 2.82                                |

#### 4.0. Equipment List

##### Bluetooth ATE # 1 (SW Version: Ate Main\_3.1.10\_R2)

| Description         | Model         | Serial Number | Calibration Date | Calibration Due Date |
|---------------------|---------------|---------------|------------------|----------------------|
| SPECTRUM ANALYZER   | FSEK30        | 838495/014    | 19-Jan-20        | 19-Jan-21            |
| POWER SUPPLY        | 6652A         | 3541A02565    | 26-Jun-20        | 26-Jun-21            |
| SPECTRUM ANALYZER   | E4445A        | MY45301089    | 07-Sep-20        | 07-Sep-21            |
| CHAMBER             | SH-641        | 92002639      | 8-Dec-20         | 8-Dec-21             |
| N to N RF Cable # 1 | SF126/11N/11N | NA            | NA               | NA                   |

##### Radiated Emission Station (SW Version: EMC FCC RE v1.6.2)

| Description               | Model                  | Serial Number | Calibration Date | Calibration Due Date |
|---------------------------|------------------------|---------------|------------------|----------------------|
| DRG HORN FREQ.            | SAS-571                | 720           | 21-Mar-19        | 21-Mar-21            |
| DRG HORN FREQ.            | SAS-571                | 1143          | 14-Feb-19        | 14-Feb-21            |
| POWER SUPPLY              | 6032A                  | 2615A01178    | 21-May-20        | 21-May-21            |
| SIGNAL GENERATOR          | SMB 100A               | 181117        | 8-Nov-18         | 8-Nov-21             |
| EMI TEST RECEIVER         | ESW44                  | 101731        | 3-Dec-19         | 3-Feb-21             |
| EMI TEST RECEIVER         | ESIB26                 | 100017        | 19-Jul-19        | 19-Jan-21            |
| 5m SEMI-ANECHOIC CHAMBER  | S800-HX                | J2308         | Not Required     | Not Required         |
| BILOG ANTENNA             | CBL6112B               | 2964          | 23-Apr-19        | 23-Apr-21            |
| BILOG ANTENNA             | CBL6112B               | 2950          | 8-Jul-19         | 8-Jul-21             |
| DATA LOGGER               | SDL500                 | A.016776      | 4-Jun-20         | 4-Jun-21             |
| SYSTEM CONTROLLER         | SC104V                 | 050806-1      | Not Required     | Not Required         |
| TURNTABLE FLUSH MOUNT 2M  | FM2011                 | NA            | Not Required     | Not Required         |
| ANTENNA POSITIONING TOWER | TLT2                   | NA            | Not Required     | Not Required         |
| BROAD-BAND HORN ANTENNA   | BBHA9170               | BBHA9170255   | 27-Jan-20        | 27-Jan-21            |
| 18 - 40GHz PREAMPLIFIER   | MITEQ Hi GAIN SUCOFLEX | 001           | Not Required     | Not Required         |
| PREAMPLIFIER              | PAM-0118               | 269           | 24-May-19        | 24-May-22            |
| LOOP ANTENNA              | 6502                   | 00203479      | 21-Jan-20        | 21-Jan-21            |
| DRG HORN FREQ.            | SAS-571                | 720           | 21-Mar-19        | 21-Mar-21            |

## 5.0. Test Mode Applicability and Test Channel Detail

The device employs MIMO technology. Below are the possible configurations.

| WLAN Configurations |                | Mode    |           |                                       |           |                               |           |
|---------------------|----------------|---------|-----------|---------------------------------------|-----------|-------------------------------|-----------|
|                     |                | SISO    |           | Spatial Diversity Multiplexing (MIMO) |           | Cyclic Delay Diversity (MIMO) |           |
| 2.4GHz              | Antenna        | Primary | Secondary | Primary                               | Secondary | Primary                       | Secondary |
|                     | 802.11b        | √       | √         | x                                     | x         | x                             | x         |
|                     | 802.11g        | √       | √         | x                                     | x         | x                             | x         |
|                     | 802.11n (HT20) | √       | √         | x                                     | x         | x                             | x         |
|                     | 802.11n (HT40) | x       | x         | x                                     | x         | x                             | x         |

√ = Support;  
 x = NOT Support

**Note:** This Device supports simultaneous transmission operation, which allows for two SISO or two MIMO channels to operate independent of one another in the 2.4GHz band on each antenna. 802.11n mode is capable of transmitting simultaneously on two antennas using Cyclic Delay Diversity and Spatial Diversity Multiplexing (2x2 MIMO).

The following tables show the worst case configurations determined during testing. The data for these configurations is contained in this test report.

### **Radiated Emission Test (Above 1GHz)**

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT Configure Mode | Modulation     | Available Channel | Tested Channel | Modulation Technology | Data Modulation Type | Date Rate (Mbps) | Mode            | Environmental Conditions |
|--------------------|----------------|-------------------|----------------|-----------------------|----------------------|------------------|-----------------|--------------------------|
| Test Mode          | 802.11b        | 1 to 11           | 1,6,11         | DSSS                  | QPSK                 | 1                | SISO            | 25.6°C, 70.2%RH          |
| Test Mode          | 802.11g        | 1 to 11           | 1,6,11         | OFDM                  | BPSK                 | 6                | SISO            | 25.6°C, 70.2%RH          |
| Test Mode          | 802.11n (HT20) | 1 to 11           | 1,6,11         | OFDM                  | BPSK                 | 6.5              | SISO CDD (MIMO) | 25.6°C, 70.2%RH          |
| Test Mode          | 802.11n (HT40) | 3 to 9            | 3,6,9          | OFDM                  | BPSK                 | 6.5              | SISO CDD (MIMO) | NA                       |

### **Radiated Emission Test (Below 1GHz)**

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT Configure Mode | Modulation     | Available Channel | Tested Channel | Modulation Technology | Data Modulation Type | Date Rate (Mbps) | Mode            | Environmental Conditions |
|--------------------|----------------|-------------------|----------------|-----------------------|----------------------|------------------|-----------------|--------------------------|
| Test Mode          | 802.11b        | 1 to 11           | 1,6,11         | DSSS                  | QPSK                 | 1                | SISO            | 25.6°C, 70.2%RH          |
| Test Mode          | 802.11g        | 1 to 11           | 1,6,11         | OFDM                  | BPSK                 | 6                | SISO            | 25.6°C, 70.2%RH          |
| Test Mode          | 802.11n (HT20) | 1 to 11           | 1,6,11         | OFDM                  | BPSK                 | 6.5              | SISO CDD (MIMO) | 25.6°C, 70.2%RH          |
| Test Mode          | 802.11n (HT40) | 3 to 9            | 3,6,9          | OFDM                  | BPSK                 | 6.5              | SISO CDD (MIMO) | NA                       |

### **Power Line Conducted Emission Test**

☐ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☐ Following channel(s) was (were) selected for the final test as listed below.

| EUT Configure Mode | Modulation      | Available Channel | Tested Channel | Modulation Technology | Data Modulation Type | Data Rate (Mbps) | Environmental Conditions |
|--------------------|-----------------|-------------------|----------------|-----------------------|----------------------|------------------|--------------------------|
| Application Mode   | 802.11bgn mixed | 1 to 11           | AUTO           | DSSS, OFDM            | AUTO                 | AUTO             | NA                       |

### **Antenna Port Conducted Measurement:**

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT Configure Mode | Modulation     | Available Channel | Tested Channel | Modulation Technology | Data Modulation Type | Data Rate (Mbps) | Mode            | Environmental Conditions |
|--------------------|----------------|-------------------|----------------|-----------------------|----------------------|------------------|-----------------|--------------------------|
| Test Mode          | 802.11b        | 1 to 11           | 1,6,11         | DSSS                  | QPSK                 | 1                | SISO            | 25°C, 54.8%RH            |
| Test Mode          | 802.11g        | 1 to 11           | 1,6,11         | OFDM                  | BPSK                 | 6                | SISO            | 25°C, 54.8%RH            |
| Test Mode          | 802.11n (HT20) | 1 to 11           | 1,6,11         | OFDM                  | BPSK                 | 6.5              | SISO CDD (MIMO) | 25°C, 54.8%RH            |
| Test Mode          | 802.11n (HT40) | 1 to 11           | 3,6,9          | OFDM                  | BPSK                 | 6.5              | SISO CDD (MIMO) | NA                       |

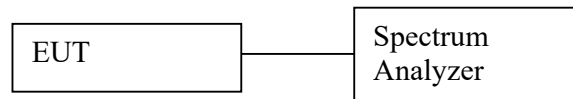
### **Duty Cycle of Test Signal**

802.11b, 802.11g and 802.11n : Duty cycle of test signal is  $\geq 98\%$ . (Refer to Clause 6.3 for duty cycle test signal)

## 6.0. Transmitter Test Parameters

### 6.1. 6dB Channel Bandwidth

#### 6.1.1. Test Setup



- a) Check and ensure the spectrum analyzer well calibrate.
- b) Turn on the DUT and set DUT to transmit maximum power.
- c) Connect DUT's antenna terminal to spectrum analyzer with a low loss cable.
- d) Setting of Spectrum analyzer :
  - a. RBW = 100 kHz
  - b. VBW = 300 kHz
  - c. Detector mode = Peak
  - d. Trace = Max hold
  - e. Sweep = auto
- e) Measure the freq different of two frequencies that were attenuated 6dB from peak of the emission & record the frequency difference as the emission bandwidth.
- f) Measure every antenna port by repeat the step above for MIMO measurement.

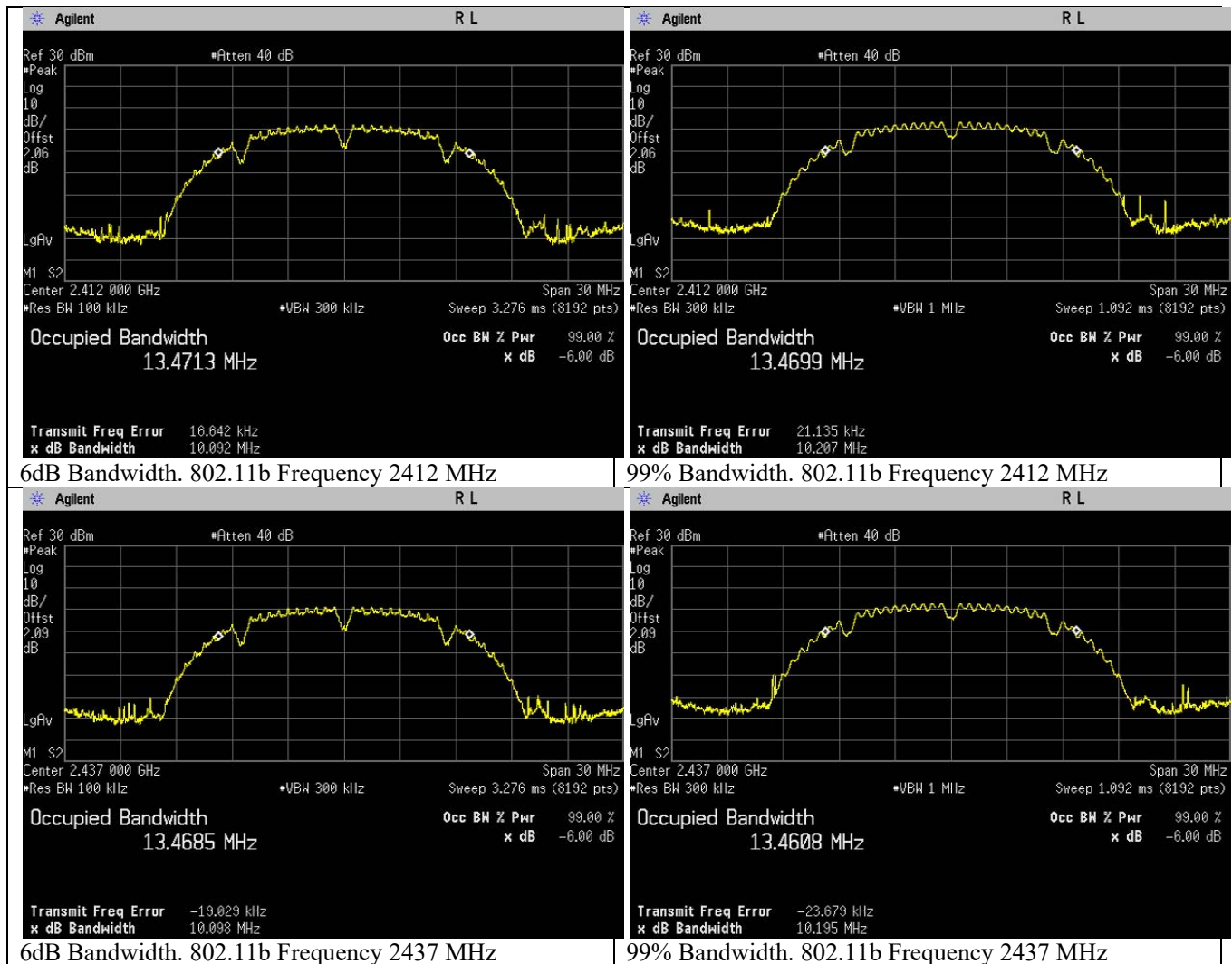
#### 6.1.2. Test Limits:

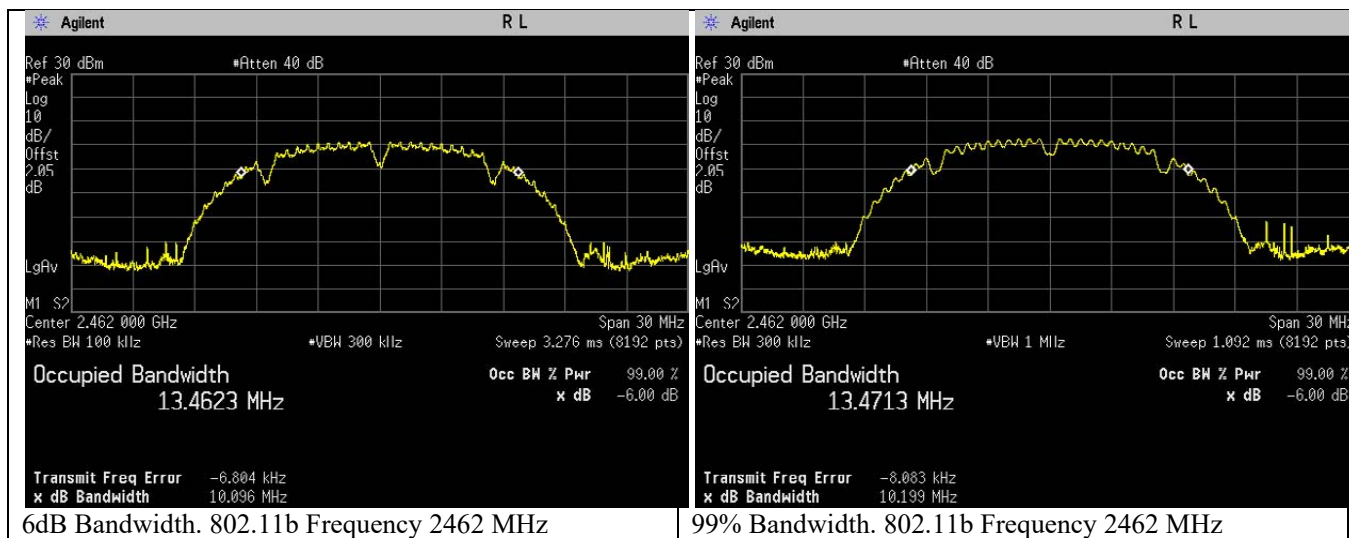
| Normal Condition (25 ° C) |
|---------------------------|
| $\geq 500$ kHz            |

### 6.1.3. Test Data:

#### 802.11 b

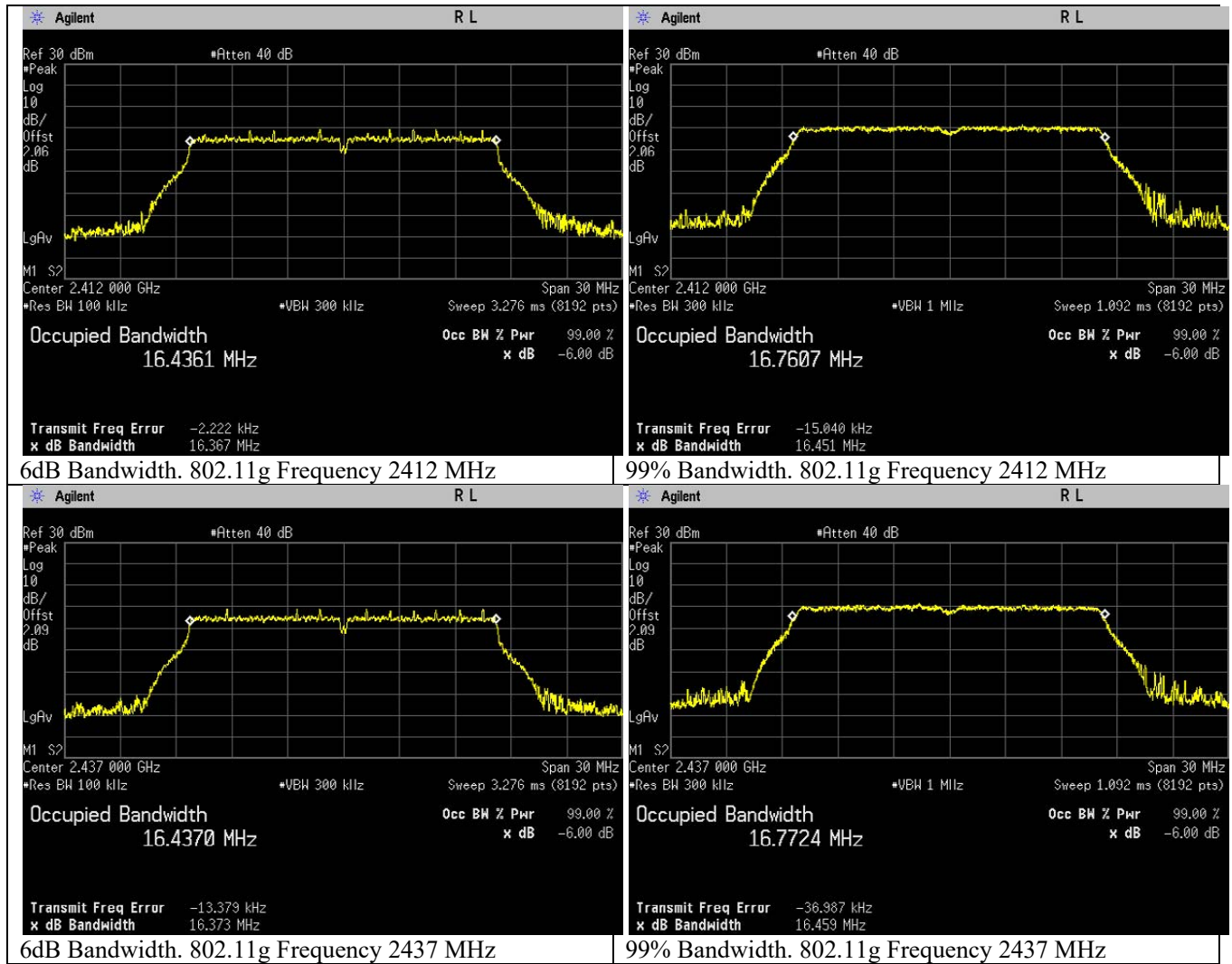
| Test Conditions |                 |                       |                  | Test Frequency | Results             |                     |        |
|-----------------|-----------------|-----------------------|------------------|----------------|---------------------|---------------------|--------|
| Standard        | Modulation Type | Modulation Technology | Data Rate (mbps) | Tx (MHz)       | 6dB Bandwidth (MHz) | 99% Bandwidth (MHz) | Status |
| 802.11b         | DSSS            | DBPSK                 | 1                | 2412           | 10.092              | 13.470              | Pass   |
| 802.11b         | DSSS            | DBPSK                 | 1                | 2437           | 10.098              | 13.461              | Pass   |
| 802.11b         | DSSS            | DBPSK                 | 1                | 2462           | 10.096              | 13.471              | Pass   |

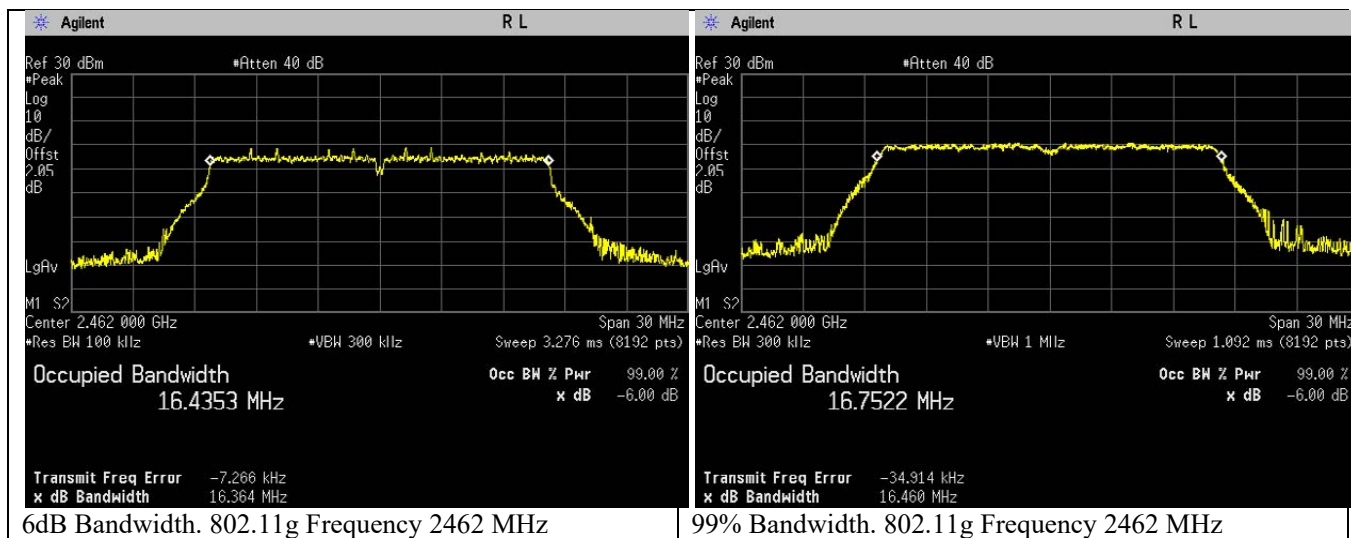




## 802.11g

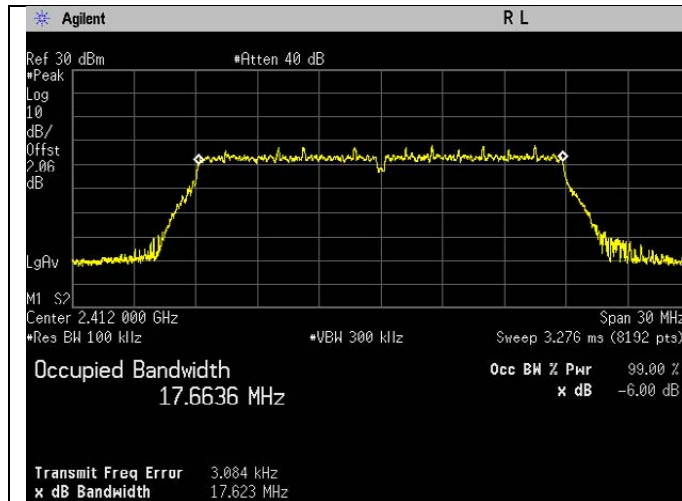
| Test Conditions |                 |                       |                  | Test Frequency | Results             |                     |        |
|-----------------|-----------------|-----------------------|------------------|----------------|---------------------|---------------------|--------|
| Standard        | Modulation Type | Modulation Technology | Data Rate (mbps) | Tx (MHz)       | 6dB Bandwidth (MHz) | 99% Bandwidth (MHz) | Status |
| 802.11g         | OFDM            | BPSK                  | 6                | 2412           | 16.367              | 16.761              | Pass   |
| 802.11g         | OFDM            | BPSK                  | 6                | 2437           | 16.373              | 16.772              | Pass   |
| 802.11g         | OFDM            | BPSK                  | 6                | 2462           | 16.364              | 16.752              | Pass   |



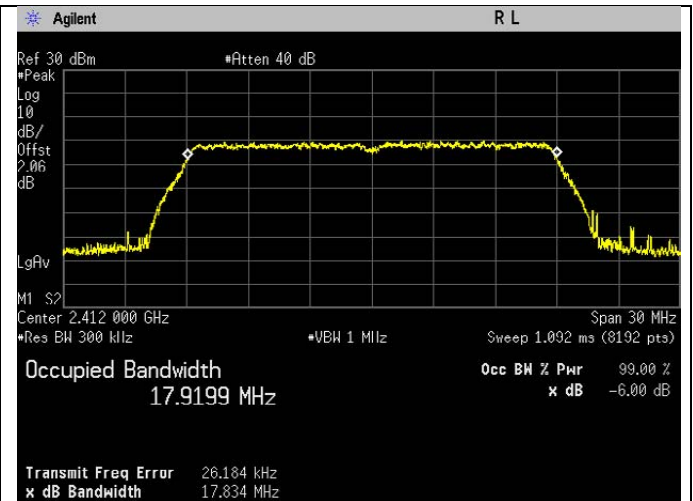


## 802.11n (HT20)

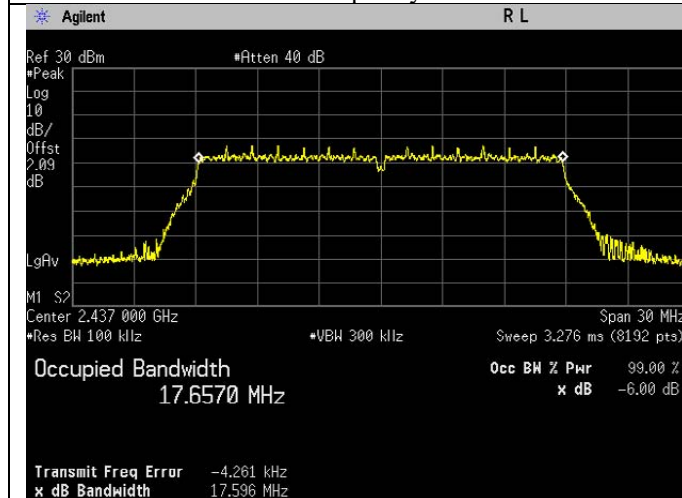
| Test Conditions |                 |                       |                  | Test Frequency | Results             |                     |        |
|-----------------|-----------------|-----------------------|------------------|----------------|---------------------|---------------------|--------|
| Standard        | Modulation Type | Modulation Technology | Data Rate (mbps) | Tx (MHz)       | 6dB Bandwidth (MHz) | 99% Bandwidth (MHz) | Status |
| 802.11n         | OFDM            | BPSK                  | 6.5              | 2412           | 17.623              | 17.920              | Pass   |
| 802.11n         | OFDM            | BPSK                  | 6.5              | 2437           | 17.596              | 17.934              | Pass   |
| 802.11n         | OFDM            | BPSK                  | 6.5              | 2462           | 17.601              | 17.901              | Pass   |



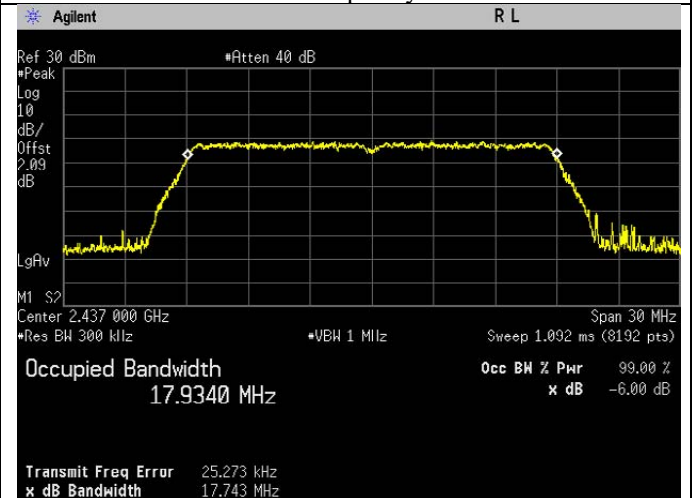
6dB Bandwidth. 802.11n Frequency 2412 MHz



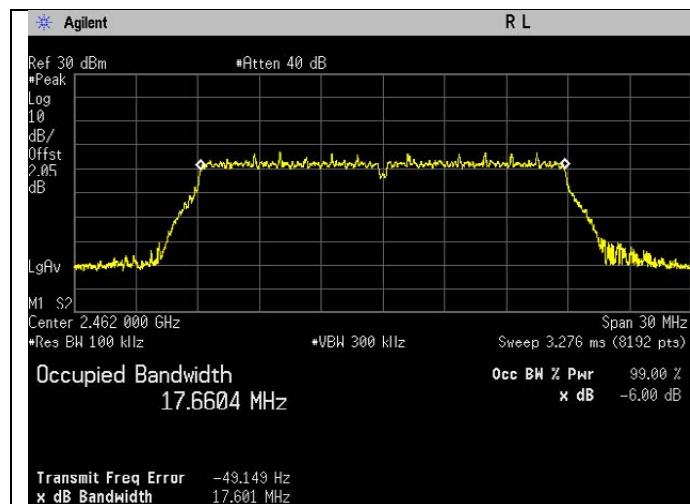
99% Bandwidth. 802.11n Frequency 2412 MHz



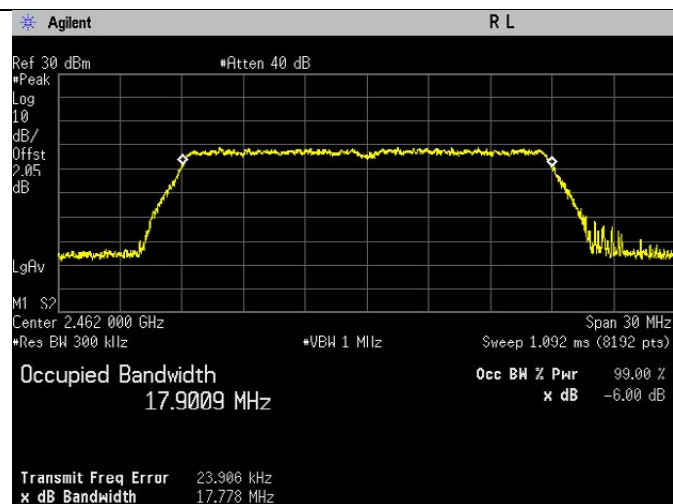
6dB Bandwidth. 802.11n Frequency 2437 MHz



99% Bandwidth. 802.11n Frequency 2437 MHz



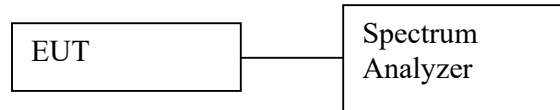
6dB Bandwidth. 802.11n Frequency 2462 MHz



99% Bandwidth. 802.11n Frequency 2462 MHz

## 6.2. Conducted RF Output Power

### 6.2.1. Test Setup



#### Average

- a) Check and ensure the spectrum analyzer well calibrate.
- b) Turn on the DUT and set DUT to transmit maximum power.
- c) Measure the duty cycle of transmitter output signal.
- d) Setting of Spectrum analyzer :
  - a. Set the RBW = 300 kHz.
  - b. Set the VBW  $\geq [3 \times \text{RBW}]$ .
  - c. Set the span  $\geq [1.5 \times \text{OBW bandwidth}]$ .
  - d. Detector = average.
  - e. Sweep time = auto couple.
  - f. Trace mode = free run.
  - g. Allow trace to fully stabilize.
- e) Add in duty cycle correction into final test result.
- f) Duty cycle correction is calculated as below:  
 $10 \log (1/x)$
- g) Measure every antenna port by repeat the step above for MIMO measurement.

### 6.2.2. Test Limits:

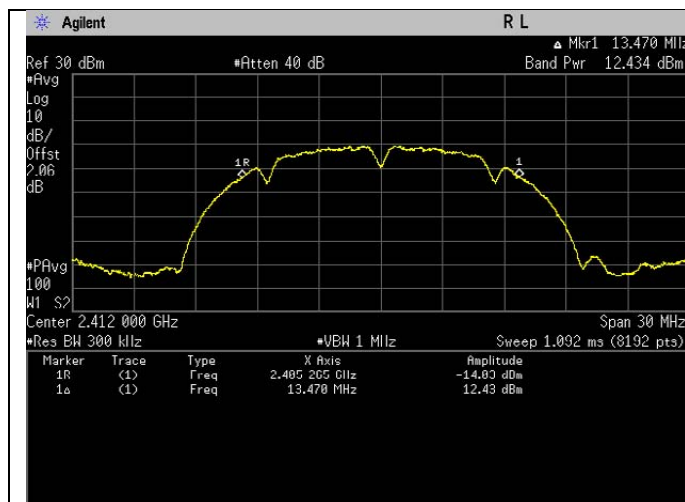
|                                                         |
|---------------------------------------------------------|
| <b>Normal Condition (25 ° C)</b>                        |
| <b><math>\leq 1 \text{ Watt}(30 \text{ dBm})</math></b> |

### 6.2.3. Test Data:

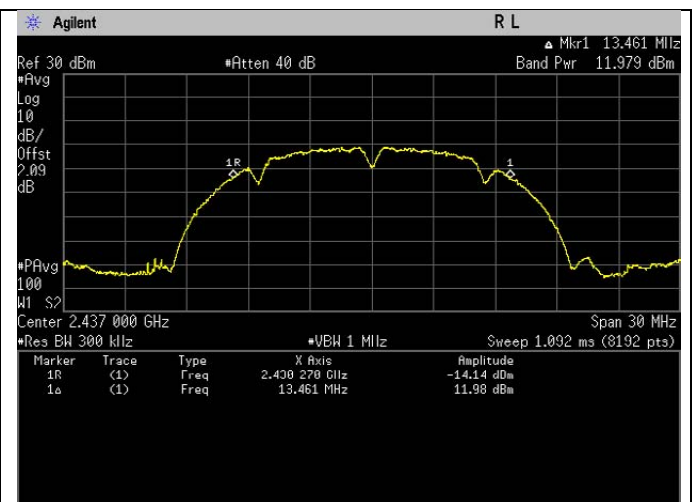
#### 802.11b

Output Power = Band Power + Duty Cycle Factor  
= Band Power + 0.030dBm

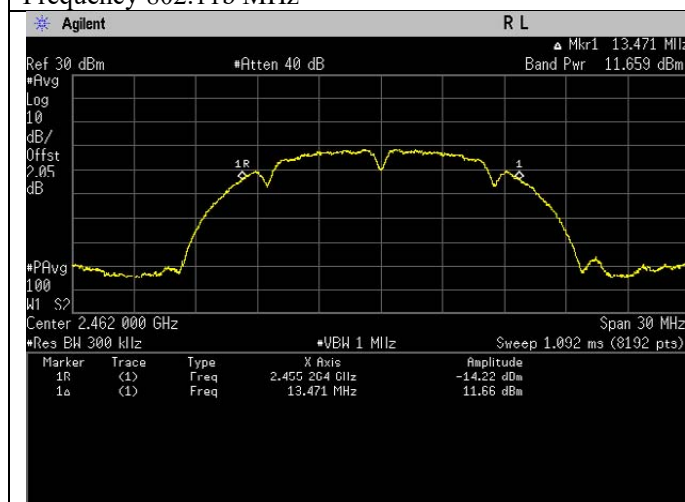
| Test Conditions |                 |                       |                  | Test Frequency | Results            |        |
|-----------------|-----------------|-----------------------|------------------|----------------|--------------------|--------|
| Standard        | Modulation Type | Modulation Technology | Data Rate (mbps) | Tx (MHz)       | Output Power (dBm) | Status |
| 802.11b         | DSSS            | DBPSK                 | 1                | 2412           | 12.464             | Pass   |
| 802.11b         | DSSS            | DBPSK                 | 1                | 2437           | 12.009             | Pass   |
| 802.11b         | DSSS            | DBPSK                 | 1                | 2462           | 11.689             | Pass   |



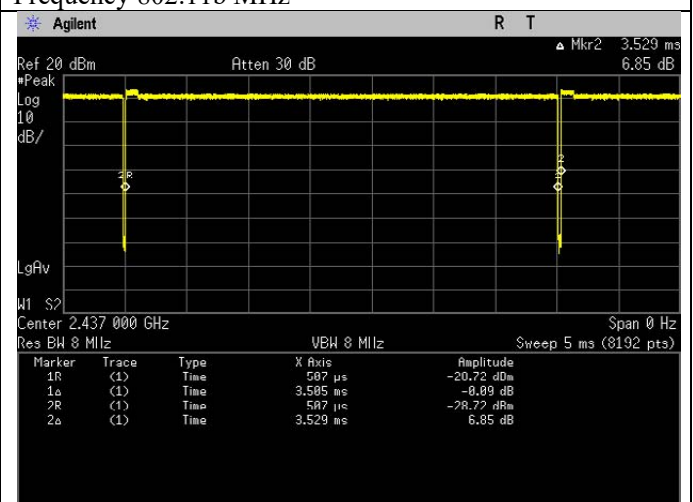
Frequency 802.11b MHz



Frequency 802.11b MHz



Frequency 802.11b MHz

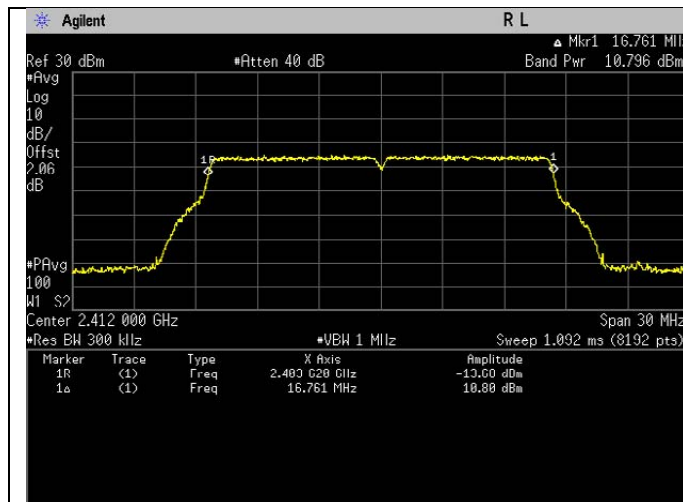


Duty Cycle

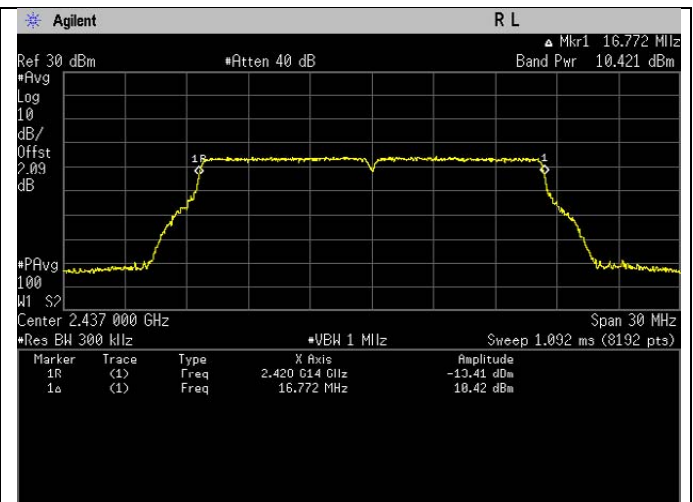
### 802.11g

Output Power = Band Power + Duty Cycle Factor  
= Band Power + 0.032dBm

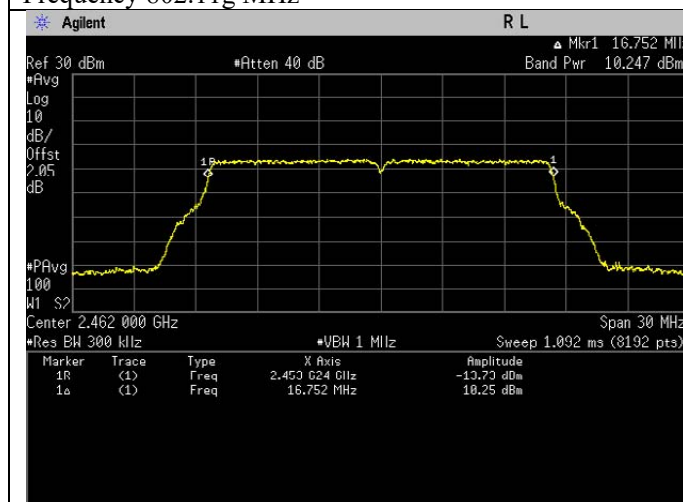
| Test Conditions |                 |                       |                  | Test Frequency | Results            |        |
|-----------------|-----------------|-----------------------|------------------|----------------|--------------------|--------|
| Standard        | Modulation Type | Modulation Technology | Data Rate (mbps) | Tx (MHz)       | Output Power (dBm) | Status |
| 802.11g         | OFDM            | BPSK                  | 6                | 2412           | 10.828             | Pass   |
| 802.11g         | OFDM            | BPSK                  | 6                | 2437           | 10.453             | Pass   |
| 802.11g         | OFDM            | BPSK                  | 6                | 2462           | 10.279             | Pass   |



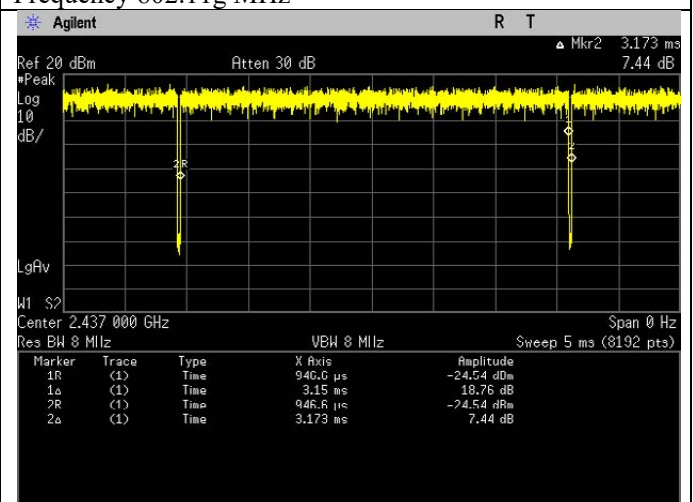
Frequency 802.11g MHz



Frequency 802.11g MHz



Frequency 802.11g MHz

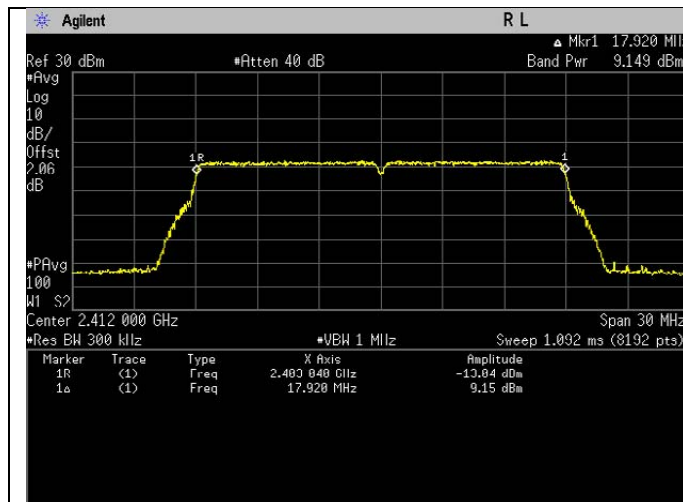


Duty Cycle

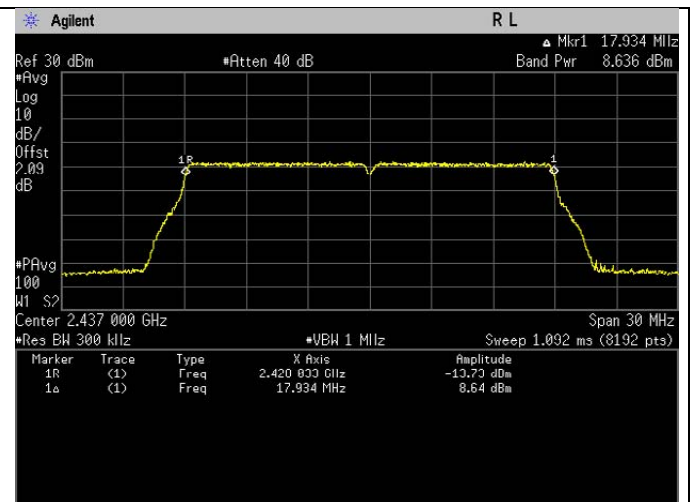
### 802.11n (HT20)

Output Power = Band Power + Duty Cycle Factor  
= Band Power + 0.034dBm

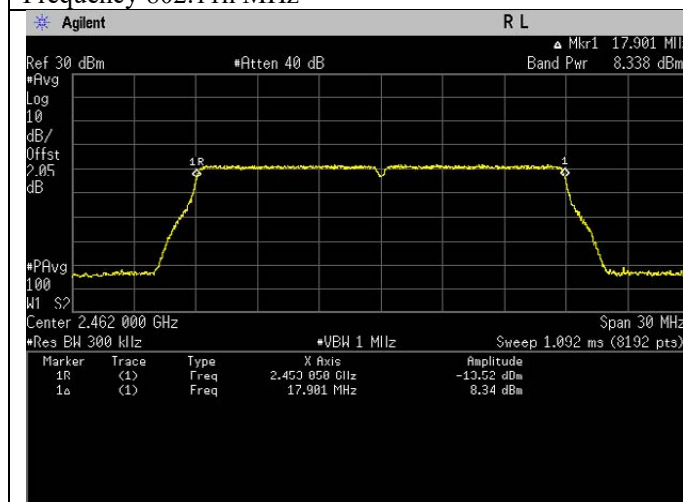
| Test Conditions |                 |                       |                  | Test Frequency | Results            |        |
|-----------------|-----------------|-----------------------|------------------|----------------|--------------------|--------|
| Standard        | Modulation Type | Modulation Technology | Data Rate (mbps) | Tx (MHz)       | Output Power (dBm) | Status |
| 802.11n         | OFDM            | BPSK                  | 6.5              | 2412           | 9.183              | Pass   |
| 802.11n         | OFDM            | BPSK                  | 6.5              | 2437           | 8.670              | Pass   |
| 802.11n         | OFDM            | BPSK                  | 6.5              | 2462           | 8.372              | Pass   |



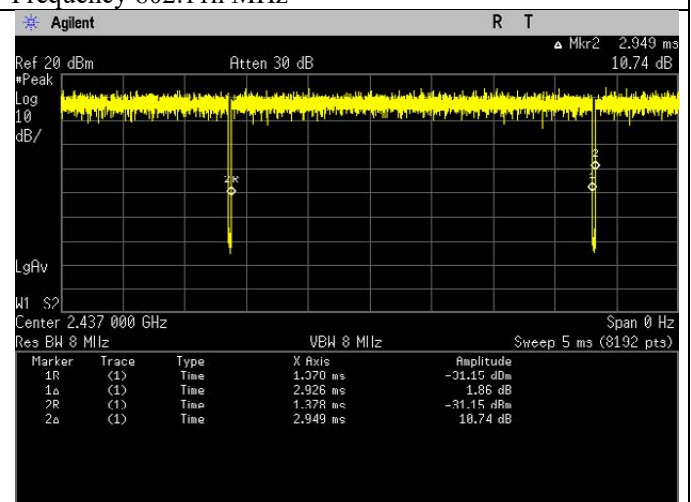
Frequency 802.11n MHz



Frequency 802.11n MHz

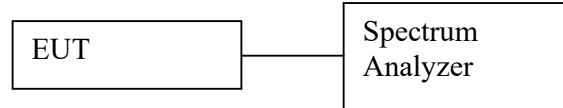


Frequency 802.11n MHz



### 6.3.Duty Cycle of the test signal

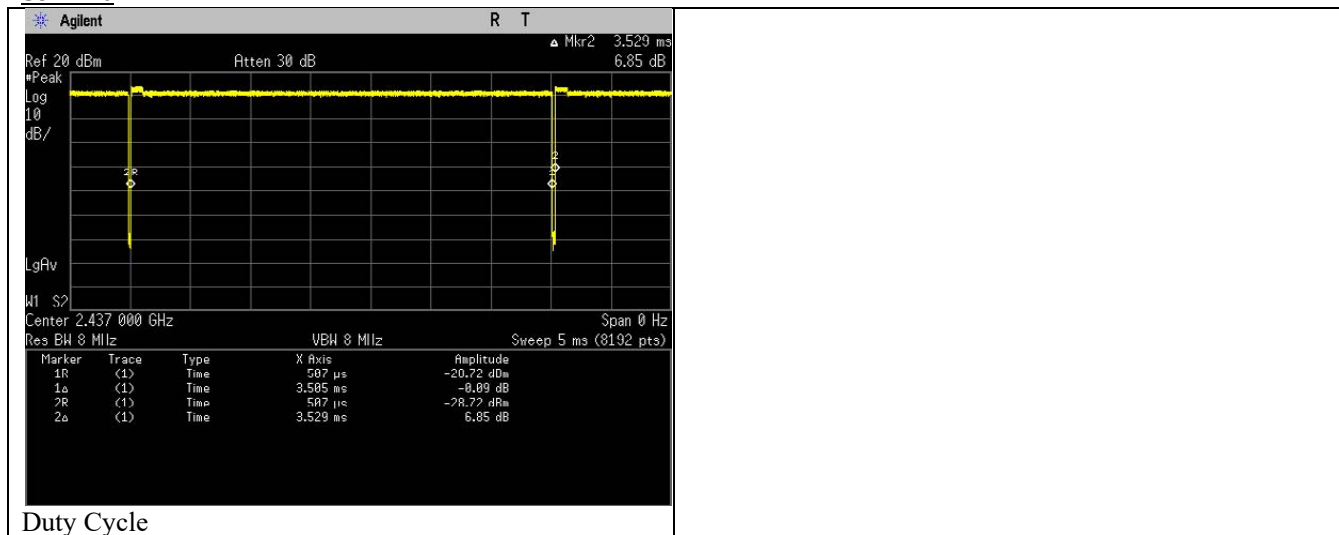
#### 6.3.1. Test Setup



- 1) Check and ensure the spectrum analyzer well calibrate.
- 2) Turn on the DUT and set DUT to transmit maximum power.
- 3) Connect DUT's antenna terminal to spectrum analyzer with a low loss cable.
- 4) Setting of Spectrum analyzer :
  - a. Set the RBW = 10 MHz or the highest RBW available on spectrum analyzer.
  - b. Set the VBW  $\geq$  RBW.
  - c. Set the span  $\geq$   $[1.5 \times \text{DTS bandwidth}]$ .
  - d. Detector = Peak.
  - e. Sweep time = 10ms or others that allow to measure accurate duty cycle.
  - f. Trace mode = max hold.
  - g. Allow trace to fully stabilize.
- 5) Record the duty cycle as X and save the plot.
- 6) Measure every antenna port by repeat the step above for MIMO measurement.

### 6.3.2. Test Data

#### 802.11b

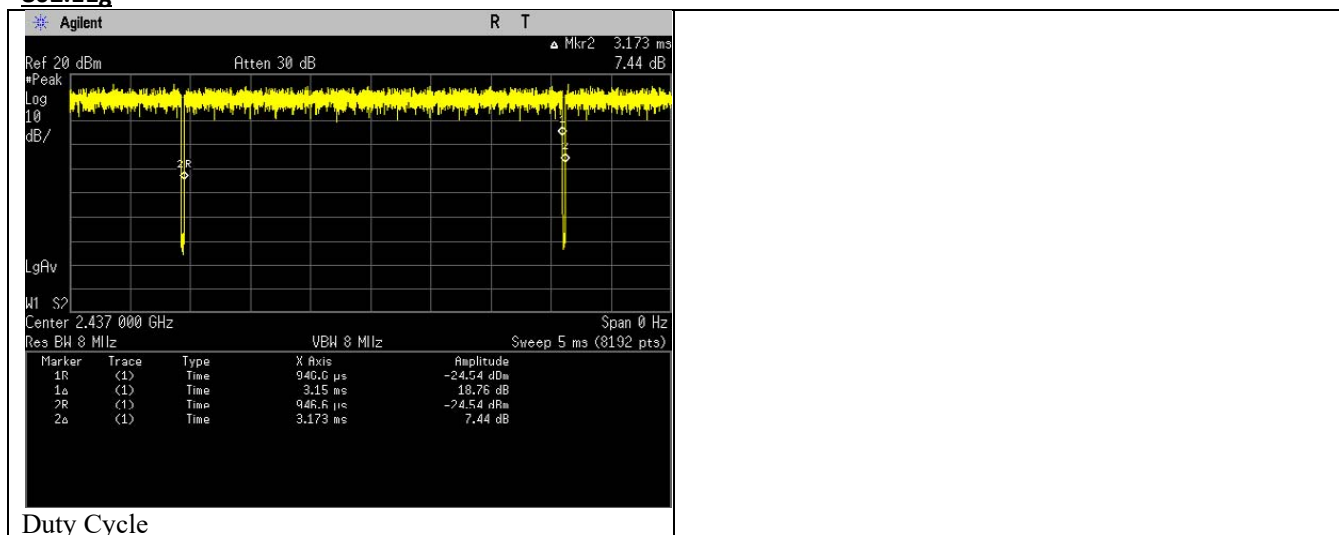


|                    |        |
|--------------------|--------|
| On time (ms)       | 3.505  |
| On + Off Time (ms) | 3.525  |
| Duty cycle         | 0.9932 |
| Duty Cycle factor  | 0.030  |

\*Duty cycle = On time/ On +off time

\*Duty Cycle factor =  $10 \cdot \log(1/\text{Duty Cycle})$

# 802.11g

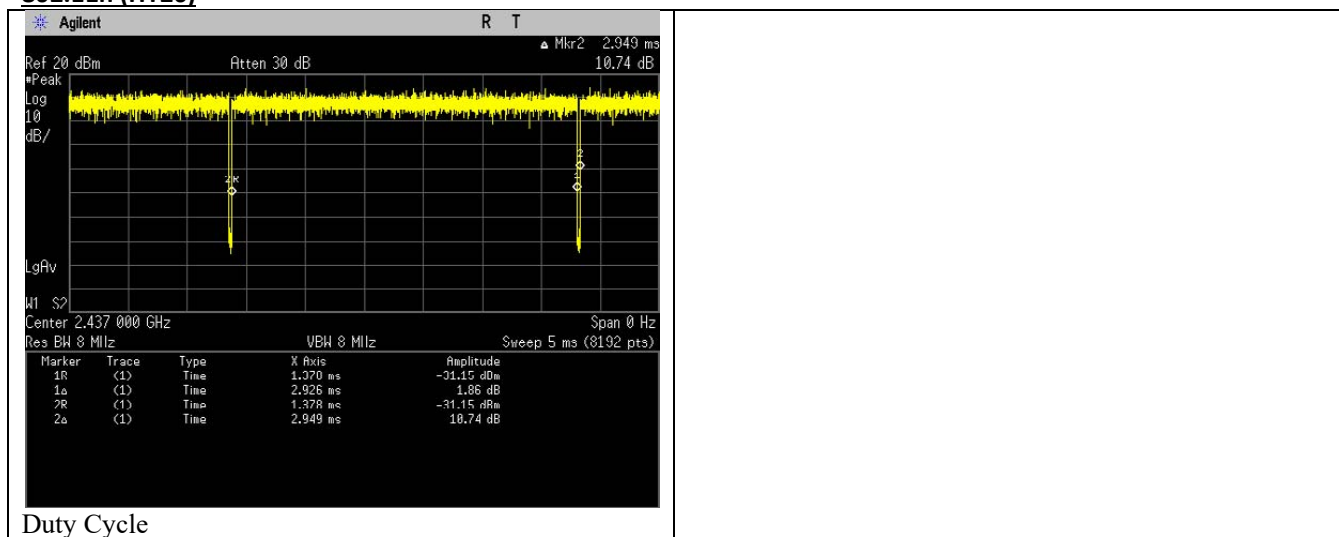


|                    |        |
|--------------------|--------|
| On time (ms)       | 3.15   |
| On + Off Time (ms) | 3.173  |
| Duty cycle         | 0.9928 |
| Duty Cycle factor  | 0.032  |

\*Duty cycle = On time/ On +off time

\*Duty Cycle factor = 10\*log(1/Duty Cycle)

### 802.11n (HT20)



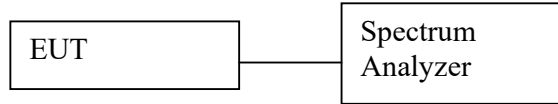
|                    |        |
|--------------------|--------|
| On time (ms)       | 2.926  |
| On + Off Time (ms) | 2.949  |
| Duty cycle         | 0.9922 |
| Duty Cycle factor  | 0.034  |

\*Duty cycle = On time/ On +off time

\*Duty Cycle factor = 10\*log(1/Duty Cycle)

## 6.4. Maximum Peak Power Spectral Density

### 6.4.1. Test Setup



#### Maximum Peak

- a) Check and ensure the spectrum analyzer well calibrate.
- b) Turn on the DUT and set DUT to transmit maximum power.
- c) Connect DUT's antenna terminal to spectrum analyzer with a low loss cable.
- d) Setting of Spectrum analyzer :
  - a. Set analyzer center frequency to DTS channel center frequency.
  - b. Set the span to 1.5 times the DTS bandwidth.
  - c. Set the RBW to  $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$ .
  - d. Set the VBW to  $\geq [3 \times \text{RBW}]$ .
  - e. Detector = peak.
  - f. Sweep time = auto couple.
  - g. Trace mode = max hold.
  - h. Allow trace to fully stabilize.
  - i. Use the peak marker function to determine the maximum amplitude level within the RBW.
  - j. If measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat.
- e) Measure every antenna port by repeat the step above for MIMO measurement.

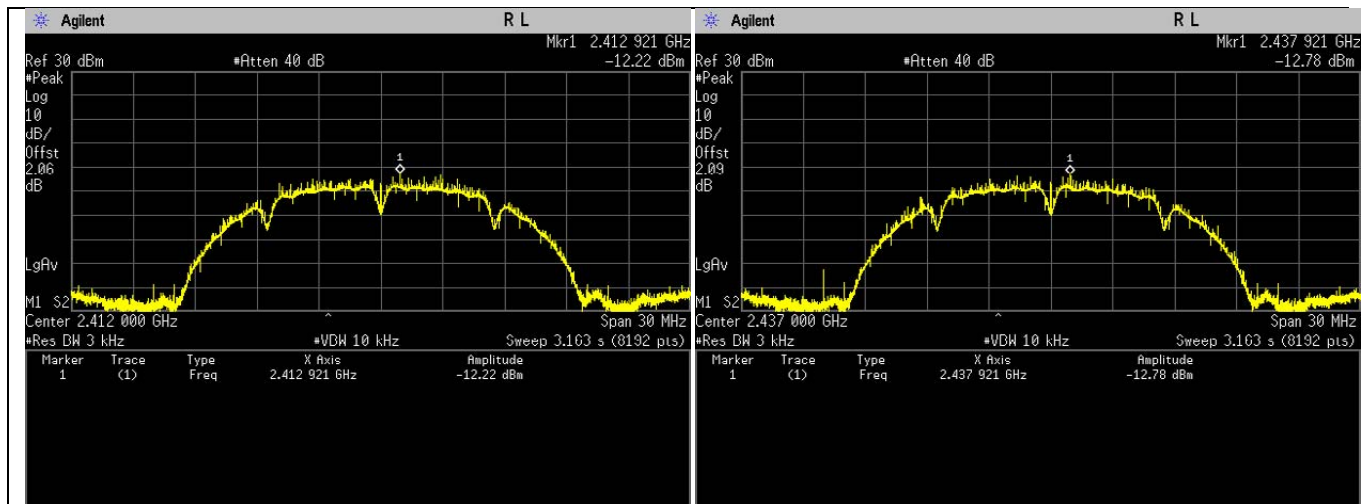
### 6.4.2. Test Limits

|                                             |
|---------------------------------------------|
| <b>Normal Condition (25 ° C)</b>            |
| <b><math>\leq 8 \text{ dBm/3kHz}</math></b> |

### 6.4.3. Test Result

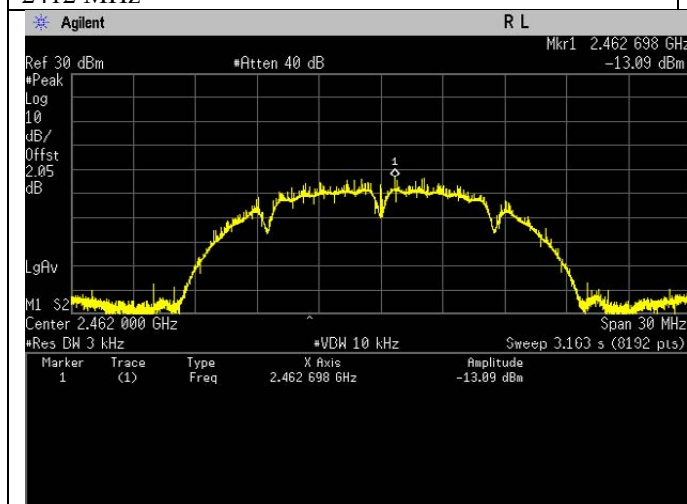
#### 802.11b

| Test Conditions |                 |                       |                  | Test Frequency | Results          |        |
|-----------------|-----------------|-----------------------|------------------|----------------|------------------|--------|
| Standard        | Modulation Type | Modulation Technology | Data Rate (mbps) | Tx (MHz)       | Power (dBm/3kHz) | Status |
| 802.11b         | DSSS            | DBPSK                 | 1                | 2412           | -12.22           | Pass   |
| 802.11b         | DSSS            | DBPSK                 | 1                | 2437           | -12.78           | Pass   |
| 802.11b         | DSSS            | DBPSK                 | 1                | 2462           | -13.09           | Pass   |



Maximum Power Spectral Density. 802.11b Frequency 2412 MHz

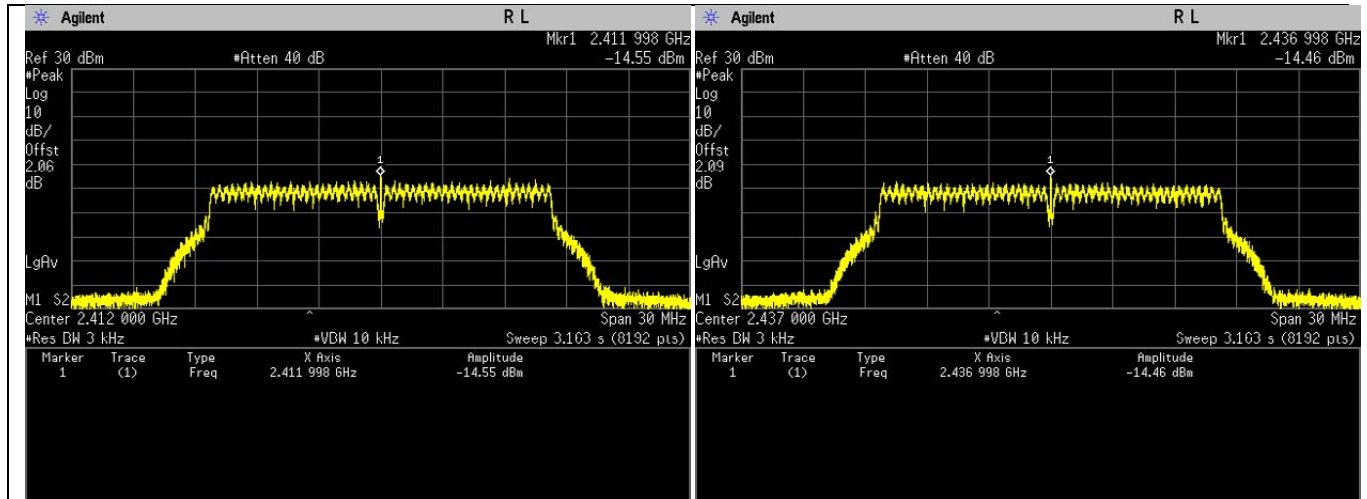
Maximum Power Spectral Density. 802.11b Frequency 2437 MHz



Maximum Power Spectral Density. 802.11b Frequency 2462 MHz

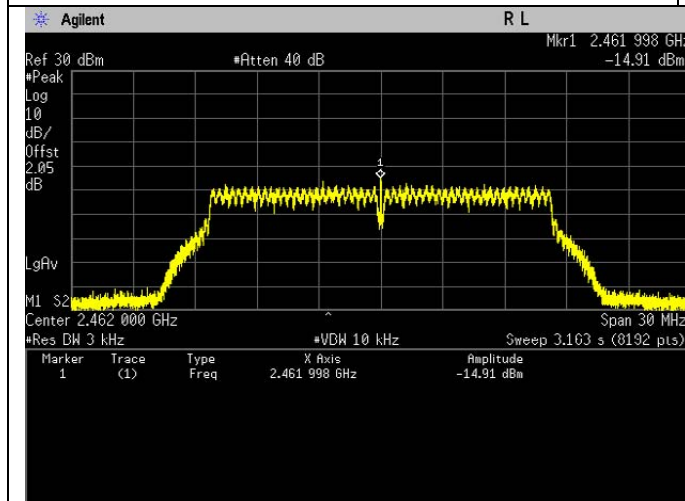
## 802.11g

| Test Conditions |                 |                       |                  | Test Frequency | Results          |        |
|-----------------|-----------------|-----------------------|------------------|----------------|------------------|--------|
| Standard        | Modulation Type | Modulation Technology | Data Rate (mbps) | Tx (MHz)       | Power (dBm/3kHz) | Status |
| 802.11g         | OFDM            | BPSK                  | 6                | 2412           | -14.55           | Pass   |
| 802.11g         | OFDM            | BPSK                  | 6                | 2437           | -14.46           | Pass   |
| 802.11g         | OFDM            | BPSK                  | 6                | 2462           | -14.91           | Pass   |



Maximum Power Spectral Density. 802.11g Frequency 2412 MHz

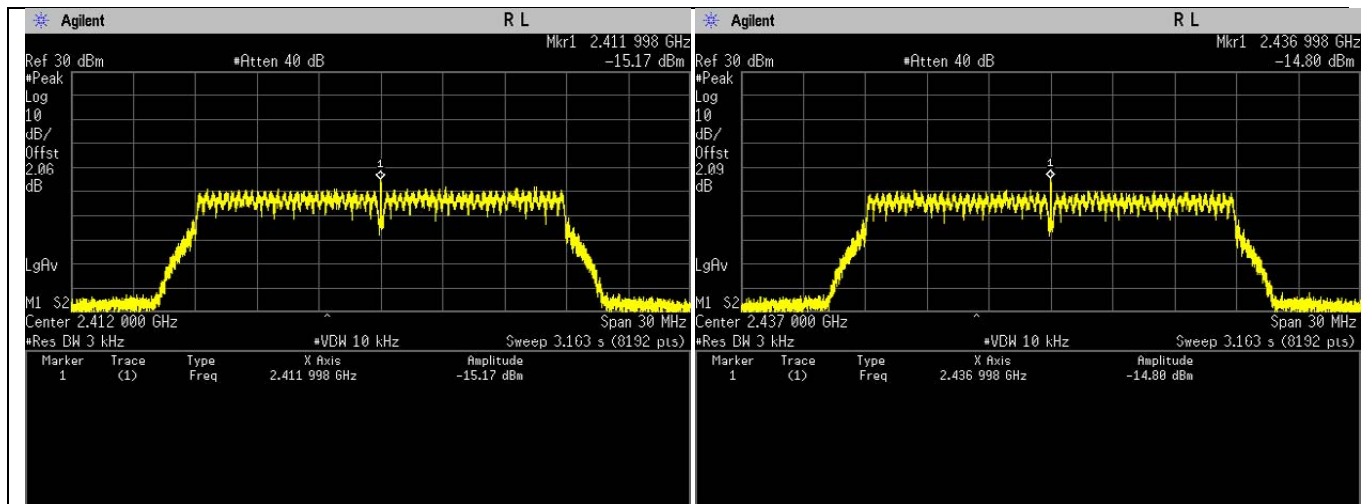
Maximum Power Spectral Density. 802.11g Frequency 2437 MHz



Maximum Power Spectral Density. 802.11g Frequency 2462 MHz

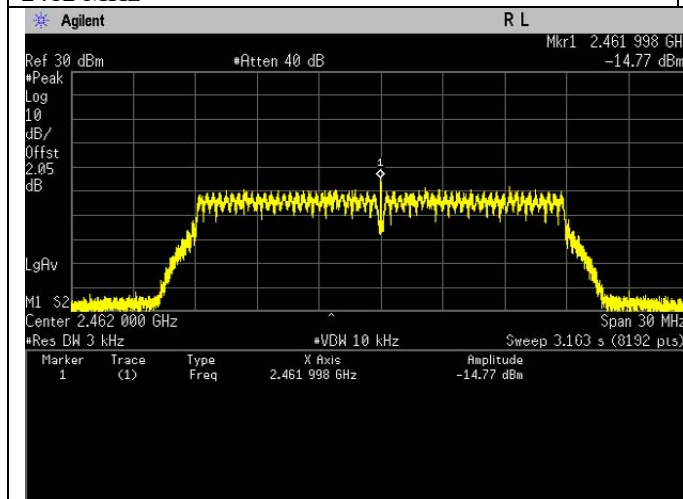
## 802.11n (HT20)

| Test Conditions |                 |                       |                  | Test Frequency | Results          |        |
|-----------------|-----------------|-----------------------|------------------|----------------|------------------|--------|
| Standard        | Modulation Type | Modulation Technology | Data Rate (mbps) | Tx (MHz)       | Power (dBm/3kHz) | Status |
| 802.11n         | OFDM            | BPSK                  | 6.5              | 2412           | -15.17           | Pass   |
| 802.11n         | OFDM            | BPSK                  | 6.5              | 2437           | -14.80           | Pass   |
| 802.11n         | OFDM            | BPSK                  | 6.5              | 2462           | -14.77           | Pass   |



Maximum Power Spectral Density. 802.11n Frequency 2412 MHz

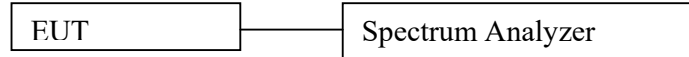
Maximum Power Spectral Density. 802.11n Frequency 2437 MHz



Maximum Power Spectral Density. 802.11n Frequency 2462 MHz

## 6.5. Conducted Spurious Emission

### 6.5.1. Test Setup



- a) Check and ensure the spectrum analyzer well calibrate.
- b) Turn on the DUT and set DUT to transmit maximum power.
- c) Connect DUT's antenna terminal to spectrum analyzer with a low loss cable.
- d) Setting of Spectrum analyzer :
  - a. RBW = 100 kHz
  - b. VBW = 300 kHz
  - c. Detector mode = Peak
  - d. Trace = Max Hold
  - e. Sweep = auto
- e) Use the peak marker function to measure highest emission and scan up to 10<sup>th</sup> harmonic.
- f) Measure every antenna port by repeat the step above for MIMO measurement.

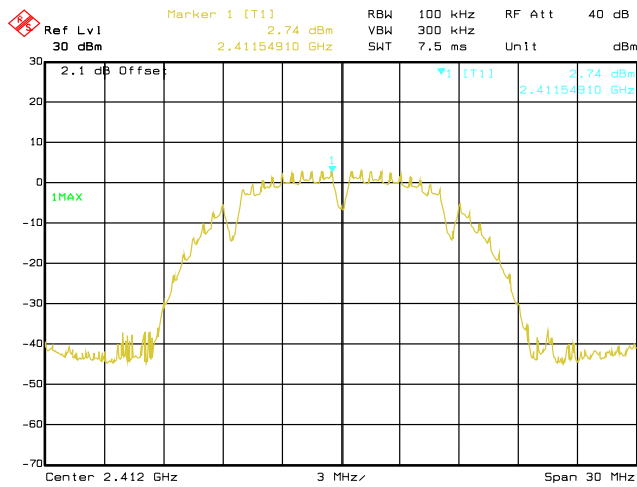
### 6.5.2. Test Limits:

|                                                        |
|--------------------------------------------------------|
| <b>Normal Condition (25 ° C)</b>                       |
| <b>Shall be at least 30 dB below peak (max) power.</b> |

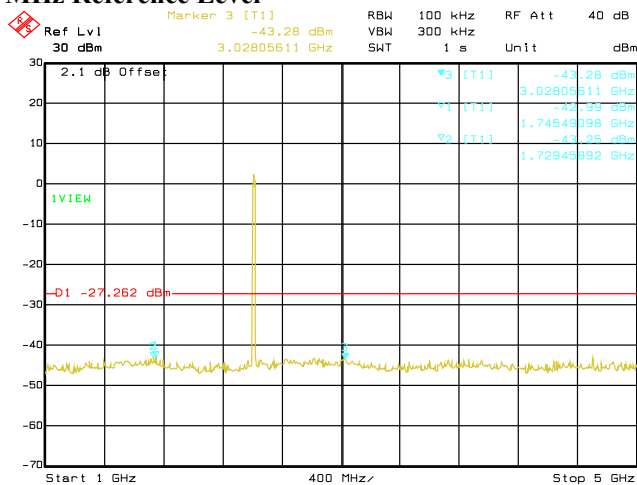
### 6.5.3. Test Result

#### 802.11b

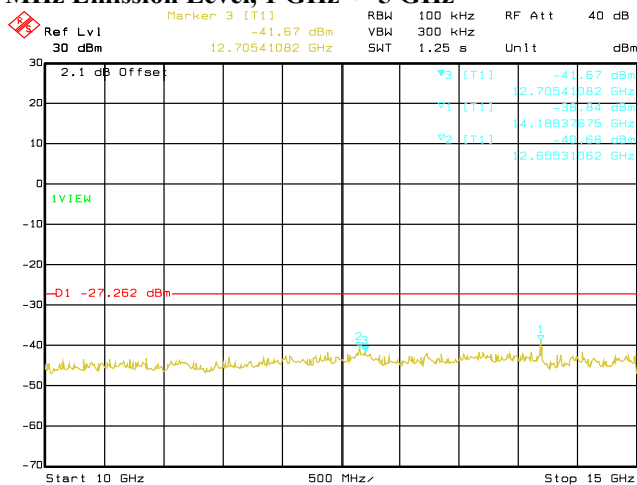
| Test Conditions |                 |                       |                  | Test Frequency | Results     |             |        |
|-----------------|-----------------|-----------------------|------------------|----------------|-------------|-------------|--------|
| Standard        | Modulation Type | Modulation Technology | Data Rate (mbps) | Tx (MHz)       | Spurs (MHz) | Level (dBm) | Status |
| 802.11b         | DSSS            | DBPSK                 | 1                | 2412           | 14188.38    | -38.84      | Pass   |
|                 |                 |                       |                  |                | 6993.99     | -39.28      | Pass   |
|                 |                 |                       |                  |                | 6743.49     | -39.93      | Pass   |
| 802.11b         | DSSS            | DBPSK                 | 1                | 2437           | 14188.38    | -39.18      | Pass   |
|                 |                 |                       |                  |                | 6653.31     | -39.48      | Pass   |
|                 |                 |                       |                  |                | 6963.93     | -39.57      | Pass   |
| 802.11b         | DSSS            | DBPSK                 | 1                | 2462           | 14188.38    | -37.89      | Pass   |
|                 |                 |                       |                  |                | 6613.23     | -39.68      | Pass   |
|                 |                 |                       |                  |                | 6953.91     | -39.69      | Pass   |



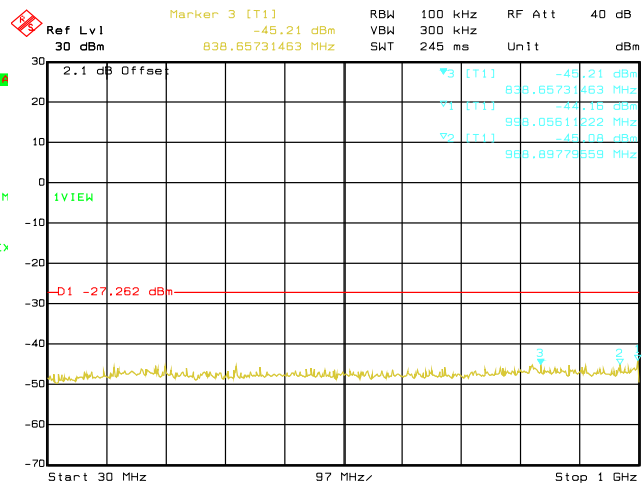
Conducted Emissions. 802.11b, Frequency 2412 MHz Reference Level



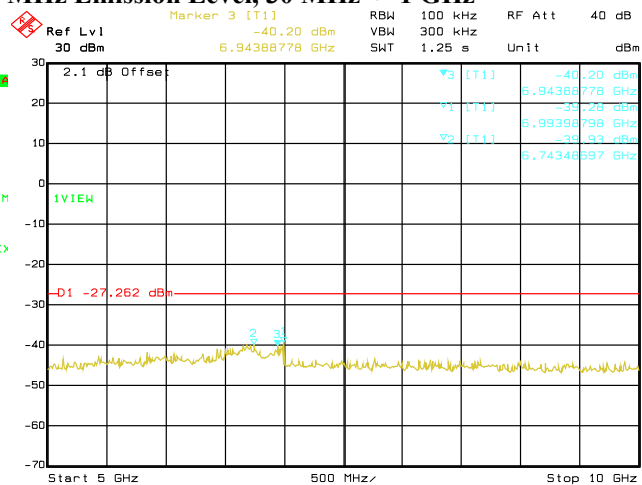
Conducted Emissions. 802.11b, Frequency 2412 MHz Emission Level, 1 GHz -> 5 GHz



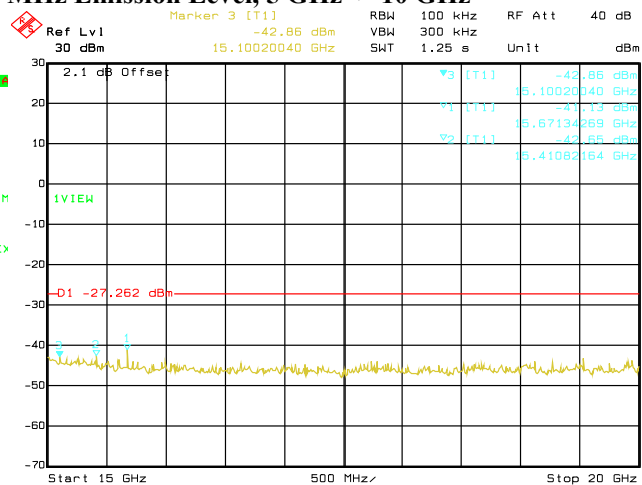
Conducted Emissions. 802.11b, Frequency 2412 Emission Level, 10 GHz -> 15 GHz



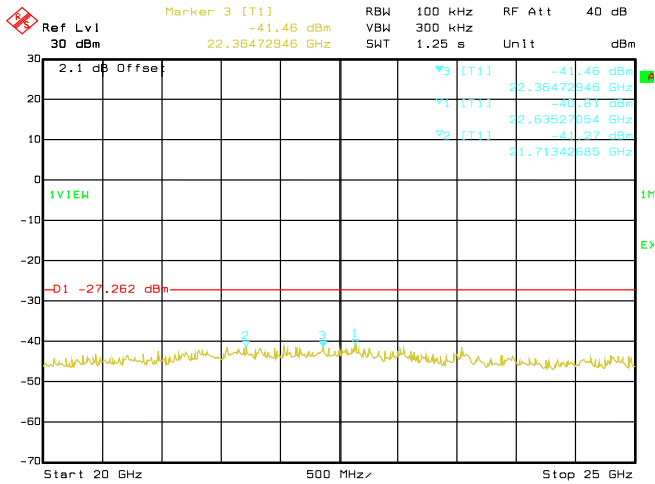
Conducted Emissions. 802.11b, Frequency 2412 MHz Emission Level, 30 MHz -> 1 GHz



Conducted Emissions. 802.11b, Frequency 2412 MHz Emission Level, 5 GHz -> 10 GHz

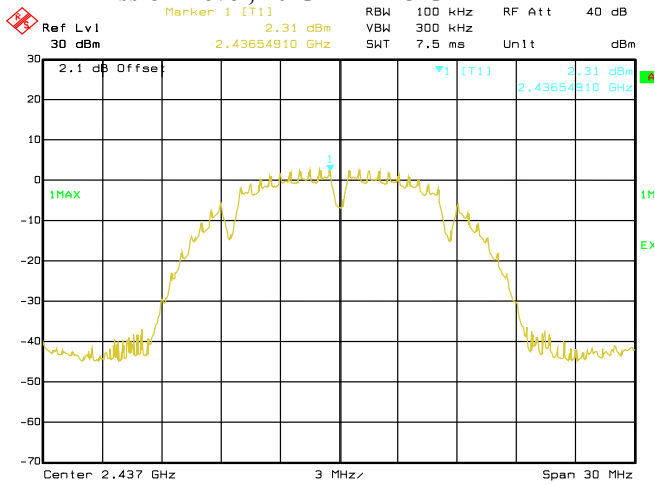


Conducted Emissions. 802.11b, Frequency 2412 MHz Emission Level, 15 GHz -> 20 GHz



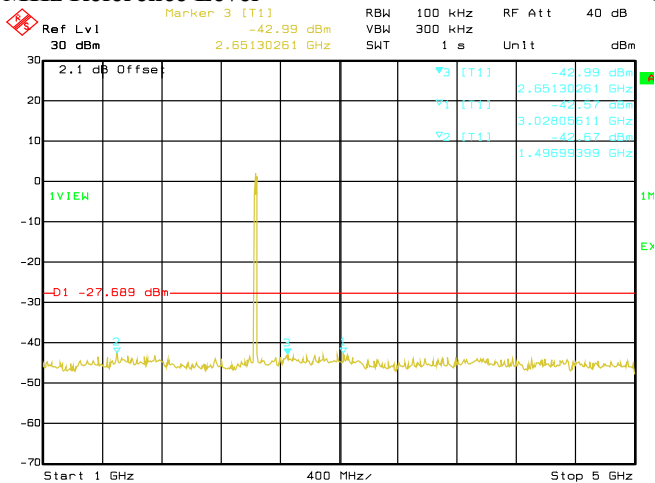
Date: 12.OCT.2020 05:10:03

### Conducted Emissions. 802.11b, Frequency 2412 MHz Emission Level, 20 GHz -> 25 GHz



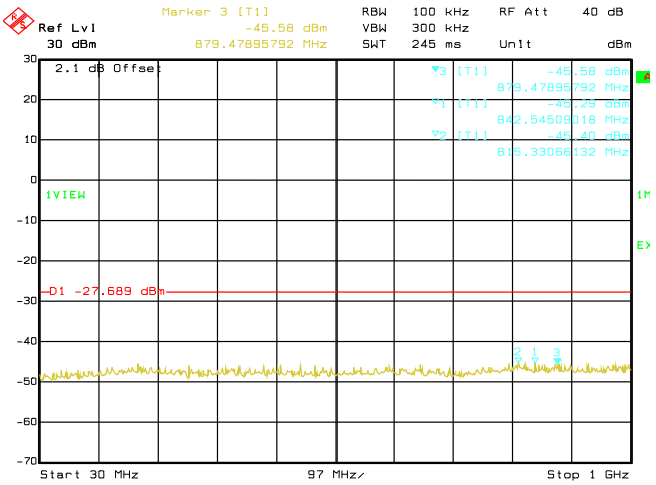
Date: 12.OCT.2020 05:13:40

### Conducted Emissions. 802.11b, Frequency 2437 MHz Reference Level



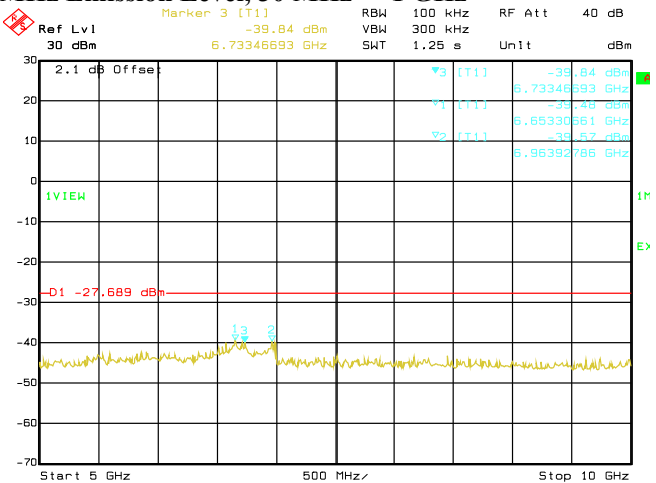
Date: 12.OCT.2020 05:15:27

### Conducted Emissions. 802.11b, Frequency 2437 MHz Emission Level, 1 GHz -> 5 GHz



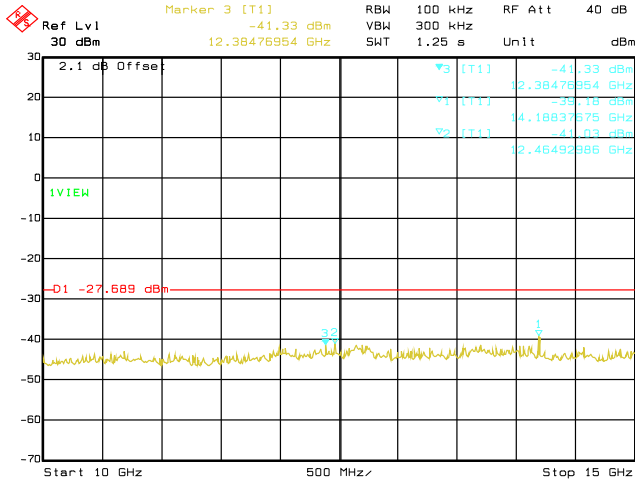
Date: 12.OCT.2020 05:14:33

### Conducted Emissions. 802.11b, Frequency 2437 MHz Emission Level, 30 MHz -> 1 GHz



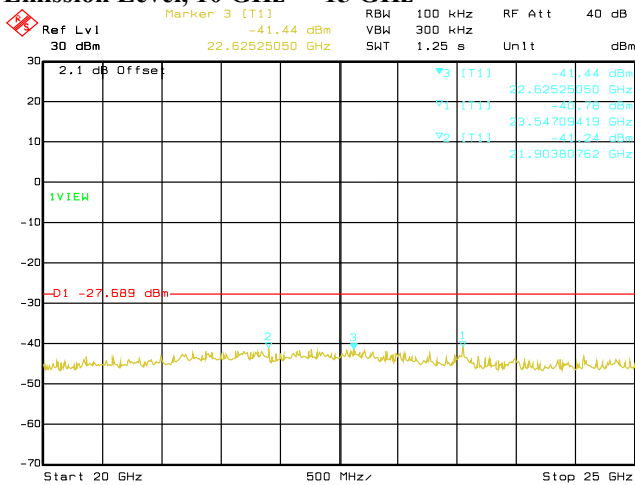
Date: 12.OCT.2020 05:16:21

### Conducted Emissions. 802.11b, Frequency 2437 MHz Emission Level, 5 GHz -> 10 GHz



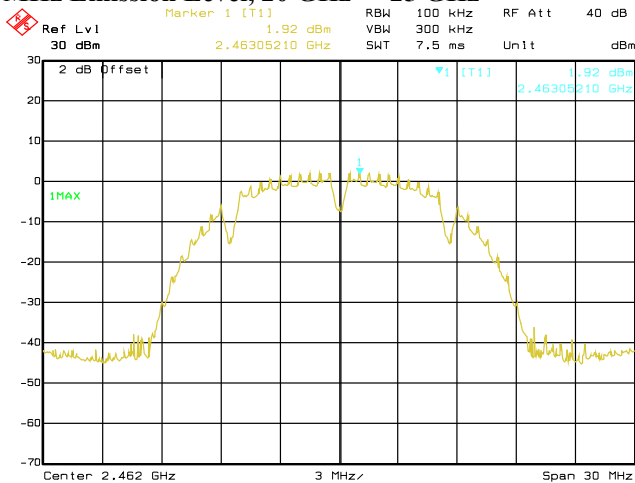
Date: 12.OCT.2020 05:17:14

**Conducted Emissions. 802.11b, Frequency 2437  
Emission Level, 10 GHz -> 15 GHz**



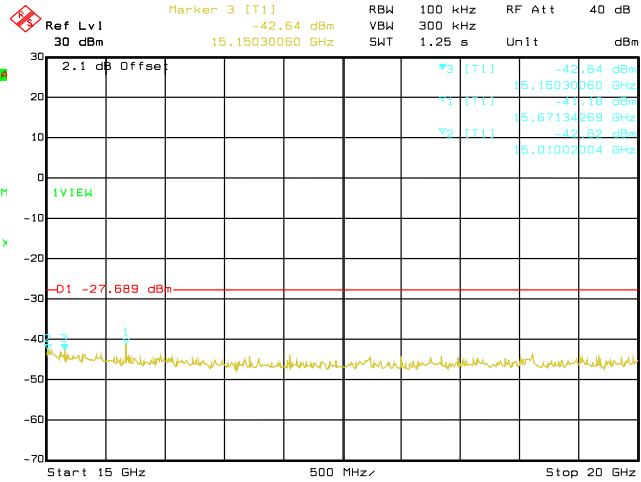
Date: 12.OCT.2020 05:19:01

**Conducted Emissions. 802.11b, Frequency 2437  
MHz Emission Level, 20 GHz -> 25 GHz**



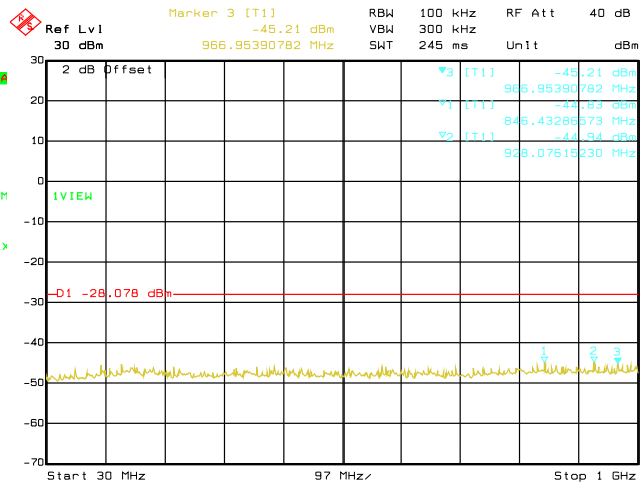
Date: 12.OCT.2020 05:20:26

**Conducted Emissions. 802.11b, Frequency 2462  
MHz Reference Level**



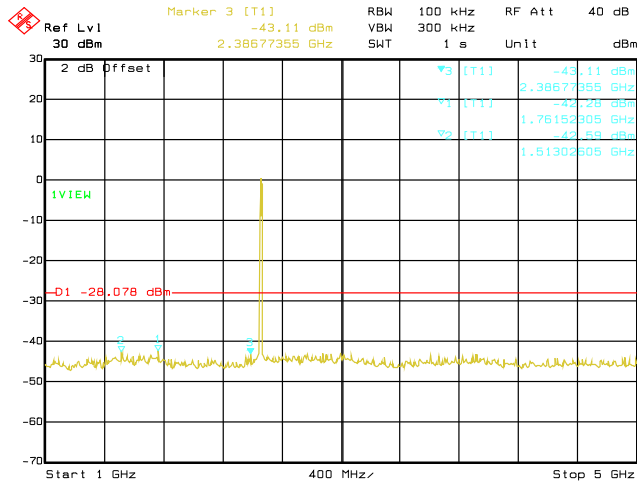
Date: 12.OCT.2020 05:18:07

**Conducted Emissions. 802.11b, Frequency 2437  
MHz Emission Level, 15 GHz -> 20 GHz**



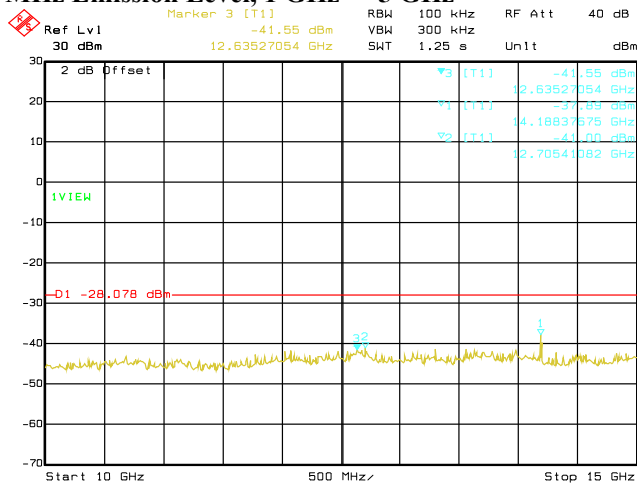
Date: 12.OCT.2020 05:21:19

**Conducted Emissions. 802.11b, Frequency 2462  
MHz Emission Level, 30 MHz -> 1 GHz**



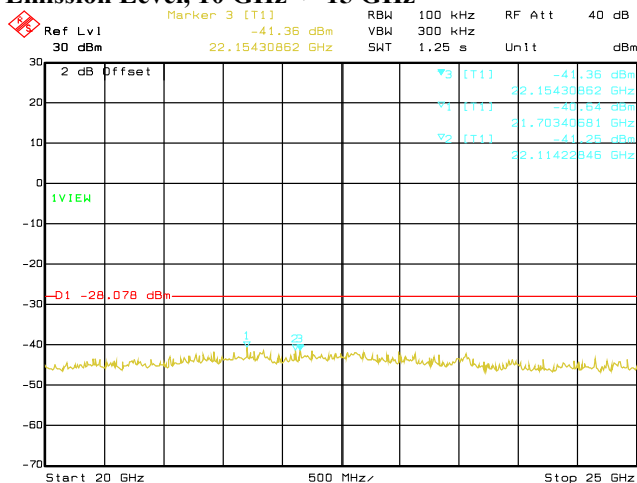
Date: 12.OCT.2020 05:22:13

**Conducted Emissions. 802.11b, Frequency 2462 MHz Emission Level, 1 GHz -> 5 GHz**



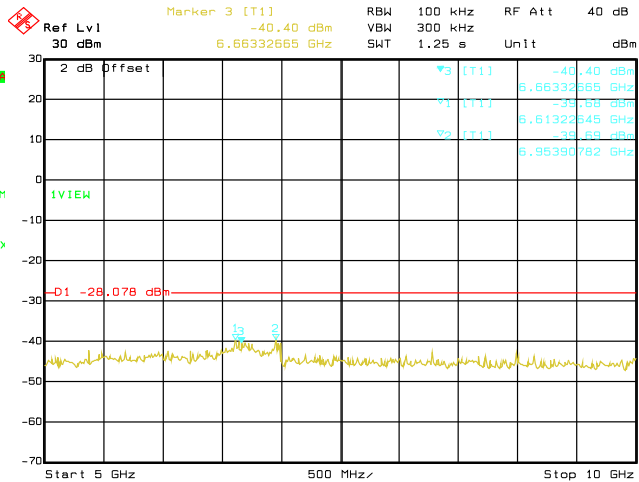
Date: 12.OCT.2020 05:24:00

**Conducted Emissions. 802.11b, Frequency 2462 MHz Emission Level, 10 GHz -> 15 GHz**



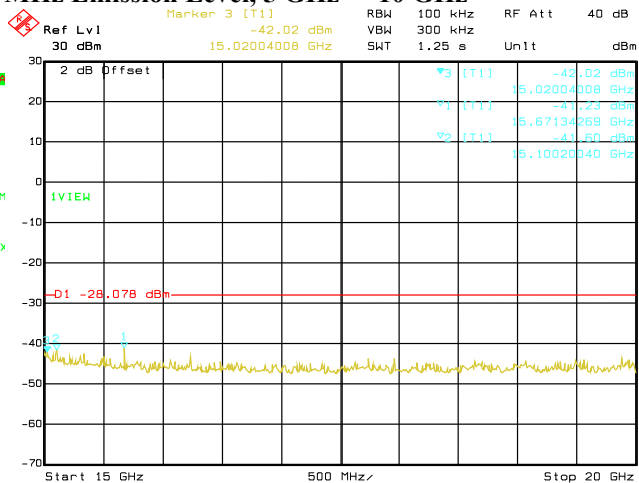
Date: 12.OCT.2020 05:25:46

**Conducted Emissions. 802.11b, Frequency 2462 MHz Emission Level, 20 GHz -> 25 GHz**



Date: 12.OCT.2020 05:23:06

**Conducted Emissions. 802.11b, Frequency 2462 MHz Emission Level, 5 GHz -> 10 GHz**

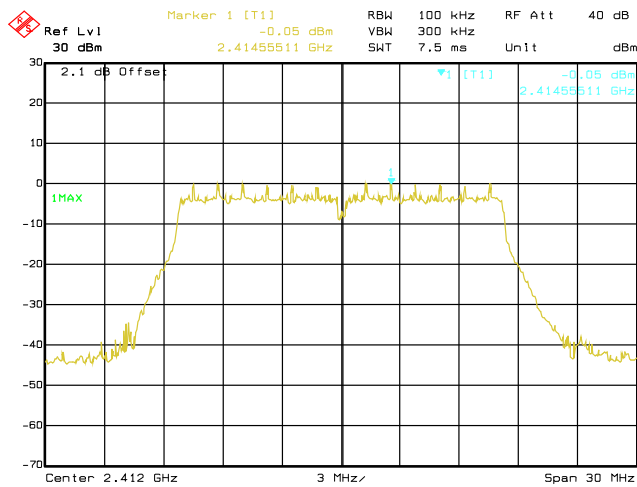


Date: 12.OCT.2020 05:24:53

**Conducted Emissions. 802.11b, Frequency 2462 MHz Emission Level, 15 GHz -> 20 GHz**

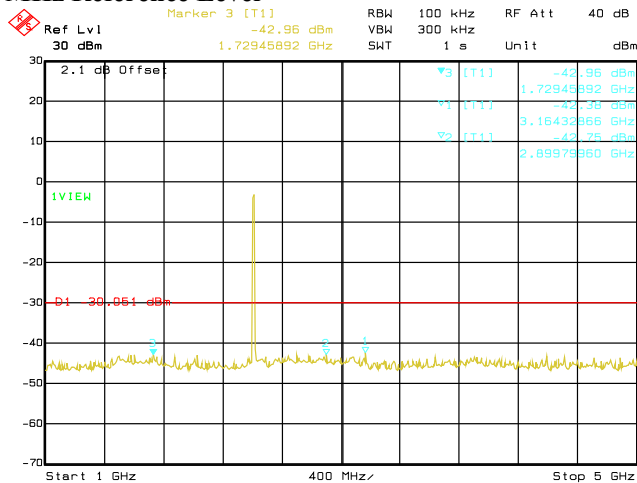
## 802.11g

| Test Conditions |                 |                       |                  | Test Frequency | Results     |             |        |
|-----------------|-----------------|-----------------------|------------------|----------------|-------------|-------------|--------|
| Standard        | Modulation Type | Modulation Technology | Data Rate (mbps) | Tx (MHz)       | Spurs (MHz) | Level (dBm) | Status |
| 802.11g         | OFDM            | BPSK                  | 6                | 2412           | 14198.40    | -39.36      | Pass   |
|                 |                 |                       |                  |                | 6713.43     | -39.49      | Pass   |
|                 |                 |                       |                  |                | 13737.47    | -40.37      | Pass   |
| 802.11g         | OFDM            | BPSK                  | 6                | 2437           | 14188.38    | -39.00      | Pass   |
|                 |                 |                       |                  |                | 6983.97     | -40.41      | Pass   |
|                 |                 |                       |                  |                | 6703.41     | -40.44      | Pass   |
| 802.11g         | OFDM            | BPSK                  | 6                | 2462           | 6993.99     | -38.61      | Pass   |
|                 |                 |                       |                  |                | 14188.38    | -39.46      | Pass   |
|                 |                 |                       |                  |                | 6663.33     | -39.84      | Pass   |



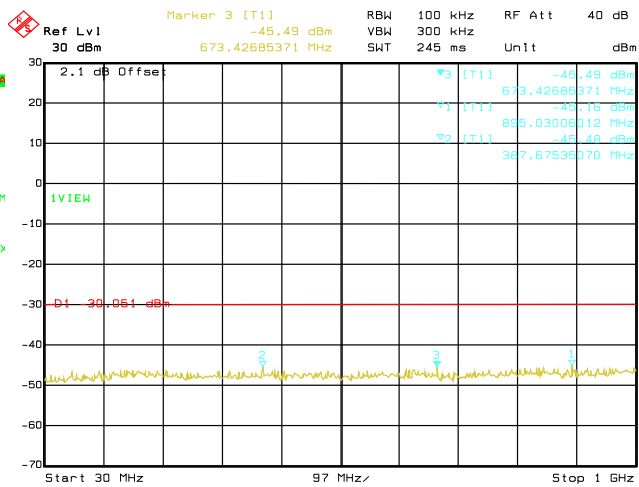
Date: 12.OCT.2020 07:14:54

### Conducted Emissions. 802.11g, Frequency 2412 MHz Reference Level



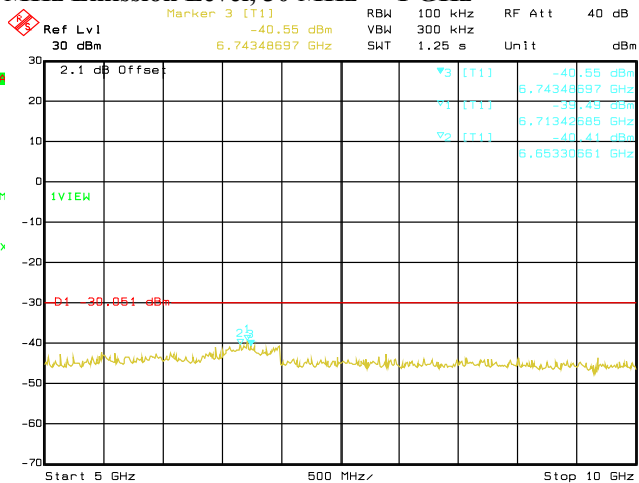
Date: 12.OCT.2020 07:16:42

### Conducted Emissions. 802.11g, Frequency 2412 MHz Emission Level, 1 GHz -> 5 GHz



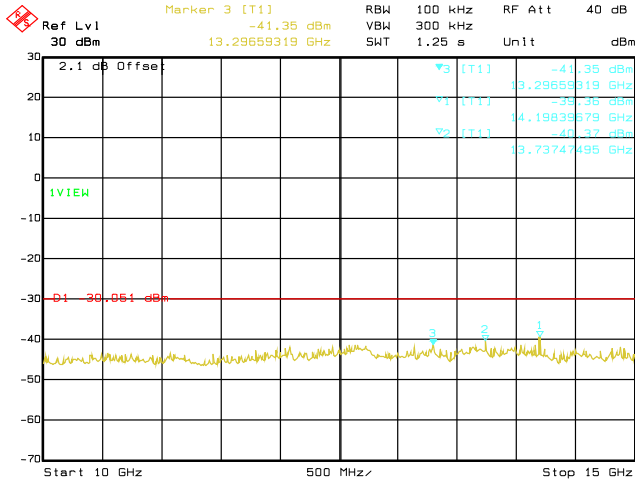
Date: 12.OCT.2020 07:15:48

### Conducted Emissions. 802.11g, Frequency 2412 MHz Emission Level, 30 MHz -> 1 GHz



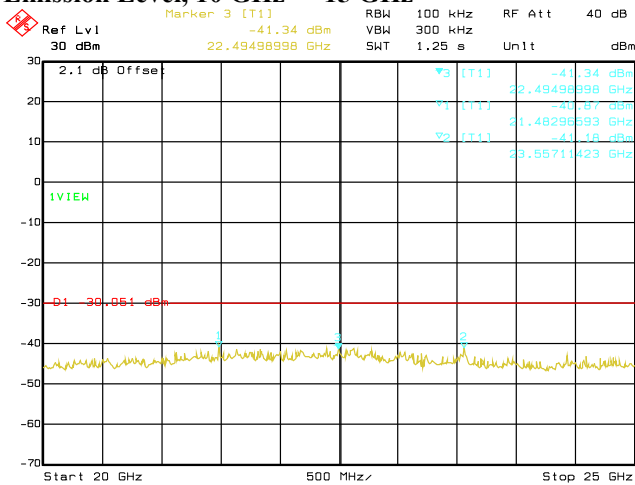
Date: 12.OCT.2020 07:17:35

### Conducted Emissions. 802.11g, Frequency 2412 MHz Emission Level, 5 GHz -> 10 GHz



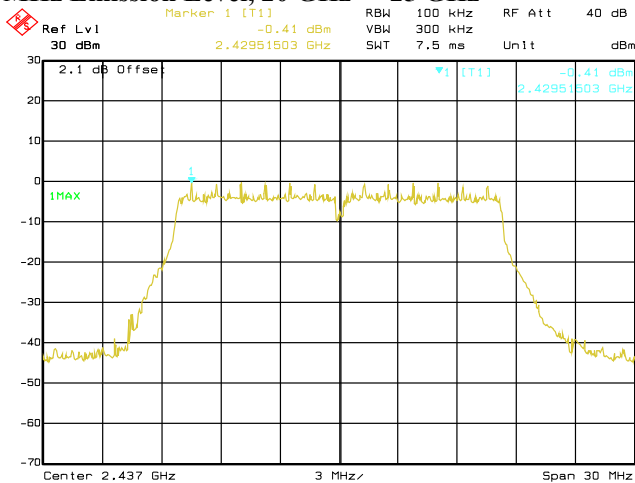
Date: 12.OCT.2020 07:18:28

**Conducted Emissions. 802.11g, Frequency 2412  
Emission Level, 10 GHz -> 15 GHz**



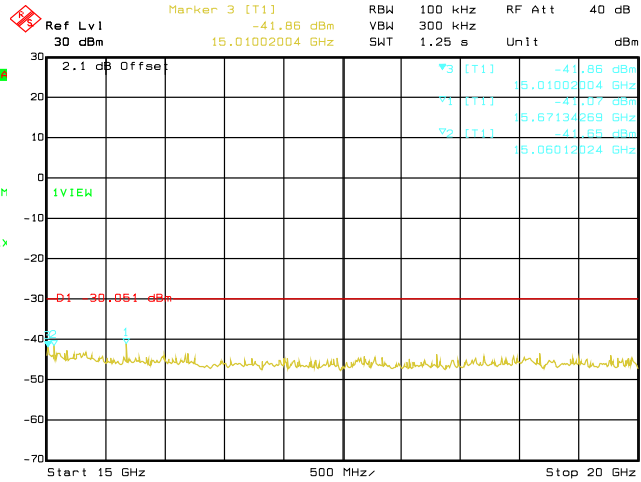
Date: 12.OCT.2020 07:20:14

**Conducted Emissions. 802.11g, Frequency 2412  
MHz Emission Level, 20 GHz -> 25 GHz**



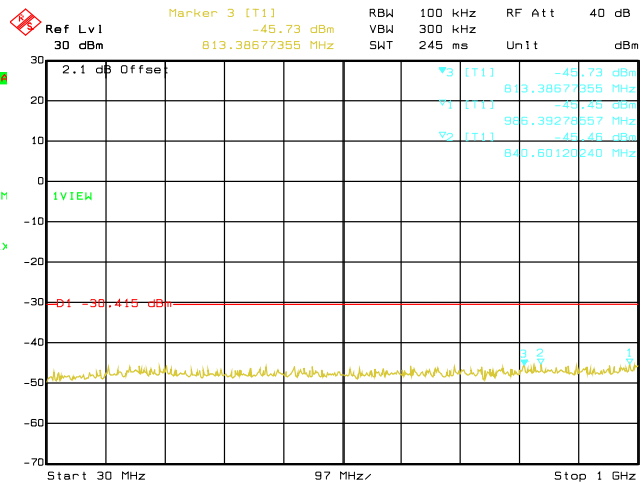
Date: 12.OCT.2020 07:25:05

**Conducted Emissions. 802.11g, Frequency 2437  
MHz Reference Level**



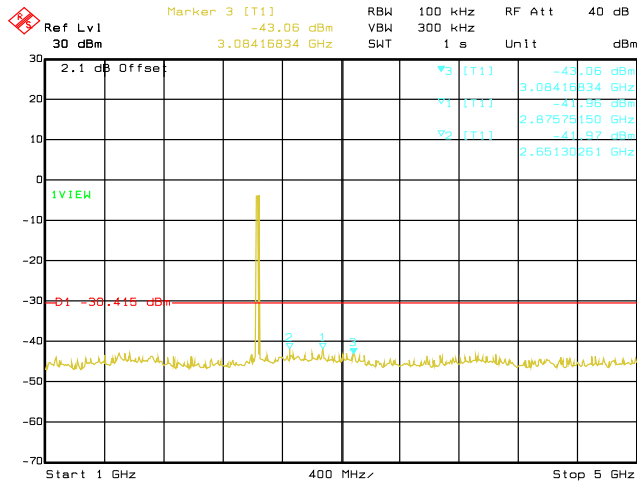
Date: 12.OCT.2020 07:19:21

**Conducted Emissions. 802.11g, Frequency 2412  
MHz Emission Level, 15 GHz -> 20 GHz**



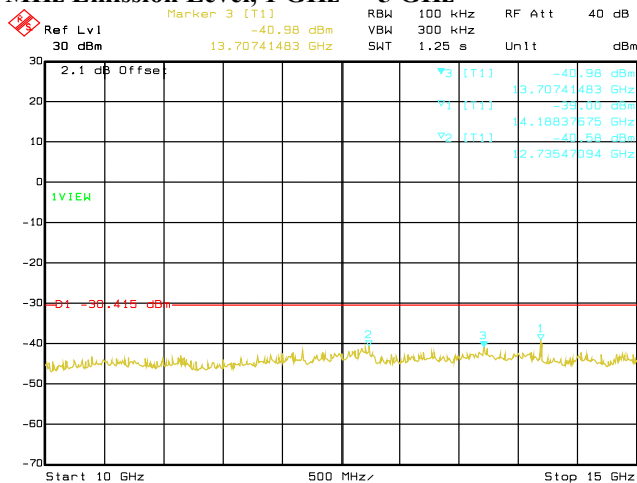
Date: 12.OCT.2020 07:25:59

**Conducted Emissions. 802.11g, Frequency 2437  
MHz Emission Level, 30 MHz -> 1 GHz**



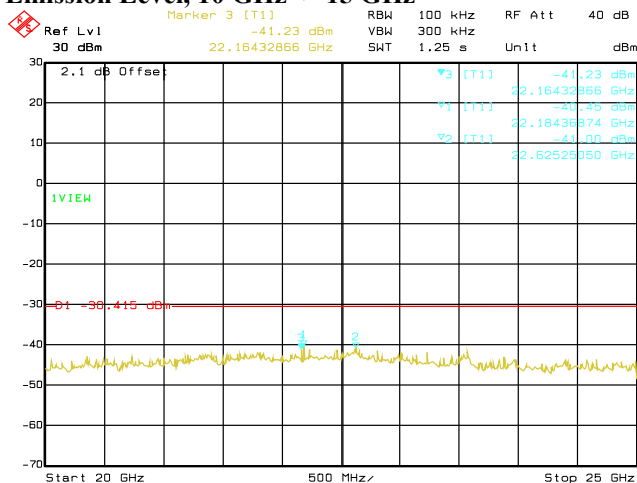
Date: 12.OCT.2020 07:26:53

### Conducted Emissions. 802.11g, Frequency 2437 MHz Emission Level, 1 GHz -> 5 GHz



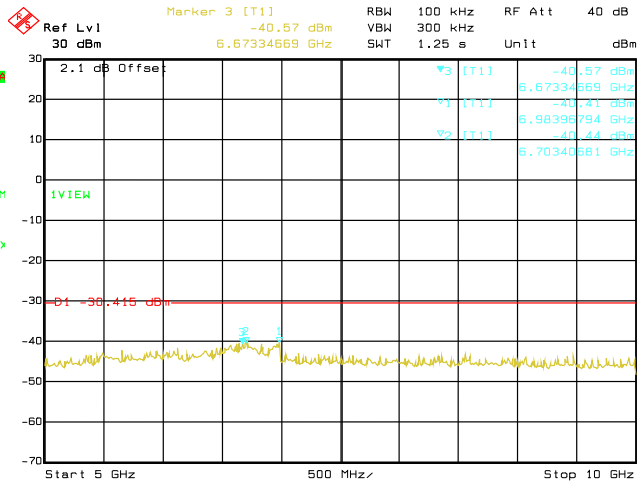
Date: 12.OCT.2020 07:28:39

### Conducted Emissions. 802.11g, Frequency 2437 MHz Emission Level, 10 GHz -> 15 GHz



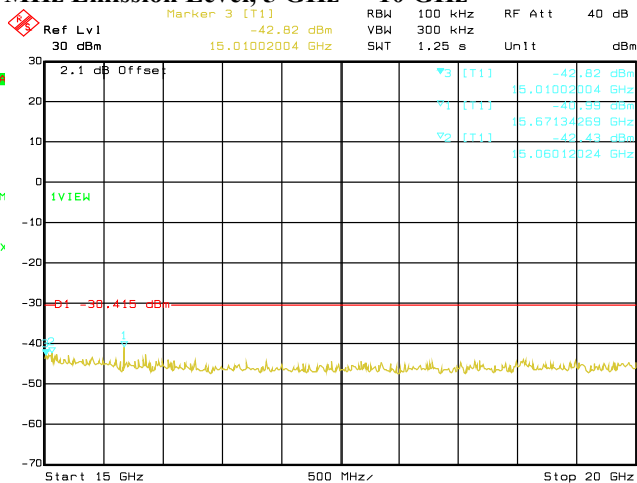
Date: 12.OCT.2020 07:30:25

### Conducted Emissions. 802.11g, Frequency 2437 MHz Emission Level, 20 GHz -> 25 GHz



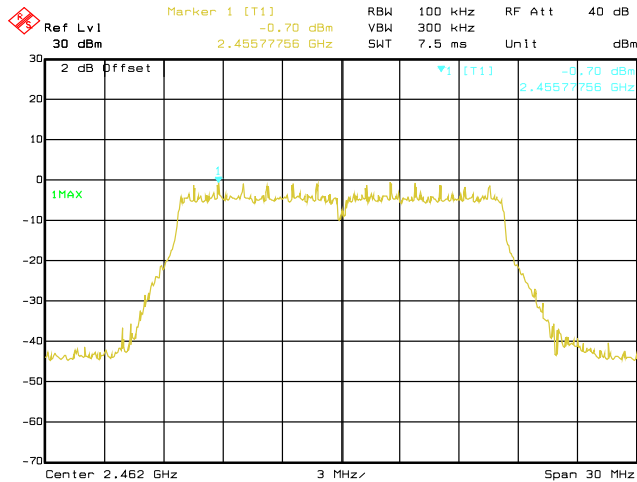
Date: 12.OCT.2020 07:27:46

### Conducted Emissions. 802.11g, Frequency 2437 MHz Emission Level, 5 GHz -> 10 GHz



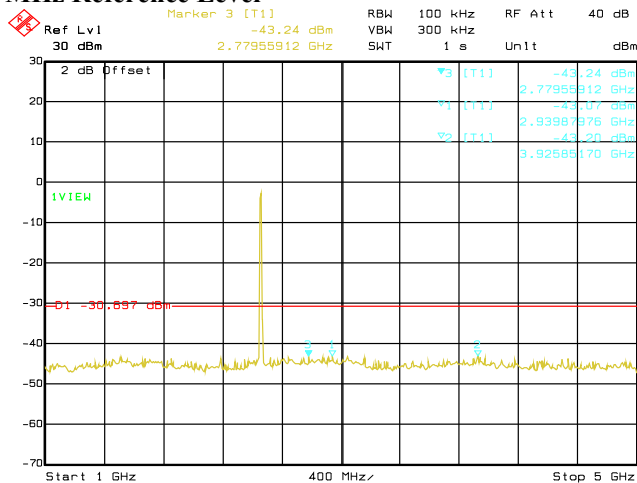
Date: 12.OCT.2020 07:29:33

### Conducted Emissions. 802.11g, Frequency 2437 MHz Emission Level, 15 GHz -> 20 GHz



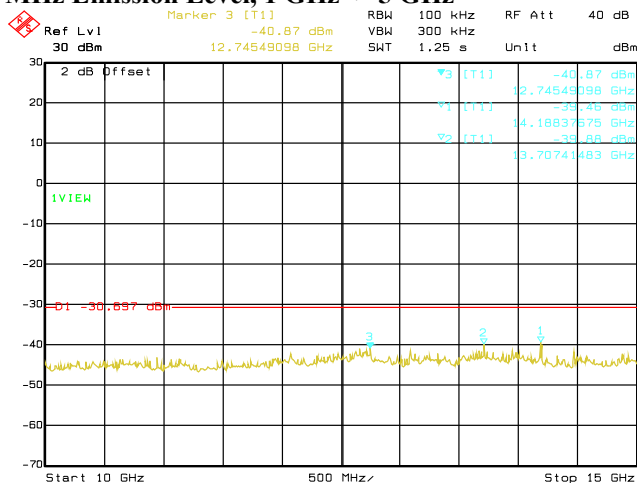
Date: 12.OCT.2020 07:32:00

### Conducted Emissions. 802.11g, Frequency 2462 MHz Reference Level



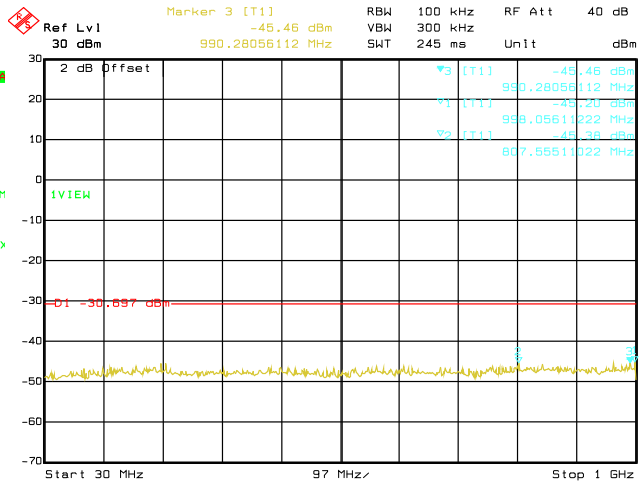
Date: 12.OCT.2020 07:33:48

### Conducted Emissions. 802.11g, Frequency 2462 MHz Emission Level, 1 GHz -> 5 GHz



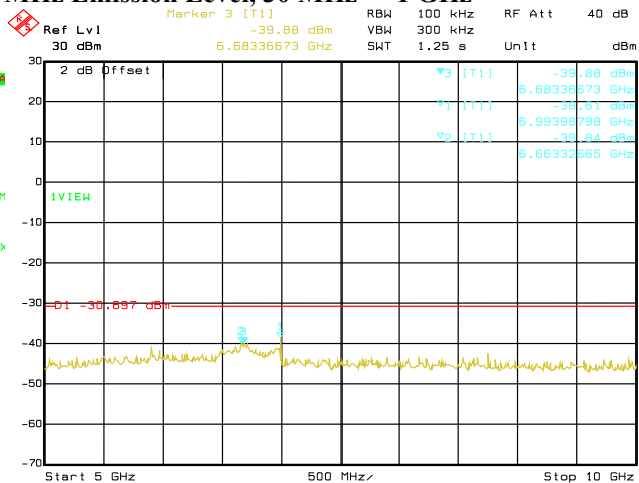
Date: 12.OCT.2020 07:35:34

### Conducted Emissions. 802.11g, Frequency 2462 Emission Level, 10 GHz -> 15 GHz



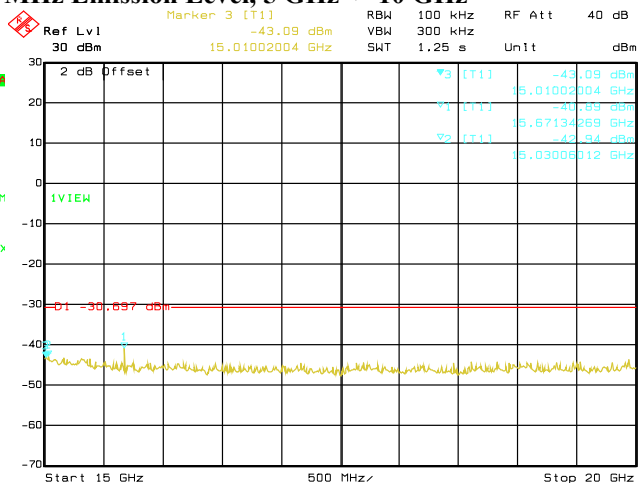
Date: 12.OCT.2020 07:32:54

### Conducted Emissions. 802.11g, Frequency 2462 MHz Emission Level, 30 MHz -> 1 GHz



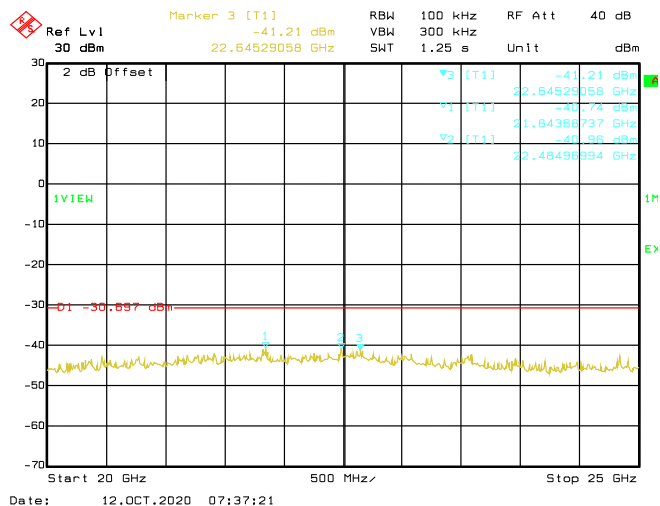
Date: 12.OCT.2020 07:34:41

### Conducted Emissions. 802.11g, Frequency 2462 MHz Emission Level, 5 GHz -> 10 GHz



Date: 12.OCT.2020 07:36:27

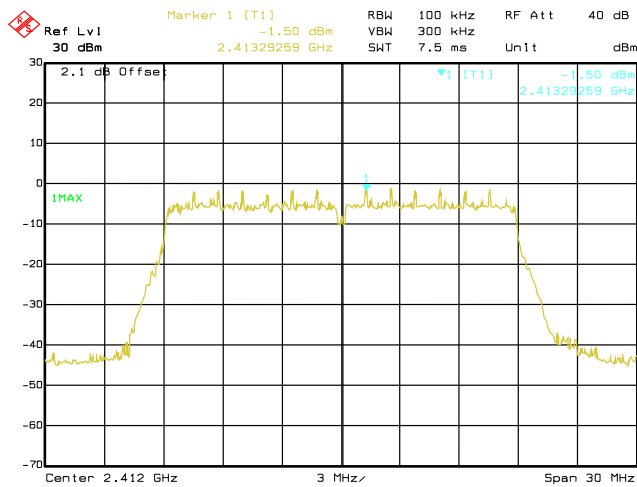
### Conducted Emissions. 802.11g, Frequency 2462 MHz Emission Level, 15 GHz -> 20 GHz



**Conducted Emissions. 802.11g, Frequency 2462  
 MHz Emission Level, 20 GHz -> 25 GHz**

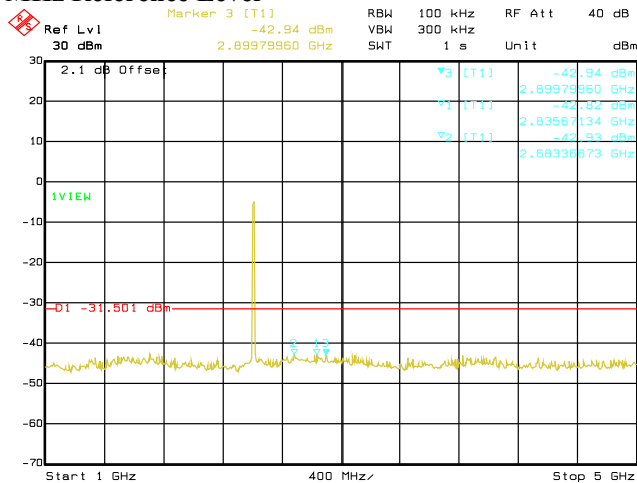
### 802.11n (HT20)

| Test Conditions |                 |                       |                  | Test Frequency | Results     |             |        |
|-----------------|-----------------|-----------------------|------------------|----------------|-------------|-------------|--------|
| Standard        | Modulation Type | Modulation Technology | Data Rate (mbps) | Tx (MHz)       | Spurs (MHz) | Level (dBm) | Status |
| 802.11n         | OFDM            | BPSK                  | 6.5              | 2412           | 14188.38    | -39.11      | Pass   |
|                 |                 |                       |                  |                | 6693.39     | -40.01      | Pass   |
|                 |                 |                       |                  |                | 6673.35     | -40.31      | Pass   |
| 802.11n         | OFDM            | BPSK                  | 6.5              | 2437           | 14188.38    | -39.09      | Pass   |
|                 |                 |                       |                  |                | 6703.41     | -39.48      | Pass   |
|                 |                 |                       |                  |                | 6993.99     | -40.34      | Pass   |
| 802.11n         | OFDM            | BPSK                  | 6.5              | 2462           | 14188.38    | -39.08      | Pass   |
|                 |                 |                       |                  |                | 6673.35     | -40.03      | Pass   |
|                 |                 |                       |                  |                | 6723.45     | -40.23      | Pass   |



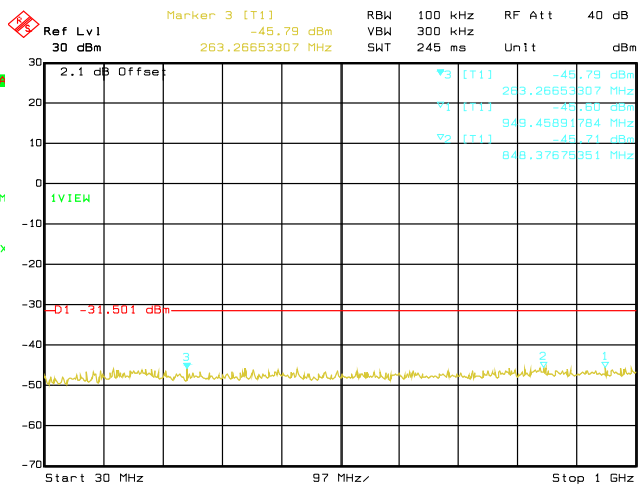
Date: 12.OCT.2020 07:40:13

### Conducted Emissions. 802.11n, Frequency 2412 MHz Reference Level



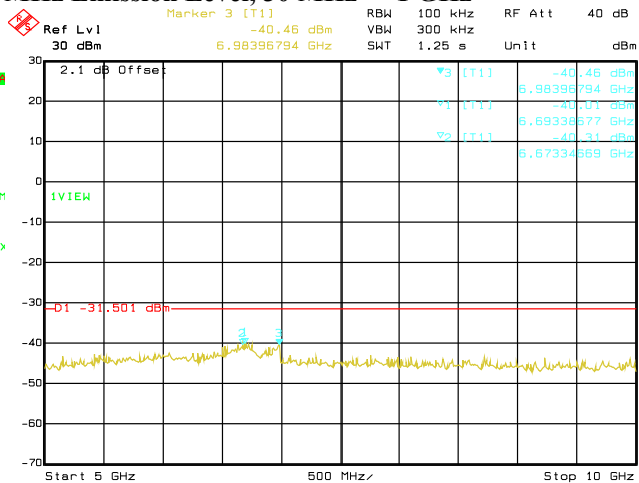
Date: 12.OCT.2020 07:42:01

### Conducted Emissions. 802.11n, Frequency 2412 MHz Emission Level, 1 GHz -> 5 GHz



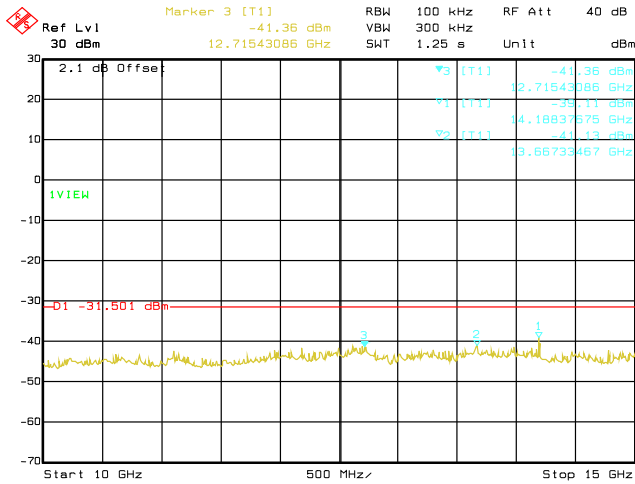
Date: 12.OCT.2020 07:41:07

### Conducted Emissions. 802.11n, Frequency 2412 MHz Emission Level, 30 MHz -> 1 GHz

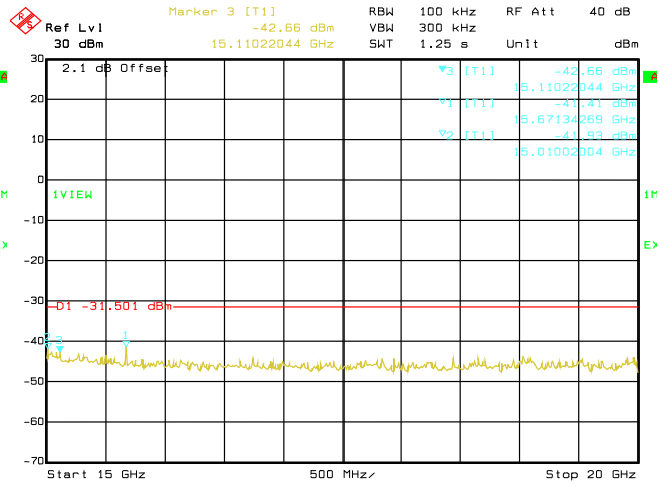


Date: 12.OCT.2020 07:42:54

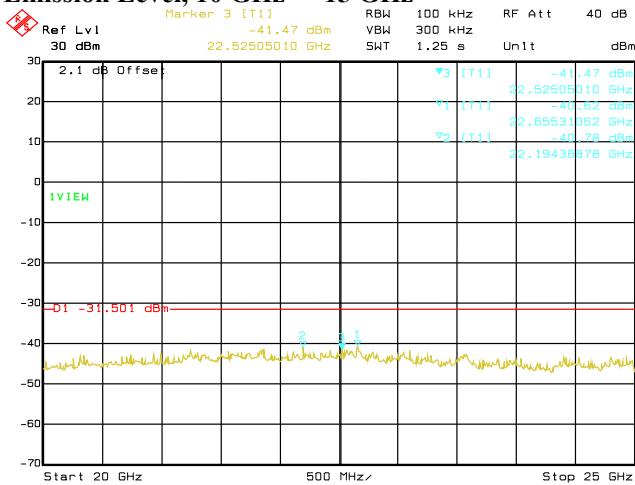
### Conducted Emissions. 802.11n, Frequency 2412 MHz Emission Level, 5 GHz -> 10 GHz



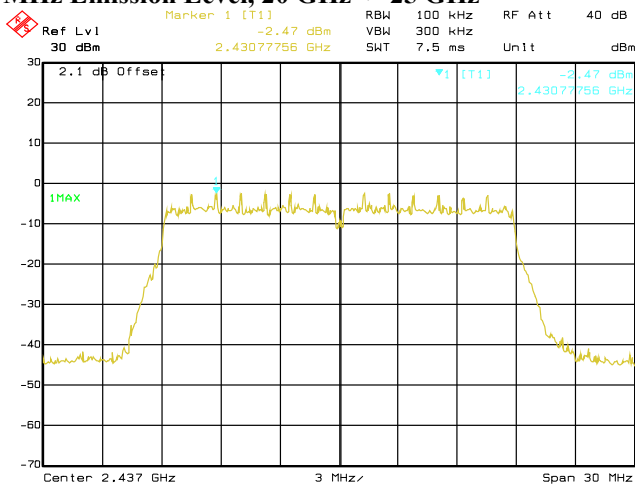
**Conducted Emissions. 802.11n, Frequency 2412 MHz Emission Level, 10 GHz -> 15 GHz**



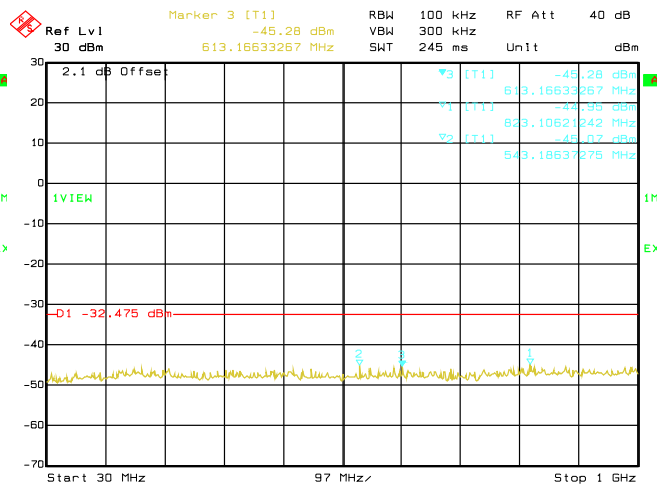
**Conducted Emissions. 802.11n, Frequency 2412 MHz Emission Level, 15 GHz -> 20 GHz**



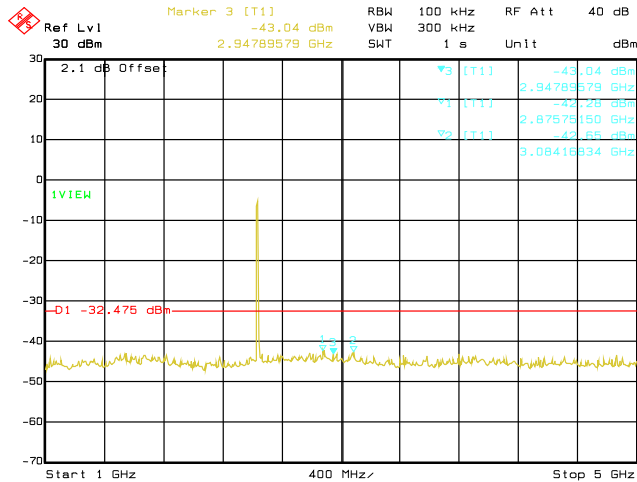
**Conducted Emissions. 802.11n, Frequency 2412 MHz Emission Level, 20 GHz -> 25 GHz**



**Conducted Emissions. 802.11n, Frequency 2437 MHz Reference Level**

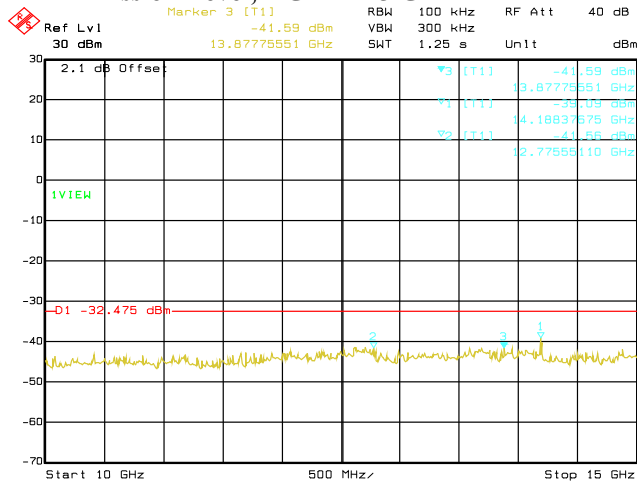


**Conducted Emissions. 802.11n, Frequency 2437 MHz Emission Level, 30 MHz -> 1 GHz**



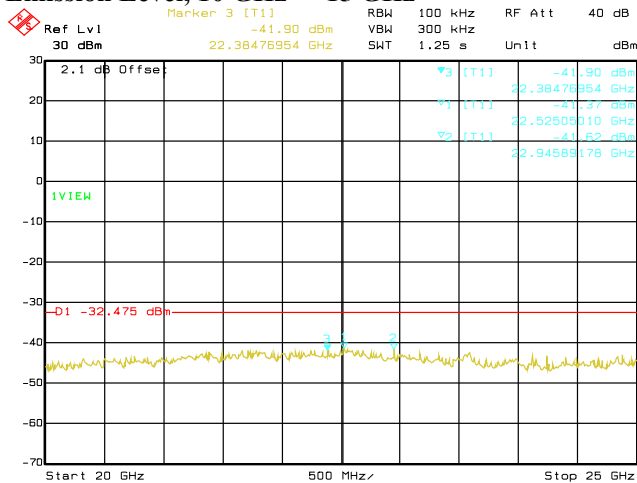
Date: 12.OCT.2020 07:48:33

**Conducted Emissions. 802.11n, Frequency 2437  
MHz Emission Level, 1 GHz -> 5 GHz**



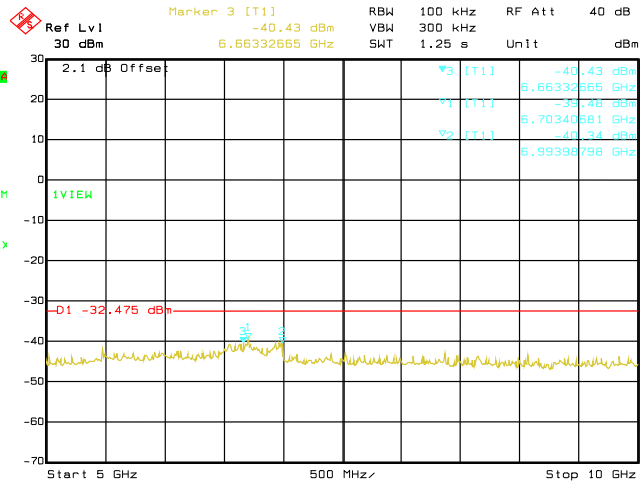
Date: 12.OCT.2020 07:50:19

**Conducted Emissions. 802.11n, Frequency 2437  
MHz Emission Level, 10 GHz -> 15 GHz**



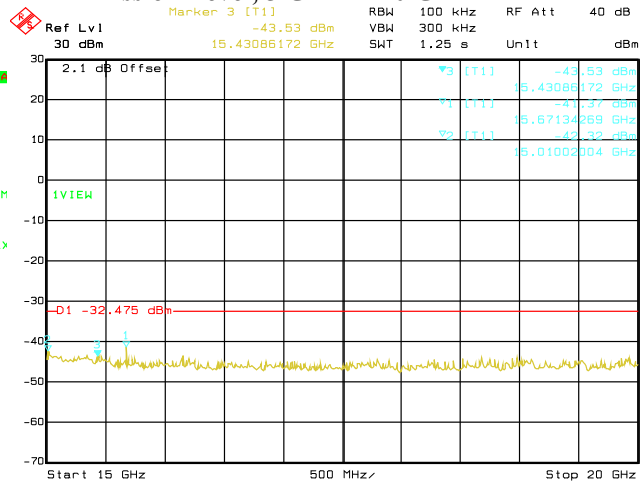
Date: 12.OCT.2020 07:52:05

**Conducted Emissions. 802.11n, Frequency 2437  
MHz Emission Level, 20 GHz -> 25 GHz**



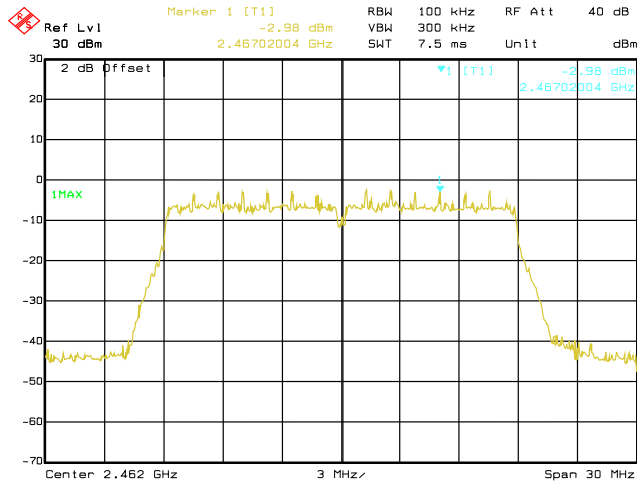
Date: 12.OCT.2020 07:49:26

**Conducted Emissions. 802.11n, Frequency 2437  
MHz Emission Level, 5 GHz -> 10 GHz**



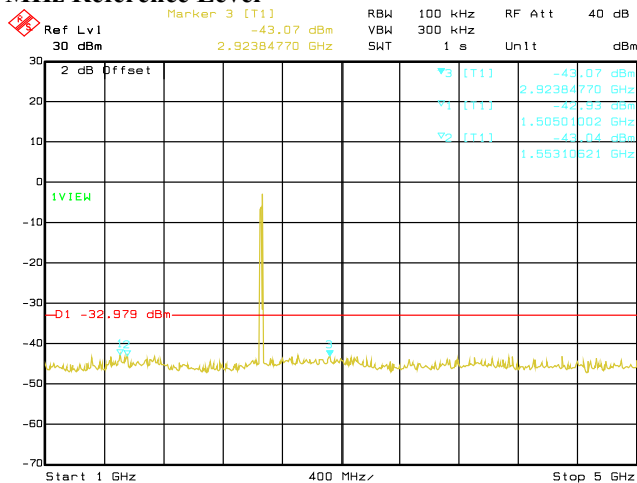
Date: 12.OCT.2020 07:51:12

**Conducted Emissions. 802.11n, Frequency 2437  
MHz Emission Level, 15 GHz -> 20 GHz**



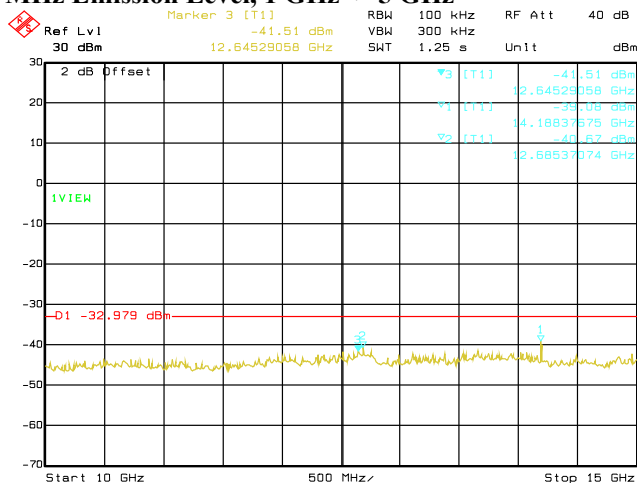
Date: 12.OCT.2020 07:53:19

### Conducted Emissions. 802.11n, Frequency 2462 MHz Reference Level



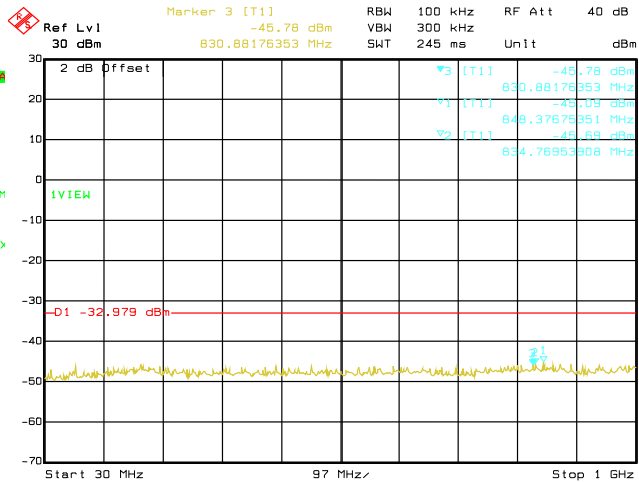
Date: 12.OCT.2020 07:55:07

### Conducted Emissions. 802.11n, Frequency 2462 MHz Emission Level, 1 GHz -> 5 GHz



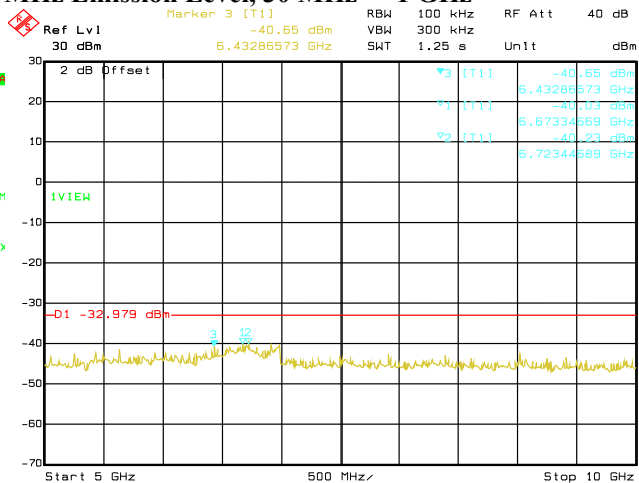
Date: 12.OCT.2020 07:56:53

### Conducted Emissions. 802.11n, Frequency 2462 Emission Level, 10 GHz -> 15 GHz



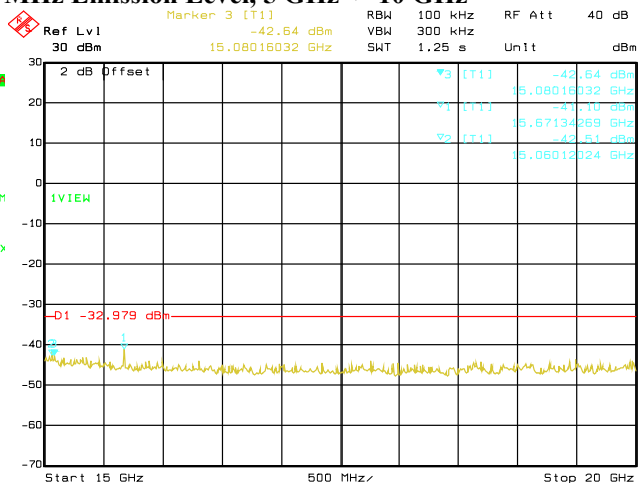
Date: 12.OCT.2020 07:54:12

### Conducted Emissions. 802.11n, Frequency 2462 MHz Emission Level, 30 MHz -> 1 GHz



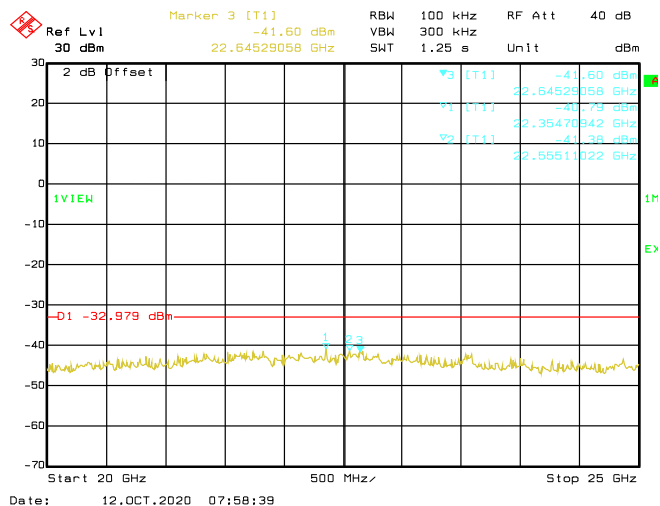
Date: 12.OCT.2020 07:55:59

### Conducted Emissions. 802.11n, Frequency 2462 MHz Emission Level, 5 GHz -> 10 GHz



Date: 12.OCT.2020 07:57:46

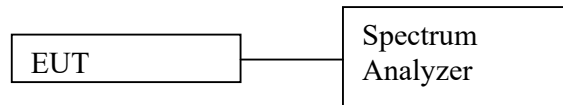
### Conducted Emissions. 802.11n, Frequency 2462 MHz Emission Level, 15 GHz -> 20 GHz



**Conducted Emissions. 802.11n, Frequency 2462  
 MHz Emission Level, 20 GHz -> 25 GHz**

## 6.6. Band edge Conducted Spurious Emission

### 6.6.1. Test Setup



- a) Check and ensure the spectrum analyzer well calibrate.
- b) Turn on the DUT and set DUT to transmit maximum power.
- c) Connect DUT's antenna terminal to spectrum analyzer with a low loss cable.
- d) Setting of Spectrum analyzer :
  - a. RBW = 100 kHz
  - b. VBW = 300 kHz
  - c. Detector mode = Peak
  - d. Trace = Max Hold
  - e. Sweep = auto
- e) Use the peak marker function to measure highest emission.
- f) Measure every antenna port by repeat the step above for MIMO measurement.

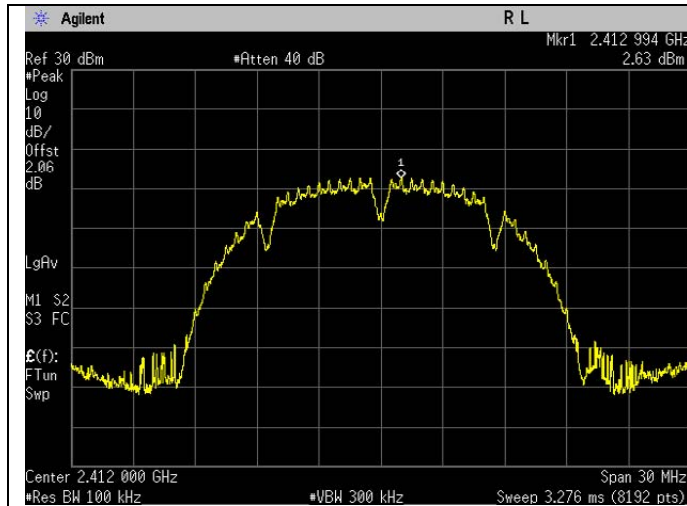
### 6.6.2. Test Limits:

|                                                        |
|--------------------------------------------------------|
| <b>Normal Condition (25 ° C)</b>                       |
| <b>Shall be at least 30 dB below peak (max) power.</b> |

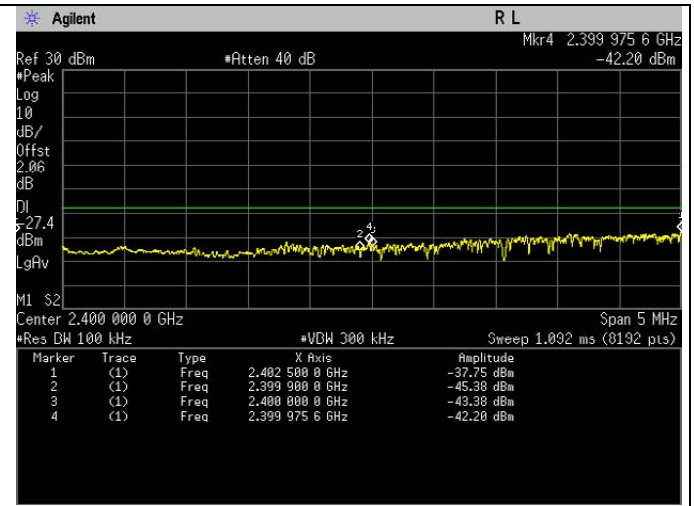
### 6.6.3. Test Result

#### 802.11b

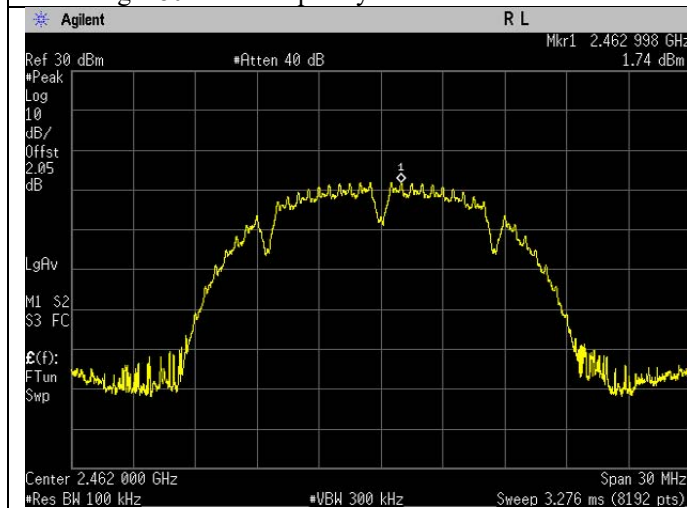
| Test Conditions |                 |                       |                  | Test Frequency | Results           |             |        |
|-----------------|-----------------|-----------------------|------------------|----------------|-------------------|-------------|--------|
| Standard        | Modulation Type | Modulation Technology | Data Rate (mbps) | Tx (MHz)       | Frequencies (MHz) | Power (dBm) | Status |
| 802.11b         | DSSS            | DBPSK                 | 1                | 2412           | 2399.98           | -42.20      | Pass   |
| 802.11b         | DSSS            | DBPSK                 | 1                | 2462           | 2483.51           | -49.13      | Pass   |



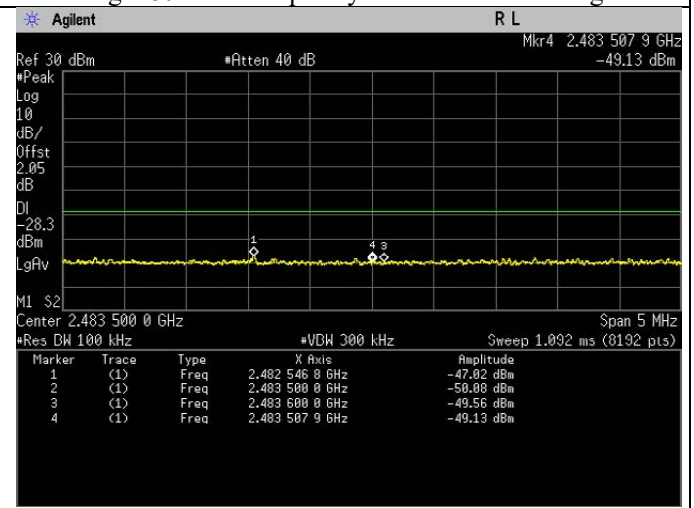
Band Edge. 802.11b Frequency 2412 MHz Reference Level



Band Edge. 802.11b Frequency 2412 MHz Band Edge



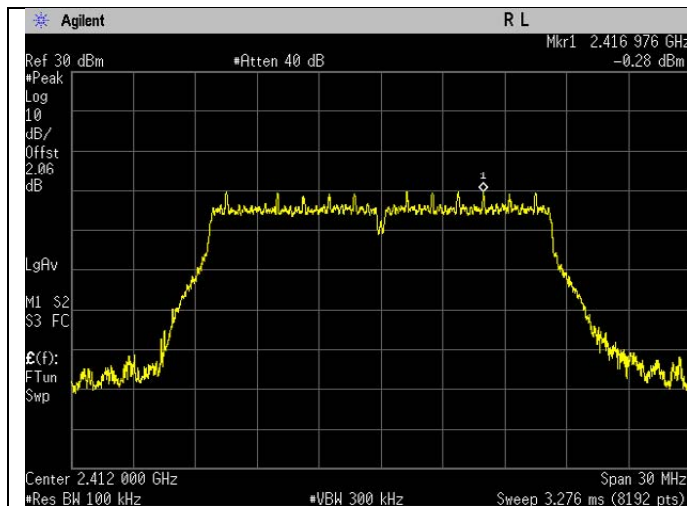
Band Edge. 802.11b Frequency 2462 MHz Reference Level



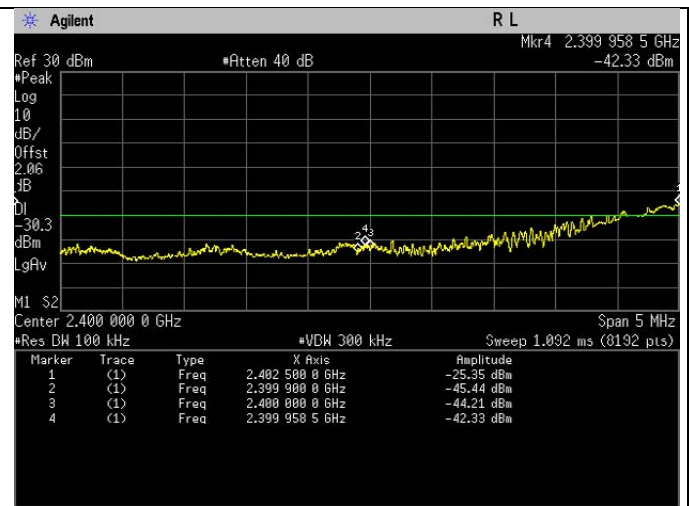
Band Edge. 802.11b Frequency 2462 MHz Band Edge

## 802.11g

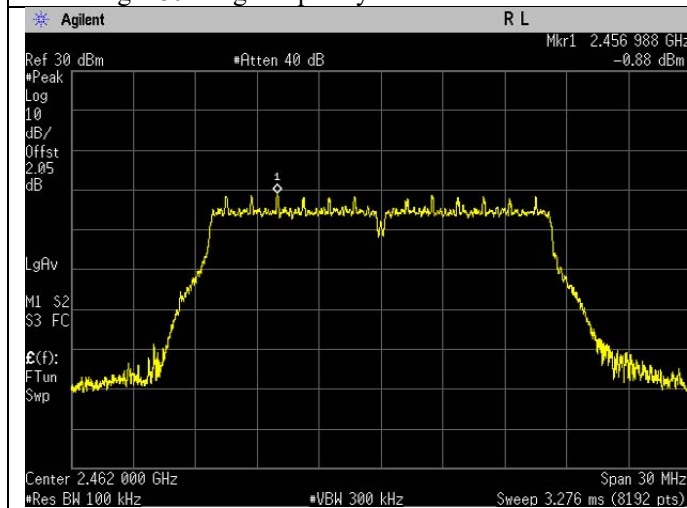
| Test Conditions |                 |                       |                  | Test Frequency | Results           |             |        |
|-----------------|-----------------|-----------------------|------------------|----------------|-------------------|-------------|--------|
| Standard        | Modulation Type | Modulation Technology | Data Rate (mbps) | Tx (MHz)       | Frequencies (MHz) | Power (dBm) | Status |
| 802.11g         | OFDM            | BPSK                  | 6                | 2412           | 2399.96           | -42.33      | Pass   |
| 802.11g         | OFDM            | BPSK                  | 6                | 2462           | 2483.53           | -48.41      | Pass   |



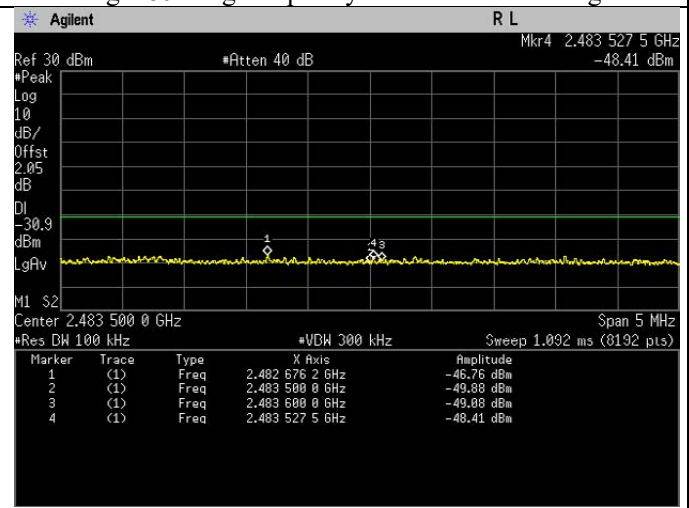
Band Edge. 802.11g Frequency 2412 MHz Reference Level



Band Edge. 802.11g Frequency 2412 MHz Band Edge



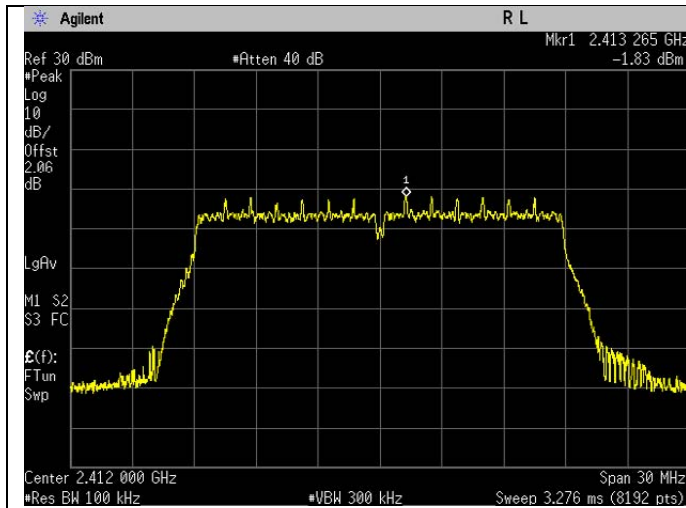
Band Edge. 802.11g Frequency 2462 MHz Reference Level



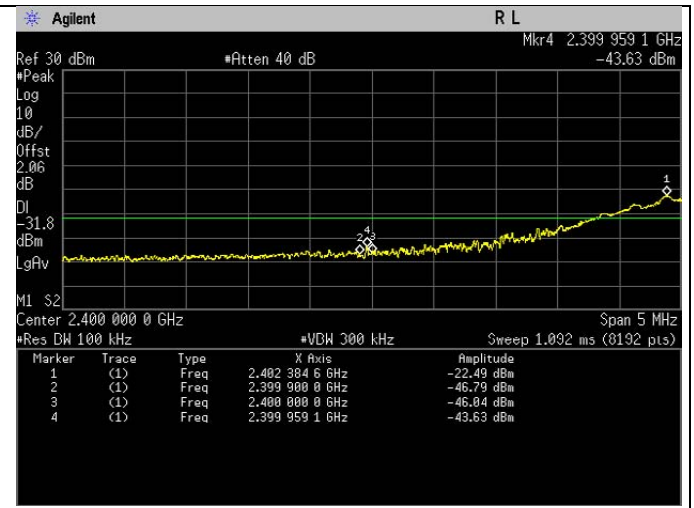
Band Edge. 802.11g Frequency 2462 MHz Band Edge

## 802.11n (HT20)

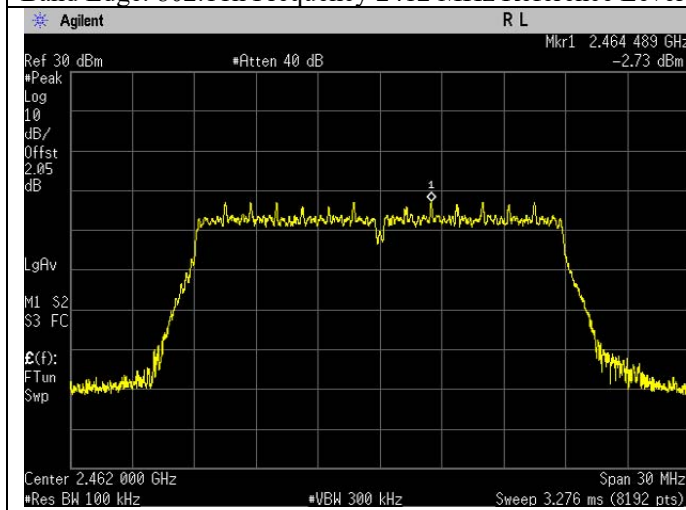
| Test Conditions |                 |                       |                  | Test Frequency | Results           |             |        |
|-----------------|-----------------|-----------------------|------------------|----------------|-------------------|-------------|--------|
| Standard        | Modulation Type | Modulation Technology | Data Rate (mbps) | Tx (MHz)       | Frequencies (MHz) | Power (dBm) | Status |
| 802.11n         | OFDM            | BPSK                  | 6.5              | 2412           | 2399.96           | -43.63      | Pass   |
| 802.11n         | OFDM            | BPSK                  | 6.5              | 2462           | 2483.51           | -49.17      | Pass   |



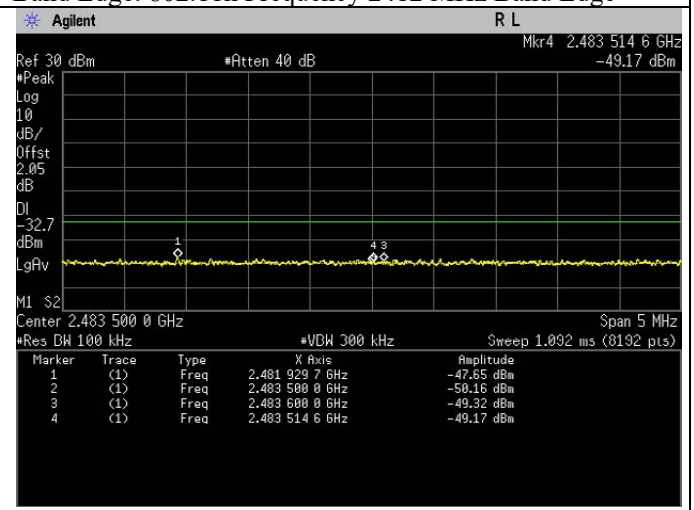
Band Edge. 802.11n Frequency 2412 MHz Reference Level



Band Edge. 802.11n Frequency 2412 MHz Band Edge



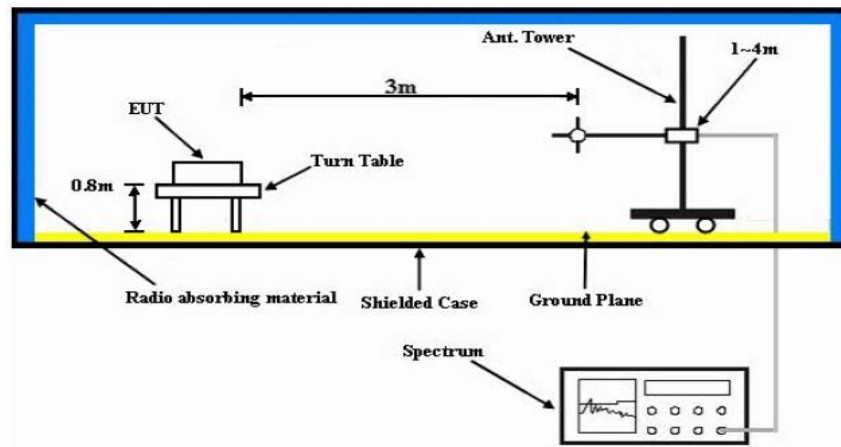
Band Edge. 802.11n Frequency 2462 MHz Reference Level



Band Edge. 802.11n Frequency 2462 MHz Band Edge

## 6.7. Radiated Emission within restricted Bands

### 6.7.1. Test Setup



- The EUT is placed on the top of a rotating table 0.8m above the ground (<1GHz) and 1.5m above the ground (>1GHz) at a 3m semi-anechoic chamber. The table is rotated 360 degrees to determine the position of the highest radiation.
- The EUT is set 3m away from the interference-receiving antenna, which is mounted on the top of a variable-height antenna tower.
- The antenna is Bilog/Horn antenna depend on which frequency range uses, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT is arranged to its worst case and then the antenna is tuned to heights from 1m to 4m and the rotatable table is turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system is set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- If the emission level of the EUT in peak mode is fall within the range of 10dB from the limit specified, the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. Otherwise, the testing could be stopped and the peak values of the EUT would be reported.

#### NOTE:

- The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection at frequency below 1GHz.
- The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3 MHz for Peak detection at frequency above 1 GHz.
- All modes of operation were investigated and the worst-case emissions are reported.

#### 6.7.2. Test Limits:

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power.

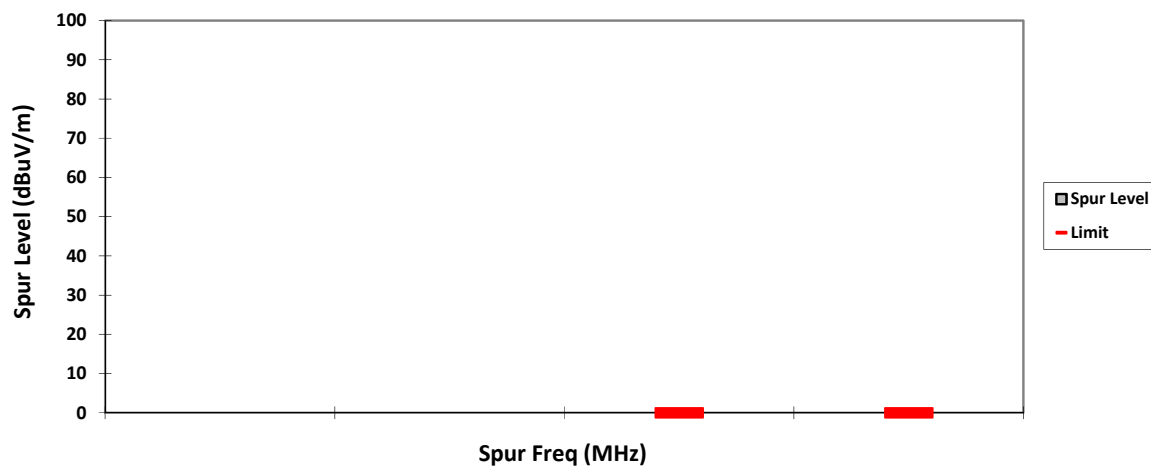
| Frequency (MHz) | Field strength (microvolts/meter) | Measurement distance (meters) |
|-----------------|-----------------------------------|-------------------------------|
| 0.009-0.490     | 2400/F(kHz)                       | 300                           |
| 0.490-1.705     | 24000/F(kHz)                      | 30                            |
| 1.705-30.0      | 30                                | 30                            |
| 30-88           | 100**                             | 3                             |
| 88-216          | 150**                             | 3                             |
| 216-960         | 200**                             | 3                             |
| Above 960       | 500                               | 3                             |

**NOTE:**

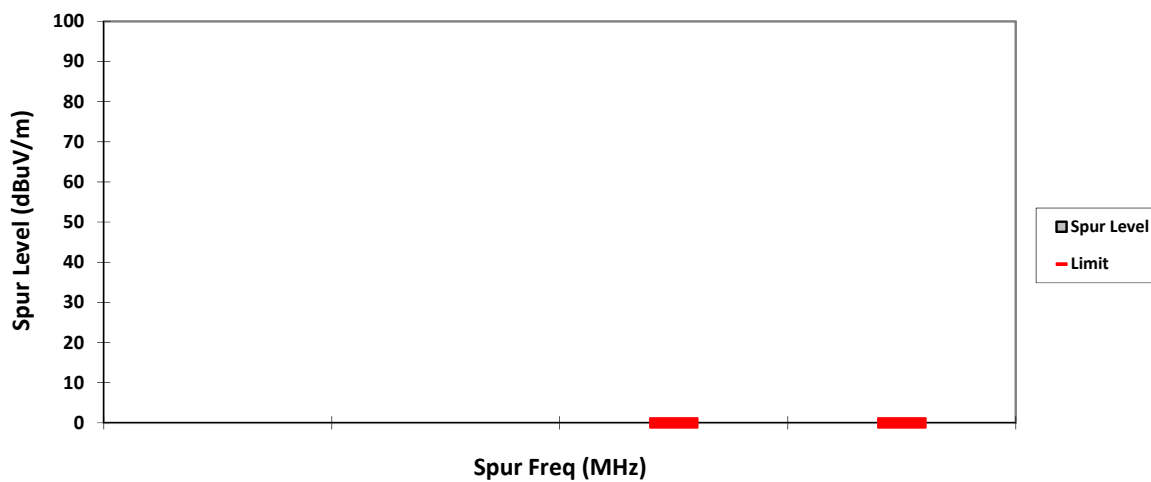
- The lower limit shall apply at the transition frequencies.
- Emission level (dBuV/m) = 20 log Emission level (uV/m).
- For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.



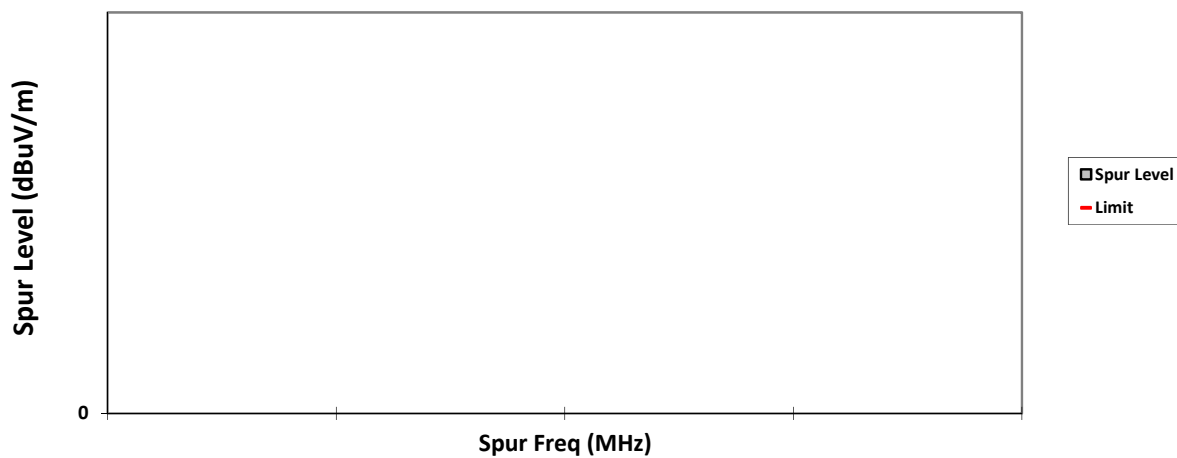
### VERTICAL, QPK



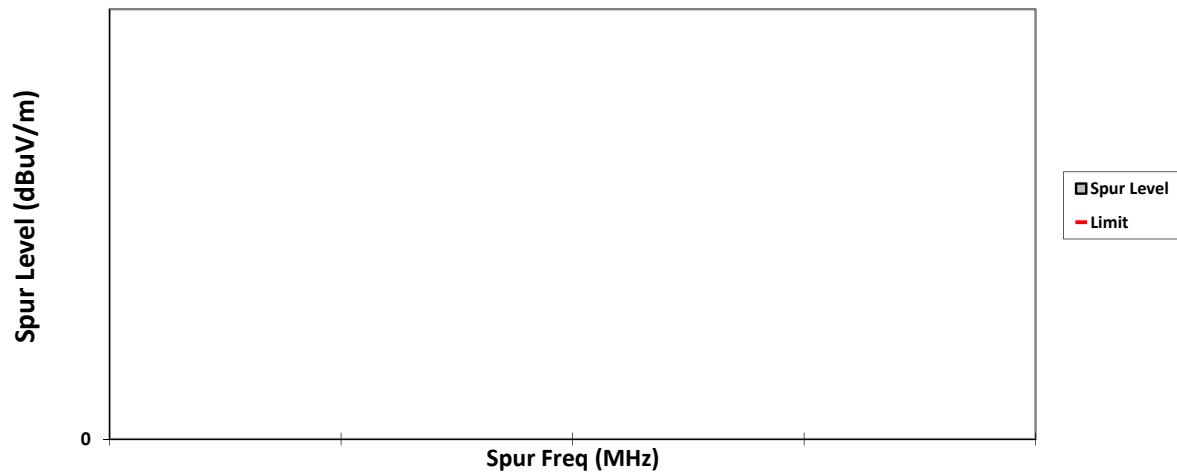
### HORIZONTAL, QPK



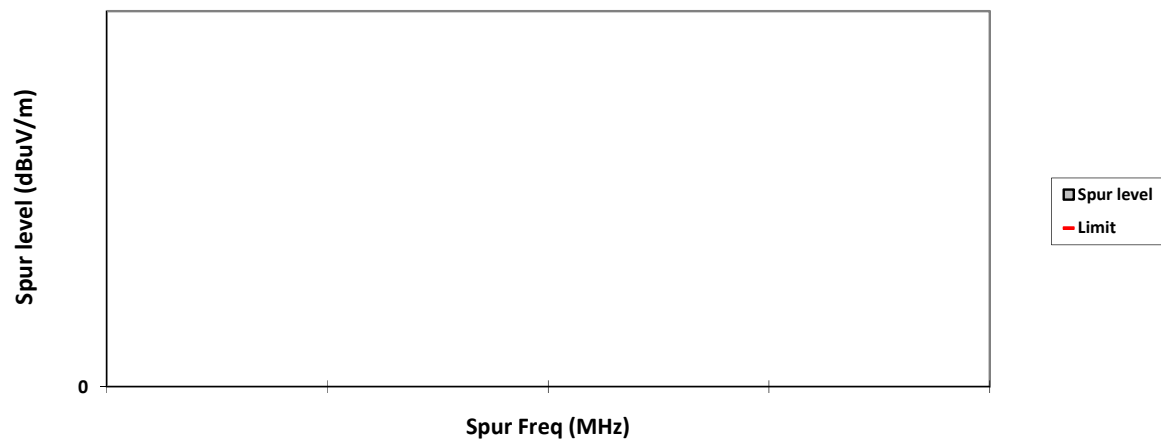
VERTICAL, PK



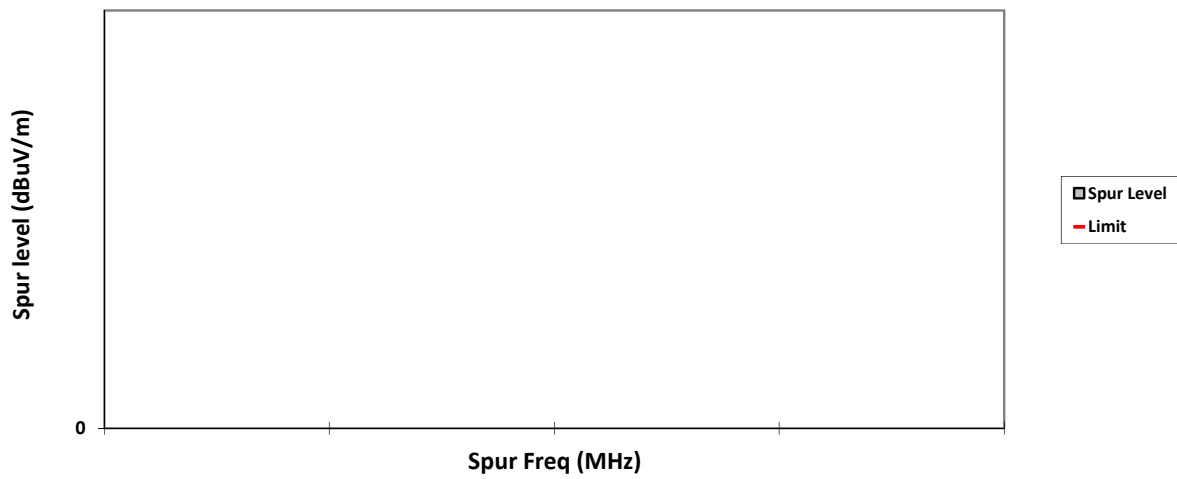
HORIZONTAL, PK



**VERTICAL, AV**

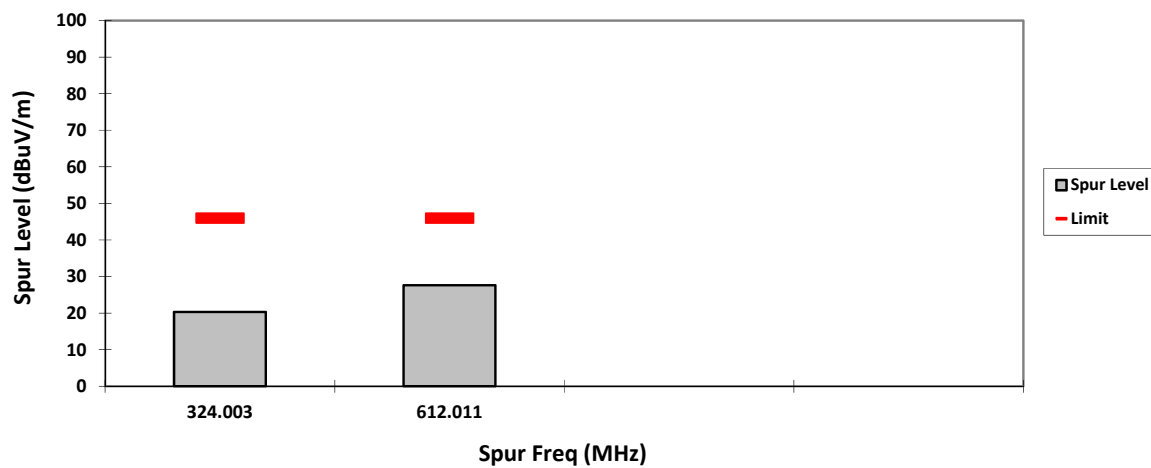


**HORIZONTAL, AV**

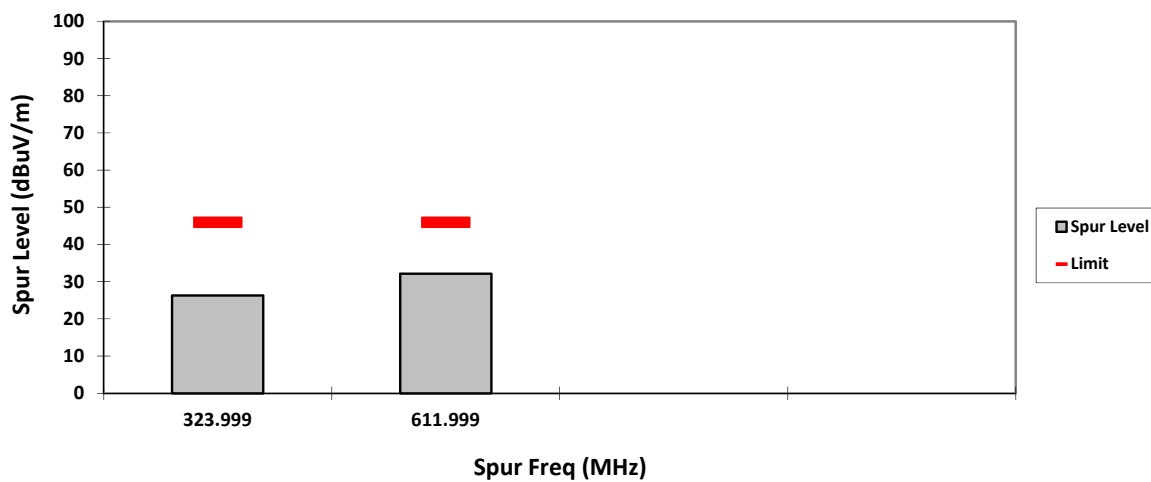




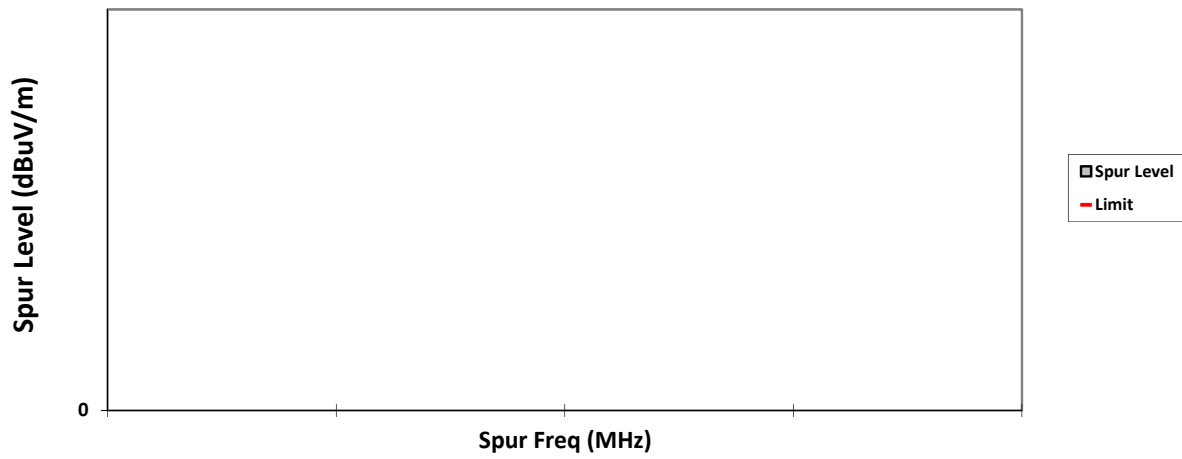
### VERTICAL, QPK



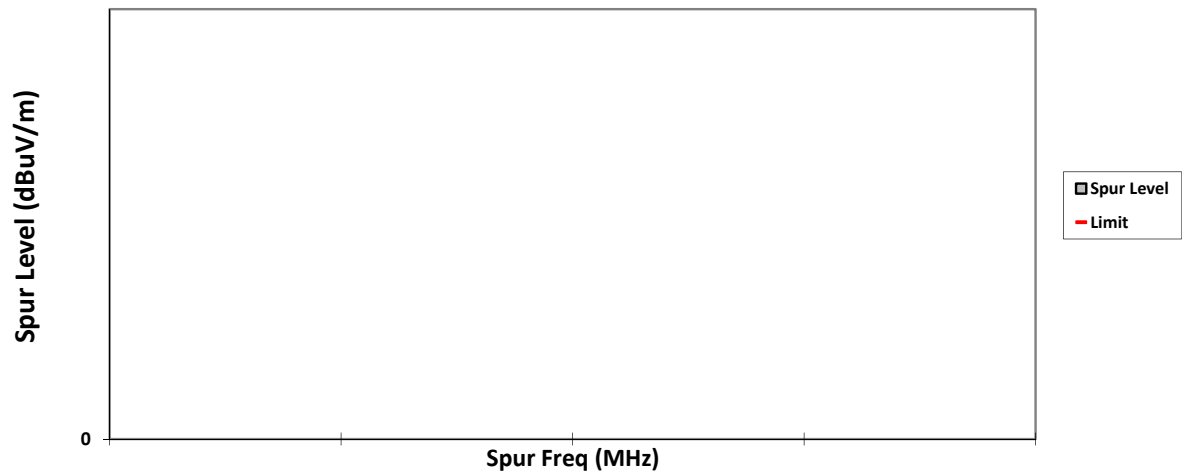
### HORIZONTAL, QPK



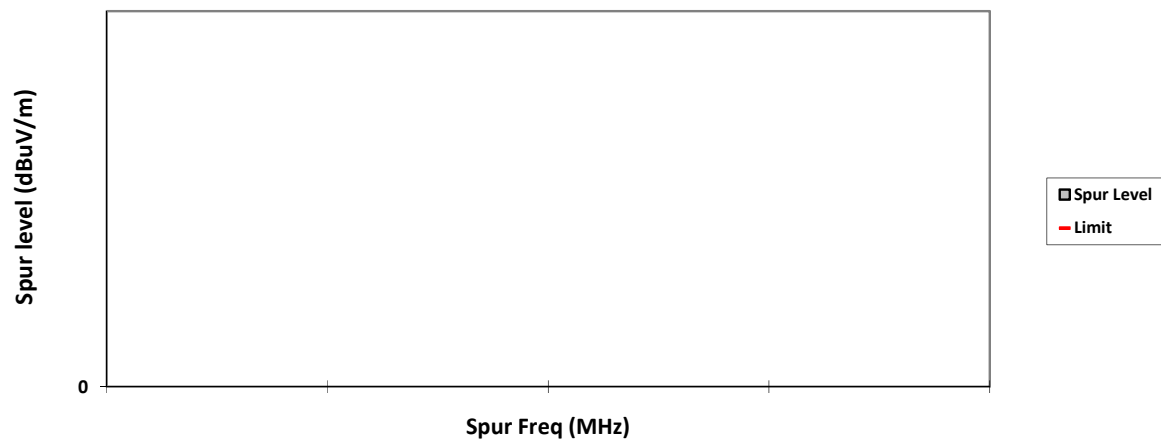
**VERTICAL, PK**



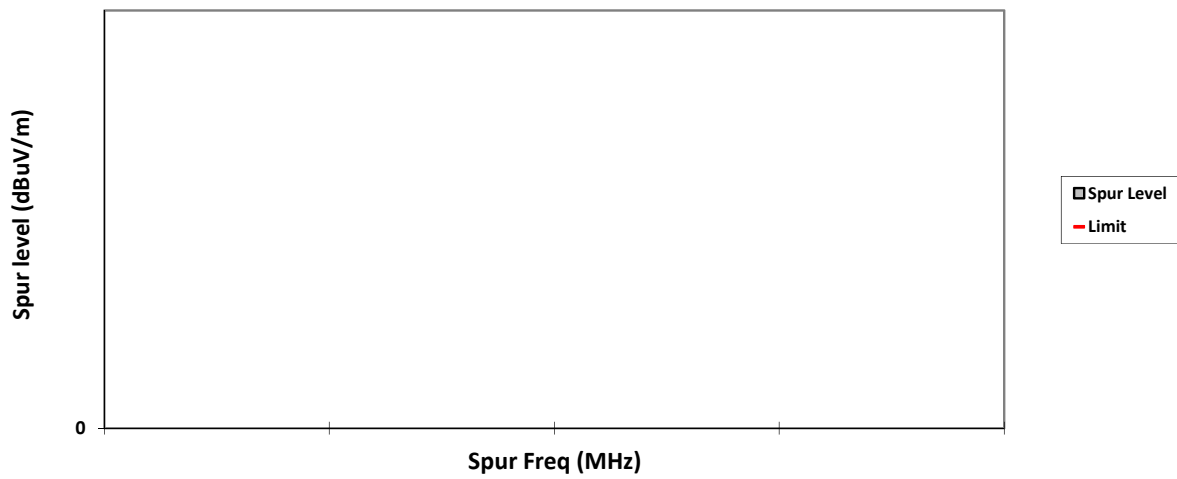
**HORIZONTAL, PK**



VERTICAL, AV

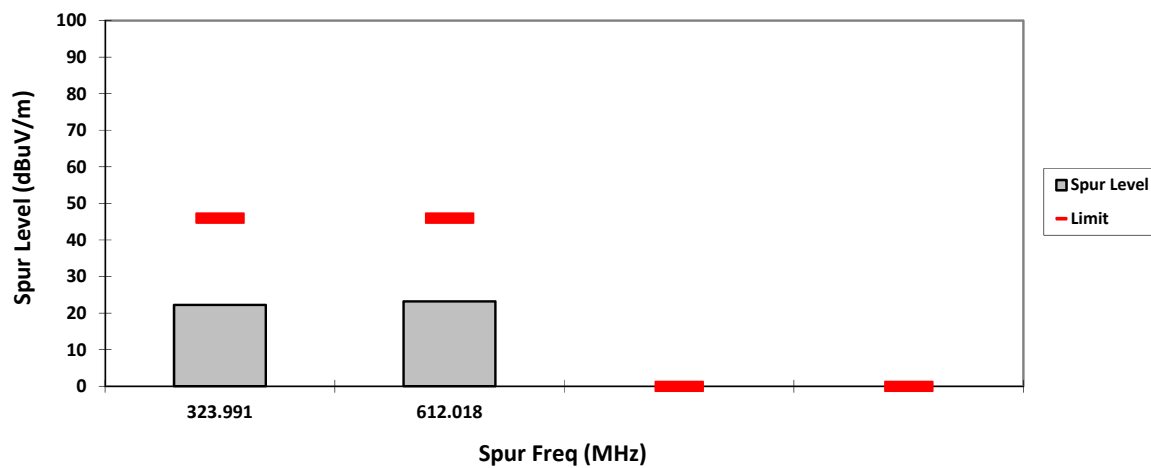


HORIZONTAL, AV

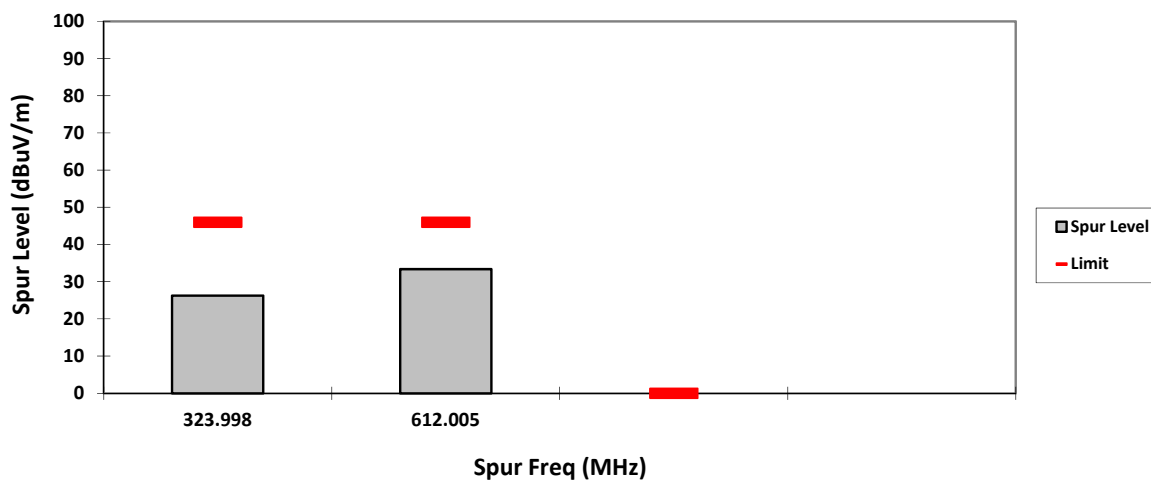




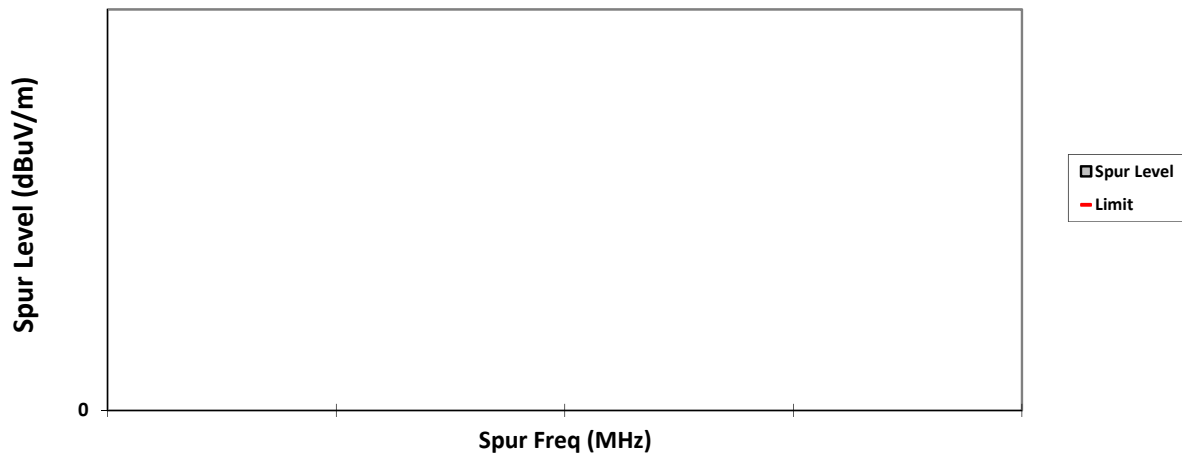
### VERTICAL, QPK



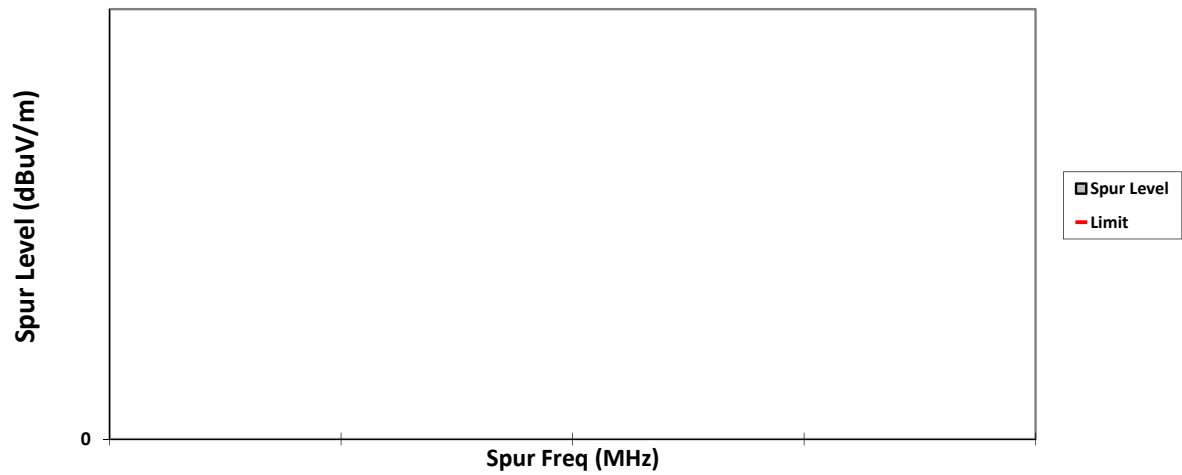
### HORIZONTAL, QPK



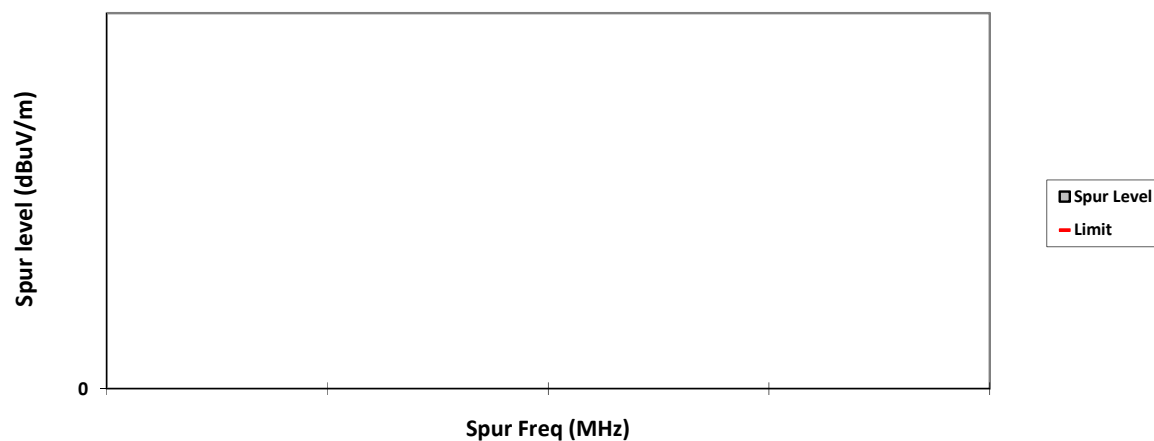
**VERTICAL, PK**



**HORIZONTAL, PK**



**VERTICAL, AV**

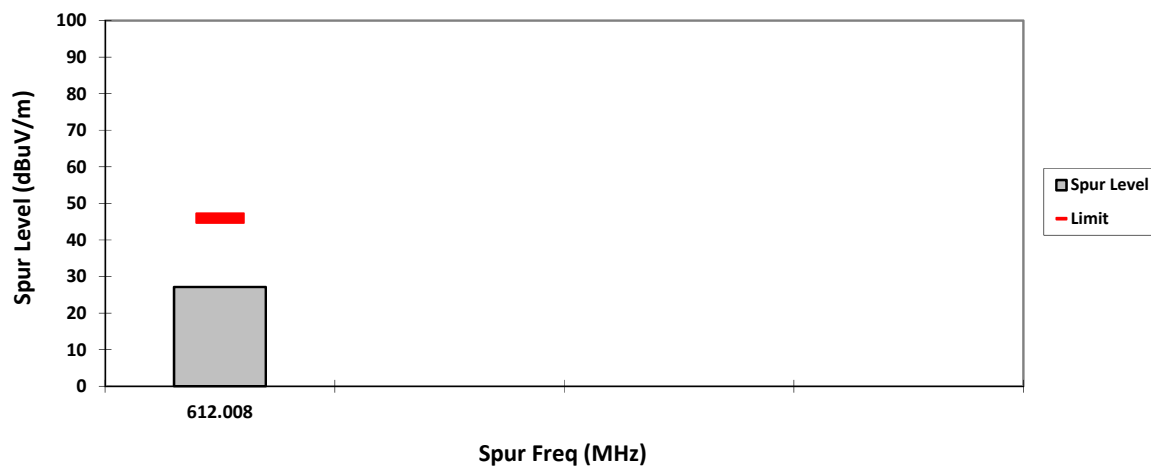


**HORIZONTAL, AV**

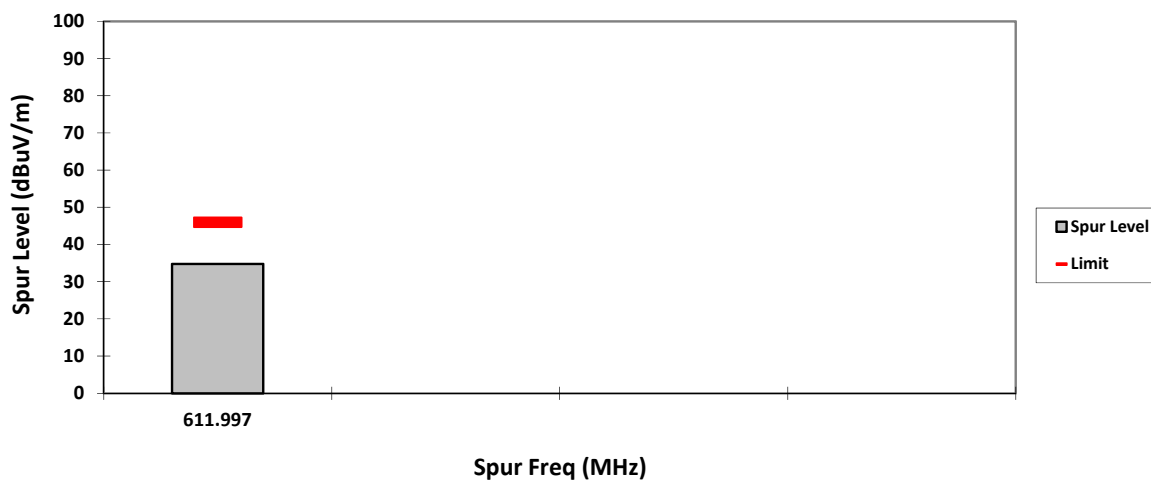




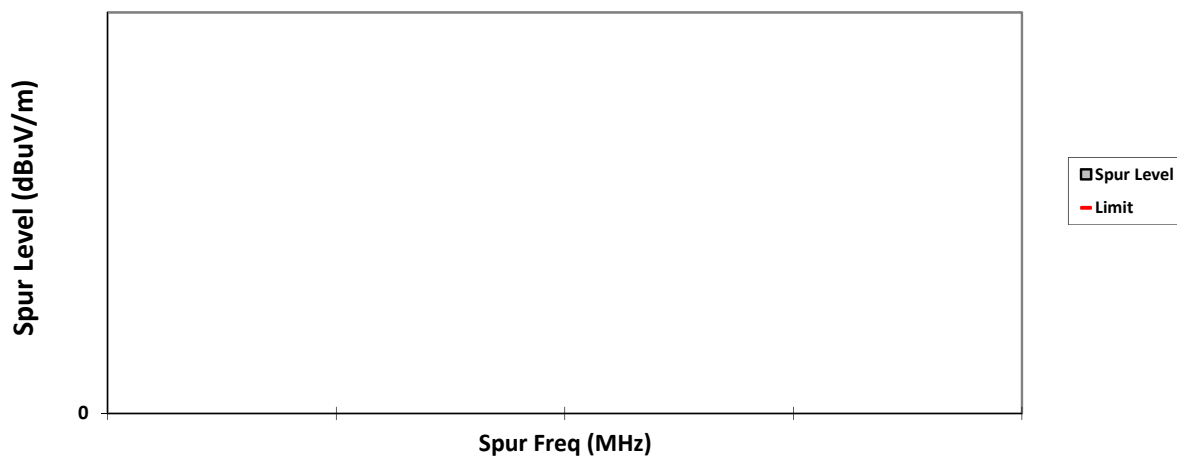
### VERTICAL, QPK



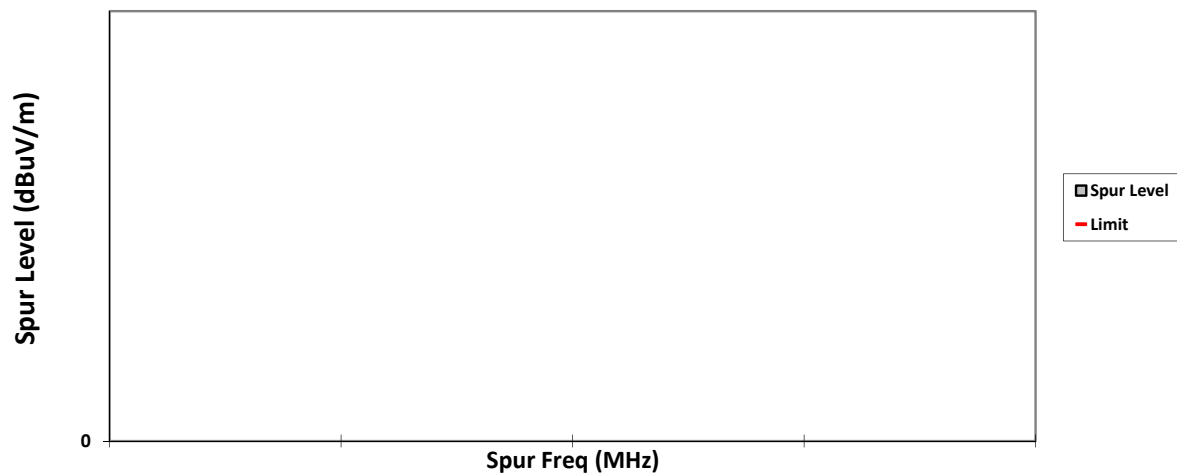
### HORIZONTAL, QPK



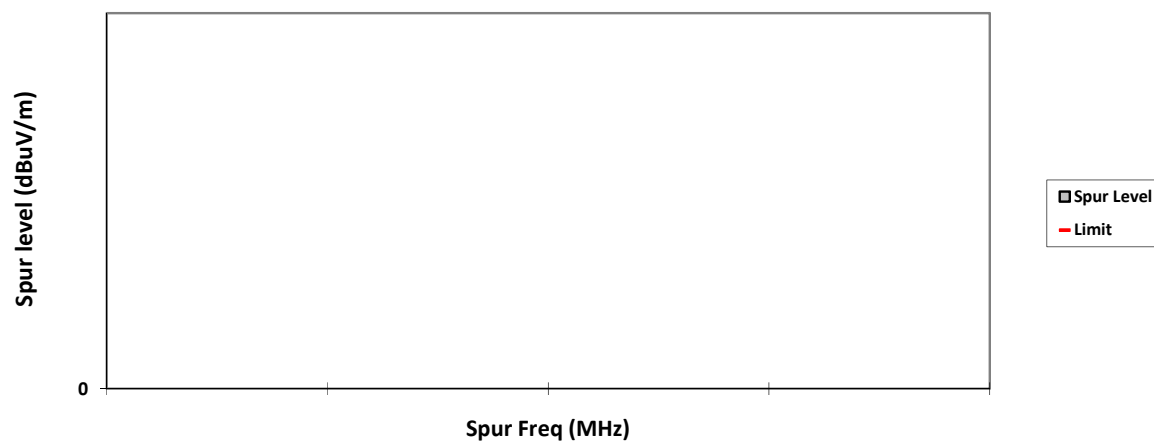
VERTICAL, PK



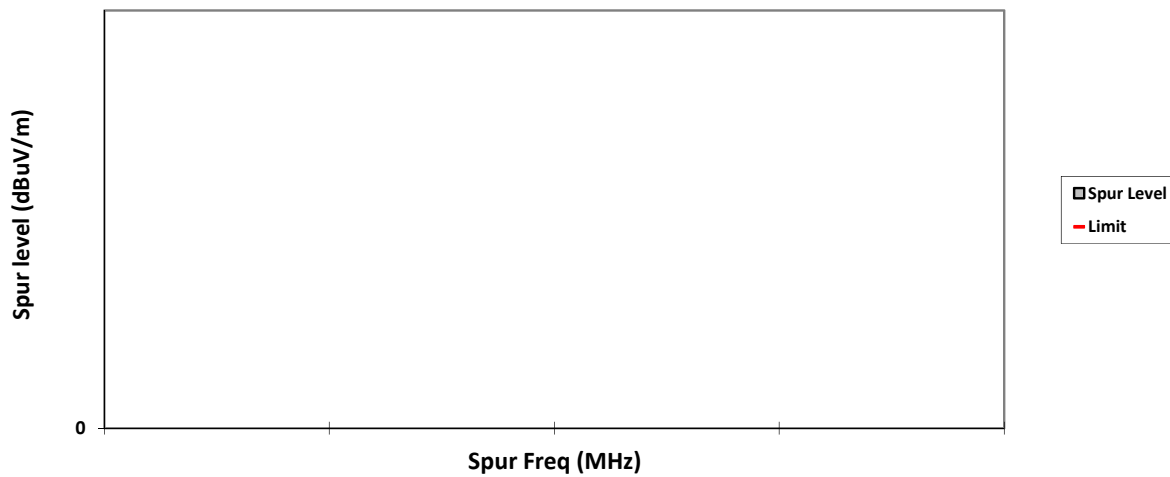
HORIZONTAL, PK



**VERTICAL, AV**

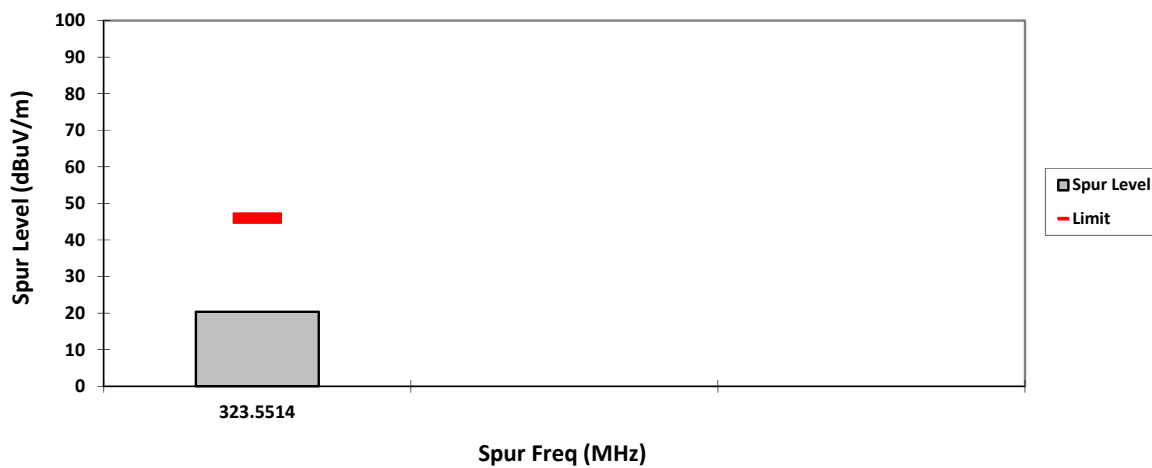


**HORIZONTAL, AV**

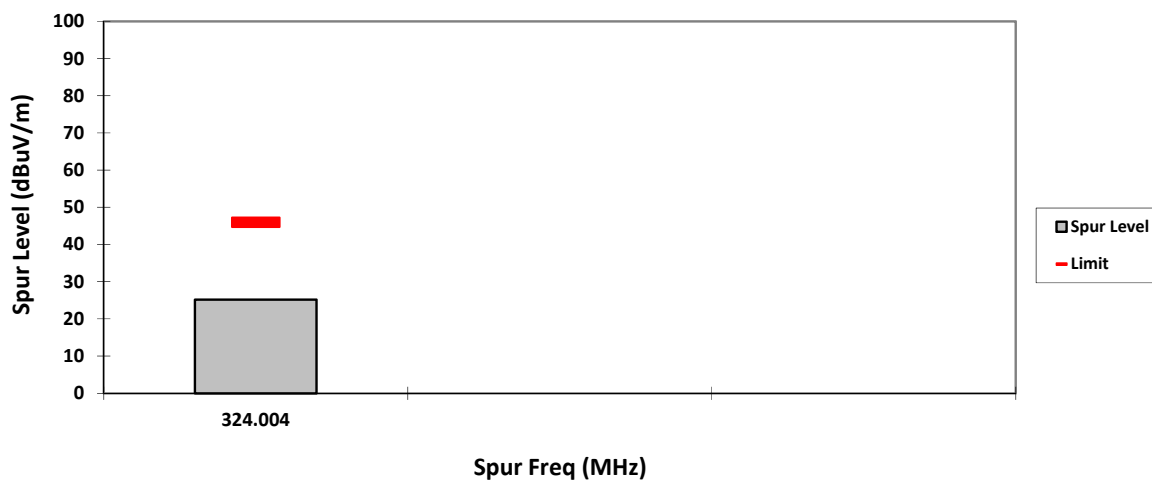




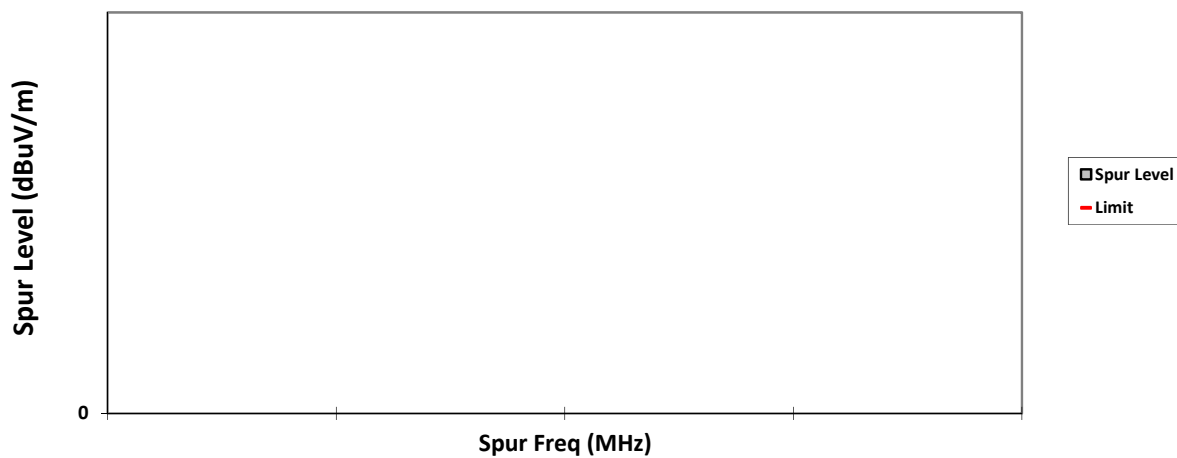
### VERTICAL, QPK



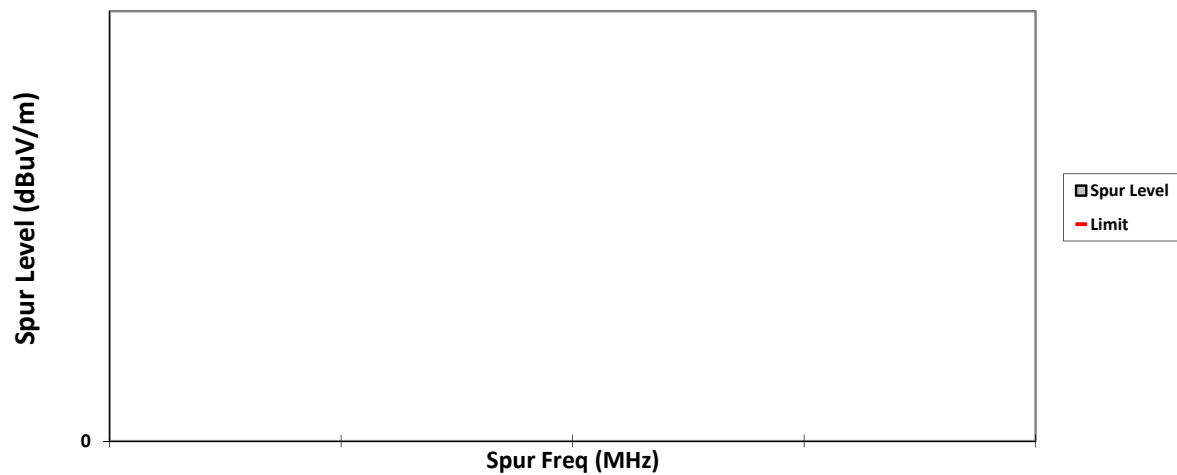
### HORIZONTAL, QPK



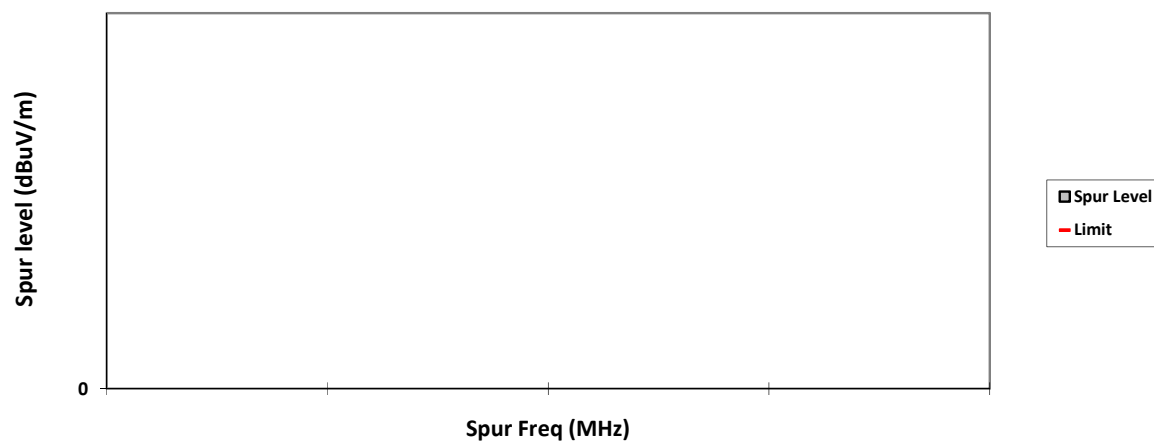
VERTICAL, PK



HORIZONTAL, PK



**VERTICAL, AV**

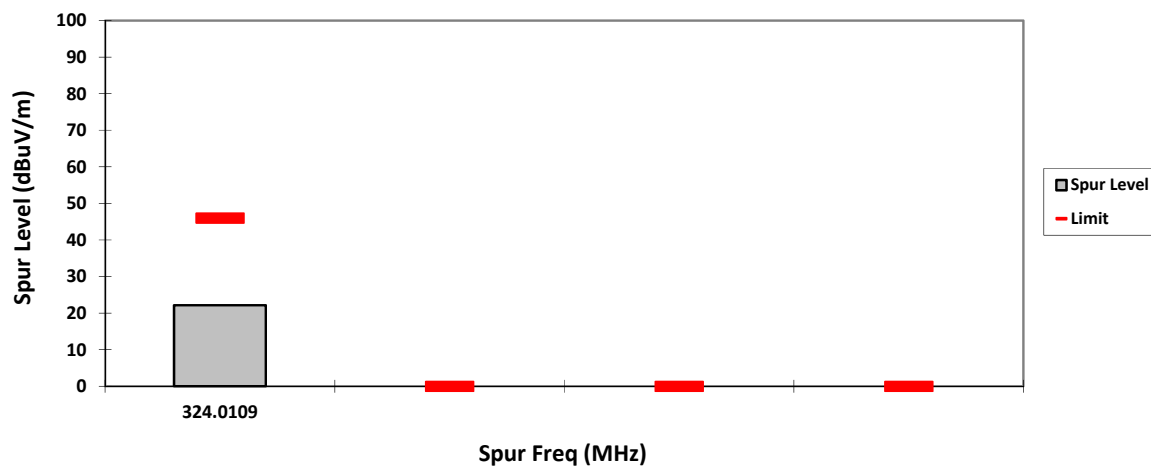


**HORIZONTAL, AV**

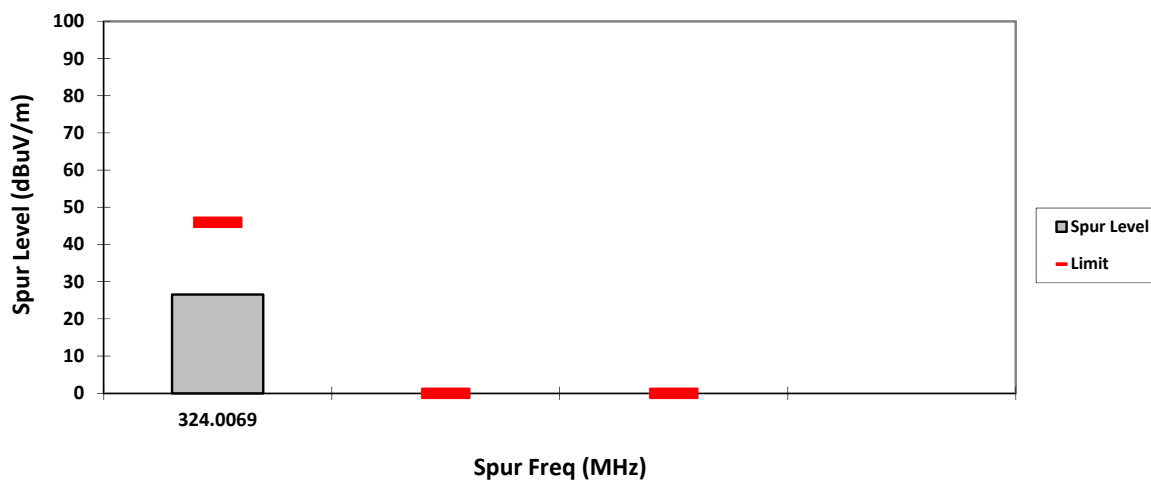




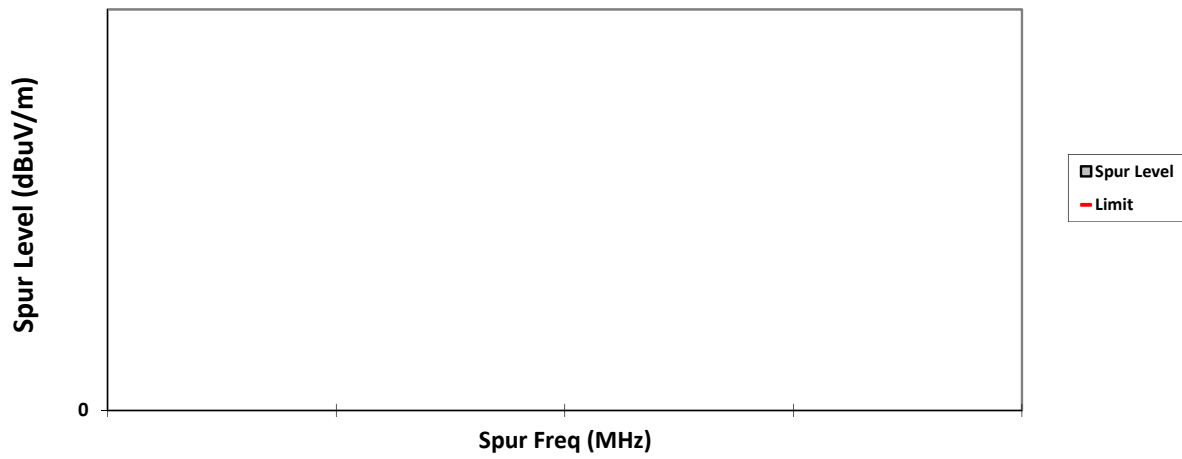
### VERTICAL, QPK



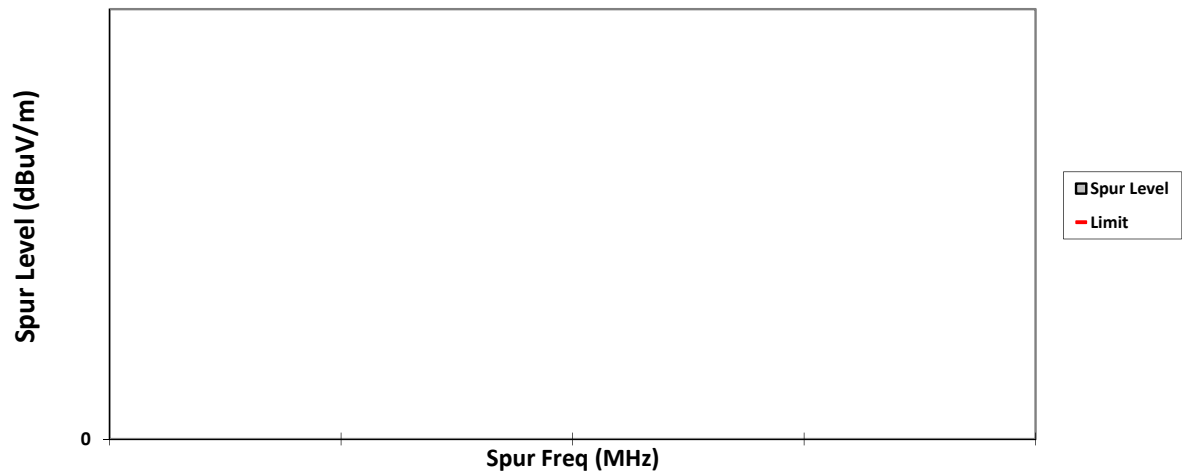
### HORIZONTAL, QPK



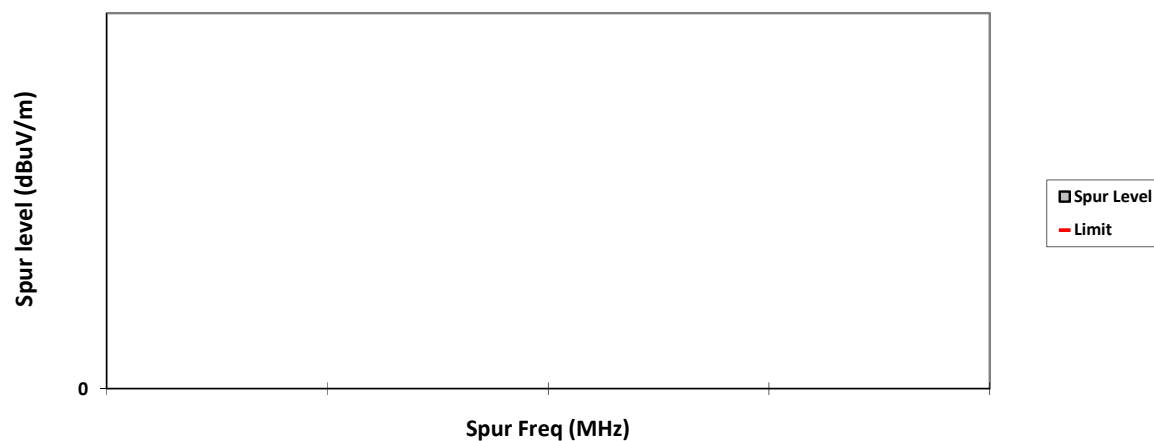
VERTICAL, PK



HORIZONTAL, PK



**VERTICAL, AV**

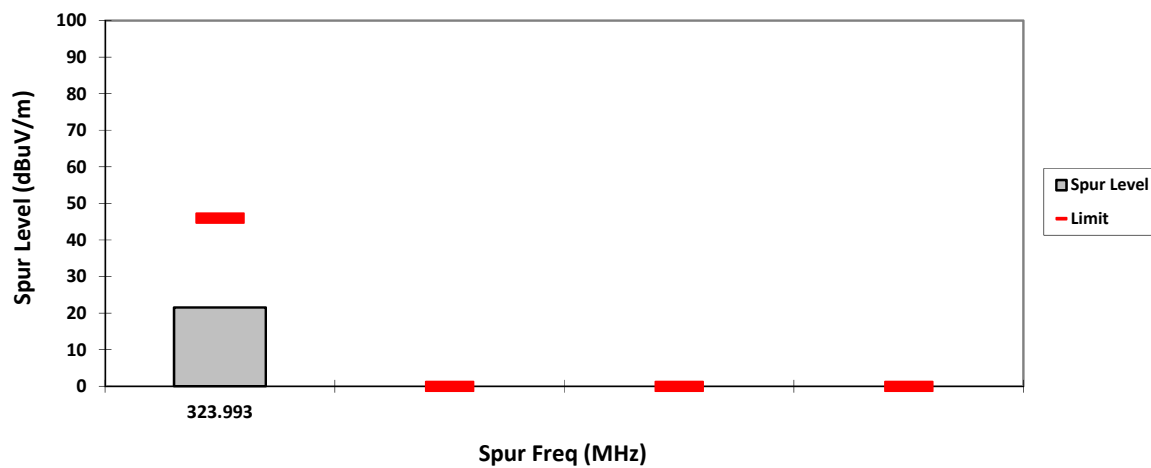


**HORIZONTAL, AV**

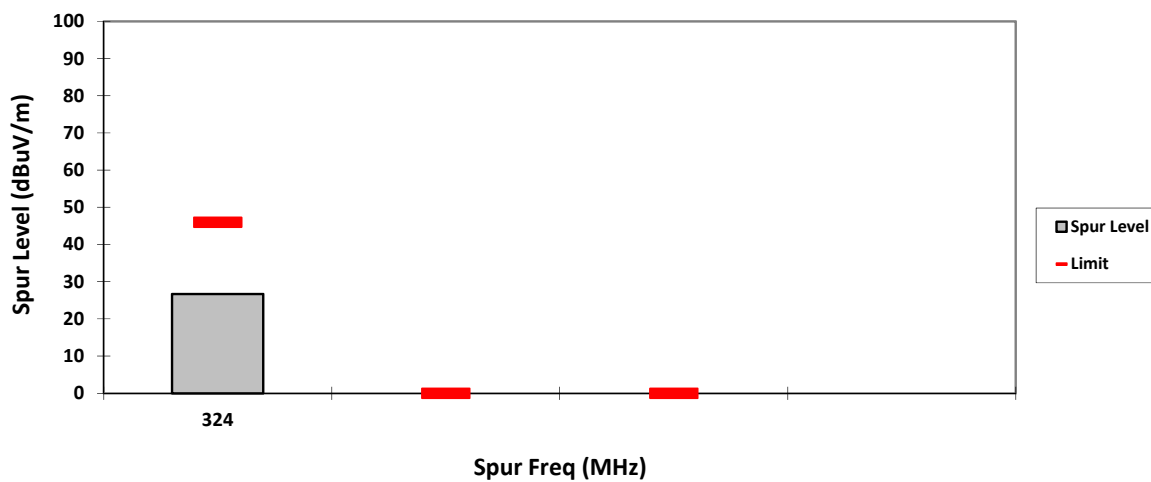




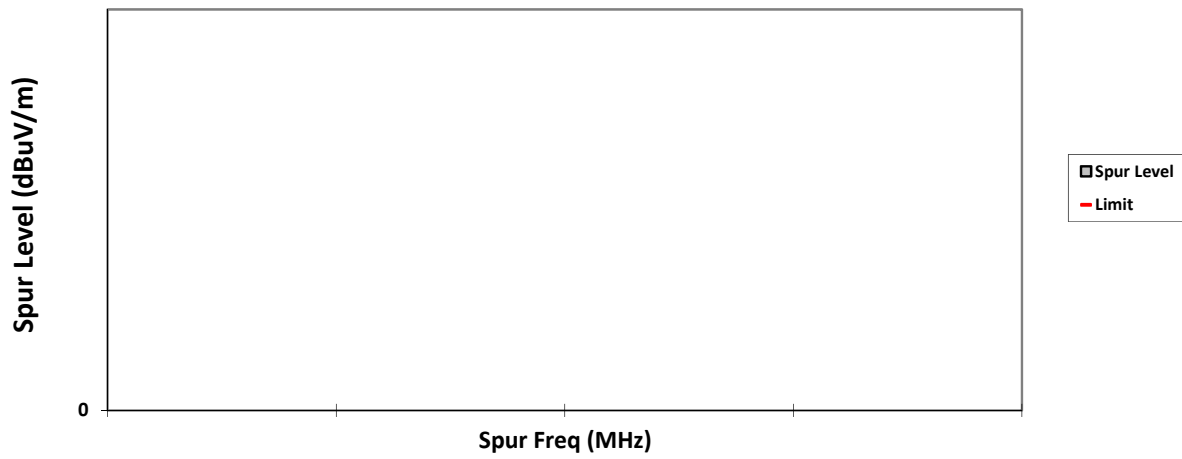
### VERTICAL, QPK



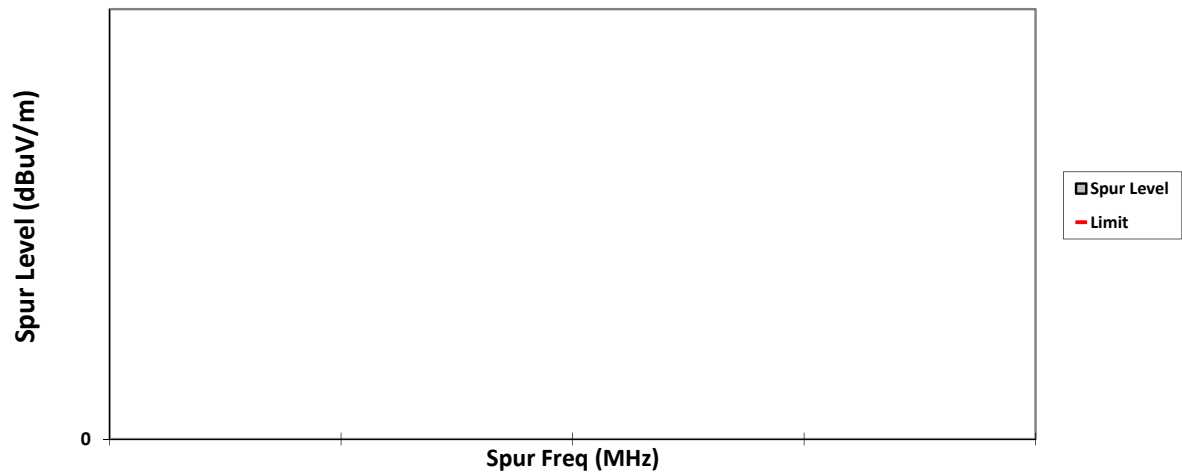
### HORIZONTAL, QPK



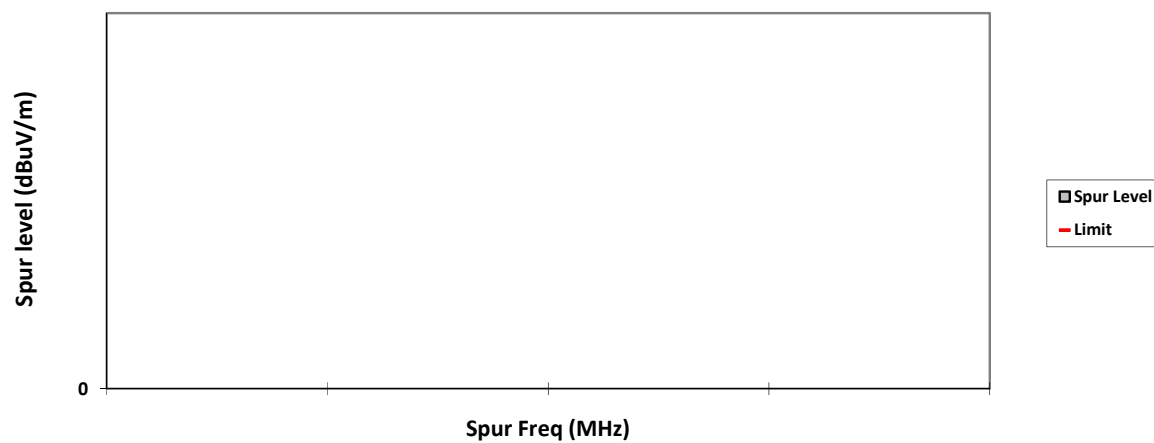
VERTICAL, PK



HORIZONTAL, PK



**VERTICAL, AV**

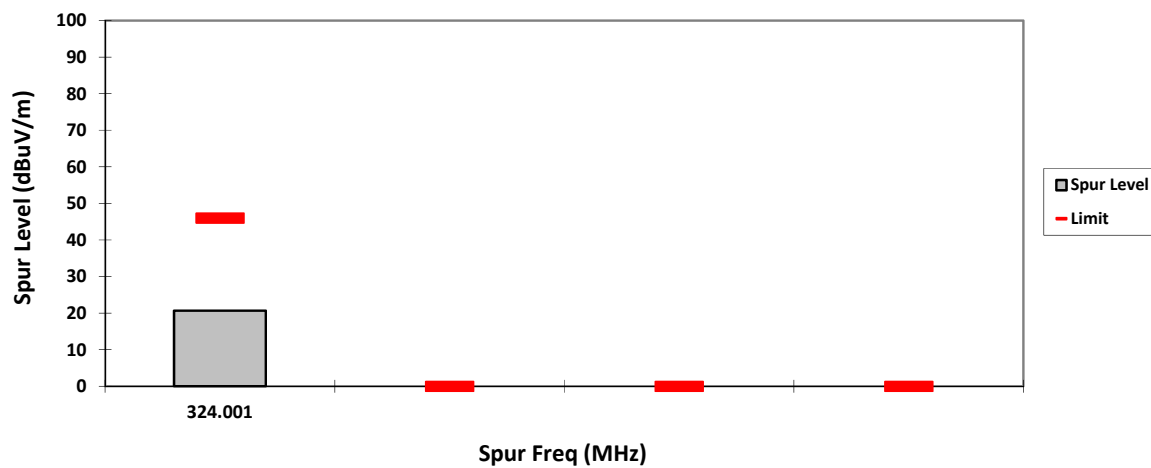


**HORIZONTAL, AV**

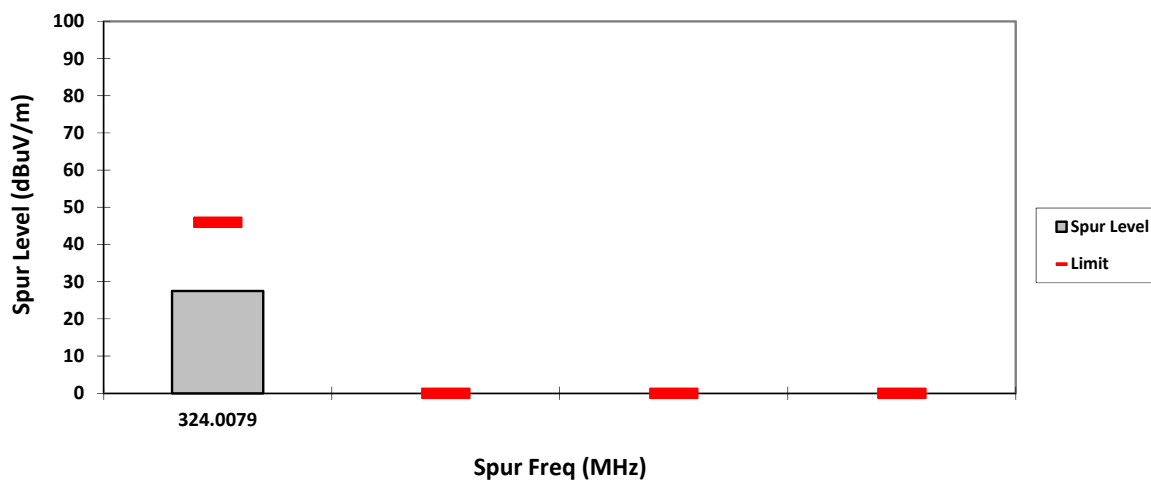




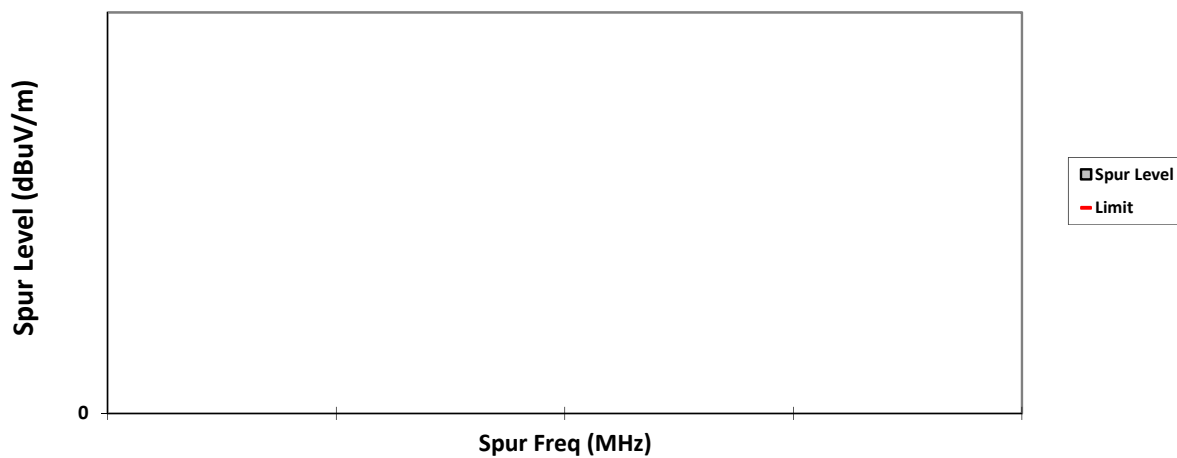
### VERTICAL, QPK



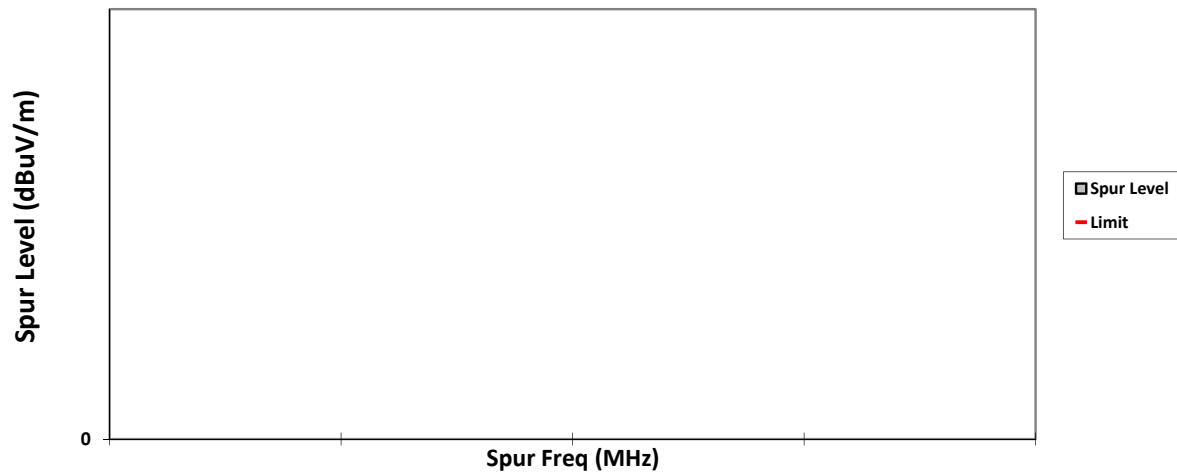
### HORIZONTAL, QPK



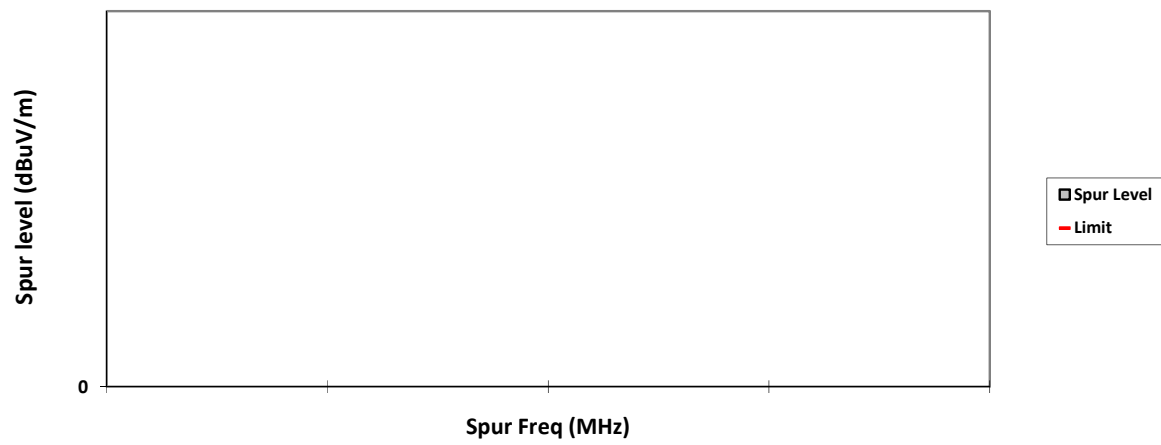
VERTICAL, PK



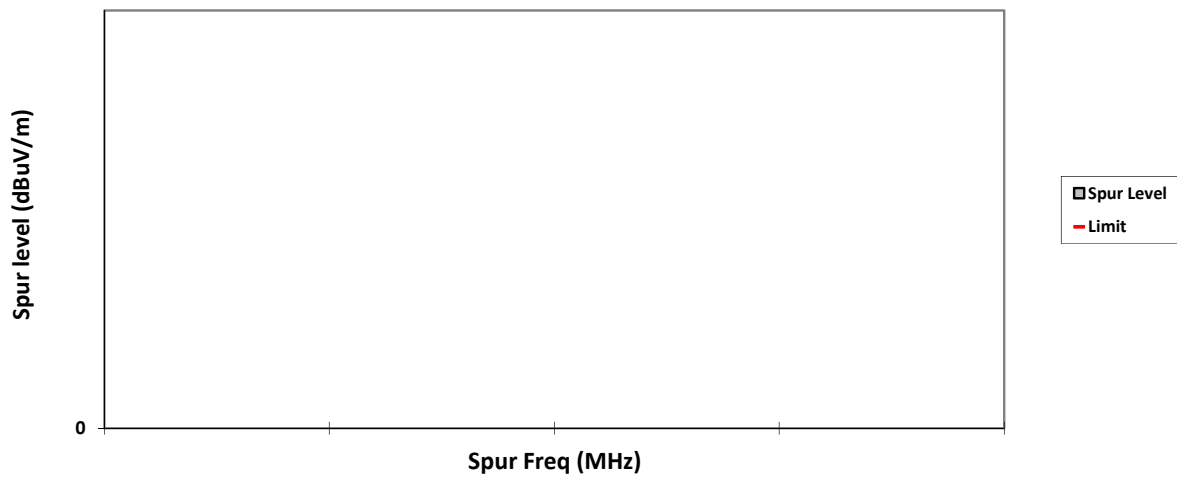
HORIZONTAL, PK



**VERTICAL, AV**

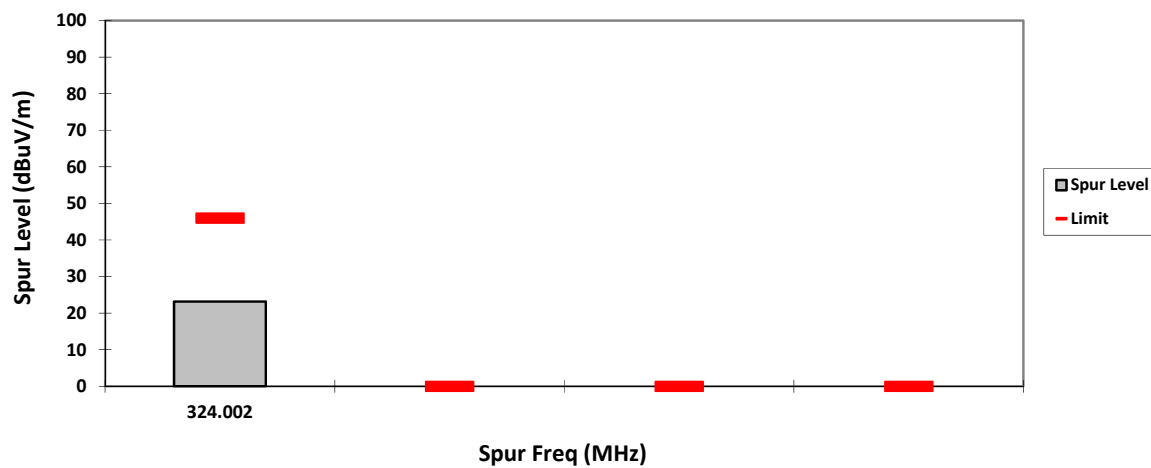


**HORIZONTAL, AV**

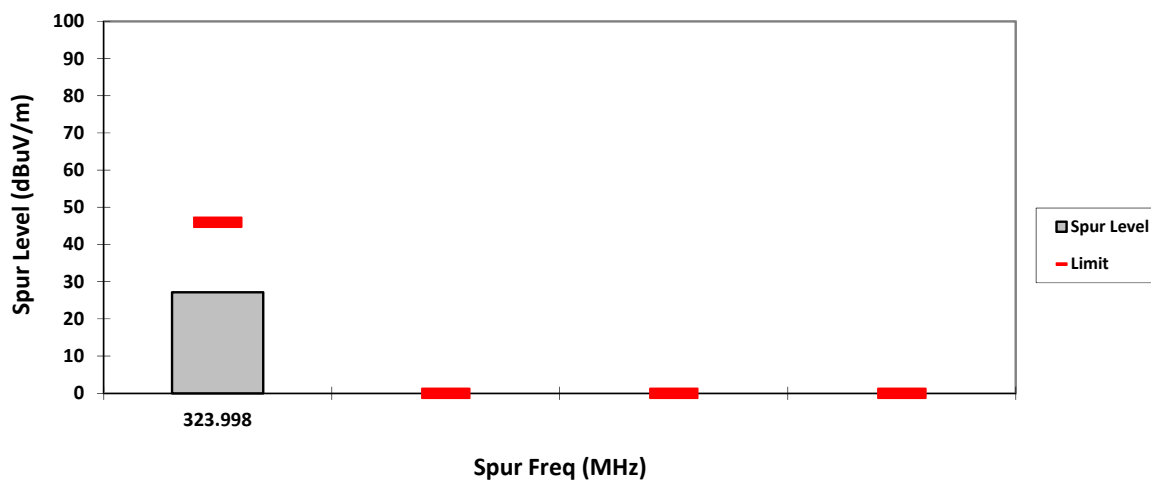




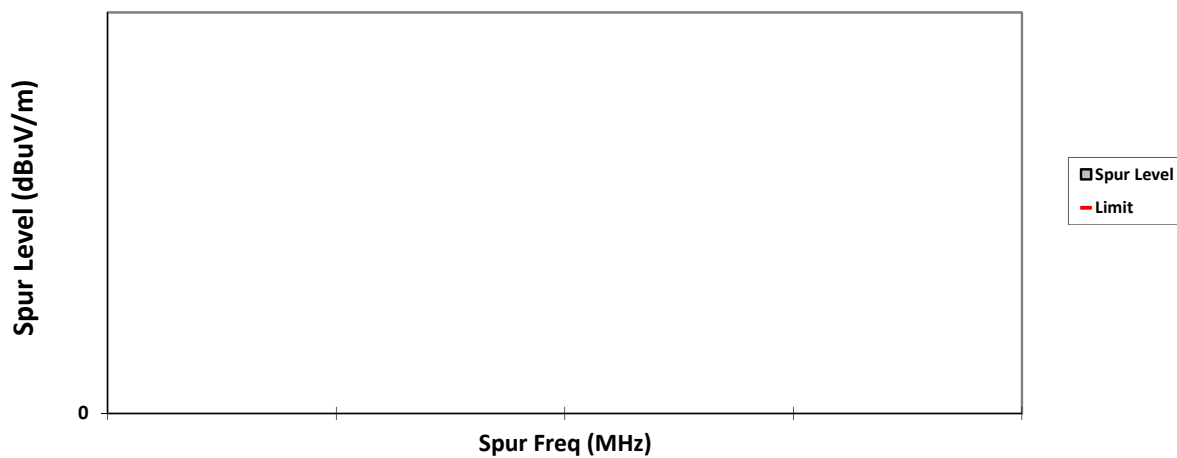
### VERTICAL, QPK



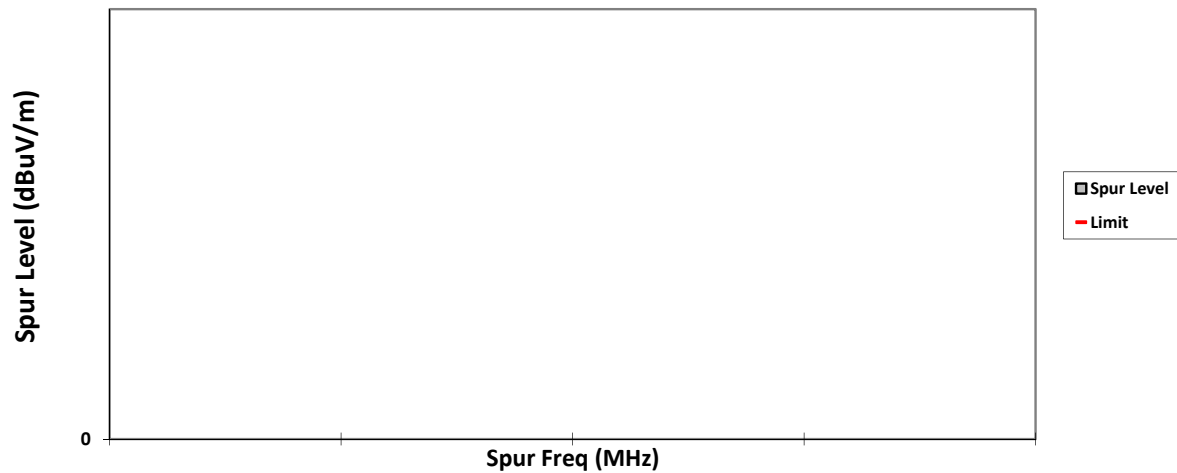
### HORIZONTAL, QPK



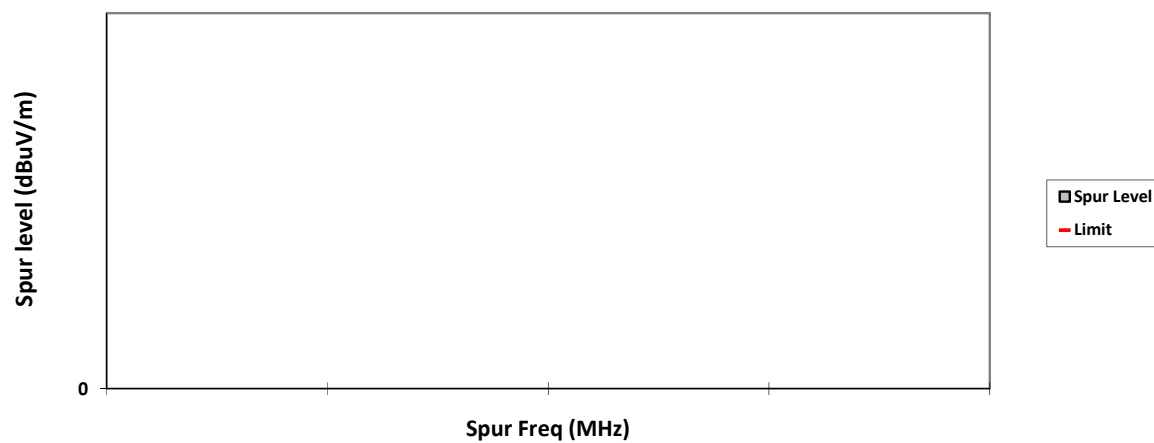
VERTICAL, PK



HORIZONTAL, PK



**VERTICAL, AV**



**HORIZONTAL, AV**

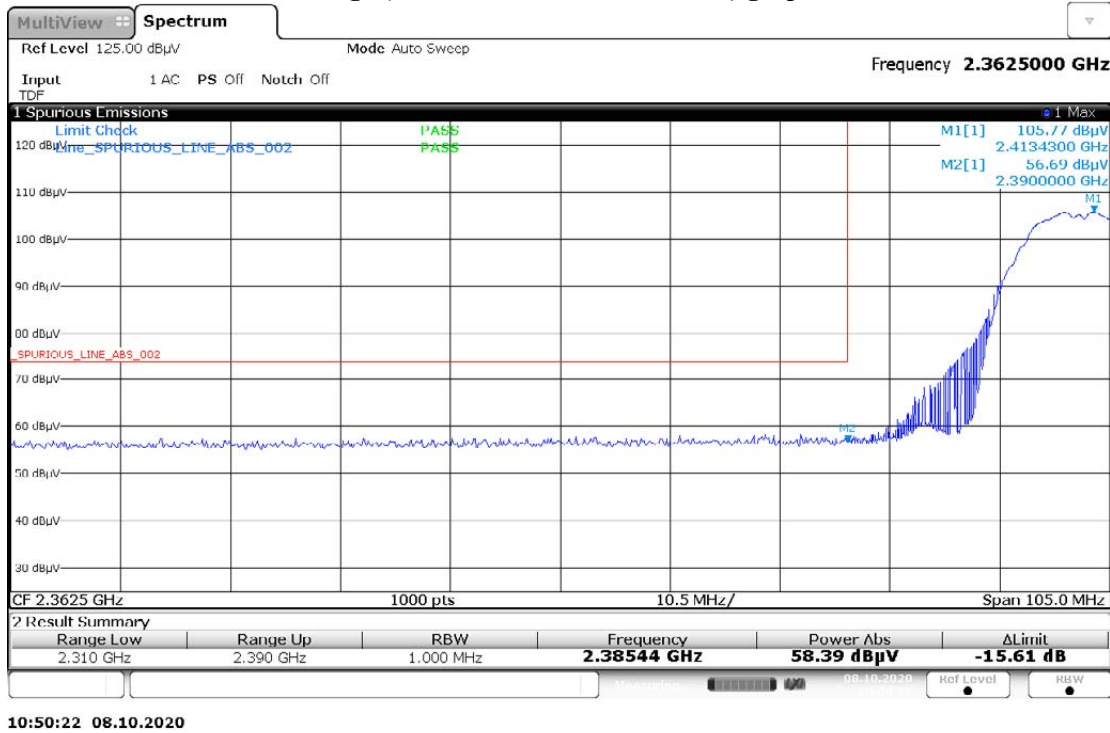


### Restricted Band Edge (Low Channel) tabular data

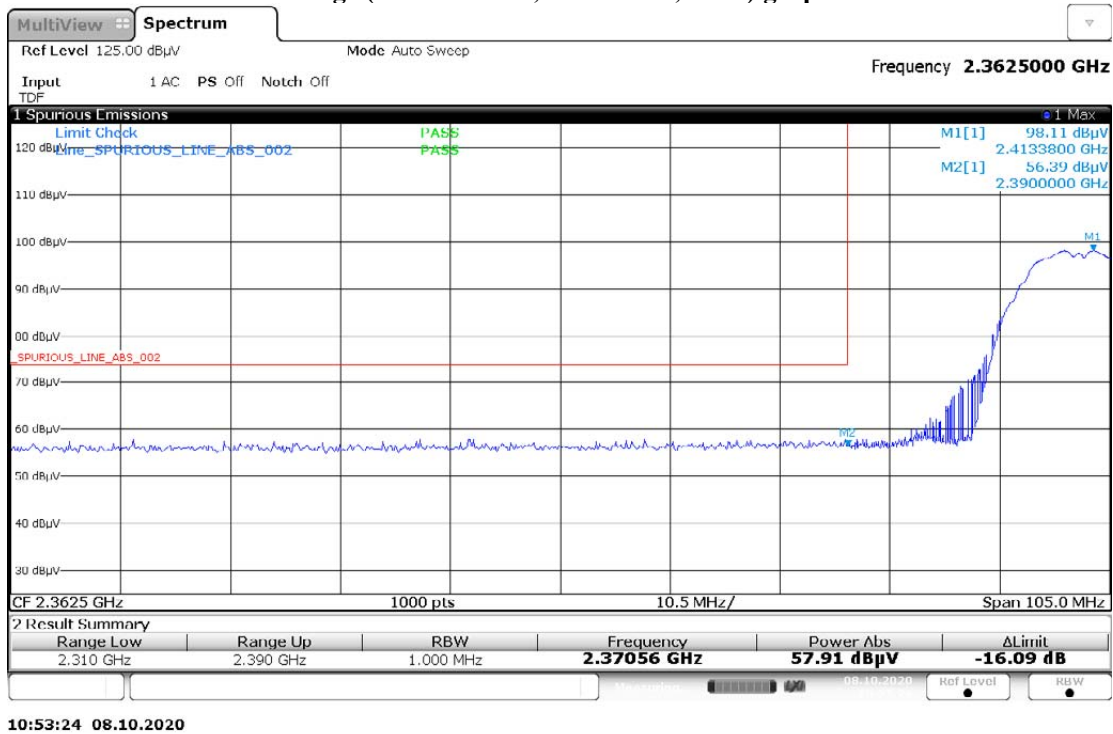
|                         |                 |             |
|-------------------------|-----------------|-------------|
| Remarks:<br>Pass Result | Marginal Result | Fail Result |
|-------------------------|-----------------|-------------|

**Humidity (%): 69.6**  
**Test Date: Thu, 8 Oct, 2020**

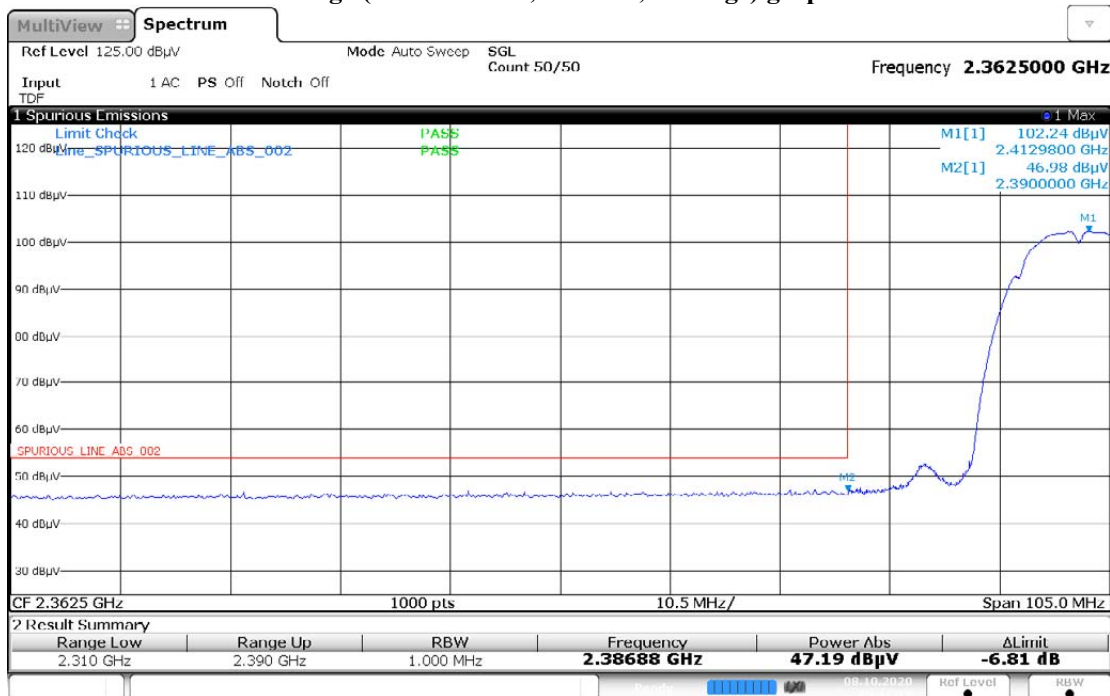
### Restricted Band Edge (Low Channel, Vertical, Peak) graphical screen shot



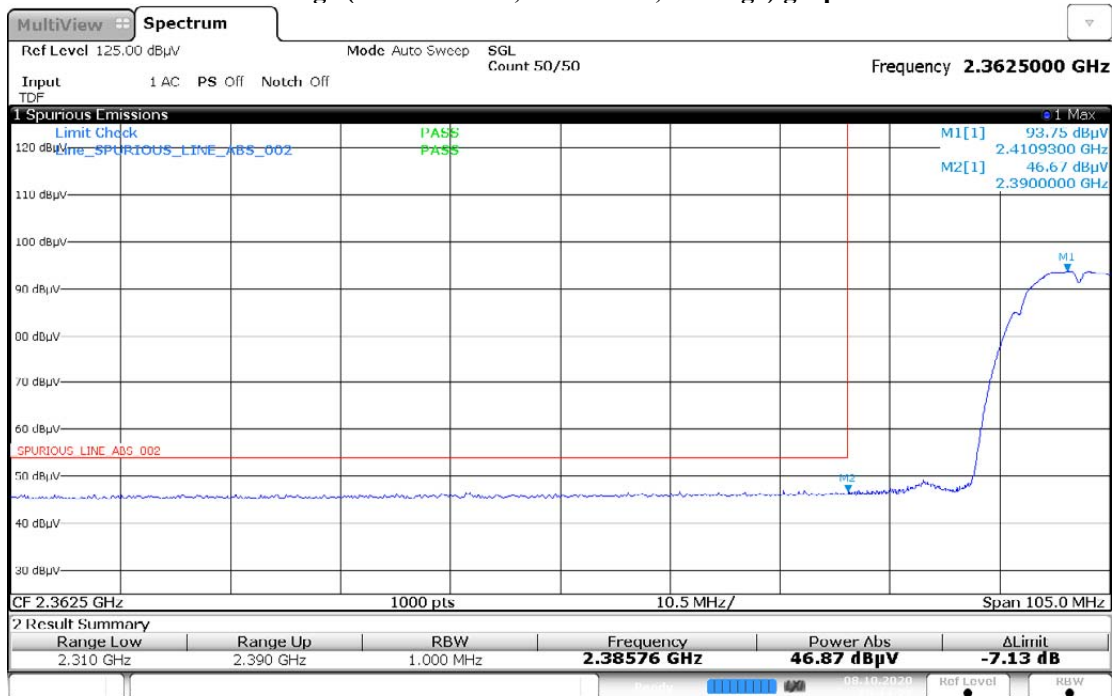
### Restricted Band Edge (Low Channel, Horizontal, Peak) graphical screen shot



### Restricted Band Edge (Low Channel, Vertical, Average) graphical screen shot



### Restricted Band Edge (Low Channel, Horizontal, Average) graphical screen shot



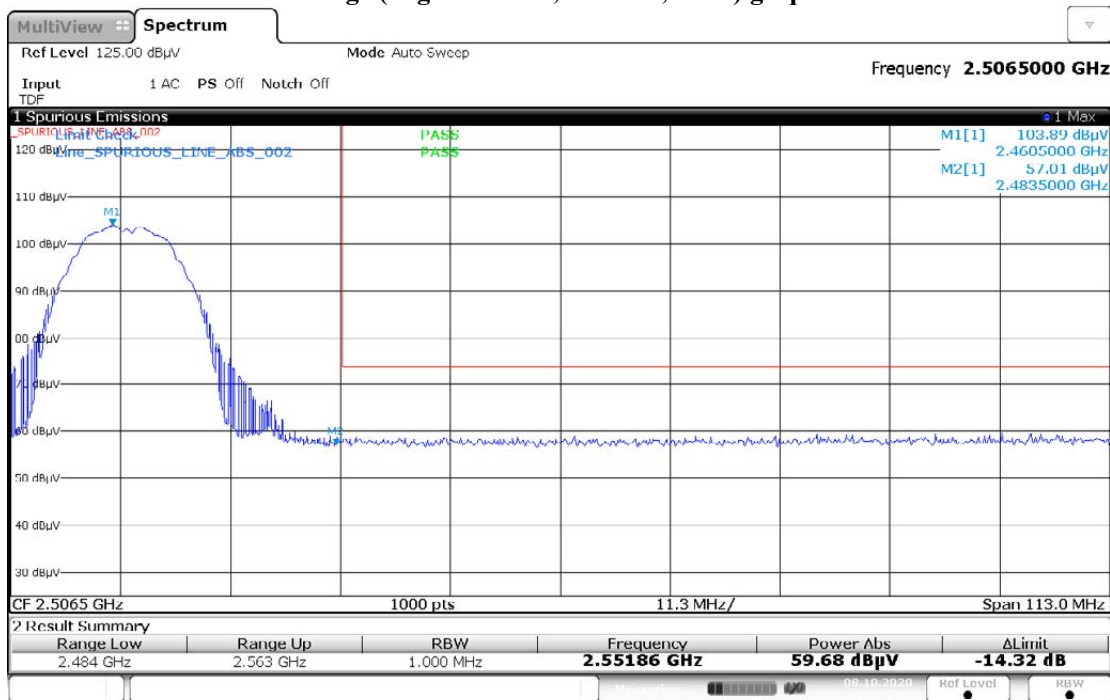
**Test Channel: High      Test Frequency: 2462.0000 MHz      Test Standard: ANSI C63.10-2013 Worst Case Plane: Y-Plane (802.11b)**

[illegible]

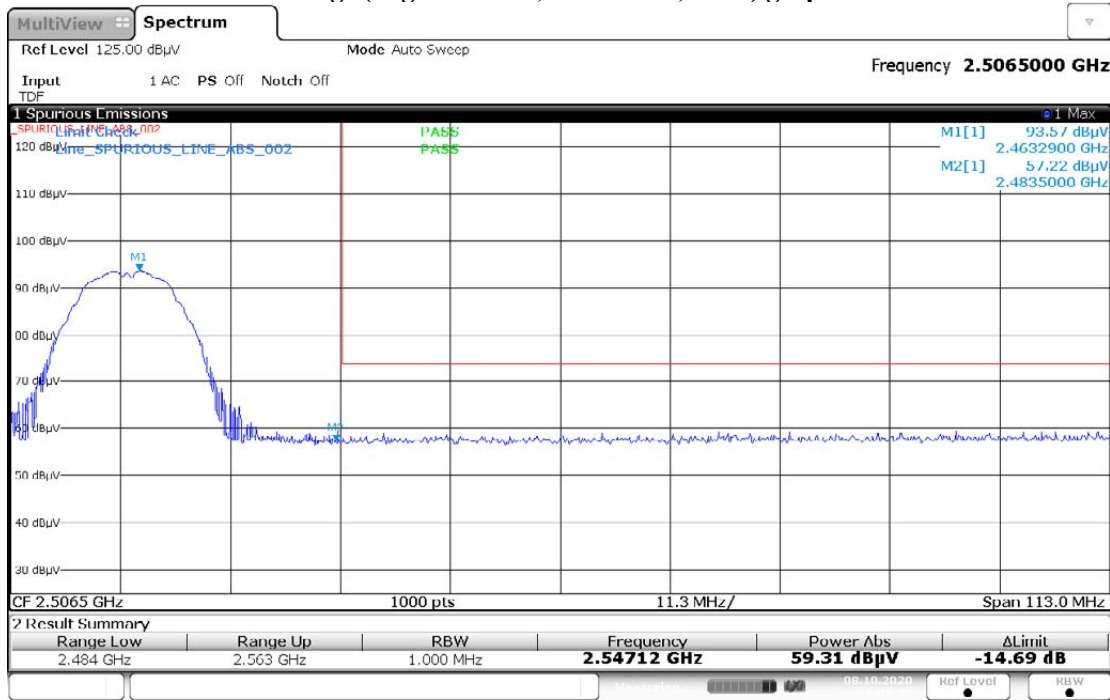
|                         |                 |             |
|-------------------------|-----------------|-------------|
| Remarks:<br>Pass Result | Marginal Result | Fail Result |
|-------------------------|-----------------|-------------|

**Humidity (%): 69.6**  
**Test Date: Thu, 8 Oct, 2020**

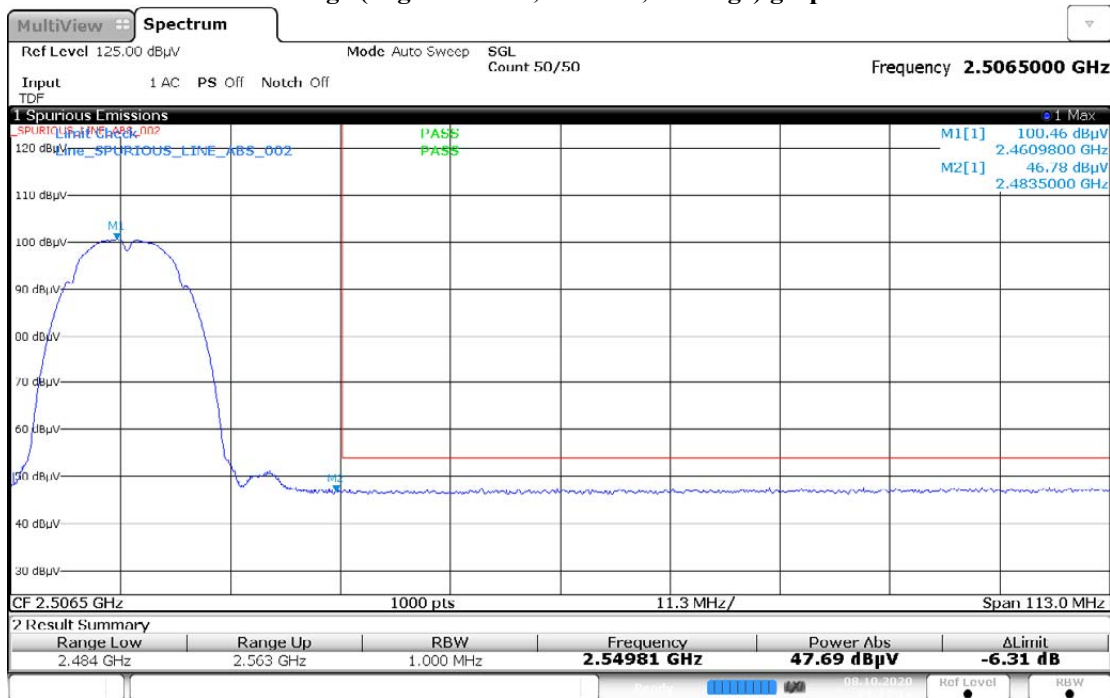
### Restricted Band Edge (High Channel, Vertical, Peak) graphical screen shot



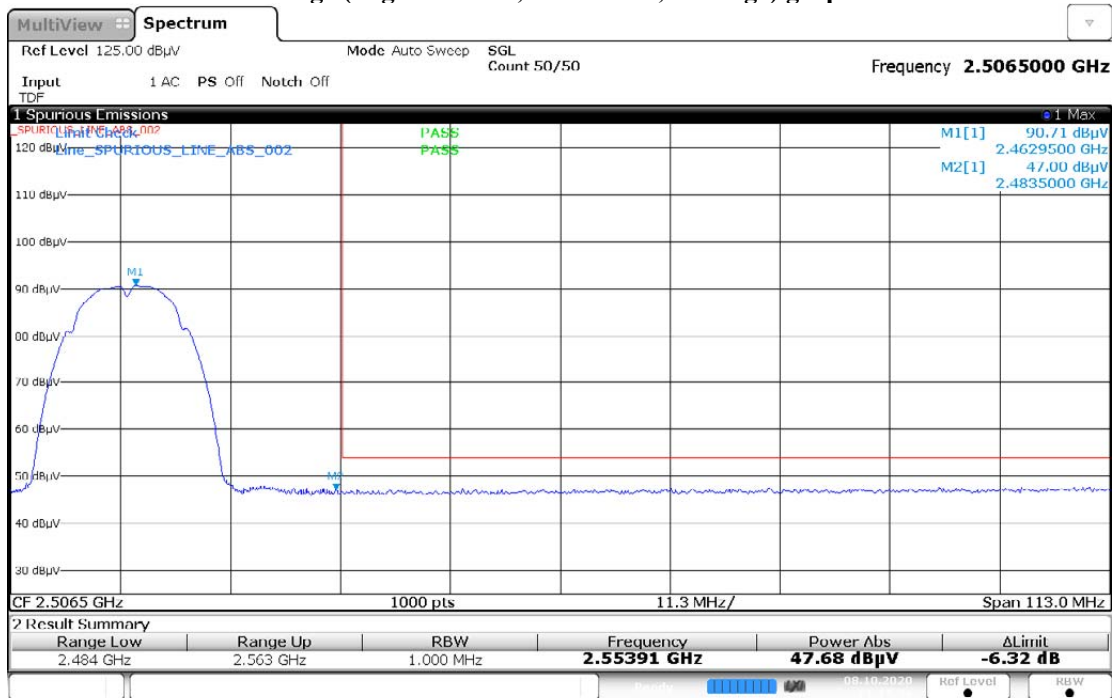
### Restricted Band Edge (High Channel, Horizontal, Peak) graphical screen shot



### Restricted Band Edge (High Channel, Vertical, Average) graphical screen shot



### Restricted Band Edge (High Channel, Horizontal, Average) graphical screen shot

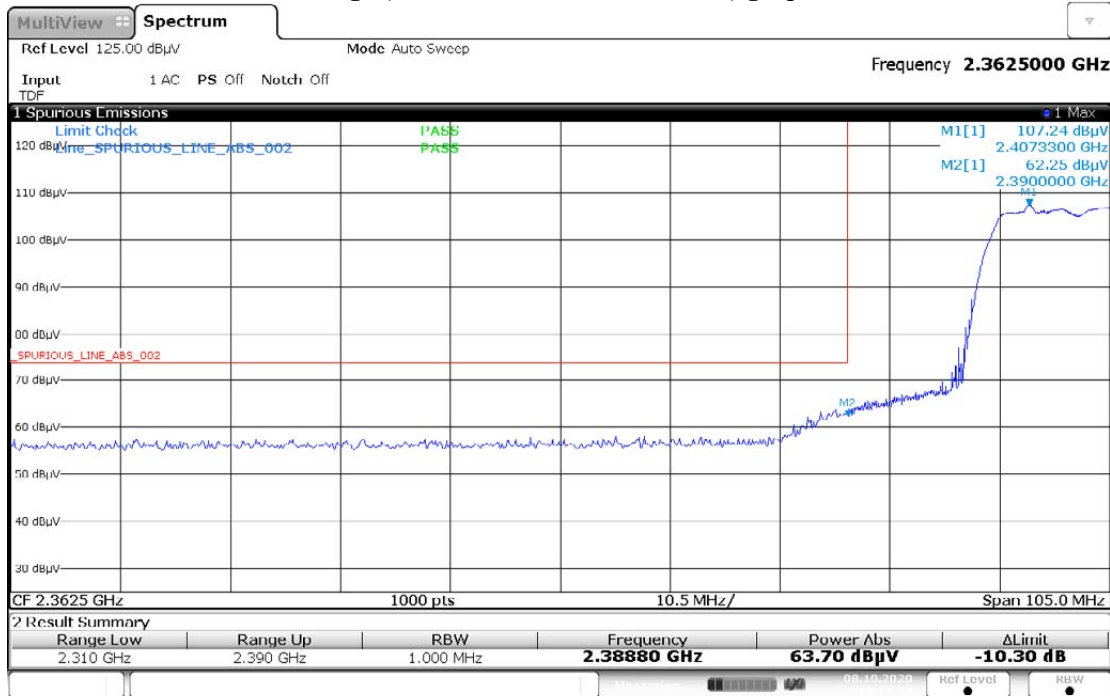


### Restricted Band Edge (Low Channel) tabular data

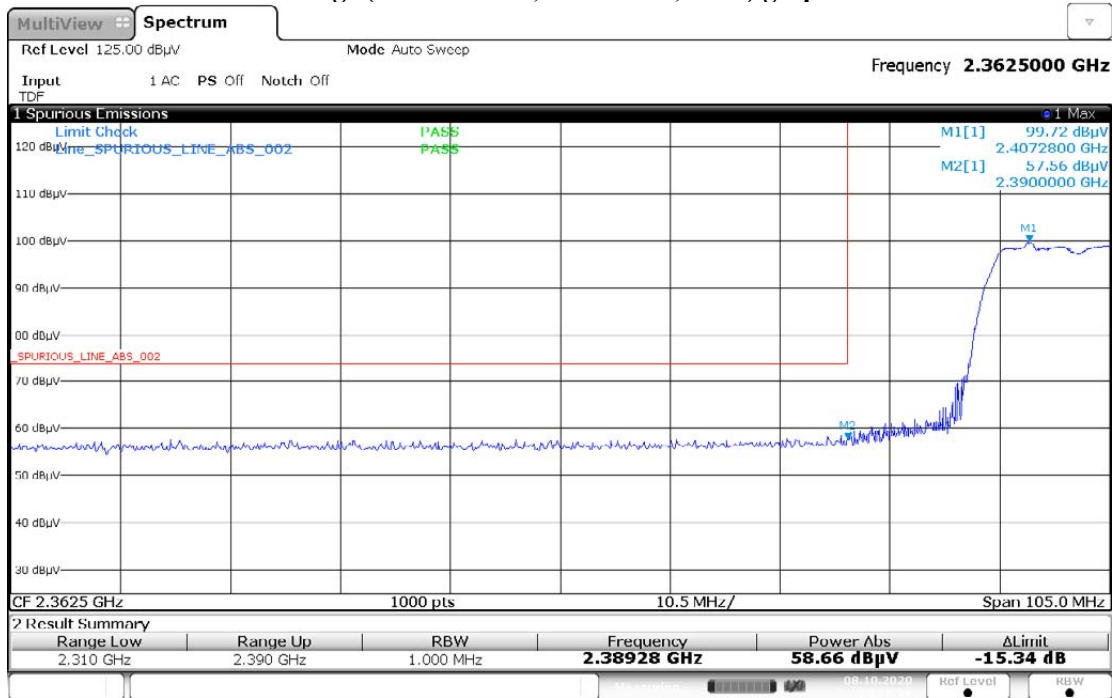
|                         |                 |             |
|-------------------------|-----------------|-------------|
| Remarks:<br>Pass Result | Marginal Result | Fail Result |
|-------------------------|-----------------|-------------|

**Humidity (%): 69.6**  
**Test Date: Thu, 8 Oct, 2020**

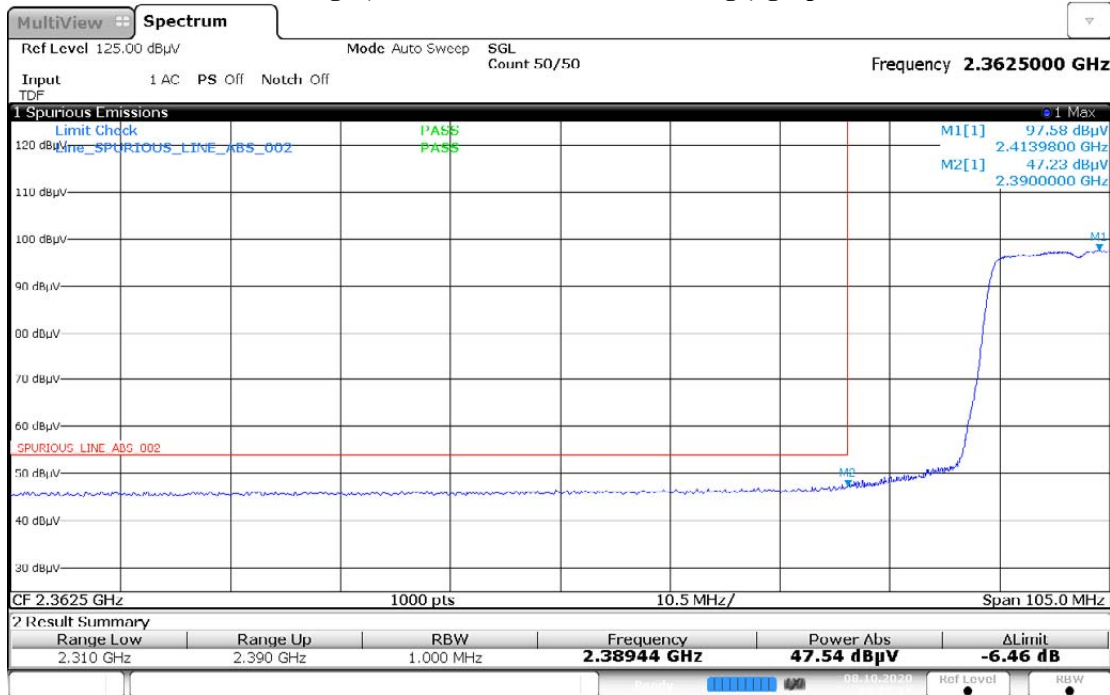
### Restricted Band Edge (Low Channel, Vertical, Peak) graphical screen shot



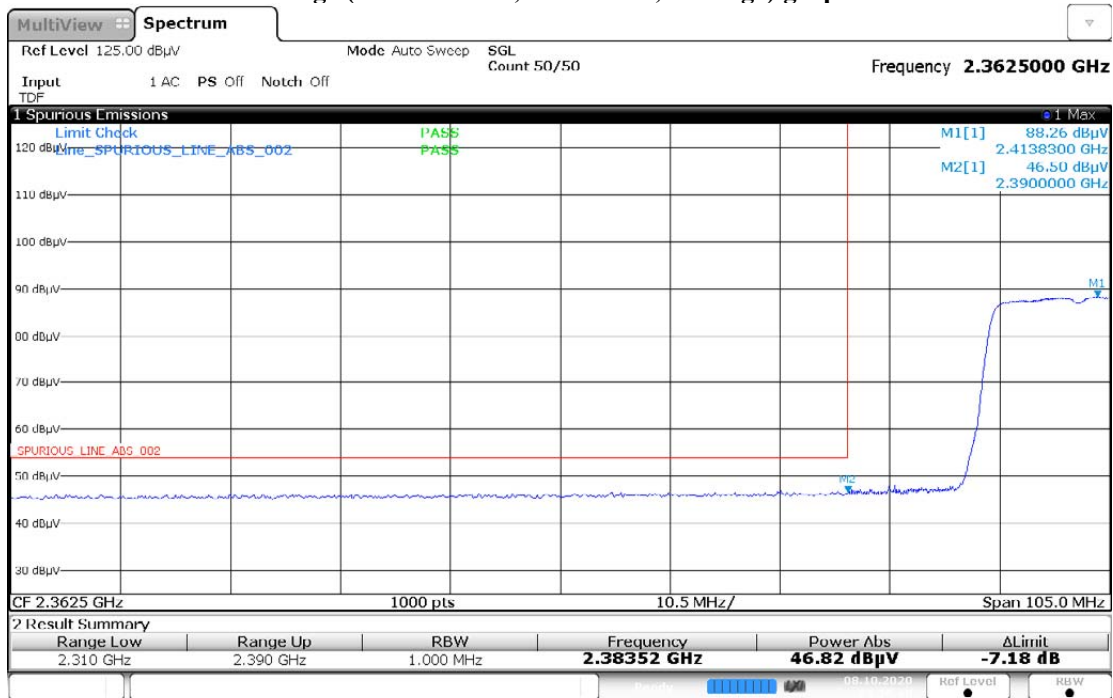
### Restricted Band Edge (Low Channel, Horizontal, Peak) graphical screen shot



### Restricted Band Edge (Low Channel, Vertical, Average) graphical screen shot



### Restricted Band Edge (Low Channel, Horizontal, Average) graphical screen shot

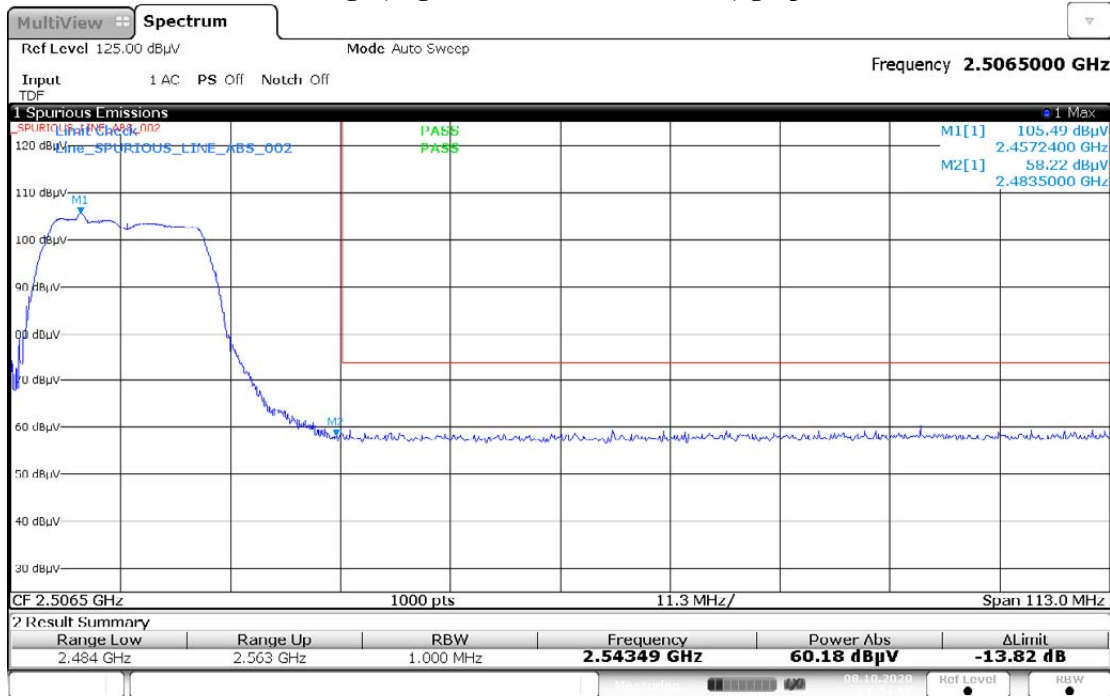


### Restricted Band Edge (High Channel) tabular data

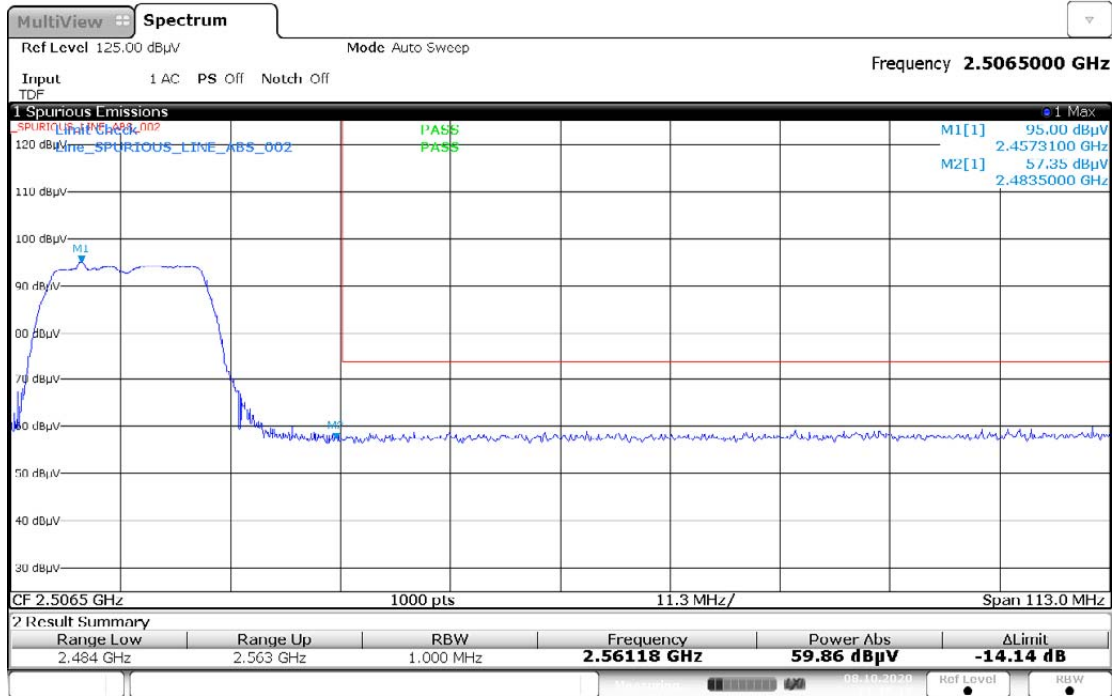
|                         |                 |             |
|-------------------------|-----------------|-------------|
| Remarks:<br>Pass Result | Marginal Result | Fail Result |
|-------------------------|-----------------|-------------|

**Humidity (%): 69.6**  
**Test Date: Thu, 8 Oct, 2020**

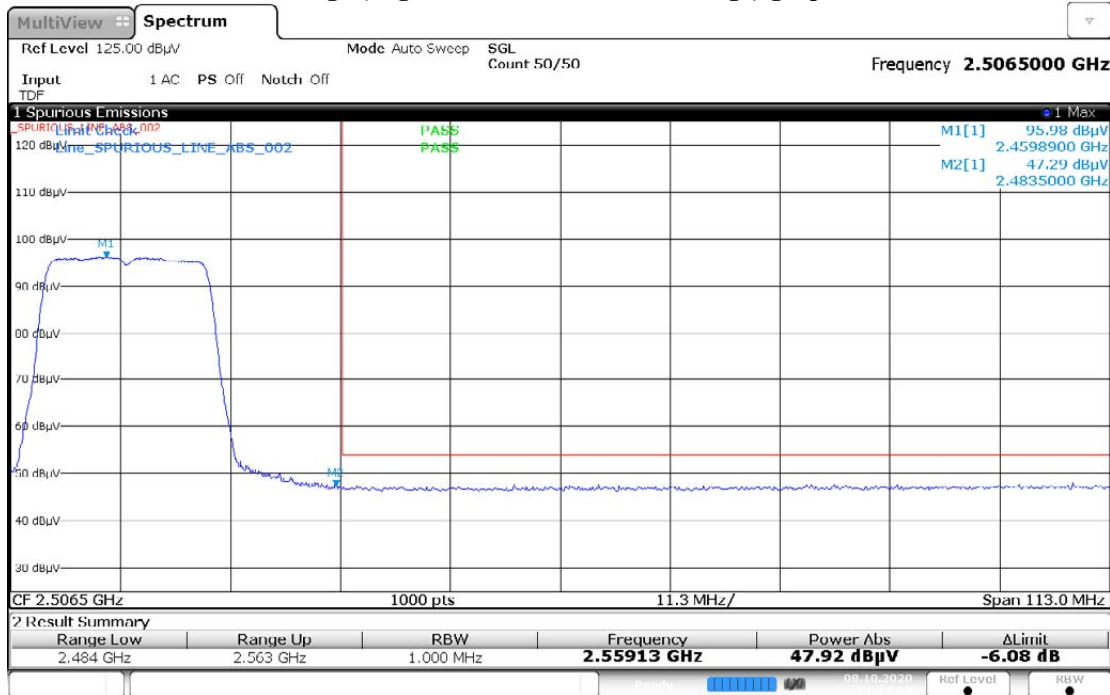
### Restricted Band Edge (High Channel, Vertical, Peak) graphical screen shot



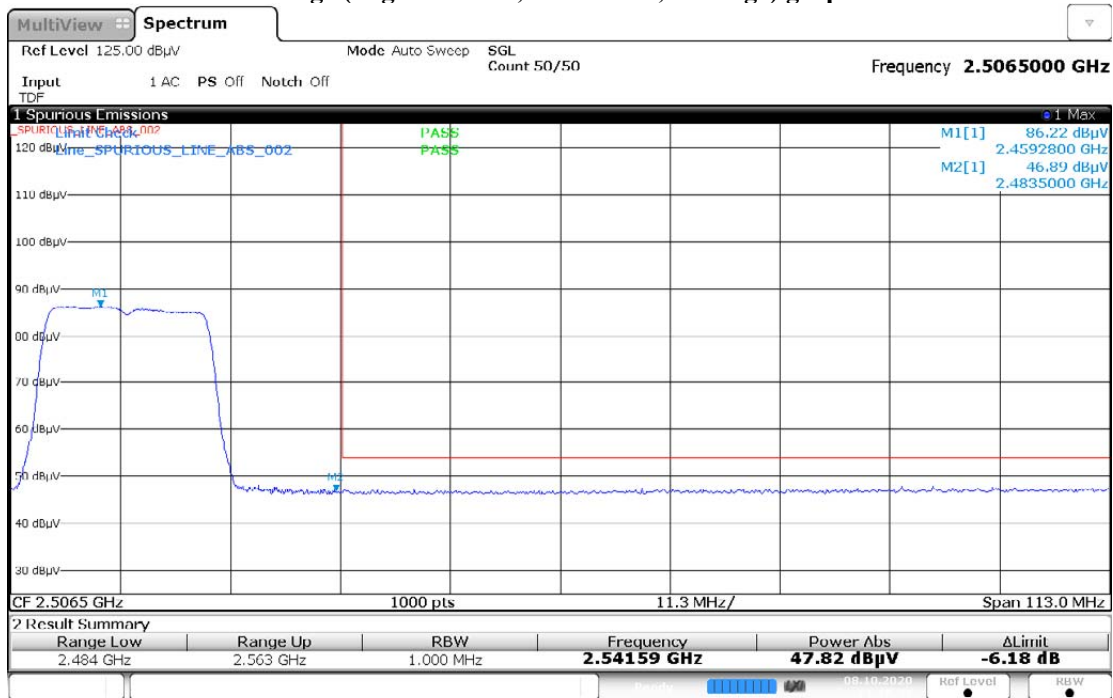
### Restricted Band Edge (High Channel, Horizontal, Peak) graphical screen shot



### Restricted Band Edge (High Channel, Vertical, Average) graphical screen shot

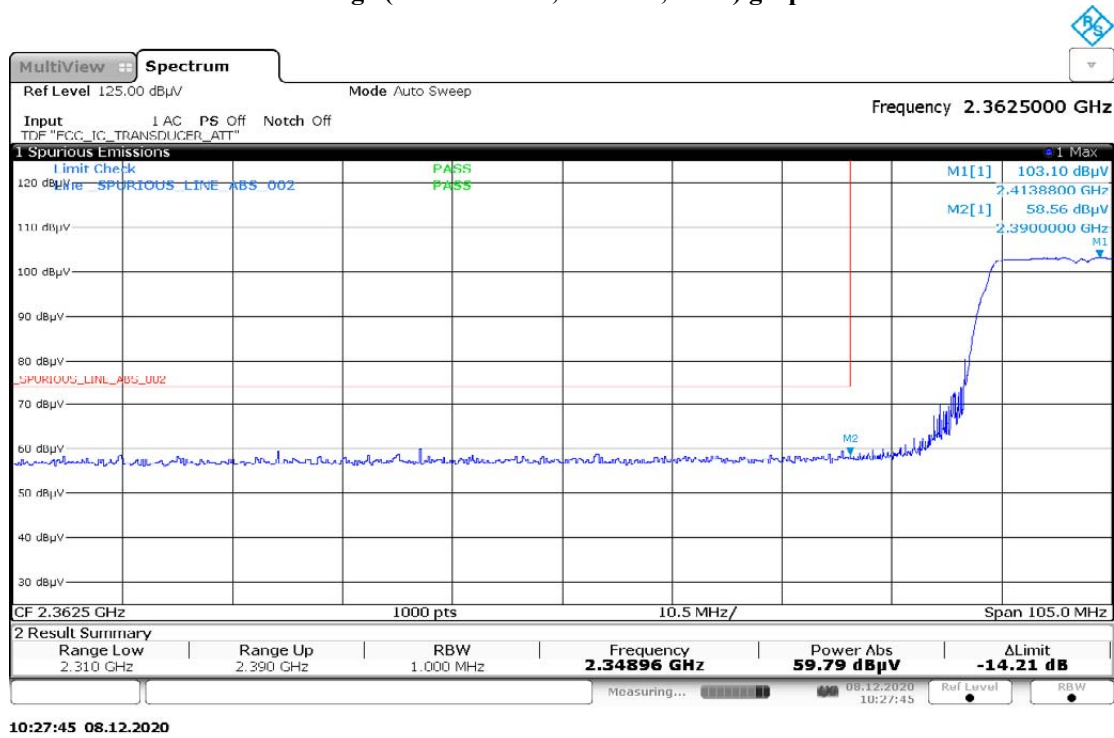


### Restricted Band Edge (High Channel, Horizontal, Average) graphical screen shot

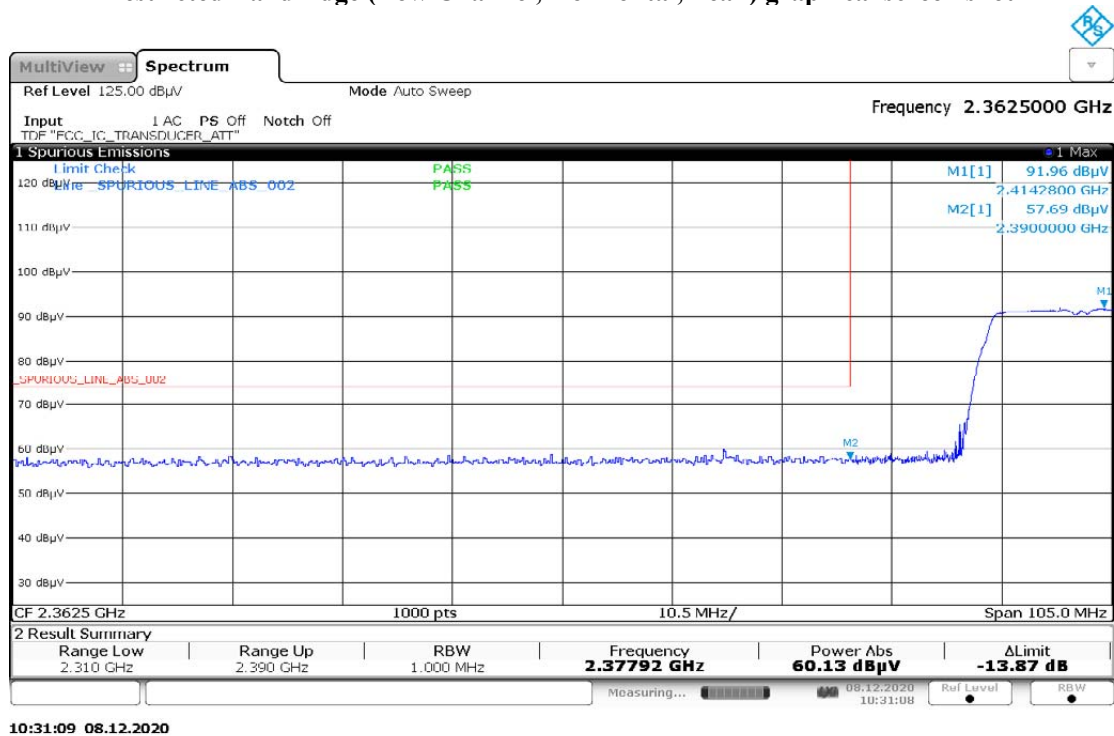




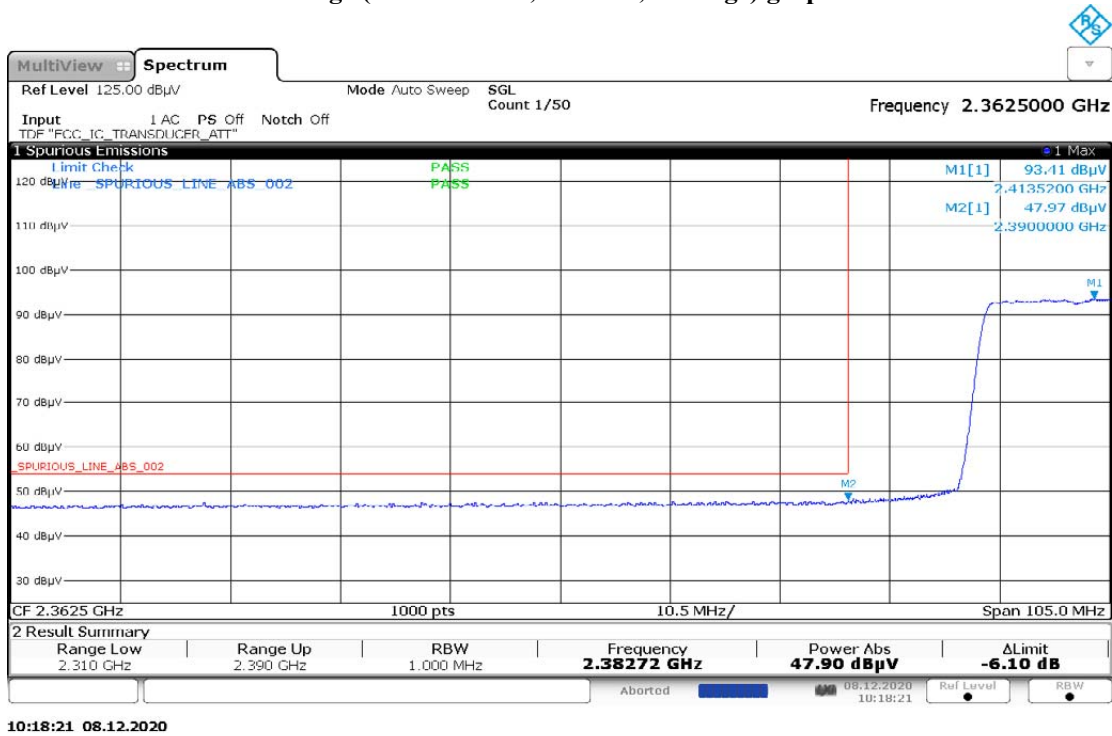
### Restricted Band Edge (Low Channel, Vertical, Peak) graphical screen shot



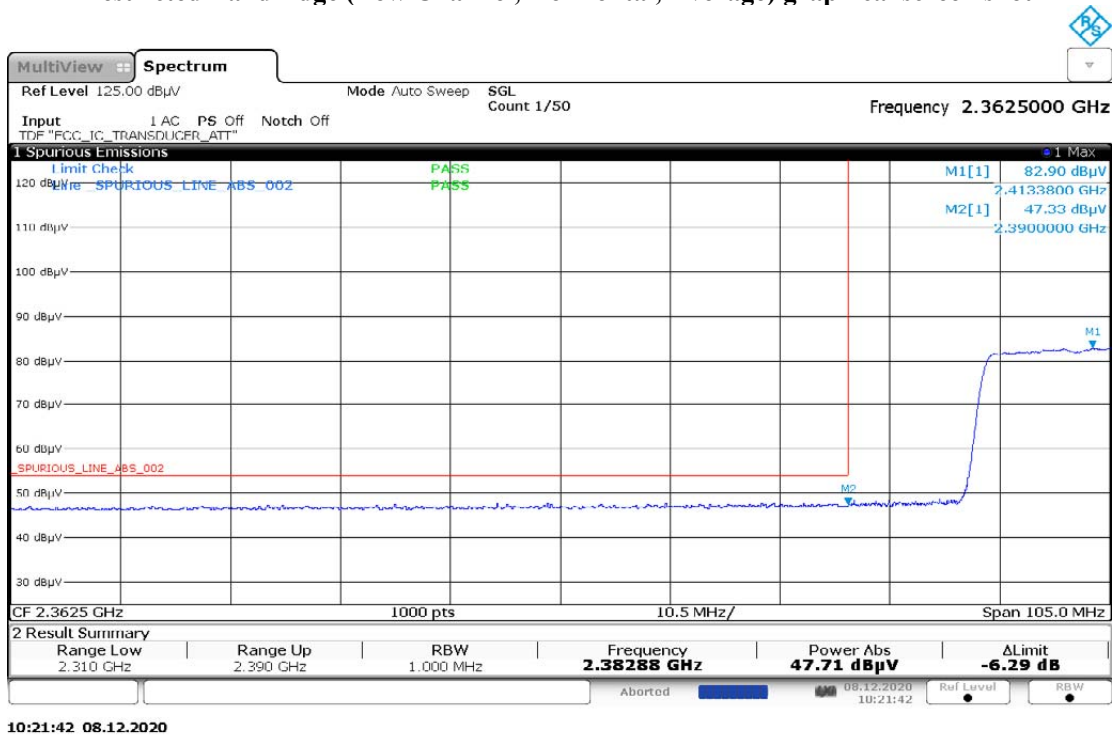
### Restricted Band Edge (Low Channel, Horizontal, Peak) graphical screen shot



Restricted Band Edge (Low Channel, Vertical, Average) graphical screen shot

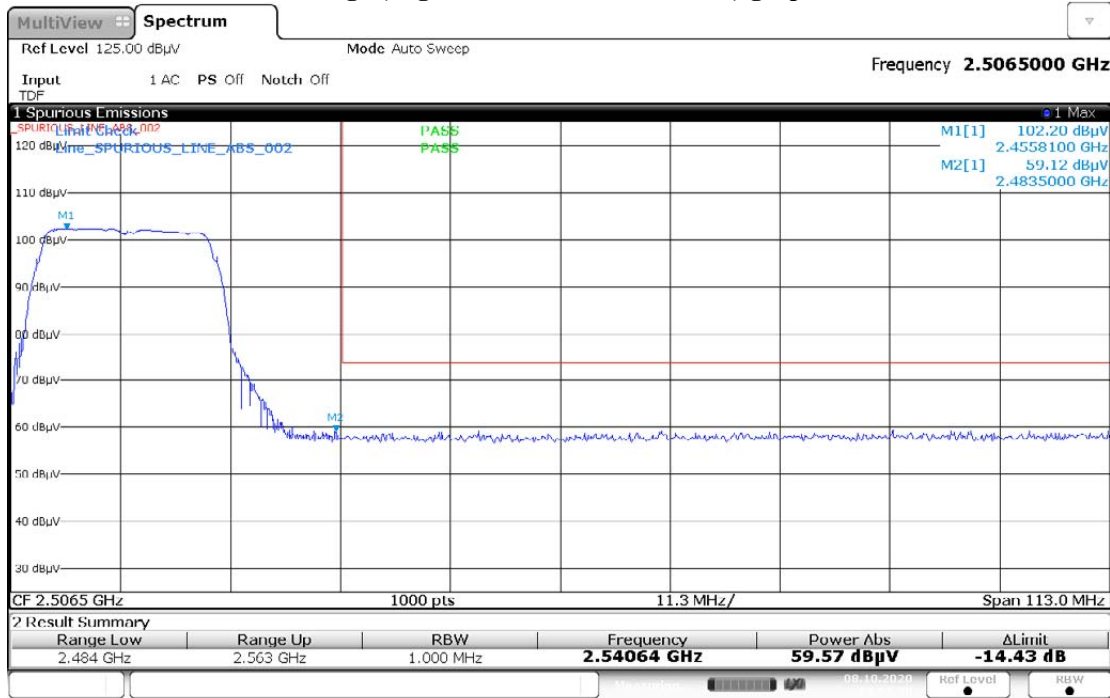


Restricted Band Edge (Low Channel, Horizontal, Average) graphical screen shot

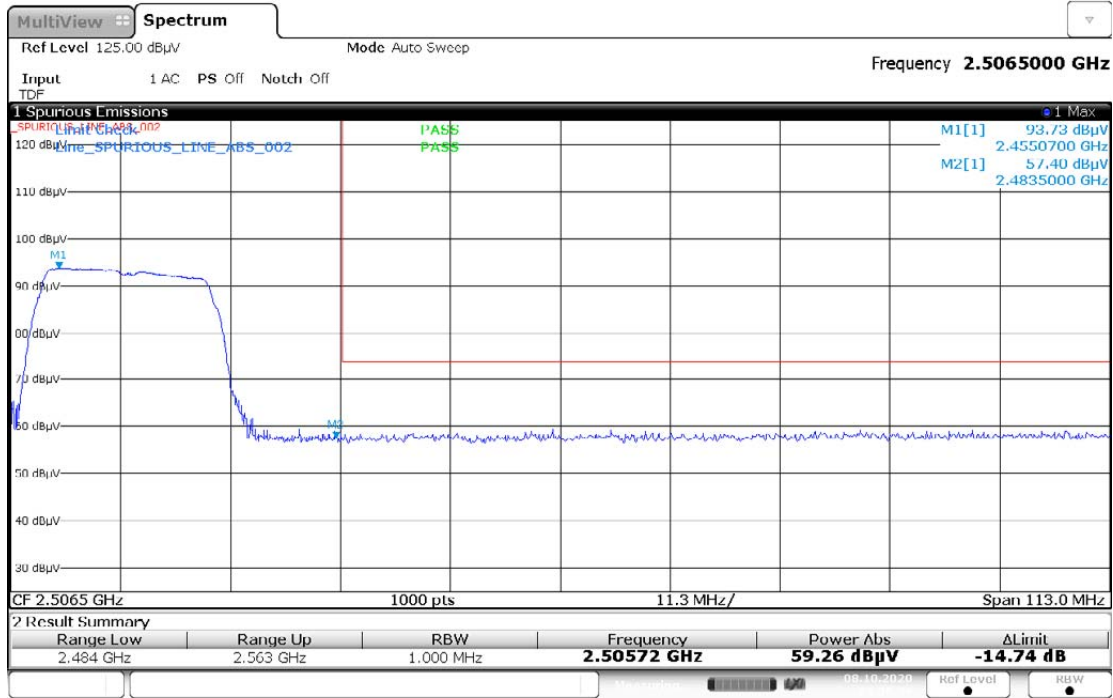




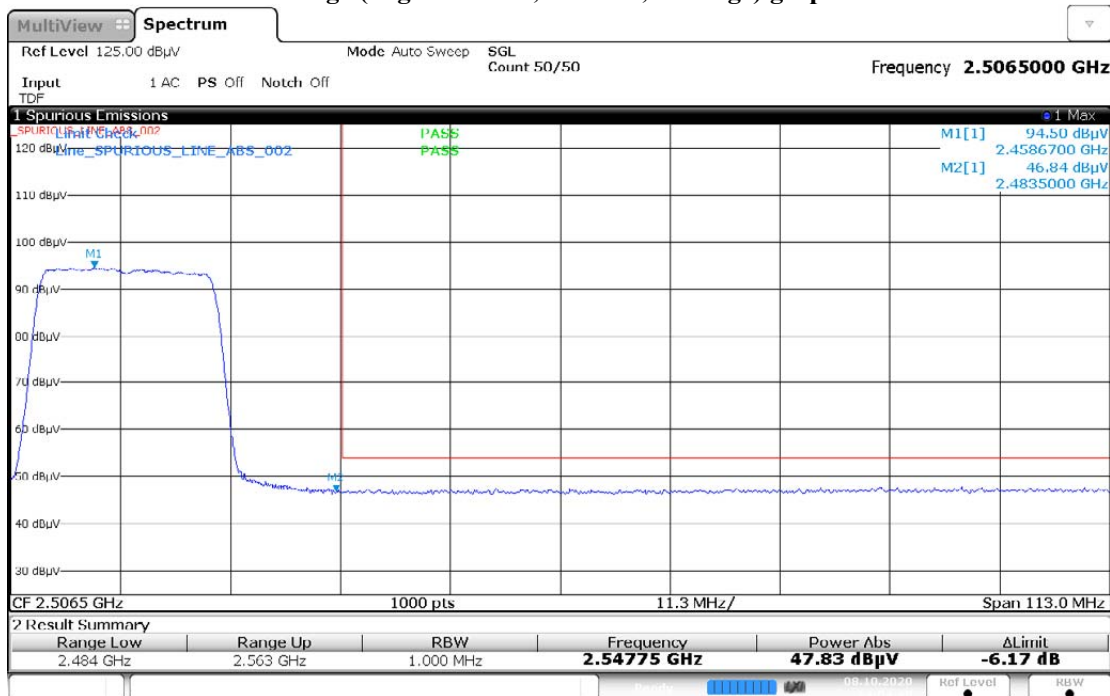
### Restricted Band Edge (High Channel, Vertical, Peak) graphical screen shot



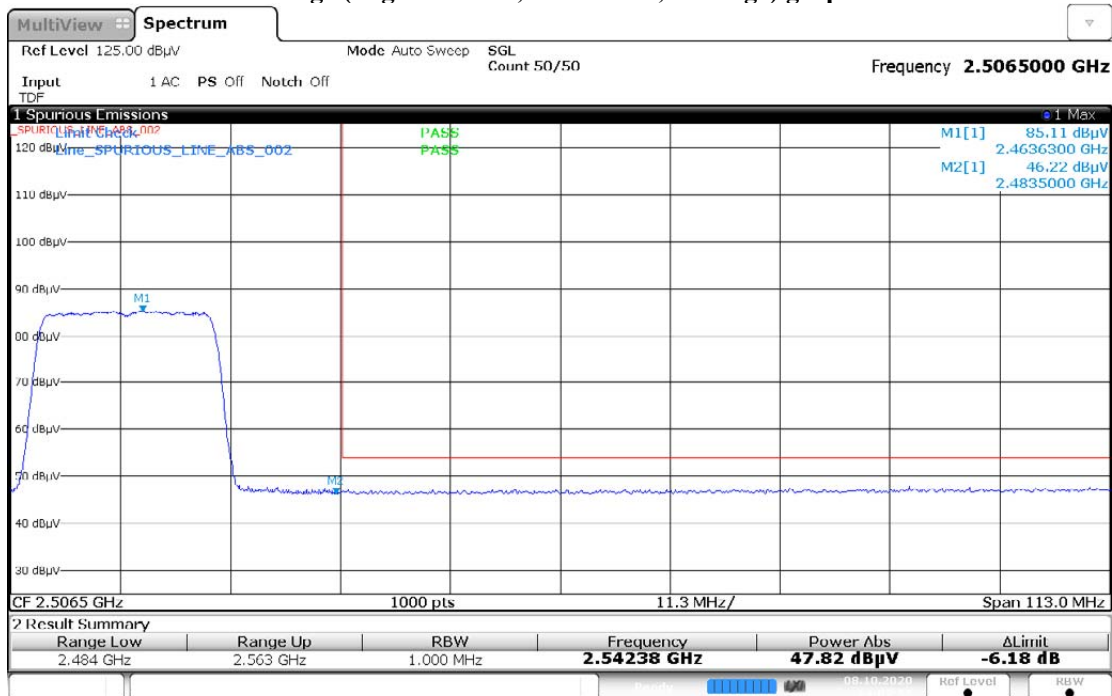
### Restricted Band Edge (High Channel, Horizontal, Peak) graphical screen shot



### Restricted Band Edge (High Channel, Vertical, Average) graphical screen shot

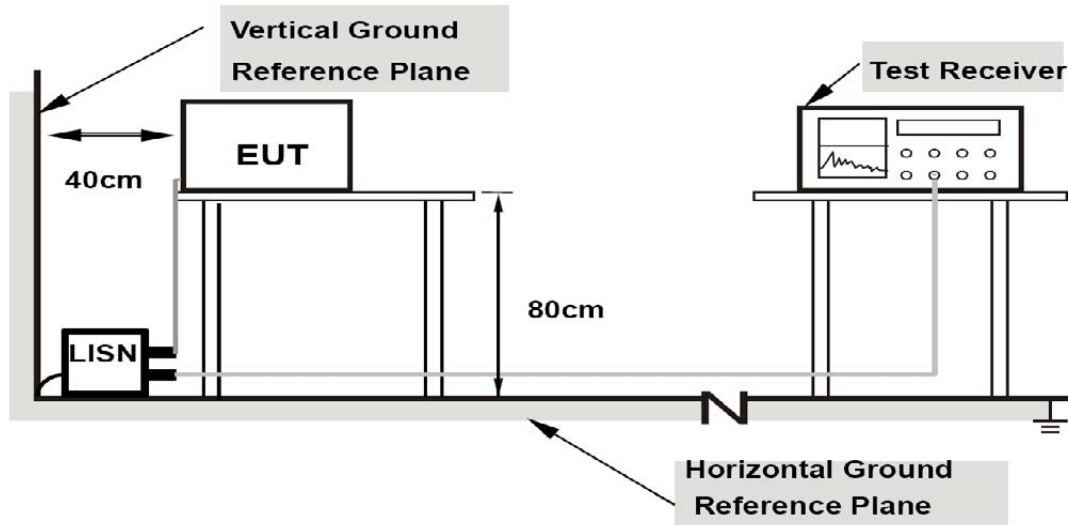


### Restricted Band Edge (High Channel, Horizontal, Average) graphical screen shot



## 6.8. AC Powerline Conducted Emission

### 6.8.1. Test Setup



- 1) Tests were conducted for both Receive and Transmit Mode of the EUT.
- 2) The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/50uH of coupling impedance for the measuring instrument.
- 3) Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- 4) The frequency range from 150 kHz to 30MHz was measured.

### 6.8.2. Test Limits:

For AC Power Line Conducted Test Limit can be Class A or B depends on product classification.

Limits for conducted disturbance at the mains ports  
of class A ITE

| Frequency range<br>MHz                                        | Limits<br>dB( $\mu$ V) |         |
|---------------------------------------------------------------|------------------------|---------|
|                                                               | Quasi-peak             | Average |
| 0,15 to 0,50                                                  | 79                     | 66      |
| 0,50 to 30                                                    | 73                     | 60      |
| NOTE The lower limit shall apply at the transition frequency. |                        |         |

**Table 1: Limits for Conducted Disturbance at the Mains Ports of Class A ITE.**

**Limits for conducted disturbance at the mains ports  
of class B ITE**

| Frequency range<br>MHz                                                                                     | Limits<br>dB( $\mu$ V) |          |
|------------------------------------------------------------------------------------------------------------|------------------------|----------|
|                                                                                                            | Quasi-peak             | Average  |
| 0,15 to 0,50                                                                                               | 66 to 56               | 56 to 46 |
| 0,50 to 5                                                                                                  | 56                     | 46       |
| 5 to 30                                                                                                    | 60                     | 50       |
| NOTE 1 The lower limit shall apply at the transition frequencies.                                          |                        |          |
| NOTE 2 The limit decreases linearly with the logarithm of the frequency in the range 0,15 MHz to 0,50 MHz. |                        |          |

**Table 2: Limits for Conducted Disturbance at the Mains Ports of Class B ITE**

### 6.8.3. Test Result

Not Applicable. Testing is not required, radio shall turn off during charging mode.

**END OF TEST REPORT**