

Appendix C

RF Test Data for BT V5.1 (2BT LE) (Conducted Measurement)

Product Name: Portable Data Collector

Trade Mark: Newland

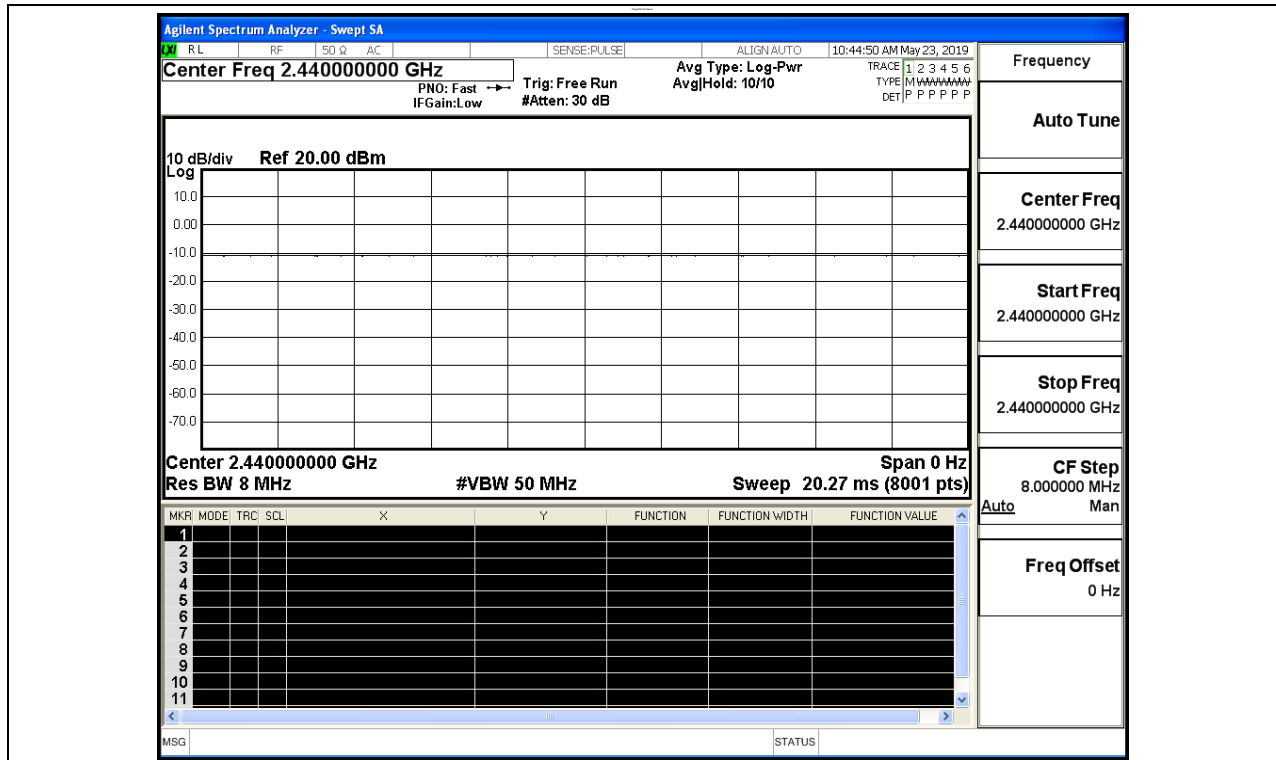
Test Model: NLS-NFT10

Environmental Conditions

| | |
|--------------------|------------|
| Temperature: | 22.6° C |
| Relative Humidity: | 54.1% |
| ATM Pressure: | 100.0 kPa |
| Test Engineer: | WANGCHUANG |
| Supervised by: | Tom.Liu |

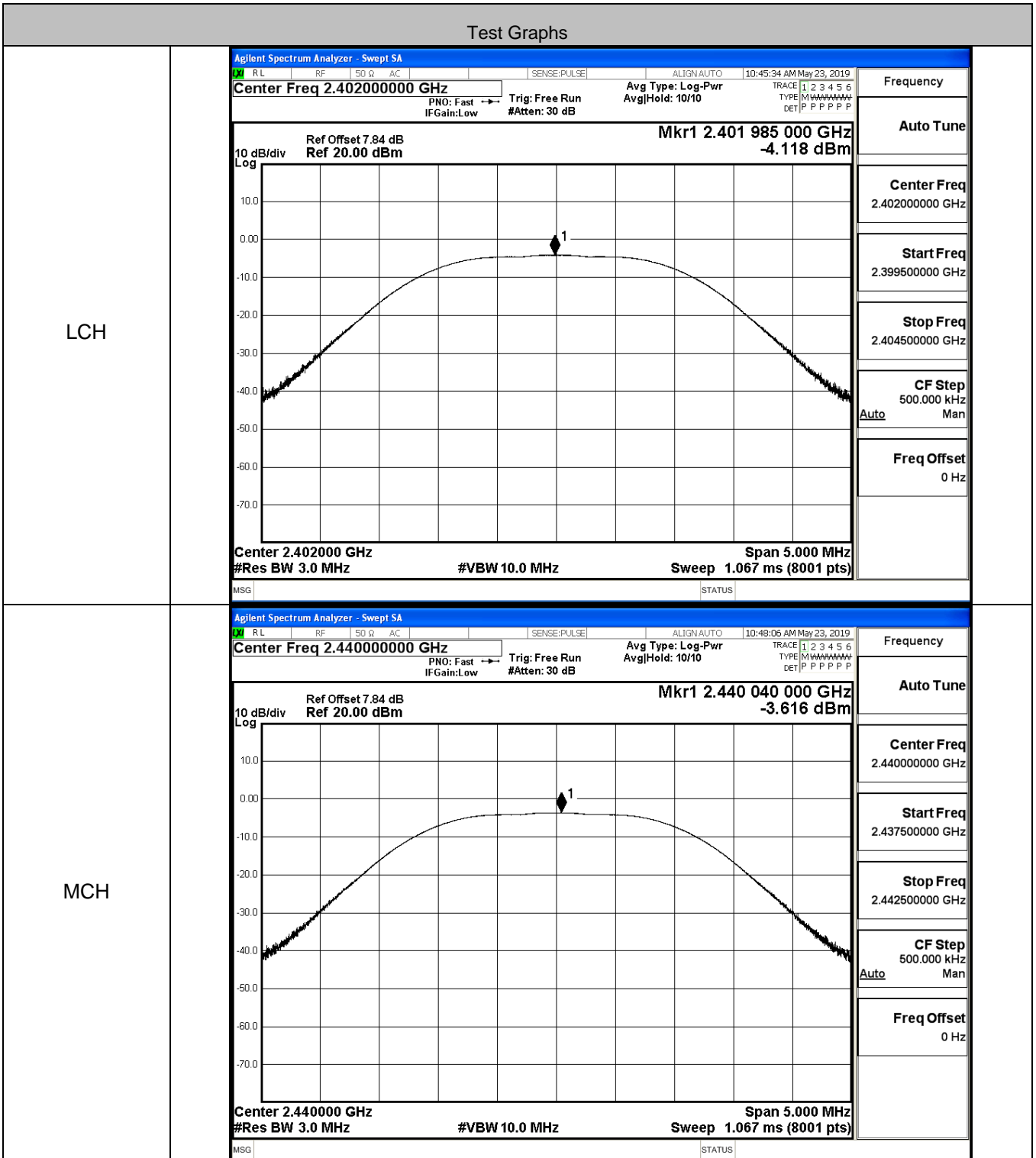
C.1 Duty Cycle

| Test Mode | Test Channel | Ant | Duty Cycle[%] | Verdict |
|-----------|--------------|------|---------------|---------|
| BT LE | 2440 | Ant1 | 100 | PASS |

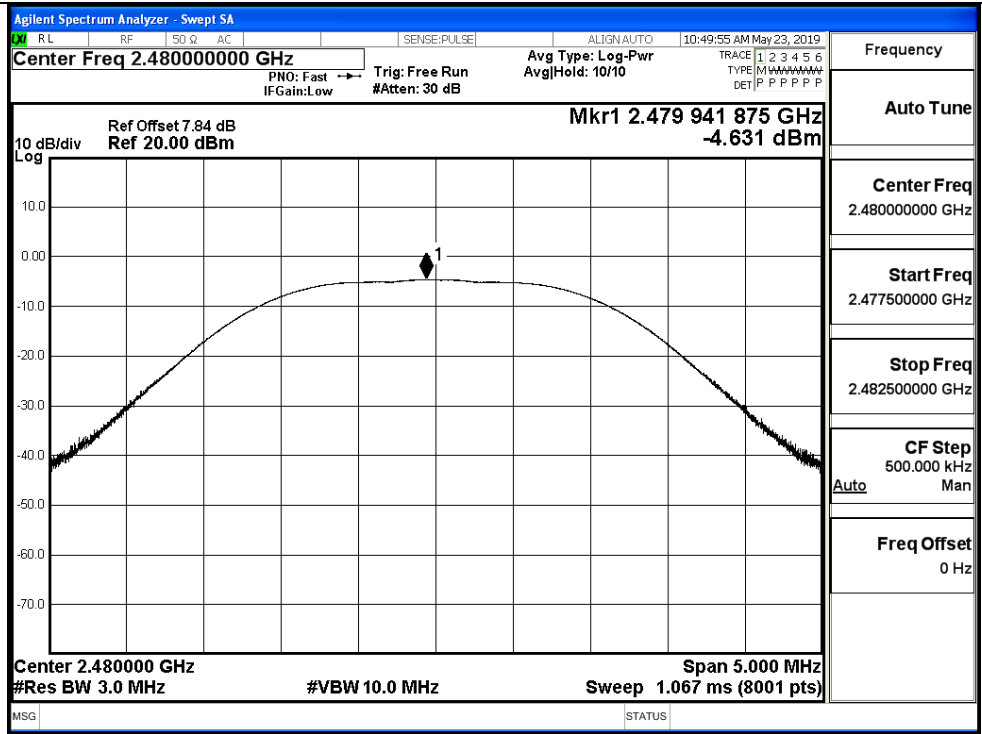


C.2 Maximum Conducted Peak Output Power

| Mode | Channel | Conduct Peak Power[dBm] | Limit [dBm] | Verdict |
|-------|---------|-------------------------|-------------|---------|
| BT LE | LCH | -4.118 | 30 | PASS |
| BT LE | MCH | -3.616 | 30 | PASS |
| BT LE | HCH | -4.631 | 30 | PASS |

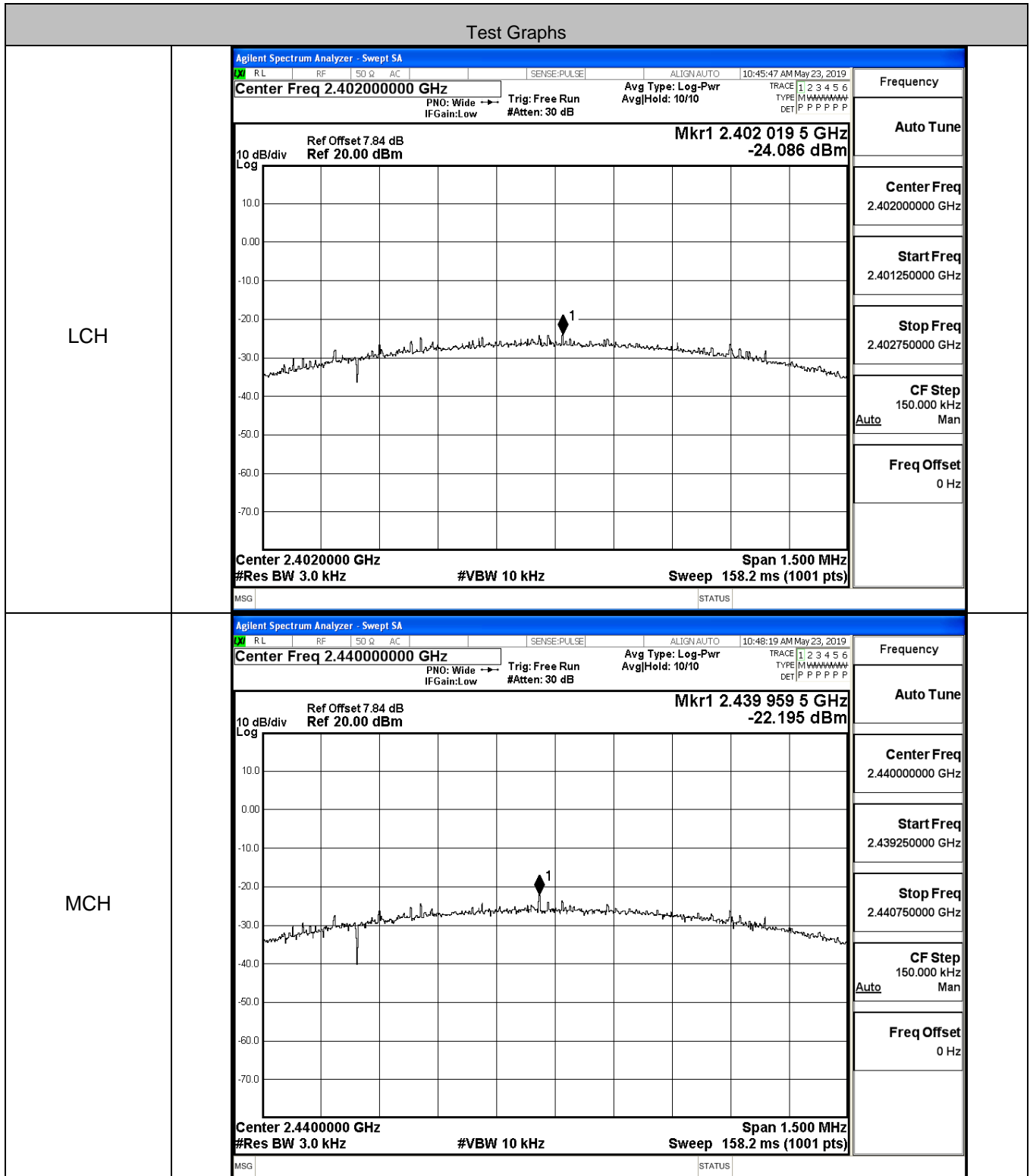


HCH

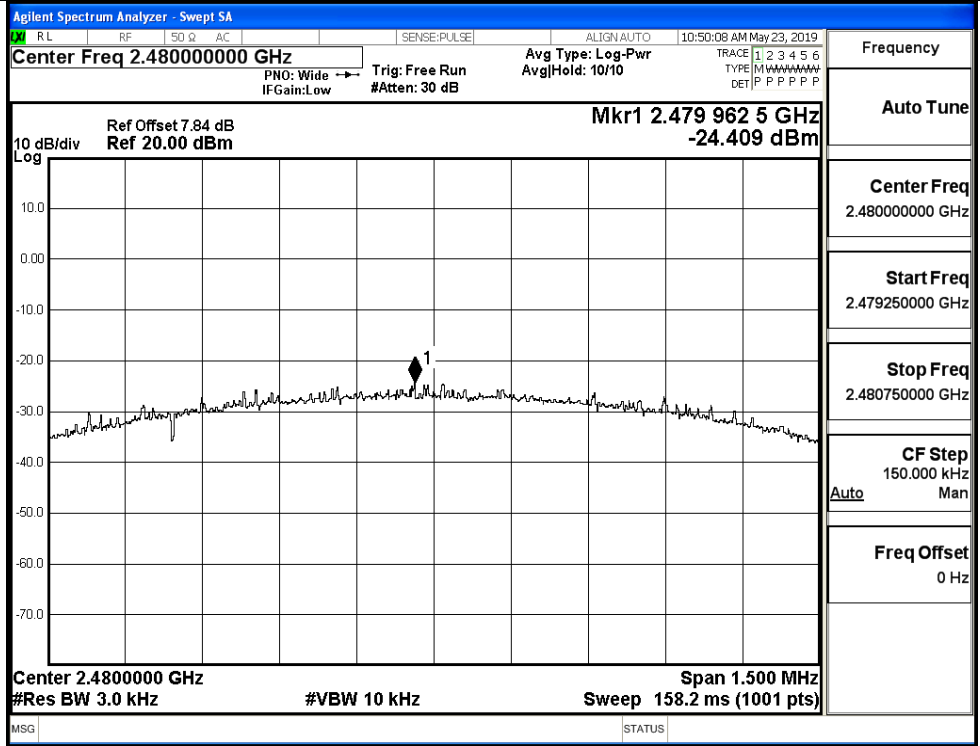


C.3 Maximum Power Spectral Density

| Mode | Channel | PSD [dBm/3KHz] | Limit [dBm/3KHz] | Verdict |
|-------|---------|----------------|------------------|---------|
| BT LE | LCH | -24.086 | 8 | PASS |
| BT LE | MCH | -22.195 | 8 | PASS |
| BT LE | HCH | -24.409 | 8 | PASS |

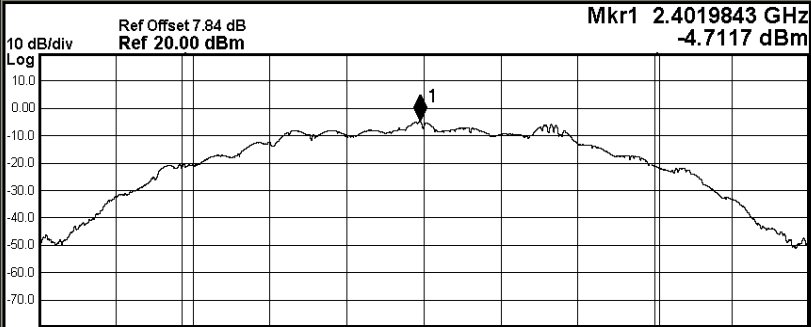
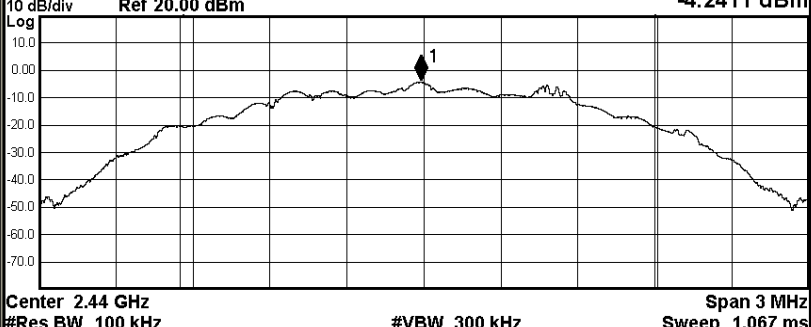


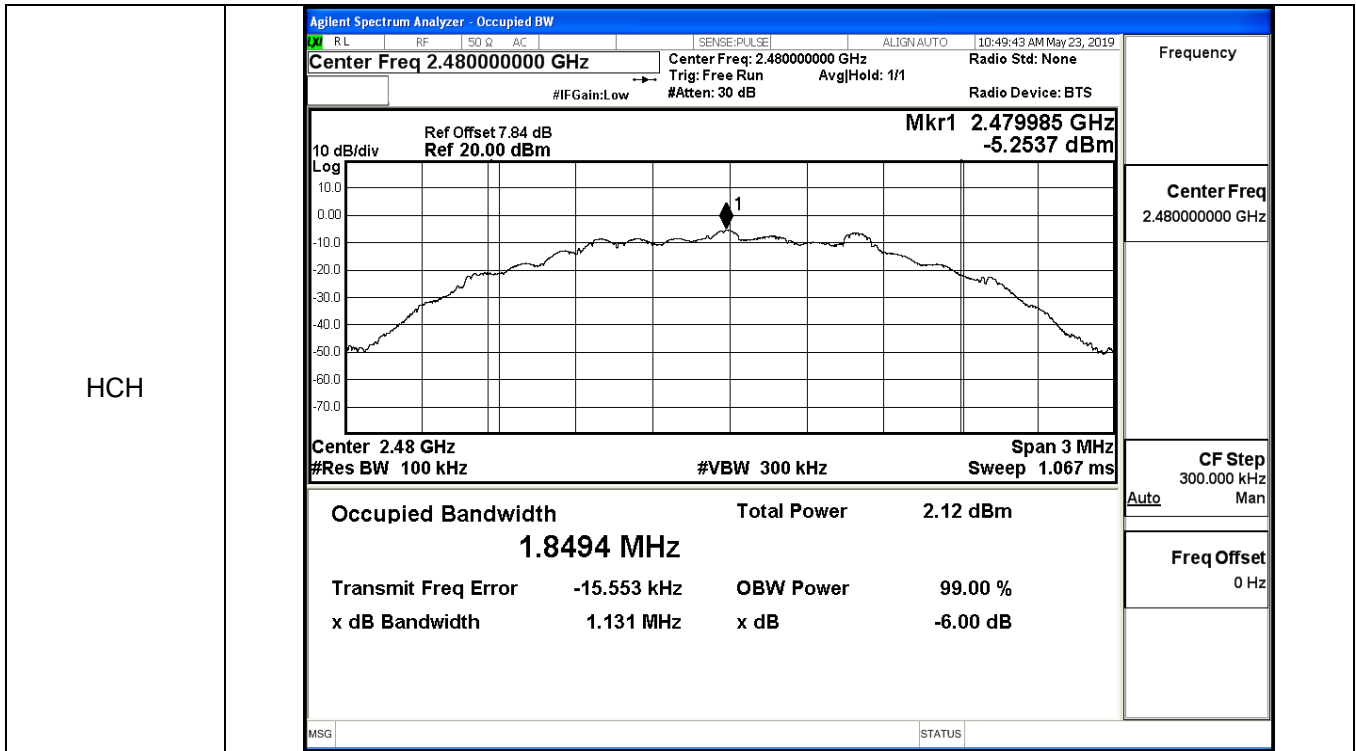
HCH



C.4 6dB Bandwidth

| Mode | Channel | 6dB Bandwidth [MHz] | Limit [MHz] | Verdict |
|-------|---------|---------------------|-------------|---------|
| BT LE | LCH | 1.131 | ≥0.5 | PASS |
| BT LE | MCH | 1.128 | ≥0.5 | PASS |
| BT LE | HCH | 1.131 | ≥0.5 | PASS |

| Test Graphs | | | | | | | | | | | | | | | | | |
|---------------------|---|--------------------|-------------|----------|--|-------------------|--|--|--|---------------------|-------------|-----------|---------|----------------|-----------|------|----------|
| LCH | <div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center; margin: 0;">Agilent Spectrum Analyzer - Occupied BW</p> <p style="font-size: small; margin: 0;">RL RF 50 Ω AC SENSE:PULSE ALIGN:AUTO 10:45:22 AM May 23, 2019</p> <p style="margin: 0;">Center Freq: 2.402000000 GHz Center Freq: 2.402000000 GHz Radio Std: None</p> <p style="margin: 0;">Trig: Free Run AvgHold> 1/1</p> <p style="margin: 0;">#IFGain:Low #Atten: 30 dB Radio Device: BTS</p> <div style="border: 1px solid black; padding: 2px;"> <p style="text-align: right; margin: 0;">Mkr1 2.4019843 GHz -4.7117 dBm</p>  </div> <p style="margin: 0;">Center 2.402 GHz Span 3 MHz</p> <p style="margin: 0;">#Res BW 100 kHz #VBW 300 kHz Sweep 1.067 ms</p> <table style="width: 100%; border-collapse: collapse; font-size: small;"> <tr> <td style="width: 50%;">Occupied Bandwidth</td> <td style="width: 50%;">Total Power</td> <td colspan="2">2.59 dBm</td> </tr> <tr> <td colspan="4" style="text-align: center;">1.8569 MHz</td> </tr> <tr> <td>Transmit Freq Error</td> <td>-10.233 kHz</td> <td>OBW Power</td> <td>99.00 %</td> </tr> <tr> <td>x dB Bandwidth</td> <td>1.131 MHz</td> <td>x dB</td> <td>-6.00 dB</td> </tr> </table> <p style="margin: 0; font-size: x-small;">MSG STATUS</p> </div> | Occupied Bandwidth | Total Power | 2.59 dBm | | 1.8569 MHz | | | | Transmit Freq Error | -10.233 kHz | OBW Power | 99.00 % | x dB Bandwidth | 1.131 MHz | x dB | -6.00 dB |
| Occupied Bandwidth | Total Power | 2.59 dBm | | | | | | | | | | | | | | | |
| 1.8569 MHz | | | | | | | | | | | | | | | | | |
| Transmit Freq Error | -10.233 kHz | OBW Power | 99.00 % | | | | | | | | | | | | | | |
| x dB Bandwidth | 1.131 MHz | x dB | -6.00 dB | | | | | | | | | | | | | | |
| MCH | <div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center; margin: 0;">Agilent Spectrum Analyzer - Occupied BW</p> <p style="font-size: small; margin: 0;">RL RF 50 Ω AC SENSE:PULSE ALIGN:AUTO 10:47:55 AM May 23, 2019</p> <p style="margin: 0;">Center Freq: 2.440000000 GHz Center Freq: 2.440000000 GHz Radio Std: None</p> <p style="margin: 0;">Trig: Free Run AvgHold> 1/1</p> <p style="margin: 0;">#IFGain:Low #Atten: 30 dB Radio Device: BTS</p> <div style="border: 1px solid black; padding: 2px;"> <p style="text-align: right; margin: 0;">Mkr1 2.4399876 GHz -4.2411 dBm</p>  </div> <p style="margin: 0;">Center 2.44 GHz Span 3 MHz</p> <p style="margin: 0;">#Res BW 100 kHz #VBW 300 kHz Sweep 1.067 ms</p> <table style="width: 100%; border-collapse: collapse; font-size: small;"> <tr> <td style="width: 50%;">Occupied Bandwidth</td> <td style="width: 50%;">Total Power</td> <td colspan="2">3.10 dBm</td> </tr> <tr> <td colspan="4" style="text-align: center;">1.8538 MHz</td> </tr> <tr> <td>Transmit Freq Error</td> <td>-18.586 kHz</td> <td>OBW Power</td> <td>99.00 %</td> </tr> <tr> <td>x dB Bandwidth</td> <td>1.128 MHz</td> <td>x dB</td> <td>-6.00 dB</td> </tr> </table> <p style="margin: 0; font-size: x-small;">MSG STATUS</p> </div> | Occupied Bandwidth | Total Power | 3.10 dBm | | 1.8538 MHz | | | | Transmit Freq Error | -18.586 kHz | OBW Power | 99.00 % | x dB Bandwidth | 1.128 MHz | x dB | -6.00 dB |
| Occupied Bandwidth | Total Power | 3.10 dBm | | | | | | | | | | | | | | | |
| 1.8538 MHz | | | | | | | | | | | | | | | | | |
| Transmit Freq Error | -18.586 kHz | OBW Power | 99.00 % | | | | | | | | | | | | | | |
| x dB Bandwidth | 1.128 MHz | x dB | -6.00 dB | | | | | | | | | | | | | | |

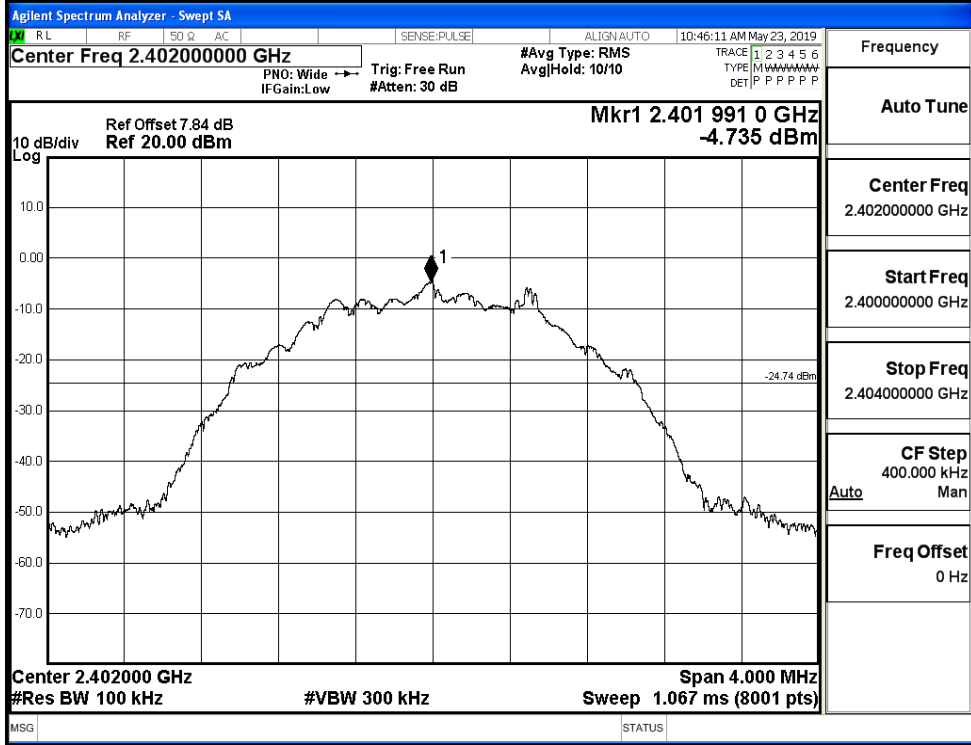


C.5 RF Conducted Spurious Emissions

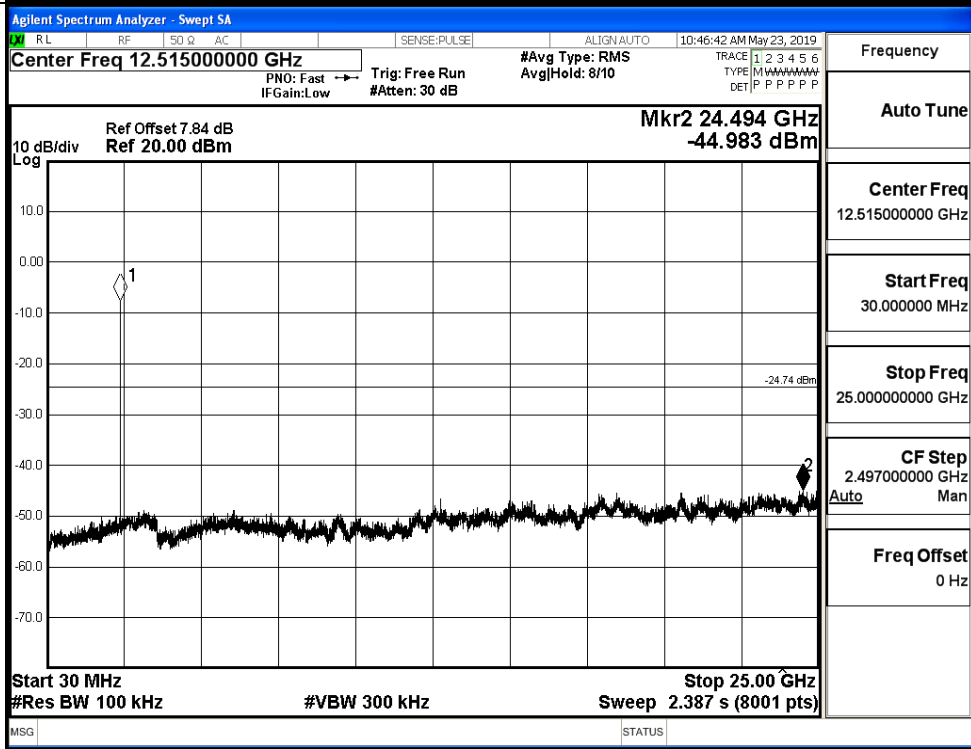
| Mode | Channel | Pref [dBm] | Max. Level [dBm] | Limit [dBm] | Verdict |
|-------|---------|------------|------------------|-------------|---------|
| BT LE | LCH | -4.735 | -44.983 | -24.735 | PASS |
| BT LE | MCH | -4.519 | -44.745 | -24.519 | PASS |
| BT LE | HCH | -5.227 | -44.502 | -25.227 | PASS |

BT LE_LCH_Graphs

Pref/BT LE/LCH

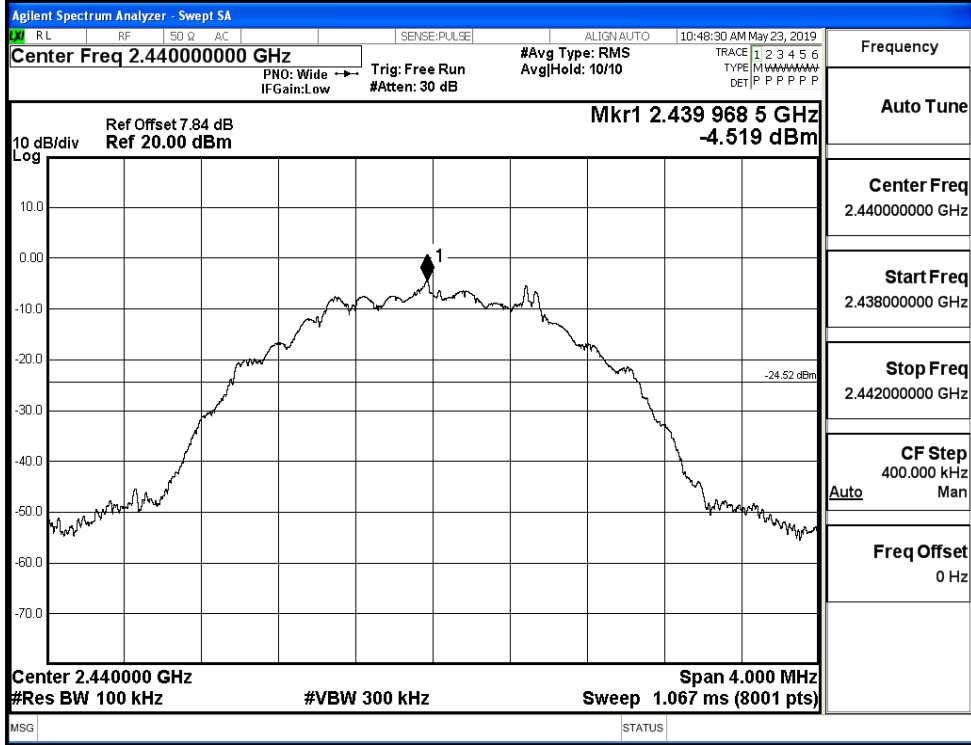


Puw/BT LE/LCH

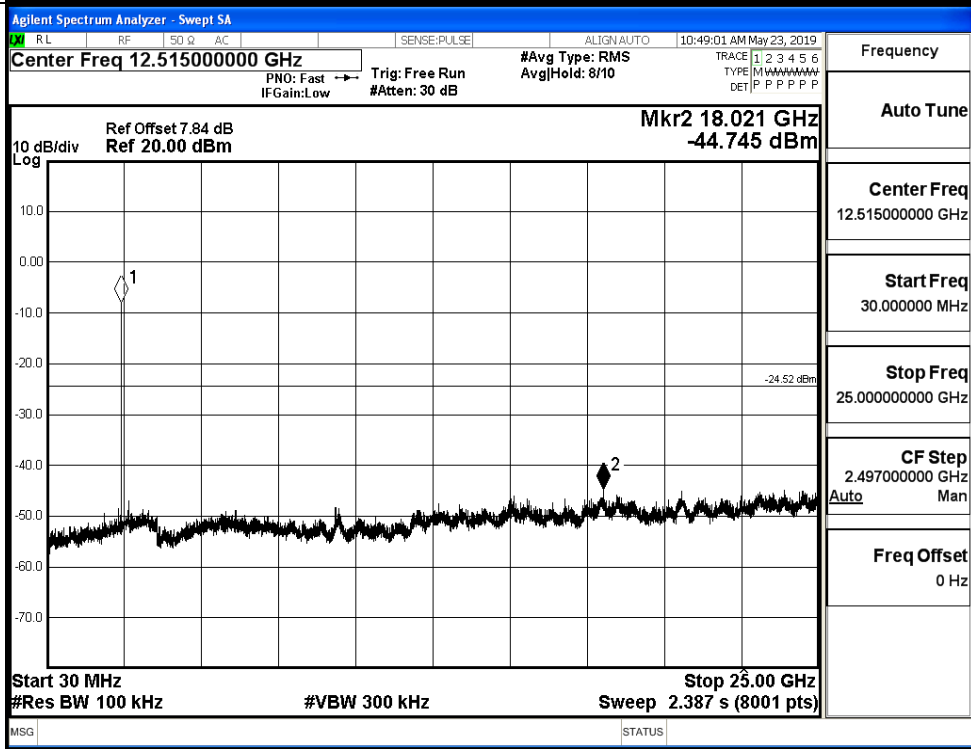


BT LE_MCH_Graphs

Pref/BT LE/MCH

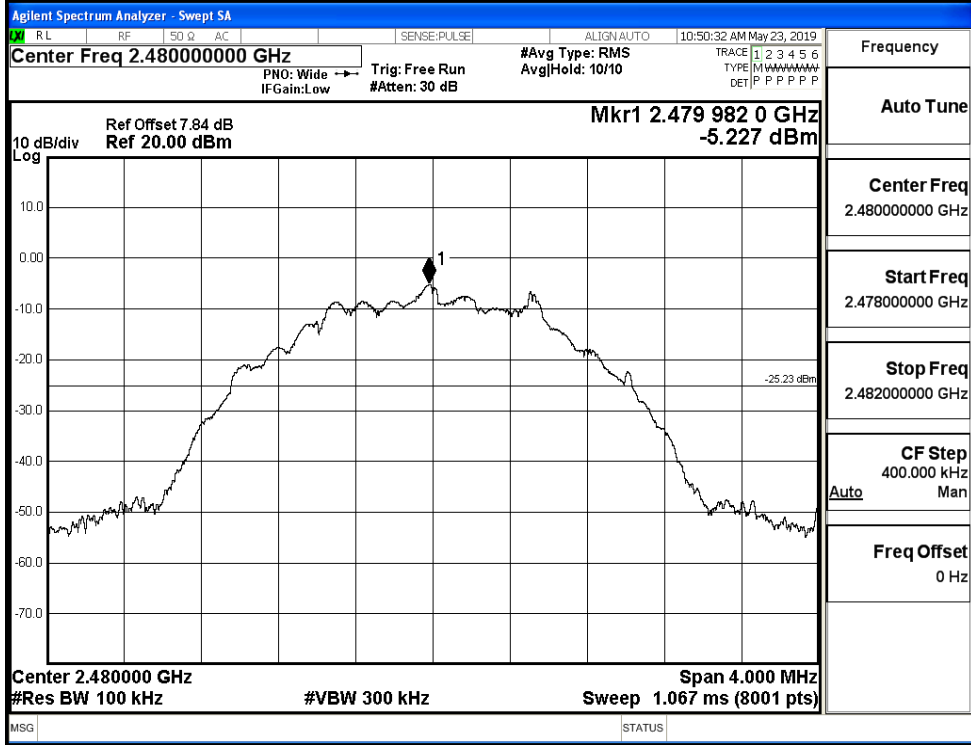


Puw/BT LE/MCH

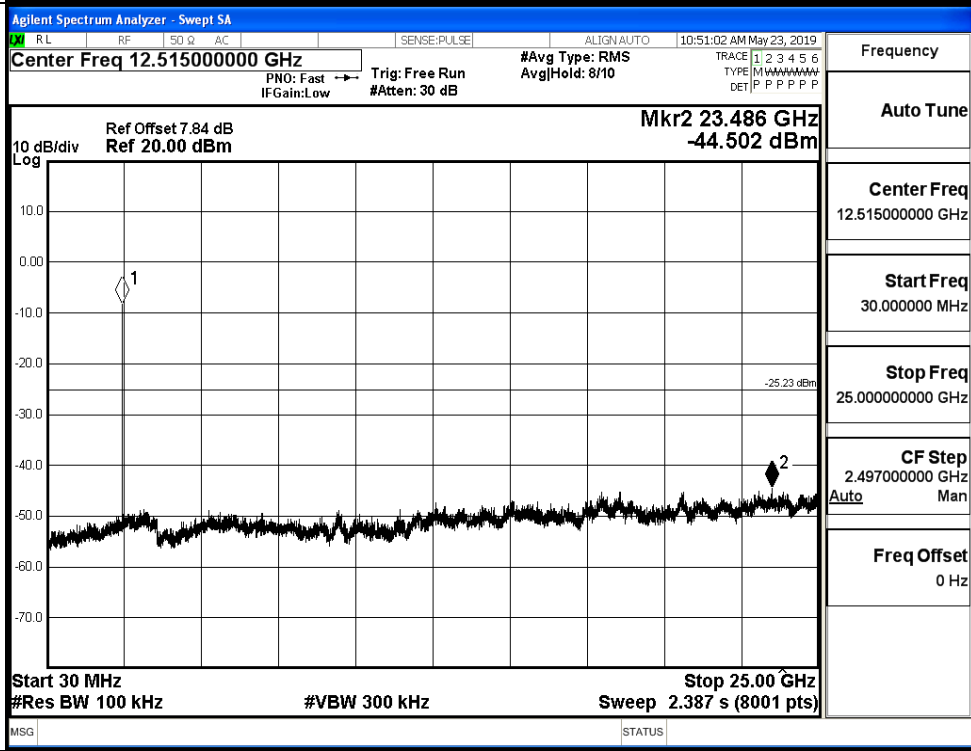


BT LE_HCH_Graphs

Pref/BT LE/HCH



Puw/BT LE/HCH



C.6 Band-edge for RF Conducted Emissions

| Mode | Channel | Carrier Power[dBm] | Max.Spurious Level [dBm] | Limit [dBm] | Verdict |
|-------|---------|--------------------|--------------------------|-------------|---------|
| BT LE | LCH | -5.372 | -50.673 | -25.37 | PASS |
| BT LE | HCH | -5.122 | -50.302 | -25.12 | PASS |

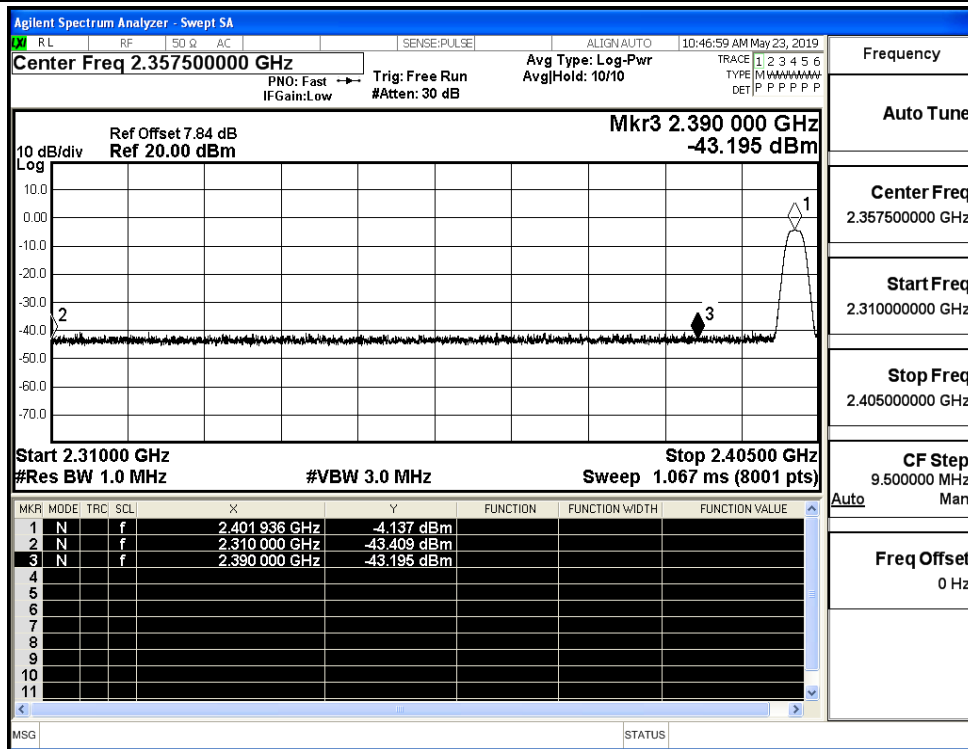
Test Graphs

| LCH | <table border="1" style="width: 100%; font-size: small;"> <thead> <tr> <th>MKR</th> <th>MODE</th> <th>TRC</th> <th>SCL</th> <th>X</th> <th>Y</th> <th>FUNCTION</th> <th>FUNCTION WIDTH</th> <th>FUNCTION VALUE</th> </tr> </thead> <tbody> <tr><td>1</td><td>N</td><td>f</td><td></td><td>2.401972 GHz</td><td>-5.372 dBm</td><td></td><td></td><td></td></tr> <tr><td>2</td><td>N</td><td>f</td><td></td><td>2.400000 GHz</td><td>-52.020 dBm</td><td></td><td></td><td></td></tr> <tr><td>3</td><td>N</td><td>f</td><td></td><td>2.390000 GHz</td><td>-54.522 dBm</td><td></td><td></td><td></td></tr> <tr><td>4</td><td>N</td><td>f</td><td></td><td>2.379623 GHz</td><td>-50.673 dBm</td><td></td><td></td><td></td></tr> </tbody> </table> | MKR | MODE | TRC | SCL | X | Y | FUNCTION | FUNCTION WIDTH | FUNCTION VALUE | 1 | N | f | | 2.401972 GHz | -5.372 dBm | | | | 2 | N | f | | 2.400000 GHz | -52.020 dBm | | | | 3 | N | f | | 2.390000 GHz | -54.522 dBm | | | | 4 | N | f | | 2.379623 GHz | -50.673 dBm | | | | <p>Frequency</p> <p>Auto Tune</p> <p>Center Freq 2.357500000 GHz</p> <p>Start Freq 2.310000000 GHz</p> <p>Stop Freq 2.405000000 GHz</p> <p>CF Step 9.500000 MHz</p> <p>Freq Offset 0 Hz</p> |
|-----|---|-----|------|--------------|-------------|----------|----------------|----------------|----------------|----------------|---|---|---|--|--------------|------------|--|--|--|---|---|---|--|--------------|-------------|--|--|--|---|---|---|--|--------------|-------------|--|--|--|---|---|---|--|--------------|-------------|--|--|--|---|
| MKR | MODE | TRC | SCL | X | Y | FUNCTION | FUNCTION WIDTH | FUNCTION VALUE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | N | f | | 2.401972 GHz | -5.372 dBm | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | N | f | | 2.400000 GHz | -52.020 dBm | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | N | f | | 2.390000 GHz | -54.522 dBm | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | N | f | | 2.379623 GHz | -50.673 dBm | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| HCH | <table border="1" style="width: 100%; font-size: small;"> <thead> <tr> <th>MKR</th> <th>MODE</th> <th>TRC</th> <th>SCL</th> <th>X</th> <th>Y</th> <th>FUNCTION</th> <th>FUNCTION WIDTH</th> <th>FUNCTION VALUE</th> </tr> </thead> <tbody> <tr><td>1</td><td>N</td><td>f</td><td></td><td>2.479990 GHz</td><td>-5.122 dBm</td><td></td><td></td><td></td></tr> <tr><td>2</td><td>N</td><td>f</td><td></td><td>2.483500 GHz</td><td>-54.093 dBm</td><td></td><td></td><td></td></tr> <tr><td>3</td><td>N</td><td>f</td><td></td><td>2.500000 GHz</td><td>-52.258 dBm</td><td></td><td></td><td></td></tr> <tr><td>4</td><td>N</td><td>f</td><td></td><td>2.492309 GHz</td><td>-50.302 dBm</td><td></td><td></td><td></td></tr> </tbody> </table> | MKR | MODE | TRC | SCL | X | Y | FUNCTION | FUNCTION WIDTH | FUNCTION VALUE | 1 | N | f | | 2.479990 GHz | -5.122 dBm | | | | 2 | N | f | | 2.483500 GHz | -54.093 dBm | | | | 3 | N | f | | 2.500000 GHz | -52.258 dBm | | | | 4 | N | f | | 2.492309 GHz | -50.302 dBm | | | | <p>Frequency</p> <p>Auto Tune</p> <p>Center Freq 2.488500000 GHz</p> <p>Start Freq 2.477000000 GHz</p> <p>Stop Freq 2.500000000 GHz</p> <p>CF Step 2.300000 MHz</p> <p>Freq Offset 0 Hz</p> |
| MKR | MODE | TRC | SCL | X | Y | FUNCTION | FUNCTION WIDTH | FUNCTION VALUE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | N | f | | 2.479990 GHz | -5.122 dBm | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | N | f | | 2.483500 GHz | -54.093 dBm | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | N | f | | 2.500000 GHz | -52.258 dBm | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | N | f | | 2.492309 GHz | -50.302 dBm | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

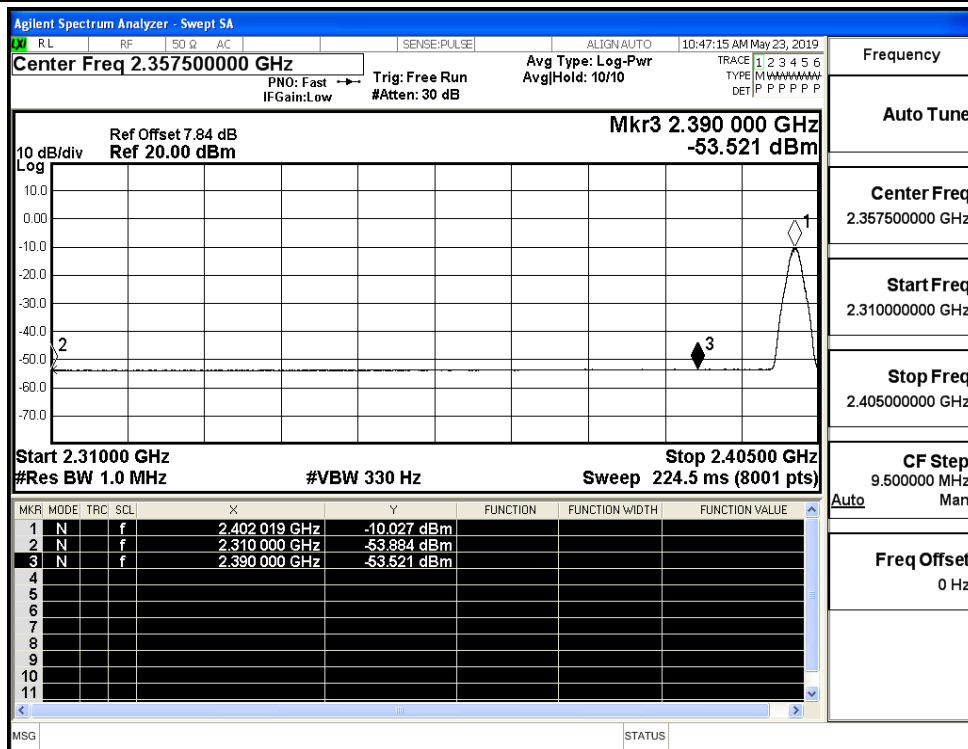
C.7 Restrict-band band-edge measurements

| Test Mode | Test Channel | Ant | Freq. | Power [dBm] | Gain | Ground Factor | E [dBuV/m] | Detector | Limit [dBuV/m] | Verdi |
|-----------|--------------|------|--------|-------------|------|---------------|------------|----------|----------------|-------|
| BT LE | 2402 | Ant1 | 2310.0 | -43.41 | 2.0 | 0 | 53.85 | PEAK | 74 | PASS |
| | | Ant1 | 2310.0 | -53.88 | 2.0 | 0 | 43.37 | AV | 54 | PASS |
| | | Ant1 | 2390.0 | -43.20 | 2.0 | 0 | 54.06 | PEAK | 74 | PASS |
| | | Ant1 | 2390.0 | -53.52 | 2.0 | 0 | 43.74 | AV | 54 | PASS |
| | 2480 | Ant1 | 2483.5 | -43.40 | 2.0 | 0 | 53.86 | PEAK | 74 | PASS |
| | | Ant1 | 2483.5 | -53.31 | 2.0 | 0 | 43.95 | AV | 54 | PASS |
| | | Ant1 | 2500.0 | -42.92 | 2.0 | 0 | 54.33 | PEAK | 74 | PASS |
| | | Ant1 | 2500.0 | -53.21 | 2.0 | 0 | 44.05 | AV | 54 | PASS |

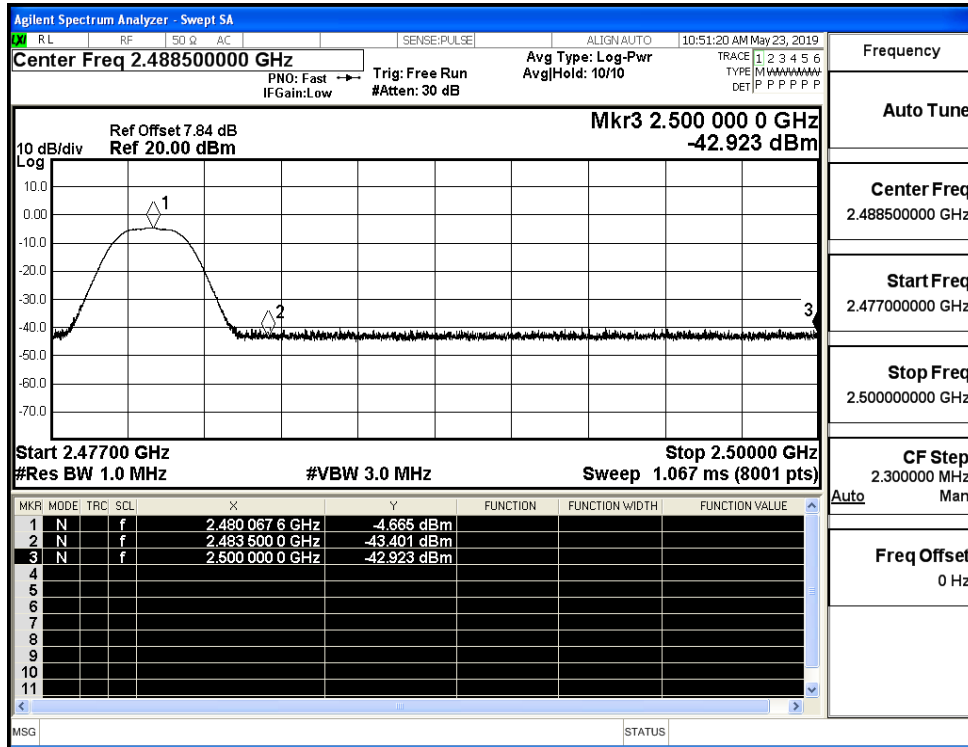
Restrict-band band-edge measurements_BT LE_2402_Ant1_PEAK



Restrict-band band-edge measurements_BT LE_2402_Ant1_AV



Restrict-band band-edge measurements_BT LE_2480_Ant1_PEAK



Restrict-band band-edge measurements_BT LE_2480_Ant1_AV

