

B.3 Out-of-band emissions (conducted)

Test limits:

| FCC part | RSS part | Limits | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------|--------------------------------|--|--------------------|-----------------------|-------------------------|--------------------|-------------|-------------|---|-----|-------------|--------------|---|-----|------------|----|---|----|-------|-----|----|---|--------|-----|------|---|---------|-----|----|---|-----------|-----|----|---|
| 15.247 (d) | RSS-247 Clause 5.5 | In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15.209 | RSS-247 Clause 6.2.2 (2) | <p>Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a):</p> <table border="1"> <thead> <tr> <th>Freq Range (MHz)</th> <th>Field Strength (μV/m)</th> <th>Field Strength (dBμV/m)</th> <th>Meas. Distance (m)</th> </tr> </thead> <tbody> <tr> <td>0.009-0.490</td> <td>2400/f(kHz)</td> <td>-</td> <td>300</td> </tr> <tr> <td>0.490-1.705</td> <td>24000/f(kHz)</td> <td>-</td> <td>300</td> </tr> <tr> <td>1.705-30.0</td> <td>30</td> <td>-</td> <td>30</td> </tr> <tr> <td>30-88</td> <td>100</td> <td>40</td> <td>3</td> </tr> <tr> <td>88-216</td> <td>150</td> <td>43.5</td> <td>3</td> </tr> <tr> <td>216-960</td> <td>200</td> <td>46</td> <td>3</td> </tr> <tr> <td>960-25000</td> <td>500</td> <td>54</td> <td>3</td> </tr> </tbody> </table> <p>The emission limits shown in the above table are based on measurements employing CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.</p> <p>For average radiated emission measurements above 1000 MHz, there is also a limit specified when measuring with peak detector function, corresponding to 20 dB above the indicated values in the table.</p> | Freq Range (MHz) | Field Strength (μV/m) | Field Strength (dBμV/m) | Meas. Distance (m) | 0.009-0.490 | 2400/f(kHz) | - | 300 | 0.490-1.705 | 24000/f(kHz) | - | 300 | 1.705-30.0 | 30 | - | 30 | 30-88 | 100 | 40 | 3 | 88-216 | 150 | 43.5 | 3 | 216-960 | 200 | 46 | 3 | 960-25000 | 500 | 54 | 3 |
| Freq Range (MHz) | Field Strength (μV/m) | Field Strength (dBμV/m) | Meas. Distance (m) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.009-0.490 | 2400/f(kHz) | - | 300 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0.490-1.705 | 24000/f(kHz) | - | 300 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.705-30.0 | 30 | - | 30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30-88 | 100 | 40 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 88-216 | 150 | 43.5 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 216-960 | 200 | 46 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 960-25000 | 500 | 54 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Test procedure:

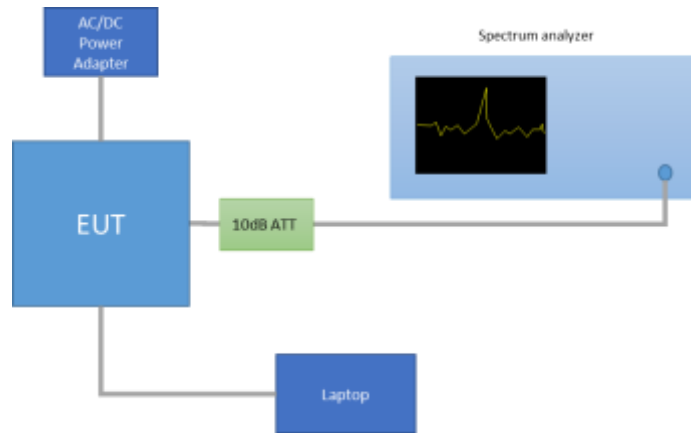
The PSD reference values to determine the -20dB compliance are taken from *B.4 Power Spectral Density*.

For Band Edge measurements falling in restricted bands, the following limits in dBm were applied for the average detector after the conversion from the limits detailed above in dBμV/m, according to FCC 47 CFR part 15 - Subpart C – §15.209(a). The limits in dBm for peak detector are 20dB above the indicated values in the table.

| §15.209(a) | | | Converted values | |
|------------------|--------------|-----------------------------------|--------------------------------------|-------------|
| Freq Range (MHz) | Distance (m) | Field strength (microvolts/meter) | Field strength (dB microvolts/meter) | Power (dBm) |
| 960-25000 | 3 | 100 | 40.00 | -55.2 |

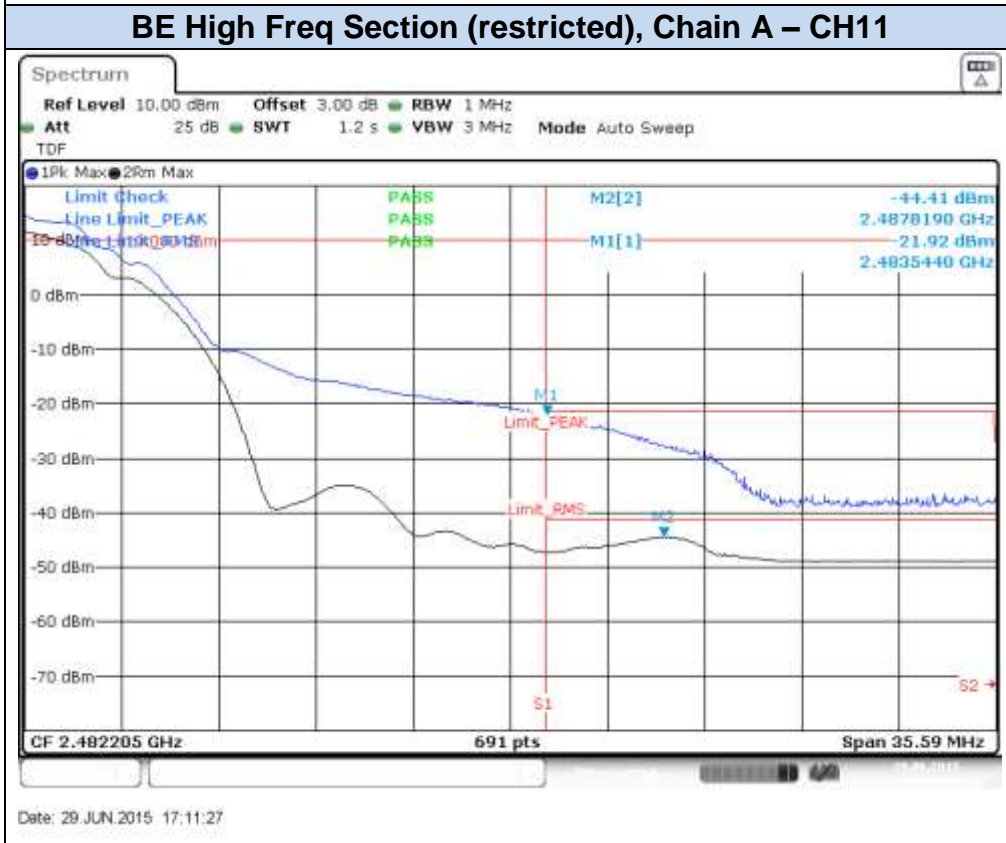
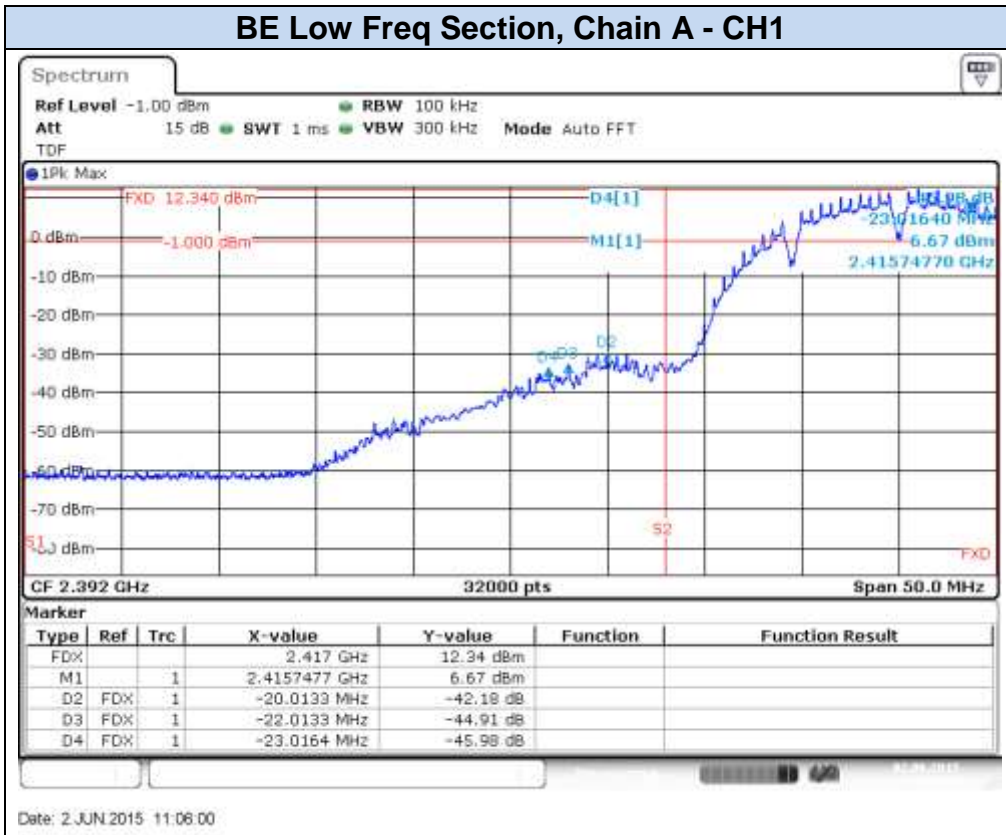
In case of Band Edge measurements falling in restricted bands, the declared Antenna Gain is also compensated in the graph. The declared maximum antenna gain is 3dBi.

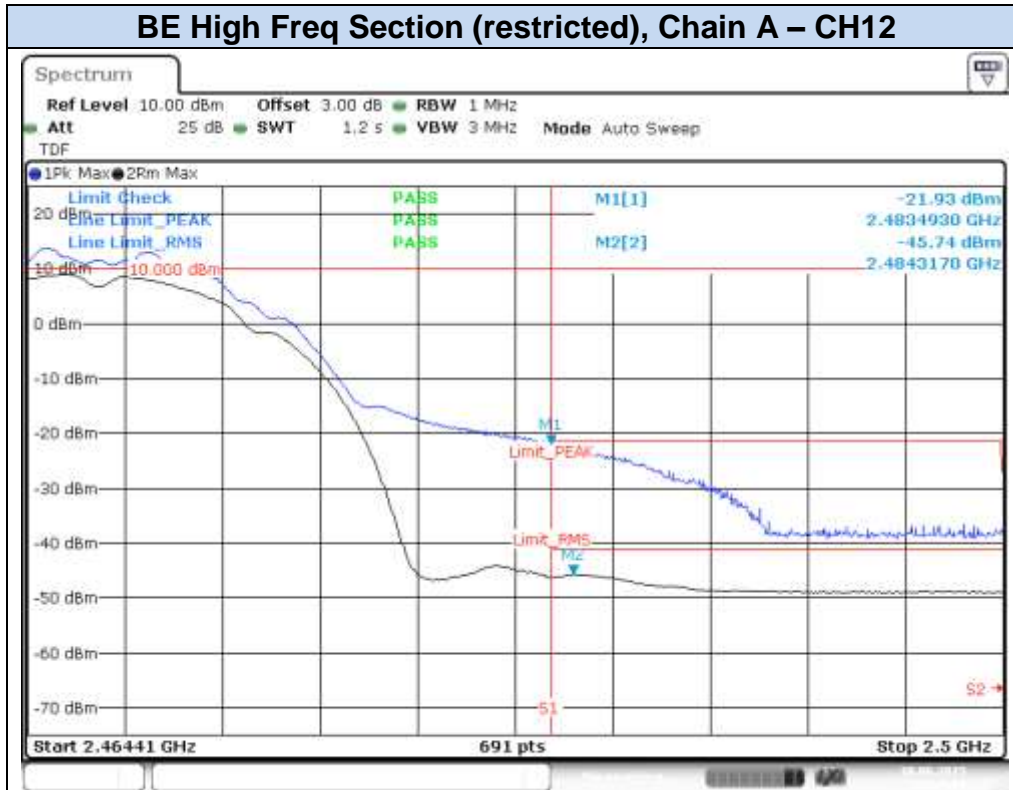
The setup below was used to measure the out-of-band emissions. The antenna terminal of the EUT is connected to the spectrum through an attenuator, and the spectrum analyzer reading is compensated to include the RF path loss.



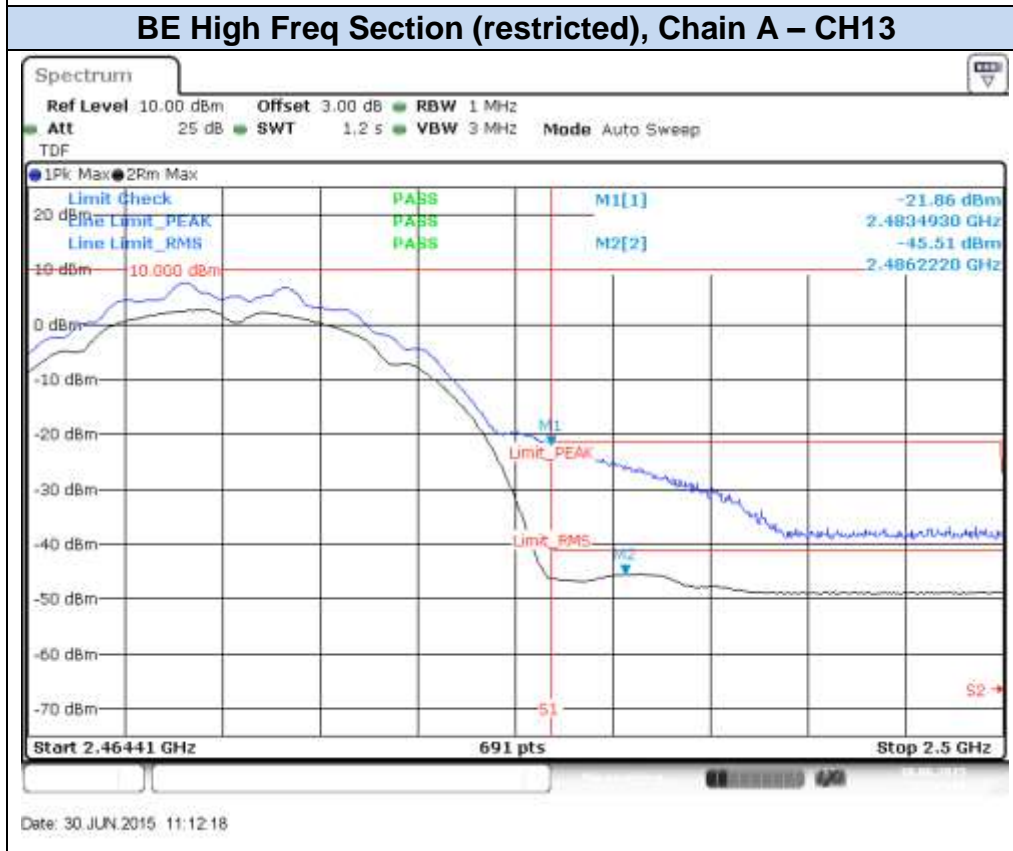
Band Edge results Screenshot:

802.11b, 1Mbps

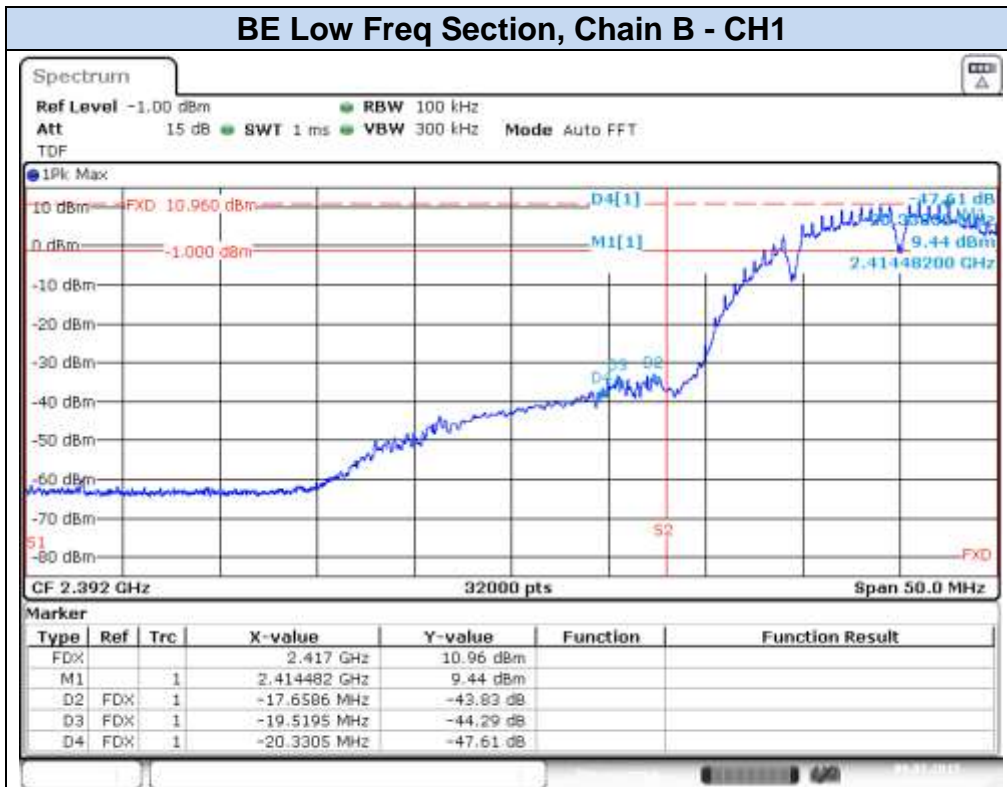




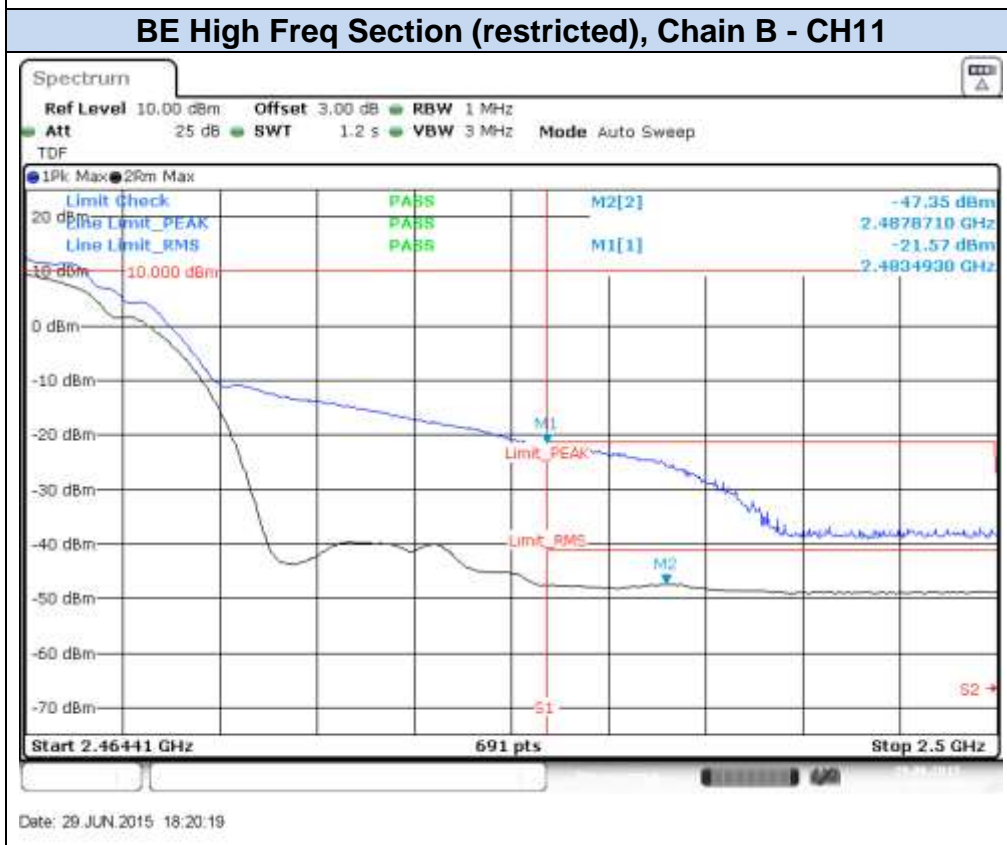
Date: 30 JUN 2015 11:01:03



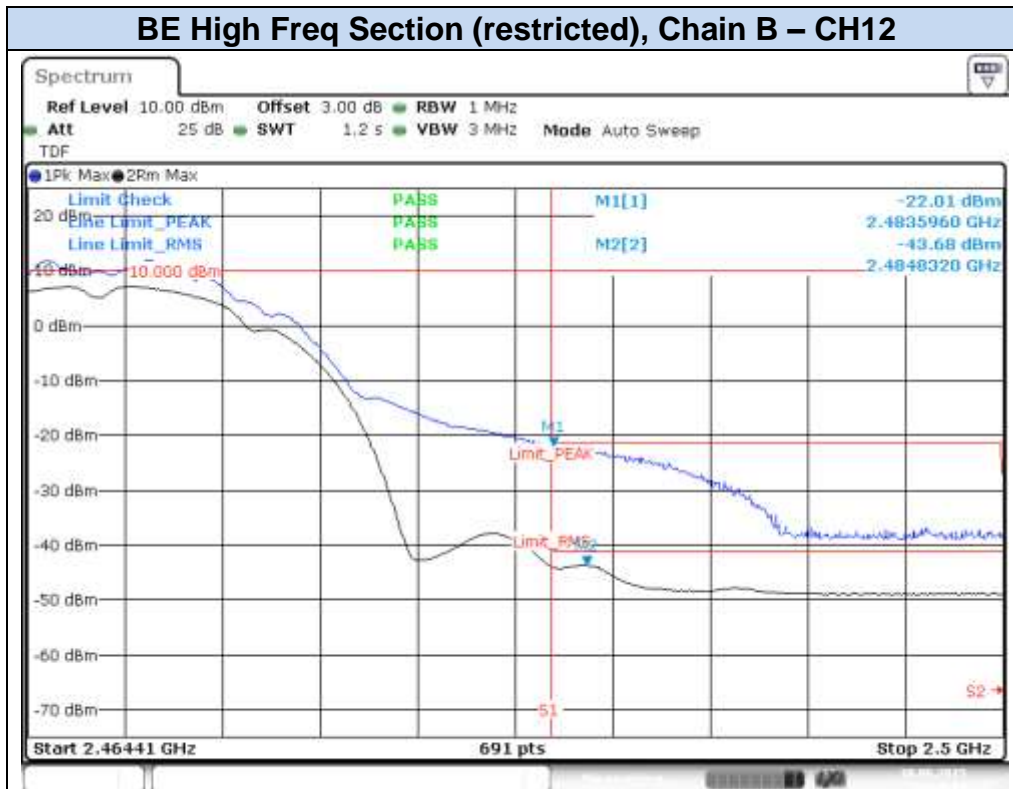
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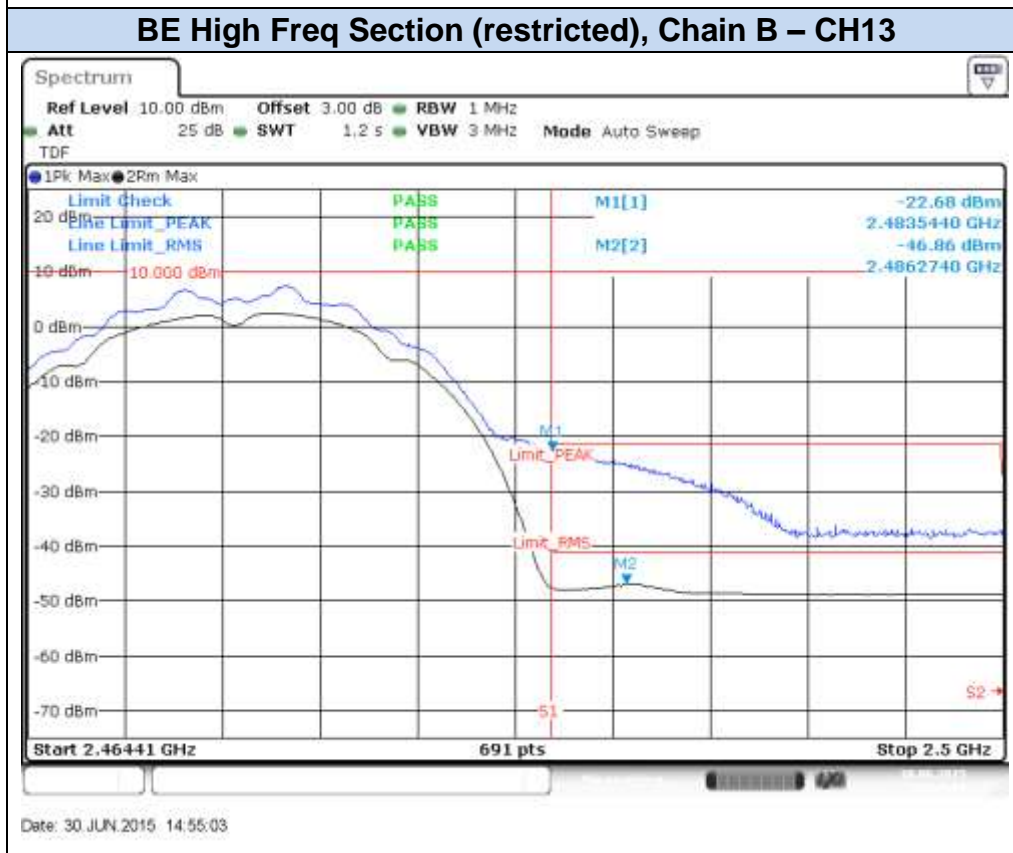
Date: 9 JUL 2015 17:22:56



Date: 29 JUN 2015 18:20:19

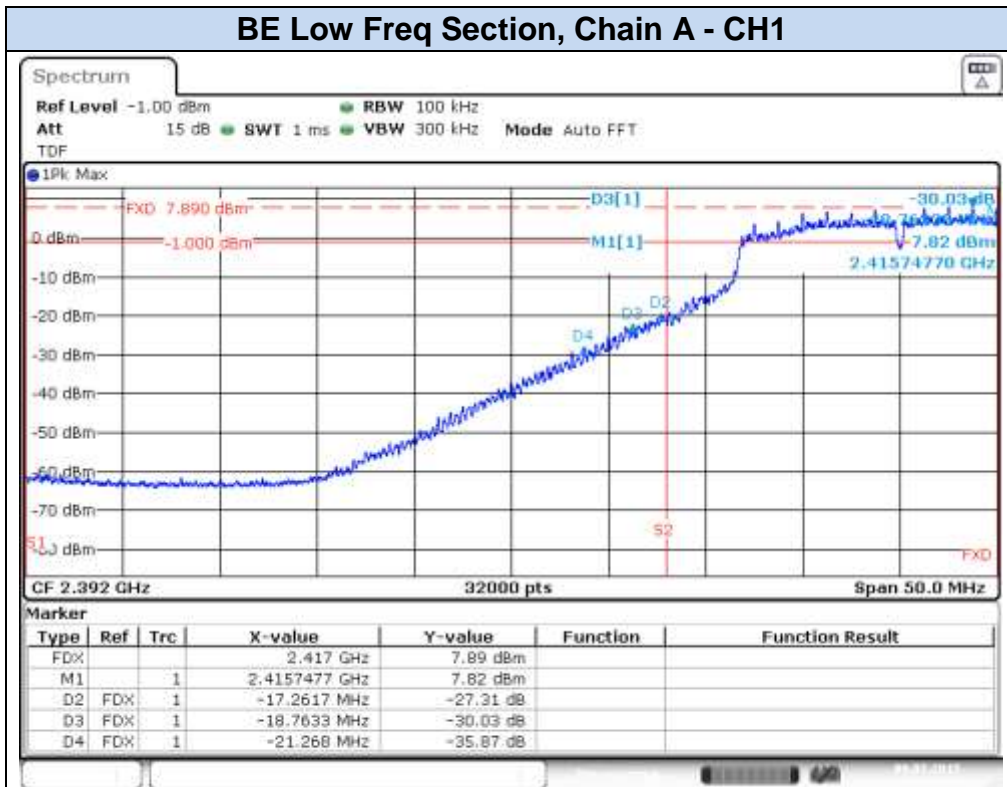


Date: 30 JUN 2015 14:08:15



Date: 30 JUN 2015 14:55:03

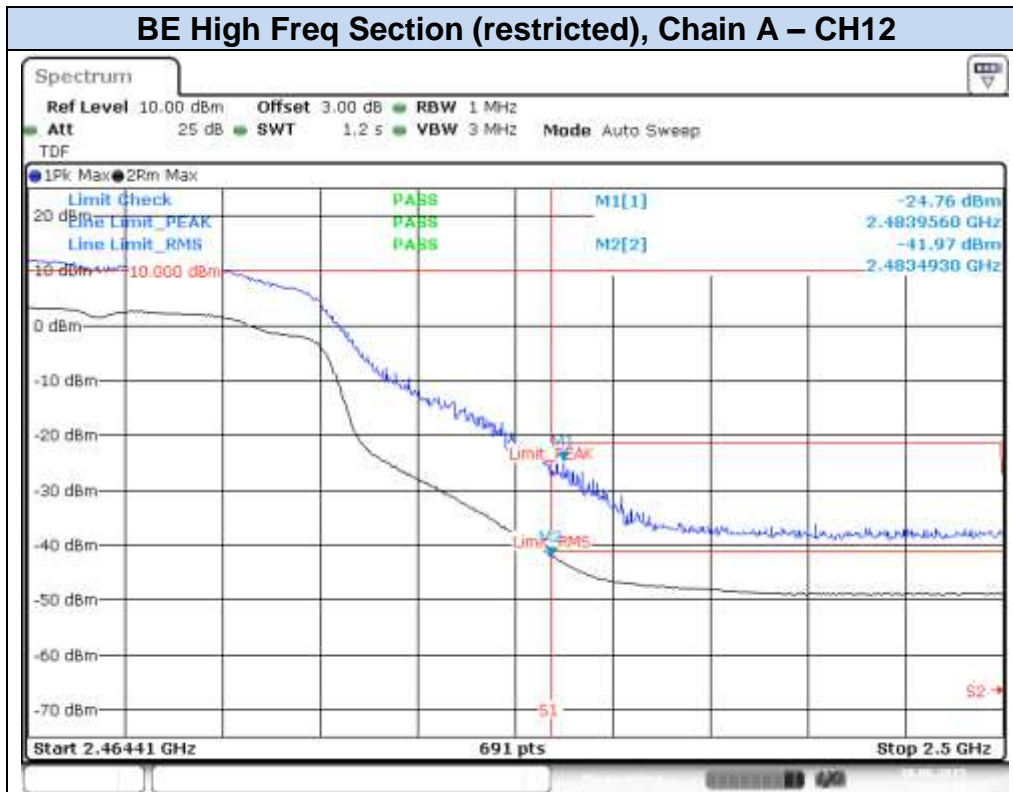
802.11g, 6Mbps



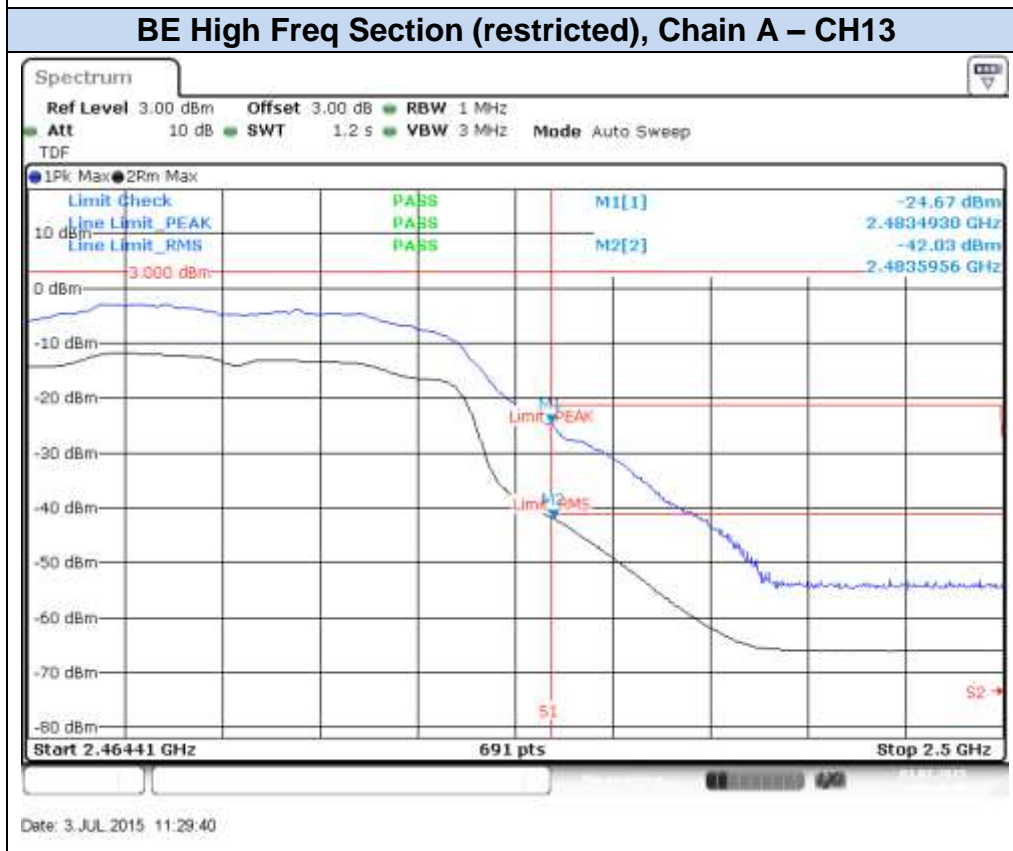
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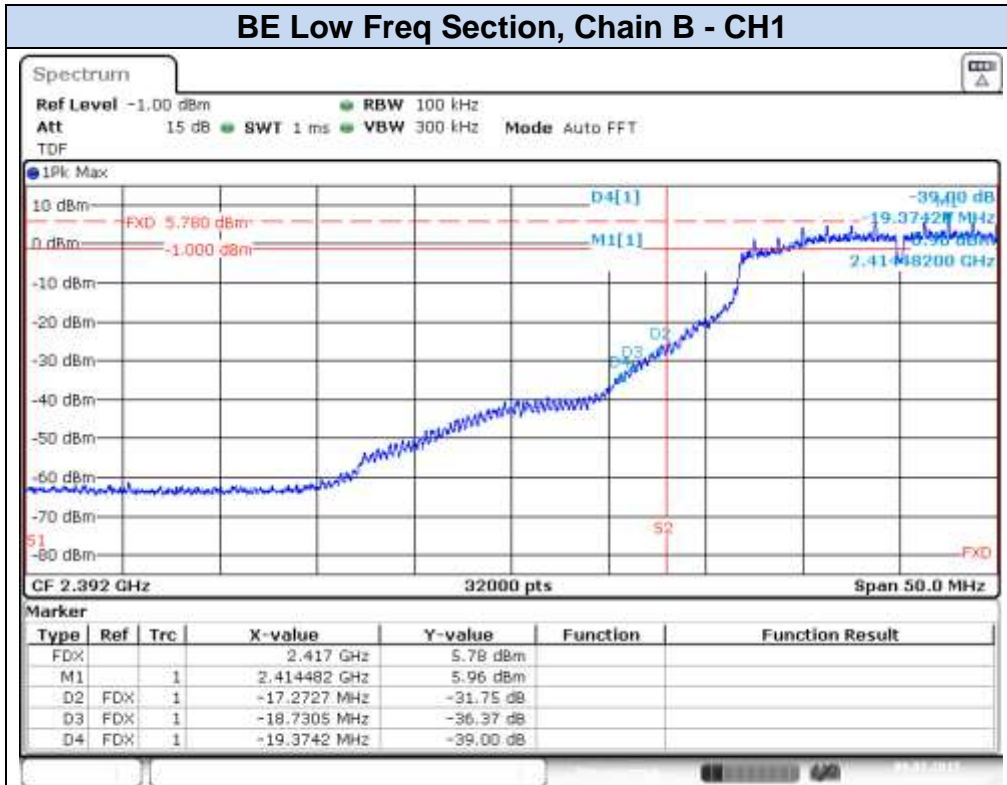
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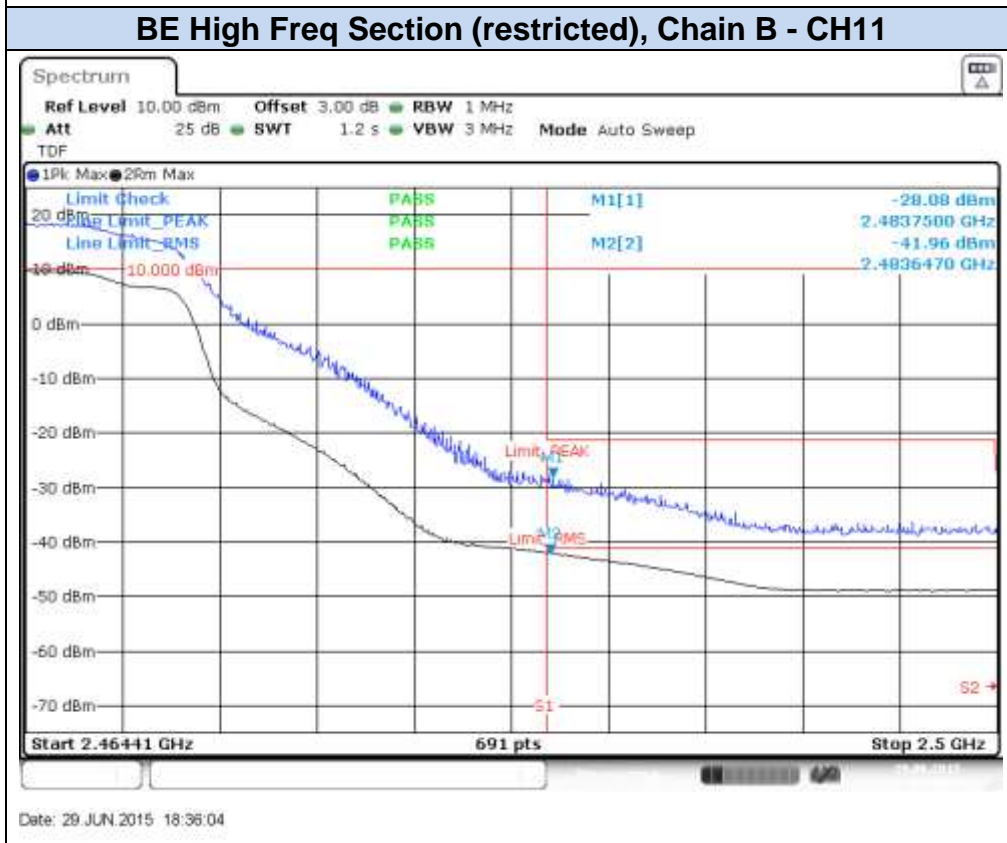
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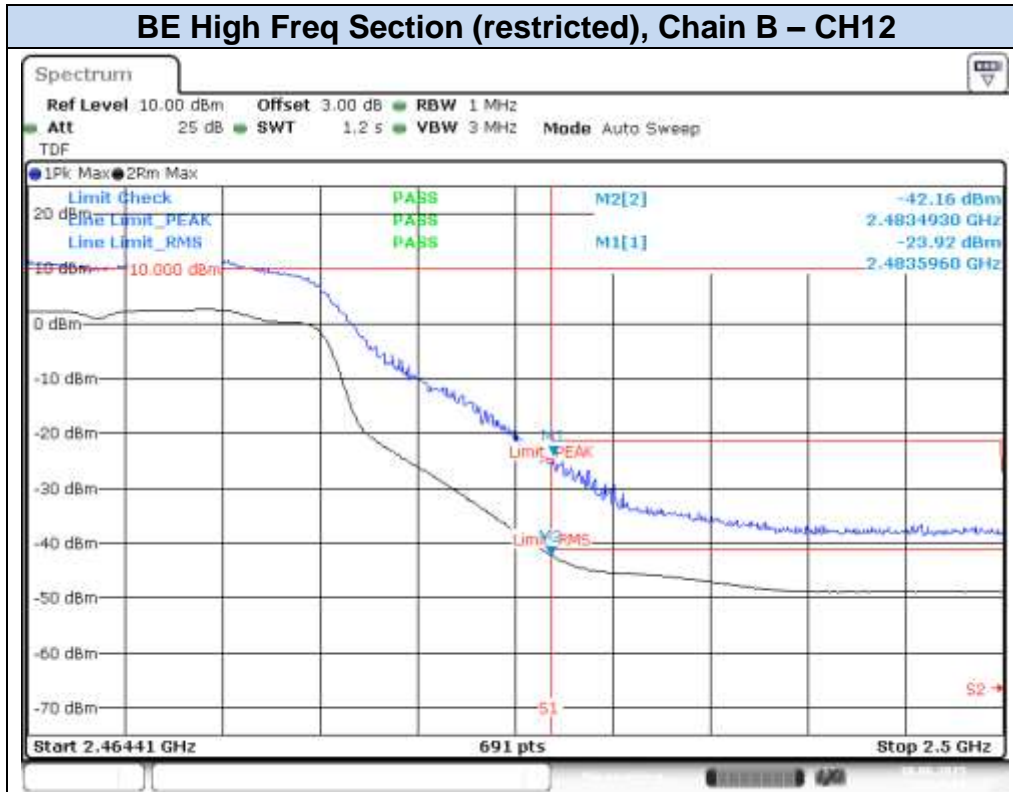
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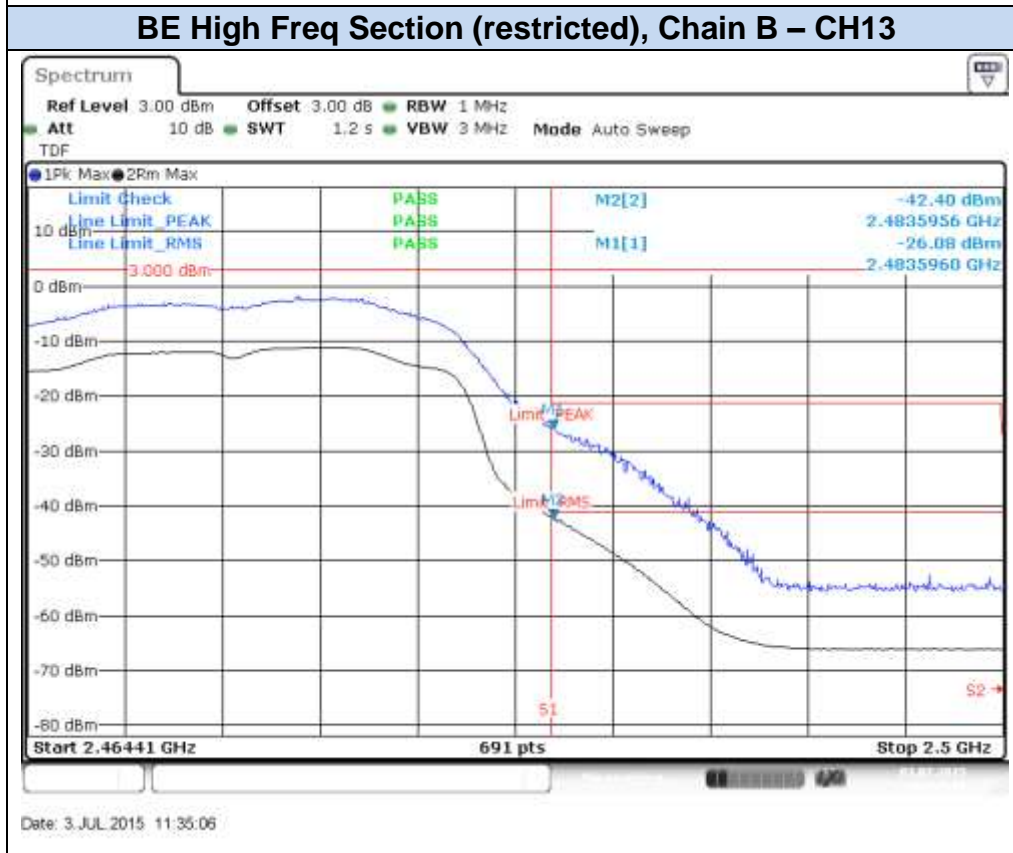
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Date: 29 JUN 2015 18:36:04

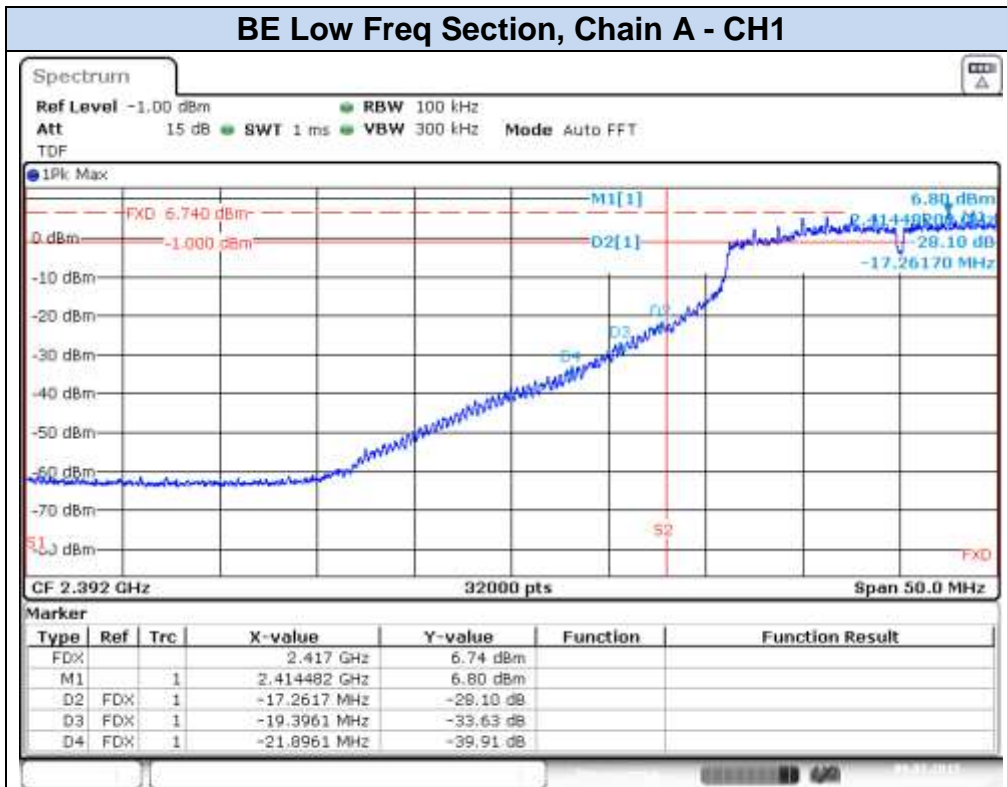


Date: 30 JUN 2015 14:57:10

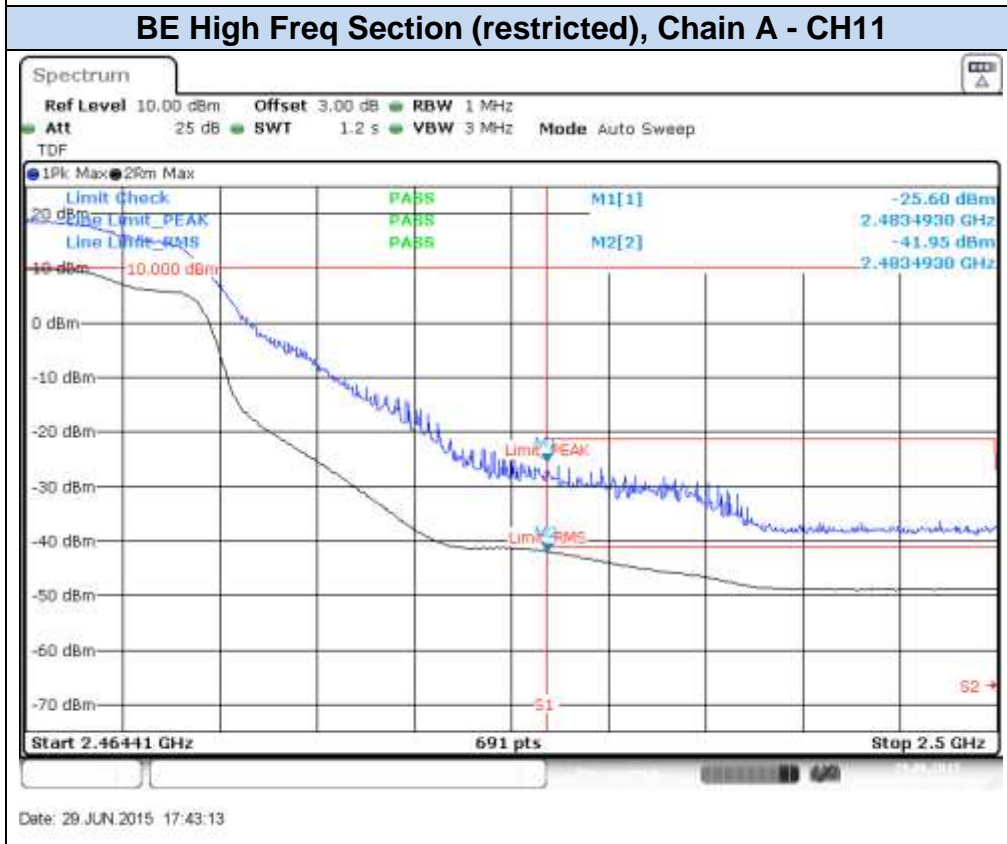


Date: 3 JUL 2015 11:35:05

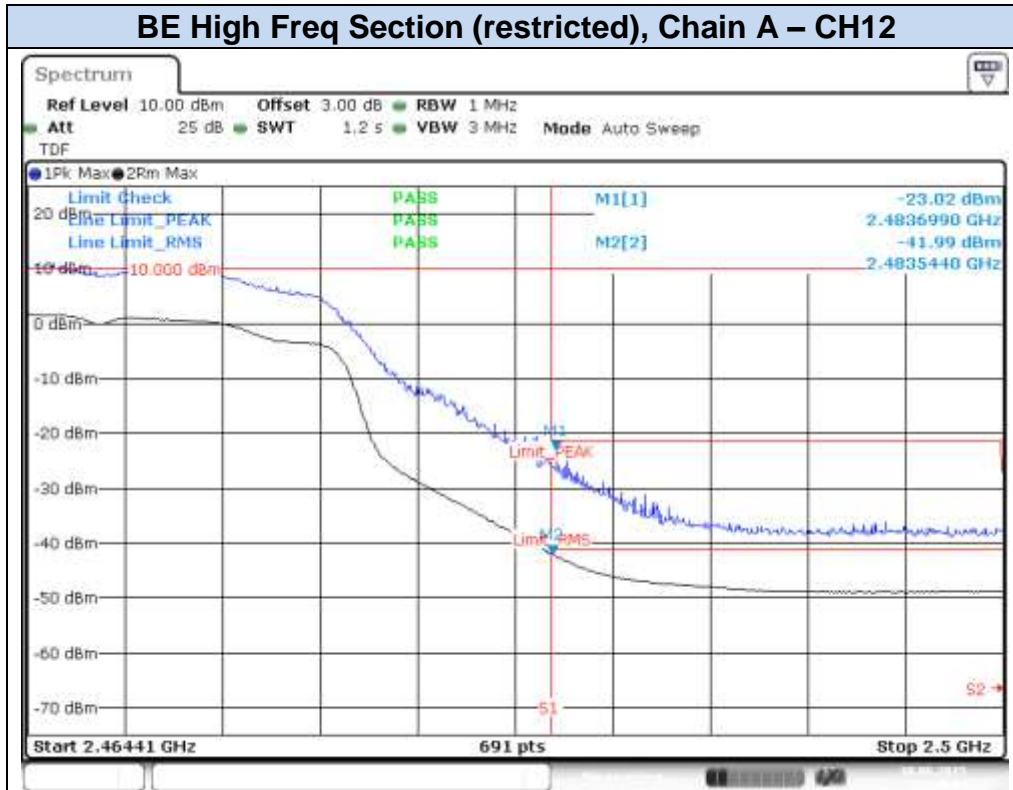
802.11n20, HT0 (SISO)



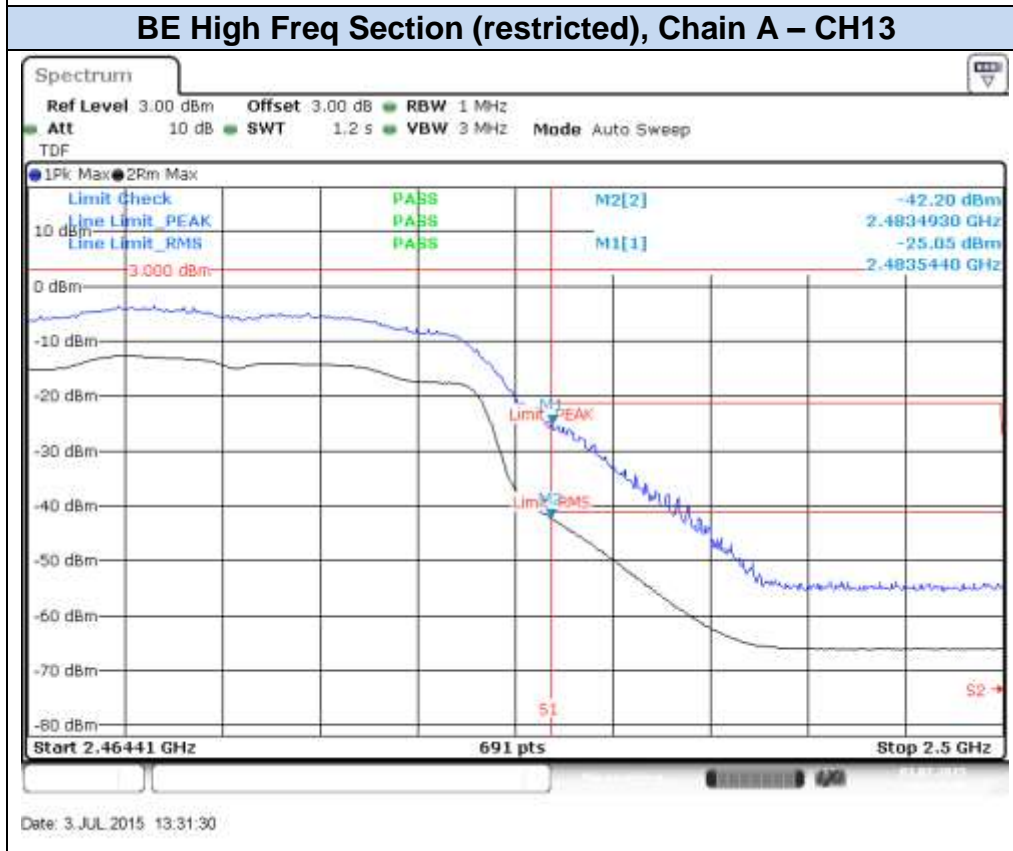
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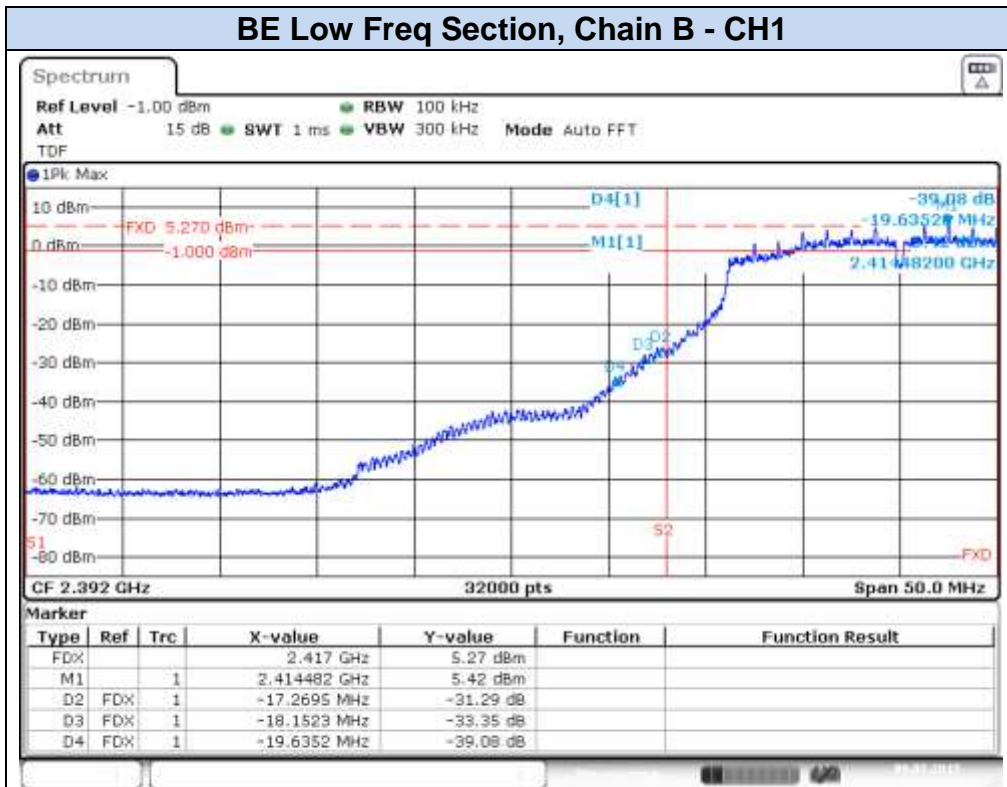
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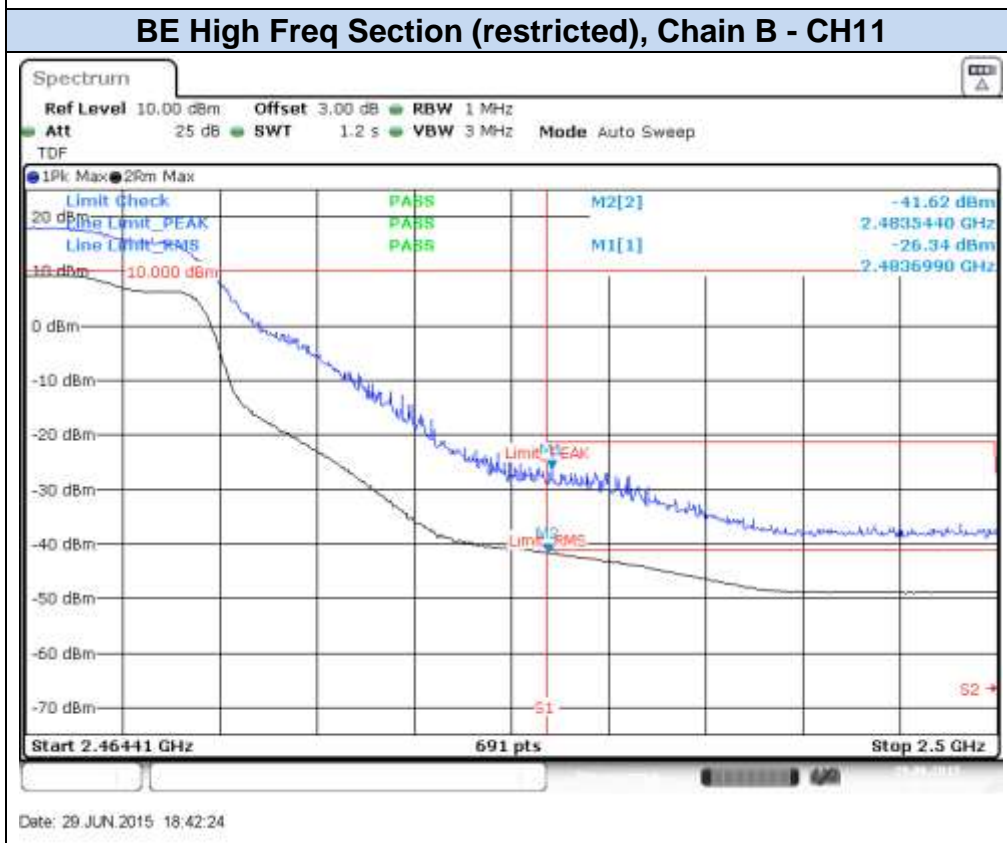
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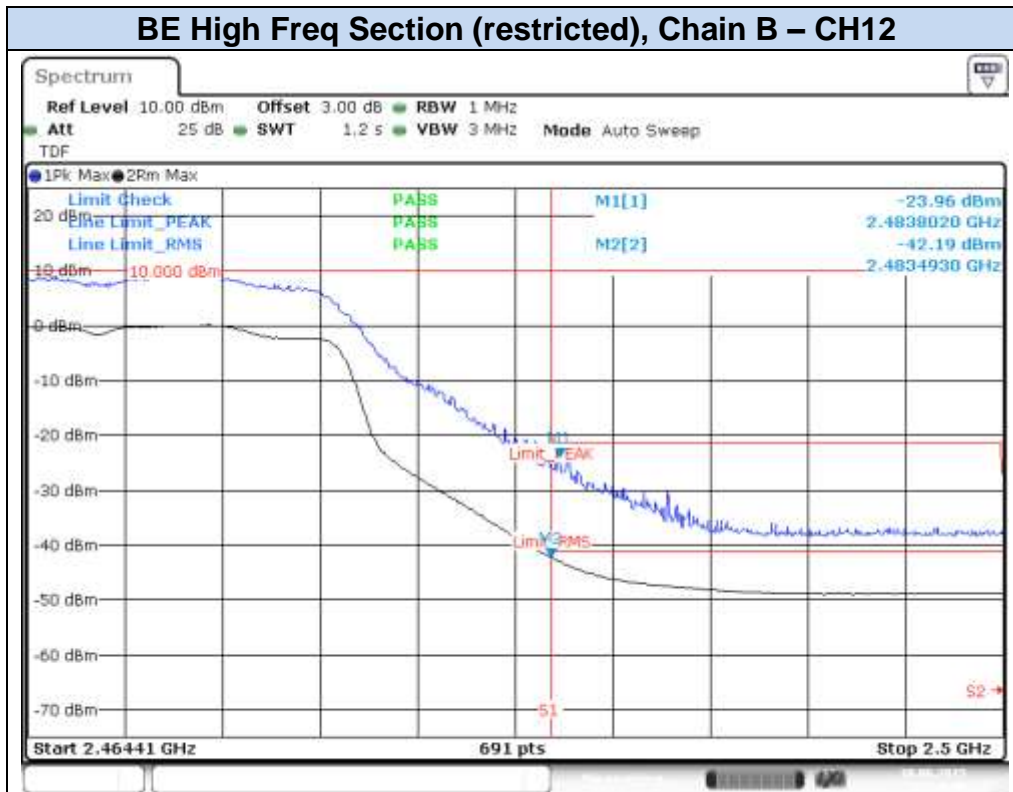
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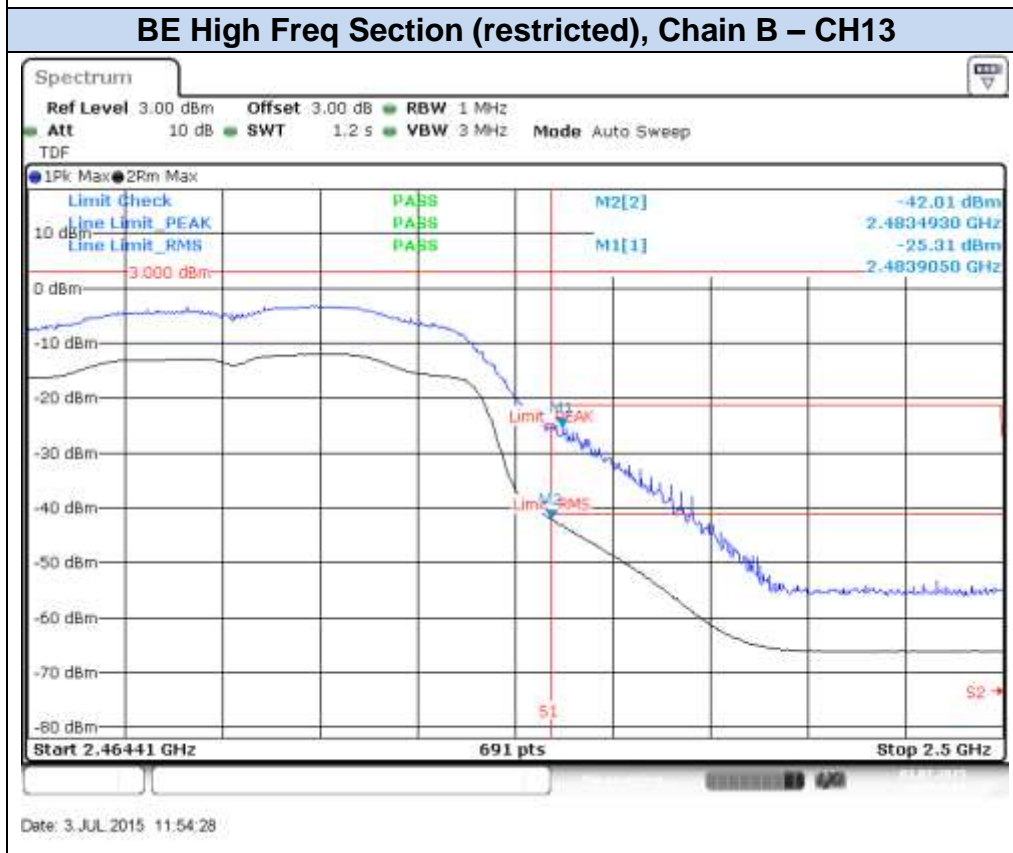
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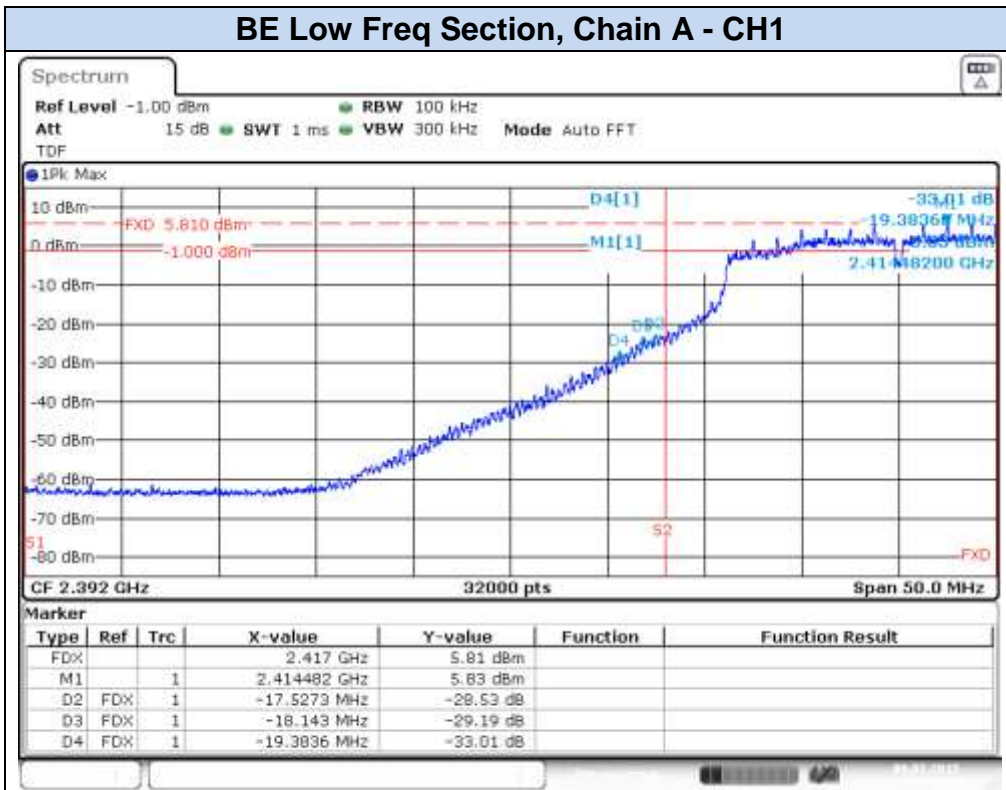


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Date: 3 JUL 2015 11:54:28

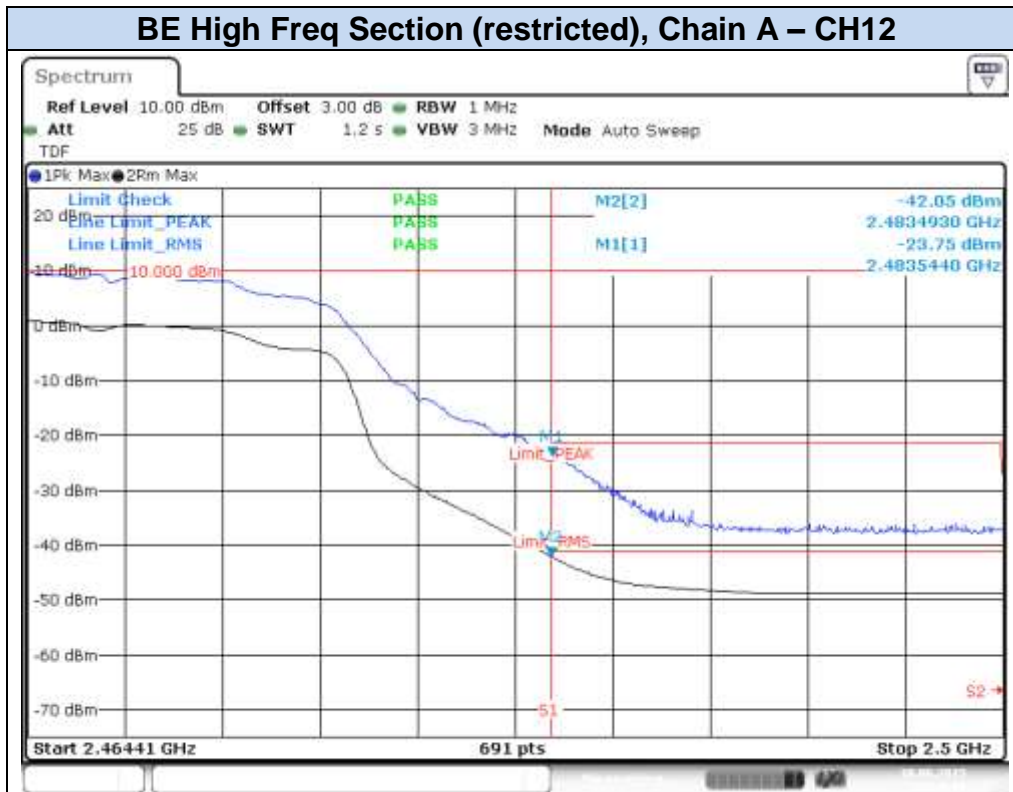
802.11n20, HT8 (MIMO)



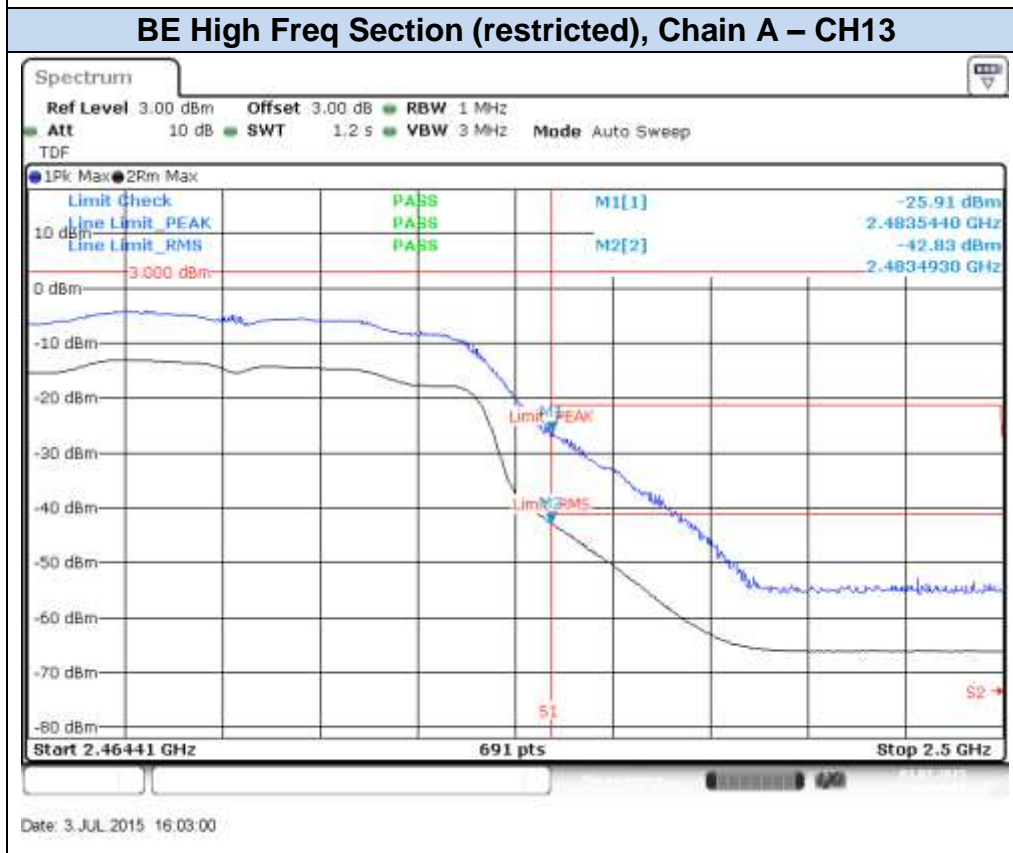
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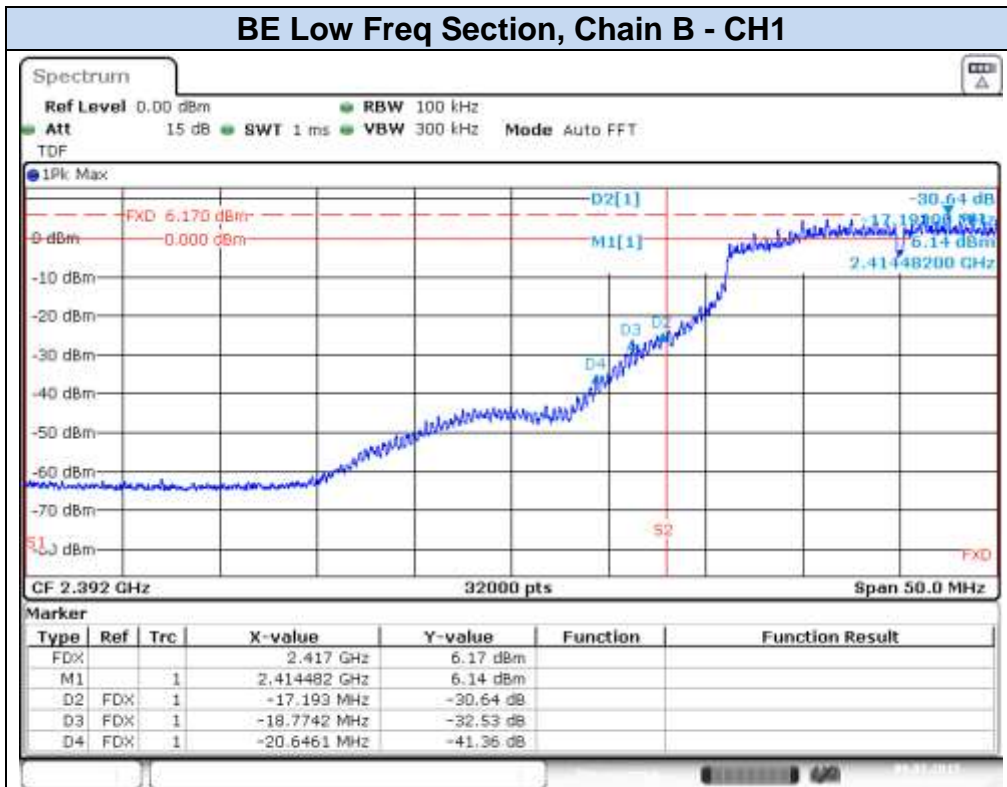
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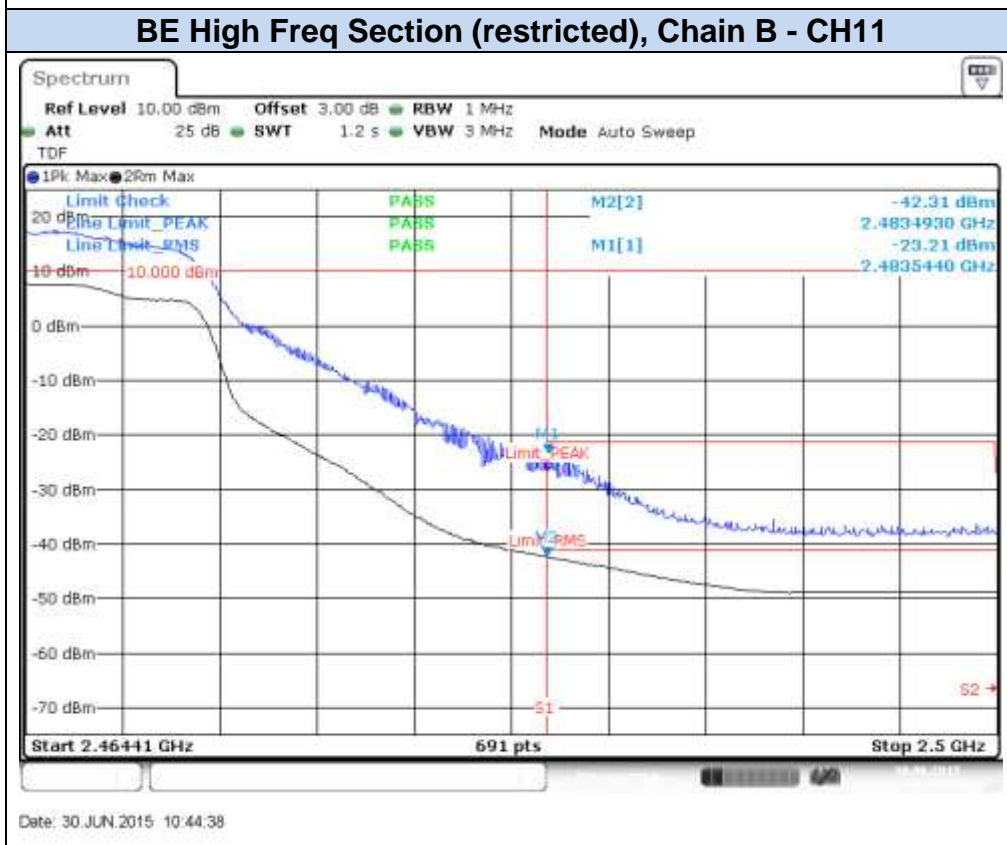
Date: 30 JUN 2015 15:59:26



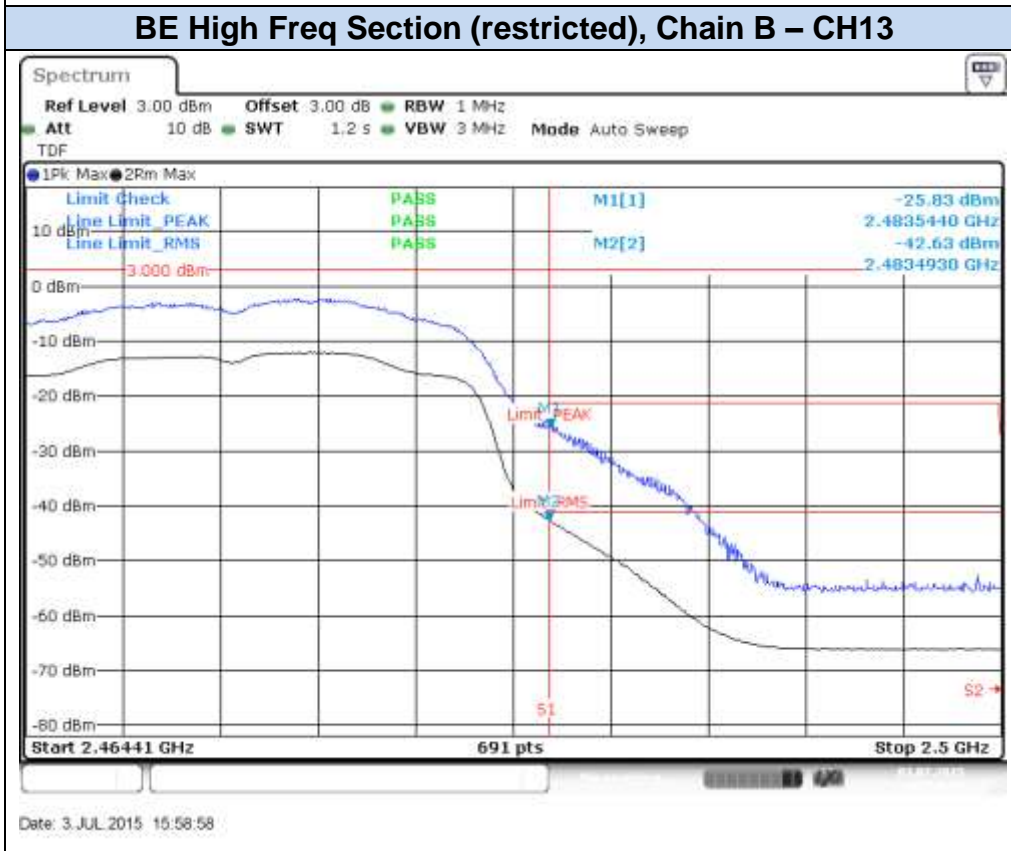
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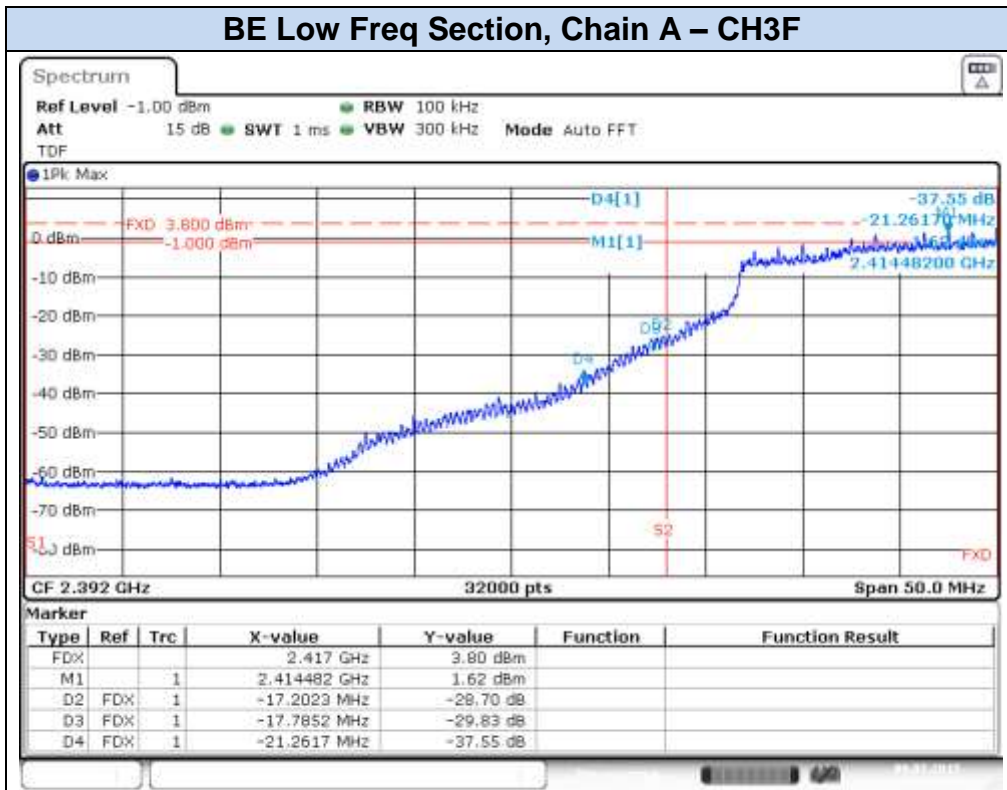
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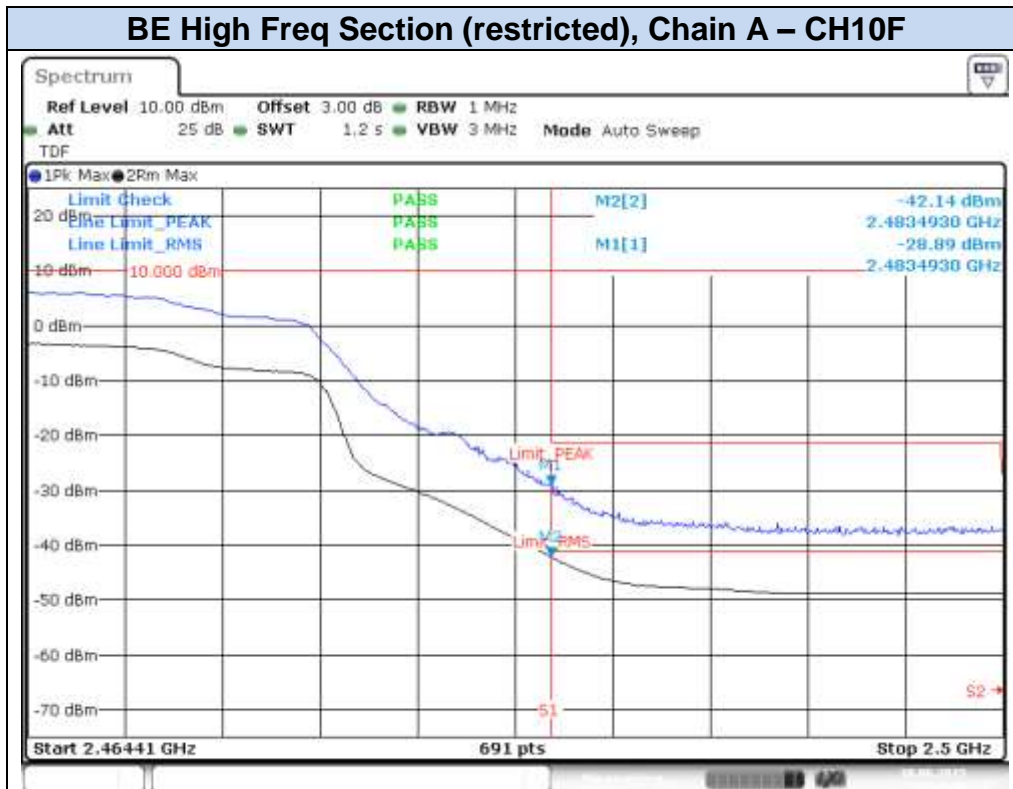


Date: 30 JUN 2015 10:44:38

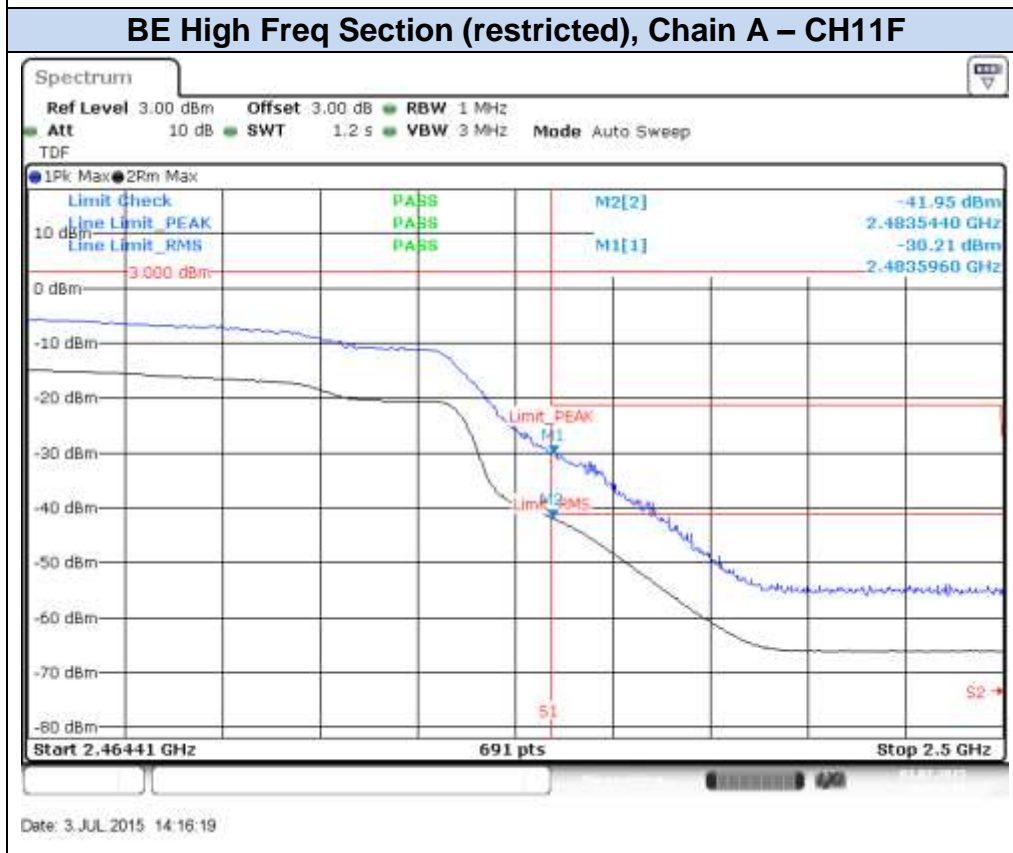


802.11n40, HT0 (SISO)

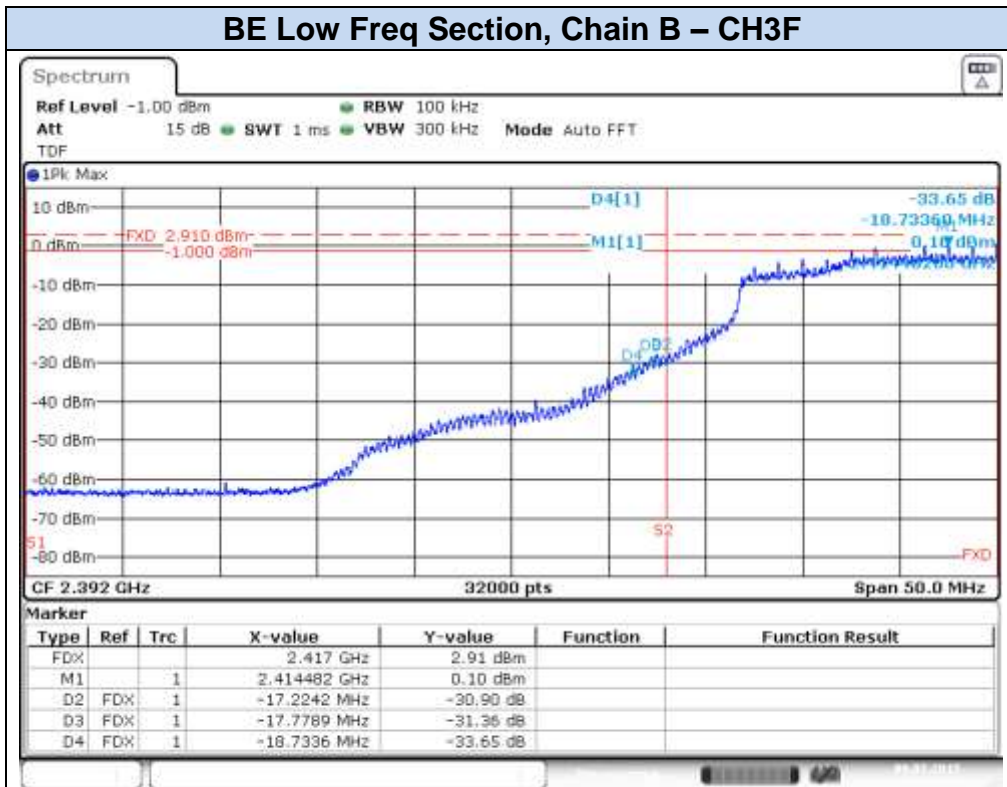




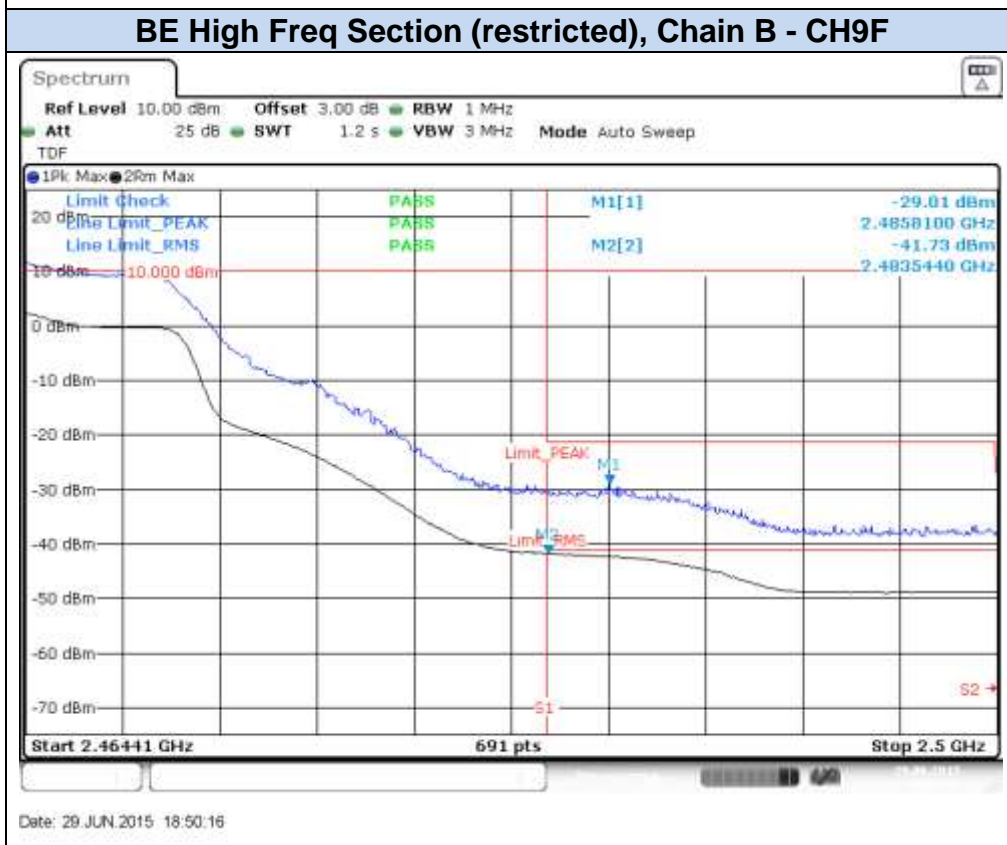
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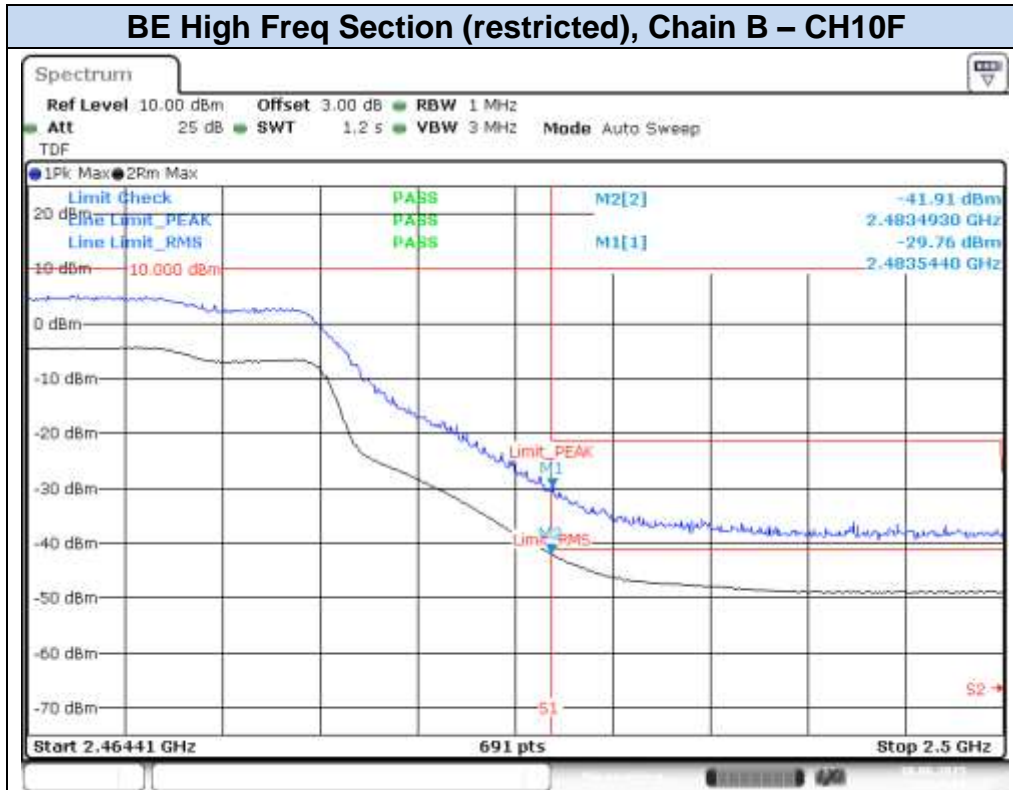
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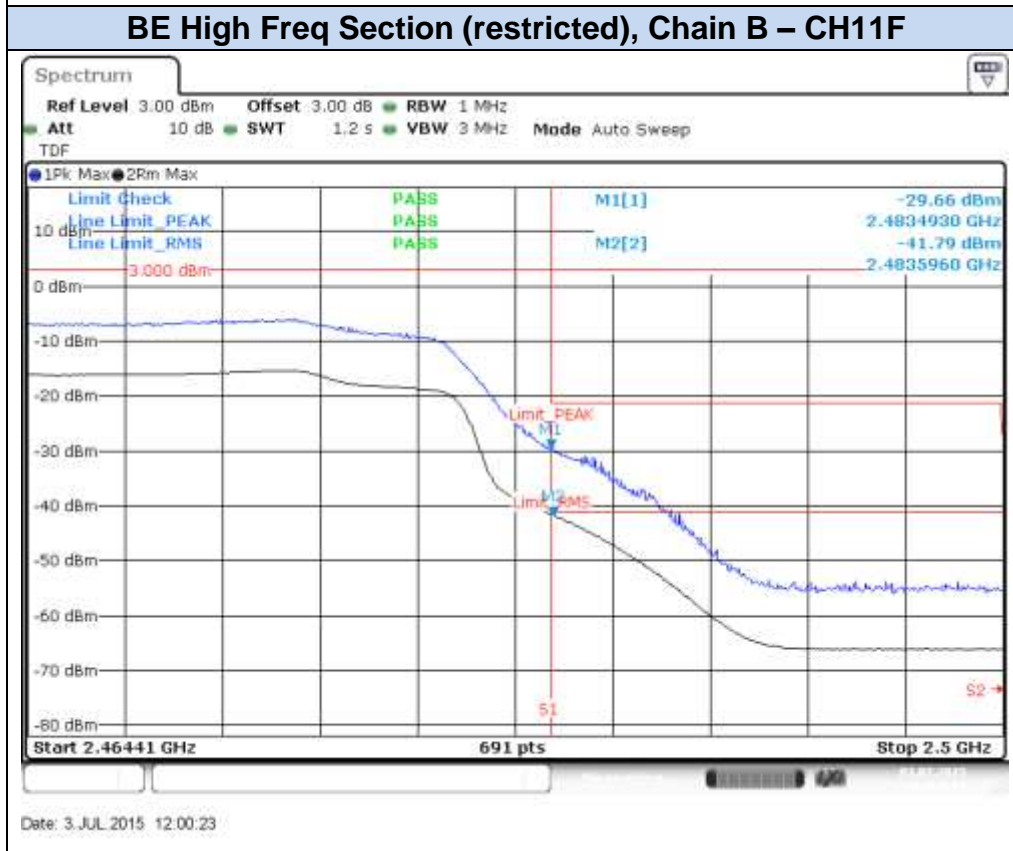
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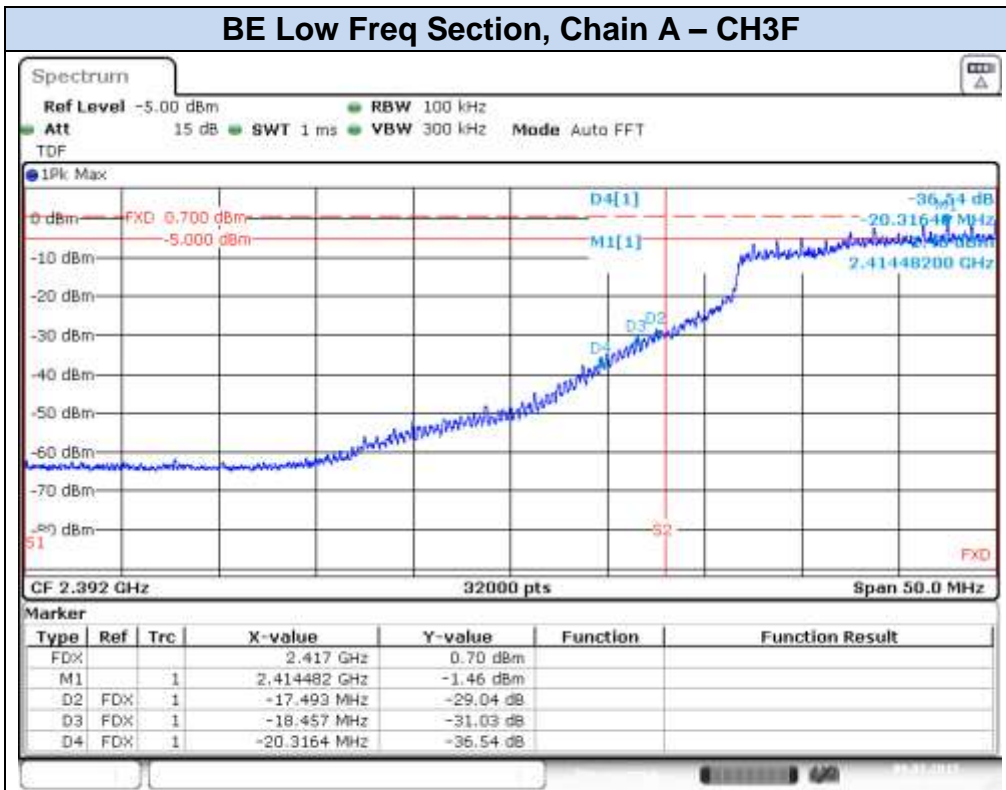


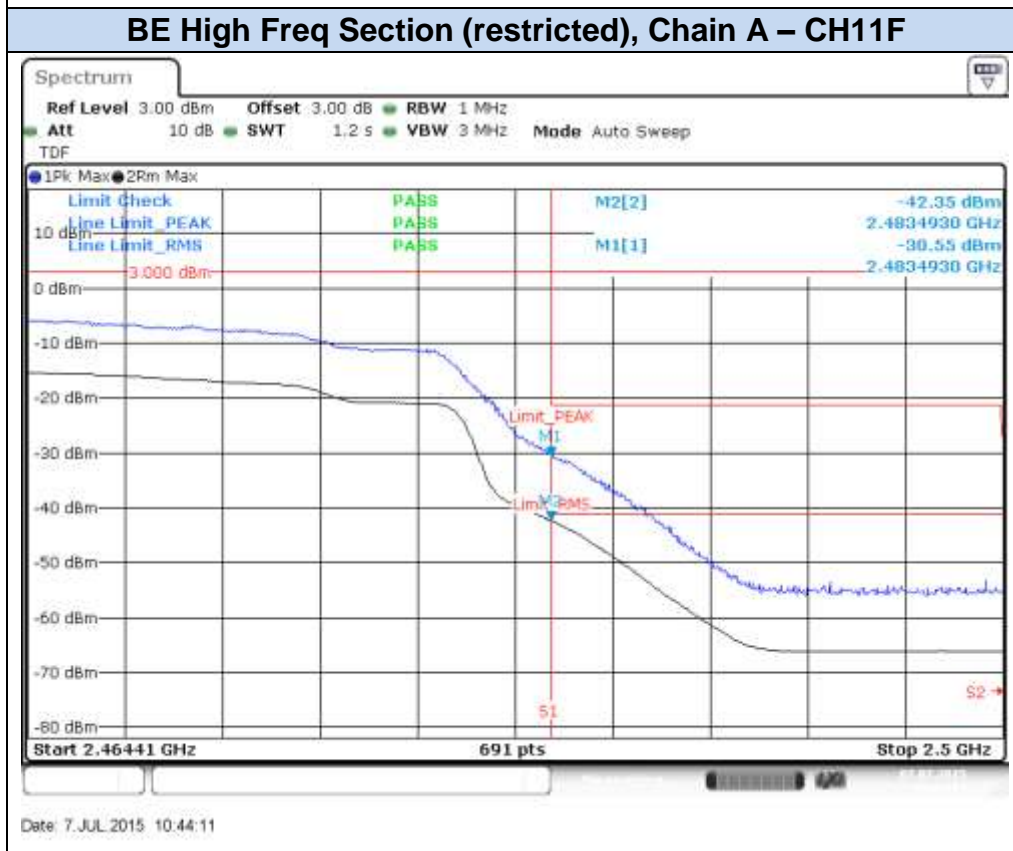
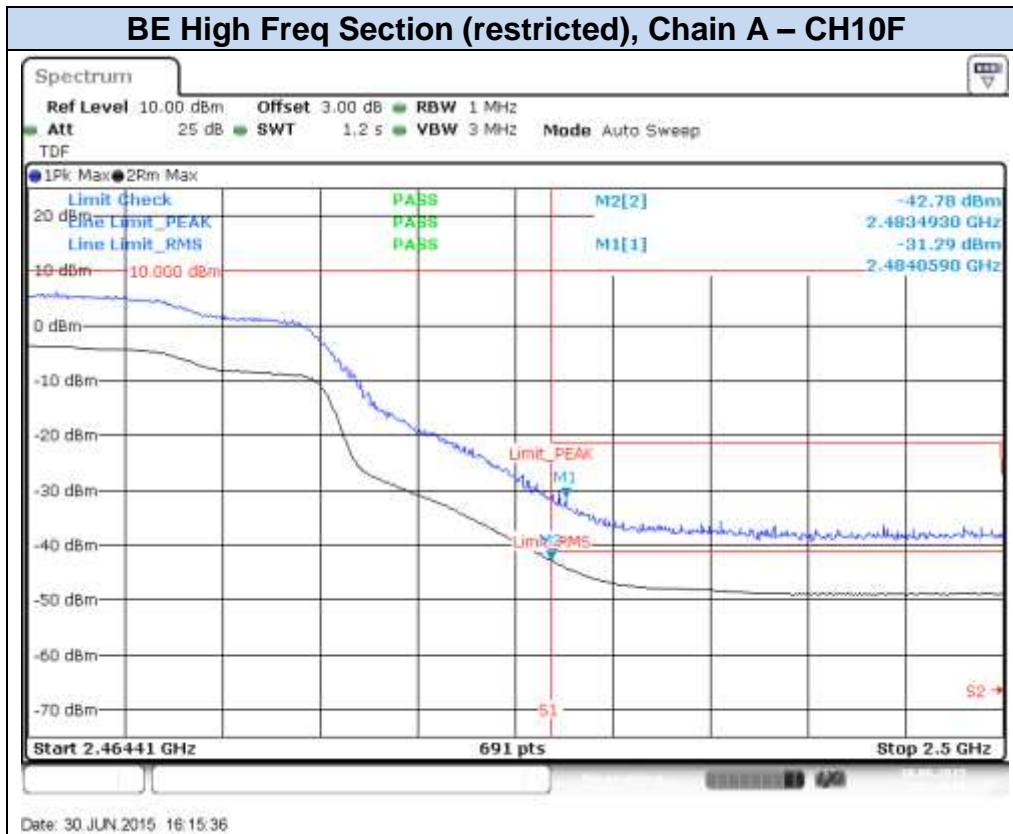
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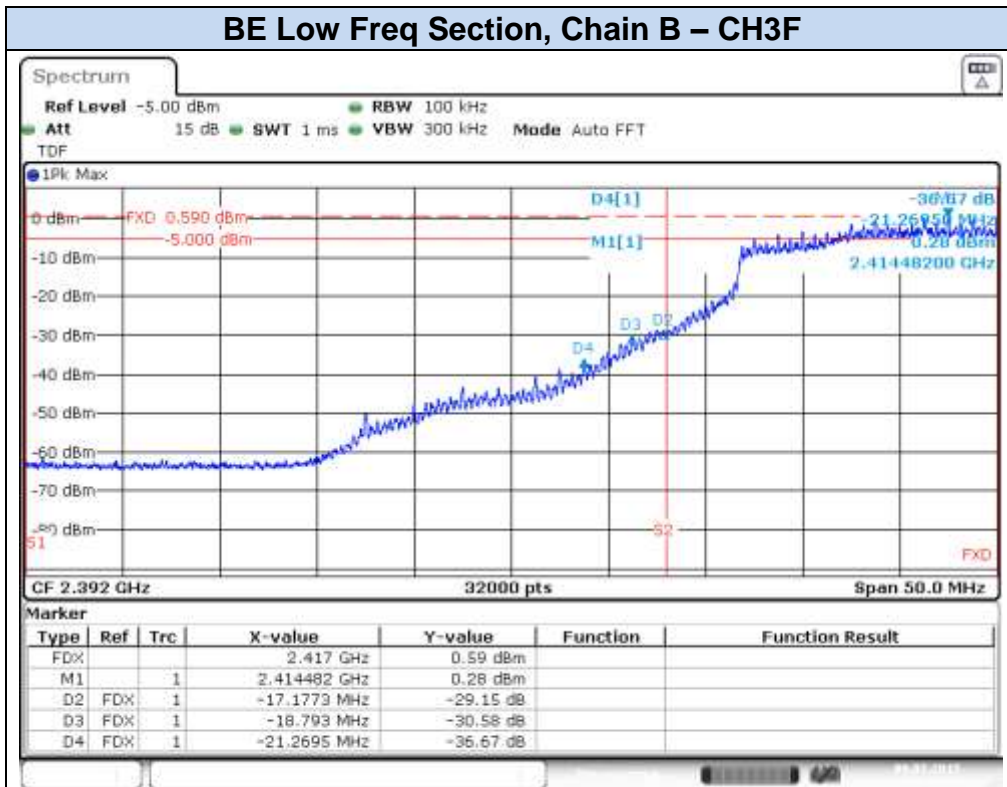


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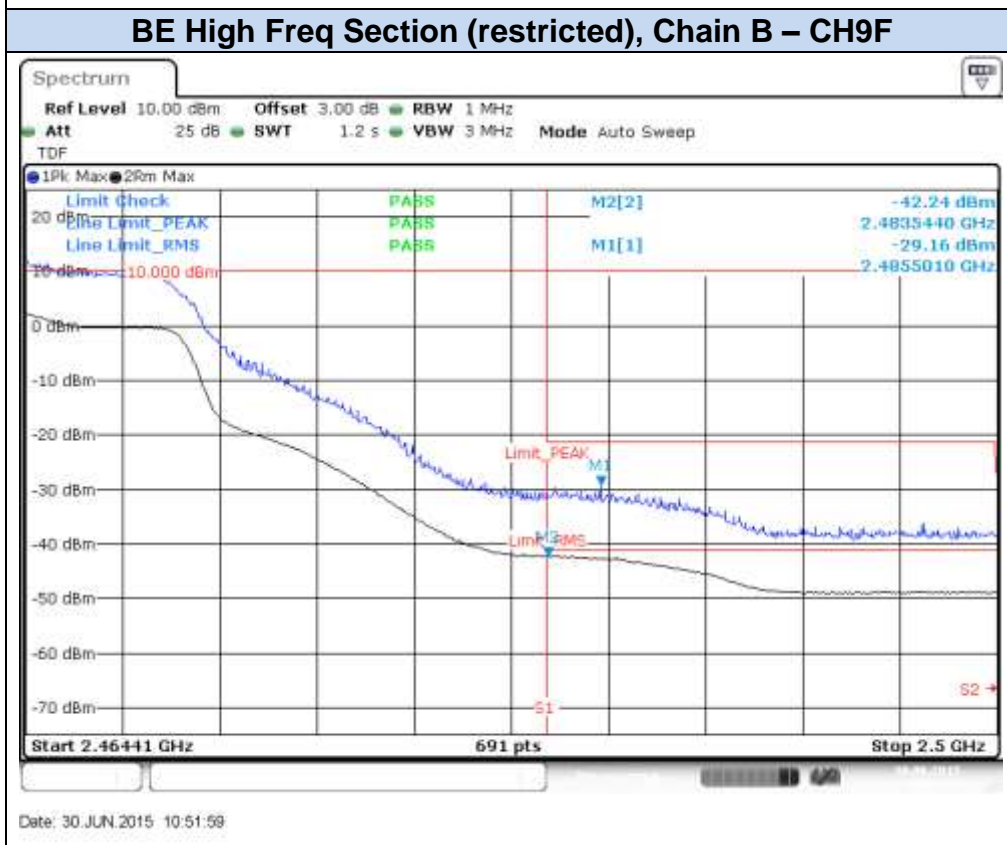
802.11n40, HT8 (MIMO)



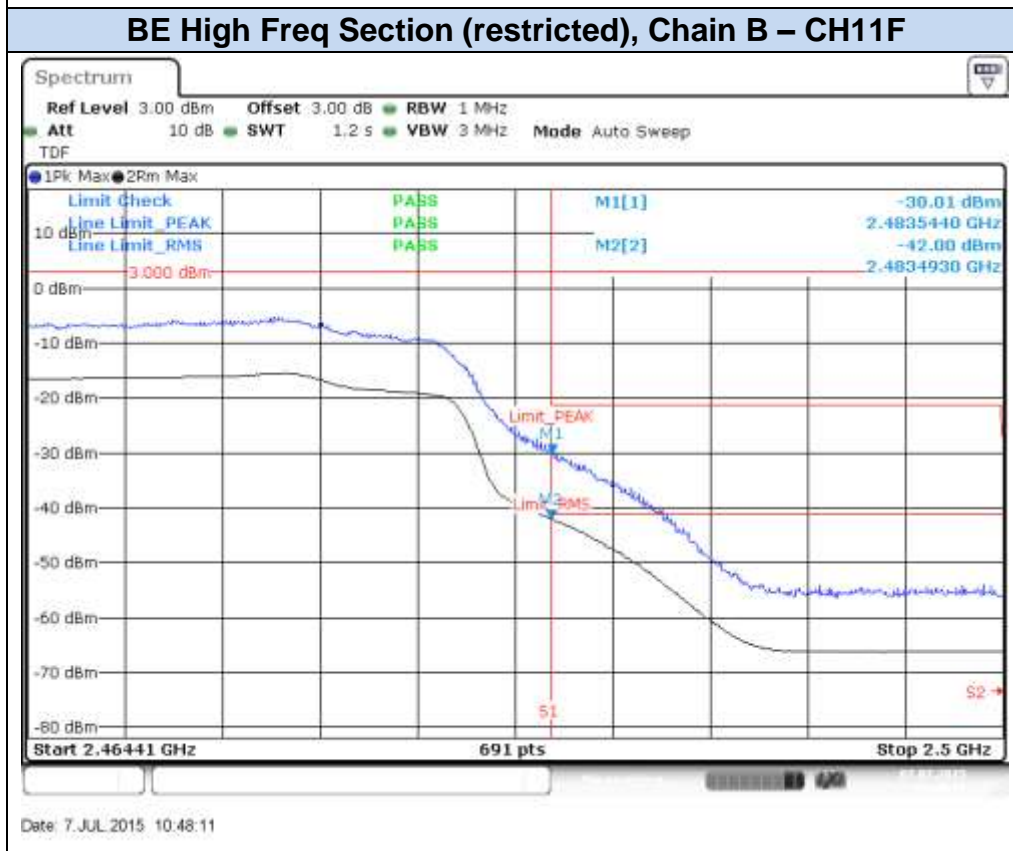
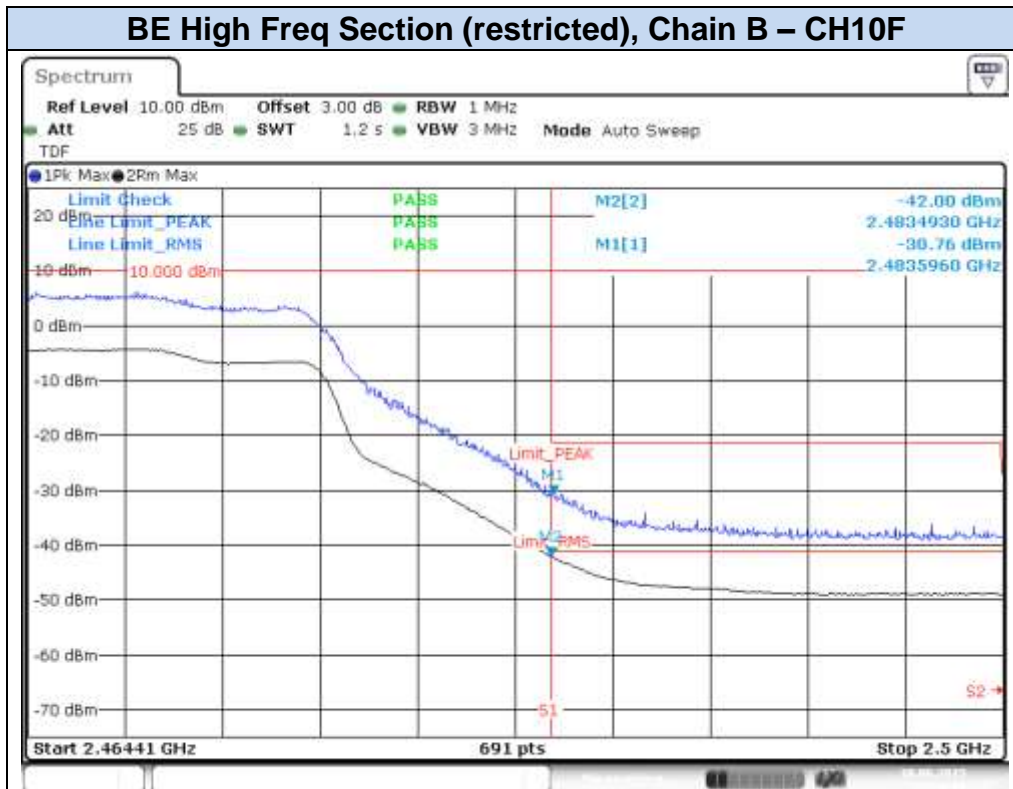




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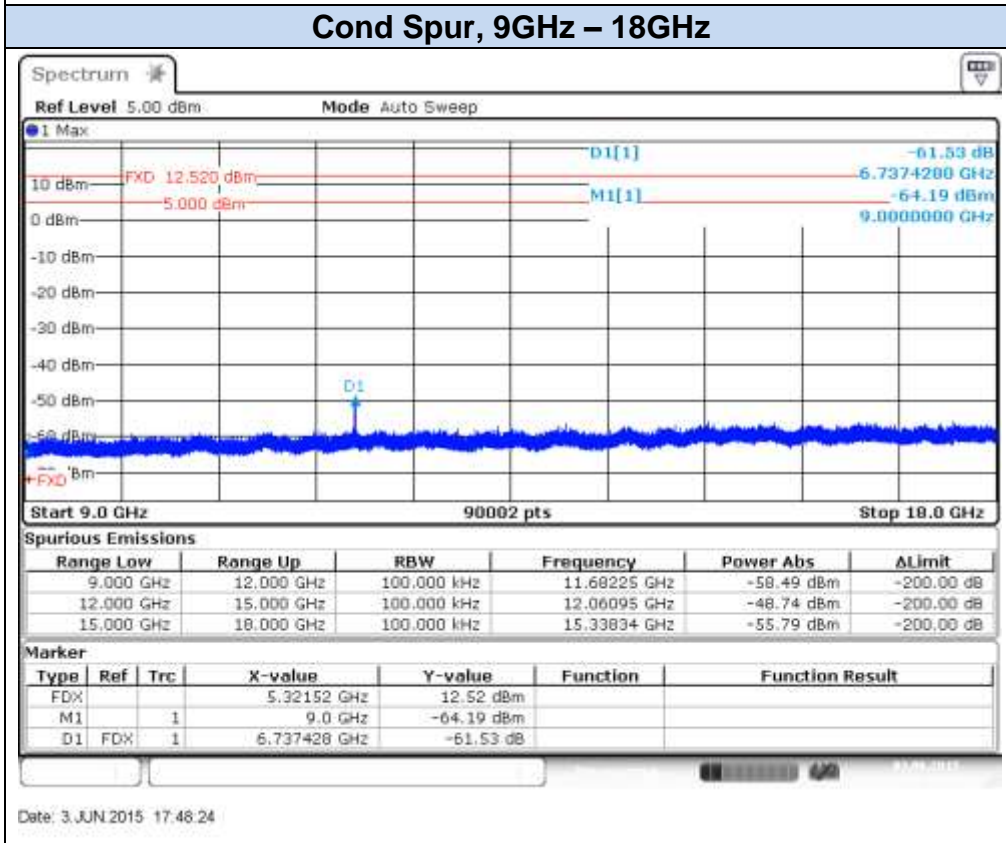
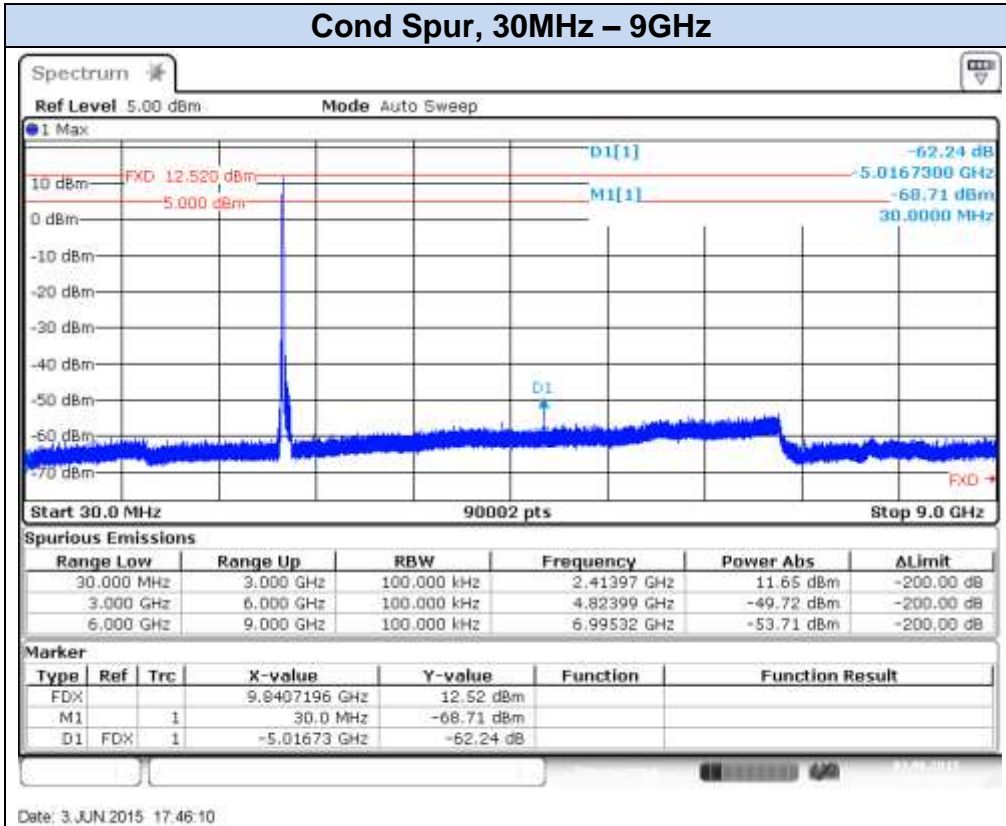


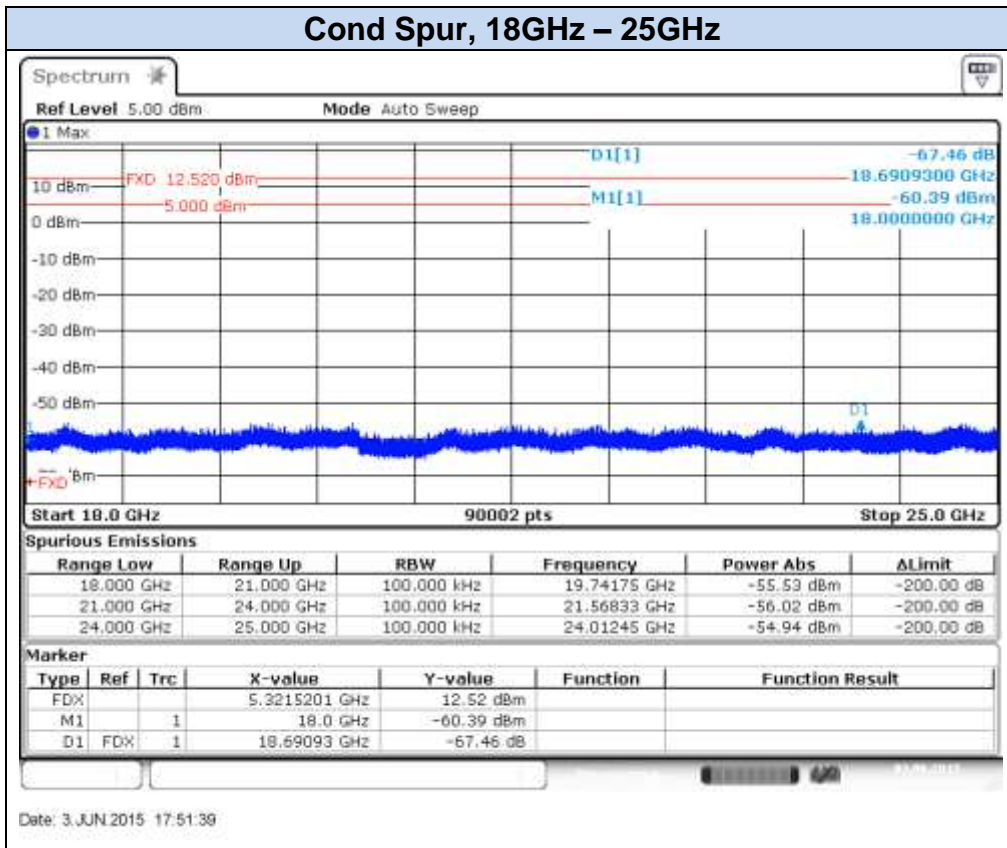
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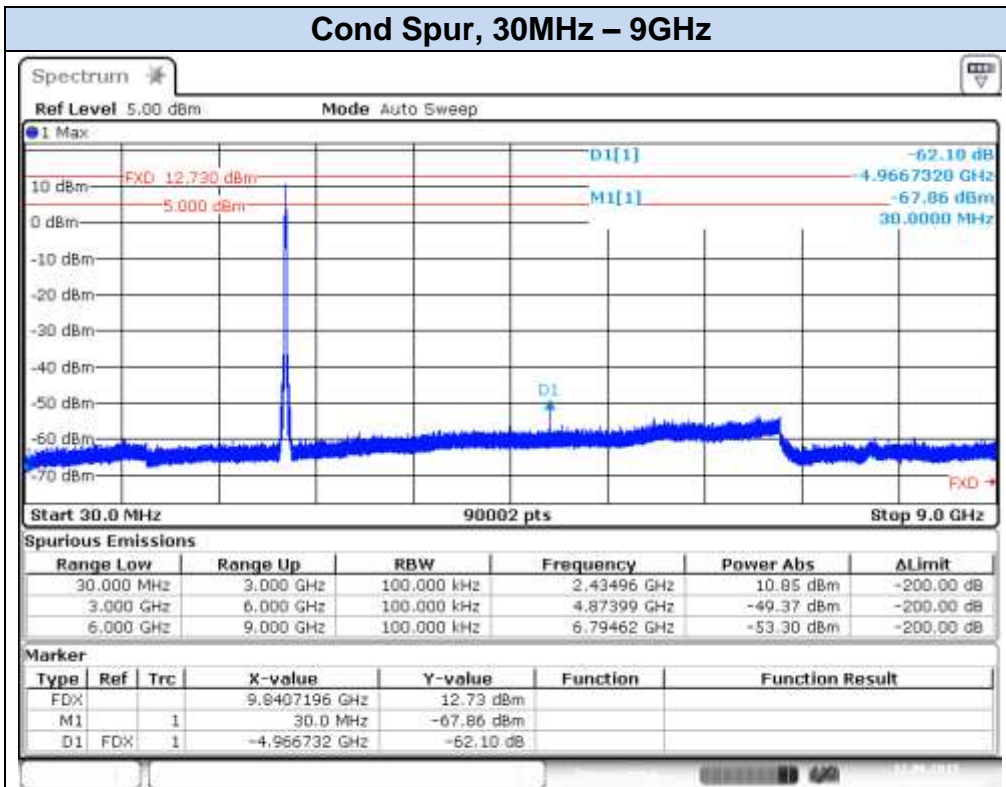
Conducted Spurious results Screenshot:

802.11b, 1Mbps – Chain A, CH1

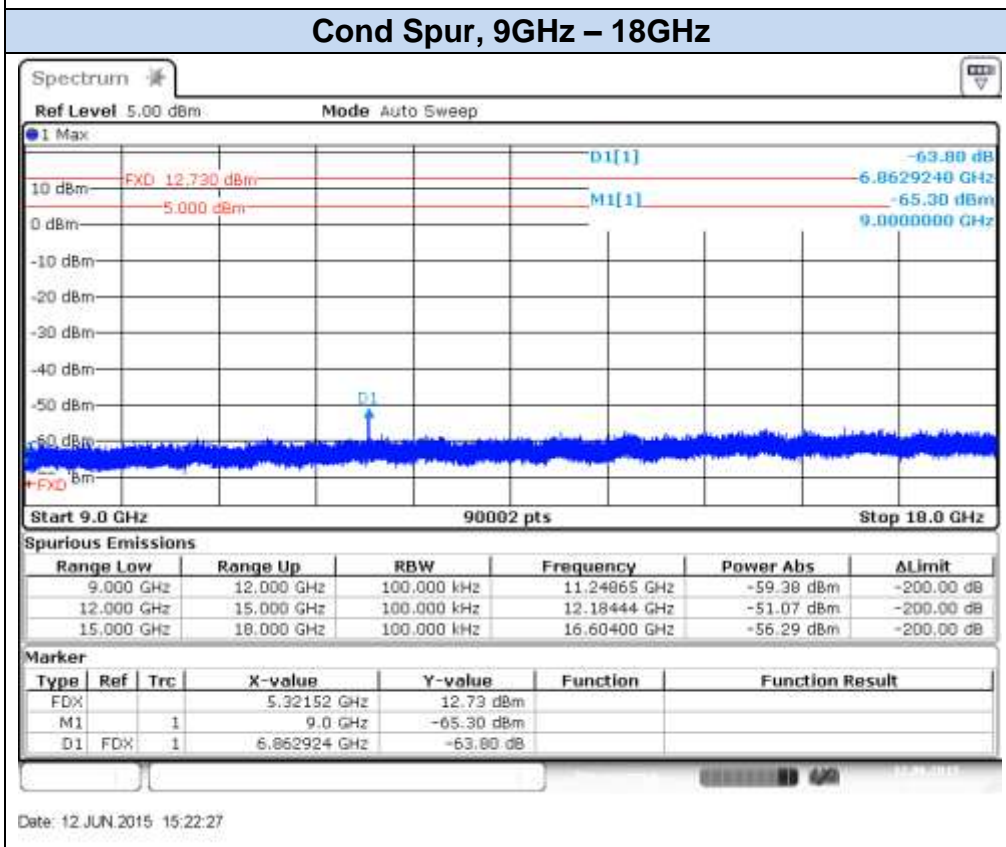




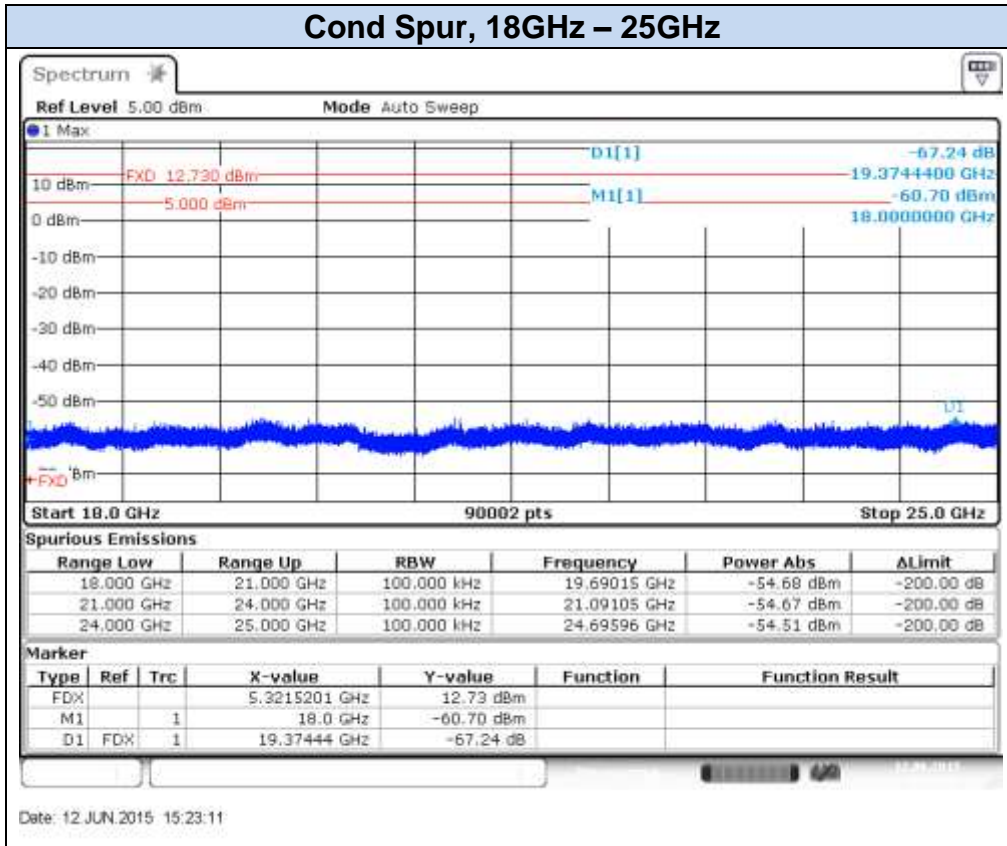
802.11b, 1Mbps – Chain A, CH6



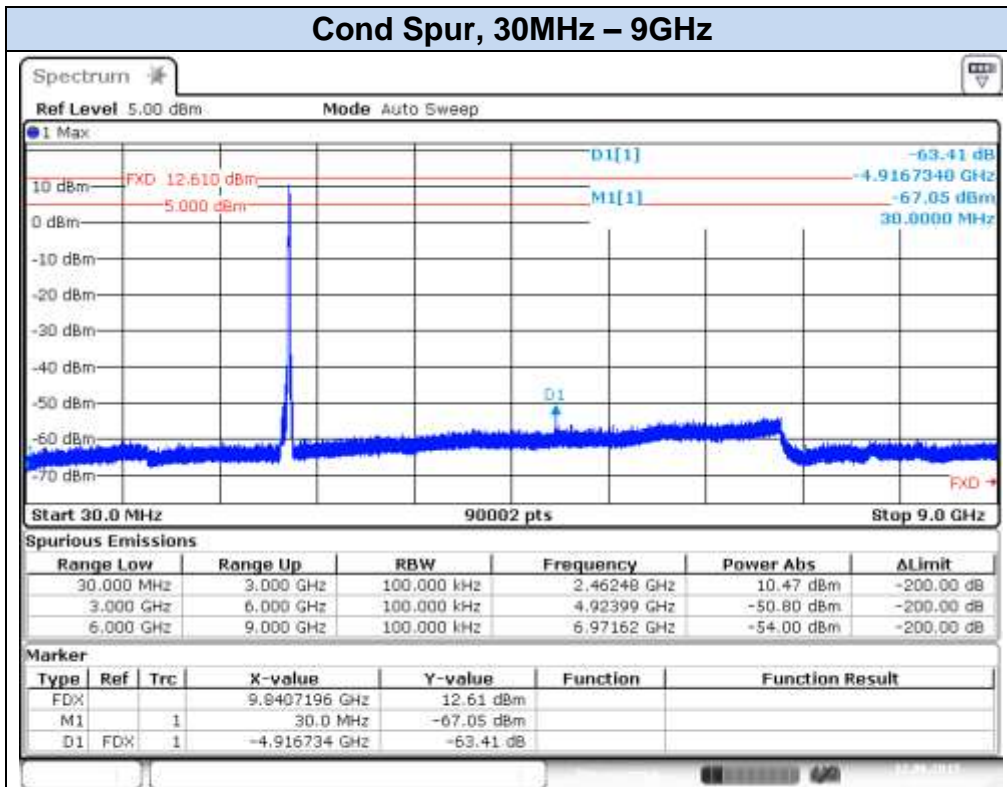
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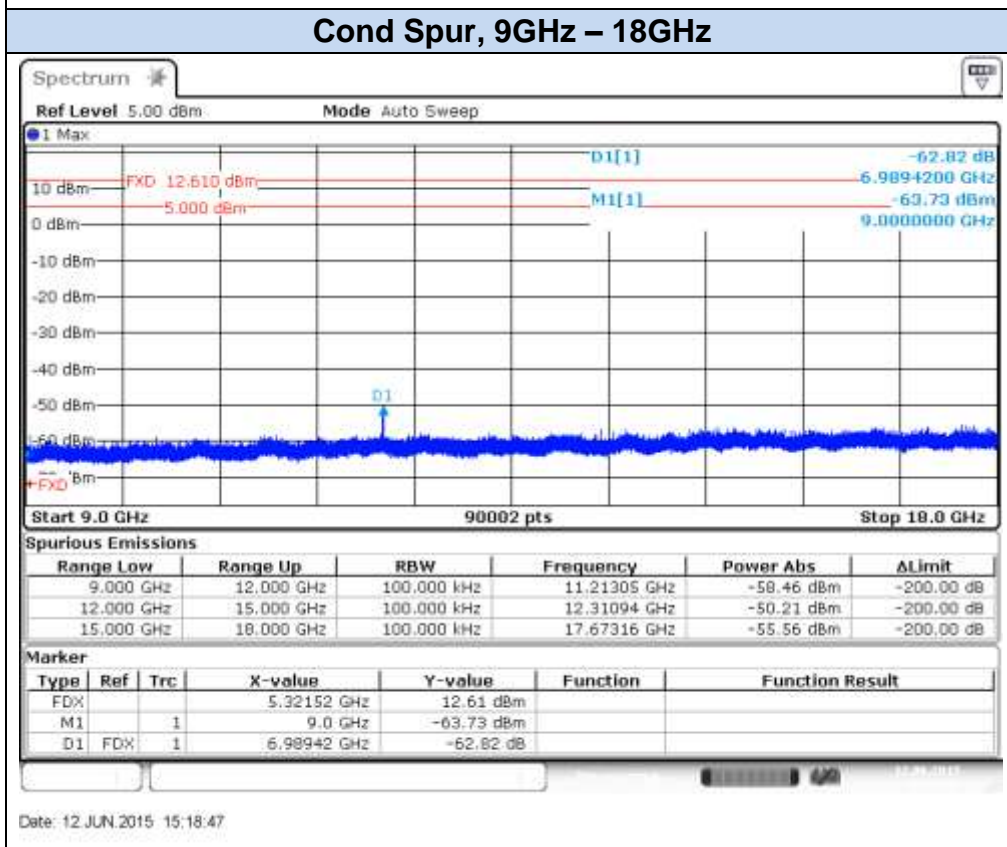
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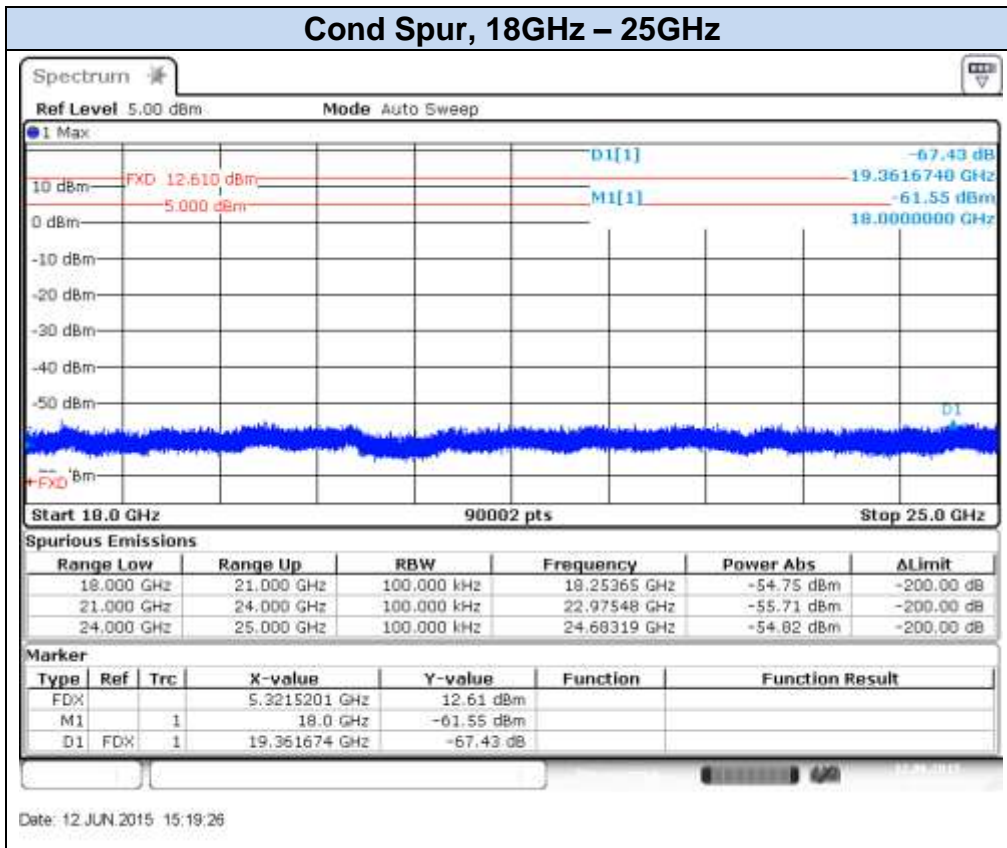
802.11b, 1Mbps – Chain A, CH11



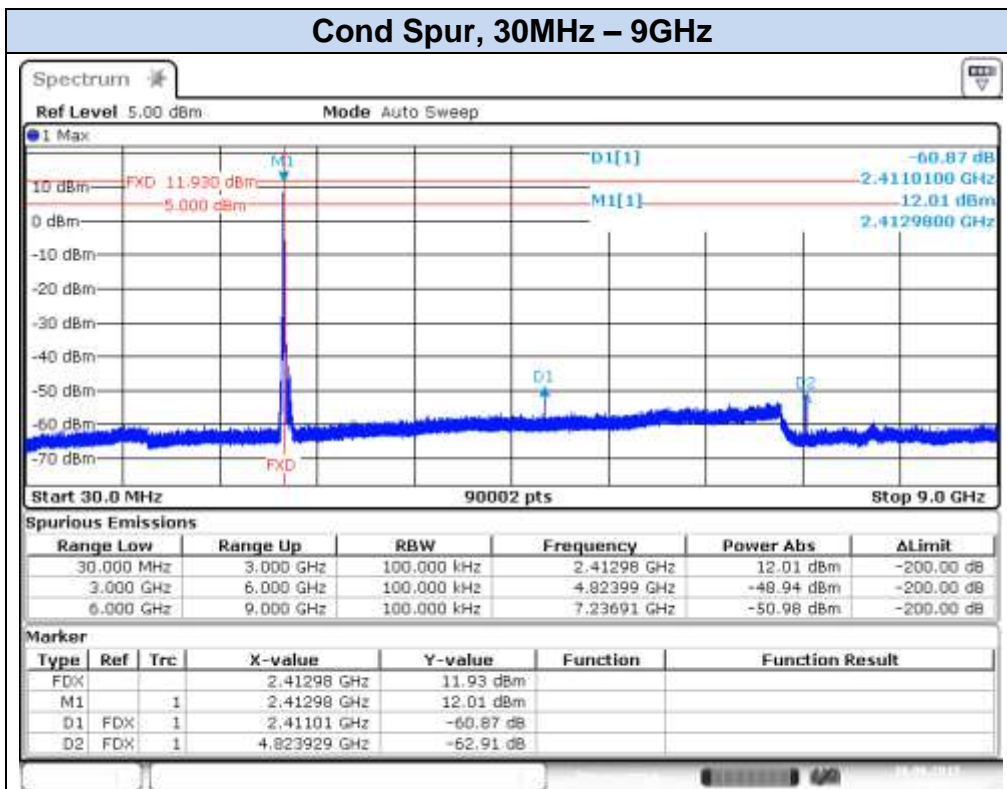
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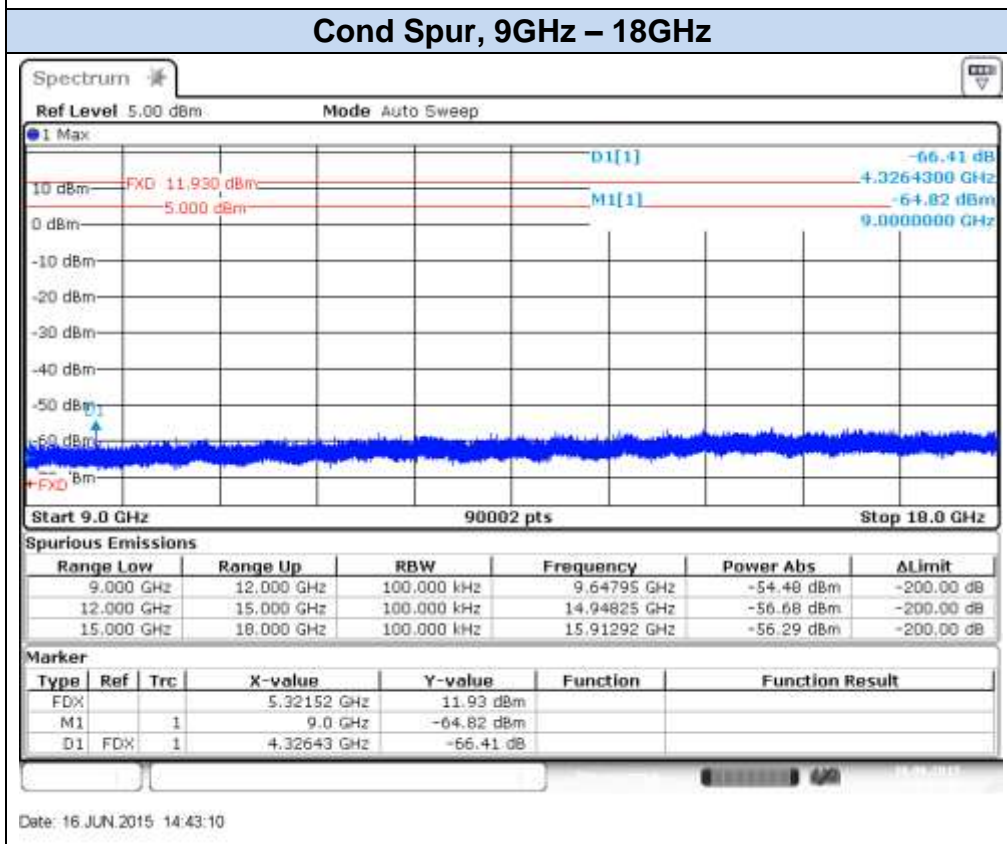
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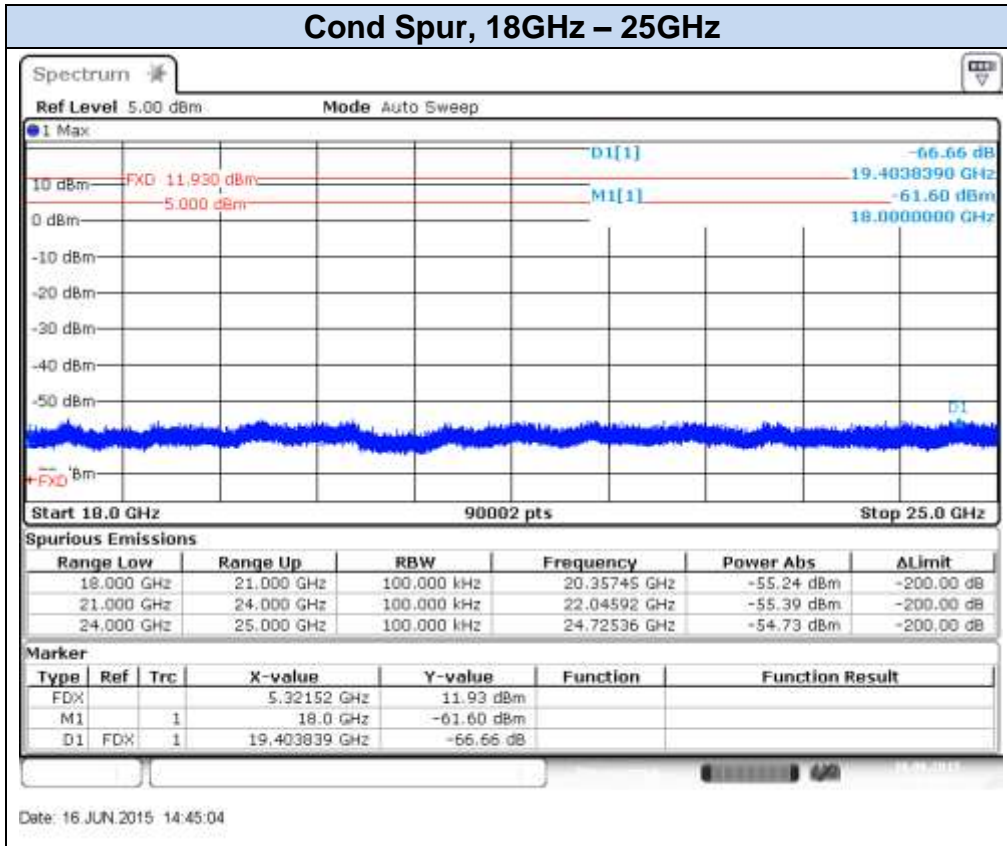
802.11b, 1Mbps – Chain B, CH1



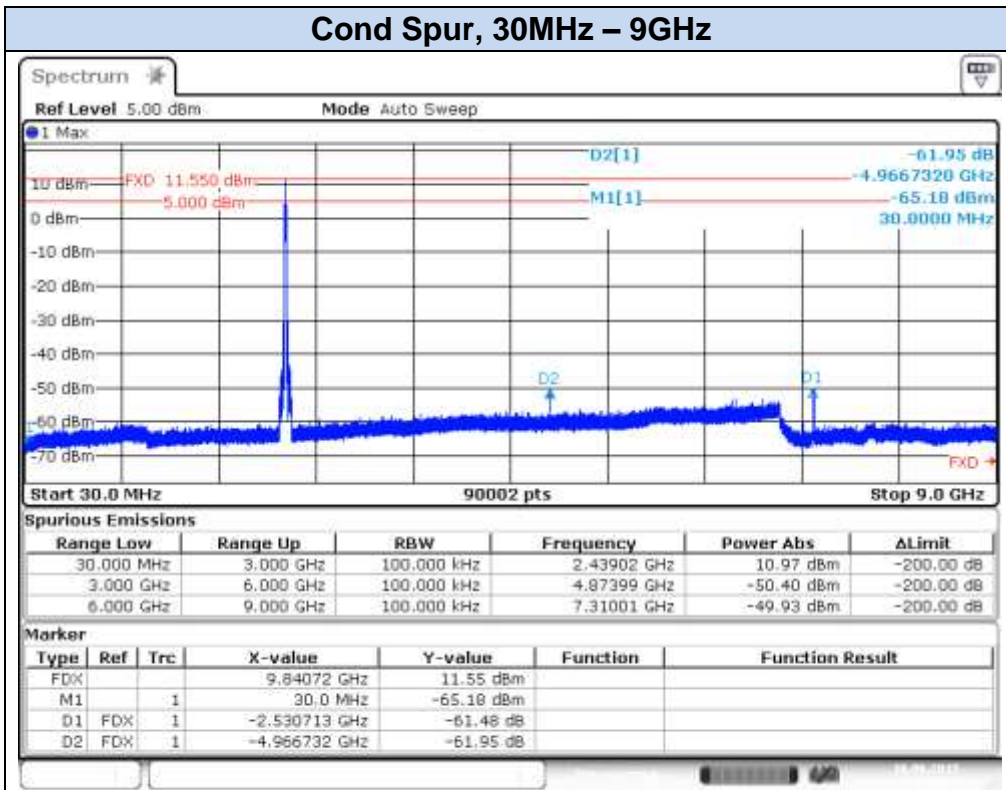
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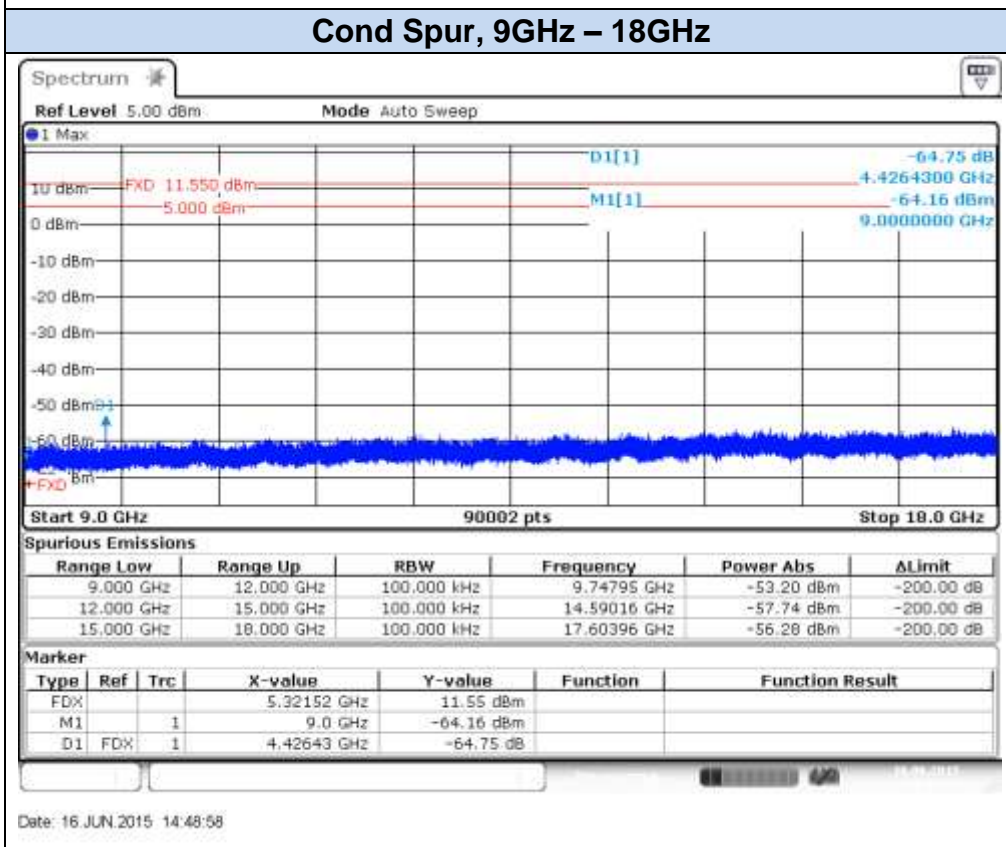
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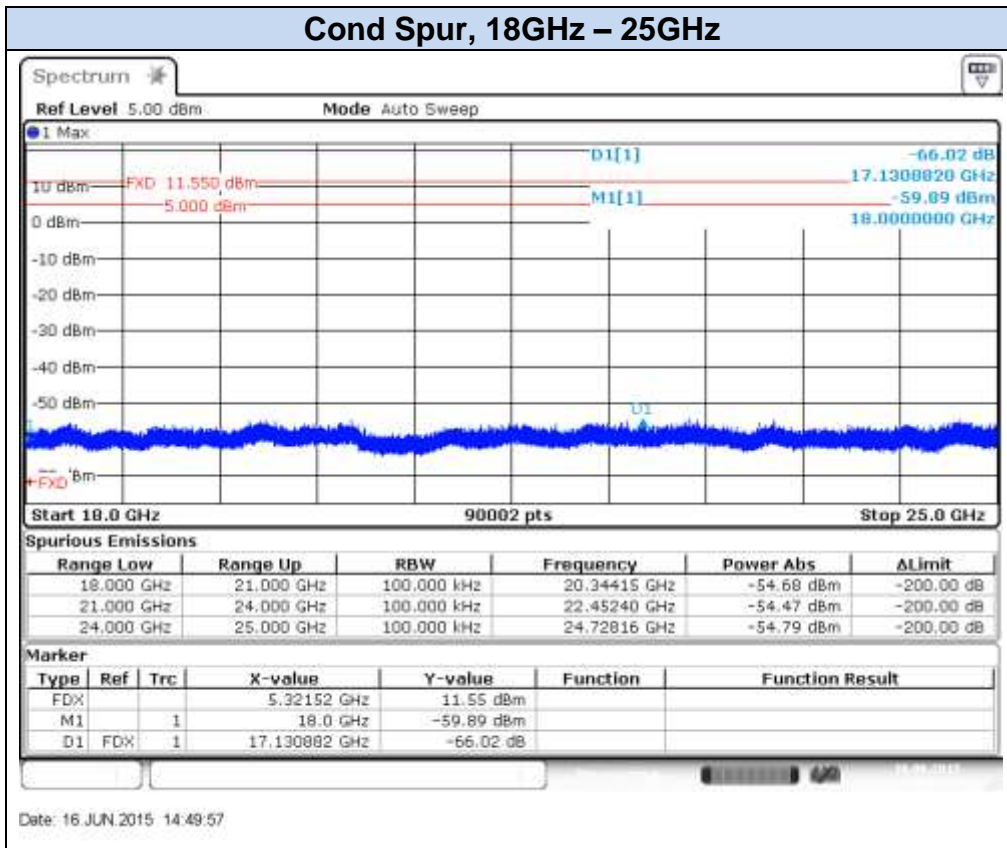
802.11b, 1Mbps – Chain B, CH6



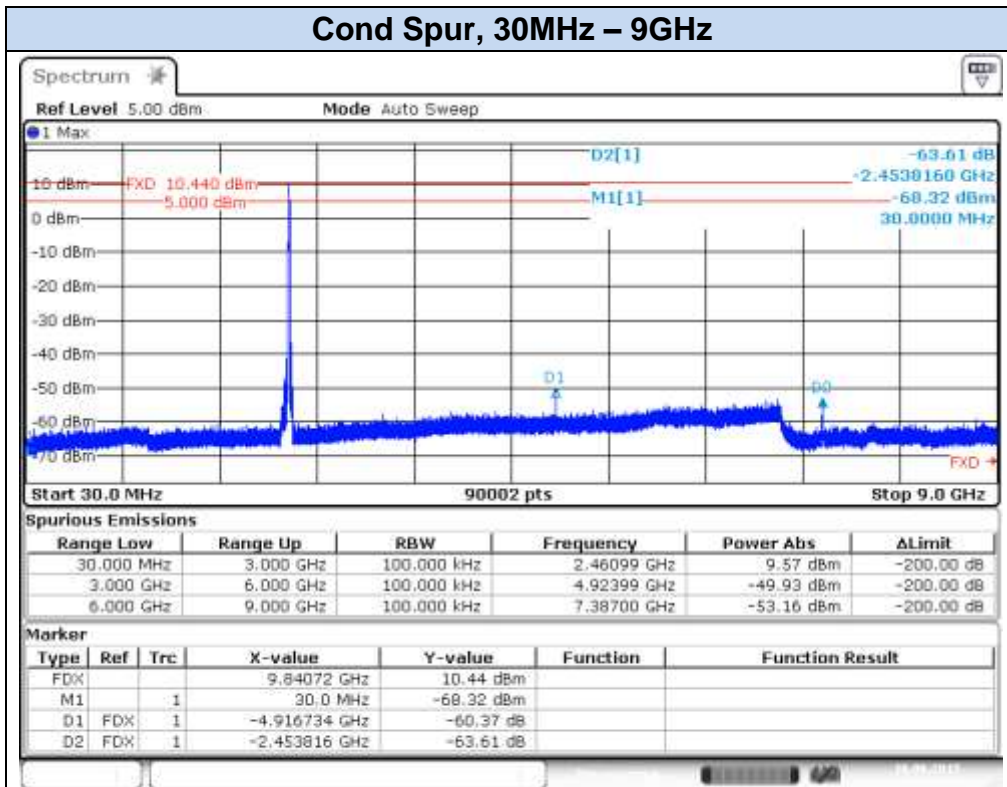
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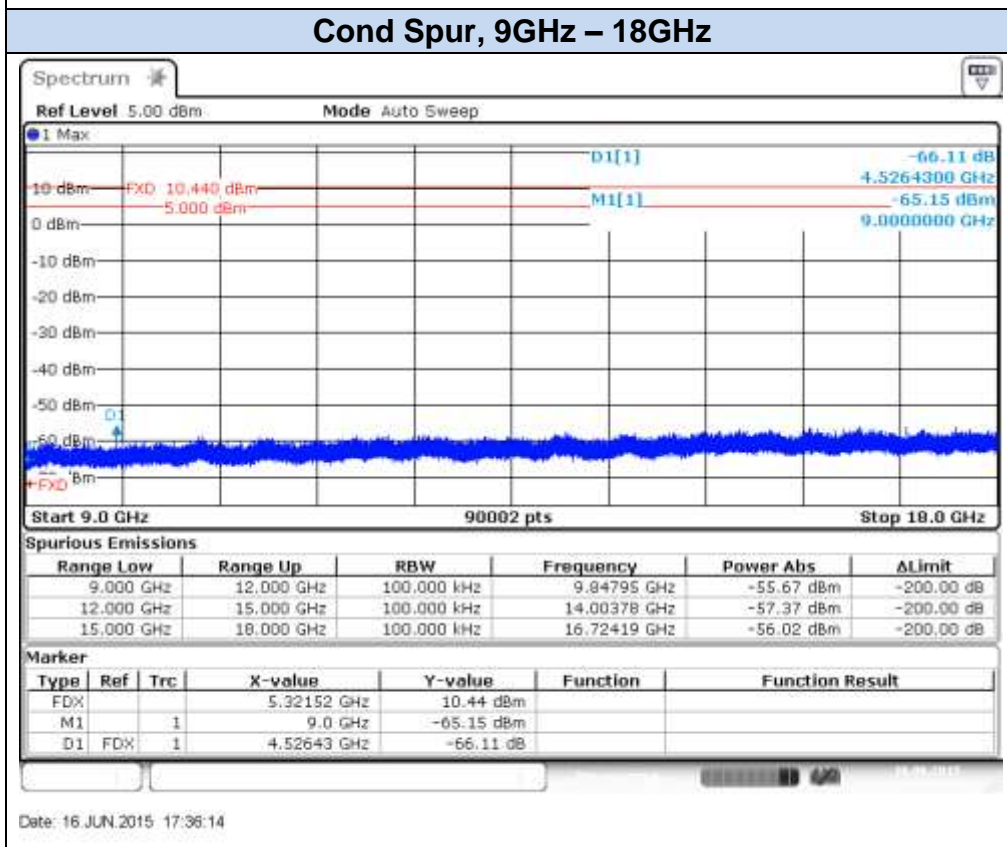
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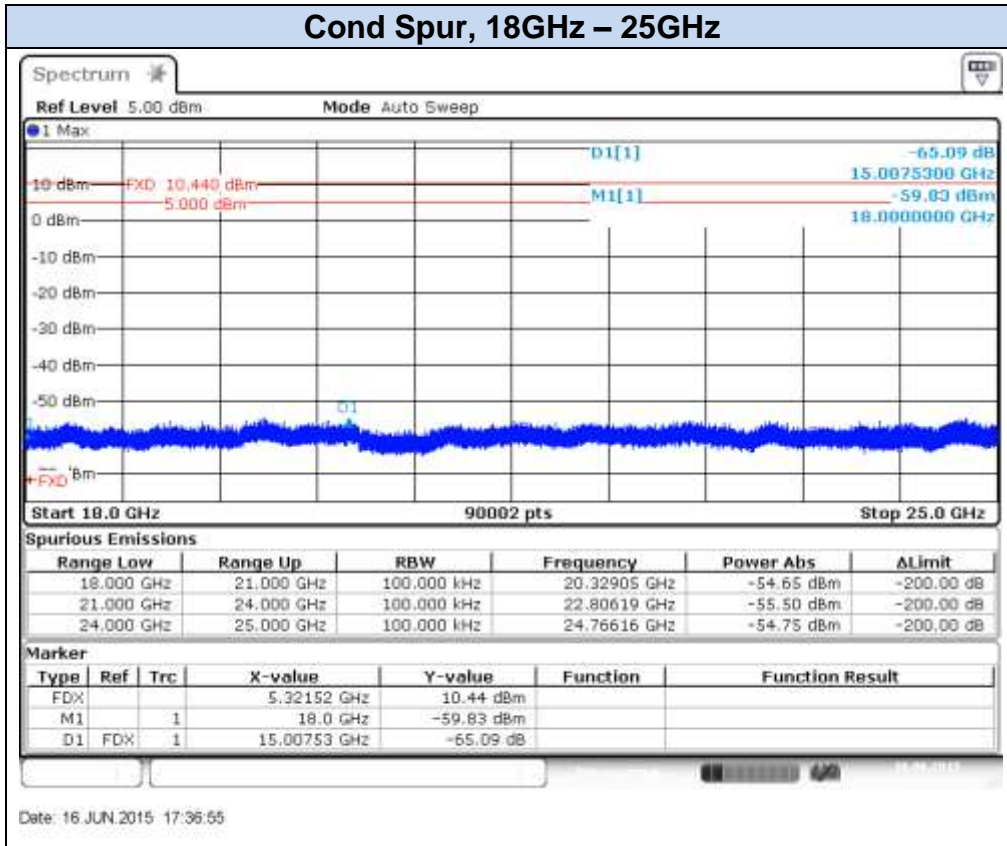
802.11b, 1Mbps – Chain B, CH11



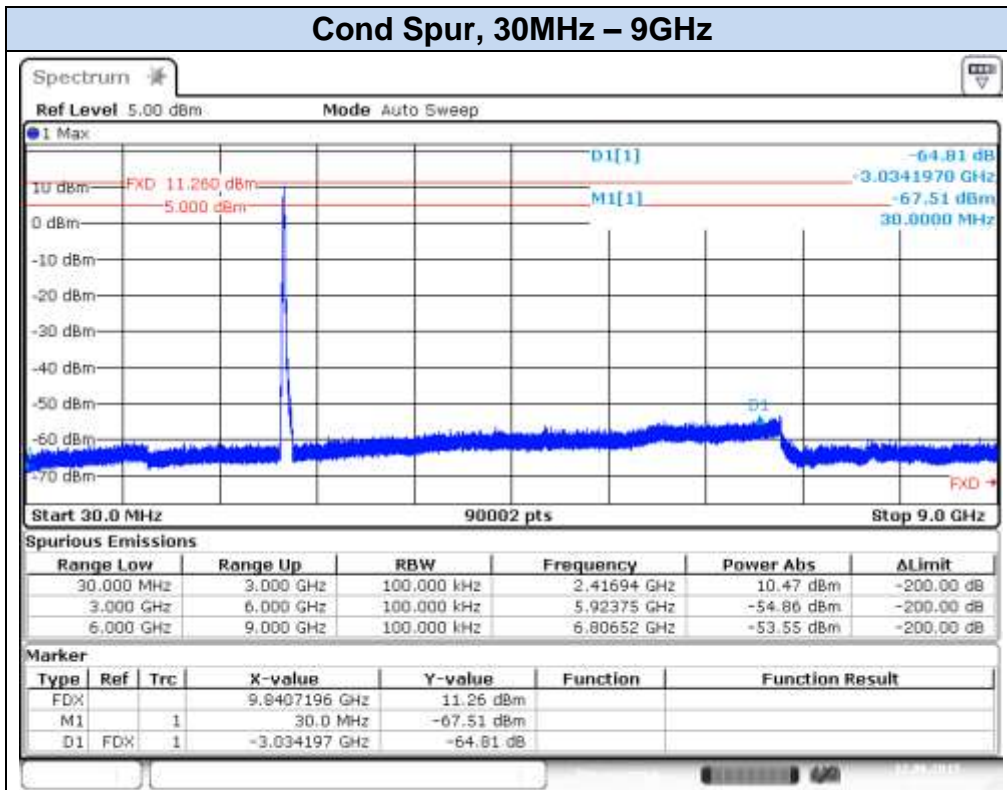
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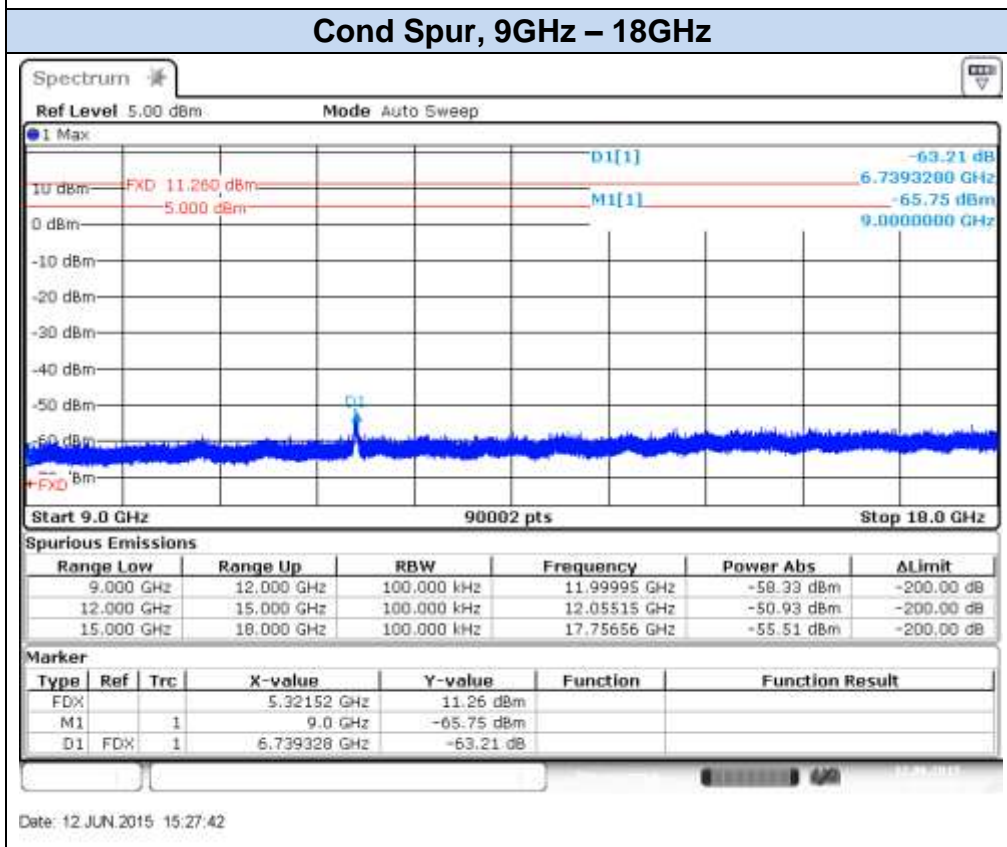
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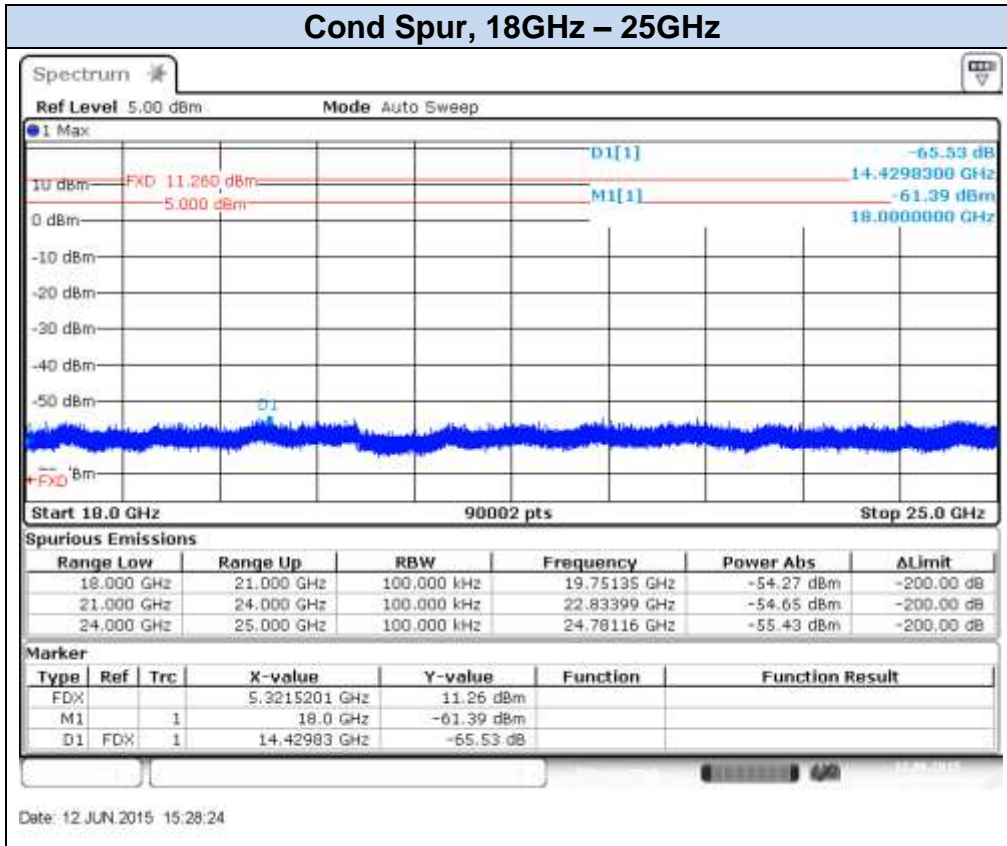
802.11g, 6Mbps – Chain A, CH1



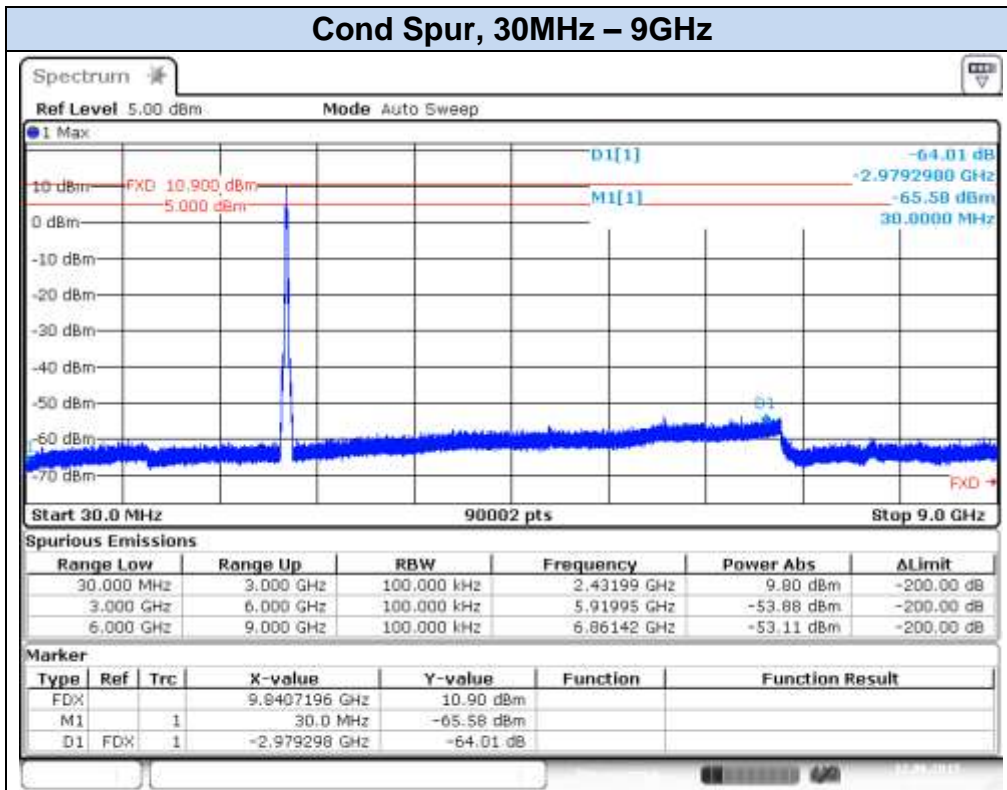
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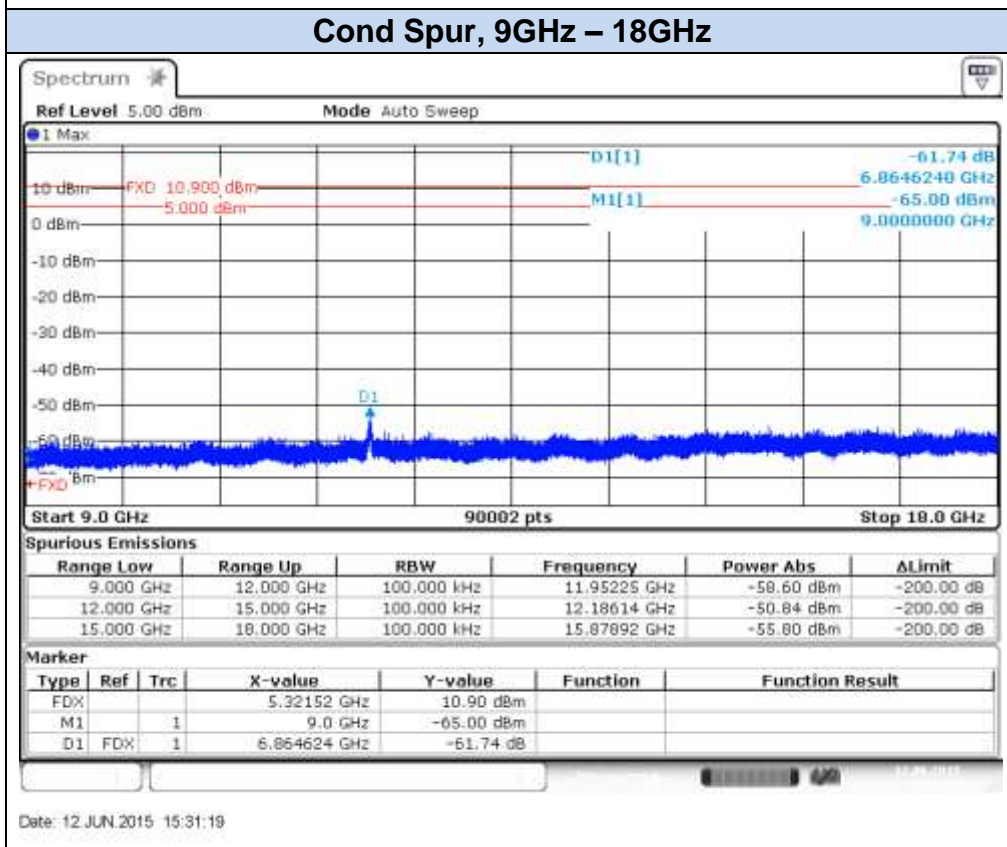
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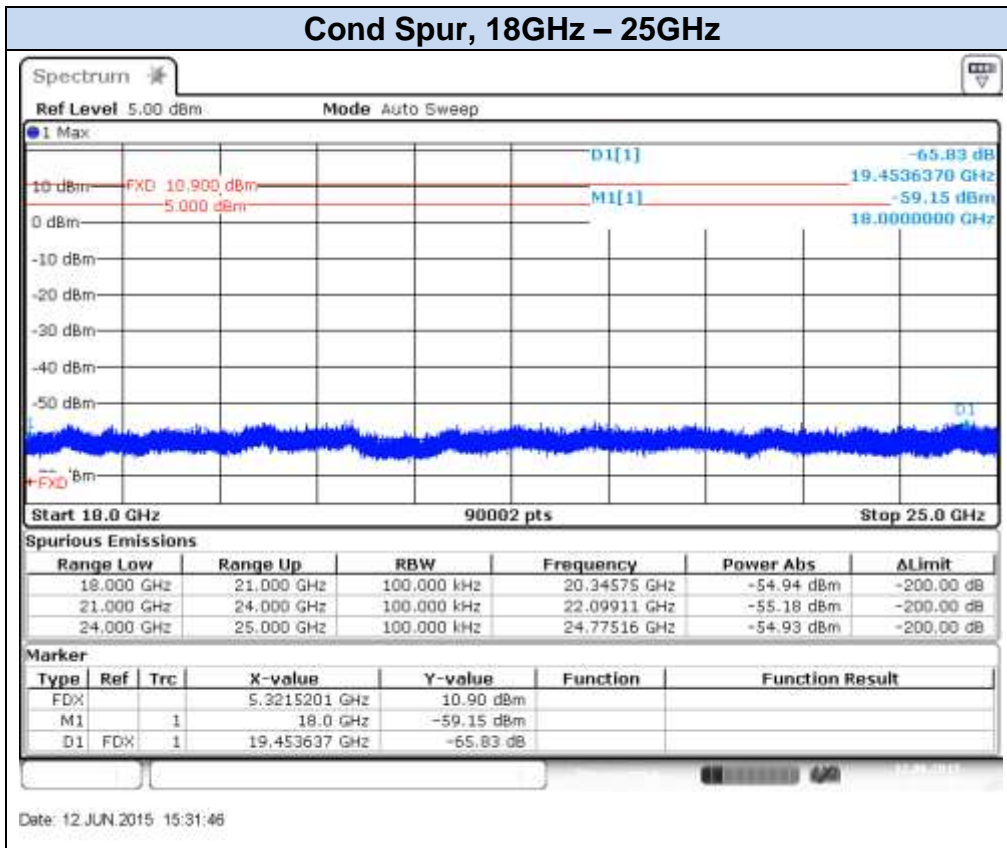
802.11g, 6Mbps – Chain A, CH6



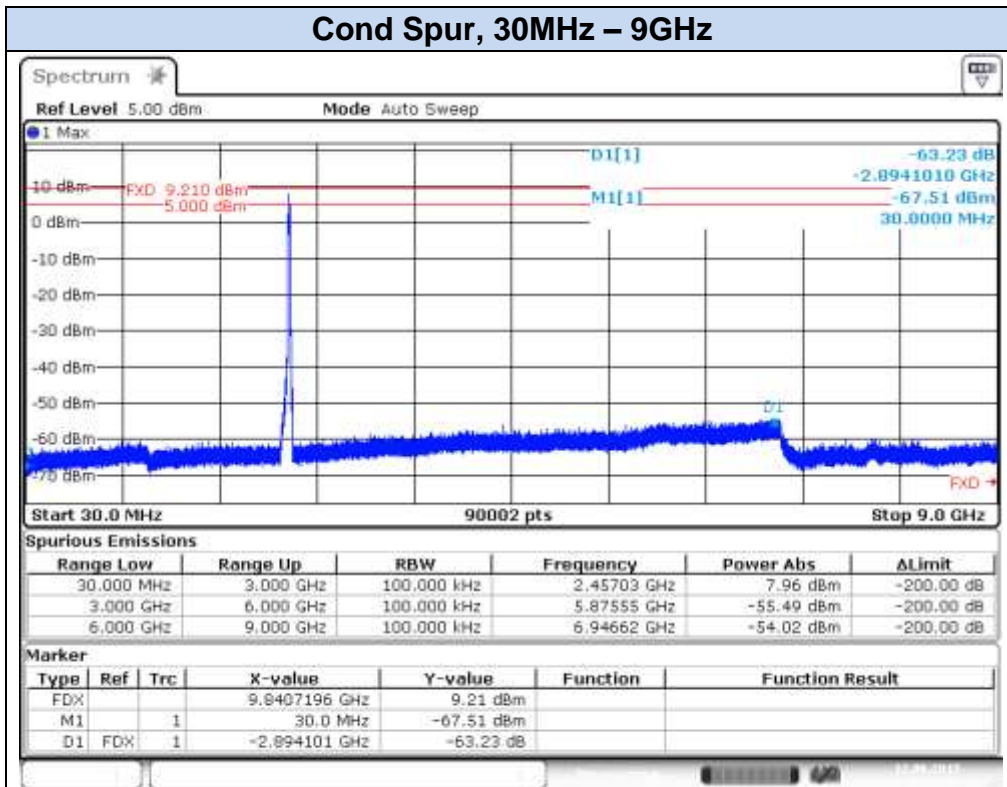
Date: 12 JUN 2015 15:30:26



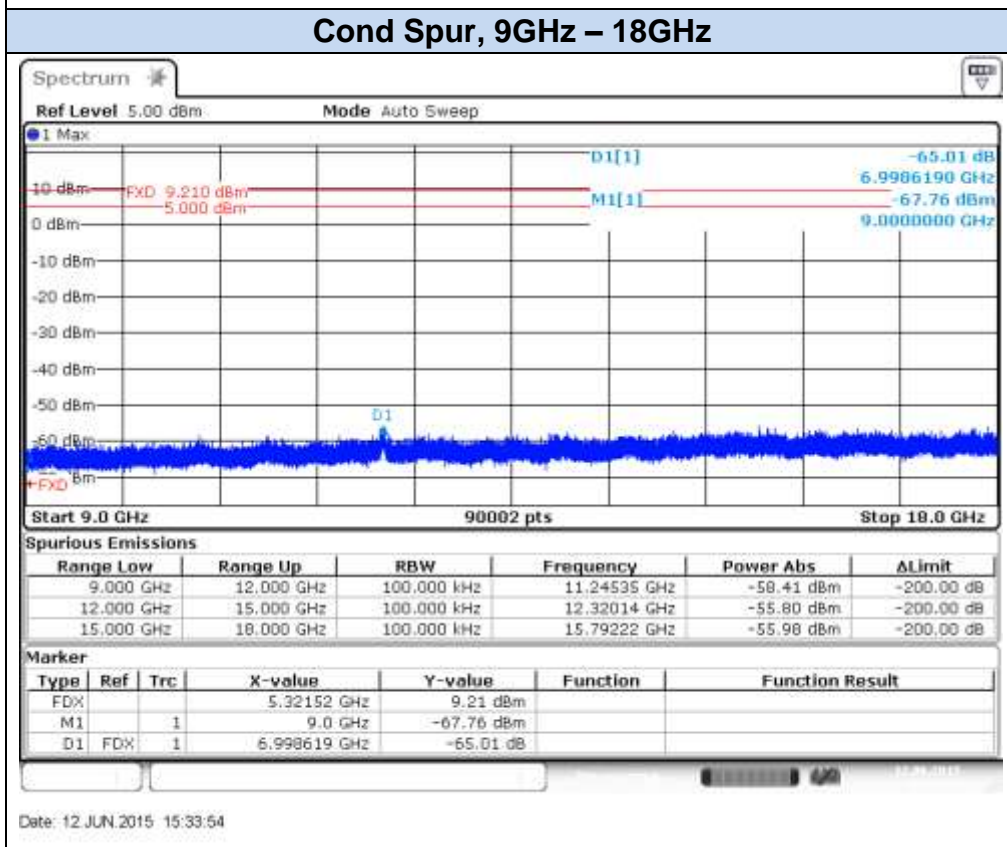
Date: 12 JUN 2015 15:31:19



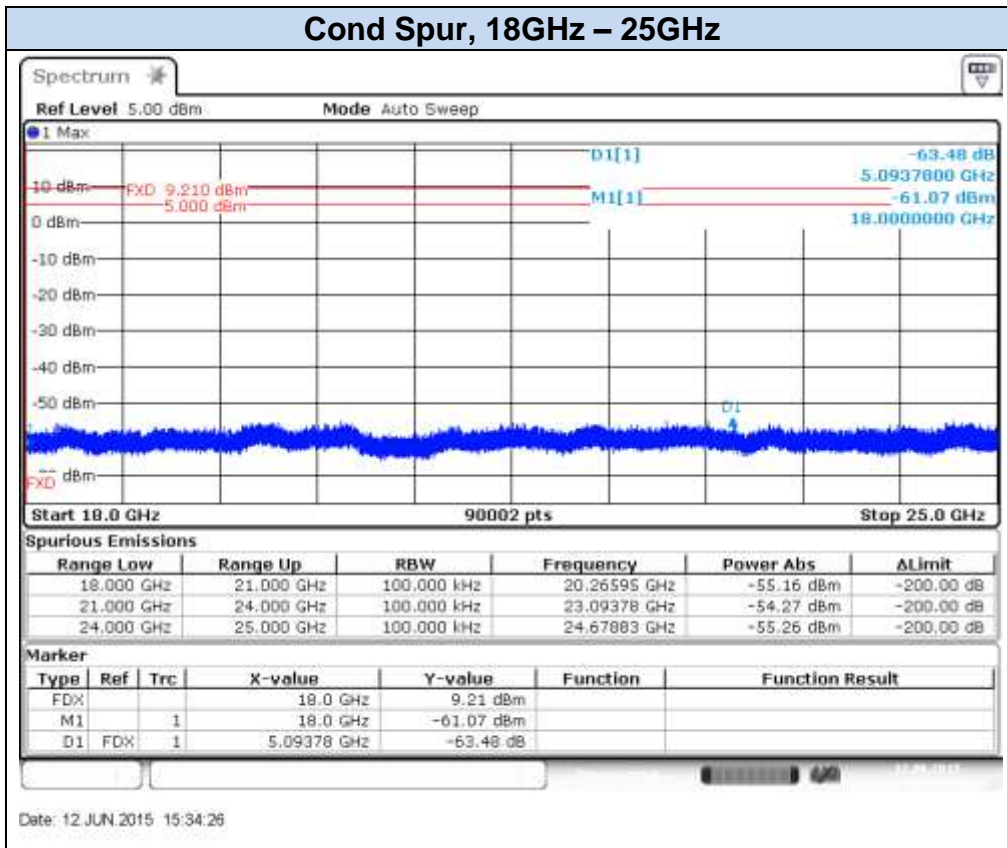
802.11g, 6Mbps – Chain A, CH11



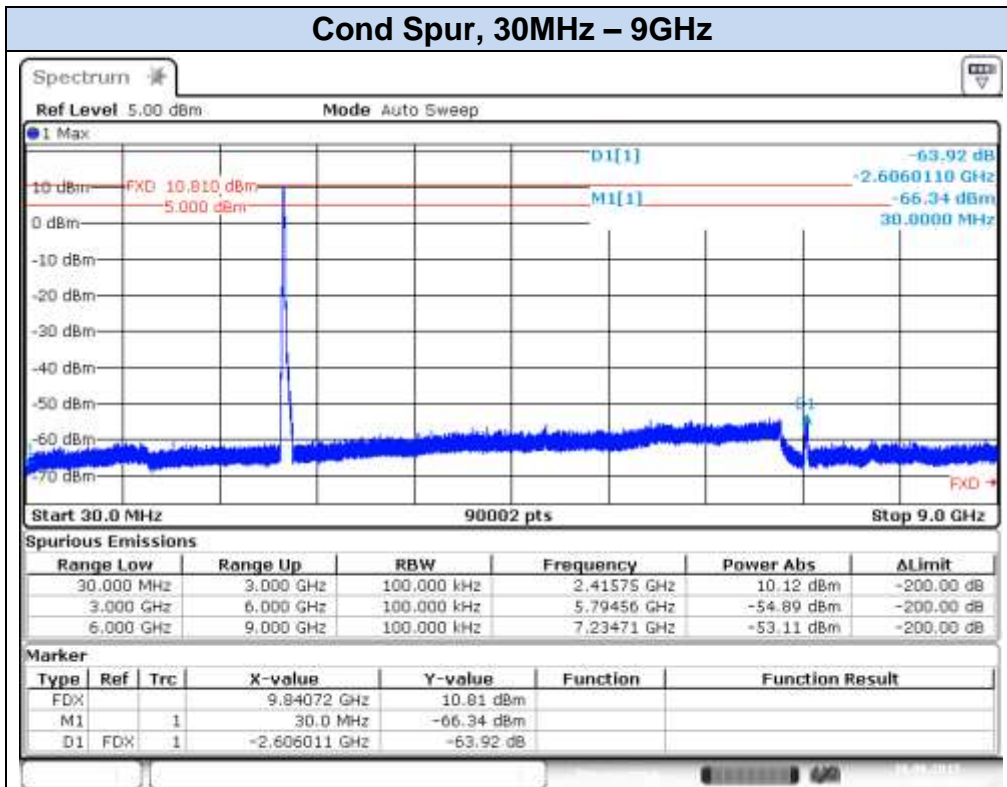
Date: 12 JUN 2015 15:33:17



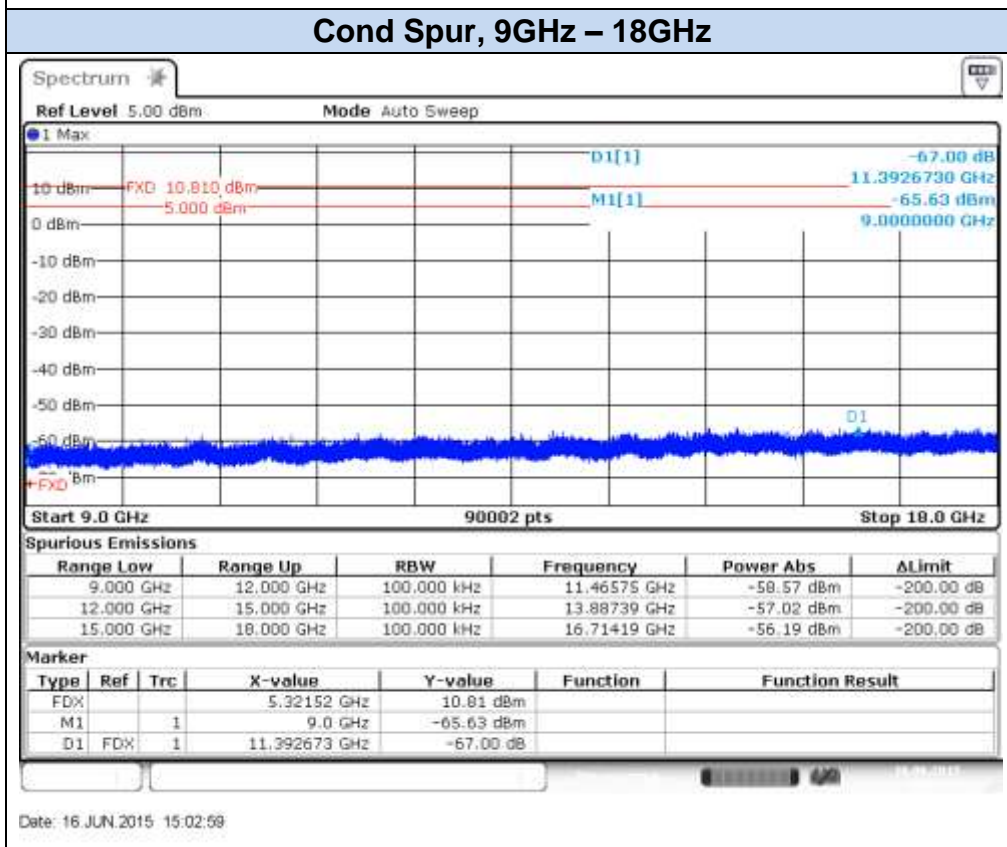
Date: 12 JUN 2015 15:33:54



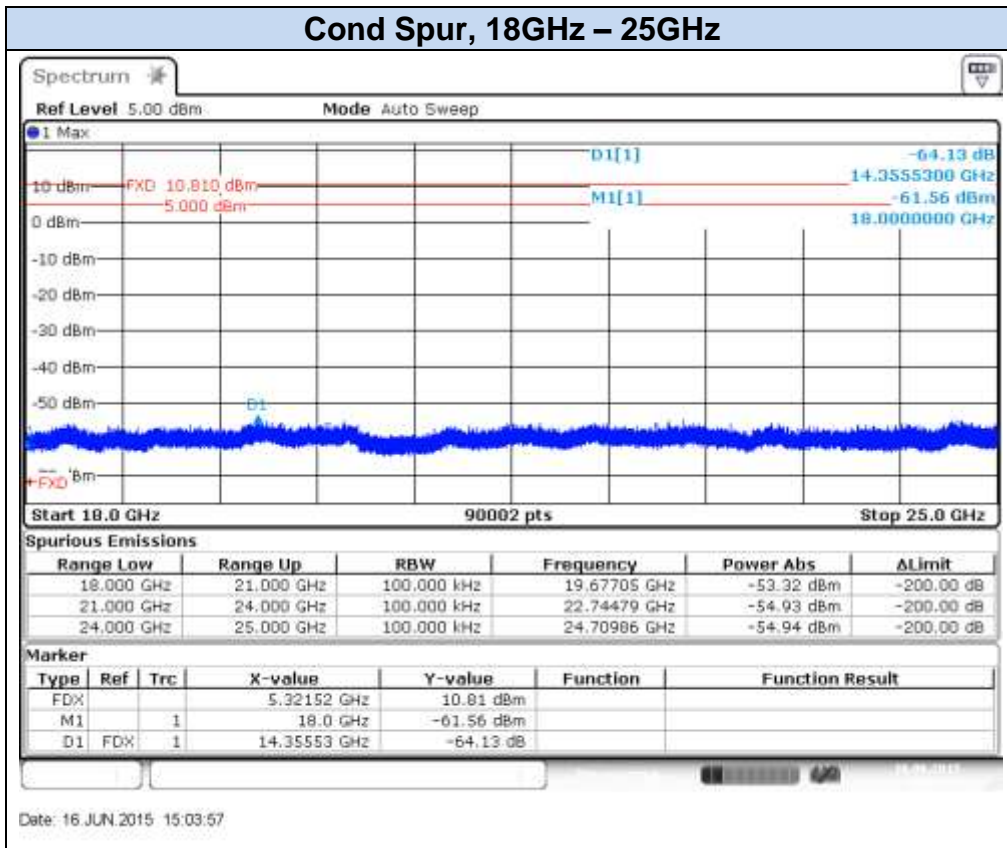
802.11g, 6Mbps – Chain B, CH1



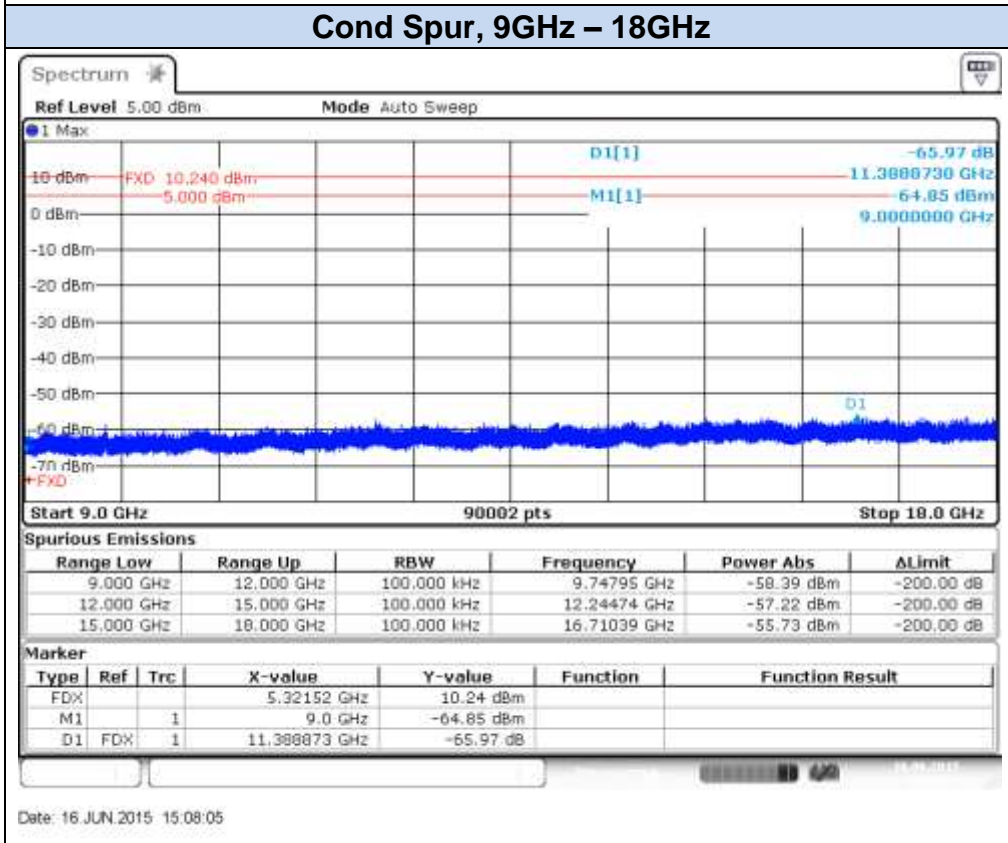
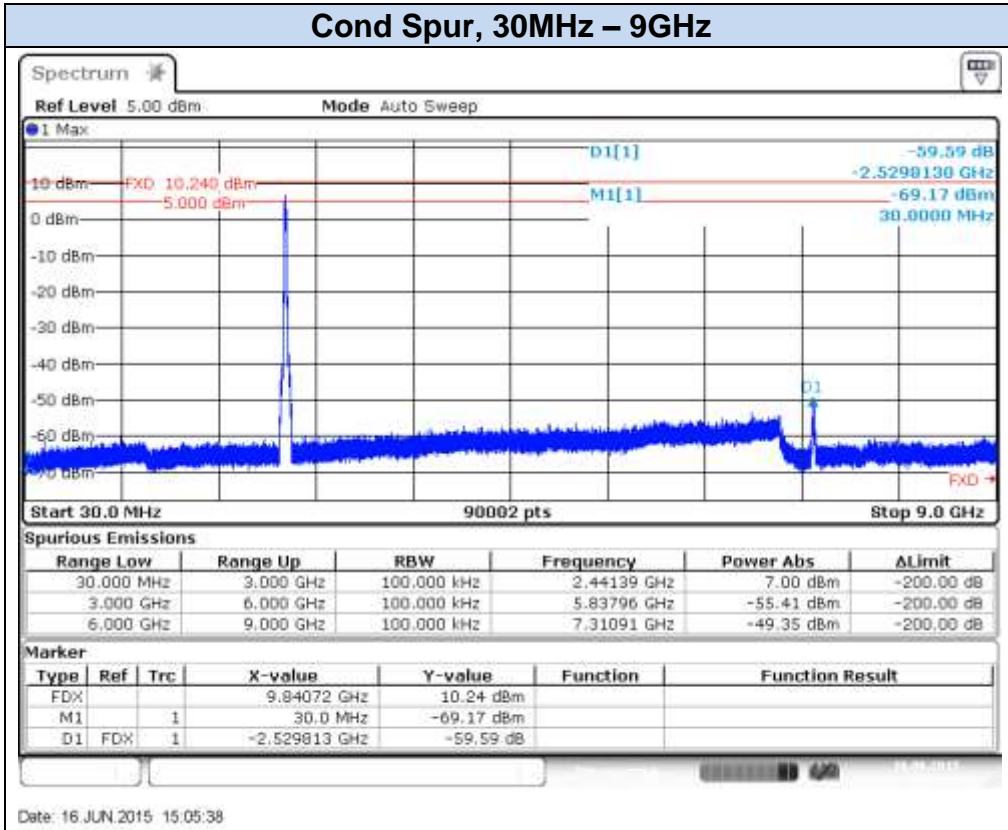
Date: 16 JUN 2015 15:01:40

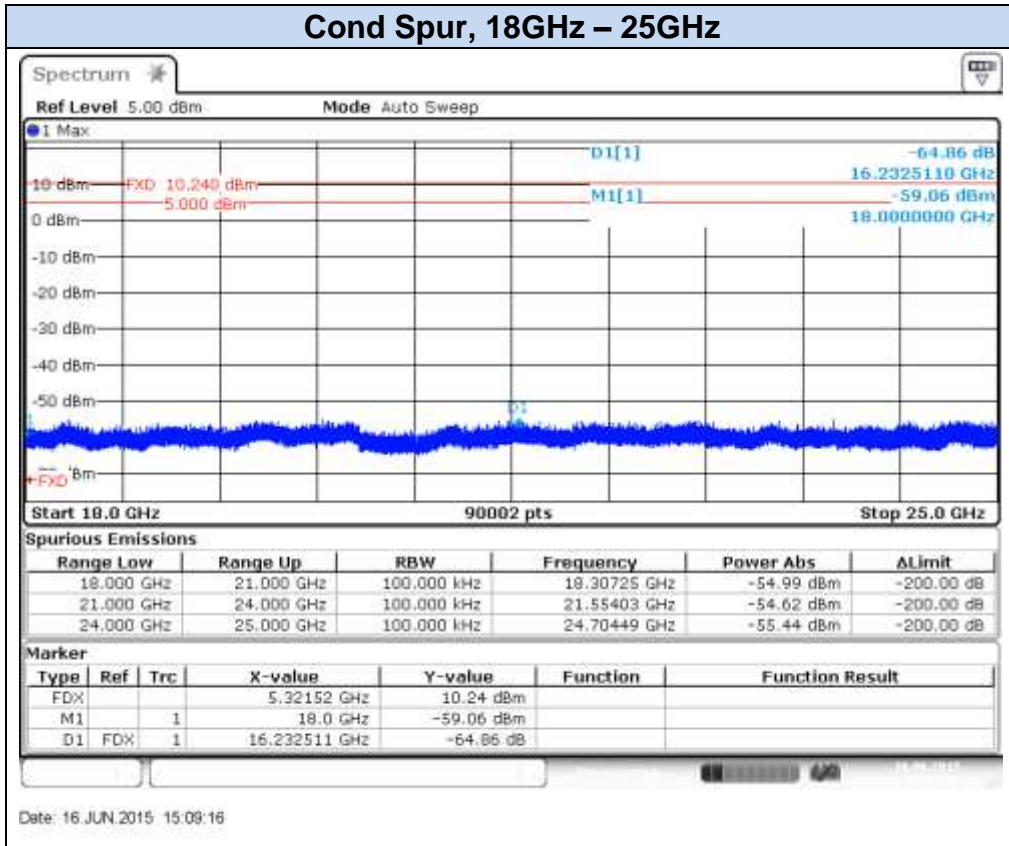


Date: 16 JUN 2015 15:02:59

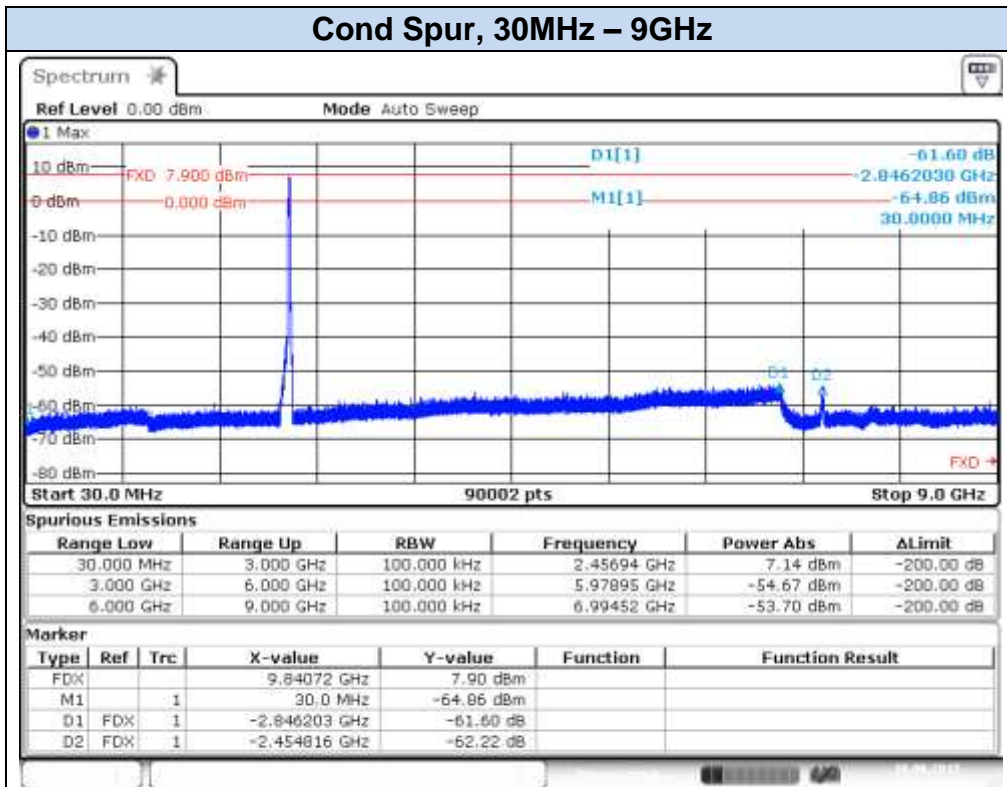


802.11g, 6Mbps – Chain B, CH6

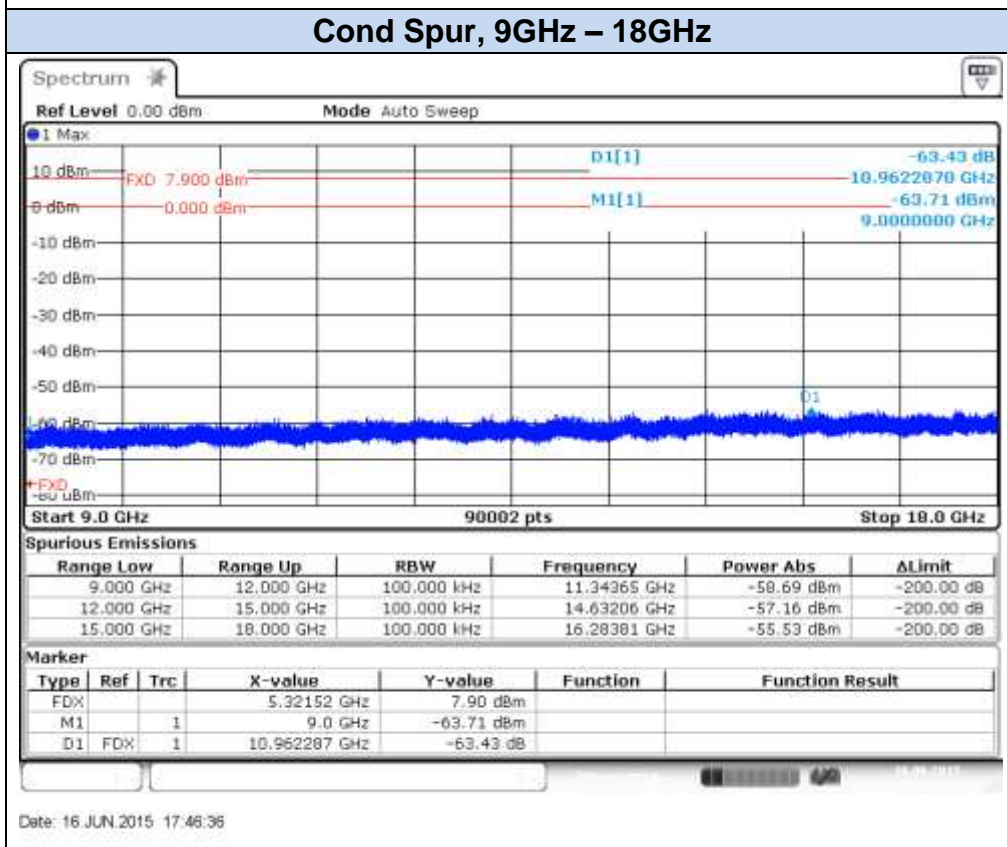




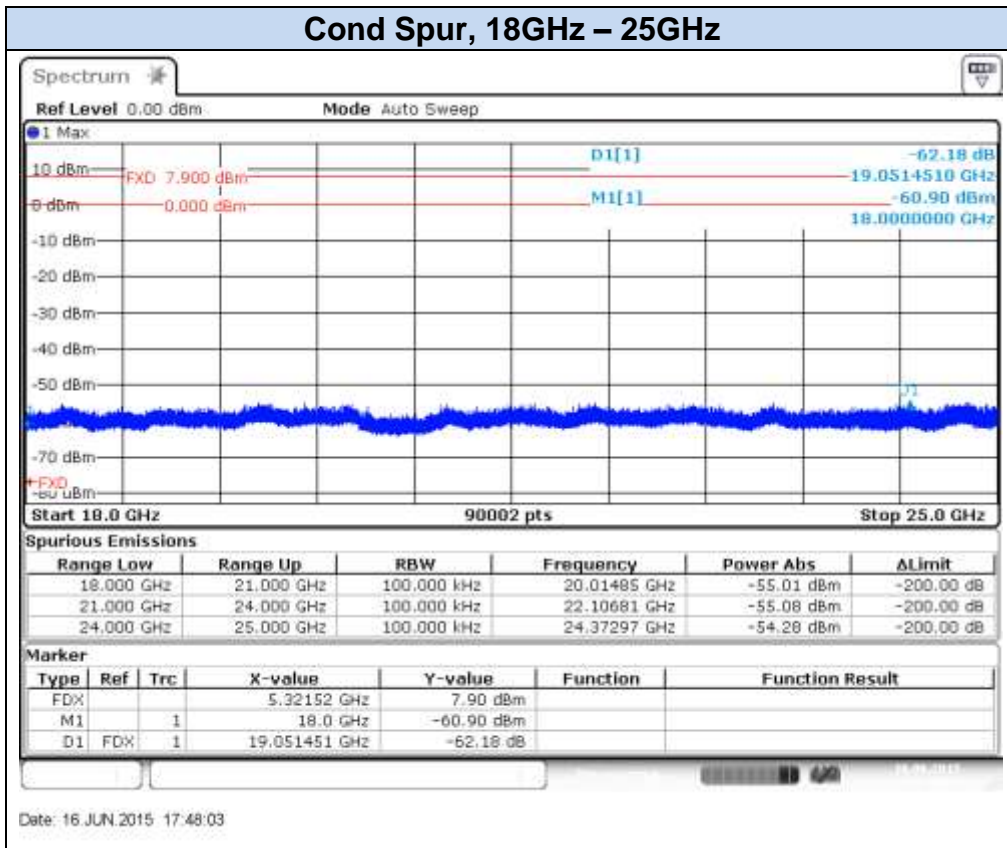
802.11g, 6Mbps – Chain B, CH11



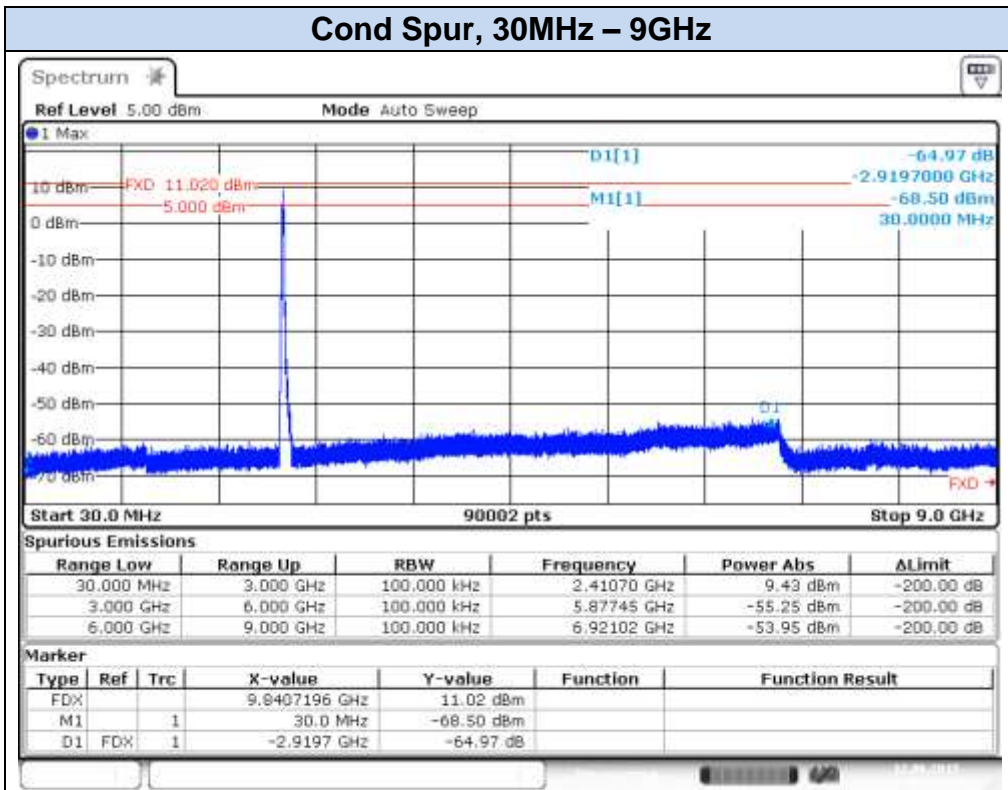
Date: 16 JUN 2015 17:43:09



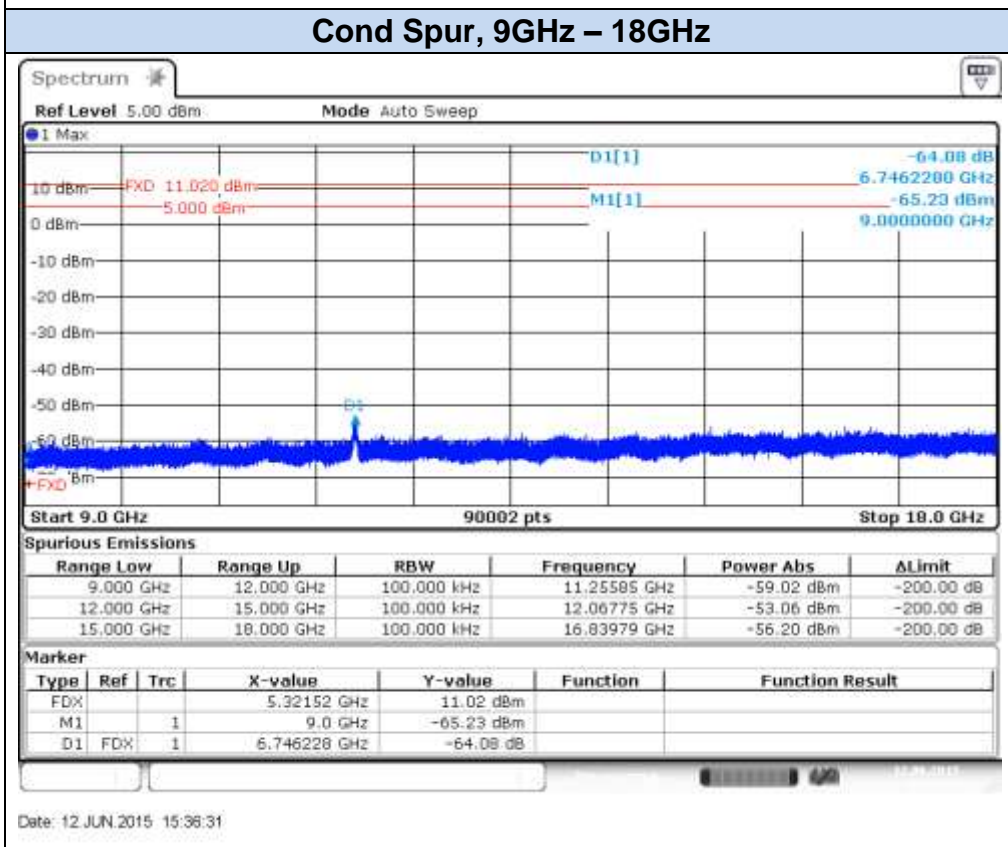
Date: 16 JUN 2015 17:46:36



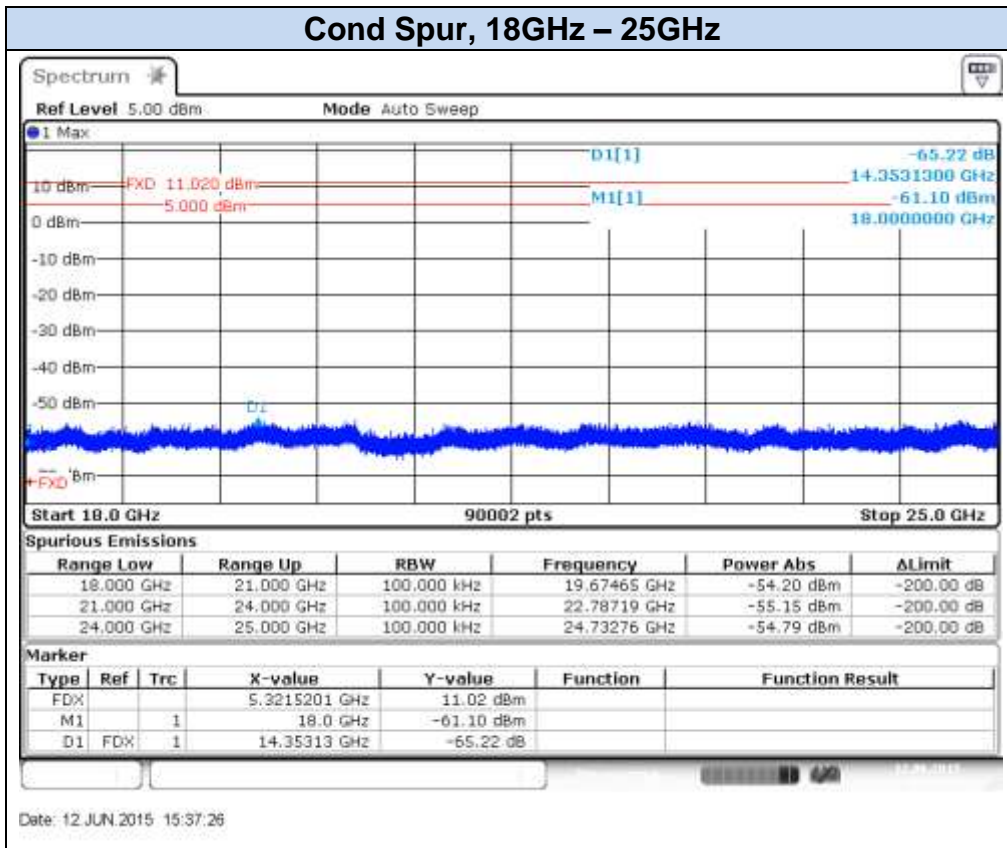
802.11n20, HT0 (SISO) – Chain A, CH1



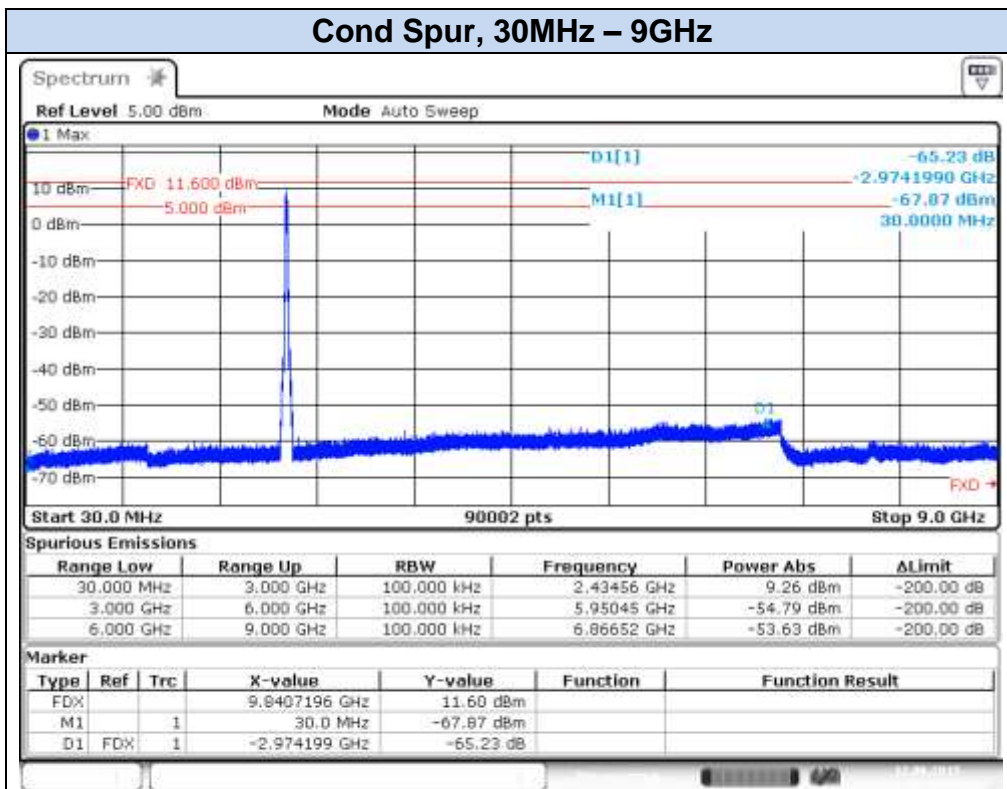
Date: 12 JUN 2015 15:35:41



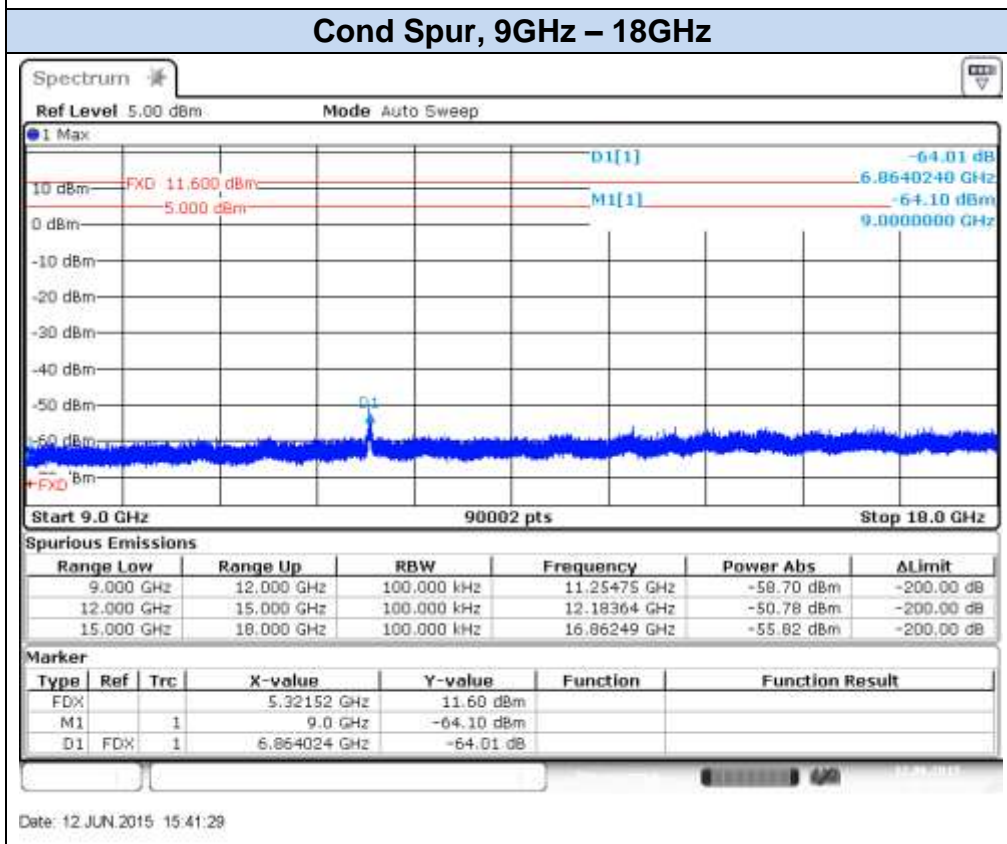
Date: 12 JUN 2015 15:36:31



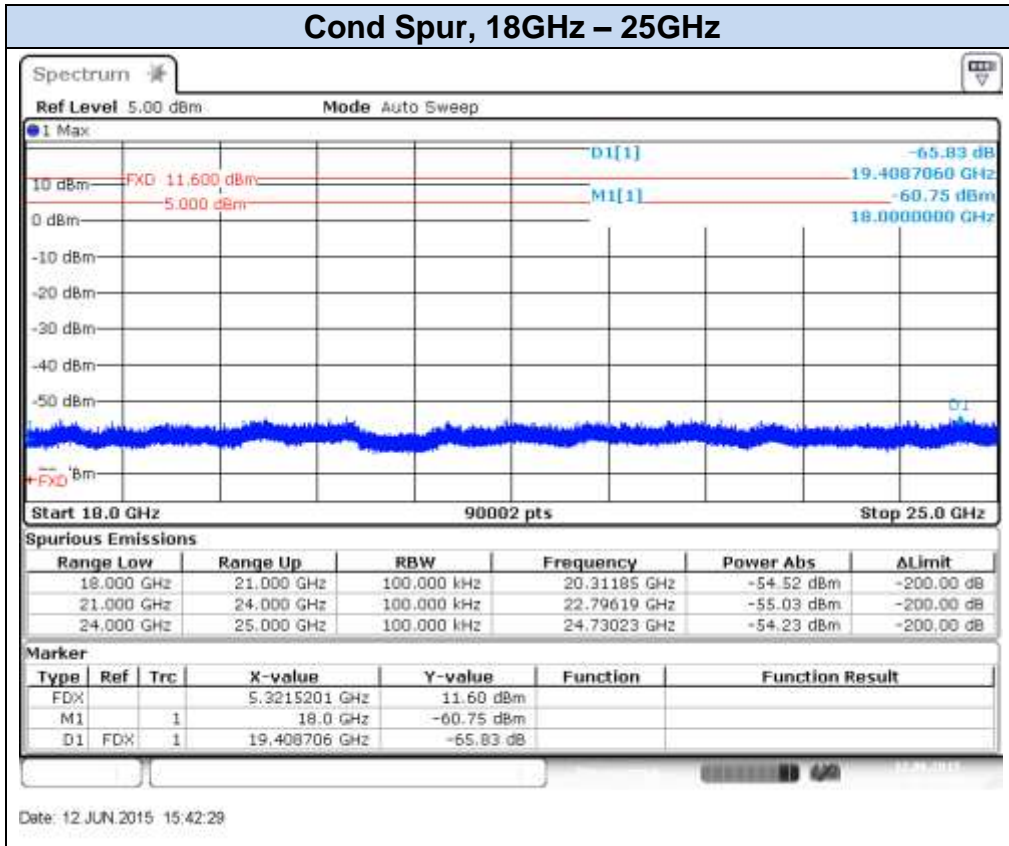
802.11n20, HT0 (SISO) – Chain A, CH6



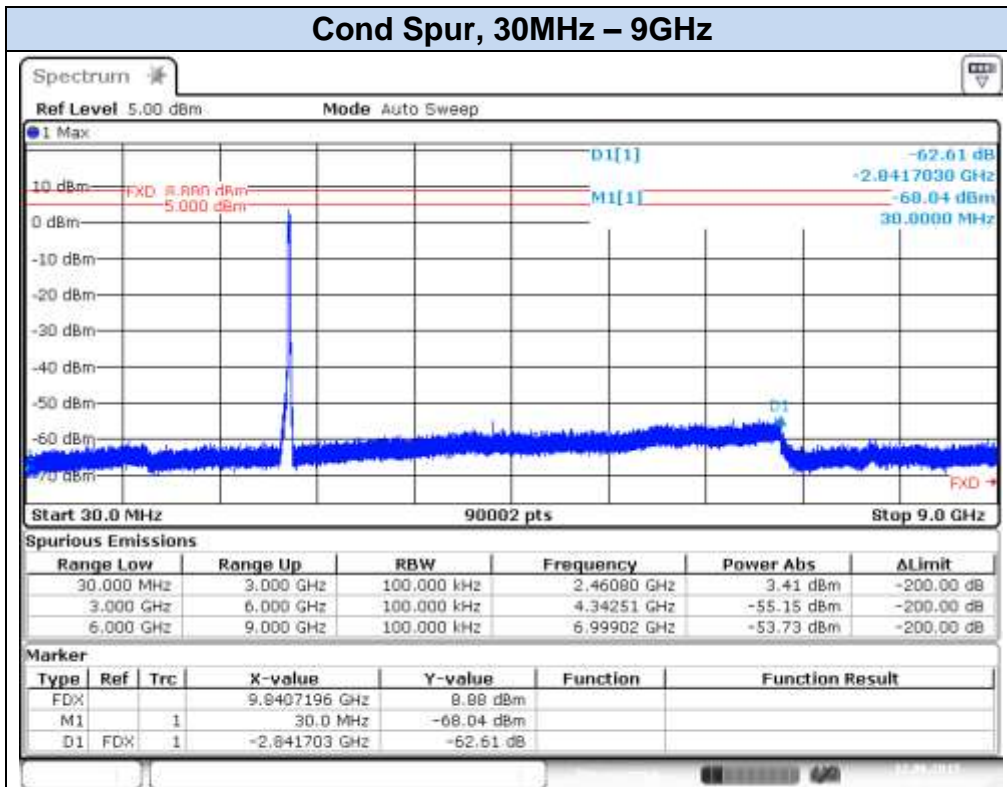
Date: 12 JUN 2015 15:40:26



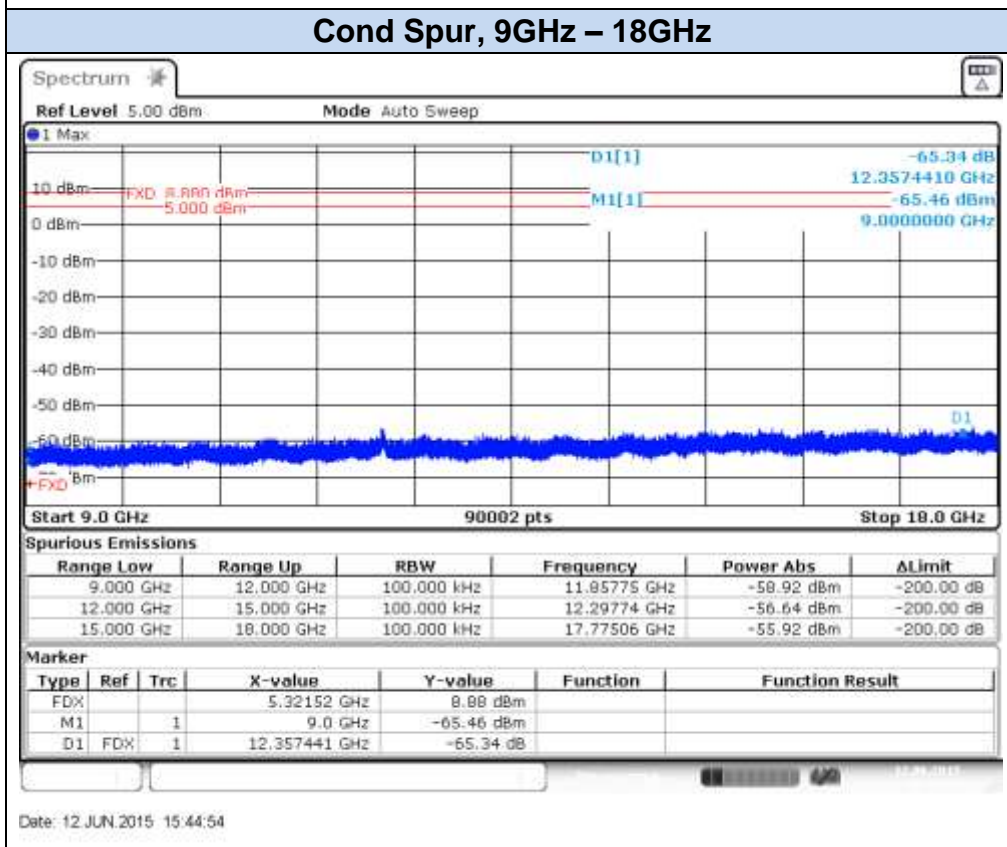
Date: 12 JUN 2015 15:41:29



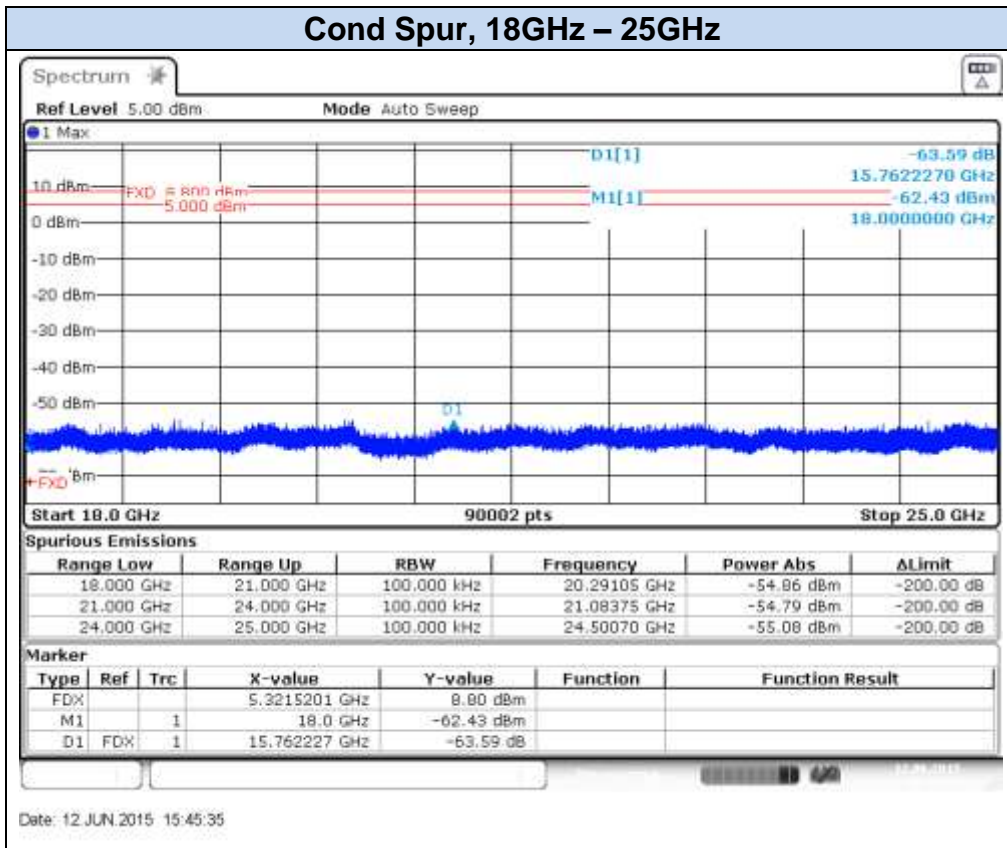
802.11n20, HT0 (SISO) – Chain A, CH11



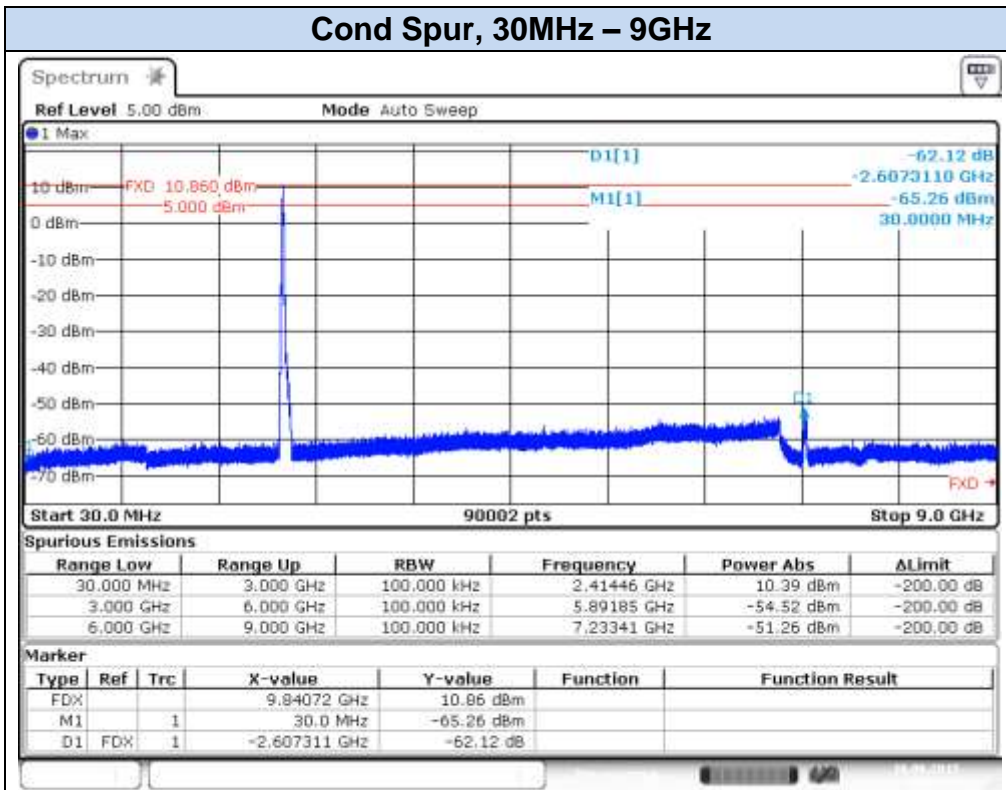
Date: 12 JUN 2015 15:43:51



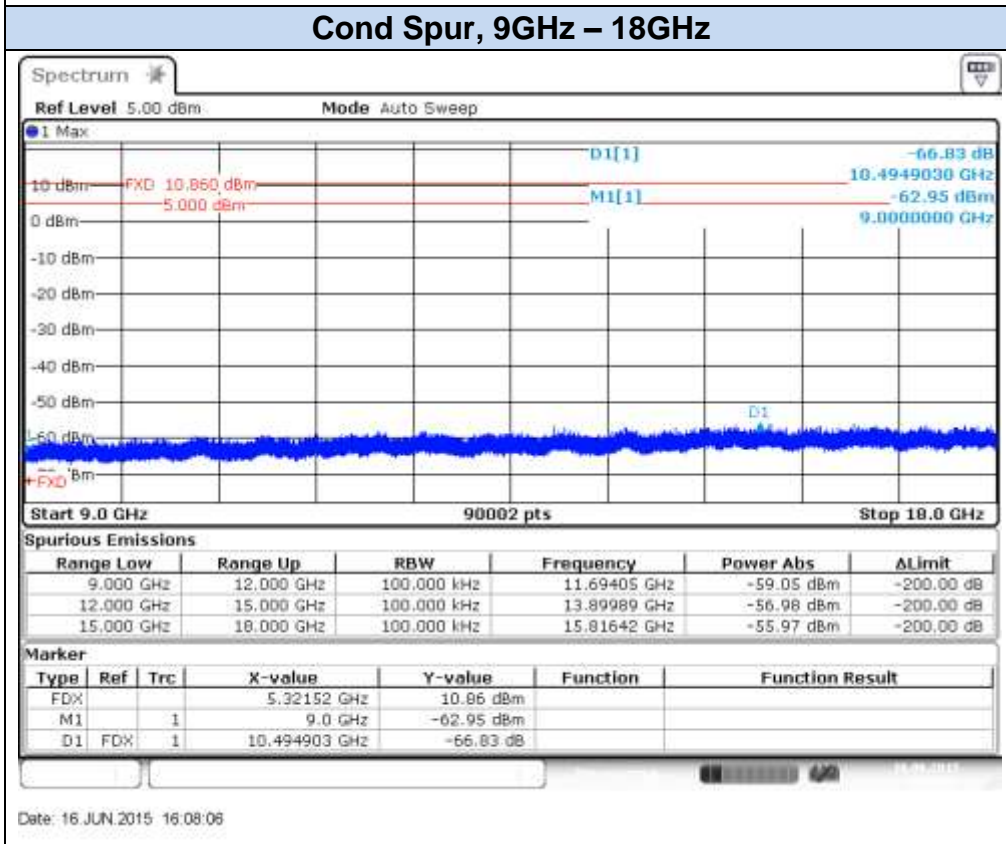
Date: 12 JUN 2015 15:44:54



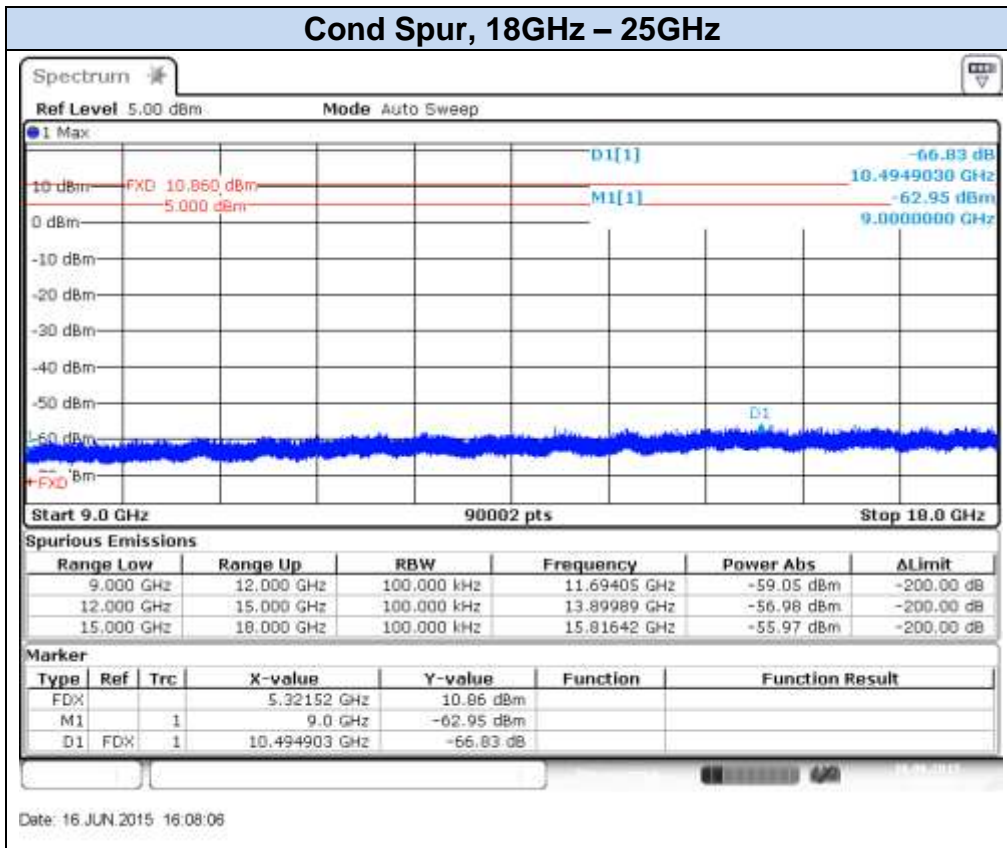
802.11n20, HT0 (SISO) – Chain B, CH1



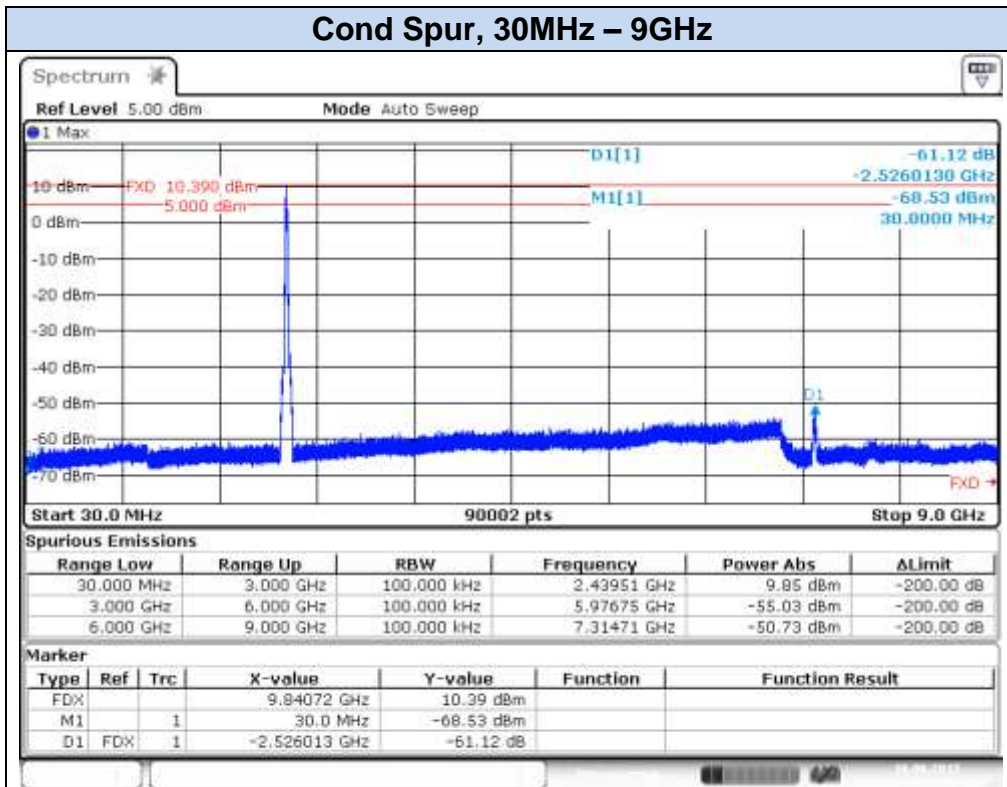
Date: 16 JUN 2015 16:07:01



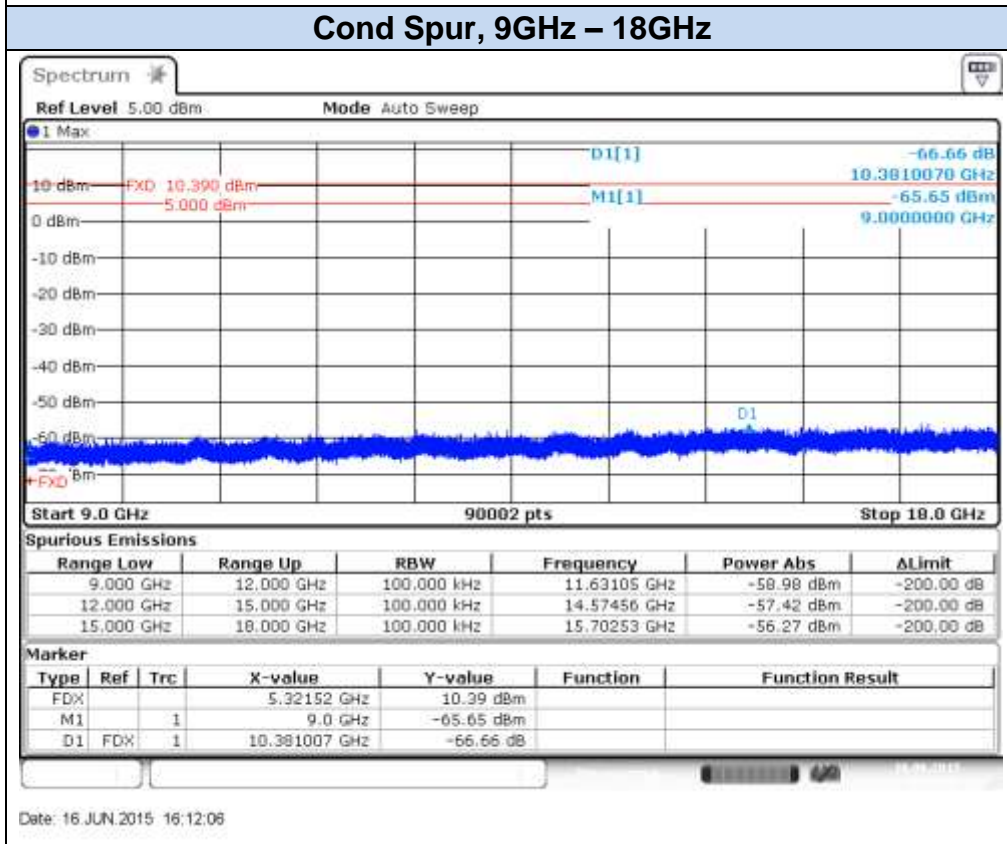
Date: 16 JUN 2015 16:08:06



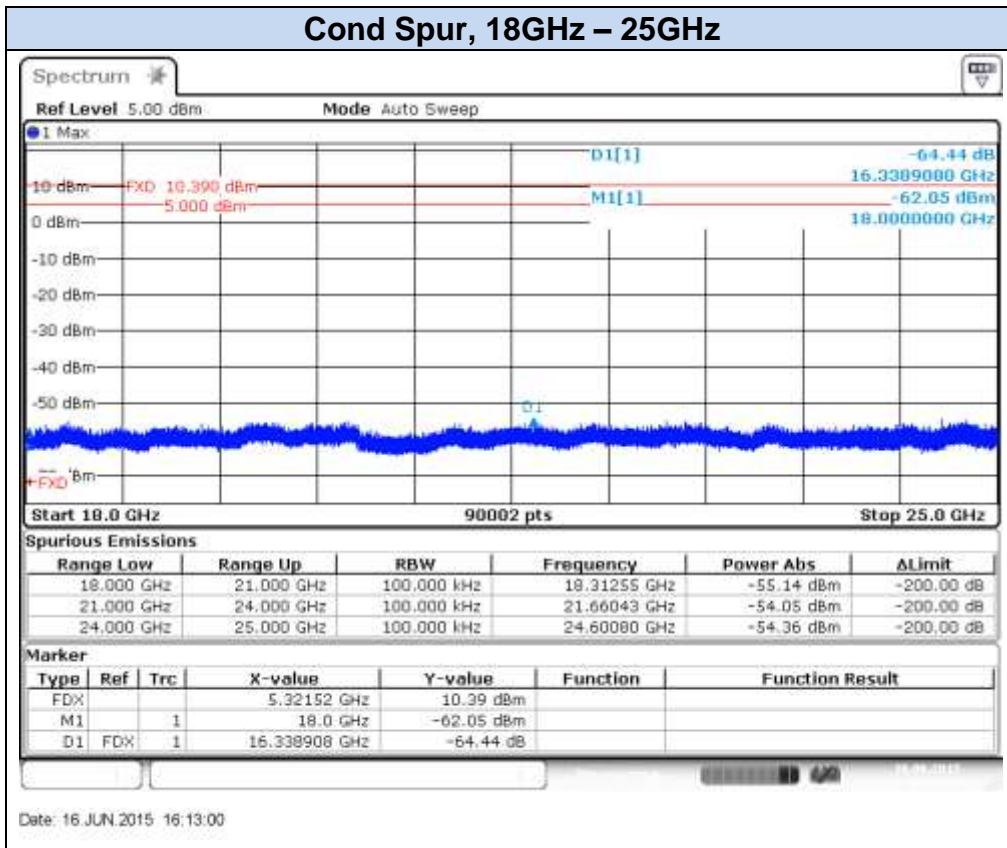
802.11n20, HT0 (SISO) – Chain B, CH6



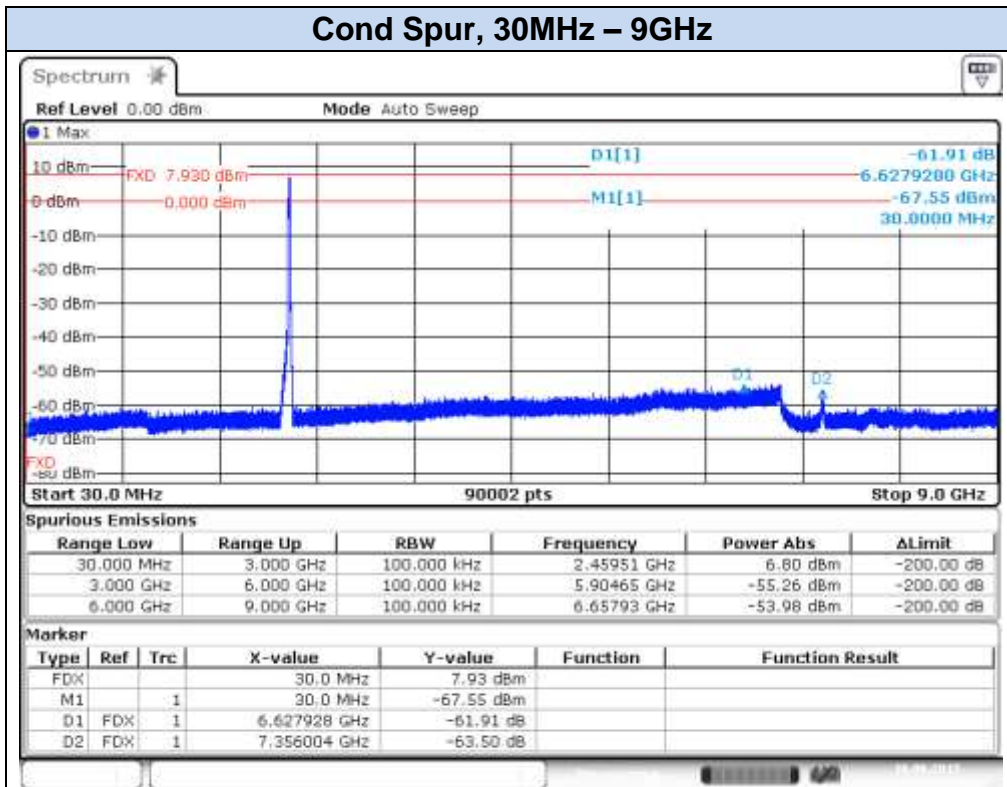
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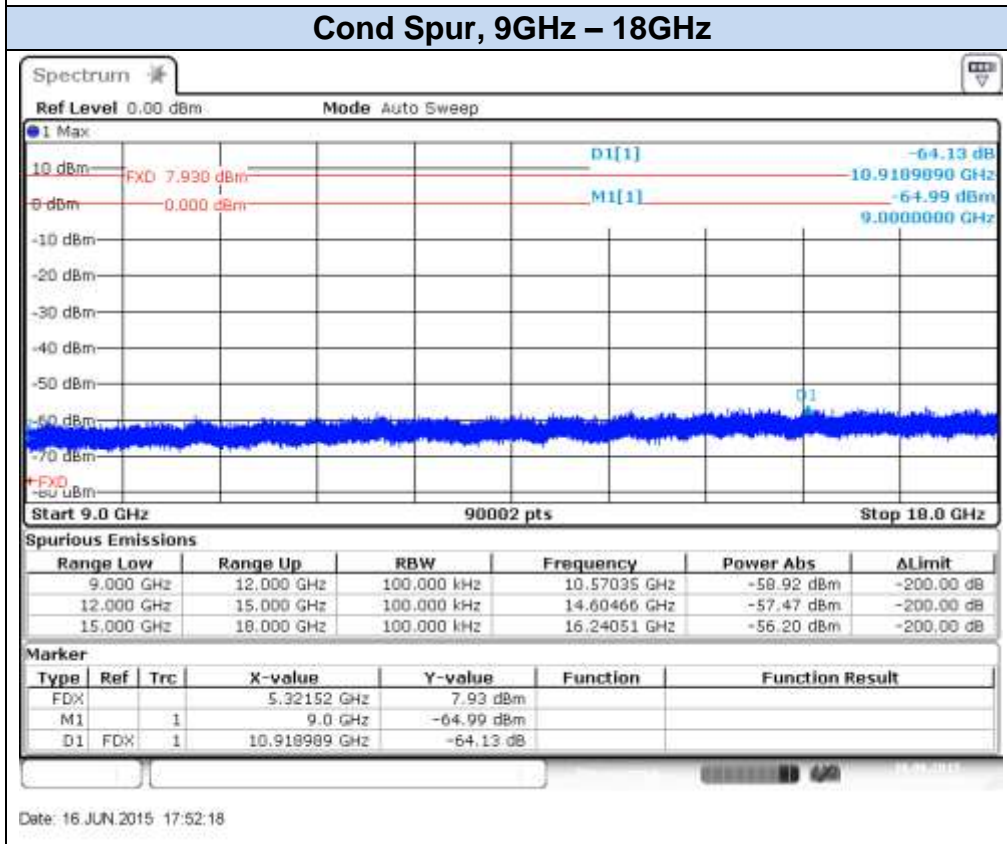
Date: 16 JUN 2015 16:12:06



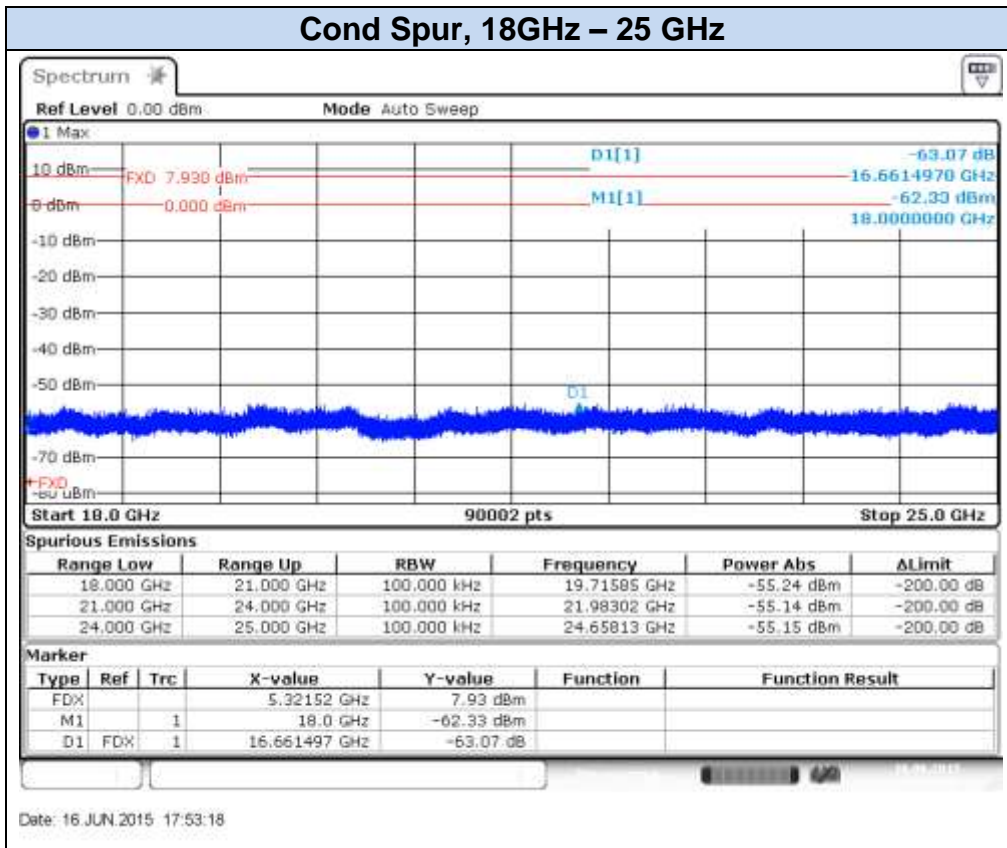
802.11n20, HT0 (SISO) – Chain B, CH11



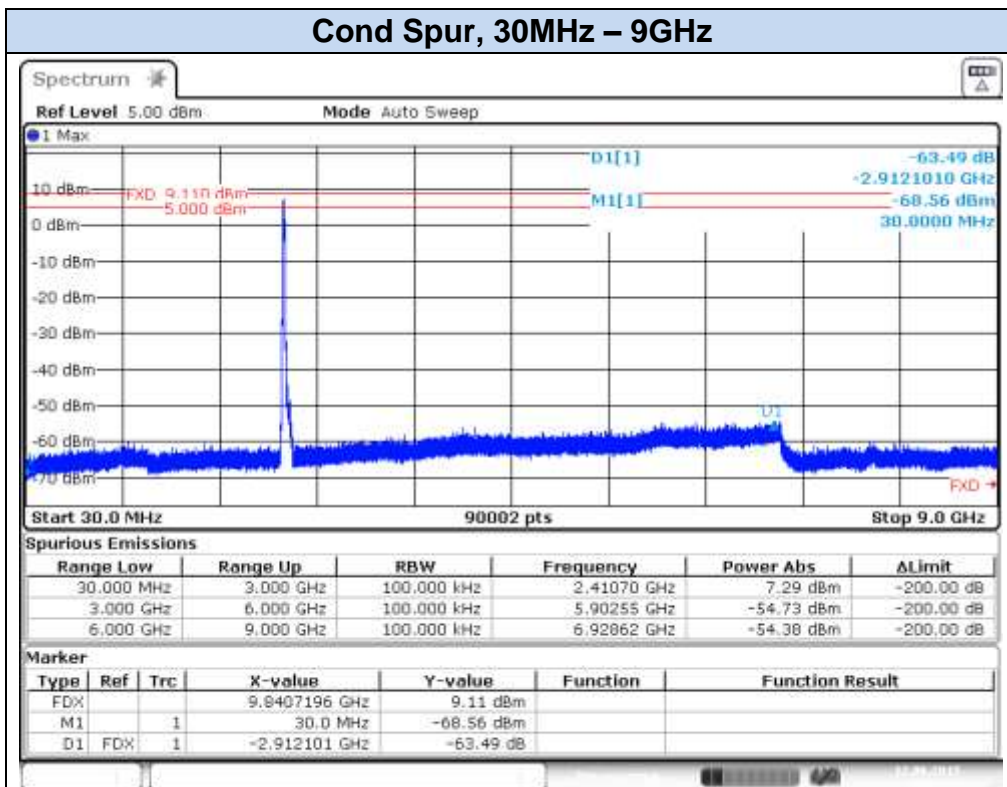
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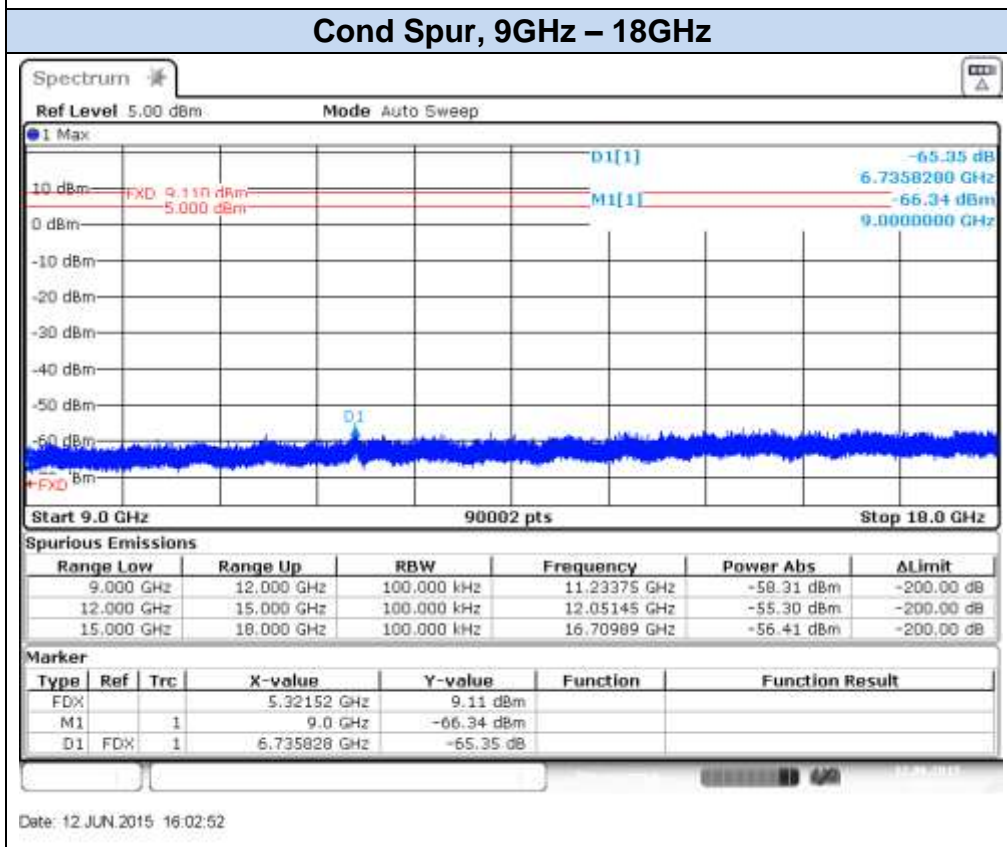
Date: 16 JUN 2015 17:52:18



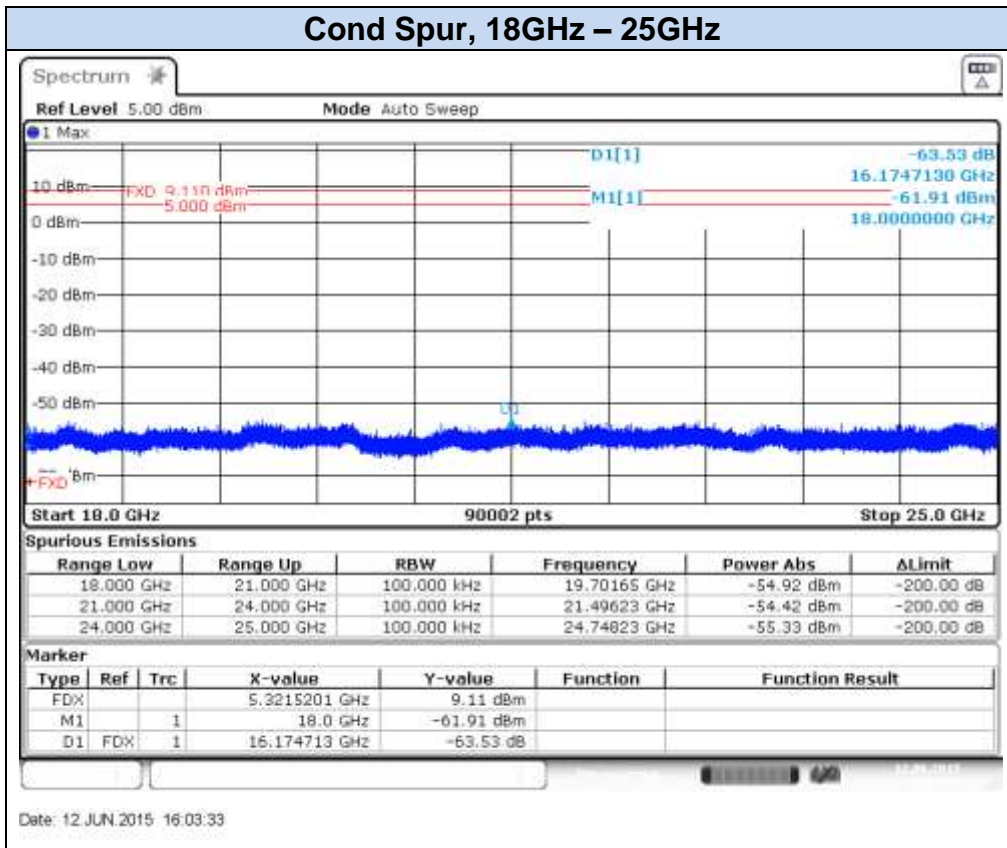
802.11n20, HT8 (MIMO) – Chain A, CH1



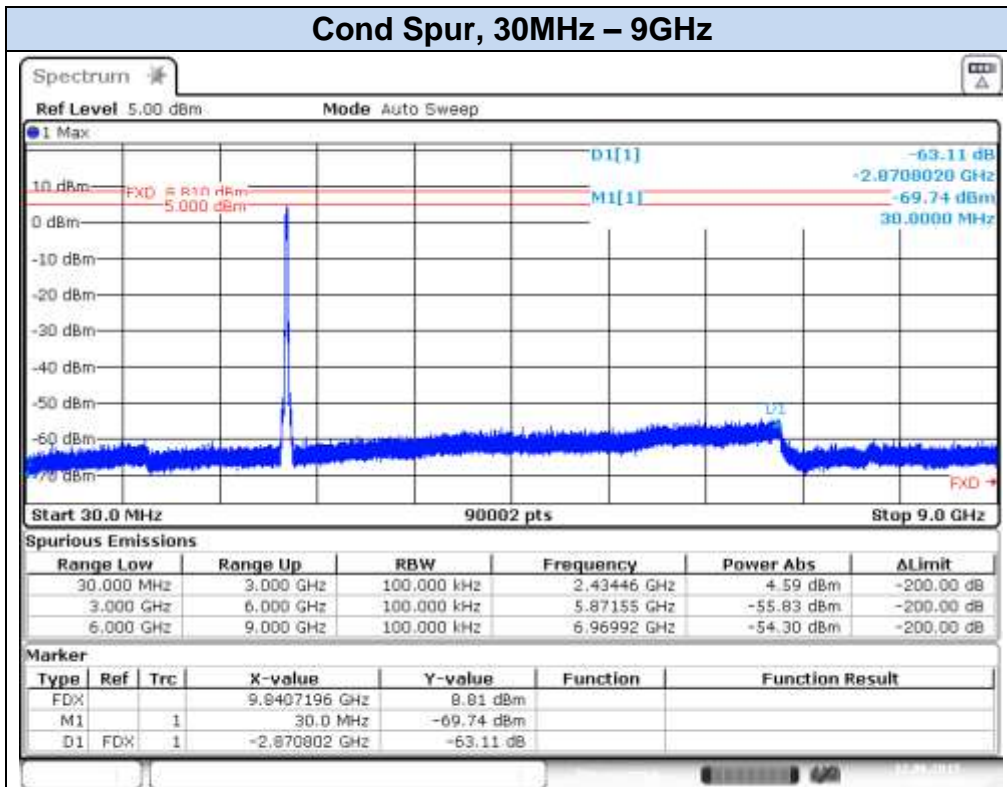
Date: 12 JUN 2015 16:01:22



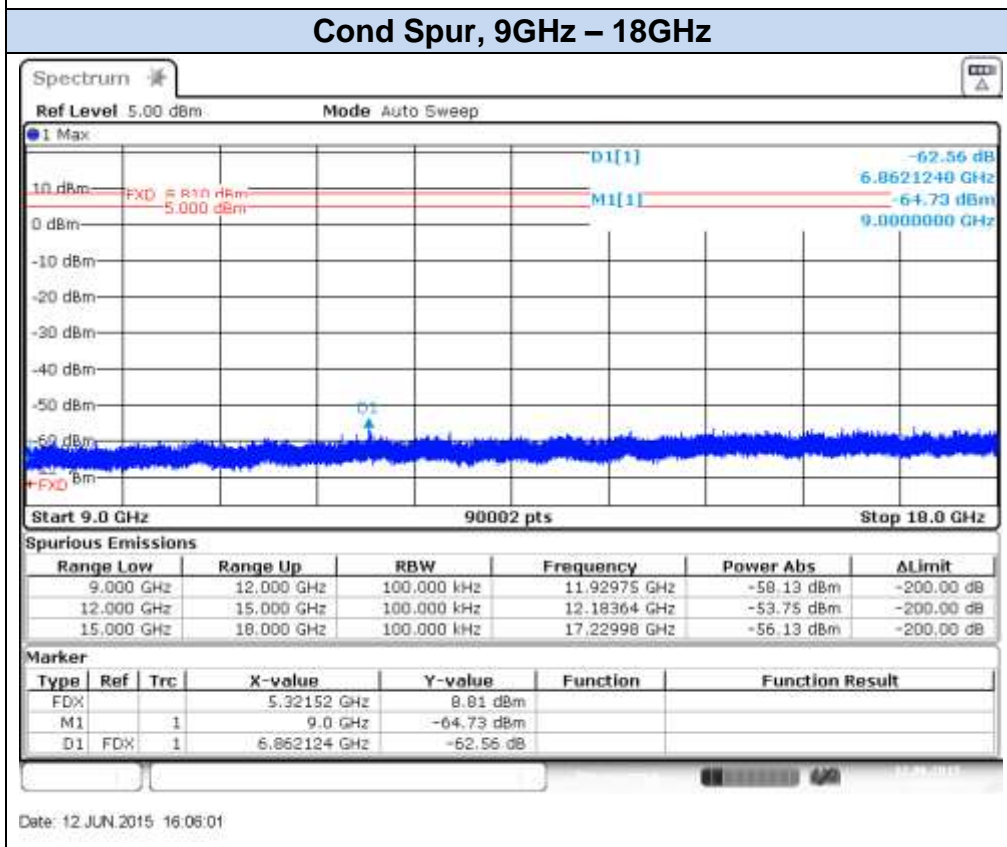
Date: 12 JUN 2015 16:02:52



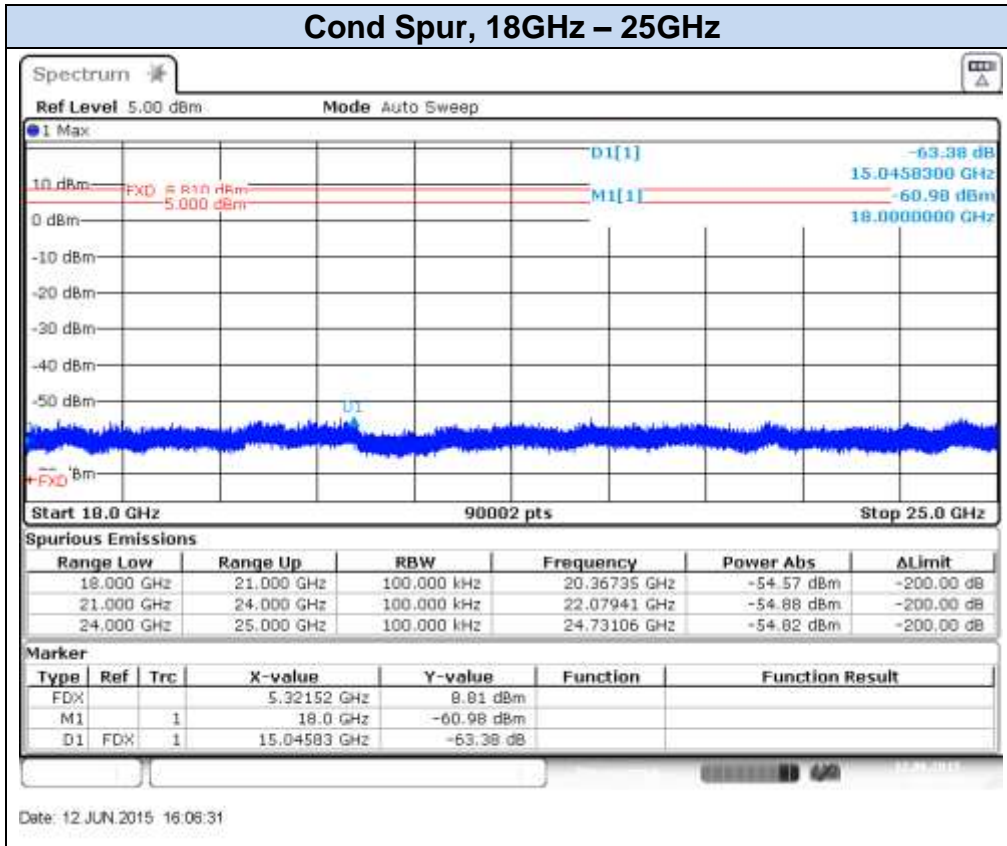
802.11n20, HT8 (MIMO) – Chain A, CH6



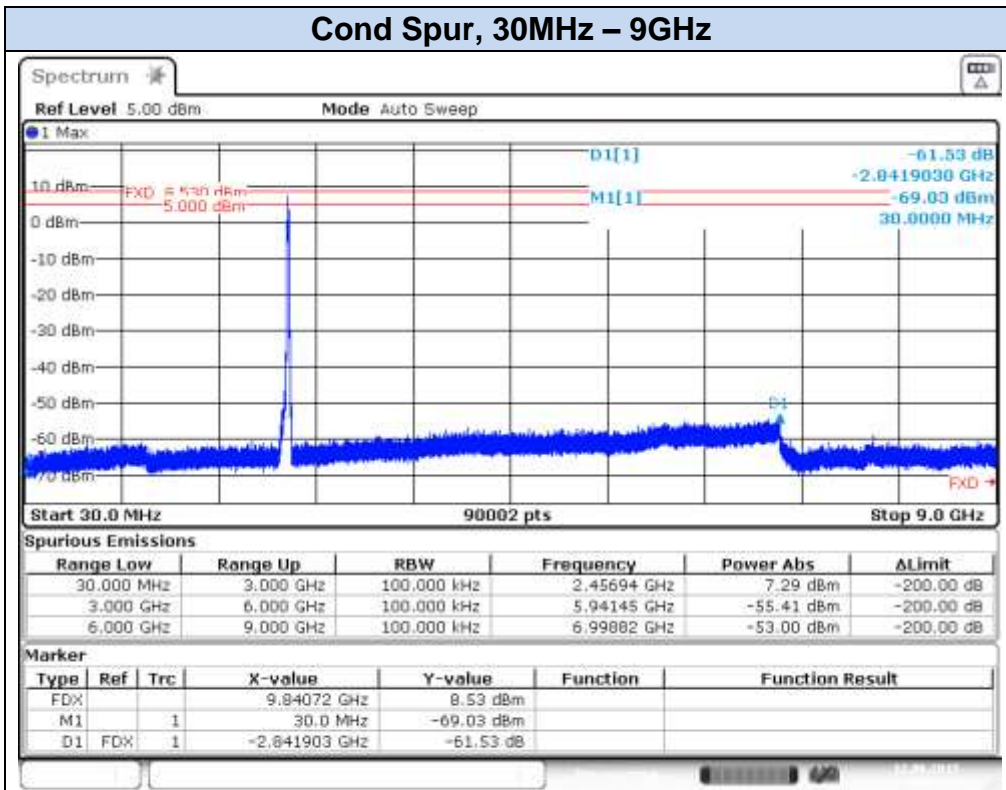
Date: 12 JUN 2015 16:04:50



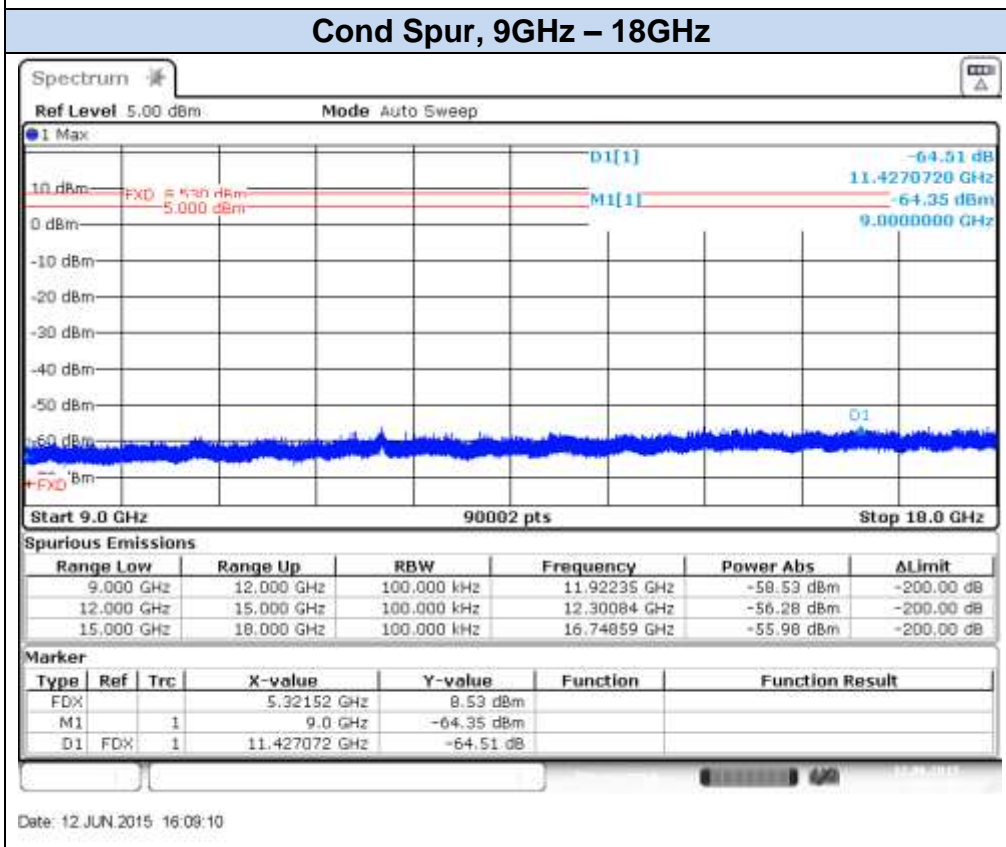
Date: 12 JUN 2015 16:06:01



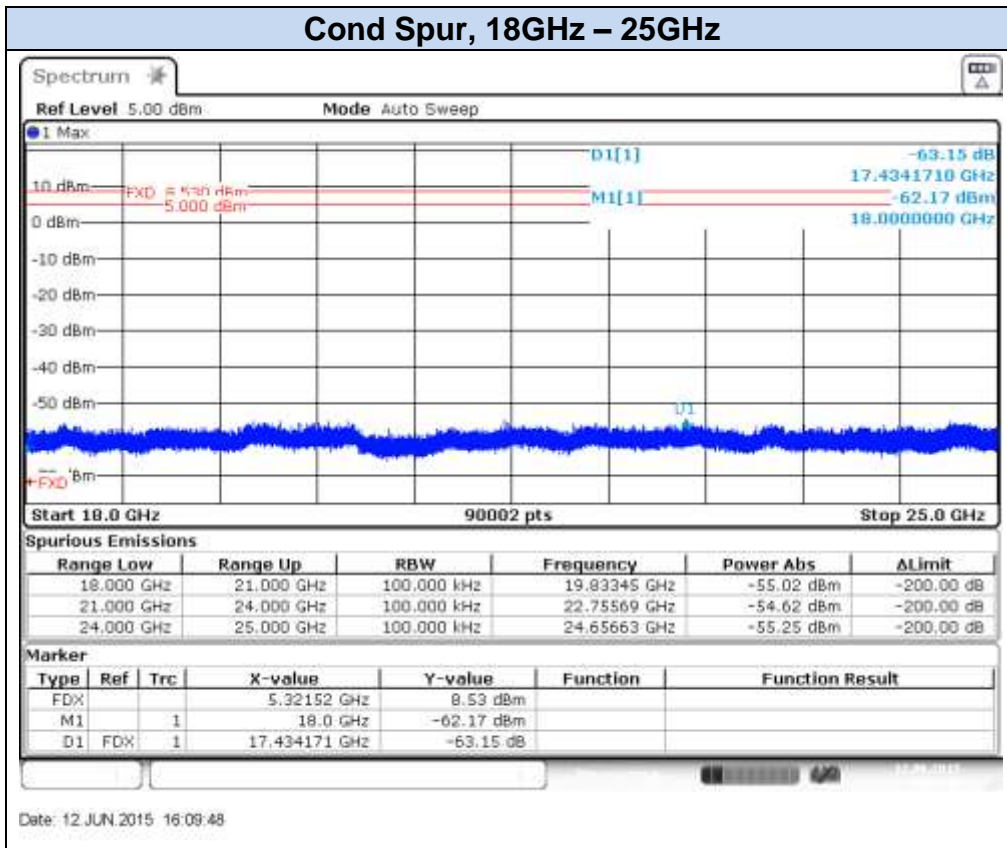
802.11n20, HT8 (MIMO) – Chain A, CH11



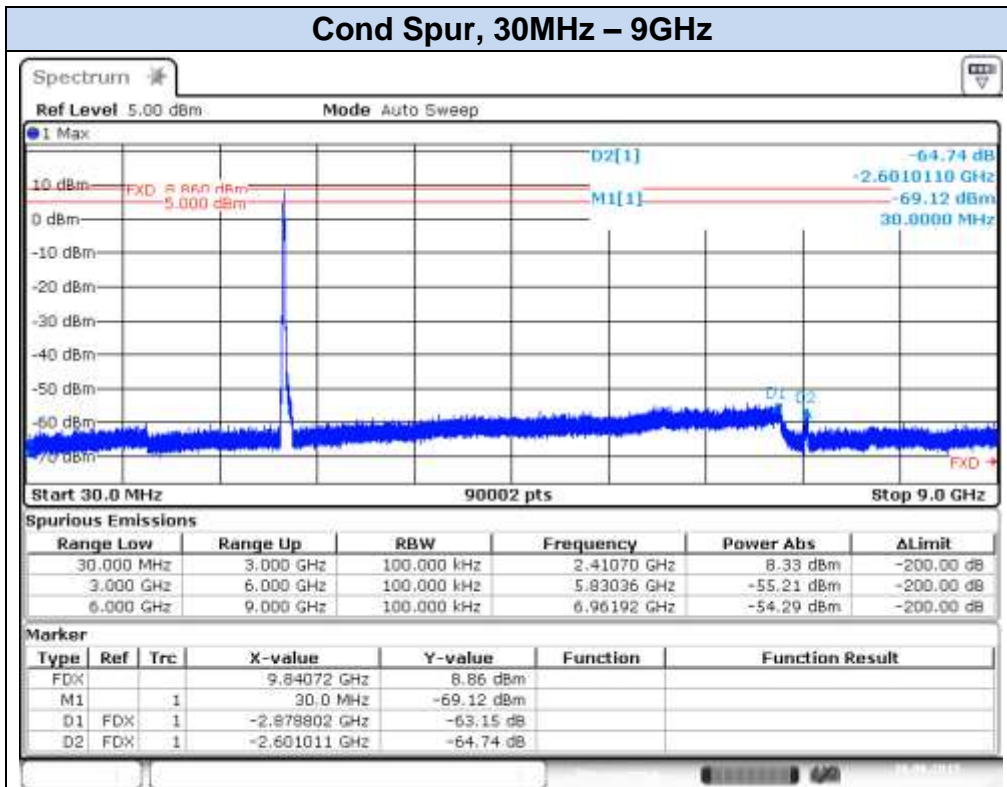
Date: 12 JUN 2015 16:07:52



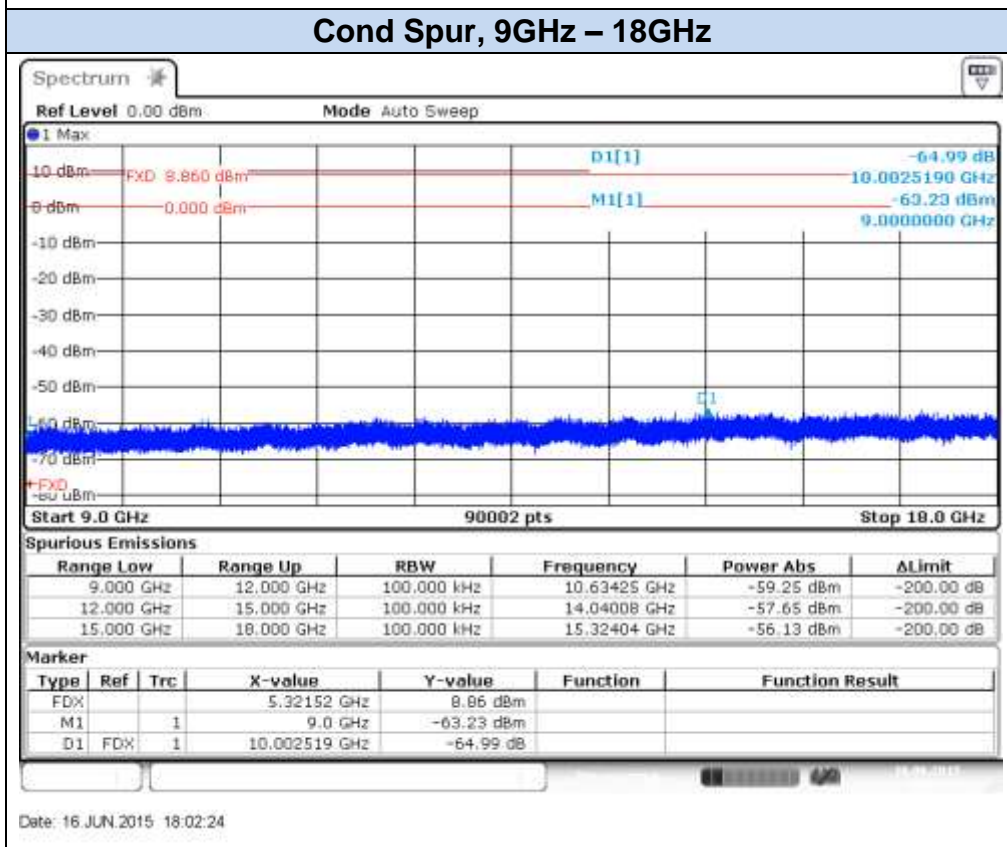
Date: 12 JUN 2015 16:08:10



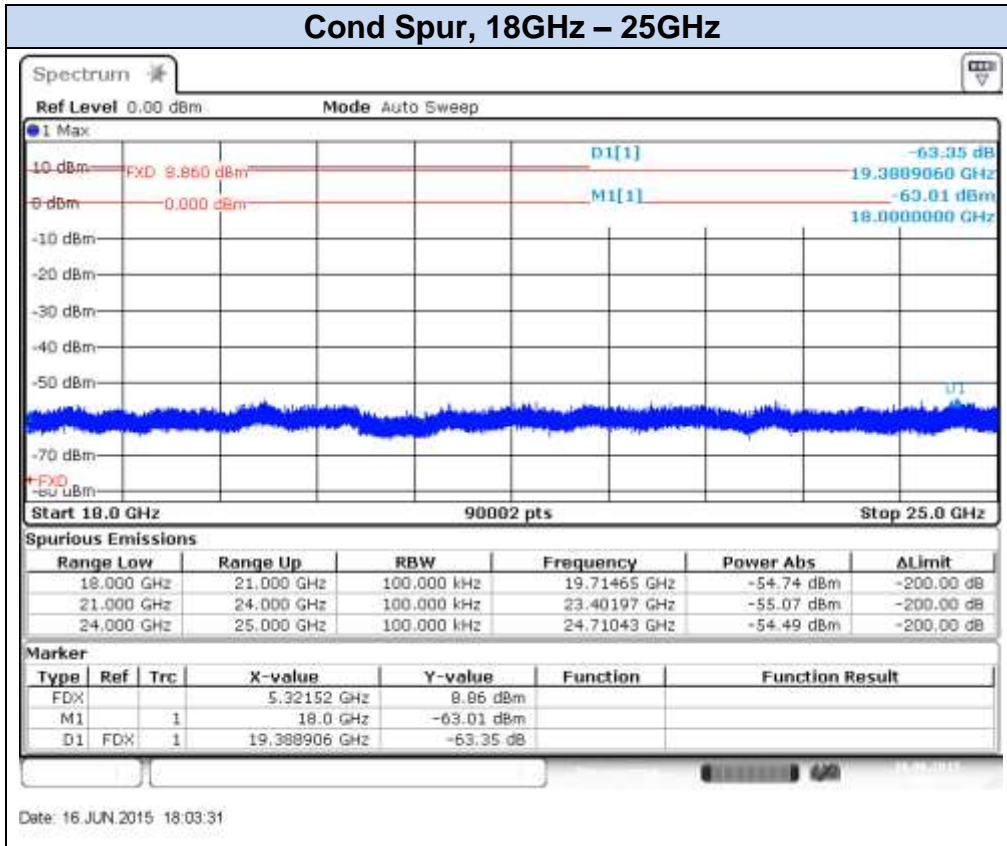
802.11n20, HT8 (MIMO) – Chain B, CH1



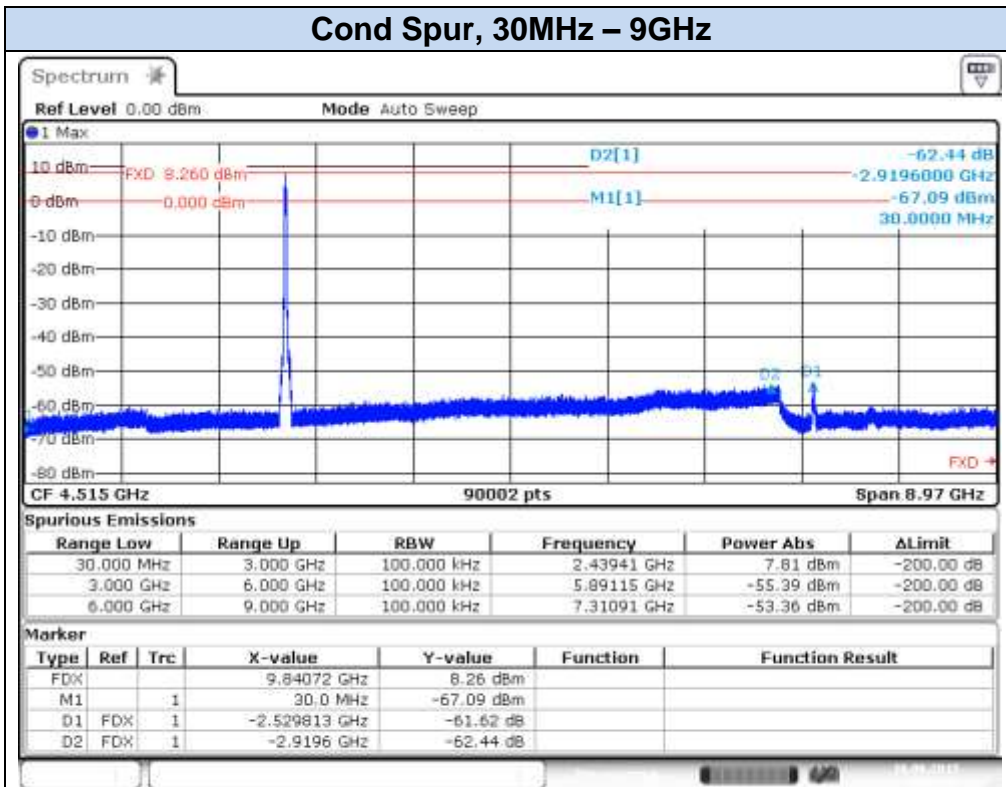
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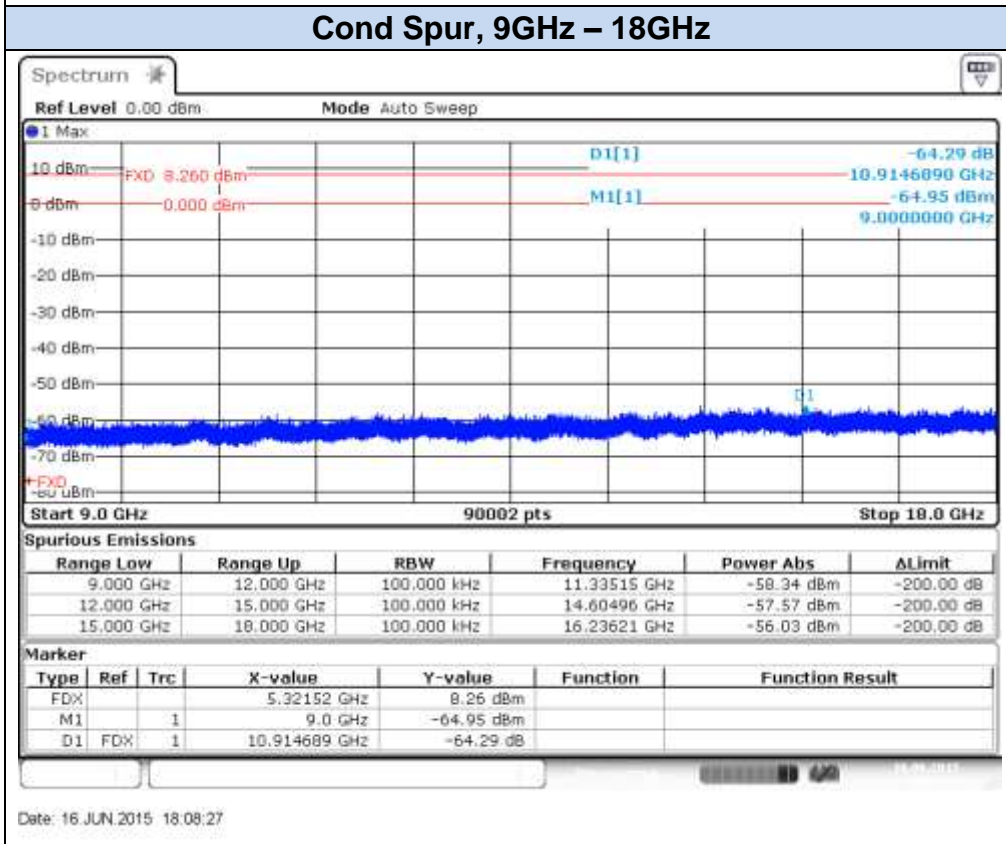
Date: 16 JUN 2015 18:02:24



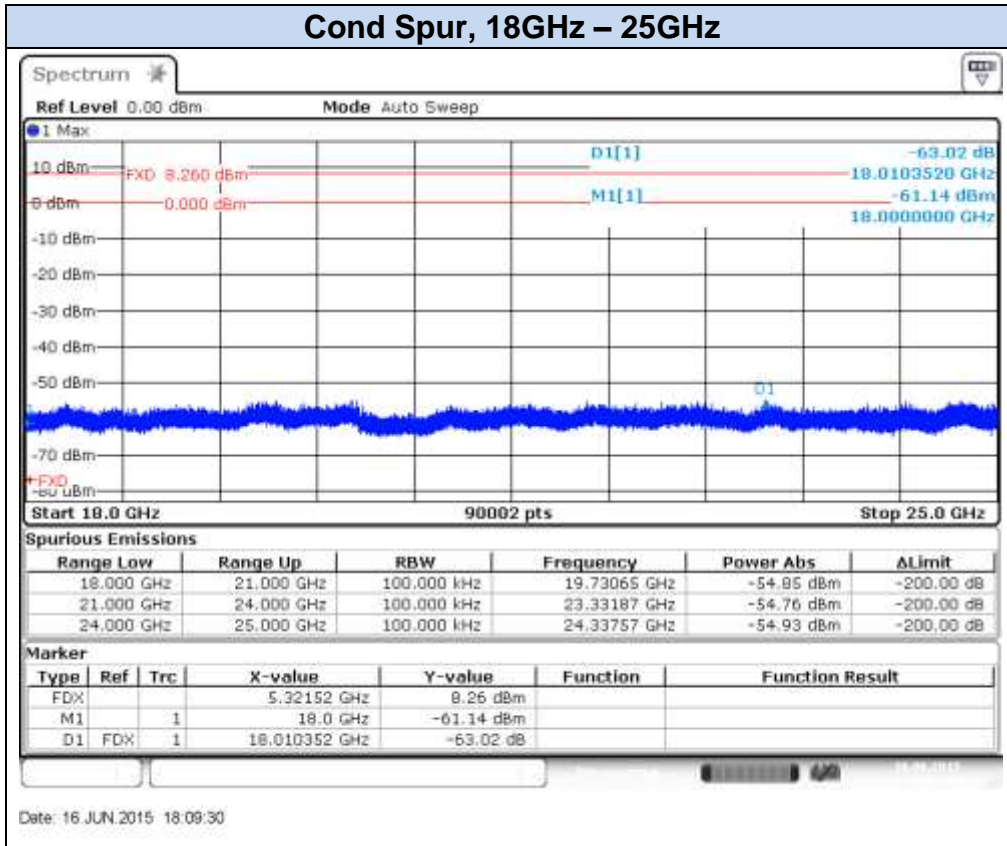
802.11n20, HT8 (MIMO) – Chain B, CH6



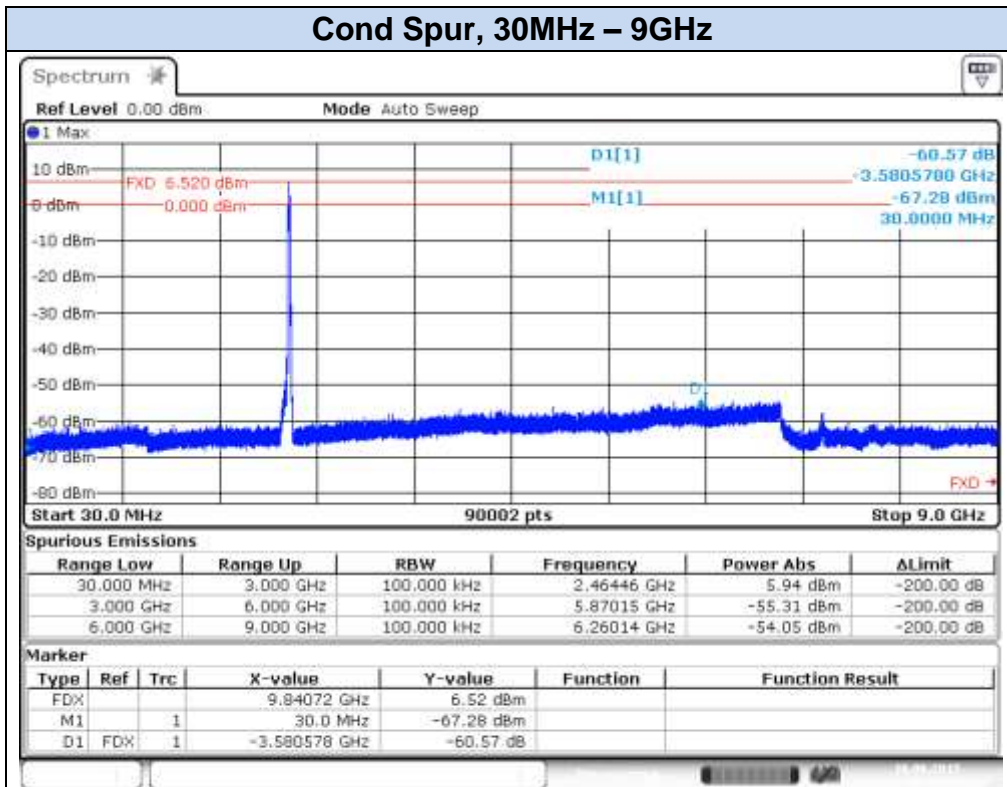
Date: 16 JUN 2015 18:07:15



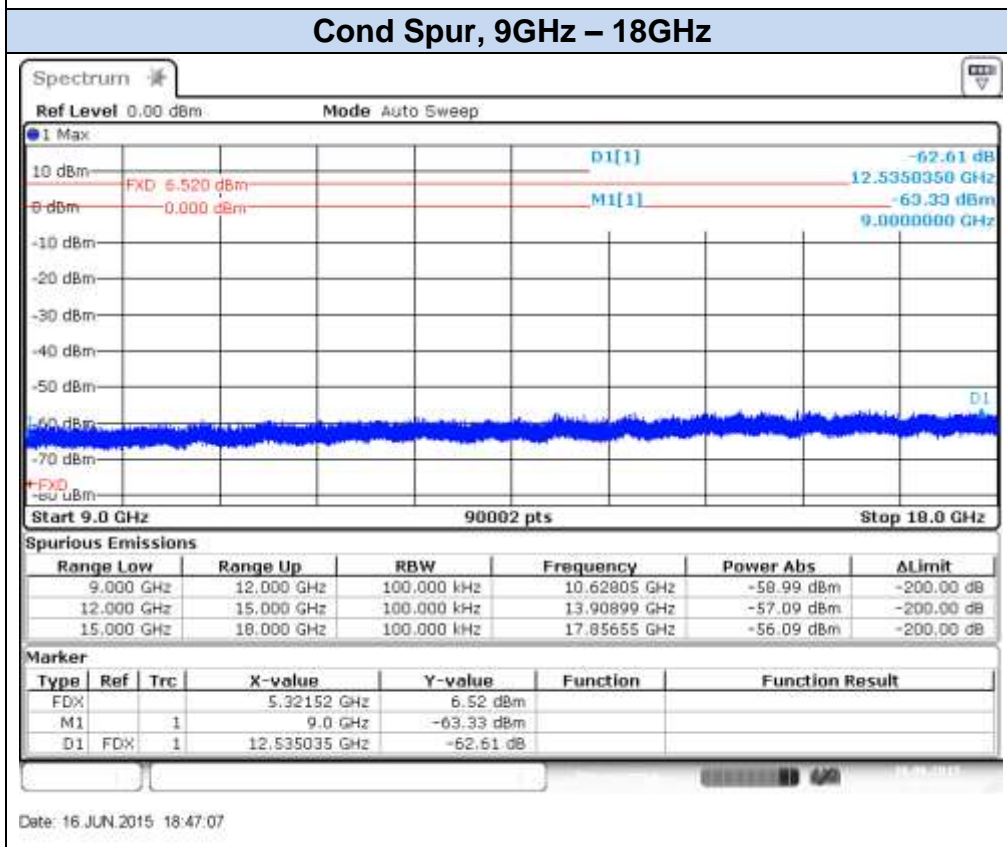
Date: 16 JUN 2015 18:08:27



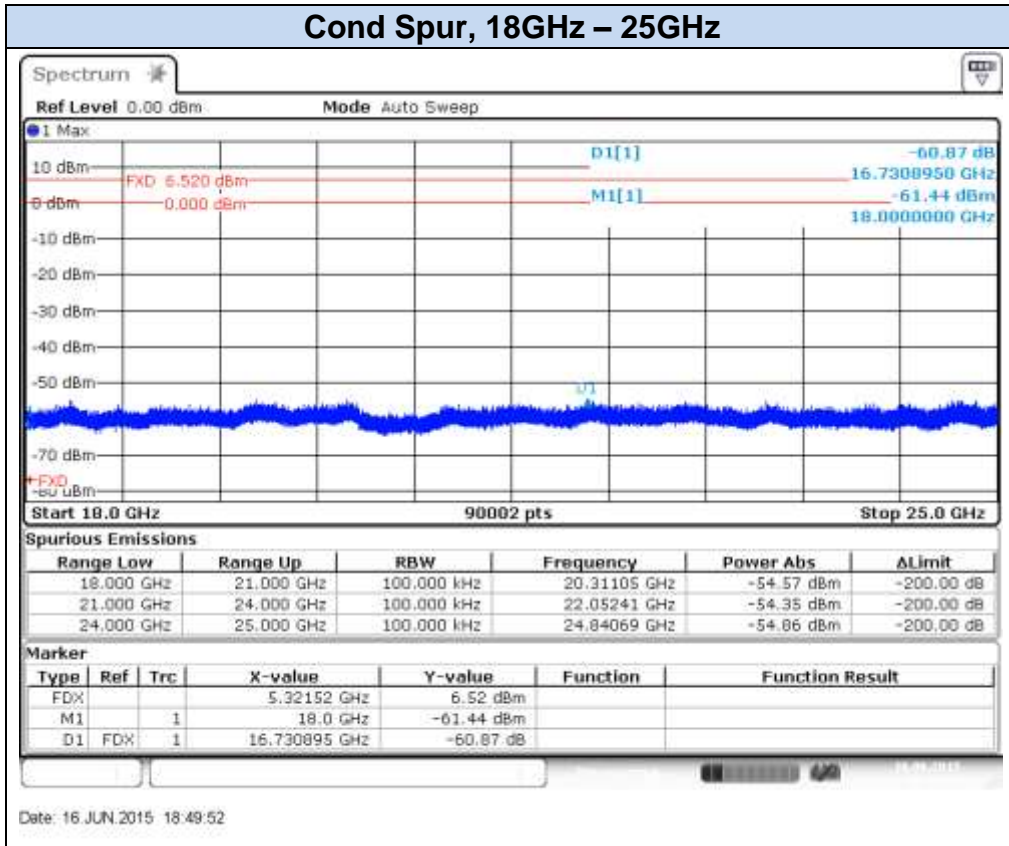
802.11n20, HT8 (MIMO) – Chain B, CH11



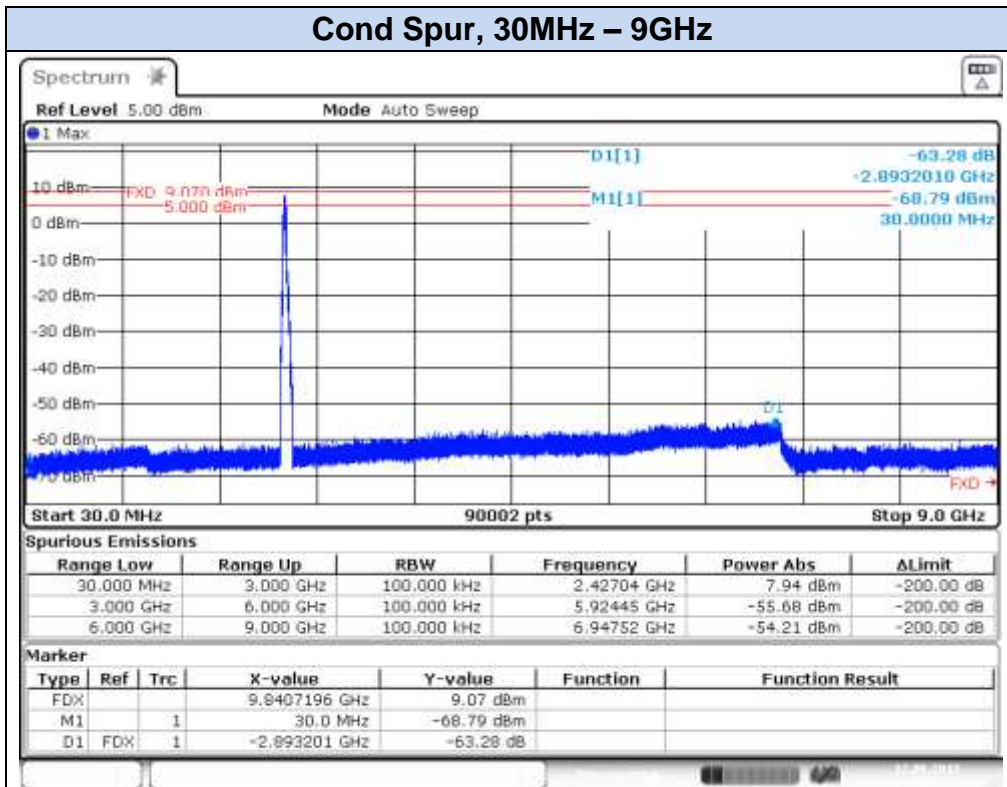
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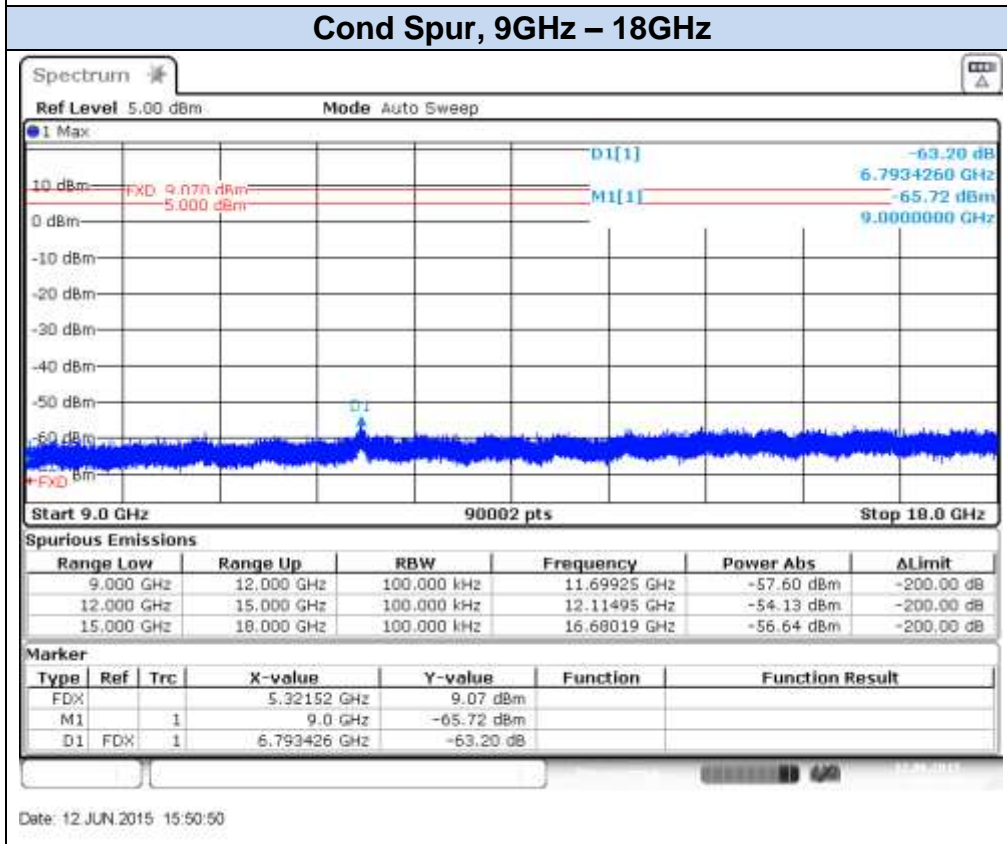
Date: 16 JUN 2015 18:47:07



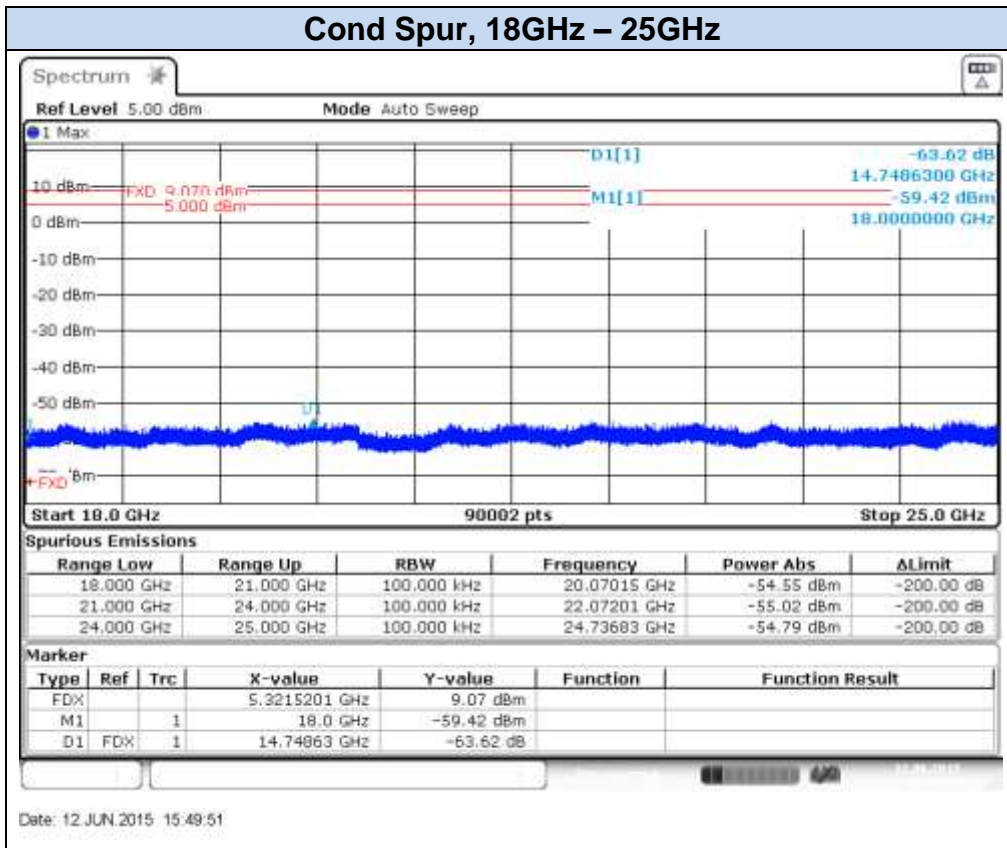
802.11n40, HT0 (SISO) – Chain A, CH3F



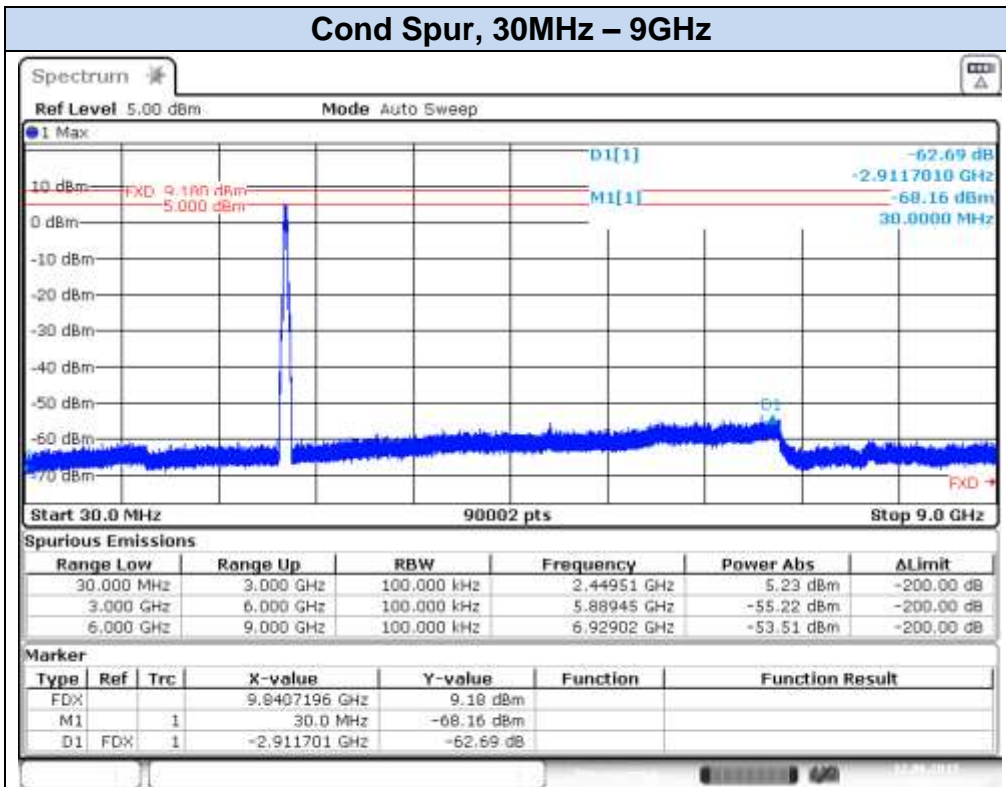
Date: 12 JUN 2015 15:50:25



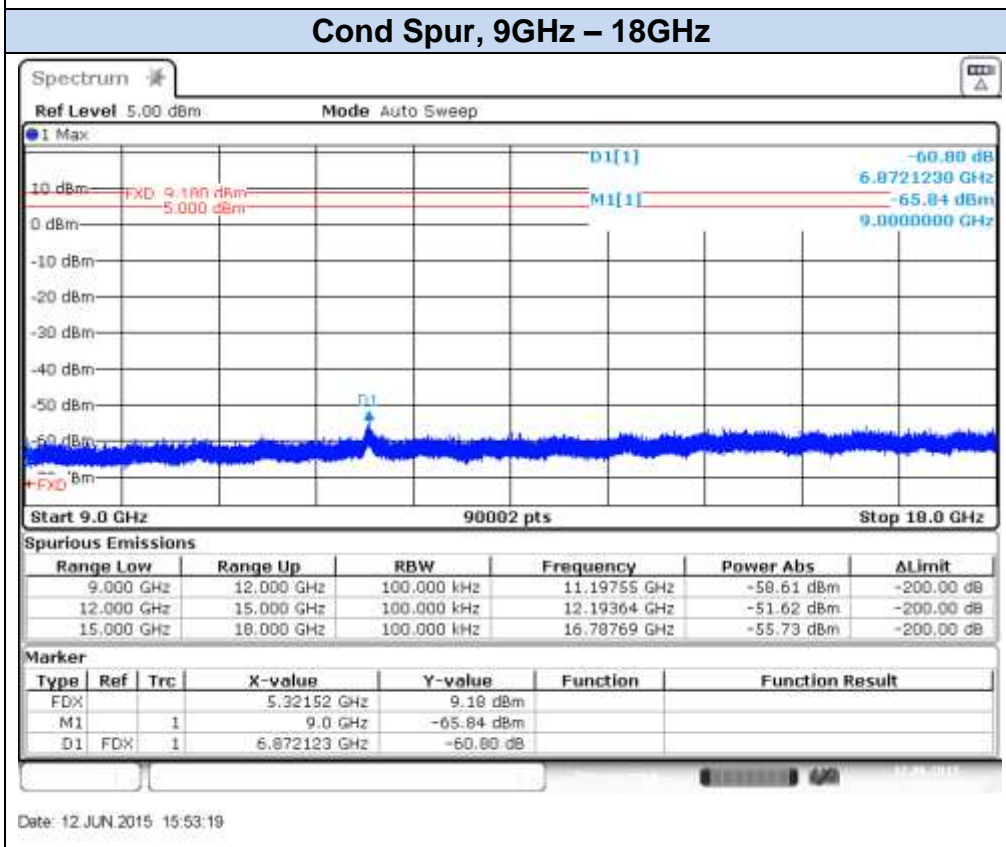
Date: 12 JUN 2015 15:50:50



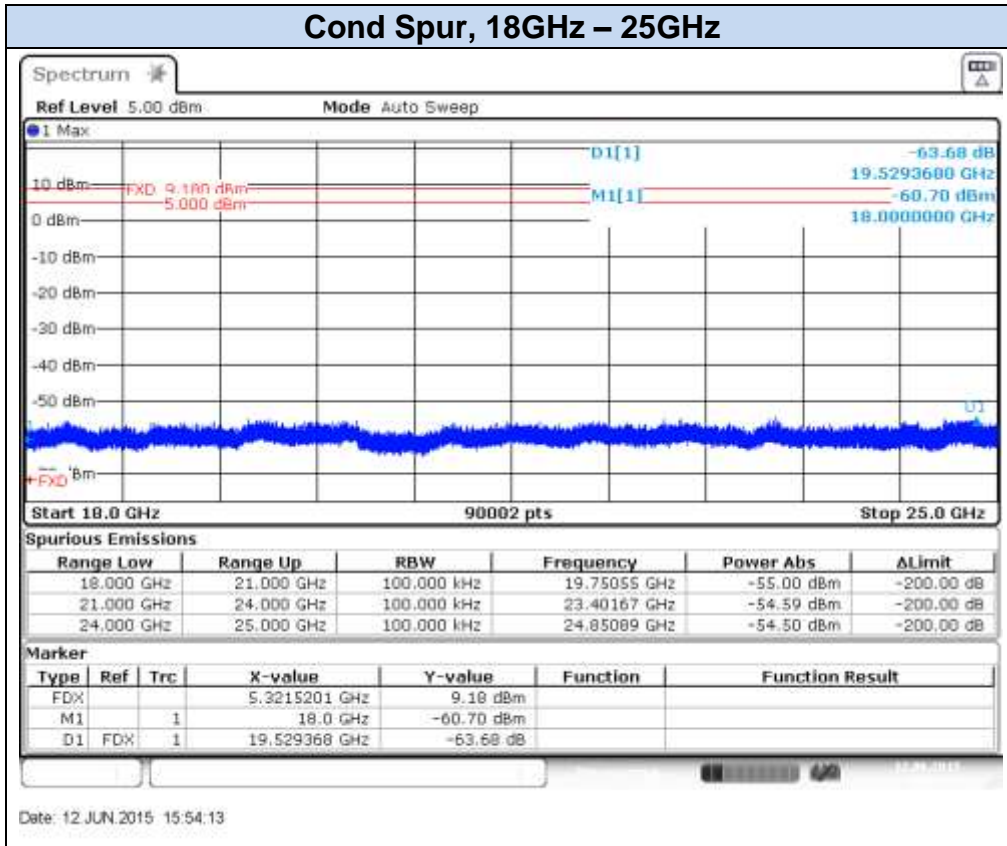
802.11n40, HT0 (SISO) – Chain A, CH6F



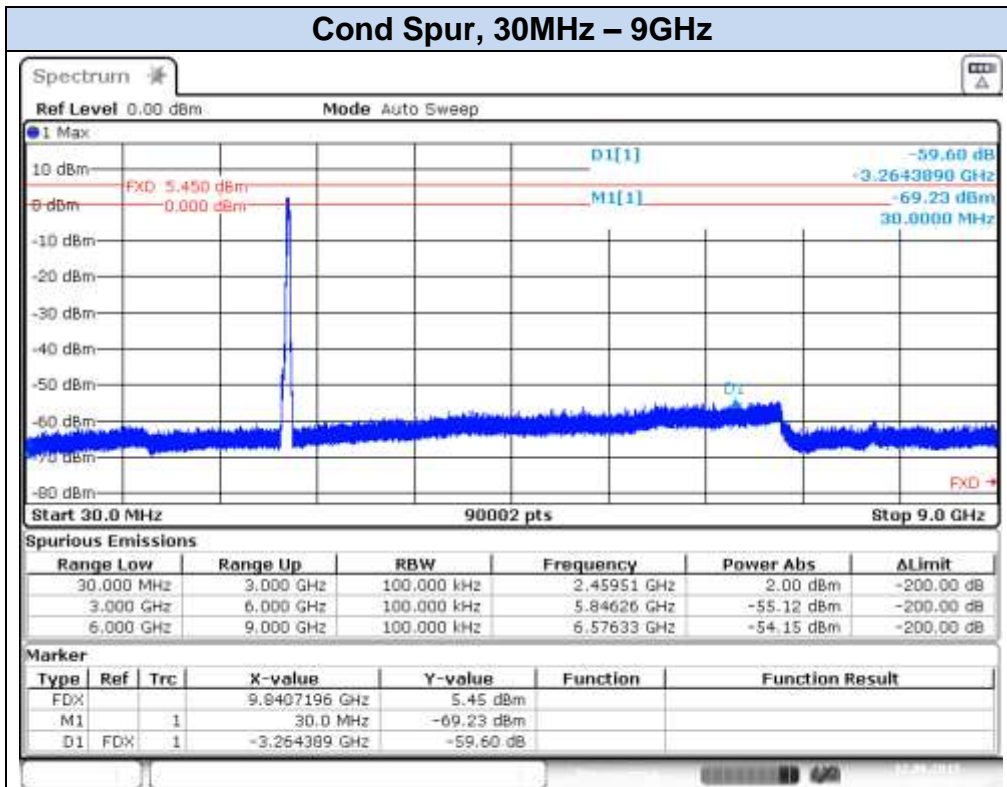
Date: 12 JUN 2015 15:51:57



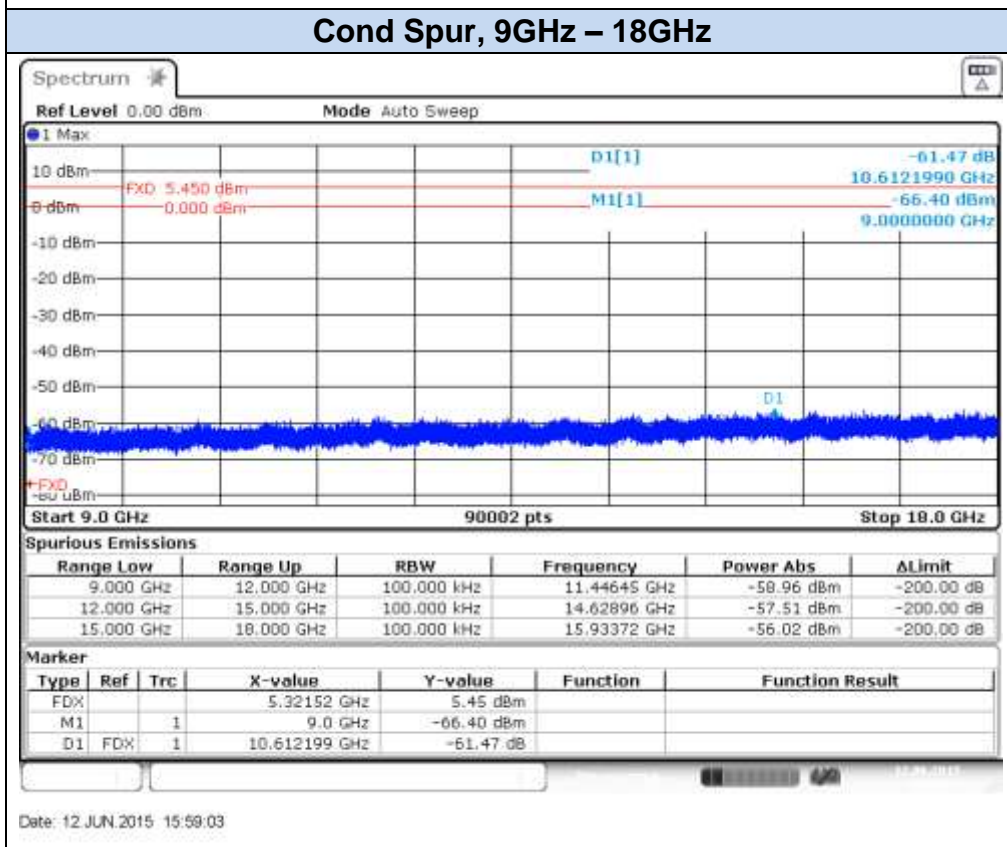
Date: 12 JUN 2015 15:53:19



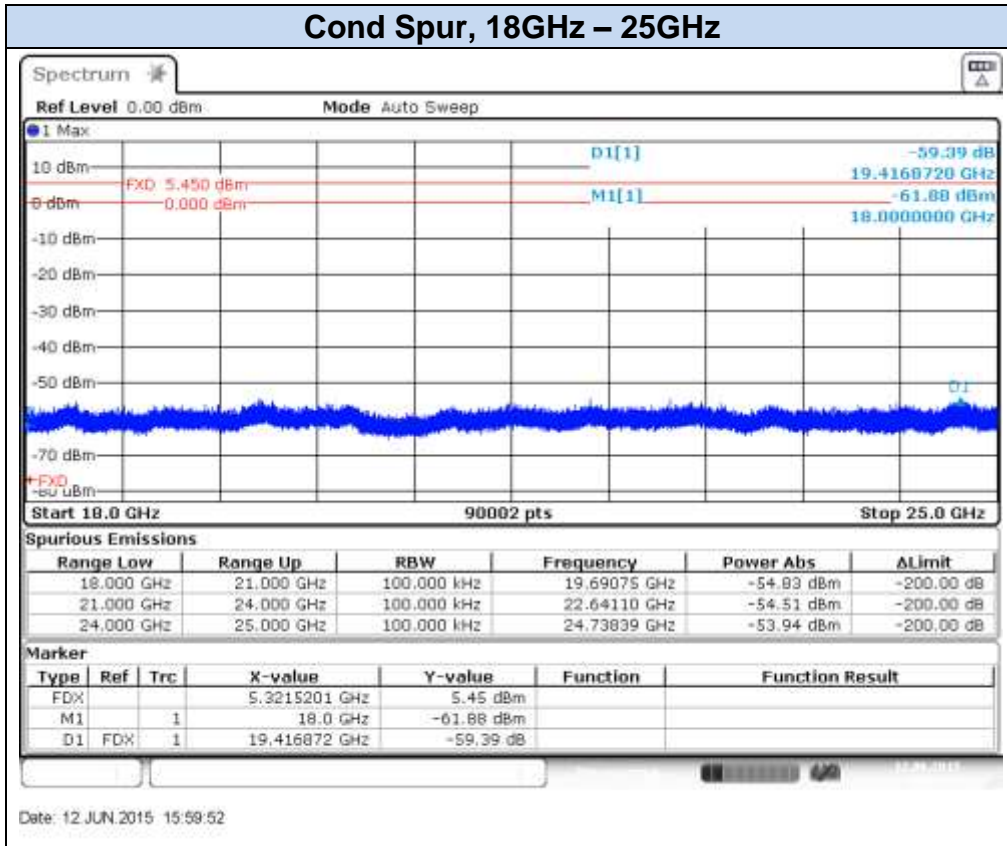
802.11n40, HT0 (SISO) – Chain A, CH9F



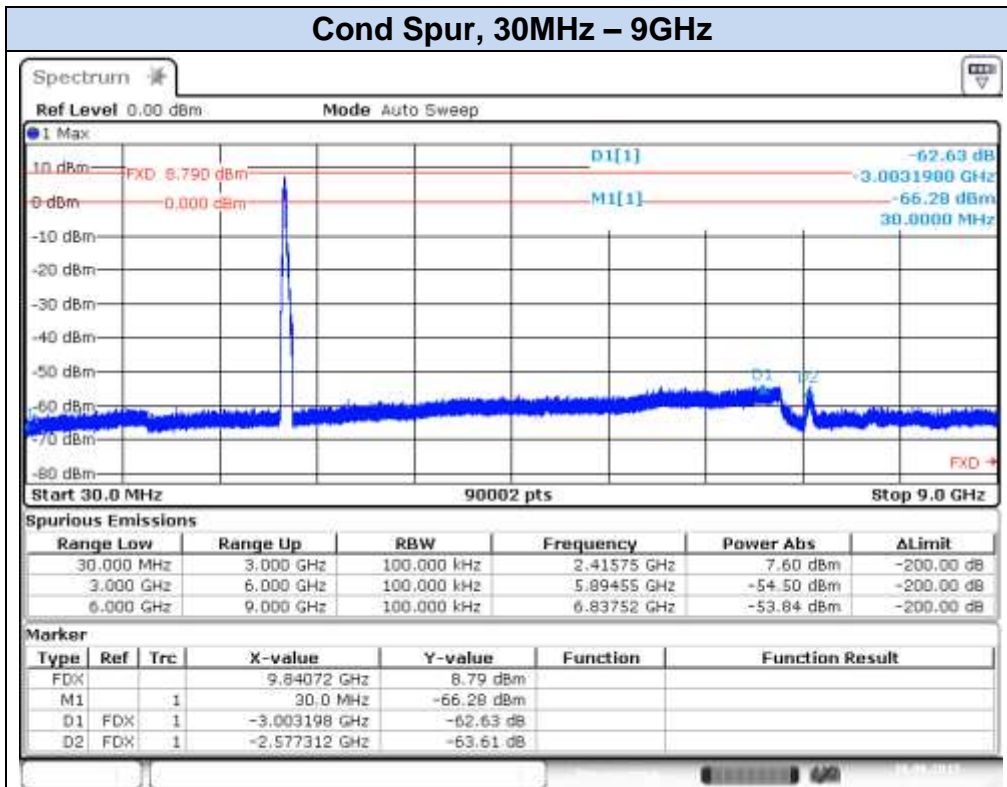
Date: 12 JUN 2015 15:58:18



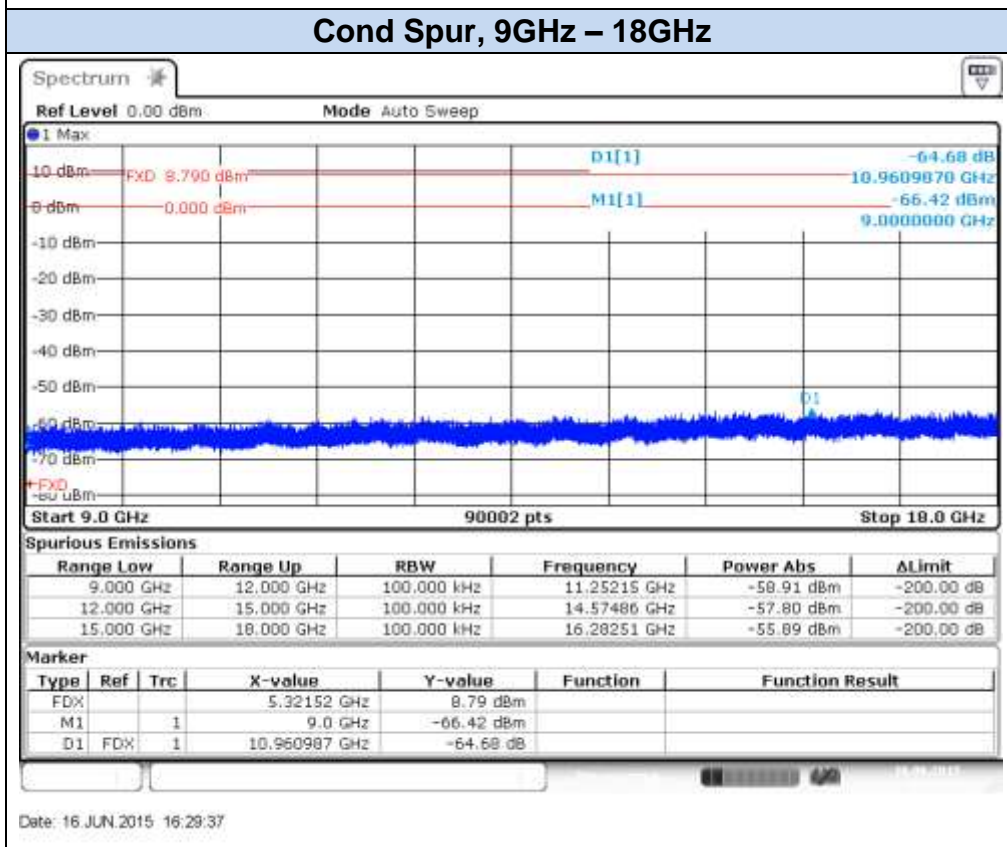
Date: 12 JUN 2015 15:59:03



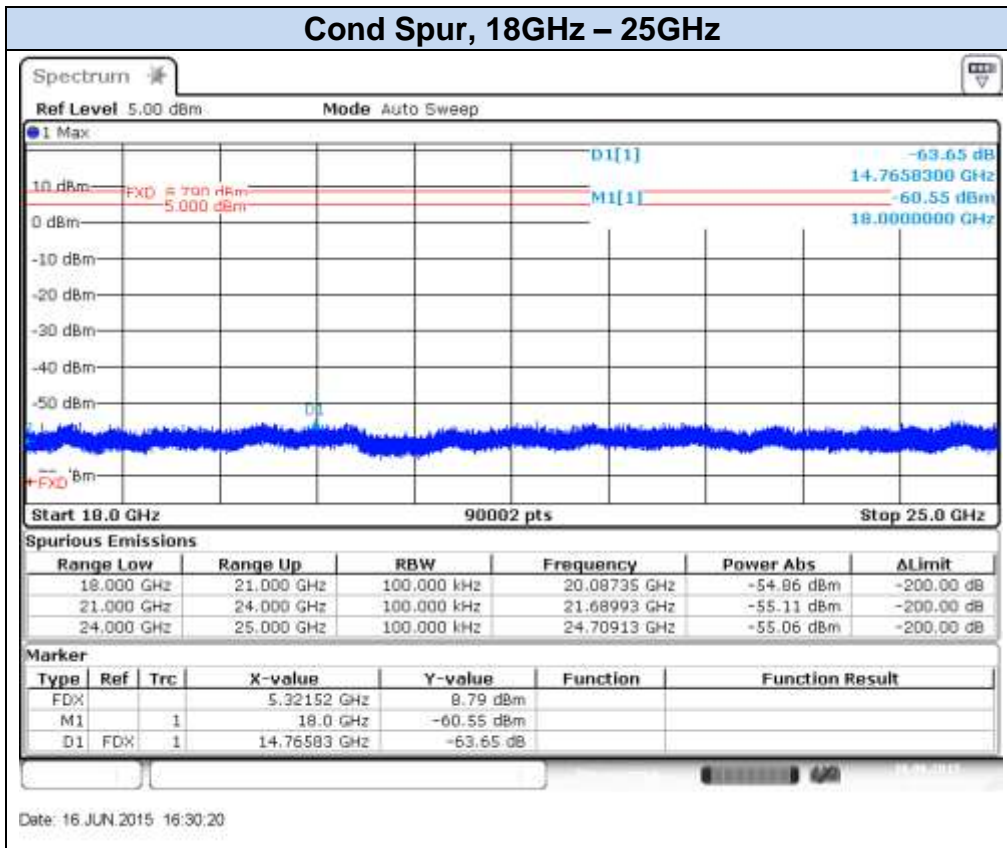
802.11n40, HT0 (SISO) – Chain B, CH3F



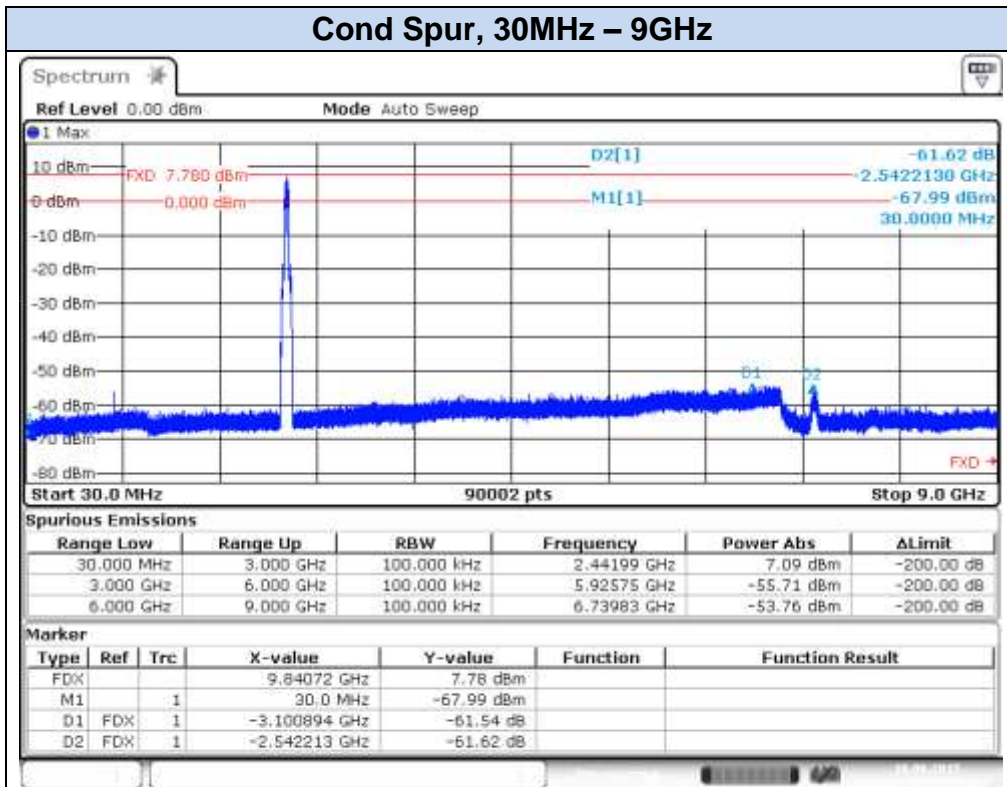
Date: 16 JUN 2015 16:27:24



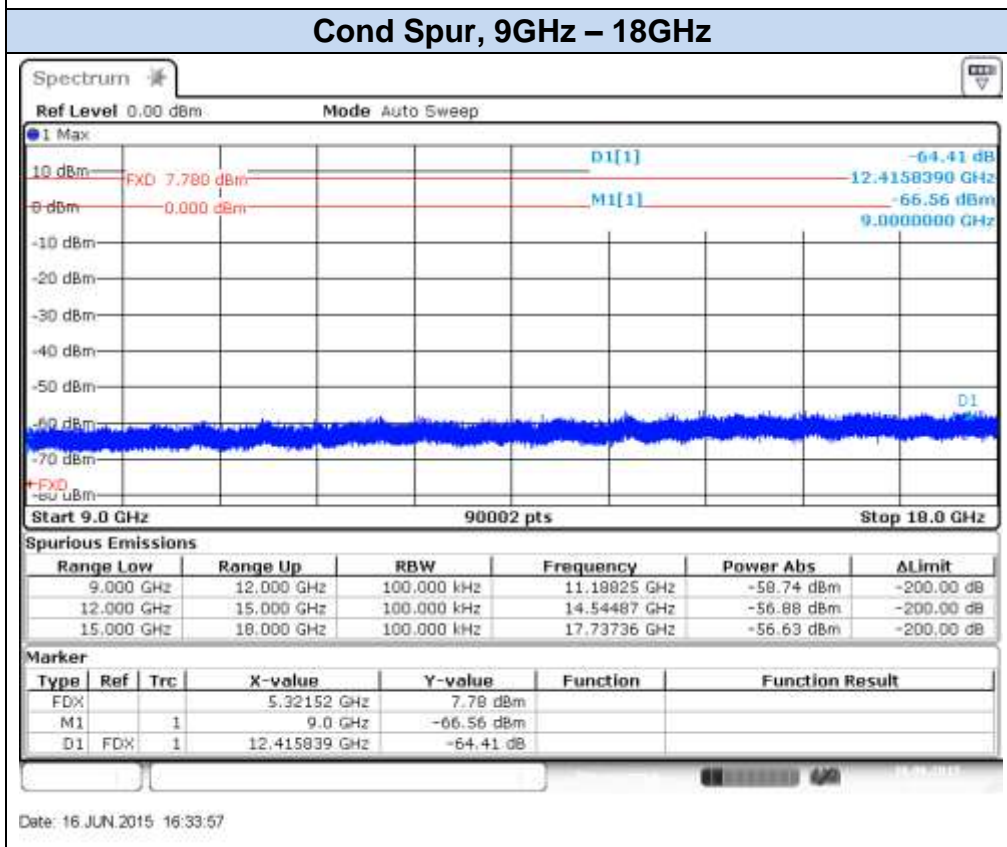
Date: 16 JUN 2015 16:29:37



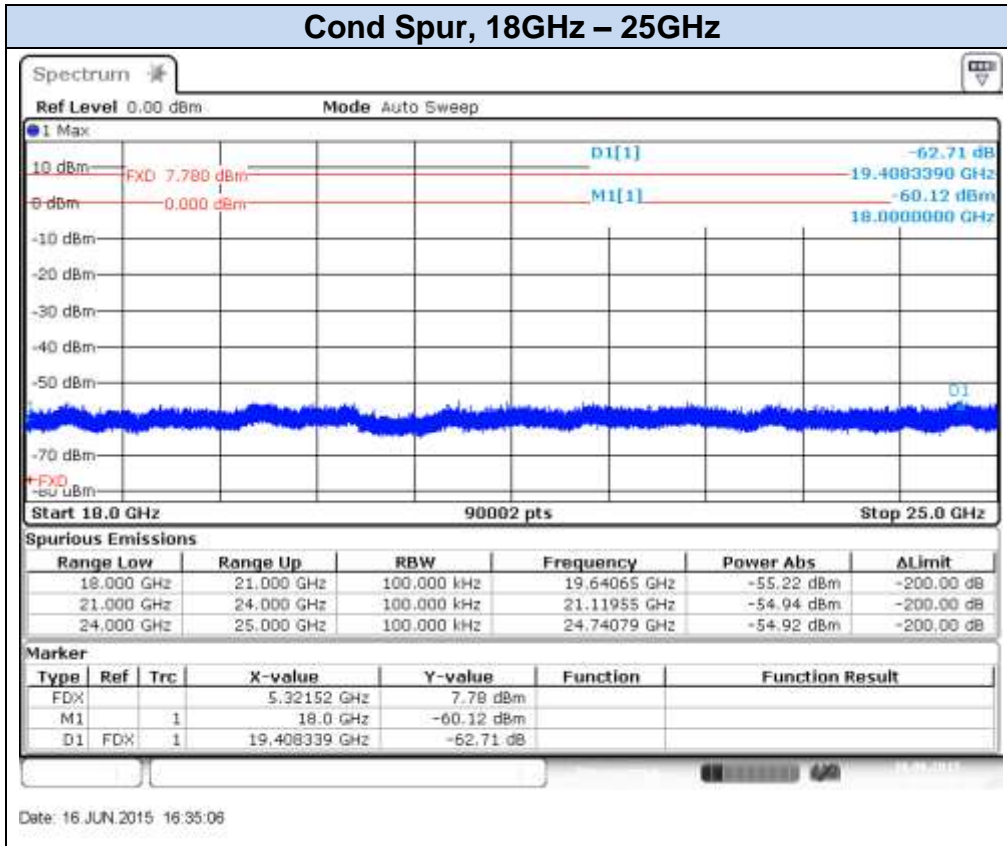
802.11n40, HT0 (SISO) – Chain B, CH6F



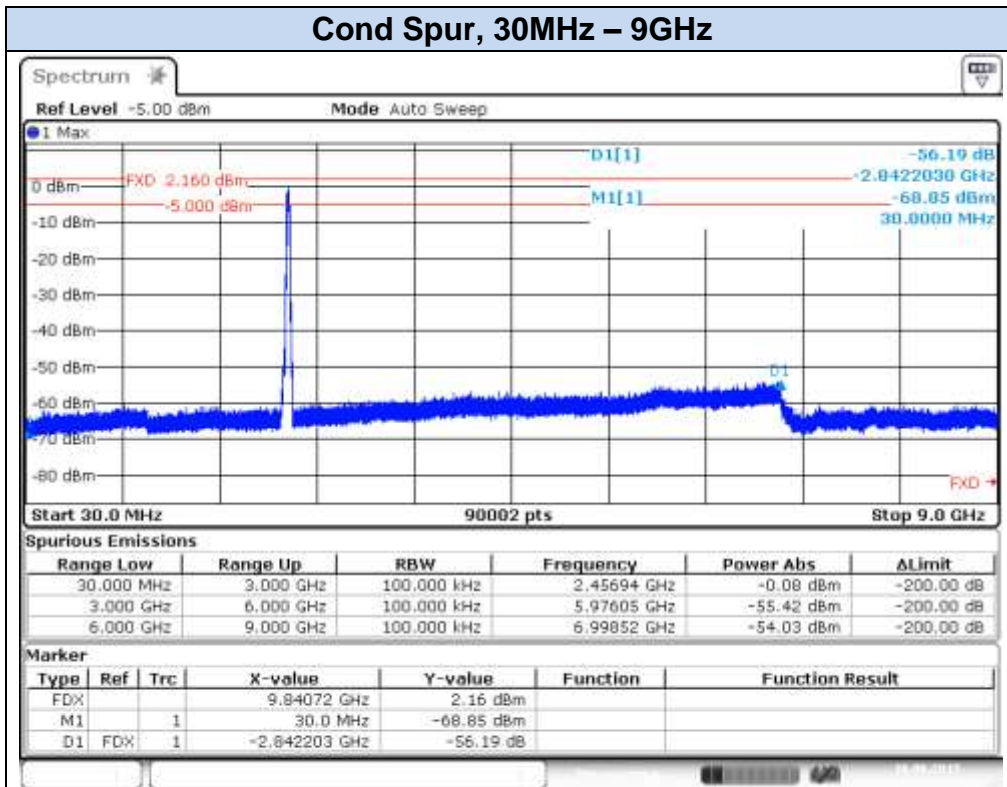
Date: 16 JUN 2015 16:31:57



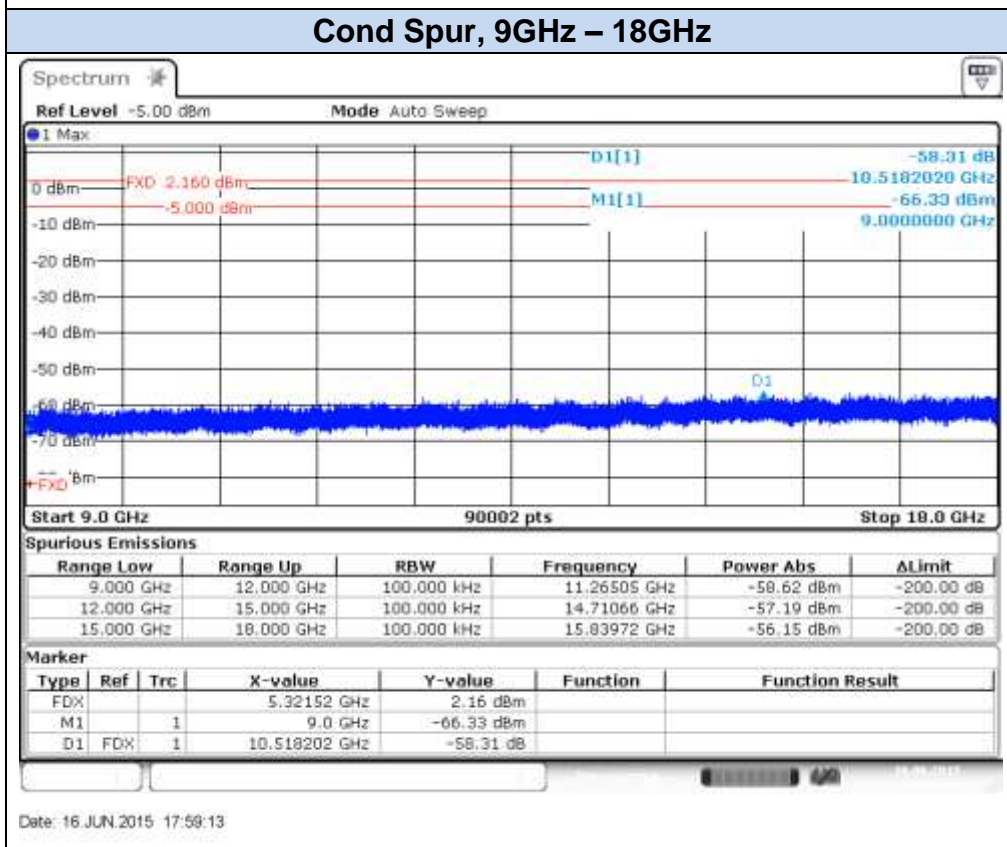
Date: 16 JUN 2015 16:33:57



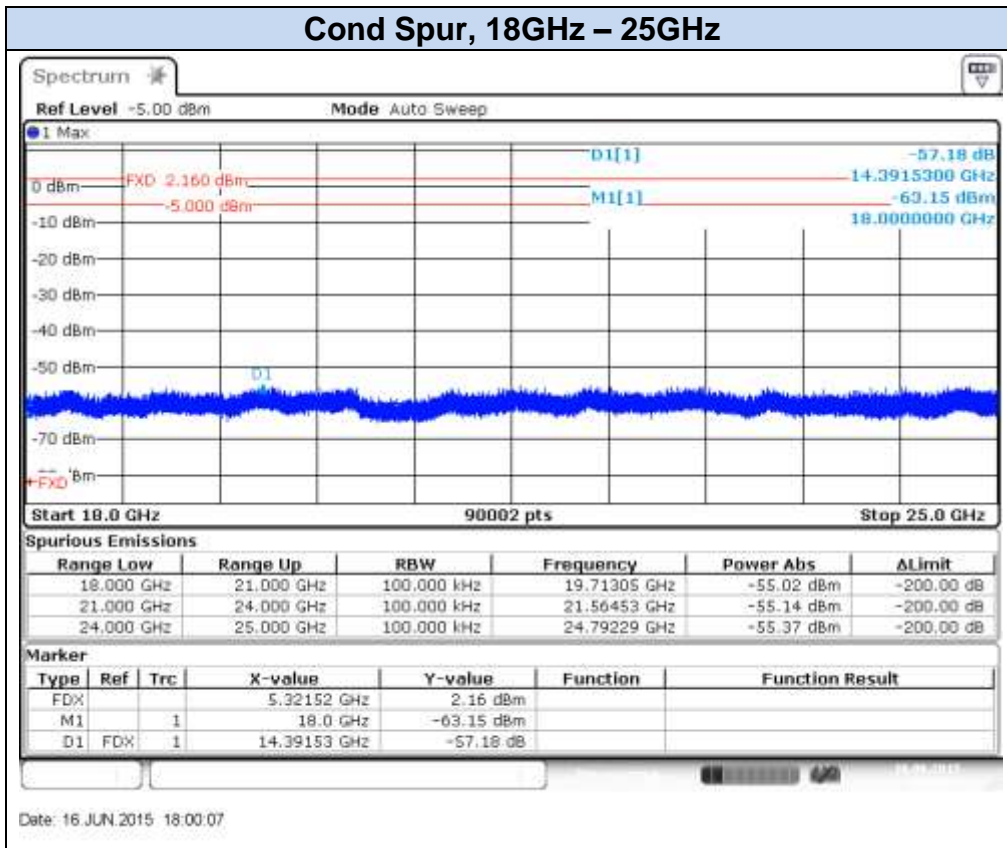
802.11n40, HT0 (SISO) – Chain B, CH9F



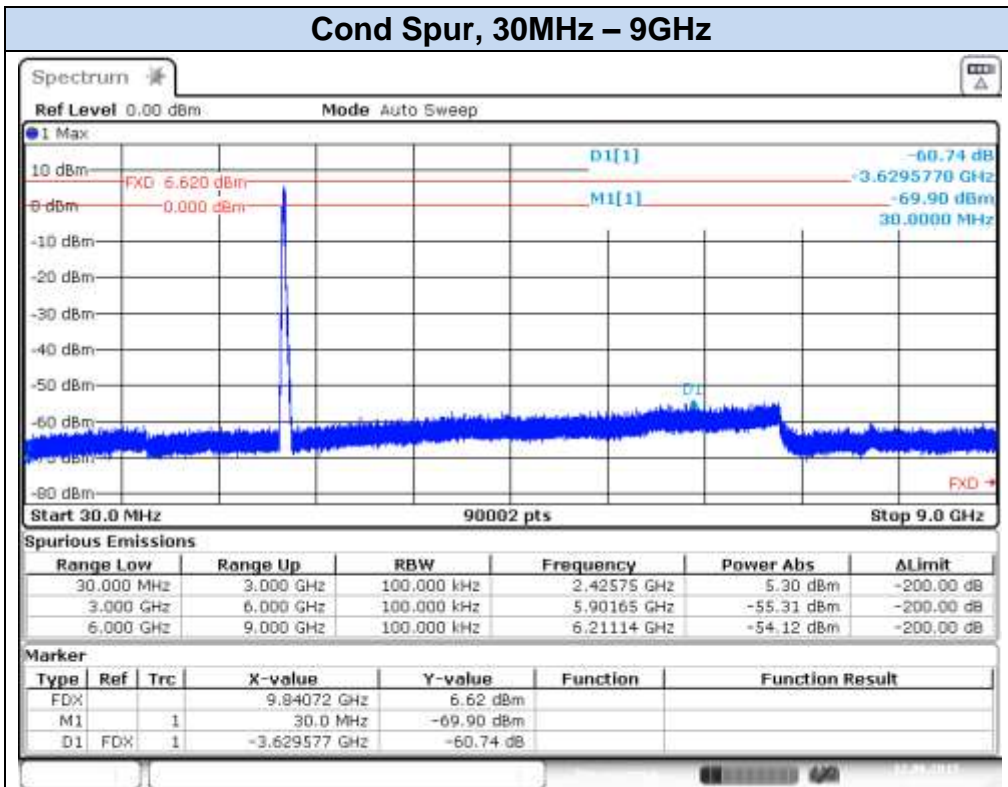
Date: 16 JUN 2015 17:58:21



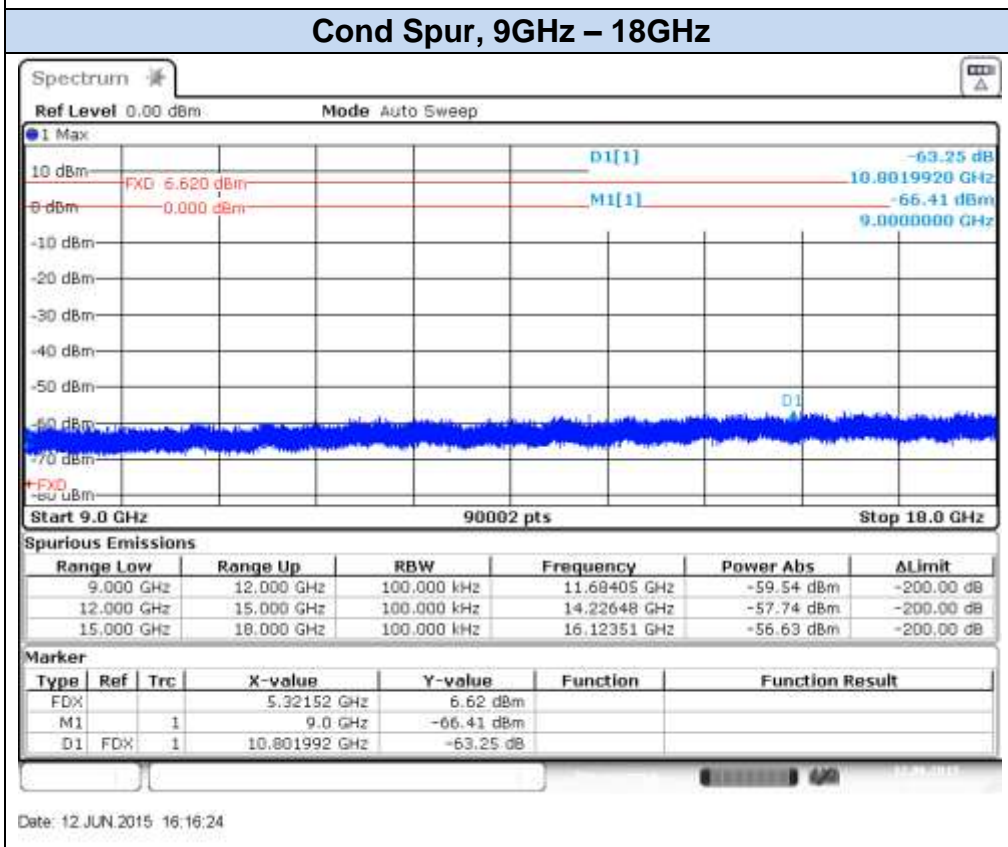
Date: 16 JUN 2015 17:58:13



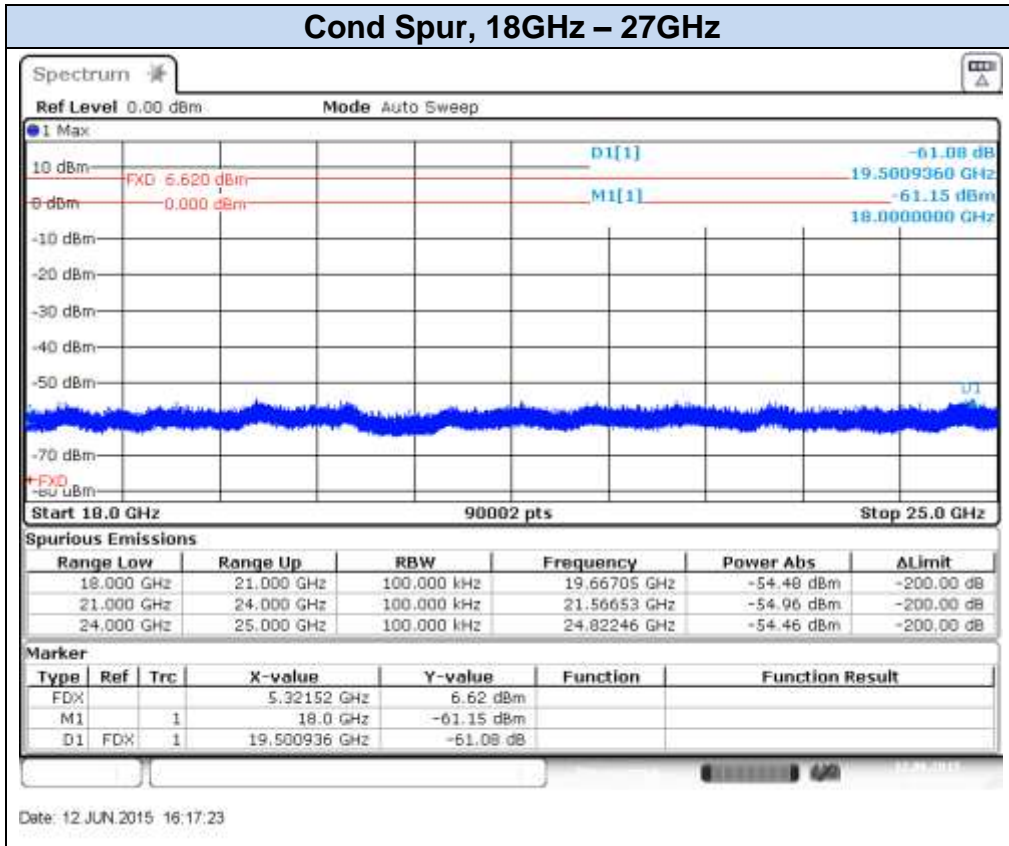
802.11n40, HT8 (MIMO) – Chain A, CH3F



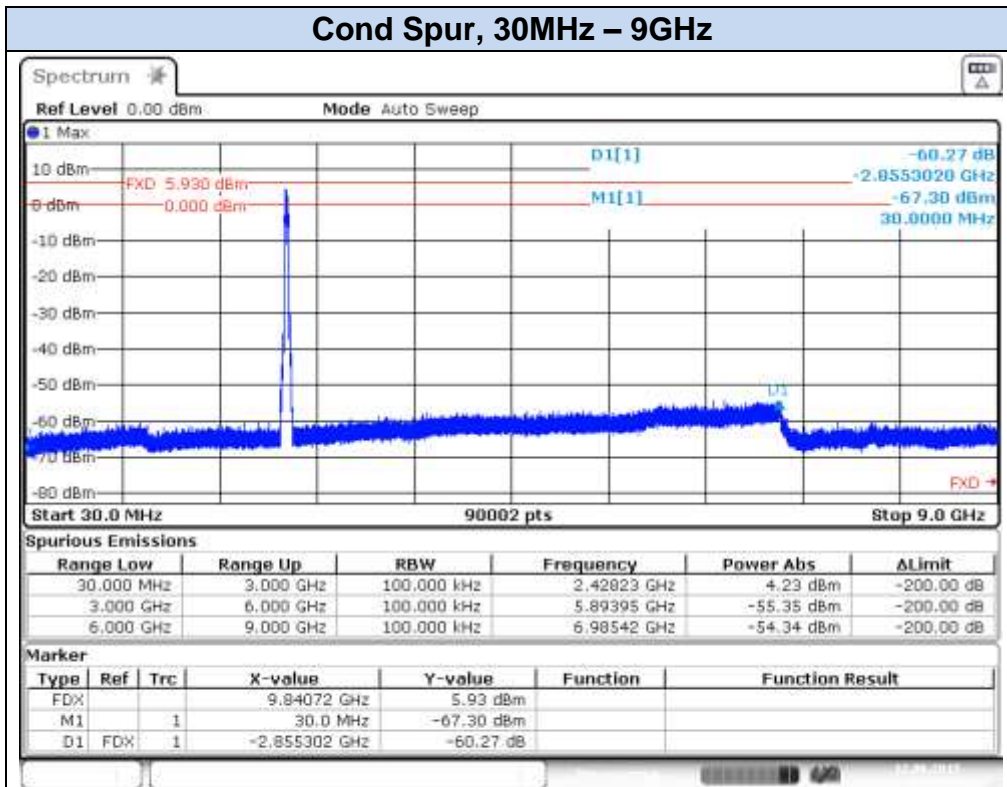
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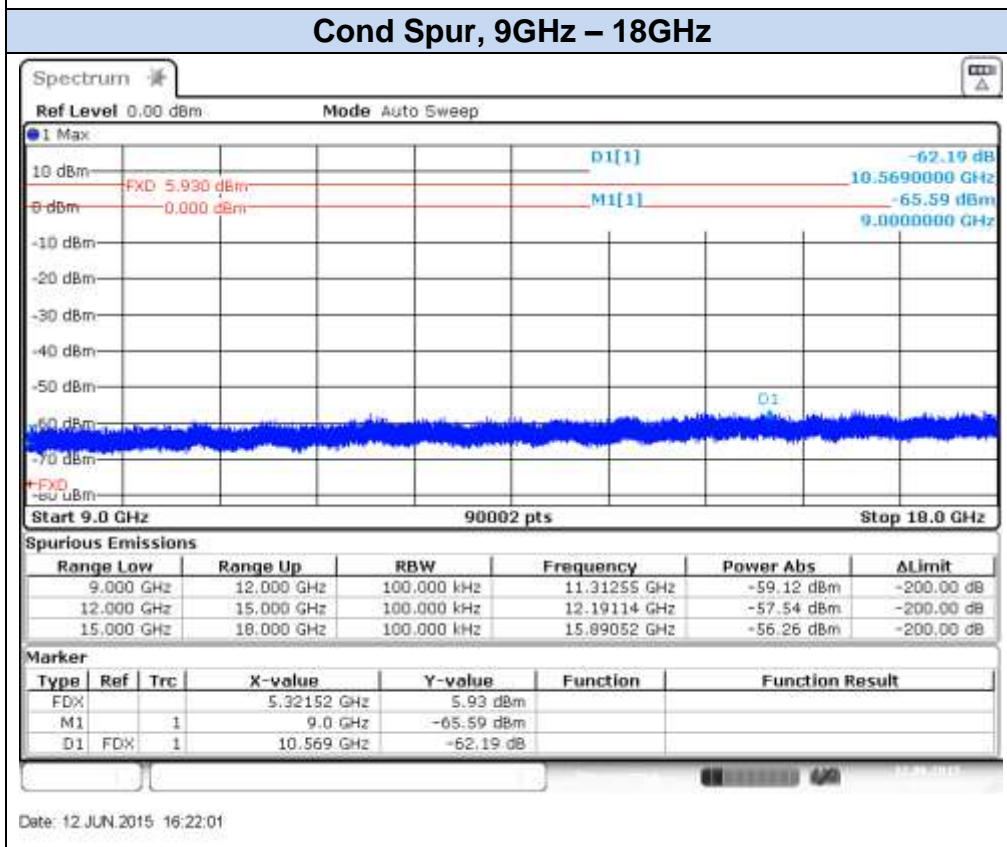
Date: 12 JUN 2015 16:16:24



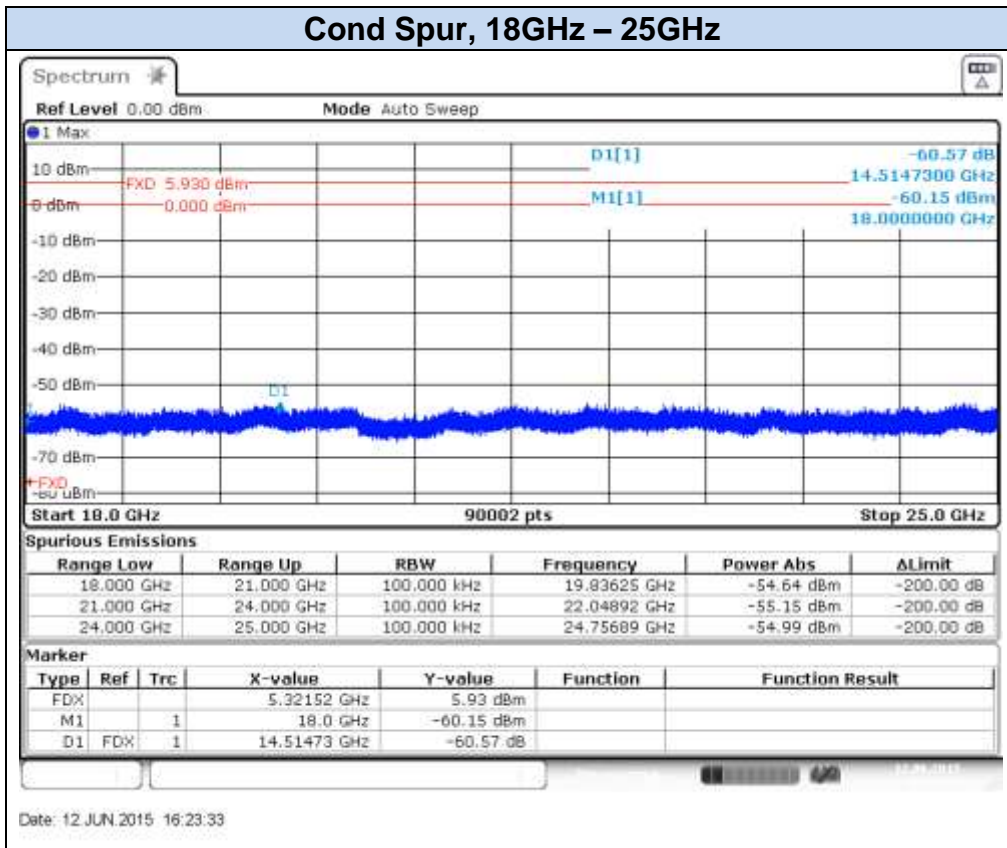
802.11n40, HT8 (MIMO) – Chain A, CH6F



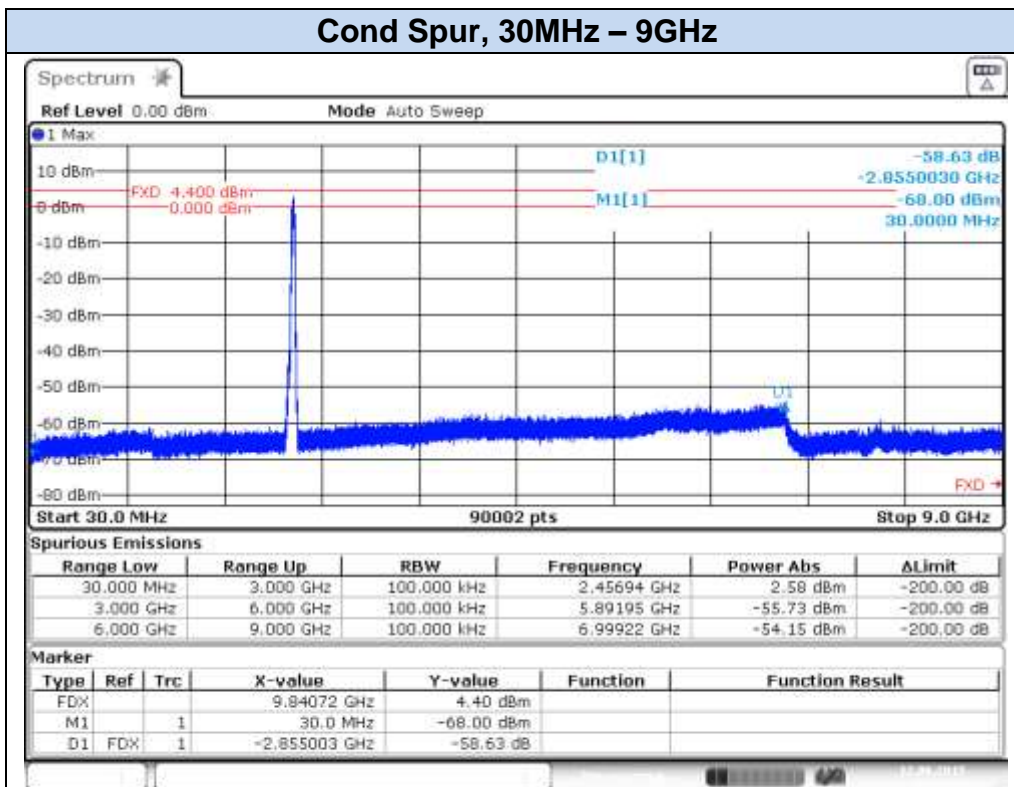
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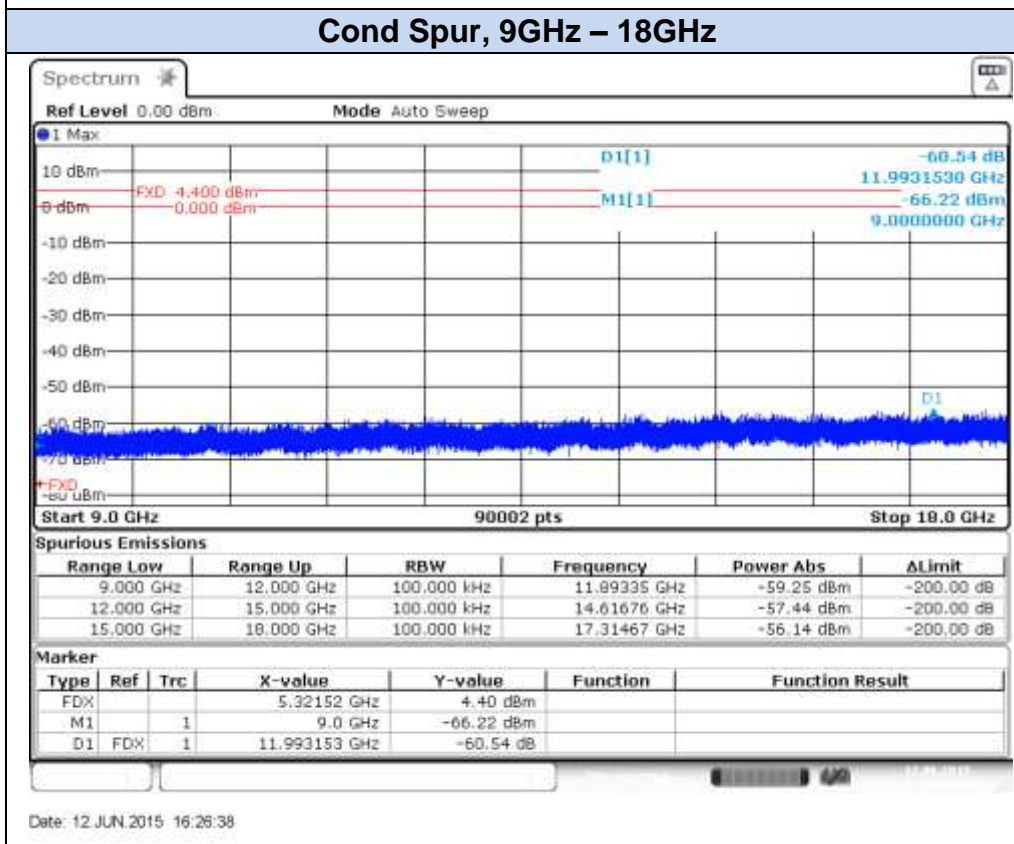
Date: 12 JUN 2015 16:22:01



802.11n40, HT8 (MIMO) – Chain A, CH9F



Date: 12 JUN 2015 16:25:02



Date: 12 JUN 2015 16:28:38