# Electromagnetic Compatibility Criteria for Intentional Radiators

## § 15.247(d) RF Conducted Spurious Emissions Requirements and Band Edge

**Test Requirement:** **15.247(d)** 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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

**Test Procedure:** For intentional radiators with a digital device portion which operates below 10 GHz, the spectrum was investigated as per §15.33(a)(1) and §15.33(a)(4); i.e., the lowest RF signal generated or used in the device up to the 10$^{th}$ harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

The transmitter was connected directly to a spectrum analyzer through an attenuator. Measurements were taken of the low, mid, and high channels, and emissions were compared to a 20 dBc limit line

See following pages for detailed test results with RF Conducted Spurious Emissions.

**Test Results:** The EUT was compliant with the Conducted Spurious Emission limits of **§15.247(d)**.

**Test Engineer(s):** Jeff Pratt

**Test Date(s):** 09/13/11

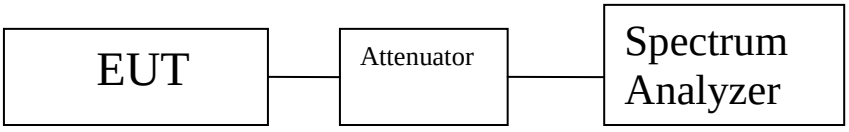
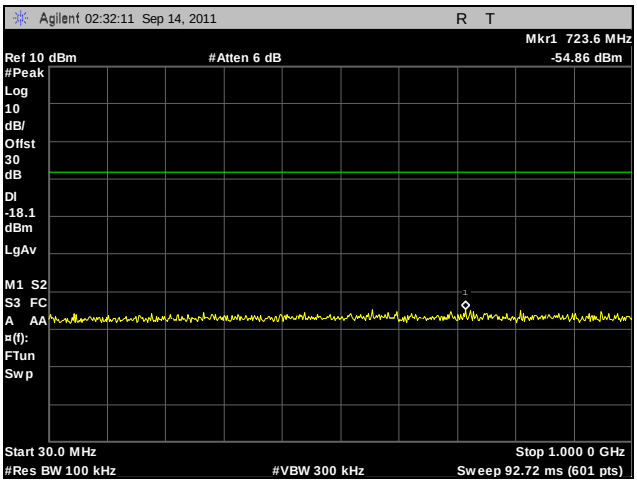
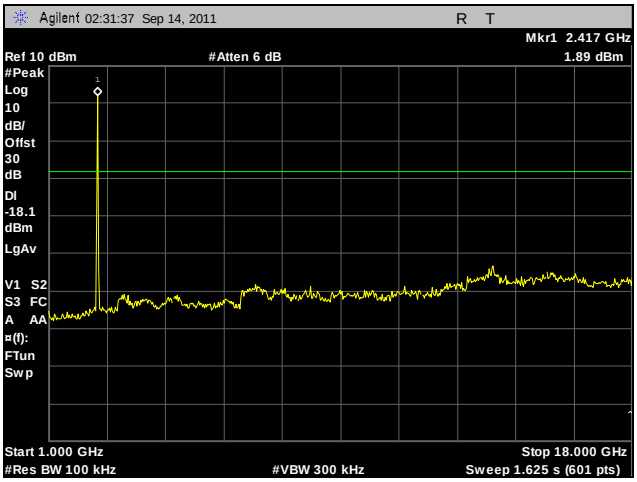



**Figure 3. Block Diagram, Conducted Spurious Emissions Test Setup**

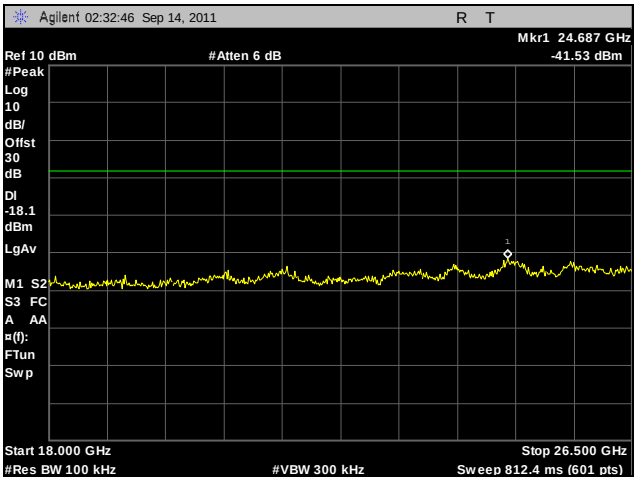
## Conducted Spurious Emissions Test Results, 2.4 GHz, 802.11b, Port A




**Plot 399. Conducted Spurious Emissions, Low Channel, 2.4 GHz, 802.11b, Port A, 30 MHz – 1 GHz**

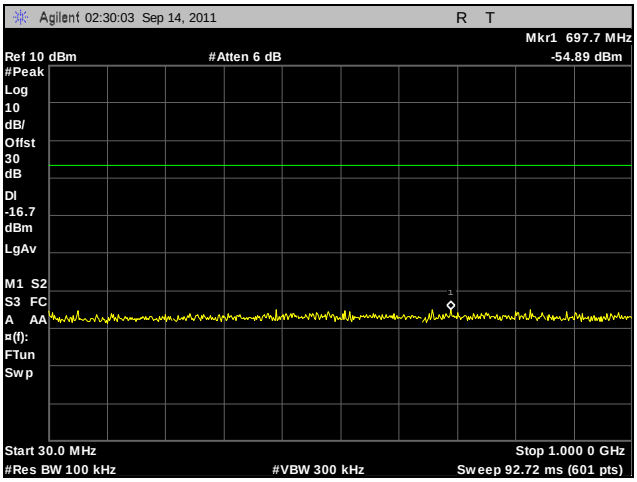



**Plot 400. Conducted Spurious Emissions, Low Channel, 2.4 GHz, 802.11b, Port A, 1 GHz – 18 GHz**

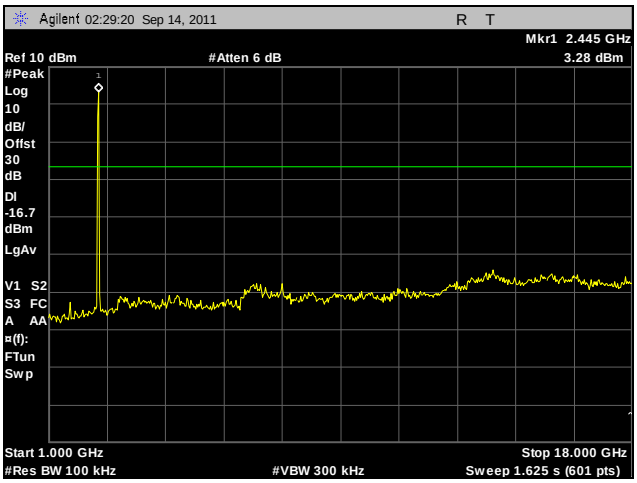



**Plot 401. Conducted Spurious Emissions, Low Channel, 2.4 GHz, 802.11b, Port A, 18 GHz – 26.5 GHz**

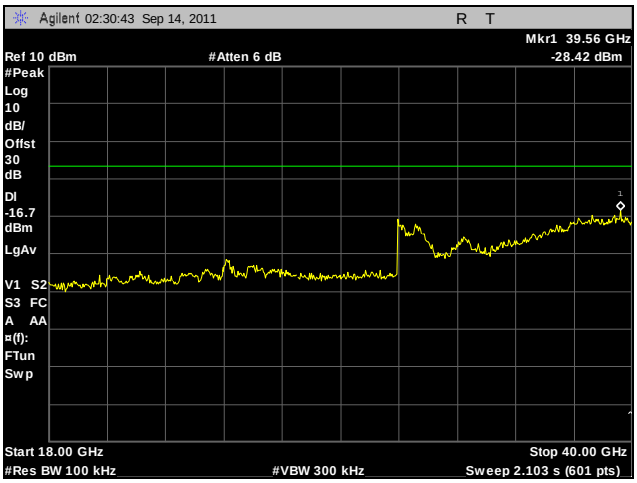
  




**Plot 402. Conducted Spurious Emissions, Mid Channel, 2.4 GHz, 802.11b, Port A, 30 MHz – 1 GHz**

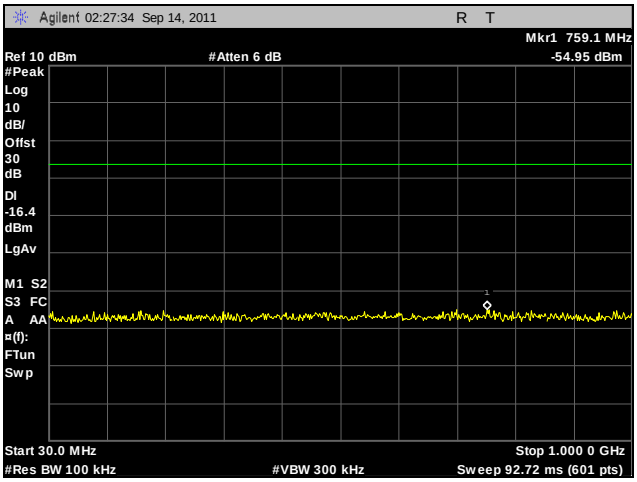



**Plot 403. Conducted Spurious Emissions, Mid Channel, 2.4 GHz, 802.11b, Port A, 1 GHz – 18 GHz**

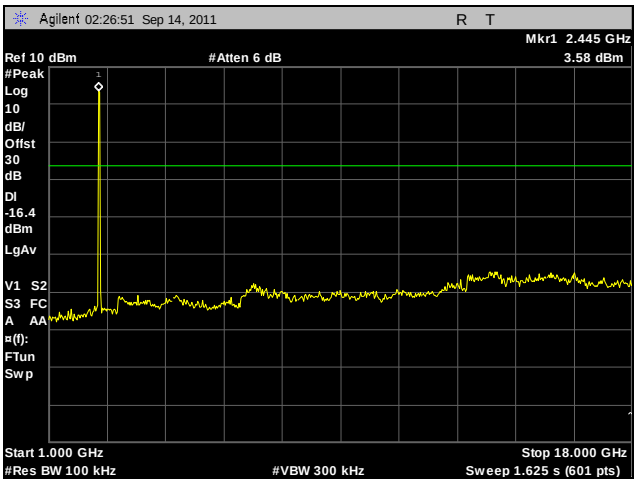



**Plot 404. Conducted Spurious Emissions, Mid Channel, 2.4 GHz, 802.11b, Port A, 18 GHz – 40 GHz**

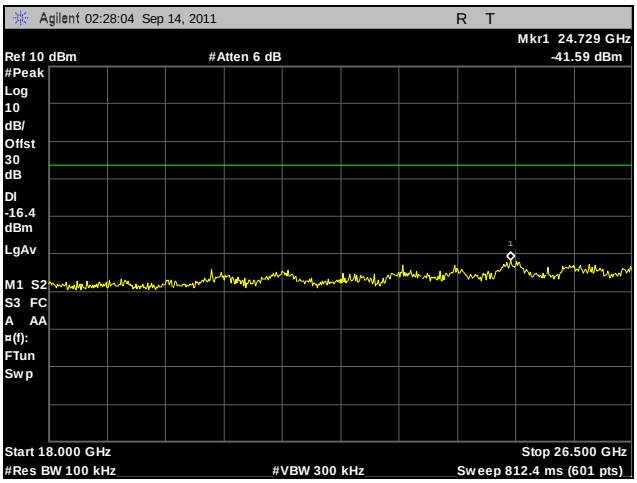
  




**Plot 405. Conducted Spurious Emissions, High Channel, 2.4 GHz, 802.11b, Port A, 30 MHz – 1 GHz**



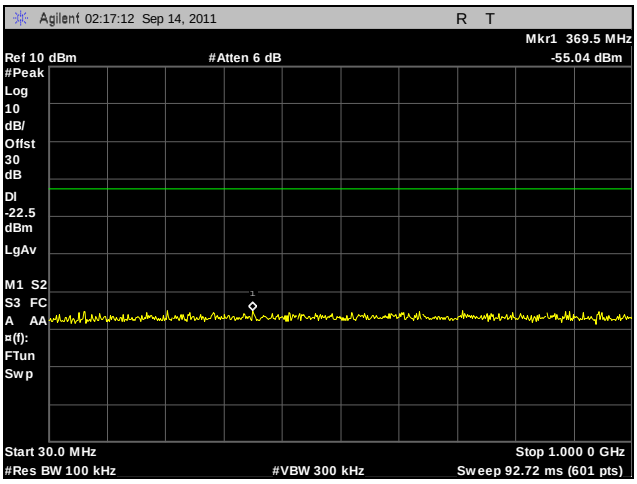

**Plot 406. Conducted Spurious Emissions, High Channel, 2.4 GHz, 802.11b, Port A, 1 GHz – 18 GHz**



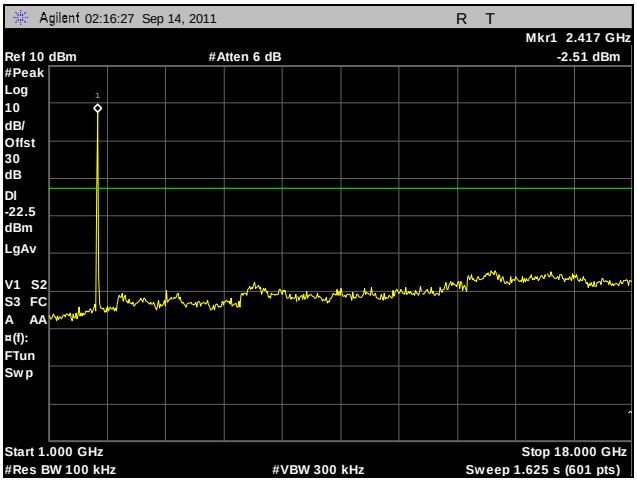

**Plot 407. Conducted Spurious Emissions, High Channel, 2.4 GHz, 802.11b, Port A, 18 GHz – 26.5 GHz**

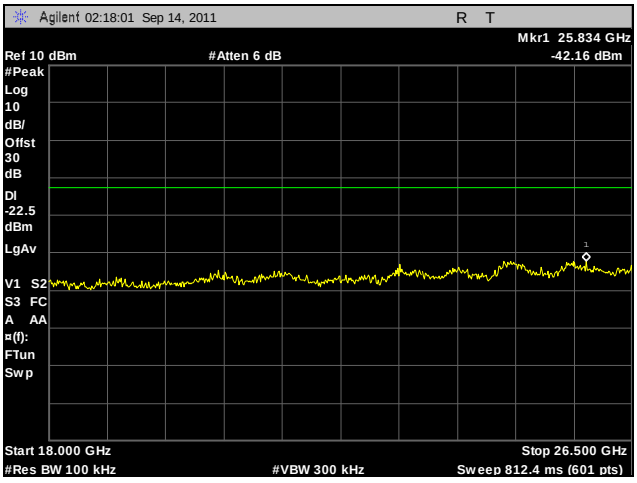
## Conducted Spurious Emissions Test Results, 2.4 GHz, 802.11g, Port A




**Plot 408. Conducted Spurious Emissions, Low Channel, 2.4 GHz, 802.11g, Port A, 30 MHz – 1 GHz**

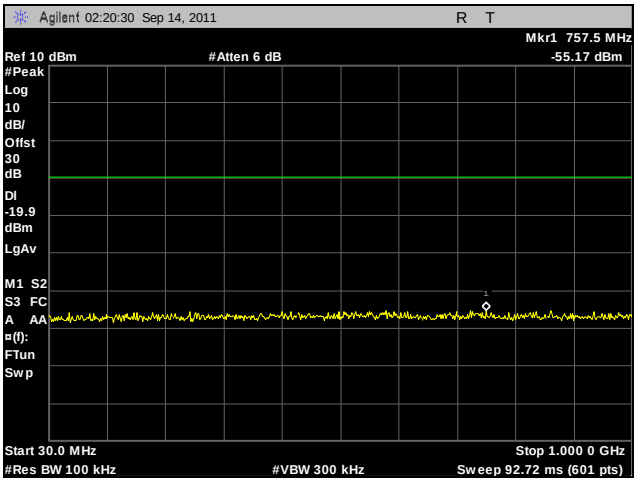



**Plot 409. Conducted Spurious Emissions, Low Channel, 2.4 GHz, 802.11g, Port A, 1 GHz – 18 GHz**

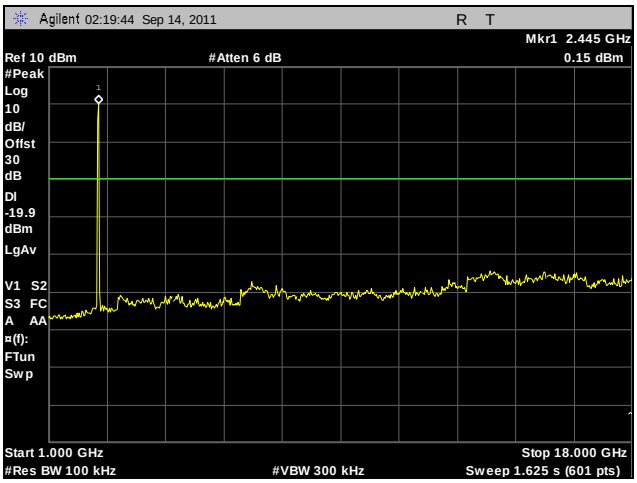



**Plot 410. Conducted Spurious Emissions, Low Channel, 2.4 GHz, 802.11g, Port A, 18 GHz – 26.5 GHz**

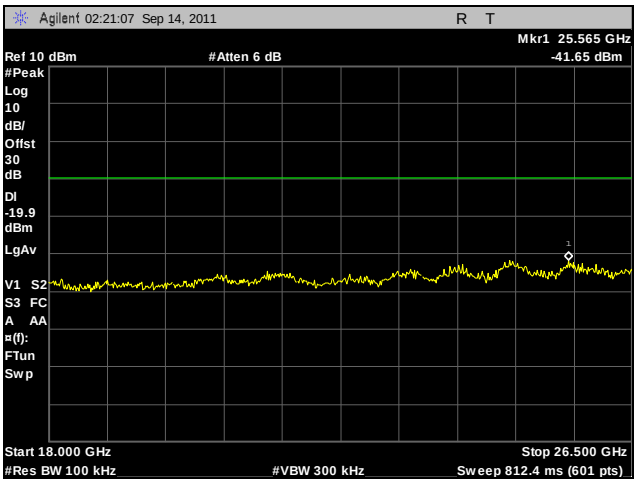
  




**Plot 411. Conducted Spurious Emissions, Mid Channel, 2.4 GHz, 802.11g, Port A, 30 MHz – 1 GHz**

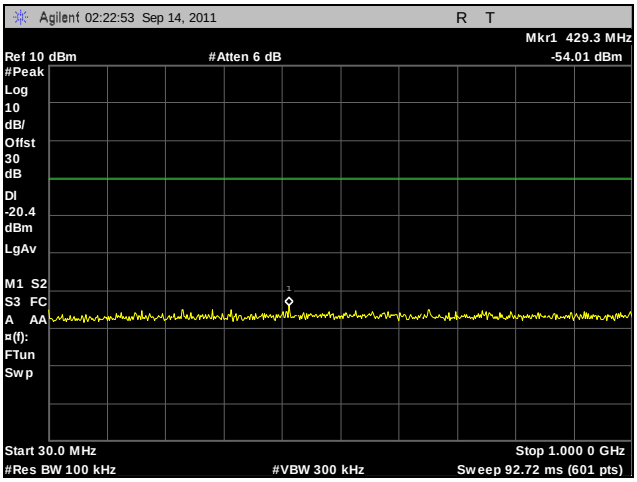



**Plot 412. Conducted Spurious Emissions, Mid Channel, 2.4 GHz, 802.11g, Port A, 1 GHz – 18 GHz**

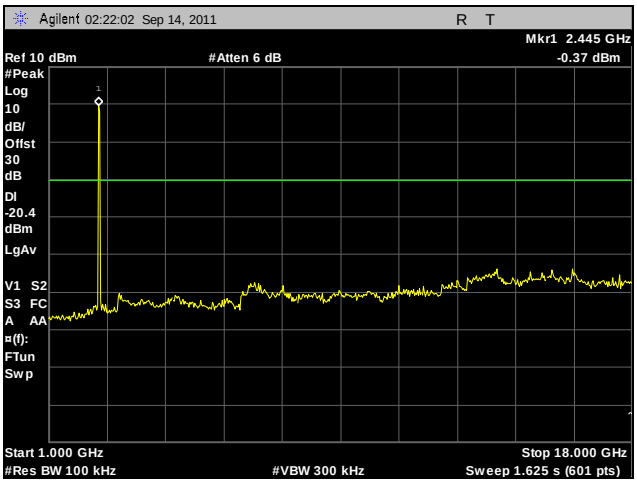



**Plot 413. Conducted Spurious Emissions, Mid Channel, 2.4 GHz, 802.11g, Port A, 18 GHz – 26.5 GHz**

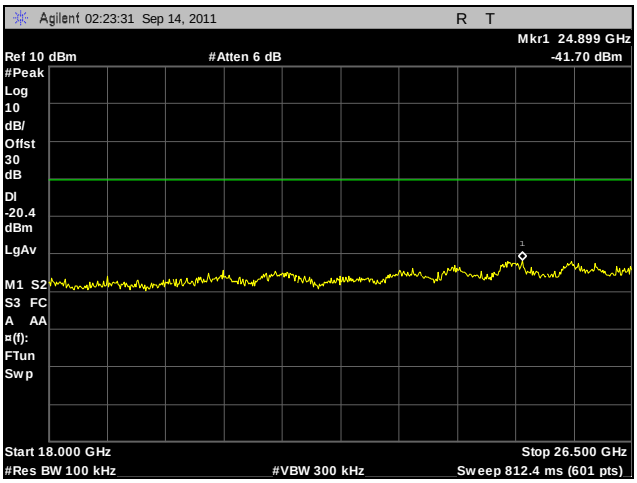
  




**Plot 414. Conducted Spurious Emissions, High Channel, 2.4 GHz, 802.11g, Port A, 30 MHz – 1 GHz**



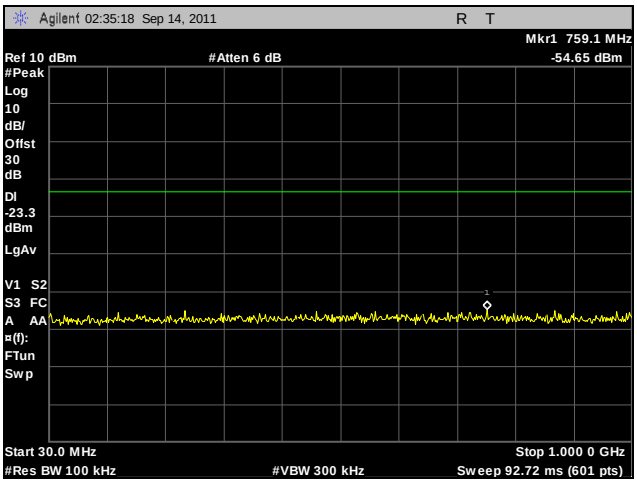

**Plot 415. Conducted Spurious Emissions, High Channel, 2.4 GHz, 802.11g, Port A, 1 GHz – 18 GHz**



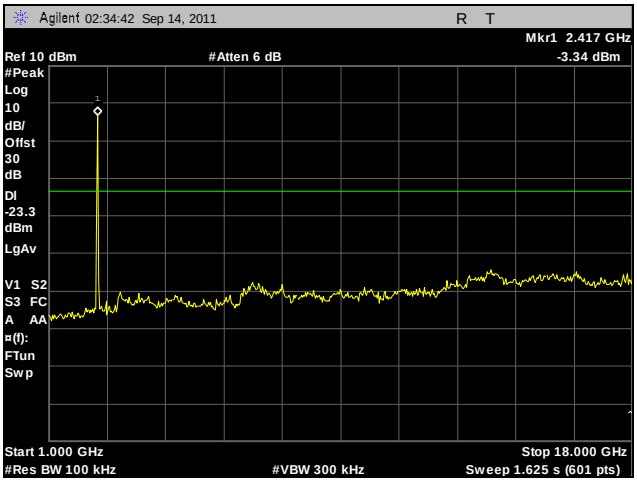

**Plot 416. Conducted Spurious Emissions, High Channel, 2.4 GHz, 802.11g, Port A, 18 GHz – 26.5 GHz**

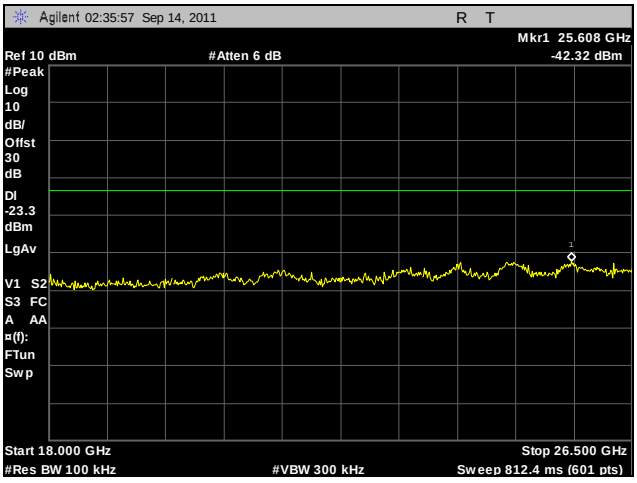
## Conducted Spurious Emissions Test Results, 2.4 GHz, 802.11g HT20, Port A, Low Channel




**Plot 417. Conducted Spurious Emissions, Low Channel, 2.4 GHz, 802.11g HT20, Port A, 30 MHz – 1 GHz**



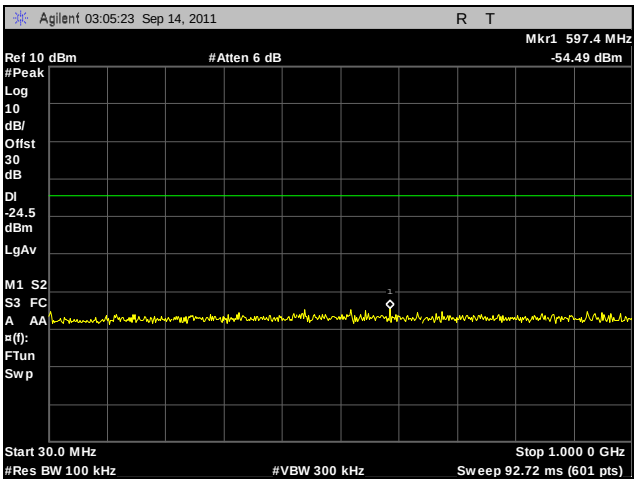

**Plot 418. Conducted Spurious Emissions, Low Channel, 2.4 GHz, 802.11g HT20, Port A, 1 GHz – 18 GHz**



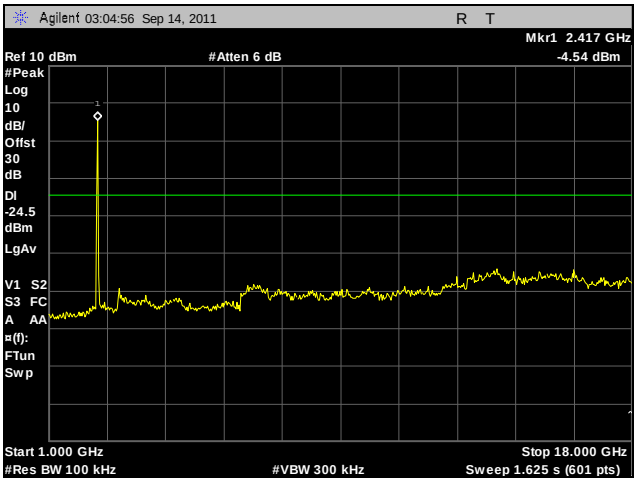

**Plot 419. Conducted Spurious Emissions, Low Channel, 2.4 GHz, 802.11g HT20, Port A, 18 GHz – 26.5 GHz**

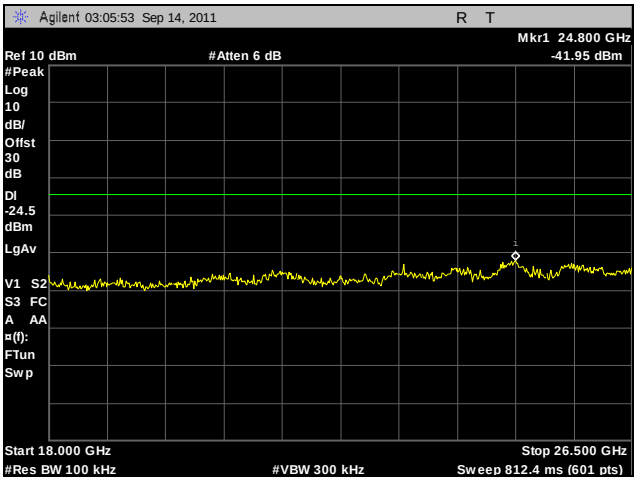
## Conducted Spurious Emissions Test Results, 2.4 GHz, 802.11g HT20, Port B, Low Channel




**Plot 420. Conducted Spurious Emissions, Low Channel, 2.4 GHz, 802.11g HT20, Port B, 30 MHz – 1 GHz**

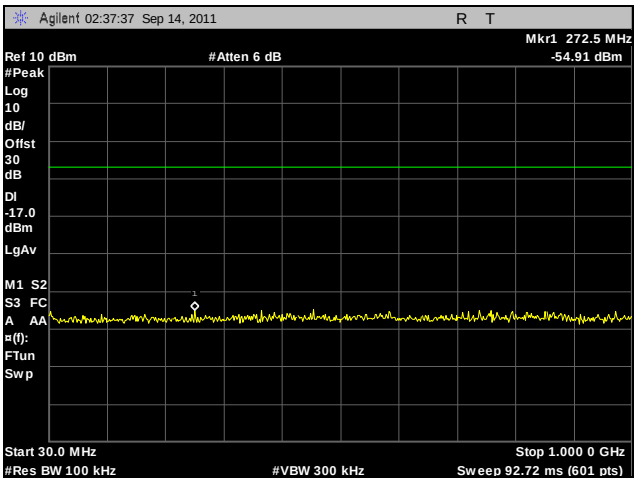



**Plot 421. Conducted Spurious Emissions, Low Channel, 2.4 GHz, 802.11g HT20, Port B, 1 GHz – 18 GHz**

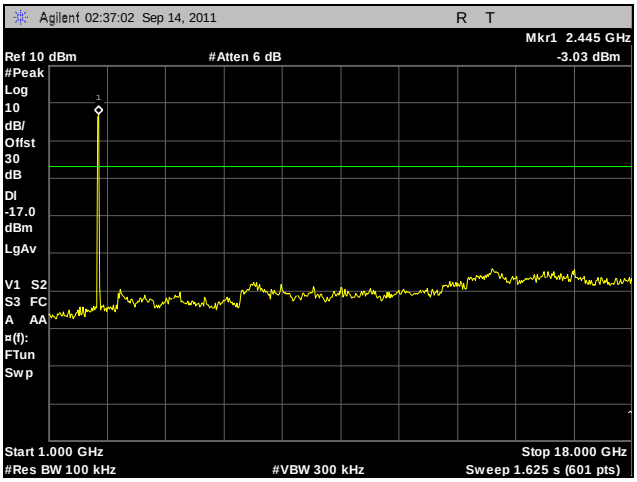



**Plot 422. Conducted Spurious Emissions, Low Channel, 2.4 GHz, 802.11g HT20, Port B, 18 GHz – 26.5 GHz**

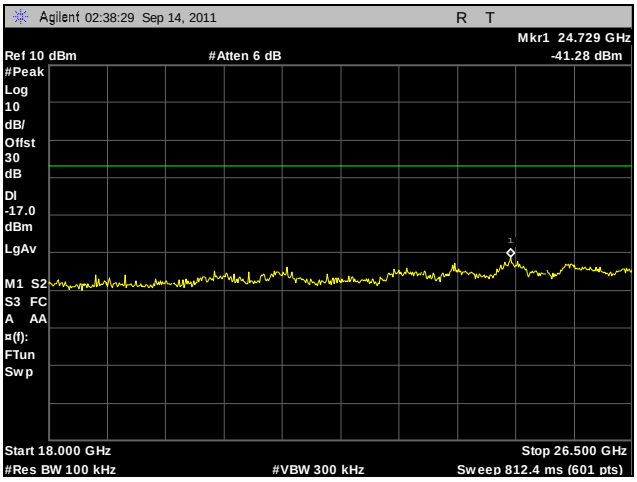
## Conducted Spurious Emissions Test Results, 2.4 GHz, 802.11g HT20, Port A, Mid Channel




**Plot 423. Conducted Spurious Emissions, Mid Channel, 2.4 GHz, 802.11g HT20, Port A, 30 MHz – 1 GHz**



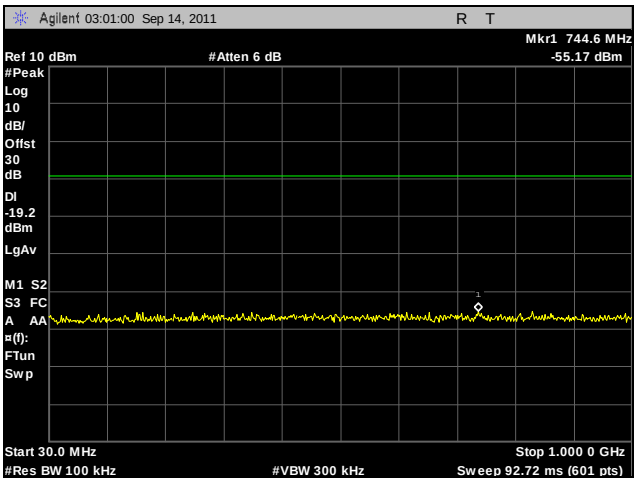

**Plot 424. Conducted Spurious Emissions, Mid Channel, 2.4 GHz, 802.11g HT20, Port A, 1 GHz – 18 GHz**



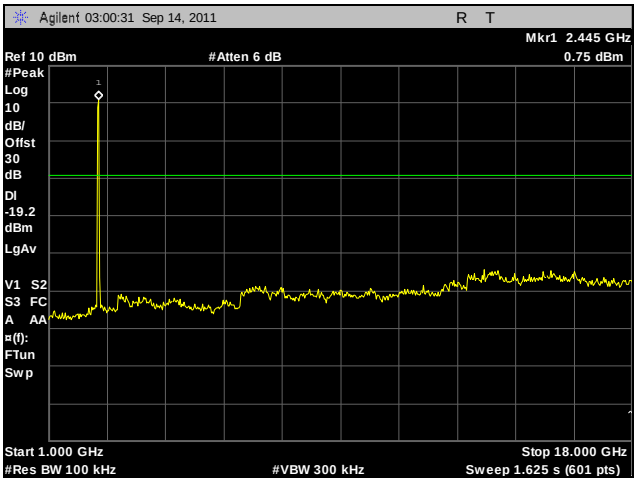

**Plot 425. Conducted Spurious Emissions, Mid Channel, 2.4 GHz, 802.11g HT20, Port A, 18 GHz – 26.5 GHz**

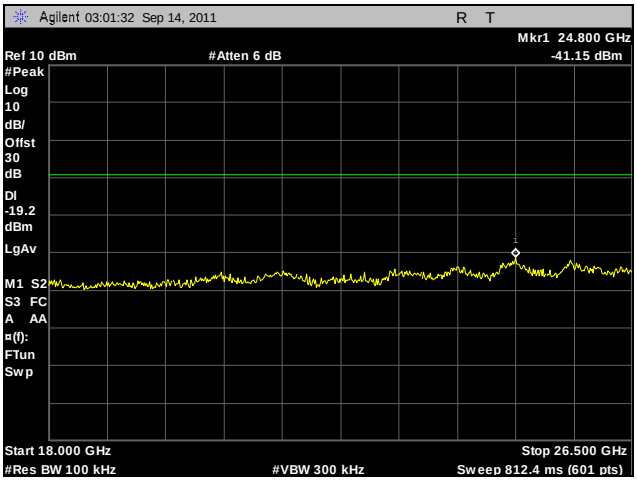
## Conducted Spurious Emissions Test Results, 2.4 GHz, 802.11g HT20, Port B, Mid Channel




**Plot 426. Conducted Spurious Emissions, Mid Channel, 2.4 GHz, 802.11g HT20, Port B, 30 MHz – 1 GHz**



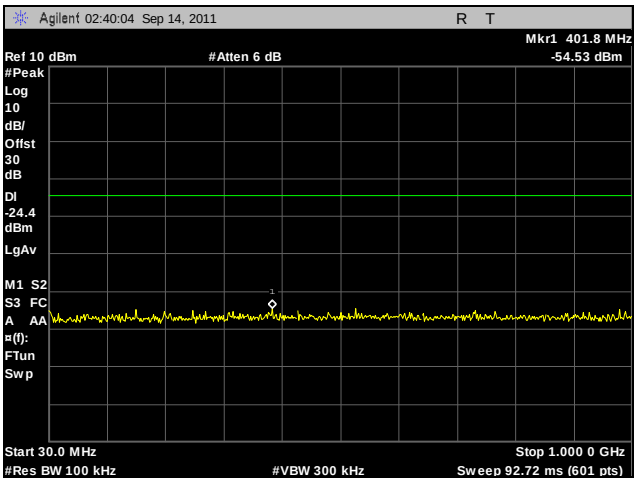

**Plot 427. Conducted Spurious Emissions, Mid Channel, 2.4 GHz, 802.11g HT20, Port B, 1 GHz – 18 GHz**



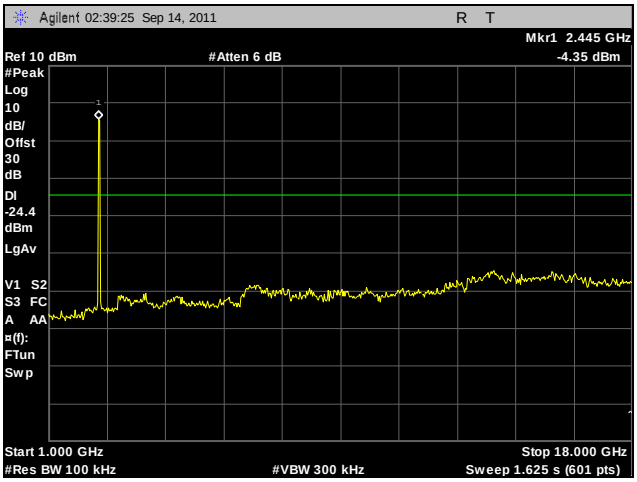

**Plot 428. Conducted Spurious Emissions, Mid Channel, 2.4 GHz, 802.11g HT20, Port B, 18 GHz – 26.5 GHz**

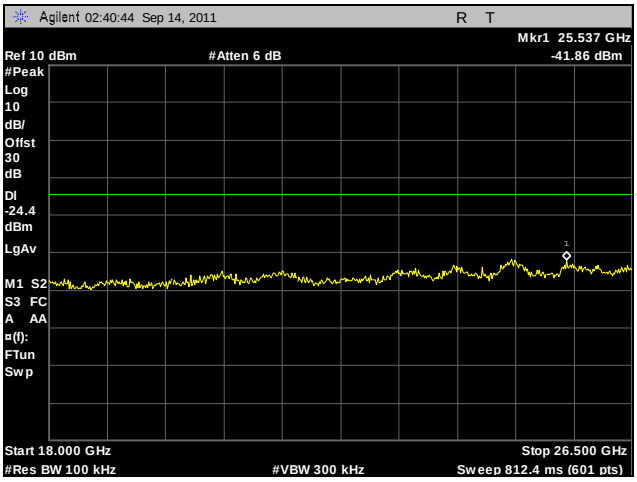
## Conducted Spurious Emissions Test Results, 2.4 GHz, 802.11g HT20, Port A, High Channel




**Plot 429. Conducted Spurious Emissions, High Channel, 2.4 GHz, 802.11g HT20, Port A, 30 MHz – 1 GHz**



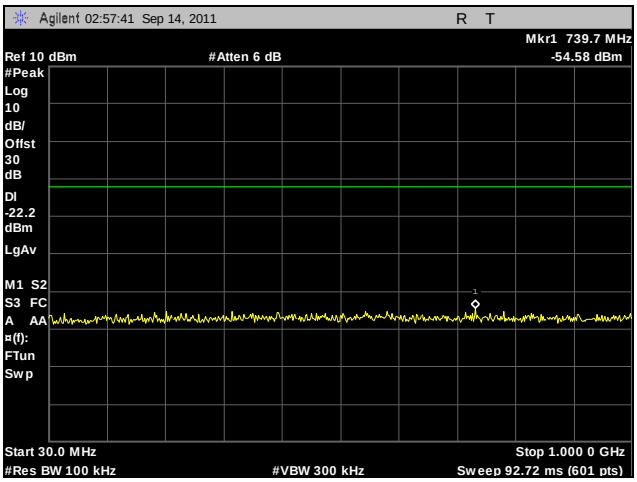

**Plot 430. Conducted Spurious Emissions, High Channel, 2.4 GHz, 802.11g HT20, Port A, 1 GHz – 18 GHz**



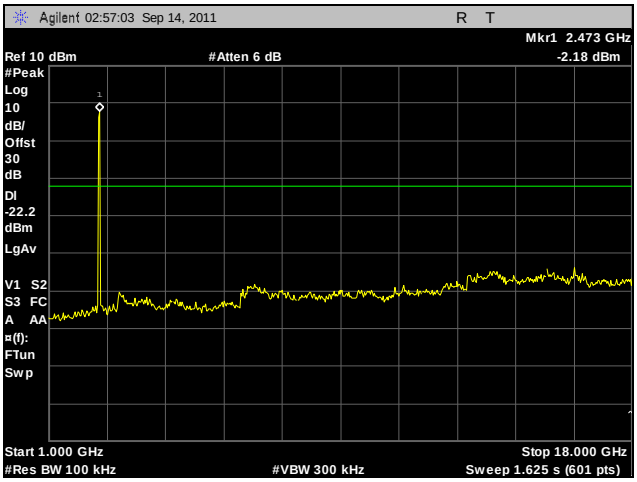

**Plot 431. Conducted Spurious Emissions, High Channel, 2.4 GHz, 802.11g HT20, Port A, 18 GHz – 26.5 GHz**

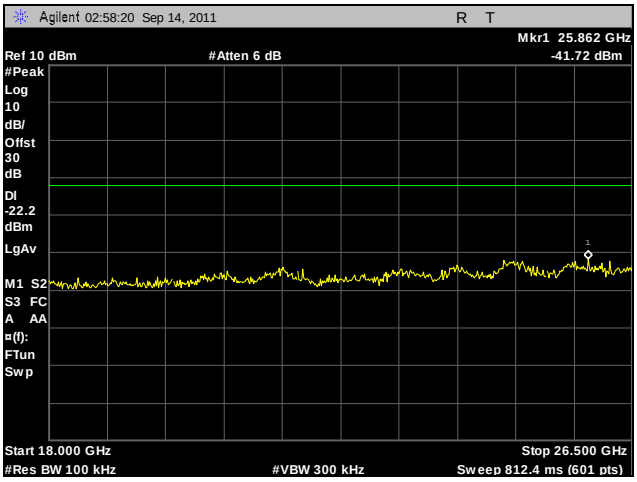
## Conducted Spurious Emissions Test Results, 2.4 GHz, 802.11g HT20, Port B, High Channel




**Plot 432. Conducted Spurious Emissions, High Channel, 2.4 GHz, 802.11g HT20, Port B, 30 MHz – 1 GHz**



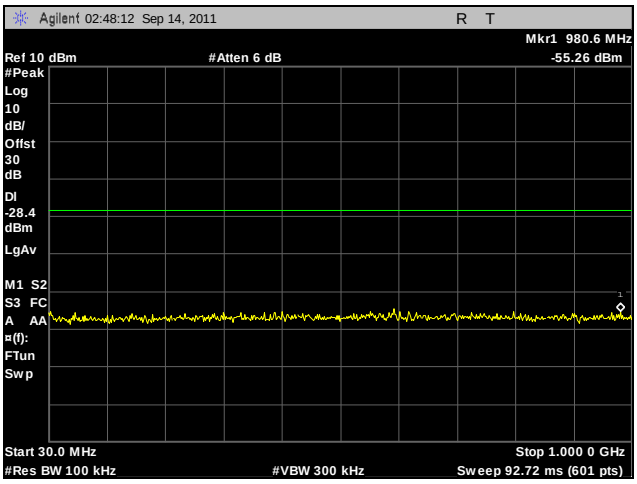

**Plot 433. Conducted Spurious Emissions, High Channel, 2.4 GHz, 802.11g HT20, Port B, 1 GHz – 18 GHz**



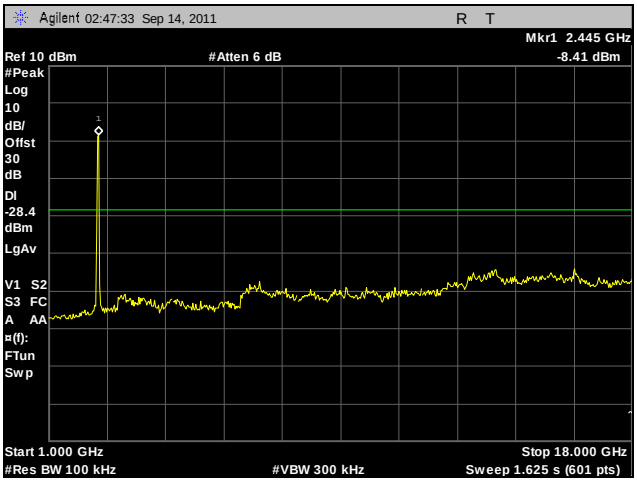

**Plot 434. Conducted Spurious Emissions, High Channel, 2.4 GHz, 802.11g HT20, Port B, 18 GHz – 26.5 GHz**

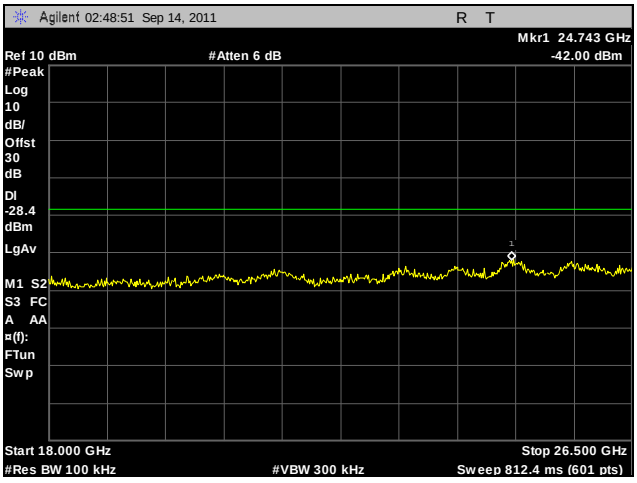
## Conducted Spurious Emissions Test Results, 2.4 GHz, 802.11g HT40, Port A, Low Channel




**Plot 435. Conducted Spurious Emissions, Low Channel, 2.4 GHz, 802.11g HT40, Port A, 30 MHz – 1 GHz**



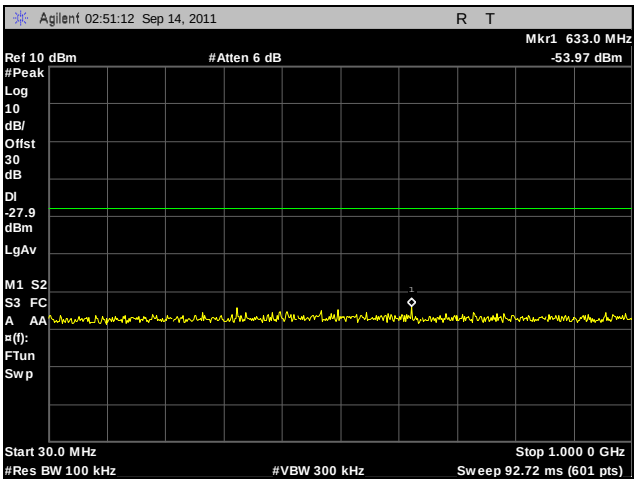

**Plot 436. Conducted Spurious Emissions, Low Channel, 2.4 GHz, 802.11g HT40, Port A, 1 GHz – 18 GHz**



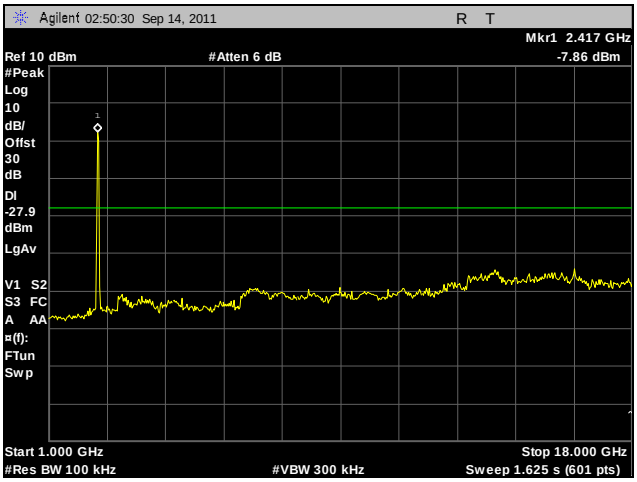

**Plot 437. Conducted Spurious Emissions, Low Channel, 2.4 GHz, 802.11g HT40, Port A, 18 GHz – 26.5 GHz**

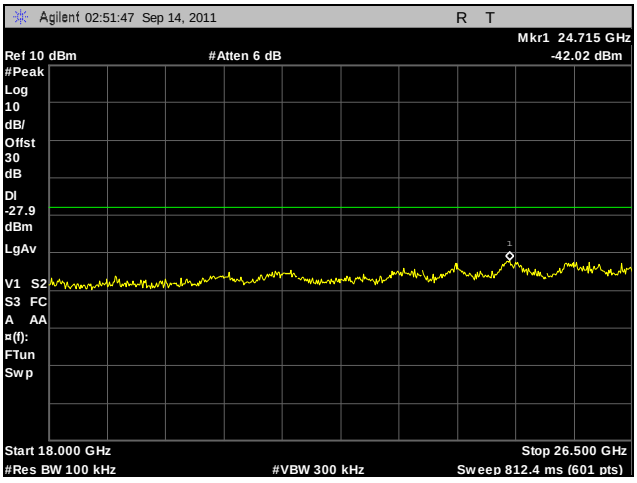
## Conducted Spurious Emissions Test Results, 2.4 GHz, 802.11g HT40, Port B, Low Channel




**Plot 438. Conducted Spurious Emissions, Low Channel, 2.4 GHz, 802.11g HT40, Port B, 30 MHz – 1 GHz**

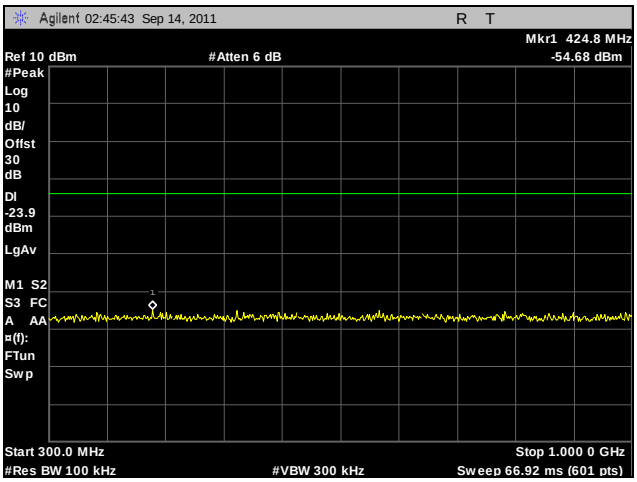



**Plot 439. Conducted Spurious Emissions, Low Channel, 2.4 GHz, 802.11g HT40, Port B, 1 GHz – 18 GHz**

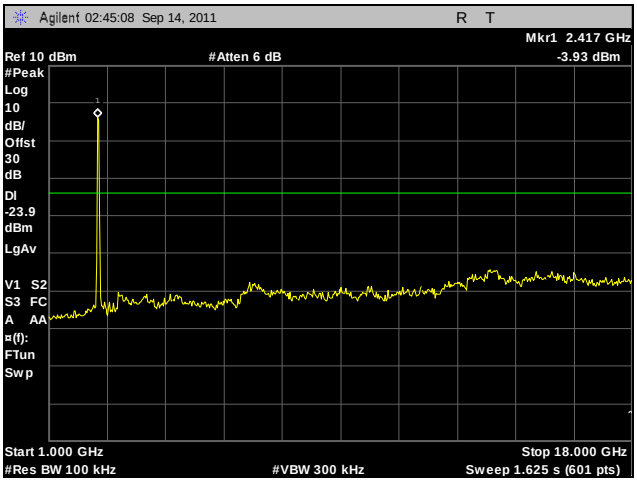



**Plot 440. Conducted Spurious Emissions, Low Channel, 2.4 GHz, 802.11g HT40, Port B, 18 GHz – 26.5 GHz**

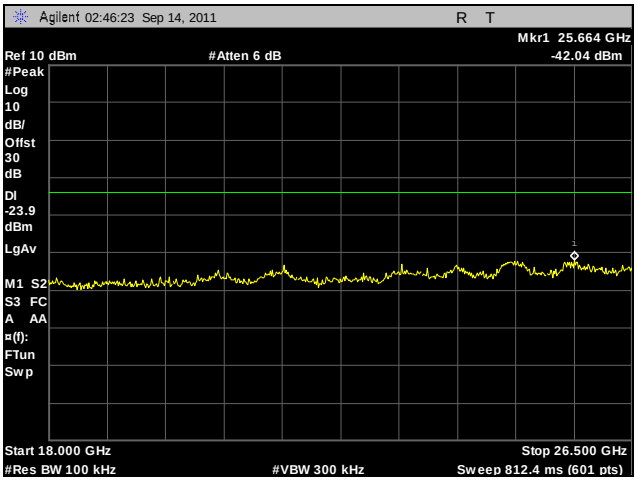
## Conducted Spurious Emissions Test Results, 2.4 GHz, 802.11g HT40, Port A, Mid Channel




**Plot 441. Conducted Spurious Emissions, Mid Channel, 2.4 GHz, 802.11g HT40, Port A, 30 MHz – 1 GHz**



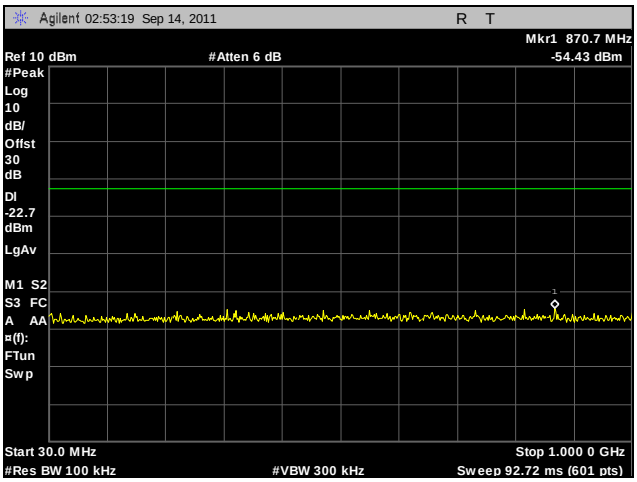

**Plot 442. Conducted Spurious Emissions, Mid Channel, 2.4 GHz, 802.11g HT40, Port A, 1 GHz – 18 GHz**



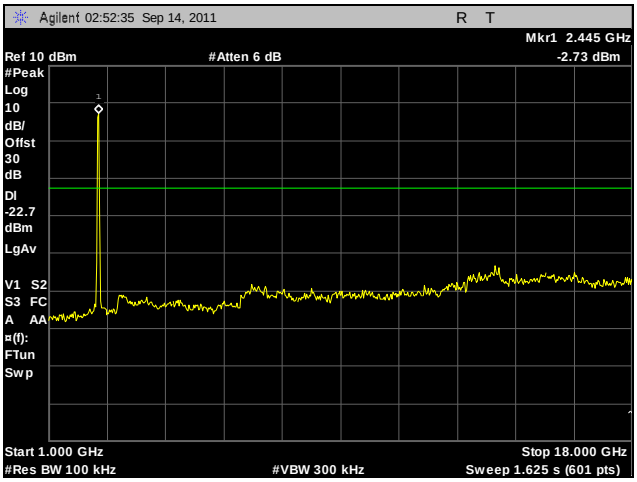

**Plot 443. Conducted Spurious Emissions, Mid Channel, 2.4 GHz, 802.11g HT40, Port A, 18 GHz – 26.5 GHz**

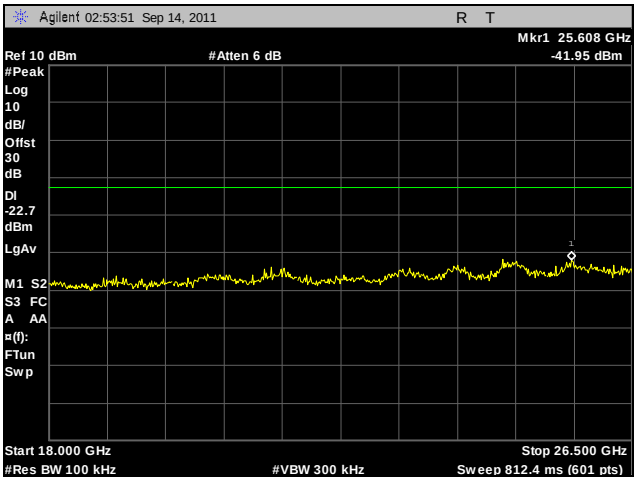
## Conducted Spurious Emissions Test Results, 2.4 GHz, 802.11g HT40, Port B, Mid Channel




**Plot 444. Conducted Spurious Emissions, Mid Channel, 2.4 GHz, 802.11g HT40, Port B, 30 MHz – 1 GHz**



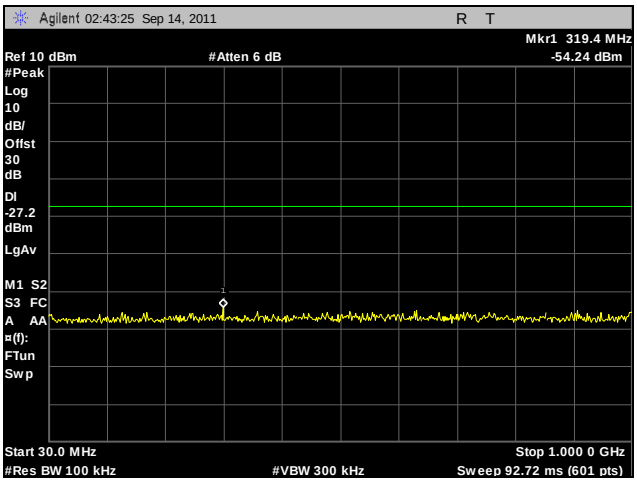

**Plot 445. Conducted Spurious Emissions, Mid Channel, 2.4 GHz, 802.11g HT40, Port B, 1 GHz – 18 GHz**



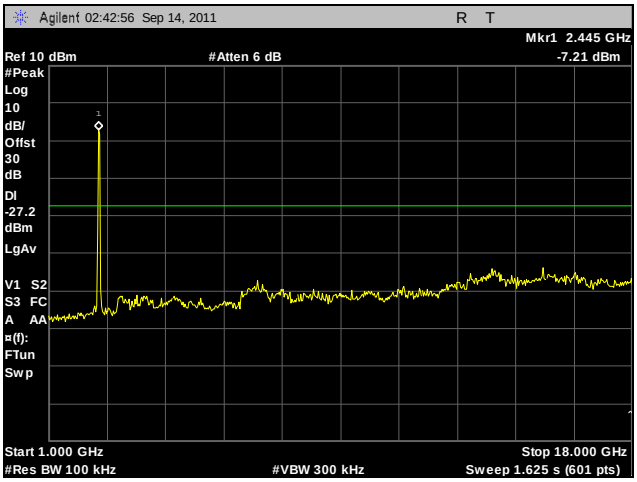

**Plot 446. Conducted Spurious Emissions, Mid Channel, 2.4 GHz, 802.11g HT40, Port B, 18 GHz – 26.5 GHz**

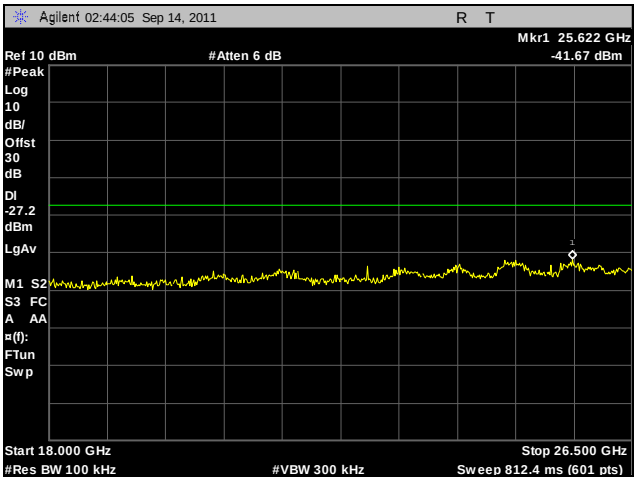
## Conducted Spurious Emissions Test Results, 2.4 GHz, 802.11g HT40, Port A, High Channel




**Plot 447. Conducted Spurious Emissions, High Channel, 2.4 GHz, 802.11g HT40, Port A, 30 MHz – 1 GHz**



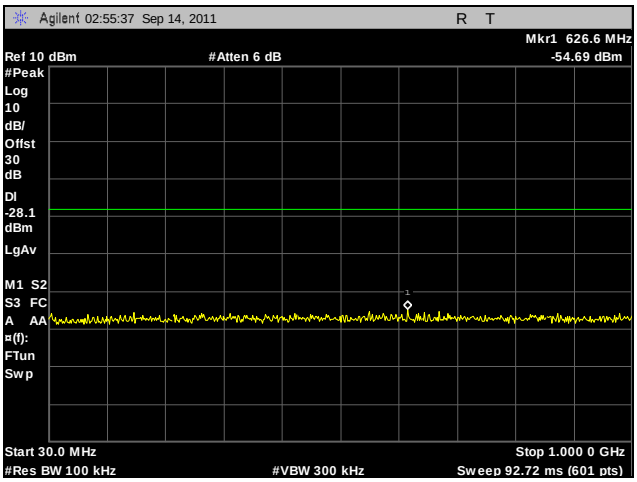

**Plot 448. Conducted Spurious Emissions, High Channel, 2.4 GHz, 802.11g HT40, Port A, 1 GHz – 18 GHz**



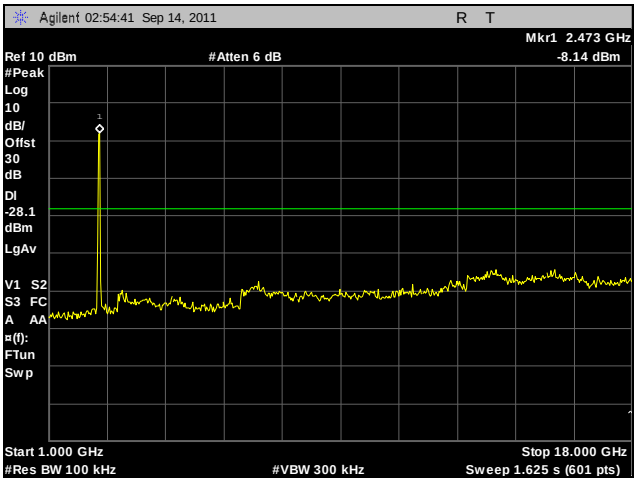

**Plot 449. Conducted Spurious Emissions, High Channel, 2.4 GHz, 802.11g HT40, Port A, 18 GHz – 26.5 GHz**

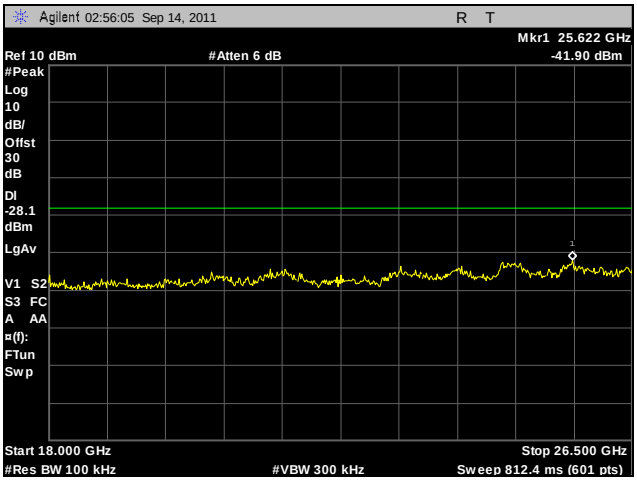
## Conducted Spurious Emissions Test Results, 2.4 GHz, 802.11g HT40, Port B, High Channel




**Plot 450. Conducted Spurious Emissions, High Channel, 2.4 GHz, 802.11g HT40, Port B, 30 MHz – 1 GHz**



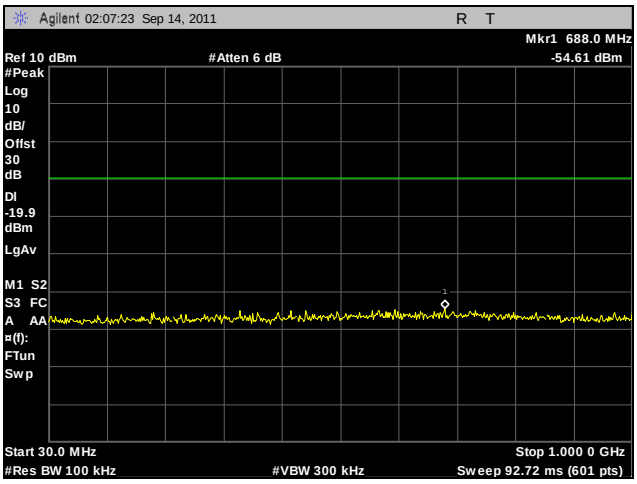

**Plot 451. Conducted Spurious Emissions, High Channel, 2.4 GHz, 802.11g HT40, Port B, 1 GHz – 18 GHz**



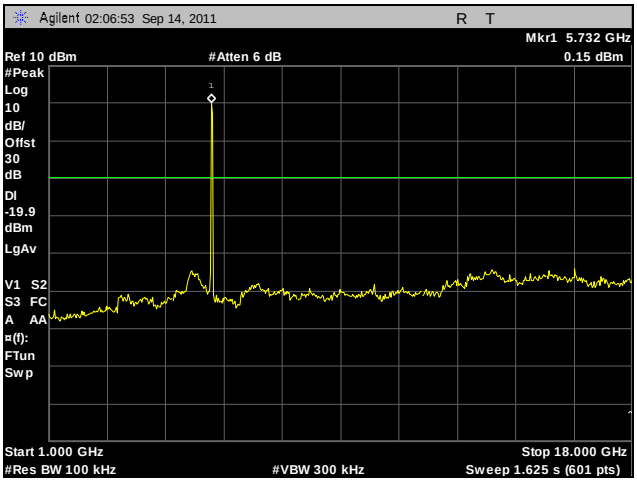

**Plot 452. Conducted Spurious Emissions, High Channel, 2.4 GHz, 802.11g HT40, Port B, 18 GHz – 26.5 GHz**

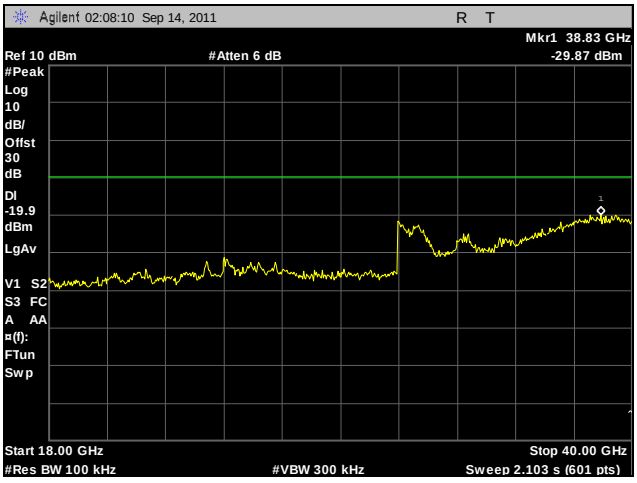
## Conducted Spurious Emissions Test Results, 5.8 GHz, 802.11a, Port A




**Plot 453. Conducted Spurious Emissions, Low Channel, 5.8 GHz, 802.11a, Port A, 30 MHz – 1 GHz**

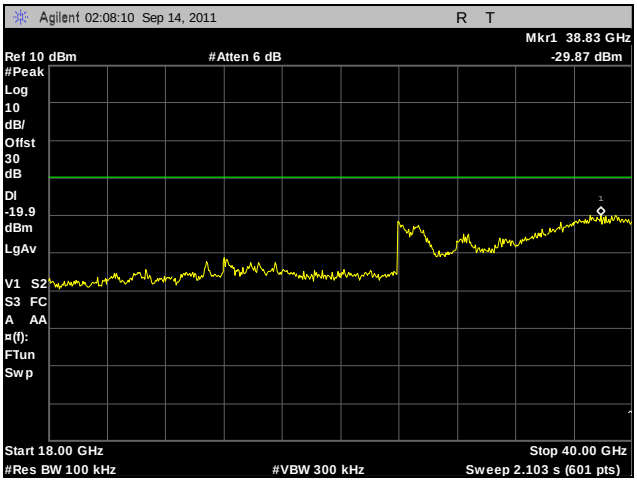



**Plot 454. Conducted Spurious Emissions, Low Channel, 5.8 GHz, 802.11a, Port A, 1 GHz – 18 GHz**

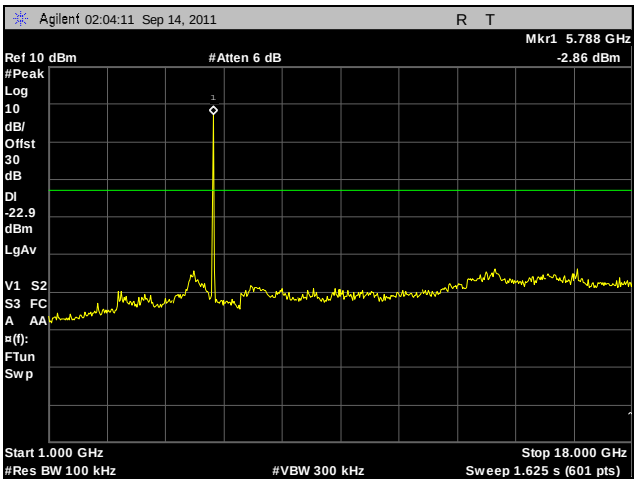



**Plot 455. Conducted Spurious Emissions, Low Channel, 5.8 GHz, 802.11a, Port A, 18 GHz – 40 GHz**

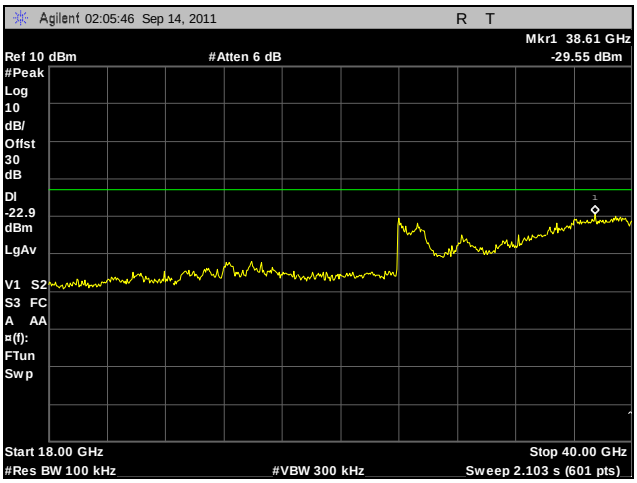
  



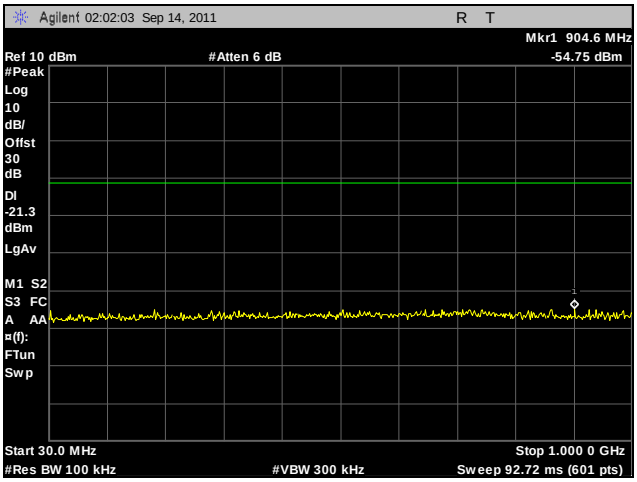

**Plot 456. Conducted Spurious Emissions, Mid Channel, 5.8 GHz, 802.11a, Port A, 30 MHz – 1 GHz**



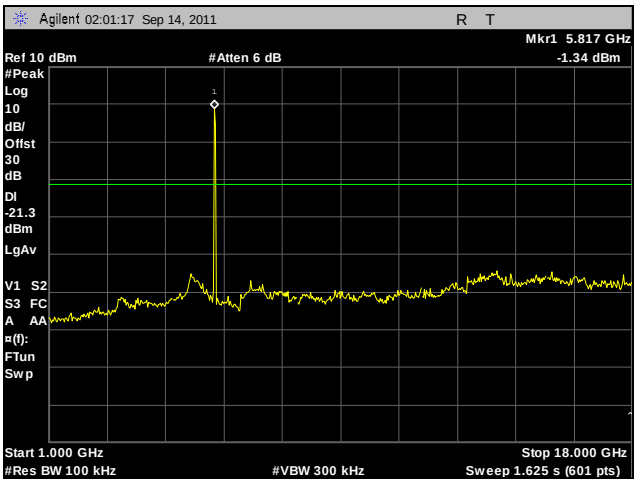

**Plot 457. Conducted Spurious Emissions, Mid Channel, 5.8 GHz, 802.11a, Port A, 1 GHz – 18 GHz**



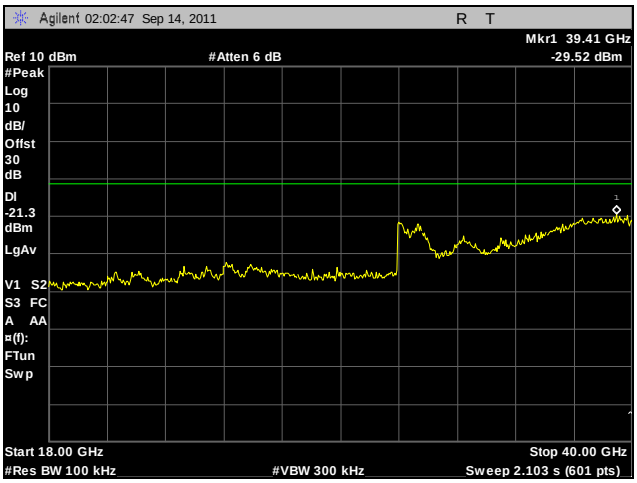

**Plot 458. Conducted Spurious Emissions, Mid Channel, 5.8 GHz, 802.11a, Port A, 18 GHz – 40 GHz**




**Plot 459. Conducted Spurious Emissions, High Channel, 5.8 GHz, 802.11a, Port A, 30 MHz – 1 GHz**



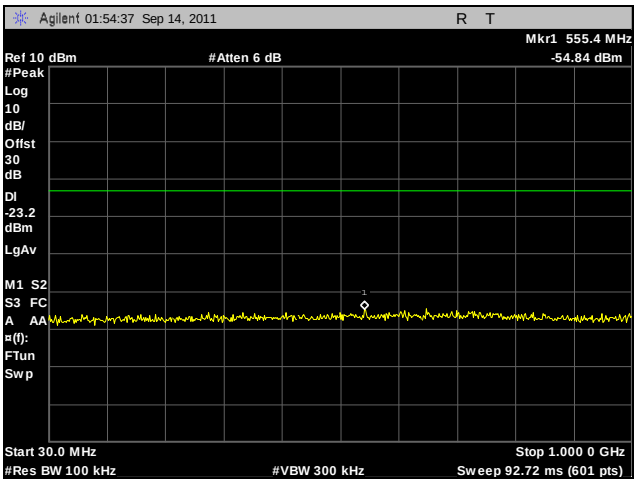

**Plot 460. Conducted Spurious Emissions, High Channel, 5.8 GHz, 802.11a, Port A, 1 GHz – 18 GHz**



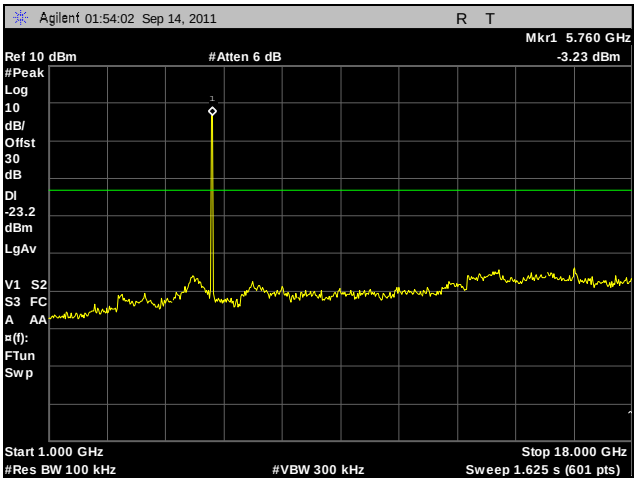

**Plot 461. Conducted Spurious Emissions, High Channel, 5.8 GHz, 802.11a, Port A, 18 GHz – 40 GHz**

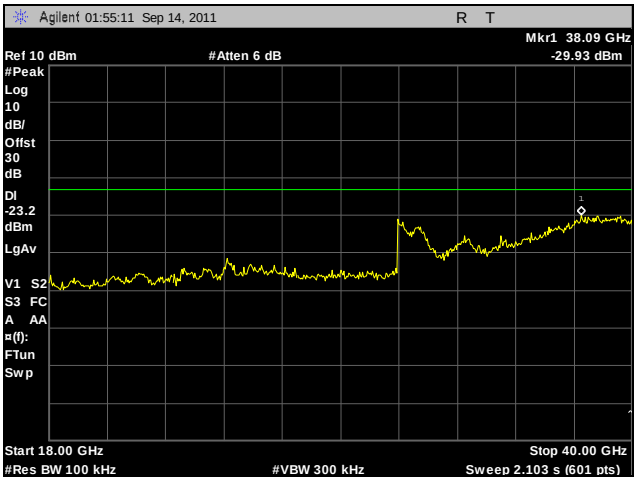
## Conducted Spurious Emissions Test Results, 5.8 GHz, 802.11n 20 MHz, Port A, Low Channel




**Plot 462. Conducted Spurious Emissions, Low Channel, 5.8 GHz, 802.11n 20 MHz, Port A, 30 MHz – 1 GHz**



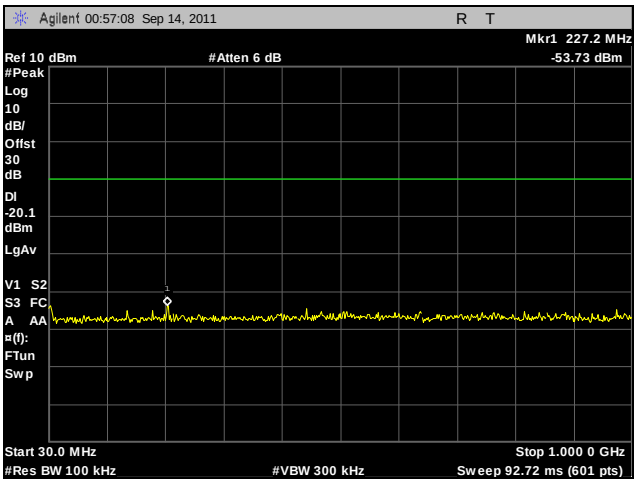

**Plot 463. Conducted Spurious Emissions, Low Channel, 5.8 GHz, 802.11n 20 MHz, Port A, 1 GHz – 18 GHz**



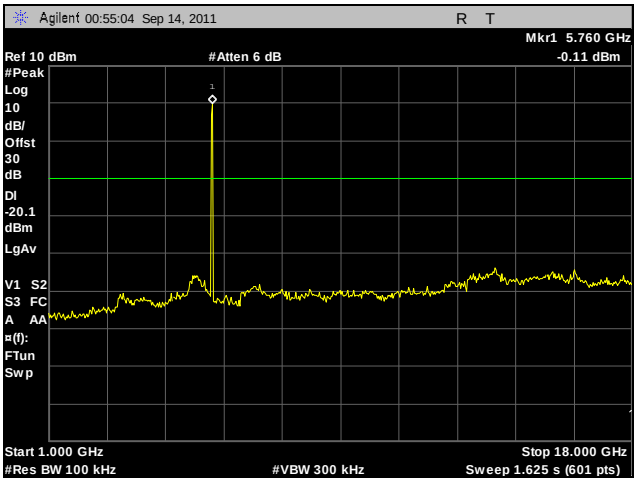

**Plot 464. Conducted Spurious Emissions, Low Channel, 5.8 GHz, 802.11n 20 MHz, Port A, 18 GHz – 40 GHz**

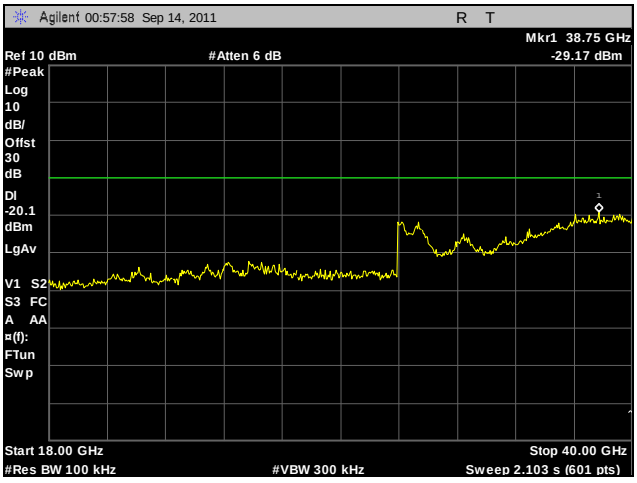
## Conducted Spurious Emissions Test Results, 5.8 GHz, 802.11n 20 MHz, Port B, Low Channel




**Plot 465. Conducted Spurious Emissions, Low Channel, 5.8 GHz, 802.11n 20 MHz, Port B, 30 MHz – 1 GHz**

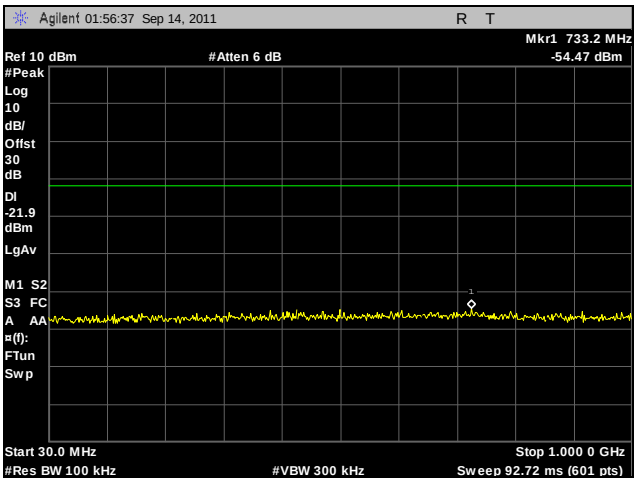



**Plot 466. Conducted Spurious Emissions, Low Channel, 5.8 GHz, 802.11n 20 MHz, Port B, 1 GHz – 18 GHz**

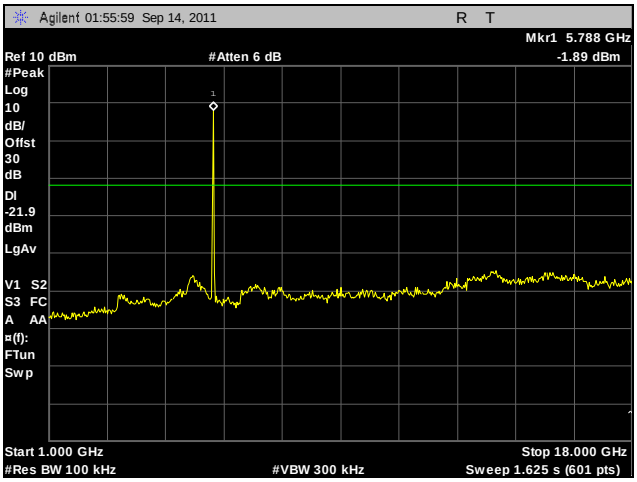



**Plot 467. Conducted Spurious Emissions, Low Channel, 5.8 GHz, 802.11n 20 MHz, Port B, 18 GHz – 40 GHz**

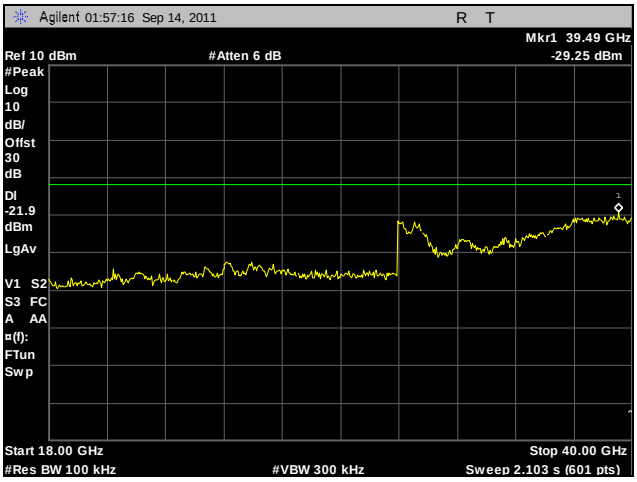
## Conducted Spurious Emissions Test Results, 5.8 GHz, 802.11n 20 MHz, Port A, Mid Channel




**Plot 468. Conducted Spurious Emissions, Mid Channel, 5.8 GHz, 802.11n 20 MHz, Port A, 30 MHz – 1 GHz**



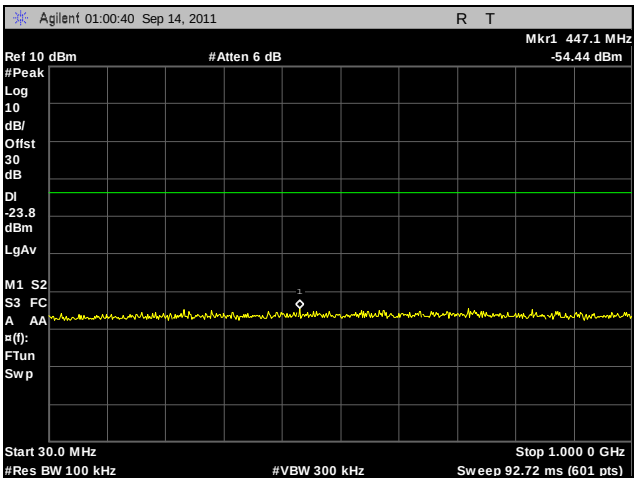

**Plot 469. Conducted Spurious Emissions, Mid Channel, 5.8 GHz, 802.11n 20 MHz, Port A, 1 GHz – 18 GHz**



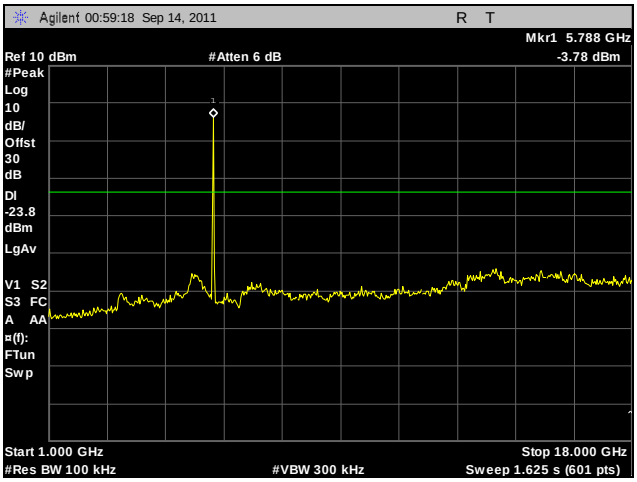

**Plot 470. Conducted Spurious Emissions, Mid Channel, 5.8 GHz, 802.11n 20 MHz, Port A, 18 GHz – 40 GHz**

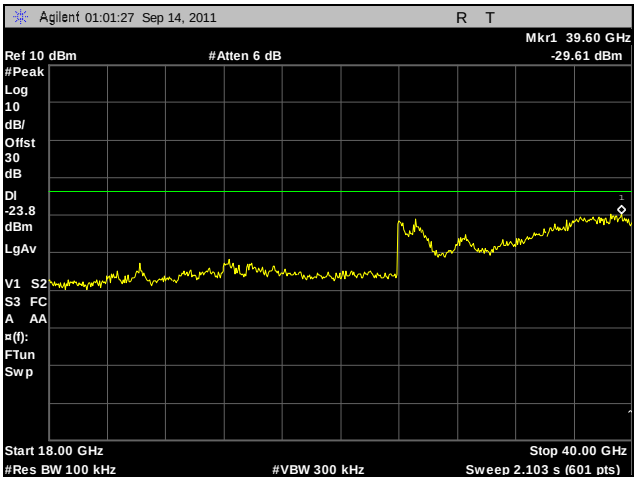
## Conducted Spurious Emissions Test Results, 5.8 GHz, 802.11n 20 MHz, Port B, Mid Channel




**Plot 471. Conducted Spurious Emissions, Mid Channel, 5.8 GHz, 802.11n 20 MHz, Port B, 30 MHz – 1 GHz**



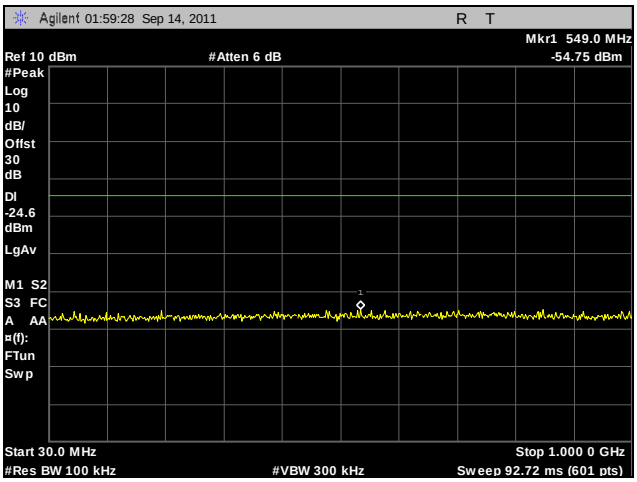

**Plot 472. Conducted Spurious Emissions, Mid Channel, 5.8 GHz, 802.11n 20 MHz, Port B, 1 GHz – 18 GHz**



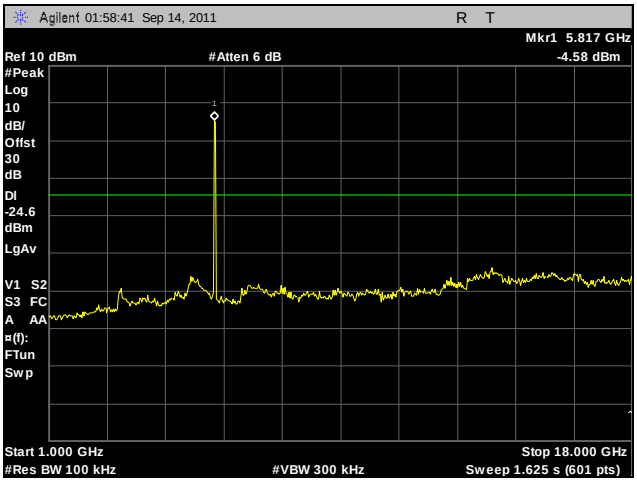

**Plot 473. Conducted Spurious Emissions, Mid Channel, 5.8 GHz, 802.11n 20 MHz, Port B, 18 GHz – 40 GHz**

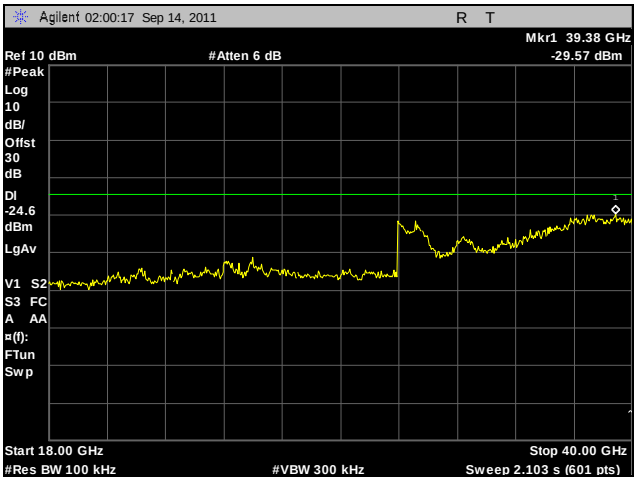
## Conducted Spurious Emissions Test Results, 5.8 GHz, 802.11n 20 MHz, Port A, High Channel




**Plot 474. Conducted Spurious Emissions, High Channel, 5.8 GHz, 802.11n 20 MHz, Port A, 30 MHz – 1 GHz**



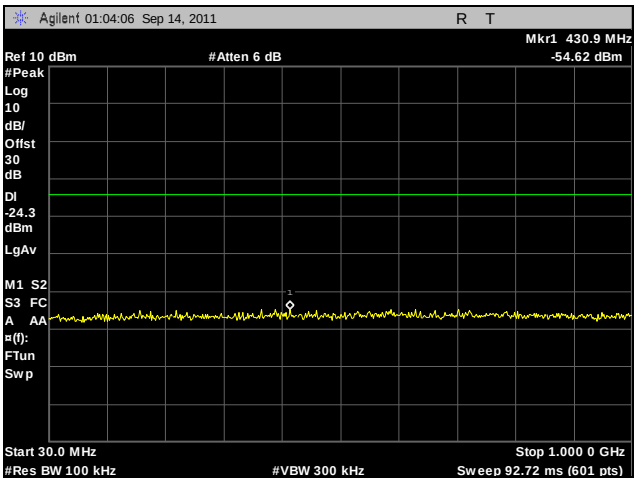

**Plot 475. Conducted Spurious Emissions, High Channel, 5.8 GHz, 802.11n 20 MHz, Port A, 1 GHz – 18 GHz**



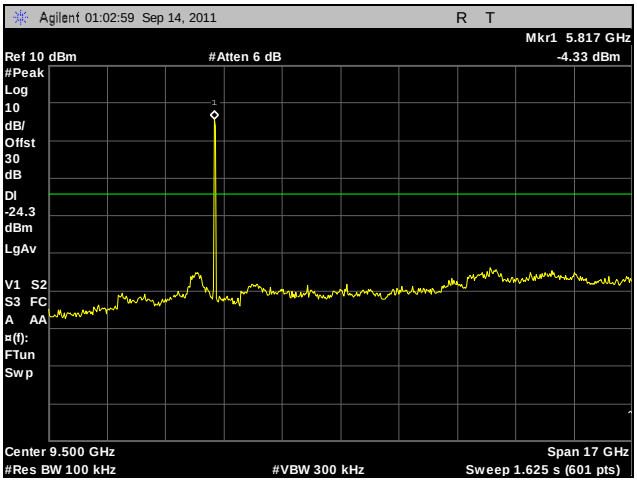

**Plot 476. Conducted Spurious Emissions, High Channel, 5.8 GHz, 802.11n 20 MHz, Port A, 18 GHz – 40 GHz**

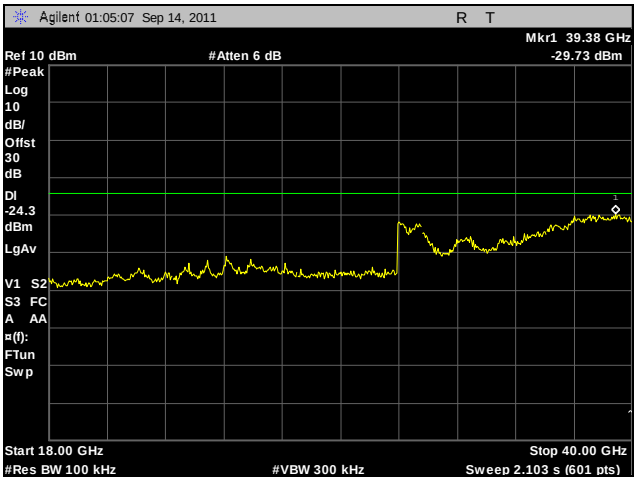
## Conducted Spurious Emissions Test Results, 5.8 GHz, 802.11n 20 MHz, Port B, High Channel




**Plot 477. Conducted Spurious Emissions, High Channel, 5.8 GHz, 802.11n 20 MHz, Port B, 30 MHz – 1 GHz**



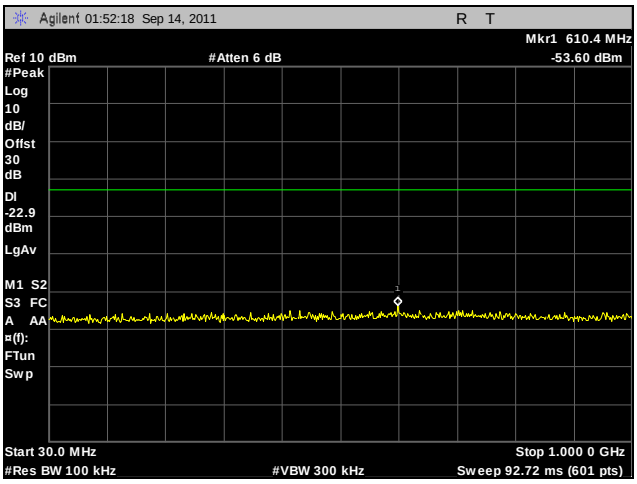

**Plot 478. Conducted Spurious Emissions, High Channel, 5.8 GHz, 802.11n 20 MHz, Port B, 1 GHz – 18 GHz**



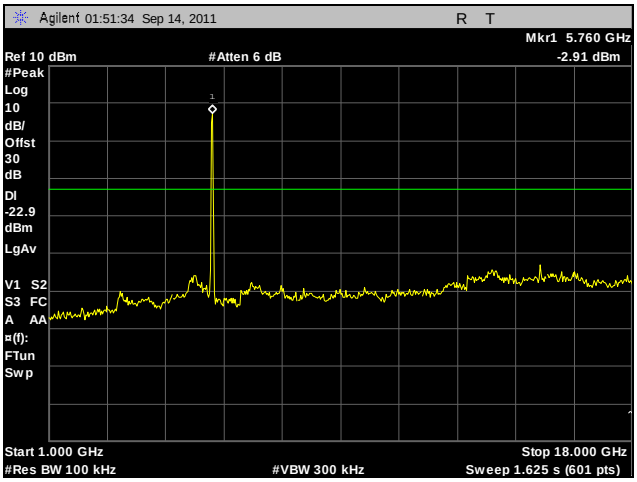

**Plot 479. Conducted Spurious Emissions, High Channel, 5.8 GHz, 802.11n 20 MHz, Port B, 18 GHz – 40 GHz**

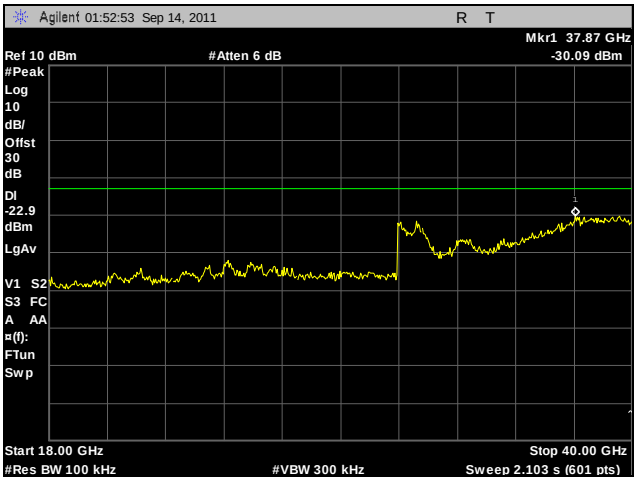
## Conducted Spurious Emissions Test Results, 5.8 GHz, 802.11n 40 MHz, Port A, Low Channel




**Plot 480. Conducted Spurious Emissions, Low Channel, 5.8 GHz, 802.11n 40 MHz, Port A, 30 MHz – 1 GHz**



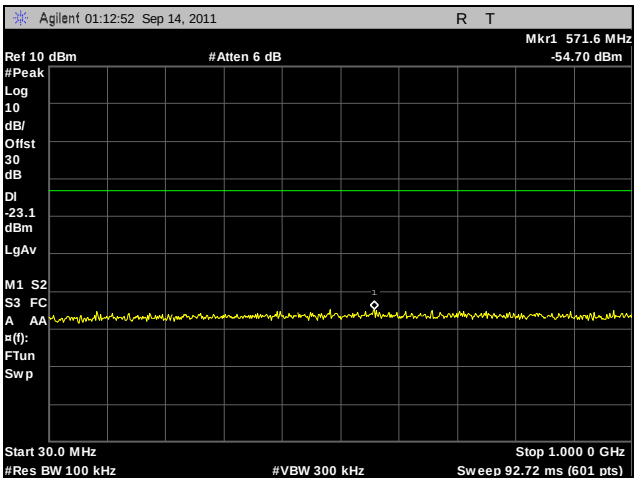

**Plot 481. Conducted Spurious Emissions, Low Channel, 5.8 GHz, 802.11n 40 MHz, Port A, 1 GHz – 18 GHz**



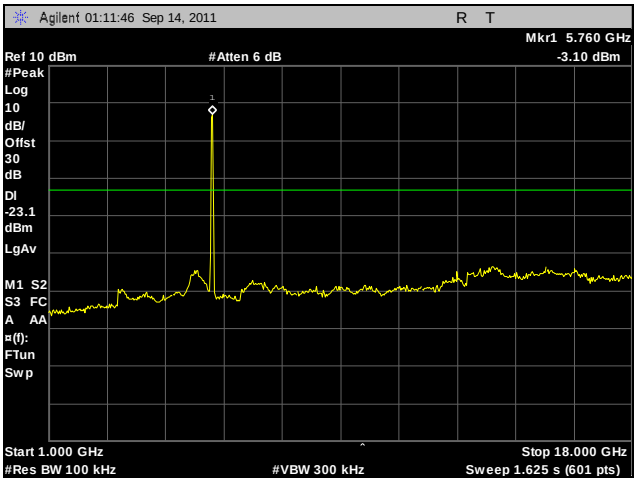

**Plot 482. Conducted Spurious Emissions, Low Channel, 5.8 GHz, 802.11n 40 MHz, Port A, 18 GHz – 40 GHz**

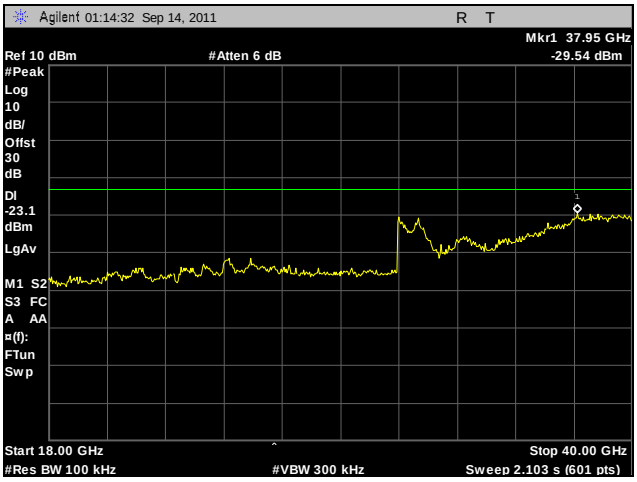
## Conducted Spurious Emissions Test Results, 5.8 GHz, 802.11n 40 MHz, Port B, Low Channel




**Plot 483. Conducted Spurious Emissions, Low Channel, 5.8 GHz, 802.11n 40 MHz, Port B, 30 MHz – 1 GHz**



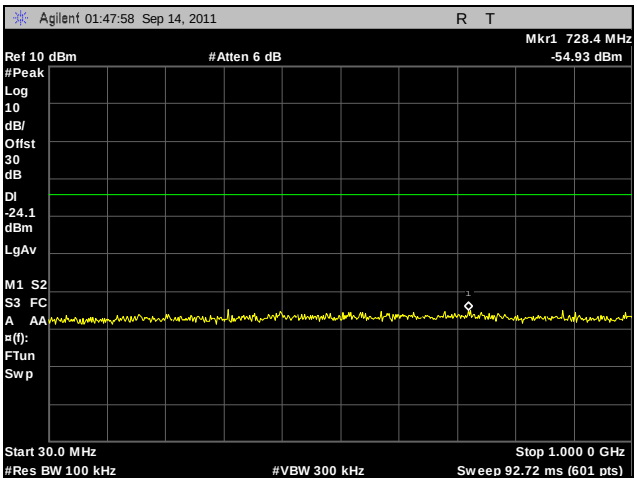

**Plot 484. Conducted Spurious Emissions, Low Channel, 5.8 GHz, 802.11n 40 MHz, Port B, 1 GHz – 18 GHz**



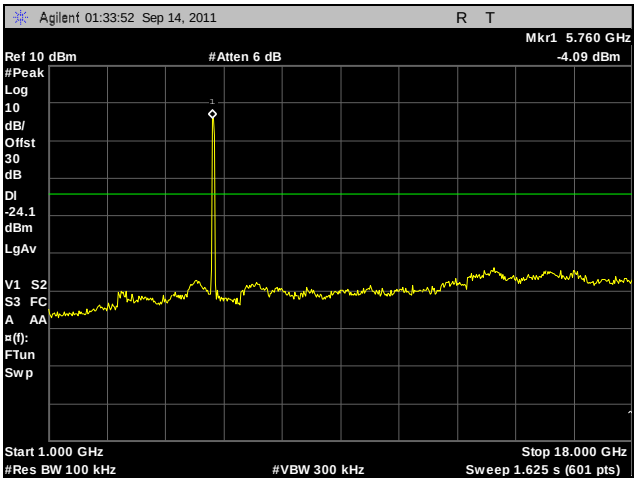

**Plot 485. Conducted Spurious Emissions, Low Channel, 5.8 GHz, 802.11n 40 MHz, Port B, 18 GHz – 40 GHz**

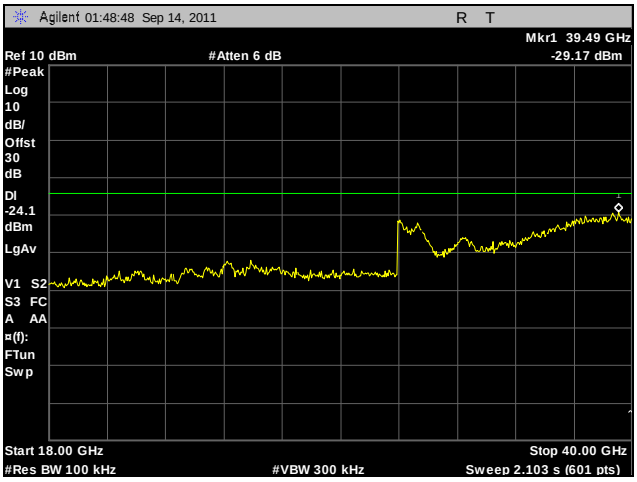
## Conducted Spurious Emissions Test Results, 5.8 GHz, 802.11n 40 MHz, Port A, Mid Channel




**Plot 486. Conducted Spurious Emissions, Mid Channel, 5.8 GHz, 802.11n 40 MHz, Port A, 30 MHz – 1 GHz**



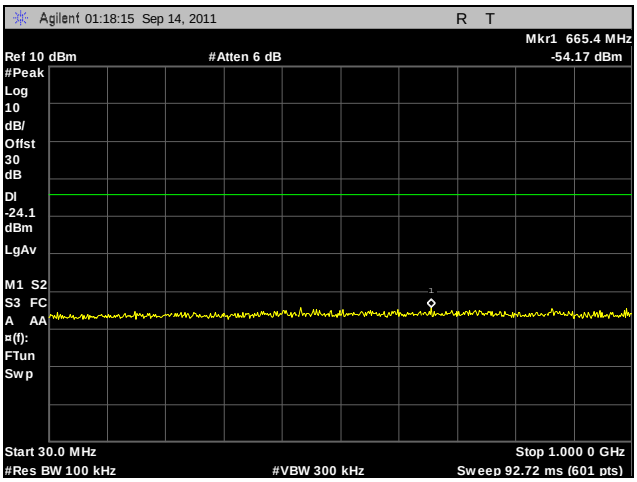

**Plot 487. Conducted Spurious Emissions, Mid Channel, 5.8 GHz, 802.11n 40 MHz, Port A, 1 GHz – 18 GHz**



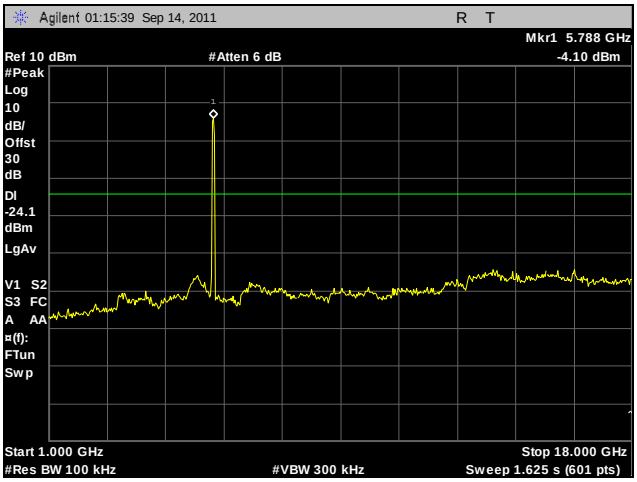

**Plot 488. Conducted Spurious Emissions, Mid Channel, 5.8 GHz, 802.11n 40 MHz, Port A, 18 GHz – 40 GHz**

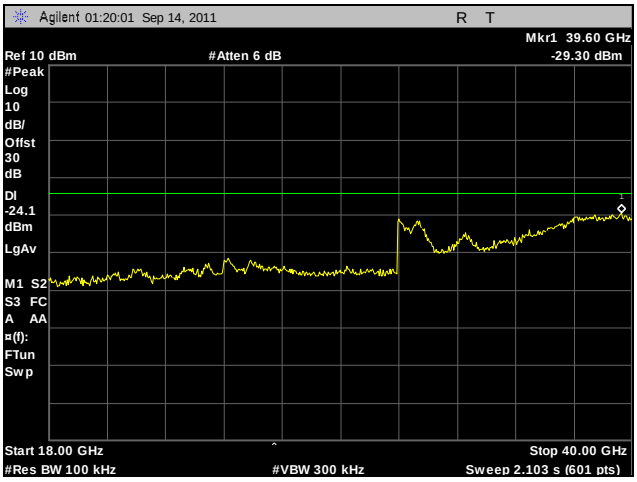
## Conducted Spurious Emissions Test Results, 5.8 GHz, 802.11n 40 MHz, Port B, Mid Channel




**Plot 489. Conducted Spurious Emissions, Mid Channel, 5.8 GHz, 802.11n 40 MHz, Port B, 30 MHz – 1 GHz**



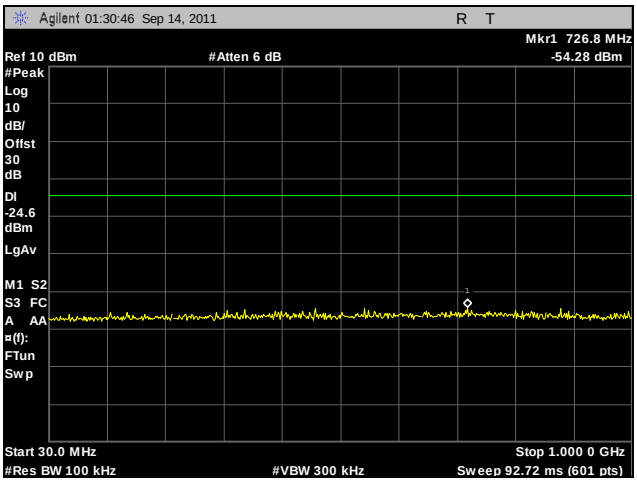

**Plot 490. Conducted Spurious Emissions, Mid Channel, 5.8 GHz, 802.11n 40 MHz, Port B, 1 GHz – 18 GHz**



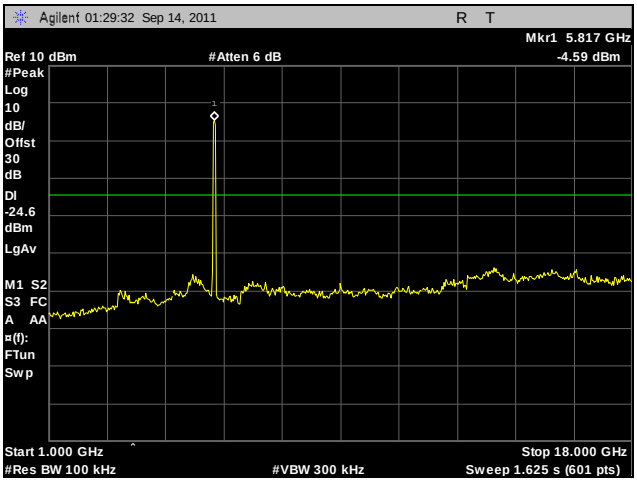

**Plot 491. Conducted Spurious Emissions, Mid Channel, 5.8 GHz, 802.11n 40 MHz, Port B, 18 GHz – 40 GHz**

## Conducted Spurious Emissions Test Results, 5.8 GHz, 802.11n 40 MHz, Port A, High Channel




**Plot 492. Conducted Spurious Emissions, High Channel, 5.8 GHz, 802.11n 40 MHz, Port A, 30 MHz – 1 GHz**

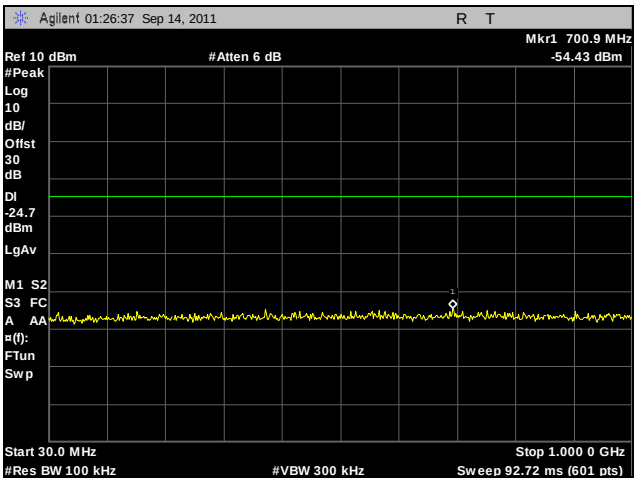



**Plot 493. Conducted Spurious Emissions, High Channel, 5.8 GHz, 802.11n 40 MHz, Port A, 1 GHz – 18 GHz**

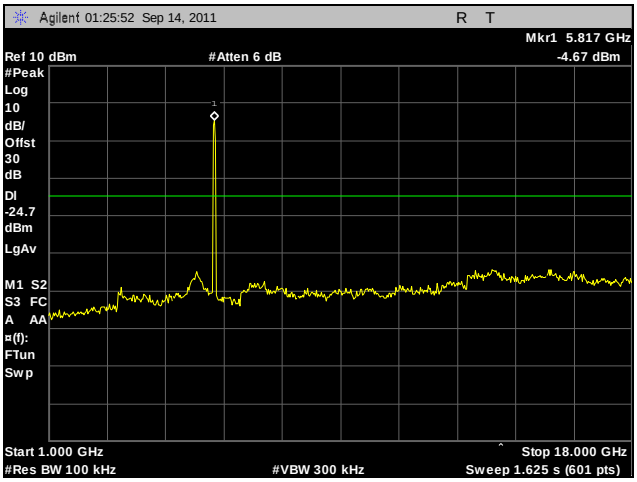

**Plot 494. Conducted Spurious Emissions, High Channel, 5.8 GHz, 802.11n 40 MHz, Port A, 18 GHz – 40 GHz**

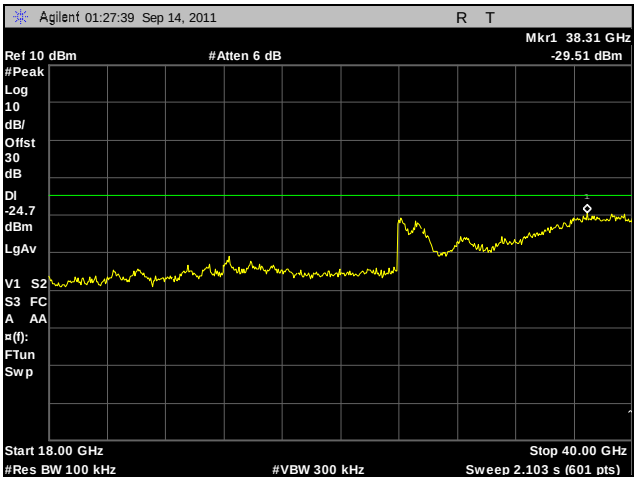
## Conducted Spurious Emissions Test Results, 5.8 GHz, 802.11n 40 MHz, Port B, High Channel




**Plot 495. Conducted Spurious Emissions, High Channel, 5.8 GHz, 802.11n 40 MHz, Port B, 30 MHz – 1 GHz**



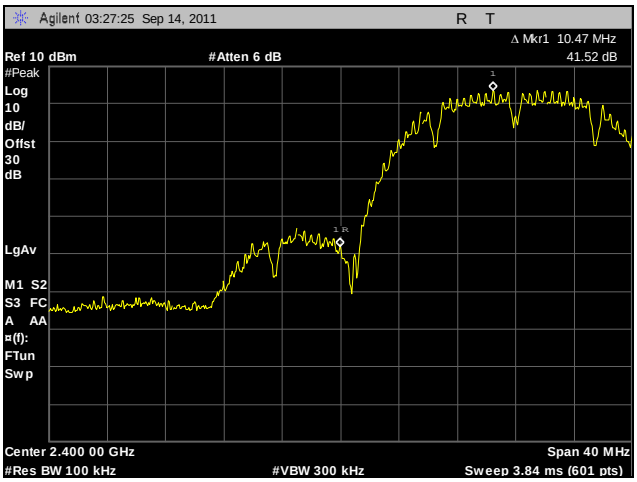

**Plot 496. Conducted Spurious Emissions, High Channel, 5.8 GHz, 802.11n 40 MHz, Port B, 1 GHz – 18 GHz**



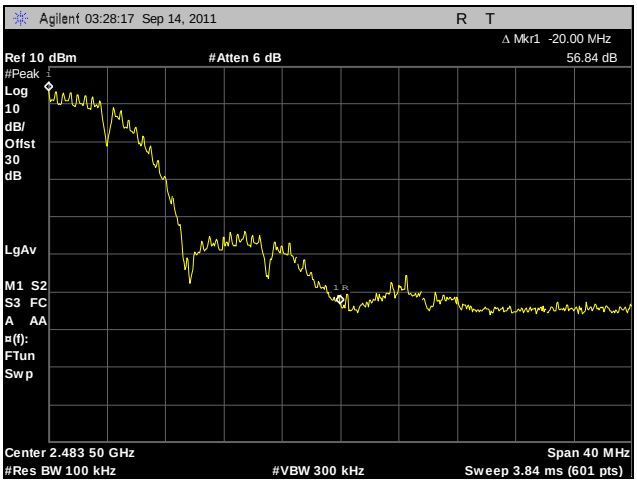

**Plot 497. Conducted Spurious Emissions, High Channel, 5.8 GHz, 802.11n 40 MHz, Port B, 18 GHz – 40 GHz**

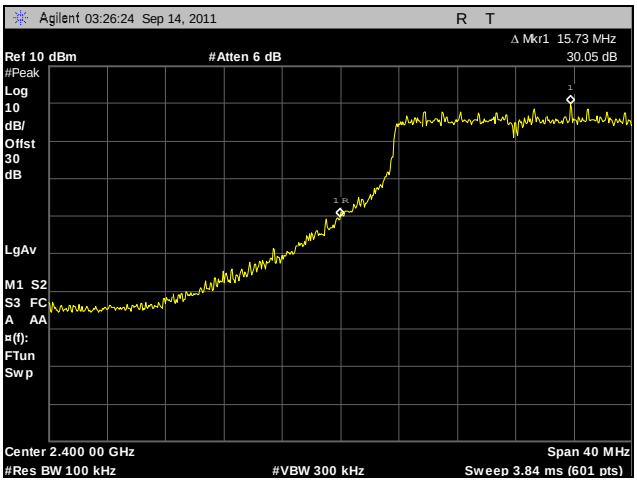
## Conducted Band Edge Test Results, 2.4 GHz



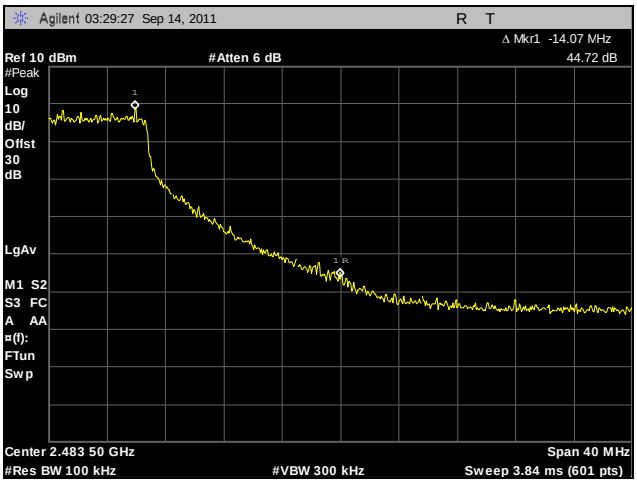

**Plot 498. Conducted Band Edge, Low Channel, 2.4 GHz, 802.11b, Port A**



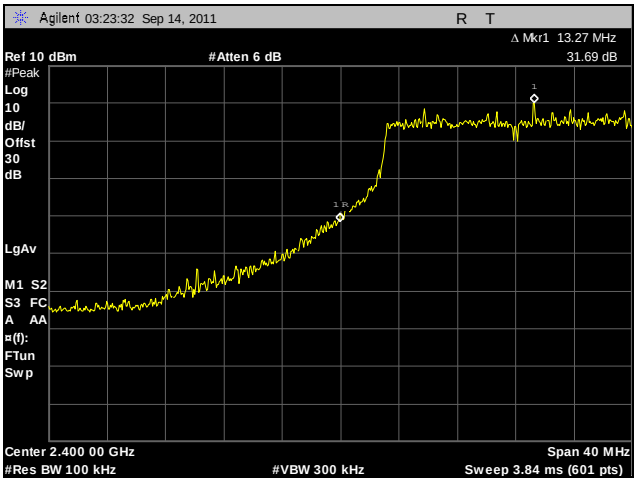

**Plot 499. Conducted Band Edge, High, Channel, 2.4 GHz, 802.11b, Port A**



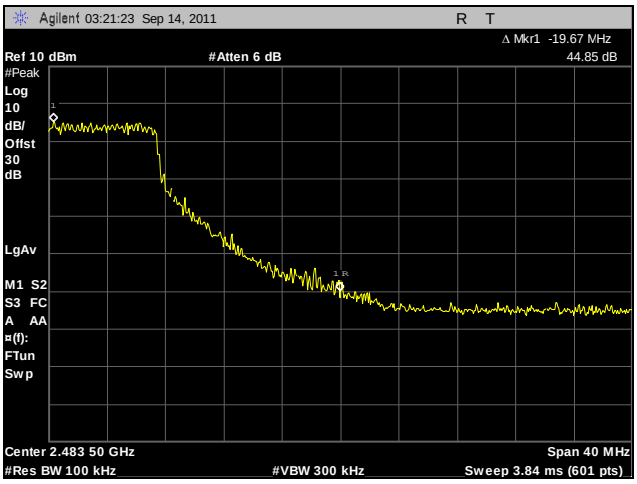

**Plot 500. Conducted Band Edge, Low Channel, 2.4 GHz, 802.11g, Port A**



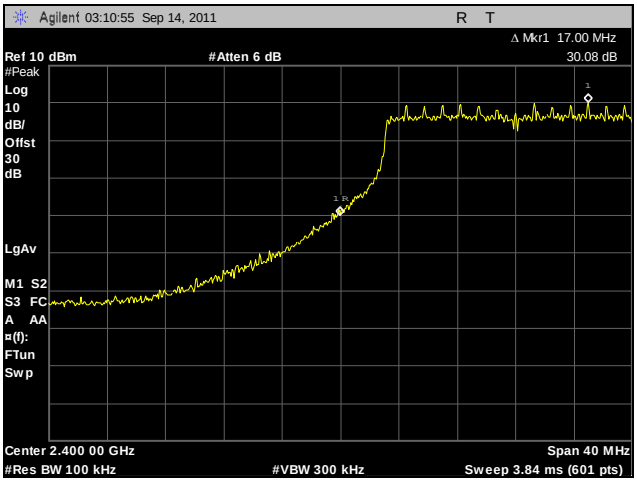

**Plot 501. Conducted Band Edge, High, Channel, 2.4 GHz, 802.11g, Port A**



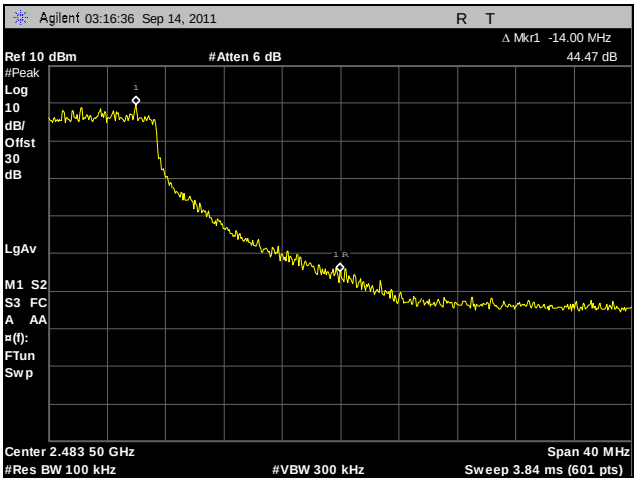

**Plot 502. Conducted Band Edge, Low Channel, 2.4 GHz, 802.11g HT20, Port A**



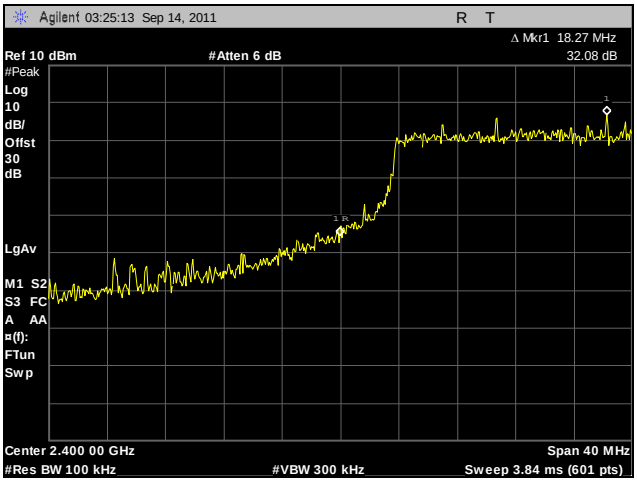

**Plot 503. Conducted Band Edge, High, Channel, 2.4 GHz, 802.11g HT20, Port A**




**Plot 504. Conducted Band Edge, Low Channel, 2.4 GHz, 802.11g HT20, Port B**

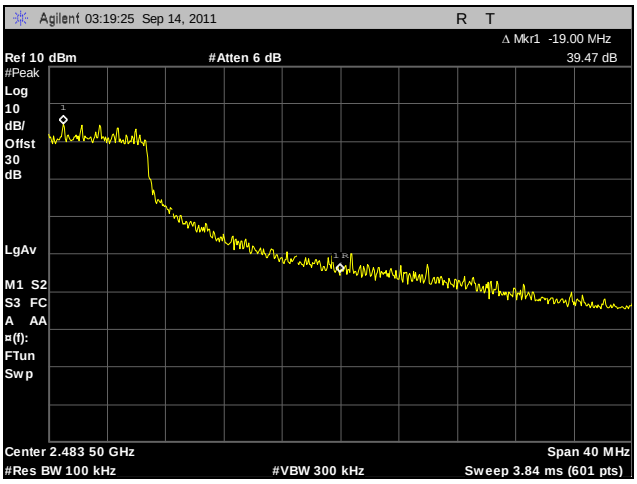



**Plot 505. Conducted Band Edge, High, Channel, 2.4 GHz, 802.11g HT20, Port B**

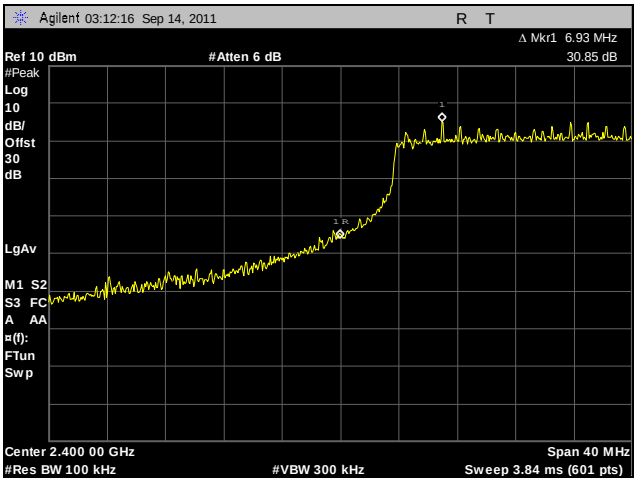



**Plot 506. Conducted Band Edge, Low Channel, 2.4 GHz, 802.11g HT40, Port A**

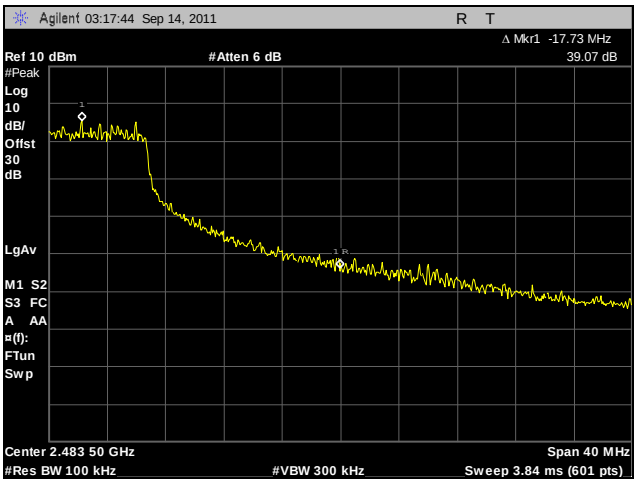
  




**Plot 507. Conducted Band Edge, High, Channel, 2.4 GHz, 802.11g HT40, Port A**



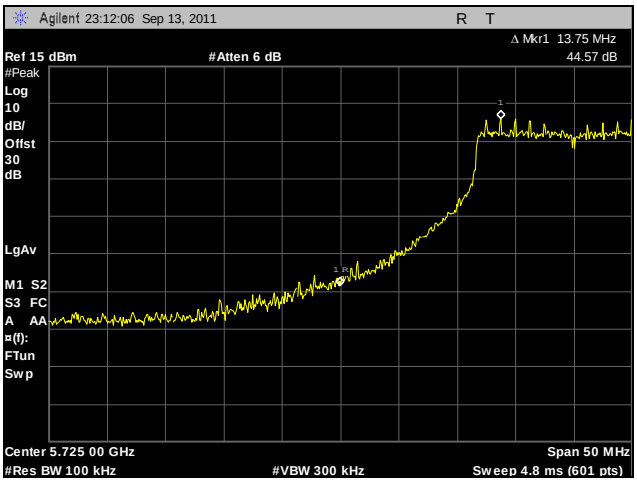

**Plot 508. Conducted Band Edge, Low Channel, 2.4 GHz, 802.11g HT40, Port B**



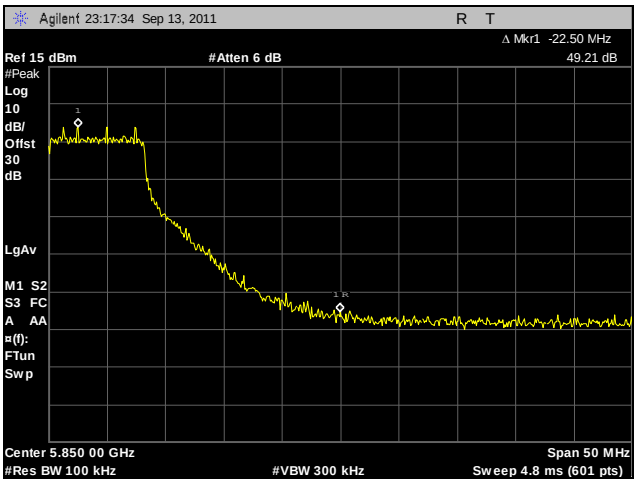

**Plot 509. Conducted Band Edge, High, Channel, 2.4 GHz, 802.11g HT40, Port B**

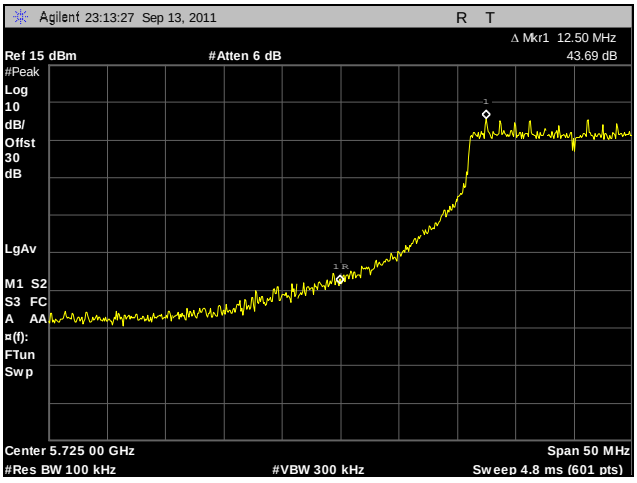
## Conducted Band Edge Test Results, 5.8 GHz



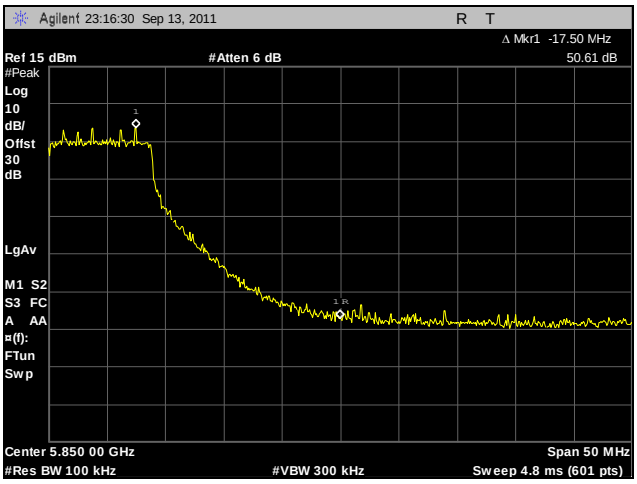

**Plot 510. Conducted Band Edge, Low Channel, 5.8 GHz, 802.11a, Port A**



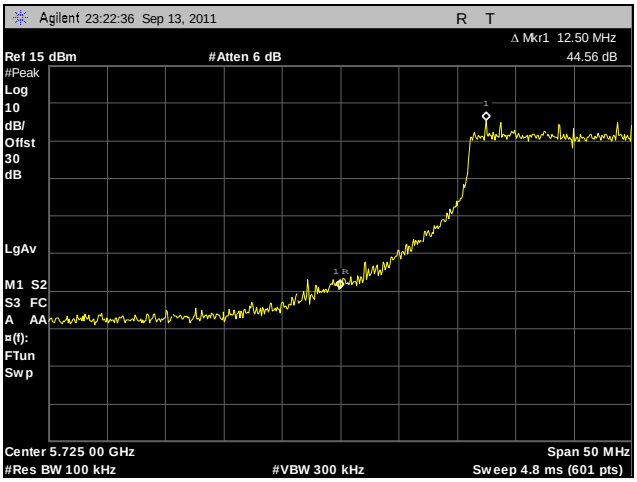

**Plot 511. Conducted Band Edge, High, Channel, 5.8 GHz, 802.11a, Port A**



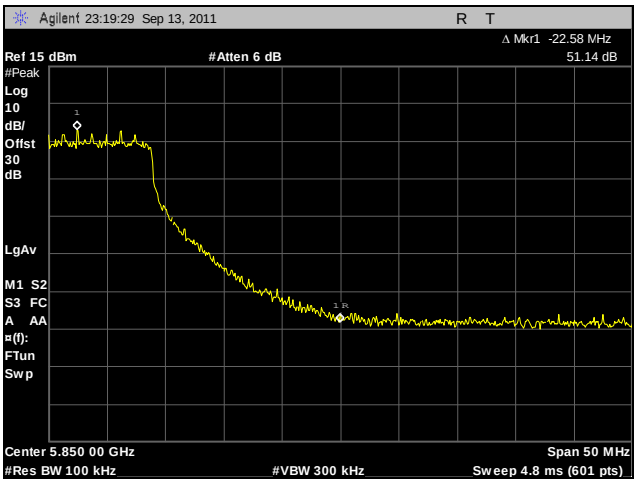

**Plot 512. Conducted Band Edge, Low Channel, 5.8 GHz, 802.11n 20 MHz, Port A**




**Plot 513. Conducted Band Edge, High, Channel, 5.8 GHz, 802.11n 20 MHz, Port A**

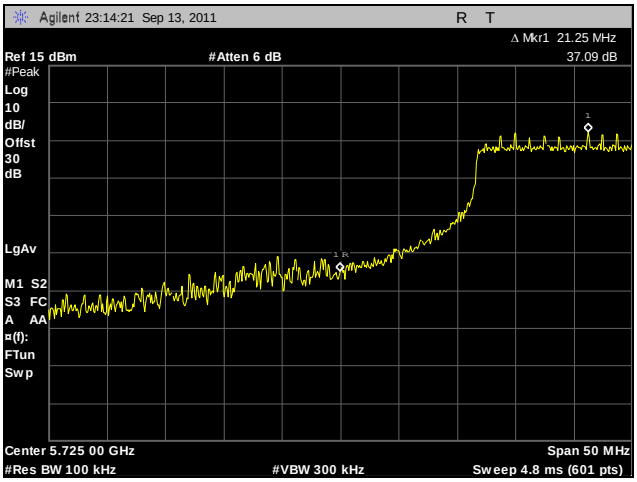



**Plot 514. Conducted Band Edge, Low Channel, 5.8 GHz, 802.11n 20 MHz, Port B**

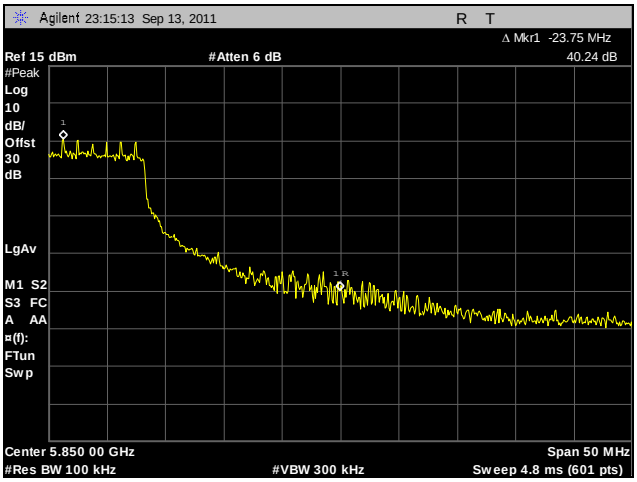



**Plot 515. Conducted Band Edge, High, Channel, 5.8 GHz, 802.11n 20 MHz, Port B**

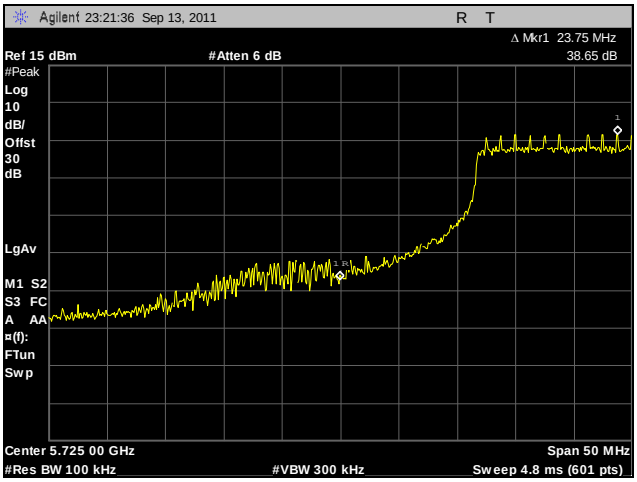
  




**Plot 516. Conducted Band Edge, Low Channel, 5.8 GHz, 802.11n 40 MHz, Port A**

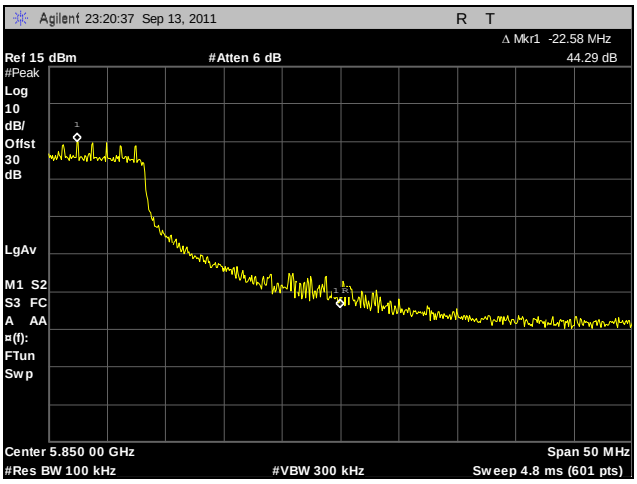



**Plot 517. Conducted Band Edge, High, Channel, 5.8 GHz, 802.11n 40 MHz, Port A**




**Plot 518. Conducted Band Edge, Low Channel, 5.8 GHz, 802.11n 40 MHz, Port B**




**Plot 519. Conducted Band Edge, High, Channel, 5.8 GHz, 802.11n 40 MHz, Port B**

# Electromagnetic Compatibility Criteria for Intentional Radiators

## § 15.247I Peak Power Spectral Density

**Test Requirements:** **§15.247I:** For digitally modulated systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission.

**Test Procedure:** The transmitter was connected directly to a spectrum analyzer through an attenuator. With an RBW of 3 kHz, a VBW of 10 kHz, and the trace set to Max Hold with a Peak detector, the frequency of peak power spectral density was found and centered. The span was reduced and the sweep time changed to (span/RBW) = (span/3kHz) seconds. The level of peak spectral density was found and recorded.

**Test Results:** The EUT was compliant with the peak power spectral density limits of **§ 15.247 I**.

The peak power spectral density was determined from plots on the following page(s).

**Test Engineer:** Jeff Pratt

**Test Date:** 09/27/11

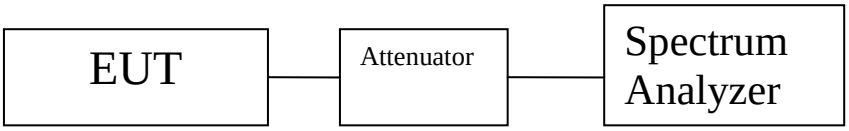



**Figure 4. Block Diagram, Peak Power Spectral Density Test Setup**

## Peak Power Spectral Density Test Results

| Channel (MHz) | Mode / Mod. Type | Port 1A Spectral Density (dBm / MHz) | Port 1A Spectral Density (mW / MHz) | Port 1B Spectral Density (dBm / MHz) | Port 1B Spectral Density (mW / MHz) | Summed Spectral Density (mW / MHz) | Summed Spectral Density (dBm / MHz) | Antenna Gain (dBi) | Limit (dBm / MHz) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|---|
| 2412 | 802.11b | -13.72 | 0.04246196 | | | 0.04246196 | -13.72 | 10 | 8 | -21.72 |
| 2437 | 802.11b | -13.64 | 0.04325138 | | | 0.04325138 | -13.64 | 10 | 8 | -21.64 |
| 2462 | 802.11b | -13.19 | 0.04797334 | | | 0.04797334 | -13.19 | 10 | 8 | -21.19 |
| 2412 | 802.11g | -4.74 | 0.33573761 | | | 0.33573761 | -4.74 | 10 | 8 | -12.74 |
| 2437 | 802.11g | 3.03 | 2.00909281 | | | 2.00909281 | 3.03 | 10 | 8 | -4.97 |
| 2462 | 802.11g | -5.52 | 0.28054336 | | | 0.28054336 | -5.52 | 10 | 8 | -13.52 |
| 2412 | 802.11g HT20 | -6.47 | 0.22542392 | -4.02 | 0.39627803 | 0.62170196 | -2.06417767 | 10 | 8 | -10.0642 |
| 2437 | 802.11g HT20 | -5.48 | 0.2831392 | -3.24 | 0.47424199 | 0.75738118 | -1.20685488 | 10 | 8 | -9.20685 |
| 2462 | 802.11g HT20 | -7.01 | 0.19906733 | -3 | 0.50118723 | 0.70025457 | -1.5474405 | 10 | 8 | -9.54744 |
| 2422 | 802.11g HT40 | -8.56 | 0.13931568 | -4.12 | 0.38725764 | 0.52657333 | -2.78541145 | 10 | 8 | -10.7854 |
| 2437 | 802.11g HT40 | -5.63 | 0.27352687 | -3.58 | 0.4385307 | 0.71205757 | -1.47484892 | 10 | 8 | -9.47485 |
| 2452 | 802.11g HT40 | -7.18 | 0.19142559 | -7.06 | 0.19678863 | 0.38821422 | -4.10928559 | 10 | 8 | -12.1093 |

**Table 27. Peak Power Spectral Density, Test Results, 2.4 GHz**

| Channel (MHz) | Mode / Mod. Type | Port 1A Spectral Density (dBm / MHz) | Port 1A Spectral Density (mW / MHz) | Port 1B Spectral Density (dBm / MHz) | Port 1B Spectral Density (mW / MHz) | Summed Spectral Density (mW / MHz) | Summed Spectral Density (dBm / MHz) | Antenna Gain (dBi) | Limit (dBm / MHz) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|---|
| 5745 | 802.11a | 3.229 | 2.103294083 | | | 2.103294083 | 3.229 | 10 | 8 | -4.771 |
| 5785 | 802.11a | 2.484 | 1.77174004 | | | 1.77174004 | 2.484 | 10 | 8 | -5.516 |
| 5825 | 802.11a | -0.04 | 0.990831945 | | | 0.990831945 | -0.04 | 10 | 8 | -8.04 |
| 5745 | 802.11n HT20 | 2.258 | 1.681899339 | -2.225 | 0.599100939 | 2.281000278 | 3.581253382 | 10 | 8 | -4.418747 |
| 5785 | 802.11n HT20 | 1.206 | 1.320079236 | -3.202 | 0.478409726 | 1.798488962 | 2.549077767 | 10 | 8 | -5.450922 |
| 5825 | 802.11n HT20 | 0.933 | 1.239652613 | -3.424 | 0.454569194 | 1.694221806 | 2.289702672 | 10 | 8 | -5.710297 |
| 5755 | 802.11n HT40 | 1.782 | 1.507301044 | -2.594 | 0.550300617 | 2.057601661 | 3.133613019 | 10 | 8 | -4.866387 |
| 5785 | 802.11n HT40 | 0.946 | 1.243368899 | -3.407 | 0.456352044 | 1.699720943 | 2.303776256 | 10 | 8 | -5.696224 |
| 5815 | 802.11n HT40 | 0.786 | 1.198395032 | -3.588 | 0.437723638 | 1.63611867 | 2.138148005 | 10 | 8 | -5.861852 |

**Table 28. Peak Power Spectral Density, Test Results, 5.8 GHz**

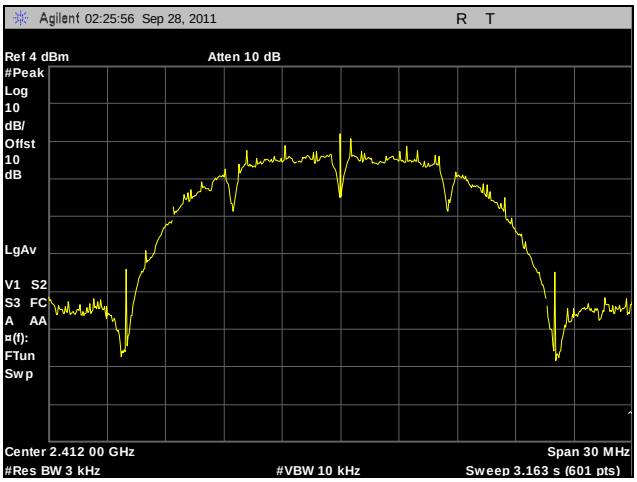
| Channel (MHz) | Mode / Mod. Type | Port 1A Spectral Density (dBm / MHz) | Port 1A Spectral Density (mW / MHz) | Port 1B Spectral Density (dBm / MHz) | Port 1B Spectral Density (mW / MHz) | Summed Spectral Density (mW / MHz) | Summed Spectral Density (dBm / MHz) | Antenna Gain (dBi) | Limit (dBm / MHz) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|---|
| 2412 | 802.11b | -13.19 | 0.04797334 | -- | -- | 0.04797334 | -13.19 | 15 | 5 | -18.19 |
| 2437 | 802.11b | -12.74 | 0.05321083 | -- | -- | 0.05321083 | -12.74 | 15 | 5 | -17.74 |
| 2462 | 802.11b | -13.72 | 0.04246196 | -- | -- | 0.04246196 | -13.72 | 15 | 5 | -18.72 |
| 2412 | 802.11g | -5.95 | 0.25409727 | -- | -- | 0.25409727 | -5.95 | 15 | 5 | -10.95 |
| 2437 | 802.11g | -5.74 | 0.26668587 | -- | -- | 0.26668587 | -5.74 | 15 | 5 | -10.74 |
| 2462 | 802.11g | -6.07 | 0.24717241 | -- | -- | 0.24717241 | -6.07 | 15 | 5 | -11.07 |
| 2412 | 802.11g HT20 | -8.3 | 0.14791084 | -4.29 | 0.37239171 | 0.52030255 | -2.8374405 | 18.0103 | 3.99656668 | -6.83401 |
| 2437 | 802.11g HT20 | -8.26 | 0.14927944 | -3.55 | 0.44157045 | 0.59084989 | -2.28522842 | 18.0103 | 3.99656668 | -6.2818 |
| 2462 | 802.11g HT20 | -6.95 | 0.20183664 | -7.58 | 0.17458222 | 0.37641885 | -4.24328635 | 18.0103 | 3.99656668 | -8.23985 |
| 2422 | 802.11g HT40 | -8.74 | 0.13365955 | -4.16 | 0.38370725 | 0.5173668 | -2.86201446 | 18.0103 | 3.99656668 | -6.85858 |
| 2437 | 802.11g HT40 | -8.75 | 0.13335214 | -3.74 | 0.42266861 | 0.55602076 | -2.54908995 | 18.0103 | 3.99656668 | -6.54566 |
| 2452 | 802.11g HT40 | -7.47 | 0.17906059 | -8.13 | 0.15381546 | 0.33287605 | -4.77717451 | 18.0103 | 3.99656668 | -8.77374 |

**Table 29. Peak Power Spectral Density, Test Results, 2.4 GHz, Sector Antenna**

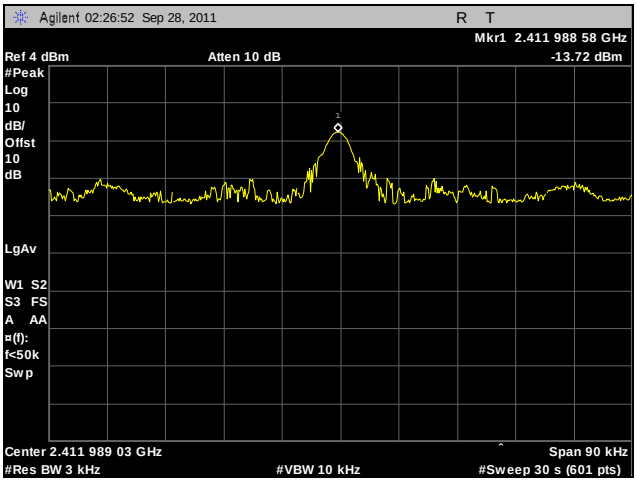
| Channel (MHz) | Mode / Mod. Type | Port 1A Spectral Density (dBm / MHz) | Port 1A Spectral Density (mW / MHz) | Port 1B Spectral Density (dBm / MHz) | Port 1B Spectral Density (mW / MHz) | Summed Spectral Density (mW / MHz) | Summed Spectral Density (dBm / MHz) | Antenna Gain (dBi) | Limit (dBm / MHz) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|---|
| 5745 | 802.11a | 1.04 | 1.270574105 | -- | -- | 1.270574105 | 1.04 | 15.5 | 8 | -6.96 |
| 5785 | 802.11a | 2.78 | 1.896705921 | -- | -- | 1.896705921 | 2.78 | 15.5 | 8 | -5.22 |
| 5825 | 802.11a | 1.42 | 1.386755829 | -- | -- | 1.386755829 | 1.42 | 15.5 | 8 | -6.58 |
| 5745 | 802.11n HT20 | -2.12 | 0.613762005 | -6.62 | 0.217770977 | 0.831532982 | -0.8012052 | 18.51029996 | 8 | -8.801205 |
| 5785 | 802.11n HT20 | -0.93 | 0.80723503 | -5.99 | 0.251767693 | 1.059002723 | 0.248970768 | 18.51029996 | 8 | -7.751029 |
| 5825 | 802.11n HT20 | 0.55 | 1.135010816 | -4.51 | 0.353997341 | 1.489008157 | 1.728970768 | 18.51029996 | 8 | -6.271029 |
| 5755 | 802.11n HT40 | -2.25 | 0.595662144 | -7.08 | 0.195884467 | 0.791546611 | -1.015235063 | 18.51029996 | 8 | -9.015235 |
| 5785 | 802.11n HT40 | 0.4 | 1.096478196 | -4.52 | 0.35318317 | 1.449661366 | 1.612665649 | 18.51029996 | 8 | -6.387334 |
| 5815 | 802.11n HT40 | -0.23 | 0.948418463 | -4.85 | 0.327340695 | 1.275759158 | 1.057686946 | 18.51029996 | 8 | -6.942313 |

**Table 30. Peak Power Spectral Density, Test Results, 5.8 GHz, Sector Antenna**

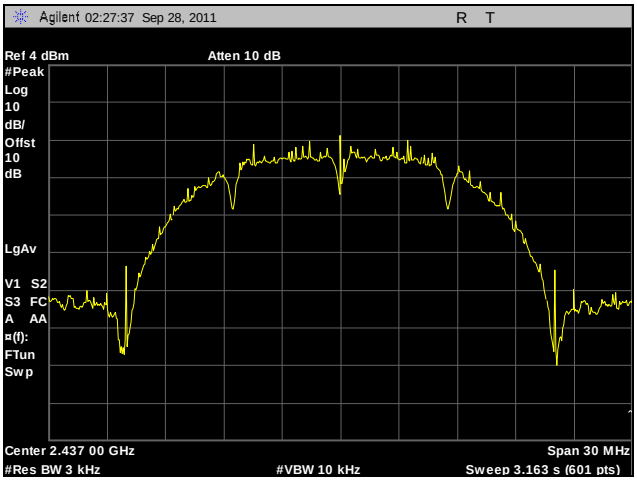
## Peak Power Spectral Density, 2.4 GHz, 802.11b




**Plot 520. Peak Power Spectral Density, Low Channel, 2.4 GHz, 802.11b, Port A, Determination**

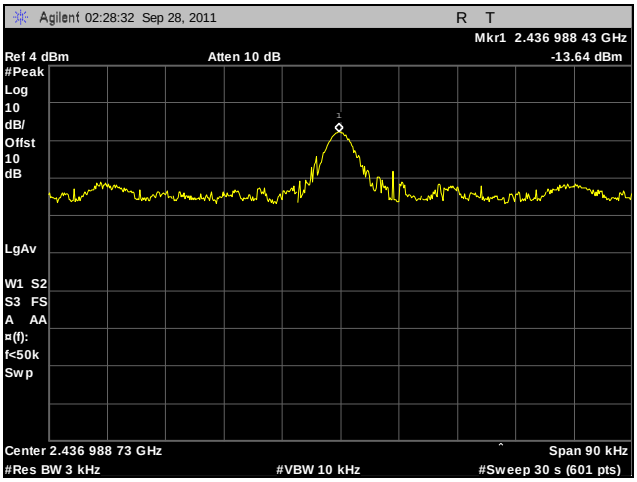



**Plot 521. Peak Power Spectral Density, Low Channel, 2.4 GHz, 802.11b, Port A**

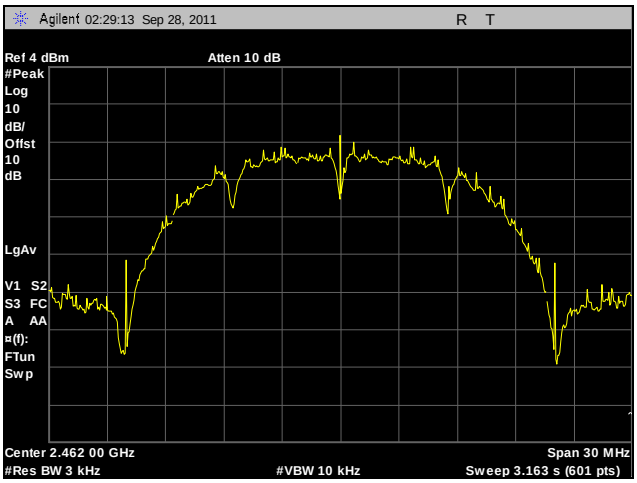



**Plot 522. Peak Power Spectral Density, Mid Channel, 2.4 GHz, 802.11b, Port A, Determination**

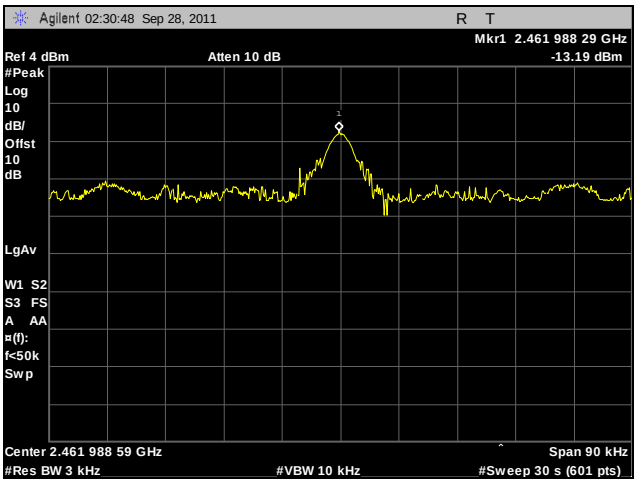
  




**Plot 523. Peak Power Spectral Density, Mid Channel, 2.4 GHz, 802.11b, Port A**

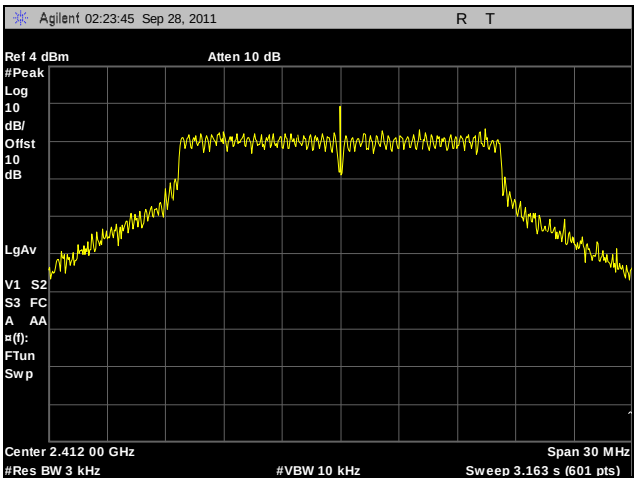



**Plot 524. Peak Power Spectral Density, High Channel, 2.4 GHz, 802.11b, Port A, Determination**

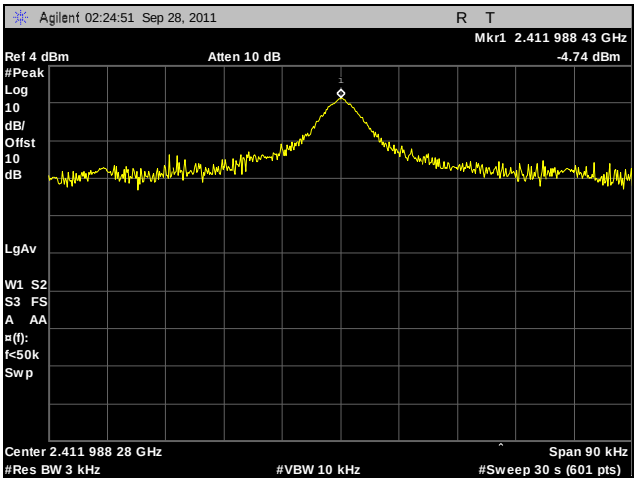



**Plot 525. Peak Power Spectral Density, High Channel, 2.4 GHz, 802.11b, Port A**

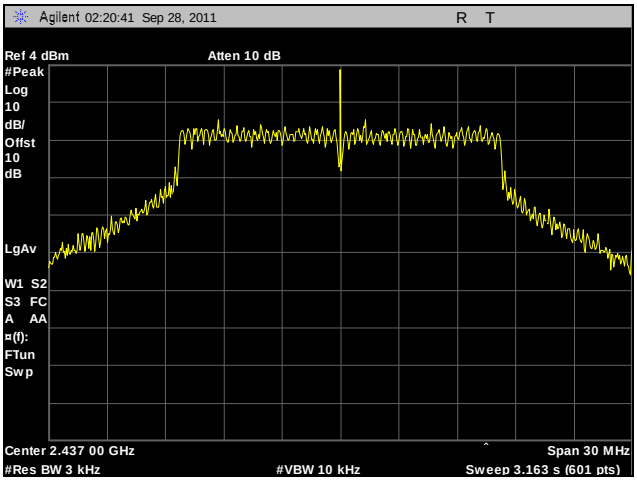
## Peak Power Spectral Density, 2.4 GHz, 802.11g




**Plot 526. Peak Power Spectral Density, Low Channel, 2.4 GHz, 802.11g, Port A, Determination**

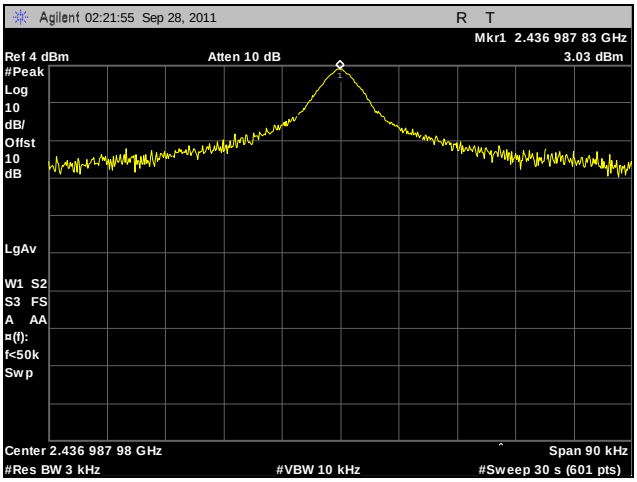



**Plot 527. Peak Power Spectral Density, Low Channel, 2.4 GHz, 802.11g, Port A**

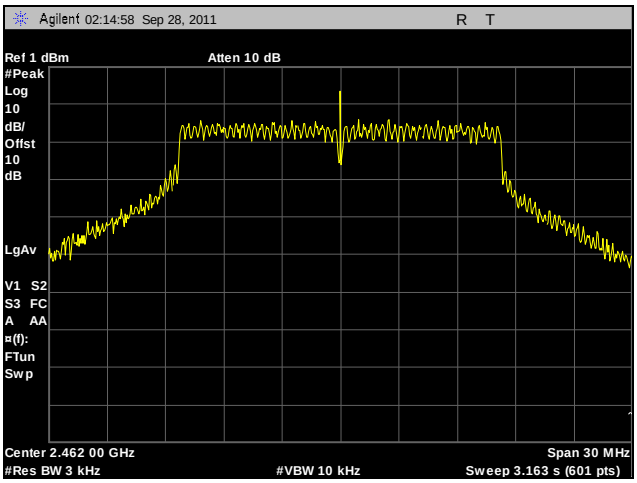



**Plot 528. Peak Power Spectral Density, Mid Channel, 2.4 GHz, 802.11g, Port A, Determination**

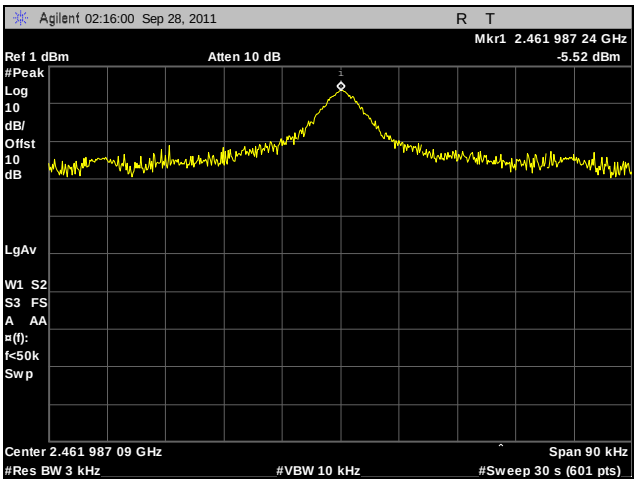
  




**Plot 529. Peak Power Spectral Density, Mid Channel, 2.4 GHz, 802.11g, Port A**

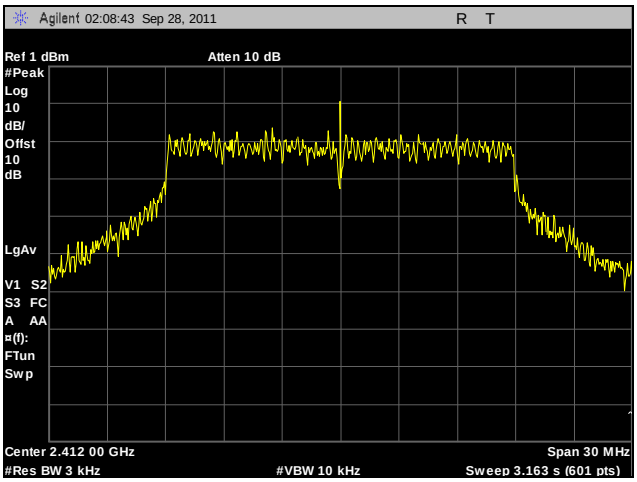



**Plot 530. Peak Power Spectral Density, High Channel, 2.4 GHz, 802.11g, Port A, Determination**

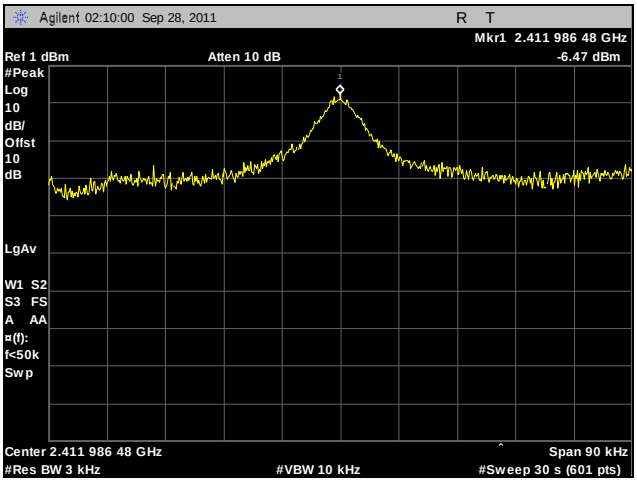



**Plot 531. Peak Power Spectral Density, High Channel, 2.4 GHz, 802.11g, Port A**

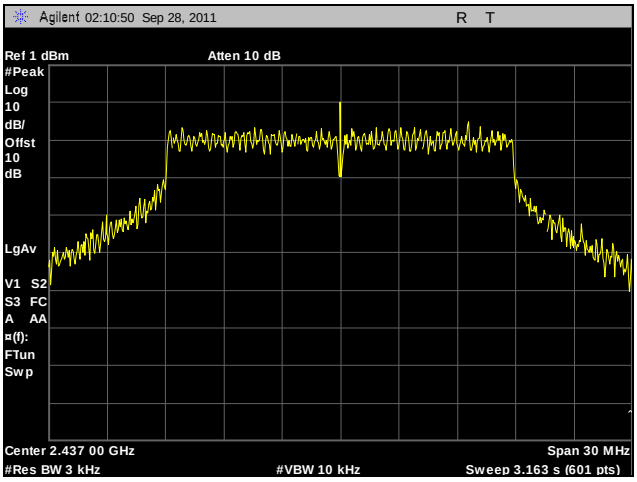
## Peak Power Spectral Density, 2.4 GHz, 802.11g HT20, Port A



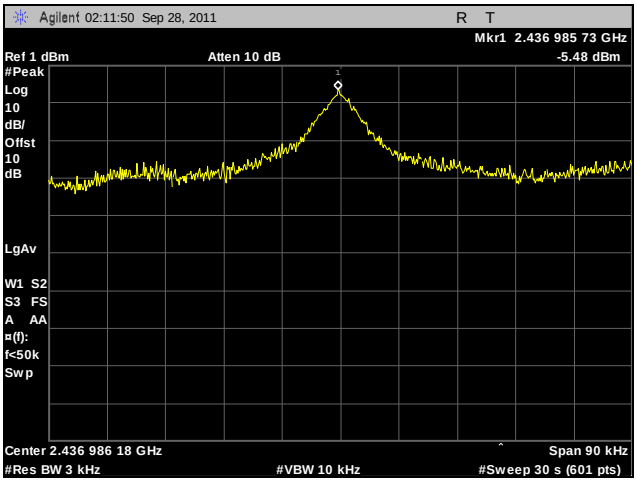

**Plot 532. Peak Power Spectral Density, Low Channel, 2.4 GHz, 802.11g HT20, Port A, Determination**



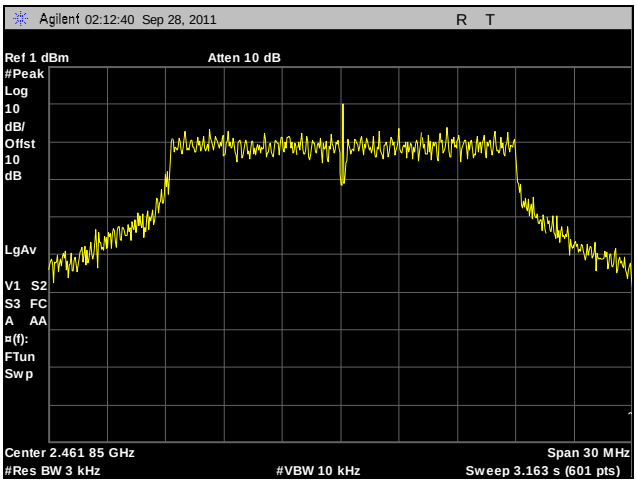

**Plot 533. Peak Power Spectral Density, Low Channel, 2.4 GHz, 802.11g HT20, Port A**



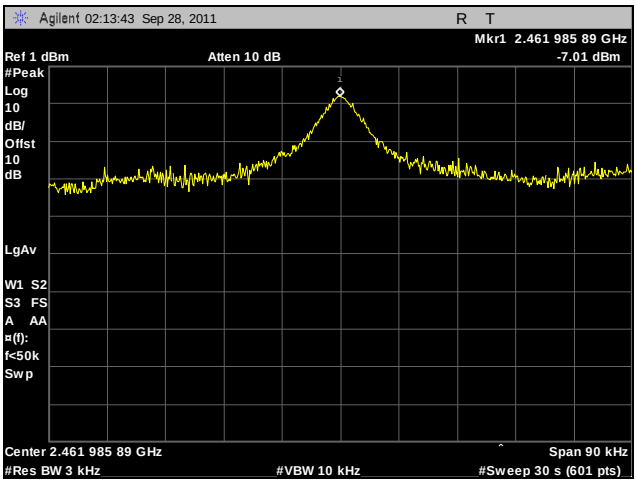

**Plot 534. Peak Power Spectral Density, Mid Channel, 2.4 GHz, 802.11g HT20, Port A, Determination**




**Plot 535. Peak Power Spectral Density, Mid Channel, 2.4 GHz802.11g HT20, Port A**

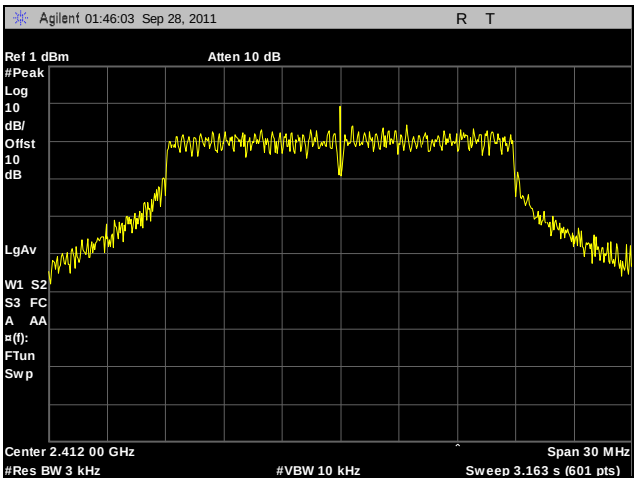



**Plot 536. Peak Power Spectral Density, High Channel, 2.4 GHz, 802.11g HT20, Port A, Determination**

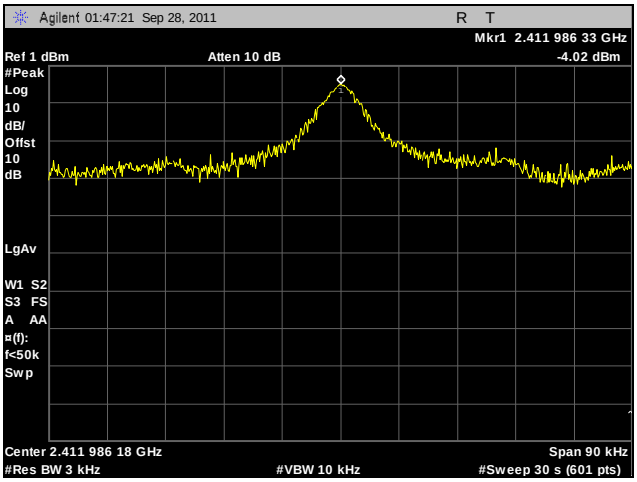



**Plot 537. Peak Power Spectral Density, High Channel, 2.4 GHz, 802.11g HT20, Port A**

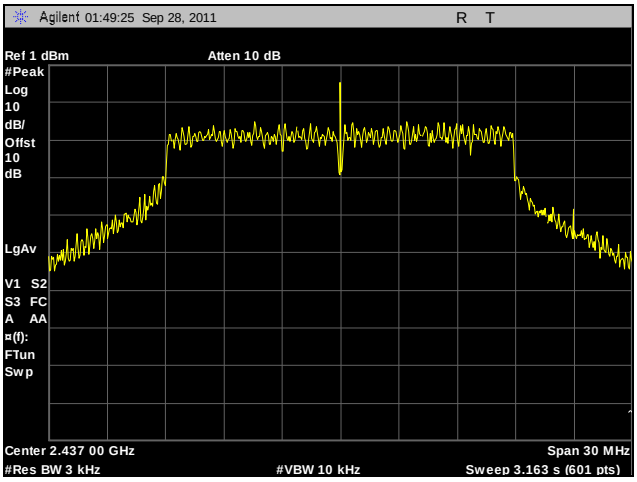
## Peak Power Spectral Density, 2.4 GHz, 802.11g HT20, Port B



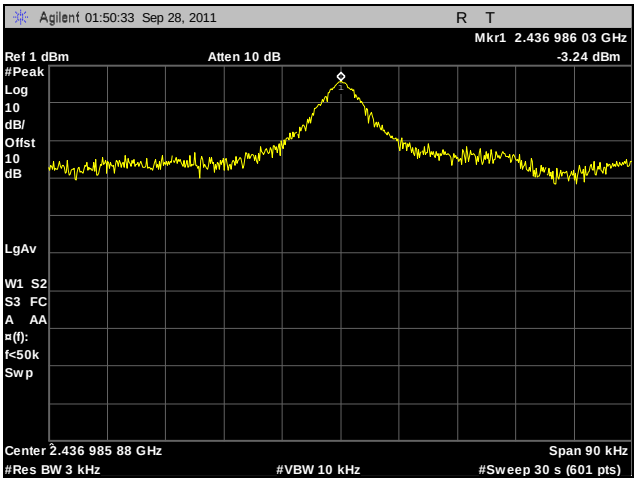

**Plot 538. Peak Power Spectral Density, Low Channel, 2.4 GHz, 802.11g HT20, Port B, Determination**



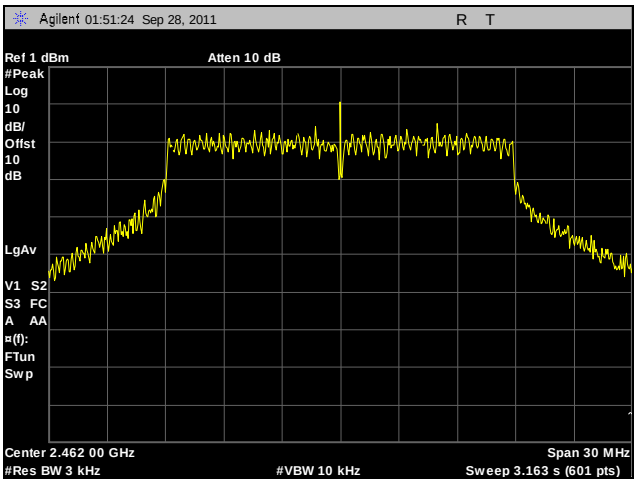

**Plot 539. Peak Power Spectral Density, Low Channel, 2.4 GHz, 802.11g HT20, Port B**



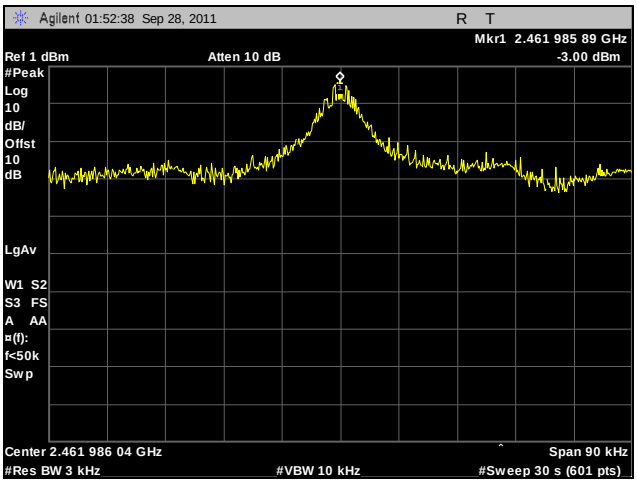

**Plot 540. Peak Power Spectral Density, Mid Channel, 2.4 GHz, 802.11g HT20, Port B, Determination**




**Plot 541. Peak Power Spectral Density, Mid Channel, 2.4 GHz802.11g HT20, Port B**

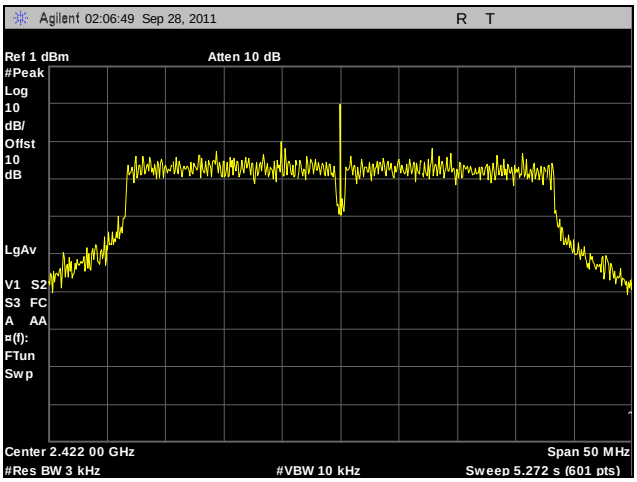



**Plot 542. Peak Power Spectral Density, High Channel, 2.4 GHz, 802.11g HT20, Port B, Determination**

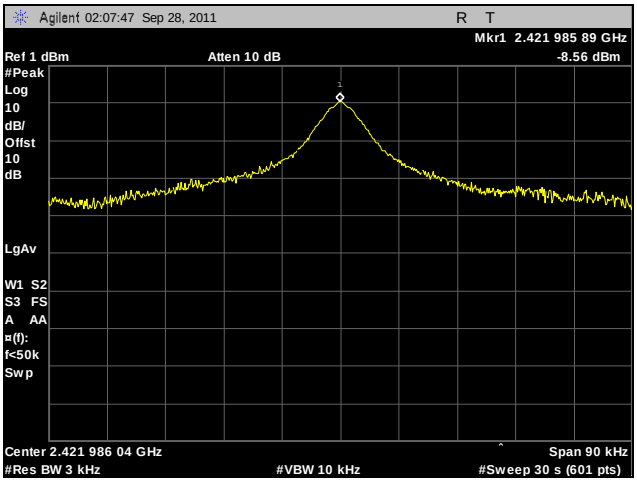



**Plot 543. Peak Power Spectral Density, High Channel, 2.4 GHz, 802.11g HT20, Port B**

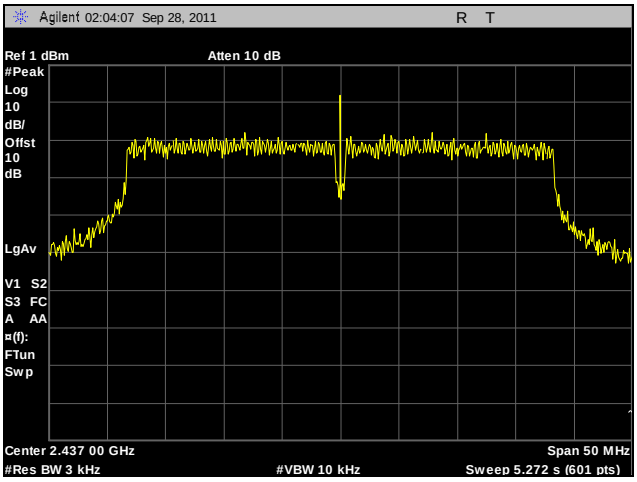
## Peak Power Spectral Density, 2.4 GHz, 802.11g HT40, Port A



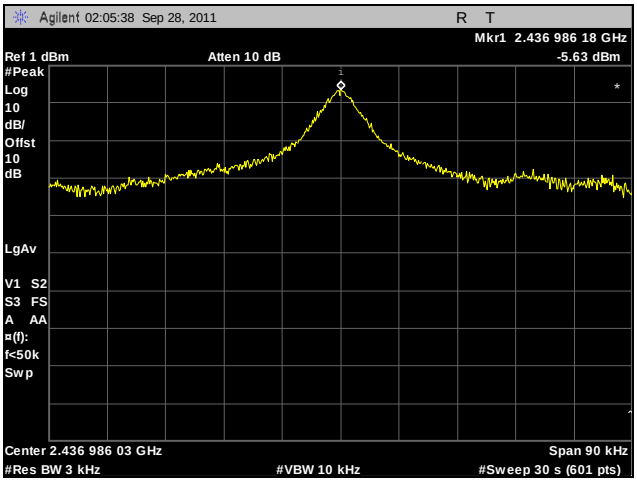

**Plot 544. Peak Power Spectral Density, Low Channel, 2.4 GHz, 802.11g HT40, Port A, Determination**



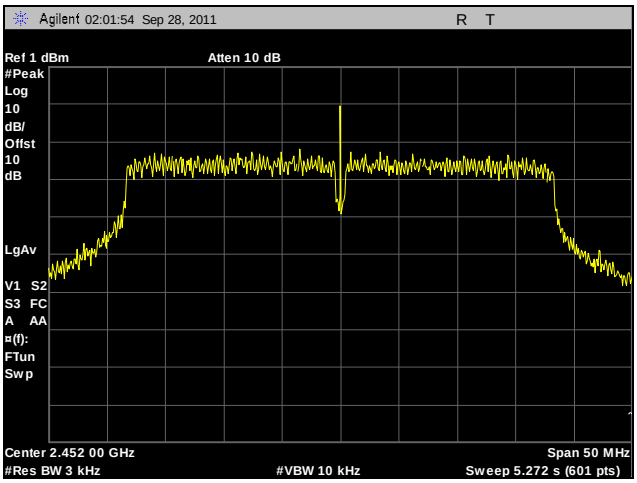

**Plot 545. Peak Power Spectral Density, Low Channel, 2.4 GHz, 802.11g HT40, Port A**



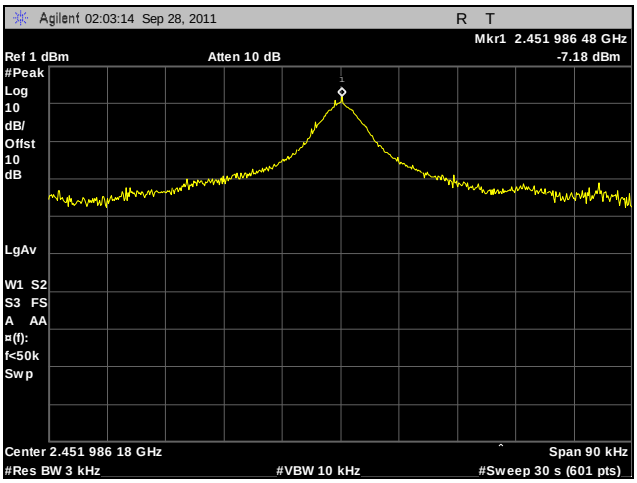

**Plot 546. Peak Power Spectral Density, Mid Channel, 2.4 GHz, 802.11g HT40, Port A, Determination**




**Plot 547. Peak Power Spectral Density, Mid Channel, 2.4 GHz802.11g HT40, Port A**

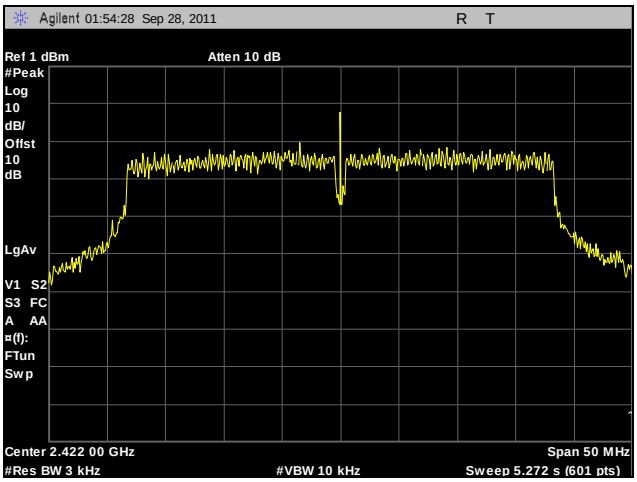



**Plot 548. Peak Power Spectral Density, High Channel, 2.4 GHz, 802.11g HT40, Port A, Determination**

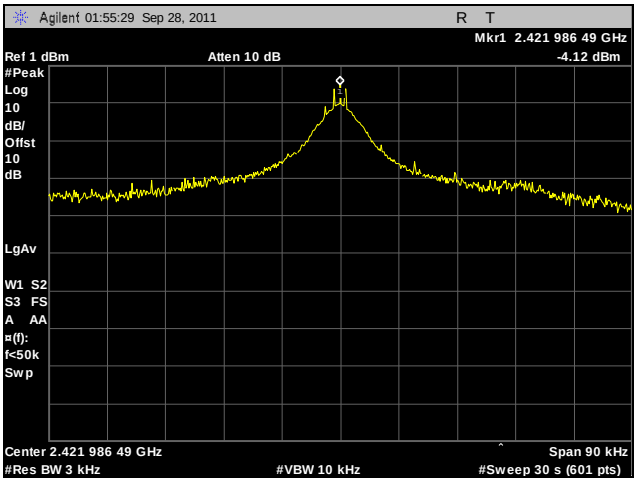



**Plot 549. Peak Power Spectral Density, High Channel, 2.4 GHz, 802.11g HT40, Port A**

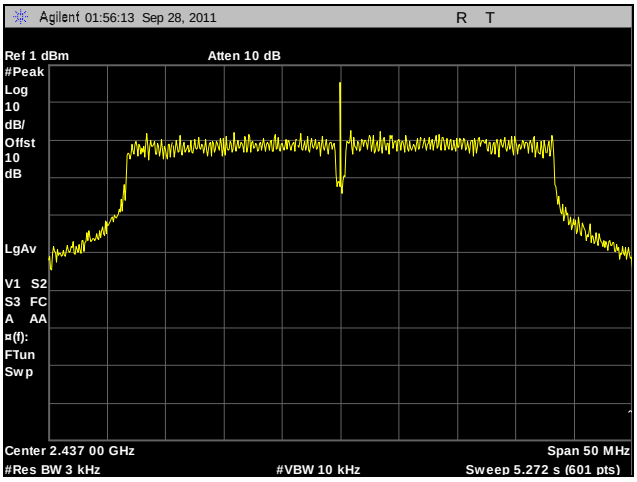
## Peak Power Spectral Density, 2.4 GHz, 802.11g HT40, Port B



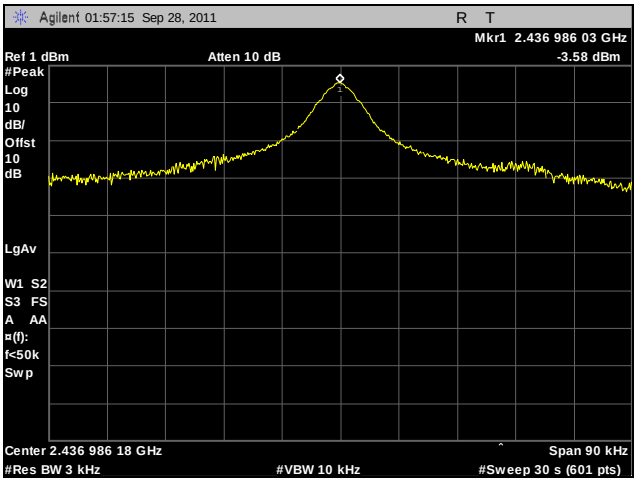

**Plot 550. Peak Power Spectral Density, Low Channel, 2.4 GHz, 802.11g HT40, Port B, Determination**



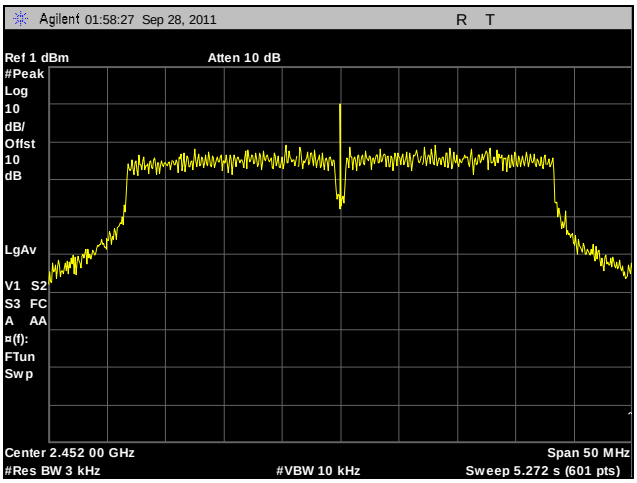

**Plot 551. Peak Power Spectral Density, Low Channel, 2.4 GHz, 802.11g HT40, Port B**



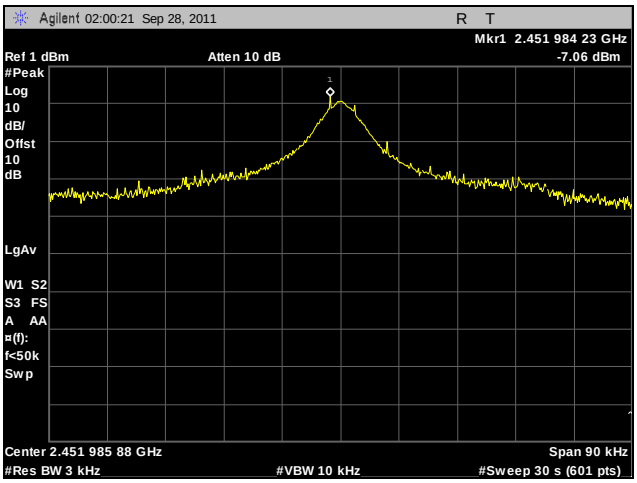

**Plot 552. Peak Power Spectral Density, Mid Channel, 2.4 GHz, 802.11g HT40, Port B, Determination**




**Plot 553. Peak Power Spectral Density, Mid Channel, 2.4 GHz802.11g HT40, Port B**

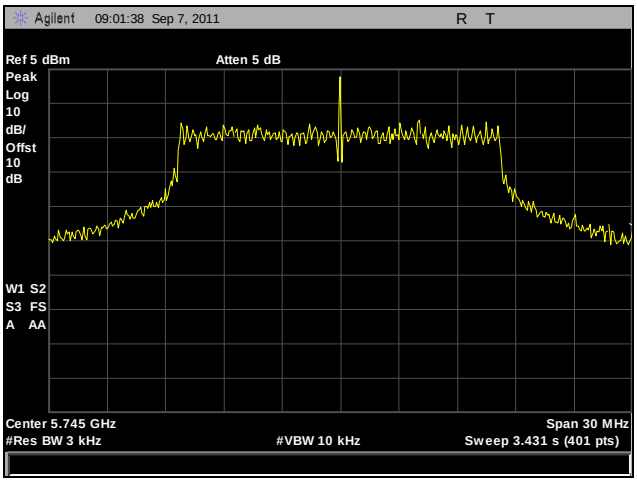



**Plot 554. Peak Power Spectral Density, High Channel, 2.4 GHz, 802.11g HT40, Port B, Determination**

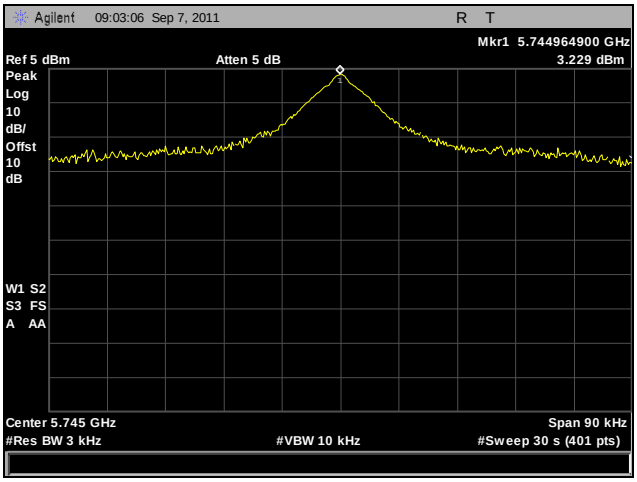



**Plot 555. Peak Power Spectral Density, High Channel, 2.4 GHz, 802.11g HT40, Port B**

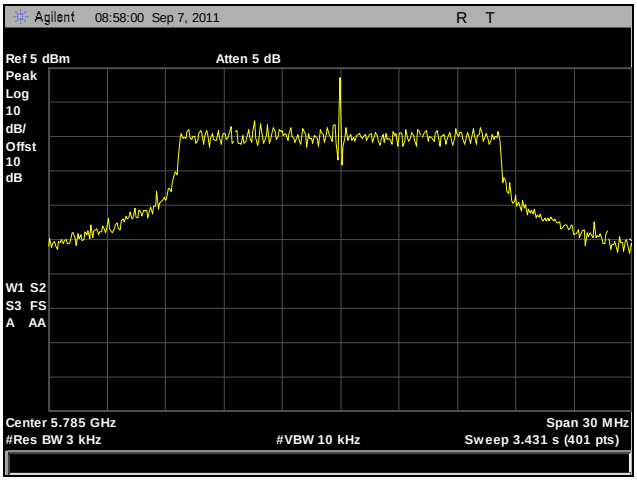
## Peak Power Spectral Density, 5.8 GHz, 802.11a



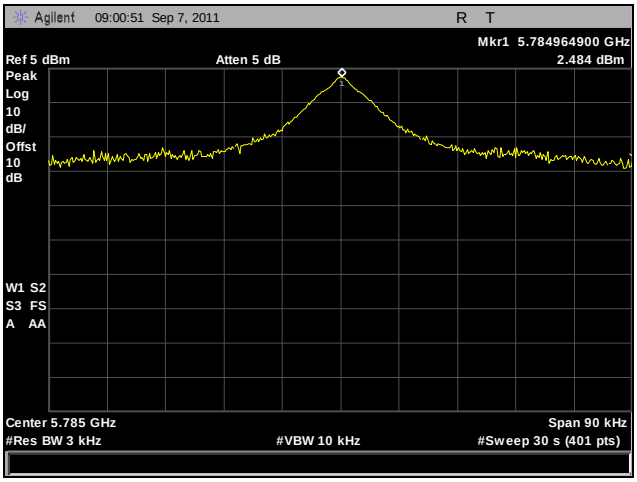

**Plot 556. Peak Power Spectral Density, Low Channel, 5.8 GHz, 802.11a, Port A, Determination**



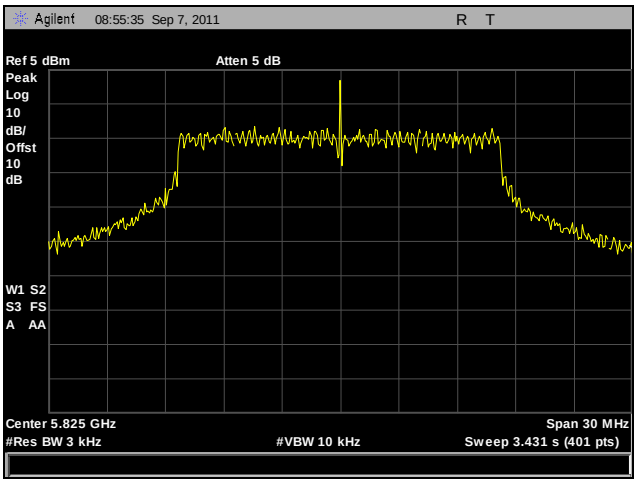

**Plot 557. Peak Power Spectral Density, Low Channel, 5.8 GHz, 802.11a, Port A**



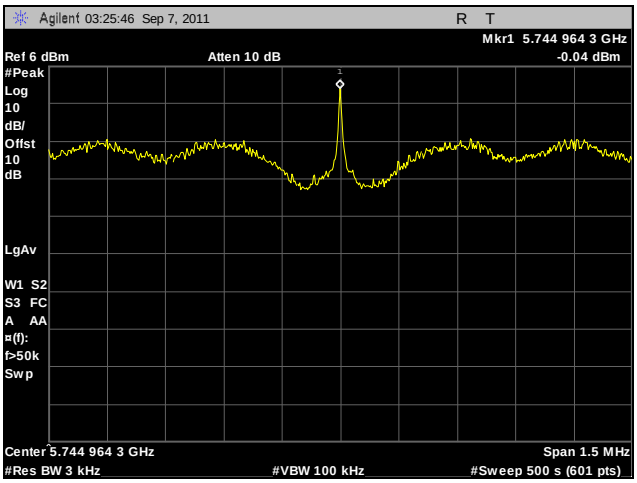

**Plot 558. Peak Power Spectral Density, Mid Channel, 5.8 GHz, 802.11a, Port A, Determination**




**Plot 559. Peak Power Spectral Density, Mid Channel, 5.8 GHz, 802.11a, Port A**



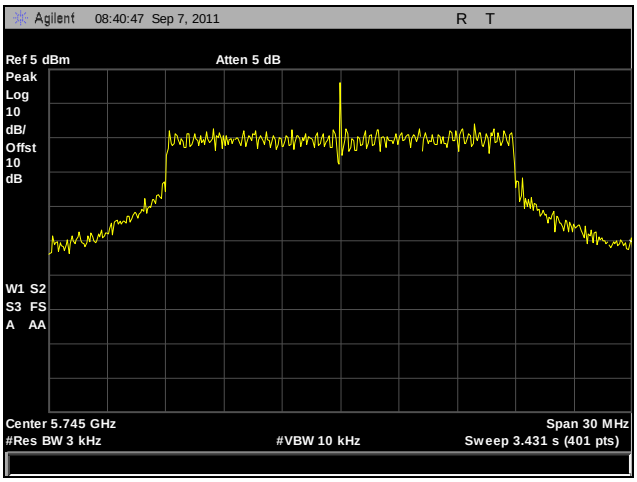

**Plot 560. Peak Power Spectral Density, High Channel, 5.8 GHz, 802.11a, Port A, Determination**



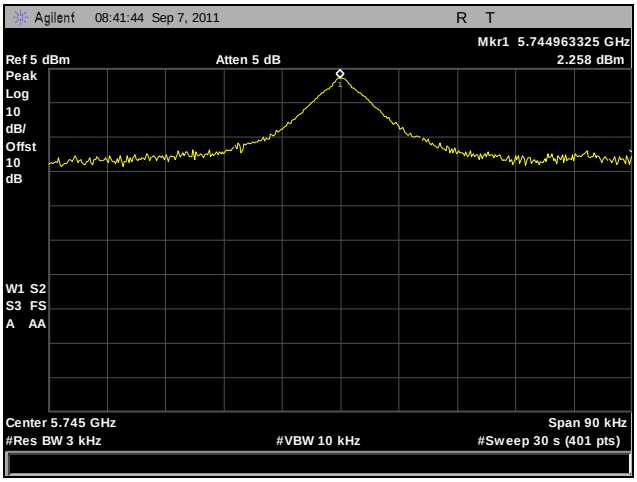

**Plot 561. Peak Power Spectral Density, High Channel, 5.8 GHz, 802.11a, Port A**

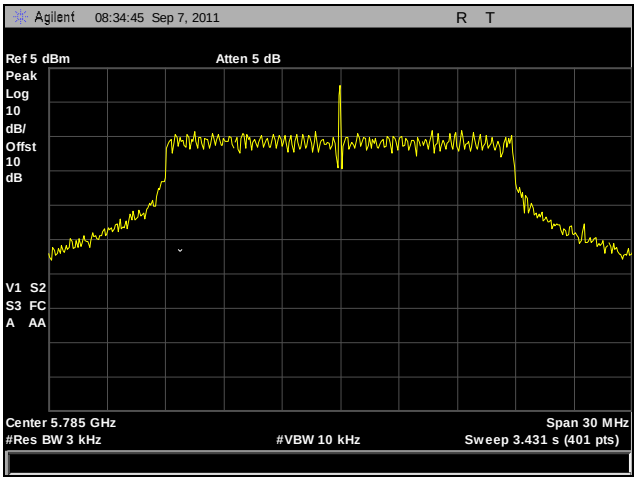
## Peak Power Spectral Density, 5.8 GHz, 802.11n 20 MHz, Port A



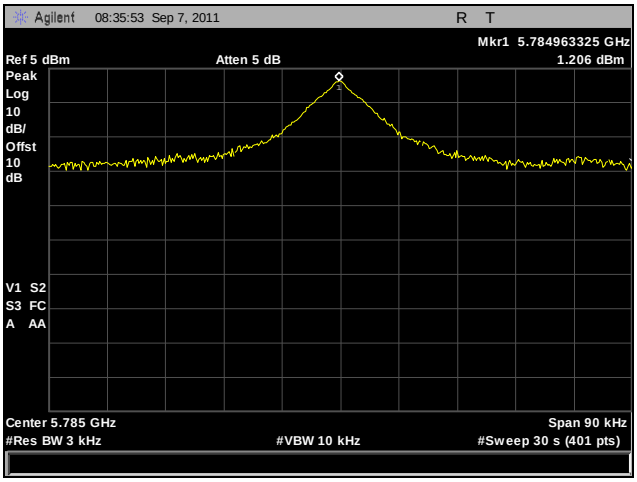

**Plot 562. Peak Power Spectral Density, Low Channel, 5.8 GHz, 802.11n 20 MHz, Port A, Determination**



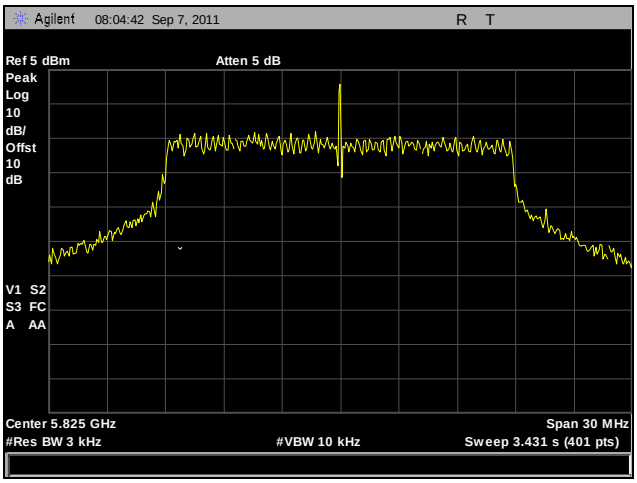

**Plot 563. Peak Power Spectral Density, Low Channel, 5.8 GHz, 802.11n 20 MHz, Port A**



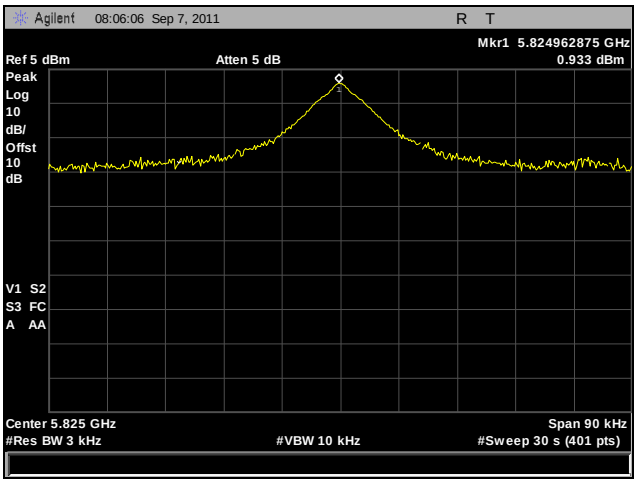

**Plot 564. Peak Power Spectral Density, Mid Channel, 5.8 GHz, 802.11n 20 MHz, Port A, Determination**




**Plot 565. Peak Power Spectral Density, Mid Channel, 5.8 GHz, 802.11n 20 MHz, Port A**

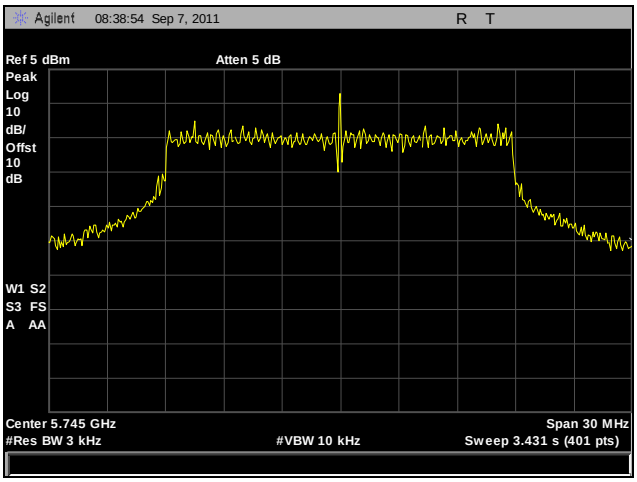



**Plot 566. Peak Power Spectral Density, High Channel, 5.8 GHz, 802.11n 20 MHz, Port A, Determination**

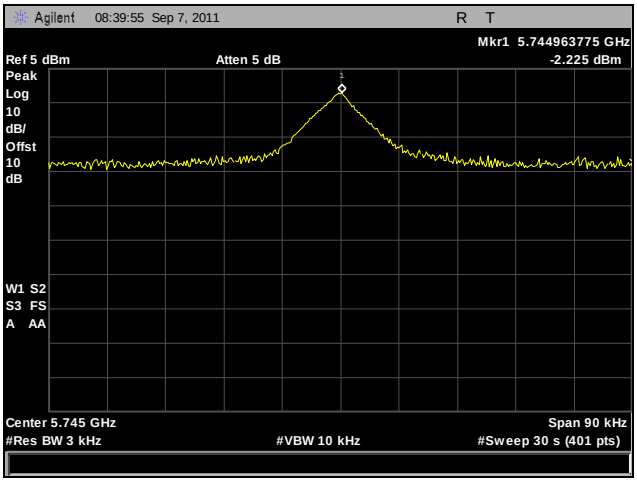



**Plot 567. Peak Power Spectral Density, High Channel, 5.8 GHz, 802.11n 20 MHz, Port A**

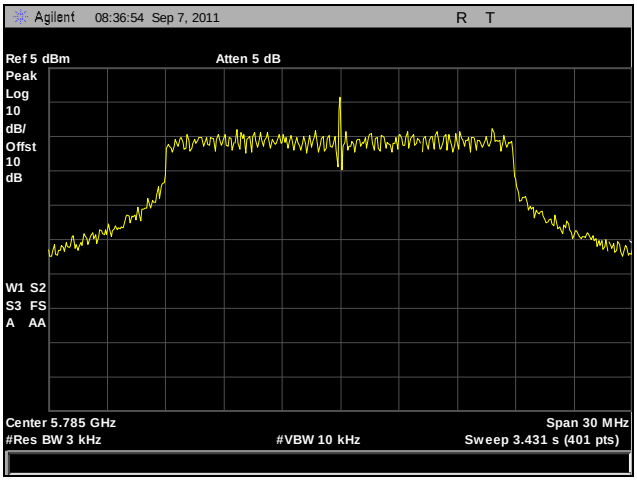
## Peak Power Spectral Density, 5.8 GHz, 802.11n 20 MHz, Port B



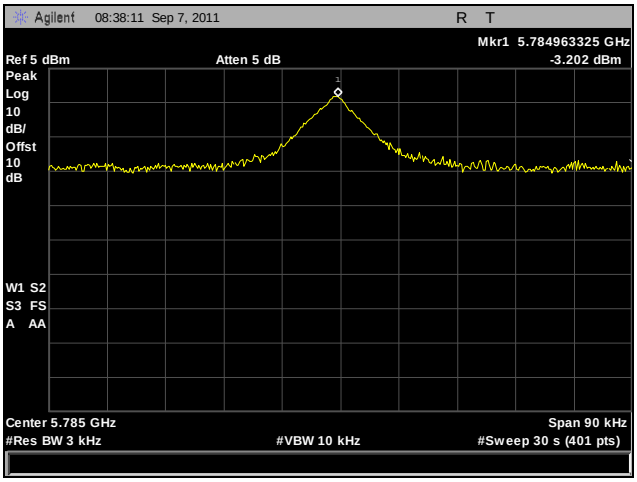

**Plot 568. Peak Power Spectral Density, Low Channel, 5.8 GHz, 802.11n 20 MHz, Port B, Determination**



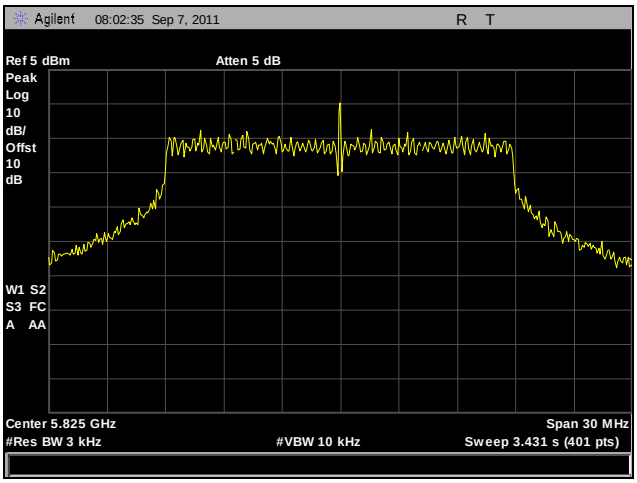

**Plot 569. Peak Power Spectral Density, Low Channel, 5.8 GHz, 802.11n 20 MHz, Port B**



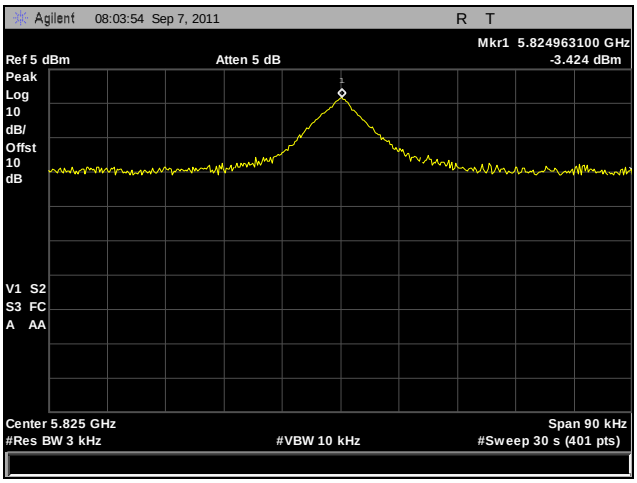

**Plot 570. Peak Power Spectral Density, Mid Channel, 5.8 GHz, 802.11n 20 MHz, Port B, Determination**




**Plot 571. Peak Power Spectral Density, Mid Channel, 5.8 GHz, 802.11n 20 MHz, Port B**

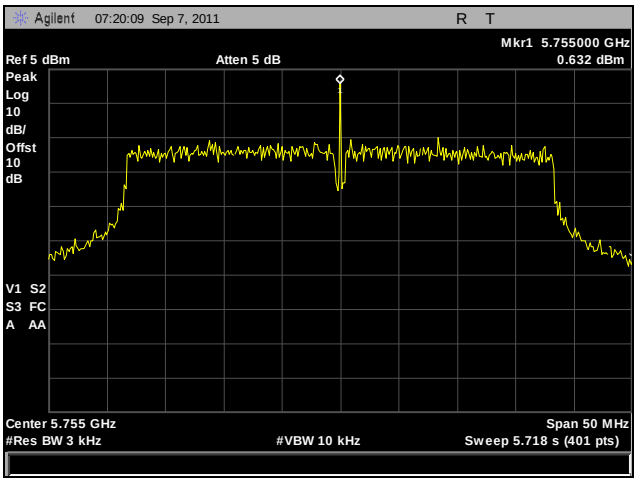



**Plot 572. Peak Power Spectral Density, High Channel, 5.8 GHz, 802.11n 20 MHz, Port B, Determination**

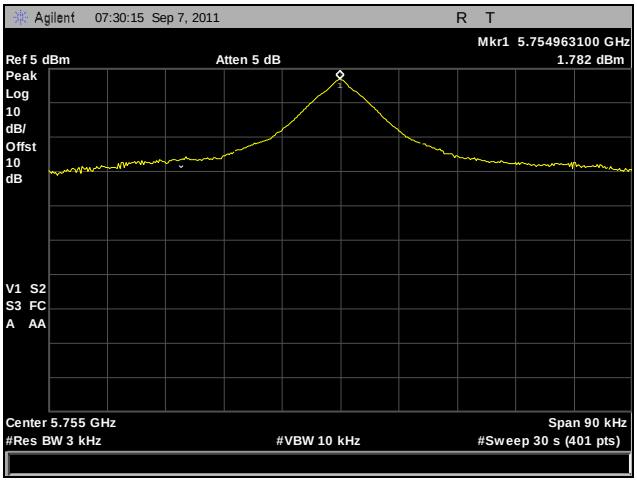



**Plot 573. Peak Power Spectral Density, High Channel, 5.8 GHz, 802.11n 20 MHz, Port B**

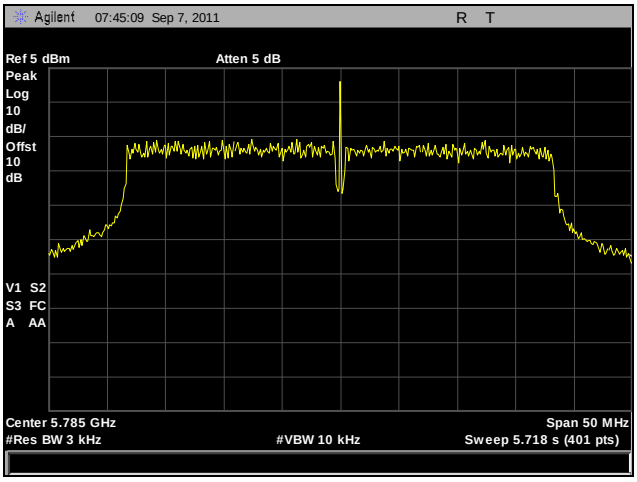
## Peak Power Spectral Density, 5.8 GHz, 802.11n 40 MHz, Port A



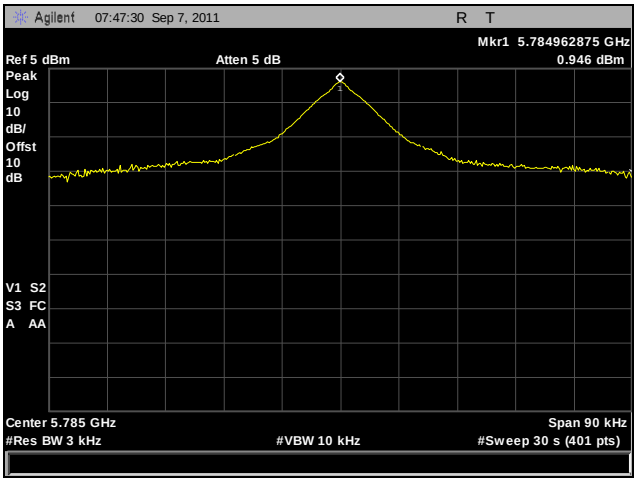

**Plot 574. Peak Power Spectral Density, Low Channel, 5.8 GHz, 802.11n 40 MHz, Port A, Determination**



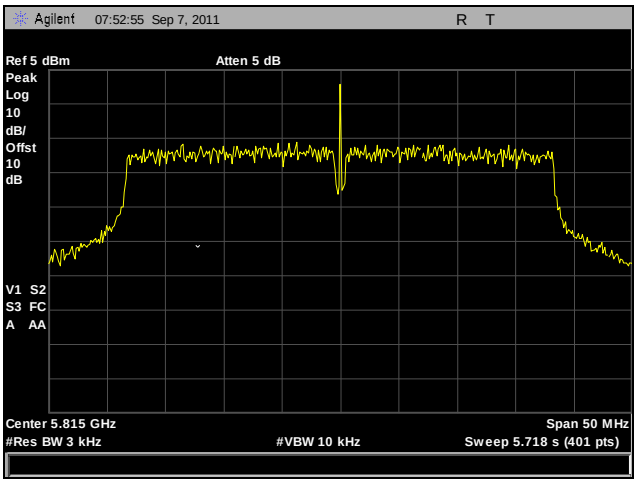

**Plot 575. Peak Power Spectral Density, Low Channel, 5.8 GHz, 802.11n 40 MHz, Port A**



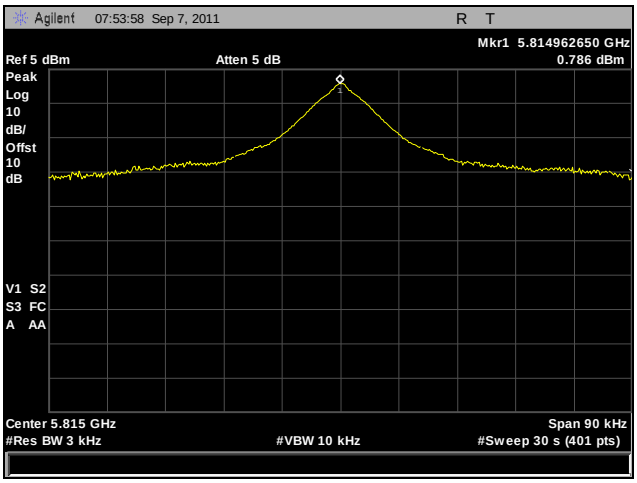

**Plot 576. Peak Power Spectral Density, Mid Channel, 5.8 GHz, 802.11n 40 MHz, Port A, Determination**




**Plot 577. Peak Power Spectral Density, Mid Channel, 5.8 GHz, 802.11n 40 MHz, Port A**

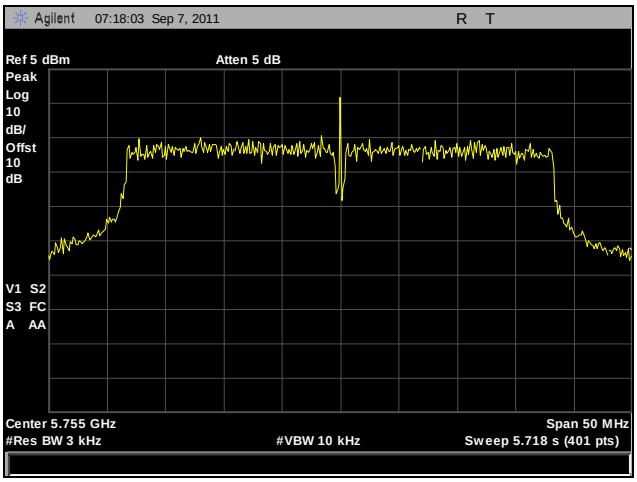



**Plot 578. Peak Power Spectral Density, High Channel, 5.8 GHz, 802.11n 40 MHz, Port A, Determination**

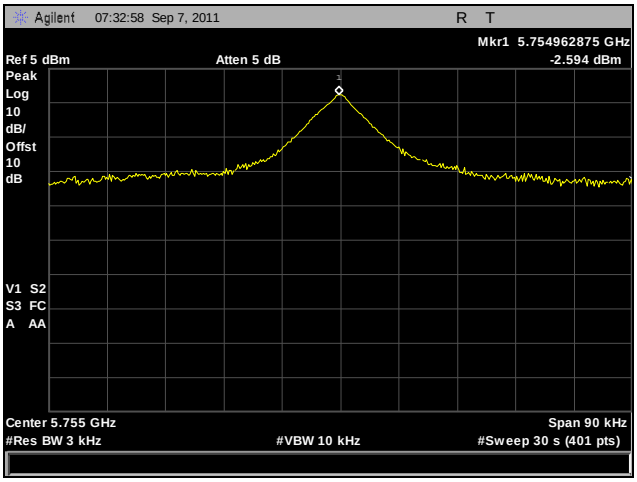



**Plot 579. Peak Power Spectral Density, High Channel, 5.8 GHz, 802.11n 40 MHz, Port A**

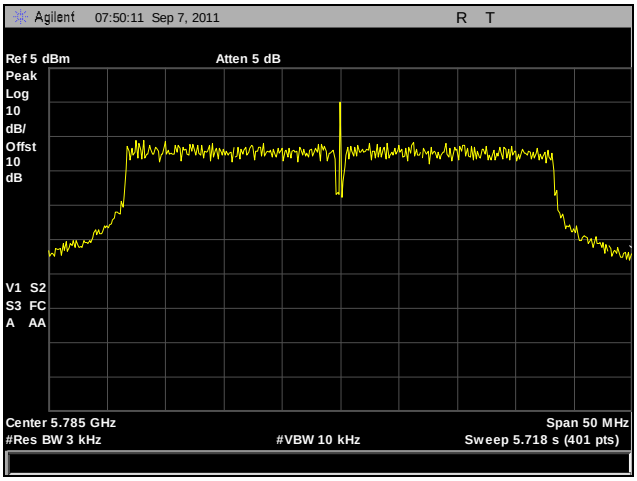
## Peak Power Spectral Density, 5.8 GHz, 802.11n 40 MHz, Port B



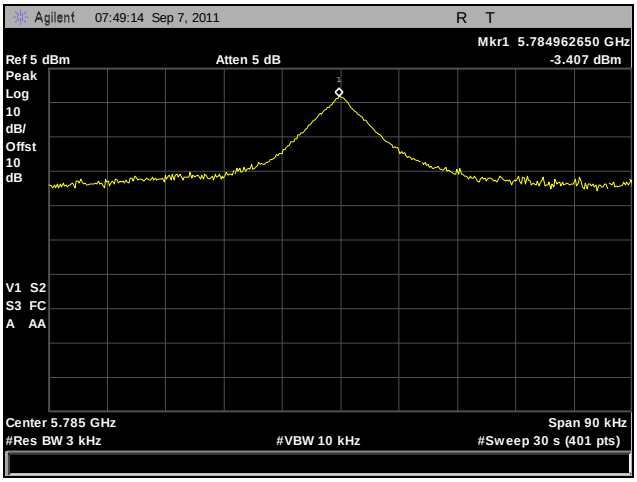

**Plot 580. Peak Power Spectral Density, Low Channel, 5.8 GHz, 802.11n 40 MHz, Port B, Determination**



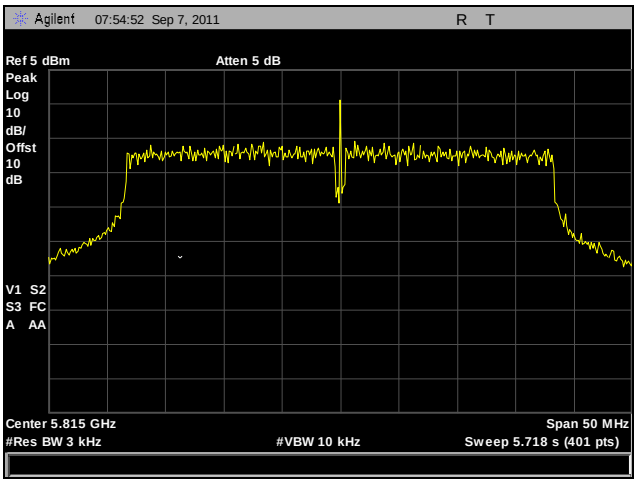

**Plot 581. Peak Power Spectral Density, Low Channel, 5.8 GHz, 802.11n 40 MHz, Port B**



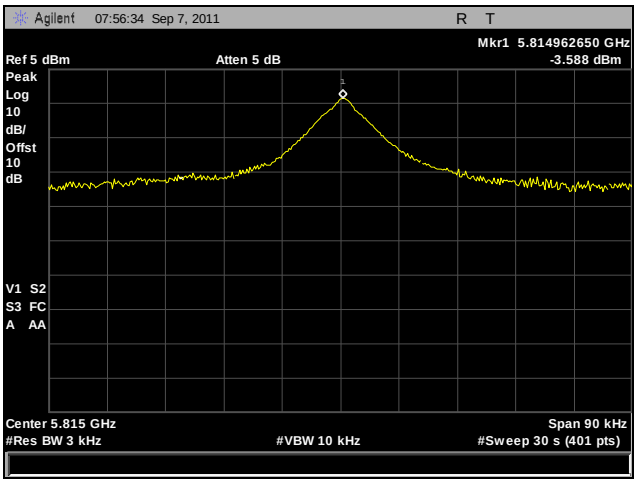

**Plot 582. Peak Power Spectral Density, Mid Channel, 5.8 GHz, 802.11n 40 MHz, Port B, Determination**




**Plot 583. Peak Power Spectral Density, Mid Channel, 5.8 GHz, 802.11n 40 MHz, Port B**

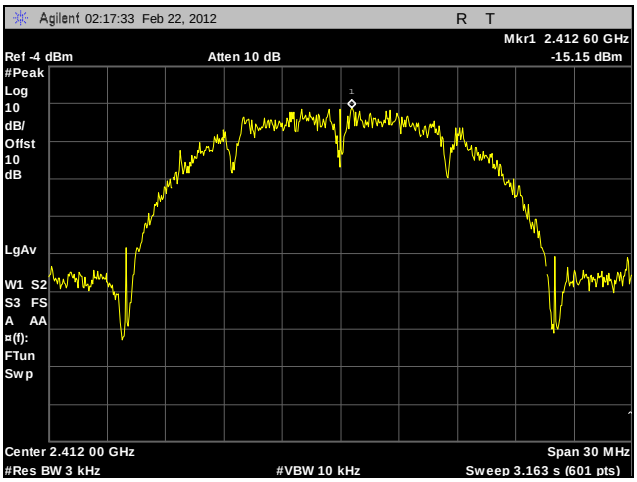



**Plot 584. Peak Power Spectral Density, High Channel, 5.8 GHz, 802.11n 40 MHz, Port B, Determination**

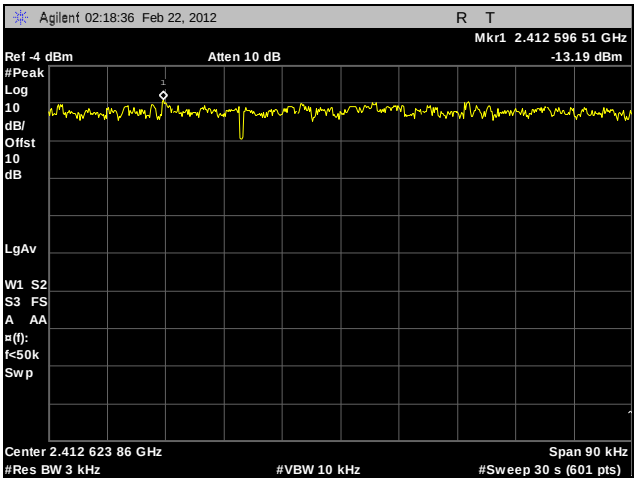



**Plot 585. Peak Power Spectral Density, High Channel, 5.8 GHz, 802.11n 40 MHz, Port B**

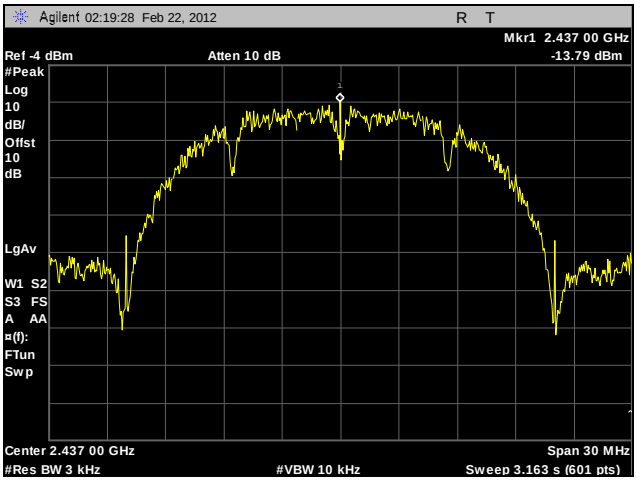
## Peak Power Spectral Density, 2.4 GHz, 802.11b, Port A, Sector Antenna



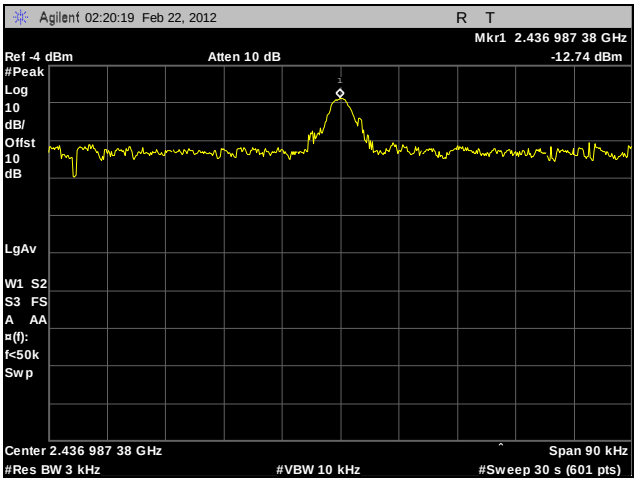

**Plot 586. Peak Power Spectral Density, Low Channel, 2.4 GHz, 802.11b, Port A, Sector Antenna, Determination**



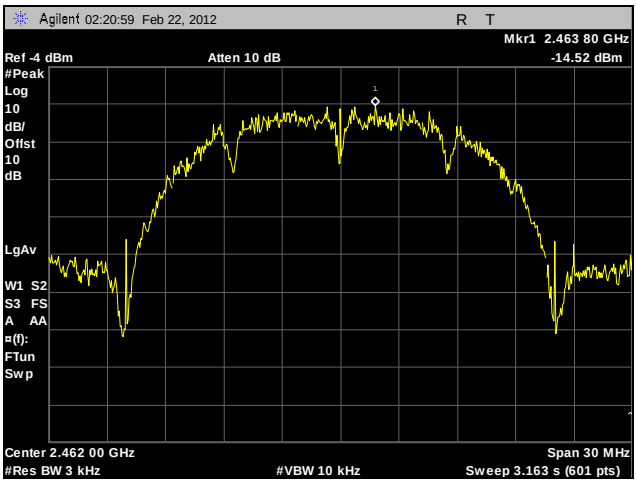

**Plot 587. Peak Power Spectral Density, Low Channel, 2.4 GHz, 802.11b, Port A, Sector Antenna**



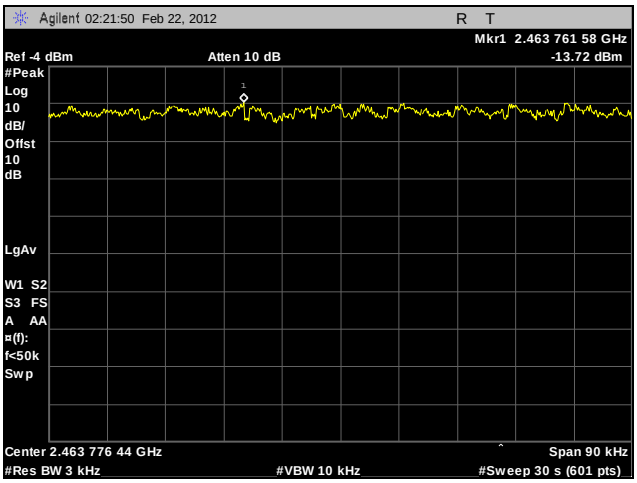

**Plot 588. Peak Power Spectral Density, Mid Channel, 2.4 GHz, 802.11b, Port A, Sector Antenna, Determination**




**Plot 589. Peak Power Spectral Density, Mid Channel, 2.4 GHz, 802.11b, Port A, Sector Antenna**



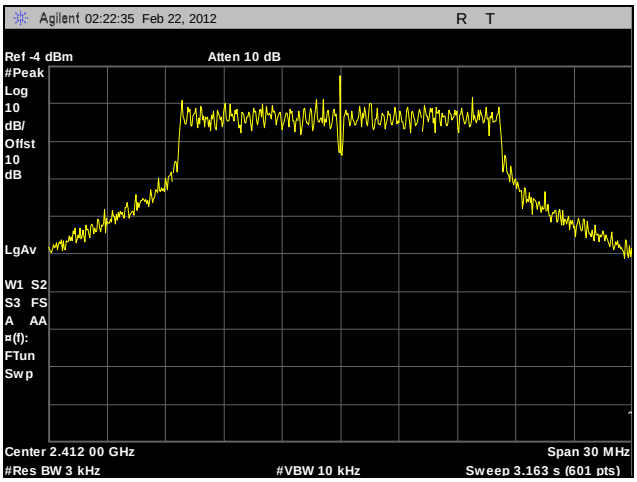

**Plot 590. Peak Power Spectral Density, High Channel, 2.4 GHz, 802.11b, Port A, Sector Antenna, Determination**



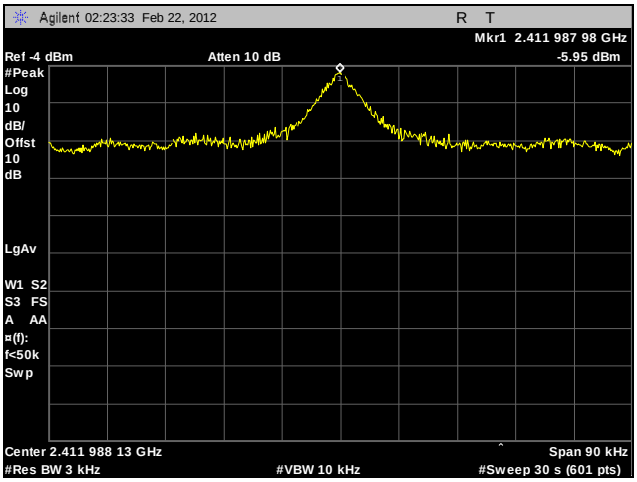

**Plot 591. Peak Power Spectral Density, High Channel, 2.4 GHz, 802.11b, Port A, Sector Antenna**

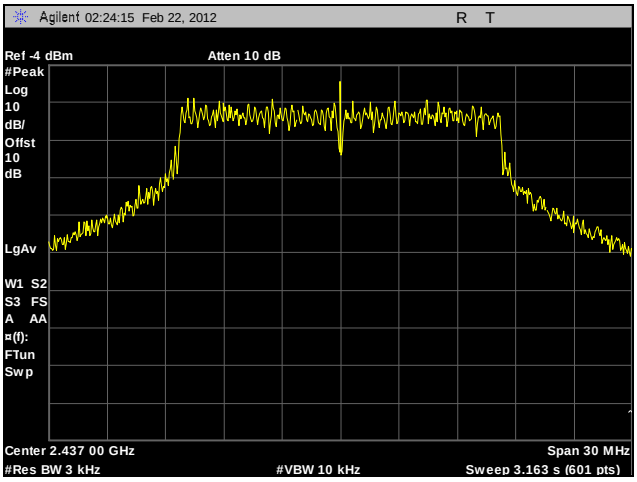
## Peak Power Spectral Density, 2.4 GHz, 802.11g




**Plot 592. Peak Power Spectral Density, Low Channel, 2.4 GHz, 802.11g, Port A, Sector Antenna, Determination**

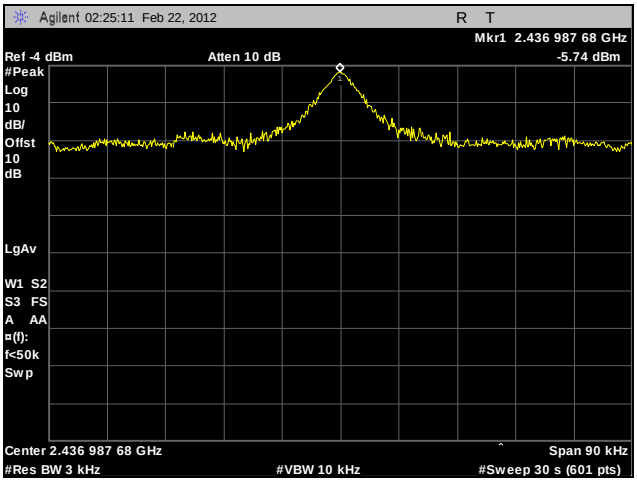



**Plot 593. Peak Power Spectral Density, Low Channel, 2.4 GHz, 802.11g, Port A, Sector Antenna**

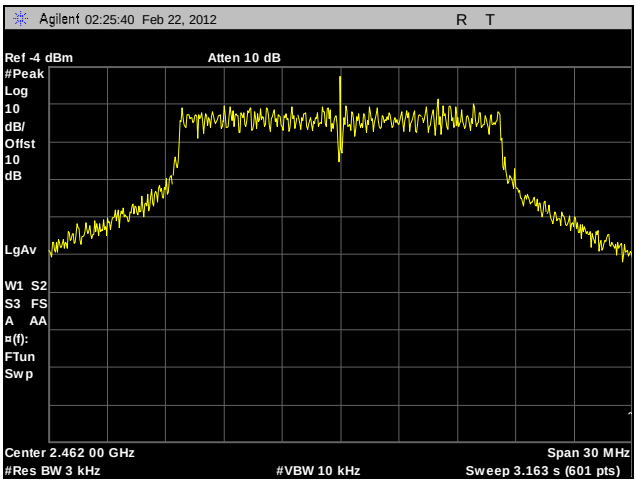



**Plot 594. Peak Power Spectral Density, Mid Channel, 2.4 GHz, 802.11g, Port A, Sector Antenna, Determination**

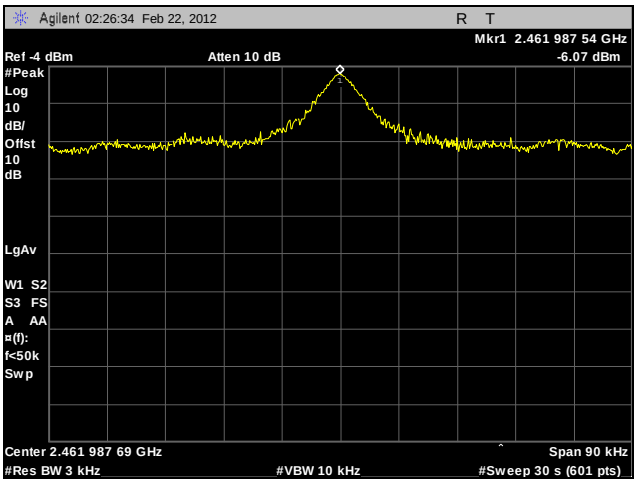
  




**Plot 595. Peak Power Spectral Density, Mid Channel, 2.4 GHz, 802.11g, Port A, Sector Antenna**



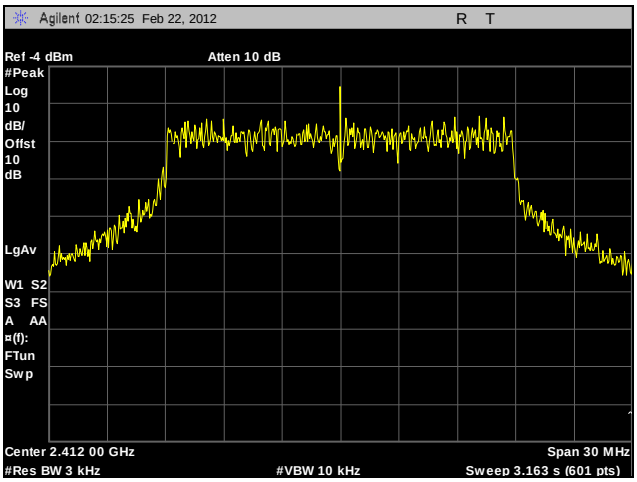

**Plot 596. Peak Power Spectral Density, High Channel, 2.4 GHz, 802.11g, Port A, Sector Antenna, Determination**



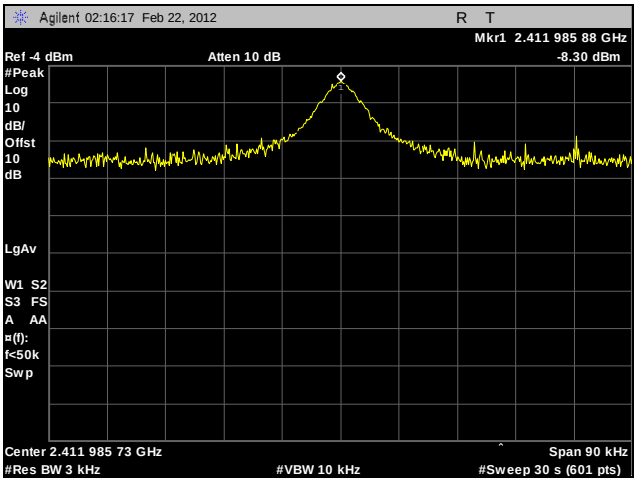

**Plot 597. Peak Power Spectral Density, High Channel, 2.4 GHz, 802.11g, Port A, Sector Antenna**

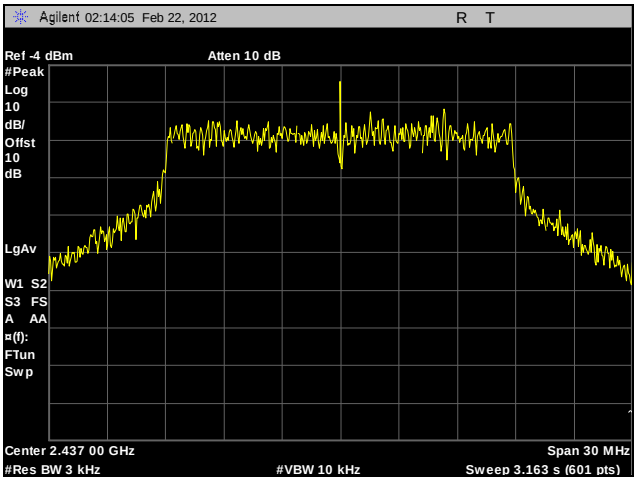
## Peak Power Spectral Density, 2.4 GHz, 802.11g HT20, Port A, Sector Antenna



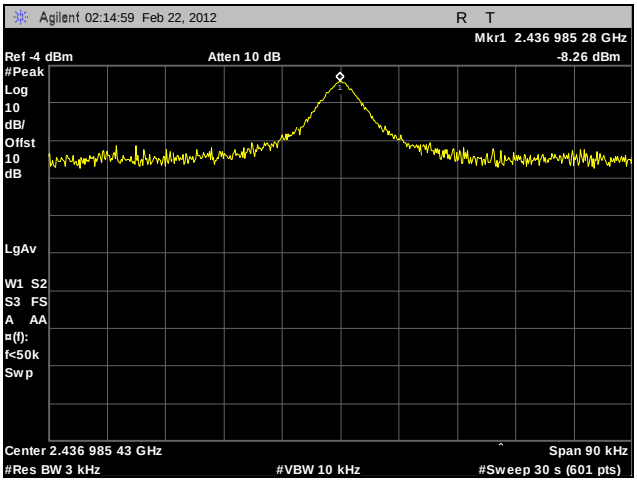

**Plot 598. Peak Power Spectral Density, Low Channel, 2.4 GHz, 802.11g HT20, Port A, Sector Antenna, Determination**



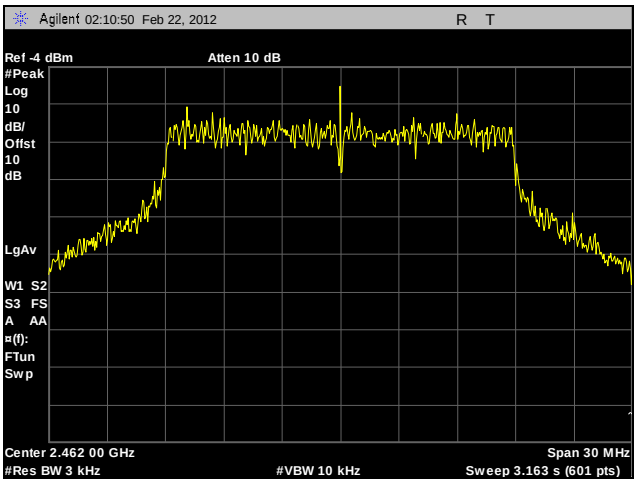

**Plot 599. Peak Power Spectral Density, Low Channel, 2.4 GHz, 802.11g HT20, Port A, Sector Antenna**



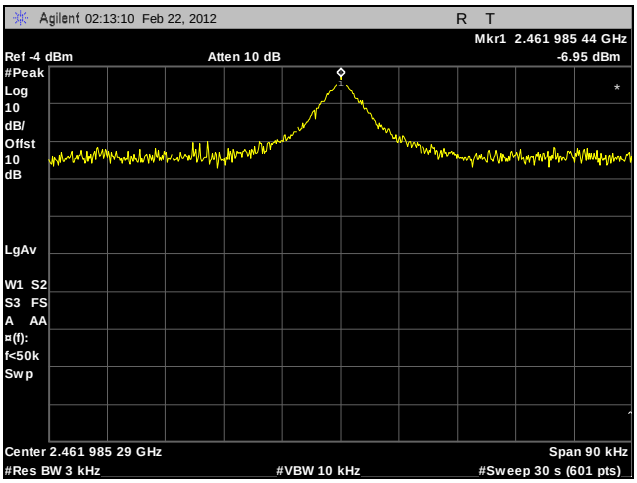

**Plot 600. Peak Power Spectral Density, Mid Channel, 2.4 GHz, 802.11g HT20, Port A, Sector Antenna, Determination**




**Plot 601. Peak Power Spectral Density, Mid Channel, 2.4 GHz802.11g HT20, Port A, Sector Antenna**



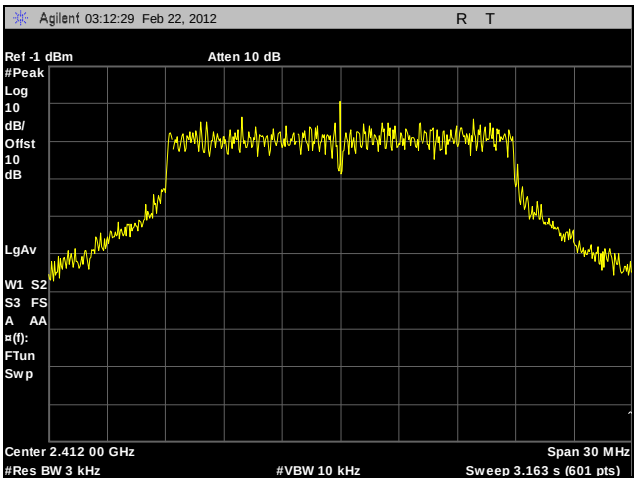

**Plot 602. Peak Power Spectral Density, High Channel, 2.4 GHz, 802.11g HT20, Port A, Sector Antenna, Determination**



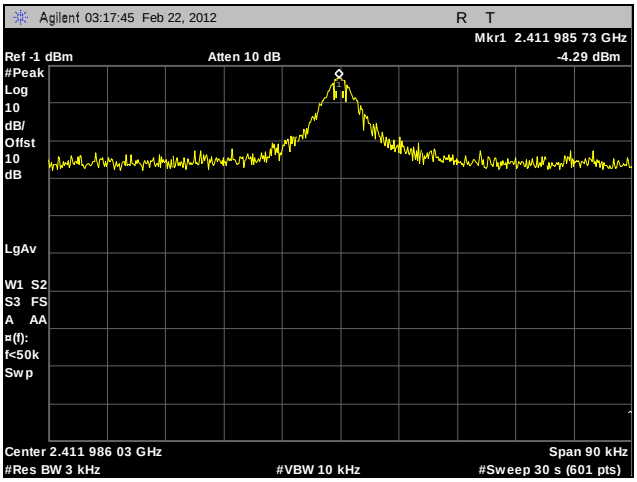

**Plot 603. Peak Power Spectral Density, High Channel, 2.4 GHz, 802.11g HT20, Port A, Sector Antenna**

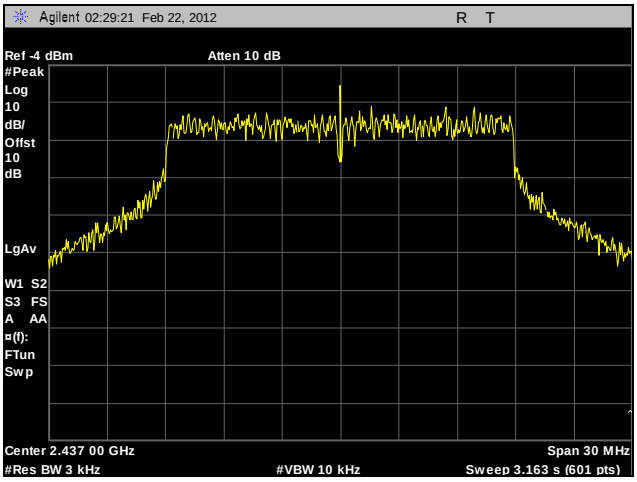
## Peak Power Spectral Density, 2.4 GHz, 802.11g HT20, Port B, Sector Antenna



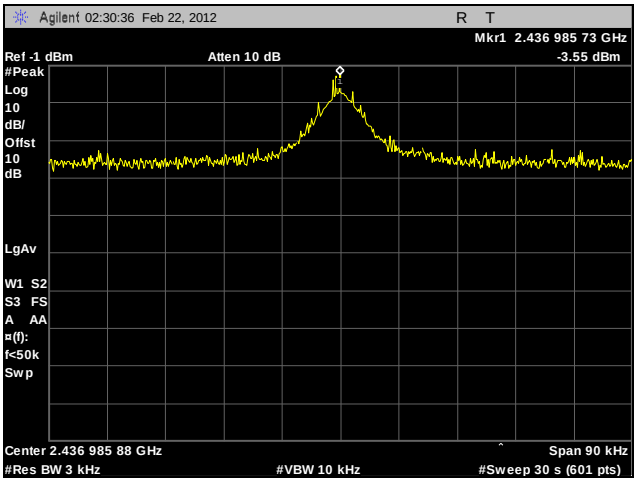

**Plot 604. Peak Power Spectral Density, Low Channel, 2.4 GHz, 802.11g HT20, Port B, Sector Antenna, Determination**



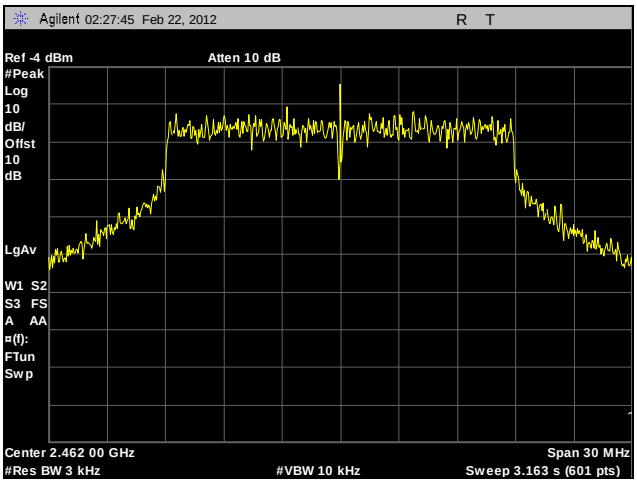

**Plot 605. Peak Power Spectral Density, Low Channel, 2.4 GHz, 802.11g HT20, Port B, Sector Antenna**



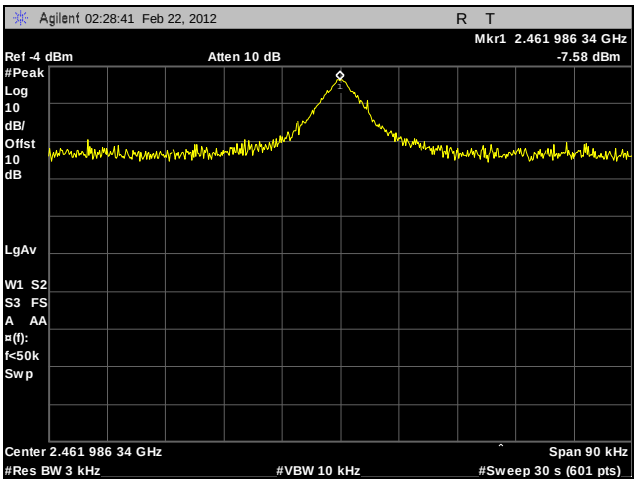

**Plot 606. Peak Power Spectral Density, Mid Channel, 2.4 GHz, 802.11g HT20, Port B, Sector Antenna, Determination**




**Plot 607. Peak Power Spectral Density, Mid Channel, 2.4 GHz802.11g HT20, Port B, Sector Antenna**



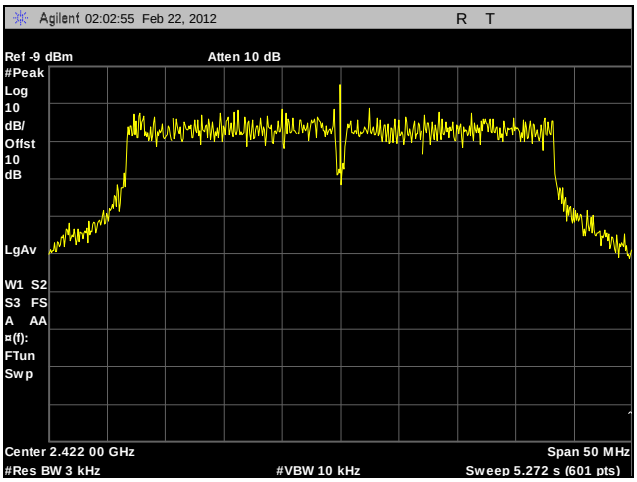

**Plot 608. Peak Power Spectral Density, High Channel, 2.4 GHz, 802.11g HT20, Port B, Sector Antenna, Determination**



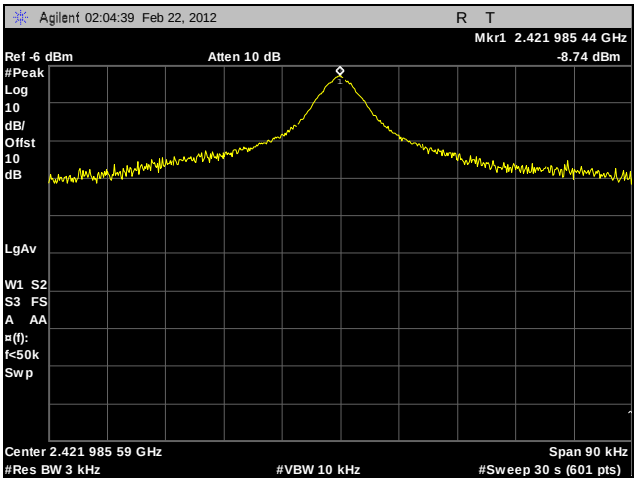

**Plot 609. Peak Power Spectral Density, High Channel, 2.4 GHz, 802.11g HT20, Port B, Sector Antenna**

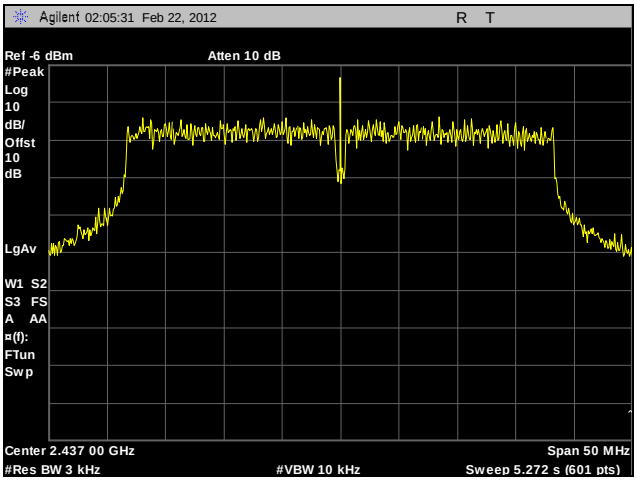
## Peak Power Spectral Density, 2.4 GHz, 802.11g HT40, Port A, Sector Antenna



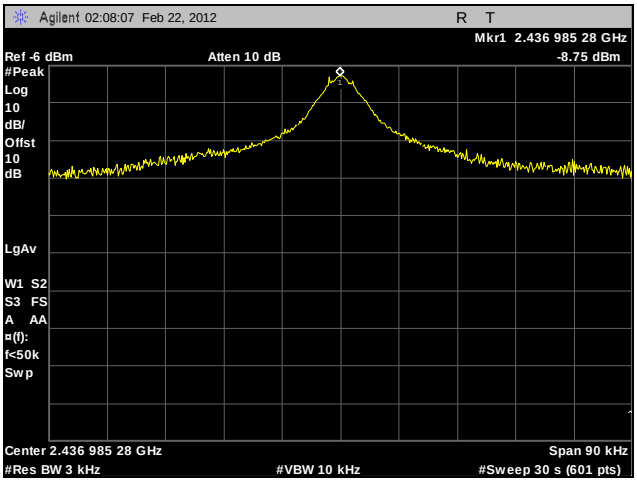

**Plot 610. Peak Power Spectral Density, Low Channel, 2.4 GHz, 802.11g HT40, Port A, Sector Antenna, Determination**



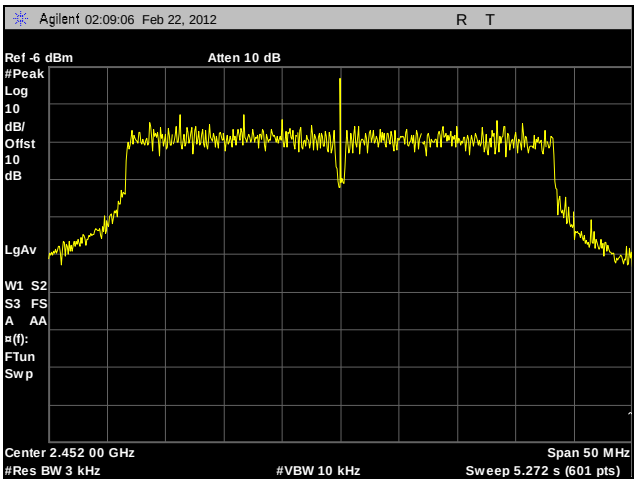

**Plot 611. Peak Power Spectral Density, Low Channel, 2.4 GHz, 802.11g HT40, Port A, Sector Antenna**



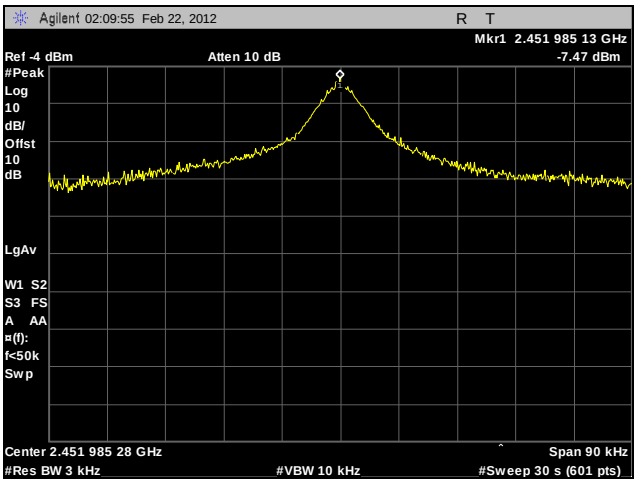

**Plot 612. Peak Power Spectral Density, Mid Channel, 2.4 GHz, 802.11g HT40, Port A, Sector Antenna, Determination**




**Plot 613. Peak Power Spectral Density, Mid Channel, 2.4 GHz802.11g HT40, Port A, Sector Antenna**



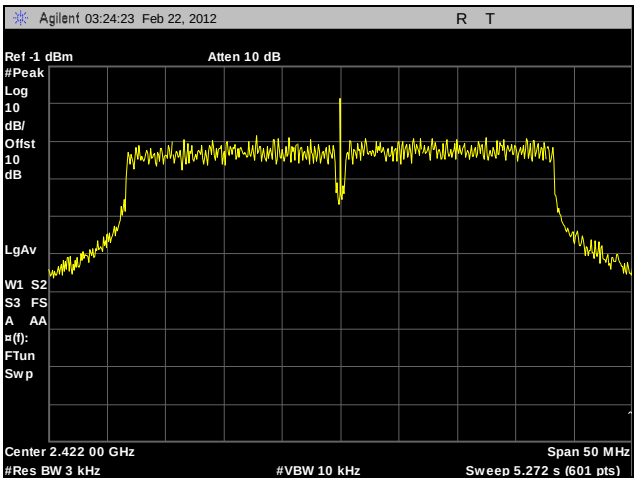

**Plot 614. Peak Power Spectral Density, High Channel, 2.4 GHz, 802.11g HT40, Port A, Sector Antenna, Determination**



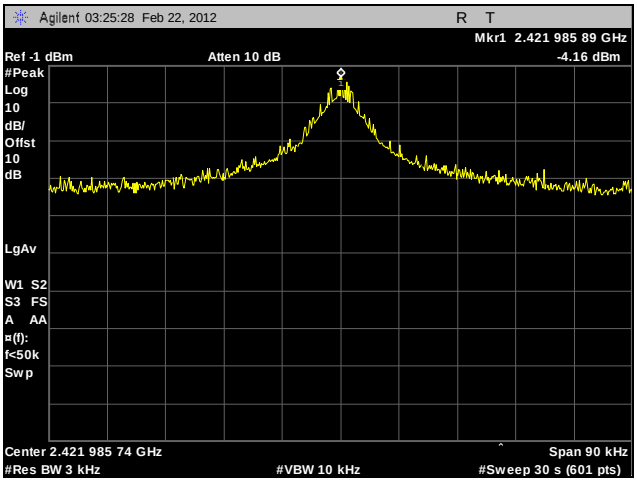

**Plot 615. Peak Power Spectral Density, High Channel, 2.4 GHz, 802.11g HT40, Port A, Sector Antenna**

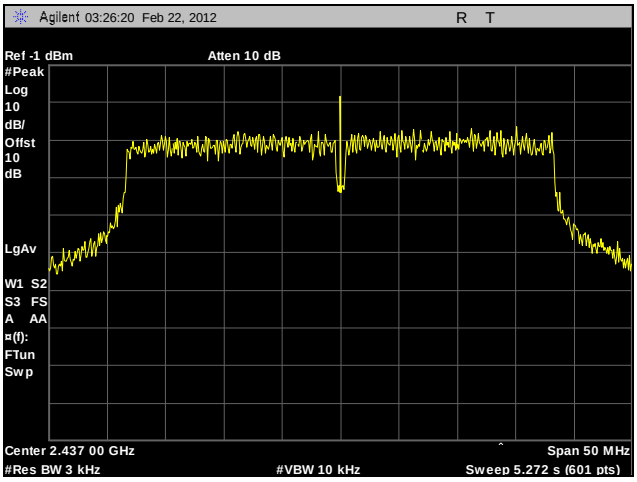
## Peak Power Spectral Density, 2.4 GHz, 802.11g HT40, Port B, Sector Antenna



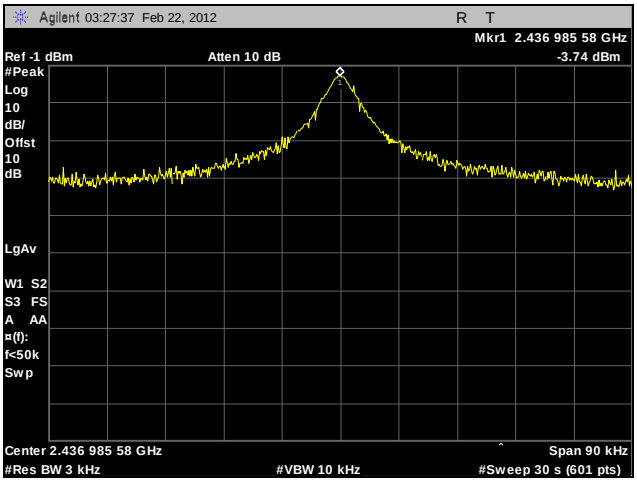

**Plot 616. Peak Power Spectral Density, Low Channel, 2.4 GHz, 802.11g HT40, Port B, Sector Antenna, Determination**



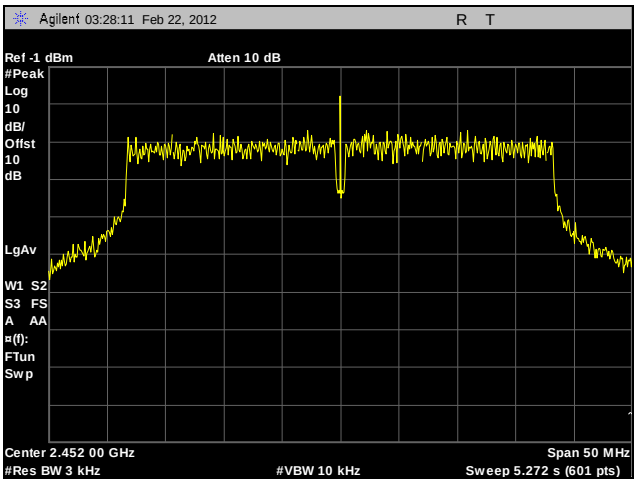

**Plot 617. Peak Power Spectral Density, Low Channel, 2.4 GHz, 802.11g HT40, Port B, Sector Antenna**



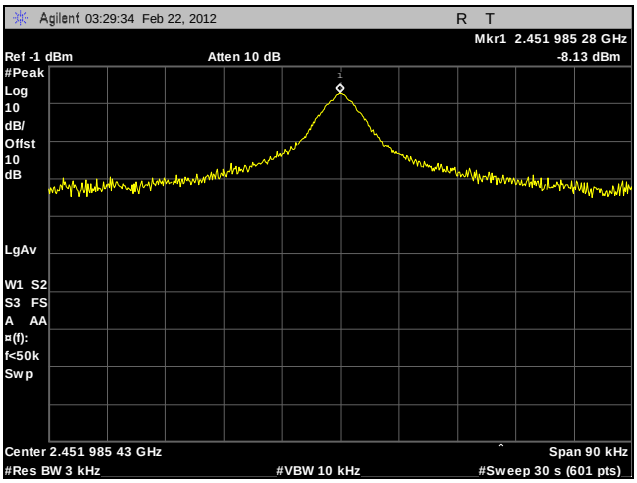

**Plot 618. Peak Power Spectral Density, Mid Channel, 2.4 GHz, 802.11g HT40, Port B, Sector Antenna, Determination**




**Plot 619. Peak Power Spectral Density, Mid Channel, 2.4 GHz802.11g HT40, Port B, Sector Antenna**



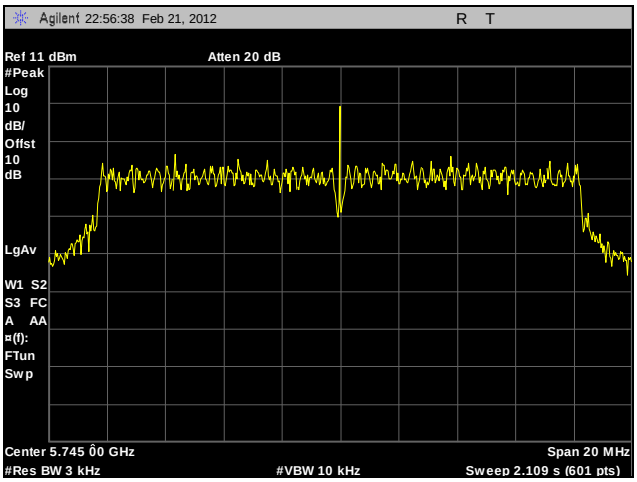

**Plot 620. Peak Power Spectral Density, High Channel, 2.4 GHz, 802.11g HT40, Port B, Sector Antenna, Determination**



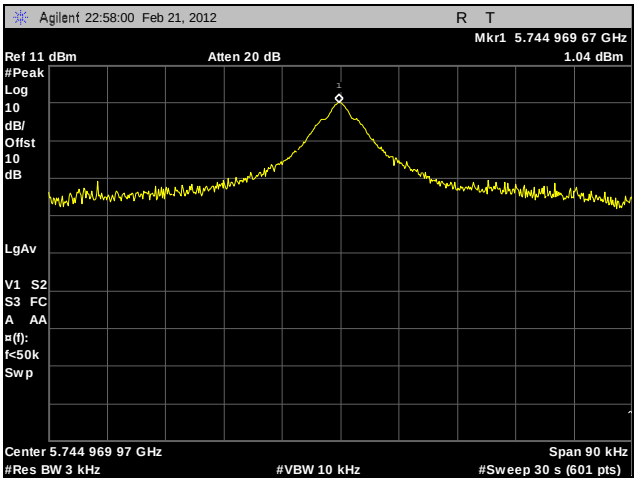

**Plot 621. Peak Power Spectral Density, High Channel, 2.4 GHz, 802.11g HT40, Port B, Sector Antenna**

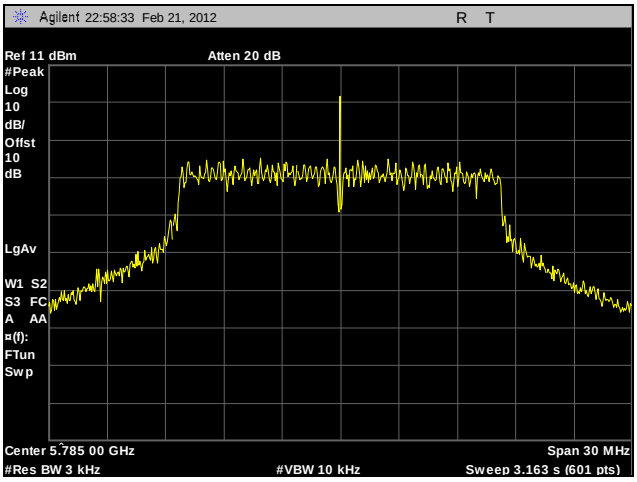
## Peak Power Spectral Density, 5.8 GHz, 802.11a



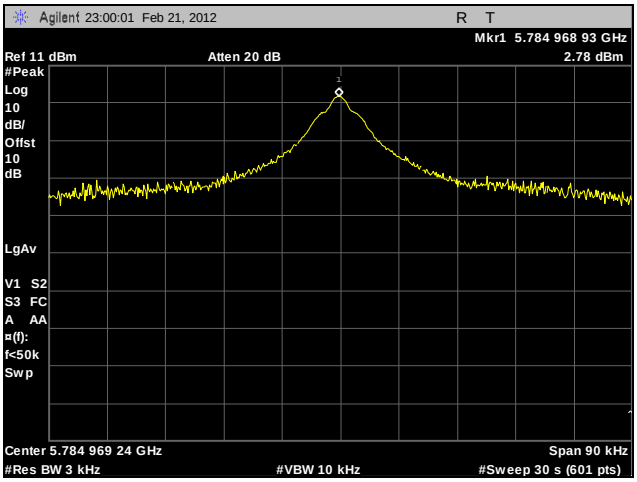

**Plot 622. Peak Power Spectral Density, Low Channel, 5.8 GHz, 802.11a, Port A, Sector Antenna, Determination**



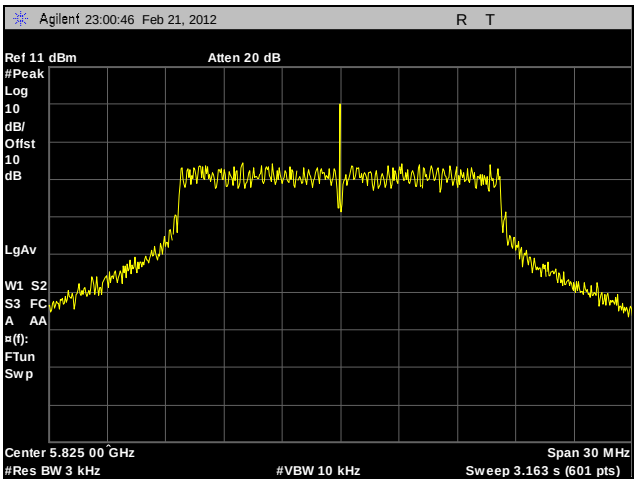

**Plot 623. Peak Power Spectral Density, Low Channel, 5.8 GHz, 802.11a, Port A, Sector Antenna**



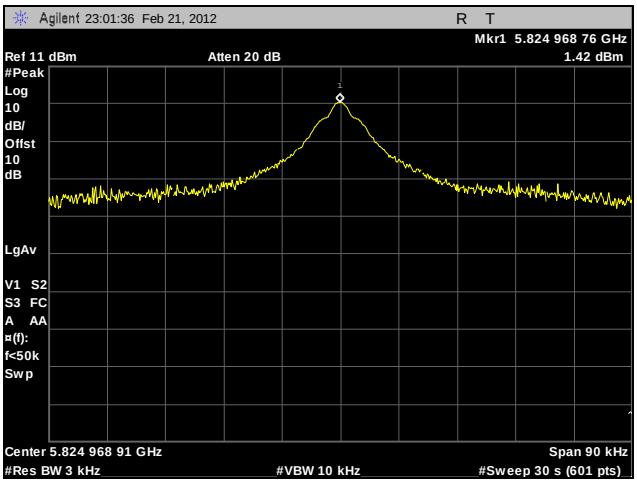

**Plot 624. Peak Power Spectral Density, Mid Channel, 5.8 GHz, 802.11a, Port A, Sector Antenna, Determination**




**Plot 625. Peak Power Spectral Density, Mid Channel, 5.8 GHz, 802.11a, Port A, Sector Antenna**



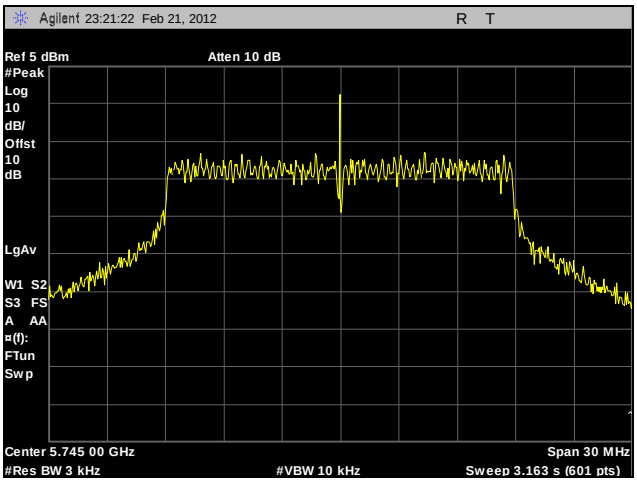

**Plot 626. Peak Power Spectral Density, High Channel, 5.8 GHz, 802.11a, Port A, Sector Antenna, Determination**



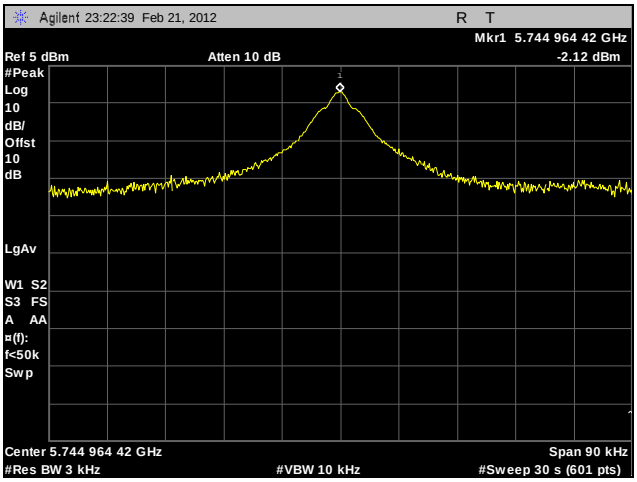

**Plot 627. Peak Power Spectral Density, High Channel, 5.8 GHz, 802.11a, Port A, Sector Antenna**

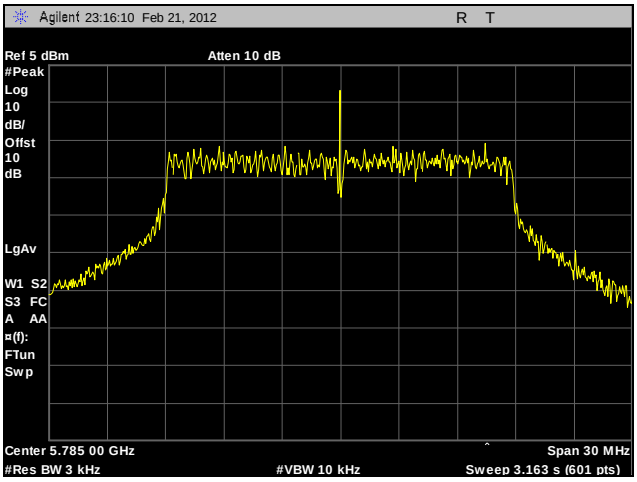
## Peak Power Spectral Density, 5.8 GHz, 802.11n 20 MHz, Port A, Sector Antenna



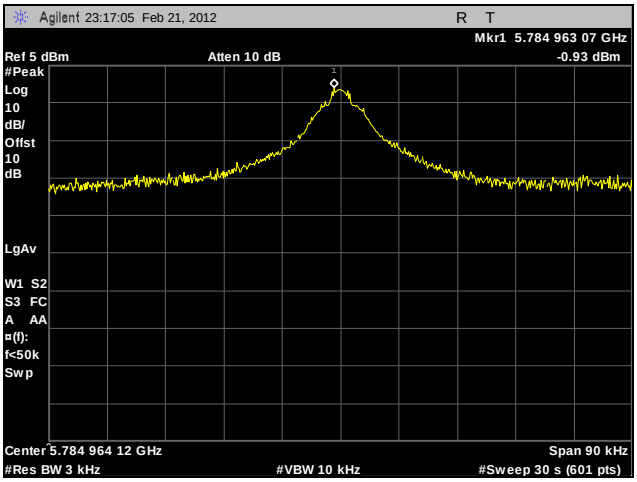

**Plot 628. Peak Power Spectral Density, Low Channel, 5.8 GHz, 802.11n 20 MHz, Port A, Sector Antenna, Determination**



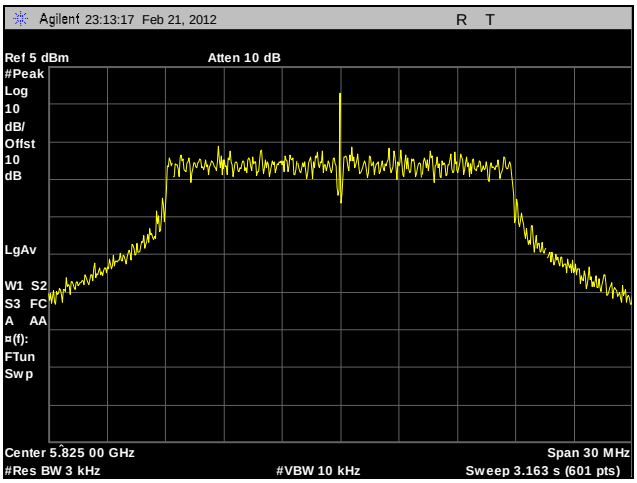

**Plot 629. Peak Power Spectral Density, Low Channel, 5.8 GHz, 802.11n 20 MHz, Port A, Sector Antenna**



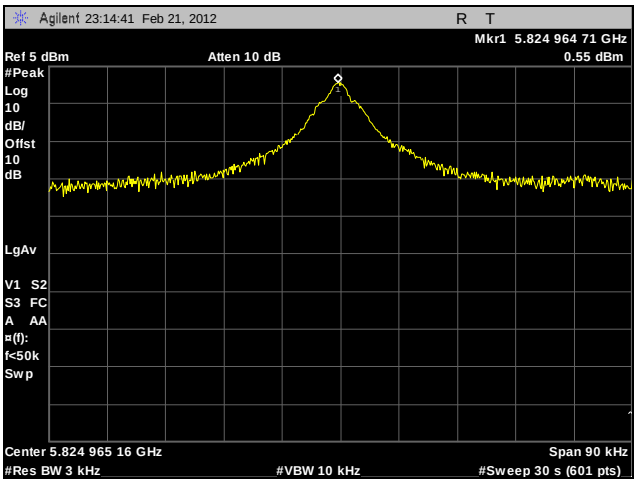

**Plot 630. Peak Power Spectral Density, Mid Channel, 5.8 GHz, 802.11n 20 MHz, Port A, Sector Antenna, Determination**




**Plot 631. Peak Power Spectral Density, Mid Channel, 5.8 GHz, 802.11n 20 MHz, Port A, Sector Antenna**

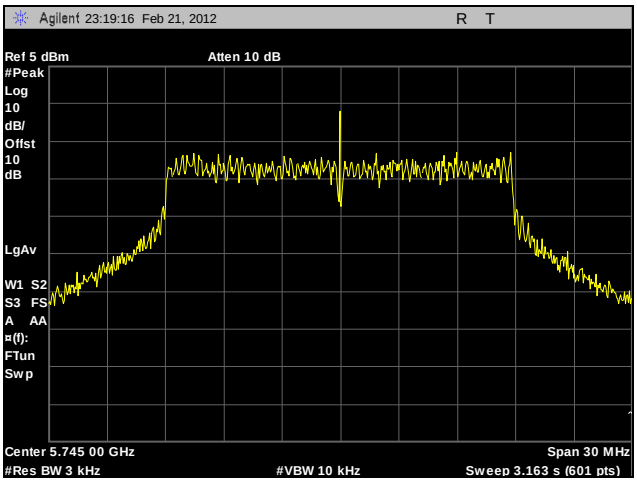



**Plot 632. Peak Power Spectral Density, High Channel, 5.8 GHz, 802.11n 20 MHz, Port A, Sector Antenna, Determination**

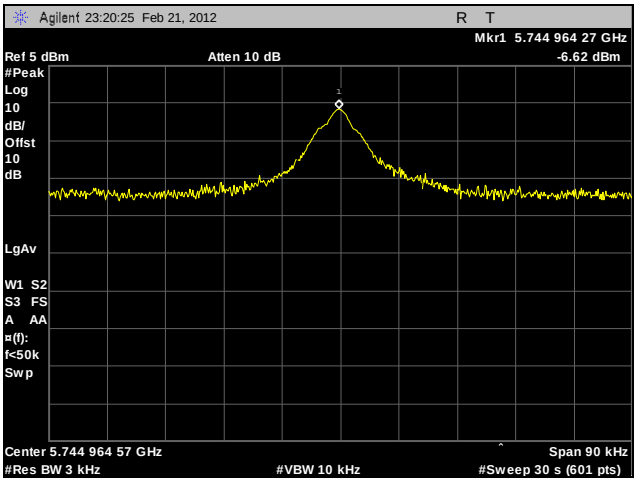



**Plot 633. Peak Power Spectral Density, High Channel, 5.8 GHz, 802.11n 20 MHz, Port A, Sector Antenna**

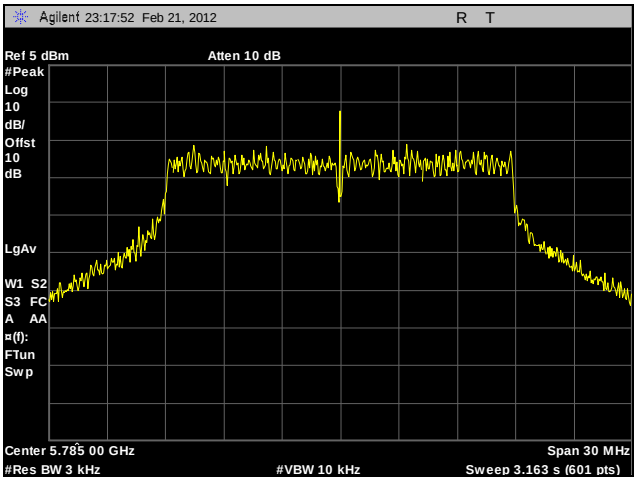
## Peak Power Spectral Density, 5.8 GHz, 802.11n 20 MHz, Port B, Sector Antenna



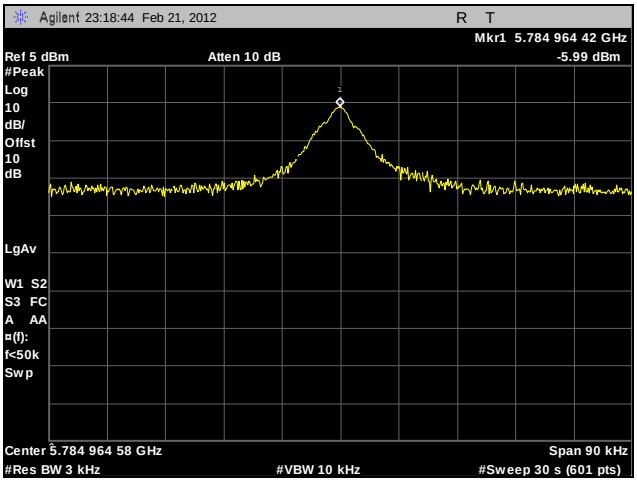

**Plot 634. Peak Power Spectral Density, Low Channel, 5.8 GHz, 802.11n 20 MHz, Port B, Sector Antenna, Determination**



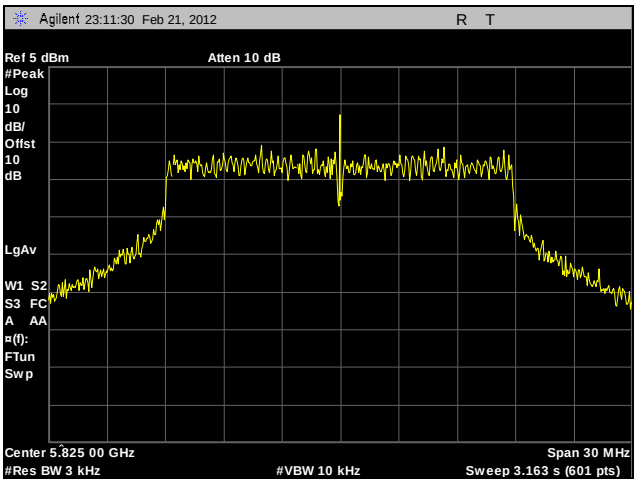

**Plot 635. Peak Power Spectral Density, Low Channel, 5.8 GHz, 802.11n 20 MHz, Port B, Sector Antenna**



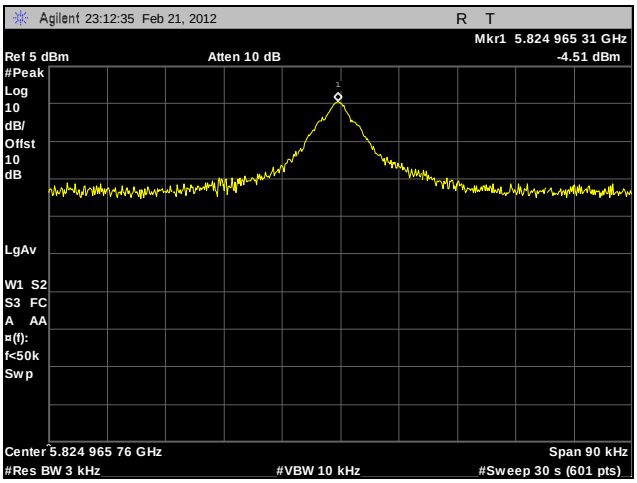

**Plot 636. Peak Power Spectral Density, Mid Channel, 5.8 GHz, 802.11n 20 MHz, Port B, Sector Antenna, Determination**




**Plot 637. Peak Power Spectral Density, Mid Channel, 5.8 GHz, 802.11n 20 MHz, Port B, Sector Antenna**

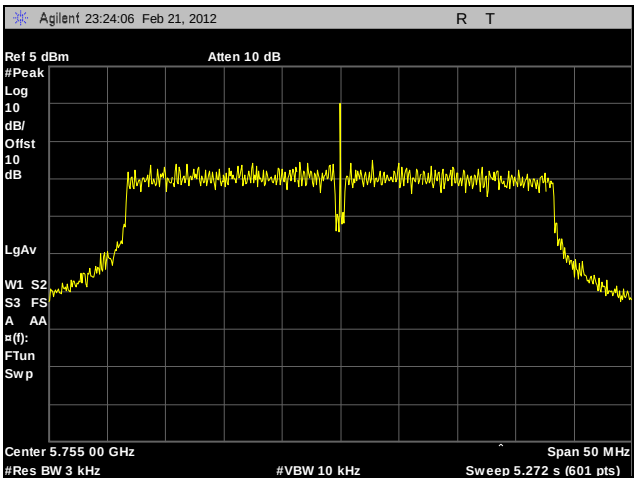



**Plot 638. Peak Power Spectral Density, High Channel, 5.8 GHz, 802.11n 20 MHz, Port B, Sector Antenna, Determination**

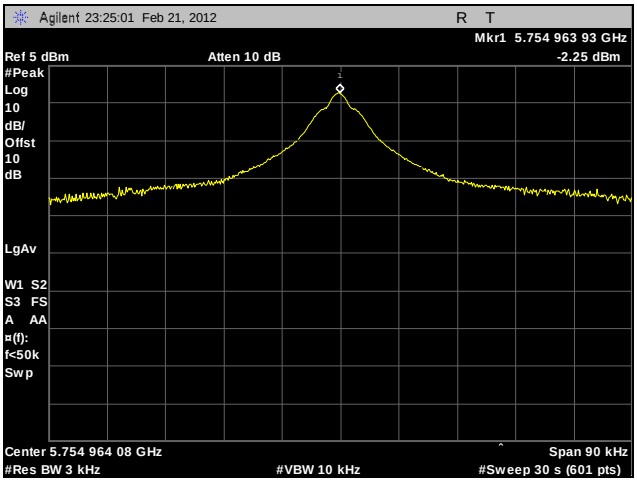



**Plot 639. Peak Power Spectral Density, High Channel, 5.8 GHz, 802.11n 20 MHz, Port B, Sector Antenna**

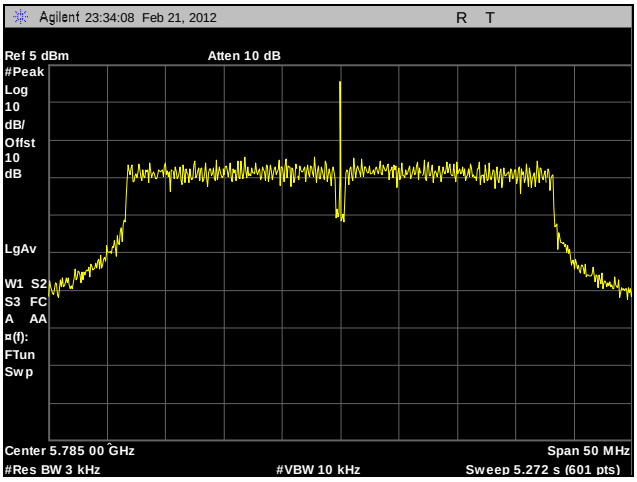
## Peak Power Spectral Density, 5.8 GHz, 802.11n 40 MHz, Port A, Sector Antenna



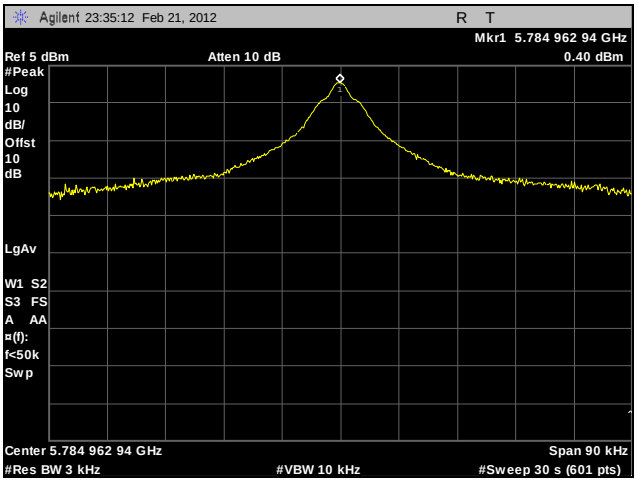

**Plot 640. Peak Power Spectral Density, Low Channel, 5.8 GHz, 802.11n 40 MHz, Port A, Sector Antenna, Determination**



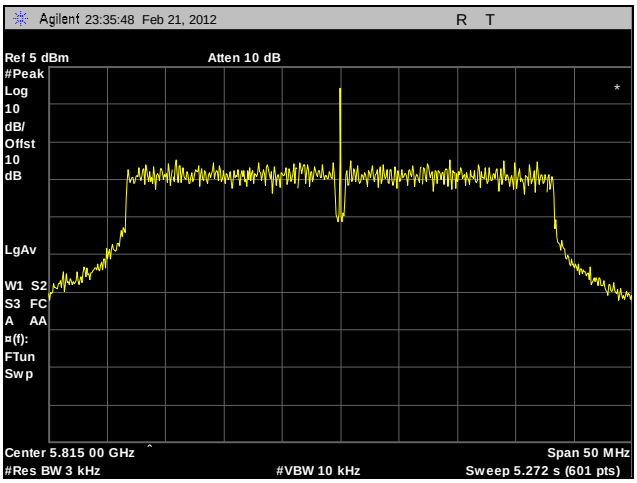

**Plot 641. Peak Power Spectral Density, Low Channel, 5.8 GHz, 802.11n 40 MHz, Port A, Sector Antenna**



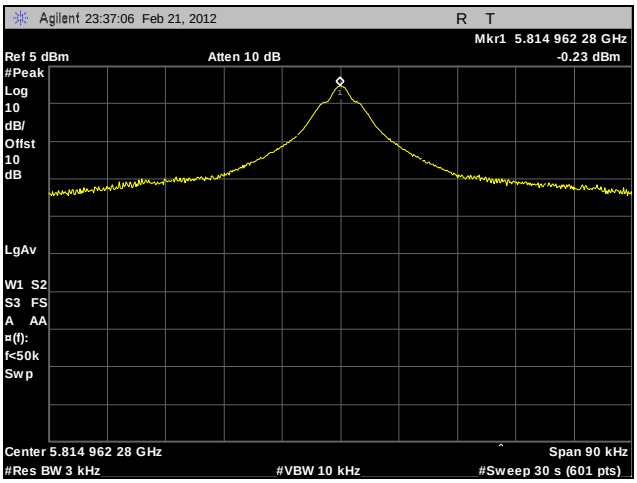

**Plot 642. Peak Power Spectral Density, Mid Channel, 5.8 GHz, 802.11n 40 MHz, Port A, Sector Antenna, Determination**




**Plot 643. Peak Power Spectral Density, Mid Channel, 5.8 GHz, 802.11n 40 MHz, Port A, Sector Antenna**



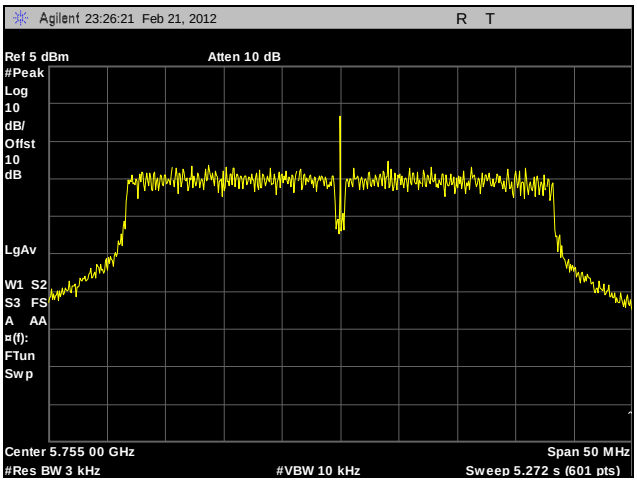

**Plot 644. Peak Power Spectral Density, High Channel, 5.8 GHz, 802.11n 40 MHz, Port A, Sector Antenna, Determination**



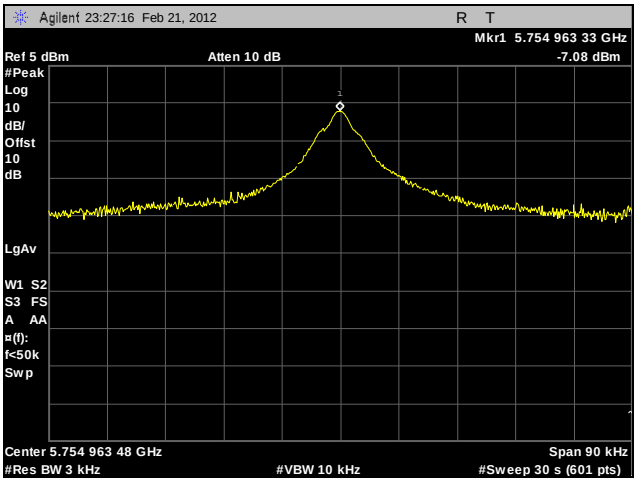

**Plot 645. Peak Power Spectral Density, High Channel, 5.8 GHz, 802.11n 40 MHz, Port A, Sector Antenna**

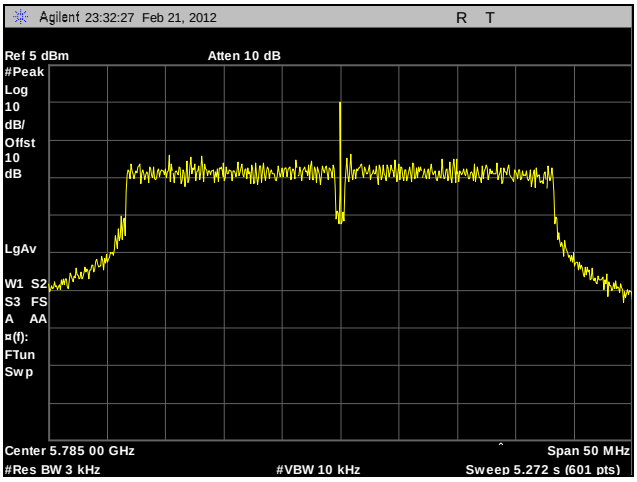
## Peak Power Spectral Density, 5.8 GHz, 802.11n 40 MHz, Port B, Sector Antenna



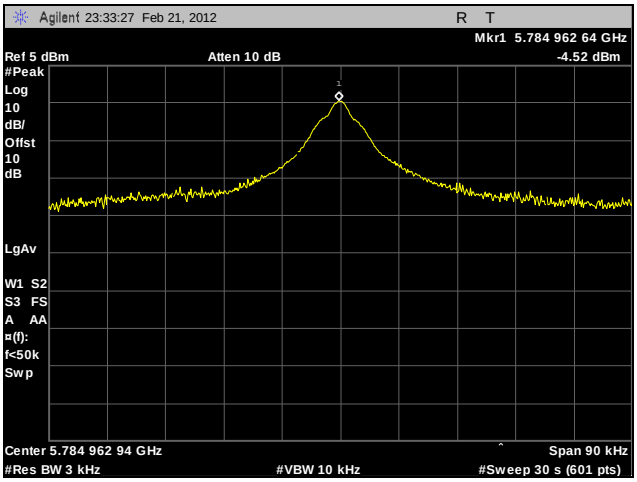

**Plot 646. Peak Power Spectral Density, Low Channel, 5.8 GHz, 802.11n 40 MHz, Port B, Sector Antenna, Determination**



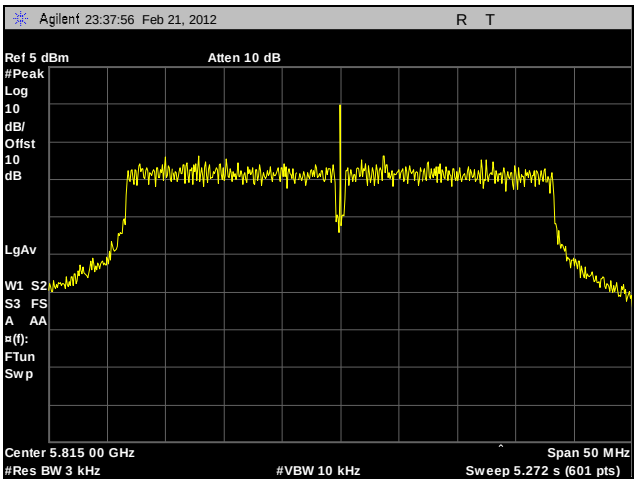

**Plot 647. Peak Power Spectral Density, Low Channel, 5.8 GHz, 802.11n 40 MHz, Port B, Sector Antenna**



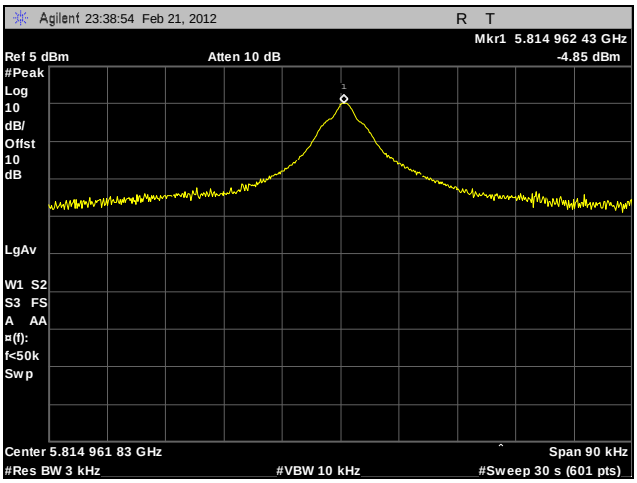

**Plot 648. Peak Power Spectral Density, Mid Channel, 5.8 GHz, 802.11n 40 MHz, Port B, Sector Antenna, Determination**




**Plot 649. Peak Power Spectral Density, Mid Channel, 5.8 GHz, 802.11n 40 MHz, Port B, Sector Antenna**




**Plot 650. Peak Power Spectral Density, High Channel, 5.8 GHz, 802.11n 40 MHz, Port B, Sector Antenna, Determination**




**Plot 651. Peak Power Spectral Density, High Channel, 5.8 GHz, 802.11n 40 MHz, Port B, Sector Antenna**

# Electromagnetic Compatibility Criteria for Intentional Radiators

## § 15.247(i) Maximum Permissible Exposure

**RF Exposure Requirements:** **§1.1307(b)(1) and §1.1307(b)(2):** Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines.

**RF Radiation Exposure Limit:** **§1.1310:** As specified in this section, the Maximum Permissible Exposure (MPE) Limit shall be used to evaluate the environmental impact of human exposure to radiofrequency (RF) radiation as specified in Sec. 1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of Sec. 2.1093 of this chapter.

MPE Limit Calculation: EUT's operating frequencies @ 2412-2462 MHz; highest conducted power = *24.3dBm* (peak) therefore, **Limit for Uncontrolled exposure: 1 mW/cm$^2$ or 10 W/m$^2$**

Gain of Omni Antenna @ 2.4GHz= 10 dBi

Equation from page 18 of OET 65, Edition 97-01

$$S = PG / 4\pi R^2 \quad \text{or} \quad R = \sqrt{PG / 4\pi S}$$

where, S = Power Density (mW/cm$^2$)
P = Power Input to antenna (269.15 mW)
G = Numeric Antenna Gain (10)
R = Radius (20 cm)

$S = (269.15 * 10)/(4*3.14*20^2) = 0.536$ mW/cm$^2$, when omni antenna is used
Since S<1mW/cm$^2$, the EUT is compliant with the RF exposure limits at 20cm.

Gain of Sector Antenna @ 2.4GHz = 15+10*log(2)=18.01 dBi
Highest Conducted Power with Sector Antenna = 20.41

$$S = PG / 4\pi R^2 \quad \text{or} \quad R = \sqrt{PG / 4\pi S}$$

where, S = Power Density (1 mW/cm$^2$)
P = Power Input to antenna (109.9 mW)
G = Numeric Antenna Gain (63.24)
R = Radius (cm)

$R = \sqrt{(109.9 * 63.24)/(4*3.14*1)} = 23.52$ cm, when sector antenna is used

MPE Limit Calculation: EUT's operating frequencies @ 5725-5850 MHz; highest conducted power = 25.02*dBm* (peak) therefore, **Limit for Uncontrolled exposure: 1 mW/cm$^2$ or 10 W/m$^2$**

Gain of Omni Antenna @ 5.8GHz = 10 dBi

Equation from page 18 of OET 65, Edition 97-01

$S = PG / 4\pi R^2$ or $R = \sqrt{PG / 4\pi S}$

where, S = Power Density (mW/cm$^2$)
P = Power Input to antenna (317.57mW)
G = Antenna Gain (10 numeric)
R = Radius (20 cm)

$S = (317.57 * 10)/(4*3.14*20^2) = 0.632$ mW/cm$^2$, when omni antenna is used
Since S<1mW/cm2, the EUT is compliant with the RF exposure limits at 20cm.

Gain of Sector Antenna @ 5.8GHz = 15.5+10log(2)=18.51 dBi
Highest Conducted Power with Sector Antenna = 20.43 dBm

$S = PG / 4\pi R^2$ or $R = \sqrt{PG / 4\pi S}$

where, S = Power Density (1 mW/cm$^2$)
P = Power Input to antenna (110.41 mW)
G = Numeric Antenna Gain (70.96)
R = Radius (cm)

$R = \sqrt{(110.41 * 70.96)/(4*3.14*1)} = 24.98$ cm, when sector antenna is used

## Electromagnetic Compatibility Criteria for Intentional Radiators

### RSS-GEN Receiver Spurious Emissions Requirements

**Test Requirements:** The following receiver spurious emission limits shall be complied with:

(a) If a radiated measurement is made, all spurious emissions shall comply with the limits of Table 31.

| Spurious Frequency (MHz) | Field Strength (microvolt/m at 3 metres) |
|---|---|
| 30 – 88 | 100 |
| 88 – 216 | 150 |
| 216 – 960 | 200 |
| Above 960 | 500 |

**Table 31. Spurious Emission Limits for Receivers**

(b) If a conducted measurement is made, no spurious output signals appearing at the antenna terminals shall exceed 2 nanowatts per any 4 kHz spurious frequency in the band 30-1000 MHz, or 5 nanowatts above 1 GHz.

**Test Procedures:** The EUT was programmed for receive mode only. Conducted measurements were taken at the antenna port of the EUT. 100 kHz resolution bandwidth was used from 30 MHz – 1 GHz and 300 kHz resolution was used for measurements done above 1 GHz. All plots are corrected for cable loss.

**Test Results:** Equipment is compliant with the Receiver Spurious Emissions Requirements of RSS-GEN.

**Test Engineer(s):** Jeff Pratt

**Test Date(s):** 10/04/11

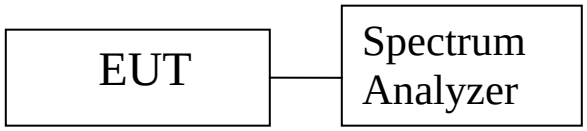
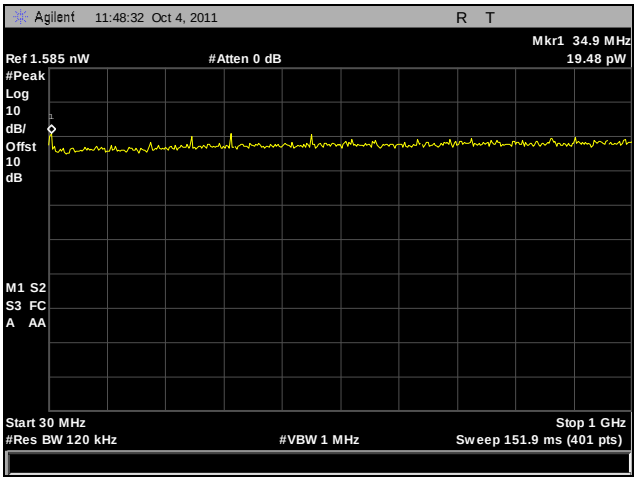
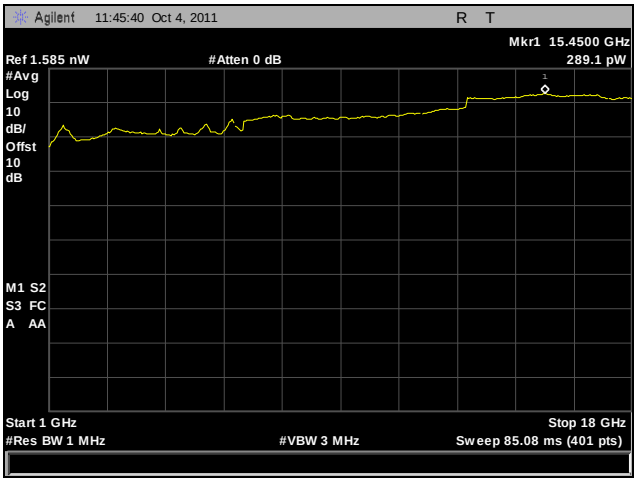



**Figure 5. Block Diagram, Conducted Receiver Spurious Emissions Test Setup**

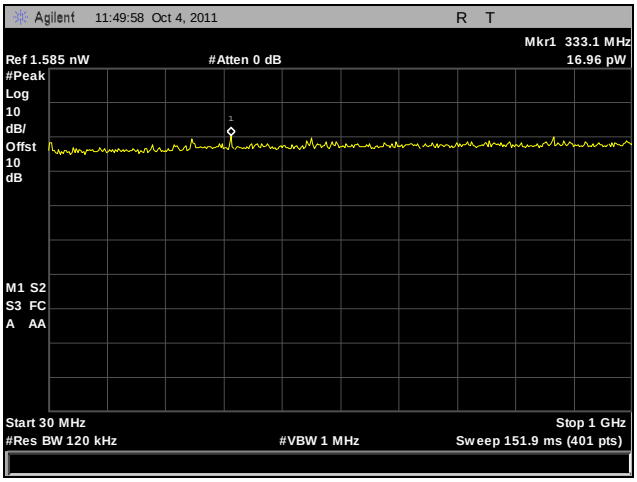
## Conducted Receiver Spurious Emissions



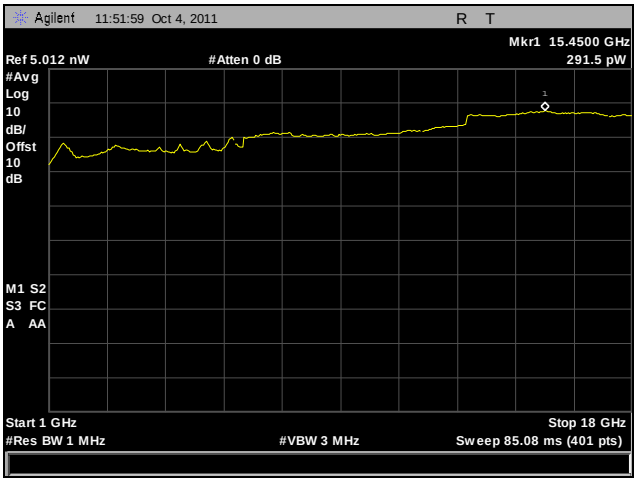

**Plot 652. Receiver Spurious Emission, 2.4 GHz, 30 MHz – 1 GHz, Port A**



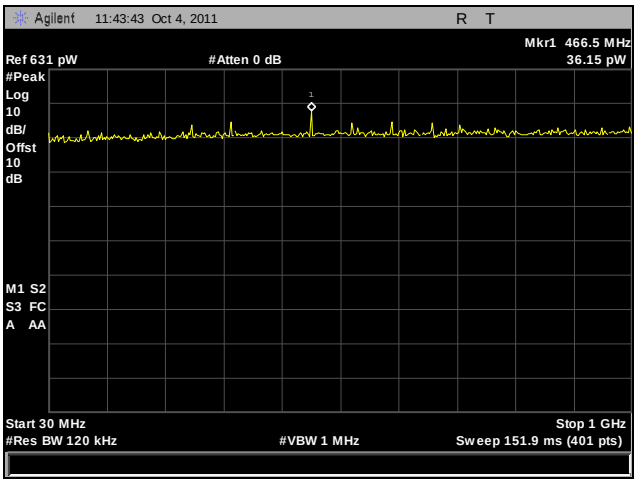

**Plot 653. Receiver Spurious Emission, 2.4 GHz, 1 GHz – 18 GHz, Port A**



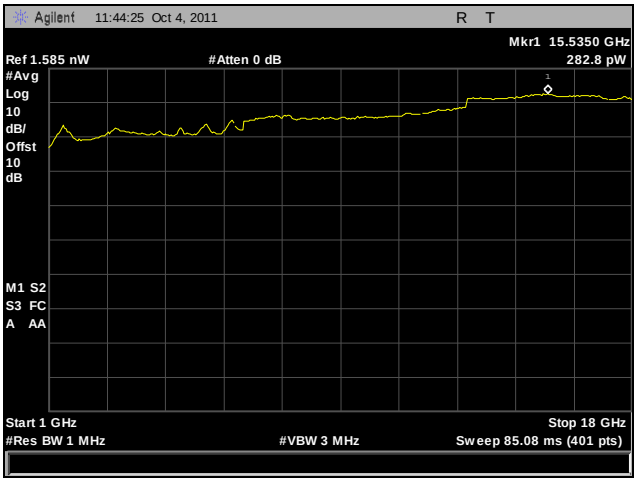

**Plot 654. Receiver Spurious Emission, 5.8 GHz, 30 MHz – 1 GHz, Port A**



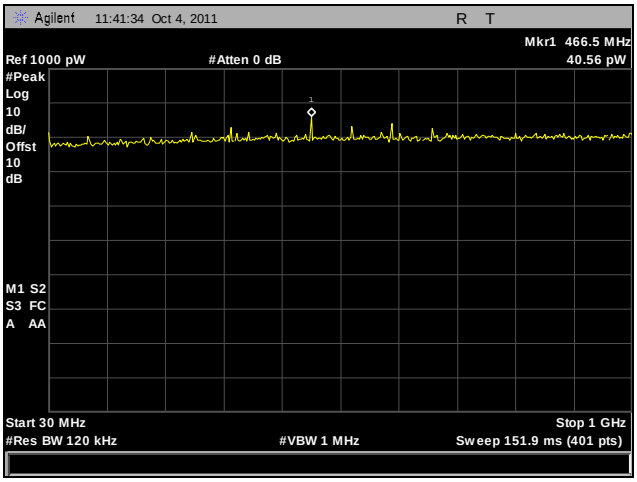

**Plot 655. Receiver Spurious Emission, 5.8 GHz, 1 GHz – 18 GHz, Port A**



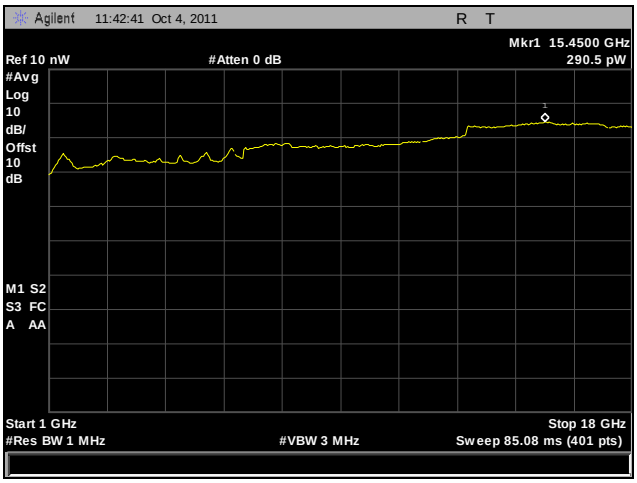

**Plot 656. Receiver Spurious Emission, 2.4 GHz, 30 MHz – 1 GHz, Port B**




**Plot 657. Receiver Spurious Emission, 2.4 GHz, 1 GHz – 18 GHz, Port B**




**Plot 658. Receiver Spurious Emission, 5.8 GHz, 30 MHz – 1 GHz, Port B**




**Plot 659. Receiver Spurious Emission, 5.8 GHz, 1 GHz – 18 GHz, Port B**

# IV. Test Equipment

## Test Equipment

Calibrated test equipment utilized during testing was maintained in a current state of calibration per the requirements of ISO/IEC 17025:2005.

| MET Asset # | Equipment | Manufacturer | Model | Last Cal Date | Cal Due Date |
|---|---|---|---|---|---|
| 1T4483 | ANTENNA; HORN | ETS-LINDGREN | 3117 | 7/19/2011 | 7/19/2012 |
| 1T4442 | PRE-AMPLIFIER, MICROWAVE | MITEQ | AFS42-01001800-30-10P | SEE NOTE | |
| 1T4771 | SPECTRUM ANALYZER | AGILENT | E4446A | 6/25/2011 | 6/25/2012 |
| 1T4612 | SPECTRUM ANALYZER | AGILENT TECHNOLOGIES | E4407B | 10/27/2010 | 10/27/2011 |
| 1T4745 | ANTENNA, HORN | ETS-LINDGREN | 3116 | 10/4/2011 | 10/4/2012 |
| 1T4751 | ANTENNA – BILOG | SUNOL SCIENCES | JB6 | 11/3/2010 | 11/3/2011 |
| 1T4409 | EMI RECEIVER | ROHDE & SCHWARZ | ESIB7 | 6/14/2011 | 6/14/2012 |
| 1T4565 | LISN (24 AMP) | SOLAR ELECTRONICS | 9252-50-R-24-BNC | 10/28/2010 | 10/28/2011 |
| 1T4752 | PRE-AMPLIFIER | MITEQ | JS44-18004000-35-8P | SEE NOTE | |
| 1T4394 | ISOLATION TRANSFORMER | TOPAZ | 91005-31 | SEE NOTE | |
| 1T4563 | LISN (24 AMP) | SOLAR ELECTRONICS | 9252-50-R-24-BNC | 10/6/2010 | 10/6/2011 |
| 1T2109 | RECEIVER, EMI, RECEIVER SECTION | HEWLETT PACKARD | 85462A | 1/7/2011 | 1/7/2012 |
| 1T2108 | RECEIVER, EMI, FILTER SECTION | HEWLETT PACKARD | 85460A | 1/7/2011 | 1/7/2012 |
| 1T4728 | PROGRAMMABLE AC POWER SOURCE | QUADTECH | 31010 | SEE NOTE | |
| 1T4502 | COMB GENERATOR | COM-POWER | CGC-255 | 10/6/2010 | 10/6/2011 |
| 1T4634 | THERMO/HYGRO/BAROMETER | CONTROL COMPANY | 02-401 | 3/11/2010 | 3/11/2012 |
| 1T4758 | THERMO-HYGROMETER | CONTROL COMPANY | 4040 | 5/21/2010 | 5/21/2012 |
| 1T4568 | RADIATING NOISE SOURCE | MET LABORATORIES | N/A | SEE NOTE | |
| N/A | 2.4GHZ BAND REJECT FILTER | MICRO-TRONICS | BRM50701 | SEE NOTE | |

**Table 32. Test Equipment List**

Note: Functionally tested equipment is verified using calibrated instrumentation at the time of testing.

# V. Certification & User's Manual Information

# Certification & User's Manual Information

## A. Certification Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 2, Subpart I — Marketing of Radio frequency devices:

**§ 2.801 Radio-frequency device defined.**

As used in this part, a radio-frequency device is any device which in its operation is capable of Emitting radio-frequency energy by radiation, conduction, or other means. Radio- frequency devices include, but are not limited to:

(a) The various types of radio communication transmitting devices described throughout this chapter.

*(b) The incidental, unintentional and intentional radiators defined in Part 15 of this chapter.*

(c) The industrial, scientific, and medical equipment described in Part 18 of this chapter.

(d) Any part or component thereof which in use emits radio-frequency energy by radiation, conduction, or other means.

**§ 2.803 Marketing of radio frequency devices prior to equipment authorization.**

(a) Except as provided elsewhere in this chapter, no person shall sell or lease, or offer for sale or lease (including advertising for sale or lease), or import, ship or distribute for the purpose of selling or leasing or offering for sale or lease, any radio frequency device unless:

(1) In the case of a device subject to certification, such device has been authorized by the Commission in accordance with the rules in this chapter and is properly identified and labeled as required by §2.925 and other relevant sections in this chapter; or

(2) In the case of a device that is not required to have a grant of equipment authorization issued by the Commission, but which must comply with the specified technical standards prior to use, such device also complies with all applicable administrative (including verification of the equipment or authorization under a Declaration of Conformity, where required), technical, labeling and identification requirements specified in this chapter.

(d) Notwithstanding the provisions of paragraph (a) of this section, the offer for sale solely to business, commercial, industrial, scientific or medical users (but not an offer for sale to other parties or to end users located in a residential environment) of a radio frequency device that is in the conceptual, developmental, design or pre-production stage is permitted prior to equipment authorization or, for devices not subject to the equipment authorization requirements, prior to a determination of compliance with the applicable technical requirements *provided* that the prospective buyer is advised in writing at the time of the offer for sale that the equipment is subject to the FCC rules and that the equipment will comply with the appropriate rules before delivery to the buyer or to centers of distribution.

(e)(1) Notwithstanding the provisions of paragraph (a) of this section, prior to equipment authorization or determination of compliance with the applicable technical requirements any radio frequency device may be operated, but not marketed, for the following purposes and under the following conditions:

*(i) Compliance testing;*

(ii) Demonstrations at a trade show provided the notice contained in paragraph (c) of this section is displayed in a conspicuous location on, or immediately adjacent to, the device;

(iii) Demonstrations at an exhibition conducted at a business, commercial, industrial, scientific or medical location, but excluding locations in a residential environment, provided the notice contained in paragraphs (c) or (d) of this section, as appropriate, is displayed in a conspicuous location on, or immediately adjacent to, the device;

(iv) Evaluation of product performance and determination of customer acceptability, provided such operation takes place at the manufacturer's facilities during developmental, design or pre-production states; or

(v) Evaluation of product performance and determination of customer acceptability where customer acceptability of a radio frequency device cannot be determined at the manufacturer's facilities because of size or unique capability of the device, provided the device is operated at a business, commercial, industrial, scientific or medical user's site, but not at a residential site, during the development, design or pre-production stages.

(e)(2) For the purpose of paragraphs (e)(1)(iv) and (e)(1)(v) of this section, the term *manufacturer's facilities* includes the facilities of the party responsible for compliance with the regulations and the manufacturer's premises, as well as the facilities of other entities working under the authorization of the responsible party in connection with the development and manufacture, but not the marketing, of the equipment.

(f) For radio frequency devices subject to verification and sold solely to business, commercial, industrial, scientific and medical users (excluding products sold to other parties or for operation in a residential environment), parties responsible for verification of the devices shall have the option of ensuring compliance with the applicable technical specifications of this chapter at each end user's location after installation, provided that the purchase or lease agreement includes a proviso that such a determination of compliance be made and is the responsibility of the party responsible for verification of the equipment.

## Certification & User's Manual Information

**The following is extracted from Title 47 of the Code of Federal Regulations, Part 2, Subpart J — Equipment Authorization Procedures:**

**§ 2.901 Basis and Purpose**

(a) In order to carry out its responsibilities under the Communications Act and the various treaties and international regulations, and in order to promote efficient use of the radio spectrum, the Commission has developed technical standards for radio frequency equipment and parts or components thereof. The technical standards applicable to individual types of equipment are found in that part of the rules governing the service wherein the equipment is to be operated.[1] *In addition to the technical standards provided, the rules governing the service may require that such equipment be verified by the manufacturer or importer*, be authorized under a Declaration of Conformity, or receive an equipment authorization from the Commission by one of the following procedures: certification or registration.

(b) The following sections describe the verification procedure, the procedure for a Declaration of Conformity, and the procedures to be followed in obtaining certification from the Commission and the conditions attendant to such a grant.

**§ 2.907 Certification.**

(a) Certification is an equipment authorization issued by the Commission, based on representation and test data submitted by the applicant.

(b) Certification attaches to all units subsequently marketed by the grantee which are identical (see Section 2.908) to the sample tested except for permissive changes or other variations authorized by the Commission pursuant to Section 2.1043.

[1] In this case, the equipment is subject to the rules of Part 15. More specifically, the equipment falls under Subpart B (of Part 15), which deals with unintentional radiators.

## Certification & User's Manual Information

**§ 2.948 Description of measurement facilities.**

(a) Each party making measurements of equipment that is subject to an equipment authorization under Part 15 or Part 18 of this chapter, regardless of whether the measurements are filed with the Commission or kept on file by the party responsible for compliance of equipment marketed within the U.S. or its possessions, shall compile a description of the measurement facilities employed.

(1) If the measured equipment is subject to the verification procedure, the description of the measurement facilities shall be retained by the party responsible for verification of the equipment.

*(i) If the equipment is verified through measurements performed by an independent laboratory, it is acceptable for the party responsible for verification of the equipment to rely upon the description of the measurement facilities retained by or placed on file with the Commission by that laboratory. In this situation, the party responsible for the verification of the equipment is not required to retain a duplicate copy of the description of the measurement facilities.*

(ii) If the equipment is verified based on measurements performed at the installation site of the equipment, no specific site calibration data is required. It is acceptable to retain the description of the measurement facilities at the site at which the measurements were performed.

(2) If the equipment is to be authorized by the Commission under the certification procedure, the description of the measurement facilities shall be filed with the Commission's Laboratory in Columbia, Maryland. The data describing the measurement facilities need only be filed once but must be updated as changes are made to the measurement facilities or as otherwise described in this section. At least every three years, the organization responsible for filing the data with the Commission shall certify that the data on file is current.

# Certification & User's Manual Information

## 1. Label and User's Manual Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 15, Subpart A — General:

**§ 15.19 Labeling requirements.**

*(a) In addition to the requirements in Part 2 of this chapter, a device subject to certification or verification shall be labeled as follows:*

(1) Receivers associated with the operation of a licensed radio service, e.g., FM broadcast under Part 73 of this chapter, land mobile operation under Part 90, etc., shall bear the following statement in a conspicuous location on the device:

This device complies with Part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference.

(2) A stand-alone cable input selector switch, shall bear the following statement in a conspicuous location on the device:

This device is verified to comply with Part 15 of the FCC Rules for use with cable television service.

(3) All other devices shall bear the following statement in a conspicuous location on the device:

*This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.*

(4) Where a device is constructed in two or more sections connected by wires and marketed together, the statement specified under paragraph (a) of this section is required to be affixed only to the main control unit.

(5) When the device is so small or for such use that it is not practicable to place the statement specified under paragraph (a) of this section on it, the information required by this paragraph shall be placed in a prominent location in the instruction manual or pamphlet supplied to the user or, alternatively, shall be placed on the container in which the device is marketed. However, the FCC identifier or the unique identifier, as appropriate, must be displayed on the device.

**§ 15.21 Information to user.**

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

## Verification & User's Manual Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 15, Subpart B — Unintentional Radiators:

**§ 15.105 Information to the user.**

(a) For a Class A digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at own expense.

(b) For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

– Reorient or relocate the receiving antenna.

– Increase the separation between the equipment and receiver.

– Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

– Consult the dealer or an experienced radio/TV technician for help.

## ICES-003 Procedural & Labeling Requirements

From the Industry Canada Electromagnetic Compatibility Advisory Bulletin entitled, "Implementation and Interpretation of the Interference-Causing Equipment Standard for Digital Apparatus, ICES-003" (EMCAB-3, Issue 2, July 1995):

> "At present, CISPR 22: 2002 and ICES technical requirements are essentially equivalent. Therefore, if you have CISPR 22: 2002 approval by meeting CISPR Publication 22, the only additional requirements are: to attach a note to the report of the test results for compliance, indicating that these results are deemed satisfactory evidence of compliance with ICES-003 of the Canadian Interference-Causing Equipment Regulations; to maintain these records on file for the requisite five year period; and to provide the device with a notice of compliance in accordance with ICES-003."

**Procedural Requirements:**

According to Industry Canada's Interference Causing Equipment Standard for Digital Apparatus ICES-003 Issue 4, February 2004:

Section 6.1: A record of the measurements and results, showing the date that the measurements were completed, shall be retained by the manufacturer or importer for a period of at least five years from the date shown in the record and made available for examination on the request of the Minister.

Section 6.2: A written notice indicating compliance must accompany each unit of digital apparatus to the end user. The notice shall be in the form of a label that is affixed to the apparatus. Where because of insufficient space or other constraints it is not feasible to affix a label to the apparatus, the notice may be in the form of a statement in the user's manual.

**Labeling Requirements:**

The suggested text for the notice, in English and in French, is provided below, from the Annex of ICES-003:

> This Class [2] digital apparatus complies with Canadian ICES-003.
>
> Cet appareil numérique de la classe [1] est conforme à la norme NMB-003 du Canada.

[2] Insert either A or B but not both as appropriate for the equipment requirements.

# End of Report