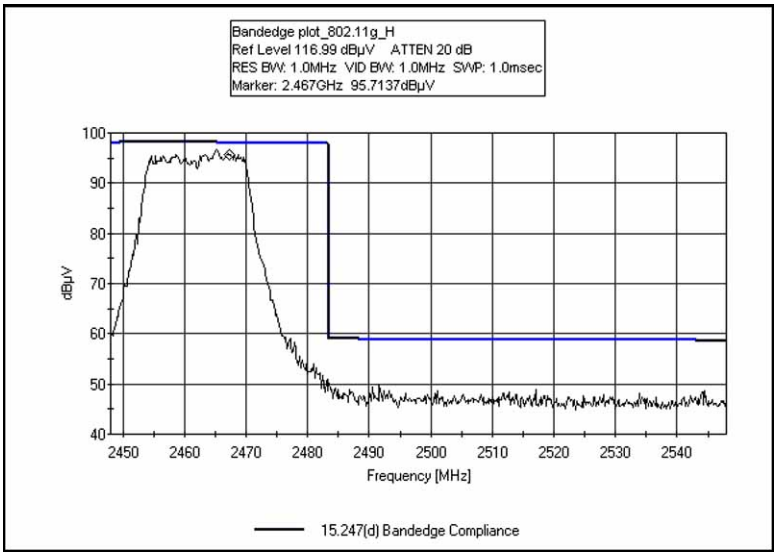
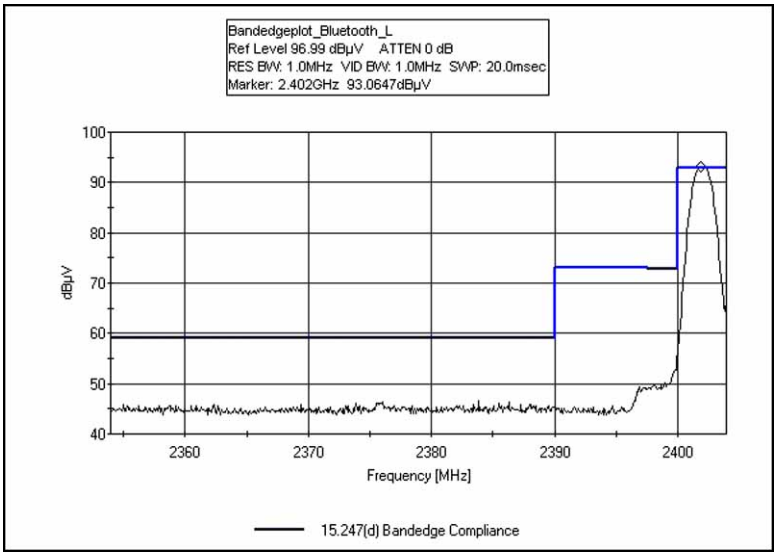
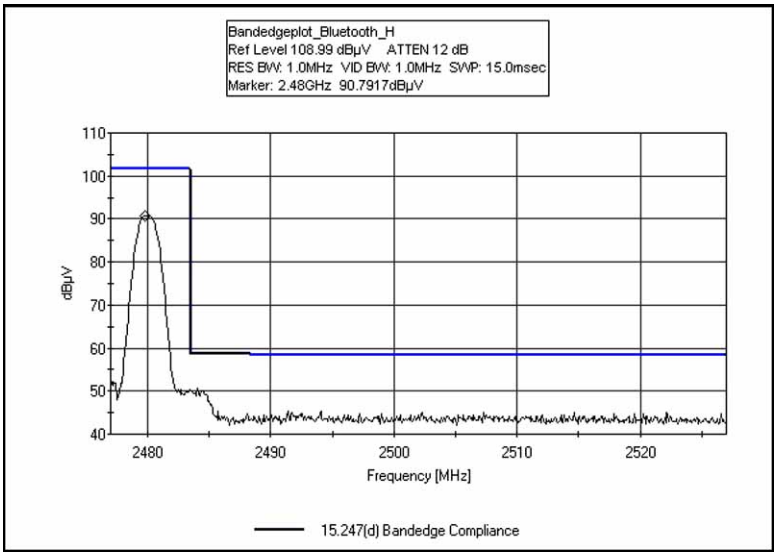
BANDEDGE - 802.11g HIGH



BANDEDGE - BLUETOOTH LOW



BANDEDGE - BLUETOOTH HIGH



FCC Part 15.247(a)(1) Carrier Frequency Separation

Test Equipment

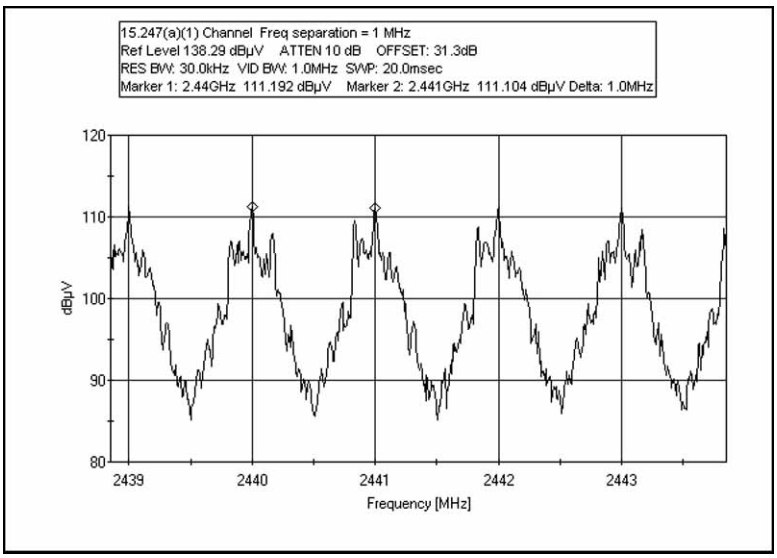
Equipment	Asset #	Manufacturer	Model	Serial #	Cal Date	Cal Due
Spectrum Analyzer	02672	Agilent	E4446A	US44300438	010307	010309
24" SMA Cable (White)	P05183	Pasterneck	35591-48	1-40GHz_white	011107	011109

Test Conditions: The EUT is placed on the test bench, USB port is connected to an AC power supply. The EUT is operating on Max power. RF emission profile evaluated at the internal antenna connector.

Test Setup Photos

Test Plots

FCC 15.247(a)(1) CHANNEL FREQUENCY SEPARATION



FCC Part 15.247(a)(1) –20 dBc Bandwidth

Test Equipment

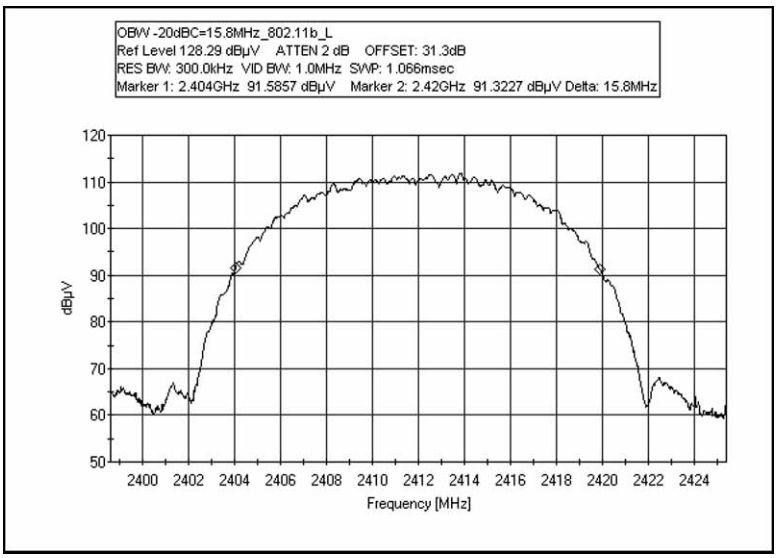
Equipment	Asset #	Manufacturer	Model	Serial #	Cal Date	Cal Due
Spectrum Analyzer	02672	Agilent	E4446A	US44300438	010307	010309
24” SMA Cable (White)	P05183	Pasterneck	35591-48	1-40GHz_white	011107	011109

Test Conditions: The EUT is placed on the test bench, USB port is connected to an AC power supply. The EUT is operating on Max power. RF emission profile evaluated at the internal antenna connector.

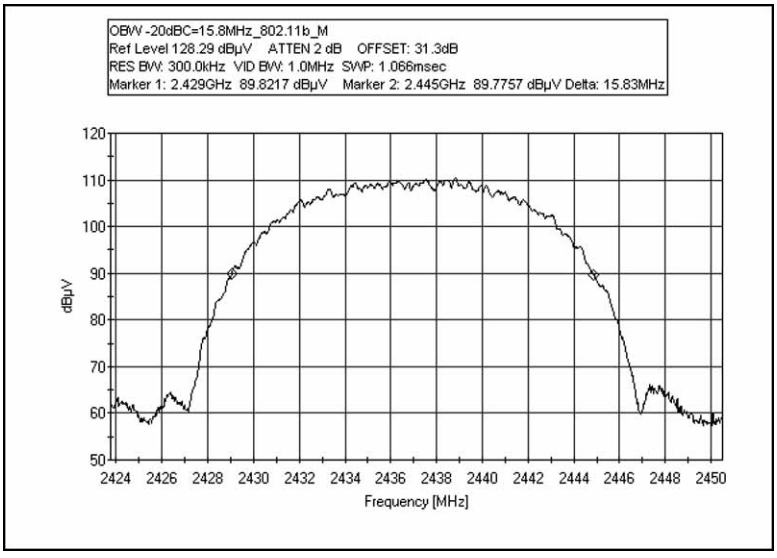
Test Setup Photos

Test Plots

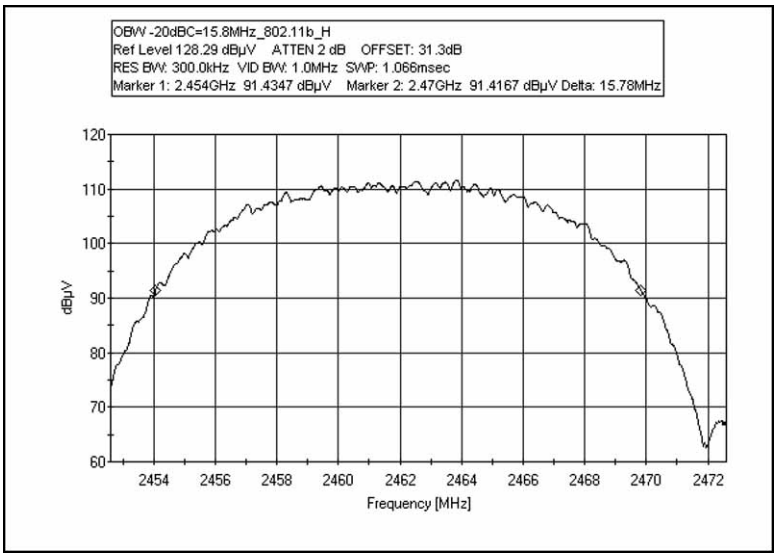
FCC 15.247(a)(1) -20dBC OCCUPIED BANDWIDTH - 802.11b LOW



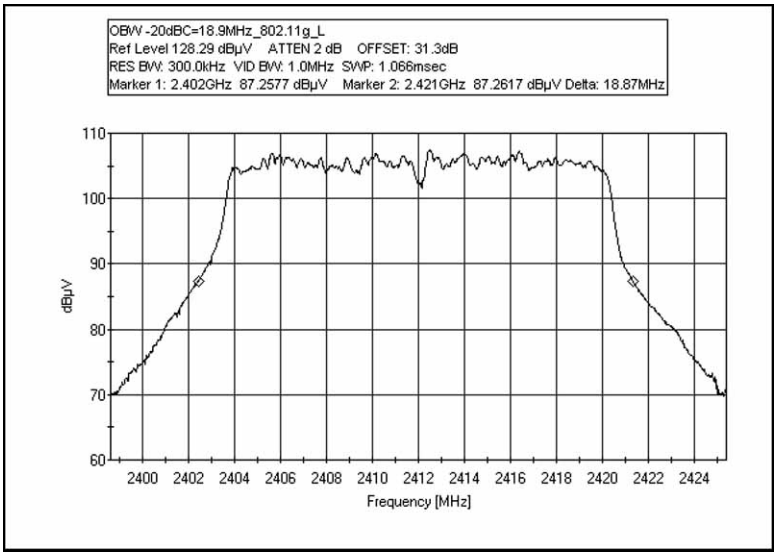
FCC 15.247(a)(1) -20dBC OCCUPIED BANDWIDTH - 802.11b MIDDLE



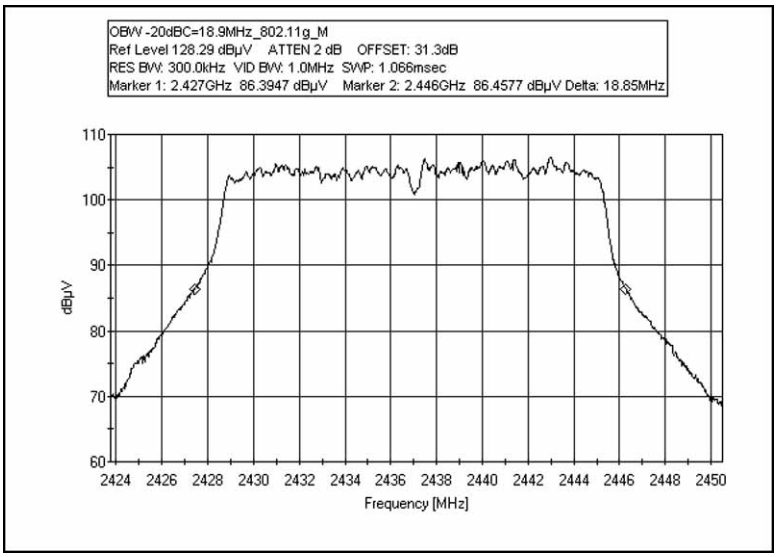
FCC 15.247(a)(1) -20dBC OCCUPIED BANDWIDTH - 802.11b HIGH



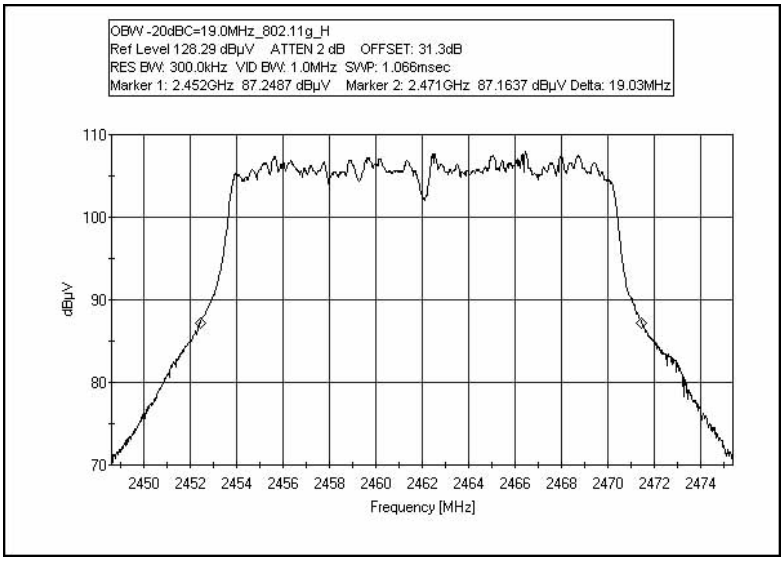
FCC 15.247(a)(1) -20dBC OCCUPIED BANDWIDTH - 802.11g LOW



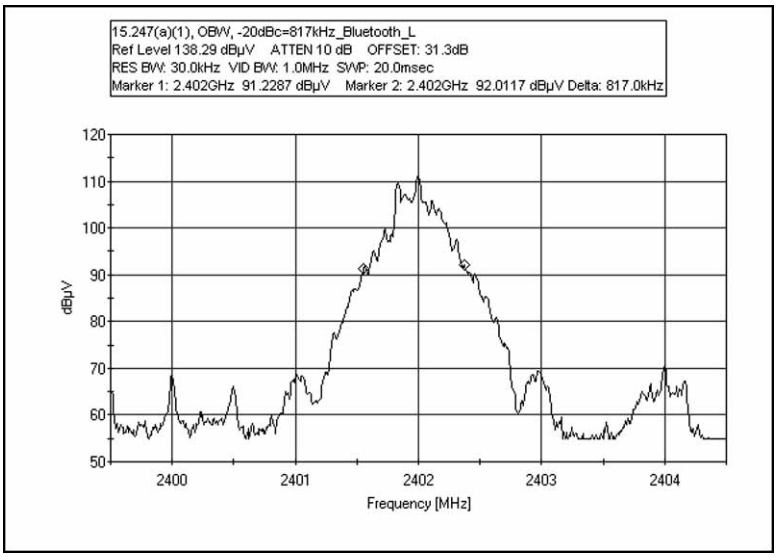
FCC 15.247(a)(1) -20dBC OCCUPIED BANDWIDTH - 802.11g MIDDLE



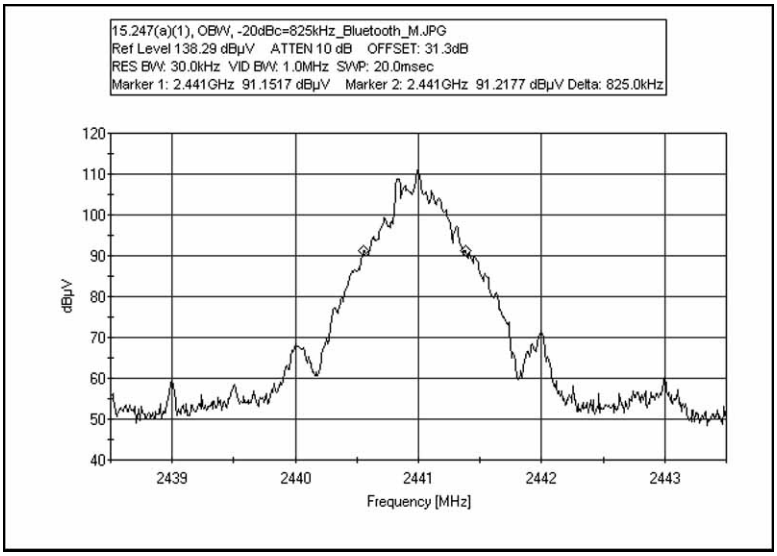
FCC 15.247(a)(1) -20dBC OCCUPIED BANDWIDTH - 802.11g HIGH



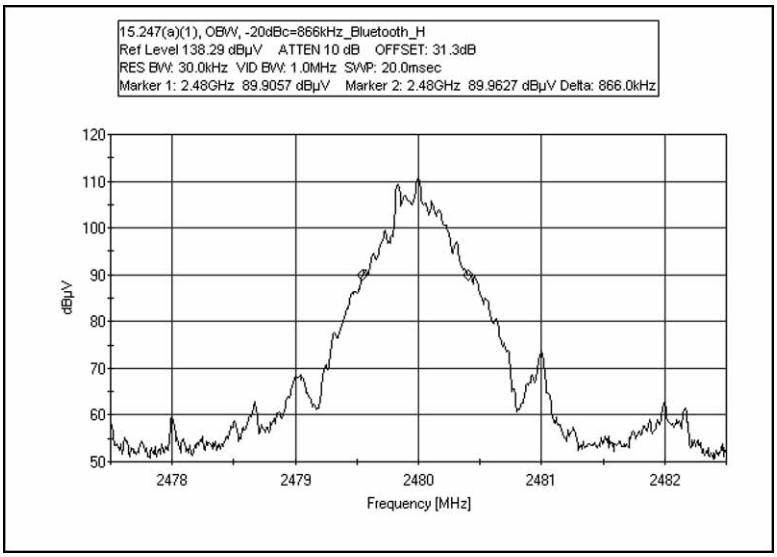
FCC 15.247(a)(1) -20dBC OCCUPIED BANDWIDTH - BLUETOOTH LOW



FCC 15.247(a)(1) -20dBC OCCUPIED BANDWIDTH - BLUETOOTH MIDDLE



FCC 15.247(a)(1) -20dBC OCCUPIED BANDWIDTH - BLUETOOTH HIGH



FCC 15.247 (a)(1)(iii) Time of Occupancy

Test Equipment

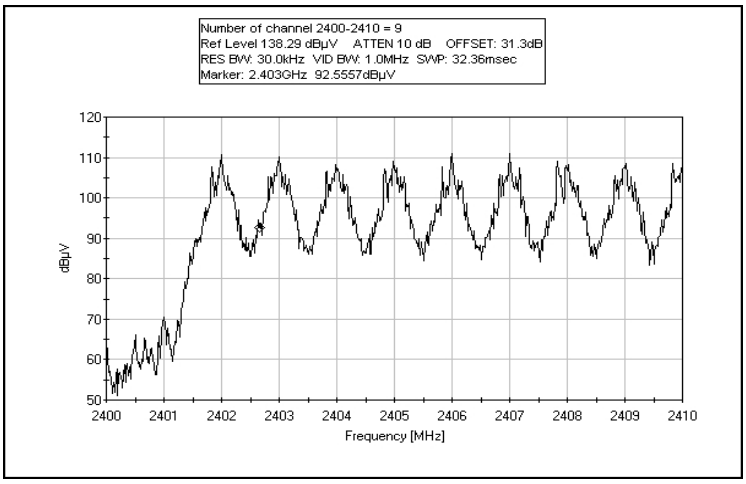
Equipment	Asset #	Manufacturer	Model	Serial #	Cal Date	Cal Due
Spectrum Analyzer	02672	Agilent	E4446A	US44300438	010307	010309
24" SMA Cable (White)	P05183	Pasterneck	35591-48	1-40GHz_white	011107	011109

Test Conditions: The EUT is placed on the test bench, USB port is connected to an AC power supply. The EUT is operating on Max power. RF emission profile evaluated at the internal antenna connector.

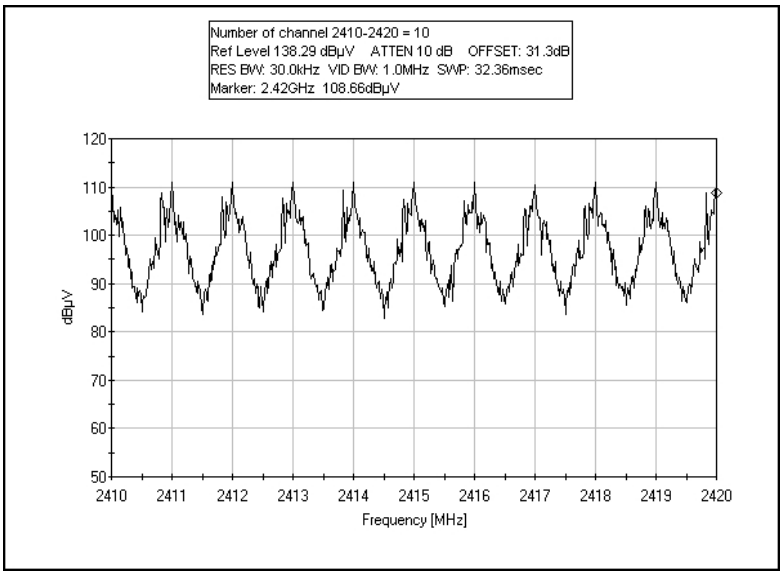
Test Setup Photos

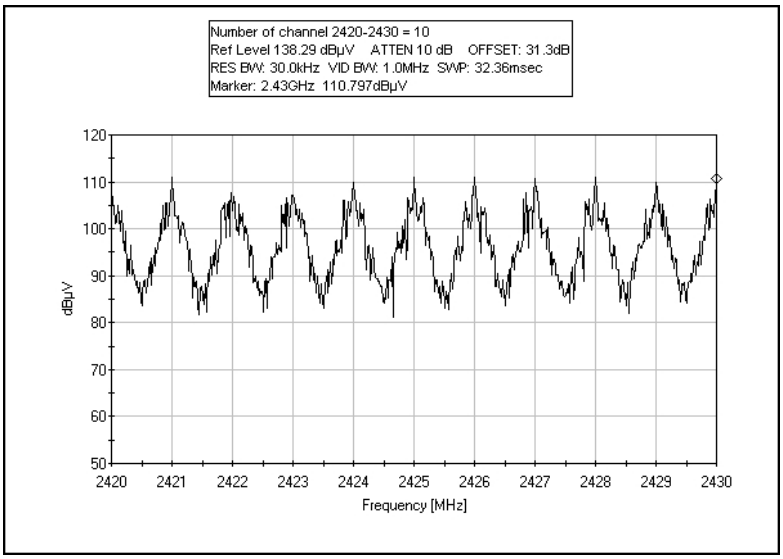
§15.247 Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.

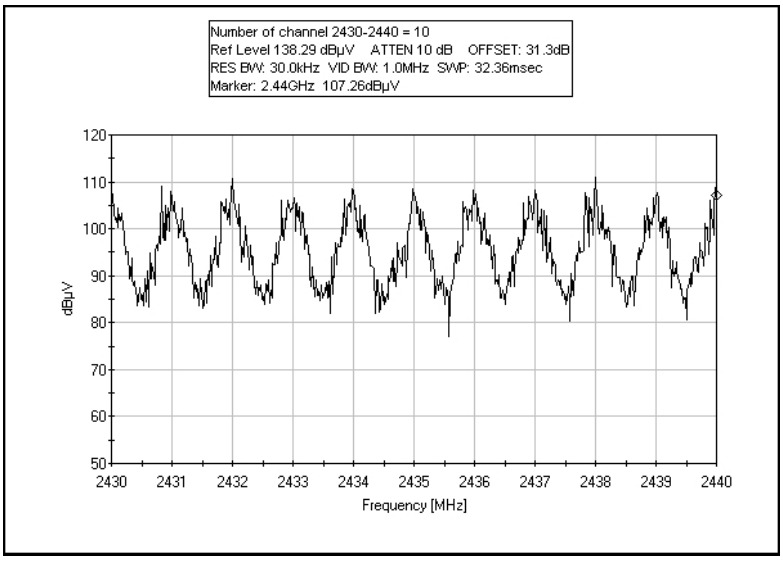
(iii) Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

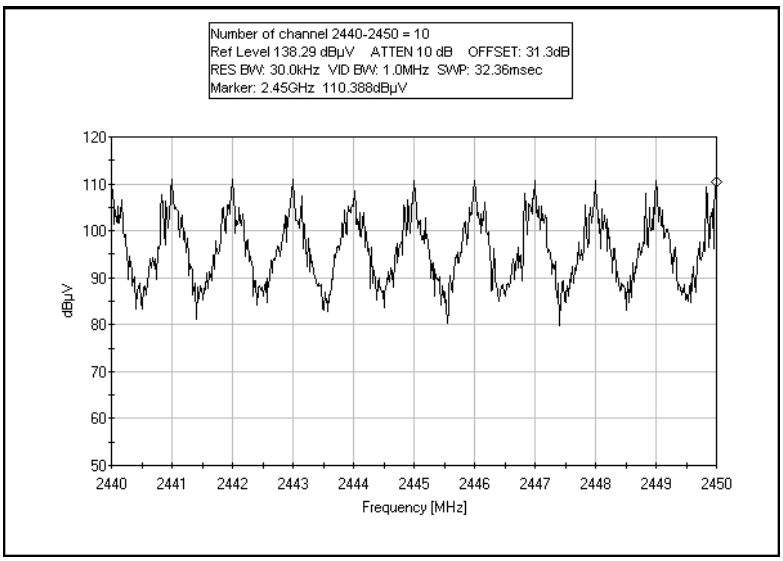

Number of channel 2400-2410 = 9
Ref Level 138.29 dBµV ATTEN 10 dB OFFSET: 31.3dB
RES BW: 30.0kHz VID BW: 1.0MHz SWP: 32.36msec
Marker: 2.403GHz 92.5557dBµV
120
110
100
90
80
70
60
50
dBµV
2400
2401
2402
2403
2404
2405
2406
2407
2408
2409
2410
Frequency [MHz]

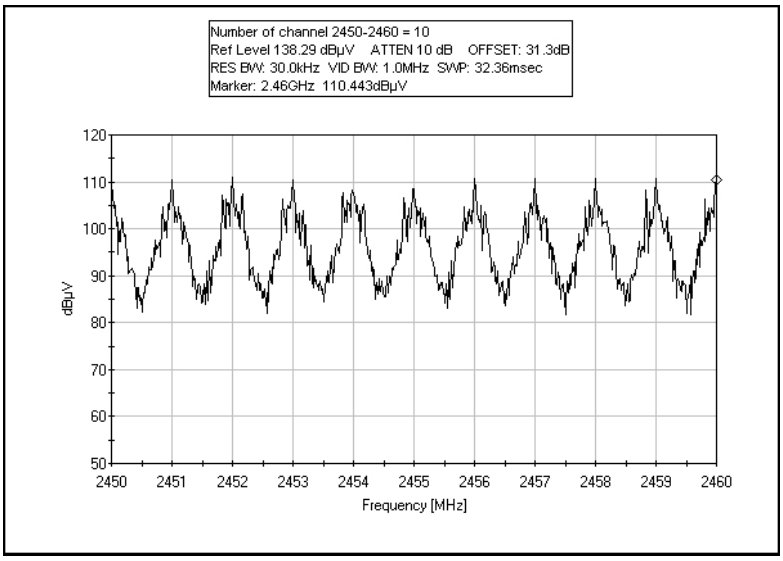
9channels

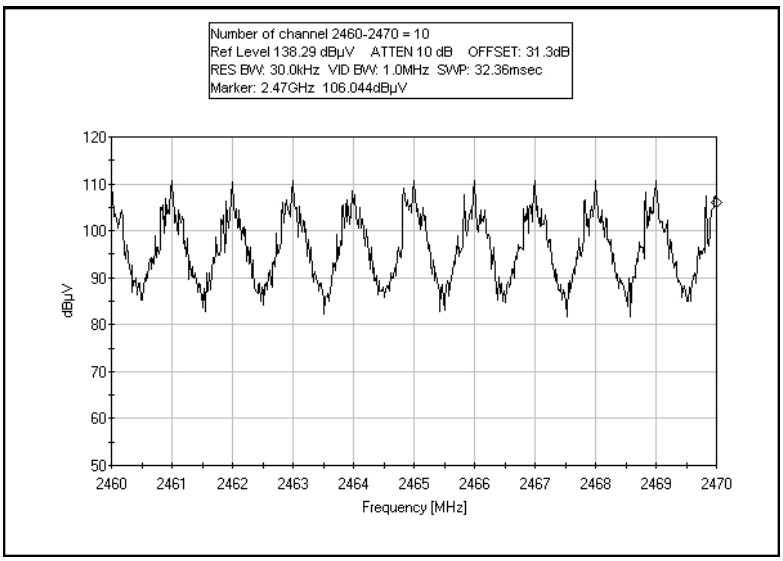

Number of channel 2410-2420 = 10
Ref Level 138.29 dBµV ATTEN 10 dB OFFSET: 31.3dB
RES BW: 30.0kHz VID BW: 1.0MHz SWP: 32.36msec
Marker: 2.42GHz 108.66dBµV
dBµV
120
110
100
90
80
70
60
50
2410 2411 2412 2413 2414 2415 2416 2417 2418 2419 2420
Frequency [MHz]

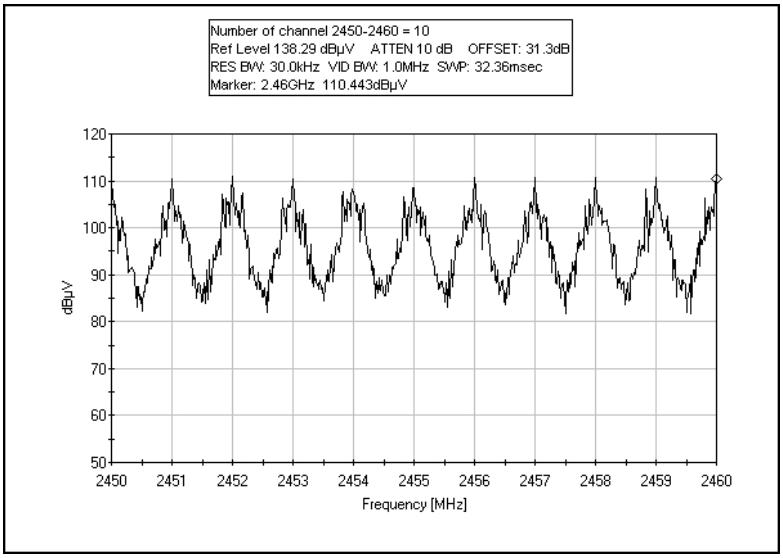

Number of channel 2420-2430 = 10
Ref Level 138.29 dBµV ATTEN 10 dB OFFSET: 31.3dB
RES BW: 30.0kHz VID BW: 1.0MHz SWP: 32.36msec
Marker: 2.43GHz 110.797dBµV
dBµV
120
110
100
90
80
70
60
50
2420 2421 2422 2423 2424 2425 2426 2427 2428 2429 2430
Frequency [MHz]

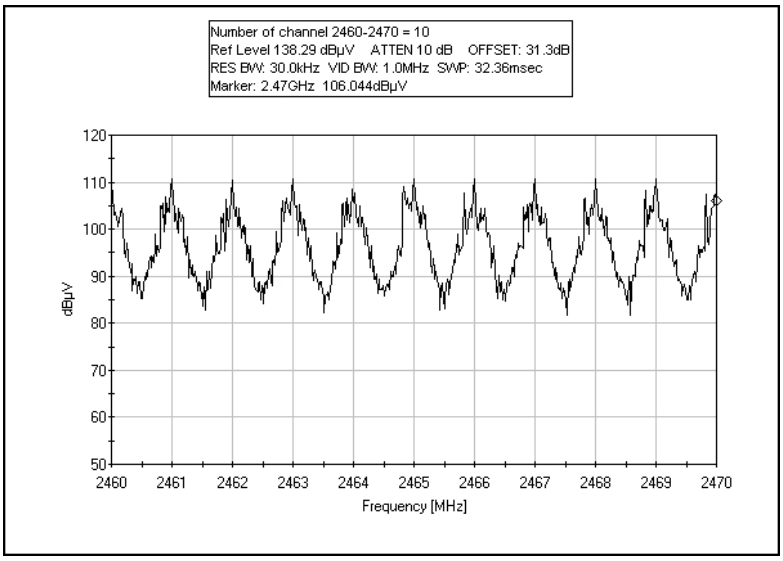

Number of channel 2430-2440 = 10
Ref Level 138.29 dBµV ATTEN 10 dB OFFSET: 31.3dB
RES BW: 30.0kHz VID BW: 1.0MHz SWP: 32.36msec
Marker: 2.44GHz 107.26dBµV
dBµV
120
110
100
90
80
70
60
50
2430 2431 2432 2433 2434 2435 2436 2437 2438 2439 2440
Frequency [MHz]

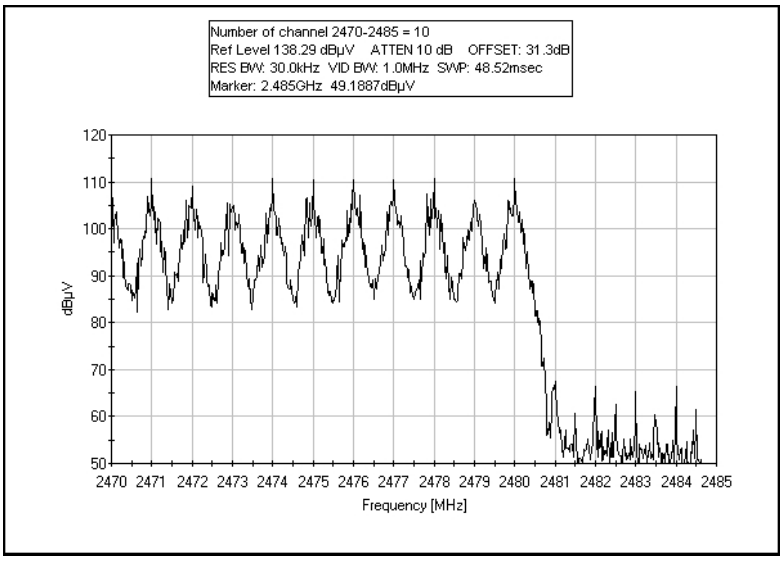

Number of channel 2440-2450 = 10
Ref Level 138.29 dBµV ATTEN 10 dB OFFSET: 31.3dB
RES BW: 30.0kHz VID BW: 1.0MHz SWP: 32.36msec
Marker: 2.45GHz 110.388dBµV
dBµV
120
110
100
90
80
70
60
50
2440 2441 2442 2443 2444 2445 2446 2447 2448 2449 2450
Frequency [MHz]


Number of channel 2450-2460 = 10
Ref Level 138.29 dBµV ATTEN 10 dB OFFSET: 31.3dB
RES BW: 30.0kHz VID BW: 1.0MHz SWP: 32.36msec
Marker: 2.46GHz 110.443dBµV
dBµV
120
110
100
90
80
70
60
50
2450 2451 2452 2453 2454 2455 2456 2457 2458 2459 2460
Frequency [MHz]

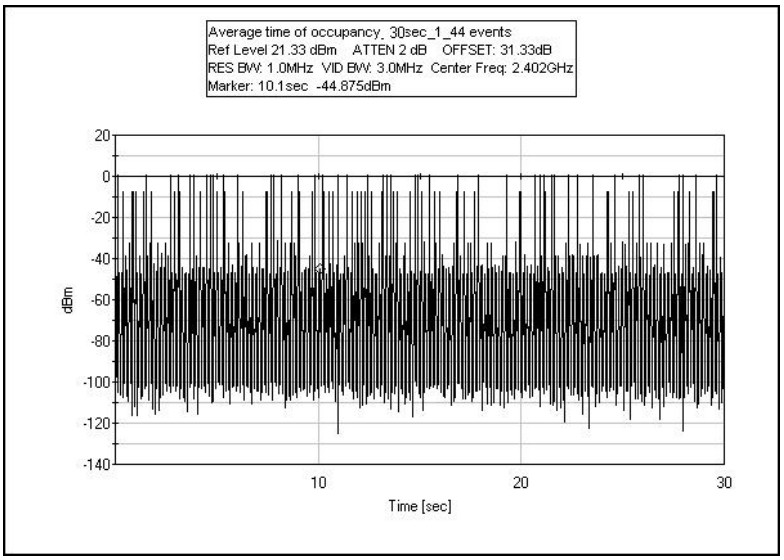

Number of channel 2460-2470 = 10
Ref Level 138.29 dBµV ATTEN 10 dB OFFSET: 31.3dB
RES BW: 30.0kHz VID BW: 1.0MHz SWP: 32.36msec
Marker: 2.47GHz 106.044dBµV
dBµV
120
110
100
90
80
70
60
50
2460 2461 2462 2463 2464 2465 2466 2467 2468 2469 2470
Frequency [MHz]

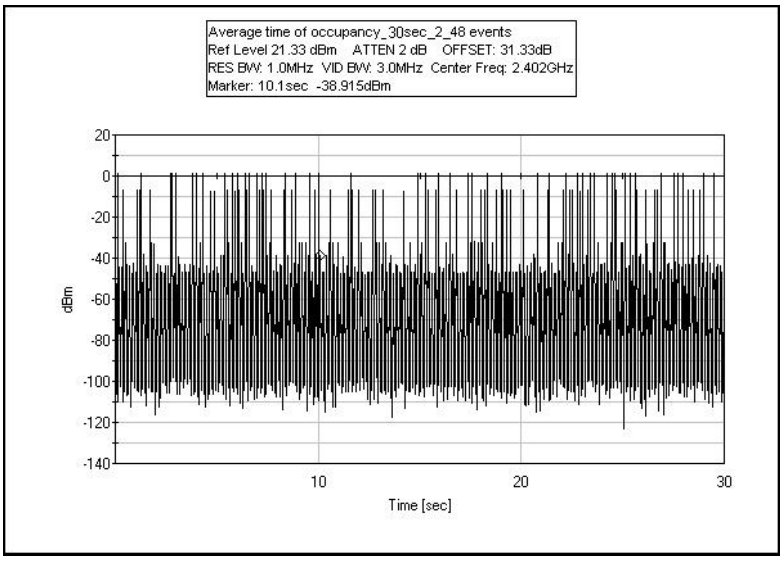

Number of channel 2450-2460 = 10
Ref Level 138.29 dBµV ATTEN 10 dB OFFSET: 31.3dB
RES BW: 30.0kHz VID BW: 1.0MHz SWP: 32.36msec
Marker: 2.46GHz 110.443dBµV
dBµV
120
110
100
90
80
70
60
50
2450 2451 2452 2453 2454 2455 2456 2457 2458 2459 2460
Frequency [MHz]

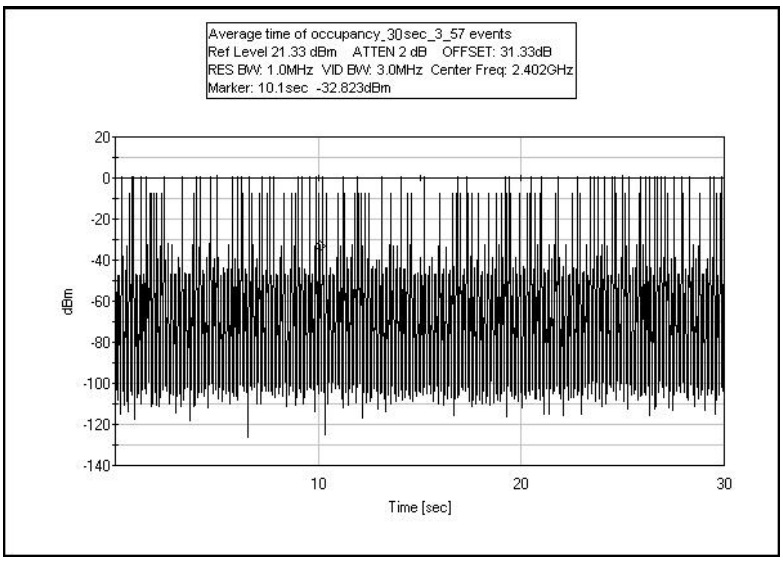

Number of channel 2460-2470 = 10
Ref Level 138.29 dBµV ATTEN 10 dB OFFSET: 31.3dB
RES BW: 30.0kHz VID BW: 1.0MHz SWP: 32.36msec
Marker: 2.47GHz 106.044dBµV
dBµV
120
110
100
90
80
70
60
50
2460 2461 2462 2463 2464 2465 2466 2467 2468 2469 2470
Frequency [MHz]

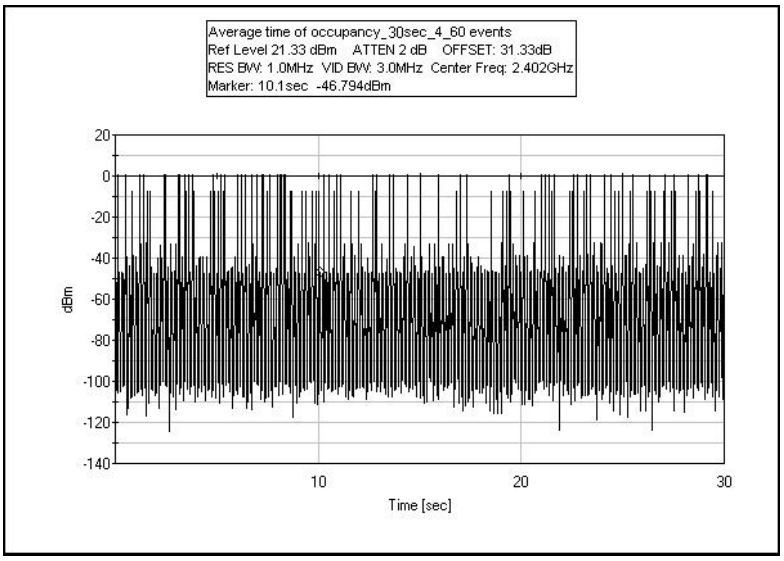


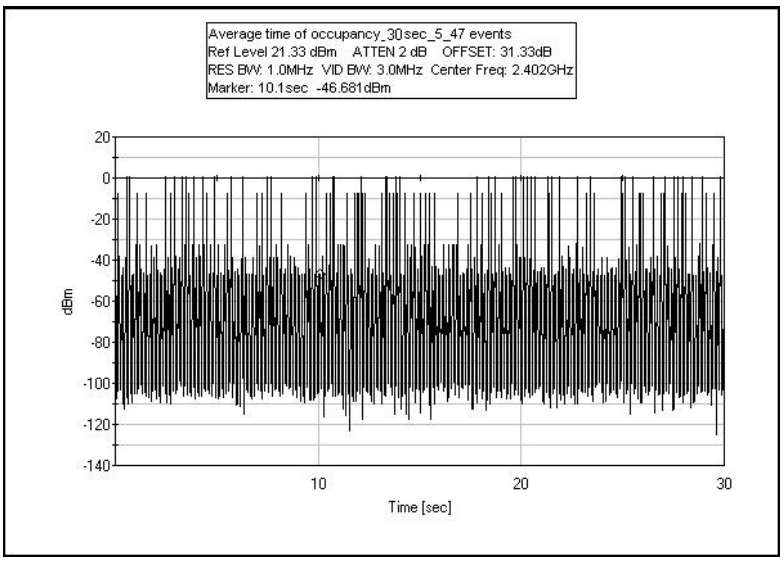
Total of 79 Channels from 2402-2480 MHz.




Average time of occupancy_30sec_2_48 events
Ref Level 21.33 dBm ATTEN 2 dB OFFSET: 31.33dB
RES BW: 1.0MHz VID BW: 3.0MHz Center Freq: 2.402GHz
Marker: 10.1sec -38.915dBm
dBm
Time [sec]

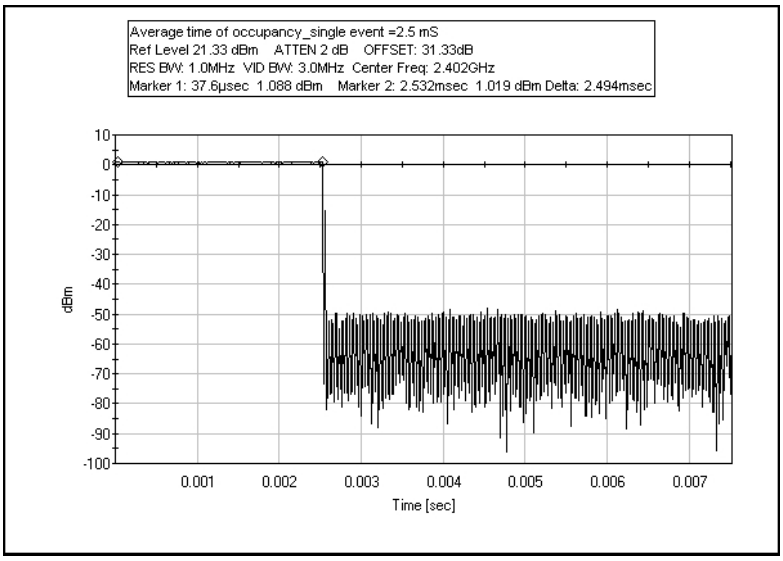

Average time of occupancy_30sec_3_57 events
Ref Level 21.33 dBm ATTEN 2 dB OFFSET: 31.33dB
RES BW: 1.0MHz VID BW: 3.0MHz Center Freq: 2.402GHz
Marker: 10.1sec -32.823dBm
dBm
Time [sec]





Average events occurred in every 30 seconds (44 + 48 + 57 +60 +47)/ 5 =51.2 events/ 30sec

51.2 / 30 = 1.7 events per second.



Each Events = 2.5 msec

79 channels x 0.4 sec = 31.6 secs.

31.6 sec x 1.7 event/sec = 53.7 events occurred in 31.6 second,

Total on time = 53.7 event x 2.5 ms/event = 134.25 mS **= 0.13 sec.**

The limit is:

*The average time of occupancy on any channel **shall not be greater than 0.4** seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed*

FCC Part 15.247(a)(2) –6 dB Bandwidth

Test Equipment

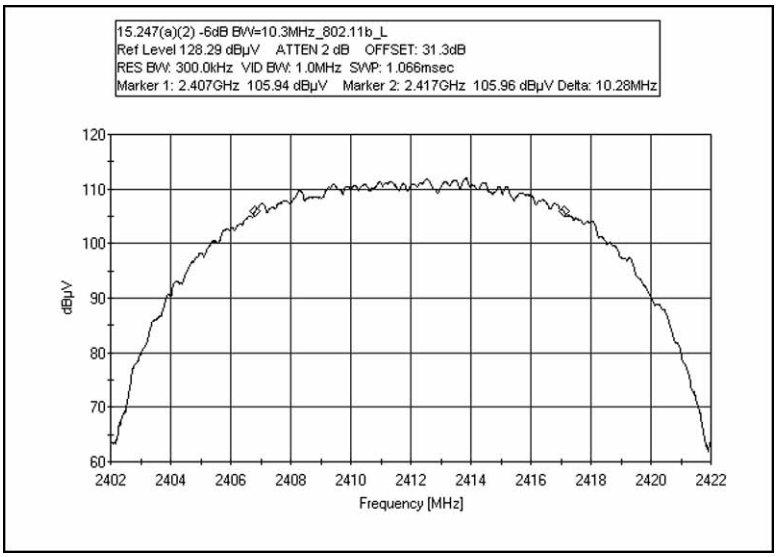
Equipment	Asset #	Manufacturer	Model	Serial #	Cal Date	Cal Due
Spectrum Analyzer	02672	Agilent	E4446A	US44300438	010307	010309
24” SMA Cable (White)	P05183	Pasterneck	35591-48	1-40GHz_white	011107	011109

Test Conditions: The EUT is placed on the test bench, USB port is connected to an AC power supply. The EUT is operating on Max power. RF emission profile evaluated at the internal antenna connector.

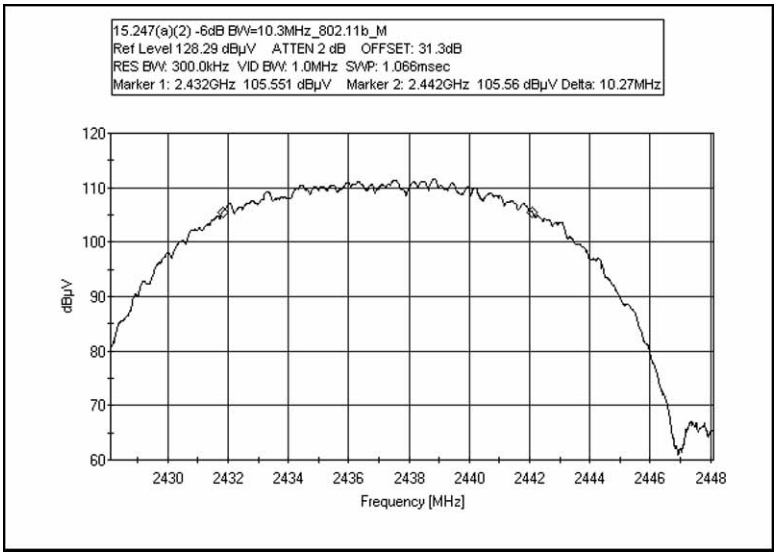
Test Setup Photos

Test Plots

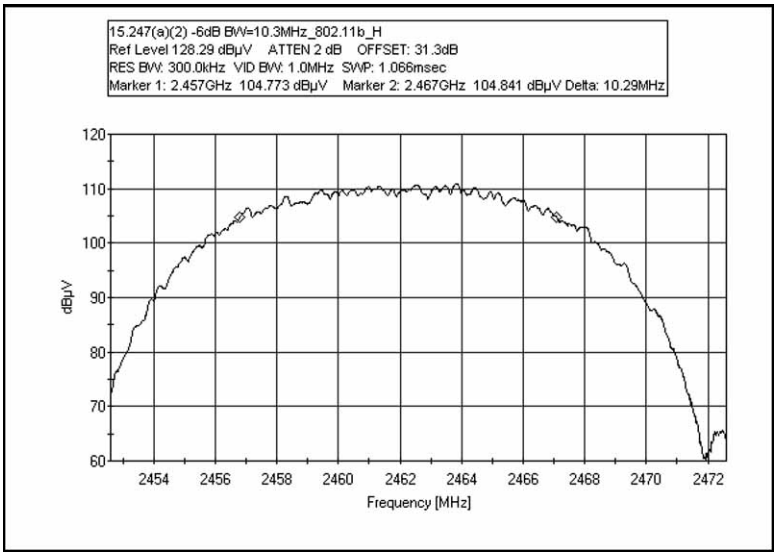
FCC 15.247(a)(2) -6dB BANDWIDTH - 802.11b LOW



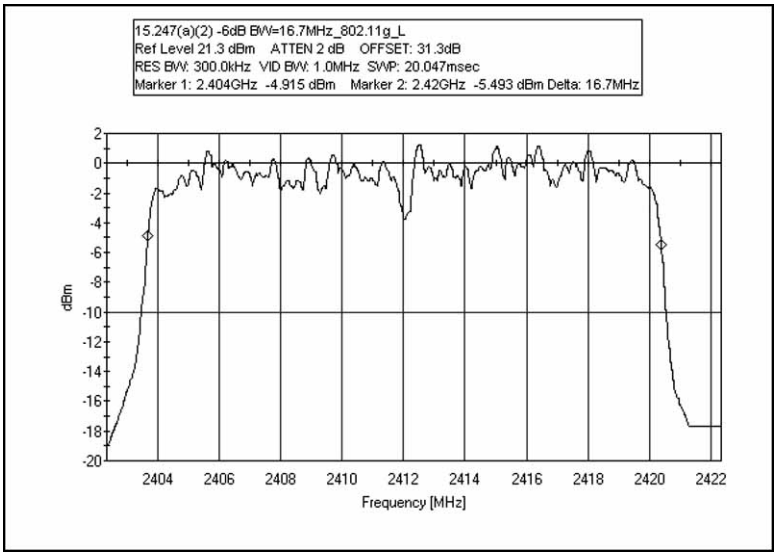
FCC 15.247(a)(2) -6dB BANDWIDTH - 802.11b MIDDLE



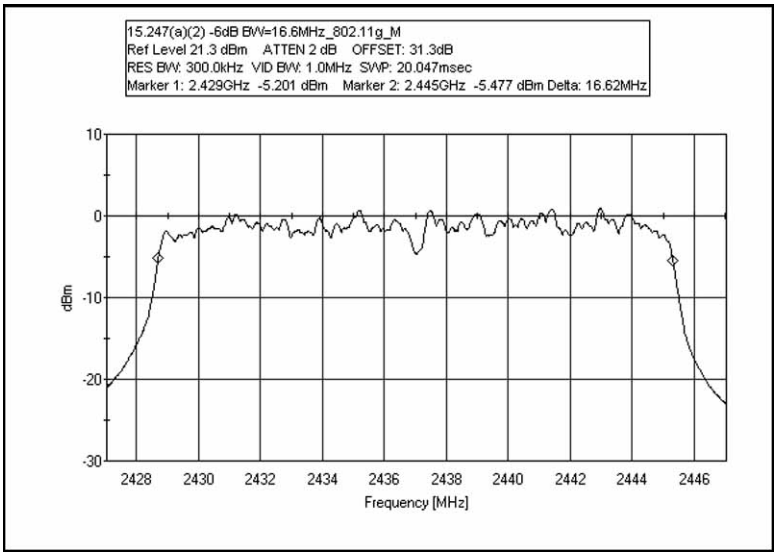
FCC 15.247(a)(2) -6dB BANDWIDTH - 802.11b HIGH



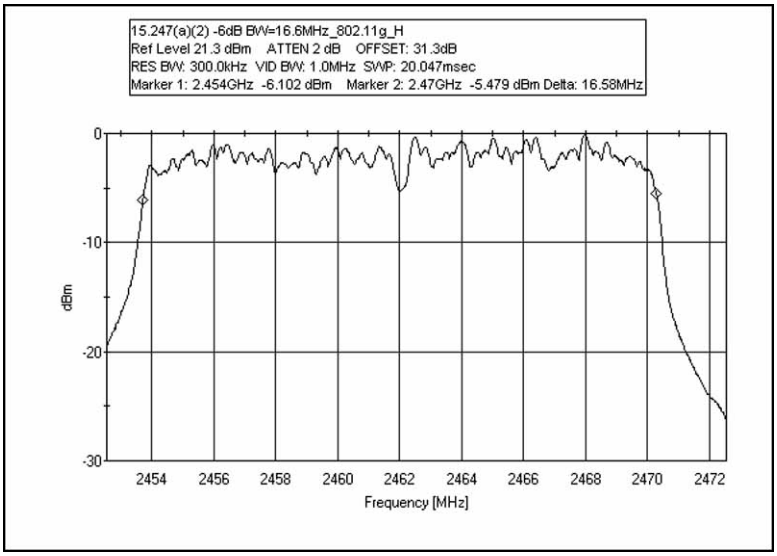
FCC 15.247(a)(2) -6dB BANDWIDTH - 802.11g LOW



FCC 15.247(a)(2) -6dB BANDWIDTH - 802.11g MIDDLE



FCC 15.247(a)(2) -6dB BANDWIDTH - 802.11g HIGH



FCC Part 15.247(b) RF Output Power

Test Equipment

Equipment	Asset #	Manufacturer	Model	Serial #	Cal Date	Cal Due
Spectrum Analyzer	02672	Agilent	E4446A	US44300438	010307	010309
24” SMA Cable (White)	P05183	Pasterneck	35591-48	1-40GHz_white	011107	011109

Test Conditions:

Test Setup Photos

RF Output power

Bluetooth: FHSS

15.247 (b) The maximum peak output power of the intentional radiator shall not exceed the following:
(1) For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: ***1 watt***

Setup: The EUT is placed on the test bench, RF output power is evaluated at the internal antenna connector, test method IAW DA00705, Peak Output power. Power setting at 63 (max) RBW=VBW=3MHz.

Frequency	Peak power	Peak Power
2402 MHz	3.9 dBm	0.002455 W
2441 MHz	3.9 dBm	0.002455 W
2480 MHz	3.5 dBm	0.002239 W

15.31(e)

The supply voltage of the intentional radiator was varied between 85% and 115% of the nominal rated supply voltage. Result: No deviation of output was detected.

802.11 b /g: DSSS

15.247(3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 ***Watt.***

The EUT is placed on the test bench, RF output power is evaluated at the internal antenna connector, test method IAW method 3 of KDB558074 Power option 2, method3.
Power setting = 15 (max)
Modulation: 802.11b (11mbps QPSK)
Measured -26dB BW = 17.6 MHz
BW correction = 10 Log (17.6/1) = 12.5 dB
Measured at RBW =1 MHz add 12.5 dB correction.,
Sample detector turned on, 50/601 point is < 0.5 RBW

Frequency	Measured power	+ BW correction	Peak power	Peak power
2412 MHz	1.3 dBm	12.5	13.8 dBm	0.02399 W
2437 MHz	1.1 dBm	12.5	13.6 dBm	0.02291 W
2462 MHz	1.2 dBm	12.5	13.7 dBm	0.02344 W

Modulation: 802.11g (54 mbps, OFDM-64QAM)
Measured 26dB BW= 24 MHz.
BW correction = 10 Log (24/1) = 13.8 db
Measured at RBW =1 MHz add 13.8 dB correction.,
Sample detector turned on, 50/601 point is < 0.5 RBW

Frequency	Measured power	+ BW correction	Peak power	Peak power
2412 MHz	-3.1 dBm	13.8	10.7 dBm	0.01175 W
2437 MHz	-3.4 dBm	13.8	10.4 dBm	0.01097 W
2462 MHz	-3.7dBm	13.8	10.1 dBm	0.01023 W

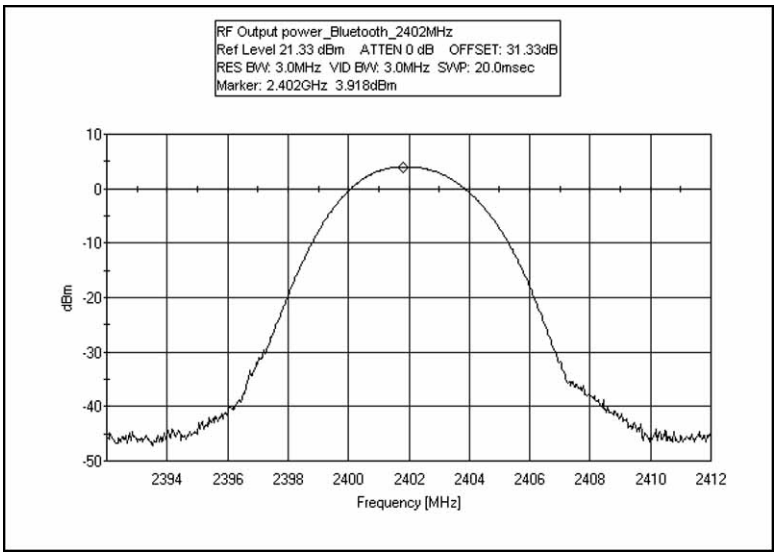
15.31(e)

The supply voltage of the intentional radiator was varied between 85% and 115% of the nominal rated supply voltage

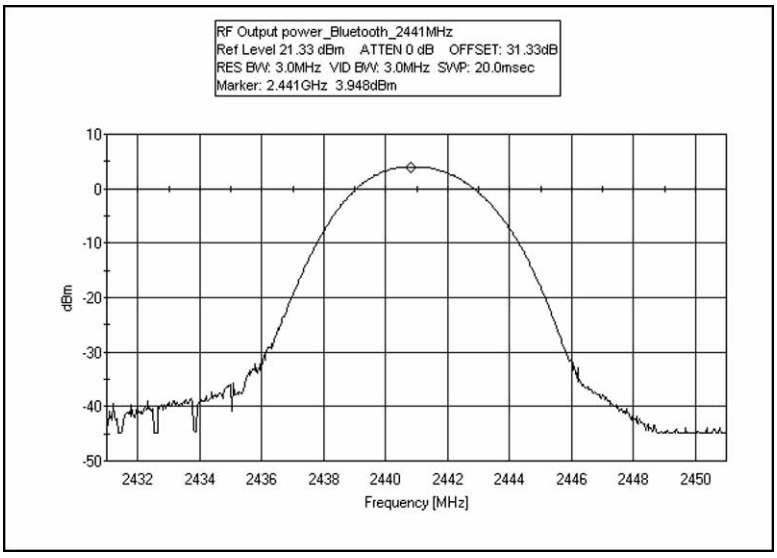
Result: No deviation of output was detected.

Test Plots

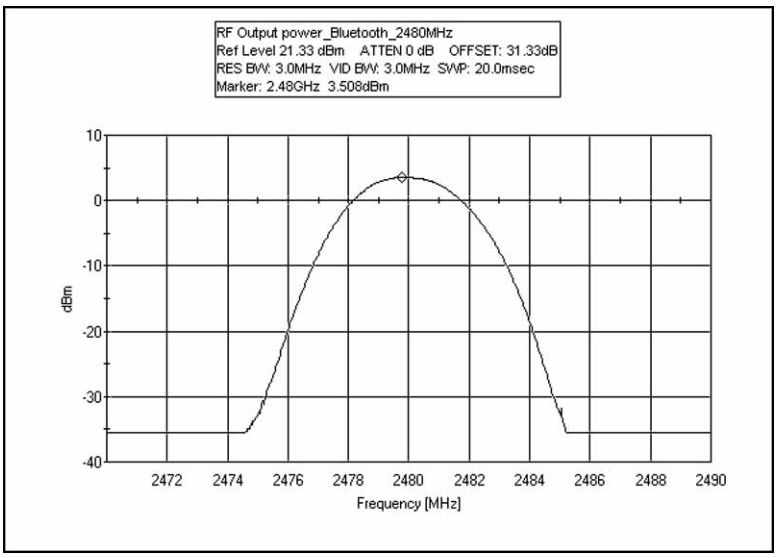
FCC 15.247(b)(1) RF OUTPUT POWER - BLUETOOTH 2402MHz



FCC 15.247(b)(1) RF OUTPUT POWER - BLUETOOTH 2441MHz



FCC 15.247(b)(1) RF OUTPUT POWER
- BLUETOOTH 2480MHz



FCC 15.247(e) POWER SPECTRAL DENSITY - 802.11b LOW

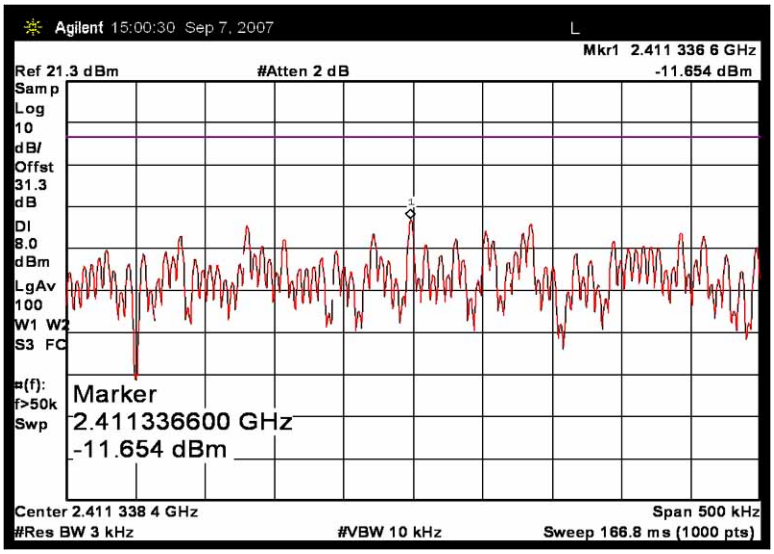
Test Equipment

Equipment	Asset #	Manufacturer	Model	Serial #	Cal Date	Cal Due
Spectrum Analyzer	02672	Agilent	E4446A	US44300438	010307	010309
24" SMA Cable (White)	P05183	Pasterneck	35591-48	1-40GHz_white	011107	011109

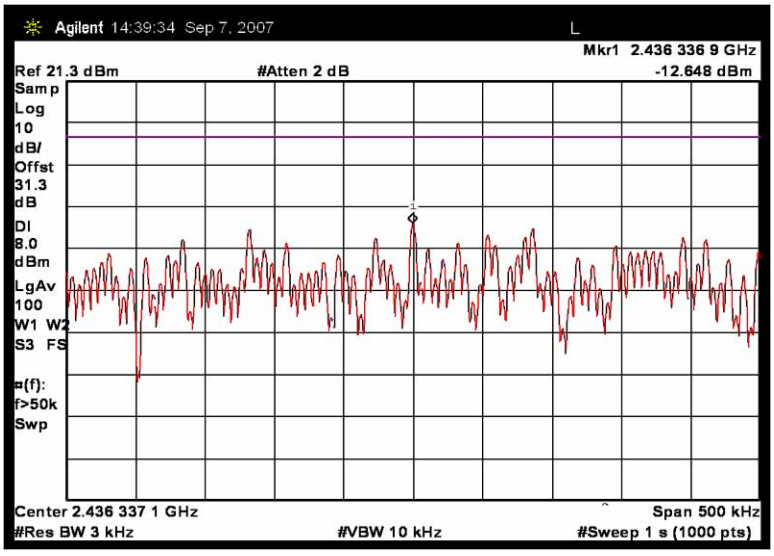
Test Conditions: The EUT is placed on the test bench, RF output power is evaluated at the internal antenna connector, test method in accordance with method 3 of KDB558074 PSD option 2.

Test Setup Photos

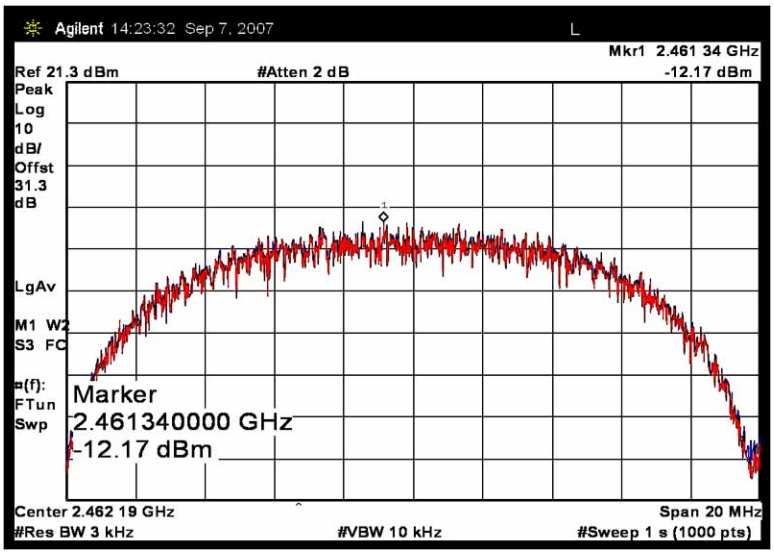
FCC 15.247(e) POWER SPECTRAL DENSITY - 802.11b LOW



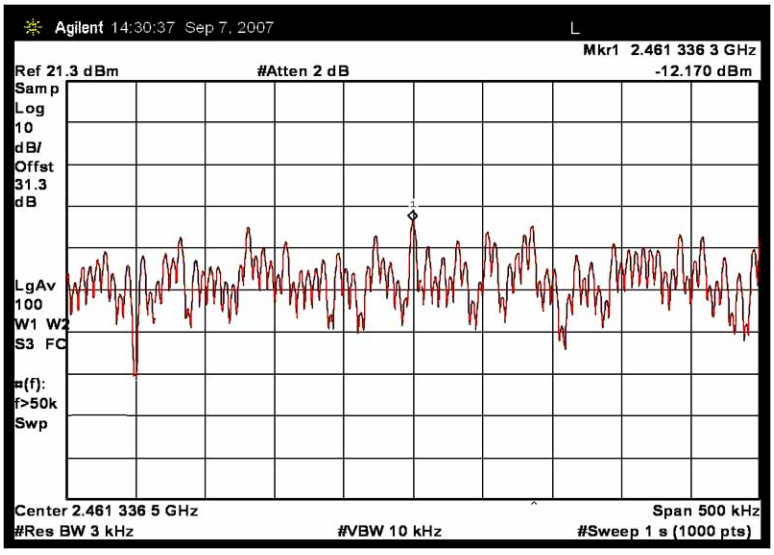
FCC 15.247(e) POWER SPECTRAL DENSITY - 802.11b MIDDLE



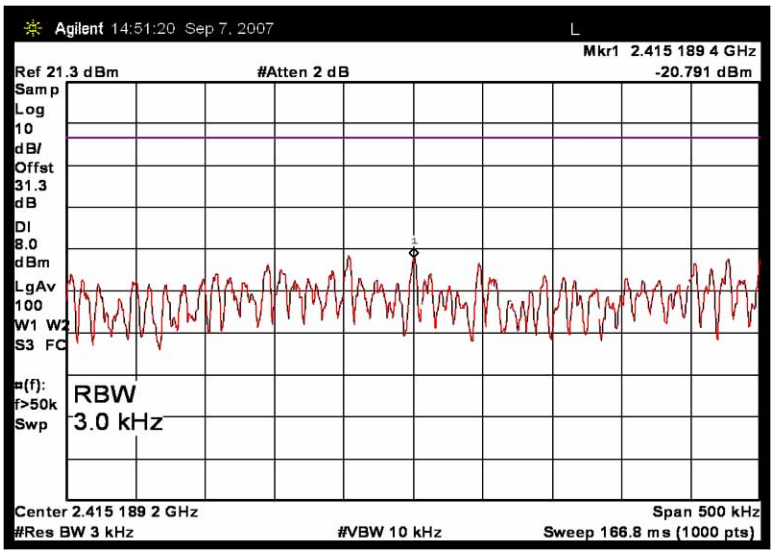
FCC 15.247(e) POWER SPECTRAL DENSITY - 802.11b HIGH SPANNED



FCC 15.247(e) POWER SPECTRAL DENSITY - 802.11b HIGH



FCC 15.247(e) POWER SPECTRAL DENSITY - 802.11G LOW



FCC 15.247(e) POWER SPECTRAL DENSITY - 802.11g MIDDLE