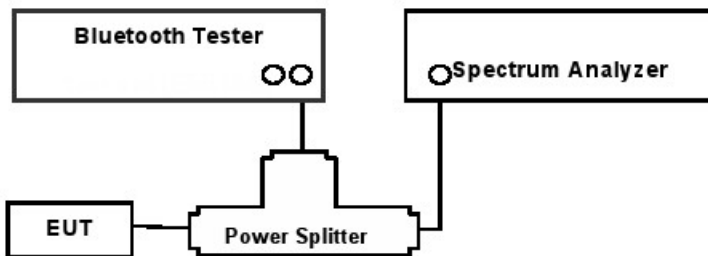


8.5 TIME OF OCCUPANCY (DWELL TIME)

LIMIT

According to §15.247(a)(1)(iii), Frequency hopping systems operating in the 2400 MHz ~ 2483.5 MHz bands. The average time of occupancy on any channels shall not greater than 0.4 s within a period 0.4 s multiplied by the number of hopping channels employed.

Test Configuration



TEST PROCEDURE

This test is performed with hopping off.

EUT was set to transmit the longest packet type (DH5)

The Spectrum Analyzer is set to (DA 00-705)

Span = Zero span, Centered on a hopping channel

RBW = 1 MHz

VBW ≥ RBW

Sweep = as necessary to capture the entire dwell time per hopping channel

Detector = Peak

Trace = Max hold

The marker-delta function was used to determine the dwell time.

Normal Mode / EDR Mode

DH 5(The longest packet type for GFSK)

CH Mid : $2.867 * (1600/6)/79 * 31.6 = 305.81$ (ms)

2-DH 5(The longest packet type for $\pi/4$ DQPSK)

CH Mid : $2.875 * (1600/6)/79 * 31.6 = 306.67$ (ms)

3-DH 5(The longest packet type for 8DPSK)

CH Mid : $2.875 * (1600/6)/79 * 31.6 = 306.67$ (ms)

AFH Mode

DH 5(The longest packet type for GFSK)

CH Mid : $2.867 * (800/6)/20 * 8.0 = 152.91$ (ms)

2-DH 5(The longest packet type for $\pi/4$ DQPSK)

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CH Mid : $2.875 * (800/6)/20 * 8.0 = 153.33$ (ms)

3-DH 5(The longest packet type for 8DPSK)

CH Mid : $2.875 * (800/6)/20 * 8.0 = 153.33$ (ms)

Note :

A DH5 Packet need 5 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 1600/6 hops per second with 79 channels. So the system have each channel 3.3755 times per second and so for 31.6 seconds the system have 106.7 times of appearance.

Each tx-time per appearance of DH5 is 2.883 ms.

Dwell time = Tx-time * 106.7

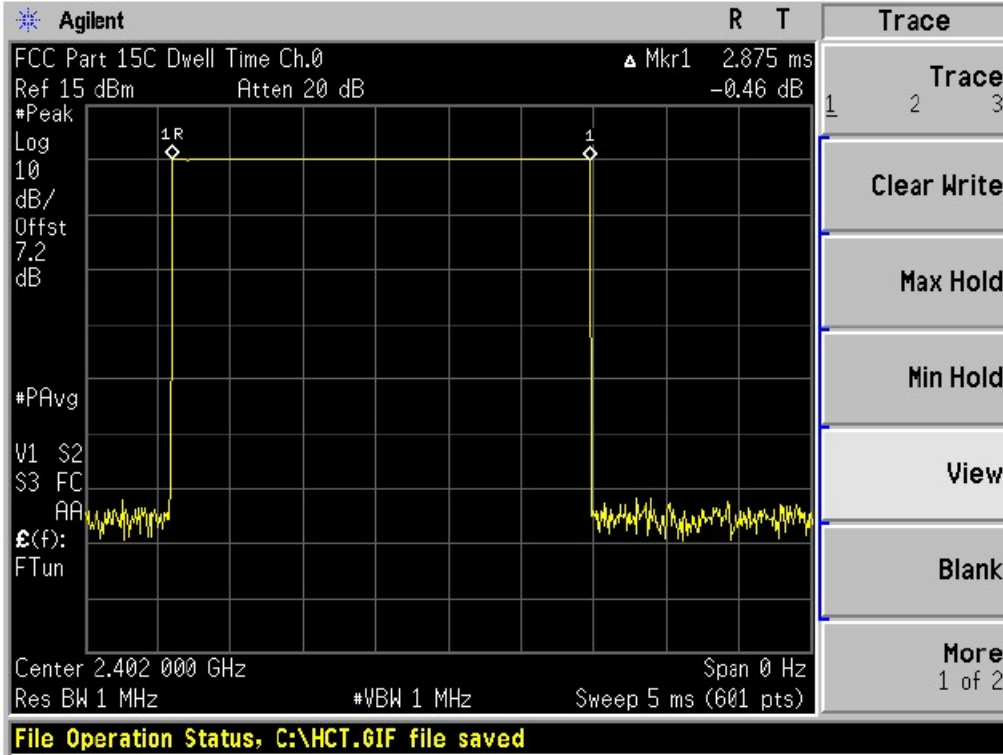
TEST RESULTS

See the table.

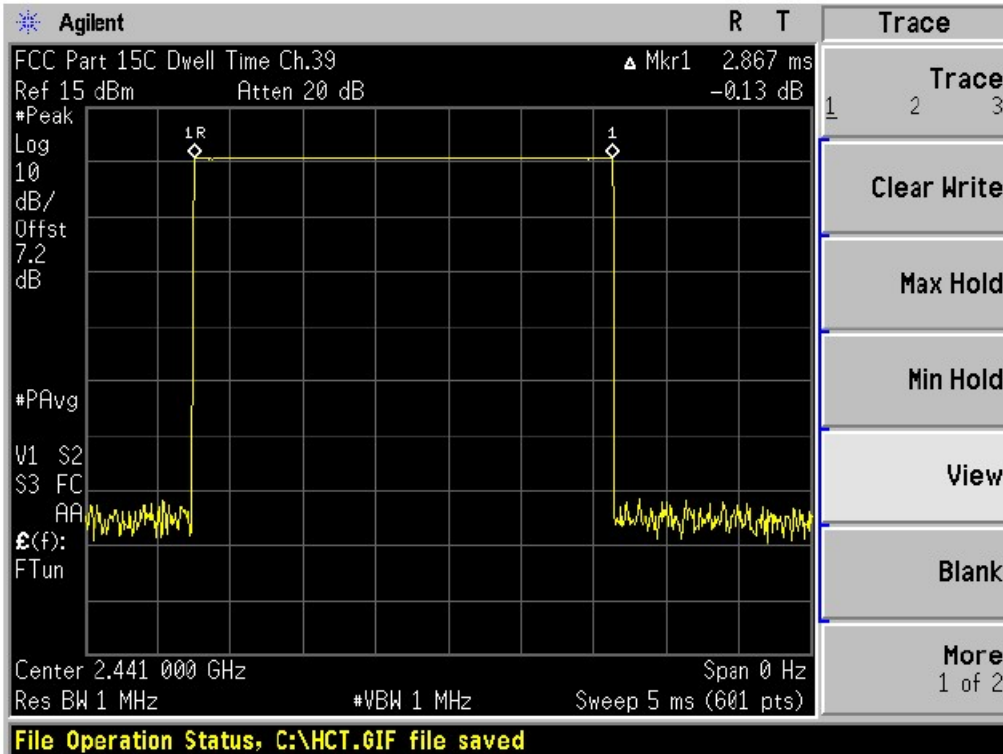
| Channel | Pulse Time (ms) | | Total of Dwell (ms) | | Period Time (s) | Limit (ms) | Result |
|---------|-----------------|-------|---------------------|--------|-----------------|------------|--------|
| | GFSK | 8DPSK | GFSK | 8DPSK | | | |
| Low | 2.875 | 2.875 | 306.67 | 306.67 | 31.6 | 400 | PASS |
| Mid | 2.867 | 2.875 | 305.81 | 306.67 | 31.6 | | PASS |
| High | 2.875 | 2.883 | 306.67 | 307.52 | 31.6 | | PASS |

| Channel | Pulse Time (ms) | Total of Dwell (ms) | Period Time (s) | Limit (ms) | Result |
|---------|-----------------|---------------------|-----------------|------------|--------|
| | π/4DQPSK | | | | |
| Low | 2.875 | 306.67 | 31.6 | 400 | PASS |
| Mid | 2.875 | 306.67 | 31.6 | | PASS |
| High | 2.883 | 307.52 | 31.6 | | PASS |

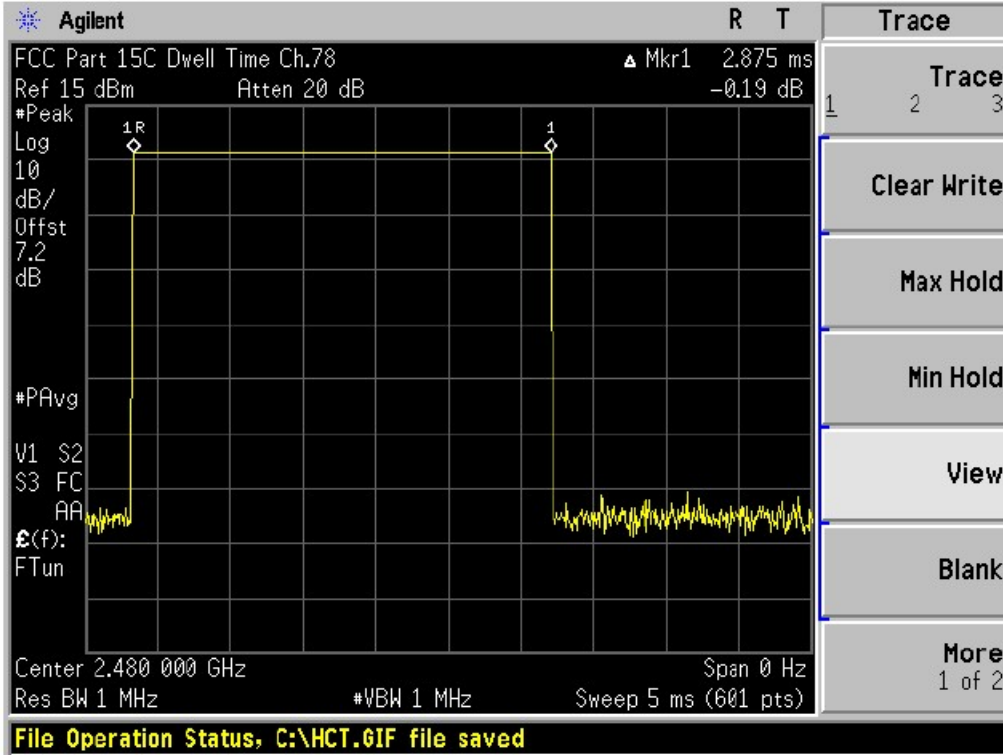
Test Plots (GFSK)
Dwell Time (Low-CH)



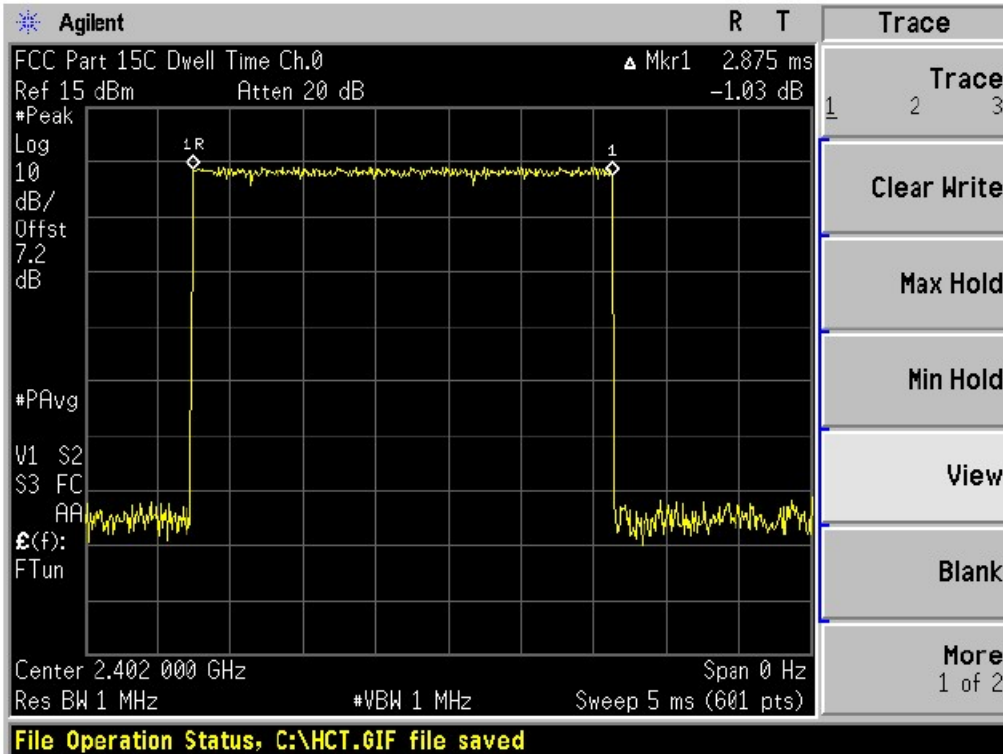
Test Plots (GFSK)
Dwell Time (Mid-CH)



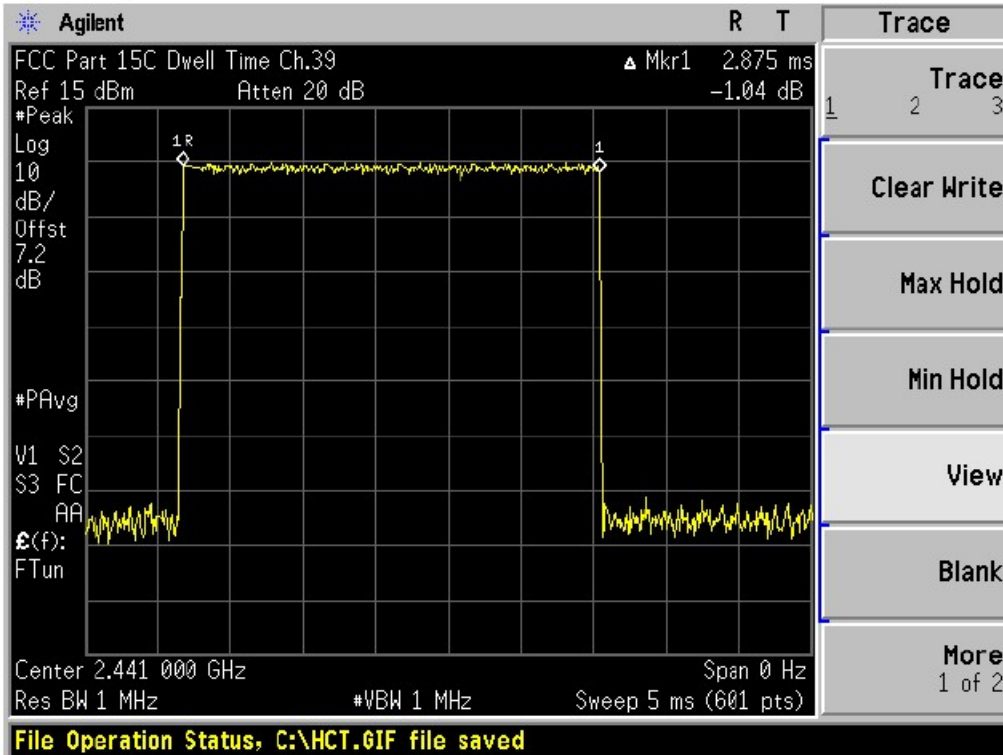
**Test Plots (GFSK)
Dwell Time (High-CH)**



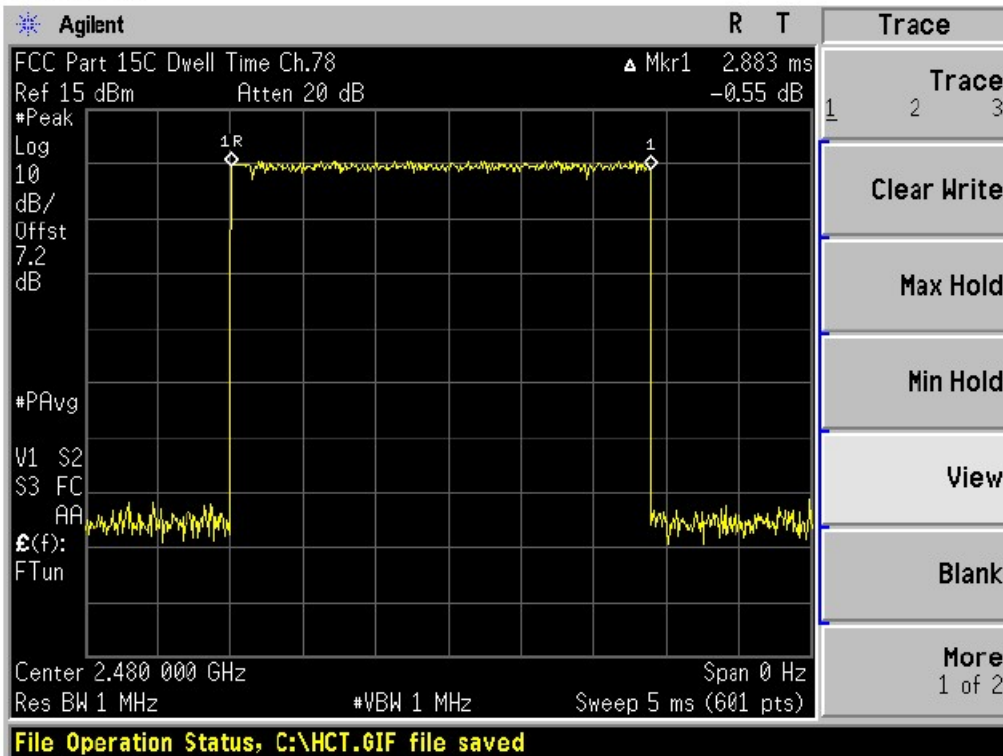
**Test Plots (8DPSK)
Dwell Time (Low-CH)**



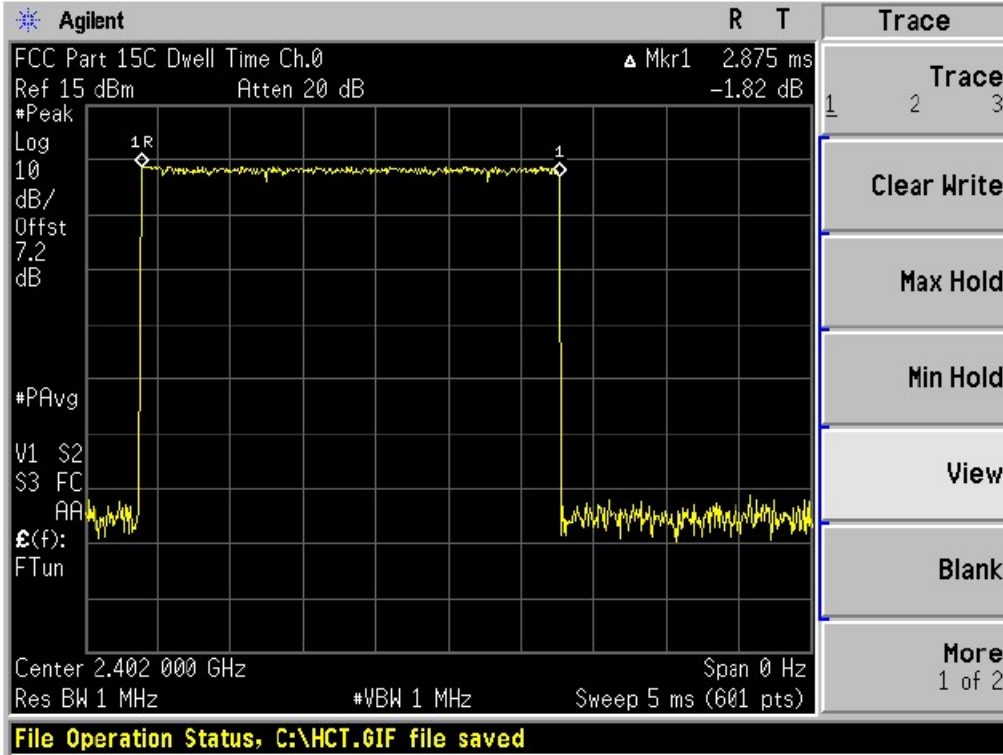
Test Plots (8DPSK)
Dwell Time (Mid-CH)



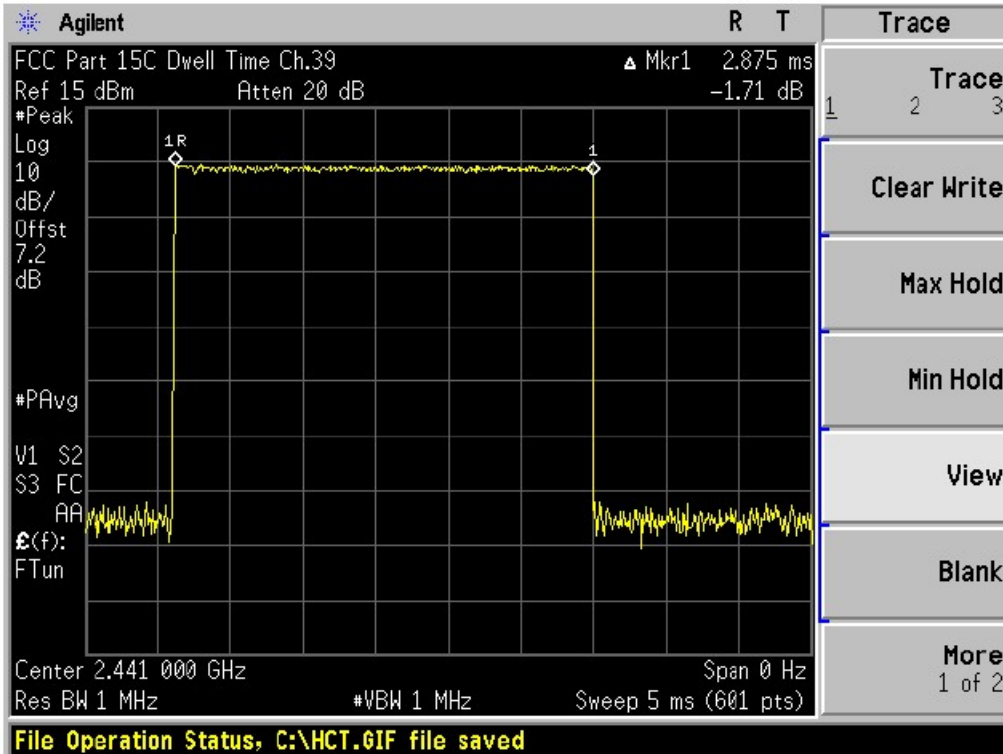
Test Plots (8DPSK)
Dwell Time (High-CH)



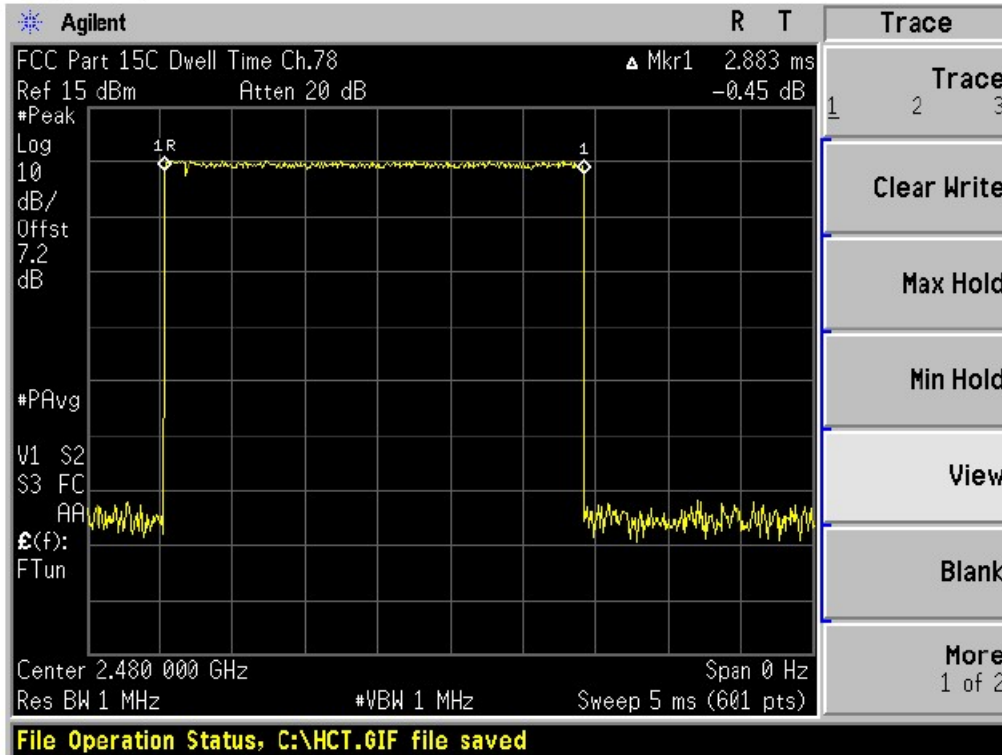
Test Plots ($\pi/4$ DQPSK)
Dwell Time (Low-CH)



Test Plots ($\pi/4$ DQPSK)
Dwell Time (Mid-CH)



Test Plots ($\pi/4$ DQPSK)
Dwell Time (High-CH)



| | | | |
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8.6 SPURIOUS EMISSIONS

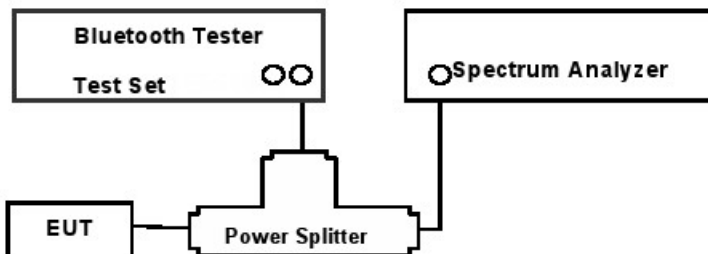
8.6.1 CONDUCTED SPURIOUS EMISSIONS

Test Requirements and limit, §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. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

Limit : 20 dBc

Test Configuration



TEST PROCEDURE

Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

The transmitter output is connected to the spectrum analyzer.

The Spectrum Analyzer is set to (DA 00-705)

1. Span = wide enough to capture the peak level of the in-band emission and all spurious emissions(e.g.,harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic.
2. RBW = 100 kHz(Upon 1 GHz = 1 MHz)
3. VBW ≥ 300 kHz(Upon 1 GHz = 3 MHz)
4. Sweep = auto
5. Sweep point ≥ 2*span/RBW
5. Detector function = peak

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6. Trace = max hold

Measurements are made over the 30 MHz to 26 GHz range with the transmitter set to the lowest, middle, and highest channels.

This test is performed with hopping off.

TEST RESULTS

No non-compliance noted.

FACTORS FOR FREQUENCY

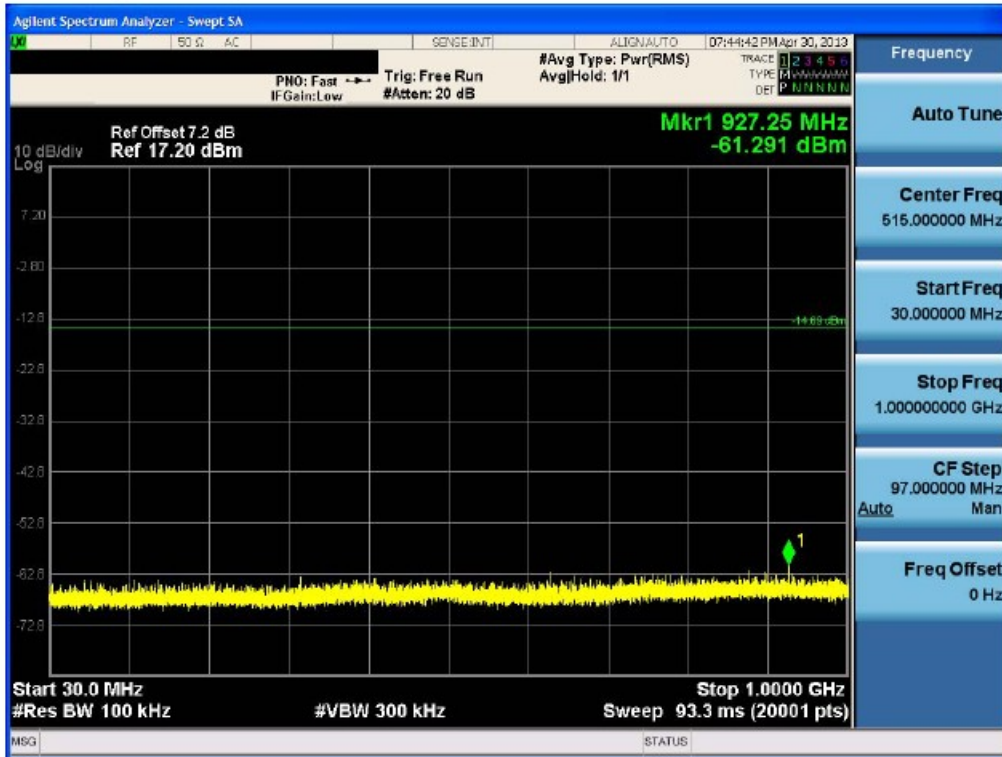
| Freq(MHz) | Factor(dB) |
|-----------|------------|
| 30 | 10.01 |
| 100 | 10.02 |
| 200 | 10.10 |
| 300 | 10.09 |
| 400 | 10.13 |
| 500 | 10.21 |
| 600 | 10.13 |
| 700 | 10.31 |
| 800 | 10.18 |
| 900 | 10.30 |
| 1000 | 10.17 |
| 2000 | 8.53 |
| 2400* | 7.18 |
| 2500* | 7.21 |
| 3000 | 8.59 |
| 4000 | 10.02 |
| 5000 | 9.88 |
| 6000 | 5.70 |
| 7000 | 10.21 |
| 8000 | 6.13 |
| 9000 | 8.79 |
| 10000 | 12.46 |
| 11000 | 8.11 |
| 12000 | 9.52 |
| 13000 | 8.98 |
| 14000 | 8.13 |
| 15000 | 11.82 |
| 16000 | 6.92 |
| 17000 | 13.23 |
| 18000 | 10.25 |
| 19000 | 10.28 |
| 20000 | 9.10 |
| 21000 | 10.94 |
| 22000 | 11.54 |
| 23000 | 8.81 |
| 24000 | 11.71 |
| 25000 | 9.37 |
| 26000 | 9.34 |

Note : 1. ** is fundamental frequency range.

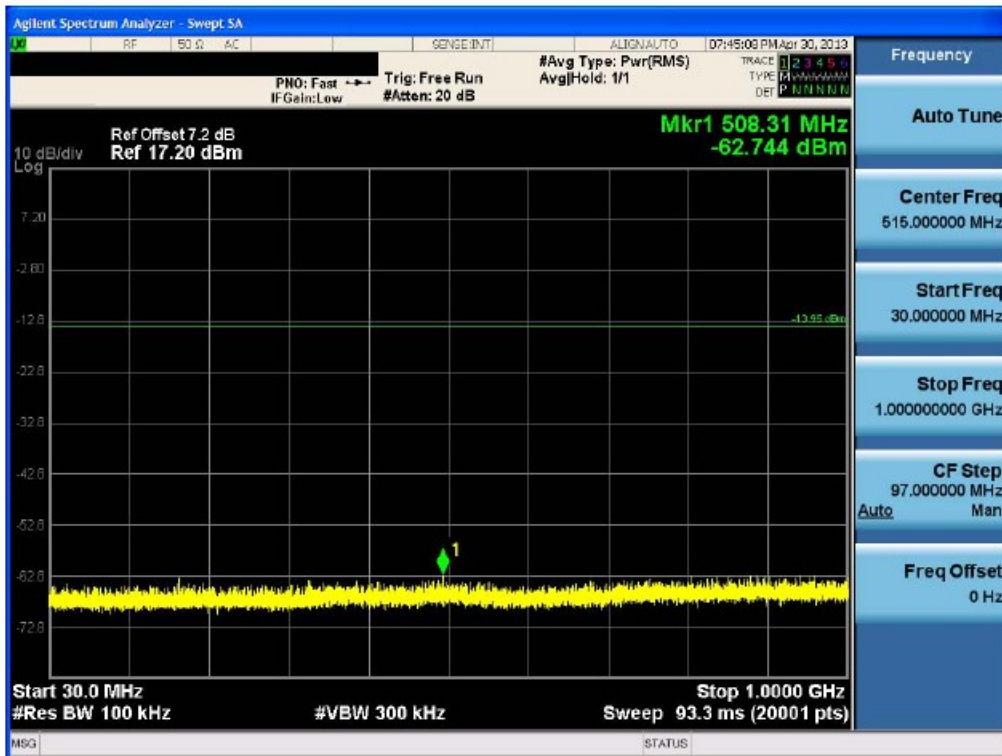
2. Factor = Cable loss + Splitter loss

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Test Plots (GFSK) - 30 MHz - 1 GHz
Spurious Emission (Low-CH)

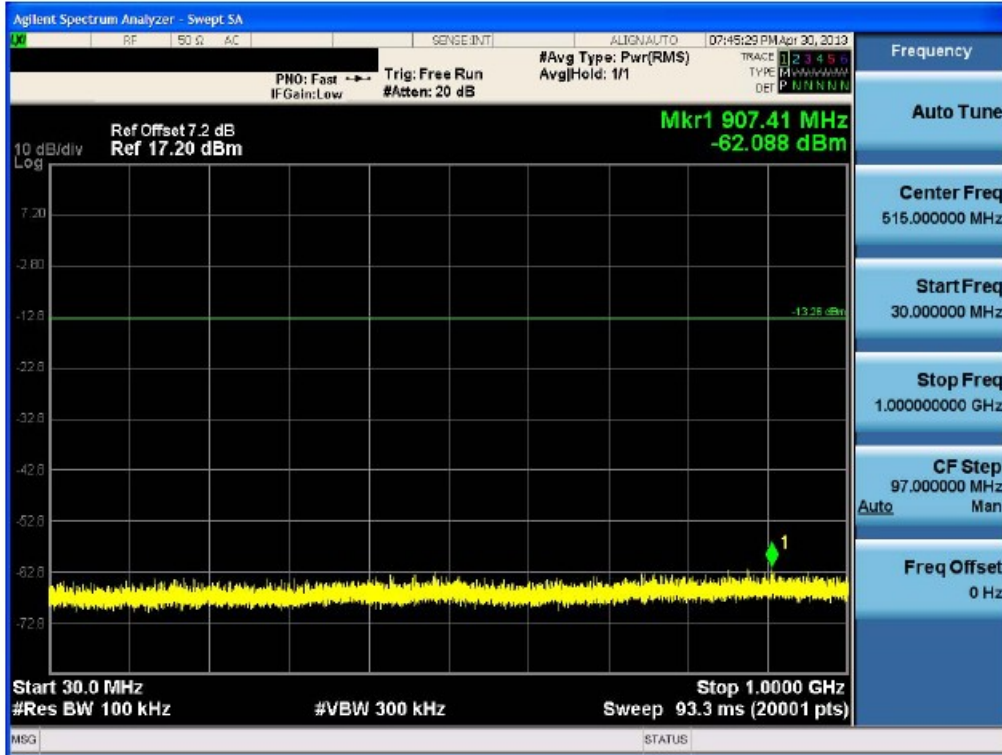


Test Plots (GFSK) - 30 MHz - 1 GHz
Spurious Emission (Mid-CH)

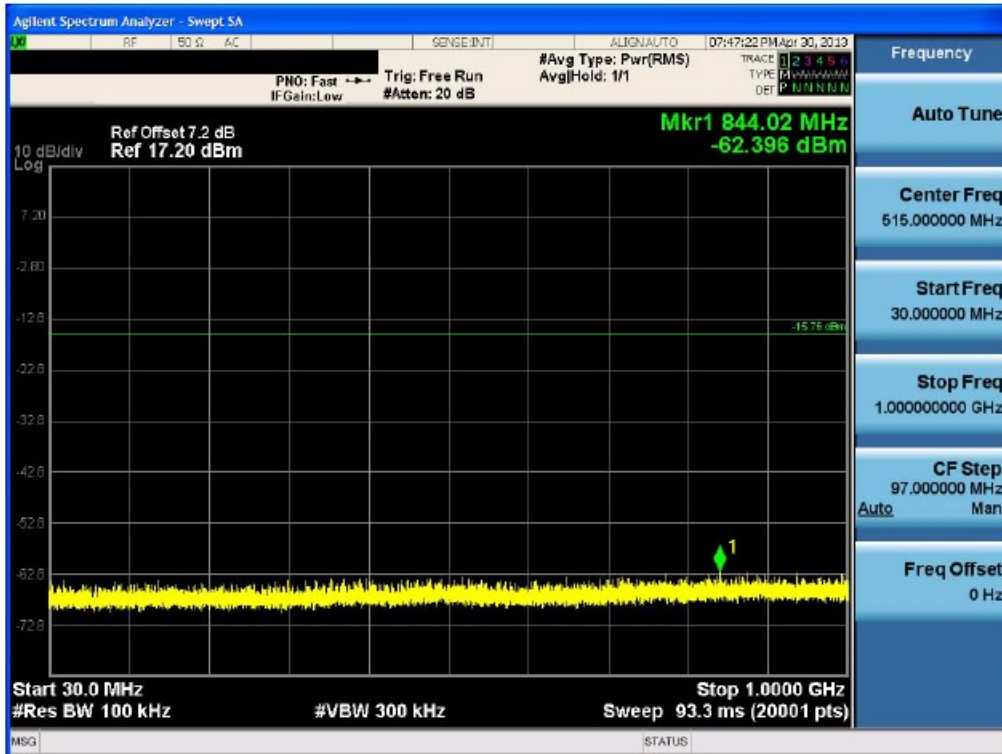


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**Test Plots (GFSK) - 30 MHz - 1 GHz
Spurious Emission (High-CH)**

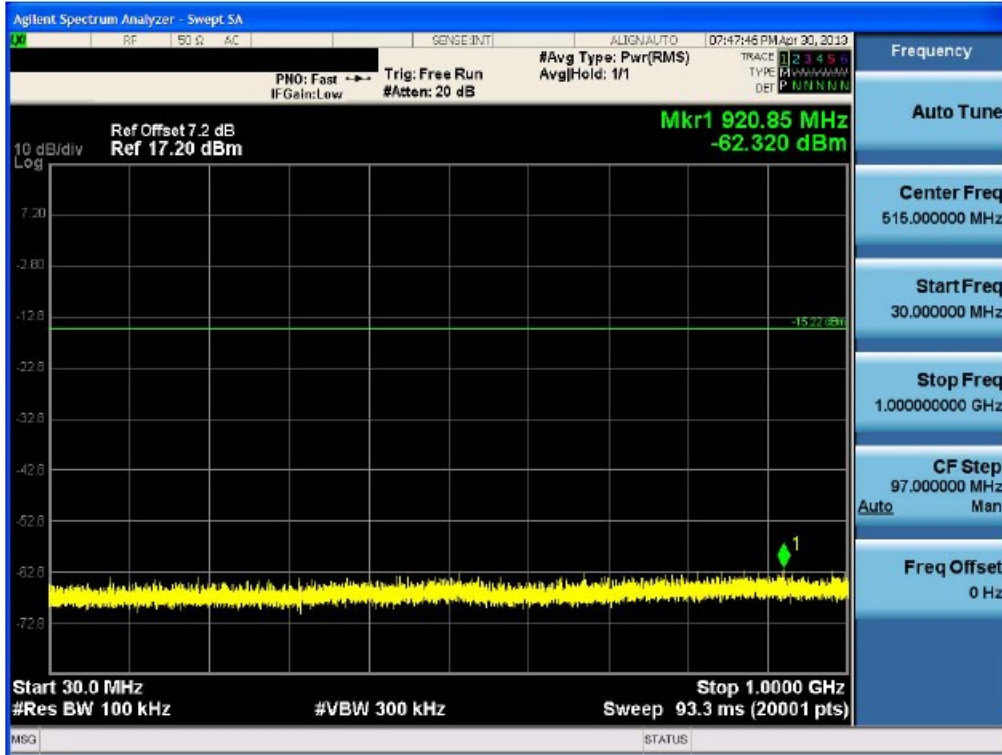


**Test Plots (8DPSK) - 30 MHz - 1 GHz
Spurious Emission (Low-CH)**

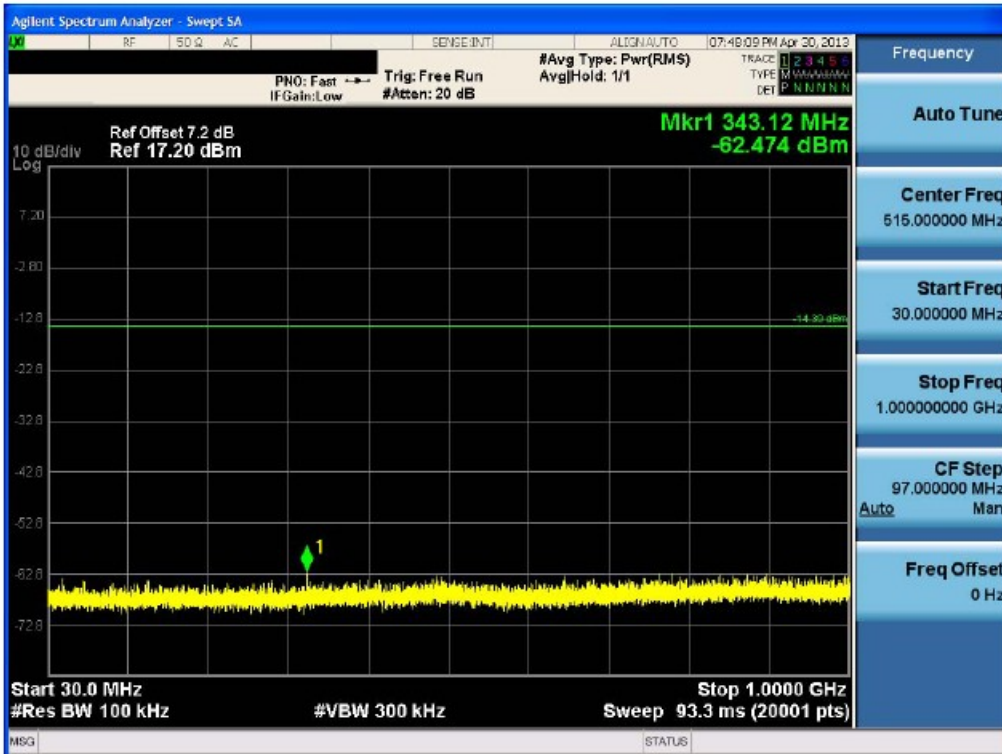


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Test Plots (8DPSK) - 30 MHz - 1 GHz
Spurious Emission (Mid-CH)

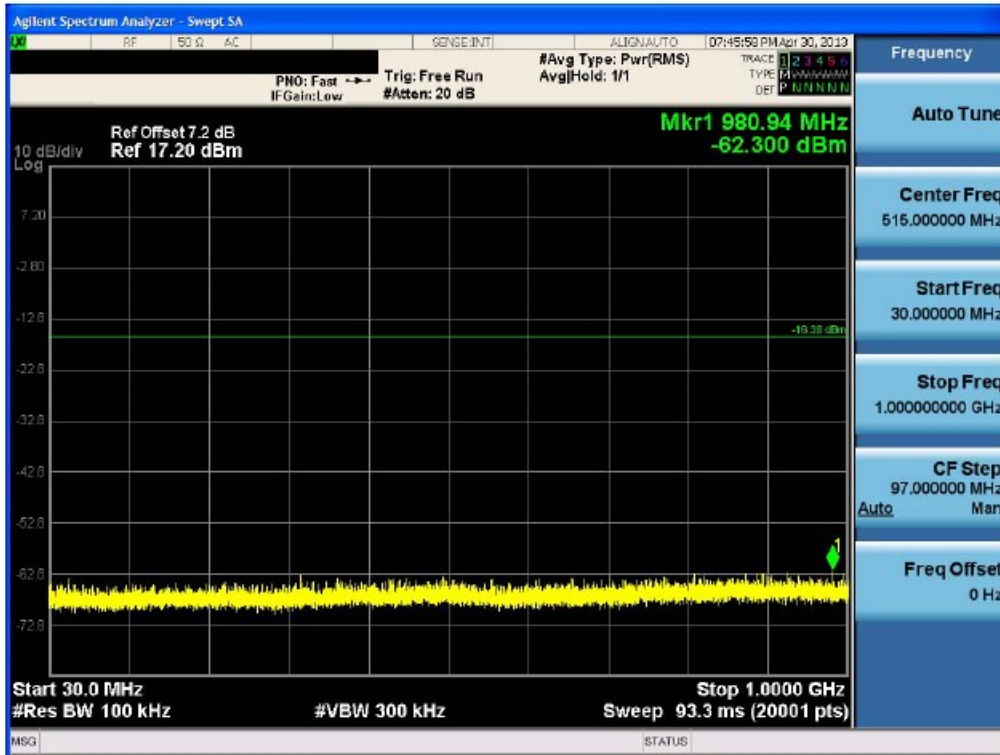


Test Plots (8DPSK) - 30 MHz - 1 GHz
Spurious Emission (High-CH)

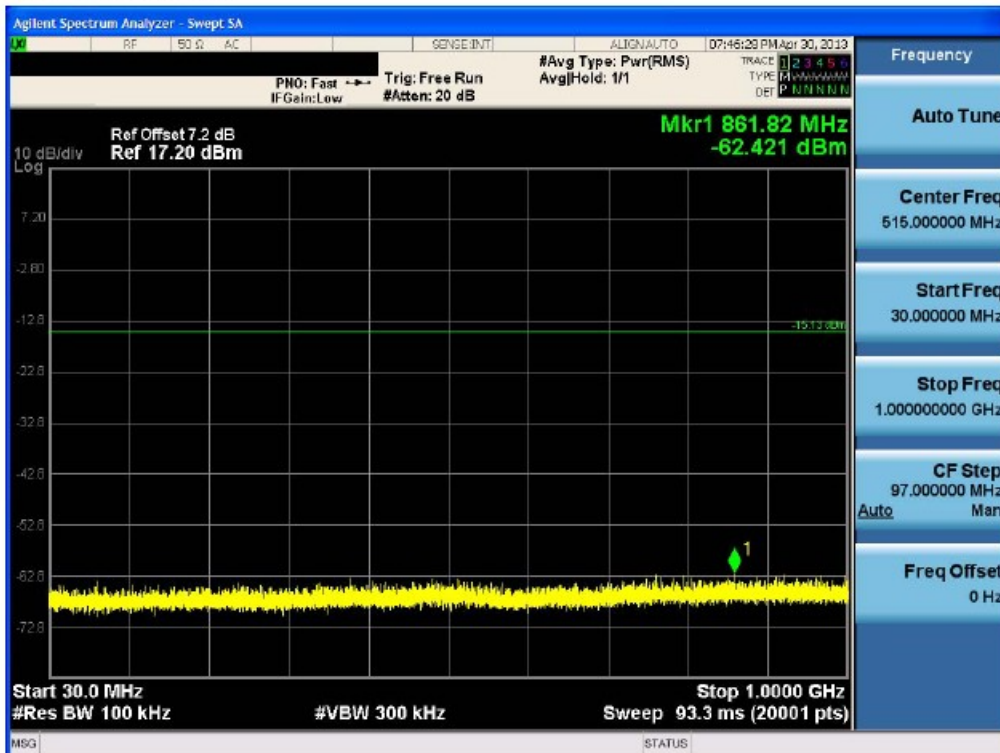


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Test Plots ($\pi/4$ DQPSK) - 30 MHz - 1 GHz
Spurious Emission (Low-CH)

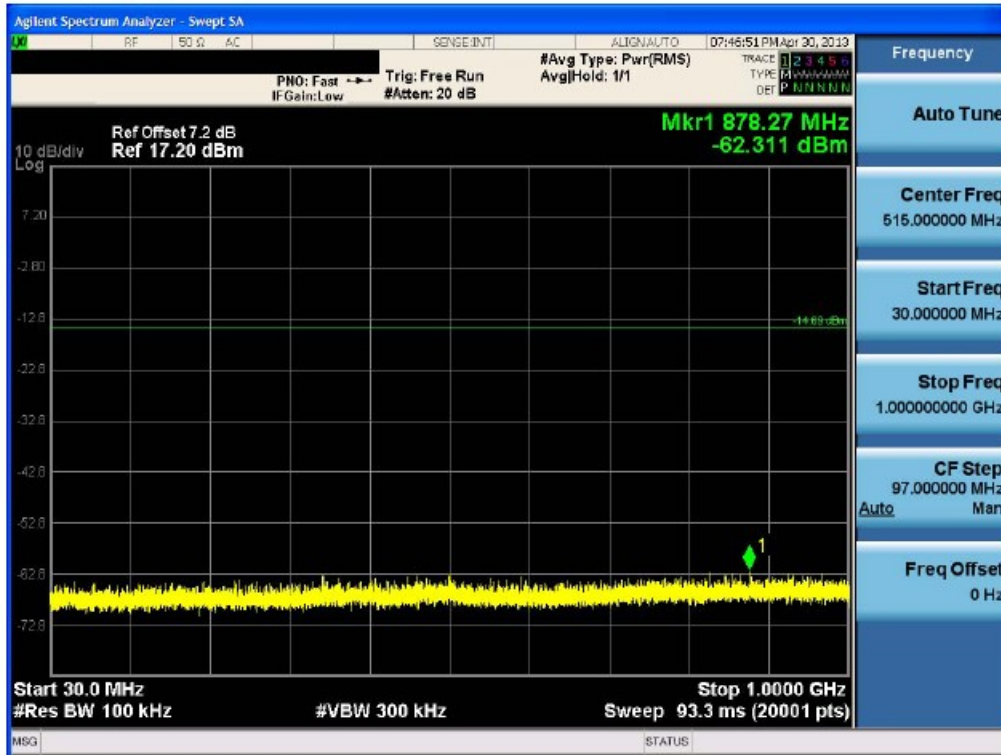


Test Plots ($\pi/4$ DQPSK) - 30 MHz - 1 GHz
Spurious Emission (Mid-CH)



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Test Plots ($\pi/4$ DQPSK) - 30 MHz - 1 GHz
 Spurious Emission (High-CH)



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