Mobile Devices business
iDEN Mobile Devices Operations

RF Test Report

FCC Rule Parts: 15C (Bluetooth)
Industry Canada: RSS-Gen, RSS-210

Product Name: i886-Series Handsets
FCC ID: IHDP56LL1
IC ID: 109O-P56LL1

Date: June 16, 2010

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Test Report Details

Tests Performed by:	Motorola EMC Laboratory Plantation, Florida 8000 W. Sunrise Blvd Plantation, Florida 33322 Phone: (954) 723-5480 FAX: (954) 723-3803 FCC Registration Number: **91932** Industry Canada Number: **IC109U-1**
Product Type:	Cellular Phone
Signaling Capabilities:	Bluetooth Transceiver (2.4 GHz ISM)
FCC ID:	IHDP56LL1
IC ID:	109O-P56LL1

Applicable Standards

All tests and measurements indicated in this document were performed in accordance with the United States Code of Federal Regulations, Title 47 Part 2, Sub-part J, as well as the following parts:

X	Part 15 Subpart C – Radio Frequency Devices.
X	RSS-210 – Low-power License-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment.

Applicable Standards: TIA/EIA-603-A, TIA/EIA-603-B, TIA/EIA-603-C, ANSI C63.4-2009, and ANSI C63.10.

Exhibit 6c: Bluetooth Measured Data– Pursuant 47 CFR 2.1041; RSS-Gen Section 3.

Bluetooth conducted measurement setup and procedure was provided in Exhibit 7.

6c.1. Bluetooth Carrier Frequency Separation – Pursuant 47 CFR 15.247(a)(1); RSS-210 Section A8.1.

Criterion: Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

The measurement shows a carrier frequency separation of 1.000 MHz, which is greater than the measured 20 dB bandwidth of 960 kHz.

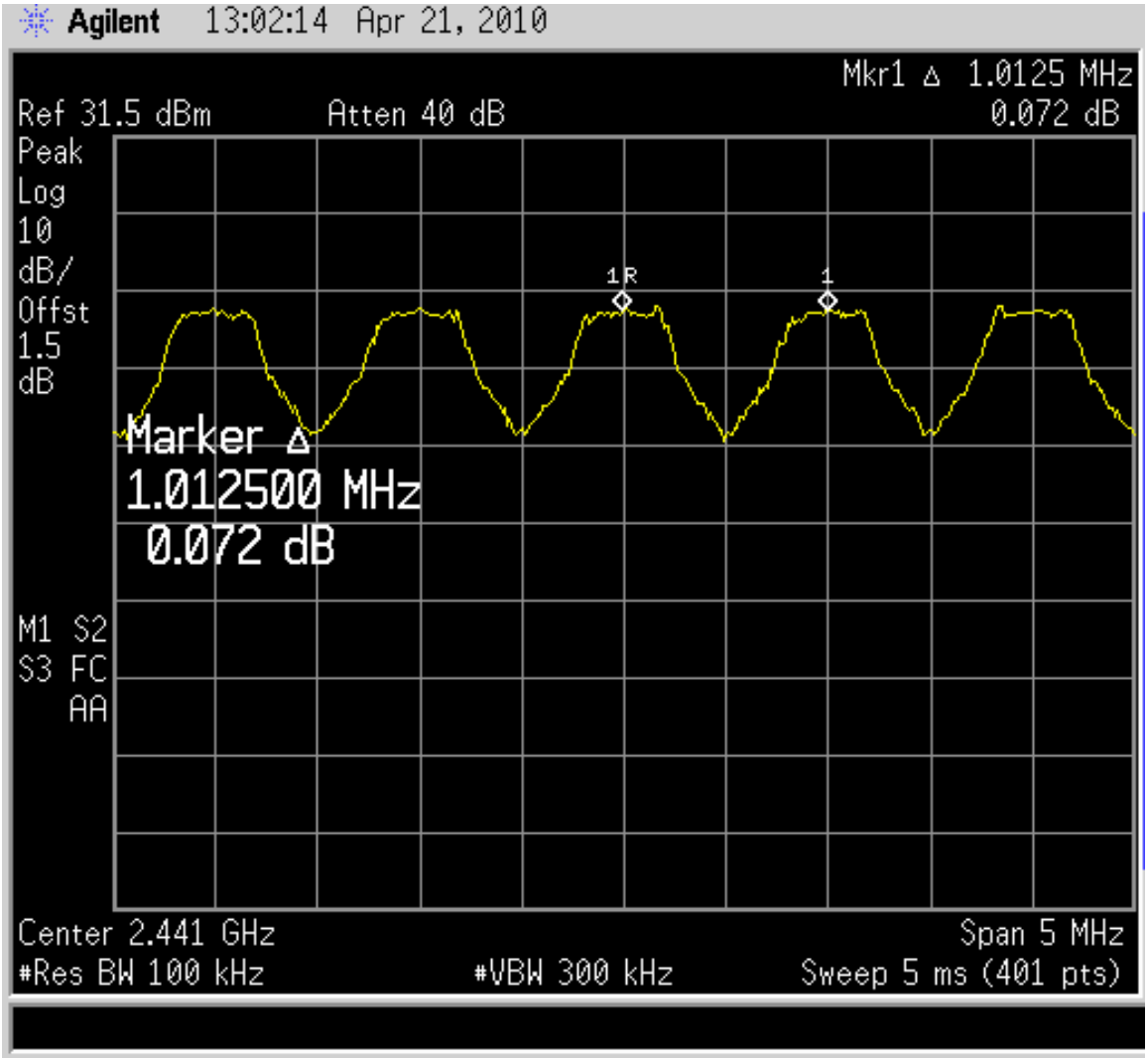

Figure 6c.1-1: Plot of Bluetooth carrier frequency separation

6c.2. 20 dB Bandwidth – Pursuant 47 CFR 15.247(a)(1); RSS-210 Section A8.1.

The 20 dB bandwidth of the emission is 960 kHz.

Figure 6c.2-1: Plot of 20 dB bandwidth (GFSK Modulation)

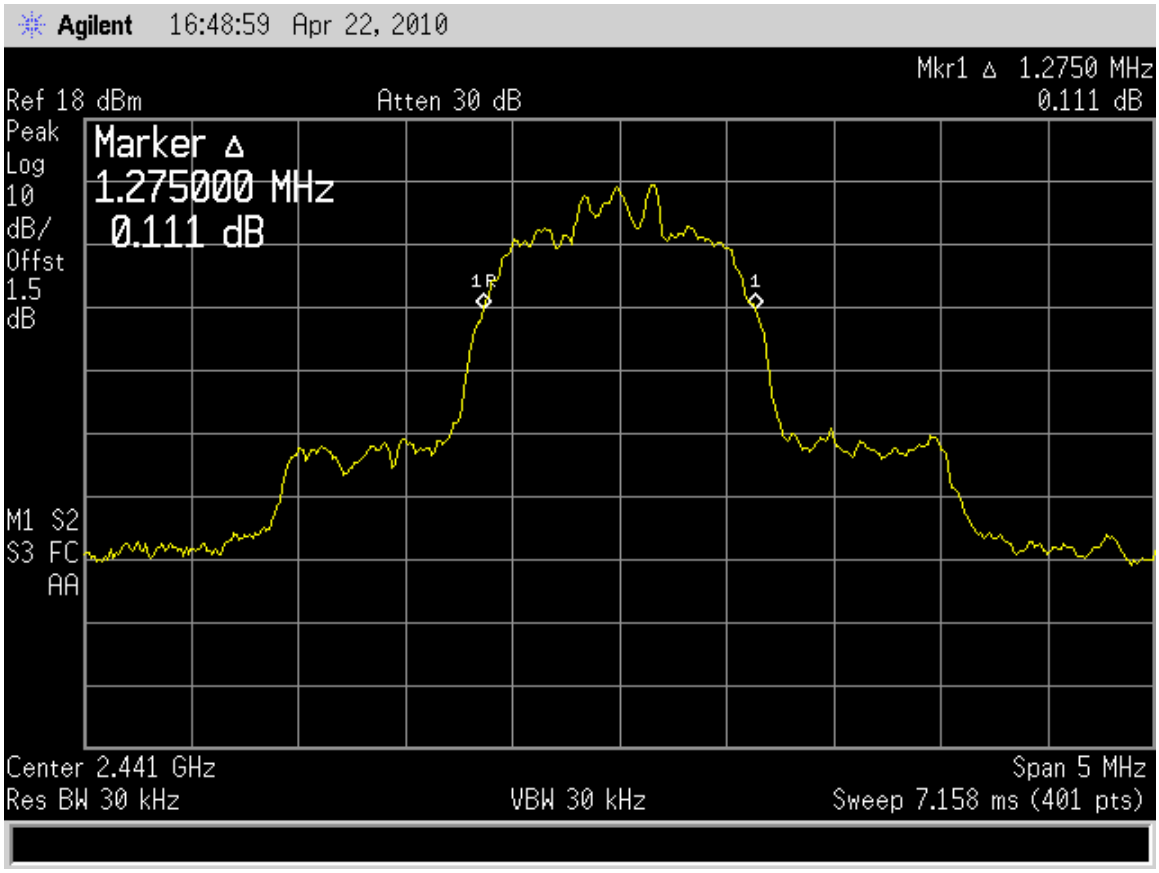

Figure 6c.2-2: Plot of 20 dB bandwidth (Pi/4 DPSK Modulation)

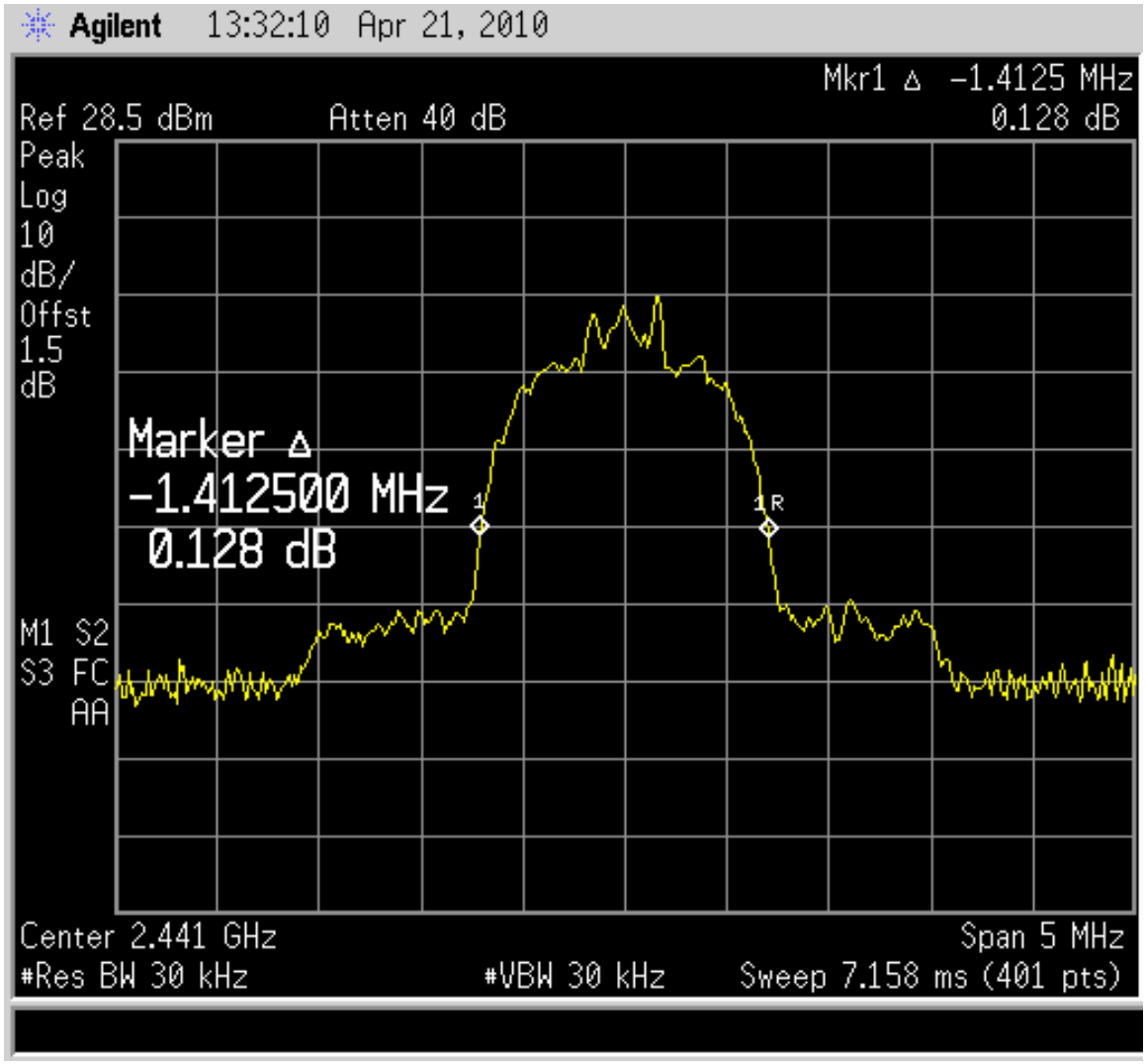

Figure 6c.2-3: Plot of 20 dB bandwidth (8-DPSK Modulation)

6c.3. Bluetooth number of hopping frequencies – Pursuant 47 CFR 15.247(a)(1)(iii); RSS-210 Section A8.1.

Criterion: Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels.

The measurement shows 79 non-overlapping channels over a span of 79 MHz.

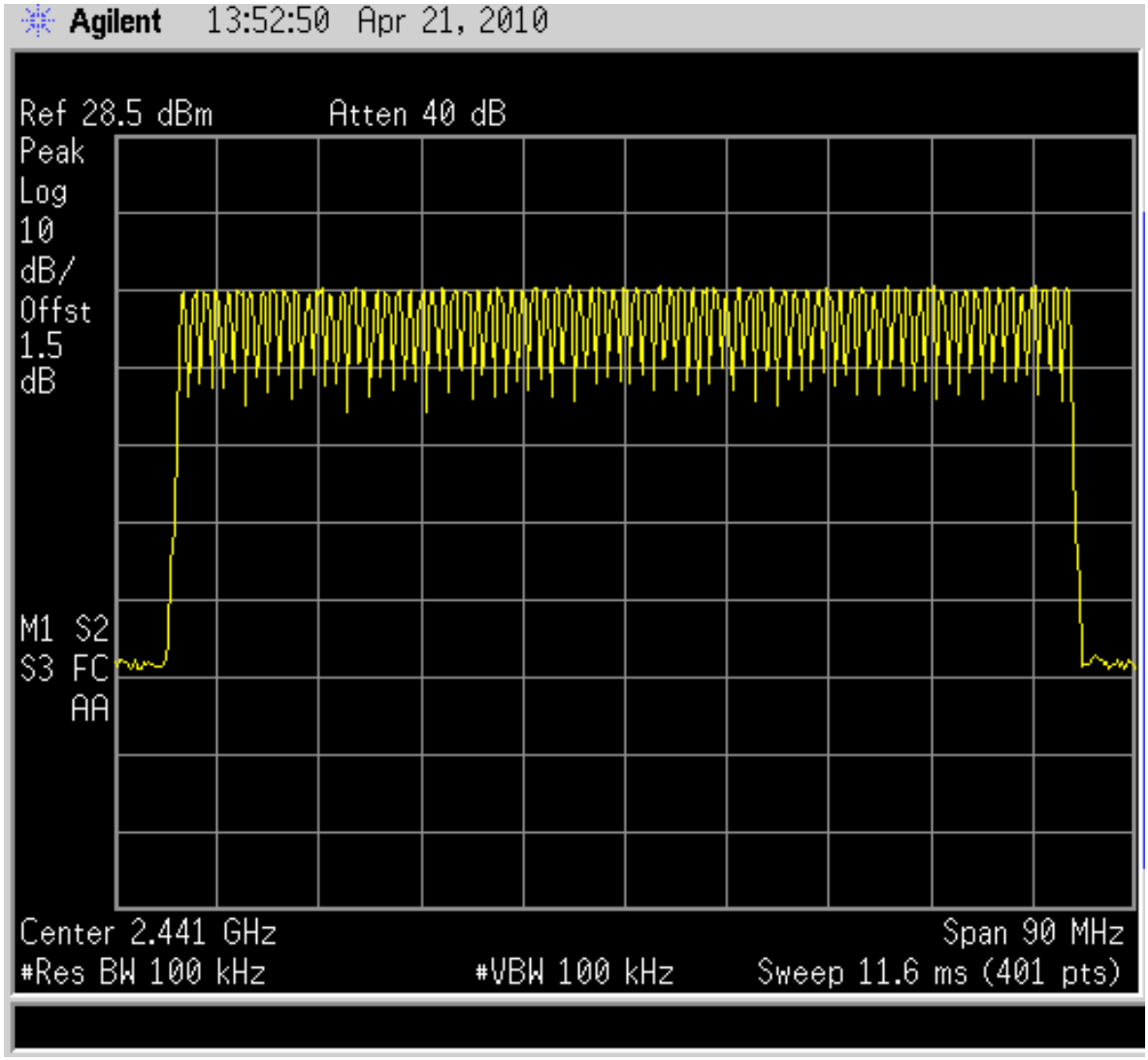

Figure 6c.3-1: Plot of number of Bluetooth hopping frequencies

6c.4. Time of Occupancy (Dwell Time) – Pursuant 47 CFR 15.247(a)(1)(iii); RSS-210 Section A8.1.

Criterion: 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.

This plot shows a sweep over a 31.6 second period for DH1 packet. It is clear that a measurement cannot be made here due to the coarse resolution in the time domain.

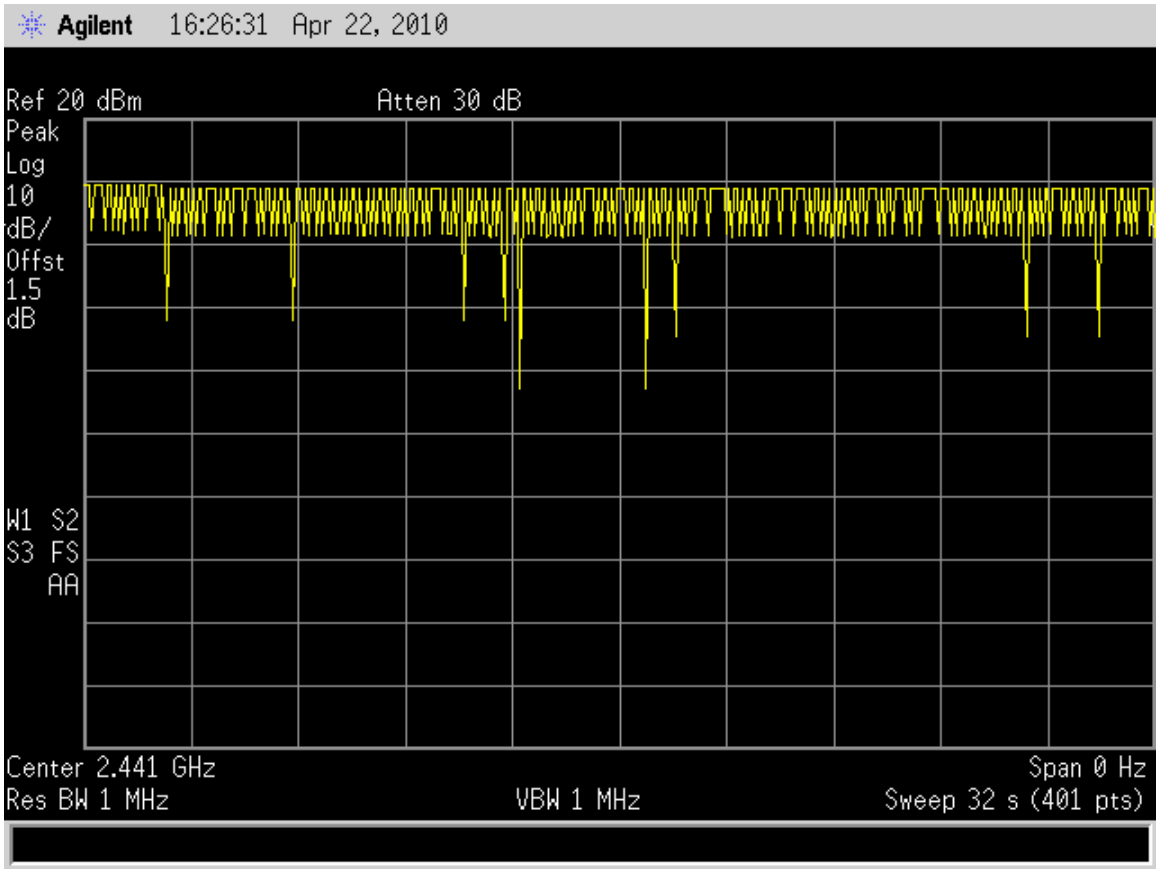

Figure 6c.4-1: Plot of dwell time over 32 second period

This plot below shows the sweep in a 4 second period. Again, the resolution is not fine enough to capture the dwell time in each burst. The periodicity, however, can be seen and the number of time slots occupied (41) can be extrapolated to show the number of time slots occupied within a 31.6 second period ($41 \bullet \frac{32s}{4s} = 323.9 \approx 324$).

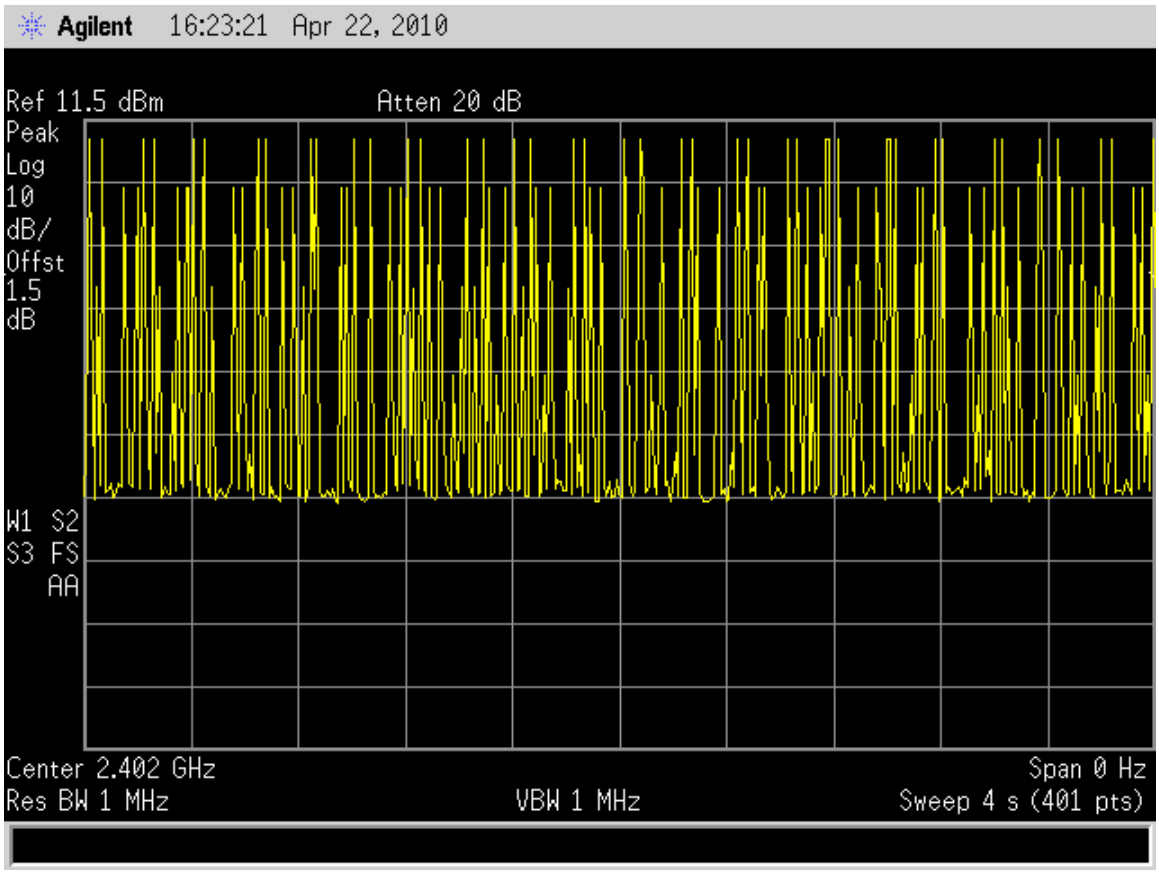

Figure 6c.4-2: Plot of dwell time over 4 second period.

This plot below shows a sweep over a 6 ms period, allowing the measurement of one time-slot (380 µs). This active time can be multiplied by the number of transmissions in a 31.6 second period (324) to derive the total dwell time in a 31.6 second period (123.1 ms). The specification is 400 ms maximum dwell time.

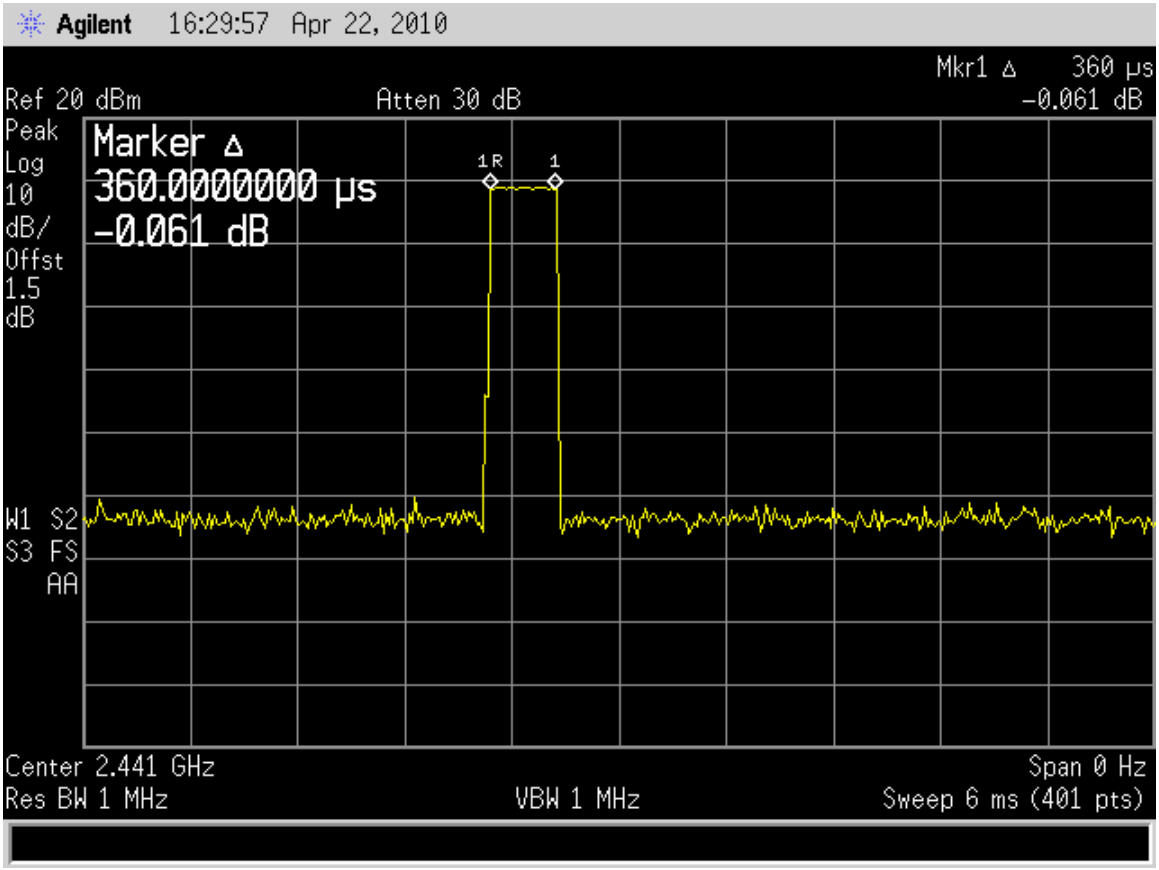

Figure 6c.4-3: Plot of dwell time over 6 ms period.

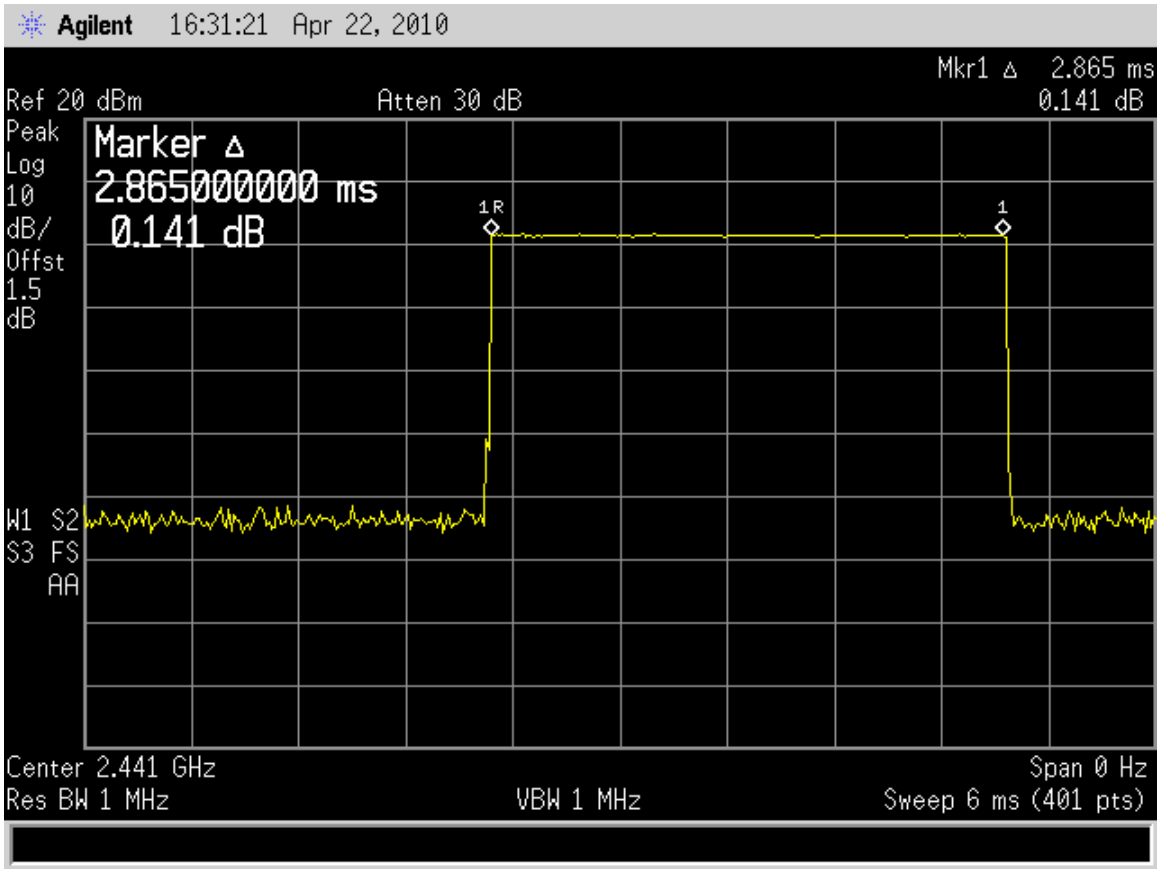

Figure 6c.4-4: Plot of dwell time over 6 ms period.

The measurement shows the total dwell time for the longest Bluetooth packet, DH-5, in a 31.6 second period is 311 ms.

6c.5. Peak Bluetooth Output Power – Pursuant 47 CFR 15.247(b)(1); RSS-210 Section A8.4.

Criterion: For frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels: 1 watt.

The peak output power is 8.97 dBm, which is equivalent to 7.9 mW.

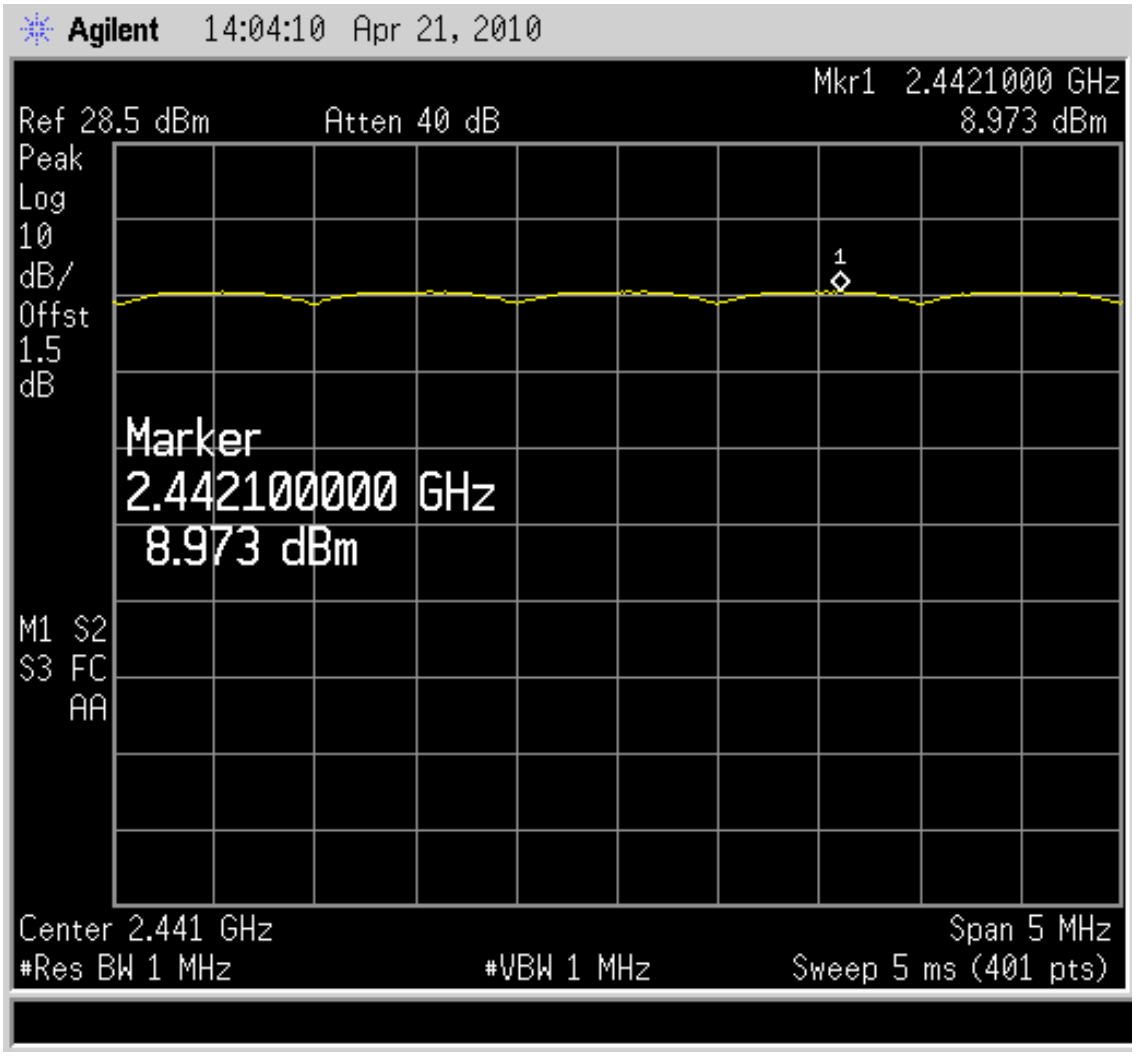

Figure 6c.5-1: Plot of peak output power

6c.6. De Facto EIRP Limit – Pursuant 47 CFR 15.247(b)(4); RSS-210 Section A8.4.

Criterion: The conducted output power limit of 1-watt is based on the use of antennas with directional gains that do not exceed 6 dB_i. If transmitting antennas of directional gain greater than 6 dB_i are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dB_i.

The antenna employed by this transmitter is intended to be omni-directional, and thus will not exhibit directional gain in excess of 6 dB_i. The conducted power is less than the limits set forth (see elsewhere in this report for details).

6c.7. Band-Edge Compliance of RF Conducted Emissions – Pursuant 47 CFR 15.247(d); RSS-210 Section A8.1.

Criterion: 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.

The measurement shows -47.07 dB at the lower band edge and -48.96 dB at the upper band edge with the hopping function disabled. The measurement shows -47.17 dB at the lower band edge and -48.09 dB at the upper band edge with the hopping function enabled.

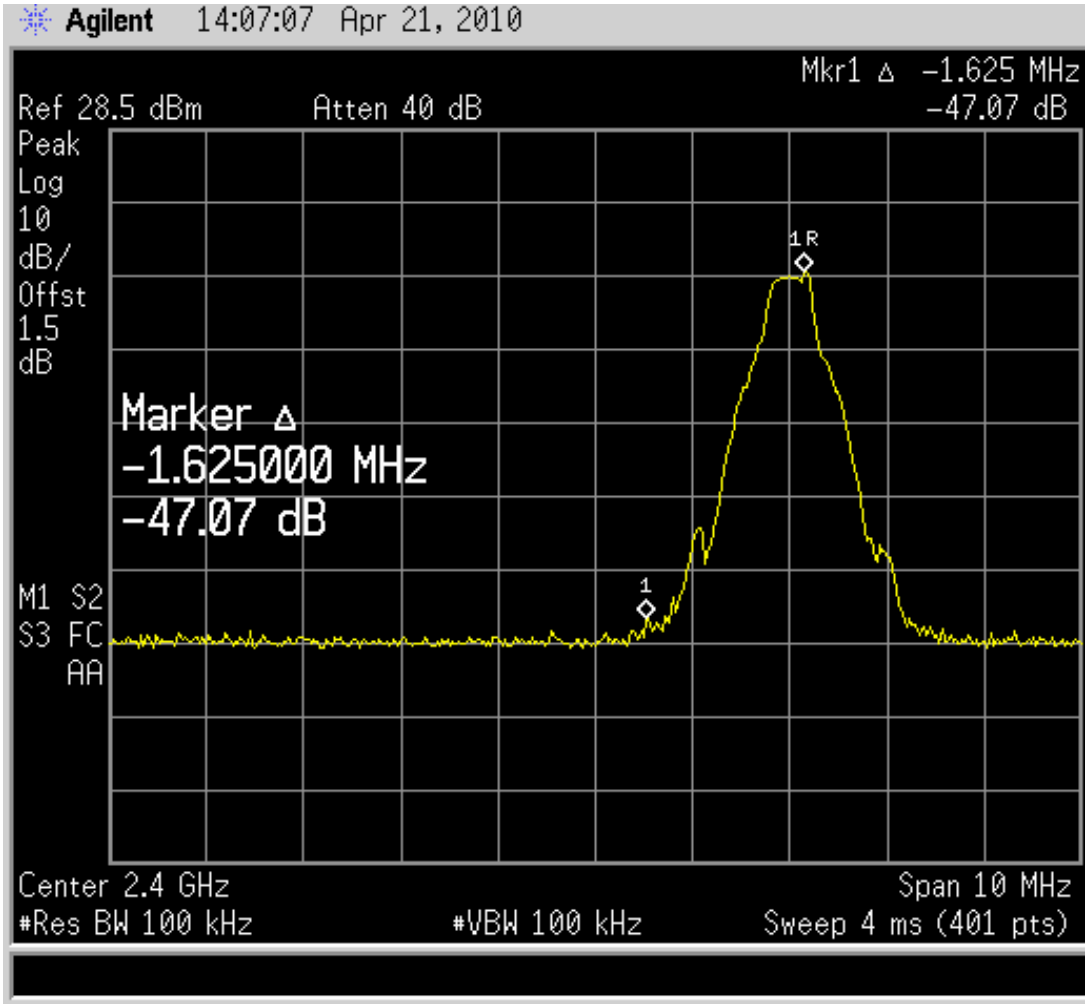

Figure 6c.6-1: Plot of lower band-edge conducted emissions with hopping disabled (GFSK Modulation).

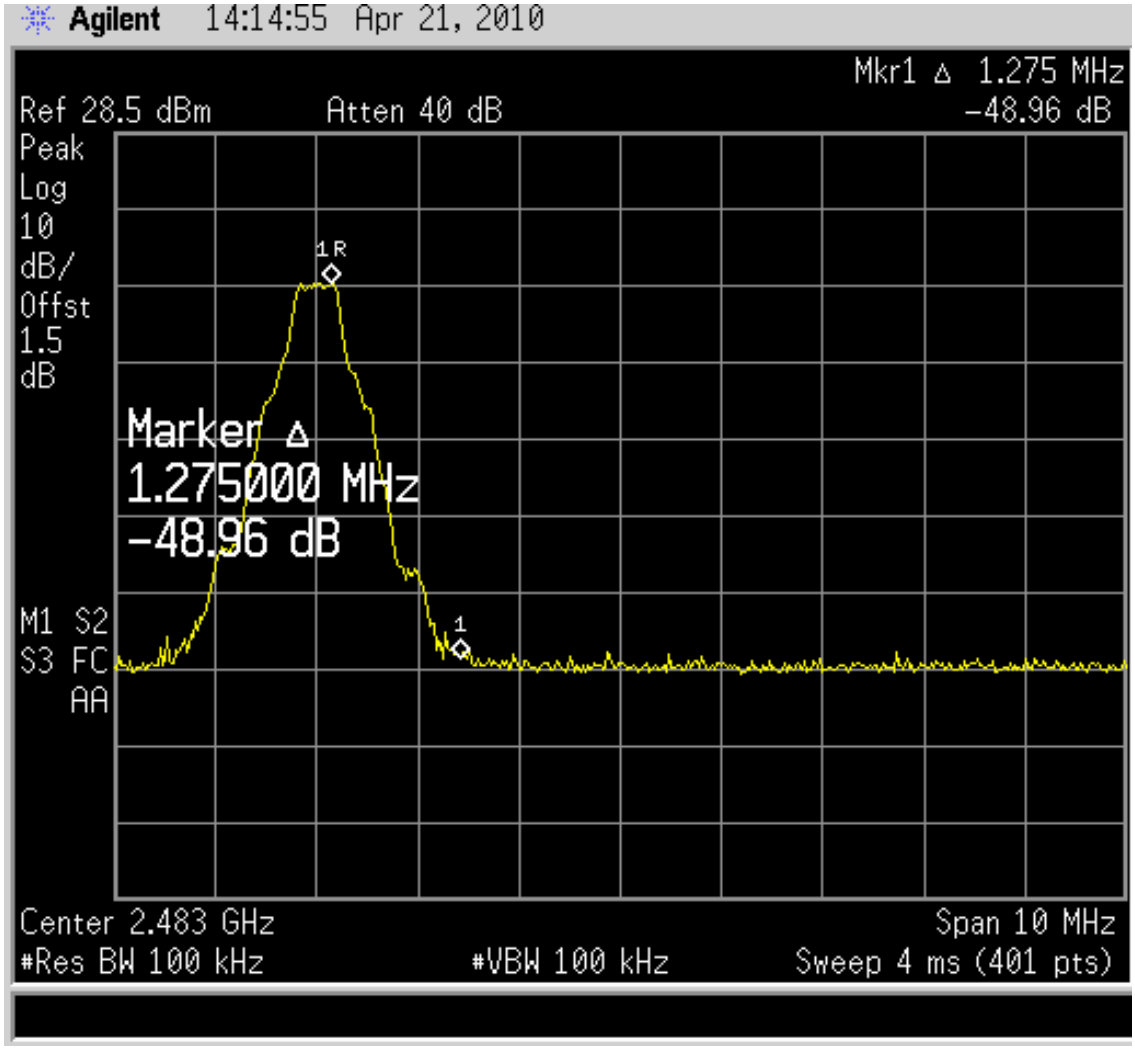

Figure 6c.6-2: Plot of upper band-edge conducted emissions with hopping disabled (GFSK Modulation).

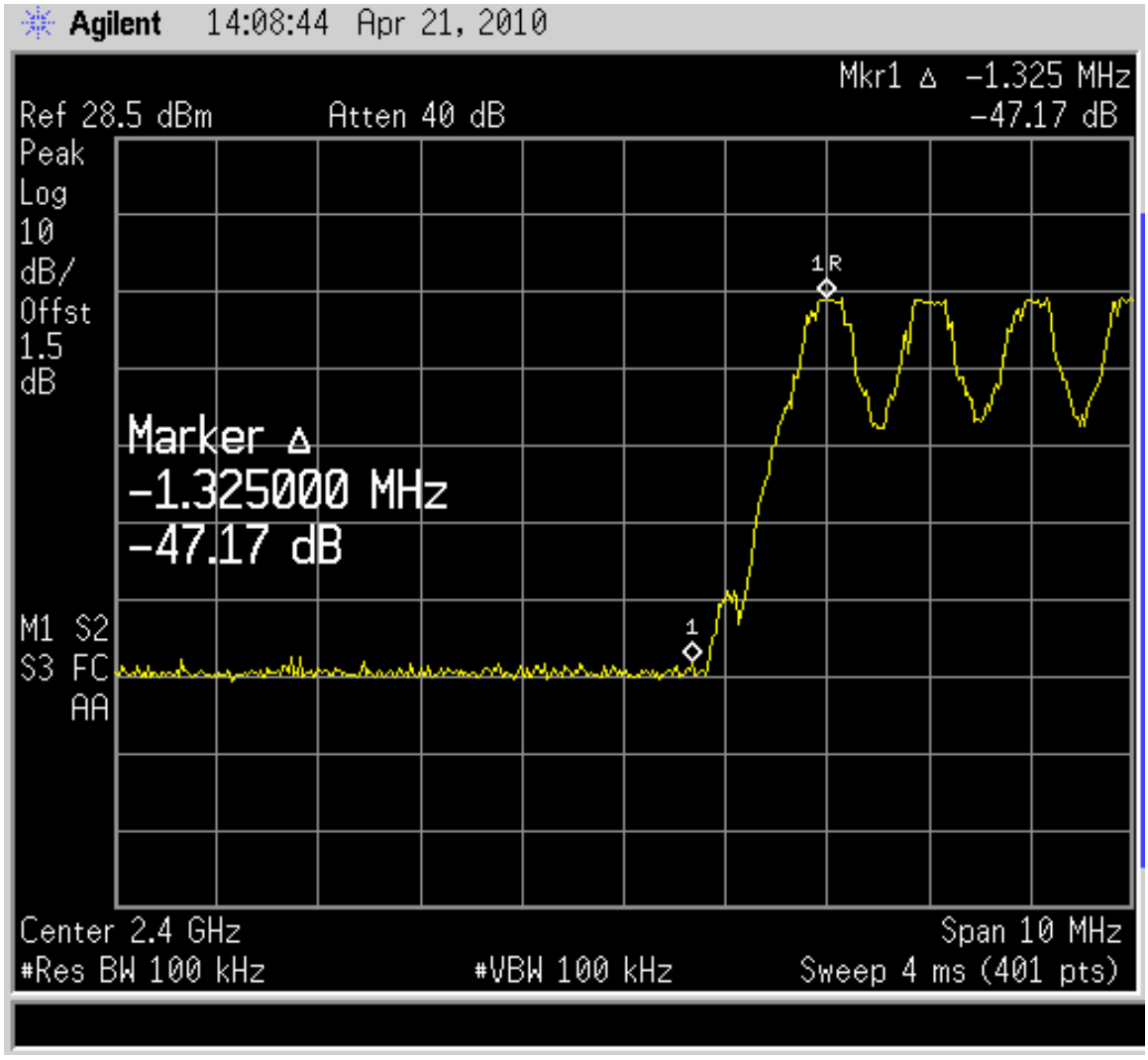

Figure 6c.6-3: Plot of lower band-edge conducted emissions with hopping enabled (GFSK Modulation).

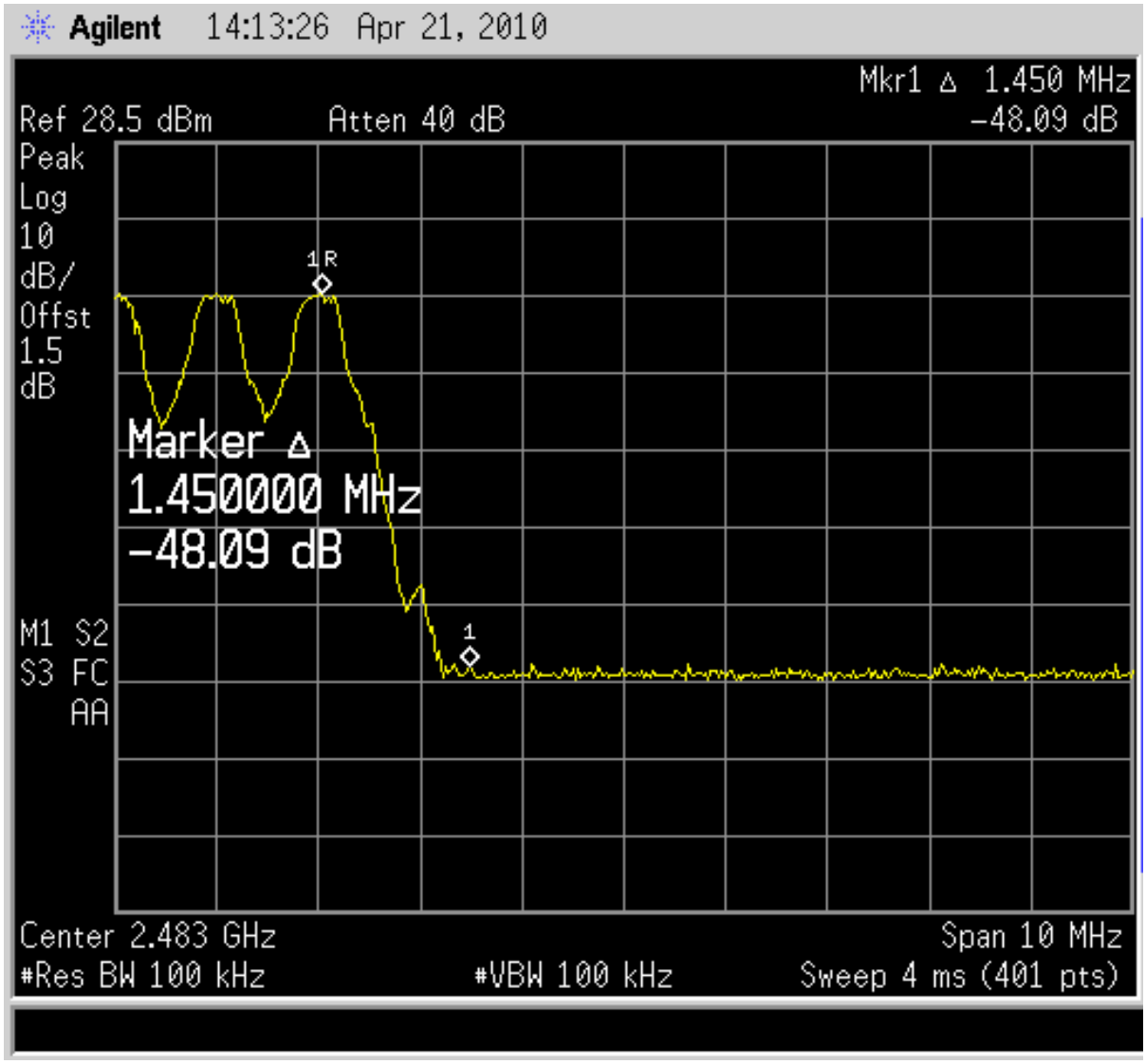

Figure 6c.6-4: Plot of upper band-edge conducted emissions with hopping enabled (GFSK Modulation).

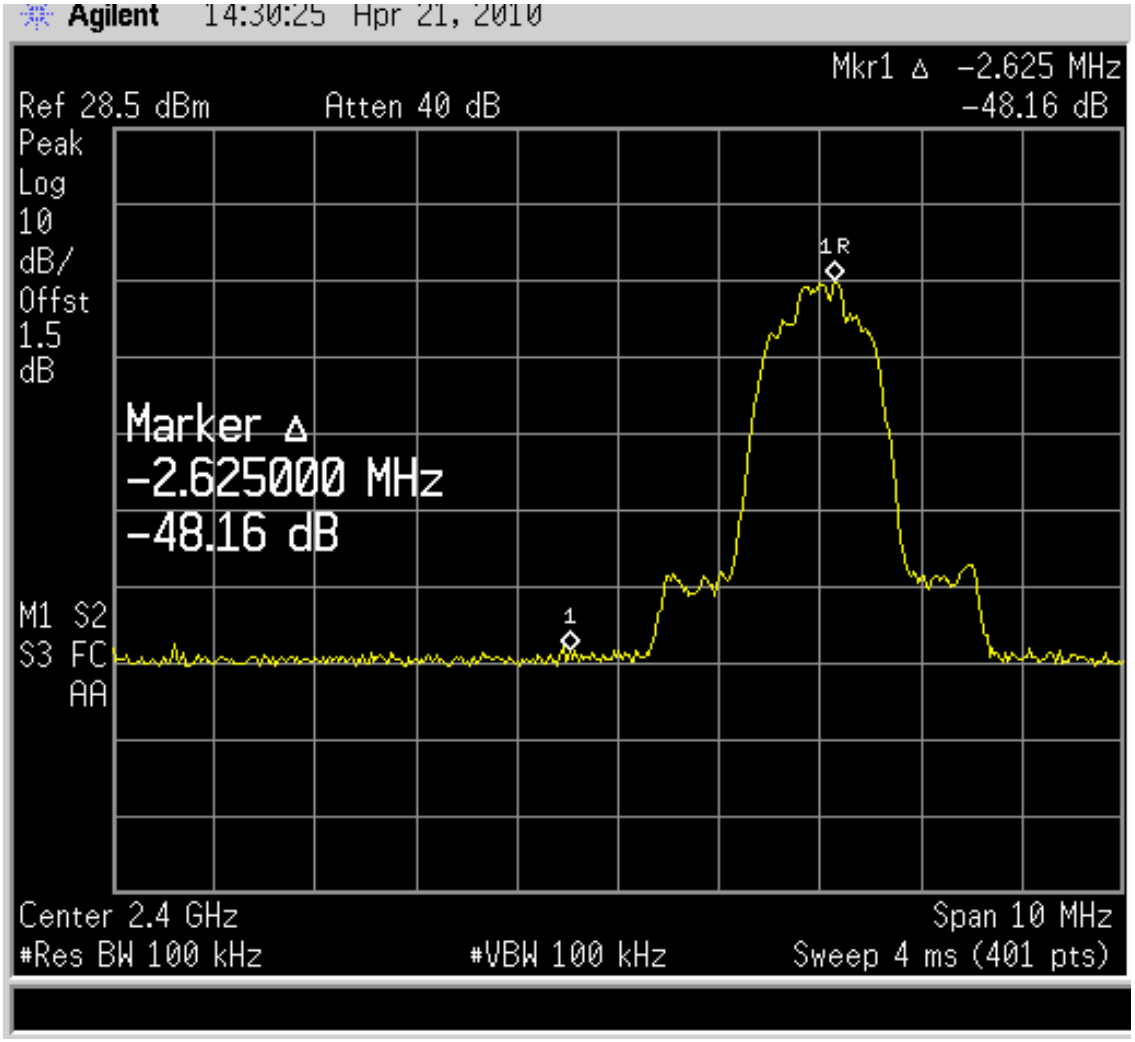

Figure 6c.6-5: Plot of lower band-edge conducted emissions with hopping disabled (Pi/4 DPSK Modulation).

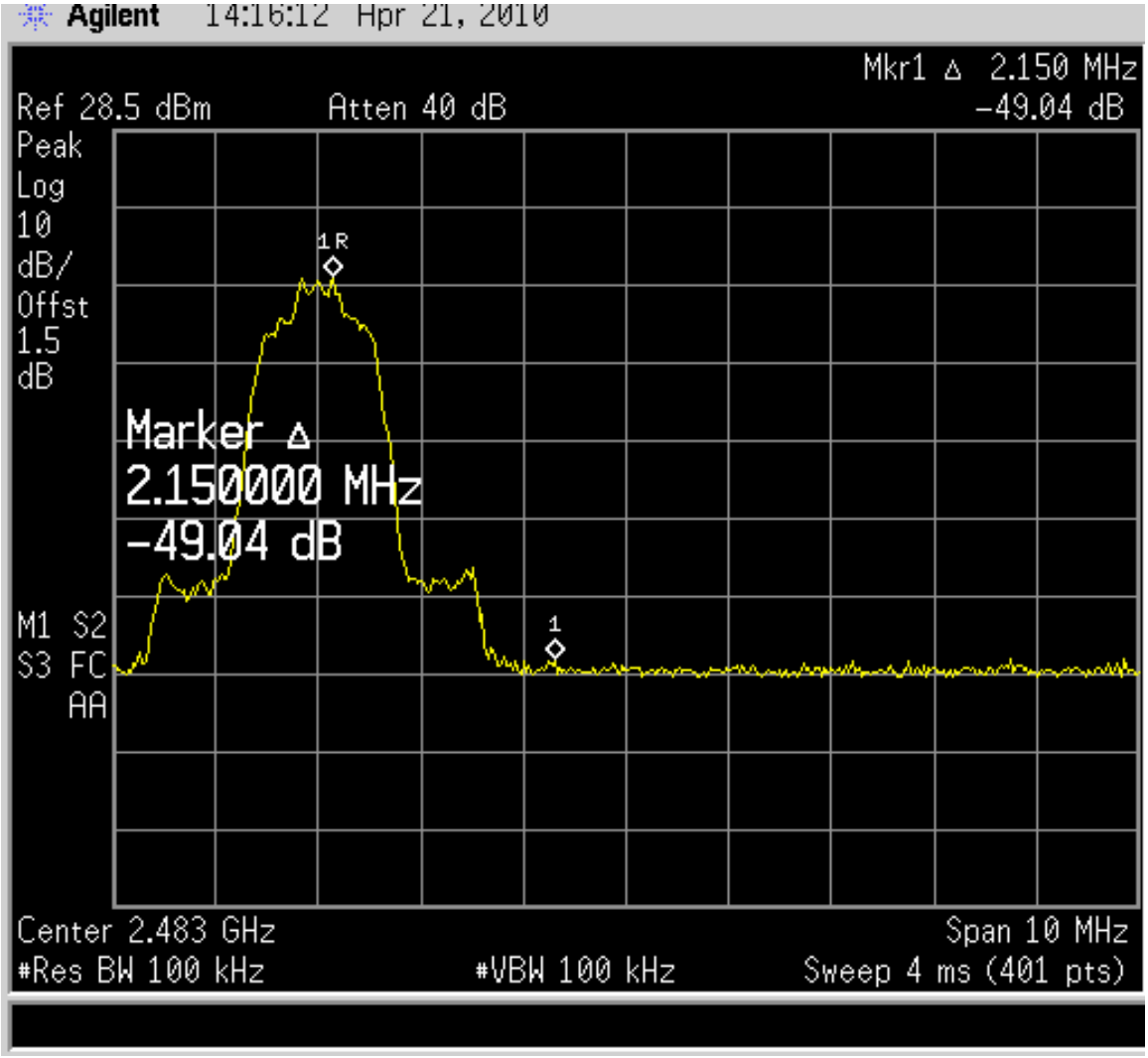

Figure 6c.6-6: Plot of upper band-edge conducted emissions with hopping disabled (Pi/4 DPSK Modulation).

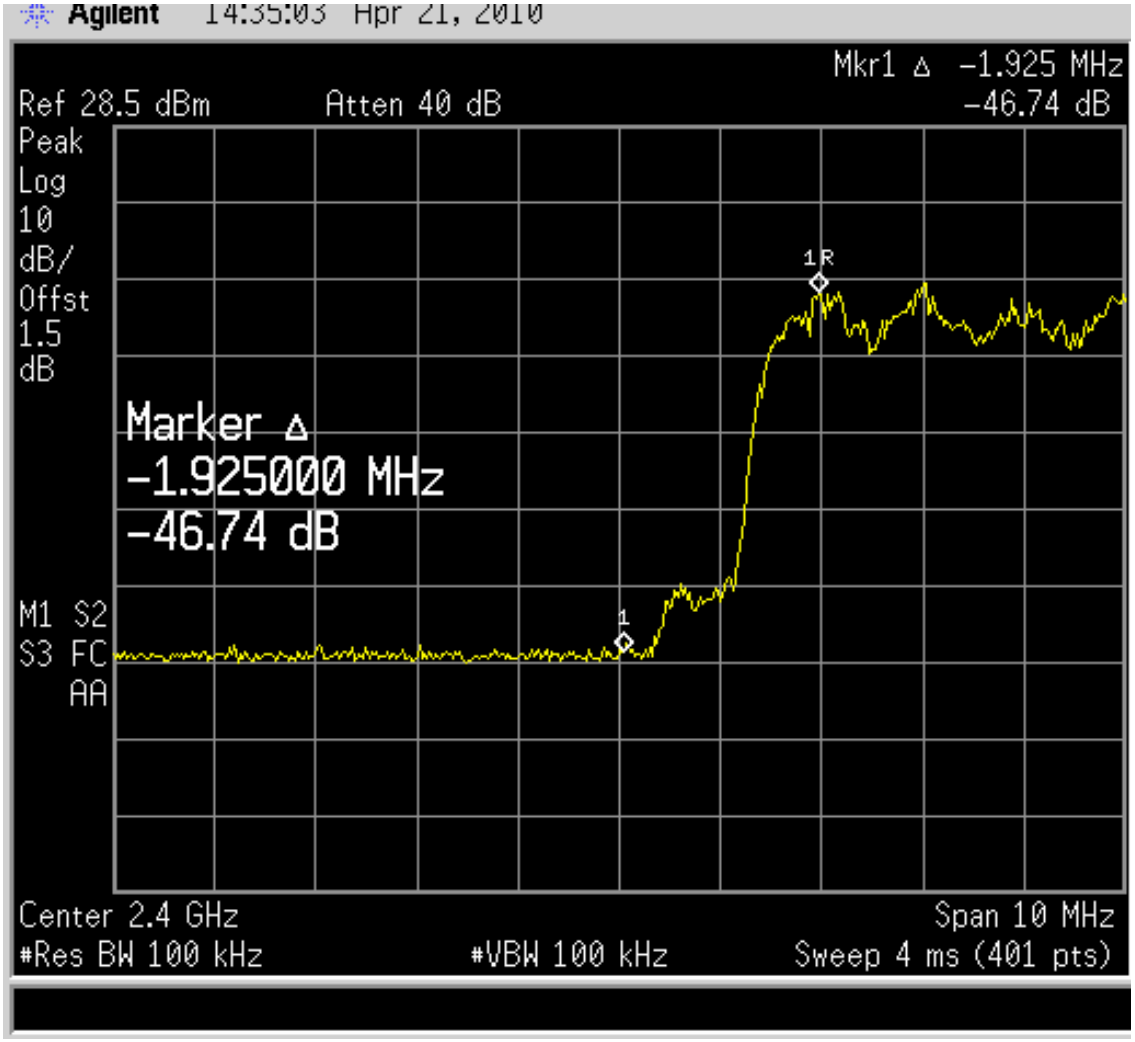

Figure 6c.6-7: Plot of lower band-edge conducted emissions with hopping enabled (Pi/4 DPSK Modulation).

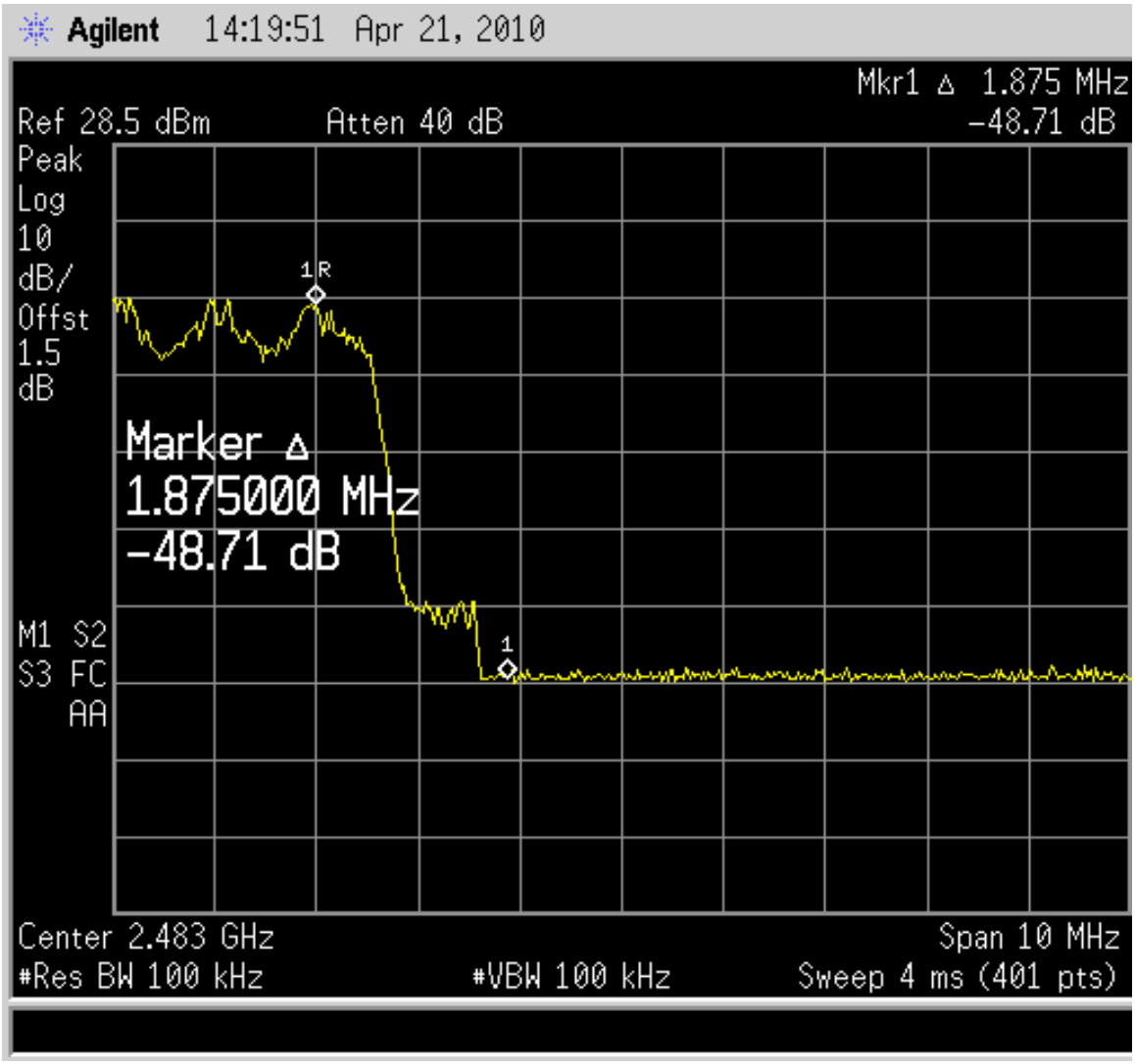

Figure 6c.6-8: Plot of upper band-edge conducted emissions with hopping enabled (Pi/4 DPSK Modulation).

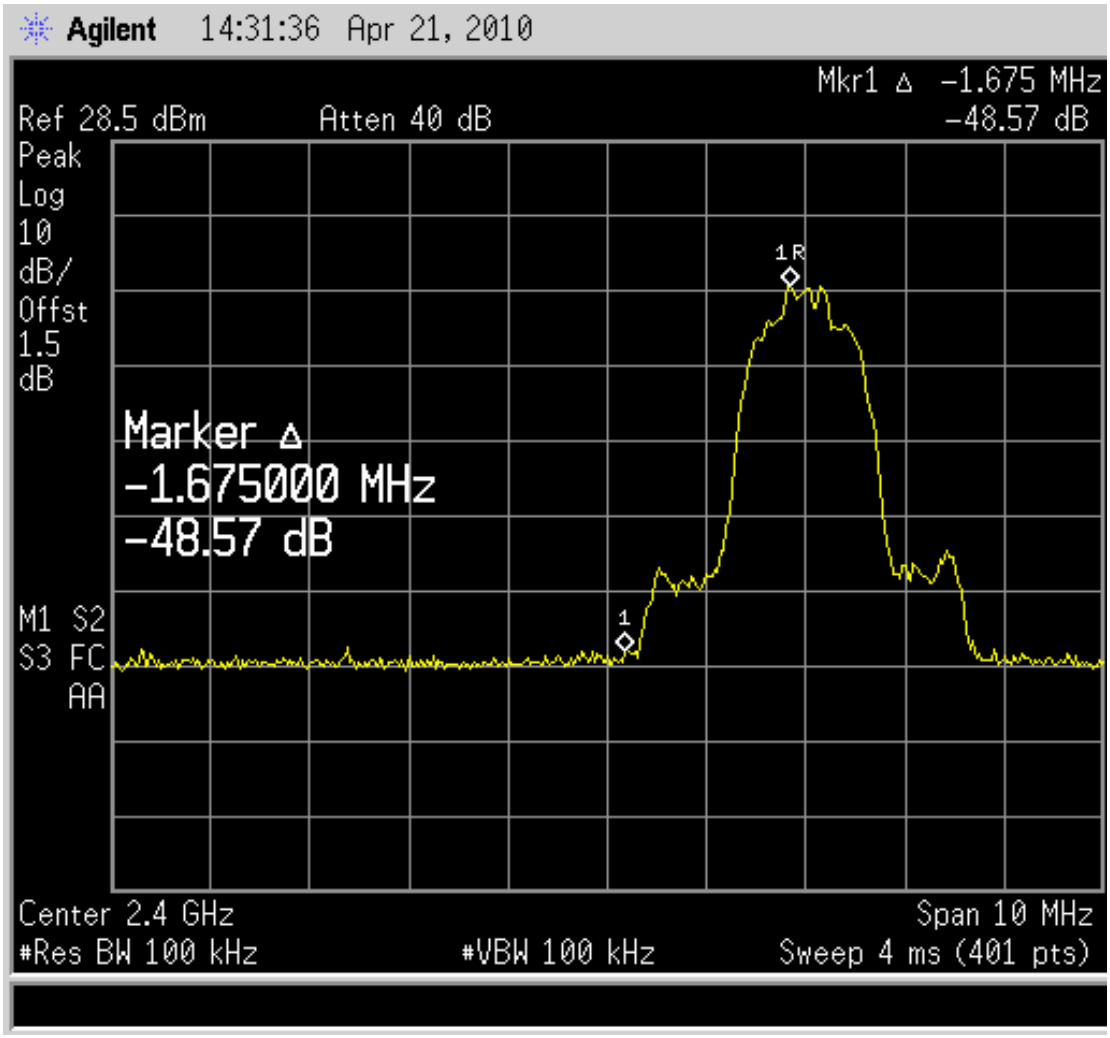

Figure 6c.6-9: Plot of lower band-edge conducted emissions with hopping disabled (8 DPSK Modulation).

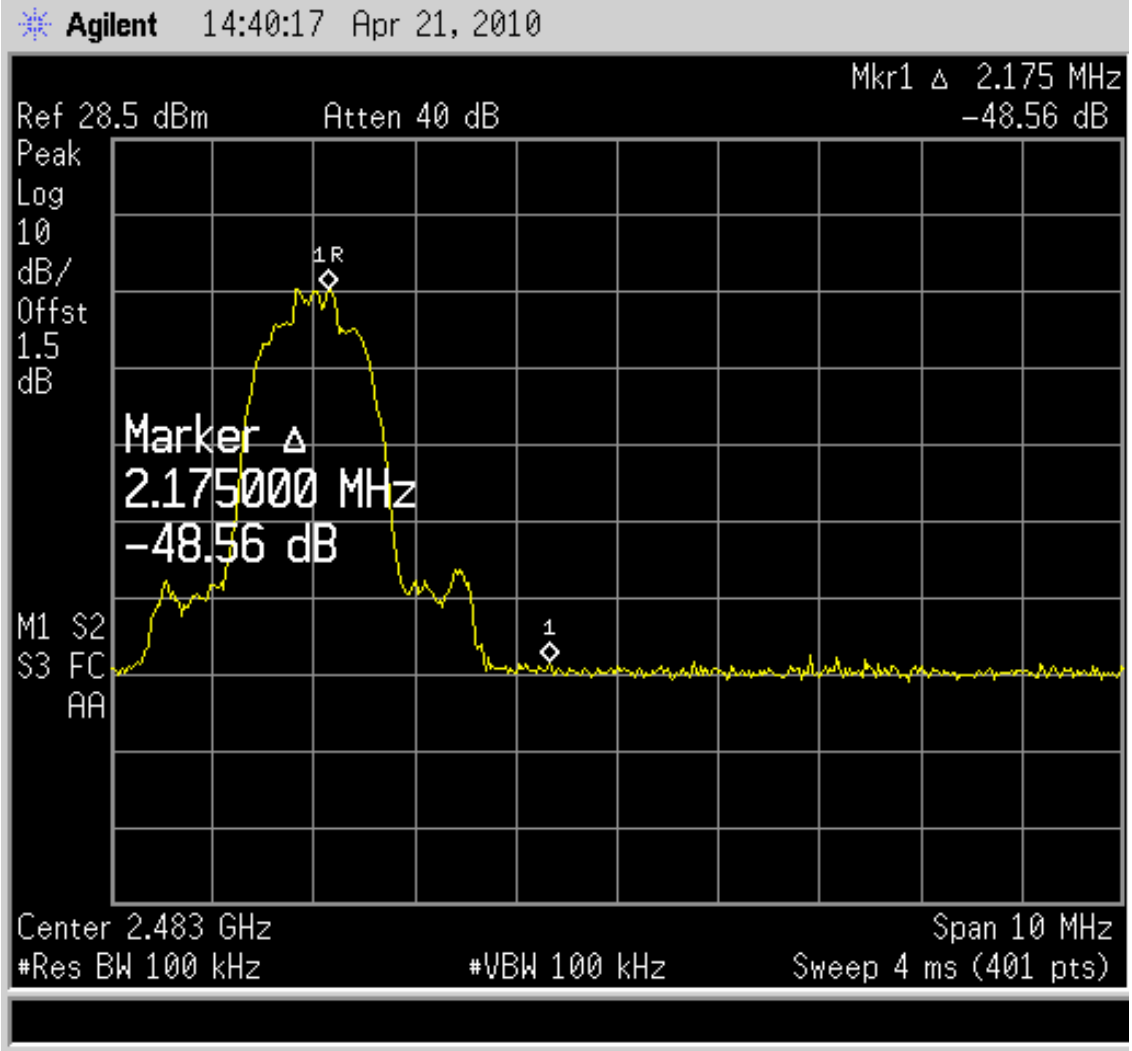

Figure 6c.6-10: Plot of upper band-edge conducted emissions with hopping disabled (8 DPSK Modulation).

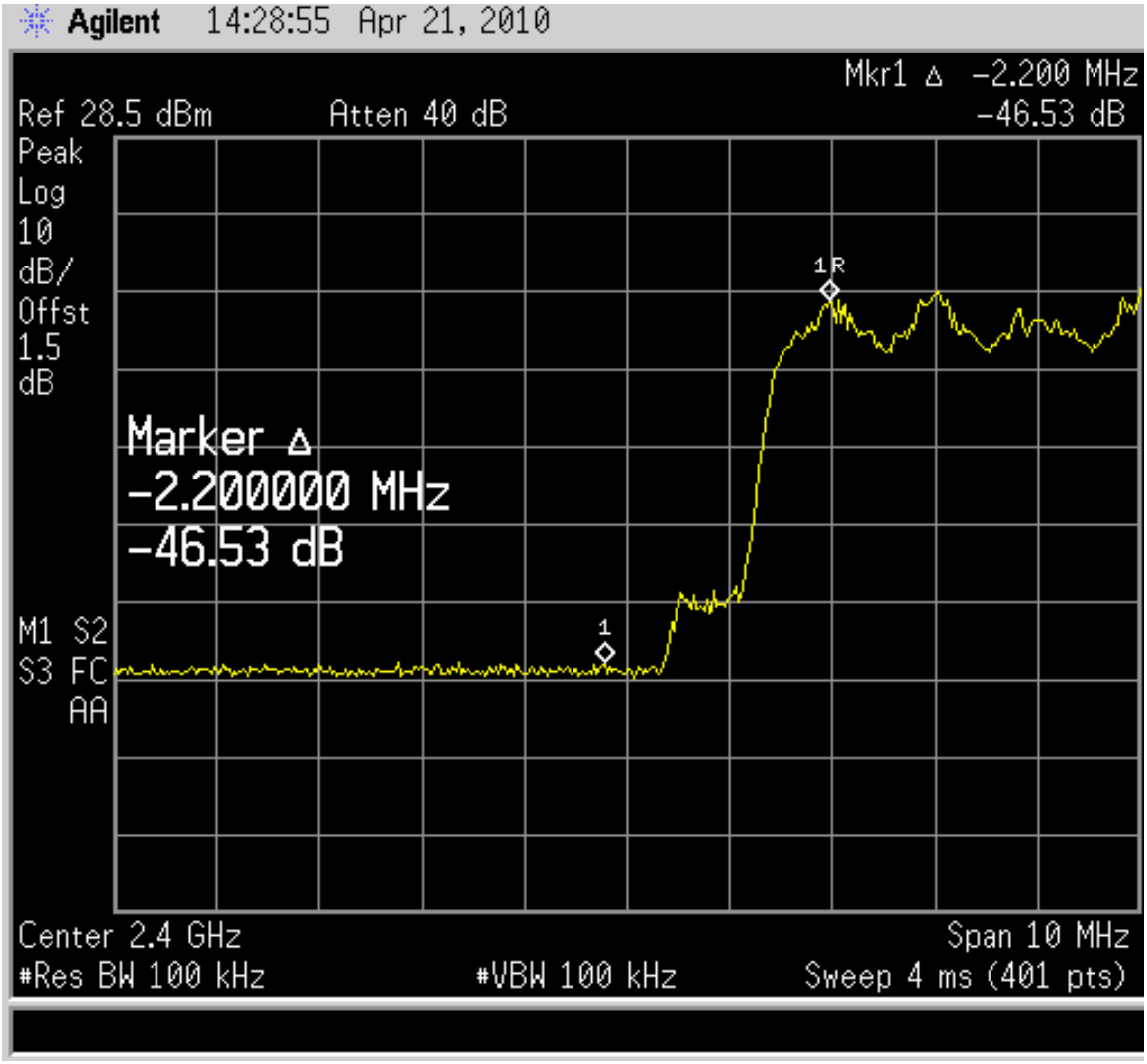

Figure 6c.6-11: Plot of lower band-edge conducted emissions with hopping enabled (8 DPSK Modulation).

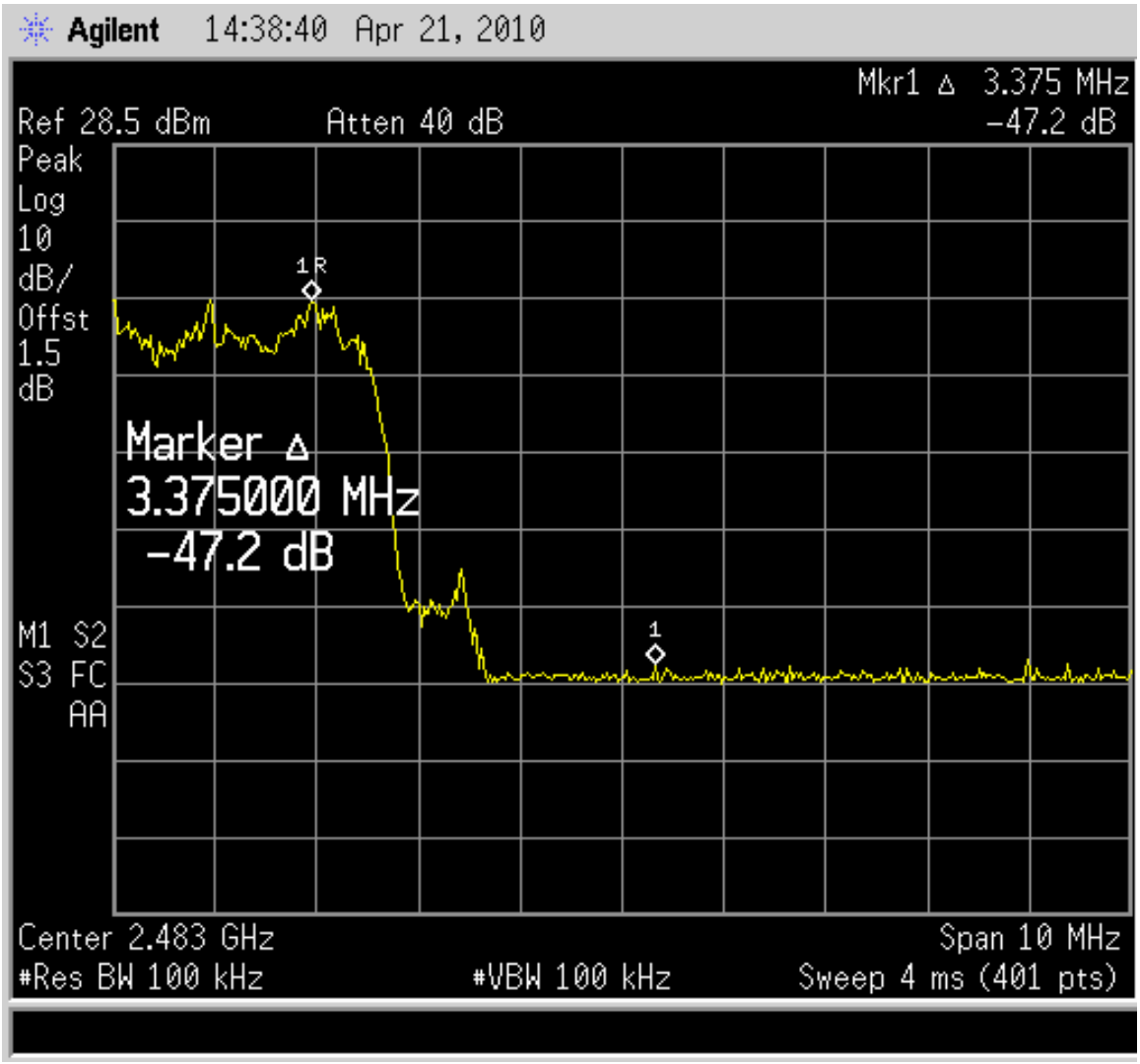

Figure 6c.6-12: Plot of upper band-edge conducted emissions with hopping enabled (8 DPSK Modulation).

6c.8. Spurious RF Conducted Emissions – Pursuant 47 CFR 15.247(d); RSS-210 A8.5.

Criterion: 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.

The emissions are below 30 dBc at the second harmonic of the transmit frequency and far lower at all other frequencies.

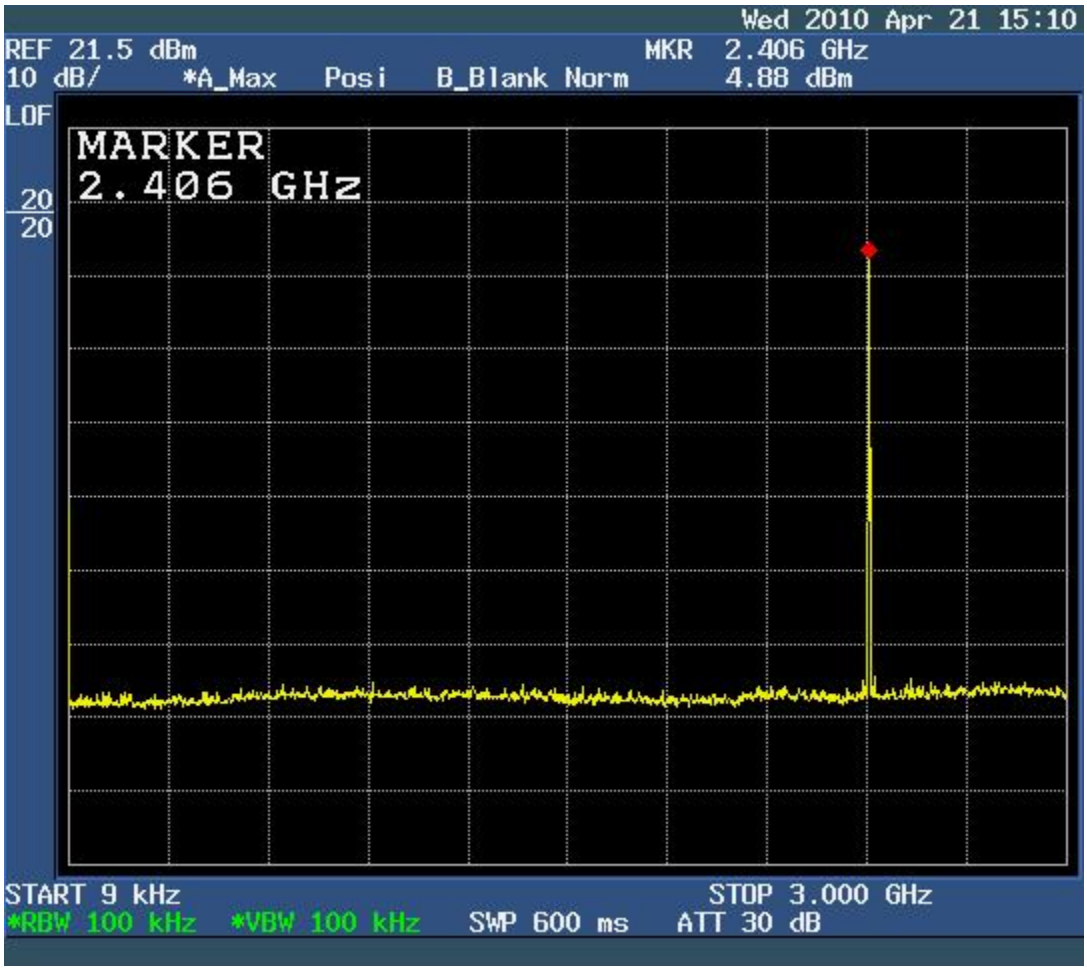

Figure 6c.7-1: Plot of spurious conducted emissions 9 kHz – 3.5 GHz (Low Channel Enabled).

Figure 6c.7-2: Plot of spurious conducted emissions 3 GHz – 13 GHz (Low Channel Enabled).

Figure 6c.7-3: Plot of spurious conducted emissions 13 GHz – 26.5 GHz (Low Channel Enabled).

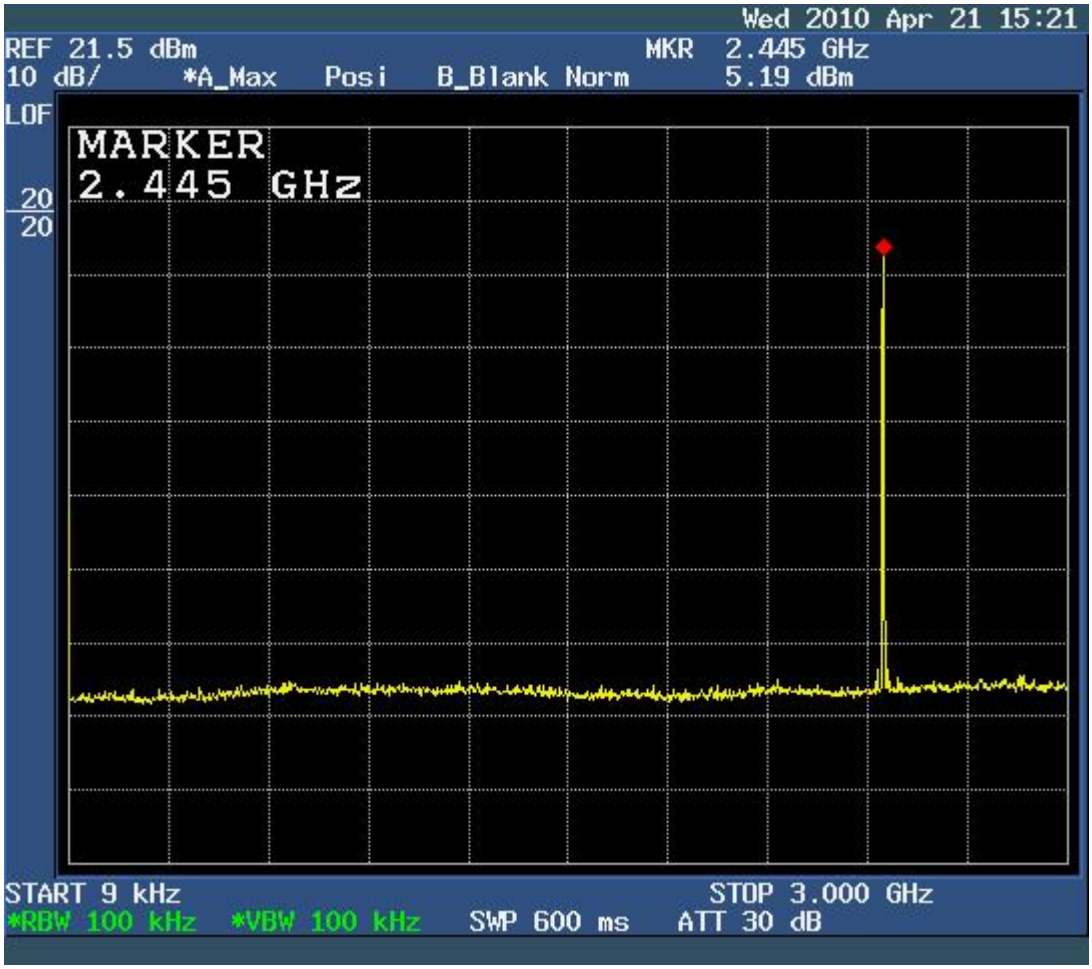

Figure 6c.7-4: Plot of spurious conducted emissions 9 kHz – 3.5 GHz (Mid Channel Enabled).

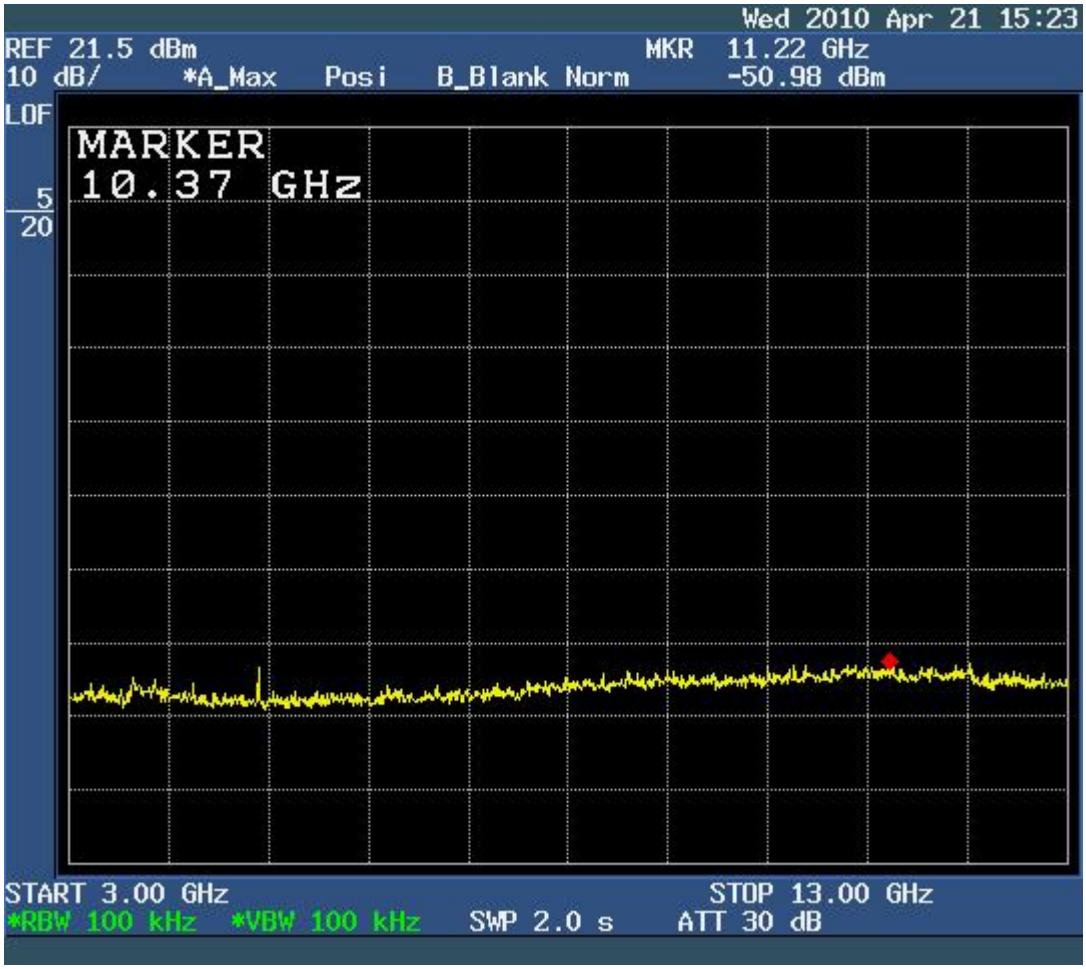

Figure 6c.7-5: Plot of spurious conducted emissions 3 GHz – 13 GHz (Mid Channel Enabled).

Figure 6c.7-6: Plot of spurious conducted emissions 13 GHz – 26.5 GHz (Mid Channel Enabled).

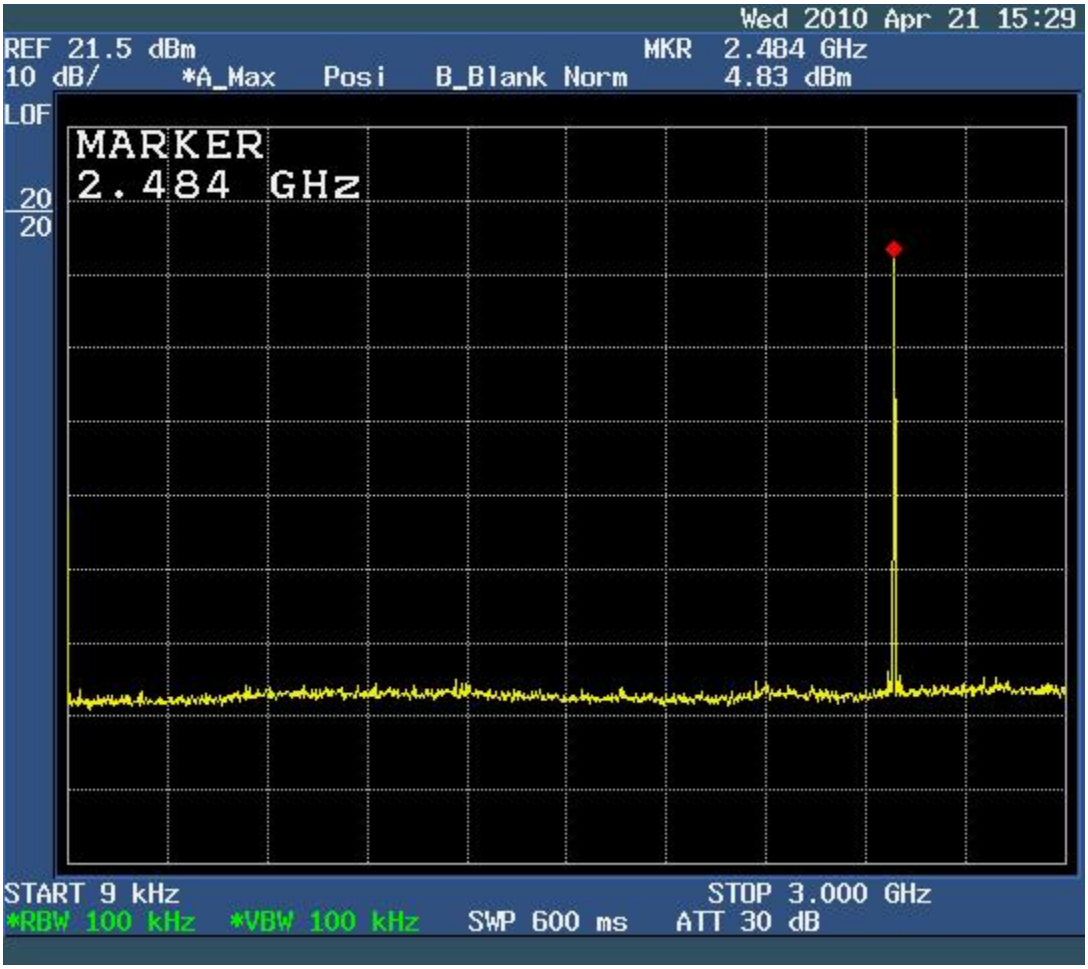

Figure 6c.7-7: Plot of spurious conducted emissions 9 kHz – 3.5 GHz (High Channel Enabled).

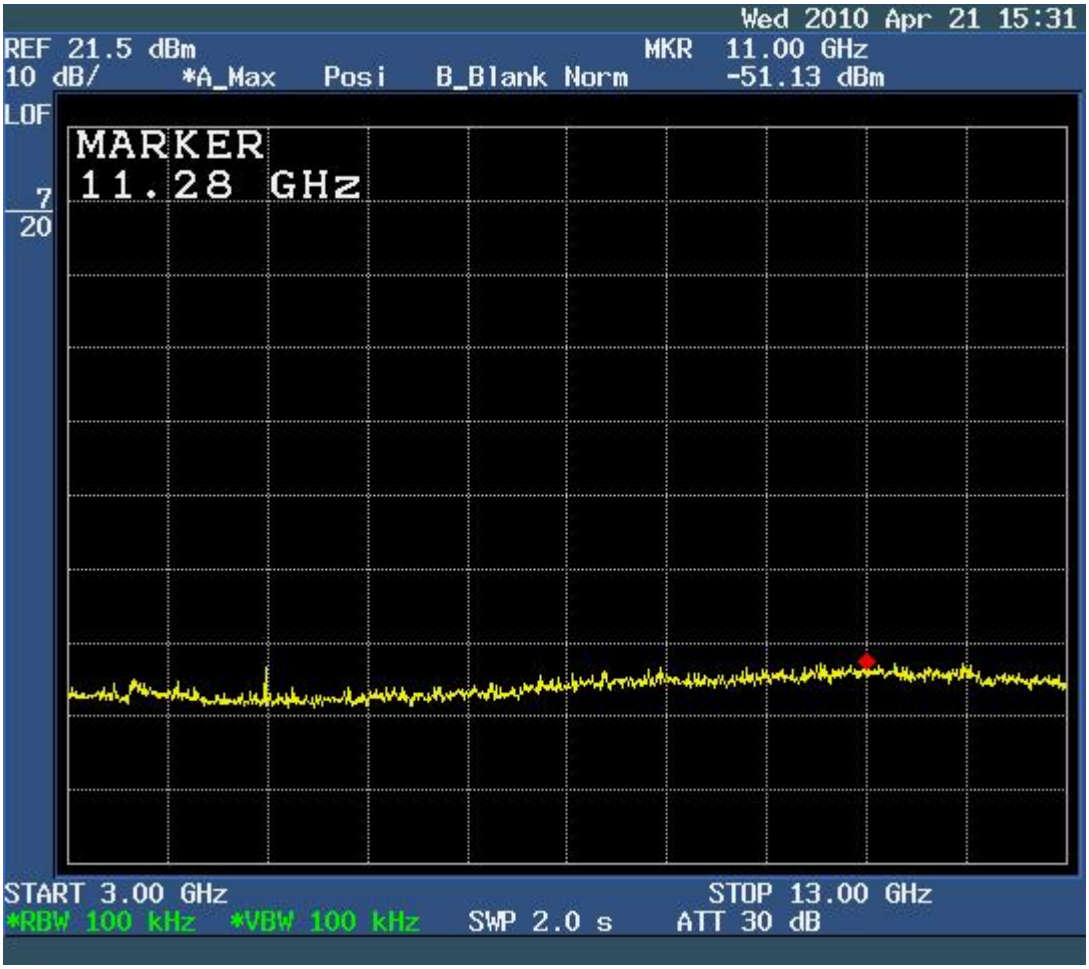

Figure 6c.7-8: Plot of spurious conducted emissions 3 GHz – 13 GHz (High Channel Enabled).

Figure 6c.7-9: Plot of spurious conducted emissions 13 GHz – 26.5 GHz (High Channel Enabled).

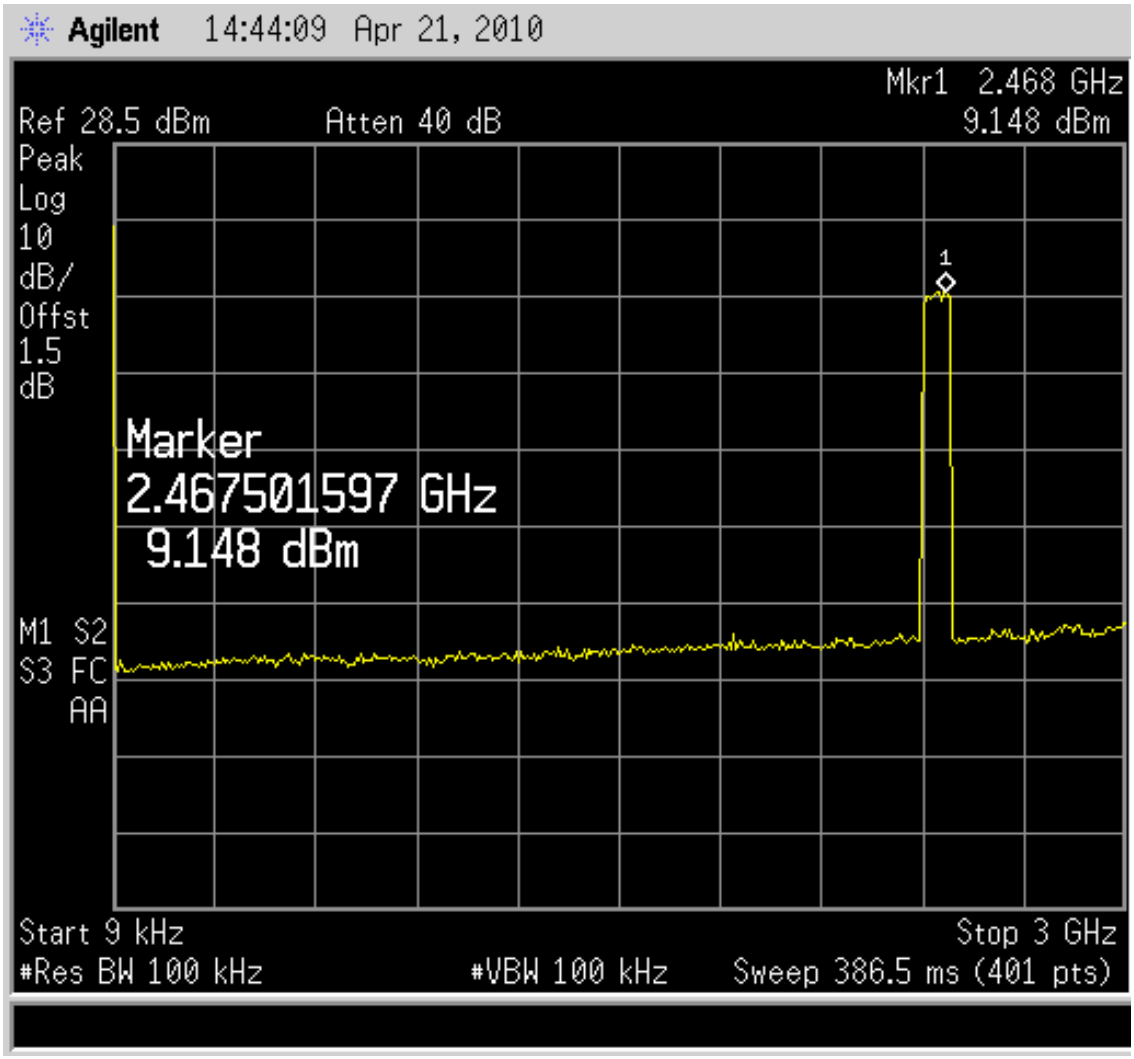

Figure 6c.7-10: Plot of spurious conducted emissions 9 kHz – 3.0 GHz (Hopping Enabled).

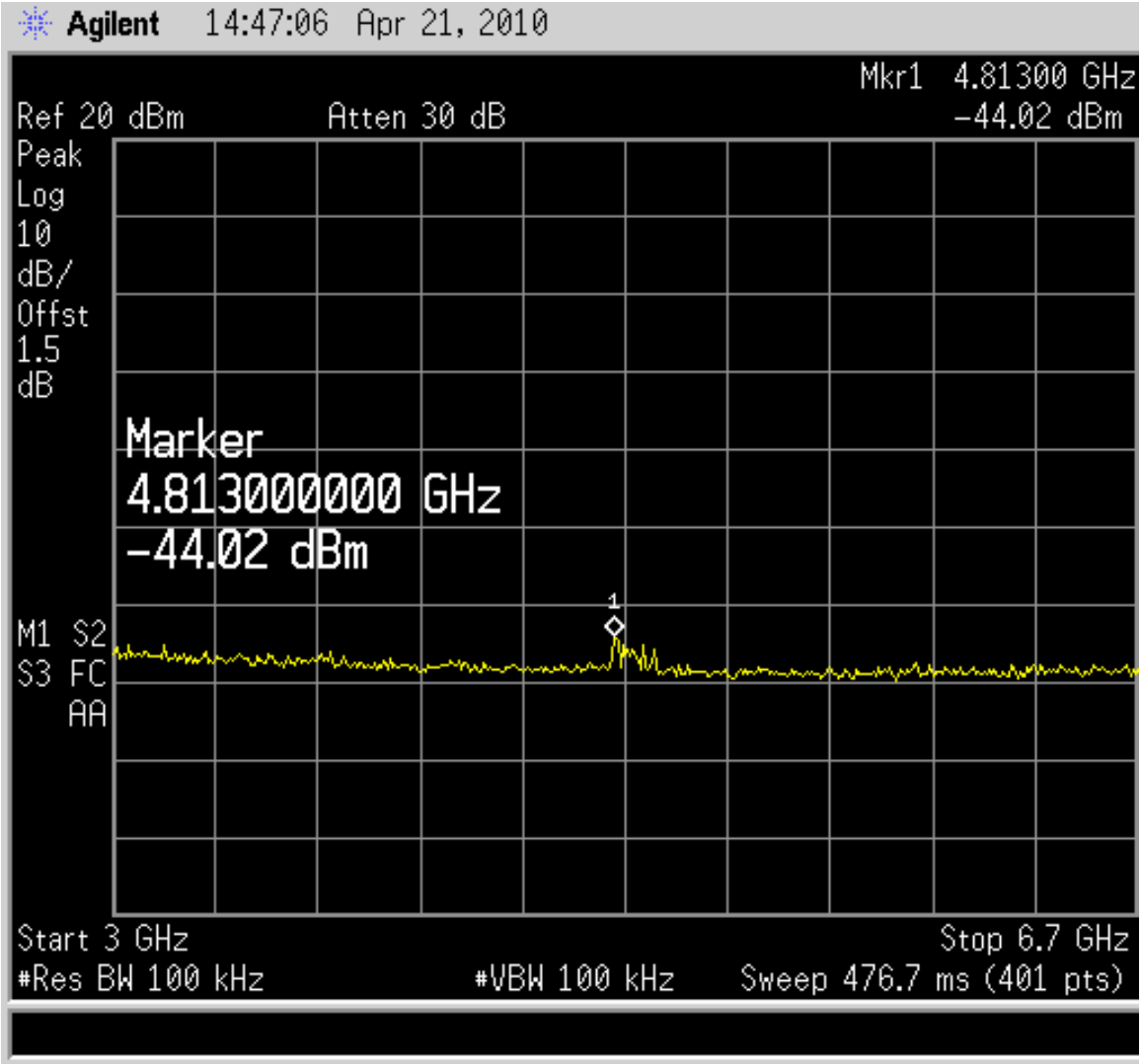

Figure 6c.7-11: Plot of spurious conducted emissions 3 GHz – 6.7 GHz (Hopping Enabled).

Figure 6c.7-12: Plot of spurious conducted emissions 6.5 GHz – 13 GHz (Hopping Enabled).

Figure 6c.7-13: Plot of spurious conducted emissions 13 GHz – 26.5 GHz (Hopping Enabled).