



*Mobile Devices business  
iDEN Mobile Devices Operations*

# RF Test Report

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

**Product Name: i440**  
**FCC ID: IHDT56MN1**  
**IC ID: 1090- T56MN1**

Date: March 15, 2011

# Table of Contents

Test Report Details	6d0-1
Bluetooth Transmitter Characteristics	6dc-1
Radiated and Conducted Spurious	ACS Test Report

## Test Report Details

Tests Performed by: Advanced Compliance Solutions  
Laboratory details in report  
FCC Registration Number: **581606**  
Industry Canada Number: **4175C**

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Product Type: Cellular Phone  
Signaling Capabilities: Bluetooth Transceiver (2.4 GHz ISM)  
FCC ID: IHDT56MN1  
IC ID: 1090- T56MN1

## 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, and ANSI C63.4-2009.

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

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

#### 6d.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 786 kHz.

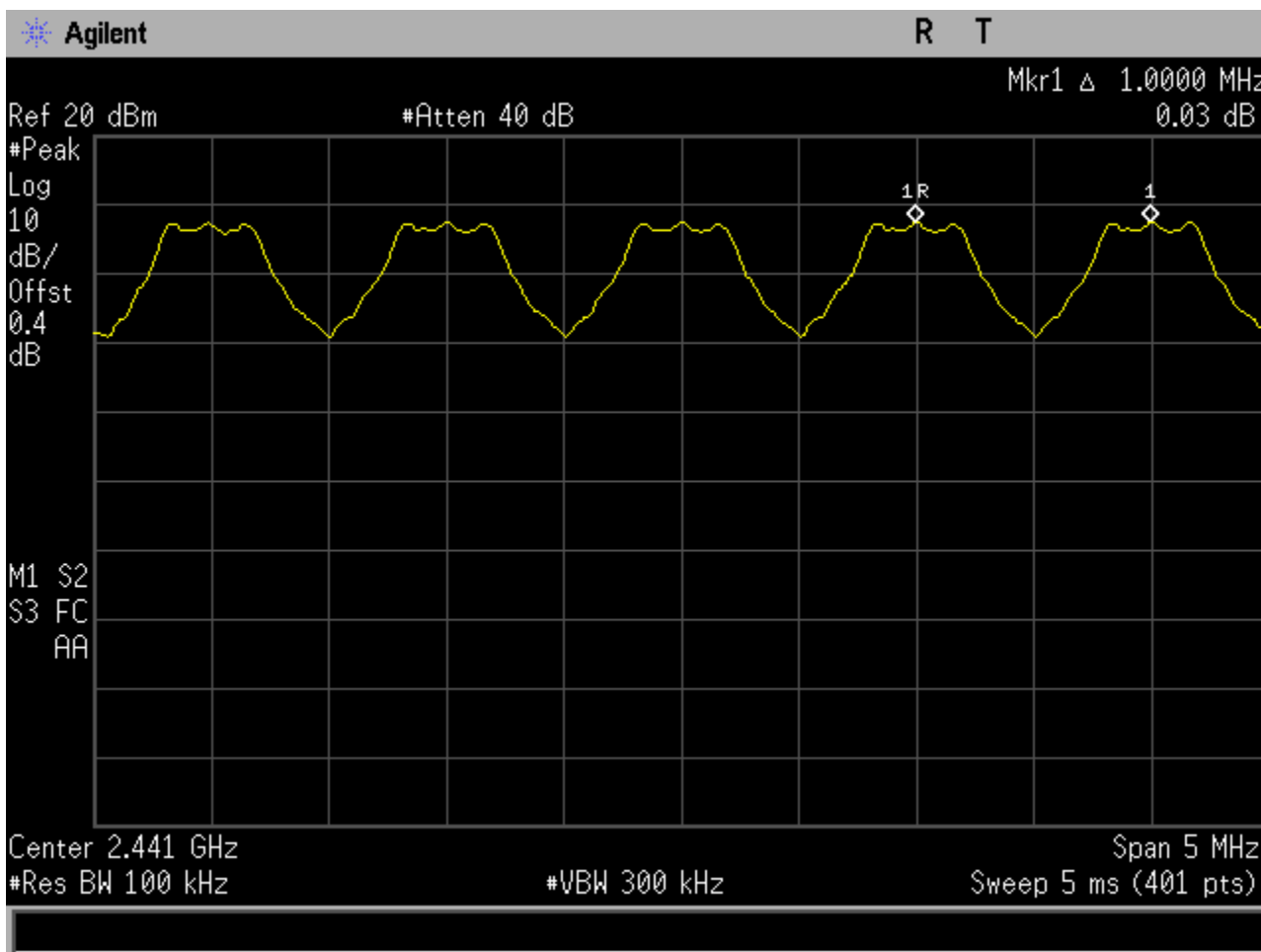
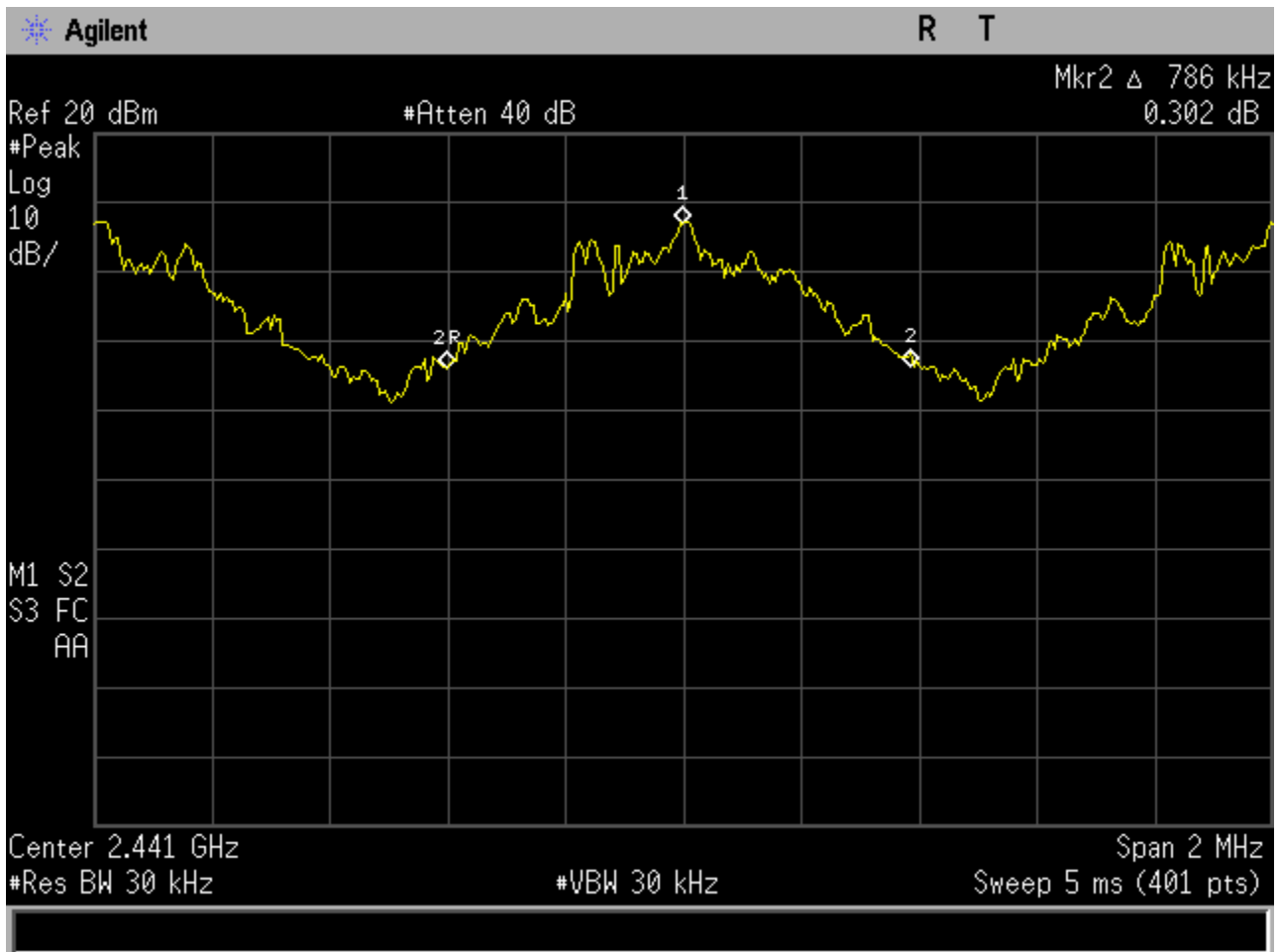


Figure 6d.1-1: Plot of Bluetooth carrier frequency separation

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

The 20 dB bandwidth of the emission is 786 kHz (for GFSK) and 1.14 MHz (for DPSK).



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

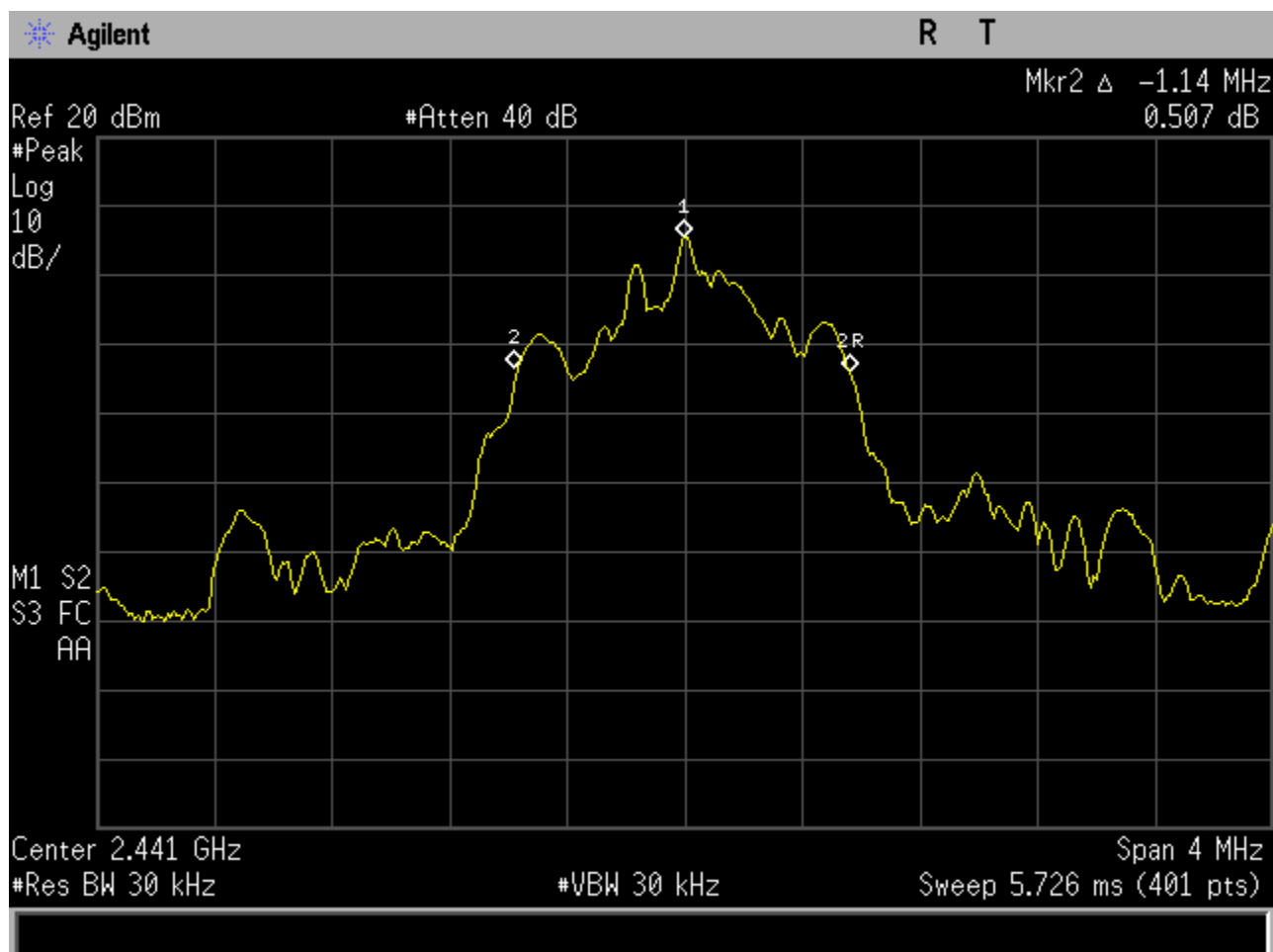


Figure 6d.2-2: Plot of 20 dB bandwidth (P/4 DPSK Modulation)

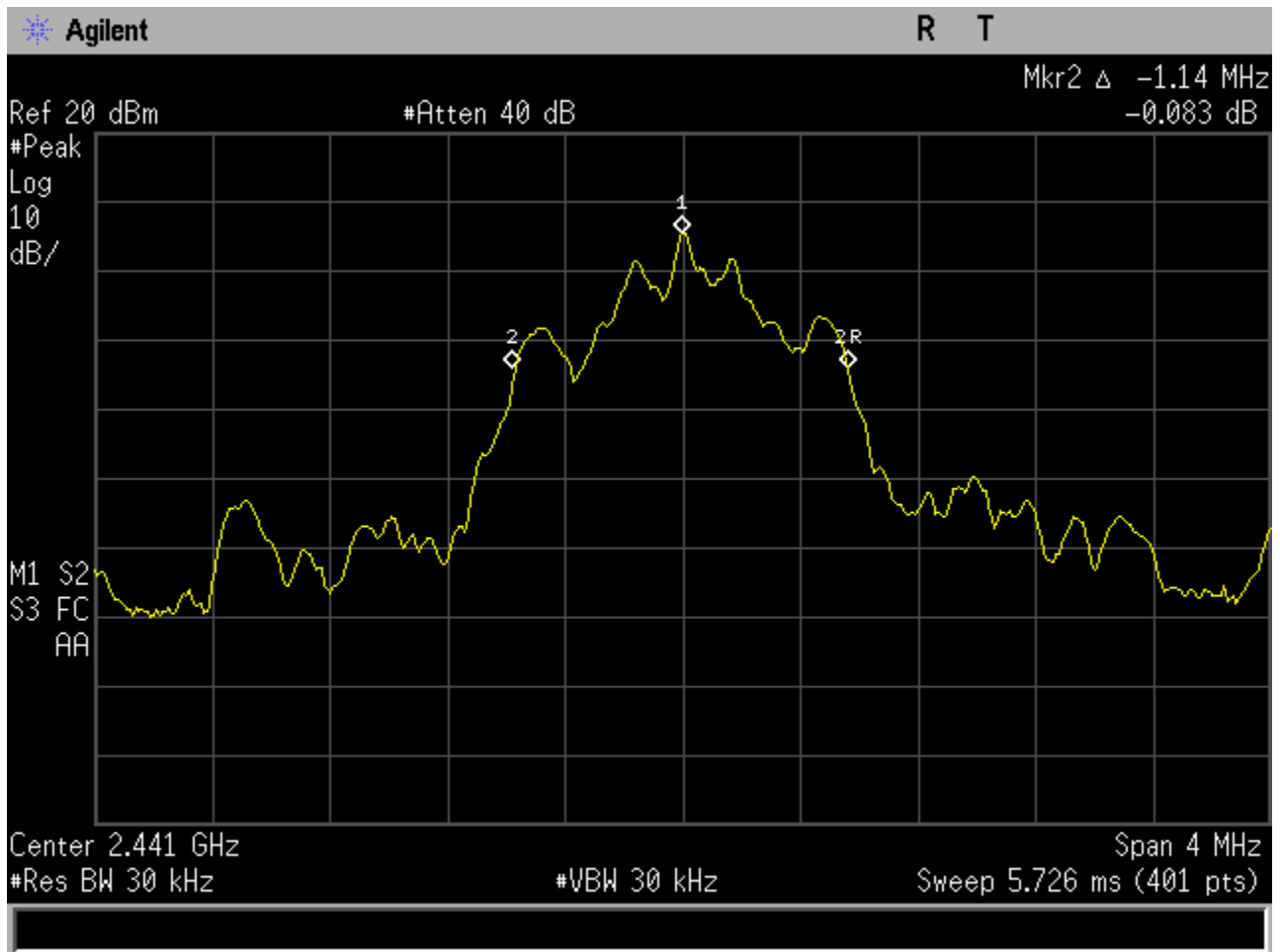
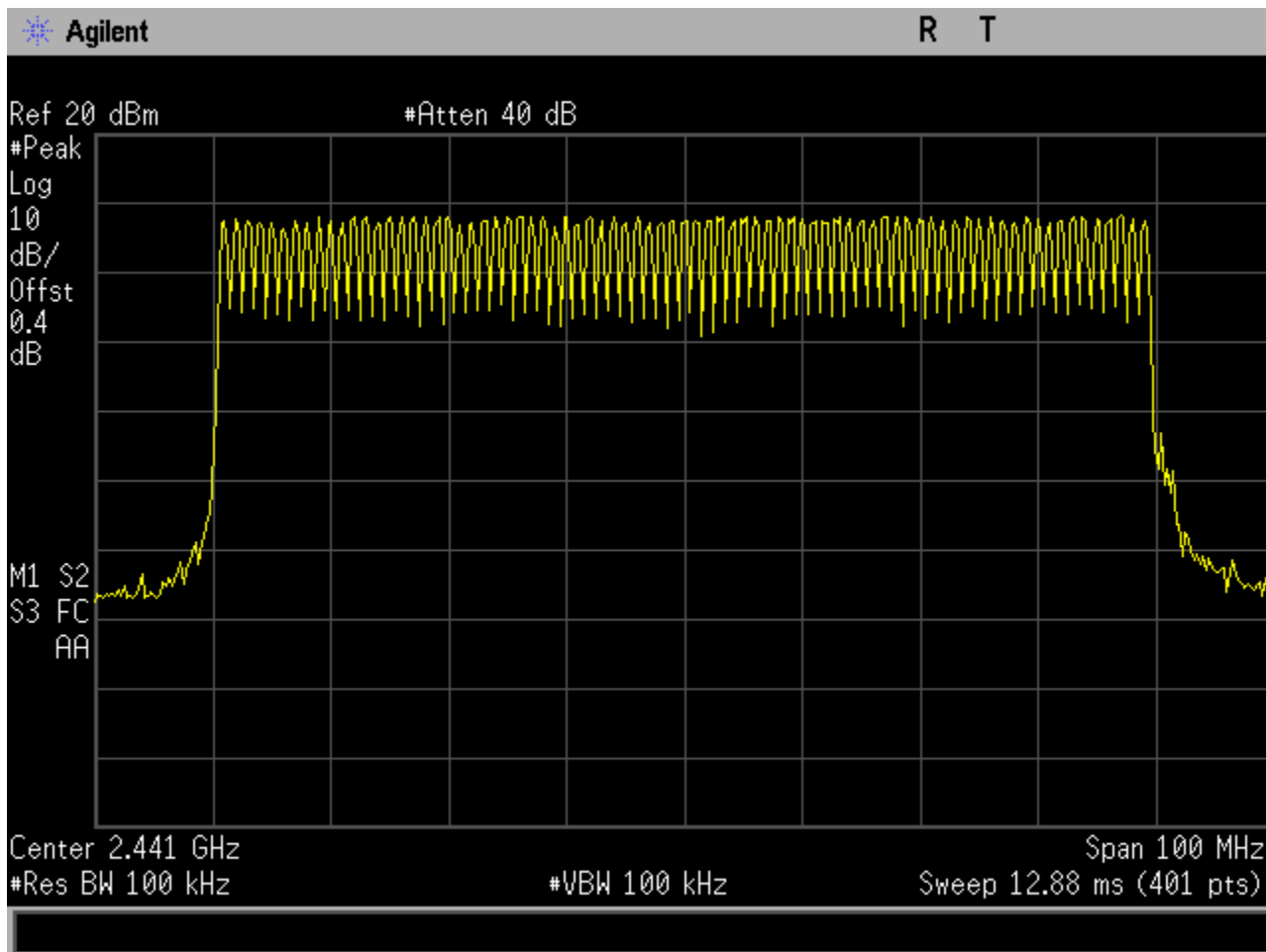


Figure 6d.2-3: Plot of 20 dB bandwidth (8-DPSK Modulation)

**6d.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.

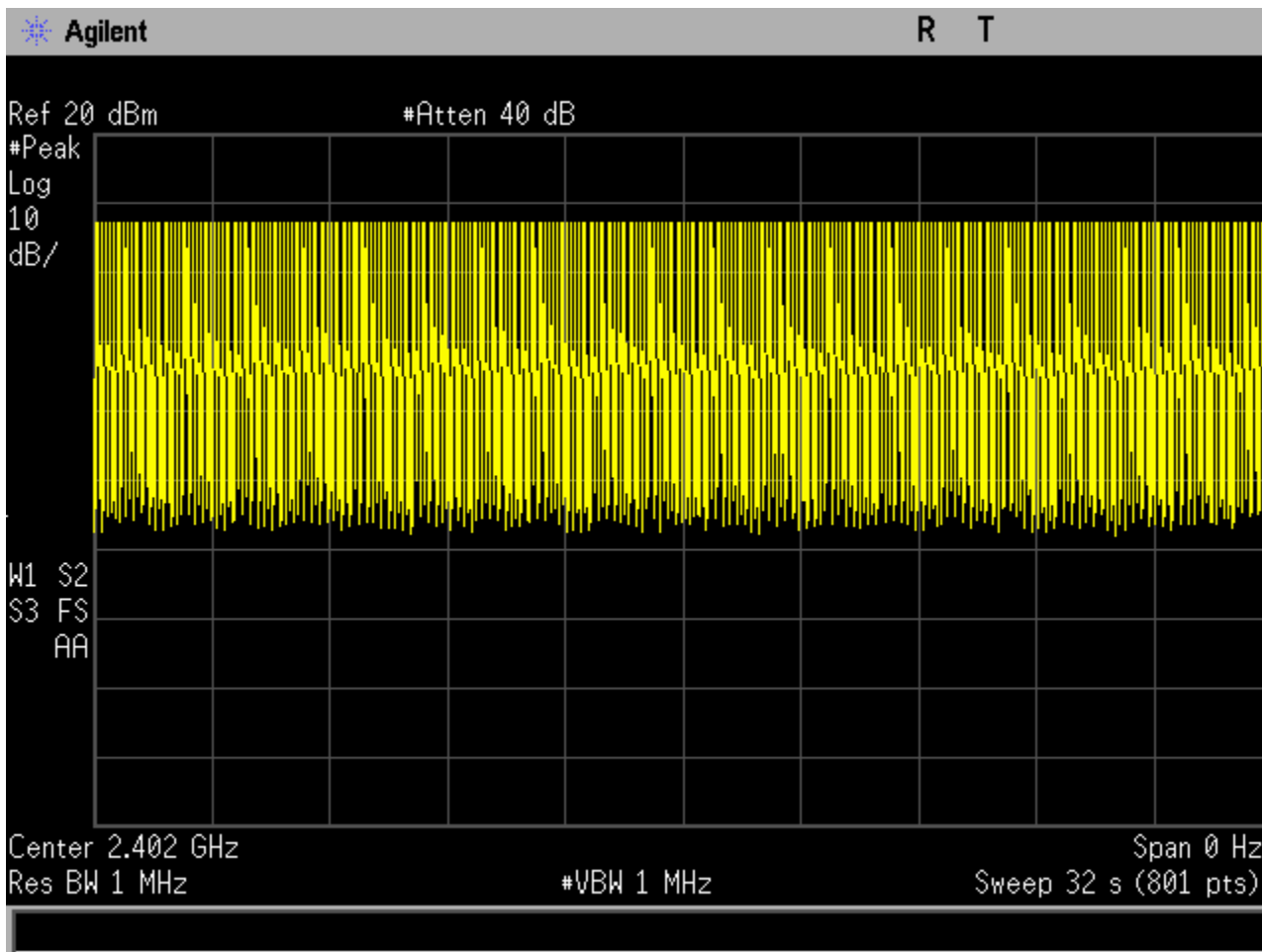


**Figure 6d.3-1: Plot of number of Bluetooth hopping frequencies**

**6d.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.

The measurement shows the total dwell time in a 31.6 second period to be 131.2 ms.



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

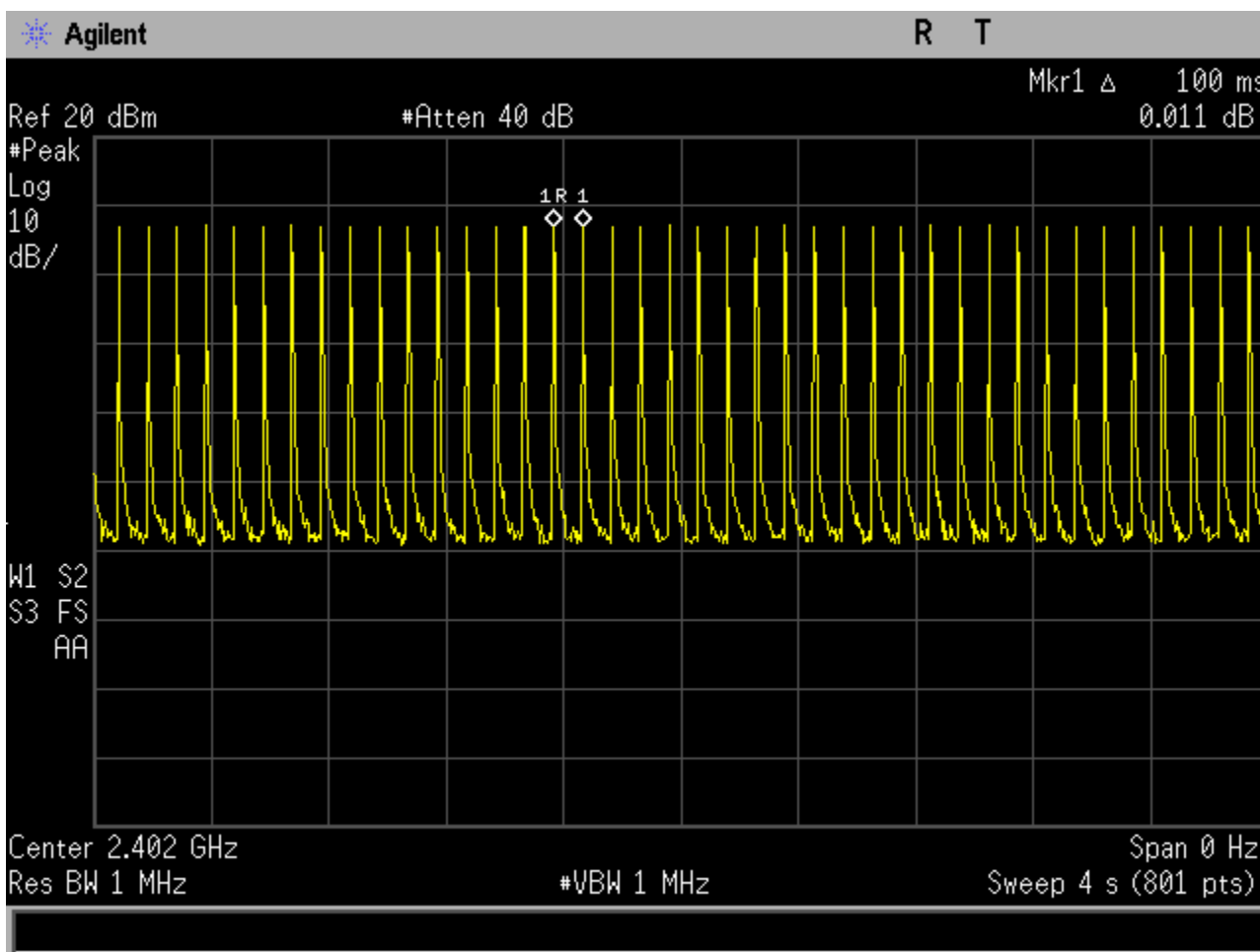


Figure 6d.4-2: Plot of dwell time over 4 second period.

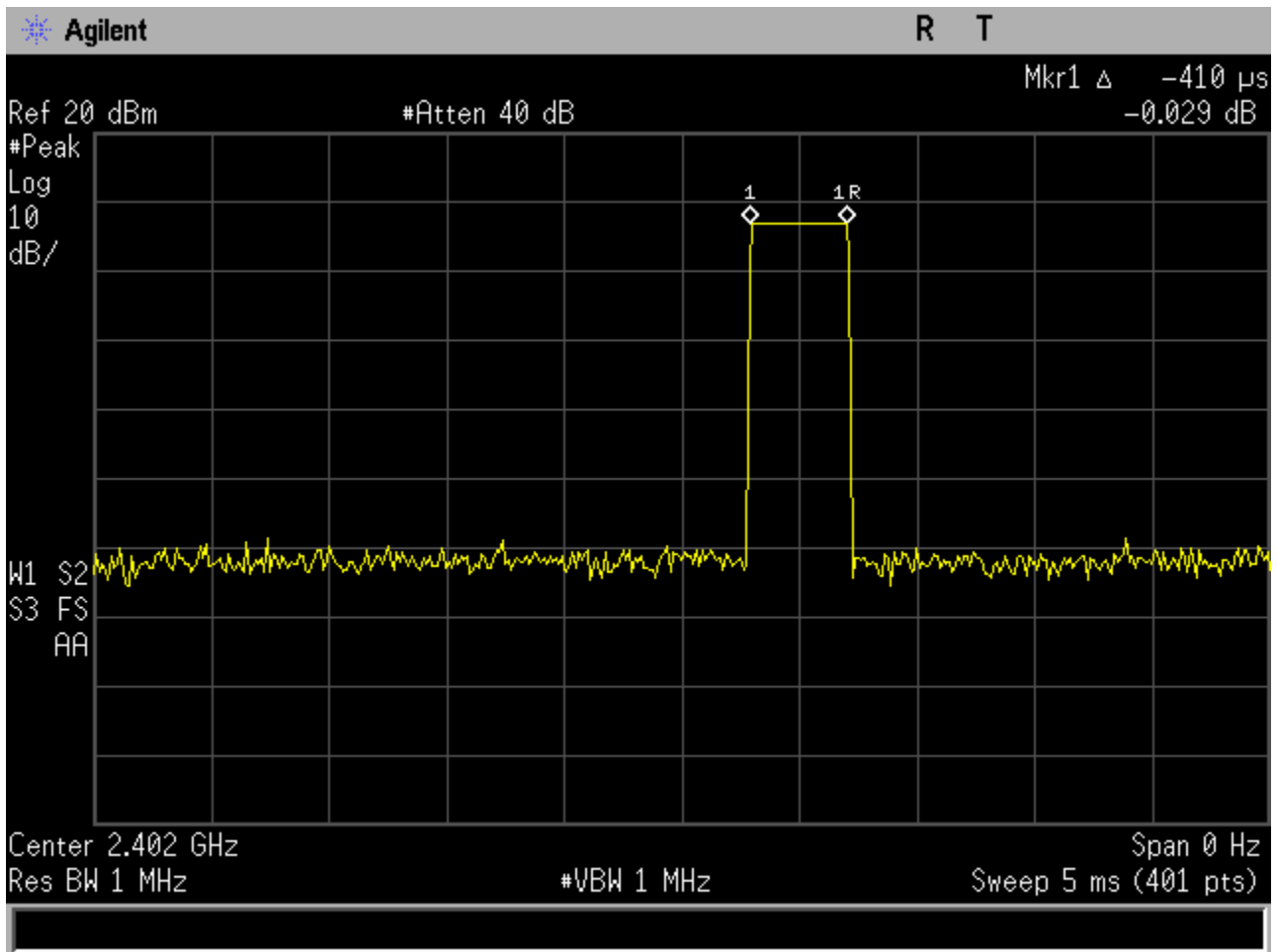
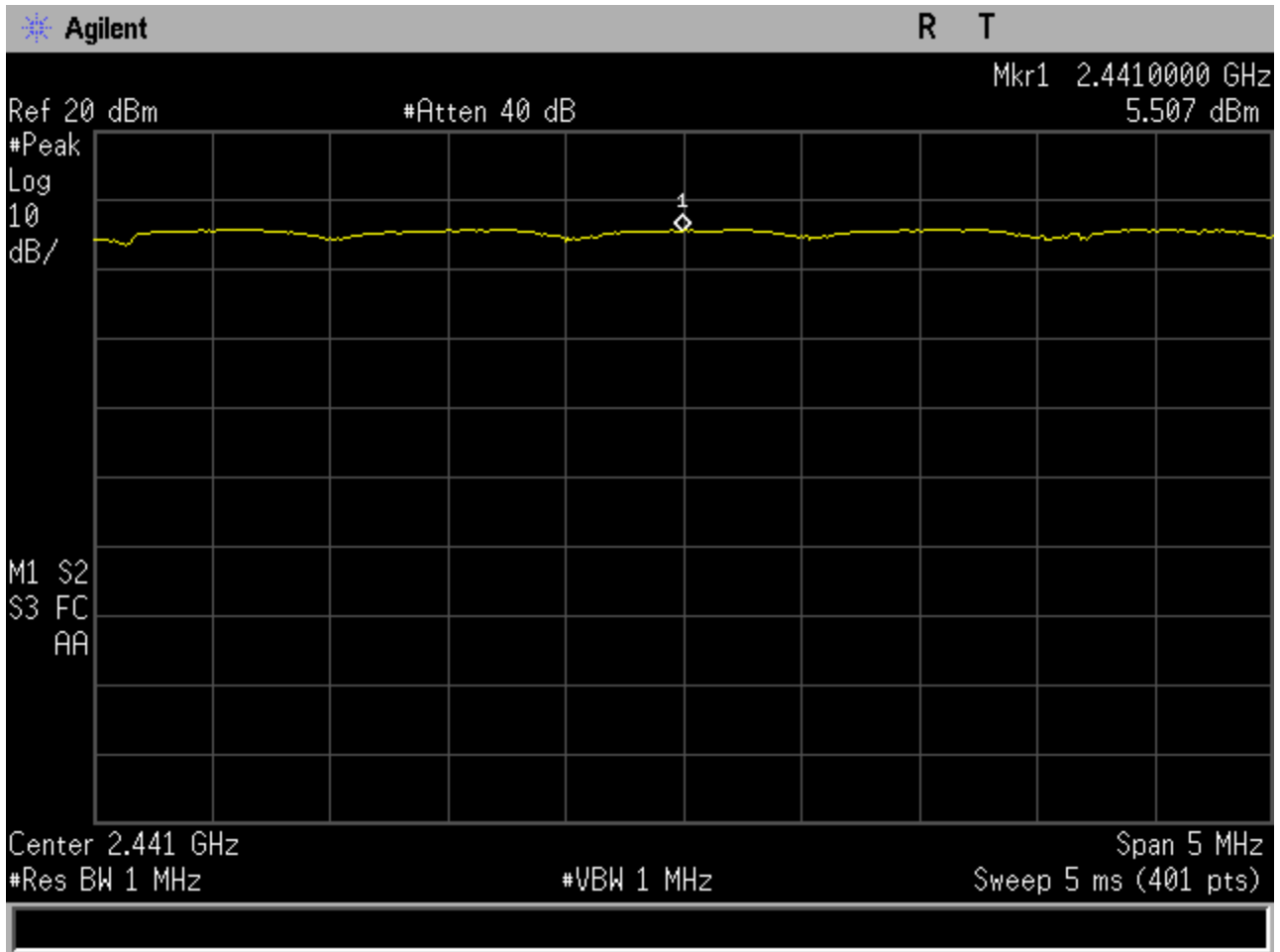


Figure 6d.4-3: Plot of dwell time over 5 ms period.

**6d.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 5.51 dBm, which is equivalent to 3.6 mW.



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

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

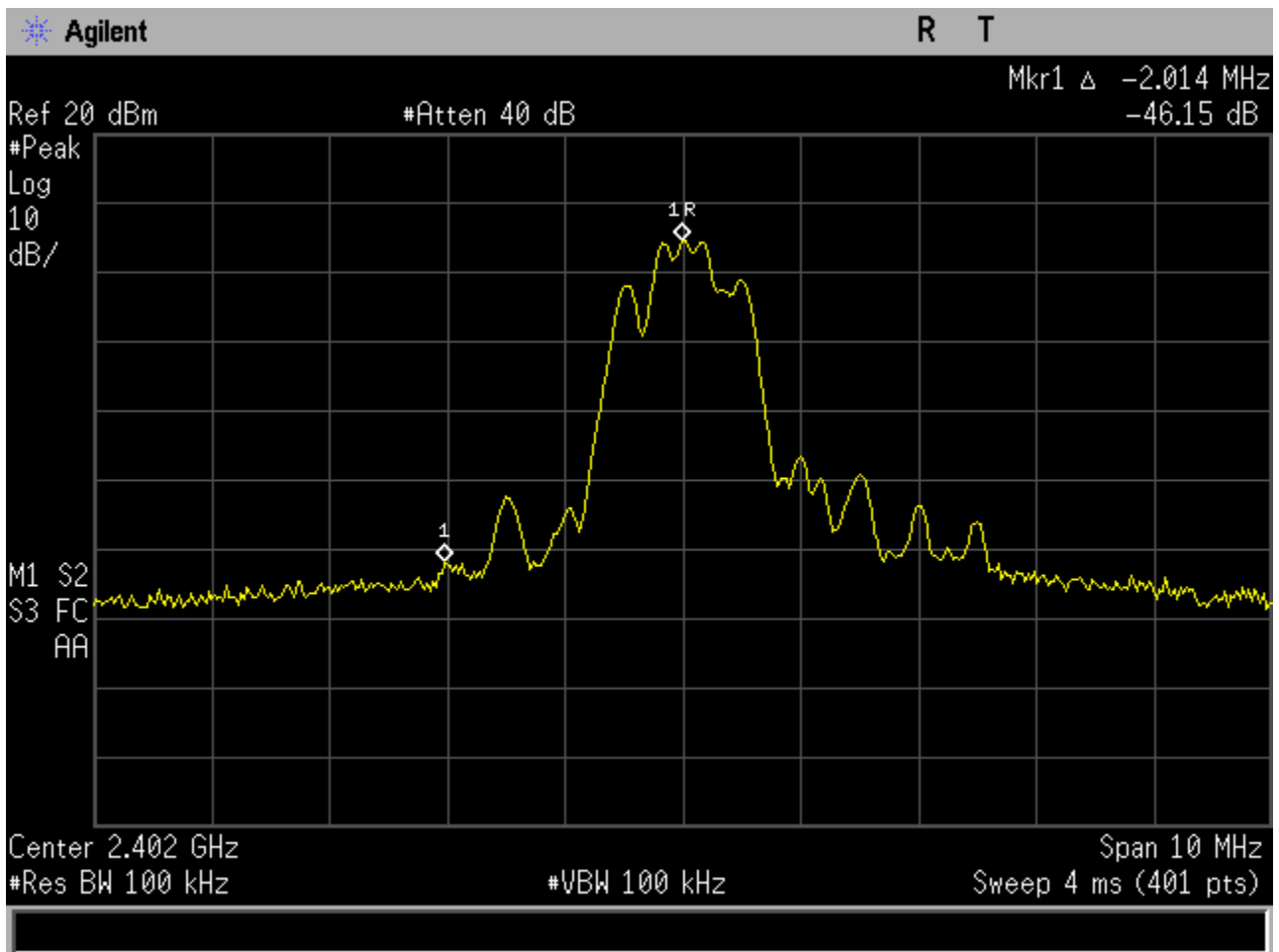
Criterion: The conducted output power limit of 1-watt is based on the use of antennas with directional gains that do not exceed 6 dB<sub>i</sub>. If transmitting antennas of directional gain greater than 6 dB<sub>i</sub> are used, the conducted output power from the intentional radiator shall be reduced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

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

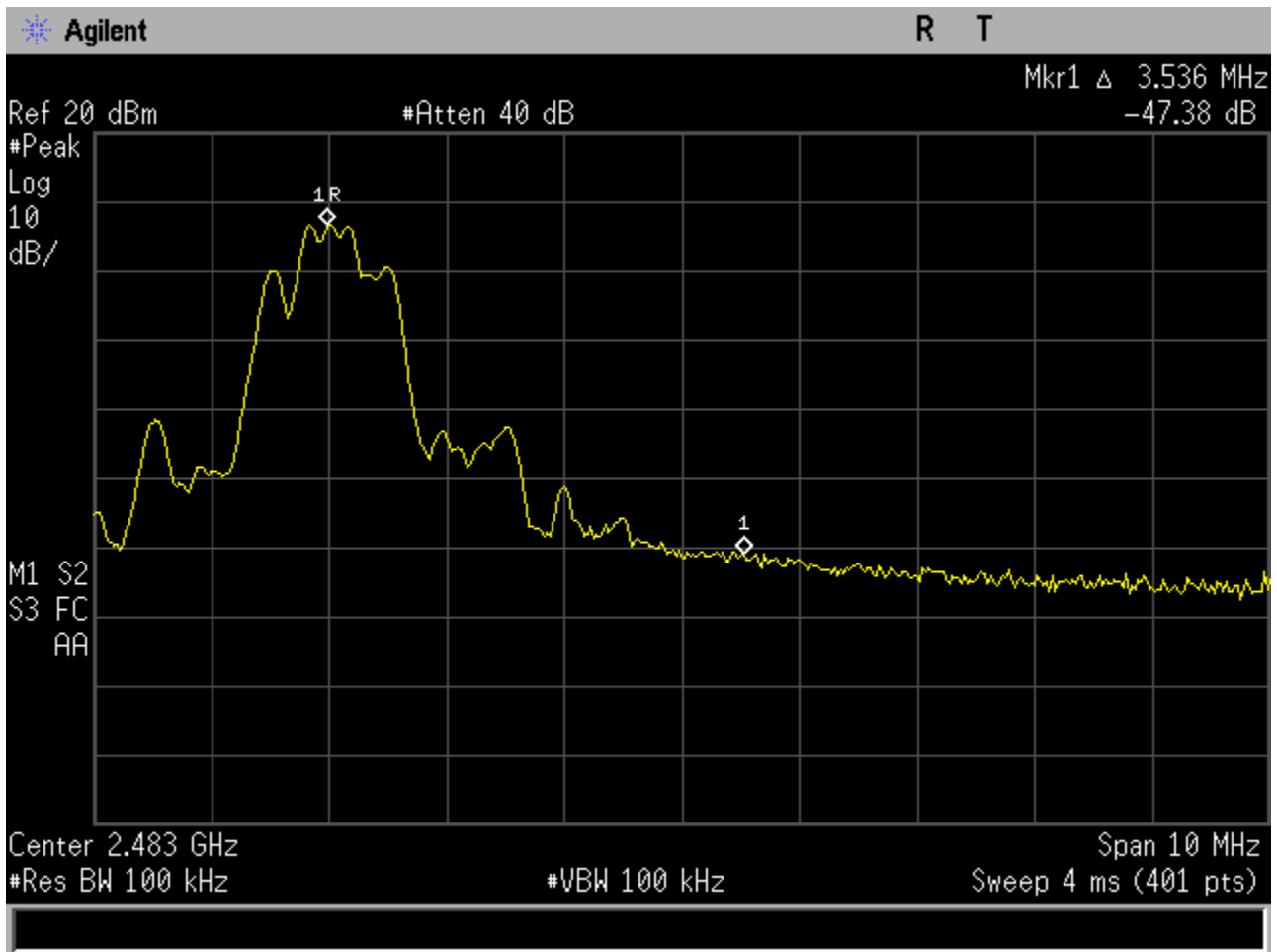
**6d.7. Band-Edge Compliance of RF Conducted Emissions – Pursuant 47 CFR 15.247(d); RSS-210 Section A8.1.**

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.

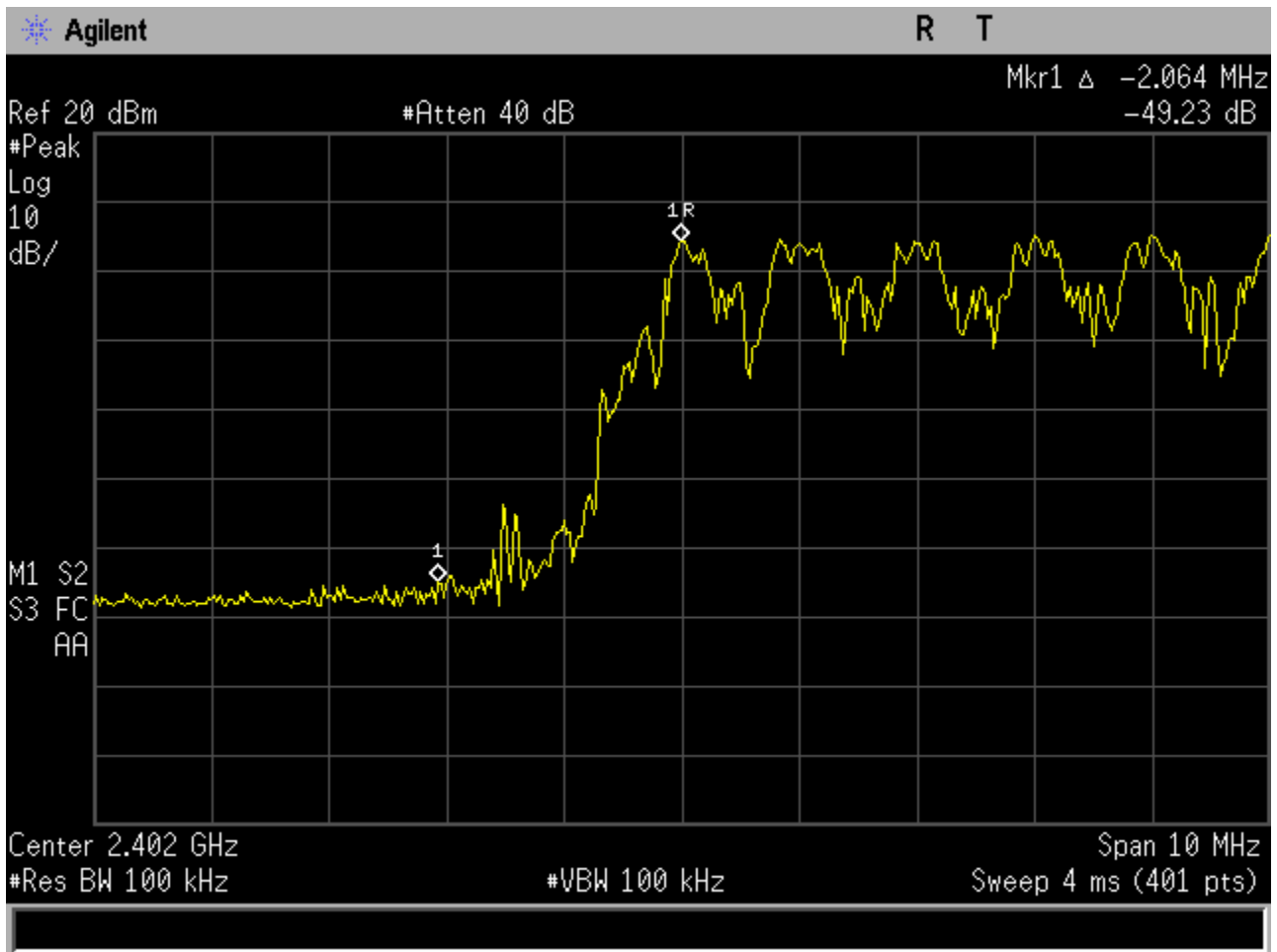
The measurement shows -46.15 dB at the lower band edge and -47.39 dB at the upper band edge with the hopping function disabled. The measurement shows -49.23 dB at the lower band edge and -48.4 dB at the upper band edge with the hopping function enabled.



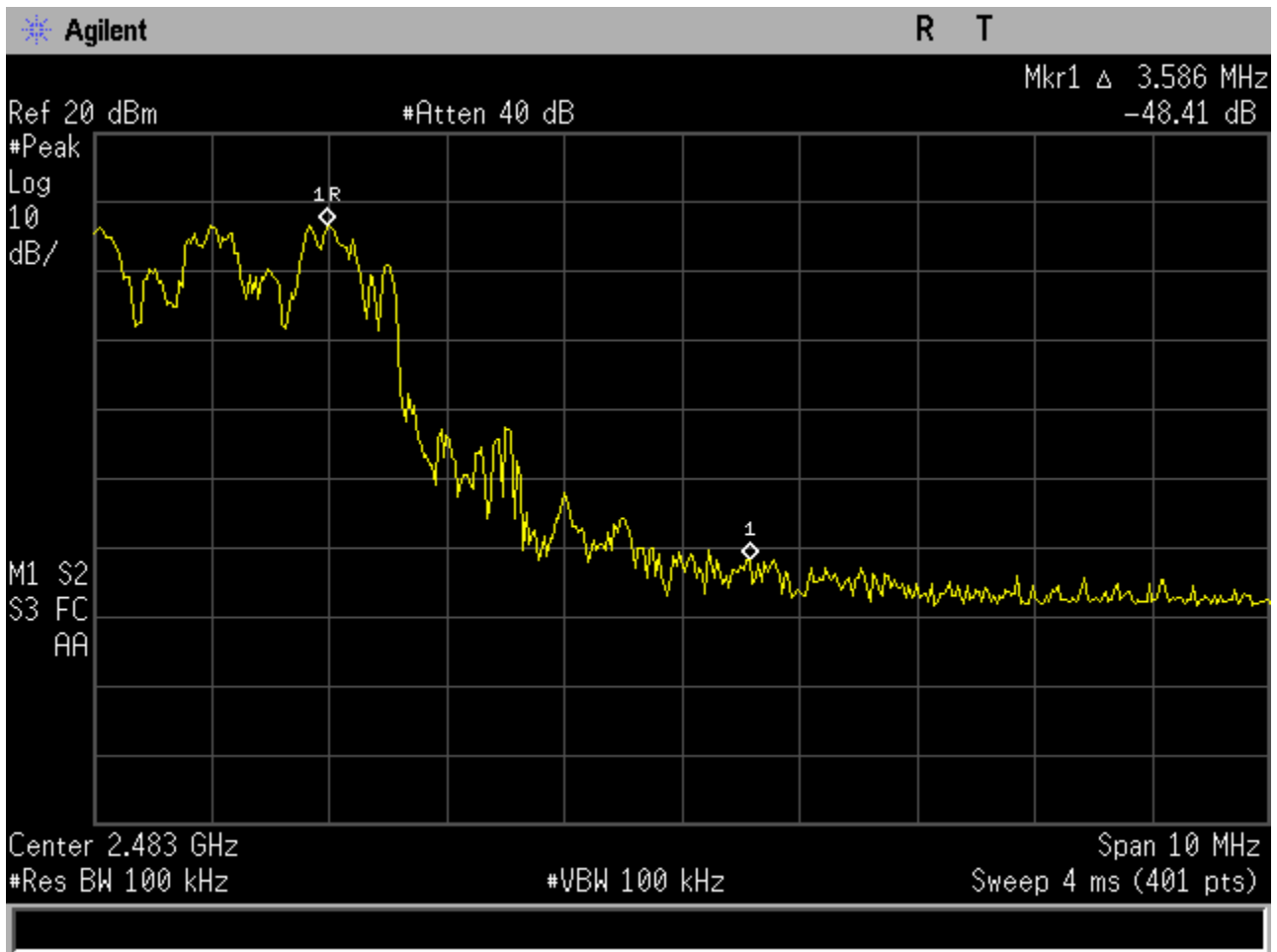
**Figure 6d.6-1: Plot of lower band-edge conducted emissions with hopping disabled (GFSK Modulation).**



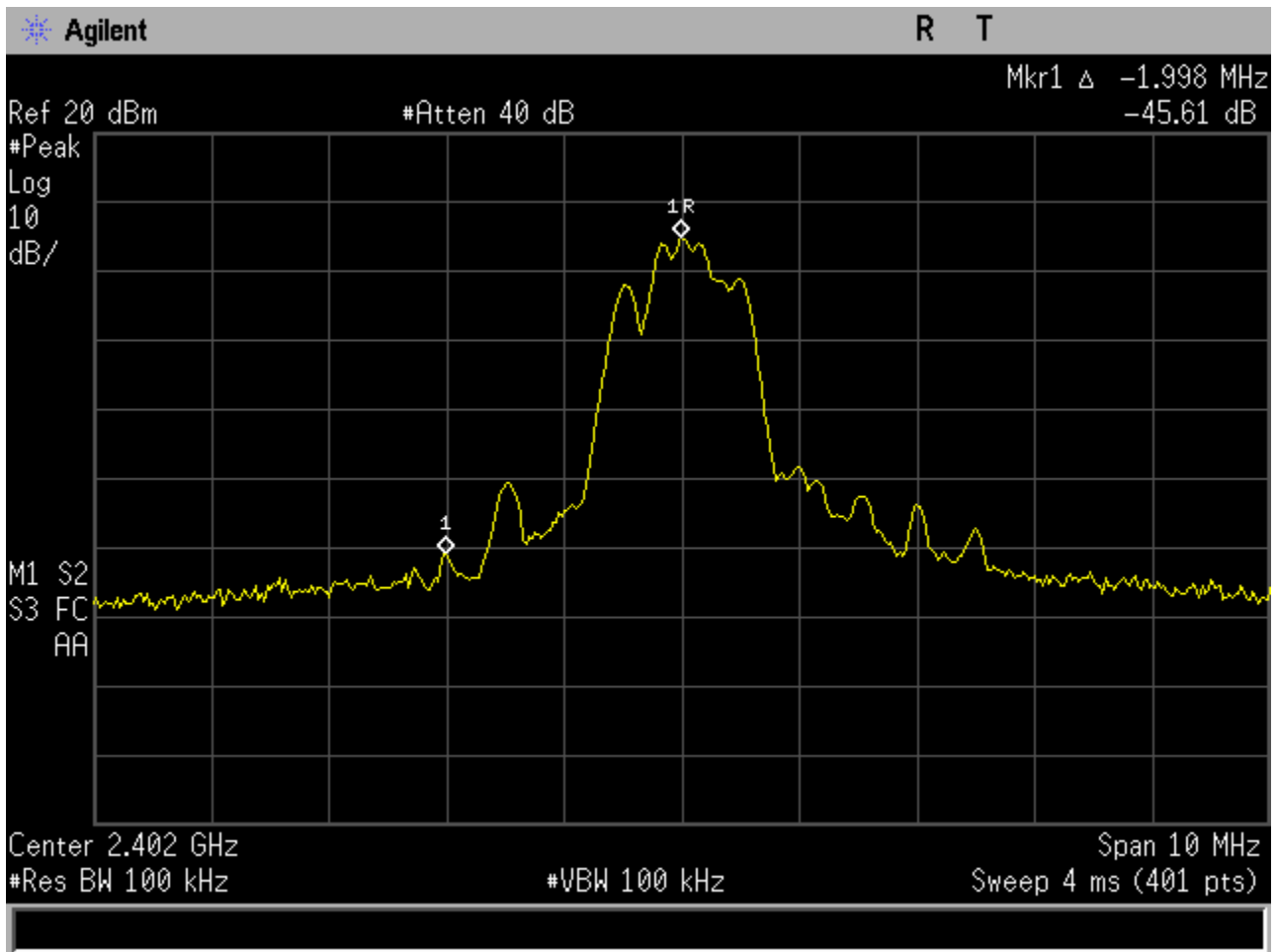
**Figure 6d.6-2: Plot of upper band-edge conducted emissions with hopping disabled (GFSK Modulation).**



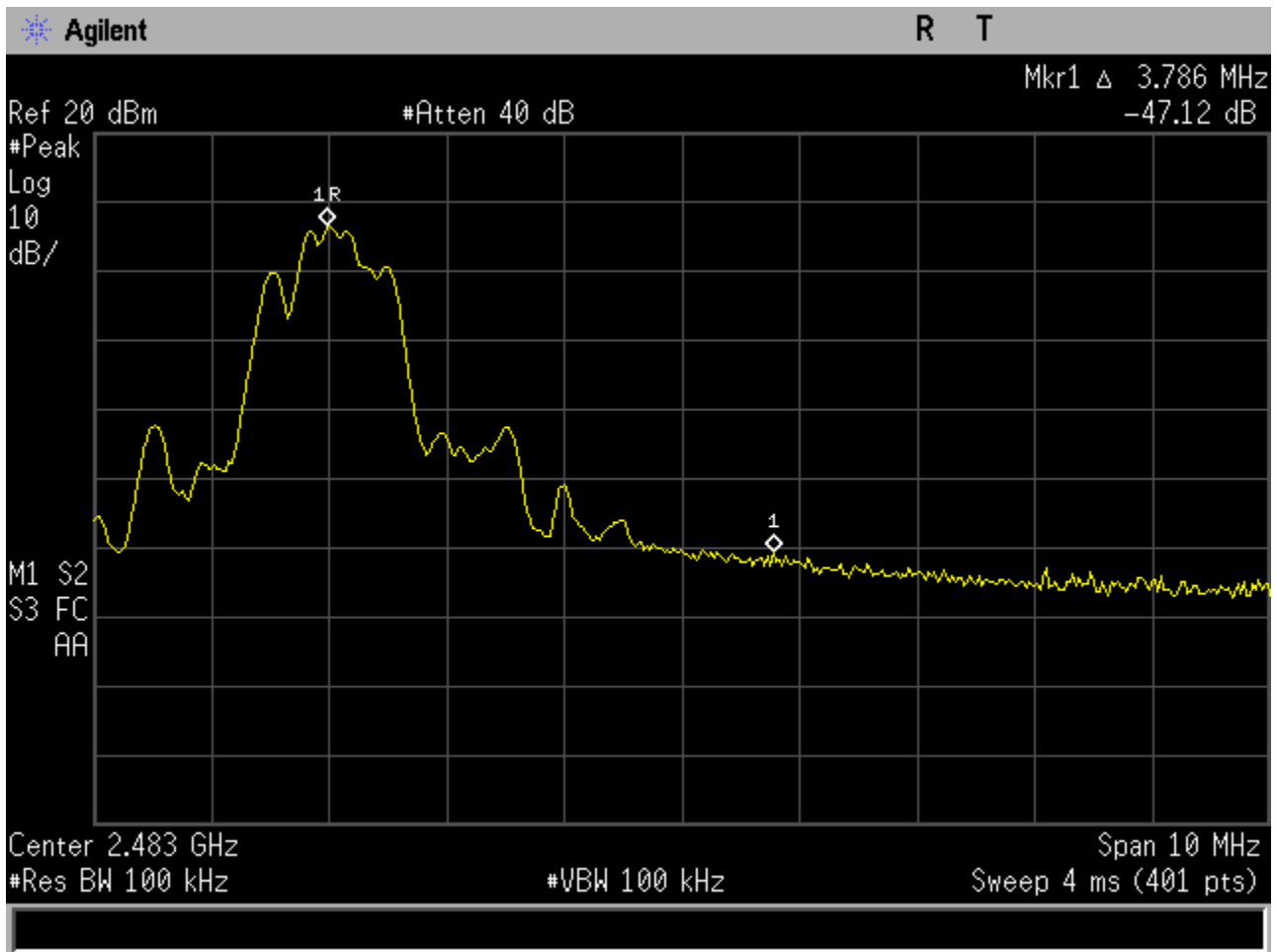
**Figure 6d.6-3: Plot of lower band-edge conducted emissions with hopping enabled (GFSK Modulation).**



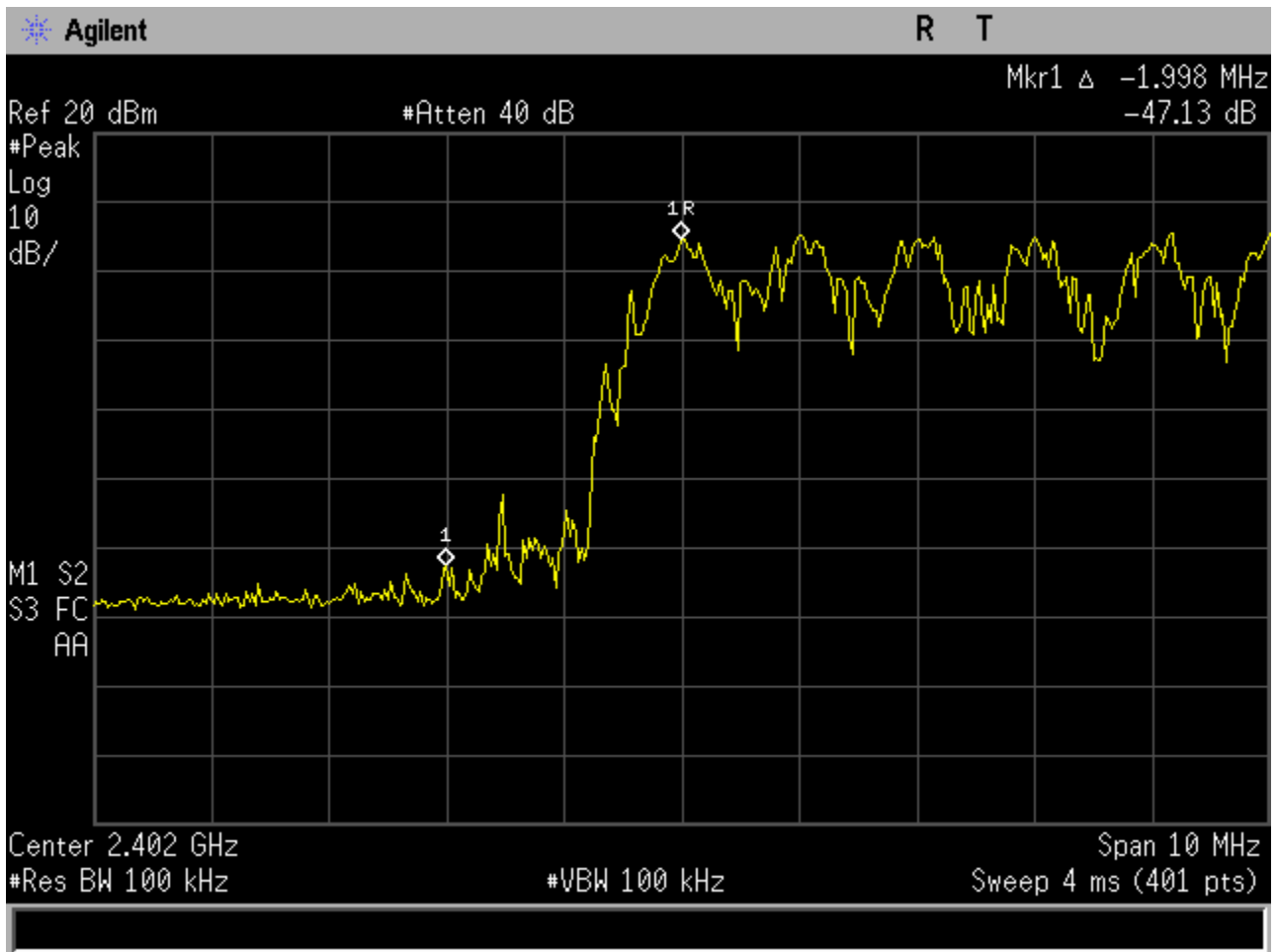
**Figure 6d.6-4: Plot of upper band-edge conducted emissions with hopping enabled (GFSK Modulation).**



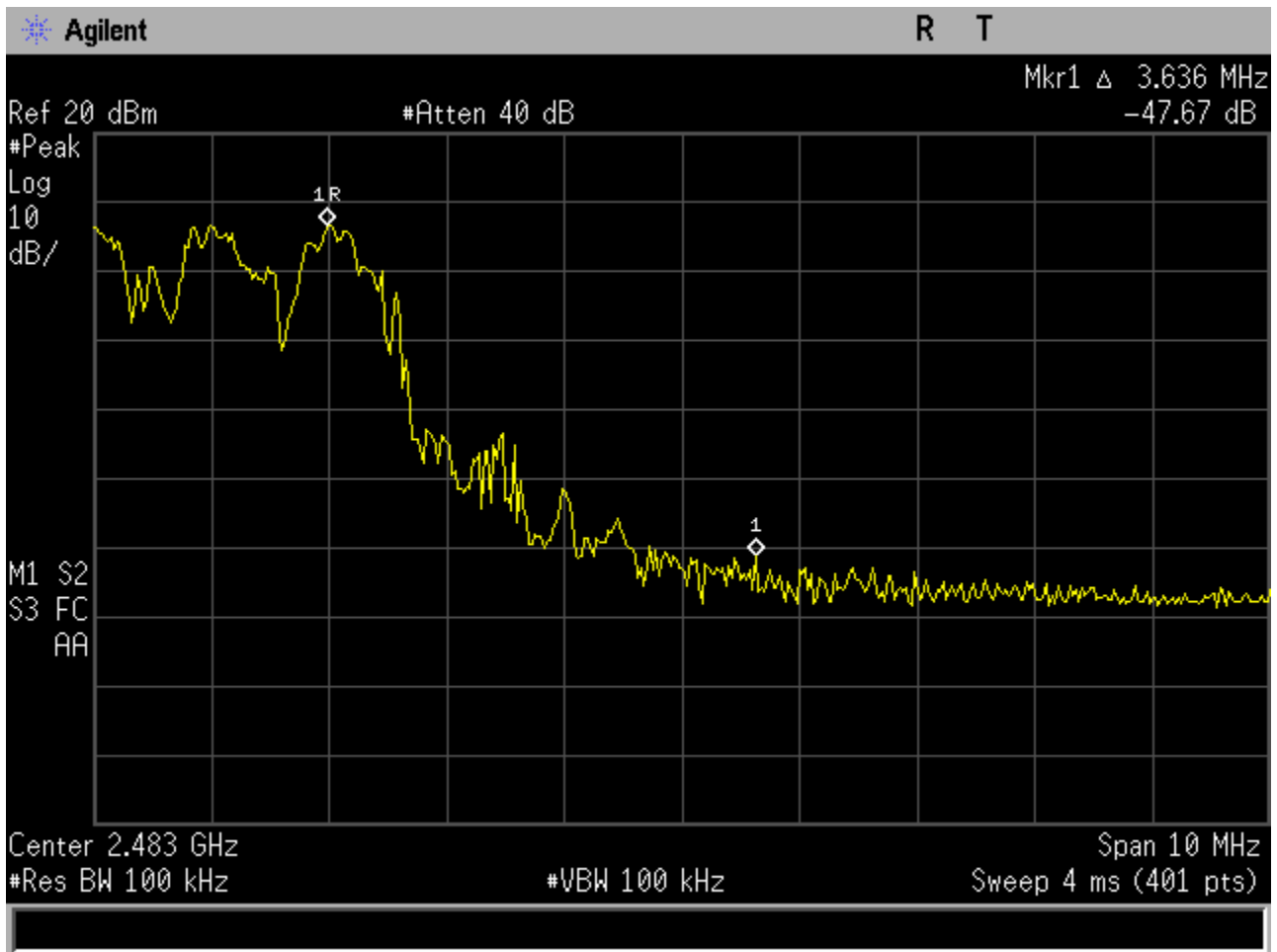
**Figure 6d.6-5: Plot of lower band-edge conducted emissions with hopping disabled (P/4 DPSK Modulation).**



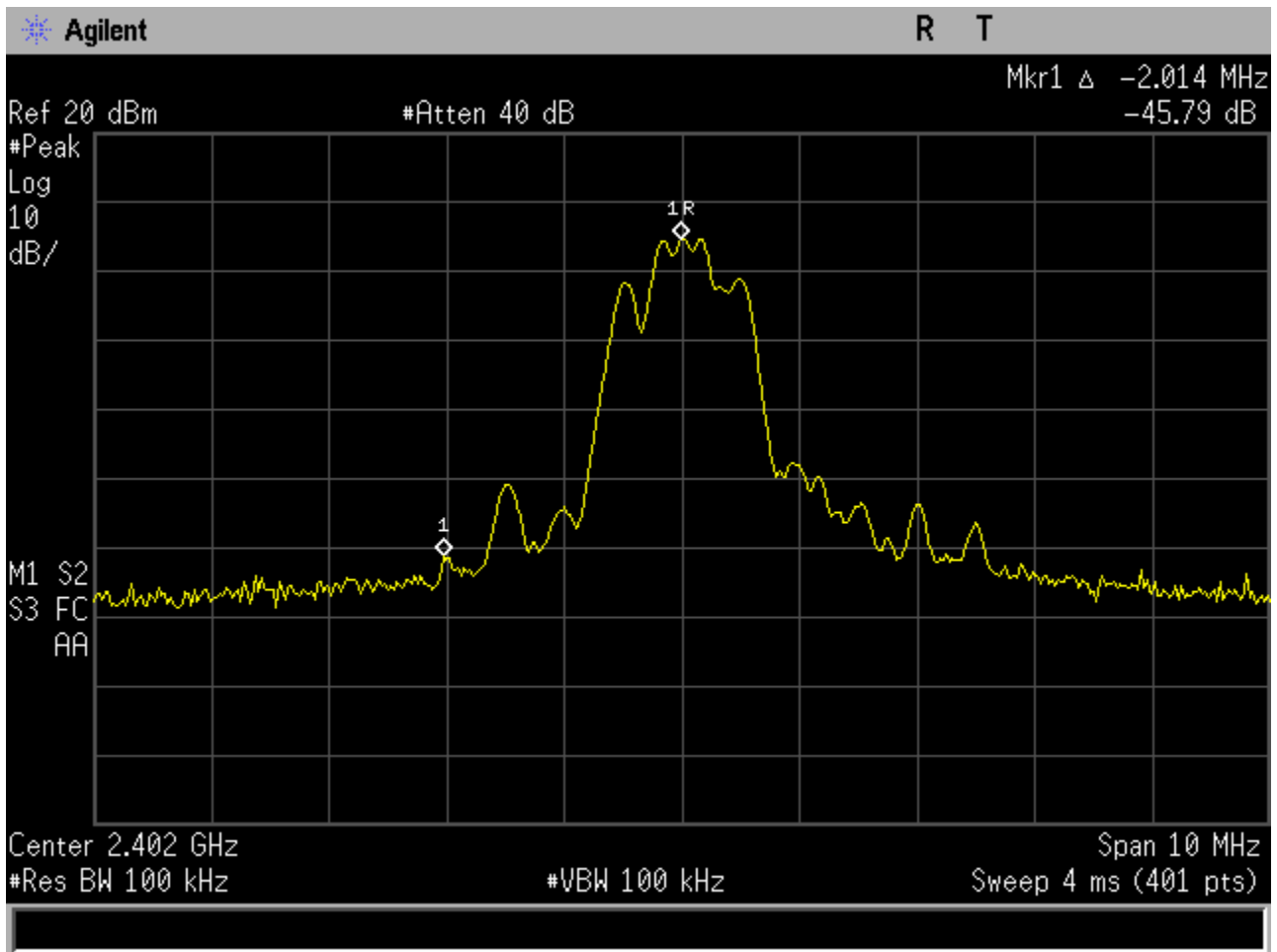
**Figure 6d.6-6: Plot of upper band-edge conducted emissions with hopping disabled (P/4 DPSK Modulation).**



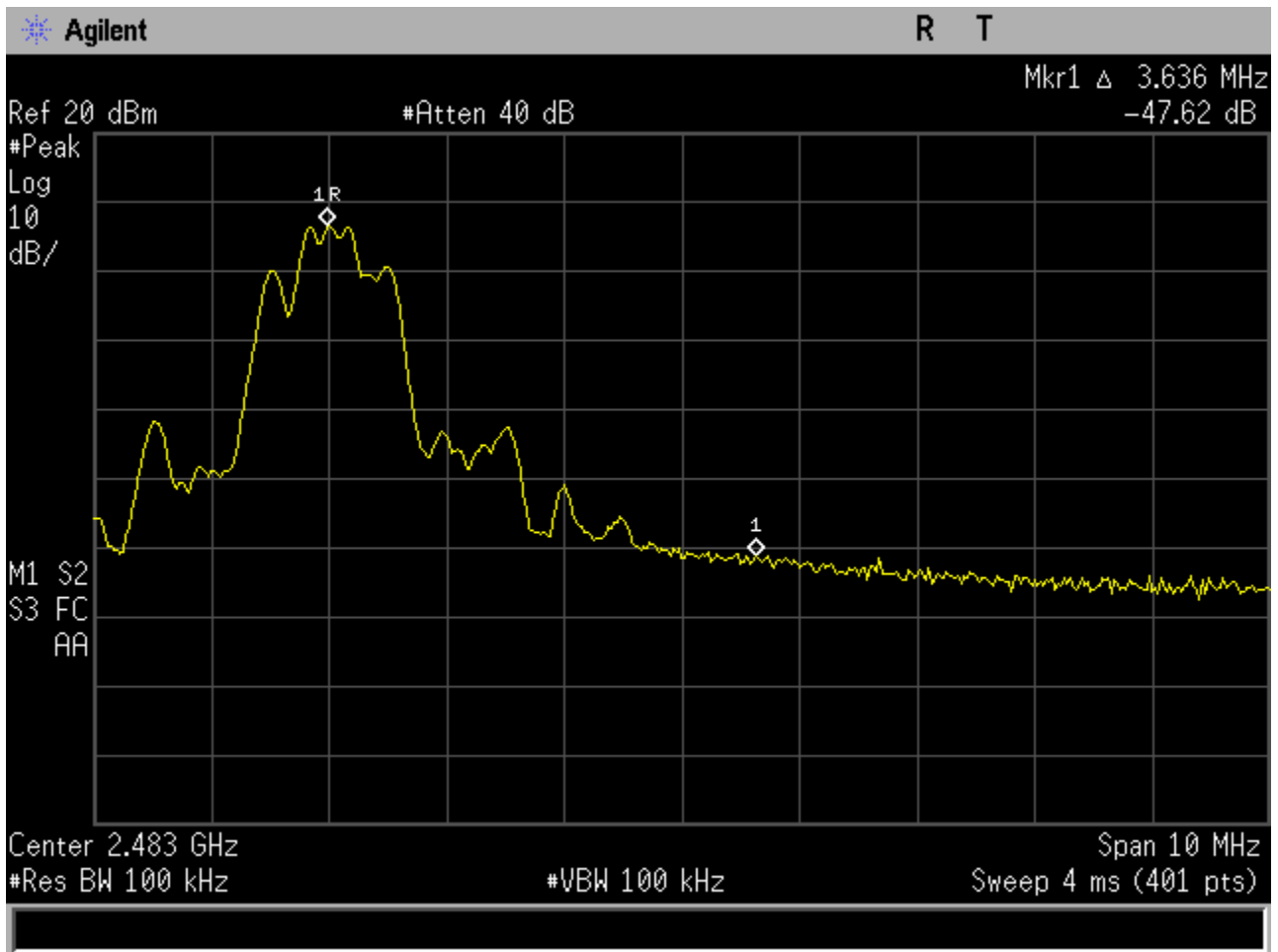
**Figure 6d.6-7: Plot of lower band-edge conducted emissions with hopping enabled (P/4 DPSK Modulation).**



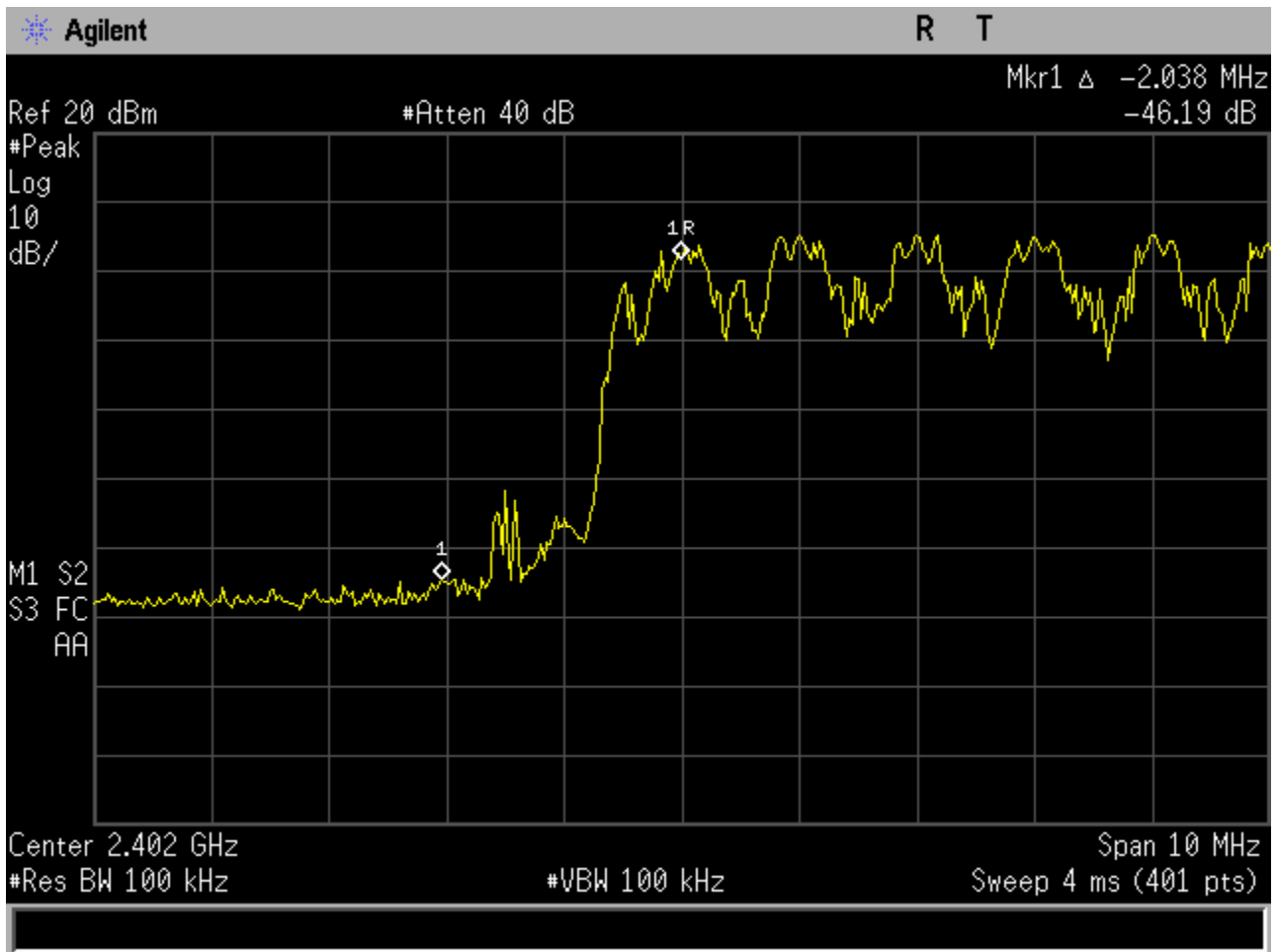
**Figure 6d.6-8: Plot of upper band-edge conducted emissions with hopping enabled (P/4 DPSK Modulation).**



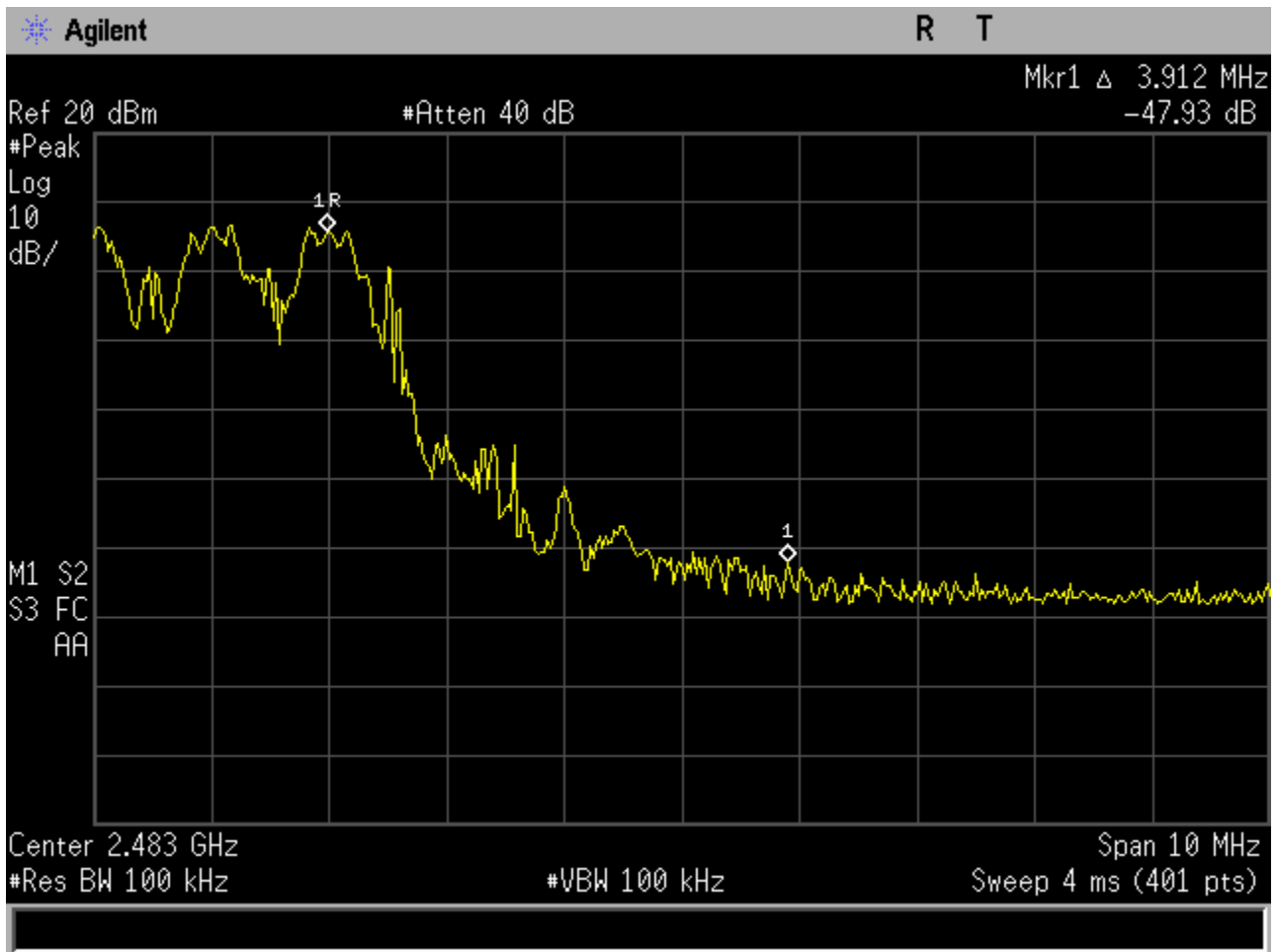
**Figure 6d.6-9: Plot of lower band-edge conducted emissions with hopping disabled (8 DPSK Modulation).**



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



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

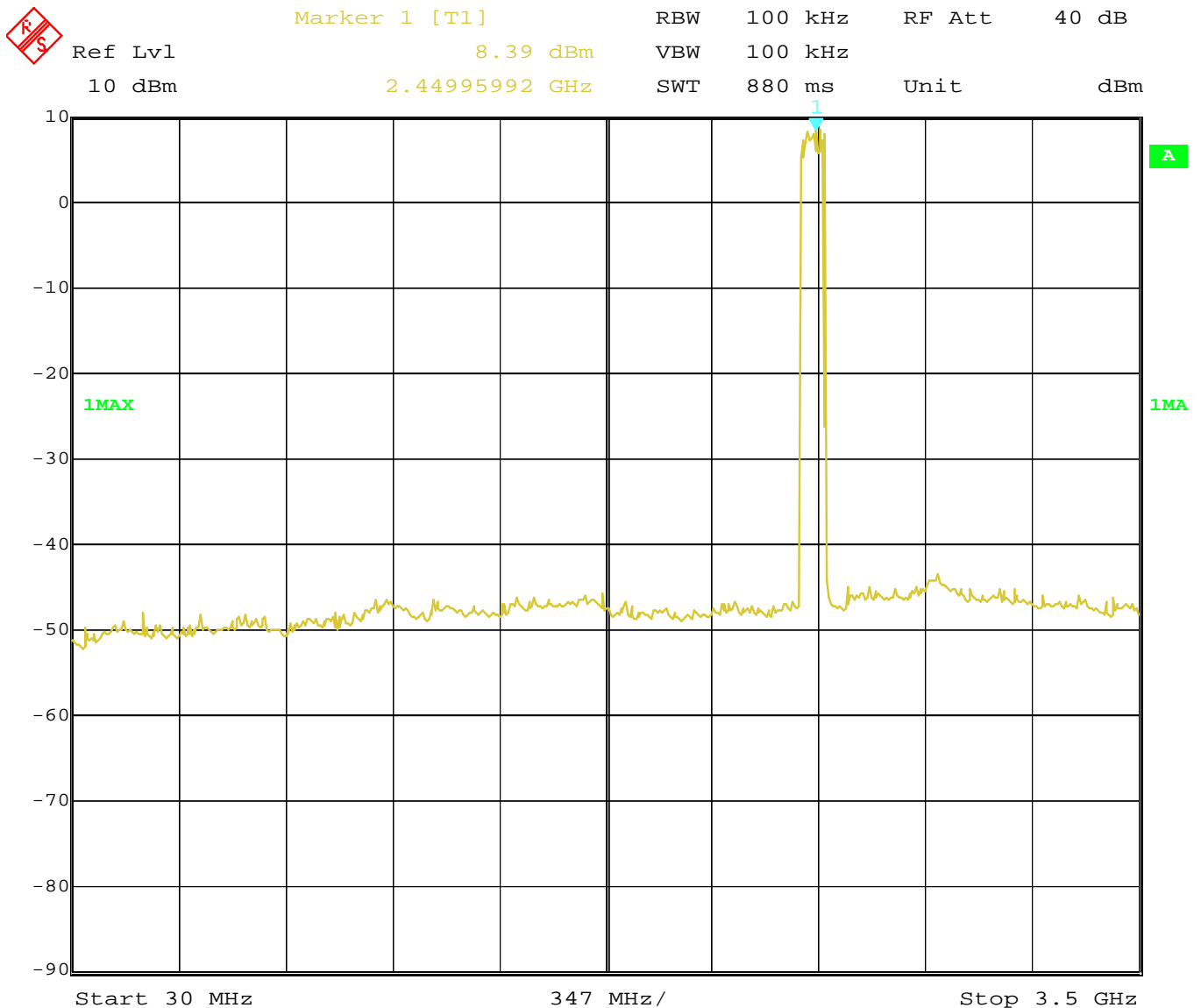


**Figure 6d.6-12: Plot of upper band-edge conducted emissions with hopping enabled (8 DPSK Modulation).**

**6d.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.

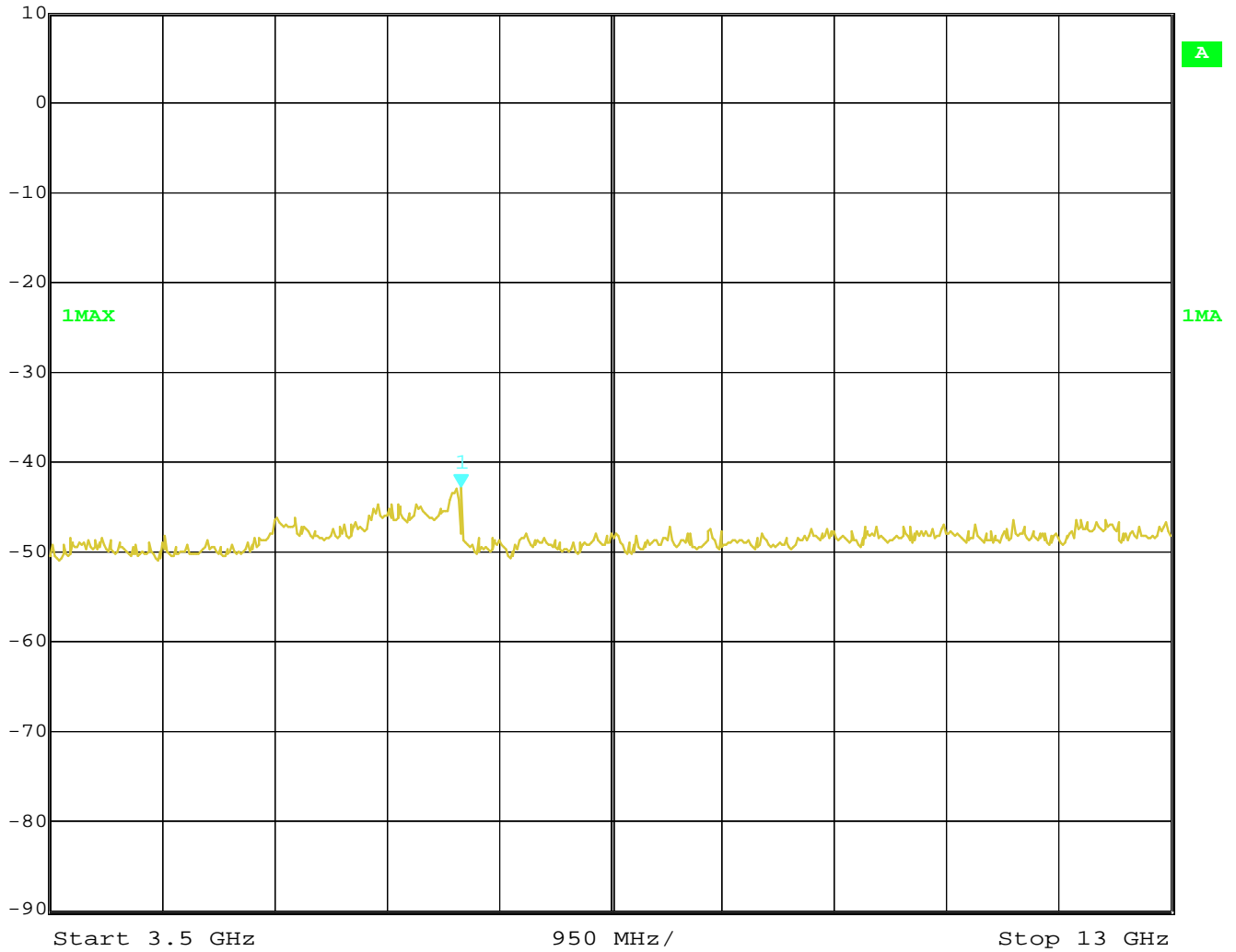


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**Figure 6d.7-1: Plot of spurious conducted emissions 30 MHz – 3.5 GHz.**



Ref Lvl	Marker 1 [T1]	RBW	100 kHz	RF Att	40 dB
10 dBm	-42.79 dBm	VBW	100 kHz		
	6.98396794 GHz	SWT	2.4 s	Unit	dBm



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**Figure 6d.7-2: Plot of spurious conducted emissions 3 GHz – 13 GHz.**

