15.247(a)(1)(iii) Average time of Occupancy

Test Conditions / Setup

Test Location: CKC Laboratories, Inc. • 1120 Fulton Places • Fremont, CA 94539 • (510) 249-1170

Customer: **Proteus Digital Health, Inc.**
Specification: **15.247 a(1)(iii)**
Work Order #: **94175** Date: 3/12/2013
Test Type: **Radiated Scan** Time: 14:47:55
Equipment: **PPM (RP4) Electronics Module** Sequence#: 3
Manufacturer: Proteus Digital Health, Inc. Tested By: Hieu Song Nguyenpham
Model: SPC-0175
S/N: None

***Test Equipment*:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	ANP05843	Cable	32022-2-29094K-48TC	8/7/2012	8/7/2014
	AN02668	Spectrum Analyzer	E4446A	2/22/2013	2/22/2015

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
PPM (RP4) Electronic Module*	Proteus Digital Health, Inc.	SPC-0175	None

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop AC/DC Power Adapter	Dell	D130PE1-00	CN-0JU012-48661-09U-K8GG-A04
Laptop	Dell	Latitude E6500	B76FVL1
DC power Supply	EZ	GP-4303A	01070038
USB to TTL Serial Cable-1.8m Wire End Version	FTDI	TTL-232RG-VREG1V8-WE	None

Test Conditions / Notes:

The EUT is a battery device, and it is adaptive equipment. The EUT is placed on the test bench. The measurement is performed at the antenna port. The service port is connected to a laptop for testing configuration purposes. Instead of using a fresh battery, the EUT is connected to a DC power supply at 2.4V.

Temperature: 19.9°C
Humidity: 40 %
Atmospheric Pressure:101.9kPa

High Clock: 26MHz
Software Used: HCI Lite
Rate power = +4dBm (nominal)

Transmitter Operation Frequency Range: 2400 - 2483.5 MHz

Low Channel: 2402MHz
Middle Channel: 2441MHz
High Channel: 2480MHz

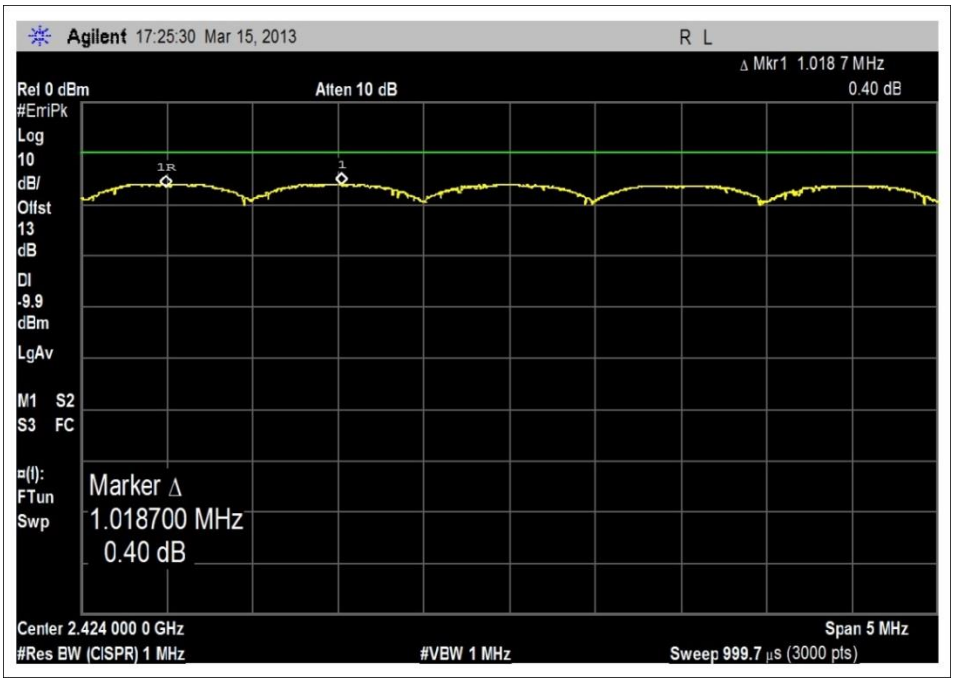
10dB External attenuation, 1.72 dB gain of the antenna and 0.9dB cable loss compensated as amplitude offset entered into the spectrum analyzer.

15.247(a)(1) 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. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

Test Data

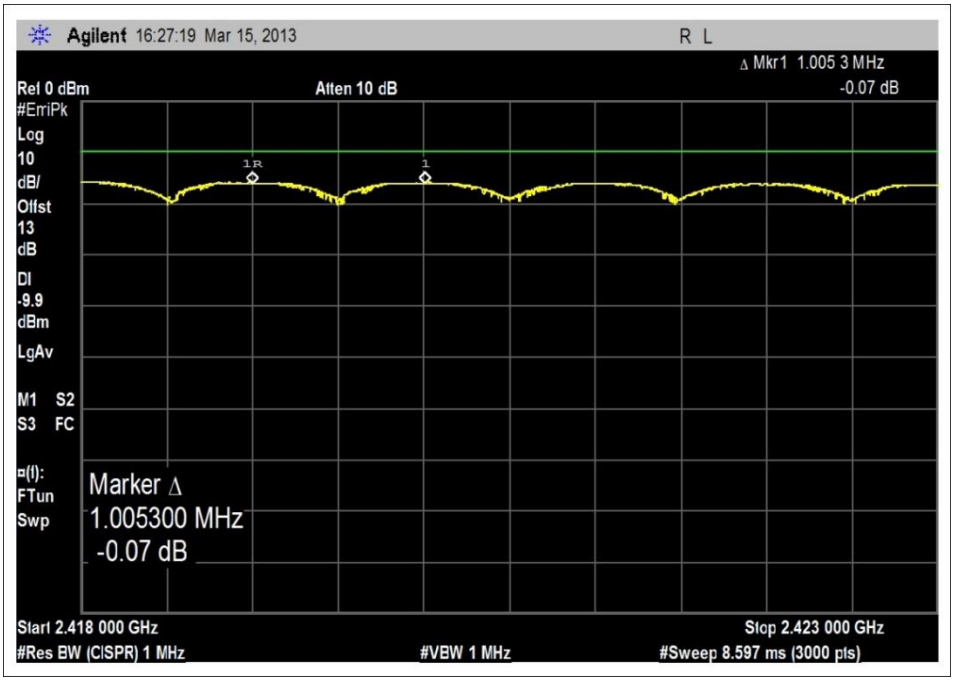
Frequency Separation

GSFK module with 1 Slot packet length



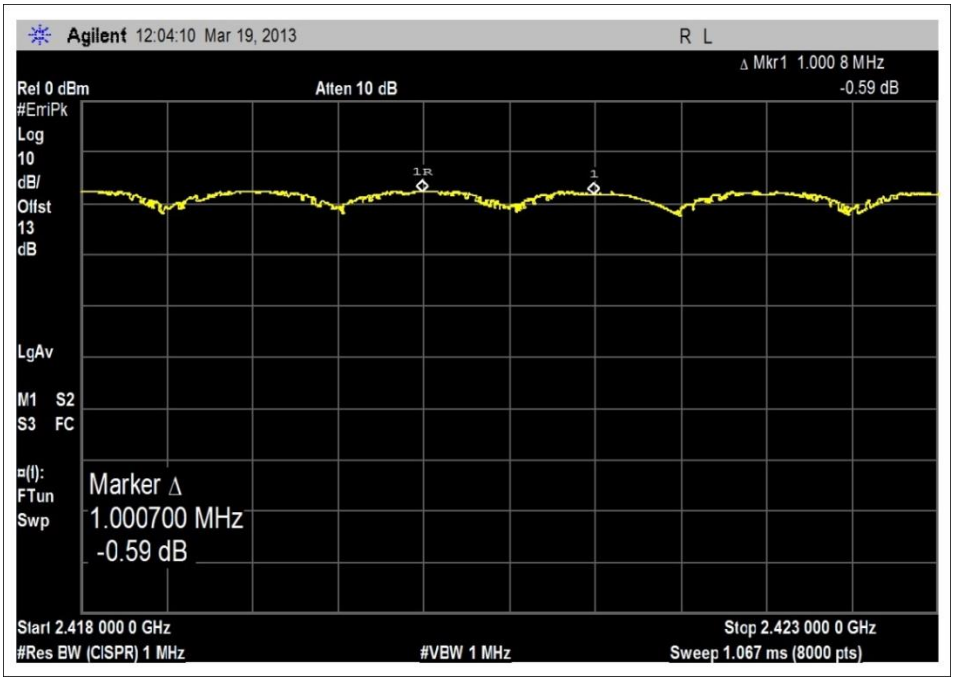
Channel Separate=1.0187MHz

GSFK module with 3 Slot packet lengths



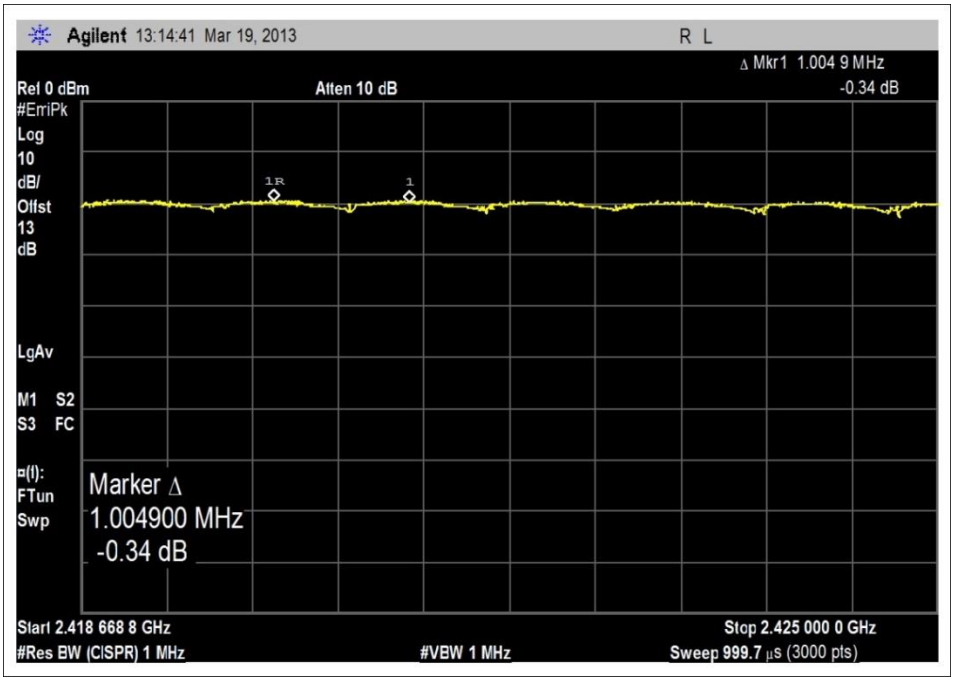
Channel Separate=1.00530MHz

GSFK module with 5 Slot packet lengths



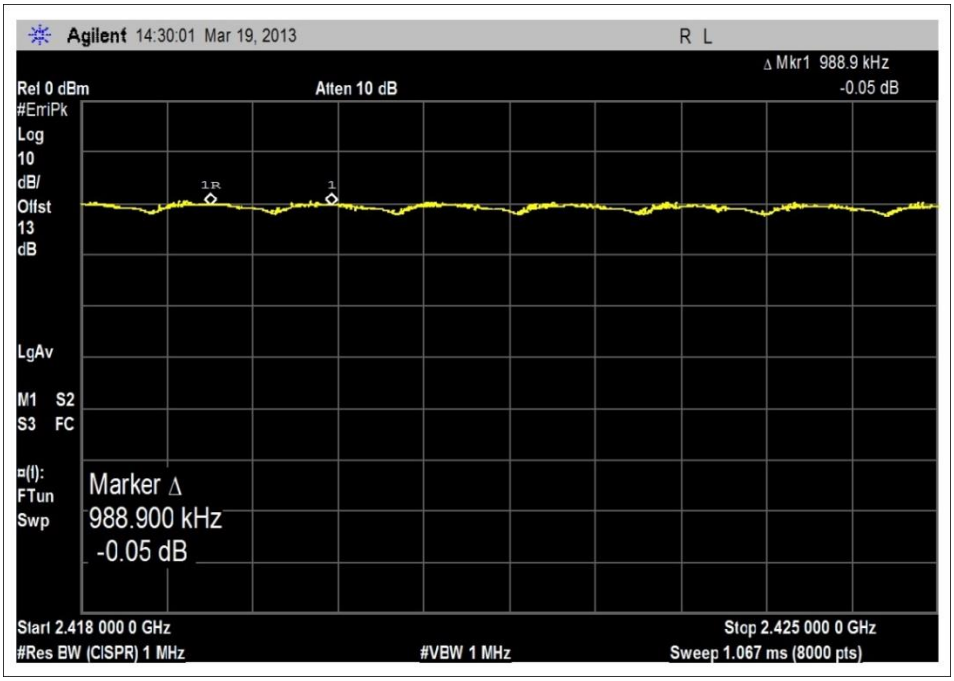
Channel Separate=1.000700MHz

QPSK module with 1 Slot packet length



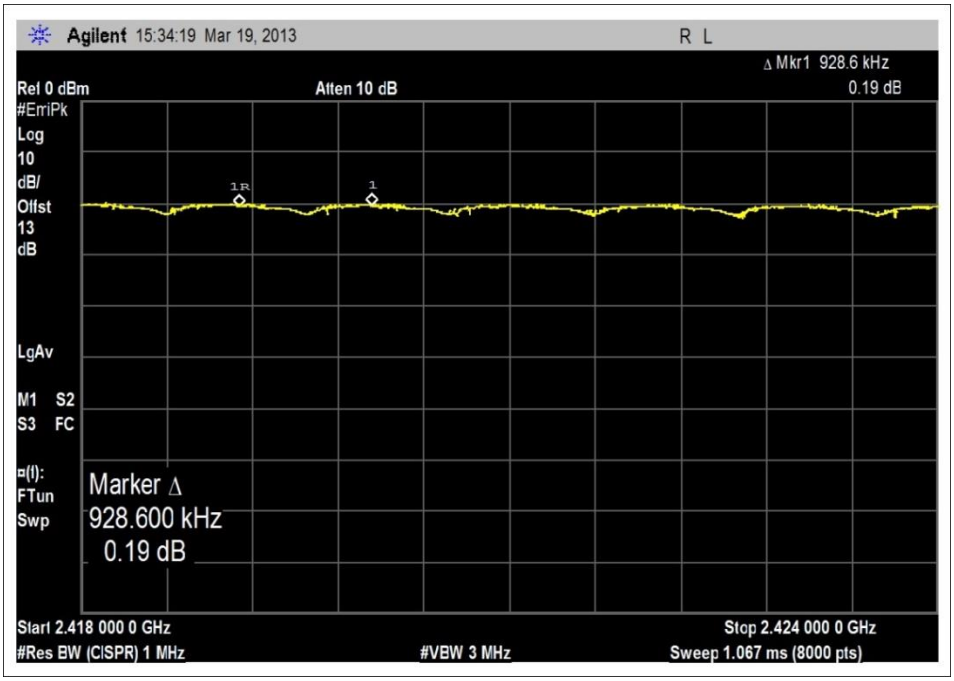
Channel Separate=1.0049MHz

QPSK module with 3 Slot packet length



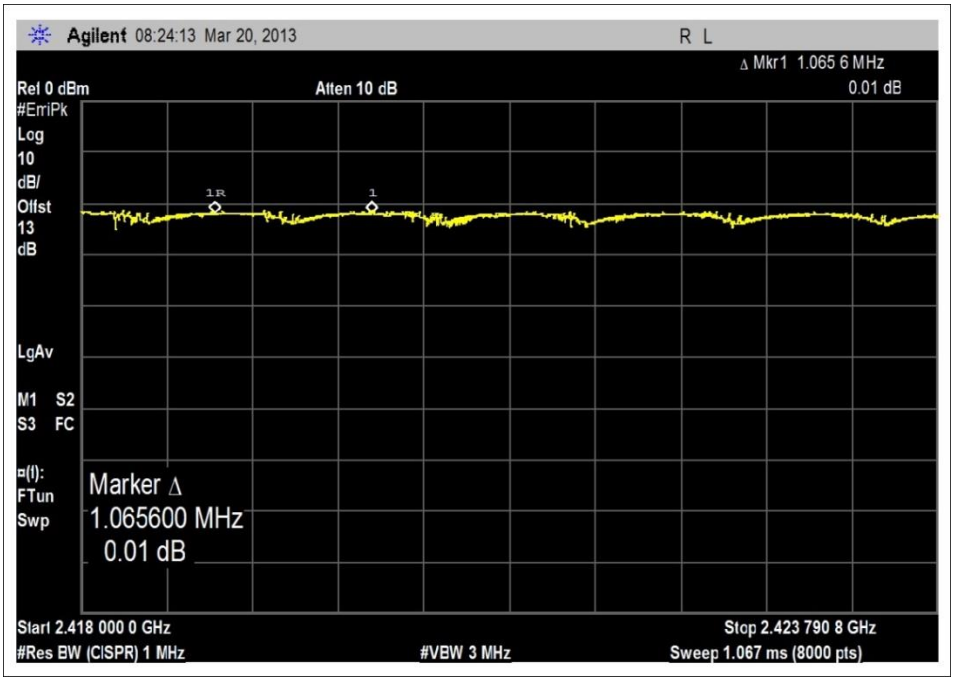
Channel Separate=988.9kHz

QPSK module with 5 Slot packet length



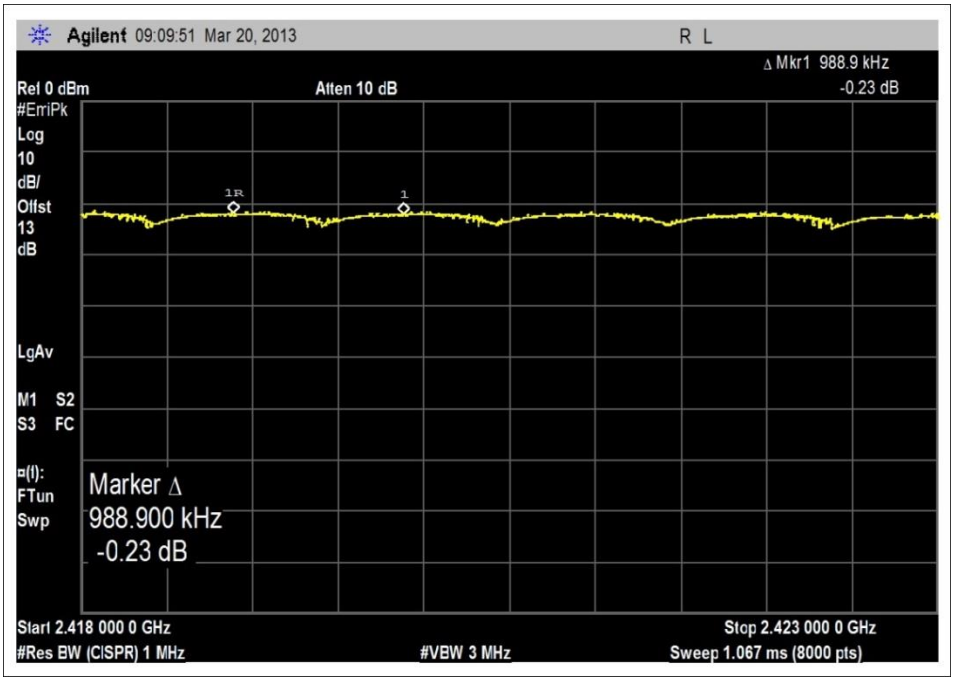
Channel Separate= 928.6 kHz

8PSK module with 1 Slot packet length



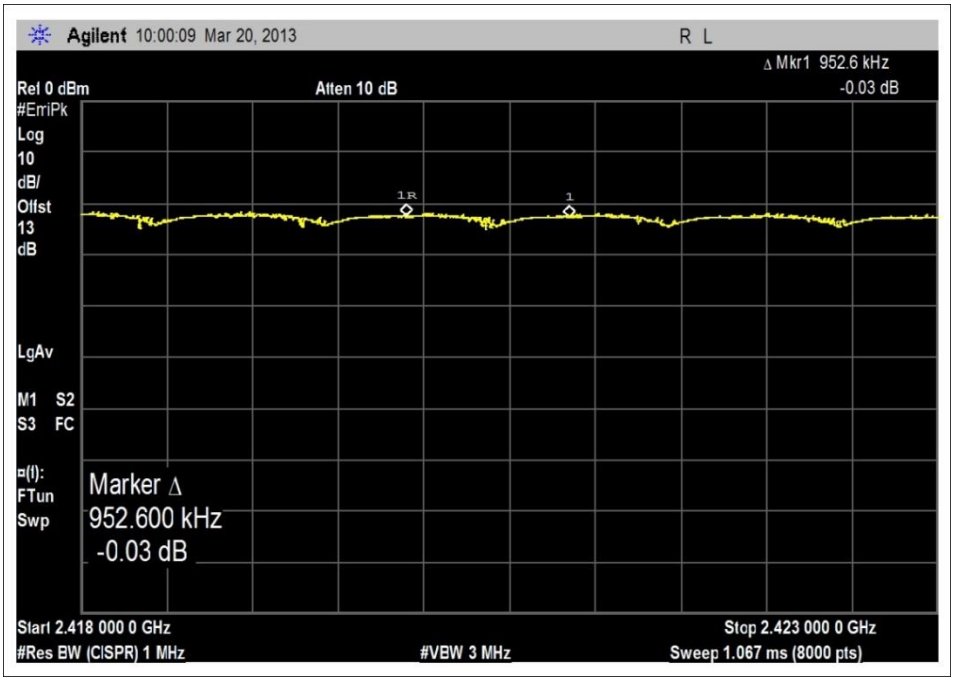
Channel Separate=1.0656MHz

8PSK module with 3 Slot packet length



Channel Separate=988.9 kHz

8PSK module with 5 Slot packet length

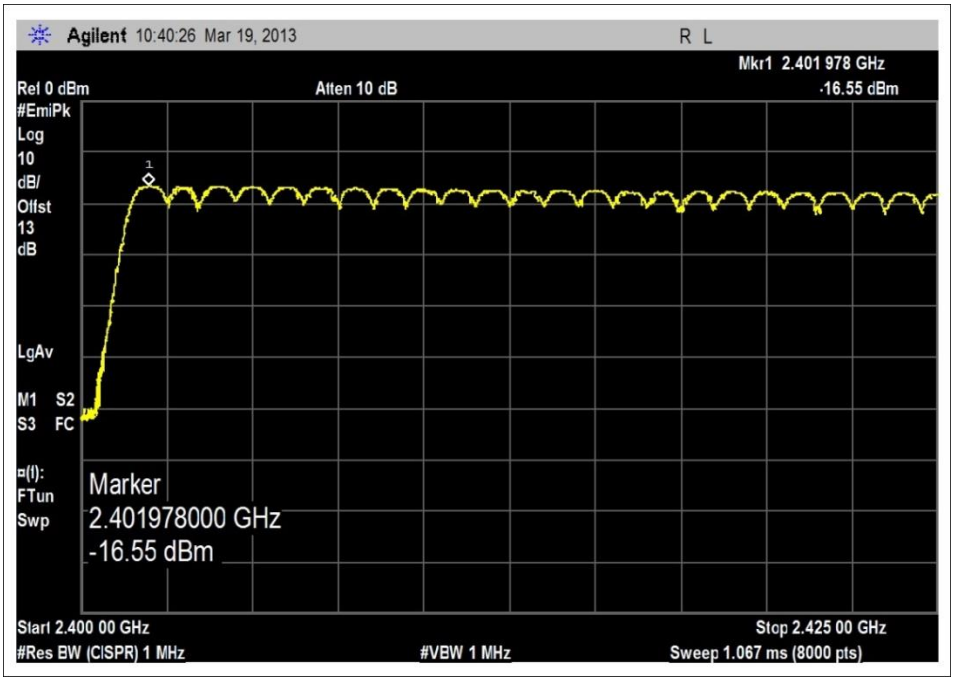


Channel Separate=952.6 kHz

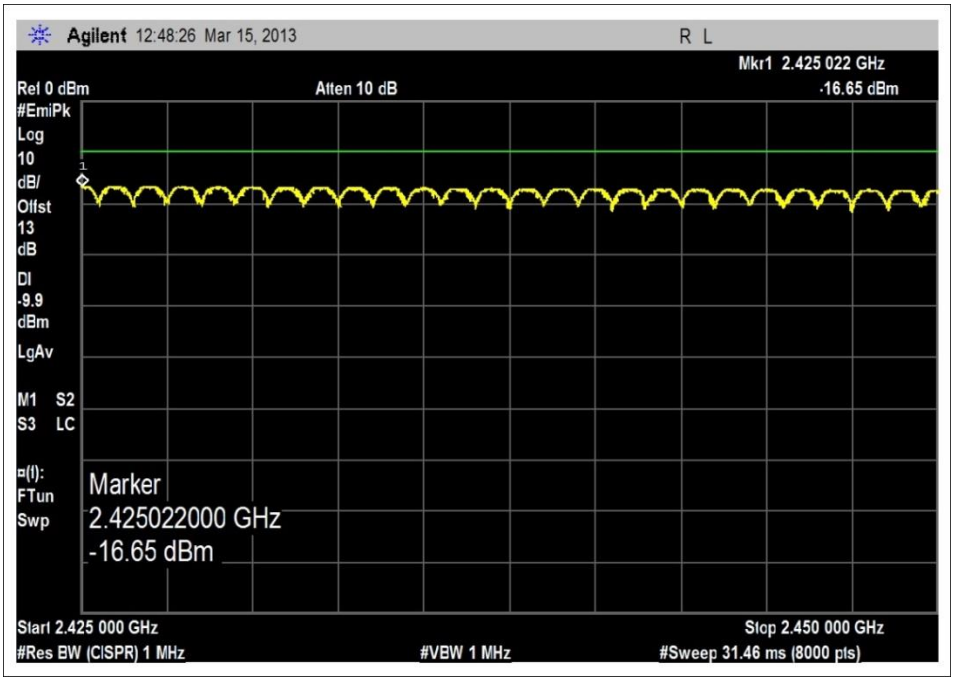
15.247(a)(1)(iii) Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel **shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed**.

Number of Hopping Channels

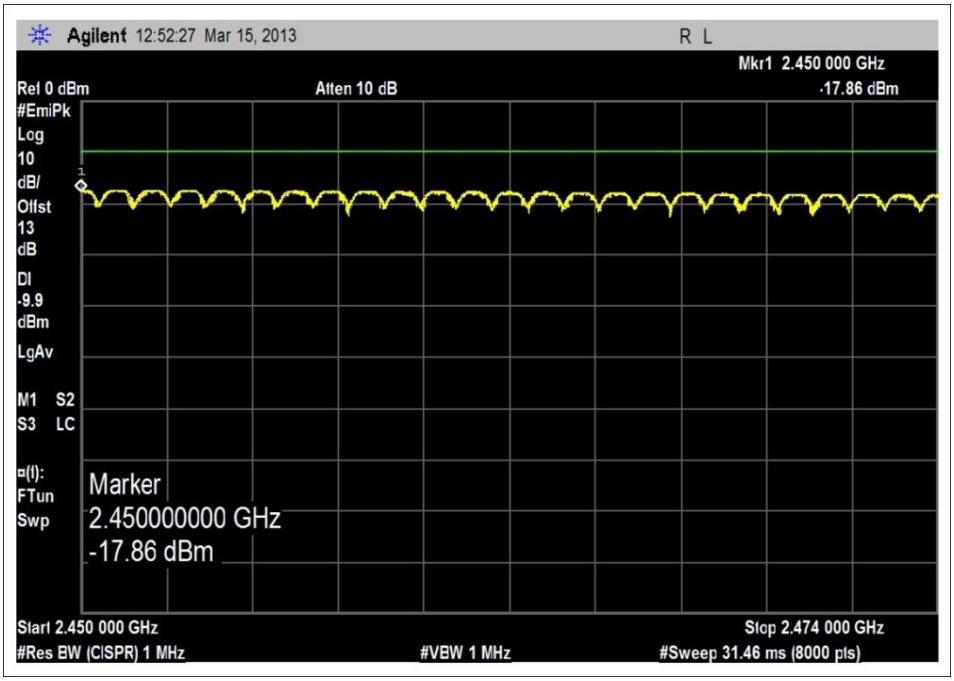
Numbers of Hopping Channels of GFSK with 1 slot pack length (channel 1 to channel 24)



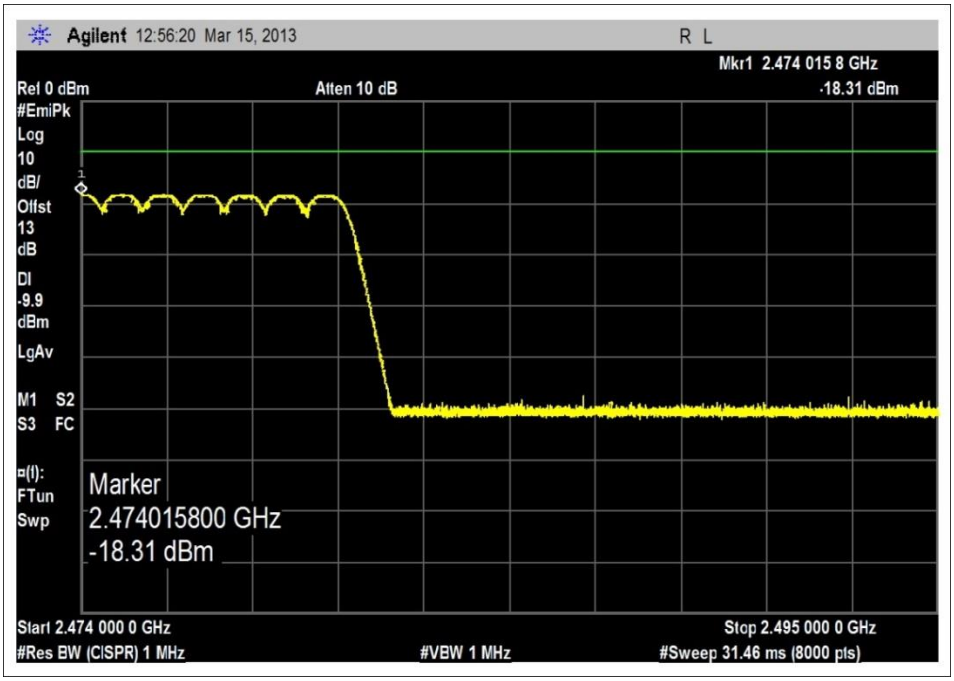
Numbers of Hopping Channels of GFSK with 1 slot pack length (channel 24 to channel 49)



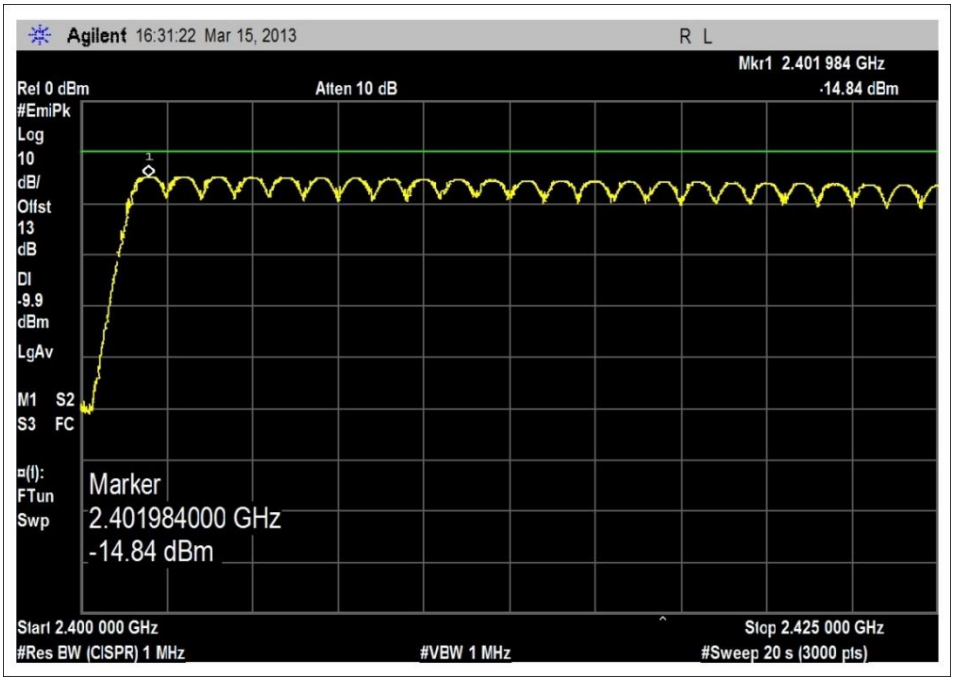
Numbers of Hopping Channels of GFSK with 1 slot pack length (channel 49 to channel 73)



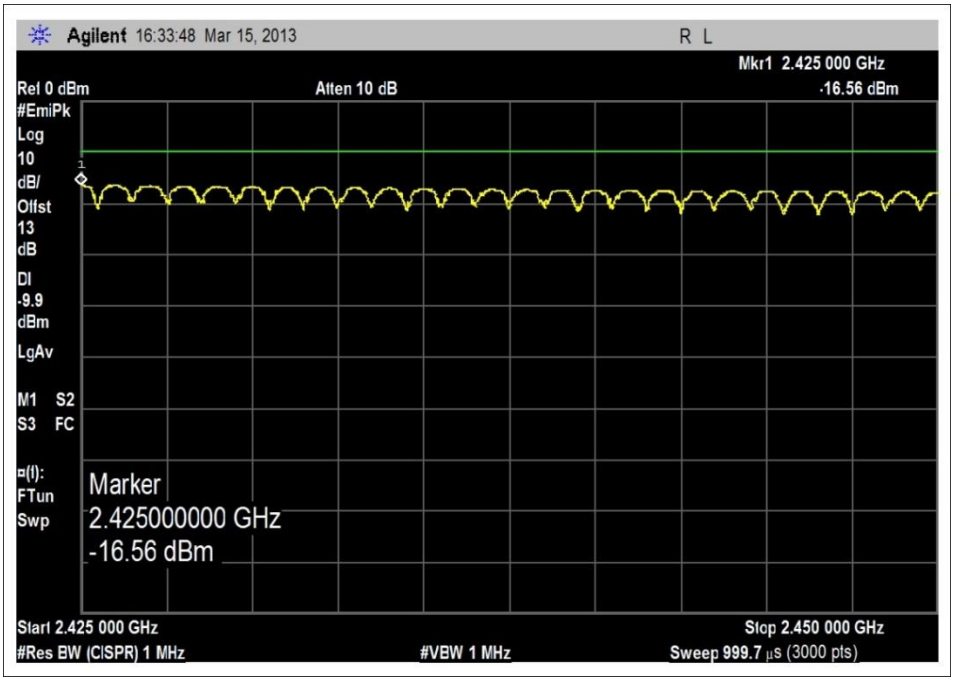
Numbers of Hopping Channels of GFSK with 1 slot pack length (channel 73 to channel 79)



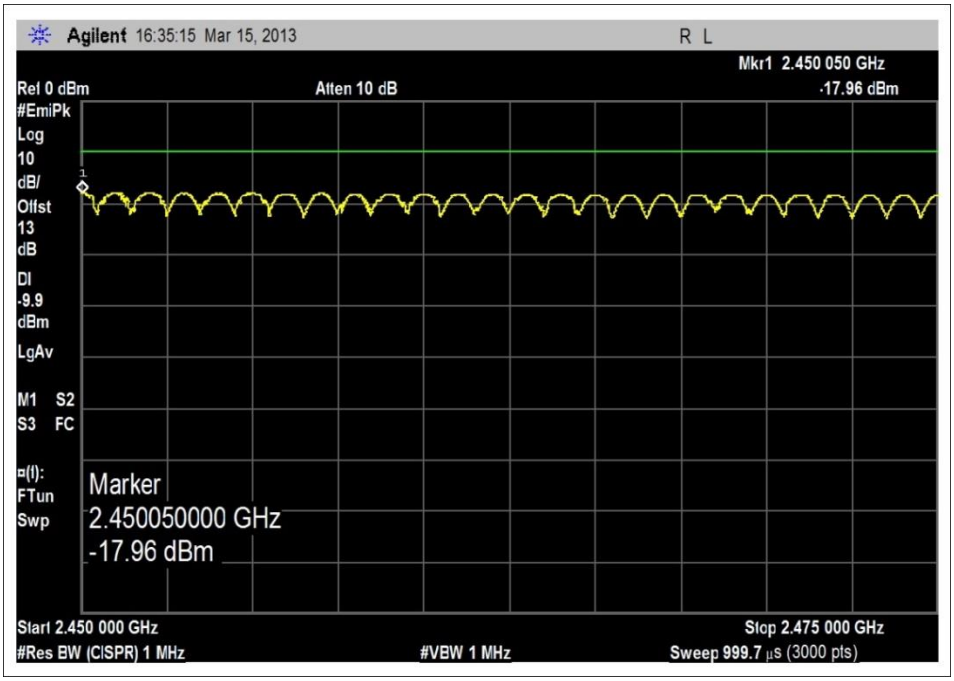
Numbers of Hopping Channels of GFSK with 3 slot pack length (channel 1 to channel 24)



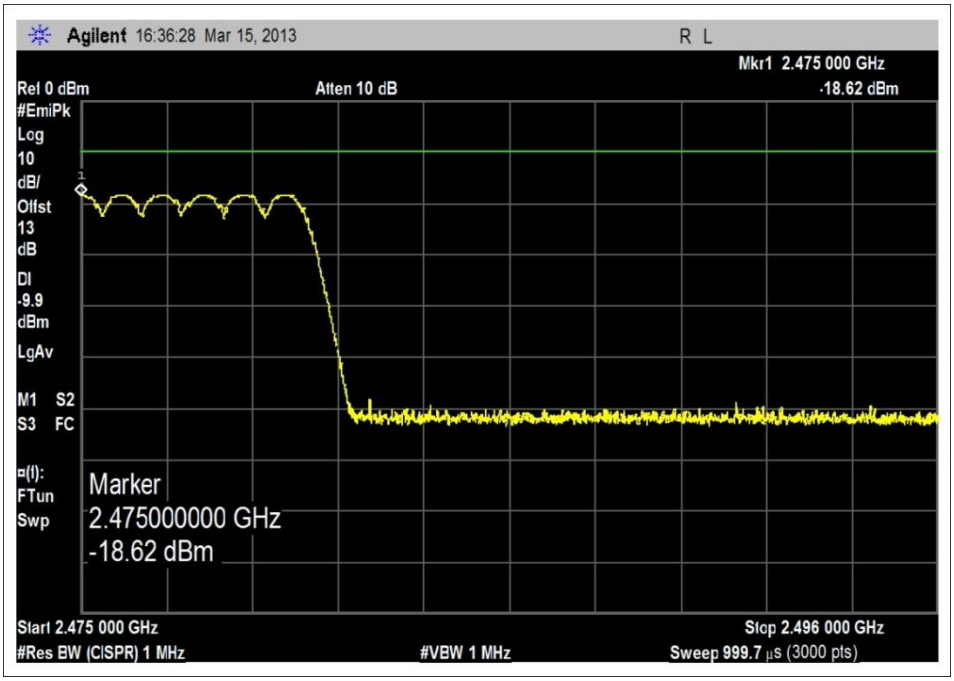
Numbers of Hopping Channels of GFSK with 3 slot pack length (channel 24 to channel 49)



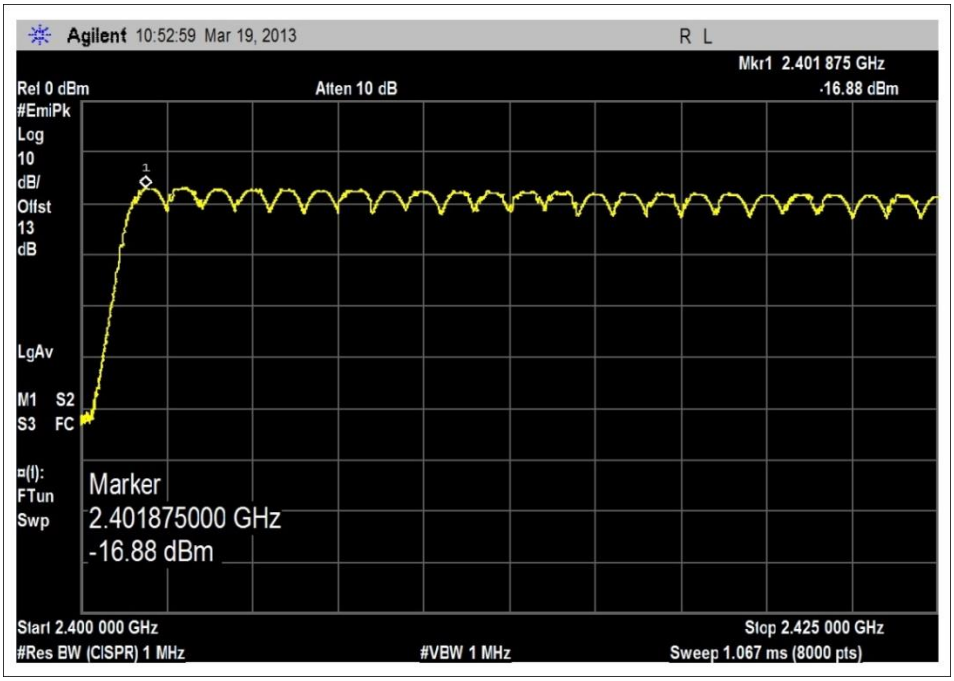
Numbers of Hopping Channels of GFSK with 3 slot pack length (channel 49 to channel 74)



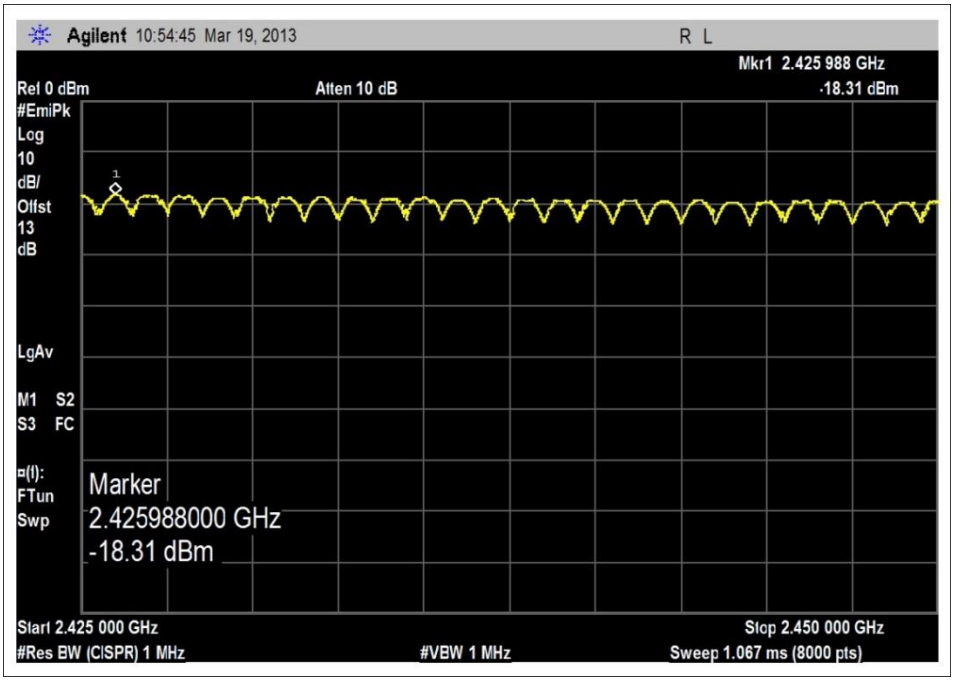
Numbers of Hopping Channels of GFSK with 3 slot pack length (channel 74 to channel 79)



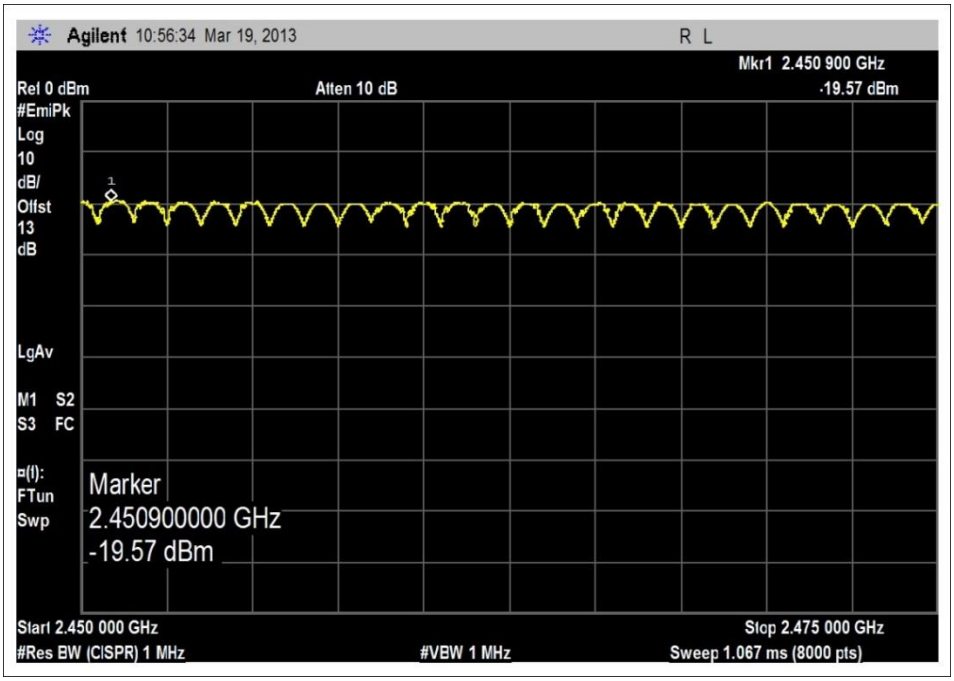
Numbers of Hopping Channels of GFSK with 5 slot pack length (channel 1 to channel 24)



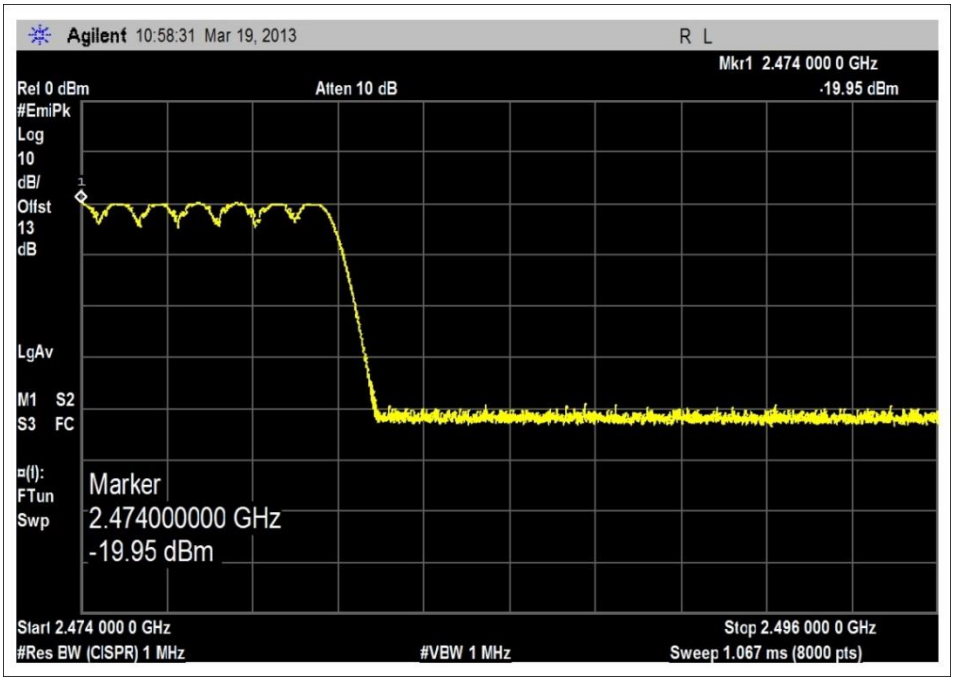
Numbers of Hopping Channels of GFSK with 5 slot pack length (channel 24 to channel 49)



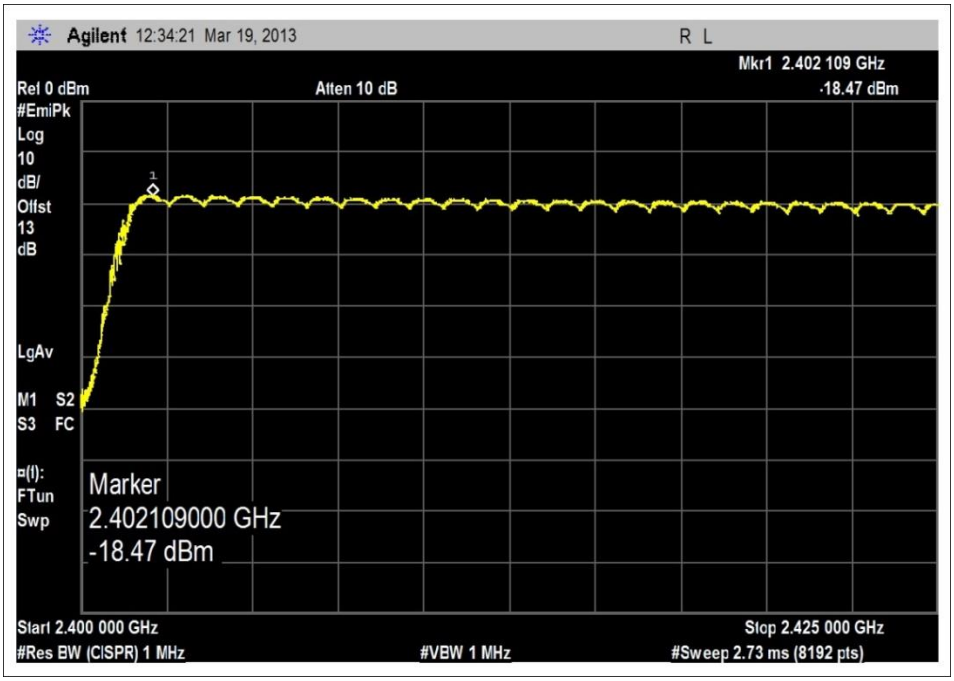
Numbers of Hopping Channels of GFSK with 5 slot pack length (channel 49 to channel 73)



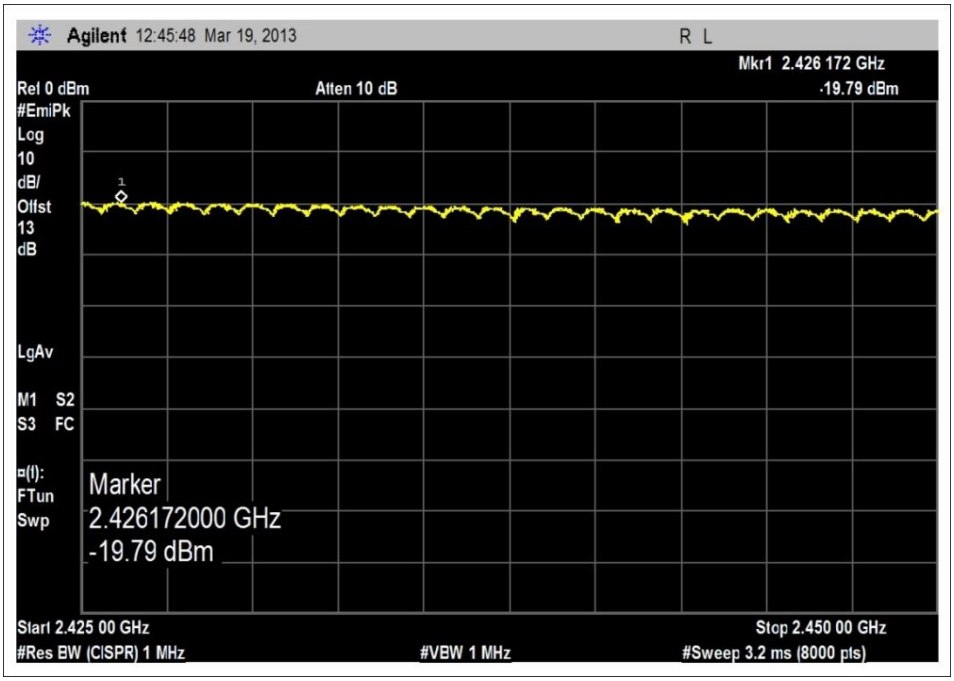
Numbers of Hopping Channels of GFSK with 5 slot pack length (channel 73 to channel 79)



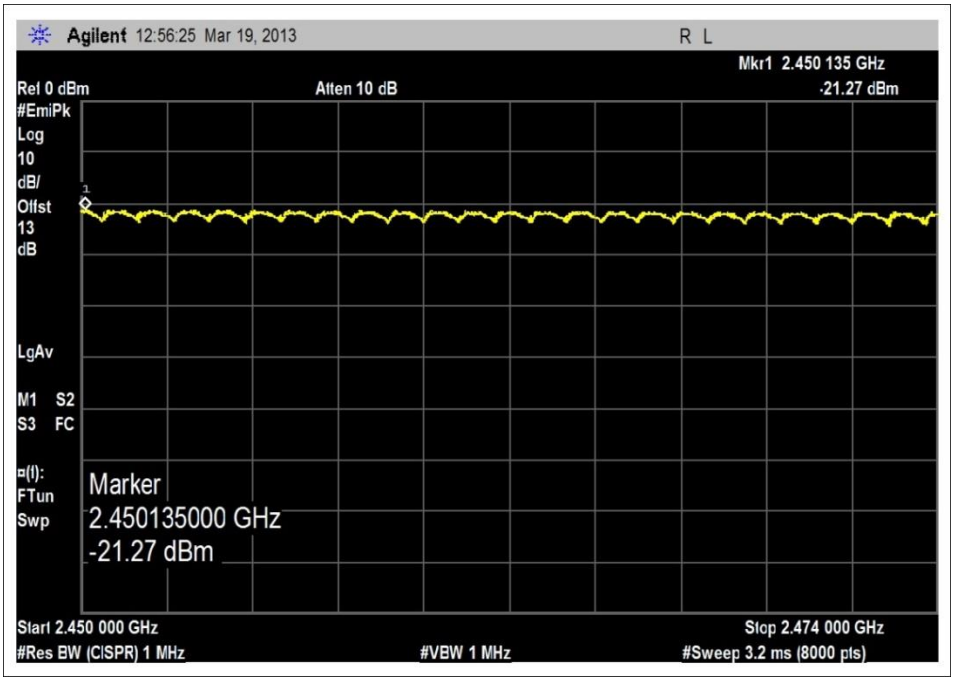
Numbers of Hopping Channels of QPSK with 1 slot pack length (channel 1 to channel 24)



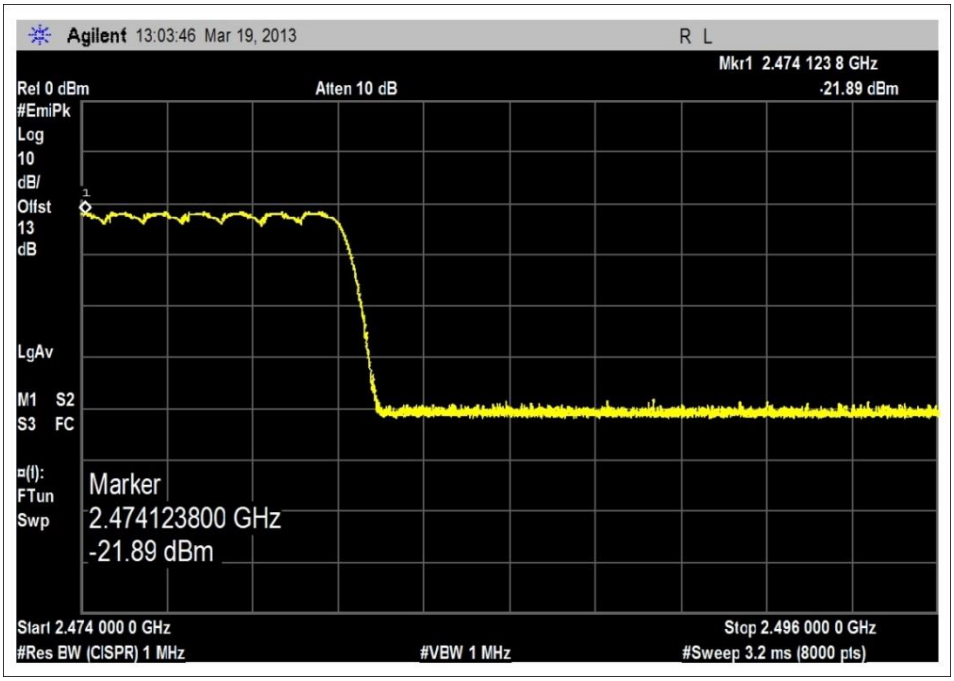
Numbers of Hopping Channels of QPSK with 1 slot pack length (channel 24 to channel 49)



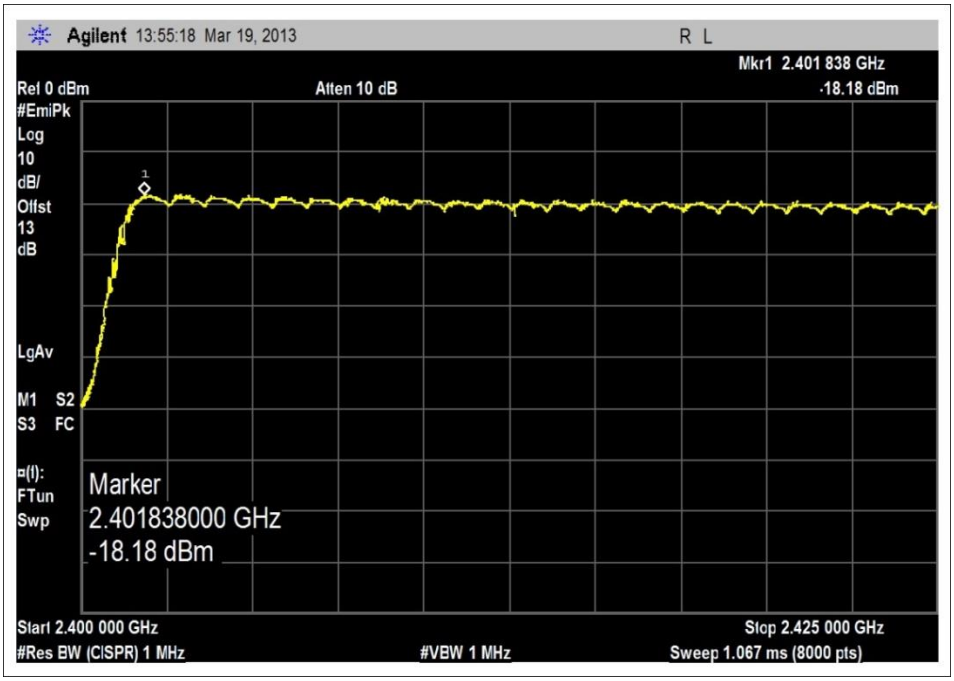
Numbers of Hopping Channels of QPSK with 1 slot pack length (channel 49 to channel 73)



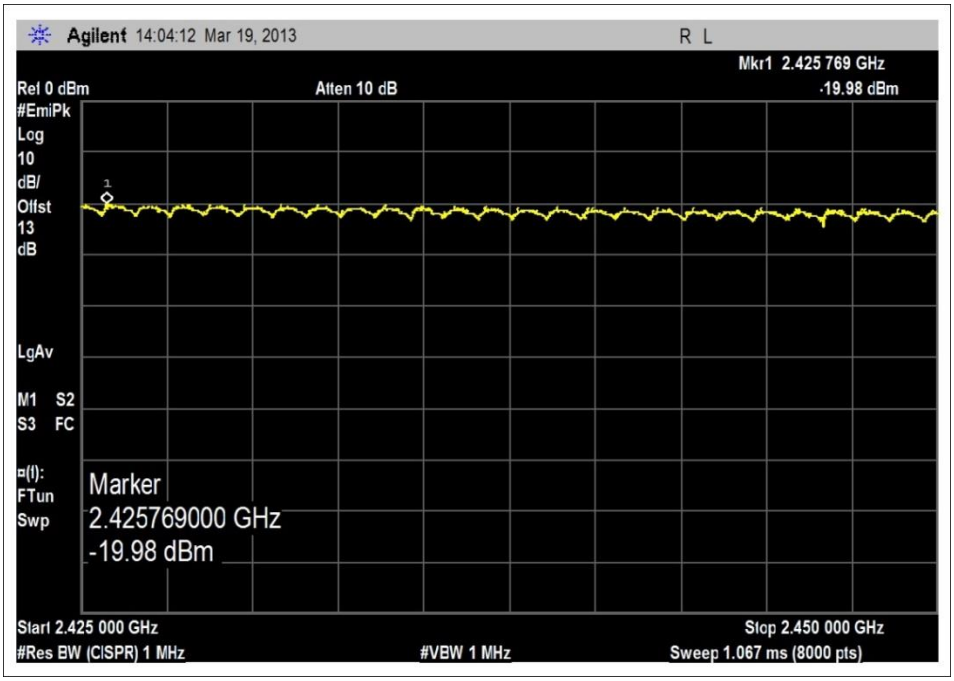
Numbers of Hopping Channels of QPSK with 1 slot pack length (channel 73 to channel 79)



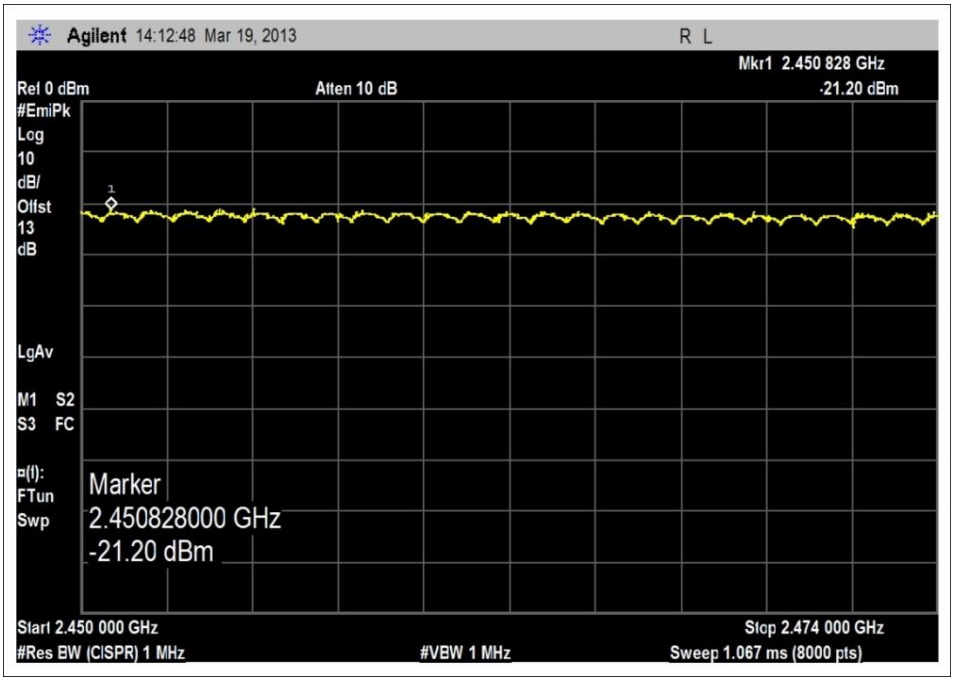
Numbers of Hopping Channels of QPSK with 3 slot pack length (channel 1 to channel 24)



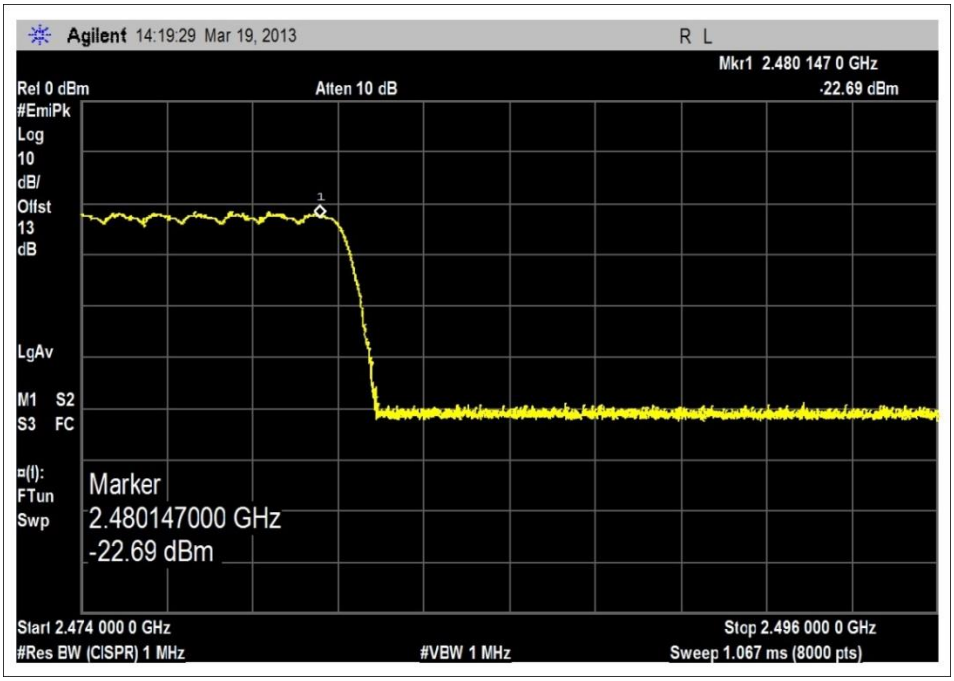
Numbers of Hopping Channels of QPSK with 3 slot pack length (channel 24 to channel 49)



Numbers of Hopping Channels of QPSK with 3 slot pack length (channel 49 to channel 73)



Numbers of Hopping Channels of QPSK with 3 slot pack length (channel 73 to channel 79)



Numbers of Hopping Channels of QPSK with 5 slot pack length (channel 1 to channel 24)