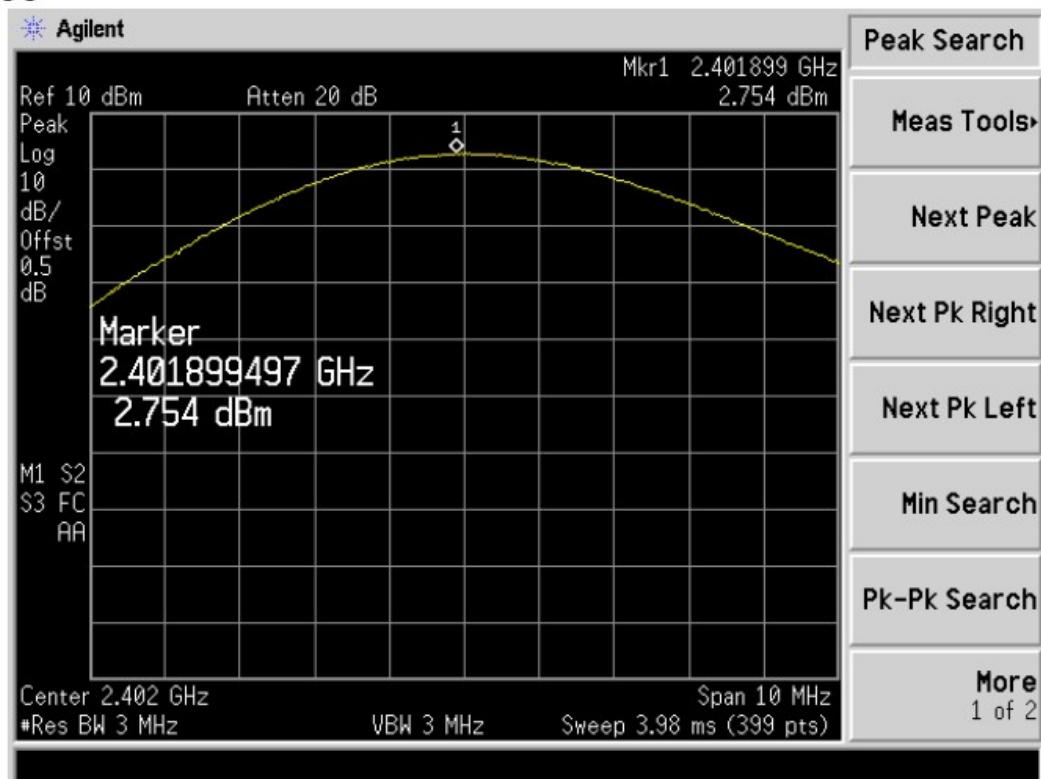
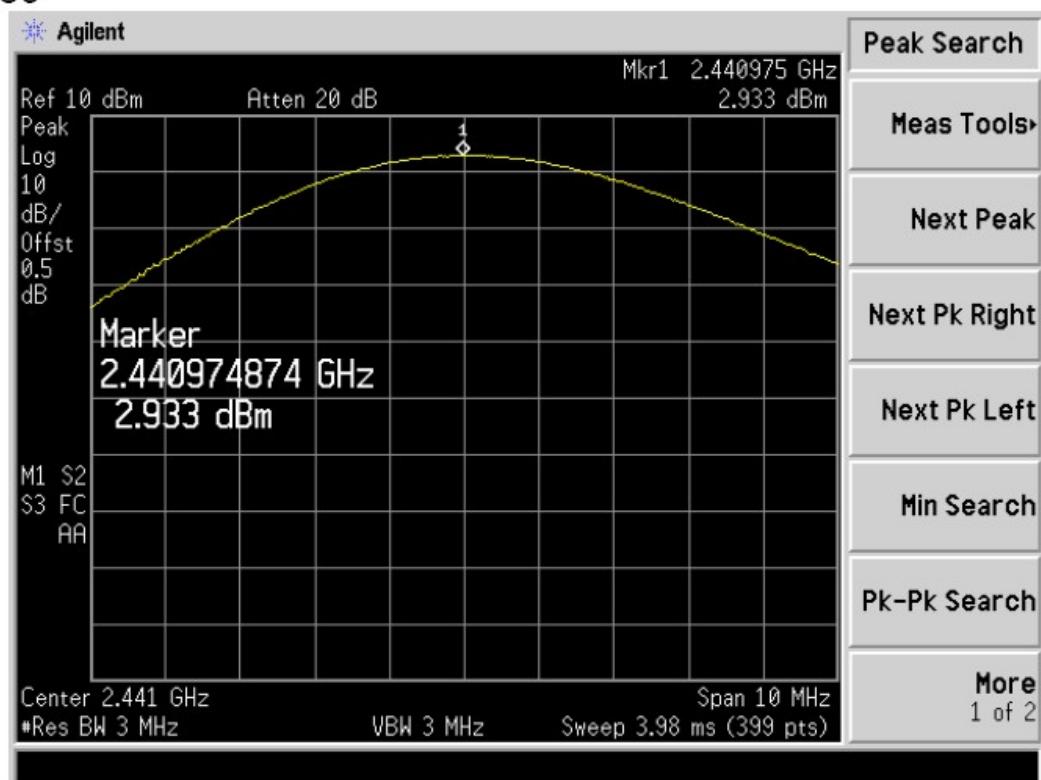


Modulation Type: 8DPSK

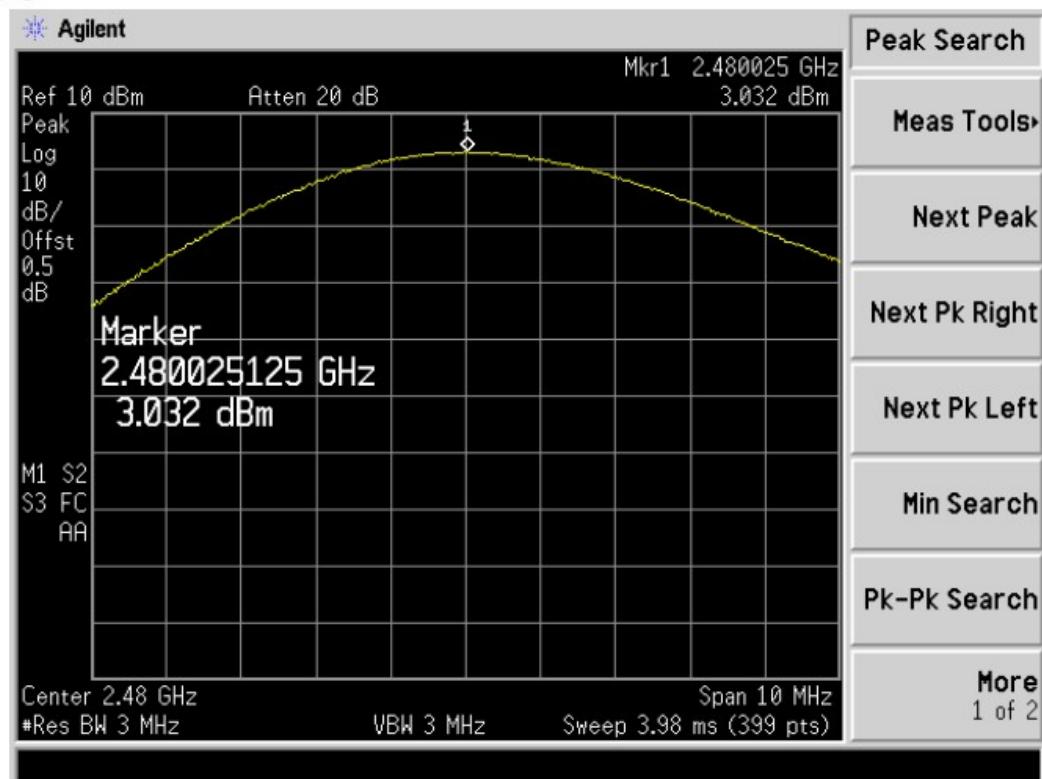
CH00



CH39



CH78



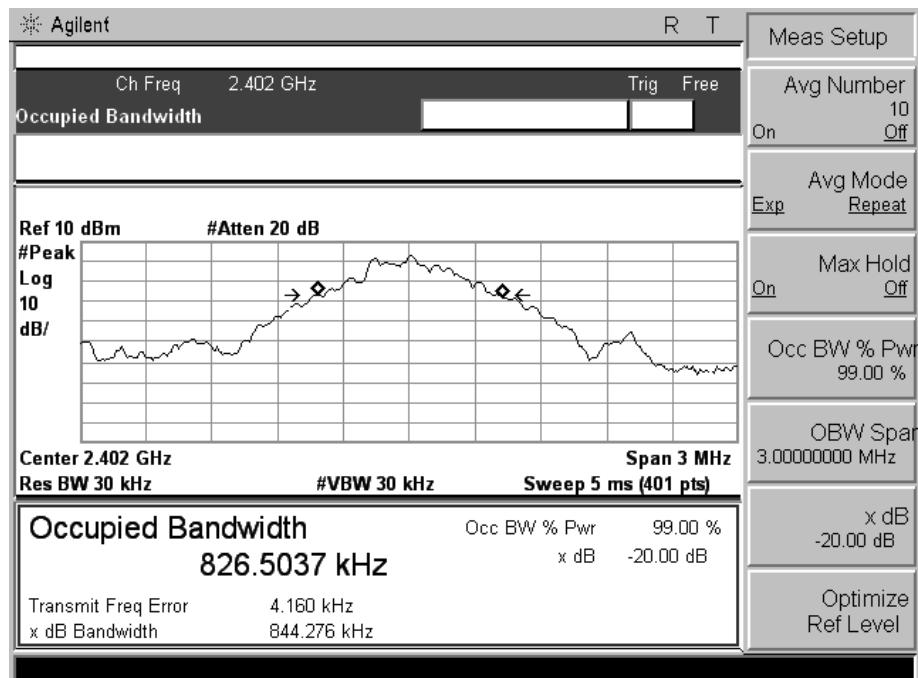
## 7.5. 20dB Bandwidth

Maximum 20dB RF Bandwidth, FCC Rule 15.247(a) (1):

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RBW was chosen so that the display was a result of the hopping channel modulation. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. Use the spectrum 20dB down delta function to measure the bandwidth.

Frequency (MHz)	20dB Bandwidth (MHz)		
	GFSK	$\pi/4$ -DQPSK	8DPSK
2402	0.8443	1.274	1.272
2441	0.8478	1.270	1.252
2480	0.8469	1.284	1.275

### GFSK:CH00

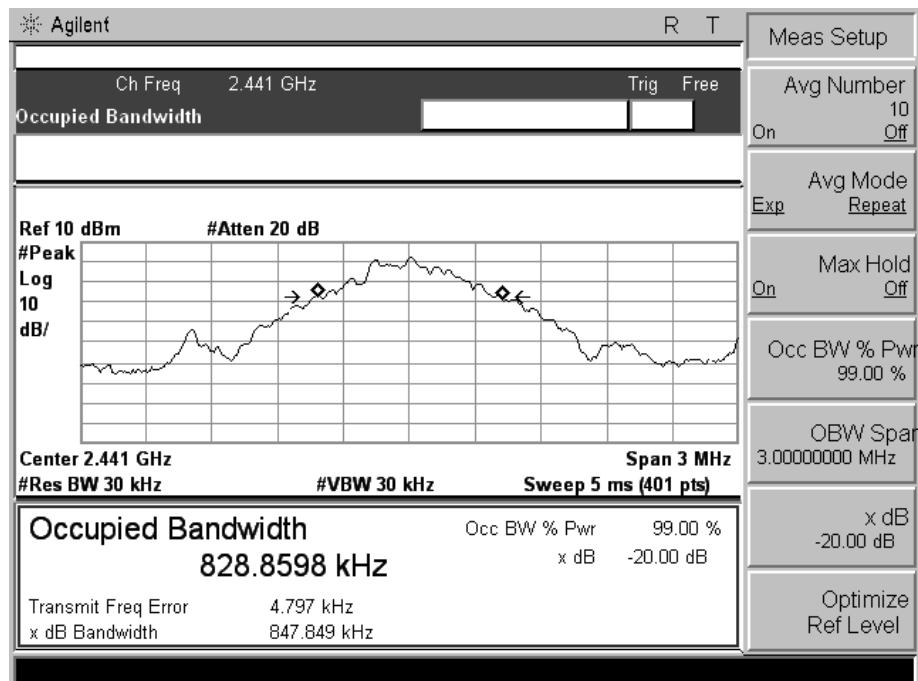


Report No.: 12110930  
FCC ID: X9PBKB83B2

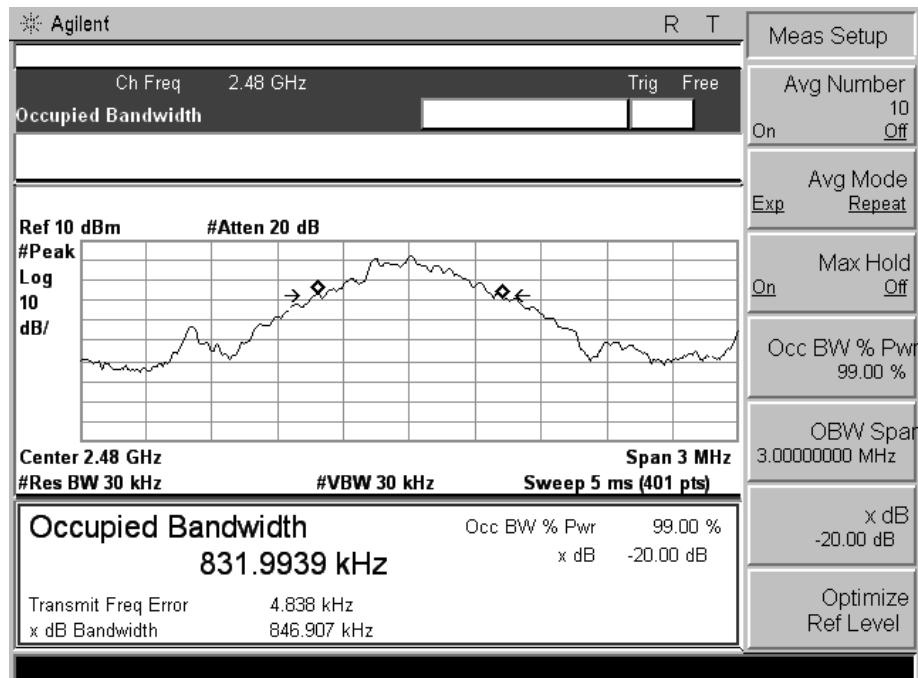
Issued: December 12, 2012

Revised: None

## GFSK:CH39



## GFSK:CH78

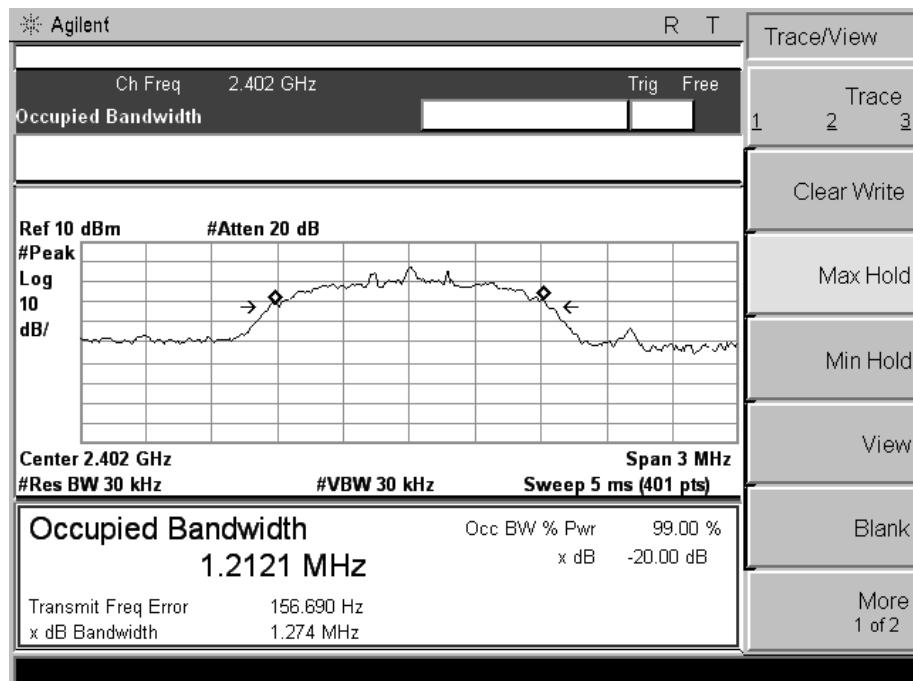


Report No.: 12110930  
FCC ID: X9PBKB83B2

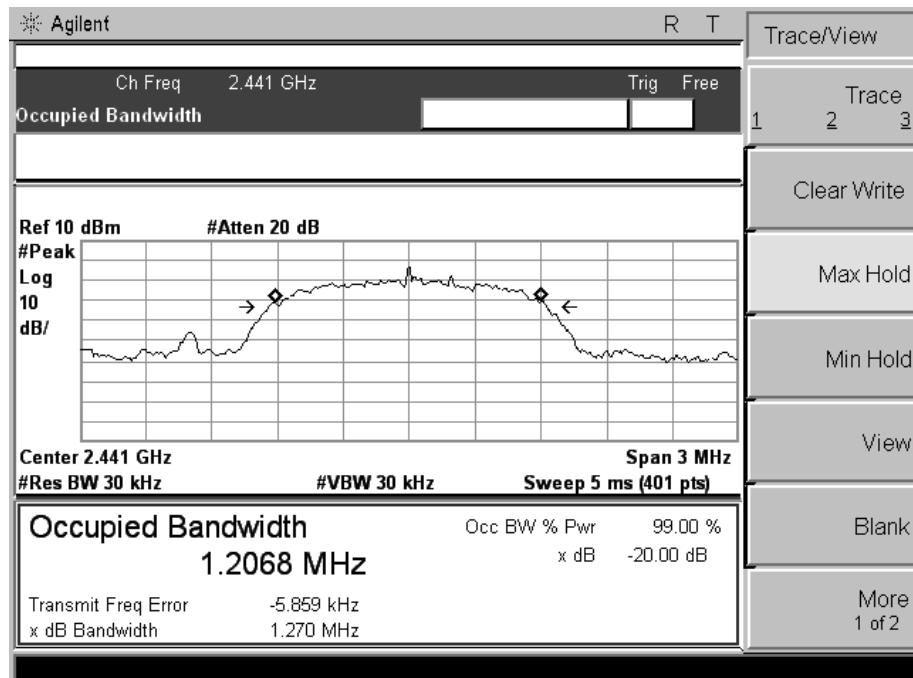
Issued: December 12, 2012

Revised: None

### $\pi/4$ -DQPSK:CH00



### $\pi/4$ -DQPSK:CH39

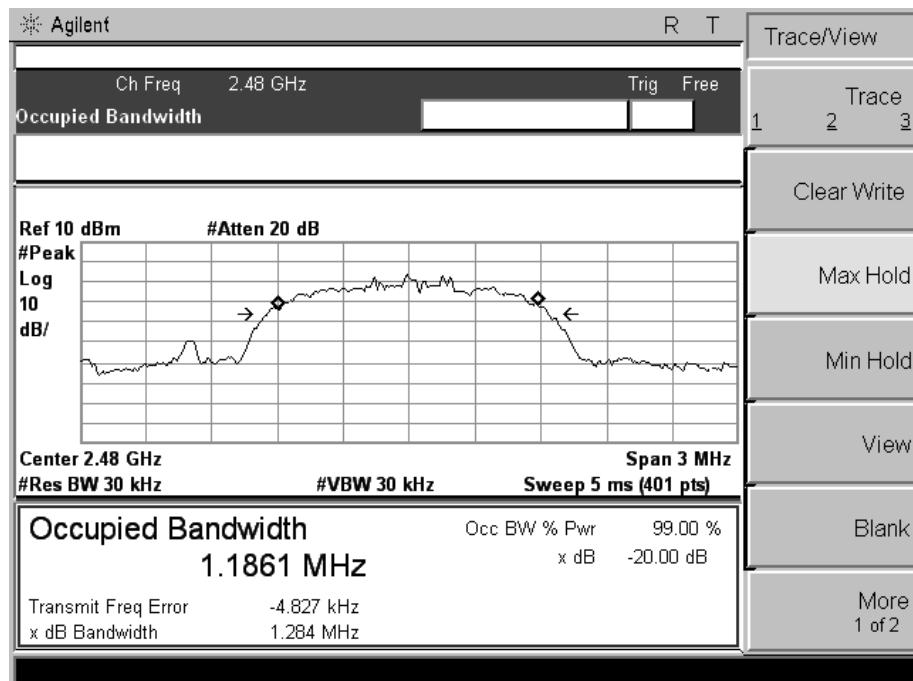


Report No.: 12110930  
FCC ID: X9PBKB83B2

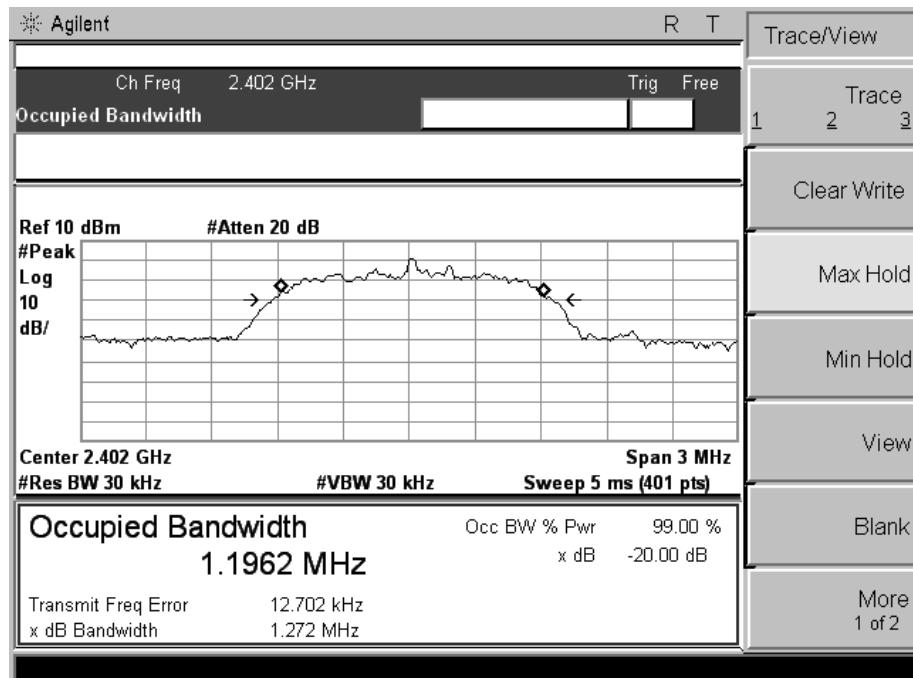
Issued: December 12, 2012

Revised: None

### $\pi/4$ -DQPSK:CH78



### 8DPSK:CH00

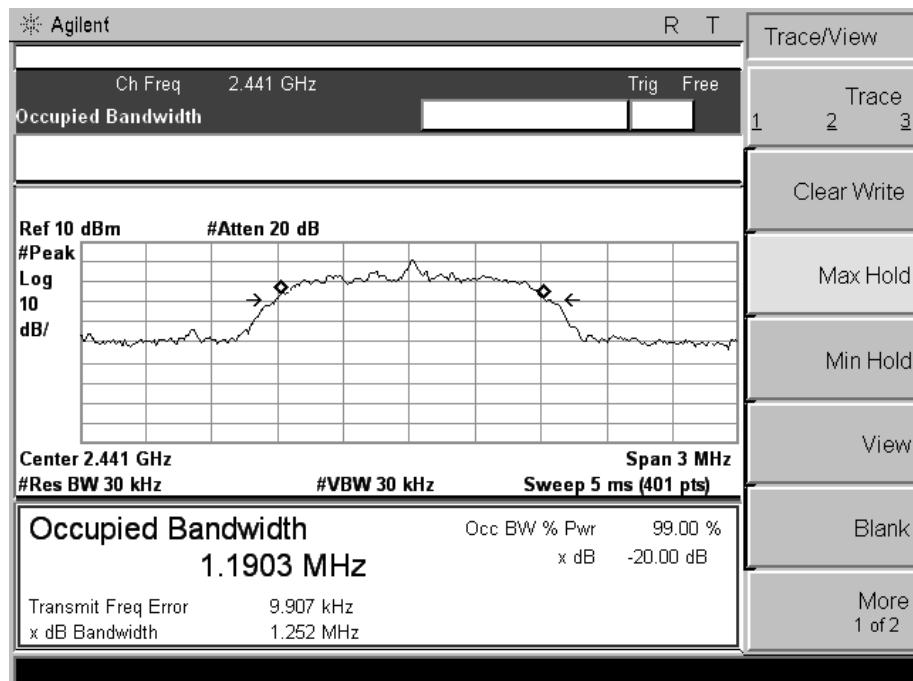


Report No.: 12110930  
FCC ID: X9PBKB83B2

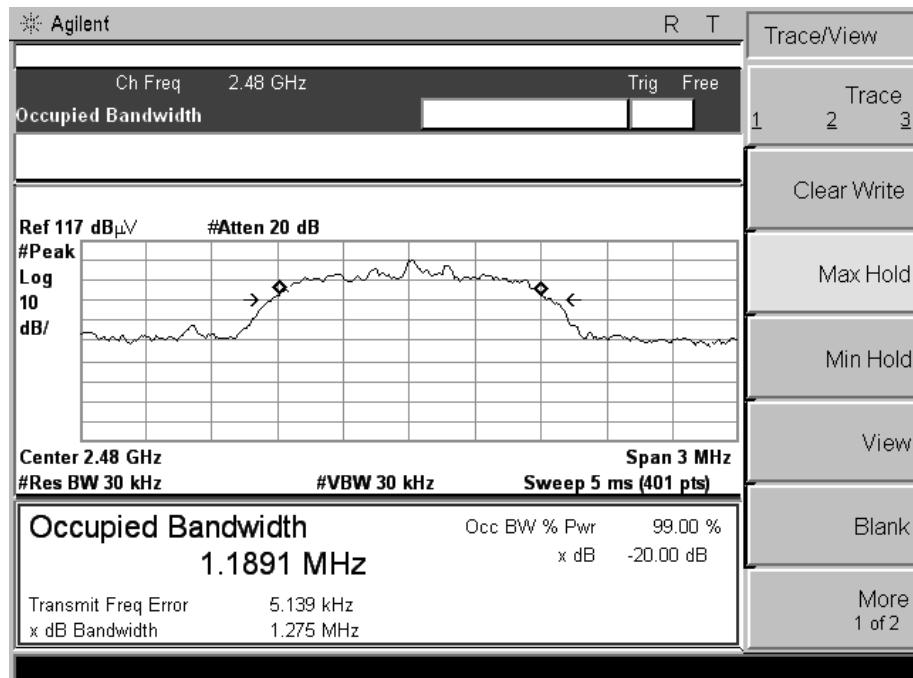
Issued: December 12, 2012

Revised: None

## 8DPSK:CH39



## 8DPSK:CH78



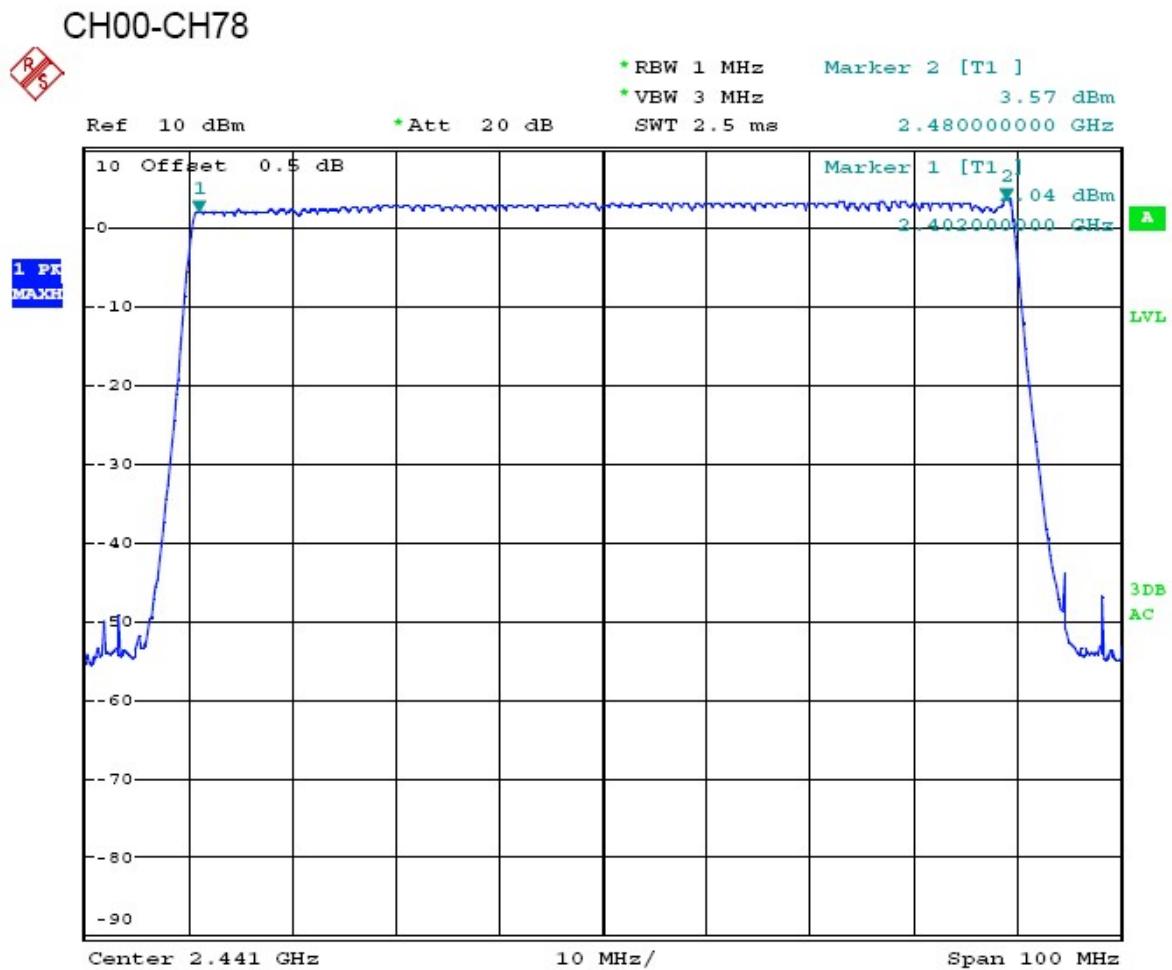
## 7.6. Channel Number (Number of Hopping Frequency)

Minimum Number of Hopping Frequencies, FCC Rule 15.247(a) (1) (iii):

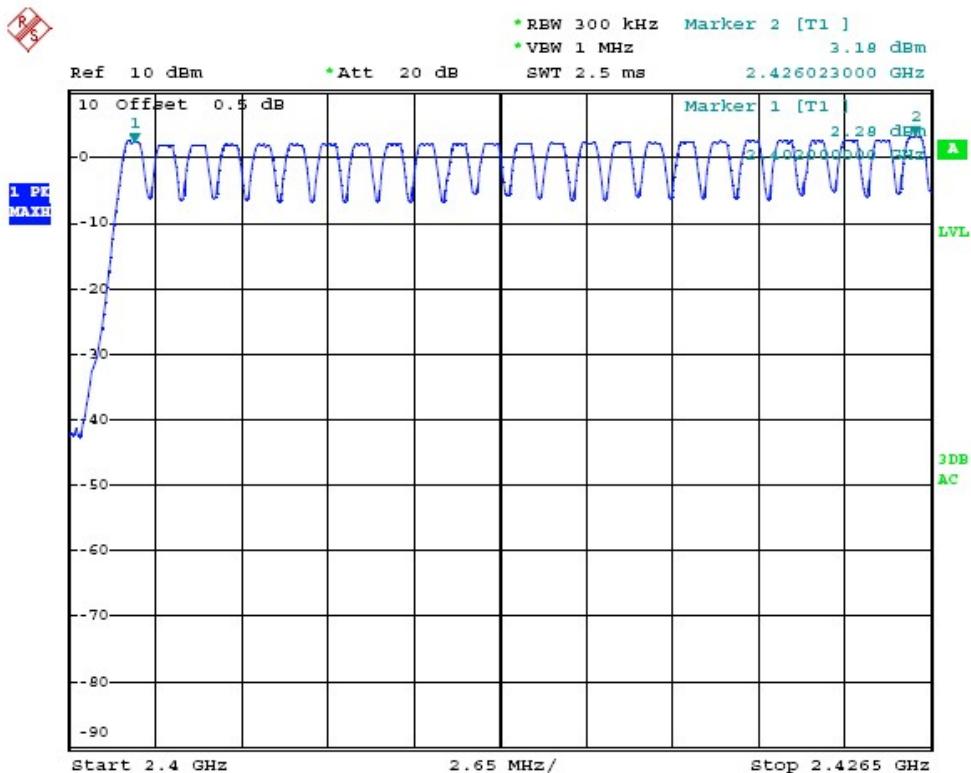
The RF passband of the EUT was divided into 5 approximately equal bands. With the analyzer set to MAX HOLD reading were taken for 2-3 minutes. The channel peaks so recorded were added together, and the total number compared to the minimum number of channels required in the regulation.

Number of hopping channels =	79
------------------------------	----

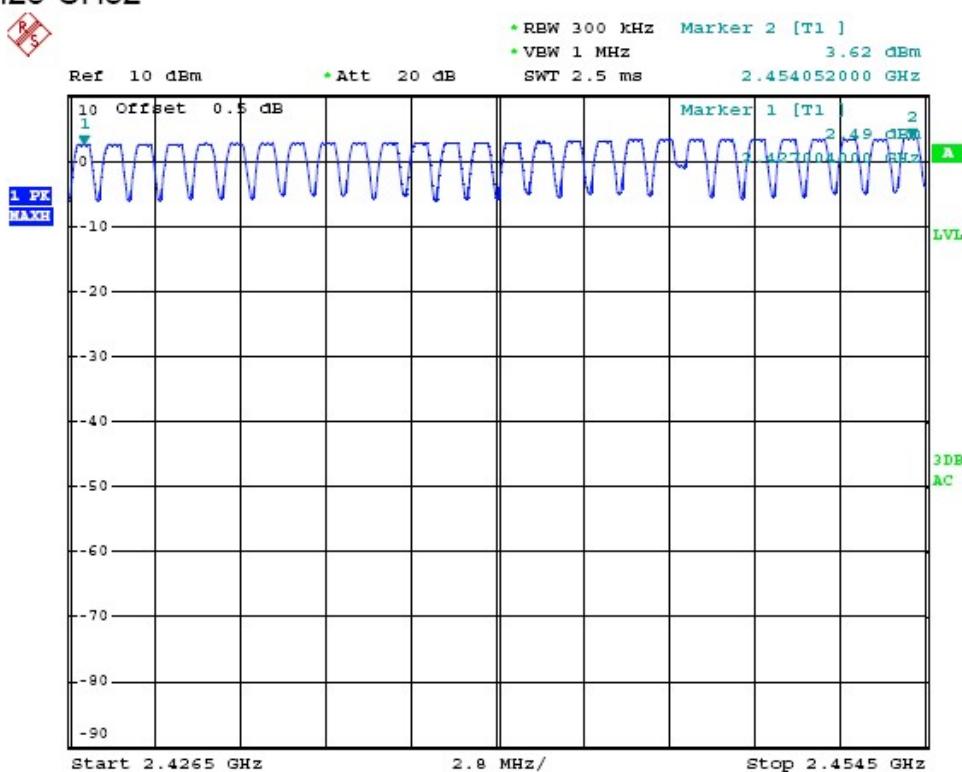
Modulation type: GFSK



### CH00-CH24



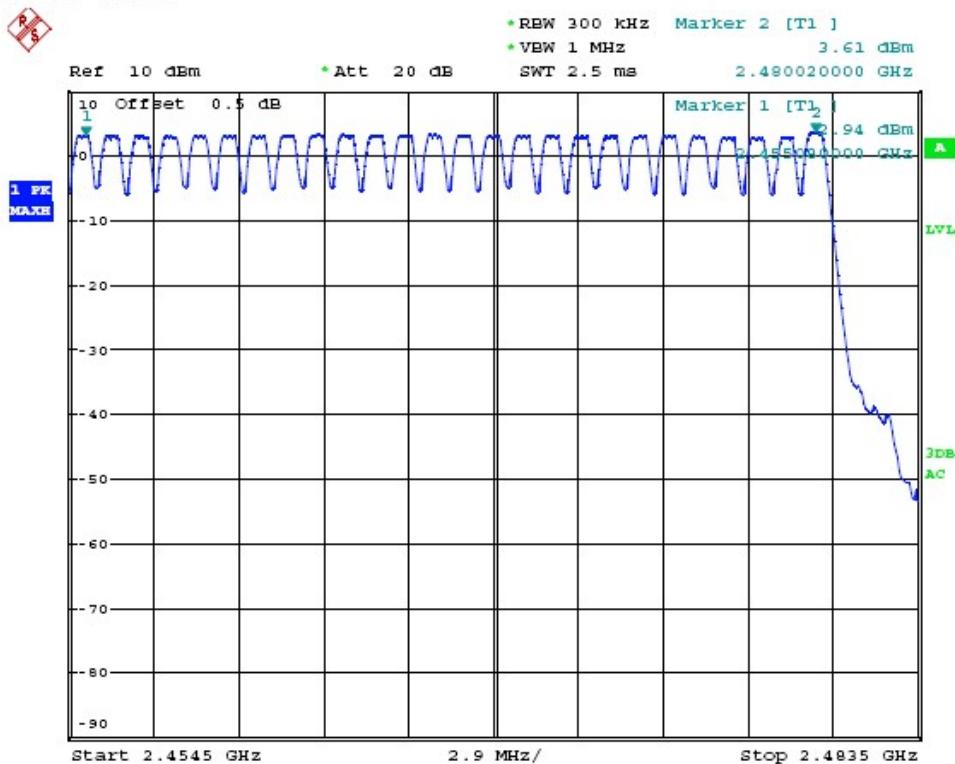
### CH25-CH52



Report No.: 12110930  
FCC ID: X9PBKB83B2

Issued: December 12, 2012      Revised: None

### CH53-CH78



## 7.7. Channel Separation (Carrier Frequency Separation)

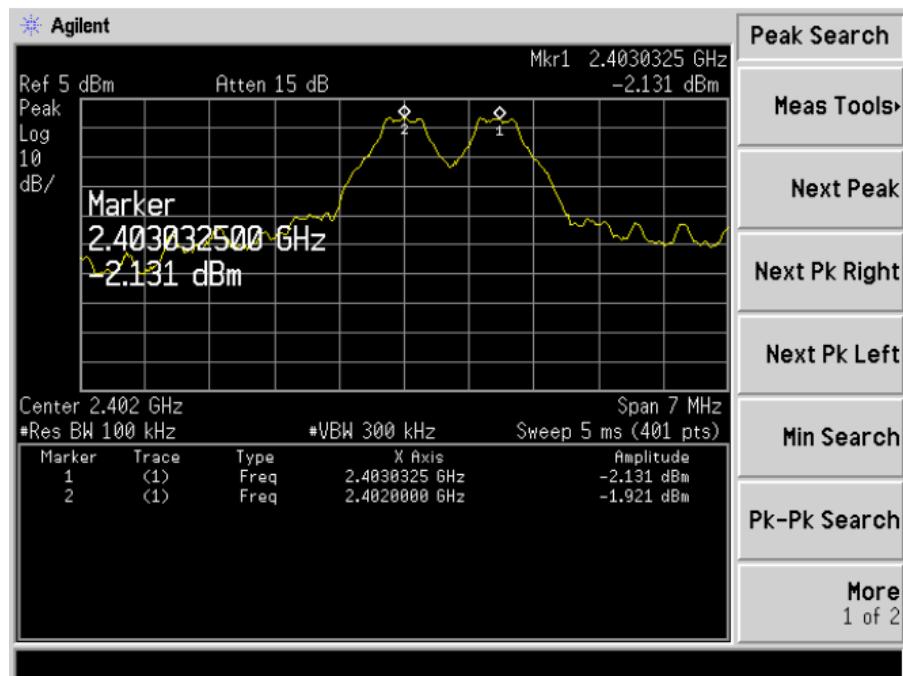
Minimum Hopping Channel Carrier Frequency Separation, FCC Ref: 15.247(a)(1):

Using the DELTA MARKER function of the analyzer, the frequency separation between two adjacent channels was measured and compared against the limit:

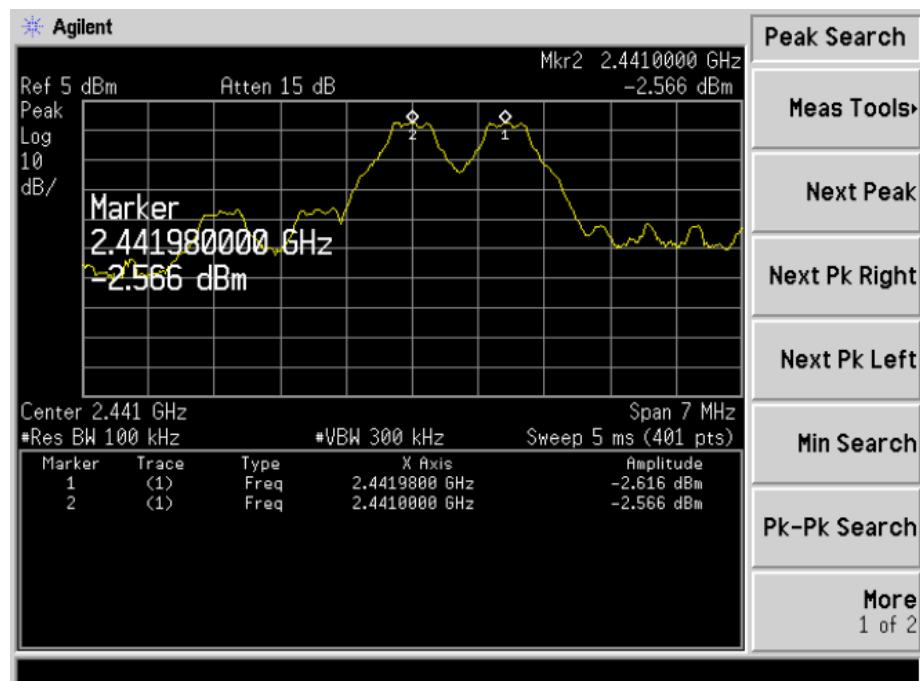
**Modulation type: GFSK**

Channel frequency (MHz)	Separation Read Value (kHz)	Separation Limit 2/3 20dB Down BW(kHz)
2402	1032.50	>562.87
2441	980.000	>565.21
2480	1015.00	>564.60

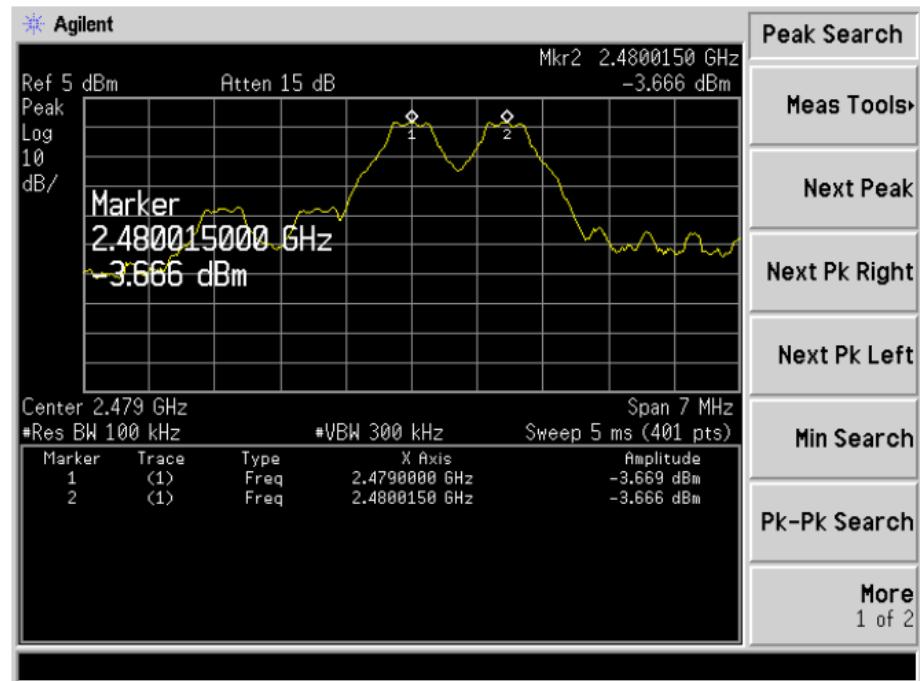
**GFSK CH00**



## GFSK CH39



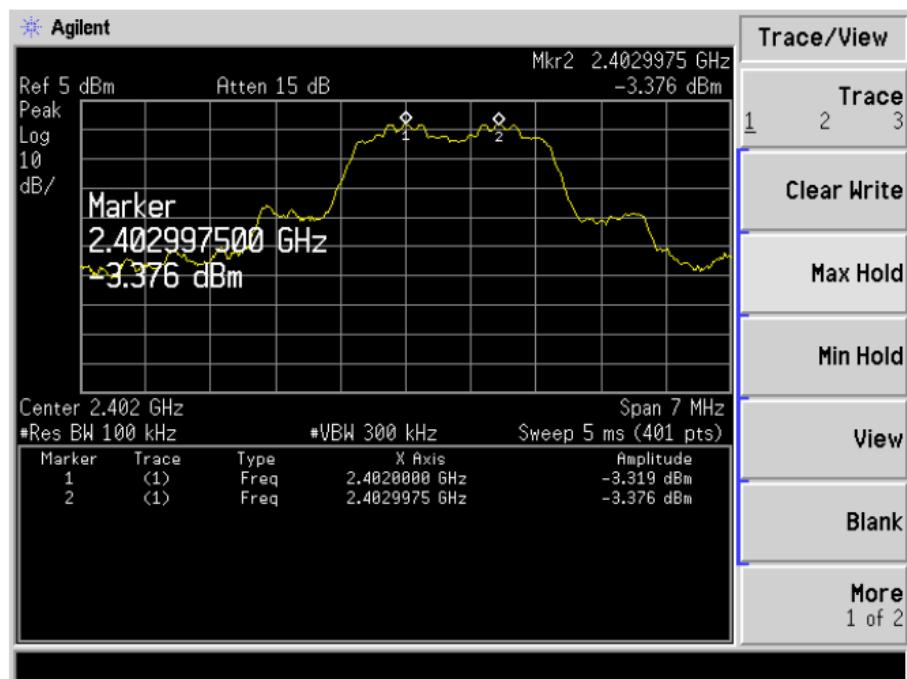
## GFSK CH78



**Modulation type:  $\pi/4$ - DQPSK**

Channel frequency (MHz)	Separation Read Value (kHz)	Separation Limit 2/3 20dB Down BW(kHz)
2402	997.5	>849.33
2441	962.5	>846.67
2480	997.5	>856.00

**$\pi/4$ - DQPSK CH00**

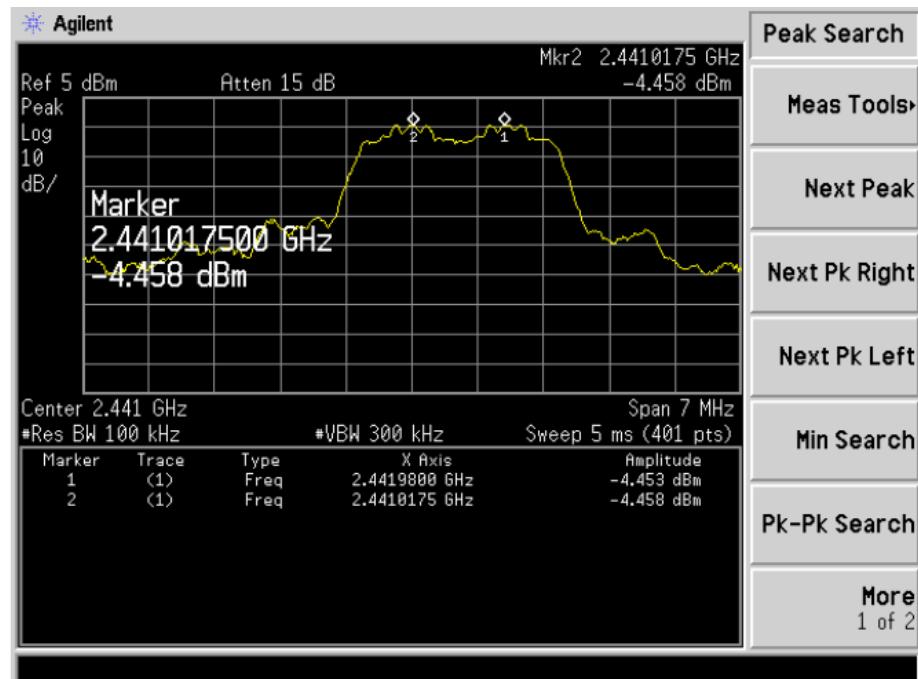


Report No.: 12110930  
FCC ID: X9PBKB83B2

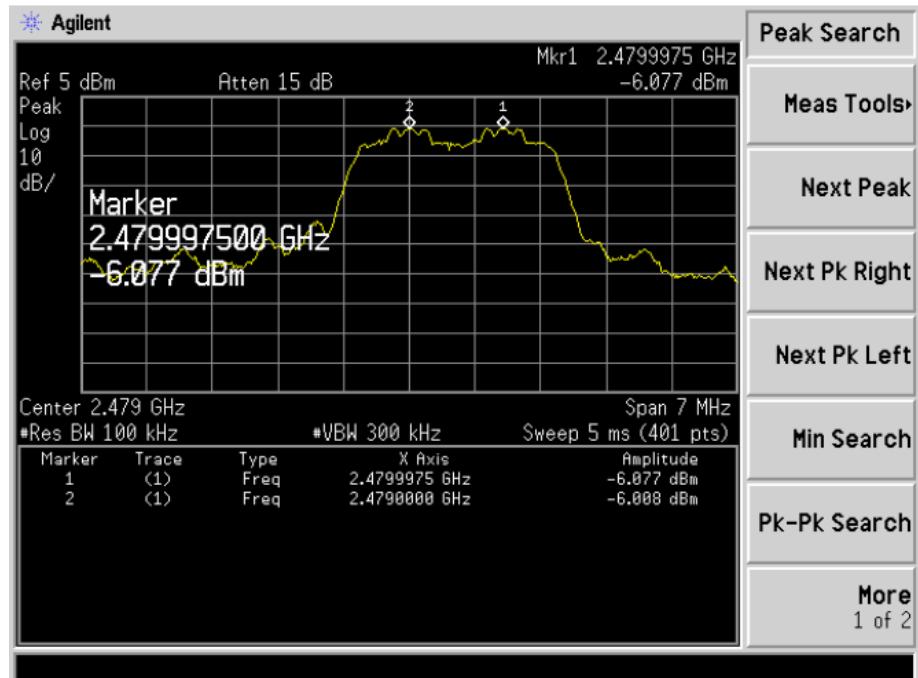
Issued: December 12, 2012

Revised: None

### $\pi/4$ -DQPSK CH39



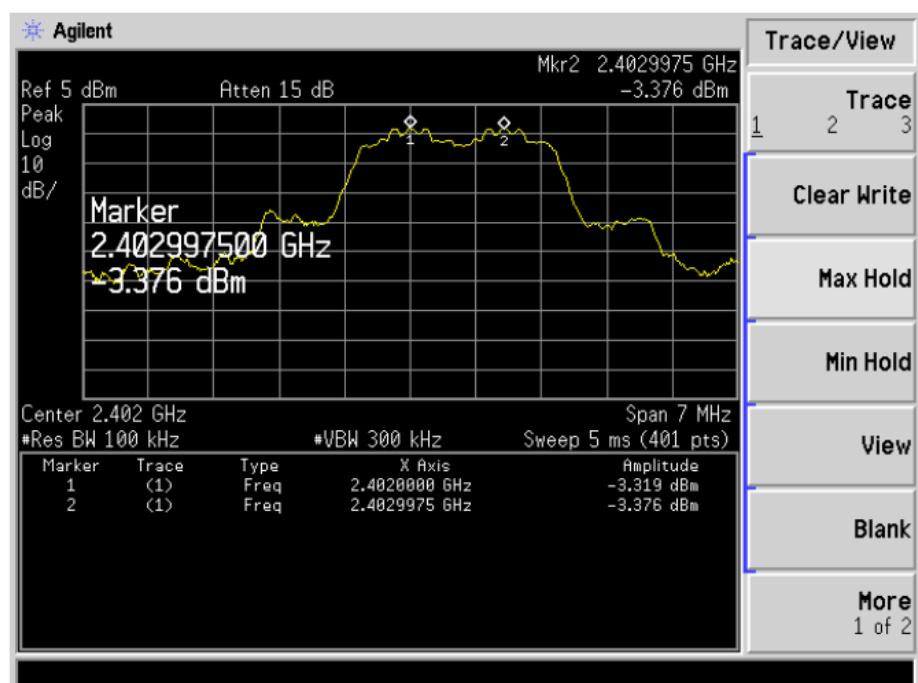
### $\pi/4$ -DQPSK CH78



**Modulation type: 8DPSK**

Channel frequency (MHz)	Separation Read Value (kHz)	Separation Limit 2/3 20dB Down BW(kHz)
2402	997.5	>848.00
2441	980.0	>834.67
2480	1015.0	>850.00

**8DPSK CH00**

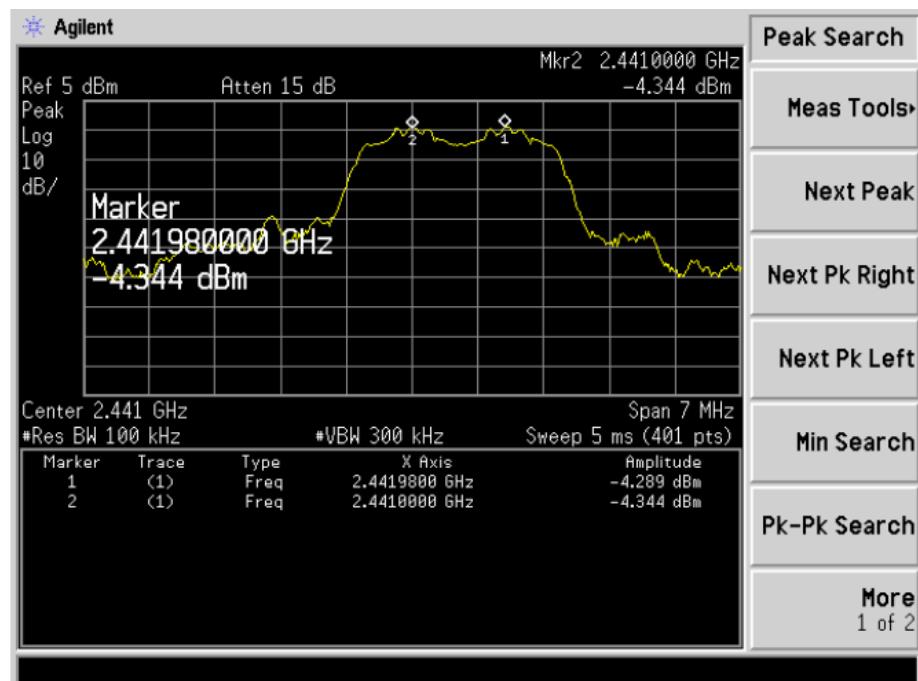


Report No.: 12110930  
FCC ID: X9PBKB83B2

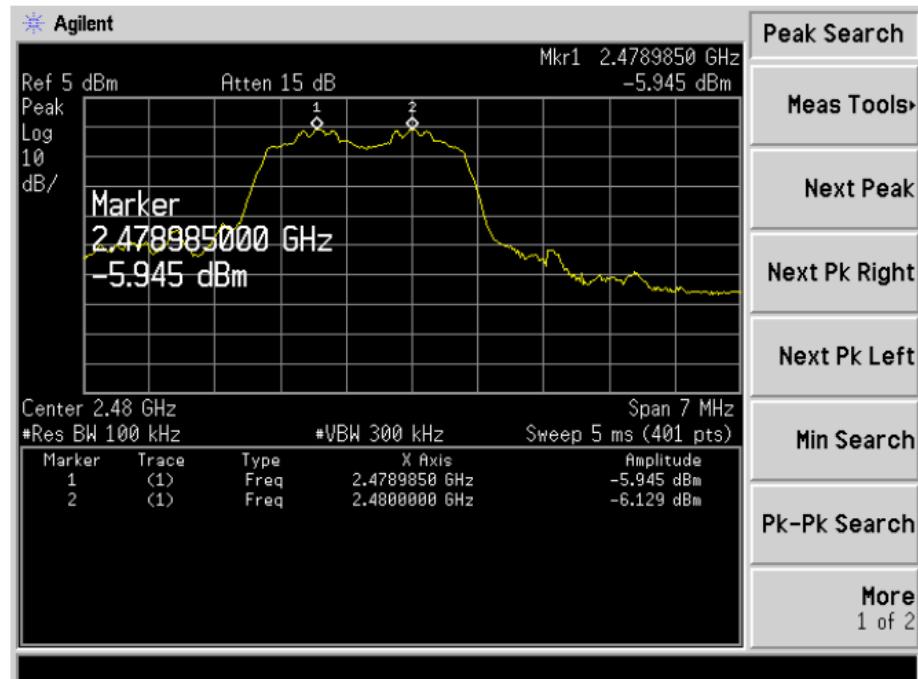
Issued: December 12, 2012

Revised: None

## 8DPSK CH39



## 8DPSK CH78



## 7.8. Dwell Time (Time of Occupancy)

Average Channel Occupancy Time, FCC Ref: 15.247(a)(1)(iii):

The Spectrum analyzer center frequency was set to one of the known hopping channels. The SWEEP was set to 10ms, the SPAN was set to ZERO SPAN, and the TRIGGER was set to VIDEO. The time duration of the transmissions so captured was measured with the MARKER DELTA function.

The SWEEP was then set to the time required by the regulation (0.4s x number of hopping channels employed for 2400-2483.5 MHz). The analyzer was set to SINGLE SWEEP, the total ON time was added and compared against the limit (0.4s)

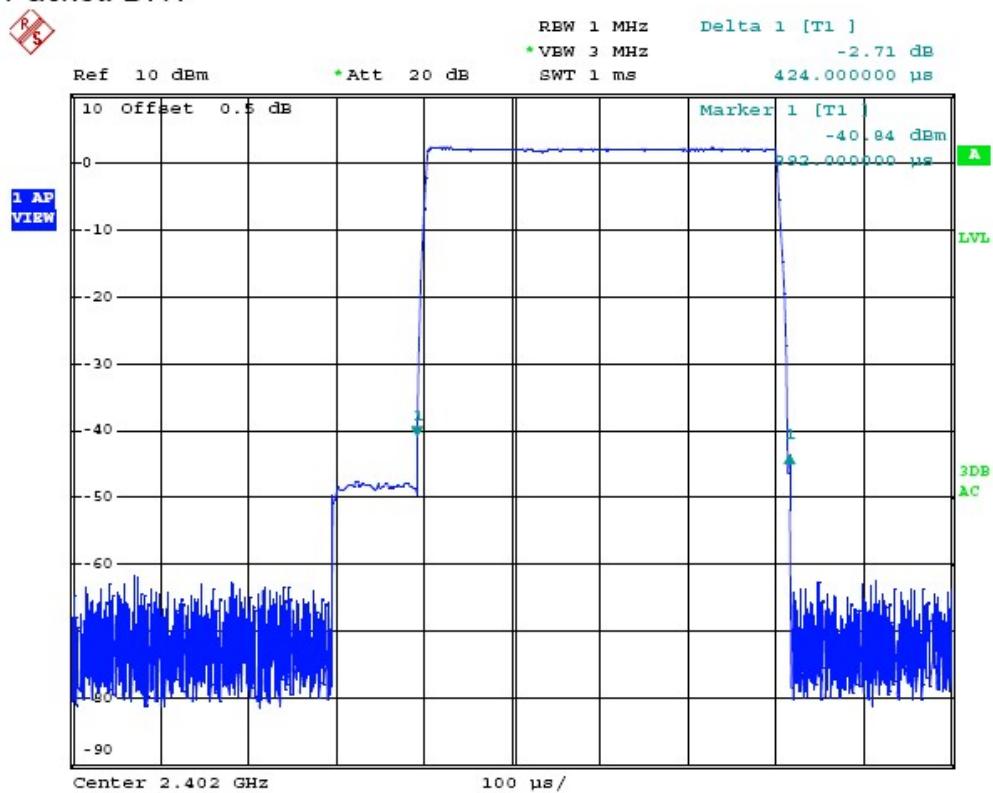
The maximum number of hopping channels in 31.6s for DH1=1600 / 2 / 79 \* 31.6=320

The maximum number of hopping channels in 31.6s for DH3=1600 / 4 / 79 \* 31.6=160

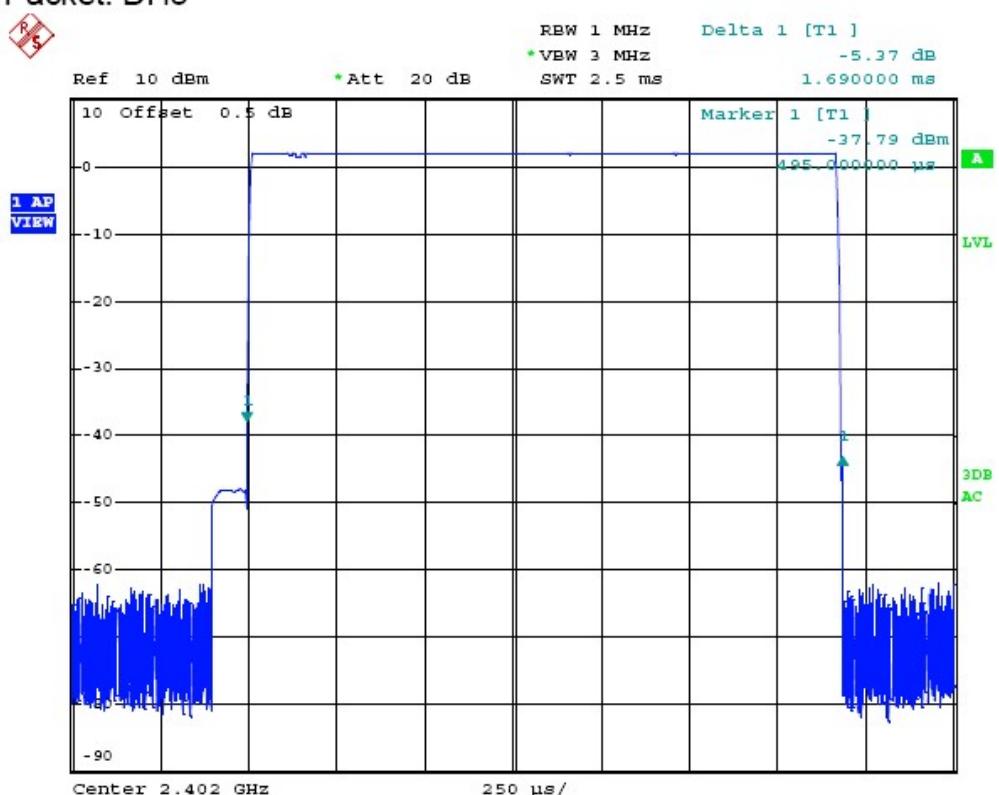
The maximum number of hopping channels in 31.6s for DH5=1600 / 6 / 79 \* 31.6=107

Modulation Type	Packet	Max Dwell Time	Limit (s)	Result
GFSK	DH1	0.424 ms * 320= 135.7 ms	0.4	Pass
	DH3	1.690 ms * 160= 270.4 ms	0.4	Pass
	DH5	2.936 ms * 107= 314.2 ms	0.4	Pass
$\pi/4$ -DQPSK	DH1	0.436 ms * 320= 139.5 ms	0.4	Pass
	DH3	1.700 ms * 160= 272.0 ms	0.4	Pass
	DH5	2.745 ms * 107= 293.7 ms	0.4	Pass
8DPSK	DH1	0.434 ms * 320= 138.9 ms	0.4	Pass
	DH3	1.700 ms *160= 272.0 ms	0.4	Pass
	DH5	2.952 ms *107= 315.9 ms	0.4	Pass

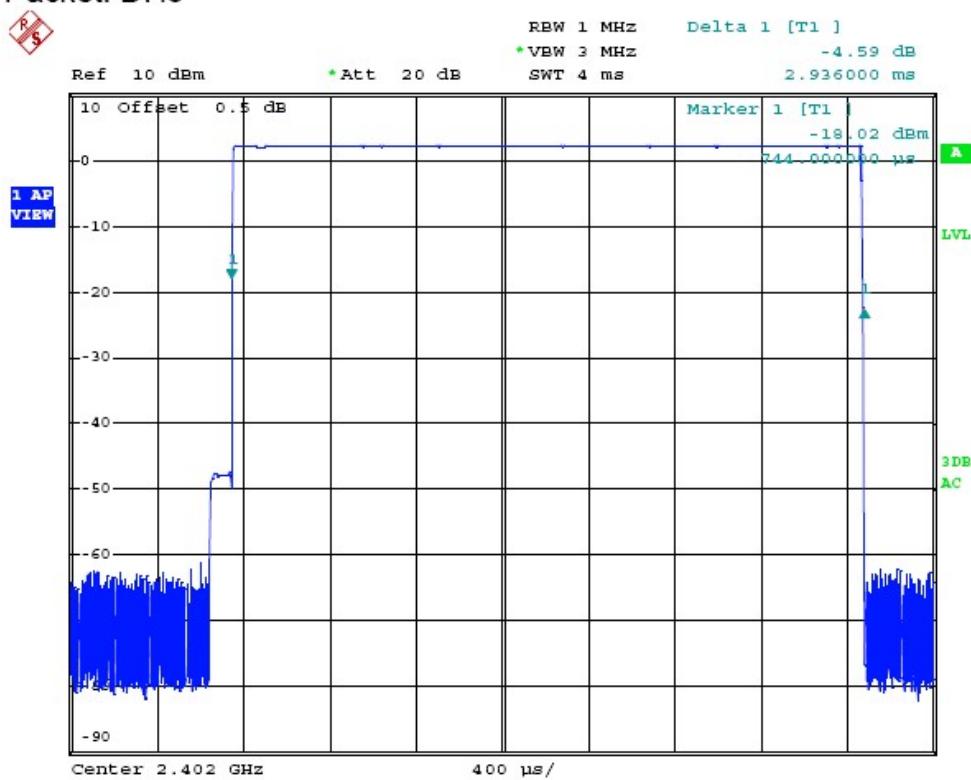
Modulation Type: GFSK  
Packet: DH1



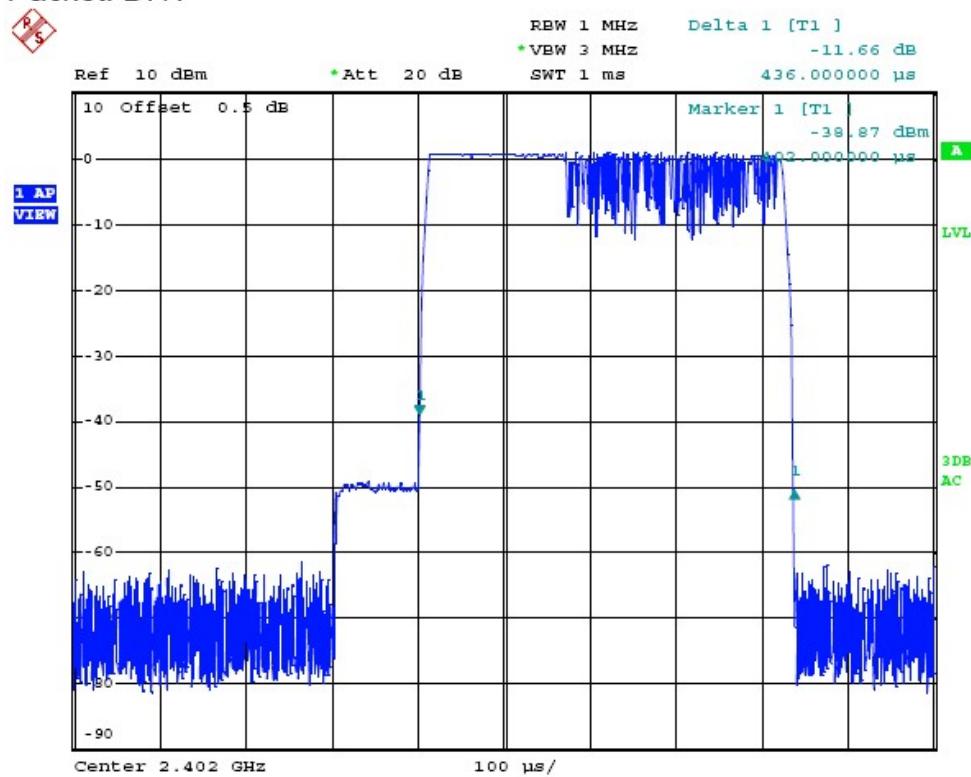
Packet: DH3



### Packet: DH5



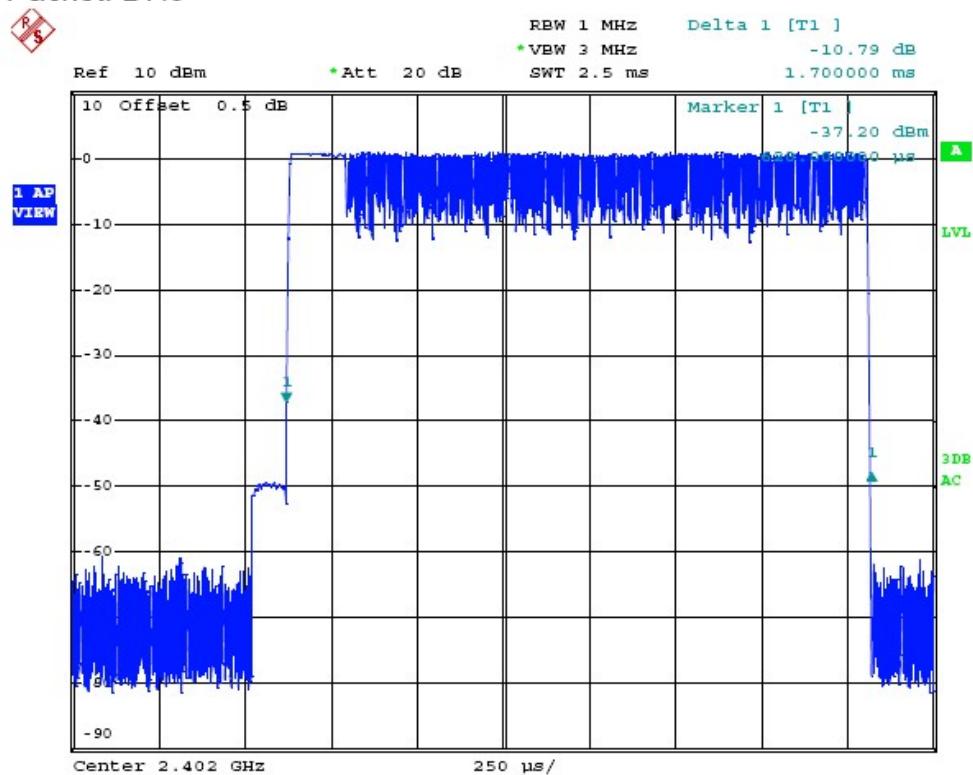
Modulation Type:  $\pi/4$  –DQPSK  
Packet: DH1



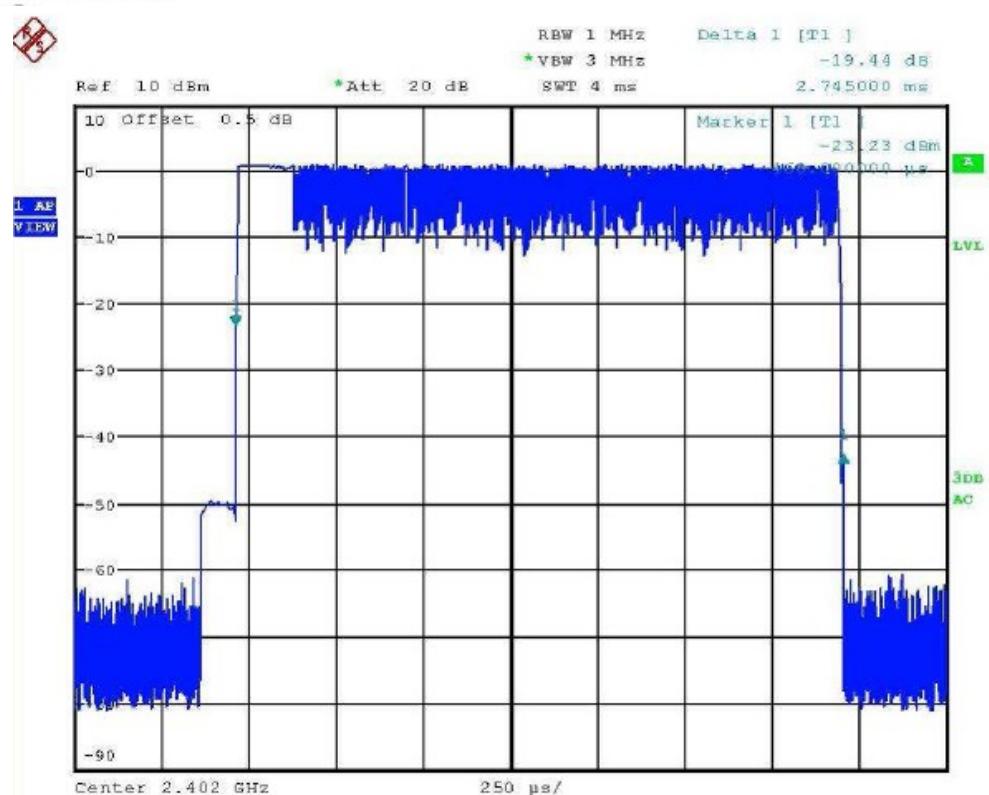
Report No.: 12110930  
FCC ID: X9PBKB83B2

Issued: December 12, 2012 Revised: None

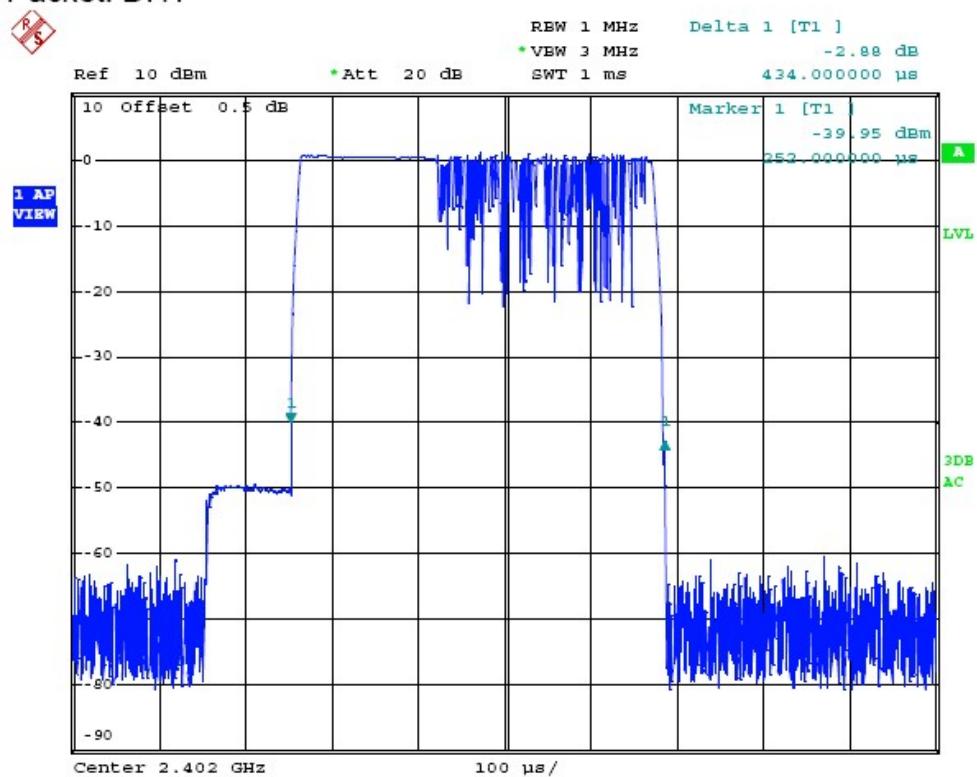
### Packet: DH3



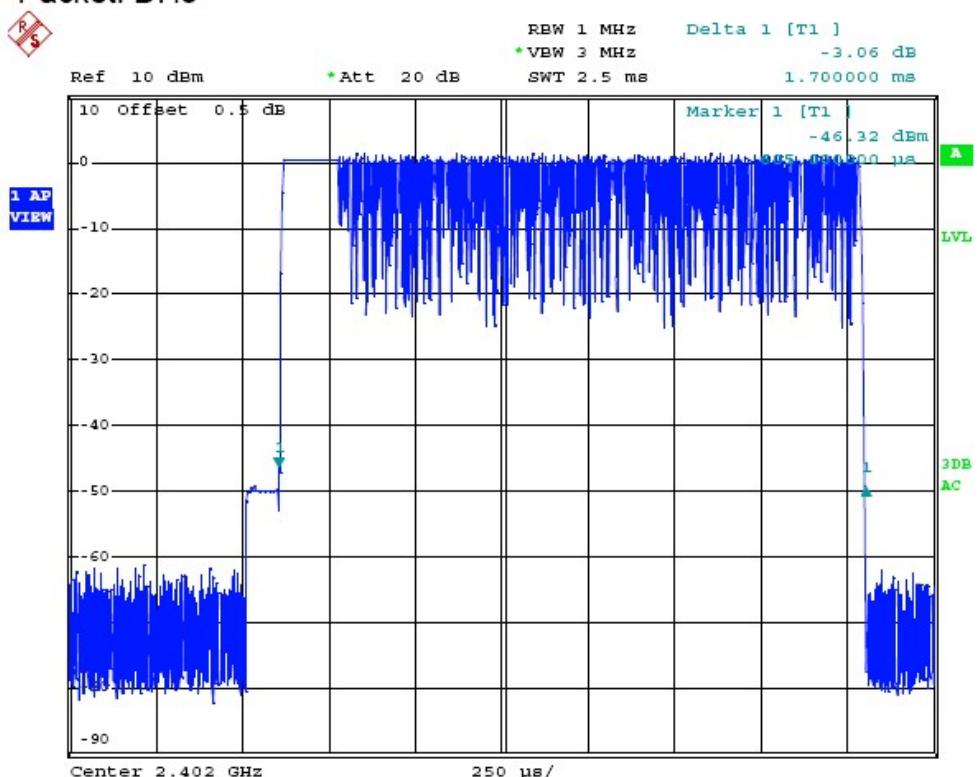
### Packet: DH5



Modulation Type: 8DPSK  
Packet: DH1



Packet: DH3

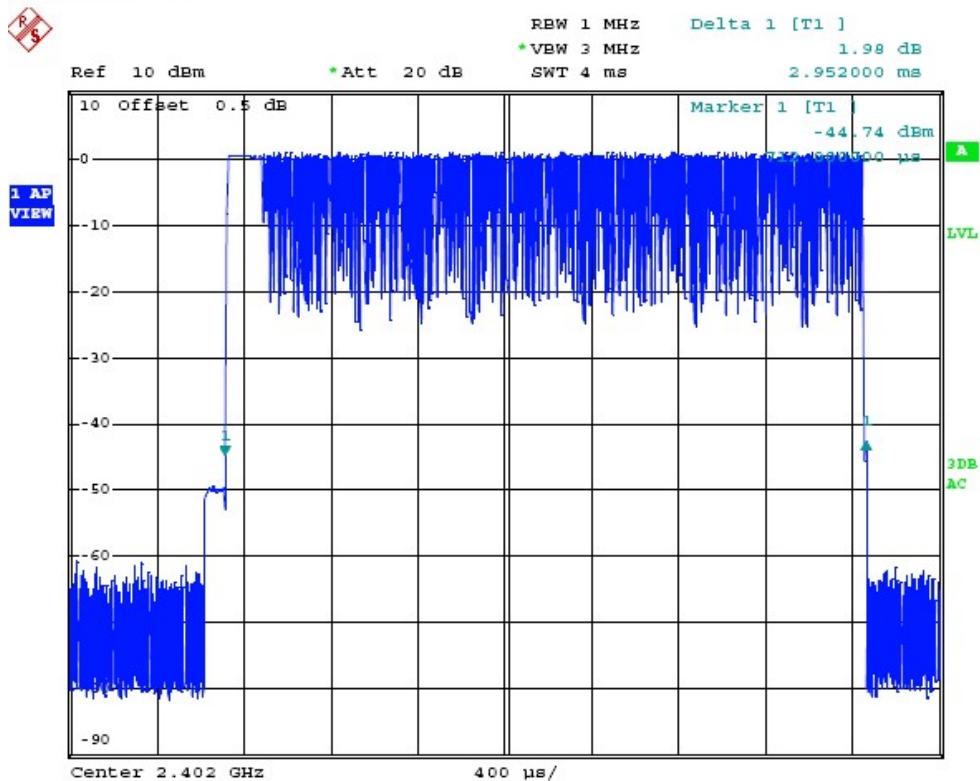


Report No.: 12110930  
FCC ID: X9PBKB83B2

Issued: December 12, 2012

Revised: None

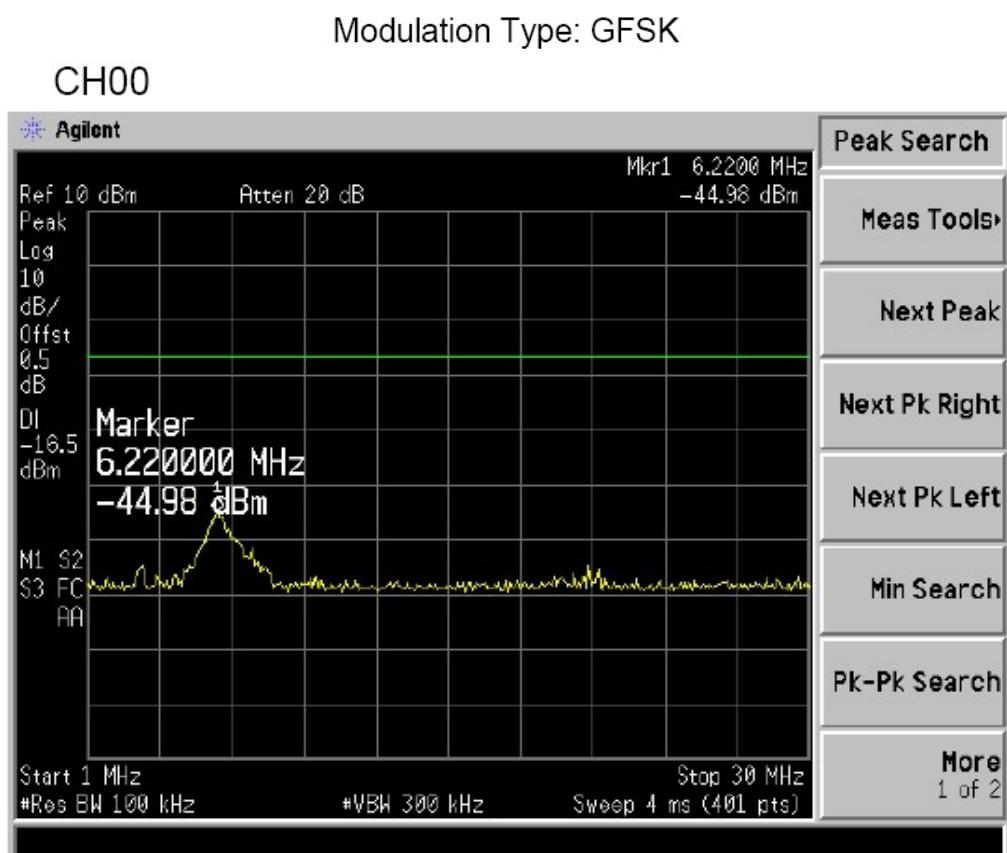
### Packet: DH5

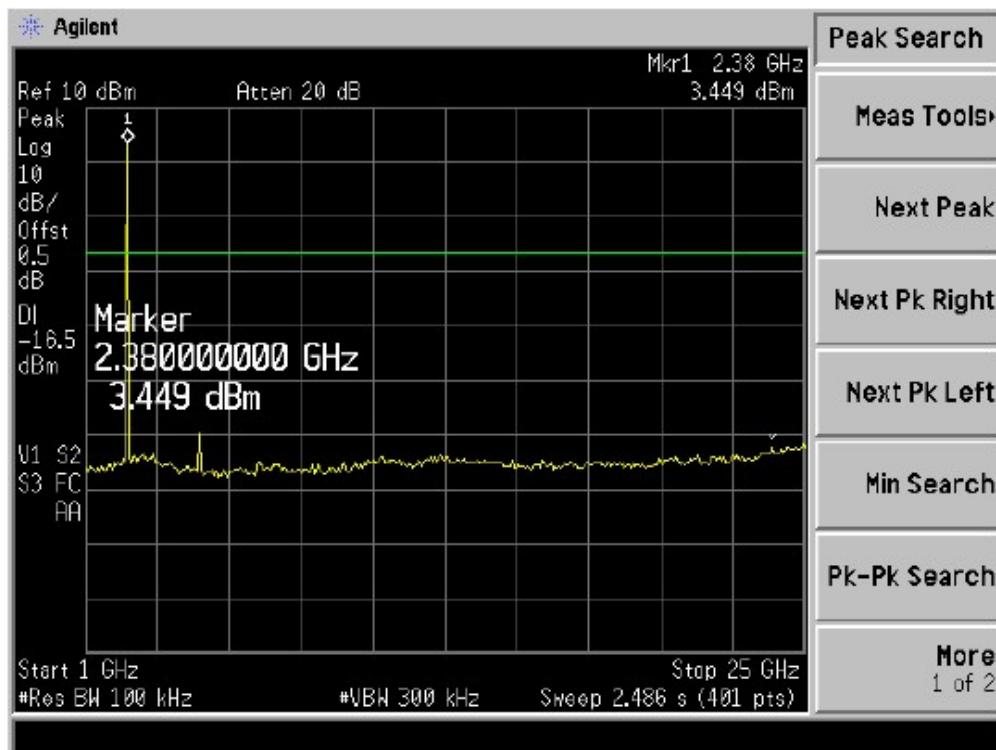
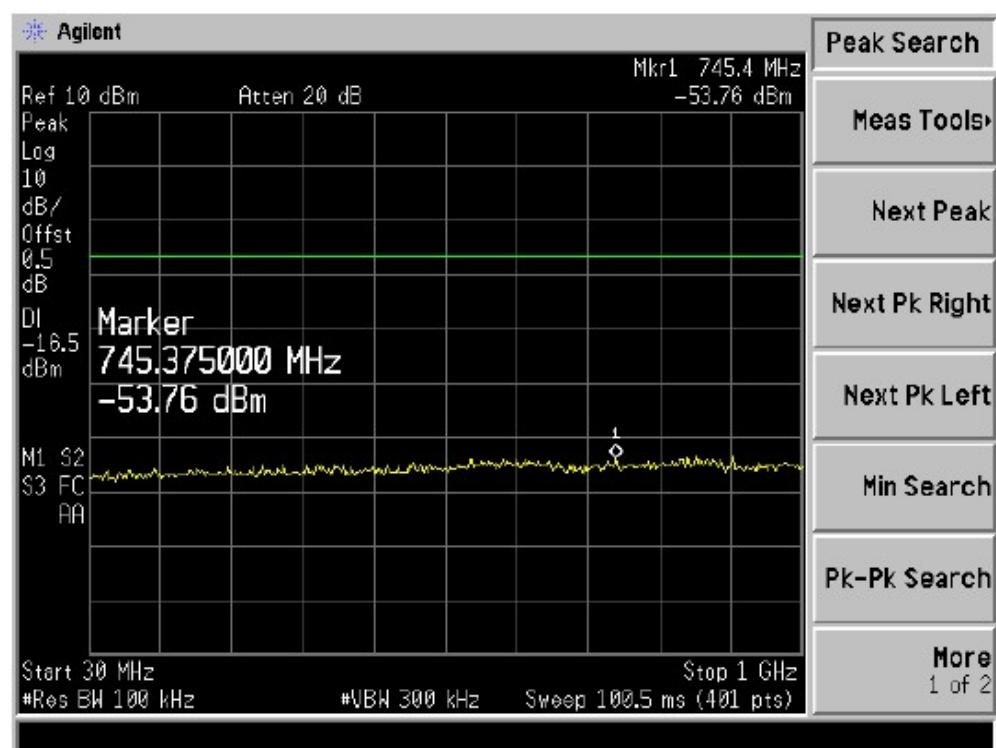


## 7.9. transmitter Spurious Emission (Conducted)

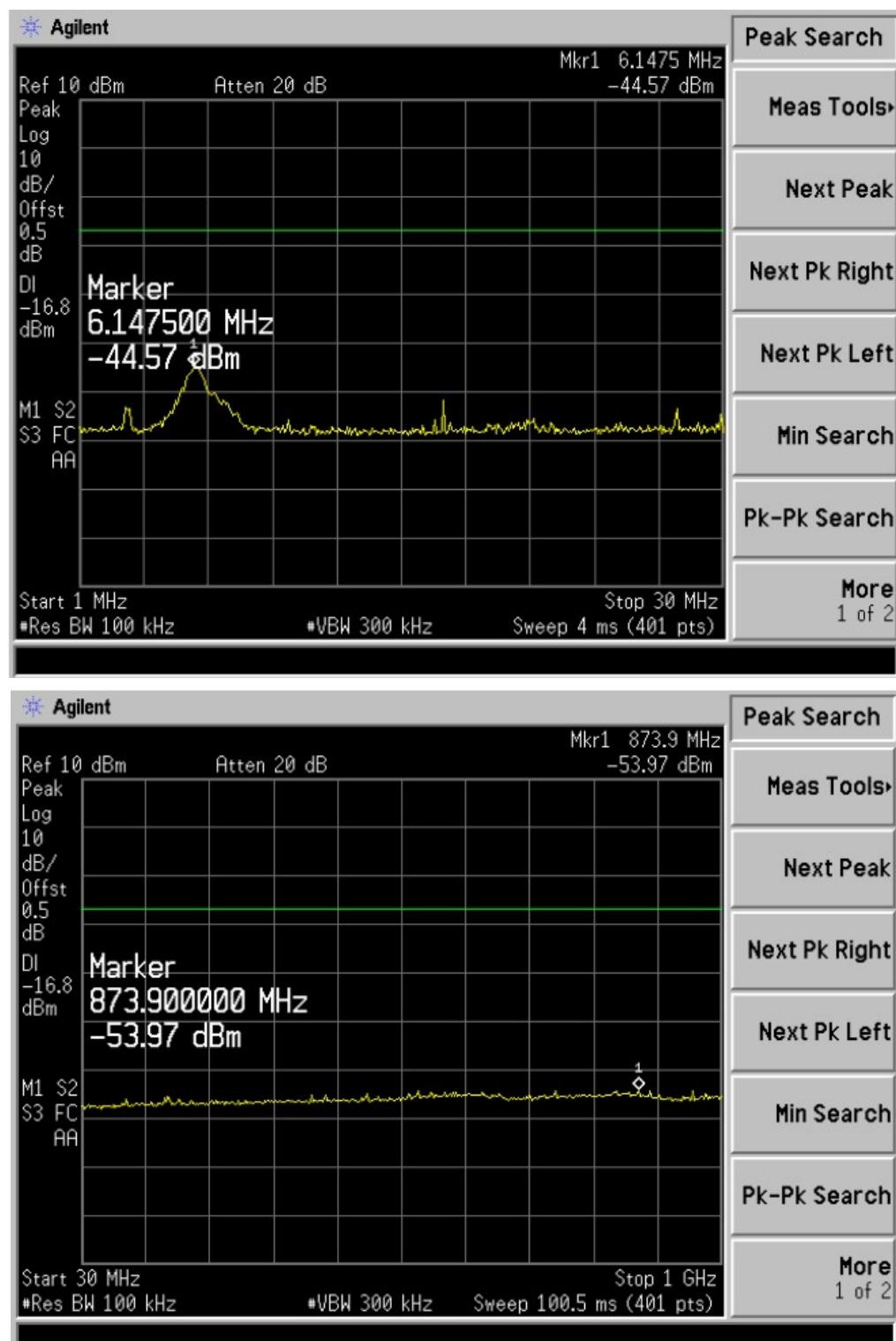
Average Channel Occupancy Time, FCC Ref: 15.247(a)(1)(iii):

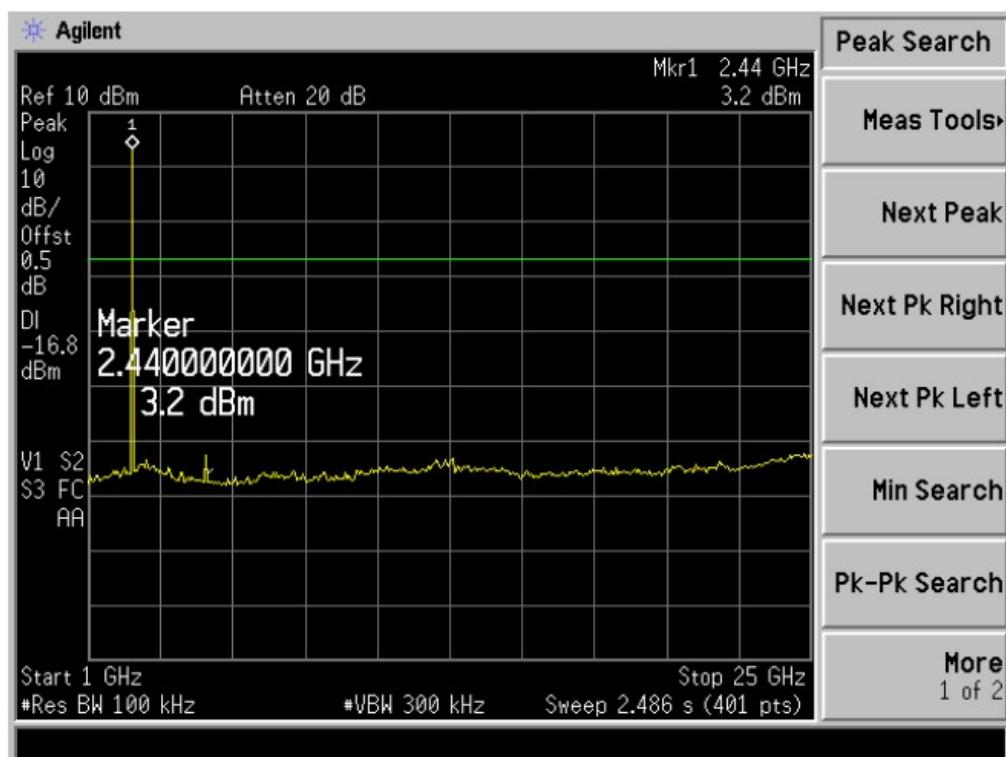
All spurious emission and up to the tenth harmonic was measured and they were found to be at least 20 dB below the highest level of the desired power in the passband.



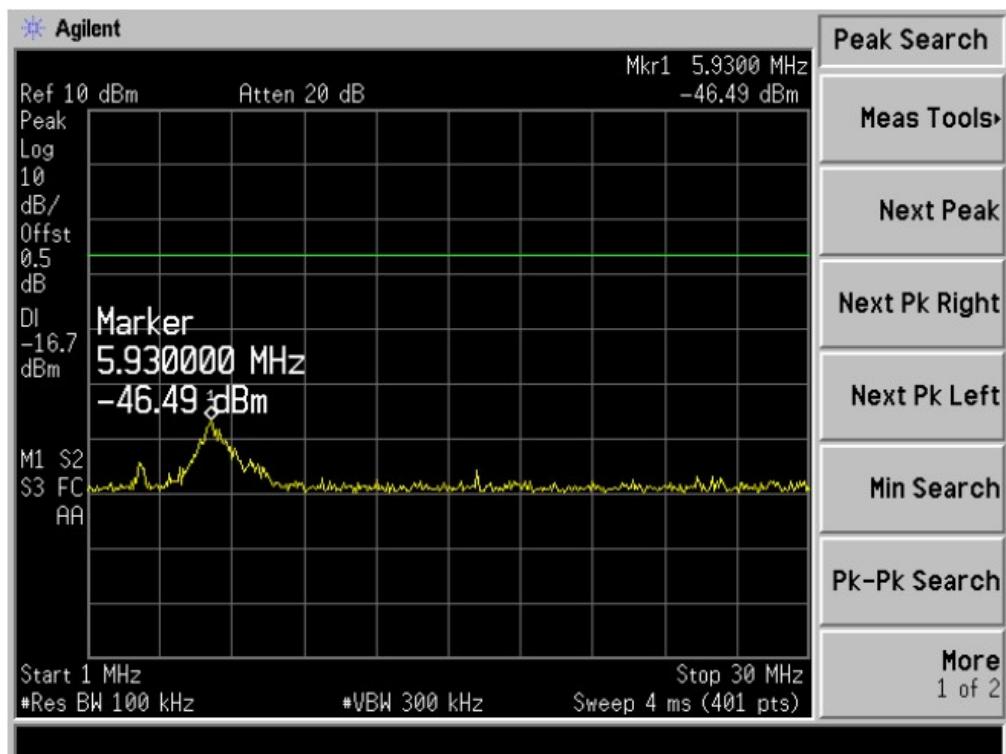


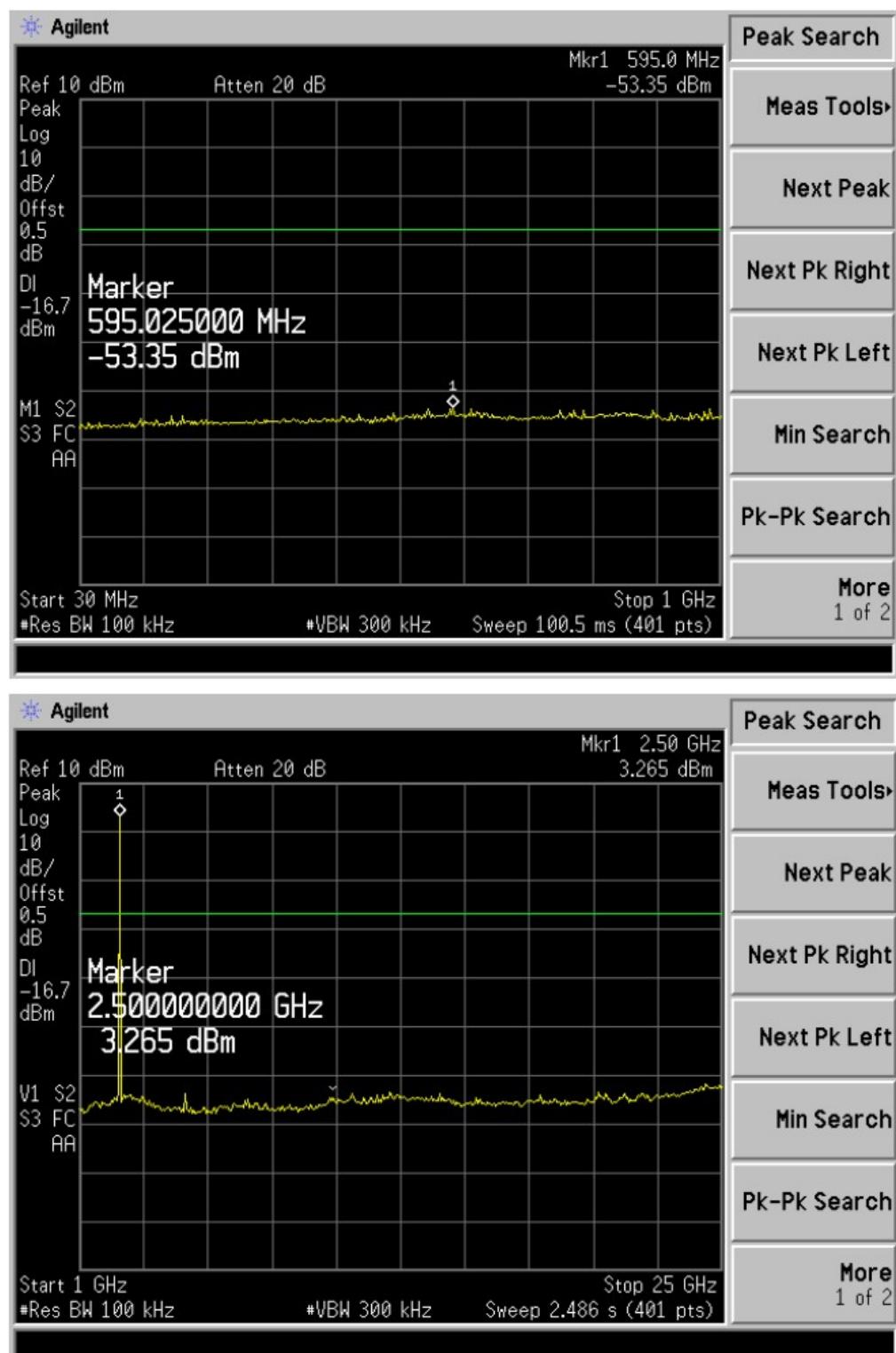
CH39





CH78





## **8. ANTENNA REQUIREMENT**

### **8.1. Standard applicable**

For intentional device, according to FCC part 15C section 15.247 requirements, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

### **8.2. Antenna connected construction**

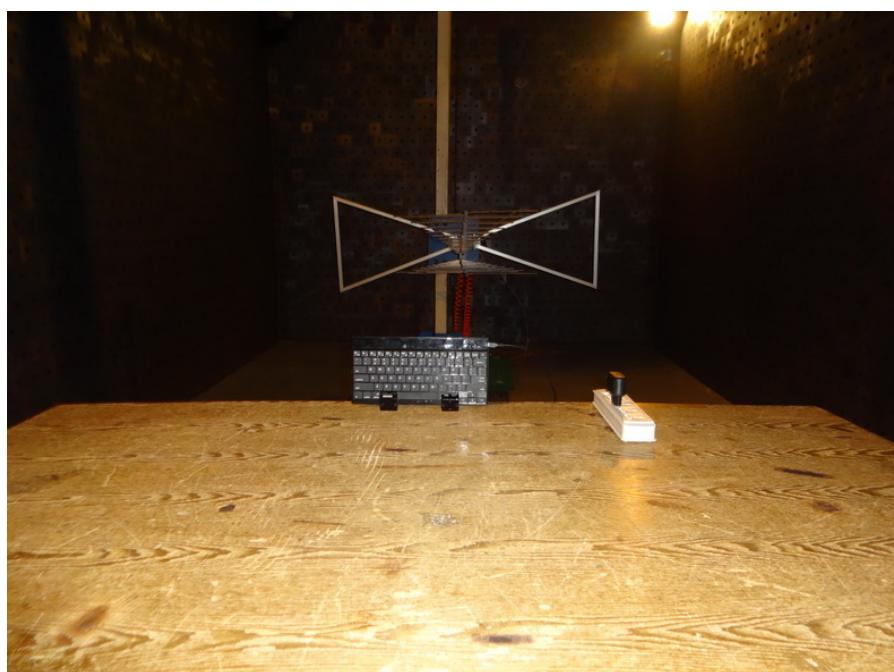
The antenna used in this product is PCB ANTENNA and no consideration of replacement.

## 9    PHOTOGRAPHS OF THE TEST CONFIGURATION

### CONDUCTED EMISSION TEST

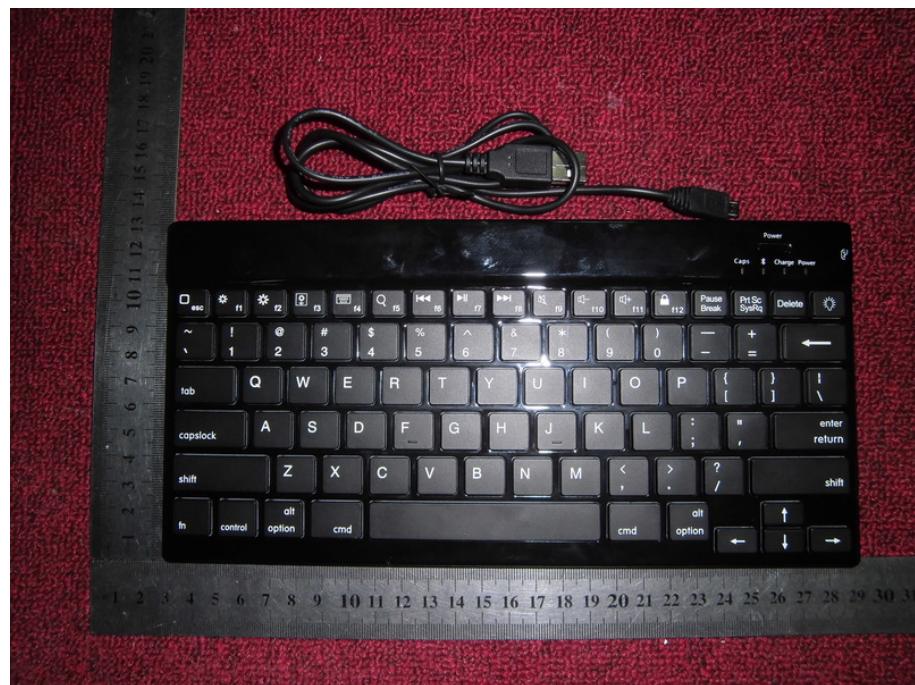


### RADIATED EMISSION TEST



## 10 PHOTOGRAPHS OF EUT

Appearance photograph of EUT



Appearance photograph of EUT



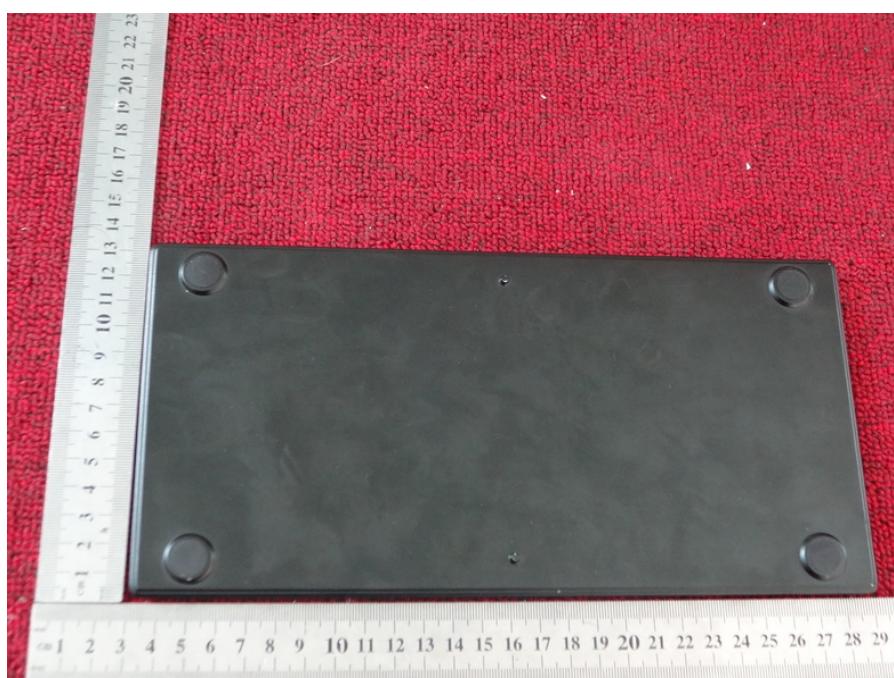
Report No.: 12110930  
FCC ID: X9PBKB83B2

Issued: December 12, 2012      Revised: None

Appearance photograph of EUT



Appearance photograph of EUT



Report No.: 12110930  
FCC ID: X9PBKB83B2

Issued: December 12, 2012      Revised: None

### Appearance photograph of EUT



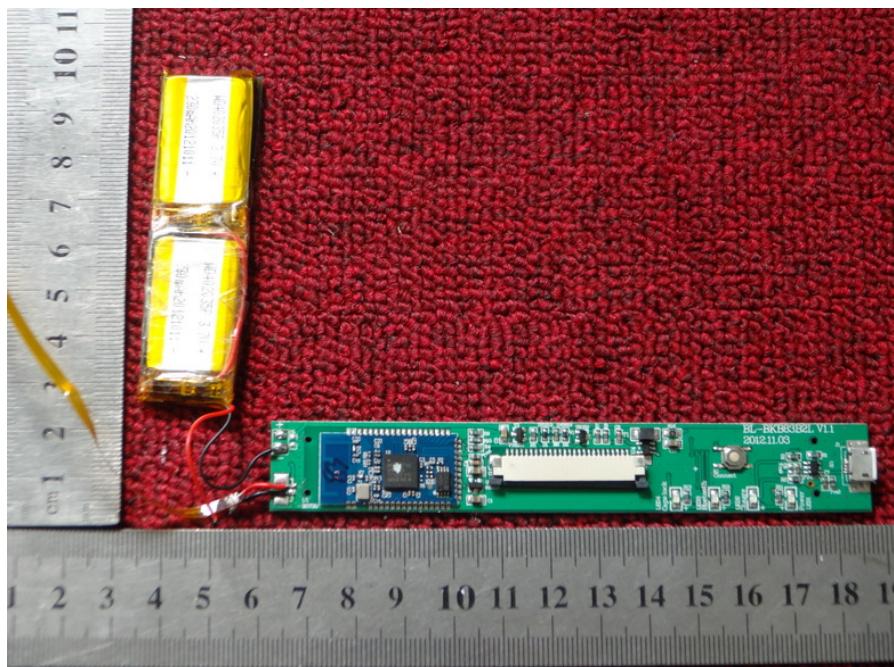
### Internal photograph of EUT



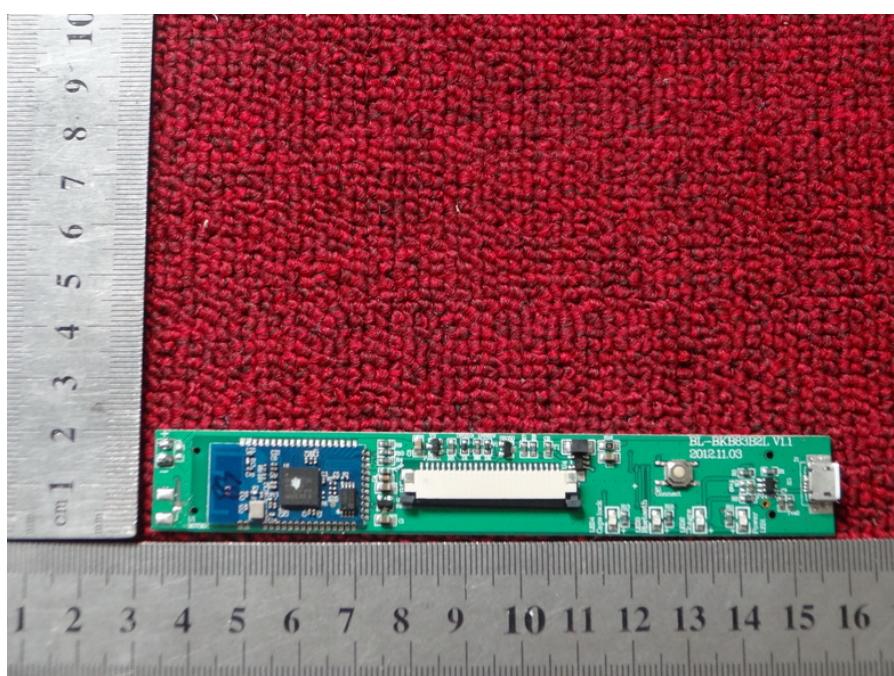
Report No.: 12110930  
FCC ID: X9PBKB83B2

Issued: December 12, 2012      Revised: None

PCB photograph of EUT



PCB photograph of EUT



Report No.: 12110930  
FCC ID: X9PBKB83B2

Issued: December 12, 2012      Revised: None

PCB photograph of EUT

