

5. CARRIER FREQUENCY SEPARATION TEST

5.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(a)(1)	Channel Separation	>25KHz or >two-thirds of the 20 dB bandwidth (Which is greater)	2400-2483.5	PASS

5.1.1 TEST PROCEDURE

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Spectrum Setting:
RBW=100 kHz, VBW=300 kHz, detector= Peak, Sweep Time =auto.
- (3) The EUT was set to the Hopping Mode for Channel Separation Test and continuously transmitting for the Test.

5.1.2 DEVIATION FROM STANDARD

No deviation.

5.1.3 TEST SETUP



5.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

5.1.5 TEST RESULTS

EUT :	Bluetooth Hearphone Amp	Model Name :	FB1121
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 5Vfrom adapter
Test Mode :	GFSK Mode /CH00, CH39, CH78		

Mode	Channel	Frequency (MHz)	Test Result (KHz)	Limit (kHz)	Result
GFSK	Middle	2441	999	556.867	Pass
$\pi/4$ -DQPSK	Middle	2441	1002	812.667	Pass
8DPSK	Middle	2441	1002	812.667	Pass



$\pi/4$ -DQPSK mode



8DPSK mode



6. NUMBER OF HOPPING CHANNEL

6.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(a)(a)	Number of Hopping Channel	>15 channels	2400-2483.5	PASS

6.1.1 TEST PROCEDURE

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Spectrum Setting: RBW=100 kHz, VBW=300 kHz, Detector=Peak, Sweep time= Auto.
- (3) The EUT was set to the Hopping Mode for Channel Separation Test and continuously transmitting for the Test.

6.1.2 DEVIATION FROM STANDARD

No deviation.

6.1.3 TEST SETUP



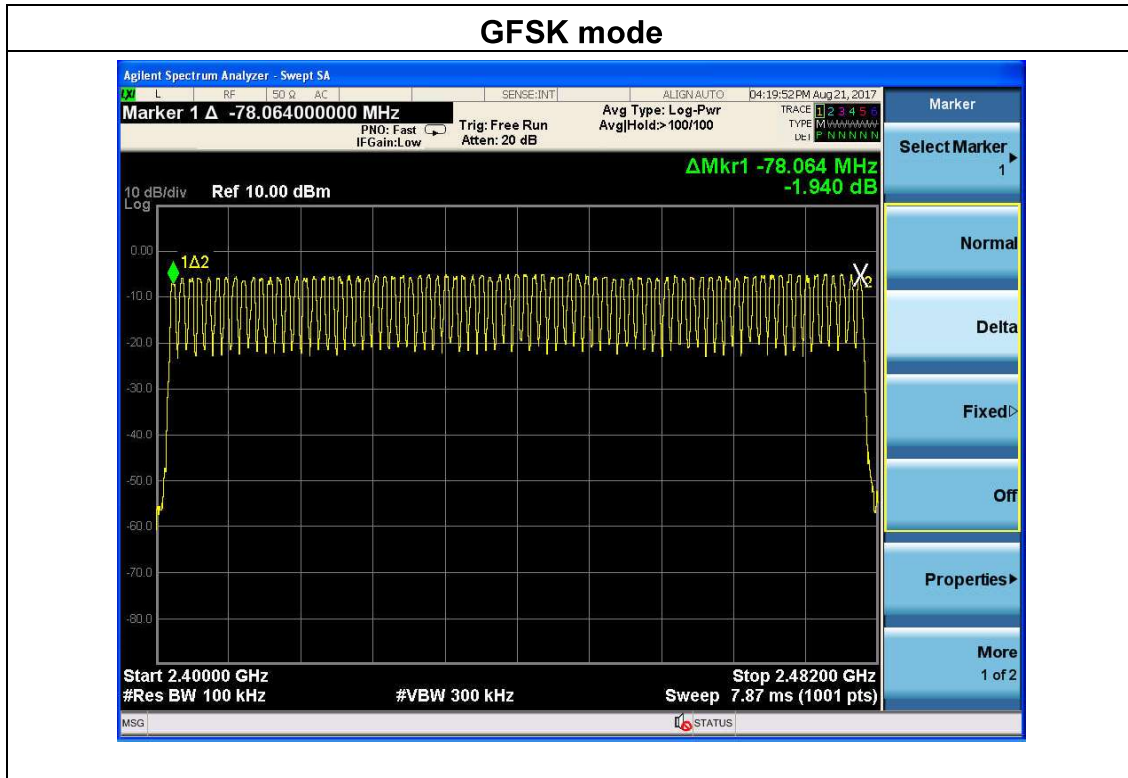
6.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

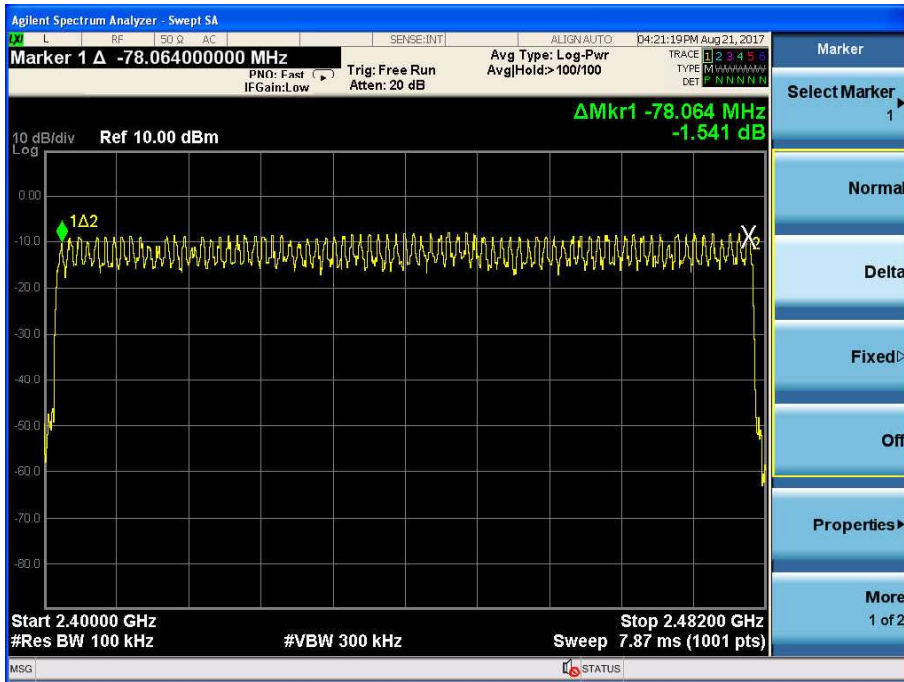
6.1.5 TEST RESULTS

EUT :	Bluetooth Hearphone Amp	Model Name :	FB1121
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 5Vfrom adapter
Test Mode :	GFSK, π/4-DQPSK, 8-DPSK Mode / CH00, CH39, CH78		

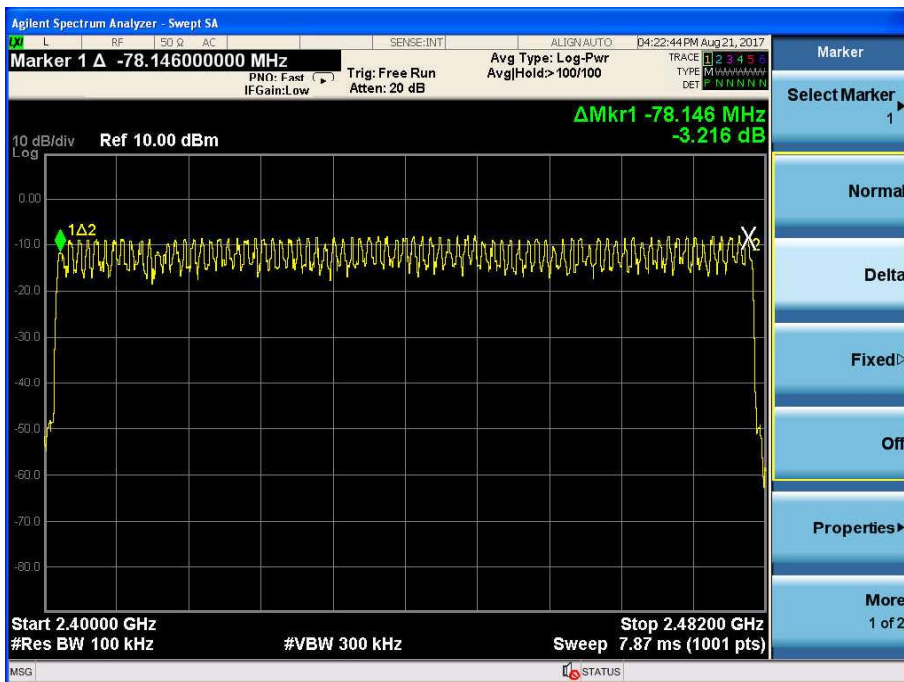
Mode	Quantity of Hopping Channel	Limit	Judgment
GFSK, π/4-DQPSK, 8DPSK	79	>15	PASSED



$\pi/4$ -DQPSK mode



8DPSK mode



7. DWELL TIME

7.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(a)(a)	Dwell time	0.4 sec	2400-2483.5	PASS

7.1.1 TEST PROCEDURE

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Spectrum Setting: RBW=1MHz, VBW=1MHz, Span=0Hz, Detector=Peak
- (3) Use video trigger with the trigger level set to enable triggering only on full pulses.
- (4) Sweep Time is more than once pulse time.
- (5) Set the center frequency on any frequency would be measure and set the frequency span to zero span.
- (6) Measure the maximum time duration of one single pulse.
- (7) Set the EUT for packet transmitting.
- (8) Measure the maximum time duration of one single pulse.
- (9) The EUT was set to the Hopping Mode for Dwell Time Test

7.1.2 DEVIATION FROM STANDARD

No deviation.

7.1.3 TEST SETUP



7.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

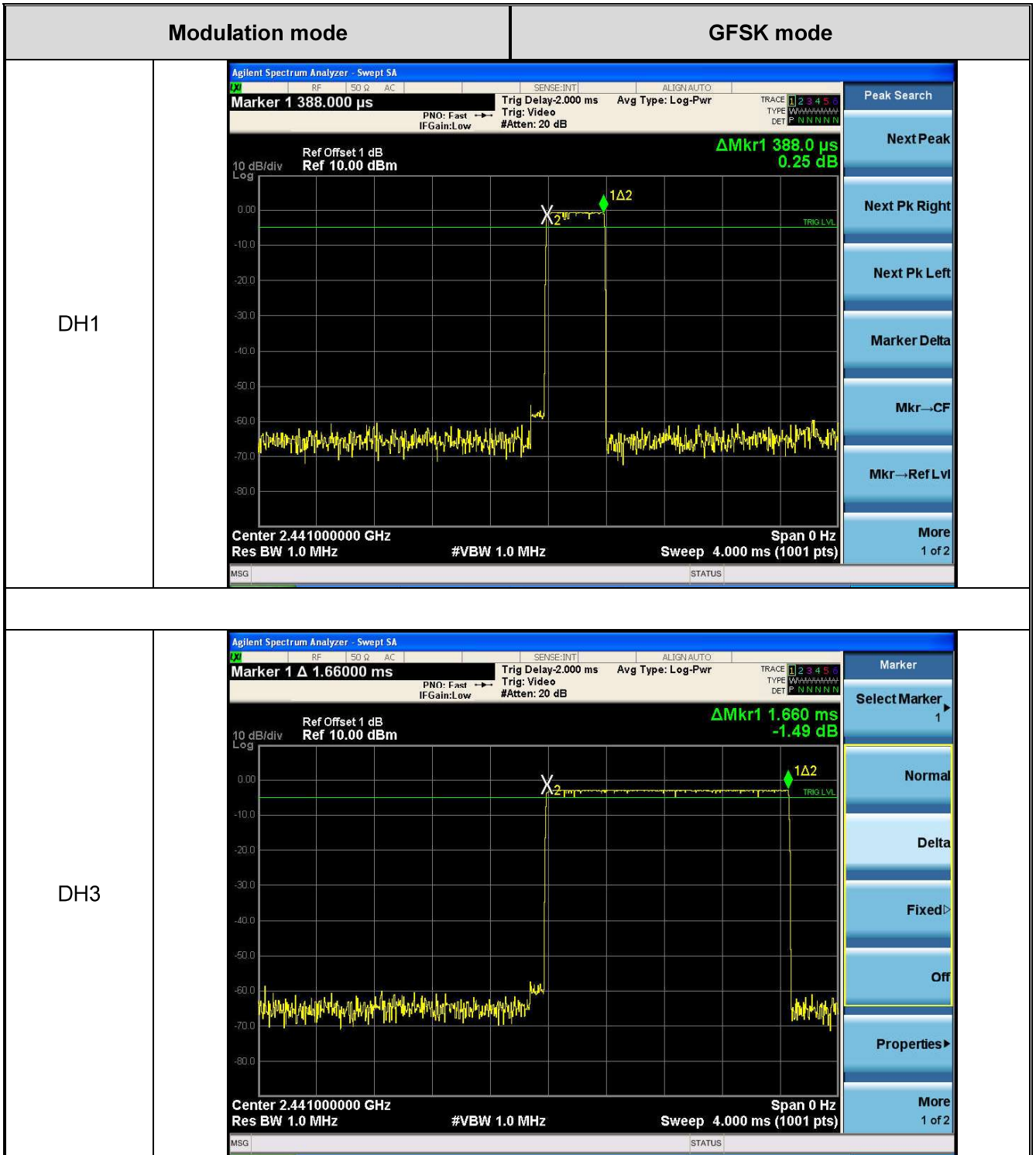
7.1.5 TEST RESULTS

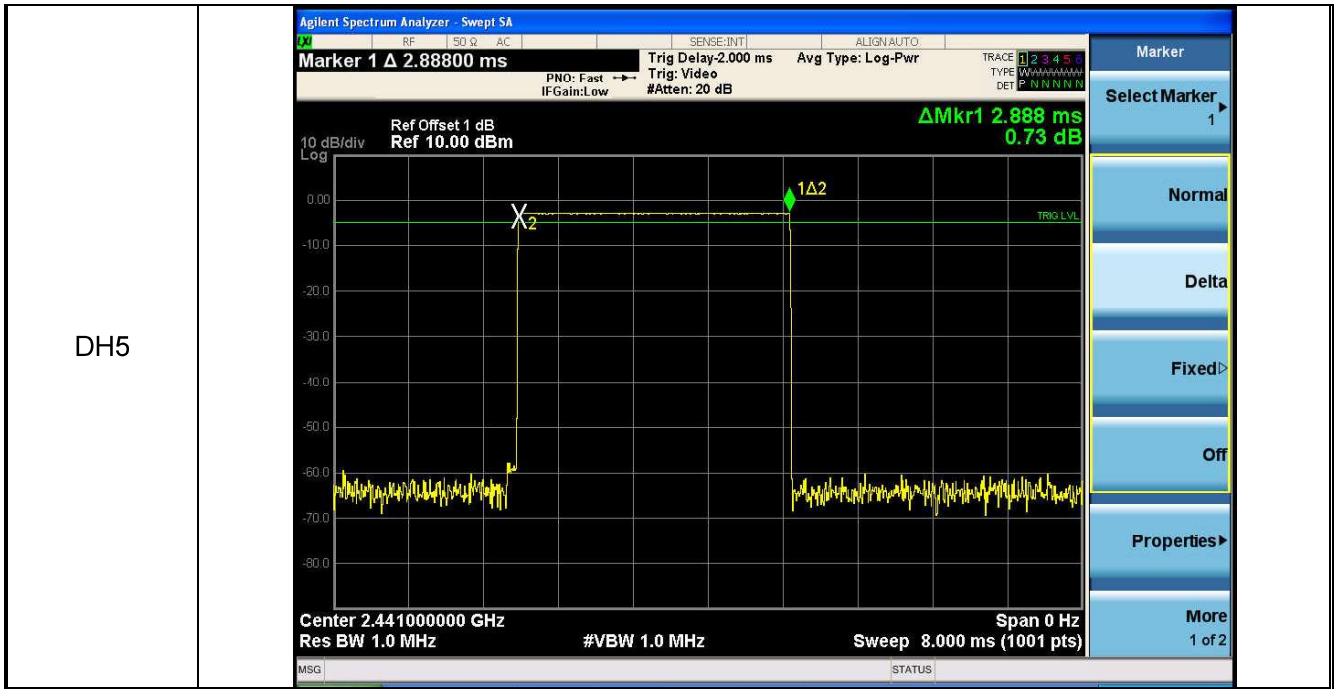
EUT :	Bluetooth Hearphone Amp	Model Name :	FB1121
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 5Vfrom adapter
Test Mode :	GFSK, π/4-DQPSK, 8-DPSK Mode / CH00, CH39, CH78		

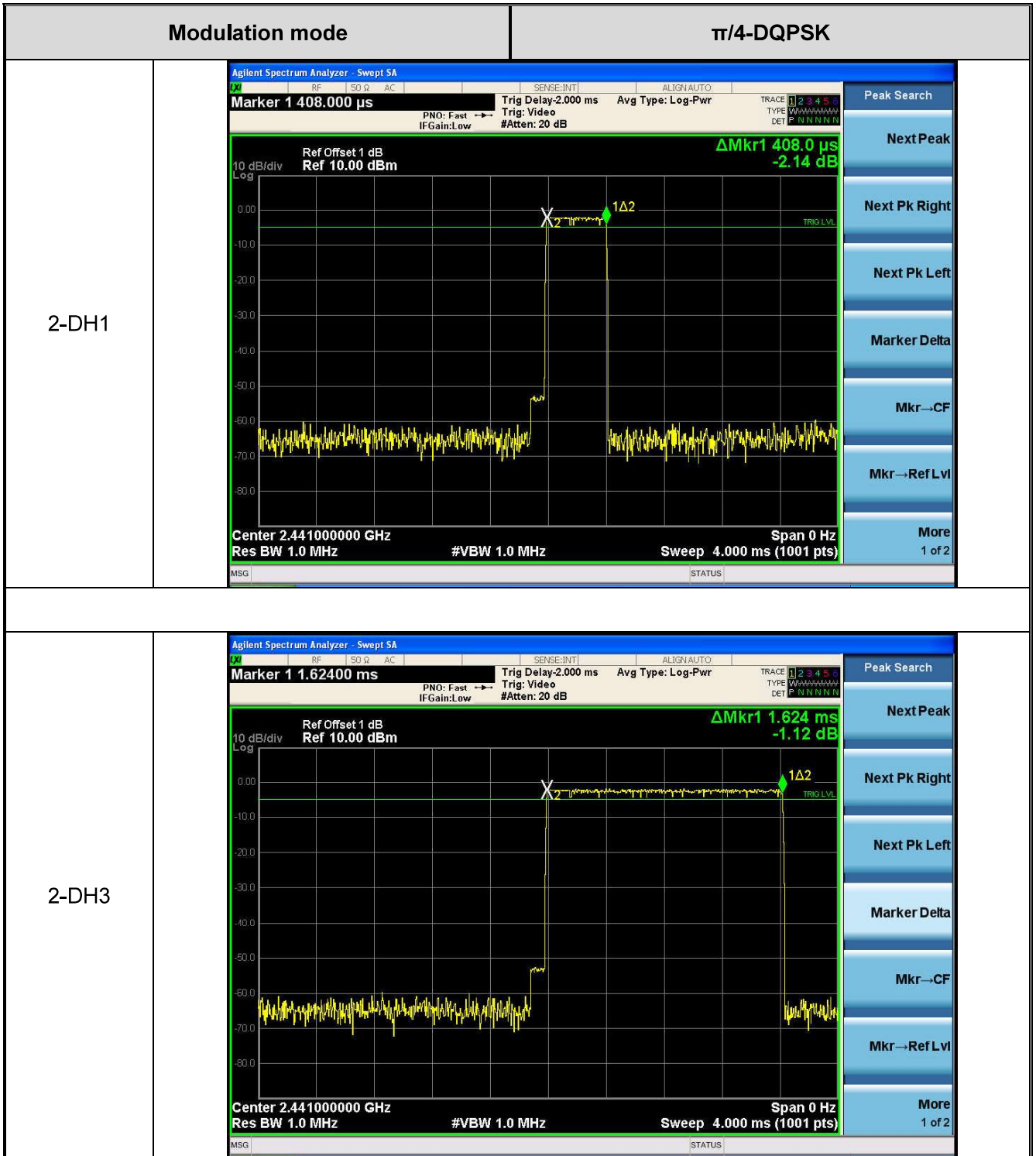
For GFSK, $\pi/4$ -DQPSK and 8DPSK:

The test period: T= 0.4 Second/Channel x 79 Channel = 31.6 s

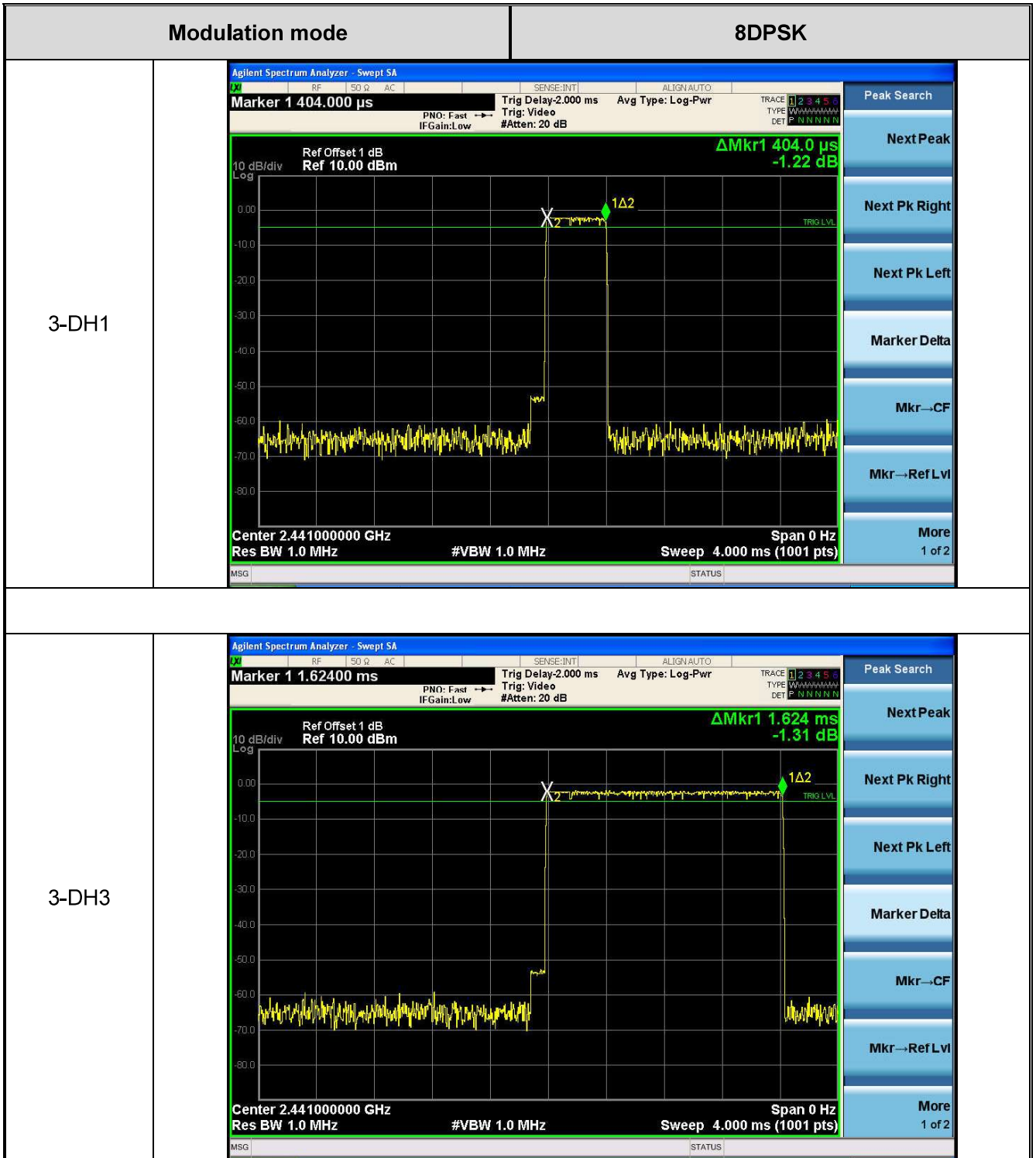
Mode	Data Packet	Frequency (MHz)	Pulse Duration (ms)	Dwell Time (s)	Limit (s)	Conclusion
GFSK	DH1	2441	0.388	0.124	<0.4	PASS
	DH3	2441	1.66	0.266	<0.4	PASS
	DH5	2441	2.888	0.308	<0.4	PASS
$\pi/4$ DQPSK	DH1	2441	0.408	0.131	<0.4	PASS
	DH3	2441	1.624	0.260	<0.4	PASS
	DH5	2441	2.896	0.309	<0.4	PASS
8- DQPSK	DH1	2441	0.404	0.129	<0.4	PASS
	DH3	2441	1.624	0.260	<0.4	PASS
	DH5	2441	2.896	0.309	<0.4	PASS
Note: 1 A period time = 0.4 (s) * 79 = 31.6(s) 2 DH1 time slot = Pulse Duration * (1600/(2*79)) * A period time DH3 time slot = Pulse Duration * (1600/(4*79)) * A period time DH5 time slot = Pulse Duration * (1600/(6*79)) * A period time						

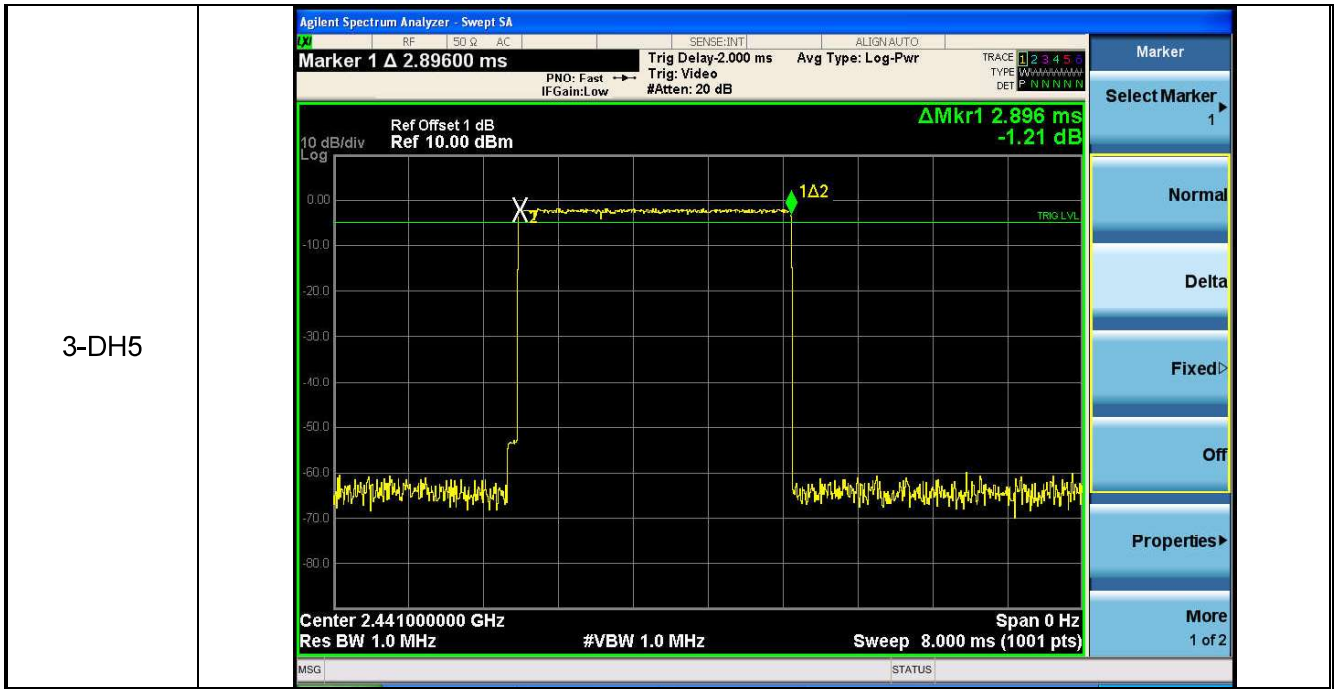












8. PEAK OUTPUT POWER TEST

8.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(3)	Peak Output Power	Hopping Channels>75 Power<1W(30dBm) Other <125 mW(21dBm)	2400-2483.5	PASS

8.1.1 TEST PROCEDURE

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Spectrum Setting:
RBW=1MHz, VBW=3MHz, Detector=Peak (If 20dB BW ≤ 1 MHz)
RBW=3MHz, VBW=10MHz, Detector=Peak (If 20dB BW > 1 MHz)
- (3) The EUT was set to continuously transmitting in the max power during the test.

8.1.2 DEVIATION FROM STANDARD

No deviation.

8.1.3 TEST SETUP



8.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

8.1.5 TEST RESULTS

EUT :	Bluetooth Hearphone Amp	Model Name :	FB1121
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 5Vfrom adapter
Test Mode :	GFSK, $\pi/4$ -DQPSK, 8-DPSK Mode / CH00, CH39, CH78		

TX GFSK Mode			
Test Channe	Frequency	Maximum Conducted Output Power(PK)	LIMIT
	(MHz)	(dBm)	dBm
CH01	2402	-2.69	30
CH40	2441	-1.56	30
CH79	2480	-1.33	30
TX $\pi/4$-DQPSK Mode			
CH01	2402	-2.24	30
CH40	2441	-0.71	30
CH79	2480	-0.67	30
TX 8-DPSK Mode			
CH01	2402	-1.96	30
CH40	2441	-0.49	30
CH79	2480	-0.46	30

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9. 100 KHZ BANDWIDTH OF FREQUENCY BAND EDGE

APPLICABLE STANDARD

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)).

TEST PROCEDURE

- a) Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- b) Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
- c) Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
- d) Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
- e) Repeat above procedures until all measured frequencies were complete.

9.1 DEVIATION FROM STANDARD

No deviation.

9.2 TEST SETUP



9.3 EUT OPERATION CONDITIONS

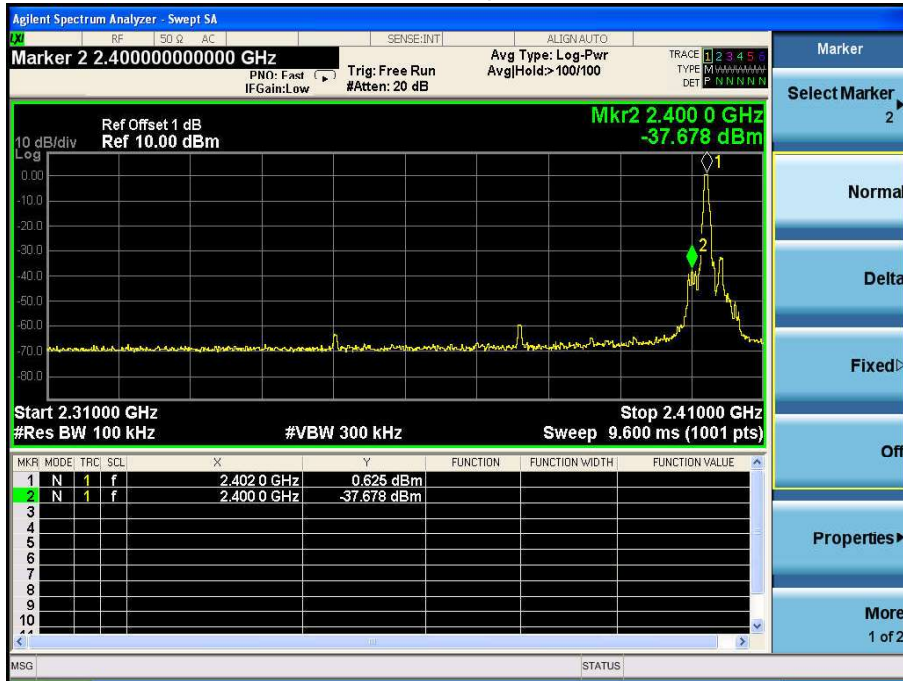
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

9.4 TEST RESULTS

EUT :	Bluetooth Hearphone Amp	Model Name :	FB1121
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1012 hPa	Test Voltage :	DC 5Vfrom adapter

Frequency Band	Delta Peak to band emission (dBc)	> Limit (dBc)	Result
GFSK mode			
Left-band	38.303	20	Pass
Right-band	60.107	20	Pass
$\pi/4$ -DQPSK mode			
Left-band	44.21	20	Pass
Right-band	57.474	20	Pass
8-DPSK mode			
Left-band	42.982	20	Pass
Right-band	58.662	20	Pass

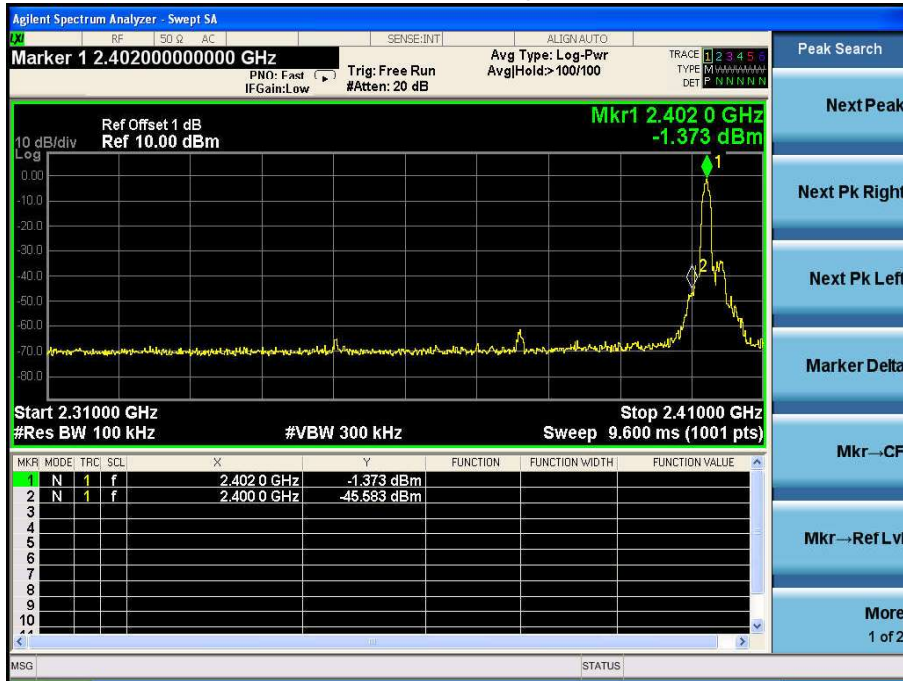
GFSK: Band Edge, Left Side



GFSK: Band Edge, Right Side



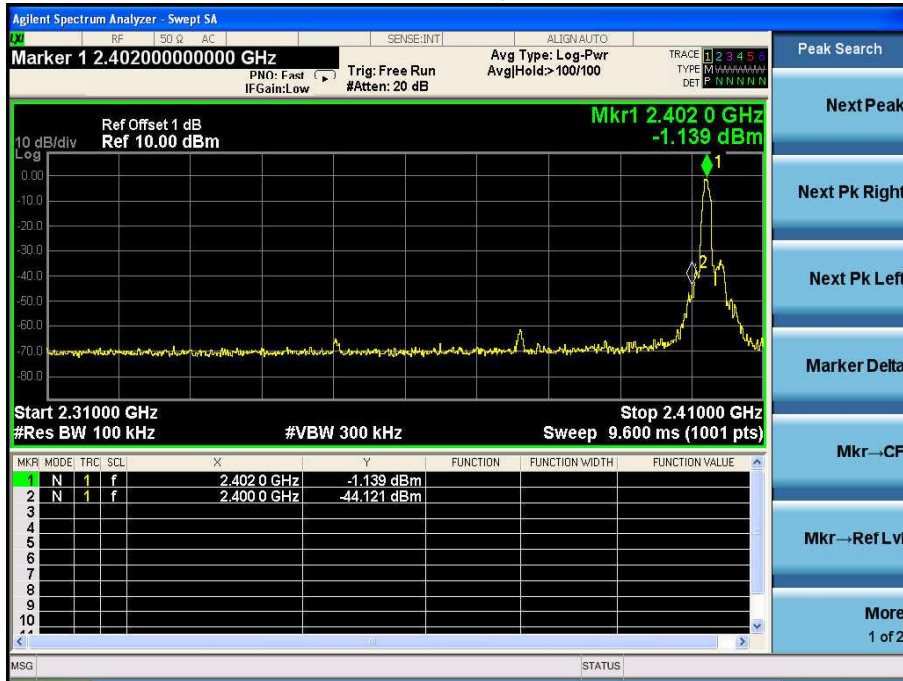
$\pi/4$ -DQPSK: Band Edge, Left Side



$\pi/4$ -DQPSK: Band Edge, Right Side



8-DPSK: Band Edge, Left Side



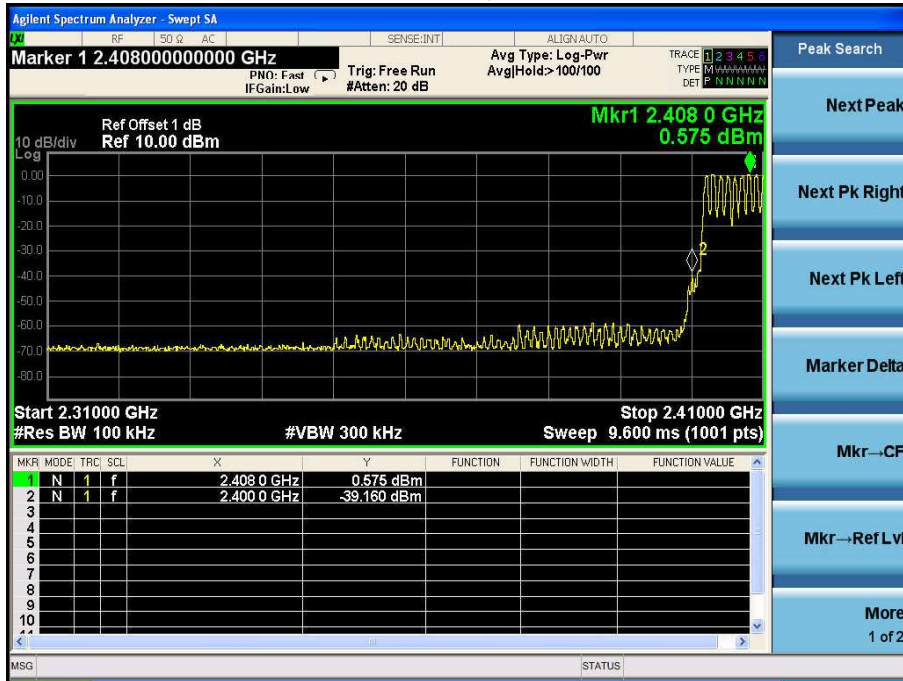
8-DPSK: Band Edge, Right Side



Hopping Mode

Frequency Band	Delta Peak to band emission (dBc)	> Limit (dBc)	Result
GFSK mode			
Left-band	39.735	20	Pass
Right-band	67.626	20	Pass
$\pi/4$ -DQPSK mode			
Left-band	51.339	20	Pass
Right-band	62.229	20	Pass
8-DPSK mode			
Left-band	46.943	20	Pass
Right-band	61.809	20	Pass

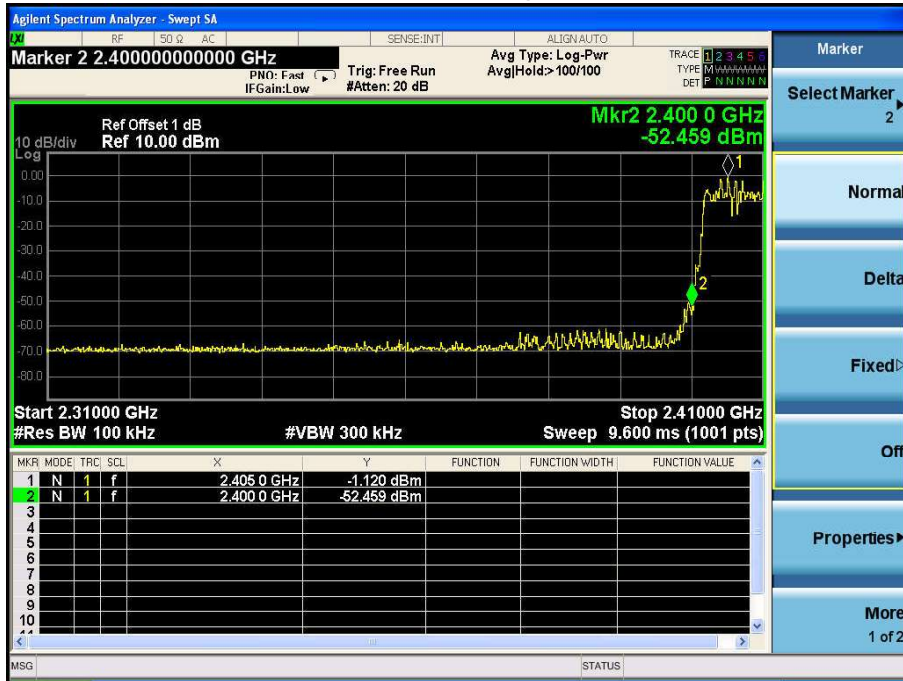
GFSK: Band Edge, Left Side



GFSK: Band Edge, Right Side



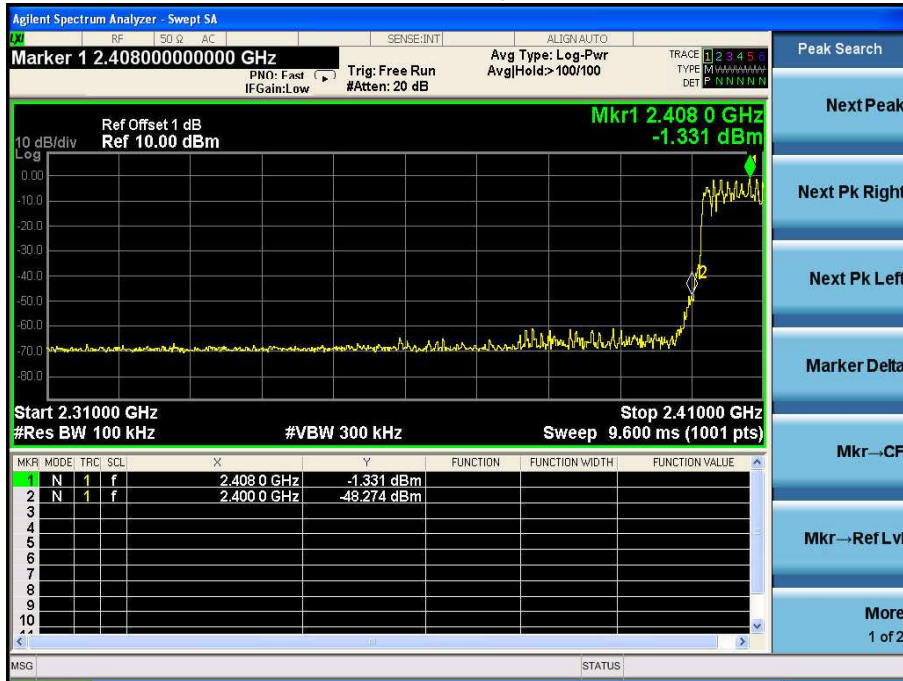
$\pi/4$ -DQPSK: Band Edge, Left Side



$\pi/4$ -DQPSK: Band Edge, Right Side



8-DPSK: Band Edge, Left Side



8-DPSK: Band Edge, Right Side



10. ANTENNA REQUIREMENT

10.1 STANDARD REQUIREMENT

15.203 requirement: For intentional device, according to 15.203: 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.

10.2 EUT ANTENNA

The EUT antenna is Chip antenna. It comply with the standard requirement. In case of replacement of broken antenna the same antenna type must be used.

---END OF REPORT---