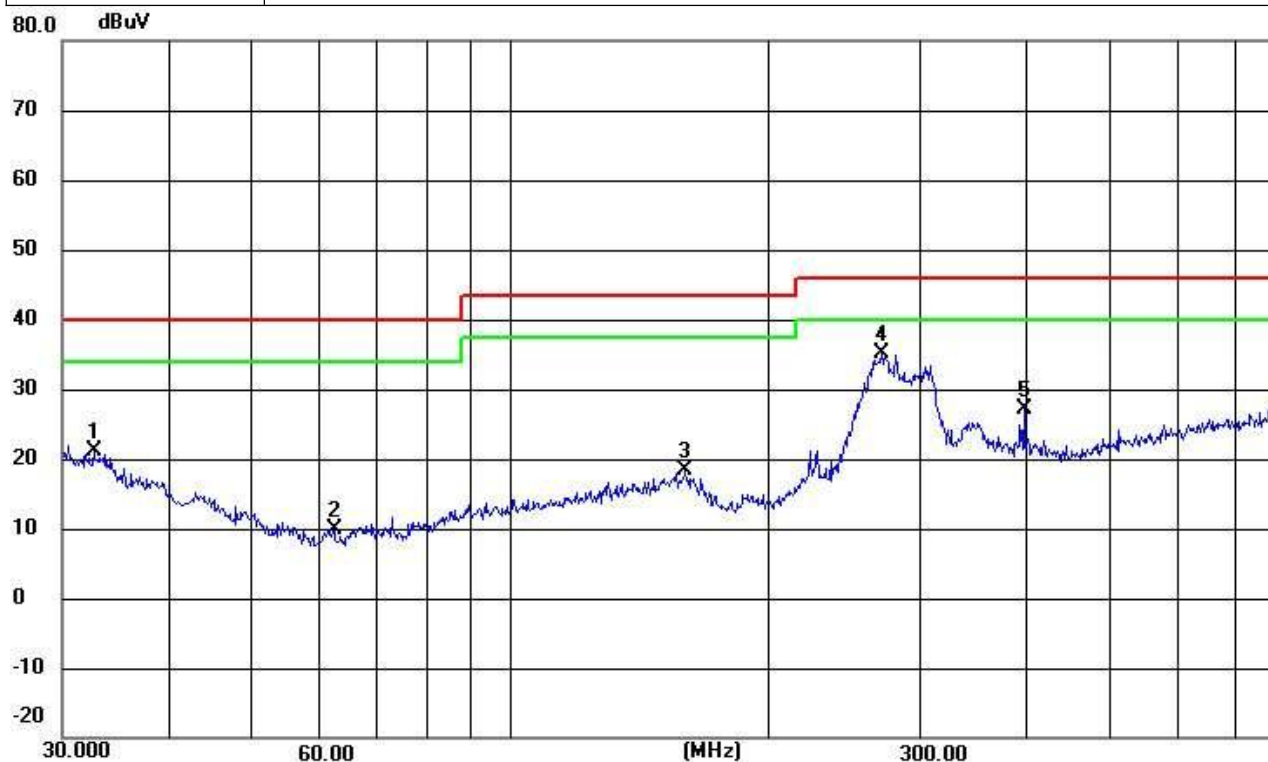


### 8.5 (30MHZ-1000MHZ)

Temperature:	24.7°C	Relative Humidity:	61%
Test Voltage:	DC 5V	Phase:	Horizontal
Test Mode:	GFSK		



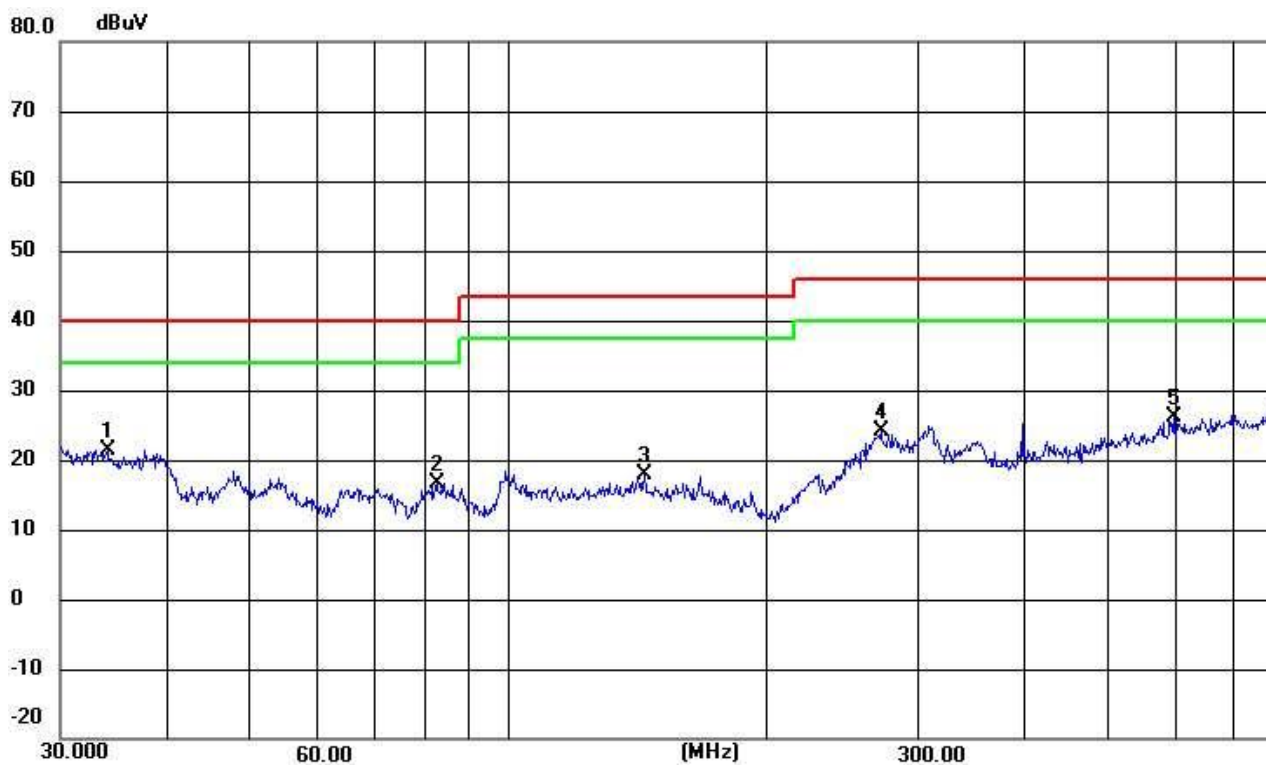
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/ m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	32.6340	30.15	-8.95	21.20	40.00	-18.80	QP
2	62.2128	30.67	-20.88	9.79	40.00	-30.21	QP
3	159.7844	50.43	-32.11	18.32	43.50	-25.18	QP
4	270.3748	67.18	-31.94	35.24	46.00	-10.76	QP
5	396.2415	58.64	-31.61	27.03	46.00	-18.97	QP
6	986.0717	60.97	-30.61	30.36	54.00	-23.64	QP

Note: 1. Margin = Result (Result = Reading + Factor) - Limit

2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.

3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

Temperature:	22.7°C	Relative Humidity:	61%
Test Voltage:	DC 5V	Phase:	Vertical
Test Mode:	GFSK		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/ m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	34.0365	31.34	-9.89	21.45	40.00	-18.55	QP
2	82.3588	48.84	-32.16	16.68	40.00	-23.32	QP
3	143.8295	49.96	-32.13	17.83	43.50	-25.67	QP
4	271.3246	55.97	-31.94	24.03	46.00	-21.97	QP
5	595.1329	57.37	-31.14	26.23	46.00	-19.77	QP
6	993.0114	64.68	-30.61	34.07	54.00	-19.93	QP

Note: 1. Margin = Result (Result =Reading + Factor )–Limit

2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.

3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

8.6 ABOVE 1GHZ  
GFSK(worst mode)  
LOW CH

**Peak value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4804.00	38.29	31.78	8.60	32.09	46.58	74.00	-27.42	Vertical
7206.00	32.48	36.15	11.65	32.00	48.28	74.00	-25.72	Vertical
9608.00	32.05	37.95	14.14	31.62	52.52	74.00	-21.48	Vertical
12010.00	*					74.00		Vertical
14412.00	*					74.00		Vertical
4804.00	42.78	31.78	8.60	32.09	51.07	74.00	-22.93	Horizontal
7206.00	34.32	36.15	11.65	32.00	50.12	74.00	-23.88	Horizontal
9608.00	31.57	37.95	14.14	31.62	52.04	74.00	-21.96	Horizontal
12010.00	*					74.00		Horizontal
14412.00	*					74.00		Horizontal

**Average value:**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4804.00	26.92	31.78	8.60	32.09	35.21	54.00	-18.79	Vertical
7206.00	21.06	36.15	11.65	32.00	36.86	54.00	-17.14	Vertical
9608.00	20.07	37.95	14.14	31.62	40.54	54.00	-13.46	Vertical
12010.00	*					54.00		Vertical
14412.00	*					54.00		Vertical
4804.00	31.25	31.78	8.60	32.09	39.54	54.00	-14.46	Horizontal
7206.00	23.30	36.15	11.65	32.00	39.10	54.00	-14.90	Horizontal
9608.00	19.88	37.95	14.14	31.62	40.35	54.00	-13.65	Horizontal
12010.00	*					54.00		Horizontal
14412.00	*					54.00		Horizontal

**Remarks:**

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.
3. “\*”, means this data is the too weak instrument of signal is unable to test.

# MIDDLE CH

## Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4882.00	38.31	31.85	8.67	32.12	46.71	74.00	-27.29	Vertical
7323.00	32.50	36.37	11.72	31.89	48.70	74.00	-25.30	Vertical
9764.00	32.06	38.35	14.25	31.62	53.04	74.00	-20.96	Vertical
12205.00	*					74.00		Vertical
14646.00	*					74.00		Vertical
4882.00	42.80	31.85	8.67	32.12	51.20	74.00	-22.80	Horizontal
7323.00	34.34	36.37	11.72	31.89	50.54	74.00	-23.46	Horizontal
9764.00	31.58	38.35	14.25	31.62	52.56	74.00	-21.44	Horizontal
12205.00	*					74.00		Horizontal
14646.00	*					74.00		Horizontal

## Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4882.00	26.95	31.85	8.67	32.12	35.35	54.00	-18.65	Vertical
7323.00	21.08	36.37	11.72	31.89	37.28	54.00	-16.72	Vertical
9764.00	20.09	38.35	14.25	31.62	41.07	54.00	-12.93	Vertical
12205.00	*					54.00		Vertical
14646.00	*					54.00		Vertical
4882.00	31.29	31.85	8.67	32.12	39.69	54.00	-14.31	Horizontal
7323.00	23.32	36.37	11.72	31.89	39.52	54.00	-14.48	Horizontal
9764.00	19.91	38.35	14.25	31.62	40.89	54.00	-13.11	Horizontal
12205.00	*					54.00		Horizontal
14646.00	*					54.00		Horizontal

## Remarks:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. The emission levels of other frequencies are very lower than the limit and not show in test report.
3. “\*”, means this data is the too weak instrument of signal is unable to test.



## HIGH CH

### Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4960.00	38.30	31.93	8.73	32.16	46.80	74.00	-27.20	Vertical
7440.00	32.49	36.59	11.79	31.78	49.09	74.00	-24.91	Vertical
9920.00	32.06	38.81	14.38	31.88	53.37	74.00	-20.63	Vertical
12400.00	*					74.00		Vertical
14880.00	*					74.00		Vertical
4960.00	42.79	31.93	8.73	32.16	51.29	74.00	-22.71	Horizontal
7440.00	34.34	36.59	11.79	31.78	50.94	74.00	-23.06	Horizontal
9920.00	31.58	38.81	14.38	31.88	52.89	74.00	-21.11	Horizontal
12400.00	*					74.00		Horizontal
14880.00	*					74.00		Horizontal

### Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4960.00	27.05	31.93	8.73	32.16	35.55	54.00	-18.45	Vertical
7440.00	21.15	36.59	11.79	31.78	37.75	54.00	-16.25	Vertical
9920.00	20.15	38.81	14.38	31.88	41.46	54.00	-12.54	Vertical
12400.00	*					54.00		Vertical
14880.00	*					54.00		Vertical
4960.00	31.40	31.93	8.73	32.16	39.90	54.00	-14.10	Horizontal
7440.00	23.40	36.59	11.79	31.78	40.00	54.00	-14.00	Horizontal
9920.00	19.98	38.81	14.38	31.88	41.29	54.00	-12.71	Horizontal
12400.00	*					54.00		Horizontal
14880.00	*					54.00		Horizontal

### Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. “\*”, means this data is the too weak instrument of signal is unable to test.
3. The emission levels of other frequencies are very lower than the limit and not show in test report.

## 8.7 RADIATED BAND EDGE DATA

Remark: All restriction band have been tested, and only the worst case is shown in report

### Low CH (GFSK)

#### Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2390.00	41.44	27.59	5.38	30.18	44.23	74.00	-29.77	Horizontal
2400.00	58.02	27.58	5.39	30.18	60.81	74.00	-13.19	Horizontal
2390.00	41.85	27.59	5.38	30.18	44.64	74.00	-29.36	Vertical
2400.00	59.90	27.58	5.39	30.18	62.69	74.00	-11.31	Vertical

#### Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2390.00	32.31	27.59	5.38	30.18	35.10	54.00	-18.90	Horizontal
2400.00	43.46	27.58	5.39	30.18	46.25	54.00	-7.75	Horizontal
2390.00	32.15	27.59	5.38	30.18	34.94	54.00	-19.06	Vertical
2400.00	44.98	27.58	5.39	30.18	47.77	54.00	-6.23	Vertical

### High CH(GFSK)

#### Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	43.37	27.53	5.47	29.93	46.44	74.00	-27.56	Horizontal
2500.00	42.82	27.55	5.49	29.93	45.93	74.00	-28.07	Horizontal
2483.50	43.97	27.53	5.47	29.93	47.04	74.00	-26.96	Vertical
2500.00	43.68	27.55	5.49	29.93	46.79	74.00	-27.21	Vertical

#### Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	35.12	27.53	5.47	29.93	38.19	54.00	-15.81	Horizontal
2500.00	33.33	27.55	5.49	29.93	36.44	54.00	-17.56	Horizontal
2483.50	36.21	27.53	5.47	29.93	39.28	54.00	-14.72	Vertical
2500.00	33.13	27.55	5.49	29.93	36.24	54.00	-17.76	Vertical

## 9. AVERAGE TIME OF OCCUPANCY

### 9.1 LIMIT

FCC Part 5 (15.247), Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
15.247(a)(1)	Average Time of Occupancy	0.4 sec	2400-2483.5

### 9.2 TEST PROCEDURE

- The transmitter output (antenna port) was connected to the spectrum analyzer.
- Set RBW =1MHz/VBW =3MHz.
- Use a video trigger with the trigger level set to enable triggering only on full pulses.
- Sweep Time is more than once pulse time.
- Set the center frequency on any frequency would be measure and set the frequency span to zero span.
- Measure the maximum time duration of one single pulse.
- Set the EUT for DH5, DH3 and DH1 packet transmitting.
- Measure the maximum time duration of one single pulse.
- DH5 Packet permit maximum  $1600 / 79 / 6 = 3.37$  hops per second in each channel (5 time slots RX, 1 time slot TX). So the number of pulses in the observation period of 31.6 seconds is  $3.37 \times 31.6 = 106.6$ .
- DH3 Packet permit maximum  $1600 / 79 / 4 = 5.06$  hops per second in each channel (3 time slots RX, 1 time slot TX). So the number of pulses in the observation period of 31.6 seconds is  $5.06 \times 31.6 = 160$ .
- DH1 Packet permit maximum  $1600 / 79 / 2 = 10.12$  hops per second in each channel (1 time slot RX, 1 time slot TX). So the number of pulses in the observation period of 31.6 seconds is  $10.12 \times 31.6 = 320$ .

### 9.3 TEST SETUP



#### 9.4 TEST RESULTS

Mode	Data Packet	Frequency (MHz)	Pulse Duration (ms)	Dwell Time (ms)	Limit(s)	Conclusion
GFSK	DH1	2441	0.38	0.118	<0.4	Pass
	DH3	2441	1.63	0.256	<0.4	Pass
	DH5	2441	2.88	0.285	<0.4	Pass
π/4-DQP	DH1	2441	0.38	0.121	<0.4	Pass
	DH3	2441	1.64	0.26	<0.4	Pass
	DH5	2441	2.88	0.309	<0.4	Pass
8-DPSK	DH1	2441	0.39	0.121	<0.4	Pass
	DH3	2441	1.14	0.179	<0.4	Pass
	DH5	2441	2.89	0.344	<0.4	Pass

Note1: A period time = 0.4 (s) \* 79 = 31.6

Note2:

DH1 time slot = Pulse Duration \* (1600/(2\*79)) \* Aperiod time

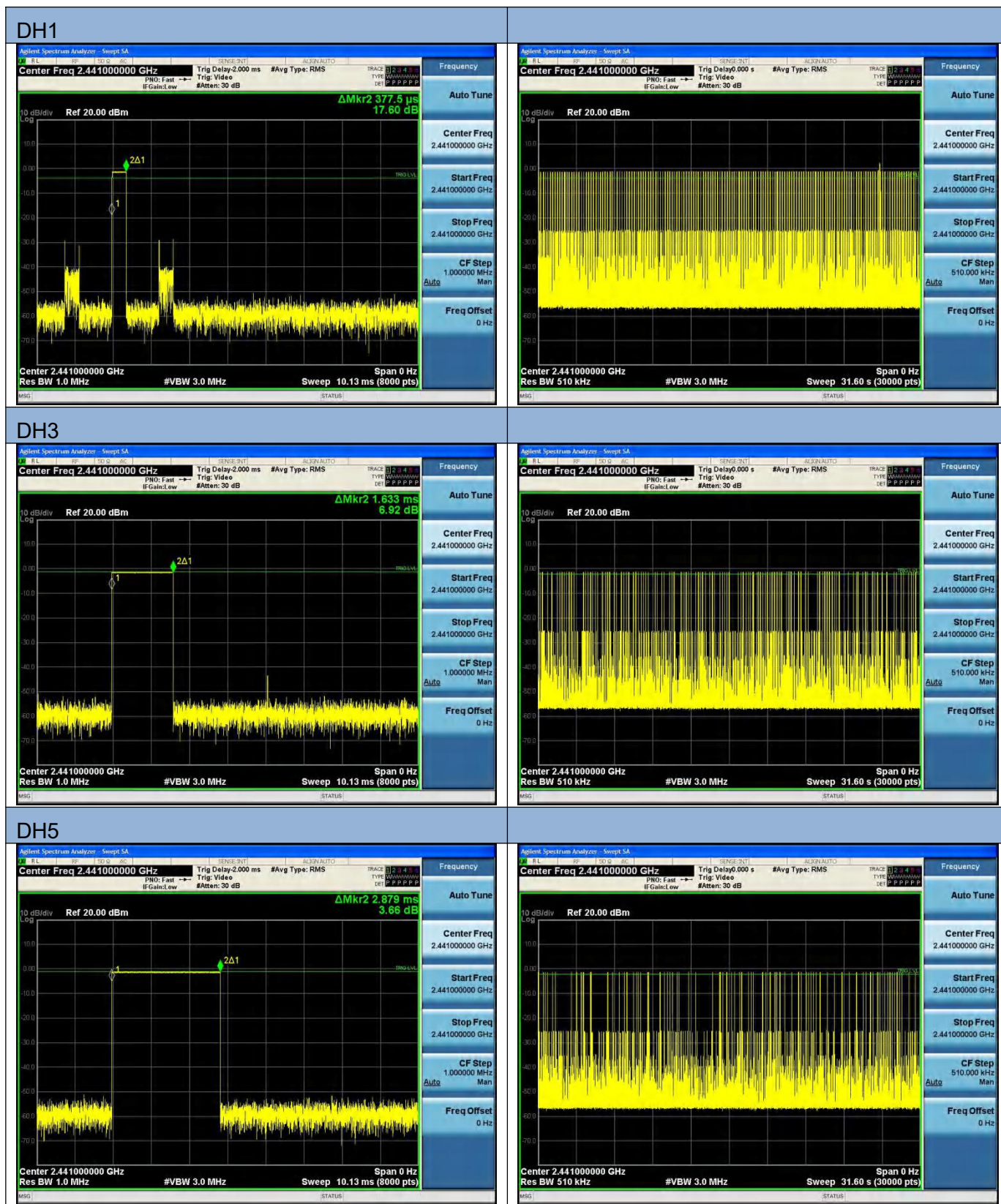
DH3 time slot = Pulse Duration \* (1600/(4\*79)) \* Aperiod time

DH5 time slot = Pulse Duration \* (1600/(6\*79)) \* Aperiod time

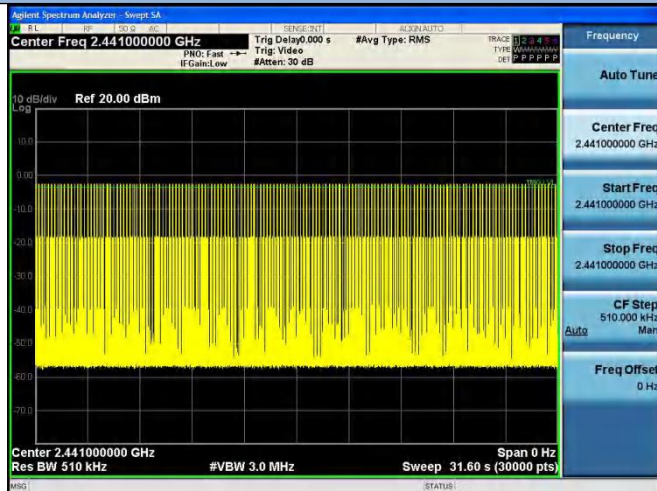
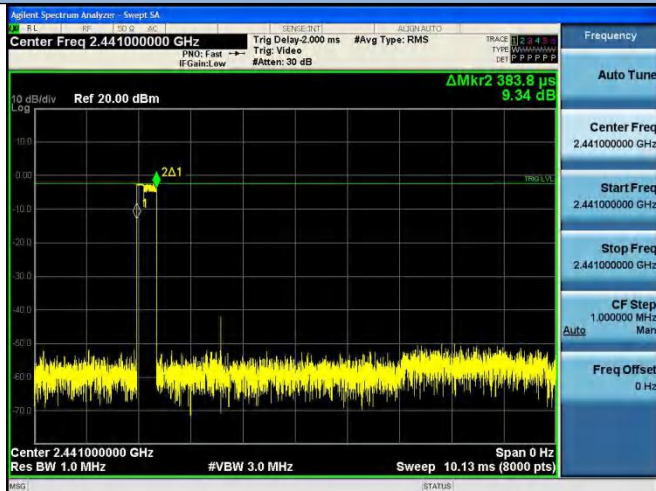
Note3: For GFSK :The test period: T= 0.4 Second/Channel x 79 Channel=31.6 s



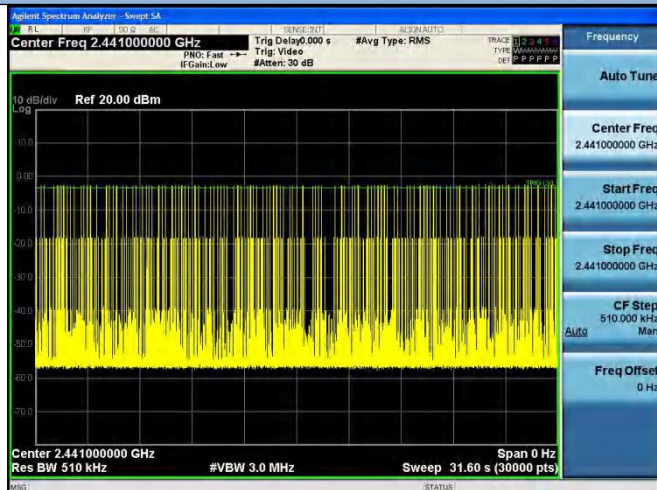
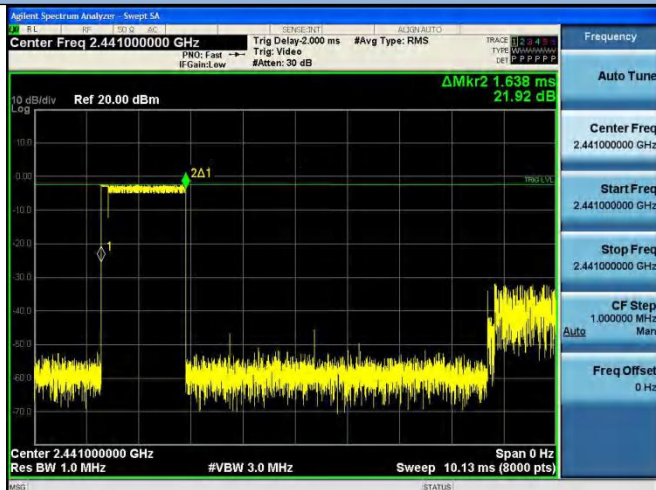
## 9.5 ORIGINAL TEST DATA



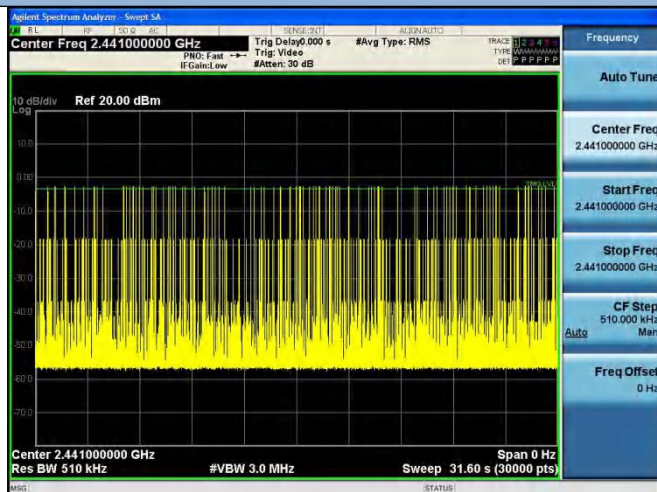
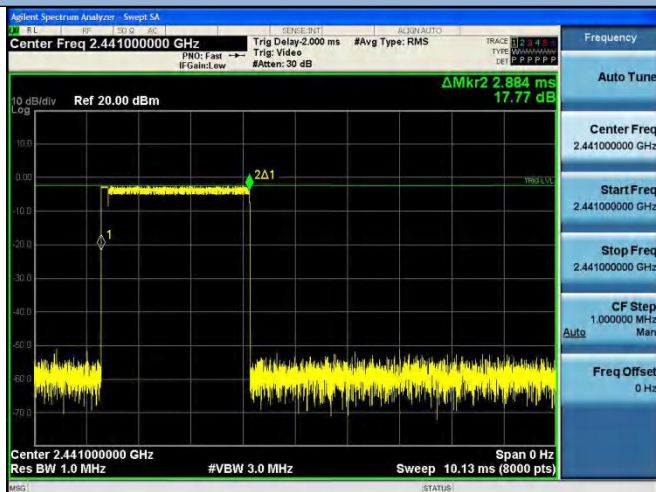
## 2DH1



## 2DH3

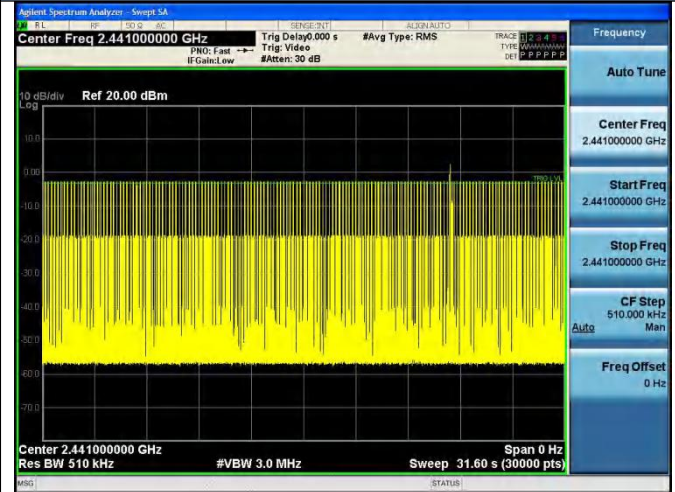
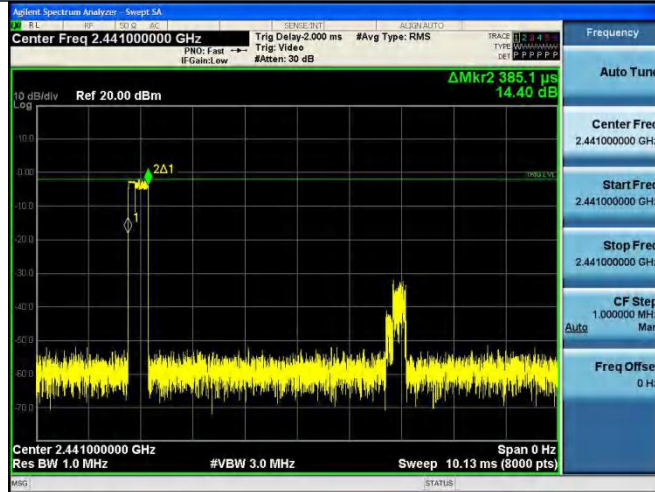


## 2DH5

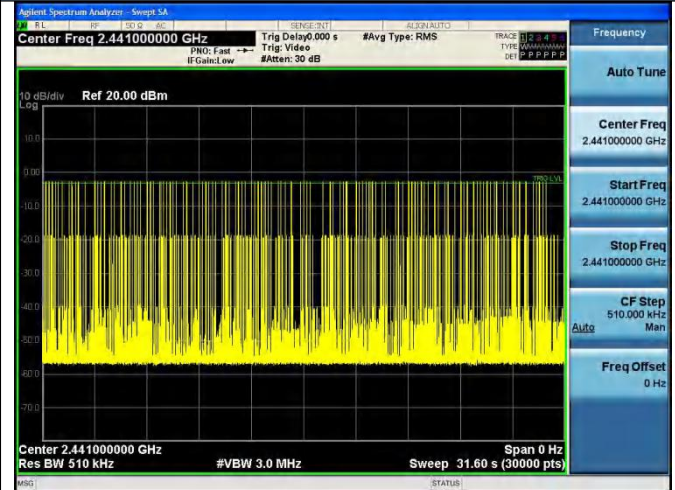




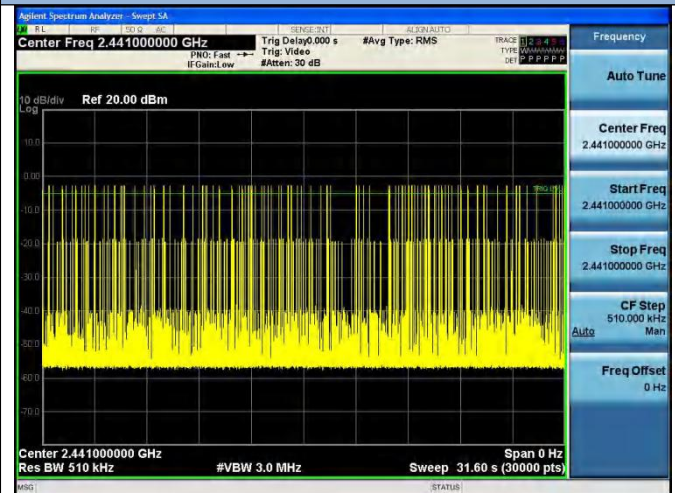
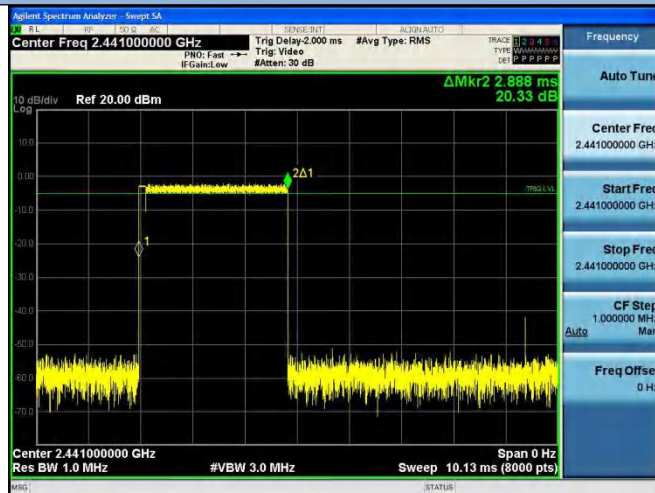
### 3DH1



### 3DH3



### 3DH5



## 10. HOPPING CHANNEL SEPARATION MEASUREMENT

### 10.1 LIMIT

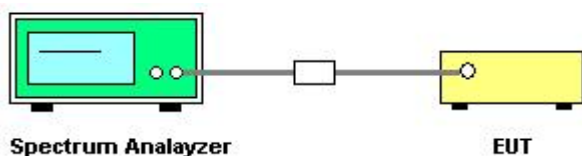
Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that 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.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> 20 dB Bandwidth or Channel Separation
RB	30 kHz (20dB Bandwidth) / 30 kHz (Channel Separation)
VB	100 kHz (20dB Bandwidth) / 100 kHz (Channel Separation)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

### 10.2 TEST PROCEDURE

- The transmitter output (antenna port) was connected to the spectrum analyser in peak hold mode.
- The resolution bandwidth of 30 kHz and the video bandwidth of 100 kHz were utilised for 20 dB bandwidth measurement.
- The resolution bandwidth of 30 kHz and the video bandwidth of 100 kHz were utilised for channel separation measurement

### 10.3 TEST SETUP



### 10.4 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

## 10.5 TEST RESULTS

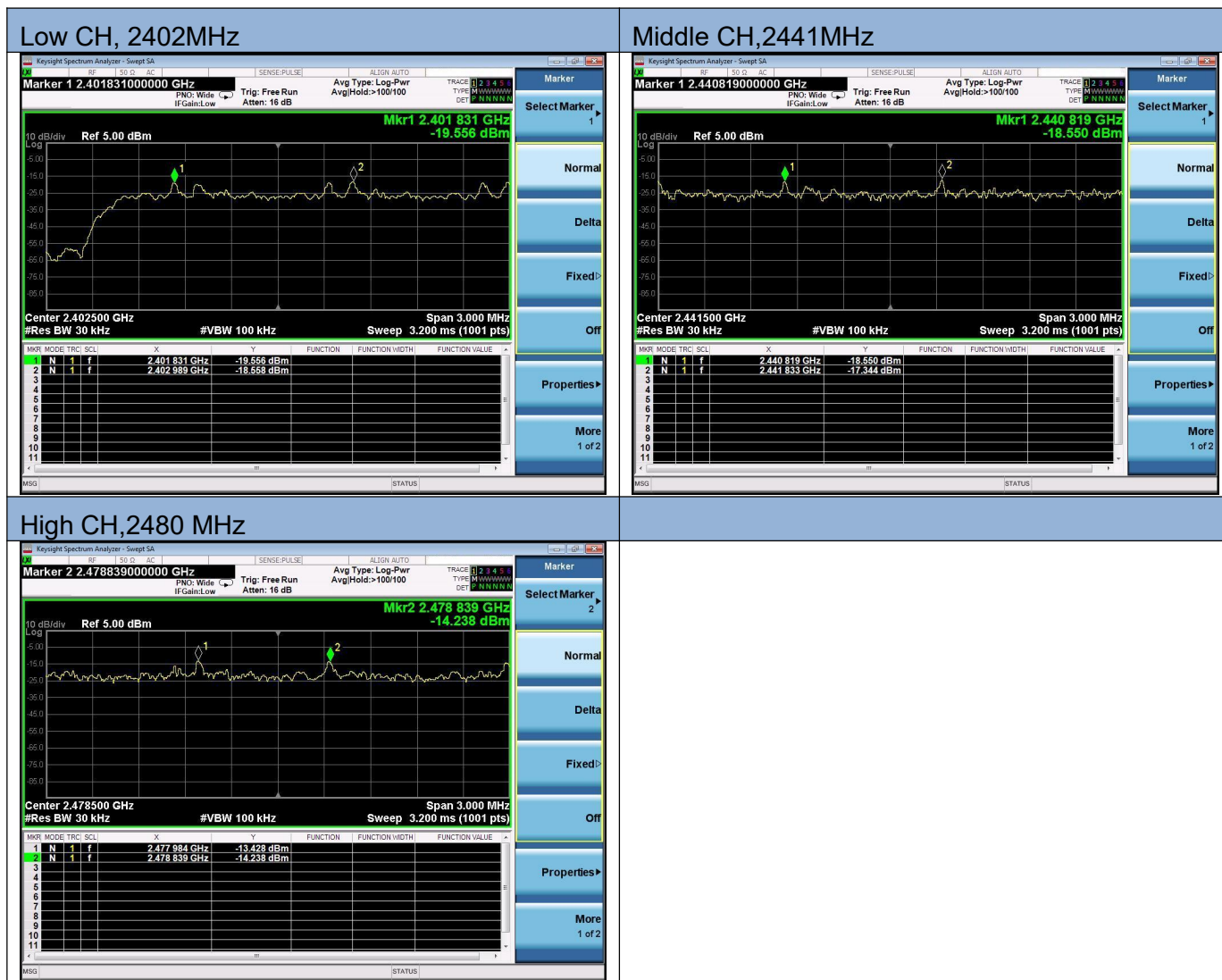
Temperature:	25 °C	Relative Humidity:	60%
Test Mode:	GFSK Mode	Test Voltage:	DC 5V

Modulation	Frequency (MHz)	Mark1 Frequency (MHz)	Mark2 Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)	Result
GFSK	2402	2402.008	2403.001	0.993	0.581	Pass
	2441	2440.975	2441.965	0.990	0.632	Pass
	2480	2477.972	2478.986	1.014	0.631	Pass

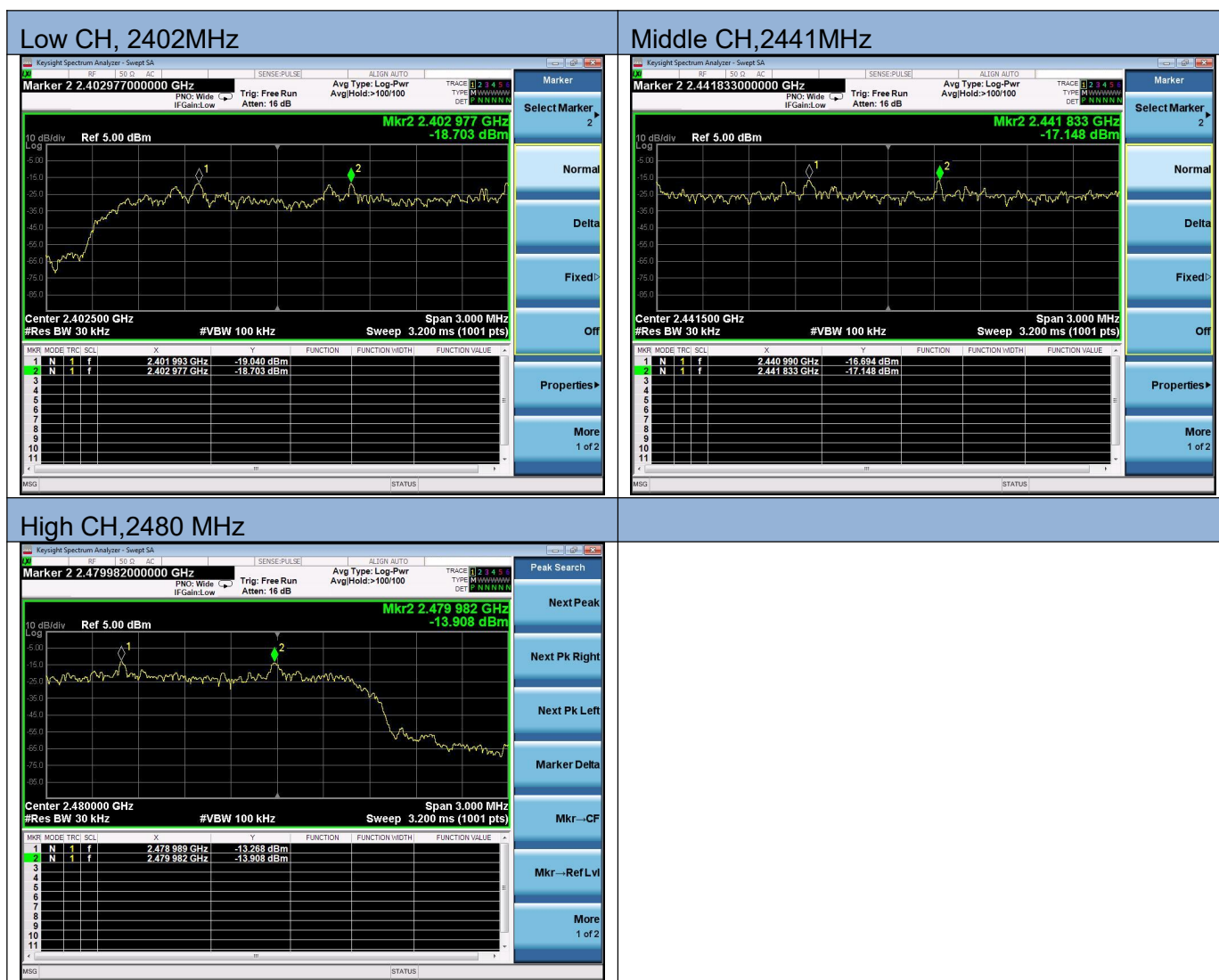




Modulation	Frequency (MHz)	Mark1 Frequency (MHz)	Mark2 Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)	Result
$\pi$ /4-DQPSK	2402	2401.831	2402.989	1.158	0.852	Pass
	2441	2440.819	2441.833	1.014	0.865	Pass
	2480	2477.984	2478.839	0.855	0.847	Pass



Modulation	Frequency (MHz)	Mark1 Frequency (MHz)	Mark2 Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)	Result
8-DPSK	2402	2401.993	2402.977	0.843	0.875	Pass
	2441	2440.990	2441.833	0.990	0.866	Pass
	2480	2478.989	2479.982	0.966	0.848	Pass



## 11. ANTENNA REQUIREMENT

### 11.1 STANDARD REQUIREMENT

For intentional device, according to FCC 47 CFR Section 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. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

### 11.2 RESULT

The antennas used for this product are FPC antenna and no antenna other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is 0.62dBi.

\*\*\*\*\*END OF THE REPORT\*\*\*\*\*