

Fig.46. Conducted spurious emission: 8DPSK, Channel 0, 3GHz - 10GHz

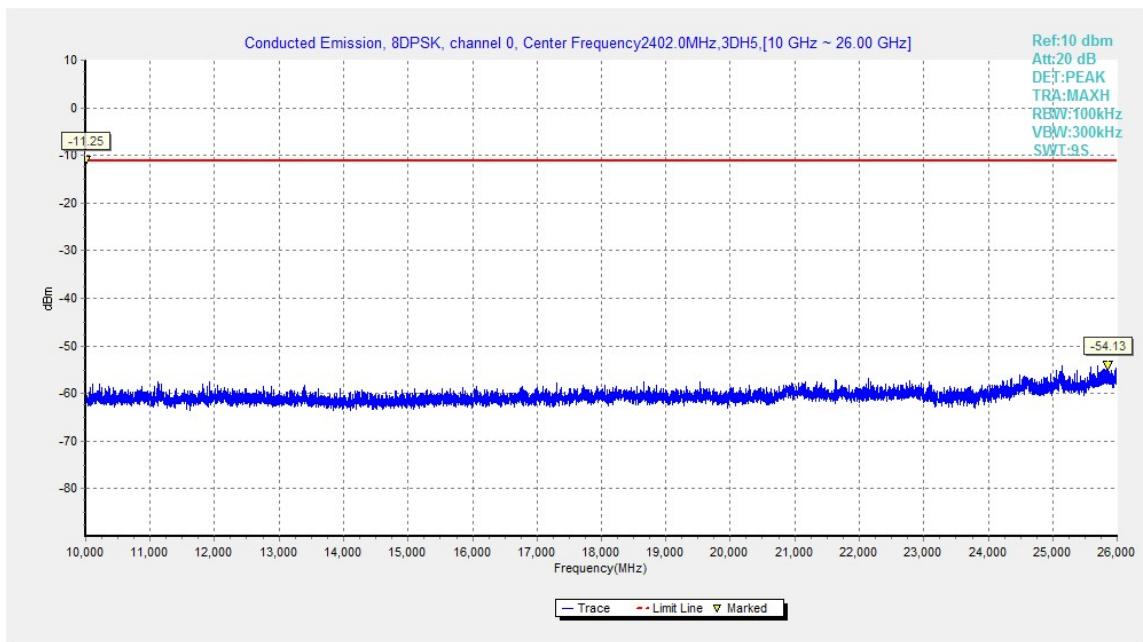


Fig.47. Conducted spurious emission: 8DPSK, Channel 0,10GHz - 26GHz

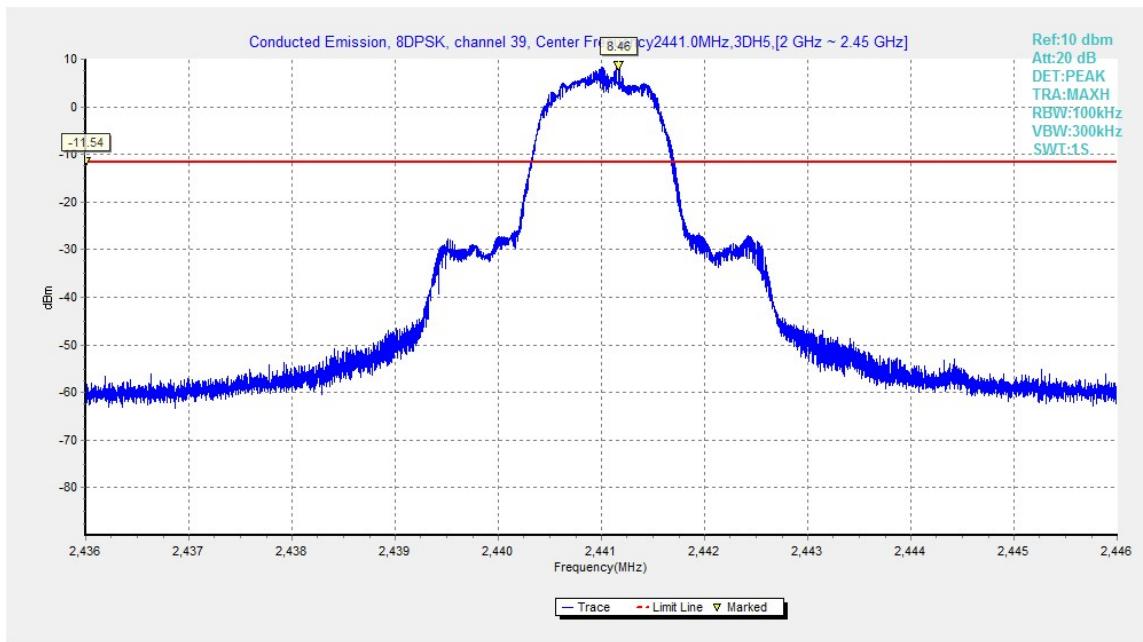


Fig.48. Conducted spurious emission: 8DPSK, Channel 39, 2441MHz

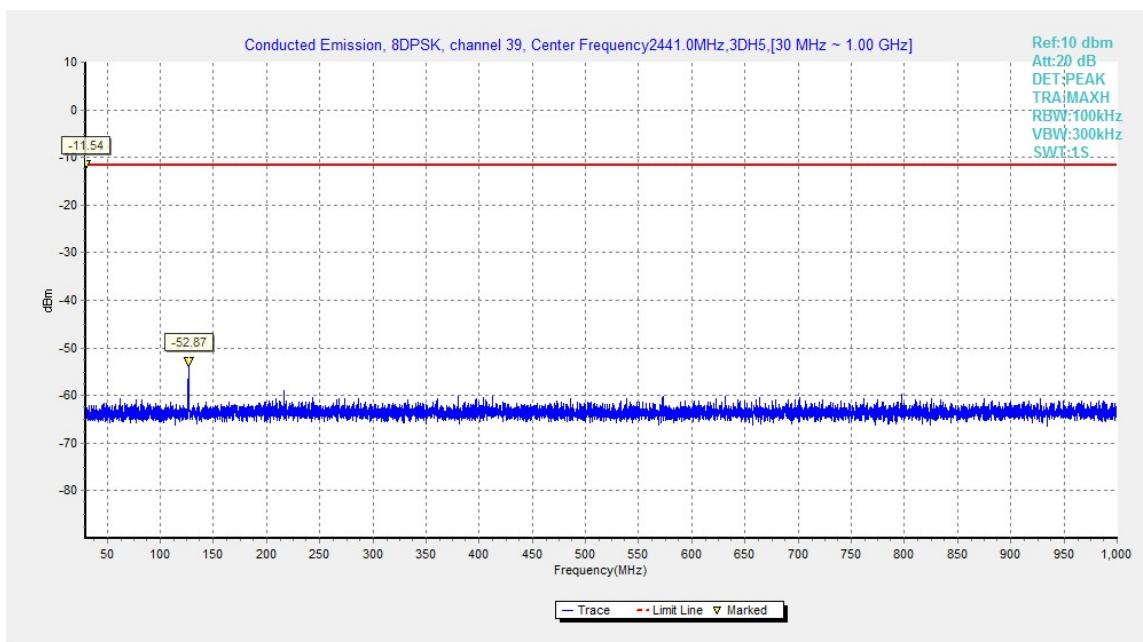


Fig.49. Conducted spurious emission: 8DPSK, Channel 39, 30MHz - 1GHz

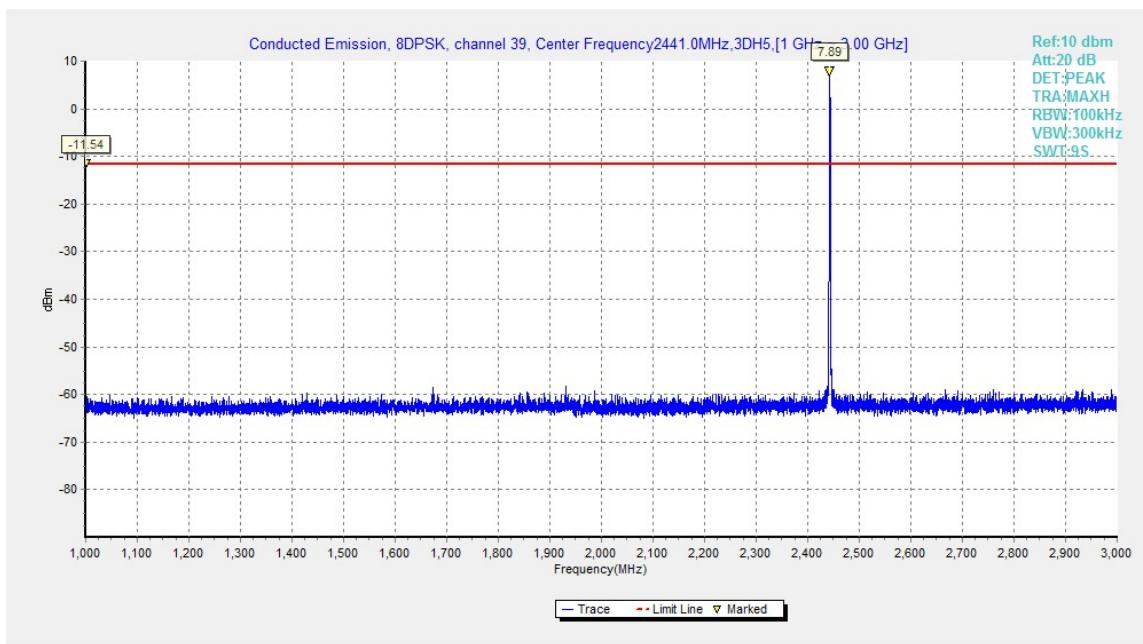


Fig.50. Conducted spurious emission: 8DPSK, Channel 39, 1GHz - 3GHz

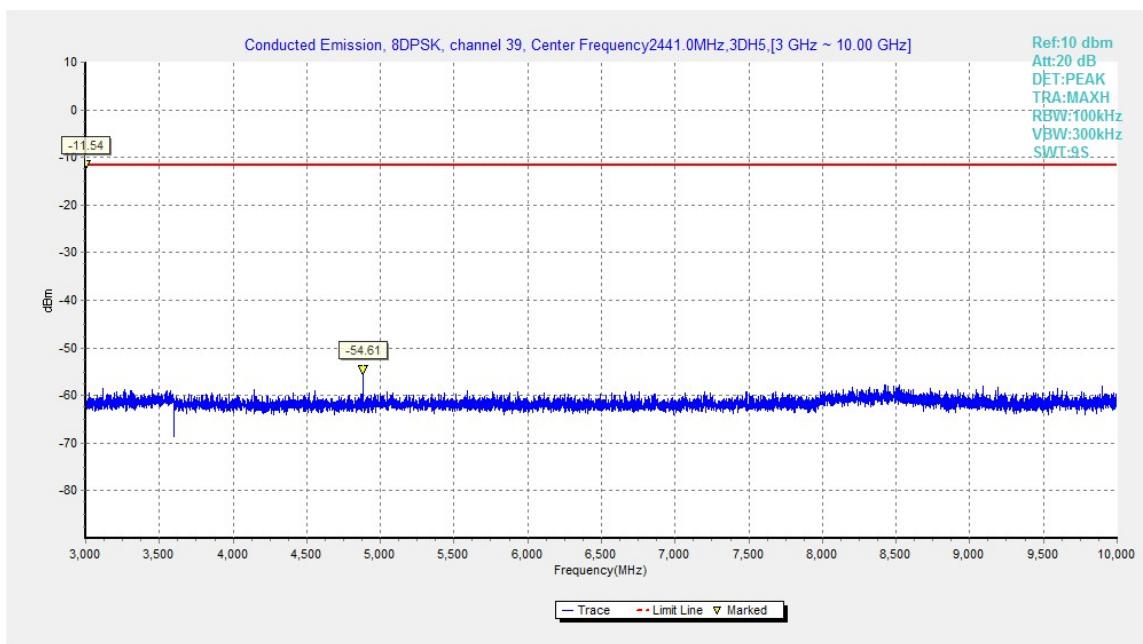


Fig.51. Conducted spurious emission: 8DPSK, Channel 39, 3GHz - 10GHz

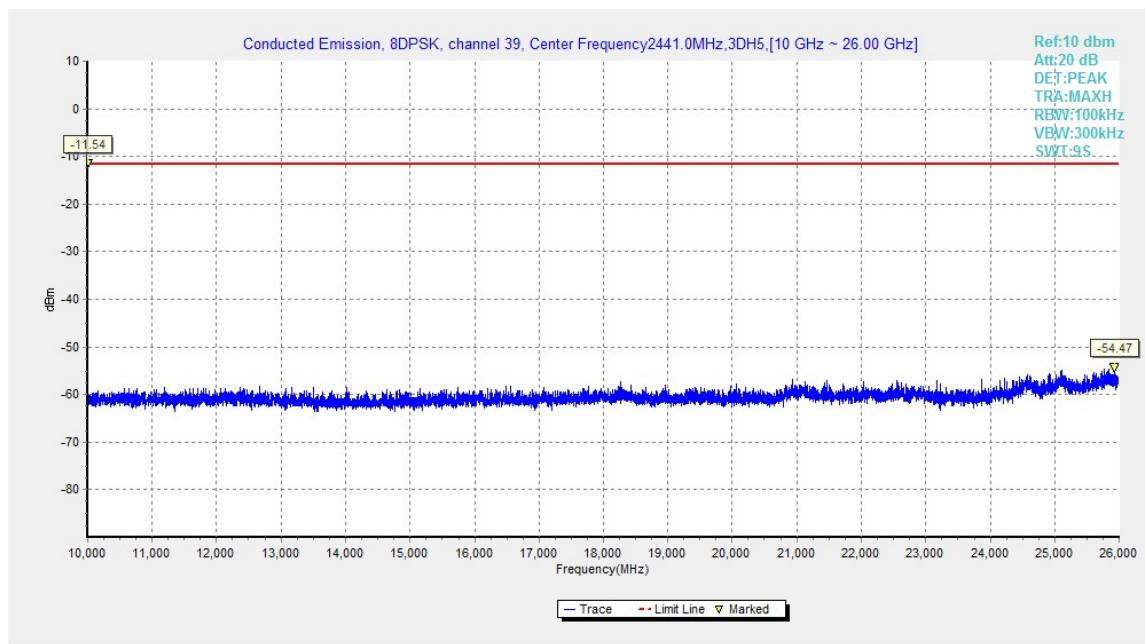


Fig.52. Conducted spurious emission: 8DPSK, Channel 39, 10GHz – 26GHz

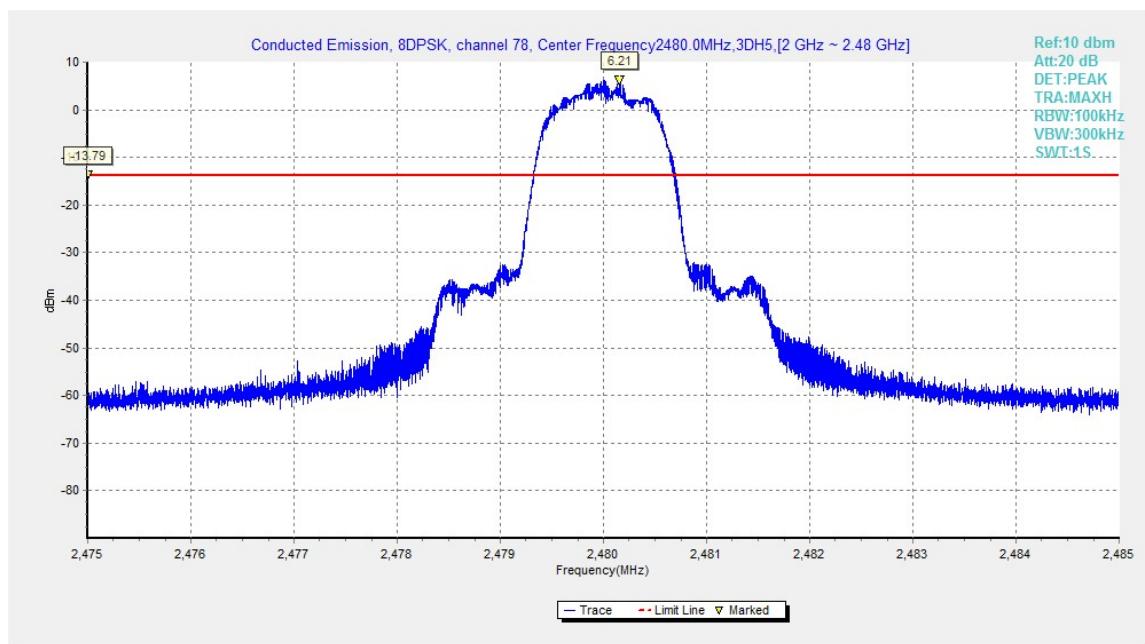


Fig.53. Conducted spurious emission: 8DPSK, Channel 78, 2480MHz

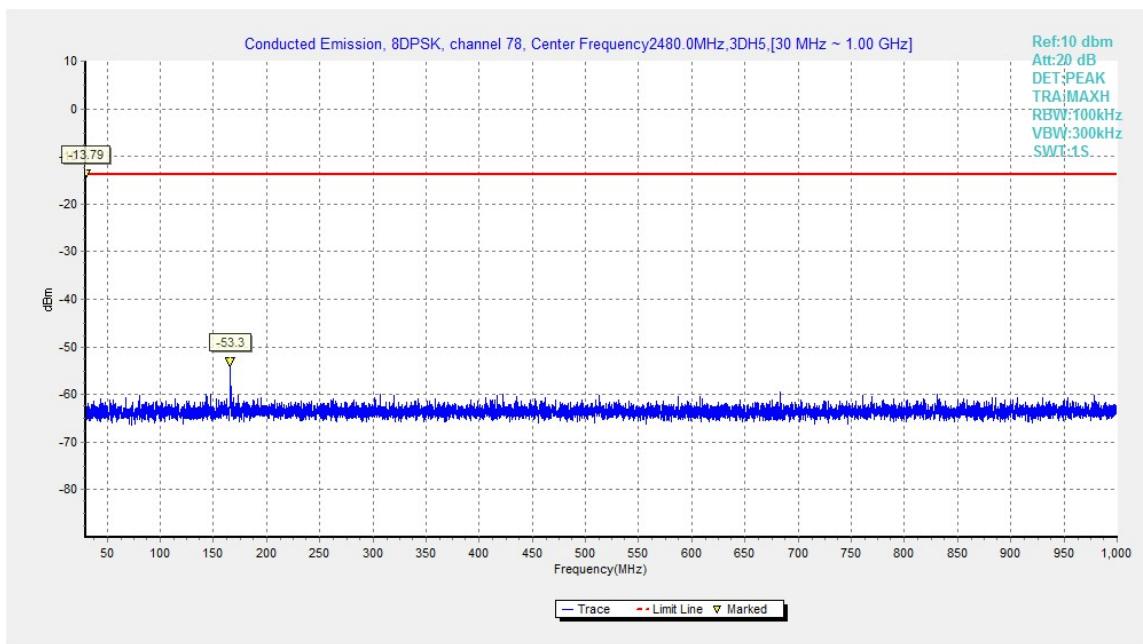


Fig.54. Conducted spurious emission: 8DPSK, Channel 78, 30MHz - 1GHz

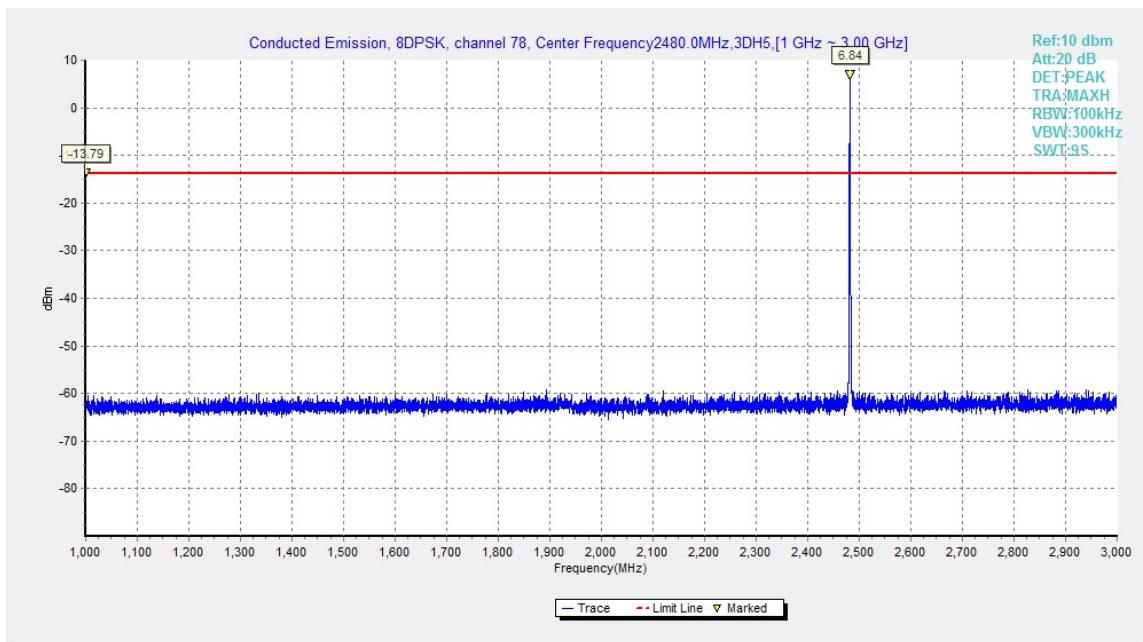


Fig.55. Conducted spurious emission: 8DPSK, Channel 78, 1GHz - 3GHz

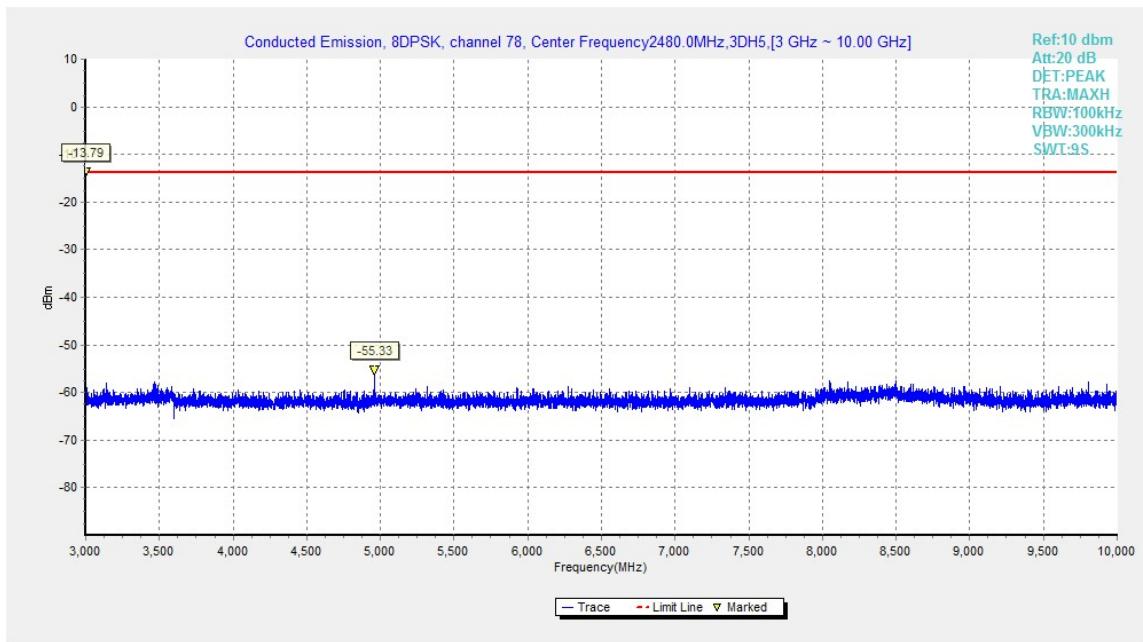


Fig.56. Conducted spurious emission: 8DPSK, Channel 78, 3GHz - 10GHz

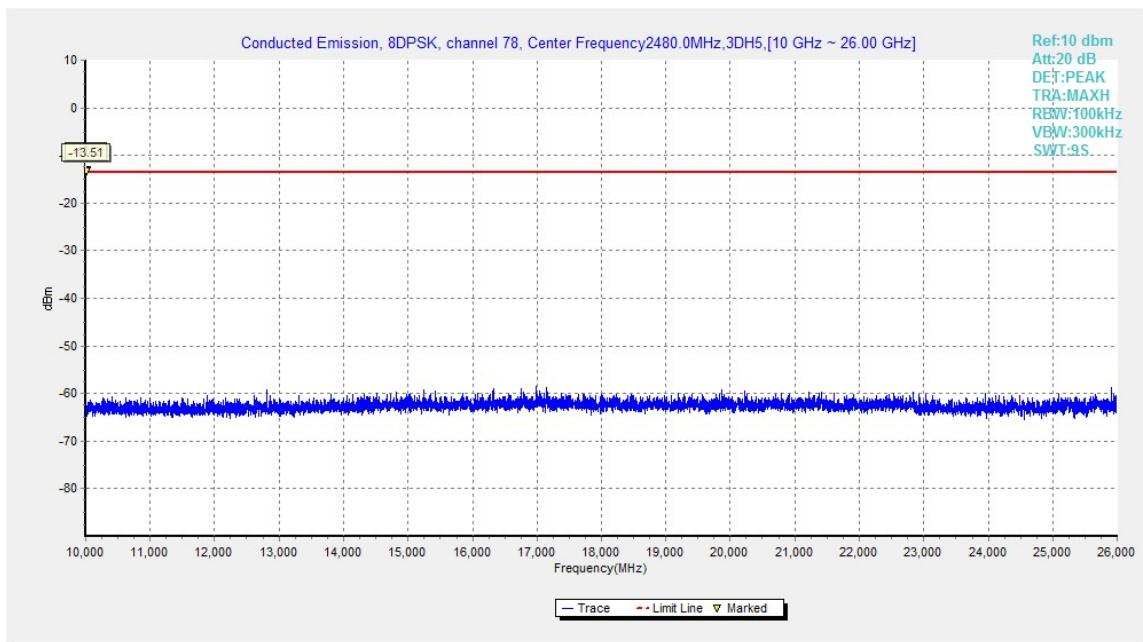


Fig.57. Conducted spurious emission: 8DPSK, Channel 78, 10GHz - 26GHz

## A.5. Radiated Emission

### Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247, 15.205, 15.209	20dB below peak output power

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)).

The measurement is made according to ANSI C63.10

### Limit in restricted band:

Frequency of emission (MHz)	Field strength(uV/m)	Field strength(dBuV/m)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

### Test Condition

The EUT was placed on a non-conductive table. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

Frequency of emission (MHz)	RBW/VBW	Sweep Time(s)
30-1000	100KHz/300KHz	5
1000-4000	1MHz/1MHz	15
4000-18000	1MHz/1MHz	40
18000-26500	1MHz/1MHz	20

### Measurement Results:

$$\text{Result} = P_{\text{Mea}} + \text{ARPL}$$

### For GFSK

Channel	Frequency Range	Test Results	Conclusion
Ch 0 2402 MHz	1 GHz ~ 3 GHz	Fig.58	P
	3 GHz ~ 18 GHz	Fig.59	P
Ch 39 2441 MHz	9 kHz ~ 30 MHz	Fig.60	P
	30 MHz ~ 1 GHz	Fig.61	P
	1 GHz ~ 3 GHz	Fig.62	P
	3 GHz ~ 18 GHz	Fig.63	P
Ch 78 2480 MHz	1 GHz ~ 3 GHz	Fig.64	P
	3 GHz ~ 18 GHz	Fig.65	P
Power	2.38GHz~2.4GHz---L	Fig.66	P
Power	2.45GHz~2.5GHz---H	Fig.67	P

For all channels	18 GHz ~ 26 GHz	Fig.68	P
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**Form/4 DQPSK**

Channel	Frequency Range	Test Results	Conclusion
Ch 0 2402 MHz	1 GHz ~ 3 GHz	Fig.69	P
	3 GHz ~ 18 GHz	Fig.70	P
Ch 39 2441 MHz	30 MHz ~ 1 GHz	Fig.71	P
	1 GHz ~ 3 GHz	Fig.72	P
	3 GHz ~ 18 GHz	Fig.73	P
Ch 78 2480 MHz	1 GHz ~ 3 GHz	Fig.74	P
	3 GHz ~ 18 GHz	Fig.75	P
Power	2.38GHz~2.4GHz---L	Fig.76	P
Power	2.45GHz~2.5GHz---H	Fig.77	P
For all channels	18 GHz ~ 26 GHz	Fig.78	P

**For 8DPSK**

Channel	Frequency Range	Test Results	Conclusion
Ch 0 2402 MHz	1 GHz ~ 3 GHz	Fig.79	P
	3 GHz ~ 18 GHz	Fig.80	P
Ch 39 2441 MHz	30 MHz ~ 1 GHz	Fig.81	P
	1 GHz ~ 3 GHz	Fig.82	P
	3 GHz ~ 18 GHz	Fig.83	P
Ch 78 2480 MHz	1 GHz ~ 3 GHz	Fig.84	P
	3 GHz ~ 18 GHz	Fig.85	P
Power	2.38GHz~2.4GHz---L	Fig.86	P
Power	2.45GHz~2.5GHz---H	Fig.87	P
For all channels	18 GHz ~ 26 GHz	Fig.88	P

**GFSK Ch 0 - Average**

Frequency(MHz)	Result(dBuv/m)	Cable Loss(dB)	Antenna Factor	PMea(dBuv/m)	Polarization
2382.975	50.1	2.9	32.0	15.240	H
2385.000	50.2	2.9	32.0	15.311	V
4804.500	38.3	-17.3	34.5	21.123	H
7206.000	40.0	-16.4	36.1	20.317	V
9607.500	39.5	-18.2	37.0	20.794	H
12010.500	42.8	-17.4	39.3	20.823	H

**GFSK Ch 39 - Average**

Frequency(MHz)	Result(dBuv/m)	Cable Loss(dB)	Antenna Factor	PMea(dBuv/m)	Polarization
2434.750	50.1	2.9	32.0	15.210	H
2448.500	50.4	2.9	32.3	15.175	H
4882.500	36.9	-18.5	34.5	20.945	H
7323.000	38.0	-18.5	36.1	20.438	V

9765.000	40.0	-17.8	37.2	20.592	V
12205.500	41.9	-17.8	39.2	20.449	H

**GFSK Ch 78 - Average**

Frequency(MHz)	Result(dBuv/m)	Cable Loss(dB)	Antenna Factor	PMea(dBuv/m)	Polarization
2483.575	51.6	2.9	32.8	15.915	H
2475.500	51.1	2.9	33.0	15.191	H
4960.500	37.5	-18.2	34.5	21.189	H
7440.000	39.9	-16.9	36.0	20.760	V
9921.000	40.8	-17.1	37.4	20.486	V
12400.500	41.8	-17.5	39.1	20.150	H

**GFSK Ch 0 – Peak**

Frequency(MHz)	Result(dBuv/m)	Cable Loss(dB)	Antenna Factor	PMea(dBuv/m)	Polarization
2381.540	53.9	2.9	32.0	19.03	H
23822.050	53.7	2.9	32.0	18.76	V
4804.500	47.5	-17.3	34.5	30.232	H
7206.000	49.8	-16.4	36.1	30.133	V
9607.500	51.5	-18.2	37.0	32.790	H
12016.500	52.3	-17.3	39.3	30.378	H

**GFSK Ch 39 - Peak**

Frequency(MHz)	Result(dBuv/m)	Cable Loss(dB)	Antenna Factor	PMea(dBuv/m)	Polarization
2411.800	51.8	2.9	32.0	16.91	H
2448.400	52.2	2.9	32.3	16.97	H
4882.500	48.3	-18.5	34.5	32.428	H
7323.000	48.3	-18.5	36.1	30.727	V
9763.500	48.3	-17.8	37.2	31.185	V
12205.500	48.3	-17.8	39.2	30.732	H

**GFSK Ch 78 - Peak**

Frequency(MHz)	Result(dBuv/m)	Cable Loss(dB)	Antenna Factor	PMea(dBuv/m)	Polarization
24835.000	57.5	2.9	32.8	21.78	H
2483.600	56.3	2.9	33.0	20.36	H
4960.500	47.5	-18.2	34.5	31.228	H
7440.000	49.9	-16.9	36.0	30.806	V
9921.000	51.5	-17.1	37.4	31.222	V
12400.500	52.2	-17.5	39.1	30.512	H

**$\pi/4$  DQPSK Ch 0 - Average**

Frequency(MHz)	Result(dBuv/m)	Cable Loss(dB)	Antenna Factor	PMea(dBuv/m)	Polarization
2388.750	50.1	2.9	32.0	15.234	H
2383.000	50.1	2.9	32.0	15.246	V
4804.500	38.1	-17.3	34.5	20.883	H
7206.000	39.8	-16.4	36.1	20.084	V
9607.500	39.2	-18.2	37.0	20.428	V
12016.500	42.1	-17.3	39.3	20.149	V

 **$\pi/4$  DQPSK Ch 39 - Average**

Frequency(MHz)	Result(dBuv/m)	Cable Loss(dB)	Antenna Factor	PMea(dBuv/m)	Polarization
2436.000	50.1	2.9	32.0	15.167	H
2446.000	50.6	2.9	32.2	15.411	V
4882.500	36.9	-18.5	34.5	20.908	V
7323.000	38.0	-18.5	36.1	20.383	V
9763.500	40.0	-17.8	37.2	20.554	V
12205.500	41.8	-17.8	39.2	20.334	H

 **$\pi/4$  DQPSK Ch 78 - Average**

Frequency(MHz)	Result(dBuv/m)	Cable Loss(dB)	Antenna Factor	PMea(dBuv/m)	Polarization
2483.500	53.2	2.9	32.8	17.524	H
2466.000	50.9	2.9	32.8	15.228	V
4960.500	37.4	-18.2	34.5	21.119	H
7440.000	39.7	-16.9	36.0	20.617	V
9921.000	40.7	-17.1	37.4	20.423	H
12400.500	41.6	-17.5	39.1	20.003	H

 **$\pi/4$  DQPSK Ch 0 – Peak**

Frequency(MHz)	Result(dBuv/m)	Cable Loss(dB)	Antenna Factor	PMea(dBuv/m)	Polarization
2389.100	54.0	2.9	32.0	19.17	H
2384.900	53.9	2.9	32.0	18.99	V
4804.500	47.6	-17.3	34.5	31.328	H
7206.000	50.0	-16.4	36.1	30.856	V
9607.500	51.4	-18.2	37.0	31.122	V
12016.500	52.3	-17.3	39.3	30.612	V

**$\pi/4$  DQPSK Ch 39 - Peak**

Frequency(MHz)	Result(dBuv/m)	Cable Loss(dB)	Antenna Factor	PMea(dBuv/m)	Polarization
2402.000	53.3	2.9	32.0	18.46	H
2403.400	52.4	2.9	32.2	17.21	V
4882.500	48.6	-18.5	34.5	32.649	V
7323.000	48.3	-18.5	36.1	30.688	V
9763.500	50.5	-17.8	37.2	31.047	V
12205.500	51.7	-17.8	39.2	30.254	H

 **$\pi/4$  DQPSK Ch 78 - Peak**

Frequency(MHz)	Result(dBuv/m)	Cable Loss(dB)	Antenna Factor	PMea(dBuv/m)	Polarization
2483.500	57.5	2.9	32.8	21.78	H
2483.525	56.0	2.9	32.8	20.35	V
4960.500	47.6	-18.2	34.5	31.328	H
7440.000	50.0	-16.9	36.0	30.856	V
9921.000	51.4	-17.1	37.4	31.122	H
12400.500	52.3	-17.5	39.1	30.612	H

**8DPSK Ch 0 - Average**

Frequency(MHz)	Result(dBuv/m)	Cable Loss(dB)	Antenna Factor	PMea(dBuv/m)	Polarization
2387.210	50.1	2.9	32.0	15.281	H
2380.750	50.2	2.9	32.1	15.252	V
4804.500	38.2	-17.3	34.5	20.940	H
7206.000	40.0	-16.4	36.1	20.296	V
9609.000	39.3	-18.3	37.0	20.551	H
12100.500	42.3	-17.2	39.3	20.326	H

**8DPSK Ch 39 - Average**

Frequency(MHz)	Result(dBuv/m)	Cable Loss(dB)	Antenna Factor	PMea(dBuv/m)	Polarization
2434.500	50.0	2.9	31.9	15.176	H
2446.000	50.6	2.9	32.2	15.477	H
4882.500	36.9	-18.5	34.5	20.978	H
7323.000	38.2	-18.5	36.1	20.617	V
9765.000	40.0	-17.8	37.2	20.566	V
12205.500	41.7	-17.8	39.2	20.307	H

**8DPSK Ch 78 - Average**

Frequency(MHz)	Result(dBuv/m)	Cable Loss(dB)	Antenna Factor	PMea(dBuv/m)	Polarization
2483.500	52.6	2.9	32.8	16.945	H
2456.750	50.7	2.9	32.5	15.263	V
4960.500	37.7	-18.2	34.5	21.346	H
7440.000	39.9	-16.9	36.0	20.742	H
9921.000	40.8	-17.1	37.4	20.494	V
12400.500	41.8	-17.5	39.1	20.110	H

**8DPSK Ch 0 – Peak**

Frequency(MHz)	Result(dBuv/m)	Cable Loss(dB)	Antenna Factor	PMea(dBuv/m)	Polarization
2385.390	54.0	2.9	32.0	19.10	H
2380.665	54.3	2.9	32.1	19.30	V
4804.500	47.6	-17.3	34.5	30.41	H
7206.000	49.8	-16.4	36.1	30.06	V
9607.500	51.7	-18.2	37.0	32.95	H
12016.500	52.5	-17.3	39.3	30.52	H

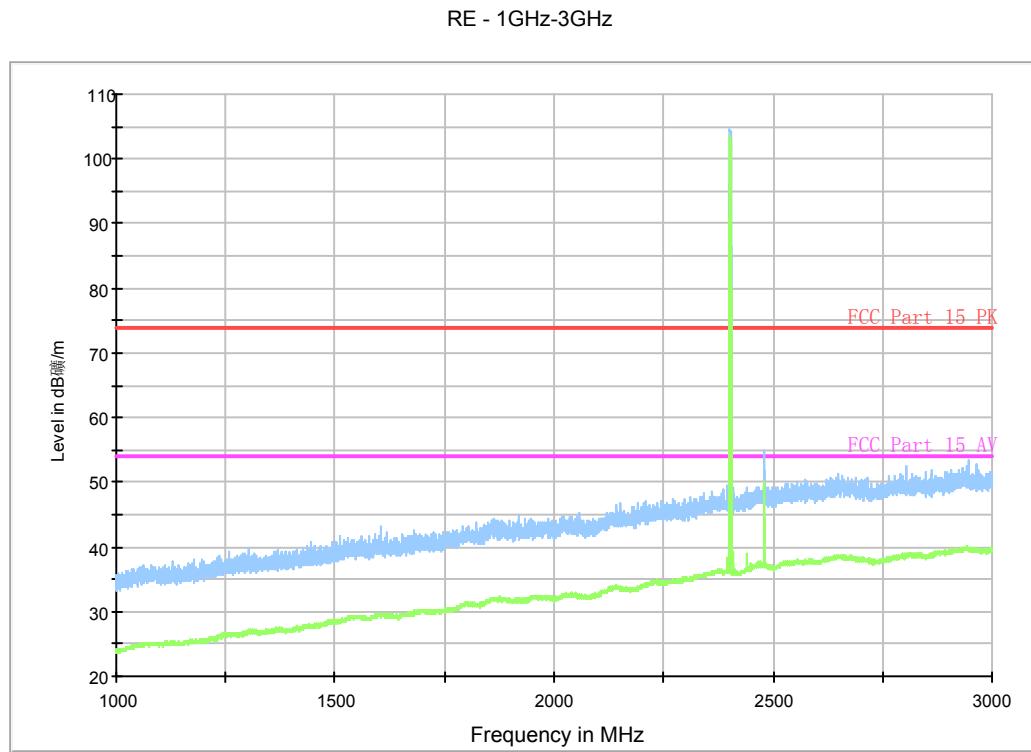
**8DPSK Ch 39 - Peak**

Frequency(MHz)	Result(dBuv/m)	Cable Loss(dB)	Antenna Factor	PMea(dBuv/m)	Polarization
2469.400	52.6	2.9	31.9	17.80	H
2462.600	51.9	2.9	32.2	16.71	H
4882.500	48.6	-18.5	34.5	32.65	H
7323.000	48.5	-18.5	36.1	30.94	V
9763.500	50.5	-17.8	37.2	31.02	V
12205.500	52.3	-17.8	39.2	30.90	H

**8DPSK Ch 78 - Peak**

Frequency(MHz)	Result(dBuv/m)	Cable Loss(dB)	Antenna Factor	PMea(dBuv/m)	Polarization
24835.000	58.5	2.9	32.8	22.80	H
2484.250	55.4	2.9	32.5	19.95	V
4960.500	47.7	-18.2	34.5	31.40	H
7440.000	49.9	-16.9	36.0	30.82	H
9921.000	51.6	-17.1	37.4	31.30	V
12400.500	52.4	-17.5	39.1	30.78	H

**Test graphs as below:**



Note: the spike over the limit is the Bluetooth carrier frequency and coming from the radio equipment.

Fig.58. Radiated emission: GFSK, Channel 0, 1 GHz - 3 GHz

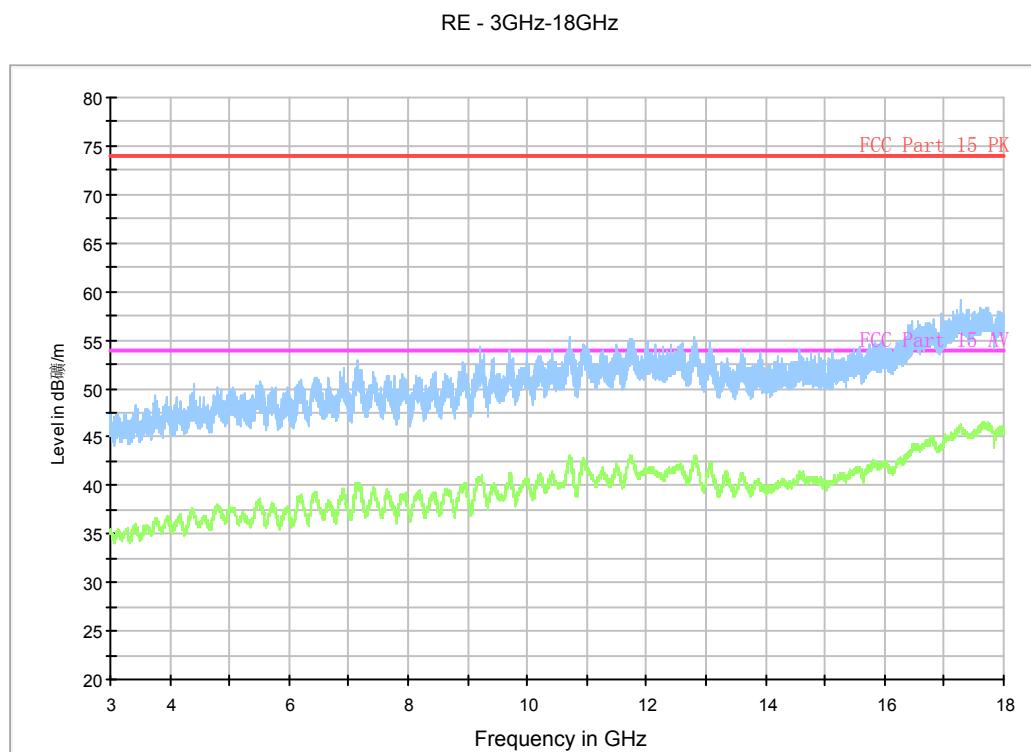


Fig.59. Radiated emission: GFSK, Channel 0, 3 GHz - 18 GHz

RE 9kHz-30MHz\_ESCI3

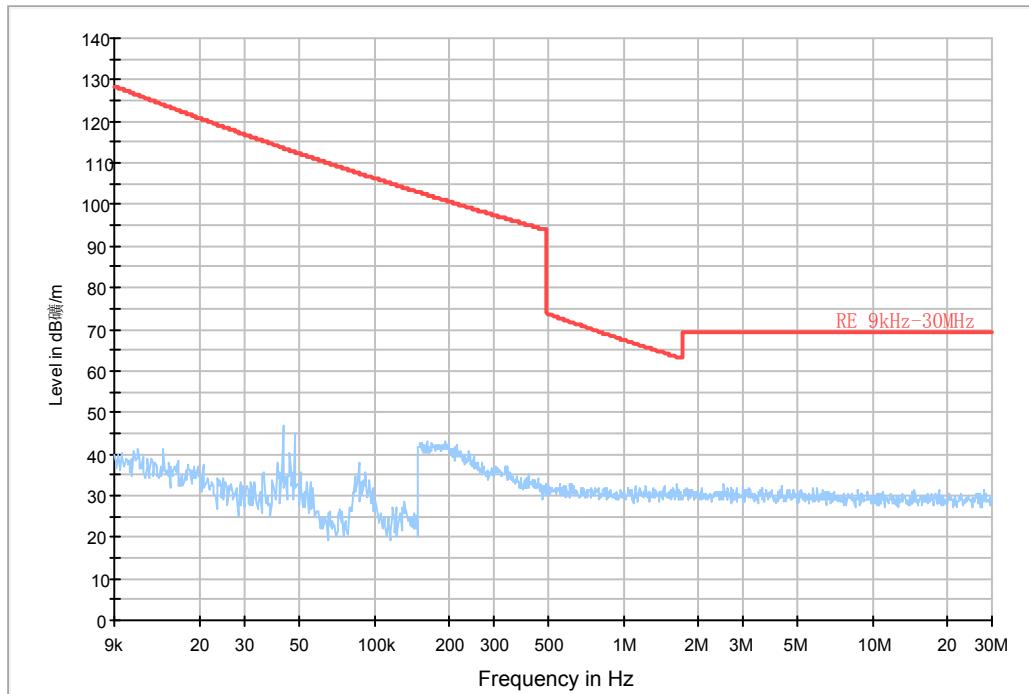


Fig.60. Radiated emission: GFSK, Channel 39, 9 kHz - 30 MHz

RE 30MHz-1GHz

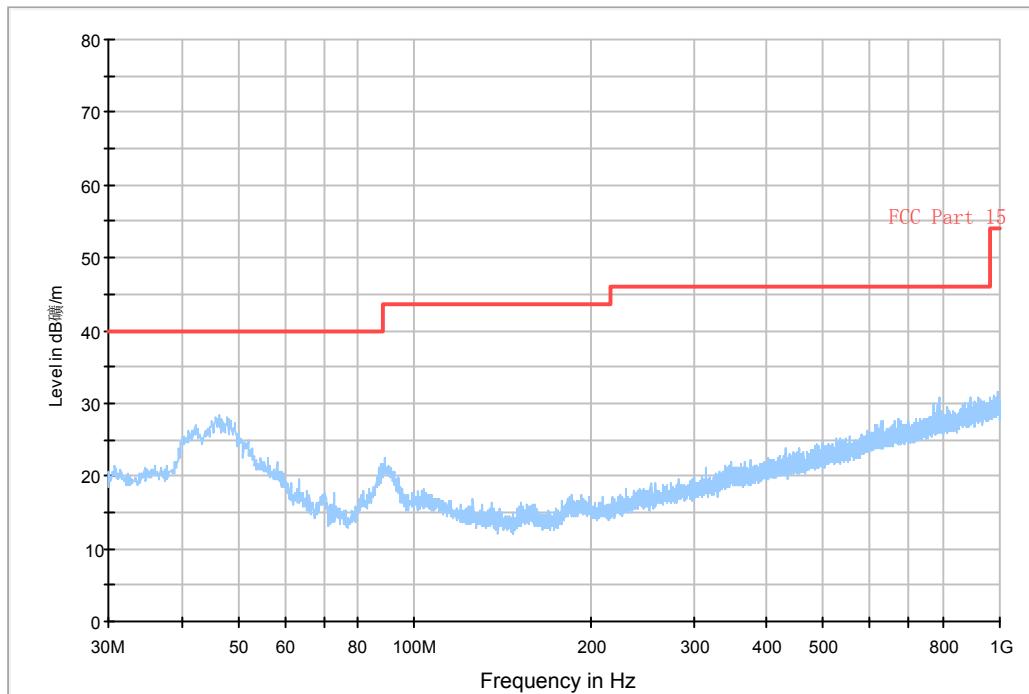
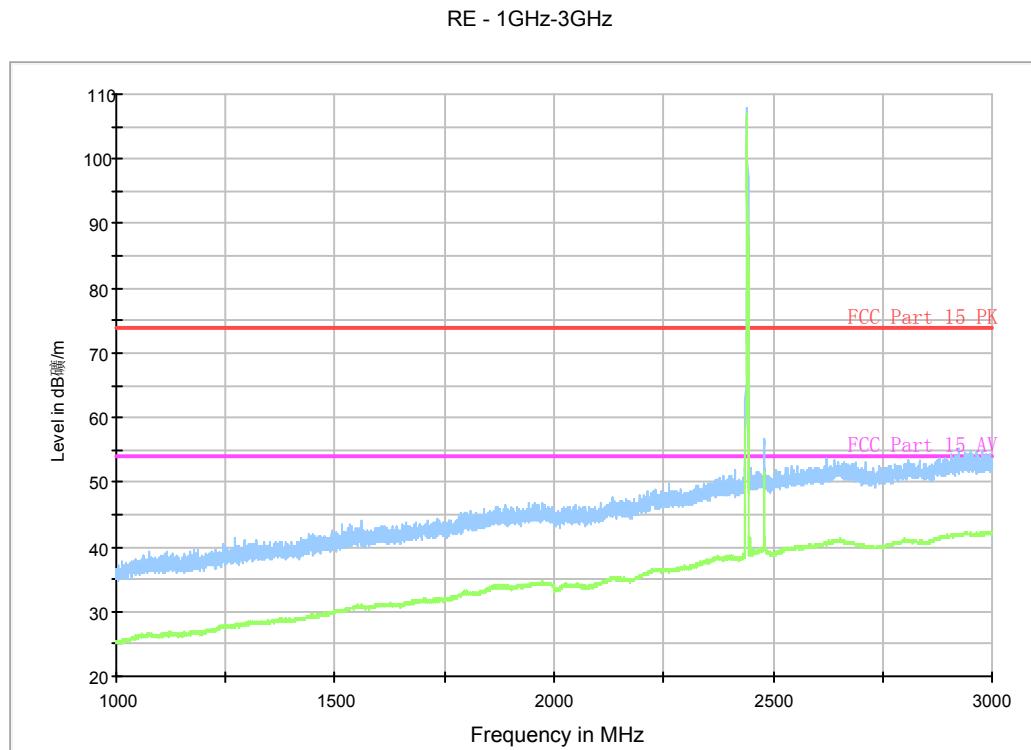


Fig.61. Radiated emission: GFSK, Channel 39, 30 MHz - 1 GHz



Note: the spike over the limit is the Bluetooth carrier frequency and coming from the radio equipment.

Fig.62. Radiated emission: GFSK, Channel 39, 1 GHz - 3 GHz

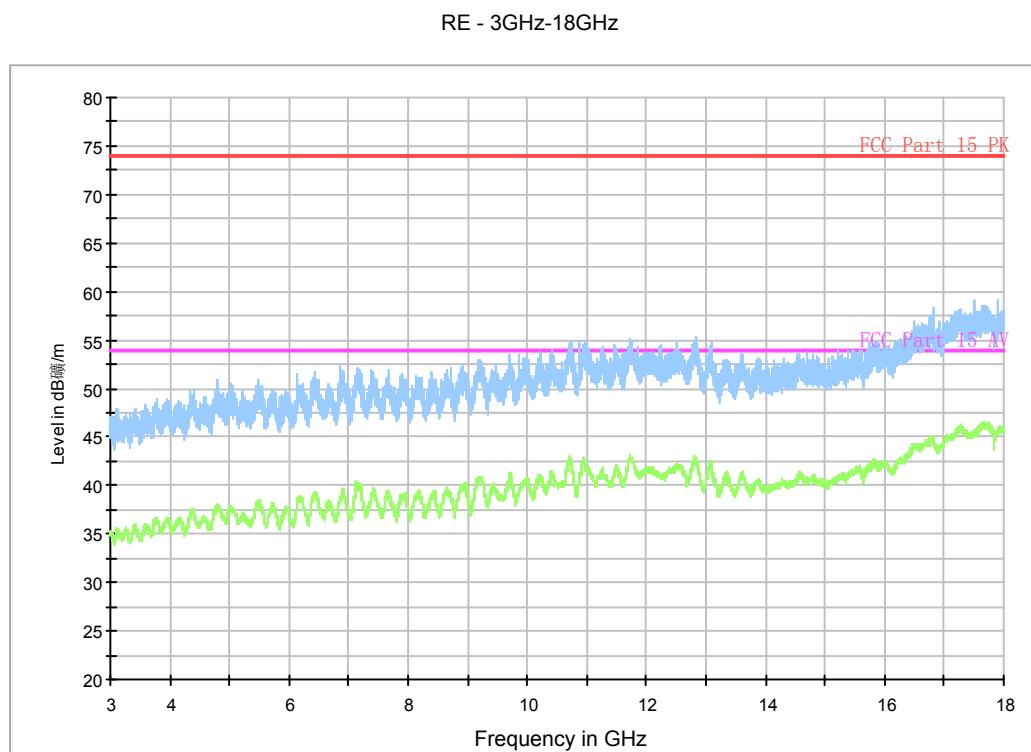
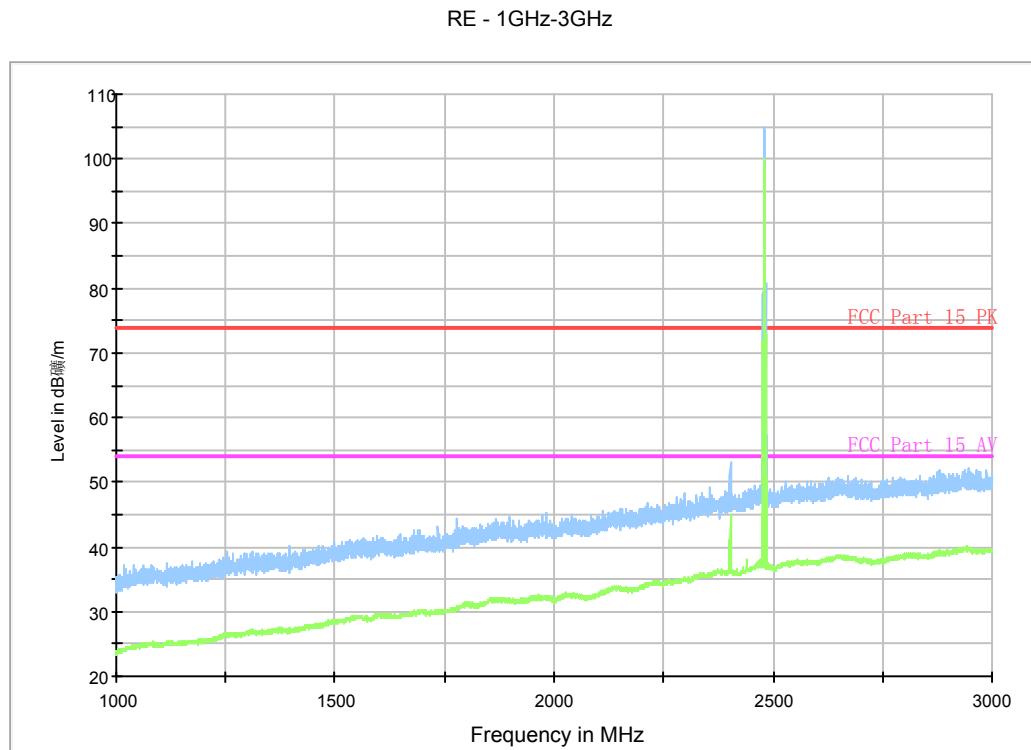


Fig.63. Radiated emission: GFSK, Channel 39, 3 GHz - 18 GHz



Note: the spike over the limit is the Bluetooth carrier frequency and coming from the radio equipment.

Fig.64. Radiated emission: GFSK, Channel 78, 1 GHz - 3 GHz

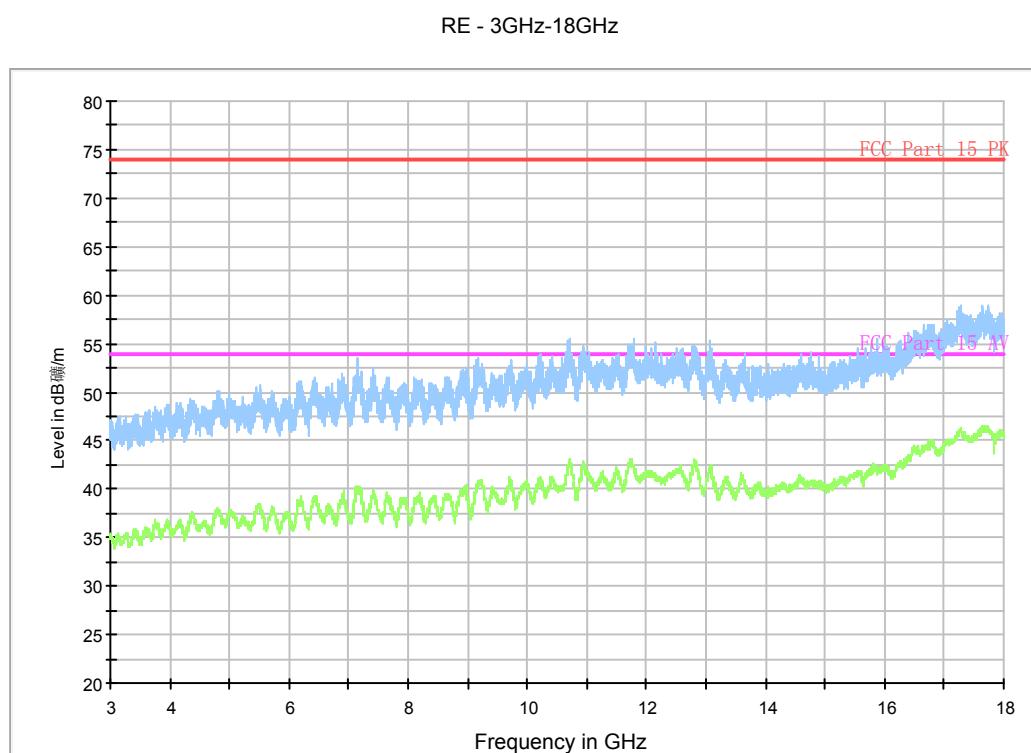


Fig.65. Radiated emission: GFSK, Channel 78, 3 GHz - 18 GHz

RE - Power-2.38GHz-2.45GHz\_ESCI3

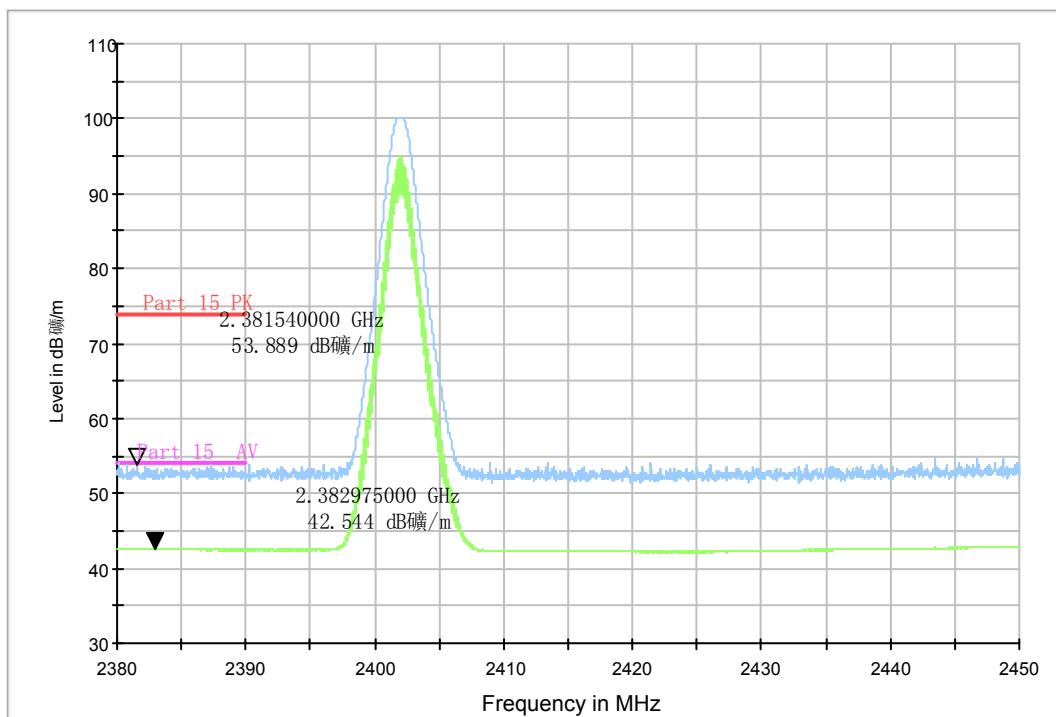


Fig.66. Radiated emission (Power): GFSK, low channel

RE - Power-2.45GHz-2.5GHz\_ESCI3

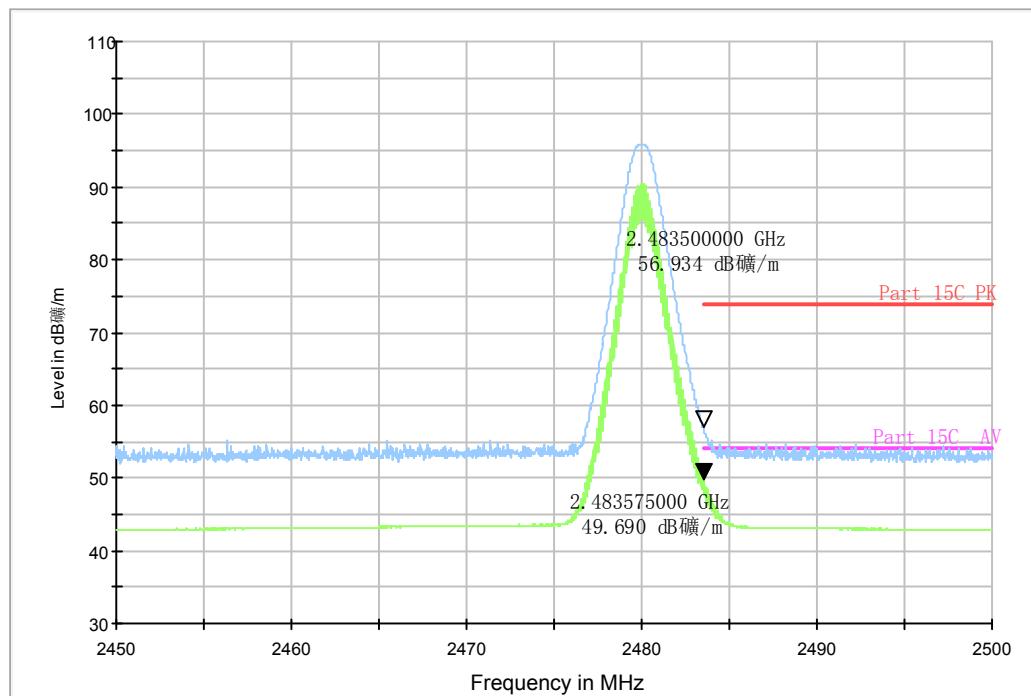


Fig.67. Radiated emission (Power) GFSK, high channel

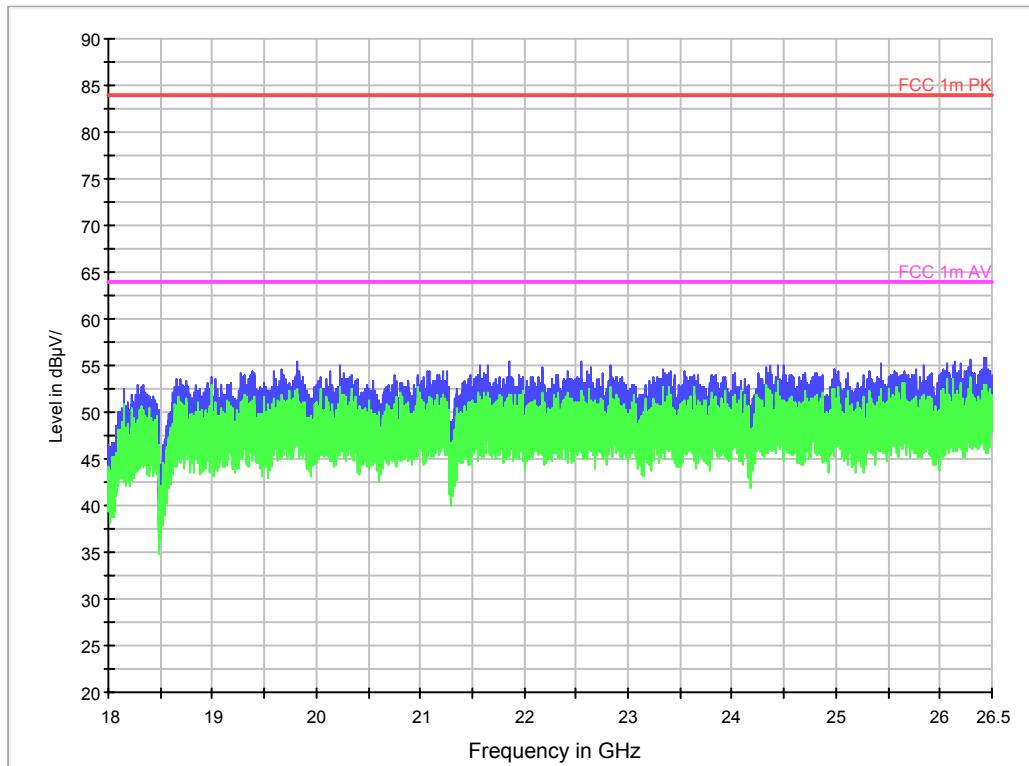
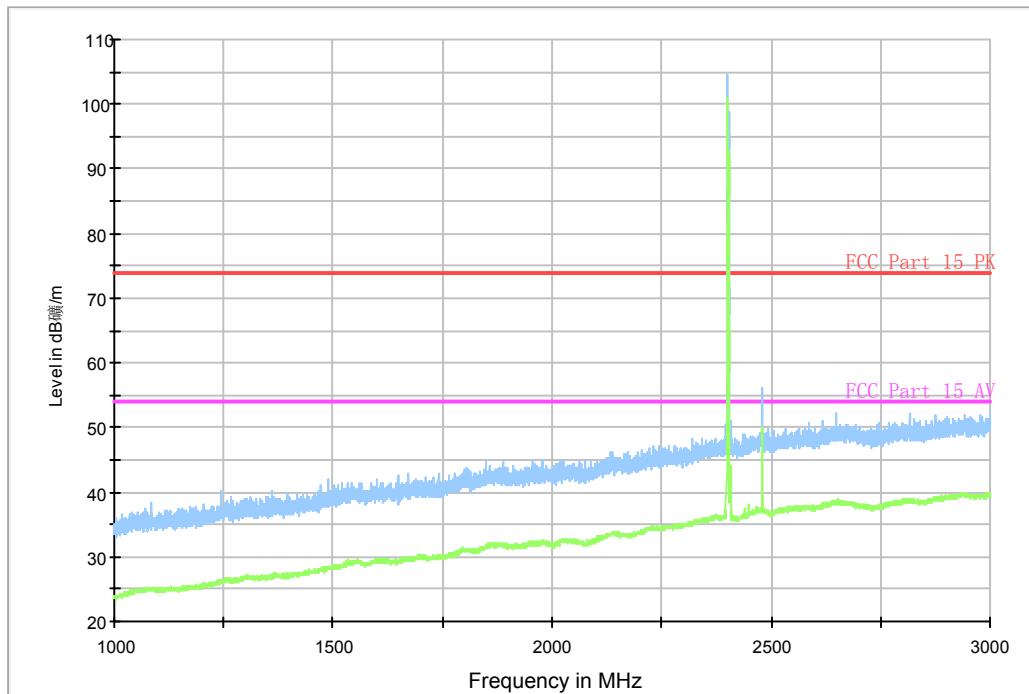


Fig.68. Radiated emission: GFSK, 18 GHz - 26 GHz

RE - 1GHz-3GHz



Note: the spike over the limit is the Bluetooth carrier frequency and coming from the radio equipment.

Fig.69. Radiated emission:  $\pi/4$  DQPSK, Channel 0, 1 GHz - 3 GHz

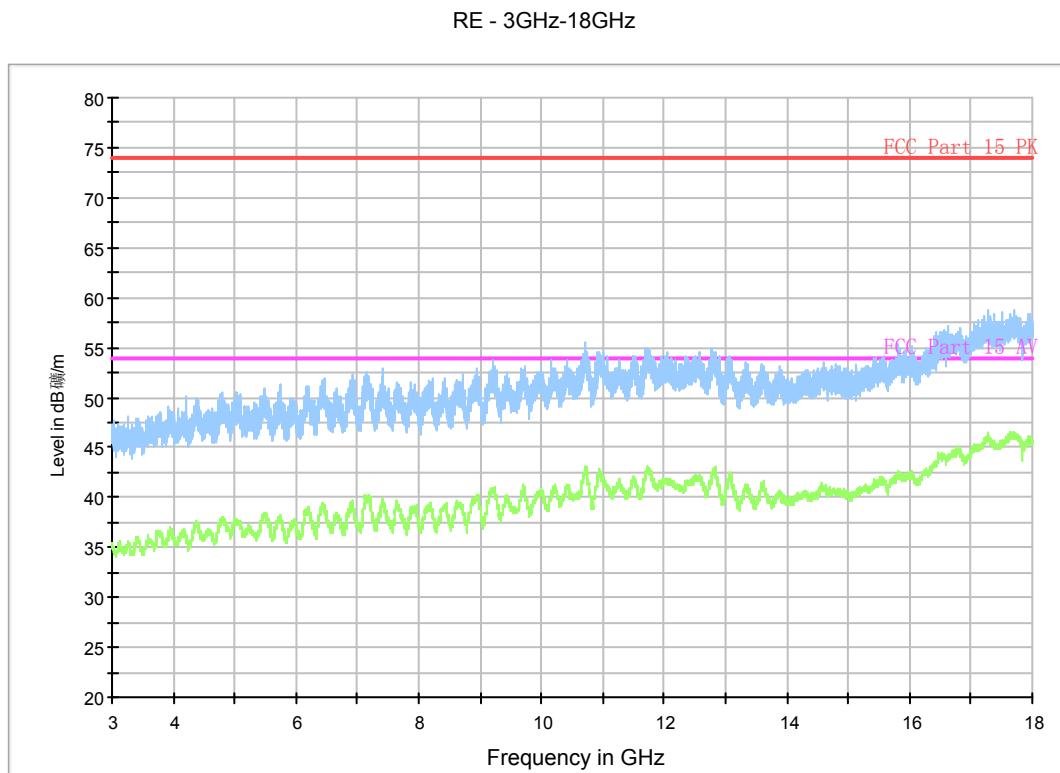


Fig.70. Radiated emission:  $\pi/4$  DQPSK, Channel 0, 3 GHz - 18 GHz

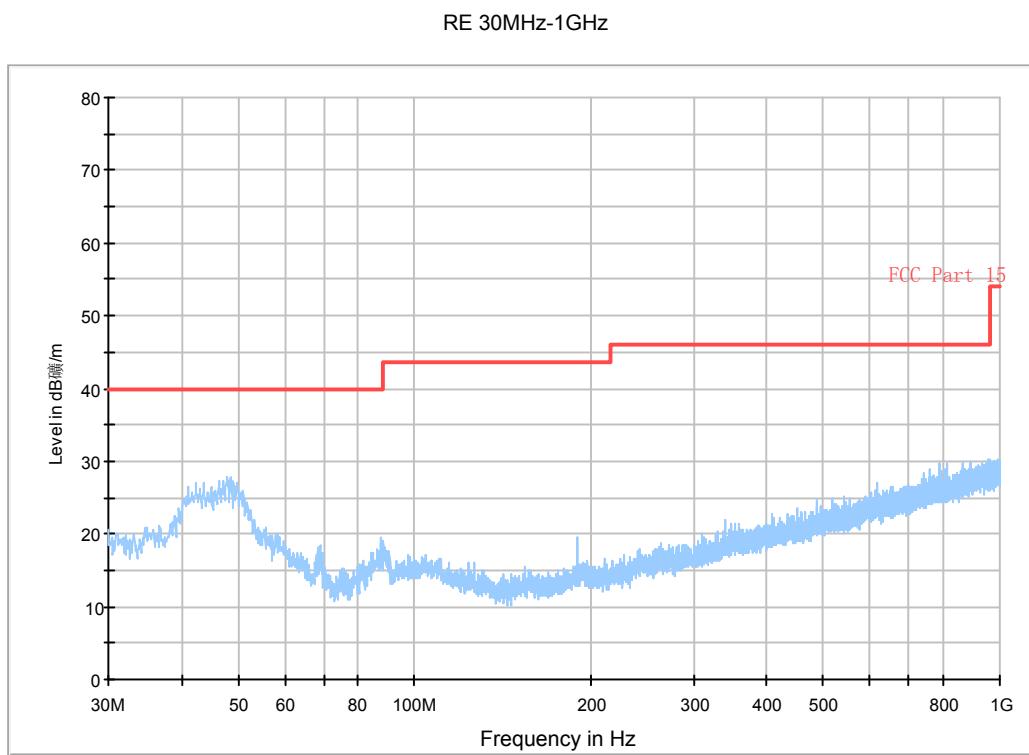
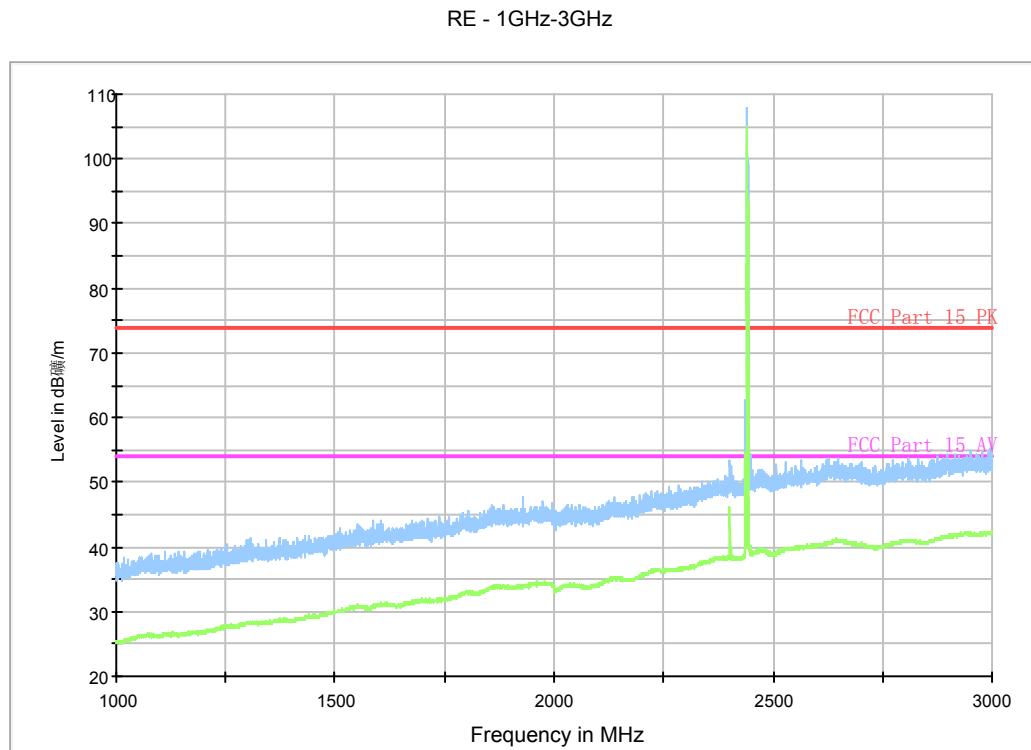


Fig.71. Radiated emission:  $\pi/4$  DQPSK, Channel 39, 30 MHz - 1 GHz



Note: the spike over the limit is the Bluetooth carrier frequency and coming from the radio equipment.

Fig.72. Radiated emission:  $\pi/4$  DQPSK, Channel 39, 1 GHz - 3 GHz

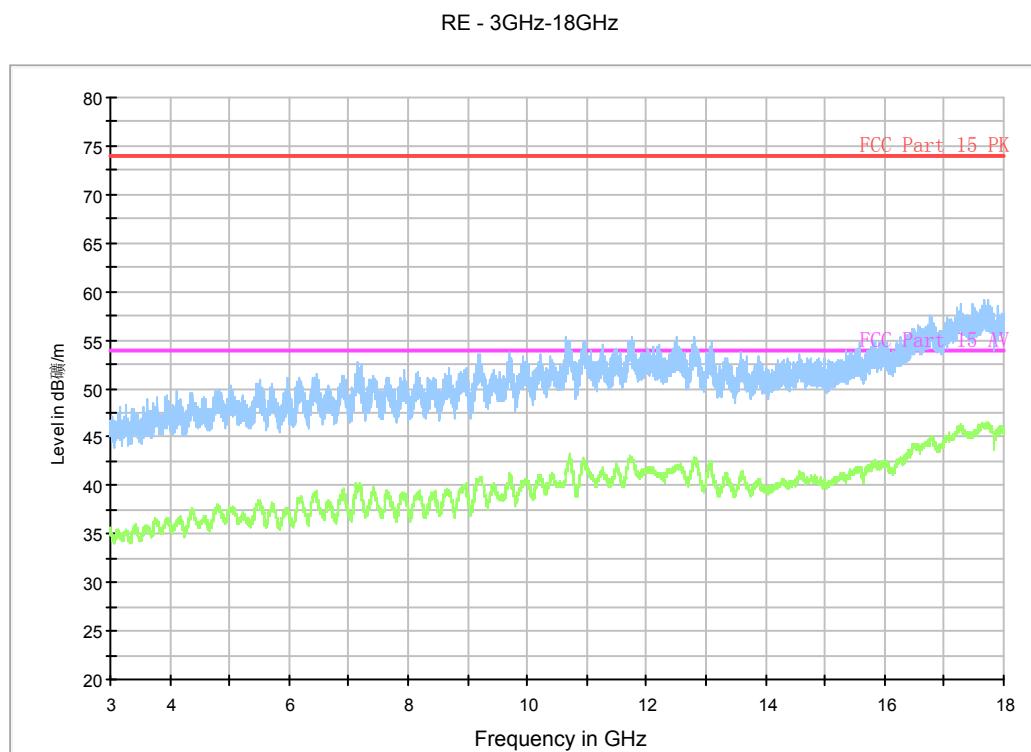
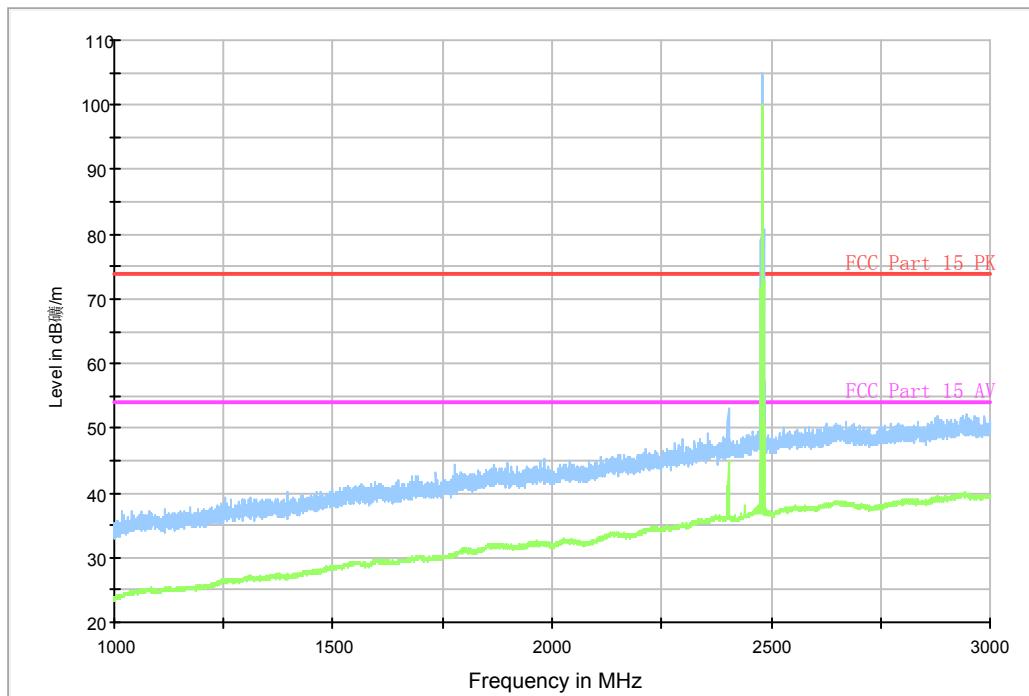


Fig.73. Radiated emission:  $\pi/4$  DQPSK, Channel 39, 3 GHz - 18 GHz

RE - 1GHz-3GHz



Note: the spike over the limit is the Bluetooth carrier frequency and coming from the radio equipment.

Fig.74. Radiated emission:  $\pi/4$  DQPSK, Channel 78, 1 GHz - 3 GHz

RE - 3GHz-18GHz

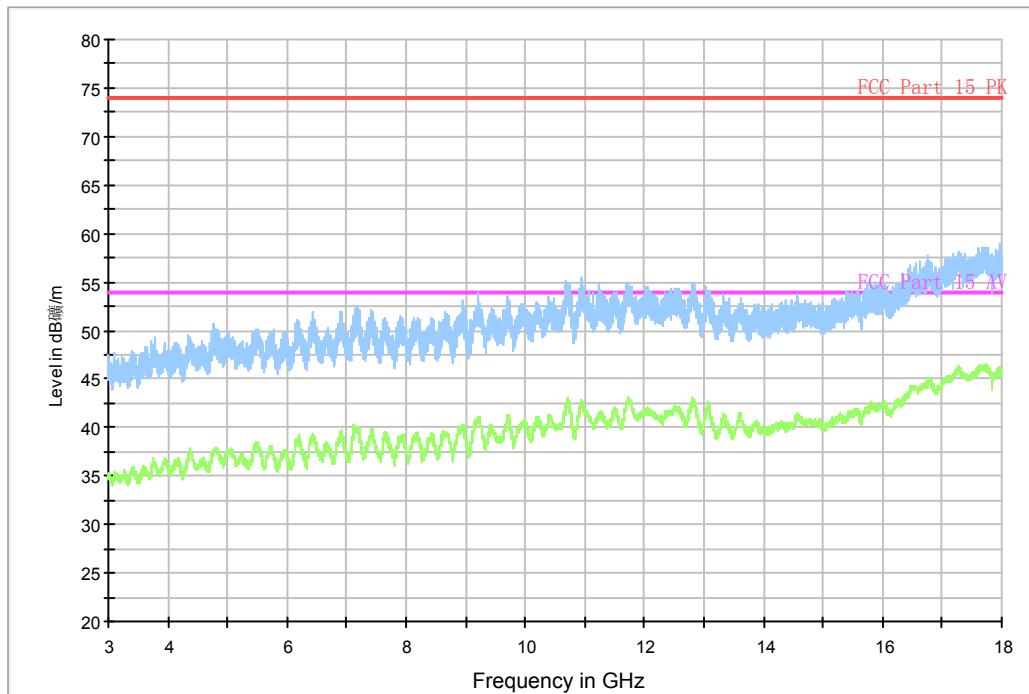


Fig.75. Radiated emission:  $\pi/4$  DQPSK, Channel 78, 3 GHz - 18 GHz

RE - Power-2.38GHz-2.45GHz\_ESCI3

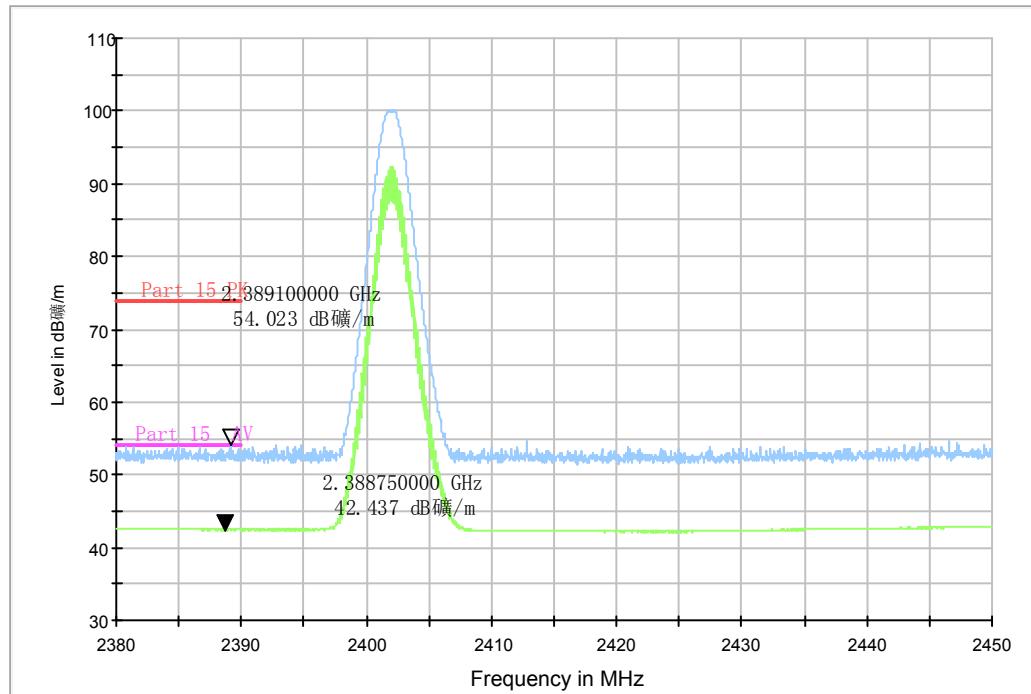


Fig.76. Radiated emission (Power):  $\pi/4$  DQPSK, low channel

RE - Power-2.45GHz-2.5GHz\_ESCI3

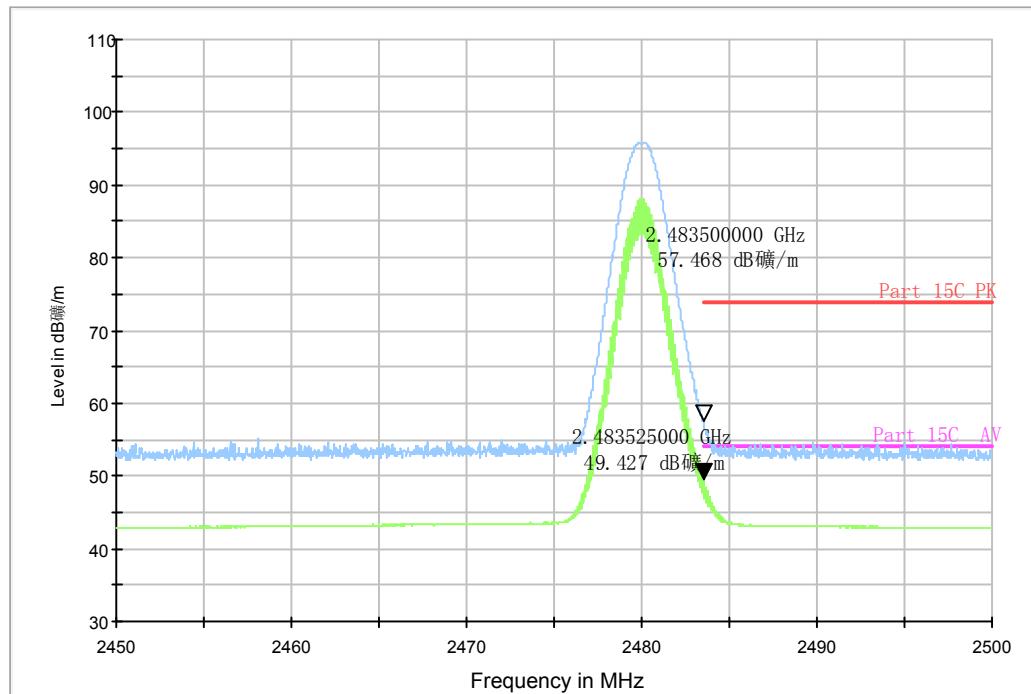


Fig.77. Radiated emission (Power):  $\pi/4$  DQPSK, high channel

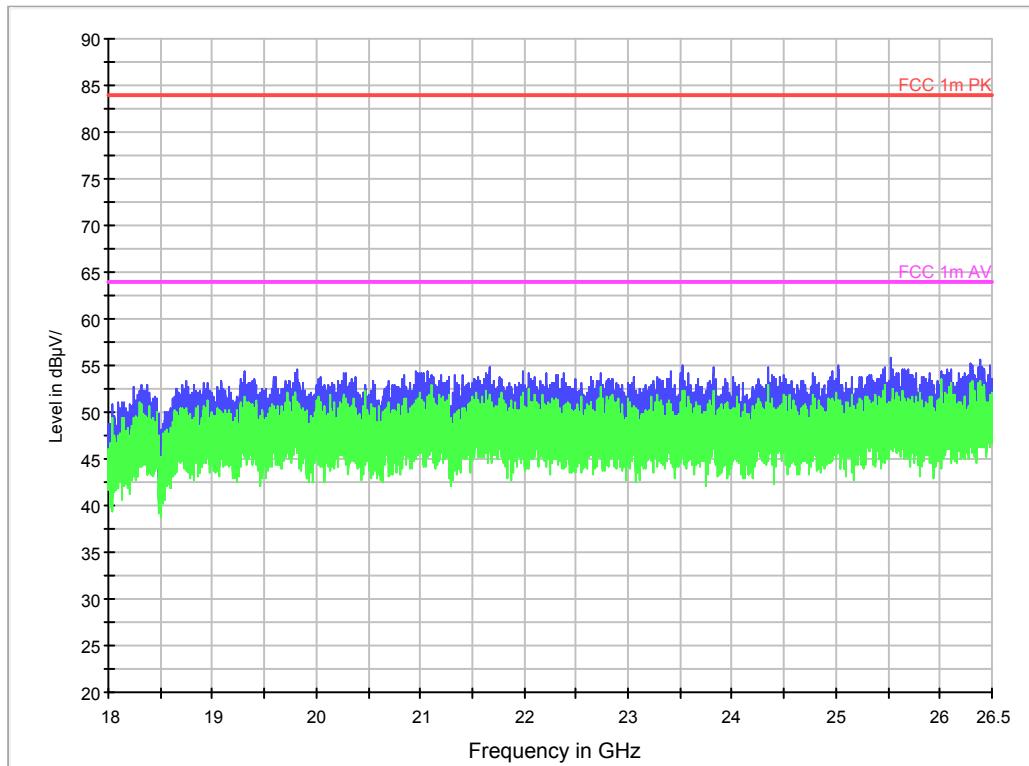
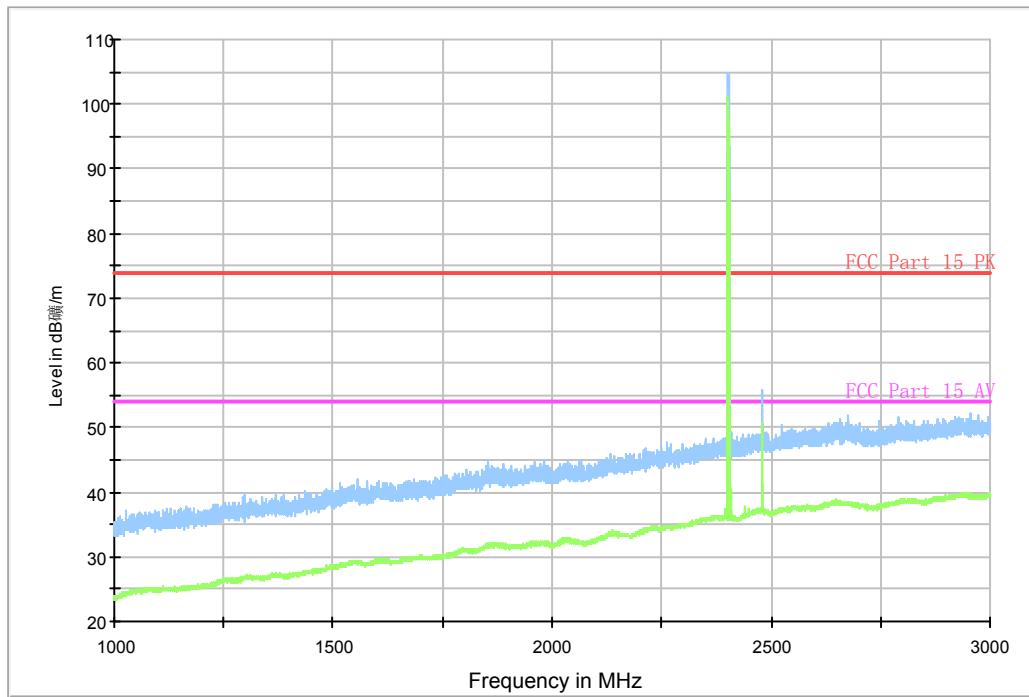


Fig.78. Radiated emission:  $\pi/4$  DQPSK, 18 GHz - 26 GHz

RE - 1GHz-3GHz



Note: the spike over the limit is the Bluetooth carrier frequency and coming from the radio equipment.

Fig.79. Radiated emission: 8DPSK, Channel 0, 1 GHz - 3 GHz

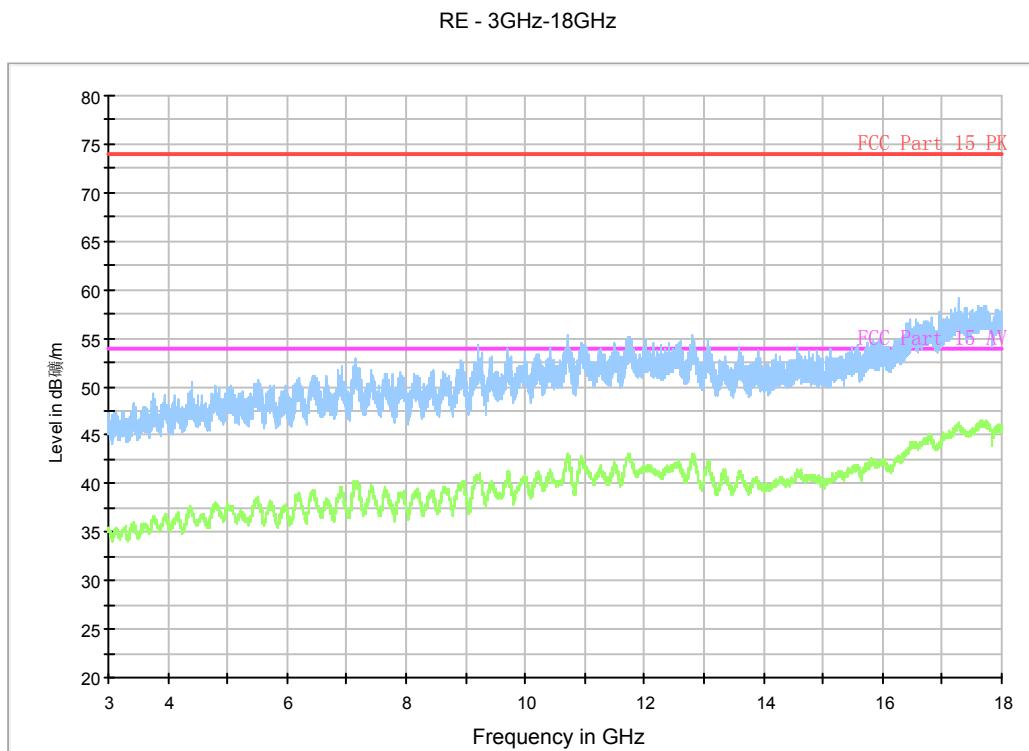


Fig.80. Radiated emission: 8DPSK, Channel 0, 3 GHz - 18 GHz

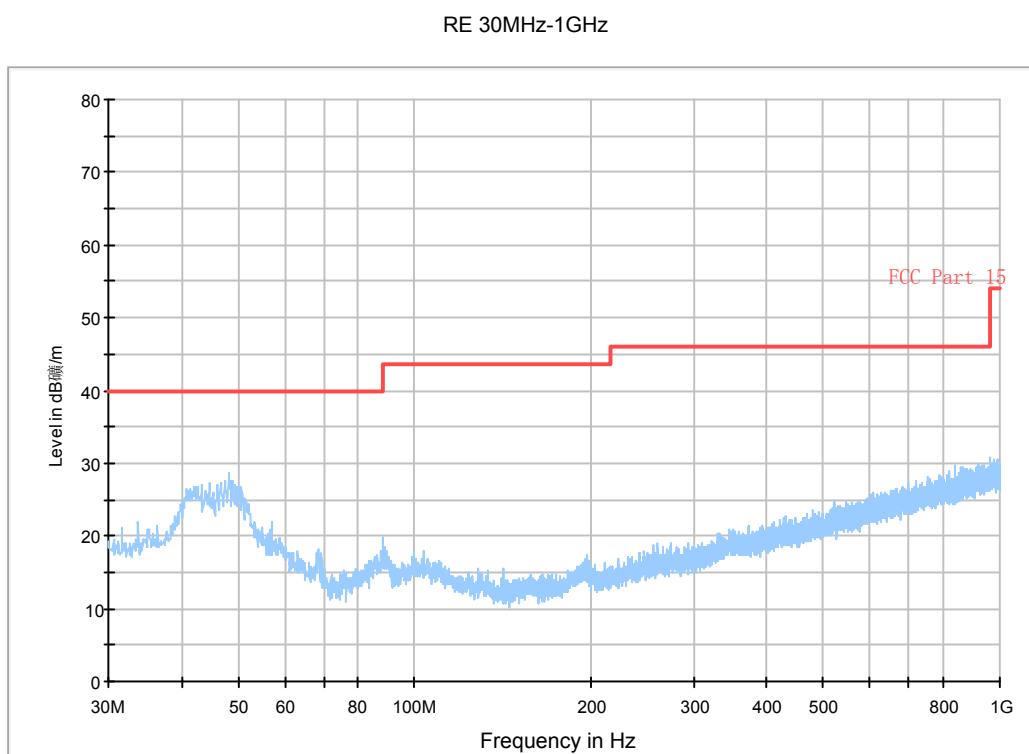
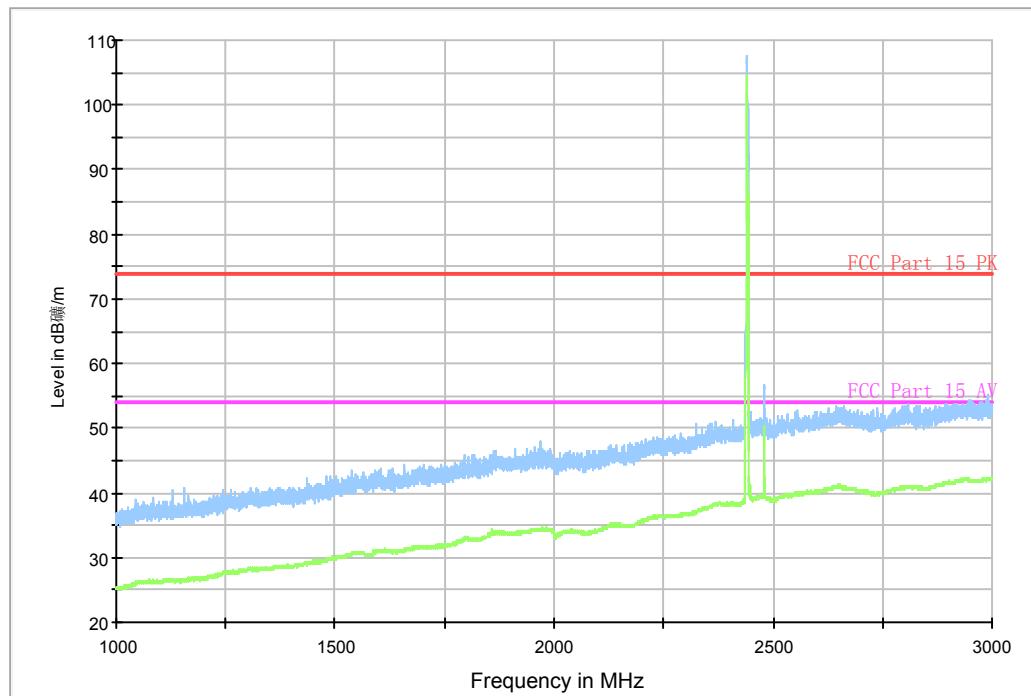


Fig.81. Radiated emission: 8DPSK, Channel 39, 30 MHz - 1 GHz

RE - 1GHz-3GHz



Note: the spike over the limit is the Bluetooth carrier frequency and coming from the radio equipment.

Fig.82. Radiated emission: 8DPSK, Channel 39, 1 GHz - 3 GHz

RE - 3GHz-18GHz

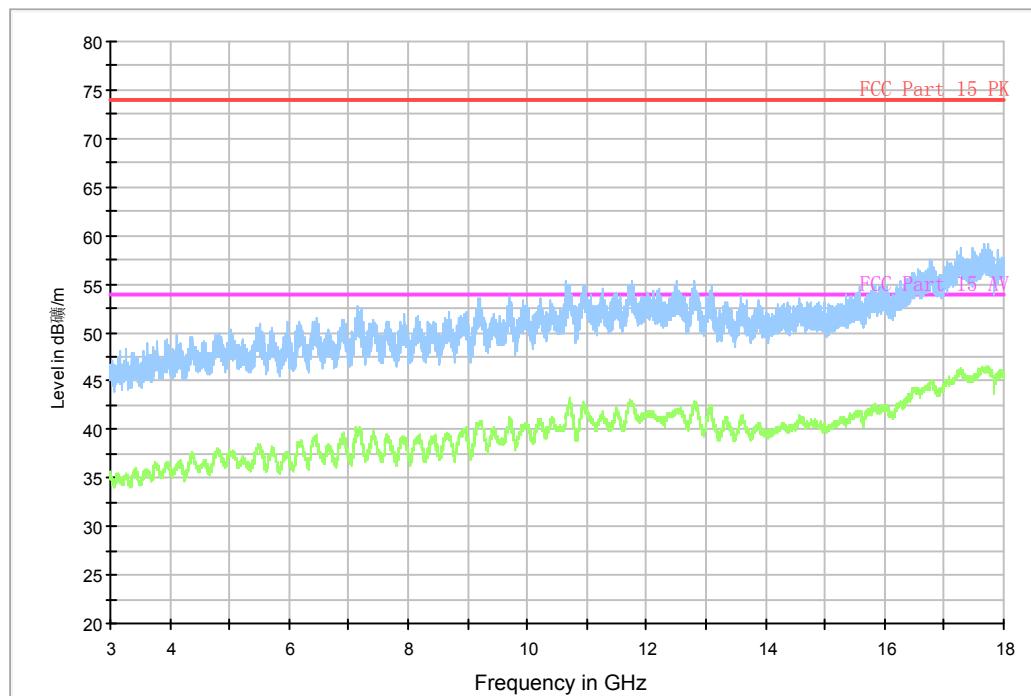
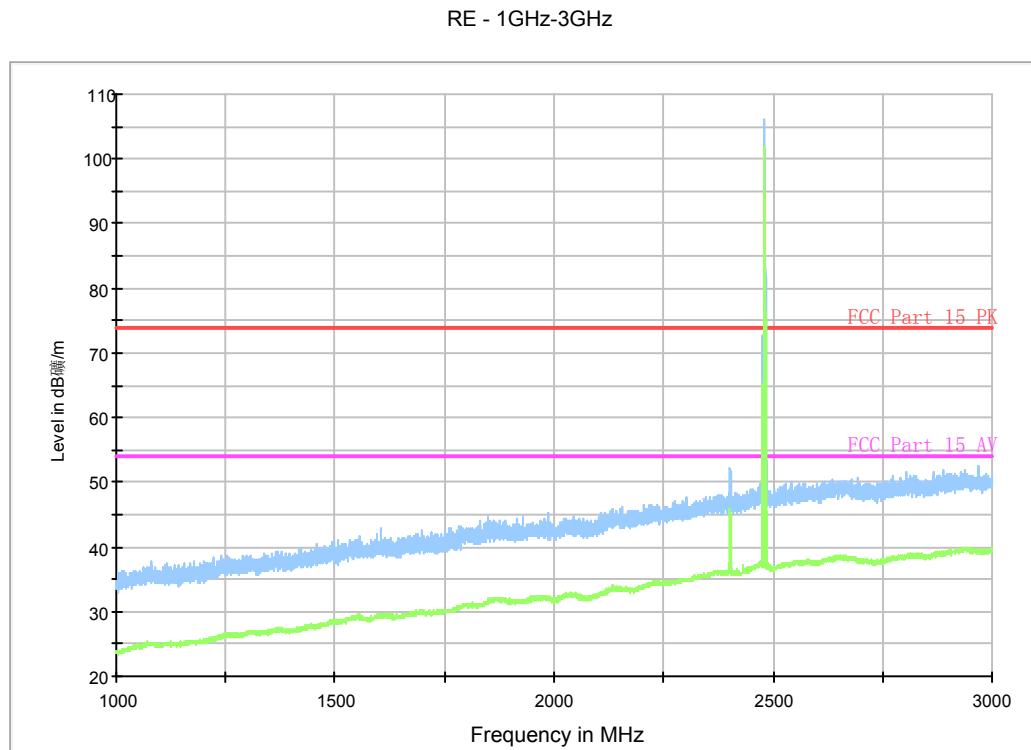


Fig.83. Radiated emission: 8DPSK, Channel 39, 3 GHz - 18 GHz



Note: the spike over the limit is the Bluetooth carrier frequency and coming from the radio equipment.

Fig.84. Radiated emission: 8DPSK, Channel 78, 1 GHz - 3 GHz

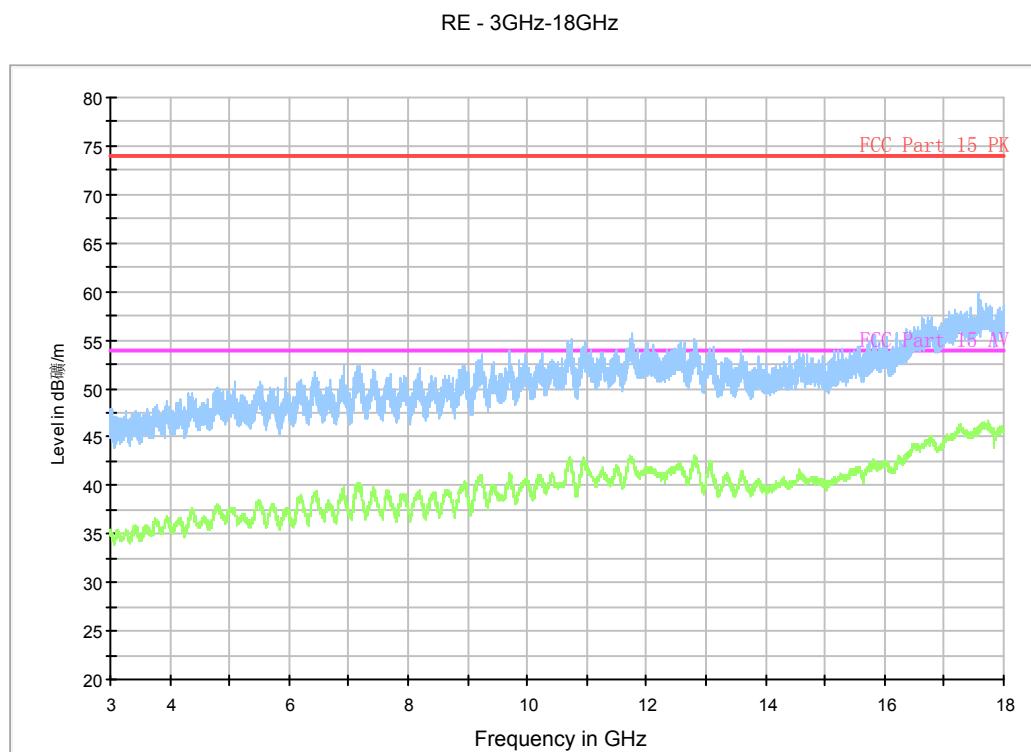


Fig.85. Radiated emission: 8DPSK, Channel 78, 3 GHz - 18 GHz

RE - Power-2.38GHz-2.45GHz\_ESCI3

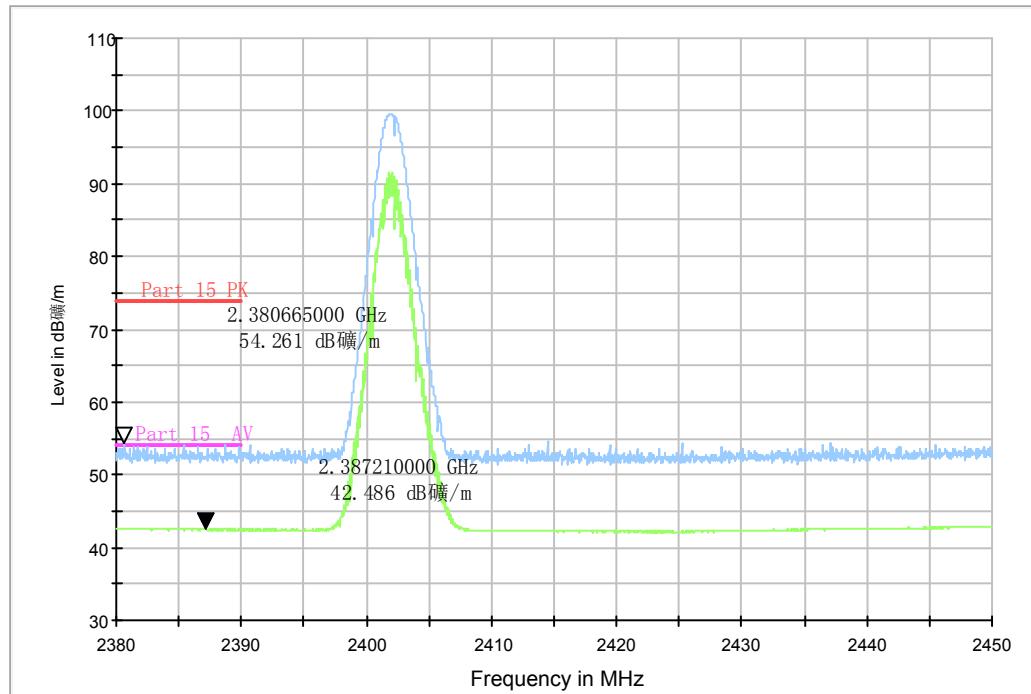


Fig.86. Radiated emission (Power): 8DPSK, low channel

RE - Power-2.45GHz-2.5GHz\_ESCI3

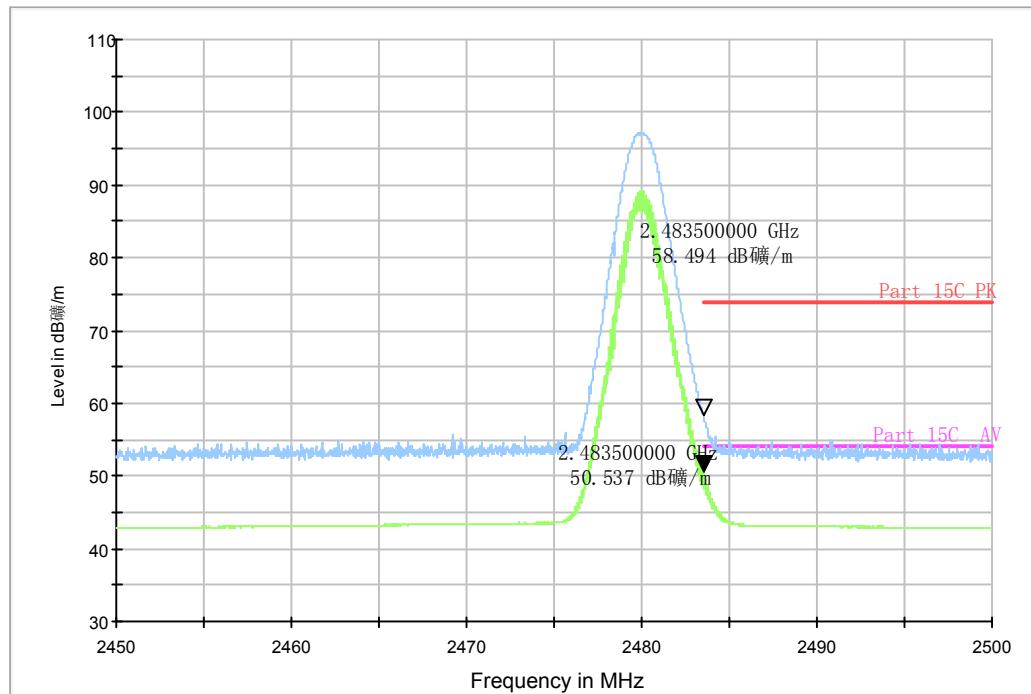


Fig.87. Radiated emission (Power): 8DPSK, high channel

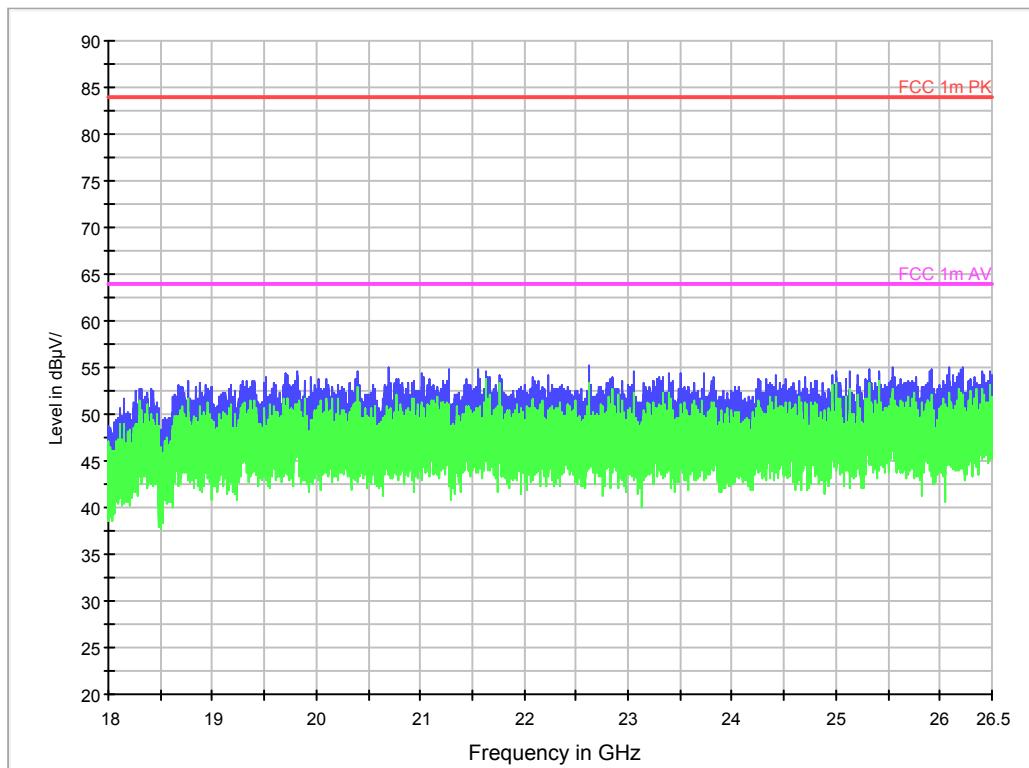


Fig.88. Radiated emission: 8DPSK, 18 GHz - 26 GHz

## A.6. Time of Occupancy (Dwell Time)

### Method of Measurement: See ANSI C63.10-clause 7.8.4

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

- Span = zero span, centered on a hopping channel
- RBW = 1 MHz
- VBW  $\geq$  RBW
- Sweep = as necessary to capture the entire dwell time per hopping channel
- Detector function = peak
- Trace = max hold

Measure a pulse time in time domain at middle frequency and then count the hopping number in 31.6s(which equals with 0.4 multiply 79) of middle frequency ,then multiply the pulse time and hopping number and record them.

#### Measurement Limit:

Standard	Limit (ms)
FCC 47 CFR Part 15.247(a) (1)(iii)	< 400

#### Measurement Result:

##### For GFSK

Channel	Packet	Dwell Time (ms)	Conclusion
39	DH1	Fig.89	121.81
	DH3	Fig.90	261.89
	DH5	Fig.91	307.74

##### For $\pi/4$ DQPSK

Channel	Packet	Dwell Time (ms)	Conclusion
39	DH1	Fig.92	123.71
	DH3	Fig.93	262.18
	DH5	Fig.94	308.00

##### For 8DPSK

Channel	Packet	Dwell Time (ms)	Conclusion
39	DH1	Fig.95	123.60

	DH3	Fig.96	262.02	P
	DH5	Fig.97	306.50	P

**Conclusion: PASS**

**Test graphs as below:**

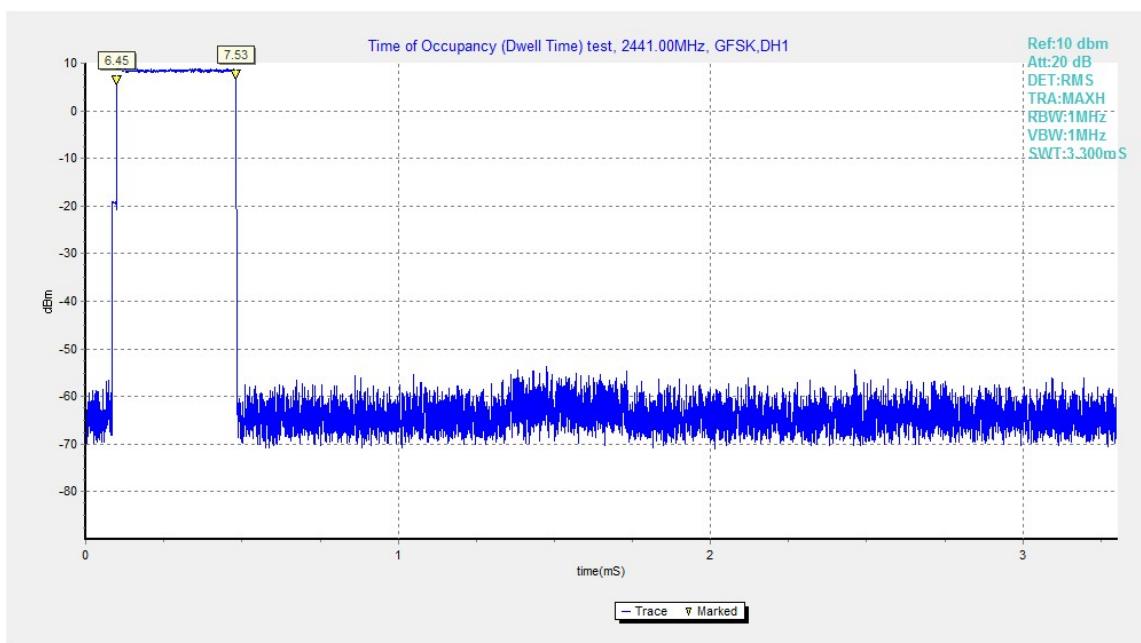


Fig.89. Time of occupancy (Dwell Time): Channel 39, Packet DH1

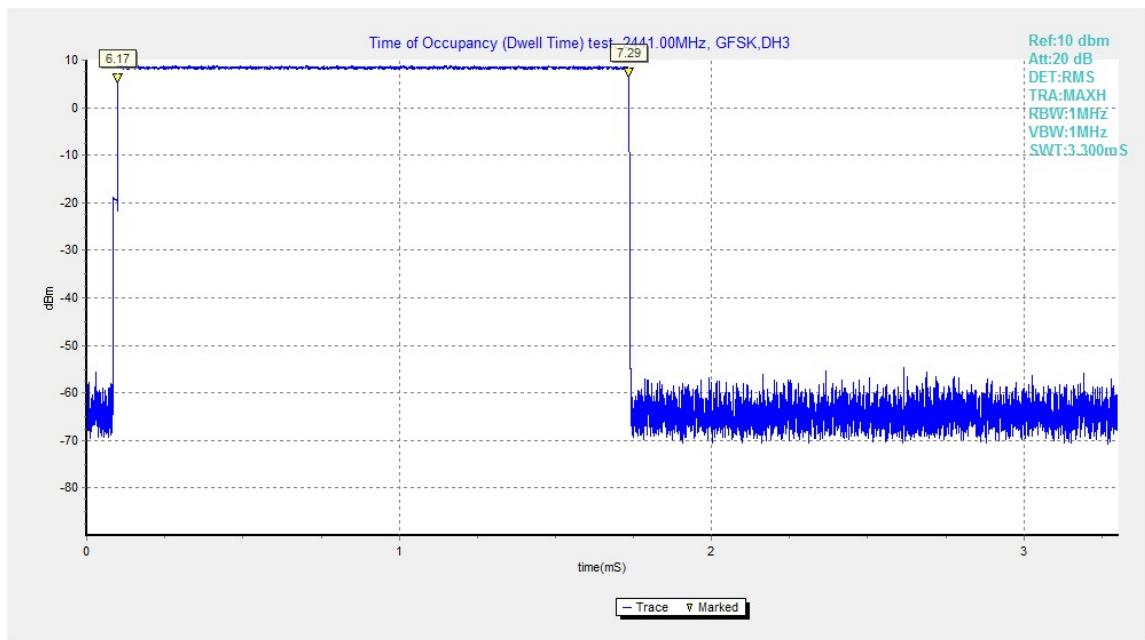


Fig.90. Time of occupancy (Dwell Time): Channel 39, Packet DH3

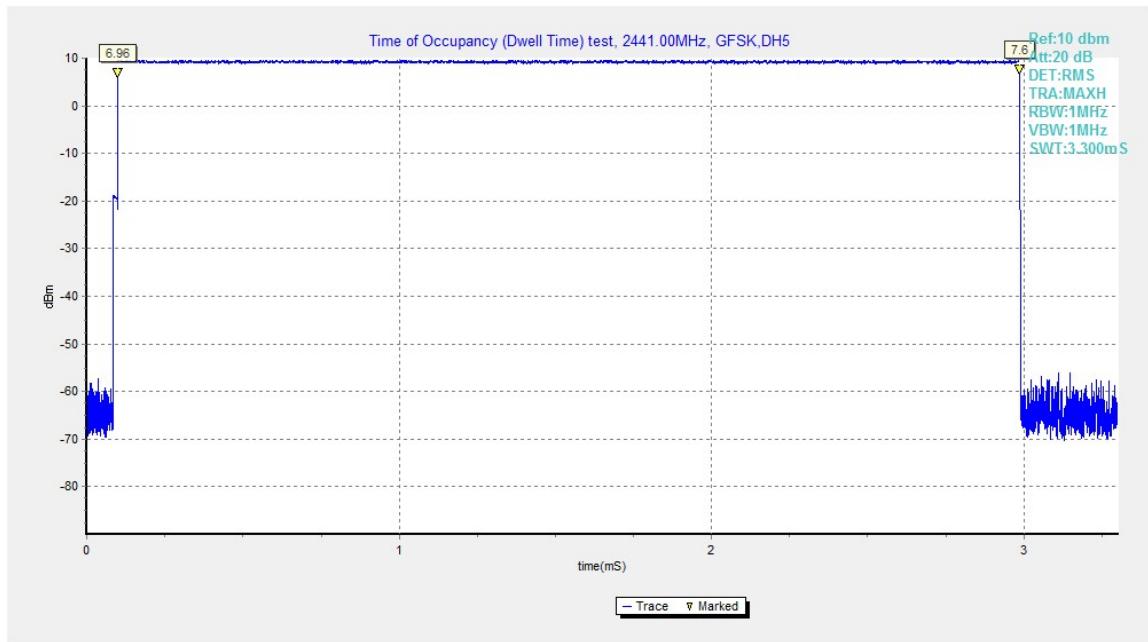


Fig.91. Time of occupancy (Dwell Time): Channel 39, Packet DH5

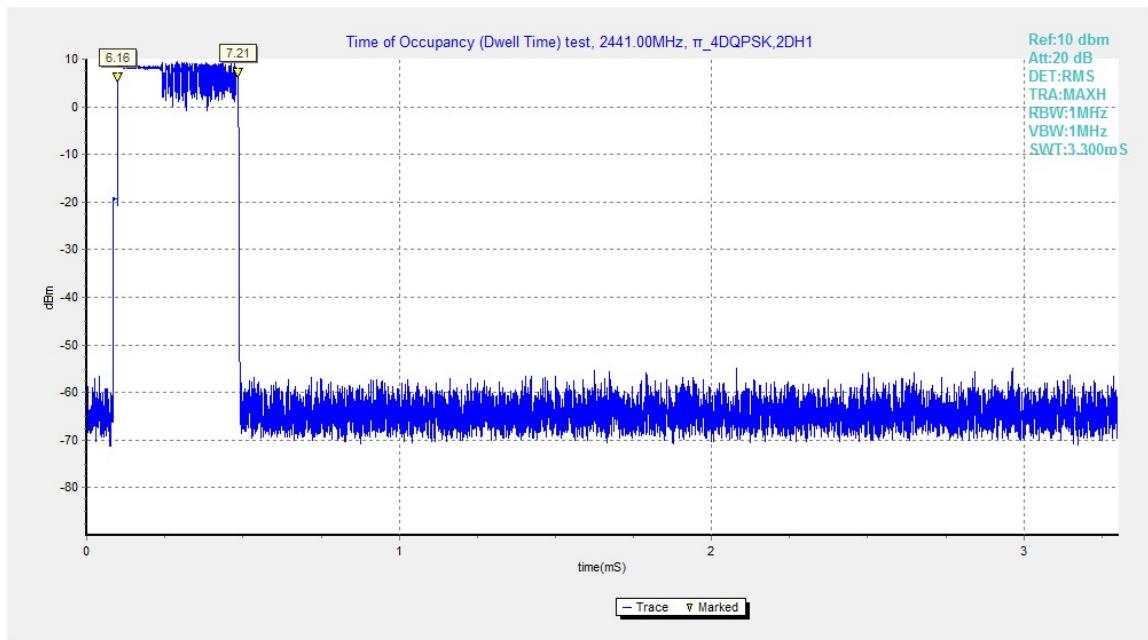


Fig.92. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH1

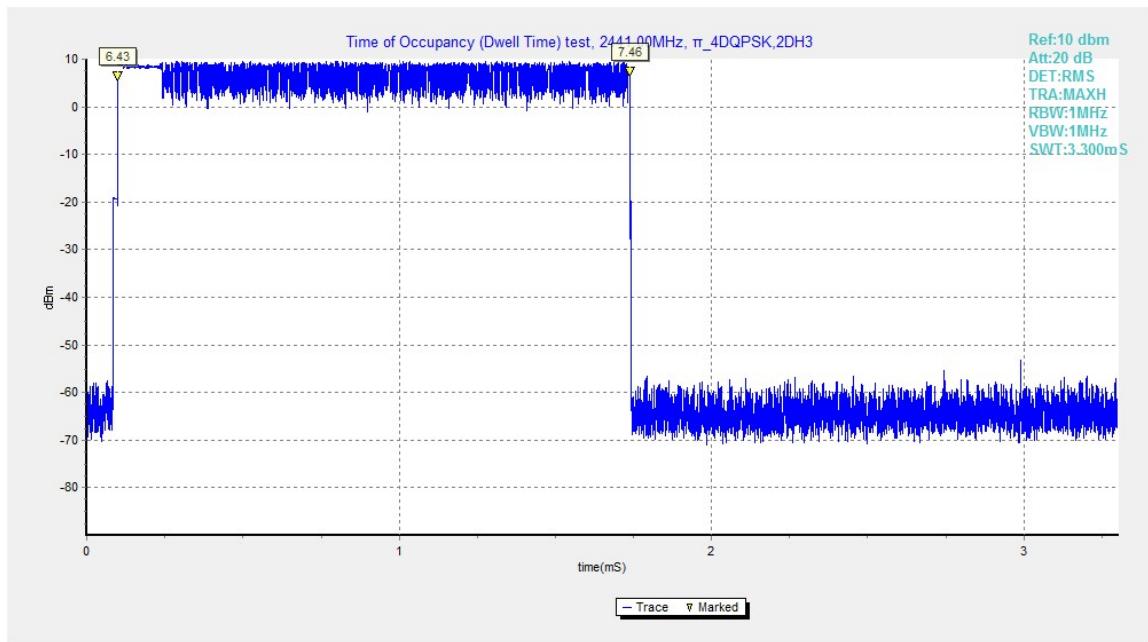


Fig.93. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH3

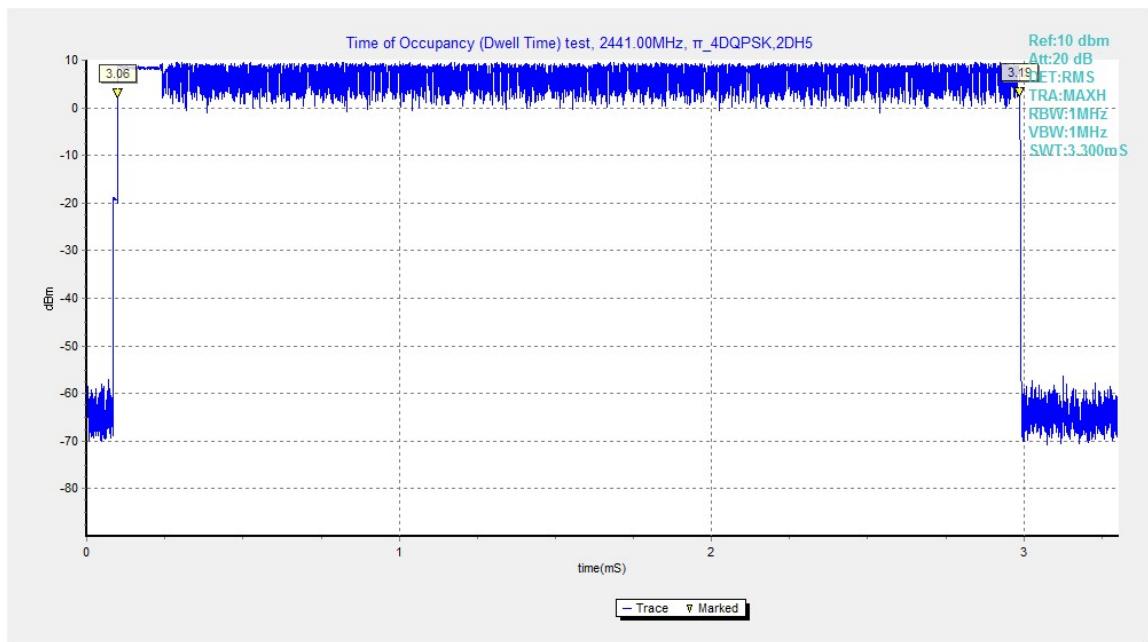


Fig.94. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH5

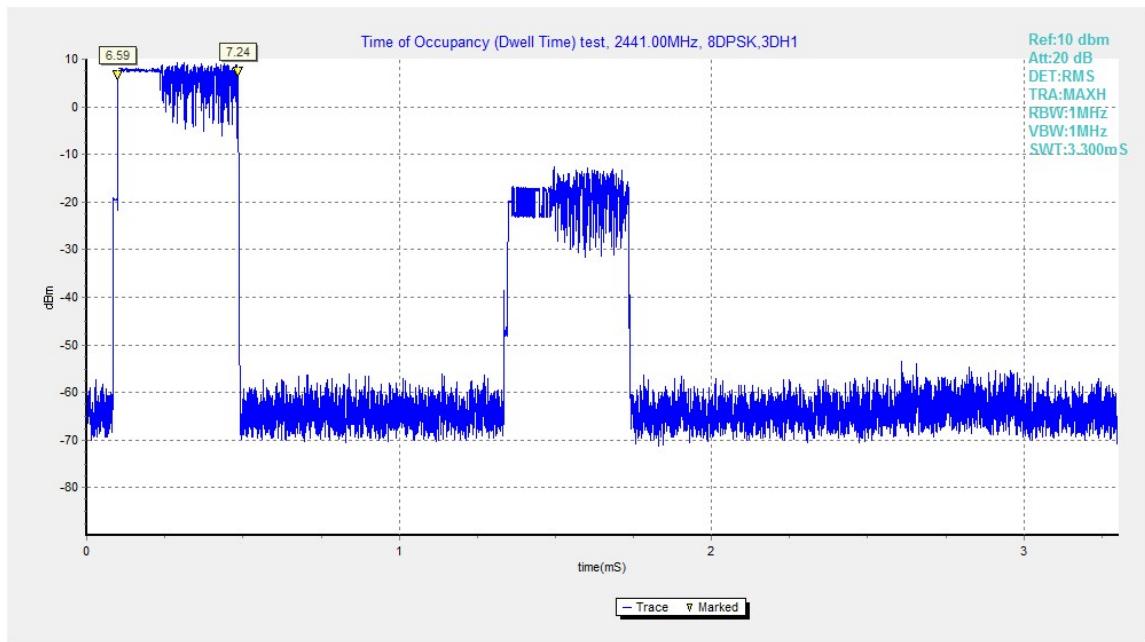


Fig.95. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH1

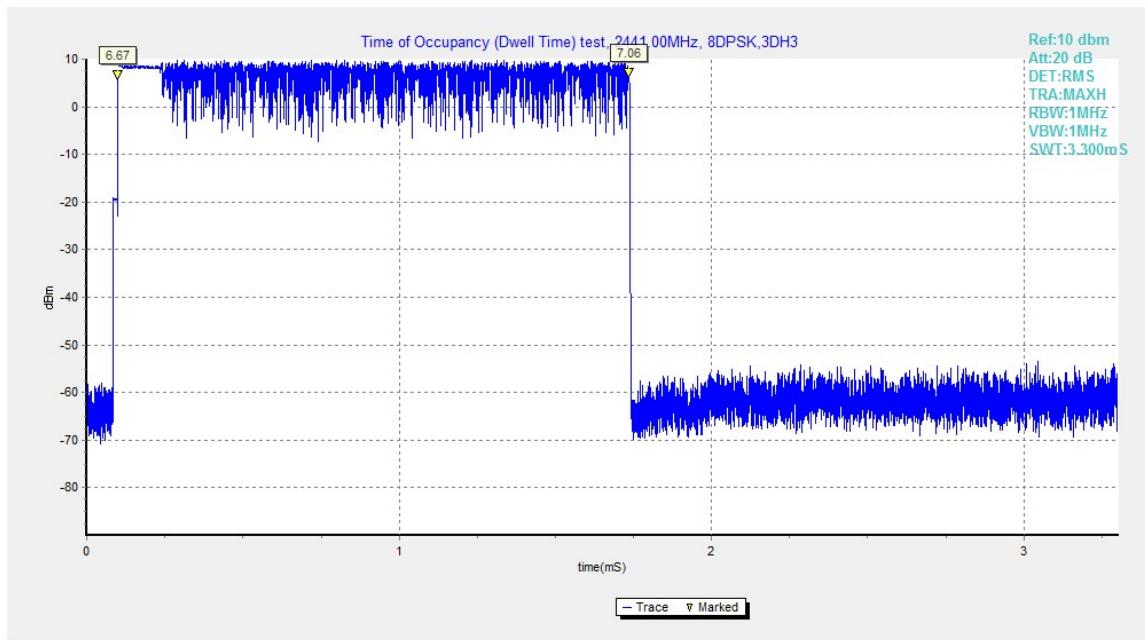


Fig.96. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH3

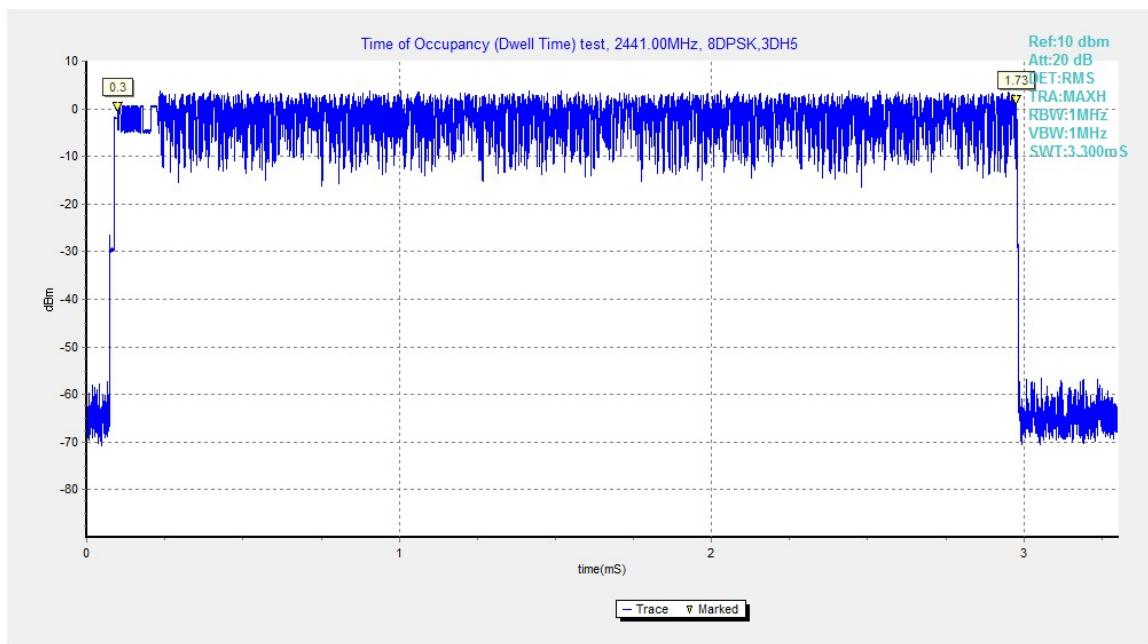


Fig.97. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH5

## A.7. 20dB Bandwidth

### **Method of Measurement: See ANSI C63.10-clause 6.9.2**

Measurement Procedure - Unwanted Emissions

1. Set RBW = 30kHz.
2. Set VBW = 100 kHz.
3. Set span to 3MHz
4. Detector = peak.
5. Trace Mode = max hold.
6. Sweep = auto couple.
7. Allow the trace to stabilize (this may take some time, depending on the extent of the span).

### **Measurement Limit:**

Standard	Limit
FCC 47 CFR Part 15.247(a)(1)	NA *

Use NdB Down function of the SA to measure the 20dB Bandwidth

\* Comment: This test case is not required according to the latest FCC 47 CFR Part 15.247. But the test results are necessary for “carrier frequency separation” test case, in Annex A.8.

### **Measurement Results:**

#### **For GFSK**

Channel	20dB Bandwidth (kHz)		Conclusion
0	Fig.98	938.00	NA
39	Fig.99	945.00	NA
78	Fig.100	941.00	NA

#### **For π/4 DQPSK**

Channel	20dB Bandwidth (kHz)		Conclusion
0	Fig.101	1317.00	NA
39	Fig.102	1277.00	NA
78	Fig.103	1308.00	NA

#### **For 8DPSK**

Channel	20dB Bandwidth (kHz)		Conclusion
0	Fig.104	1277.00	NA
39	Fig.105	1293.00	NA
78	Fig.106	1276.00	NA

**Conclusion: NA**

**Test graphs as below:**

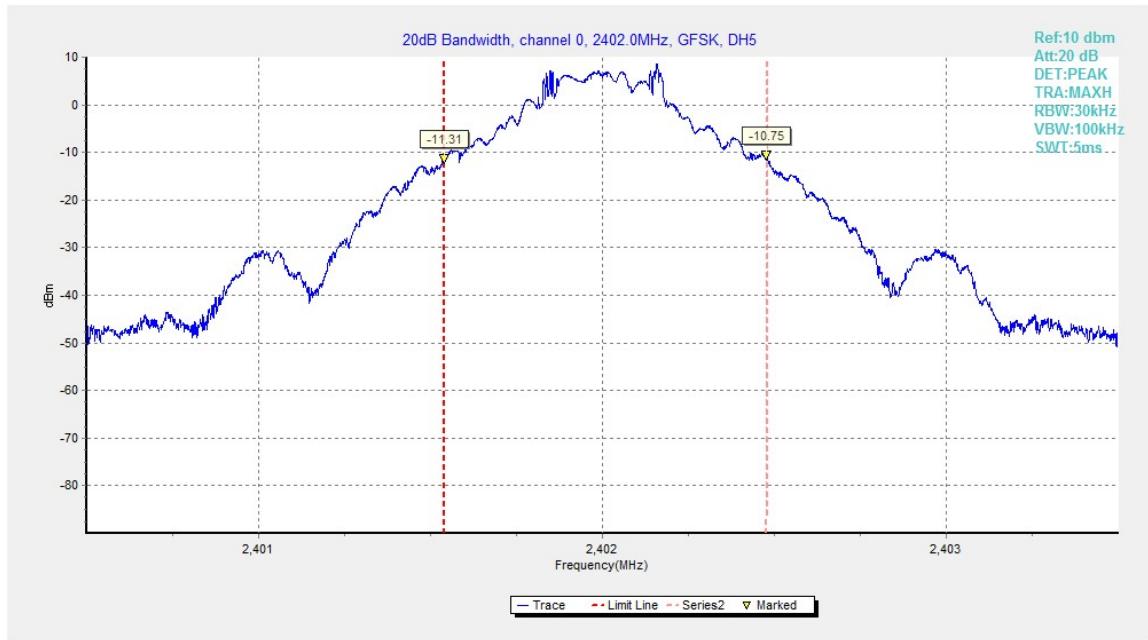


Fig.98. 20dB Bandwidth: GFSK, Channel 0

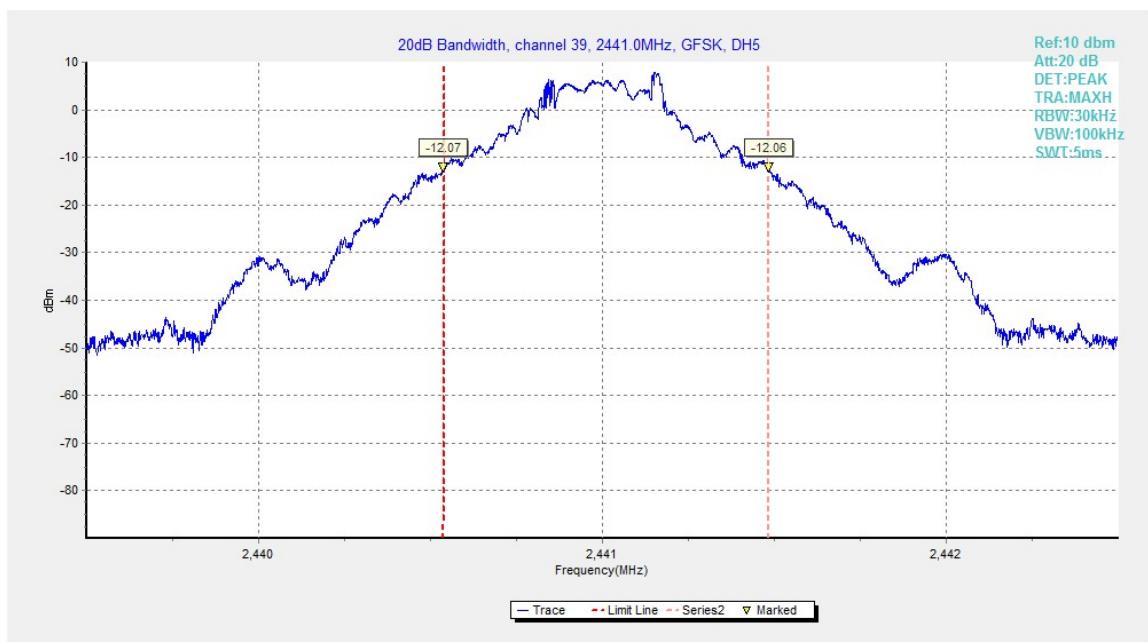


Fig.99. 20dB Bandwidth: GFSK, Channel 39

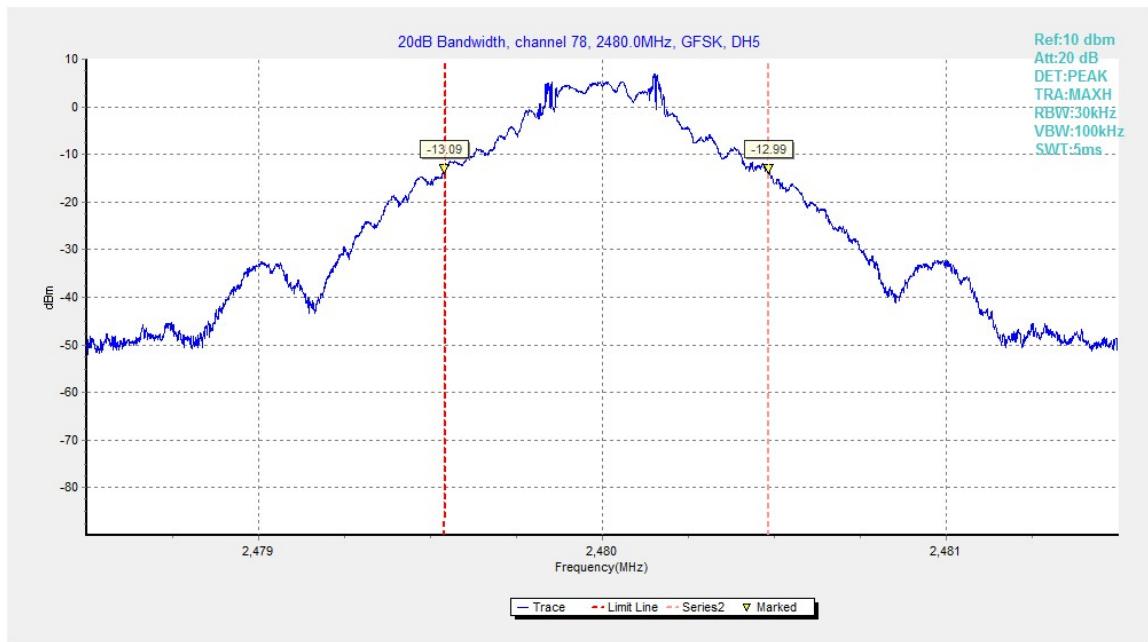


Fig.100. 20dB Bandwidth: GFSK, Channel 78

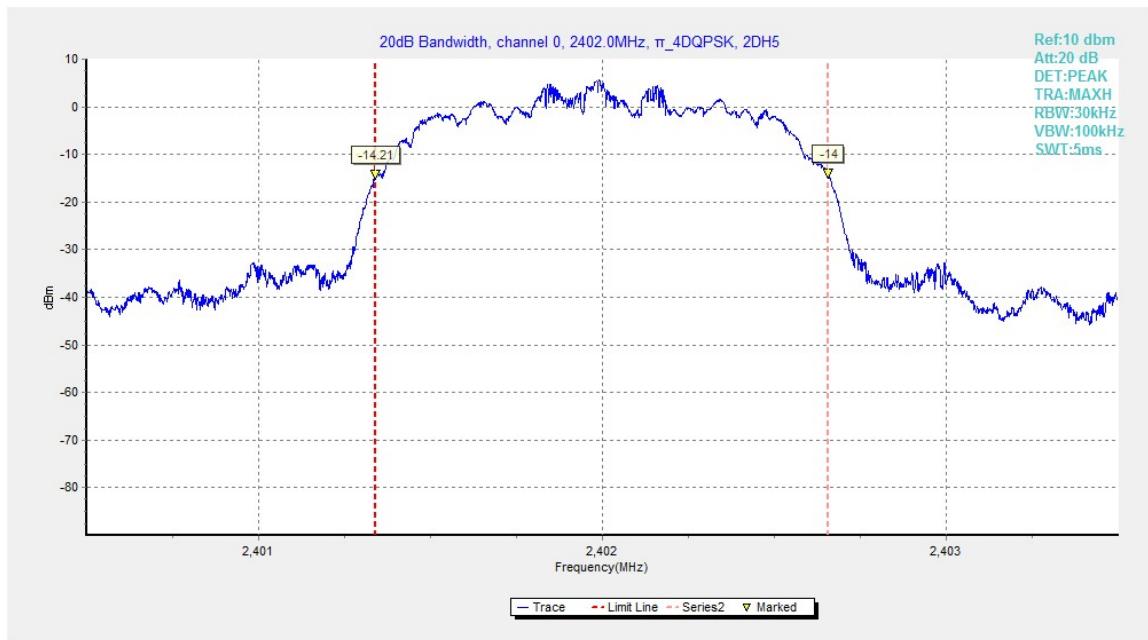


Fig.101. 20dB Bandwidth:  $\pi/4$  DQPSK, Channel 0

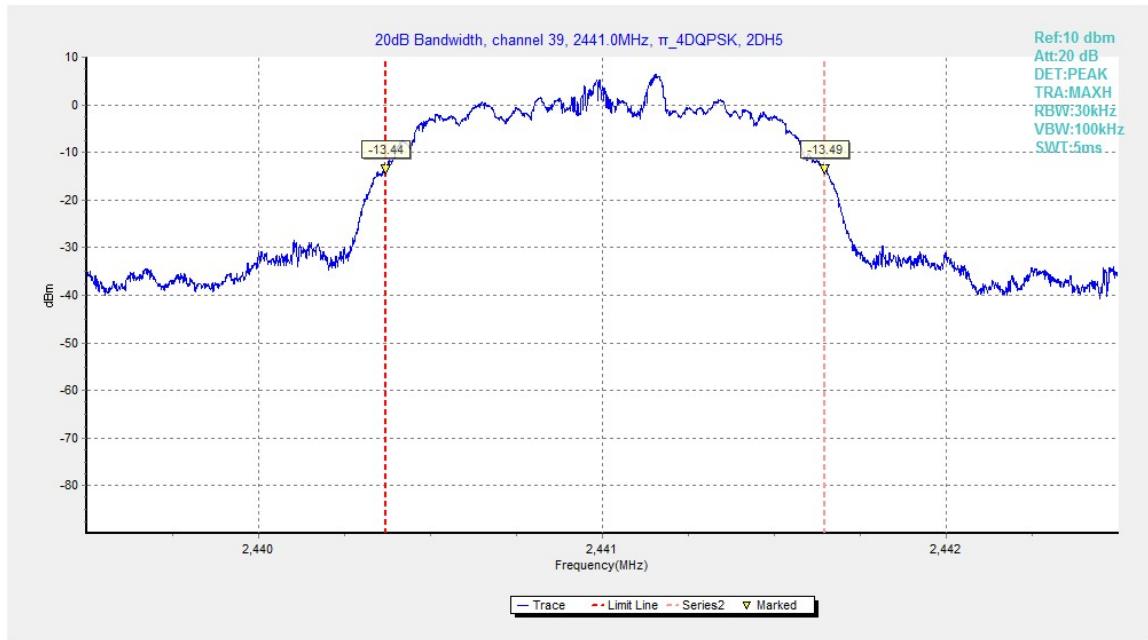


Fig.102. 20dB Bandwidth:  $\pi/4$  DQPSK, Channel 39

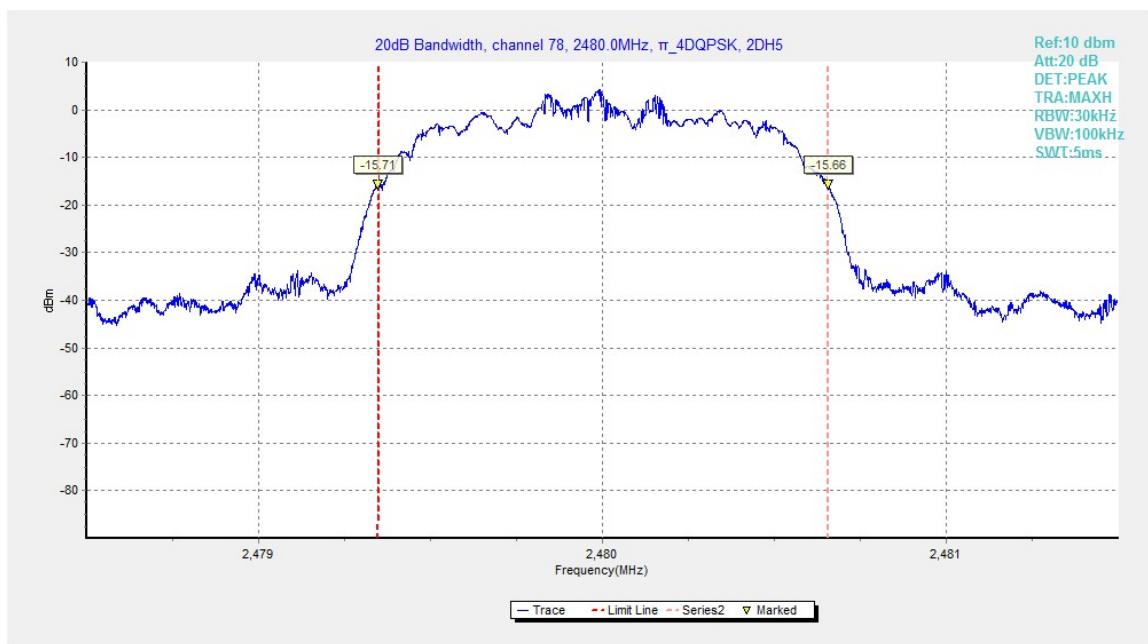


Fig.103. 20dB Bandwidth:  $\pi/4$  DQPSK, Channel 78

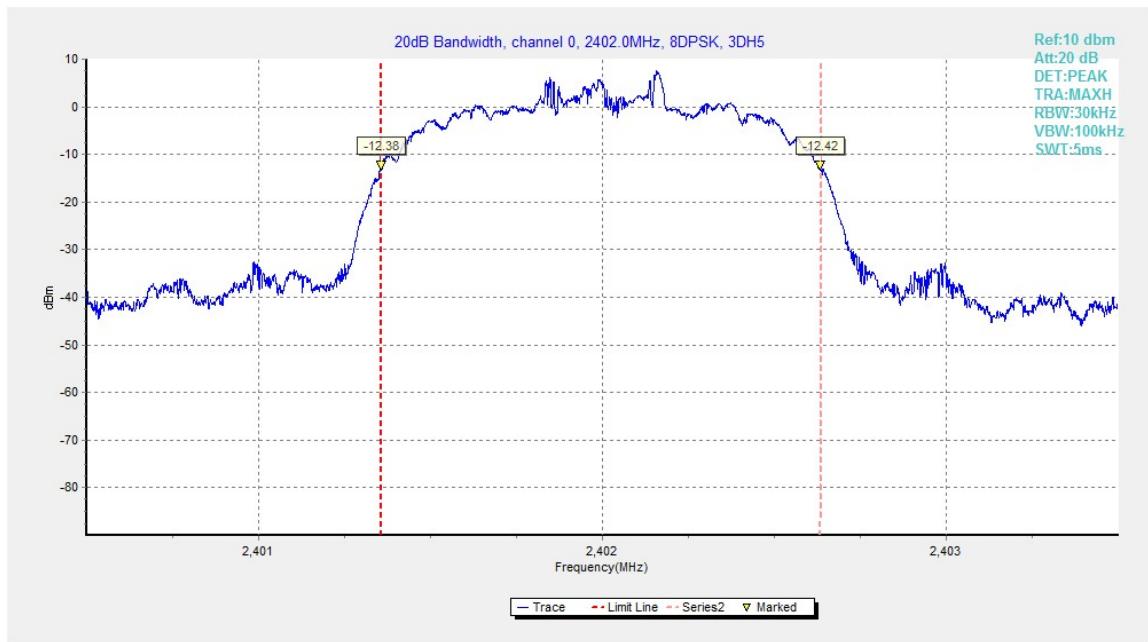


Fig.104. 20dB Bandwidth: 8DPSK, Channel 0

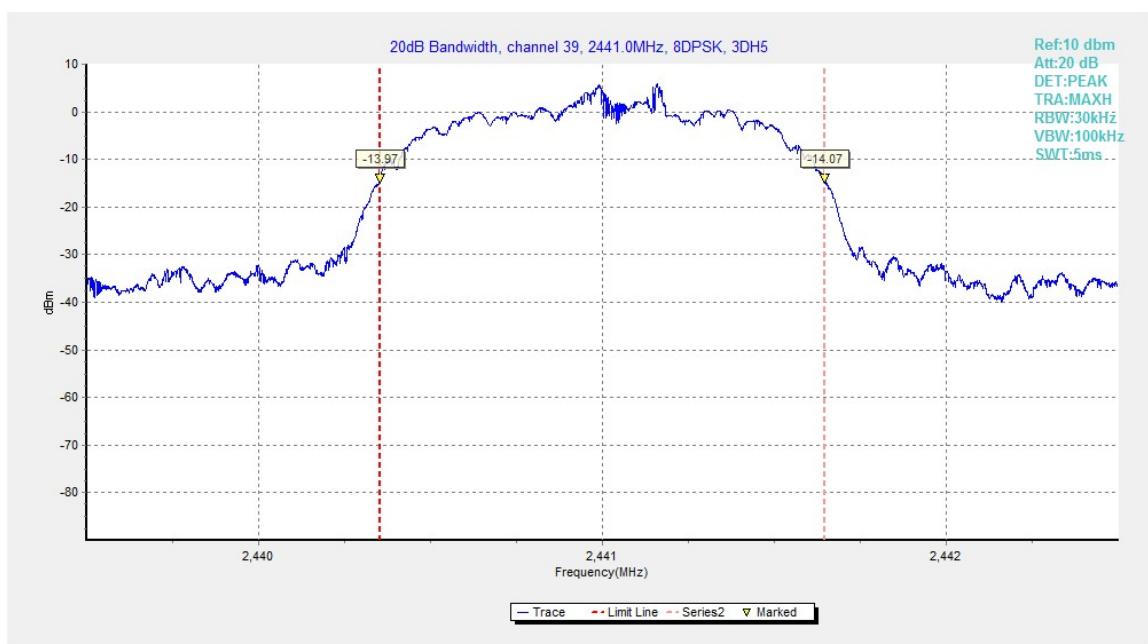


Fig.105. 20dB Bandwidth: 8DPSK, Channel 39

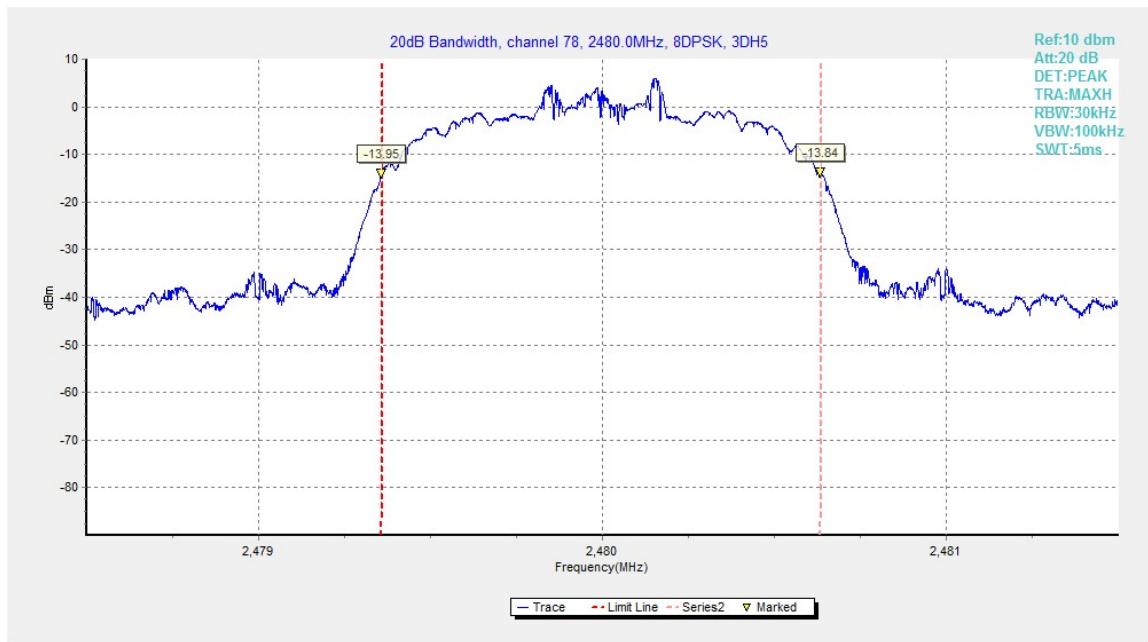


Fig.106. 20dB Bandwidth: 8DPSK, Channel 78

## A.8. Carrier Frequency Separation

### Method of Measurement: See ANSI C63.10-clause 7.8.2

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

- Span = 3MHz
- RBW=300kHz
- VBW=300kHz
- Sweep = auto
- Detector function = peak
- Trace = max hold
- Allow the trace to stabilize

Search the peak marks of the middle frequency and adjacent channel, then record the separation between them.

\* Comment: This limit should be over 25 kHz or  $(2/3) * 20\text{dB}$  bandwidth, whichever is greater.

#### Measurement Limit:

Standard	Limit(kHz)
FCC 47 CFR Part 15.247(a)(1)	over 25 kHz or $(2/3) * 20\text{dB}$ bandwidth

#### Measurement Result:

##### For GFSK

Channel	Carrier frequency separation (kHz)		Conclusion
39	Fig.107	974.00	P

##### For $\pi/4$ DQPSK

Channel	Carrier frequency separation (kHz)		Conclusion
39	Fig.108	1166.00	P

##### For 8DPSK

Channel	Carrier frequency separation (kHz)		Conclusion
39	Fig.109	1126.00	P

**Conclusion: PASS**

**Test graphs as below:**

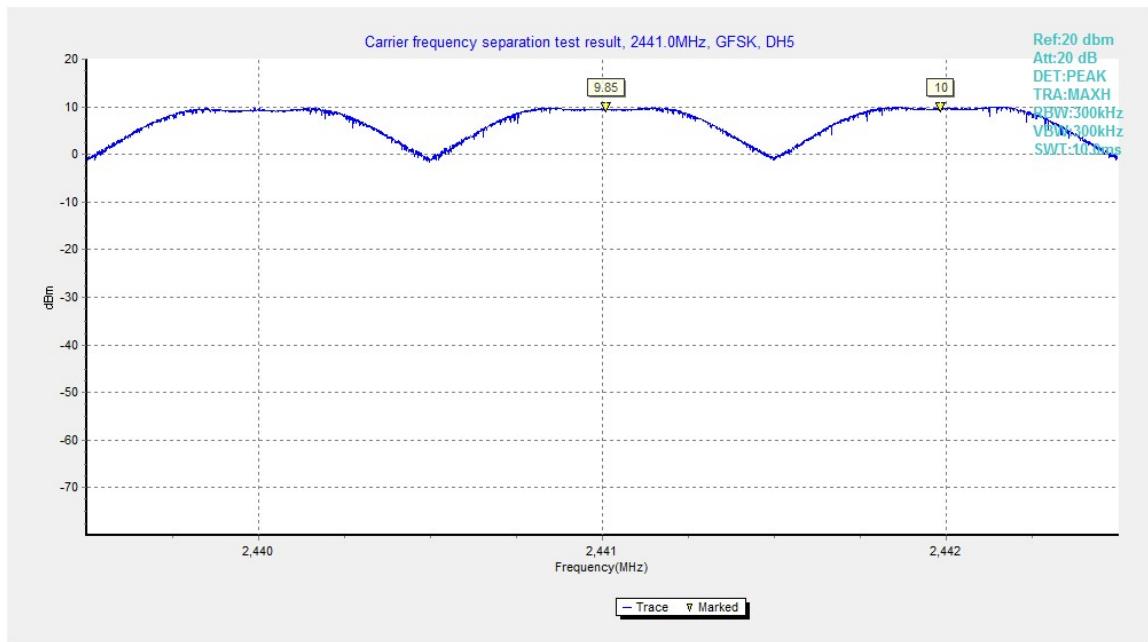


Fig.107. Carrier frequency separation measurement: GFSK, Channel 39

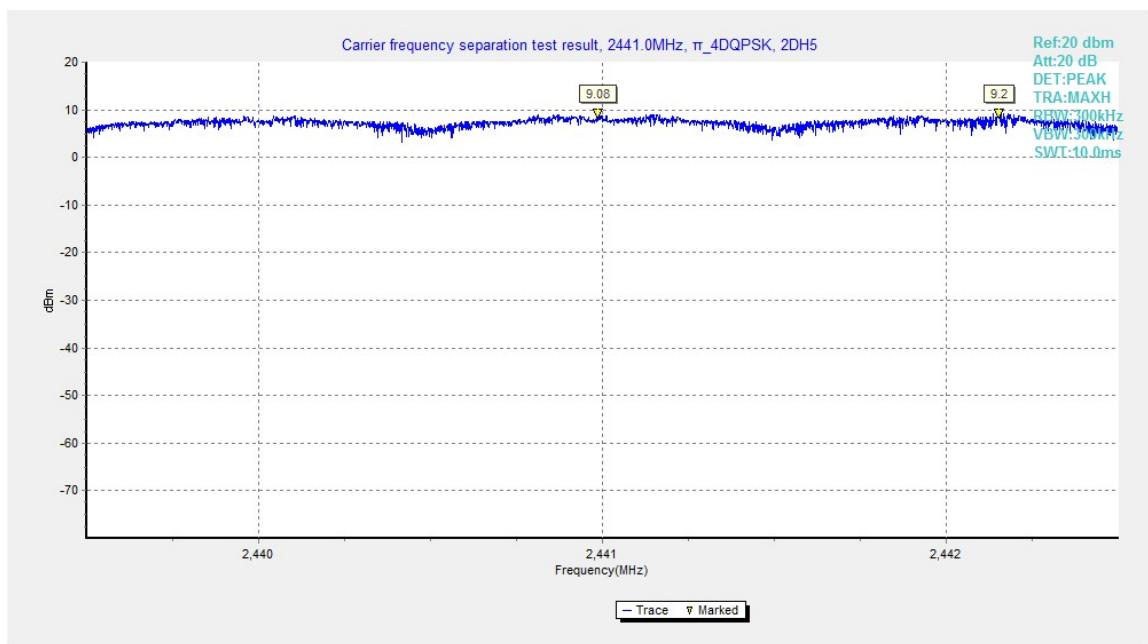


Fig.108. Carrier frequency separation measurement: π/4 DQPSK, Channel 39

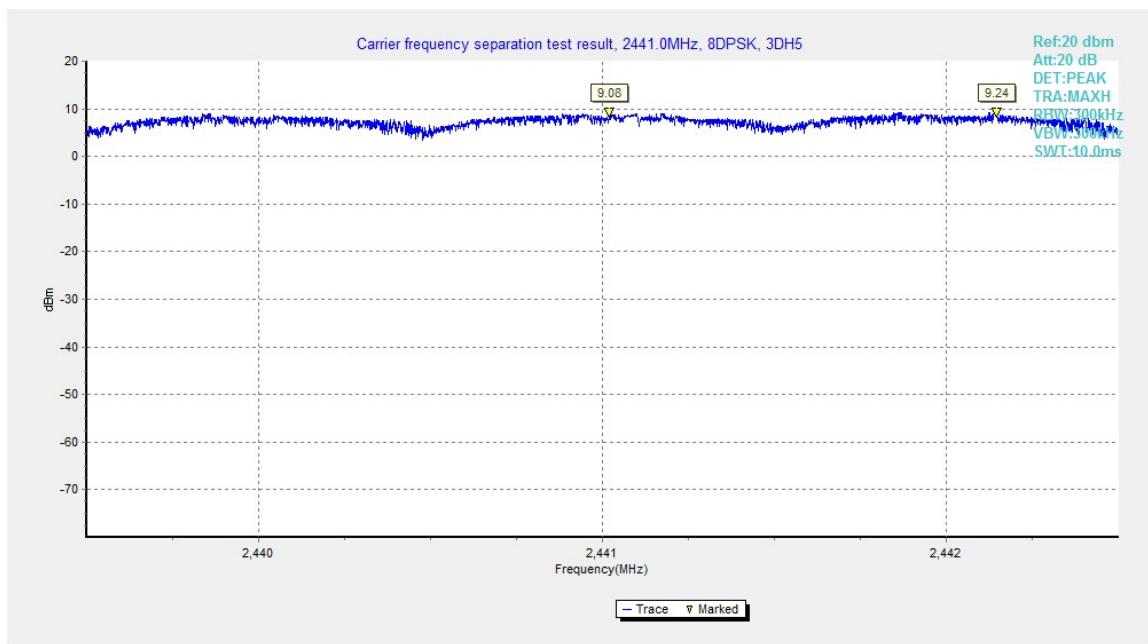


Fig.109. Carrier frequency separation measurement: 8DPSK, Channel 39

## A.9. Number of Hopping Channels

### Method of Measurement: See ANSI C63.10-clause 7.8.3

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

- Span = the frequency band of operation
- RBW = 500kHz
- VBW = 500kHz
- Sweep = auto
- Detector function = peak
- Trace = max hold
- Allow the trace to stabilize

It might prove necessary to break the span up into subranges to show clearly all of the hopping frequencies. Compliance of an EUT with the appropriate regulatory limit shall be determined for the number of hopping channels. A plot of the data shall be included in the test report.

#### Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247(a) (1)(iii)	At least 15 non-overlapping channels

#### Measurement Result:

##### For GFSK

Channel	Number of hopping channels	Conclusion
0~39	Fig.110	
40~78	Fig.111	P

##### For π/4 DQPSK

Channel	Number of hopping channels	Conclusion
0~39	Fig.112	
40~78	Fig.113	P

##### For 8DPSK

Channel	Number of hopping channels	Conclusion
0~39	Fig.114	
40~78	Fig.115	P

#### Conclusion: PASS

#### Test graphs as below:

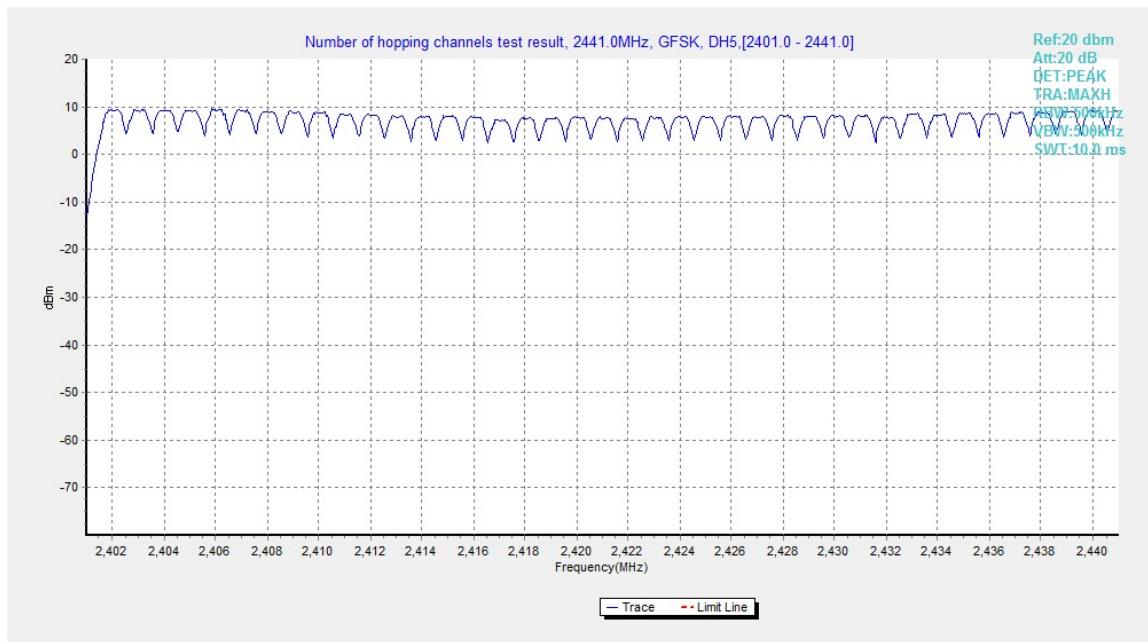


Fig.110. Number of hopping frequencies: GFSK, Channel 0 - 39

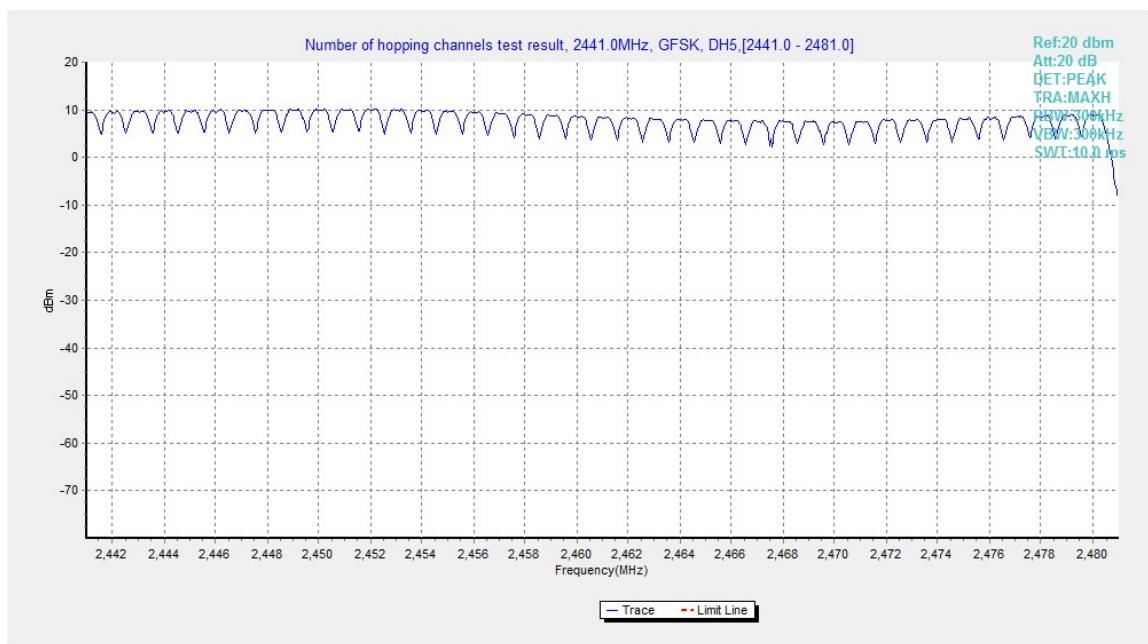


Fig.111. Number of hopping frequencies: GFSK, Channel 40 - 78

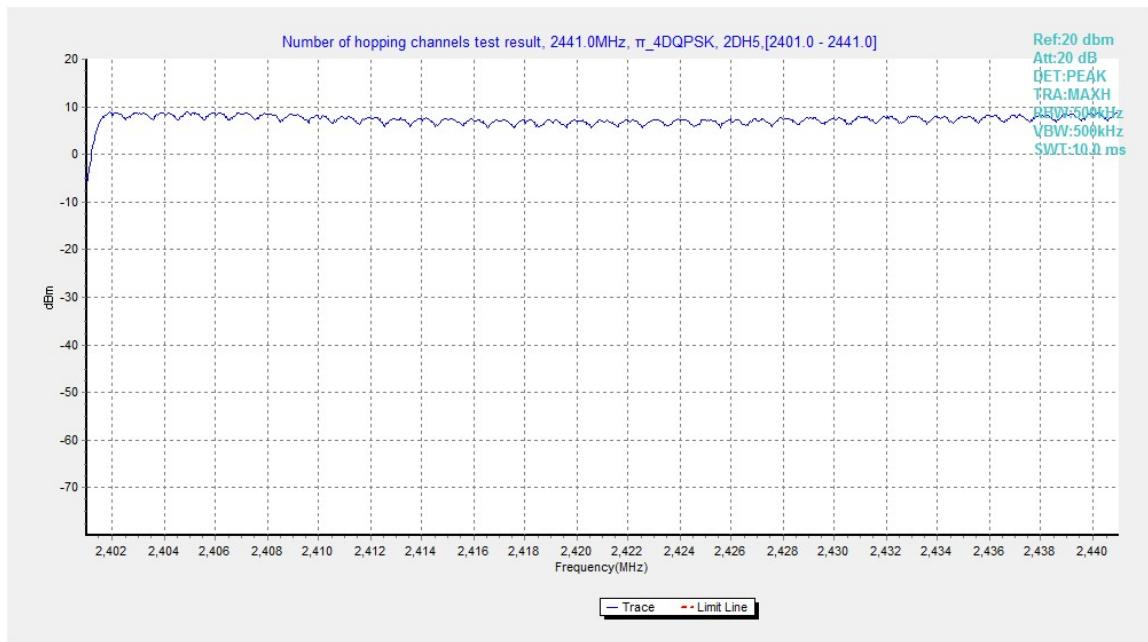


Fig.112. Number of hopping frequencies:  $\pi/4$  DQPSK, Channel 0 - 39

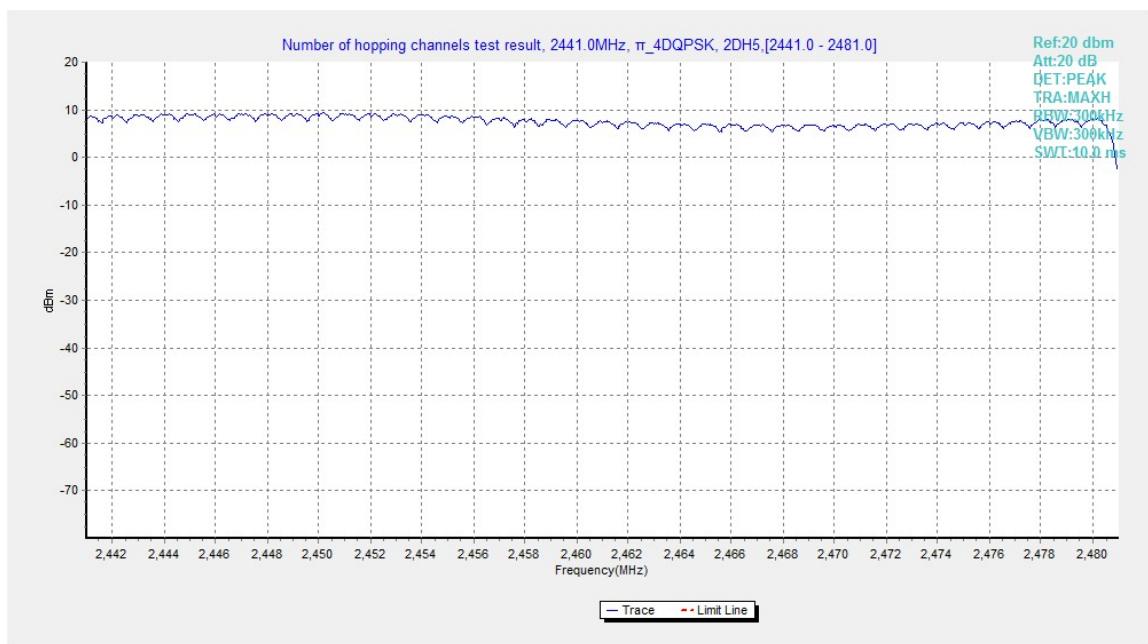


Fig.113. Number of hopping frequencies:  $\pi/4$  DQPSK, Channel 40 - 78

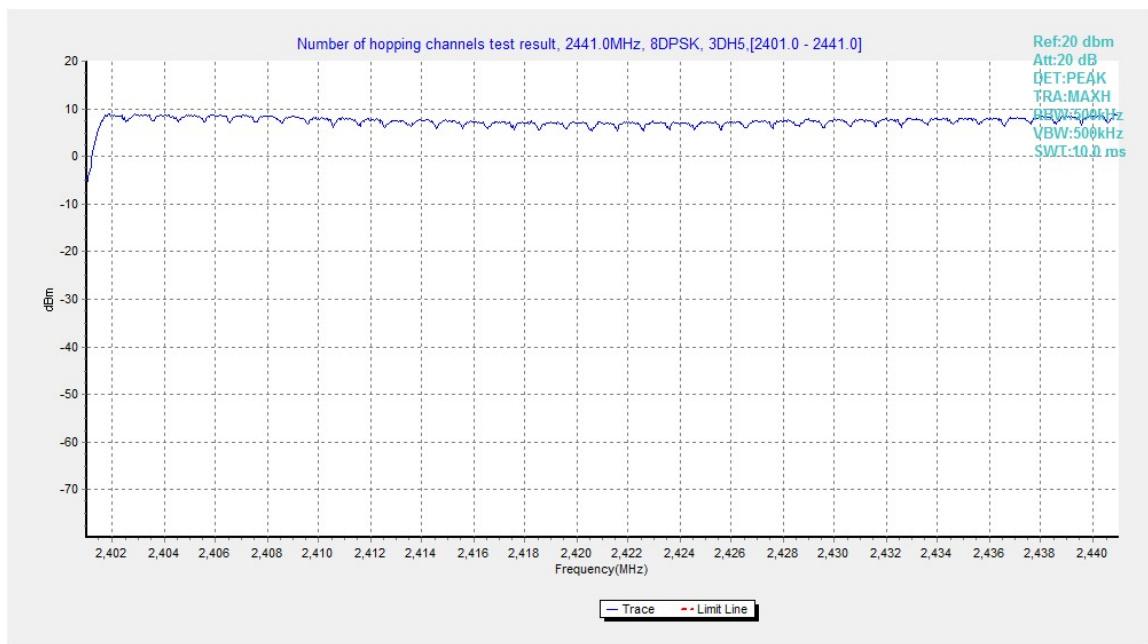


Fig.114. Number of hopping frequencies: 8DPSK, Channel 0 - 39

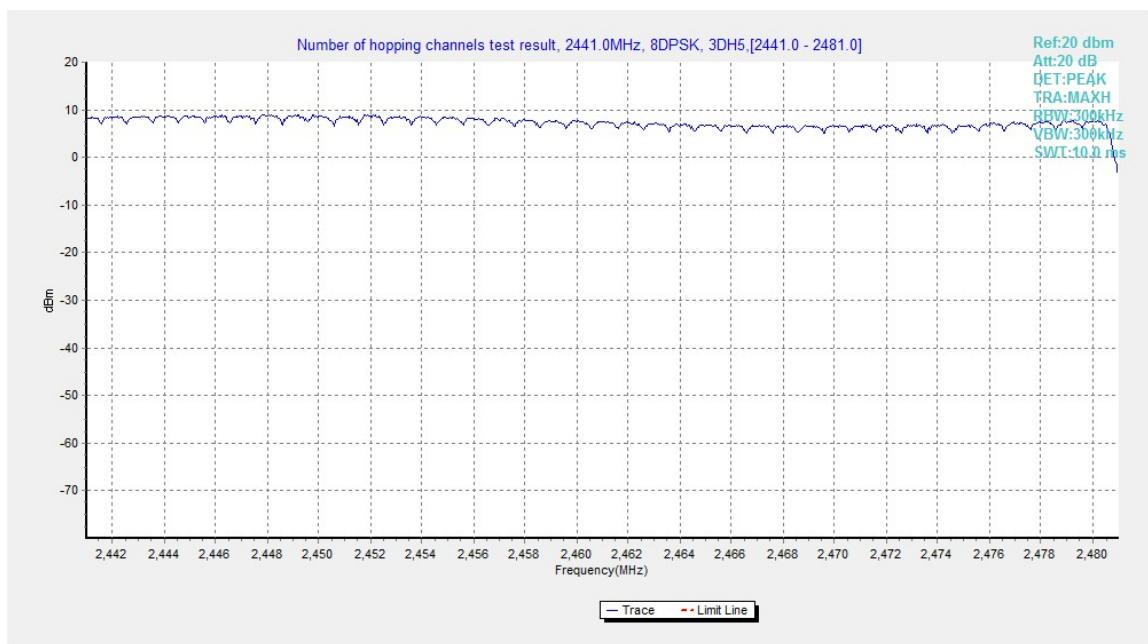


Fig.115. Number of hopping frequencies: 8DPSK, Channel 40 - 78

## A.10. AC Powerline Conducted Emission

### Test Condition

Voltage (V)	Frequency (Hz)
120	60

### Measurement Result and limit:

#### Bluetooth (Quasi-peak Limit)

Frequency range (MHz)	Quasi-peak Limit (dB $\mu$ V)	Conclusion
0.15 to 0.5	66 to 56	P
0.5 to 5	56	
5 to 30	60	

NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

#### Bluetooth (Average Limit)

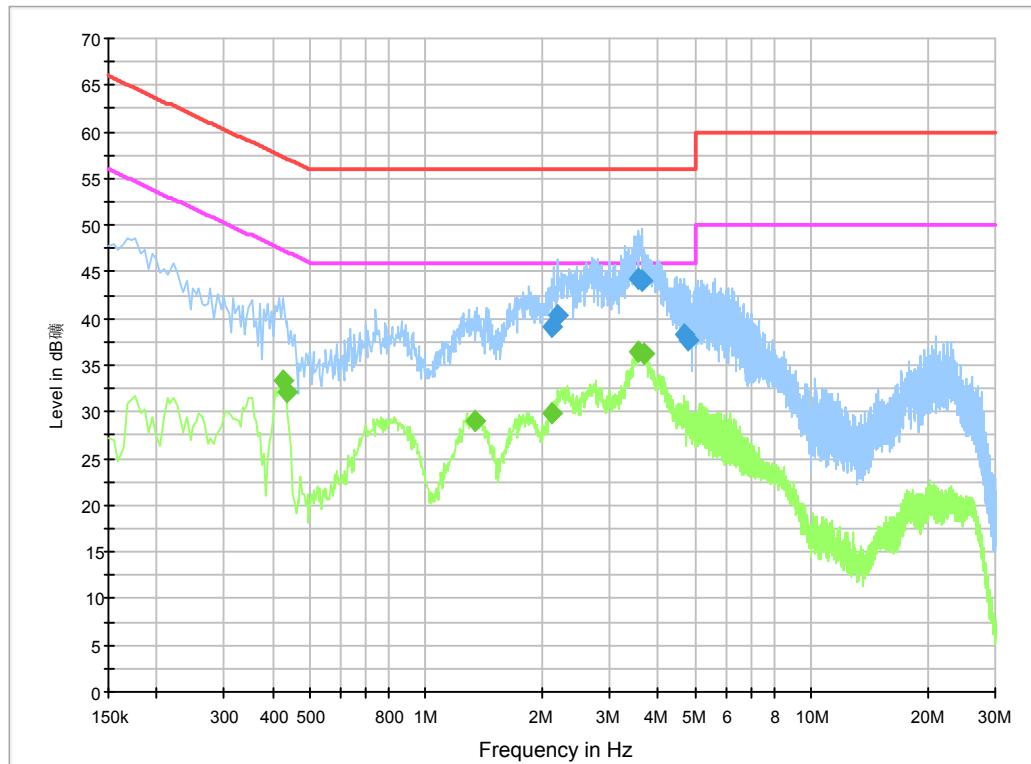
Frequency range (MHz)	Average Limit (dB $\mu$ V)	Conclusion
0.15 to 0.5	56 to 46	P
0.5 to 5	46	
5 to 30	50	

NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

The measurement is made according to ANSI C63.10

**Conclusion: PASS**

**Test graphs as below:**

**Traffic:**


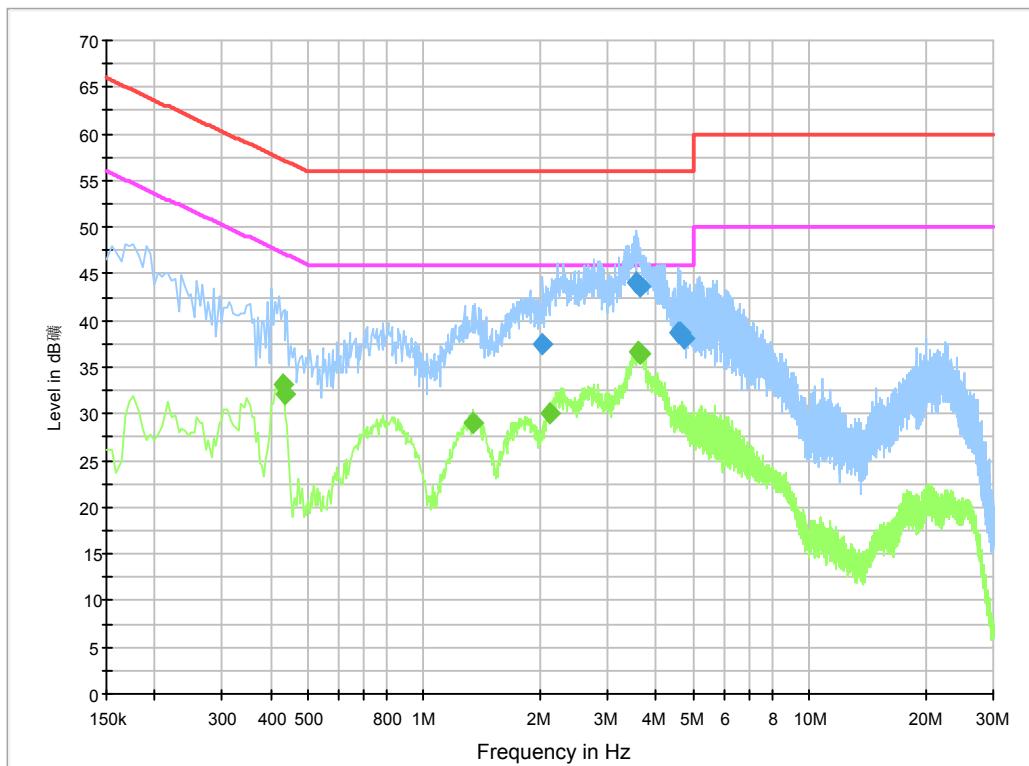
## Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
2.116500	39.2	2000.0	9.000	On	L1	10.4	16.8	56.0
2.197500	40.4	2000.0	9.000	On	L1	10.4	15.6	56.0
3.574500	44.3	2000.0	9.000	On	L1	10.4	11.7	56.0
3.628500	44.0	2000.0	9.000	On	L1	10.4	12.0	56.0
4.699500	38.4	2000.0	9.000	On	L1	10.5	17.6	56.0
4.807500	37.7	2000.0	9.000	On	L1	10.5	18.3	56.0

## Final Result 2

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.424500	33.4	2000.0	9.000	On	N	10.4	14.0	47.4
0.433500	32.1	2000.0	9.000	On	N	10.4	15.1	47.2
1.333500	29.1	2000.0	9.000	On	N	10.4	16.9	46.0
2.112000	29.8	2000.0	9.000	On	L1	10.4	16.2	46.0
3.556500	36.4	2000.0	9.000	On	L1	10.4	9.6	46.0
3.678000	36.1	2000.0	9.000	On	L1	10.4	9.9	46.0

Idle:



## Final Result 1

Frequency (MHz)	QuasiPeak (dB $\mu$ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)
2.035500	37.6	2000.0	9.000	On	L1	10.4	18.4	56.0
3.561000	44.1	2000.0	9.000	On	L1	10.4	11.9	56.0
3.633000	43.7	2000.0	9.000	On	L1	10.4	12.3	56.0
4.551000	38.8	2000.0	9.000	On	L1	10.5	17.2	56.0
4.623000	38.7	2000.0	9.000	On	L1	10.5	17.3	56.0
4.735500	38.2	2000.0	9.000	On	L1	10.5	17.8	56.0

## Final Result 2

Frequency (MHz)	QuasiPeak (dB $\mu$ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dB $\mu$ V)
0.429000	33.1	2000.0	9.000	On	N	10.4	14.2	47.3
0.433500	32.1	2000.0	9.000	On	N	10.4	15.1	47.2
1.347000	29.1	2000.0	9.000	On	N	10.4	16.9	46.0
2.116500	30.1	2000.0	9.000	On	L1	10.4	15.9	46.0
3.601500	36.6	2000.0	9.000	On	L1	10.4	9.4	46.0
3.651000	36.4	2000.0	9.000	On	L1	10.4	9.6	46.0

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