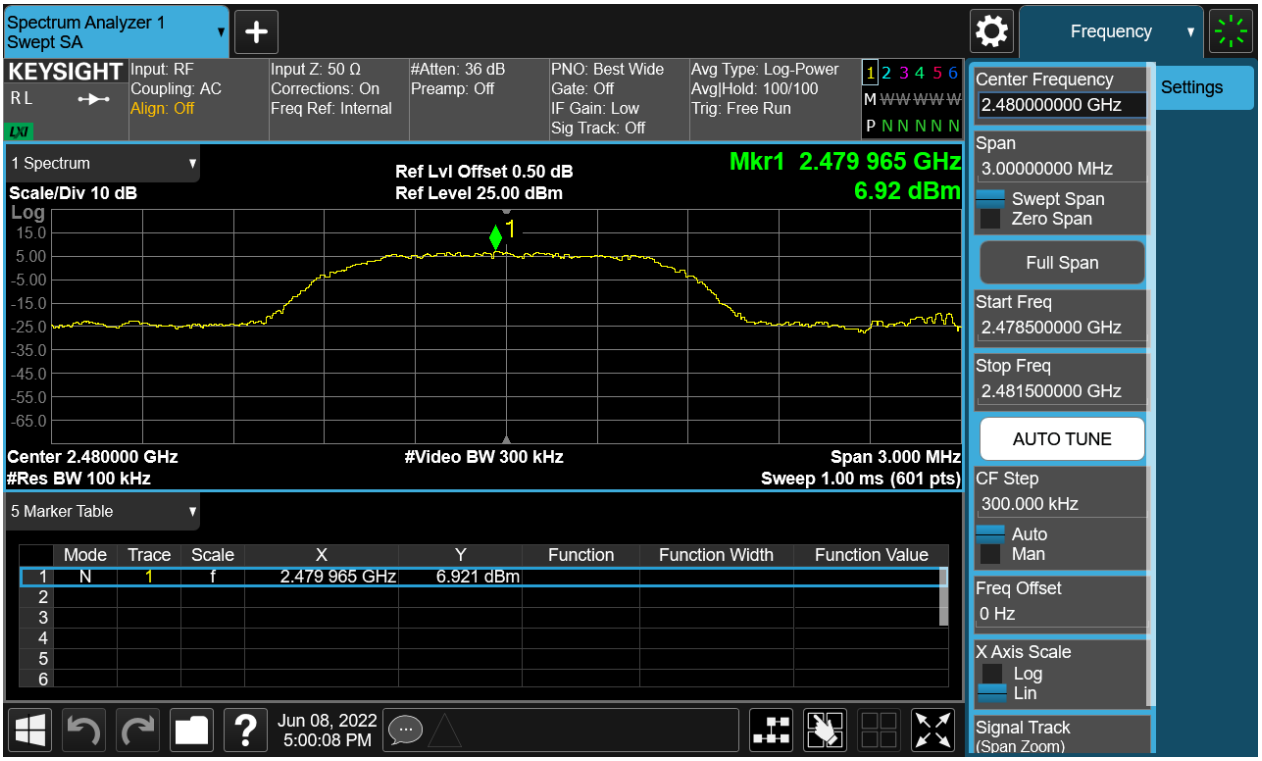
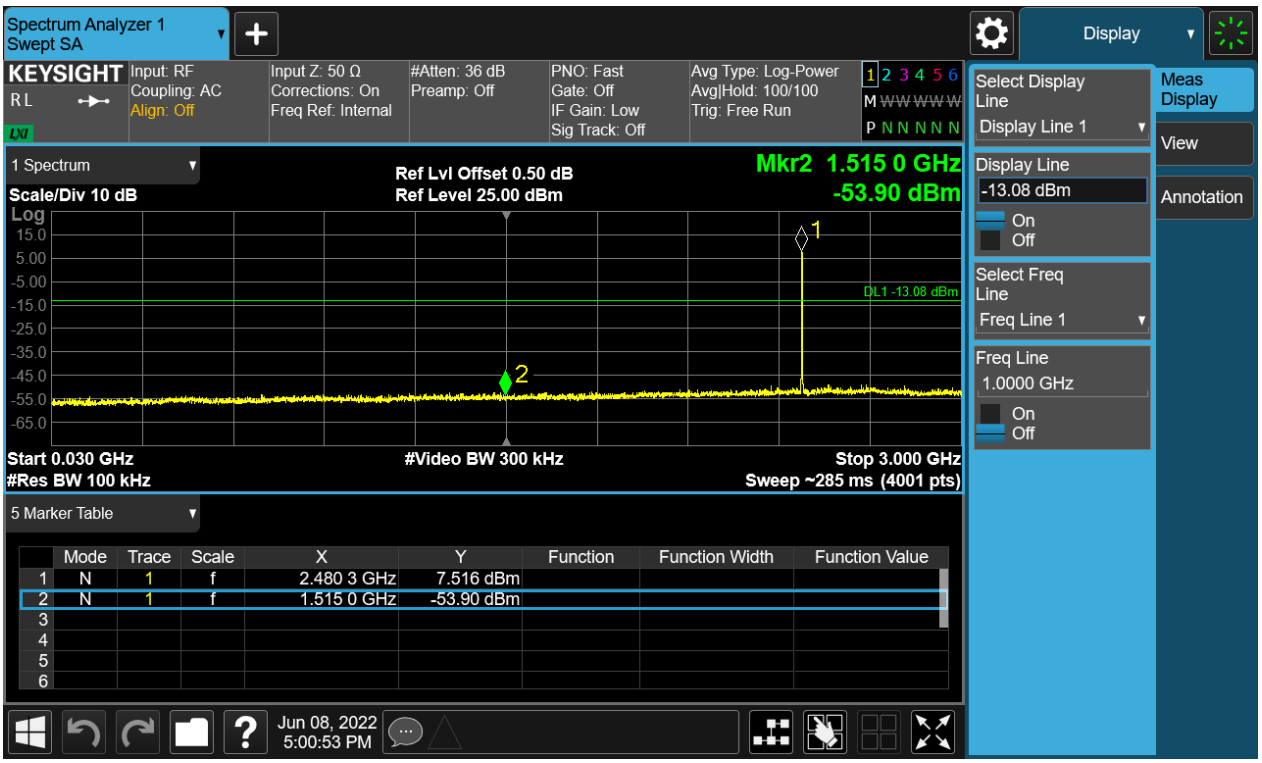
Figure 21: Conducted Spurious Emission & Authorized-band band-edge, 2480MHz, 8-DPSK

Carrier Level



Band Edge

Conducted spurious emissions 30MHz-25GHz



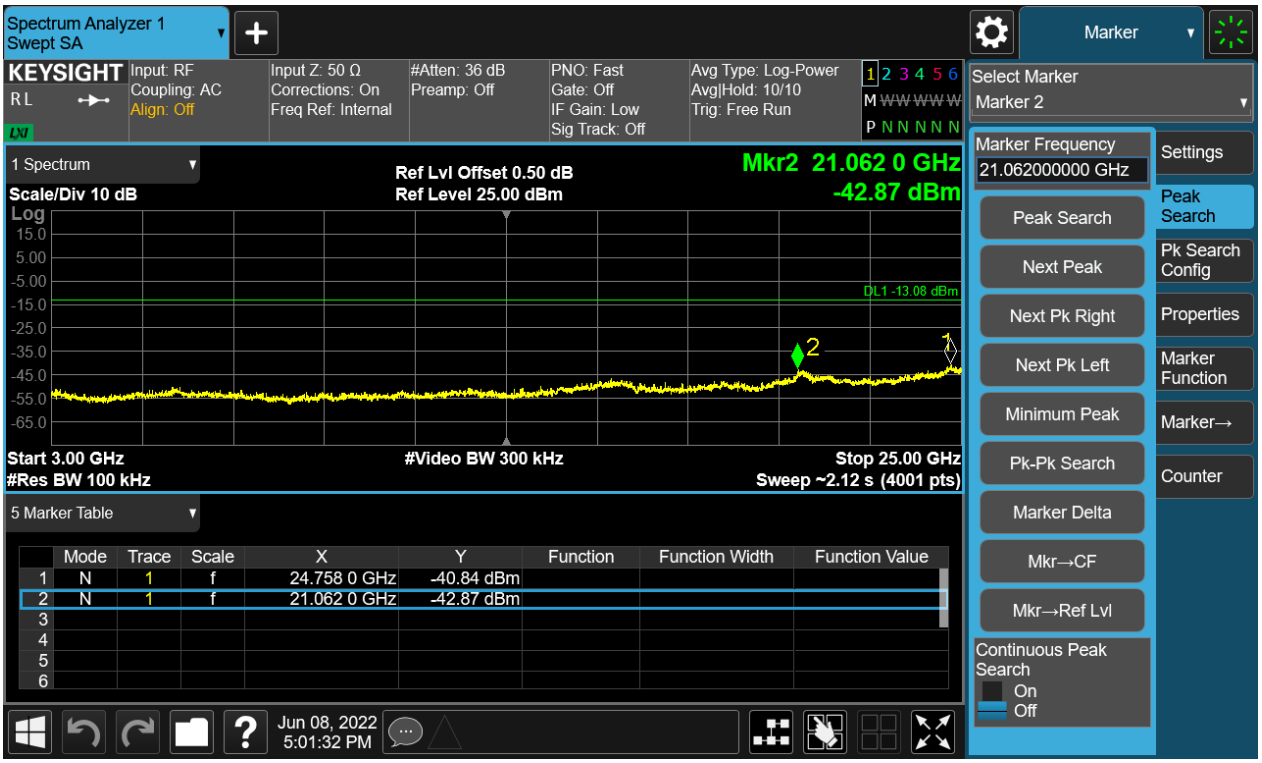
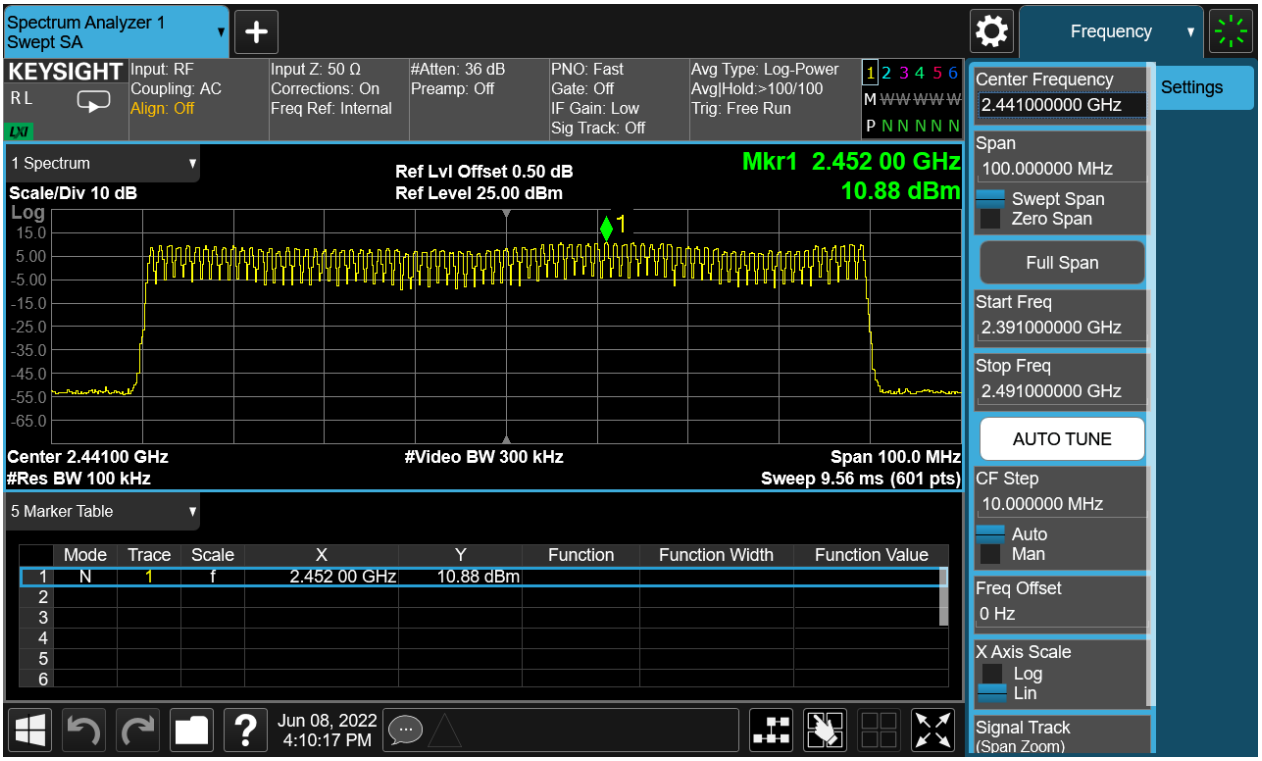
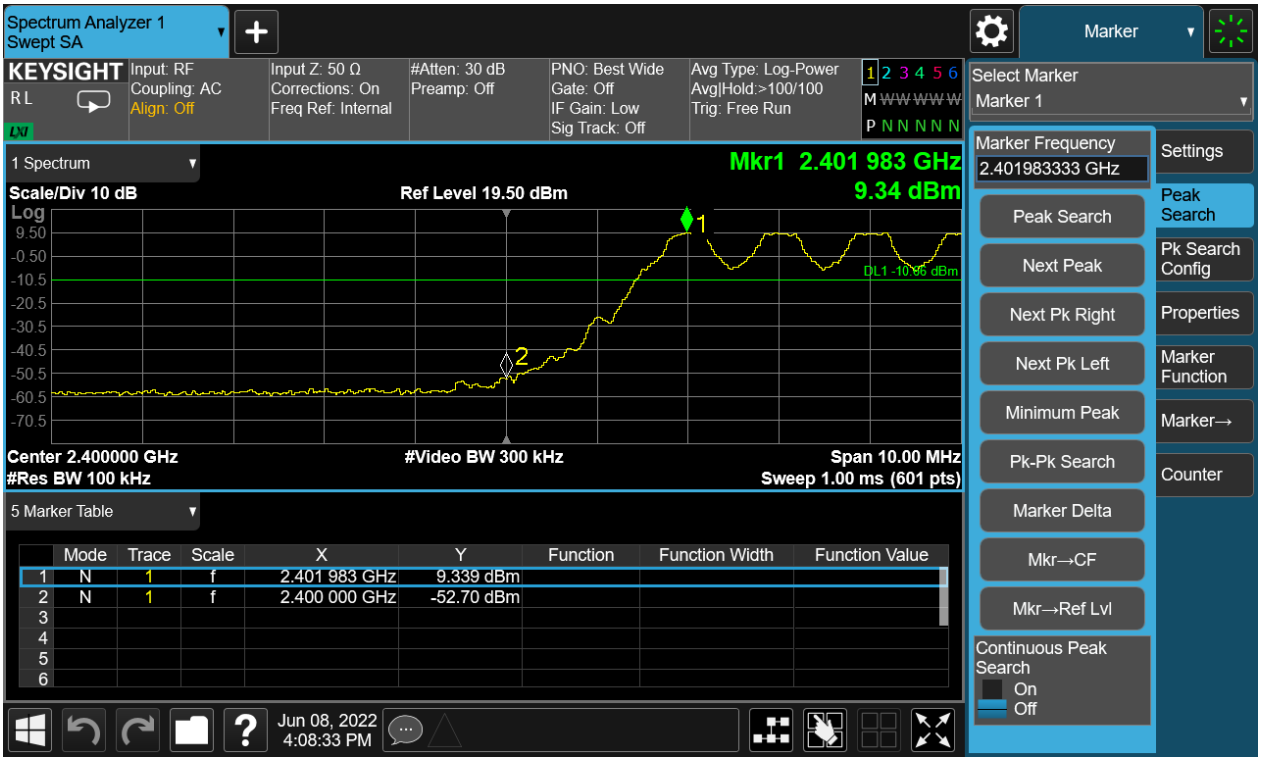


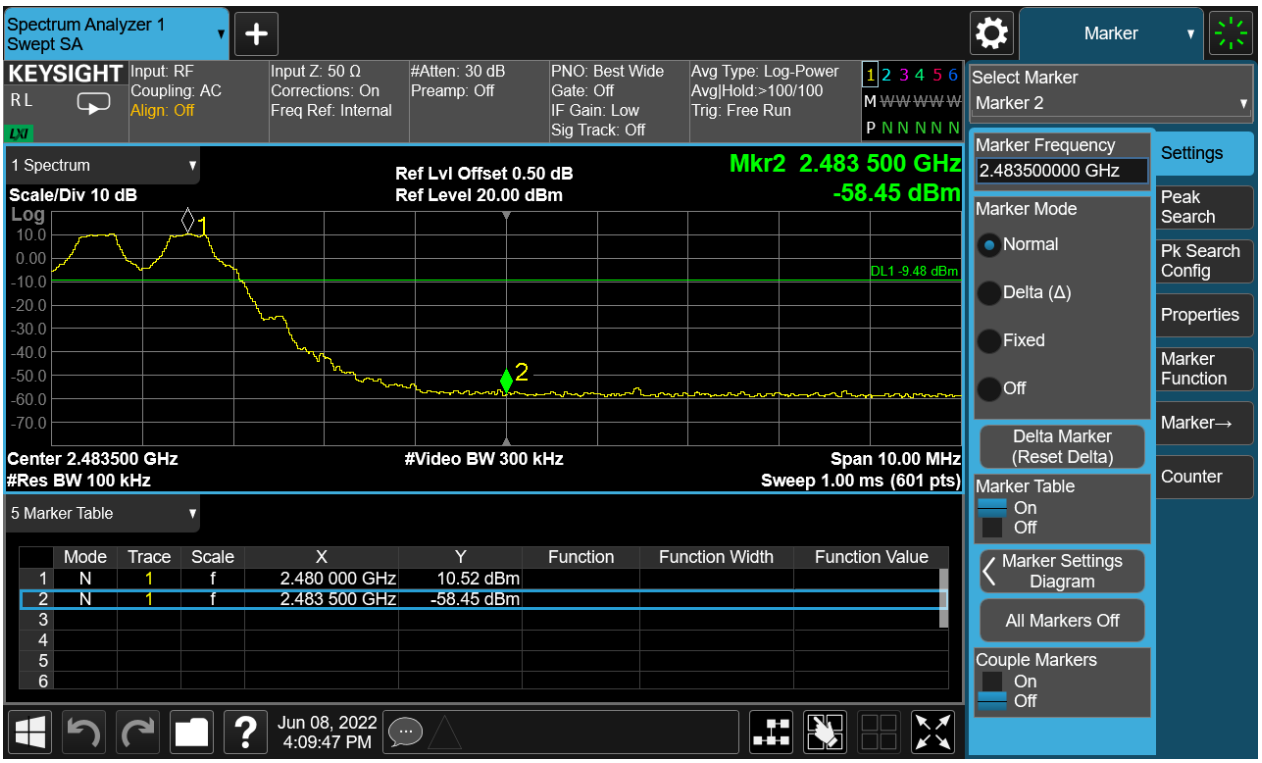
Figure 22: Conducted Spurious Emission & Authorized-band band-edge, Hopping Mode, GFSK Carrier Level



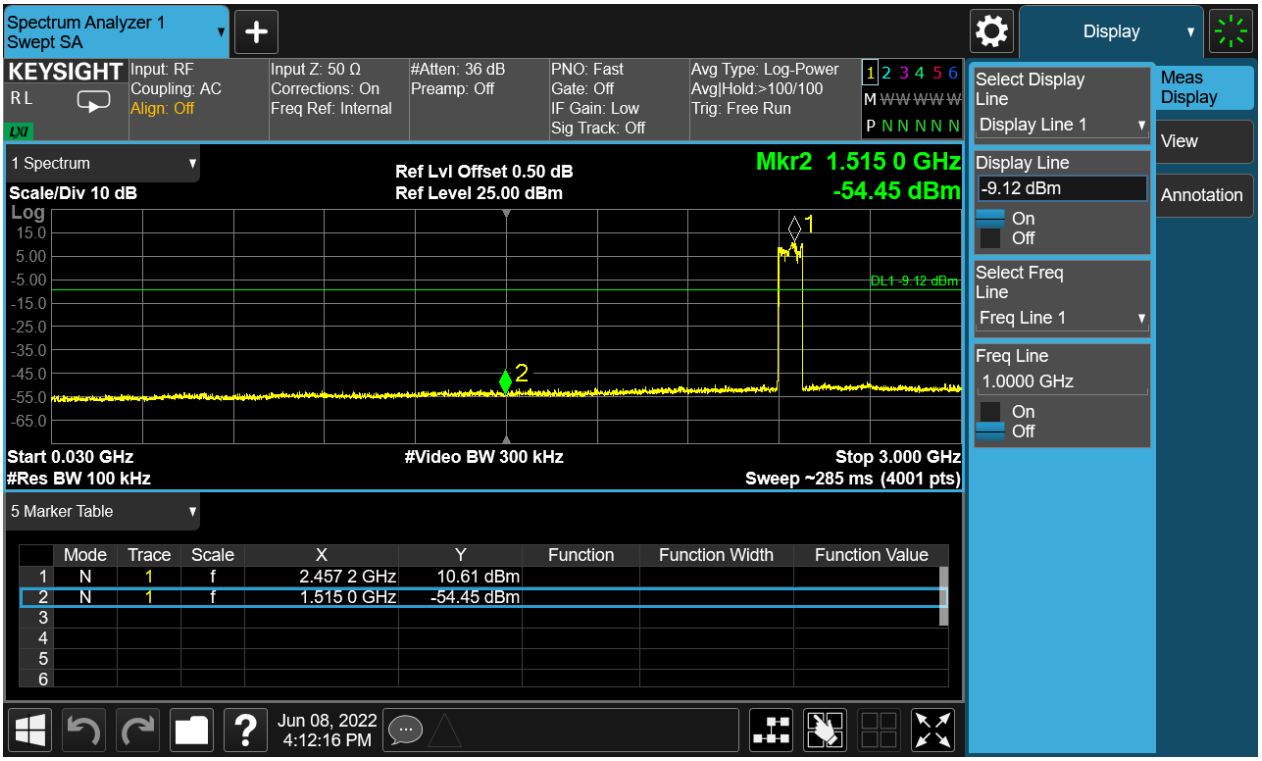
Band Edge(Low)



Band Edge(High)



Conducted spurious emissions 30MHz-25GHz



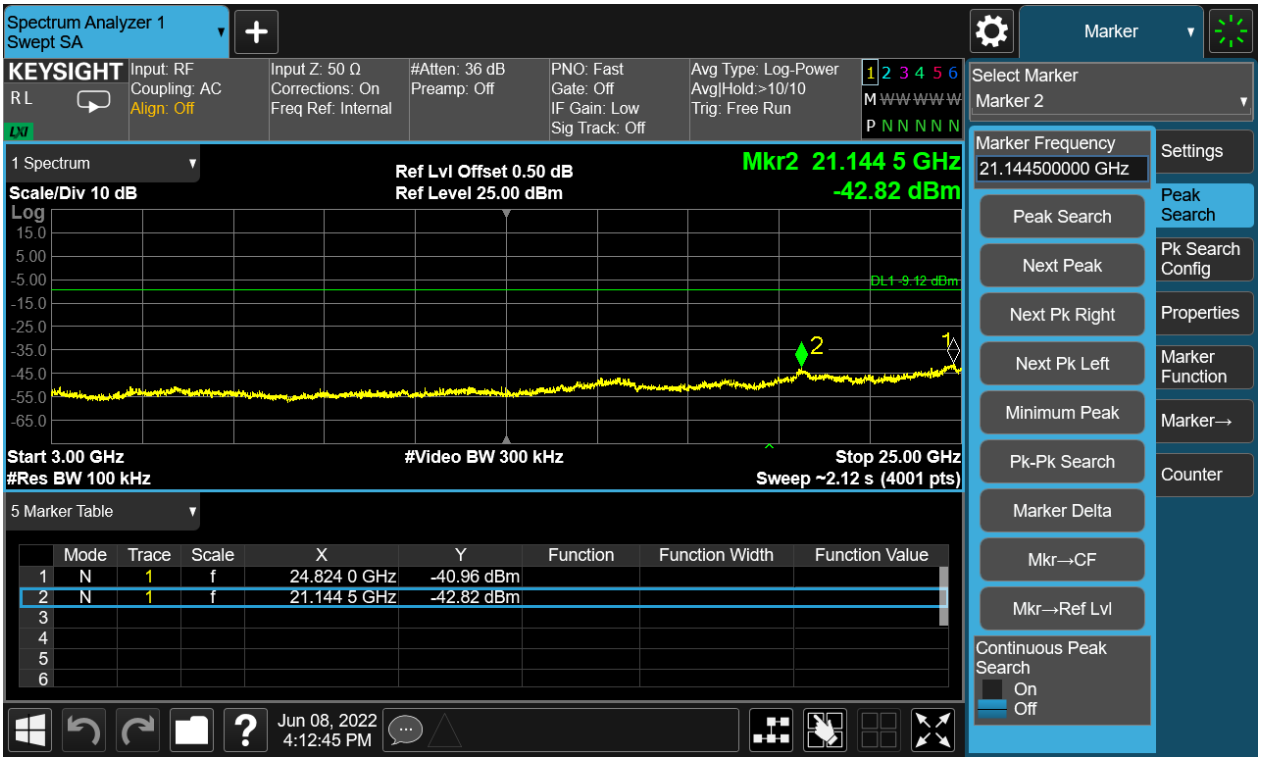
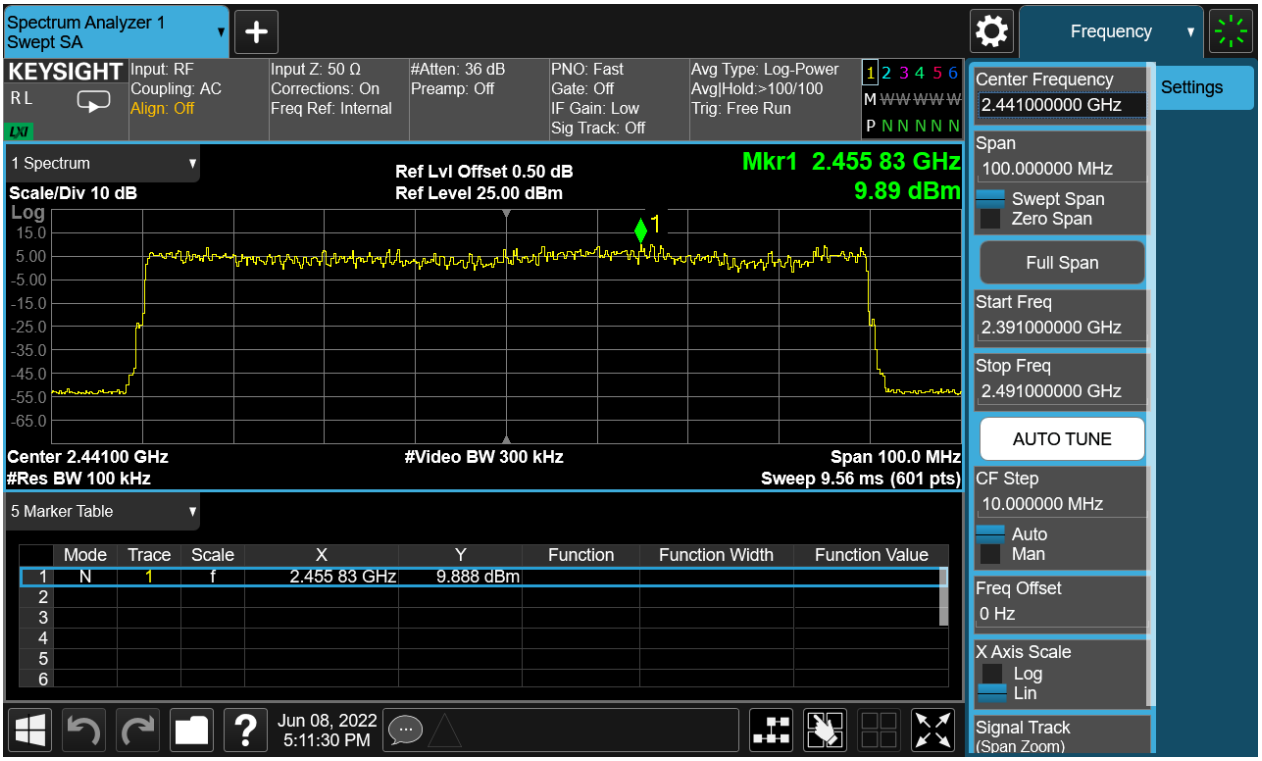
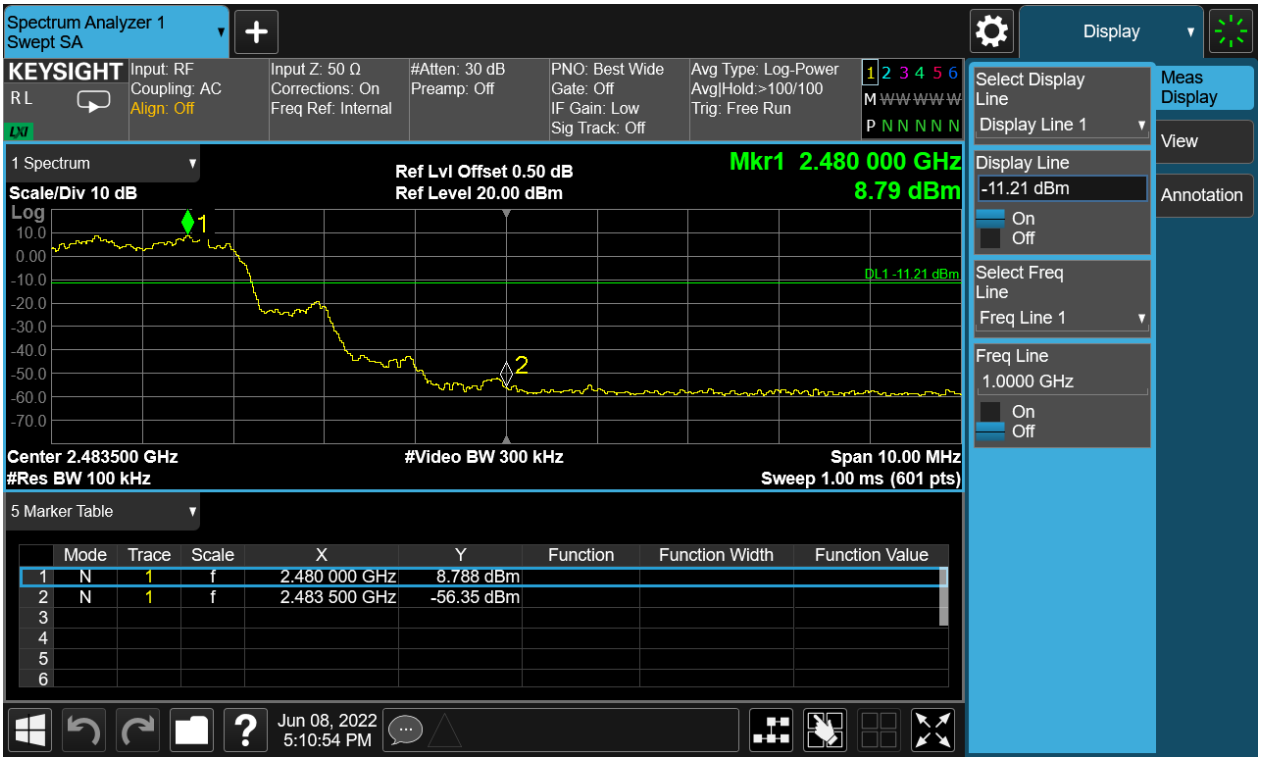


Figure 23: Conducted Spurious Emission & Authorized-band band-edge, Hopping Mode, 8-DPSK Carrier Level

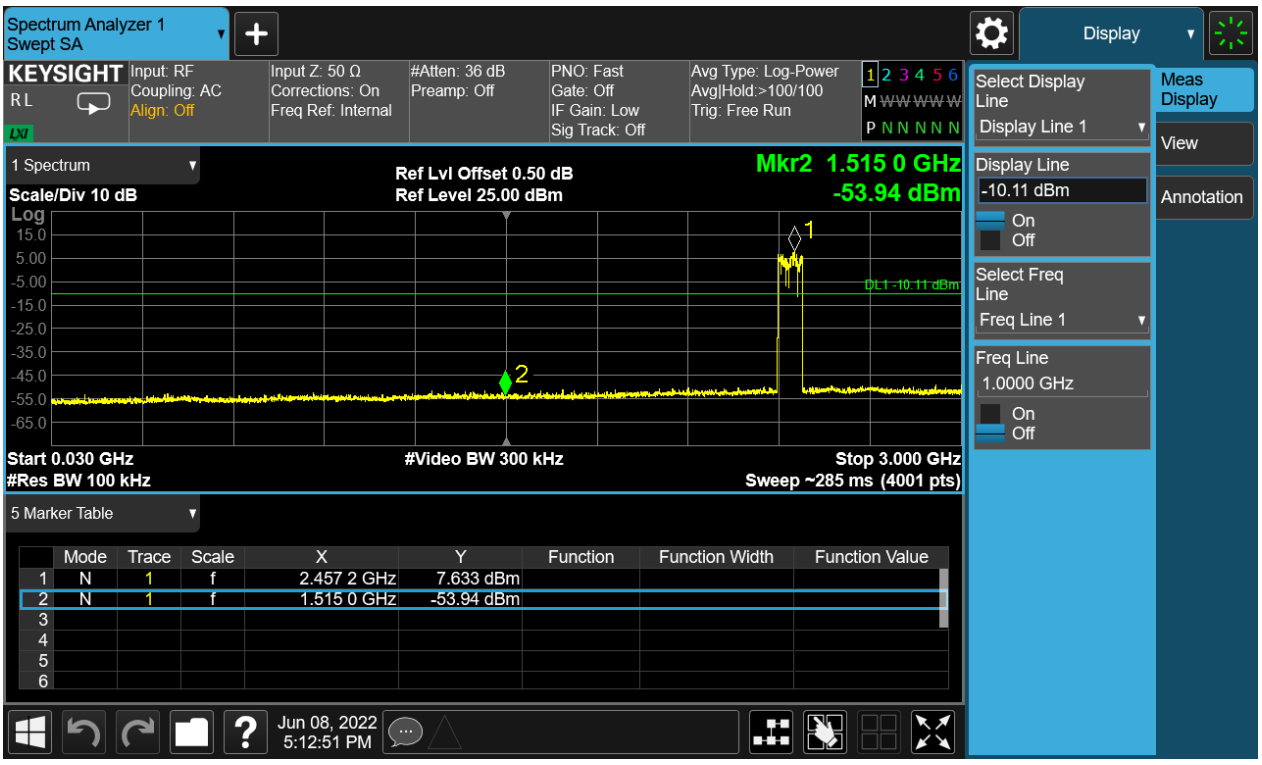


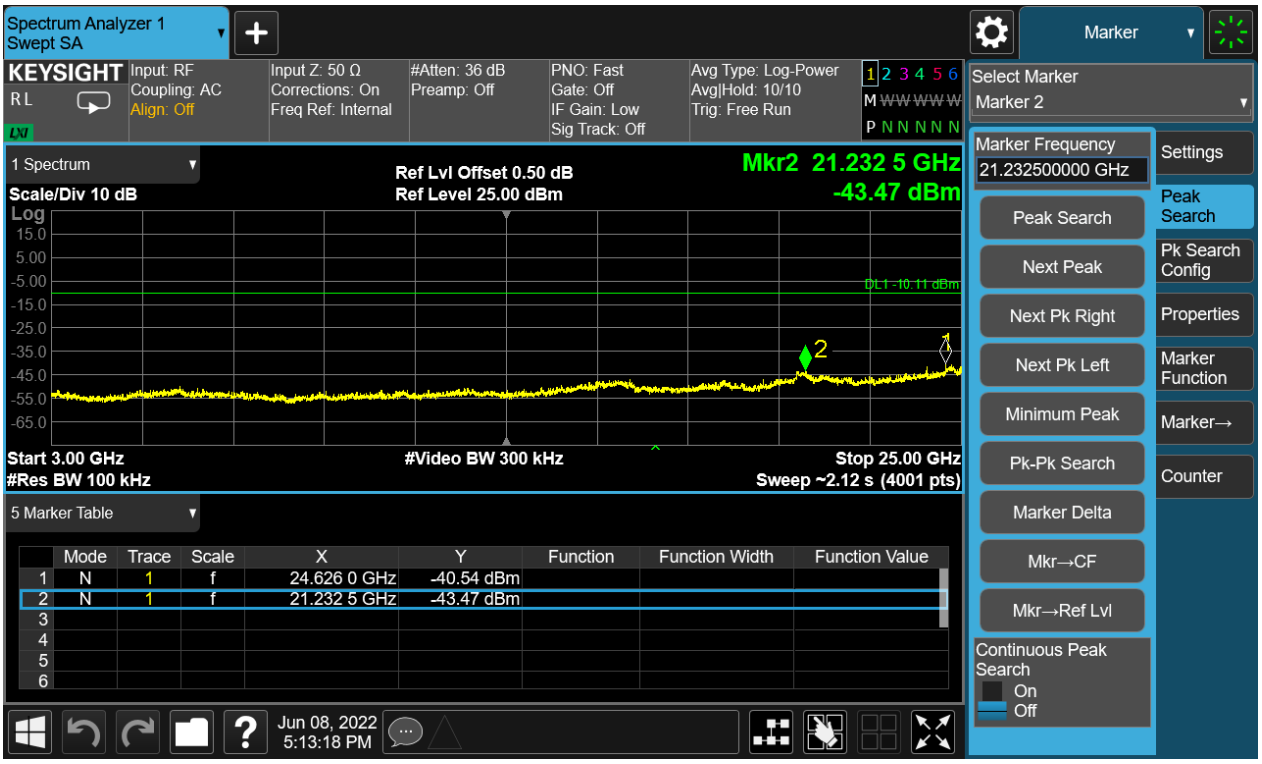
Band Edge(Low)

Band Edge(High)



Conducted spurious emissions 30MHz-25GHz





4.1.5 Radiated Spurious Emission

RESULT: **PASS**

Test standard	:	FCC Part 15.247(d), 15.205, 15.209
Requirement	:	ANSI C63.10-2013
Kind of test site	:	3m Semi-Anechoic Chamber

Test setup

Test Channel	:	Low/Middle/High
Operation Mode	:	A
Ambient temperature	:	23°C
Relative humidity	:	54%

Notes

Test plots please refer to the annex document "SHH22020028-01CE DATA BDEDR-TX EXHIBIT A".

1. For 9 kHz ~ 30 MHz, the amplitude of spurious emissions that are attenuated by more than 20dB below the permissible. The value has no need to be reported.
2. The spurious above 18GHz is noise only and 20dB below the limit. The value has no need to be reported.
3. All test modes had been pre-test below 1 GHz, Only the worst mode data of GFSK-hopping mode was recorded in the report.
4. The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement –X, Y, and Z-plane. The X-plane results were found as the worst case and were shown in this report.

4.1.6 Band Edge (Restricted-band band-edge)

RESULT: **PASS**

Test standard	:	FCC Part 15.247(d), 15.205, 15.209
Requirement	:	ANSI C63.10-2013
Kind of test site	:	3m Semi-Anechoic Chamber

Test setup

Test Channel	:	Low/Middle/High
Operation Mode	:	A.1
Ambient temperature	:	23°C
Relative humidity	:	54%

Notes

Test plots please refer to the annex document "SHH22020028-01CE DATA BDEDR-TX EXHIBIT A".

4.1.7 Hopping Frequency Separation

RESULT: **PASS**

Test standard : FCC Part 15.247(a)(1)
Requirement : ANSI C63.10-2013
Kind of test site : Shielded room

Test setup

Test Channel : Hopping
Operation Mode : A.1.a.iv
Ambient temperature : 24.8°C
Relative humidity : 52%

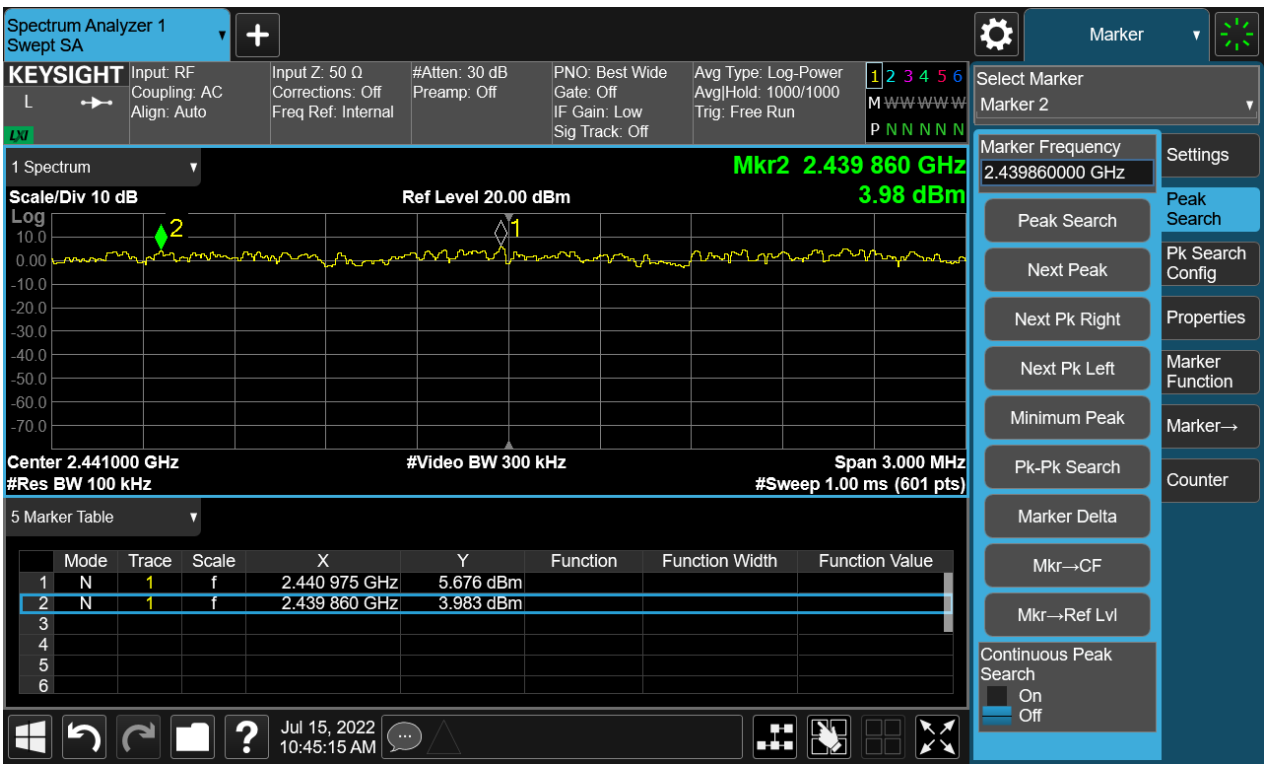
Table 3: Hopping Frequency Separation

Mode	Frequency (MHz)	Channel Separation (MHz)	Limit (MHz)
GFSK	2441	1.105	≥ 25kHz or two-thirds of 20dB bandwidth
8-DPSK	2441	1.115	

*Note: The systems operate with an output power no greater than 125mW.

Figure 24: Hopping Frequency Separation, Hopping Mode, GFSK

Figure 25: Hopping Frequency Separation, Hopping Mode, 8DPSK



4.1.8 Number of Hopping Frequency

RESULT: **PASS**

Test standard	:	FCC Part 15.247(a)(1)(iii) RSS-247 5.1(4)
Requirement	:	ANSI C63.10-2013
Kind of test site	:	Shielded room

Test setup

Test Channel	:	Hopping
Operation Mode	:	A.1.a.iv
Ambient temperature	:	24.8°C
Relative humidity	:	52%

Table 2: Number of Hopping Frequency

Mode	Frequency Range	Measured Quantity of Hopping Channel	Limit
GFSK	2400 – 2483.5	79	≥15
8-DPSK	2400 – 2483.5	79	≥15

Figure 26: Number of Hopping Frequency, Hopping Mode, GFSK

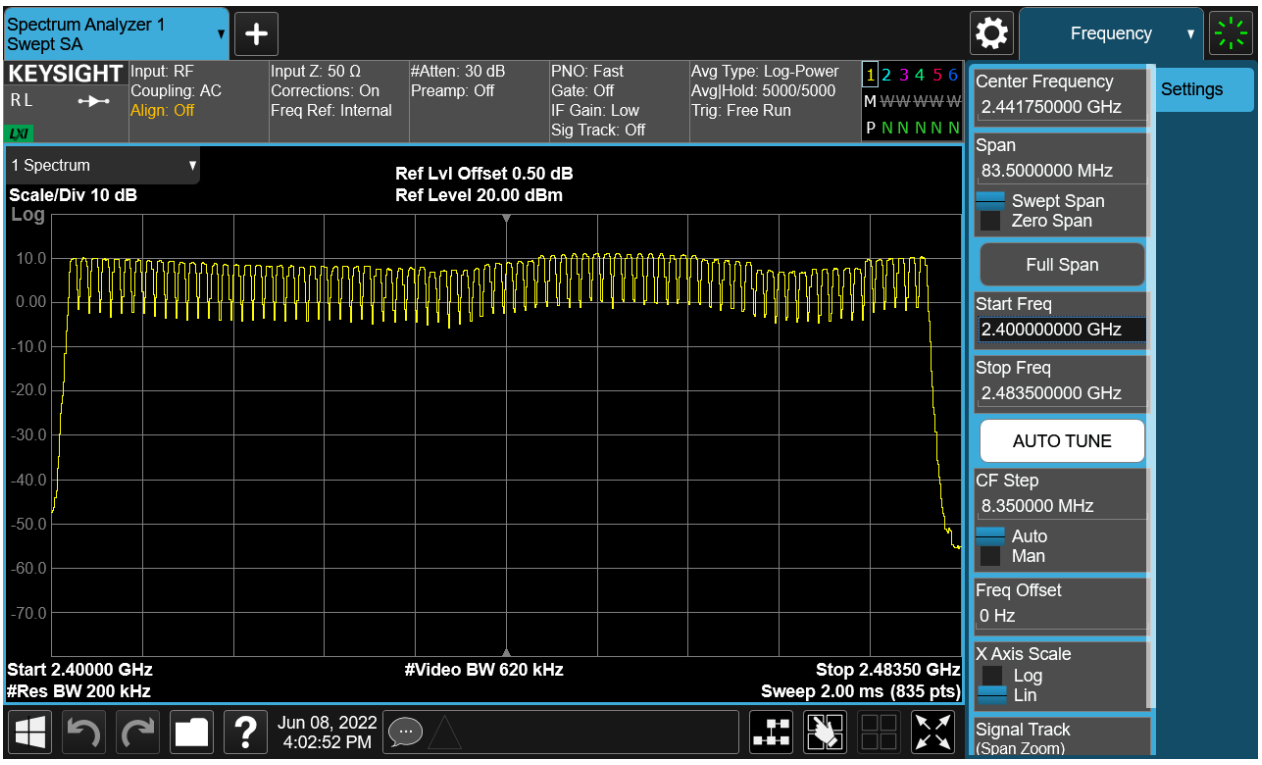
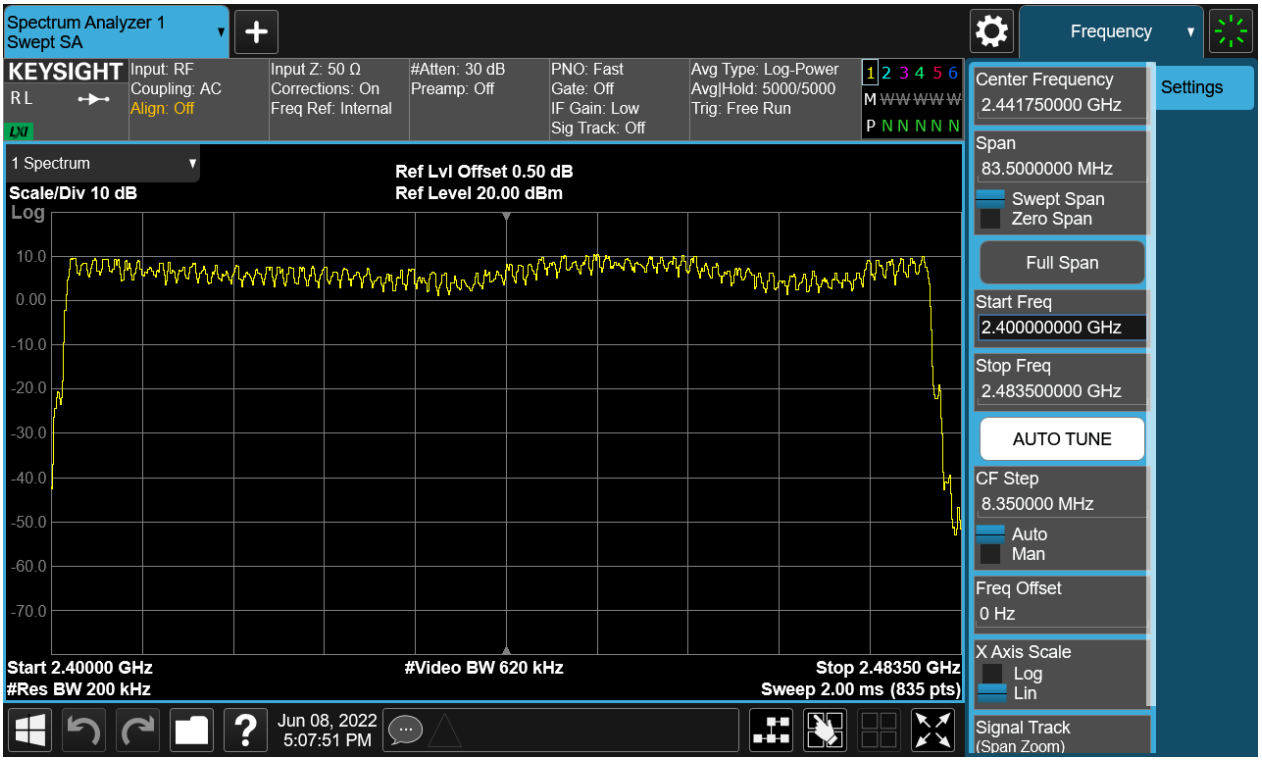


Figure 27: Number of Hopping Frequency, Hopping Mode, 8-DPSK



4.1.9 Time of Occupancy

RESULT: **PASS**

Test standard : FCC Part 15.247(a)(1)(iii)
Requirement : ANSI C63.10-2013
Kind of test site : Shielded room

Test setup

Test Channel : Middle
Operation Mode : A.1.a
Ambient temperature : 24.8°C
Relative humidity : 52%

Table 3: Time of Occupancy

Mode	Packet Type	Pulse Time (ms)	Total of Dwell (ms)	Limit (s)
GFSK	DH1	0.3900	124.80	0.4
	DH3	1.6550	264.80	0.4
	DH5	2.9070	310.08	0.4
8-DPSK	DH1	0.3983	127.46	0.4
	DH3	1.6550	264.80	0.4
	DH5	2.9200	311.47	0.4

Note:
For DH1 package type:
Total of Dwell = {Pulse Time*(1600/2)/Number of Hopping Frequency}*Period
Period = 0.4* Number of Hopping Frequency
For DH3 package type:
Total of Dwell = {Pulse Time*(1600/4)/Number of Hopping Frequency}*Period
Period = 0.4* Number of Hopping Frequency
For DH5 package type:
Total of Dwell = {Pulse Time*(1600/6)/Number of Hopping Frequency}*Period
Period = 0.4* Number of Hopping Frequency

Figure 28: Time of Occupancy, 2441MHz, GFSK DH1

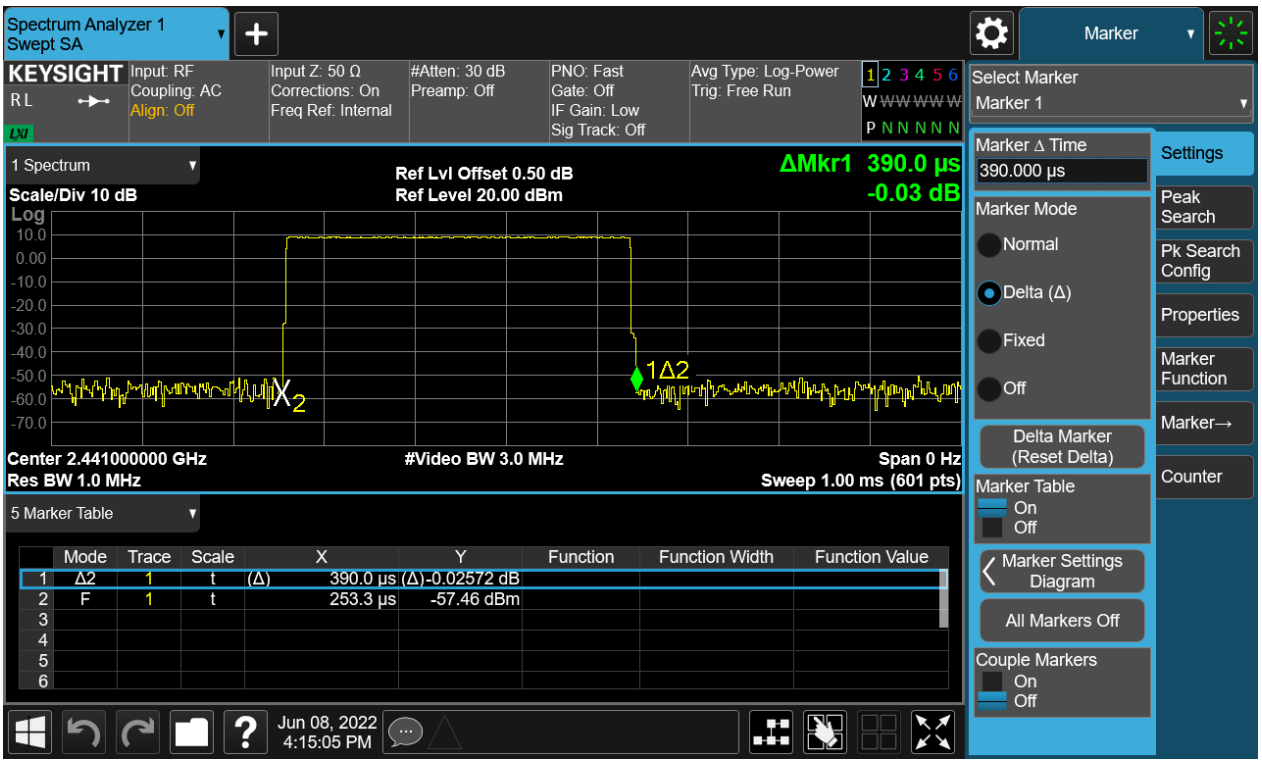


Figure 26: Time of Occupancy, 2441MHz, GFSK DH3

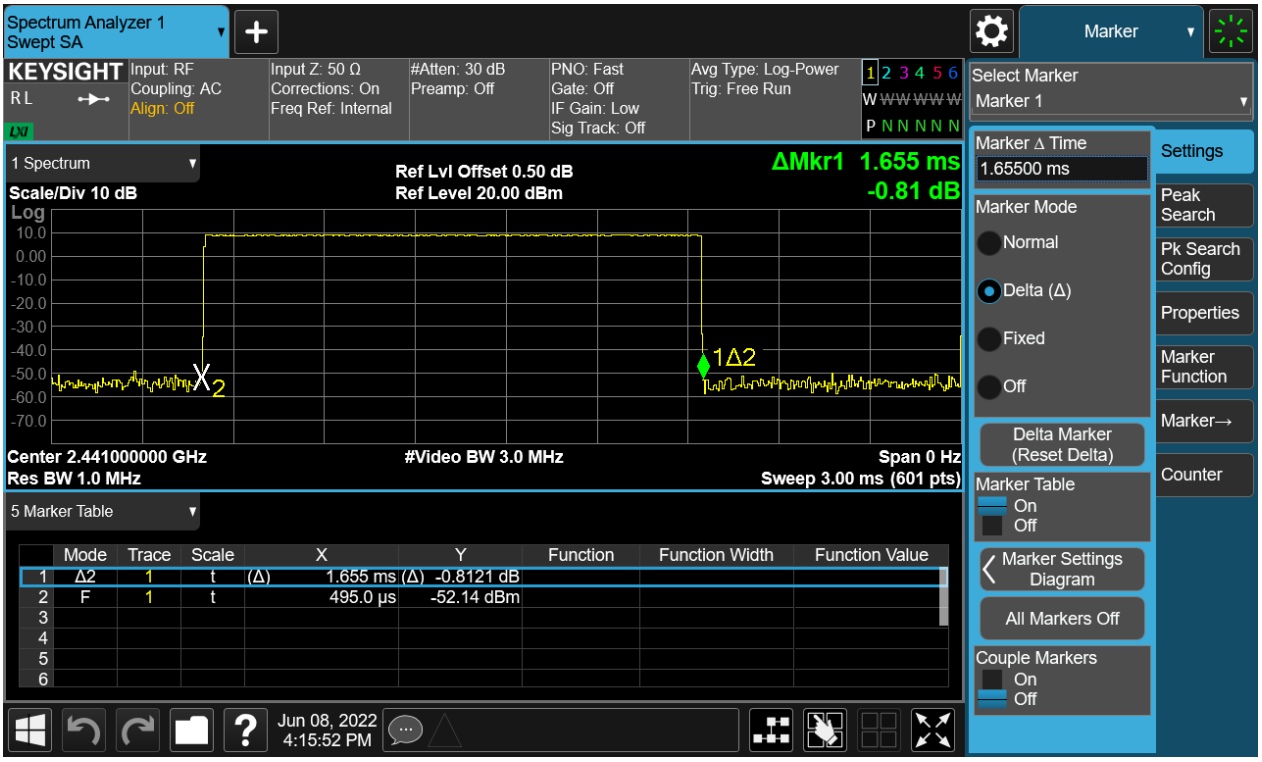


Figure 30: Time of Occupancy, 2441MHz, GFSK DH5

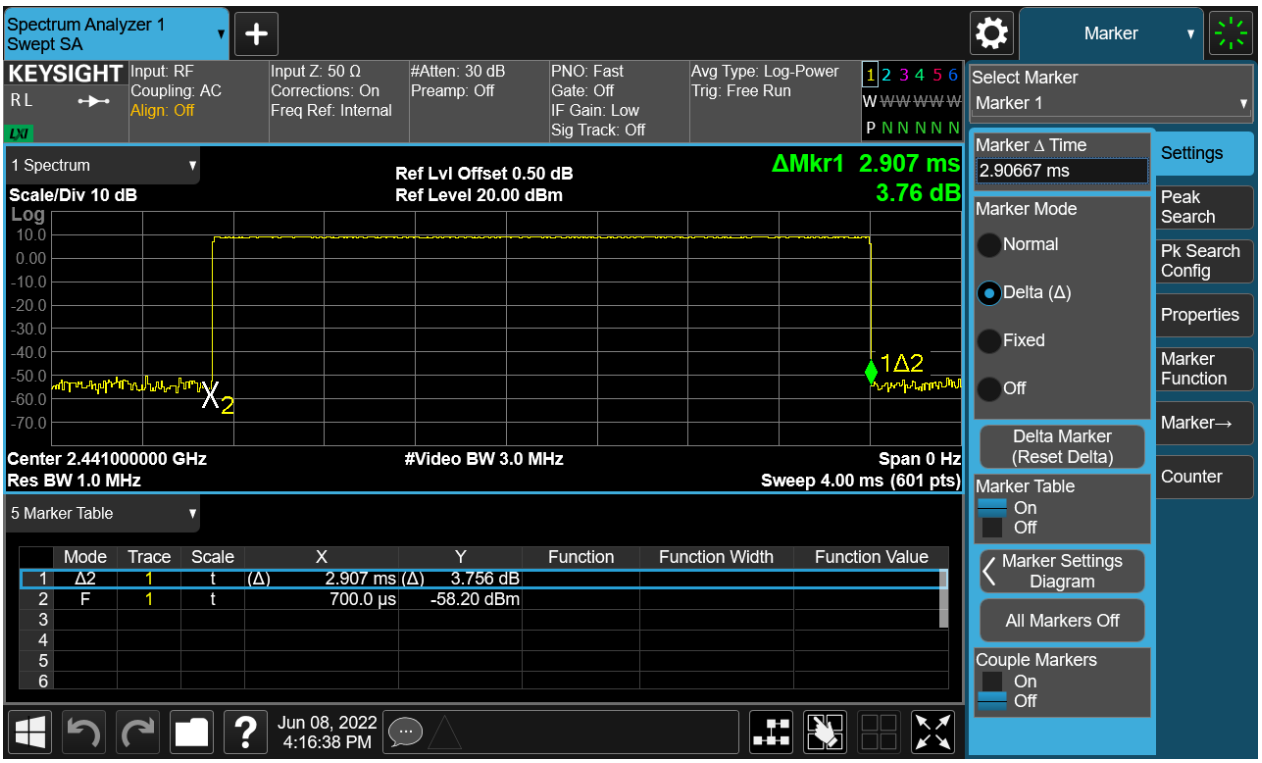


Figure 31: Time of Occupancy, 2441MHz, 8-DPSK DH1

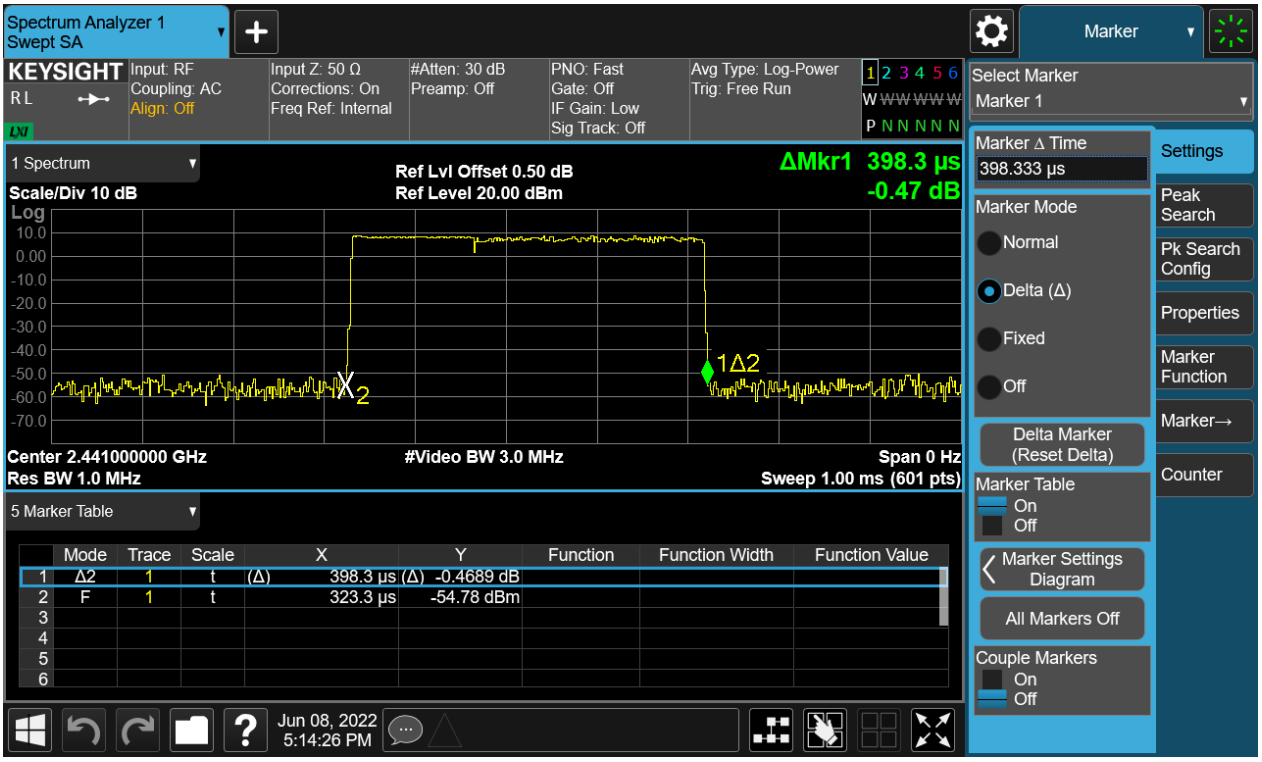


Figure 32: Time of Occupancy, 2441MHz, 8-DPSK DH3

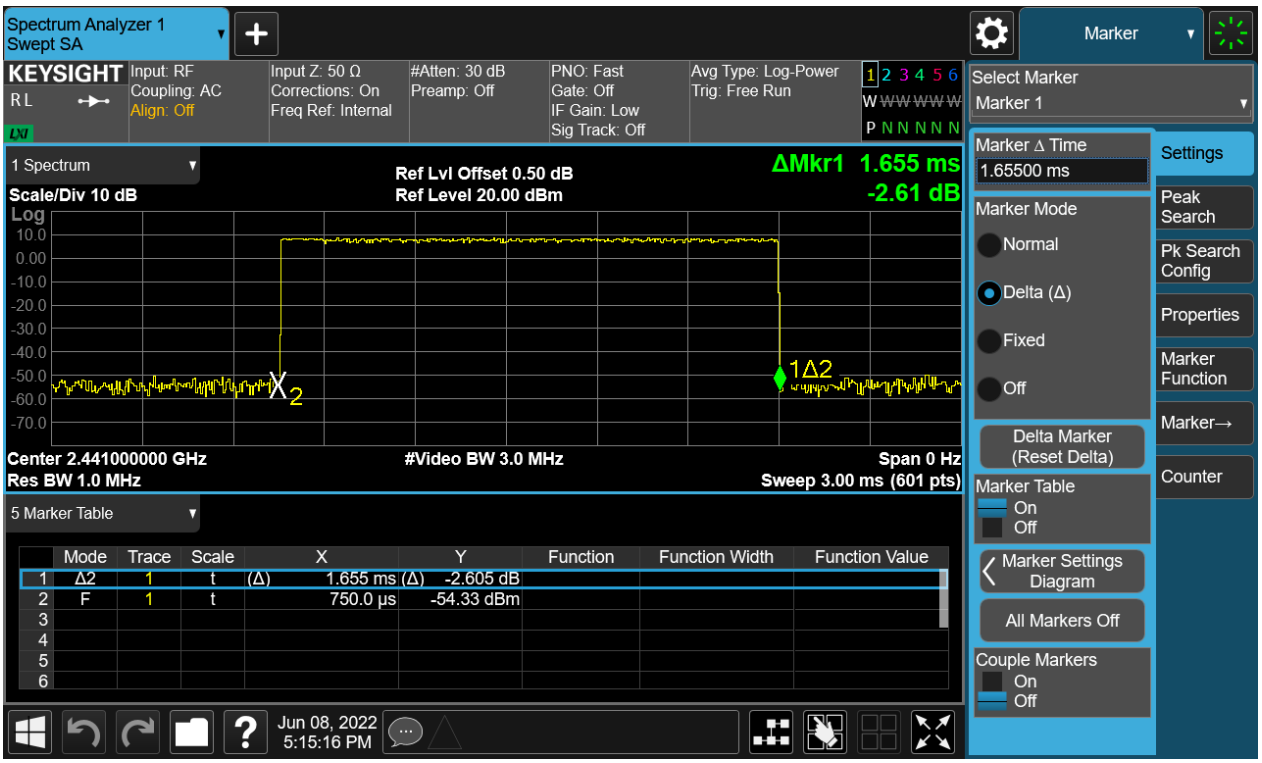
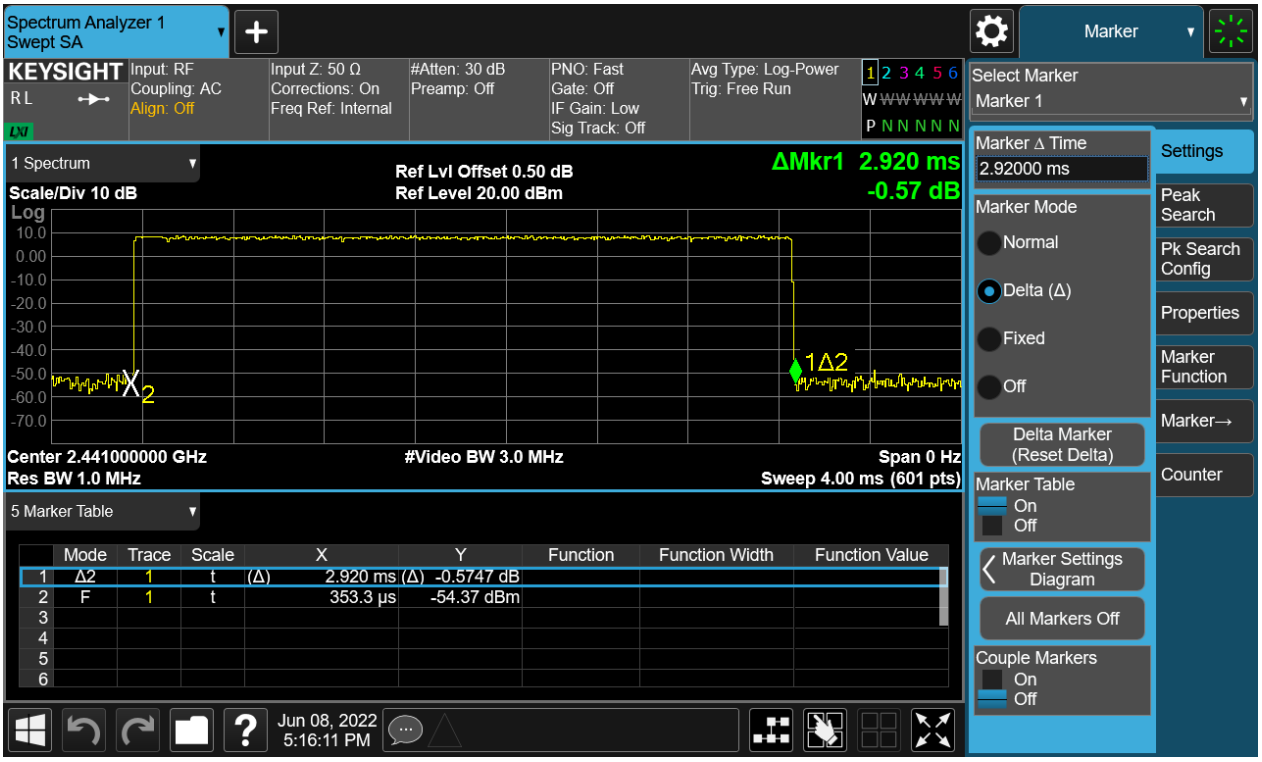


Figure 33: Time of Occupancy, 2441MHz, 8-DPSK DH5



4.2 Mains Emissions

4.2.1 Conducted Emission on AC Mains

RESULT: **PASS**

Test standard	:	FCC Part 15.207(a)
Requirement	:	ANSI C63.10-2013
Kind of test site	:	Shielded room

Test setup

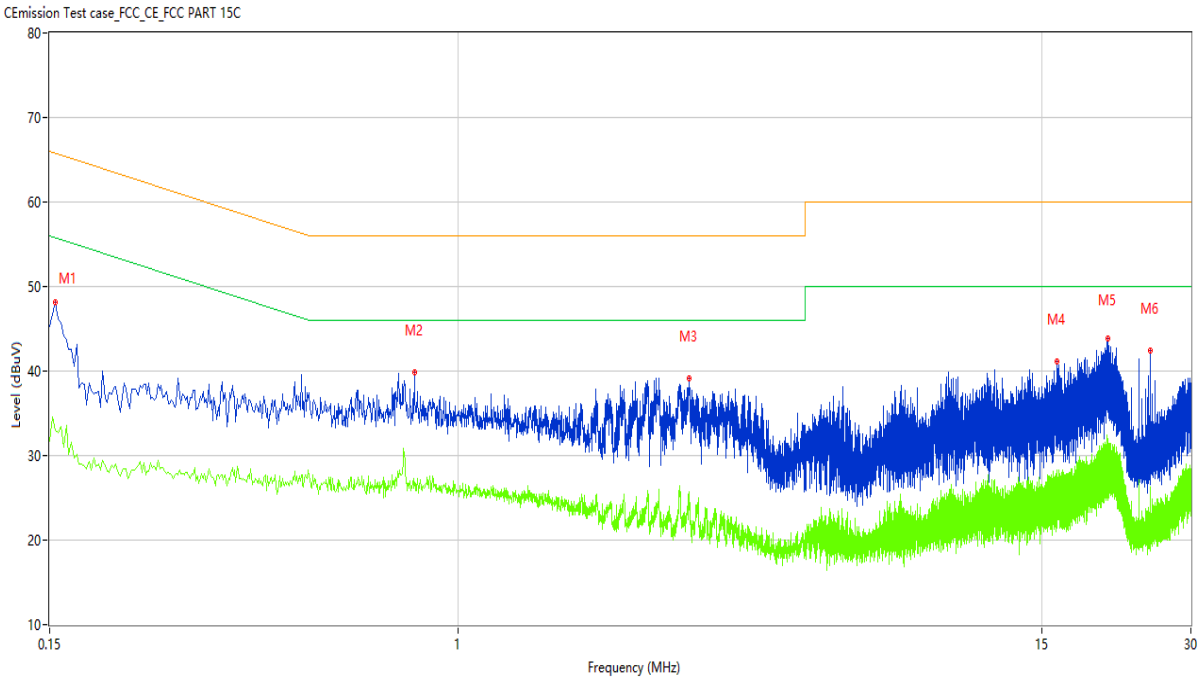
Input Voltage	:	AC 120V, 60Hz
Operation Mode	:	A.1.a
Earthing	:	Not Connected
Ambient temperature	:	23°C
Relative humidity	:	51%

For details refer to following test plot.

Note:

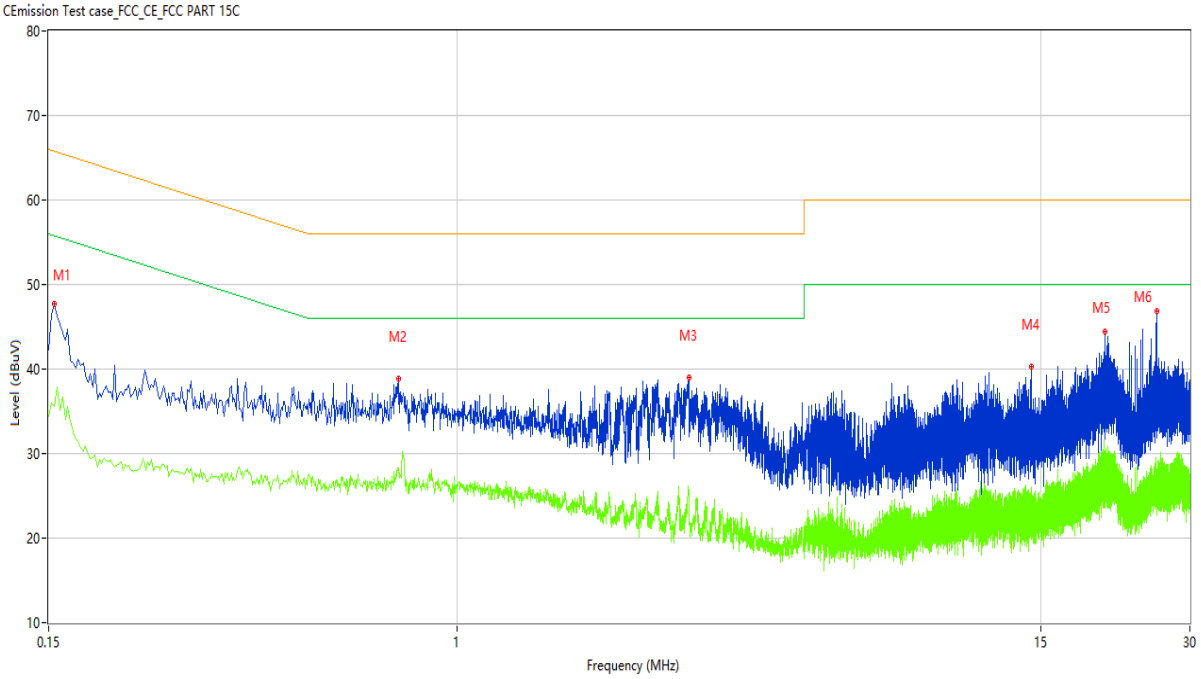
The all configurations were tested respectively, but only the worst configuration(GFSK-hopping mode) shown here.

Figure 34: Conducted Emission on AC Mains, L Phase



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Over Limit (dB)	Detector	Line	Verdict
1	0.150	47.90	10.26	66.00	-18.10	Peak	L	Pass
1*	0.150	40.56	10.26	66.00	-25.44	QP	L	Pass
1**	0.150	31.78	10.26	56.00	-24.22	AV	L	Pass
2	0.816	34.49	10.31	56.00	-21.51	Peak	L	Pass
2*	0.816	25.32	10.31	56.00	-30.68	QP	L	Pass
2**	0.816	26.79	10.31	46.00	-19.21	AV	L	Pass
3	2.916	38.92	10.16	56.00	-17.08	Peak	L	Pass
3*	2.916	34.78	10.16	56.00	-21.22	QP	L	Pass
3**	2.916	25.63	10.16	46.00	-20.37	AV	L	Pass
4	16.144	42.20	10.57	60.00	-17.80	Peak	L	Pass
4*	16.144	33.06	10.57	60.00	-26.94	QP	L	Pass
4**	16.144	26.79	10.57	50.00	-23.21	AV	L	Pass
5	20.410	44.58	10.96	60.00	-15.42	Peak	L	Pass
5*	20.410	35.86	10.96	60.00	-24.14	QP	L	Pass
5**	20.410	30.31	10.96	50.00	-19.69	AV	L	Pass
6	24.902	44.64	11.02	60.00	-15.36	Peak	L	Pass
6*	24.902	27.60	11.02	60.00	-32.40	QP	L	Pass
6**	24.902	26.33	11.02	50.00	-23.67	AV	L	Pass

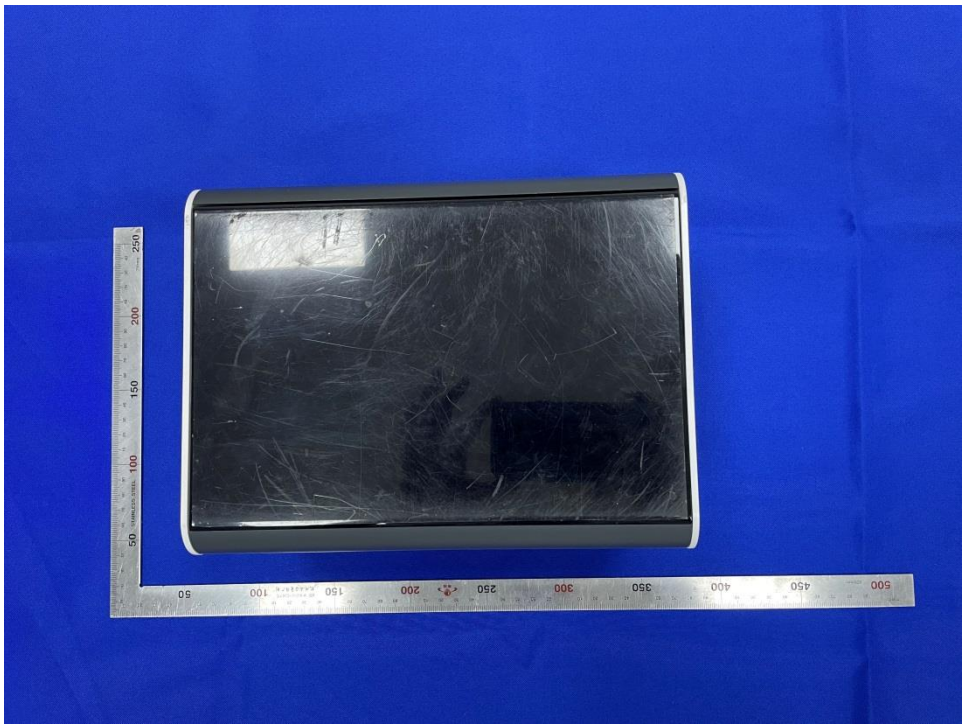
Figure 35: Conducted Emission on AC Mains, N Phase



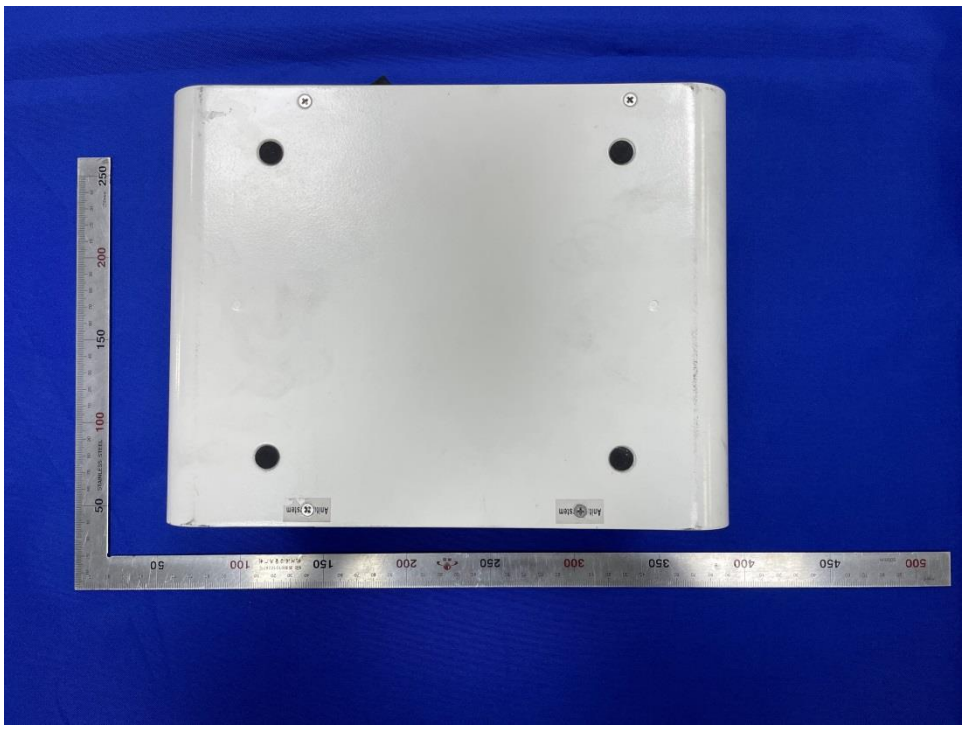
No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Over Limit (dB)	Detector	Line	Verdict
1	0.150	46.69	10.26	66.00	-19.31	Peak	N	Pass
1*	0.150	40.11	10.26	66.00	-25.89	QP	N	Pass
1**	0.150	34.47	10.26	56.00	-21.53	AV	N	Pass
2	0.762	43.65	10.31	56.00	-12.35	Peak	N	Pass
2*	0.762	32.18	10.31	56.00	-23.82	QP	N	Pass
2**	0.762	28.34	10.31	46.00	-17.66	AV	N	Pass
3	2.928	38.47	10.16	56.00	-17.53	Peak	N	Pass
3*	2.928	34.12	10.16	56.00	-21.88	QP	N	Pass
3**	2.928	25.66	10.16	46.00	-20.34	AV	N	Pass
4	14.366	39.45	10.43	60.00	-20.55	Peak	N	Pass
4*	14.366	30.09	10.43	60.00	-29.91	QP	N	Pass
4**	14.366	25.96	10.43	50.00	-24.04	AV	N	Pass
5	20.248	44.38	10.95	60.00	-15.62	Peak	N	Pass
5*	20.248	35.47	10.95	60.00	-24.53	QP	N	Pass
5**	20.248	28.81	10.95	50.00	-21.19	AV	N	Pass
6	25.784	46.35	11.03	60.00	-13.65	Peak	N	Pass
6*	25.784	33.72	11.03	60.00	-26.28	QP	N	Pass
6**	25.784	27.37	11.03	50.00	-22.63	AV	N	Pass

5 Appendixes

5.1 Photographs of the Sample



Front of the sample

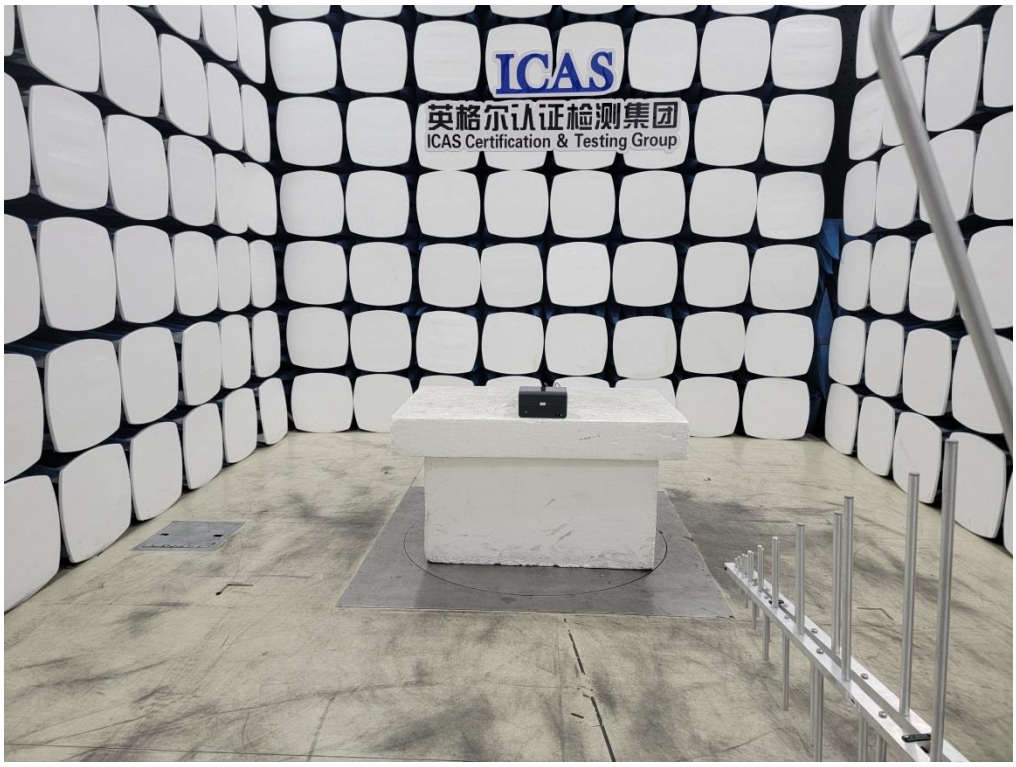


Back of the sample

5.2 Set-up for Conducted Emission

5.3 Set-up for Conducted RF test at Antenna Port

5.4 Set-up for Spurious Emission below 1GHz



5.5 Set-up for Spurious Emission above 1GHz

End of the report