Appendix A

RF Test Data for 2.4G (Conducted Measurement)

Product Name: Remote control boat

Test Model: S2

Environmental Conditions

Temperature:	23.9 ° C
Relative Humidity:	52.4%
ATM Pressure:	100.0 kPa
Test Engineer:	Kay Hu
Supervised by:	Li Huan

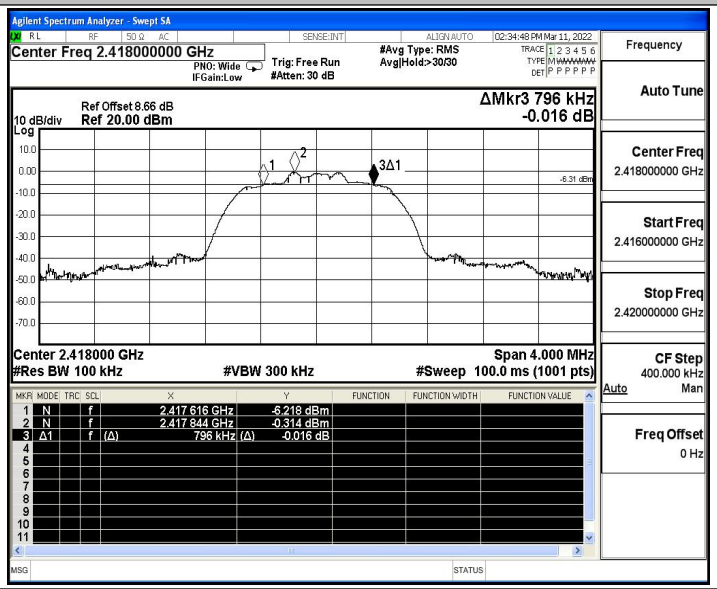
A.1 DTS Bandwidth

Test Result

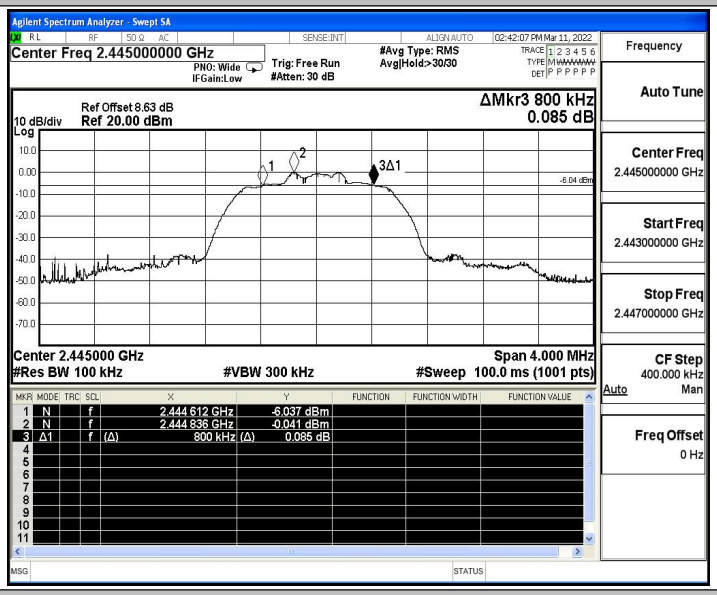
TestMode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
GFSK	Ant1	2418	0.796	2417.616	2418.412	0.5	PASS
		2445	0.800	2444.612	2445.412	0.5	PASS
		2465	0.796	2464.616	2465.412	0.5	PASS

Test Graphs

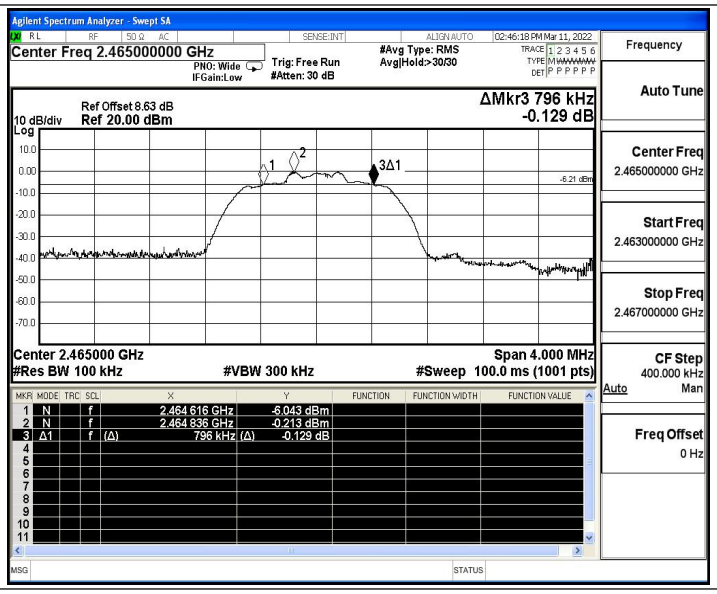
GFSK_Ant1_2418



GFSK_Ant1_2445



GFSK_Ant1_2465


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.465000000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold:>30/30
02:46:18 PM Mar 11, 2022
Ref Offset 8.63 dB
10 dB/div Ref 20.00 dBm
Log
ΔMkr3 796 kHz
-0.129 dB
-6.21 dBm
Center 2.465000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 4.000 MHz
#Sweep 100.0 ms (1001 pts)
1 N f 2.464 616 GHz -6.043 dBm
2 N f 2.464 836 GHz -0.213 dBm
3 Δ1 f (Δ) 796 kHz (Δ) -0.129 dB
Frequency
Auto Tune
Center Freq
2.465000000 GHz
Start Freq
2.463000000 GHz
Stop Freq
2.467000000 GHz
CF Step
400.000 kHz
Auto Man
Freq Offset
0 Hz

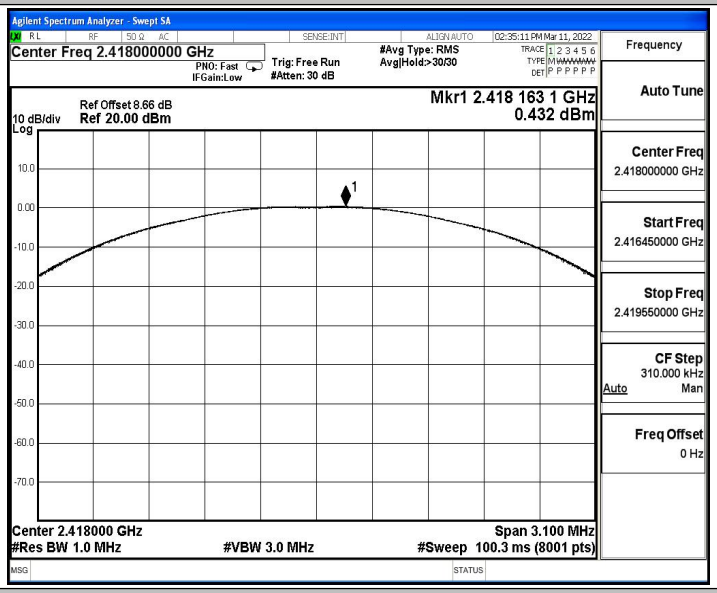
A.2 Maximum peak conducted output power

Test Result

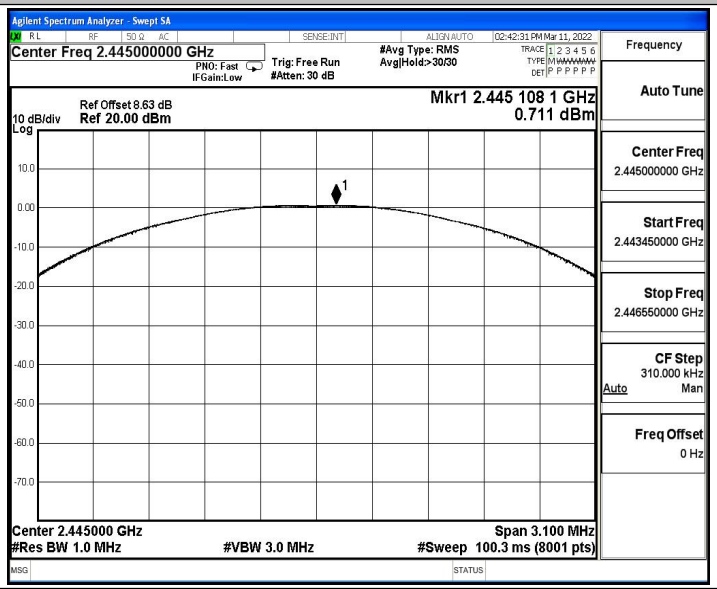
TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
GFSK	Ant1	2418	0.43	≤30	PASS
		2445	0.71	≤30	PASS
		2465	0.54	≤30	PASS

Test Graphs

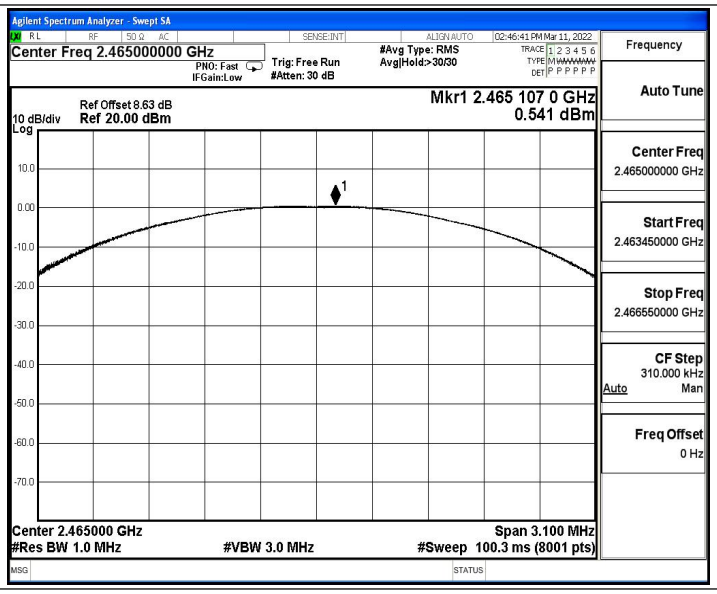
GFSK_Ant1_2418



GFSK_Ant1_2445



GFSK_Ant1_2465


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.465000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold:>30/30
02:46:41 PM Mar 11, 2022
Ref Offset 8.63 dB
10 dB/div Ref 20.00 dBm
Log
Mkr1 2.465 107 0 GHz
0.541 dBm
Center 2.465000 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz
Span 3.100 MHz
#Sweep 100.3 ms (8001 pts)
Frequency
Auto Tune
Center Freq
2.465000000 GHz
Start Freq
2.463450000 GHz
Stop Freq
2.466550000 GHz
CF Step
310.000 kHz
Auto Man
Freq Offset
0 Hz

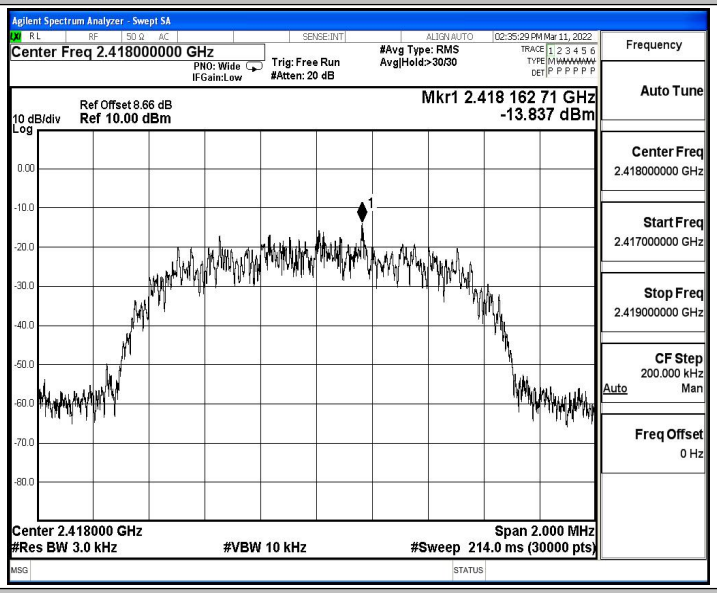
A.3 Maximum power spectral density

Test Result

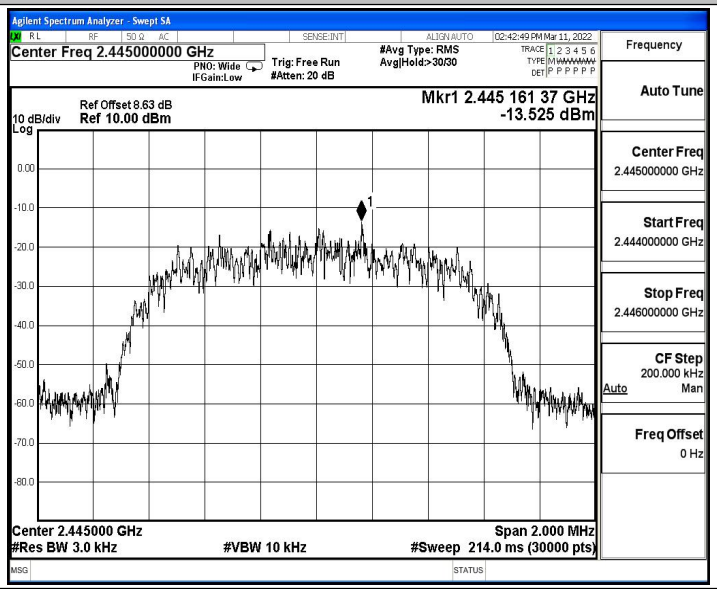
TestMode	Antenna	Channel	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
GFSK	Ant1	2418	-13.84	≤8.00	PASS
		2445	-13.53	≤8.00	PASS
		2465	-13.82	≤8.00	PASS

Test Graphs

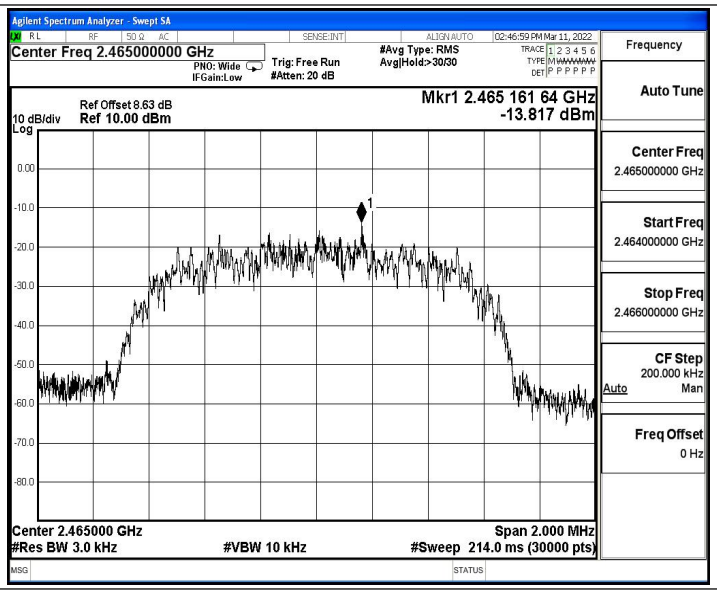
GFSK_Ant1_2418



GFSK_Ant1_2445



GFSK_Ant1_2465


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.465000000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 20 dB
#Avg Type: RMS
Avg|Hold:>30/30
02:46:59 PM Mar 11, 2022
Ref Offset 8.63 dB
10 dB/div Ref 10.00 dBm
Log
Mkr1 2.465 161 64 GHz
-13.817 dBm
Center 2.465000 GHz
#Res BW 3.0 kHz
#VBW 10 kHz
Span 2.000 MHz
#Sweep 214.0 ms (30000 pts)
Frequency
Auto Tune
Center Freq
2.465000000 GHz
Start Freq
2.464000000 GHz
Stop Freq
2.466000000 GHz
CF Step
200.000 kHz
Auto Man
Freq Offset
0 Hz

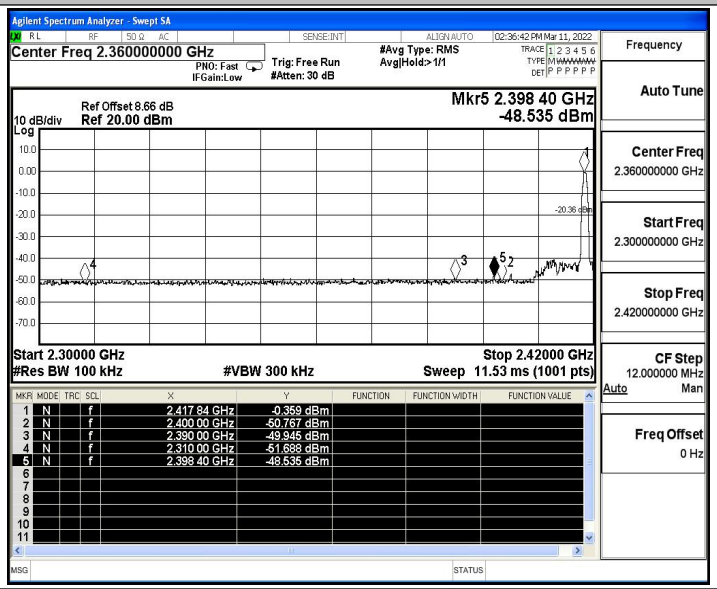
A.4 Band edge measurements

Test Result

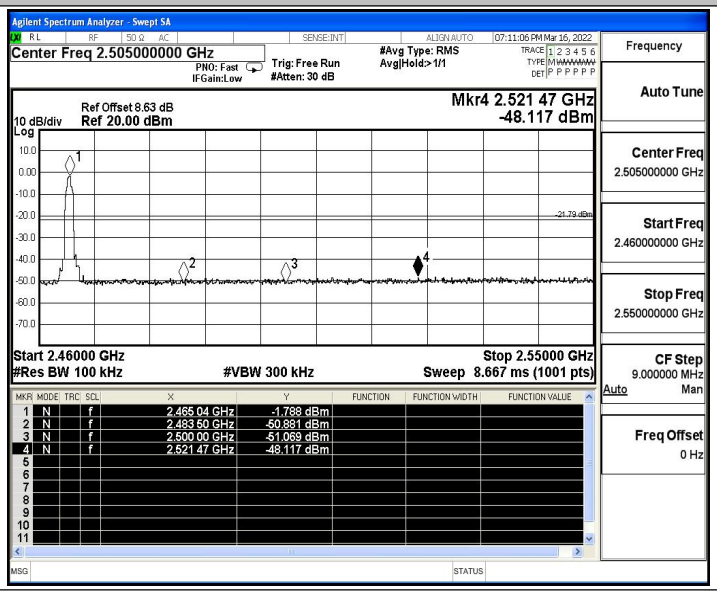
TestMode	Antenna	ChName	Channel	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
GFSK	Ant1	Low	2418	-0.36	-48.54	≤-20.36	PASS
		High	2465	-1.79	-48.12	≤-21.79	PASS

Test Graphs

GFSK_Ant1_Low_2418



GFSK_Ant1_High_2465



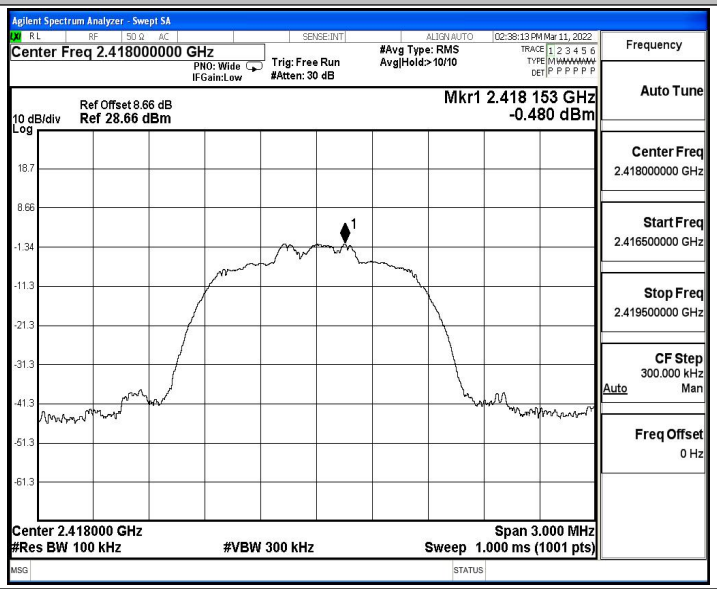
A.5 Conducted Spurious Emission

Test Result

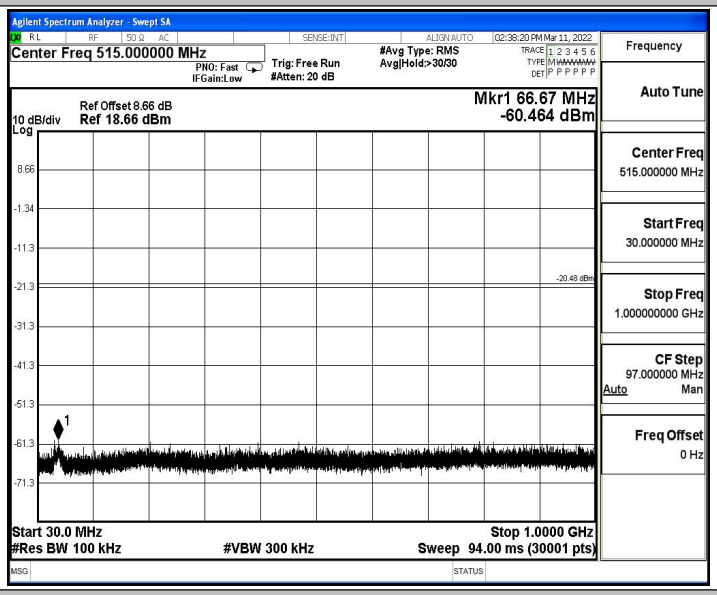
TestMode	Antenna	Channel	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
GFSK	Ant1	2418	Reference	-0.48	-0.48	---	PASS
			30~1000	-0.48	-60.46	≤-20.48	PASS
			1000~26500	-0.48	-46.5	≤-20.48	PASS
		2445	Reference	-0.15	-0.15	---	PASS
			30~1000	-0.15	-60.72	≤-20.15	PASS
			1000~26500	-0.15	-44.98	≤-20.15	PASS
		2465	Reference	-0.29	-0.29	---	PASS
			30~1000	-0.29	-59.46	≤-20.29	PASS
			1000~26500	-0.29	-45.53	≤-20.29	PASS

Test Graphs

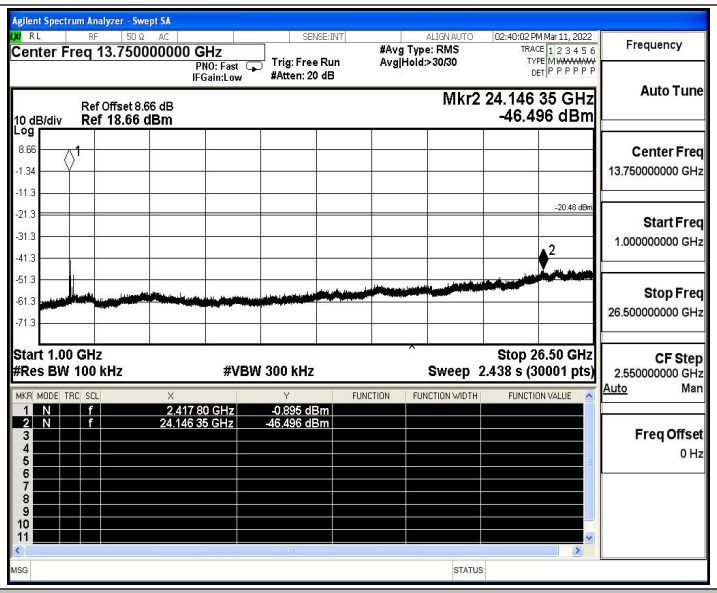
GFSK_Ant1_2418_0~Reference



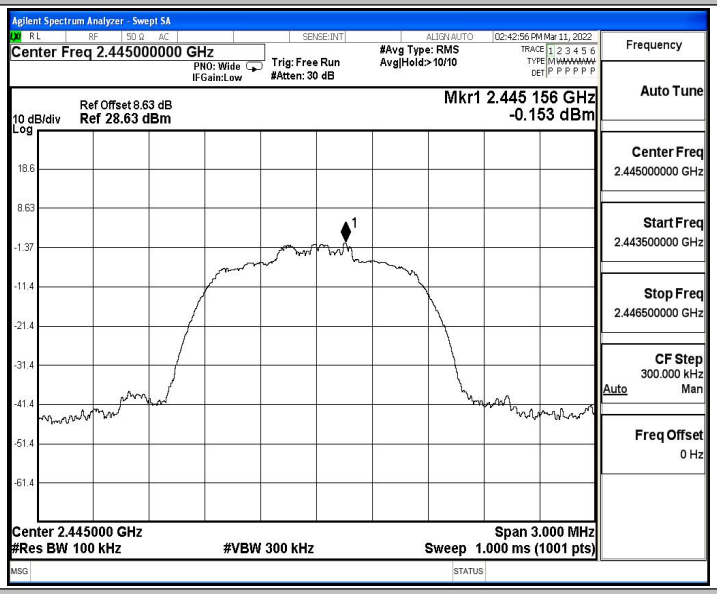
GFSK_Ant1_2418_30~1000



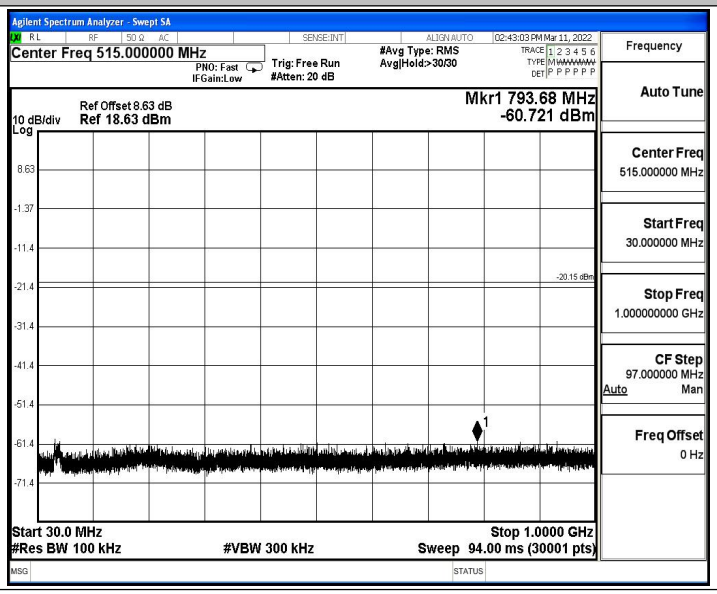
GFSK_Ant1_2418_1000~26500



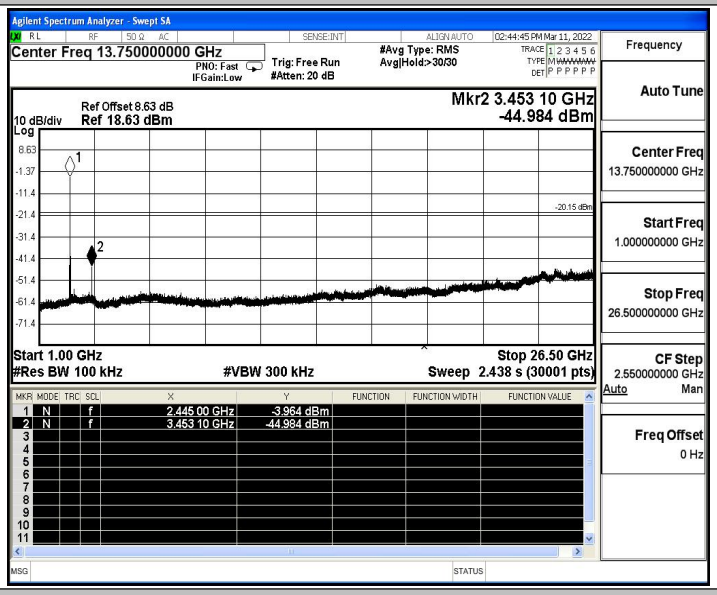
GFSK_Ant1_2445_0~Reference



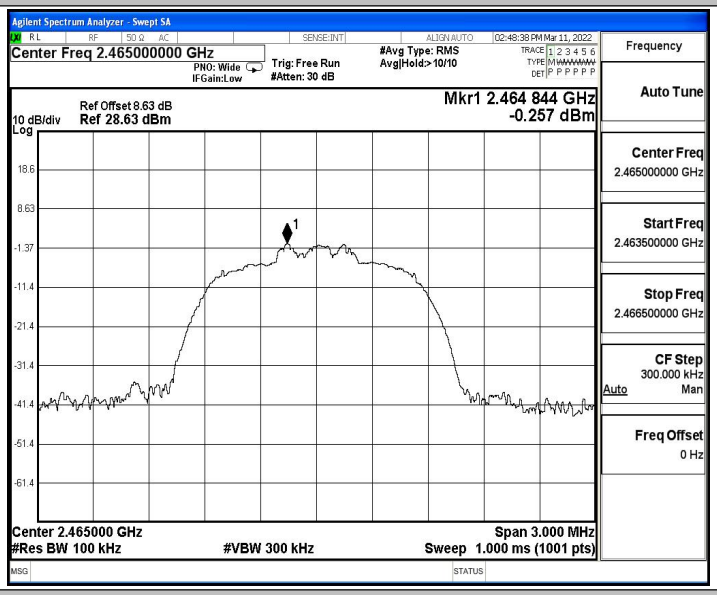
GFSK_Ant1_2445_30~1000



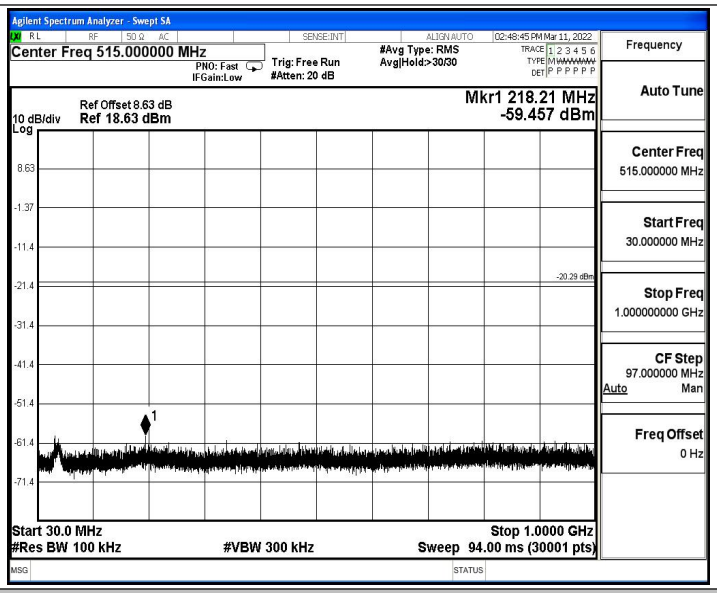
GFSK_Ant1_2445_1000~26500



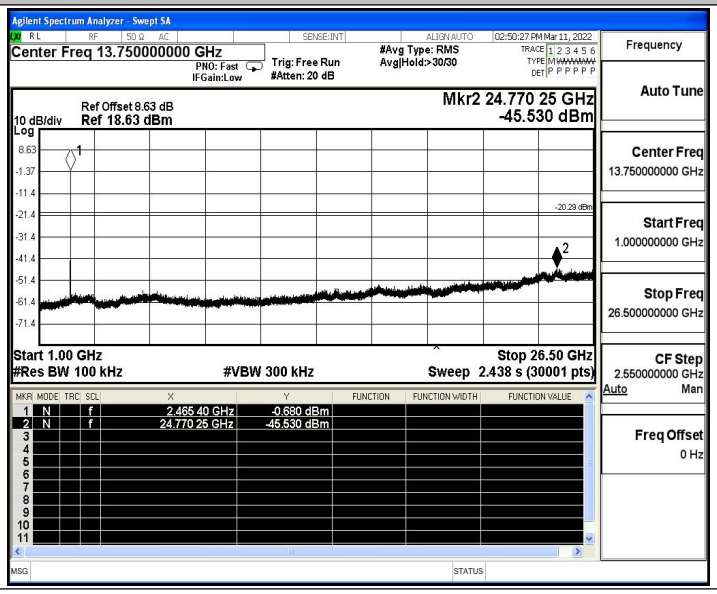
GFSK_Ant1_2465_0~Reference



GFSK_Ant1_2465_30~1000



GFSK_Ant1_2465_1000~26500



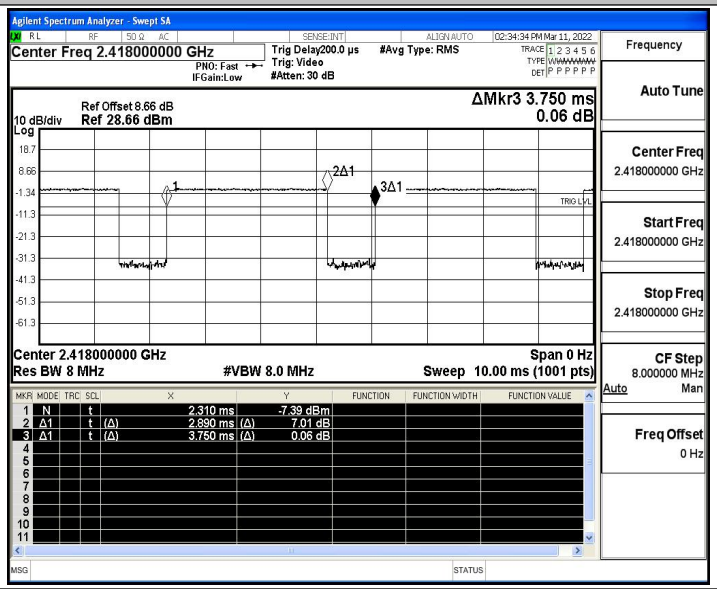
A.6 Duty Cycle

Test Result

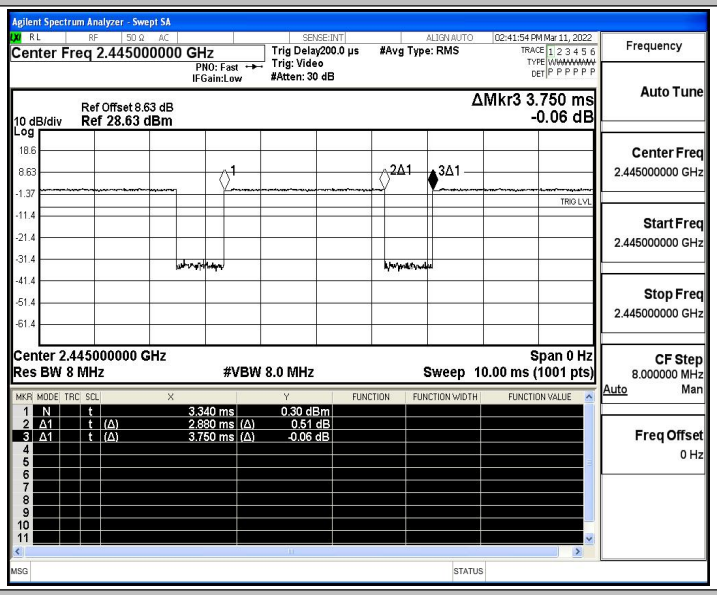
TestMode	Antenna	Channel	ON Time [ms]	Period [ms]	X	DC [%]	xFactor	Minimum VBW(KHz)	Limit	Verdict
GFSK	Ant1	2418	2.89	3.75	0.7707	77.07	1.13	0.35	---	---
		2445	2.88	3.75	0.7680	76.80	1.15	0.35	---	---
		2465	2.89	3.75	0.7707	77.07	1.13	0.35	---	---

Test Graphs

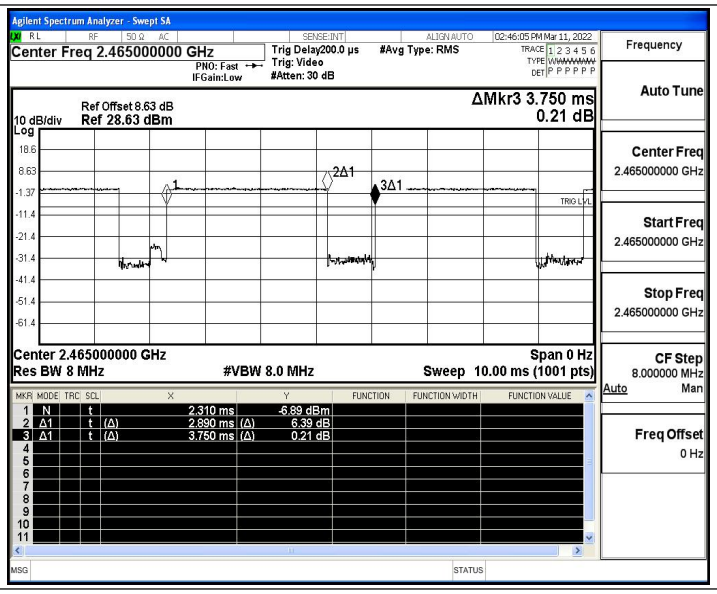
GFSK_Ant1_2418



GFSK_Ant1_2445



GFSK_Ant1_2465


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.465000000 GHz
Trig Delay200.0 µs
Trig: Video
#Atten: 30 dB
#Avg Type: RMS
02:46:05 PM Mar 11, 2022
Ref Offset 8.63 dB
10 dB/div Ref 28.63 dBm
ΔMkr3 3.750 ms
0.21 dB
Center 2.465000000 GHz
Span 0 Hz
Res BW 8 MHz
#VBW 8.0 MHz
Sweep 10.00 ms (1001 pts)
1 N t 2.310 ms -6.89 dBm
2 Δ1 t (Δ) 2.890 ms (Δ) 6.39 dB
3 Δ1 t (Δ) 3.750 ms (Δ) 0.21 dB
Frequency
Auto Tune
Center Freq 2.465000000 GHz
Start Freq 2.465000000 GHz
Stop Freq 2.465000000 GHz
CF Step 8.000000 MHz
Auto Man
Freq Offset 0 Hz

A.7 Emissions in Restricted Bands

Test Result

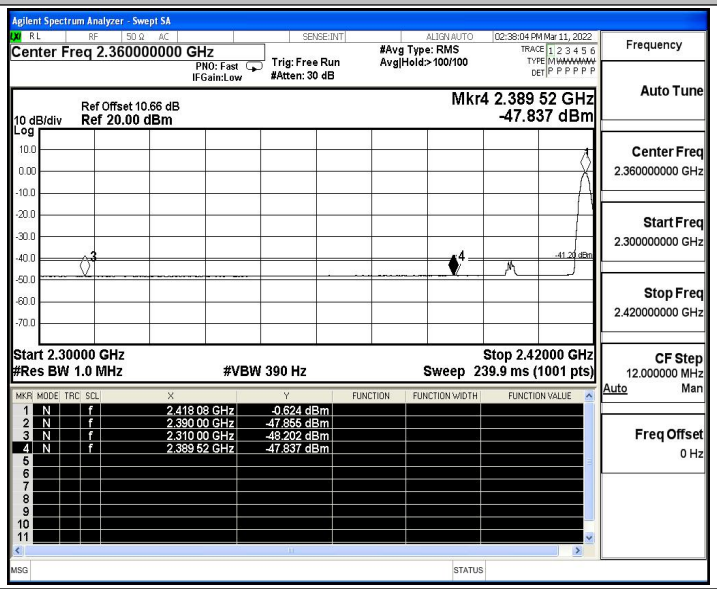
TestMode	Antenna	ChName	Channel	Detector	Freq. [MHz]	Result [dBm]	Limit [dBm]	Result [dBuV/m]	Limit [dBuV/m]	Verdict
GFSK	Ant1	Low	2418	AV	2310.000	-48.2	≤-41.20	47.00	≤54	PASS
				AV	2389.520	-47.84	≤-41.20	47.36	≤54	PASS
				AV	2390.000	-47.86	≤-41.20	47.34	≤54	PASS
				Peak	2310.000	-38.42	≤-21.20	56.78	≤74	PASS
				Peak	2384.840	-37.22	≤-21.20	57.98	≤74	PASS
				Peak	2390.000	-38.62	≤-21.20	56.58	≤74	PASS
		High	2465	AV	2483.500	-47.56	≤-41.20	47.64	≤54	PASS
				AV	2497.980	-47.22	≤-41.20	47.98	≤54	PASS
				AV	2500.000	-47.41	≤-41.20	47.79	≤54	PASS
				Peak	2483.500	-38.05	≤-21.20	57.15	≤74	PASS
				Peak	2497.170	-36.73	≤-21.20	58.47	≤74	PASS
				Peak	2500.000	-38.18	≤-21.20	57.02	≤74	PASS

Note：

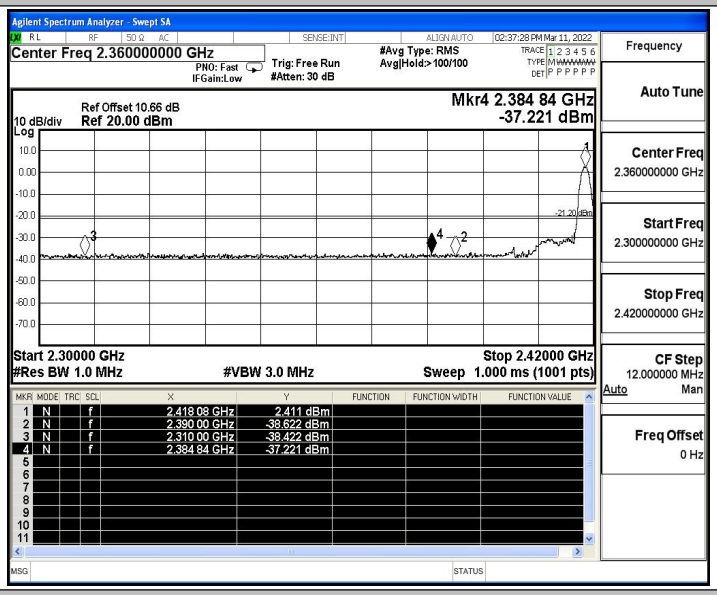
1. The Antenna Gain is compensated in the graph.
2. The limit in dBm for average detector is conversion from 54dBuV/m, according to 15.209(a). The limit in dBm for peak detector is 20dB above the limit of average detector in dBm.

Test Graphs

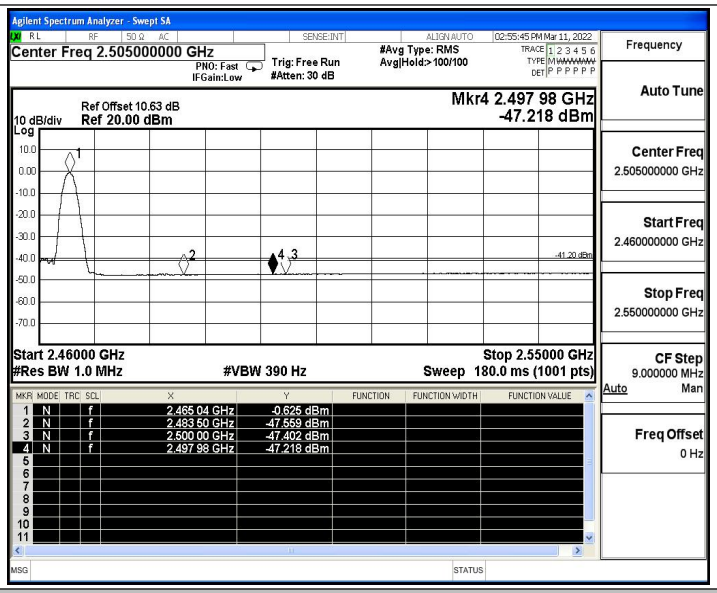
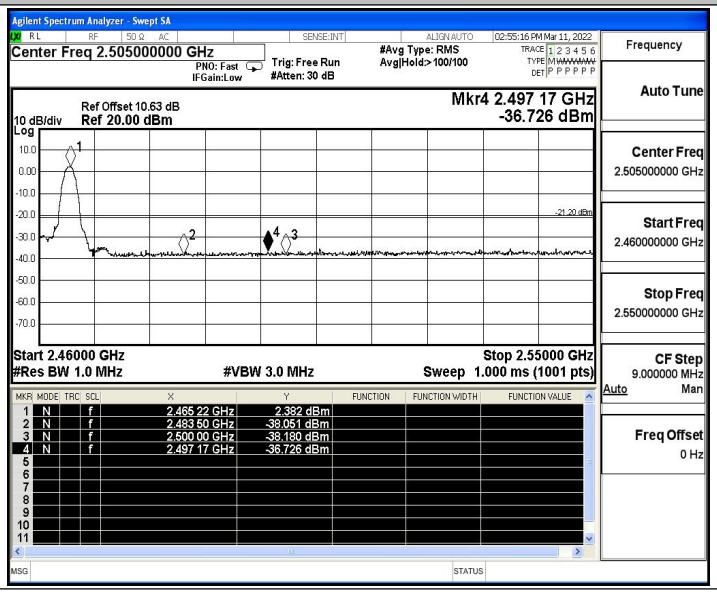
GFSK_Ant1_Low_2418_AV



GFSK_Ant1_Low_2418_Peak



GFSK_Ant1_High_2465_AV



GFSK_Ant1_High_2465_Peak