Appendix A for ZigBee Test Data

Product Name: Tilta Gravity Motorized Lighting Control System (35KG) - Titanium Gray

Test Model: TLA-MCS-L35-TG

Environmental Conditions

Temperature:	22.5° C
Relative Humidity:	53.2%
ATM Pressure:	100.0 kPa
Test Engineer:	Andre Tan
Supervised by:	Nick Peng

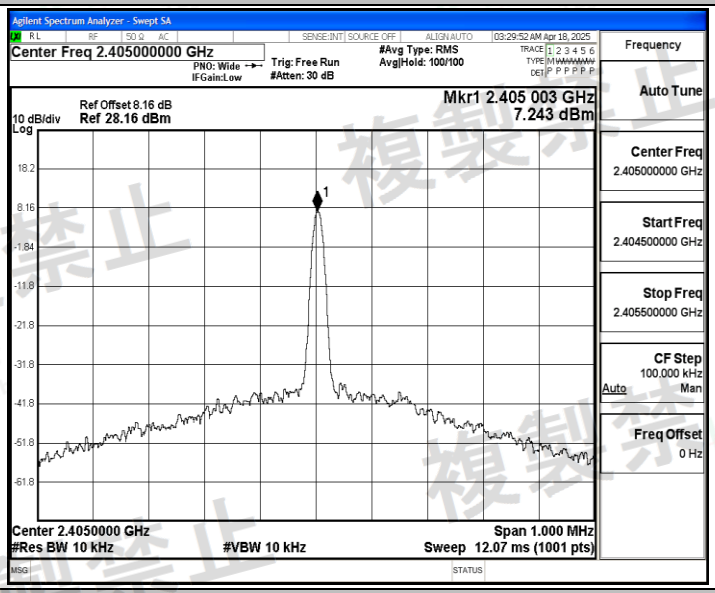
A.1 Frequency Error

Test Result

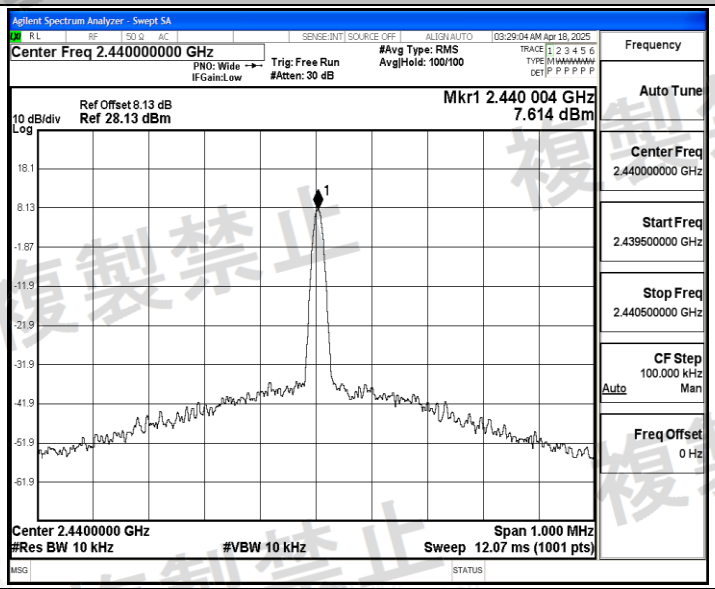
TestCondition	TestMode	Antenna	Frequency [MHz]	Result[ppm]	Limit[ppm]	Verdict
NTNV	Frequency_Error	Ant1	2405	1.24740	±50	PASS
			2440	1.63934	±50	PASS
			2478	1.61421	±50	PASS

Test Graphs

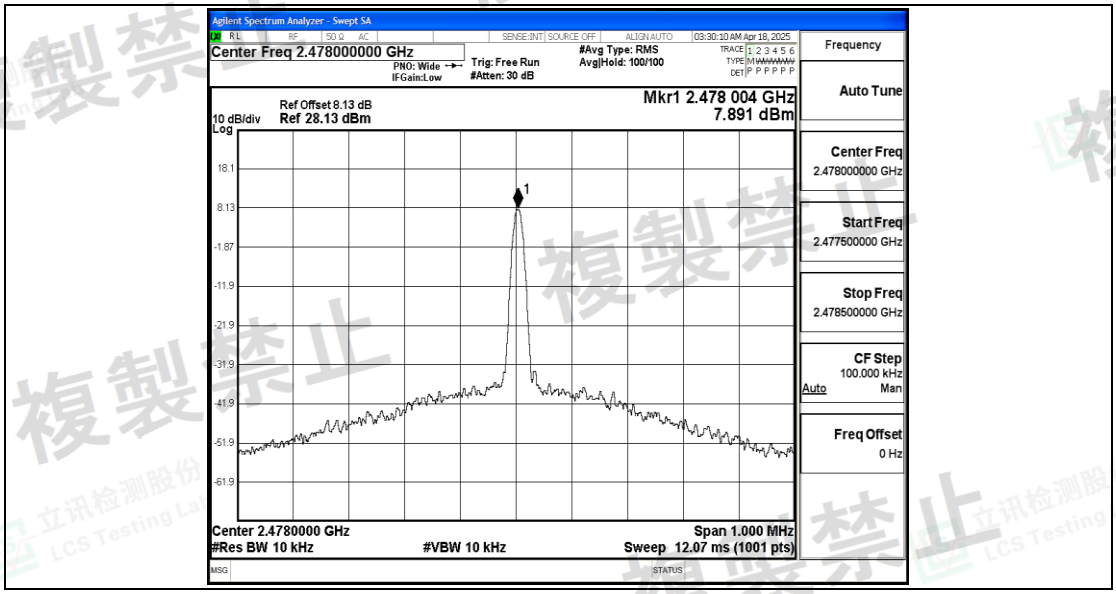
NTNV_Ant1_2405



NTNV_Ant1_2440



NTNV_Ant1_2478


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.478000000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
Avg|Hold: 100/100
03:30:10 AM Apr 18, 2025
Frequency
Ref Offset 8.13 dB
10 dB/div
Ref 28.13 dBm
Log
Mkr1 2.478 004 GHz
7.891 dBm
18.1
8.13
-1.87
-11.9
-21.9
-31.9
-41.9
-51.9
-61.9
Center 2.4780000 GHz
#Res BW 10 kHz
#VBW 10 kHz
Span 1.000 MHz
Sweep 12.07 ms (1001 pts)
Auto Tune
Center Freq
2.478000000 GHz
Start Freq
2.477500000 GHz
Stop Freq
2.478500000 GHz
CF Step
100.000 kHz
Auto
Man
Freq Offset
0 Hz

A.2 Antenna Power

Test Result

Antenna Power							
TestCondition	TestMode	Antenna	Frequency [MHz]	Result (dBm)	Result (mW)	Limit (mW)	Verdict
NTNV	ZigBee	Ant	2405	7.08	5.1050	≤10	PASS
			2440	7.51	5.6364	≤10	PASS
			2480	7.87	6.1235	≤10	PASS

Tolerance								
Test Condition	Test Mode	Antenna	Frequency [MHz]	Power (mW)	RatedPower (mW)	Result (%)	Limit (%)	Verdict
NTNV	ZigBee	Ant	2405	5.1050	7	-27.07	+20	PASS
			2440	5.6364	7	-19.48	+20	PASS
			2480	6.1235	7	-12.52	+20	PASS

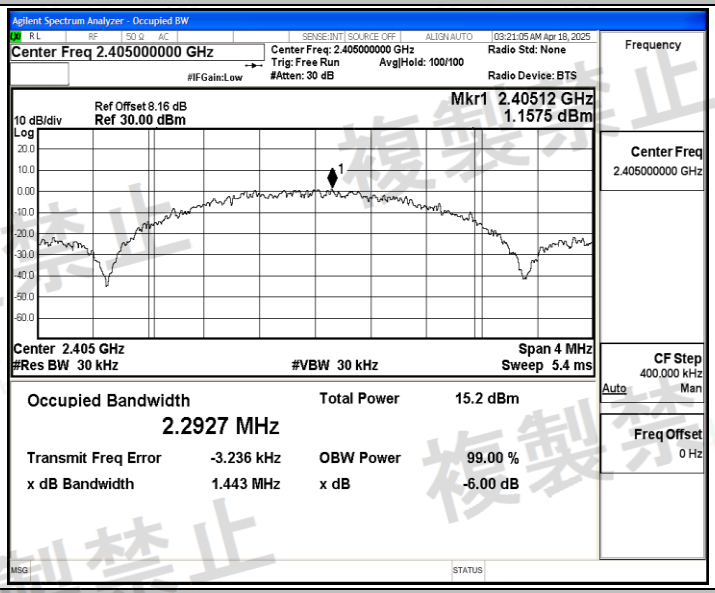
A.3 Occupied Bandwidth

Test Result

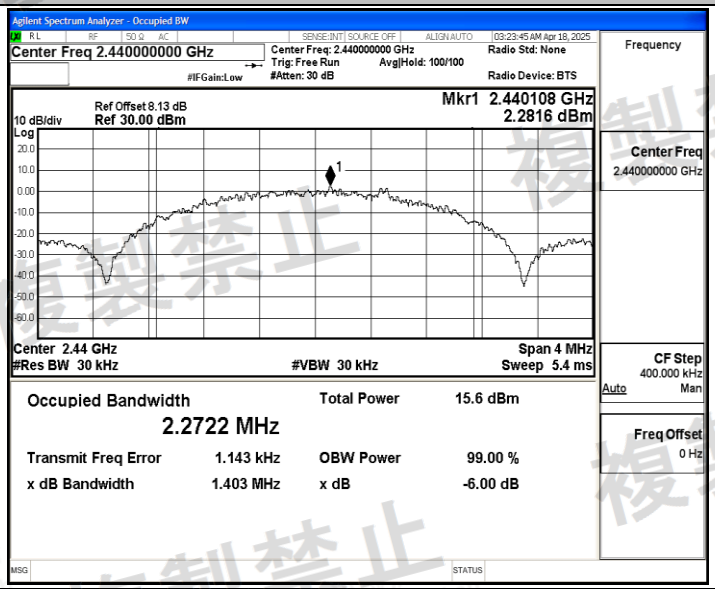
TestCondition	TestMode	Antenna	Frequency [MHz]	Result [MHz]	Limit [MHz]	Verdict
NTNV	ZIGBEE	Ant1	2405	2.293	≤26	PASS
			2440	2.272	≤26	PASS
			2478	2.292	≤26	PASS

Test Graphs

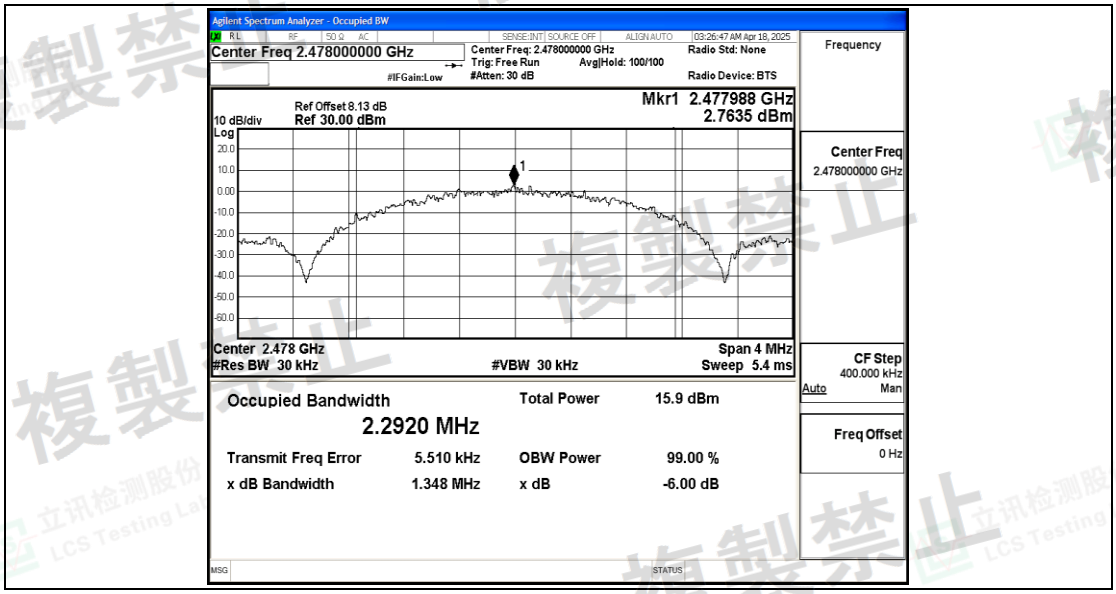
NTNV_ZIGBEE_Ant1_2405



NTNV_ZIGBEE_Ant1_2440



NTNV_ZIGBEE_Ant1_2478


Agilent Spectrum Analyzer - Occupied BW
Center Freq 2.478000000 GHz
Center Freq: 2.478000000 GHz
Trig: Free Run
Avg|Hold: 100/100
#Atten: 30 dB
#IFGain:Low
Radio Std: None
Radio Device: BTS
03:26:47 AM Apr 18, 2025
Frequency
Ref Offset 8.13 dB
10 dB/div
Ref 30.00 dBm
Log
Mkr1 2.477988 GHz
2.7635 dBm
Center Freq
2.478000000 GHz
Center 2.478 GHz
#Res BW 30 kHz
#VBW 30 kHz
Span 4 MHz
Sweep 5.4 ms
CF Step
400.000 kHz
Auto
Man
Freq Offset
0 Hz
Occupied Bandwidth
2.2920 MHz
Total Power 15.9 dBm
Transmit Freq Error 5.510 kHz
OBW Power 99.00 %
x dB Bandwidth 1.348 MHz
x dB -6.00 dB
MSG
STATUS

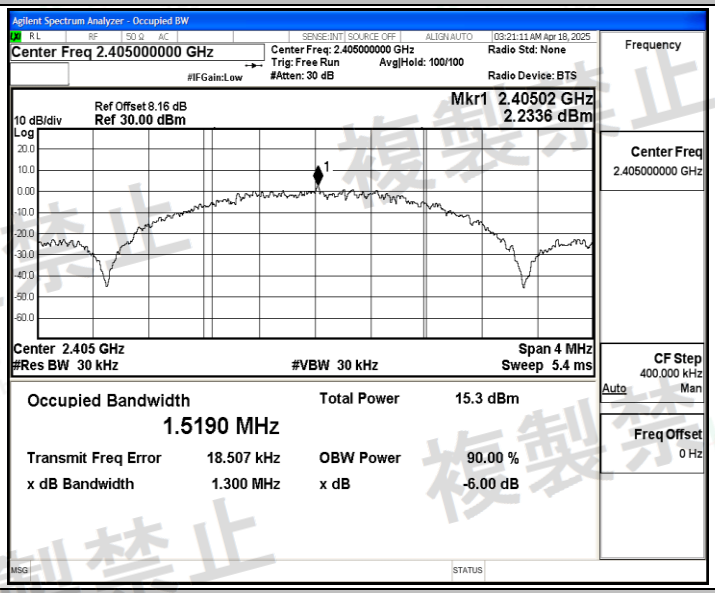
A.4 Spread Bandwidth

Test Result

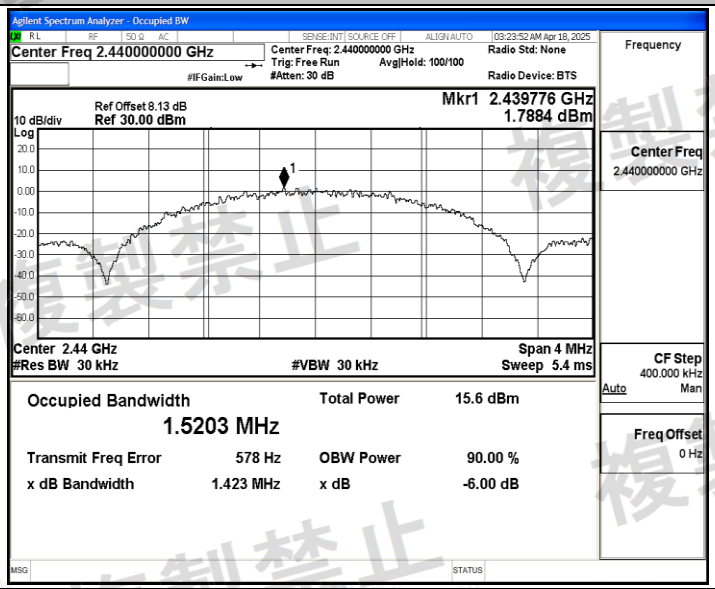
TestCondition	TestMode	Antenna	Frequency [MHz]	Result [MHz]	Limit [MHz]	Verdict
NTNV	ZIGBEE	Ant1	2405	1.519	≥0.5	PASS
			2440	1.520	≥0.5	PASS
			2478	1.542	≥0.5	PASS

Test Graphs

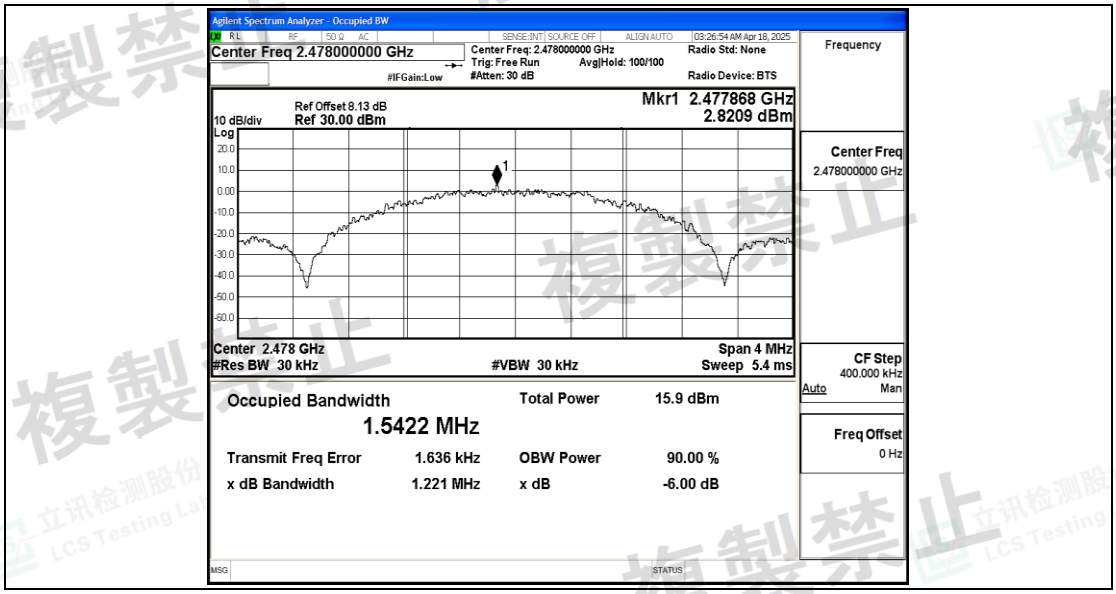
NTNV_ZIGBEE_Ant1_2405



NTNV_ZIGBEE_Ant1_2440



NTNV_ZIGBEE_Ant1_2478


Agilent Spectrum Analyzer - Occupied BW
Center Freq 2.478000000 GHz
Center Freq: 2.478000000 GHz
Trig: Free Run
Avg|Hold: 100/100
#Atten: 30 dB
Radio Std: None
Radio Device: BTS
Frequency
Ref Offset 8.13 dB
10 dB/div
Ref 30.00 dBm
Log
Mkr1 2.477868 GHz
2.8209 dBm
Center Freq
2.478000000 GHz
Center 2.478 GHz
#Res BW 30 kHz
#VBW 30 kHz
Span 4 MHz
Sweep 5.4 ms
CF Step
400.000 kHz
Auto
Man
Freq Offset
0 Hz
Occupied Bandwidth
1.5422 MHz
Total Power 15.9 dBm
Transmit Freq Error 1.636 kHz
OBW Power 90.00 %
x dB Bandwidth 1.221 MHz
x dB -6.00 dB
MSG
STATUS

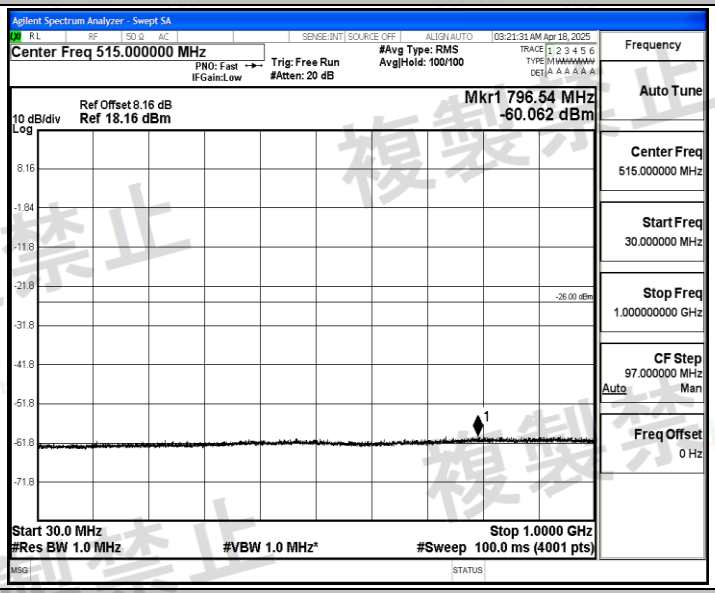
A.5 Spurious Emission of TX

Test Result

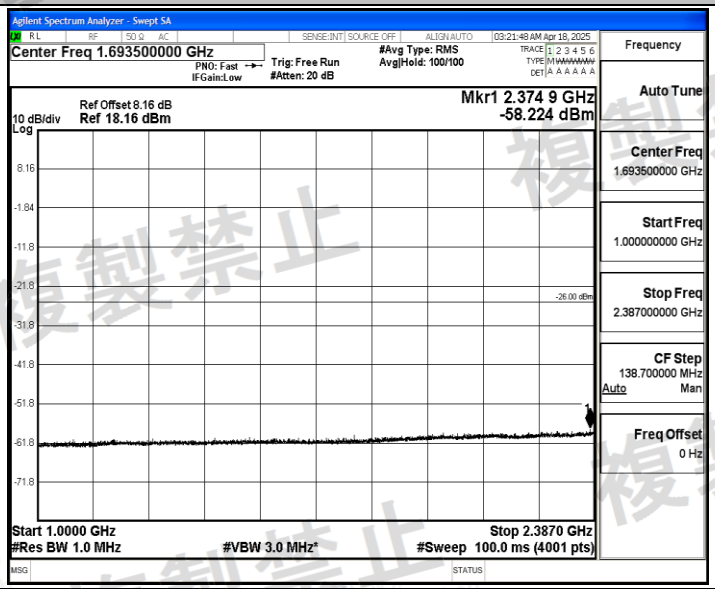
TestCondition	TestMode	Antenna	Frequency [MHz]	Freq.Range [MHz]	Result [dBm]	Limit [dBm]	Result [μW]	Limit [μW]	Verdict
NTNV	ZIGBEE	Ant1	2405	30~1000	-60.06	≤-26	0.00099	≤2.5	PASS
				1000~2387	-58.22	≤-26	0.00151	≤2.5	PASS
				2387~2400	-36.41	≤-16	0.22856	≤25	PASS
				2483.5~2496.5	-49.36	≤-16	0.01159	≤25	PASS
				2496.5~13000	-52.09	≤-26	0.00618	≤2.5	PASS
			2440	30~1000	-59.90	≤-26	0.00102	≤2.5	PASS
				1000~2387	-58.90	≤-26	0.00129	≤2.5	PASS
				2387~2400	-49.54	≤-16	0.01112	≤25	PASS
				2483.5~2496.5	-49.35	≤-16	0.01161	≤25	PASS
				2496.5~13000	-51.93	≤-26	0.00641	≤2.5	PASS
			2478	30~1000	-60.06	≤-26	0.00099	≤2.5	PASS
				1000~2387	-58.62	≤-26	0.00137	≤2.5	PASS
				2387~2400	-49.67	≤-16	0.01079	≤25	PASS
				2483.5~2496.5	-37.59	≤-16	0.17418	≤25	PASS
				2496.5~13000	-50.60	≤-26	0.00871	≤2.5	PASS

Test Graphs

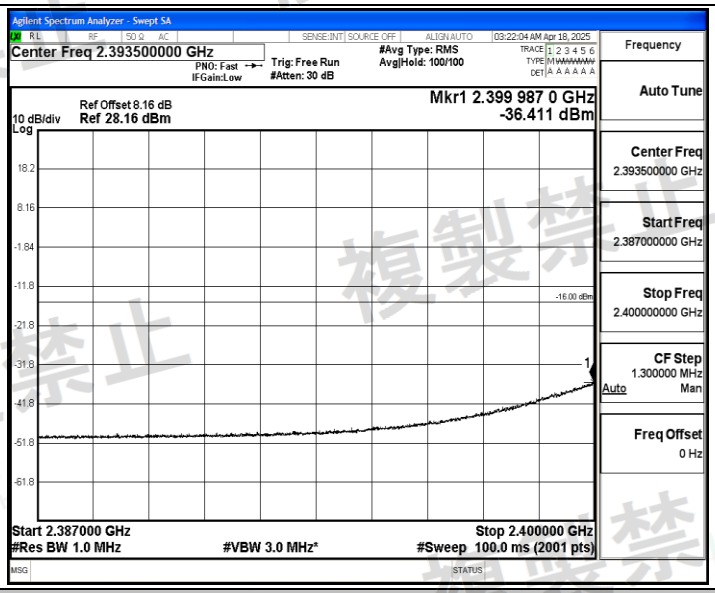
NTNV_ZIGBEE_Ant1_2405_30~1000



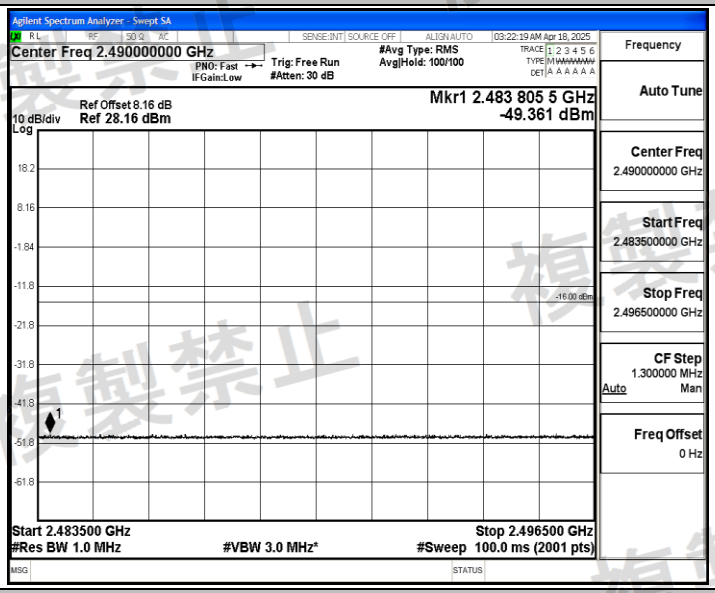
NTNV_ZIGBEE_Ant1_2405_1000~2387



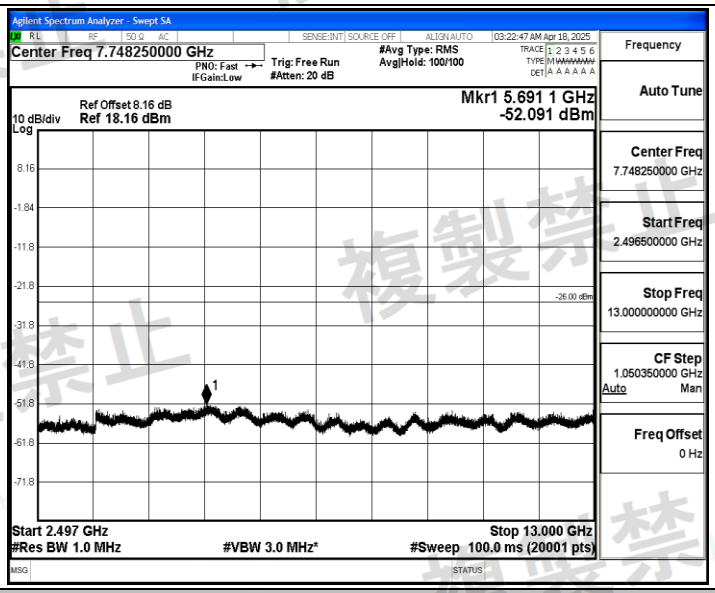
NTNV_ZIGBEE_Ant1_2405_2387~2400



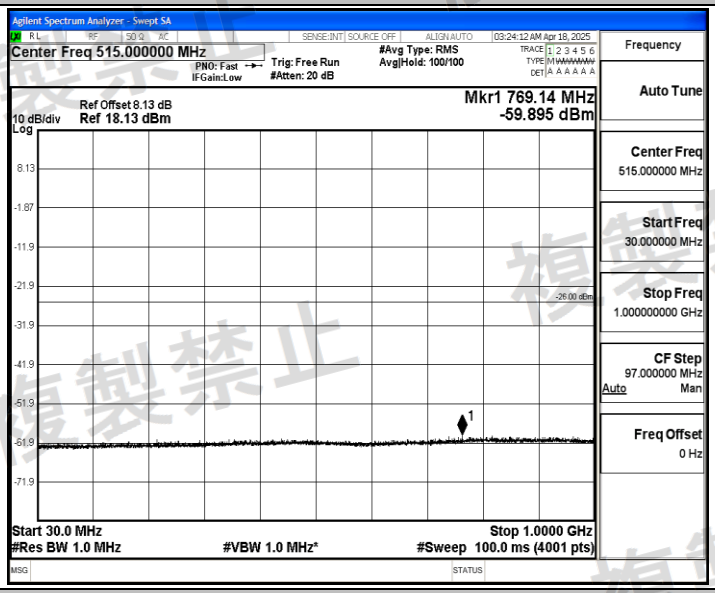
NTNV_ZIGBEE_Ant1_2405_2483.5~2496.5



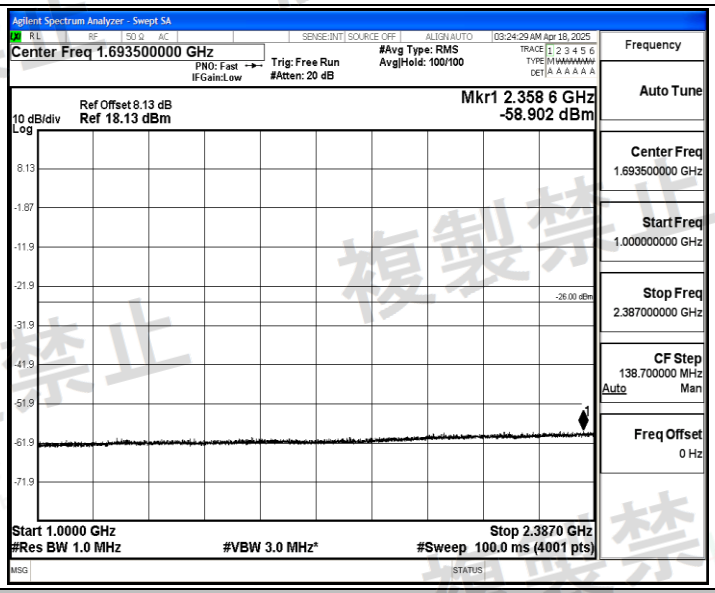
NTNV_ZIGBEE_Ant1_2405_2496.5~13000



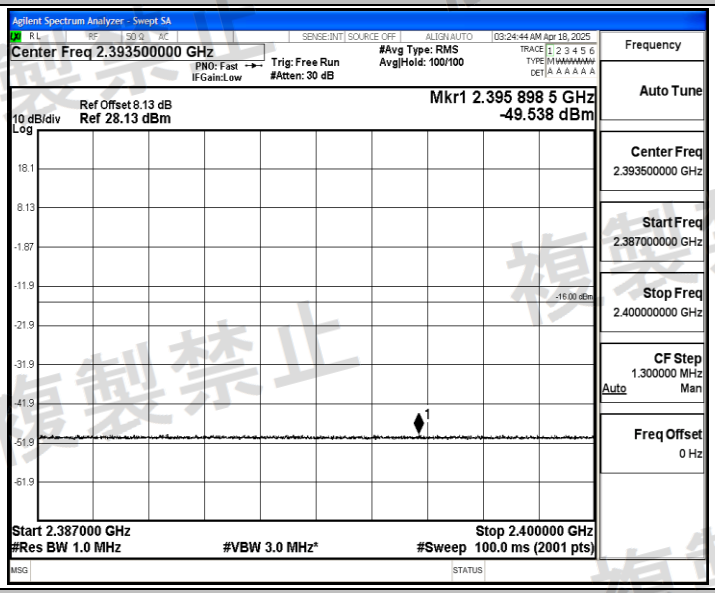
NTNV_ZIGBEE_Ant1_2440_30~1000



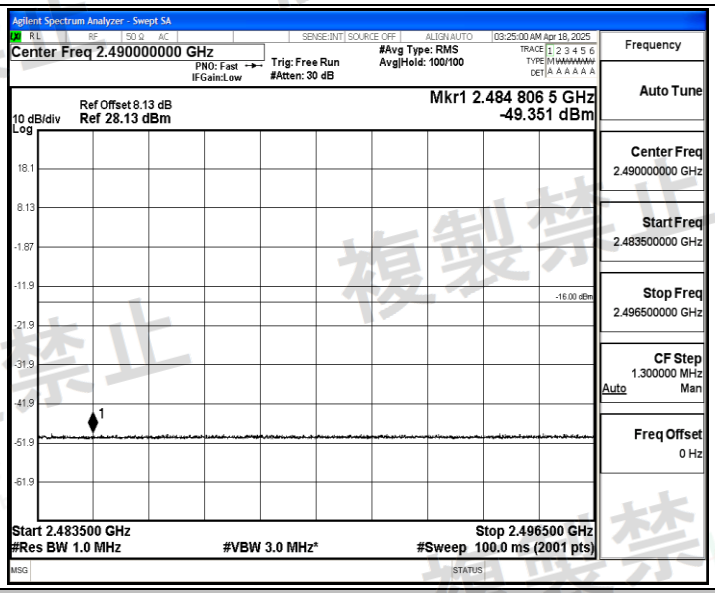
NTNV_ZIGBEE_Ant1_2440_1000~2387



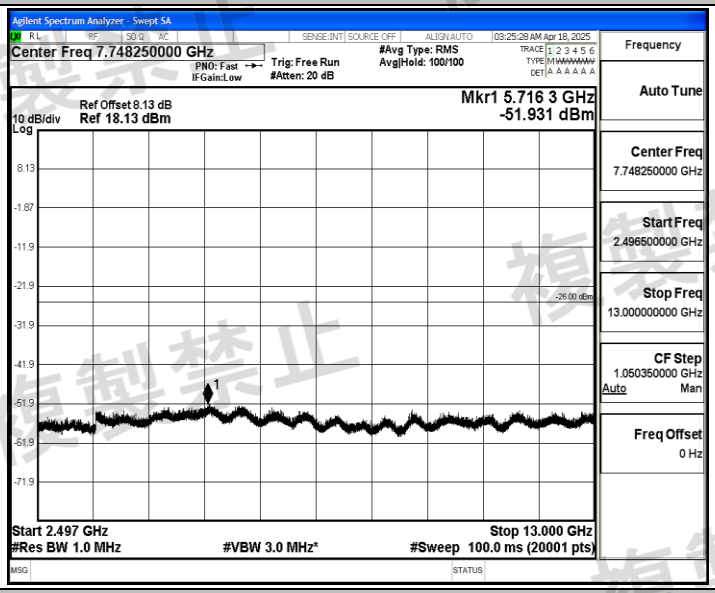
NTNV_ZIGBEE_Ant1_2440_2387~2400



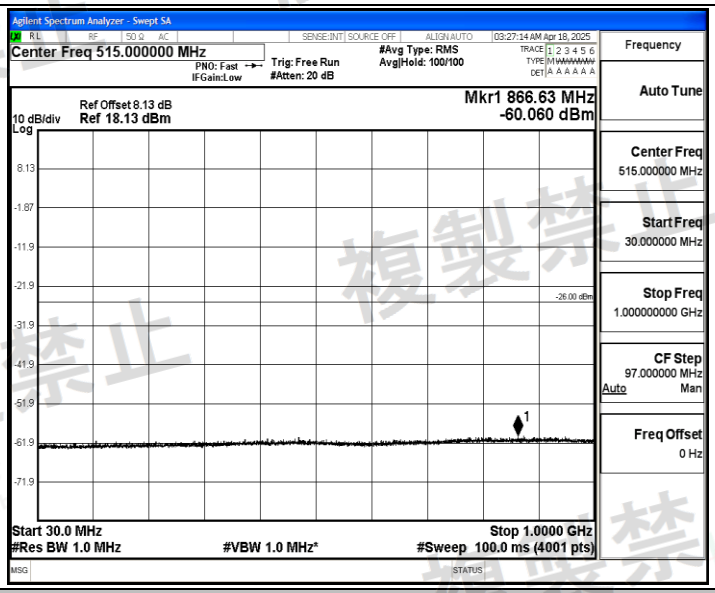
NTNV_ZIGBEE_Ant1_2440_2483.5~2496.5



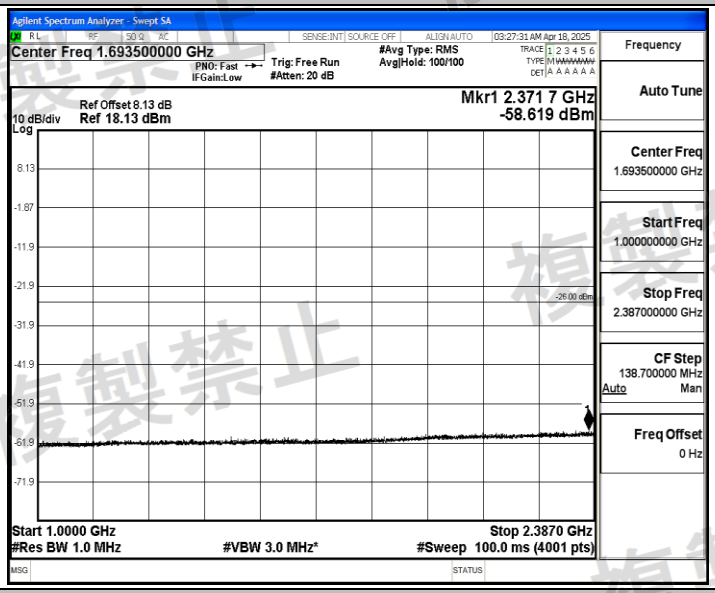
NTNV_ZIGBEE_Ant1_2440_2496.5~13000



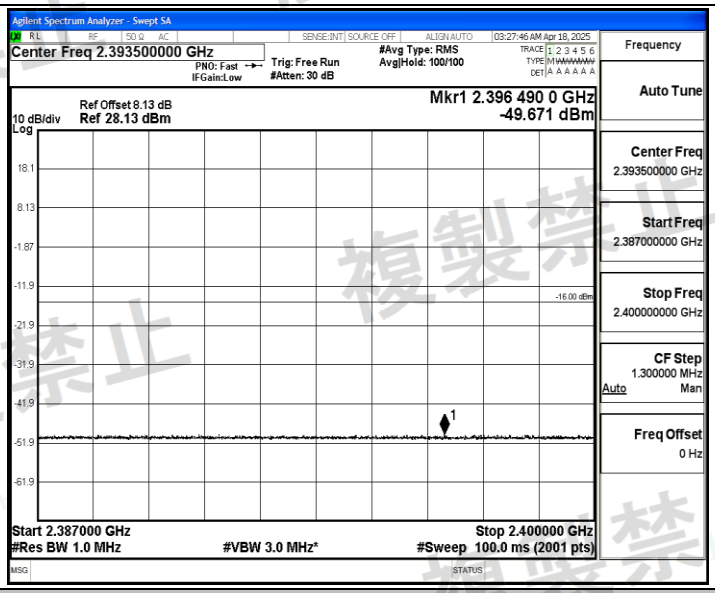
NTNV_ZIGBEE_Ant1_2478_30~1000



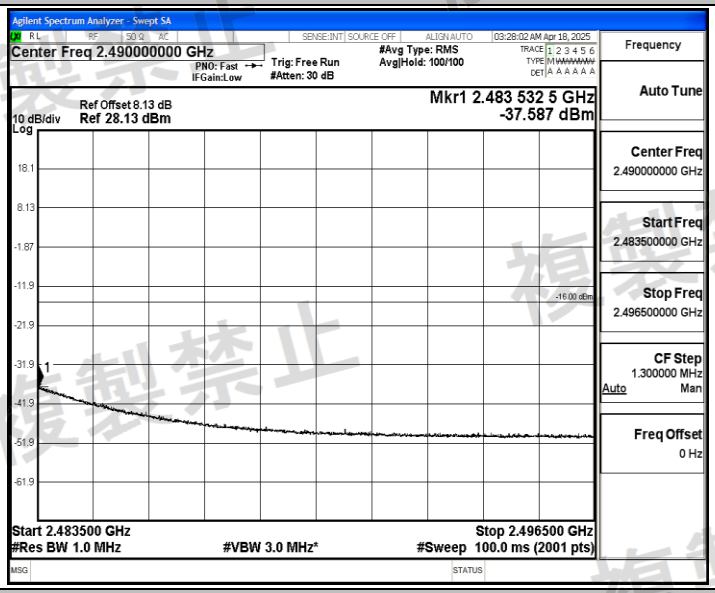
NTNV_ZIGBEE_Ant1_2478_1000~2387



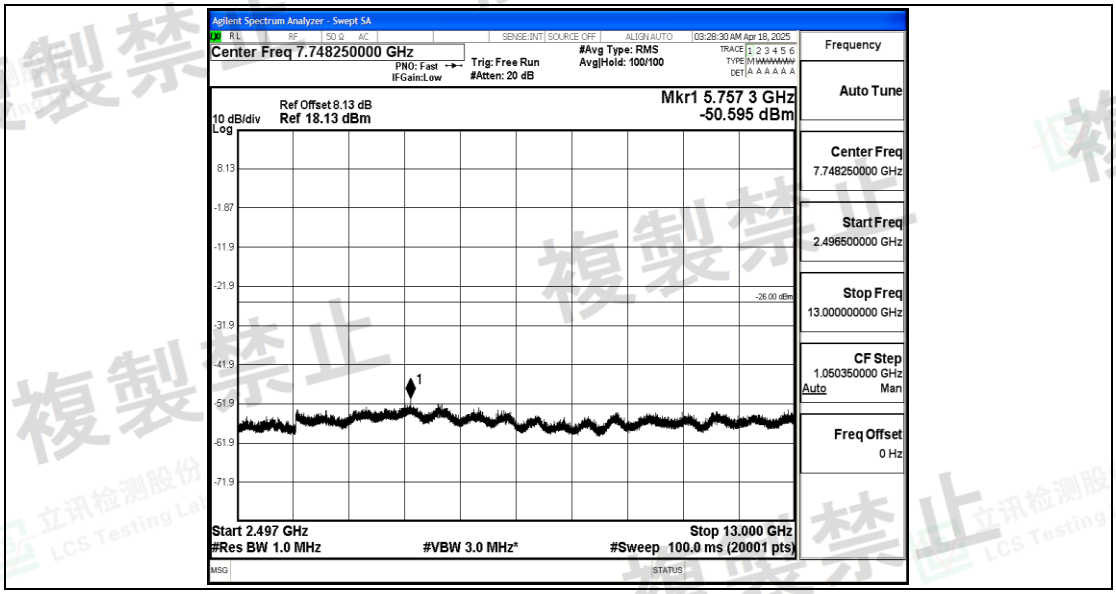
NTNV_ZIGBEE_Ant1_2478_2387~2400



NTNV_ZIGBEE_Ant1_2478_2483.5~2496.5



NTNV_ZIGBEE_Ant1_2478_2496.5~13000


Agilent Spectrum Analyzer - Swept SA
Center Freq 7.748250000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
#Avg Type: RMS
Avg|Hold: 100/100
03:28:30 AM Apr 18, 2025
Ref Offset 8.13 dB
10 dB/div Ref 18.13 dBm
Log
Mkr1 5.757 3 GHz
-50.595 dBm
-26.00 dBm
Start 2.497 GHz
#Res BW 1.0 MHz
#VBW 3.0 MHz*
Stop 13.000 GHz
#Sweep 100.0 ms (20001 pts)
Frequency
Auto Tune
Center Freq
7.748250000 GHz
Start Freq
2.496500000 GHz
Stop Freq
13.000000000 GHz
CF Step
1.050350000 GHz
Auto
Man
Freq Offset
0 Hz

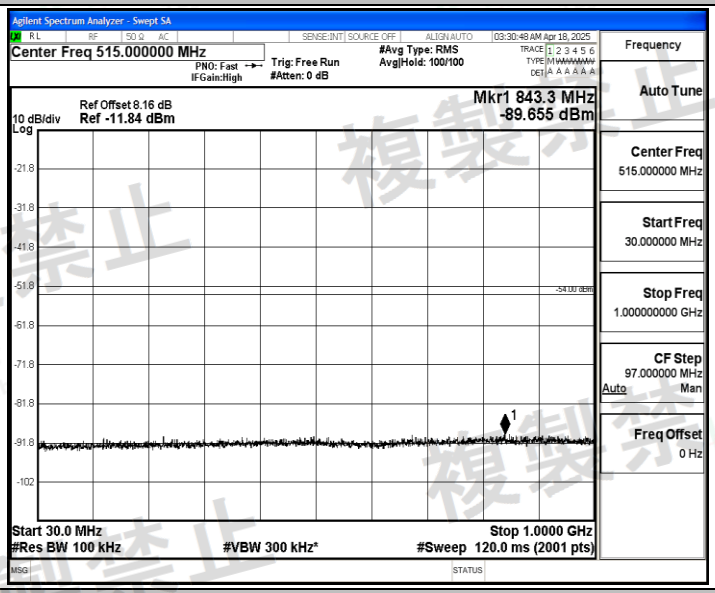
A.6 Spurious Emission of RX

Test Result

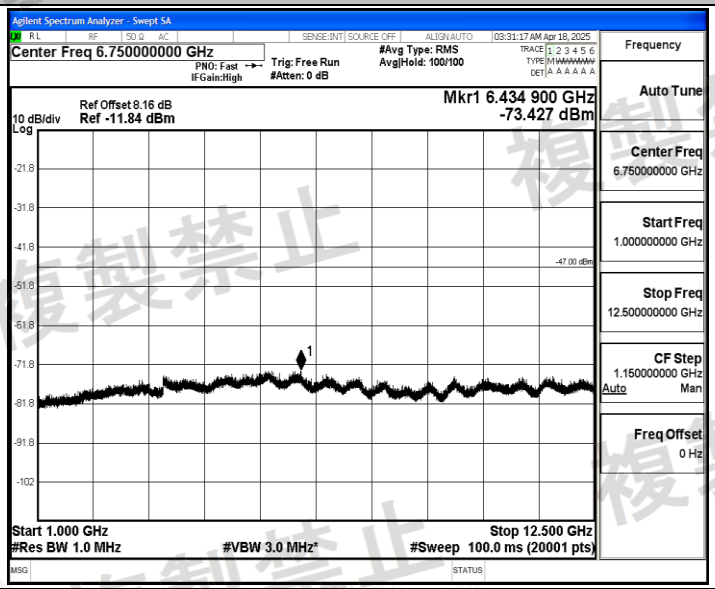
TestCondition	TestMode	Antenna	Frequency [MHz]	Freq.Range [MHz]	Result [dBm]	Limit [dBm]	Result [nW]	Limit [nW]	Verdict
NTNV	ZIGBEE	Ant1	2405	30~1000	-89.66	≤-54	0.00108	≤4	PASS
				1000~12500	-73.43	≤-47	0.04539	≤20	PASS
			2440	30~1000	-89.62	≤-54	0.00109	≤4	PASS
				1000~12500	-73.04	≤-47	0.04966	≤20	PASS
			2478	30~1000	-89.23	≤-54	0.00119	≤4	PASS
				1000~12500	-72.63	≤-47	0.05458	≤20	PASS

Test Graphs

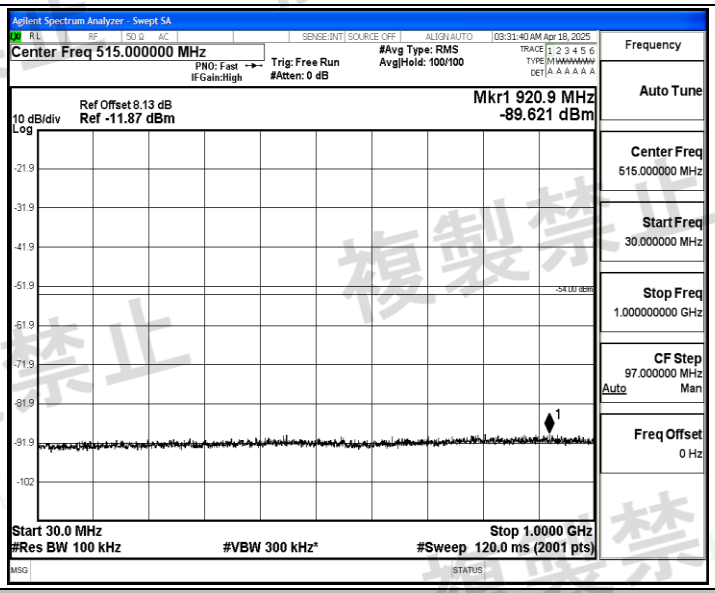
NTNV_ZIGBEE_Ant1_2405_30~1000



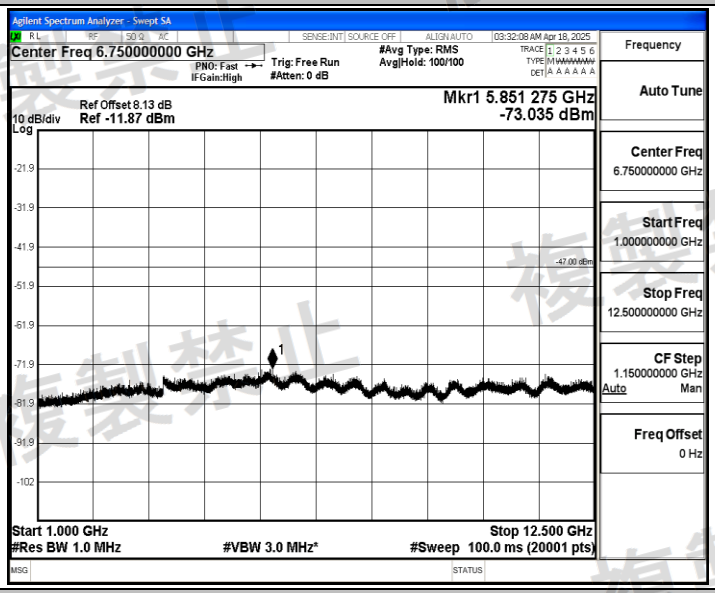
NTNV_ZIGBEE_Ant1_2405_1000~12500



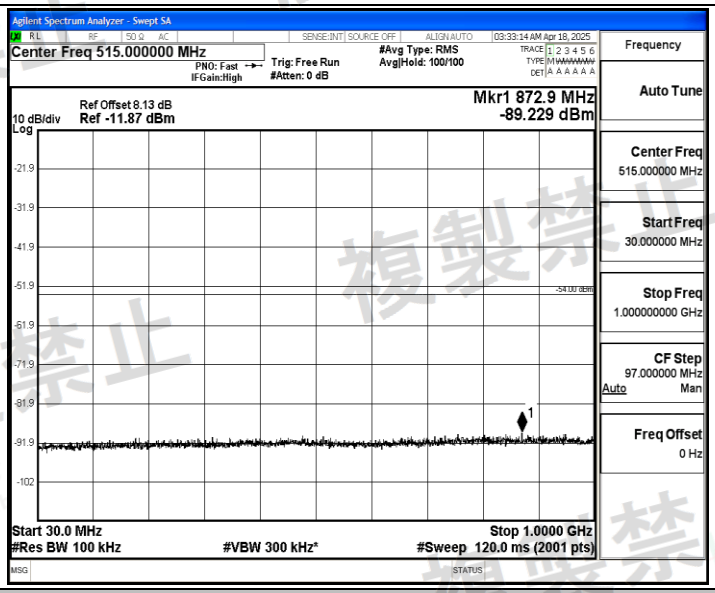
NTNV_ZIGBEE_Ant1_2440_30~1000



NTNV_ZIGBEE_Ant1_2440_1000~12500



NTNV_ZIGBEE_Ant1_2478_30~1000



NTNV_ZIGBEE_Ant1_2478_1000~12500

