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Annex for Bluetooth Low Energy

Test Report No.: CTL2411217041-WR01

TABLE OF CONTENTS

1. RF Output Power, Duty Cycle, Tx-sequence, Tx-gap, Medium Utilization

1.1 Test Result

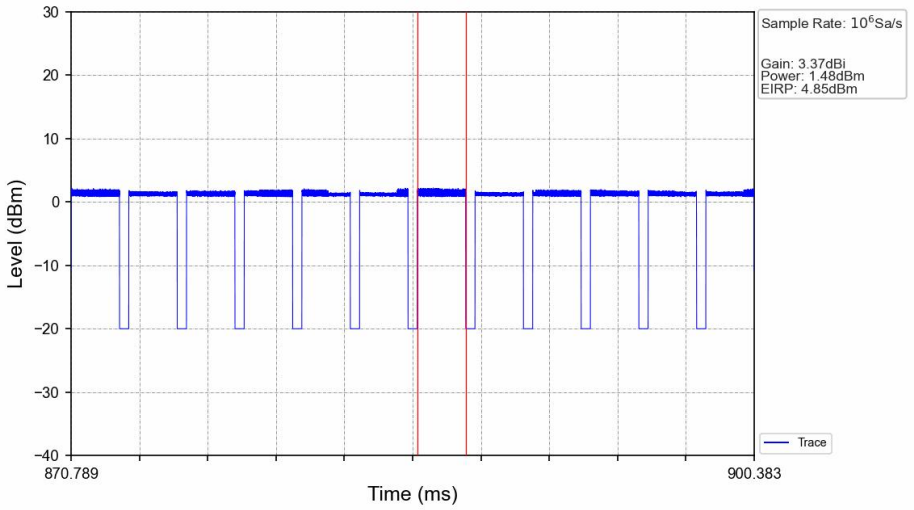
1.1.1 Power

ENV	Mode	TX Type	Frequency (MHz)	ANT	Gain (dBi)	Power (dBm)	EIRP (dBm)	Limit (dBm)	Verdict
NTNV	1M	SISO	2402	1	3.37	1.48	4.85	<=20	Pass
			2440	1	3.37	-0.89	2.48	<=20	Pass
			2480	1	3.37	-2.12	1.25	<=20	Pass
	2M	SISO	2402	1	3.37	1.73	5.10	<=20	Pass
			2440	1	3.37	-0.67	2.70	<=20	Pass
			2480	1	3.37	-1.78	1.59	<=20	Pass
HTNV	1M	SISO	2402	1	3.37	1.49	4.86	<=20	Pass
			2440	1	3.37	-0.91	2.46	<=20	Pass
			2480	1	3.37	-2.10	1.27	<=20	Pass
	2M	SISO	2402	1	3.37	1.73	5.10	<=20	Pass
			2440	1	3.37	-0.67	2.70	<=20	Pass
			2480	1	3.37	-1.75	1.62	<=20	Pass
LTNV	1M	SISO	2402	1	3.37	1.48	4.85	<=20	Pass
			2440	1	3.37	-0.92	2.45	<=20	Pass
			2480	1	3.37	-2.11	1.26	<=20	Pass
	2M	SISO	2402	1	3.37	1.74	5.11	<=20	Pass
			2440	1	3.37	-0.66	2.71	<=20	Pass
			2480	1	3.37	-1.76	1.61	<=20	Pass
Note1: E.I.R.P = Measured Power + Antenna Gain									

1.2 Test Graph

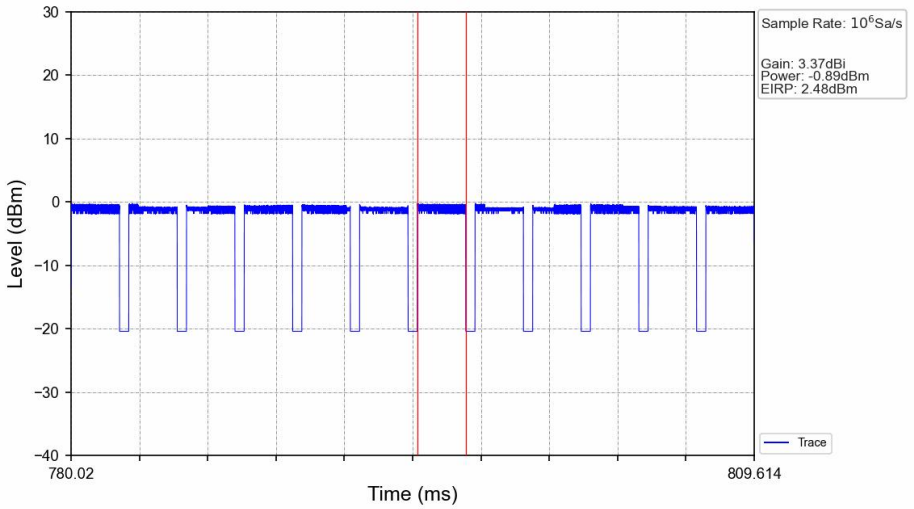
1.2.1 Power

1M_2402MHz_Ant1_NTNV



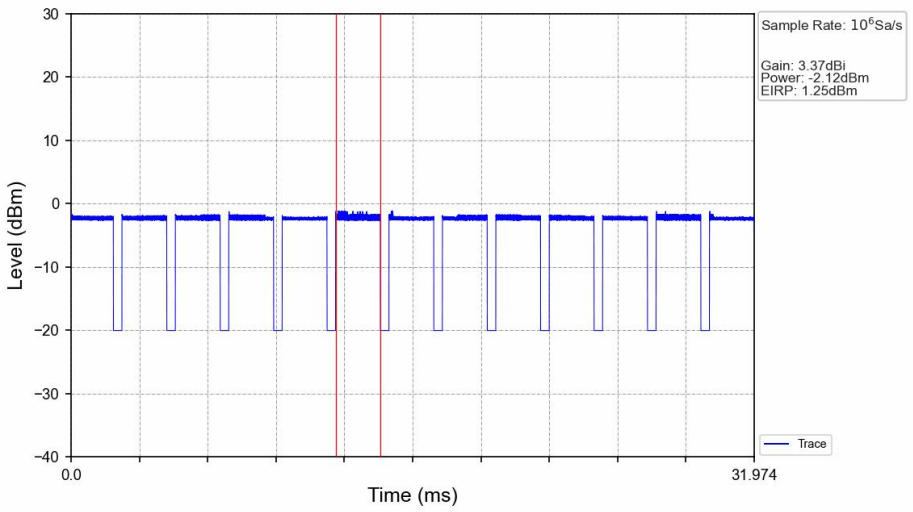
Burst No.	1	2	3	4	5	6	**7**	8	9	10	11	12
Length (ms)	2.098	2.097	2.097	2.098	2.097	2.097	**2.098**	2.097	2.097	2.098	2.097	2.097
Power (dBm)	1.45	1.29	1.33	1.40	1.32	1.27	**1.48**	1.23	1.40	1.37	1.31	1.32
Remark	/	/	/	/	/	/	**Max**	/	/	/	/	/

1M_2440MHz_Ant1_NTNV



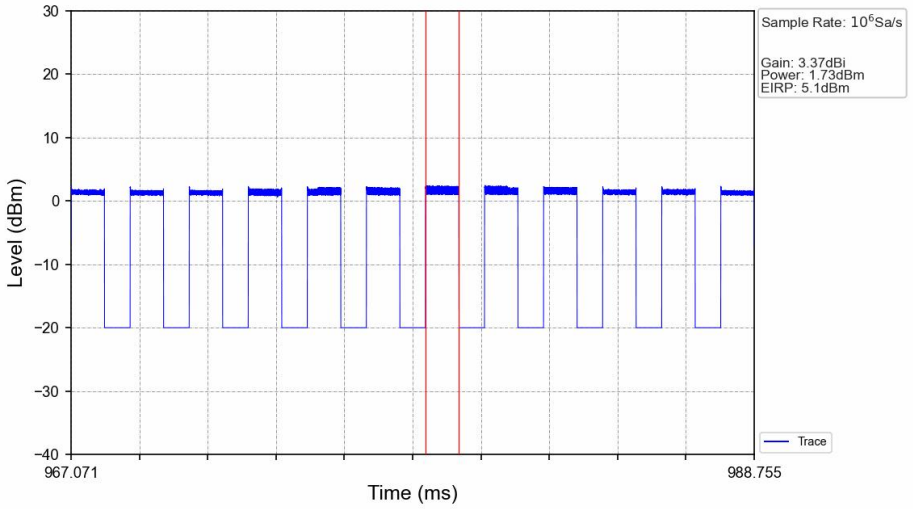
Burst No.	1	2	3	4	5	6	**7**	8	9	10	11	12
Length (ms)	2.098	2.097	2.097	2.098	2.097	2.097	**2.098**	2.097	2.097	2.097	2.097	2.097
Power (dBm)	-0.91	-1.06	-1.06	-0.99	-0.99	-1.12	**-0.89**	-1.09	-1.03	-0.97	-1.05	-1.07
Remark	/	/	/	/	/	/	**Max**	/	/	/	/	/

1M_2480MHz_Ant1_NTNV



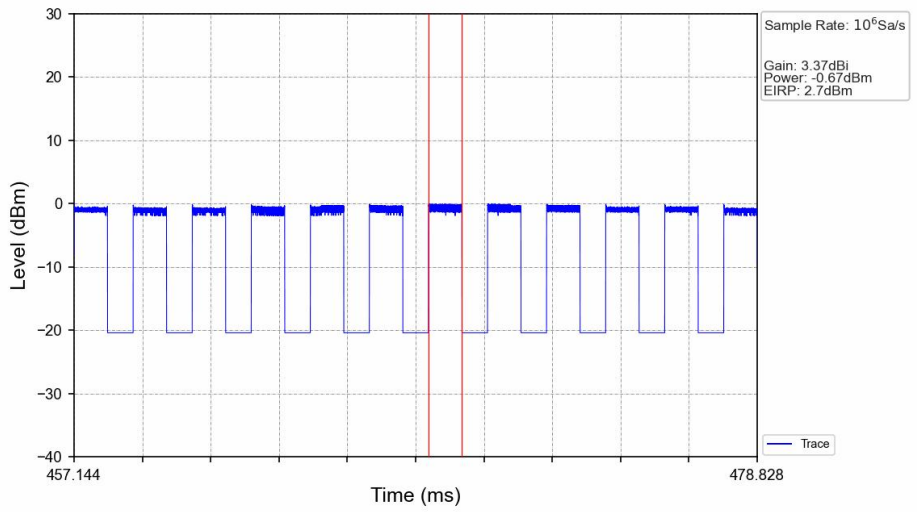
Burst No.	1	2	3	4	**5**	6	7	8	9	10	11	12
Length (ms)	2.097	2.097	2.097	2.097	**2.098**	2.097	2.097	2.096	2.097	2.097	2.098	2.097
Power (dBm)	-2.26	-2.21	-2.21	-2.34	**-2.12**	-2.31	-2.24	-2.19	-2.25	-2.29	-2.14	-2.33
Remark	/	/	/	/	**Max**	/	/	/	/	/	/	/

2M_2402MHz_Ant1_NTNV



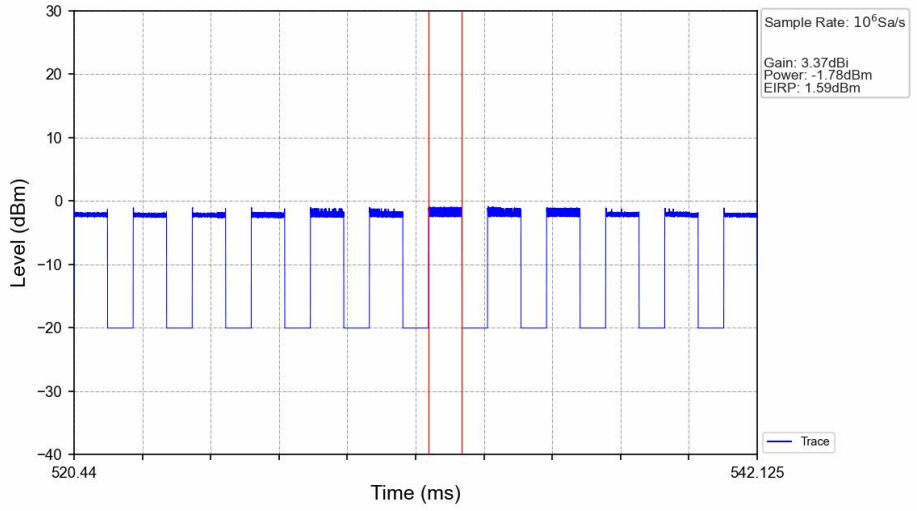
Burst No.	1	2	3	4	5	6	**7**	8	9	10	11	12
Length (ms)	1.062	1.061	1.061	1.062	1.062	1.062	**1.061**	1.061	1.063	1.061	1.061	1.062
Power (dBm)	1.40	1.31	1.31	1.39	1.50	1.53	**1.73**	1.67	1.60	1.44	1.46	1.30
Remark	/	/	/	/	/	/	**Max**	/	/	/	/	/

2M_2440MHz_Ant1_NTNV



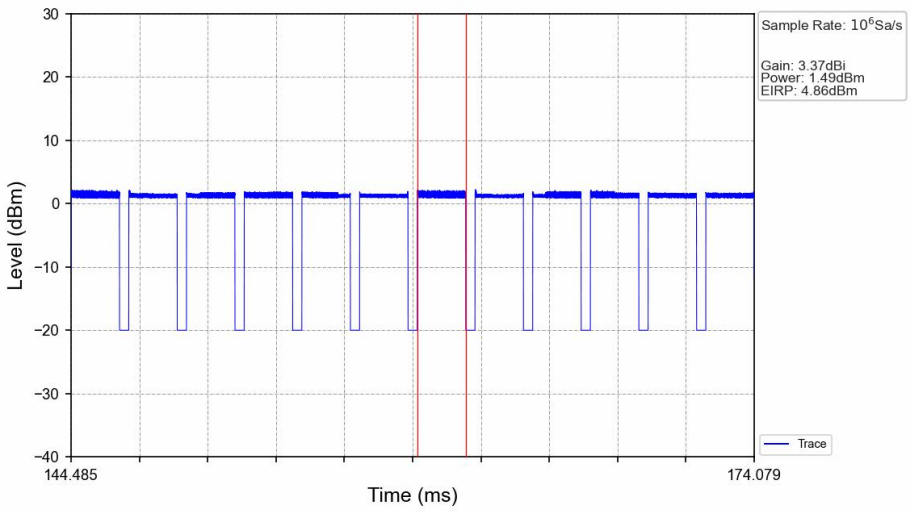
Burst No.	1	2	3	4	5	6	**7**	8	9	10	11	12
Length (ms)	1.062	1.061	1.061	1.062	1.061	1.061	**1.061**	1.061	1.063	1.061	1.061	1.062
Power (dBm)	-0.94	-1.05	-1.04	-0.99	-0.87	-0.82	**-0.67**	-0.70	-0.75	-0.90	-0.88	-1.06
Remark	/	/	/	/	/	/	**Max**	/	/	/	/	/

2M_2480MHz_Ant1_NTNV



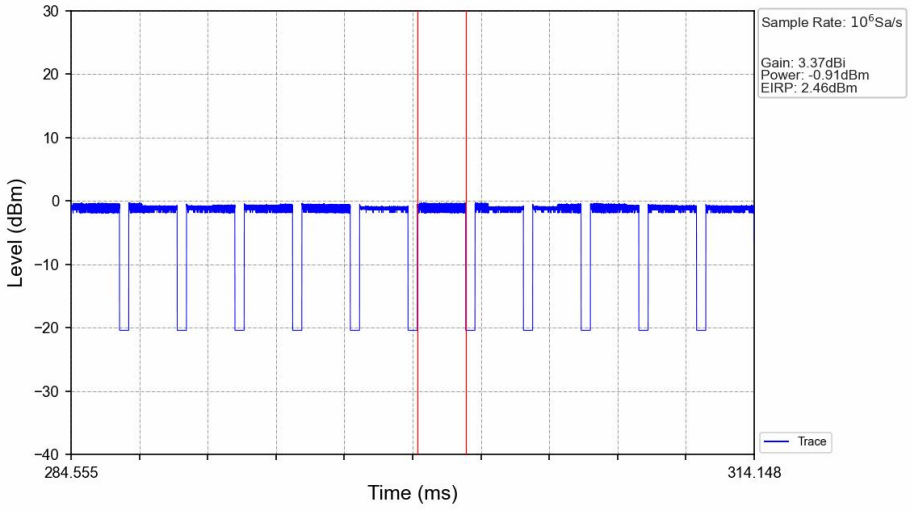
Burst No.	1	2	3	4	5	6	**7**	8	9	10	11	12
Length (ms)	1.063	1.061	1.061	1.062	1.061	1.061	**1.061**	1.061	1.063	1.061	1.061	1.062
Power (dBm)	-2.13	-2.22	-2.20	-2.18	-2.04	-2.05	**-1.78**	-1.87	-1.89	-2.09	-2.11	-2.21
Remark	/	/	/	/	/	/	**Max**	/	/	/	/	/

1M_2402MHz_Ant1_HTNV



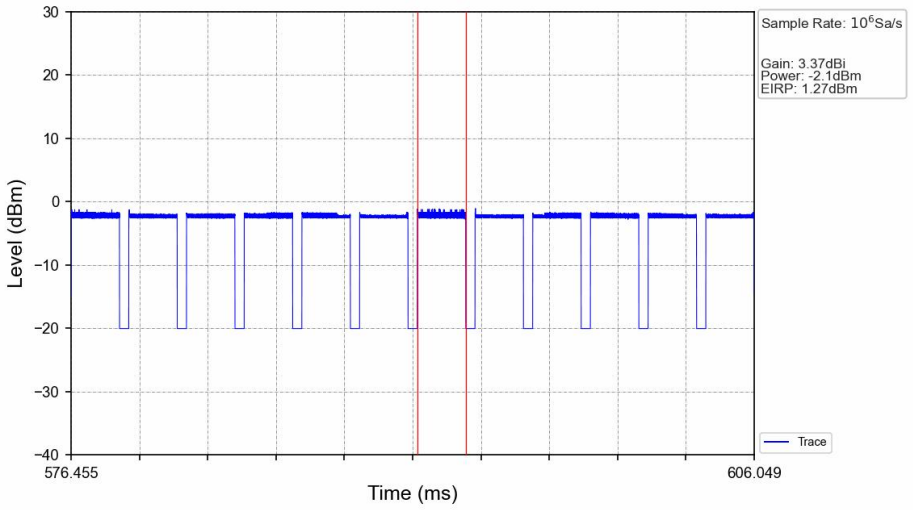
Burst No.	1	2	3	4	5	6	**7**	8	9	10	11	12
Length (ms)	2.098	2.097	2.097	2.098	2.097	2.097	**2.098**	2.097	2.097	2.098	2.097	2.097
Power (dBm)	1.47	1.26	1.32	1.38	1.34	1.24	**1.49**	1.21	1.38	1.38	1.31	1.30
Remark	/	/	/	/	/	/	**Max**	/	/	/	/	/

1M_2440MHz_Ant1_HTNV



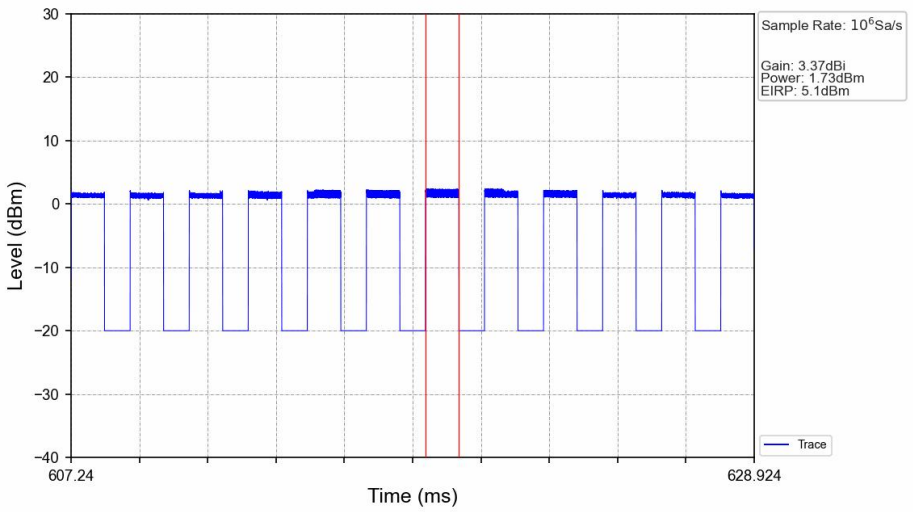
Burst No.	1	2	3	4	5	6	**7**	8	9	10	11	12
Length (ms)	2.097	2.097	2.097	2.098	2.097	2.097	**2.097**	2.097	2.097	2.097	2.097	2.097
Power (dBm)	-0.93	-1.04	-1.07	-1.02	-0.98	-1.13	**-0.91**	-1.09	-1.06	-0.97	-1.05	-1.10
Remark	/	/	/	/	/	/	**Max**	/	/	/	/	/

1M_2480MHz_Ant1_HTNV



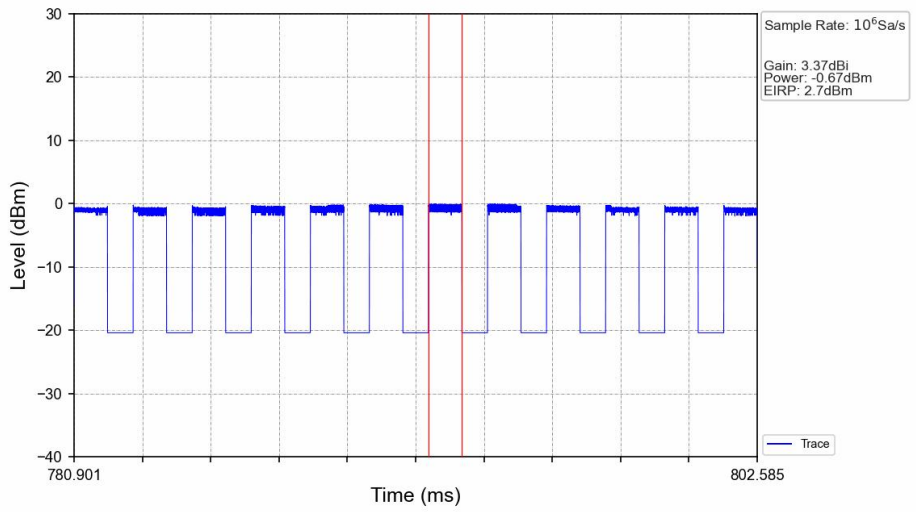
Burst No.	1	2	3	4	5	6	**7**	8	9	10	11	12
Length (ms)	2.098	2.097	2.097	2.097	2.097	2.097	**2.098**	2.097	2.097	2.097	2.097	2.097
Power (dBm)	-2.14	-2.26	-2.25	-2.20	-2.21	-2.32	**-2.10**	-2.32	-2.21	-2.20	-2.24	-2.28
Remark	/	/	/	/	/	/	**Max**	/	/	/	/	/

2M_2402MHz_Ant1_HTNV



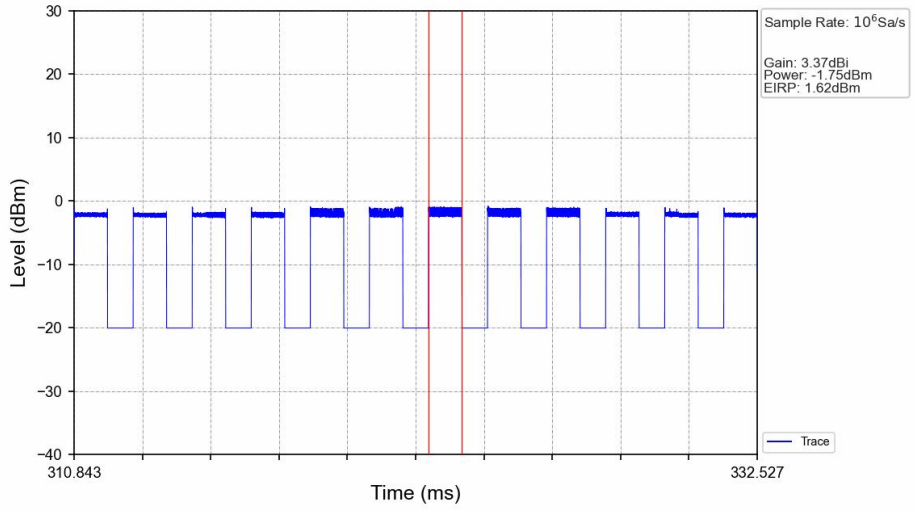
Burst No.	1	2	3	4	5	6	**7**	8	9	10	11	12
Length (ms)	1.062	1.061	1.061	1.062	1.062	1.062	**1.062**	1.062	1.063	1.061	1.061	1.062
Power (dBm)	1.39	1.32	1.32	1.42	1.54	1.57	**1.73**	1.66	1.59	1.42	1.43	1.31
Remark	/	/	/	/	/	/	**Max**	/	/	/	/	/

2M_2440MHz_Ant1_HTNV



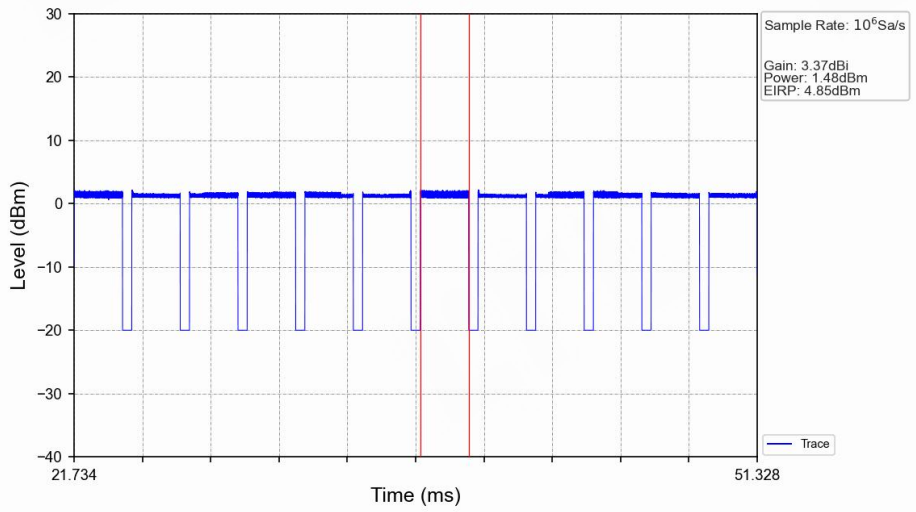
Burst No.	1	2	3	4	5	6	**7**	8	9	10	11	12
Length (ms)	1.062	1.061	1.061	1.062	1.062	1.062	**1.062**	1.062	1.063	1.062	1.061	1.062
Power (dBm)	-1.01	-1.06	-1.07	-0.91	-0.83	-0.76	**-0.67**	-0.69	-0.80	-0.94	-0.94	-1.04
Remark	/	/	/	/	/	/	**Max**	/	/	/	/	/

2M_2480MHz_Ant1_HTNV



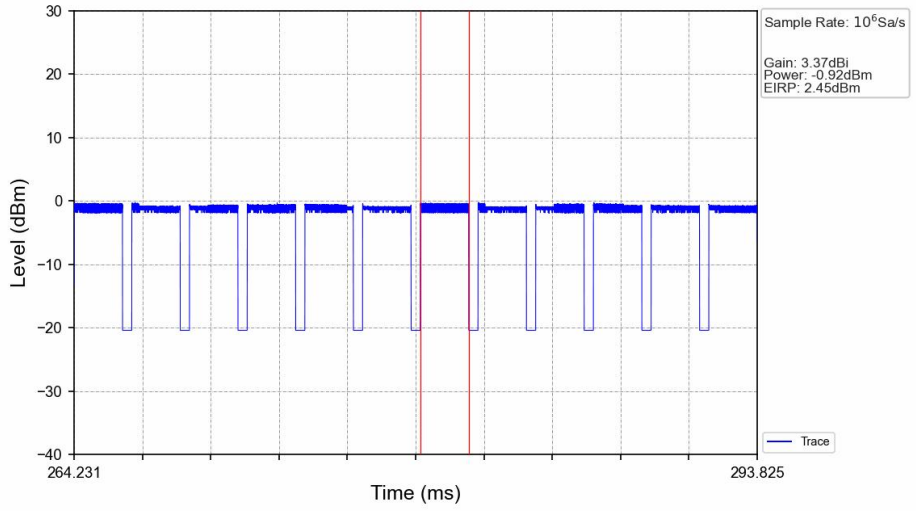
Burst No.	1	2	3	4	5	6	**7**	8	9	10	11	12
Length (ms)	1.062	1.061	1.061	1.062	1.061	1.061	**1.061**	1.061	1.063	1.061	1.061	1.062
Power (dBm)	-2.13	-2.21	-2.17	-2.16	-1.98	-1.95	**-1.75**	-1.92	-1.90	-2.08	-2.14	-2.20
Remark	/	/	/	/	/	/	**Max**	/	/	/	/	/

1M_2402MHz_Ant1_LTNV



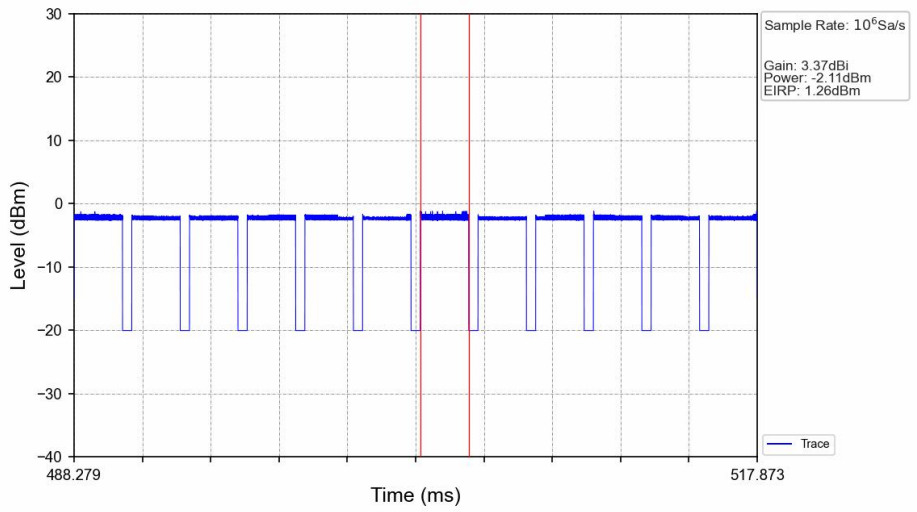
Burst No.	1	2	3	4	5	6	**7**	8	9	10	11	12
Length (ms)	2.098	2.097	2.097	2.098	2.097	2.097	**2.098**	2.097	2.097	2.098	2.097	2.097
Power (dBm)	1.46	1.28	1.34	1.39	1.36	1.24	**1.48**	1.23	1.37	1.38	1.31	1.30
Remark	/	/	/	/	/	/	**Max**	/	/	/	/	/

1M_2440MHz_Ant1_LTNV



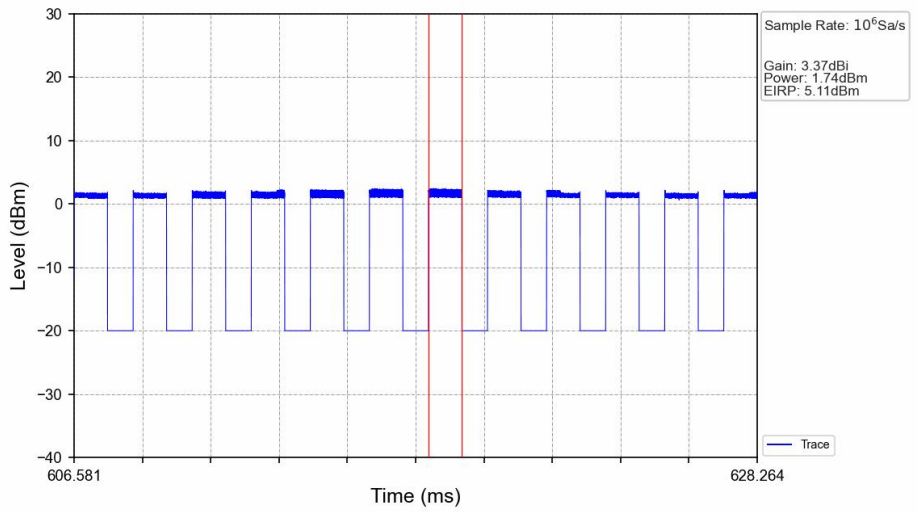
Burst No.	1	2	3	4	5	6	**7**	8	9	10	11	12
Length (ms)	2.098	2.097	2.097	2.098	2.097	2.097	**2.098**	2.097	2.097	2.097	2.097	2.097
Power (dBm)	-0.93	-1.10	-1.07	-1.02	-1.02	-1.14	**-0.92**	-1.14	-1.03	-1.00	-1.08	-1.09
Remark	/	/	/	/	/	/	**Max**	/	/	/	/	/

1M_2480MHz_Ant1_LTNV



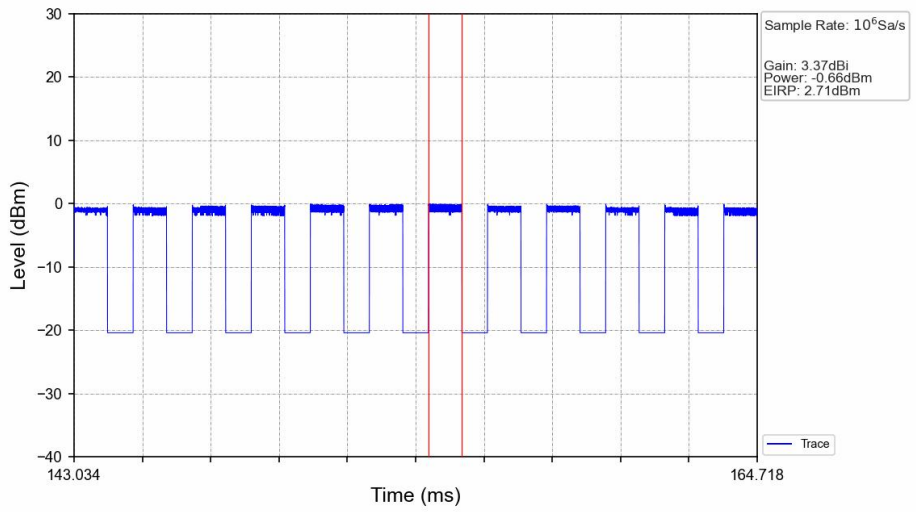
Burst No.	1	2	3	4	5	6	**7**	8	9	10	11	12
Length (ms)	2.098	2.097	2.097	2.097	2.097	2.097	**2.098**	2.097	2.097	2.097	2.097	2.097
Power (dBm)	-2.13	-2.26	-2.24	-2.19	-2.22	-2.30	**-2.11**	-2.32	-2.20	-2.20	-2.24	-2.26
Remark	/	/	/	/	/	/	**Max**	/	/	/	/	/

2M_2402MHz_Ant1_LTNV



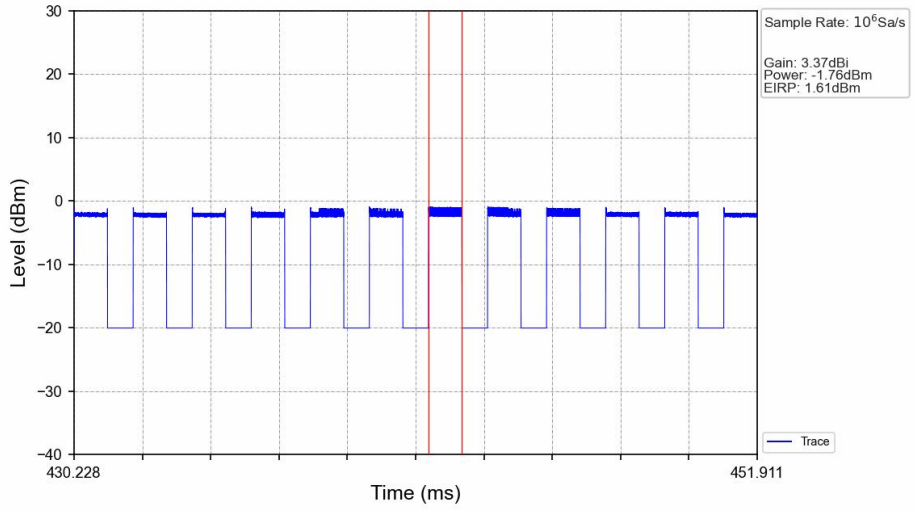
Burst No.	1	2	3	4	5	6	**7**	8	9	10	11	12
Length (ms)	1.061	1.061	1.062	1.062	1.062	1.061	**1.062**	1.063	1.062	1.061	1.062	1.061
Power (dBm)	1.35	1.32	1.45	1.47	1.60	1.73	**1.74**	1.56	1.48	1.42	1.31	1.33
Remark	/	/	/	/	/	/	**Max**	/	/	/	/	/

2M_2440MHz_Ant1_LTNV



Burst No.	1	2	3	4	5	6	**7**	8	9	10	11	12
Length (ms)	1.061	1.061	1.061	1.061	1.062	1.061	**1.061**	1.063	1.062	1.061	1.061	1.062
Power (dBm)	-0.99	-1.05	-0.93	-0.91	-0.75	-0.72	**-0.66**	-0.83	-0.81	-0.98	-1.05	-1.07
Remark	/	/	/	/	/	/	**Max**	/	/	/	/	/

2M_2480MHz_Ant1_LTNV



Burst No.	1	2	3	4	5	6	**7**	8	9	10	11	12
Length (ms)	1.061	1.061	1.061	1.060	1.060	1.061	**1.061**	1.060	1.060	1.061	1.060	1.060
Power (dBm)	-2.13	-2.21	-2.20	-2.15	-2.02	-2.01	**-1.76**	-1.84	-1.91	-2.10	-2.08	-2.21
Remark	/	/	/	/	/	/	**Max**	/	/	/	/	/

2. Power Spectral Density

2.1 Test Result

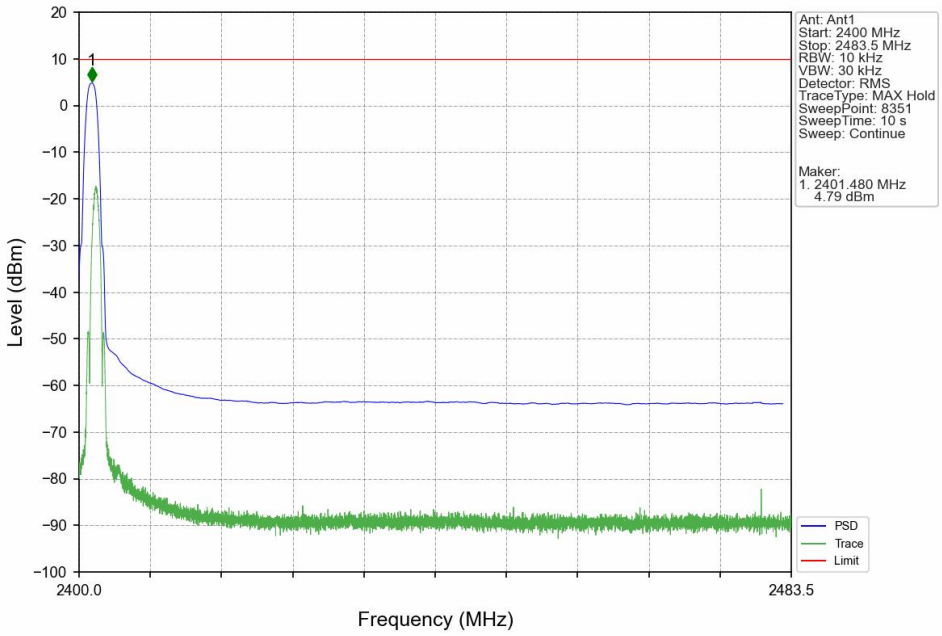
2.1.1 PSD

ENV	Mode	TX Type	Frequency (MHz)	ANT	E.I.R.PSD (dBm/MHz)	Limit (dBm/MHz)	Verdict
NTNV	1M	SISO	2402	1	4.79	<=10	Pass
			2440	1	2.42	<=10	Pass
			2480	1	1.19	<=10	Pass
	2M	SISO	2402	1	4.02	<=10	Pass
			2440	1	1.64	<=10	Pass
			2480	1	0.52	<=10	Pass

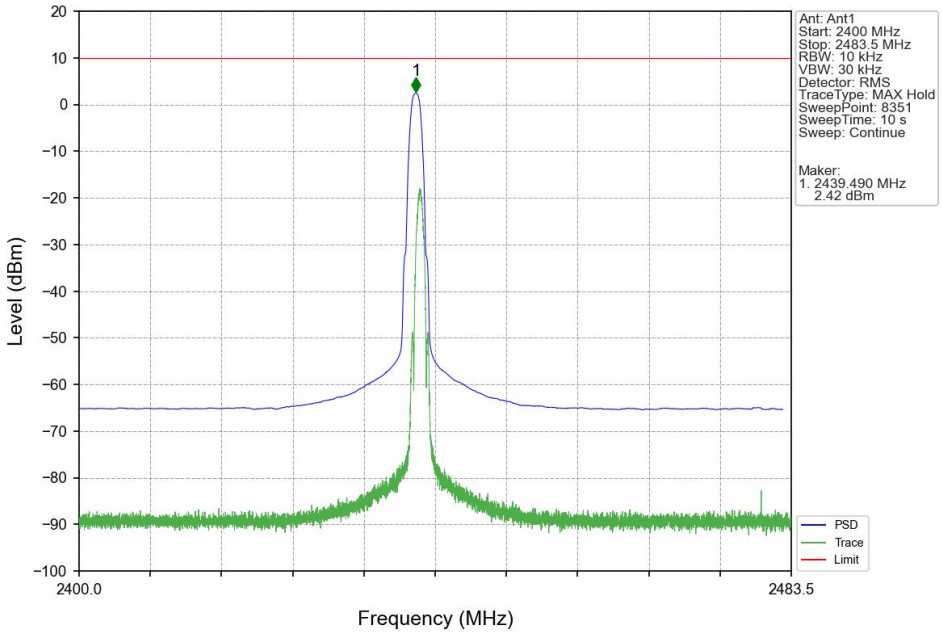
2.2 Test Graph

2.2.1 PSD

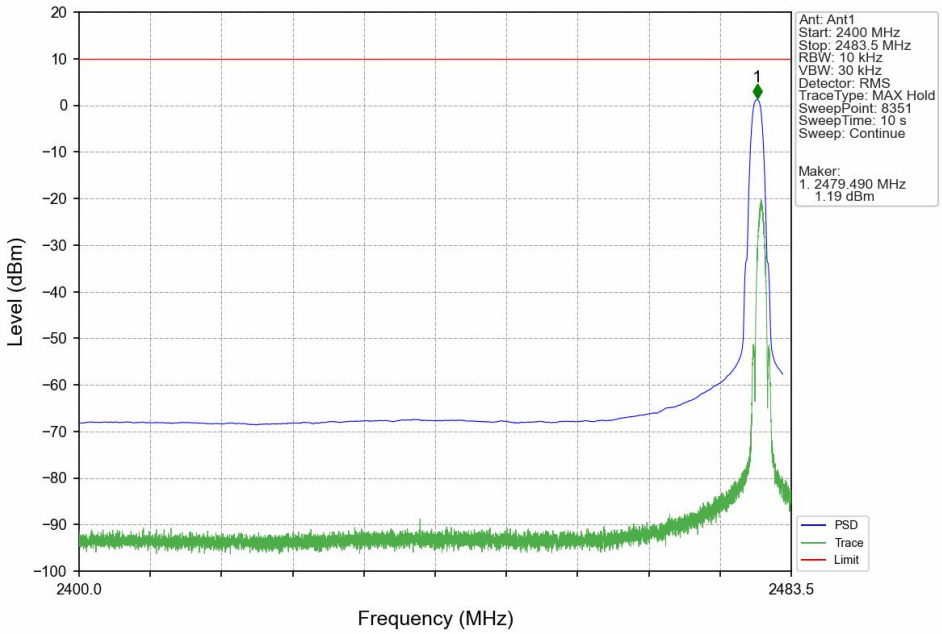
1M_2402MHz_Ant1_NTNV



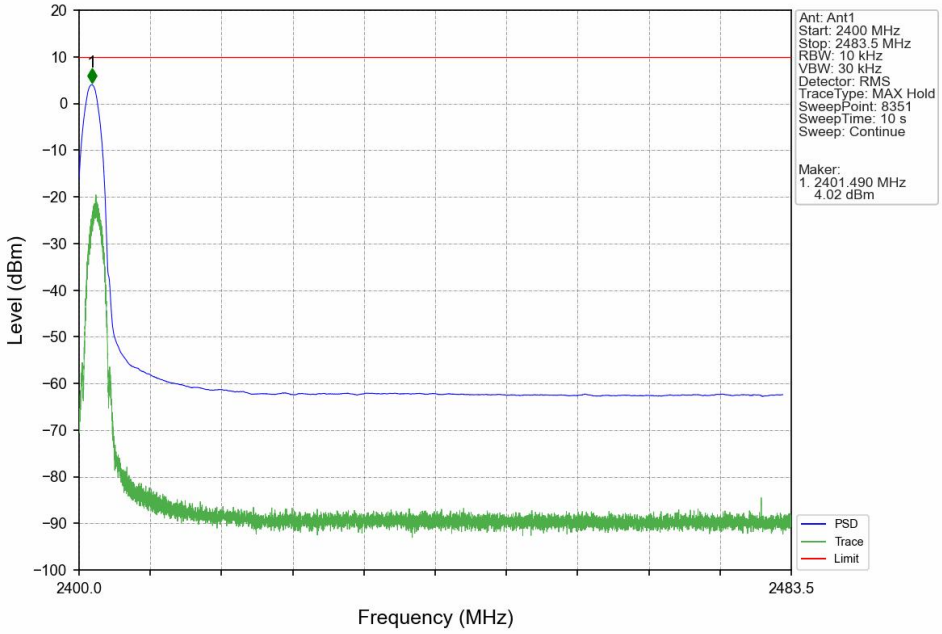
1M_2440MHz_Ant1_NTNV



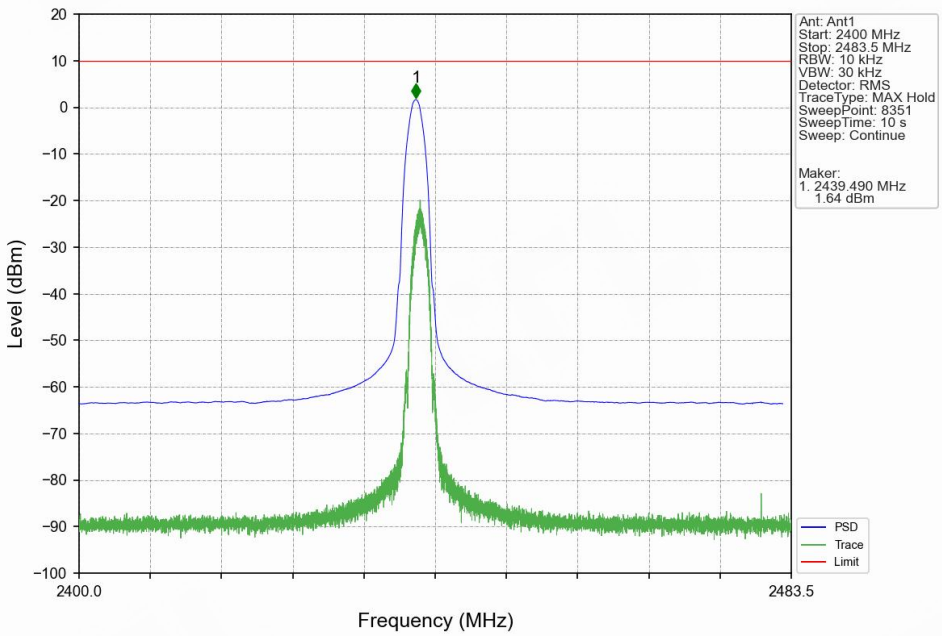
1M_2480MHz_Ant1_NTNV



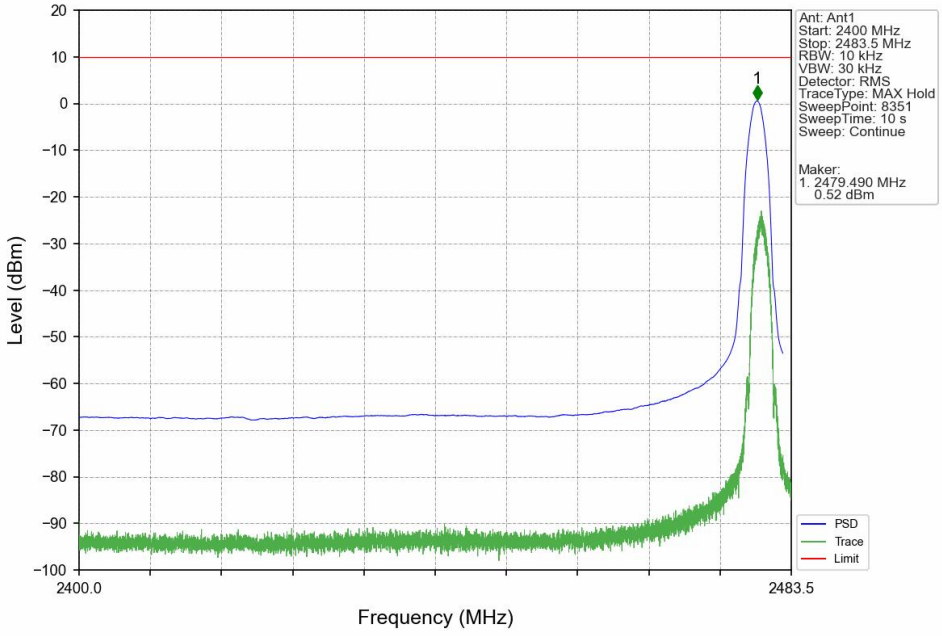
2M_2402MHz_Ant1_NTNV



2M_2440MHz_Ant1_NTNV



2M_2480MHz_Ant1_NTNV



3. Occupied Channel Bandwidth

3.1 Test Result

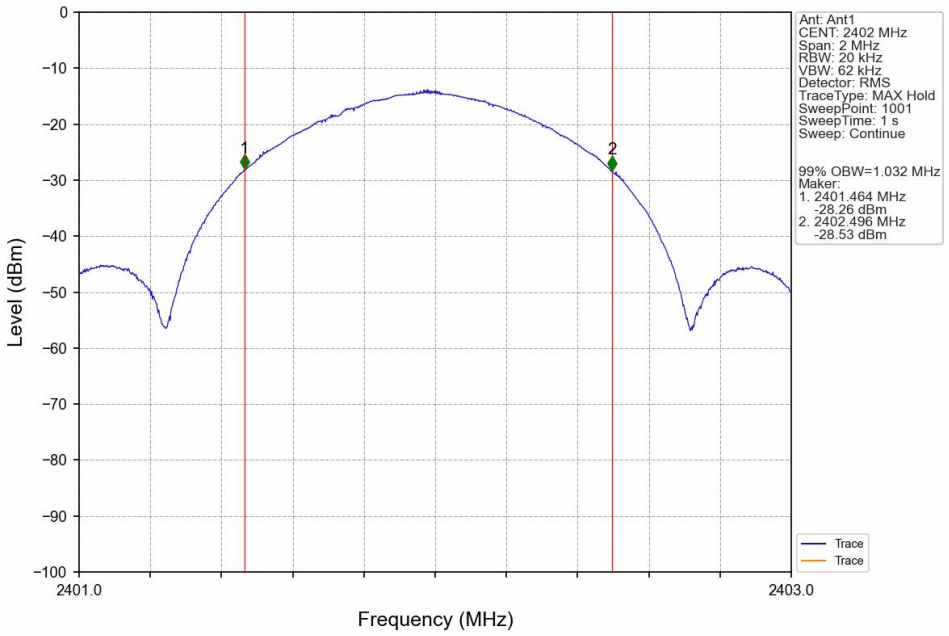
3.1.1 OBW_Ant1

Ant1								
ENV	Mode	TX Type	Frequency (MHz)	OBW (MHz)	Frequency Range (MHz)			Verdict
				Result	FL	FH	Limit	
NTNV	1M	SISO	2402	1.032	2401.464	/	>=2400	Pass
			2480	1.032	/	2480.495	<=2483.5	Pass
	2M	SISO	2402	2.042	2400.959	/	>=2400	Pass
			2480	2.042	/	2480.997	<=2483.5	Pass

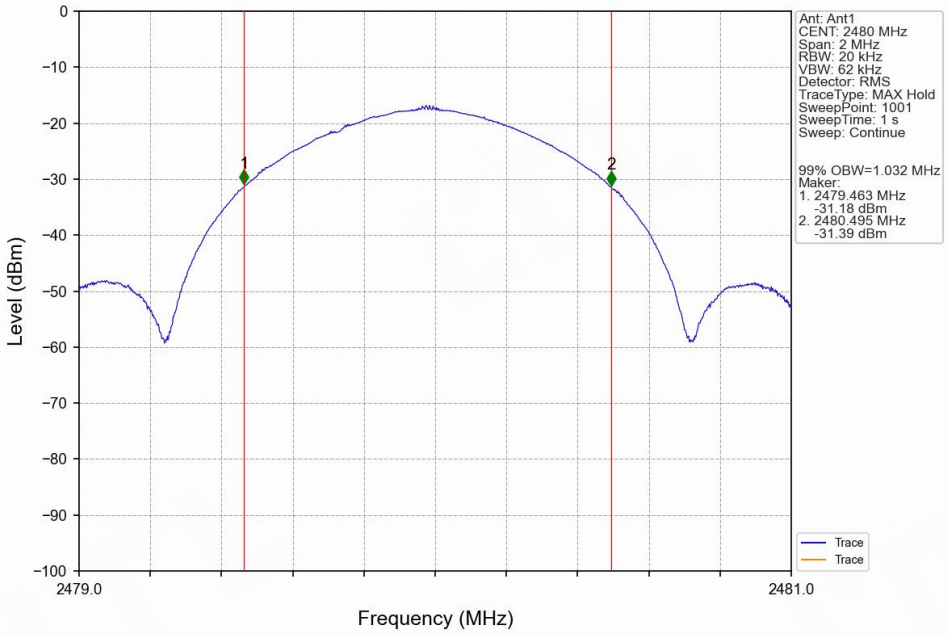
3.2 Test Graph

3.2.1 OBW_Ant1

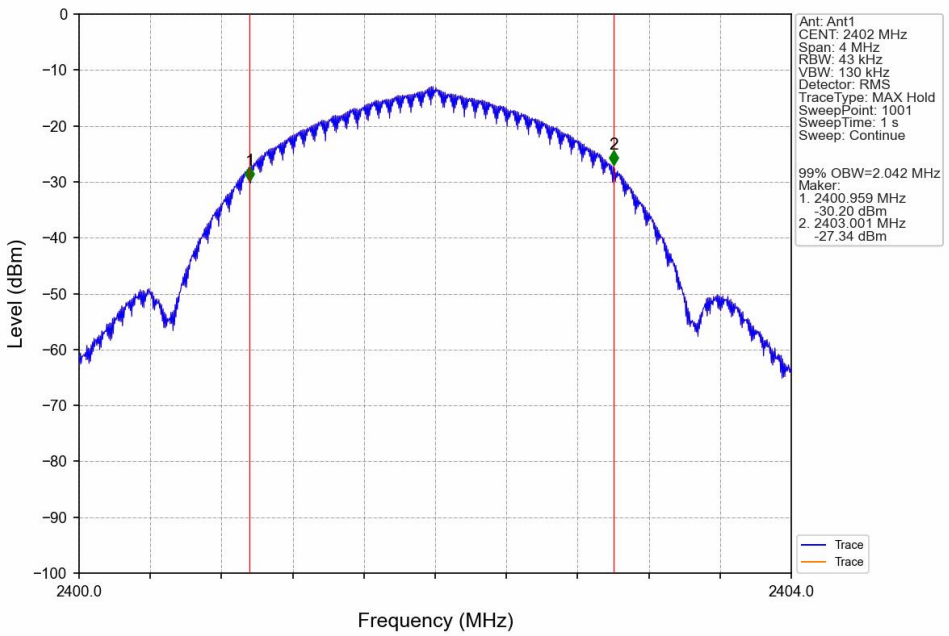
1M_2402MHz_Ant1_NTNV



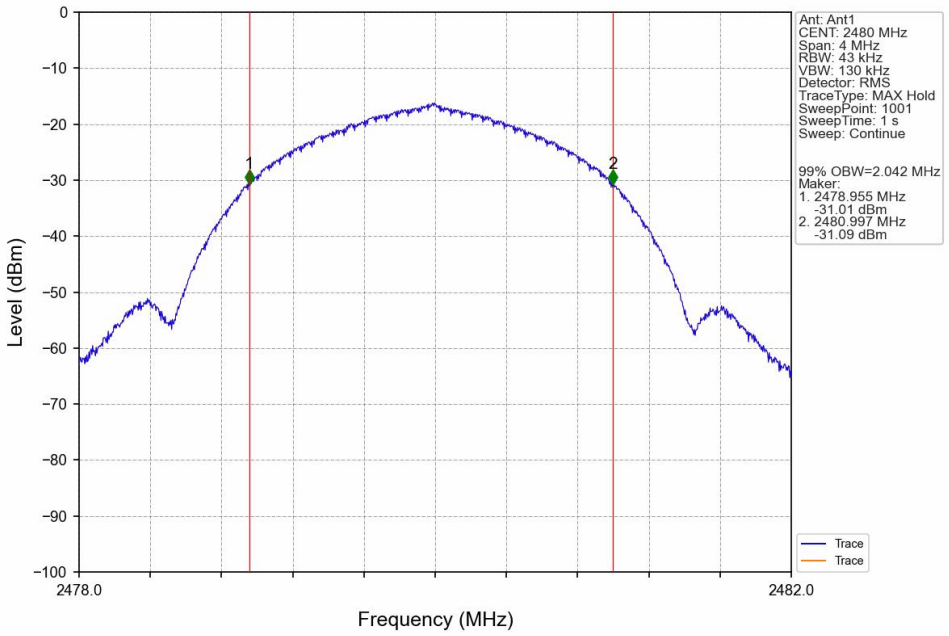
1M_2480MHz_Ant1_NTNV



2M_2402MHz_Ant1_NTNV



2M_2480MHz_Ant1_NTNV



4. Transmitter Unwanted Emissions In The Out-Of-Band Domain

4.1 Test Result

4.1.1 1M-Ant1_NTNV

Ant1_NTNV							
Mode	TX Type	Frequency (MHz)	ANT	Test Freq. (MHz)	Result (dBm/MHz)	Limit (dBm/MHz)	Verdict
1M	SISO	2402	1	2398.436	-58.72	<=-20	Pass
				2398.468	-58.66	<=-20	Pass
				2399.468	-55.60	<=-10	Pass
				2399.500	-55.48	<=-10	Pass
		2480	1	2484.000	-61.80	<=-10	Pass
				2484.032	-62.03	<=-10	Pass
				2485.032	-63.50	<=-20	Pass
				2485.064	-63.49	<=-20	Pass

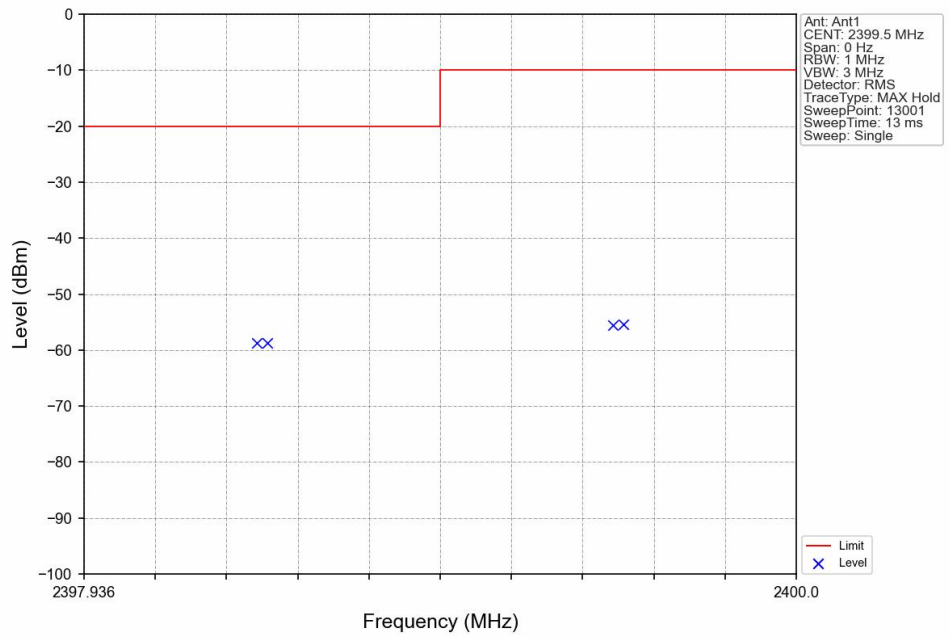
4.1.2 2M-Ant1_NTNV

Ant1_NTNV							
Mode	TX Type	Frequency (MHz)	ANT	Test Freq. (MHz)	Result (dBm/MHz)	Limit (dBm/MHz)	Verdict
2M	SISO	2402	1	2396.416	-62.06	<=-20	Pass
				2396.458	-62.37	<=-20	Pass
				2397.458	-60.87	<=-20	Pass
				2398.458	-58.46	<=-10	Pass
				2398.500	-57.89	<=-10	Pass
				2399.500	-43.13	<=-10	Pass
		2480	1	2484.000	-60.81	<=-10	Pass
				2485.000	-62.66	<=-10	Pass
				2485.042	-62.91	<=-10	Pass
				2486.042	-63.99	<=-20	Pass
				2487.042	-65.21	<=-20	Pass
				2487.084	-65.07	<=-20	Pass

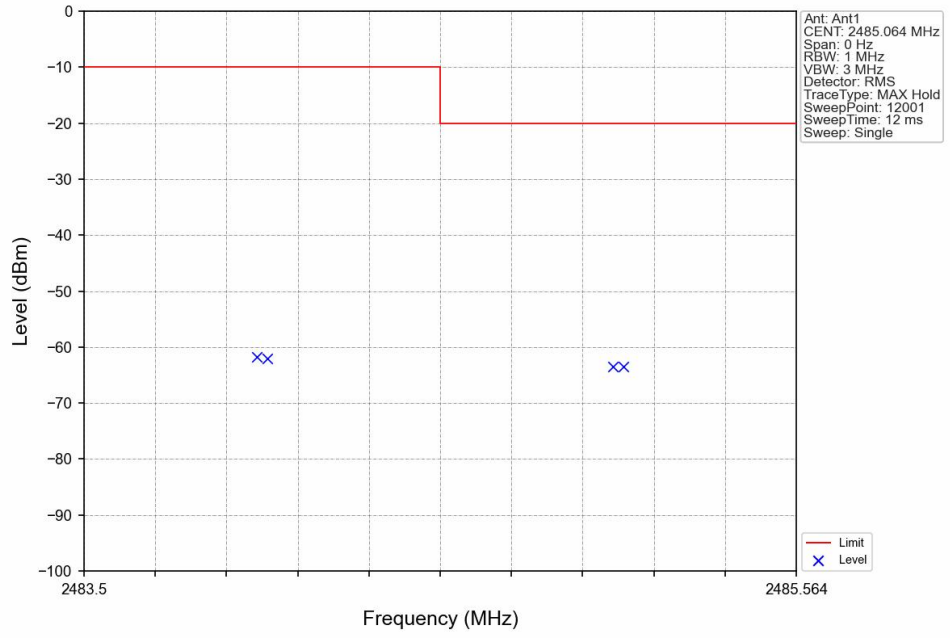
4.2 Test Graph

4.2.1 1M-Ant1_NTNV

1M_2402MHz_Ant1_NTNV

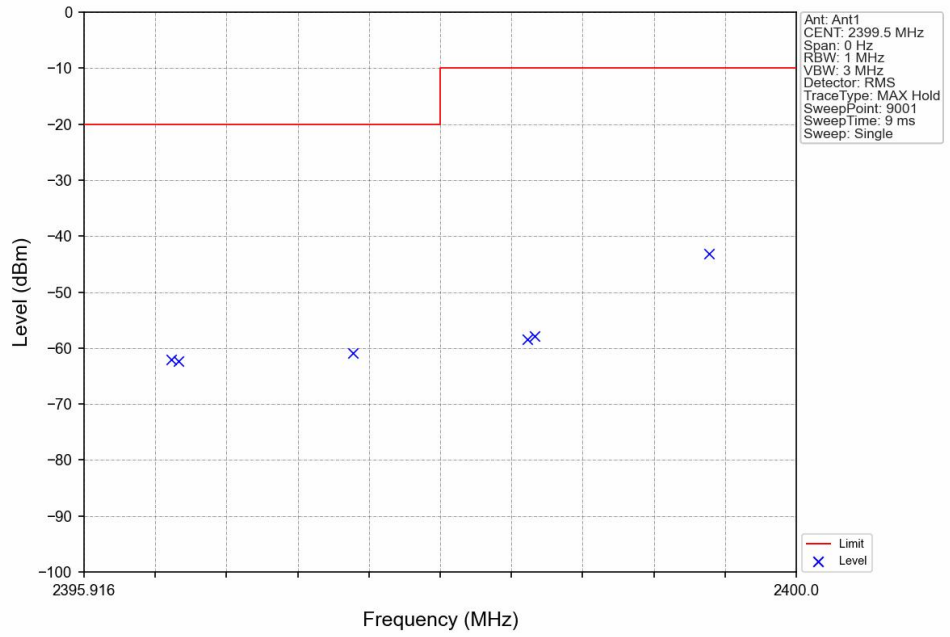


1M_2480MHz_Ant1_NTNV



4.2.2 2M-Ant1_NTNV

2M_2402MHz_Ant1_NTNV



2M_2480MHz_Ant1_NTNV