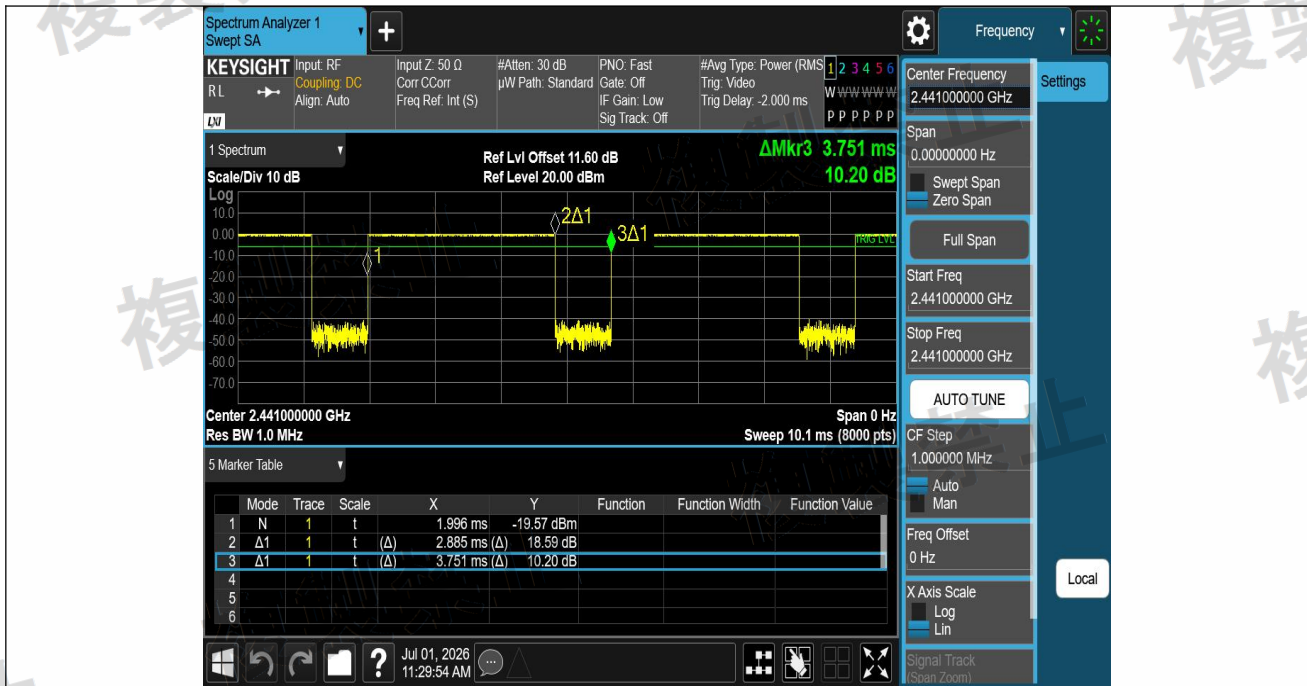
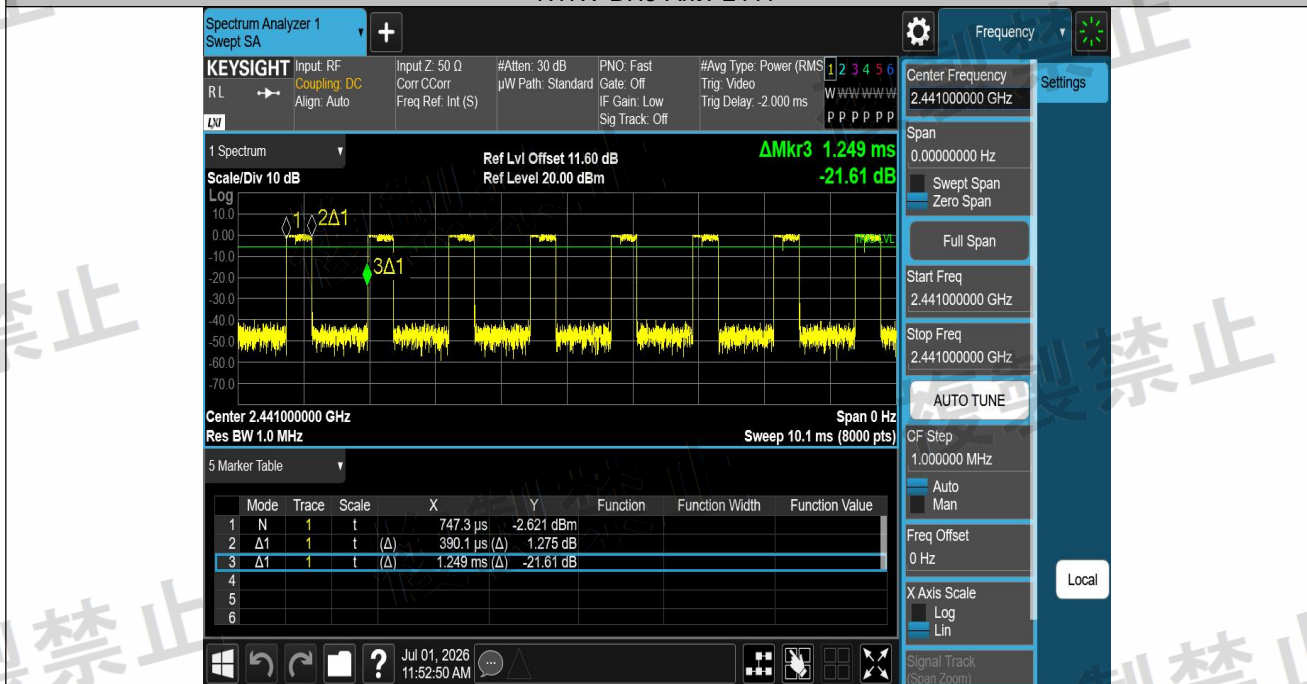
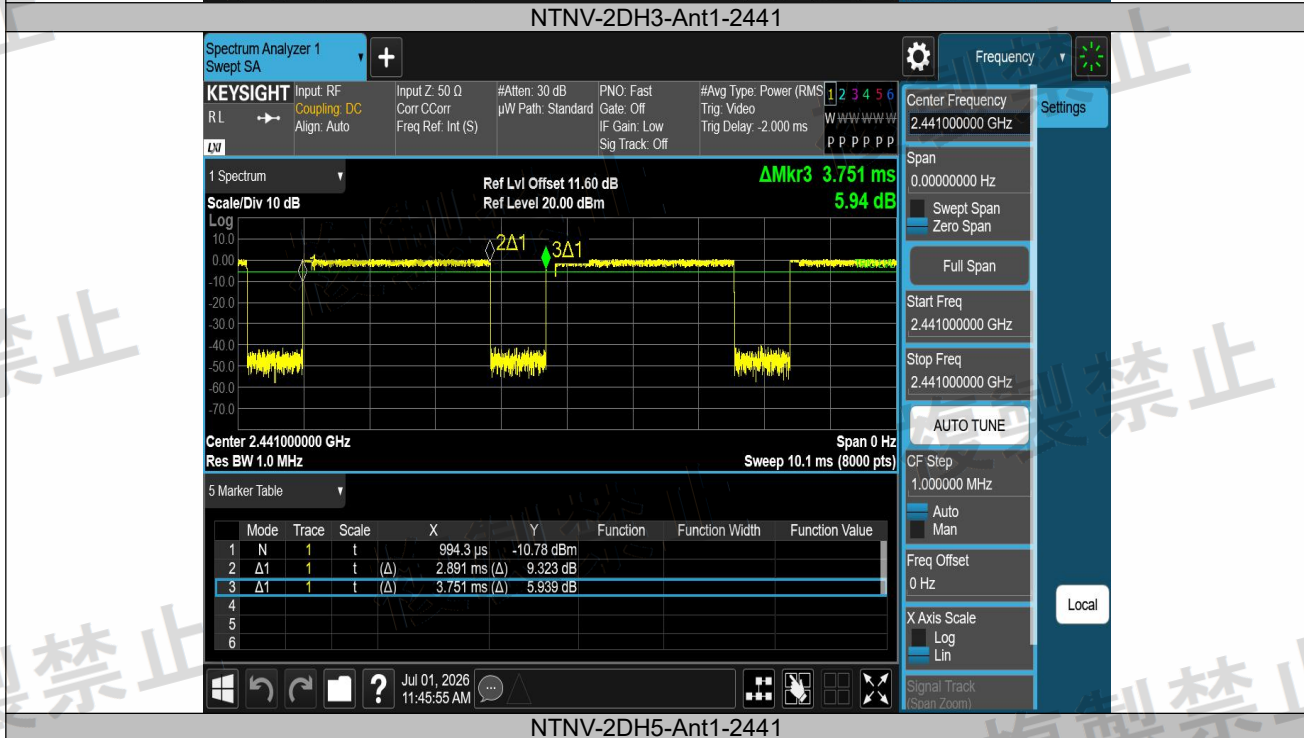
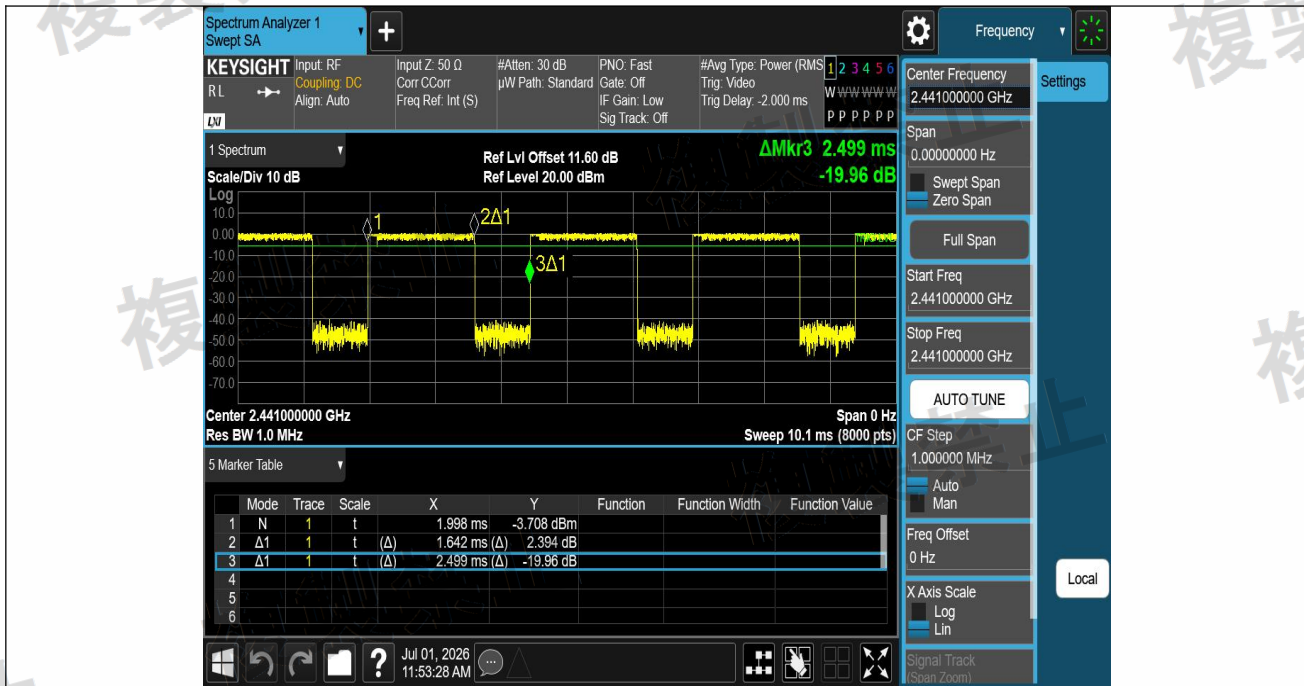


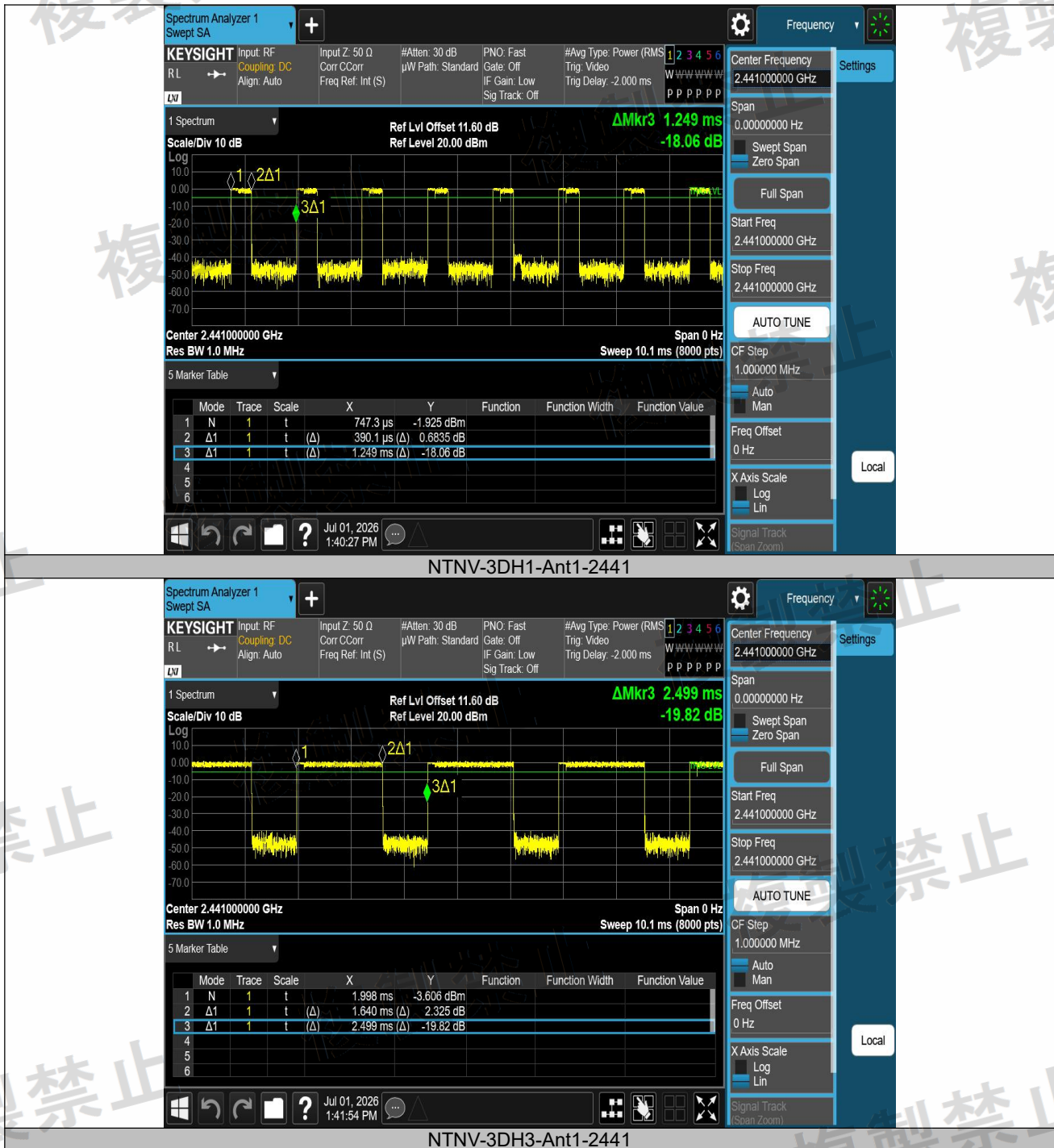


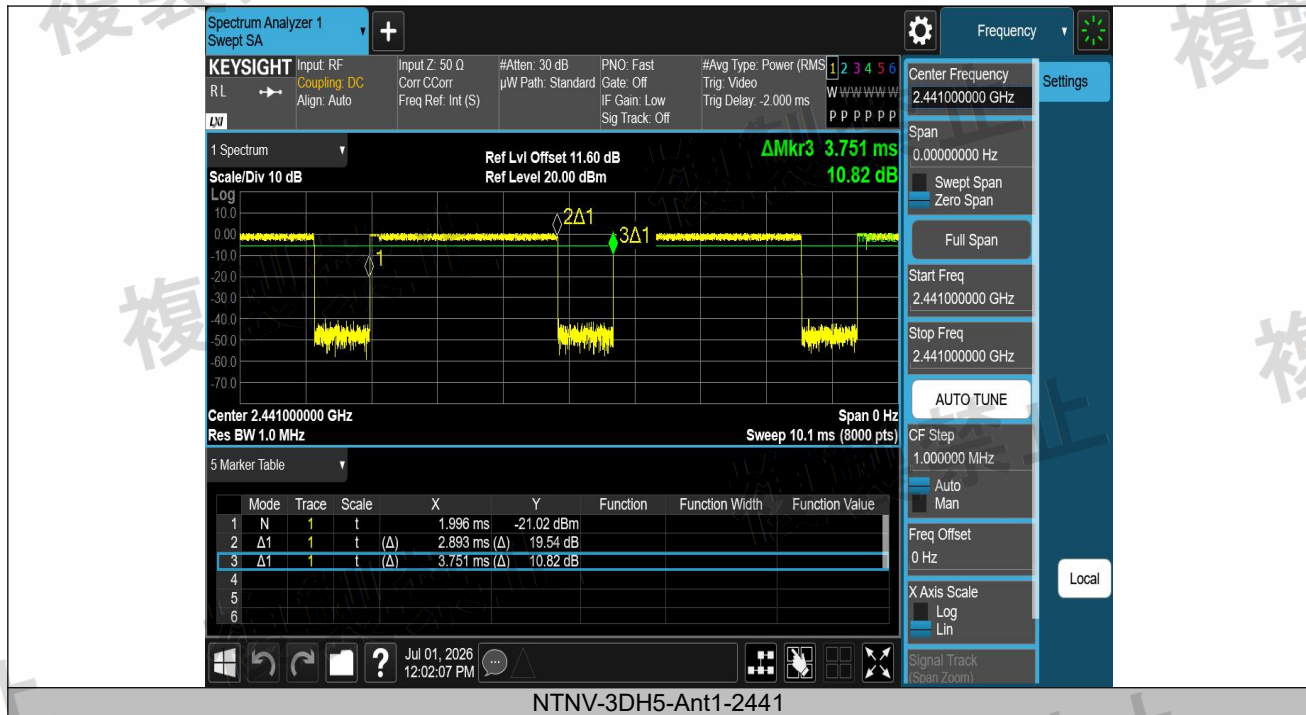
NTNV-DH5-Ant1-2441



NTNV-2DH1-Ant1-2441







7.4 POWER TO ANTENNA (CONDUCTED)

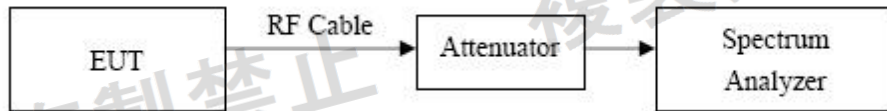
7.4.1 Applicable Standard

According to Item 19 of Article 2 Paragraph 1.

7.4.2 Conformance Limit

The maximum permit antenna power is 3mW/MHz for DSSS the maximum permit antenna power is 10mW, and the maximum permit tolerance is +20% or -80%

7.4.3 Test Setup Block Diagram



7.4.4 Test Procedure

Set the EUT on the test frequency and the consecutive TX mode or continuous (constant period, constant burst length) burst TX mode.

In case of spreading code used, set on the test spreading code, then the modulation is performed with standard coding test signal.

(1) Measure the equivalent noise bandwidth at the spectrum analyzer for resolution bandwidth of 1 MHz, then read the value correcting the resolution bandwidth on the 1 MHz equivalent bandwidth. In case of a spreading bandwidth lower than 1 MHz, however, perform the correction only for a higher value than "Spreading bandwidth (MHz) / Equivalent noise bandwidth (MHz)".

(2) The attenuation value of the attenuator shall be set to achieve the optimal operating input level at the spectrum analyzer.

(3) Spectrum analyzer for seeking the maximum antenna power is set as below.

Central Frequency	Test frequency
Sweeping Bandwidth	Approx. twice the Occupied Bandwidth
Resolution Bandwidth	1 MHz
Video Bandwidth	Approx. twice the resolution bandwidth (VBW=2MHz)
Y-Axis Scale	10 dB/Div
Sweep Time	Minimum time to assure the measurement accuracy (In case of burst wave, 1 burst per 1 sample)
Trigger Condition	Free run
Data points	More than 400 points
Sweep Mode	Consecutive sweep
Phase-Detection Mode	Positive peak
Display mode	Max-hold

(4) Spectrum analyzer for measuring the antenna power is set as below. In this case, calibrate the indication of the RF Power Meter on the output of the EUT with the RF Power Meter connected to the IF output of the spectrum analyzer.

Central Frequency	Frequency to achieve the maximum power (sought frequency)
Sweeping Bandwidth	0 Hz

Resolution Bandwidth	1 MHz
Video Bandwidth	Same level as the resolution bandwidth
Sweep Mode	Consecutive sweep
Phase-Detection Mode	Sample

Measurement Procedure

Frequency hopping system or combined systems of direct spread and frequency hopping:

- Connect the high frequency power meter to the output of the attenuator and measure the total power (without bandwidth limitation)
- Divide the total power by the spread bandwidth to find the “average” power per MHz.
- Confirm that frequency distribution of the hopping frequencies is homogeneous according to the supporting data. If frequency distribution of the frequencies is not homogeneous, consider other measurement or correction methods based on the supporting data.
- Set the antenna power as follows:
 - Continuous waves: value in b.
 - Burst waves: value in b. and value calculated from the average power within bursts from rates of transmission times (i.e. correction on the duty-cycle, to find the average within the transmit burst)

7.4.5 Environmental Conditions

Temperature:	25°C
Relative Humidity:	45%
ATM Pressure:	1011 mbar

7.4.6 Test Results

All the modes were tested and recorded, the results of the test item are good.

Test Condition	TestMode	Antenna	Freq(MHz)	Result (dBm)	Result (mW)	90% BW (MHz)	Result (mW /MHz)	Limit (mW /MHz)	Verdict
NTNV	DH5	Ant1	Hop	0.57	1.1402	71.108	0.0160	≤3	PASS
NTNV	2DH5	Ant1	Hop	-0.81	0.8299	71.040	0.0117	≤3	PASS
NTNV	3DH5	Ant1	Hop	-0.83	0.8260	71.152	0.0116	≤3	PASS

Test Condition	Test Mode	Antenna	Freq(MHz)	Power (mW/MHz)	RatedPower (mW/MHz)	Result (%)	Limit (%)	Verdict
NTNV	DH5	Ant1	Hop	0.0160	0.02	-20	-80 to +20	PASS
NTNV	2DH5	Ant1	Hop	0.0117	0.02	-41.5	-80 to +20	PASS
NTNV	3DH5	Ant1	Hop	0.0116	0.02	-42	-80 to +20	PASS

Test Condition	TestMode	Antenna	Freq(MHz)	Power (dBm/MHz)	EIRP(dBm/MHz)	Limit(dBm/MHz)	Verdict
NTNV	DH5	Ant1	Hop	-17.96	-15.19	≤6.91	PASS
NTNV	2DH5	Ant1	Hop	-19.32	-16.55	≤6.91	PASS
NTNV	3DH5	Ant1	Hop	-19.36	-16.59	≤6.91	PASS

Note: Tolerance = (Output Power – Rated Output Power) / Rated Output Power * 100%

7.5 SPURIOUS EMISSIONS INTENSITY

7.5.1 Applicable Standard

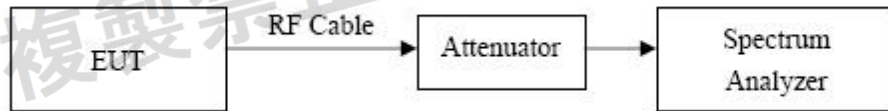
According to Item 19 of Article 2 Paragraph 1.

7.5.2 Conformance Limit

Permissible mean power of spurious emission of each frequency supplied to a feeder, that is, mean power of spurious emission in the 1 MHz bandwidth at frequency f other than frequency band used shall be as follows:

- | | |
|---|-----------------------------------|
| a. $2,387\text{MHz} \leq f \leq 2,400\text{MHz}$ and $2,483.5\text{MHz} < f \leq 2,496.5\text{MHz}$ | 25 μW (-16dB) or less |
| b. $2,387\text{MHz} > f$ and $2,496.5\text{MHz} < f$ | 2.5 μW (-26dB) or less |

7.5.3 Test Setup Block Diagram



7.5.4 Test Procedure

(1) Spectrum analyzer for seeking the spurious emission is set as below

Sweeping Bandwidth	For seeking the spurious emission, from frequency lowest possible to the 5 times the carrier frequency
Resolution Bandwidth	1 MHz
Video Bandwidth	Approx. As same as Resolution bandwidth
Y-Axis Scale	10 dB/Div
Input Level	Value of maximum dynamic range
Sweep Time	Minimum time to assure the measurement accuracy (Note 1)
Sweep Mode	Single sweep
Phase-Detection Mode	Positive peak

(2) The settings of the spectrum analyzer while conducting spurious amplitude measurements are as follows:

- Central Frequency: Acquired spurious frequencies in (1)
- Sweep Frequency 0 Hz
- Resolution Bandwidth 1 MHz
- Video Bandwidth same as Resolution Bandwidth
- Note: take into account that the requirement limits the power in a bandwidth of 1 MHz.
- If the measurement is carried out with a bandwidth of 100 kHz (for frequencies below 1 GHz), the limit shall be reduced with 10 dB.
- For example 2.5 μW in 1 MHz = -26 dBm limit, becomes -36 dBm for 100 kHz bandwidth.
- Y-Axis Scale 10 dB/Div
- Input Level: choose input level within the linear range of the SA mixer (so that no additional spurious are generated by the mixer)
- Sweep Time: Minimum amount of time to ensure measurement accuracy. However, in the case of burst waves, time exceeds duration of 1 burst.
- Data Points Over 400 points
- Sweep Mode: Single sweep
- Detection Mode Sample (BIN-Width $\ll$ RBW, so that all spurious emissions are captured) [BIN-width is the frequency difference between 2 adjacent sample points on the display]

(3)Set EUT as occupied bandwidth is measure. That is, Set the EUT on the test frequency and the continuous TX mode or continuous (constant period, constant burst length) burst TX mode. In case of spreading code used, set on the test spreading code, then the modulation is performed with standard coding test signal.

The spectrum analyzer is set as 2 (1). Seek the spurious emission If the amplitude of the sought spurious emission satisfies the specified value (in case of 2 (2) Note 1, the specified value is -3dB), the measurement of 2 (2) is not performed, then the estimated value is employed as the measured value.

In case the sought spurious emission amplitude exceeds the specified value, seek the spurious frequency by narrowing the sweeping band sequentially as 100 MHz, 10 MHz, 1 MHz for the purpose of higher accuracy of the spectrum analyzer. Set the spectrum analyzer as 2 (2). Estimate the mean value of the spurious amplitude, then employ it as the measured value (In case DSSS as well as OFDM with burst wave, the mean inside of the burst).

Sweep Bandwidth: 30MHz~2387MHz, 2483.5MHz~2496.5MHz, 2496.5MHz~12500MHz

1. Respectively mark the maximum results in the above sweep bandwidth.

7.5.5 Environmental Conditions

Temperature:	25°C
Relative Humidity:	45%
ATM Pressure:	1011 mbar

7.5.6 Test Results

All the modes were tested and recorded, the results of the test item are good.

Test Condition	Test Mode	Antenna	Frequency [MHz]	Freq. Range [MHz]	Freq. [MHz]	Result [dBm]	Limit [dBm]	Result [μW]	Limit [μW]	Verdict
NTNV	DH5	Ant1	2402	30~1000	912.94	-49.15	≤ -26	0.01216	≤ 2.5	PASS
NTNV	DH5	Ant1	2402	1000~2387	2209.81	-45.00	≤ -26	0.03162	≤ 2.5	PASS
NTNV	DH5	Ant1	2402	2387~2400	2399.79	-25.55	≤ -16	2.78612	≤ 25	PASS
NTNV	DH5	Ant1	2402	2483.5~2496.5	2496.34	-36.36	≤ -16	0.23121	≤ 25	PASS
NTNV	DH5	Ant1	2402	2496.5~3000	2593.85	-43.49	≤ -26	0.04477	≤ 2.5	PASS
NTNV	DH5	Ant1	2402	3000~13000	10576.00	-43.92	≤ -26	0.04055	≤ 2.5	PASS
NTNV	DH5	Ant1	2441	30~1000	828.31	-49.07	≤ -26	0.01239	≤ 2.5	PASS
NTNV	DH5	Ant1	2441	1000~2387	1921.66	-40.82	≤ -26	0.08279	≤ 2.5	PASS
NTNV	DH5	Ant1	2441	2387~2400	2395.34	-36.23	≤ -16	0.23823	≤ 25	PASS
NTNV	DH5	Ant1	2441	2483.5~2496.5	2485.73	-36.61	≤ -16	0.21827	≤ 25	PASS
NTNV	DH5	Ant1	2441	2496.5~3000	2632.52	-43.76	≤ -26	0.04207	≤ 2.5	PASS
NTNV	DH5	Ant1	2441	3000~13000	4027.00	-43.96	≤ -26	0.04018	≤ 2.5	PASS
NTNV	DH5	Ant1	2480	30~1000	877.78	-48.60	≤ -26	0.01380	≤ 2.5	PASS
NTNV	DH5	Ant1	2480	1000~2387	2288.18	-43.07	≤ -26	0.04932	≤ 2.5	PASS
NTNV	DH5	Ant1	2480	2387~2400	2392.14	-36.70	≤ -16	0.21380	≤ 25	PASS
NTNV	DH5	Ant1	2480	2483.5~2496.5	2488.37	-36.12	≤ -16	0.24434	≤ 25	PASS
NTNV	DH5	Ant1	2480	2496.5~3000	2671.57	-44.62	≤ -26	0.03451	≤ 2.5	PASS
NTNV	DH5	Ant1	2480	3000~13000	7434.00	-43.72	≤ -26	0.04246	≤ 2.5	PASS
NTNV	DH5	Ant1	Hop	30~1000	998.06	-61.01	≤ -26	0.00079	≤ 2.5	PASS
NTNV	DH5	Ant1	Hop	1000~2387	1926.17	-44.26	≤ -26	0.03750	≤ 2.5	PASS
NTNV	DH5	Ant1	Hop	2387~2400	2399.99	-44.33	≤ -16	0.03690	≤ 25	PASS
NTNV	DH5	Ant1	Hop	2483.5~2496.5	2494.99	-48.13	≤ -16	0.01538	≤ 25	PASS
NTNV	DH5	Ant1	Hop	2496.5~3000	2636.78	-54.89	≤ -26	0.00324	≤ 2.5	PASS
NTNV	DH5	Ant1	Hop	3000~13000	7280.50	-54.59	≤ -26	0.00348	≤ 2.5	PASS
NTNV	2DH5	Ant1	2402	30~1000	893.79	-49.45	≤ -26	0.01135	≤ 2.5	PASS
NTNV	2DH5	Ant1	2402	1000~2387	1929.98	-33.69	≤ -26	0.42756	≤ 2.5	PASS
NTNV	2DH5	Ant1	2402	2387~2400	2400.00	-25.75	≤ -16	2.66073	≤ 25	PASS
NTNV	2DH5	Ant1	2402	2483.5~2496.5	2493.82	-36.29	≤ -16	0.23496	≤ 25	PASS
NTNV	2DH5	Ant1	2402	2496.5~3000	2593.65	-43.83	≤ -26	0.04140	≤ 2.5	PASS
NTNV	2DH5	Ant1	2402	3000~13000	4803.50	-43.39	≤ -26	0.04581	≤ 2.5	PASS

NTNV	2DH5	Ant1	2441	30~1000	167.98	-49.01	≤-26	0.01256	≤2.5	PASS
NTNV	2DH5	Ant1	2441	1000~2387	2248.65	-44.53	≤-26	0.03524	≤2.5	PASS
NTNV	2DH5	Ant1	2441	2387~2400	2398.89	-36.92	≤-16	0.20324	≤25	PASS
NTNV	2DH5	Ant1	2441	2483.5~2496.5	2491.16	-35.83	≤-16	0.26122	≤25	PASS
NTNV	2DH5	Ant1	2441	2496.5~3000	2632.65	-44.55	≤-26	0.03508	≤2.5	PASS
NTNV	2DH5	Ant1	2441	3000~13000	7317.00	-43.93	≤-26	0.04046	≤2.5	PASS
NTNV	2DH5	Ant1	2480	30~1000	879.72	-49.30	≤-26	0.01175	≤2.5	PASS
NTNV	2DH5	Ant1	2480	1000~2387	2321.12	-41.15	≤-26	0.07674	≤2.5	PASS
NTNV	2DH5	Ant1	2480	2387~2400	2398.44	-36.05	≤-16	0.24831	≤25	PASS
NTNV	2DH5	Ant1	2480	2483.5~2496.5	2495.73	-36.66	≤-16	0.21577	≤25	PASS
NTNV	2DH5	Ant1	2480	2496.5~3000	2672.07	-44.64	≤-26	0.03436	≤2.5	PASS
NTNV	2DH5	Ant1	2480	3000~13000	9913.00	-43.45	≤-26	0.04519	≤2.5	PASS
NTNV	2DH5	Ant1	Hop	30~1000	908.34	-61.08	≤-26	0.00078	≤2.5	PASS
NTNV	2DH5	Ant1	Hop	1000~2387	1923.40	-45.79	≤-26	0.02636	≤2.5	PASS
NTNV	2DH5	Ant1	Hop	2387~2400	2399.99	-38.46	≤-16	0.14256	≤25	PASS
NTNV	2DH5	Ant1	Hop	2483.5~2496.5	2493.63	-48.47	≤-16	0.01422	≤25	PASS
NTNV	2DH5	Ant1	Hop	2496.5~3000	2595.71	-55.65	≤-26	0.00272	≤2.5	PASS
NTNV	2DH5	Ant1	Hop	3000~13000	9905.00	-55.62	≤-26	0.00274	≤2.5	PASS
NTNV	3DH5	Ant1	2402	30~1000	168.47	-49.64	≤-26	0.01086	≤2.5	PASS
NTNV	3DH5	Ant1	2402	1000~2387	2209.81	-45.21	≤-26	0.03013	≤2.5	PASS
NTNV	3DH5	Ant1	2402	2387~2400	2399.99	-25.04	≤-16	3.13329	≤25	PASS
NTNV	3DH5	Ant1	2402	2483.5~2496.5	2486.39	-36.30	≤-16	0.23442	≤25	PASS
NTNV	3DH5	Ant1	2402	2496.5~3000	2593.93	-43.83	≤-26	0.04140	≤2.5	PASS
NTNV	3DH5	Ant1	2402	3000~13000	7200.00	-43.58	≤-26	0.04385	≤2.5	PASS
NTNV	3DH5	Ant1	2441	30~1000	953.20	-49.28	≤-26	0.01180	≤2.5	PASS
NTNV	3DH5	Ant1	2441	1000~2387	2248.65	-44.77	≤-26	0.03334	≤2.5	PASS
NTNV	3DH5	Ant1	2441	2387~2400	2389.54	-36.72	≤-16	0.21281	≤25	PASS
NTNV	3DH5	Ant1	2441	2483.5~2496.5	2490.18	-35.96	≤-16	0.25351	≤25	PASS
NTNV	3DH5	Ant1	2441	2496.5~3000	2633.02	-44.63	≤-26	0.03443	≤2.5	PASS
NTNV	3DH5	Ant1	2441	3000~13000	9757.00	-43.02	≤-26	0.04989	≤2.5	PASS
NTNV	3DH5	Ant1	2480	30~1000	922.89	-48.74	≤-26	0.01337	≤2.5	PASS
NTNV	3DH5	Ant1	2480	1000~2387	1923.74	-38.29	≤-26	0.14825	≤2.5	PASS
NTNV	3DH5	Ant1	2480	2387~2400	2398.49	-36.40	≤-16	0.22909	≤25	PASS
NTNV	3DH5	Ant1	2480	2483.5~2496.5	2484.37	-36.33	≤-16	0.23281	≤25	PASS
NTNV	3DH5	Ant1	2480	2496.5~3000	2517.34	-42.09	≤-26	0.06180	≤2.5	PASS
NTNV	3DH5	Ant1	2480	3000~13000	7433.50	-43.34	≤-26	0.04634	≤2.5	PASS
NTNV	3DH5	Ant1	Hop	30~1000	897.67	-60.80	≤-26	0.00083	≤2.5	PASS
NTNV	3DH5	Ant1	Hop	1000~2387	2339.50	-41.97	≤-26	0.06353	≤2.5	PASS
NTNV	3DH5	Ant1	Hop	2387~2400	2399.99	-37.53	≤-16	0.17660	≤25	PASS
NTNV	3DH5	Ant1	Hop	2483.5~2496.5	2496.19	-48.34	≤-16	0.01466	≤25	PASS
NTNV	3DH5	Ant1	Hop	2496.5~3000	2604.22	-40.07	≤-26	0.09840	≤2.5	PASS
NTNV	3DH5	Ant1	Hop	3000~13000	7344.00	-55.42	≤-26	0.00287	≤2.5	PASS

