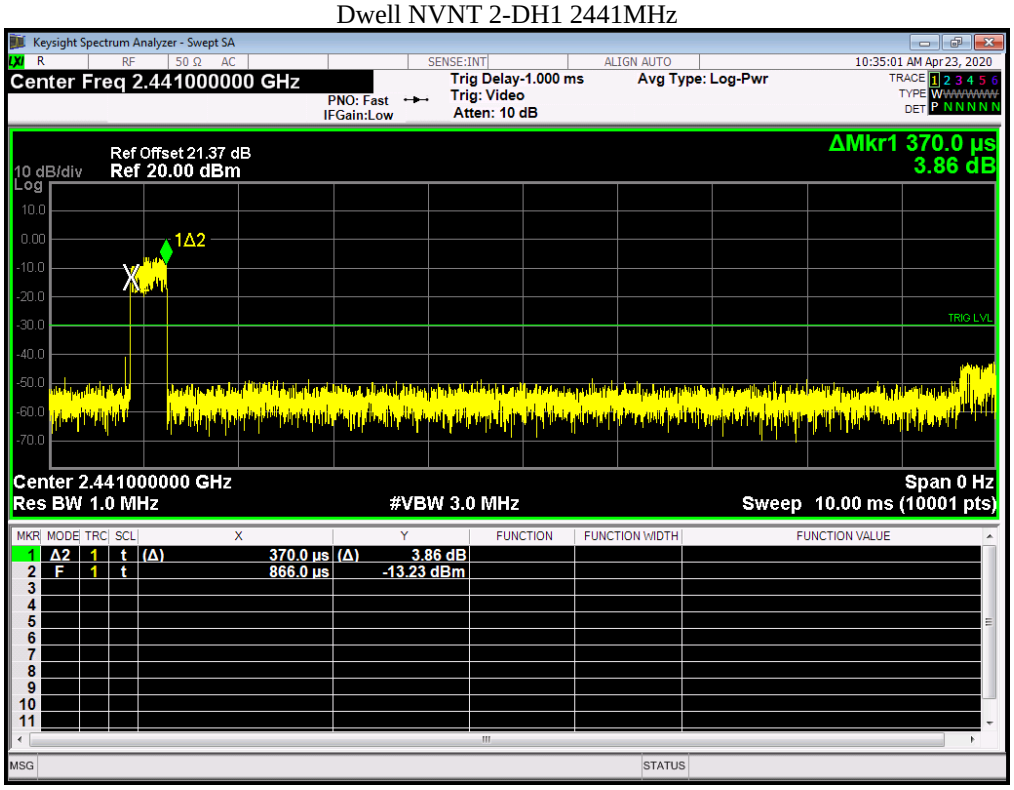
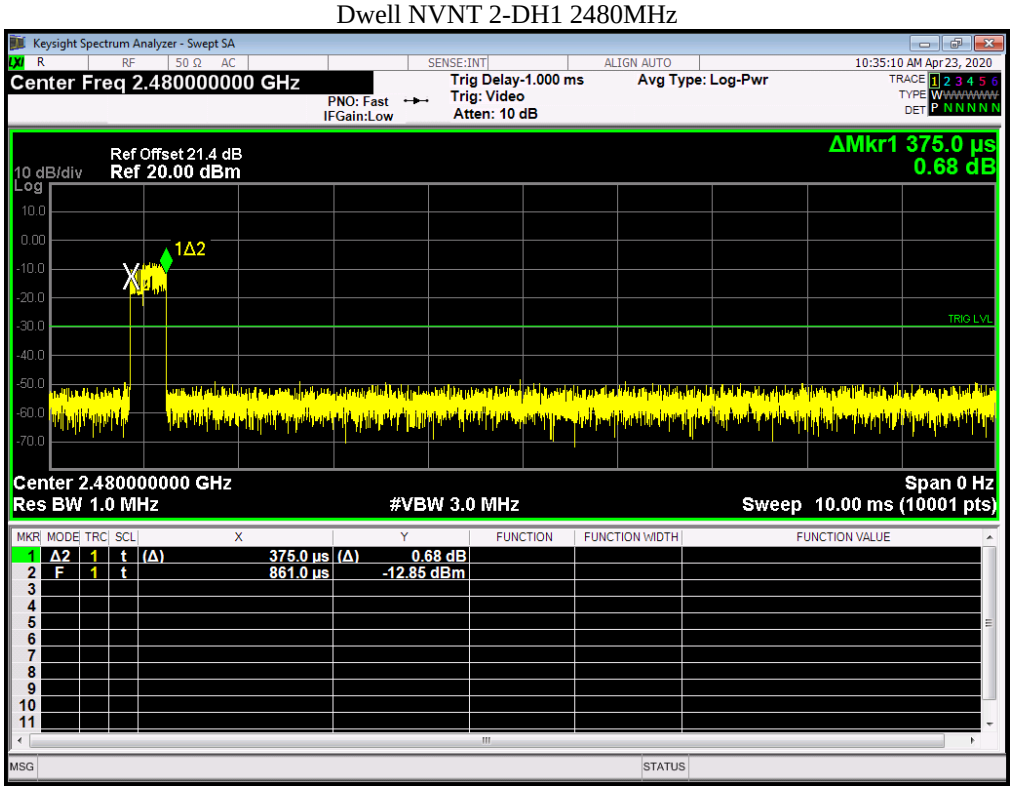
Dwell NVNT 2-DH1 2441MHz

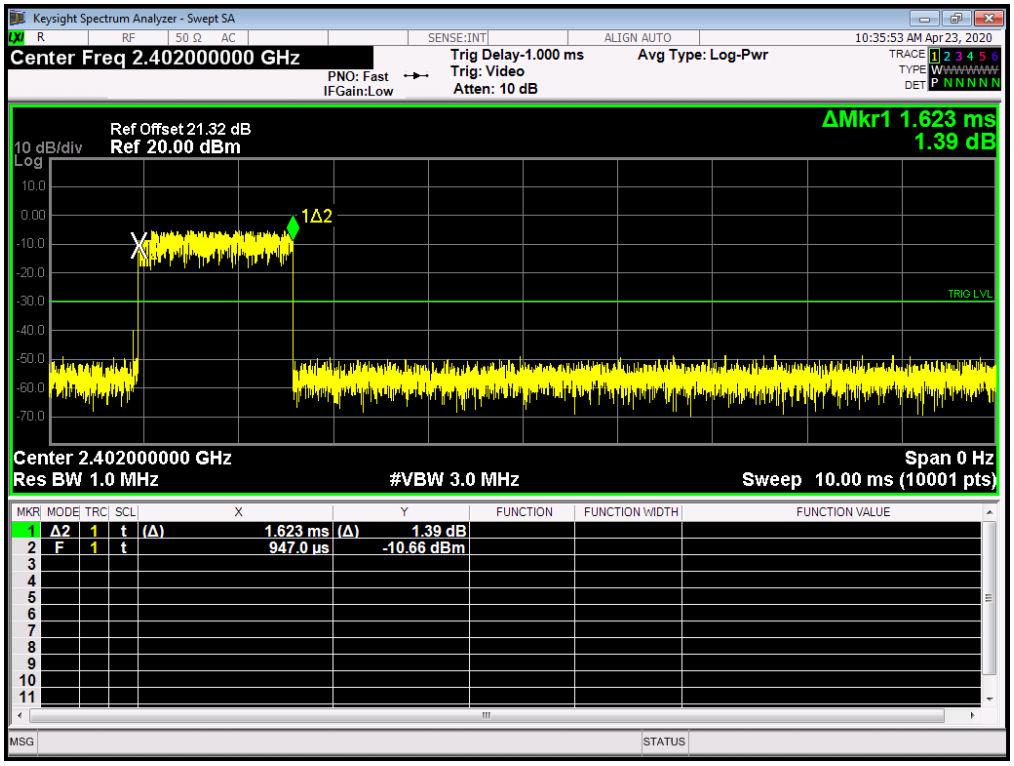


Dwell NVNT 2-DH1 2480MHz

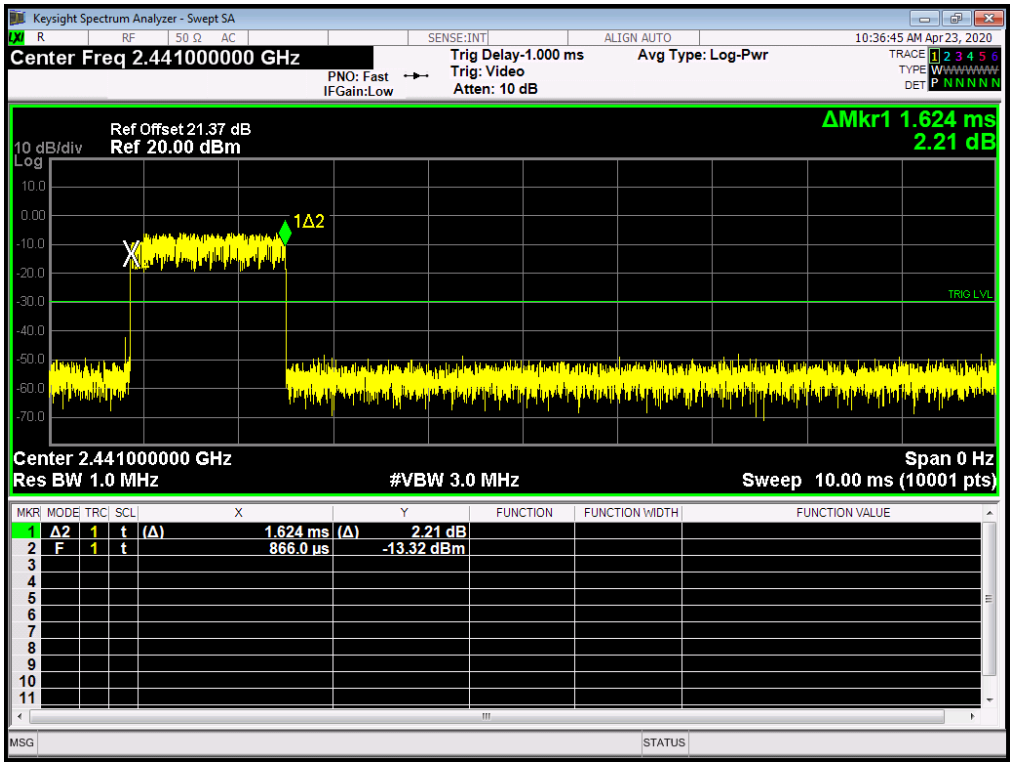


Condition	Mode	Frequency (MHz)	Pulse Time (ms)	Total Dwell Time (ms)	Period Time (ms)	Limit (ms)	Verdict
NVNT	2-DH3	2402	1.623	256.434	31600	400	Pass
NVNT	2-DH3	2441	1.624	256.592	31600	400	Pass
NVNT	2-DH3	2480	1.636	258.488	31600	400	Pass

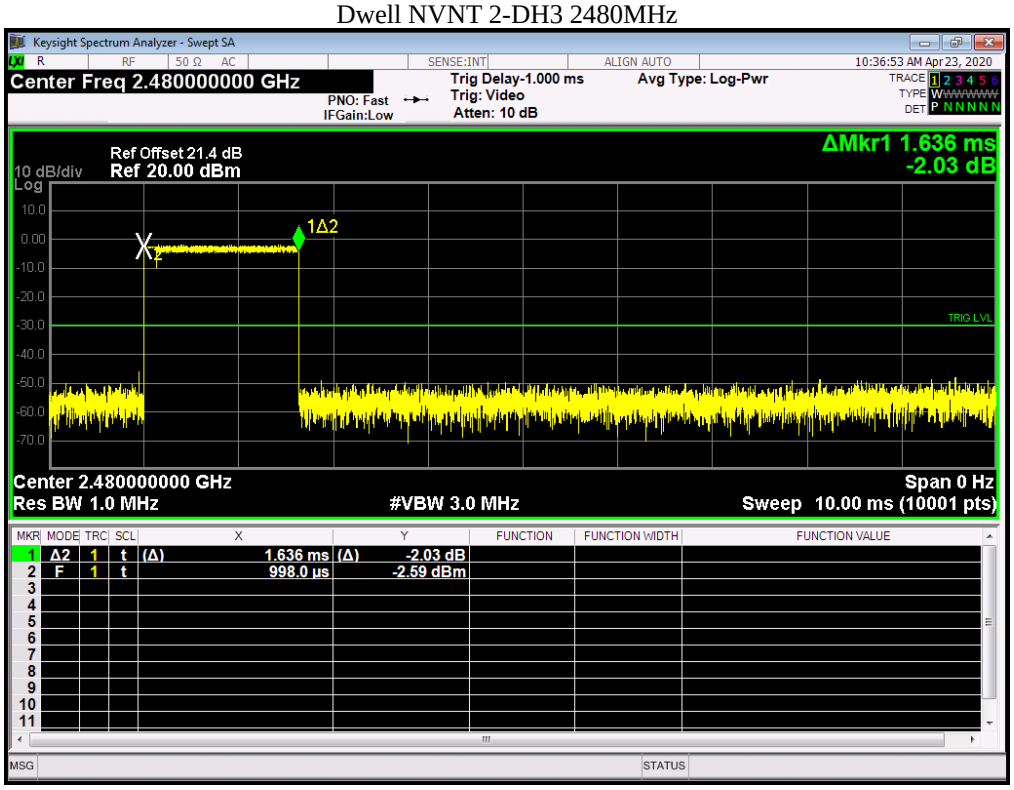
Dwell NVNT 2-DH3 2402MHz



Dwell NVNT 2-DH3 2441MHz

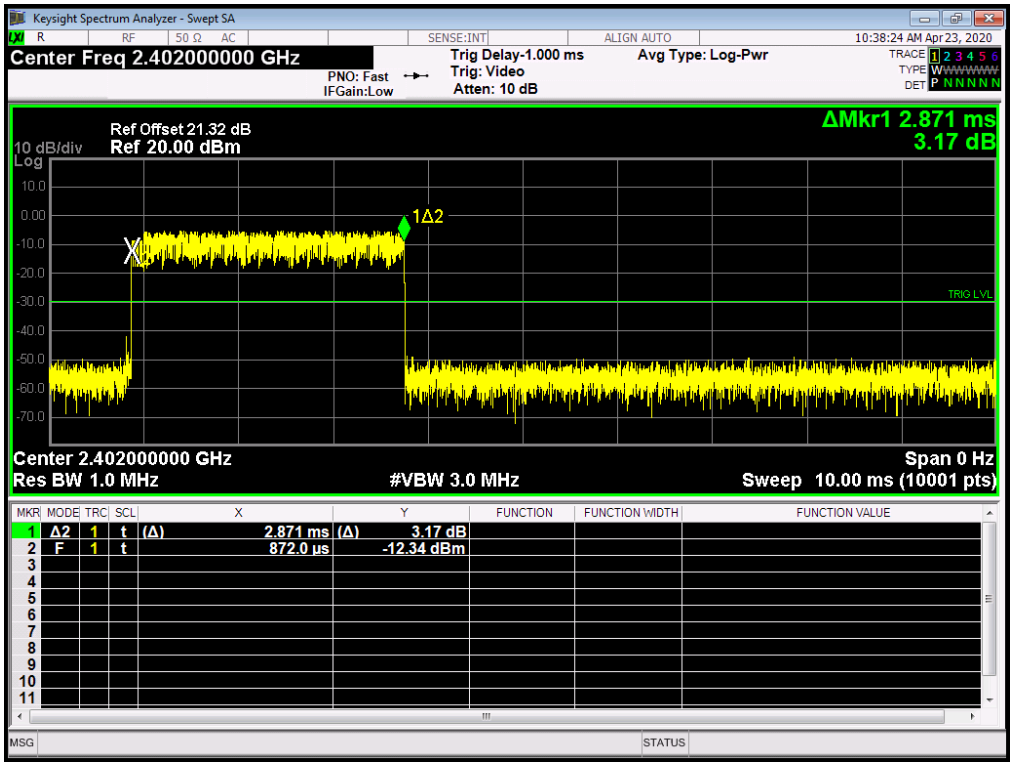


Dwell NVNT 2-DH3 2480MHz

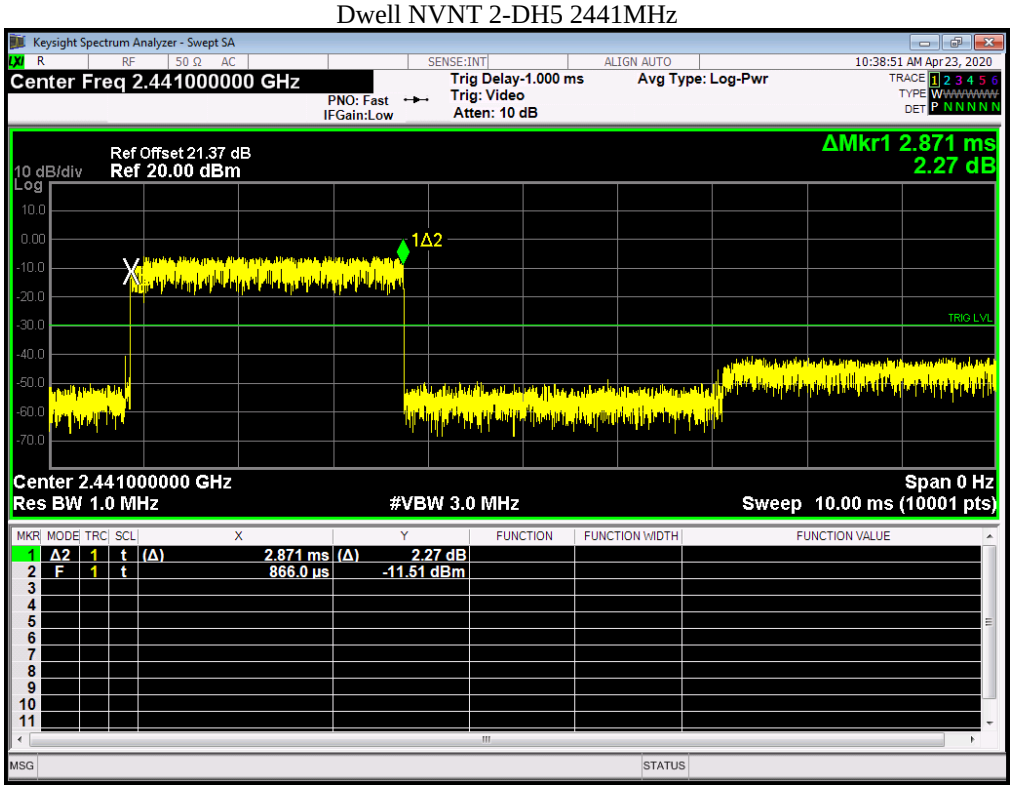


Condition	Mode	Frequency (MHz)	Pulse Time (ms)	Total Dwell Time (ms)	Period Time (ms)	Limit (ms)	Verdict
NVNT	2-DH5	2402	2.871	272.171	31600	400	Pass
NVNT	2-DH5	2441	2.871	272.171	31600	400	Pass
NVNT	2-DH5	2480	2.876	272.645	31600	400	Pass

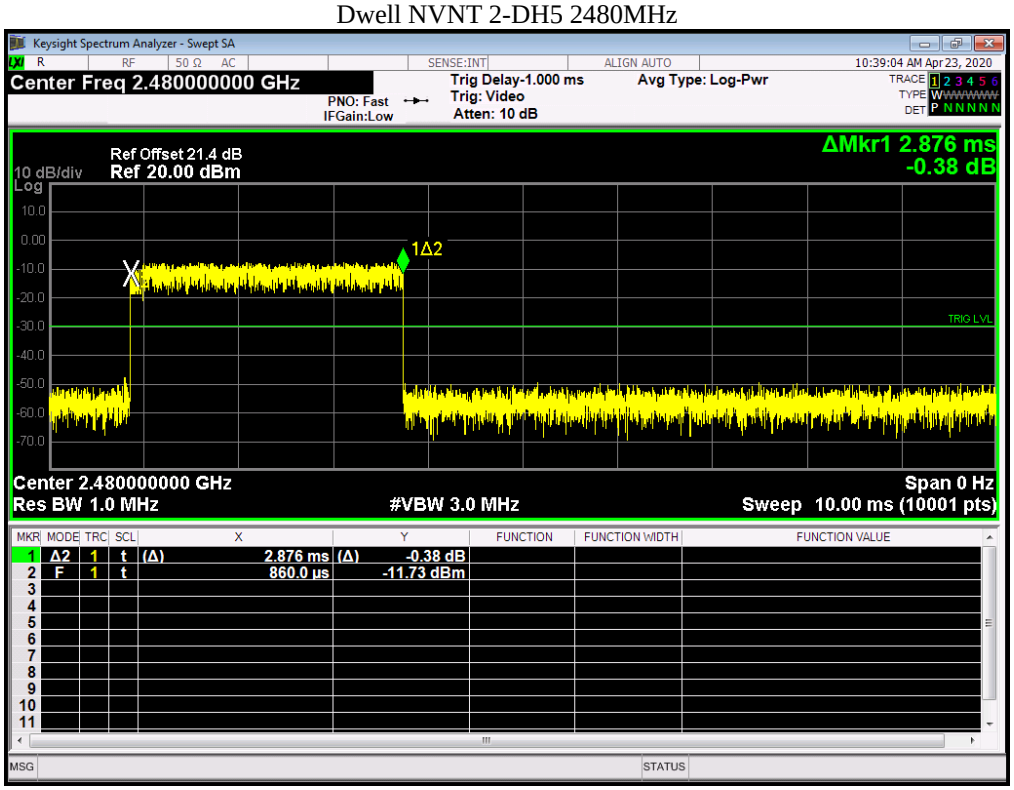
Dwell NVNT 2-DH5 2402MHz



Dwell NVNT 2-DH5 2441MHz

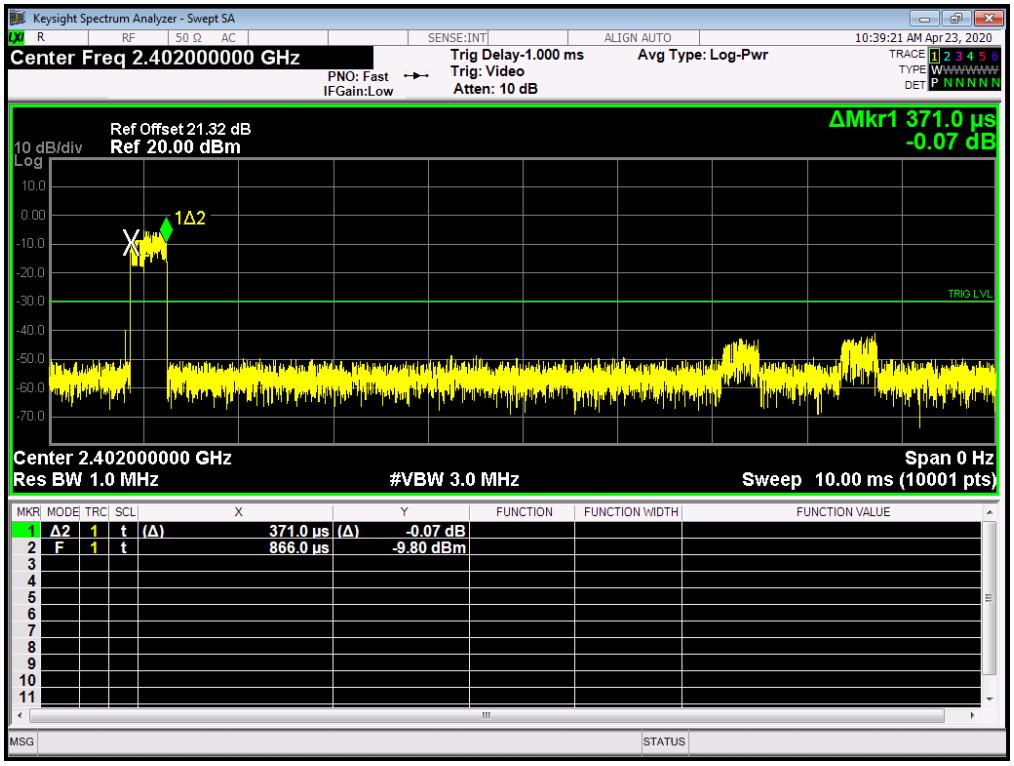


Dwell NVNT 2-DH5 2480MHz

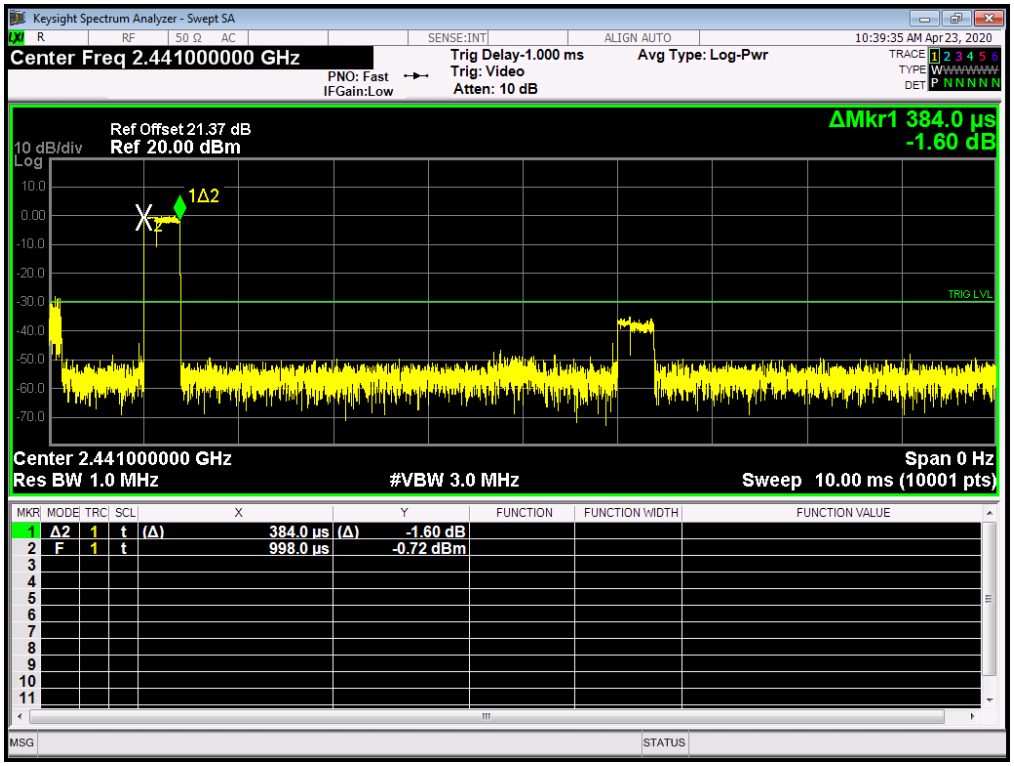


Condition	Mode	Frequency (MHz)	Pulse Time (ms)	Total Dwell Time (ms)	Period Time (ms)	Limit (ms)	Verdict
NVNT	3-DH1	2402	0.371	117.236	31600	400	Pass
NVNT	3-DH1	2441	0.384	121.344	31600	400	Pass
NVNT	3-DH1	2480	0.384	121.344	31600	400	Pass

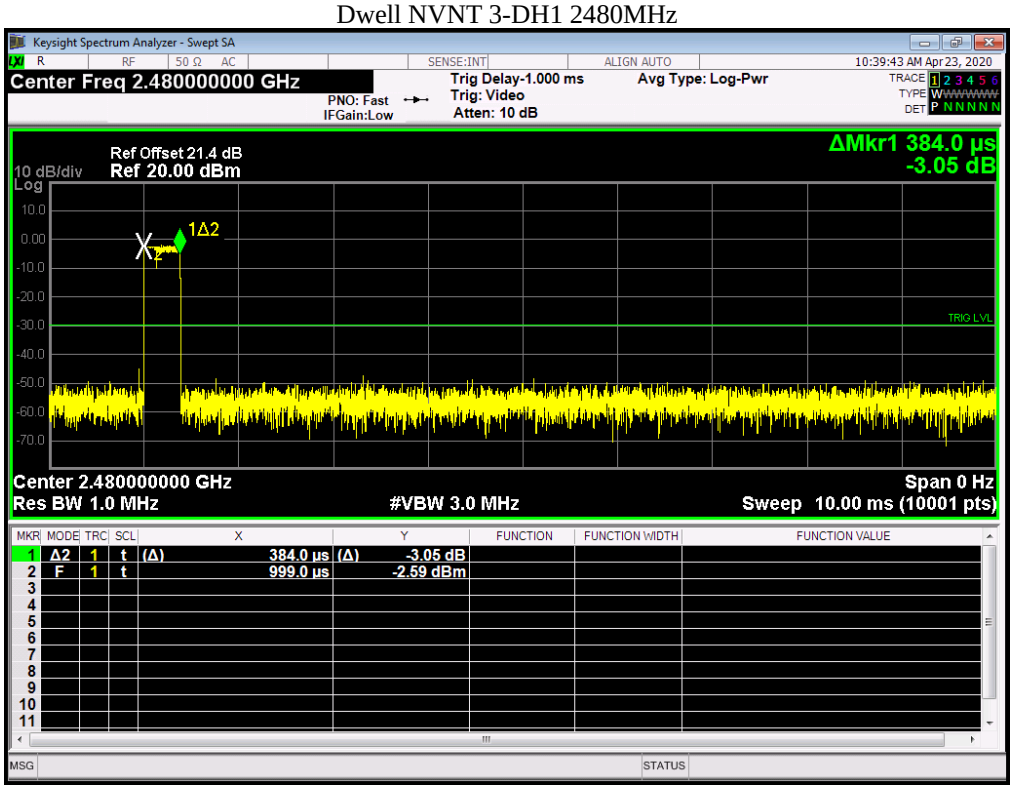
Dwell NVNT 3-DH1 2402MHz



Dwell NVNT 3-DH1 2441MHz

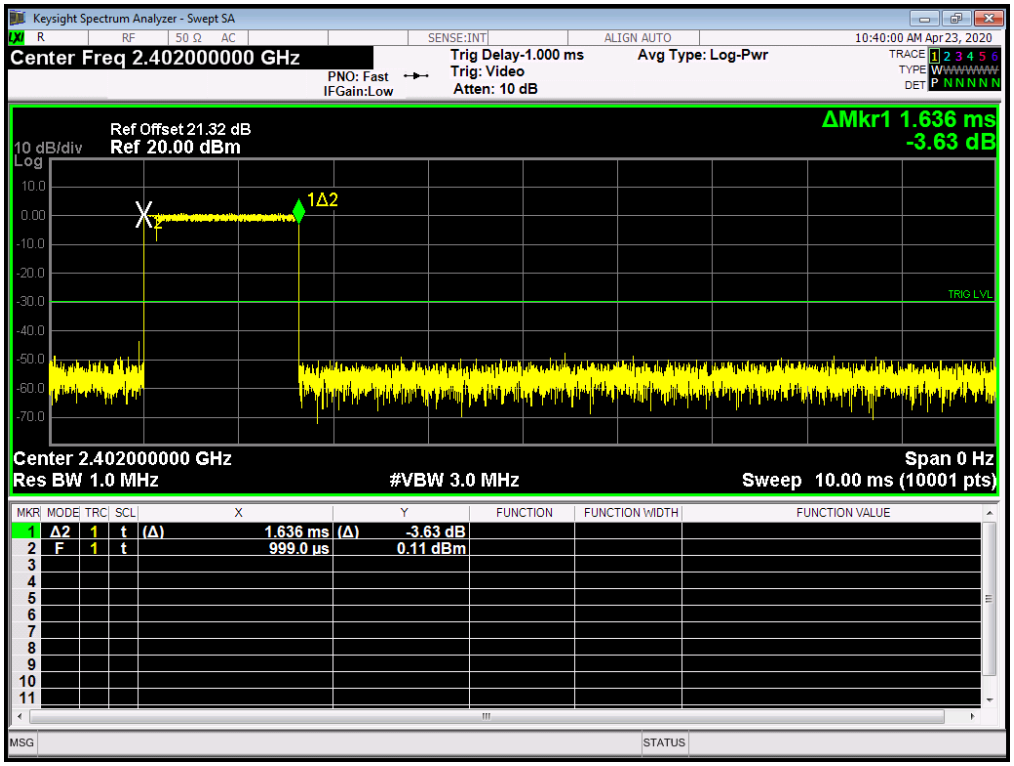


Dwell NVNT 3-DH1 2480MHz

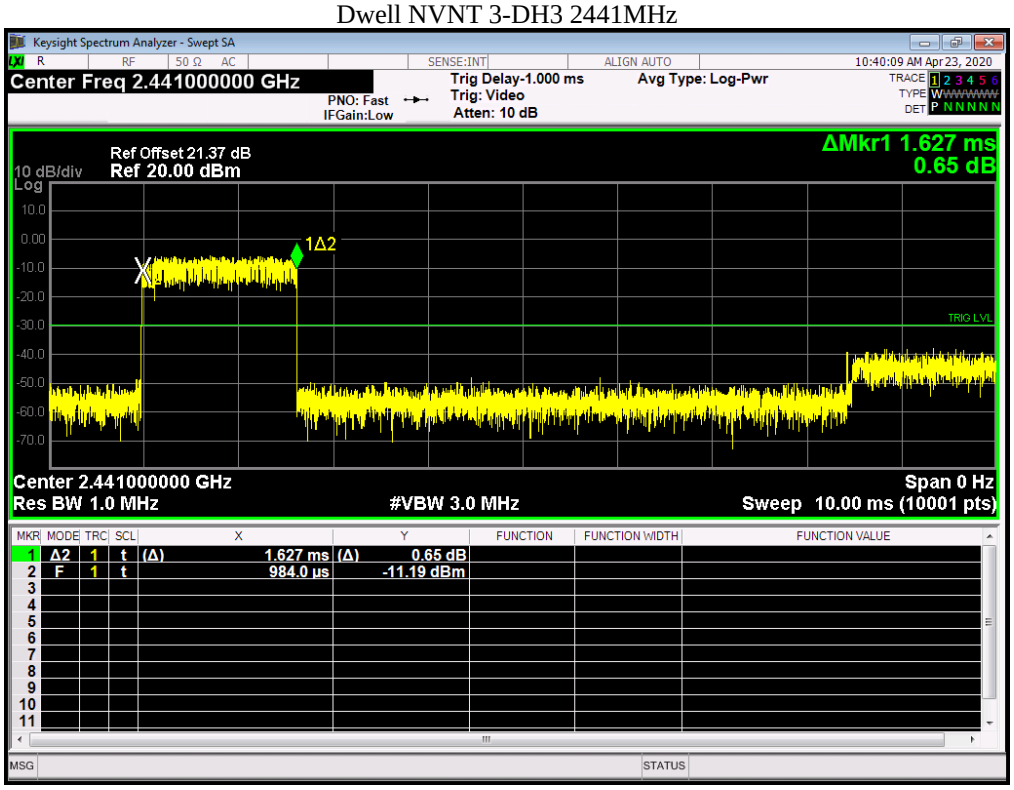


Condition	Mode	Frequency (MHz)	Pulse Time (ms)	Total Dwell Time (ms)	Period Time (ms)	Limit (ms)	Verdict
NVNT	3-DH3	2402	1.636	258.488	31600	400	Pass
NVNT	3-DH3	2441	1.627	257.066	31600	400	Pass
NVNT	3-DH3	2480	1.628	257.224	31600	400	Pass

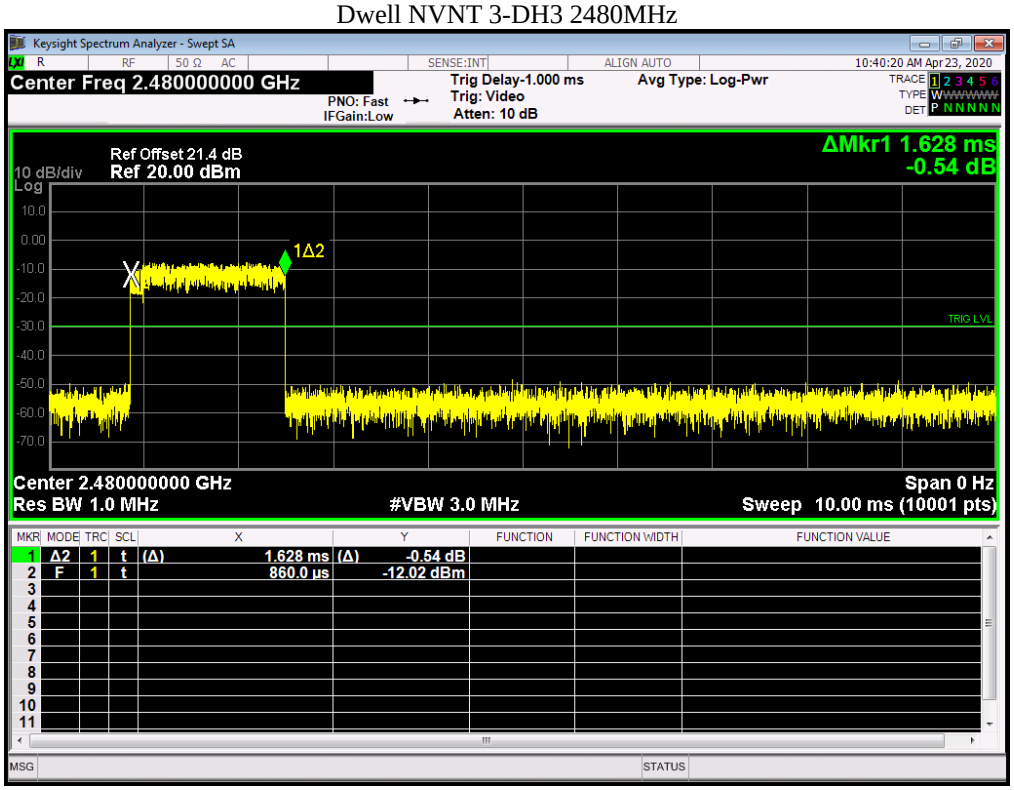
Dwell NVNT 3-DH3 2402MHz



Dwell NVNT 3-DH3 2441MHz

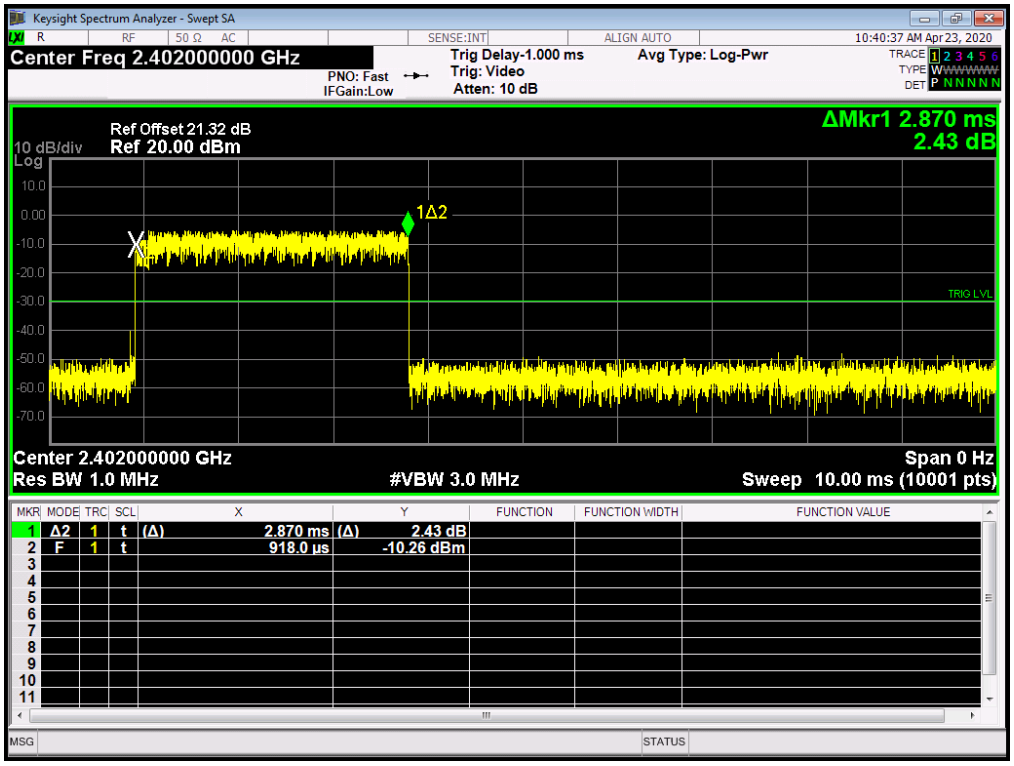


Dwell NVNT 3-DH3 2480MHz

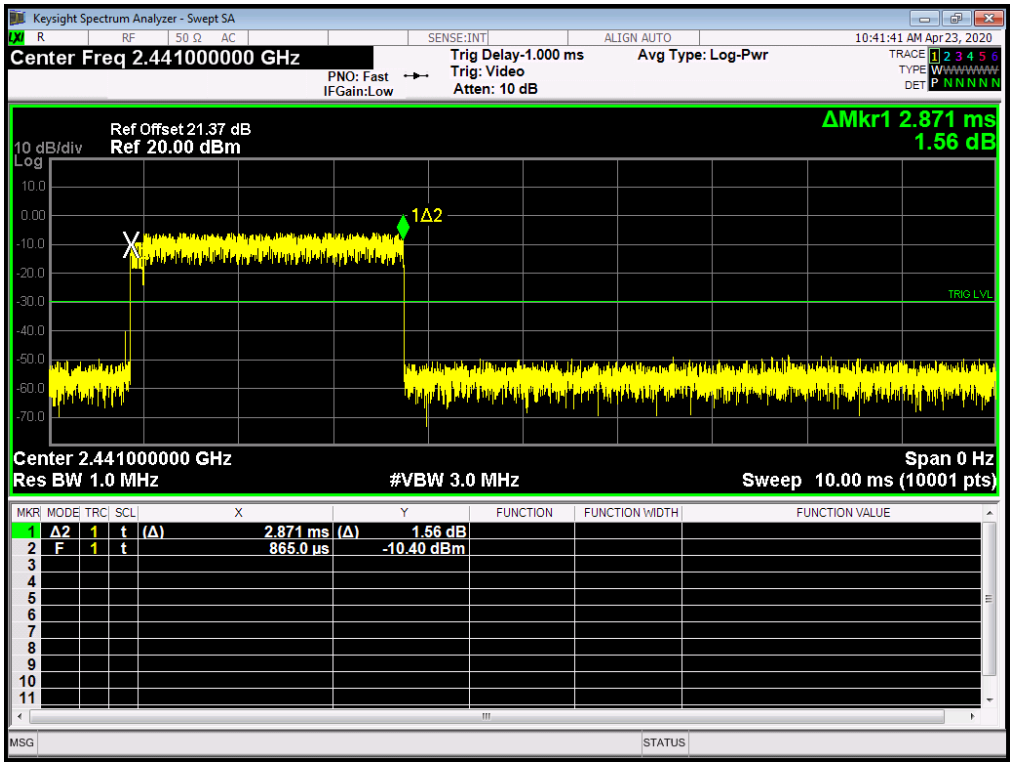


Condition	Mode	Frequency (MHz)	Pulse Time (ms)	Total Dwell Time (ms)	Period Time (ms)	Limit (ms)	Verdict
NVNT	3-DH5	2402	2.87	272.076	31600	400	Pass
NVNT	3-DH5	2441	2.871	272.171	31600	400	Pass
NVNT	3-DH5	2480	2.884	273.403	31600	400	Pass

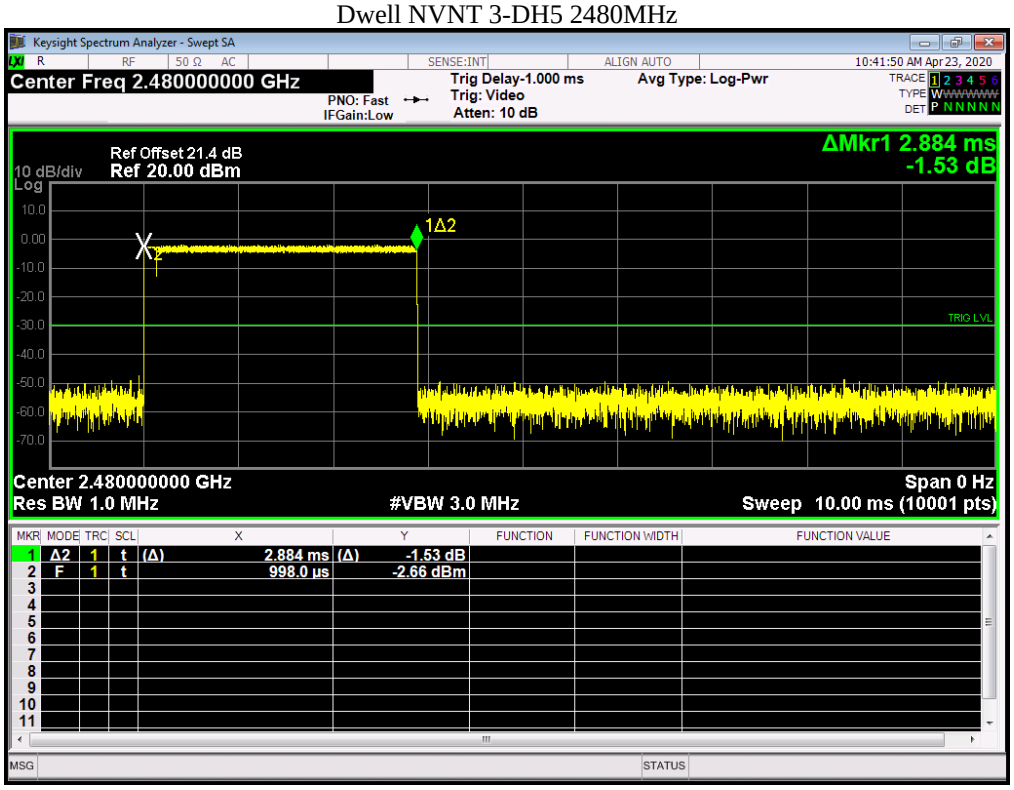
Dwell NVNT 3-DH5 2402MHz



Dwell NVNT 3-DH5 2441MHz



Dwell NVNT 3-DH5 2480MHz



10. Band edge

10.1. Applied procedures / Limit

15.247(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

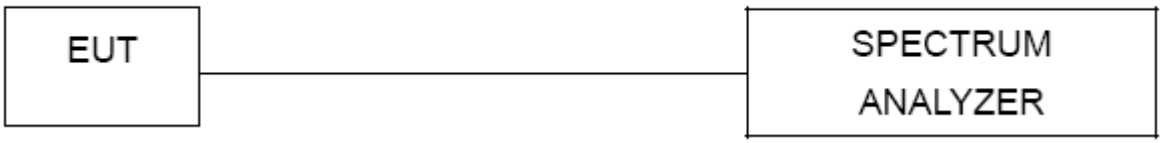
10.2. Test procedure

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
b. Span = wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products which fall outside of the authorized band of operation, RBW ≥ 1% of the span, VBW ≥ RBW, Sweep = auto,
Detector function = peak, Trace = max hold

10.3. Deviation from standard

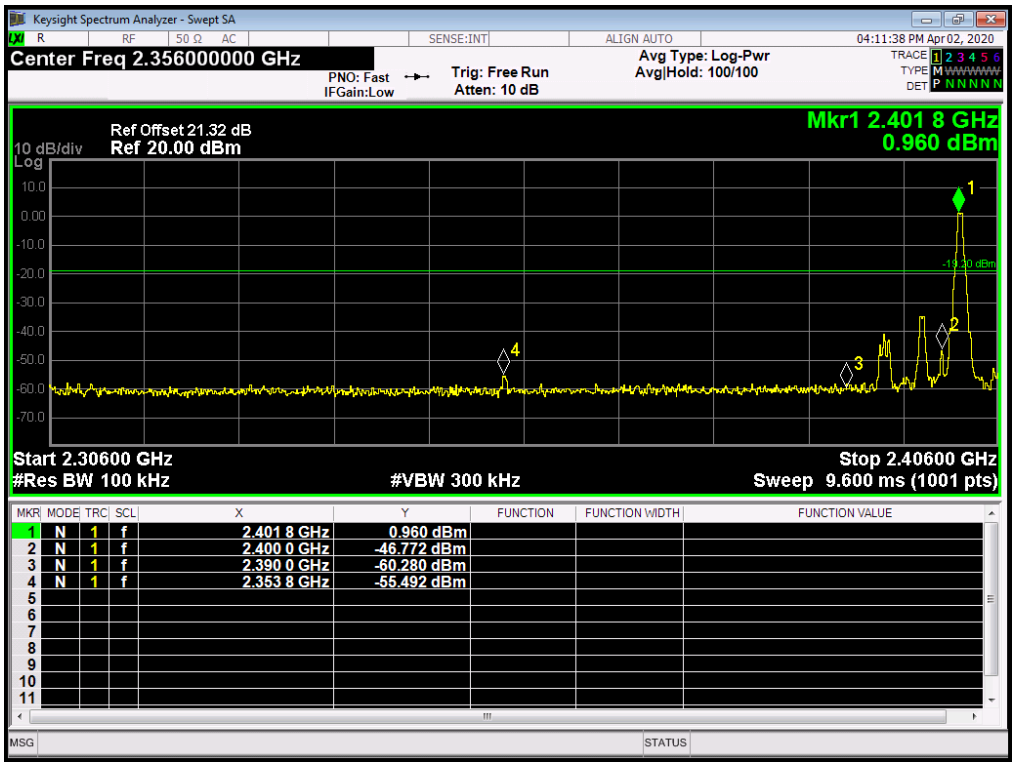
No deviation.

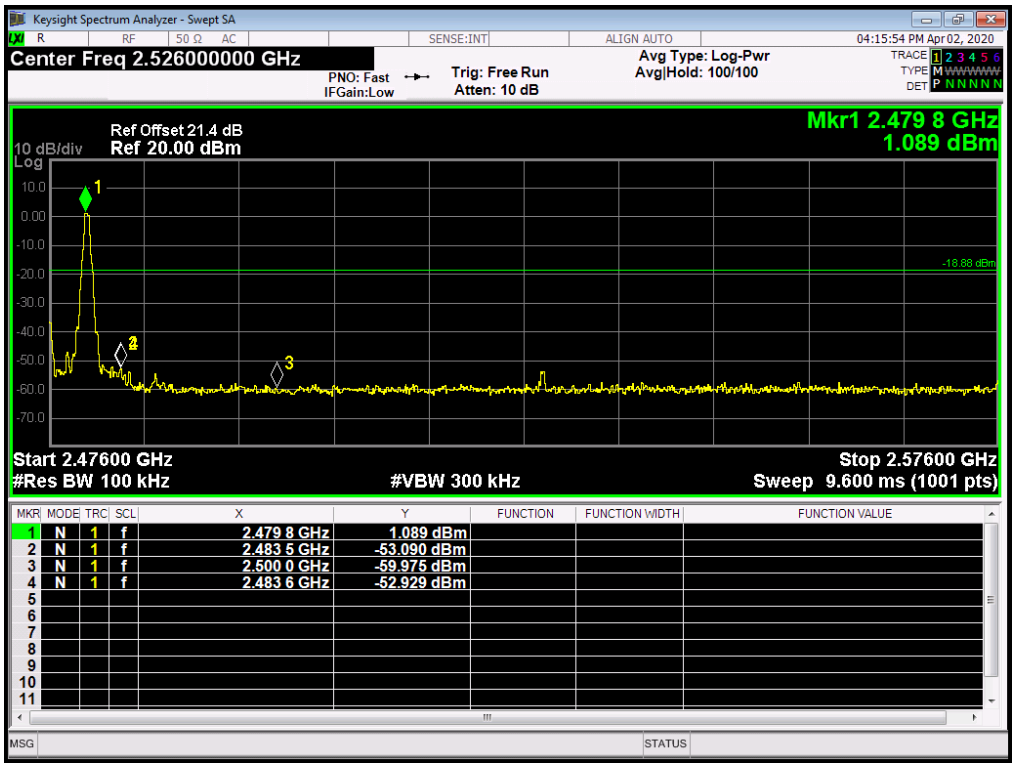
10.4. Test setup



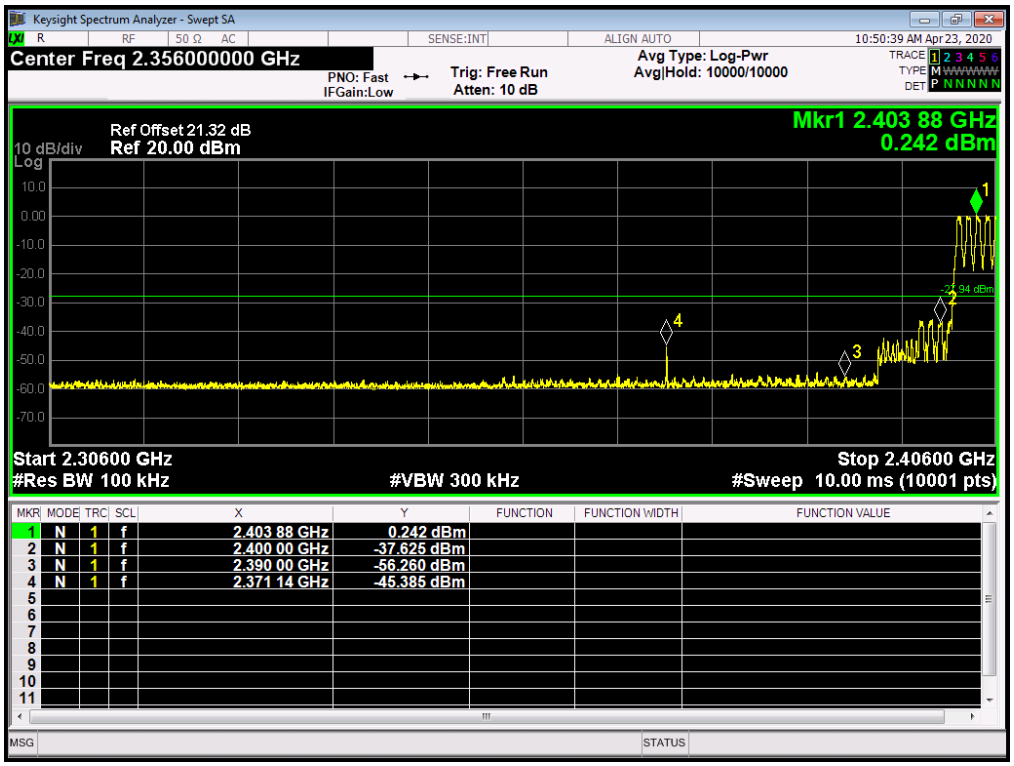
10.5. Test results

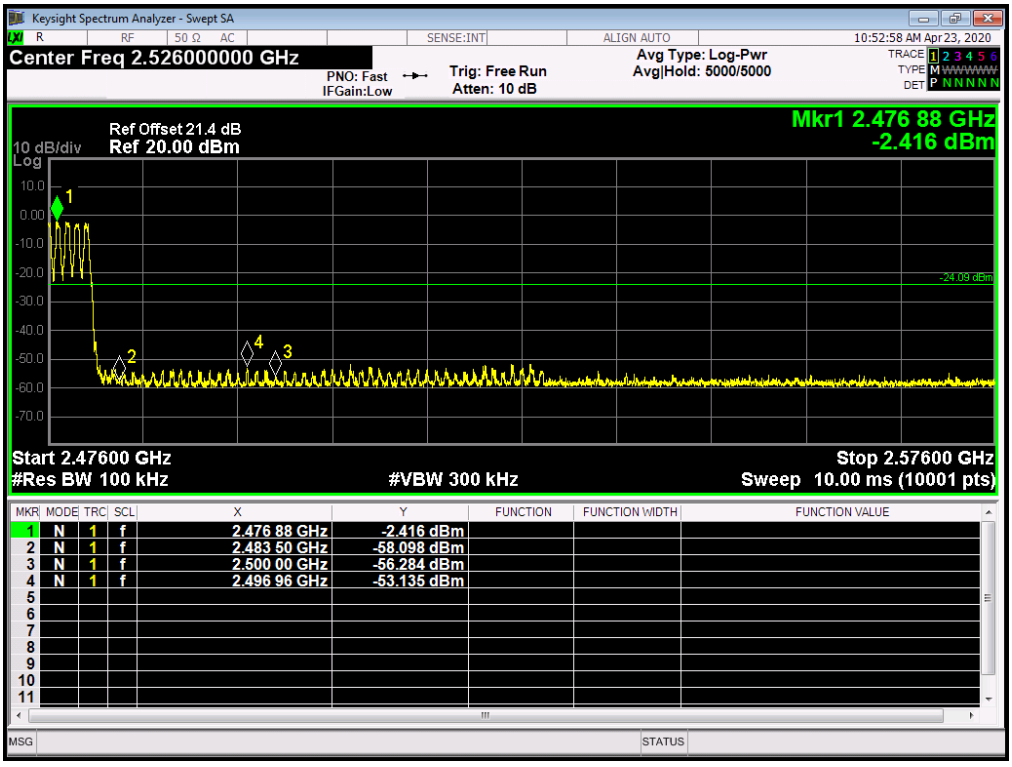
Condition	Mode	Frequency (MHz)	Antenna	Hopping Mode	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	GFSK	2402	Ant 1	No-Hopping	-56.293	-20	Pass
NVNT	GFSK	2480	Ant 1	No-Hopping	-54.039	-20	Pass



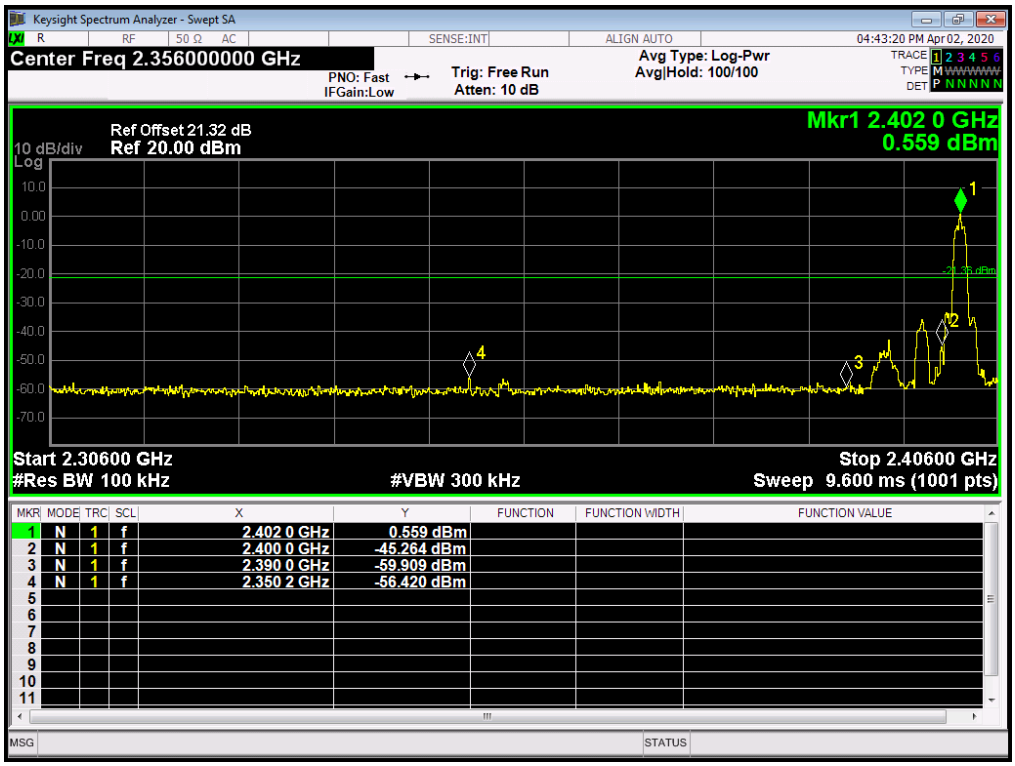


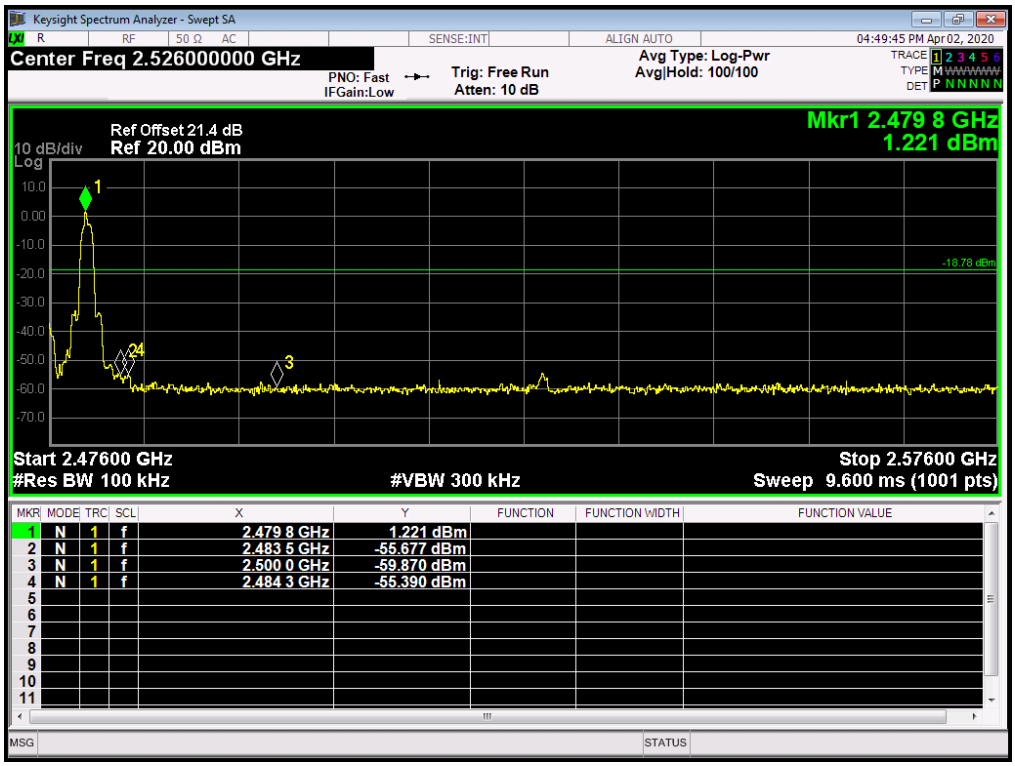
Condition	Mode	Frequency (MHz)	Antenna	Hopping Mode	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	GFSK	2402	Ant 1	Hopping	-37.44	-20	Pass
NVNT	GFSK	2480	Ant 1	Hopping	-49.043	-20	Pass



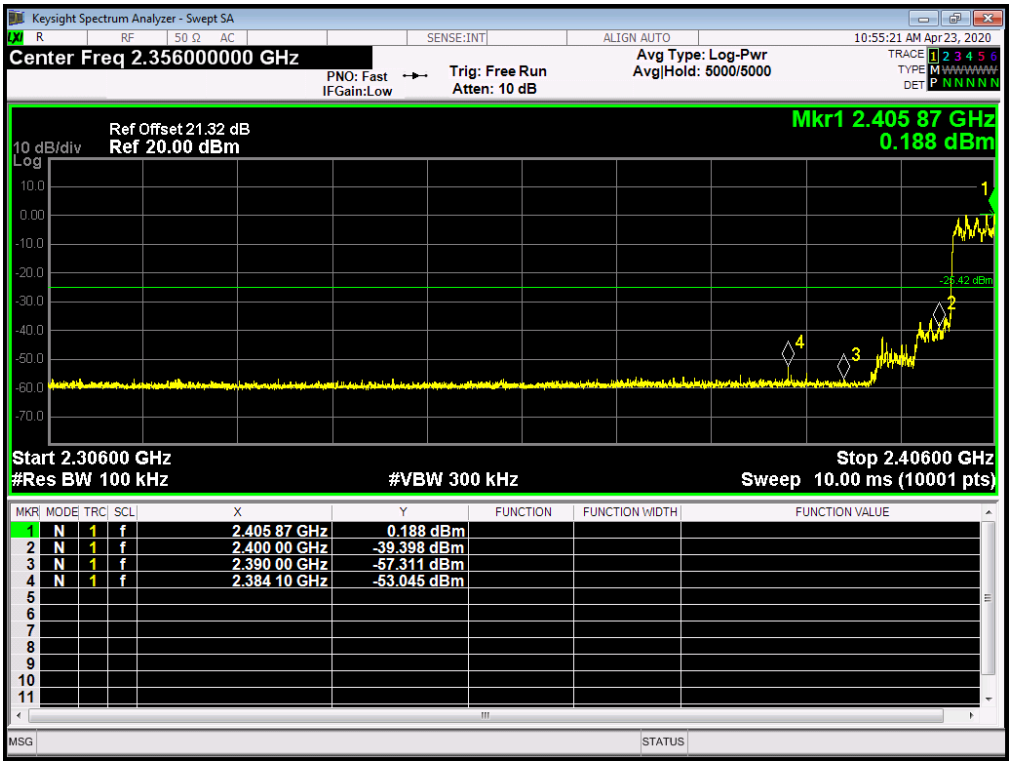


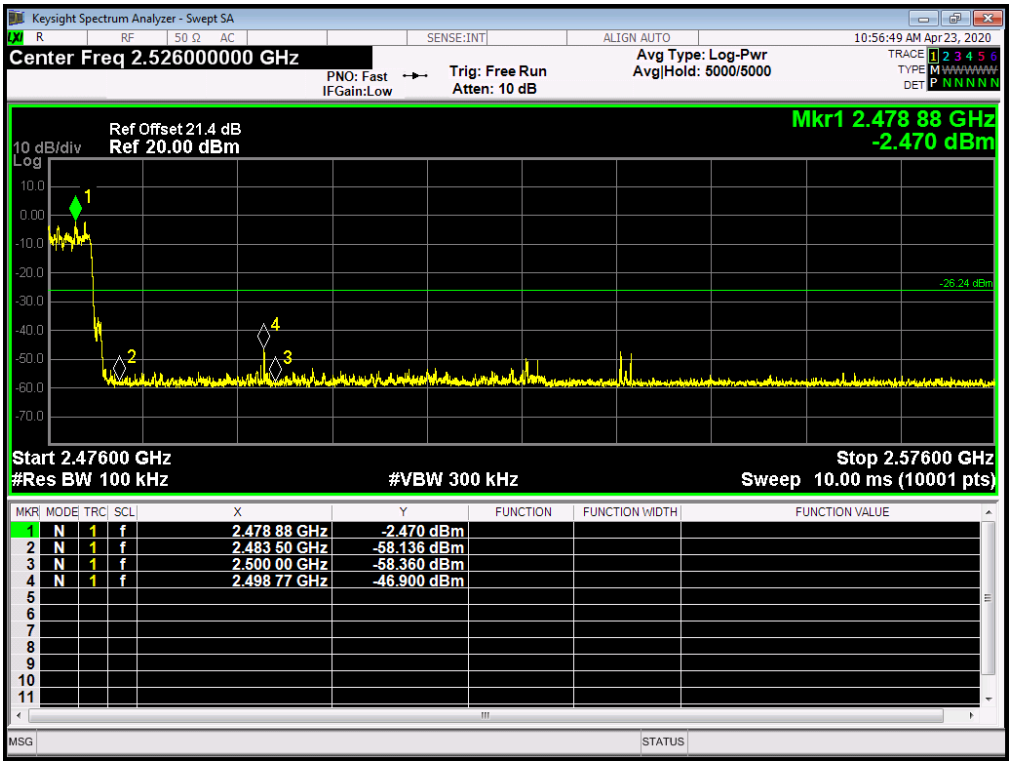
Condition	Mode	Frequency (MHz)	Antenna	Hopping Mode	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	π/4-DQPSK	2402	Ant 1	No-Hopping	-55.064	-20	Pass
NVNT	π/4-DQPSK	2480	Ant 1	No-Hopping	-56.606	-20	Pass



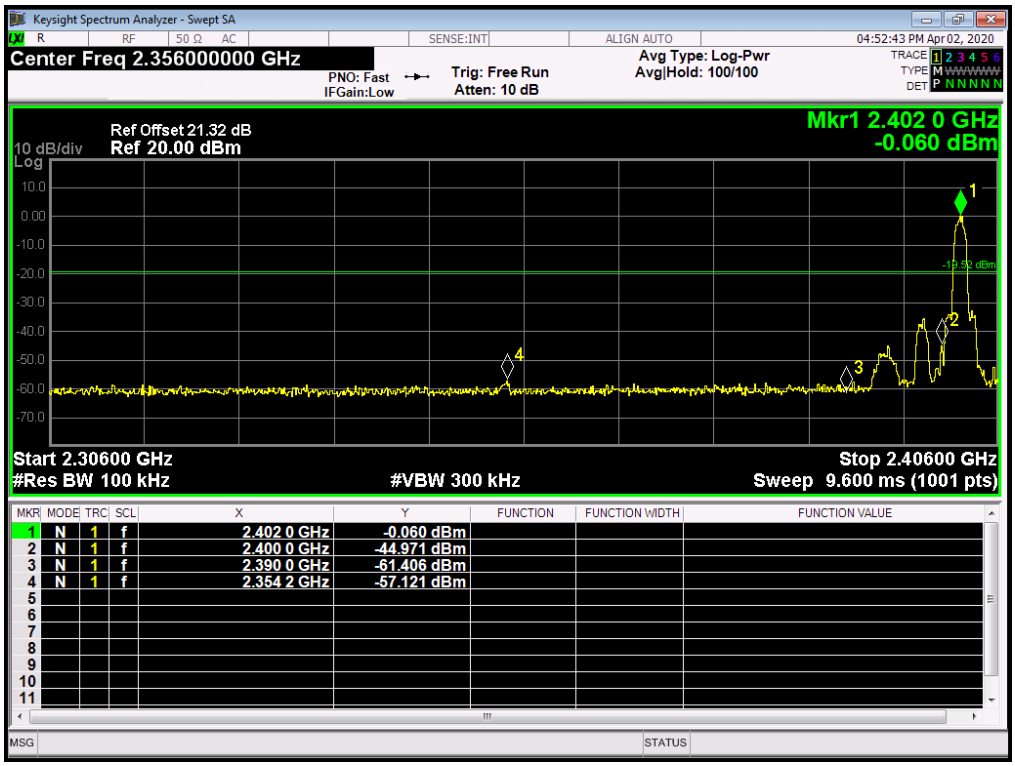


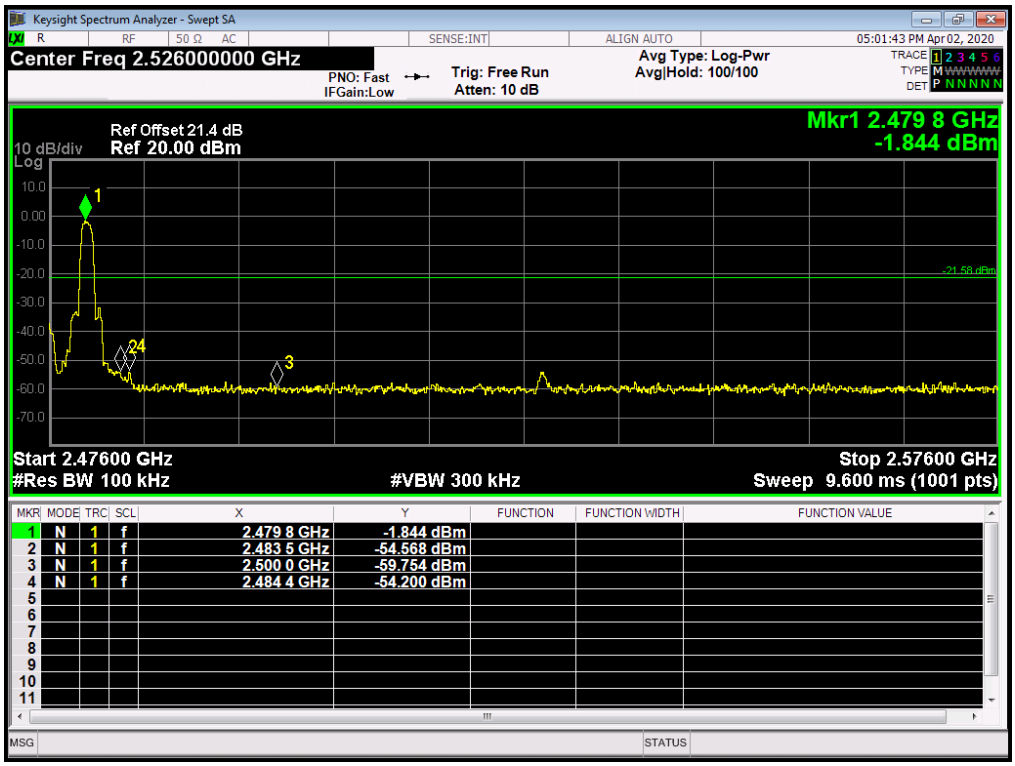
Condition	Mode	Frequency (MHz)	Antenna	Hopping Mode	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	π/4-DQPSK	2402	Ant 1	Hopping	-47.617	-20	Pass
NVNT	π/4-DQPSK	2480	Ant 1	Hopping	-40.654	-20	Pass



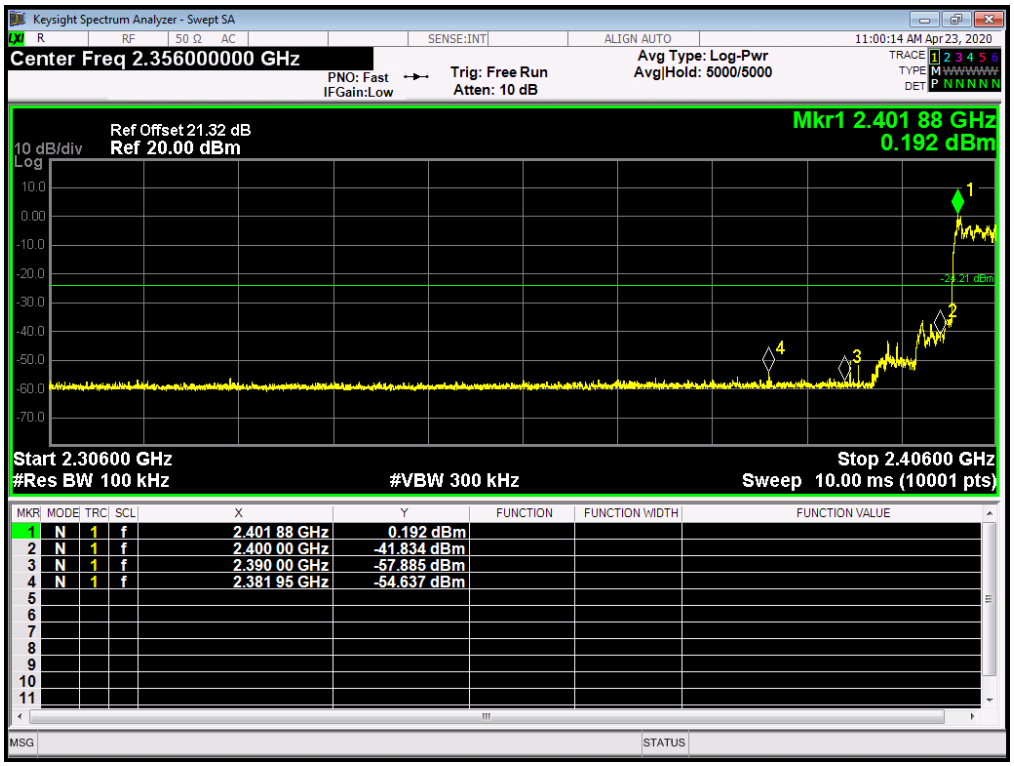


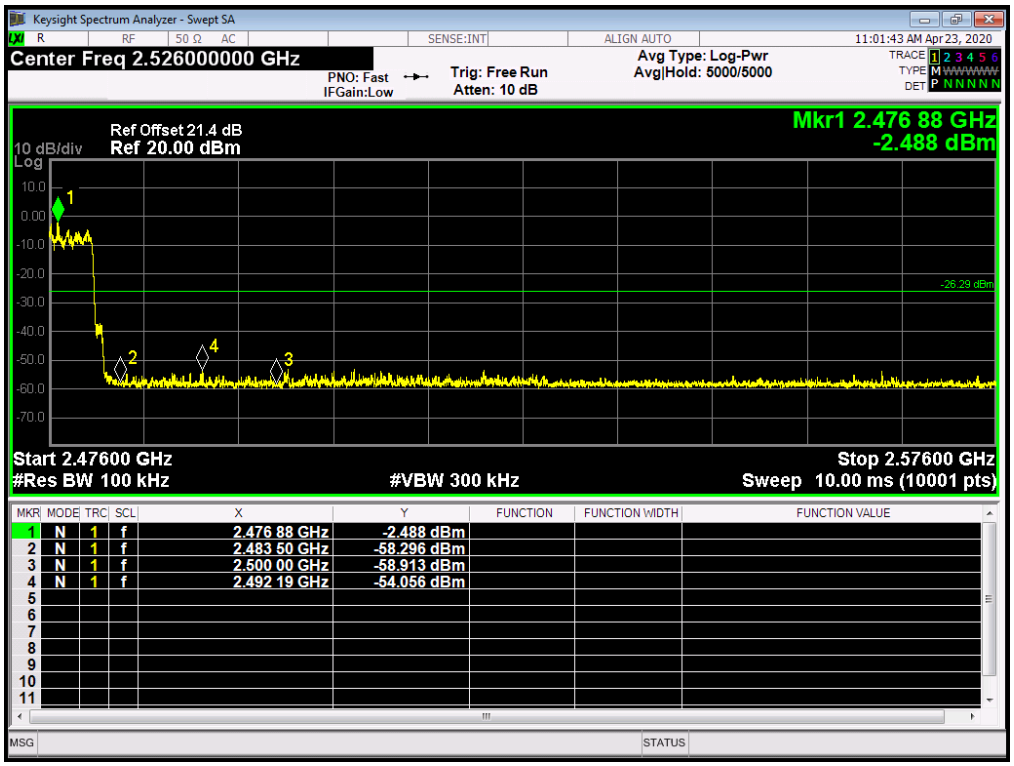
Condition	Mode	Frequency (MHz)	Antenna	Hopping Mode	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	8DPSK	2402	Ant 1	No-Hopping	-57.603	-20	Pass
NVNT	8DPSK	2480	Ant 1	No-Hopping	-52.616	-20	Pass





Condition	Mode	Frequency (MHz)	Antenna	Hopping Mode	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	8DPSK	2402	Ant 1	Hopping	-50.418	-20	Pass
NVNT	8DPSK	2480	Ant 1	Hopping	-47.762	-20	Pass





11. Conducted Spurious Emissions

11.1. Applied procedures / Limit

15.247(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

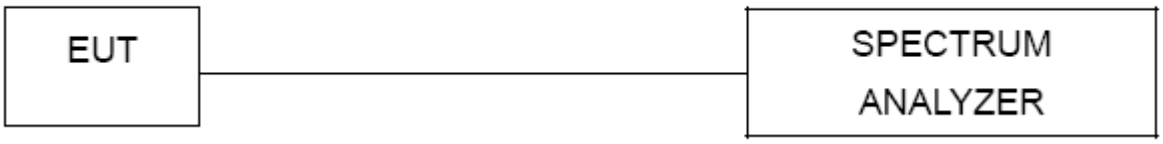
11.2. Test procedure

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
b. Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic. Typically, several plots are required to cover this entire span. RBW = 100 kHz
VBW ≥ RBW, Sweep = auto, Detector function = peak, Trace = max hold
sweep points ≥ investigated frequency range/RBW.

11.3. Deviation from standard

No deviation.

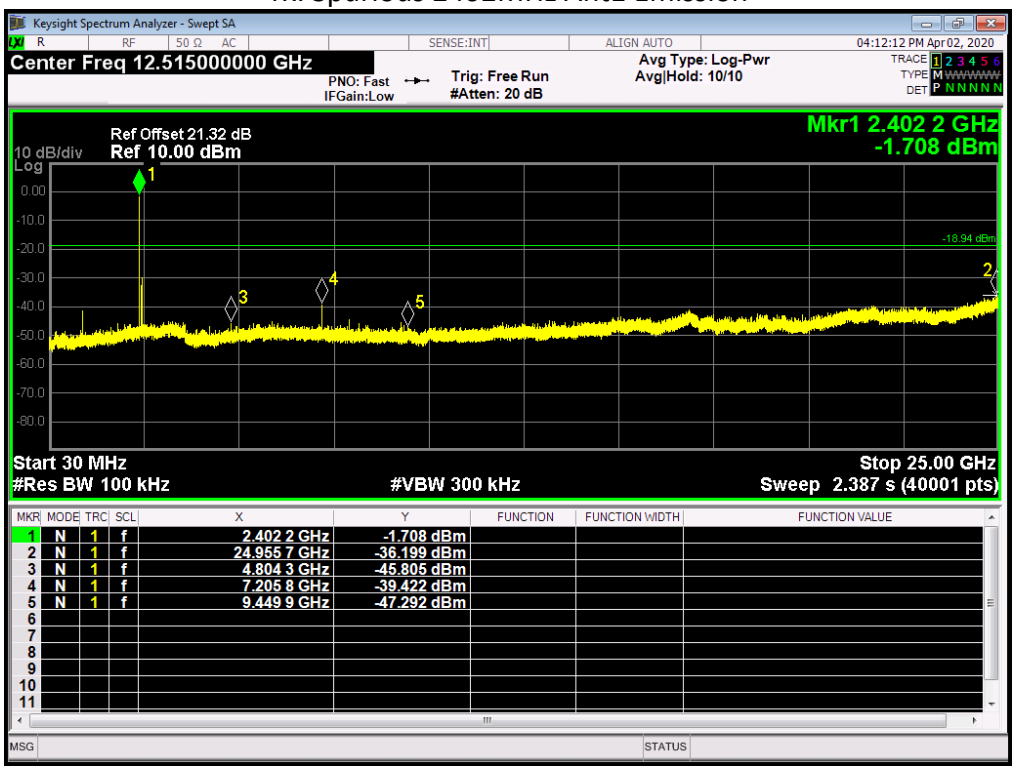
11.4. Test setup



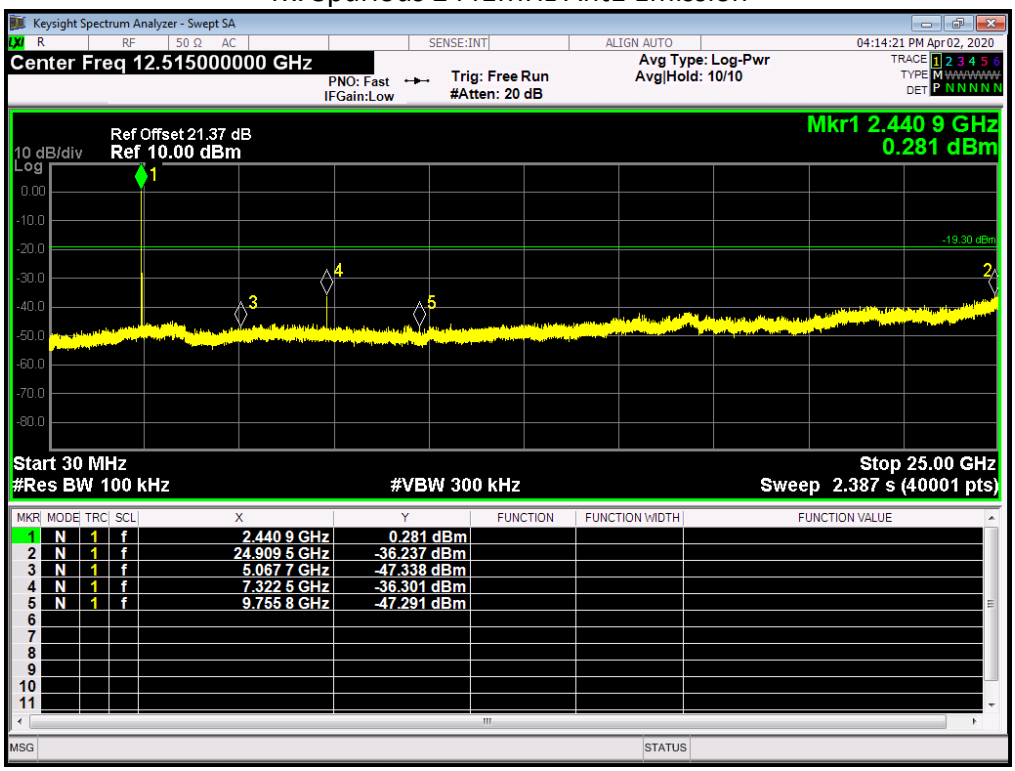
11.5. Test results

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	GFSK	2402	Ant 1	-37.247	-20	Pass
NVNT	GFSK	2441	Ant 1	-36.931	-20	Pass
NVNT	GFSK	2480	Ant 1	-36.143	-20	Pass

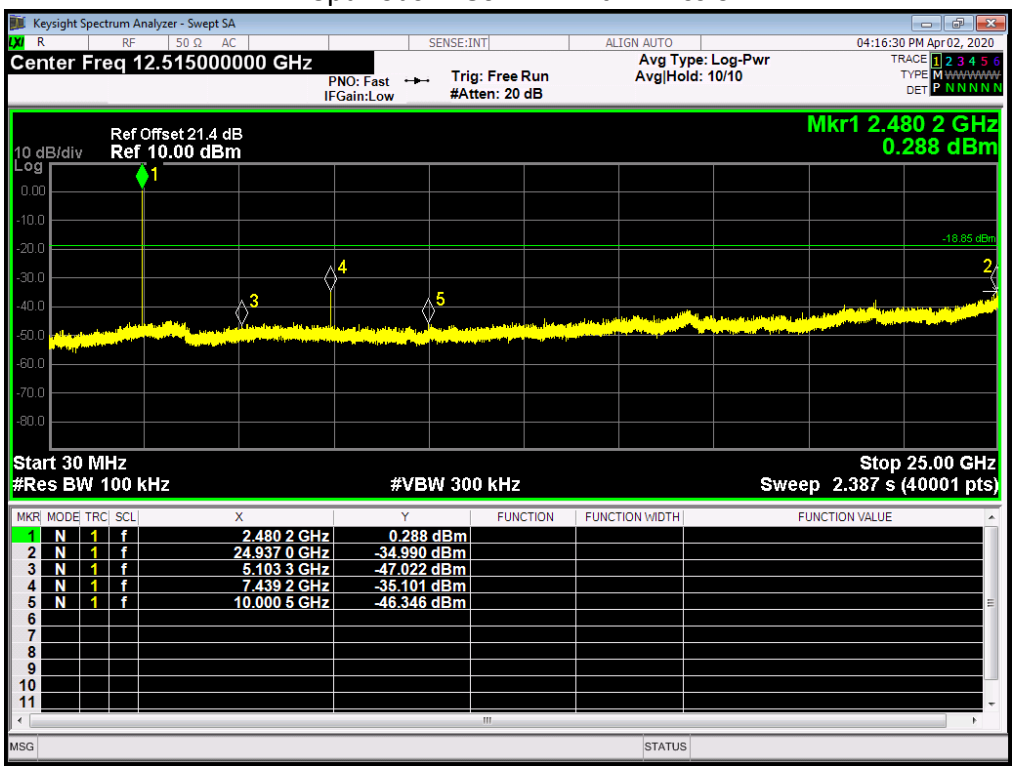
Tx. Spurious 2402MHz Ant1 Emission



Tx. Spurious 2441MHz Ant1 Emission

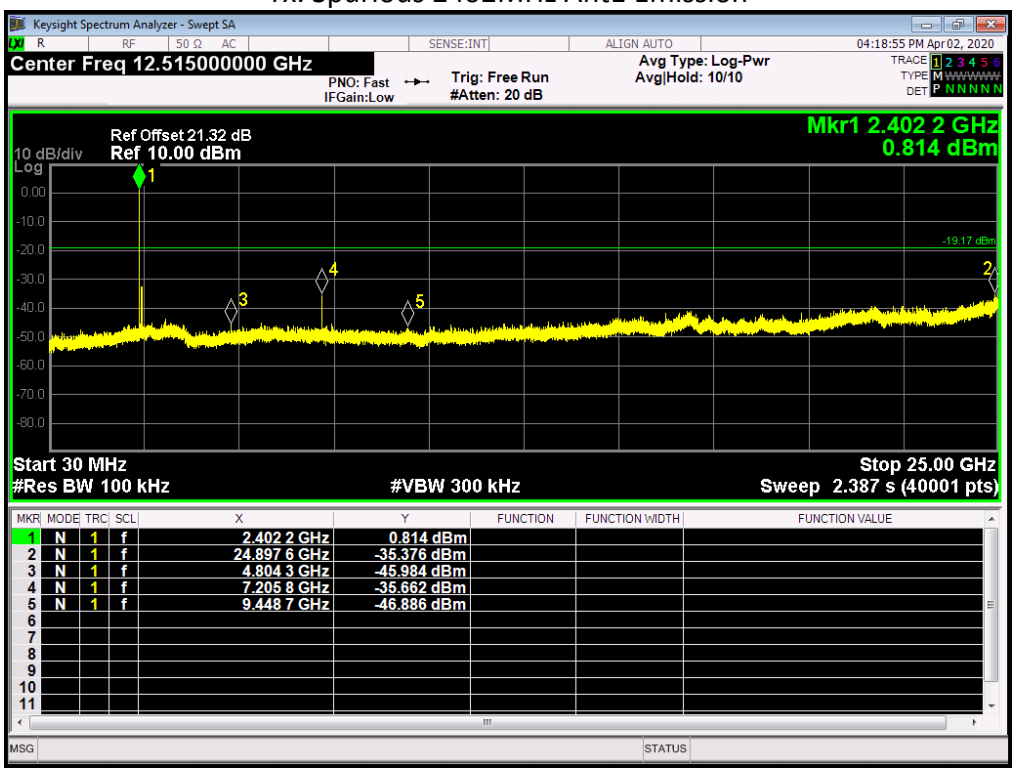


Tx. Spurious 2480MHz Ant1 Emission

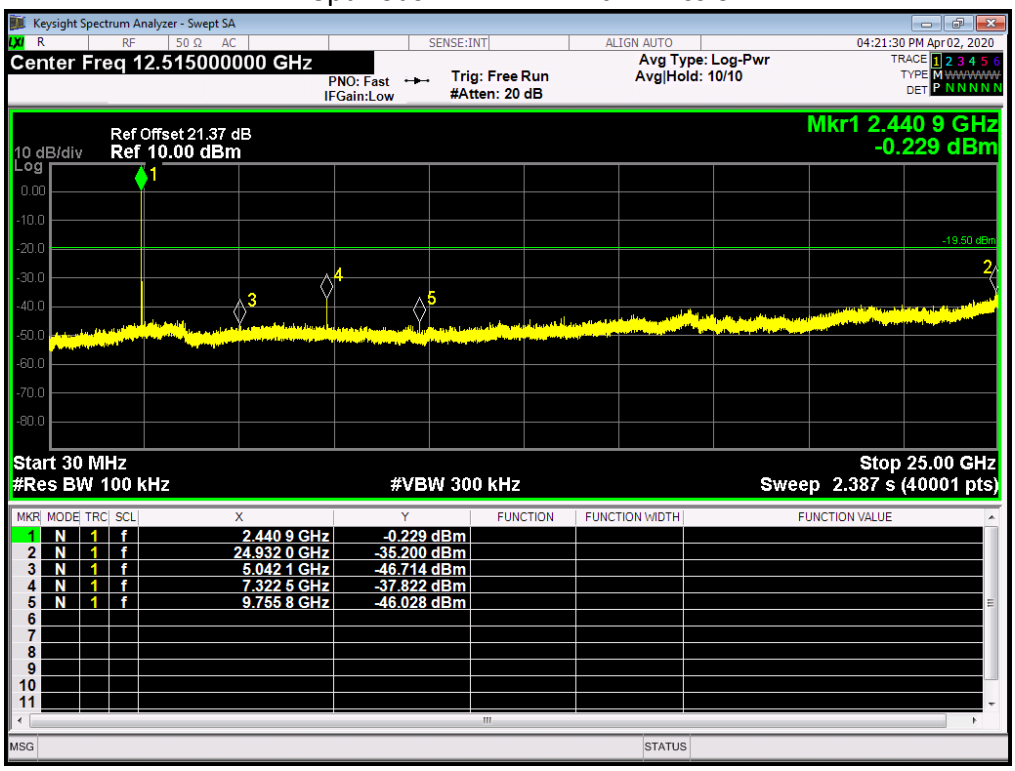


Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	π/4-DQPSK	2402	Ant 1	-36.197	-20	Pass
NVNT	π/4-DQPSK	2441	Ant 1	-35.689	-20	Pass
NVNT	π/4-DQPSK	2480	Ant 1	-37.299	-20	Pass

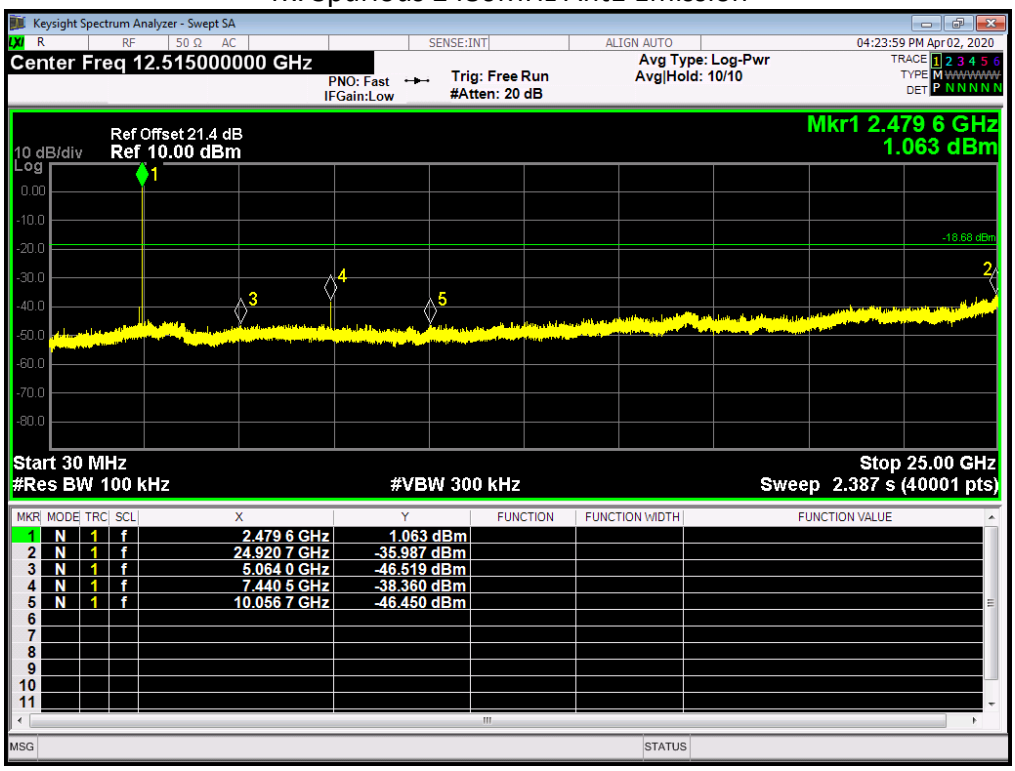
Tx. Spurious 2402MHz Ant1 Emission



Tx. Spurious 2441MHz Ant1 Emission

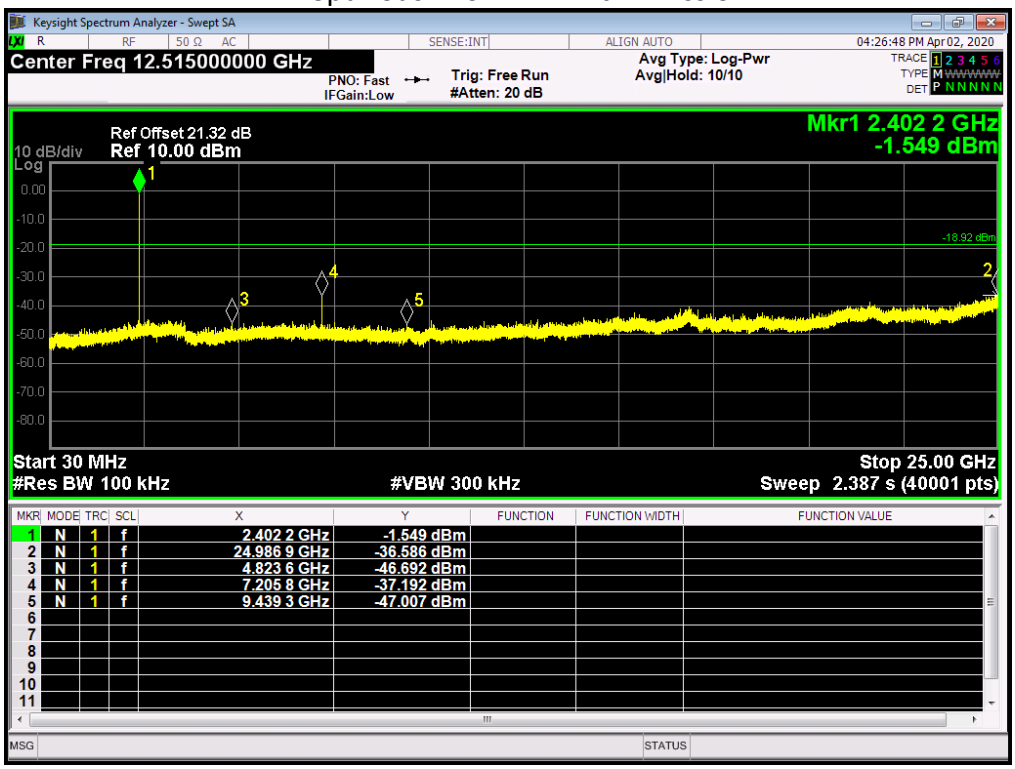


Tx. Spurious 2480MHz Ant1 Emission

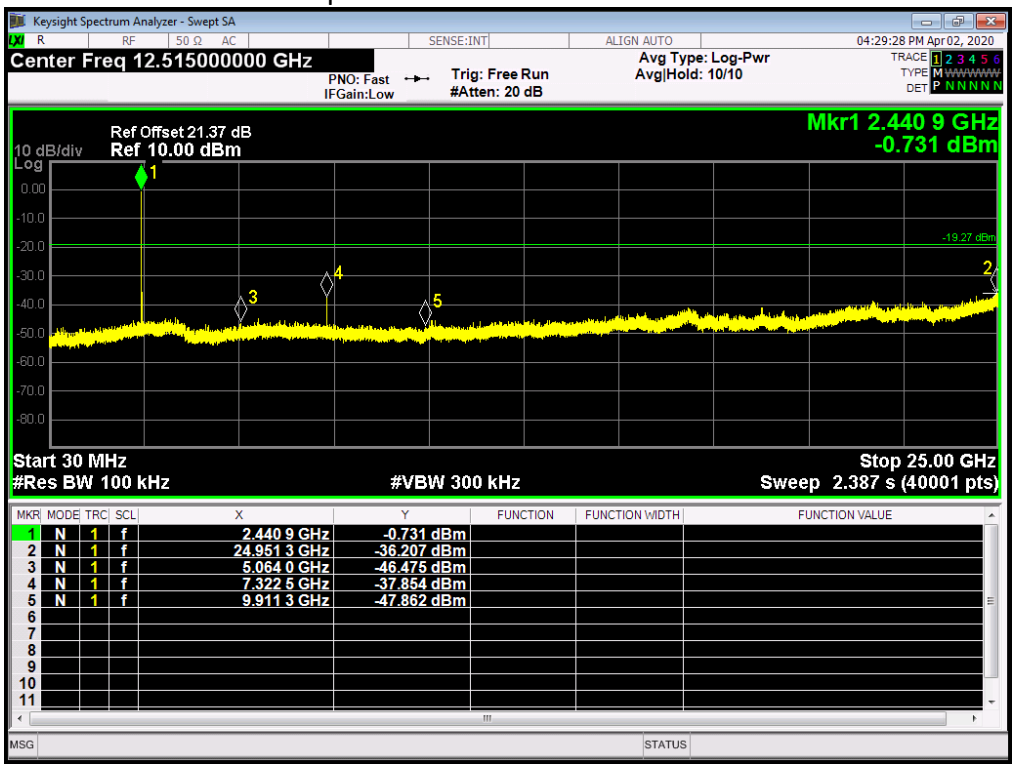


Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	8DPSK	2402	Ant 1	-37.658	-20	Pass
NVNT	8DPSK	2441	Ant 1	-36.932	-20	Pass
NVNT	8DPSK	2480	Ant 1	-36.96	-20	Pass

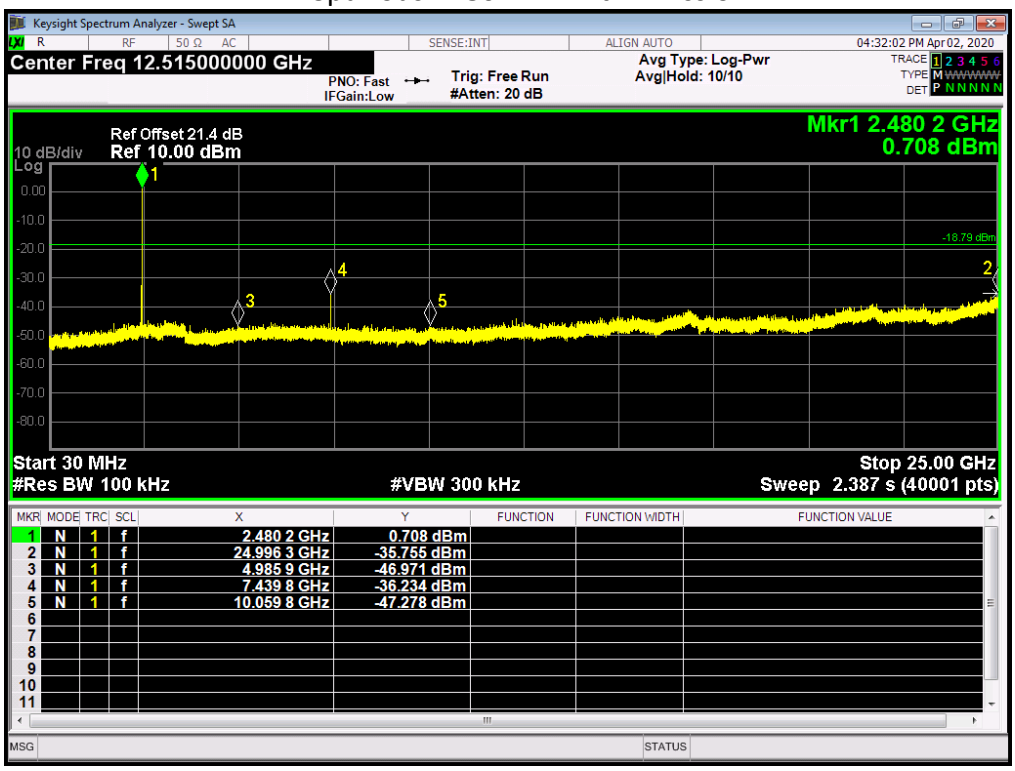
Tx. Spurious 2402MHz Ant1 Emission



Tx. Spurious 2441MHz Ant1 Emission



Tx. Spurious 2480MHz Ant1 Emission



12. Antenna Requirement

12.1. Standard requirement

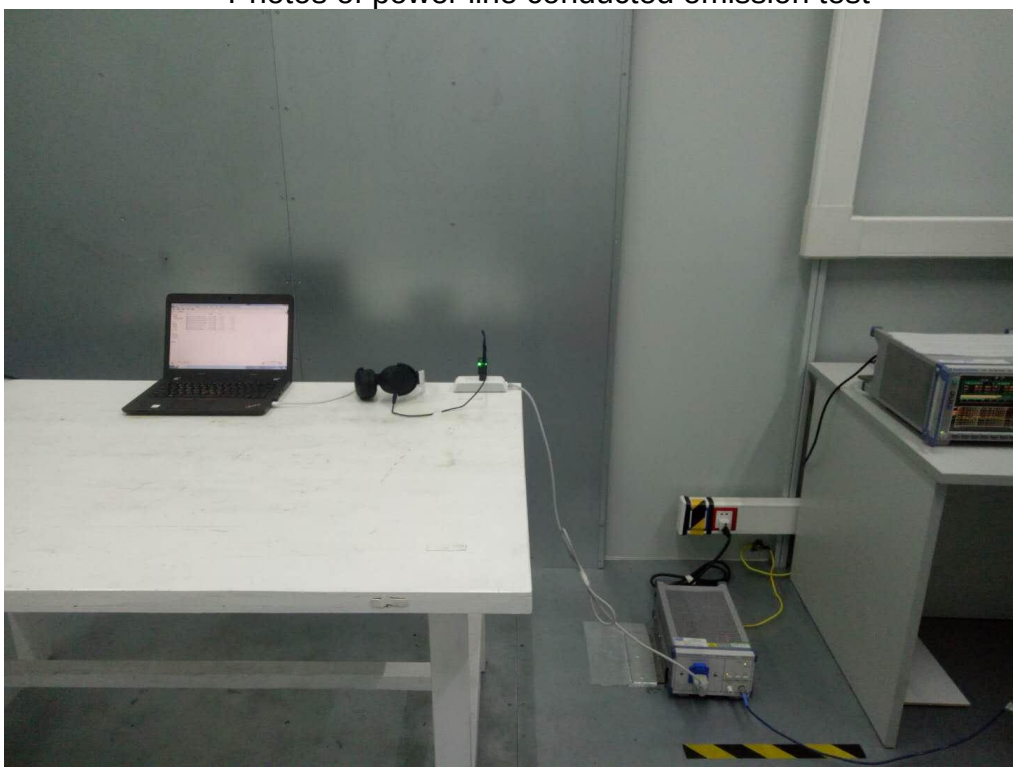
15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. 15.247(c) (1)(i) requirement: (i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiatoris reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

12.2. EUT Antenna

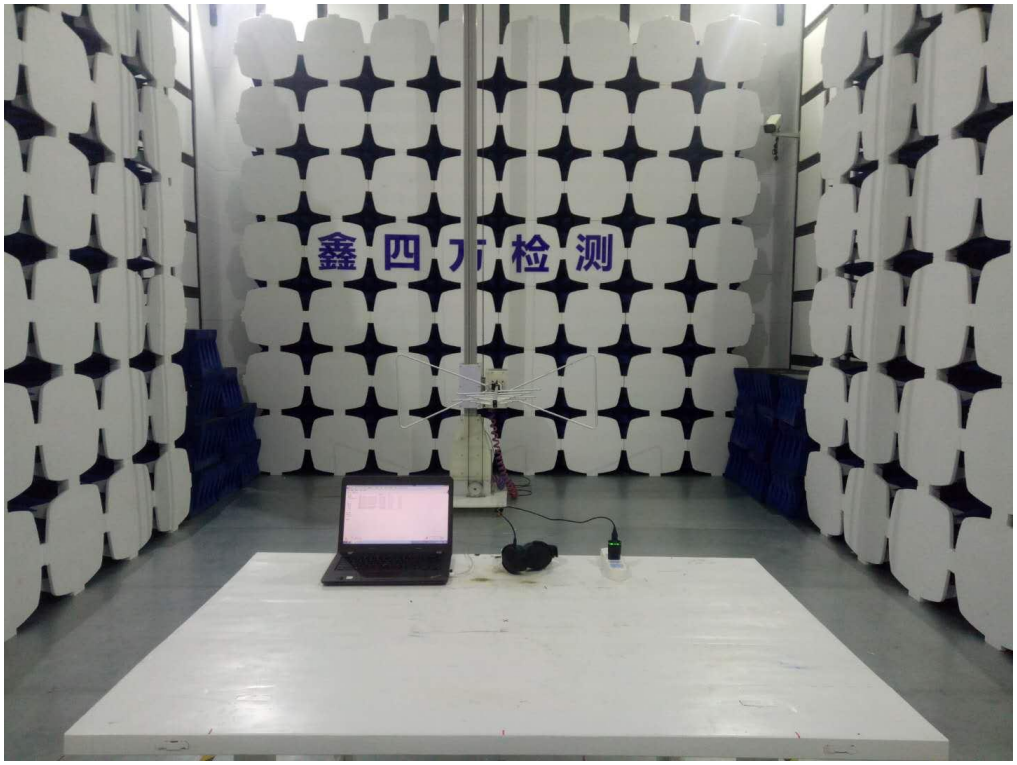
The antenna is Integral Antenna and no consideration of replacement. Antenna gain is Maximum -0.58 dBi from 2.4GHz to 2.5GHz.

13. Test setup photograph

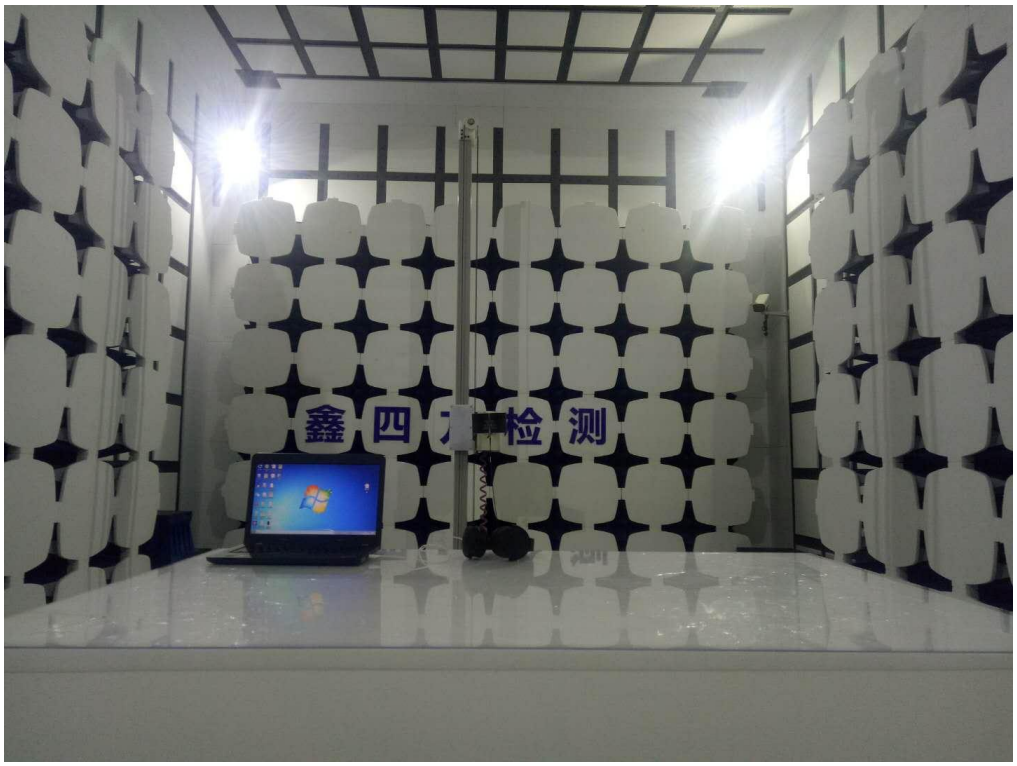
Photos of power line conducted emission test



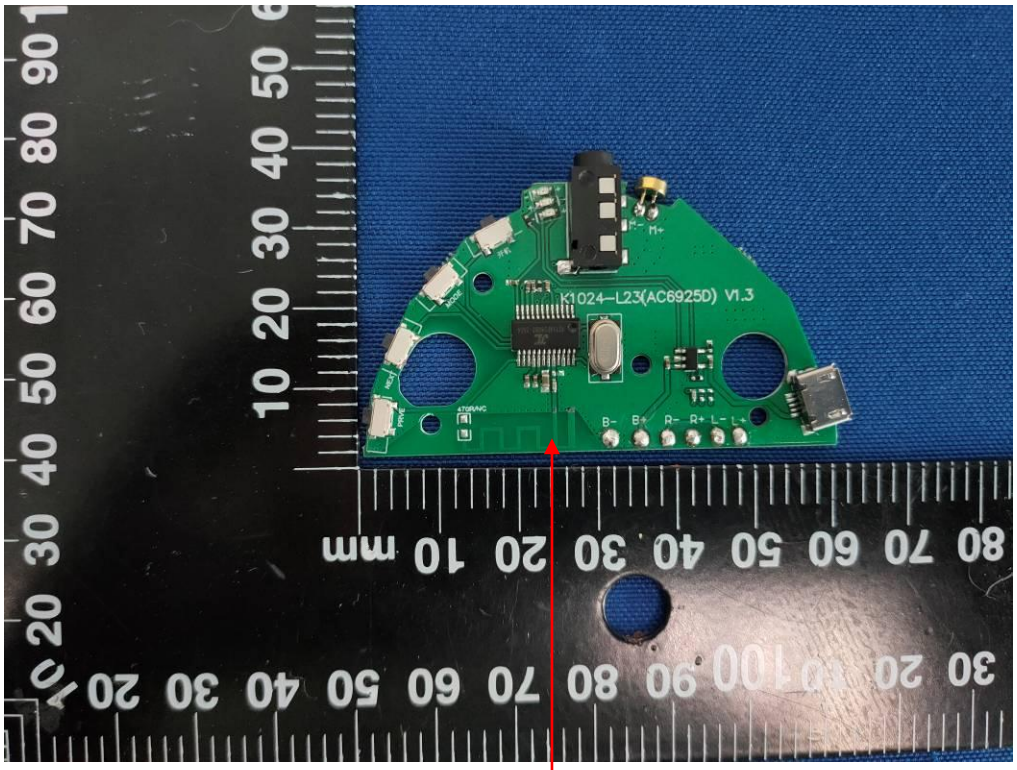
Photos of radiated emission test
30MHz – 1GHz



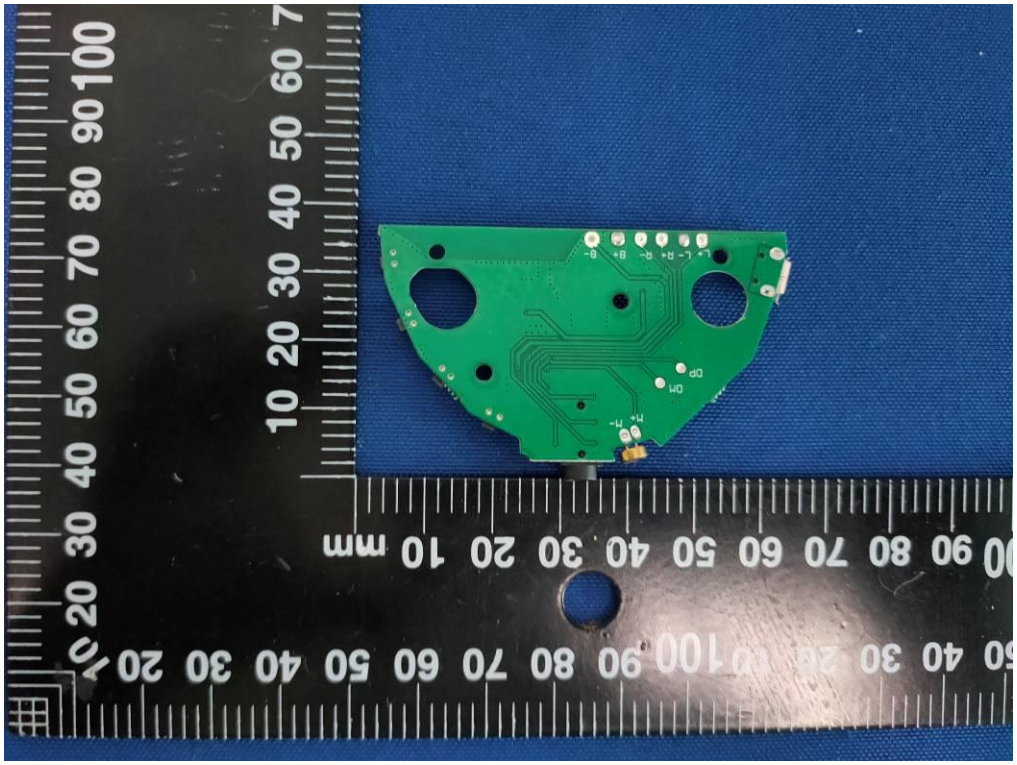
Photos of radiated emission test
Above 1GHz

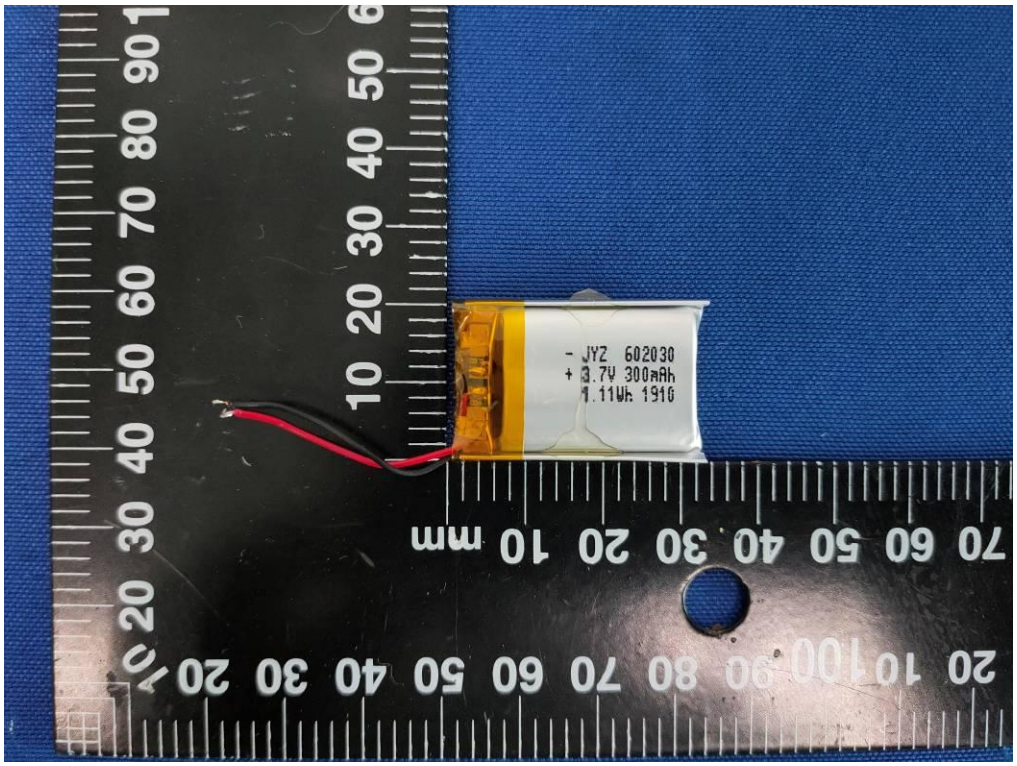


14. Photos of the EUT



Antenna





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