



REPORT No.: SZ26030276W02

TEST REPORT

APPLICANT : Shenzhen Zero Point Zero One
Tech Co., Ltd

PRODUCT NAME : Low-profile Mechanical Keyboard

MODEL NAME : O2 for Mac

BRAND NAME : MelGeek

FCC ID : 2B000-O2MAC

STANDARD(S) : 47 CFR Part 15 Subpart C

RECEIPT DATE : 2026-03-25

TEST DATE : 2026-04-02 to 2026-04-20

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Change History		
Version	Date	Reason for change
1.0	2026-04-29	First edition



1. Summary of Test Result

No.	Section	Description	Test Date	Test Engineer	Result	Remark
1	15.203	Antenna Requirement	N/A	N/A	PASS	/
2	15.247(a) 15.247(h)	Hopping Mechanism	N/A	N/A	PASS	/
3	15.247(a)	Number of Hopping Frequency	Apr. 17, 2026	Li Xinpeng	PASS	/
4	ANSI C63.10	Duty Cycle	Apr. 17, 2026	Li Xinpeng	PASS	/
5	15.247(b)	Maximum Peak Conducted Output Power	Apr. 17, 2026	Li Xinpeng	PASS	/
6	15.247(b)	Maximum Average Conducted Output Power	Apr. 17, 2026	Li Xinpeng	PASS	/
7	15.247(a)	20dB Bandwidth	Apr. 17, 2026	Li Xinpeng	PASS	/
8	15.247(a)	Carrier Frequency Separation	Apr. 17, 2026	Li Xinpeng	PASS	/
9	15.247(a)	Time of Occupancy (Dwell time)	Apr. 17, 2026	Li Xinpeng	PASS	/
10	15.247(d)	Conducted Spurious Emission	Apr. 17, 2026	Li Xinpeng	PASS	/
11	15.207	Conducted Emission	Apr. 03, 2026	Wang Yapeng	PASS	/
12	15.247(d)	Restricted Frequency Bands	Apr. 02, 2026	Tian Xin	PASS	/
13	15.209, 15.247(d)	Radiated Emission	Apr. 15, 2026	Tian Xin	PASS	/

Note 1: The tests were performed according to the method of measurements prescribed in ANSI



C63.10-2013, KDB558074 D01 v05r02 and DA 00-075.

Note 2: Any additions, deviation, or exclusions from the method shall be noted in the "Remark".

1.1. Testing Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- 47 CFR Part 15 Subpart C Radio Frequency Devices



1.2. Test Equipment List

1.2.1 Conducted Test Equipment

Equipment	Serial No.	Type	Manufacturer	Cal. Date	Due Date
EXA Signal Analyzer	MY53470836	N9010A	Agilent	2025.12.23	2026.12.22
RF Cable (30MHz-26GHz)	CB01	RF01	Morlab	N/A	N/A
SMA Connector	CN01	RF03	HUBER-SUHNER	N/A	N/A

1.2.2 Conducted Emission Test Equipment

Equipment	Serial No.	Type	Manufacturer	Cal. Date	Due Date
Receiver	101052	ESPI	R&S	2025.05.15	2026.05.14
LISN	103131	ENV 216	R&S	2026.03.18	2027.03.17
RF Coaxial Cable (DC-100MHz)	BNC	MRE04	Qualwave	2025.05.06	2026.05.05

1.2.3 List of Software Used

Description	Manufacturer	Software Version
Test System	MaiWei	2.0.0.0
JS32-RE	Tonscend	5.0.0
TS+ -[JS32-CE]	Tonscend	2.5.0.0

**1.2.4 Radiated Test Equipment**

Equipment	Serial No.	Type	Manufacturer	Cal. Date	Due Date
Signal Analyzer	MY56060145	N9020A	Agilent	2025.05.13	2026.05.12
Test Antenna - Bi-Log	9163-274	VULB 9163	Schwarzbeck	2025.06.28	2026.06.27
Test Antenna - Loop	1519-022	FMZB1519	Schwarzbeck	2025.05.16	2026.05.15
Test Antenna – Horn	01774	BBHA 9120D	Schwarzbeck	2025.06.20	2026.06.19
Test Antenna – Horn	BBHA9170 #773	BBHA9170	Schwarzbeck	2025.06.20	2026.06.19
Preamplifier (10MHz-6GHz)	46732	S10M100L38 02	LUCIX CORP.	2025.05.13	2026.05.12
Preamplifier (2GHz-18GHz)	61171/61172	S020180L32 03	LUCIX CORP.	2025.05.13	2026.05.12
Preamplifier (18GHz-40GHz)	DS77209	DCLNA0118-40C-S	Decentest	2025.05.13	2026.05.12
RF Coaxial Cable (DC-18GHz)	MRE001	PE330	Pasternack	2025.05.13	2026.05.12
RF Coaxial Cable (DC-18GHz)	MRE002	CLU18	Pasternack	2025.05.13	2026.05.12
RF Coaxial Cable (DC-18GHz)	MRE003	CLU18	Pasternack	2025.05.13	2026.05.12
RF Coaxial Cable (DC-40GHz)	22290045	QA360-40-KK-0.5	Qualwave	2025.09.03	2026.09.02
RF Coaxial Cable (DC-40GHz)	22290046	QA360-40-KKF-2	Qualwave	2025.09.03	2026.09.02
RF Coaxial Cable (DC-18GHz)	22120181	QA500-18-NN-5	Qualwave	2025.09.03	2026.09.02
Notch Filter	N/A	WRCG-2400-2483.5-60SS	Wainwright	N/A	N/A
Anechoic Chamber	N/A	9m*6m*6m	CRT	2025.06.21	2028.06.20
Anechoic Chamber	N/A	9m*6m*6m	CRT	2025.04.19	2028.04.18



1.3. Measurement Uncertainty

Test Items	Uncertainty	Remark
Number of Hopping Frequency	±5%	Confidence levels of 95%
Peak Output Power	±2.22dB	Confidence levels of 95%
Bandwidth	±5%	Confidence levels of 95%
Carrier Frequency Separation	±5%	Confidence levels of 95%
Time of Occupancy (Dwell time)	±5%	Confidence levels of 95%
Conducted Spurious Emission	±2.77dB	Confidence levels of 95%
Restricted Frequency Bands	±5%	Confidence levels of 95%
Radiated Emission	±2.95dB	Confidence levels of 95%
Conducted Emission	±2.44dB	Confidence levels of 95%

1.4. Testing Laboratory

Laboratory Name	Shenzhen Morlab Communications Technology Co., Ltd.
Laboratory Address	FL.1-3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China
Telephone	+86 755 36698555
Facsimile	+86 755 36698525
FCC Designation Number	CN1192
FCC Test Firm Registration Number	226174



2. General Description

2.1. Information of Applicant and Manufacturer

Applicant	Shenzhen Zero Point Zero One Tech Co., Ltd
Applicant Address	Room 308, Building F, Nanshan I Valley, NO.3157, Shahe West Road Shuguang Community, Xili Street, Nanshan District, Shenzhen, Guangdong, China
Manufacturer	Shenzhen Zero Point Zero One Tech Co., Ltd
Manufacturer Address	Room 308, Building F, Nanshan I Valley, NO.3157, Shahe West Road Shuguang Community, Xili Street, Nanshan District, Shenzhen, Guangdong, China

2.2. Information of EUT

Product Name:	Low-profile Mechanical Keyboard
Sample No.:	1#, 9#, 10#
Hardware Version:	V0.02
Software Version:	V1.04
Modulation Type:	GFSK
Data Rate:	1Mbps, Support Hopping
Operating Frequency Range:	2405MHz-2473MHz
Antenna Type:	PCB Antenna
Antenna Gain:	1.75dBi

Note 1: The EUT description presented in the report are provided by applicant and/or manufacturer, and the test laboratory is not responsible for the accuracy of the information. For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

2.3.Channel List of EUT

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2405	12	2427	23	2455
2	2407	13	2431	24	2457
3	2409	14	2433	25	2459
4	2411	15	2435	26	2461
5	2413	16	2439	27	2463
6	2415	17	2441	28	2465
7	2417	18	2443	29	2467
8	2419	19	2445	30	2469
9	2421	20	2447	31	2471
10	2423	21	2449	32	2473
11	2425	22	2451		
1	2405	12	2427		

Note 1: The black bold channels were selected for test.

2.4. Test Configuration of EUT

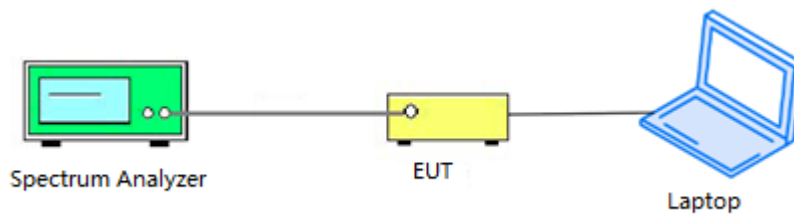
Test mode is used to control the EUT under the maximum power level during test.

2.5. Test Conditions

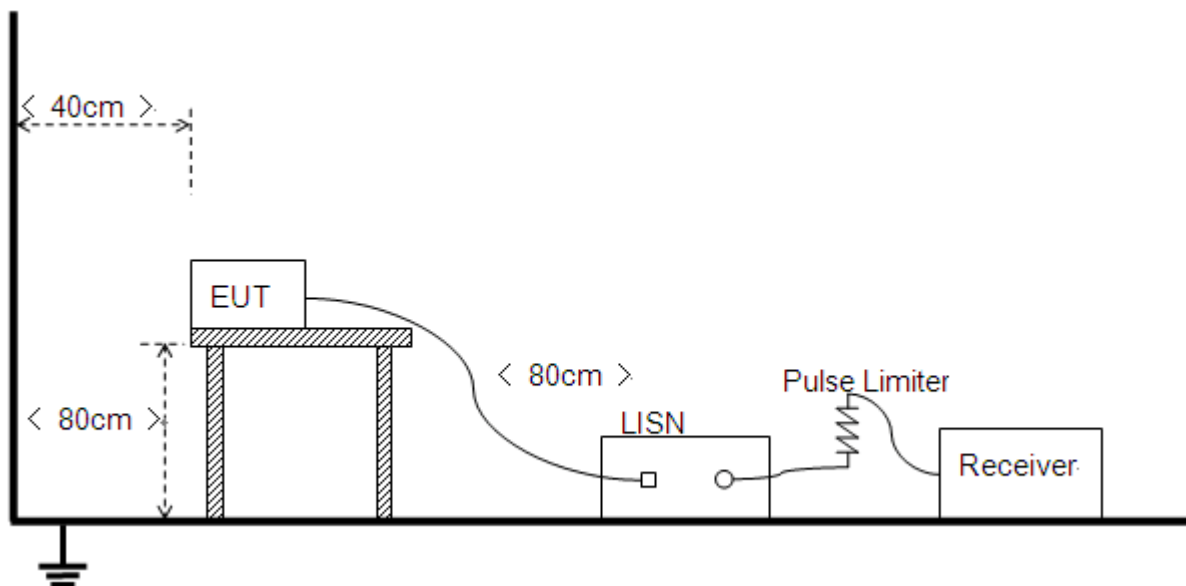
Temperature (°C)	15-35
Relative Humidity (%)	30-60
Atmospheric Pressure (kPa)	86-106

2.6. Test Setup Layout Diagram

2.6.1. Conducted Measurement

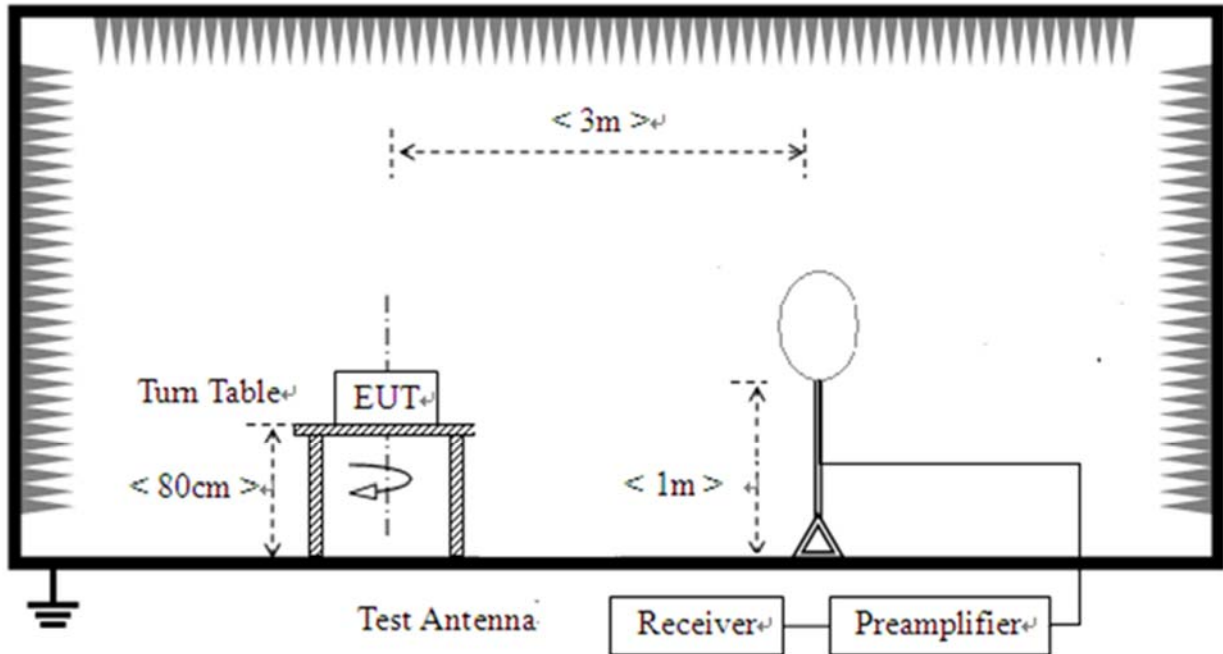


2.6.2. Conducted Emission Measurement

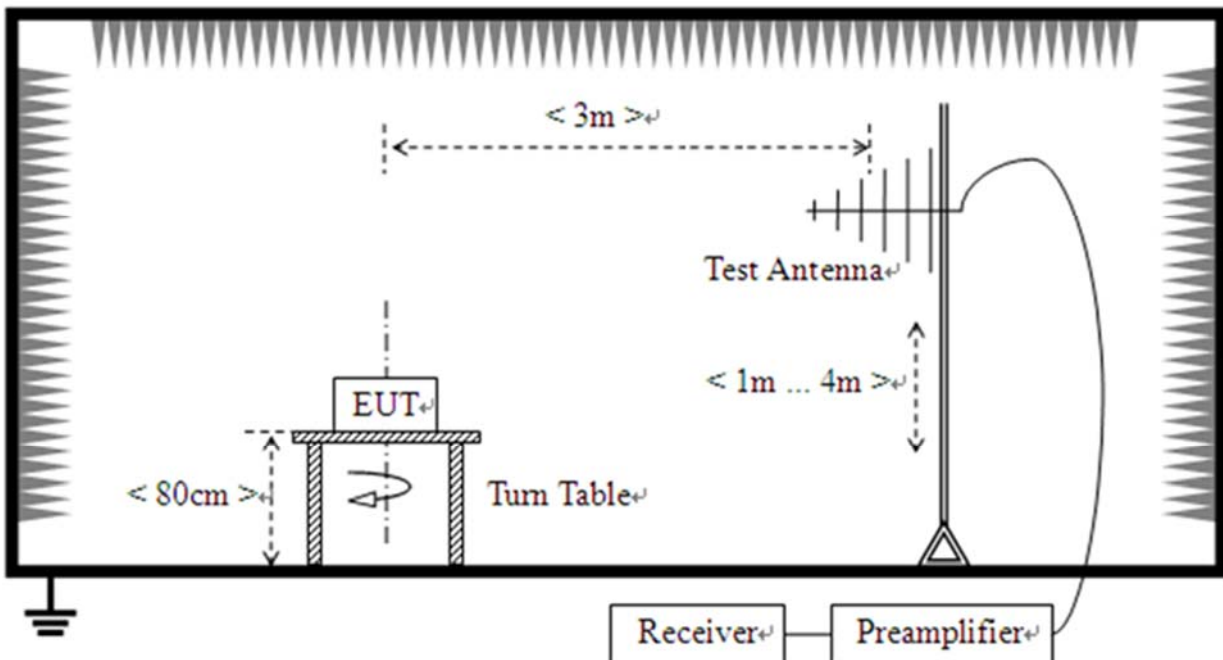


2.6.3.Radiation Measurement

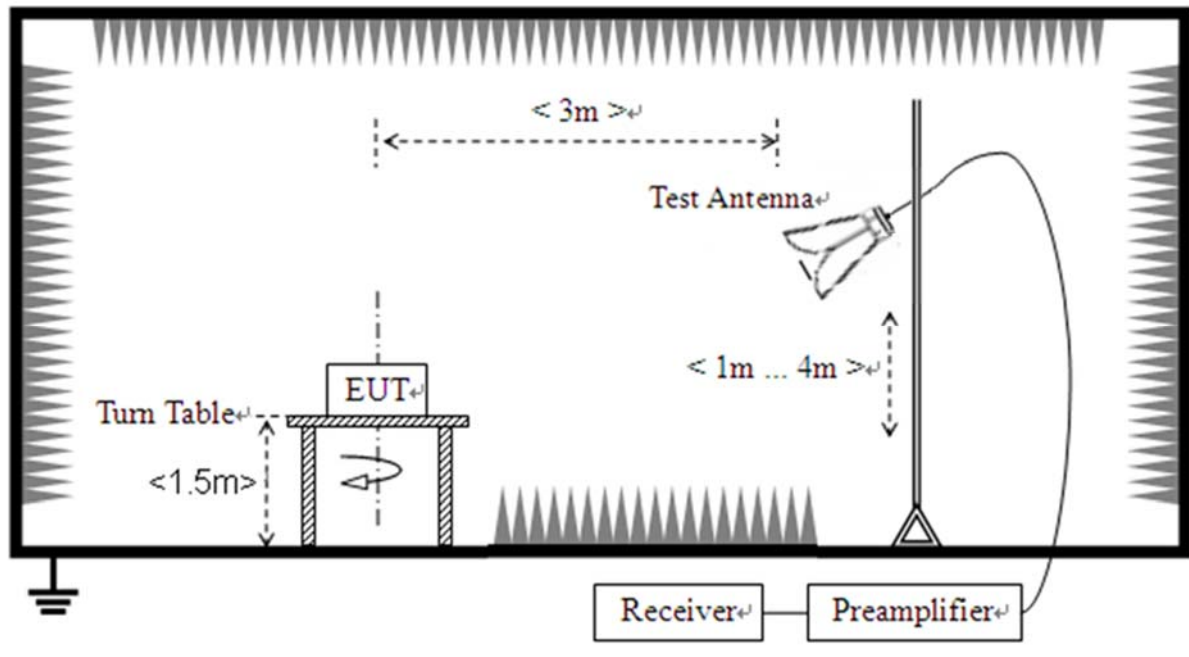
1) For radiated emissions from 9kHz to 30MHz



2) For radiated emissions from 30MHz to 1GHz



3) For radiated emissions above 1GHz



3. Test Results

3.1. Antenna Requirement

3.1.1. Requirement

According to FCC 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

3.1.2. Test Result

The EUT has a permanently and irreplaceable attached antenna. Please refer to the EUT internal photos.

3.2. Hopping Mechanism

3.2.1. Requirement

According to FCC section 15.247(a)(1), a frequency hopping spread spectrum system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

According to FCC section 15.247(h), the incorporation of intelligence within a frequency hopping spread spectrum system that permits the system to recognize other users within the spectrum band so that it individually and independently chooses and adapts its hop sets to avoid hopping on occupied channels is permitted. The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

3.2.2. Test Result

The hopping mechanism of the EUT is in compliance with the document "" **ISO18000-6C** "".



3.3. Number of Hopping Frequency

3.3.1. Requirement

According to FCC section 15.247(a)(1)(iii), frequency hopping systems operating in the 2400MHz to 2483.5MHz bands shall use at least 15 hopping frequencies.

3.3.2. Test Procedures

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

Span = the frequency band of operation

RBW: To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller.

VBW $\geq$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize

3.3.3. Test Setup Layout

Refer to chapter 2.6.1 in this report.

3.3.4. Test Result

Refer to Annex A.1 in this report.



3.4. Duty Cycle of Test Signal

3.4.1. Requirement

Preferably, all measurements of maximum conducted (average) output power will be performed with the EUT transmitting continuously (i.e., with a duty cycle of greater than or equal to 98%). When continuous operation cannot be realized, then the use of sweep triggering/signal gating techniques can be used to ensure that measurements are made only during transmissions at the maximum power control level. Such sweep triggering/signal gating techniques will require knowledge of the minimum transmission duration (T) over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation. Sweep triggering/signal gating techniques can then be used if the measurement/sweep time of the analyzer can be set such that it does not exceed T at any time that data are being acquired (i.e., no transmitter OFF-time is to be considered).

When continuous transmission cannot be achieved and sweep triggering/signal gating cannot be implemented, alternative procedures are provided that can be used to measure the average power; however, they will require an additional measurement of the transmitter duty cycle (D). Within this sub clause, the duty cycle refers to the fraction of time over which the transmitter is ON and is transmitting at its maximum power control level. The duty cycle is considered to be constant if variations are less than $\pm 2\%$; otherwise, the duty cycle is considered to be non constant.

3.4.2. Test Result

Refer to Annex A.2 in this report.



3.5. Maximum Peak Conducted Output Power

3.5.1. Requirement

According to FCC section 15.247(b)(1), for frequency hopping systems that operates in the 2400MHz to 2483.5MHz band employing at least 75 hopping channels, the maximum peak output power of the intentional radiator shall not exceed 1Watt. For all other frequency hopping systems in the 2400MHz to 2483.5MHz band, it is 0.125Watts.

3.5.2. Test Procedures

KDB 558074 Section 8.3.1 was used in order to prove compliance.

3.5.3. Test Setup Layout

Refer to chapter 2.6.1 in this report.

3.5.4. Test Result

Refer to Annex A.3 in this report.



3.6. Maximum Average Conducted Output Power

3.6.1. Requirement

According to FCC section 15.247(b)(1), for frequency hopping systems that operates in the 2400MHz to 2483.5MHz band employing at least 75 hopping channels, the maximum peak output power of the intentional radiator shall not exceed 1Watt. For all other frequency hopping systems in the 2400MHz to 2483.5MHz band, it is 0.125Watts.

3.6.2. Test Procedures

KDB 558074 Section 8.3.2 was used in order to prove compliance.

3.6.3. Test Setup Layout

Refer to chapter 2.6.1 in this report.

3.6.4. Test Result

Refer to Annex A.4 in this report.



3.7.20 dB Bandwidth

3.7.1.Requirement

According to FCC section 15.247(a)(1), the 20 dB bandwidth is known as the 99% emission bandwidth, or 20 dB bandwidth ($10 \cdot \log 1\% = 20 \text{ dB}$) taking the total RF output power.

3.7.1.Test Procedures

Use the following spectrum analyzer settings:

Span = between 2 to 5 times the OBW, centered on the test channel

RBW= 1% to 5% of the OBW

VBW $\geq 3 \times$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

3.7.2.Test Setup Layout

Refer to chapter 2.6.1 in this report.

3.7.3.Test Result

Refer to Annex A.5 in this report.



3.8. Carried Frequency Separation

3.8.1. Requirement

According to FCC section 15.247(a)(1), frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater.

3.8.2. Test Procedures

The EUT must have its hopping function enabled. According to DA 00-705, use the following spectrum analyzer settings:

Span = wide enough to capture the peaks of two adjacent channels

Resolution (or IF) Bandwidth (RBW) $\geq$ 1% of the span

Video (or Average) Bandwidth (VBW) $\geq$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels.

3.8.3. Test Setup Layout

Refer to chapter 2.6.1 in this report.

3.8.4. Test Result

Refer to Annex A.6 in this report.



3.9. Time of Occupancy (Dwell time)

3.9.1. Requirement

According to FCC section 15.247(a) (1) (iii), frequency hopping systems in the 2400 - 2483.5MHz band shall use at least 15 non-overlapping channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

3.9.2. Test Procedures

Normal Mode:

DH1: Dwell time equal to Pulse time (ms) $\times (1600 / 2 / 79) \times 31.6$ Millisecond
DH3: Dwell time equal to Pulse time (ms) $\times (1600 / 4 / 79) \times 31.6$ Millisecond
DH5: Dwell time equal to Pulse Time (ms) $\times (1600 / 6 / 79) \times 31.6$ Millisecond

AFH Mode:

DH1: Dwell time equal to Pulse time (ms) $\times (800 / 2 / 20) \times (0.4 \times 20)$ Millisecond
DH3: Dwell time equal to Pulse time (ms) $\times (800 / 4 / 20) \times (0.4 \times 20)$ Millisecond
DH5: Dwell time equal to Pulse Time (ms) $\times (800 / 6 / 20) \times (0.4 \times 20)$ Millisecond.

3.9.3. Test Setup Layout

Refer to chapter 2.6.1 in this report.

3.9.4. Test Result

Refer to Annex A.7 in this report.

3.10. Conducted Spurious Emissions and Band Edge

3.10.1.Requirement

According to FCC section 15.247(d), in any 100kHz 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 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

3.10.2.Test Procedures

Use the following spectrum analyzer settings:

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 $\geq$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize.

3.10.3.Test Setup Layout

Refer to chapter 2.6.1 in this report.

3.10.4.Test Result

Refer to Annex A.8 and A.9 in this report.

3.11. Restricted Frequency Bands

3.11.1.Requirement

According to FCC section 15.247(d), in any 100kHz 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 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, In addition, radiated emissions which fall in the restricted bands, as defined in 15.205(a), must also comply with the radiated emission limits specified in 15.209(a).

3.11.2.Test Procedures

The EUT is located in a 3m Semi-Anechoic Chamber; the antenna factors, cable loss and so on of the site as factors are calculated to correct the reading.

For the Test Antenna:

Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m above the ground to determine the maximum value of the field strength.

Span = wide enough to fully capture the emission being measured

RBW = 1 MHz for $f \geq 1\text{GHz}$, 100 kHz for $f < 1\text{GHz}$

VBW = 3 MHz

Sweep = auto

Detector function = peak/average

Trace = max hold

Allow the trace to stabilize

3.11.3.Test Setup Layout

Refer to chapter 2.6.3 in this report.

3.11.4.Test Result

Refer to Annex A.9 in this report.

3.12. Conducted Emission

3.12.1.Requirement

According to FCC section 15.207, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the band 150kHz to 30MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 Ω line impedance stabilization network (LISN).

Frequency Range (MHz)	Conducted Limit (dB μ V)	
	Quai-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
5 - 30	60	50

Note:

- (a) The lower limit shall apply at the band edges.
- (b) The limit decreases linearly with the logarithm of the frequency in the range 0.15 - 0.50MHz.

3.12.2.Test Procedures

The Table-top EUT was placed upon a non-metallic table 0.8m above the horizontal metal reference ground plane. EUT was connected to LISN and LISN was connected to reference Ground Plane. EUT was 80cm from LISN. The set-up and test methods were according to ANSI C63.10: 2013.

3.12.3.Test Setup Layout

Refer to chapter 2.6.2 in this report.

3.12.4.Test Result

Refer to Annex A.10 in this report.

3.13. Radiated Emission

3.13.1.Requirement

According to FCC section 15.247(d), radiated emission outside the frequency band attenuation below the general limits specified in FCC section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in FCC section 15.205(a), must also comply with the radiated emission limits specified in FCC section 15.209(a).

According to FCC section 15.209 (a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength ($\mu\text{V}/\text{m}$)	Measurement Distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

Note1: For above 1000MHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.

Note2:For above 1000MHz, limit field strength of harmonics: 54dBuV/m@3m (AV) and 74dBuV/m@3m (PK).In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), also should comply with the radiated emission limits specified in Section 15.209(a)(above table).



3.13.2.Test Procedures

The EUT is placed on a non-conducting table 80 cm above the ground plane for measurement below 1GHz; 1.5 m above the ground plane for measurement above 1GHz. The antenna to EUT distance is 3meters. The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.

For measurements below 30MHz, the emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9kHz-90 kHz, 110kHz-490 kHz. Radiated emission limits in these two bands are based on measurements employing an average detector.

For measurements below 1GHz the resolution bandwidth is set to 100kHz for peak detection measurements or 120kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1GHz the resolution bandwidth is set to 1MHz, the video band width is set to 3MHz for peak measurements and as applicable for average measurements.

The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions. For measurements above 1 GHz, keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response.

3.13.3.Test Setup Layout

Refer to chapter 2.6.3 in this report.

3.13.4.Test Result

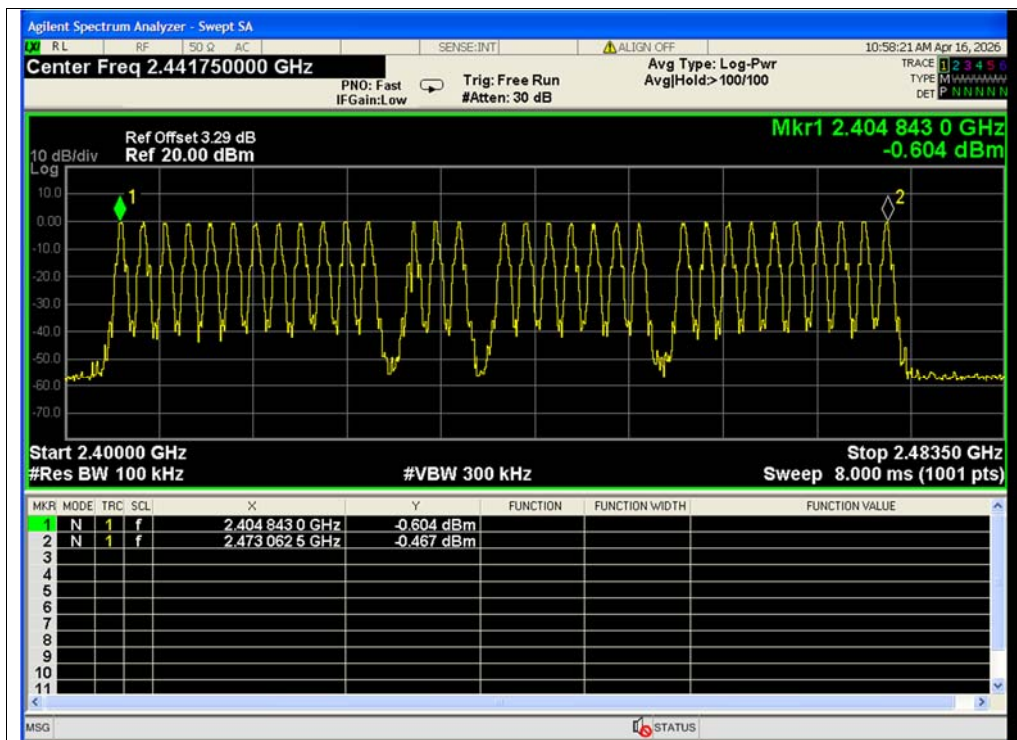
Refer to Annex A.12 in this report.



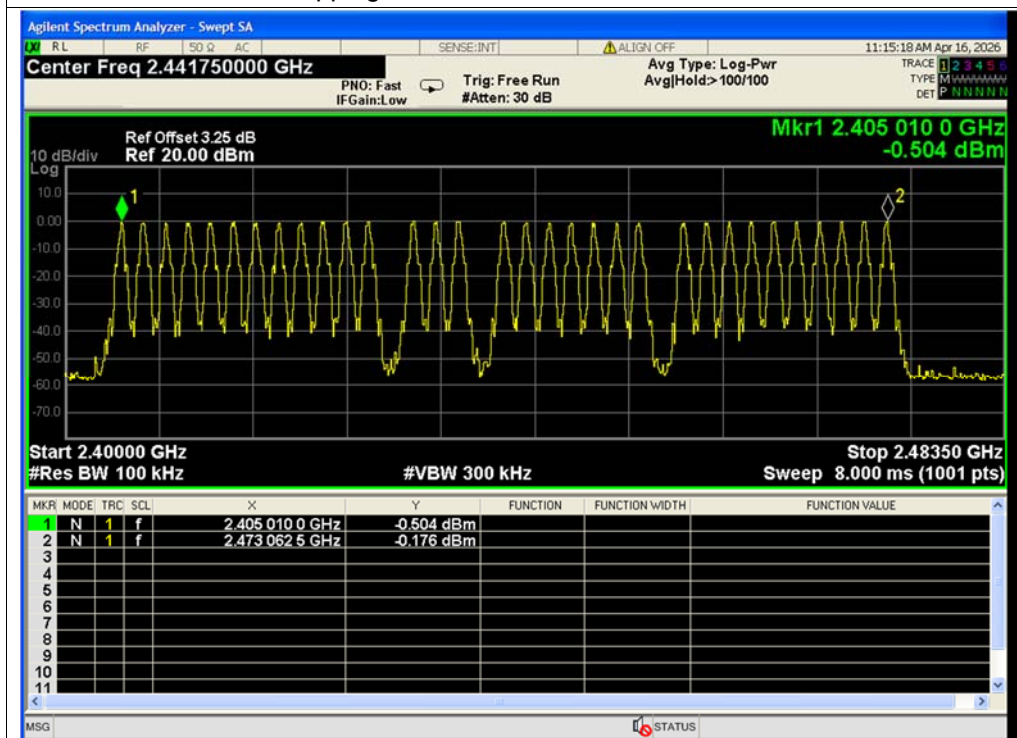
Annex A Test Data and Result

A.1. Number of Hopping Frequency

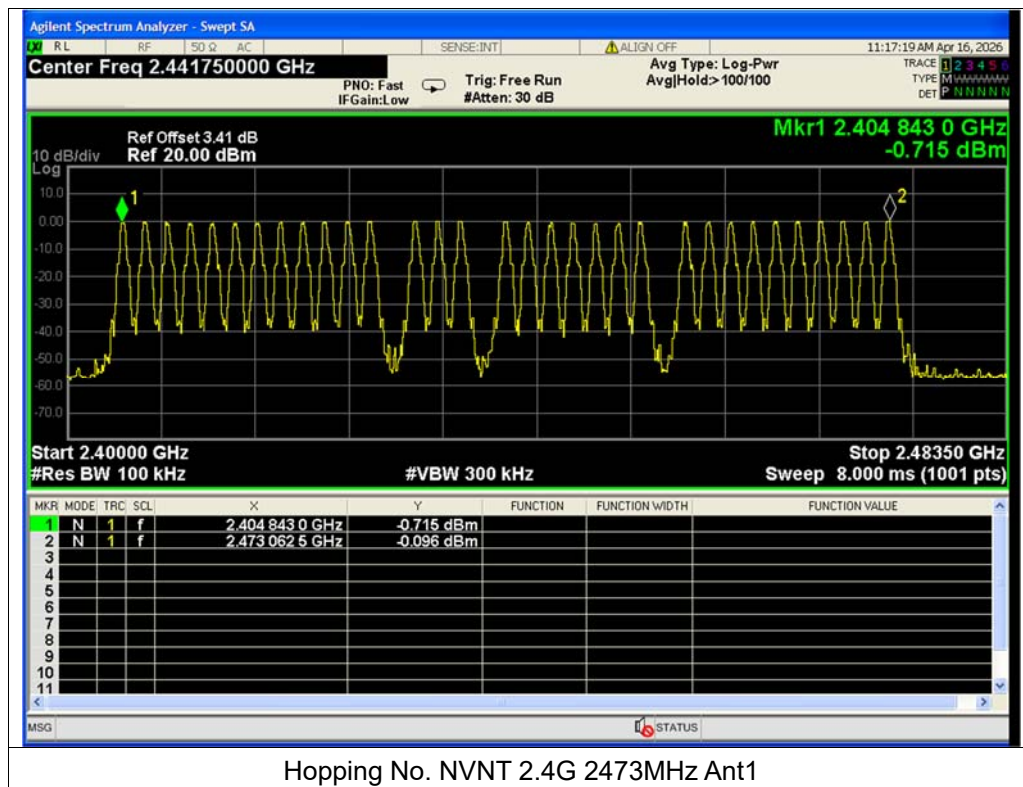
Condition	Mode	Antenna	Hopping Number	Limit	Verdict
NVNT	2.4G	Ant1	32	15	Pass
NVNT	2.4G	Ant1	32	15	Pass
NVNT	2.4G	Ant1	32	15	Pass



Hopping No. NVNT 2.4G 2405MHz Ant1

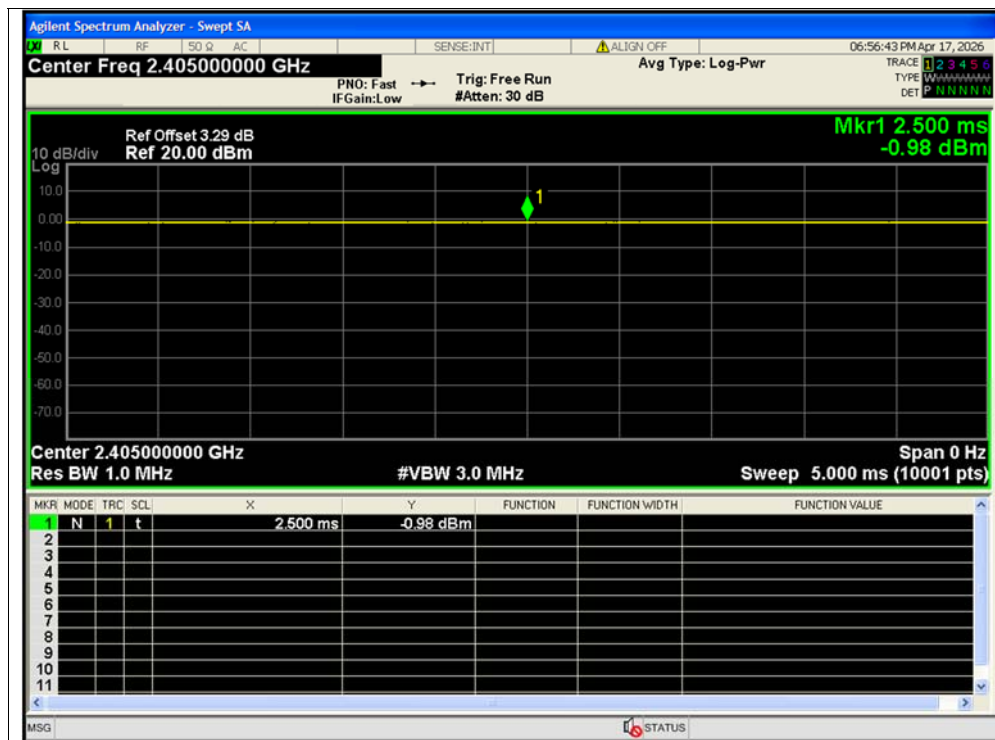


Hopping No. NVNT 2.4G 2439MHz Ant1

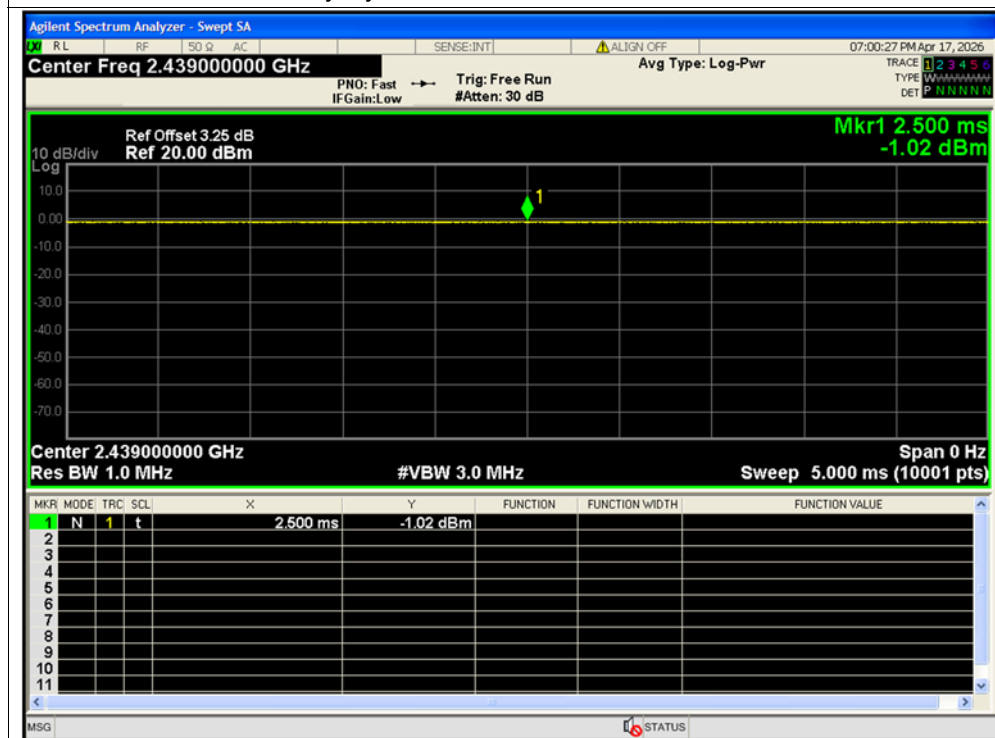


**A.2. Duty Cycle of Test Signal**

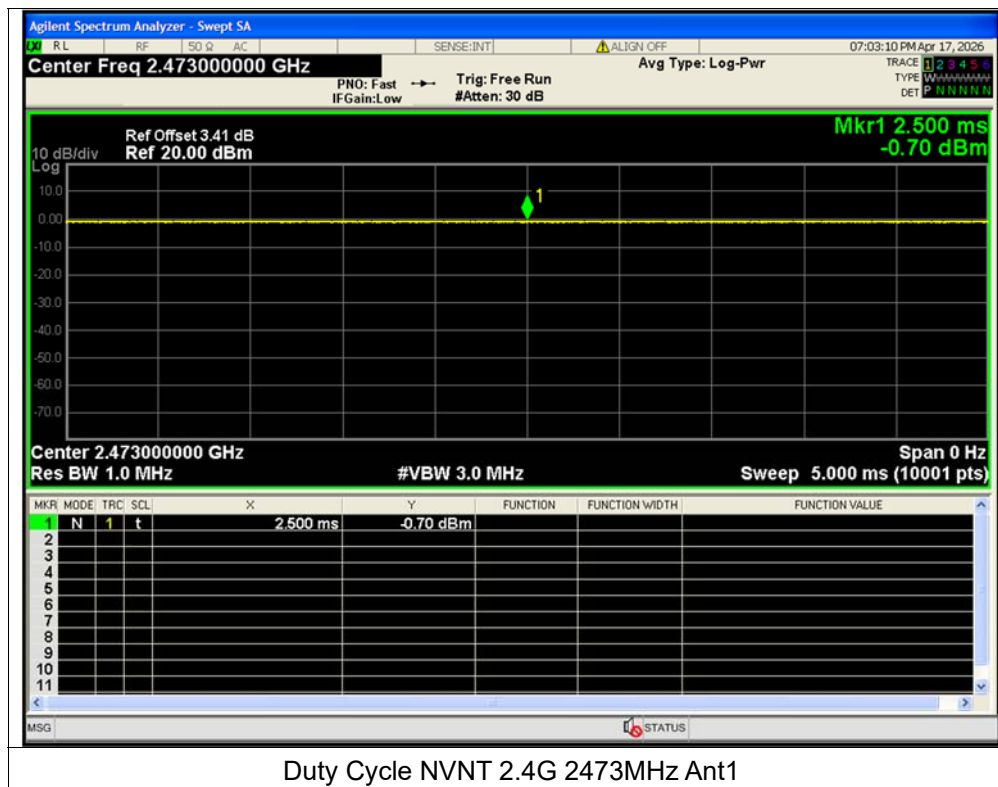
Condition	Mode	Frequency (MHz)	Antenna	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
NVNT	2.4G	2405	Ant1	100	0	0
NVNT	2.4G	2439	Ant1	100	0	0
NVNT	2.4G	2473	Ant1	100	0	0



Duty Cycle NVNT 2.4G 2405MHz Ant1

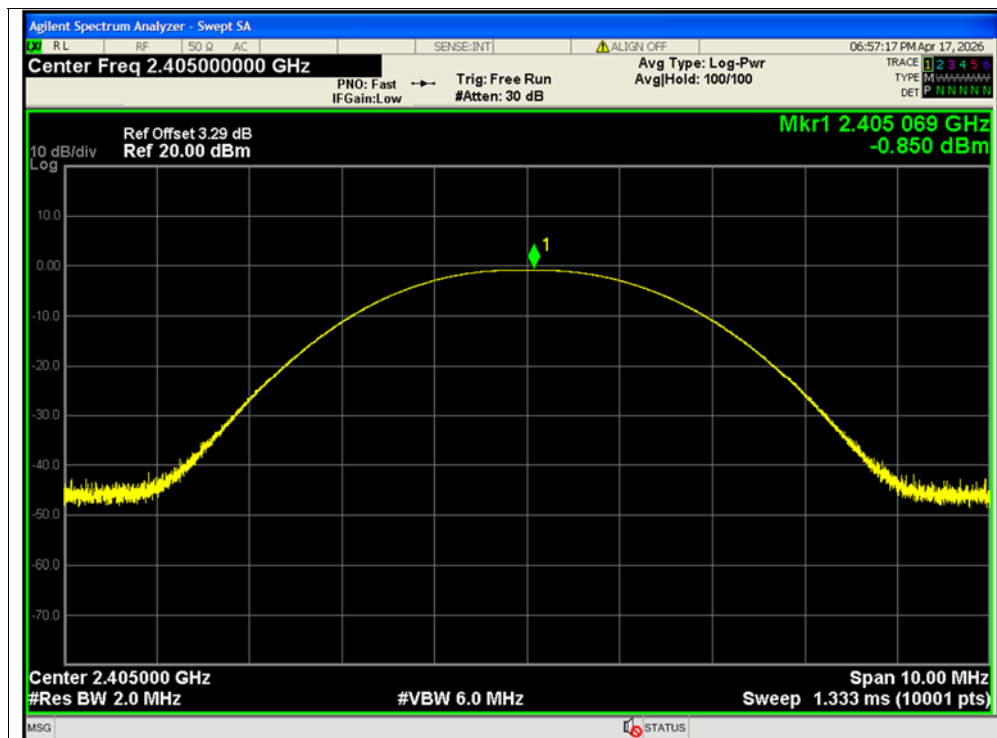


Duty Cycle NVNT 2.4G 2439MHz Ant1

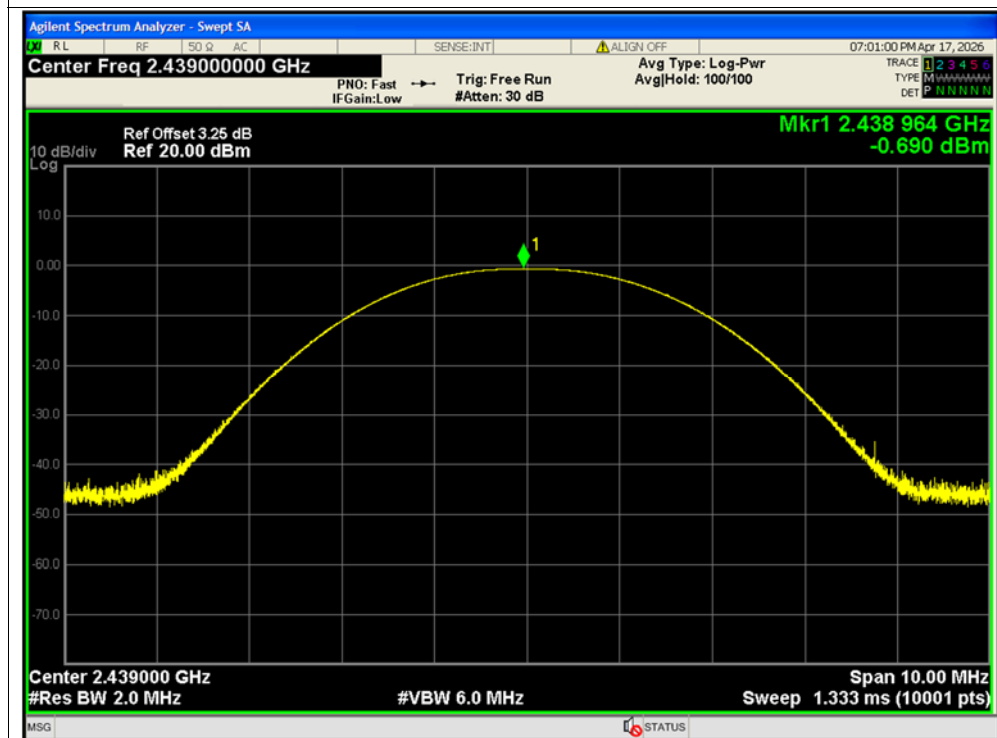


**A.3. Maximum Peak Conducted Output Power**

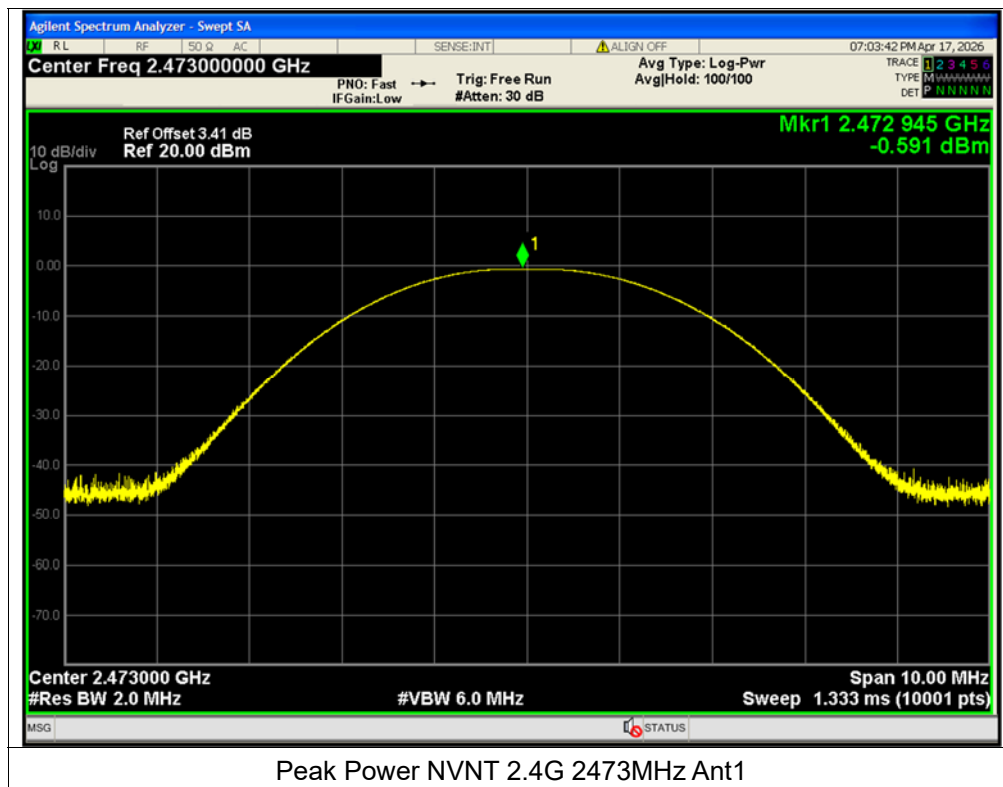
Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Duty Factor (dB)	Total Conducted Power (dBm)	Total Conducted Power (W)	Limit Conducted (dBm)	Verdict
NVNT	2.4G	2405	Ant1	-0.85	0	-0.85	0.00082	30	Pass
NVNT	2.4G	2439	Ant1	-0.69	0	-0.69	0.00085	30	Pass
NVNT	2.4G	2473	Ant1	-0.59	0	-0.59	0.00087	30	Pass



Peak Power NVNT 2.4G 2405MHz Ant1



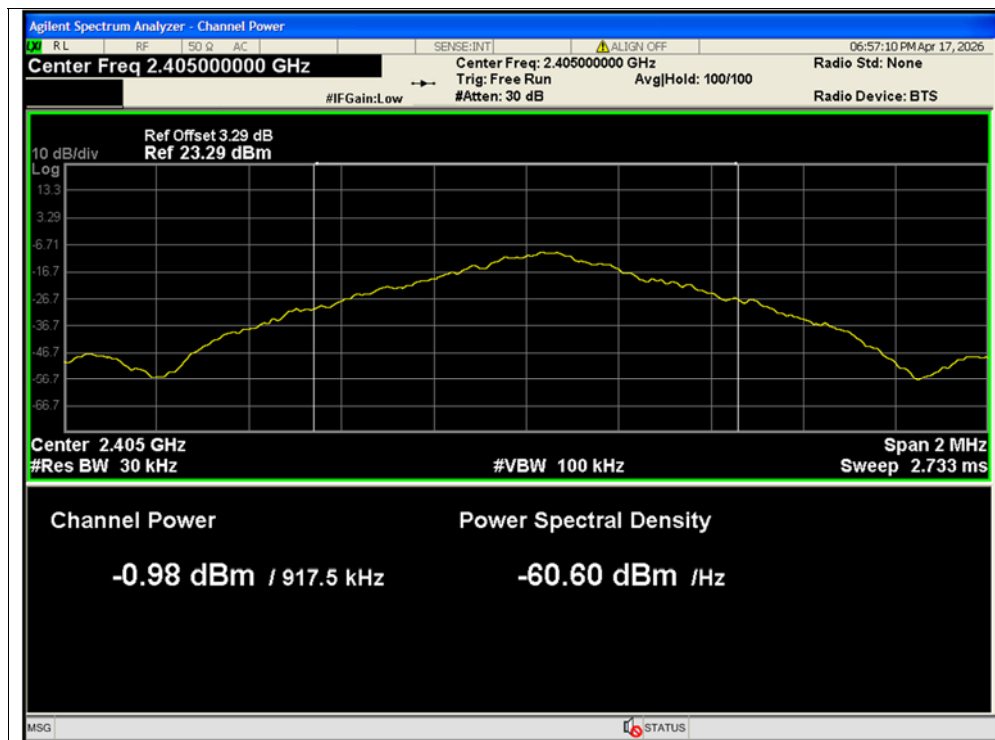
Peak Power NVNT 2.4G 2439MHz Ant1



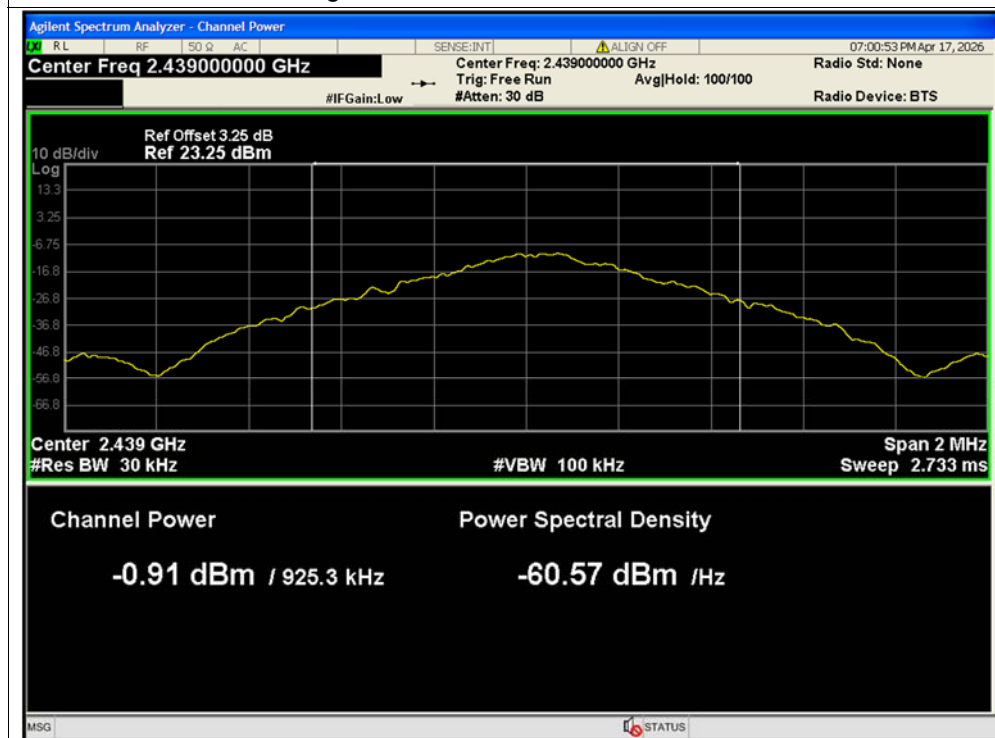
Peak Power NVNT 2.4G 2473MHz Ant1

**A.4. Maximum Average Conducted Output Power**

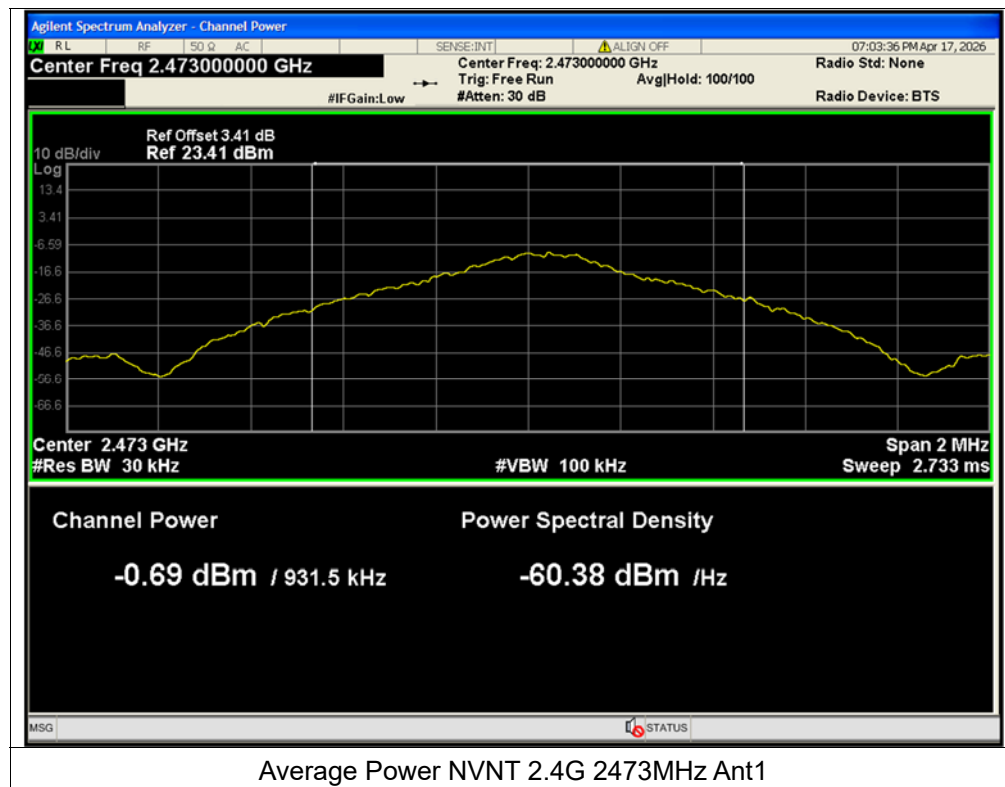
Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Duty Factor (dB)	Total Conducted Power (dBm)	Total Conducted Power (W)	Limit Conducted (dBm)	Verdict
NVNT	2.4G	2405	Ant1	-0.98	0	-0.98	0.0008	30	Pass
NVNT	2.4G	2439	Ant1	-0.91	0	-0.91	0.00081	30	Pass
NVNT	2.4G	2473	Ant1	-0.69	0	-0.69	0.00085	30	Pass



Average Power NVNT 2.4G 2405MHz Ant1

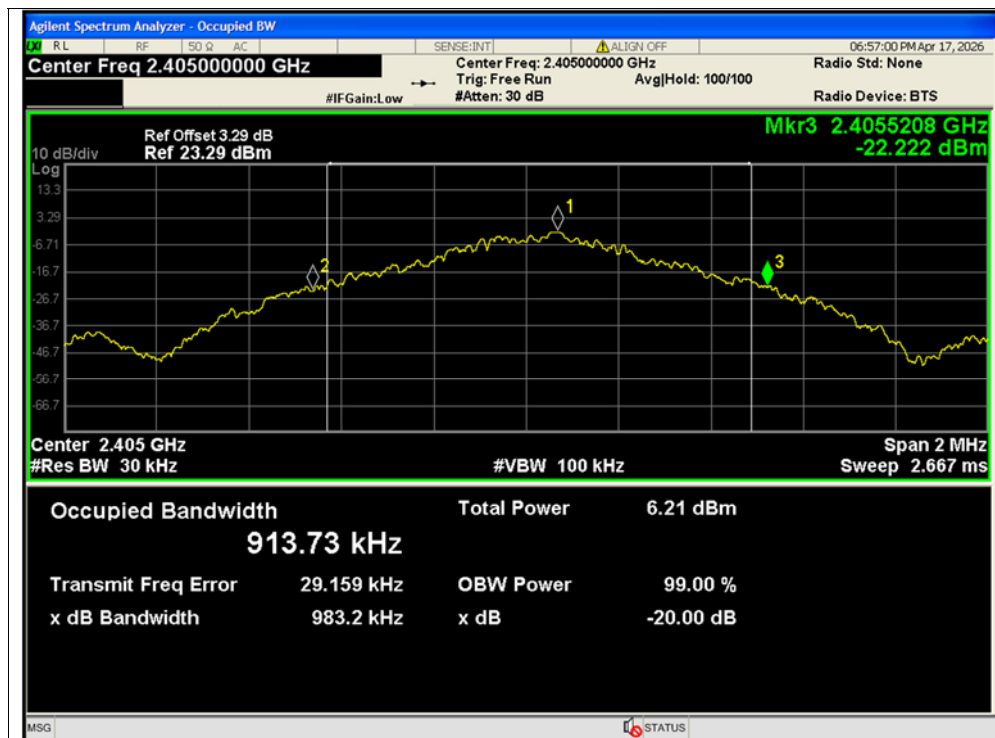


Average Power NVNT 2.4G 2439MHz Ant1

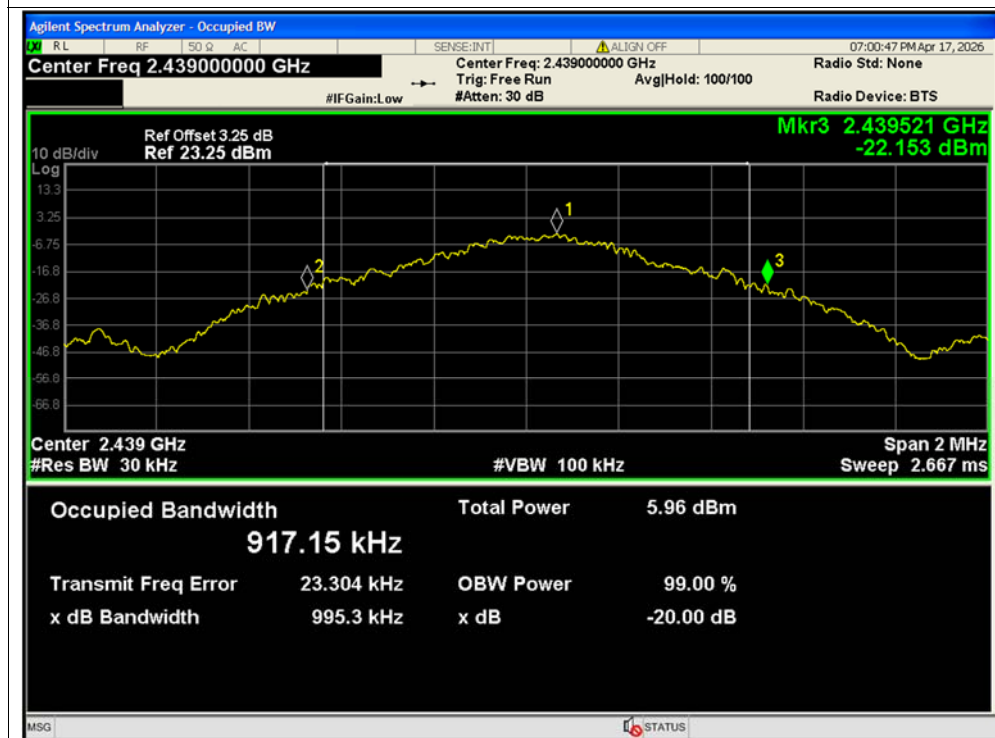


**A.5. 20 dB Bandwidth**

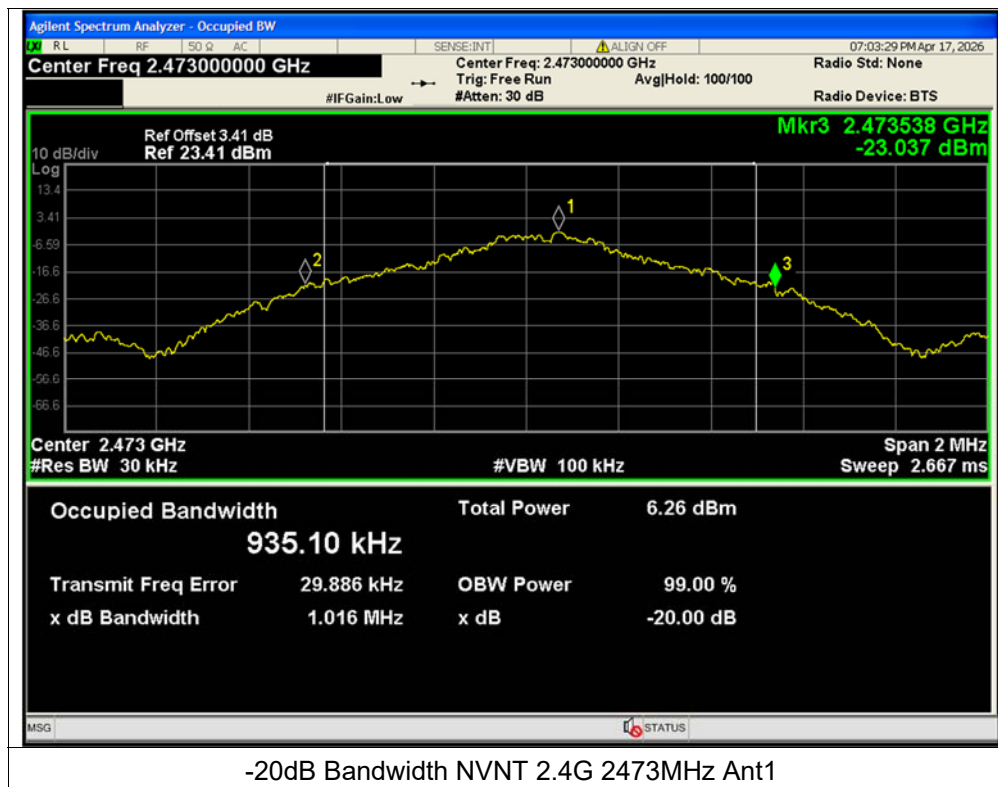
Condition	Mode	Frequency (MHz)	Antenna	-20 dB Bandwidth (MHz)
NVNT	2.4G	2405	Ant1	0.9832
NVNT	2.4G	2439	Ant1	0.9953
NVNT	2.4G	2473	Ant1	1.016



-20dB Bandwidth NVNT 2.4G 2405MHz Ant1



-20dB Bandwidth NVNT 2.4G 2439MHz Ant1



**A.6. Carried Frequency Separation**

Condition	Mode	Antenna	Hopping Freq1 (MHz)	Hopping Freq2 (MHz)	HFS (MHz)	Limit (MHz)	Verdict
NVNT	2.4G	Ant1	2405.019	2407.02	2.001	0.025	Pass
NVNT	2.4G	Ant1	2439.019	2441.02	2.001	0.025	Pass
NVNT	2.4G	Ant1	2471.022	2473.02	1.998	0.025	Pass



CFS NVNT 2.4G 2405MHz Ant1

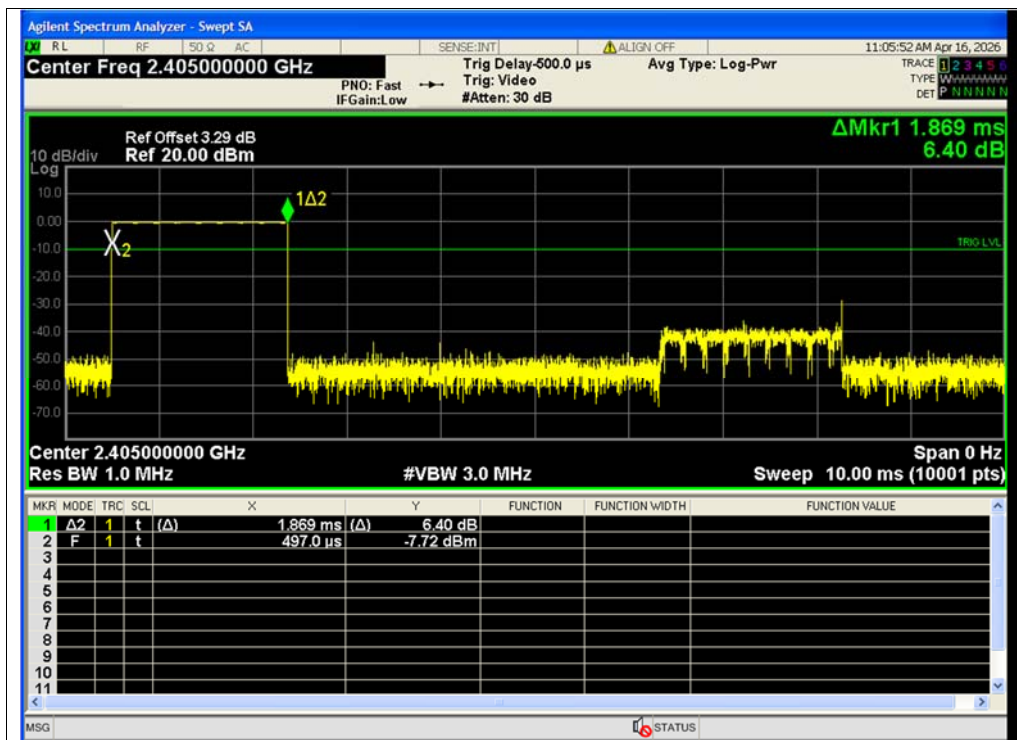


CFS NVNT 2.4G 2439MHz Ant1

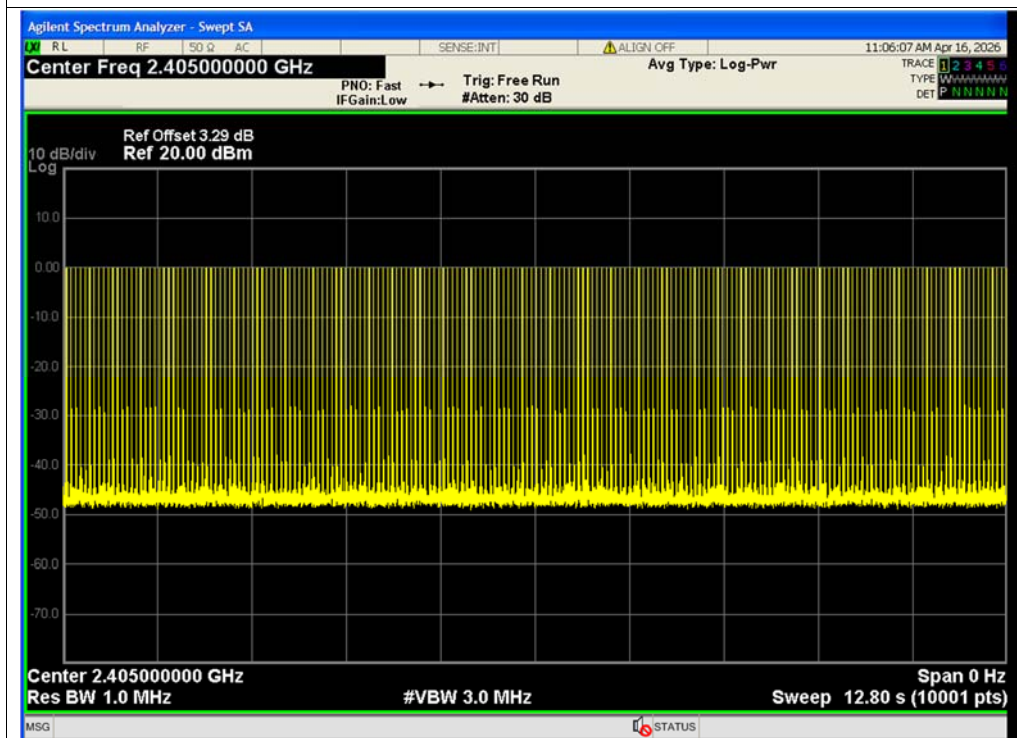


**A.7. Time of Occupancy (Dwell time)**

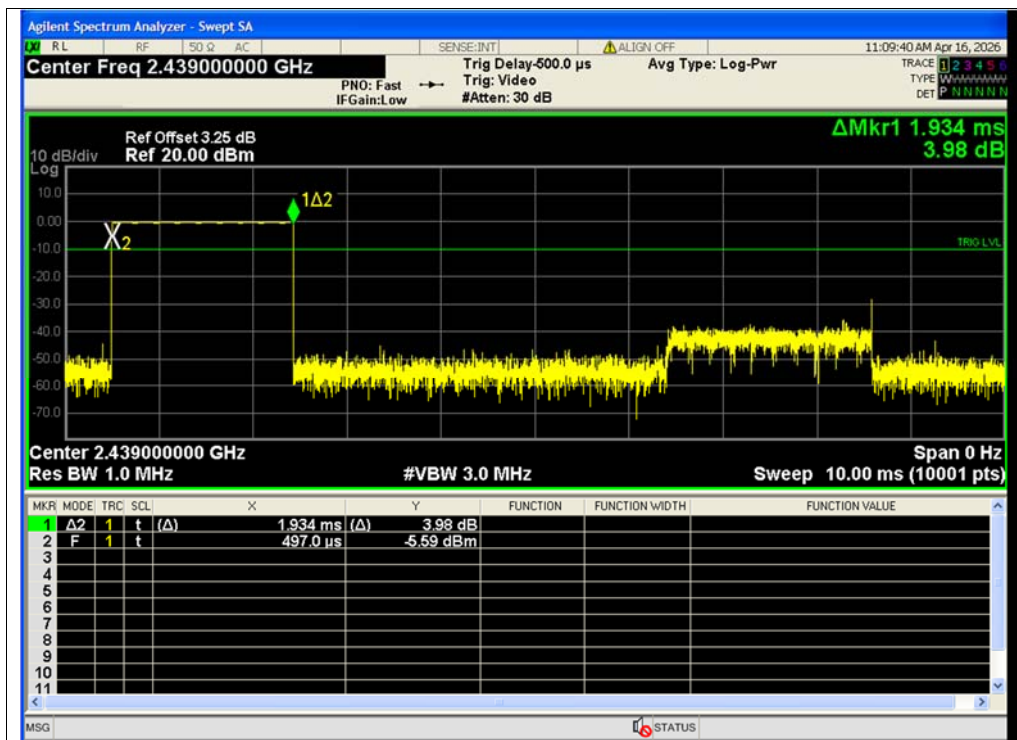
Condition	Mode	Frequency (MHz)	Antenna	Pulse Time (ms)	Total Dwell Time (ms)	Burst Count	Period Time (ms)	Limit (ms)	Verdict
NVNT	2.4G	2405	Ant1	1.869	379.407	203	12800	400	Pass
NVNT	2.4G	2439	Ant1	1.934	392.602	203	12800	400	Pass
NVNT	2.4G	2473	Ant1	1.934	392.602	203	12800	400	Pass



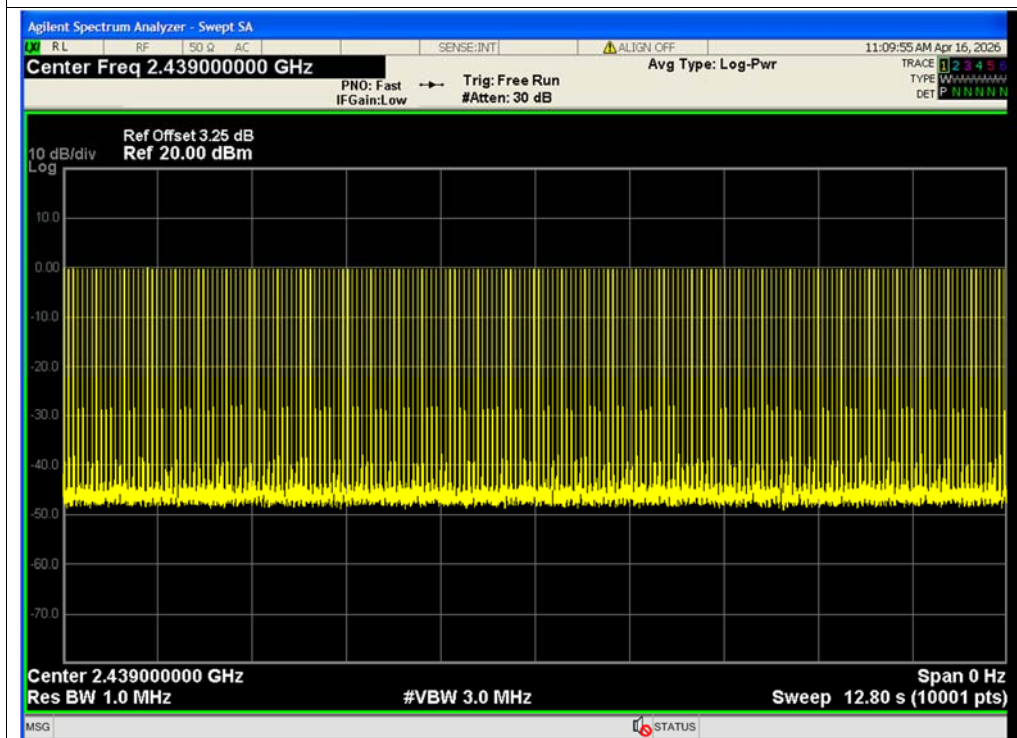
Dwell NVNT 2.4G 2405MHz Ant1 One Burst



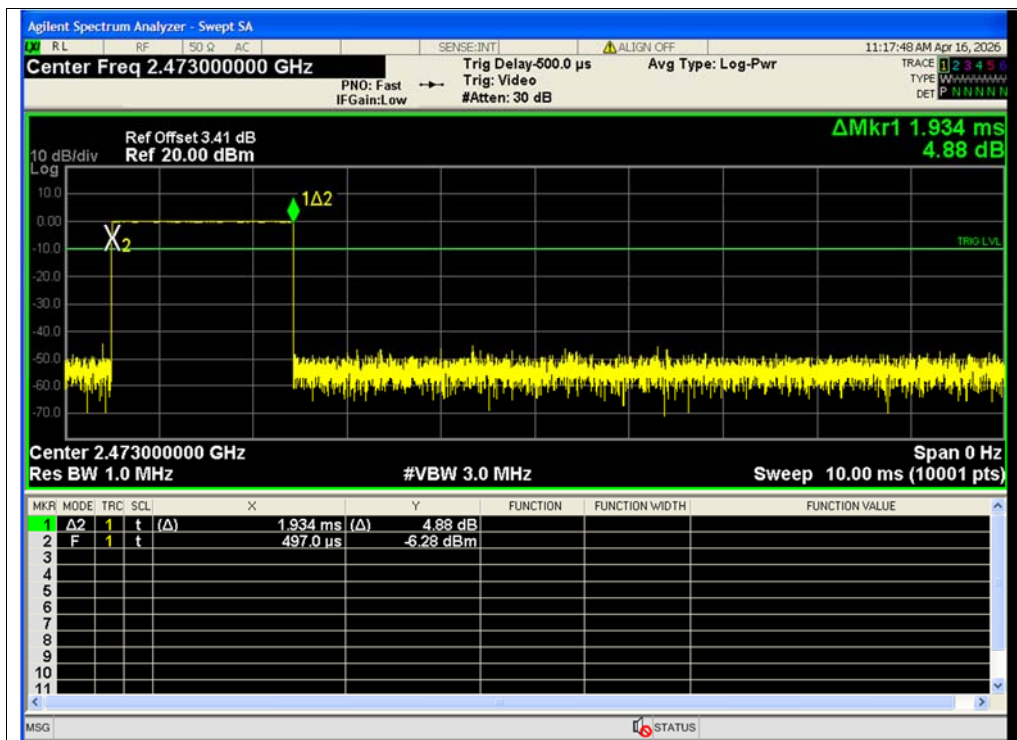
Dwell NVNT 2.4G 2405MHz Ant1 Accumulated



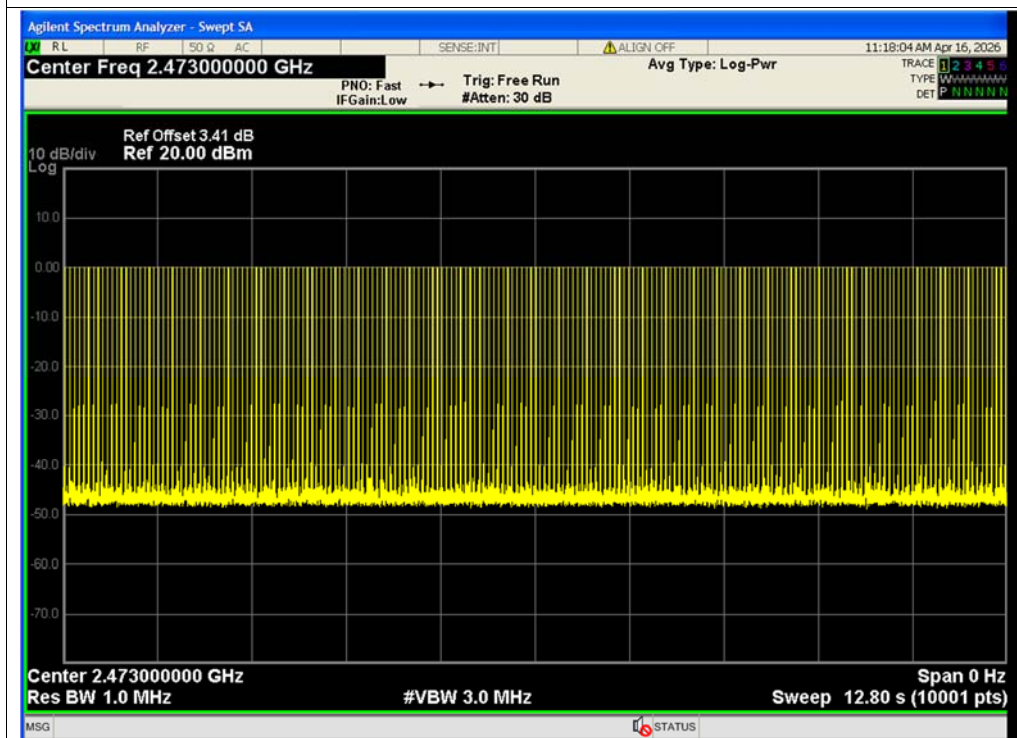
Dwell NVNT 2.4G 2439MHz Ant1 One Burst



Dwell NVNT 2.4G 2439MHz Ant1 Accumulated



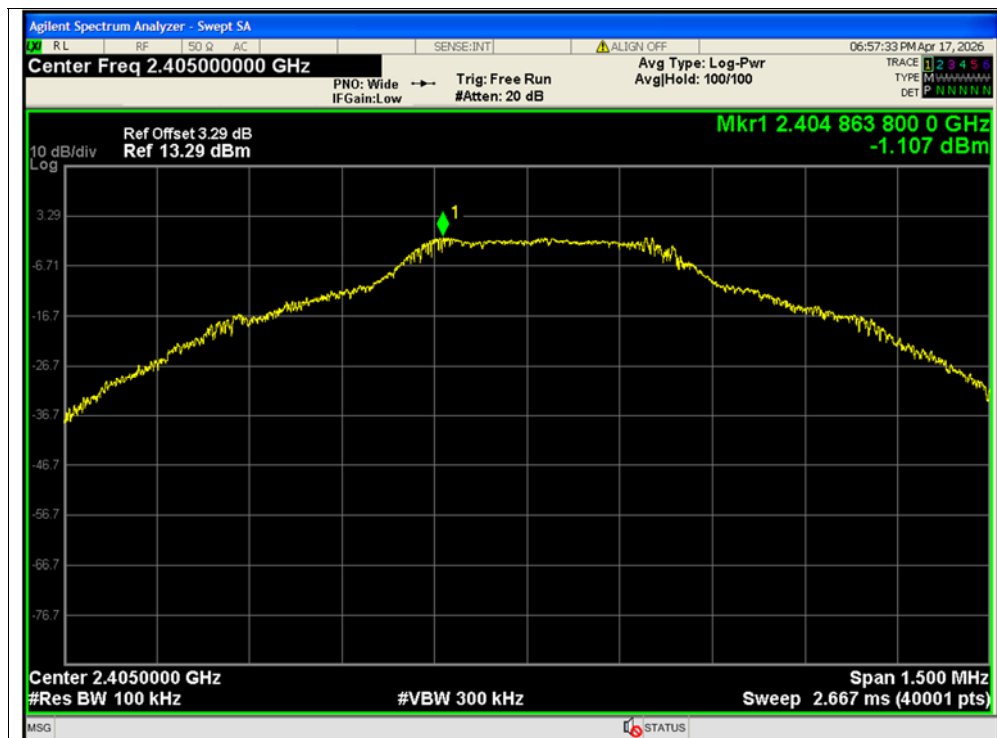
Dwell NVNT 2.4G 2473MHz Ant1 One Burst



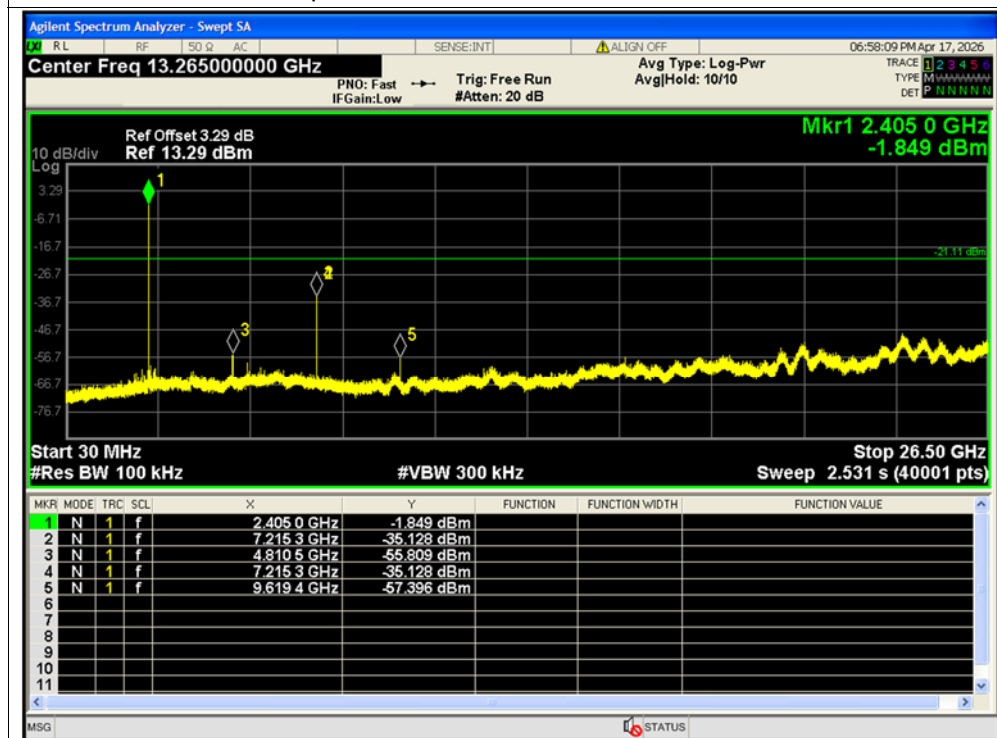
Dwell NVNT 2.4G 2473MHz Ant1 Accumulated

**A.8. Conducted Spurious Emissions**

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	2.4G	2405	Ant1	-34.01	-20	Pass
NVNT	2.4G	2439	Ant1	-35.07	-20	Pass
NVNT	2.4G	2473	Ant1	-31.92	-20	Pass



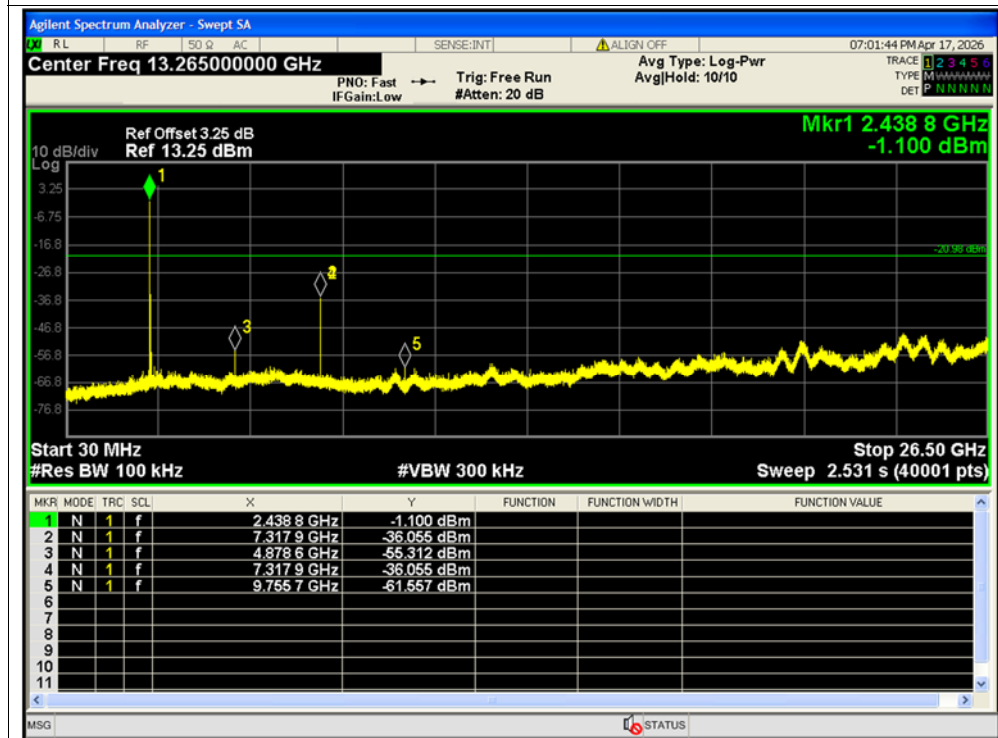
Tx. Spurious NVNT 2.4G 2405MHz Ant1 Ref



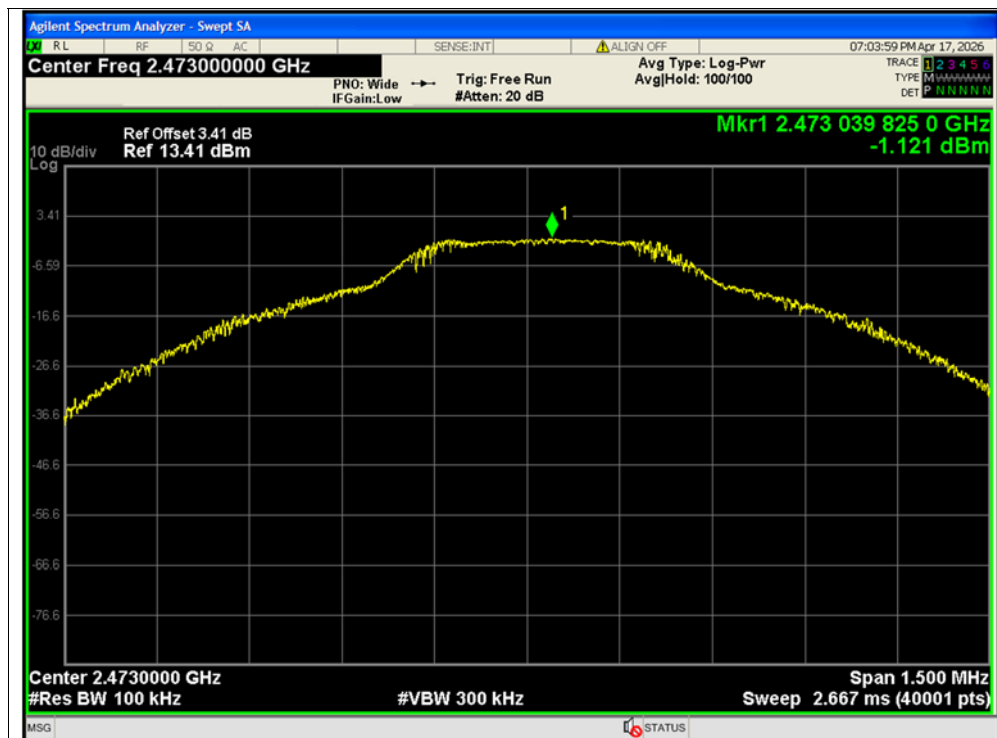
Tx. Spurious NVNT 2.4G 2405MHz Ant1 Emission



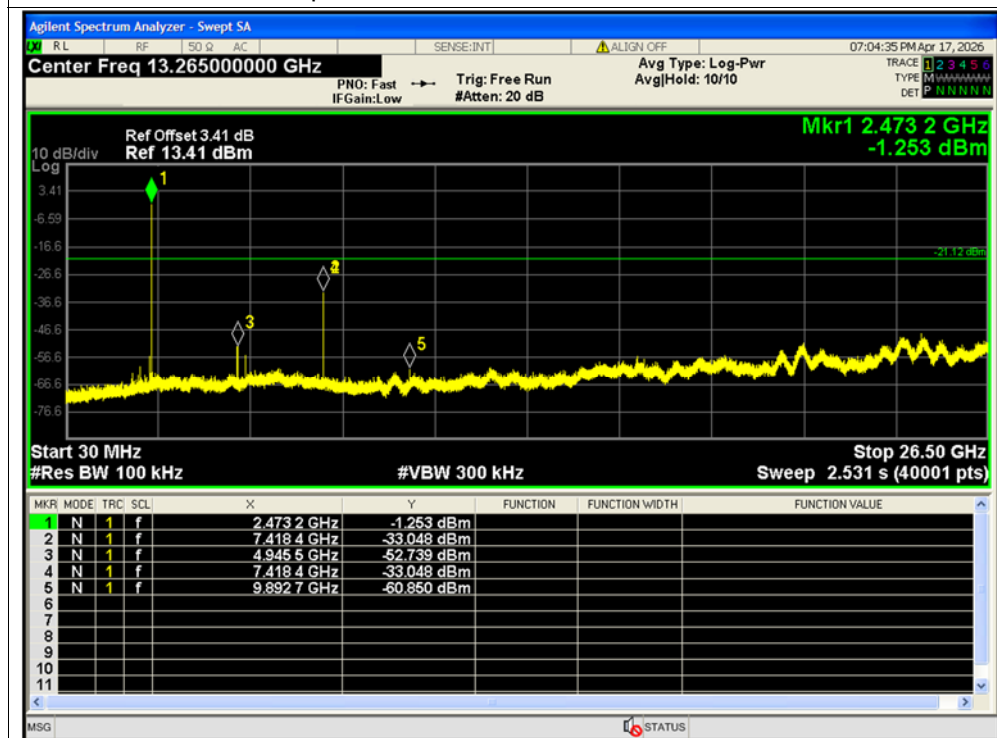
Tx. Spurious NVNT 2.4G 2439MHz Ant1 Ref



Tx. Spurious NVNT 2.4G 2439MHz Ant1 Emission



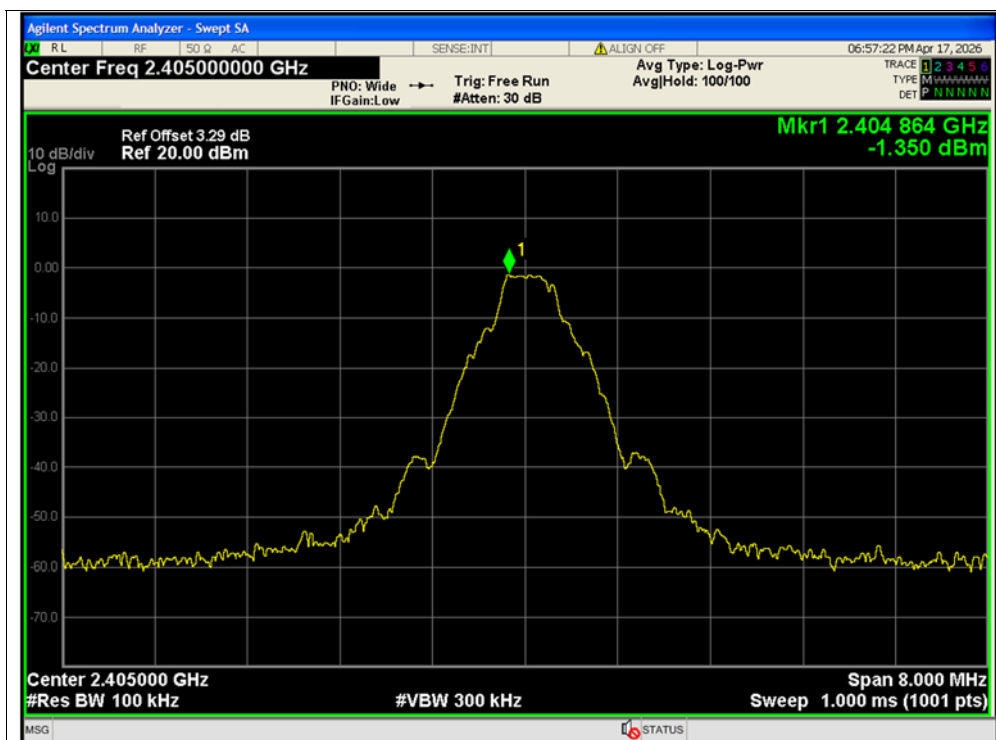
Tx. Spurious NVNT 2.4G 2473MHz Ant1 Ref



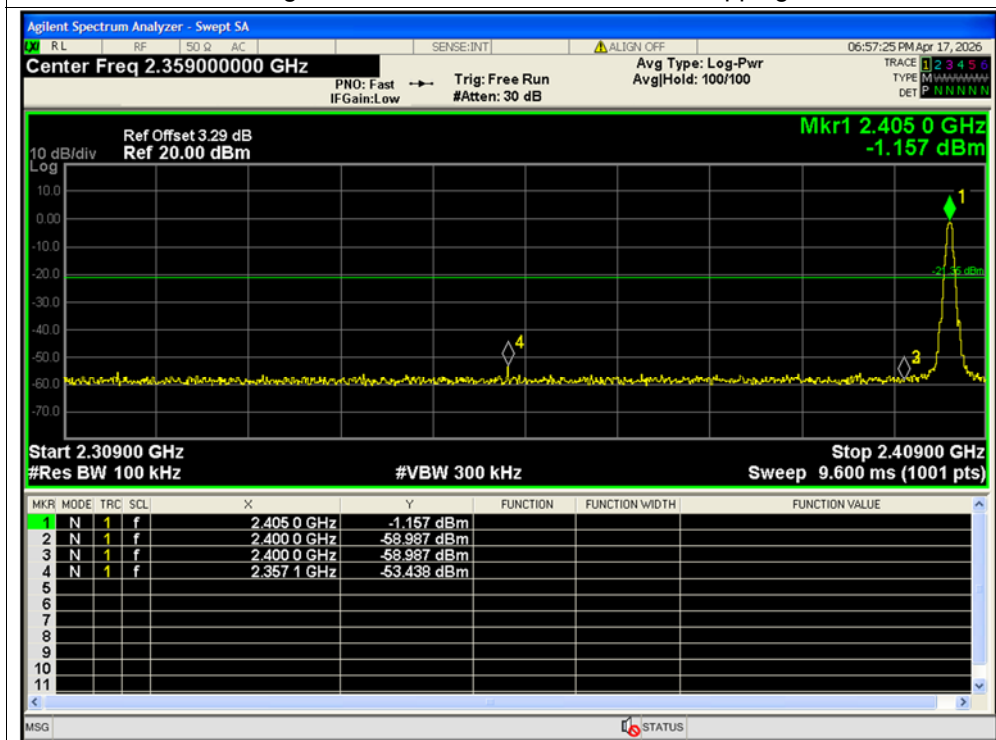
Tx. Spurious NVNT 2.4G 2473MHz Ant1 Emission

**A.9. Band Edge**

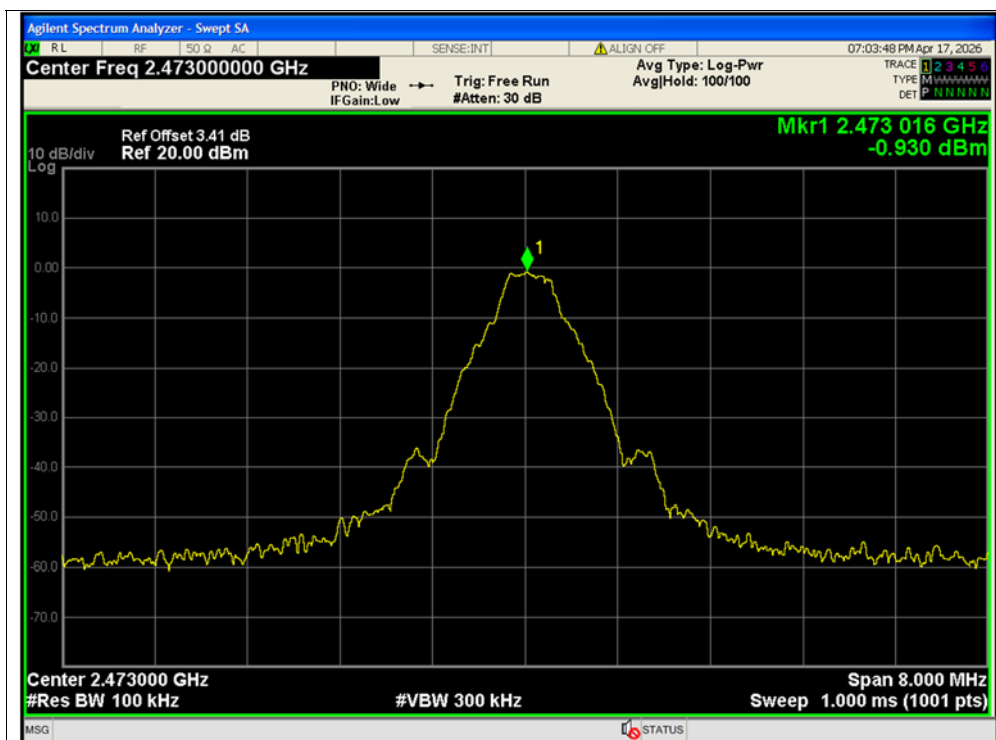
Condition	Mode	Frequency (MHz)	Antenna	Hopping Mode	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	2.4G	2405	Ant1	No-Hopping	-52.08	-20	Pass
NVNT	2.4G	2473	Ant1	No-Hopping	-54.93	-20	Pass
NVNT	2.4G	2405	Ant1	Hopping	-52.81	-20	Pass
NVNT	2.4G	2473	Ant1	Hopping	-54.6	-20	Pass



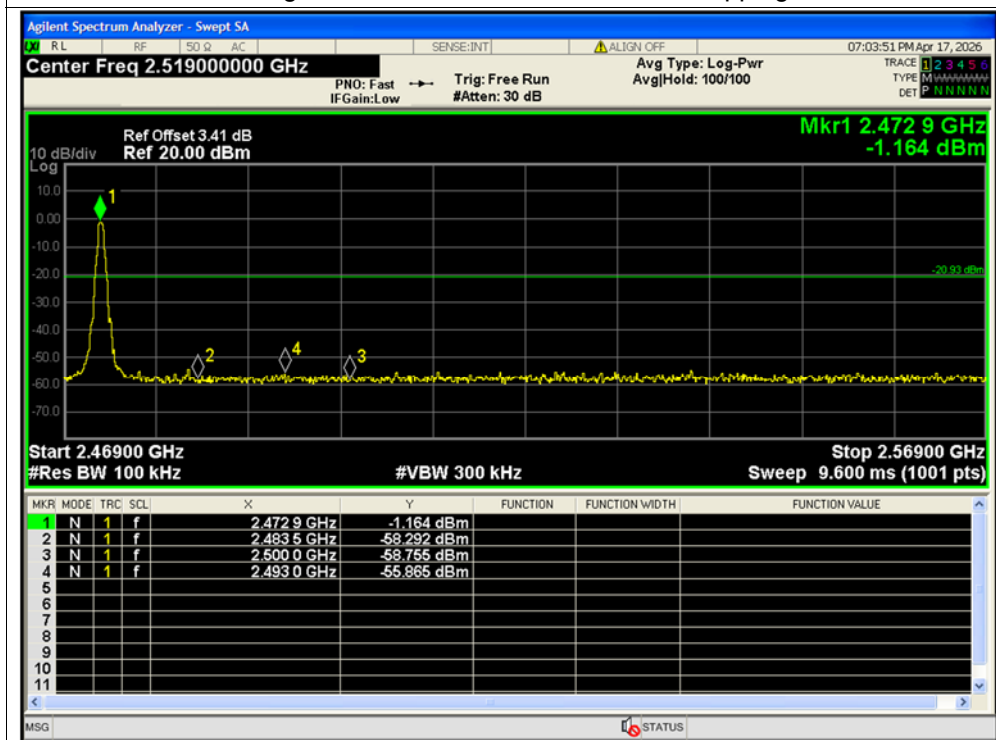
Band Edge NVNT 2.4G 2405MHz Ant1 No-Hopping Ref



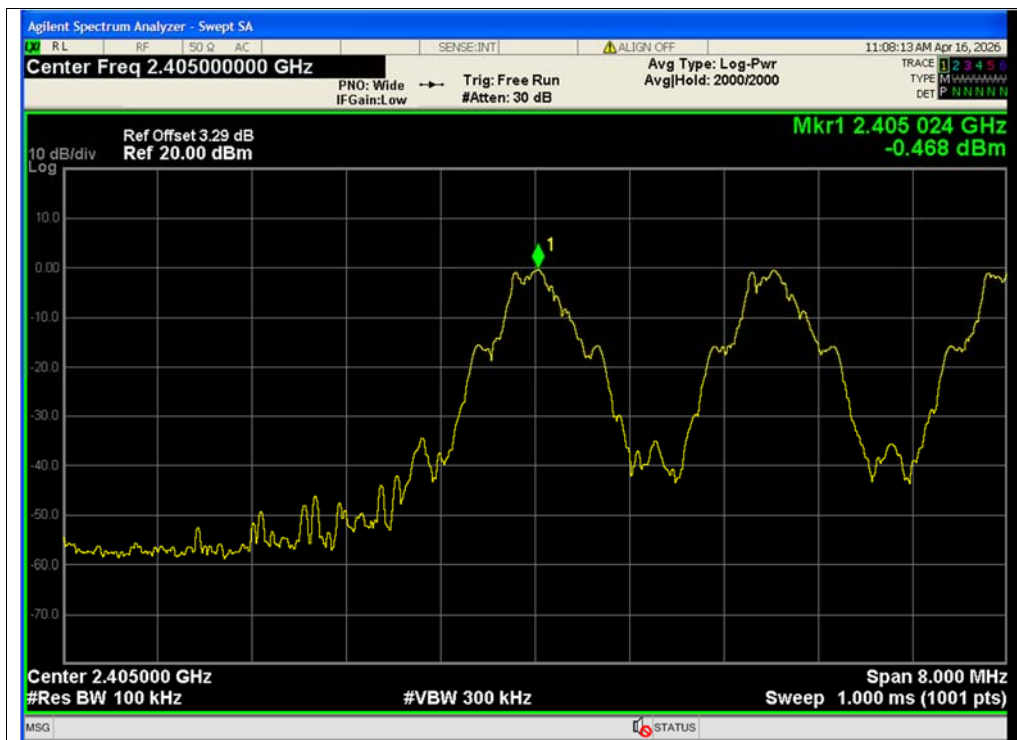
Band Edge NVNT 2.4G 2405MHz Ant1 No-Hopping Emission



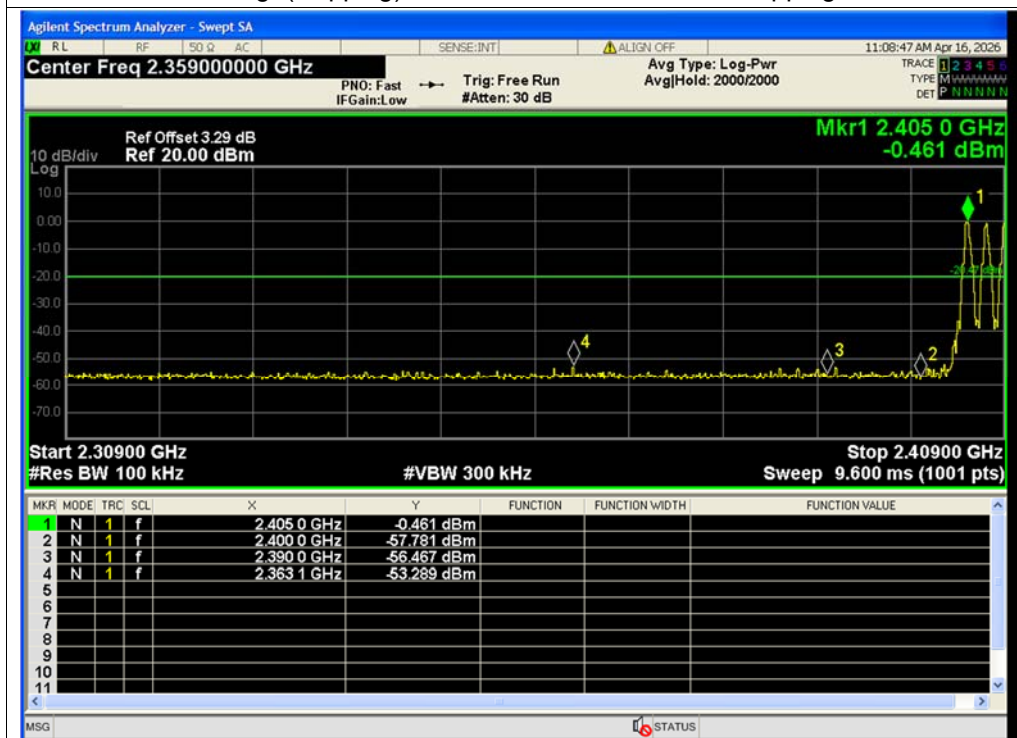
Band Edge NVNT 2.4G 2473MHz Ant1 No-Hopping Ref



Band Edge NVNT 2.4G 2473MHz Ant1 No-Hopping Emission



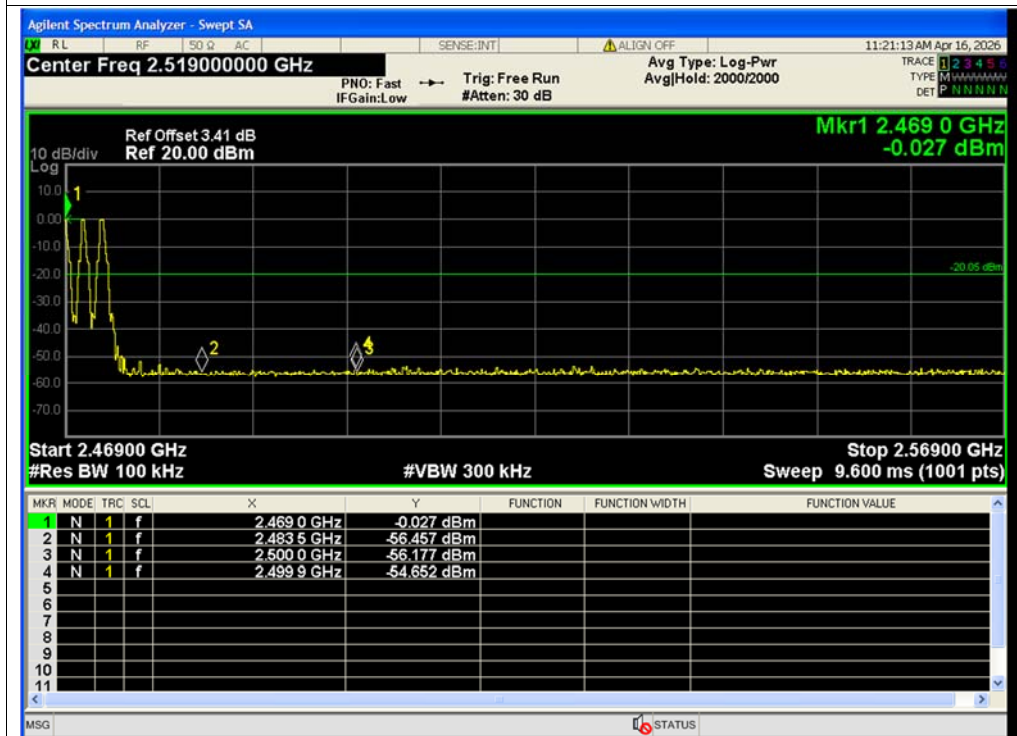
Band Edge(Hopping) NVNT 2.4G 2405MHz Ant1 Hopping Ref



Band Edge(Hopping) NVNT 2.4G 2405MHz Ant1 Hopping Emission



Band Edge(Hopping) NVNT 2.4G 2473MHz Ant1 Hopping Ref



Band Edge(Hopping) NVNT 2.4G 2473MHz Ant1 Hopping Emission

**A.10. Conducted Emission**

The maximum conducted interference is searched using Peak (PK), if the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed. Set RBW=9kHz, VBW=30kHz. Refer to recorded points and plots below.

Note: Both of the test voltage AC 120V/60Hz and AC 230V/50Hz were considered and tested respectively, only the results of the worst case AC 120V/60Hz were recorded in this report.

A. Test Setup:

Test Mode: EUT+Notebook+Notebook adapter+Serial port board+2.4G TX

Test voltage: AC 120V/60Hz

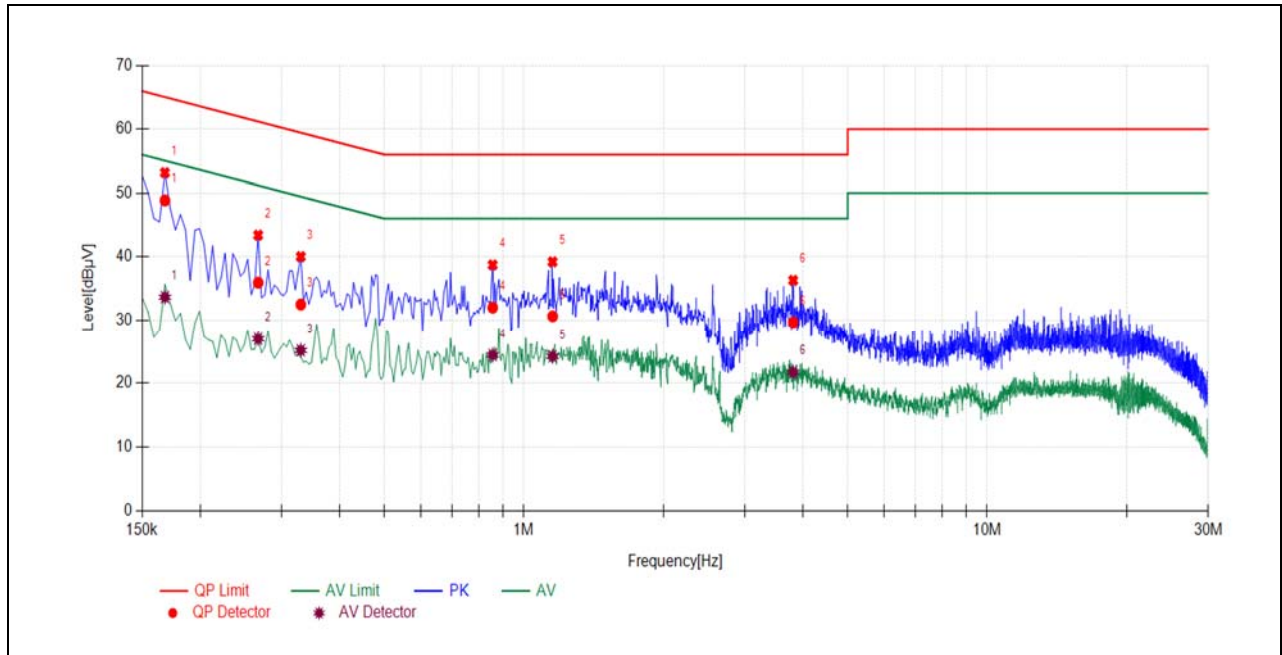
The measurement results are obtained as below:

$$E [\text{dB}\mu\text{V}] = U_R + L_{\text{Cable loss}} [\text{dB}] + A_{\text{Factor}}$$

U_R : Receiver Reading

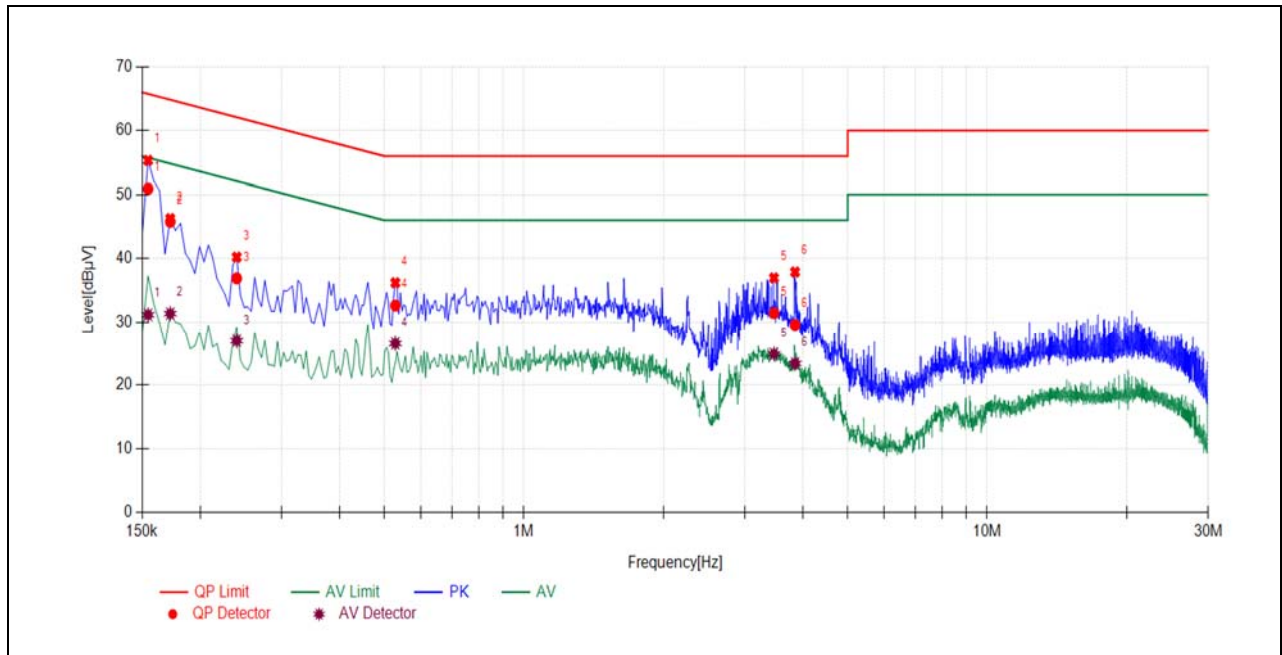
A_{Factor} : Voltage division factor of LISN

B. Test Plot:



(L Phase)

No.	Fre. (MHz)	Emission Level (dBμV)		Limit (dBμV)		Power-line	Verdict
		Quai-peak	Average	Quai-peak	Average		
1	0.1680	48.87	33.64	65.06	55.06	Line	PASS
2	0.2670	35.92	26.98	61.21	51.21		PASS
3	0.3300	32.47	25.14	59.45	49.45		PASS
4	0.8565	31.98	24.41	56.00	46.00		PASS
5	1.1536	30.61	24.21	56.00	46.00		PASS
6	3.8132	29.66	21.70	56.00	46.00		PASS



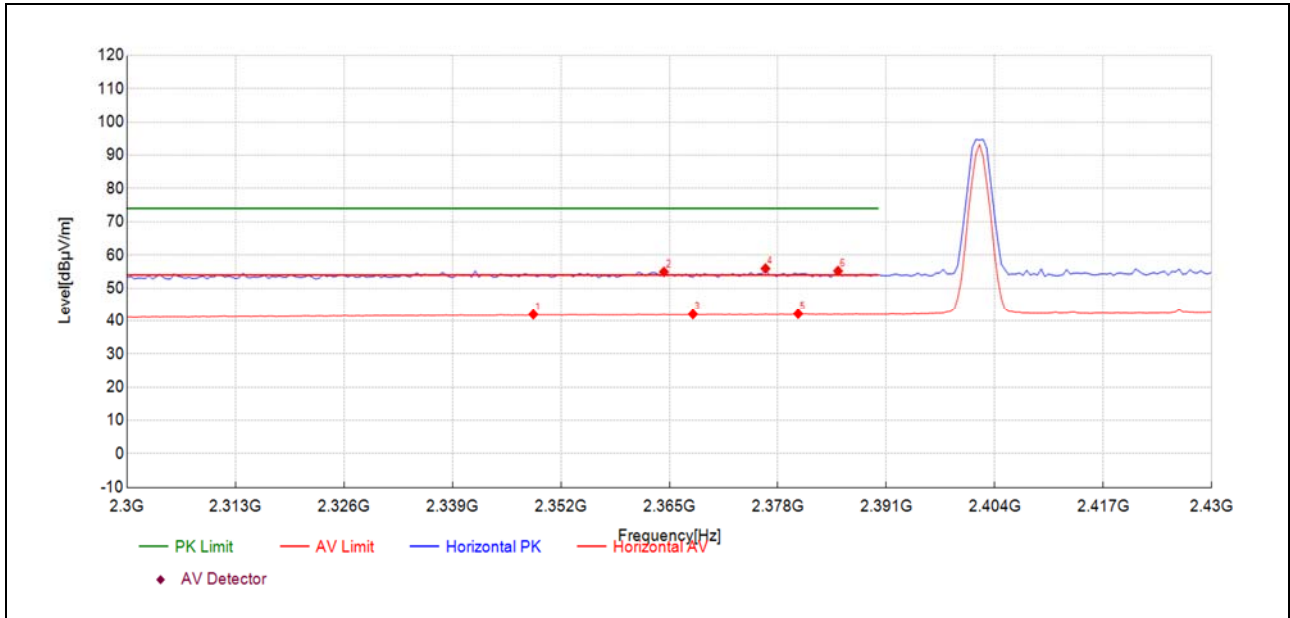
(N Phase)

No.	Fre. (MHz)	Emission Level (dBμV)		Limit (dBμV)		Power-line	Verdict
		Quai-peak	Average	Quai-peak	Average		
1	0.1545	50.91	31.17	65.75	55.75	Neutral	PASS
2	0.1725	45.78	31.35	64.84	54.84		PASS
3	0.2400	36.90	26.97	62.10	52.10		PASS
4	0.5280	32.63	26.54	56.00	46.00		PASS
5	3.4665	31.43	24.88	56.00	46.00		PASS
6	3.8487	29.57	23.37	56.00	46.00		PASS

A.11. Restricted Frequency Bands

Note: Restricted Frequency Bands were performed when antenna was at vertical and horizontal polarity, and only the worse test condition (Horizontal) was recorded in this test report.

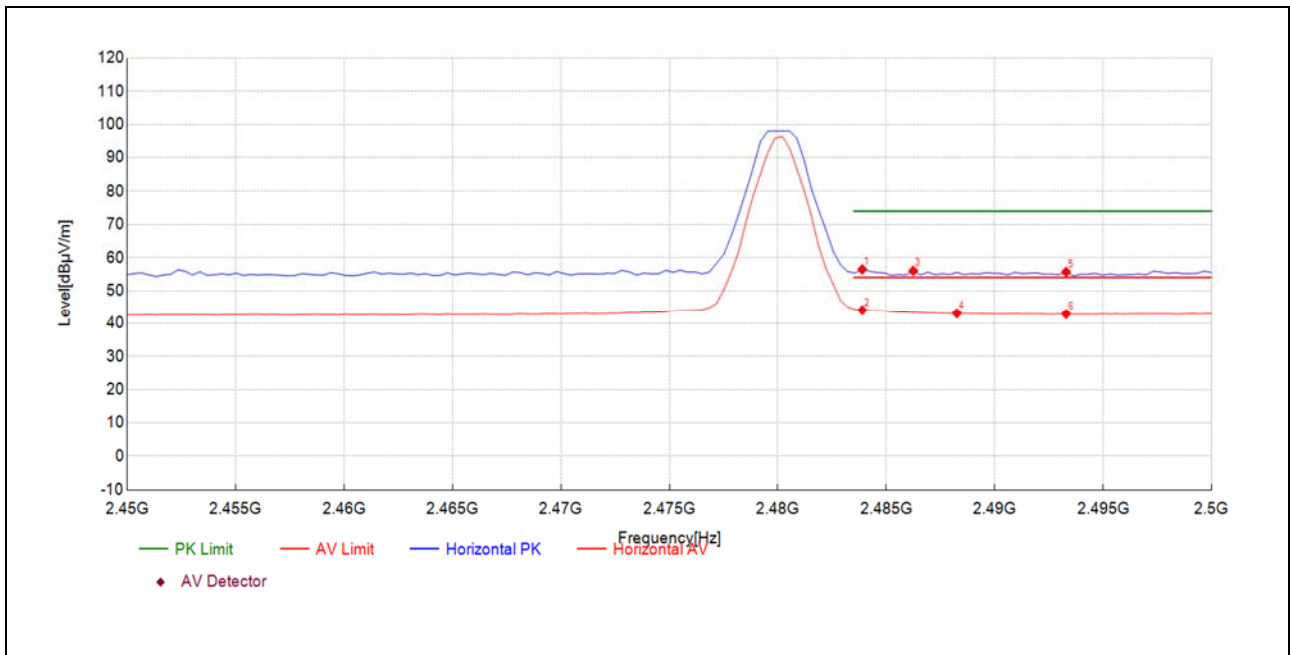
Plot for Channel 1



Fre. (MHz)	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Verdict
2348.70	9.5	41.89	32.390	54.00	12.11	165	211	AV	PASS
2364.35	22.5	54.94	32.450	74.00	19.06	165	275	PK	PASS
2367.83	9.5	41.96	32.470	54.00	12.04	165	153	AV	PASS
2376.52	23.5	55.95	32.490	74.00	18.05	165	41	PK	PASS
2380.43	9.6	42.08	32.510	54.00	11.92	165	219	AV	PASS
2385.22	22.7	55.20	32.530	74.00	18.80	165	124	PK	PASS



Plot for Channel 32



Fre. (MHz)	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Verdict
2483.89	23.4	56.45	33.030	74.00	17.55	165	294	PK	PASS
2483.89	11.0	44.02	33.030	54.00	9.98	165	90	AV	PASS
2486.24	23.0	56.02	33.030	74.00	17.98	165	164	PK	PASS
2488.26	10.0	43.03	33.020	54.00	10.97	165	90	AV	PASS
2493.29	22.7	55.69	33.010	74.00	18.31	165	193	PK	PASS
2493.29	9.8	42.84	33.010	54.00	11.16	165	164	AV	PASS



A.12. Radiated Emission

According to ANSI C63.10, because of peak detection will yield amplitudes equal to or greater than amplitudes measured with the quasi-peak (or average) detector, the measurement data from a spectrum analyzer peak detector will represent the worst-case results, if the peak measured value complies with the quasi-peak (or average) limit, it is unnecessary to perform an quasi-peak measurement (or average).

The measurement results are obtained as below:

$$E [\text{dB}\mu\text{V/m}] = U_R + A_T + A_{\text{Factor}} [\text{dB}]; A_T = L_{\text{Cable loss}} [\text{dB}] - G_{\text{preamp}} [\text{dB}]$$

A_T : Total correction Factor except Antenna

U_R : Receiver Reading

G_{preamp} : Preamplifier Gain

A_{Factor} : Antenna Factor at 3m

During the test, the total correction Factor A_T and A_{Factor} were built in test software.

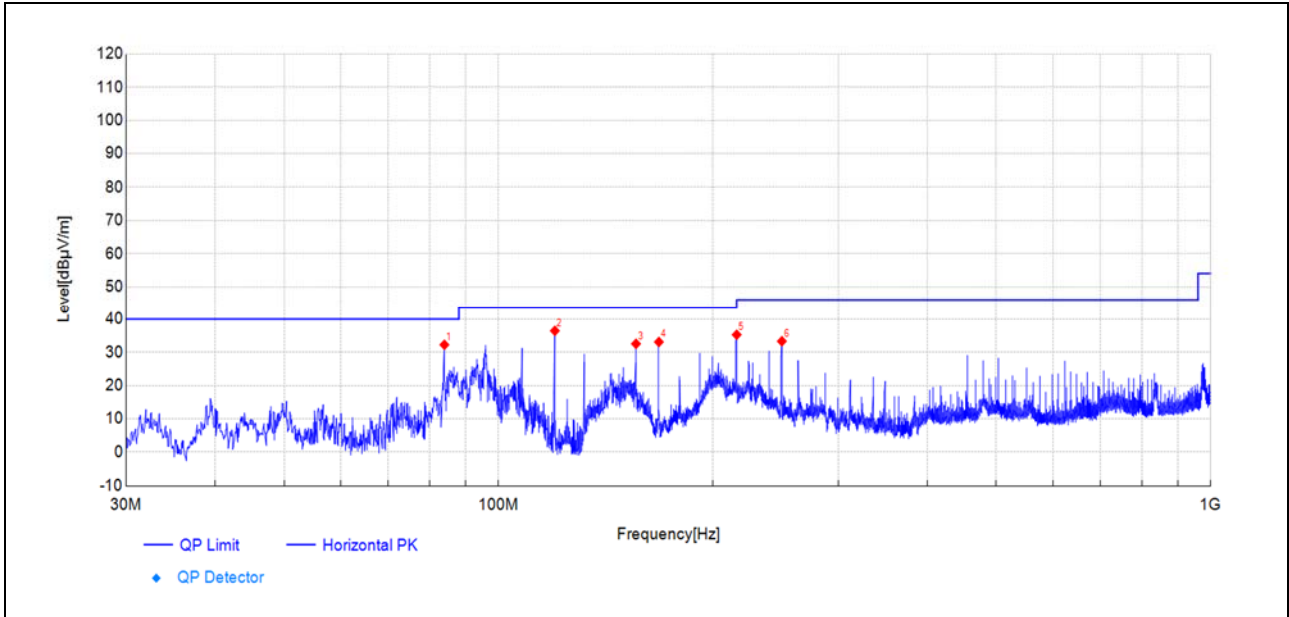
Note1: All radiated emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

Note2: For the frequency, which started from 9kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit was not recorded.

Note3: For the frequency, which started from 18GHz to 10th harmonic of the highest frequency, was pre-scanned and the result which was 20dB lower than the limit was not recorded.

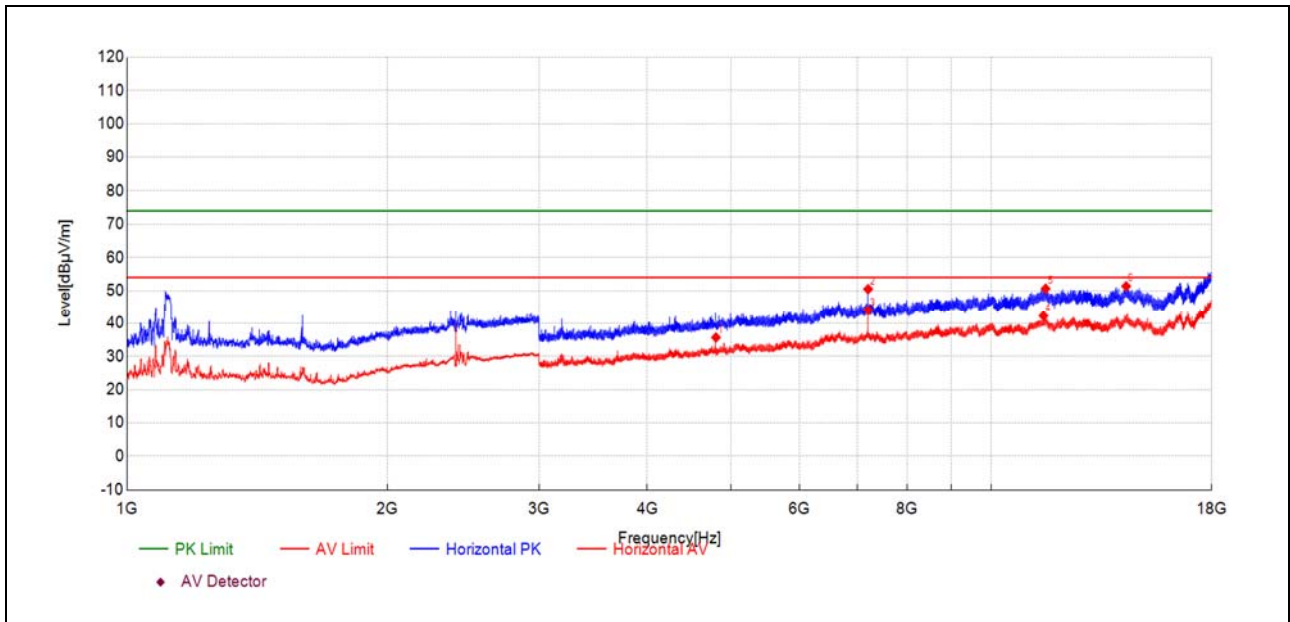


Plot for Channel 1



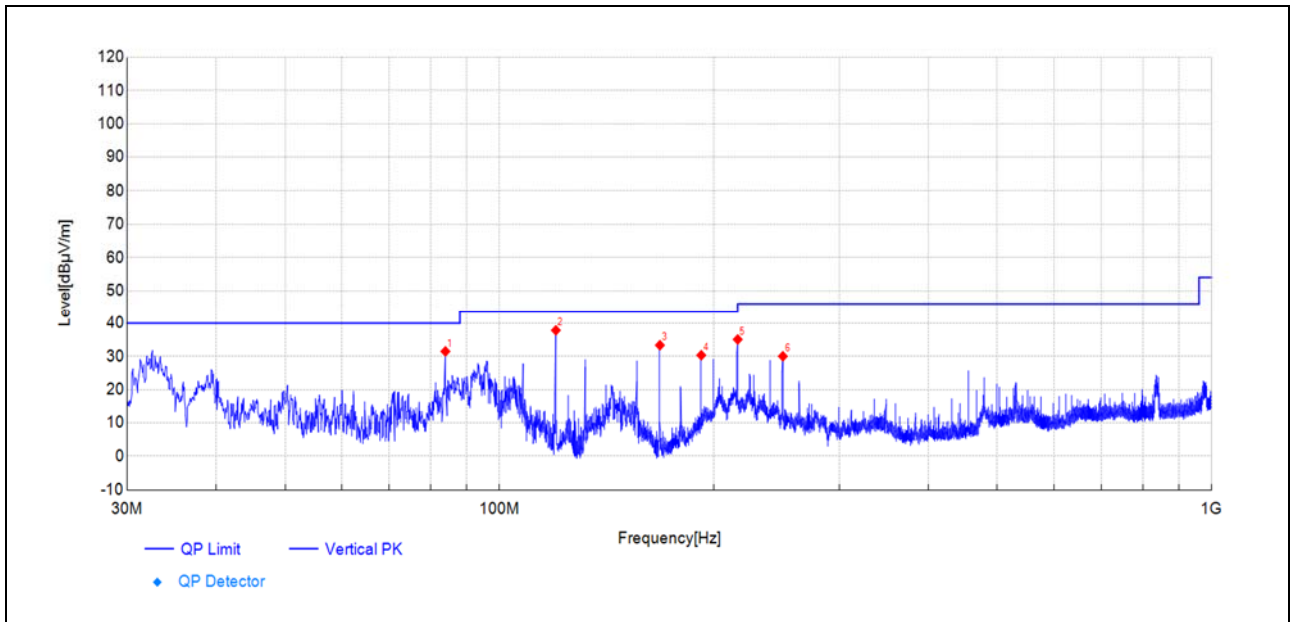
(Antenna Horizontal, 30MHz to 1GHz)

Fre. (MHz)	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Verdict
83.97	66.6	32.25	-34.310	40.00	7.75	165	2	PK	PASS
120.01	68.7	36.45	-32.250	43.50	7.05	165	299	PK	PASS
155.99	65.5	32.54	-33.000	43.50	10.96	165	287	PK	PASS
167.98	65.4	33.10	-32.330	43.50	10.40	165	34	PK	PASS
216.02	64.8	35.27	-29.500	46.00	10.73	165	160	PK	PASS
250.00	61.4	33.32	-28.120	46.00	12.68	165	85	PK	PASS



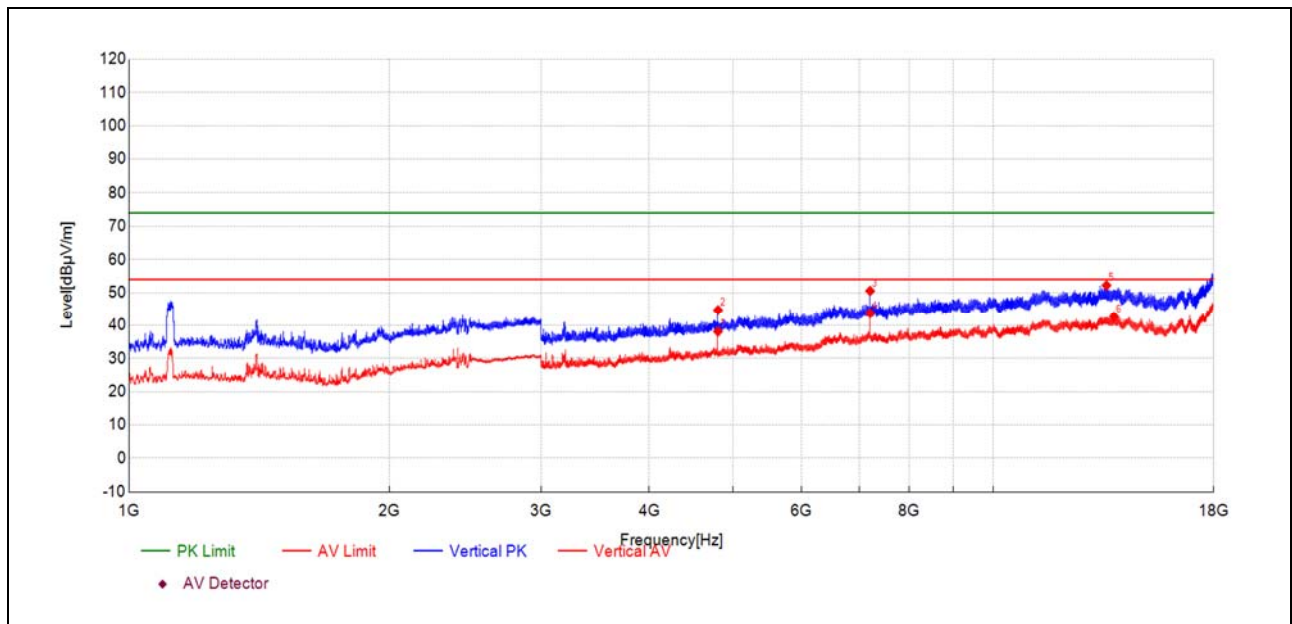
(Antenna Horizontal, 1GHz to 18GHz)

Fre. (MHz)	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Verdict
4803.79	46.4	35.67	-10.720	54.00	18.33	165	285	AV	PASS
7205.18	54.1	50.47	-3.650	74.00	23.53	165	81	PK	PASS
7205.18	47.6	43.96	-3.650	54.00	10.04	165	81	AV	PASS
11495.60	39.6	42.24	2.650	54.00	11.76	165	11	AV	PASS
11562.88	47.8	50.62	2.790	74.00	23.38	165	56	PK	PASS
14331.12	46.5	51.35	4.880	74.00	22.65	165	311	PK	PASS



(Antenna Vertical, 30MHz to 1GHz)

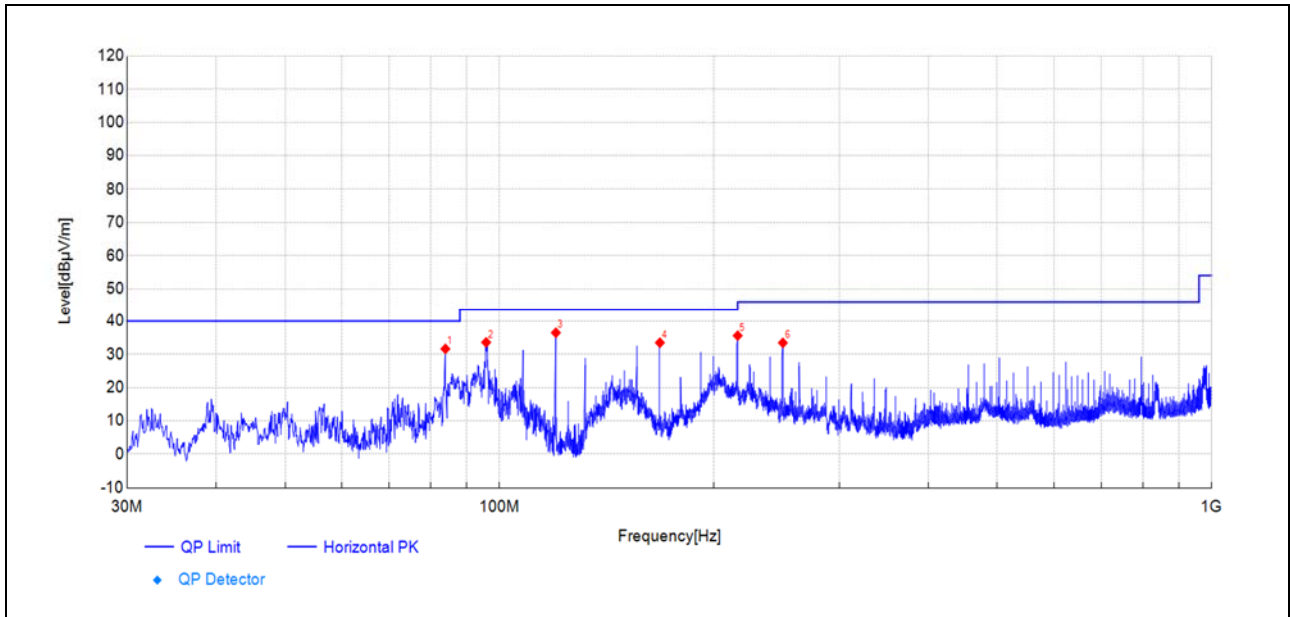
Fre. (MHz)	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Verdict
83.97	65.8	31.48	-34.310	40.00	8.52	165	98	PK	PASS
120.01	70.1	37.83	-32.250	43.50	5.67	165	10	PK	PASS
167.98	65.7	33.34	-32.330	43.50	10.16	165	46	PK	PASS
192.03	59.9	30.33	-29.600	43.50	13.17	165	46	PK	PASS
216.02	64.6	35.07	-29.500	46.00	10.93	165	34	PK	PASS
250.00	58.1	30.01	-28.120	46.00	15.99	165	147	PK	PASS



(Antenna Vertical, 1GHz to 18GHz)

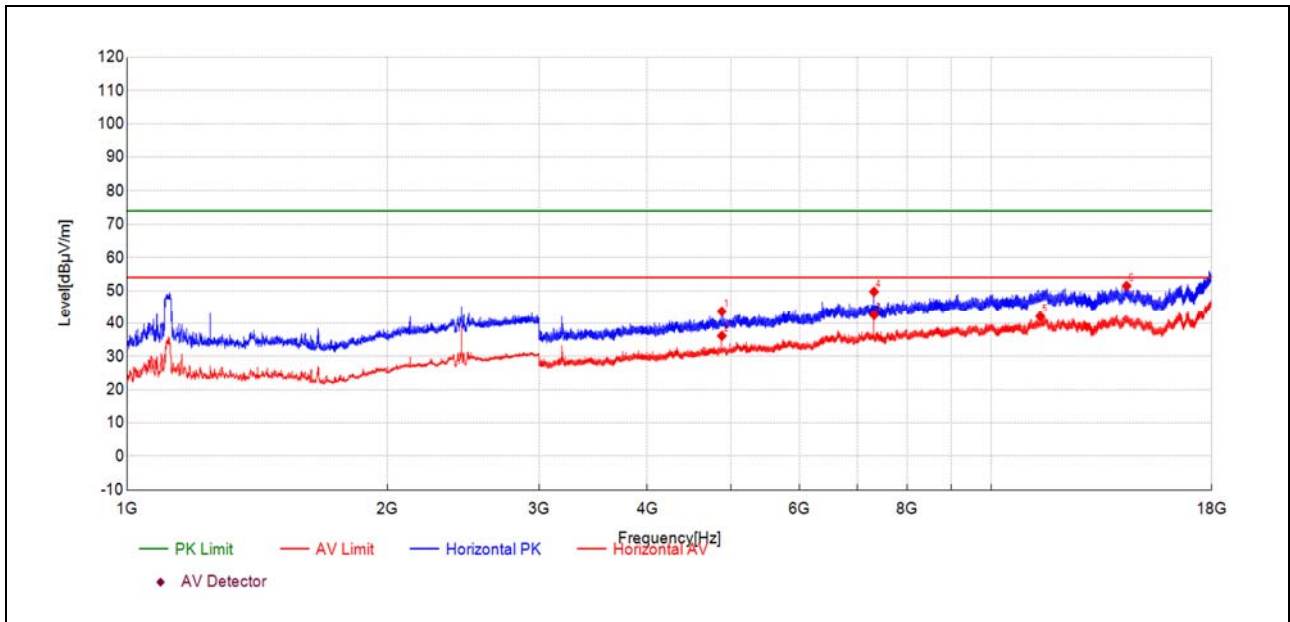
Fre. (MHz)	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Verdict
4803.79	48.8	38.08	-10.720	54.00	15.92	165	81	AV	PASS
4804.29	55.4	44.67	-10.720	74.00	29.33	165	100	PK	PASS
7204.69	54.2	50.52	-3.640	74.00	23.48	165	358	PK	PASS
7205.18	47.3	43.67	-3.650	54.00	10.33	165	358	AV	PASS
13526.67	47.5	52.22	4.740	74.00	21.78	165	127	PK	PASS
13797.81	37.1	42.65	5.550	54.00	11.35	165	35	AV	PASS

Plot for Channel 16



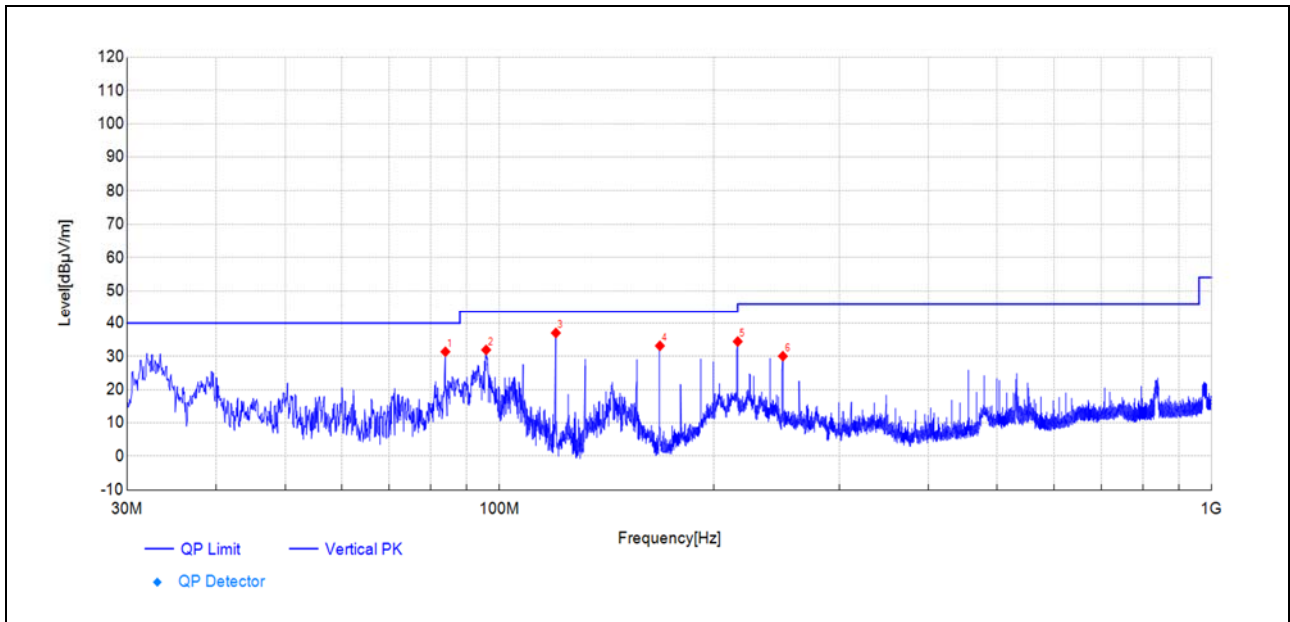
(Antenna Horizontal, 30MHz to 1GHz)

Fre. (MHz)	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Verdict
83.97	65.9	31.61	-34.310	40.00	8.39	165	6	PK	PASS
95.79	64.1	33.59	-30.550	43.50	9.91	165	145	PK	PASS
120.01	68.7	36.47	-32.250	43.50	7.03	165	313	PK	PASS
167.98	65.8	33.48	-32.330	43.50	10.02	165	21	PK	PASS
216.02	65.1	35.60	-29.500	46.00	10.40	165	145	PK	PASS
250.00	61.6	33.43	-28.120	46.00	12.57	165	83	PK	PASS



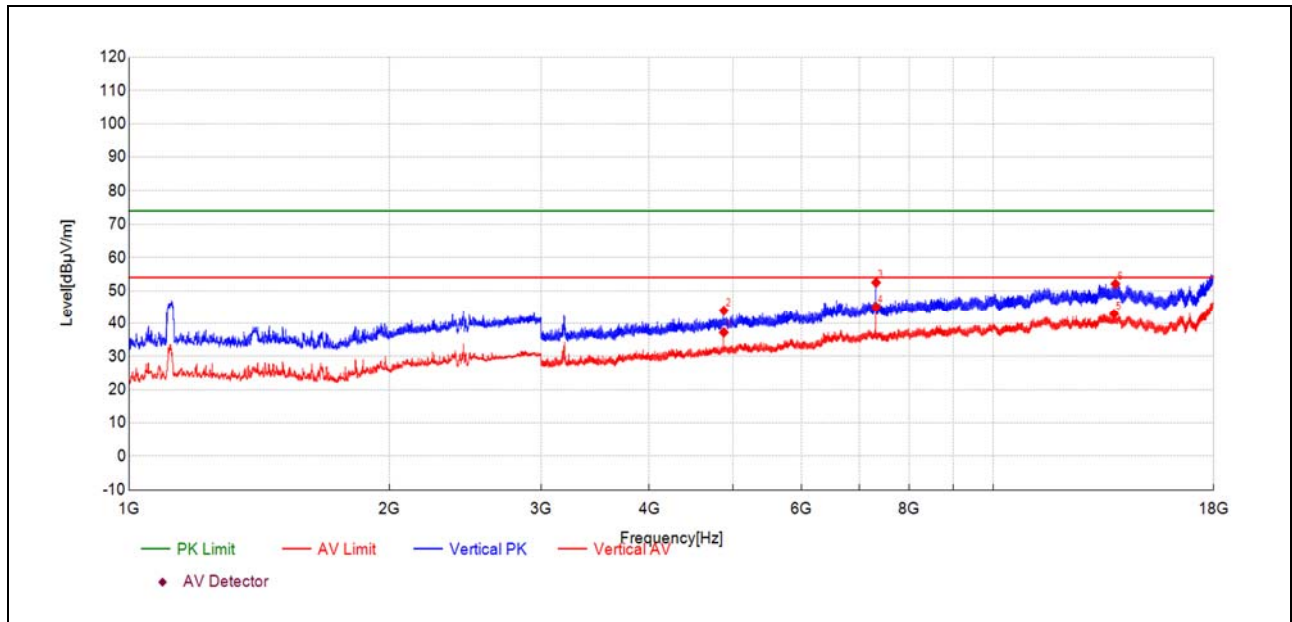
(Antenna Horizontal, 1GHz to 18GHz)

Fre. (MHz)	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Verdict
4879.05	53.7	43.64	-10.020	74.00	30.36	165	283	PK	NA
4880.05	46.2	36.16	-10.010	54.00	17.84	165	283	AV	PASS
7319.32	46.2	42.49	-3.670	54.00	11.51	165	307	AV	PASS
7319.32	53.4	49.69	-3.670	74.00	24.31	165	307	PK	PASS
11398.90	39.4	42.09	2.660	54.00	11.91	165	102	AV	PASS
14347.07	46.6	51.45	4.890	74.00	22.55	165	148	PK	PASS



(Antenna Vertical, 30MHz to 1GHz)

Fre. (MHz)	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Verdict
83.97	65.7	31.37	-34.310	40.00	8.63	165	110	PK	PASS
95.79	62.5	31.92	-30.550	43.50	11.58	165	110	PK	PASS
120.01	69.3	37.03	-32.250	43.50	6.47	165	10	PK	PASS
167.98	65.5	33.14	-32.330	43.50	10.36	165	48	PK	PASS
216.02	64.0	34.45	-29.500	46.00	11.55	165	360	PK	PASS
250.00	58.2	30.04	-28.120	46.00	15.96	165	237	PK	PASS

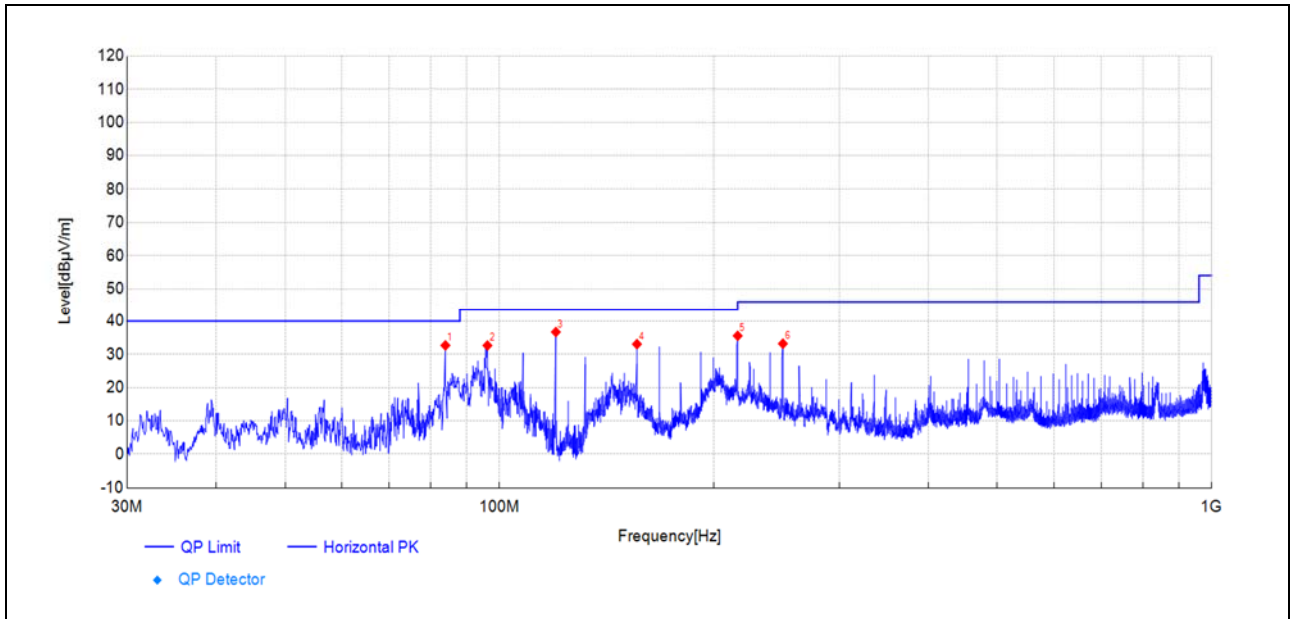


(Antenna Vertical, 1GHz to 18GHz)

Fre. (MHz)	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Verdict
4879.05	47.2	37.22	-10.020	54.00	16.78	165	349	AV	PASS
4879.55	53.9	43.87	-10.010	74.00	30.13	165	349	PK	PASS
7320.82	56.1	52.46	-3.670	74.00	21.54	165	147	PK	PASS
7320.82	48.7	45.03	-3.670	54.00	8.97	165	126	AV	PASS
13803.29	37.3	42.86	5.540	54.00	11.14	165	171	AV	PASS
13851.64	47.0	52.06	5.040	74.00	21.94	165	102	PK	PASS

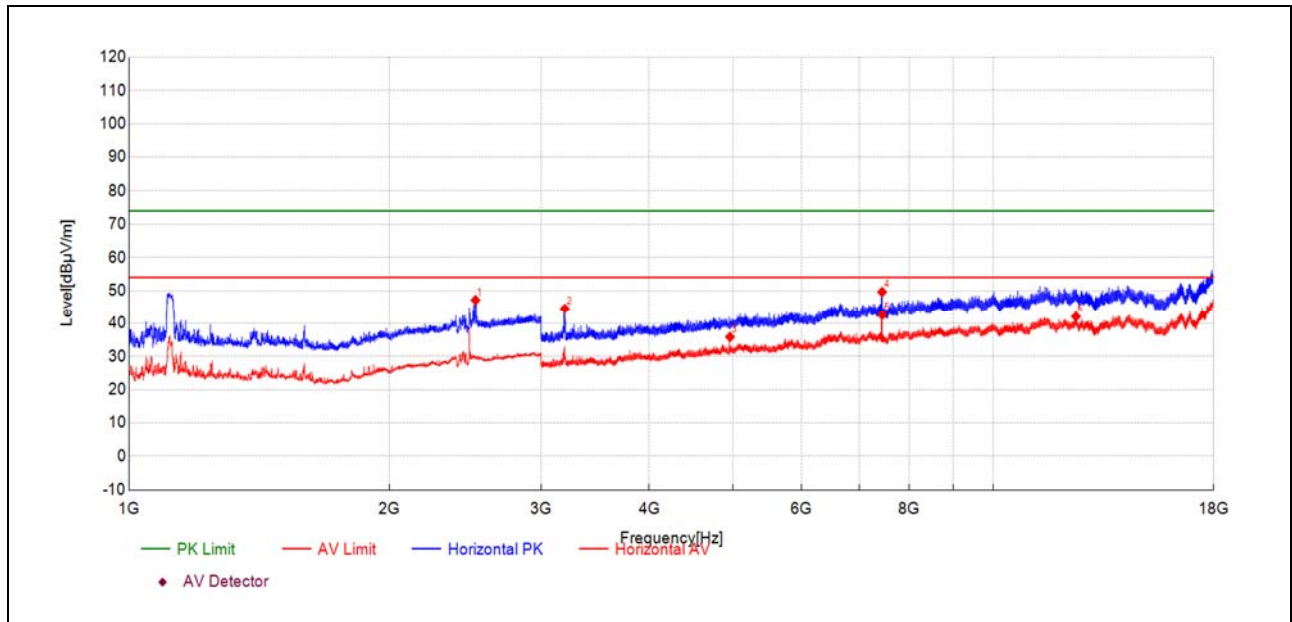


Plot for Channel 32



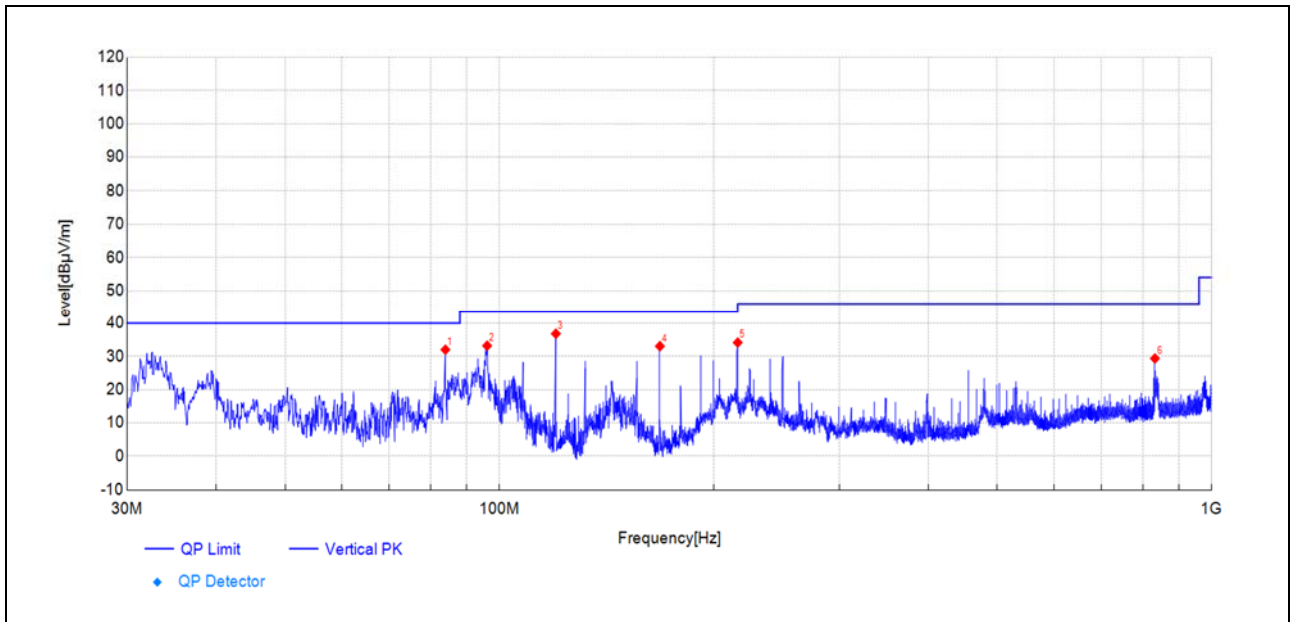
(Antenna Horizontal, 30MHz to 1GHz)

Fre. (MHz)	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Verdict
83.97	67.0	32.66	-34.310	40.00	7.34	165	349	PK	PASS
96.20	63.1	32.63	-30.480	43.50	10.87	165	135	PK	PASS
120.01	68.9	36.68	-32.250	43.50	6.82	165	323	PK	PASS
155.99	66.1	33.05	-33.000	43.50	10.45	165	249	PK	PASS
216.02	65.1	35.55	-29.500	46.00	10.45	165	162	PK	PASS
250.00	61.3	33.18	-28.120	46.00	12.82	165	199	PK	PASS



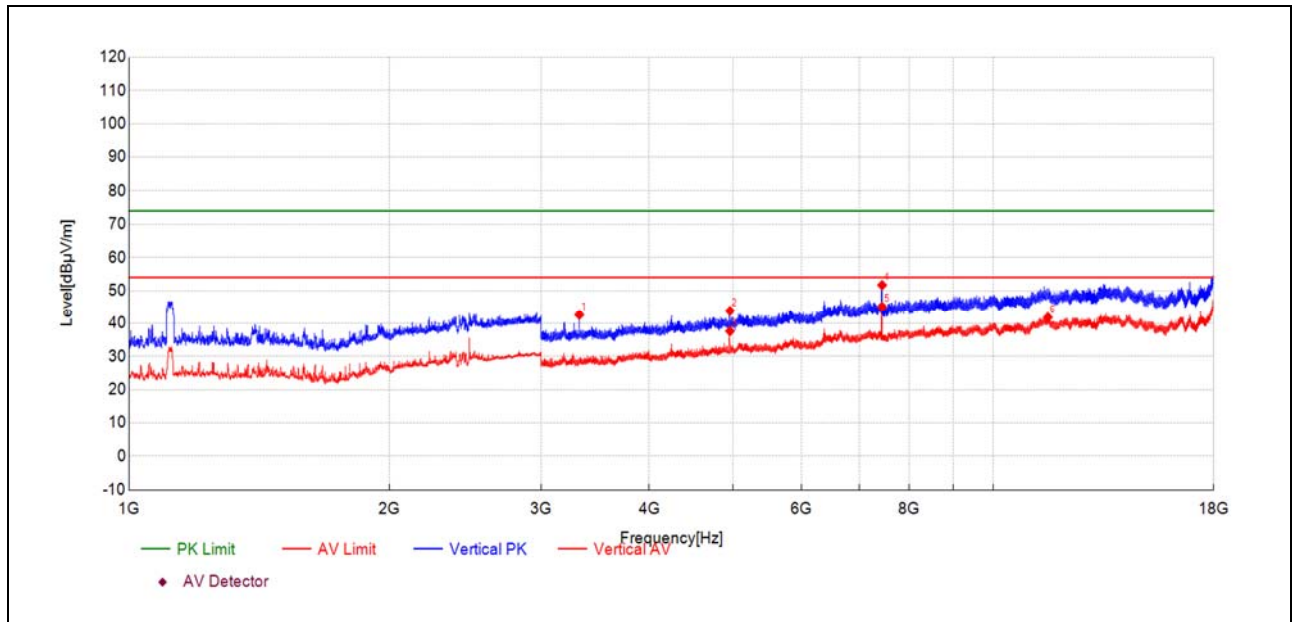
(Antenna Horizontal, 1GHz to 18GHz)

Fre. (MHz)	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Verdict
2517.46	46.3	47.14	0.830	74.00	26.86	165	84	PK	NA
3193.89	60.0	44.50	-15.520	74.00	29.50	165	360	PK	NA
4960.29	46.0	35.86	-10.130	54.00	18.14	165	79	AV	PASS
7438.94	54.0	49.60	-4.440	74.00	24.40	165	147	PK	PASS
7440.94	47.0	42.53	-4.470	54.00	11.47	165	307	AV	PASS
12469.01	38.4	42.02	3.670	54.00	11.98	165	79	AV	PASS



(Antenna Vertical, 30MHz to 1GHz)

Fre. (MHz)	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Verdict
83.97	66.3	31.99	-34.310	40.00	8.01	165	48	PK	PASS
96.08	63.7	33.18	-30.490	43.50	10.32	165	112	PK	PASS
120.01	69.0	36.79	-32.250	43.50	6.71	165	112	PK	PASS
167.98	65.4	33.05	-32.330	43.50	10.45	165	48	PK	PASS
216.02	63.6	34.13	-29.500	46.00	11.87	165	11	PK	PASS
832.27	45.3	29.35	-15.950	46.00	16.65	165	348	PK	PASS



(Antenna Vertical, 1GHz to 18GHz)

Fre. (MHz)	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Verdict
3319.99	58.1	42.58	-15.530	74.00	31.42	165	81	PK	PASS
4959.30	53.9	43.80	-10.130	74.00	30.20	165	358	PK	PASS
4959.79	47.8	37.62	-10.130	54.00	16.38	165	358	AV	PASS
7439.44	56.1	51.66	-4.450	74.00	22.34	165	127	PK	PASS
7439.44	49.6	45.12	-4.450	54.00	8.88	165	127	AV	PASS
11569.36	39.0	41.79	2.800	54.00	12.21	165	57	AV	PASS



Notes

1. The report shall have report stamp or our company stamp.
2. The report shall be invalid without all the signatures of the editor and approver.
3. The report shall not be changed.
4. Any objections must be raised to Morlab within 15 days since the date when the report is received. It will not be taken into consideration beyond this limit.
5. Conformity declaration:
 - ☒ Morlab issues a statement of conformity based on the corresponding standards (default)
 - ☐ Morlab issues a statement of conformity based on the applicant requirement
6. Use of uncertainty of measurement for decisions on conformity (decision rule):

No decision rule is specified by the testing standard, when comparing the measurement result with the applicable limit according to the specification in that standard. The decisions on conformity are made without applying the measurement uncertainty ("simple acceptance" decision rule).

————— END OF REPORT —————