



REPORT No.: SZ26060192W01

TEST REPORT

APPLICANT : Eforthink Technology Co., Ltd.

PRODUCT NAME : UWB Indoor Wall-mounted
Positioning Base Station

MODEL NAME : D32

BRAND NAME : EforLink

FCC ID : 2BTEQEFORLINKD32

STANDARD(S) : 47 CFR Part 15 Subpart C

RECEIPT DATE : 2026-06-16

TEST DATE : 2026-07-06 to 2026-08-03

ISSUE DATE : 2026-09-15



Edited by:

Zeng Xiaoying
Zeng Xiaoying (Rapporteur)

Approved by:

Shen Junsheng
Shen Junsheng (Supervisor)

NOTE: This document is issued by Shenzhen Morlab Communications Technology Co., Ltd., the test report shall not be reproduced except in full without prior written permission of the company. The test results apply only to the particular sample(s) tested and to the specific tests carried out which is available on request for validation and information confirmed at our website.

MORLAB

Shenzhen Morlab Communications Technology Co., Ltd.
FL.1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen, GuangDong Province, P. R. China

Tel: 86-755-36698555

Http://www.morlab.cn

Fax: 86-755-36698525

E-mail: service@morlab.cn





DIRECTORY

1. Summary of Test Result	4
1.1. Testing Applied Standards	5
1.2. Test Equipment List	6
1.3. Measurement Uncertainty	8
1.4. Testing Laboratory	8
2. General Description	9
2.1. Information of Applicant and Manufacturer	9
2.2. Information of EUT	9
2.3. Channel List of EUT	10
2.4. Test Configuration of EUT	11
2.5. Test Conditions	11
2.6. Test Setup Layout Diagram	11
3. Test Results	14
3.1. Antenna Requirement	14
3.2. Duty Cycle of Test Signal	15
3.3. Maximum Peak Conducted Output Power	16
3.4. Maximum Average Conducted Output Power	17
3.5. 6 dB Bandwidth	18
3.6. Conducted Spurious Emissions and Band Edge	19
3.7. Power Spectral Density	20
3.8. Conducted Emission	21
3.9. Restricted Frequency Bands	22
3.10. Radiated Emission	23
Annex A Test Data and Result	25
Notes	65



REPORT No.: SZ26060192W01

Change History		
Version	Date	Reason for change
1.0	2026-09-15	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	N/A	Duty Cycle of Test Signal	Jul. 06, 2026	Zhu Peihong	PASS	/
3	15.247(b)	Maximum Peak Conducted Output Power	Jul. 06, 2026	Zhu Peihong	PASS	/
4	15.247(b)	Maximum Average Conducted Output Power	Jul. 06, 2026	Zhu Peihong	PASS	/
5	15.247(a)	Bandwidth	Jul. 06, 2026	Zhu Peihong	PASS	/
6	15.247(d)	Conducted Spurious Emission and Band Edge	Jul. 06, 2026	Zhu Peihong	PASS	/
7	15.247(e)	Power Spectral Density	Jul. 06, 2026	Zhu Peihong	PASS	/
8	15.207	Conducted Emission	Aug. 03, 2026	Wang Yapeng	PASS	/
9	15.247(d)	Restricted Frequency Bands	Jul. 23, 2026	Tian Xin	PASS	/
10	15.209, 15.247(d)	Radiated Emission	Jul. 23, 2026	Tian Xin	PASS	/

Note 1: The tests were performed according to the method of measurements prescribed in ANSI C63.10-2020 and KDB 558074 D01 v05r02.

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	2026.05.07	2027.05.06
LISN	103131	ENV 216	R&S	2026.03.18	2027.03.17
RF Coaxial Cable (DC-100MHz)	BNC	MRE04	Qualwave	2026.05.06	2027.05.05

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	2026.04.28	2027.04.27
Test Antenna - Bi-Log	9163-274	VULB 9163	Schwarzbeck	2026.06.28	2027.06.27
Test Antenna - Loop	1519-022	FMZB1519	Schwarzbeck	2026.05.09	2027.05.08
Test Antenna – Horn	01774	BBHA 9120D	Schwarzbeck	2026.05.30	2027.05.29
Test Antenna – Horn	BBHA9170 #773	BBHA9170	Schwarzbeck	2026.05.30	2027.05.29
Preamplifier (10MHz-6GHz)	46732	S10M100L38 02	LUCIX CORP.	2026.05.07	2027.05.06
Preamplifier (2GHz-18GHz)	61171/61172	S020180L32 03	LUCIX CORP.	2026.05.07	2027.05.06
Preamplifier (18GHz-40GHz)	DS77209	DCLNA0118-40C-S	Decentest	2026.05.07	2027.05.06
RF Coaxial Cable (DC-18GHz)	MRE001	PE330	Pasternack	2025.09.03	2026.09.02
RF Coaxial Cable (DC-18GHz)	MRE002	CLU18	Pasternack	2025.09.03	2026.09.02
RF Coaxial Cable (DC-18GHz)	MRE003	CLU18	Pasternack	2025.09.03	2026.09.02
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
Peak Output Power	$\pm 2.22\text{dB}$	Confidence levels of 95%
Power Spectral Density	$\pm 2.22\text{dB}$	Confidence levels of 95%
Bandwidth	$\pm 5\%$	Confidence levels of 95%
Conducted Spurious Emission	$\pm 2.77\text{dB}$	Confidence levels of 95%
Restricted Frequency Bands	$\pm 5\%$	Confidence levels of 95%
Radiated Emission	$\pm 2.95\text{dB}$	Confidence levels of 95%
Conducted Emission	$\pm 2.44\text{dB}$	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:	Eforthink Technology Co., Ltd.
Applicant Address:	Units 904,905,906, 9/Floor & Unit 1007, 10/Floor Building 1, 898 Baicao Road, Gaoxin West District, Chengdu City, Sichuan Province, China
Manufacturer:	Eforthink Technology Co., Ltd.
Manufacturer Address:	Units 904,905,906, 9/Floor & Unit 1007, 10/Floor Building 1, 898 Baicao Road, Gaoxin West District, Chengdu City, Sichuan Province, China

2.2. Information of EUT

Product Name:	UWB Indoor Wall-mounted Positioning Base Station
Sample No.:	1#, 4#, 7#
Hardware Version:	V0401
Software Version:	V8.10
Equipment Type:	Zigbee
Modulation Type:	O-QPSK/DSSS
Operating Frequency Range:	2405MHz-2480MHz
Antenna Type:	Chip Antenna
Antenna Gain:	2.50dBi

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)
11	2405	21	2455
12	2410	22	2460
13	2415	23	2465
14	2420	24	2470
15	2425	25	2475
16	2430	26	2480
17	2435		
18	2440		
19	2445		
20	2450		

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

2.4. Test Configuration of EUT

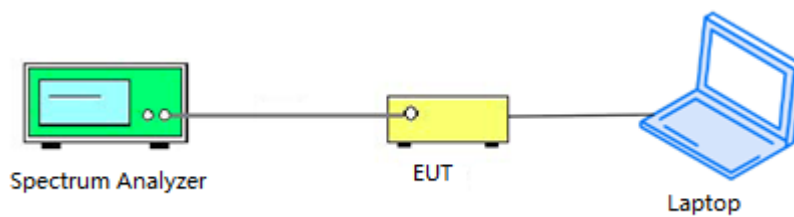
Test mode is used to control the EUT under the maximum power level during test.

2.5. Test Conditions

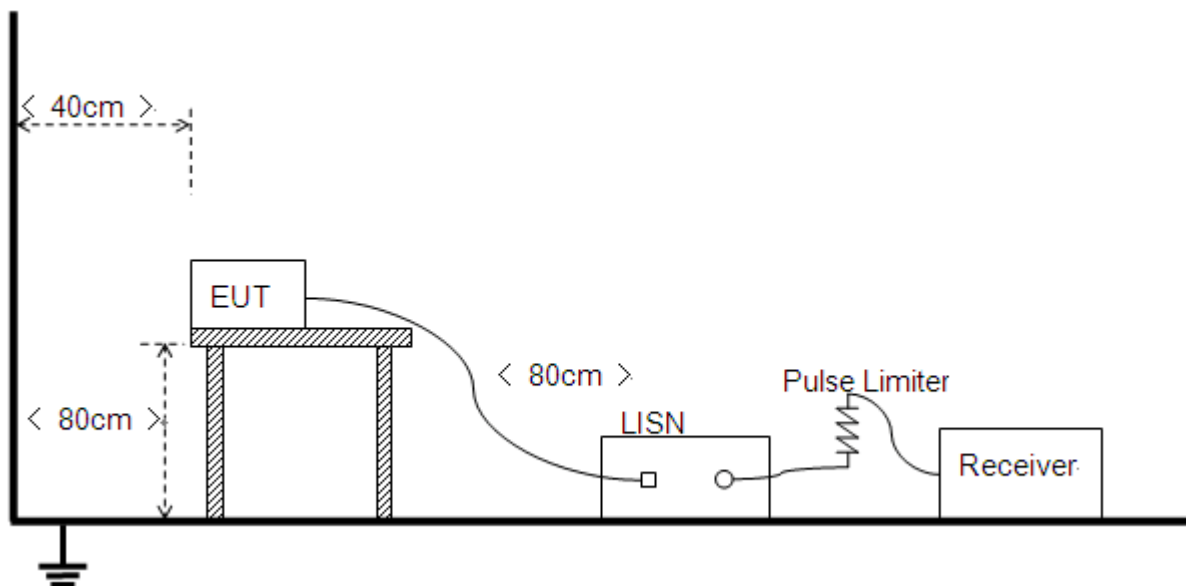
Temperature (°C):	15–35
Relative Humidity (%):	30–60
Atmospheric Pressure (kPa):	86–106

2.6. Test Setup Layout Diagram

2.6.1. Conducted Measurement

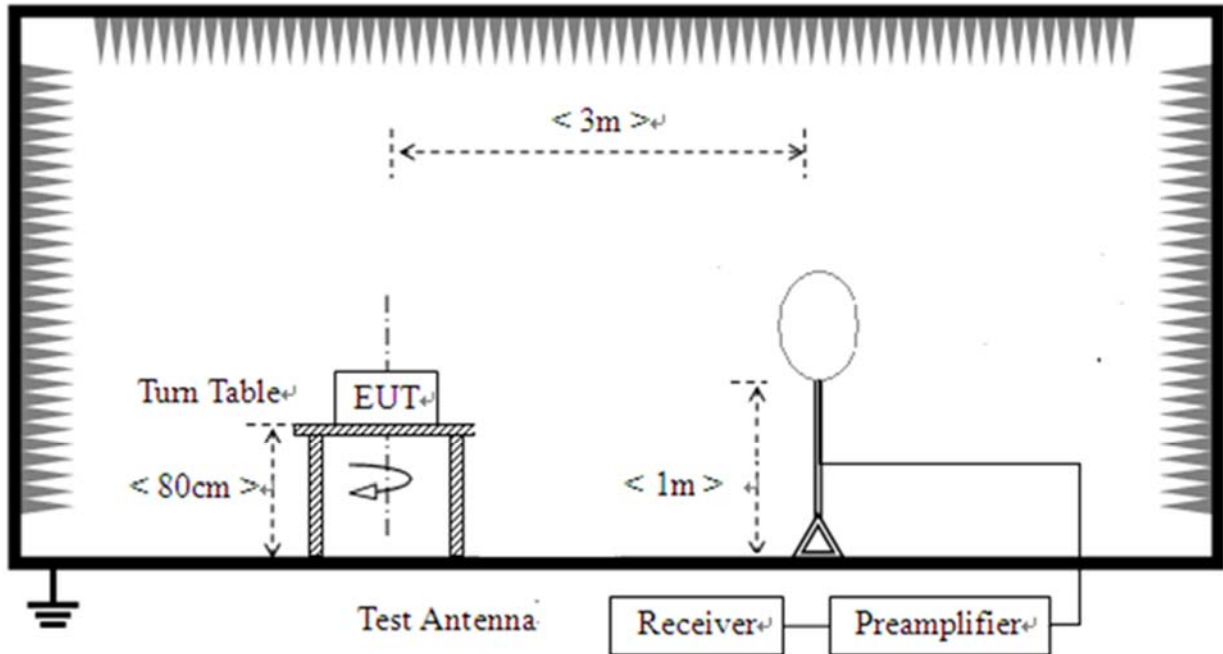


2.6.2. Conducted Emission Measurement

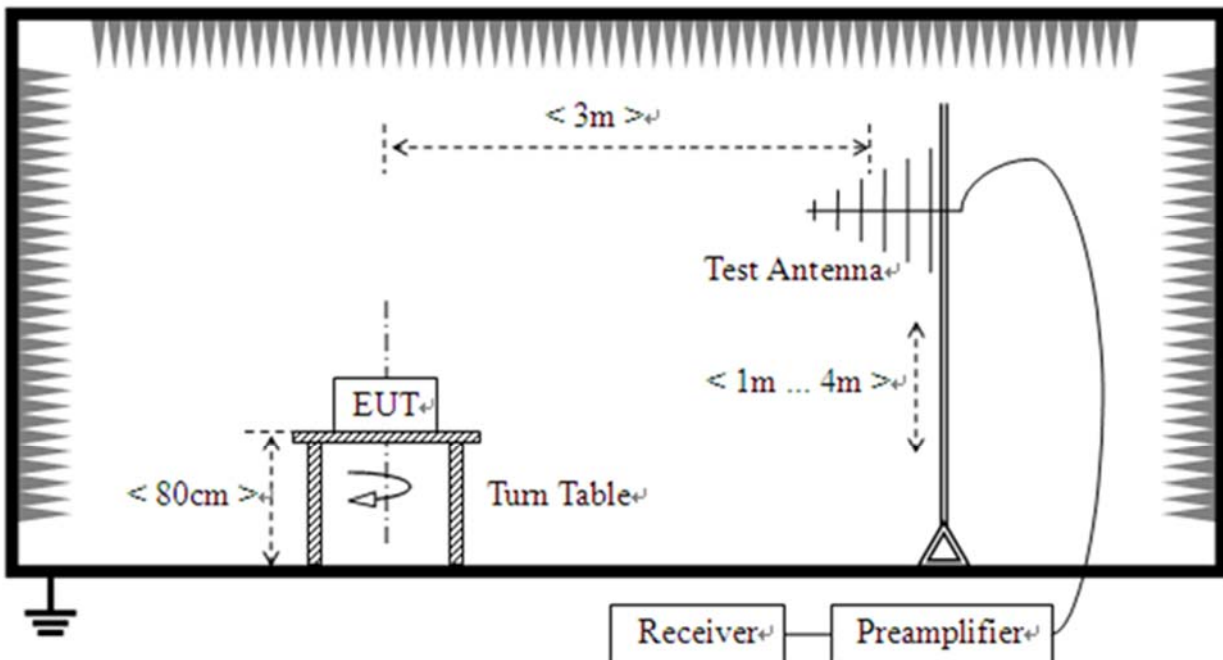


2.6.3.Radiation Measurement

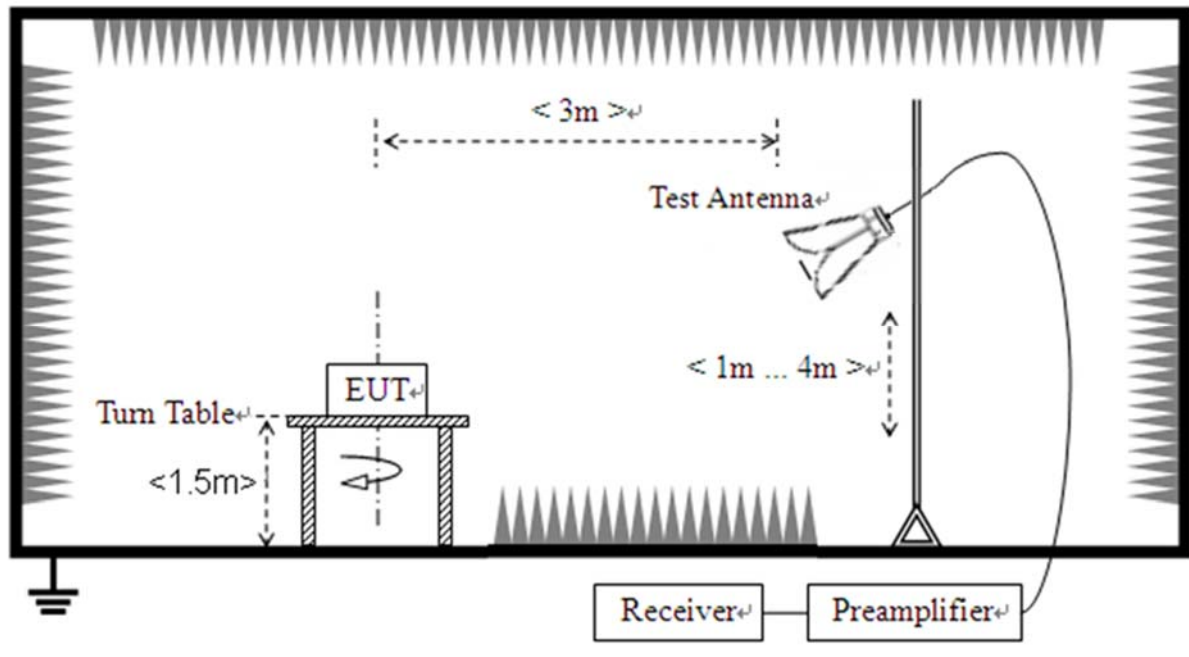
1) For radiated emissions from 9kHz to 30MHz



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

Antenna location	Antenna Type	Coupling Method
☒ Internal ☐ External	☐ FPC Antenna ☐ Spring Antenna ☐ Ceramic Antenna ☐ Integrated Antenna ☐ Dipole Antenna ☐ PCB Antenna ☐ PIFA Antenna ☒ Chip Antenna	☐ I-PEX Connector ☐ SMA Connector ☐ RP-SMA Connector ☐ Metal Shrapnel ☒ Layout

3.2. Duty Cycle of Test Signal

3.2.1. 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.

3.2.2. Test Result

Refer to Annex A.1 in this report.



3.3. Maximum Peak Conducted Output Power

3.3.1. Requirement

According to FCC section 15.247(b)(3), For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: The maximum peak conducted output power of the intentional radiator shall not exceed 1 Watt.

3.3.2. Test Procedures

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

3.3.3. Test Setup Layout

Refer to chapter 2.6.1 in this report.

3.3.4. Test Result

Refer to Annex A.2 in this report.



3.4. Maximum Average Conducted Output Power

3.4.1. Requirement

According to FCC section 15.247(b)(3), for systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: The maximum average conducted output power of the intentional radiator shall not exceed 1 Watt.

3.4.2. Test Procedures

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

3.4.3. Test Setup Layout

Refer to chapter 2.6.1 in this report.

3.4.4. Test Result

Refer to Annex A.3 in this report.



3.5.6 dB Bandwidth

3.5.1.Requirement

According to FCC section 15.247(a) (2), systems using digital modulation techniques may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz, and 5725 - 5850 MHz bands. The minimum 6dB bandwidth shall be at least 500 kHz.

3.5.1.Test Procedures

The steps for the first option are as follows:

- a) Set analyzer center frequency to channel center frequency
- b) Set RBW to 100kHz
- c) Set VBW to 300kHz
- d) Detector = peak.
- e) Trace mode = max hold
- f) Sweep time = auto couple
- g) Allow the trace to fully stabilize
- h) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 6 dB, if the functionality described in 11.8.1 (i.e., $RBW = 100\text{ kHz}$, $VBW \geq 3 \times RBW$, and peak detector with maximum hold) is implemented by the instrumentation function. When using this capability, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be $\geq 6\text{ dB}$.

3.5.2.Test Setup Layout

Refer to chapter 2.6.1 in this report.

3.5.3.Test Result

Refer to Annex A.4 in this report.



3.6. Conducted Spurious Emissions and Band Edge

3.6.1. 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.

3.6.2. Test Procedures

KDB 558074 Section 8.5 and 8.7 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.5 and A.6 in this report.



3.7. Power Spectral Density

3.7.1. Requirement

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

3.7.2. Test Procedures

The measured power spectral density was calculated by the reading of the spectrum analyzer and calibration. Following is the test procedure for PSD test:

- a) Set analyzer center frequency to channel center frequency
- b) Set span to 1.5 times DTS
- c) Set RBW to 3kHz
- d) Set VBW to 10kHz
- e) Detector = peak
- f) Sweep time = auto couple
- g) Trace mode = max hold
- h) Allow trace to fully stabilize
- i) Use the peak marker function to determine the maximum amplitude level within the RBW

3.7.3. Test Setup Layout

Refer to chapter 2.6.1 in this report.

3.7.4. Test Result

Refer to Annex A.7 in this report.

3.8. Conducted Emission

3.8.1. 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.

3.8.2. 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.

3.8.3. Test Setup Layout

Refer to chapter 2.6.2 in this report.

3.8.4. Test Result

Refer to Annex A.8 in this report.

3.9. Restricted Frequency Bands

3.9.1. 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).

3.9.2. 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

3.9.3. Test Setup Layout

Refer to chapter 2.6.3 in this report.

3.9.4. Test Result

Refer to Annex A.9 in this report.

3.10. Radiated Emission

3.10.1.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).



3.10.2.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.

3.10.3.Test Setup Layout

Refer to chapter 2.6.3 in this report.

3.10.4.Test Result

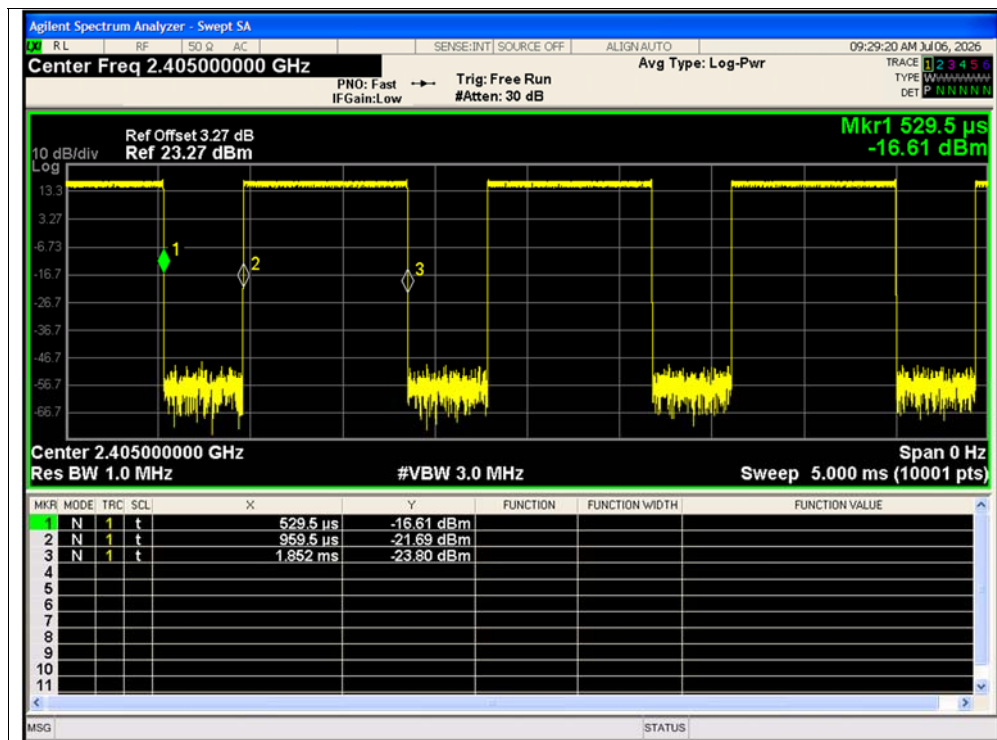
Refer to Annex A.10 in this report.



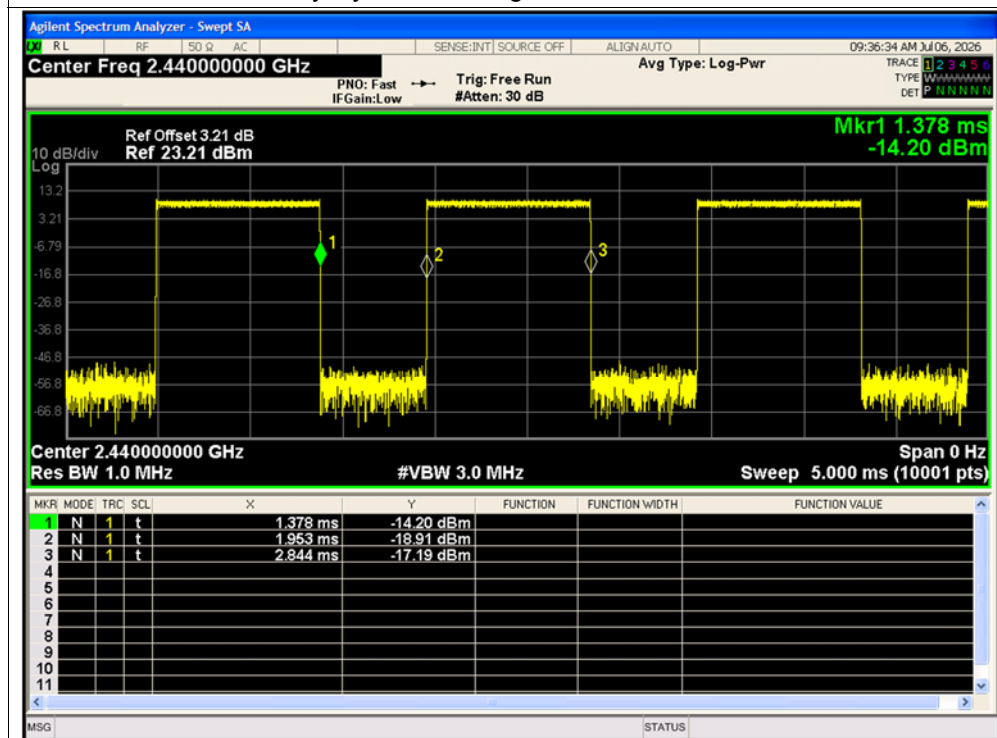
Annex A Test Data and Result

A.1. Duty Cycle of Test Signal

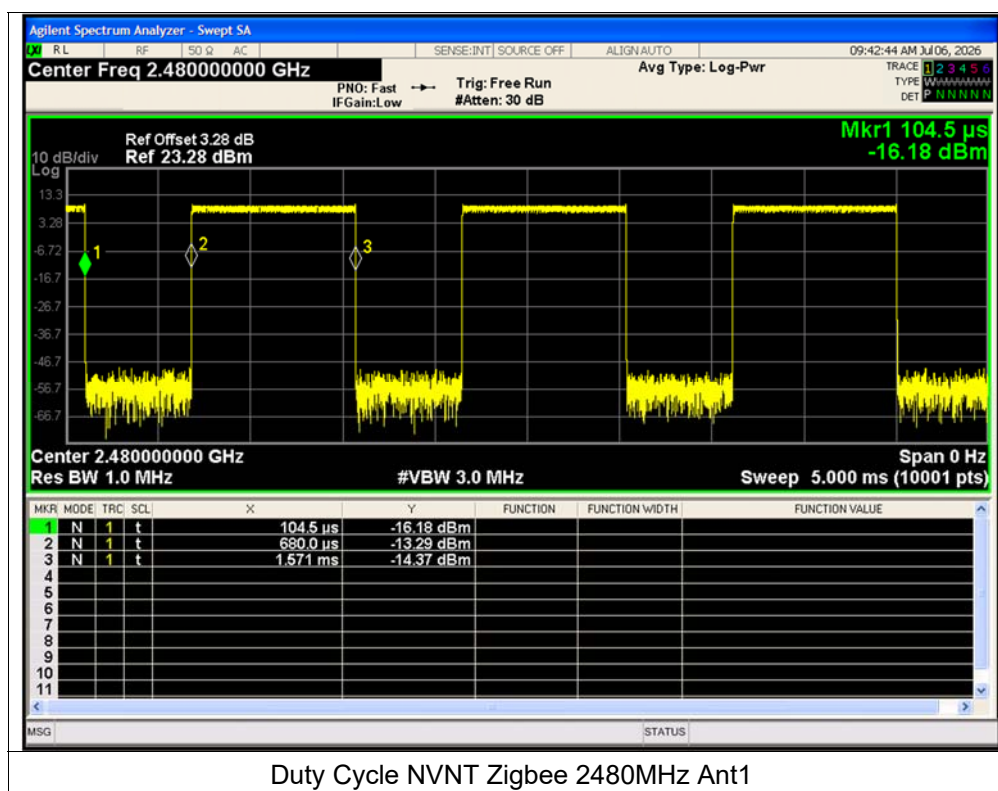
Condition	Mode	Frequency (MHz)	Antenna	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
NVNT	Zigbee	2405	Ant1	67.49	1.71	1.12
NVNT	Zigbee	2440	Ant1	60.76	2.16	1.12
NVNT	Zigbee	2480	Ant1	60.74	2.17	1.12



Duty Cycle NVNT Zigbee 2405MHz Ant1

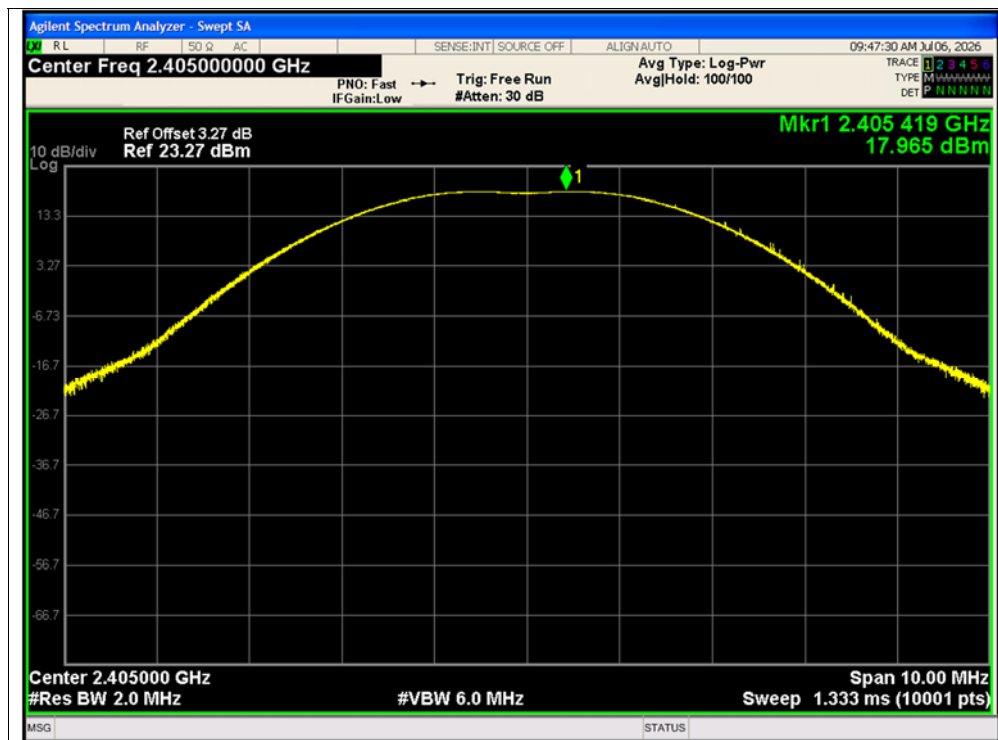


Duty Cycle NVNT Zigbee 2440MHz Ant1

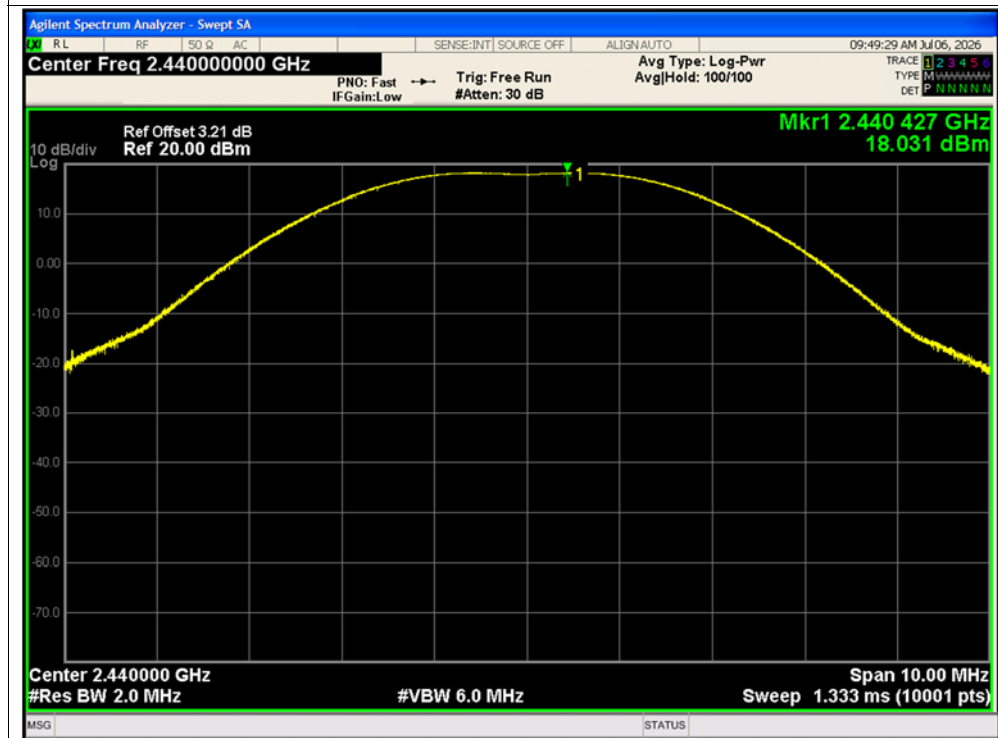


**A.2. Maximum Peak Conducted Output Power**

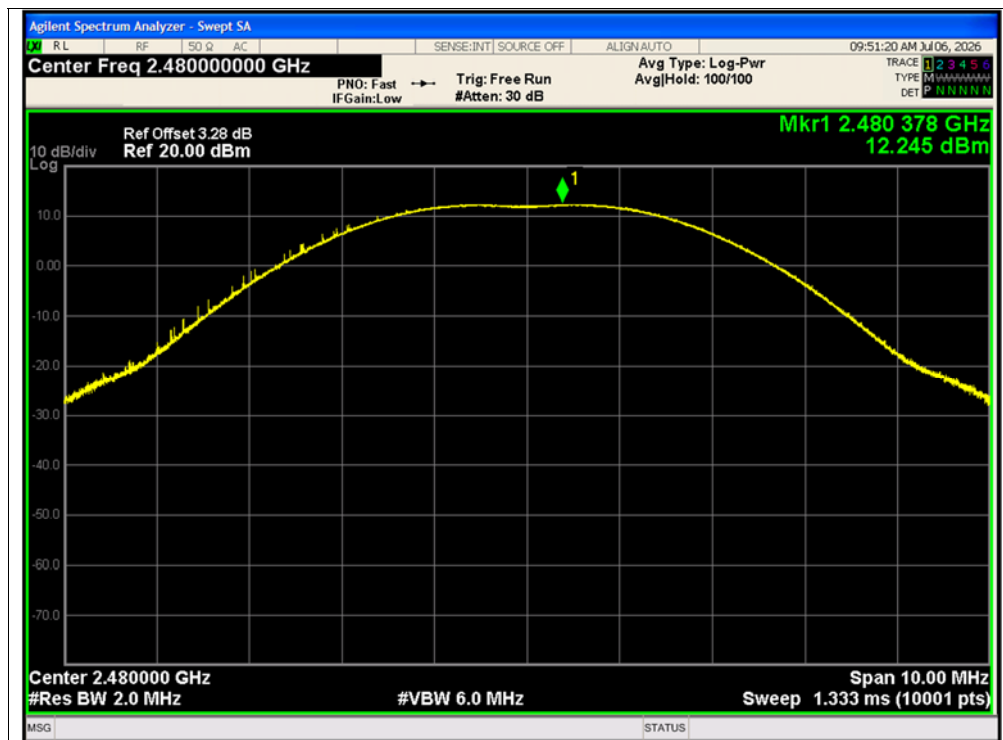
Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Duty Factor (dB)	Total Conducted Power (dBm)	Total Conducted Power (W)	Limit Conducted (dBm)	Verdict
NVNT	Zigbee	2405	Ant1	17.97	0	17.97	0.06266	30	Pass
NVNT	Zigbee	2440	Ant1	18.03	0	18.03	0.06353	30	Pass
NVNT	Zigbee	2480	Ant1	12.25	0	12.25	0.01679	30	Pass



Peak Power NVNT Zigbee 2405MHz Ant1



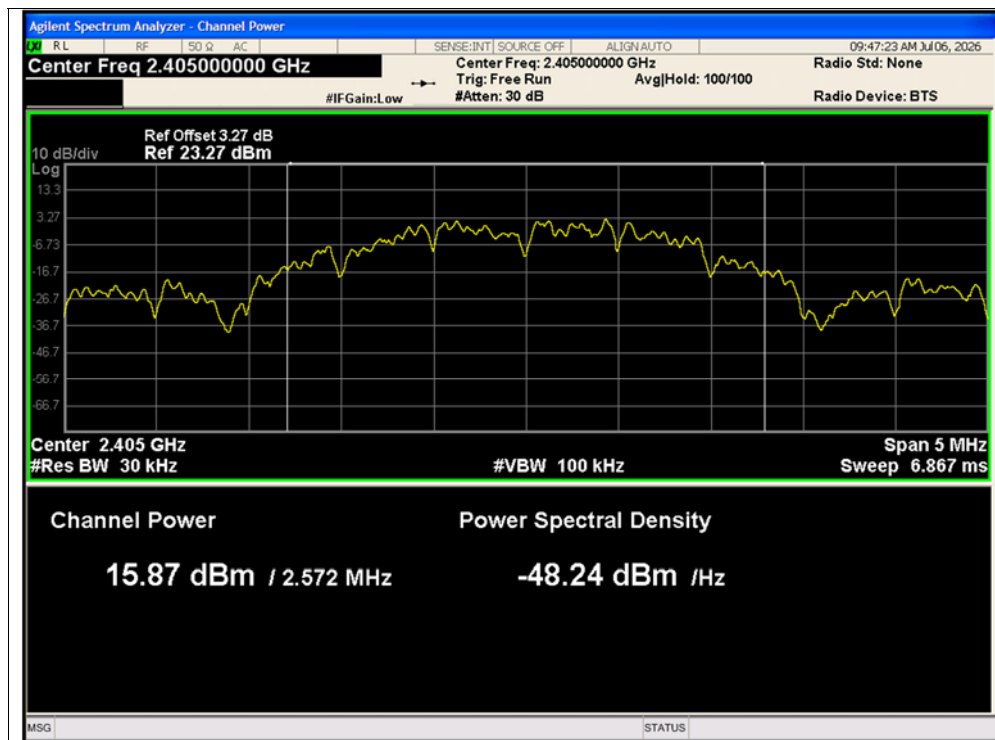
Peak Power NVNT Zigbee 2440MHz Ant1



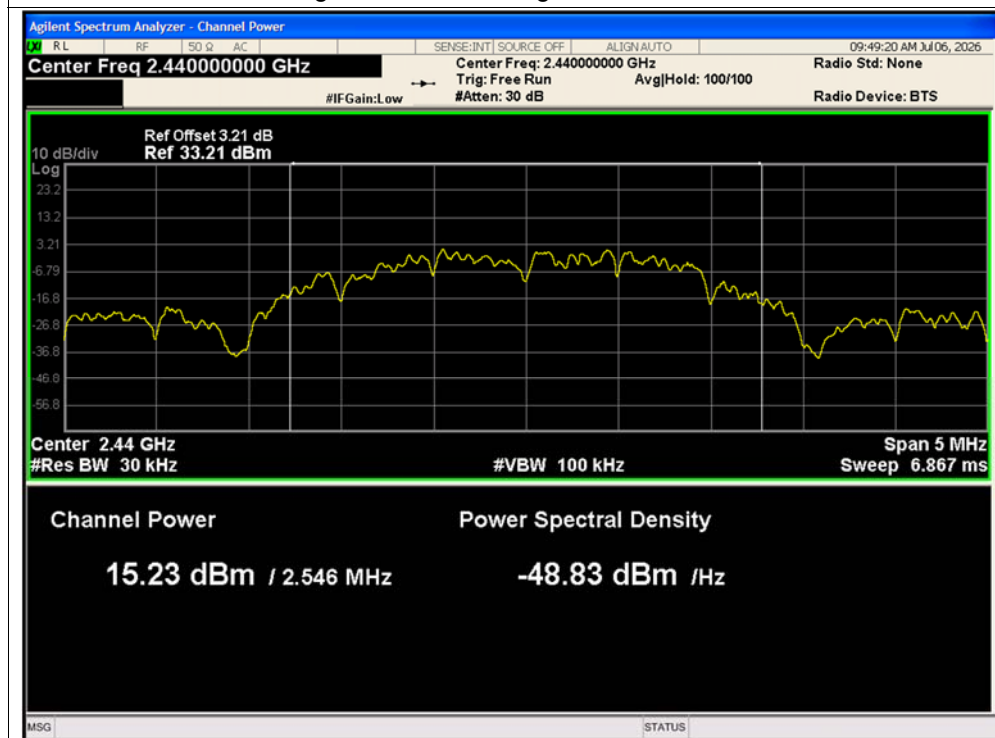
Peak Power NVNT Zigbee 2480MHz Ant1

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

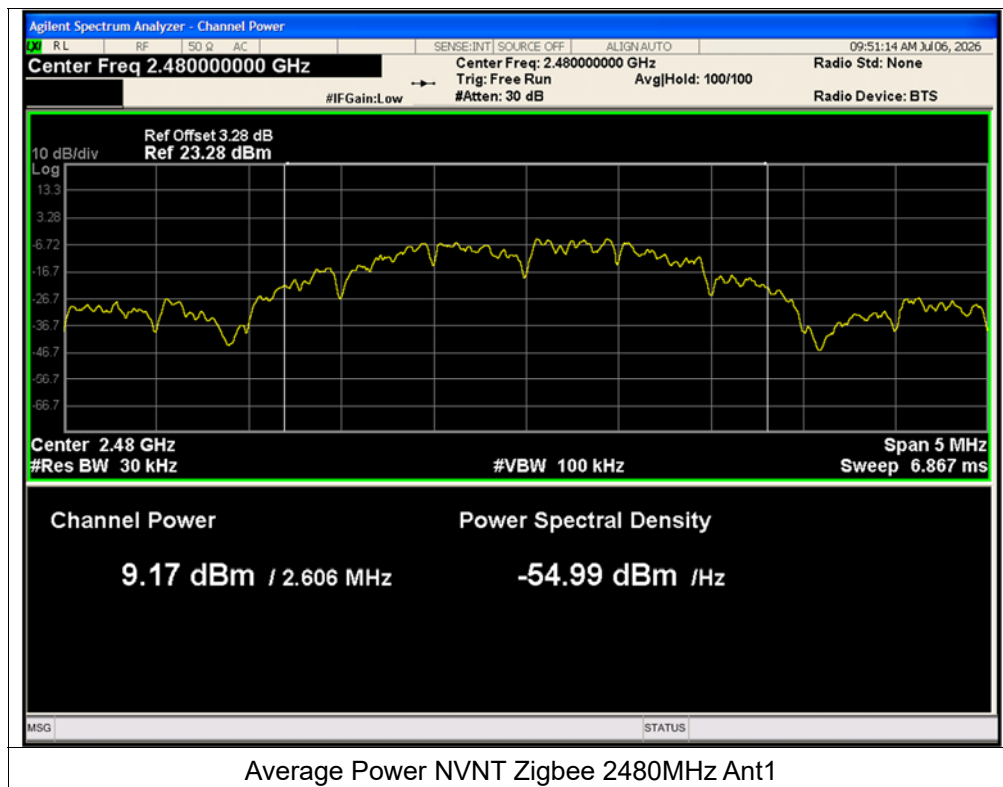
Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Duty Factor (dB)	Total Conducted Power (dBm)	Total Conducted Power (W)	Limit Conducted (dBm)	Verdict
NVNT	Zigbee	2405	Ant1	15.87	1.71	17.58	0.05728	30	Pass
NVNT	Zigbee	2440	Ant1	15.23	2.16	17.39	0.05483	30	Pass
NVNT	Zigbee	2480	Ant1	9.17	2.17	11.34	0.01361	30	Pass



Average Power NVNT Zigbee 2405MHz Ant1



Average Power NVNT Zigbee 2440MHz Ant1

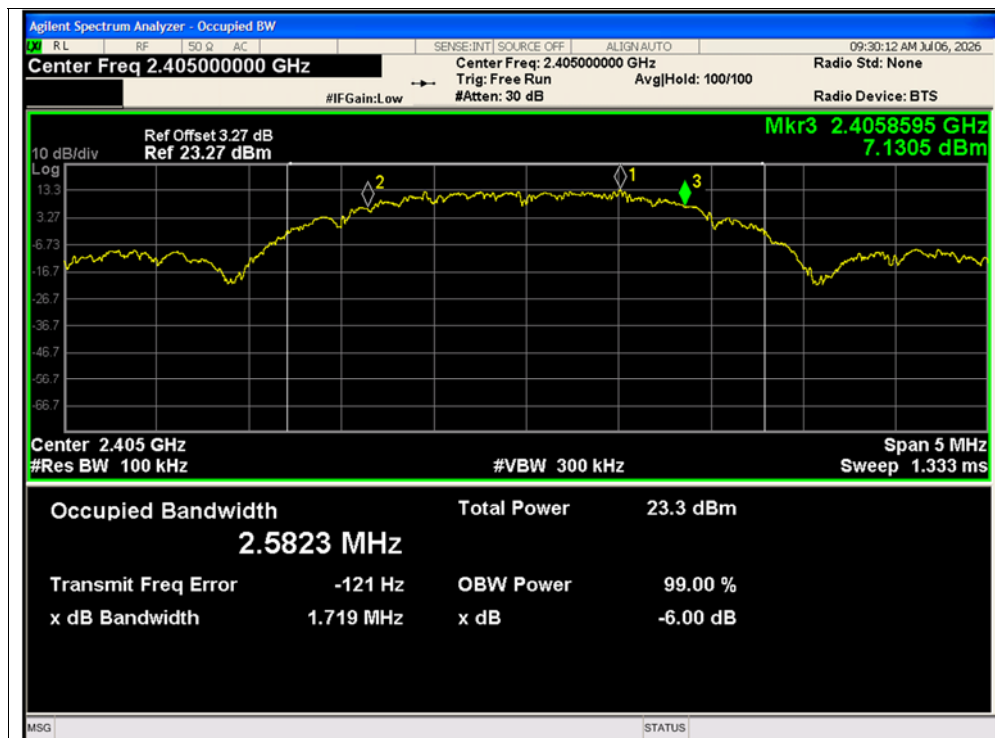




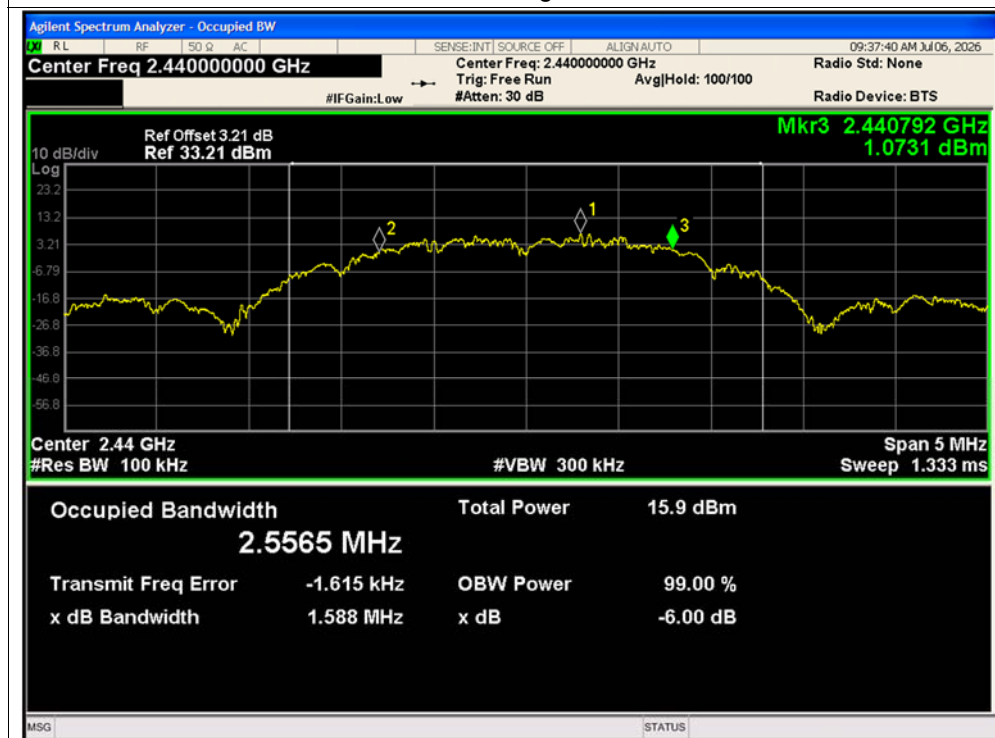
REPORT No.: SZ26060192W01

A.4. 6 dB Bandwidth

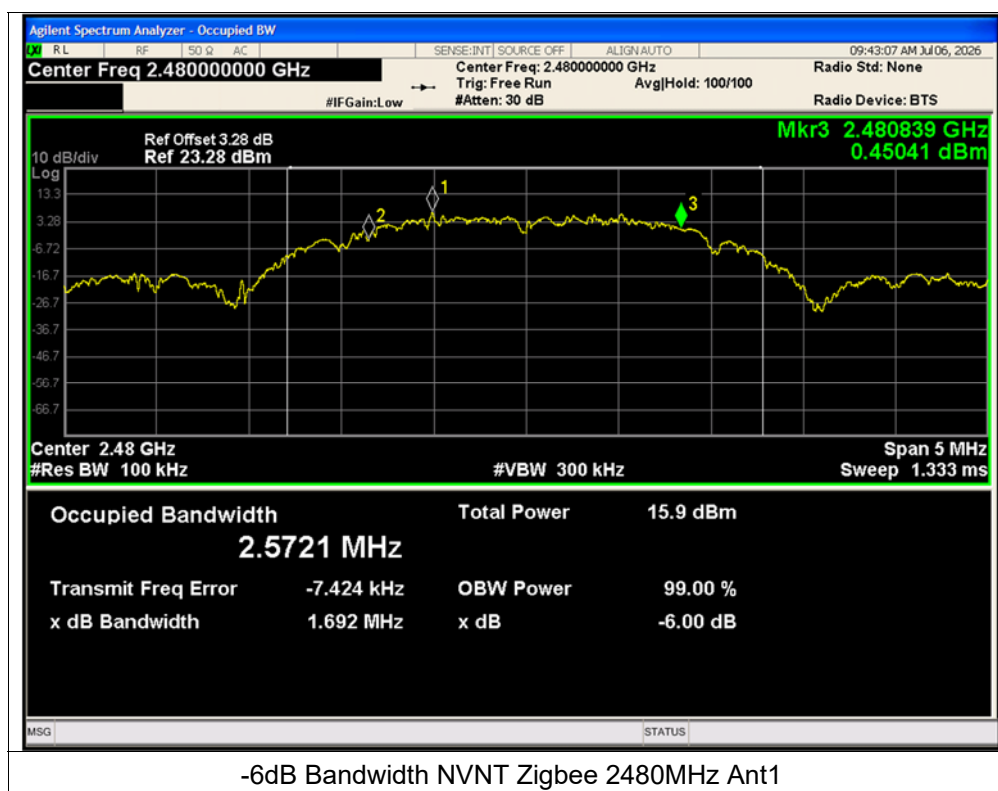
Condition	Mode	Frequency (MHz)	Antenna	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
NVNT	Zigbee	2405	Ant1	1.719	0.5	Pass
NVNT	Zigbee	2440	Ant1	1.588	0.5	Pass
NVNT	Zigbee	2480	Ant1	1.692	0.5	Pass



-6dB Bandwidth NVNT Zigbee 2405MHz Ant1



-6dB Bandwidth NVNT Zigbee 2440MHz Ant1

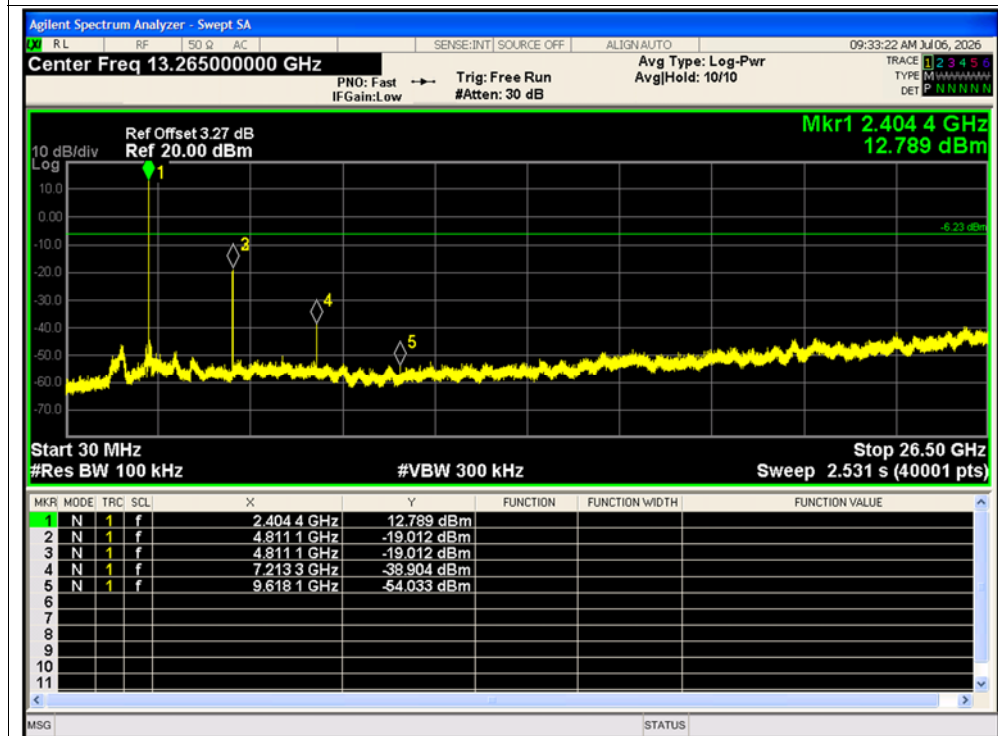


**A.5. Conducted Spurious Emissions**

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	Zigbee	2405	Ant1	-32.78	-20	Pass
NVNT	Zigbee	2440	Ant1	-34.29	-20	Pass
NVNT	Zigbee	2480	Ant1	-40.11	-20	Pass



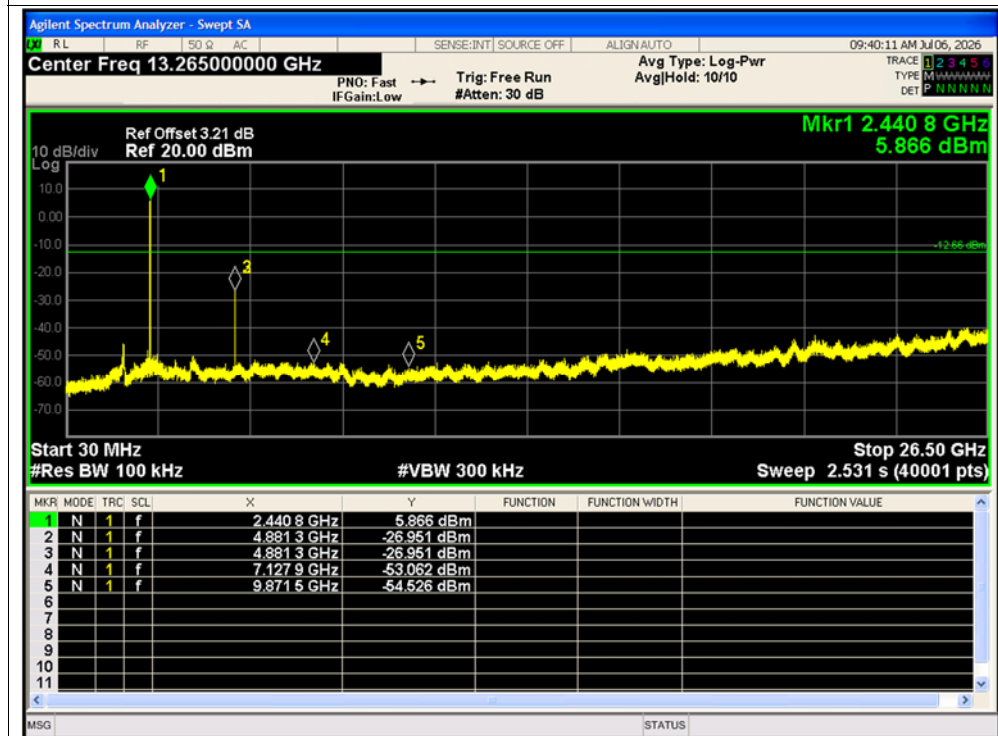
Tx. Spurious NVNT Zigbee 2405MHz Ant1 Ref



Tx. Spurious NVNT Zigbee 2405MHz Ant1 Emission



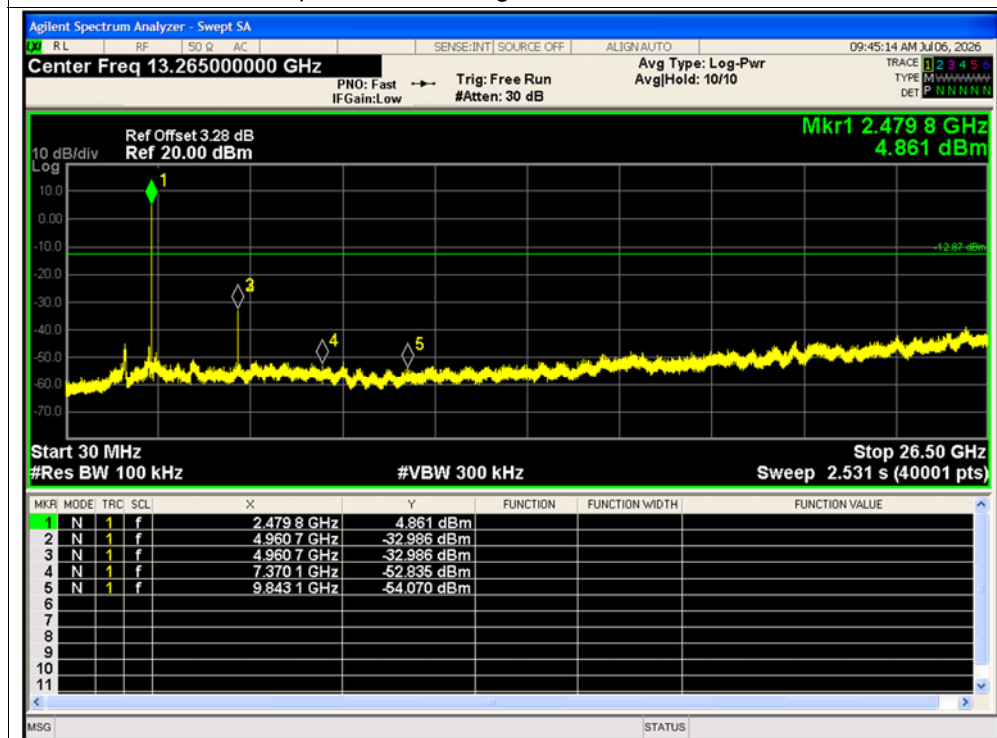
Tx. Spurious NVNT Zigbee 2440MHz Ant1 Ref



Tx. Spurious NVNT Zigbee 2440MHz Ant1 Emission



Tx. Spurious NVNT Zigbee 2480MHz Ant1 Ref



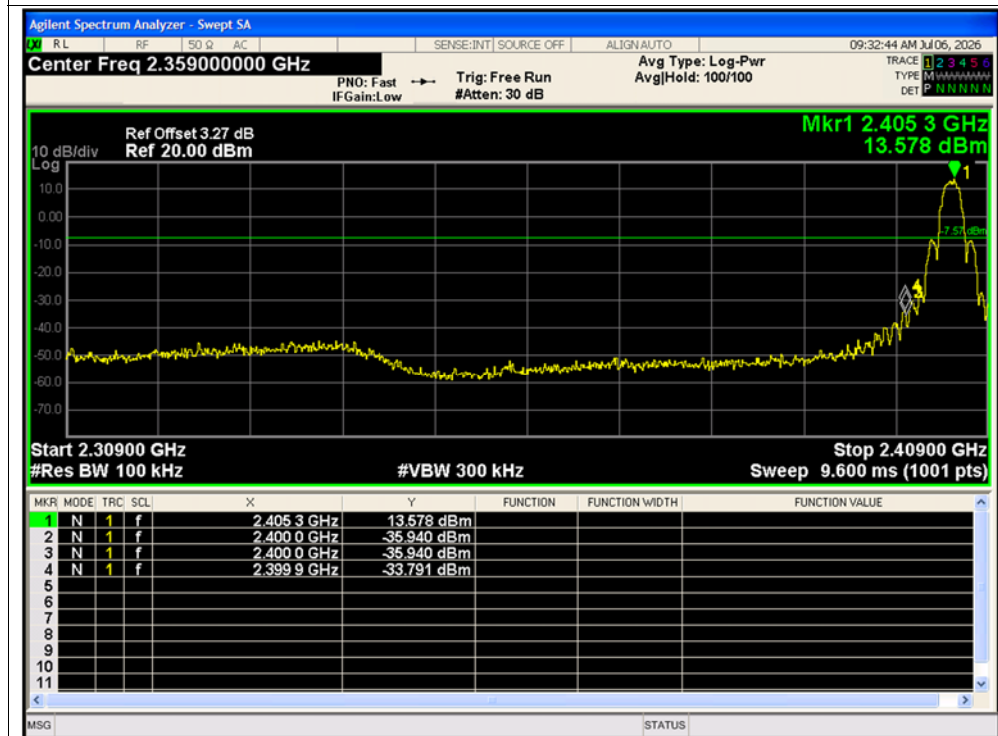
Tx. Spurious NVNT Zigbee 2480MHz Ant1 Emission

**A.6. Band Edge**

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	Zigbee	2405	Ant1	-46.23	-20	Pass
NVNT	Zigbee	2480	Ant1	-43.58	-20	Pass



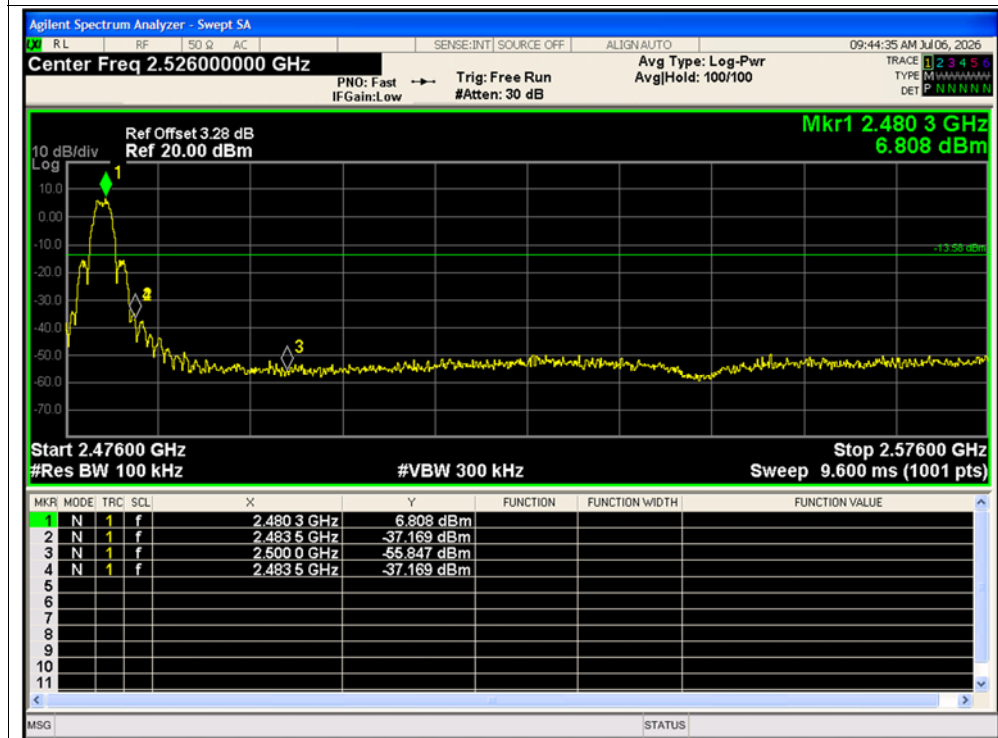
Band Edge NVNT Zigbee 2405MHz Ant1 Ref



Band Edge NVNT Zigbee 2405MHz Ant1 Emission



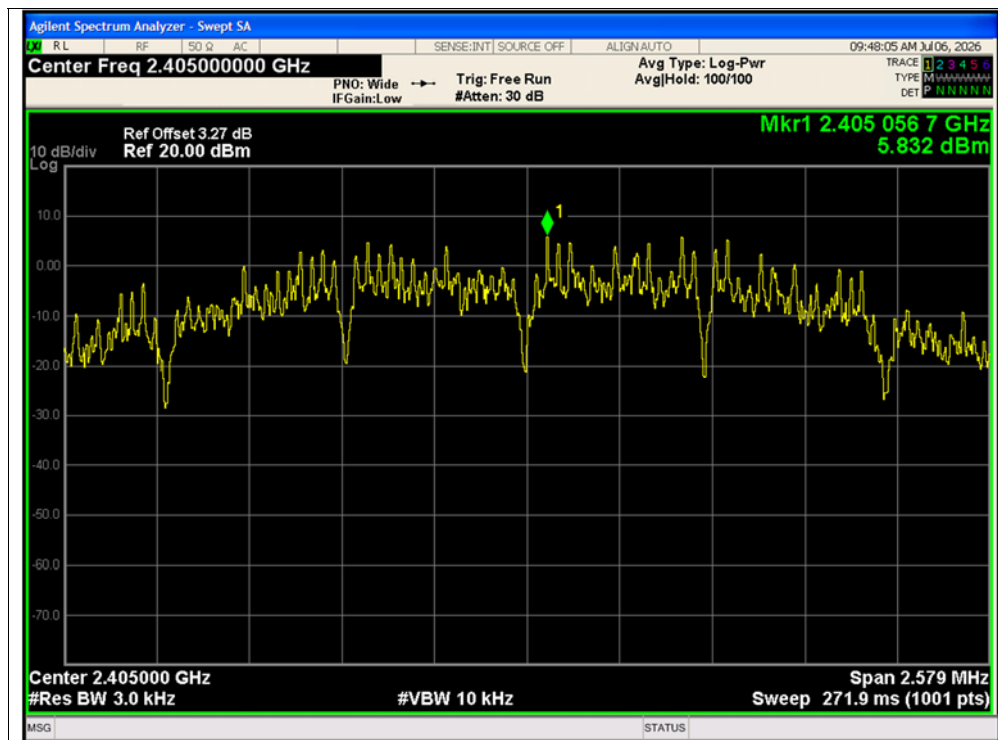
Band Edge NVNT Zigbee 2480MHz Ant1 Ref



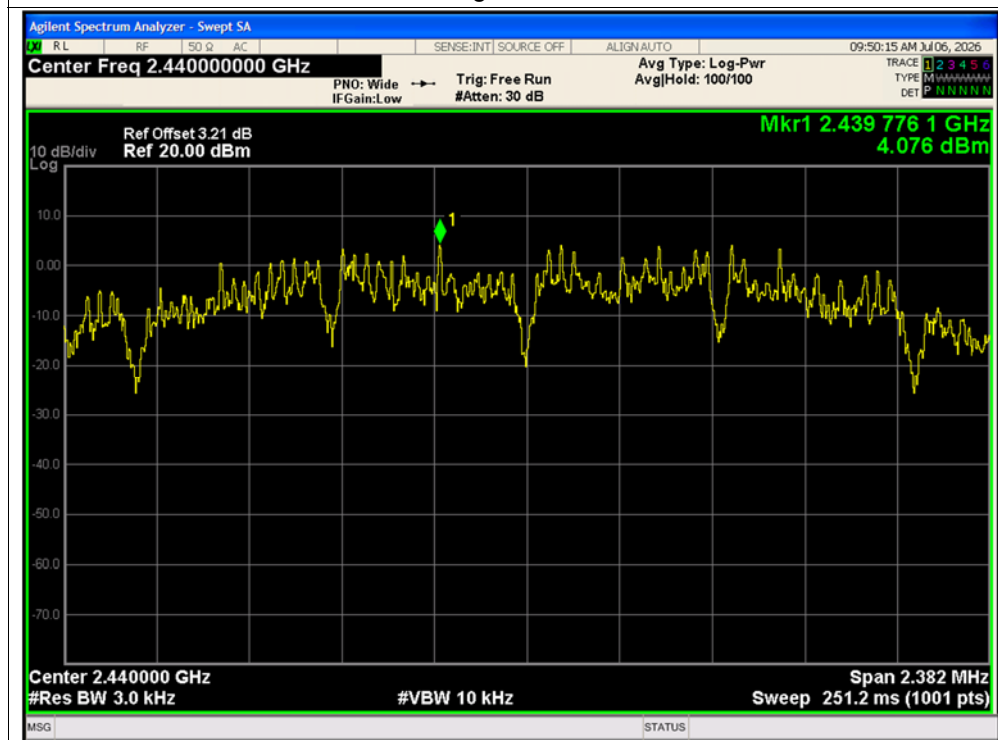
Band Edge NVNT Zigbee 2480MHz Ant1 Emission

**A.7. Power Spectral Density**

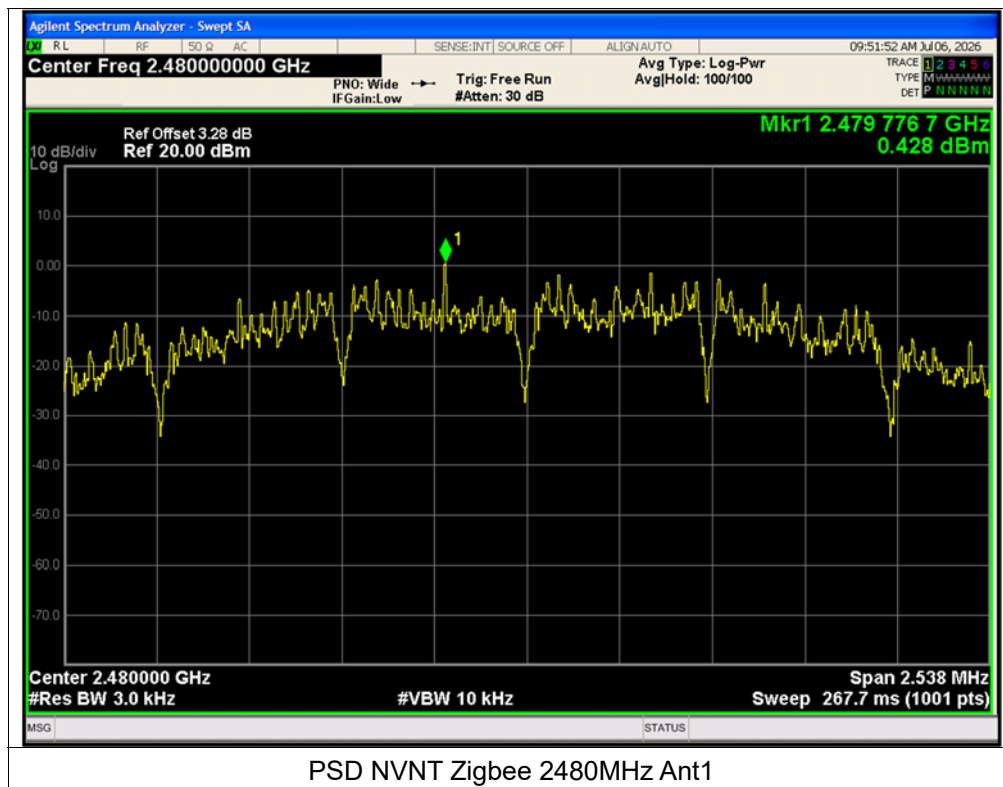
Condition	Mode	Frequency (MHz)	Antenna	Conducted PSD (dBm/3kHz)	Duty Factor (dB)	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	Verdict
NVNT	Zigbee	2405	Ant1	5.83	0	5.83	8	Pass
NVNT	Zigbee	2440	Ant1	4.08	0	4.08	8	Pass
NVNT	Zigbee	2480	Ant1	0.43	0	0.43	8	Pass



PSD NVNT Zigbee 2405MHz Ant1



PSD NVNT Zigbee 2440MHz Ant1





A.8. 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+Zigbee TX

Test voltage: AC 120V/60Hz

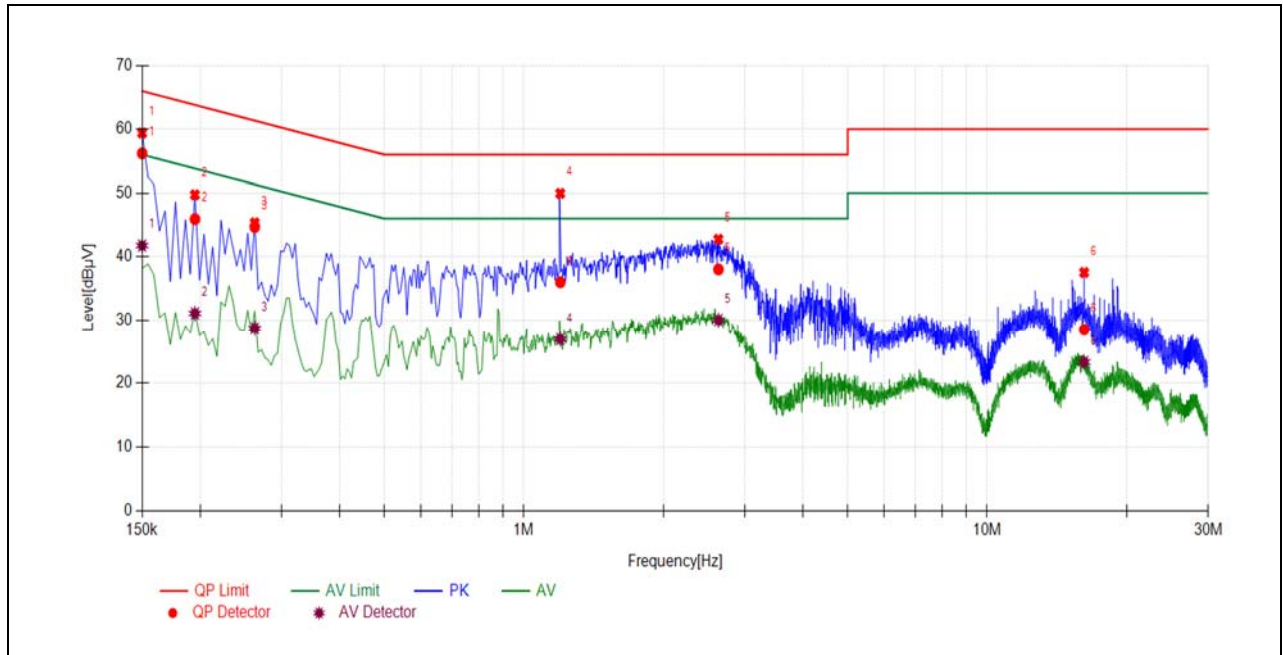
The measurement results are obtained as below:

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

U_R : Receiver Reading

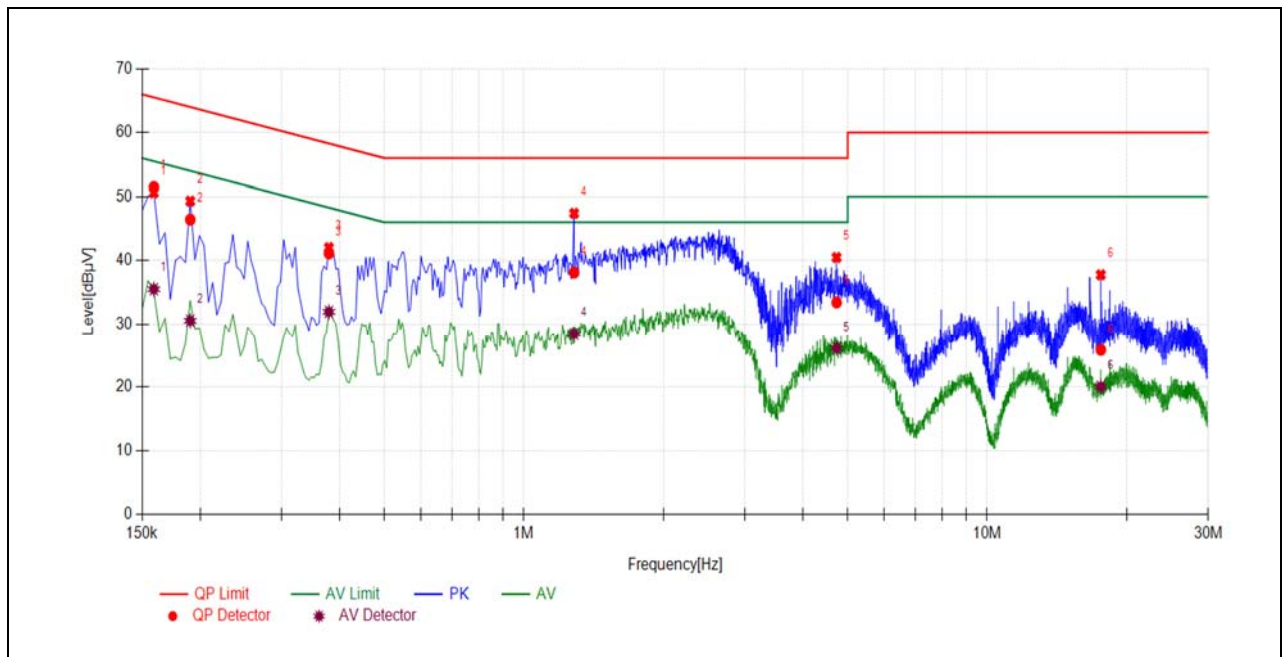
A_{Factor} : Voltage division factor of LISN

B. Test Plot:



(L Phase)

No.	Fre. (MHz)	Emission Level (dBμV)		Limit (dBμV)		Power-line	Verdict
		Quai-peak	Average	Quai-peak	Average		
1	0.1500	56.19	41.76	66.00	56.00	Line	PASS
2	0.1950	45.93	31.06	63.82	53.82		PASS
3	0.2625	44.70	28.67	61.35	51.35		PASS
4	1.1986	36.00	26.91	56.00	46.00		PASS
5	2.6297	38.01	30.01	56.00	46.00		PASS
6	16.1965	28.46	23.29	60.00	50.00		PASS



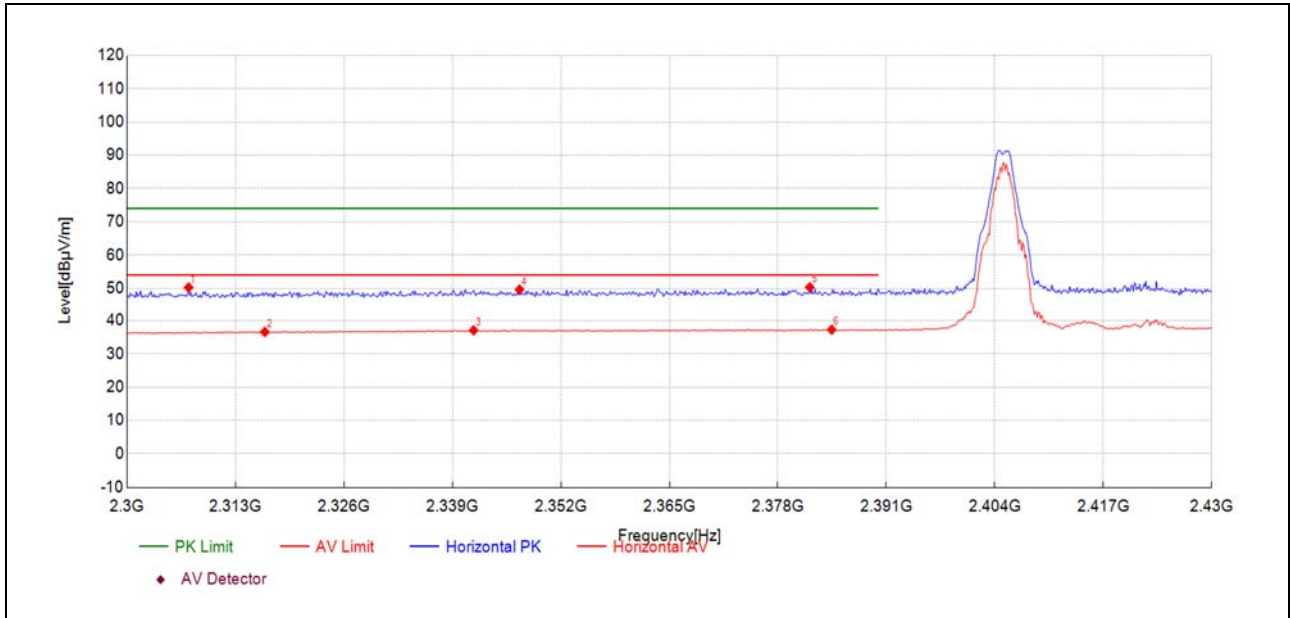
(N Phase)

No.	Fre. (MHz)	Emission Level (dBμV)		Limit (dBμV)		Power-line	Verdict
		Quai-peak	Average	Quai-peak	Average		
1	0.1590	51.48	35.51	65.52	55.52	Neutral	PASS
2	0.1905	46.43	30.54	64.01	54.01		PASS
3	0.3795	41.14	31.94	58.29	48.29		PASS
4	1.2840	38.13	28.42	56.00	46.00		PASS
5	4.7312	33.43	26.11	56.00	46.00		PASS
6	17.5923	25.85	20.02	60.00	50.00		PASS

A.9. Restricted Frequency Bands

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

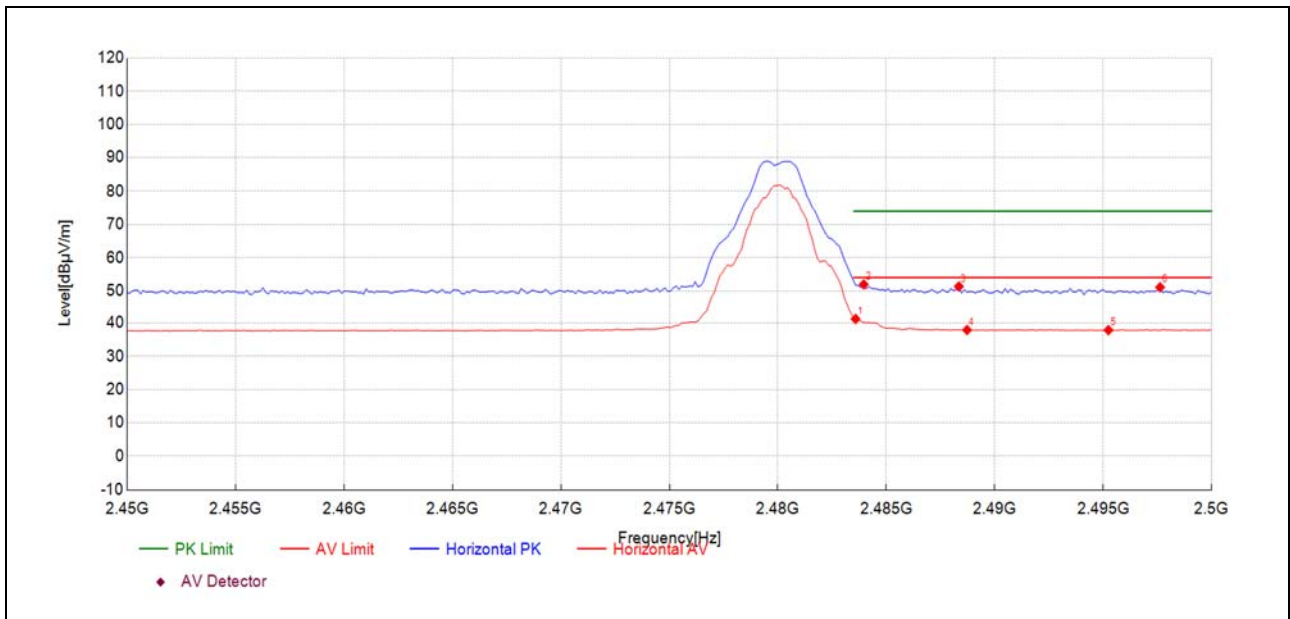
Plot for Channel 11



Fre. (MHz)	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Verdict
2307.38	18.3	50.25	31.990	74.00	23.75	160	360	PK	PASS
2316.52	4.5	36.59	32.080	54.00	17.41	160	30	AV	PASS
2341.54	4.7	37.05	32.320	54.00	16.95	160	39	AV	PASS
2347.05	17.2	49.60	32.380	74.00	24.40	160	244	PK	PASS
2381.83	17.8	50.30	32.510	74.00	23.70	160	11	PK	PASS
2384.46	4.7	37.25	32.530	54.00	16.75	160	138	AV	PASS



Plot for Channel 26



Fre. (MHz)	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Verdict
2483.58	8.2	41.21	33.030	54.00	12.79	160	337	AV	PASS
2483.96	18.9	51.92	33.030	74.00	22.08	160	344	PK	PASS
2488.35	18.3	51.31	33.020	74.00	22.69	160	132	PK	PASS
2488.72	4.9	37.90	33.020	54.00	16.10	160	197	AV	PASS
2495.24	4.8	37.85	33.010	54.00	16.15	160	360	AV	PASS
2497.62	18.1	51.07	33.000	74.00	22.93	160	337	PK	PASS



A.10. 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

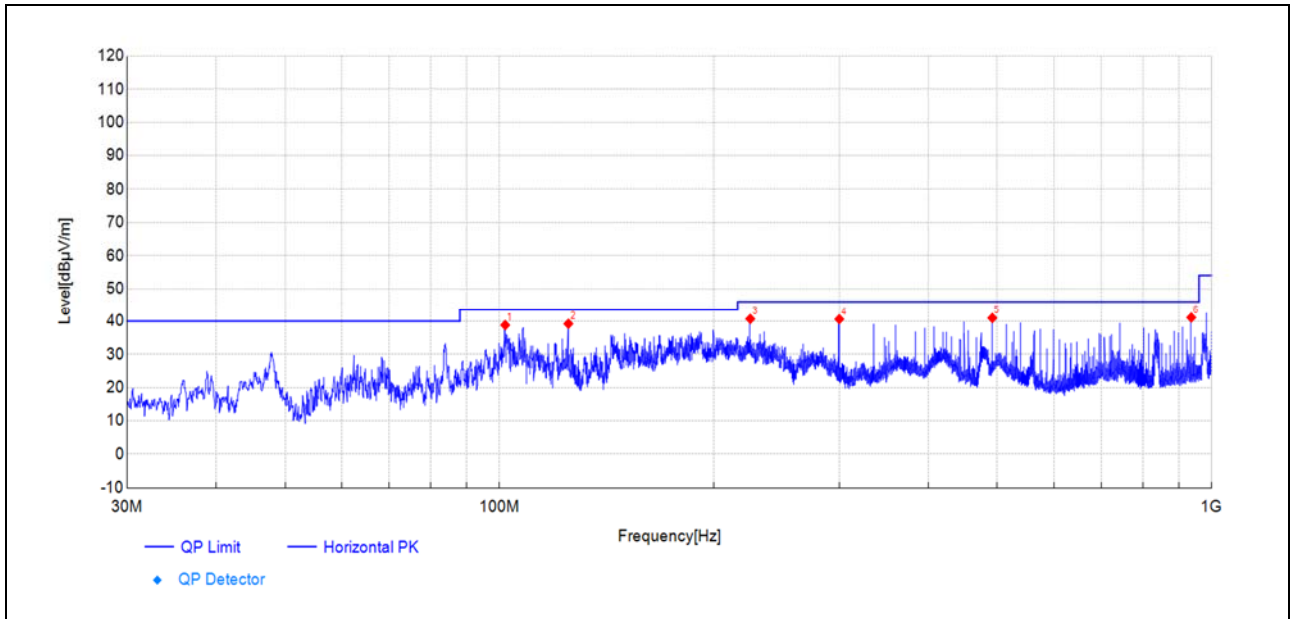
During the test, the total correction Factor A_T and A_{Factor} were built in test software.

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.

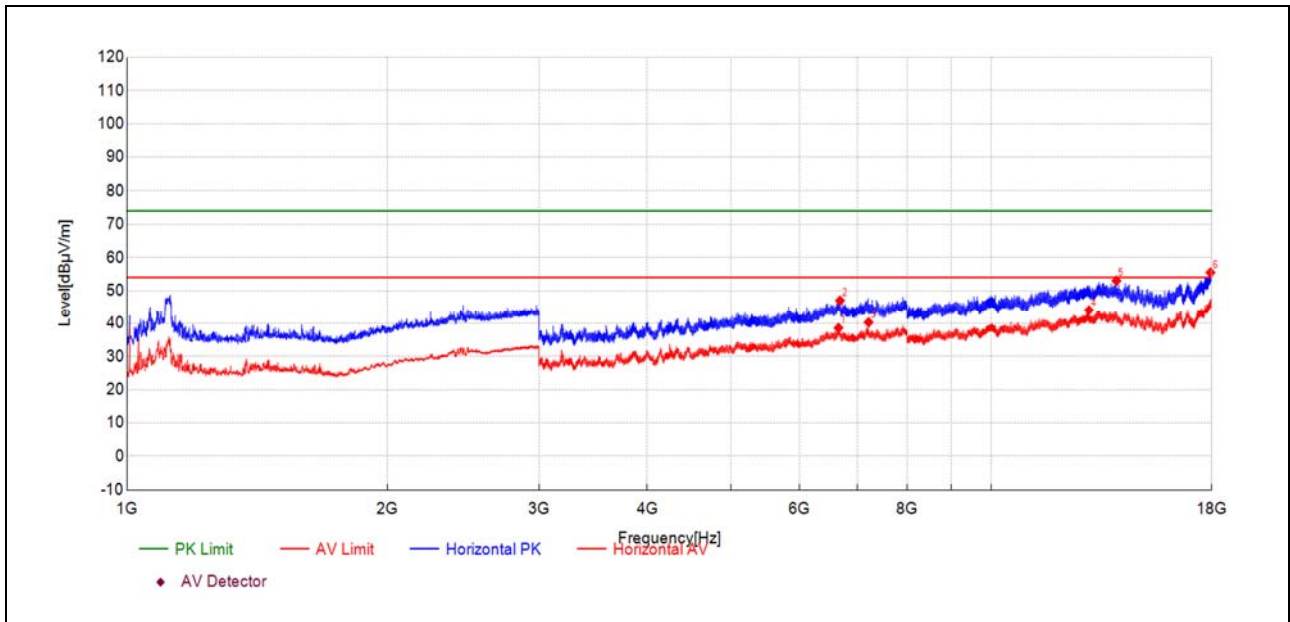
Note3: For the frequency, which started from 18GHz to 10th harmonic of the highest frequency, was pre-scanned and the result which was 20dB lower than the limit was not recorded.

Plot for Channel 11



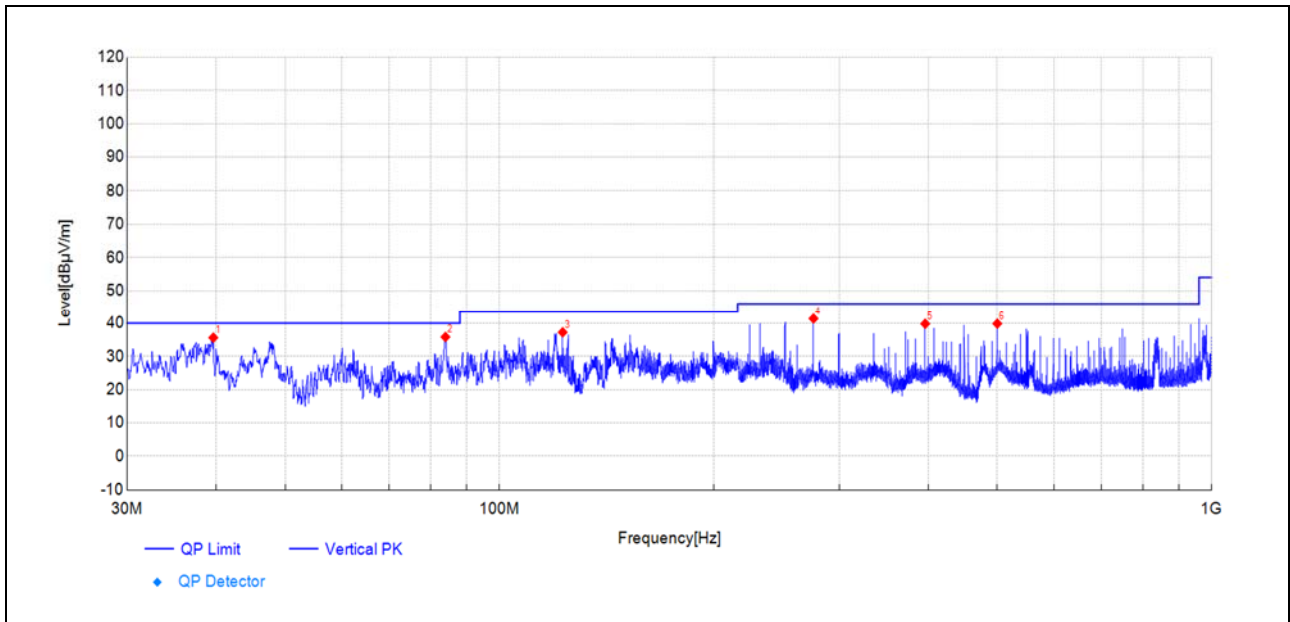
(Antenna Horizontal, 30MHz to 1GHz)

Fre. (MHz)	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Verdict
101.88	69.1	38.79	-30.320	43.50	4.71	155	144	PK	PASS
124.97	72.1	39.19	-32.930	43.50	4.31	155	130	PK	PASS
224.98	69.6	40.67	-28.960	46.00	5.33	155	170	PK	PASS
300.01	67.6	40.60	-26.970	46.00	5.40	155	196	PK	PASS
492.03	63.0	40.95	-22.010	46.00	5.05	155	170	PK	PASS
936.12	55.5	41.10	-14.440	46.00	4.90	155	328	PK	PASS



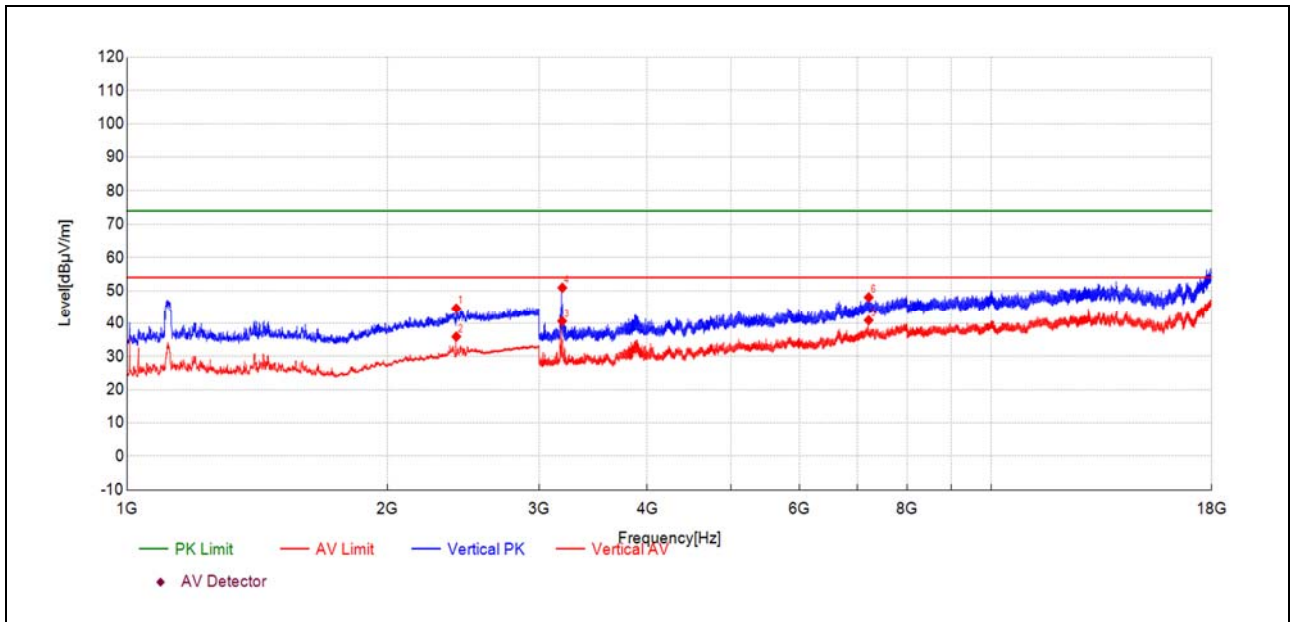
(Antenna Horizontal, 1GHz to 18GHz)

Fre. (MHz)	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Verdict
6658.82	42.3	38.55	-3.760	54.00	15.45	160	7	AV	PASS
6685.39	50.9	47.02	-3.830	74.00	26.98	160	172	PK	PASS
7213.83	44.0	40.25	-3.730	54.00	13.75	160	1	AV	PASS
12979.14	39.9	44.01	4.080	54.00	9.99	160	349	AV	PASS
13961.03	47.9	53.01	5.140	74.00	20.99	160	23	PK	PASS
17942.14	43.8	55.48	11.730	74.00	18.52	160	300	PK	PASS



(Antenna Vertical, 30MHz to 1GHz)

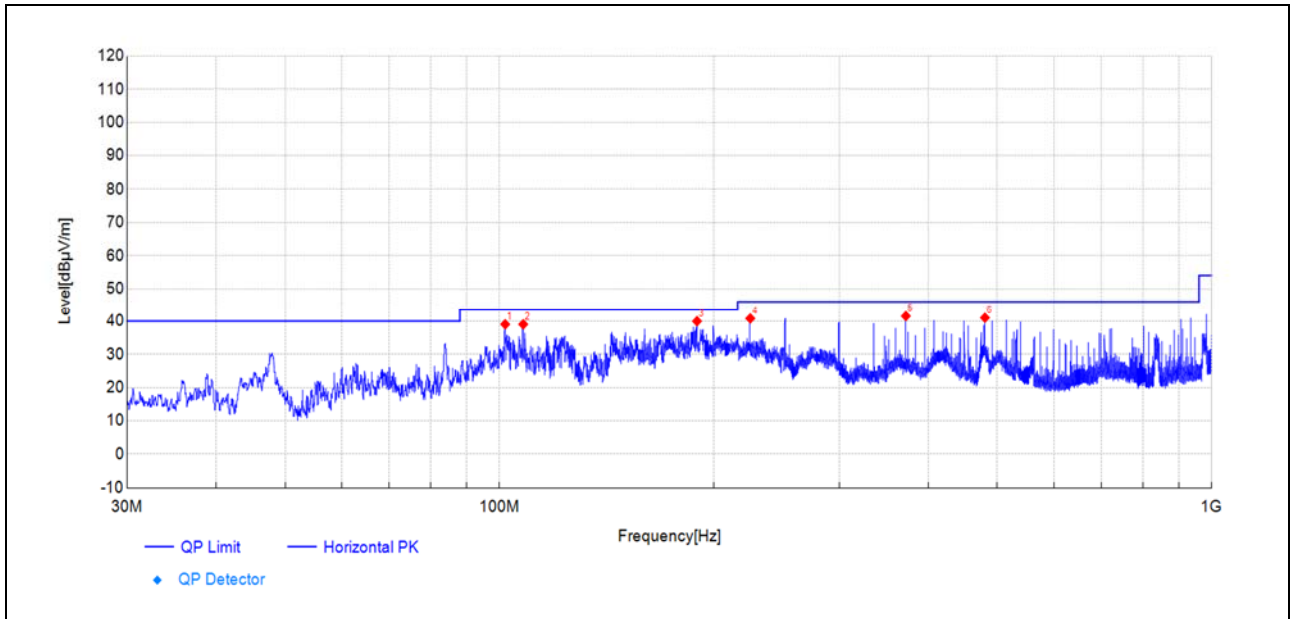
Fre. (MHz)	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Verdict
39.65	64.8	35.60	-29.200	40.00	4.40	155	150	PK	PASS
83.98	70.1	35.82	-34.310	40.00	4.18	155	202	PK	PASS
122.69	69.9	37.24	-32.610	43.50	6.26	155	269	PK	PASS
276.00	69.1	41.39	-27.680	46.00	4.61	155	150	PK	PASS
396.05	64.0	39.80	-24.230	46.00	6.20	155	294	PK	PASS
499.99	61.5	39.85	-21.660	46.00	6.15	155	255	PK	PASS



(Antenna Vertical, 1GHz to 18GHz)

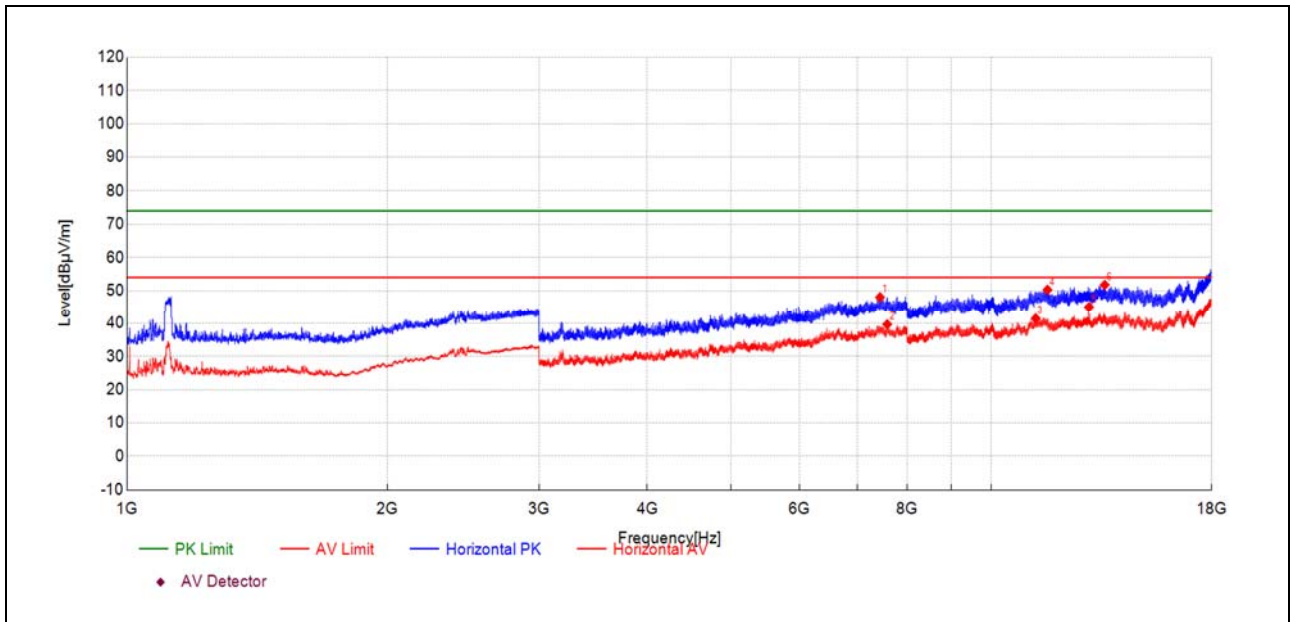
Fre. (MHz)	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Verdict
2404.64	43.8	44.57	0.770	-	-	160	244	PK	NA
2404.64	35.2	35.93	0.770	-	-	160	244	AV	NA
3188.15	56.2	40.63	-15.540	54.00	13.37	160	222	AV	PASS
3189.86	66.4	50.90	-15.540	74.00	23.10	160	222	PK	PASS
7215.98	44.6	40.88	-3.750	54.00	13.12	160	7	AV	PASS
7216.41	51.7	47.99	-3.750	74.00	26.01	160	323	PK	PASS

Plot for Channel 19



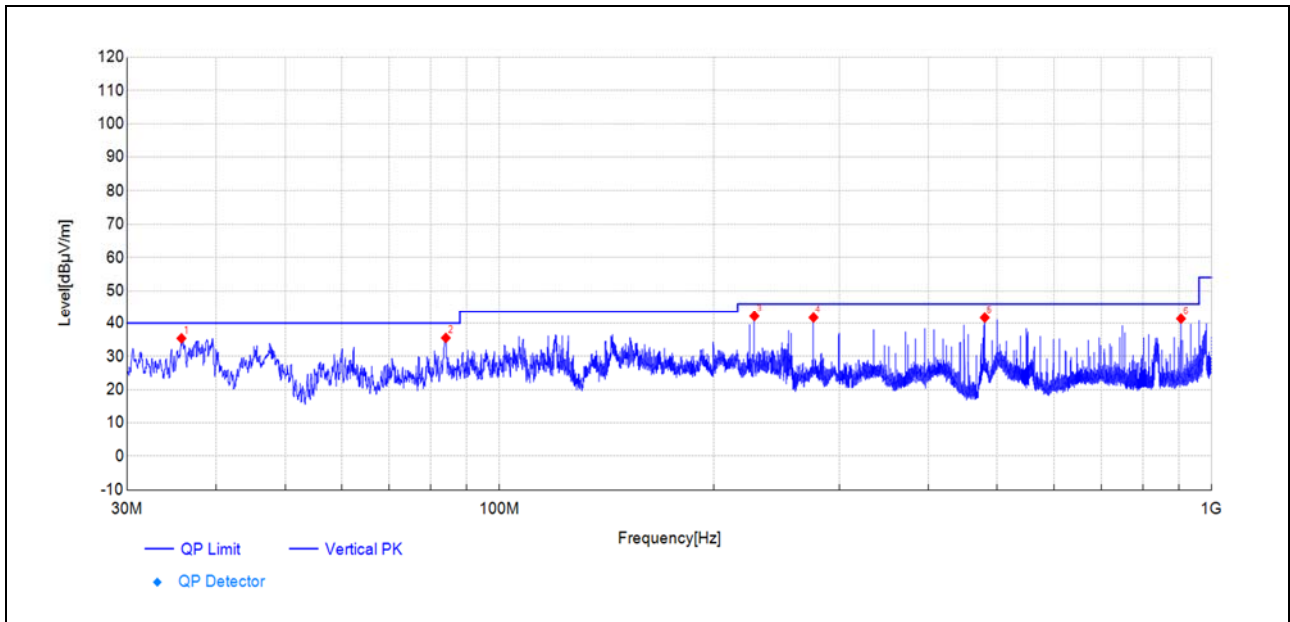
(Antenna Horizontal, 30MHz to 1GHz)

Fre. (MHz)	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Verdict
101.88	69.3	39.02	-30.320	43.50	4.48	155	118	PK	PASS
107.99	69.6	39.01	-30.600	43.50	4.49	155	237	PK	PASS
189.38	70.0	39.97	-30.010	43.50	3.53	155	25	PK	PASS
224.98	69.8	40.81	-28.960	46.00	5.19	155	184	PK	PASS
372.04	66.5	41.52	-24.990	46.00	4.48	155	292	PK	PASS
480.44	63.3	41.02	-22.320	46.00	4.98	155	159	PK	PASS



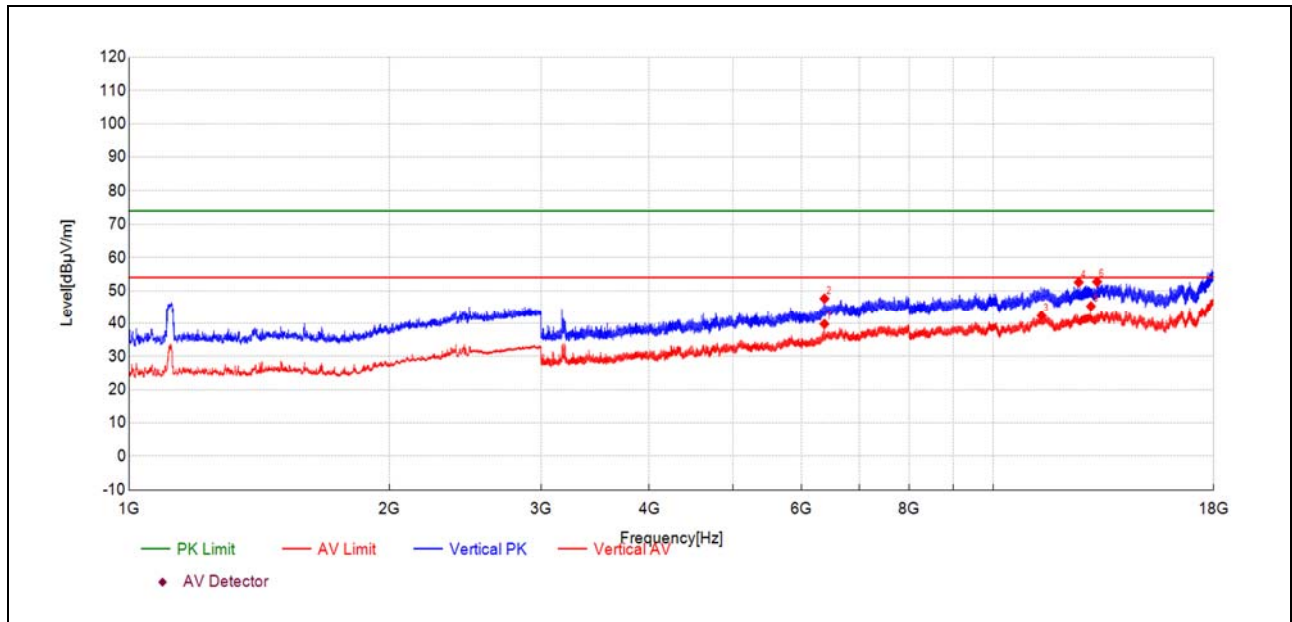
(Antenna Horizontal, 1GHz to 18GHz)

Fre. (MHz)	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Verdict
7437.56	51.0	48.00	-3.040	74.00	26.00	160	273	PK	PASS
7581.13	42.7	39.64	-3.100	54.00	14.36	160	221	AV	PASS
11258.38	39.8	41.46	1.650	54.00	12.54	160	171	AV	PASS
11620.53	47.7	50.26	2.580	74.00	23.74	160	0	PK	PASS
12979.14	41.0	45.04	4.080	54.00	8.96	160	121	AV	PASS
13535.87	47.0	51.75	4.750	74.00	22.25	160	147	PK	PASS



(Antenna Vertical, 30MHz to 1GHz)

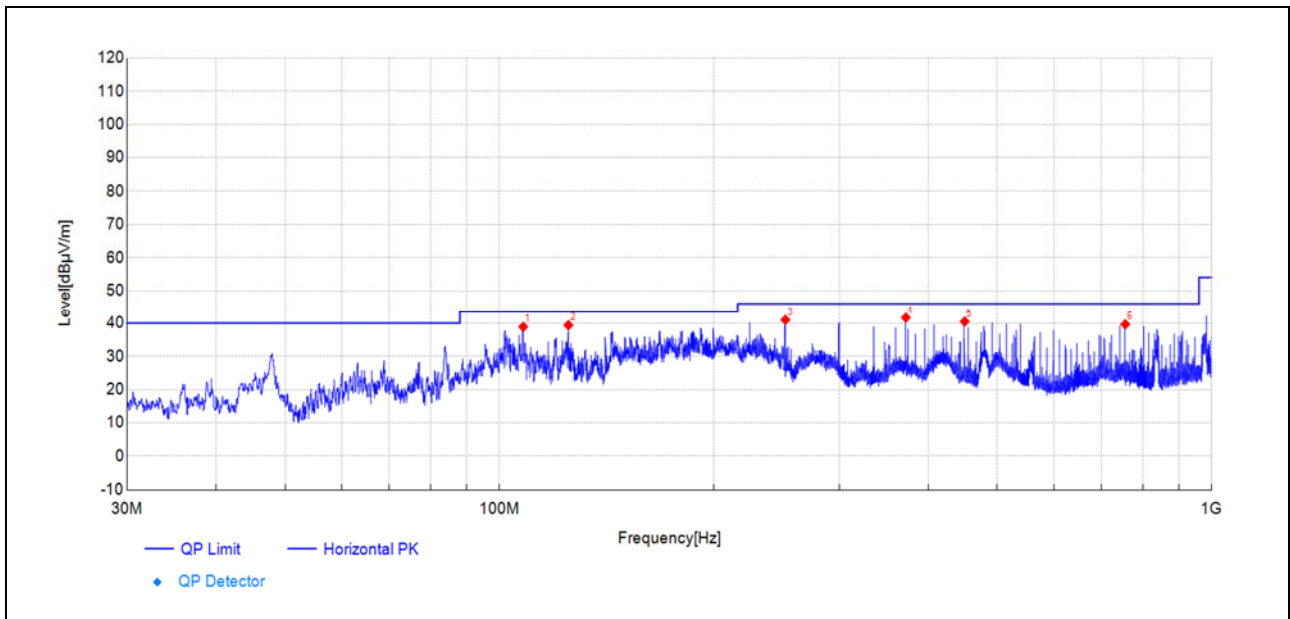
Fre. (MHz)	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Verdict
35.77	66.1	35.39	-30.670	40.00	4.61	155	84	PK	PASS
84.08	69.8	35.54	-34.280	40.00	4.46	155	269	PK	PASS
227.99	70.9	42.13	-28.810	46.00	3.87	155	164	PK	PASS
276.00	69.4	41.69	-27.680	46.00	4.31	155	136	PK	PASS
480.10	64.0	41.65	-22.330	46.00	4.35	155	231	PK	PASS
905.47	56.2	41.33	-14.820	46.00	4.67	155	164	PK	PASS



(Antenna Vertical, 1GHz to 18GHz)

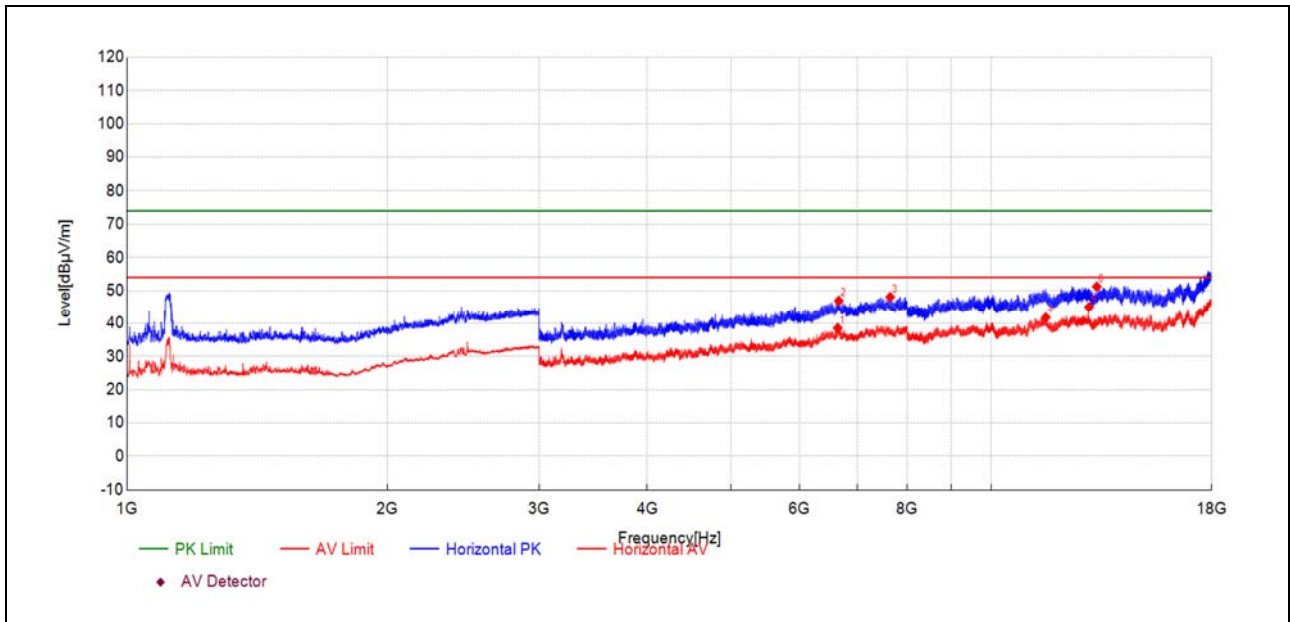
Fre. (MHz)	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Verdict
6379.81	45.2	39.75	-5.400	54.00	14.25	160	97	AV	PASS
6380.24	53.0	47.59	-5.400	74.00	26.41	160	97	PK	PASS
11377.95	39.8	42.28	2.530	54.00	11.72	160	224	AV	PASS
12561.27	49.2	52.55	3.340	74.00	21.45	160	274	PK	PASS
12979.14	41.2	45.28	4.080	54.00	8.72	160	323	AV	PASS
13192.15	48.3	52.70	4.400	74.00	21.30	160	22	PK	PASS

Plot for Channel 26



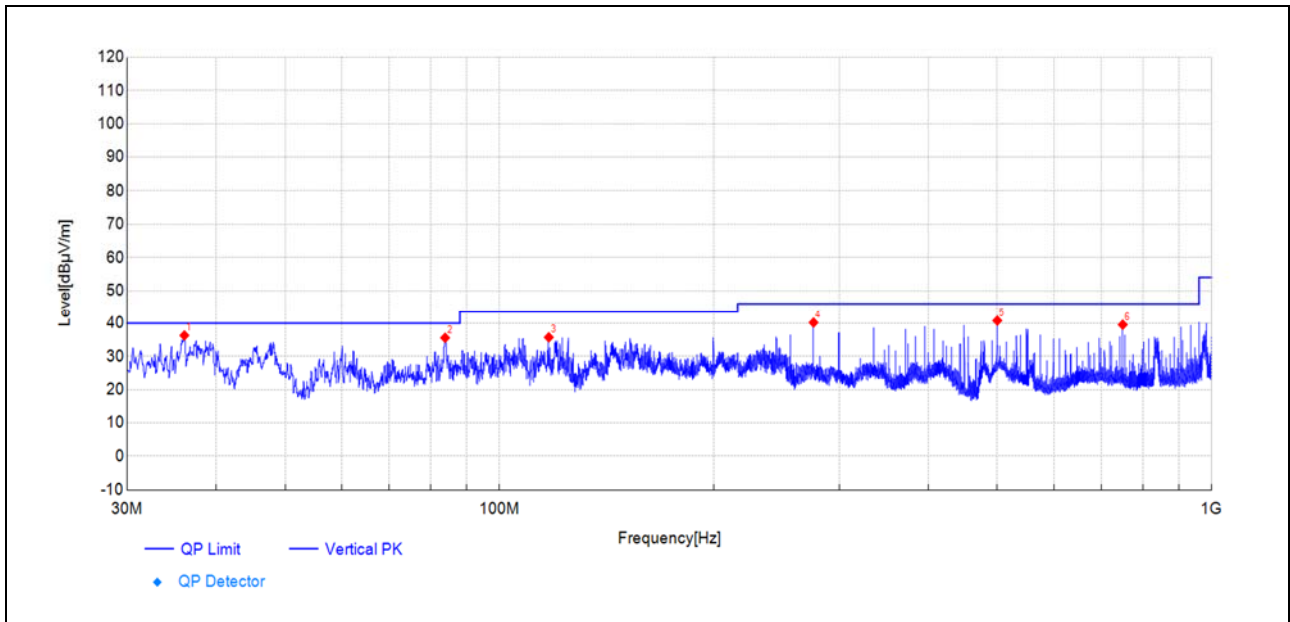
(Antenna Horizontal, 30MHz to 1GHz)

Fre. (MHz)	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Verdict
107.99	69.5	38.86	-30.600	43.50	4.64	155	247	PK	PASS
124.97	72.3	39.38	-32.930	43.50	4.12	155	142	PK	PASS
252.04	69.1	41.00	-28.070	46.00	5.00	155	247	PK	PASS
372.04	66.6	41.65	-24.990	46.00	4.35	155	275	PK	PASS
449.98	63.6	40.48	-23.150	46.00	5.52	155	10	PK	PASS
756.08	56.6	39.62	-16.970	46.00	6.38	155	36	PK	PASS



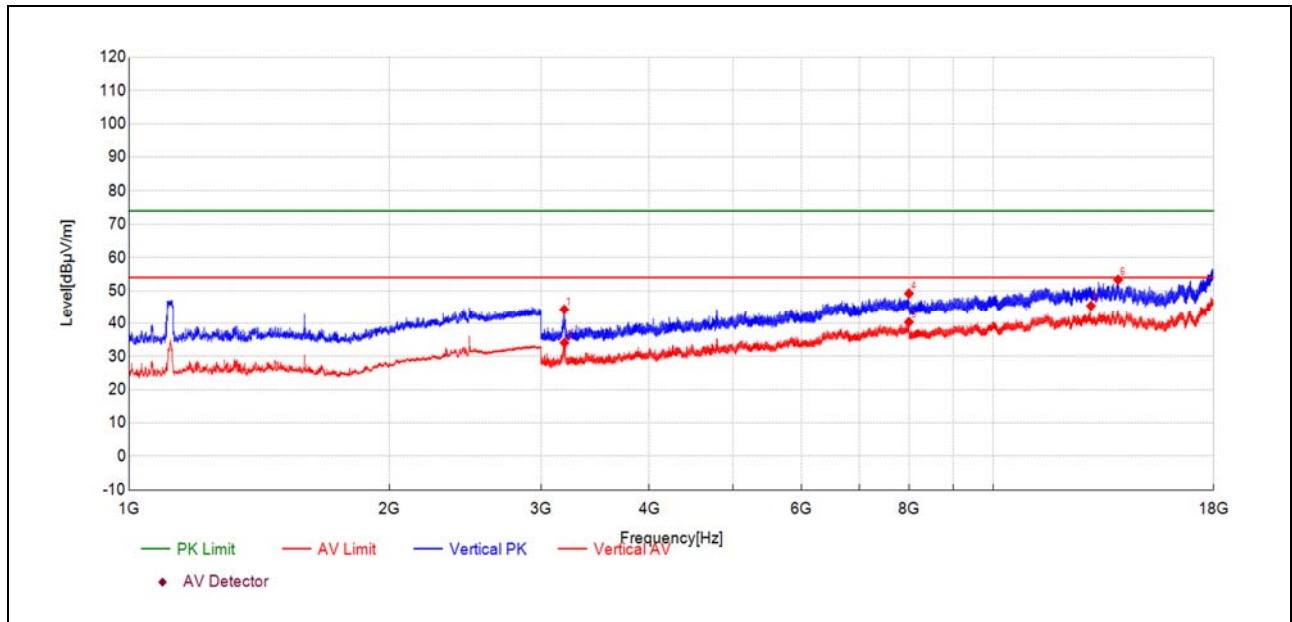
(Antenna Horizontal, 1GHz to 18GHz)

Fre. (MHz)	Reading [dBμV]	Level [dBμV/m]	Factor [dB/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Detector	Verdict
6644.68	42.4	38.54	-3.840	54.00	15.46	160	1	AV	PASS
6662.68	50.7	46.91	-3.770	74.00	27.09	160	174	PK	PASS
7641.99	51.7	48.07	-3.640	74.00	25.93	160	350	PK	PASS
11569.10	38.9	41.74	2.800	54.00	12.26	160	200	AV	PASS
12979.14	40.9	45.02	4.080	54.00	8.98	160	123	AV	PASS
13250.86	46.2	51.21	4.990	74.00	22.79	160	0	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
36.11	66.8	36.29	-30.490	40.00	3.71	155	124	PK	PASS
83.89	69.9	35.57	-34.330	40.00	4.43	155	269	PK	PASS
117.30	67.6	35.73	-31.820	43.50	7.77	155	244	PK	PASS
276.05	67.9	40.18	-27.680	46.00	5.82	155	163	PK	PASS
499.99	62.4	40.77	-21.660	46.00	5.23	155	256	PK	PASS
750.02	56.5	39.53	-16.970	46.00	6.47	155	124	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
3189.86	59.8	44.23	-15.540	74.00	29.77	160	300	PK	PASS
3191.15	49.6	34.07	-15.540	54.00	19.93	160	201	AV	PASS
7990.43	43.7	40.33	-3.340	54.00	13.67	160	72	AV	PASS
7990.43	52.5	49.14	-3.340	74.00	24.86	160	72	PK	PASS
12979.14	41.3	45.39	4.080	54.00	8.61	160	324	AV	PASS
13950.74	48.2	53.28	5.040	74.00	20.72	160	250	PK	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 —————