MEASUREMENT REPORT

FCC PART 15.247 802.11b/g

FCC ID:	2ASIE-A5E40992378
APPLICANT:	Siemens Numerical Control Ltd., Nanjing
Application Type:	Certification
Product:	SINAMICS G120 Smart Access
Model No.:	6SL3255-0AA00-5AA0
Brand Name:	SIEMENS
FCC Classification:	Digital Transmission System (DTS)
FCC Rule Part(s):	Part 15 Subpart C (Section 15.247)
Test Procedure(s):	ANSI C63.10-2013, KDB 558074 D01v05r01
Test Date:	December 14, 2018 ~ December 22, 2018

Reviewed By: (Kevin Guo)

Approved By: (Robin Wu)

ACCREDITED
TESTING LABORATORY
CERTIFICATE #3628.01

The test results relate only to the samples tested.
This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.10 2013. Test results reported herein relate only to the item(s) tested.
The test report shall not be reproduced except in full without the written approval of MRT Technology (Suzhou) Co., Ltd.

Revision History

Report No.	Version	Description	Issue Date	Note
1812WSU005-U1	Rev. 01	Initial report	02-27-2019	Valid

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§2.1033 General Information

Applicant:	Siemens Numerical Control Ltd., Nanjing
Applicant Address:	No. 18, Siemens Road, Jiangning Development Zone, Nanjing, Jiangsu Province 211100, P.R. China
Manufacturer:	Siemens Numerical Control Ltd., Nanjing
Manufacturer Address:	No. 18, Siemens Road, Jiangning Development Zone, Nanjing, Jiangsu Province 211100, P.R. China
Test Site:	MRT Technology (Suzhou) Co., Ltd
Test Site Address:	D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China
FCC Registration No.:	893164
IC Registration No.:	11384A-1
Test Device Serial No.:	N/A ☐ Production ☒ Pre-Production ☐ Engineering

Test Facility / Accreditations

Measurements were performed at MRT Laboratory located in Tian'edang Rd., Suzhou, China.

- **MRT facility is a FCC registered (MRT Reg. No. 893164) test facility with the site description report on file and has met all the requirements specified in ANSI C63.4-2014.**
- **MRT facility is an IC registered (MRT Reg. No. 11384A-1) test laboratory with the site description on file at Industry Canada.**
- **MRT facility is a VCCI registered (R-20025, G-20034, C-20020, T-20020) test laboratory with the site description on file at VCCI Council.**
- **MRT Lab is accredited to ISO 17025 by the American Association for Laboratory Accreditation (A2LA) under the American Association for Laboratory Accreditation Program (A2LA Cert. No. 3628.01) in EMC, Telecommunications, Radio and SAR testing.**

Accredited Laboratory

A2LA has accredited

MRT TECHNOLOGY (SUZHOU) CO., LTD.

Suzhou, Jiangsu, People's Republic of China

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).

Presented this 24th day of July 2018.

President and CEO
For the Accreditation Council
Certificate Number 3628.01
Valid to August 31, 2020

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.

1. INTRODUCTION

1.1. Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Industry Canada Certification and Engineering Bureau.

1.2. MRT Test Location

The map below shows the location of the MRT LABORATORY, its proximity to the Taihu Lake. These measurement tests were conducted at the MRT Technology (Suzhou) Co., Ltd. Facility located at D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China. The measurement facility compliant with the test site requirements specified in ANSI C63.4-2014.

2. PRODUCT INFORMATION

2.1. Feature of Equipment under Test

Product Name:	SINAMICS G120 Smart Access
Model No.:	6SL3255-0AA00-5AA0
Brand Name:	SIEMENS
RF Specification:	802.11b/g
Rated Voltage:	DC15V

2.2. Product Specification Subjective to this Report

Frequency Range:	802.11b/g: 2412 ~ 2462 MHz
Type of Modulation:	802.11b: DSSS 802.11g: OFDM
Data Rate:	802.11b: 1/2/5.5/11Mbps 802.11g: 6/9/12/18/24/36/48/54Mbps
Antenna Type:	Internal Antenna
Antenna Gain:	1.9dBi

Note: For other features of this EUT, test report will be issued separately.

2.3. Working Frequencies for this report

Channel List for 802.11b/g

Channel	Frequency	Channel	Frequency	Channel	Frequency
01	2412 MHz	02	2417 MHz	03	2422 MHz
04	2427 MHz	05	2432 MHz	06	2437 MHz
07	2442 MHz	08	2447 MHz	09	2452 MHz
10	2457 MHz	11	2462 MHz	--	--

2.4. Test Mode

Test Mode	Mode 1: Transmit by 802.11b (1Mbps)
	Mode 2: Transmit by 802.11g (6Mbps)

2.5. Test Software

The test utility software used during testing was “RadioToolGUI”, and the version was “V0.8.5973.20907”.

Power Parameter Value:

Test Mode	Test Channel No.	Test Channel (MHz)	Power Parameter Value
802.11b	01	2412	0
	06	2437	0
	11	2462	0
802.11g	01	2412	0
	06	2437	0
	11	2462	0

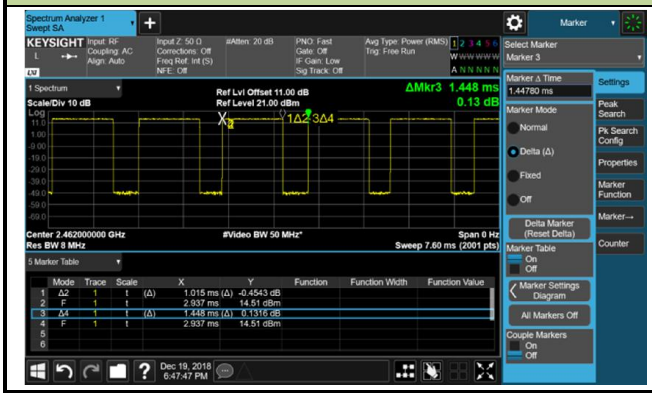
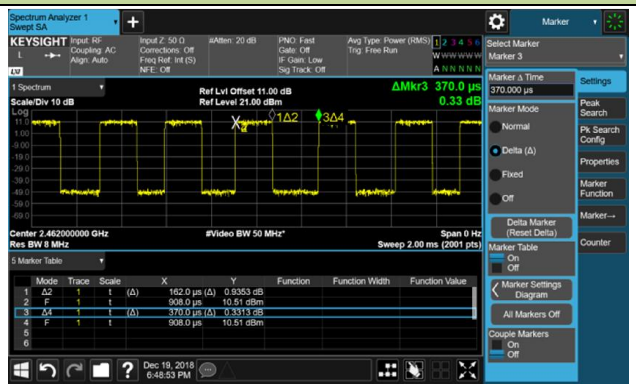
2.6. Device Capabilities

This device contains the following capabilities:

802.11b/g(DTS)

The maximum achievable duty cycles for all modes were determined based on measurements performed on a spectrum analyzer in zero-span mode with RBW = 8MHz, VBW = 50MHz, and detector = peak. The RBW and VBW were both greater than 50/T, where T is the minimum transmission duration, and the number of sweep points across T was greater than 100. The duty cycles are as follows:

Test Mode	Duty Cycle
802.11b	70.10 %
802.11g	43.78 %

Duty Cycle (T = Transmission Duration)	
802.11b (T = 1.015 ms)	802.11g (T = 0162 ms)
	

2.7. Test Configuration

The device was tested per the guidance of ANSI C63.10-2013. ANSI C63.10-2013 was used to reference the appropriate EUT setup for radiated spurious emissions testing and AC line conducted testing.

2.8. EMI Suppression Device(s)/Modifications

No EMI suppression device(s) were added and/or no modifications were made during testing.

2.9. Labeling Requirements

Per 2.1074 & 15.19; Docket 95-19

The label shall be permanently affixed at a conspicuous location on the device; instruction manual or pamphlet supplied to the user and be readily visible to the purchaser at the time of purchase. However, when the device is so small wherein placement of the label with specified statement is not practical, only the FCC ID must be displayed on the device per Section 15.19(a)(5). Please see attachment for FCC ID label and label location.

3. DESCRIPTION of TEST

3.1. Evaluation Procedure

The measurement procedures described in the American National Standard for Testing Unlicensed Wireless Devices (ANSI C63.10-2013), and the guidance provided in KDB 558074 D01v05r01 were used in the measurement of the device.

Deviation from measurement procedure…….....None

3.2. AC Line Conducted Emissions

The line-conducted facility is located inside an 8'x4'x4' shielded enclosure. A 1m x 2m wooden table 80cm high is placed 40cm away from the vertical wall and 80cm away from the sidewall of the shielded room. Two 10kHz-30MHz, 50Ω/50uH Line-Impedance Stabilization Networks (LISNs) are bonded to the shielded room floor. Power to the LISNs is filtered by external high-current high-insertion loss power line filters. These filters attenuate ambient signal noise from entering the measurement lines. These filters are also bonded to the shielded enclosure.

The EUT is powered from one LISN and the support equipment is powered from the second LISN. All interconnecting cables more than 1 meter were shortened to a 1 meter length by non-inductive bundling (serpentine fashion) and draped over the back edge of the test table. All cables were at least 40cm above the horizontal reference ground-plane. Power cables for support equipment were routed down to the second LISN while ensuring that that cables were not draped over the second LISN.

Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the receiver and exploratory measurements were made to determine the frequencies producing the maximum emission from the EUT. The receiver was scanned from 150kHz to 30MHz. The detector function was set to peak mode for exploratory measurements while the bandwidth of the analyzer was set to 9kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Each emission was also maximized by varying: power lines, the mode of operation or data exchange speed, or support equipment whichever determined the worst-case emission. Once the worst case emissions have been identified, the one EUT cable configuration/arrangement and mode of operation that produced these emissions are used for final measurements on the same test site. The analyzer is set to CISPR quasi-peak and average detectors with a 9kHz resolution bandwidth for final measurements.

An extension cord was used to connect to a single LISN which powered by EUT. The extension cord was calibrated with LISN, the impedance and insertion loss are compliance with the requirements as stated in ANSI C63.10-2013.

3.3. Radiated Emissions

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. For measurements above 1GHz absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1GHz, the absorbers are removed. A MF Model 210SS turntable is used for radiated measurement. It is a continuously rotatable, remote controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. An 80cm high PVC support structure is placed on top of the turntable.

For all measurements, the spectrum was scanned through all EUT azimuths and from 1 to 4 meter receive antenna height using a broadband antenna from 30MHz up to the upper frequency shown in 15.33(b)(1) depending on the highest frequency generated or used in the device or on which the device operates or tunes. For frequencies above 1GHz, linearly polarized double ridge horn antennas were used. For frequencies below 30MHz, a calibrated loop antenna was used. When exploratory measurements were necessary, they were performed at 1 meter test distance inside the semi-anechoic chamber using broadband antennas, broadband amplifiers, and spectrum analyzers to determine the frequencies and modes producing the maximum emissions. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The test set-up for frequencies below 1GHz was placed on top of the 0.8 meter high, 1 x 1.5 meter table; and test set-up for frequencies 1-40GHz was placed on top of the 1.5 meter high, 1 x 1.5 meter table. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Appropriate precaution was taken to ensure that all emissions from the EUT were maximized and investigated. The system configuration, clock speed, mode of operation or video resolution, if applicable, turntable azimuth, and receive antenna height was noted for each frequency found.

Final measurements were made in the semi-anechoic chamber using calibrated, linearly polarized broadband and horn antennas. The test setup was configured to the setup that produced the worst case emissions. The spectrum analyzer was set to investigate all frequencies required for testing to compare the highest radiated disturbances with respect to the specified limits. The turntable containing the EUT was rotated through 360 degrees and the height of the receive antenna was varied 1 to 4 meters and stopped at the azimuth and height producing the maximum emission. Each emission was maximized by changing the orientation of the EUT through three orthogonal planes and changing the polarity of the receive antenna, whichever produced the worst-case emissions. According to 3dB Beam-Width of horn antenna, the horn antenna should be always directed to the EUT when rising height.

4. ANTENNA REQUIREMENTS

Excerpt from §15.203 of the FCC Rules/Regulations:

"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can 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."

- The antenna of the EUT is **permanently attached.**
- There are no provisions for connection to an external antenna.

Conclusion:

The device unit complies with the requirement of §15.203.

5. TEST EQUIPMENT CALIBRATION DATE

Conducted Emissions - SR2

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR3	MRTSUE06185	1 year	2019/04/20
Two-Line V-Network	R&S	ENV 216	MRTSUE06002	1 year	2019/06/15
Two-Line V-Network	R&S	ENV 216	MRTSUE06003	1 year	2019/06/15
Thermohygrometer	Testo	608-H1	MRTSUE06404	1 year	2019/08/15
Shielding Anechoic Chamber	Mikebang	Chamber-SR2	MRTSUE06214	N/A	N/A

Radiated Disturbance – AC1

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
Spectrum Analyzer	Keysight	N9030B	MRTSUE06395	1 year	2019/09/30
EMI Test Receiver	R&S	ESR7	MRTSUE06001	1 year	2019/08/18
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2019/11/20
Bilog Period Antenna	Schwarzbeck	VULB 9168	MRTSUE06172	1 year	2019/04/12
Horn Antenna	Schwarzbeck	BBHA9120D	MRTSUE06023	1 year	2019/10/21
Broadband Horn Antenna	Schwarzbeck	BBHA9170	MRTSUE06024	1 year	2019/12/14
Microwave System Amplifier	Agilent	83017A	MRTSUE06076	1 year	2019/11/17
Preamplifier	Schwarzbeck	BBV 9721	MRTSUE06121	1 year	2019/06/13
Temperature/Humidity Meter	Testo	608-H1	MRTSUE06403	1 year	2019/08/14
Anechoic Chamber	TDK	Chamber-AC1	MRTSUE06212	1 year	2019/05/02

Conducted Test Equipment - TR3

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EXA Signal Analyzer	KEYSIGHT	N9010B	MRTSUE06452	1 year	2019/07/20
Spectrum Analyzer	Agilent	N9020A	MRTSUE06106	1 year	2019/04/20
USB wideband power sensor	KEYSIGHT	U2021XA	MRTSUE06446	1 year	2019/07/20
Attenuator	MVE	MVE2211-10	MRTSUE06800	1 year	2019/07/10
Temperature & Humidity Chamber	BAOYT	BYH-150CL	MRTSUE06051	1 year	2019/12/06
Thermohygrometer	testo	608-H1	MRTSUE06401	1 year	2019/08/15

Software	Version	Function
e3	V8.3.5	EMI Test Software

6. MEASUREMENT UNCERTAINTY

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k = 2.

AC Conducted Emission Measurement - SR2
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 150kHz~30MHz: ± 3.46dB
Radiated Emission Measurement – AC1
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 9kHz ~ 1GHz: ± 4.18dB 1GHz ~ 25GHz: ± 4.76dB
Spurious Emissions, Conducted - TR3
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 0.78dB
Output Power - TR3
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 1.13dB
Power Spectrum Density - TR3
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 1.15dB
Occupied Bandwidth - TR3
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 0.28%

7. TEST RESULT

7.1. Summary

Company Name: **Siemens Numerical Control Ltd., Nanjing**

FCC ID: **2ASIE-A5E40992378**

FCC Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
15.247(a)(2)	6dB Bandwidth	≥ 500kHz	Conducted	Pass	Section 7.2
15.247(b)(3)	Output Power	≤ 30dBm		Pass	Section 7.3
15.247(e)	Power Spectral Density	≤ 8dBm/3kHz		Pass	Section 7.4
15.247(d)	Band Edge / Out-of-Band Emissions	≤ 30dBc(Average)		Pass	Section 7.5
15.205 15.209	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Emissions in restricted bands must meet the radiated limits detailed in 15.209	Radiated	Pass	Section 7.6 & 7.7
15.207	AC Conducted Emissions 150kHz - 30MHz	< FCC 15.207 limits	Line Conducted	Pass	Section 7.8

Notes:

1) All modes of operation and data rates were investigated. For radiated emission test, every axis (X, Y, Z) was also verified. The test results shown in the following sections represent the worst case emissions.
2) The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.

7.2. 6dB Bandwidth Measurement

7.2.1.Test Limit

The minimum 6dB bandwidth shall be at least 500 kHz.

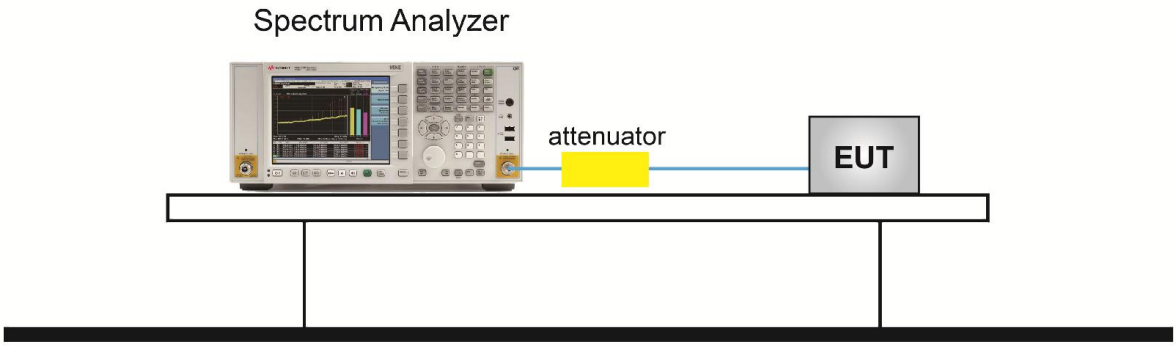
7.2.2.Test Procedure used

ANSI C63.10-2013 - Section 11.8.2 Option 2

7.2.3.Test Setting

1. The Spectrum's automatic bandwidth measurement capability was used to perform the 6dB bandwidth measurement. The "X" dB bandwidth parameter was set to X = 6. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. Set RBW = 100 kHz
3. VBW ≥ 3 × RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. Allow the trace was allowed to stabilize

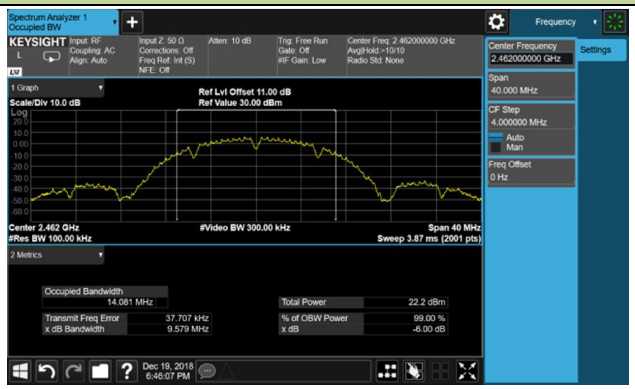
7.2.4.Test Setup



7.2.5.Test Result

Product	SINAMICS G120 Smart Access	Temperature	25°C
Test Engineer	Dandy Li	Relative Humidity	52%
Test Site	TR3	Test Date	2018/12/19

Test Mode	Data Rate (Mbps)	Channel No.	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
11b	1Mbps	01	2412	9.57	≥ 0.5	Pass
11b	1Mbps	06	2437	9.57	≥ 0.5	Pass
11b	1Mbps	11	2462	9.58	≥ 0.5	Pass
11g	6Mbps	01	2412	15.12	≥ 0.5	Pass
11g	6Mbps	06	2437	15.12	≥ 0.5	Pass
11g	6Mbps	11	2462	15.12	≥ 0.5	Pass

802.11b 6dB Bandwidth	
Channel 01 (2412MHz)	Channel 06 (2437MHz)
Channel 11 (2462MHz)	
	

802.11g 6dB Bandwidth	
Channel 01 (2412MHz)	Channel 06 (2437MHz)
Channel 11 (2462MHz)	

7.3. Output Power Measurement

7.3.1.Test Limit

The maximum conducted output power shall be exceed 1 Watt (30dBm).

The total conducted output power shall be reduced by 1 dB below the specified limits for each 3 dB that the directional gain of the antenna/antenna array exceeds 6dBi.

7.3.2.Test Procedure Used

ANSI C63.10-2013 - Section 11.9.1.3 PKPM1 Peak-reading power meter method

ANSI C63.10-2013 - Section 11.9.2.3.2 Method AVGPM-G

7.3.3.Test Setting

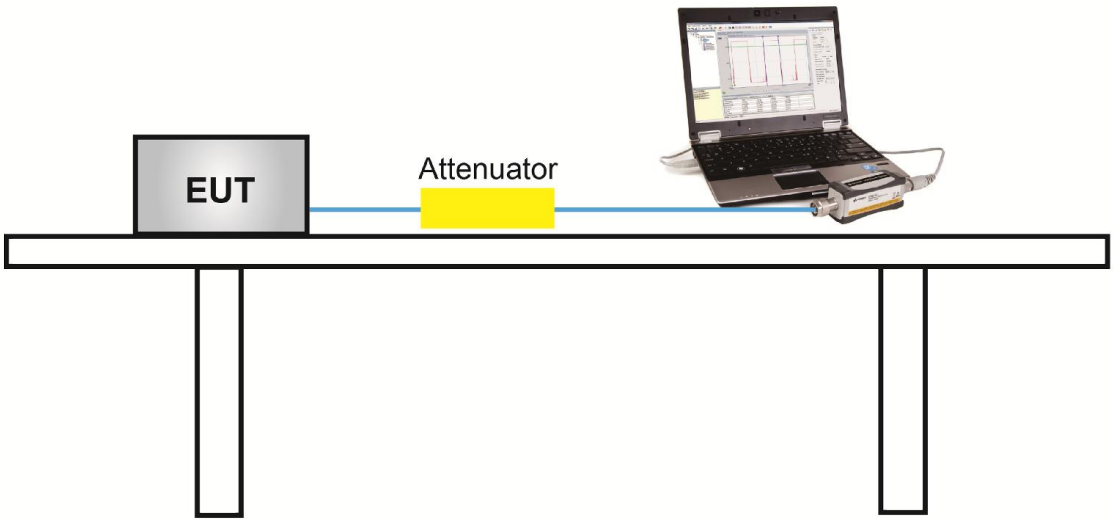
PKPM1 Peak-reading power meter method

The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.

Method AVGPM-G (Measurement using a gated RF average-reading power meter)

Measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since this measurement is made only during the ON time of the transmitter, no duty cycle correction is required.

7.3.4.Test Setup



7.3.5.Test Result

Power output test was verified over all data rates of each mode shown as below, and then choose the maximum power output (gray marker) for final test of each channel.

Output power at various data rates:

Test Mode	Bandwidth (MHz)	Channel No.	Frequency (MHz)	Data Rate / MCS	Average Power (dBm)
802.11b	20	06	2437	1Mbps	15.06
				5.5Mbps	14.73
				11Mbps	14.56
802.11g	20	06	2437	6Mbps	15.22
				24Mbps	14.94
				54Mbps	14.55

Product	SINAMICS G120 Smart Access	Temperature	23°C
Test Engineer	Dandy Li	Relative Humidity	51%
Test Site	TR3	Test Date	2018/12/19

Test Result of Peak Output Power

Test Mode	Channel No.	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)	Result
11b	01	2412	16.93	≤ 30	Pass
11b	06	2437	17.26	≤ 30	Pass
11b	11	2462	17.63	≤ 30	Pass
11g	01	2412	20.10	≤ 30	Pass
11g	06	2437	20.32	≤ 30	Pass
11g	11	2462	20.02	≤ 30	Pass

Test Result of Average Output Power (Reporting Only)

Test Mode	Channel No.	Frequency (MHz)	Average Power (dBm)	Limit (dBm)	Result
11b	01	2412	14.75	≤ 30	Pass
11b	06	2437	15.06	≤ 30	Pass
11b	11	2462	15.39	≤ 30	Pass
11g	01	2412	12.56	≤ 30	Pass
11g	06	2437	15.22	≤ 30	Pass
11g	11	2462	13.01	≤ 30	Pass

7.4. Power Spectral Density Measurement

7.4.1.Test Limit

The maximum permissible power spectral density is 8dBm in any 3 kHz band.

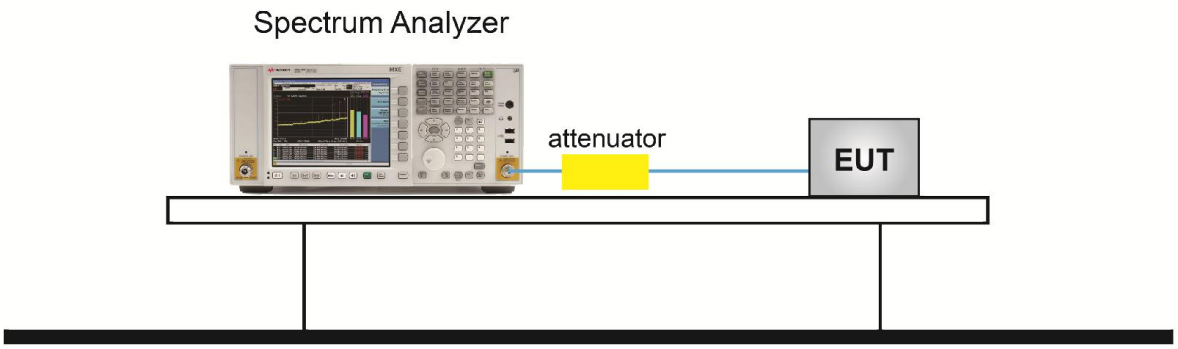
7.4.2.Test Procedure Used

ANSI C63.10 Section 11.10.5

7.4.3.Test Setting

1. Analyzer was set to the center frequency of the DTS channel under investigation
2. Span = 1.5 times the DTS channel bandwidth
3. RBW = 3kHz
4. VBW = 10kHz
5. Detector = peak
6. Sweep time = auto couple
7. Trace mode = max hold
8. Trace was allowed to stabilize

7.4.4.Test Setup

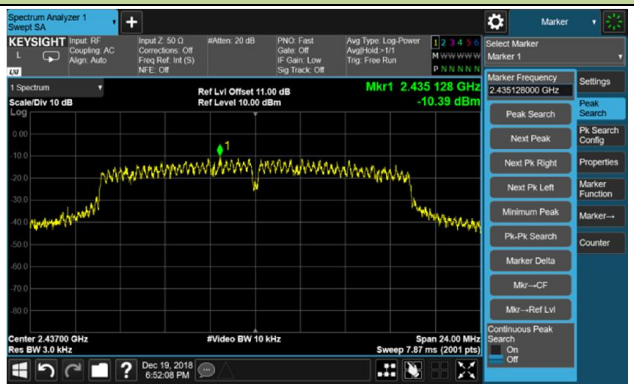
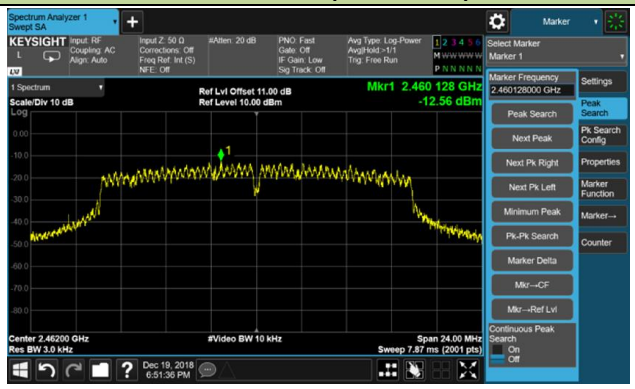


7.4.5.Test Result

Product	SINAMICS G120 Smart Access	Temperature	23°C
Test Engineer	Dandy Li	Relative Humidity	52%
Test Site	TR3	Test Date	2018/12/19

Test Mode	Channel No.	Frequency (MHz)	PSD Result (dBm / 3kHz)	Limit (dBm / 3kHz)	Result
11b	01	2412	-9.37	≤ 8.00	Pass
11b	06	2437	-9.17	≤ 8.00	Pass
11b	11	2462	-8.76	≤ 8.00	Pass
11g	01	2412	-12.92	≤ 8.00	Pass
11g	06	2437	-10.39	≤ 8.00	Pass
11g	11	2462	-12.56	≤ 8.00	Pass

802.11b PSD	
Channel 01 (2412MHz)	**Channel 06 (2437MHz)**
Channel 11 (2462MHz)	

802.11g PSD	
Channel 01 (2412MHz)	**Channel 06 (2437MHz)**
	
Channel 11 (2462MHz)	
	

7.5. Conducted Band Edge and Out-of-Band Emissions

7.5.1.Test Limit

The limit for out-of-band spurious emissions at the band edge is 20dB below the fundamental emission level, as determined from the in-band power measurement of the DTS channel performed in a 100 kHz bandwidth per the PSD procedure.

7.5.2.Test Procedure Used

ANSI C63.10 Section 11.11

7.5.3.Test Settitng

Reference level measurement

1. Set instrument center frequency to DTS channel center frequency
2. Set the span to ≥ 1.5 times the DTS bandwidth
3. Set the RBW = 100 kHz
4. Set the VBW ≥ 3 x RBW
5. Detector = peak
6. Sweep time = auto couple
7. Trace mode = max hold
8. Allow trace to fully stabilize

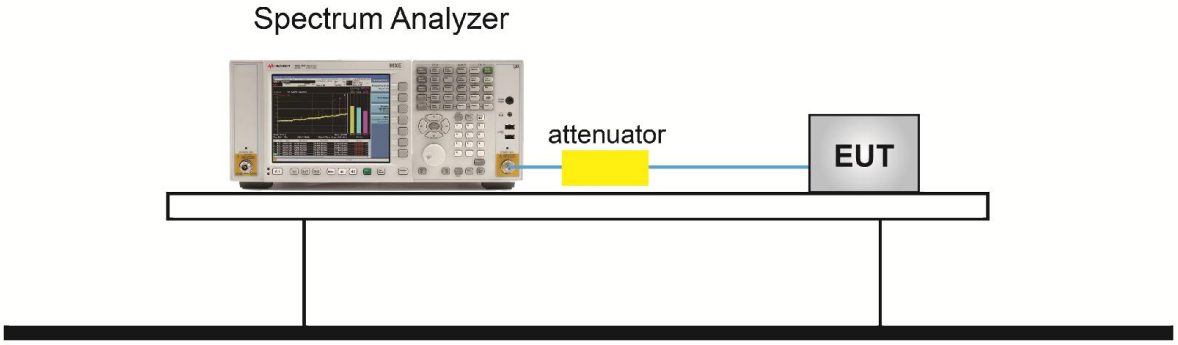
Emission level measurement

1. Set the center frequency and span to encompass frequency range to be measured
2. RBW = 1.3MHz
3. VBW = 4MHz
4. Detector = Peak
5. Trace mode = max hold
6. Sweep time = auto couple
7. The trace was allowed to stabilize

Test Notes

1. RBW was set to 1.3MHz rather than 100 kHz in order to increase the measurement speed.
2. The display line shown in the following plots denotes the limit at 20dB below the fundamental emission level measured in a 100 kHz bandwidth. However, since the traces in the following plots are measured with a 1.3MHz RBW, the display line may not necessarily appear to be 30dB below the level of the fundamental in a 1.3MHz bandwidth.
3. For plots showing conducted spurious emissions near the limit, the frequencies were investigated with a reduced RBW to ensure that no emissions were present

7.5.4.Test Setup



7.5.5.Test Result

Product	SINAMICS G120 Smart Access	Temperature	23°C
Test Engineer	Dandy Li	Relative Humidity	52%
Test Site	TR3	Test Date	2018/12/19

Test Mode / Bandwidth	Channel No.	Frequency (MHz)	Limit	Result
11b	01	2412	20dBc	Pass
11b	06	2437	20dBc	Pass
11b	11	2462	20dBc	Pass
11g	01	2412	20dBc	Pass
11g	06	2437	20dBc	Pass
11g	11	2462	20dBc	Pass

802.11b Out-of-Band Emissions

Channel 01 (2412MHz)

100kHz PSD reference Level	Low Band Edge

Spurious Emission	

Channel 06 (2437MHz)

100kHz PSD reference Level	Spurious Emission

Channel 11 (2462MHz)	
100kHz PSD reference Level	**High Band Edge**
Spurious Emission	

802.11g Out-of-Band Emissions

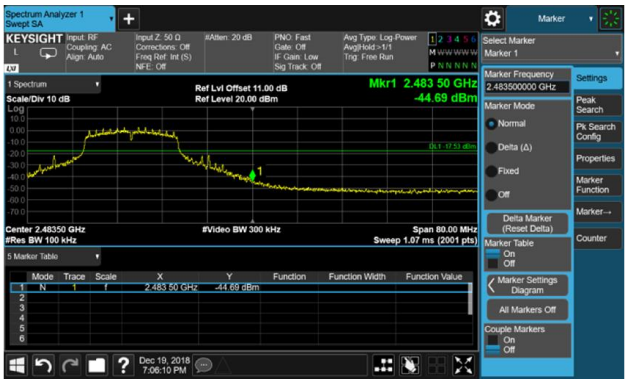
Channel 01 (2412MHz)

100kHz PSD reference Level	Low Band Edge

Spurious Emission	

Channel 06 (2437MHz)

100kHz PSD reference Level	Spurious Emission

Channel 11 (2462MHz)	
100kHz PSD reference Level	**High Band Edge**
	
Spurious Emission	

7.6. Radiated Spurious Emission Measurement

7.6.1.Test Limit

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Table per Section 15.209.

FCC Part 15 Subpart C Paragraph 15.209		
Frequency [MHz]	Field Strength [uV/m]	Measured Distance [Meters]
0.009 - 0.490	2400/F (kHz)	300
0.490 - 1.705	24000/F (kHz)	30
1.705 - 30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

7.6.2.Test Procedure Used

ANSI C63.10 Section 6.3 (General Requirements)

ANSI C63.10 Section 6.4 (Standard test method below 30MHz)

ANSI C63.10 Section 6.5 (Standard test method above 30MHz to 1GHz)

ANSI C63.10 Section 6.6 (Standard test method above 1GHz)

7.6.3.Test Setting

Table 1 - RBW as a function of frequency

Frequency	RBW
9 ~ 150 kHz	200 ~ 300 Hz
0.15 ~ 30 MHz	9 ~ 10 kHz
30 ~ 1000 MHz	100 ~ 120 kHz
> 1000 MHz	1 MHz

Quasi-Peak Measurements below 1GHz

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. Span was set greater than 1MHz
3. RBW = as specified in Table 1
4. Detector = CISPR quasi-peak
5. Sweep time = auto couple
6. Trace was allowed to stabilize

Peak Measurements above 1GHz

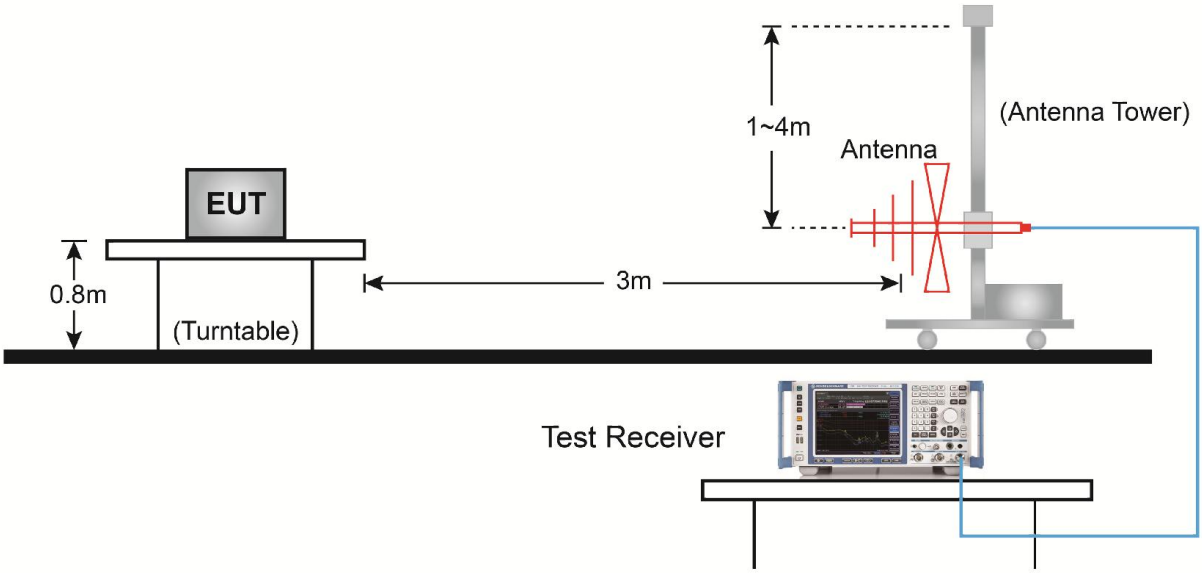
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

Average Measurements above 1GHz (Method VB)

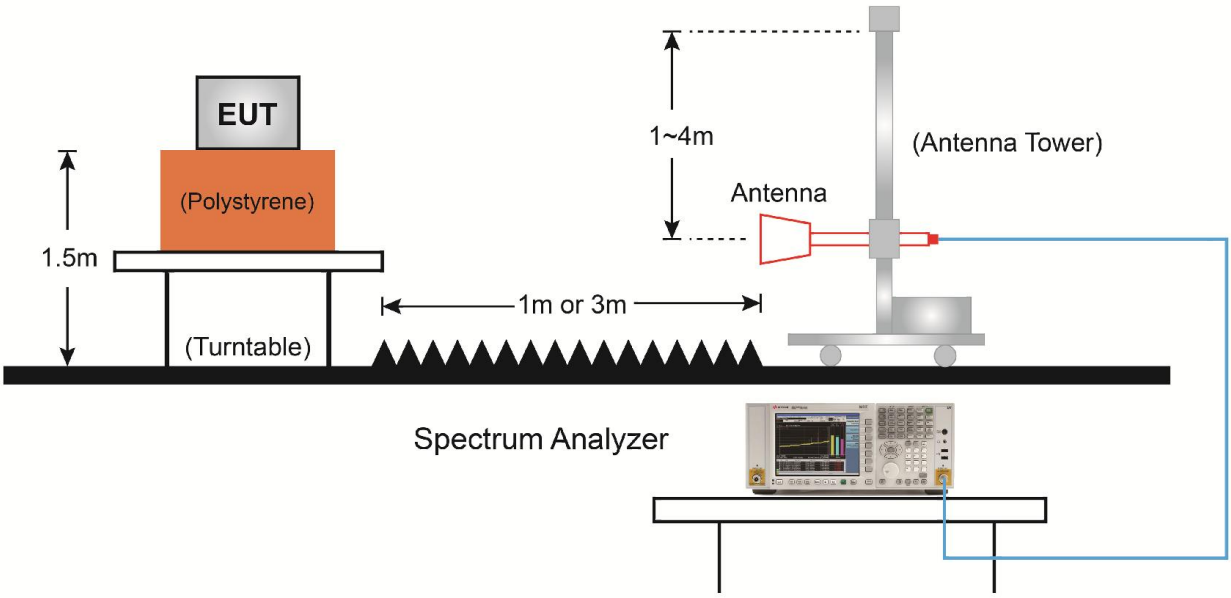
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW; If the EUT is configured to transmit with duty cycle ≥ 98%, set VBW = 10 Hz.
4. If the EUT duty cycle is < 98%, set VBW ≥ 1/T. T is the minimum transmission duration.
5. Detector = Peak
6. Sweep time = auto
7. Trace mode = max hold
8. Trace was allowed to stabilize

7.6.4.Test Setup

Below 1GHz Test Setup:



Above 1GHz Test Setup:



7.6.5.Test Result

Product	SINAMICS G120 Smart Access	Temperature	26°C
Test Engineer	Snake Ni	Relative Humidity	56%
Test Site	AC1	Test Date	2018/12/19
Test Mode:	802.11b	Test Channel:	01
Remark:	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
	4017.5	43.5	2.7	46.2	74.0	-27.8	Peak	Horizontal
	4825.0	36.4	5.6	42.0	74.0	-32.0	Peak	Horizontal
*	6431.5	39.5	9.8	49.3	81.7	-32.4	Peak	Horizontal
*	10307.5	31.2	18.4	49.6	81.7	-32.1	Peak	Horizontal
	4017.5	43.9	2.7	46.6	74.0	-27.4	Peak	Vertical
	4825.0	36.7	5.6	42.3	74.0	-31.7	Peak	Vertical
*	8012.5	32.3	14.8	47.1	81.7	-34.6	Peak	Vertical
*	9857.0	32.2	17.3	49.5	81.7	-32.2	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (101.7dBμV/m) or 15.209 which is higher.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Product	SINAMICS G120 Smart Access	Temperature	26°C
Test Engineer	Snake Ni	Relative Humidity	56%
Test Site	AC1	Test Date	2018/12/19
Test Mode:	802.11b	Test Channel:	06
Remark:	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
*	3252.5	46.5	0.5	47.0	83.6	-36.6	Peak	Horizontal
	4060.0	42.3	3.1	45.4	74.0	-28.6	Peak	Horizontal
*	6499.5	39.0	10.3	49.3	83.6	-34.3	Peak	Horizontal
	11650.5	31.5	21.0	52.5	74.0	-21.5	Peak	Horizontal
	4060.0	42.3	3.1	45.4	74.0	-28.6	Peak	Vertical
	4961.0	34.3	5.7	40.0	74.0	-34.0	Peak	Vertical
*	7247.5	32.1	13.9	46.0	83.6	-37.6	Peak	Vertical
*	10112.0	31.2	18.0	49.2	83.6	-34.4	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (103.6dBμV/m) or 15.209 which is higher.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Product	SINAMICS G120 Smart Access	Temperature	26°C
Test Engineer	Snake Ni	Relative Humidity	56%
Test Site	AC1	Test Date	2018/12/19
Test Mode:	802.11b	Test Channel:	11
Remark:	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
	4102.5	41.6	3.1	44.7	74.0	-29.3	Peak	Horizontal
	5071.5	34.7	6.1	40.8	74.0	-33.2	Peak	Horizontal
*	6567.5	38.1	10.7	48.7	85.2	-36.5	Peak	Horizontal
*	7230.5	32.5	13.9	46.4	85.2	-38.8	Peak	Horizontal
	4102.5	40.4	3.1	43.5	74.0	-30.5	Peak	Vertical
	5054.5	34.8	6.0	40.8	74.0	-33.2	Peak	Vertical
*	6788.5	32.9	10.9	43.8	85.2	-41.4	Peak	Vertical
*	9780.5	31.9	16.9	48.9	85.2	-36.3	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (105.2dBμV/m) or 15.209 which is higher.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Product	SINAMICS G120 Smart Access	Temperature	26°C
Test Engineer	Snake Ni	Relative Humidity	56%
Test Site	AC1	Test Date	2018/12/19
Test Mode:	802.11g	Test Channel:	01
Remark:	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
*	3218.5	47.1	0.6	47.6	84.1	-36.5	Peak	Horizontal
	4017.5	43.4	2.7	46.1	74.0	-27.9	Peak	Horizontal
	4587.0	35.2	5.0	40.2	74.0	-33.8	Peak	Horizontal
*	6431.5	38.3	9.8	48.2	84.1	-35.9	Peak	Horizontal
*	3218.5	46.1	0.6	46.7	84.1	-37.4	Peak	Vertical
	4017.5	42.8	2.7	45.4	74.0	-28.6	Peak	Vertical
*	5522.0	35.8	6.5	42.3	84.1	-41.8	Peak	Vertical
	8072.0	32.4	14.8	47.2	74.0	-26.8	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (104.1dBμV/m) or 15.209 which is higher.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Product	SINAMICS G120 Smart Access	Temperature	26°C
Test Engineer	Snake Ni	Relative Humidity	56%
Test Site	AC1	Test Date	2018/12/19
Test Mode:	802.11g	Test Channel:	06
Remark:	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
*	3252.5	43.6	0.5	44.1	85.8	-41.7	Peak	Horizontal
	4060.0	42.6	3.1	45.7	74.0	-28.3	Peak	Horizontal
*	6499.5	37.9	10.3	48.2	85.8	-37.6	Peak	Horizontal
	11557.0	30.8	20.9	51.7	74.0	-22.3	Peak	Horizontal
*	3490.5	47.8	1.2	48.9	85.8	-36.9	Peak	Vertical
	4060.0	41.6	3.1	44.6	74.0	-29.4	Peak	Vertical
*	7137.0	32.1	13.7	45.8	85.8	-40.0	Peak	Vertical
	12160.5	31.5	20.4	51.9	74.0	-22.1	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (105.8dBμV/m) or 15.209 which is higher.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

Product	SINAMICS G120 Smart Access	Temperature	26°C
Test Engineer	Snake Ni	Relative Humidity	56%
Test Site	AC1	Test Date	2018/12/19
Test Mode:	802.11g	Test Channel:	11
Remark:	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
*	3286.5	43.3	0.4	43.8	86.1	-42.3	Peak	Horizontal
	4102.5	39.8	3.1	42.9	74.0	-31.1	Peak	Horizontal
*	6567.5	38.2	10.7	48.8	86.1	-37.3	Peak	Horizontal
	10766.5	32.2	19.7	51.9	74.0	-22.1	Peak	Horizontal
*	3490.5	43.7	1.2	44.8	86.1	-41.3	Peak	Vertical
	4102.5	39.0	3.1	42.1	74.0	-31.9	Peak	Vertical
	7332.5	32.6	13.9	46.5	74.0	-27.5	Peak	Vertical
*	10579.5	32.3	19.0	51.4	86.1	-34.7	Peak	Vertical

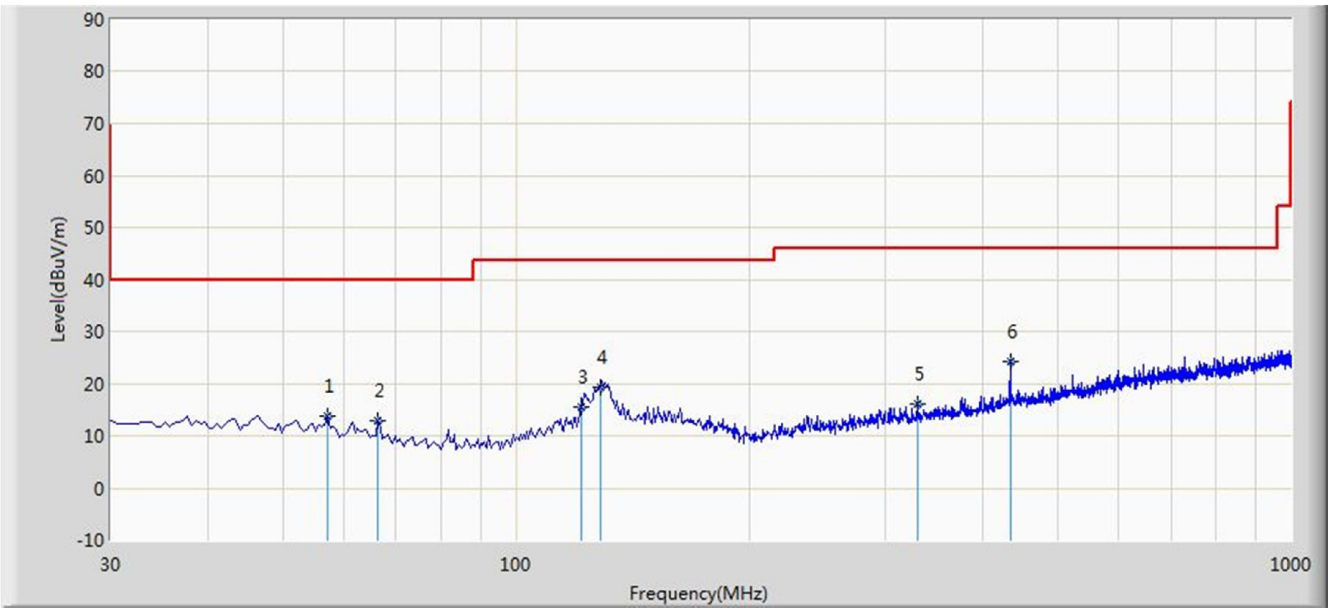
Note 1: "*" is not in restricted band, its limit is 20dBc of the fundamental emission level (106.1dBμV/m) or 15.209 which is higher.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

The worst case of Radiated Emission below 1GHz:

Site: AC1	Time: 2018/12/21 - 16:12
Limit: FCC_Part15.209_RE(3m)	Engineer: Cloud Guo
Probe: VULB 9168 _20-2000MHz	Polarity: Horizontal
EUT: SINAMICS G120 Smart Access	Power: DC 15V
Test Mode: There is the worst case within frequency range 30MHz~1GHz.	



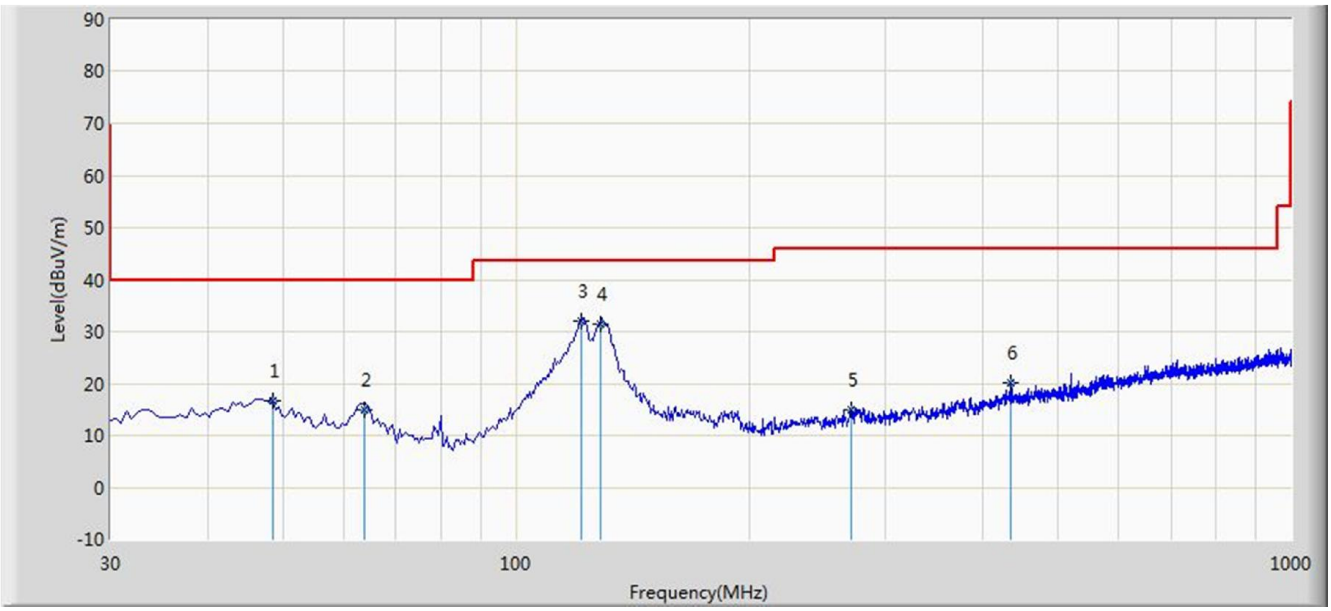
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	57.150	13.690	0.020	-26.310	40.000	13.670	QP
2			66.265	12.792	0.500	-27.208	40.000	12.292	QP
3			121.180	15.433	2.120	-28.067	43.500	13.313	QP
4			128.626	19.379	5.626	-24.121	43.500	13.753	QP
5			329.260	16.188	1.022	-29.812	46.000	15.166	QP
6			434.265	24.165	6.650	-21.835	46.000	17.516	QP

Note 1: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Note 2: The test trace is same as the ambient noise and the amplitude of the emissions are attenuated more than 20dB below the permissible (the test frequency range: 9kHz ~ 30MHz, 18GHz ~ 25GHz), therefore no data appear in the report.

Site: AC1	Time: 2018/12/21 - 16:15
Limit: FCC_Part15.209_RE(3m)	Engineer: Cloud Guo
Probe: VULB 9168 _20-2000MHz	Polarity: Vertical
EUT: SINAMICS G120 Smart Access	Power: DC 15V
Test Mode: There is the worst case within frequency range 30MHz~1GHz.	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			48.665	16.701	2.487	-23.299	40.000	14.213	QP
2			63.625	14.929	2.145	-25.071	40.000	12.784	QP
3			121.326	31.948	18.626	-11.552	43.500	13.322	QP
4			128.326	31.361	17.626	-12.139	43.500	13.735	QP
5			271.230	14.959	1.323	-31.041	46.000	13.636	QP
6		*	434.326	20.143	2.626	-25.857	46.000	17.517	QP

Note 1: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Note 2: The test trace is same as the ambient noise and the amplitude of the emissions are attenuated more than 20dB below the permissible (the test frequency range: 9kHz ~ 30MHz, 18GHz ~ 25GHz), therefore no data appear in the report.

7.7. Radiated Restricted Band Edge Measurement

7.7.1.Test Limit

For 15.205 requirement:

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a) of FCC part 15, must also comply with the radiated emission limits specified in Section 15.209(a).

Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (GHz)
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1] 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	([2])
13.36 - 13.41	--	--	--

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47CFR must not exceed the limits shown in Table per Section 15.209.

FCC Part 15 Subpart C Paragraph 15.209		
Frequency [MHz]	Field Strength [uV/m]	Measured Distance [Meters]
0.009 - 0.490	2400/F (kHz)	300
0.490 - 1.705	24000/F (kHz)	30
1.705 - 30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

7.7.2.Test Procedure Used

ANSI C63.10 Section 6.3 (General Requirements)

ANSI C63.10 Section 6.6 (Standard test method above 1GHz)

7.7.3.Test Setting

Peak Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = as specified in Table 1
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

Average Field Strength Measurements

. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest

2. RBW = 1MHz

3. VBW; If the EUT is configured to transmit with duty cycle ≥ 98%, set VBW = 10 Hz.

If the EUT duty cycle is < 98%, set VBW ≥ 1/T. T is the minimum transmission duration.

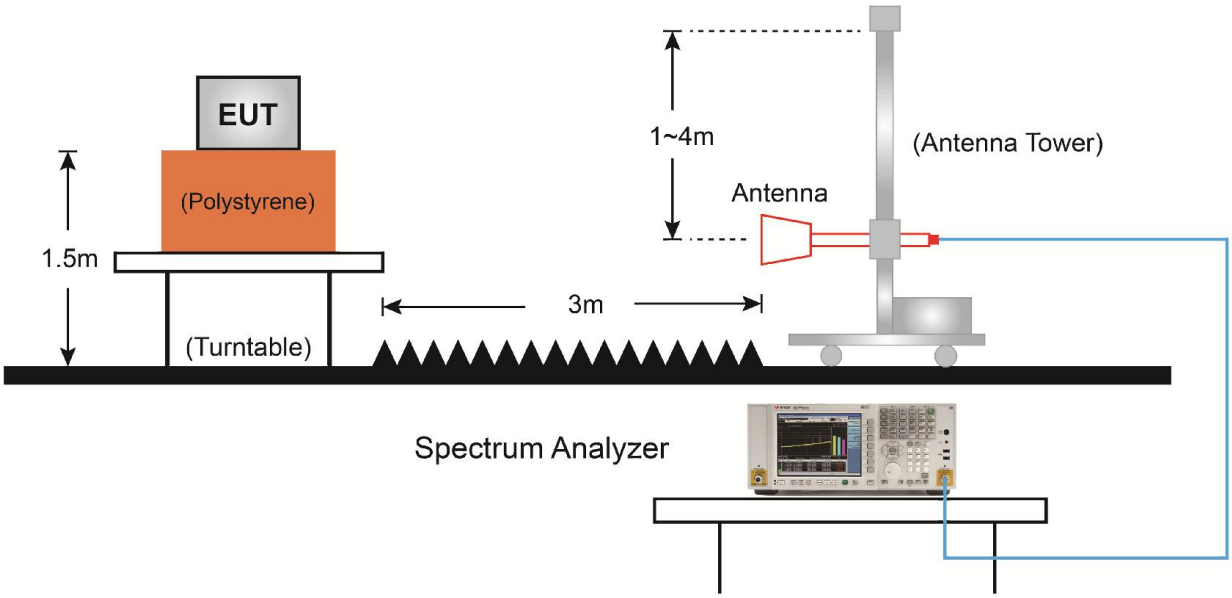
4. Detector = Peak

5. Sweep time = auto

6. Trace mode = max hold

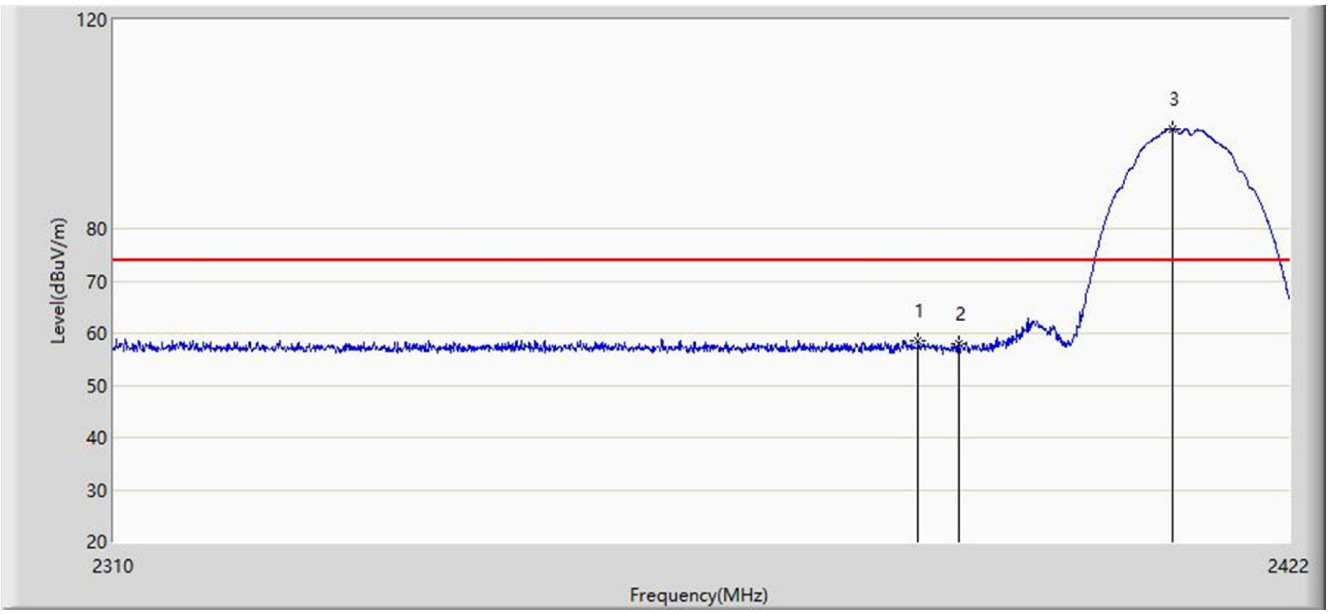
7. Trace was allowed to stabilize

7.7.4.Test Setup



7.7.5.Test Result

Site: AC1	Time: 2018/12/19 - 00:57
Limit: FCC_Part15.209_RE(3m)	Engineer: Stone Jia
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: SINAMICS G120 Smart Access	Power: DC 15V
Test Mode: Transmit by 802.11b at Channel 2412MHz	

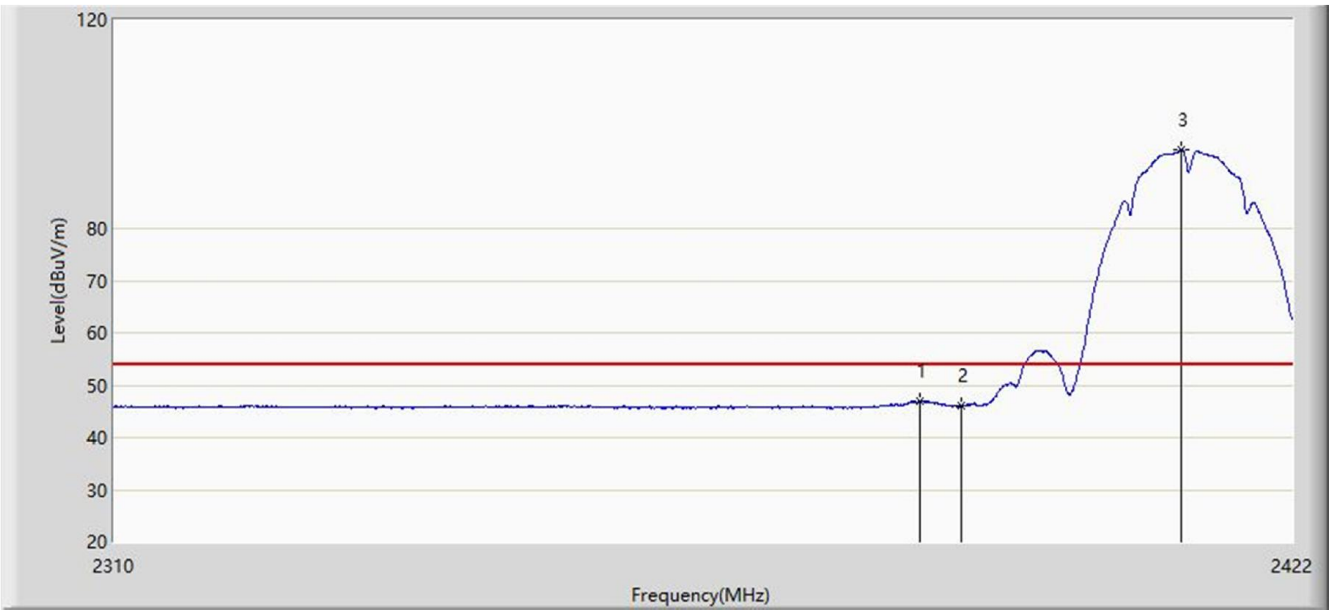


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2386.104	58.424	25.843	-15.576	74.000	32.581	PK
2			2390.000	57.983	25.408	-16.017	74.000	32.575	PK
3		*	2410.632	99.233	66.683	N/A	N/A	32.549	PK

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2018/12/19 - 01:15
Limit: FCC_Part15.209_RE(3m)	Engineer: Stone Jia
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: SINAMICS G120 Smart Access	Power: DC 15V
Test Mode: Transmit by 802.11b at Channel 2412MHz	

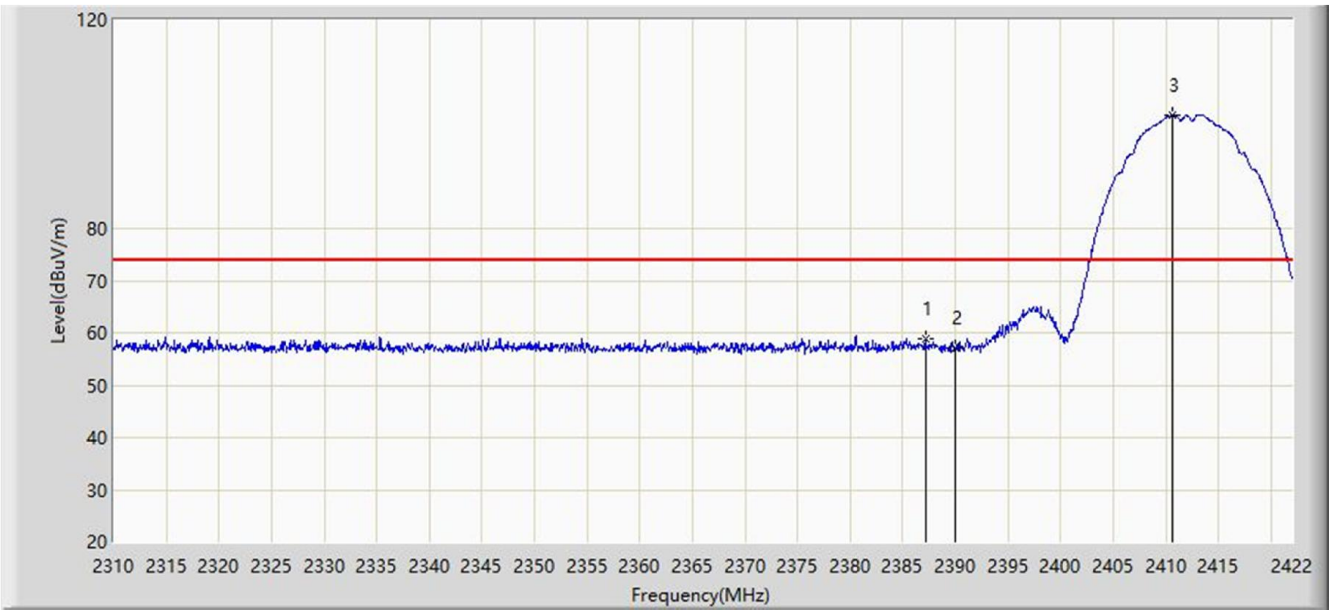


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2385.992	46.883	14.301	-7.117	54.000	32.581	AV
2			2390.000	45.995	13.420	-8.005	54.000	32.575	AV
3		*	2411.304	95.092	62.543	N/A	N/A	32.549	AV

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2018/12/19 - 01:18
Limit: FCC_Part15.209_RE(3m)	Engineer: Stone Jia
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: SINAMICS G120 Smart Access	Power: DC 15V
Test Mode: Transmit by 802.11b at Channel 2412MHz	

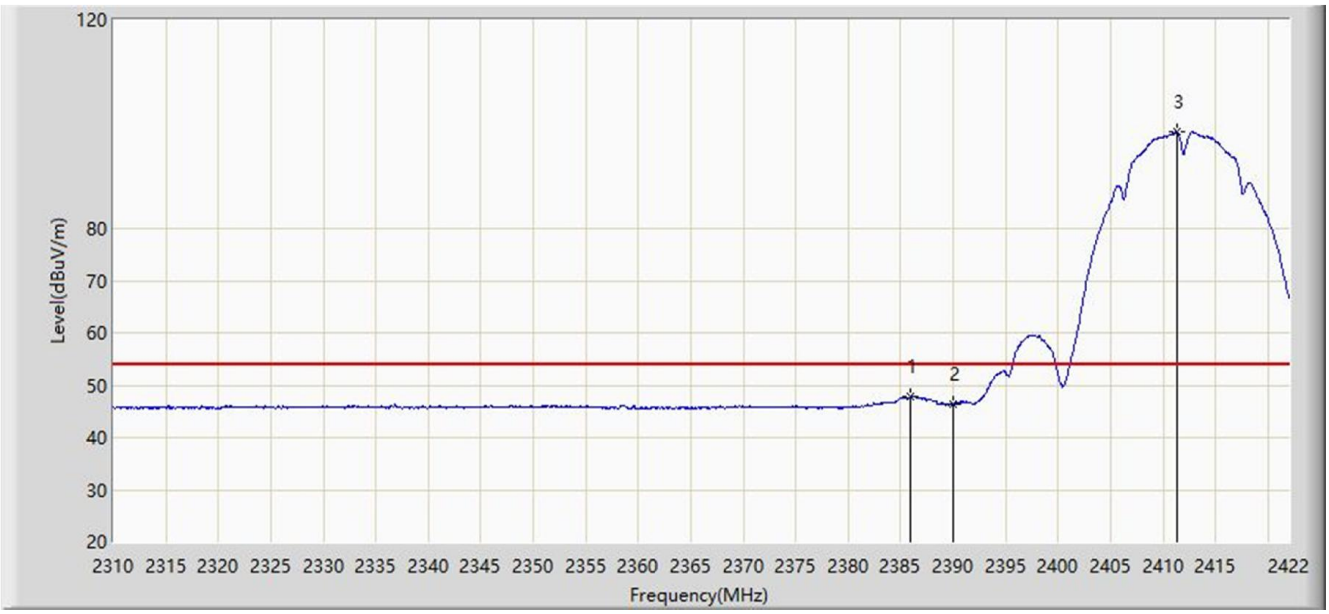


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2387.168	58.788	26.208	-15.212	74.000	32.579	PK
2			2390.000	57.224	24.649	-16.776	74.000	32.575	PK
3		*	2410.632	101.748	69.198	N/A	N/A	32.549	PK

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2018/12/19 - 01:31
Limit: FCC_Part15.209_RE(3m)	Engineer: Stone Jia
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: SINAMICS G120 Smart Access	Power: DC 15V
Test Mode: Transmit by 802.11b at Channel 2412MHz	

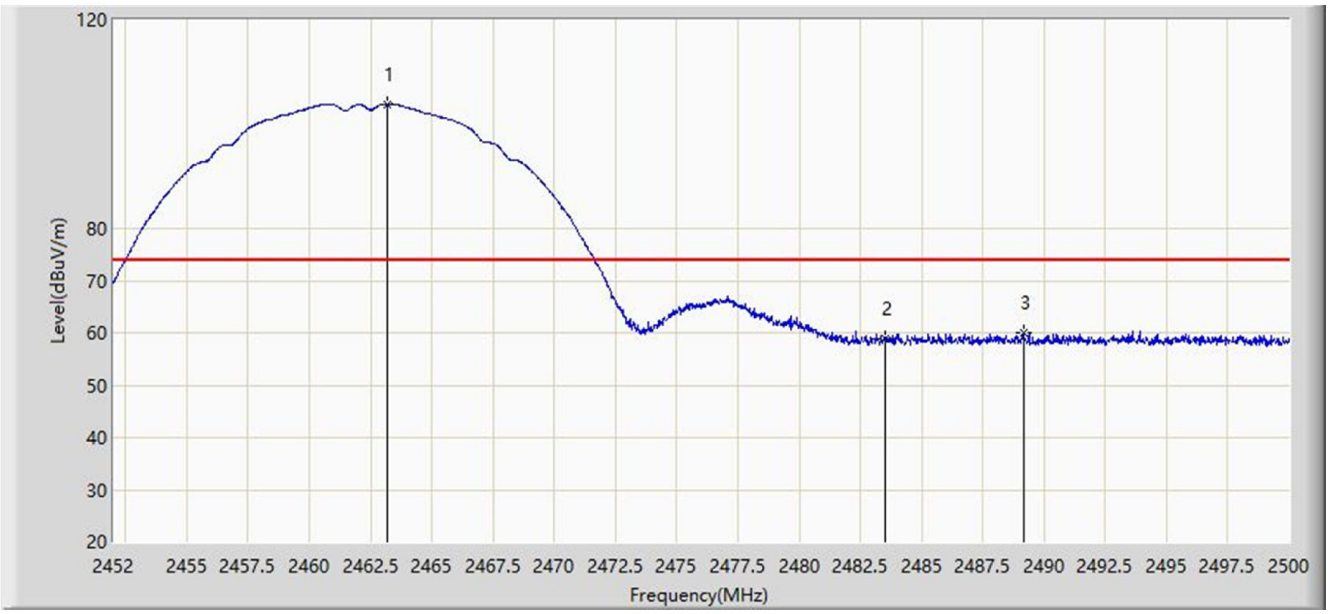


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2385.992	47.814	15.232	-6.186	54.000	32.581	AV
2			2390.000	46.408	13.833	-7.592	54.000	32.575	AV
3		*	2411.304	98.483	65.934	N/A	N/A	32.549	AV

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2018/12/19 - 02:18
Limit: FCC_Part15.209_RE(3m)	Engineer: Stone Jia
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: SINAMICS G120 Smart Access	Power: DC 15V
Test Mode: Transmit by 802.11b at Channel 2462MHz	

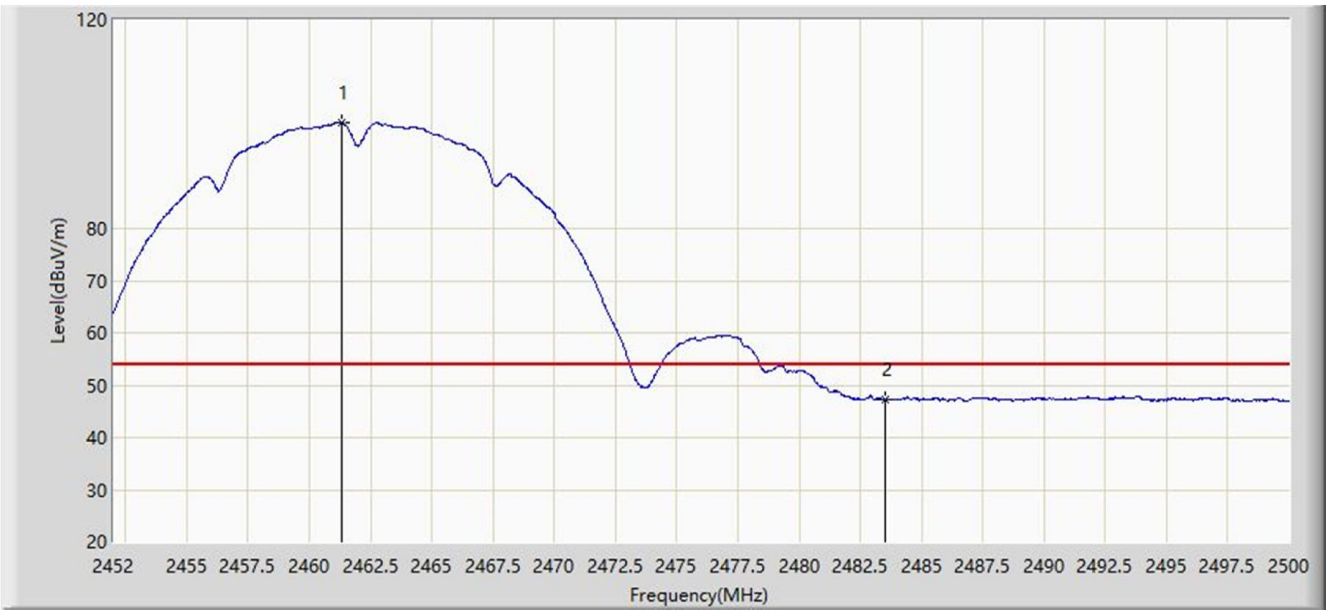


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2463.184	103.810	71.268	N/A	N/A	32.542	PK
2			2483.500	58.780	26.184	-15.220	74.000	32.596	PK
3			2489.152	59.922	27.312	-14.078	74.000	32.610	PK

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2018/12/19 - 02:21
Limit: FCC_Part15.209_RE(3m)	Engineer: Stone Jia
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: SINAMICS G120 Smart Access	Power: DC 15V
Test Mode: Transmit by 802.11b at Channel 2462MHz	

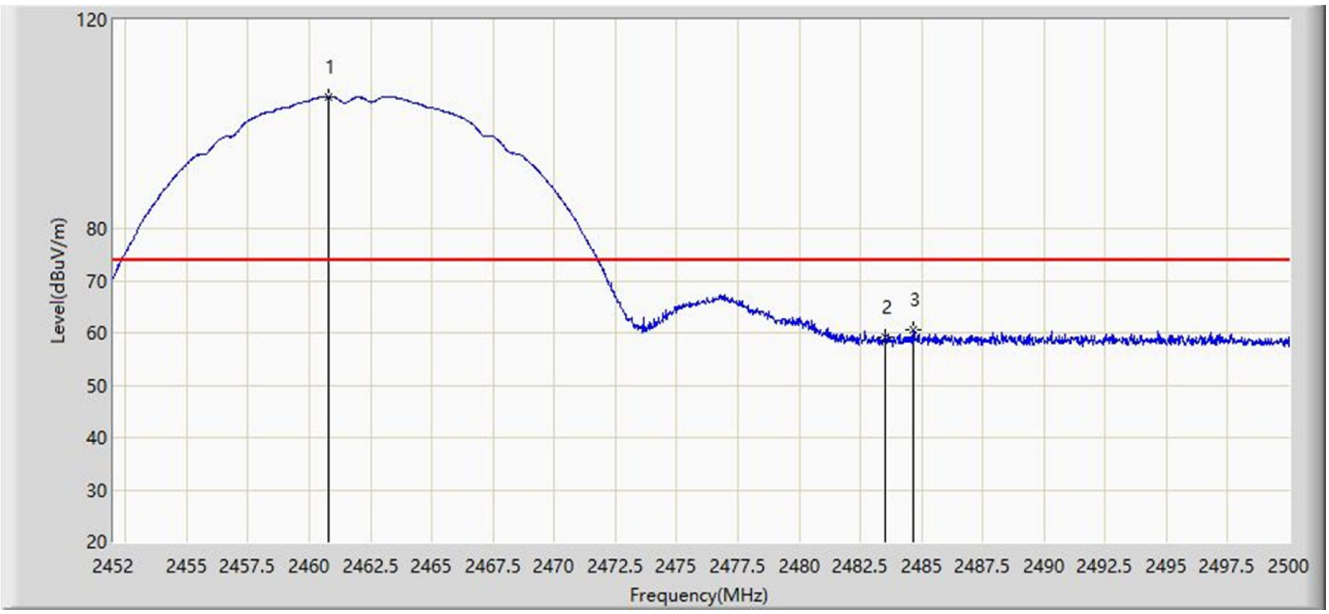


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2461.312	100.328	67.789	N/A	N/A	32.539	AV
2			2483.500	47.191	14.595	-6.809	54.000	32.596	AV

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2018/12/19 - 02:22
Limit: FCC_Part15.209_RE(3m)	Engineer: Stone Jia
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: SINAMICS G120 Smart Access	Power: DC 15V
Test Mode: Transmit by 802.11b at Channel 2462MHz	

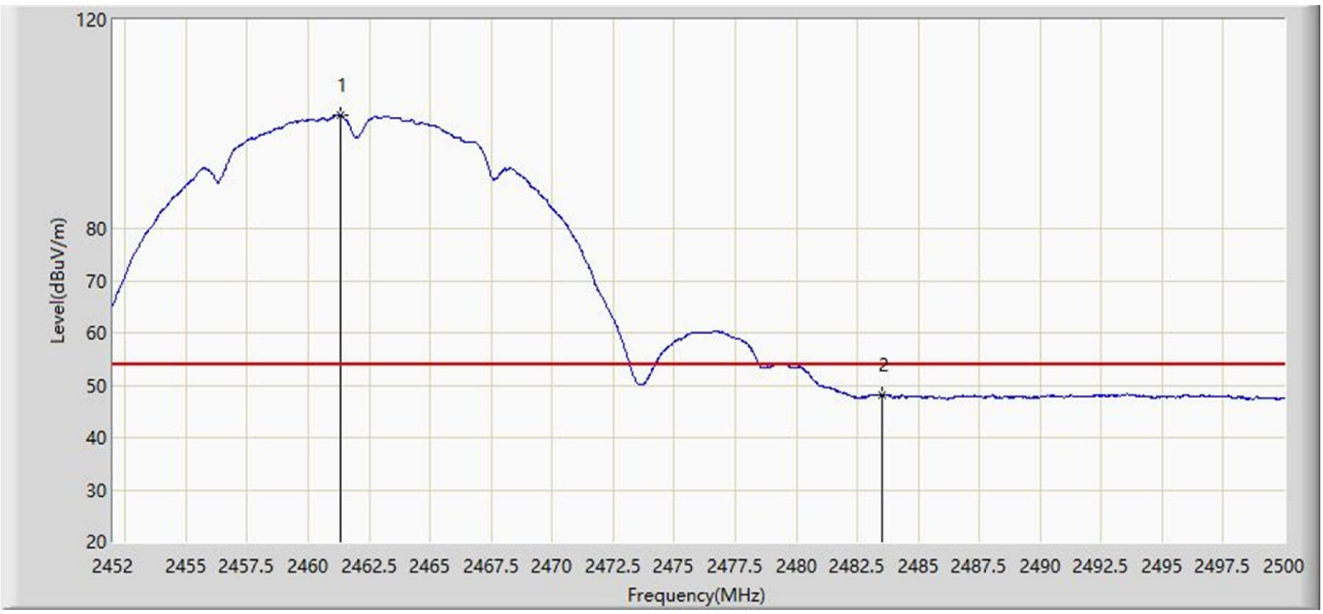


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2460.784	105.253	72.715	N/A	N/A	32.537	PK
2			2483.500	59.008	26.412	-14.992	74.000	32.596	PK
3			2484.688	60.565	27.966	-13.435	74.000	32.599	PK

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2018/12/19 - 02:23
Limit: FCC_Part15.209_RE(3m)	Engineer: Stone Jia
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: SINAMICS G120 Smart Access	Power: DC 15V
Test Mode: Transmit by 802.11b at Channel 2462MHz	

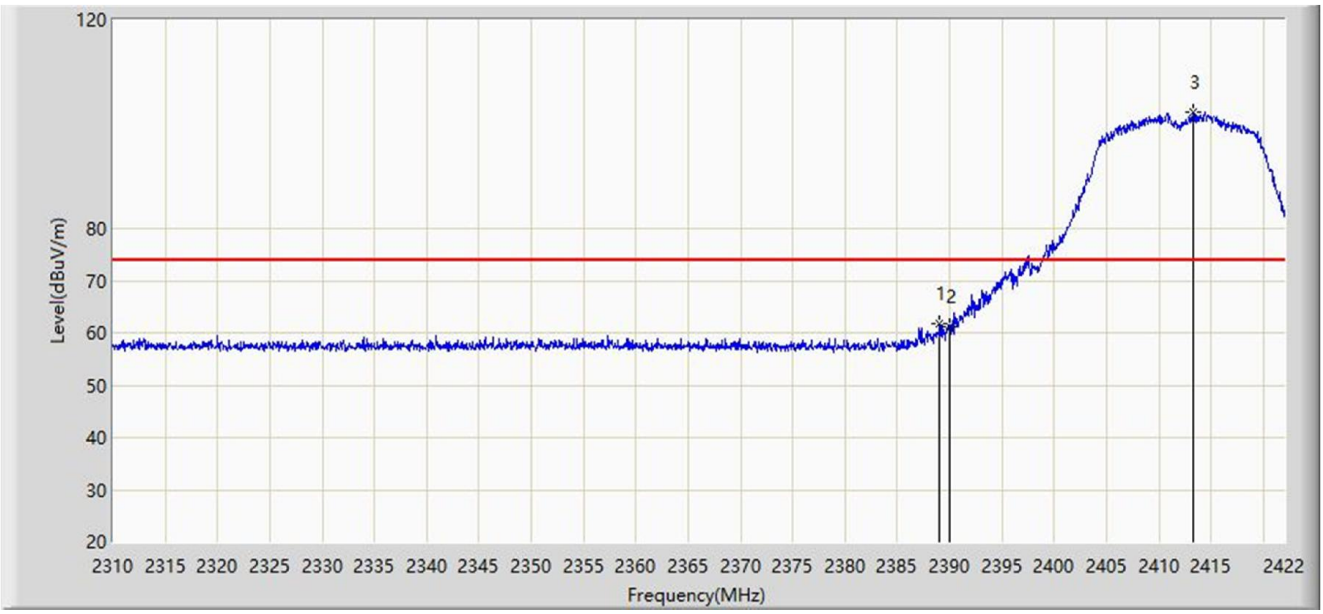


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2461.312	101.845	69.306	N/A	N/A	32.539	AV
2			2483.500	48.208	15.612	-5.792	54.000	32.596	AV

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2018/12/19 - 02:24
Limit: FCC_Part15.209_RE(3m)	Engineer: Stone Jia
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: SINAMICS G120 Smart Access	Power: DC 15V
Test Mode: Transmit by 802.11g at Channel 2412MHz	

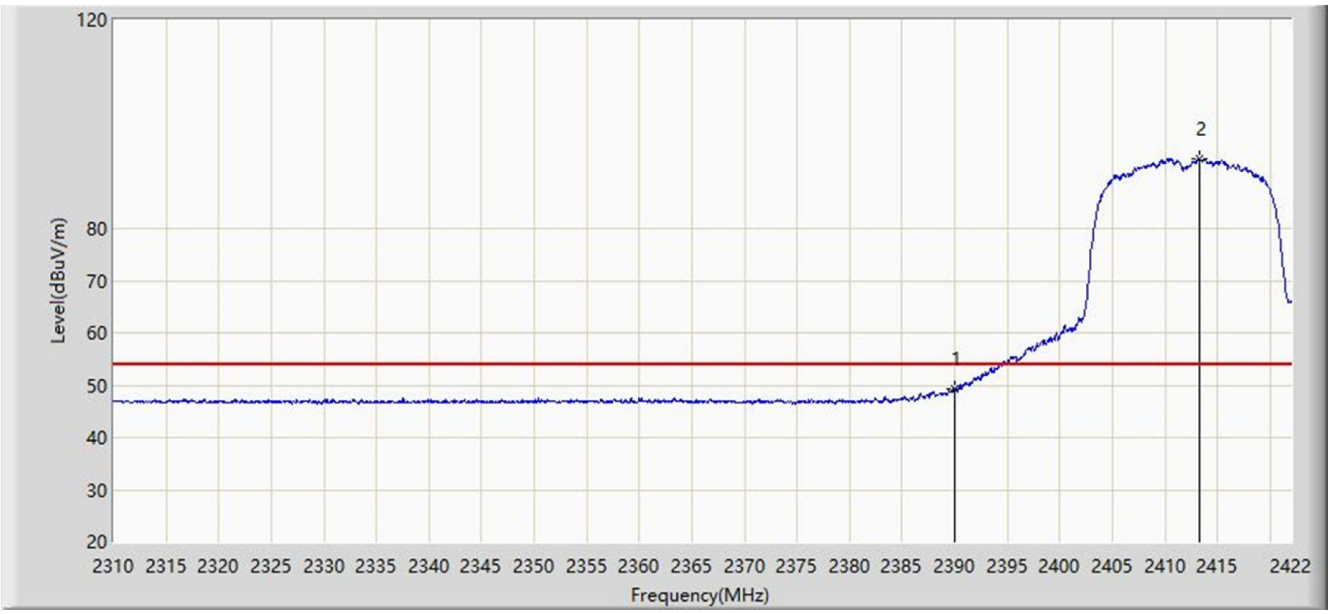


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2389.072	61.716	29.140	-12.284	74.000	32.576	PK
2			2390.000	61.218	28.643	-12.782	74.000	32.575	PK
3		*	2413.320	102.332	69.786	N/A	N/A	32.546	PK

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2018/12/19 - 02:27
Limit: FCC_Part15.209_RE(3m)	Engineer: Stone Jia
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: SINAMICS G120 Smart Access	Power: DC 15V
Test Mode: Transmit by 802.11g at Channel 2412MHz	

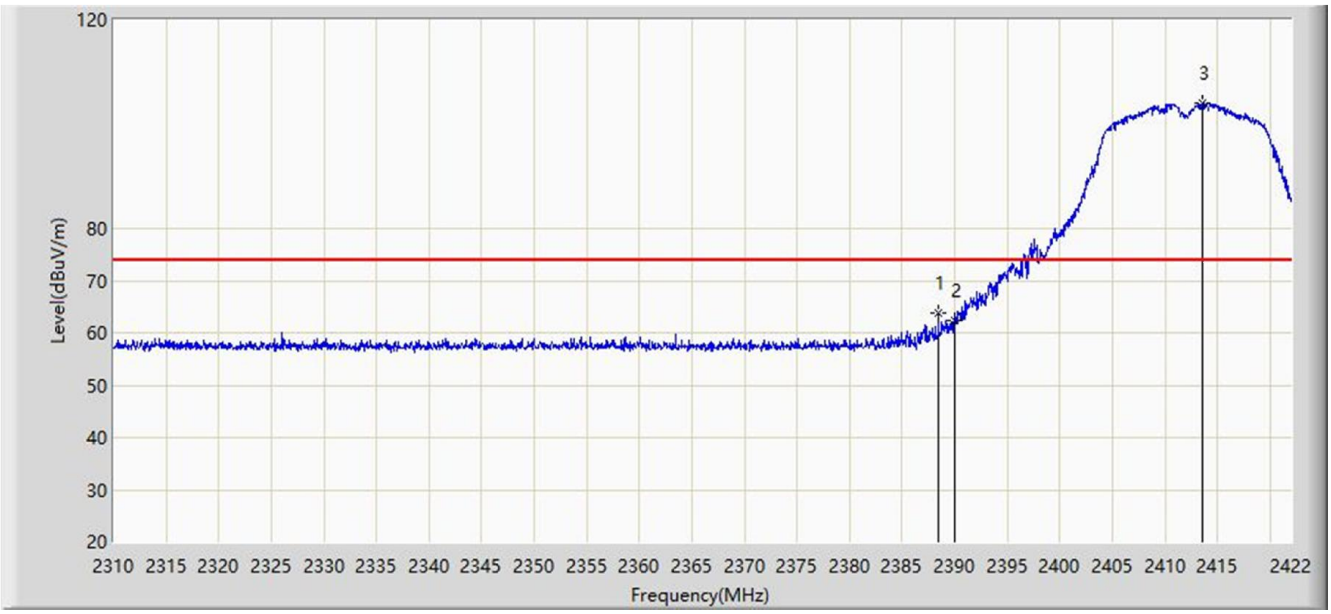


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2390.000	49.242	16.667	-4.758	54.000	32.575	AV
2		*	2413.320	93.467	60.921	N/A	N/A	32.546	AV

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2018/12/19 - 02:30
Limit: FCC_Part15.209_RE(3m)	Engineer: Stone Jia
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: SINAMICS G120 Smart Access	Power: DC 15V
Test Mode: Transmit by 802.11g at Channel 2412MHz	

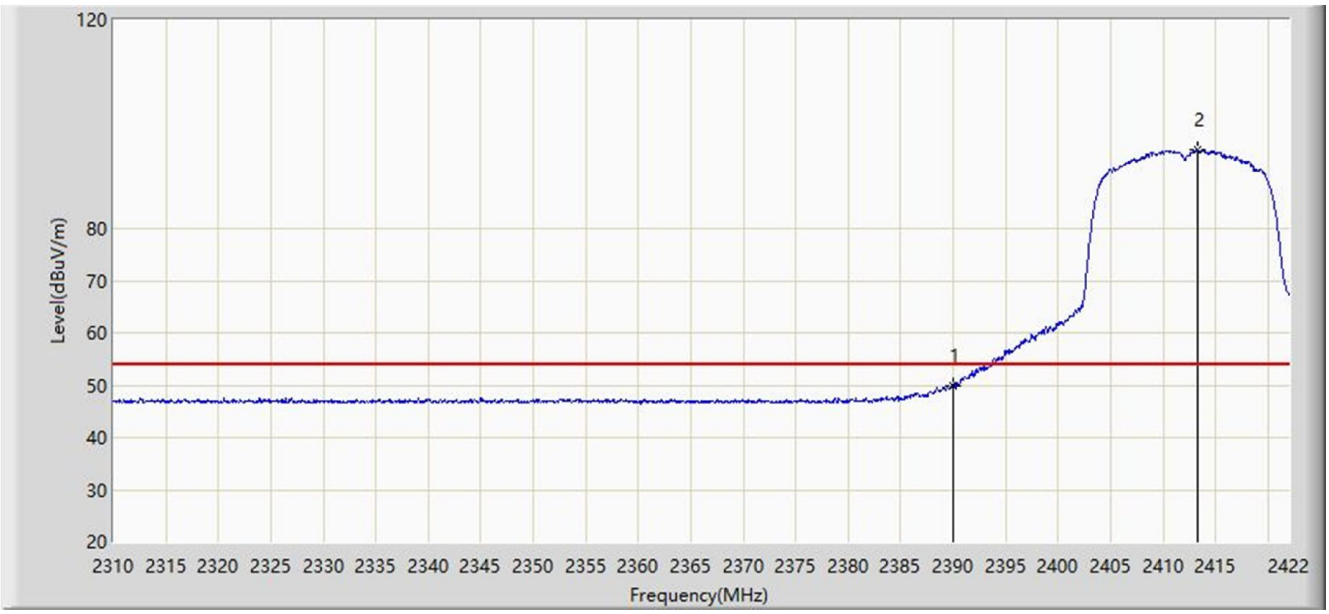


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2388.456	63.863	31.286	-10.137	74.000	32.577	PK
2			2390.000	62.298	29.723	-11.702	74.000	32.575	PK
3		*	2413.600	104.195	71.649	N/A	N/A	32.546	PK

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2018/12/19 - 02:31
Limit: FCC_Part15.209_RE(3m)	Engineer: Stone Jia
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: SINAMICS G120 Smart Access	Power: DC 15V
Test Mode: Transmit by 802.11g at Channel 2412MHz	

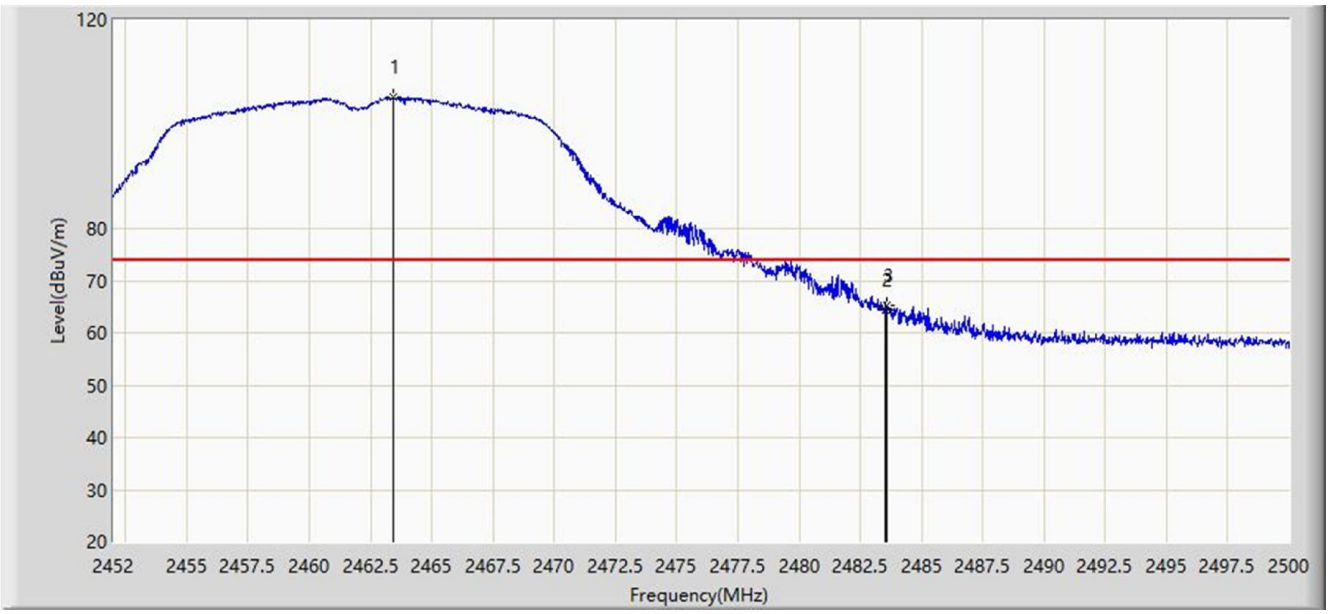


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2390.000	49.982	17.407	-4.018	54.000	32.575	AV
2		*	2413.264	95.018	62.472	N/A	N/A	32.546	AV

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2018/12/19 - 02:32
Limit: FCC_Part15.209_RE(3m)	Engineer: Stone Jia
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: SINAMICS G120 Smart Access	Power: DC 15V
Test Mode: Transmit by 802.11g at Channel 2462MHz	

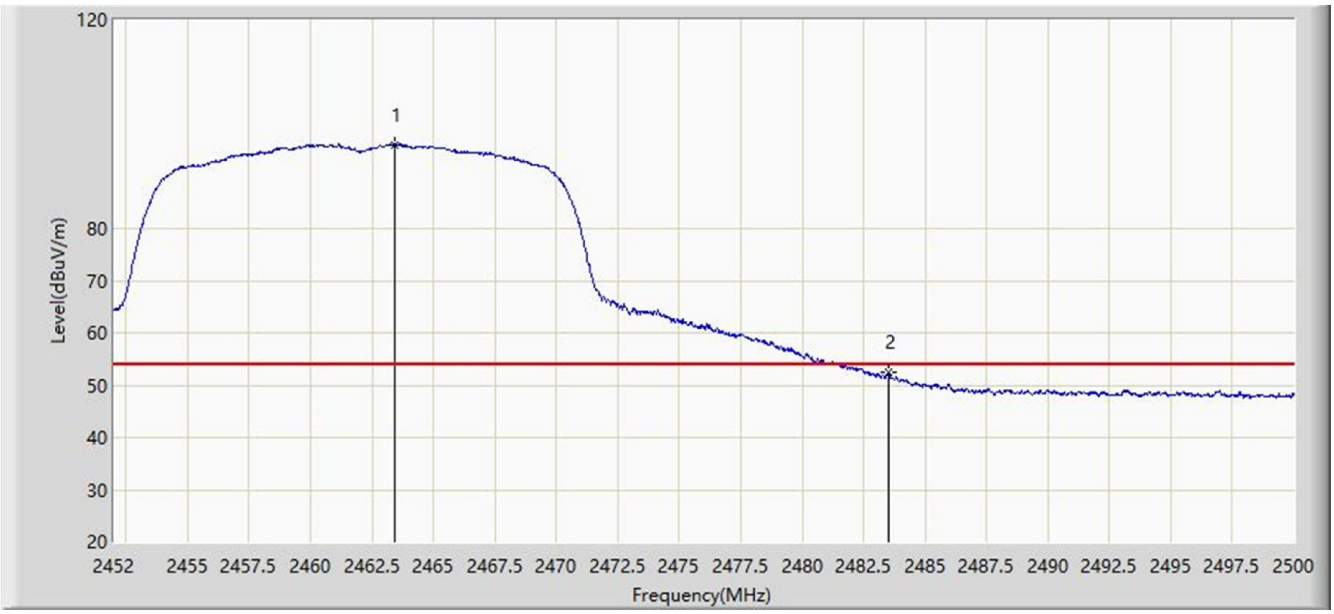


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2463.448	105.282	72.739	N/A	N/A	32.543	PK
2			2483.500	64.226	31.630	-9.774	74.000	32.596	PK
3			2483.560	65.296	32.700	-8.704	74.000	32.596	PK

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2018/12/19 - 02:35
Limit: FCC_Part15.209_RE(3m)	Engineer: Stone Jia
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: SINAMICS G120 Smart Access	Power: DC 15V
Test Mode: Transmit by 802.11g at Channel 2462MHz	

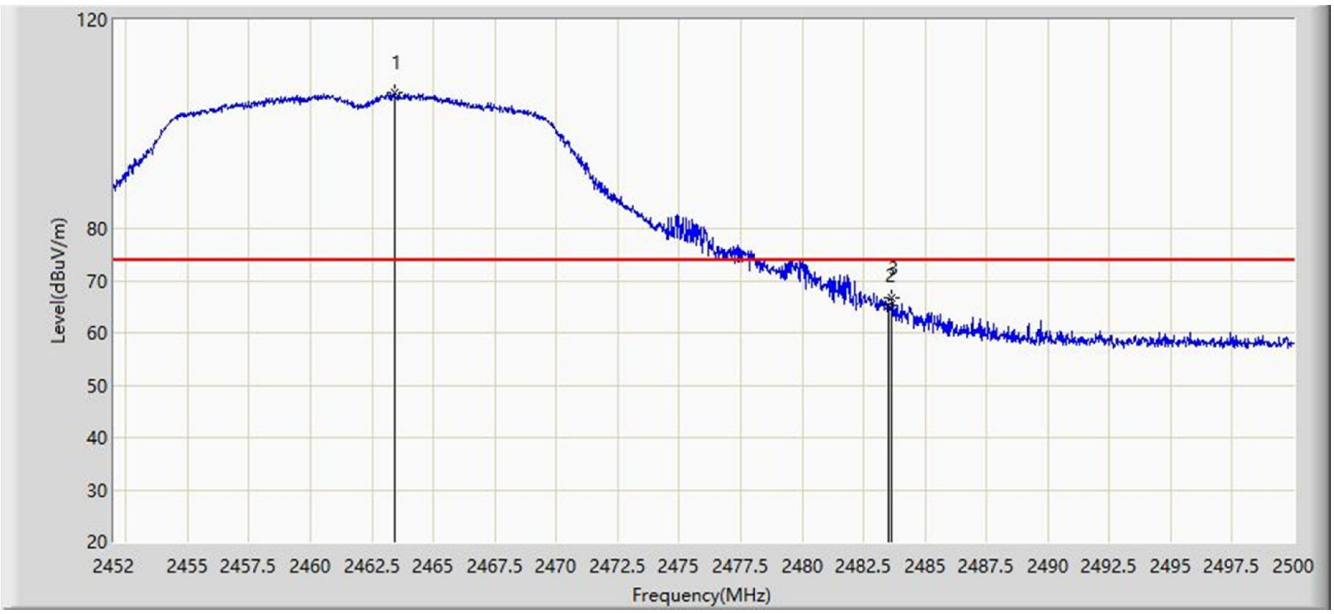


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2463.400	96.084	63.541	N/A	N/A	32.543	AV
2			2483.500	52.325	19.729	-1.675	54.000	32.596	AV

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2018/12/19 - 02:35
Limit: FCC_Part15.209_RE(3m)	Engineer: Stone Jia
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: SINAMICS G120 Smart Access	Power: DC 15V
Test Mode: Transmit by 802.11g at Channel 2462MHz	

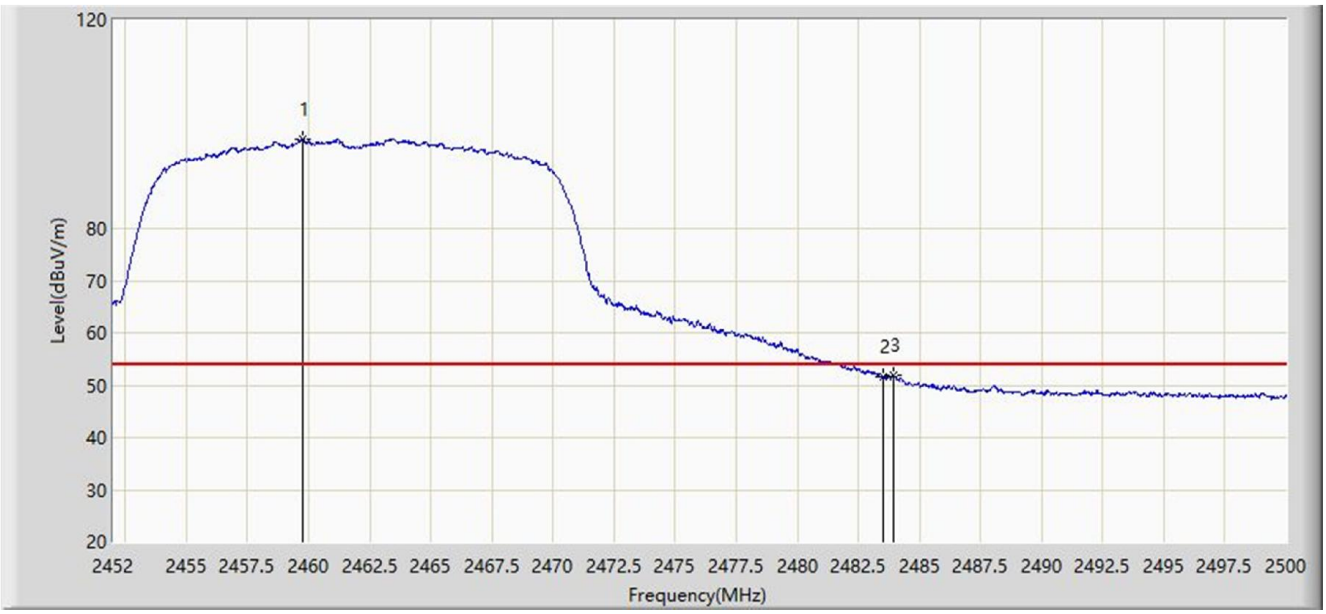


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2463.400	106.104	73.561	N/A	N/A	32.543	PK
2			2483.500	65.212	32.616	-8.788	74.000	32.596	PK
3			2483.656	66.808	34.212	-7.192	74.000	32.596	PK

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: AC1	Time: 2018/12/19 - 02:36
Limit: FCC_Part15.209_RE(3m)	Engineer: Stone Jia
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: SINAMICS G120 Smart Access	Power: DC 15V
Test Mode: Transmit by 802.11g at Channel 2462MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2459.776	97.198	64.663	N/A	N/A	32.535	AV
2			2483.500	51.450	18.854	-2.550	54.000	32.596	AV
3			2483.920	51.840	19.243	-2.160	54.000	32.596	AV

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

7.8. AC Conducted Emissions Measurement

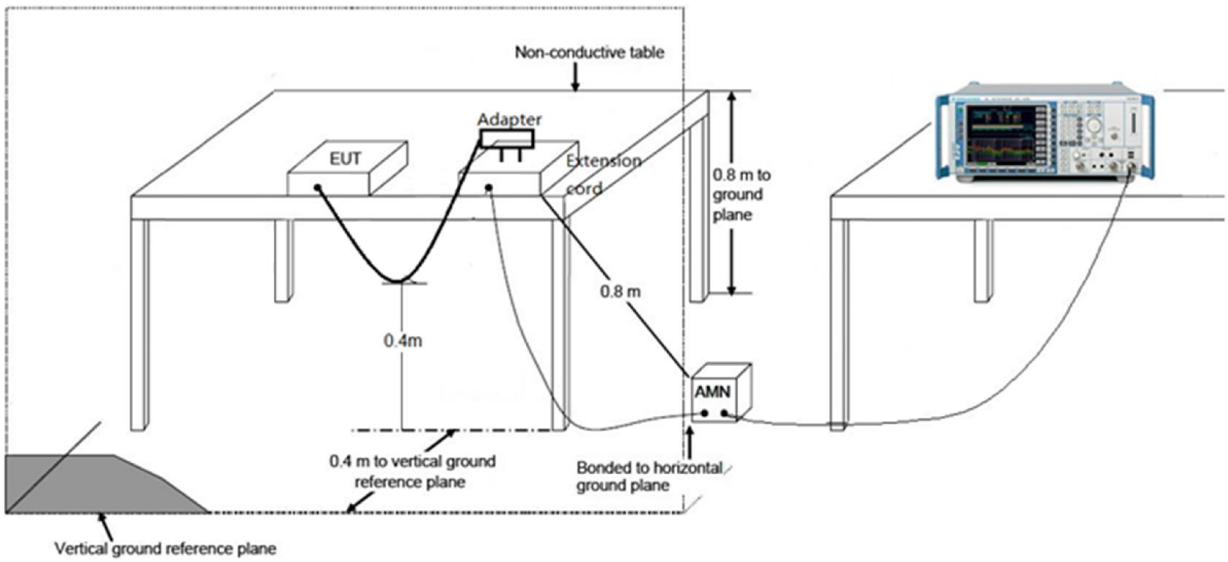
7.8.1.Test Limit

FCC Part 15 Subpart C Paragraph 15.207 Limits		
Frequency (MHz)	QP (dBuV)	AV (dBuV)
0.15 - 0.50	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30	60	50

Note 1: The lower limit shall apply at the transition frequencies.

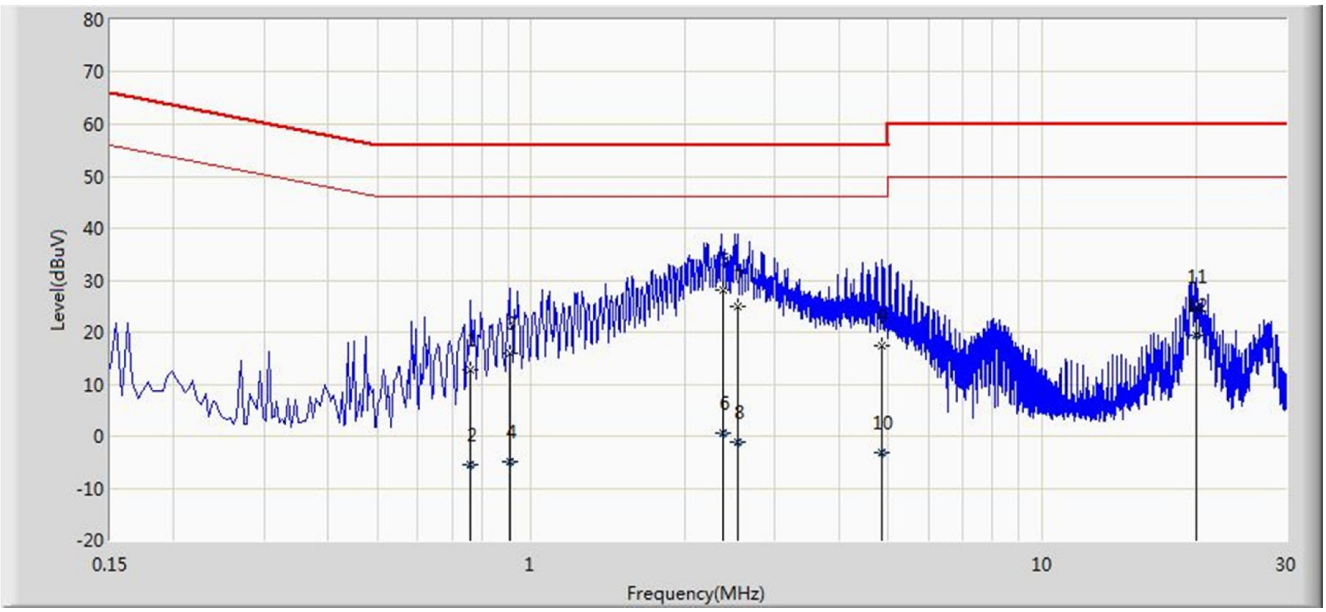
Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.

7.8.2.Test Setup



7.8.3.Test Result

Site: SR2	Time: 2018/12/22 - 13:12
Limit: FCC_Part15.207_CE_AC Power	Engineer: Lewis Huang
Probe: ENV216_101683_Filter On	Polarity: Line
EUT: SINAMICS G120 Smart Access	Power: AC 120V/60Hz
Test Mode 1	

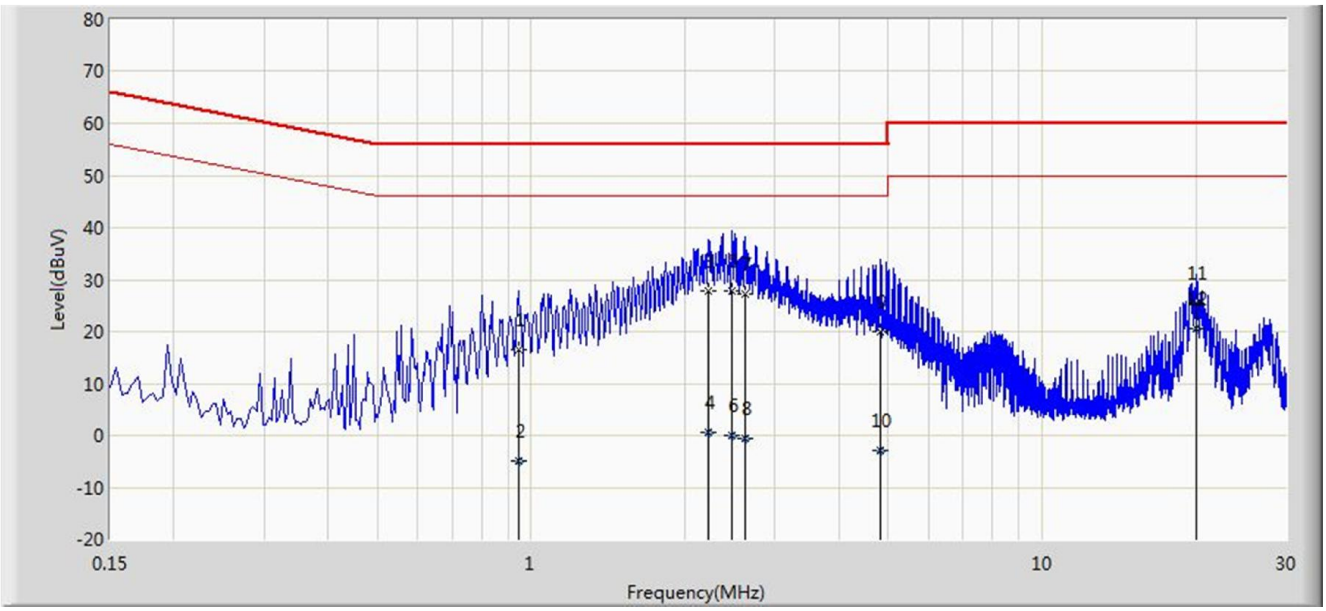


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1			0.762	12.729	2.698	-43.271	56.000	10.031	QP
2			0.762	-5.570	-15.601	-51.570	46.000	10.031	AV
3			0.906	16.034	6.077	-39.966	56.000	9.957	QP
4			0.906	-5.015	-14.972	-51.015	46.000	9.957	AV
5			2.367	28.061	18.200	-27.939	56.000	9.862	QP
6		*	2.367	0.561	-9.300	-45.439	46.000	9.862	AV
7			2.534	24.853	14.998	-31.147	56.000	9.856	QP
8			2.534	-1.172	-11.028	-47.172	46.000	9.856	AV
9			4.866	17.395	7.369	-38.605	56.000	10.026	QP
10			4.866	-3.230	-13.256	-49.230	46.000	10.026	AV
11			20.074	24.810	14.671	-35.190	60.000	10.139	QP
12			20.074	19.510	9.371	-30.490	50.000	10.139	AV

Note: Measure Level (dBμV) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + LISN Factor (dB)

Site: SR2	Time: 2018/12/22 - 13:19
Limit: FCC_Part15.207_CE_AC Power	Engineer: Lewis Huang
Probe: ENV216_101683_Filter On	Polarity: Neutral
EUT: SINAMICS G120 Smart Access	Power: AC 120V/60Hz
Test Mode 1	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1			0.946	16.537	6.598	-39.463	56.000	9.938	QP
2			0.946	-4.863	-14.801	-50.863	46.000	9.938	AV
3			2.226	27.888	18.020	-28.112	56.000	9.868	QP
4			2.226	0.464	-9.404	-45.536	46.000	9.868	AV
5			2.474	27.799	17.938	-28.201	56.000	9.861	QP
6		*	2.474	0.080	-9.781	-45.920	46.000	9.861	AV
7			2.618	27.138	17.281	-28.862	56.000	9.857	QP
8			2.618	-0.467	-10.324	-46.467	46.000	9.857	AV
9			4.822	19.875	9.839	-36.125	56.000	10.035	QP
10			4.822	-2.904	-12.939	-48.904	46.000	10.035	AV
11			20.002	25.460	15.290	-34.540	60.000	10.170	QP
12			20.002	20.681	10.511	-29.319	50.000	10.170	AV

Note: Measure Level (dBμV) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + LISN Factor (dB)

8. CONCLUSION

The data collected relate only the item(s) tested and show that the device is in compliance with Part 15C of the FCC Rules.

The End

Appendix A – Test Setup Photograph

Refer to “1812WSU005-UT” file.

Appendix B – EUT Photograph

Refer to “1812WSU005-UE” file.