NTS Silicon Valley
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Radio Test Report

FCC Part 90.217
(450 MHz to 470 MHz)

Models: VNS2200, VNS2210 and WPRP-1

COMPANY:	Visiplex 1287 Barclay Blvd Buffalo, IL 60089
TEST SITE(S):	National Technical Systems - Silicon Valley 41039 Boyce Road. Fremont, CA. 94538-2435
REPORT DATE:	June 6, 2016
RE-ISSUED:	July 27, 2016
FINAL TEST DATES:	May 5, 17 and 18, 2016
TOTAL NUMBER OF PAGES:	28

PROGRAM MGR /
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A2LA ACCREDITED
Testing Cert #0214.26

REVISION HISTORY

Rev#	Date	Comments	Modified By
-	June 6, 2016	First release	
1	July 20, 2016	Corrected notes on page 18 and 19. Added note about bandwidth measurements on page 20 and note about modulation on page 22, updated antenna gain info on pages 6 and 18. Added model numbers.	dwb
2	July 27, 2016	Corrected typographical error on page 27	dwb

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SCOPE

Tests have been performed on the Visiplex model VNS2200, VNS2210 and WPRP-1, pursuant to the relevant requirements of the following standard(s) in order to obtain device certification against the regulatory requirements of the Federal Communications Commission and Innovation Science and Economic Development Canada.

- Code of Federal Regulations (CFR) Title 47 Part 2
- CFR 47 Part 90 (Private Land Mobile Radio Service)

Conducted and radiated emissions data has been collected, reduced, and analyzed within this report in accordance with measurement guidelines set forth in the following reference standards and as outlined in National Technical Systems - Silicon Valley test procedures:

ANSI C63.4:2014
ANSI TIA-603-D June 2010

The intentional radiator above has been tested in a simulated typical installation to demonstrate compliance with the relevant Innovation Science and Economic Development Canada performance and procedural standards.

Every practical effort was made to perform an impartial test using appropriate test equipment of known calibration. All pertinent factors have been applied to reach the determination of compliance.

The test results recorded herein are based on a single type test of the Visiplex model VNS2200 and therefore apply only to the tested samples. The samples were selected and prepared by Ben Agam of Visiplex.

OBJECTIVE

The primary objective of the manufacturer is compliance with the regulations outlined in the previous section.

Prior to marketing in the USA, the device requires certification. Prior to marketing in Canada, Class I transmitters, receivers and transceivers require certification.

Certification is a procedure where the manufacturer submits test data and technical information to a certification body and receives a certificate or grant of equipment authorization upon successful completion of the certification body's review of the submitted documents. Once the equipment authorization has been obtained, the label indicating compliance must be attached to all identical units, which are subsequently manufactured.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product which may result in increased emissions should be checked to ensure compliance has been maintained (i.e., printed circuit board layout changes, different line filter, different power supply, harnessing or I/O cable changes, etc.).

STATEMENT OF COMPLIANCE

The tested samples of Visiplex model VNS2200, VNS2210 and WPRP-1 complied with the requirements of the standards and frequency bands declared in the scope of this test report.

Maintenance of compliance is the responsibility of the manufacturer. Any modifications to the product should be assessed to determine their potential impact on the compliance status of the device with respect to the standards detailed in this test report.

DEVIATIONS FROM THE STANDARDS

No deviations were made from the published requirements listed in the scope of this report.

TEST RESULTS

FCC Part 90

FCC		Description	Measured	Limit	Result
Transmitter Modulation, output power and other characteristics					
§2.1033 (c) (5) § 90.35		Frequency range(s)	450 – 470 MHz	450 – 470 MHz	Pass
§2.1033 (c) (6) §2.1033 (c) (7) § 2.1046 § 90.217		RF power output at the antenna terminals	18.2 dBm	20.8 dBm	Pass
§2.1033 (c) (4) § 2.1047 § 90.210		Emission types	F1D, F3E, F7W		
		Emission mask	> 30dBc at edge of mask		Pass
§ 2.1049 § 90.209		Occupied Bandwidth	4.99 kHz, 7.87 kHz, 10.3 kHz	11.25 kHz	Pass
Transmitter spurious emissions					
§ 2.1051 § 2.1057		At the antenna terminals	> -30dBc @ > 25 kHz	All > -30 dBc	Pass
Other details					
§ 2.1055 § 90.213		Frequency stability	0.6 ppm	None, only used for Mask	Pass
§ 2.1093		RF Exposure	Refer to MPE calculations in separate exhibit, and User Manual statements.	Refer to OET 65 and FCC Part 1	Pass
§2.1033 (c) (8)		Final radio frequency amplifying circuit's dc voltages and currents for normal operation over the power range	5V, 65mA	None	-
-	-	Antenna Gain	2.5 or 3.0 dB stated	None	-
Notes					

EXTREME CONDITIONS

Frequency stability is determined over extremes of temperature and voltage. The extremes of voltage were 85 to 115 percent of the nominal value.

The extremes of temperature were -30°C to +50°C as specified in FCC §2.1055(a)(1).

MEASUREMENT UNCERTAINTIES

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2) and were calculated in accordance with NAMAS document NIS 81 and M3003.

Measurement Type	Measurement Unit	Frequency Range	Expanded Uncertainty
RF frequency	Hz	25 to 7,000 MHz	1.7×10^{-7}
RF power, conducted	dBm	25 to 7,000 MHz	± 0.52 dB
Conducted emission of transmitter	dBm	25 to 40,000 MHz	± 0.7 dB
Conducted emission of receiver	dBm	25 to 40,000 MHz	± 0.7 dB
Radiated emission (substitution method)	dBm	25 to 40,000 MHz	± 2.5 dB
Radiated emission (field strength)	dBμV/m	25 to 1,000 MHz 1 to 40 GHz	± 3.6 dB ± 6.0 dB

EQUIPMENT UNDER TEST (EUT) DETAILS

GENERAL

The Visiplex models VNS2200, VNS2210 and WPRP-1 are wireless paging controllers (receiver/transceiver) designed to receive wireless commands and activate wired devices connected to its port terminals such as PA speakers, strobe lights, intercom station and a controlled relay output. Since the EUT would normally be wall mounted, the EUT was treated as tabletop equipment during testing to simulate the end-user environment. The electrical rating of the EUT is 12 Volts DC, 5 Amps. The AC adapter provided is rated 100-240 Volts, 50-60 Hz, 1.8 Amps.

The sample was received on May 5, 2016 and tested on May 5, 17 and 18, 2016. The following samples of the EUT were tested:

Company	Model	Description	Serial Number	FCC ID
Visiplex	VNS22xx	Wireless Paging Controller	None	2AAFWVNS22XX
Visiplex	VNS22xx	Wireless Paging Controller	None	2AAFWVNS22XX
Visiplex	VNS22xx	Wireless Paging Controller	None	2AAFWVNS22XX
Powertron Electronics	PA1060-120T1A500	AC Adapter	B20151100035026	-

OTHER EUT DETAILS

The following EUT details should be noted: the VNS22xx can drive one or two attached public address speakers for pre-recorded audio alerts or live voice announcements and control one or two strobe light fixtures to provide high impact visual alerts. There are no changes to the radio between the models. VNS2200 is a weather resistant version of the VNS2210. Model WPRP-1 performs slightly different function with fewer connections.

ENCLOSURE

The EUT enclosure is primarily constructed of plastic. It measures approximately 19 cm wide by 7.6 cm deep by 11.4 cm high.

MODIFICATIONS

No modifications were made to the EUT during the time the product was at National Technical Systems - Silicon Valley.

SUPPORT EQUIPMENT

The following equipment was used as remote support equipment for emissions testing:

Company	Model	Description	Serial Number	FCC ID
VISIPLEX	CT-104	Remote Control	94220149	2AAFWCT10X

EUT INTERFACE PORTS

The I/O cabling configuration during testing was as follows:

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Power	AC Adapter	2 wire	Unshielded	2
AC Adpater input	AC Mains	3 wire	Unshielded	2

EUT OPERATION

During radio testing the EUT was transmitting continuously on the programmed frequency with either digital or analog modulation at maximum power.

TESTING

GENERAL INFORMATION

Antenna port measurements were taken at the National Technical Systems - Silicon Valley test site located at 41039 Boyce Road, Fremont, CA 94538-2435.

Radiated spurious emissions measurements were taken at the National Technical Systems - Silicon Valley Anechoic Chambers and/or Open Area Test Site(s) listed below. The sites conform to the requirements of ANSI C63.4: 2003 *American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz* and CISPR 16-1-4:2007 - *Specification for radio disturbance and immunity measuring apparatus and methods Part 1-4: Radio disturbance and immunity measuring apparatus Ancillary equipment Radiated disturbances*. They are on file with the FCC and Innovation Science and Economic Development Canada.

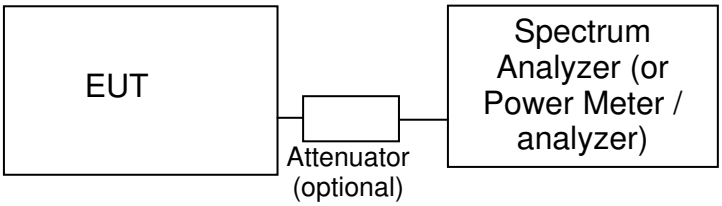
Site	Designation / Registration Numbers		Location
	FCC	Canada	
Chamber 4	US0027	IC 2845B-4	41039 Boyce Road Fremont, CA 94538-2435

In the case of Open Area Test Sites, ambient levels are at least 6 dB below the specification limits with the exception of predictable local TV, radio, and mobile communications traffic.

Considerable engineering effort has been expended to ensure that the facilities conform to all pertinent requirements.

RF PORT MEASUREMENT PROCEDURES

Conducted measurements are performed with the EUT's rf input/output connected to the input of a spectrum analyzer, power meter or modulation analyzer. When required an attenuator, filter and/or dc block is placed between the EUT and the spectrum analyzer to avoid overloading the front end of the measurement device. Measurements are corrected for the insertion loss of the attenuators and cables inserted between the rf port of the EUT and the measurement equipment.



Test Configuration for Antenna Port Measurements

For devices with an integral antenna the output power and spurious emissions are measured as a field strength at a test distance of (typically) 3m and then converted to an eirp using a substitution measurement. All other measurements are made as detailed below but with the test equipment connected to a measurement antenna directed at the EUT.

OUTPUT POWER

Output power is measured using a power meter and an average sensor head, a spectrum analyzer or a power meter and peak power sensor head as required by the relevant rule part(s). Where necessary measurements are gated to ensure power is only measured over periods that the device is transmitting.

Power measurements made directly on the rf power port are, when appropriate, converted to an EIRP by adding the gain of the highest gain antenna that can be used with the device under test, as specified by the manufacturer.

BANDWIDTH MEASUREMENTS

The 6dB, 20dB and/or 26dB signal bandwidth is measured in using the bandwidths recommended by ANSI C63.4. When required, the 99% bandwidth is measured using the methods detailed in RSS-GEN. The measurement bandwidth is set to be at least 1% of the instrument's frequency span.

CONDUCTED SPURIOUS EMISSIONS

Initial scans are made using a peak detector (RBW=VBW) and using scan rates to ensure that the EUT transmits before the sweep moves out of each resolution bandwidth (for transmit mode measurements). Where the limits are expressed as an average power the spectrum analyzer is tunes to that frequency with a narrow span (wide enough to capture the emission and its sidebands) and the resolution and video bandwidths are adjusted as required by the reference measurement standards. For transmitter measurements the appropriate detector (average, peak, normal ,sample, quasi-peak) is used when making measurements for licensed devices. For receiver conducted spurious measurements the detector is set to peak.

TRANSMITTER MASK MEASUREMENTS

The transmitter mask measurements are made using resolution bandwidths as specified in the pertinent rule part(s). Where narrower bandwidths are used the measurement is corrected to account for the reduced bandwidth by either using the adjacent channel power function of the spectrum analyzer to sum the power across the required measurement bandwidth. The frequency span of the analyzer is set to ensure the fundamental signal and all significant sidebands are displayed.

The top of the mask may be set by the total output power of the signal, the power of the unmodulated signal or the peak value of the signal in the reference bandwidth being used for the mask measurement.

FREQUENCY STABILITY

The EUT is placed inside a temperature chamber with all support and test equipment located outside of the chamber. The temperature is varied across the specified frequency range in 10 degree increments with frequency measurements made at each temperature step. The EUT is allowed enough time to stabilize at each temperature variation.

The spectrum analyzer is configured to give a 5- or 6-digit display for the marker-frequency function. The spectrum analyzer's built-in frequency counter is used to measure the maximum deviation of the fundamental frequency at each temperature. Where possible the device is set to transmit an unmodulated signal. Where this is not possible the frequency drift is determined by finding a stable point on the signal (e.g. the null at the centre of an OFDM signal) or by calculating a centre frequency based on the upper and lower XdB points (where X is typically 6dB or 10dB) on the signal’s skirts.

SAMPLE CALCULATIONS

SAMPLE CALCULATIONS - CONDUCTED SPURIOUS EMISSIONS

Measurements are compared directly to the conducted emissions specification limit (decibel form). The calculation is as follows:

$$R_r - S = M$$

where:

R_r = Measured value in dBm
S = Specification Limit in dBm
M = Margin to Specification in +/- dB

Appendix A Test Equipment Calibration Data

Manufacturer	Description	Model	Asset #	Calibrated	Cal Due
Radio Antenna Port (Power and Bandwidth), 05-May-16					
Rohde & Schwarz	Power Meter, Single Channel	NRVS	1290	12/17/2015	12/17/2016
Rohde & Schwarz	Peak Power Sensor 100 uW - 2 Watts (w/ 20 dB pad, SN BJ5155)	NRV-Z32	1536	3/10/2016	3/10/2017
Rohde & Schwarz	Signal Analyzer 20 Hz - 26.5 GHz	FSQ26	2327	5/6/2015	6/6/2016
Radio Antenna Port (Power and Spurious Emissions), 17-May-16					
Agilent Technologies	PSA, Spectrum Analyzer, (installed options, 111, 115, 123, 1DS, B7J, HYX,	E4446A	2139	6/22/2015	6/22/2016
Radio Antenna Port (Power and Spurious Emissions), 18-May-16					
Agilent Technologies	PSA, Spectrum Analyzer, (installed options, 111, 115, 123, 1DS, B7J, HYX,	E4446A	2139	6/22/2015	6/22/2016
Watlow	Temp Chamber (w/ F4 watlow Controller)	96A0	2171	7/14/2015	7/14/2016

Appendix B Test Data

T101482 Pages 16 – 27

Client:	Visiplex, Inc.	Job Number:	JD101398
Product	VNS22xx	T-Log Number:	T101482
System Configuration:	-	Project Manager:	Deepa Shetty
Contact:	Ben Agam	Project Coordinator:	-
Emissions Standard(s):	FCC Part 90.217, Part 15	Class:	N/A
Immunity Standard(s):	-	Environment:	Radio

EMC Test Data

For The

Visiplex, Inc.

Product

VNS22xx

Date of Last Test: 5/17/2016

Client:	Visiplex, Inc.	Job Number:	JD101398
Model:	VNS22xx	T-Log Number:	T101482
		Project Manager:	Deepa Shetty
Contact:	Ben Agam	Project Coordinator:	-
Standard:	FCC Part 90.217, Part 15	Class:	N/A

FCC Part 90.217

Power, Occupied Bandwidth, Frequency Stability and Spurious Emissions

Test Specific Details

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

General Test Configuration

With the exception of the radiated spurious emissions tests, all measurements are made with the EUT's rf port connected to the measurement instrument via an attenuator or dc-block if necessary. All amplitude measurements are adjusted to account for the attenuation between EUT and measuring instrument. For frequency stability measurements the EUT was place inside an environmental chamber.

Radiated measurements are made with the EUT located on a non-conductive table, 3m from the measurement antenna.

Ambient Conditions:

Temperature: 19-20 °C
Rel. Humidity: 30-35 %

Summary of Results

Run #	Spacing		Test Performed	Limit	Pass / Fail	Result / Margin
1	12.5 kHz		Output Power	20.8 dBm	Pass	18.2 dBm
2	12.5 kHz		Spectral Mask	90.217 (-30dBc > 25 kHz from center)	Pass	> 30dBc at edge of mask
3	12.5 kHz		99% or Occupied Bandwidth	11.25 kHz	Pass	10.3 kHz
4	12.5 kHz		Spurious Emissions (conducted)	-30 dBc	Pass	> -30dBc
5	-		Frequency Stability	None, used for Mask	-	0.28 kHz

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

EMC Test Data

Client:	Visiplex, Inc.	Job Number:	JD101398
Model:	VNS22xx	T-Log Number:	T101482
		Project Manager:	Deepa Shetty
Contact:	Ben Agam	Project Coordinator:	-
Standard:	FCC Part 90.217, Part 15	Class:	N/A

Run #1: Output Power

Date of Test: 5/5/2016
Test Engineer: David Bare
Test Location: Fremont EMC Lab #4A

Config. Used: 1
Config Change: No peripherals used
EUT Voltage: 120V/60Hz

Cable Loss:
Cable ID(s): None

Attenuator:
Attenuator IDs: None

Total Loss: 0.0 dB

Power Setting[2]	Frequency (MHz)	Output Power (dBm) [1]	Output Power mW	Antenna Gain (dBi)	Result	EIRP dBm	EIRP W
-	450	18.0	63.1	3.0	Pass	21.0	0.126
-	460	18.2	66.1	3.0	Pass	21.2	0.132
-	469.999	17.2	52.5	3.0	Pass	20.2	0.105

Note 1:	Output power measured using a peak power meter

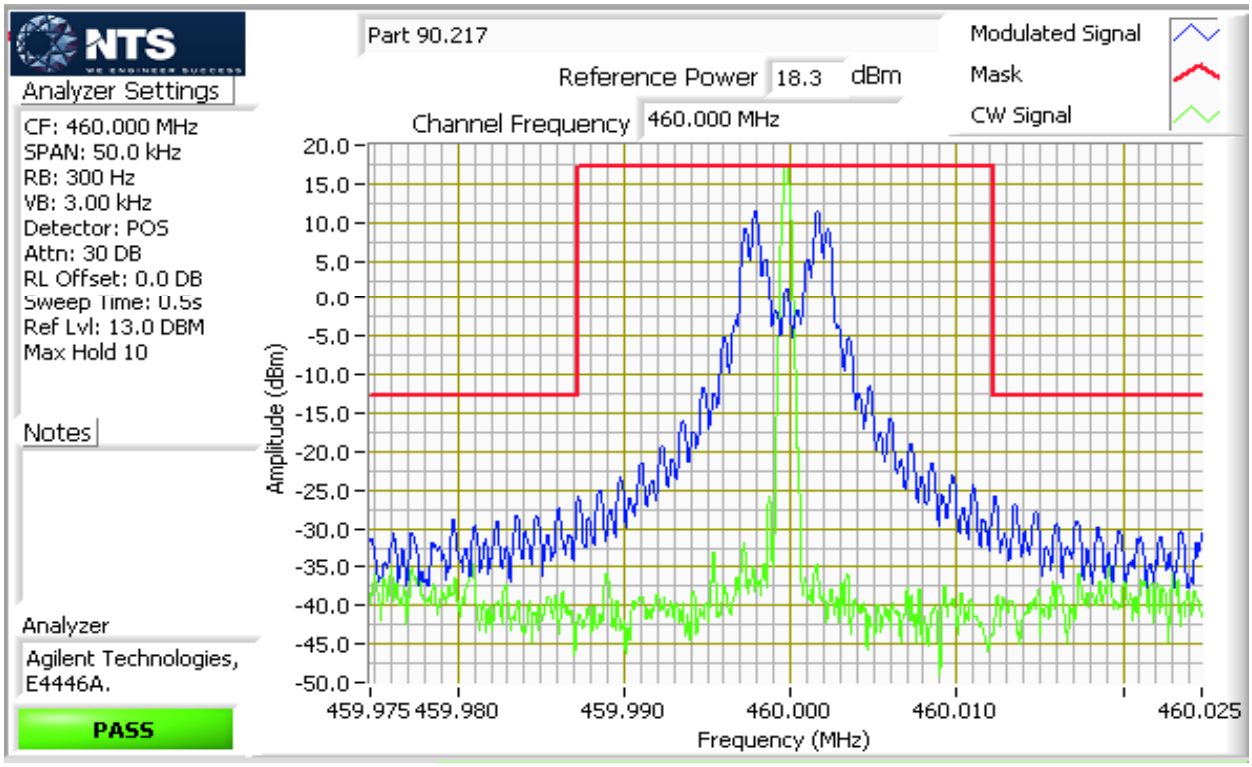
Client:	Visiplex, Inc.	Job Number:	JD101398
Model:	VNS22xx	T-Log Number:	T101482
		Project Manager:	Deepa Shetty
Contact:	Ben Agam	Project Coordinator:	-
Standard:	FCC Part 90.217, Part 15	Class:	N/A

Run #2: Spectral Mask, FCC Part 90.217

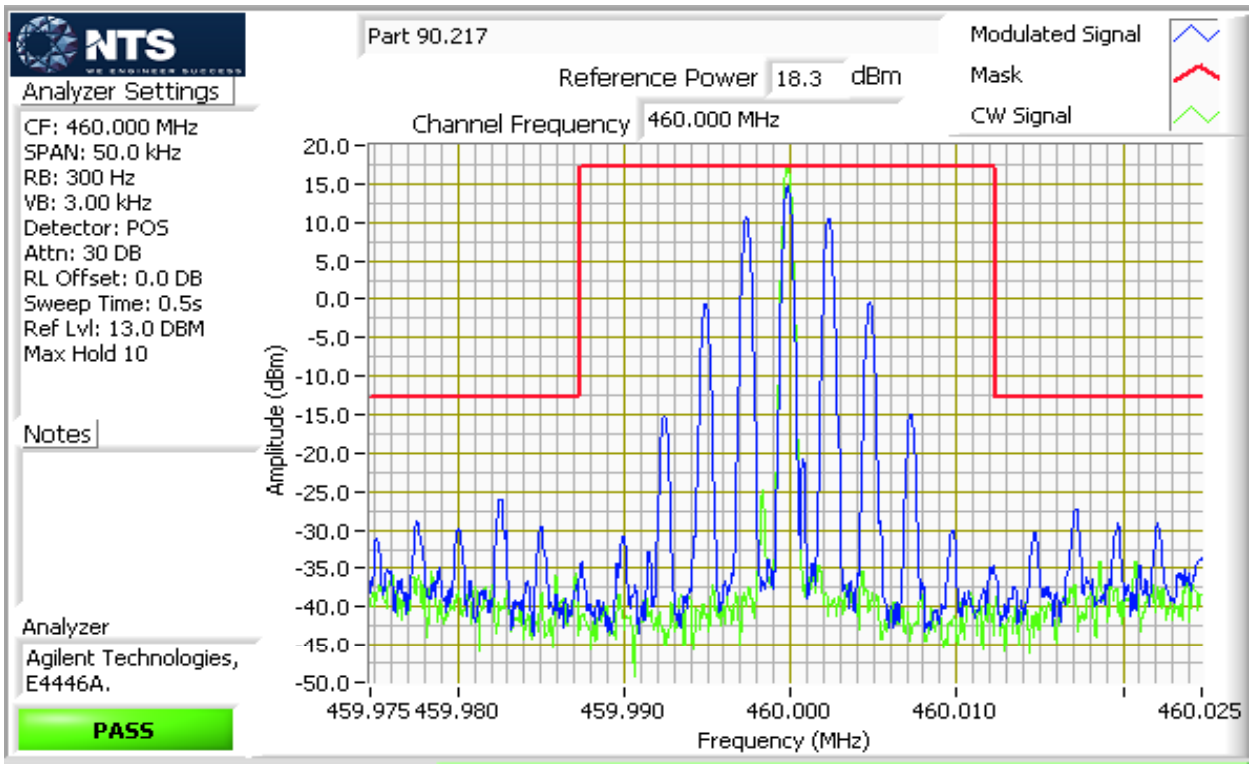
Date of Test: 5/18/2016
Test Engineer: Mehran Birgani
Test Location: Lab #4

Config. Used: 1
Config Change: No peripherals used
EUT Voltage: 120V/60Hz

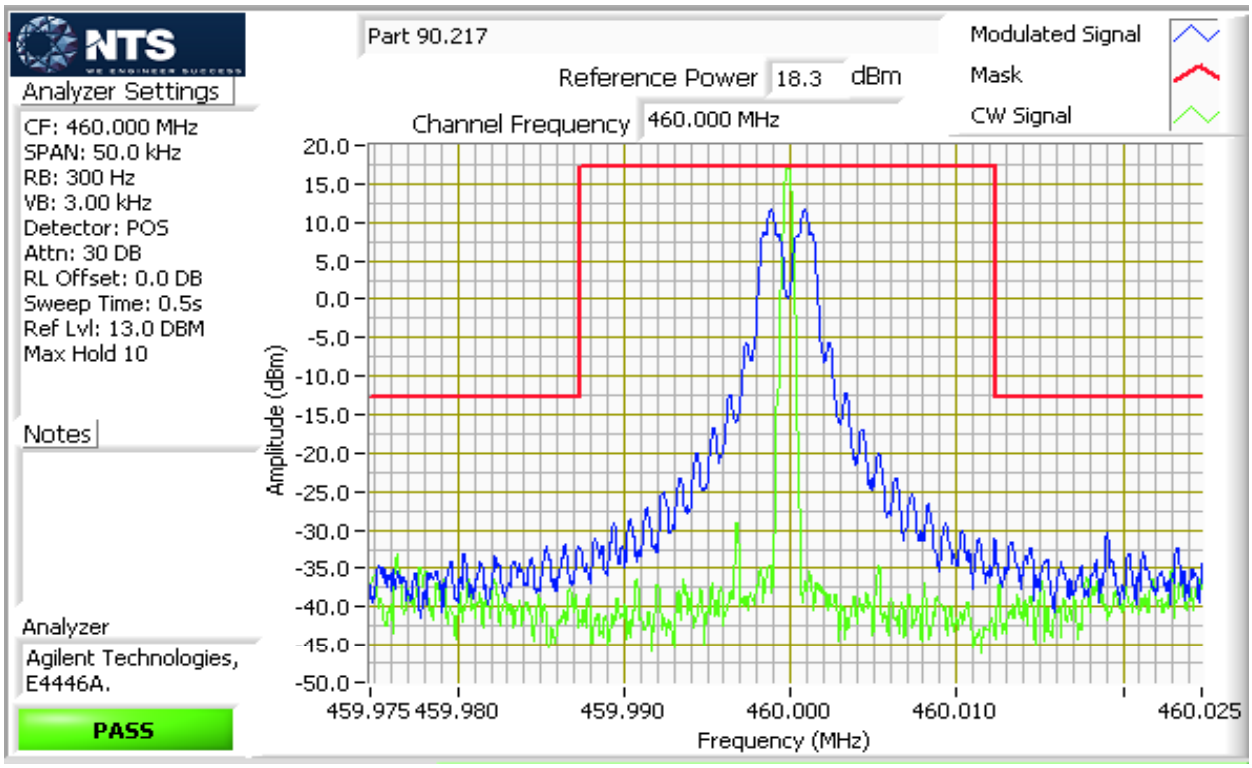
Note 1:	Requirement is -30dBc >25 KHz from the center of the channel but this offset frequency needs to include the frequency stability. Plot taken at the worse case temperature, the product complies with the requirement.



Client:	Visiplex, Inc.	Job Number:	JD101398
Model:	VNS22xx	T-Log Number:	T101482
		Project Manager:	Deepa Shetty
Contact:	Ben Agam	Project Coordinator:	-
Standard:	FCC Part 90.217, Part 15	Class:	N/A



Client:	Visiplex, Inc.	Job Number:	JD101398
Model:	VNS22xx	T-Log Number:	T101482
		Project Manager:	Deepa Shetty
Contact:	Ben Agam	Project Coordinator:	-
Standard:	FCC Part 90.217, Part 15	Class:	N/A



Client:	Visiplex, Inc.	Job Number:	JD101398
Model:	VNS22xx	T-Log Number:	T101482
		Project Manager:	Deepa Shetty
Contact:	Ben Agam	Project Coordinator:	-
Standard:	FCC Part 90.217, Part 15	Class:	N/A

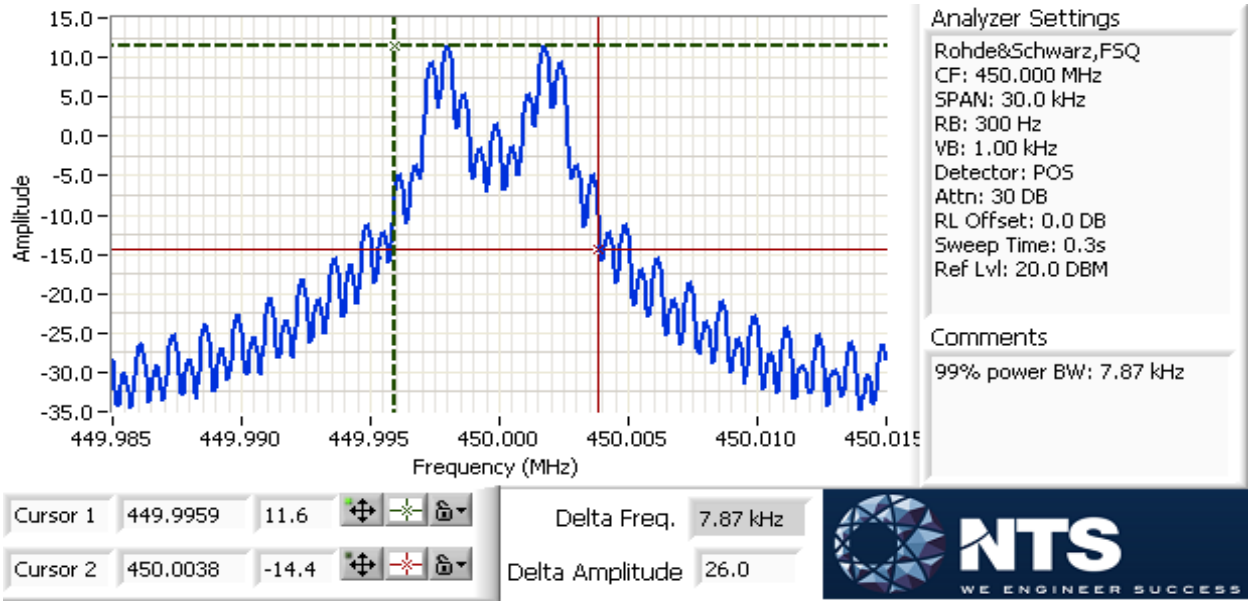
Run #3: Signal Bandwidth

Date of Test: 5/5/2016
Test Engineer: David Bare
Test Location: Fremont EMC Lab #4A

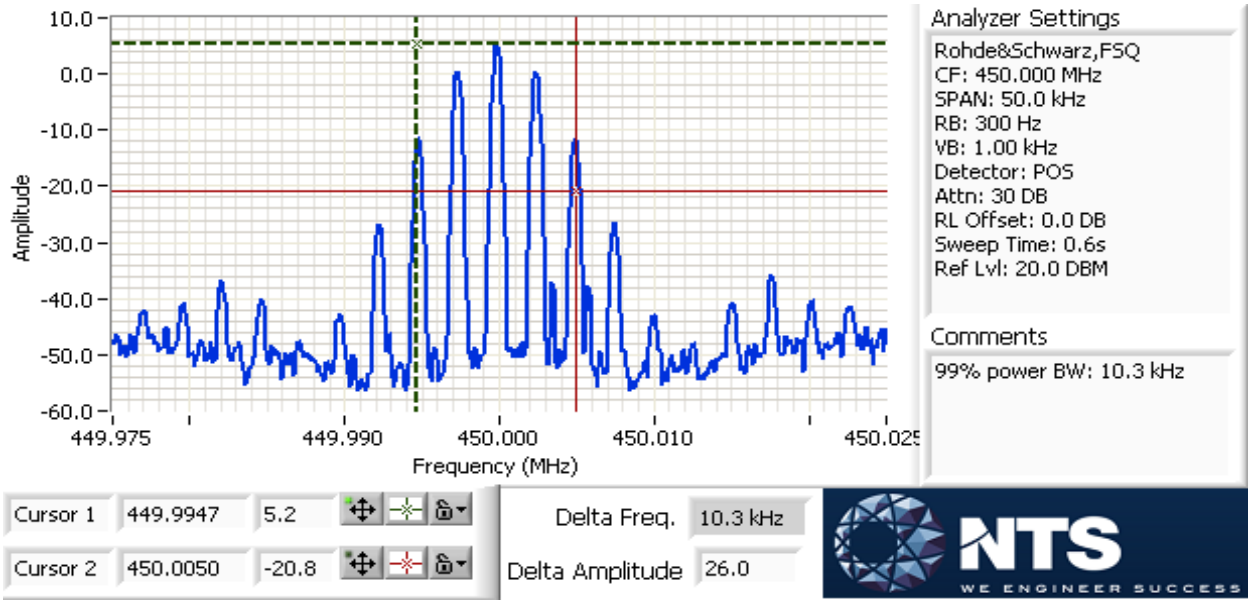
Config. Used: 1
Config Change: No peripherals used
EUT Voltage: 120V/60Hz

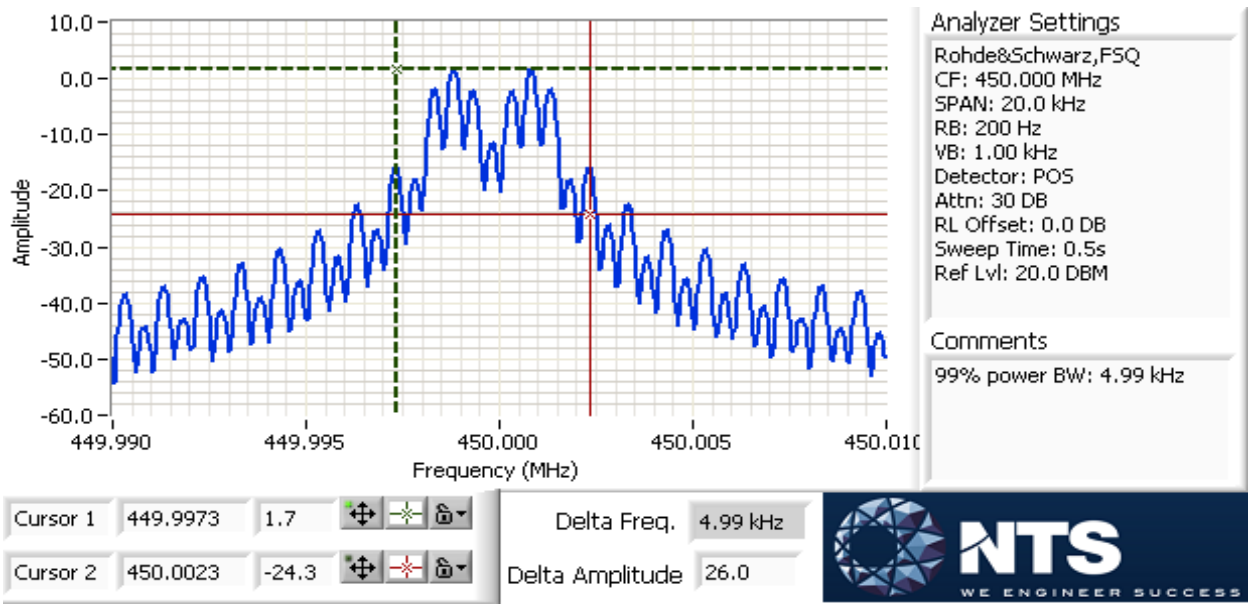
Power Setting	Modulation	Frequency (MHz)	Resolution Bandwidth	Bandwidth (kHz) 99%	
-	Digital	450	300	7.87	F1D
-	Analog	450	300	10.3	F3E
-	Digital/Analog	450	200	4.99	F7W

Note 1:	99% bandwidth measured in accordance with ANSI C63.10, with RB between 1% and 5% of the measured bandwidth and VB ≥ 3*RB and Span ≥ 1.5% and ≤ 5% of measured bandwidth.



Client:	Visiplex, Inc.	Job Number:	JD101398
Model:	VNS22xx	T-Log Number:	T101482
		Project Manager:	Deepa Shetty
Contact:	Ben Agam	Project Coordinator:	-
Standard:	FCC Part 90.217, Part 15	Class:	N/A





Note:	A 10 dB attenuator was used between the device and spectrum analyzer for the 10.3 kHz and 4.99 kHz bandwidth measurements.

Client:	Visiplex, Inc.	Job Number:	JD101398
Model:	VNS22xx	T-Log Number:	T101482
		Project Manager:	Deepa Shetty
Contact:	Ben Agam	Project Coordinator:	-
Standard:	FCC Part 90.217, Part 15	Class:	N/A

Run #4: Out of Band Spurious Emissions, Conducted

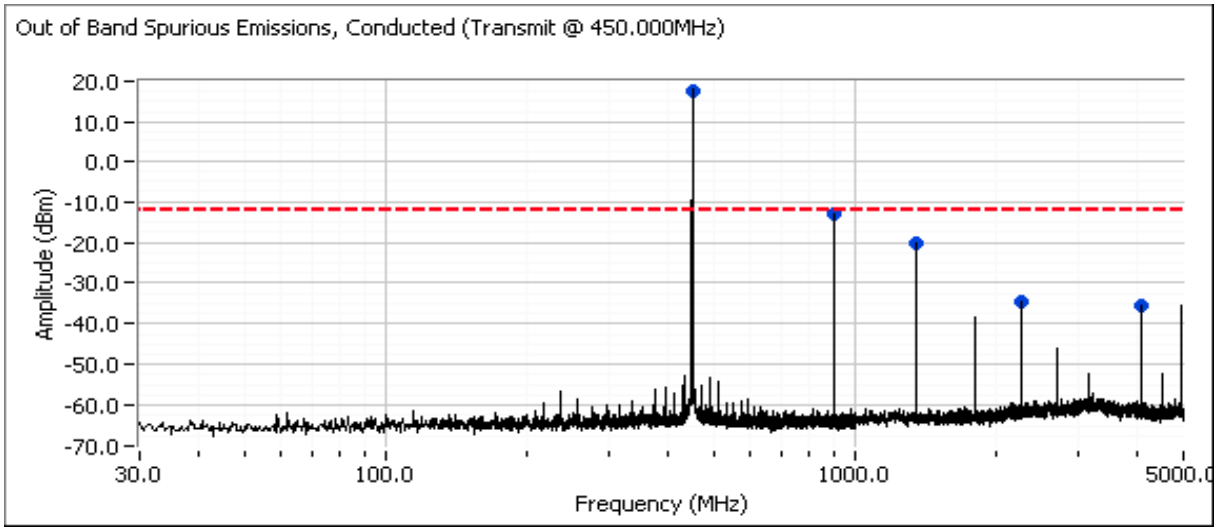
Date of Test: 5/17/2016
Test Engineer: Mehran Birgani
Test Location: Lab #4

Config. Used: 1
Config Change: No peripherals used
EUT Voltage: 120V/60Hz

Frequency (MHz)	Limit	Result
450.000	-30dBc	Pass
460.000	-30dBc	Pass
469.999	-30dBc	Pass

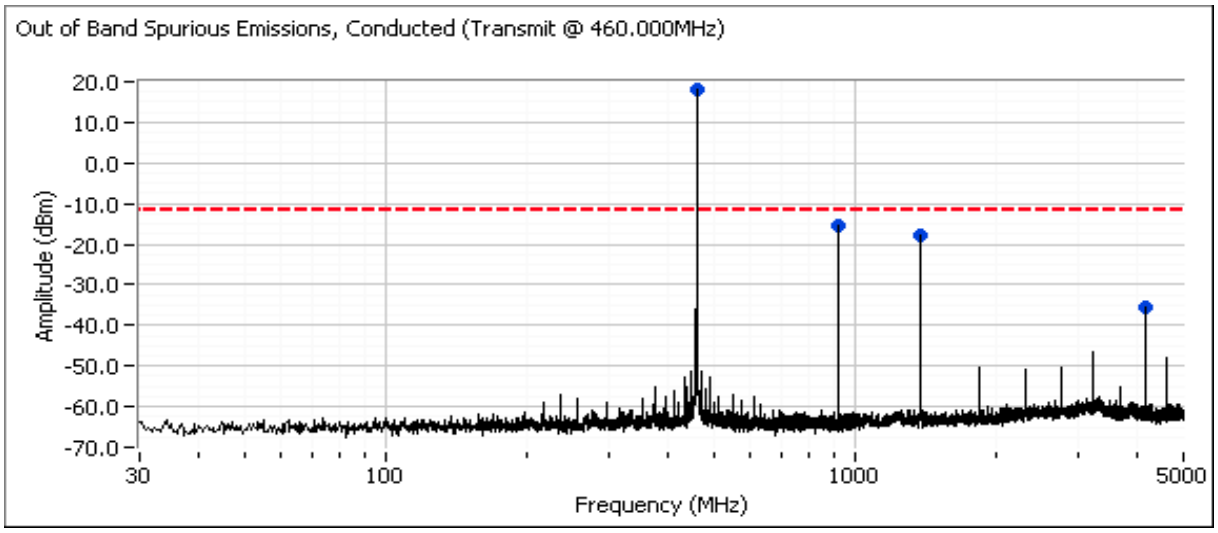
The limit is taken from FCC Part 90.217
EUT operation: unmodulated

Plots for low channel, power setting(s) = max

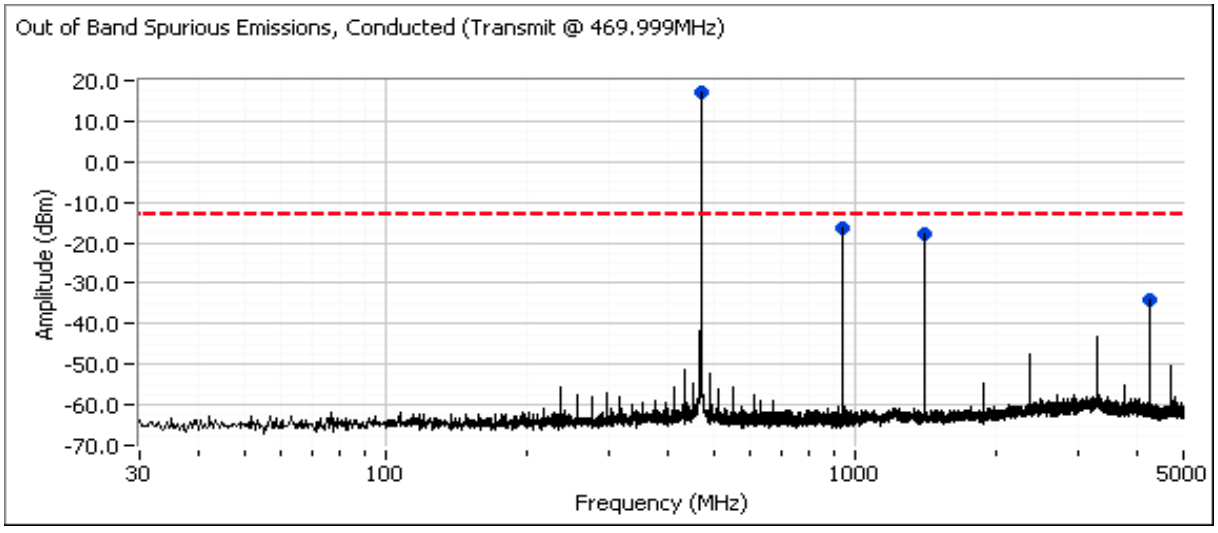


Client:	Visiplex, Inc.	Job Number:	JD101398
Model:	VNS22xx	T-Log Number:	T101482
		Project Manager:	Deepa Shetty
Contact:	Ben Agam	Project Coordinator:	-
Standard:	FCC Part 90.217, Part 15	Class:	N/A

Plots for center channel, power setting(s) = max



Plots for high channel, power setting(s) = max



Client:	Visiplex, Inc.	Job Number:	JD101398
Model:	VNS22xx	T-Log Number:	T101482
		Project Manager:	Deepa Shetty
Contact:	Ben Agam	Project Coordinator:	-
Standard:	FCC Part 90.217, Part 15	Class:	N/A

Results:

Frequency MHz	Level dBm	Port	Limit	Margin	Detector QP/Ave	Comments	Channel
450.000	18.0	RF Port	-	-	Peak	450.000 MHz - Fundamental	Low
900.057	-13.0	RF Port	-12.0	-1.0	Peak	450.000 MHz	Low
1349.450	-20.3	RF Port	-12.0	-8.3	Peak	450.000 MHz	Low
2249.750	-34.7	RF Port	-12.0	-22.7	Peak	450.000 MHz	Low
4050.350	-35.5	RF Port	-12.0	-23.5	Peak	450.000 MHz	Low
459.999	18.2	RF Port	-	-	Peak	460.000 MHz - Fundamental	Center
920.110	-15.2	RF Port	-11.8	-3.4	Peak	460.000 MHz	Center
1380.130	-17.9	RF Port	-11.8	-6.1	Peak	460.000 MHz	Center
4139.710	-35.5	RF Port	-11.8	-23.7	Peak	460.000 MHz	Center
469.999	17.2	RF Port	-	-	Peak	469.999 MHz - Fundamental	High
939.840	-16.5	RF Port	-12.8	-3.7	Peak	469.999 MHz	High
4230.410	-34.0	RF Port	-12.8	-21.2	Peak	469.999 MHz	High
1409.470	-17.7	RF Port	-12.8	-4.9	Peak	469.999 MHz	High

Client:	Visiplex, Inc.	Job Number:	JD101398
Model:	VNS22xx	T-Log Number:	T101482
		Project Manager:	Deepa Shetty
Contact:	Ben Agam	Project Coordinator:	-
Standard:	FCC Part 90.217, Part 15	Class:	N/A

Run #5: Frequency Stability

Date of Test: 5/18/2016
Test Engineer: Mehran Birgani
Test Location: Lab #4

Config. Used: 1
Config Change: No peripherals used
EUT Voltage: 120V/60Hz

Nominal Frequency: 460 MHz

Frequency Stability Over Temperature

The EUT was soaked at each temperature for a minimum of 30 minutes prior to making the measurements to ensure the EUT and chamber had stabilized at that temperature.

Temperature	Frequency Measured	Drift	
(Celsius)	(MHz)	(Hz)	(ppm)
-30	459.999731	-269	-0.6
-20	459.999719	-281	-0.6
-10	459.999890	-110	-0.2
0	459.999947	-53	-0.1
10	459.999924	-76	-0.2
20	459.999850	-150	-0.3
30	459.999940	-60	-0.1
40	459.999845	-155	-0.3
50	459.999780	-220	-0.5
	Worst case:	-281	-0.6

Frequency Stability Over Input Voltage

Nominal Voltage is 120Vac.

Voltage	Frequency Measured	Drift	
(AC)	(MHz)	(Hz)	(ppm)
85%	459.999850	-150	-0.3
115%	459.999850	-150	-0.3
	Worst case:	-150	-0.3

Note 1:	Maximum drift of fundamental frequency before it shut down at 30.4 Vac.

End of Report

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