FCC Test Report

Report No.:	FCC_SL19060603-SLX-017_2.4G
FCC ID:	WUW-22135255
IC:	9613A-22135255
Test Model:	NSC-100
Series Model:	N/A
Received Date:	9/16/2019
Test Date:	9/16/2019 -9/24/2019
Issued Date:	9/30/2019
Applicant:	Viavi Solutions, Inc.
Address:	6001 America Center Drive, 6th Floor, San Jose, CA 95002
Issued By:	Bureau Veritas Consumer Products Services, Inc.
Test Location:	775 Montague Expressway, Milpitas, CA 95035, USA
FCC Test Site Reg No.:	540430
IC Test Site No:	4842D

This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification. The report must not be used by the client to claim product certification, approval, or endorsement by A2LA or any government agencies.

Table of Contents

Release Control Record 3

1 Certificate of Conformity 4

2 Summary of Test Results 5

2.1 Measurement Uncertainty 5
2.2 Modification Record 5

3 General Information 6

3.1 General Description of EUT 6
3.2 Description of Test Modes 7
3.2.1 Test Mode Applicability and Tested Channel Detail 8
3.3 Description of Support Units 10
3.3.1 Configuration of System under Test 10
3.4 General Description of Applied Standards 11

4 Test Types and Results 12

4.1 Radiated Emission Measurement 12
4.1.1 Limits of Radiated Emission Measurement 12
4.1.2 Test Instruments 13
4.1.3 Test Procedures 14
4.1.4 Deviation from Test Standard 15
4.1.5 Test Setup 15
4.1.6 EUT Operating Conditions 17
4.1.7 Test Results 18

5 Pictures of Test Arrangements 23

Appendix – Information on the Testing Laboratories 24

Release Control Record

Issue No.	Description	Date Issued
FCC_SL19060603-SLX-017_2.4G	Original release	09/30/2019

1 Certificate of Conformity

Product:	Network & Service Companion
Brand:	Viavi
Test Model:	NSC-100
Series Model:	N/A
Sample Status:	Engineer Sample
Applicant:	Viavi Solutions, Inc.
Test Date:	9/16/2019 – 9/24/2019
Standards:	47 CFR FCC Part 15, Subpart C (Section 15.247) ANSI C63.10: 2013

The above equipment has been tested by **Bureau Veritas Consumer Products Services, Inc. Milpitas Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by : _____ , **Date:** 09/30/2019

Deon Dai / Test Engineer

Approved by : _____ , **Date:** 09/30/2019

Chen Ge / Engineer Reviewer

2 Summary of Test Results

47 CFR FCC Part 15, Subpart C (Section 15.247)			
FCC Clause	Test Item	Result	Remarks
15.207	AC Power Conducted Emission	PASS	N/A
15.205 / 15.209 / 15.247(d)	Radiated Emissions Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -8.69dB at 750.03MHz.
15.247(d)	Antenna Port Emission	PASS	N/A
15.247(a)(2)	6dB bandwidth	PASS	N/A
15.247(b)	Conducted power	PASS	N/A
15.247(e)	Power Spectral Density	PASS	N/A
15.203	Antenna Requirement	PASS	Antenna connector is U.FL.

Note:

N/A - For details, see original FCC and IC Test report No.: FCC ID: N6C-SXPCEACDB, Test Report No.: ER/2016/20013 / IC: 4908A- SXPCEACDB, Test Report No.: ER/2016/20018

2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150kHz ~ 30MHz	3.51dB
Radiated Emissions up to 1 GHz	30MHz ~ 1GHz	3.73dB
Radiated Emissions above 1 GHz	1GHz ~ 6GHz	4.64dB
	6GHz ~ 18GHz	4.82dB
	18GHz ~ 40GHz	4.91dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	Network & Service Companion
Brand	Viavi
Test Model	NSC-100
Series Model	N/A
Model Difference	N/A
Status of EUT	Engineer Sample
Power Supply Rating	100-240VAC,1.2A, 50-60Hz
Modulation Type	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Modulation Technology	DSSS,OFDM
Transfer Rate	802.11b: up to 11Mbps 802.11g: up to 54Mbps 802.11n: up to 300Mbps
Operating Frequency	2.412 ~ 2.462GHz
Number of Channel	11 for 802.11b, 802.11g, 802.11n (HT20) 7 for 802.11n (HT40)
Antenna Type	PIFA Antenna, 2.7dBi
Antenna Connector	U.FL Connector

Note:

1. The EUT uses following adapter.

Brand	FSP
Model	FSP045-D3MR3
Input Power	100-240V,1.2A, 50-60Hz
Output Power	5.0V/9.0V/12.0V/15.0V 3.0A 20.0V 2.25A
Power Line	1.2m

2. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 Description of Test Modes

11 channels are provided for 802.11b, 802.11g and 802.11n (HT20):

Channel	Frequency	Channel	Frequency
1	2412MHz	7	2442MHz
2	2417MHz	8	2447MHz
3	2422MHz	9	2452MHz
4	2427MHz	10	2457MHz
5	2432MHz	11	2462MHz
6	2437MHz		

7 channels are provided for 802.11n (HT40):

Channel	Frequency	Channel	Frequency
3	2422MHz	7	2442MHz
4	2427MHz	8	2447MHz
5	2432MHz	9	2452MHz
6	2437MHz		

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE≥1G	RE<1G	PLC	APCM	
-	√	√	-	-	-

Where RE≥1G: Radiated Emission above 1GHz & Bandedge Measurement **RE<1G:** Radiated Emission below 1GHz
PLC: Power Line Conducted Emission **APCM:** Antenna Port Conducted Measurement

NOTE: The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Y-plane**.
NOTE: "-"means no effect.

Radiated Emission Test (Above 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
-	802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
-	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

Radiated Emission Test (Below 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11n (20MHz)	1 to 11	6	OFDM	BPSK	6.5

Power Line Conducted Emission Test:

☐ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
☐ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11n (HT20)	1 to 11	6	OFDM	BPSK	6.5

Antenna Port Conducted Measurement:

☐ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.

☐ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☐ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6
-	802.11n (HT20)	1 to 11	1, 6, 11	OFDM	BPSK	6.5
-	802.11n (HT40)	3 to 9	3, 6, 9	OFDM	BPSK	13.5

Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	25deg. C, 65%RH	120Vac, 60Hz	Deon Dai
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Deon Dai
PLC	25deg. C, 68%RH	120Vac, 60Hz	-
APCM	21deg. C, 60%RH	120Vac, 60Hz	-

3.3 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

ID	Product	Brand	Model No.	Serial No.	FCC ID	Remarks
A.	Switch	TP-LINK	TL-WR841HP	2151802000460	TE7WR841HPV1	N/A
B.	Laptop	Acer	Aspire A315-51	N/A	N/A	N/A
C.	Power Supply(Laptop)	LITEON	PA-1450-26	N/A	N/A	N/A
D.	Laptop	Acer	Aspire A315-51	N/A	N/A	N/A
E.	Switching Power Adapter for Switch	Zebra	FSP025-DYAA3	N/A	N/A	N/A
F.	Switching Power Adapter for EUT	FSP	FSP045-D3MR3	H00000093	N/A	N/A
G.	USB Drive	SanDisk	Ultra	N/A	N/A	N/A

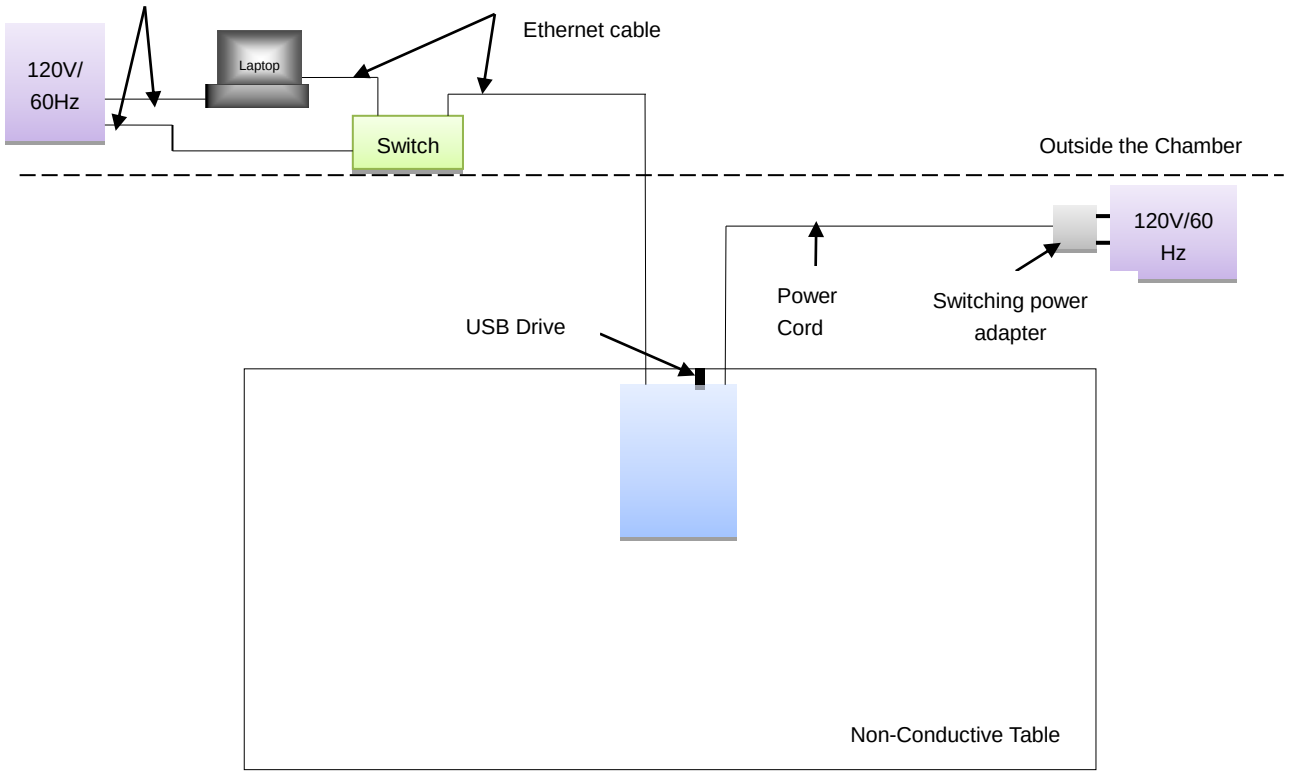
Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Items E~F acted as communication partners to transfer data.

ID	Descriptions	Qty.	Length (m)	Shielding (Yes/No)	Cores (Qty.)	Remarks
1.	Ethernet	1	3m	No	0	Connect from EUT to Switch
2.	Switching power adapter	1	2.4m	No	0	Use for power
3.						

Note: The core(s) is(are) originally attached to the cable(s).

3.3.1 Configuration of System under Test



3.4 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

47 CFR FCC Part 15, Subpart C (Section 15.247)
RSS 247 Issue2, February 2017
RSS Gen Issue5, March 2019
KDB 558074 D01 15.247 Meas Guidance v05r01
KDB 662911 D01 Multiple Transmitter Output v02r01
ANSI C63.10-2013

All test items have been performed and recorded as per the above standards.

4 Test Types and Results

4.1 Radiated Emission Measurement

4.1.1 Limits of Radiated Emission Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB (power peak measurement) or 30dB (power Ave.measurement) below the highest level of the desired power:

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
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

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

4.1.2 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
50GHz Spectrum Analyzer	N9030B (PXA)	MY57140597	6/5/2019	6/5/2020
Biconilog Antenna Sunol	JB1	A030702	3/9/2018	3/9/2020
Pre-Amplifier RF Bay, Inc.	LPA-6-30	11170601	4/27/2019	4/27/2020
Horn Antenna ETS-Lindgren	3117	218554	11/22/2017	11/22/2019
Pre-Amplifier RF-Lambda	RAMP00M50GA	17032300048	6/18/2019	6/18/2020

4.1.3 Test Procedures

For Radiated emission below 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

For Radiated emission above 30MHz

a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

f. The test-receiver system was set to peak and average detects function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

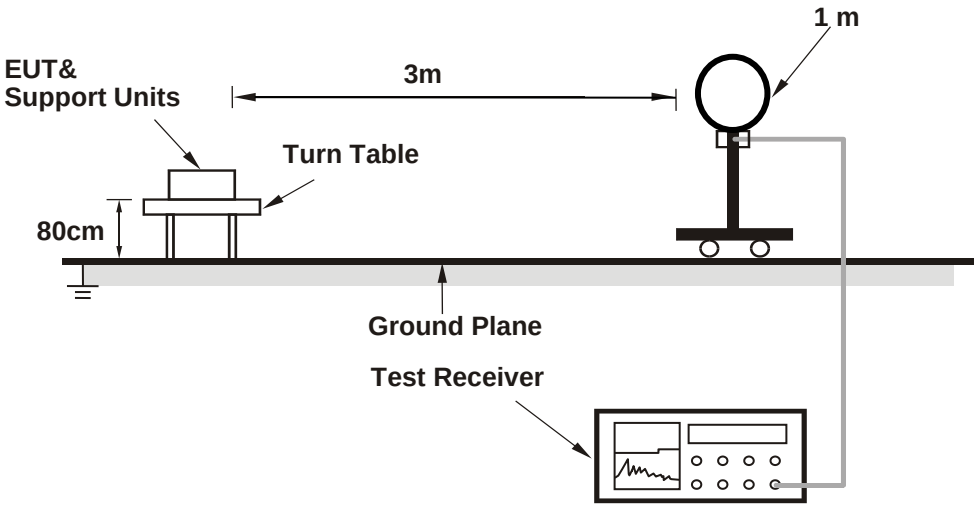
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is ≥ 1/T (Duty cycle < 98%) or 10Hz (Duty cycle ≥ 98%) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.4 Deviation from Test Standard

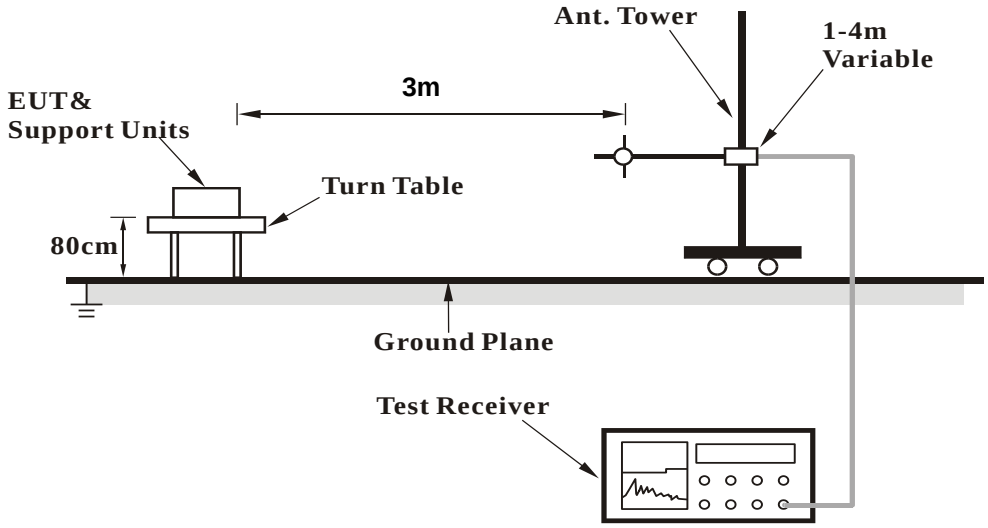
No deviation.

4.1.5 Test Setup

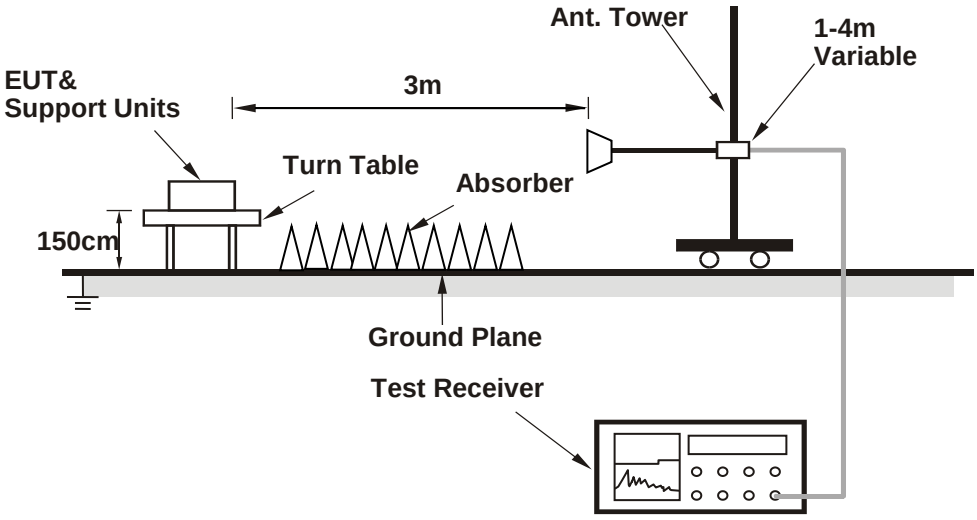
For Radiated emission below 30MHz



For Radiated emission 30MHz to 1GHz



For Radiated emission above 1GHz



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.6 EUT Operating Conditions

a. Placed the EUT on the testing table.
b. Prepared notebooks to act as communication partner and placed it outside of testing area.
c. The communication partner connected with EUT via a RJ45 cable and ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.
d. The communication partner sent data to EUT by command "PING".
e. The necessary accessories enable the system in full functions.

4.1.7 Test Results

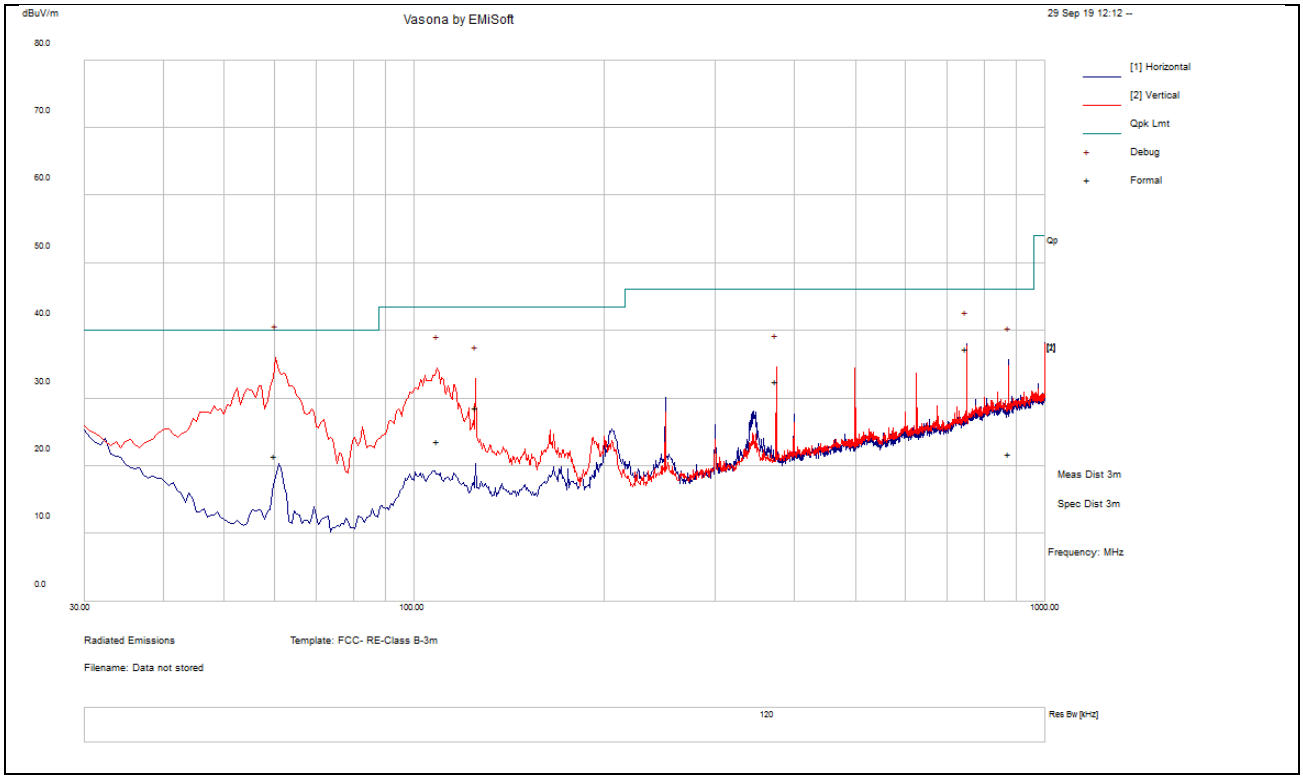
BELOW 1GHz WORST-CASE DATA:

CHANNEL	802.11n Channel 7	**DETECTOR FUNCTION**	Quasi Peak
FREQUENCY RANGE	30MHz – 1GHz		

ANTENNA POLARITY & test distance: HORIZONTAL& VERTICAL at 3 m												
No	Freq.	Raw	Cale Loss	AF	Level	Measurement Type	Pol	Hgt	Azt	Limit	Margin	Pass /Fail
	[MHz]	(dBuV)	(dB)	(dB/m)	(dBuV/m)			(cm)	Deg	(dBuV/m)	(dB)	
1	60.15	37.5	11.51	-27.42	21.58	Quasi Max	V	204	74	40	-18.42	Pass
2	750.03	36.53	15.28	-14.49	37.32	Quasi Max	H	101	239	46	-8.69	Pass
3	109.02	35.31	11.95	-23.61	23.66	Quasi Max	V	132	221	43.5	-19.84	Pass
4	875.13	19.53	15.79	-13.55	21.77	Quasi Max	H	322	292	46	-24.23	Pass
5	125.00	39.38	12.12	-22.87	28.63	Quasi Max	V	111	323	43.5	-14.87	Pass
6	375.00	39.58	13.65	-20.72	32.51	Quasi Max	V	141	297	46	-13.49	Pass

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Cable Loss (dB) + AF (dB)
2. AF (dB/m) = Antenna Factor (dB/m) – Preamplifier Gain (dB).
3. The emission levels of other frequencies were less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.



Above 1GHz Test Data:

Above 1GHz-25GHz – 802.11b – 2412MHz

ANTENNA POLARITY & test distance: HORIZONTAL& VERTICAL at 3 m												
No	Freq.	Raw	Cale Loss	AF	Level	Measurement Type	Pol	Hgt	Azt	Limit	Margin	Pass /Fail
	[MHz]	(dBuV)	(dB)	(dB/m)	(dBuV/m)			(cm)	Deg	(dBuV/m)	(dB)	
1	3336.04	47.5	3.51	-13.74	37.27	Peak Max	V	206	300	74	-36.73	Pass
2	4824.43	48.65	4.12	-10.92	41.85	Peak Max	V	217	28	74	-32.15	Pass
3	8313.16	49.98	5.4	-7.06	48.32	Peak Max	H	163	149	74	-25.68	Pass
4	3336.04	32.77	3.51	-13.74	22.54	Average Max	V	206	300	54	-31.46	Pass
5	4824.43	34.45	4.12	-10.92	27.65	Average Max	V	217	28	54	-26.35	Pass
6	8313.16	35.91	5.4	-7.06	34.25	Average Max	H	163	149	54	-19.75	Pass

Above 1GHz-25GHz- 802.11b - 2437MHz

ANTENNA POLARITY & test distance: HORIZONTAL& VERTICAL at 3 m												
No	Freq.	Raw	Cale Loss	AF	Level	Measurement Type	Pol	Hgt	Azt	Limit	Margin	Pass /Fail
	[MHz]	(dBuV)	(dB)	(dB/m)	(dBuV/m)			(cm)	Deg	(dBuV/m)	(dB)	
1	3733.82	48.62	3.57	-13.13	39.06	Peak Max	H	213	299	74	-34.94	Pass
2	4873.31	48.36	4.17	-11.01	41.52	Peak Max	V	223	30	74	-32.48	Pass
3	8539.25	50.24	5.55	-6.82	48.97	Peak Max	H	165	146	74	-25.03	Pass
4	3733.82	34.53	3.57	-13.13	24.97	Average Max	H	213	299	54	-29.03	Pass
5	4873.31	34.03	4.17	-11.01	27.19	Average Max	V	223	30	54	-26.81	Pass
6	8539.25	35.78	5.55	-6.82	34.51	Average Max	H	165	146	54	-19.49	Pass

Above 1GHz-25GHz – 802.11b – 2462MHz

ANTENNA POLARITY & test distance: HORIZONTAL& VERTICAL at 3 m												
No	Freq.	Raw	Cale Loss	AF	Level	Measurement Type	Pol	Hgt	Azt	Limit	Margin	Pass /Fail
	[MHz]	(dBuV)	(dB)	(dB/m)	(dBuV/m)			(cm)	Deg	(dBuV/m)	(dB)	
1	3847.15	48.02	3.68	-12.87	38.83	Peak Max	H	209	294	74	-35.17	Pass
2	4924.16	48.26	4.22	-11.11	41.37	Peak Max	H	219	31	74	-32.63	Pass
3	8676.41	49.24	5.6	-6.59	48.25	Peak Max	V	162	154	74	-25.75	Pass
4	3847.15	33.35	3.68	-12.87	24.16	Average Max	H	209	294	54	-29.84	Pass
5	4924.16	33.97	4.22	-11.11	27.08	Average Max	H	219	31	54	-26.92	Pass
6	8676.41	34.87	5.6	-6.59	33.88	Average Max	V	162	154	54	-20.12	Pass

Above 1GHz-25GHz- 802.11g - 2412MHz

ANTENNA POLARITY & test distance: HORIZONTAL& VERTICAL at 3 m												
No	Freq.	Raw	Cale Loss	AF	Level	Measurement Type	Pol	Hgt	Azt	Limit	Margin	Pass /Fail
	[MHz]	(dBuV)	(dB)	(dB/m)	(dBuV/m)			(cm)	Deg	(dBuV/m)	(dB)	
1	3153.33	47.71	3.39	-13.81	37.29	Peak Max	H	207	298	74	-36.71	Pass
2	4824.23	48.67	4.12	-10.92	41.87	Peak Max	V	218	31	74	-32.13	Pass
3	8719.87	48.84	5.62	-6.51	47.95	Peak Max	H	170	145	74	-26.05	Pass
4	3153.33	33.03	3.39	-13.81	22.61	Average Max	H	207	298	54	-31.39	Pass
5	4824.23	34.34	4.12	-10.92	27.54	Average Max	V	218	31	54	-26.46	Pass
6	8719.87	34.29	5.62	-6.51	33.4	Average Max	H	170	145	54	-20.6	Pass

Above 1GHz-25GHz – 802.11g – 2437MHz

ANTENNA POLARITY & test distance: HORIZONTAL& VERTICAL at 3 m												
No	Freq.	Raw	Cale Loss	AF	Level	Measurement Type	Pol	Hgt	Azt	Limit	Margin	Pass /Fail
	[MHz]	(dBuV)	(dB)	(dB/m)	(dBuV/m)			(cm)	Deg	(dBuV/m)	(dB)	
1	3214.26	47.6	3.44	-13.77	37.27	Peak Max	H	209	294	74	-36.73	Pass
2	4873.14	48.36	4.17	-11.01	41.52	Peak Max	H	219	27	74	-32.48	Pass
3	8511.24	50.23	5.53	-6.84	48.92	Peak Max	H	169	147	74	-25.08	Pass
4	3214.26	32.72	3.44	-13.77	22.39	Average Max	H	209	294	54	-31.61	Pass
5	4873.14	33.88	4.17	-11.01	27.04	Average Max	H	219	27	54	-26.96	Pass
6	8511.24	35.36	5.53	-6.84	34.05	Average Max	H	169	147	54	-19.95	Pass

Above 1GHz-25GHz- 802.11g - 2462MHz

ANTENNA POLARITY & test distance: HORIZONTAL& VERTICAL at 3 m												
No	Freq.	Raw	Cale Loss	AF	Level	Measurement Type	Pol	Hgt	Azt	Limit	Margin	Pass /Fail
	[MHz]	(dBuV)	(dB)	(dB/m)	(dBuV/m)			(cm)	Deg	(dBuV/m)	(dB)	
1	3653.14	47.88	3.57	-13.37	38.08	Peak Max	H	209	296	74	-35.92	Pass
2	4924.60	48.26	4.22	-11.11	41.37	Peak Max	V	217	27	74	-32.63	Pass
3	8185.30	50.82	5.37	-7.1	49.09	Peak Max	V	170	146	74	-24.91	Pass
4	3653.14	33.44	3.57	-13.37	23.64	Average Max	H	209	296	54	-30.36	Pass
5	4924.60	33.98	4.22	-11.11	27.09	Average Max	V	217	27	54	-26.91	Pass
6	8185.30	36.2	5.37	-7.1	34.47	Average Max	V	170	146	54	-19.53	Pass

Above 1GHz-25GHz- 802.11n20 - 2412MHz

ANTENNA POLARITY & test distance: HORIZONTAL& VERTICAL at 3 m												
No	Freq.	Raw	Cale Loss	AF	Level	Measurement Type	Pol	Hgt	Azt	Limit	Margin	Pass /Fail
	[MHz]	(dBuV)	(dB)	(dB/m)	(dBuV/m)			(cm)	Deg	(dBuV/m)	(dB)	
1	3715.88	47.85	3.57	-13.19	38.23	Peak Max	H	210	300	74	-35.77	Pass
2	4824.04	48.69	4.12	-10.92	41.89	Peak Max	V	218	28	74	-32.11	Pass
3	8802.91	50.42	5.63	-6.3	49.75	Peak Max	V	169	153	74	-24.25	Pass
4	3715.88	33.14	3.57	-13.19	23.52	Average Max	H	210	300	54	-30.48	Pass
5	4824.04	34.66	4.12	-10.92	27.86	Average Max	V	218	28	54	-26.14	Pass
6	8802.91	35.84	5.63	-6.3	35.17	Average Max	V	169	153	54	-18.83	Pass

Above 1GHz-25GHz – 802.11n20 – 2437MHz

ANTENNA POLARITY & test distance: HORIZONTAL& VERTICAL at 3 m												
No	Freq.	Raw	Cale Loss	AF	Level	Measurement Type	Pol	Hgt	Azt	Limit	Margin	Pass /Fail
	[MHz]	(dBuV)	(dB)	(dB/m)	(dBuV/m)			(cm)	Deg	(dBuV/m)	(dB)	
1	3239.14	49.11	3.46	-13.76	38.81	Peak Max	H	205	297	74	-35.19	Pass
2	4873.96	48.34	4.17	-11.01	41.5	Peak Max	V	218	28	74	-32.5	Pass
3	8056.33	50.02	5.41	-7.05	48.38	Peak Max	H	162	146	74	-25.62	Pass
4	3239.14	34.9	3.46	-13.76	24.6	Average Max	H	205	297	54	-29.4	Pass
5	4873.96	33.67	4.17	-11.01	26.83	Average Max	V	218	28	54	-27.17	Pass
6	8056.33	35.66	5.41	-7.05	34.02	Average Max	H	162	146	54	-19.98	Pass

Above 1GHz-25GHz- 802.11n20 - 2462MHz

ANTENNA POLARITY & test distance: HORIZONTAL& VERTICAL at 3 m												
No	Freq.	Raw	Cale Loss	AF	Level	Measurement Type	Pol	Hgt	Azt	Limit	Margin	Pass /Fail
	[MHz]	(dBuV)	(dB)	(dB/m)	(dBuV/m)			(cm)	Deg	(dBuV/m)	(dB)	
1	3313.44	47.3	3.5	-13.74	37.06	Peak Max	H	207	299	74	-36.94	Pass
2	4924.83	48.29	4.22	-11.11	41.4	Peak Max	V	221	33	74	-32.6	Pass
3	8396.37	51.12	5.46	-6.97	49.61	Peak Max	V	162	150	74	-24.39	Pass
4	3313.44	33.18	3.5	-13.74	22.94	Average Max	H	207	299	54	-31.06	Pass
5	4924.83	33.82	4.22	-11.11	26.93	Average Max	V	221	33	54	-27.07	Pass
6	8396.37	37.02	5.46	-6.97	35.51	Average Max	V	162	150	54	-18.49	Pass

Above 1GHz-25GHz- 802.11n40 - 2422MHz

ANTENNA POLARITY & test distance: HORIZONTAL& VERTICAL at 3 m												
No	Freq.	Raw	Cale Loss	AF	Level	Measurement Type	Pol	Hgt	Azt	Limit	Margin	Pass /Fail
	[MHz]	(dBuV)	(dB)	(dB/m)	(dBuV/m)			(cm)	Deg	(dBuV/m)	(dB)	
1	3979.70	48.08	3.83	-12.67	39.24	Peak Max	H	211	297	74	-34.76	Pass
2	4843.15	49.36	4.14	-10.94	42.56	Peak Max	H	224	25	74	-31.44	Pass
3	8198.98	50.31	5.37	-7.11	48.57	Peak Max	H	168	149	74	-25.43	Pass
4	3979.70	33.43	3.83	-12.67	24.59	Average Max	H	211	297	54	-29.41	Pass
5	4843.15	34.9	4.14	-10.94	28.1	Average Max	H	224	25	54	-25.9	Pass
6	8198.98	35.41	5.37	-7.11	33.67	Average Max	H	168	149	54	-20.33	Pass

Above 1GHz-25GHz – 802.11n40 – 2437MHz

ANTENNA POLARITY & test distance: HORIZONTAL& VERTICAL at 3 m												
No	Freq.	Raw	Cale Loss	AF	Level	Measurement Type	Pol	Hgt	Azt	Limit	Margin	Pass /Fail
	[MHz]	(dBuV)	(dB)	(dB/m)	(dBuV/m)			(cm)	Deg	(dBuV/m)	(dB)	
1	3929.35	48.55	3.77	-12.74	39.58	Peak Max	H	208	293	74	-34.42	Pass
2	4873.94	48.34	4.17	-11.01	41.5	Peak Max	V	217	27	74	-32.5	Pass
3	8558.41	49.84	5.55	-6.79	48.6	Peak Max	V	166	149	74	-25.4	Pass
4	3929.35	33.68	3.77	-12.74	24.71	Average Max	H	208	293	54	-29.29	Pass
5	4873.94	33.39	4.17	-11.01	26.55	Average Max	V	217	27	54	-27.45	Pass
6	8558.41	34.99	5.55	-6.79	33.75	Average Max	V	166	149	54	-20.25	Pass

Above 1GHz-25GHz- 802.11n40 - 2452MHz

ANTENNA POLARITY & test distance: HORIZONTAL& VERTICAL at 3 m												
No	Freq.	Raw	Cale Loss	AF	Level	Measurement Type	Pol	Hgt	Azt	Limit	Margin	Pass /Fail
	[MHz]	(dBuV)	(dB)	(dB/m)	(dBuV/m)			(cm)	Deg	(dBuV/m)	(dB)	
1	3232.31	48.33	3.46	-13.76	38.03	Peak Max	V	206	296	74	-35.97	Pass
2	4904.15	48.62	4.2	-11.09	41.73	Peak Max	H	221	33	74	-32.27	Pass
3	8907.37	49.65	5.62	-6.13	49.14	Peak Max	V	164	152	74	-24.86	Pass
4	3232.31	34.04	3.46	-13.76	23.74	Average Max	V	206	296	54	-30.26	Pass
5	4904.15	34.51	4.2	-11.09	27.62	Average Max	H	221	33	54	-26.38	Pass
6	8907.37	35.52	5.62	-6.13	35.01	Average Max	V	164	152	54	-18.99	Pass

5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).

Appendix – Information on the Testing Laboratories

Bureau Veritas is a global leader in testing, inspection and certification (TIC) services. We help businesses improve safety, sustainability and productivity; and our clients include the majority of leading brands in retail, manufacturing and other industries. With a presence in every major country around the world, our quality assurance and compliance solutions are vital in helping our customers enhance product quality and concept-to-consumer journeys. We also assist with increasing speed to market, profitability and brand equity throughout the supply chain. Bureau Veritas is a leading wireless/IoT testing, inspection, audit and certification provider, with a global network of test laboratories to support the IoT industry in areas of connectivity, security, interoperability as well as quality, health & safety, and environmental/chemical requirements.

If you have any comments, please feel free to contact us at the following:

Milpitas EMC/RF/Safety/Telecom Lab
775 Montague Expressway, Milpitas, CA 95035
Tel: +1 408 526 1188

Sunnyvale OTA/Bluetooth Lab
1293 Anvilwood Avenue, Sunnyvale, CA 94089
Tel: +1 669 600 5293

Littleton EMC/RF/Safety/Environmental Lab
1 Distribution Center Cir #1, Littleton, MA 01460
Tel: +1 978 486 8880

Irvine OTA/PTCRB/Bluetooth/V2X Lab
15 Musick, Irvine, CA 92618
Tel: +1 949 716 6512

Email: sales.eaw@us.bureauveritas.com
Web Site: www.cpsusa-bureauveritas.com

The address and road map of all our labs can be found in our web site also.

--- END ---