MET Laboratories, Inc. ***Safety Certification - EMI - Telecom Environmental Simulation***
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33439 WESTERN AVENUE ● UNION CITY, CALIFORNIA 94587 ● PHONE (510) 489-6300 ● FAX (510) 489-6372
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13301 MCCALLEN PASS ! AUSTIN, TX 78753 ! PHONE (512) 287-2500 ! FAX (512) 287-2513

June 6, 2018

Checkpoint Systems
101 Wolf Drive
West Deptford, NJ 08086

Dear Shawn Singh,

Enclosed is the EMC test report for compliance testing of the Checkpoint Systems, EAS RF Detection System/NP10 and EAS RF Detection System/NP20, tested to the requirements of Title 47 of the CFR, Ch. 1 (10-1-06 ed.) FCC Part 15.223 for Intentional Radiators.

Thank you for using the services of MET Laboratories, Inc. If you have any questions regarding these results or if MET can be of further service to you, please feel free to contact me.

Sincerely yours,
MET LABORATORIES, INC.

Joel Huna
Documentation Department

Reference: (\Checkpoint Systems\EMC98238B-FCC223 Rev. 2)

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Electromagnetic Compatibility Criteria
Test Report

For the

Checkpoint Systems
EAS RF Detection System/NP10 and EAS RF Detection System/NP20

Tested under
the FCC Certification Rules
contained in
15.223
for Intentional Radiators

MET Report: EMC98238B-FCC223 Rev. 2

June 6, 2018

Prepared For:

Checkpoint Systems
101 Wolf Drive
West Deptford, NJ 08086

Prepared By:
MET Laboratories, Inc.
914 West Patapsco Avenue,
Baltimore, MD 21230

Electromagnetic Compatibility Criteria
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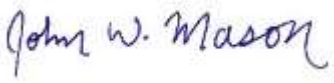
15.223
for Intentional Radiators

MET Report: EMC98238B-FCC223 Rev. 2

Arsalan Hasan, Project Engineer
Electromagnetic Compatibility Lab

Joel Huna
Documentation Department

Engineering Statement: The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of FCC Rules Parts 15.223 under normal use and maintenance.



John Mason,
Director, Electromagnetic Compatibility Lab

Report Status Sheet

Revision	Report Date	Reason for Revision
∅	May 15, 2018	Initial Issue.
1	May 21, 2018	Customer Corrections.
2	June 6, 2018	TCB Corrections.

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List of Terms and Abbreviations

AC	**A**lternating **C**urrent
ACF	**A**ntenna **C**orrection **F**actor
Cal	**Cal**ibration
d	**M**easurement **D**istance
dB	**D**eci **B**els
dBµV	**D**eci-**B**els above one **micro V**olt
dBµV/m	**D**eci-**B**els above one **micro V**olt **per m**eter
DC	**D**irect **C**urrent
DCF	**D**istance **C**orrection **F**actor
E	**E**lectric Field
DSL	**D**igital **S**ubscriber **L**ine
ESD	**E**lectro**s**tatic **D**ischarge
EUT	**E**quipment **U**nder **T**est
f	**F**requency
FCC	**F**ederal **C**ommunications **C**ommission
H	Magnetic Field
GHz	**G**iga **H**ert**z**
Hz	**H**ert**z**
ICES	**I**nterference-**C**ausing **E**quipment **S**tandard
kHz	**k**ilo**h**ert**z**
kPa	**k**ilo**pa**scal
kV	**k**ilo **V**olt
LISN	**L**ine **I**mpedance **S**tabilization **N**etwork
MHz	**M**ega**H**ertz
µ**H**	**micro H**enry
µ**F**	**micro F**arad
µ**s**	**micro s**econds
RF	**R**adio **F**requency
RMS	**R**oot-**M**ean-**S**quare

1. Testing Summary

Title 47 of the CFR, Part 15, Subpart C, Reference	Description	Results
Title 47 of the CFR, Part 15 §15.203	Antenna Requirement	Compliant
Title 47 of the CFR, Part 15 §15.223	Occupied Bandwidth	Compliant
Title 47 of the CFR, Part 15 §15.207(a)	Conducted Emission	Compliant
Title 47 of the CFR, Part 15 §15.209	Radiated Emissions	Compliant
Title 47 of the CFR, Part 15 §15.205	Restricted Bands	Compliant
Title 47 of the CFR, Part 15 §15. 223(a)	Fundamental Field Strength	Compliant
Title 47 of the CFR, Part 15 §15.223(b)	Out of Band Emissions	Compliant

Table 1. Summary of Test Results

2. Equipment Configuration

2.1 Overview

MET Laboratories, Inc. was contracted by Checkpoint Systems to perform testing on the EAS RF Detection System/NP10 and EAS RF Detection System/NP20, under Checkpoint Systems' purchase order number 1101086359.

This document describes the test setups, test methods, required test equipment, and the test limit criteria used to perform compliance testing of the Checkpoint Systems, EAS RF Detection System/NP10 and EAS RF Detection System/NP20.

The results obtained relate only to the item(s) tested.

Filing Status:	Original	
Model(s) Tested:	EAS RF Detection System/NP10 and EAS RF Detection System/NP20	
EUT Specifications:	FCC ID: DO4NEO-C	
	Primary Power: 100 – 240 VAC 50 – 60 Hz	
	Type of Modulations:	Pulse
	Equipment Code:	FAP
	EUT TX Frequency Ranges:	7.975-8.425 MHz
Analysis:	The results obtained relate only to the item(s) tested.	
Evaluated by:	Arsalan Hasan	
Report Date(s):	June 6, 2018	

Note: This report's FCC ID references the NP10/NP20 with the Bluetooth/Cellular dongles.

2.2 References

CFR 47, Part 15, Subpart C	Federal Communication Commission, Code of Federal Regulations, Title 47, Part 15: General Rules and Regulations, Allocation, Assignment, and Use of Radio Frequencies
CFR 47, Part 15, Subpart B	Electromagnetic Compatibility: Criteria for Radio Frequency Devices
ANSI C63.4:2014	Methods and Measurements of Radio-Noise Emissions from Low-Voltage Electrical And Electronic Equipment in the Range of 9 kHz to 40 GHz
ISO/IEC 17025:2005	General Requirements for the Competence of Testing and Calibration Laboratories
ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

2.3 Test Site

All testing was performed at MET Laboratories, Inc., 914 West Patapsco Avenue, Baltimore, MD 21230. All equipment used in making physical determinations is accurate and bears recent traceability to the National Institute of Standards and Technology.

Radiated Emissions measurements were performed in a semi-anechoic chamber. In accordance with §2.948(a)(3), a complete site description is contained at MET Laboratories.

2.4 Description of Test Sample

The Checkpoint Systems EAS RF Detection System/NP10 and EAS RF Detection System/NP20, Equipment Under Test (EUT), is an Electronic Article Surveillance detection system which detects tags that are applied to merchandise. The pulse-listen EAS system triggers an alarm when a non-deactivated tag is detected.

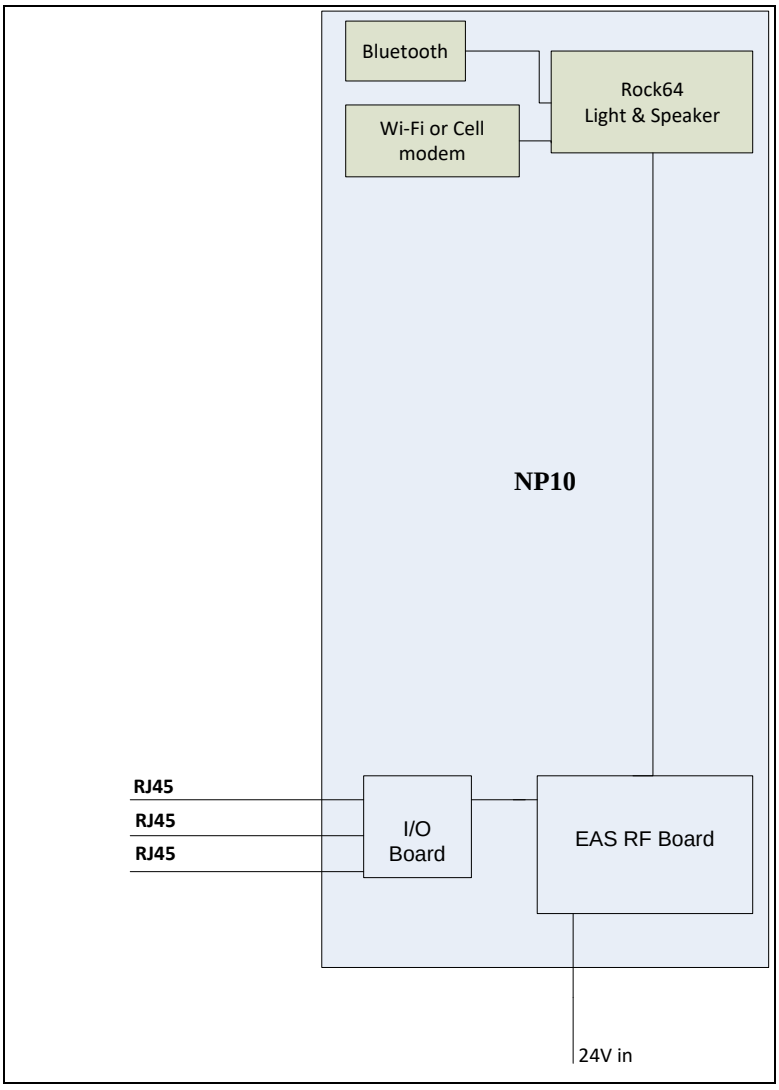


Figure 1. Block Diagram of Test Configuration, NP10

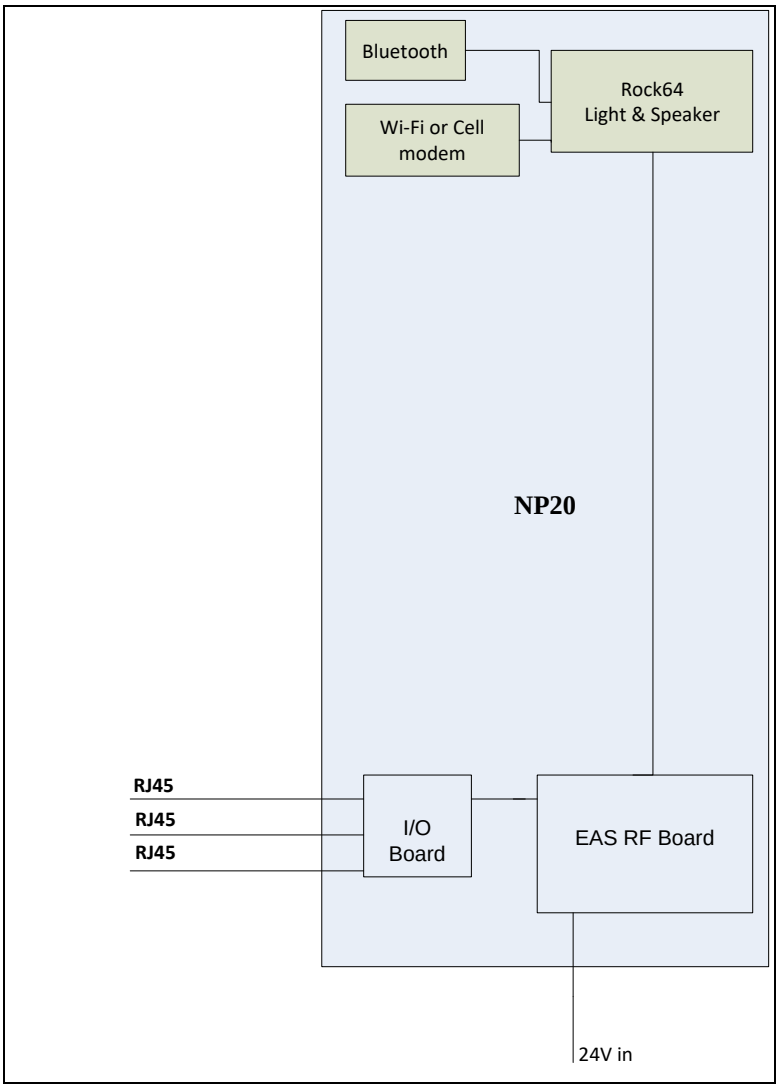


Figure 2. Block Diagram of Test Configuration, NP20

2.5 Equipment Configuration

The EUT is part of a system as shown in Figure 1, Block Diagram of Test Setup. All cards, etc., incorporated as part of the EUT is included in the following list.

Ref. ID	Slot #	Name / Description	Model Number	Part Number	Serial Number	Rev. #
		Checkpoint/EAS RF Board	TR4300	10053101		
		Checkpoint/IO Board	A1203	10043479		
		Checkpoint/ Coupler Board	A1200	10054493		
		Checkpoint/LED Board	A1179	10055944		
		Checkpoint/Light and Speaker Board w/Rock64	A1177	10077571		
		Pine64/Rock64 SOM Module	Rock64 V 2.0	10075913		
		Globtek/90W power supply	GTM96900P9024-T3	TR9CI3700A03 -CIMR6B		
		Huawei/Cellular modem FCC	MS2372h-517			
		Huawei/Cellular modem CE	MS2372h-153			
		Globtek/50W power supply	2S5024D-R-ES	7116509		
		Pine64/Wi-Fi Adapter	RTL8188			
		Plugable/Bluetooth Adapter	USB-BT4LE			

Table 2. Equipment Configuration, NP10

Ref. ID	Slot #	Name / Description	Model Number	Part Number	Serial Number	Rev. #
		Checkpoint/EAS RF Board	TR4300	10053101		
		Checkpoint/IO Board	A1203	10043479		
		Checkpoint/ Coupler Board	A1200	10073673		
		Checkpoint/LED Board	A1178	10084027		
		Checkpoint/Light and Speaker Board w/Rock64	A1177	10077571		
		Pine64/Rock64 SOM Module	Rock64 V 2.0	10075913		
		Globtek/90W power supply	GTM96900P9024-T3	TR9CI3700A03-CIMR6B		
		Huawei/Cellular modem FCC	MS2372h-517			
		Huawei/Cellular modem CE	MS2372h-153			
		Globtek/50W power supply	2S5024D-R-ES	7116509		
		Pine64/Wi-Fi Adapter	RTL8188			
		Plugable/Bluetooth Adapter	USB-BT4LE			

Table 3. Equipment Configuration, NP20

2.6 Support Equipment

Support equipment necessary for the operation and testing of the EUT is included in the following list.

Ref. ID	Name / Description	Manufacturer	Model Number	*Customer Supplied Calibration Data
	PC/DMS software	Lenovo	W550	N/A
	Hard Tag/8.2 MHz	Checkpoint	N/A	N/A
The 'Customer Supplied Calibration Data' column will be marked as either not applicable, not available, or will contain the calibration date supplied by the customer.				

Table 4. Support Equipment, NP10

Ref. ID	Name / Description	Manufacturer	Model Number	*Customer Supplied Calibration Data
	PC/DMS software	Lenovo	W550	N/A
	Hard Tag/8.2 MHz	Checkpoint	N/A	N/A
The 'Customer Supplied Calibration Data' column will be marked as either not applicable, not available, or will contain the calibration date supplied by the customer.				

Table 5. Support Equipment, NP20

2.7 Ports and Cabling Information

Ref. ID	Port name on EUT	Cable Description or reason for no cable	Qty	Length as tested (m)	Max Length (m)	Shielded? (Y/N)	Termination Box ID & Port Name
1	DC	24V DC output	1	1.2		Y	TR4300 Board J2
2	J5	CPID Interface	1	3		N	TR4300 Board J5
3	J6	Relay Contact Interface	1	3		N	TR4300 Board J6
4	J8	General Purpose	1	3		N	TR4300 Board J8

Table 6. Ports and Cabling Information, NP10

Ref. ID	Port name on EUT	Cable Description or reason for no cable	Qty	Length as tested (m)	Max Length (m)	Shielded? (Y/N)	Termination Box ID & Port Name
1	DC	24V DC output	1	1.2		Y	TR4300 Board J2
2	J5	CPID Interface	1	3		N	TR4300 Board J5
3	J6	Relay Contact Interface	1	3		N	TR4300 Board J6
4	J8	General Purpose	1	3		N	TR4300 Board J8

Table 7. Ports and Cabling Information, NP20

2.8 Mode of Operation

NP10
System transmits at a tag frequency (tune circuit) and listen to a tag ring down.
8.2 MHz tag band
{7.975, 8.125, 8.275, 8.425 MHz}

NP20
System transmits at a tag frequency (tune circuit) and listen to a tag ring down.
8.2 MHz tag band
{7.975, 8.125, 8.275, 8.425 MHz}

2.9 Method of Monitoring EUT Operation

NP10
The function of the EUT during the test was observed via optical and acoustic alarm on the EUT.

NP20
The function of the EUT during the test was observed via optical and acoustic alarm on the EUT.

2.10 Modifications

a) Modifications to EUT

No modifications were made to the EUT.

b) Modifications to Test Standard

No modifications were made to the test standard.

2.11 Disposition of EUT

The test sample including all support equipment submitted to the Electro-Magnetic Compatibility Lab for testing was returned to Checkpoint Systems upon completion of testing.

3.0 Intentional Radiators

3.1 §15.203 Antenna Requirements

Test Requirement: **§ 15.203:** An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

The structure and application of the EUT were analyzed to determine compliance with Section 15.203 of the Rules. Section 15.203 states that the subject device must meet at least one of the following criteria:

a.) Antenna must be permanently attached to the unit.

b.) Antenna must use a unique type of connector to attach to the EUT.

c.) Unit must be professionally installed. Installer shall be responsible for verifying that the correct antenna is employed with the unit.

Results: The EUT as tested is compliant the criteria of §15.203.

Test Engineer(s): Arsalan Hasan

Test Date(s): March 29 and April 2, 2018

Gain	Type
-40 dBi	Loop

Table 8. Antenna List, NP10

Gain	Type
-40 dBi	Loop

Table 9. Antenna List, NP20

3.2 §15.223(a) 6 dB and 99% Bandwidth

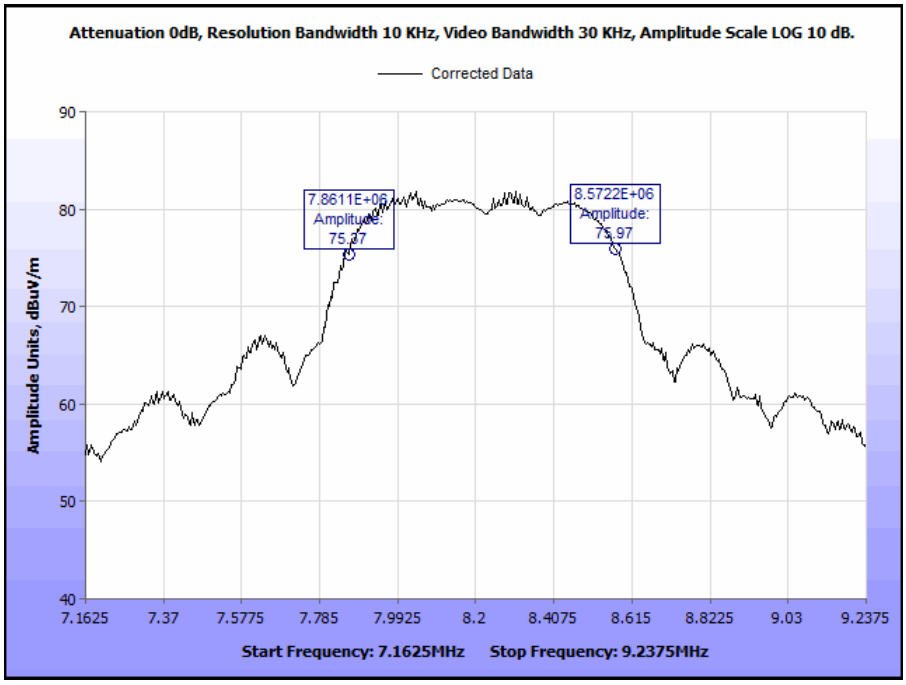
Test Requirements: **§ 15.223(a):** The field strength of any emission within the band 1.705 – 10.0 MHz shall not exceed 100 microvolts/meter at a distance of 30 meters. However, if the bandwidth of the emission is less than 10% of the center frequency, the field strength shall not exceed 15 microvolts/meter or (the bandwidth of the device in kHz) divided by (the center frequency of the device in MHz) microvolts/meter at a distance of 30 meters, whichever is the higher level. For the purposes of this section, bandwidth is determined at the points 6 dB down from the modulated carrier. The emission limits in this paragraph are based on measurement instrumentation employing an average detector. The provisions in §15.35(b) for limiting peak emissions apply.

Test Procedure: The transmitter was on and transmitting. The 6 dB bandwidth of the fundamental frequency was measured with the spectrum analyzer using a RBW approximately 1% of the total span and a VBW > RBW. The 6 dB Bandwidth was measured and used to determine the field strength limit of the fundamental. The measurements were performed on the low, mid, and high channels. Because of the nature of the pulse modulation, a peak detector using max hold was used for the 99% bandwidth measurement.

Test Results The EUT was compliant with the requirements of this section. The 6 dB Bandwidth was determined from the plots on the following pages.

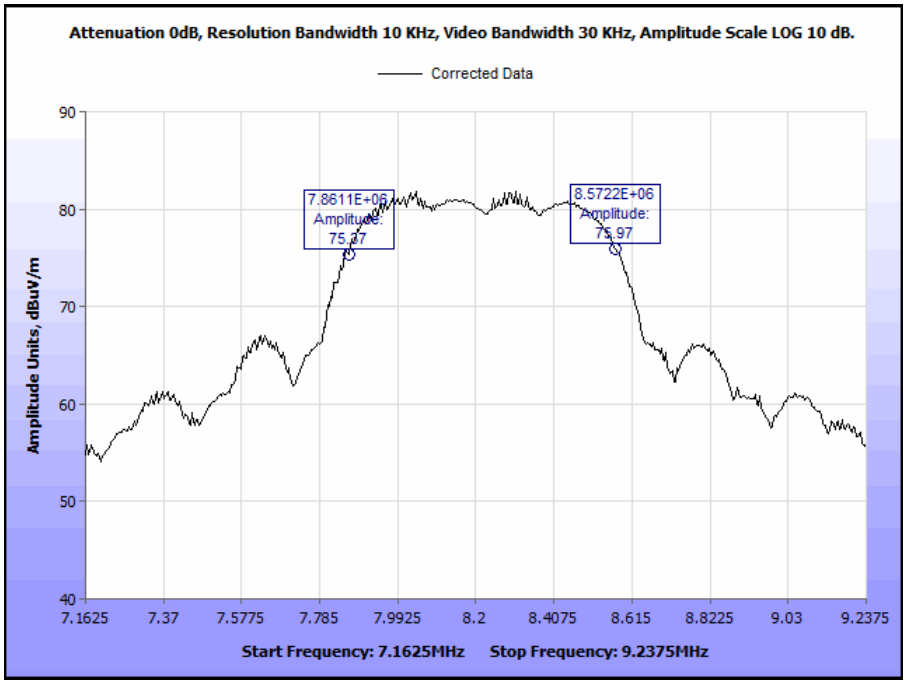
Test Engineer(s): Arsalan Hasan

Test Date(s): March 29 and April 2, 2018



Plot 1. 6 dB Occupied Bandwidth, NP10

Plot 2. 99% Occupied Bandwidth, NP10



Plot 3. 6 dB Occupied Bandwidth, NP20

Plot 4. 99% Occupied Bandwidth, NP20

3.3 §15.207(a) Conducted Emissions Limits

Test Requirement(s): **§ 15.207 (a):** For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30MHz, shall not exceed the limits in the following table, as measured using a 50 μH/50 Σ line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency range (MHz)	§ 15.207(a), Conducted Limit (dBμV)	
	Quasi-Peak	Average
* 0.15- 0.45	66 - 56	56 - 46
0.45 - 0.5	56	46
0.5 - 30	60	50

Table 10. Conducted Limits for Intentional Radiators from FCC Part 15 § 15.207(a)

Test Procedure: The EUT was placed on a 0.8 m-high wooden table inside a screen room. The EUT was situated such that the back of the EUT was 0.4 m from one wall of the vertical ground plane, and the remaining sides of the EUT were no closer than 0.8 m from any other conductive surface. The EUT was powered from a 50 Ω/50 μH Line Impedance Stabilization Network (LISN). The EMC receiver scanned the frequency range from 150 kHz to 30 MHz. Conducted Emissions measurements were made in accordance with *ANSI C63.4-2003 "Methods and Measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40 GHz"*. The measurements were performed over the frequency range of 0.15 MHz to 30 MHz using a 50 Ω/50 μH LISN as the input transducer to an EMC/field intensity meter. For the purpose of this testing, the transmitter was turned on. Scans were performed with the transmitter on.

Test Results: The EUT was compliant with this requirement. Measured emissions were below applicable limits.

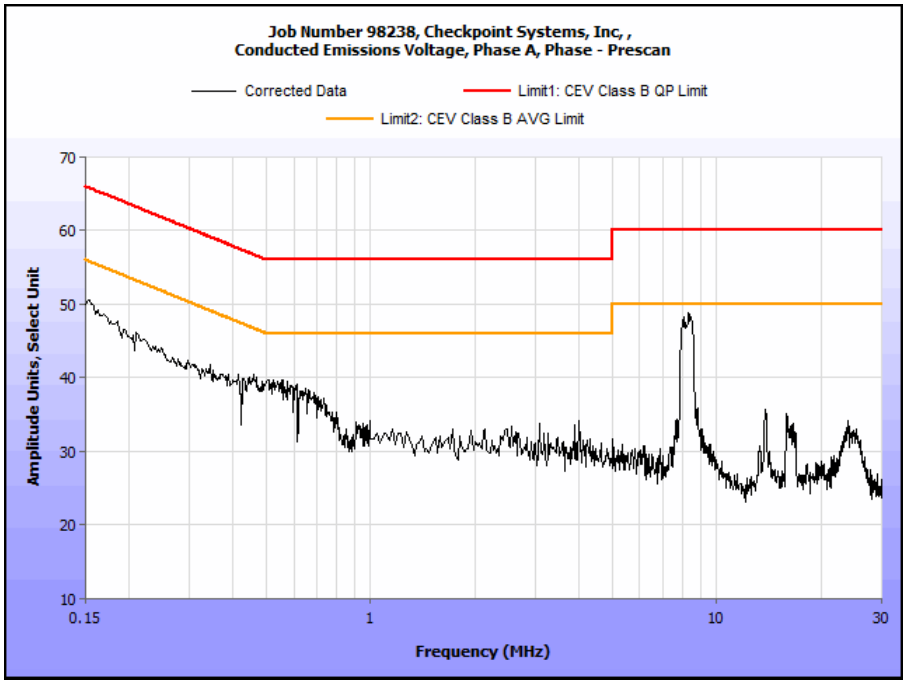
Test Engineer(s): Arsalan Hasan

Test Date(s): March 29 and April 2, 2018

15.207(a) Conducted Emissions Test Results, NP10

Frequency (MHz)	Uncorrected Meter Reading (dBuV) QP	Cable Loss (dB)	Corrected Measurement (dBuV) QP	Limit (dBuV) QP	Margin (dB) QP	Uncorrected Meter Reading (dBuV) Avg.	Cable Loss (dB)	Corrected Measurement (dBuV) AVG	Limit (dBuV) AVG	Margin (dB) AVG
8.29	45.3	0	45.3	60	-14.7	34.67	0	34.67	50	-15.33
7.95	44.35	0	44.35	60	-15.65	29.97	0	29.97	50	-20.03
8.492	45.67	0	45.67	60	-14.33	31.62	0	31.62	50	-18.38
0.15425	42.21	0	42.21	65.77	-23.56	21.84	0	21.84	55.77	-33.93
0.50275	31.17	0	31.17	56	-24.83	18.95	0	18.95	46	-27.05
0.2095	38.28	0	38.28	63.23	-24.95	20.49	0	20.49	53.23	-32.74

Table 11. Conducted Emissions, 15.207(a), Phase Line, Test Results, NP10

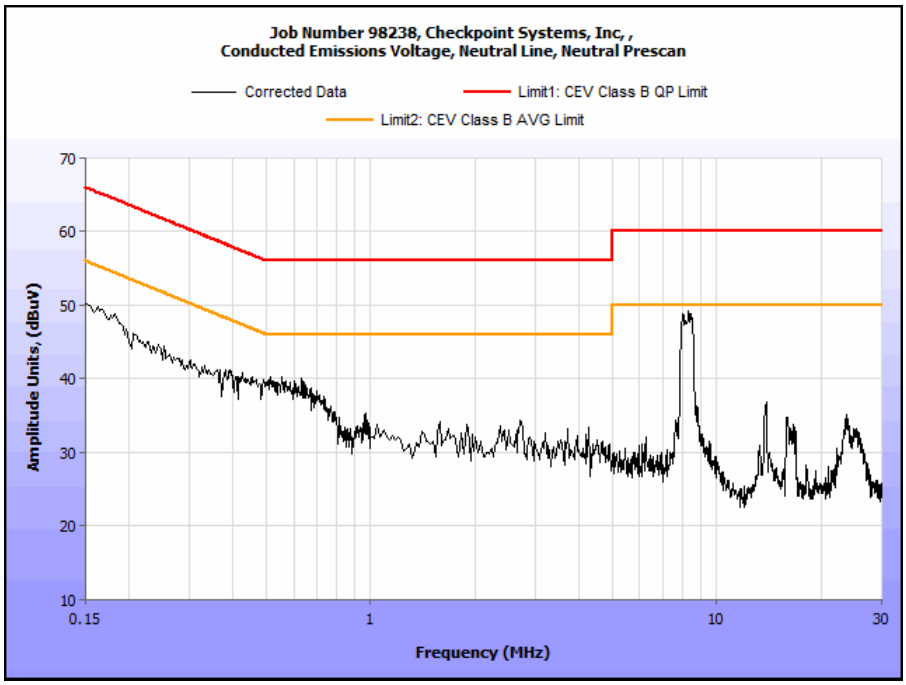


Plot 5. Conducted Emissions, 15.207(a), Phase Line, NP10

15.207(a) Conducted Emissions Test Results, NP10

Frequency (MHz)	Uncorrected Meter Reading (dBuV) QP	Cable Loss (dB)	Corrected Measurement (dBuV) QP	Limit (dBuV) QP	Margin (dB) QP	Uncorrected Meter Reading (dBuV) Avg.	Cable Loss (dB)	Corrected Measurement (dBuV) AVG	Limit (dBuV) AVG	Margin (dB) AVG
8.3125	45.8	0	45.8	60	-14.2	35.11	0	35.11	50	-14.89
7.975	45.33	0	45.33	60	-14.67	31.6	0	31.6	50	-18.4
8.47	46.12	0	46.12	60	-13.88	32.84	0	32.84	50	-17.16
0.15425	42.59	0	42.59	65.77	-23.18	21.08	0	21.08	55.77	-34.69
0.184	40.01	0	40.01	64.3	-24.29	26.42	0	26.42	54.3	-27.88
0.51338	31.6	0	31.6	56	-24.4	17.93	0	17.93	46	-28.07

Table 12. Conducted Emissions, 15.207(a), Neutral Line, Test Results, NP10

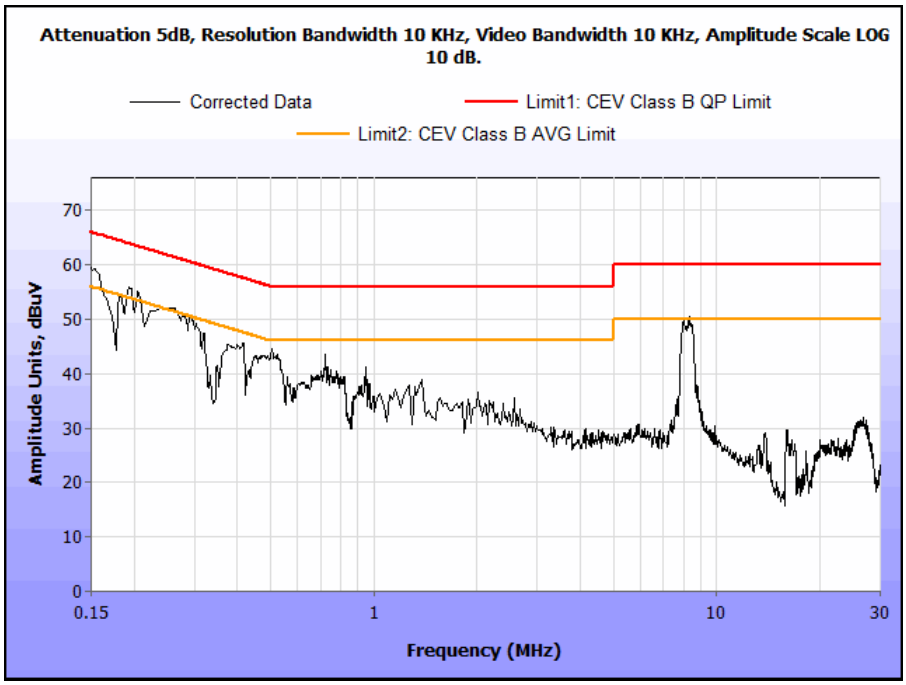


Plot 6. Conducted Emissions, 15.207(a), Neutral Line, NP10

15.207(a) Conducted Emissions Test Results, NP20

Frequency (MHz)	Uncorrected Meter Reading (dBuV) QP	Cable Loss (dB)	Corrected Measurement (dBuV) QP	Limit (dBuV) QP	Margin (dB) QP	Uncorrected Meter Reading (dBuV) Avg.	Cable Loss (dB)	Corrected Measurement (dBuV) AVG	Limit (dBuV) AVG	Margin (dB) AVG
0.1568	47.67	0	47.67	65.63	-17.96	26.39	0	26.39	55.63	-29.24
0.2056	48.06	0	48.06	63.38	-15.32	26.44	0	26.44	53.38	-26.94
0.254	51.11	0	51.11	61.63	-10.52	45.12	0	45.12	51.63	-6.51
0.376	43.21	0	43.21	58.37	-15.16	34.95	0	34.95	48.37	-13.42
0.5188	40.69	0	40.69	56	-15.31	32.5	0	32.5	46	-13.5
8.431	47.23	0.08	47.31	60	-12.69	35.26	0.08	35.34	50	-14.66

Table 13. Conducted Emissions, 15.207(a), Phase Line, Test Results, NP20

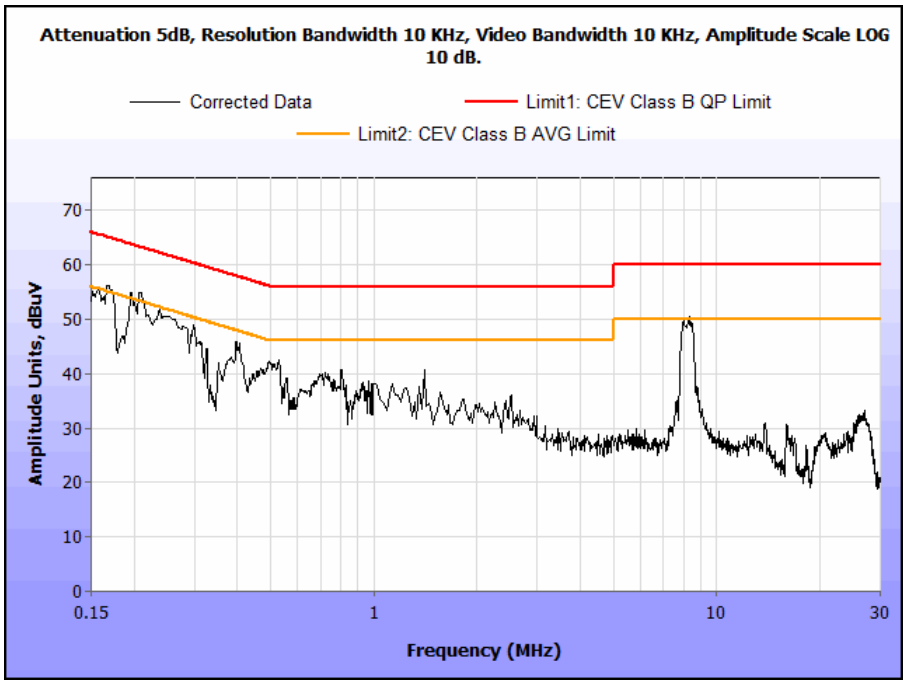


Plot 7. Conducted Emissions, 15.207(a), Phase Line, NP20

15.207(a) Conducted Emissions Test Results, High Band

Frequency (MHz)	Uncorrected Meter Reading (dBuV) QP	Cable Loss (dB)	Corrected Measurement (dBuV) QP	Limit (dBuV) QP	Margin (dB) QP	Uncorrected Meter Reading (dBuV) Avg.	Cable Loss (dB)	Corrected Measurement (dBuV) AVG	Limit (dBuV) AVG	Margin (dB) AVG
0.1616	45.74	0	45.74	65.38	-19.64	23.04	0	23.04	55.38	-32.34
0.185	43.64	0	43.64	64.26	-20.62	23.08	0	23.08	54.26	-31.18
0.2568	49.12	0	49.12	61.53	-12.41	42.97	0	42.97	51.53	-8.56
0.408	39.04	0	39.04	57.69	-18.65	22.82	0	22.82	47.69	-24.87
1.273	26.7	0	26.7	56	-29.3	15.55	0	15.55	46	-30.45
8.441	46.92	0.08	47	60	-13	34.82	0.08	34.9	50	-15.1

Table 14. Conducted Emissions, 15.207(a), Neutral Line, Test Results, NP20



Plot 8. Conducted Emissions, 15.207(a), Neutral Line, NP20

Electromagnetic Compatibility Emission Criteria

3.2. §15.223(a) Fundamental Field Strength

Test Requirement(s): §15.223 (a) The field strength of any emissions within the band 1.705 – 10.0 MHz shall not exceed 100 microvolts/meter at a distance of 30 meters. However, if the bandwidth of the emission is less than 10% of the center frequency, the field strength shall not exceed 15 microvolts/meter or (the bandwidth of the device in kHz) divided by (the center frequency of the device in MHz) microvolts/meter at a distance of 30 meters, whichever is the higher level. For the purposes of this section, bandwidth is determined at the points 6 dB down from the modulated carrier. The emission limits in this paragraph are based on measurement instrumentation employing an average detector. The provisions in Section 15.35(b) for limiting peak emissions apply.

Test Procedure: The EUT was set to transmit at the different assigned bands and placed in an orientation typical of installation on an OATS. The method of testing and test conditions of ANSI C63.4: 2003 were used. The loop antenna was located 3 m from the EUT. Measurements were conducted with the loop antenna at coaxial (parallel) and planar (perpendicular) orientations. A peak detector was used with a 300 kHz RBW (instead of 10 kHz) for minimum pulse desensitization.

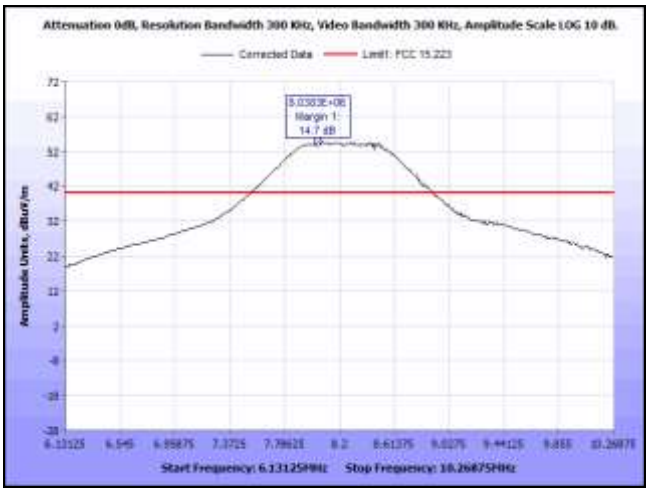
For the purposes of showing compliance, the measurements of the fundamental were made at a 3 m distance and then extrapolated to the 30 m published limit.

Plots were initially created using Peak detector, and then a subsequent final measurement was taken using the average detector of an EMI Receiver, found underneath the Peak detector plots.

Test Results: The EUT was found compliant with Part 15.223 (a) requirements of this section.

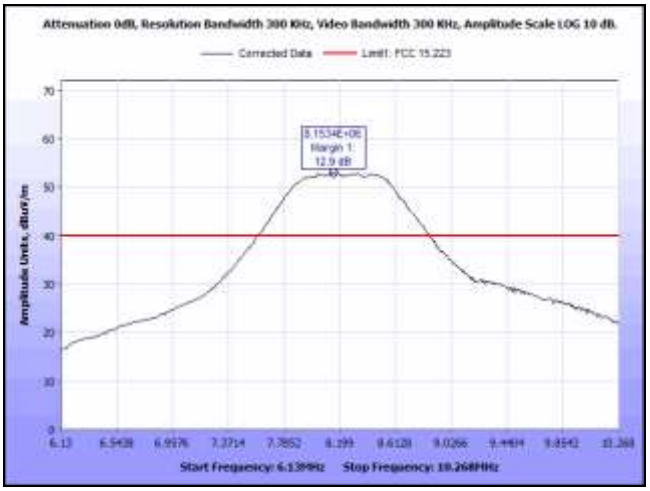
Test Engineer(s): Arsalan Hasan

Test Date(s): March 9 and April 2, 2018



Plot 9. Fundamental Field Strength, NP10, 8.2 MHz, Fundamental Peak

Frequency (MHz)	EUT Azimuth (Degrees)	Antenna Polarity (H/V)	Antenna Height (m)	Uncorrected EMI Meter Reading (dBuV)	Antenna Correction Factor (dB/m) (+)	Cable Loss/Pre-amp (dB) (+)	Distance Correction Factor (dB) (-)	Corrected Amplitude (dBuV/m)	Limit (dBuV/m)	Margin (dB)
8.2	7	V	1.9856	35.34	35.1	0.34	47.00	23.78	40	-16.22



Plot 10. Fundamental Field Strength, NP20, 8.2 MHz, Fundamental Peak

Frequency (MHz)	EUT Azimuth (Degrees)	Antenna Polarity (H/V)	Antenna Height (m)	Uncorrected EMI Meter Reading (dBuV)	Antenna Correction Factor (dB/m) (+)	Cable Loss/Pre-amp (dB) (+)	Distance Correction Factor (dB) (-)	Corrected Amplitude (dBuV/m)	Limit (dBuV/m)	Margin (dB)
8.2	7	V	1.9856	35.34	35.1	0.34	47.00	23.78	40	-16.22

Electromagnetic Compatibility Emission Criteria

3.3. § 15.209(a) and § 15.205 (a)Radiated Spurious Emissions Requirements and Restricted Bands

Test Requirement(s): **§ 15.209 (a):** Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in Table 15.

Frequency (MHz)	§ 15.209(a),Radiated Emission Limits (μV/m)	Measurement Distance (meters)
0.009 – 0.490	2400/F [kHz]	300
0.490 – 1.705	24000/F [kHz]	30
1.705 – 30	30	30

Table 15. Radiated Emissions Limits Calculated from FCC Part 15, § 15.209 (a)

§15.205(a): Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	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----------	156.52475–156.52525	2483.5–2500	17.7–21.4
8.37625–8.38675----------	156.7–156.9	2655–2900	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])

Table 16. Restricted Bands of Operation

[1] Until February 1, 1999, this restricted band shall be 0.490 – 0.510 MHz.
[2] Above 38.6

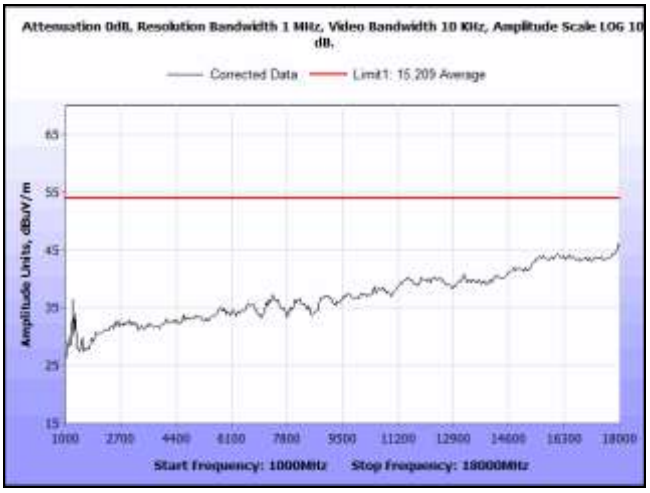
Test Procedures: The transmitter was turned on. Measurements were performed at constant transmission. The EUT was rotated a full 360° and with the antenna at parallel and perpendicular polarities (Below 30 MHz). Plots shown are corrected for both antenna correction factor and distance and compared to the appropriate limit line defined in Table 6.

Test Results: The EUT was compliant with the Radiated Spurious Emission limits of **§ 15.209**. The plots and points recorded are of the noise floor. According to **§ 15.201 (a)**, devices below 490 kHz and which all emissions are at least 40 dB below the **§ 15.209** limits shall be verified pursuant.

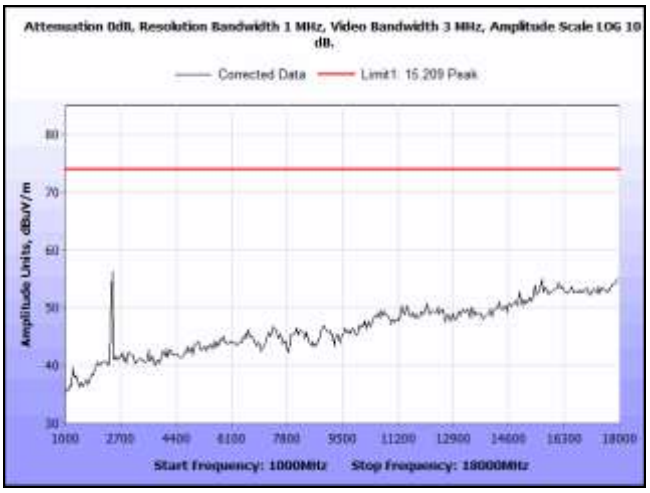
The transmitting frequency was verified by placing the EUT next to the measuring antenna to confirm it was constantly transmitting during testing.

Test Engineer(s): Arsalan Hasan

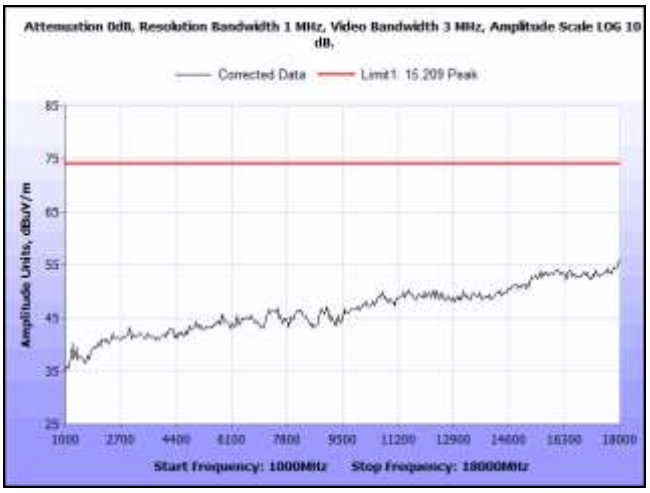
Test Date(s): March 29, 2018



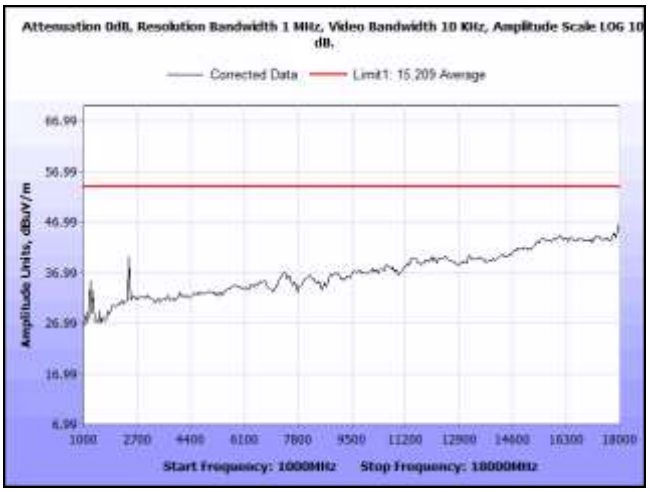
Plot 11. Radiated Emissions, NP10, 1 GHz – 18 GHz, Average Bluetooth and FCC Cellular



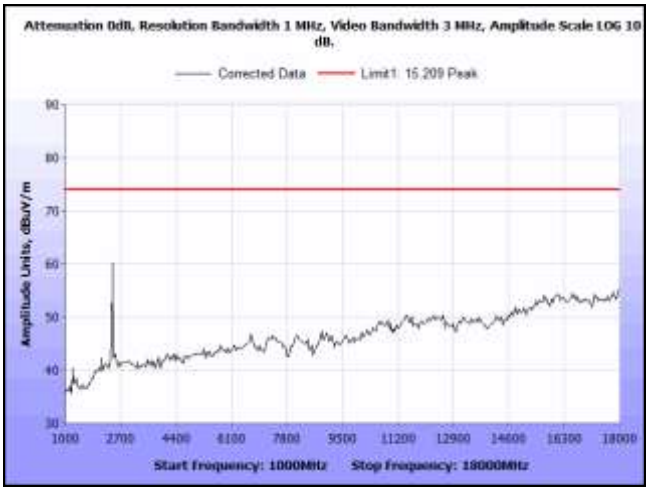
Plot 12. Radiated Emissions, NP10, 1 GHz – 18 GHz, Peak Bluetooth and ETSI Cellular



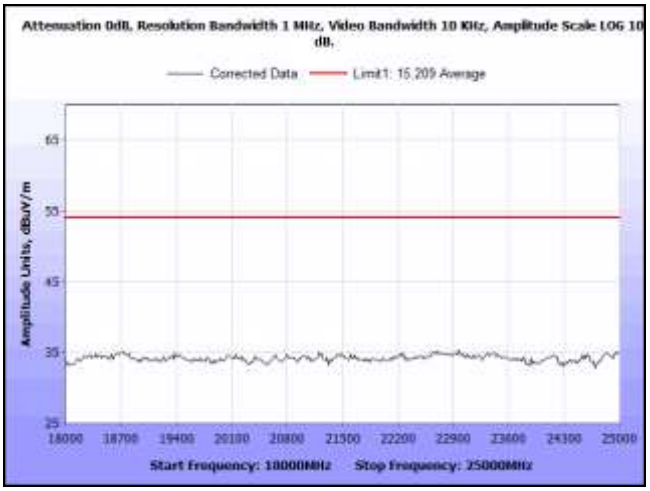
Plot 13. Radiated Emissions, NP10, 1 GHz – 18 GHz, Peak Bluetooth and FCC Cellular



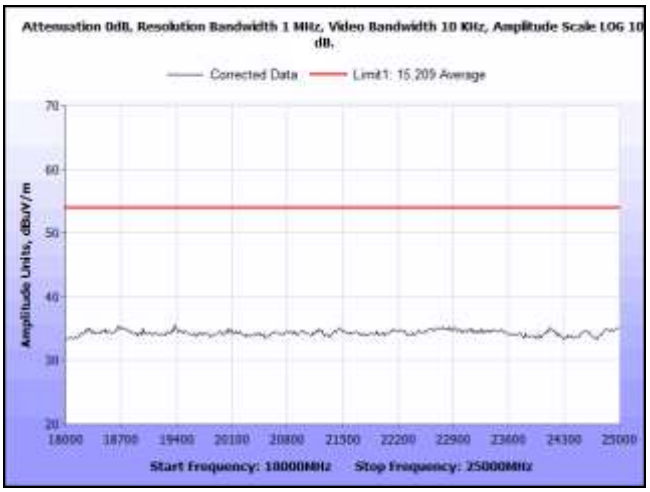
Plot 14. Radiated Emissions, NP10, 1 GHz – 18 GHz, Average Wifi and Bluetooth



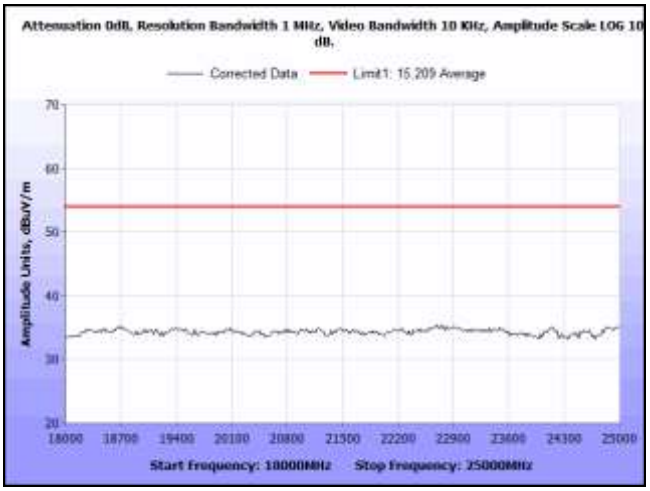
Plot 15. Radiated Emissions, NP10, 1 GHz – 18 GHz, Peak Wifi and Bluetooth



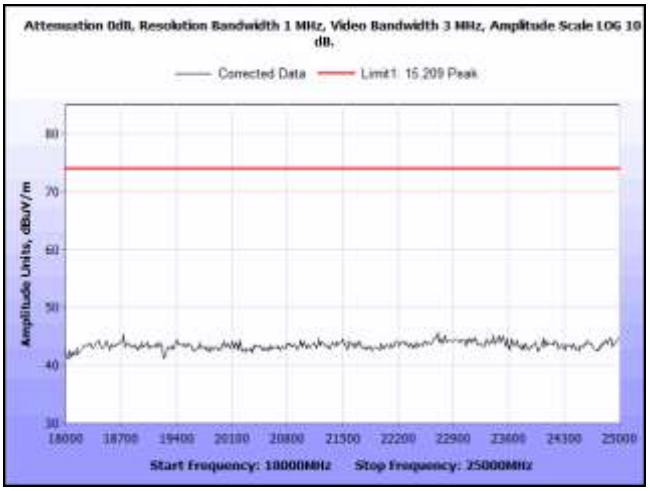
Plot 16. Radiated Emissions, NP10, 18 GHz – 25 GHz, Average Bluetooth and ETSI Cellular



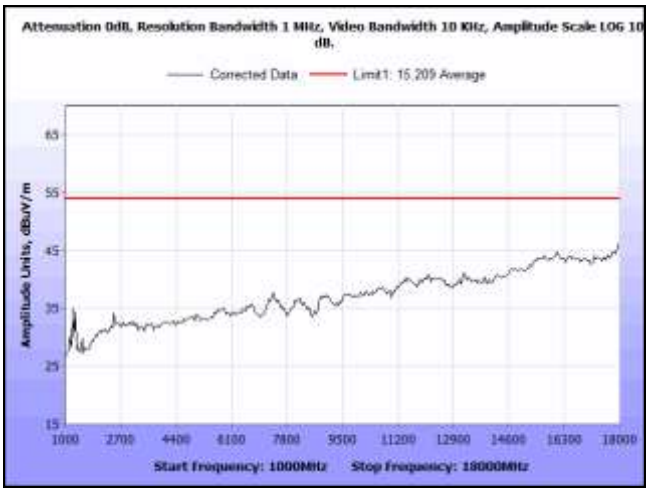
Plot 17. Radiated Emissions, NP10, 18 GHz – 25 GHz, Average Bluetooth and FCC Cellular



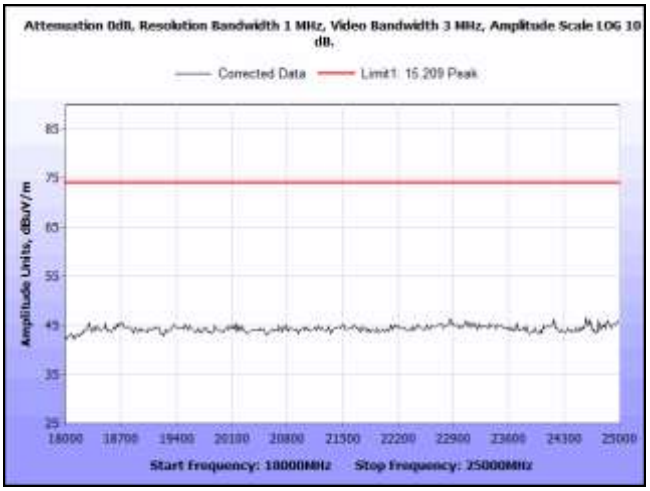
Plot 18. Radiated Emissions, NP10, 18 GHz – 25 GHz, Average Wifi and Bluetooth



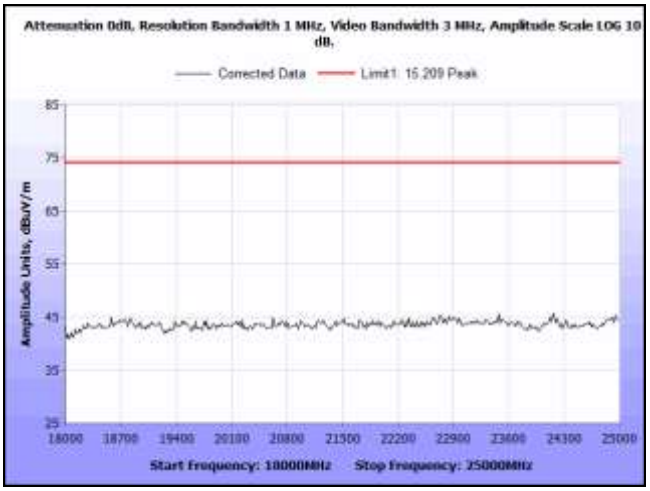
Plot 19. Radiated Emissions, NP10, 18 GHz – 25 GHz, Peak Bluetooth and ETSI Cellular



Plot 20. Radiated Emissions, NP10, 1 GHz – 18 GHz, Average Bluetooth and ETSI Cellular



Plot 21. Radiated Emissions, NP10, 18 GHz – 25 GHz, Peak Wifi and Bluetooth



Plot 22. Radiated Emissions, NP10, 18 GHz – 25 GHz, Peak Bluetooth and FCC Cellular

Frequency (MHz)	EUT Azimuth (Degrees)	Antenna Polarity (H/V)	Antenna HEIGHT (m)	Uncorrected EMI Meter Reading (dBuV)	Antenna Correction Factor (dB/m) (+)	Cable Loss/Pre-amp (dB) (+)	Distance Correction Factor (dB) (-)	Corrected Amplitude (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pass/Fail
*408.76357	33	H	0.9778	25.11	16.58	3.06	0	44.75	46	-1.25	**3 dB**
*408.76357	212	V	0.9873	25.27	16.58	3.06	0	44.91	46	-1.09	**3 dB**
900.03131	194	H	0.9778	19.35	23.00	4.49	0	46.84	46	0.84	**fail**
900.03131	169	V	0.9878	20.24	23.00	4.49	0	47.73	46	1.73	**fail**
39.960233	372	H	1.4221	5.65	15.03	1.08	0	21.76	40	-18.24	pass
39.960233	55	V	1	18.26	15.03	1.08	0	34.37	40	-5.63	pass
67.540354	208	H	4.0208	13.59	8.60	1.37	0	23.56	40	-16.44	pass
67.540354	149	V	1	26.22	8.60	1.37	0	36.19	40	-3.81	pass
211.05375	184	H	1	22.73	11.54	2.18	0	36.45	43.5	-7.05	pass
211.05375	150	V	1.1073	22.2	11.54	2.18	0	35.92	43.5	-7.58	pass

Table 17. Radiated Emissions, NP10, WiFi, Test Results

Note 1: * - At this frequency, the measured electric-field strength exhibits a margin of compliance that is less than 3 dB below the specification limit. We recommend that every emission measured, have at least a 3 dB margin to allow for deviations in the emission characteristics that may occur during the production process.

Note 2: The EUT was tested at 3 m. The data has been corrected for comparison with the 10 m limit using the formula: 20log (3 m/10 m) as expressed in the 'Distance Correction' column.

Note 3: The following sample calculation was used to correct the amplitude (Corrected Amplitude (dBuV/m)= Uncorrected Data+ACF+Cable Loss-Distance Correction Factor).

Note 4: It was determined that at the frequency 900 MHz the measured electric-field strength was due to digital emissions and subject to FCC Class A limits .

Frequency (MHz)	EUT Azimuth (Degrees)	Antenna Polarity (H/V)	Antenna HEIGHT (m)	Uncorrected EMI Meter Reading (dBuV)	Antenna Correction Factor (dB/m) (+)	Cable Loss/Pre-amp (dB) (+)	Distance Correction Factor (dB) (-)	Corrected Amplitude (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pass/Fail
211.08858	180	H	1.0169	22.97	11.54	2.18	0	36.69	43.5	-6.81	pass
211.08858	116	V	1.2091	21.4	11.54	2.18	0	35.12	43.5	-8.38	pass
264.81933	139	H	3.7504	22.05	13.28	2.39	0	37.72	46	-8.28	pass
*264.81933	176	V	1.0691	27.5	13.28	2.39	0	43.17	46	-2.83	**3 dB**
352.91583	320	H	1.6165	24.44	15.52	2.83	0	42.79	46	-3.21	pass
*352.91583	157	V	0.9873	27.08	15.52	2.83	0	45.43	46	-0.57	**3 dB**
*408.78319	318	H	1.0843	26.1	16.58	3.06	0	45.74	46	-0.26	**3 dB**
*408.78319	216	V	1.2656	25.45	16.58	3.06	0	45.09	46	-0.91	**3 dB**
438.97796	293	H	1.1304	16.86	17.28	3.18	0	37.32	46	-8.68	pass
438.97796	152	V	1.0165	22.35	17.28	3.18	0	42.81	46	-3.19	pass
*900.02129	195	H	1.0343	17.63	23.00	4.49	0	45.12	46	-0.88	**3 dB**
900.02129	1	V	1.1156	19.24	23.00	4.49	0	46.73	46	0.73	**fail**

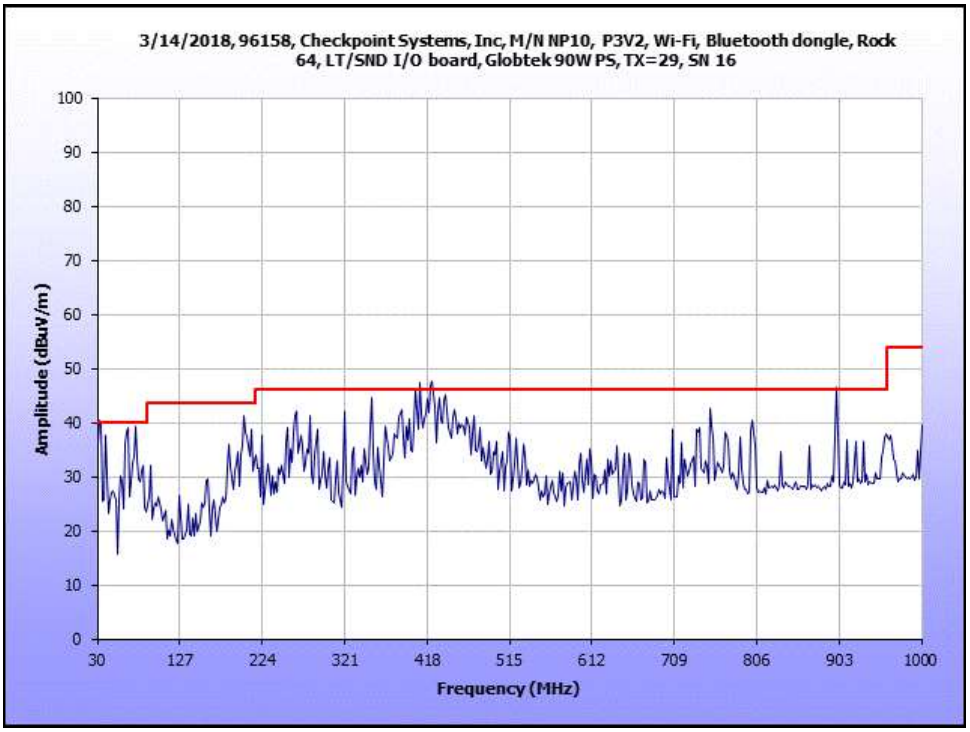
Table 18. Radiated Emissions, NP10, Cellular, Test Results

Note 1: * - At this frequency, the measured electric-field strength exhibits a margin of compliance that is less than 3 dB below the specification limit. We recommend that every emission measured, have at least a 3 dB margin to allow for deviations in the emission characteristics that may occur during the production process.

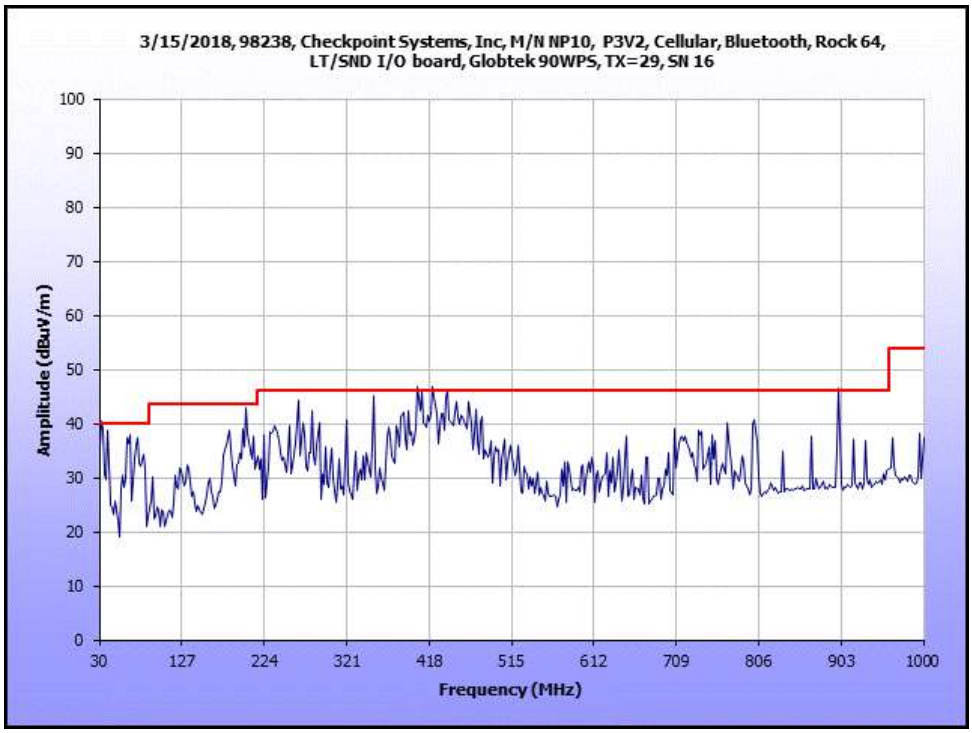
Note 2: The EUT was tested at 3 m. The data has been corrected for comparison with the 10 m limit using the formula: 20log (3 m/10 m) as expressed in the 'Distance Correction' column.

Note 3: The following sample calculation was used to correct the amplitude (Corrected Amplitude (dBuV/m)= Uncorrected Data+ACF+Cable Loss-Distance Correction Factor).

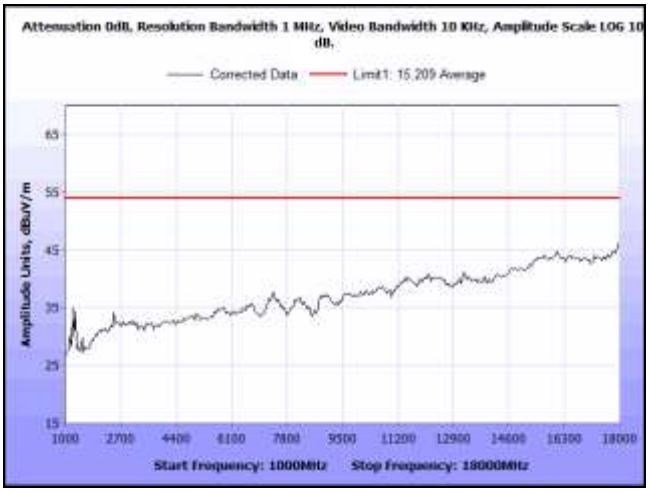
Note 4: It was determined that at the frequency 900 MHz the measured electric-field strength was due to digital emissions and subject to FCC Class A limits .



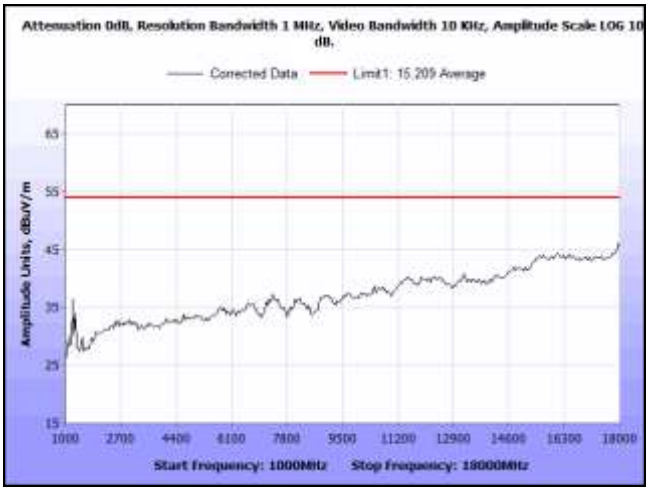
Plot 23. Radiated Emissions, NP10, 15.209, WiFi



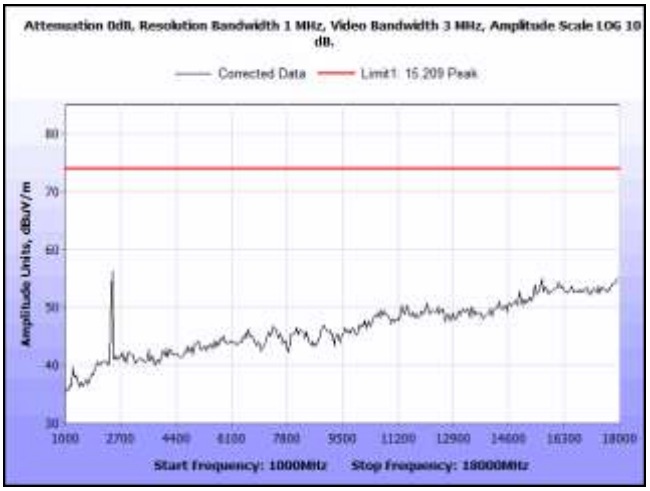
Plot 24. Radiated Emissions, NP10, 15.209, Cellular



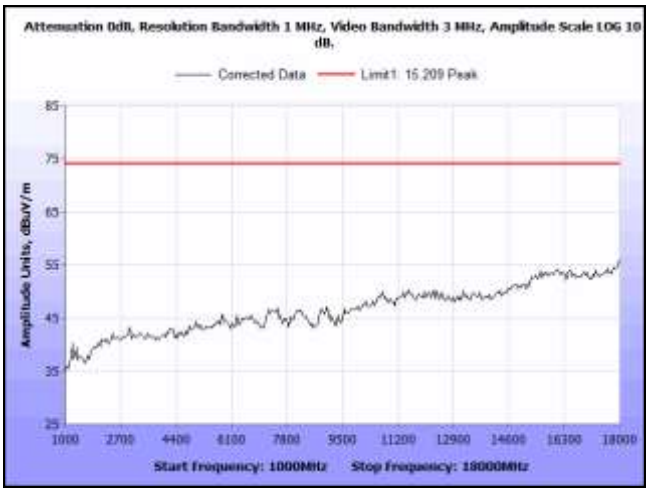
Plot 25. Radiated Emissions, NP20, 1 GHz – 18 GHz, Average Bluetooth and ETSI Cellular



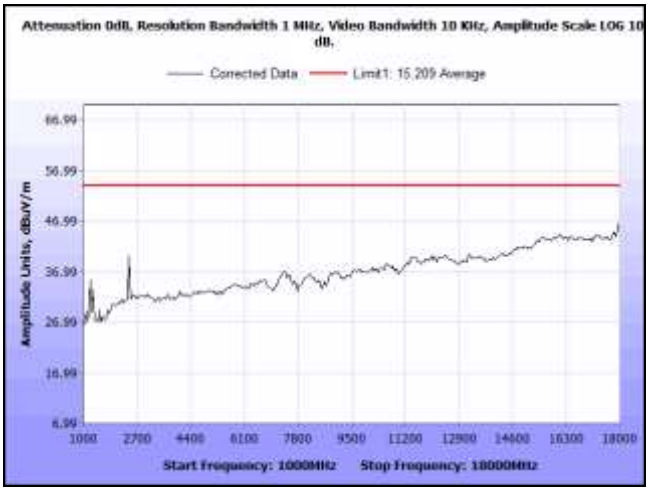
Plot 26. Radiated Emissions, NP20, 1 GHz – 18 GHz, Average Bluetooth and FCC Cellular



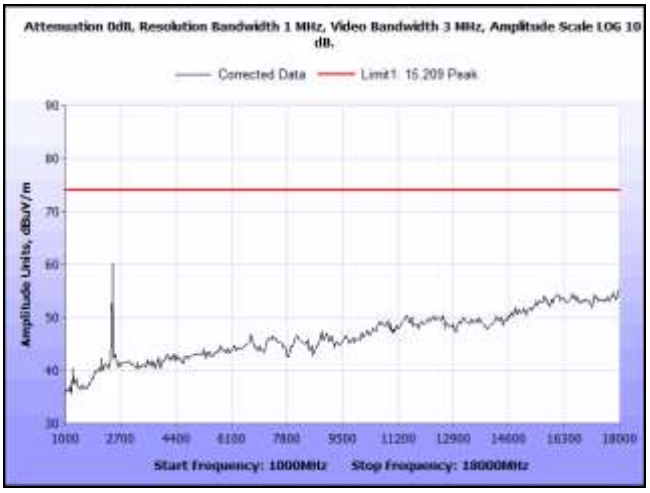
Plot 27. Radiated Emissions, NP20, 1 GHz – 18 GHz, Peak Bluetooth and ETSI Cellular



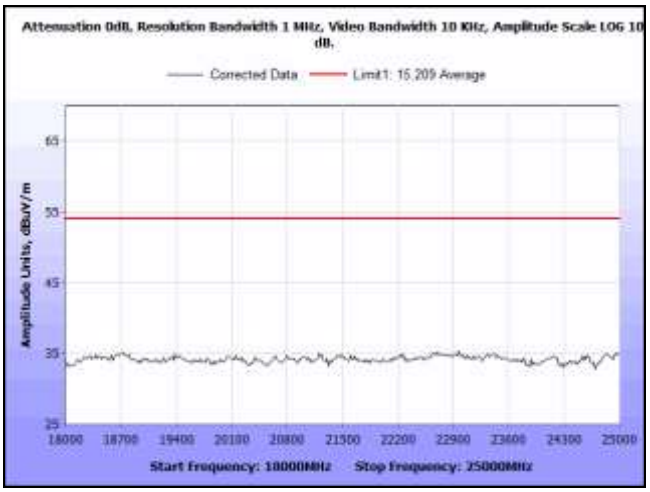
Plot 28. Radiated Emissions, NP20, 1 GHz – 18 GHz, Peak Bluetooth and FCC Cellular



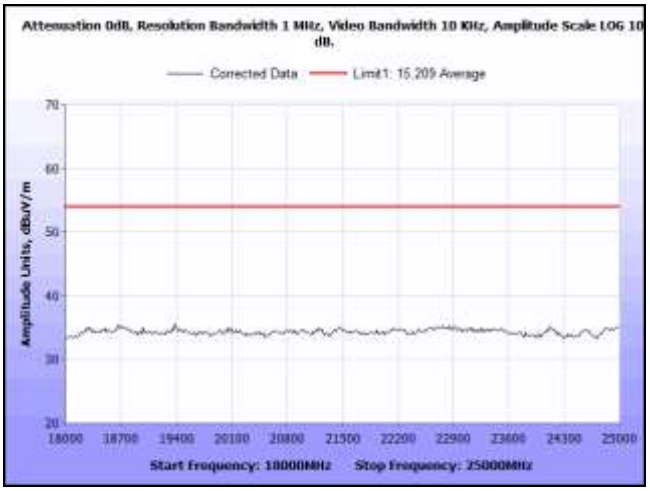
Plot 29. Radiated Emissions, NP20, 1 GHz – 18 GHz, Average Wifi and Bluetooth



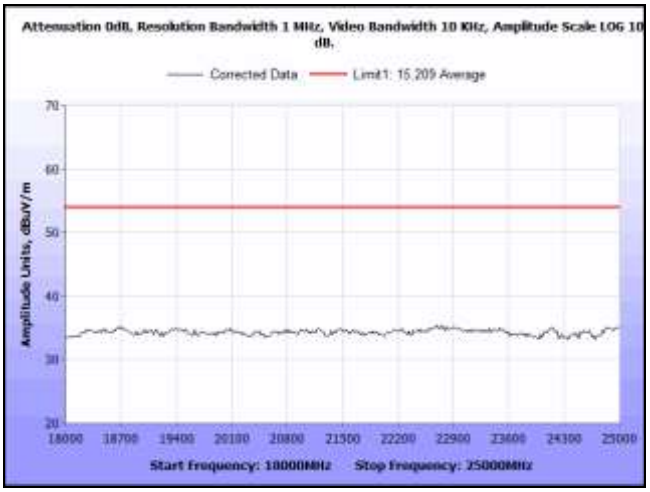
Plot 30. Radiated Emissions, NP20,1 GHz – 18 GHz, Peak Wifi and Bluetooth



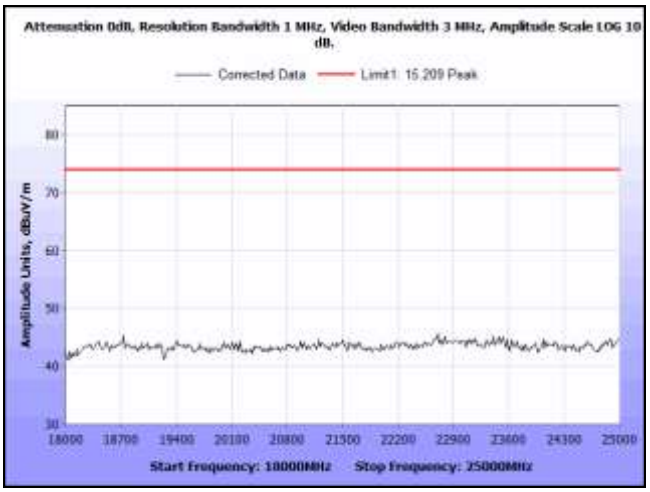
Plot 31. Radiated Emissions, NP20, 18 GHz – 25 GHz, Average Bluetooth and ETSI Cellular



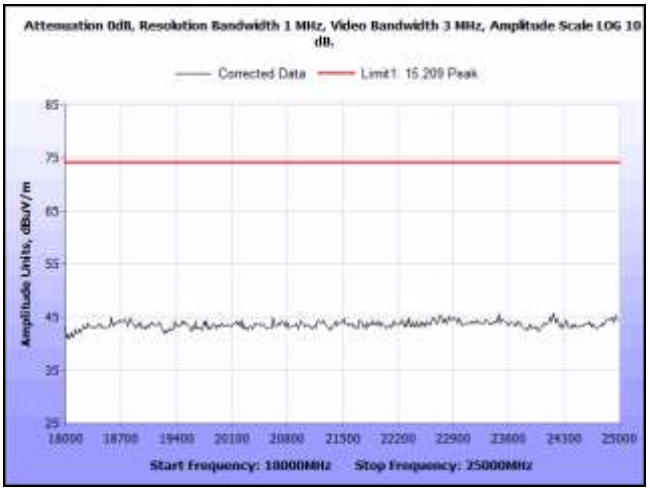
Plot 32. Radiated Emissions, NP20, 18 GHz – 25 GHz, Average Bluetooth and FCC Cellular



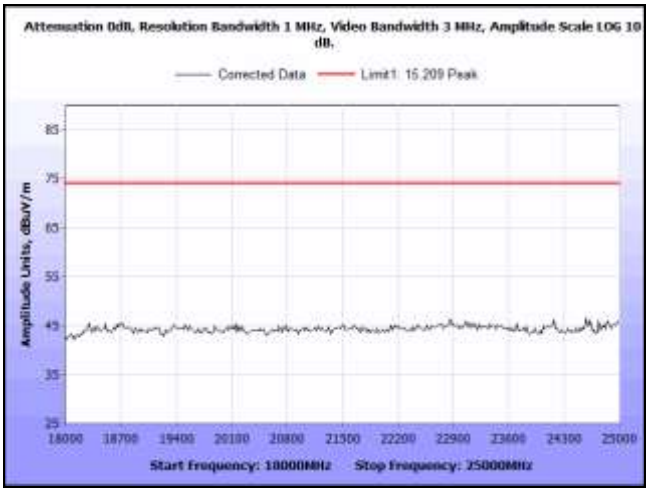
Plot 33. Radiated Emissions, NP20, 18 GHz – 25 GHz, Average Wifi and Bluetooth



Plot 34. Radiated Emissions, NP20, 18 GHz – 25 GHz, Peak Bluetooth and ETSI Cellular



Plot 35. Radiated Emissions, NP20, 18 GHz – 25 GHz, Peak Bluetooth and FCC Cellular



Plot 36. Radiated Emissions, NP20, 18 GHz – 25 GHz, Peak Wifi and Bluetooth

Frequency (MHz)	EUT Azimuth (Degrees)	Antenna Polarity (H/V)	Antenna HEIGHT (m)	Uncorrected EMI Meter Reading (dBuV)	Antenna Correction Factor (dB/m) (+)	Cable Loss/Pre-amp (dB) (+)	Distance Correction Factor (dB) (-)	Corrected Amplitude (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pass/Fail
67.535383	330	H	2.4786	15.66	8.60	1.37	0	25.63	40	-14.37	pass
*67.535383	145	V	1.0917	28.29	8.60	1.37	0	38.26	40	-1.74	**3 dB**
261.71343	148	H	2.3995	25.09	12.97	2.39	0	40.45	46	-5.55	pass
261.71343	-2	V	1.0021	23.22	12.97	2.39	0	38.58	46	-7.42	pass
*413.74507	173	H	1.1726	23.86	16.67	3.09	0	43.62	46	-2.38	**3 dB**
413.74507	191	V	1.2165	22.73	16.67	3.09	0	42.49	46	-3.51	pass
900.00842	316	H	1.0943	19.16	23.00	4.49	0	46.65	46	0.65	**fail**
900.00842	191	V	1	22.11	23.00	4.49	0	49.60	46	3.60	**fail**
*385.00644	6	H	2.3073	26.67	16.10	2.96	0	45.73	46	-0.27	**3 dB**
385.00644	111	V	1.3991	20.1	16.10	2.96	0	39.16	46	-6.84	pass

Table 19. Radiated Emissions, NP20, 15.209, Test Results

Note 1: * - At this frequency, the measured electric-field strength exhibits a margin of compliance that is less than 3 dB below the specification limit. We recommend that every emission measured, have at least a 3 dB margin to allow for deviations in the emission characteristics that may occur during the production process.

Note 2: The EUT was tested at 3 m. The data has been corrected for comparison with the 10 m limit using the formula: 20log (3 m/10 m) as expressed in the 'Distance Correction' column.

Note 3: The following sample calculation was used to correct the amplitude (Corrected Amplitude (dBuV/m)= Uncorrected Data+ACF+Cable Loss-Distance Correction Factor).

Note 4: It was determined that at the frequency 900 MHz the measured electric-field strength was due to digital emissions and subject to FCC Class A limits .

Plot 37. Radiated Emissions, NP20, 15.209, Cellular

Frequency (MHz)	EUT Azimuth (Degrees)	Antenna Polarity (H/V)	Antenna HEIGHT (m)	Uncorrected EMI Meter Reading (dBuV)	Antenna Correction Factor (dB/m) (+)	Cable Loss/Pre-amp (dB) (+)	Distance Correction Factor (dB) (-)	Corrected Amplitude (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pass/Fail
67.560903	1	H	2.533	23.18	8.60	0.90	0	32.68	40	-7.32	pass
*67.560903	259	V	1	30.1	8.60	0.90	0	39.60	40	-0.40	**3 dB**
42.215368	222	H	1.1573	5.57	13.35	0.69	0	19.61	40	-20.39	pass
*42.215368	137	V	1	24.51	13.35	0.69	0	38.55	40	-1.45	**3 dB**
196.34206	177	H	1	24.02	12.97	1.50	0	38.49	43.5	-5.01	pass
*196.34206	282	V	1	26.22	12.97	1.50	0	40.69	43.5	-2.81	**3 dB**
413.75172	178	H	1.163	21.2	16.68	2.11	0	39.99	46	-6.01	pass
413.75172	154	V	1	22.69	16.68	2.11	0	41.48	46	-4.52	pass
*900.00607	170	H	1	19.75	23.00	2.84	0	45.59	46	-0.41	**3 dB**
900.00607	216	V	1	21.3	23.00	2.84	0	47.14	46	1.14	**fail**

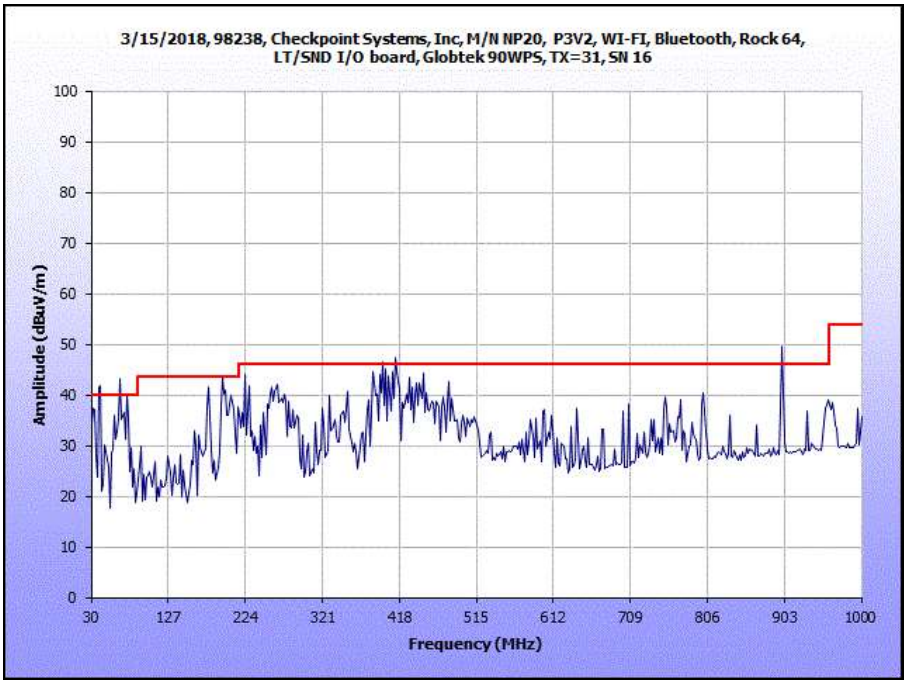
Table 20. Radiated Emissions, NP20, 15.209, WiFi, Test Results

Note 1: * - At this frequency, the measured electric-field strength exhibits a margin of compliance that is less than 3 dB below the specification limit. We recommend that every emission measured, have at least a 3 dB margin to allow for deviations in the emission characteristics that may occur during the production process.

Note 2: The EUT was tested at 3 m. The data has been corrected for comparison with the 10 m limit using the formula: 20log (3 m/10 m) as expressed in the 'Distance Correction' column.

Note 3: The following sample calculation was used to correct the amplitude (Corrected Amplitude (dBuV/m)= Uncorrected Data+ACF+Cable Loss-Distance Correction Factor).

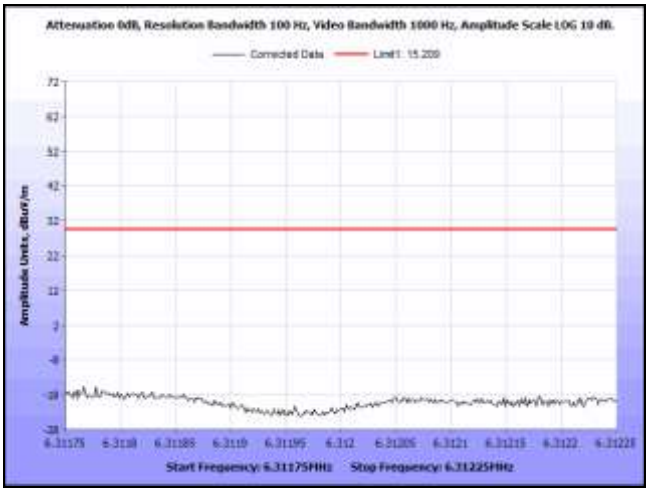
Note 4: It was determined that at the frequency 900 MHz the measured electric-field strength was due to digital emissions and subject to FCC Class A limits .



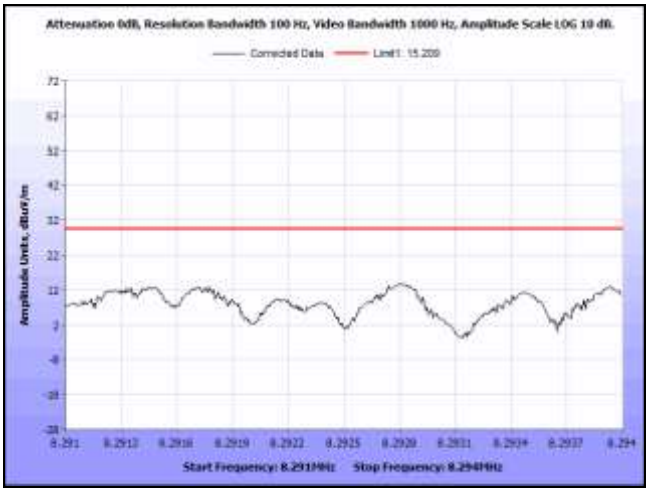
Plot 38. Radiated Emissions, NP20, 15.209, Wifi

Radiated Band Edge Measurements

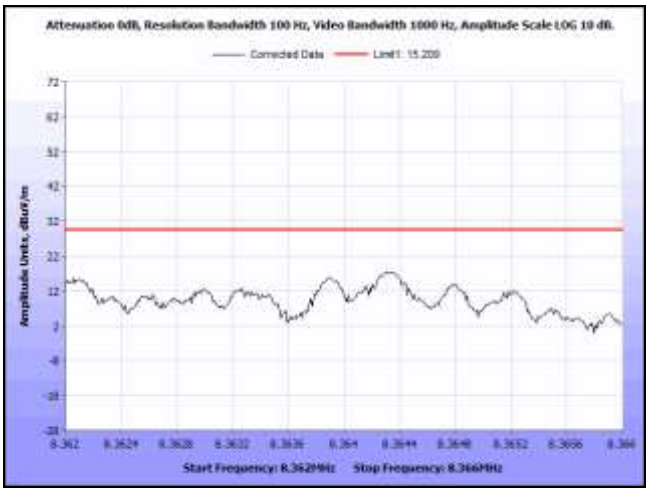
Test Procedures: The transmitter was turned on. Measurements were performed of the low, mid and high Channels. The EUT was rotated orthogonally through all three axes. Plots shown are corrected for both antenna correction factor and distance and compared to a 3 m limit line.



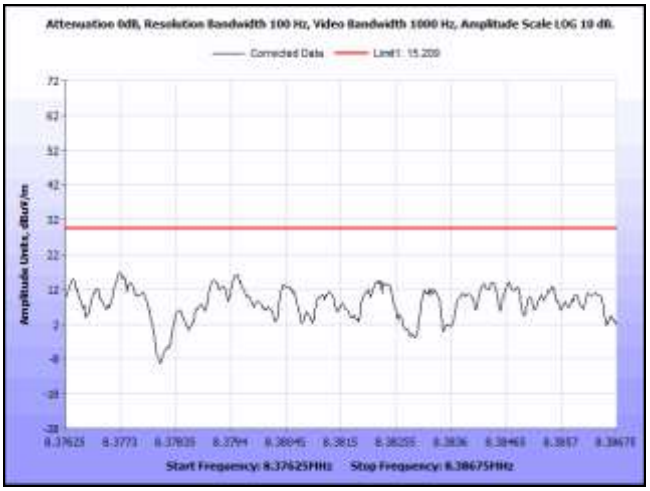
Plot 39. Radiated Restricted Band Edge, NP10, 6.31175 MHz – 6.31225 MHz



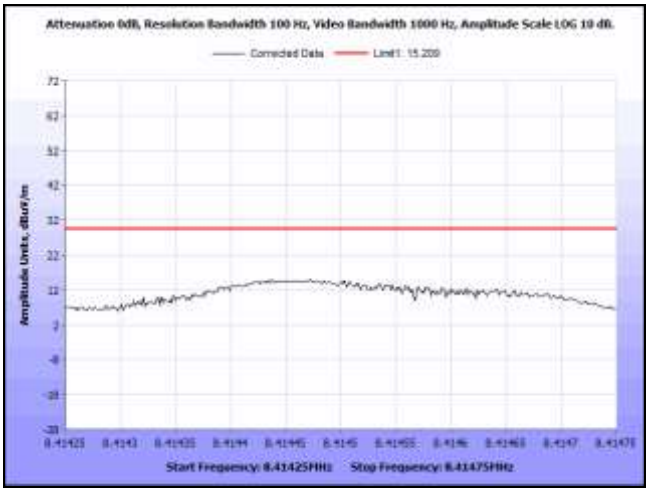
Plot 40. Radiated Restricted Band Edge, NP10, 8.291 MHz – 8.294 MHz



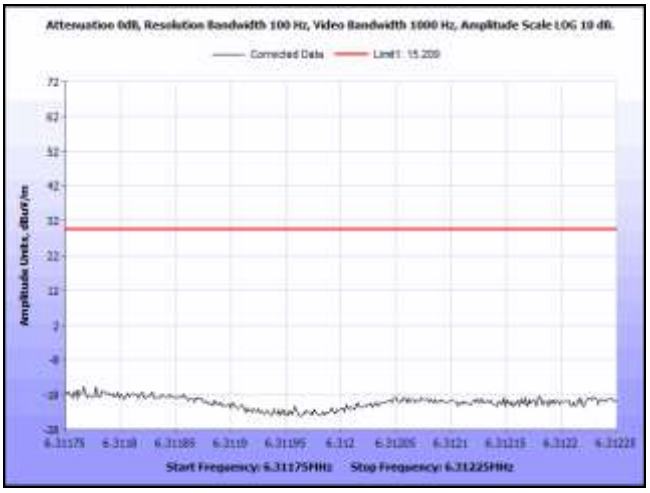
Plot 41. Radiated Restricted Band Edge, NP10, 8.362 MHz – 8.366 MHz



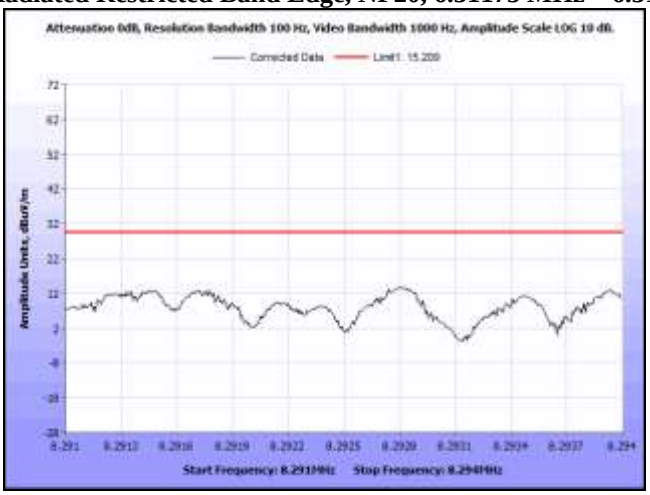
Plot 42. Radiated Restricted Band Edge, NP10, 8.37625 MHz – 8.38675 MHz



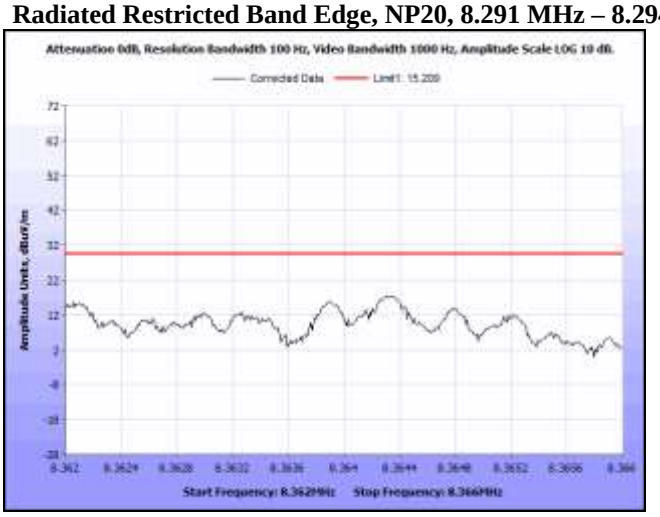
Plot 43. Radiated Restricted Band Edge, NP10, 8.41425 MHz – 8.41475 MHz



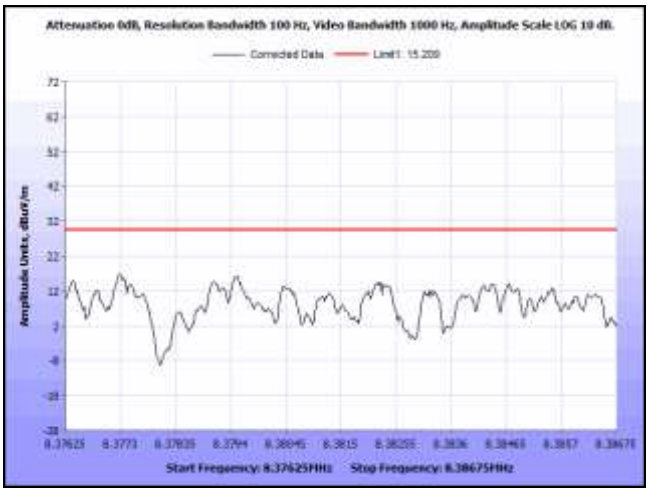
Plot 44. Radiated Restricted Band Edge, NP20, 6.31175 MHz – 6.31225 MHz



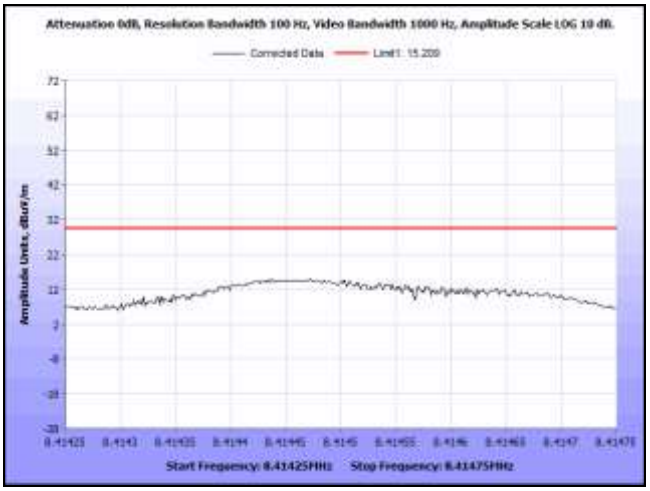
Plot 45. Radiated Restricted Band Edge, NP20, 8.291 MHz – 8.294 MHz



Plot 46. Radiated Restricted Band Edge, NP20, 8.362 MHz – 8.366 MHz



Plot 47. Radiated Restricted Band Edge, NP20, 8.37625 MHz – 8.38675 MHz



Plot 48. Radiated Restricted Band Edge, NP20, 8.41425 MHz – 8.41475 MHz

Electromagnetic Compatibility Emission Criteria

3.4. §15.223(b) Out of Band Emissions

Test Requirement(s): **§15.223 (b)** The field strength of emissions outside of the band 1.705 – 10.0 MHz shall not exceed the general radiated emission limits in Section 15.209.

Test Procedures: The EUT was set to transmit and placed on a turn table inside a semi-anechoic chamber. The method of testing and test conditions of ANSI C63.4: 2003 were used. For measurements below 30 MHz a loop antenna placed 3m away from the unit was used. For measurements above 30 MHz a biconalog antenna placed 3m away from the unit was used. Measurements were conducted with the loop antenna at coaxial (parallel) and planar (perpendicular) orientations.

For investigation of spurious emissions in the restricted bands, measurements were made using a loop antenna at a 10 m distance on the OATS.

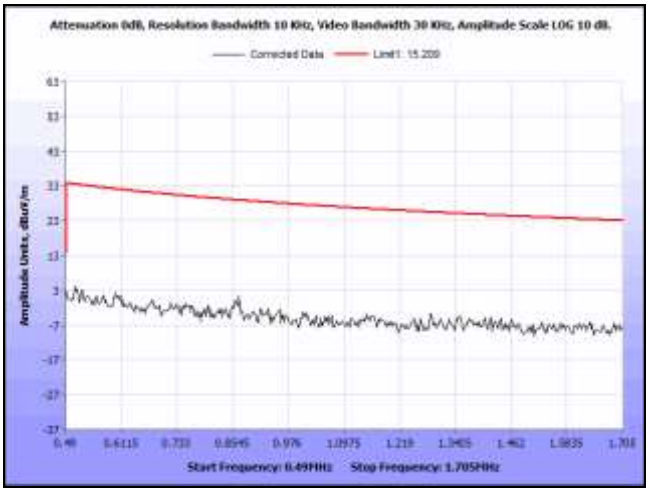
The measurements made at 3 m with the loop antenna were then extrapolated to 30m using the following correction factor.
40log(3/30) = -40 dB

The measurements made at 10 m with the loop antenna were then extrapolated to 30 m using the following correction factor:
40log(10/30) = -19.08 dB

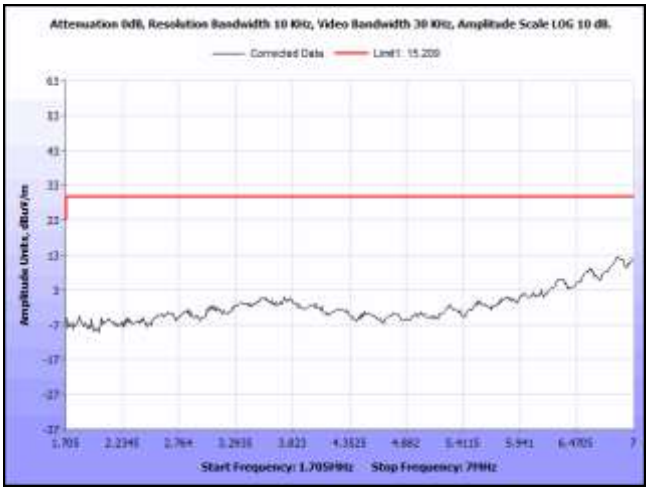
Test Results: The EUT was found compliant with Part 15.223 (b) requirements of this section.

Test Engineer(s): Arsalan Hasan

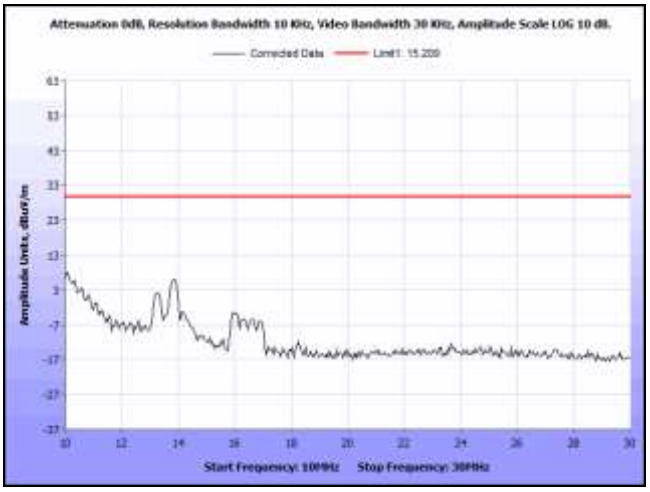
Test Date(s): March 29, 2018



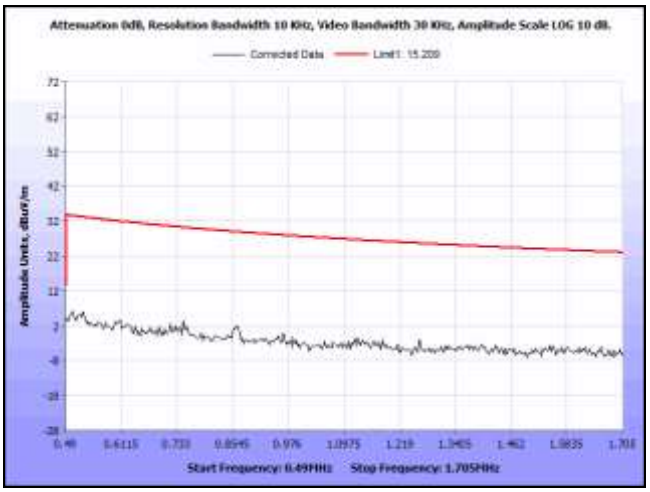
Plot 49. Radiated Spurious Emissions, NP10, 490 kHz – 1.705 MHz



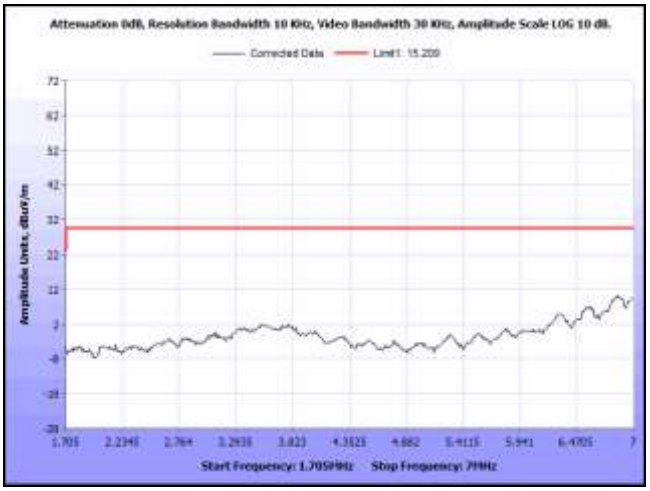
Plot 50. Radiated Spurious Emissions, NP10, 1.705-7 MHz



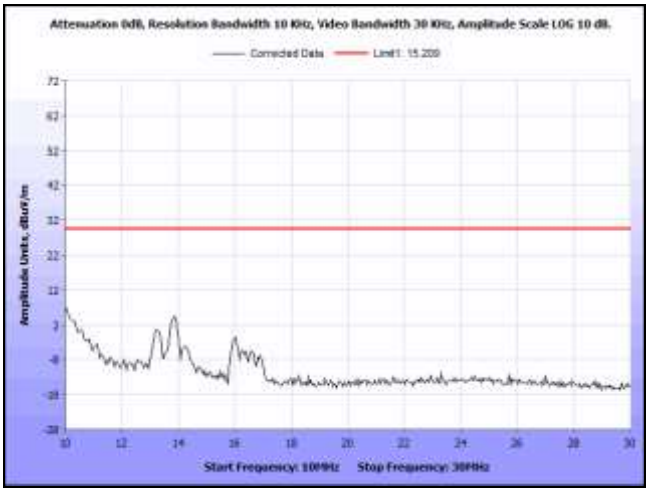
Plot 51. Radiated Spurious Emissions, NP10, 10 – 30 MHz



Plot 52. Radiated Spurious Emissions, NP20, 490 kHz – 1.705 MHz



Plot 53. Radiated Spurious Emissions, NP20, 1.705-7 MHz



Plot 54. Radiated Spurious Emissions, NP20, 10 – 30 MHz

4.0. Test Equipment

Calibrated test equipment utilized during testing was maintained in a current state of calibration per the requirements of ISO/IEC 17025:2005.

Test Name: Conducted Emissions					Test Date: April 2, 2018
MET Asset #	**Equipment**	**Manufacturer**	**Model**	**Last Cal**	**Cal Due**
1A1188	LISN	COM-POWER	CP-L1-150A	6/13/17	6/13/18
1T4621	SPECTRUM ANALYZER	AGILENT TECHNOLOGIES	E4402B	2/28/17	8/28/18
1T4870	THERM./CLOCK/HUMIDITY MONITOR	CONTROL COMPANY	06-662-4, FB70258	3/14/17	3/14/19
Test Name: Radiated Emissions					**Test Date: March 28, 2018**
MET Asset #	**Equipment**	**Manufacturer**	**Model**	**Last Cal**	**Cal Due**
1T4753	ANTENNA - BILOG	SUNOL SCIENCES	JB6	10/24/16	04/24/18
1T4409	EMI RECEIVER	ROHDE & SCHWARZ	ESIB7	12/07/16	12/07/18
1T4300	SEMI-ANECHOIC CHAMBER # 1 (NSA)	EMC TEST SYSTEMS	NONE	NA	
1T4744	Horn Antenna 18 GHz	ETS LINGREN	3116	10/20/2017	4/20/2019
1T4488	Horn Antenna 1 GHz	ETS LINGREN	3117	4/19/2017	10/19/2018
1T4800	Loop Antenna	EMCO	6512	04/12/2017	10/12/2018

Note: Functionally verified test equipment is verified using calibrated instrumentation at the time of testing.

5.0. Compliance Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 2, Subpart I — Marketing of Radio frequency devices:

§ 2.801 Radio-frequency device defined.

As used in this part, a radio-frequency device is any device which in its operation is capable of Emitting radio-frequency energy by radiation, conduction, or other means. Radio- frequency devices include, but are not limited to:

(a) The various types of radio communication transmitting devices described throughout this chapter.

(b) The incidental, unintentional and intentional radiators defined in Part 15 of this chapter.

(c) The industrial, scientific, and medical equipment described in Part 18 of this chapter.

(d) Any part or component thereof which in use emits radio-frequency energy by radiation, conduction, or other means.

§ 2.803 Marketing of radio frequency devices prior to equipment authorization.

(a) Except as provided elsewhere in this chapter, no person shall sell or lease, or offer for sale or lease (including advertising for sale or lease), or import, ship or distribute for the purpose of selling or leasing or offering for sale or lease, any radio frequency device unless:

(1) In the case of a device subject to certification, such device has been authorized by the Commission in accordance with the rules in this chapter and is properly identified and labeled as required by §2.925 and other relevant sections in this chapter; or

(2) In the case of a device that is not required to have a grant of equipment authorization issued by the Commission, but which must comply with the specified technical standards prior to use, such device also complies with all applicable administrative (including verification of the equipment or authorization under a Declaration of Conformity, where required), technical, labeling and identification requirements specified in this chapter.

(d) Notwithstanding the provisions of paragraph (a) of this section, the offer for sale solely to business, commercial, industrial, scientific or medical users (but not an offer for sale to other parties or to end users located in a residential environment) of a radio frequency device that is in the conceptual, developmental, design or pre-production stage is permitted prior to equipment authorization or, for devices not subject to the equipment authorization requirements, prior to a determination of compliance with the applicable technical requirements *provided* that the prospective buyer is advised in writing at the time of the offer for sale that the equipment is subject to the FCC rules and that the equipment will comply with the appropriate rules before delivery to the buyer or to centers of distribution.

(e)(1) Notwithstanding the provisions of paragraph (a) of this section, prior to equipment authorization or determination of compliance with the applicable technical requirements any radio frequency device may be operated, but not marketed, for the following purposes and under the following conditions:

(i) Compliance testing;

(ii) Demonstrations at a trade show provided the notice contained in paragraph (c) of this section is displayed in a conspicuous location on, or immediately adjacent to, the device;

(iii) Demonstrations at an exhibition conducted at a business, commercial, industrial, scientific or medical location, but excluding locations in a residential environment, provided the notice contained in paragraphs (c) or (d) of this section, as appropriate, is displayed in a conspicuous location on, or immediately adjacent to, the device;

(iv) Evaluation of product performance and determination of customer acceptability, provided such operation takes place at the manufacturer's facilities during developmental, design or pre-production states; or

(v) Evaluation of product performance and determination of customer acceptability where customer acceptability of a radio frequency device cannot be determined at the manufacturer's facilities because of size or unique capability of the device, provided the device is operated at a business, commercial, industrial, scientific or medical user's site, but not at a residential site, during the development, design or pre-production stages.

(e)(2) For the purpose of paragraphs (e)(1)(iv) and (e)(1)(v) of this section, the term *manufacturer's facilities* includes the facilities of the party responsible for compliance with the regulations and the manufacturer’s premises, as well as the facilities of other entities working under the authorization of the responsible party in connection with the development and manufacture, but not the marketing, of the equipment.

(f) For radio frequency devices subject to verification and sold solely to business, commercial, industrial, scientific and medical users (excluding products sold to other parties or for operation in a residential environment), parties responsible for verification of the devices shall have the option of ensuring compliance with the applicable technical specifications of this chapter at each end user's location after installation, provided that the purchase or lease agreement includes a provision that such a determination of compliance be made and is the responsibility of the party responsible for verification of the equipment.

The following is extracted from Title 47 of the Code of Federal Regulations, Part 2, Subpart J — Equipment Authorization Procedures:

§ 2.901 Basis and Purpose

(a) In order to carry out its responsibilities under the Communications Act and the various treaties and international regulations, and in order to promote efficient use of the radio spectrum, the Commission has developed technical standards for radio frequency equipment and parts or components thereof. The technical standards applicable to individual types of equipment are found in that part of the rules governing the service wherein the equipment is to be operated.[1] *In addition to the technical standards provided, the rules governing the service may require that such equipment be verified by the manufacturer or importer,* be authorized under a Declaration of Conformity, or receive an equipment authorization from the Commission by one of the following procedures: certification or registration.

(b) The following sections describe the verification procedure, the procedure for a Declaration of Conformity, and the procedures to be followed in obtaining certification from the Commission and the conditions attendant to such a grant.

§ 2.948 Description of measurement facilities.

(a) Each party making measurements of equipment that is subject to an equipment authorization under Part 15 or Part 18 of this chapter, regardless of whether the measurements are filed with the Commission or kept on file by the party responsible for compliance of equipment marketed within the U.S. or its possessions, shall compile a description of the measurement facilities employed.

(1) If the measured equipment is subject to the verification procedure, the description of the measurement facilities shall be retained by the party responsible for verification of the equipment.

(i) If the equipment is verified through measurements performed by an independent laboratory, it is acceptable for the party responsible for verification of the equipment to rely upon the description of the measurement facilities retained by or placed on file with the Commission by that laboratory. In this situation, the party responsible for the verification of the equipment is not required to retain a duplicate copy of the description of the measurement facilities.

(ii) If the equipment is verified based on measurements performed at the installation site of the equipment, no specific site calibration data is required. It is acceptable to retain the description of the measurement facilities at the site at which the measurements were performed.

[1] In this case, the equipment is subject to the rules of Part 15. More specifically, the equipment falls under Subpart C (of Part 15), which deals with unintentional radiators.

(2) If the equipment is to be authorized by the Commission under the certification procedure, the description of the measurement facilities shall be filed with the Commission's Laboratory in Columbia, Maryland. The data describing the measurement facilities need only be filed once but must be updated as changes are made to the measurement facilities or as otherwise described in this section. At least every three years, the organization responsible for filing the data with the Commission shall certify that the data on file is current.

§ 2.955 Retention of records.

(a) For each equipment subject to verification, the responsible party, as shown in §2.909 shall maintain the records listed as follows:

(1) A record of the original design drawings and specifications and all changes that have been made that may affect compliance with the requirements of §2.953.

(2) A record of the procedures used for production inspection and testing (if tests were performed) to insure the conformance required by §2.953. (Statistical production line Emission testing is not required.)

(b) The records listed in paragraph (a) of this section shall be retained for two years after the manufacture of said equipment item has been permanently discontinued, or until the conclusion of an investigation or a proceeding if the manufacturer or importer is officially notified that an investigation or any other administrative proceeding involving his equipment has been instituted.

§ 2.956 FCC inspection and submission of equipment for testing.

(a) Each responsible party shall upon receipt of reasonable request:

(1) Submit to the Commission the records required by §2.955.

(2) Submit one or more sample units for measurements at the Commission's Laboratory.

(i) Shipping costs to the Commission’s Laboratory and return shall be borne by the responsible party.

(ii) In the event the responsible party believes that shipment of the sample to the Commission's Laboratory is impractical because of the size or weight of the equipment, or the power requirement or for any other reason, the responsible party may submit a written explanation why such shipment is impractical and should not be required.

6.0. Label and User's Manual Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 15, Subpart A — General:

§ 15.19 Labeling requirements.

(a) In addition to the requirements in Part 2 of this chapter, a device subject to certification or verification shall be labeled as follows:

(1) Receivers associated with the operation of a licensed radio service, e.g., FM broadcast under Part 73 of this chapter, land mobile operation under Part 90, etc., shall bear the following statement in a conspicuous location on the device:

This device complies with Part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference.

(2) A stand-alone cable input selector switch, shall bear the following statement in a conspicuous location on the device:

This device is verified to comply with Part 15 of the FCC Rules for use with cable television service.

(3) All other devices shall bear the following statement in a conspicuous location on the device:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

(4) Where a device is constructed in two or more sections connected by wires and marketed together, the statement specified under paragraph (a) of this section is required to be affixed only to the main control unit.

(5) When the device is so small or for such use that it is not practicable to place the statement specified under paragraph (a) of this section on it, the information required by this paragraph shall be placed in a prominent location in the instruction manual or pamphlet supplied to the user or, alternatively, shall be placed on the container in which the device is marketed. However, the FCC identifier or the unique identifier, as appropriate, must be displayed on the device.

§ 15.21 Information to user.

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

The following is extracted from Title 47 of the Code of Federal Regulations, Part 15, Subpart C — Unintentional Radiators:

§ 15.105 Information to the user.

(a) For a Class A digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at own expense.

(b) For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful power line and ground at the power terminal. The lower limit applies at the band edges.

End of Report