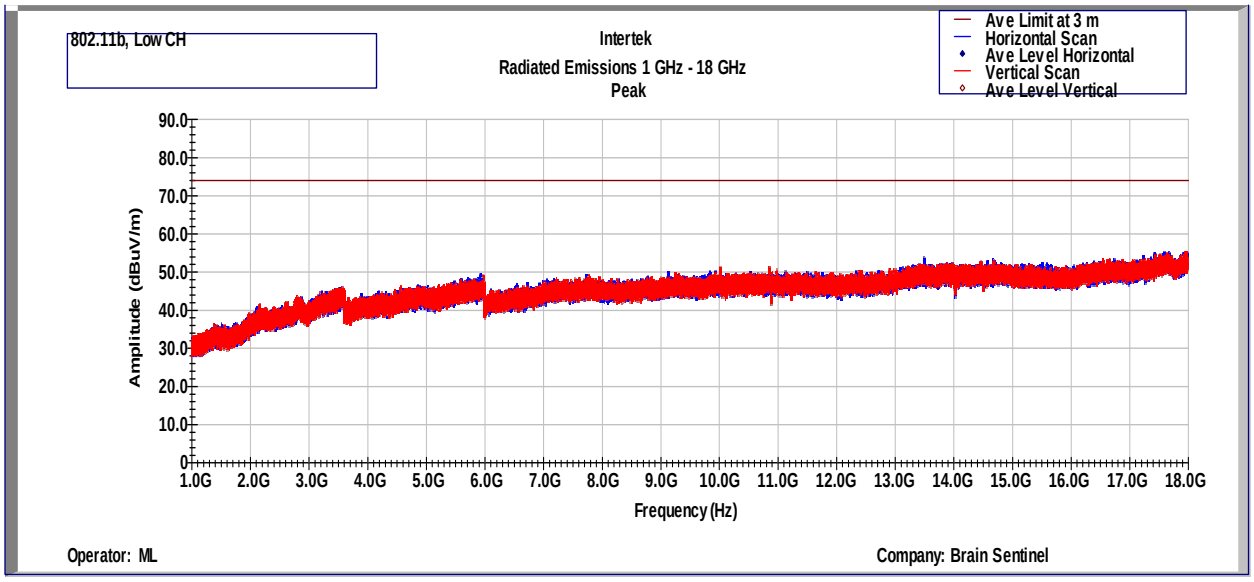
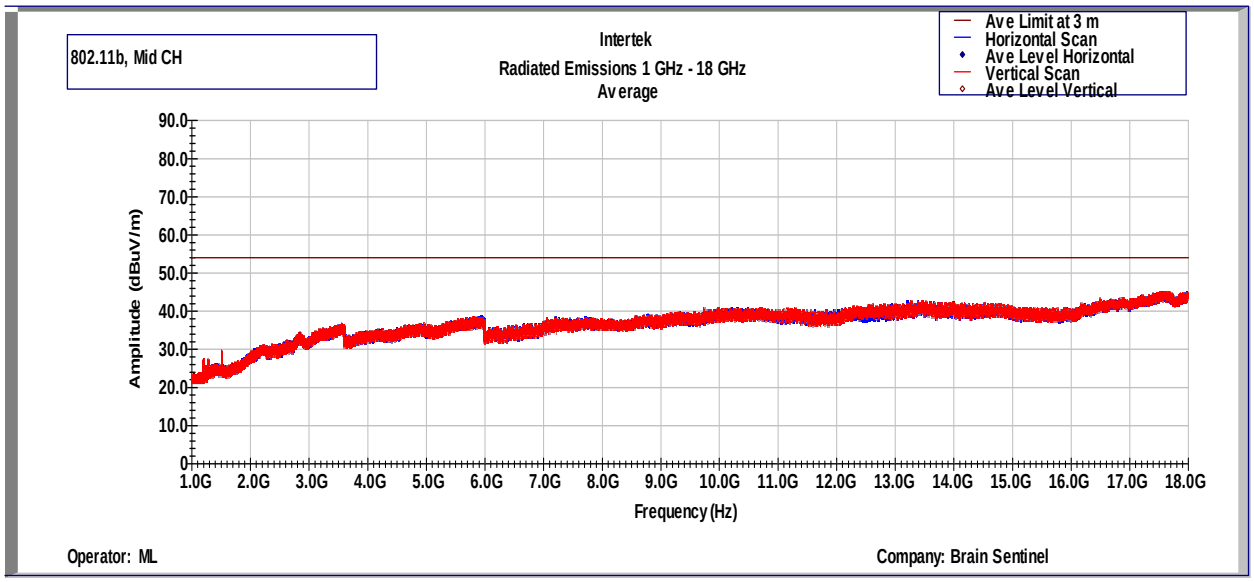
Out-of-Band Radiated Spurious Emissions (Cabinet Radiation) - 1 GHz to 18 GHz, Peak



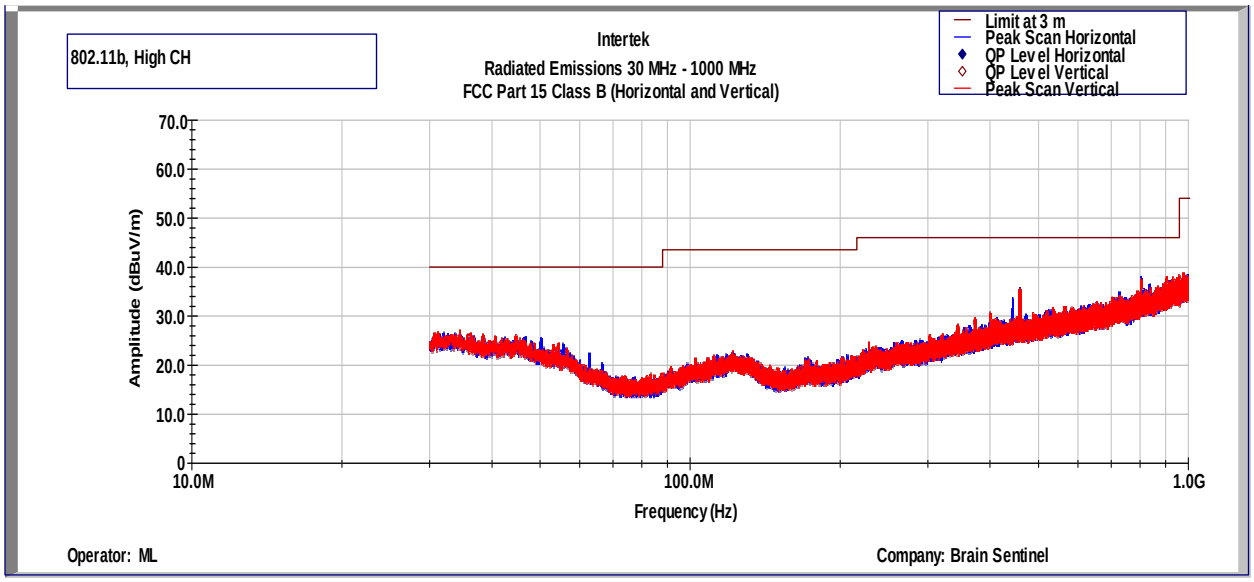
Out-of-Band Radiated Spurious Emissions (Cabinet Radiation) - 1 GHz to 18 GHz, Average



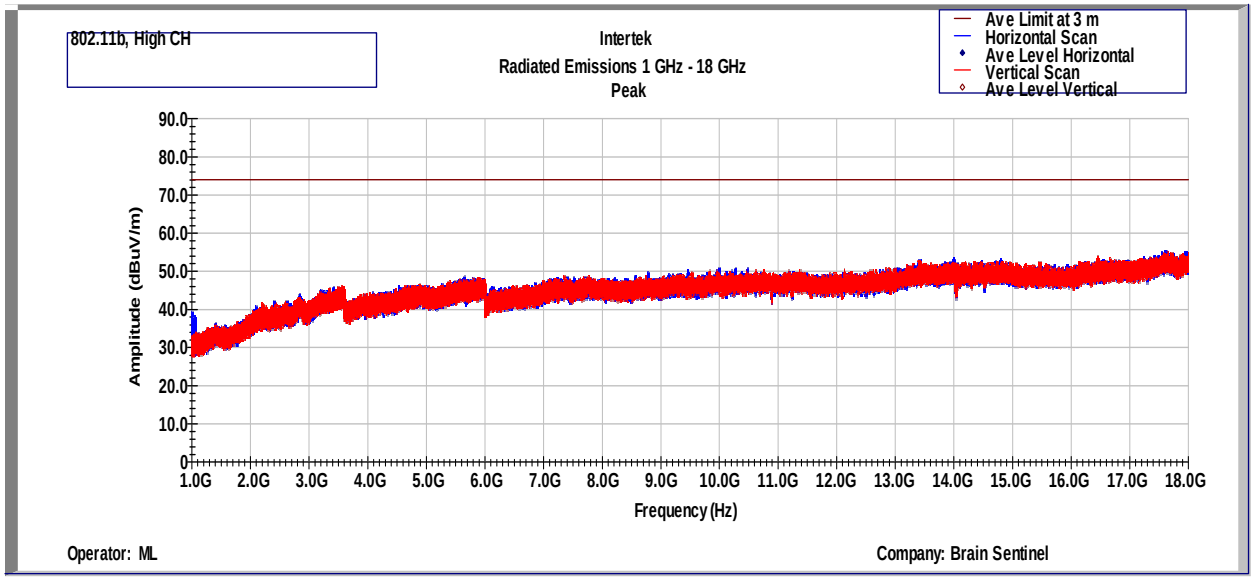
Note: Radiated emission measurements were performed up to 25GHz. No Emissions were identified when scanned from 18-25 GHz

Tx @ 2462MHz 802.11b

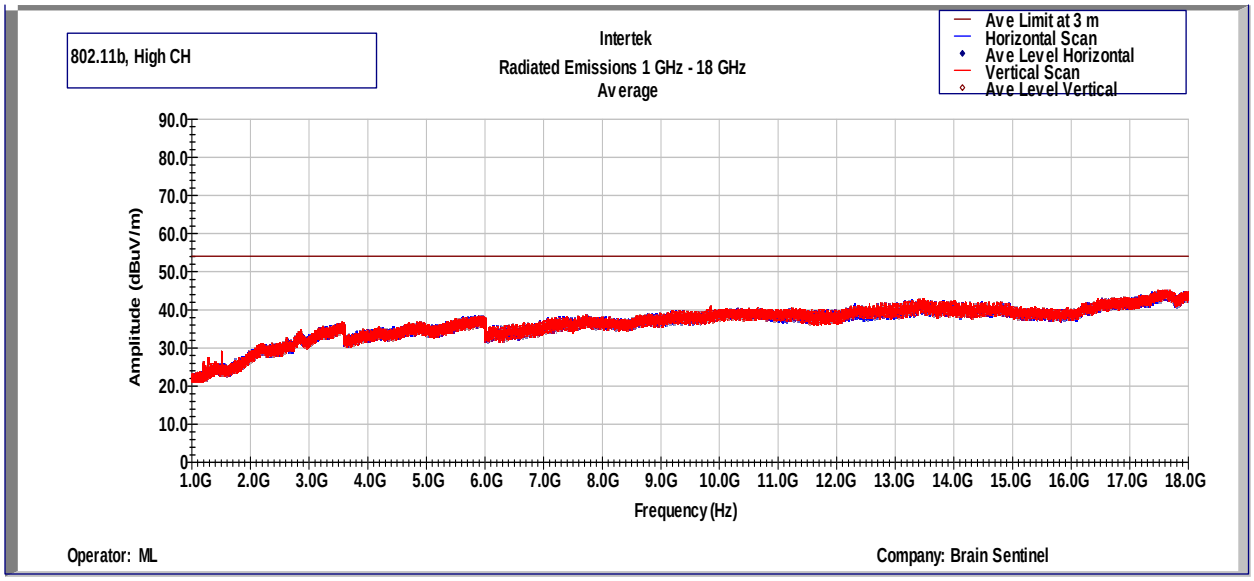
Out-of-Band Radiated Spurious Emissions (Cabinet Radiation) - 30 MHz to 1 GHz



Out-of-Band Radiated Spurious Emissions (Cabinet Radiation) - 1 GHz to 18 GHz, Peak



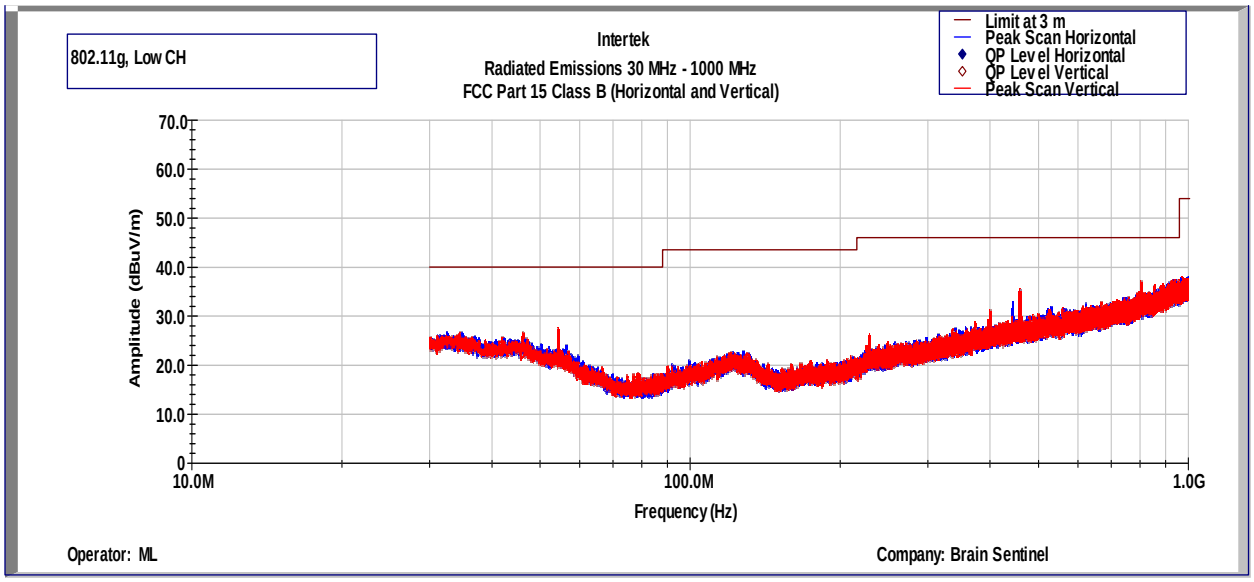
Out-of-Band Radiated Spurious Emissions (Cabinet Radiation) - 1 GHz to 18 GHz, Average



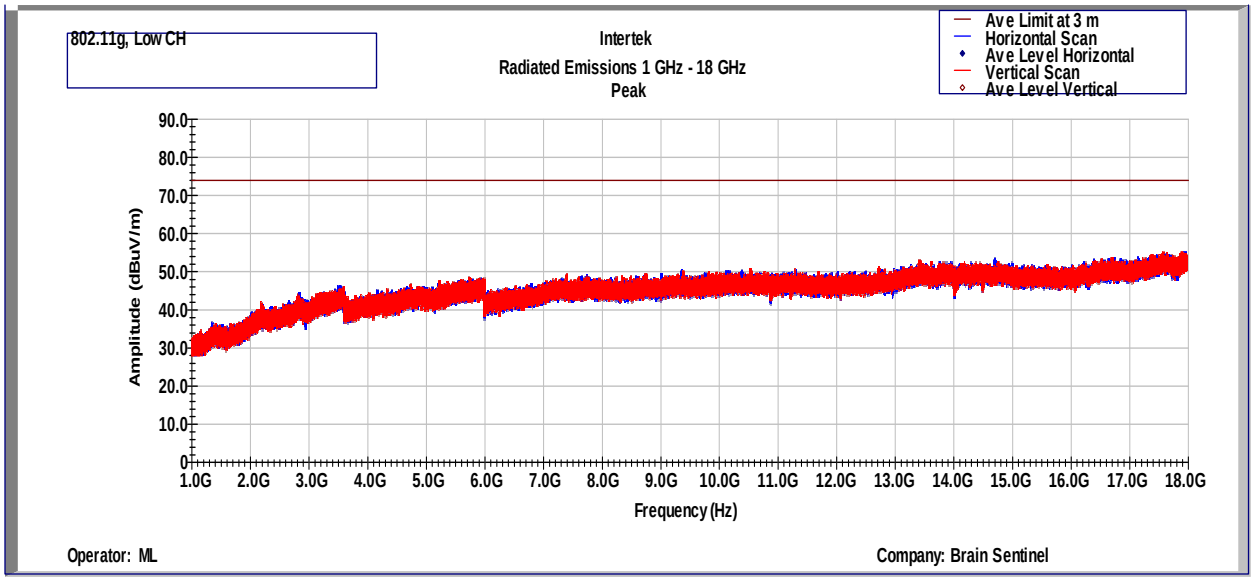
Note: Radiated emission measurements were performed up to 25GHz. No Emissions were identified when scanned from 18-25 GHz

Tx @ 2412MHz 802.11g

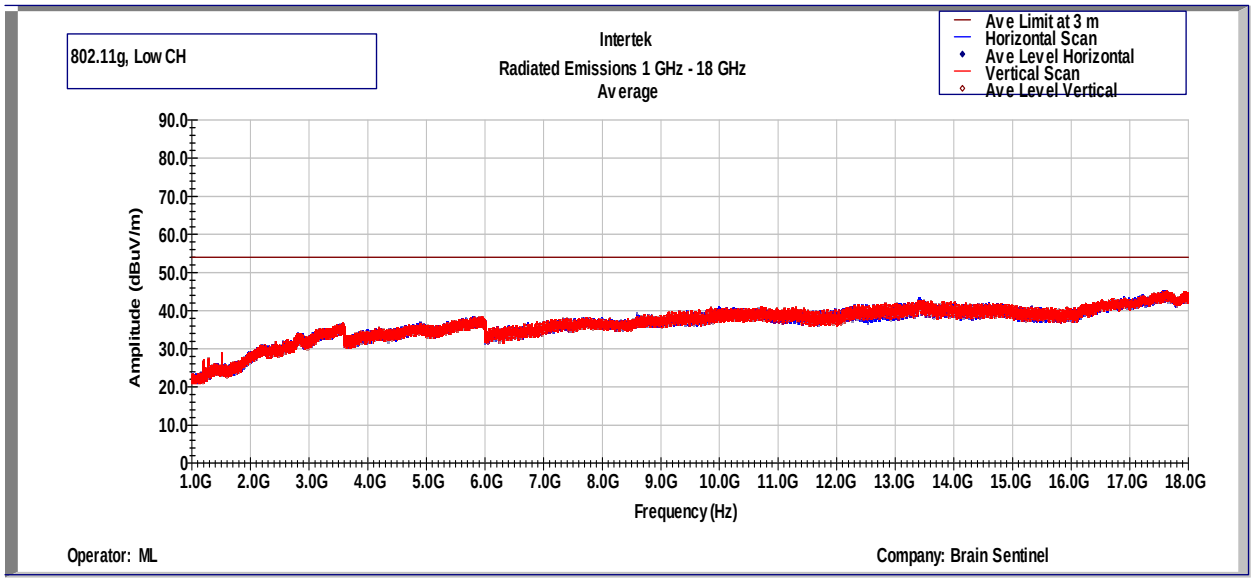
Out-of-Band Radiated Spurious Emissions (Cabinet Radiation) - 30 MHz to 1 GHz



Out-of-Band Radiated Spurious Emissions (Cabinet Radiation) - 1 GHz to 18 GHz, Peak



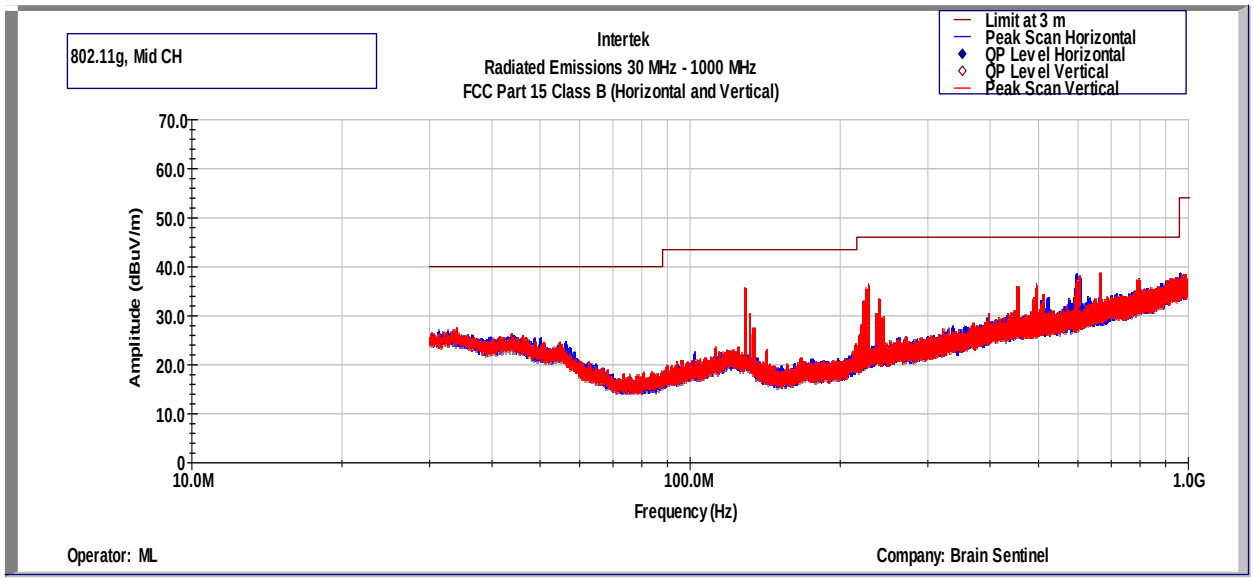
Out-of-Band Radiated Spurious Emissions (Cabinet Radiation) - 1 GHz to 18 GHz, Average



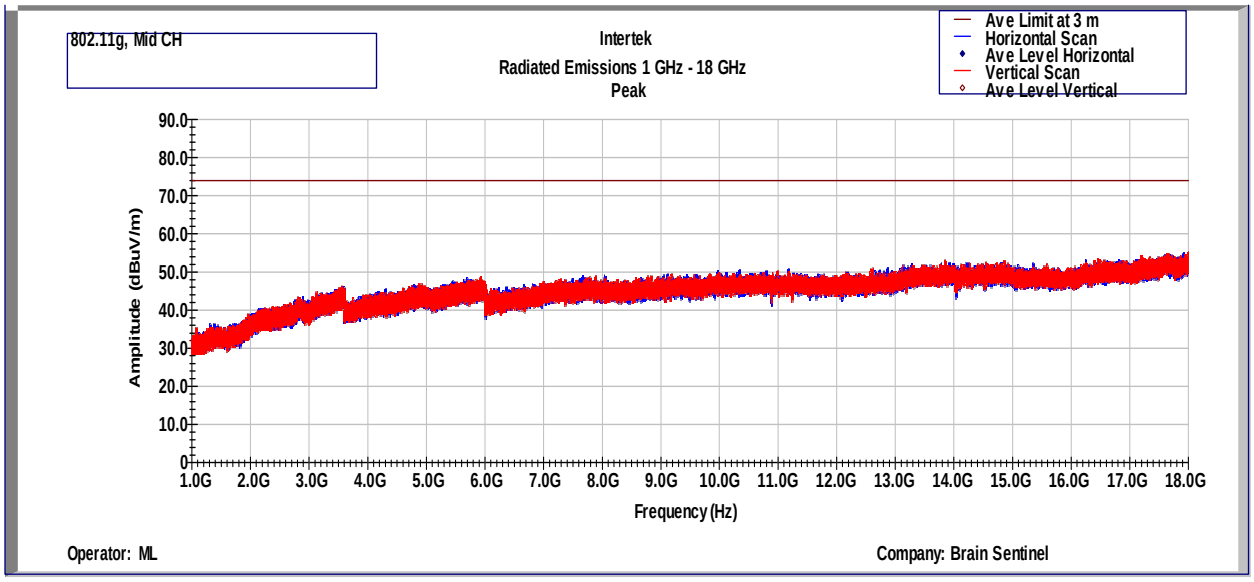
Note: Radiated emission measurements were performed up to 25GHz. No Emissions were identified when scanned from 18-25 GHz

Tx @ 2437MHz 802.11g

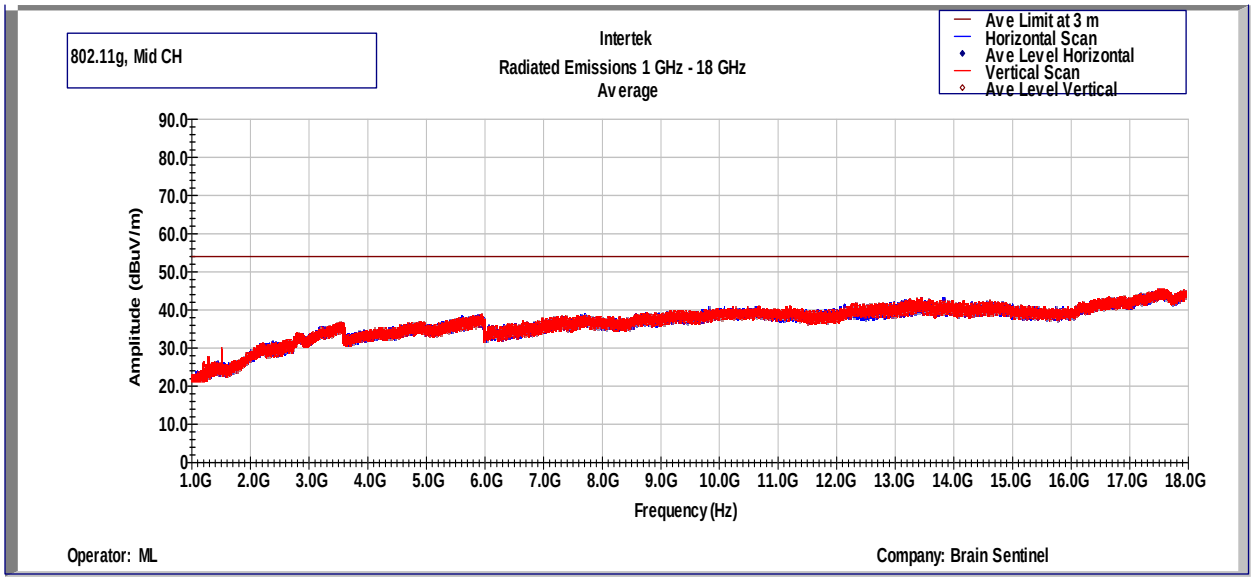
Out-of-Band Radiated Spurious Emissions (Cabinet Radiation) - 30 MHz to 1 GHz



Out-of-Band Radiated Spurious Emissions (Cabinet Radiation) - 1 GHz to 18 GHz, Peak



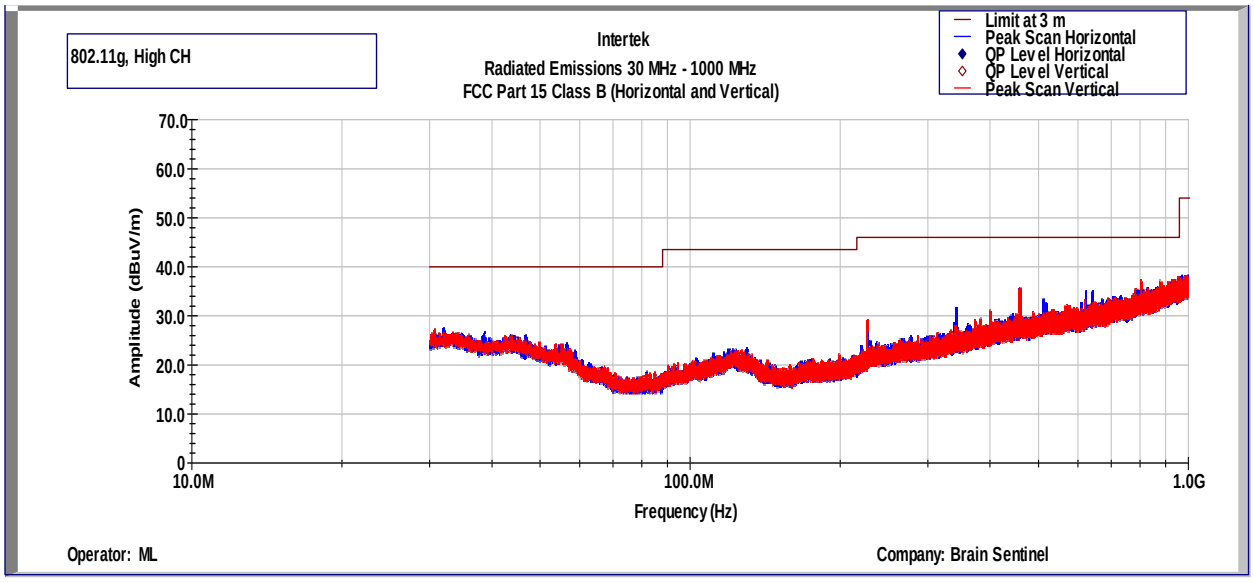
Out-of-Band Radiated Spurious Emissions (Cabinet Radiation) - 1 GHz to 18 GHz, Average



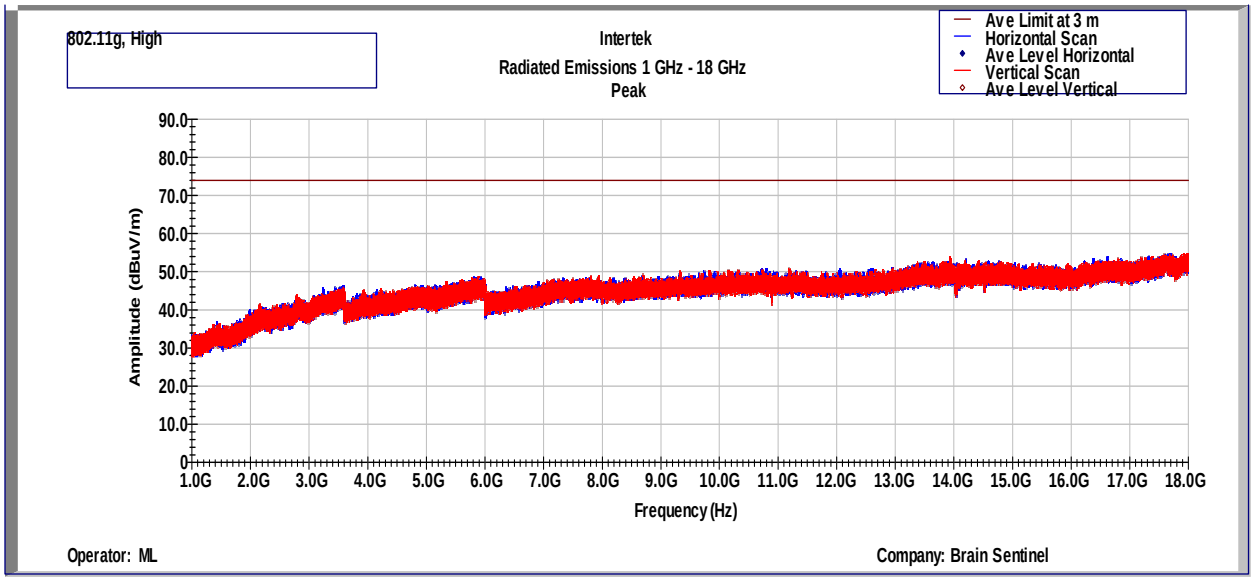
Note: Radiated emission measurements were performed up to 25GHz. No Emissions were identified when scanned from 18-25 GHz

Tx @ 2462MHz 802.11g

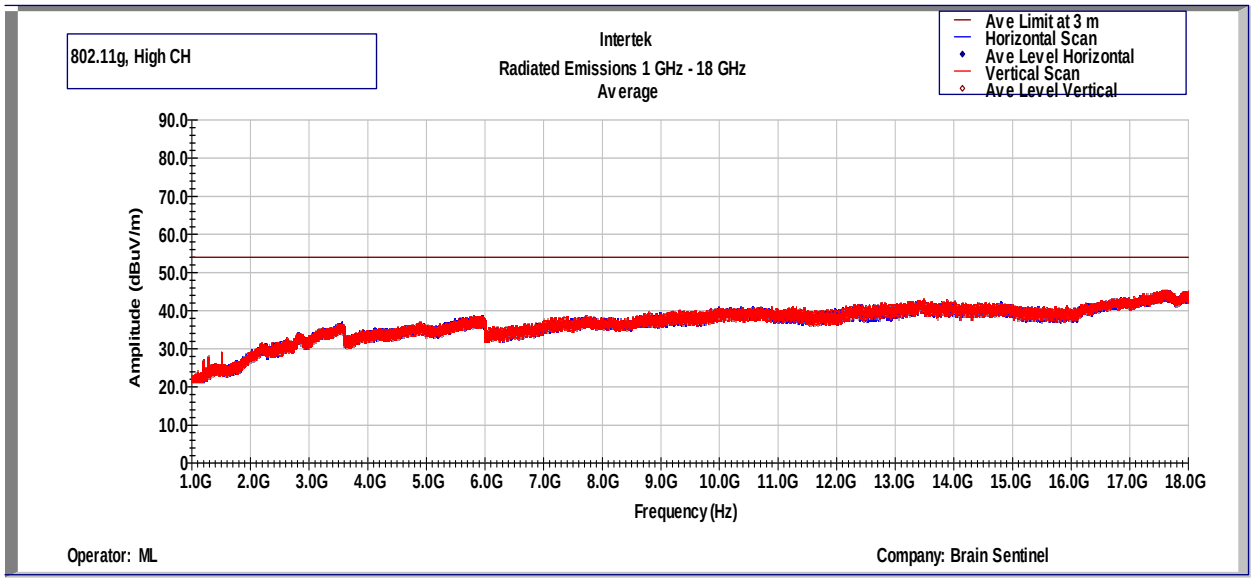
Out-of-Band Radiated Spurious Emissions (Cabinet Radiation) - 30 MHz to 1 GHz



Out-of-Band Radiated Spurious Emissions (Cabinet Radiation) - 1 GHz to 18 GHz, Peak



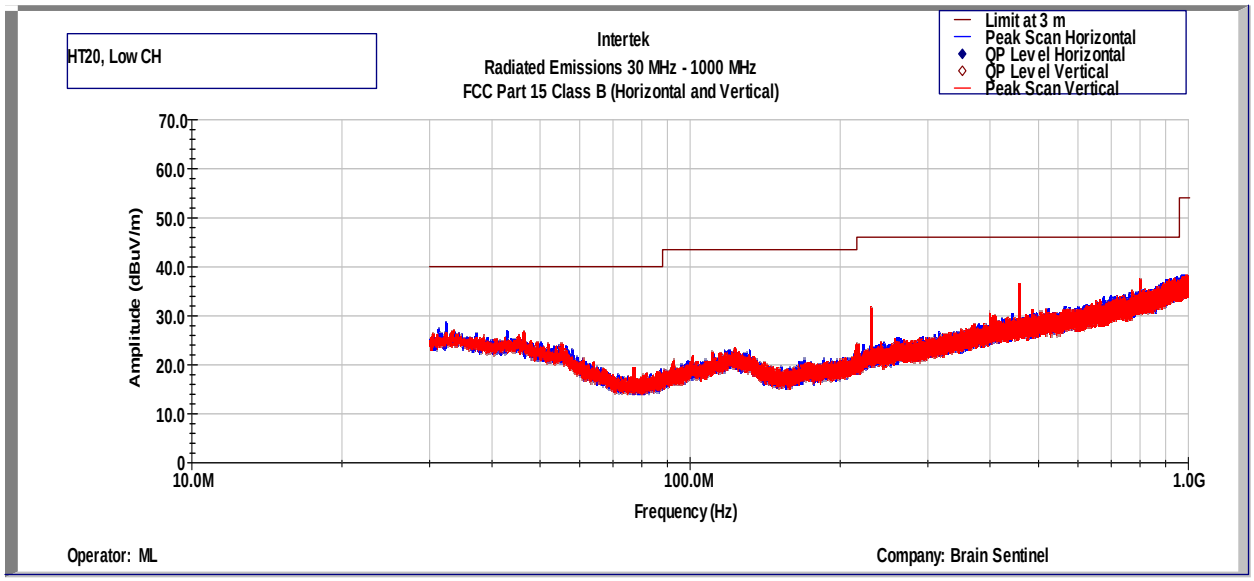
Out-of-Band Radiated Spurious Emissions (Cabinet Radiation) - 1 GHz to 18 GHz, Average



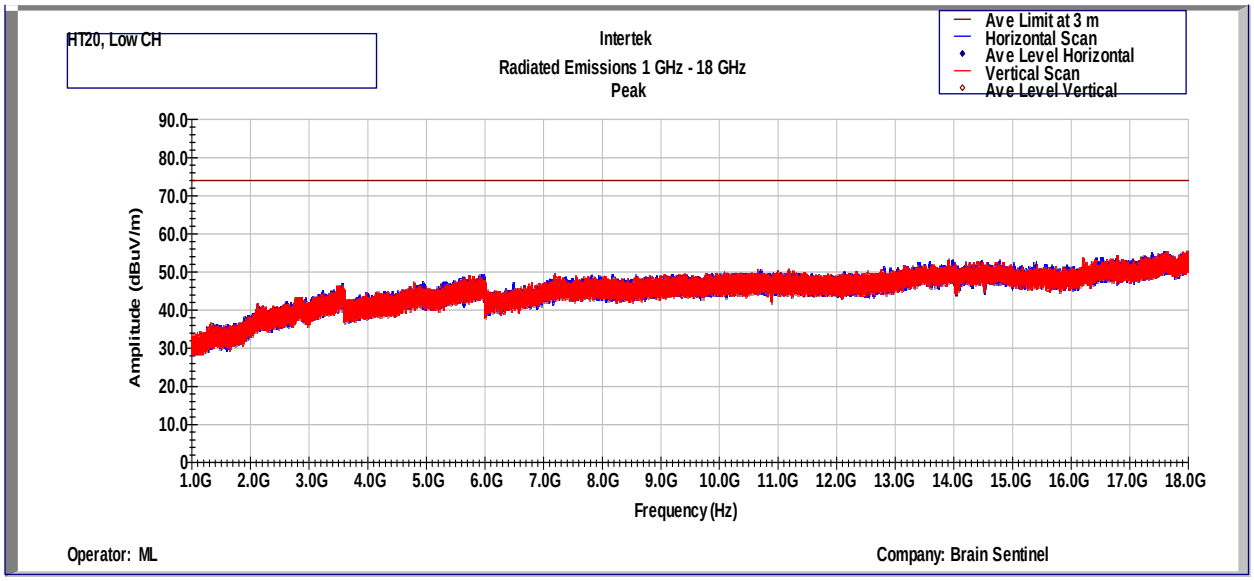
Note: Radiated emission measurements were performed up to 25GHz. No Emissions were identified when scanned from 18-25 GHz

Tx @ 2412MHz 802.11n, 20MHz

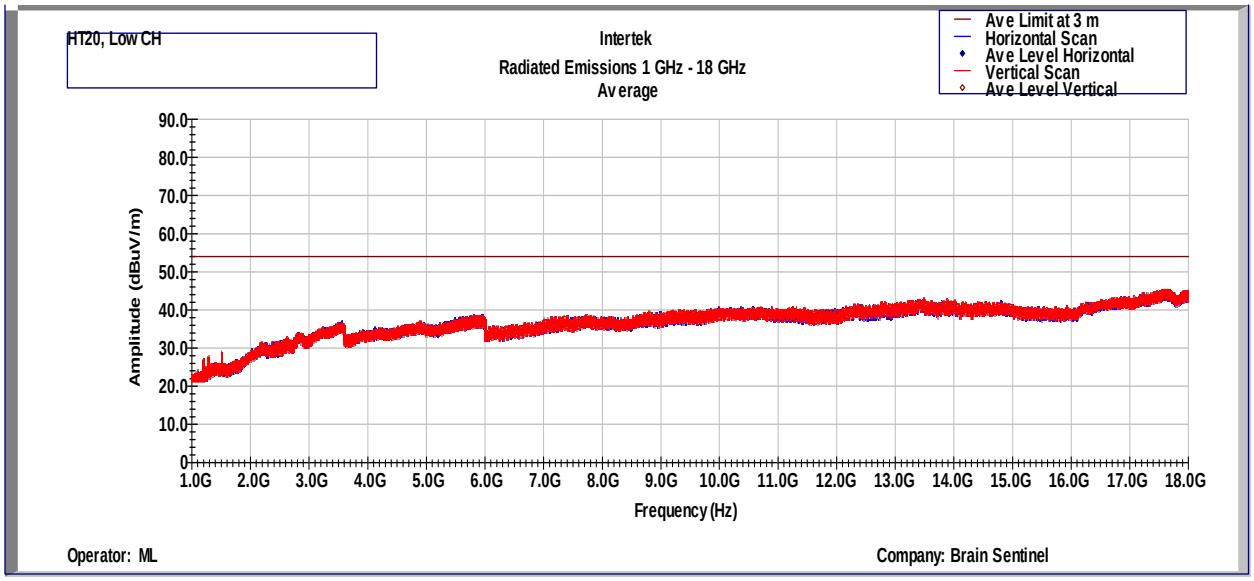
Out-of-Band Radiated Spurious Emissions (Cabinet Radiation) - 30 MHz to 1 GHz



Out-of-Band Radiated Spurious Emissions (Cabinet Radiation) - 1 GHz to 18 GHz, Peak



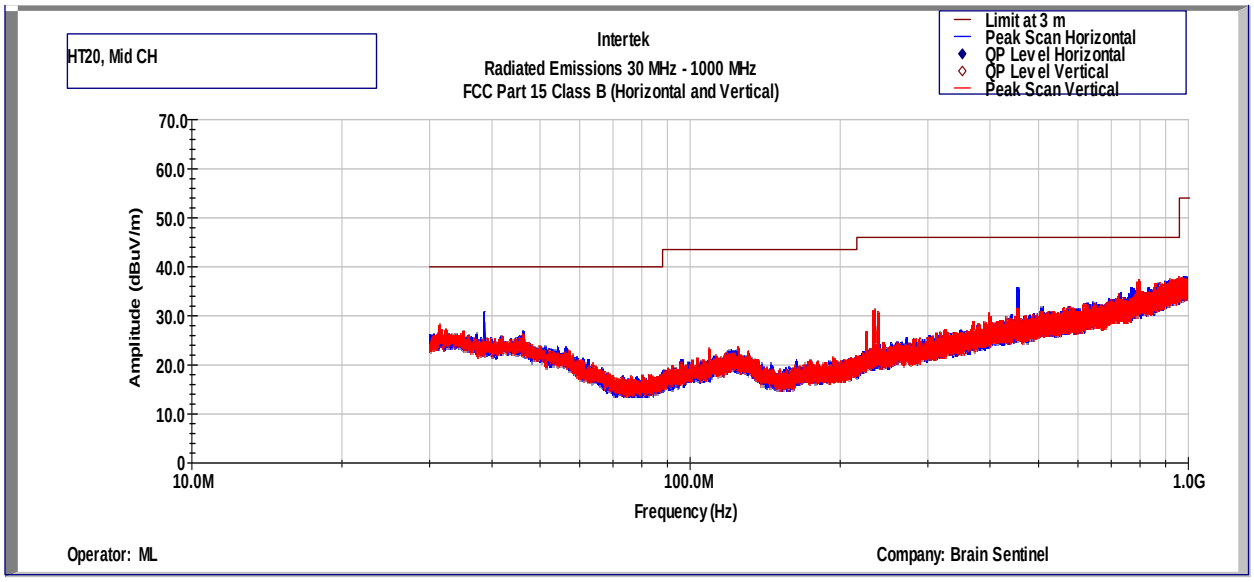
Out-of-Band Radiated Spurious Emissions (Cabinet Radiation) - 1 GHz to 18 GHz, Average



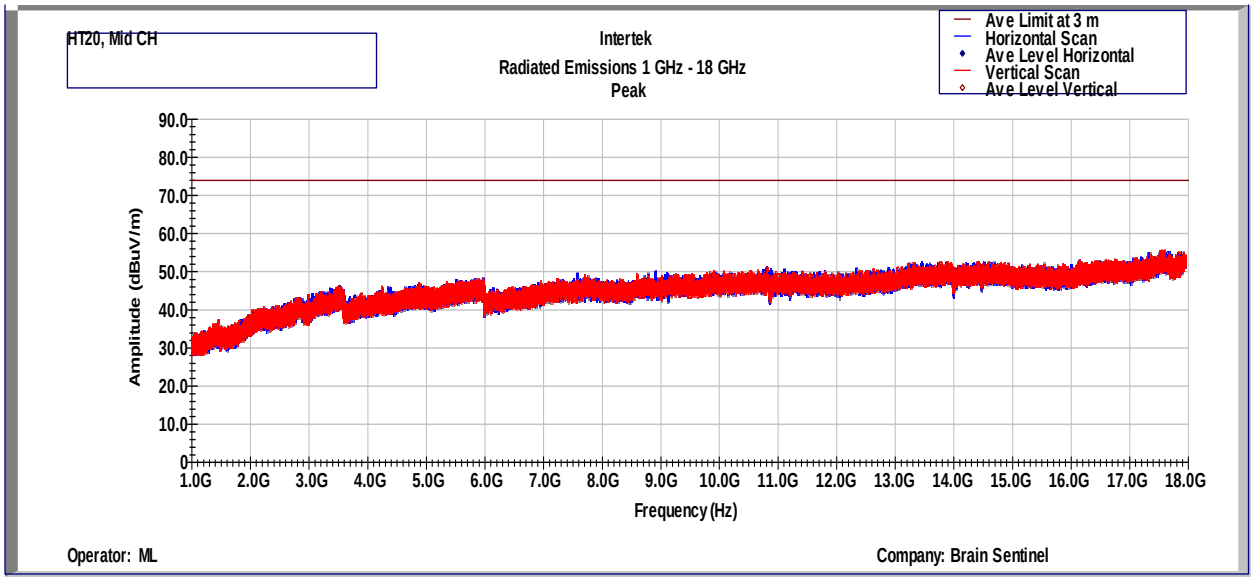
Note: Radiated emission measurements were performed up to 25GHz. No Emissions were identified when scanned from 18-25 GHz

Tx @ 2437MHz 802.11n, 20MHz

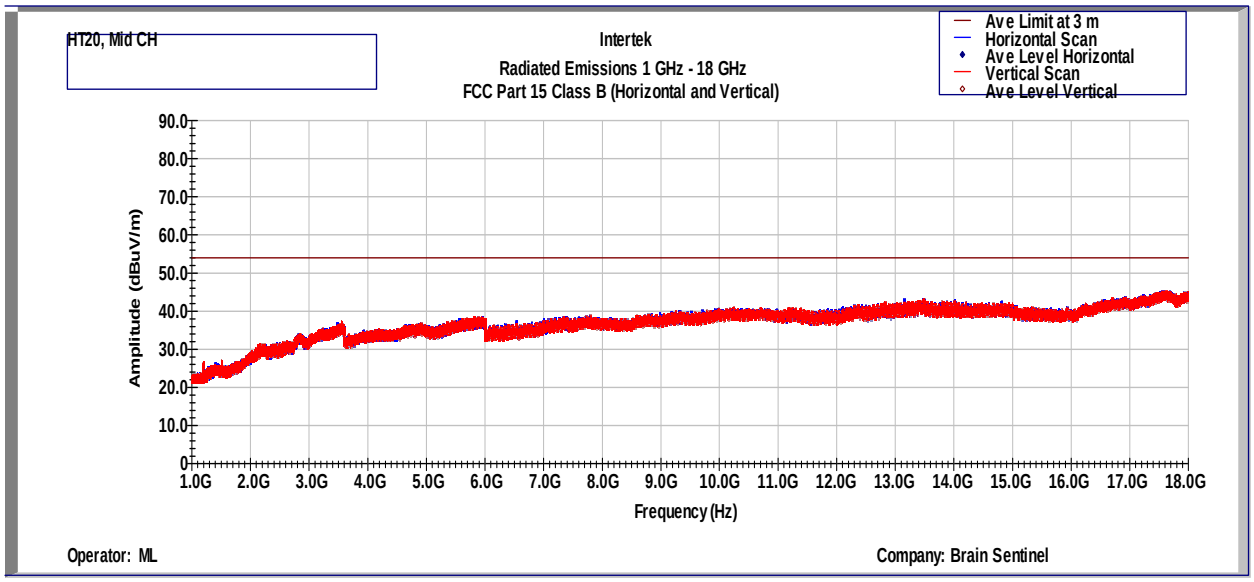
Out-of-Band Radiated Spurious Emissions (Cabinet Radiation) - 30 MHz to 1 GHz



Out-of-Band Radiated Spurious Emissions (Cabinet Radiation) - 1 GHz to 18 GHz, Peak



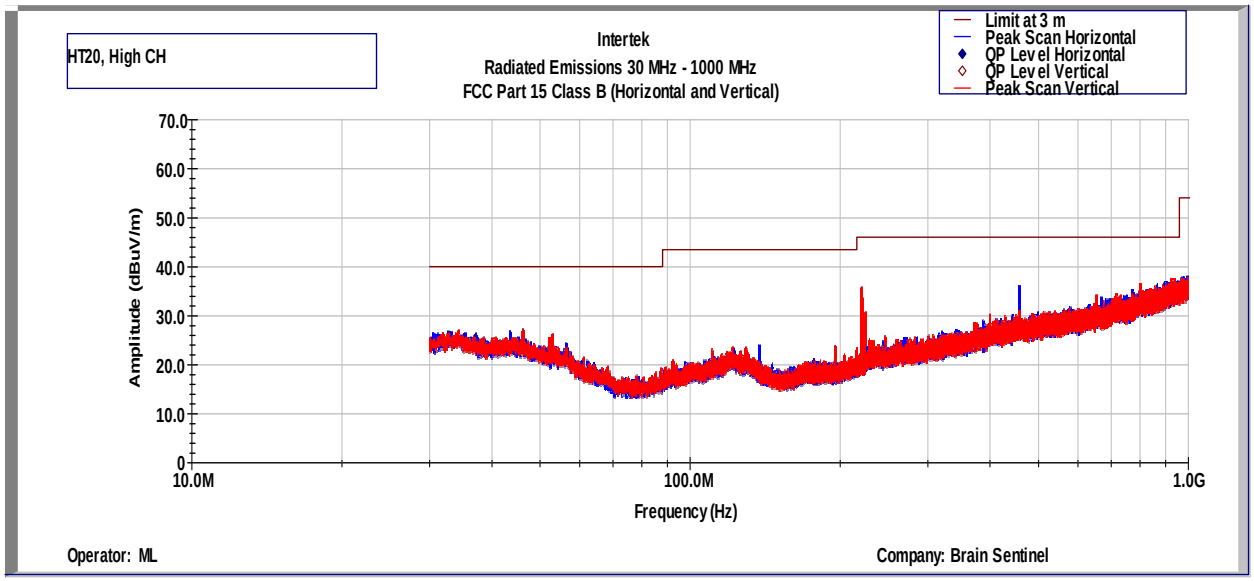
Out-of-Band Radiated Spurious Emissions (Cabinet Radiation) - 1 GHz to 18 GHz, Average



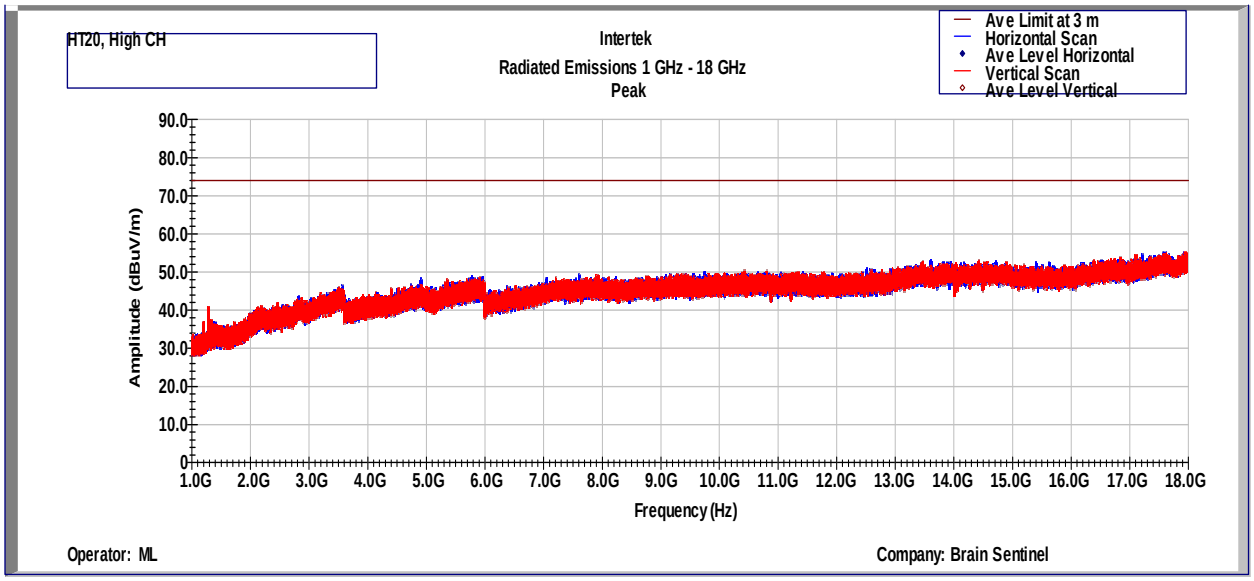
Note: Radiated emission measurements were performed up to 25GHz. No Emissions were identified when scanned from 18-25 GHz

Tx @ 2462MHz 802.11n, 20MHz

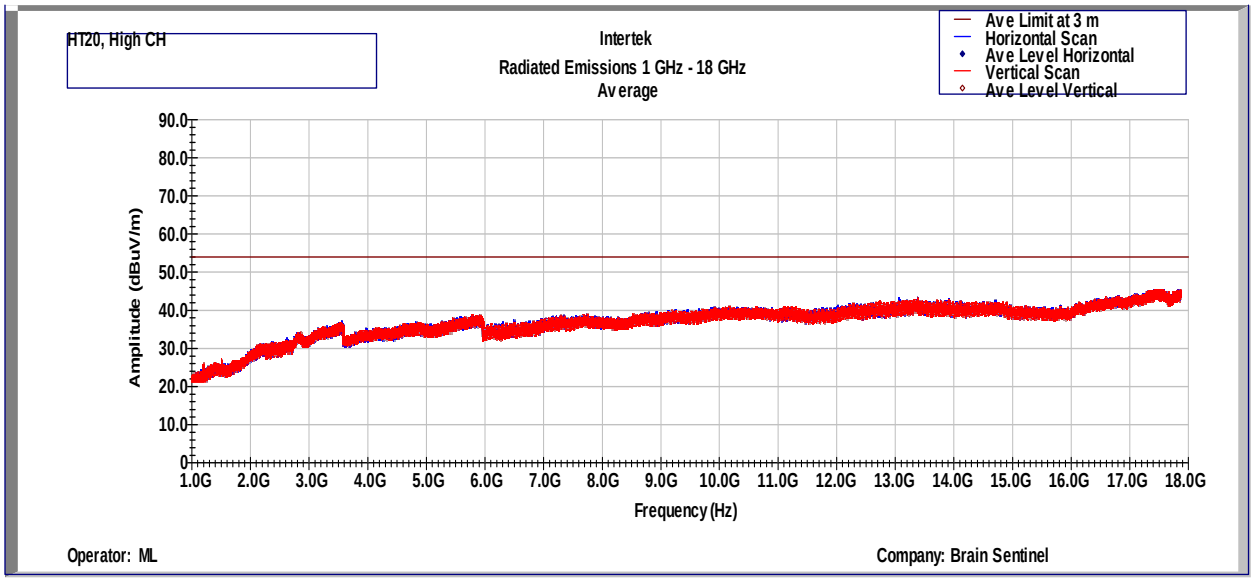
Out-of-Band Radiated Spurious Emissions (Cabinet Radiation) - 30 MHz to 1 GHz



Out-of-Band Radiated Spurious Emissions (Cabinet Radiation) - 1 GHz to 18 GHz, Peak



Out-of-Band Radiated Spurious Emissions (Cabinet Radiation) - 1 GHz to 18 GHz, Average



Note: Radiated emission measurements were performed up to 25GHz. No Emissions were identified when scanned from 18-25 GHz

4.5.4 Test Setup Photographs

Test Setup Photographs are located in the separate file.

4.6 Radiated Emissions

FCC Ref: 15.109, ICES 003

4.6.1 Requirement

Limits for Electromagnetic Radiated Emissions FCC Section 15.109(b), ICES 003*, RSS GEN

Frequency (MHz)	**Class A at 10m dB(μV/m)**	**Class B at 3m dB(μV/m)**
30-88	39	40.0
88-216	43.5	43.5
216-960	46.4	46.0
Above 960	49.5	54.0

* According to FCC Part 15.109(g) an alternative to the radiated emission limits shown above, digital devices may be shown to comply with the limit of CISPR Pub. 22

4.6.2 Procedures

Measurements are conducted with a quasi-peak detector instrument in the frequency range of 30 MHz to 1000 MHz and with the average detector instrument in the frequency range above 1000 MHz. The measuring receiver meets the requirements of Section One of CISPR 16 and the measuring antenna correlates to a balanced dipole.

Measurements of the radiated field are made with the antenna located at a distance of 10 meters from the EUT. If the field-strength measurements at 10m cannot be made because of high ambient noise level or for other reasons, measurements of Class B equipment may be made at a closer distance, for example 3m. An inverse proportionality factor of 20 dB per decade should be used to normalize the measured data to the specified distance for determining compliance.

The antenna is adjusted between 1m and 4m in height above the ground plane for maximum meter reading at each test frequency.

The antenna-to-EUT azimuth is varied during the measurement to find the maximum field-strength readings.

The antenna-to-EUT polarization (horizontal and vertical) is varied during the measurements to find the maximum field-strength readings.

The EUT, where intended for tabletop use, is placed on a table whose top is 0.8m above the ground plane. The table is constructed of non-conductive materials. Its dimensions are 1m by 1.5m, but may be extended for a larger EUT.

Floor standing EUT are placed on a horizontal metal ground plane and isolated from the ground plane by resting on an insulating material.

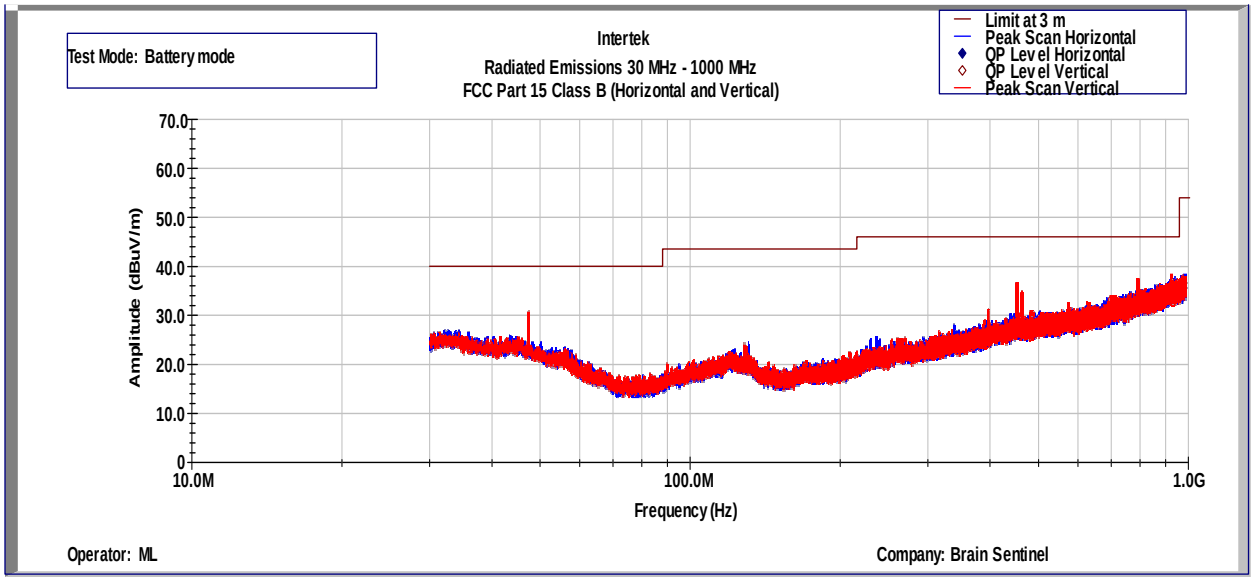
Equipment setup for radiated disturbance tests followed the guidelines of ANSI C63.4 and EN 55022.

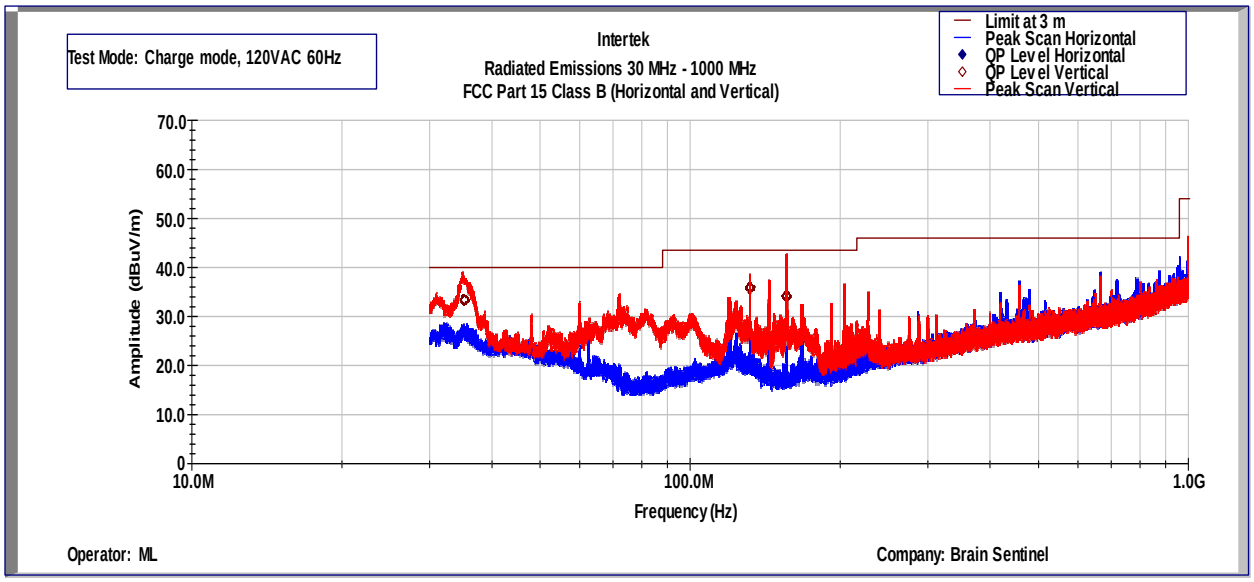
4.6.3 Test Results

The highest clock frequency used in the EUT is 100 MHz; therefor testing for Radiated Emissions need be tested up to 1 GHz for FCC 15B. Radiated emission measurements were performed from 30 MHz to 1000 MHz. The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

Date of Test:	December 02, 2015

Radiated Emissions 30 MHz – 1000MHz.





Intertek Testing Services
Radiated Emissions 30 MHz - 1000 MHz

Operator: ML

Model Number: SPC15
Company: Brain Sentinel

FCC Part 15 Class B (QP-Vertical)										
Frequency	Quasi Pk FS	Limit@3m	Margin	RA	Cable	AG	DCF	AF	Azimuth	Height
MHz	dB(uV/m)	dB(uV/m)	dB	dB(uV)	dB	dB	dB	dB(1/m)	deg	cm
35.200	33.4	40.0	-6.6	37.7	0.6	32.1	10.5	16.7	42.0	151.0
72.000	33.6	40.0	-6.4	47.3	0.9	32.1	10.5	7.0	6.0	200.0
132.000	35.8	43.5	-7.7	45.0	1.2	32.0	10.5	11.1	317.0	120.0
143.970	35.1	43.5	-8.4	46.7	1.3	32.0	10.5	8.6	347.0	100.0
156.030	34.2	43.5	-9.3	46.4	1.4	32.0	10.5	8.0	0.0	155.0
204.000	35.8	43.5	-7.7	46.0	1.6	32.0	10.5	9.7	347.0	100.0

Result: **Complies** by 6.4 dB

4.6.4 Test Configuration Photographs

The following photographs show the testing configurations used.

Please refer to the attachments.

4.7 AC Line Conducted Emission
FCC: 15.107; RSS-GEN;

4.7.1 Requirement

Frequency Band MHz	Class B Limit dB (μV)	
	Quasi-Peak	Average
0.15-0.50	66 to 56 Decreases linearly with the logarithm of the frequency	56 to 46 Decreases linearly with the logarithm of the frequency
0.50-5.00	56	46
5.00-30.00	60	50

Note: At the transition frequency the lower limit applies.

4.7.2 Procedure

Measurements are carried out using quasi-peak and average detector receivers in accordance with CISPR 16. An AMN is required to provide a defined impedance at high frequencies across the power feed at the point of measurement of terminal voltage and also to provide isolation of the circuit under test from the ambient noise on the power lines. An AMN as defined in CISPR 16 shall be used.

The EUT is located so that the distance between the boundary of the EUT and the closest surface of the AMN is 0.8m.

Where a flexible mains cord is provided by the manufacturer, this shall be 1m long or if in excess of 1m, the excess cable is folded back and forth as far as possible so as to form a bundle not exceeding 0.4m in length.

The EUT is arranged and connected with cables terminated in accordance with the product specification.

Conducted disturbance is measured between the phase lead and the reference ground, and between the neutral lead and the reference ground. Both measured values are reported.

The EUT, where intended for tabletop use, is placed on a table whose top is 0.8m above the ground plane. A vertical, metal reference plane is placed 0.4m from the EUT. The vertical metal reference-plane is at least 2m by 2m. The EUT shall be kept at least 0.8m from any other metal surface or other ground plane not being part of the EUT. The table is constructed of non-conductive materials. Its dimensions are 1m by 1.5m, but may be extended for larger EUT.

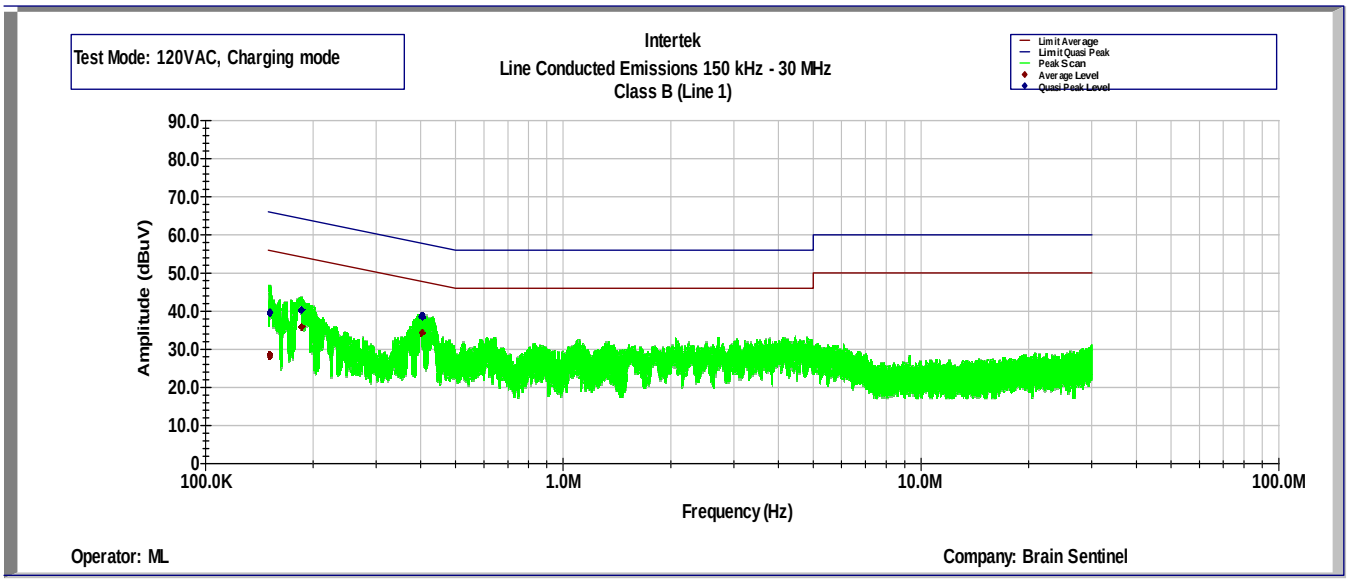
Floor standing EUT are placed on a horizontal metal ground plane and isolated from the ground plane by resting on an insulating material. The metal ground plane extends at least 0.5m beyond the boundaries of the EUT and has minimum dimensions of 2m by 2m.

Equipment setup for conducted disturbance tests followed the guidelines of ANSI C63.4.

4.7.3 Test Result

Date of Test:	December 02, 2015

AC Line Conducted Emission Data, Charge Mode



Intertek Testing Services
Line Conducted Emissions 150 kHz - 30 MHz
FCC Class B (Line 1)

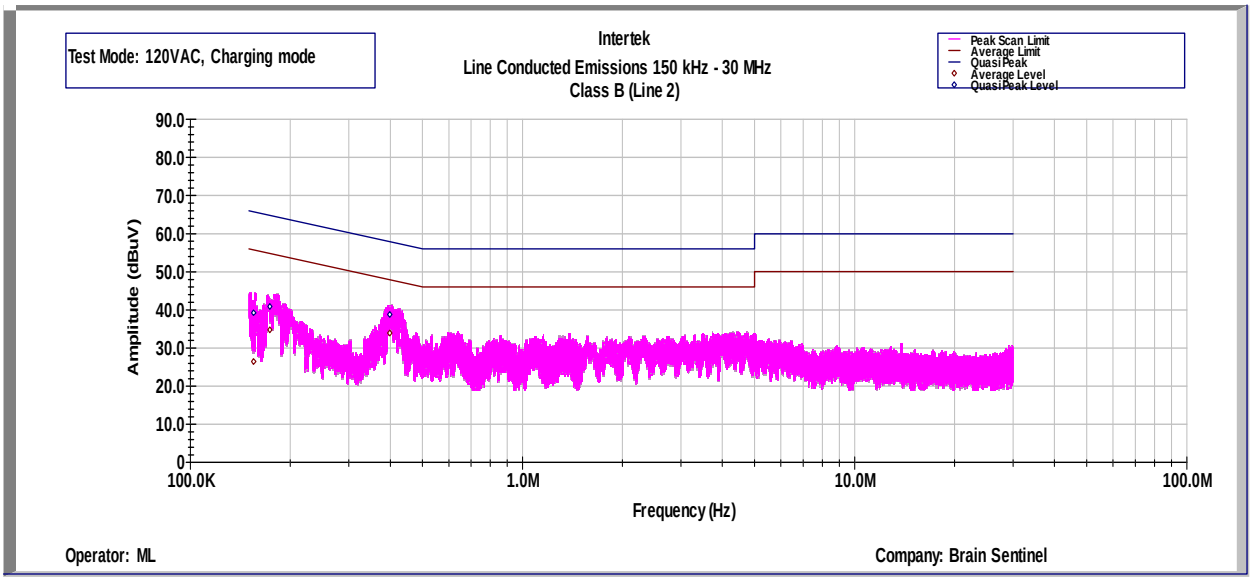
Operator: ML

Model Number: Brain Sentinel GTC Seizure Detection and Warning System
Company: Brain Sentinel, Inc.

Frequency	Av Level	QP Level	Av Limit	QP Limit	Av Margin	QP Margin
MHz	dBuV	dBuV	dBuV	dBuV	dB	dB
0.151	28.4	39.6	56.0	66.0	-27.6	-26.4
0.186	36.0	40.2	55.0	65.0	-19.0	-24.8
0.403	34.2	38.7	48.8	58.8	-14.6	-20.1

Test Mode: Charging Mode
Temp.: 22.8C
Humidity: 49.9%

AC Line Conducted Emission Data, Charge Mode



Intertek Testing Services
Line Conducted Emissions 150 kHz - 30 MHz
FCC Class B (Line 2)

Operator: ML

Model Number: Brain Sentinel GTC Seizure Detection and Warning System
Company: Brain Sentinel, Inc.

Frequency	Av Level	QP Level	Av Limit	QP Limit	Av Margin	QP Margin
MHz	dBuV	dBuV	dBuV	dBuV	dB	dB
0.155	26.5	39.3	55.9	65.9	-29.4	-26.6
0.174	34.8	40.9	55.3	65.3	-20.6	-24.4
0.398	33.9	38.8	48.9	58.9	-15.0	-20.1

Test Mode: Charging Mode
Temp.: 22.8C
Humidity: 49.9%

Results	**Complies** by 14.6 dB

4.7.4 Test Configuration Photographs

The following photographs show the testing configurations used.

Please refer to the attachments.

5.0 RF Exposure Evaluation

MPE Evaluation

SAR test exclusion threshold formula according to FCC KDB 447898 D01 v05r02 is

$P^*\sqrt{f}/d < 3$

where
P is *max. power of channel, including tune-up tolerance, mW*
f is operating frequency in GHz
d is *min. test separation distance, mm*

The maximum measured conducted output power is 14.22 mW (11.53 dBm). The antenna gain, G is 3.0 dBi. Therefore, the maximum calculated EIRP is 28.38 mW.

As declared by the Applicant, the EUT transmits with the maximum source-based Duty Cycle of 2.84%. Therefore, the average EIRP is 0.81 mW (P).

At 5mm distance the condition for SAR exclusion threshold is

$0.85 \times \sqrt{2.480} \div 5 = 0.26$ which is less than 3.

Therefore, SAR testing is not required as the SAR Test Exclusion Threshold condition is satisfied.

SAR Exemption limit according to IC RSS-102 Issue 5, at 5 mm separation distance = 4 mW

Routine evaluation is not required since the higher of the maximum conducted or equivalent isotropically radiated power (e.i.r.p.) source-based, time averaged output power is below the exemption limit.

Results	**Complies**

6.0 List of Test Equipment

Measurement equipment used for emission compliance testing utilized the equipment on the following list:

Equipment	Manufacturer	Model/Type	Asset #	Cal Int	Cal Due
Spectrum Analyzer	Rohde and Schwarz	FSU	ITS00913	12	12/16/15
EMI Receiver	Rohde and Schwarz	ESU	ITS 00961	12	06/02/16
Spectrum Analyzer	Rohde and Schwarz	FSP	ITS 01200	12	02/09/16
BI-Log Antenna	Antenna Research	LPB-2513/A	ITS 00355	12	09/11/16
Pyramidal Horn Antenna	EMCO	3160-09	ITS00571	#	#
Pre-Amplifier	Sonoma Instrument	310	ITS 00415	12	01/15/16
Pre-Amplifier (1-18GHz)	Miteq	AMF-4D-001180-24-10P	ITS 00526	12	10/06/16
Pre-Amplifier (18-40GHz)	Miteq	JSD44-18004000-305P	ITS 00921	12	06/18/16
Horn Antenna	ETS Lindgren	3115	ITS 001595	12	01/14/16
LISN	FCC	FCC-LISN-50-50-M-H	ITS 00552	12	05/05/16

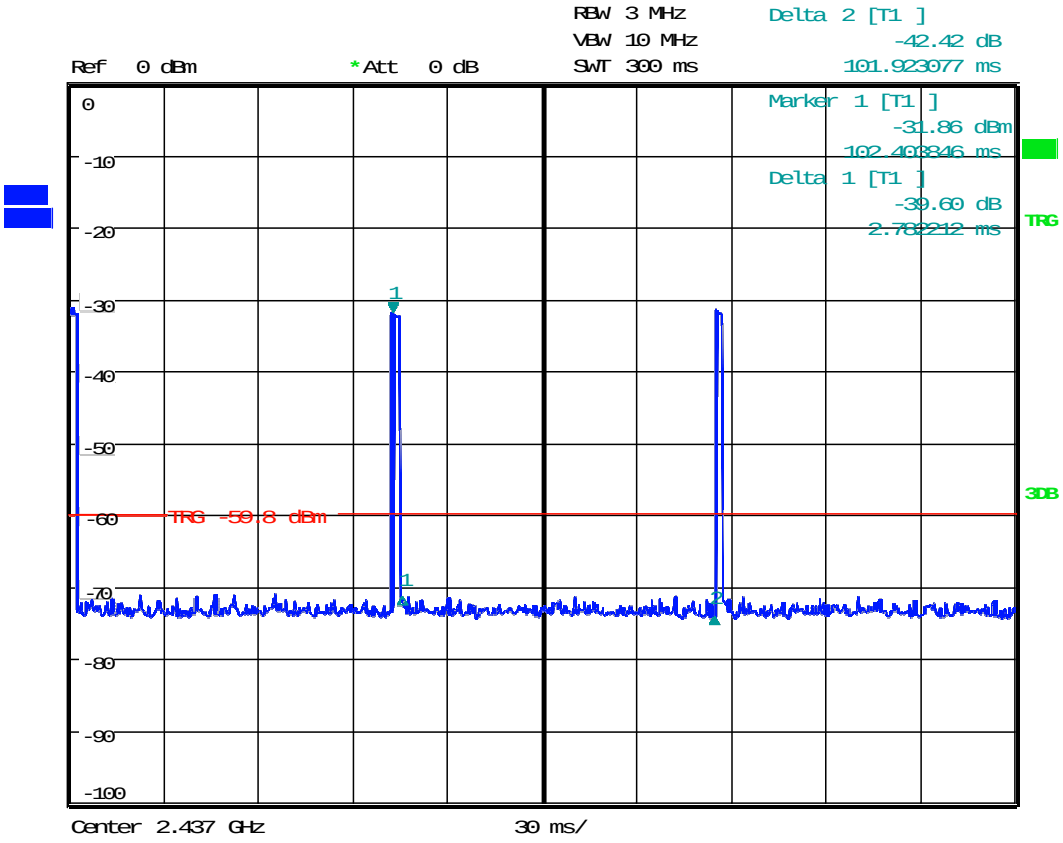
No Calibration required

7.0 Document History

Revision/ Job Number	Writer Initials	Reviewers Initials	Date	Change
1.0 / G102364477	ML	KV	December 28, 2015	Original document

ANNEX A

Measured Duty Cycle during Normal Operation



Date: 15.DEC.2015 17:06:57

Duty Cycle: DC = 2.78 / 101.92 = 0.0272 or 2.72%