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# *EMC Test Report*

## *Application for FCC Grant of Equipment Authorization*

## *FCC Part 15 Subpart C*

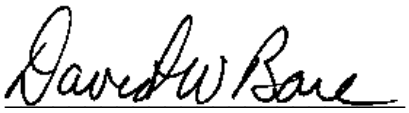
## *Model: CS20101*

| | |
|---|---|
| FCC ID: | 2AV6N-CS20101 |
| APPLICANT: | ConserVention<br>5310 Buena Vista<br>Frisco, TX 75034 |
| TEST SITE(S): | National Technical Systems<br>41039 Boyce Road.<br>Fremont, CA. 94538-2435 |
| IC SITE REGISTRATION #: | 2845B-4 and 2845B-5 |
| PROJECT NUMBER: | PR118617 |
| REPORT DATE: | July 23, 2020 |
| REISSUE DATE: | August 6, 2020 |
| FINAL TEST DATES: | June 12, 29 and July 1, 2020 |
| TOTAL NUMBER OF PAGES: | 56 |

ACCREDITED
Testing Cert #0214.26

## VALIDATING SIGNATORIES

PROGRAM MGR



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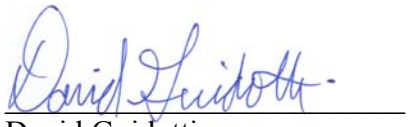

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## REVISION HISTORY

| Rev# | Date | Comments | Modified By |
|---|---|---|---|
| - | July 23, 2020 | First release | |
| 1 | August 6, 2020 | Revised report to add radiated emission data below 1 GHz | David Guidotti |

## TABLE OF CONTENTS

## SCOPE

An electromagnetic emissions test has been performed on the ConserVention model CS20101, pursuant to the following rules:

FCC Part 15 Subpart C

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

ANSI C63.10-2013
FCC DTS Measurement Guidance KDB558074

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

Final system data was gathered in a mode that tended to maximize emissions by varying orientation of EUT, orientation of power and I/O cabling, antenna search height, and antenna polarization.

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

National Technical Systems is accredited by the A2LA, certificate number 0214.26, to perform the test(s) listed in this report, except where noted otherwise.

## OBJECTIVE

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

Prior to marketing in the USA, all unlicensed transmitters and transceivers require certification. Receive-only devices operating between 30 MHz and 960 MHz are subject to either certification or a manufacturer's declaration of conformity, with all other receive-only devices exempt from the technical requirements.

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

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

## STATEMENT OF COMPLIANCE

The tested sample of ConserVention model CS20101 complied with the requirements of the following regulations:

FCC Part 15 Subpart C

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

The test results recorded herein are based on a single type test of ConserVention model CS20101 and therefore apply only to the tested sample. The sample was selected and prepared by Steve Shaw of ConserVention.

## DEVIATIONS FROM THE STANDARDS

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

## TEST RESULTS SUMMARY

*DIGITAL TRANSMISSION SYSTEMS (2400 – 2483.5MHz)*

| FCC Rule Part | | Description | Measured Value / Comments | Limit / Requirement | Result |
|---|---|---|---|---|---|
| 15.247(a) | | Digital Modulation | Systems uses GFSK Modulation | System must utilize a digital transmission technology | Complies |
| 15.247 (a) (2) | | 6dB Bandwidth | 625 kHz | >500kHz | Complies |
| 15.247 (b) (3) | | Output Power (multipoint systems) | -1.5 dBm EIRP = 0.00095 W Note 1 | 1Watt, EIRP limited to 4 Watts. | Complies |
| 15.247(e) | | Power Spectral Density | > 8 dBm/3MHz | 8dBm/3kHz | Complies |
| 15.247(d) | | Antenna Port Spurious Emissions 30MHz – 25 GHz | Performed Radiated | | |
| 15.247(d) / 15.209 | | Radiated Spurious Emissions 30MHz – 25 GHz | 52.8 dBµV/m @ 7439.4 MHz (-1.2 dB) | Refer to the limits section (p18) for restricted bands, all others < -20dBc | Complies |
| 15.247(d) / 15.209 | | Radiated Spurious Emissions 30 kHz – 30 MHz | No emissions observed above the noise floor of the test equipment | Refer to the limits section (p18) for restricted bands, all others < -20dBc | Complies |
| Note 1: EIRP calculated using antenna gains of 1.6 dBi for the highest EIRP system. | | | | | |

*GENERAL REQUIREMENTS APPLICABLE TO ALL BANDS*

| FCC Rule Part | | Description | Measured Value / Comments | Limit / Requirement | Result (margin) |
|---|---|---|---|---|---|
| 15.203 | | RF Connector | Integral Antenna | Unique or integral antenna required | Complies |
| 15.407 (b) (6) | | AC Conducted Emissions | 32.0 dBµV @ 0.55 MHz (-24.0 dB) | Refer to page 18 | Complies |
| 15.247 (i) 15.407 (f) | | RF Exposure Requirements | Refer to SAR exclusion calculations and RSS 102 declaration | Refer to OET 65, FCC Part 1 and RSS 102 | Complies |

*MEASUREMENT UNCERTAINTIES*

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level and were calculated in accordance with UKAS document LAB 34.

| Measurement Type | Measurement Unit | Frequency Range | Expanded Uncertainty |
|---|---|---|---|
| Radiated Emissions (field strength) | dBµV/m | 25 to 1000 MHz | ± 3.6 dB |
| | | 1000 to 40000 MHz | ± 6.0 dB |
| Conducted Emissions (AC Power) | dBµV | 0.15 to 30 MHz | ± 2.4 dB |

## EQUIPMENT UNDER TEST (EUT) DETAILS

### GENERAL

The ConserVention model CS20101 is a apparel attachment device that is designed to warn/help prevent a user from touching their face. Since the EUT would be placed close to the body during operation, the EUT was treated as tabletop equipment during testing to simulate the end-user environment. The electrical rating of the EUT is 3.7 VDC, supplied from a rechargeable LiPo battery.

The sample was received on June 12, 2020 and tested on June 12, 29 and July 1, 2020. The EUT consisted of the following component(s):

| Company | Model | Description | Serial Number | FCC ID |
|---|---|---|---|---|
| ConserVention | SMAT | Apparel Attachment Device | Prototype | 2AV6N-CS20101 |

### OTHER EUT DETAILS

The following EUT details should be noted: The charging port does not support data.

### ANTENNA SYSTEM

The antenna system consists of integral antenna.

### ENCLOSURE

The EUT enclosure is primarily constructed of plastic. It measures approximately 11 cm wide by 6 cm deep by 2 cm high.

### MODIFICATIONS

The EUT required the following modifications in order to comply with the emission specifications.

| Mod. # | Test | Date | Modification |
|---|---|---|---|
| 1 | Radiated Emissions | 6/29/2020 | The power setting was reduced, a new balum/harmonic filter chip was used and discrete Pi filter was installed. |

### SUPPORT EQUIPMENT

The following equipment was used as local support equipment for testing:

| Company | Model | Description | Serial Number | FCC ID |
|---|---|---|---|---|
| Qualtek Electronic Corp | QFAW-05-05 | Power Adapter | - | - |

No remote support equipment was used during testing.

*EUT INTERFACE PORTS*

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

| Port | | Cable(s) | | |
|---|---|---|---|---|
| From | To | Description | Shielded/Unshielded | Length(m) |
| Charging Port | Adapter | Two wire | Shielded | 1.8 |

The charging cable is only used while charging

*EUT OPERATION*

During emissions testing the EUT was running special software that allowed continuous operation on a single channel.

## TEST SITE

### GENERAL INFORMATION

Final test measurements were taken at the test sites listed below. Pursuant to section 2.948 of the FCC's Rules and section 6.2 of RSS-GEN, NTS has been recognized as an accredited test laboratory by the Commission and Innovation, Science and Economic Development Canada. A description of the facilities employed for testing is maintained by NTS.

| Site | Company / Registration Numbers | | Location |
|---|---|---|---|
| | FCC | Canada | |
| Chamber 4 | US1031 | 2845B (Wireless Test Lab #US0027) | 41039 Boyce Road Fremont, CA 94538-2435 |
| Chamber 5 | | | |

ANSI C63.4 recommends that ambient noise at the test site be at least 6 dB below the allowable limits. Ambient levels are below this requirement. The test site(s) contain separate areas for radiated and conducted emissions testing. Results from testing performed in this chamber have been correlated with results from an open area test site. Considerable engineering effort has been expended to ensure that the facilities conform to all pertinent requirements of ANSI C63.4.

### CONDUCTED EMISSIONS CONSIDERATIONS

Conducted emissions testing is performed in conformance with ANSI C63.10. Measurements are made with the EUT connected to the public power network through a nominal, standardized RF impedance, which is provided by a line impedance stabilization network, known as a LISN. A LISN is inserted in series with each current-carrying conductor in the EUT power cord.

### RADIATED EMISSIONS CONSIDERATIONS

The FCC has determined that radiation measurements made in a shielded enclosure are not suitable for determining levels of radiated emissions. Radiated measurements are performed in an open field environment or in a semi-anechoic chamber. The test sites are maintained free of conductive objects within the CISPR defined elliptical area incorporated in ANSI C63.4 guidelines and meet the Normalized Site Attenuation (NSA) requirements of ANSI C63.4.

## MEASUREMENT INSTRUMENTATION

### RECEIVER SYSTEM

An EMI receiver as specified in CISPR 16-1-1 is used for emissions measurements. The receivers used can measure over the frequency range of 9 kHz up to 2000 MHz. These receivers allow both ease of measurement and high accuracy to be achieved. The receivers have Peak, Average, and CISPR (Quasi-peak) detectors built into their design so no external adapters are necessary. The receiver automatically sets the required bandwidth for the CISPR detector used during measurements. If the repetition frequency of the signal being measured is below 20Hz, peak measurements are made in lieu of Quasi-Peak measurements.

For measurements above the frequency range of the receivers, a spectrum analyzer is utilized because it provides visibility of the entire spectrum along with the precision and versatility required to support engineering analysis. Average measurements above 1000MHz are performed on the spectrum analyzer using the linear-average method with a resolution bandwidth of 1 MHz and a video bandwidth of 10 Hz, unless the signal is pulsed in which case the average (or video) bandwidth of the measuring instrument is reduced to onset of pulse desensitization and then increased.

### INSTRUMENT CONTROL COMPUTER

Software is used to view and convert receiver measurements to the field strength at an antenna or voltage developed at the LISN measurement port, which is then compared directly with the appropriate specification limit. This provides faster, more accurate readings by performing the conversions described under Sample Calculations within the Test Procedures section of this report. Results are printed in a graphic and/or tabular format, as appropriate. A personal computer is used to record all measurements made with the receivers. The software used for radiated and conducted emissions measurements is NTS EMI Test Software (rev 2.10)

### LINE IMPEDANCE STABILIZATION NETWORK (LISN)

Line conducted measurements utilize a fifty microhenry Line Impedance Stabilization Network as the monitoring point. The LISN used also contains a 250 uH CISPR adapter. This network provides for calibrated radio frequency noise measurements by the design of the internal low pass and high pass filters on the EUT and measurement ports, respectively.

*FILTERS/ATTENUATORS*

External filters and precision attenuators are often connected between the receiving antenna or LISN and the receiver. This eliminates saturation effects and non-linear operation due to high amplitude transient events.

*ANTENNAS*

A loop antenna is used below 30 MHz. For the measurement range 30 MHz to 1000 MHz either a combination of a biconical antenna and a log periodic or a bi-log antenna is used. Above 1000 MHz, horn antennas are used. The antenna calibration factors to convert the received voltage to an electric field strength are included with appropriate cable loss and amplifier gain factors to determine an overall site factor, which is then programmed into the test receivers or incorporated into the test software.

*ANTENNA MAST AND EQUIPMENT TURNTABLE*

The antennas used to measure the radiated electric field strength are mounted on a non-conductive antenna mast equipped with a motor-drive to vary the antenna height. Measurements below 30 MHz are made with the loop antenna at a fixed height of 1m above the ground plane.

ANSI C63.10 specifies that the test height above ground for table mounted devices shall be 80 centimeters for testing below 1 GHz and 1.5m for testing above 1 GHz. Floor mounted equipment shall be placed on the ground plane if the device is normally used on a conductive floor or separated from the ground plane by insulating material from 3 to 12 mm if the device is normally used on a non-conductive floor as specified in ANSI C63.4. During radiated measurements, the EUT is positioned on a motorized turntable in conformance with this requirement.

*INSTRUMENT CALIBRATION*

All test equipment is regularly checked to ensure that performance is maintained in accordance with the manufacturer's specifications. All antennas are calibrated at regular intervals with respect to tuned half-wave dipoles. An exhibit of this report contains the list of test equipment used and calibration information.

## TEST PROCEDURES

### EUT AND CABLE PLACEMENT

The regulations require that interconnecting cables be connected to the available ports of the unit and that the placement of the unit and the attached cables simulate the worst case orientation that can be expected from a typical installation, so far as practicable. To this end, the position of the unit and associated cabling is varied within the guidelines of ANSI C63.10, and the worst-case orientation is used for final measurements.

### CONDUCTED EMISSIONS

Conducted emissions are measured at the plug end of the power cord supplied with the EUT. Excess power cord length is wrapped in a bundle between 30 and 40 centimeters in length near the center of the cord. Preliminary measurements are made to determine the highest amplitude emission relative to the specification limit for all the modes of operation. Placement of system components and varying of cable positions are performed in each mode. A final peak mode scan is then performed in the position and mode for which the highest emission was noted on all current carrying conductors of the power cord.

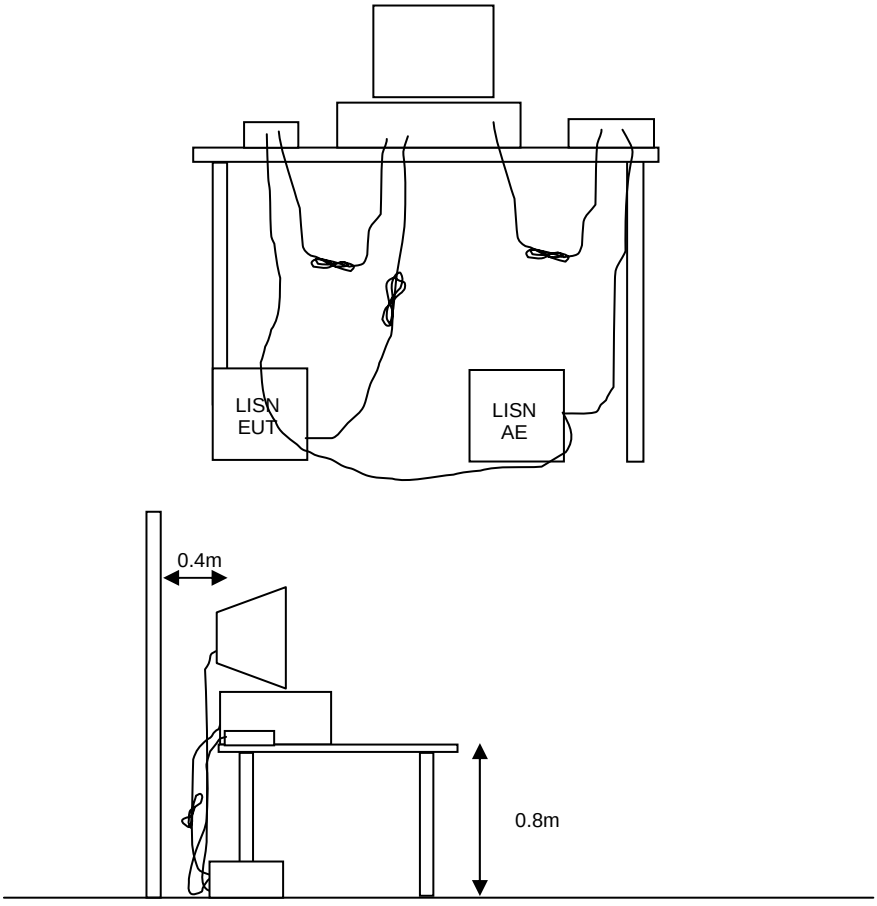



**Figure 1 Typical Conducted Emissions Test Configuration**

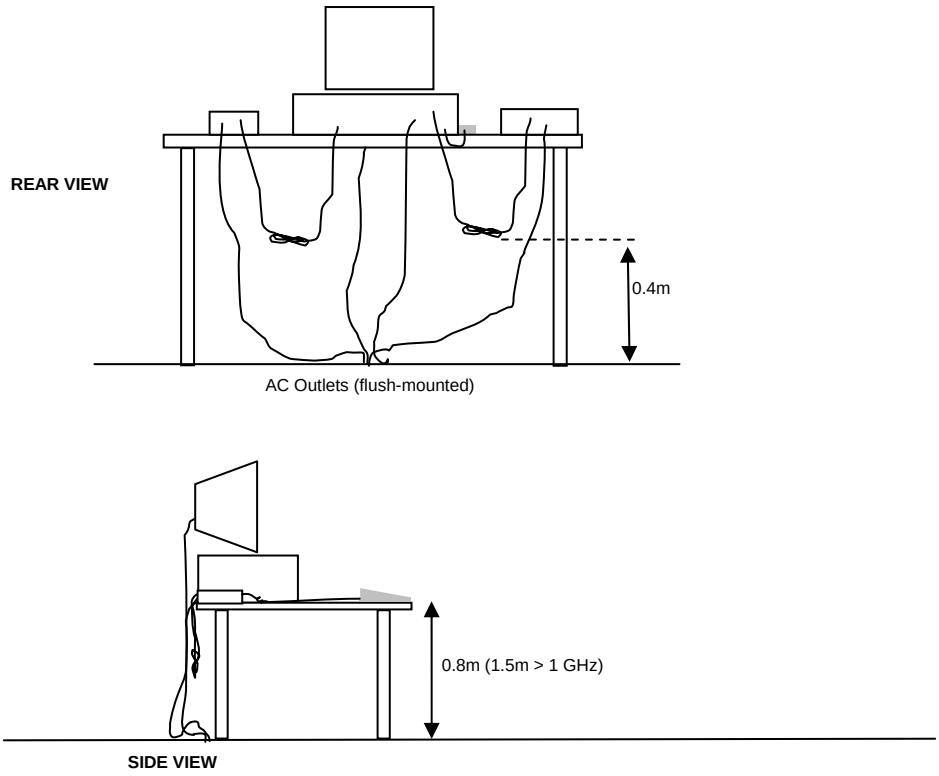
*RADIATED EMISSIONS*

A preliminary scan of the radiated emissions is performed in which all significant EUT frequencies are identified with the system in a nominal configuration. At least two scans are performed, one scan for each antenna polarization (horizontal and vertical; loop parallel and perpendicular to the EUT). During the preliminary scans, the EUT is rotated through 360˚, the antenna height is varied (for measurements above 30 MHz) and cable positions are varied to determine the highest emission relative to the limit. Preliminary scans may be performed in a fully anechoic chamber for the purposes of identifying the frequencies of the highest emissions from the EUT.

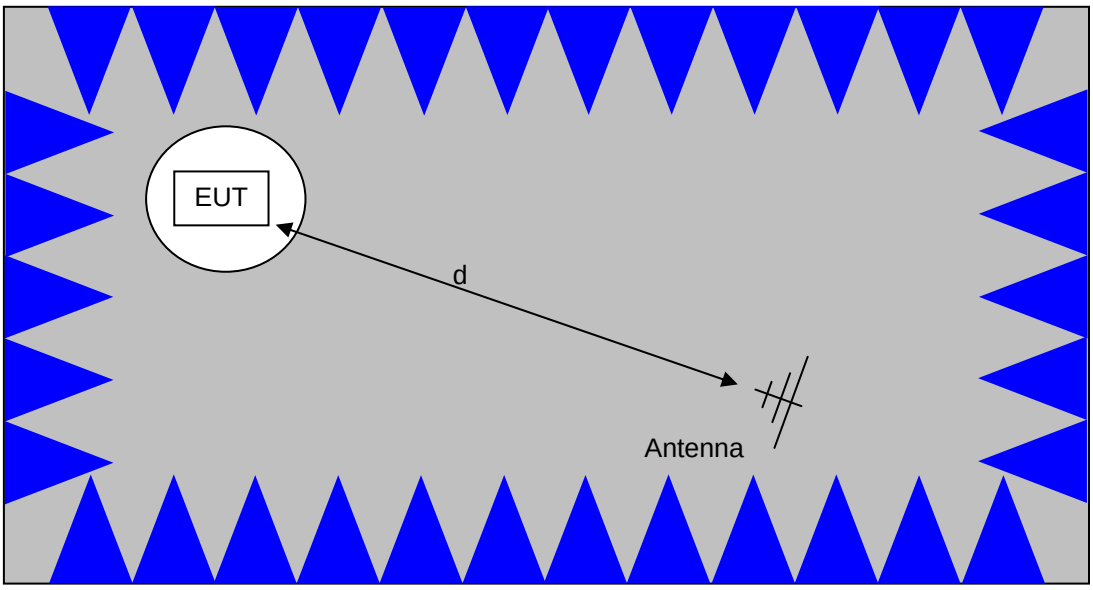
A speaker is provided in the receiver to aid in discriminating between EUT and ambient emissions. Other methods used during the preliminary scan for EUT emissions involve scanning with near field magnetic loops, monitoring I/O cables with RF current clamps, and cycling power to the EUT.

Final maximization is a phase in which the highest amplitude emissions identified in the spectral search are viewed while the EUT azimuth angle is varied from 0 to 360 degrees relative to the receiving antenna. The azimuth, which results in the highest emission is then maintained while varying the antenna height from one to four meters (for measurements above 30 MHz, measurements below 30 MHz are made with the loop antenna at a fixed height of 1m). The result is the identification of the highest amplitude for each of the highest peaks. Each recorded level is corrected in the receiver using appropriate factors for cables, connectors, antennas, and preamplifier gain.

When testing above 18 GHz, the receive antenna is located at 1meter from the EUT and the antenna height is restricted to a maximum of 2.5 meters.

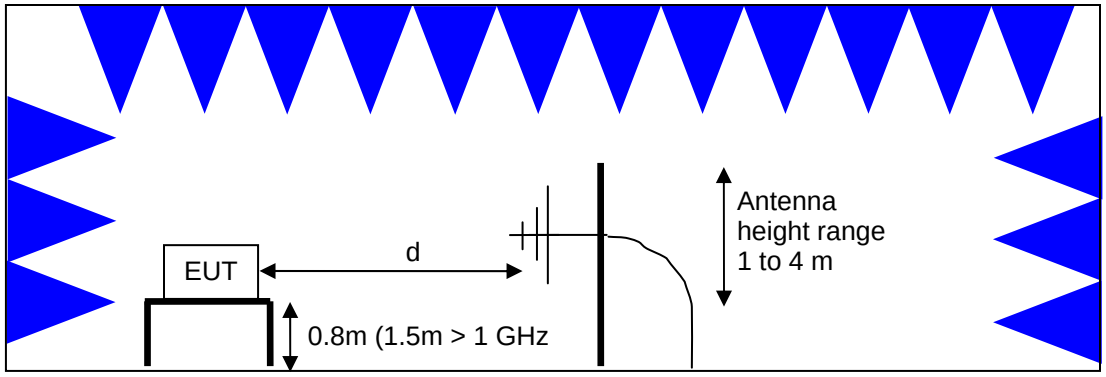



Typical Test Configuration for Radiated Field Strength Measurements




The anechoic materials on the walls and ceiling ensure compliance with the normalized site attenuation requirements of CISPR 16 / CISPR 22 / ANSI C63.4 for an alternate test site at the measurement distances used.

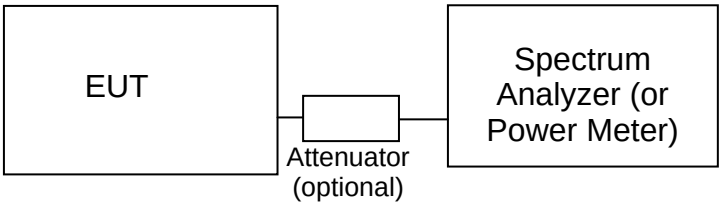
Floor-standing equipment is placed on the floor with insulating supports between the unit and the ground plane.




Test Configuration for Radiated Field Strength Measurements
Semi-Anechoic Chamber, Plan and Side Views

*CONDUCTED EMISSIONS FROM ANTENNA PORT*

Direct measurements of power, bandwidth and power spectral density are performed, where possible, with the antenna port of the EUT connected to either the power meter or spectrum analyzer via a suitable attenuator and/or filter. These are used to ensure that the front end of the measurement instrument is not overloaded by the fundamental transmission.




Test Configuration for Antenna Port Measurements

Measurement bandwidths (video and resolution) are set in accordance with the relevant standards and NTS Silicon Valley's test procedures for the type of radio being tested. When power measurements are made using a resolution bandwidth less than the signal bandwidth the power is calculated by summing the power across the signal bandwidth using either the analyzer channel power function or by capturing the trace data and calculating the power using software. In both cases the summed power is corrected to account for the equivalent noise bandwidth (ENBW) of the resolution bandwidth used.

If power averaging is used (typically for certain digital modulation techniques), the EUT is configured to transmit continuously. Power averaging is performed using either the built-in function of the analyzer or, if the analyzer does not feature power averaging, using external software. In both cases the average power is calculated over a number of sweeps (typically 100). When the EUT cannot be configured to continuously transmit then either the analyzer is configured to perform a gated sweep to ensure that the power is averaged over periods that the device is transmitting or power averaging is disabled and a max-hold feature is used.

If a power meter is used to make output power measurements the sensor head type (peak or average) is stated in the test data table.

*BANDWIDTH MEASUREMENTS*

The 6dB, 20dB, 26dB and/or 99% signal bandwidth are measured using the bandwidths recommended by ANSI C63.10 and RSS GEN.

*SPECIFICATION LIMITS AND SAMPLE CALCULATIONS*

The limits for conducted emissions are given in units of microvolts, and the limits for radiated emissions are given in units of microvolts per meter at a specified test distance. Data is measured in the logarithmic form of decibels relative to one microvolt, or dB microvolts (dBuV). For radiated emissions, the measured data is converted to the field strength at the antenna in dB microvolts per meter (dBuV/m). The results are then converted to the linear forms of uV and uV/m for comparison to published specifications.

For reference, converting the specification limits from linear to decibel form is accomplished by taking the base ten logarithm, then multiplying by 20. These limits in both linear and logarithmic form are as follows:

*CONDUCTED EMISSIONS SPECIFICATION LIMITS: FCC 15.207; RSS GEN*

The table below shows the limits for the emissions on the AC power line from an intentional radiator and a receiver.

| Frequency (MHz) | Average Limit (dBuV) | Quasi Peak Limit (dBuV) |
|---|---|---|
| 0.150 to 0.500 | Linear decrease on logarithmic frequency axis between 56.0 and 46.0 | Linear decrease on logarithmic frequency axis between 66.0 and 56.0 |
| 0.500 to 5.000 | 46.0 | 56.0 |
| 5.000 to 30.000 | 50.0 | 60.0 |

*GENERAL TRANSMITTER RADIATED EMISSIONS SPECIFICATION LIMITS*

The table below shows the limits for the spurious emissions from transmitters that fall in restricted bands[1].

| Frequency Range (MHz) | Limit (uV/m) | Limit (dBuV/m @ 3m) |
|---|---|---|
| 0.009-0.490 | $2400/F_{KHz}$ @ 300m | $67.6-20*\log_{10}(F_{KHz})$ @ 300m |
| 0.490-1.705 | $24000/F_{KHz}$ @ 30m | $87.6-20*\log_{10}(F_{KHz})$ @ 30m |
| 1.705 to 30 | 30 @ 30m | 29.5 @ 30m |
| 30 to 88 | 100 @ 3m | 40 @ 3m |
| 88 to 216 | 150 @ 3m | 43.5 @ 3m |
| 216 to 960 | 200 @ 3m | 46.0 @ 3m |
| Above 960 | 500 @ 3m | 54.0 @ 3m |

[1] The restricted bands are detailed in FCC 15.205 and RSS-Gen Table 7

*OUTPUT POWER LIMITS – DIGITAL TRANSMISSION SYSTEMS*

The table below shows the limits for output power and output power density. Where the signal bandwidth is less than 20 MHz the maximum output power is reduced to the power spectral density limit plus 10 times the log of the bandwidth (in MHz).

| Operating Frequency (MHz) | Output Power | Power Spectral Density |
|---|---|---|
| 902 – 928 | 1 Watt (30 dBm) | 8 dBm/3kHz |
| 2400 – 2483.5 | 1 Watt (30 dBm) | 8 dBm/3kHz |
| 5725 – 5850 | 1 Watt (30 dBm) | 8 dBm/3kHz |

The maximum permitted output power is reduced by 1dB for every dB the antenna gain exceeds 6dBi. For FCC, fixed point to point applications using the 2400-2483.5 MHz band may use antennas with more than 6 dBi gain but output power is reduced by 1 dB for every 3dB that the antenna gain exceeds 6 dBi. For Canada, fixed point-to-point applications using the 2400-2483.5 MHz band are not subject to this restriction. Fixed point-to-point applications using the 5725 – 5850 MHz band are also not subject to this restriction. Certification of DTS systems operating in the 5725-5850 MHz band is no longer allowed under FCC Rules per §15.37(h).

*TRANSMIT MODE SPURIOUS RADIATED EMISSIONS LIMITS – FHSS and DTS SYSTEMS*

The limits for unwanted (spurious) emissions from the transmitter falling in the restricted bands are those specified in the general limits sections of FCC Part 15 and RSS GEN. All other unwanted (spurious) emissions shall be at least 20dB below the level of the highest in-band signal level (30dB if the power is measured using the sample detector/power averaging method).

*SAMPLE CALCULATIONS - CONDUCTED EMISSIONS*

Receiver readings are compared directly to the conducted emissions specification limit (decibel form) as follows:

$$R_r - S = M$$

where:
$R_r$ = Receiver Reading in dBuV
S = Specification Limit in dBuV
M = Margin to Specification in +/- dB

*SAMPLE CALCULATIONS - RADIATED EMISSIONS*

Receiver readings are compared directly to the specification limit (decibel form). The receiver internally corrects for cable loss, preamplifier gain, and antenna factor. The calculations are in the reverse direction of the actual signal flow, thus cable loss is added and the amplifier gain is subtracted. The Antenna Factor converts the voltage at the antenna coaxial connector to the field strength at the antenna elements.

A distance factor, when used for electric field measurements above 30MHz, is calculated by using the following formula:

$$F_d = 20*LOG_{10} (D_m/D_s)$$

where:
$F_d$ = Distance Factor in dB
$D_m$ = Measurement Distance in meters
$D_s$ = Specification Distance in meters

For electric field measurements below 30MHz the extrapolation factor is either determined by making measurements at multiple distances or a theoretical value is calculated using the formula:

$$F_d = 40*LOG_{10} (D_m/D_s)$$

Measurement Distance is the distance at which the measurements were taken and Specification Distance is the distance at which the specification limits are based. The antenna factor converts the voltage at the antenna coaxial connector to the field strength at the antenna elements.

The margin of a given emission peak relative to the limit is calculated as follows:

$$R_c = R_r + F_d$$

and

$$M = R_c - L_s$$

where:
$R_r$ = Receiver Reading in dBuV/m
$F_d$ = Distance Factor in dB
$R_c$ = Corrected Reading in dBuV/m
$L_s$ = Specification Limit in dBuV/m
M = Margin in dB Relative to Spec

*SAMPLE CALCULATIONS - FIELD STRENGTH TO EIRP CONVERSION*

Where the radiated electric field strength is expressed in terms of the equivalent isotropic radiated power (eirp), or where a field strength measurement of output power is made in lieu of a direct measurement, the following formula is used to convert between eirp and field strength at a distance of d (meters) from the equipment under test:

$$E = \frac{1000000 \sqrt{30 P}}{d} \quad \text{microvolts per meter}$$

where P is the eirp (Watts)

For a measurement at 3m the conversion from a logarithmic value for field strength (dBuV/m) to an eirp power (dBm) is -95.3dB.

# Appendix A Test Equipment Calibration Data

| Manufacturer | Description | Model | Asset # | Calibrated | Cal Due |
|---|---|---|---|---|---|
| **Radiated Emissions, Fundamental & Band Edge, 11-Jun-20** | | | | | |
| National Technical Systems | NTS EMI Software (rev 2.10) | N/A | WC022452 | N/A | |
| National Technical Systems | NTS Capture Analyzer Software (rev 4.0) | N/A | WC022706 | N/A | |
| EMCO | Horn Antenna | 3115 | WC062583 | 7/9/2018 | 7/9/2020 |
| Rhode & Schwarz | EMI Test Receiver 20Hz-26.5GHz | ESI | WC071498 | 5/4/2020 | 5/4/2021 |
| **Radiated Emissions, 1,000 - 25,000 MHz, 12-Jun-20** | | | | | |
| National Technical Systems | NTS EMI Software (rev 2.10) | N/A | WC022452 | N/A | |
| Hewlett Packard | Spectrum Analyzer (Red) | 8564E (84125C) | WC055584 | 10/10/2019 | 10/10/2020 |
| Hewlett Packard | Microwave Preamplifier Head, 18-40 GHz (Red) | 84125C EMI Test Head | WC055586 | 10/4/2019 | 10/4/2020 |
| EMCO | Antenna, Horn, 1-18 GHz (SA40-Blu) | 3115 | WC064442 | 10/8/2018 | 10/8/2020 |
| A. H. Systems | Antenna, Horn, 18-40GHz | SAS-574 | WC064555 | 7/8/2019 | 7/8/2021 |
| Hewlett Packard | Microwave Preamplifier, 1-26.5GHz | 8449B | WC064574 | 7/19/2019 | 7/19/2020 |
| **Radiated Emissions, 30 kHz - 1,000 MHz, 12-Jun-20** | | | | | |
| National Technical Systems | NTS EMI Software (rev 2.10) | N/A | WC022452 | N/A | |
| Sunol Sciences | Biconilog, 30-3000 MHz | JB3 | WC064478 | 10/31/2018 | 10/31/2021 |
| Com-Power | Preamplifier, 30-1000 MHz | PA-103 | WC064693 | 5/13/2020 | 5/13/2021 |
| Rhode & Schwarz | Loop Antenna | HFH2-Z2 | WC062457 | 1/23/2020 | 1/23/2022 |
| Rohde & Schwarz | EMI Test Receiver, 20 Hz-7 GHz | ESIB 7 | WC064989 | 11/4/2019 | 11/4/2020 |
| **Conducted Emissions - AC Power Ports, 12-Jun-20** | | | | | |
| National Technical Systems | NTS EMI Software (rev 2.10) | N/A | WC022452 | N/A | |
| Com-Power | 9KHz-30MHz, 50uH, 15Aac, 10Adc, max CISPR 15 | LI-215A | WC064688 | 8/1/2019 | 8/1/2020 |
| Rohde & Schwarz | EMI Test Receiver, 20 Hz-7 GHz | ESIB 7 | WC064989 | 11/4/2019 | 11/4/2020 |
| Rohde & Schwarz | Pulse Limiter | ESH3-Z2 | WC072358 | 6/24/2019 | 6/24/2020 |
| **Radiated Emissions, 1,000 - 25,000 MHz, 29-Jun-20** | | | | | |
| National Technical Systems | NTS EMI Software (rev 2.10) | N/A | WC022452 | N/A | |
| Hewlett Packard | Microwave Preamplifier Head, 18-40 GHz (Purple) | 84125C Head | WC055610 | 8/13/2019 | 8/13/2020 |
| Hewlett Packard | Spectrum Analyzer (Purple) | 8564E | WC055660 | 7/24/2019 | 7/24/2020 |
| Hewlett Packard | Microwave Preamplifier, 1-26.5GHz | 8449B | WC064416 | 7/18/2019 | 7/18/2020 |
| EMCO | Antenna, Horn, 1-18 GHz (SA40-Red) | 3115 | WC064432 | 9/18/2018 | 9/18/2020 |

| Manufacturer | Description | Model | Asset # | Calibrated | Cal Due |
|---|---|---|---|---|---|
| Hewlett Packard | High Pass filter, 3.5 GHz | P/N 84300-80038 | WC064434 | 1/7/2020 | 1/7/2021 |
| A. H. Systems | Antenna, Horn, 18-40GHz | SAS-574 | WC064554 | 8/30/2018 | 8/30/2020 |
| **Radiated Emissions, 1,000 - 25,000 MHz, 01-Jul-20** | | | | | |
| National Technical Systems | NTS EMI Software (rev 2.10) | N/A | WC022452 | N/A | |
| Hewlett Packard | Spectrum Analyzer (Red) | 8564E (84125C) | WC055584 | 10/10/2019 | 10/10/2020 |
| Hewlett Packard | Microwave Preamplifier Head, 18-40 GHz (Red) | 84125C EMI Test Head | WC055586 | 10/4/2019 | 10/4/2020 |
| Hewlett Packard | High Pass filter, 3.5 GHz | P/N 84300-80038 | WC064434 | 1/7/2020 | 1/7/2021 |
| EMCO | Antenna, Horn, 1-18 GHz (SA40-Blu) | 3115 | WC064442 | 10/8/2018 | 10/8/2020 |
| A. H. Systems | Antenna, Horn, 18-40GHz | SAS-574 | WC064555 | 7/8/2019 | 7/8/2021 |
| Hewlett Packard | Microwave Preamplifier, 1-26.5GHz | 8449B | WC064574 | 7/19/2019 | 7/19/2020 |

# Appendix B Test Data

TL118617-RA Pages 25 – 55

| | | | |
|---|---|---|---|
| Client: | ConserVention | PR Number: | PR118617 |
| Product | SMAT | T-Log Number: | TL118617-RA |
| System Configuration: | Body Worn | Project Manager: | Christine Krebill |
| Contact: | Thomas Shaw | Project Engineer: | David Bare |
| Emissions Standard(s): | FCC Part 15 | Class: | B |
| Immunity Standard(s): | - | Environment: | Radio |

# EMC Test Data

For The

# ConserVention

Product

SMAT

Date of Last Test: 7/1/2020

| | | | |
|---|---|---|---|
| Client: | ConserVention | PR Number: | PR118617 |
| Model: | SMAT | T-Log Number: | TL118617-RA |
| | | Project Manager: | Christine Krebill |
| Contact: | Thomas Shaw | Project Engineer: | David Bare |
| Standard: | FCC Part 15 | Class: | N/A |

# RSS-247 and FCC 15.247 (DTS) Antenna Port Measurements

## Power, PSD and Bandwidth

### Test Specific Details

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

Date of Test: 6/29/2020
Test Engineer: David Bare
Test Location: Fremont Chamber #5
Config. Used: 1
Config Change: None
EUT Voltage: Battery

### General Test Configuration

The EUT was connected to the spectrum analyzer or power meter via a suitable attenuator. All measurements were made on a single chain.

All measurements have been corrected to allow for the external attenuators used.

### Ambient Conditions:

Temperature: 21 °C
Rel. Humidity: 41 %

### Summary of Results

| Run # | | | Test Performed | Limit | Pass / Fail | Result / Margin |
|---|---|---|---|---|---|---|
| 1 | | | Output Power | 15.247(b) | Pass | -1.5 dBm |
| 2 | | | Power spectral Density (PSD) | 15.247(d) | Pass | > 8 dBm/3MHz |
| 3 | | | Minimum 6dB Bandwidth | 15.247(a) | Pass | 625 kHz |
| 3 | | | 99% Bandwidth | RSS GEN | - | 1.206 MHz |

### Modifications Made During Testing

No modifications were made to the EUT during testing

### Deviations From The Standard

No deviations were made from the requirements of the standard.

### Procedure Comments:

Measurements performed in accordance with ANSI C63.10

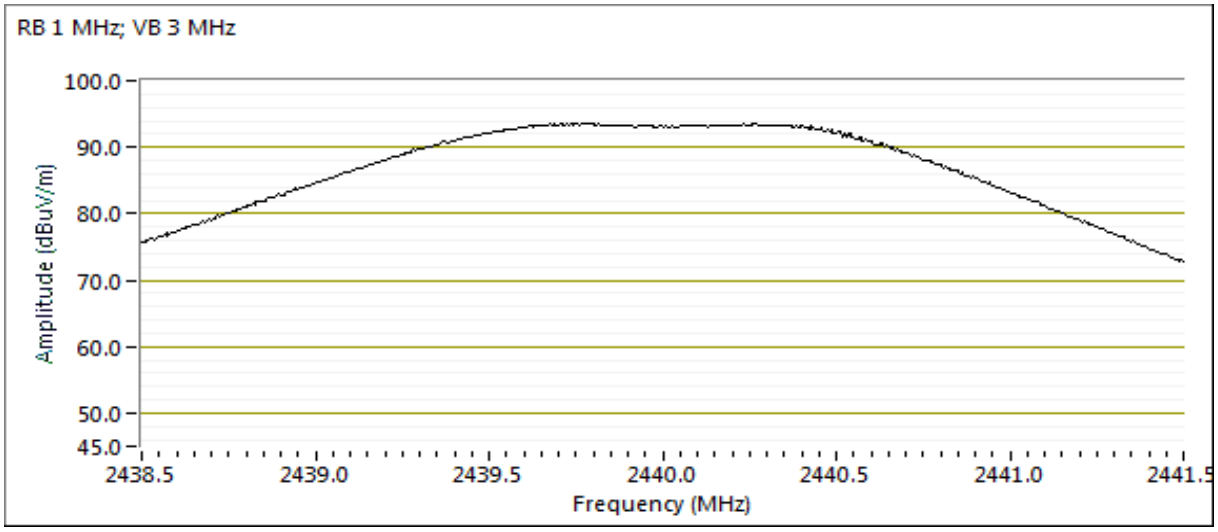
| | | | |
|---|---|---|---|
| Client: | ConserVention | PR Number: | PR118617 |
| Model: | SMAT | T-Log Number: | TL118617-RA |
| | | Project Manager: | Christine Krebill |
| Contact: | Thomas Shaw | Project Engineer: | David Bare |
| Standard: | FCC Part 15 | Class: | N/A |

Run #1: Output Power

Mode: BLE

| Power Setting | Frequency (MHz) | Output Power (dBm) [1] | Output Power mW | Antenna Gain (dBi) | Result | EIRP dBm | EIRP W |
|---|---|---|---|---|---|---|---|
| - | 2402 | -1.5 | 0.7 | 1.3 | Pass | -0.2 | 0.00095 |
| - | 2440 | -2.5 | 0.6 | 1.6 | Pass | -0.9 | 0.00081 |
| - | 2480 | -1.7 | 0.7 | 1.2 | Pass | -0.5 | 0.00089 |

| | |
|---|---|
| Note 1: | Output power calculated from the measured field strength using a spectrum analyzer with RBW = 3 MHz and RBW = 10 MHz and peak detector, spurious limit is -20dBc. Output power = Field strength - 95.2 - antenna gain. |




Run #2: Power spectral Density

Power is less than 8 dBm, no separate PSD measurement required as the limit is 8 dBm

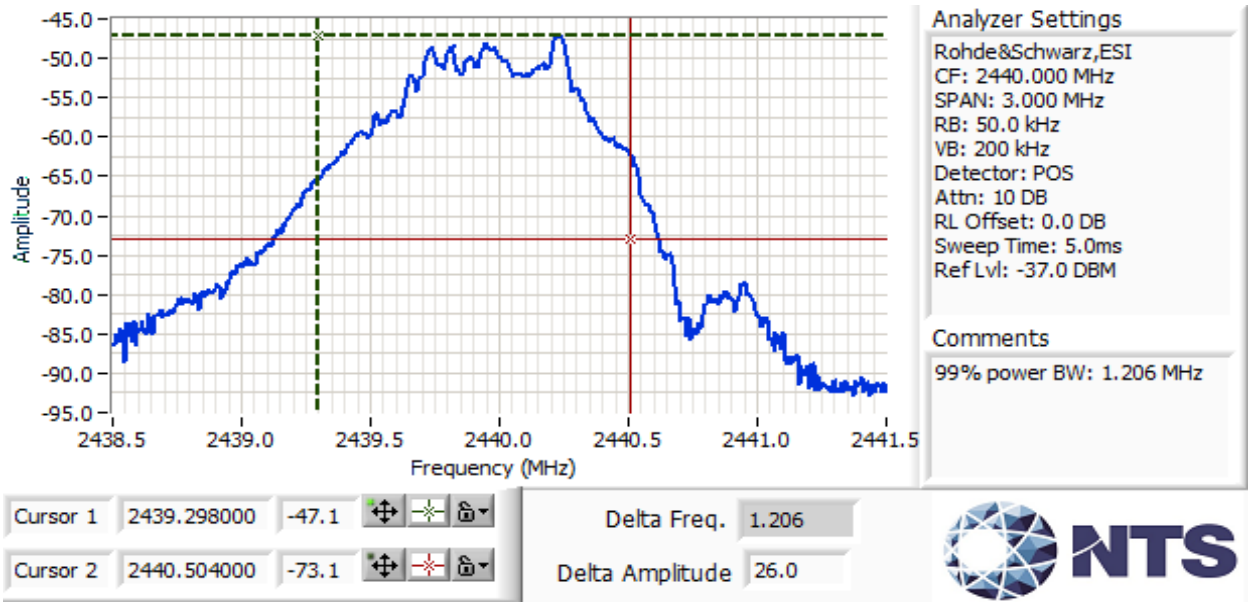
| | | | |
|---|---|---|---|
| Client: | ConserVention | PR Number: | PR118617 |
| Model: | SMAT | T-Log Number: | TL118617-RA |
| | | Project Manager: | Christine Krebill |
| Contact: | Thomas Shaw | Project Engineer: | David Bare |
| Standard: | FCC Part 15 | Class: | N/A |

Run #3: Signal Bandwidth

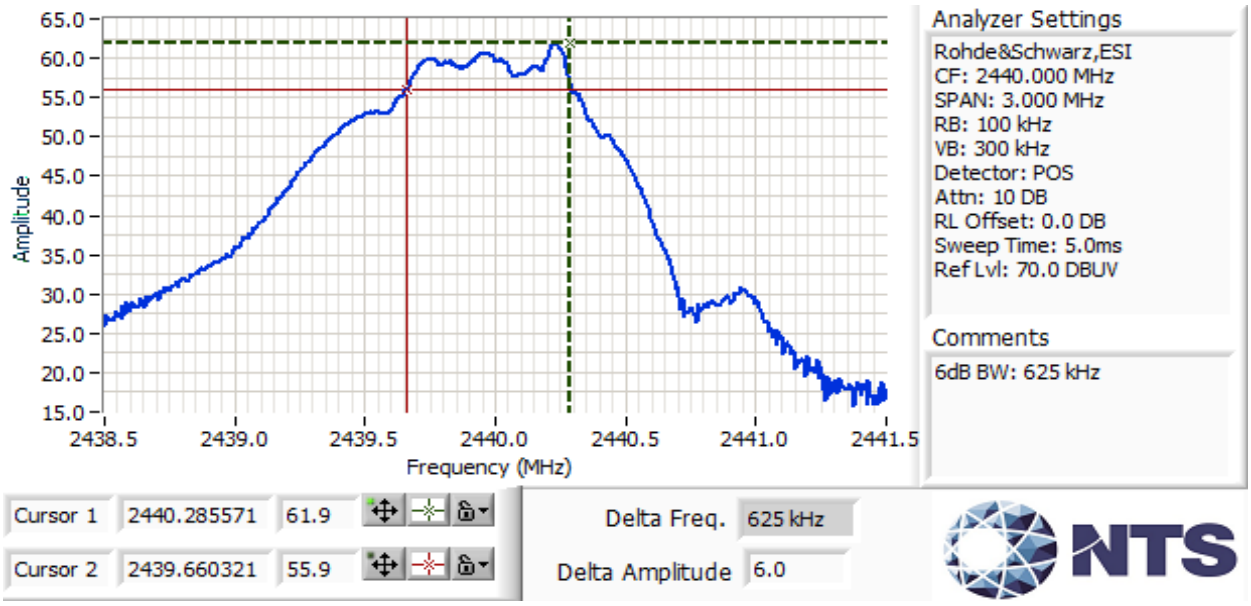
Mode: BLE

| Power Setting | Frequency (MHz) | Bandwidth (MHz) | | RBW Setting (MHz) | |
|---|---|---|---|---|---|
| | | 6dB | 99% | 6dB | 99% |
| - | 2402 | 0.625 | 1.098 | 0.1 | 0.05 |
| - | 2440 | 0.625 | 1.206 | 0.1 | 0.05 |
| - | 2480 | 0.667 | 1.17 | 0.1 | 0.05 |

| | |
|---|---|
| Note 1: | DTS BW: RBW=100kHz, VBW ≥ 3*RBW, peak detector, max hold, auto sweep time, Span 2-5 times measured BW.<br>99% BW: RBW=1-5% of 99%BW, VBW ≥ 3*RBW, peak detector, max hold, auto sweep time. Span 1.5-5 times OBW. |



| | | | |
|---|---|---|---|
| Client: | ConserVention | PR Number: | PR118617 |
| Model: | SMAT | T-Log Number: | TL118617-RA |
| | | Project Manager: | Christine Krebill |
| Contact: | Thomas Shaw | Project Engineer: | David Bare |
| Standard: | FCC Part 15 | Class: | N/A |



| | | | |
|---|---|---|---|
| Client: | ConserVention | PR Number: | PR118617 |
| Model: | SMAT | T-Log Number: | TL118617-RA |
| | | Project Manager: | Christine Krebill |
| Contact: | Thomas Shaw | Project Engineer: | David Bare |
| Standard: | FCC Part 15 | Class: | N/A |

# RSS-247 and FCC 15.247 (DTS) Radiated Fundamental Emissions

## Test Specific Details

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

## General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing.
For radiated emissions testing the measurement antenna was located 3 meters from the EUT, unless otherwise noted.

## Ambient Conditions:

Temperature: 21 °C
Rel. Humidity: 42 %

## Summary of Results - Device Operating in the 2400-2483.5 MHz Band

| Run # | Mode | Channel | | | Test Performed | Limit | Result / Margin |
|---|---|---|---|---|---|---|---|
| 1a | BLE | low | | | Radiated Emissions, Fundamental | FCC Part 15.209 / 15.247( c) | 95.0 dBµV/m |
| 1b | BLE | center | | | Radiated Emissions, Fundamental | FCC Part 15.209 / 15.247( c) | 94.3 dBµV/m |
| 1c | BLE | high | | | Radiated Emissions, Fundamental | FCC Part 15.209 / 15.247( c) | 94.7 dBµV/m |

## Modifications Made During Testing

No modifications were made to the EUT during testing

## Deviations From The Standard

No deviations were made from the requirements of the standard.

## Procedure Comments:

Measurements performed in accordance with ANSI C63.10
Peak measurements performed with: RBW = 100kHz, VBW = 300kHz and RBW=1MHz, VBW=3MHz, peak detector, max hold, auto sweep time

| | | | |
|---|---|---|---|
| Client: | ConserVention | PR Number: | PR118617 |
| Model: | SMAT | T-Log Number: | TL118617-RA |
| | | Project Manager: | Christine Krebill |
| Contact: | Thomas Shaw | Project Engineer: | David Bare |
| Standard: | FCC Part 15 | Class: | N/A |

Run #1: Radiated Spurious Emissions, Fundamental. Operating Mode: BLE

Date of Test: 6/29/2020 15:50 Config. Used: 1

Test Engineer: David Bare Config Change: None

Test Location: Fremont Chamber #5 EUT Voltage: Battery

Run #1a: Low Channel @ 2402 MHz

Fundamental Signal Field Strength: Peak values measured in 100 kHz and 3 MHz bandwidths

| Frequency | Level | Pol | 15.209 / 15.247 | | Detector | Azimuth | Height | Comments |
|---|---|---|---|---|---|---|---|---|
| MHz | dBµV/m | V/H | Limit | Margin | Pk/QP/Avg | degrees | meters | |
| EUT upright | | | | | | | | |
| 2402.000 | 95.0 | v | - | - | Pk | 302 | 1.6 | RB = 100kHz, VB = 300kHz |
| 2402.000 | 85.2 | h | - | - | Pk | 247 | 2.0 | RB = 100kHz, VB = 300kHz |
| 2402.000 | 95.0 | v | - | - | Pk | 302 | 1.6 | RB = 3 MHz, VB = 10MHz |
| EUT flat | | | | | | | | |
| 2402.000 | 85.2 | v | - | - | Pk | 292 | 2.2 | RB = 100kHz, VB = 300kHz |
| 2402.000 | 94.0 | h | - | - | Pk | 0 | 2.1 | RB = 100kHz, VB = 300kHz |
| 2402.000 | 94.1 | h | - | - | Pk | 0 | 2.1 | RB = 3 MHz, VB = 10MHz |
| EUT side | | | | | | | | |
| 2402.000 | 86.6 | v | - | - | Pk | 72 | 2.2 | RB = 100kHz, VB = 300kHz |
| 2402.000 | 92.3 | h | - | - | Pk | 0 | 2.0 | RB = 100kHz, VB = 300kHz |
| 2402.000 | 92.4 | h | - | - | Pk | 0 | 2.0 | RB = 3 MHz, VB = 10MHz |

| | | | |
|---|---|---|---|
| Fundamental emission level @ 3m in 100kHz RBW: | 95.0 | dBµV/m | |
| Limit for emissions outside of restricted bands: | 75 | dBµV/m | Limit is -20dBc (Peak power measurement) |
| Limit for emissions outside of restricted bands: | 65 | dBµV/m | Limit is -30dBc (UNII power measurement) |

| | | | |
|---|---|---|---|
| Client: | ConserVention | PR Number: | PR118617 |
| Model: | SMAT | T-Log Number: | TL118617-RA |
| | | Project Manager: | Christine Krebill |
| Contact: | Thomas Shaw | Project Engineer: | David Bare |
| Standard: | FCC Part 15 | Class: | N/A |

Run #1b: Center Channel @ 2440 MHz

Fundamental Signal Field Strength: Peak values measured in 100 kHz and 3 MHz bandwidths

| Frequency | Level | Pol | 15.209 / 15.247 | | Detector | Azimuth | Height | Comments |
|---|---|---|---|---|---|---|---|---|
| MHz | dBµV/m | V/H | Limit | Margin | Pk/QP/Avg | degrees | meters | |
| EUT upright | | | | | | | | |
| 2440.000 | 93.7 | v | - | - | Pk | 12 | 1.3 | RB = 100kHz, VB = 300kHz |
| 2440.000 | 86.2 | h | - | - | Pk | 215 | 2.5 | RB = 100kHz, VB = 300kHz |
| 2440.000 | 94.3 | v | - | - | Pk | 12 | 1.3 | RB = 3 MHz, VB = 10MHz |
| EUT flat | | | | | | | | |
| 2440.000 | 87.8 | v | - | - | Pk | 118 | 2.2 | RB = 100kHz, VB = 300kHz |
| 2440.000 | 93.5 | h | - | - | Pk | 0 | 1.6 | RB = 100kHz, VB = 300kHz |
| 2440.000 | 94.1 | h | - | - | Pk | 0 | 1.6 | RB = 3 MHz, VB = 10MHz |
| EUT side | | | | | | | | |
| 2440.000 | 86.5 | v | - | - | Pk | 50 | 2.1 | RB = 100kHz, VB = 300kHz |
| 2440.000 | 93.1 | h | - | - | Pk | 347 | 1.7 | RB = 100kHz, VB = 300kHz |
| 2440.000 | 93.6 | h | - | - | Pk | 347 | 1.7 | RB = 3 MHz, VB = 10MHz |

| | | | |
|---|---|---|---|
| Fundamental emission level @ 3m in 100kHz RBW: | 94.3 | dBµV/m | |
| Limit for emissions outside of restricted bands: | 74.3 | dBµV/m | Limit is -20dBc (Peak power measurement) |
| Limit for emissions outside of restricted bands: | 64.3 | dBµV/m | Limit is -30dBc (UNII power measurement) |

Run #1c: High Channel @ 2480 MHz

Fundamental Signal Field Strength: Peak values measured in 100 kHz and 3 MHz bandwidths

| Frequency | Level | Pol | 15.209 / 15.247 | | Detector | Azimuth | Height | Comments |
|---|---|---|---|---|---|---|---|---|
| MHz | dBµV/m | V/H | Limit | Margin | Pk/QP/Avg | degrees | meters | |
| EUT upright | | | | | | | | |
| 2480.000 | 93.0 | v | - | - | Pk | 0 | 1.0 | RB = 100kHz, VB = 300kHz |
| 2480.000 | 87.8 | h | - | - | Pk | 147 | 1.7 | RB = 100kHz, VB = 300kHz |
| 2480.000 | 93.3 | v | - | - | Pk | 0 | 1.0 | RB = 3 MHz, VB = 10MHz |
| EUT flat | | | | | | | | |
| 2480.000 | 86.6 | v | - | - | Pk | 112 | 2.4 | RB = 100kHz, VB = 300kHz |
| 2480.000 | 94.0 | h | - | - | Pk | 359 | 2.4 | RB = 100kHz, VB = 300kHz |
| 2480.000 | 94.7 | h | - | - | Pk | 359 | 2.4 | RB = 3 MHz, VB = 10MHz |
| EUT side | | | | | | | | |
| 2480.000 | 89.4 | v | - | - | Pk | 111 | 2.4 | RB = 100kHz, VB = 300kHz |
| 2480.000 | 94.2 | h | - | - | Pk | 171 | 2.4 | RB = 100kHz, VB = 300kHz |
| 2480.000 | 94.4 | h | - | - | Pk | 171 | 2.4 | RB = 3 MHz, VB = 10MHz |

| | | | |
|---|---|---|---|
| Fundamental emission level @ 3m in 100kHz RBW: | 94.7 | dBµV/m | |
| Limit for emissions outside of restricted bands: | 74.7 | dBµV/m | Limit is -20dBc (Peak power measurement) |
| Limit for emissions outside of restricted bands: | 64.7 | dBµV/m | Limit is -30dBc (UNII power measurement) |

| | | | |
|---|---|---|---|
| Client: | ConserVention | PR Number: | PR118617 |
| Model: | SMAT | T-Log Number: | TL118617-RA |
| | | Project Manager: | Christine Krebill |
| Contact: | Thomas Shaw | Project Engineer: | David Bare |
| Standard: | FCC Part 15 | Class: | N/A |

# RSS-247 and FCC 15.247 (DTS) Radiated Spurious Emissions

## Test Specific Details

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

Date of Test: 7/1/2020 10:00
Test Engineer: David Bare
Test Location: Fremont Chamber #4
Config. Used: 1
Config Change: None
EUT Voltage: Battery

## General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing.
For radiated emissions testing the measurement antenna was located 3 meters from the EUT, unless otherwise noted.

## Ambient Conditions:

Temperature: 21 °C
Rel. Humidity: 41 %

## Summary of Results - Device Operating in the 2400-2483.5 MHz Band

| Run # | Mode | Channel | | | Test Performed | Limit | Result / Margin |
|---|---|---|---|---|---|---|---|
| 1 | BLE | 37 - 2402MHz | | | Restricted Band Edge (2390 MHz) | FCC Part 15.209 / 15.247( c) | 44.5 dBµV/m @ 2370.8 MHz (-9.5 dB) |
| | BLE | 39 - 2480MHz | | | Restricted Band Edge (2483.5 MHz) | FCC Part 15.209 / 15.247( c) | 42.8 dBµV/m @ 2483.8 MHz (-11.2 dB) |

## Modifications Made During Testing

No modifications were made to the EUT during testing

## Deviations From The Standard

No deviations were made from the requirements of the standard.

| | | | |
|---|---|---|---|
| Client: | ConserVention | PR Number: | PR118617 |
| Model: | SMAT | T-Log Number: | TL118617-RA |
| | | Project Manager: | Christine Krebill |
| Contact: | Thomas Shaw | Project Engineer: | David Bare |
| Standard: | FCC Part 15 | Class: | N/A |

## Procedure Comments:

Measurements performed in accordance with ANSI C63.10
Peak measurements performed with: RBW=1MHz, VBW=3MHz, peak detector, max hold, auto sweep time
Unless otherwise stated/noted, emission has a duty cycle ≥ 98% and was measured using RBW=1MHz, VBW=10Hz, peak detector, linear voltage average, auto sweep time, max hold.

| Mode | Data Rate | Duty Cycle (x) | Constant DC? | T (ms) | Pwr Cor Factor* | Lin Volt Cor Factor** | Min VBW for FS (Hz) |
|---|---|---|---|---|---|---|---|
| BLE | 2 Mbps | 0.18 | Yes | 0.438 | 7.5 | 15.0 | 2283 |

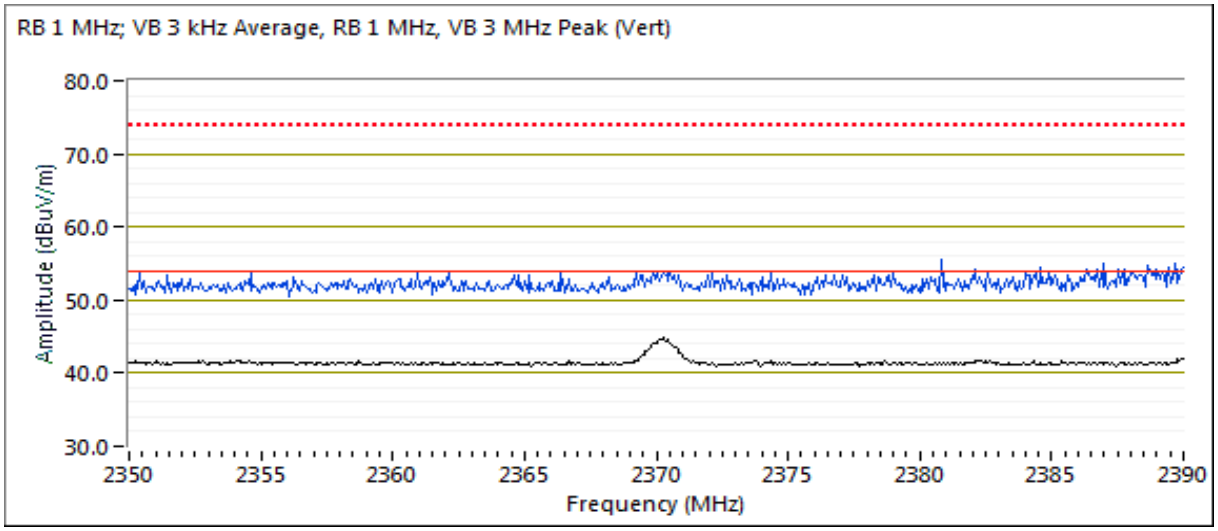
## Measurement Specific Notes:

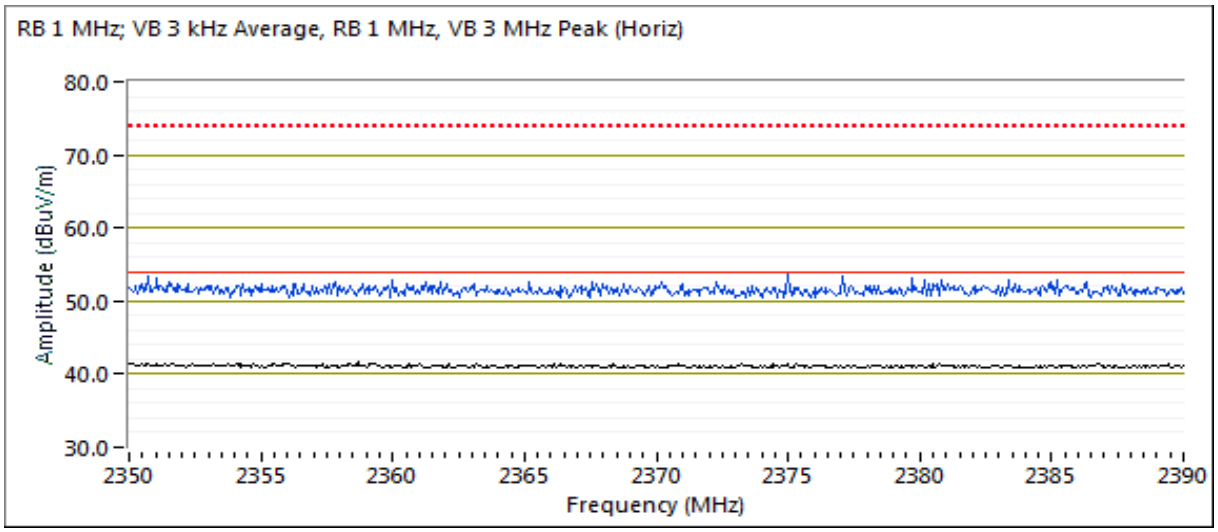
| | |
|---|---|
| Note 1: | Emission in non-restricted band, but limit of 15.209 used. |
| Note 2: | Emission in non-restricted band, the limit was set 30dB below the level of the fundamental and measured in 100kHz. |
| Note 3: | Emission has a duty cycle ≥ 98%, average measurement performed: RBW=1MHz, VBW=3MHz, RMS, Power averaging, auto sweep, trace average 100 traces |
| Note 4: | Emission has constant duty cycle < 98%, average measurement performed: RBW=1MHz, VBW>1/T but not less than 10Hz, peak detector, linear averaging, auto sweep, trace average 100 traces, measurement corrected by Linear voltage correction factor |
| Note 5: | Emission has constatnt duty cycle < 98%, average measurement performed: RBW=1MHz, VBW=3MHz, RMS, Power averaging, auto sweep, trace average 100 traces, measurement corrected by Pwr correction factor |
| Note 6: | Emission has non constant duty cycle < 98%, average measurement performed: RBW=1MHz, VBW> 1/T, peak detector, linear voltage average, sweep time auto, max hold. Max hold for 50*(1/DC) traces |
| Note 7: | Emission has non constant duty cycle < 98%, average measurement performed: RBW=1MHz, VBW> 1/T, RMS detector, sweep time auto, max hold. Max hold for 50*(1/DC) traces |
| Note 8: | Plots of the average and peak bandedge do not account for any duty cycle correction. Refer to the tabular results for final measurements. |

| | | | |
|---|---|---|---|
| Client: | ConserVention | PR Number: | PR118617 |
| Model: | SMAT | T-Log Number: | TL118617-RA |
| | | Project Manager: | Christine Krebill |
| Contact: | Thomas Shaw | Project Engineer: | David Bare |
| Standard: | FCC Part 15 | Class: | N/A |

Run #1: Radiated Bandedge Measurements (Worst case orientation)

Channel: 37 Mode: BLE Wosrt case orientation



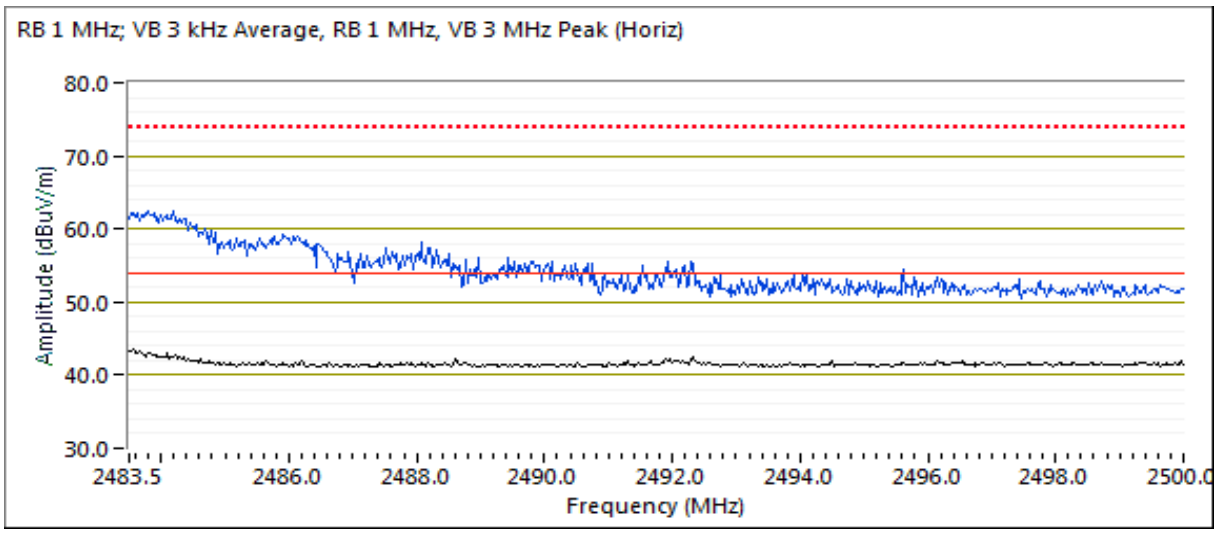



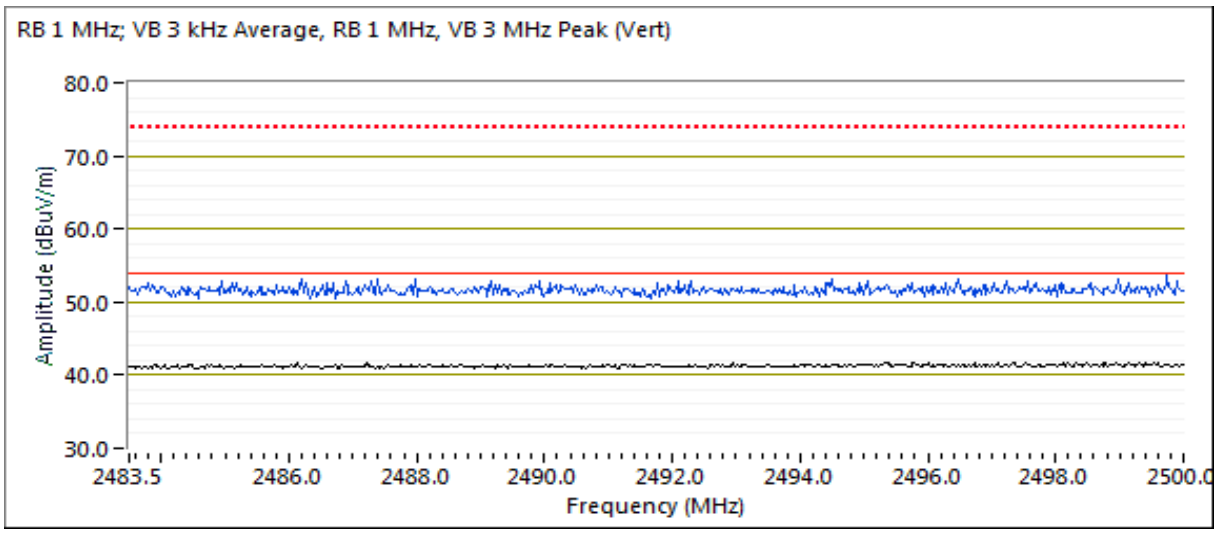

Band Edge Signal Field Strength - Direct measurement of field strength

| Frequency | Level | Pol | 15.209 / 15.247 | | Detector | Azimuth | Height | Comments |
|---|---|---|---|---|---|---|---|---|
| MHz | dBµV/m | V/H | Limit | Margin | Pk/QP/Avg | degrees | meters | |
| 2370.800 | 44.5 | V | 54.0 | -9.5 | Avg | 136 | 1.7 | RB 1 MHz;VB 3 kHz;Peak, Note 6 |
| 2368.670 | 55.0 | V | 74.0 | -19.0 | PK | 136 | 1.7 | RB 1 MHz;VB 3 MHz;Peak |

| | | | |
|---|---|---|---|
| Client: | ConserVention | PR Number: | PR118617 |
| Model: | SMAT | T-Log Number: | TL118617-RA |
| | | Project Manager: | Christine Krebill |
| Contact: | Thomas Shaw | Project Engineer: | David Bare |
| Standard: | FCC Part 15 | Class: | N/A |

Channel: 39 Mode: BLE
At worst case orientation




Band Edge Signal Field Strength - Direct measurement of field strength

| Frequency | Level | Pol | 15.209 / 15.247 | | Detector | Azimuth | Height | Comments |
|---|---|---|---|---|---|---|---|---|
| MHz | dBµV/m | V/H | Limit | Margin | Pk/QP/Avg | degrees | meters | |
| 2483.800 | 42.8 | H | 54.0 | -11.2 | Avg | 0 | 1.8 | RB 1 MHz;VB 3 kHz;Peak, Note 6 |
| 2483.750 | 62.5 | H | 74.0 | -11.5 | PK | 0 | 1.8 | RB 1 MHz;VB 3 MHz;Peak |

| | | | |
|---|---|---|---|
| Client: | ConserVention | PR Number: | PR118617 |
| Model: | SMAT | T-Log Number: | TL118617-RA |
| | | Project Manager: | Christine Krebill |
| Contact: | Thomas Shaw | Project Engineer: | David Bare |
| Standard: | FCC Part 15 | Class: | N/A |

# RSS-247 and FCC 15.247 (DTS) Radiated Spurious Emissions

## Test Specific Details

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

## General Test Configuration

The EUT and all local support equipment were located on the turntable for radiated spurious emissions testing.

For radiated emissions testing the measurement antenna was located 3 meters from the EUT, unless otherwise noted.

## Ambient Conditions:

Temperature: 20 °C

Rel. Humidity: 41 %

## Summary of Results - Device Operating in the 2400-2483.5 MHz Band

| Run # | Mode | Channel | | | Test Performed | Limit | Result / Margin |
|---|---|---|---|---|---|---|---|
| 1 | BLE | 37 - 2402MHz | | | Radiated Emissions, 1 - 25 GHz | FCC Part 15.209 / 15.247( c) | 46.8 dBµV/m @ 4803.9 MHz (-7.2 dB) |
| | BLE | 17 - 2440MHz | | | Radiated Emissions, 1 - 25 GHz | FCC Part 15.209 / 15.247( c) | 52.0 dBµV/m @ 12198.8 MHz (-2.0 dB) |
| | BLE | 39 - 2480MHz | | | Radiated Emissions, 1 - 25 GHz | FCC Part 15.209 / 15.247( c) | 52.8 dBµV/m @ 7439.4 MHz (-1.2 dB) |

## Modifications Made During Testing

The following modifications were made to the EUT during testing:

The power setting was reduced, a new balum/harmonic filter chip was used and discrete Pi filter was installed.

## Deviations From The Standard

No deviations were made from the requirements of the standard.

| | | | |
|---|---|---|---|
| Client: | ConserVention | PR Number: | PR118617 |
| Model: | SMAT | T-Log Number: | TL118617-RA |
| | | Project Manager: | Christine Krebill |
| Contact: | Thomas Shaw | Project Engineer: | David Bare |
| Standard: | FCC Part 15 | Class: | N/A |

## Procedure Comments:

Measurements performed in accordance with ANSI C63.10
Peak measurements performed with: RBW=1MHz, VBW=3MHz, peak detector, max hold, auto sweep time
Unless otherwise stated/noted, emission has duty cycle ≥ 98% and was measured using RBW=1MHz, VBW=10Hz, peak detector, linear voltage average, auto sweep time, max hold.
2.4GHz band reject filter used

| Mode | Data Rate | Duty Cycle (x) | Constant DC? | T (ms) | Pwr Cor Factor* | Lin Volt Cor Factor** | Min VBW for FS (Hz) |
|---|---|---|---|---|---|---|---|
| BLE | 2 Mbps | 0.18 | Yes | 0.438 | 7.5 | 15.0 | 2283 |

## Measurement Specific Notes:

| | |
|---|---|
| Note 1: | Emission in non-restricted band, but limit of 15.209 used. |
| Note 2: | Emission in non-restricted band, the limit was set 20dB below the level of the fundamental and measured in 100kHz. |
| Note 3: | Emission has a duty cycle ≥ 98%, average measurement performed: RBW=1MHz, VBW=3MHz, RMS, Power averaging, auto sweep, trace average 100 traces |
| Note 4: | Emission has constant duty cycle < 98%, average measurement performed: RBW=1MHz, VBW>1/T but not less than 10Hz, peak detector, linear averaging, auto sweep, trace average 100 traces, measurement corrected by Linear voltage correction factor |
| Note 5: | Emission has constatnt duty cycle < 98%, average measurement performed: RBW=1MHz, VBW=3MHz, RMS, Power averaging, auto sweep, trace average 100 traces, measurement corrected by Pwr correction factor |
| Note 6: | Emission has non constant duty cycle < 98%, average measurement performed: RBW=1MHz, VBW> 1/T, peak detector, linear voltage average, sweep time auto, max hold. Max hold for 50*(1/DC) traces |
| Note 7: | Emission has non constant duty cycle < 98%, average measurement performed: RBW=1MHz, VBW> 1/T, RMS detector, sweep time auto, max hold. Max hold for 50*(1/DC) traces |

| | | | |
|---|---|---|---|
| Client: | ConserVention | PR Number: | PR118617 |
| Model: | SMAT | T-Log Number: | TL118617-RA |
| | | Project Manager: | Christine Krebill |
| Contact: | Thomas Shaw | Project Engineer: | David Bare |
| Standard: | FCC Part 15 | Class: | N/A |

Run #1: Radiated Spurious Emissions, 1,000 - 25000 MHz. Operating Mode: BLE

Date of Test: 6/29 & 7/1/2020 Config. Used: 1

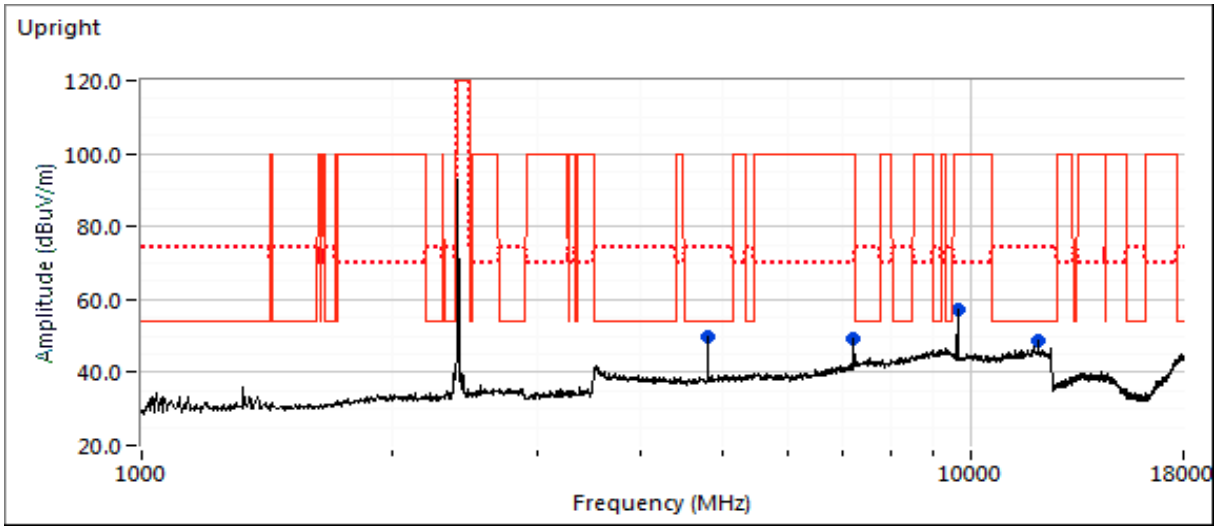
Test Engineer: David Bare Config Change: Nne

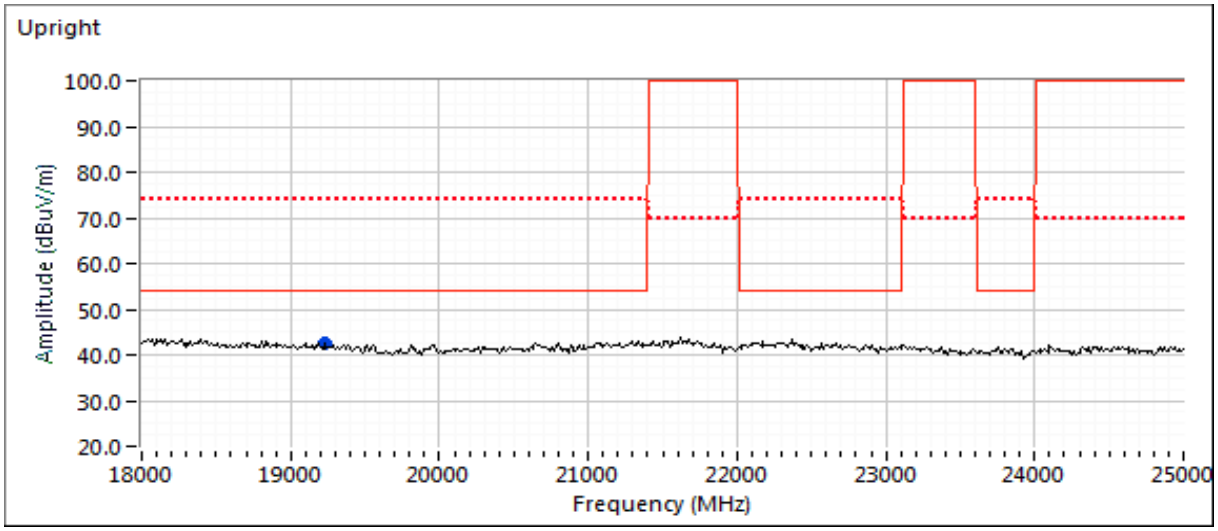
Test Location: Fremont Chamber #5 EUT Voltage: Battery

Run #1a: Low Channel

Channel: 37 Mode: BLE

At worst case orientation from Run # 1b (Upright)



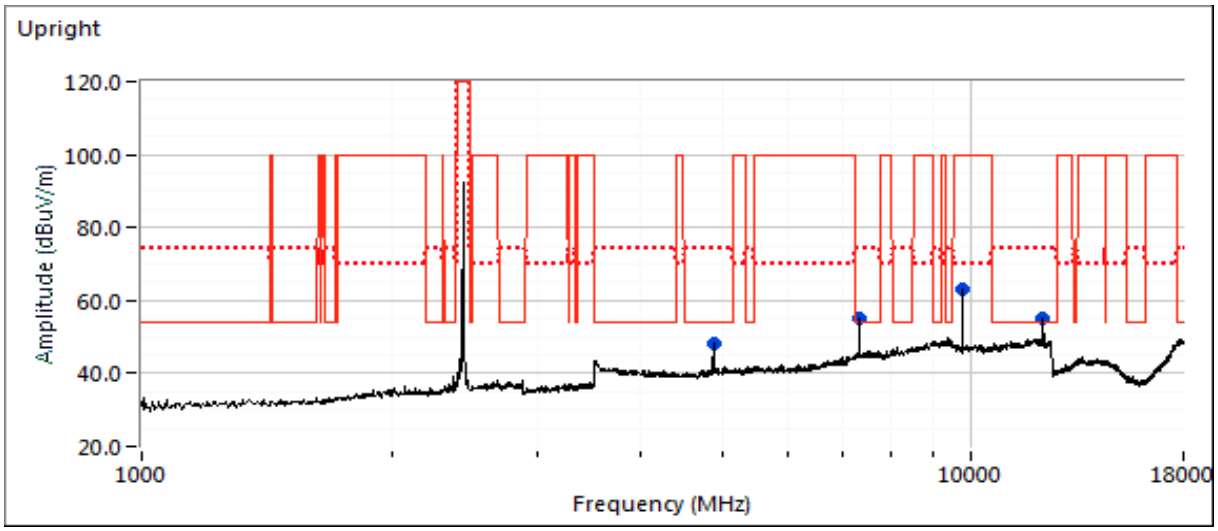



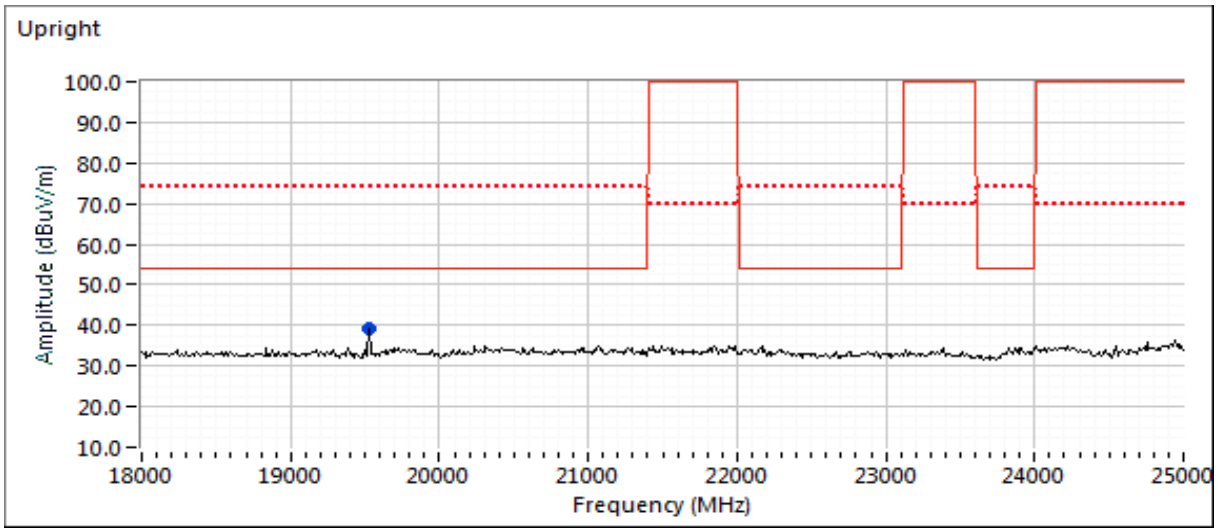
| | | | |
|---|---|---|---|
| Client: | ConserVention | PR Number: | PR118617 |
| Model: | SMAT | T-Log Number: | TL118617-RA |
| | | Project Manager: | Christine Krebill |
| Contact: | Thomas Shaw | Project Engineer: | David Bare |
| Standard: | FCC Part 15 | Class: | N/A |

| Frequency | Level | Pol | 15.209 / 15.247 | | Detector | Azimuth | Height | Comments |
|---|---|---|---|---|---|---|---|---|
| MHz | dBµV/m | V/H | Limit | Margin | Pk/QP/Avg | degrees | meters | |
| 4803.910 | 46.8 | V | 54.0 | -7.2 | Avg | 171 | 1.6 | RB 1 MHz;VB 3 kHz;Peak, Note 6 |
| 4803.580 | 52.2 | V | 74.0 | -21.8 | PK | 171 | 1.6 | RB 1 MHz;VB 3 MHz;Peak |
| 7205.250 | 52.5 | V | 75.0 | -22.5 | PK | 349 | 2.2 | RB 100 kHz;VB 300 kHz;Peak |
| 9607.040 | 59.8 | H | 75.0 | -15.2 | PK | 183 | 1.9 | RB 100 kHz;VB 300 kHz;Peak |
| 12008.950 | 44.8 | H | 54.0 | -9.2 | Avg | 133 | 1.9 | RB 1 MHz;VB 3 kHz;Peak, Note 6 |
| 12008.970 | 53.9 | H | 74.0 | -20.1 | PK | 133 | 1.9 | RB 1 MHz;VB 3 MHz;Peak |
| 19217.410 | 40.1 | V | 54.0 | -13.9 | Avg | 145 | 1.9 | RB 1 MHz;VB 3 kHz;Peak, Note 6 |
| 19214.970 | 51.2 | V | 74.0 | -22.8 | PK | 145 | 1.9 | RB 1 MHz;VB 3 MHz;Peak |

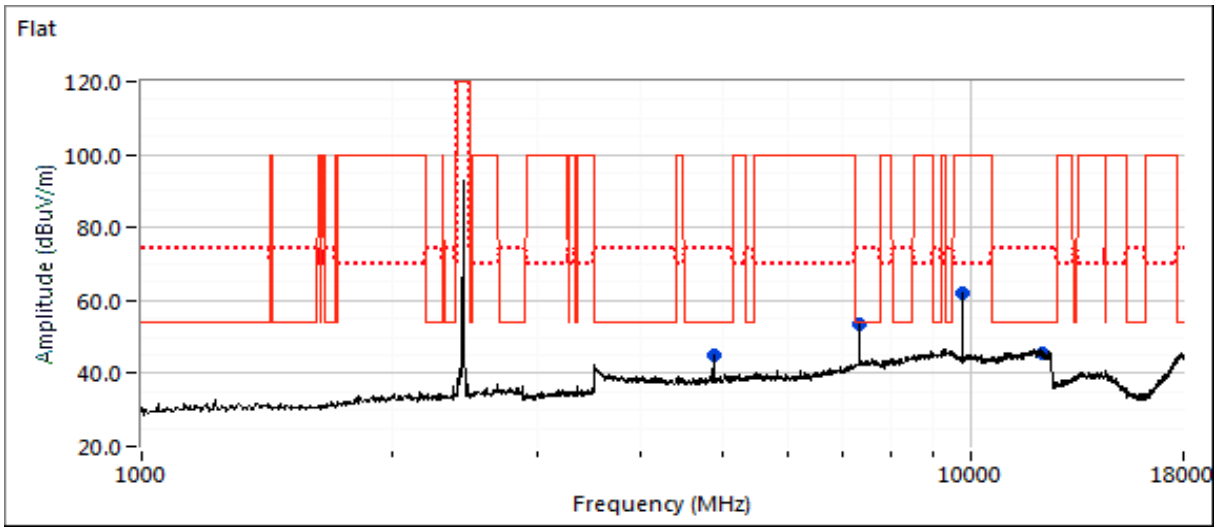
| | | | |
|---|---|---|---|
| Client: | ConserVention | PR Number: | PR118617 |
| Model: | SMAT | T-Log Number: | TL118617-RA |
| | | Project Manager: | Christine Krebill |
| Contact: | Thomas Shaw | Project Engineer: | David Bare |
| Standard: | FCC Part 15 | Class: | N/A |

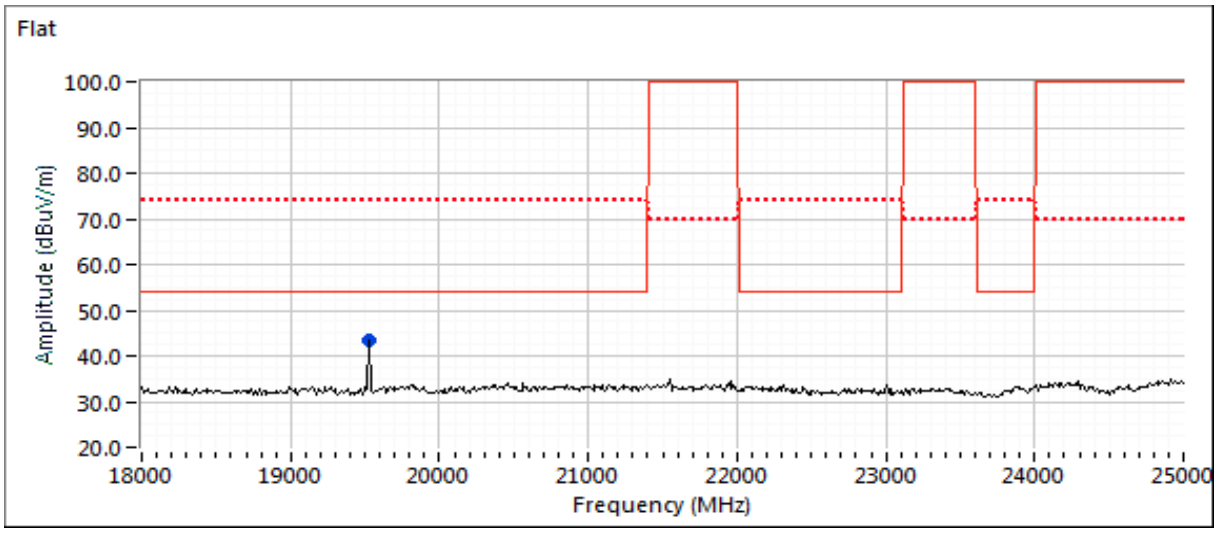
Run #1b: Center Channel
Channel: 17 Mode: BLE



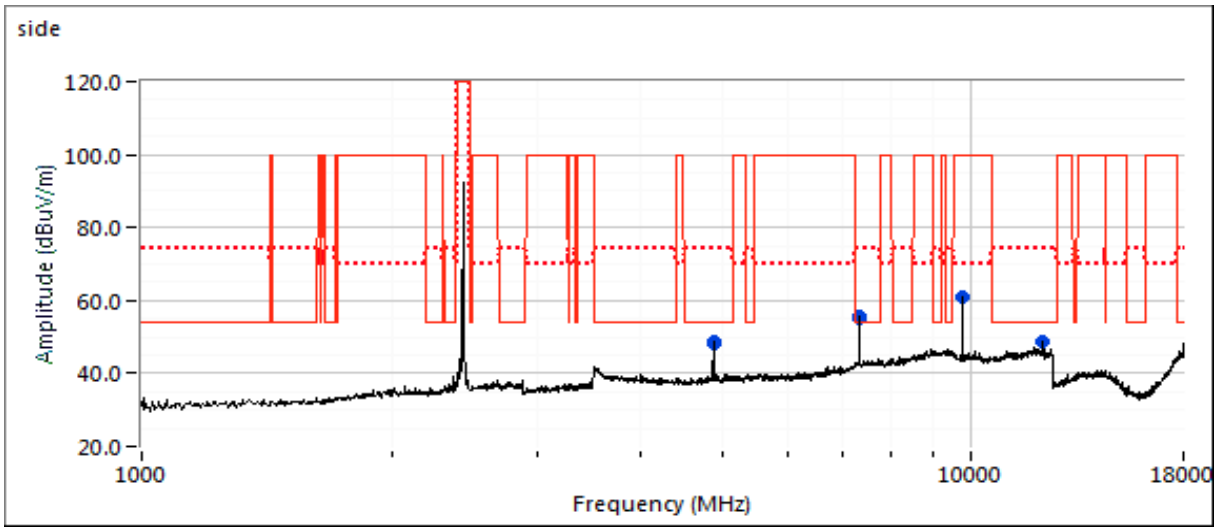



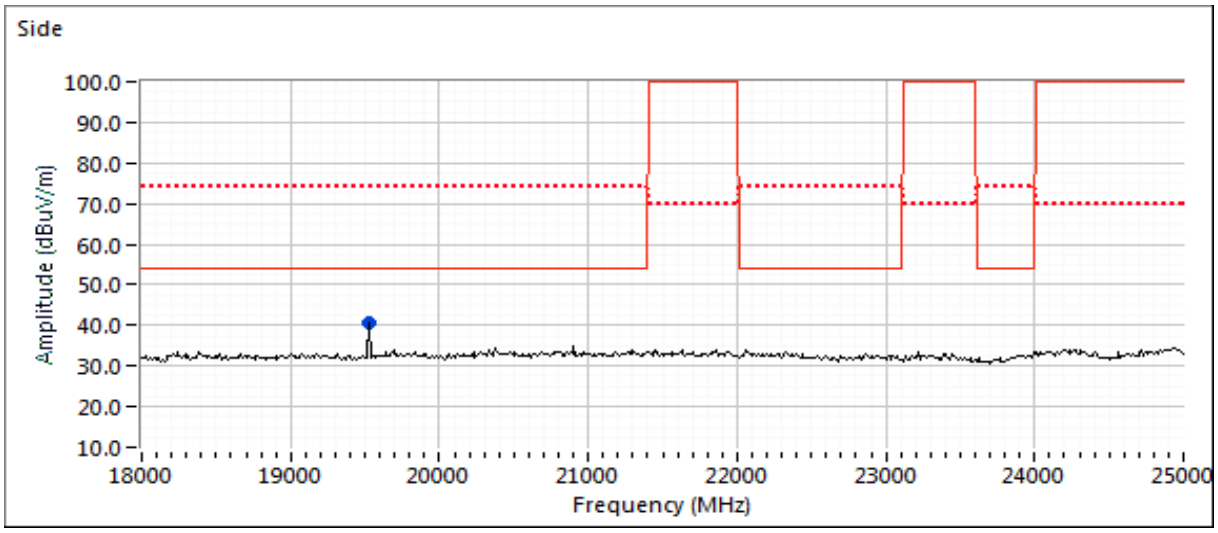
| | | | |
|---|---|---|---|
| Client: | ConserVention | PR Number: | PR118617 |
| Model: | SMAT | T-Log Number: | TL118617-RA |
| | | Project Manager: | Christine Krebill |
| Contact: | Thomas Shaw | Project Engineer: | David Bare |
| Standard: | FCC Part 15 | Class: | N/A |



| | | | |
|---|---|---|---|
| Client: | ConserVention | PR Number: | PR118617 |
| Model: | SMAT | T-Log Number: | TL118617-RA |
| | | Project Manager: | Christine Krebill |
| Contact: | Thomas Shaw | Project Engineer: | David Bare |
| Standard: | FCC Part 15 | Class: | N/A |



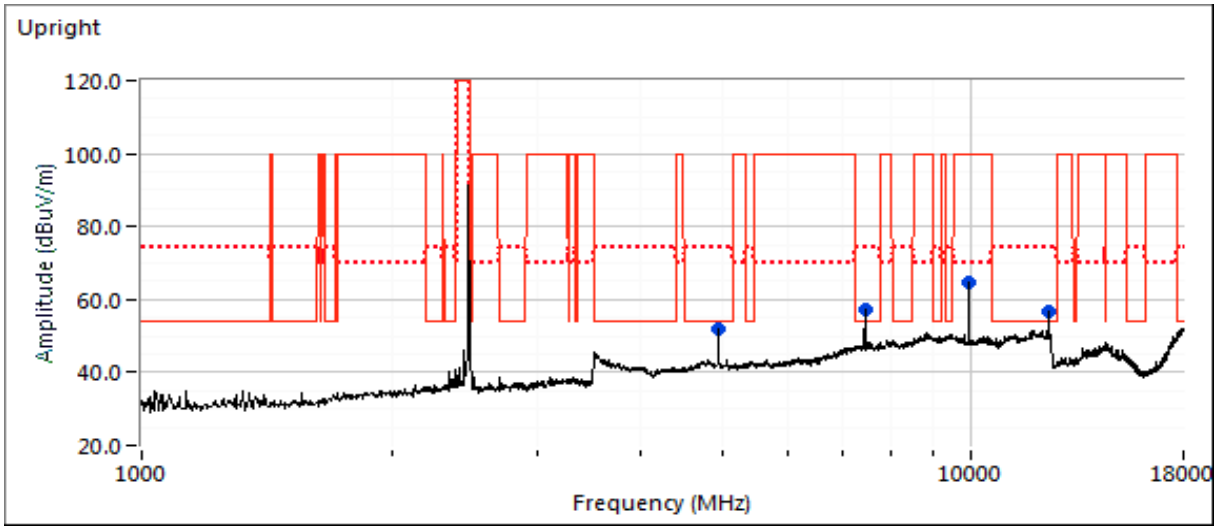



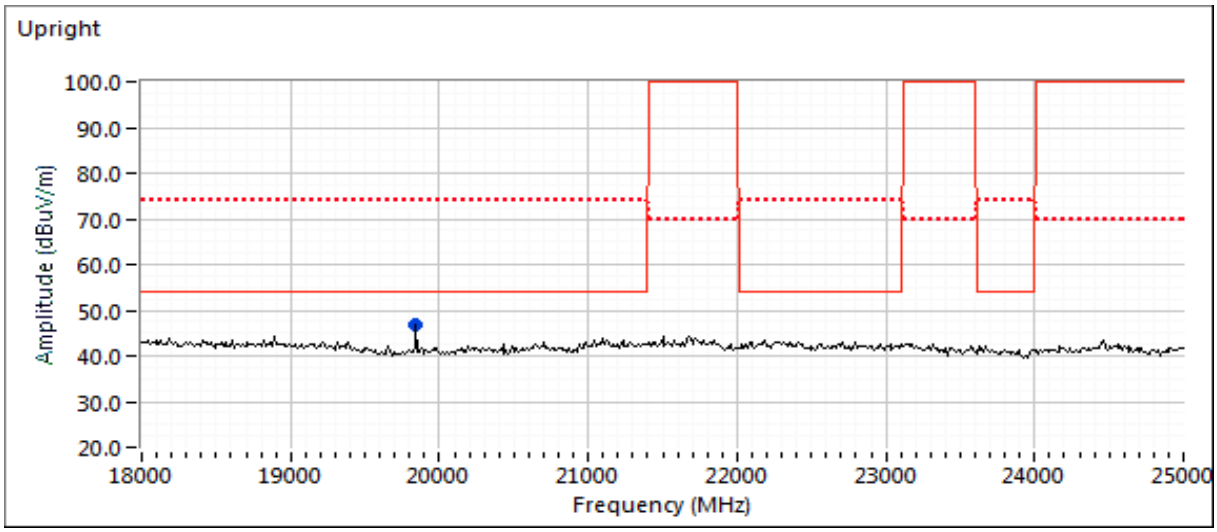
| | | | |
|---|---|---|---|
| Client: | ConserVention | PR Number: | PR118617 |
| Model: | SMAT | T-Log Number: | TL118617-RA |
| | | Project Manager: | Christine Krebill |
| Contact: | Thomas Shaw | Project Engineer: | David Bare |
| Standard: | FCC Part 15 | Class: | N/A |

| Frequency | Level | Pol | 15.209 / 15.247 | | Detector | Azimuth | Height | Comments |
|---|---|---|---|---|---|---|---|---|
| MHz | dBµV/m | V/H | Limit | Margin | Pk/QP/Avg | degrees | meters | |
| EUT upright | | | | | | | | |
| 4879.760 | 44.5 | V | 54.0 | -9.5 | Avg | 93 | 2.2 | RB 1 MHz;VB 3 kHz;Peak, Note 6 |
| 4880.460 | 51.1 | V | 74.0 | -22.9 | PK | 93 | 2.2 | RB 1 MHz;VB 3 MHz;Peak |
| 7319.270 | 52.1 | V | 54.0 | -1.9 | Avg | 348 | 2.2 | RB 1 MHz;VB 3 kHz;Peak, Note 6 |
| 7319.190 | 58.7 | V | 74.0 | -15.3 | PK | 348 | 2.2 | RB 1 MHz;VB 3 MHz;Peak |
| 9760.900 | 64.8 | V | 74.3 | -9.5 | PK | 354 | 1.9 | RB 100 kHz;VB 300 kHz;Peak |
| 12198.780 | 52.0 | H | 54.0 | -2.0 | Avg | 141 | 2.2 | RB 1 MHz;VB 3 kHz;Peak, Note 6 |
| 12198.670 | 60.0 | H | 74.0 | -14.0 | PK | 141 | 2.2 | RB 1 MHz;VB 3 MHz;Peak |
| 19520.040 | 40.2 | V | 54.0 | -13.8 | PK | 94 | 1.9 | RB 1 MHz;VB 3 MHz;Peak |
| EUT flat | | | | | | | | |
| 4879.920 | 43.5 | H | 54.0 | -10.5 | Avg | 49 | 1.6 | RB 1 MHz;VB 3 kHz;Peak, Note 6 |
| 4879.600 | 50.4 | H | 74.0 | -23.6 | PK | 49 | 1.6 | RB 1 MHz;VB 3 MHz;Peak |
| 7319.230 | 47.4 | H | 54.0 | -6.6 | Avg | 124 | 1.0 | RB 1 MHz;VB 3 kHz;Peak, Note 6 |
| 7320.700 | 54.5 | H | 74.0 | -19.5 | PK | 124 | 1.0 | RB 1 MHz;VB 3 MHz;Peak |
| 9760.880 | 64.0 | H | 74.3 | -10.3 | PK | 263 | 1.0 | RB 100 kHz;VB 300 kHz;Peak |
| 12198.850 | 39.9 | H | 54.0 | -14.1 | Avg | 360 | 1.3 | RB 1 MHz;VB 3 kHz;Peak, Note 6 |
| 12198.780 | 51.7 | H | 74.0 | -22.3 | PK | 360 | 1.3 | RB 1 MHz;VB 3 MHz;Peak |
| 19521.240 | 43.6 | V | 54.0 | -10.4 | PK | 77 | 1.0 | RB 1 MHz;VB 3 MHz;Peak |
| EUT side | | | | | | | | |
| 4879.890 | 45.2 | H | 54.0 | -8.8 | Avg | 119 | 1.3 | RB 1 MHz;VB 3 kHz;Peak, Note 6 |
| 4880.230 | 50.7 | H | 74.0 | -23.3 | PK | 119 | 1.3 | RB 1 MHz;VB 3 MHz;Peak |
| 7319.420 | 50.8 | H | 54.0 | -3.2 | Avg | 315 | 1.3 | RB 1 MHz;VB 3 kHz;Peak, Note 6 |
| 7319.330 | 57.0 | H | 74.0 | -17.0 | PK | 315 | 1.3 | RB 1 MHz;VB 3 MHz;Peak |
| 9761.040 | 62.4 | V | 74.3 | -11.9 | PK | 253 | 1.0 | RB 100 kHz;VB 300 kHz;Peak |
| 12198.730 | 42.6 | V | 54.0 | -11.4 | Avg | 214 | 2.2 | RB 1 MHz;VB 3 kHz;Peak, Note 6 |
| 12198.870 | 53.1 | V | 74.0 | -20.9 | PK | 214 | 2.2 | RB 1 MHz;VB 3 MHz;Peak |
| 19521.460 | 43.1 | H | 54.0 | -10.9 | PK | 268 | 1.6 | RB 1 MHz;VB 3 MHz;Peak |

| | | | |
|---|---|---|---|
| Client: | ConserVention | PR Number: | PR118617 |
| Model: | SMAT | T-Log Number: | TL118617-RA |
| | | Project Manager: | Christine Krebill |
| Contact: | Thomas Shaw | Project Engineer: | David Bare |
| Standard: | FCC Part 15 | Class: | N/A |

Run #1c: High Channel
Channel: 39 Mode: BLE
At worst case orientation from Run # 1b



| | | | |
|---|---|---|---|
| Client: | ConserVention | PR Number: | PR118617 |
| Model: | SMAT | T-Log Number: | TL118617-RA |
| | | Project Manager: | Christine Krebill |
| Contact: | Thomas Shaw | Project Engineer: | David Bare |
| Standard: | FCC Part 15 | Class: | N/A |

| Frequency | Level | Pol | 15.209 / 15.247 | | Detector | Azimuth | Height | Comments |
|---|---|---|---|---|---|---|---|---|
| MHz | dBµV/m | V/H | Limit | Margin | Pk/QP/Avg | degrees | meters | |
| 4960.040 | 52.0 | V | 54.0 | -2.0 | Avg | 302 | 1.3 | RB 1 MHz;VB 3 kHz;Peak, Note 6 |
| 4960.560 | 56.1 | V | 74.0 | -17.9 | PK | 302 | 1.3 | RB 1 MHz;VB 3 MHz;Peak |
| 7439.400 | 52.8 | H | 54.0 | -1.2 | Avg | 208 | 1.3 | RB 1 MHz;VB 3 kHz;Peak, Note 6 |
| 7439.170 | 60.9 | H | 74.0 | -13.1 | PK | 208 | 1.3 | RB 1 MHz;VB 3 MHz;Peak |
| 9920.880 | 66.6 | H | 70.0 | -3.4 | PK | 187 | 2.2 | RB 1 MHz;VB 3 MHz;Peak |
| 12398.840 | 50.0 | H | 54.0 | -4.0 | Avg | 132 | 2.1 | RB 1 MHz;VB 3 kHz;Peak, Note 6 |
| 12400.280 | 59.1 | H | 74.0 | -14.9 | PK | 132 | 2.1 | RB 1 MHz;VB 3 MHz;Peak |
| 19838.610 | 40.8 | V | 54.0 | -13.2 | Avg | 97 | 1.9 | RB 1 MHz;VB 3 kHz;Peak, Note 6 |
| 19841.250 | 51.5 | V | 74.0 | -22.5 | PK | 97 | 1.9 | RB 1 MHz;VB 3 MHz;Peak |

| | | | |
|---|---|---|---|
| Client: | ConserVention | PR Number: | PR118617 |
| Model: | SMAT | T-Log Number: | TL118617-RA |
| | | Project Manager: | Christine Krebill |
| Contact: | Thomas Shaw | Project Engineer: | David Bare |
| Standard: | FCC Part 15 | Class: | B |

# Conducted Emissions

*(NTS Silicon Valley, Fremont Facility, Semi-Anechoic Chamber)*

## Test Specific Details

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

Date of Test: 6/12/2020
Test Engineer: M. Birgani
Test Location: Fremont Chamber #5
Config. Used: 1
Config Change: -
Power Adapter Voltage: 120V/60Hz

## General Test Configuration

The EUT was located on a table inside the semi-anechoic chamber, 40 cm from a vertical coupling plane and 80cm from the LISN.

## Ambient Conditions:

Temperature: 20-22 °C
Rel. Humidity: 38-40 %

## Summary of Results

| Run # | Test Performed | Limit | Result | Margin |
|---|---|---|---|---|
| 1 | CE, AC Power,120V/60Hz | Class B | Pass | 32.0 dBµV @ 0.55 MHz (-24.0 dB) |

## Modifications Made During Testing

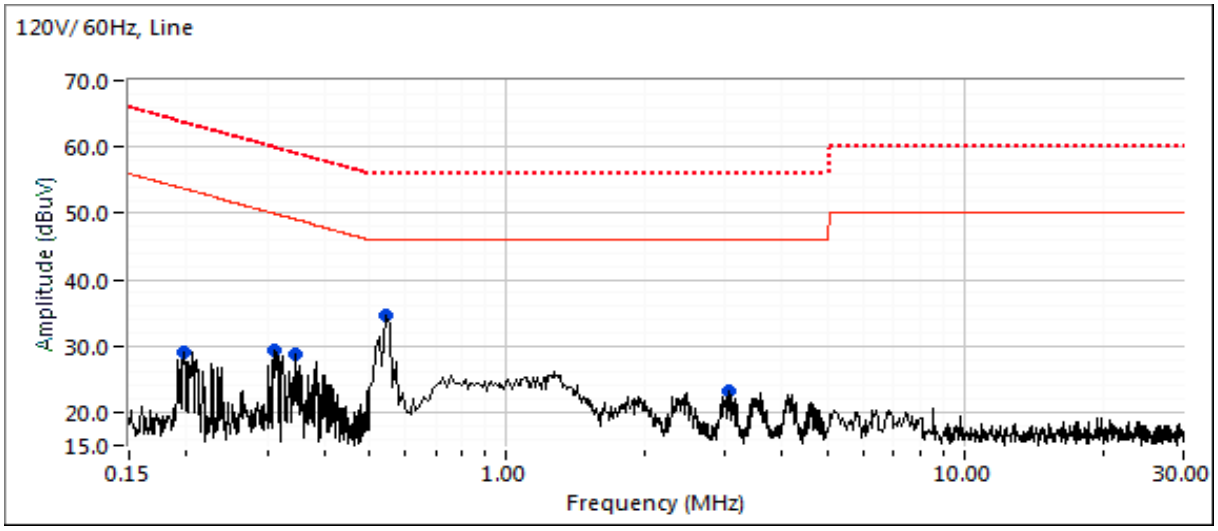
No modifications were made to the EUT during testing

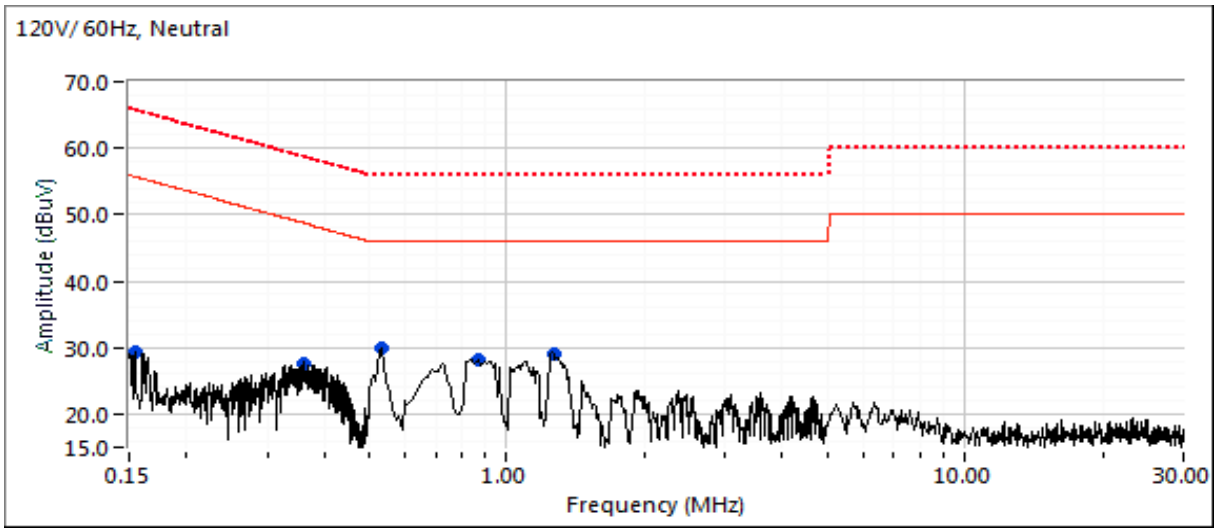
## Deviations From The Standard

No deviations were made from the requirements of the standard.

| | | | |
|---|---|---|---|
| Client: | ConserVention | PR Number: | PR118617 |
| Model: | SMAT | T-Log Number: | TL118617-RA |
| | | Project Manager: | Christine Krebill |
| Contact: | Thomas Shaw | Project Engineer: | David Bare |
| Standard: | FCC Part 15 | Class: | B |

Run #1: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz



| | | | |
|---|---|---|---|
| Client: | ConserVention | PR Number: | PR118617 |
| Model: | SMAT | T-Log Number: | TL118617-RA |
| | | Project Manager: | Christine Krebill |
| Contact: | Thomas Shaw | Project Engineer: | David Bare |
| Standard: | FCC Part 15 | Class: | B |

Run #1: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz

Preliminary peak readings captured during pre-scan (peak readings vs. average limit)

| Frequency | Level | AC | Class B | | Detector | Comments |
|---|---|---|---|---|---|---|
| MHz | dBµV | Line | Limit | Margin | QP/Ave | |
| 0.154 | 29.2 | Neutral | 55.8 | -26.6 | Peak | |
| 0.198 | 29.1 | Line | 53.7 | -24.6 | Peak | |
| 0.313 | 29.2 | Line | 49.9 | -20.7 | Peak | |
| 0.344 | 28.8 | Line | 49.1 | -20.3 | Peak | |
| 0.362 | 27.7 | Neutral | 48.7 | -21.0 | Peak | |
| 0.540 | 34.7 | Line | 46.0 | -11.3 | Peak | |
| 0.546 | 29.9 | Neutral | 46.0 | -16.1 | Peak | |
| 0.854 | 28.2 | Neutral | 46.0 | -17.8 | Peak | |
| 1.262 | 29.0 | Neutral | 46.0 | -17.0 | Peak | |
| 3.041 | 23.1 | Line | 46.0 | -22.9 | Peak | |

Final quasi-peak and average readings

| Frequency | Level | AC | Class B | | Detector | Comments |
|---|---|---|---|---|---|---|
| MHz | dBµV | Line | Limit | Margin | QP/Ave | |
| 0.546 | 32.0 | Neutral | 56.0 | -24.0 | QP | QP (1.00s) |
| 0.546 | 19.2 | Neutral | 46.0 | -26.8 | AVG | AVG (0.10s) |
| 0.540 | 28.0 | Line | 56.0 | -28.0 | QP | QP (1.00s) |
| 1.262 | 23.9 | Neutral | 56.0 | -32.1 | QP | QP (1.00s) |
| 0.854 | 23.5 | Neutral | 56.0 | -32.5 | QP | QP (1.00s) |
| 1.262 | 11.9 | Neutral | 46.0 | -34.1 | AVG | AVG (0.10s) |
| 0.540 | 11.7 | Line | 46.0 | -34.3 | AVG | AVG (0.10s) |
| 0.854 | 11.7 | Neutral | 46.0 | -34.3 | AVG | AVG (0.10s) |
| 0.362 | 22.5 | Neutral | 58.7 | -36.2 | QP | QP (1.00s) |
| 0.362 | 12.1 | Neutral | 48.7 | -36.6 | AVG | AVG (0.10s) |
| 0.344 | 20.7 | Line | 59.1 | -38.4 | QP | QP (1.00s) |
| 0.313 | 20.6 | Line | 59.9 | -39.3 | QP | QP (1.00s) |
| 0.344 | 9.3 | Line | 49.1 | -39.8 | AVG | AVG (0.10s) |
| 0.313 | 9.1 | Line | 49.9 | -40.8 | AVG | AVG (0.10s) |
| 3.041 | 5.1 | Line | 46.0 | -40.9 | AVG | AVG (0.10s) |
| 3.041 | 13.3 | Line | 56.0 | -42.7 | QP | QP (1.00s) |
| 0.198 | 20.1 | Line | 63.7 | -43.6 | QP | QP (1.00s) |
| 0.154 | 21.7 | Neutral | 65.8 | -44.1 | QP | QP (1.00s) |
| 0.198 | 9.3 | Line | 53.7 | -44.4 | AVG | AVG (0.10s) |
| 0.154 | 10.6 | Neutral | 55.8 | -45.2 | AVG | AVG (0.10s) |

| | | | |
|---|---|---|---|
| Client: | ConserVention | PR Number: | PR118617 |
| Model: | SMAT | T-Log Number: | TL118617-RA |
| | | Project Manager: | Christine Krebill |
| Contact: | Thomas Shaw | Project Engineer: | David Bare |
| Standard: | FCC Part 15 | Class: | B |

# Radiated Emissions

*(NTS Silicon Valley, Fremont Facility, Semi-Anechoic Chamber)*

## Test Specific Details

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

Date of Test: 6/12/2020
Test Engineer: M. Birgani
Test Location: Fremont Chamber #5
Config. Used: 1
Config Change: Unit was charging
EUT Voltage: 120V/ 60Hz

## General Test Configuration

The EUT and any local support equipment were located on the turntable for radiated emissions testing. Any remote support equipment was located outside the semi-anechoic chamber. Any cables running to remote support equipment were routed through metal conduit and when possible passed through a ferrite clamp upon exiting the chamber.

The test distance and extrapolation factor (if applicable) are detailed under each run description.

Note, preliminary testing indicates that the emissions were maximized by orientation of the EUT and elevation of the measurement antenna. Maximized testing indicated that the emissions were maximized by orientation of the EUT, elevation of the measurement antenna, and manipulation of the EUT's interface cables.

## Ambient Conditions:

Temperature: 20-22 °C
Rel. Humidity: 38-40 %

## Summary of Results

| Run # | Test Performed | Limit | Result | Margin |
|---|---|---|---|---|
| 1 | Radiated Emissions 30 - 1000 MHz, Preliminary | Class B | PASS | Refer to individual runs |
| 2 | Radiated Emissions 30 - 1000 MHz, Maximized | Class B | PASS | 26.9 dBµV/m @ 39.96 MHz (Margin: -13.1 dB) |

## Modifications Made During Testing

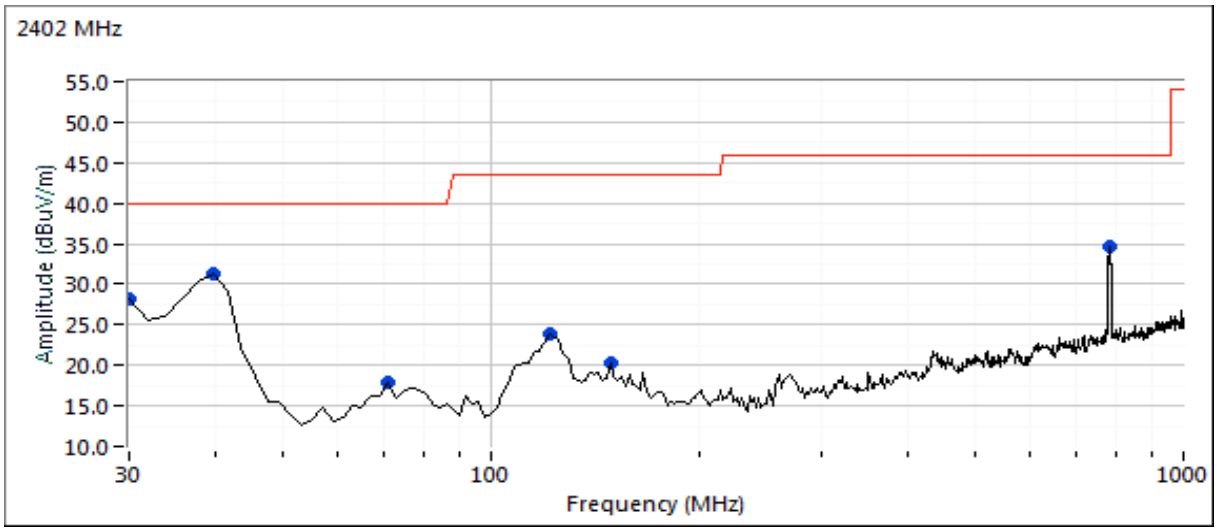
No modifications were made to the EUT during testing

## Deviations From The Standard

No deviations were made from the requirements of the standard.

| | | | |
|---|---|---|---|
| Client: | ConserVention | PR Number: | PR118617 |
| Model: | SMAT | T-Log Number: | TL118617-RA |
| | | Project Manager: | Christine Krebill |
| Contact: | Thomas Shaw | Project Engineer: | David Bare |
| Standard: | FCC Part 15 | Class: | B |

Run #1a: Preliminary Radiated Emissions, 30 - 1000 MHz
Low Channel with Flat Orientation




Preliminary peak readings captured during pre-scan

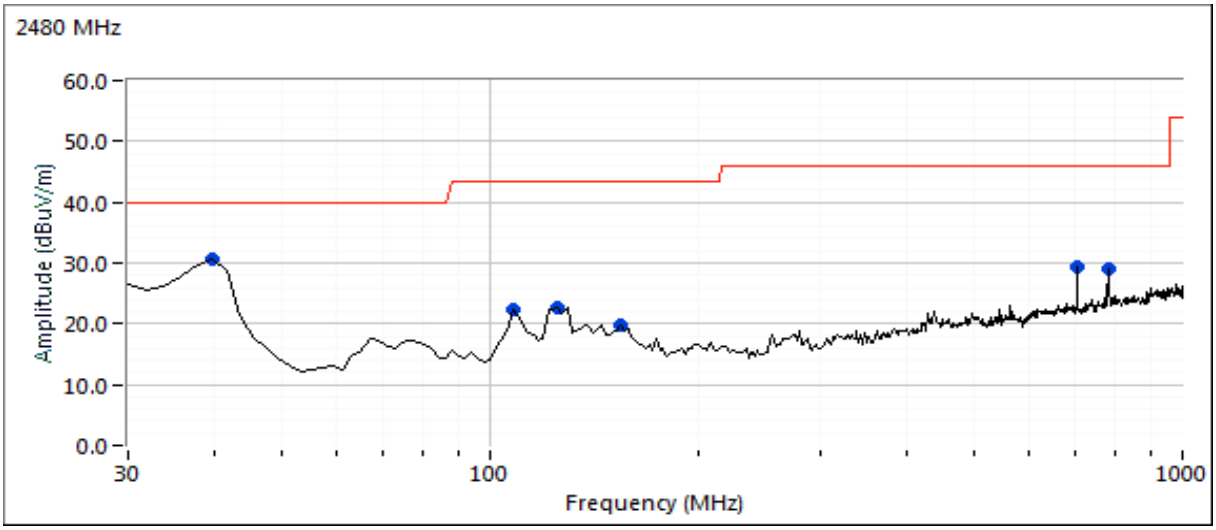
| Frequency | Level | Pol | Class B | | Detector | Azimuth | Height | Comments |
|---|---|---|---|---|---|---|---|---|
| MHz | dBµV/m | v/h | Limit | Margin | Pk/QP/Avg | degrees | meters | |
| 30.280 | 28.2 | H | 40.0 | -11.8 | Peak | 0 | 1.0 | |
| 39.964 | 31.2 | V | 40.0 | -8.8 | Peak | 323 | 1.0 | |
| 72.000 | 17.9 | V | 40.0 | -22.1 | Peak | 117 | 1.0 | |
| 122.261 | 24.0 | V | 43.5 | -19.5 | Peak | 56 | 1.0 | |
| 152.088 | 20.3 | V | 43.5 | -23.2 | Peak | 152 | 1.0 | |
| 781.650 | 34.6 | V | 46.0 | -11.4 | Peak | 319 | 1.0 | |

| | |
|---|---|
| Note 1: | No emissions related the BLE radio were observed so additional tests on other channels are not necessary to demonstrate compliance. |

| | | | |
|---|---|---|---|
| Client: | ConserVention | PR Number: | PR118617 |
| Model: | SMAT | T-Log Number: | TL118617-RA |
| | | Project Manager: | Christine Krebill |
| Contact: | Thomas Shaw | Project Engineer: | David Bare |
| Standard: | FCC Part 15 | Class: | B |

Run #1b: Preliminary Radiated Emissions, 30 - 1000 MHz

High Channel with Upright Orientation




Preliminary peak readings captured during pre-scan

| Frequency | Level | Pol | Class B | | Detector | Azimuth | Height | Comments |
|---|---|---|---|---|---|---|---|---|
| MHz | dBµV/m | v/h | Limit | Margin | Pk/QP/Avg | degrees | meters | |
| 40.664 | 30.7 | V | 40.0 | -9.3 | Peak | 73 | 1.0 | |
| 109.261 | 22.4 | V | 43.5 | -21.1 | Peak | 85 | 1.0 | |
| 124.703 | 22.7 | V | 43.5 | -20.8 | Peak | 303 | 1.0 | |
| 152.275 | 19.9 | V | 43.5 | -23.6 | Peak | 94 | 1.0 | |
| 706.220 | 29.4 | V | 46.0 | -16.6 | Peak | 294 | 1.0 | |
| 786.138 | 28.9 | V | 46.0 | -17.1 | Peak | 154 | 1.0 | |

| | |
|---|---|
| Note 1: | No emissions related the BLE radio were observed so additional tests on other channels are not necessary to demonstrate compliance. |

| | | | |
|---|---|---|---|
| Client: | ConserVention | PR Number: | PR118617 |
| Model: | SMAT | T-Log Number: | TL118617-RA |
| | | Project Manager: | Christine Krebill |
| Contact: | Thomas Shaw | Project Engineer: | David Bare |
| Standard: | FCC Part 15 | Class: | B |

Run #2: Maximized Readings From Run #1

Maximized quasi-peak readings (includes manipulation of EUT interface cables)

| Frequency | Level | Pol | Class B | | Detector | Azimuth | Height | Comments | |
|---|---|---|---|---|---|---|---|---|---|
| MHz | dBµV/m | v/h | Limit | Margin | Pk/QP/Avg | degrees | meters | | |
| 39.964 | 26.9 | V | 40.0 | -13.1 | QP | 321 | 1.0 | QP (1.00s) | 2402 |
| 30.280 | 21.3 | H | 40.0 | -18.7 | QP | 0 | 1.0 | QP (1.00s) | 2402 |
| 781.650 | 26.0 | V | 46.0 | -20.0 | QP | 315 | 1.0 | QP (1.00s) | 2402 |
| 122.261 | 20.8 | V | 43.5 | -22.7 | QP | 54 | 1.0 | QP (1.00s) | 2402 |
| 72.000 | 16.6 | V | 40.0 | -23.4 | QP | 115 | 1.0 | QP (1.00s) | 2402 |
| 152.088 | 14.8 | V | 43.5 | -28.7 | QP | 150 | 1.0 | QP (1.00s) | 2402 |

| | | | |
|---|---|---|---|
| Client: | ConserVention | PR Number: | PR118617 |
| Model: | SMAT | T-Log Number: | TL118617-RA |
| | | Project Manager: | Christine Krebill |
| Contact: | Thomas Shaw | Project Engineer: | David Bare |
| Standard: | FCC Part 15 | Class: | B |

# Radiated Emissions

## Test Specific Details

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

Date of Test: 6/12/2020
Test Engineer: M. Birgani
Test Location: Fremont Chamber #5

Config. Used: 1
Config Change: Unit was charging
EUT Voltage: 120V/ 60Hz

## General Test Configuration

The EUT and any local support equipment were located on the turntable for radiated emissions testing. Remote support equipment was located ????

The test distance and extrapolation factor (if used) are detailed under each run description.

Note, preliminary testing indicates that the emissions were maximized by orientation of the EUT and elevation of the measurement antenna. Maximized testing indicated that the emissions were maximized by orientation of the EUT, elevation of the measurement antenna, and manipulation of the EUT's interface cables.

## Ambient Conditions:

Temperature: 20-22 °C
Rel. Humidity: 38-40 %

## Summary of Results

| Run # | Test Performed | Limit | Result | Margin |
|---|---|---|---|---|
| 1 | 30 kHz - 30 MHz | FCC 15.209 | Pass | No emissions observed above the noise floor |

## Modifications Made During Testing

No modifications were made to the EUT during testing

## Deviations From The Standard

No deviations were made from the requirements of the standard.

| | | | |
|---|---|---|---|
| Client: | ConserVention | PR Number: | PR118617 |
| Model: | SMAT | T-Log Number: | TL118617-RA |
| | | Project Manager: | Christine Krebill |
| Contact: | Thomas Shaw | Project Engineer: | David Bare |
| Standard: | FCC Part 15 | Class: | B |

Run #1: Radiated Emissions, 30 kHz - 30 MHz

| Frequency Range | Test Distance | Limit Distance | Extrapolation Factor |
|---|---|---|---|
| 0.03 - 0.490 MHz | 3 | 300 | -80.0 |
| 0.490 - 30 MHz | 3 | 30 | -40.0 |

Note - the extrapolation factor is based on 40log(test distance/limit distance) as permitted by FCC 15.31

Preliminary readings

| Frequency | Level | Pol | FCC 15.209 | | Detector | Azimuth | Height | Comments |
|---|---|---|---|---|---|---|---|---|
| MHz | dBµV/m | O/C | Limit | Margin | Pk/QP/Avg | degrees | meters | |
| 0.515 | 7.9 | O | 33.4 | -25.5 | Pk | 137 | 1.0 | Noise Floor |

| | |
|---|---|
| Note 1: | The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, with a peak limit 20dB above the average limit. |

*End of Report*

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marks the last page of this test report.