TÜVRheinland®
Precisely Right.

Emissions
Test Report

EUT Name: BLUtag V8

Model No.: BLUtag V8

CFR47 part 15.247:2018, RSS247 Issue 2:2017

FCC ID S5EBTV81018 IC ID: 9086A-BTV81018

Prepared for:

Satellite Tracking of People
5353 W Sam Houston Parkway N, Suite 190
Houston, TX 77041-5186
USA

Prepared by:

TUV Rheinland of North America, Inc.
1279 Quarry Lane, Suite A
Pleasanton, CA 94566
Tel: (925) 249-9123
Fax: (925) 249-9124
http://www.tuv.com/

Report/Issue Date:	November 08, 2019
Revision Number	0
Project Number:	234112604
Report Number:	31965174.001

Revisions

Revision No.	Date MM/DD/YYYY	Reason for Change	Author
0	11/08/2019	Original Document	DF

Note: Latest revision report will replace all previous reports.

Statement of Compliance

Manufacturer:	Satellite Tracking of People 5353 W Sam Houston Parkway N, Suite 190 Houston, TX 77041-5186 USA
Requester / Applicant:	Mark Kirincic
Name of Equipment:	BLUtag V8
Model No.	BLUtag V8
Type of Equipment:	Intentional Radiator
Application of Regulations:	CFR47 part 15.247, RSS 247 Issue 2:2017
Test Dates:	October 29, 2019 to November 10, 2019

Guidance Documents:

ANSI C63.10-2013

Test Methods:

KDB 558074 D01 Measurement Guidance v05r02

The electromagnetic compatibility test and documented data described in this report has been performed and recorded by TUV Rheinland, in accordance with the standards and procedures listed herein. As the responsible authorized agent of the EMC laboratory, I hereby declare that the equipment described above has been shown to be compliant with the EMC requirements of the stated regulations and standards based on these results. If any special accessories and/or modifications were required for compliance, they are listed in the Executive Summary of this report.

This report must not be used to claim product endorsement by A2LA or any agency of the U.S. Government. This report contains data that are not covered by A2LA accreditation. This report shall not be reproduced except in full, without the written authorization of TUV Rheinland of North America.

Donn Foster		Richard Decker	
Test Engineer	Date November 8, 2019	Laboratory Signatory	Date December 17, 2019

Testing Cert #3331.02 **US1131** **2932M**

1 Executive Summary

1.1 Scope

This report is intended to document the status of conformance with the requirements of the CFR 47 Part 15.247: 2018 and RSS 247: 2017 based on the results of testing performed on October 29 to November 10, 2019 on the BLUtag V8 manufactured by Satellite Tracking of People. This report only applies to the specific samples tested under the stated test conditions. It is the responsibility of the manufacturer to assure that additional production units of this model are manufactured with identical or EMI equivalent electrical and mechanical components. This report is further intended to document changes and modifications to the EUT throughout its life cycle. All documentation will be included as a supplement.

1.2 Purpose

Testing was performed to evaluate the radio performance of the EUT in accordance with the applicable requirements, procedures, and criteria defined in the application of regulations and application of standards listed in this report.

1.3 Summary of Test Results

Table 1: Summary of Test Results

Test	Test Method ANSI C63.10: 2013	Test Parameters	Measured Value	Result
Spurious Emission in Transmitted Mode	CFR47 15.209, CFR47 15.247 (d) RSS-GEN Sect.8.9, RSS 247 Sect. 6.2.1.2	Class B	-10.33 dB	**Complied**
Restricted Bands of Operation	CFR47 15.205, RSS GEN Sect.8.10	Class B		**Complied**
AC Power Conducted Emission	CFR47 15.207, RSS-GEN Sect.8.8	Class B	-17.46 dB	**Complied**
Occupied Bandwidth	CFR47 15.247 (a1), RSS GEN Sect.6.7	≥ 500 kHz	0.531 MHz (DTS) 0.635 MHz (99%)	**Complied**
Maximum Output Power	CFR47 15.247 (b), RSS 247 Sect. 5.4	30 dBm w/ 6 dBi antenna	+13.25 dBm	**Complied**
Peak Power Spectral Density	CFR47 15.247 (e), RSS 247 Sect. 5.2.2	8 dBm/ 3 kHz	-2.46 dBm	**Complied**
Out of Band Emission	CFR47 15.247 (d), RSS 247 Sect.5.5	-30 dBr	-44.40 dB	**Complied**

1.4 Special Accessories

No special accessories were necessary in order to achieve compliance.

1.5 Equipment Modifications

None

2 Laboratory Information

2.1 Accreditations & Endorsements

2.1.1 US Federal Communications Commission

TUV Rheinland of North America at 1279 Quarry Ln, Pleasanton, CA 94566 and 5015 Brandin Ct, Fremont, CA. 94538 is recognized by the commission for performing testing services for the general public on a fee basis. These laboratory test facilities have been fully described in reports submitted to and accepted by the FCC (US1131). The laboratory scope of accreditation includes: Title 47 CFR Parts 15, 18, and 90. The accreditation is updated every 3 years.

2.1.2 NIST / A2LA

TUV Rheinland of North America is accredited by the National Voluntary Laboratory Accreditation Program, which is administered under the auspices of the National Institute of Standards and Technology. The laboratory has been assessed and accredited in accordance with ISO Guide 17025:2017. The scope of laboratory accreditation includes emission and immunity testing. The accreditation is updated annually.

2.1.3 Canada – Industry Canada

TUV Rheinland of North America at the 1279 Quarry Ln, Pleasanton, CA 94566 address is accredited by Industry Canada for performing testing services for the general public on a fee basis. This laboratory test facilities have been fully described in reports submitted to and accepted by Industry Canada (File Number 2932M). This reference number is the indication to the Industry Canada Certification Officers that the site meets the requirements of RSS 212, Issue 1 (Provisional). The accreditation is updated every 3 years.

2.1.4 Japan – VCCI

The Voluntary Control Council for Interference by Information Technology Equipment (VCCI) is a group that consists of Information Technology Equipment (ITE) manufacturers and EMC test laboratories. The purpose of the Council is to take voluntary control measures against electromagnetic interference from Information Technology Equipment, and thereby contribute to the development of a socially beneficial and responsible state of affairs in the realm of Information Technology Equipment in Japan. TUV Rheinland of North America at 1279 Quarry Ln, Pleasanton, CA 94566 and 5015 Brandin Ct, Fremont, CA. 94538 has been assessed and approved in accordance with the Regulations for Voluntary Control Measures.

VCCI Registration No. for Pleasanton: A-0326 and A-0327 for Fremont

2.1.5 Acceptance by Mutual Recognition Arrangement

The United States has an established agreement with specific countries under the Asia Pacific Laboratory Accreditation Corporation (APLAC) Mutual Recognition Arrangement. Under this agreement, all TUV Rheinland at 1279 Quarry Ln, Pleasanton, CA 94566 test results and test reports within the scope of the laboratory NIST / A2LA accreditation will be accepted by each member country.

2.2 Test Facilities

All of the test facilities are located at 1279 Quarry Lane, Pleasanton, California 94566, and 5015 Brandin Ct, Fremont, CA. 94538.

2.2.1 Emission Test Facility

The Semi-Anechoic chamber and AC Line Conducted measurement facility used to collect the radiated and conducted data has been constructed in accordance with ANSI C63.7:1992. The site has been measured in accordance with and verified to comply with the theoretical normalized site attenuation requirements of ANSI C63.4-2014, at a test distance of 3 and 5 meters. The site is listed with the FCC and accredited by A2LA (Lab Code Testing Cert #3331.02). The 3/5-meter semi-anechoic chamber used to collect the radiated data has been verified to comply with the theoretical normalized site attenuation requirements of ANSI C63.4-2014, at a test distance of 3 meter and 5 meters. A report detailing this site can be obtained from TUV Rheinland of North America.

2.2.2 Immunity Test Facility

ESD, EFT, Surge, PQF: These tests are performed in an environmentally controlled room with a 3.7 m x 4.8 m x 3.175 mm thick aluminum floor connected to PE ground.

For ESD testing, tabletop equipment is placed on an insulated mat with a surface resistivity of 10^9 Ohms/square on a 1.6 m x 0.8 m x 0.8 m high non-conductive table with a 3.175 mm aluminum top (Horizontal Coupling Plane). The HCP is connected to the main ground plane via a low impedance ground strap through two 470-kΩ resistors. The Vertical Coupling Plane consists of an aluminum plate 50 cm x 50 cm x 3.175 mm thick. The VCP is connected to the main ground plane via a low impedance ground strap through two 470-kΩ resistors.

For EFT, Surge, PQF, the HCP and VCP are removed.

RF Field Immunity testing is performed in a 7.3m x 4.3m x 4.1m anechoic chamber.

RF Conducted and Magnetic Field Immunity testing is performed on a 4.8m x 3.7m x 3.175mm thick aluminum ground plane.

All test areas allow a minimum distance of 1 meter from the EUT to walls or conducting objects.

2.3 Measurement Uncertainty

Two types of measurement uncertainty are expressed in this report, per ISO Guide To The Expression Of Uncertainty In Measurement, 1st Edition, 1995.

The Combined Standard Uncertainty is the standard uncertainty of the result of a measurement when that result is obtained from the values of a number of other quantities; it is equal to the positive square root of the sum of the variances or co-variances of these other quantities, weighted according to how the measurement result varies with changes in these quantities. The term standard uncertainty is the result of a measurement expressed as a standard deviation.

2.3.1 Sample Calculation – radiated & conducted emissions

The field strength is calculated by subtracting the Amplifier Gain and adding the Cable Loss and Antenna Correction Factor to the measured reading. The basic equation is as follows:

Field Strength (dBµV/m) = RAW - AMP + CBL + ACF

Where: RAW = Measured level before correction (dBµV)

AMP = Amplifier Gain (dB)

CBL = Cable Loss (dB)

ACF = Antenna Correction Factor (dB/m)

$$\mu V/m = 10^{\frac{dB\mu V/m}{20}}$$

Sample radiated emissions calculation @ 30 MHz

Measurement +Antenna Factor–Amplifier Gain+Cable loss=Radiated Emissions (dBuV/m)

25 dBuV/m + 17.5 dB – 20 dB + 1.0 dB = 23.5 dBuV/m

2.3.2 Measurement Uncertainty

Per CISPR 16-4-2	**U_{lab}**	**U_{cispr}**
Radiated Disturbance @ 10 meters		
30 – 1,000 MHz	2.25 dB	4.51 dB
Radiated Disturbance @ 3 meters		
30 – 1,000 MHz	2.26 dB	4.52 dB
1 – 6 GHz	2.12 dB	4.25 dB
6 – 18 GHz	2.47 dB	4.93 dB
Conducted Disturbance @ Mains Terminals		
150 kHz – 30 MHz	1.09 dB	2.18 dB
Disturbance Power		
30 MHz – 300 MHz	3.92 dB	4.3 dB

2.3.3 Voltech PM6000A

The estimated combined standard uncertainty for harmonic current and flicker measurements is ± 5.0%.	Per CISPR 16-4-2 Methods

2.3.4 Measurement Uncertainty Immunity

The estimated combined standard uncertainty for ESD immunity measurements is ± 8.2%.	Per IEC 61000-4-2
The estimated combined standard uncertainty for radiated immunity measurements is ± 4.10 dB.	Per IEC 61000-4-3
The estimated combined standard uncertainty for conducted immunity measurements with CDN is ± 3.66 dB	Per IEC 61000-4-6
The estimated combined standard uncertainty for power frequency magnetic field immunity is ± 2.9%.	Per IEC 61000-4-8

Thermo KeyTek EMC Pro

The estimated combined standard uncertainty for EFT fast transient immunity measurements is ± 2.6%.
The estimated combined standard uncertainty for surge immunity measurements is ± 2.6%.
The estimated combined standard uncertainty for voltage variation and interruption measurements is ± 1.74%.

The expanded uncertainty at a level of 95% confidence is obtained by multiplying the combined standard uncertainty by a coverage factor of 2. Compliance criteria are not based on measurement uncertainty.

2.4 Calibration Traceability

All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST). Measurement method complies with ANSI/NCSL Z540-1-1994 and ISO Standard 17025:2017. Equipment calibration records are kept on file at the test facility.

3 Product Information

3.1 Product Description

The BLUtag V8 is an ankle bracelet used to monitor the movement of the wearer. It employs several transmitter technologies the focus of this report being the 900 MHz. radio.

3.2 Equipment Configuration

A description of the equipment configuration is given in the Test Plan Section. The EUT was tested as called for in the test standard and was configured and operated in a manner consistent with its intended use. The EUT was connected to rated power and allowed to reach intended operating conditions. The placement of the EUT system components was guided by the test standard and selected to represent typical installation conditions.

In the case of an EUT that can operate in more than one configuration, preliminary testing was performed to determine the configuration that produced maximum radiation.

The final configuration was selected to produce the worst case radiation for emissions testing and to place the EUT in the most susceptible state for immunity testing.

3.3 Operating Mode

A description of the operation mode is given in the Test Plan Section. In the case of an EUT that can operate in more than one state, preliminary testing was performed to determine the operating mode that produced maximum radiation.

The final operating mode was selected to produce the worst case radiation for emissions testing and to place the EUT in the most susceptible state for immunity testing.

3.4 Unique Antenna Connector

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of CFR47 Parts 15.211, 15.213, 15.217, 15.219, or 15.221.

3.4.1 Results

The BLUtag for the purposes of this test report uses a Laser Direct Structuring (0dbi). The other interfaces are all certified modules with integrated antennas.

3.5 Duty Cycle

The unlicensed wireless device shall be configured to operate at 100% duty cycle. For systems incapable of supporting 100% duty cycle, the unlicensed wireless device shall be operated using the maximum possible duty cycle, and this information shall be noted as such in the test report.

3.5.1 Results

Mode	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Factor (dB)
Continuous Tx	100	0	100	0
Notes: EUT configured and measured for the duty cycle. All measurements use 100% duty cycle.				

4 Emissions

Testing was performed in accordance with CFR 47 Part 15.247: 2018 and RSS 247 Issue 2, 2017. These test methods are listed under the laboratory's A2LA Scope of Accreditation. This test measures the levels emanating from the EUT, thus evaluating the potential for the EUT to cause radio frequency interference to other electronic devices. Procedures described in section 8 of the standard were used.

4.1 Output Power Requirements

The maximum output power requirement is the maximum equivalent isotropic radiated power delivering at the transmitting antenna under specified conditions of measurements in the presence of modulation.

The maximum output power and harmonics shall not exceed CFR47 Part 15.247 (b):2018 and RSS 247: 2017 Sect. 5.4.4, and Sect. 6.2.4.

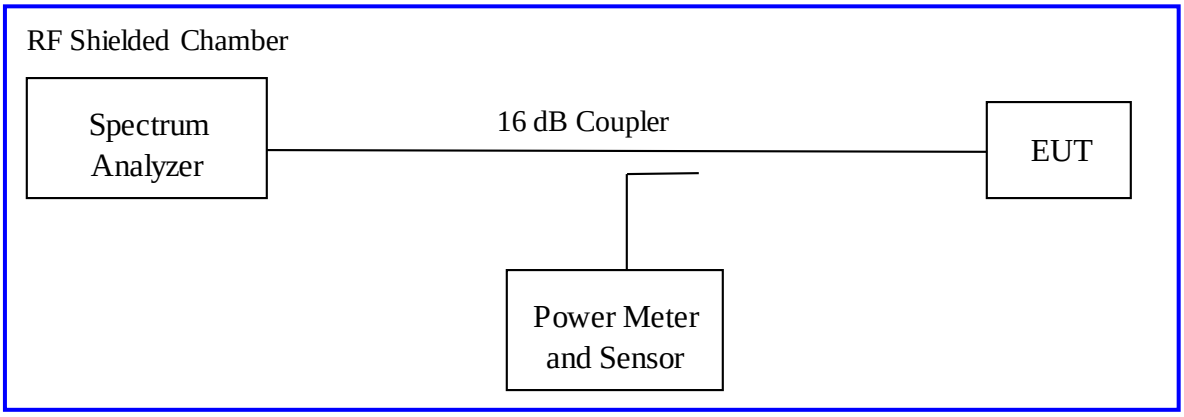
The maximum transmitted powers are

Band 902-928 MHz: 1 W

4.1.1 Test Method

The ANSI C63.10-2013 Section 11.9.1 conducted method was used to measure the channel power output. The preliminary investigation was performed at different data rate/ chain to determine the highest power output for each mode. The worst findings were conducted on 3 channels in each operating range per CFR47 Part 15.247(b): 2017 and RSS 247 Sect. 5.4.4. This test was conducted on 3 channels of the sample. The worst mode result indicated below.

Test Setup:



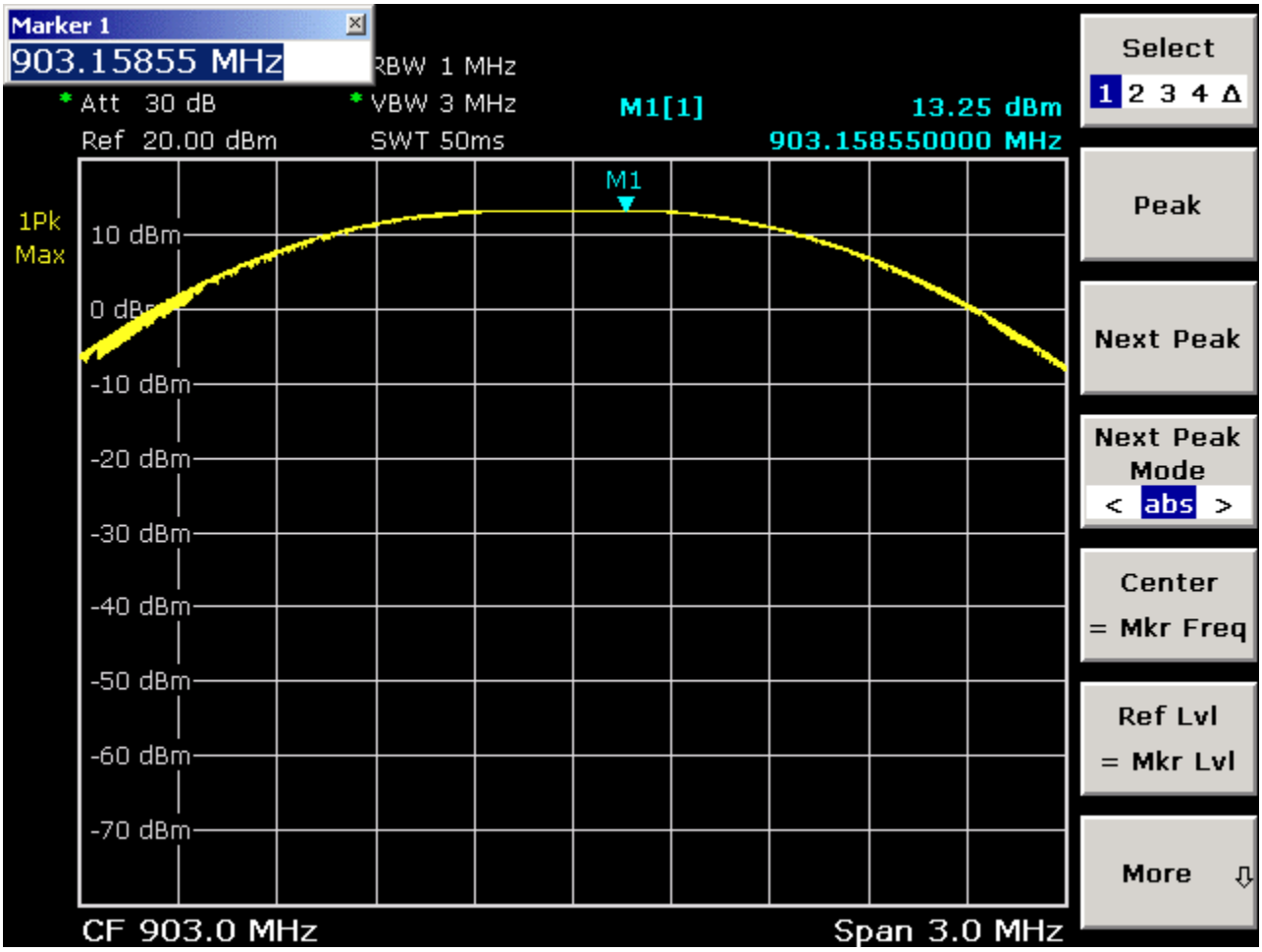
4.1.2 Results

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

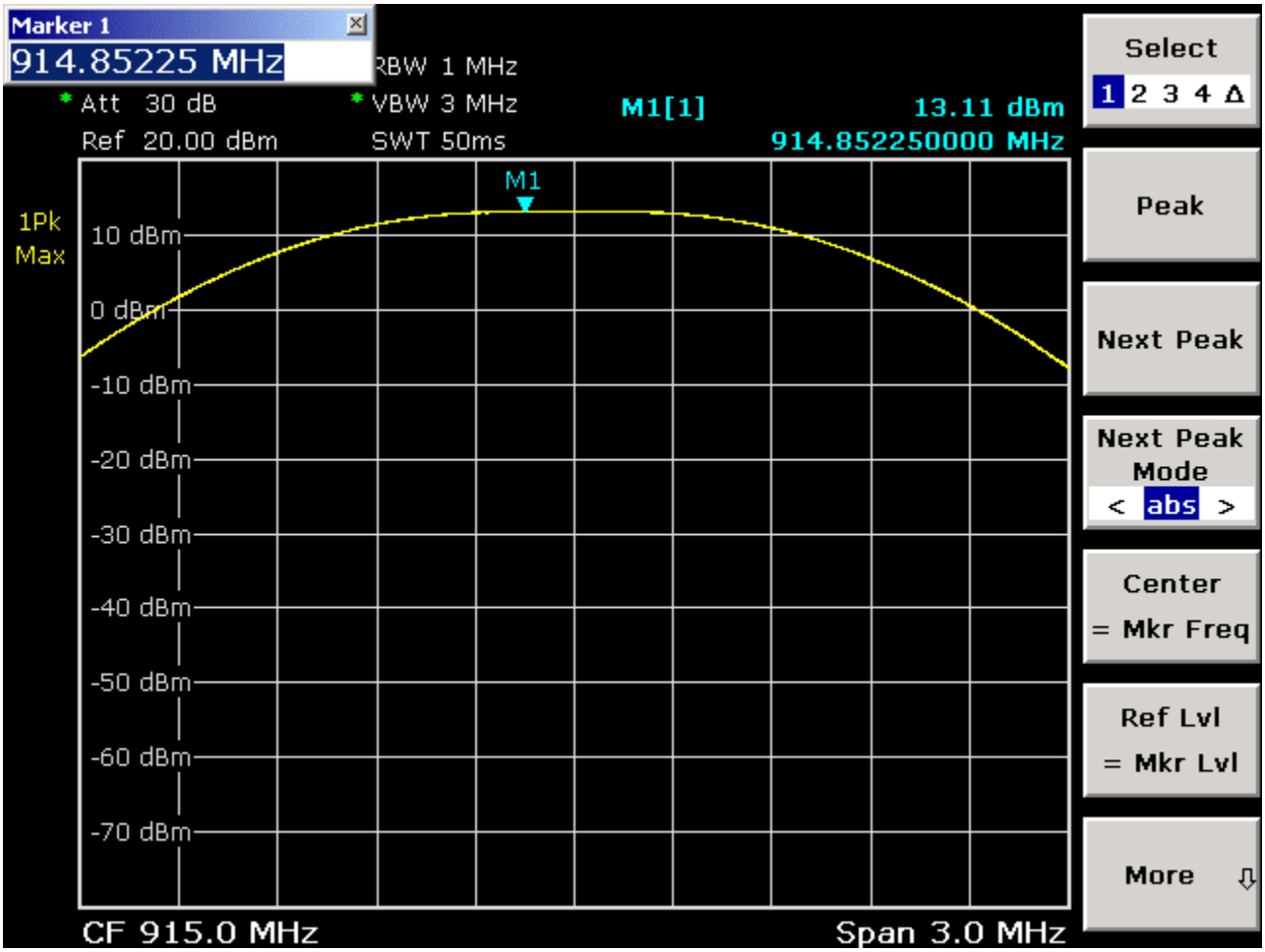
Table 2: RF Output Power at the Antenna Port – Test Results

Test Date: October 29, 2019	**Test By:** Donn Foster
Test Method: Conducted Measurements	**Power Setting:** Fixed at 12dBm
Antenna Type: Laser Direct Structuring	**Max. Antenna Gain:** 0 dBi
Operating Mode: Uncorrelated	**Signal State**: Modulated at 1 Mbps
Ambient Temp.: 22 °C	**Relative Humidity:** 35%

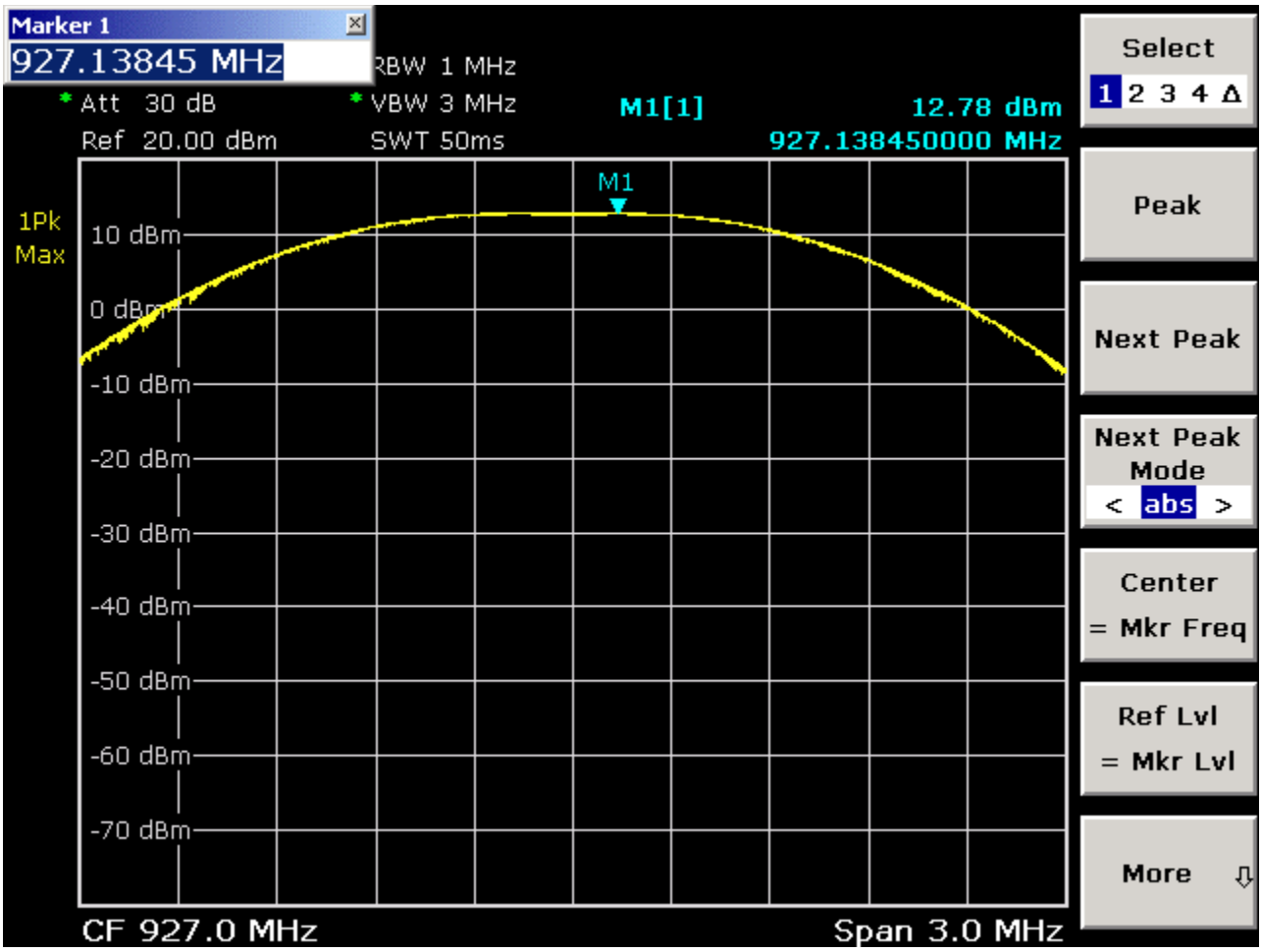
Frequency (MHz)	Limit [dBm]	Output [dBm]	Duty Cycle [dB]	∑ Power [dBm]	Margin [dB]
903	30	13.25			16.75
915	30	13.11			16.89
927	30	12.78			17.22



RF Output Power channel 903



RF output Power Channel 915



RF Output Power Channel 927

4.2 Occupied Bandwidth

The occupied bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency.

The 99% bandwidth is the bandwidth in which 99% of the transmitted power occupied.

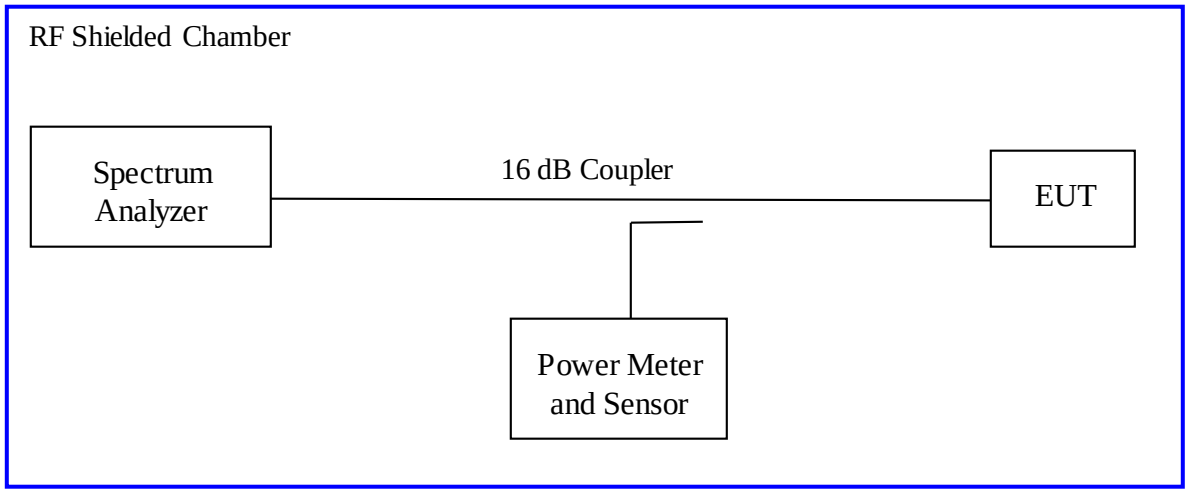
The minimum 6 dB bandwidth shall be at least 500 kHz.

The bandwidth shall be at least 500 kHz per Section CFR47 15.247(a2) 2018 and RSS 247 Sect.5.2.1: 2017

4.2.1 Test Method

The conducted method was used to measure the occupied bandwidth according to ANSI C63.10:2013 Section 11.8.1. The measurement was performed with modulation per CFR47 15.247(a) (2) 2018 and RSS Gen Sect. 6.6 2014. The preliminary investigation was performed to find the narrowest 6 dB bandwidth for each operational mode at different data rates. This worst finding was performed on 3 channels in each operating frequency range; 902 to 928 MHz. This test was conducted on 3 channels in each mode of the sample. The worst sample result indicated below.

Test Setup:

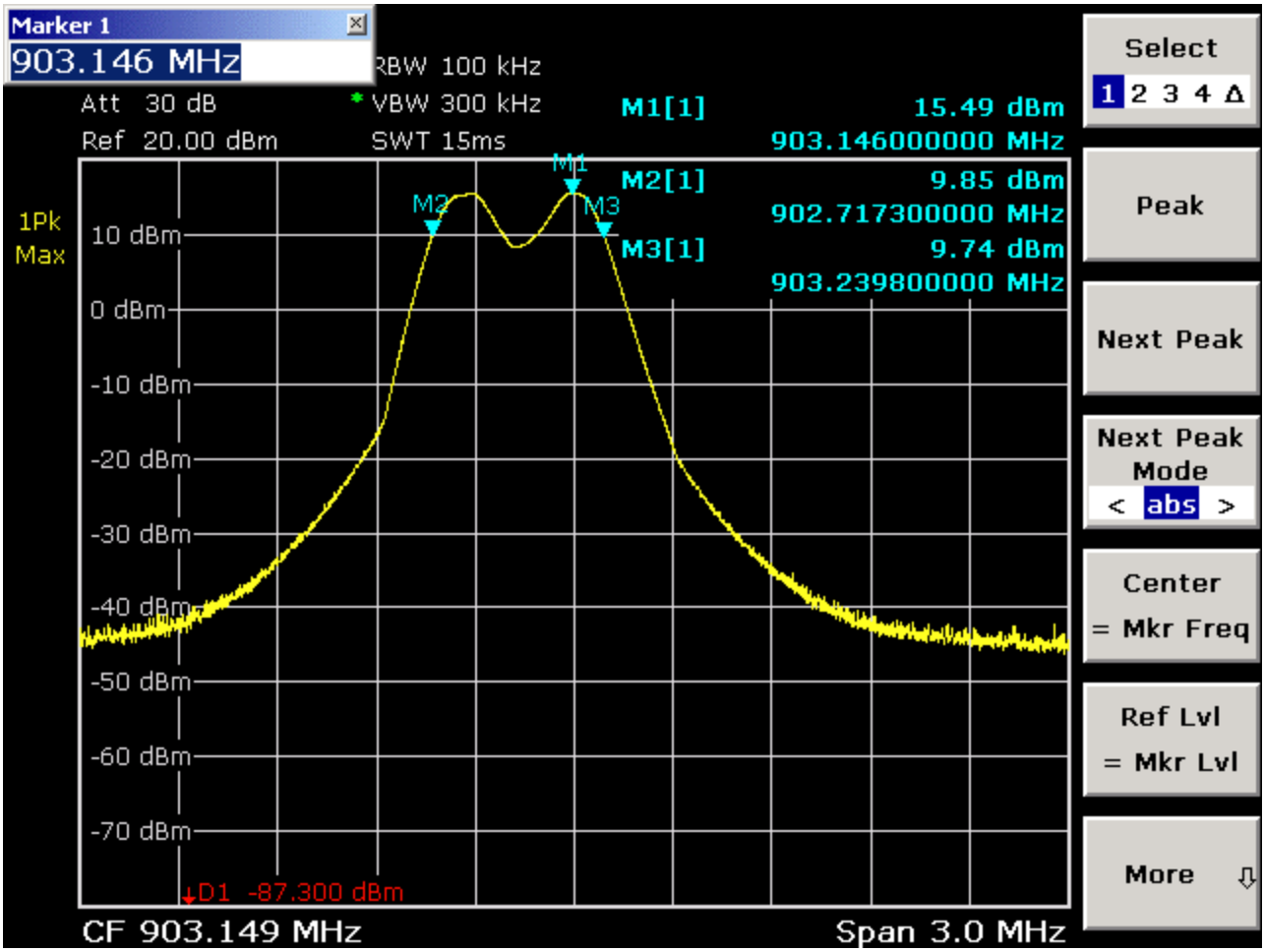


4.2.2 Results

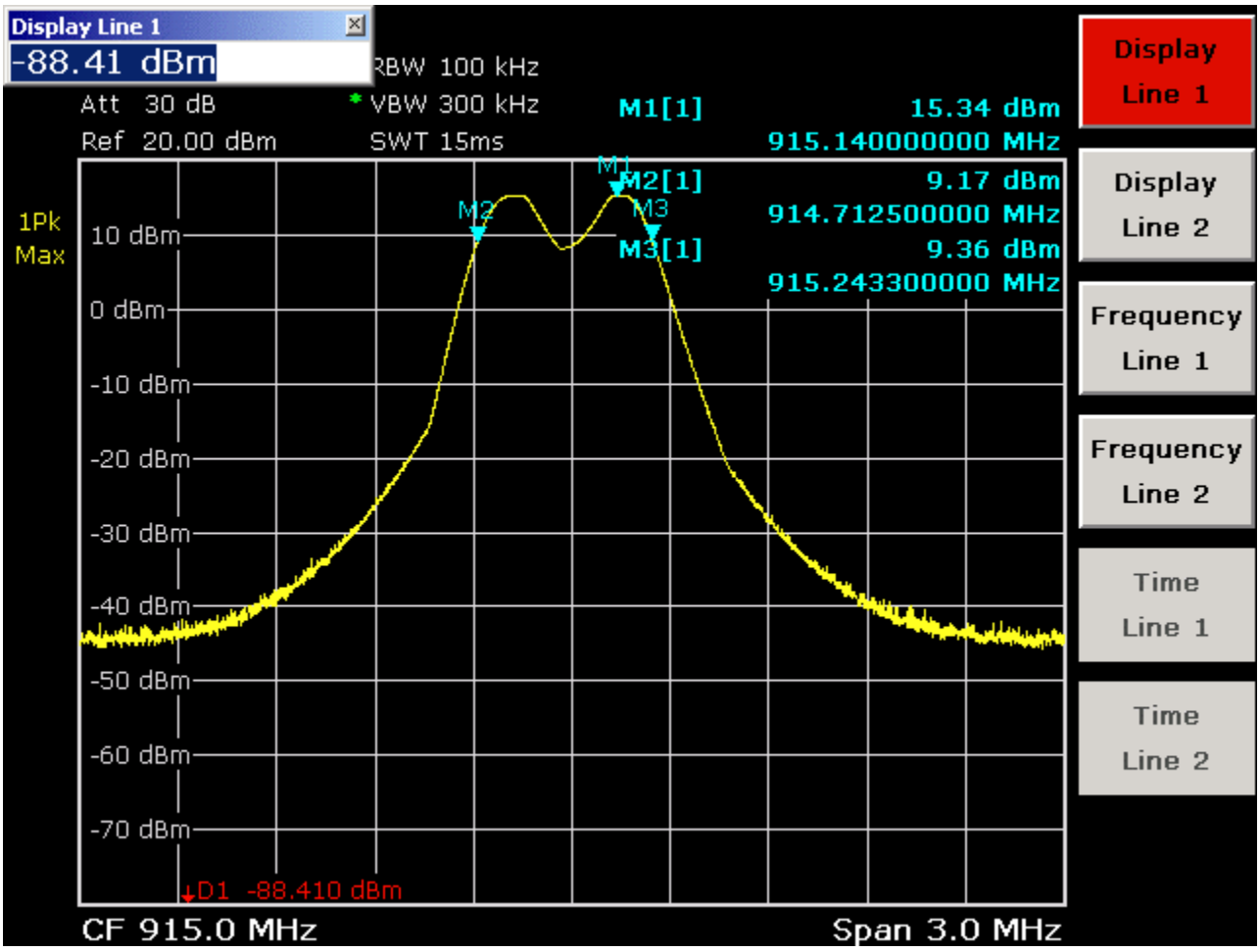
As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

Table 3: Occupied Bandwidth – Test Results

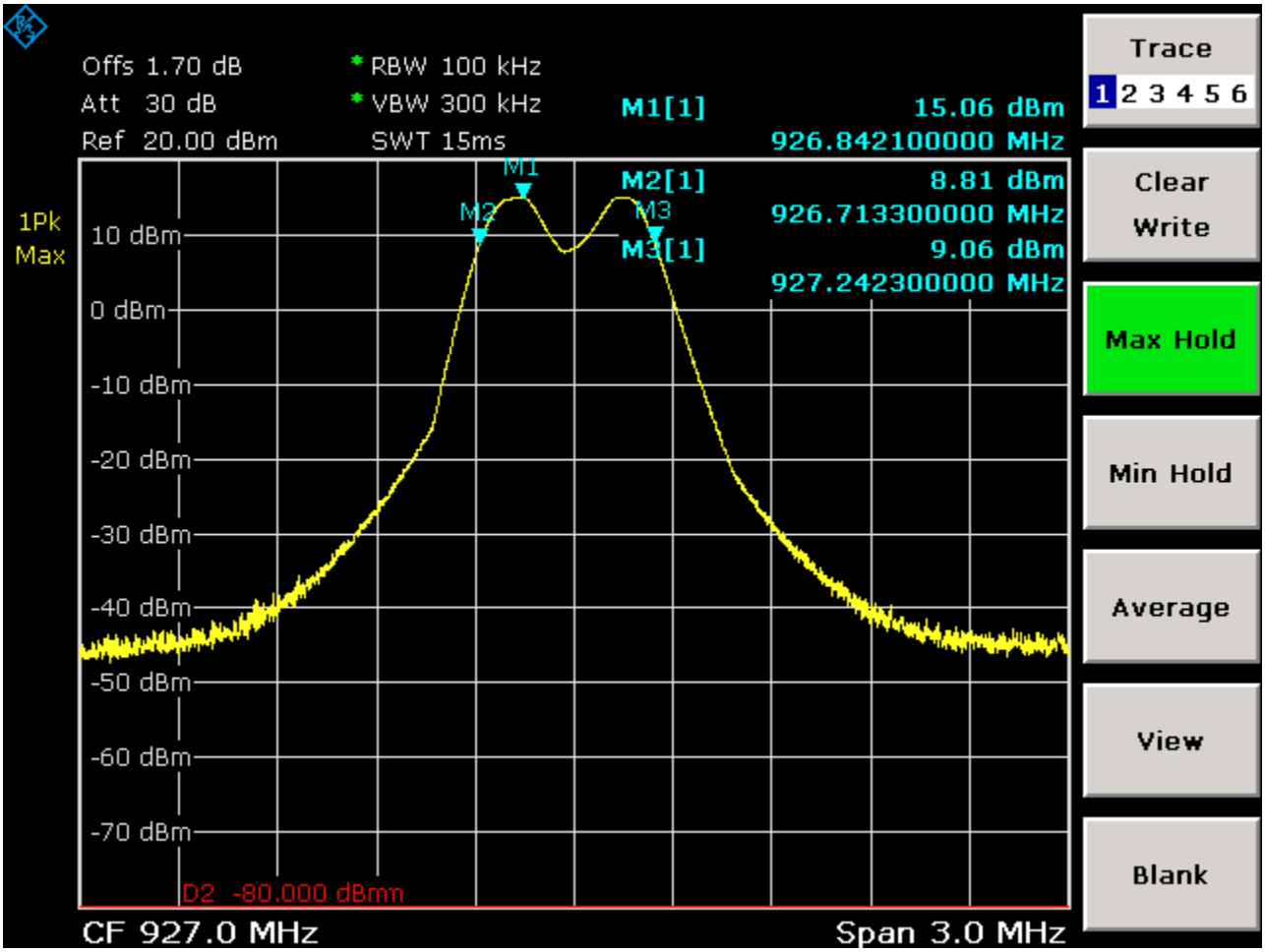
Test Date: October 29, 2019		**Test By:** Donn Foster		
Test Method: Conducted Measurements		**Power Setting:** Fixed at 12dBm		
Antenna Type: Laser Direct Structuring		**Max. Antenna Gain:** 0 dBi		
Operating Mode: Uncorrelated		**Signal State**: Modulated at 1 Mbps		
Ambient Temp.: 22 °C		**Relative Humidity:** 36%		
Bandwidth (MHz) for Wireless Audio Headset				
Frequency (MHz)	**Limit (kHz)**	**99% Bandwidth kHz**	**6 dB Bandwidth kHz**	**Results**
903	500	635	522	Pass
915	500	622	531	Pass
927	500	633	529	Pass
Note: The narrower bandwidth was measured at 1Mbps with 100% duty cycle.				



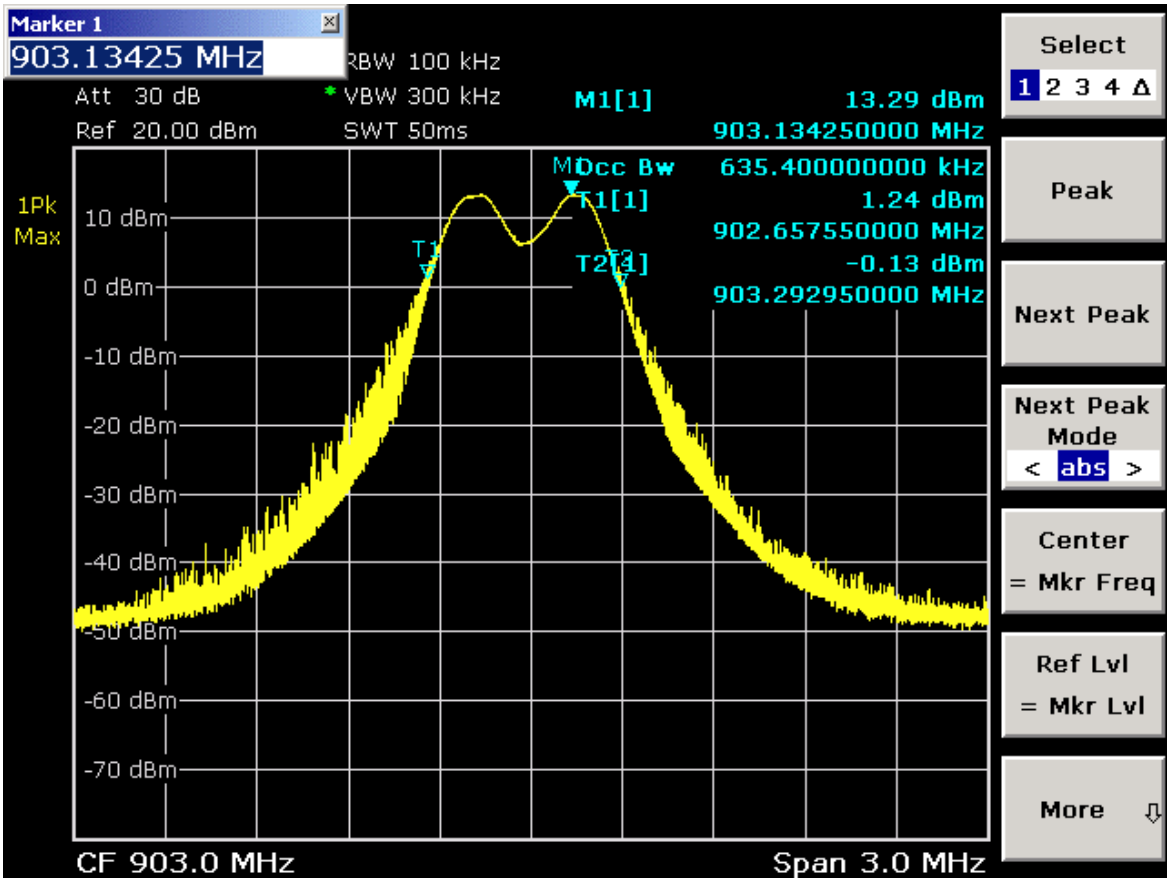
6db Bandwidth for channel 903



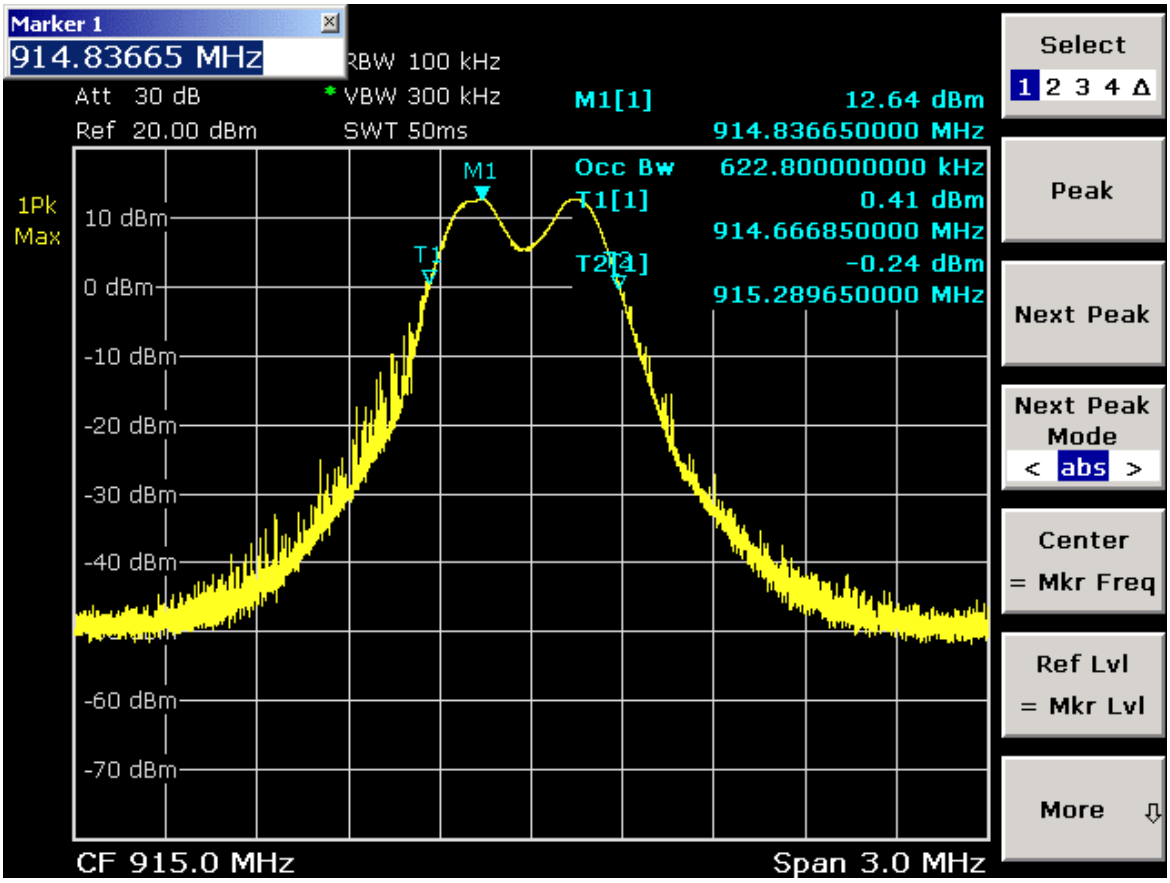
6db Bandwidth for channel 915



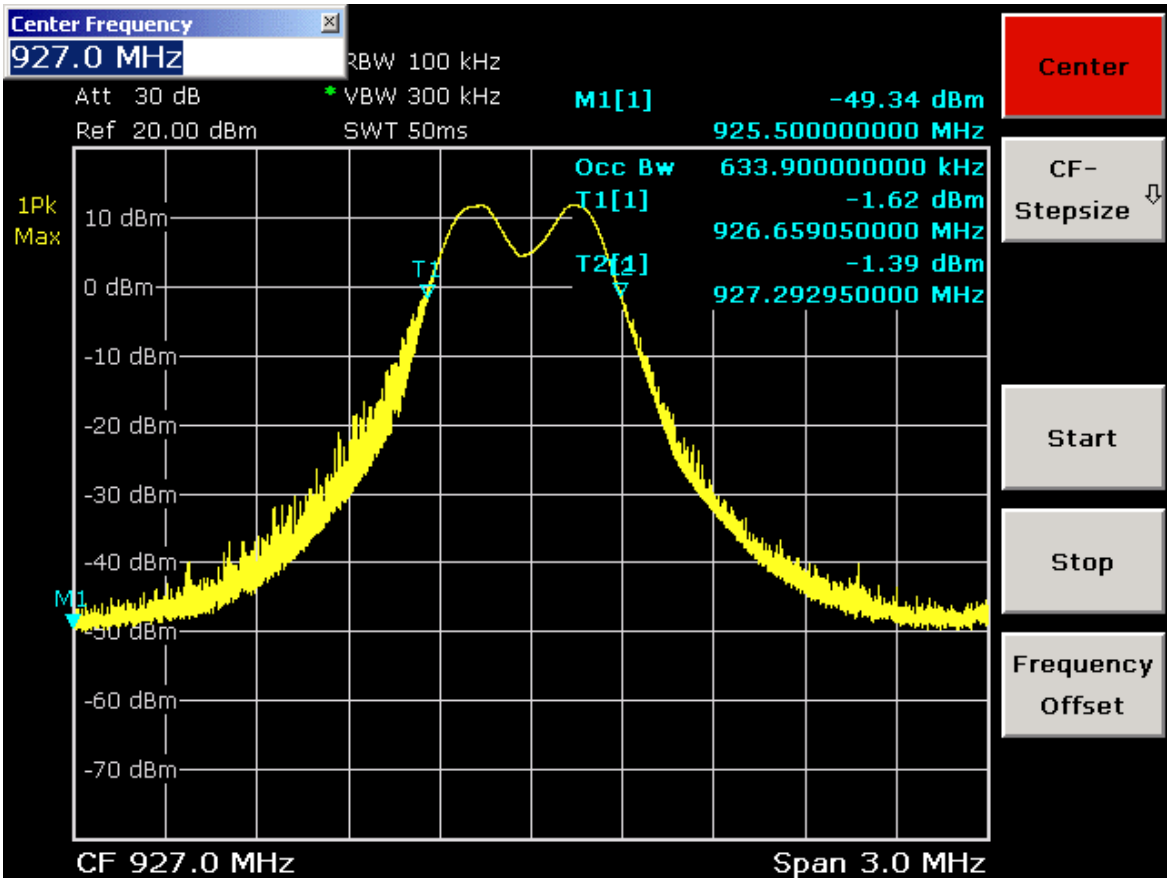
6db Bandwidth for channel 927



99% OBW channel 903



99% OBW Channel 915



99% OBW Channel 927

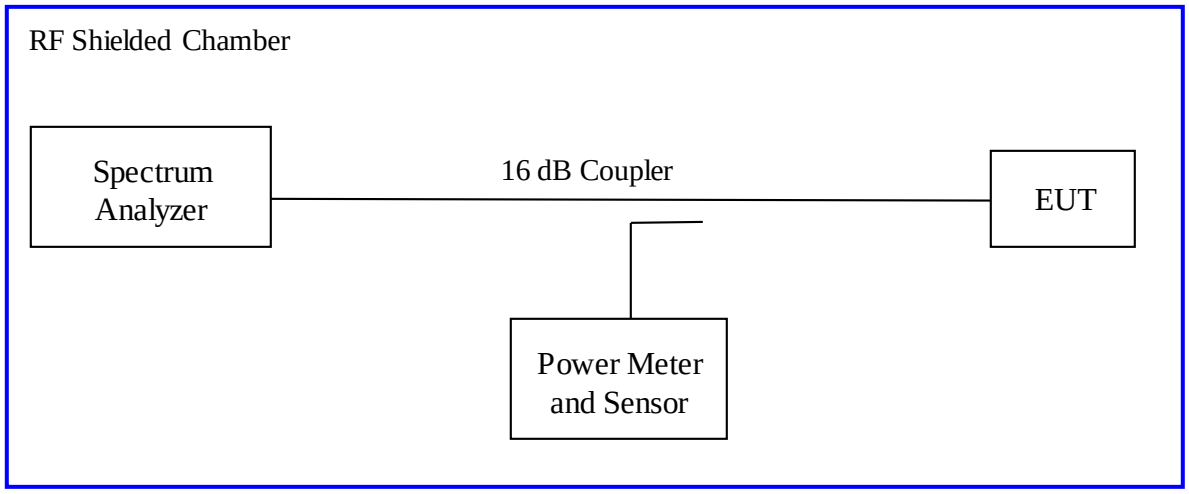
4.3 Peak Power Spectral Density

According to the CFR47 Part 15.247 (e) and RSS 247 Sect.5.2.2, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

4.3.1 Test Method

The conducted method was used to measure the channel power output per ANSI C63.10-2013 Section 11.10.3. The measurement was performed with modulation per CFR47 Part 15.247 (e) and RSS 247 Sect.5.2.2. The pre-evaluation was performed to find the worst modes. The worst findings were conducted on 3 channels in each operating frequency range of 902 to 928 MHz. This test was conducted on 3 channels of the sample. The worst sample result indicated below.

Test Setup:



4.3.2 Results

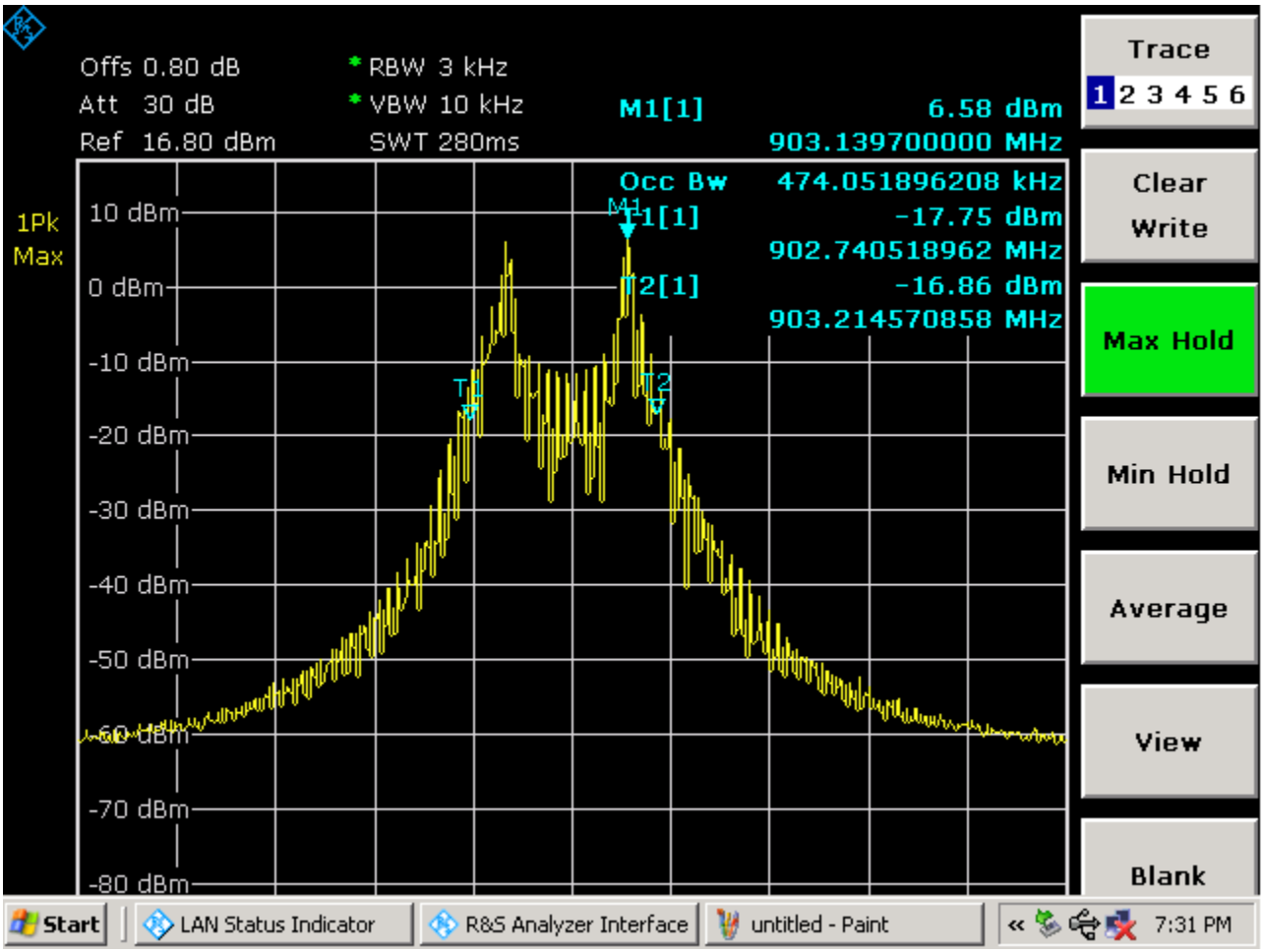
As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

Table 4: Peak Power Spectral Density – Test Results

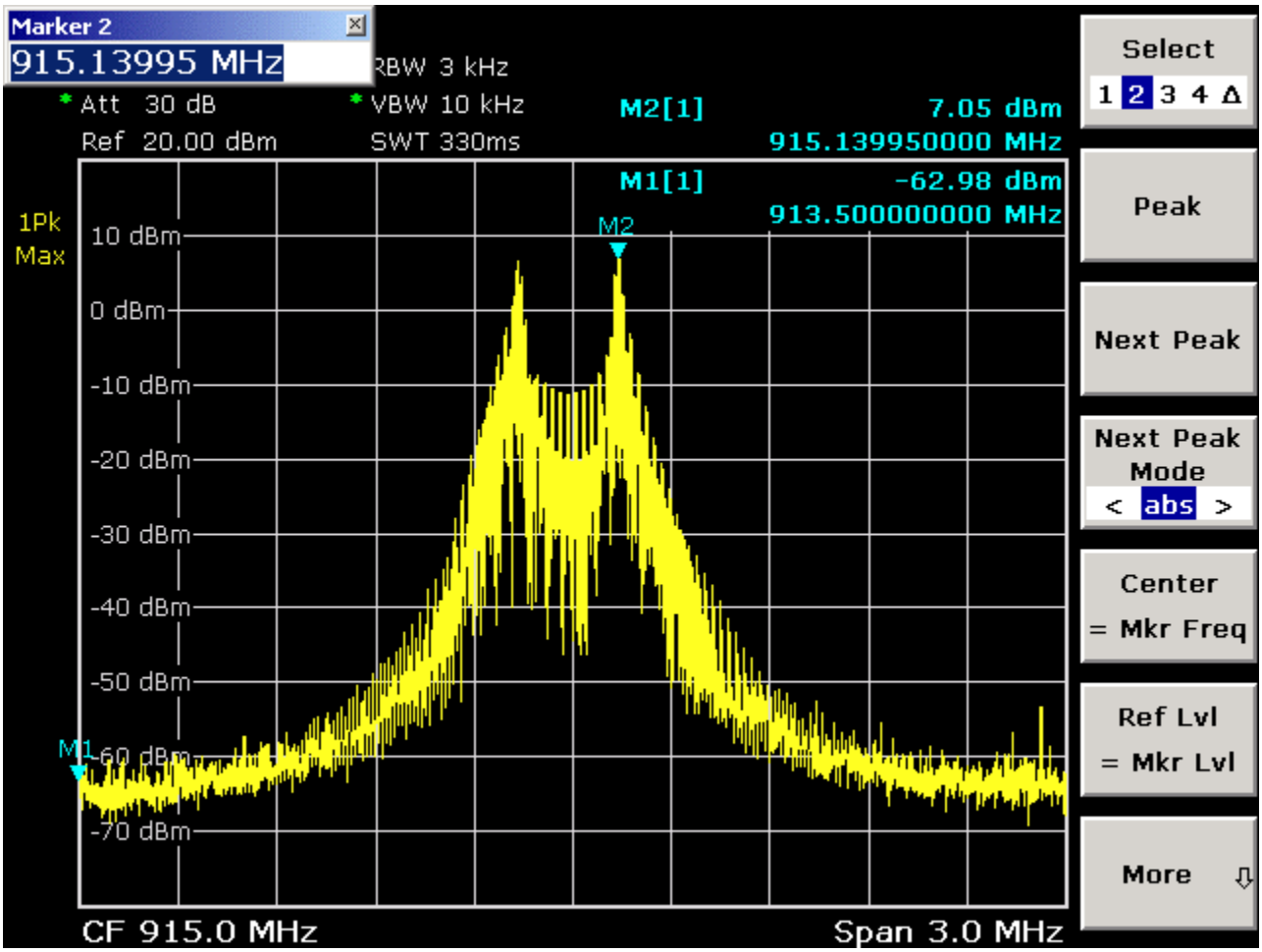
Test Date: October 29, 2019	**Test By:** Donn Foster
Test Method: Conducted Measurements	**Power Setting:** Fixed at 12dBm
Antenna Type: Laser Direct Structuring	**Max. Antenna Gain:** 0 dBi
Operating Mode: Uncorrelated	**Signal State**: Modulated at 100% Duty Cycle
Ambient Temp.: 22 °C	**Relative Humidity:** 35%

Peak Power Spectral Density

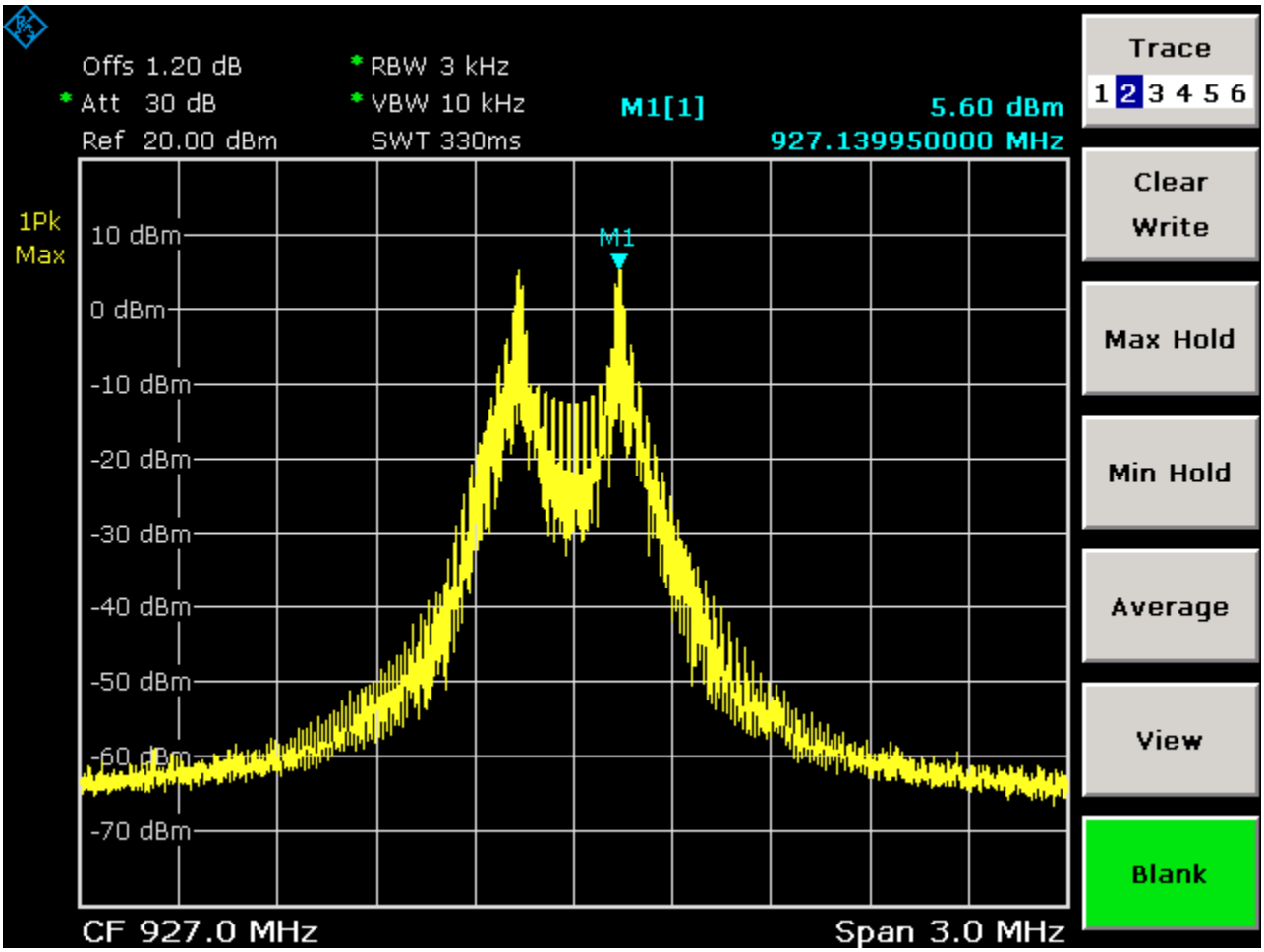
Freq. (MHz)	Config.	Output [dBm]		Max. PPSD [dBm]	Limit [dBm]	Margin [dB]
903	1 Mbps	-2.46		6.58	8.00	1.42
915	1 Mbps	-2.74		5.59	8.00	2.41
927	1 Mbps	-2.82		5.60	8.00	2.4


Offs 0.80 dB
Att 30 dB
Ref 16.80 dBm
RBW 3 kHz
VBW 10 kHz
SWT 280ms
M1[1]
6.58 dBm
903.139700000 MHz
Occ Bw
474.051896208 kHz
M1[1]
-17.75 dBm
902.740518962 MHz
T2[1]
-16.86 dBm
903.214570858 MHz
1Pk
Max
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
Trace
1 2 3 4 5 6
Clear
Write
Max Hold
Min Hold
Average
View
Blank
Start
LAN Status Indicator
R&S Analyzer Interface
untitled - Paint
7:31 PM

903MHz PPSD


Marker 2
915.13995 MHz
RBW 3 kHz
Att 30 dB
VBW 10 kHz
Ref 20.00 dBm
SWT 330ms
M2[1]
7.05 dBm
915.139950000 MHz
M1[1]
-62.98 dBm
913.500000000 MHz
1Pk
Max
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
M2
CF 915.0 MHz
Span 3.0 MHz
Select
1 2 3 4 Δ
Peak
Next Peak
Next Peak Mode
< abs >
Center = Mkr Freq
Ref Lvl = Mkr Lvl
More

915 PPSD


Offs 1.20 dB
RBW 3 kHz
Att 30 dB
VBW 10 kHz
Ref 20.00 dBm
SWT 330ms
M1[1]
5.60 dBm
927.139950000 MHz
1Pk
Max
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
CF 927.0 MHz
Span 3.0 MHz
Trace
1 2 3 4 5 6
Clear Write
Max Hold
Min Hold
Average
View
Blank

927 PPSD

4.4 Out of Band Emissions

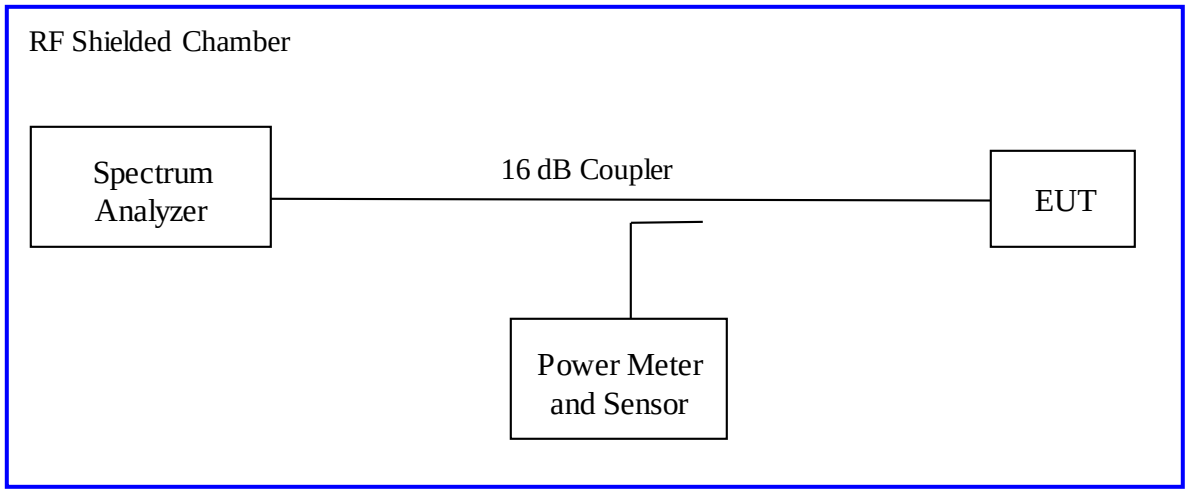
The setup was identical to RF output power measurement. Intentional radiators operating under the alternative provisions to the general emission limits, must be designed to ensure that the 20 dB or 30 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If the frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

Since the transmitter complies with the conducted power limits base on the use of RMS averaging per CFR47 Part 15.247(b)(3), any frequency outside the band of 2400MHz to 2483.5MHz, the power output level must be below 30db from the in-band transmitting signal; CFR 47 Part 15.215, 15.247(d) and RSS-247 Sect.5.5..

4.4.1 Test Method

The conducted method was used to measure the out-of-band emission requirement. The measurement was performed with modulation per CFR47 15.247(4) (d) 2018 and RSS-247 Sect.5.5: 2017. This test was conducted on 3 channels of Sample S/N PP #1. The worst sample result indicated below.

Test Setup:



4.4.2 Results

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

Table 5: Out of Band Emissions – Test Results

Test Date: November 7,2019	**Test By:** Donn Foster
Test Method: Conducted Measurements	**Power Setting:** Fixed at 12dBm
Antenna Type: Laser Direct Structuring	**Max. Antenna Gain:** 0 dBi
Operating Mode: Uncorrelated	**Signal State**: Modulated at 1 Mbps
Ambient Temp.: 22 °C	**Relative Humidity:**36%

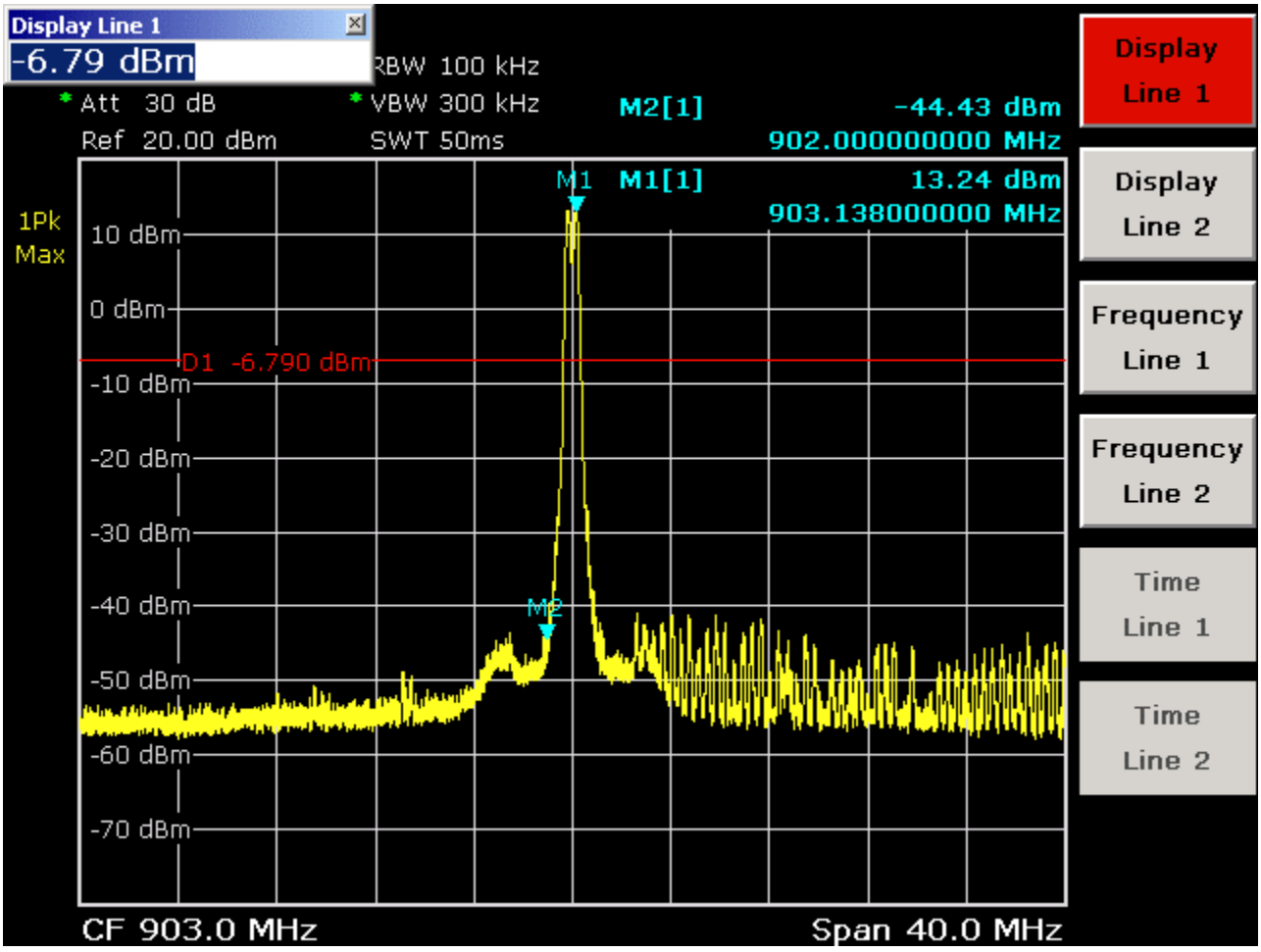
Operating Channel	Out of Band Level (dBm)	20 dBc Level (dBm)	Margin (dB)
903	-44.4	-6.79	37.61
927	-45.73	-7.36	38.37

Note: dBc is defined as the level below the main carrier.

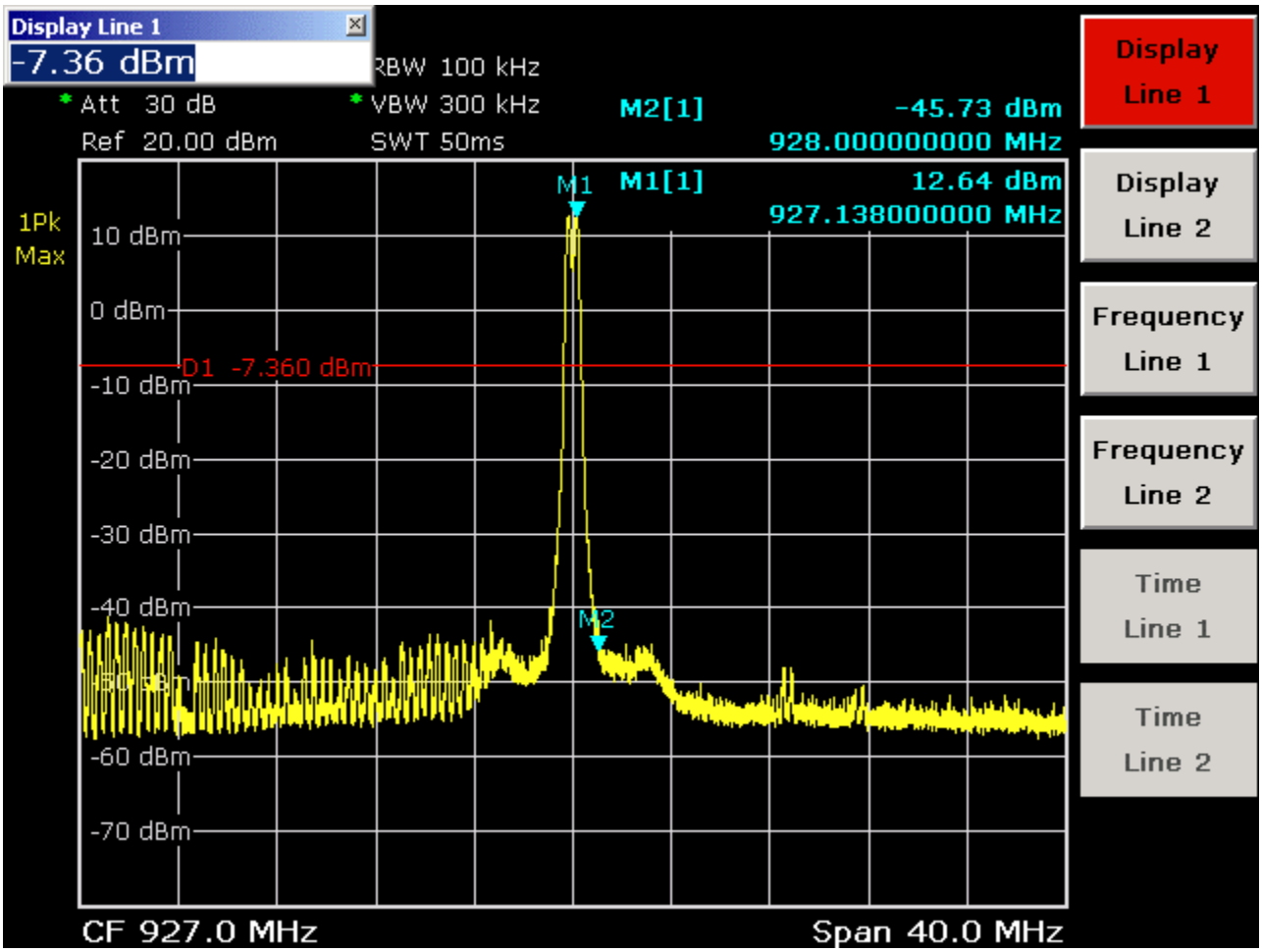
The band-edge level must lower than the 30dBc level.

The maximum out of band emission on each individual output put is at least 30 dB below the maximum in-band PSD on that output.

(*) The band-edge is compared to the highest -30dBc level of the test mode.



903 Nonrestricted Band Emissions



927 Nonrestricted Band Emissions

4.5 Transmit Spurious Emissions

Transmitter spurious emissions are emissions outside the frequency range of the equipment when the equipment is in transmit mode; per requirement of CFR47 15.205, 15.209, 15.247(d), RSS-Gen Sect. 8.9.

4.5.1 Test Methodology

4.5.1.1 Preliminary Test

A test program that controls instrumentation and data logging was used to automate the preliminary RF emission test procedure. The frequency range of interest was divided into sub-ranges to yield a frequency resolution of approximately 120 kHz and provide a reading at each frequency for no more than 12° of turntable rotation. For each frequency sub-range the turntable was rotated 360° while peak emission data was recorded and plotted over the frequency range of interest in horizontal and vertical antenna polarization's.

Preliminary emission profile testing was performed inside the anechoic chamber. The EUT was placed on a 1.0m x 1.5m non-conductive table 80cm (<1 GHz) and 150cm (>1 GHz) above the floor. The EUT was positioned as shown in the setup photographs. The receiving antenna was placed at a distance of 3m at a fixed height of 1m. Measurement equipment was located outside of the chamber. A video camera was placed inside the chamber to view the EUT.

Pres-scans were performed to determine the worst case configuration for data rate; 1 Mbps and 2 Mbps.

4.5.1.2 Final Test

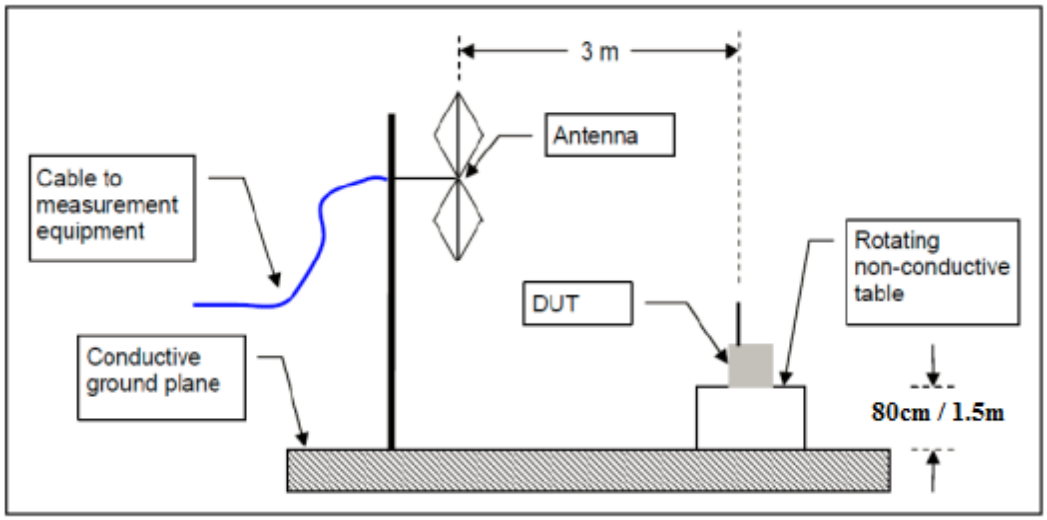
For each frequency measured, the peak emission was maximized by manipulating the receiving antenna from 1 to 4 meters above the ground plane and placing it at the position that produced the maximum signal strength reading. The turntable was then rotated through 360° while observing the peak signal and placing the EUT at the position that produced maximum radiation. The six highest emissions relative to the limit were measured unless such emissions were more than 20 dB below the limit. If less than six emissions are within 20 dB of the limit, than the noise level of the receiver is measured at frequencies where emissions are expected. Multiples of all oscillator and microprocessor frequencies were also checked.

Final testing was performed on an NSA compliant test site. The EUT was placed on a 1.0m x 1.5m non-conductive table 80cm (<1 GHz) and 150cm (>1 GHz) above the ground plane. The placement of EUT and cables were the same as for preliminary testing and is shown in the setup photographs.

4.5.1.3 Deviations

None.

Test Setup:



4.5.2 Transmitter Spurious Emission Limit

The spurious emissions of the transmitter shall not exceed the values in CFR47 Part 15.205, 15.209: 2018 and RSS Gen Sect. 8.10: 2014.

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490.....	2400/F(kHz)	300
0.490-1.705.....	24000/F(kHz)	30
1.705-30.0.....	30	30
30-88.....	100 **	3
88-216.....	150 **	3
216-960.....	200 **	3
Above 960.....	500	3

All harmonics and spurious emission which are outside of the restricted band shall be 20dB below the in-band emission.

4.5.3 Test Results

The final measurement data was taken under the worst case operating modes, configurations, and/or cable positions. It also reflects the results including any modifications and/or special accessories listed in Sections 1.4 and test plan.

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

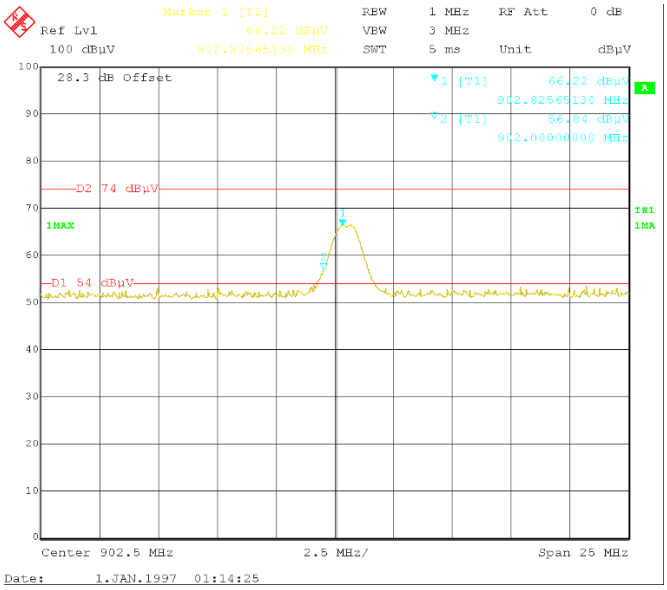
Table 6: Transmit Spurious Emission at Band-Edge Requirements

Test Date: November 8-9, 2019	**Test By:** Donn Foster
Test Method: Radiated Measurements	**Power Setting:** Fixed at 12dBm
Antenna Type: Laser Direct Structuring	**Max. Antenna Gain:** 0 dBi
Operating Mode: Uncorrelated	**Signal State**: Modulated at 1 Mbps
Ambient Temp.: 21 °C	**Relative Humidity:** 36%

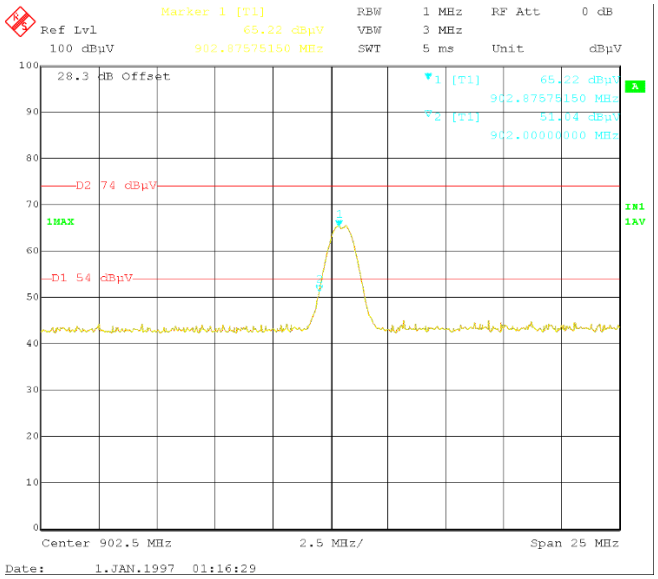
Band-Edge Results

Operating Frequency (MHz)	Restricted band emission (dbuV)
903 (peak vertical)	56.65
903 (peak horizontal)	56.84
903 (ave vertical)	52.07
903 (ave horizontal)	51.04
927 (peak vertical)	56.61
927 (peak horizontal)	56.57
927 (average vertical)	51.63
927 (average horizontal)	51.63

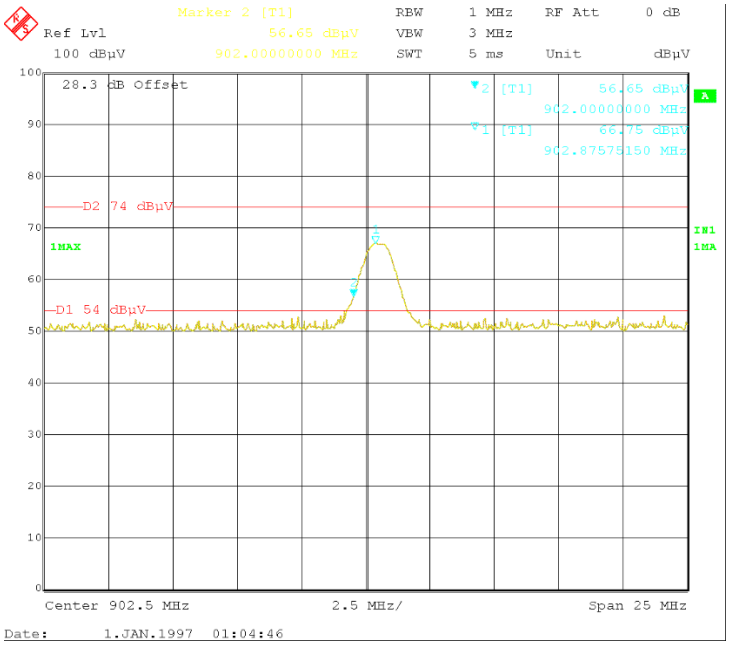
903 Peak Horizontal BE



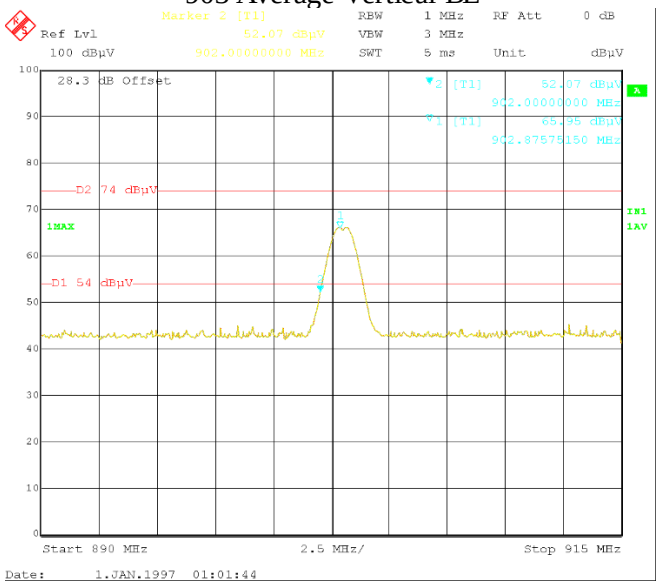
903 Average Horizontal BE



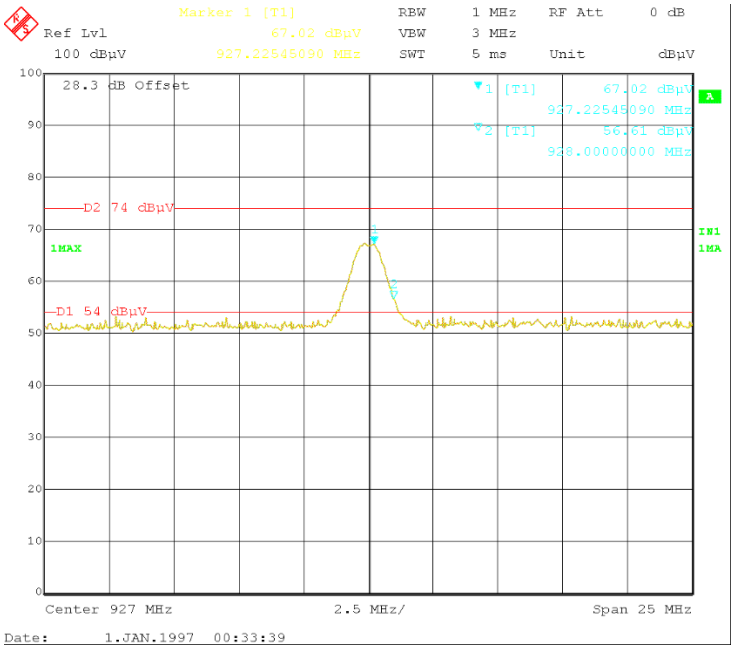
903 Peak Vertical BE



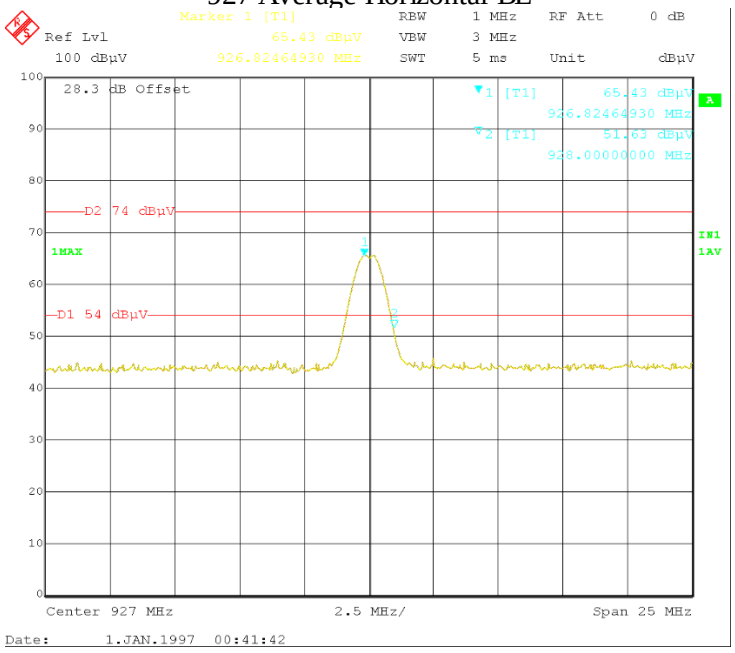
903 Average Vertical BE



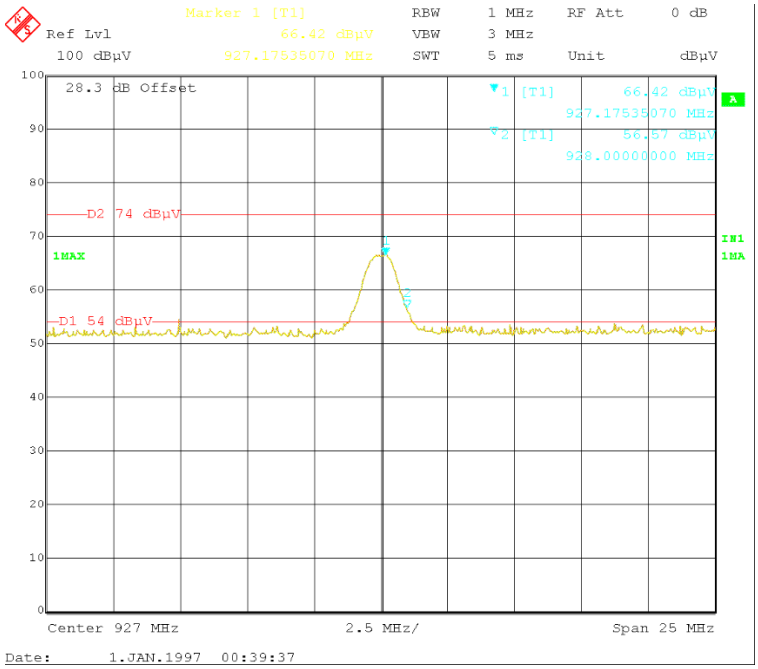
927 Peak Horizontal BE



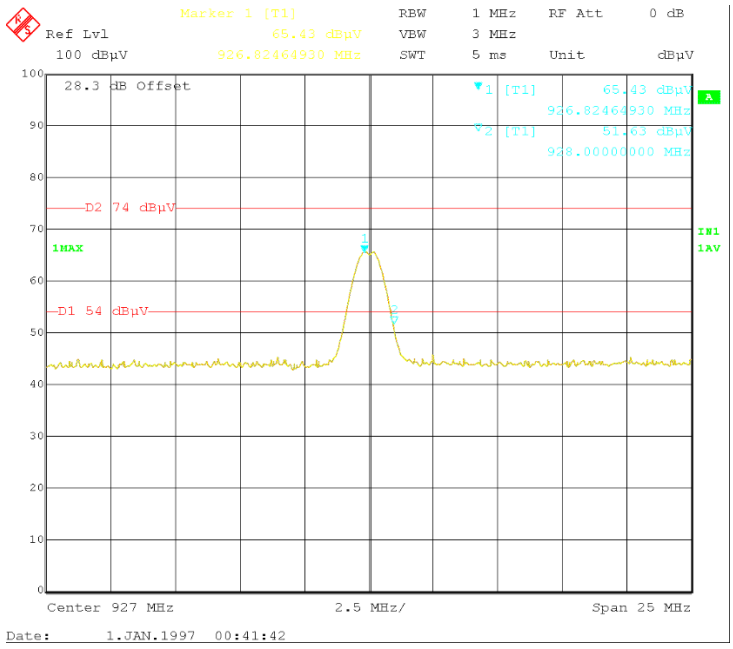
927 Average Horizontal BE



927 Peak Vertical BE

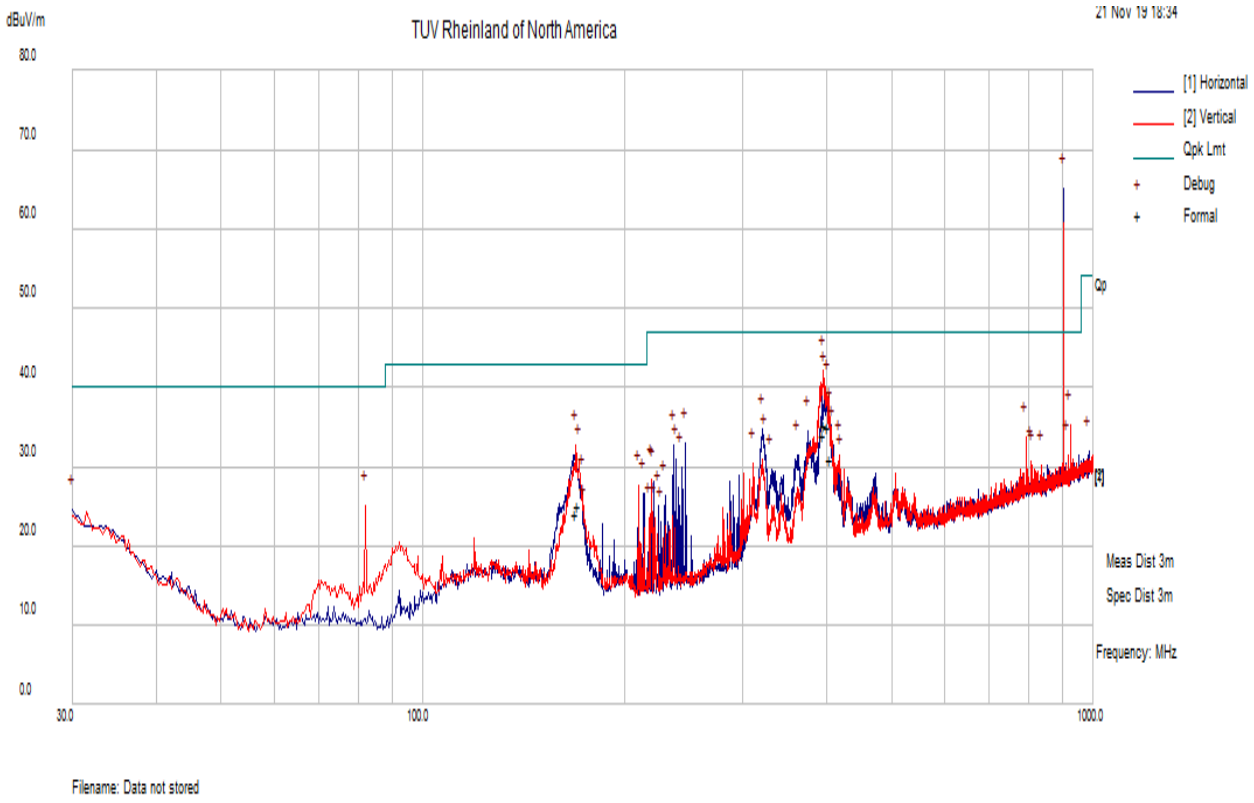


927 Average Vertical BE



SOP 1 Radiated Emissions

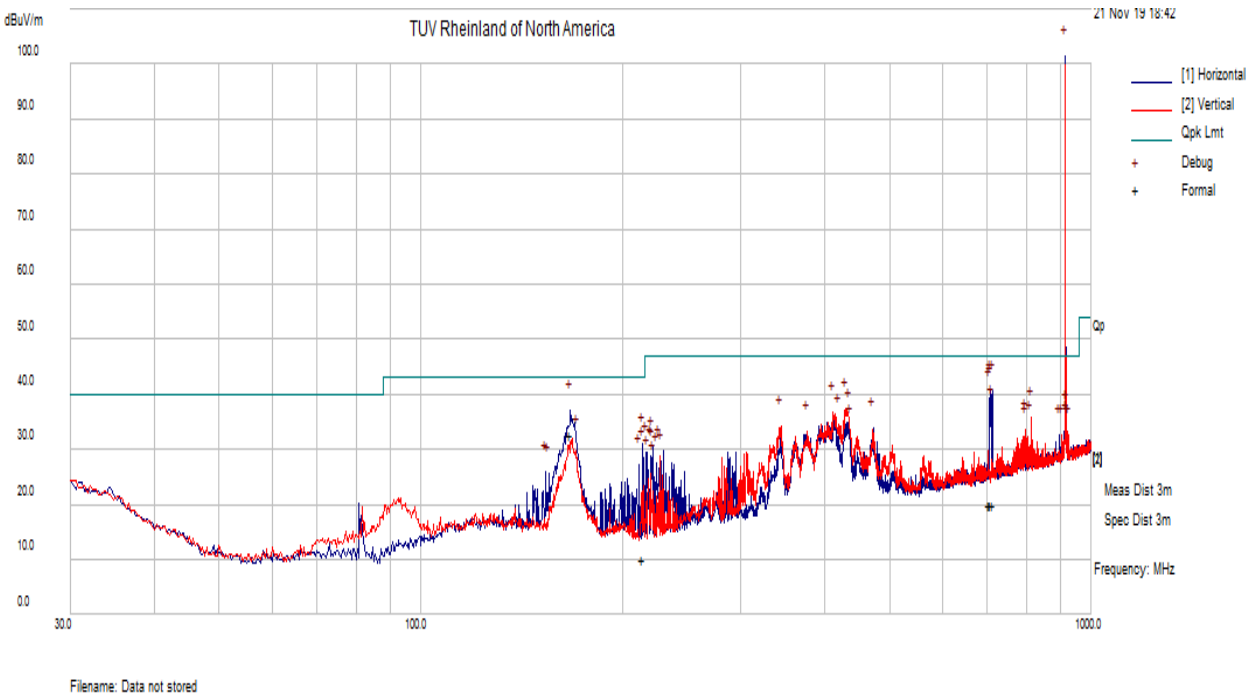
EUT Name	BLUtag V8	**Date**	November 6, 2019
EUT Model	BLUtag V8	**Temp / Hum in**	23°C / 33%rh
EUT Serial	proto #2	**Temp / Hum out**	N/A
EUT Config.	Upright	**Line AC / Freq**	3.7 VDC
Standard	CFR47 Part 15 Subpart C	**RBW / VBW**	See Note
Dist/Ant Used	3m / JB3	**Date**	Donn Foster



Note: The frequency seen above the limit the intentional radiator

30-1000 MHz. Channel 903

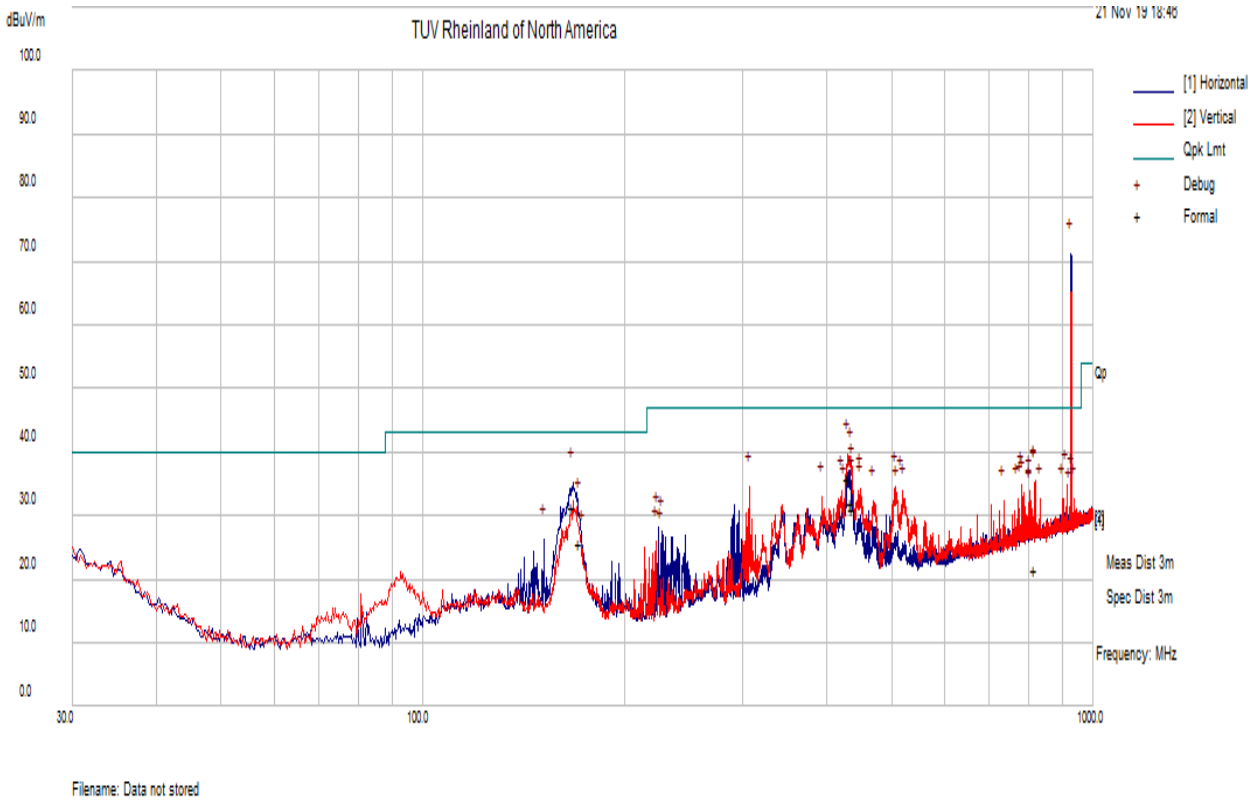
Frequency	Raw dBu\	Cable Los	AF dB	Level dBu	Measuren	Pol	Hgt cm	Azt Deg	Limit dBu'	Margin dB	Pass /Fail
395.9963	42.3	3.86	-12.02	34.14	Quasi Ma	V	186	186	47	-12.86	Pass
397.8959	43.28	3.87	-11.92	35.23	Quasi Ma	V	135	333	47	-11.77	Pass
169.2856	37.16	3.18	-16.22	24.13	Quasi Ma	V	128	92	43	-18.87	Pass
402.8797	42.92	3.88	-11.73	35.07	Quasi Ma	V	139	352	47	-11.93	Pass
170.8641	38.35	3.18	-16.29	25.24	Quasi Ma	V	105	302	43	-17.76	Pass
405.8181	38.77	3.89	-11.64	31.02	Quasi Ma	H	104	178	47	-15.98	Pass



Note: The frequency seen above the limit the intentional radiator

30-1000 MHz Channel 915

Frequency	Raw dBu\	Cable	Los	AF dB	Level dBu	Measuren	Pol	Hgt cm	Azt Deg	Limit dBu'	Margin dI	Pass /Fail
167.2444	45.52	3.17		-16.01	32.67	Quasi Ma	H	179	92	43	-10.33	Pass
708.4769	22.39	4.59		-7.09	19.88	Quasi Ma	H	250	108	47	-27.12	Pass
712.8903	22.48	4.6		-7.08	20	Quasi Ma	H	192	208	47	-27	Pass
709.1319	22.44	4.59		-7.09	19.94	Quasi Ma	H	210	360	47	-27.06	Pass
705.2222	22.42	4.58		-7.2	19.8	Quasi Ma	H	267	197	47	-27.2	Pass
214.0884	23.54	3.34		-16.84	10.03	Quasi Ma	H	167	358	43	-32.97	Pass

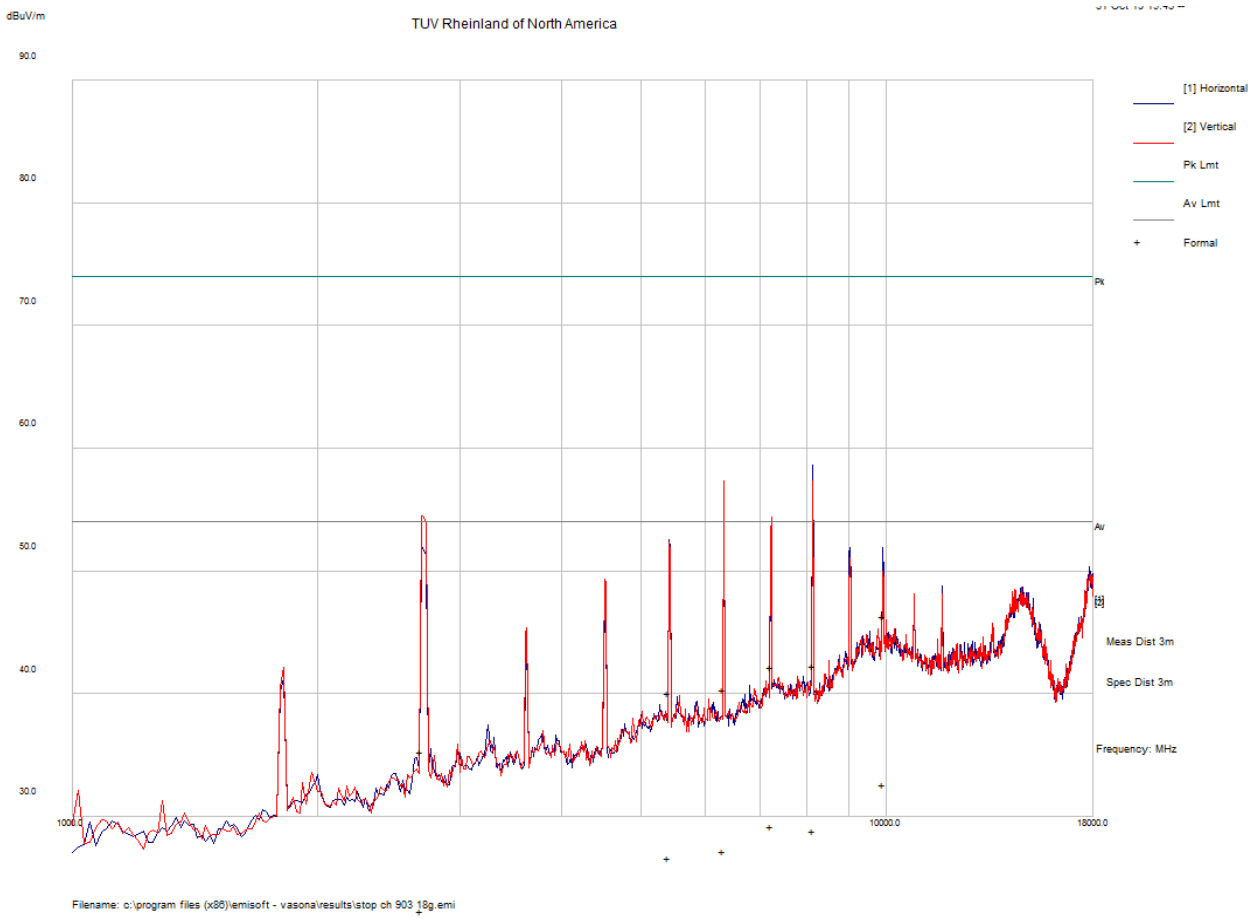


Note: The frequency seen above the limit the intentional radiator

30-1000 MHz Channel 927

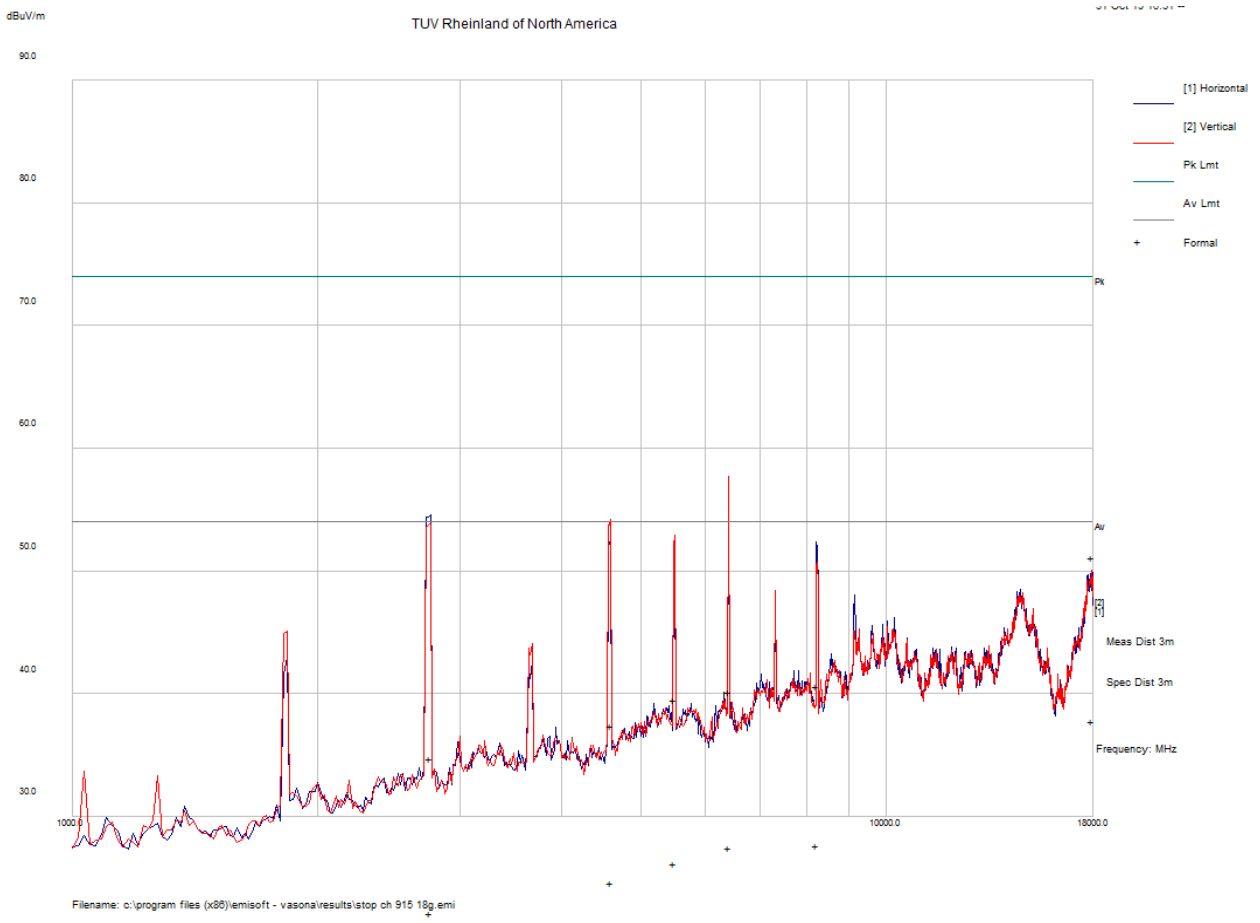
Frequency	Raw dBu\	Cable Los	AF dB	Level dBu	Measuren	Pol	Hgt cm	Azt Deg	Limit dBu'	Margin dI	Pass /Fail
167.3359	44.4	3.17	-16.02	31.55	Quasi Ma	H	207	279	43	-11.45	Pass
430.5956	43.2	3.94	-11.15	35.99	Quasi Ma	V	141	208	47	-11.01	Pass
435.9744	39.31	3.95	-11.11	32.15	Quasi Ma	V	145	223	47	-14.85	Pass
171.0956	38.88	3.18	-16.3	25.76	Quasi Ma	H	121	250	43	-17.24	Pass
437.2334	38.17	3.96	-11.09	31.05	Quasi Ma	V	127	238	47	-15.95	Pass
819.0697	22.28	4.81	-5.46	21.62	Quasi Ma	V	237	242	47	-25.38	Pass

SOP 1 Radiated Emissions			
EUT Name	BLUtag V8	**Date**	November 6, 2019
EUT Model	BLUtag V8	**Temp / Hum in**	23°C / 33%rh
EUT Serial	proto #2	**Temp / Hum out**	N/A
EUT Config.	Continuous Tx	**Line AC / Freq**	3.7 VDC
Standard	CFR47 Part 15 Subpart C	**RBW / VBW**	1 MHz / 3 MHz
Dist/Ant Used	3m / EMCO3115	**Performed by**	Donn Foster



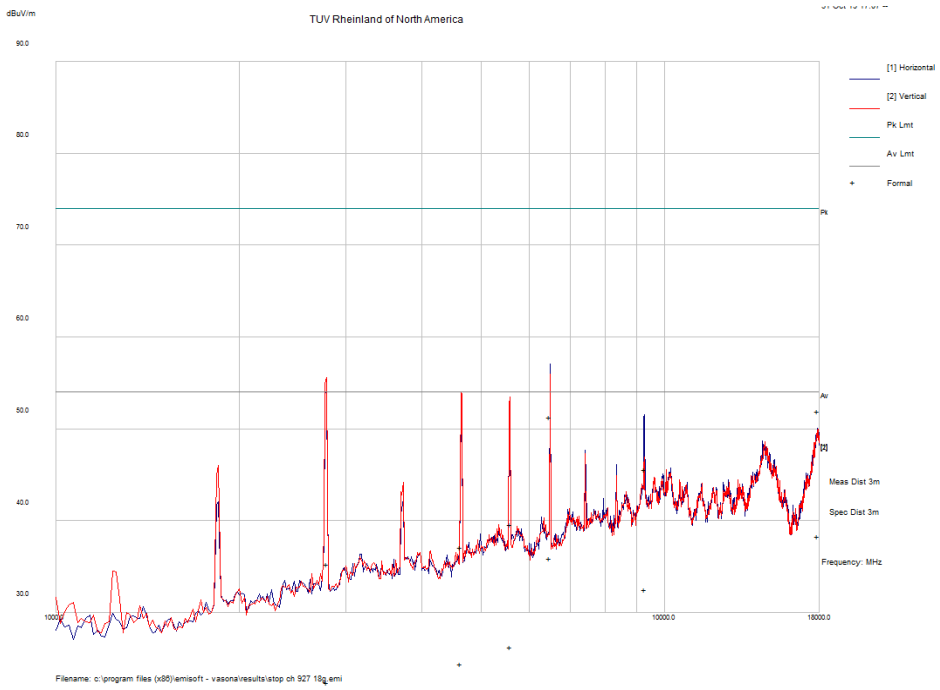
1-18 GHz Channel 903

Frequency	Raw dBu\	Cable Los	AF dB	Level dBu	Measuren	Pol	Hgt cm	Azt Deg	Limit dBu'	Margin dB	Pass /Fail
9927.411	45.26	2.96	-15.59	32.62	Average M	H	272	226	54	-21.38	Pass
7234.112	46.6	2.38	-19.8	29.18	Average M	V	273	164	54	-24.82	Pass
8137.142	46.03	2.62	-19.82	28.83	Average M	H	227	328	54	-25.17	Pass
6314.208	46.58	2.25	-21.65	27.19	Average M	V	239	64	54	-26.81	Pass
5410.481	46.37	2.02	-21.77	26.62	Average M	H	111	314	54	-27.38	Pass
9927.411	58.96	2.96	-15.59	46.32	Peak Max	H	272	226	74	-27.68	Pass
8137.142	59.49	2.62	-19.82	42.29	Peak Max	H	227	328	74	-31.71	Pass
2684.91	49.11	1.2	-28.03	22.28	Average M	V	172	222	54	-31.72	Pass
7234.112	59.6	2.38	-19.8	42.18	Peak Max	V	273	164	74	-31.82	Pass
6314.208	59.69	2.25	-21.65	40.29	Peak Max	V	239	64	74	-33.71	Pass
5410.481	59.78	2.02	-21.77	40.03	Peak Max	H	111	314	74	-33.97	Pass
2684.91	62.06	1.2	-28.03	35.24	Peak Max	V	172	222	74	-38.76	Pass



1-18 GHz Channel 915

Frequency	Raw dBu\	Cable Los	AF dB	Level dBu	Measuren	Pol	Hgt cm	Azt Deg	Limit dBu'	Margin dI	Pass /Fail
6418.826	59.6	2.29	-21.73	40.15	Peak Max	V	232	149	74	-33.85	Pass
2754.77	61.53	1.47	-28.29	34.71	Peak Max	H	195	270	74	-39.29	Pass
4595.459	60.05	2.04	-24.66	37.42	Peak Max	V	136	145	74	-36.58	Pass
5497.271	59.28	2	-21.74	39.55	Peak Max	V	137	0	74	-34.45	Pass
8220.766	57.78	2.53	-19.7	40.61	Peak Max	H	118	174	74	-33.39	Pass
17916.7	54.93	4.11	-7.96	51.07	Peak Max	V	127	170	74	-22.93	Pass
6418.826	46.92	2.29	-21.73	27.47	Average M	V	232	149	54	-26.53	Pass
2754.77	48.95	1.47	-28.29	22.13	Average M	H	195	270	54	-31.87	Pass
4595.459	47.23	2.04	-24.66	24.6	Average M	V	136	145	54	-29.4	Pass
5497.271	45.9	2	-21.74	26.17	Average M	V	137	0	54	-27.83	Pass
8220.766	44.83	2.53	-19.7	27.66	Average M	H	118	174	54	-26.34	Pass
17916.7	41.6	4.11	-7.96	37.75	Average M	V	127	170	54	-16.25	Pass



1-18 GHz Channel 927

Notes: None.

Tabular Data 1-18 GHz Channel 927

Frequency	Raw dBu\	Cable Los	AF dB	Level dBu	Measuren	Pol	Hgt cm	Azt Deg	Limit dBu'	Margin dI	Pass /Fail
6486.962	70.88	2.29	-21.9	51.27	Peak Max	H	281	16	74	-22.73	Pass
2787.9	62.06	1.3	-28.13	35.23	Peak Max	V	259	229	74	-38.77	Pass
4626.762	59.63	1.89	-24.41	37.11	Peak Max	V	220	300	74	-36.89	Pass
5581.126	59.22	2.12	-21.76	39.58	Peak Max	V	231	177	74	-34.42	Pass
9277.255	59.11	2.69	-16.26	45.54	Peak Max	H	277	184	74	-28.46	Pass
17864.17	55.61	4.09	-7.79	51.92	Peak Max	H	109	360	74	-22.08	Pass
6486.962	55.5	2.29	-21.9	35.89	Average M	H	281	16	54	-18.11	Pass
2787.9	49.2	1.3	-28.13	22.37	Average M	V	259	229	54	-31.63	Pass
4626.762	46.93	1.89	-24.41	24.42	Average M	V	220	300	54	-29.58	Pass
5581.126	45.92	2.12	-21.76	26.28	Average M	V	231	177	54	-27.72	Pass
9277.255	46.12	2.69	-16.26	32.55	Average M	H	277	184	54	-21.45	Pass
17864.17	41.97	4.09	-7.79	38.27	Average M	H	109	360	54	-15.73	Pass

4.5.4 Sample Calculation

The field strength is calculated by subtracting the Amplifier Gain and adding the Cable Loss and Antenna Correction Factor to the measured reading. The basic equation is as follows:

$$\text{Field Strength (dB}\mu\text{V/m)} = \text{FIM - AMP + CBL + ACF}$$

Where: FIM = Field Intensity Meter (dBμV)

AMP = Amplifier Gain (dB)

CBL = Cable Loss (dB)

ACF = Antenna Correction Factor (dB/m)

$$\mu\text{V/m} = 10^{\frac{dB\mu V/m}{20}}$$

4.6 AC Conducted Emissions

Testing was performed in accordance with ANSI C63.10: 2013. These test methods are listed under the laboratory's A2LA Scope of Accreditation.

This test measures the levels emanating from the EUT's AC input port, thus evaluating the potential for the EUT to cause radio frequency interference to other electronic devices.

The AC conducted emissions of equipment under test shall not exceed the values in CFR47 Part 15.207: 2018 and RSS Gen: 2017 Sect. 8.8.

4.6.1 Test Methodology

A test program that controls instrumentation and data logging was used to automate the AC Power Line Conducted emission test procedure. The frequency range of interest was divided into sub-ranges such as to yield a frequency resolution of 9 kHz. Each phase and neutral of the AC power line were measured with respect to ground. Measurements were performed using a set of 50µH / 50Ω LISNs.

Testing is performed in Lab 5. The setup photographs clearly identify which site was used. The vertical ground plane used in the semi-anechoic chamber is a 2m x 2m solid aluminum frame and panel, and it is bonded to the horizontal ground plane.

In the case of tabletop equipment, the EUT is placed on a 1.0m x 1.5m non-conductive table 80cm above the ground plane and 40cm from a vertical ground reference plane. The rear of the EUT was positioned flush with the backside of the table and directly over the LISNs. The power and I/O cables were routed over the edge of the table and bundled approximately 40cm from the ground plane. Support equipment was powered from a separate LISN.

4.6.1.1 Deviations

There were no deviations from this test methodology.

4.6.2 Test Results

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

Table 7: AC Conducted Emissions – Test Results

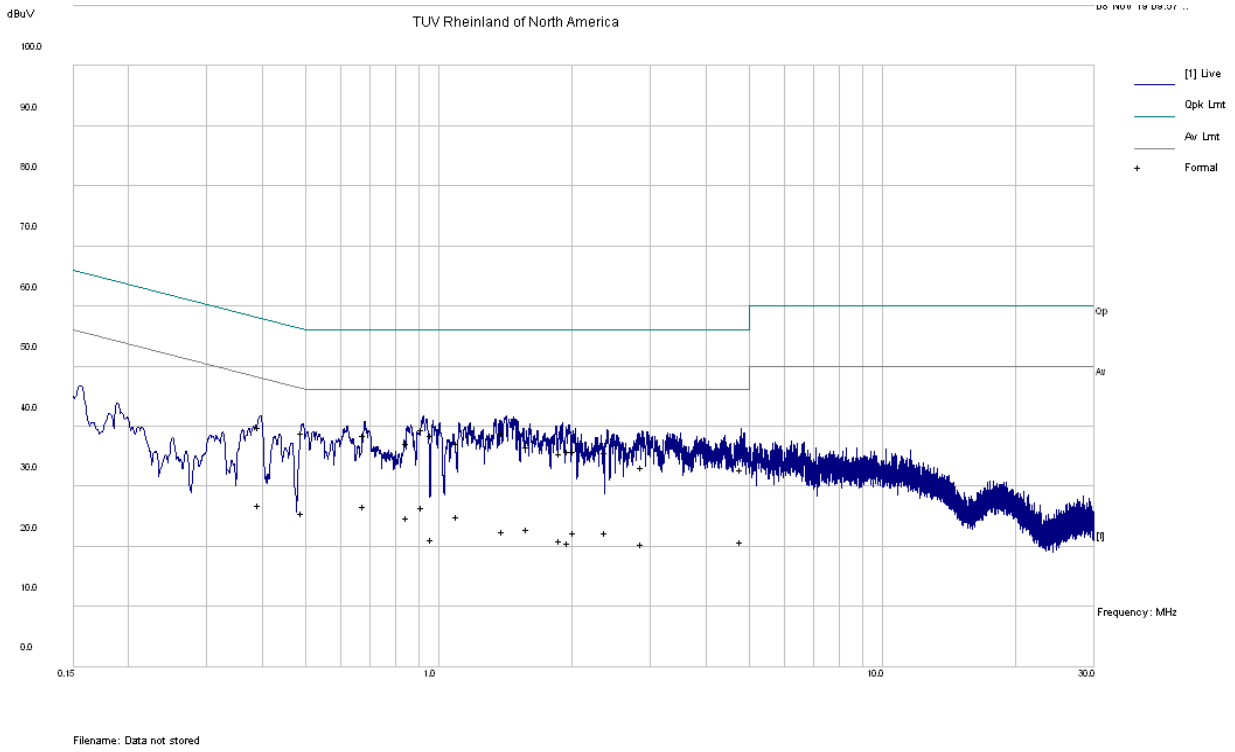
Test Conditions: Conducted Measurement	**Test Date:** November 5, 2019
Antenna Type: Laser Direct Structuring	**Power Level:** 12 dbm
EUT Power: Battery with the charger attached and tested in charging mode only.	**Configuration:** Tabletop
Ambient Temperature: 23° C	**Relative Humidity:** 34% RH

Configuration	Frequency Range	Test Result
Line 1 (Hot)	0.15 to 30 MHz	Pass
Line 2 (Neutral)	0.15 to 30 MHz	Pass

Conducted Emissions

EUT Name	BLUtag V8	**Date**	November 5, 2019
EUT Model	BLUtag V8	**Temp / Hum in**	23° C / 34% rh
EUT Serial	Proto 2	**Temp / Hum out**	N/A
EUT Config.	Integrated Antenna	**Line AC**	120 Vac/60 Hz
Standard	CFR47 Part 15.207	**RBW / VBW**	9 kHz / 30 kHz
Lab/LISN	Lab #5 /Com-Power, Line 1	**Performed by**	Donn Foster

150 kHz to 30 MHz Plot for Line 1 (Hot)

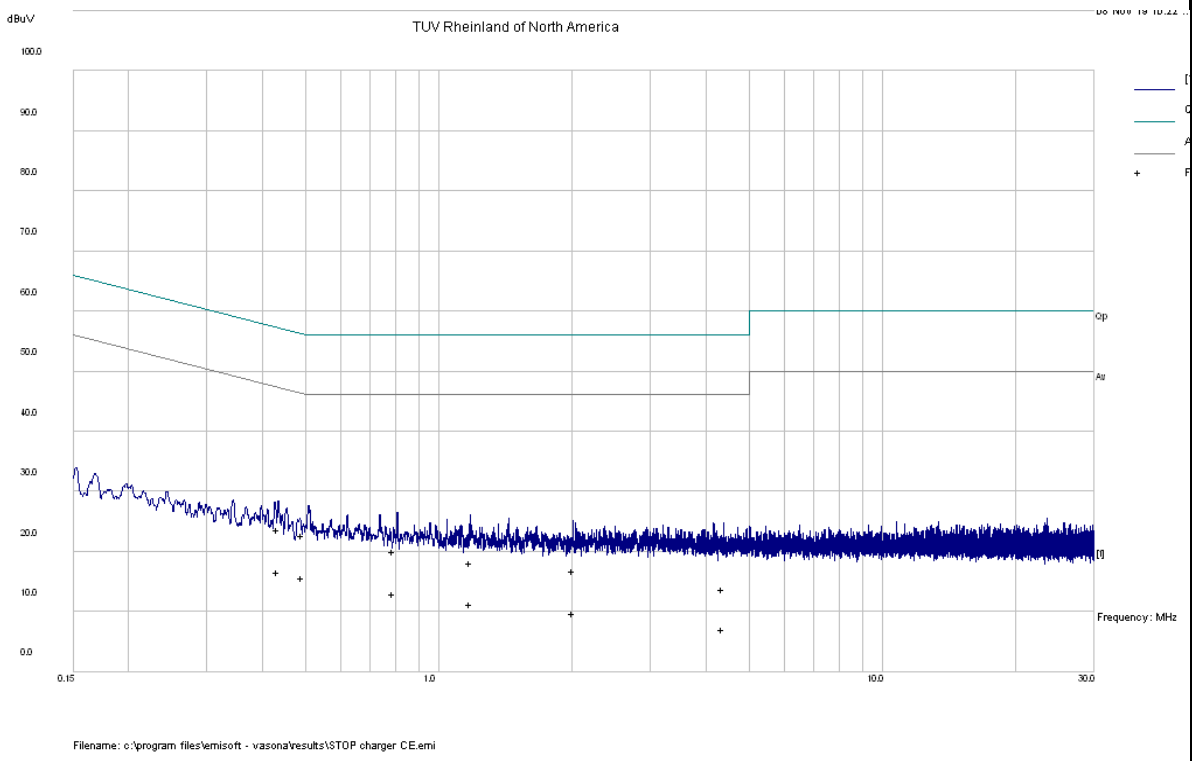


Notes: Meets FCC Class B limit.

SOP 2 Conducted Emissions

EUT Name	BLUtag V8	**Date**	November 5, 2019
EUT Model	BLUtag V8	**Temp / Hum in**	23° C / 34% rh
EUT Serial	Proto 2	**Temp / Hum out**	N/A
EUT Config.	Integrated Antenna	**Line AC**	120 Vac/60 Hz
Standard	CFR47 Part 15.207	**RBW / VBW**	9 kHz / 30 kHz
Lab/LISN	Lab #5 /Com-Power	**Performed by**	Donn Foster

150 kHz to 30 MHz Plot for Line 2 (Neutral)



Note: Meets FCC Class B Limit.

SOP 2 Conducted Emissions

EUT Name	BLUtag V8	**Date**	November 5, 2019
EUT Model	BLUtag V8	**Temp / Hum in**	23° C / 34% rh
EUT Serial	Proto 2	**Temp / Hum out**	N/A
EUT Config.	Laser Direct Structuring	**Line AC**	120 Vac/60 Hz
Standard	CFR47 Part 15.207	**RBW / VBW**	9 kHz / 30 kHz
Lab/LISN	Lab #5 /Com-Power, Line 1	**Performed by**	Donn Foster
Notes	Powered by 3.7VDC the charger was used as a convenience for lengthy testing and tested in charging mode		

Spec Margin = QP./Ave. - Limit, ± Uncertainty

Combined Standard Uncertainty $u_c(y) = \pm 2.18$ dB Expanded Uncertainty $U = ku_c(y)$ k = 2 for 95% confidence

Notes: EUT was setup as table top equipment and transmitting at 927 MHz

Frequency	Raw dBu\	Cable Los	Factors d	Level dBu	Measurem	Line	Limit dBu\	Margin dE	Pass /Fail
0.394236	29.88	9.97	0.04	39.89	Quasi Pea	Live	57.97	-18.08	Pass
0.394236	16.99	9.97	0.04	27.01	Average	Live	47.97	-20.97	Pass
0.493103	28.83	9.98	0.04	38.85	Quasi Pea	Live	56.12	-17.26	Pass
0.493103	15.59	9.98	0.04	25.61	Average	Live	46.12	-20.51	Pass
0.678036	28.48	9.98	0.04	38.5	Quasi Pea	Live	56	-17.5	Pass
0.678036	16.65	9.98	0.04	26.67	Average	Live	46	-19.34	Pass
0.850873	27.22	9.99	0.04	37.25	Quasi Pea	Live	56	-18.75	Pass
0.850873	14.77	9.99	0.04	24.8	Average	Live	46	-21.2	Pass
0.919496	29.53	9.99	0.04	39.56	Quasi Pea	Live	56	-16.44	Pass
0.919496	16.56	9.99	0.04	26.59	Average	Live	46	-19.41	Pass
0.964364	28.51	9.99	0.04	38.54	Quasi Pea	Live	56	-17.46	Pass
0.964364	11.2	9.99	0.04	21.23	Average	Live	46	-24.77	Pass

SOP 2 Conducted Emissions

EUT Name	BLUtag V8	**Date**	November 5, 2019
EUT Model	BLUtag V8	**Temp / Hum in**	23° C / 34% rh
EUT Serial	Proto 2	**Temp / Hum out**	N/A
EUT Config.	Laser Direct Structuring	**Line AC**	120 Vac/60 Hz
Standard	CFR47 Part 15.207	**RBW / VBW**	9 kHz / 30 kHz
Lab/LISN	Lab #5 /Com-Power, Line 2	**Performed by**	Donn Foster
Notes	Powered by 3.7VDC the charger was used as a convenience for lengthy testing and tested in charging mode		

Spec Margin = QP./Ave. - Limit, ± Uncertainty

Combined Standard Uncertainty $u_c(y) = \pm 2.18$ dB Expanded Uncertainty $U = ku_c(y)$ $k = 2$ for 95% confidence

Notes: EUT was setup as table top equipment and transmitting at 927 MHz

Frequency	Raw dBu\	Cable Los	Factors d	Level dBu	Measurem	Line	Limit dBu\	Margin dE	Pass /Fail
0.491704	12.69	9.98	0.04	22.71	Quasi Pea	Neutral	56.14	-33.43	Pass
0.434543	13.75	9.97	0.04	23.76	Quasi Pea	Neutral	57.17	-33.41	Pass
0.791481	9.93	9.99	0.04	19.96	Quasi Pea	Neutral	56	-36.04	Pass
1.181179	8.12	9.99	0.04	18.15	Quasi Pea	Neutral	56	-37.85	Pass
2.014936	6.78	10.01	0.04	16.83	Quasi Pea	Neutral	56	-39.17	Pass
4.373818	3.72	10.05	0.04	13.81	Quasi Pea	Neutral	56	-42.19	Pass
0.491704	5.69	9.98	0.04	15.71	Average	Neutral	46.14	-30.43	Pass
0.434543	6.53	9.97	0.04	16.54	Average	Neutral	47.17	-30.63	Pass
0.791481	2.89	9.99	0.04	12.92	Average	Neutral	46	-33.08	Pass
1.181179	1.24	9.99	0.04	11.28	Average	Neutral	46	-34.72	Pass
2.014936	-0.3	10.01	0.04	9.75	Average	Neutral	46	-36.25	Pass
4.373818	-3.1	10.05	0.04	6.99	Average	Neutral	46	-39.01	Pass

5 Test Equipment List

5.1 Equipment List

Equipment	Manufacturer	Model #	Serial/Inst #	Last Cal mm/dd/yyyy	Next Cal mm/dd/yyyy
Bilog Antenna	Sunol Sciences	JB3	A102606	11/20/2017	11/20/2019
Amplifier	Sonoma Instruments	310	165516	01/23/2019	01/23/2020
Rigid Horn antenna	Emco	3115	9602-4676	06/20/19	06/20/21
1-18GHz preamp	Miteq	TTA1800-30-HG	1842452	01/15/2019	01/15/2020
Spectrum Analyzer	Rhode&Schwarz	FSV	5000-309088910	11/21/18	11/21/19
Spectrum Analyzer	Agilent	N9030A	US51350291	01/15/19	01/15/20
Horn antenna	Emco	AH840	105005	9/3/2019	9/3/2021
LISN	Com-Power	LI-215	12111	01/15/2019	01/15/2020

Note: Equipment is characterized before use.

* Calibration of equipment past due for re-calibration will be performed expeditiously. If any equipment is found to be out of tolerance at that time, affected customers will be notified accordingly.

6 EMC Test Plan

6.1 Introduction

This section provides a description of the Equipment Under Test (EUT), configurations, operating conditions, and performance acceptance criteria. It is an overview of information provided by the manufacturer so that the test laboratory may perform the requested testing.

6.2 Customer

Table 8: Customer Information

Company Name	Satellite Tracking of People
Address	5353 W Sam Houston Parkway N, Suite 190
City, State, Zip	Houston, TX 77041-5186
Country	USA

Table 9: Technical Contact Information

Name	Mark Kirincic
E-mail	mkirincic@stopllc.com
Phone	281-658-7242

6.3 Equipment Under Test (EUT)

Table 10: EUT Specifications

EUT Specification	
Package Dimensions	10x5x4.5 cm
Power Input	3.7 VDC (battery) 110VAC for testing only the charger is only used to run the unit as a convenience for prolonged testing.
Environment	Indoor\Outdoor
Operating Temperature Range:	0 to 50 degrees C
Multiple Feeds:	☐ Yes and how many ☒ No
Product Marketing Name (PMN)	BLUtag V8
Hardware Version Identification Number (HVIN)	Version 8
Firmware Version Identification Number (FVIN)	n/a
Operating Mode	Continuous Tx
Transmitter Frequency Band	902-928 MHz
Max. Measured Power Output	13.25 dBm
Power Setting @ Operating Channel	+12 dBm
Antenna Type	Laser Direct Structuring (0dbi)
Modulation Type	☐ AM ☐ FM ☐ DSSS ☐ OFDM ☒ Other describe: FSK
Date Rate	1 Mbps
TX/RX Chain (s)	1
Directional Gain Type	☒ Uncorrelated ☒ No Beam-Forming ☐ Other describe:
Type of Equipment	☐ Table Top ☐ Wall-mount ☐ Floor standing cabinet ☒ Other : Body worn
Note: None.	

Table 11: Interface Specifications

Interface Type	Cabled with what type of cable?	Is the cable shielded?	Maximum potential length of the cable?	Metallic (M), Coax (C), Fiber (F), or Not Applicable?
Charging port	Battery Charger	☒ Yes	☒ Metric:1m	☒ M
		☐	☐	☐

Table 12: Supported Equipment

Reference Designation	Manufacturer	Model	Serial Number
Laptop	Lenovo	Thinkpad	None found
Battery Charger	Stonetronics	DSA-13FFC-05-FUS	None listed (p/n T66345T}

Table 13: Description of Sample used for Testing

Device	Serial Number	Configuration	Used For
BLUtag V8	Proto 2	Radiated Sample	Radiated Emissions. Conducted Emission, Bandedge
BLUtag V8	Proto 1	Conducted Sample	Output Power, Occupied Bandwidth, Conducted Spurious Emissions, Peak Power Spectral Density
Note: None			

Table 14: Description of Test Configuration used for Radiated Measurement.

Device	Antenna	Mode	Setup Description
BLUtag V8	Laser Direct Structuring	Continuous Transmit	The unit is standing in the normal upright position for use.
Note: This is the final setup configuration used for testing. All other orientations were investigated for worst case.			

Table 15: Final Test Mode for 902 MHz to 928 MHz Band

Test	Frequency
Occupied Bandwidth	903,915,927 MHz
Output Power	903,915,927 MHz
Peak Power Spectral Density	903,915,927 MHz
Out-of-Band (-30 dBr)	903,927 MHz
Band-Edge (Radiated)	903,927 MHz
Transmitted Spurious Emission	903,915,927 MHz
AC Conducted Emission	903 MHz
Note: Pre-test performed for worse case determination. EUT transmits at 100% duty cycle.	

6.4 Test Specifications

Table 16: Test Specifications

Emissions and Immunity	
Standard	**Requirement**
CFR 47 Part 15.247: 2019	All
RSS 247 Issue 2, 2017	All

END OF REPORT