FCC PART 15, SUBPART C

TEST REPORT

For

Silvus Technologies, Inc.

10990 Wilshire Blvd
Los Angeles, CA 90024

FCC ID: N2S-SL52-245-OEM

Report Type: Original Report	**Model:** SL5220-139235-O **Similar Models:** SL5220-139235-O, SL5220-139235F-O SL5210-139235-O, SL5210-139235F-O LC5220-139235-O, LC5220-139235F-O LC5210-139235-O, LC5210-139235F-O LC52.50-139235-O, LC52.50-139235F-O

Prepared By:	Angel Cruz RF Test Engineer	Angel Cruz
Report Number:	R2410231-247	
Report Date:	2025-01-29	
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CERTIFICATE #3297.02

* This test report may contain data and test methods that are not covered by BACL's scope of accreditation as of the test report date shown above. These items are marked within the test report text with an asterisk "*"

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R2410231-247	Original Report	2025-01-29

1 General Description

1.1 Product Description for Equipment Under Test (EUT)

This test report is prepared on behalf of *Silvus Technologies, Inc.*, and their product model: SL5220-139235-O, S/N: SLE19, FCC ID: N2S-SL52-245-OEM, the "EUT" as referred to in this report. The EUT is a 2.4GHz communications mesh networking radio.

All SL5000 & LC5000 OEM radio models have been declared by the manufacturer to be electrically identical and model SL5220-139235-O was selected for testing. Please refer to the manufacturer declaration of similarity letter in Appendix D of this report.

Model Number	SL5220-139235-O
Similar Models	SL5220-139235-O, SL5220-139235F-O SL5210-139235-O, SL5210-139235F-O LC5220-139235-O, LC5220-139235F-O LC5210-139235-O, LC5210-139235F-O LC52.50-139235-O, LC52.50-139235F-O
FCC ID	N2S-SL52-245-OEM
Bandwidth	10 MHz, 20MHz
Antenna Gain	2.4 dBi

1.2 Mechanical Description of EUT

The EUT measures approximately 6.35cm (L) x 4.445cm (W) x 1.041cm (H) and weighs approximately 52g.

The data gathered was from a production sample provided by Silvus Technologies, Inc. with S/N: SLE19

1.3 Objective

This report is prepared on behalf of *Silvus Technologies, Inc.* in accordance with Part 2, Subpart J, and Part 15, Subpart C of the Federal Communication Commission's rules.

The objective is to determine compliance with FCC Part 15.247 for Antenna Requirement, RF Exposure, AC Line Conducted Emissions, Radiated & Conducted Spurious Emissions, Emission Bandwidth, Maximum Output Power, Power Spectral Density, and 100 kHz spurious emissions.

In order to determine compliance, the manufacturer or a contracted laboratory makes measurements and takes the necessary steps to ensure that the equipment complies with the appropriate technical standards.

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

1.4 Related Submittal(s)/Grant(s)

N/A

1.5 Test Methodology

All measurements contained in this report were conducted in accordance with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices and FCC KDB 558074 D01 DTS Meas Guidance v05r02: Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247.

1.6 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Parameter	Measurement uncertainty
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±0.57 dB
Power Spectral Density, conducted	±1.48dB
Unwanted Emissions, conducted	±1.57dB
All emissions, radiated	±4.0 dB
AC power line Conducted Emission	±2.0 dB
Temperature	±2 º C
Humidity	±5 %
DC and low frequency voltages	±1.0 %
Time	±2 %
Duty Cycle	±3 %

1.7 Test Facility Registrations

BACLs test facilities that are used to perform Radiated and Conducted Emissions tests are currently recognized by the Federal Communications Commission as Accredited with NIST Designation Number US1129.

BACL's test facilities that are used to perform Radiated and Conducted Emissions tests are currently registered with Industry Canada under Registration Numbers: 3062A.

BACL is a Chinese Taipei Bureau of Standards Metrology and Inspection (BSMI) validated Conformity Assessment Body (CAB), under Appendix B, Phase I Procedures of the APEC Mutual Recognition Arrangement (MRA). BACL's BSMI Lab Code Number is: SL2-IN-E-1002R

BACL's test facilities that are used to perform AC Line Conducted Emissions, Telecommunications Line Conducted Emissions, Radiated Emissions from 30 MHz to 1 GHz, and Radiated Emissions from 1 GHz to 6 GHz are currently recognized as Accredited in accordance with the Voluntary Control Council for Interference [VCCI] Article 15 procedures under Registration Number A-428.

1.8 Test Facility Accreditations

Bay Area Compliance Laboratories Corp. (BACL) is:

A- ***An independent, 3rd-Party, Commercial Test Laboratory accredited to ISO/IEC 17025:2017 by A2LA (Test Laboratory Accreditation Certificate Number 3297.02),*** in the fields of: Electromagnetic Compatibility and Telecommunications. Unless noted by an Asterisk (*) in the Compliance Matrix (See Section 3 of this Test Report), BACL's ISO/IEC 17025:2005 Scope of Accreditation includes all of the Test Method Standards and/or the Product Family Standards detailed in this Test Report..

BACL's ISO/IEC 17025:2005 Scope of Accreditation includes a comprehensive suite of EMC Emissions, EMC Immunity, Radio, RF Exposure, Safety and wireline Telecommunications test methods applicable to a wide range of product categories. These product categories include Central Office Telecommunications Equipment [including NEBS - Network Equipment Building Systems], Unlicensed and Licensed Wireless and RF devices, Information Technology Equipment (ITE); Telecommunications Terminal Equipment (TTE); Medical Electrical Equipment; Industrial, Scientific and Medical Test Equipment; Professional Audio and Video Equipment; Industrial and Scientific Instruments and Laboratory Apparatus; Cable Distribution Systems, and Energy Efficient Lighting.

B- ***A Product Certification Body accredited to ISO/IEC 17065:2012 by A2LA (Product Certification Body Accreditation Certificate Number 3297.03)*** to certify

- For the USA (Federal Communications Commission):
  1- All Unlicensed radio frequency devices within FCC Scopes A1, A2, A3, and A4;
  2- All Licensed radio frequency devices within FCC Scopes B1, B2, B3, and B4;
  3- All Telephone Terminal Equipment within FCC Scope C.
- For the Canada (Industry Canada):
  1 All Scope 1-Licence-Exempt Radio Frequency Devices;
  2 All Scope 2-Licensed Personal Mobile Radio Services;
  3 All Scope 3-Licensed General Mobile & Fixed Radio Services;
  4 All Scope 4-Licensed Maritime & Aviation Radio Services;
  5 All Scope 5-Licensed Fixed Microwave Radio Services
  6 All Broadcasting Technical Standards (BETS) in the Category I Equipment Standards List.
- For Singapore (Info-Communications Development Authority (IDA)):
  1 All Line Terminal Equipment: All Technical Specifications for Line Terminal Equipment – Table 1 of IDA MRA Recognition Scheme: 2011, Annex 2
  2. All Radio-Communication Equipment: All Technical Specifications for Radio-Communication Equipment – Table 2 of IDA MRA Recognition Scheme: 2011, Annex 2
- For the Hong Kong Special Administrative Region:
  1 All Radio Equipment, per KHCA 10XX-series Specifications;
  2 All GMDSS Marine Radio Equipment, per HKCA 12XX-series Specifications;
  3 All Fixed Network Equipment, per HKCA 20XX-series Specifications.
- For Japan:
  1 MIC Telecommunication Business Law (Terminal Equipment):
    - All Scope A1 - Terminal Equipment for the Purpose of Calls;
    - All Scope A2 - Other Terminal Equipment
  2 Radio Law (Radio Equipment):
    - All Scope B1 - Specified Radio Equipment specified in Article 38-2-2, paragraph 1, item 1 of the Radio Law
    - All Scope B2 - Specified Radio Equipment specified in Article 38-2-2, paragraph 1, item 2 of the Radio Law
    - All Scope B3 - Specified Radio Equipment specified in Article 38-2-2, paragraph 1, item 3 of the Radio Law

C- ***A Product Certification Body accredited to ISO/IEC 17065:2012 by A2LA (Product Certification Body Accreditation Certificate Number 3297.01)*** to certify Products to USA's Environmental Protection Agency (EPA) ENERGY STAR Product Specifications for:

1 Electronics and Office Equipment:
- for Telephony (ver. 3.0)
- for Audio/Video (ver. 3.0)
- for Battery Charging Systems (ver. 1.1)
- for Set-top Boxes & Cable Boxes (ver. 4.1)
- for Televisions (ver. 6.1)
- for Computers (ver. 6.0)
- for Displays (ver. 6.0)
- for Imaging Equipment (ver. 2.0)
- for Computer Servers (ver. 2.0)

2 Commercial Food Service Equipment
- for Commercial Dishwashers (ver. 2.0)
- for Commercial Ice Machines (ver. 2.0)
- for Commercial Ovens (ver. 2.1)
- for Commercial Refrigerators and Freezers

3 Lighting Products
- For Decorative Light Strings (ver. 1.5)
- For Luminaires (including sub-components) and Lamps (ver. 1.2)
- For Compact Fluorescent Lamps (CFLs) (ver. 4.3)
- For Integral LED Lamps (ver. 1.4)

4 Heating, Ventilation, and AC Products
- for Residential Ceiling Fans (ver. 3.0)
- for Residential Ventilating Fans (ver. 3.2)

5 Other
- For Water Coolers (ver. 3.0)

D- ***A NIST Designated Phase-I and Phase-II Conformity Assessment Body (CAB) for the following economies and regulatory authorities under the terms of the stated MRAs/Treaties:***

- Australia: ACMA (Australian Communication and Media Authority) – APEC Tel MRA -Phase I;
- Canada: (Innovation, Science and Economic development Canada - ISED) Foreign Certification Body – FCB – APEC Tel MRA -Phase I & Phase II;
- Chinese Taipei (Republic of China – Taiwan):
  - BSMI (Bureau of Standards, Metrology and Inspection) APEC Tel MRA -Phase I;
  - NCC (National Communications Commission) APEC Tel MRA -Phase I;
- European Union:
  - EMC Directive 2014/30/EU US-EU EMC & Telecom MRA CAB (NB)
  - Radio Equipment (RE) Directive 2014/53/EU US-EU EMC & Telecom MRA CAB (NB)
  - Low Voltage Directive (LVD) 2014/35/EU
- Hong Kong Special Administrative Region: (Office of the Telecommunications Authority – OFTA) APEC Tel MRA -Phase I & Phase II
- Israel – US-Israel MRA Phase I
- Republic of Korea (Ministry of Communications - Radio Research Laboratory) APEC Tel MRA -Phase I
- Singapore: (Infocomm Media Development Authority - IMDA) APEC Tel MRA -Phase I & Phase II;
- Japan: VCCI - Voluntary Control Council for Interference US-Japan Telecom Treaty VCCI Side Letter-
- USA:
  - ENERGY STAR Recognized Test Laboratory – US EPA
  - Telecommunications Certification Body (TCB) – US FCC;
  - Nationally Recognized Test Laboratory (NRTL) – US OSHA
- Vietnam: APEC Tel MRA -Phase I;

2 System Test Configuration

2.1 Justification

The EUT was configured for testing according to ANSI C63.10-2013 and FCC KDB 558074 D01 DTS Meas Guidance v05r02.

The EUT was tested in a testing mode to represent worst-case results during the final qualification test.

2.2 EUT Exercise Software

The exercising software used during testing was “PuTTY”, provided by Silvus Technologies, Inc. The software is compliant with the standard requirements being tested against.

Channel Bandwidth	Channel	Frequency (MHz)	Power Setting
10 MHz	Low	2416	g48
	Middle	2440	g48
	High	2457	g48
20 MHz	Middle	2440	g52

2.3 Duty Cycle Correction Factor

According to KDB 558074 D01 DTS Meas Guidance v05r02 section 6.0:

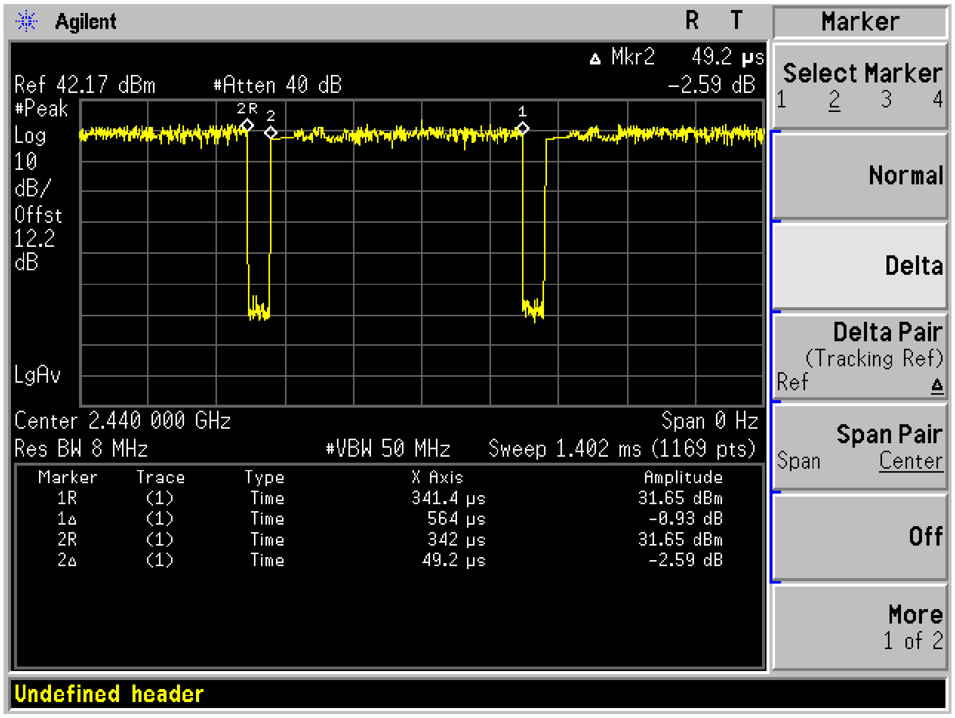
Preferably, all measurements of maximum conducted (average) output power will be performed with the EUT transmitting continuously (i.e., with a duty cycle of greater than or equal to 98%). When continuous operation cannot be realized, then the use of sweep triggering/signal gating techniques can be utilized to ensure that measurements are made only during transmissions at the maximum power control level. Such sweep triggering/signal gating techniques will require knowledge of the minimum transmission duration (T) over which the transmitter is on and is transmitting at it’s maximum power control level for the tested mode of operation. Sweep triggering/signal gating techniques can then be used if the measurement/sweep time of the analyzer can be set such that it does not exceed T at any time that data is being acquired (i.e., no transmitter off-time is to be considered).

Bandwidth	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
10 MHz	0.5148	0.564	91.2	0.4
20 MHz	0.6816	0.7272	93.7	0.28

Duty Cycle = On Time (ms)/ Period (ms)
Duty Cycle Correction Factor (dB) = 10*log(1/Duty Cycle)

Please refer to the following plots.

10 MHz


Agilent
R T
Marker
Mkr2 49.2 μs
-2.59 dB
Ref 42.17 dBm #Atten 40 dB
#Peak
Log
10
dB/
Offst
12.2
dB
LgAv
Center 2.440 000 GHz Span 0 Hz
Res BW 8 MHz #VBW 50 MHz Sweep 1.402 ms (1169 pts)
Marker Trace Type X Axis Amplitude
1R (1) Time 341.4 μs 31.65 dBm
1Δ (1) Time 564 μs -0.93 dB
2R (1) Time 342 μs 31.65 dBm
2Δ (1) Time 49.2 μs -2.59 dB
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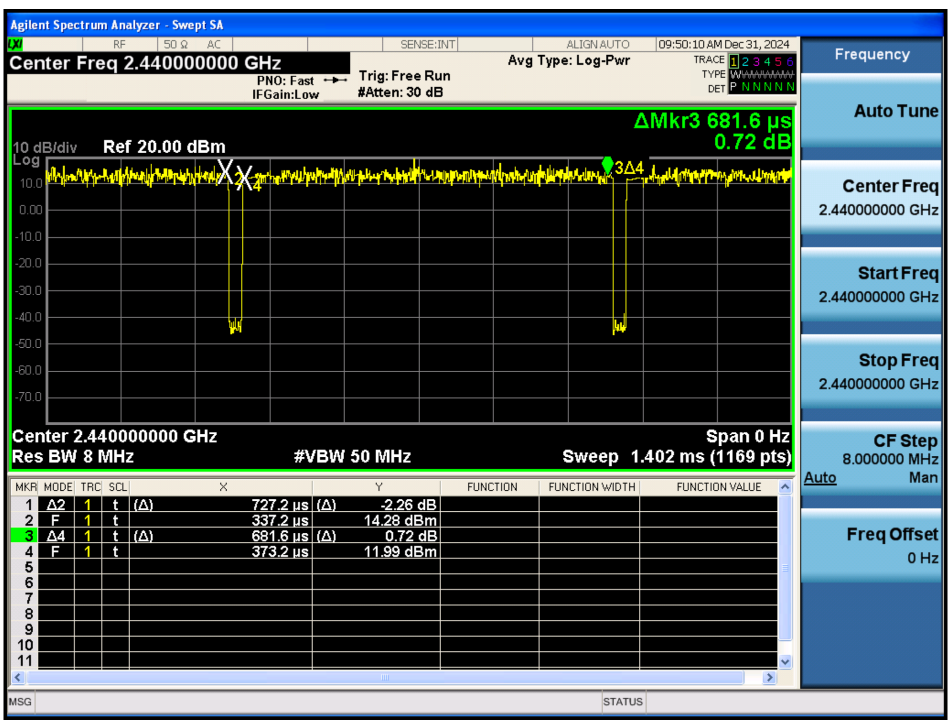
Normal
Delta
Delta Pair (Tracking Ref) Ref Δ
Span Pair Span Center
Off
More 1 of 2
Undefined header

20 MHz


Agilent Spectrum Analyzer - Swept SA
Center Freq 2.440000000 GHz
PNO: Fast IFGain:Low
Trig: Free Run
#Atten: 30 dB
Avg Type: Log-Pwr
09:50:10 AM Dec 31, 2024
ΔMkr3 681.6 μs
0.72 dB
10 dB/div Ref 20.00 dBm
Center 2.440000000 GHz Span 0 Hz
Res BW 8 MHz #VBW 50 MHz Sweep 1.402 ms (1169 pts)
1 Δ2 1 t (Δ) 727.2 μs (Δ) -2.26 dB
2 F 1 t 337.2 μs 14.28 dBm
3 Δ4 1 t (Δ) 681.6 μs (Δ) 0.72 dB
4 F 1 t 373.2 μs 11.99 dBm
Frequency
Auto Tune
Center Freq 2.440000000 GHz
Start Freq 2.440000000 GHz
Stop Freq 2.440000000 GHz
CF Step 8.000000 MHz Auto Man
Freq Offset 0 Hz

2.4 Equipment Modification

No modifications were made to the EUT during testing.

2.5 Local Support Equipment

N/A

2.6 Remote Support Equipment

Manufacturer	Description	Model	Serial Number
HP	Support Laptop	14-dq1037wm	5CD946WF6

2.7 Power Supply and Line Filters

N/A

2.8 Interface Ports and Cabling

Cable Description	Length (m)	From	To
Ethernet Cable	< 1m	Support Laptop	EUT

3 Summary of Test Results

FCC Rules	Description of Test	Results
FCC §15.203	Antenna Requirements	Compliant
FCC §2.1091, §15.247(i)	RF Exposure	Compliant
FCC §15.207	AC Line Conducted Emissions	N/A[1]
FCC §2.1053, §15.35(b), §15.205, §15.209, §15.247(d)	Radiated Spurious Emissions	Compliant
FCC §15.247(a)(2)	6 dB & 99% Emission Bandwidth	Compliant
FCC §15.247(b)(3)	Maximum Output Power	Compliant
FCC §15.247(e)	Power Spectral Density	Compliant
FCC §2.1051, §15.247 (d)	Spurious Emissions and bandedges at Antenna Terminal (dBc)	Compliant

Note[1]: AC line conducted emissions test not required since EUT is battery powered.

BACL is responsible for all the information provided in this report, except when information is provided by the customer as identified in this report. Information provided by the customer, e.g., antenna gain, can affect the validity of results.

4 FCC §15.203 – Antenna Requirements

4.1 Applicable Standards

According to FCC §15.203:

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

And according to FCC §15.247 (b) (4), if transmitting antennas of directional gain greater than 6 dBi are used the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

4.2 Antenna Description

External/Internal/ Integral	Part Number	Antenna Type	Frequency Range (MHz)	Maximum Antenna Gain (dBi)
External	AOV2S192G-TM	Omnidirectional	1350-2500	2.4
External	AOV2S192G-TM	Omnidirectional	1350-2500	2.4

5 FCC §2.1091, FCC §15.247(i) – RF Exposure

5.1 Applicable Standards

According to FCC §15.247(i), Radio frequency devices operating under the provisions of this part are subject to the radio frequency radiation exposure requirements specified in §§ 1.1307(b), 1.1310, 2.1091, and 2.1093 of this chapter, as appropriate. Applications for equipment authorization of mobile or portable devices operating under this section must contain a statement confirming compliance with these requirements. Technical information showing the basis for this statement must be submitted to the Commission upon request.

According to FCC §2.1091 and §1.1310(e)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Averaging Time (minutes)
Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	* (100)	30
1.34-30	824/f	2.19/f	* ($180/f^2$)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz
* = Plane-wave equivalent power density

5.2 MPE Prediction

Predication of MPE limit at a given distance, Equation from OET Bulletin 65, Edition 97-01

$$S = PG/4\pi R^2$$

Where: S = power density
P = power input to antenna
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna

5.3 MPE Result

Worst case: 20MHz Bandwidth, 2440 MHz

Maximum output power at antenna input terminal (dBm):	29.91
Maximum output power at antenna input terminal (mW):	979.48
Prediction distance (cm):	20
Prediction frequency (MHz):	2440
Maximum Directional Antenna Gain, typical (dBi):	5.4
Maximum Antenna Gain (numeric):	3.47
Power density of prediction frequency at 20.0 cm (mW/cm^2):	0.68
FCC MPE limit for uncontrolled exposure at prediction frequency (mW/cm^2):	1.0

The device is compliant with the requirement MPE limit for uncontrolled exposure. The maximum power density at the distance of 20 cm is 0.68 mW/cm^2. Limit is 1 mW/cm^2.

Note: maximum antenna gain is the max directional gain for MIMO operation whereby it is calculated as 2.4dBi + 10*log(Number of antennas[2]) = 5.4dbi

6 FCC §15.35(b), §15.205, §15.209, §15.247(d) – Spurious Radiated Emissions

6.1 Applicable Standards

As per FCC §15.35(b): Unless otherwise specified, on any frequency or frequencies above 1000 MHz, the radiated emission limits are based on the use of measurement instrumentation employing an average detector function. Unless otherwise specified, measurements above 1000 MHz shall be performed using a minimum resolution bandwidth of 1 MHz.

As Per FCC §15.205(a) except as show in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 – 0.110 0.495 – 0.505 2.1735 – 2.1905 4.125 – 4.128 4.17725 – 4.17775 4.20725 – 4.20775 6.215 – 6.218 6.26775 – 6.26825 6.31175 – 6.31225 8.291 – 8.294 8.362 – 8.366 8.37625 – 8.38675 8.41425 – 8.41475 12.29 – 12.293 12.51975 – 12.52025 12.57675 – 12.57725 13.36 – 13.41	16.42 – 16.423 16.69475 – 16.69525 25.5 – 25.67 37.5 – 38.25 73 – 74.6 74.8 – 75.2 108 – 121.94 123 – 138 149.9 – 150.05 156.52475 – 156.52525 156.7 – 156.9 162.0125 –167.17 167.72 – 173.2 240 – 285 322 – 335.4 399.9 – 410 608 – 614	960 – 1240 1300 – 1427 1435 – 1626.5 1645.5 – 1646.5 1660 – 1710 1718.8 – 1722.2 2200 – 2300 2310 – 2390 2483.5 – 2500 2690 – 2900 3260 – 3267 3.332 – 3.339 3 3458 – 3 358 3.600 – 4.400	4. 5 – 5. 15 5. 35 – 5. 46 7.25 – 7.75 8.025 – 8.5 9.0 – 9.2 9.3 – 9.5 10.6 – 12.7 13.25 – 13.4 14.47 – 14.5 15.35 – 16.2 17.7 – 21.4 22.01 – 23.12 23.6 – 24.0 31.2 – 31.8 36.43 – 36.5 Above 38.6

As per FCC §15.209(a): Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table

Frequency (MHz)	Field Strength (micro volts/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

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

As per FCC §15.247 (d),

in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c).

6.2 Test Setup

The radiated emissions tests were performed in the 5-meter chamber, using the setup in accordance with ANSI C63.10-2013. The specification used was the FCC §15.247 limits.

The spacing between the peripherals was 10 centimeters.

External I/O cables were draped along the edge of the test table and bundled when necessary.

6.3 Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

The EUT was set 3 meter away from the testing antenna, which was varied from 1-4 meters, and the EUT was placed on a turntable, which was 0.8 meters and 1.5 meters above the ground plane for below and above 1000 MHz measurements, the table shall be rotated for 360 degrees to find out the highest emission. The receiving antenna's polarity should be changed between horizontal and vertical.

The spectrum analyzer or receiver was set as:

Below 1000 MHz:

RBW = 100 kHz / VBW = 300 kHz / Sweep = Auto

Above 1000 MHz:

(1) Peak: RBW = 1MHz / VBW = 3MHz / Sweep = Auto
(2) Average: RBW = 1MHz / VBW = 2kHz / Sweep = Auto
Average(for 10MHz BW average bandedges): RBW = 1MHz / VBW = 3MHz / Sweep = Auto for 100traces

6.4 Corrected Amplitude and Margin Calculation

For emissions below 1 GHz,

The Corrected Amplitude (CA) is calculated by adding the Correction Factor to the S.A. Reading. The basic equation is as follows:

CA = S.A. Reading + Correction Factor

For example, a corrected amplitude of 40.3 dBuV/m = S.A. Reading (32.5 dBuV) + Correction Factor (7.8 dB/m)

The Correction Factor is calculated by adding the Antenna Factor (AF), the Cable Loss (CL), the Attenuator Factor (Atten) and subtracting the Amplifier Gain (Ga) together. This calculation is done in the measurement software, and reported in the test result section. The basic equation is as follows:

Correction Factor = AF + CL + Atten – Ga

The “Margin” column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of -7 dB means the emission is 7 dB below the maximum limit. The equation for margin calculation is as follows:

Margin = Corrected Amplitude – Limit

For emission above 1 GHz,

The Corrected Amplitude (CA) is calculated by adding the Antenna Factor (AF), the Cable Loss (CL), the Attenuator Factor (Atten) and subtracting the Amplifier Gain (Ga) to indicated Amplitude (Ai) reading. The basic equation is as follows:

CA = Ai + AF + CL + Atten – Ga

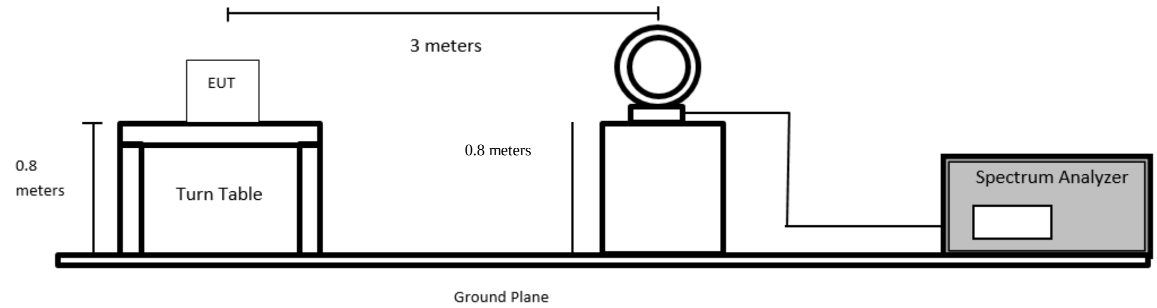
For example, a corrected amplitude of 40.3 dBuV/m = Indicated Reading (32.5 dBuV) + Antenna Factor (+23.5dB) + Cable Loss (3.7 dB) + Attenuator (10 dB) - Amplifier Gain (29.4 dB)

The “Margin” column of the following data tables indicates the degree of compliance within the applicable limit. For example, a margin of -7 dB means the emission is 7 dB below the maximum limit. The equation for margin calculation is as follows:

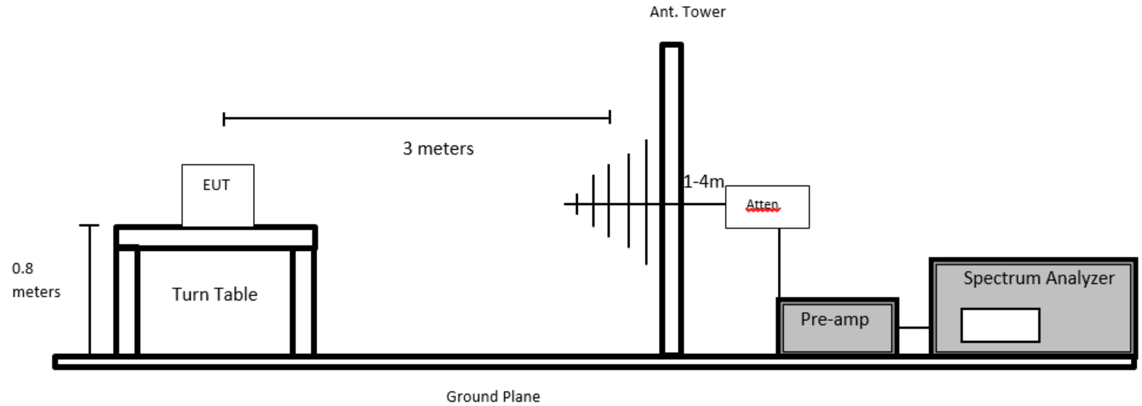
Margin = Corrected Amplitude – Limit

6.5 Test Setup Block Diagram

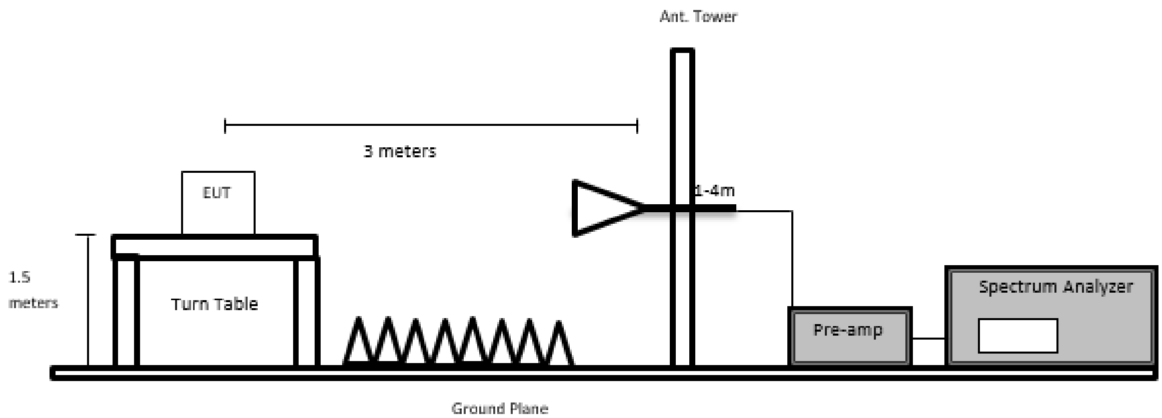
Radiated Spurious 9 kHz to 30 MHz



Radiated Spurious 30 MHz to 1 GHz



Radiated Spurious Above 1 GHz



6.6 Test Equipment List and Details

BACL No	Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
327	Sunol Sciences	System Controller	SC110V	122303-1	N/R	N/R
1075	Sunol Sciences	Boresight Tower	TLT3	050119-7	N/R	N/R
1388	Sunol Sciences	Flush Mount Turntable	FM	112005-2	N/R	N/R
1432	Keysight Technologies	MXE EMI Receiver, Multi-touch	N9038B	MY60180008	2024-01-15	1 year
1427	Keysight Technologies	PXE EMI Receiver	N9048B	MY59500006	2024-12-23	1 year[2]
393	COMPOWER	Active Loop Antenna, 10kHz-30MHz	AL-130	17043	2023-05-26	2 years
321	Sunol Sciences	Biconilog Antenna, 30MHz-1GHz	JB3	A020106-2; 1504	2023-12-18	2 years
1245	-	6dB Attenuator	PE7390-6	01182018A	2023-12-18	2 years
1359	Pasternack	N 600in RF Cable	PE3496LF-600	-	2024-07-26	6 months
316	Sonoma Instruments	Preamplifier 10 kHz - 2.5 GHz	317	260406	2024-08-30	6 months
1248	Pasternack	RG214 COAX Cable	PE3062	-	2024-10-01	6 months
1246	Hewlet Packard	RF Limiter	11867A	01734	2024-04-09	1 year
1249	Time microwave	LMR-400 Cable Dc-3 GHz	AE13684	2k80612-5 6fts	2024-04-09	1 year
1192	ETS Lindgren	Horn Antenna, 1GHz-18GHz	3117	00218973	2024-10-23	2 years
1295	Carlisle	10m Ultra Low Loss Coaxial Cable	UFB142A-1-3937-200200	64639890912-001	2024-10-16	6 months
1449	BACL	Preamplifier, 0.1GHz-18GHz	BACL1313-A100M18G	4052472	2024-08-19	6 months
1397	Mini Circuit	CBL ASSY 2.92MM PLUG TO PLUG 12"	FL086-12KM+	QN2318110-2318	2024-08-16	6 months
91	Wisewave	Horn Antenna, 18GHz-26.5GHz	ARH-4223-02	10555-02	2023-03-14	2 years
1451	BACL	Preamplifier 18GHz-40GHz	BACL-1313-A1840	4052432	2024-08-16	6 months
1394	Mini Circuit	CBL ASSY 2.92MM PLUG TO PLUG 12"	FL086-12KM+	QN2318110-2318	2024-08-16	6 months
230	Wisewave	HORN ANTENNA, 26.5GHz-40GHz	ARH-2823-02	10555-02	2024-03-14	2 years
1334	Micro-Tronics	Notch Filter, 2.4GHz-2.5GHz	BRM50702	G361	2024-01-05	1 year[3]
672	MICRO-TRONICS	2.4-2.6 GHz Notch Filter	BRM50701	160	2024-03-06	1 year
1522	Mini-Circuits	Low Pass Filter	15542 NLP-1200+	V UU42501636	2024-10-01	6 months

Note[1]: cables, attenuators and notch filters included in the test set-up were checked each time before testing.
Note[2]: Equipment used on 2024-12-30 only.
Note[3]: Equipment used on 2024-11-12 and 2024-12-30 only.

Statement of Traceability: BACL Corp. *attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with the latest version of A2LA policy P102 "A2LA Policy on Metrological Traceability".*

6.7 Test Environmental Conditions

Temperature:	16.1 - 23 ºC
Relative Humidity:	45.2 – 49.7 %
ATM Pressure:	102 – 102.5 kPa

The testing was performed by Angel Cruz and Arturo Reyes from 2024-11-04 to 2025-01-07 in 5m chamber 3.

6.8 Summary of Test Results

According to the data hereinafter, the EUT complied with the FCC Part 15.209, 15.247 standards' radiated emissions limits, and had the worst margin of:

Worst Case – Mode: Transmitting			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Configuration**
-2.36	105.750625	Vertical	10 MHz Bandwidth, Middle Channel 2440 MHz

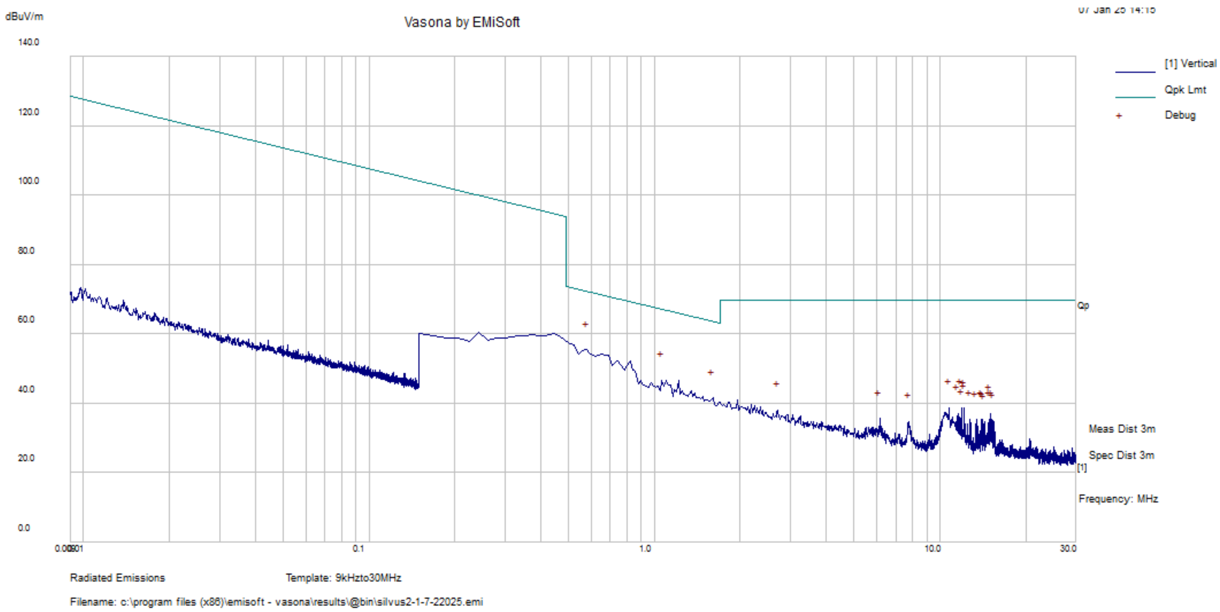
Please refer to the tables and plots in the next section for detailed test results.

6.9 Radiated Emissions Test Results

Note 1: Pre-scan was performed in order to determine worst-case orientation of device with respect to measurement antenna in the X/Y/Z axis. Plots/data shown represent measurements made in worst-case orientation.
Note 2: See annex E for 15.209 band edge results.

1) 9 kHz – 30 MHz, Worst Case, Measured at 3 meters

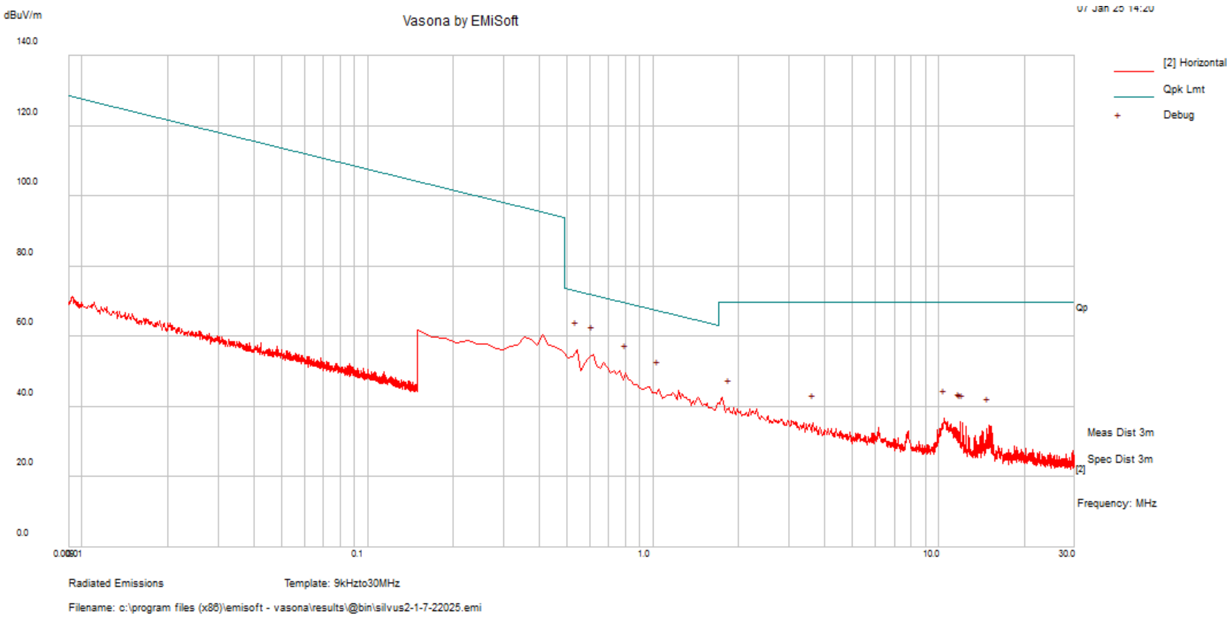
20 MHz Bandwidth, Middle Channel 2440 MHz, Perpendicular Polarization



Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector
0.579094	45.09	10.22	55.31	72.35	-17.04	Peak
1.064156	36.52	10.15	46.67	67.06	-20.39	Peak
1.605188	31.11	10.34	41.45	63.49	-22.04	Peak
11.884781	27.95	10.81	38.76	69.54	-30.78	Peak
10.802719	27.96	10.77	38.73	69.54	-30.81	Peak
12.201938	27.69	10.82	38.51	69.54	-31.04	Peak

Note: The plot above shows that all peak emissions passed the quasi-peak limits.

20 MHz Bandwidth, Middle Channel 2440 MHz, Parallel Polarization

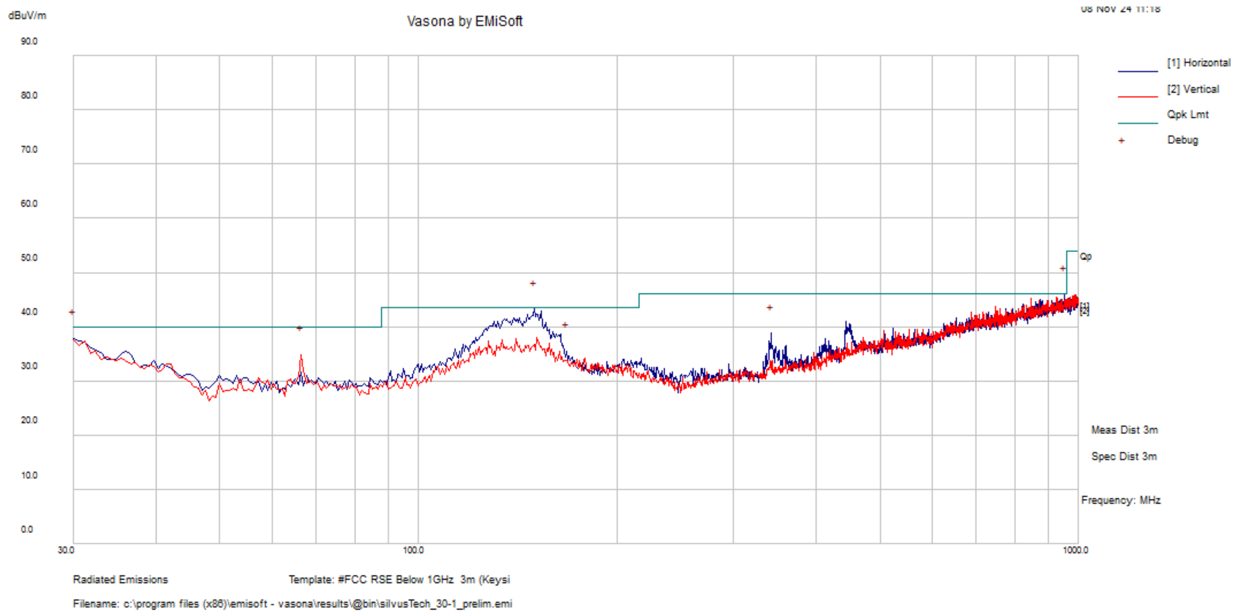


Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Detector
0.541781	46.06	10.22	56.28	72.93	-16.65	Peak
0.616406	44.58	10.21	54.79	71.81	-17.02	Peak
0.802969	39.42	10.16	49.58	69.51	-19.93	Peak
1.0455	34.74	10.14	44.88	67.22	-22.33	Peak
1.847719	29.21	10.41	39.62	69.54	-29.92	Peak
10.485563	25.81	10.78	36.59	69.54	-32.95	Peak

Note: The plot above shows that all peak emissions passed the quasi-peak limits.

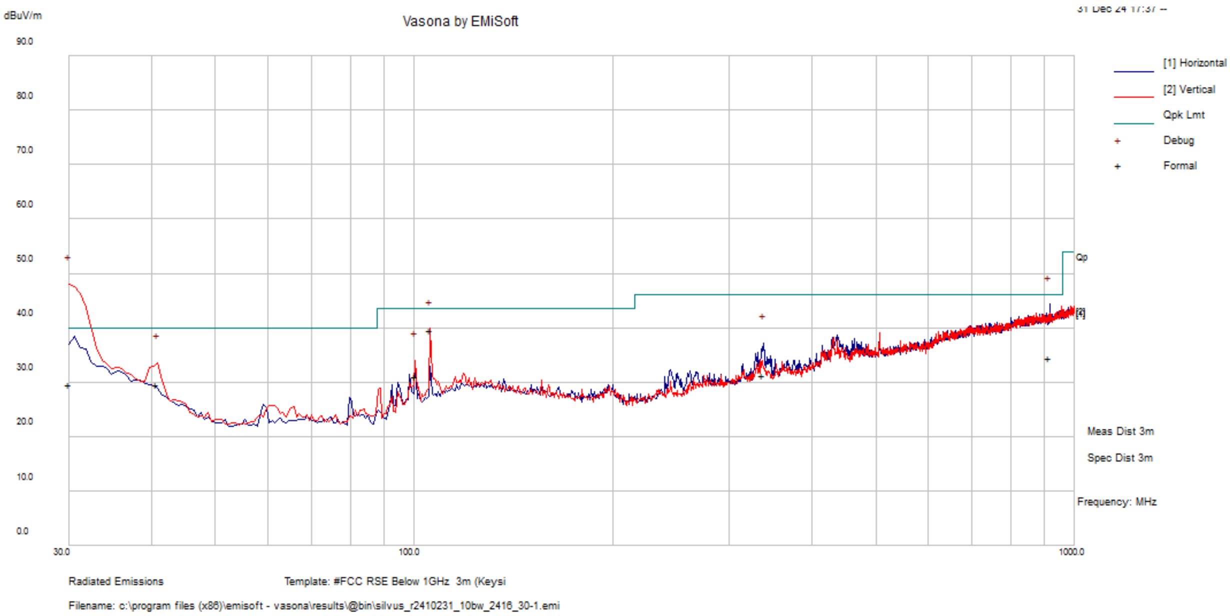
2) 30 MHz – 1 GHz, Measured at 3 meters

20 MHz Bandwidth, Middle Channel 2440 MHz



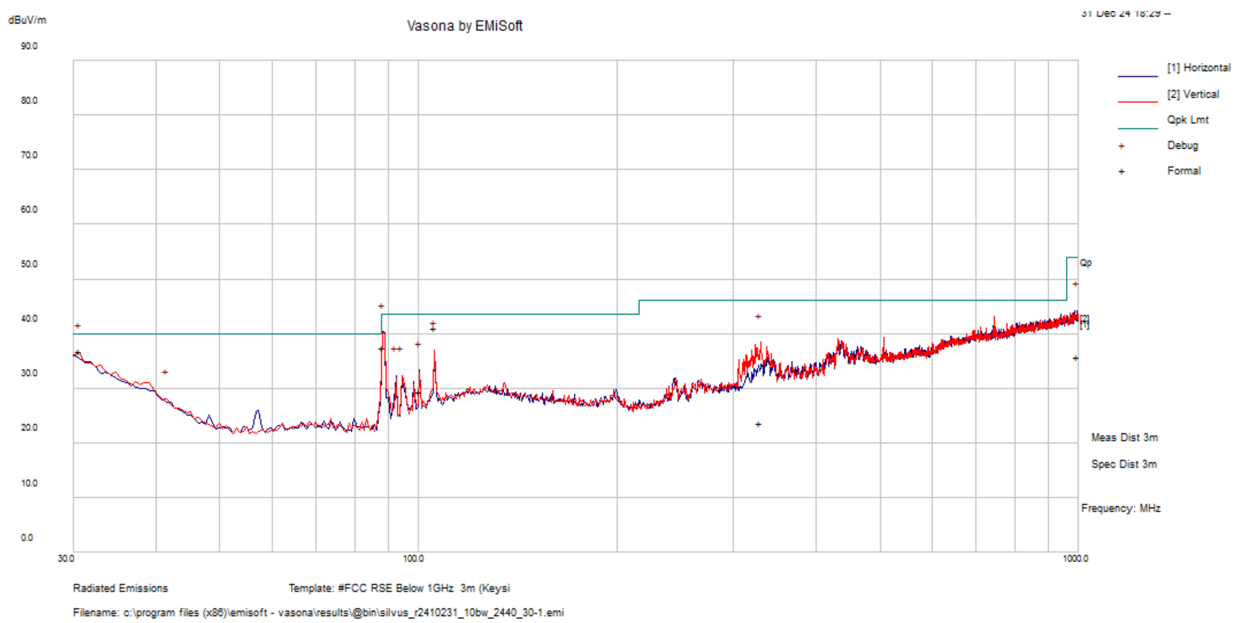
Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
952.215	28.22	7.56	35.78	285	H	99	46	-10.22	QP
150.277188	43.06	-7.47	35.59	264	H	240	43.5	-7.91	QP
30	30.67	-0.57	30.1	134	H	227	40	-9.9	QP
66.385625	45.95	-12.84	33.11	101	V	7	40	-6.89	QP
342.165625	38.65	-4.67	33.98	101	H	124	46	-12.02	QP
167.461563	38.48	-7.94	30.54	283	H	57	43.5	-12.96	QP

10 MHz Bandwidth, Low Channel 2416 MHz



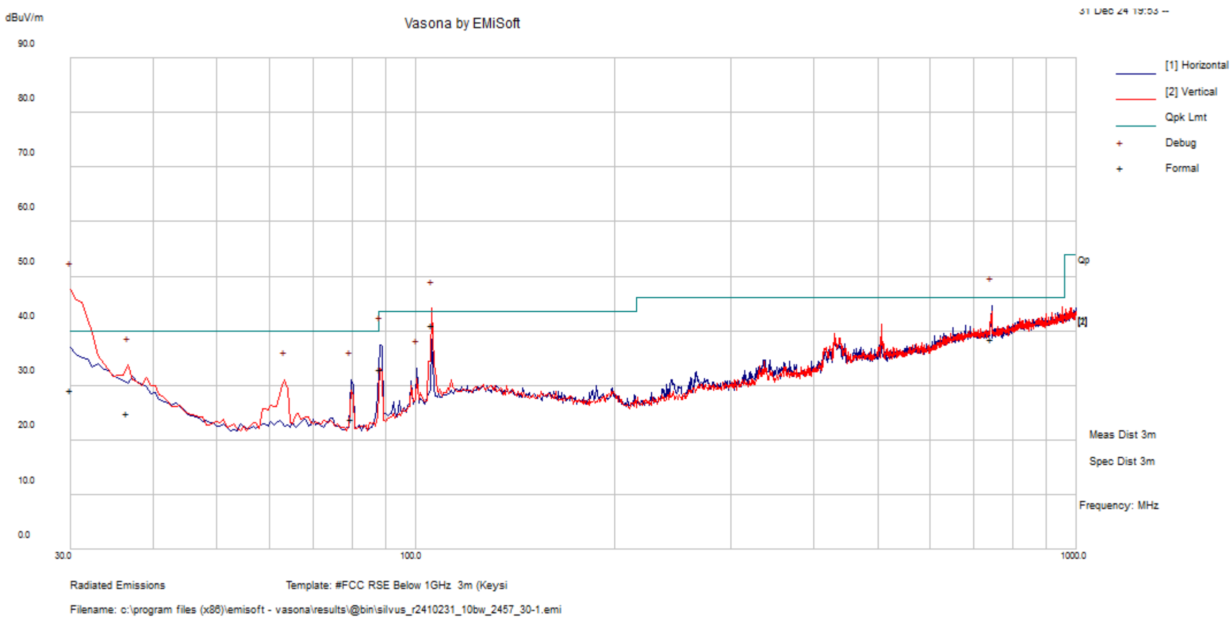
Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
30.011633	30.21	-0.61	29.6	277	V	61	40	-10.4	QP
916.87375	28.07	6.34	34.41	217	H	26	46	-11.59	QP
105.785938	47.84	-8.27	39.57	126	V	294	43.5	-3.93	QP
40.823125	37.52	-8.04	29.48	132	V	45	40	-10.52	QP
337.755313	36.15	-4.92	31.23	111	H	126	46	-14.77	QP
100.337188	40.54	-9.58	30.96	100	V	136	43.5	-12.54	QP

10 MHz Bandwidth, Middle Channel 2440 MHz



Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
88.449688	50.54	-13.03	37.51	201	H	156	43.5	-5.99	QP
30.613125	37.83	-1.08	36.75	123	V	328	40	-3.25	QP
105.750625	49.42	-8.28	41.14	107	V	142	43.5	-2.36	QP
329.594063	28.65	-4.93	23.72	226	V	280	46	-22.29	QP
996.451563	27.91	7.77	35.68	106	H	293	54	-18.32	QP
100.347813	38.89	-9.58	29.31	209	H	142	43.5	-14.19	QP

10 MHz Bandwidth, High Channel 2457 MHz



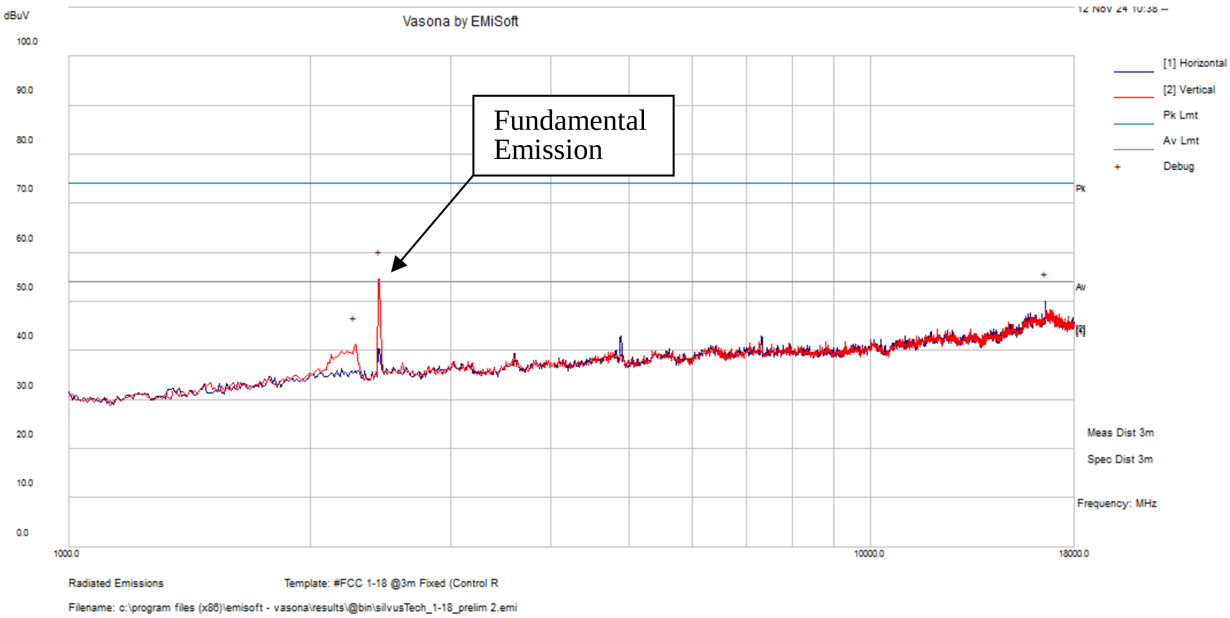
Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
30.007785	29.7	-0.61	29.09	271	V	74	40	-10.91	QP
105.75625	49.24	-8.28	40.96	283	V	194	43.5	-2.54	QP
743.598438	34.03	4.42	38.45	101	H	44	46	-7.55	QP
88.442813	46.02	-13.03	32.99	198	H	28	43.5	-10.51	QP
36.530938	29.94	-5.02	24.92	169	V	41	40	-15.09	QP
79.95375	37.41	-13.5	23.91	291	H	352	40	-16.09	QP

FCC Limits for 1 GHz to 26.5 GHz			
Applicability	**(dBm)**	**(uV/m at 3meters)**	**(dBuV/m at 3 meters)**
Restricted Band Average Limit	-	500	54[2]
Restricted Band Peak Limit[1]	-	-	74

Note 1: Restricted Band Peak Limit is defined to be 20dB higher than Average Limit.
Note 2: Above 1GHz limit calculation:
dBuV/m = 20*log(V/m) + 120 = 20*log((500 [uV/m]/1000000)) + 120 = 54 [dBuV/m]

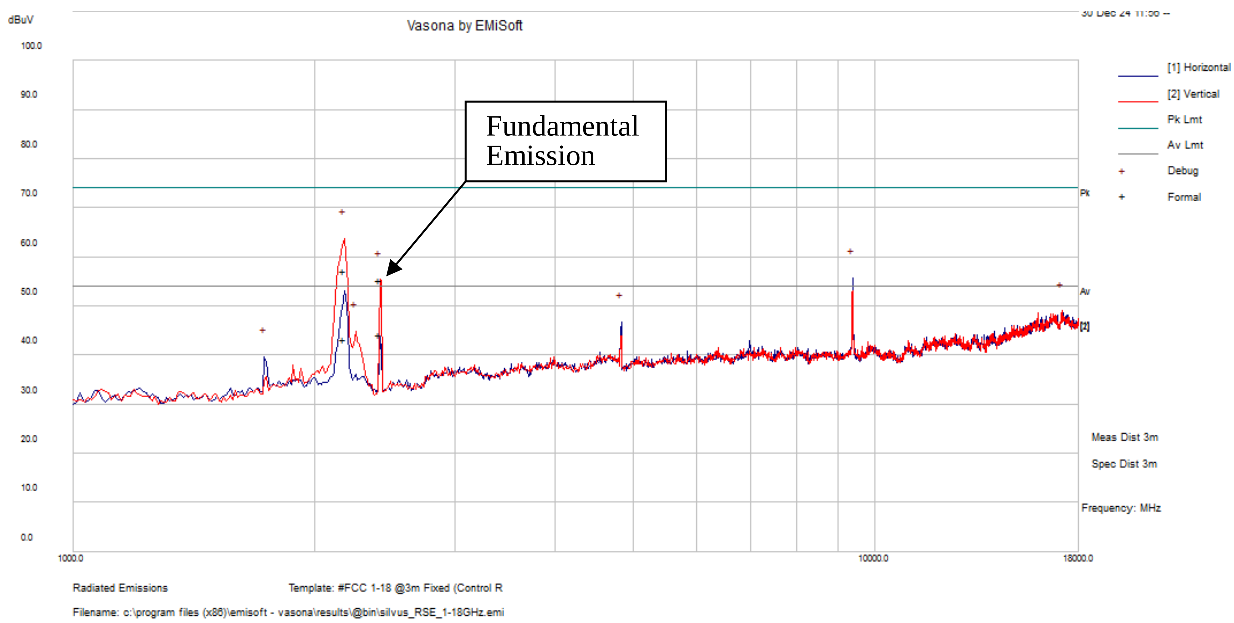
3) 1 GHz – 18 GHz, Measured at 3 meter

20 MHz Bandwidth, Middle Channel 2440 MHz



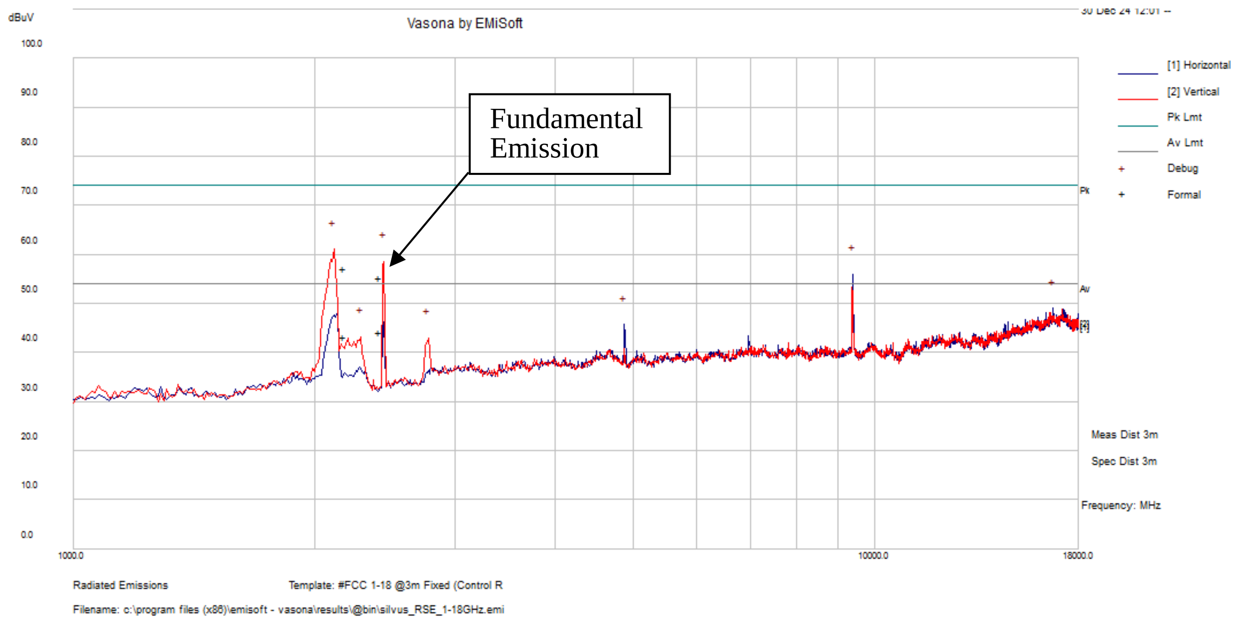
Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
16576.048	35.45	14.81	50.26	133	H	133	74	-23.74	Peak
16576.048	18.25	14.81	33.06	133	H	133	54	-20.94	Avg.

10 MHz Bandwidth, Low Channel 2416 MHz



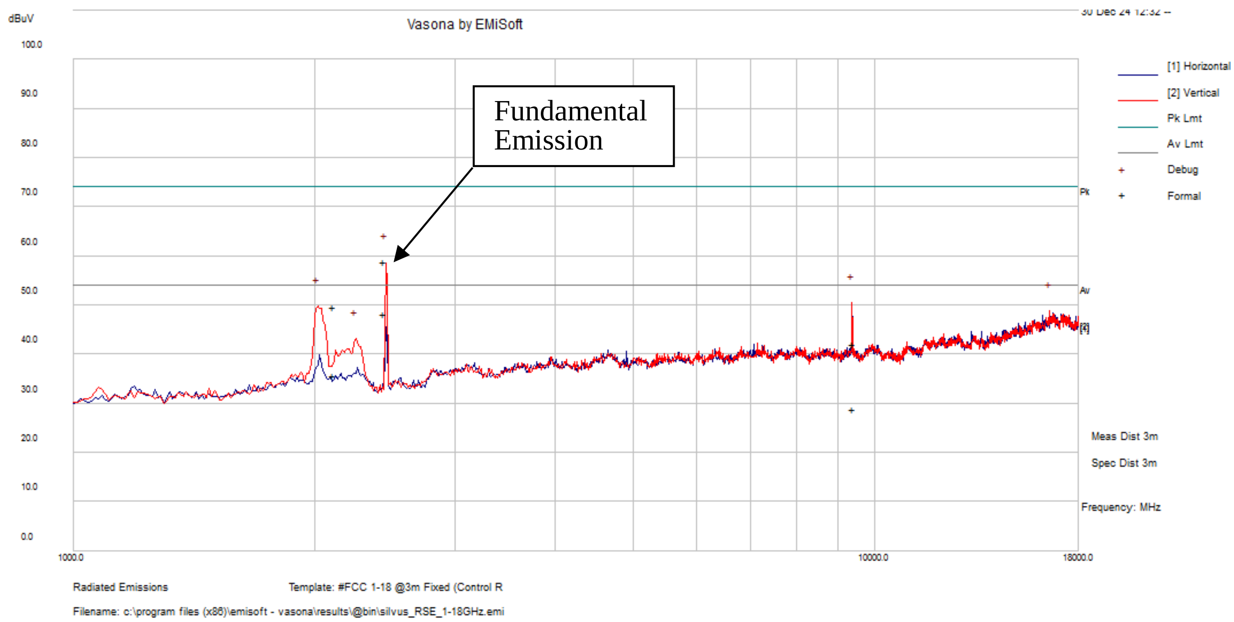
Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)	Detector
2180.125	62.65	2180.125	57.22	217	V	85	74	-16.78	Peak
9392.385	48.1	4.87	52.97	231	H	226	74	-11.03	Peak
2180.125	48.58	2180.125	43.14	217	V	85	54	-10.86	Avg.
9392.385	31.87	4.86	36.73	231	H	226	54	-17.27	Avg.

10 MHz Bandwidth, Middle Channel 2440 MHz



Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBμV/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBμV/m)	Margin (dB)	Detector
2114.2275	55.27	-5.53	49.74	290	V	242	74	-24.26	Peak
9403.3825	47.31	4.86	52.17	221	H	29	74	-31.83	Peak
2114.2275	41.23	-5.53	35.7	290	V	242	54	-18.3	Avg.
9403.3825	32.09	4.87	36.96	221	H	29	54	-17.04	Avg.

10 MHz Bandwidth, High Channel 2457 MHz

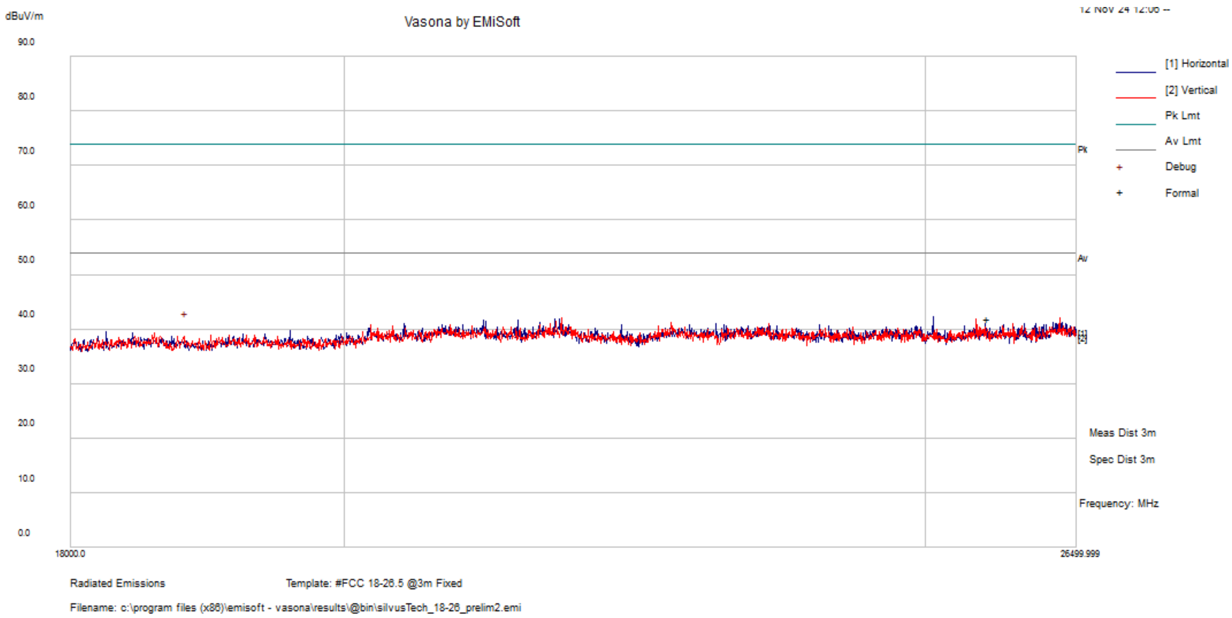


Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Polarity (H/V)	Limit (dBµV/m)	Margin (dB)	Detector
9383.125	45.53	4.87	50.4	V	54	-3.6	Peak
2020	55.33	-5.61	49.72	V	54	-4.28	Peak
16544.375	33.42	15.33	48.75	V	54	-5.26	Peak
2253.75	48.27	-5.19	43.08	V	54	-10.92	Peak
16721.031	31.82	15.54	47.36	V	54	-6.64	Peak
4694.299	39.86	-0.48	39.38	V	54	-14.62	Peak

Note: The plot above shows that all peak emissions passed the average limits.

4) 18 GHz – 26.5 GHz, Measured at 3 meter

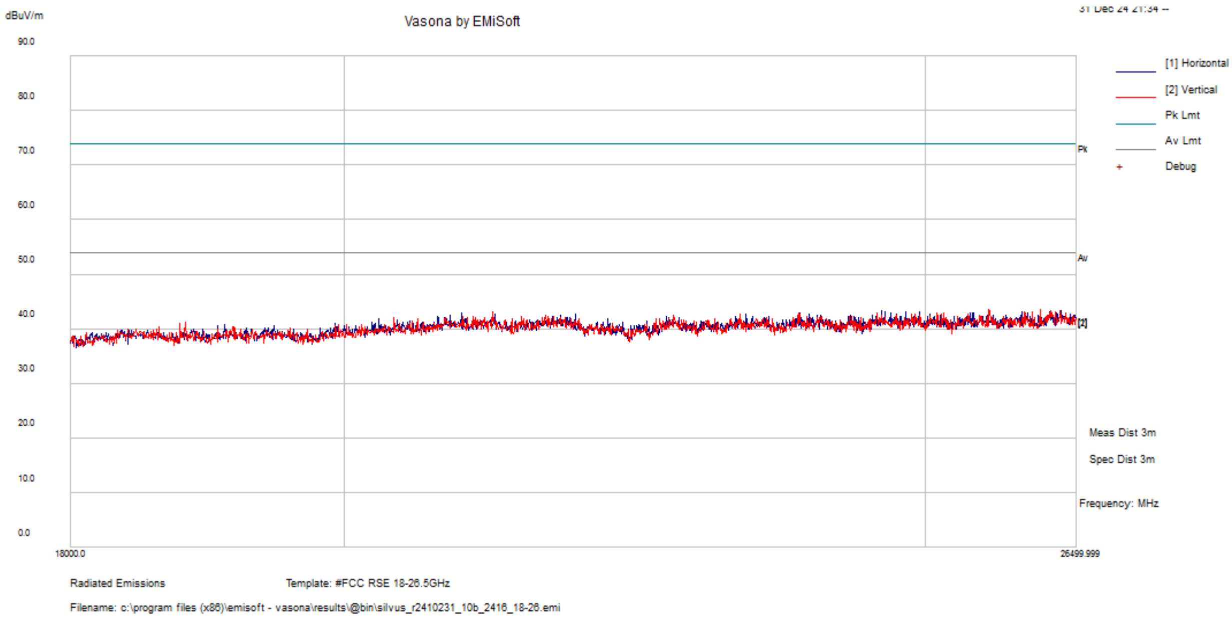
20 MHz Bandwidth, Middle Channel 2440 MHz



Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBμV/m)	Antenna Polarity (H/V)	Limit (dBμV/m)	Margin (dB)	Detector
25583.519	38.12	2.26	40.38	V	54	-13.62	Peak

Note 1: The plot above shows that there were no emissions above the noise floor at 18-26.5GHz frequency range.
Note 2: The plot above shows that all peak emissions passed the average limits.

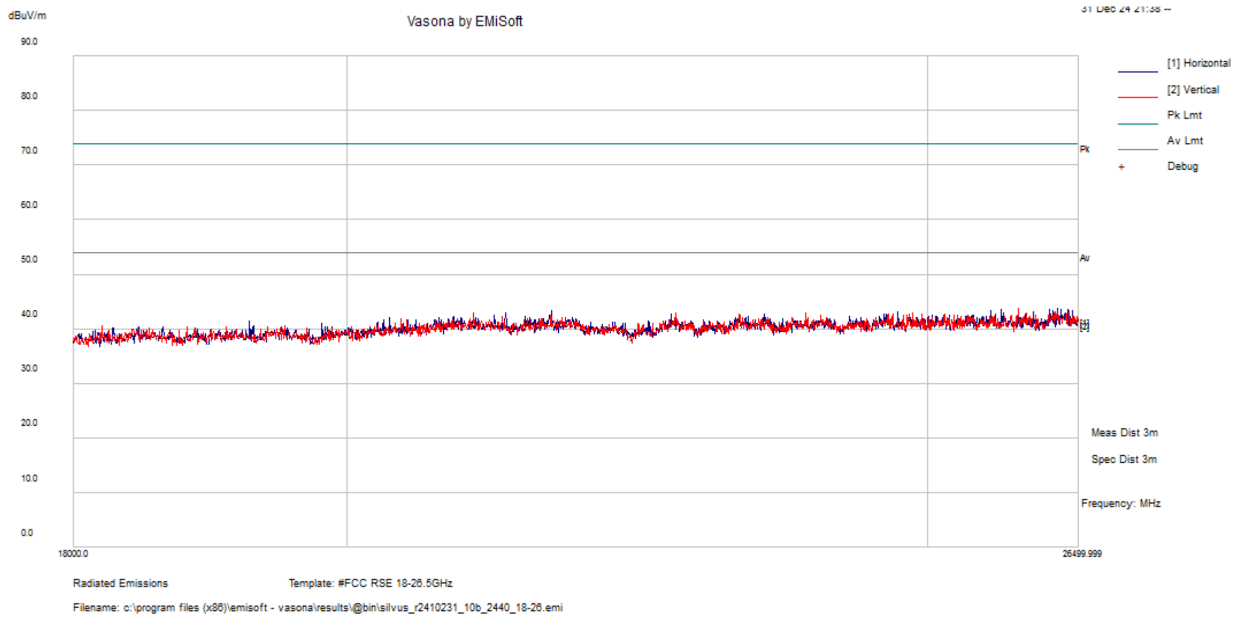
10 MHz Bandwidth, Low Channel 2416 MHz



Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBμV/m)	Antenna Polarity (H/V)	Limit (dBμV/m)	Margin (dB)	Detector
20950.869	42.69	-1.25	41.44	V	54	-12.56	Peak

Note 1: The plot above shows that there were no emissions above the noise floor at 18-26.5GHz frequency range.
Note 2: The plot above shows that all peak emissions passed the average limits.

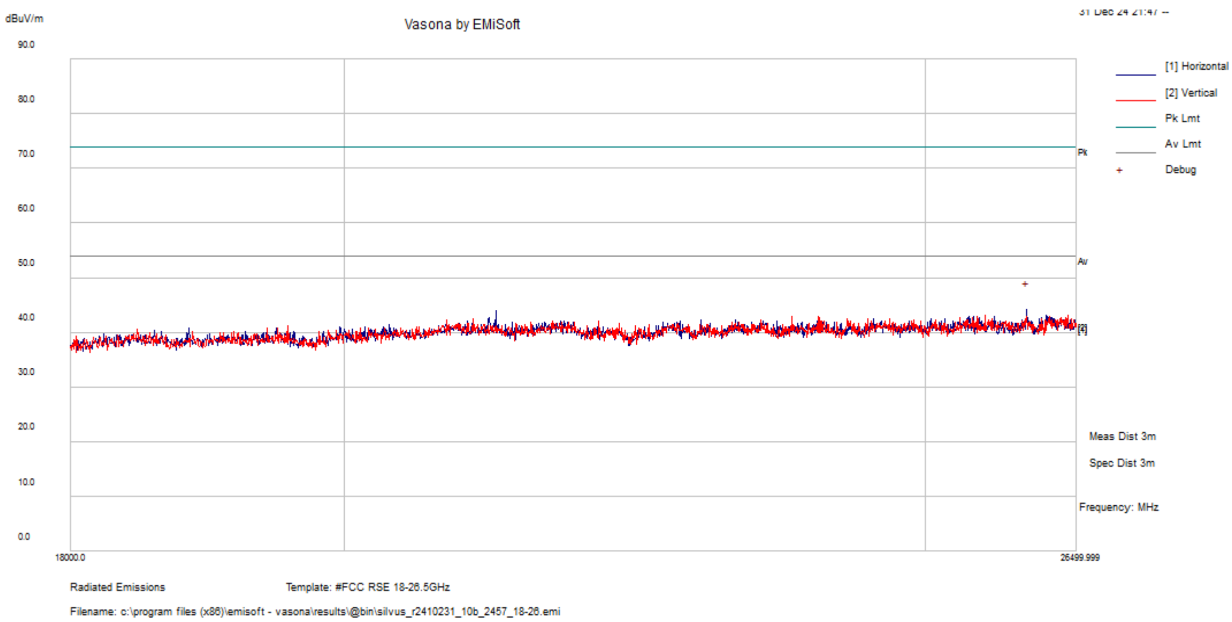
10 MHz Bandwidth, Middle Channel 2440 MHz



Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Polarity (H/V)	Limit (dBµV/m)	Margin (dB)	Detector
21634.349	43.33	-0.16	43.17	V	54	-10.83	Peak

Note 1: The plot above shows that there were no emissions above the noise floor at 18-26.5GHz frequency range.
Note 2: The plot above shows that all peak emissions passed the average limits.

10 MHz Bandwidth, High Channel 2457 MHz



Frequency (MHz)	S.A. Reading (dBuV)	Correction Factor (dB/m)	Corrected Amplitude (dBµV/m)	Antenna Polarity (H/V)	Limit (dBµV/m)	Margin (dB)	Detector
25995.312	41.43	2.7	44.13	H	54	-9.87	Peak

Note 1: The plot above shows that there were no emissions above the noise floor at 18-26.5GHz frequency range.
Note 2: The plot above shows that all peak emissions passed the average limits.

7 FCC §15.247(a) (2) – Emission Bandwidth

7.1 Applicable Standards

According to FCC §15.247(a) (2): the minimum 6 dB bandwidth shall be 500 kHz.

7.2 Measurement Procedure

The measurements are based on FCC KDB 558074 D01 DTS Meas Guidance v05r02: Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 section 8: DTS bandwidth.

As per ANSI C63.10 Clause 6.9.3: Occupied bandwidth—power bandwidth (99%) measurement procedure

The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission.

The following procedure shall be used for measuring 99% power bandwidth:

a. The instrument center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be between 1.5 times and 5.0 times the OBW.
b. The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW, and VBW shall be approximately three times the RBW, unless otherwise specified by the applicable requirement.
c. Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level. Specific guidance is given in 4.1.5.2.
d. Step a) through step c) might require iteration to adjust within the specified range.
e. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
f. Use the 99% power bandwidth function of the instrument (if available) and report the measured bandwidth.
g. If the instrument does not have a 99% power bandwidth function, then the trace data points are recovered and directly summed in linear power terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5% of the total is reached; that frequency is recorded as the upper frequency. The 99% power bandwidth is the difference between these two frequencies.
h. The occupied bandwidth shall be reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

As per ANSI C63.10 Clause 11.8: DTS bandwidth

One of the following procedures may be used to determine the modulated DTS bandwidth.

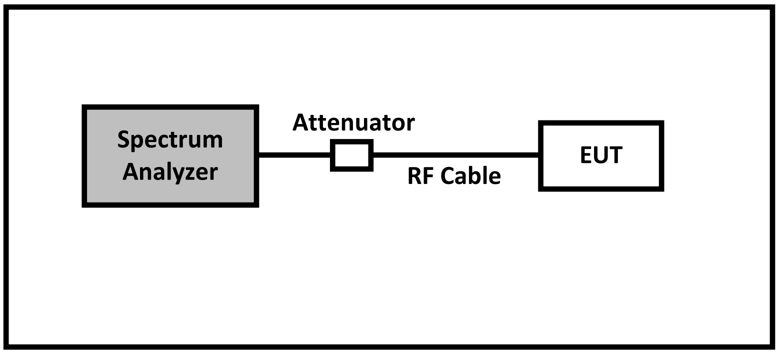
Option 1:

a. Set RBW = 100 kHz.
b. Set the VBW ⩾ [3 × RBW].
c. Detector = peak.
d. Trace mode = max hold.
e. Sweep = auto couple.
f. Allow the trace to stabilize.
g. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Option 2:

The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 6 dB, if the functionality described in 11.8.1 (i.e., RBW = 100 kHz, VBW ⩾ 3 × RBW, and peak detector with maximum hold) is implemented by the instrumentation function.
When using this capability, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be ⩾6 dB.

7.3 Test Setup Block Diagram



7.4 Test Equipment List and Details

BACL No	Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
424	Agilent	Spectrum Analyzer	E4440A	US45303156	2024-06-03	1 year
1128	Agilent	EXA SIGNAL ANALYZER 26.5 GHz	N9010A	MY48030852	2024-05-23	1 year
1506	-	RF Cable	-	-	Each Time[1]	N/A
-	-	10 dB Attenuator	18B10W-10DB	-	Each Time[1]	N/A

Note[1]: cables, attenuators and notch filters included in the test set-up were checked each time before testing.

Statement of Traceability: BACL Corp. *attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with the latest version of A2LA policy P102 "A2LA Policy on Metrological Traceability".*

7.5 Test Environmental Conditions

Temperature:	19.8 - 21.3 ºC
Relative Humidity:	49 - 58 %
ATM Pressure:	102 - 102.2 kPa

The testing was performed by Angel Cruz on 2024-12-27, 2025-01-02, and 2025-01-29 at test bench.

7.6 Test Results

Channel	Frequency (MHz)	99% OBW (MHz)		6 dB OBW (MHz)		6 dB OBW Limit (kHz)	Result
		Port 1	Port 2	Port 1	Port 2		
10 MHz							
Low	2416	8.8315	8.8323	8.824	8.747	≥ 500	Pass
Middle	2440	8.8382	8.8042	8.597	8.728	≥ 500	Pass
High	2457	8.8097	8.8366	8.716	8.724	≥ 500	Pass
20 MHz							
Middle	2440	18.0080	18.0591	17.773	17.753	≥ 500	Pass

Please refer to Annex A for detailed Emissions Bandwidth test results.

8 FCC §15.247(b)(3) – Maximum Output Power

8.1 Applicable Standards

According to FCC §15.247(b)(3): For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

8.2 Measurement Procedure

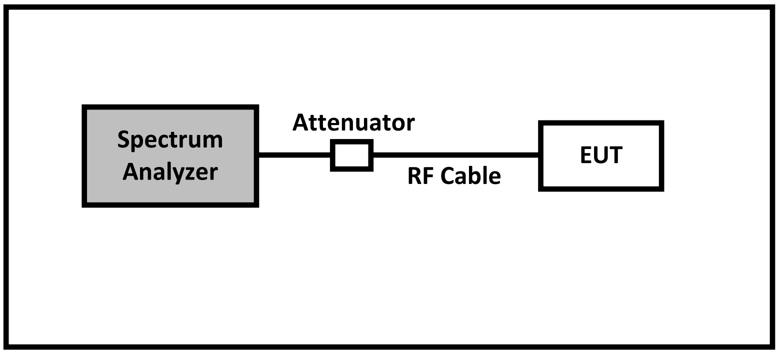
The measurements are based on ANSI C63.10-2013, Section 11.9.2.2.2.

11.9.2.2.2 Method AVGSA-1

Method AVGSA-1 uses trace averaging with the EUT transmitting at full power throughout each sweep. The procedure for this method is as follows:

a. Set span to at least 1.5 times the OBW.
b. Set RBW = 1% to 5% of the OBW, not to exceed 1 MHz.
c. Set VBW ⩾ [3 × RBW].
d. Number of points in sweep ⩾ [2 × span / RBW]. (This gives bin-to-bin spacing ⩽ RBW / 2, so that narrowband signals are not lost between frequency bins.)
e. Sweep time = auto.
f. Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode.
g. If transmit duty cycle < 98%, use a sweep trigger with the level set to enable triggering only on full power pulses. The transmitter shall operate at the maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no OFF intervals) or at duty cycle ⩾ 98%, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to "free run."
h. Trace average at least 100 traces in power averaging (rms) mode.
i. Compute power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function, with band limits set equal to the OBW band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.

8.3 Test Setup Block Diagram



8.4 Test Equipment List and Details

BACL No	Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
424	Agilent	Spectrum Analyzer	E4440A	US45303156	2024-06-03	1 year
1128	Agilent	EXA SIGNAL ANALYZER 26.5 GHz	N9010A	MY48030852	2024-05-23	1 year
1506	-	RF Cable	-	-	Each Time[1]	N/A
-	-	10 dB Attenuator	18B10W-10DB	-	Each Time[1]	N/A

Note[1]: cables, attenuators and notch filters included in the test set-up were checked each time before testing.

Statement of Traceability: BACL Corp. *attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with the latest version of A2LA policy P102 "A2LA Policy on Metrological Traceability".*

8.5 Test Environmental Conditions

Temperature:	19.8 - 21.3 ºC
Relative Humidity:	49 - 58 %
ATM Pressure:	102 - 102.2 kPa

The testing was performed by Angel Cruz on 2024-12-27 and 2025-01-02 at test bench.

8.6 Test Results

Channel	Frequency (MHz)	Antenna Gain (dBi)	Conducted Output Power (dBm)			Conducted Output Power Limit (dBm)	Result
			Port 1	Port 2	Port 1+2		
10 MHz							
Low	2416	2.4	23.53	23.83	26.69	< 30	Pass
Middle	2440	2.4	23.78	23.92	26.86	< 30	Pass
High	2457	2.4	23.71	24.04	26.89	< 30	Pass
20 MHz							
Middle	2440	2.4	26.84	26.96	29.91	< 30	Pass

*Note 1: Conducted Output Power Limit [dBm] = 10*log(Power[mW]/1mW) = 10*log(1000mW/1mW) = 30 dBm*
*Note 2: Port 1+2 [dBm] = 10*log((10^(Port 1 [dBm]/10)) + (10^(Port 2 [dBm]/10)))*
Note 3: Duty Cycle correction factor has already been added to the measurement.

Please refer to Annex B for detailed Maximum Output Power test results.

9 FCC §15.247(e) – Power Spectral Density

9.1 Applicable Standards

According to ECFR §15.247(e), for digitally modulated systems, 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.

9.2 Measurement Procedure

The measurements are based on FCC KDB 558074 D01 DTS Meas Guidance v05r02: Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 section 8.4: Maximum power spectral density level in the fundamental emission.

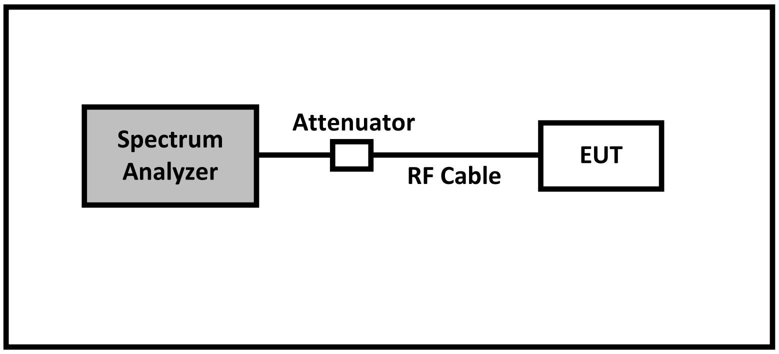
As per ANSI C63.10 Clause 11.10: Maximum power spectral density level in the fundamental emission

Some regulatory requirements specify a conducted PSD limit within the DTS bandwidth during any time interval of continuous transmission.88 Such specifications require that the same method as used to determine the conducted output power shall be used to determine the power spectral density. If maximum peak conducted output power was measured, then the peak PSD procedure 11.10.2 (method PKPSD) shall be used. If maximum conducted output power was measured, then one of the average PSD procedures shall be used, as applicable based on the following criteria (the peak PSD procedure is also an acceptable option):

Method AVGPSD-2: Method AVGPSD-2 uses trace averaging across ON and OFF times of the EUT transmissions, followed by duty cycle correction. The following procedure is applicable when the EUT cannot be configured to transmit continuously (i.e.,D < 98%), when sweep triggering/signal gating cannot be used to measure only when the EUT is transmitting at its maximum power control level, and when the transmission duty cycle is constant (i.e., duty cycle variations are less than ±2%):

a) Measure the duty cycle (D) of the transmitter output signal as described in 11.6.
b) Set instrument center frequency to DTS channel center frequency.
c) Set span to > 1.5 times the OBW.
d) Set RBW to: 3 kHz ⩽ RBW ⩽ 100 kHz.
e) Set VBW ⩾ [3 × RBW].
f) Detector = power averaging (rms) or sample detector (when rms not available).
g) Ensure that the number of measurement points in the sweep ⩾ [2 × span / RBW].
h) Sweep time = auto couple.
i) Do not use sweep triggering; allow sweep to “free run.”
j) Employ trace averaging (rms) mode over a minimum of 100 traces.
k) Use the peak marker function to determine the maximum amplitude level.
l) Add [10 log (1 / D)], where D is the duty cycle measured in step a), to the measured PSD to compute the average PSD during the actual transmission time.
m) If measured value exceeds requirement specified by regulatory agency, then reduce RBW (but no less than 3 kHz) and repeat (note that this might require zooming in on the emission of interest and reducing the span to meet the minimum measurement point requirement as the RBW is reduced).

9.3 Test Setup Block Diagram



9.4 Test Equipment List and Details

BACL No	Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
424	Agilent	Spectrum Analyzer	E4440A	US45303156	2024-06-03	1 year
1128	Agilent	EXA SIGNAL ANALYZER 26.5 GHz	N9010A	MY48030852	2024-05-23	1 year
1506	-	RF Cable	-	-	Each Time[1]	N/A
-	-	10 dB Attenuator	18B10W-10DB	-	Each Time[1]	N/A

Note[1]: cables, attenuators and notch filters included in the test set-up were checked each time before testing.

Statement of Traceability: BACL Corp. *attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with the latest version of A2LA policy P102 "A2LA Policy on Metrological Traceability".*

9.5 Test Environmental Conditions

Temperature:	19.8 - 21.3 ºC
Relative Humidity:	49 - 58 %
ATM Pressure:	102 - 102.2 kPa

The testing was performed by Angel Cruz on 2024-12-27 and 2025-01-02 at test bench.

9.6 Test Results

Channel	Frequency (MHz)	PSD [dBm/10kHz][2]			Limit (dBm/3kHz)	Result
		Port 1	Port 2	Port 1+2		
10 MHz						
Low	2416	-1.818	-0.525	1.887	< 8	Pass
Middle	2440	-1.477	-1.09	1.731	< 8	Pass
High	2457	-1.267	-1.104	1.826	< 8	Pass
20 MHz						
Middle	2440	-0.152	0.374	3.129	< 8	Pass

*Note 1: Port 1+2 [dBm/10kHz] = 10*log((10^(Port 1 [dBm/10kHz]/10)) + (10^(Port 2 [dBm/10kHz]/10)))*
Note 2: The EUT passed with wider RBW of 10kHz, thus it complies with FCC RBW requirement of 3kHz as compliance is shown under a worse-case circumstance.
Note 3: Duty Cycle correction factor has already been added to the measurement.

Please refer to Annex C for detailed Power Spectral Density test results.

10 FCC §15.247(d) – 100 kHz Spurious Emissions and Band Edges at Antenna Terminal (dBc)

10.1 Applicable Standards

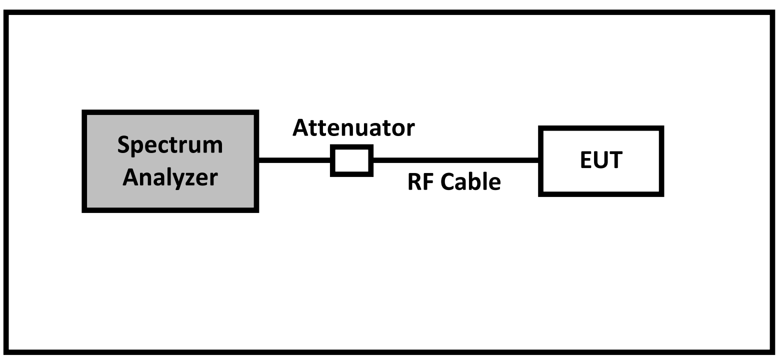
According to FCC §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emissions limits specified in §15.209(a) see §15.205(c).

10.2 Measurement Procedure

Span = wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products which fall outside of the authorized band of operation

RBW = 100 kHz
VBW = 300 kHz
Sweep = coupled
Detector function = peak
Trace = max hold

10.3 Test Setup Block Diagram



10.4 Test Equipment List and Details

BACL No	Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
424	Agilent	Spectrum Analyzer	E4440A	US45303156	2024-06-03	1 year
1128	Agilent	EXA SIGNAL ANALYZER 26.5 GHz	N9010A	MY48030852	2024-05-23	1 year
1506	-	RF Cable	-	-	Each Time[1]	N/A
-	-	10 dB Attenuator	18B10W-10DB	-	Each Time[1]	N/A

Note[1]: cables, attenuators and notch filters included in the test set-up were checked each time before testing.

Statement of Traceability: BACL Corp. *attests that all of the calibrations on the equipment items listed above were traceable to NIST or to another internationally recognized National Metrology Institute (NMI), and were compliant with the latest version of A2LA policy P102 "A2LA Policy on Metrological Traceability".*

10.5 Test Environmental Conditions

Temperature:	19.8 - 18 ºC
Relative Humidity:	49 - 52.3 %
ATM Pressure:	102 - 102.4 kPa

The testing was performed by Angel Cruz on 2024-12-30, 2025-01-02, and 2025-01-29 at test bench.

10.6 Test Results

Test Result: Pass

Please refer to Annex D for detailed 100 kHz Spurious Emissions at Antenna Terminal (dBc) test results.

11 Annex A – Emission Bandwidth

Please refer to the attachment.

12 Annex B – Maximum Output Power

Please refer to the attachment.

13 Annex C –Power Spectral Density

Please refer to the attachment.

14 Annex D – 100 kHz Spurious Emissions at Antenna Terminal (dBc)

Please refer to the attachment.

15 Annex E – Band Edges 15.209

Please refer to the attachment.

16 Appendix A (Normative) – EUT Test Setup Photographs

Please refer to the attachment.

17 Appendix B (Normative) – EUT External Photographs

Please refer to the attachment

18 Appendix C (Normative) – EUT Internal Photographs

Please refer to the attachment

19 Appendix D (Informative) – Declaration of Similarity (DOS)

SiLVUS TECHNOLOGIES

Silvus Technologies, Inc.
10990 Wilshire Blvd., Suite 1500
Los Angeles, California 90024
Ph 310-479-3333

February 10, 2025
To Whom It May Concern,

Models Differences Letter:

SL5220-139235-O, SL5220-139235F-O
SL5210-139235-O, SL5210-139235F-O
LC5220-139235-O, LC5220-139235F-O
LC5210-139235-O, LC5210-139235F-O
LC52.50-139235-O, LC52.50-139235F-O

SL/LC5000 OEM radios, each has 2 model#s/SPNs (-139235, -139235F).

SL5000 & LC5000 OEM radios' models above have identical HWs & electrical/RF characteristics. LC5000 is a lost-cost & light features version of SL5000.

	Series	
Category	**SL5000**	**LC5000**
Tx BW (MHz)	20/10	20/10
Data rate (up to)	100Mbps	12Mbps
Options:		
MANET Spectrum Analyzer (MAN-SA)	x	x*
MANET Power Control (MAN-PC)	x	x*
MANET Protected Waveform (MAN-PW)	x	
*: Future options		

Sincerely,

Cyrus Naim

Signature
Cyrus S. Naim
General Counsel
Silvus Technologies, Inc.
Tel.: (310) 773-5490

20 Appendix E (Normative) – A2LA Electrical Testing Certificate

Accredited Laboratory

A2LA has accredited

BAY AREA COMPLIANCE LABORATORIES CORP.

Sunnyvale, CA

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*. This laboratory also meets A2LA R222 - Specific Requirements EPA ENERGY STAR Accreditation Program. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated April 2017*).

Presented this 13th day of September 2024.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 3297.02
Valid to September 30, 2026

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.

Please follow the web link below for a full ISO 17025 scope

https://www.a2la.org/scopepdf/3297-02.pdf

--- END OF REPORT ---