NVLAP Lab Code 200087-0

Rogers Labs, a division of The Compatibility Center LLC

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Class 2 Permissible Change Test Report

47CFR Parts 2, 90 and RSS-137

Location and Monitoring Service Transmitter

Transcore

Amtech Technology Center
8600 Jefferson Street, NE
Albuquerque, NM 87113

Model: E6V2

FCC ID: FIHE6PT90V2

IC: 1584A-E6RSS137V2

MRA Designation Number: US5305
IC Test Site Registration: 3041A

Test Report Number: 240416

Test Date: April 16, 2024

Authorized Signatory:

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Revisions

Revision 1 Issued June 14, 2024

Summary

The following information is submitted as documentation of compliance with regulations supporting Class 2 (Class 3 ISED) Permissible Change of Authorized Equipment. This product was authorized under 47CFR Parts 2 and 90 and RSS-137 as Location and Monitoring Service Transmitter operating in the 902-928 MHz frequency band.

Name of Applicant: Transcore
Amtech Technology Center
8600 Jefferson Street, NE
Albuquerque, NM 87113

HVIN: E6V2

PMN: E5, E6

FVIN: 19125.102.02 or higher

FCC ID: FIHE6PT90V2 IC: 1584A-E6RSS137V2

Frequency of Operation: 902.25-903.75, 910.00-921.50 MHz

Opinion / Interpretation of Results

Test Number	Measurement	FCC Rule	Pass/Fail
#1	Transmitter Power Output	47CFR paragraphs 2.1046 90.205, RSS-137, Issue 2	Pass
#2	Occupied Bandwidth	47CFR paragraphs 2.1049, 2.1051, 90.207, 90.209, RSS-137	Pass
#3	Spurious Emissions	47CFR 2.1051, 2.1053, 47CFR paragraphs 90.209 and RSS-137	Pass
#4	Emission Mask	47CFR 2.1051, 90.210, RSS-137	Pass
#5	Field Strength of Spurious Radiation	47CFR 2.1051, 2.1053, 47CFR paragraphs 90.209 and RSS-137	Pass

Change to Equipment from Original Design

The information contained in this report addresses modification to the original equipment as summarized below. The transmitter remains electrically identical and functionally equivalent to the original equipment authorization. The modification of the Interrogator system includes a software change to modify the spectral emission of the 6C/EPC protocol narrowing the emission and extending the frequency from 912.75-918.75 MHz to 912.00-919.5 MHz for this protocol. The 6C Protocol needs the wider separation, and as it could be achieved in production, this update was created so that sites with more than two antennas and readers can achieve proper frequency separation for highest reliability of backscatter communication. No other protocols or functionality were affected by this change. As a result, 6C/EPC protocol was the only transmitter tested for this report.

Equipment Tested

Equipment	Model / PN	Serial Number
EUT #1	E6V2	3431565
AC power box	Manufacturer provided	N/A

Test results in this report relate only to the items tested.

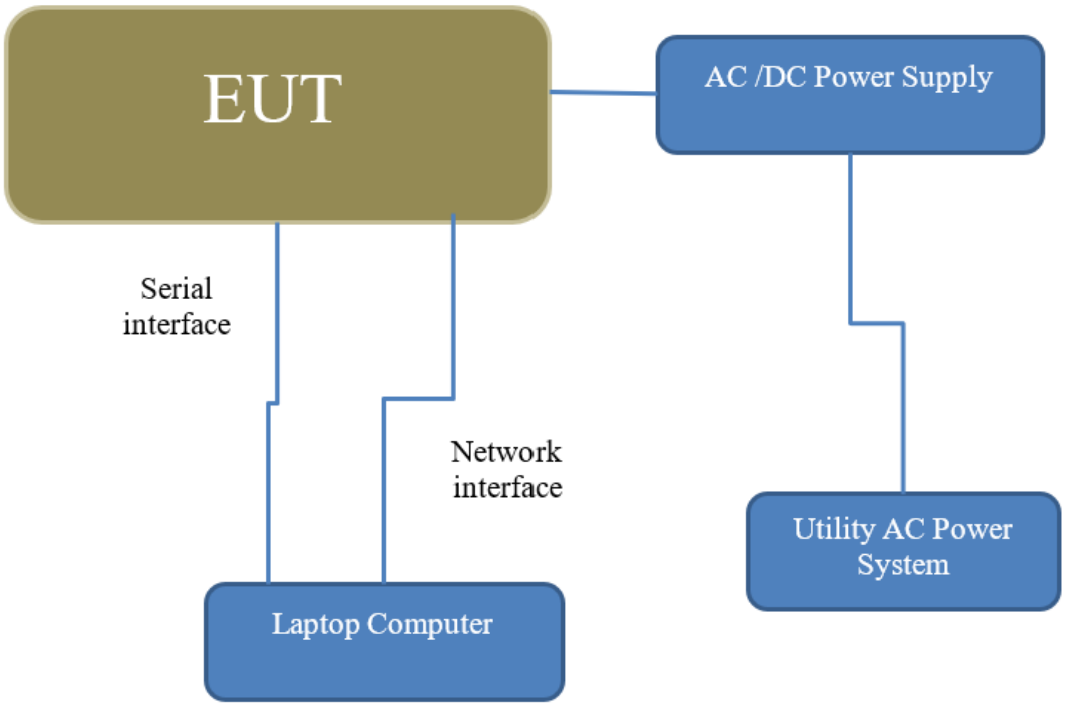
FVIN / Software Version: 19125.102.02 or higher

Equipment Function and Configuration

The EUT is a fixed Non-Multilateral transmitter operating under the Intelligent Transportation Systems Radio Service as Location and Monitoring Services (LMS). The E6V2 Interrogator operates and functions as an Encompass Reader. The E in the Product Marketing Name stands for Encompass and the 5 or 6 defines the color of the reader housing. Operation of the design utilizes industry standardized modulation schemes offering the ability to interface and respond with Radio Frequency Identification Device (RFID) interrogation systems. The system operates over input power range of 19-30 V_{dc}, or 19-27 V_{ac} rms, 2.5 amps and provides serial and network interface connections for communications. The manufacturer provided software which allowed testing personnel operational control of the transmitter for testing purposes. The test samples were loaded with manufacturers updated software. The EUT was arranged as described by the

manufacturer emulating typical use configurations for testing purposes. The EUT offers no other interface connections than those documented in the configuration options presented. The EUT functions as an active interrogator operating in the 902.25-903.75 and 910.00-921.50 MHz LMS frequency band. During testing all interface connections were appropriately terminated. Test results in this report relate only to the products described in this report.

Equipment Configuration



Applicable Standards & Test Procedures

In accordance with the Federal Communications Code of Federal Regulations, 47CFR dated May 20, 2024, Part 2 Subpart J, Paragraphs 2.907, 2.911, 2.925, 2.926, 2.1031, 2.1041, 2.1043, 2.1046, 2.1049, 2.1051, 2.1053, and 2.1057; 90.201 through 90.217, 90.350 through 90.363 and RSS-137 the following information is submitted for consideration in processing Class 2 (Class 3 for ISED) Permissible Change of Certified Equipment. Test procedures used were the established Methods of Measurement of Radio-Noise Emissions as described in ANSI/TIA-603-E-2016, ANSI C63.26-2015, and ANSI 63.4-2014.

Test Procedures

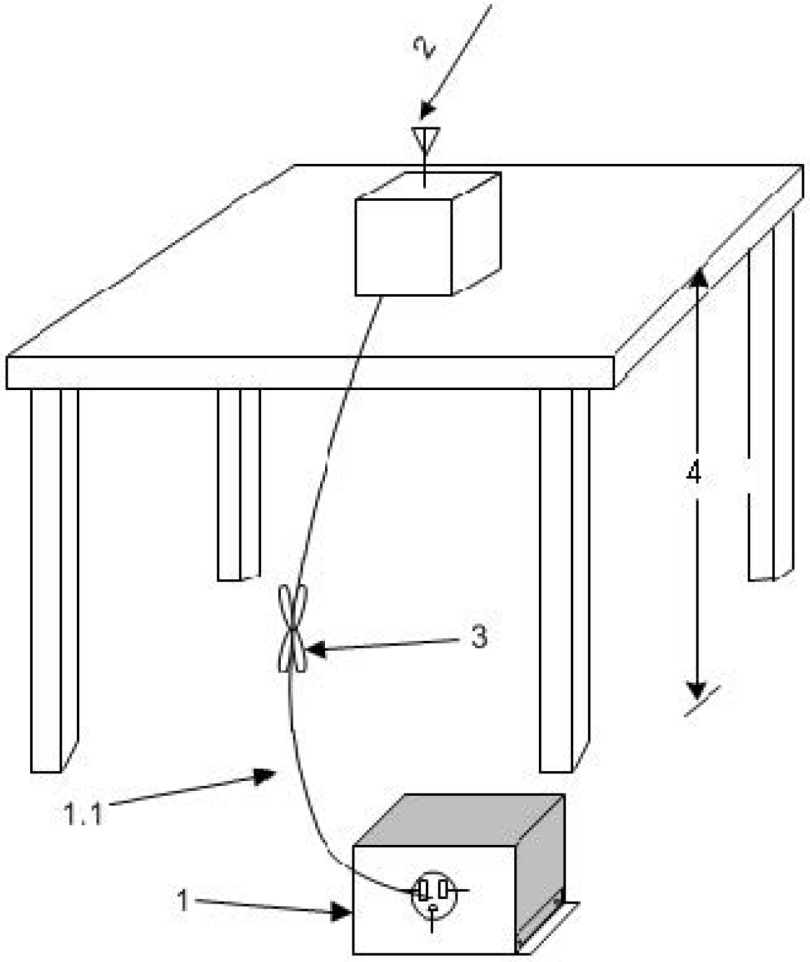
Radiated Emission Procedure

Radiated emissions testing was performed as required in 47CFR, RSS-137, RSS-GEN and specified in ANSI C63.26-2015. The EUT was placed on a rotating 0.9 x 1.2-meter platform, elevated as required above the ground plane at a distance of 3 meters from the FSM antenna. EMI energy was maximized by equipment placement permitting orientation in three orthogonal axes, raising, and lowering the FSM antenna, changing the antenna polarization, and by rotating the turntable. Each emission was maximized before data was taken and recorded. The frequency spectrum from 9 kHz to 10,000 MHz was searched for emissions during preliminary investigation. Refer to diagrams one and two showing typical test setup. Refer to photographs in the test setup exhibits for specific EUT placement during testing.

Antenna Port Conducted Emission Test Procedure

The EUT was assembled as required for operation placed on a benchtop. This configuration provided the ability to connect test equipment to the provided test antenna port Antenna Port conducted emissions testing was performed presented in the regulations and specified in ANSI C63.26-2015. Testing was completed on a laboratory bench in a shielded room. The active antenna port of the device was connected to appropriate attenuation and the spectrum analyzer. Refer to diagram three showing typical test arrangement and photographs in the test setup exhibits for specific EUT placement during testing.

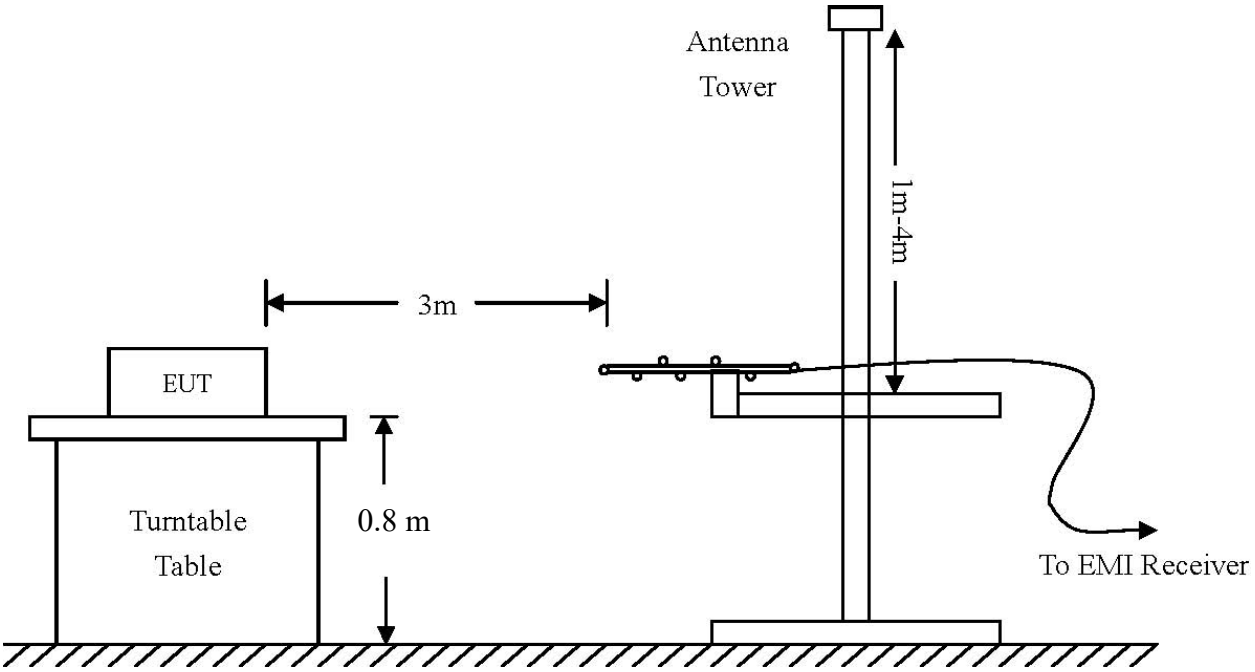
Diagram 1 Test arrangement for radiated emissions of tabletop equipment



1—A LISN is optional for radiated measurements between 30 MHz and 1000 MHz but not allowed for measurements
below 30 MHz and above 1000 MHz (see 6.3.1). If used, then connect EUT to one LISN. Unused LISN measuring port
connectors shall be terminated in 50 Ω loads. The LISN may be placed on top of, or immediately beneath, the reference
ground plane (see 6.2.2 and 6.2.3.2).
1.1—LISN spaced at least 80 cm from the nearest part of the EUT chassis.
2—Antenna can be integral or detachable, depending on the EUT (see 6.3.1).
3—Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center
forming a bundle 30 cm to 40 cm long (see 6.3.1).
4—For emission measurements at or below 1 GHz, the table height shall be 80 cm. For emission measurements above
1 GHz, the table height shall be 1.5 m for measurements, except as otherwise specified (see 6.3.1 and 6.6.3.1).

Diagram 2 Test arrangement for radiated emissions tested in Semi-Anechoic Chamber (SAC) and Outdoor Area Test Site (OATS)

Below 1 GHz



Above 1 GHz:

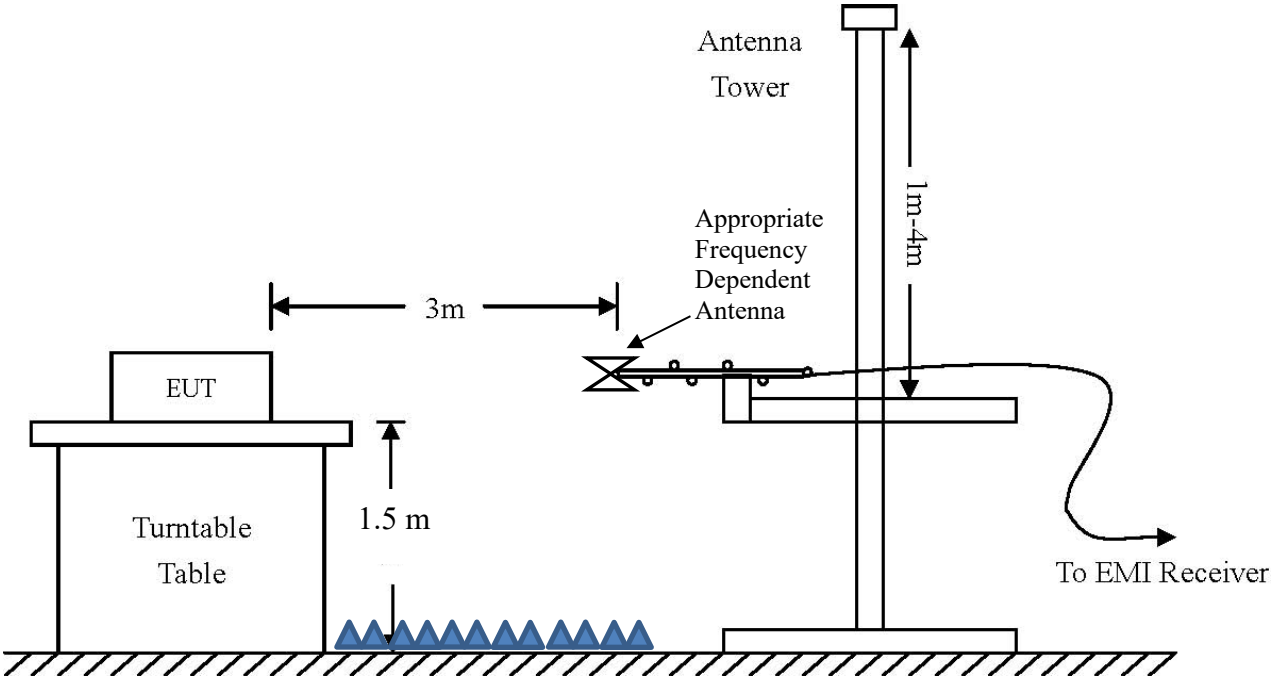
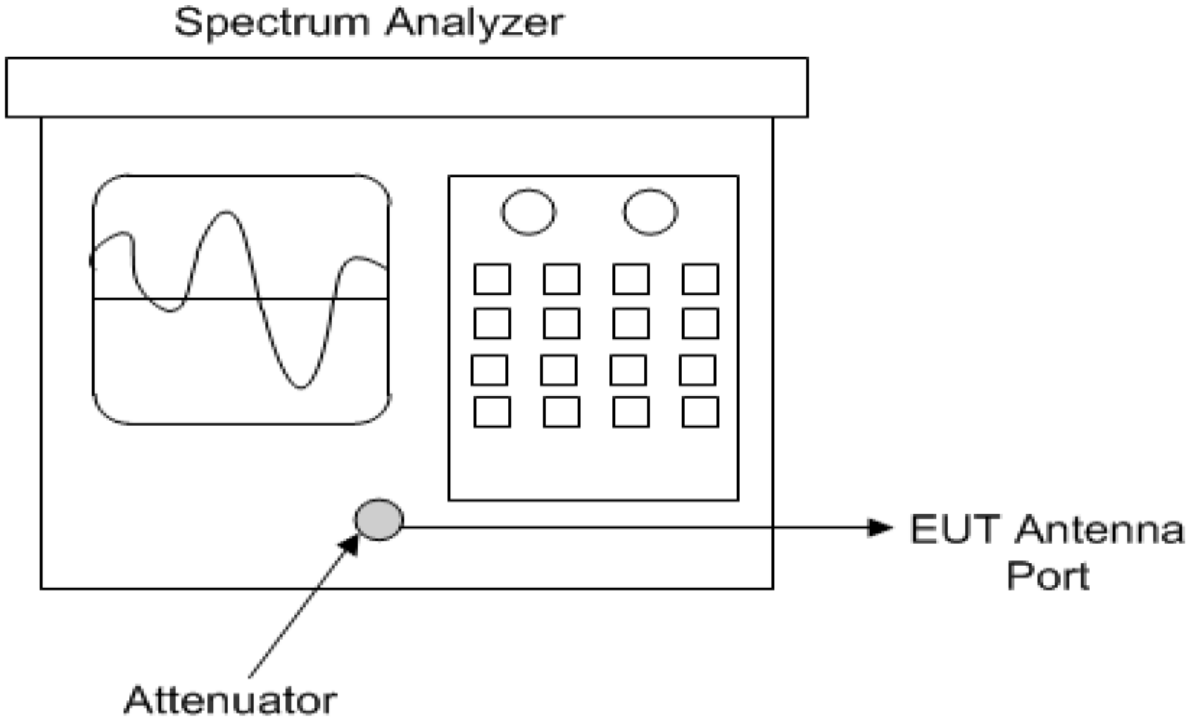


Diagram 3 Test arrangement for Antenna Port Conducted emissions



Statement of Modifications and Deviations

No modifications to the EUT or test setup were required during investigation for the equipment to demonstrate compliance with the CFR47, Part 2.1043, applicable parts of Paragraph 90, and RSS-137 requirements. There were no deviations to the specifications.

Environmental Conditions

Ambient Temperature	23.3° C
Relative Humidity	51%
Atmospheric Pressure	1003.0 mb

Test Site Location

Conducted EMI — AC line conducted emissions testing performed in a shielded screen room located at Rogers Labs, a division of The Compatibility Center LLC, 7915 Nieman Rd., Lenexa, KS (or satellite location).

Antenna port — Antenna port conducted emissions testing was performed in a shielded screen room located at Rogers Labs, a division of The Compatibility Center LLC, 7915 Nieman Rd., Lenexa, KS (or satellite location).

Radiated EMI — The radiated emissions tests were performed at the 3 meters Semi-Anechoic Chamber (SAC) located at Rogers Labs, a division of The Compatibility Center LLC, 7915 Nieman Rd., Lenexa, KS or at the 3 meters Outdoor Area Test Site (OATS) in the satellite location.

Registered Site information: FCC Site: US5305, ISED: 3041A, CAB Identifier: US0096

NVLAP Accreditation — Lab code 200087-0

Units of Measurements

Conducted EMI — Data presented in dBµV; dB referenced to one microvolt

Antenna port Conducted — Data is in dBm; dB referenced to one milliwatt

Radiated EMI — Data presented in dBµV/m; dB referenced to one microvolt per meter

Note: The limit is expressed for a measurement in dBµV/m when the measurement is taken at a distance of 3 or 10 meters. Data taken for this report was taken at distance of 3 meters. Sample calculation demonstrates corrected field strength reading for Semi-Anechoic Chamber using the measurement reading and correcting for receive antenna factor, cable losses, and amplifier gains.

Sample Calculation:

RFS = Radiated Field Strength, FSM = Field Strength Measured
A.F. = Receive antenna factor, Losses = attenuators/cable losses, Gain = amplification gains
RFS (dBµV/m @ 3m) = FSM (dBµV) + A.F. (dB/m) + Losses (dB) - Gain (dB)

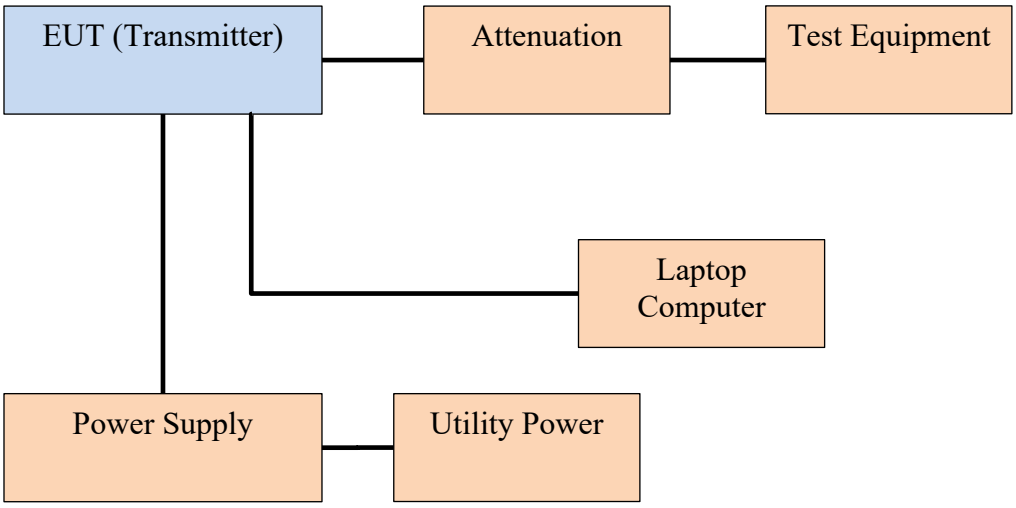
TEST #1 Transmitter Power Output

Measurements Required

Measurements shall be made to establish the radio frequency power delivered by the transmitter into the standard output termination. The power output shall be monitored and recorded, and no adjustment shall be made to the transmitter after the test has begun, except as noted below:

If the power output is adjustable, measurements shall be made for the highest and lowest power levels.

Test Arrangement Output Power



The radio frequency power output was measured at the antenna terminal by placing appropriate attenuation on the antenna port connector and observing the spectral emissions with the spectrum analyzer. The spectrum analyzer and attenuation offered an impedance of 50Ω to match the impedance of the standard antenna. A Rohde & Schwarz ESU40 Spectrum Analyzer and/or an Agilent Power Meter were used to measure the radio frequency power at the antenna port. Data was taken in dBm and converted to watts as shown in the following table. Refer to Figures 1 and 2 showing plots of output power of the transmitter across the frequency band. The testing procedures used conform to the procedures stated in the ANSI C63.26-2015 document. Data was taken per 47CFR Paragraph 2.1046(a) and applicable paragraphs of Part 90 and RSS-137.

P_{dBm} = power in dB above 1 milliwatt

Milliwatts = $10^{(PdBm/10)}$

Watts = (Milliwatts)(0.001)(W/mW)

Milliwatts = $10^{(33.00/10)}$

= 1,995.3 mW

= 2.00 Watts power

Table 1 Transmitter Power Results

Frequency (MHz)	P_{dBm}	P_{mw}	P_w
6C/EPC (Maximum)	33.00	1,995.3	2.00
6C/EPC (Minimum)	17.90	61.52	0.062

The EUT demonstrated compliance with specifications of 47CFR Paragraph 2.1046(a) and applicable Parts of 2 and 90.205 and RSS-137. There are no deviations to the specifications.

Figure 1 Transmitter Highest Power Output Across Frequency Band 6C/EPC

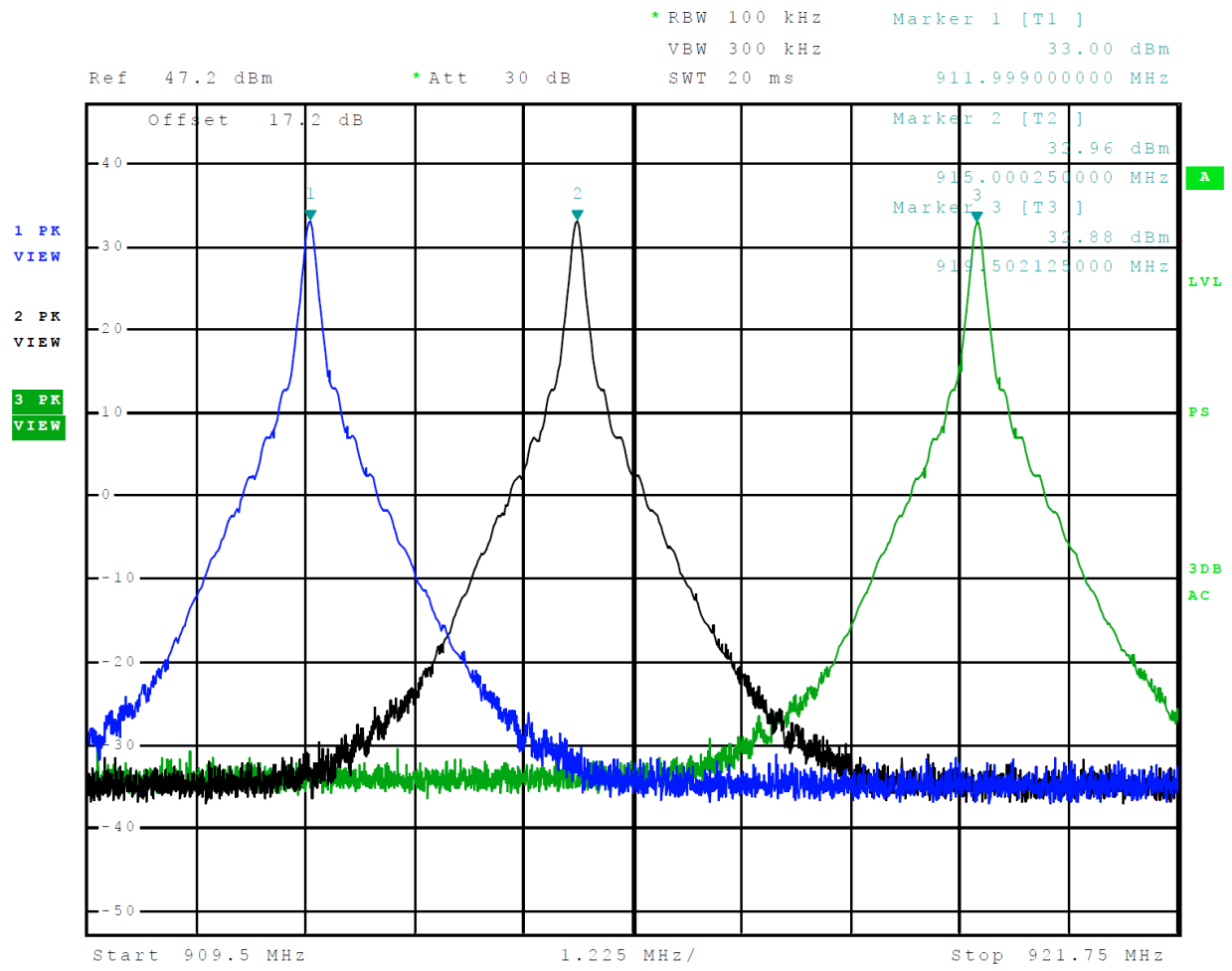
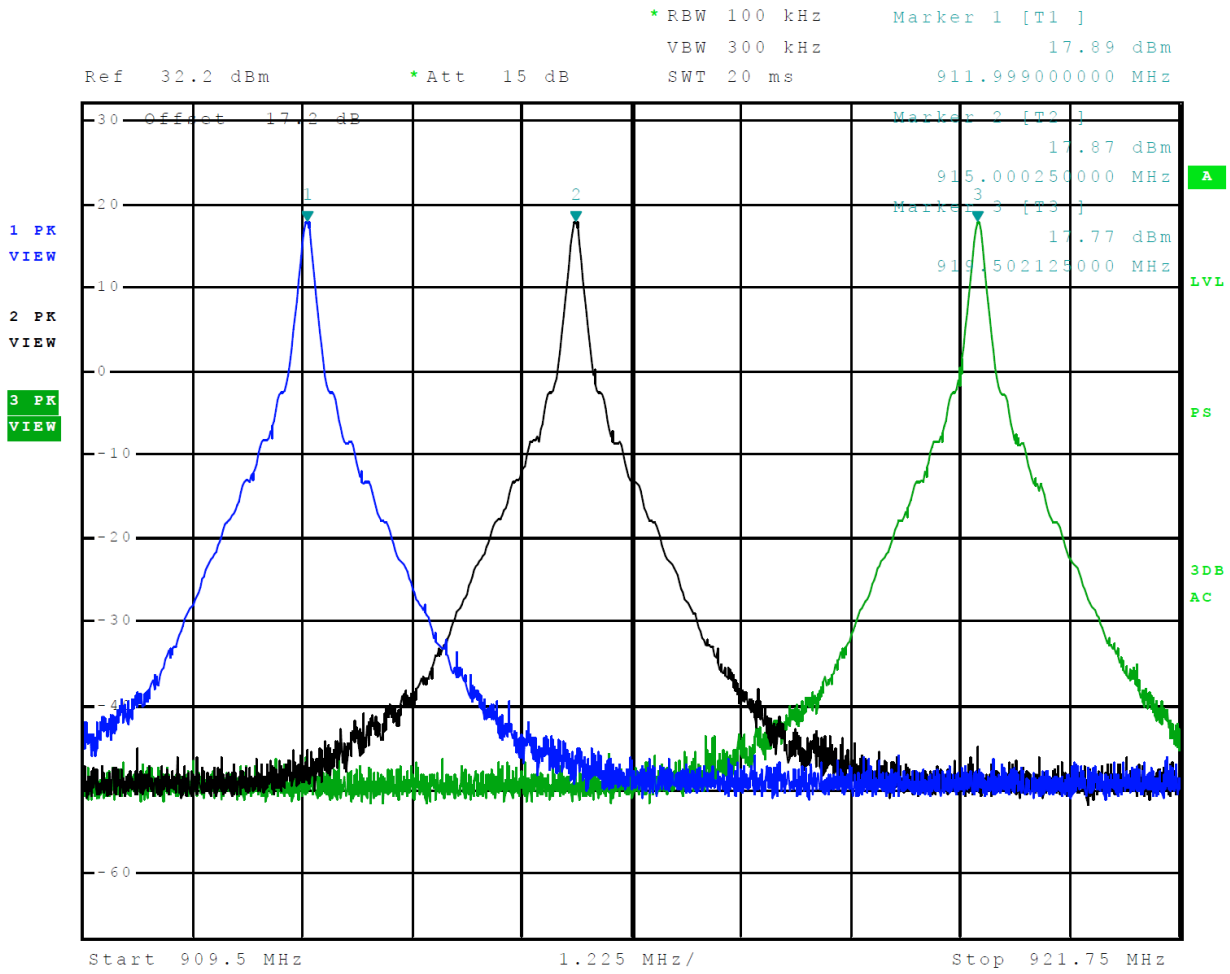


Figure 2 Transmitter Low Power Output Across Frequency Band 6C/EPC



TEST #2 Occupied Bandwidth

Measurements Required

The occupied bandwidth, which is the frequency bandwidth such that below its lower and above its upper frequency limits, the mean powers radiated are equal to 0.5 percent of the total mean power radiated by a given emission. Refer to figure 3 displaying plot of the occupied bandwidth measurement.

Test Arrangement

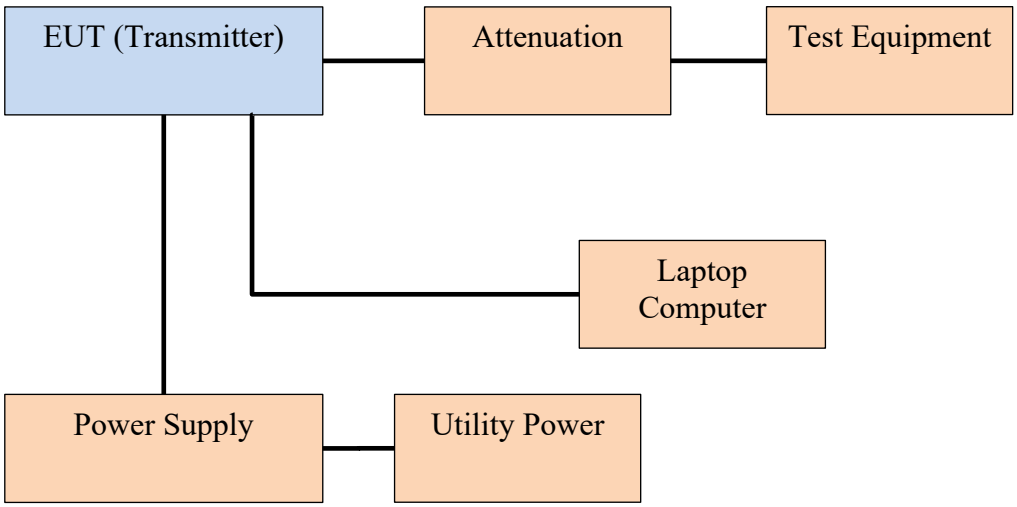
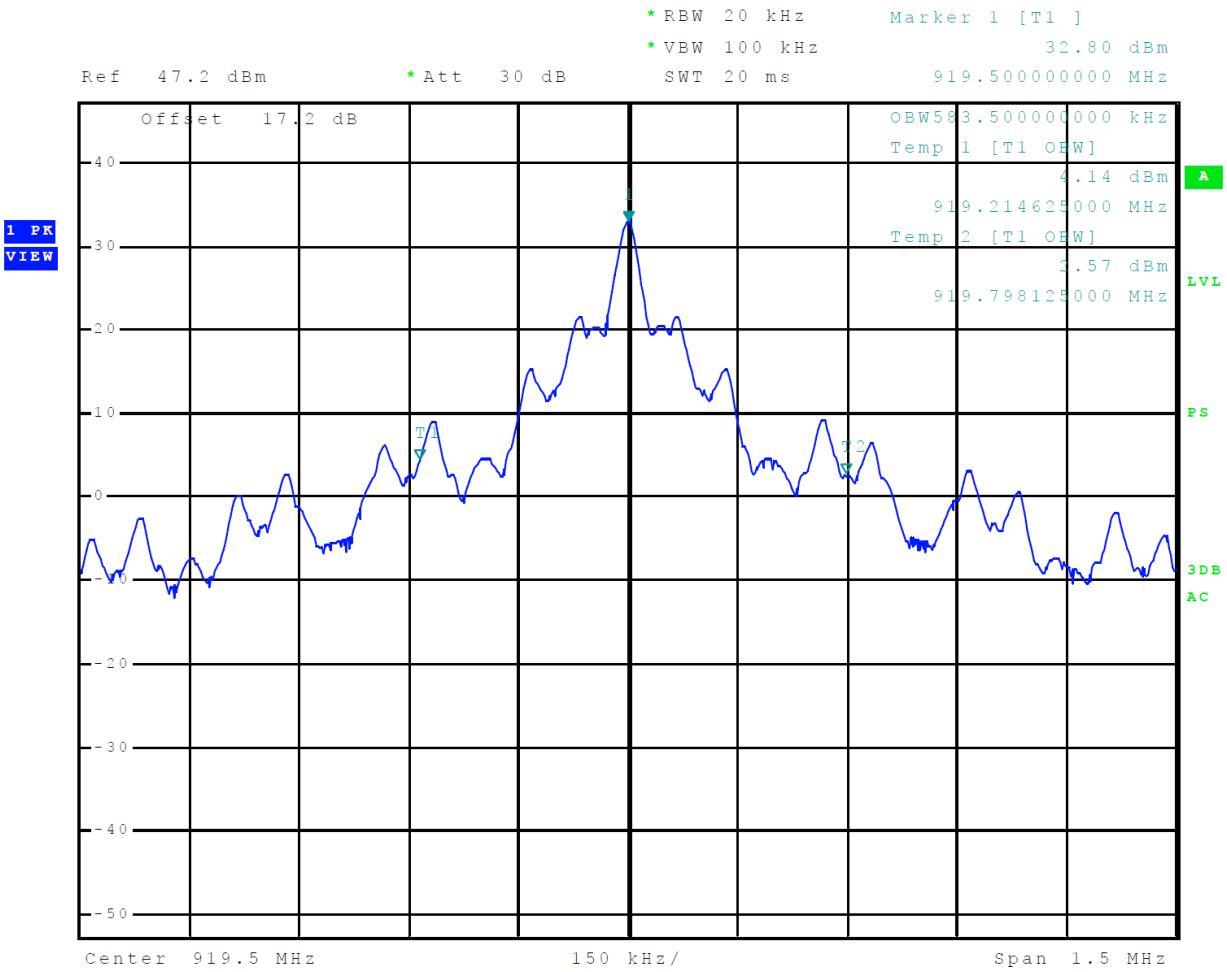


Table 2 Occupied Bandwidth Results

Operational mode	Operational Frequency Band (MHz)	Occupied Bandwidth (kHz)
6C/EPC	912.00-919.5	583.5

The EUT demonstrated compliance with the requirements of Paragraphs 2.1049, 90.209 and RSS-137 paragraph 6.1.2. There are no deviations to the specifications.

Figure 3 Occupied Bandwidth 6C/EPC

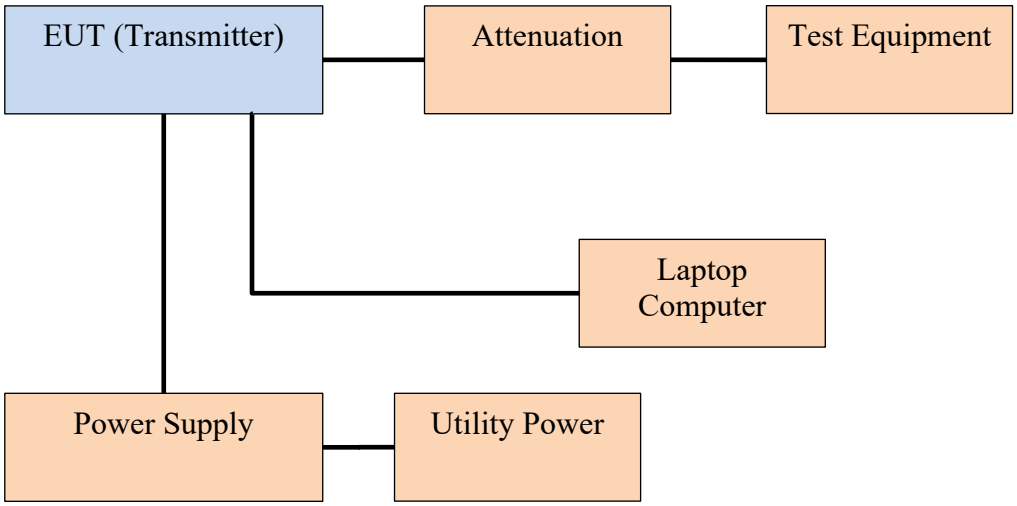


TEST #3 Spurious Emissions

Measurements Required

The radio frequency voltage or power generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. To gain dynamic range in the test equipment, a high pass filter attenuated the fundamental frequency of operation was used to observe the harmonic emissions.

Test Arrangement



The radio frequency output was coupled to a Rohde &Schwarz ESU40 Spectrum Analyzer. The spectrum analyzer was used to observe the radio frequency spectrum with the transmitter operating in its normal modes. The frequency spectrum from 9 kHz to 10 GHz was observed. Data was taken per 47CFR 2.1051 and applicable paragraphs of Part 90 and RSS-137.

Limit: Spurious emissions must be attenuated below the peak output power by at least 55 + 10 Log (P_o) dB.

High Pwr: 2.0 -watt transmitter limit requires the out of band emissions must be suppressed by at least 58.0 dBc

Low Pwr: 0.062 -watt transmitter limit requires the out of band emissions to be suppressed by at least 42.9 dBc

Attenuation	= 55 + 10 $Log_{10}(P_w)$	= 55 + 10 $Log_{10}(P_w)$
	= 55 + 10 Log_{10} (2)	= 55 + 10 Log_{10} (0.062)
	= 58.0 dBc	= 42.9 dBc

Table 3 Spurious Emissions Results High Power 6C/EPC

Channel MHz	Spurious Freq. (MHz)	Measured Level (dBm)	Level Below Carrier (dBc)
912.00	1824.0	-35.0	68.0
	2736.0	-34.4	67.4
	3648.0	-65.9	98.9
	4560.0	-69.3	102.3
	5472.0	-66.8	99.8
	6384.0	-62.6	95.6
915.00	1830.0	-34.4	67.4
	2745.0	-34.7	67.7
	3660.0	-67.9	100.9
	4575.0	-68.7	101.7
	5490.0	-68.4	101.4
	6405.0	-65.5	98.5
919.50	1839.0	-33.7	66.6
	2758.5	-34.5	67.4
	3678.0	-69.5	102.4
	4597.5	-69.6	102.5
	5517.0	-67.3	100.2
	6436.5	-61.2	94.1

Data was taken per 2.1051 and applicable parts of 47CFR 90.210 and RSS-137. The EUT demonstrated compliance with the specifications of Paragraphs 47CFR 2.1051, 2.1057 and 90.210(k) and RSS-137 paragraph 6.5. There are no deviations to the specifications.

Table 4 Spurious Emissions Results Low Power 6C/EPC

Channel MHz	Spurious Freq. (MHz)	Measured Level (dBm)	Level Below Carrier (dBc)
912.00	1824.0	-61.4	79.3
	2736.0	-39.0	56.9
	3648.0	-66.3	84.2
	4560.0	-68.8	86.7
	5472.0	-67.2	85.1
	6384.0	-61.7	79.6
915.00	1830.0	-61.3	79.2
	2745.0	-37.9	55.8
	3660.0	-67.5	85.4
	4575.0	-69.4	87.3
	5490.0	-68.3	86.2
	6405.0	-65.0	82.9
919.50	1839.0	-61.2	78.4
	2758.5	-37.6	54.8
	3678.0	-68.5	85.7
	4597.5	-68.6	85.8
	5517.0	-67.1	84.3
	6436.5	-64.3	81.5

Data was taken per 2.1051 and applicable parts of 47CFR 90.210 and RSS-137. The EUT demonstrated compliance with the specifications of Paragraphs 47CFR 2.1051, 2.1057 and 90.210(k) and RSS-137 paragraph 6.5. There are no deviations to the specifications.

TEST #4 Emission Mask

Measurements Required

Transmitters used in the radio services governed by this part must comply with the emissions masks outlined in this section. Paragraph 90.210(K)(3) specifies the out of band emission limitations for this equipment. The spurious emissions for the device were measured at the maximum output power condition.

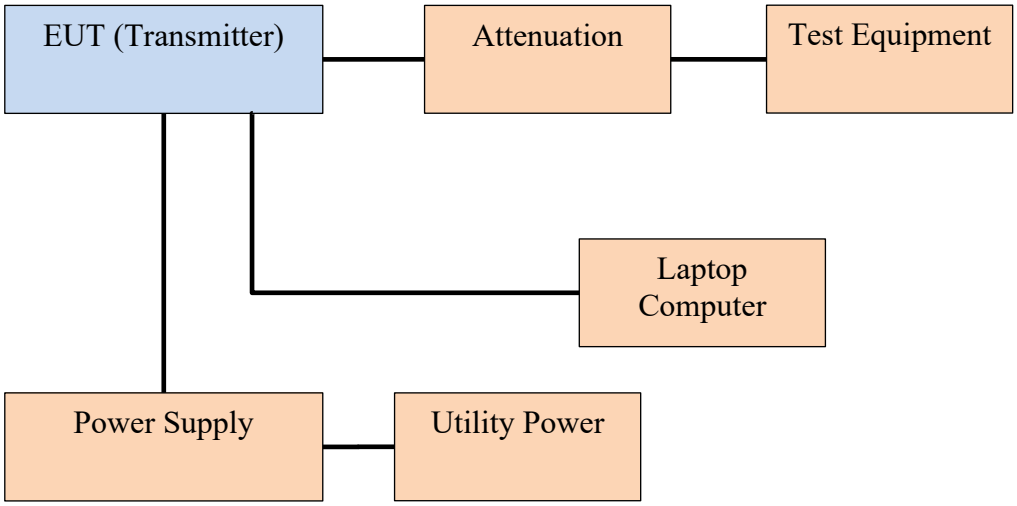
90.210 (k)
(3) *Other transmitters*. For all other transmitters authorized under subpart M that operate in the 902-928 MHz band, the peak power of any emission shall be attenuated below the power of the highest emission contained within the licensee's sub-band in accordance with the following schedule:

(i) On any frequency within the authorized bandwidth: Zero dB.
(ii) On any frequency outside the licensee's sub-band edges: 55 + 10 log(P) dB, where (P) is the highest emission (watts) of the transmitter inside the licensee's sub-band.

(4) In the 902-928 MHz band, the resolution bandwidth of the instrumentation used to measure the emission power shall be 100 kHz, except that, in regard to paragraph (2) of this section, a minimum spectrum analyzer resolution bandwidth of 300 Hz shall be used for measurement center frequencies with 1 MHz of the edge of the authorized subband.
RSS-137
6.5.3 Emission Mask C – Other Transmitters
Except as provided in sections 6.5.1, 6.5.2 and 6.5.4, the unwanted emission of all other transmitters operating in the band 902-928 MHz shall comply with the following:
The power of any emission outside the equipment operating sub-band edge shall be attenuated below the maximum permitted output power P_{max} by at least $55 + 10 \log_{10} P_{max}$ dB

Emission Mask Calculation for this equipment: Limit=55+10Log (2) which equates to 58 dBc.
33 dBm minus 58 = -25 dBm limit

Test Arrangement



The radio frequency output was coupled to a Rohde &Schwarz ESU40 Spectrum Analyzer. The spectrum analyzer was used to observe the radio frequency spectrum with the transmitter operating through normal modes with maximum output power. The frequency spectrum at the band edges were observed and plots produced. Refer to figures 4 and 5 for plots presenting compliance with emission mask requirements at the band edges. Data was taken per 47CFR 2.1051 and applicable parts of Part 90.210 (k) and RSS-137.

The EUT demonstrated compliance with the specifications of Paragraphs 47CFR 2.1051, 2.1057 and 90.210(k) and RSS-137 paragraph 6.5. There are no deviations to the specifications.

Figure 4 Emissions Mask (High Power) 6C/EPC

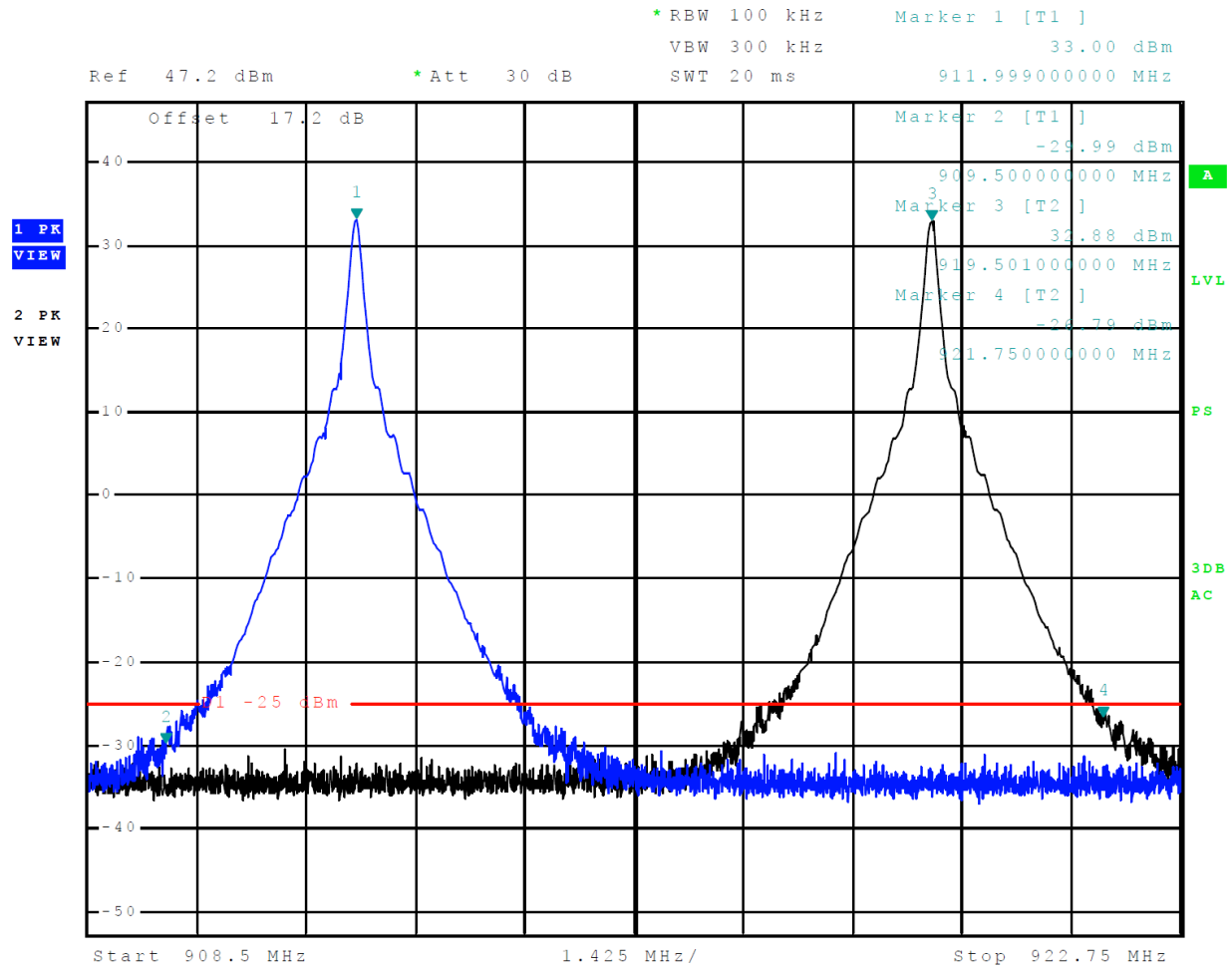
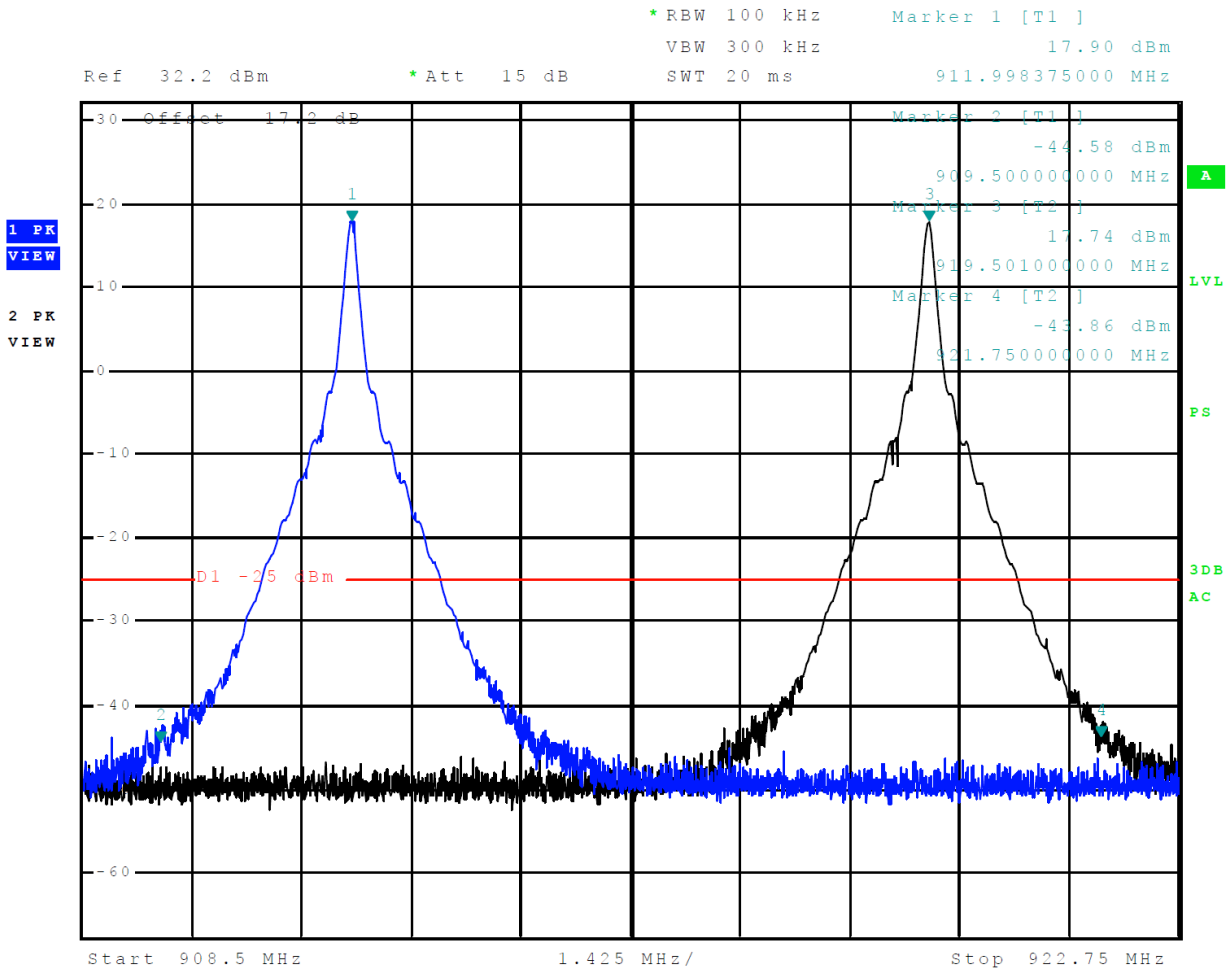


Figure 5 Emissions Mask (Low Power) 6C/EPC

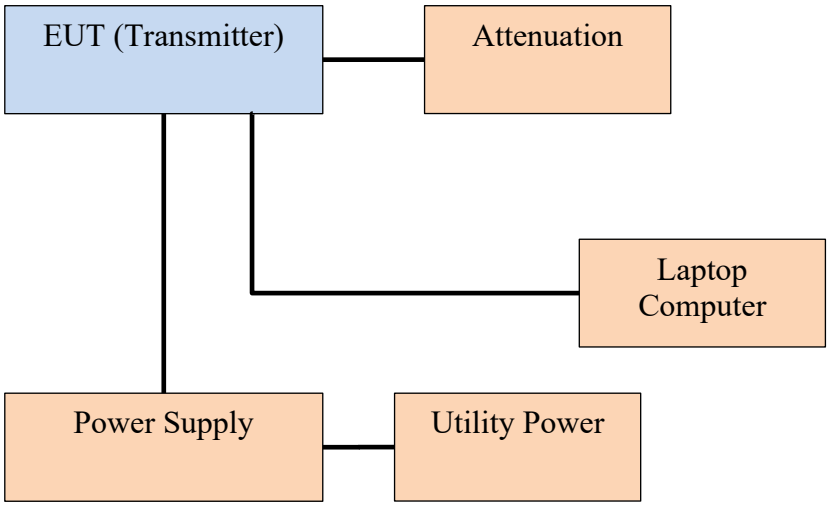


TEST #5 Field Strength of Spurious Radiation

Measurements Required

Measurements shall be made to detect spurious emissions that may be radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal conditions of installation and operation.

Test Arrangement



Preliminary radiated emissions investigation was made in a screen room to determine frequencies of emissions for investigation in the SAC. The transmitter spurious emissions were measured in the SAC. The EUT was placed on a turntable elevated as required above the ground plane at a distance of 3 meters from the FSM antenna. The turntable was rotated though 360 degrees to locate the position registering the highest amplitude emission. The frequency spectrum was then searched for spurious emissions generated from the transmitter. Raising and lowering the FSM antenna and rotating the turntable to maximize the emission. Data was measured and recorded for the maximum amplitude of each spurious emission. A Loop antenna was used for measuring emissions from 0.009 to 30 MHz, Biconilog Antenna for 30 to 1000 MHz, Double-Ridge, and/or Pyramidal Horn Antennas above 1 GHz. Emissions were measured in dBµV/m @ 3 meters. The substitution method was used to measure harmonic emissions. Harmonic emission levels from the EUT were measured and amplitude levels were recorded. The EUT transmitter was then removed and replaced with a substitution antenna, which was powered from a signal generator. The output signal from the generator was then adjusted such

that the amplitude received was the same as that previously recorded for each frequency. This step was repeated for both horizontal and vertical polarizations. The power in dBm required to produce the desired signal level was then recorded from the signal generator. The power in dBm was then calculated by reducing the previous readings by the gain in the substitution antenna.

The limits for the spurious radiated emissions are defined by the following equation.

Limit = Amplitude of the spurious emission must be attenuated by this amount below the level of the fundamental. On any frequency removed from the assigned frequency outside the assigned sub-band edges: at least 55 + 10 Log (P_o) dB.

Emission requirement for 2.0-watt transmitter power requires spurious emissions be attenuated at least 58.0 dBc below the carrier.

$$\text{Attenuation} = 55 + 10\ \text{Log}_{10}(P_w)$$
$$= 55 + 10\ \text{Log}_{10}(2.0)$$
$$= 58.0\ \text{dBc}$$

Data was taken per 2.1053 and applicable parts of 47CFR 90. The EUT demonstrated compliance with the specifications of Paragraphs 47CFR 2.1053, 2.1057 and 90.210(k) and RSS-137 paragraph 6.5. There are no deviations to the specifications.

Table 5 General Radiated Emission Results (worst-case)

Frequency	Amplitude of Emission (dBμV)		ERP (dBm)		Emission level below carrier (dBc)		Limit (dBc)
MHz	Horizontal	Vertical	Horizontal	Vertical	Horizontal	Vertical	
240.0	38.3	33.5	-56.9	-61.7	89.9	94.7	58
500.0	39.3	32.7	-55.9	-62.5	88.9	95.5	58
520.0	19.5	24.5	-75.7	-70.7	108.7	103.7	58
528.0	32.7	40.1	-62.5	-55.1	95.5	88.1	58
720.0	35.5	31.6	-59.7	-63.6	92.7	96.6	58
768.0	45.3	37.8	-49.9	-57.4	82.9	90.4	58
816.0	42.5	37.5	-52.7	-57.7	85.7	90.7	58
864.0	45.6	41.4	-49.6	-53.8	82.6	86.8	58
960.0	45.5	44.4	-49.7	-50.8	82.7	83.8	58

Annex

- Annex A Measurement Uncertainty Calculations
- Annex B Test Equipment
- Annex C Laboratory Certificate of Accreditation

Annex A Measurement Uncertainty Calculations

The measurement uncertainty was calculated for all measurements listed in this test report according To CISPR 16–4. Result of measurement uncertainty calculations are recorded below. Component and process variability of production devices similar to those tested may result in additional deviations. The manufacturer has the sole responsibility of continued compliance.

Measurement	Expanded Measurement Uncertainty $U_{(lab)}$
3 Meter Horizontal 0.009-1000 MHz Measurements	4.16
3 Meter Vertical 0.009-1000 MHz Measurements	4.33
3 Meter Measurements 1-18 GHz	5.46
3 Meter Measurements 18-40 GHz	5.16
10 Meter Horizontal Measurements 0.009-1000 MHz	4.15
10 Meter Vertical Measurements 0.009-1000 MHz	4.32
AC Line Conducted	1.75
Antenna Port Conducted power	1.17
Frequency Stability	1.00E-11
Temperature	1.6˚C
Humidity	3%

Annex B Test Equipment

Equipment	Manufacturer	Model (SN)	Band	Last Cal Date	Next Cal Due
☐ AC Power Source	Ametech / California Instruments	??	N/A	2/18/2023	2/18/2024
☐ Amplifier	Com-Power	PA-010 (171003)	100Hz-30MHz	9/26/2023	9/26/2024
☐Amplifier	Com-Power	CPPA-102 (01254)	1-1000 MHz	9/26/2023	9/26/2024
√ Amplifier	Com-Power	PAM-118A (551014)	0.5-18 GHz	9/26/2023	9/26/2024
√ Amplifier	Com-Power	PAM-840A (461328)	18-40 GHz	9/26/2023	9/26/2024
√ Analyzer	Rohde & Schwarz	ESU40 (100108)	20Hz-40GHz	6/26/2023	6/26/2024
√ Analyzer	Rohde & Schwarz	ESW44 (101534)	20Hz-44GHz	1/26/2024	1/26/2025
☐ Analyzer	Rohde & Schwarz	FS-Z60, 90, 140, and 220	40GHz-220GHz	12/22/2017	12/22/2027
√ Analyzer	HP	8562A (3051A05950)	9kHz-125GHz	3/25/2024	3/25/2025
√ Antenna	Com Power	AL-130 (121055)	.001-30 MHz	9/26/2023	9/26/2024
☐ Antenna	ARA	BCD-235-B (169)	20-350MHz	9/26/2023	9/26/2024
√ Antenna	Sunol	JB-6 (A100709)	30-1000 MHz	11/8/2023	11/8/2024
☐ Antenna	ETS-Lindgren	3147 (40582)	200-1000MHz	9/26/2023	10/11/2024
√ Antenna	ETS-Lindgren	3117 (200389)	1-18 GHz	3/25/2024	3/25/2026
√ Antenna	Com Power	AH-118 (10110)	1-18 GHz	10/11/2022	10/11/2024
√ Antenna	Com Power	AH-1840 (101046)	18-40 GHz	3/27/2023	3/27/2025
☐ Antenna	EMCO	6509	.001-30 MHz	10/11/2022	10/11/2024
☐ Antenna	Solar	9229-1 & 9230-1	??	2/18/2023	2/18/2024
☐ Attenuator	Fairview	SA6NFNF100W-40 (1625)	30-18000 MHz	3/25/2024	3/25/2025
√ Attenuator	Mini-Circuits	VAT-3W2+ (1436)	30-6000 MHz	3/25/2024	3/25/2025
√ Attenuator	Mini-Circuits	VAT-3W2+ (1445)	30-6000 MHz	3/25/2024	3/25/2025
√ Attenuator	Mini-Circuits	VAT-3W2+ (1735)	30-6000 MHz	3/25/2024	3/25/2025
☐ Attenuator	Mini-Circuits	VAT-6W2+ (1438)	30-6000 MHz	3/25/2024	3/25/2025
☐ Attenuator	Mini-Circuits	VAT-6W2+ (1736)	30-6000 MHz	3/25/2024	3/25/2025
√ Cable	Huber & Suhner Inc.	Sucoflex102ea(L10M)(303073)	9kHz-40Ghz	9/26/2023	9/26/2024
√ Cable	Huber & Suhner Inc.	Sucoflex102ea(1.5M)(303069)	9kHz-40Ghz	9/26/2023	9/26/2024
☐ Cable	Huber & Suhner Inc.	Sucoflex102ea(1.5M)(303070)	9kHz-40Ghz	9/26/2023	9/26/2024
√ Cable	Belden	RG-58 (L1-CAT3-11509)	9kHz-30 MHz	9/26/2023	9/26/2024
☐ Cable	Belden	RG-58 (L2-CAT3-11509)	9kHz-30 MHz	9/26/2023	9/26/2024
√ Cable	Huber & Suhner Inc.	Sucoflex102ea(1.5M)(303072) 9kHz-40 GHz	9kHz-40Ghz	9/26/2023	9/26/2024
√ Cable	Huber & Suhner Inc.	Sucoflex102ea(L1M)(281183) 9kHz-40 GHz	9kHz-40Ghz	9/26/2023	9/26/2024
√ Cable	Huber & Suhner Inc.	Sucoflex102ea(L4M)(281184) 9kHz-40 GHz	9kHz-40Ghz	9/26/2023	9/26/2024
√ Cable	Huber & Suhner Inc.	Sucoflex102ea(L10M)(317546)9kHz-40 GHz	9kHz-40Ghz	9/26/2023	9/26/2024
√ Cable	Time Microwave	4M-750HF290-750 (S/N-L4M)	9kHz-24 GHz	9/26/2023	9/26/2024
☐ Cable	Mini-Circuits	KBL-2M-LOW+ (23090329)	9kHz-40Ghz	3/25/2024	3/25/2025

Equipment	Manufacturer	Model (SN)	Band	Last Cal Date	Next Cal Due
☐ CDN	Com-Power	CDN325E		10/11/2022	10/11/2024
☐ EMC Transient Generator HVT	EMC?	TR3000		2/18/2023	2/18/2024
☐ ESD Simulator	??	MZ-15	N/A	2/18/2023	2/18/2024
☐ Field Intensity Meter	??	EFM-018	??	2/18/2023	2/18/2024
☐ Frequency Counter	Leader	LDC-825	??	3/28/2023	3/28/2025
√ Generator	Rohde & Schwarz	SMB100A6 (100150)	20Hz-6 GHz	3/25/2024	3/25/2025
√ Generator	Rohde & Schwarz	SMBV100A6 (260771)	20Hz-6 GHz	3/25/2024	3/25/2025
☐ ISN	Com-Power	ISN T-8 (600111)	??	3/25/2024	3/25/2025
√ LISN	Fischer Custom Communications	FCC-LISN-50-25-10(1PA) (160611)	.15-30MHz	3/25/2024	3/25/2025
☐ LISN	Fischer Custom Communications	FCC-LISN-50-16-2-08		3/25/2024	3/25/2025
☐ LISN	Compliance Design	FCC-LISN-2.Mod.cd,(126)	.15-30MHz	9/26/2023	10/11/2024
☐ LISN	Com-Power	LI-220A	??	3/29/2023	3/29/2025
√ LISN	Com-Power	LI-550C	??	9/26/2023	10/11/2024
☐ Oscilloscope Scope	Tektronix	MDO 4104	??	2/18/2023	2/18/2024
√ Power meter	Agilent	N1911A with N1921A	0.05-40 GHz	3/28/2023	3/28/2025
√ Pwr Sensor	Rohde & Schwarz	NRP33T	0.05-33 GHz	9/26/2023	9/26/2025
√ RF Filter	Micro-Tronics	BRC50722 (009).9G notch	30-18000 MHz	3/25/2024	3/25/2025
☐ RF Filter	Micro-Tronics	HPM50114 (017)1.5G HPF	30-18000 MHz	3/25/2024	3/25/2025
☐ RF Filter	Micro-Tronics	HPM50117 (063) 3G HPF	30-18000 MHz	3/25/2024	3/25/2025
☐ RF Filter	Micro-Tronics	HPM50105 (059) 6G HPF	30-18000 MHz	3/25/2024	3/25/2025
√ RF Filter	Micro-Tronics	BRM50702 (172) 2G notch	30-18000 MHz	3/25/2024	3/25/2025
√ RF Filter	Micro-Tronics	BRC50703 (G102) 5G notch	30-18000 MHz	3/25/2024	3/25/2025
√ RF Filter	Micro-Tronics	BRC50705 (024) 5G notch	30-18000 MHz	3/25/2024	3/25/2025
☐ RF Filter	Micro-Tronics	BRC17663 (001)	9.3-9.5 notch 30-1800 MHz	3/28/2023	3/28/2025
☐ RF Filter	Micro-Tronics	BRC19565 (001)	9.2-9.6 notch 30-1800 MHz	3/28/2023	3/28/2025
☐ Wave Form Generator	Keysight	33512B (MY57400128)	??	3/29/2022	3/25/2026
☐ Weather station	Davis	6152 (A70927D44N)	N/A	7/13/2022	7/14/2024
√ Generator	Rohde & Schwarz	SMBV100A6 (101844)	20Hz-6 GHz	3/07/2024	9/17/2025

NVLAP Lab Code 200087-0

Annex C Laboratory Certificate of Accreditation

3/18/24 through 3/31/25:

United States Department of Commerce
National Institute of Standards and Technology

Certificate of Accreditation to ISO/IEC 17025:2017

NVLAP LAB CODE: 200087-0

Rogers Labs, a division of The Compatibility Center LLC
Lenexa, KS

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

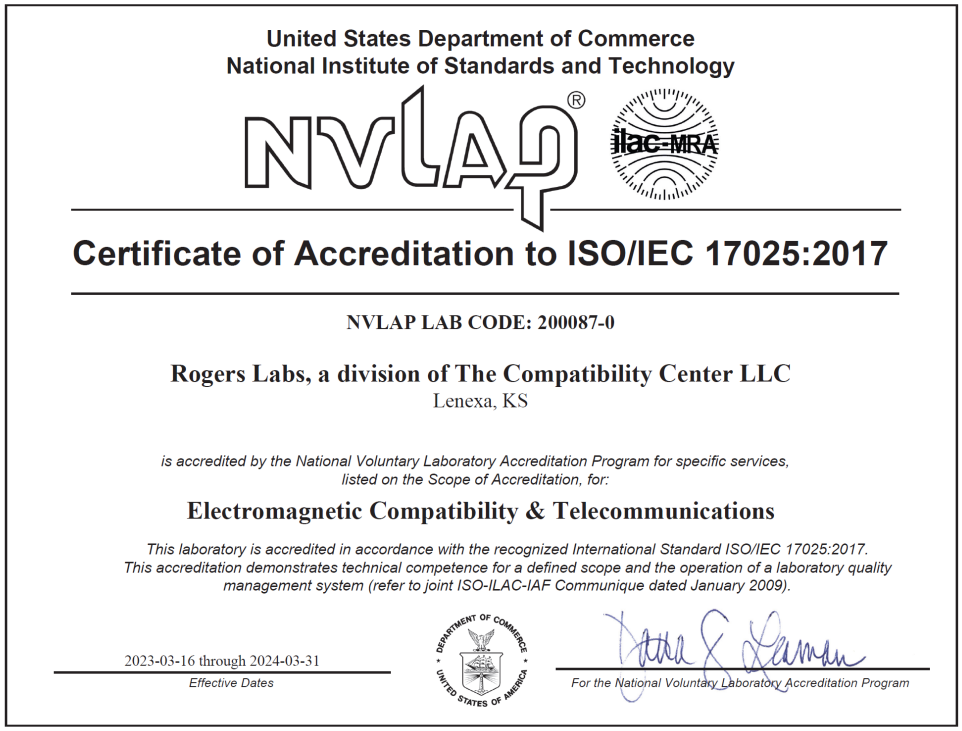
Electromagnetic Compatibility & Telecommunications

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).

2024-03-18 through 2025-03-31
Effective Dates

For the National Voluntary Laboratory Accreditation Program

3/16/23 through 3/31/24:



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2023-03-16 through 2024-03-31
Effective Dates

For the National Voluntary Laboratory Accreditation Program