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45462016 r2.0

Test Report Date:

26 August 2025

Project Number:

1685

## EMC Test Report - C2PC

Applicant:



**4RF Limited**  
**PO Box 13-506**  
**Wellington 6440**  
**New Zealand**

FCC ID:

**UIPSQ400M1311**

Product Model Number / HVIN

**SQ400M131**

Product Name / PMN

**Aprisa SR+ 400**

In Accordance With:

**FCC 47 CFR Part 90**

Private Land Mobile Radio Service

Approved By:

**Ben Hewson, President**

Celltech Labs Inc.  
21-364 Lougheed Rd.  
Kelowna, BC, V1X 7R8  
Canada



Test Lab Certificate: 2470.01



**Industry  
Canada**

IC Registration 3874A



FCC Registration: CA3874

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## 1.0 REVISION HISTORY

Revision History				
Samples Tested By:		Art Voss, P.Eng.	Date(s) of Evaluation:	24 June - 14 August 2025
Report Prepared By:		Art Voss, P.Eng.	Report Reviewed By:	Ben Hewson
Report Revision	Description of Revision	Revised Section	Revised By	Revision Date
1.0	Initial Release	n/a	Art Voss	14 August 2025
2.0	Corrected Antenna Gain Information	2.0	Art Voss	26 August 2025

## 2.0 CLIENT AND DUT INFORMATION

Client Information		
Applicant Name (FCC)	4RF Limited	
Applicant Address (FCC)	PO Box 13-506	
	Wellington 6440,	
	New Zealand	
DUT Information		
Device Identifier(s):	FCC ID:	UIPSQ400M131
Device Type:	Digital Transceiver	
Device Model(s) / HVIN:	SQ928M141	
Device Marketing Name / PMN:	Aprisa SR+ 400	
Test Sample Serial No.:	R5310007053	
Equipment Class (FCC):	TNB - Licensed Non-Broadcast Station Transmitter	
Transmit Frequency Range:	Part 90: 406.1-470MHz	
Test Channels:	Programmable	
Manuf. Max. Rated Output Power:	10dBm (10mW) to 37dBm (5W), Field-Programmable	
Manuf. Max. Rated BW:	Part 90. 12.5kHz, 25kHz	
Antenna Type and Gain:	Max: 15dBi (12.85dBd)	
Modulation:	QPSK, 16QAM, 64QAM, 256QAM	
Mode:	Half Duplex	
DUT Power Source:	10 - 30VDC	
DUT Dimensions [HxWxD] (mm)	H x W x D: 40mm x 140mm x 210mm.	
Deviation(s) from standard/procedure:	None	
Modification of DUT:	None	

### \*\*\* NOTE \*\*\*

The Aprisa SR+ must be professionally installed by trained and qualified installers. The installer must ensure regulatory compliance to the requirements and standards cited herein and to the local requirements in place at the time of installation. When the maximum permissible Effective Radiated Power (ERP) or Equivalent Isotropic Radiated Power (EIPR) is regulated, knowledge of the regulation, antenna gain and feeder cable loss must be known by the installer prior to adjusting the Maximum Transmit Output Power of the Aprisa SR+.

### 3.0 SCOPE

#### Preface:

This Certification Report was prepared on behalf of:

#### 4RF Limited

, (the '*Applicant*'), in accordance with the applicable Federal Communications Commission (FCC) CFR 47 and Innovation, Scientific and Economic Development (ISED) Canada rules parts and regulations (the '*Rules*'). The scope of this investigation was limited to only the equipment, devices and accessories (the '*Equipment*') supplied by the *Applicant*. The tests and measurements performed on this *Equipment* were only those set forth in the applicable *Rules* and/or the Test and Measurement Standards they reference. The *Rules* applied and the Test and Measurement Standards used during this evaluation appear in the Normative References section of this report. The limits set forth in the technical requirements of the applicable *Rules* were applied to the measurement results obtained during this evaluation and ,unless otherwise noted, these limits were used as the Pass/Fail criteria. The Pass/Fail statements made in this report apply to only the tests and measurements performed on only the *Equipment* tested during this evaluation. Where applicable and permissible, information including test and measurement data and/or results from previous evaluations of same or similar equipment, devices and/or accessories may be cited in this report.

#### Device:

The Aprisa SR+400, FCC ID: UIPSQ400M1311, is a digital Land Mobile trasceiver. The transceiver synthesizers are being replaced and are not pin-to-pin compatible. All other aspects of the transmitter with regards to output power, bands of operation, bandwidths and modulations have not been changed from those in the previous filings.

#### Requirement:

As per FCC KDB 388624 D02v18r07, a C2PC (C2PCPX) using the procedures of FCC KDB 178919 (Notificationb 202109-001) is being sought.

#### Application:

This is an application for a C2PC.

#### Scope:

The scope of this investigation is limited to the evaluation and reporting of the wanted and spurious emissions in accordance with the rule parts cited in Normative References section of this report.

#### 4.0 TEST RESULT SUMMARY

TEST SUMMARY					
Section	Description of Test	Procedure Reference	Applicable Rule Part(s) FCC	Test Date	Result
<b>7.0</b>	Conducted Power (Fundamental)	ANSI C63.26-2015	§90.205	24 June 2025	Pass
<b>8.0</b>	Occupied Bandwidth	ANSI C63.26-2015	§90.209	24 June 2025	Pass
<b>9.0</b>	Emissions Mask	ANSI C63.26-2015	§90.210	24 June 2025	Pass
<b>10.0</b>	Antenna Port Conducted Spurious	ANSI C63.26-2015	§90.210	24 June 2025	Pass
<b>11.0</b>	Radiated Tx Spurious Emissions	ANSI C63.26-2015	§90.210	25 June 2025	Pass
<b>12.0</b>	Radiated Rx Spurious Emissions	ANSI C63.4-2014	§15B	14 Aug 2025	Pass

Test Station Day Log					
Date	Ambient Temp (°C)	Relative Humidity (%)	Barometric Pressure (kPa)	Test Station	Tests Performed Section(s)
24 June 2025	25.3	26	103.1	<b>EMC</b>	<b>7, 8, 9, 10</b>
25 June 2025	27.3	49	102.6	<b>OATS</b>	<b>11</b>
14 Aug 2025	21.0	53	101.4	<b>OATS</b>	<b>12</b>

**EMC** - EMC Test Bench

**OATS** - Open Area Test Site

**LISN** - LISN Test Area

**IMM** - Immunity Test Area


**SAC** - Semi-Anechoic Chamber

**TC** - Temperature Chamber

**ESD** - ESD Test Bench

**RI** - Radiated Immunity Chamber

I attest that the data reported herein is true and accurate within the tolerance of the Measurement Instrument Uncertainty; that all tests and measurements were performed in accordance with accepted practices or procedures; and that all tests and measurements were performed by me or by trained personnel under my direct supervision. The results of this investigation are based solely on the test sample(s) provided by the client which were not adjusted, modified or altered in any manner whatsoever, except as required to carry out specific tests or measurements. This test report has been completed in accordance with ISO/IEC 17025.



Art Voss, P.Eng.  
Technical Manager  
Celltech Labs Inc.

14 August 2025

Date



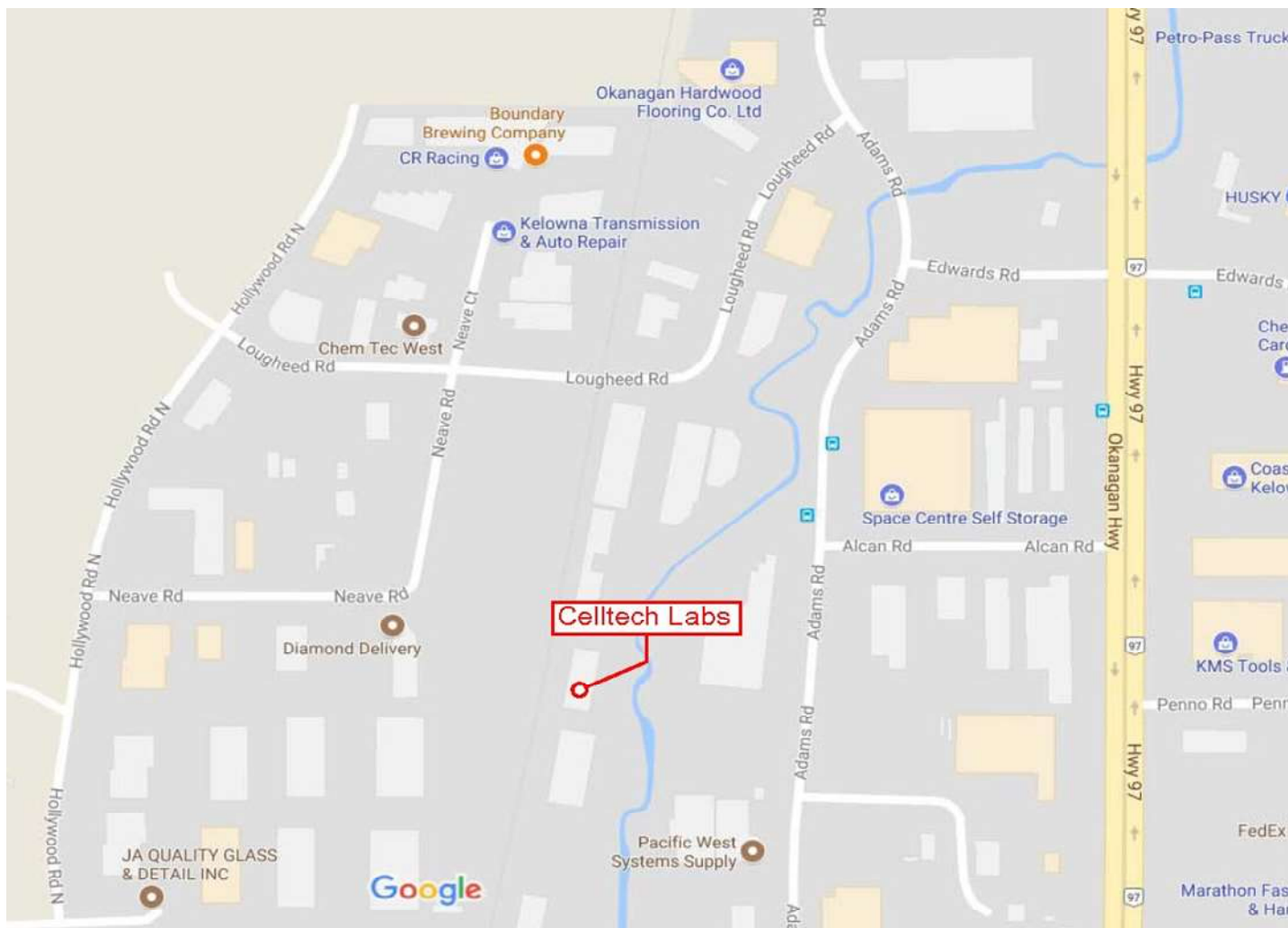
## 5.0 NORMATIVE REFERENCES

Normative References	
ISO/IEC 17025:2017	General requirements for the competence of testing and calibration laboratories
ANSI C63.4-2014	American National Standard of Procedures for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electric and Electronic Equipment in the Range of 9kHz to 40GHz
ANSI C63.4A-2017	American National Standard of Procedures for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electric and Electronic Equipment in the Range of 9kHz to 40GHz Amendment 1: Test Site Validation
ANSI C63.26-2015	American National Standard of Procedures for Compliance Testing of Transmitters Used in Licensed Radio Services
CFR	Code of Federal Regulations Title 47: Telecommunication Part 2: Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
CFR	Code of Federal Regulations Title 47: Telecommunication Part 15: Radio Frequency Devices Subpart B: Unintentional Radiators
CFR	Code of Federal Regulations Title 47: Telecommunication Part 90: Private Land Mobile Radio Services Sub Part I: General Technical Standards

## 6.0 FACILITIES AND ACCREDITATIONS

### Facility and Accreditation:

The facilities used to evaluate this device outlined in this report are located at 21-364 Lougheed Road, Kelowna, British Columbia, Canada V1X 7R8. The radiated emissions site (OATS) conforms to the requirements set forth in ANSI C63.4 and is filed and listed with the FCC under Test Firm Registration Number CA3874 and Industry Canada under Test Site File Number IC 3874A. Celltech is accredited to ISO 17025, through accrediting body A2LA and with certificate 2470.01.





## 7.0 CONDUCTED OUTPUT POWER

### Test Procedure

<b>Normative</b>	FCC 47 CFR §90.203, §90.265, §90.279
<b>References</b>	ANSI C63.26

### Requirement / Limits

	<b>§90.279 Power limitations applicable to the 421-430 MHz band.</b>
47 CFR §90.279(a)	250W ERP

<b>Test Setup</b>	<b>Appendix A - Figure A.1</b>
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### Measurement Procedure

The DUT was connected to the SA as specified above via a 30dB attenuator. The DUT was configured to transmit unmodulated at its highest output power. The Conducted Power was measured using the instrument's Marker Peak function and recorded.

See Appendix D for Measurement Plots

**Table 7.1 - Summary of Conduct Power Measurements, 12.5kHz Bandwidth**

Conducted Power Measurement Results: FCC											
Frequency  Band (MHz)	Channel  Frequency (MHz)	Channel  Bandwidth (kHz)	Modulation	Meas.  Detector <sup>(2)</sup>	Measured Power <sup>(1)</sup> [P <sub>Meas.</sub> ] (dBm)	Antenna Gain [G] (dBd)	ERP Power [P <sub>erp.</sub> ] (dBm)	Limit [P <sub>Lim.</sub> ] (dBm)	Margin (dB)	Rated Power [P <sub>rated</sub> ] (dBm)	Delta <sup>(3)</sup> Rated Power (dB)
406.1-420	413.0	12.50	QPSK	RMS	37.00	0.85	37.85	54	16.2	37	0.00
421-430	425.5				36.99		37.84		16.2		-0.01
450-470	460.0				37.02		37.87		16.1		0.02
Result:											Complies
(1) Path Loss, including cable, attenuator and connectors, accounted for in the instrument's Transducer Factor (TDF) Approximate Path Loss (worst case) = 0.6dB @1GHz ERP [P <sub>erp</sub> ] = [P <sub>meas</sub> ] + [G](dBd) Margin = [P <sub>lim</sub> ] - [P <sub>erp</sub> ]											
(2) Per RSS-119 4.2.2, PEAK mode is required for compliance to Mask D.											
(3) Delta Rated Power = [P <sub>meas</sub> ] - [P <sub>rated</sub> ]. Note: There is no rated power for PEAK measurements.											
Note: Maximum Output Power is field-programable.											

**Table 7.2 - Summary of Conduct Power Measurements, 25kHz Bandwidth**

Conducted Power Measurement Results: FCC											
Frequency  Band (MHz)	Channel  Frequency (MHz)	Channel  Bandwidth (kHz)	Modulation	Meas.  Detector	Measured Power <sup>(1)</sup> [P <sub>Meas</sub> ] (dBm)	Antenna Gain [G] (dBd)	ERP Power [P <sub>erp</sub> ] (dBm)	Limit [P <sub>Lim</sub> ] (dBm)	Margin (dB)	Rated Power [P <sub>rated</sub> ] (dBm)	Delta <sup>(2)</sup> Rated Power (dB)
406.1-420	413.0	25.00	QPSK	RMS	37.05	0.85	37.90	54	16.1	37	0.05
421-430	425.5				37.12		37.97		16.0		0.12
450-470	460.0				37.16		38.01		16.0		0.16
Result:											Complies
(1) Path Loss, including cable, attenuator and connectors, accounted for in the instrument's Transducer Factor (TDF) Approximate Path Loss (worst case) = 0.6dB @1GHz ERP [P <sub>erp</sub> ] = [P <sub>meas</sub> ] + [G](dBd) Margin = [P <sub>lim</sub> ] - [P <sub>erp</sub> ]											
(2) Delta Rated Power = [P <sub>meas</sub> ] - [P <sub>rated</sub> ].											
Note: Maximum Output Power is field-programable.											

**\*\*\* NOTE \*\*\***

The Aprisa SR+ must be professionally installed by trained and qualified installers. The installer must ensure regulatory compliance to the requirements and standards cited herein and to the local requirements in place at the time of installation. When the maximum permissible Effective Radiated Power (ERP) or Equivalent Isotropic Radiated Power (EIPR) is regulated, knowledge of the regulation, antenna gain and feeder cable loss must be known by the installer prior to adjusting the Maximum Transmit Output Power of the Aprisa SR+.

## 8.0 OCCUPIED BANDWIDTH

### Test Procedure

<b>Normative</b>	FCC 47 CFR §90.209(b)(5)
<b>References</b>	ANSI C63.26

### Requirement / Limits

	<b>§90.209(b)(5) Bandwidth limitations.</b>
47 CFR §90.209(b)(5)	(5) Unless specified elsewhere, channel spacings and bandwidths that will be authorized in the following frequency bands are given in the following table
§90.209(b)(5) Table 1	<b>Authorized Bandwidth (kHz)</b>
	406-512: 20 / 11.25 / 6

<b>Test Setup</b>	<b>Appendix A - Figure A.1</b>
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### Measurement Procedure

The DUT was connected to a Spectrum Analyzer via a 30dB attenuator. The DUT was configured to transmit modulated at its highest output power. The Occupied Bandwidth was measured using the instrument's 99% Bandwidth function and recorded for each applicable bandwidth and modulation.

See Appendix E for Measurement Plots

**Table 8.1 - Summary of Occupied Bandwidth Measurements, 12.5kHz Bandwidth**

99% Occupied Bandwidth Results:					
Frequency  Band  (kHz)	Channel  Frequency  (MHz)	Channel  Bandwidth  (kHz)	Modulation	Measured  Occupied Bandwidth  (kHz)	Emission  Designator
406.1-420	413.00	12.5	QPSK	10.5	10K5G1D
			16QAM	10.7	10K7D1D
			64QAM	10.7	10K7D1D
			256QAM	10.6	10K6D1D
421-430	425.50		QPSK	10.6	10K6G1D
			16QAM	10.7	10K7D1D
			64QAM	10.6	10K6D1D
			256QAM	10.9	10K9D1D
450-470	460.00		QPSK	10.5	10K5G1D
			16QAM	10.7	10K7D1D
			64QAM	10.6	10K6D1D
			256QAM	10.6	10K6D1D
Result:				Complies	

**Table 8.3 - Summary of Occupied Bandwidth Measurements, 25kHz Bandwidth**

99% Occupied Bandwidth Results:					
Frequency  Band  (kHz)	Channel  Frequency  (MHz)	Channel  Bandwidth  (kHz)	Modulation	Measured  Occupied Bandwidth  (kHz)	Emission  Designator
406.1-420	413.00	25.0	QPSK	19.2	19K2G1D
			16QAM	19.2	19K2D1D
			64QAM	19.1	19K1D1D
			256QAM	19.0	19K0D1D
421-430	425.50		QPSK	19.0	19K0G1D
			16QAM	19.1	19K1D1D
			64QAM	19.0	19K0D1D
			256QAM	19.1	19K1D1D
450-470	460.00		QPSK	19.0	19K0G1D
			16QAM	19.1	19K1D1D
			64QAM	18.9	18K9D1D
			256QAM	19.4	19K4D1D
Result:				Complies	

## 9.0 CONDUCTED SPURIOUS EMISSIONS – EMISSIONS MASK

### Test Procedure

<b>Normative</b>	<b>FCC 47 CFR §90.210</b>
<b>References</b>	<b>ANSI C63.26</b>

### Requirement / Limits

47 CFR §90.210	<b>§90.210 Emission Mask</b>
	<b>Emission Mask D</b> —12.5 kHz channel bandwidth equipment. For transmitters designed to operate with a 12.5 kHz channel bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:
	(1) On any frequency from the center of the authorized bandwidth $f_0$ to 5.625 kHz removed from $f_0$ : Zero dB.
	On any frequency removed from the center of the authorized bandwidth by a displacement frequency ( $f_d$ in kHz) of more than 5.625 kHz but no more than 12.5 kHz: At least $7.27(f_d - 2.88 \text{ kHz})$ dB.
	(3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency ( $f_d$ in kHz) of more than 12.5 kHz: At least $50 + 10 \log(P)$ dB or 70 dB, whichever is the lesser attenuation.
	<b>(b) Emission Mask B.</b> For transmitters that are equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) as follows:
	(1) On any frequency removed from the assigned frequency by more than 50 percent, but not more than 100 percent of the authorized bandwidth: At least 25 dB.
	(2) On any frequency removed from the assigned frequency by more than 100 percent, but not more than 250 percent of the authorized bandwidth: At least 35 dB.
	(3) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least $43 + 10 \log(P)$ dB.

<b>Test Setup</b>	<b>Appendix A - Figure A.1</b>
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### Measurement Procedure

The DUT was connected to a Spectrum Analyzer via a 30dB attenuator. The DUT was configured to transmit modulated at its highest output power. The emissions mask was created in the SA and the SA Reference Level was set to the DUT's maximum rated power. The SA's Limit Check (Pass/Fail) was enabled and the results recorded for each applicable bandwidth and modulation.

See Appendix F for Measurement Plots

Table 9.1 - Summary of Emissions Mask Measurements, 12.5kHz Bandwidth

Emissions Mask Results									
Channel Band (MHz)	Channel Frequency (MHz)	Channel Bandwidth (kHz)	Modulation	Meas. Detector	Mask ID	Measured Power [P <sub>meas</sub> ] (dBm)	Instrument RL [RL] (dBm)	Mask Offset <sup>(1)</sup> [Offset] (dB)	Mask Results
406.1-420	413.0	12.5	QPSK	RMS	D	37.00	50.00	-13.00	PASS
421-430	425.5					36.99		-13.01	PASS
450-470	460.0					37.02		-12.98	PASS
Result:									Complies
(1) Mask Offset [Offset] if the difference between the measured power [P <sub>meas</sub> ] and the Instrument Reference Level [RL]. [Offset] = [P <sub>meas</sub> ] - [RL]									
Note: Path Loss, including cable, attenuator and connectors, accounted for in the instrument's Transducer Factor (TDF) Approximate Path Loss (worst case) = 0.6dB @1GHz									

Table 9.2 - Summary of Emissions Mask Measurements, 25kHz Bandwidth

Emissions Mask Results									
Channel Band (MHz)	Channel Frequency (MHz)	Channel Bandwidth (kHz)	Modulation	Meas. Detector	Mask ID	Measured Power [P <sub>meas</sub> ] (dBm)	Instrument RL (dBm)	Mask Offset <sup>(1)</sup> [Offset] (dB)	Mask Results
406.1-420	413.0	12.5	QPSK	RMS	D	37.05	50.00	-12.95	PASS
421-430	425.5					37.12		-12.88	PASS
450-470	460.0					37.16		-12.84	PASS
Result:									Complies
(1) Mask Offset [Offset] if the difference between the measured power [P <sub>meas</sub> ] and the Instrument Reference Level [RL].									
[Offset] = [P <sub>meas</sub> ] - [RL]									
Note: Path Loss, including cable, attenuator and connectors, accounted for in the instrument's Transducer Factor (TDF)									
Approximate Path Loss (worst case) = 0.6dB @1GHz									

## 10.0 CONDUCTED SPURIOUS EMISSIONS TO 10<sup>TH</sup> HARMONIC

### Test Procedure

<b>Normative</b>	<b>FCC 47 CFR §90.210</b>
<b>References</b>	<b>ANSI C63.26</b>

### Requirement / Limits

47 CFR §90.210	<b>§90.210 Emission Mask</b>
	<b>Emission Mask D</b> —12.5 kHz channel bandwidth equipment. For transmitters designed to operate with a 12.5 kHz channel bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:
	(1) On any frequency from the center of the authorized bandwidth $f_0$ to 5.625 kHz removed from $f_0$ : Zero dB.
	On any frequency removed from the center of the authorized bandwidth by a displacement frequency ( $f_d$ in kHz) of more than 5.625 kHz but no more than 12.5 kHz: At least $7.27(f_d - 2.88 \text{ kHz})$ dB.
	(3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency ( $f_d$ in kHz) of more than 12.5 kHz: At least $50 + 10 \log(P)$ dB or 70 dB, whichever is the lesser attenuation.
	<b>(b) Emission Mask B.</b> For transmitters that are equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) as follows:
	(1) On any frequency removed from the assigned frequency by more than 50 percent, but not more than 100 percent of the authorized bandwidth: At least 25 dB.
	(2) On any frequency removed from the assigned frequency by more than 100 percent, but not more than 250 percent of the authorized bandwidth: At least 35 dB.
	(3) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least $43 + 10 \log(P)$ dB.

<b>Test Setup</b>	<b>Appendix A - Figure A.1</b>
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### Measurement Procedure

The DUT was connected to a Spectrum Analyzer via a 30dB attenuator. The DUT was configured to transmit modulated at its highest output power. The emissions mask was created in the SA and the SA Reference Level was set to the DUT's maximum rated power. The SA's Limit Check (Pass/Fail) was enabled and the results recorded for each applicable bandwidth and modulation.

See Appendix G for Measurement Plots

**Table 10.1 - Summary of Conducted Spurious Emissions Measurements**

<b>Conducted Spurious Emissions Measurement Results:</b>							
<b>Frequency</b> <b>(MHz)</b>	<b>Modulation</b>	<b>Emission Power</b> <b>[P<sub>Em</sub>]</b> <b>(dBm)</b>	<b>Emission Frequency</b> <b>(MHz)</b>	<b>Fundamental Measurment</b> <b>[P<sub>Fund</sub>]</b> <b>(dBm)</b>	<b>Attenuation</b> <b>[Atten]</b> <b>(dB)</b>	<b>Limit</b> <b>(dB)</b>	<b>Margin</b> <b>(dB)</b>
460.00	QPSK	ND	ND	37.00	n/a	43	n/a
<b>Results:</b>						<b>Complies</b>	

Attenuation [Atten] = [P<sub>Fund</sub>] - [P<sub>Em</sub>]

Margin = Attenuation - Limit

ND = None Detected

n/a = Not Applicable



## 11.0 RADIATED TX SPURIOUS EMISSIONS

### Test Procedure

<b>Normative</b>	<b>FCC 47 CFR §90.210</b>
<b>References</b>	<b>ANSI C63.26</b>

### Requirement / Limits

47 CFR §90.210	<b>§90.210 Emission Mask</b>
	<b>Emission Mask D</b> —12.5 kHz channel bandwidth equipment. For transmitters designed to operate with a 12.5 kHz channel bandwidth, any emission must be attenuated below the power (P) of the highest emission contained within the authorized bandwidth as follows:
	(1) On any frequency from the center of the authorized bandwidth $f_0$ to 5.625 kHz removed from $f_0$ : Zero dB.
	On any frequency removed from the center of the authorized bandwidth by a displacement frequency ( $f_d$ in kHz) of more than 5.625 kHz but no more than 12.5 kHz: At least $7.27(f_d - 2.88 \text{ kHz})$ dB.
	(3) On any frequency removed from the center of the authorized bandwidth by a displacement frequency ( $f_d$ in kHz) of more than 12.5 kHz: At least $50 + 10 \log(P)$ dB or 70 dB, whichever is the lesser attenuation.
	<b>(b) Emission Mask B.</b> For transmitters that are equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) as follows:
	(1) On any frequency removed from the assigned frequency by more than 50 percent, but not more than 100 percent of the authorized bandwidth: At least 25 dB.
	(2) On any frequency removed from the assigned frequency by more than 100 percent, but not more than 250 percent of the authorized bandwidth: At least 35 dB.
	(3) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least $43 + 10 \log(P)$ dB.

<b>Test Setup</b>	<b>Appendix A - Figure A.1</b>
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### Measurement Procedure

The DUT was connected to a Spectrum Analyzer via a 30dB attenuator. The DUT was configured to transmit modulated at its highest output power. The emissions mask was created in the SA and the SA Reference Level was set to the DUT's maximum rated power. The SA's Limit Check (Pass/Fail) was enabled and the results recorded for each applicable bandwidth and modulation.

See Appendix H for Measurement Plots

Table 11.1 – Summary of Radiated Tx Emissions Measurements

Radiated Tx Spurious Emissions Measurement Results:							
Frequency (MHz)	Modulation	Emission FS [E <sub>Em</sub> ] (dBuV)	Emission Frequency (MHz)	Fundamental Measurment [E <sub>Fund</sub> ]* (dBuV)	Attenuation [Atten] (dB)	Limit (dB)	Margin (dB)
929.50	CW	ND	ND	26.70	n/a	43	n/a
Results:						Complies	

Attenuation [Atten] = [P<sub>Fund</sub>] - [E<sub>Em</sub>]

Margin = Attenuation - Limit

ND = None Detected

n/a = Not Applicable

\* Uncorrected

## 12.0 RADIATED RX SPURIOUS EMISSIONS

### Test Procedure

<b>Normative Reference</b>	FCC 47 CFR §15.109 ANSI C63.4-2014
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### Limits

47 CFR §15.109	(b) The field strength of radiated emissions from a Class A digital device, as determined at a distance of 10 meters, shall not exceed the following:	
	30-88MHz: 39.1dBuV/m	30-88MHz: 49.6dBuV/m @ 3m
	88-216MHz: 43.5dBuV/m	88-216MHz: 54.0dBuV/m @ 3m
	216-960MHz: 46.4dBuV/m	216-960MHz: 56.9dBuV/m @ 3m
	> 960MHz: 49.5dBuV/m	> 960MHz: 60.0dBuV/m @ 3m

<b>Test Setup</b>	<b>Appendix A</b>	<b>Figure A.2 to A.4</b>
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### Measurement Procedure

The DUT was set up as per ANSI C63.4:2014. Emissions were scanned between 30MHz and 1000MHz. The turntable was rotated 360 degrees and the antenna was elevated to 4m to optimize the measured emissions.

See Appendix I for Measurement Plots

**Table 12.1 – Summary of Radiated Rx Emissions Measurements**

Radiated Rx Spurious Emissions Measurement Results:					
Frequency (MHz)	Modulation	Emission FS [E <sub>Em</sub> ] (dBuV)	Emission Frequency (MHz)	Limit (dB)	Margin (dB)
n/a	n/a	ND	ND	-	n/a
Results:				Complies	

Attenuation [Atten] = [P<sub>Fund</sub>] - [P<sub>Em</sub>]

Margin = Attenuation - Limit

ND = None Detected

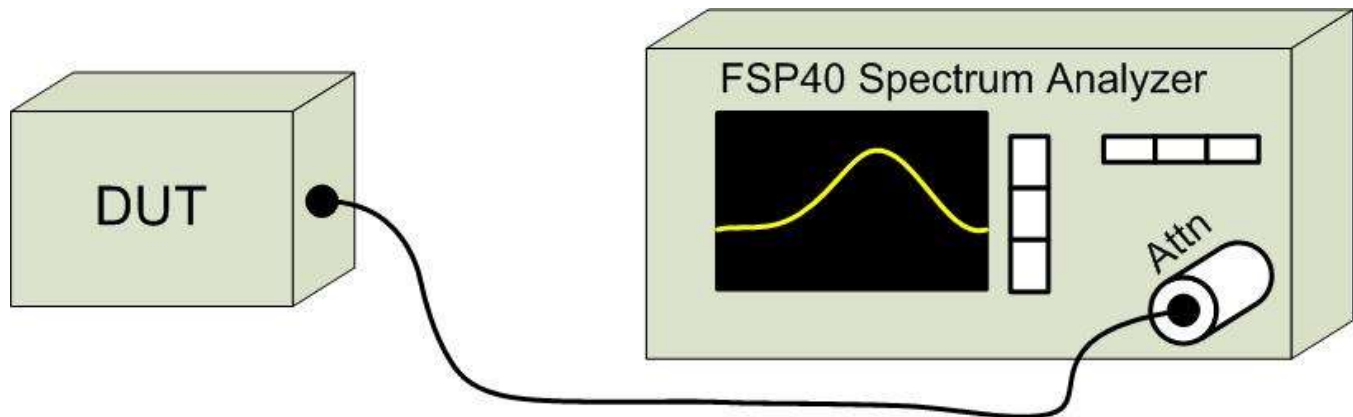
n/a = Not Applicable

## APPENDIX A – TEST SETUP DRAWINGS AND EQUIPMENT

Table A.1 – Setup - Conducted Measurements Equipment

Equipment List			
Asset Number	Manufacturer	Model Number	Description
00241	R&S	FSU40	Spectrum Analyzer

Figure A.1 – Test Setup Conducted Measurements

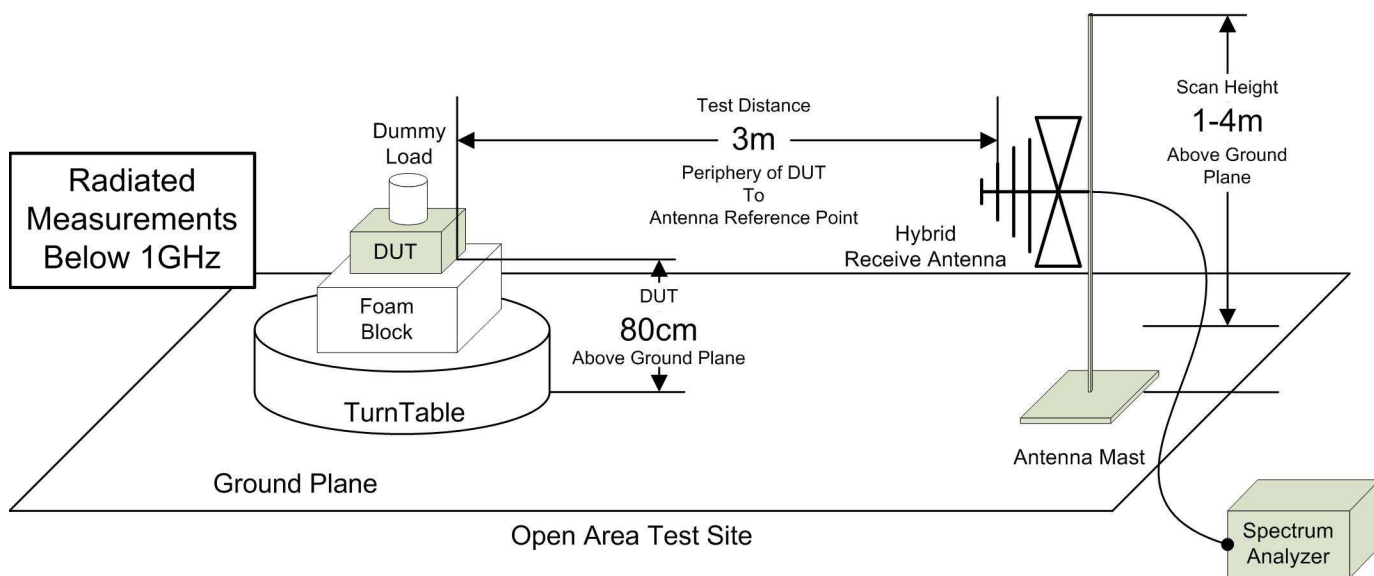


**Table A.2 – Setup - Radiated Emissions Equipment**

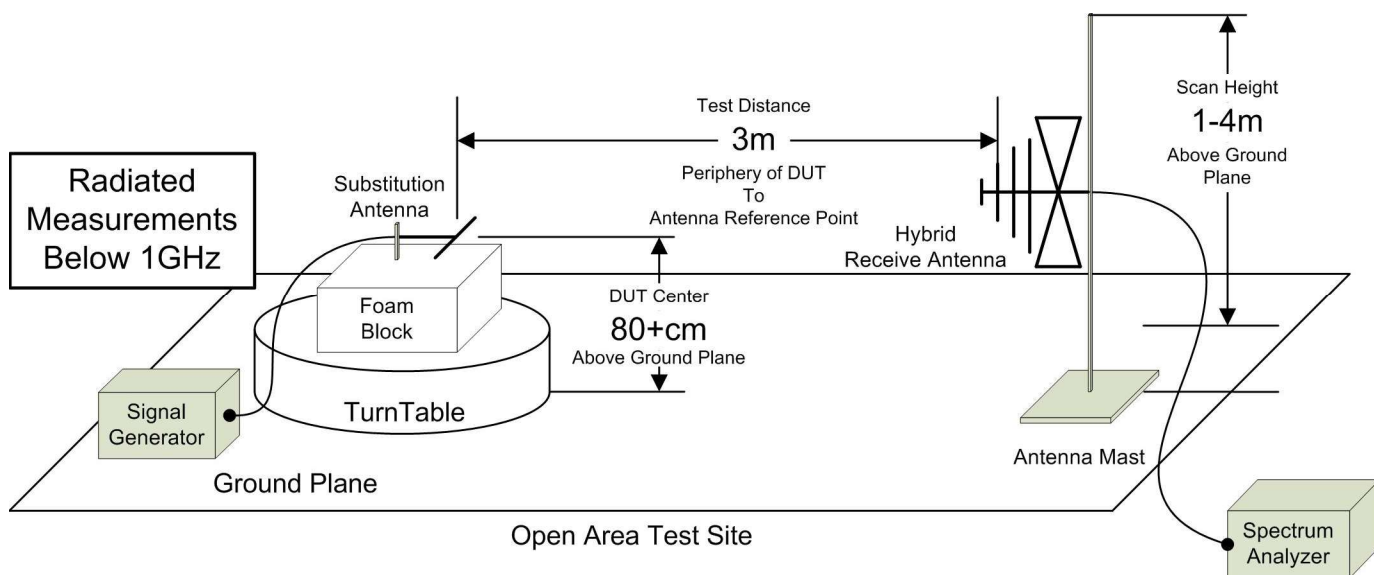
Equipment List			
Asset Number	Manufacturer	Model Number	Description
00072	EMCO	2075	Mini-mast
00073	EMCO	2080	Turn Table
00071	EMCO	2090	Multi-Device Controller
00241	R&S	FSU40	Spectrum Analyzer
00050	Chase	CBL-6111A	Bilog Antenna
00275	Coaxis	LMR400	25m Cable
00276	Coaxis	LMR400	4m Cable
00278	TILE	34G3	TILE Test Software
00034	ETS	3115	Double Ridged Guide Horn

CNR: Calibration Not Required  
COU: Calibrate On Use

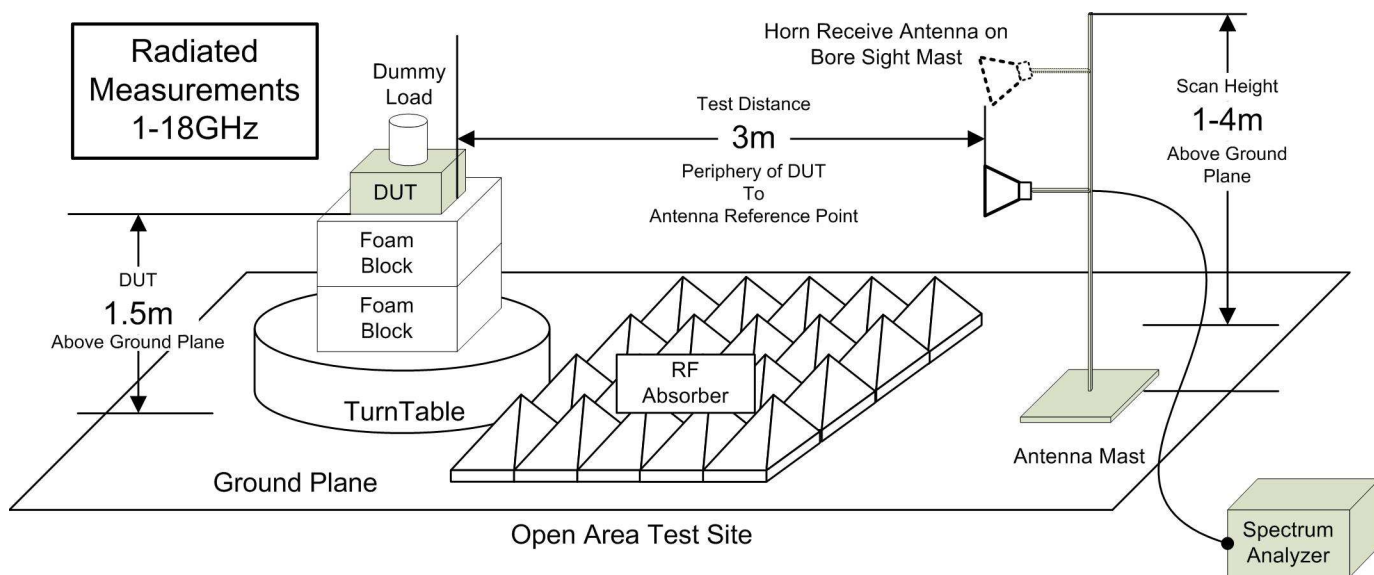
**Figure A.2 – Test Setup Radiated Measurements 30MHz – 1GHz**



**Figure A.3 – Test Setup Radiated Measurements 30MHz – 1GHz, Signal Substitution**



**Figure A.4 – Test Setup Radiated Measurements 1 – 18GHz,**



## APPENDIX B – EQUIPMENT LIST AND CALIBRATION

Equipment List							
Asset Number	Manufacturer	Model Number	Serial Number	Description	Last Calibrated	Calibration Interval	Calibration Due
00050	Chase	CBL-6111A	1607	Bilog Antenna	16 Nov 2023	Triennial	16 Nov 2026
00035	ETS	3115	6276	Double Ridged Guide Horn	27 Mar 2025	Triennial	27 Mar 2028
00241	R&S	FSU40	100500	Spectrum Analyzer	6 Sep 2024	Triennial	6 Sep 2027
00250	Circuit Test	DMR-1800	TE182	Digital Multi-Meter - DVM	26 Jun 2023	Triennial	26 Jun 2026
00071	EMCO	2090	9912-1484	Multi-Device Controller	n/a	n/a	n/a
00072	EMCO	2075	0001-2277	Mini-mast	n/a	n/a	n/a
00073	EMCO	2080	0002-1002	Turn Table	n/a	n/a	n/a
00263	Koaxis	KP10-1.00M-TD	263	1m Armoured Cable	COU	n/a	COU
00263B	Koaxis	KP10-1.00M-TD	263B	1m Armoured Cable	COU	n/a	COU
00130	Pasternack	PE7019-30	n/a	30dB, 50W Attenuator	COU	n/a	COU
00275	TMS	LMR400	n/a	25m Cable	COU	n/a	COU
00278	TILE	34G3	n/a	TILE Test Software	NCR	n/a	NCR

NCR: No Calibration Required

COU: Calibrate On Use



## APPENDIX C – MEASUREMENT INSTRUMENT UNCERTAINTY

### CISPR 16-4 Measurement Uncertainty ( $U_{LAB}$ )

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence interval using a coverage factor of  $k=2$

#### 30MHz - 200MHz

$$U_{LAB} = 5.14\text{dB} \quad U_{CISPR} = 6.3\text{dB}$$

#### 200MHz - 1000MHz

$$U_{LAB} = 5.90\text{dB} \quad U_{CISPR} = 6.3\text{dB}$$

#### 1GHz - 6GHz

$$U_{LAB} = 4.80\text{dB} \quad U_{CISPR} = 5.2\text{dB}$$

#### 6GHz - 18GHz

$$U_{LAB} = 5.1\text{dB} \quad U_{CISPR} = 5.5\text{dB}$$

If the calculated uncertainty  $U_{lab}$  is **less** than  $U_{CISPR}$  then:

- |   |   |
|---|---|
| 1 | Compliance is deemed to occur if <b>NO</b> measured disturbance exceeds the disturbance limit             |
| 2 | Non-Compliance is deemed to occur if <b>ANY</b> measured disturbance <b>EXCEEDS</b> the disturbance limit |

If the calculated uncertainty  $U_{lab}$  is **greater** than  $U_{CISPR}$  then:

- |   |  |
|---|--|
| 3 | Compliance is deemed to occur if <b>NO</b> measured disturbance, increased by ( $U_{lab} - U_{CISPR}$ ), exceeds the disturbance limit             |
| 4 | Non-Compliance is deemed to occur if <b>ANY</b> measured disturbance, increased by ( $U_{lab} - U_{CISPR}$ ), <b>EXCEEDS</b> the disturbance limit |

**END OF REPORT**