



Test Report Serial Number:

45462006 r2.0

Test Report Date:

21 October 2025

Project Number:

1683

EMC Test Report - C2PC

Applicant:



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

FCC ID:

UIPSQ896M141

Product Model Number / HVIN

SQ896M141

Product Name / PMN

Aprisa SR+

In Accordance With:

FCC 47 CFR Part 101, Subpart C
Fixed Microwave Services

Approved By:

Ben Hewson, President

Celltech Labs Inc.
21-364 Lougheed Rd.
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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:		Date(s) of Evaluation:		30 Mar - 9 Oct, 2025
Report Prepared By:		Report Reviewed By:		Ben Hewson
Report Revision	Description of Revision	Revised Section	Revised By	Revision Date
1.0	Initial Release	n/a	Art Voss	20 August 2025
2.0	Revised per TCB Review	ALL	Art Voss	21 October 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: UIPSQ896M141
Device Type:	Digital Transceiver
Device Model(s) / HVIN:	SQ896M141
Device Marketing Name / PMN:	Aprisa SR+
Test Sample Serial No.:	R5310007043
Equipment Class (FCC):	PCB - PCS Licensed Transmitter
Transmit Frequency Range:	Part 24: 901-902MHz, 930-931MHz, 940-941MHz
	Part 90: 896-901MHz, 929-930MHz, 935-940MHz
	Part 101: 928-929MHz, 932-932.5MHz, 932.5-935MHz
	Part 101: 941-941.5MHz, 941.5-944MHz, 952-960MHz
Test Channels:	Programmable
Manuf. Max. Rated Output Power:	10dBm (10mW) to 37dBm (5W), Field-Programmable
Manuf. Max. Rated BW:	Part 24. 12.5kHz, 25kHz, 50kHz, 100kHz
	Part 90. 12.5kHz, 25kHz
	Part 101. 12.5kHz, 25kHz, 50kHz
Antenna Type and Gain:	Max: 28dBi (25.85dBd)
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 SQ896M141, FCC ID: UIPSQ896M141, is a digital PCS transceiver and was previously certified to Parts 24, 90 and 101. 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 (Notification 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) ISED	Test Date	Result
7.0	Conducted Power (Fundamental)	ANSI C63.26-2015	RSS-119 (5.4)	29 Sep 2025 30 Sep 2025	Pass
8.0	Occupied Bandwidth	ANSI C63.26-2015	RSS-119 (5.5)	24 Sep 2025 30 Sep 2025	Pass
9.0	Emissions Mask	ANSI C63.26-2015	RSS-119 (5.8)	3 Oct 2025	Pass
10.0	Antenna Port Conducted Spurious	ANSI C63.26-2015	RSS-119 (5.8)	9 Oct 2025	Pass
11.0	Radiated Tx Spurious Emissions	ANSI C63.26-2015	RSS-119 (5.8)	3 Apr 2025	Pass

Test Station Day Log					
Date	Ambient Temp (°C)	Relative Humidity (%)	Barometric Pressure (kPa)	Test Station	Tests Performed Section(s)
24 Sep 2025	23.0	23	103.4	EMC	8
29 Sep 2025	22.8	24	102.9	EMC	7, 8
30 Sep 2025	23.6	25	103.3	EMC	7, 8
3 Oct 2025	22.5	25	103.2	EMC	7, 9
9 Oct 2025	22.4	25	102.4	EMC	10
3 Apr 2025	9.0	46	101.8	OATS	11

EMC - EMC Test Bench

SAC - Semi-Anechoic Chamber

OATS - Open Area Test Site

TC - Temperature Chamber

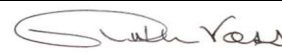
LISN - LISN Test Area

ESD - ESD Test Bench

IMM - Immunity Test Area

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.

21 October 2025

Date



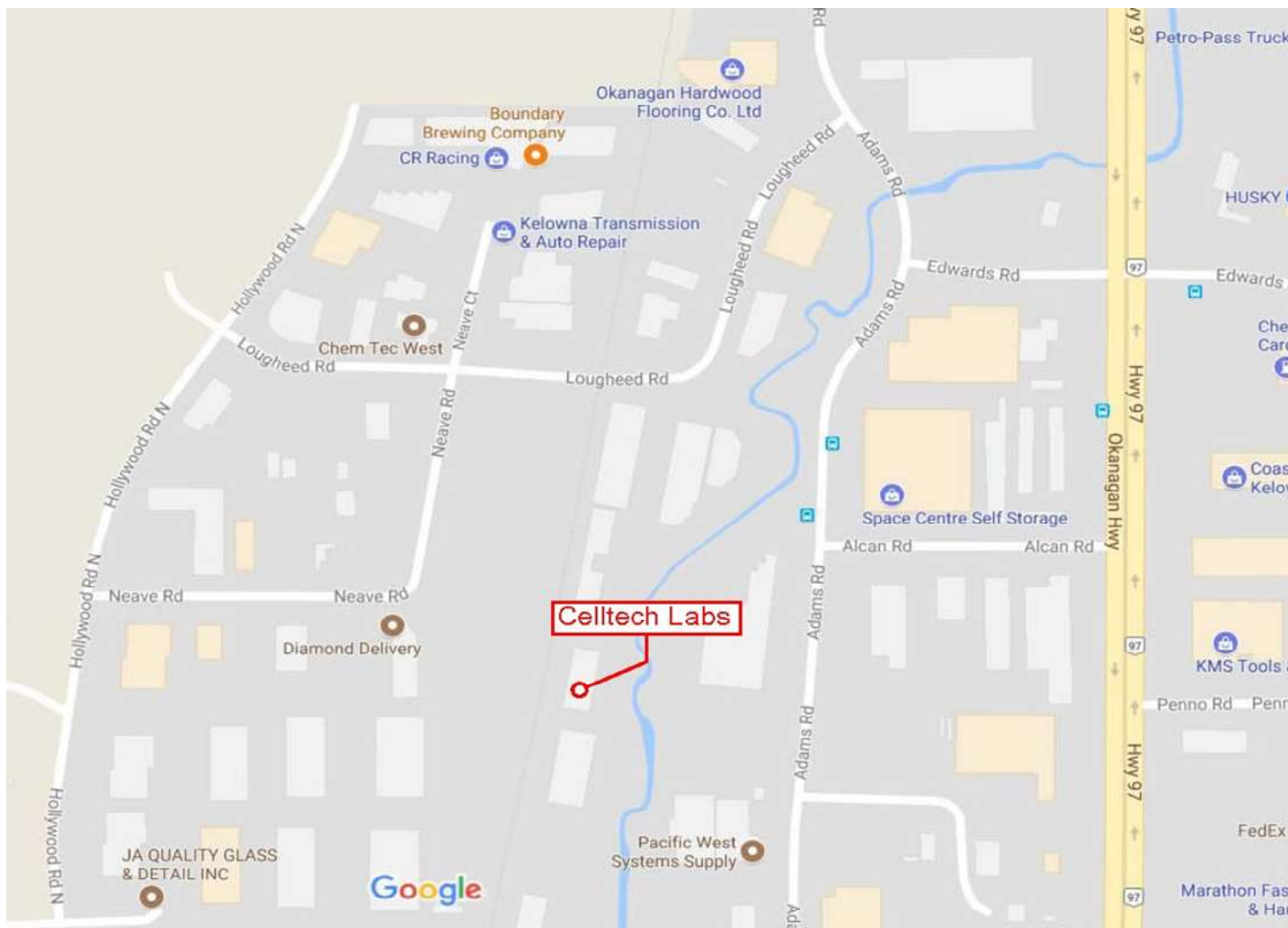
5.0 NORMATIVE REFERENCES

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 101: Fixed Microwave Services Subpart C: 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

Normative	FCC 47 CFR §101.113
References	ANSI C63.26

Requirement / Limits

47 CFR §101.113	§101.113 Transmitter Power Limitations
	a) In no event shall the average equivalent isotropically radiated power (EIRP), as referenced to an isotropic radiator, exceed the values specified below.
	Maximum Allowable EIRP (dBW)
	902-929MHz: +17
	932-932.5MHz :+17
	932.5-935MHz: +40
	941-941.5MHz :+30
	941.5-944MHz: +40
	952-960MHz :+40

Test Setup

Appendix A - Figure A.1

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 L for Measurement Plots, Part 101 Conducted Output Power

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

Conducted Power Measurement Results: FCC Part 101												
Frequency Band (MHz)	Channel Frequency (MHz)	Channel Bandwidth (kHz)	Modulation	Meas. Detector	Measured Power ⁽¹⁾ [P _{Meas}] (dBm)	Antenna Gain [G] (dBd)	ERP Power [P _{erp}] (dBm)	Limit [P _{Lim}] (dBm)	Margin (dB)			
928-929	928.5	12.50	QPSK	RMS	37.04	0.50	37.54	47	9.5			
			16QAM		34.41		34.91		12.1			
			64QAM		32.64		33.14		13.9			
			256QAM		31.26		31.76		15.2			
932-932.5	932.25		QPSK		37.21		37.71	47	9.3			
			16QAM		34.01		34.51		12.5			
			64QAM		32.71		33.21		13.8			
			256QAM		31.94		32.44		14.6			
932.5-935	933.75		QPSK		37.72		38.22	70	31.8			
			16QAM		34.14		34.64		35.4			
			64QAM		32.95		33.45		36.6			
			256QAM		31.94		32.44		37.6			
941-941.5	941.25		QPSK		37.21		37.71	60	22.3			
			16QAM		34.77		35.27		24.7			
			64QAM		33.10		33.60		26.4			
			256QAM		31.74		32.24		27.8			
941.5-944	942.75		QPSK		37.16		37.66	70	32.3			
			16QAM		33.91		34.41		35.6			
			64QAM		32.81		33.31		36.7			
			256QAM		32.27		32.77		37.2			
952-960	952.5		QPSK		37.39		37.89	70	32.1			
			16QAM		33.56		34.06		35.9			
			64QAM		32.58		33.08		36.9			
			256QAM		32.56		33.06		36.9			
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 _{erp}] = [P _{meas}] + [G](dBd)												
Margin = [P _{lim}] - [P _{erp}]												
Note: Maximum Output Power is field-programable.												

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

Conducted Power Measurement Results: FCC Part 101									
Frequency Band (MHz)	Channel Frequency (MHz)	Channel Bandwidth (kHz)	Modulation	Meas. Detector	Measured Power ⁽¹⁾ [P _{Meas}] (dBm)	Antenna Gain [G] (dBd)	ERP Power [P _{erp}] (dBm)	Limit [P _{Lim}] (dBm)	Margin (dB)
928-929	928.5	25.00	QPSK	RMS	37.42	0.50	37.92	47	9.1
			16QAM		35.14		35.64		11.4
			64QAM		34.27		34.77		12.2
			256QAM		33.20		33.70		13.3
932-932.5	932.25		QPSK		37.81		38.31	47	8.7
			16QAM		35.76		36.26		10.7
			64QAM		34.47		34.97		12.0
			256QAM		33.83		34.33		12.7
932.5-935	933.75		QPSK		37.83		38.33	70	31.7
			16QAM		35.46		35.96		34.0
			64QAM		34.79		35.29		34.7
			256QAM		33.89		34.39		35.6
941-941.5	941.25		QPSK		37.88		38.38	60	21.6
			16QAM		35.65		36.15		23.9
			64QAM		34.51		35.01		25.0
			256QAM		33.60		34.10		25.9
941.5-944	942.75		QPSK		37.83		38.33	70	31.7
			16QAM		35.45		35.95		34.1
			64QAM		34.66		35.16		34.8
			256QAM		33.78		34.28		35.7
952-960	952.5	QPSK	37.78	38.28	70	31.7			
		16QAM	35.68	36.18		33.8			
		64QAM	34.56	35.06		34.9			
		256QAM	33.61	34.11		35.9			
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 _{erp}] = [P _{meas}] + [G](dBd)									
Margin = [P _{lim}] - [P _{erp}]									
Note: Maximum Output Power is field-programable.									

Table 7.3 - Summary of Conduct Power Measurements, 50kHz Channel Bandwidth

Conducted Power Measurement Results: FCC Part 101									
Frequency Band (MHz)	Channel Frequency (MHz)	Channel Bandwidth (kHz)	Modulation	Meas. Detector	Measured Power ⁽¹⁾ [P _{Meas}] (dBm)	Antenna Gain [G] (dBd)	ERP Power [P _{erp}] (dBm)	Limit [P _{Lim}] (dBm)	Margin (dB)
928-929	928.5	50.00	QPSK	RMS	37.58	0.50	38.08	47	8.9
			16QAM		34.94		35.44		11.6
			64QAM		33.83		34.33		12.7
			256QAM		33.37		33.87		13.1
932-932.5	932.25		QPSK		37.62		38.12	47	8.9
			16QAM		35.14		35.64		11.4
			64QAM		34.31		34.81		12.2
			256QAM		33.64		34.14		12.9
932.5-935	933.75		QPSK		37.60		38.10	70	31.9
			16QAM		35.17		35.67		34.3
			64QAM		34.19		34.69		35.3
			256QAM		33.49		33.99		36.0
941-941.5	941.25		QPSK		37.69		38.19	60	21.8
			16QAM		35.28		35.78		24.2
			64QAM		34.08		34.58		25.4
			256QAM		33.73		34.23		25.8
941.5-944	942.75		QPSK		37.64		38.14	70	31.9
			16QAM		35.22		35.72		34.3
			64QAM		34.16		34.66		35.3
			256QAM		33.64		34.14		35.9
952-960	952.5	QPSK	37.58	38.08	70	31.9			
		16QAM	35.20	35.70		34.3			
		64QAM	34.11	34.61		35.4			
		256QAM	33.61	34.11		35.9			
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 _{erp}] = [P _{meas}] + [G](dBd)									
Margin = [P _{lim}] - [P _{erp}]									
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

Normative	FCC 47 CFR §101.109(c)
References	ANSI C63.26

Requirement / Limits

47 CFR §101.109(c)	§101.109(c) Bandwidth
	(c) The maximum bandwidth which will be authorized per frequency assigned is set out in the table that follows. Regardless of the maximum authorized bandwidth specified for each frequency band, the Commission reserves the right to issue a license for less than the maximum bandwidth if it appears that a lesser bandwidth would be sufficient to support an applicant's intended communications.
	Maximum Authorized Bandwidth
	928-929MHz: 25kHz
	932-932.5, 941-941.5MHz: 12.5kHz
	932.5-935, 941.5-944MHz: 200kHz
	952-960MHz: 200kHz

Test Setup	Appendix A - Figure A.1
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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 M for Measurement Plots, Part 101 Occupied Bandwidth

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

99% Occupied Bandwidth Results:					
Frequency Band (kHz)	Channel Frequency (MHz)	Channel Bandwidth (kHz)	Modulation	Measured Occupied Bandwidth (kHz)	Emission Designator
928-929	928.50	12.5	QPSK	9.52	9K52G1D
			16QAM	9.40	9K40D1D
			64QAM	9.28	9K28D1D
			256QAM	9.36	9K36D1D
932-932.5	932.25		QPSK	9.36	9K36G1D
			16QAM	9.56	9K56D1D
			64QAM	9.32	9K32D1D
			256QAM	9.36	9K36D1D
932.5-935	933.75		QPSK	9.48	9K48G1D
			16QAM	9.40	9K40D1D
			64QAM	9.40	9K40D1D
			256QAM	9.24	9K24D1D
941-941.5	941.25		QPSK	9.44	9K44G1D
			16QAM	9.36	9K36D1D
			64QAM	9.36	9K36D1D
			256QAM	9.40	9K40D1D
941.5-944	942.75		QPSK	9.52	9K52G1D
			16QAM	9.28	9K28D1D
			64QAM	9.32	9K32D1D
			256QAM	9.40	9K40D1D
952-953	952.50		QPSK	9.40	9K40G1D
			16QAM	9.48	9K48D1D
			64QAM	9.28	9K28D1D
			256QAM	9.44	9K44D1D
Result:				Complies	

Table 8.2 - Summary of Occupied Bandwidth Measurements, 25kHz Channel Bandwidth

99% Occupied Bandwidth Results:					
Frequency Band (kHz)	Channel Frequency (MHz)	Channel Bandwidth (kHz)	Modulation	Measured Occupied Bandwidth (kHz)	Emission Designator
928-929	928.50	25.0	QPSK	19.1	19K1G1D
			16QAM	19.5	19K5D1D
			64QAM	19.1	19K1D1D
			256QAM	19.2	19K2D1D
932-932.5	932.25		QPSK	19.5	19K5G1D
			16QAM	19.5	19K5D1D
			64QAM	19.2	19K2D1D
			256QAM	19.4	19K4D1D
932.5-935	933.75		QPSK	19.3	19K3G1D
			16QAM	19.1	19K1D1D
			64QAM	19.0	19K0D1D
			256QAM	19.1	19K1D1D
941-941.5	941.25		QPSK	19.5	19K5G1D
			16QAM	19.1	19K1D1D
			64QAM	19.2	19K2D1D
			256QAM	19.3	19K3D1D
941.5-944	942.75		QPSK	19.4	19K4G1D
			16QAM	18.9	18K9D1D
			64QAM	19.0	19K0D1D
			256QAM	19.2	19K2D1D
952-953	952.50		QPSK	19.2	19K2G1D
			16QAM	18.9	18K9D1D
			64QAM	19.3	19K3D1D
			256QAM	19.0	19K0D1D
Result:				Complies	

Table 8.3 - Summary of Occupied Bandwidth Measurements, 50kHz Channel Bandwidth

99% Occupied Bandwidth Results:					
Frequency	Channel	Channel		Measured	
Band	Frequency	Bandwidth	Modulation	Occupied	Emission
(kHz)	(MHz)	(kHz)		Bandwidth	Designator
				(kHz)	
928-929	928.50	50.0	QPSK	44.0	44K0G1D
			16QAM	43.8	43K8D1D
			64QAM	43.4	43K4D1D
			256QAM	43.6	43K6D1D
932-932.5	QPSK		43.8	43K8G1D	
	16QAM		43.6	43K6D1D	
	64QAM		43.2	43K2D1D	
	256QAM		43.8	43K8D1D	
932.5-935	933.75		QPSK	44.0	44K0G1D
			16QAM	43.8	43K8D1D
			64QAM	43.0	43K0D1D
			256QAM	43.2	43K2D1D
941-941.5	941.25		QPSK	43.8	43K8G1D
			16QAM	43.6	43K6D1D
			64QAM	43.2	43K2D1D
			256QAM	43.4	43K4D1D
941.5-944	942.75		QPSK	43.6	43K6G1D
			16QAM	43.8	43K8D1D
			64QAM	43.2	43K2D1D
			256QAM	43.4	43K4D1D
952-953	952.50		QPSK	43.6	43K6G1D
			16QAM	43.6	43K6D1D
			64QAM	43.6	43K6D1D
			256QAM	43.6	43K6D1D
Result:				Complies	

9.0 CONDUCTED SPURIOUS EMISSIONS – EMISSIONS MASK

Test Procedure

Normative	FCC 47 CFR §101.111
References	ANSI C63.26

Requirement / Limits

47 CFR §101.111	§101.111 Emission Mask
	(a) The mean power of emissions must be attenuated below the mean output power of the transmitter in accordance with the following schedule:
	5) When using transmissions employing digital modulation techniques on the 900 MHz multiple address frequencies with a 12.5 KHz bandwidth, the power of any emission must be attenuated below the unmodulated carrier power of the transmitter (P) in accordance with the following schedule:
	(i) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in KHz) of more than 2.5 KHz up to and including 6.25 KHz: At least 53 log10 (fd/2.5) decibels;
	(ii) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in KHz) of more than 6.25 KHz up to and including 9.5 KHz: At least 103 log10 (fd/3.9) decibels;
	(iii) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in KHz) of more than 9.5 KHz up to and including 15 KHz: At least 157 log10 (fd/5.3) decibels; and
	(iv) On any frequency removed from the center of the authorized bandwidth by a displacement frequency greater than 15 KHz: At least 50 plus 10 log10(P) or 70 decibels, whichever is the lesser attenuation.
	(6) When using transmissions employing digital modulation techniques on the 900 MHz multiple address frequencies with a bandwidth greater than 12.5 KHz, the power of any emission must be attenuated below the unmodulated carrier power of the transmitter (P) in accordance with the following schedule:
	(i) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in KHz) of more than 5 KHz up to and including 10 KHz: At least 83 log10 (fd/5)decibels;
	(ii) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in KHz) of more than 10 KHz up to and including 250 percent of the authorized bandwidth: At least 116 log10 (fd/6.1) decibels or 50 plus 10 log10 (P) or 70 decibels, whichever is the lesser attenuation; and

Test Setup

Appendix A - Figure A.1

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 N for Measurement Plots, Part 101 Emissions Mask

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

Emissions Mask Results													
Channel Band (MHz)	Channel Frequency (MHz)	Channel Bandwidth (kHz)	Modulation	Meas. Detector	Maks ID	Measured Power [P _{meas}] (dBm)	Instrument RL [RL] (dBm)	Mask Offset ⁽¹⁾ [Offset] (dB)	Mask Results				
928-929	928.5	12.5	QPSK	RMS	101.111(a)(5)	37.04	50.00	-12.96	PASS				
			16QAM			34.41		-15.59	PASS				
			64QAM			32.64		-17.36	PASS				
			256QAM			31.26		-18.74	PASS				
932-932.5	932.25		QPSK			37.21		-12.79	PASS				
			16QAM			34.01		-15.99	PASS				
			64QAM			32.71		-17.29	PASS				
			256QAM			31.94		-18.06	PASS				
932.5-935	933.75		QPSK			37.72		-12.28	PASS				
			16QAM			34.14		-15.86	PASS				
			64QAM			32.95		-17.05	PASS				
			256QAM			31.94		-18.06	PASS				
941-941.5	941.25		QPSK			37.21		-12.79	PASS				
			16QAM			34.77		-15.23	PASS				
			64QAM			33.10		-16.90	PASS				
			256QAM			31.74		-18.26	PASS				
941.5-944	942.75		QPSK			37.16		-12.84	PASS				
			16QAM			33.91		-16.09	PASS				
			64QAM			32.81		-17.19	PASS				
			256QAM			32.27		-17.73	PASS				
952-960	952.5		QPSK			37.39		-12.61	PASS				
			16QAM			33.56		-16.44	PASS				
			64QAM			32.58		-17.42	PASS				
			256QAM			32.56		-17.44	PASS				
Result:								Complies					
(1) Mask Offset [Offset] if the difference between the measured power [P _{meas}] and the Instrument Reference Level [RL]. [Offset] = [P _{meas}] - [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 Channel Bandwidth

Emissions Mask Results													
Channel Band (MHz)	Channel Frequency (MHz)	Channel Bandwidth (kHz)	Modulation	Meas. Detector	Maks ID	Measured Power [P _{meas}] (dBm)	Instrument RL [RL] (dBm)	Mask Offset ⁽¹⁾ [Offset] (dB)	Mask Results				
928-929	928.5	25.0	QPSK	RMS	101.111(a)(6)	37.42	50.00	-12.58	PASS				
			16QAM			35.14		-14.86	PASS				
			64QAM			34.27		-15.73	PASS				
			256QAM			33.20		-16.80	PASS				
932-932.5	932.25		QPSK			37.81		-12.19	PASS				
			16QAM			35.76		-14.24	PASS				
			64QAM			34.47		-15.53	PASS				
			256QAM			33.83		-16.17	PASS				
932.5-935	933.75		QPSK			37.83		-12.17	PASS				
			16QAM			35.46		-14.54	PASS				
			64QAM			34.79		-15.21	PASS				
			256QAM			33.89		-16.11	PASS				
941-941.5	941.25		QPSK			37.88		-12.12	PASS				
			16QAM			35.65		-14.35	PASS				
			64QAM			34.51		-15.49	PASS				
			256QAM			33.60		-16.40	PASS				
941.5-944	942.75		QPSK			37.83		-12.17	PASS				
			16QAM			35.45		-14.55	PASS				
			64QAM			34.66		-15.34	PASS				
			256QAM			33.78		-16.22	PASS				
952-960	952.5		QPSK			37.78		-12.22	PASS				
			16QAM			35.68		-14.32	PASS				
			64QAM			34.56		-15.44	PASS				
			256QAM			33.61		-16.39	PASS				
Result:									Complies				
(1) Mask Offset [Offset] if the difference between the measured power [P _{meas}] and the Instrument Reference Level [RL]. [Offset] = [P _{meas}] - [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 9.3 - Summary of Emissions Mask Measurements, 50kHz Channel Bandwidth

Emissions Mask Results													
Channel Band (MHz)	Channel Frequency (MHz)	Channel Bandwidth (kHz)	Modulation	Meas. Detector	Maks ID	Measured Power [P _{meas}] (dBm)	Instrument RL [RL] (dBm)	Mask Offset ⁽¹⁾ [Offset] (dB)	Mask Results				
928-929	928.5	50.0	QPSK	RMS	101.111(a)(6)	37.58	50.00	-12.42	PASS				
			16QAM			34.94		-15.06	PASS				
			64QAM			33.83		-16.17	PASS				
			256QAM			33.37		-16.63	PASS				
932-932.5	932.25		QPSK			37.62		-12.38	PASS				
			16QAM			35.14		-14.86	PASS				
			64QAM			34.31		-15.69	PASS				
			256QAM			33.64		-16.36	PASS				
932.5-935	933.75		QPSK			37.60		-12.40	PASS				
			16QAM			35.17		-14.83	PASS				
			64QAM			34.19		-15.81	PASS				
			256QAM			33.49		-16.51	PASS				
941-941.5	941.25		QPSK			37.69		-12.31	PASS				
			16QAM			35.28		-14.72	PASS				
			64QAM			34.08		-15.92	PASS				
			256QAM			33.73		-16.27	PASS				
941.5-944	942.75		QPSK			37.64		-12.36	PASS				
			16QAM			35.22		-14.78	PASS				
			64QAM			34.16		-15.84	PASS				
			256QAM			33.64		-16.36	PASS				
952-960	952.5		QPSK			37.58		-12.42	PASS				
			16QAM			35.20		-14.80	PASS				
			64QAM			34.11		-15.89	PASS				
			256QAM			33.61		-16.39	PASS				
Result:									Complies				
(1) Mask Offset [Offset] if the difference between the measured power [P _{meas}] and the Instrument Reference Level [RL]. [Offset] = [P _{meas}] - [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 10TH HARMONIC

Test Procedure

Normative	FCC 47 CFR §101.111
References	ANSI C63.26

Requirement / Limits

47 CFR §101.111	§101.111 Emission Mask
	(a) The mean power of emissions must be attenuated below the mean output power of the transmitter in accordance with the following schedule:
	5) When using transmissions employing digital modulation techniques on the 900 MHz multiple address frequencies with a 12.5 KHz bandwidth, the power of any emission must be attenuated below the unmodulated carrier power of the transmitter (P) in accordance with the following schedule:
	(i) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in KHz) of more than 2.5 KHz up to and including 6.25 KHz: At least 53 log ₁₀ (fd/2.5) decibels;
	(ii) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in KHz) of more than 6.25 KHz up to and including 9.5 KHz: At least 103 log ₁₀ (fd/3.9) decibels;
	(iii) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in KHz) of more than 9.5 KHz up to and including 15 KHz: At least 157 log ₁₀ (fd/5.3) decibels; and
	(iv) On any frequency removed from the center of the authorized bandwidth by a displacement frequency greater than 15 KHz: At least 50 plus 10 log ₁₀ (P) or 70 decibels, whichever is the lesser attenuation.
	(6) When using transmissions employing digital modulation techniques on the 900 MHz multiple address frequencies with a bandwidth greater than 12.5 KHz, the power of any emission must be attenuated below the unmodulated carrier power of the transmitter (P) in accordance with the following schedule:
	(i) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in KHz) of more than 5 KHz up to and including 10 KHz: At least 83 log ₁₀ (fd/5)decibels;
	(ii) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in KHz) of more than 10 KHz up to and including 250 percent of the authorized bandwidth: At least 116 log ₁₀ (fd/6.1) decibels or 50 plus 10 log ₁₀ (P) or 70 decibels, whichever is the lesser attenuation; and

Test Setup

Appendix A - Figure A.1

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 O for Measurement Plots, Part 101 Spurious Emissions

Table 10 - Summary of Conducted Spurious Emissions Measurements

Conducted Spurious Emissions Measurement Results:							
Frequency (MHz)	Modulation	Emission Power [P _{Em}] (dBm)	Emission Frequency (MHz)	Fundamental Measurment [P _{Fund}] (dBm)	Attenuation [Atten] (dB)	Limit (dB)	Margin (dB)
942.75	CW	ND	ND	37.00	n/a	43	n/a
Results:						Complies	

Attenuation [Atten] = [P_{Fund}] - [P_{Em}]

Margin = Attenuation - Limit

ND = None Detected

n/a = Not Applicable

11.0 RADIATED TX SPURIOUS EMISSIONS

Test Procedure

Normative	FCC 47 CFR §101.111
References	ANSI C63.26

Requirement / Limits

47 CFR §101.111	§101.111 Emission Mask
	(a) The mean power of emissions must be attenuated below the mean output power of the transmitter in accordance with the following schedule:
	5) When using transmissions employing digital modulation techniques on the 900 MHz multiple address frequencies with a 12.5 KHz bandwidth, the power of any emission must be attenuated below the unmodulated carrier power of the transmitter (P) in accordance with the following schedule:
	(i) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in KHz) of more than 2.5 KHz up to and including 6.25 KHz: At least 53 log10 (fd/2.5) decibels;
	(ii) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in KHz) of more than 6.25 KHz up to and including 9.5 KHz: At least 103 log10 (fd/3.9) decibels;
	(iii) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in KHz) of more than 9.5 KHz up to and including 15 KHz: At least 157 log10 (fd/5.3) decibels; and
	(iv) On any frequency removed from the center of the authorized bandwidth by a displacement frequency greater than 15 KHz: At least 50 plus 10 log10(P) or 70 decibels, whichever is the lesser attenuation.
	(6) When using transmissions employing digital modulation techniques on the 900 MHz multiple address frequencies with a bandwidth greater than 12.5 KHz, the power of any emission must be attenuated below the unmodulated carrier power of the transmitter (P) in accordance with the following schedule:
	(i) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in KHz) of more than 5 KHz up to and including 10 KHz: At least 83 log10 (fd/5)decibels;
	(ii) On any frequency removed from the center of the authorized bandwidth by a displacement frequency (fd in KHz) of more than 10 KHz up to and including 250 percent of the authorized bandwidth: At least 116 log10 (fd/6.1) decibels or 50 plus 10 log10 (P) or 70 decibels, whichever is the lesser attenuation; and

Test Setup

Appendix A - Figure A.2 to A.4

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 O for Measurement Plots, Part 101 Spurious Emissions

Table 11.1 – Summary of Radiated Tx Emissions Measurements

Radiated Tx Spurious Emissions Measurement Results:													
Fundamental Frequency [F _{fund}] (MHz)	Modulation	Emission Frequency [F _{em}] (MHz)	Measured Emission [M _{em}] (dBuV)	Receive ACF @ [F _{em}] [ACF _E] (dB/m)	Cable Loss @ [F _{em}] [L _E] (dB)	Emission Field Strength [E _{em}] (dBuV/m)	Measured Fundamental [M _{fund}] (dBuV)	Receive ACF @ [F _{fund}] [ACF _F] (dB/m)	Cable Loss @ [F _{fund}] [L _F] (dB)	Fundamental Field Strength [E _{fund}] (dBuV/m)	Attenuation [Atten] (dB)	Limit (dB)	Margin (dB)
941.50	CW	ND	ND	n/a	n/a	ND	26.36	29.30	3.00	58.66	n/a	43	n/a
Results:												Complies	

Emission Field Strength [E_{em}] = [M_{em}] + [ACF_E] + [L_E]
Fundamental Field Strength [E_{fund}] = [M_{fund}] + [ACF_F] + [L_F]
Attenuation [Atten] = [E_{fund}] - [E_{em}]
Margin = Limit - [Atten]
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

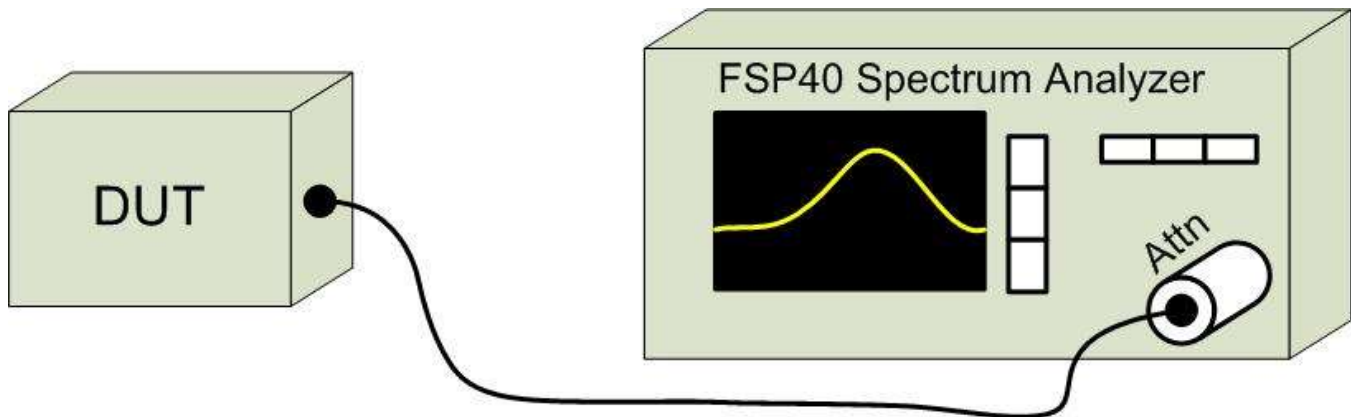


Table A.2 – Setup - Radiated Emissions Equipment

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

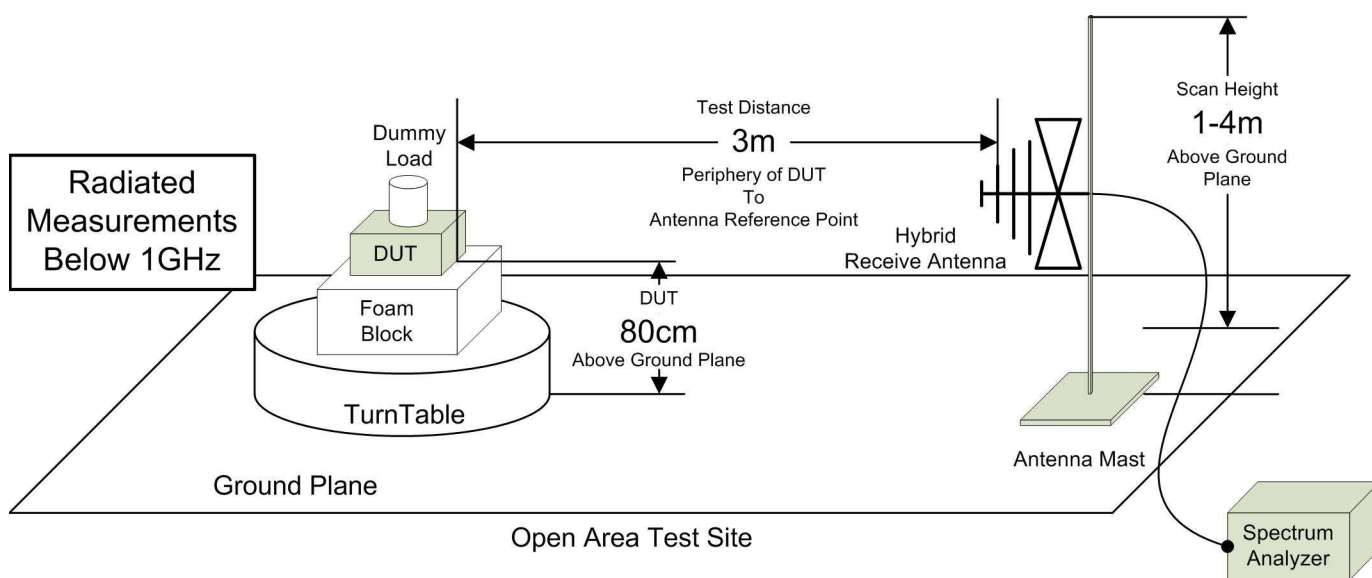


Figure A.3 – Test Setup Radiated Measurements 30MHz – 1GHz, Signal Substitution

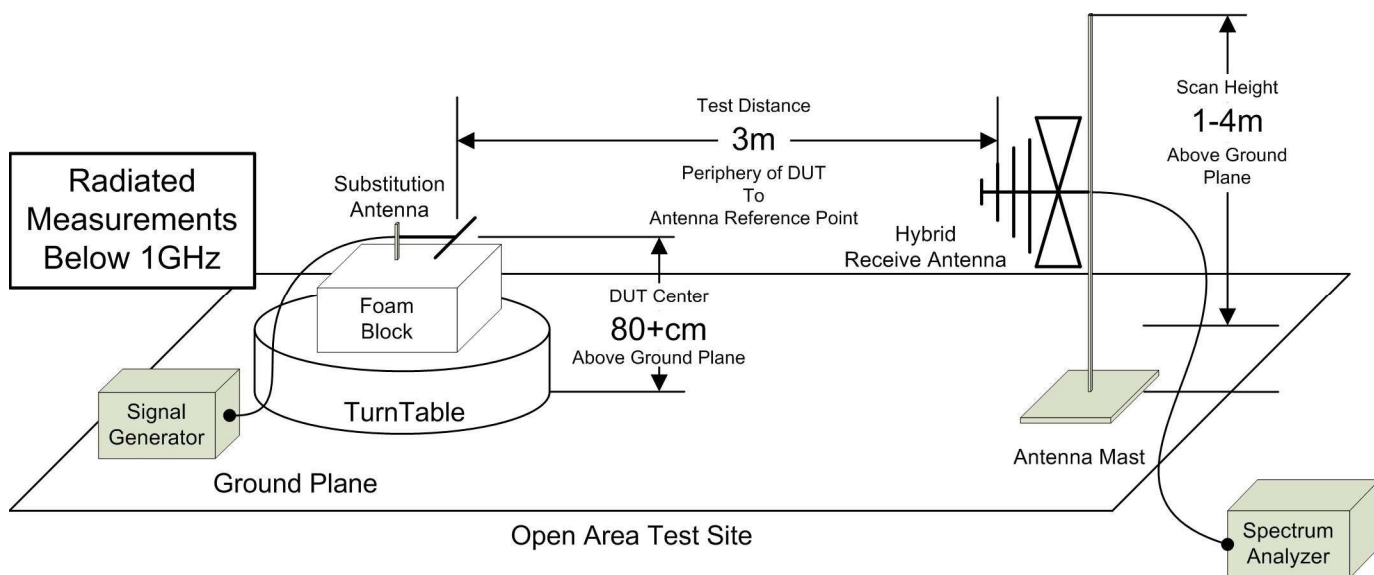
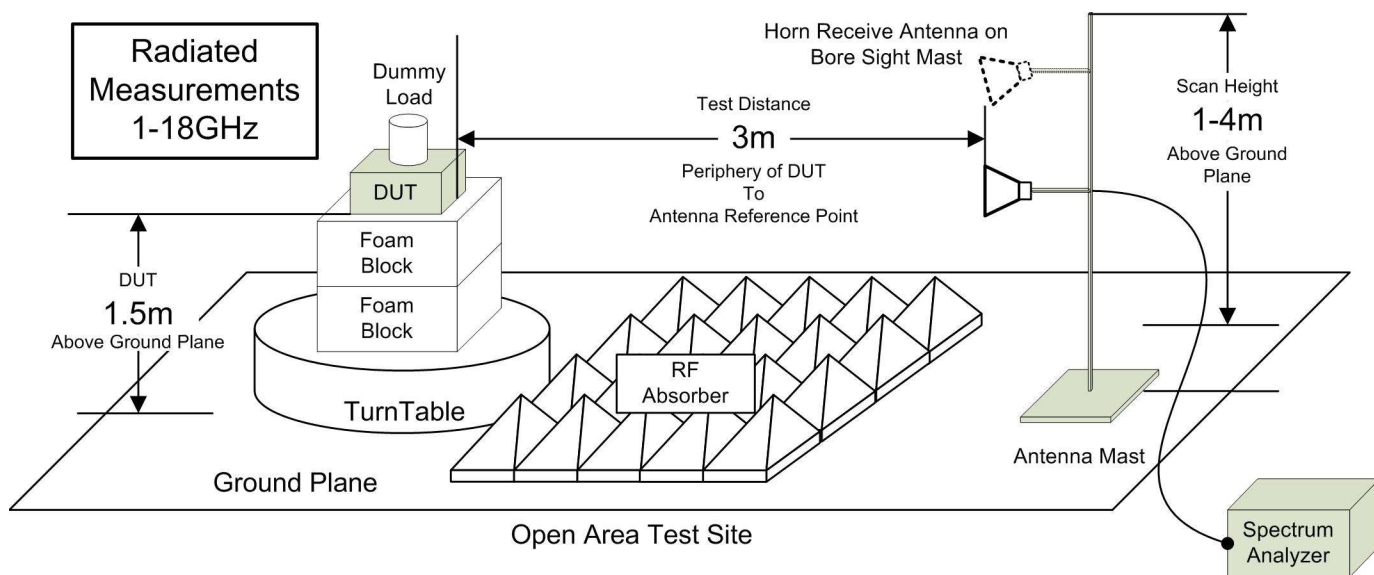


Figure A.4 – Test Setup Radiated Measurements 1 – 18GHz,



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
00005	HP	8648D	3847A00611	Signal Generator	28 Jun 2023	Triennial	28 Jun 2026
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
00065	Pasternack	PE7014-30	n/a	30dB, 5W Attenuator	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	
$U_{LAB} = 5.14\text{dB}$ $U_{CISPR} = 6.3\text{dB}$	
200MHz - 1000MHz	
$U_{LAB} = 5.90\text{dB}$ $U_{CISPR} = 6.3\text{dB}$	
1GHz - 6GHz	
$U_{LAB} = 4.80\text{dB}$ $U_{CISPR} = 5.2\text{dB}$	
6GHz - 18GHz	
$U_{LAB} = 5.1\text{dB}$ $U_{CISPR} = 5.5\text{dB}$	
If the calculated uncertainty U_{lab} is less than U_{CISPR} then:	
1	Compliance is deemed to occur if NO measured disturbance exceeds the disturbance limit
2	Non-Compliance is deemed to occur if ANY measured disturbance EXCEEDS the disturbance limit
If the calculated uncertainty U_{lab} is greater than U_{CISPR} then:	
3	Compliance is deemed to occur if NO measured disturbance, increased by ($U_{lab} - U_{CISPR}$), exceeds the disturbance limit
4	Non-Compliance is deemed to occur if ANY measured disturbance, increased by ($U_{lab} - U_{CISPR}$), EXCEEDS the disturbance limit

END OF REPORT

24 Oct 2025 2:15