# **Test Report**

As per

# FCC Part 96 SAS requirements (CBRS Test Plan)



Add value. **Inspire trust.** 

on the KRD 901 254 Air 3268 B48 (3550-3700MHz)

#### FCC ID(s): TA8AKRD901254

Issued by: TÜV SÜD Canada Inc. 1280 Teron Rd, Ottawa, ON K2K 2C1 Canada

Testing produced for

Ericcson Canada

See Appendix A for full client & EUT details.

Steve McFarlane. Test Personnel

Scott Drysdale Report Reviewer

Stere Miralan State Drysdale



Page 1 of 73 Report Issued: 11/22/2022 Report File #: 7169007158-CBRS-002 © TÜV SÜD Canada Inc. This test report shall not be reproduced except in full, without written approval of TÜV SÜD Canada Inc

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	TUV
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

# **Table of Contents**

Table of Contents
Report Scope
Summary
Test Results Summary
Applicable Standards, Specifications and Methods15
Document Revision Status
Definitions and Acronyms
Testing Facility
Calibrations and Accreditations
Detailed Test Results Section
Check the device registration and authorization with the SAS
Appendix A – EUT & Client Provided Details
Technical Description
Appendix B – EUT, Peripherals, and Test Setup Photos
Appendix C – Additional Test Information

Page 2 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	SUD
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

# **Report Scope**

This report addresses the EMC verification testing and test results of the **Ericsson Remote Radio Air 3268 B48 KRD 901 254 (3550-3700 MHz)** herein referred to as EUT (Equipment Under Test). The EUT was tested for compliance against the following standards:

FCC Part 96 SAS requirements (CBRS Test Plan)

Test procedures, results, justifications, and engineering considerations, if any, follow later in this report.

For a more detailed list of the standards and the revision used, see the "Applicable Standards, Specifications and Methods" section of this report.

This report does not imply product endorsement by any government, accreditation agency, or TÜV SÜD Canada Inc.

Opinions or interpretations expressed in this report, if any, are outside the scope of TÜV SÜD Canada Inc accreditations. Any opinions expressed do not necessarily reflect the opinions of TÜV SÜD Canada Inc, unless otherwise stated.

	Page 3 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002
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Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

## Summary

The results contained in this report relate only to the item(s) tested.

Equipment Under Test (EUT)	Ericsson Remote Radio Air 3268 B48 KRD 901 254 (3550-3700MHz)
EUT passed all tests performed	Yes
Tests conducted by	Steve McFarlane / Scott Drysdale

For testing dates, see 'Testing Environmental Conditions and Dates'.

Page 4 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

## Test Results Summary

Section as	per Working Document WINNF-TS-0122
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Section	CBS D	D P	Test Case ID	Test Case Title	RF Measurement Requirement	Pass / Fail
6.1.4.1. 1	X		WINNF.FT.C.R EG.1	Multi-Step registration	Monitor for 60 seconds after REG message sent. No transmission during test.	N/A
6.1.4.1. 2		X	WINNF.FT.D.R EG.2	Domain Proxy Multi-Step registration	Monitor for 60 seconds after REG message sent. No transmission during test.	Р
6.1.4.1. 3	X		WINNF.FT.C.R EG.3	Single-Step registration for Category A CBSD	Monitor for 60 seconds after REG message sent. No transmission during test.	N/A
6.1.4.1. 4		X	WINNF.FT.D.R EG.4	Domain Proxy Single-Step registration for Cat A CBSD (Note: Mandatory for without CPI, if EUT will always have signed CPI – asked for email waiver)	Monitor for 60 seconds after REG message sent. No transmission during test.	N/A
6.1.4.1. 5	X		WINNF.FT.C.R EG.5	Single-Step registration for CBSD with CPI signed data	Monitor for 60 seconds after REG message sent. No transmission during test.	N/A
6.1.4.1. 6		X	WINNF.FT.D.R EG.6	Domain Proxy Single-Step registration for CBSD with CPI signed data	Monitor for 60 seconds after REG message sent. No transmission during test.	Р
6.1.4.1. 7	Х	X	WINNF.FT.C.R EG.7	Registration due to change of an installation parameter	Test waits until transmission starts, then trigger an	N/A

Page 5 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002
--------------	---------------------------	--

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

					<ul> <li>installationParam change.</li> <li>Record time at which transmission stops. Time must be within 60 seconds of the installationPa ram change taking effect.</li> </ul>	
6.1.4.2.	X		WINNF.FT.C.R EG.8	Missing Required parameters (responseCode 102)	Monitor for 60 seconds after REG message sent. No transmission during test.	N/A
6.1.4.2. 2		X	WINNF.FT.D.R EG.9	Domain Proxy Missing Required parameters (responseCode 102)	Monitor for 60 seconds after REG message sent. No transmission during test.	Ρ
6.1.4.2. 3	X		WINNF.FT.C.R EG.10	Pending registration (responseCode 200)	Monitor for 60 seconds after REG message sent. No transmission during test.	N/A
6.1.4.2. 4		X	WINNF.FT.D.R EG.11	Domain Proxy Pending registration (responseCode 200)	Monitor for 60 seconds after REG message sent. No transmission during test.	Ρ
6.1.4.2. 5	X		WINNF.FT.C.R EG.12	Invalid parameter (responseCode 103)	Monitor for 60 seconds after REG message sent. No transmission during test.	N/A
6.1.4.2. 6		X	WINNF.FT.D.R EG.13	Domain Proxy Invalid parameters (responseCode 103)	Monitor for 60 seconds after REG message sent. No transmission during test.	Ρ
6.1.4.2. 7	Х		WINNF.FT.C.R EG.14	Blacklisted CBSD (responseCode 101)	Monitor for 60 seconds after REG message sent. No	N/A

Client	Ericsson	
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					transmission during test.	
6.1.4.2. 8		X	WINNF.FT.D.R EG.15	Domain Proxy Blacklisted CBSD (responseCode 101)	Monitor for 60 seconds after REG message sent. No transmission during test.	Ρ
6.1.4.2. 9	X		WINNF.FT.C.R EG.16	Unsupported SAS protocol version (responseCode 100)	Monitor for 60 seconds after REG message sent. No transmission during test.	N/A
6.1.4.2. 10		X	WINNF.FT.D.R EG.17	Domain Proxy Unsupported SAS protocol version responseCode 100)	Monitor for 60 seconds after REG message sent. No transmission during test.	Ρ
6.1.4.2. 11	X		WINNF.FT.C.R EG.18	Group Error (responseCode 201)	Monitor for 60 seconds after REG message sent. No transmission during test.	N/A
6.1.4.2. 12		X	WINNF.FT.D.R EG.19	Domain Proxy Group Error (responseCode 201)	Monitor for 60 seconds after REG message sent. No transmission during test.	Ρ
6.1.4.3. 1	Х	X	WINNF.FT.C.R EG.20	Category A CBSD location update		N/A
6.3.4.2. 1	Х	X	WINNF.FT.C.G RA.1 (TYPO FIXED D TO C)	Unsuccessful Grant responseCode=400 (INTERFERENCE)	Monitor for 60 seconds after REG message sent. No transmission during test.	Ρ
6.3.4.2. 2	X	X	WINNF.FT.C.G RA.2	Unsuccessful Grant responseCode=401 (GRANT_CONFLIC T)	Monitor for 60 seconds after REG message sent. No transmission during test.	Ρ
6.4.4.1. 1	Х		WINNF.FT.C.H BT.1	Heartbeat Success Case (first Heartbeat Response)	Monitor RF from start of test. Ensure that: • Transmission does not start until time of first	N/A

Page 7 of 73 Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002
--	--

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	TUV
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					<ul> <li>heartbeat response or after.</li> <li>After transmission starts, meas ure that transmission is within the granted channel (frequencyLo w, freque ncyHigh)</li> </ul>	
6.4.4.1. 2		X	WINNF.FT.D.H BT.2	Domain Proxy Heartbeat Success Case (first Heartbeat Response)	Monitor RF from start of test. Ensure that: Transmission does not start until time of first heartbeat response or after. After transmission starts, meas ure that transmission is within the granted channel (frequencyLo w, freque ncyHigh)	Ρ
6.4.4.2. 1	X	X	WINNF.FT.C.H BT.3	Heartbeat responseCode=105 (DEREGISTER)	Monitor RF transmission. Ensur e that: • CBSD stops transmission within 60 seconds of the heartbeatRe sponse which contains	Ρ

Client	Ericsson	
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					responseCod e = 105	
6.4.4.2. 2	X		WINNF.FT.C.H BT.4	Heartbeat responseCode=500 (TERMINATED_G RANT)		N/A
6.4.4.2. 3	X	X	WINNF.FT.C.H BT.5	Heartbeat responseCode=501 (SUSPENDED_GR ANT) in First Heartbeat Response	Monitor RF transmission from start of test. Ensure there is no transmission during the test	Ρ
6.4.4.2. 4	X	X	WINNF.FT.C.H BT.6	Heartbeat responseCode=501 (SUSPENDED_GR ANT) in Subsequent Heartbeat Response	Monitor RF transmission. Ensur e: • CBSD stops transmission within 60 seconds of heartbeatRe sponse which contains responseCod e=501	Ρ
6.4.4.2. 5	X	X	WINNF.FT.C.H BT.7	Heartbeat responseCode=502 (UNSYNC_OP_PA RAM)	Monitor RF transmission. Ensur e: • CBSD stops transmission within 60 seconds of heartbeatRe sponse which contains responseCod e=502	Ρ
6.4.4.2. 6		X	WINNF.FT.D.H BT.8	Domain Proxy Heartbeat responseCode=500 (TEMINATED_GR ANT)	Monitor RF transmission. CBSD s will have different behavior: • CBSD1: will continue to transmit to end of test	Ρ

Page 9 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002
--------------	---------------------------	--

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	TUV
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

					<ul> <li>(this is not a pass/fail criteria, but check)</li> <li>CBSD2: must stop transmission within 60 seconds of being sent heartbeatRe sponse with responseCod e = 500</li> </ul>	
6.4.4.3. 1	Х	Х	WINNF.FT.C.H BT.9	Heartbeat Response Absent (First Heartbeat)	Monitor RF from start of test to 60 seconds after last heartbeatResponse message was sent. CBSD should not transmit at any time during test	Ρ
6.4.4.3. 2	X	x	WINNF.FT.C.H BT.10	Heartbeat Response Absent (Subsequent Heartbeat)	Monitor RF transmission. Verify: • CBSD must stop transmission within transmitExpir eTime+60 seconds, where transmitExpir eTime is from last successful heartbeatRe sponse message	Ρ
6.5.4.2. 1	Х		WINNF.FT.C.M ES.1	Registration Response contains measReportConfig	No RF monitoring	N/A
6.5.4.2. 2		X	WINNF.FT.D.M ES.2	Domain Proxy Registration Response contains measReportConfig	No RF monitoring	Р

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	SUD
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

6.5.4.2. 3	X	X	WINNF.FT.C.M ES.3	Grant Response contains measReportConfig	No RF monitoring	Р
6.5.4.2. 4	X		WINNF.FT.C.M ES.4	Heartbeat Response contains measReportConfig	No RF monitoring	N/A
6.5.4.2. 5		X	WINNF.FT.D.M ES.5	Domain Proxy Heartbeat Response contains measReportConfig	No RF monitoring	Р
6.6.4.1. 1	X		WINNF.FT.C.R LQ.1	Successful Relinquishment	Monitor RF transmission. Ensur e: • CBSD stops transmission at any time prior to sending the relinquishme ntRequest message.	N/A
6.6.4.1. 2		X	WINNF.FT.D.R LQ.2	Domain Proxy Successful Relinquishment	Monitor RF transmission. Ensure : • CBSD stops transmission at any time prior to sending the relinquishmentReque st message.	Р
6.7.4.1. 1	X		WINNF.FT.C.D RG.1	Successful Deregistration	Monitor RF transmission. Ensur e: • CBSD stops transmission at any time prior to sending the relinquishme ntRequest message or deregistrat ionRequest message (whichever is sent first)	N/A

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Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

6.7.4.1.		Х	WINNF.FT.D.D	Domain Proxy	Monitor RF	
2			RG.2	Successful	transmission. Ensure	Р
				Deregistration	:	
				0	CBSD stops	
					transmission at any	
					time prior to sending	
					the	
					relinquishmentReque	
					st message or	
					deregistrationReques	
					t message	
					(whichever is sent	
					first)	
6.8.4.1.	Х	Х	WINNF.FT.C.SC	Successful TLS	No RF transmission	
1			S.1	connection between	during test	Р
				UUT and SAS Test	Check the tcpdump	
				Harness	for the TLS	
					information	
6.8.4.2.	Х	Х	WINNF.FT.C.SC	TLS failure due to	No RF transmission	_
1			S.2	revoked certificate	during test	Р
					Check the tcpdump	
					for the TLS	
6040	37	V			information	
6.8.4.2.	X	Х	WINNF.FT.C.SC	TLS failure due to	No RF transmission	Р
2			S.3	expired server certificate	during test	P
				certificate	Check the tcpdump for the TLS	
					information	
6.8.4.2.	X	X	WINNF.FT.C.SC	TLS failure when	No RF transmission	
3	1	1	S.4	SAS Test Harness	during test	Р
				certificate is issue by	Check the tcpdump	•
				unknown CA	for the TLS	
					information	
6.8.4.2.	Х	Х	WINNF.FT.C.SC	TLS failure when	No RF transmission	
4			S.5	certificate at the SAS	during test	Р
				Test Harness is	Check the tcpdump	
				corrupted	for the TLS	
				_	information	
7.1.4.1.	Х	Х	WINNF.PT.C.H	UUT RF Transmit	Power Spectral	
1			BT	Power Measurement	Density test case.	Р
					Assume we use 1	
					carrier bandwidth	

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Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

		(say, 5 or 10 MHz),	
		one frequency (say	
		middle channel in	
		band) for	
		test. Measure at max	
		transmit power, and	
		reduce in steps of 3	
		dB to minimum	
		declared transmit	
		power.	

If the product as tested complies with the specification, the EUT is deemed to comply with the standard and is deemed a 'PASS' or 'P' grade. If not 'FAIL' grade is issued. Where 'N/A' is stated this means the test case is not applicable, and see Notes, Justifications or Deviations Section for details.

	Page 13 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002
--	---------------	---------------------------	--

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	SUD
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

### Notes, Justifications, or Deviations

The following notes, justifications for tests not performed or deviations from the above listed specifications apply:

A later revision of the standard may have been substituted in place of the previous dated referenced revision. The year of the specification used is listed under applicable standards. Using the later revision accomplishes the goal of ensuring compliance to the intent of the previous specification, while allowing the laboratory to incorporate the extensions and clarifications made available by a later revision.

Test results were obtained using the KRD 901 254/31model, the client attests the test results are representative or worst case of all models as listed in appendix A

For the N/A test cases, the following justifications apply:

- a. EUT is a CBSD with Domain Proxy
- b. EUT supports the following Conditional functionality from WINNF-TS-0122-V1.0.0, Table 6-2:
  - i. C1 Multi-step registration (WINNF.FT.D.REG.2)
  - ii. C3 Single step registration containing CPI-signed data in the registration message (WINNF.FT.D.REG.6)
  - iii. C4 RECEIVED\_POWER\_WITHOUT\_GRANT measurement report (WINNF.FT.D.MES.2)
  - iv. C5 RECEIVED\_POWER\_WITH\_GRANT measurement report (WINNF.FT.D.MES.3, WINNF.FT.D.MES.5)
- c. Optional test cases were not performed

The device does not use single-step registration (as defined in condition C2 in WINNF-TS-0122-V1.0.0, Table 6-2), therefore test cases 6.1.4.1.4, and 6.1.4.3.1 are not applicable as per WINNF-TS-0122-V1.0.0, Table 6-3 and therefore not required or performed.

Note, where graph sweeps are incomplete, this was used to set the time stamp of when the events occurred. This can be accomplished by determining the time at which the graph was captured and subtracting the remaining time. For example if there was a 30 second sweep, and 9 out of 10 is complete, that means the end occurred at the 27 second market. If the time on the graph was 12:03:35, this means the graph started at 12:03:08. This allows us to co-ordinate graph with timing provided in the logs.

Additional testing for power spectral density (PSD) requirements were evaluated as the original EUT firmware was changed to allow for higher conducted power with different antenna gains. All other parameters were deemed to not be affected as there was no other changes.

Logs are kept on file.

	Page 14 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002
--	---------------	---------------------------	--

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	SUD
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# Applicable Standards, Specifications and Methods

ANSI C63.4:2014	Methods of Measurement of Radio-Noise Emissions from Low- Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
CFR47 FCC Part 96	Code of Federal Regulations – Citizens Broadband Radio Service
Version V1.0.2	Conformance and Performance Test Technical Specification; CBSD/DP as Unit Under Test (UUT) Working Document
ISO/IEC 17025:2017	General requirements for the competence of testing and calibration laboratories

Page 15 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	TÜV
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

## **Document Revision Status**

TR-7169012035-000: Nov 19, 2022. First Draft, unsigned. Subject to review

TR-7169012035-001: Nov 21, 2022. Minor revisions as per customer request. Reviewed and signed.

TR-7169012035-002: Nov 22, 2022. Minor typographical errors corrected as per customer request. Reviewed and signed.

Page 16 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	TÜV
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

## **Definitions and Acronyms**

The following definitions and acronyms are applicable in this report. See also ANSI C63.14.

AE – Auxiliary Equipment. A digital accessory that feeds data into or receives data from another device (host) that in turn, controls its operation.

**AM** – Amplitude Modulation

**Class A device** – A device that is marketed for use in a commercial, industrial or business environment. A 'Class A' device should not be marketed for use by the general public and the instructions for use accompanying the product shall contain the following text:

**Caution:** This equipment is not intended for use in residential environments and may not provide adequate protection to radio reception in such environments.

**Class B device** – A device that is marketed for use in a residential environment and may also be used in a commercial, business or industrial environments.

**EMC** – Electro-Magnetic Compatibility. The ability of an equipment or system to function satisfactorily in its electromagnetic environment without introducing intolerable electromagnetic disturbances to anything in that environment.

**EMI** – Electro-Magnetic Immunity. The ability to maintain a specified performance when the equipment is subjected to disturbance (unwanted) signals of specified levels.

**Enclosure Port** – Physical boundary of equipment through which electromagnetic fields may radiate or impinge.

**EUT** – Equipment Under Test. A device or system being evaluated for compliance that is representative of a product to be marketed.

**LISN** – Line Impedance Stabilization Network

NCR – No Calibration Required

NSA – Normalized Site Attenuation

RF - Radio Frequency

**EMC Test Plan** – An EMC test plan established prior to testing. See 'Appendix A – EUT & Client Provided Details'.

Page 17 of 73         Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002
---	--

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	TÜV
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

## **Testing Facility**

Testing for EMC on the EUT was carried out at customer location as described in Appendix A.

### **Calibrations and Accreditations**

TÜV SÜD Canada Inc is accredited to ISO/IEC 17025 by A2LA with Testing Certificate #2955.19. The laboratory's current scope of accreditation listing can be found as listed on the A2LA website. All measuring equipment is calibrated on an annual or bi-annual basis as listed for each respective test.

	Page 18 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002
--	---------------	---------------------------	--

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	TUV
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## Testing Environmental Conditions and Dates

Following environmental conditions were recorded in the facility during time of testing

Date	Test	Initials	Temperature (ºC)	Humidity (%)	Pressure (kPa)
Nov 16-17, 2022	All	SD	20-23	40-55	96.106

Page 19 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	TUV
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

# **Detailed Test Results Section**

Page 20 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	SUD
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

Authorization transmit after it receives authorization from a SAS.

Section	DP	Test Case ID	Test Case Title	Pass / Fail
6.1.4.1.2	X	WINNF.FT.D.REG.2	Domain Proxy Multi-Step registration	Р
Agilent Spectrum	Analyzer - Sv	wept SA		
Marker 1 3.6	1380000	AC SENSE:INT 00000 GHz It: RF PN0: Fast Trig: Free Run	Avg Type: Pwr(RMS) AvgIHold:>100/100	Peak Search
10 dB/div Ref	0.00 dB	IFGain:Low Atten: 10 dB	Mkr1 3.613 80 GHz -69.525 dBm	NextPeak
-10.0				Next Righ
30.0				Next Lef
40.0				Marker Delt
-60.0				Mkr→Cf
-80.0	munatsatemer	A. A. M. S. a. A. Car. J. Levier of the angle of the angl	marken well marken waren	Mkr→RefLv
-90.0 Center 3.5550 #Res BW 1.0 P		#VBW	Span 150.0 MHz #Sweep 29.4 ms (1001 pts)	More 1 of 2
ISG			STATUS	1

Page 21 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

Р			on for CI	Domain registrati signed da	i.6	Γ.D.REG.6	INNF.FT.I	X WII	.1.6	6.1.4
				0			<u>,</u>	yzer - Swept SA		🛛 Agile
Peak Search	MNov 17, 2022 E 1 2 3 4 5 6	TRAC	ALIGN AUTO Pwr(RMS)		SENSE:INT		0 GHz	600000000	50 Ω er 1 3.612	<b>x</b> Mark
	ET A N N N N N	TYP	100/100	Avg Hold	Free Run 1: 10 dB	<b>L</b>	PNO: Fast G	Input: RF		
NextPea	60 GHz 77 dBm		Mkr1					00 dBm	liu Pof (	10 dB/
										- <sup>og</sup> [
Next Rig										10.0
										20.0
Next Le										30.0
Marker Del										40.0
	<b>├───</b> ┃L			_						-50.0
										60.0
Mkr→C	1	•								-00.0
	un human	- A								-70.0 -
Mire Defi	and alwards trade	www.ww	energenergener	amandamalandar	lour margane		-adamptor about the		the second second	80.0
Mkr→RefL										
	╞───╢╞									-90.0
Mo									- 0.55565	Ļ
1 of	50.0 MHz 1001 pts)		Sweep 2	-		BW	#VBV		r 3.55500 BW 1.0 MH	
			STATUS							ISG

Page 22 of 73         Report Issued: 11/22/2022         Report File #: TR- 7169012035-CBRS-002			
	Page 22 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002

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Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	TUV
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

D	5		Proxy M		EG.9	NF.FT.D.I	WINN	Х	1.4.2.2
Р			d paramet						
		)2)	seCode 10	(respo					
	24 PMNov 17, 2022	02:08:24	ALIGN AUTO		SENSE:INT	AC	wept SA		gilent Spectrum / 50 ດ
Peak Search	TRACE 1 2 3 4 5 6	TR/	e: Pwr(RMS) d:>100/100		ig: Free Run	Hz			rker 1 3.6
	DET A N N N N N			, and a	ten: 10 dB	NO: Fast 😱 Gain:Low	out: RF PI	Inpu	
NextPea	2 30 GHz .860 dBm		Mkr1				3m	0.00 dB	dB/div Ref
Next Rig									0
	Ir			_					
Next Le									
Marker Del									
	<u></u> ⊢ L								
Mkr→C	∎i II								
	/								0
	Mare Verman	unmession			-	-	-	aman man	-
Mkr→RefL									
									0
Мо									
1 of	n 150.0 MHz								nter 3.5550
	s (1001 pts)	29.4 ms	#Sweep 2			#VBW -		/IHz	es BW 1.0 N
			STATUS						

Page 23 of 73         Report Issued: 11/22/2022         Report File #: TR- 7169012035-CBRS-002			
	Page 23 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002

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Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	TUV
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

Aglient Spectrum An Aglient Spectrum An So R Aarker 1 3.613 Aarker 1 3.613 No dB/div Ref (	365000 Inpu	0000 GHz	ast L	SENSE:INT	Aug Tur	ALIGN AUTO	01/51/07 01		
	Inpu	t: RF PNO: I	ast L	ree Run	AVG I UDI	e: Pwr(RMS)		Nov 17, 2022	Peak Search
	0.00 dBi	m		10 dB	AvgHold	:>100/100	3.613	65 GHz 66 dBm	NextPea
-og 10.0									Next Righ
30.0									Next Le
40.0									Marker Del
70.0							•	1	Mkr→C
80.0		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		<del></del>	Loger & et 194-194-194-194-194	aloonineand	Linenal	HI's Allowed in	Mkr→RefL
Center 3.55500 #Res BW 1.0 MI			#VBW			#Sweep 2		50.0 MHz 1001 pts)	<b>Mor</b> 1 of

Page 24 of 73         Report Issued: 11/22/2022         Report File #: TR- 7169012035-CBRS-002			
	Page 24 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

6.1.4.2.6	Х	WINNF.FT.D	.REG.13	Domain l			102)	Р
-				paramete	rs (respo	nseCod	e 103)	
LXI	trum Analyzer - Sr 50 ฉ 3.61290000		C SENSE:INT	Avg Type Avg Hold:	ALIGN AUTO : Pwr(RMS) > 100/100	TRAC	MNov 17, 2022 E 1 2 3 4 5 6 PE MWWWWW	
		IFGain:Low	Atten: 10 dB			3.612	90 GHz 96 dBm	Next Peak
10 dB/div Log	Ref 0.00 dB	m						Next Right
-20.0								Next Left
-40.0								Marker Delta
-60.0						•	1	Mkr→CF
-80.0	he fer an	actor and a second and a second and	warangi na ngangi di kaban kanak			asserved	Wm Uner	Mkr→RefLvl
Center 3.5 #Res BW 1		#VBW		#	≠Sweep 2		50.0 MHz 1001 pts)	
MSG					STATUS			

Client	Ericsson	
Product	TÜV	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

6.1.4.2.8	X	WINNF	F.FT.D	.REG.1:		Domain I CBSD (re	•			Р
D Agilent Spectrum	Analyzer - Sv	vept SA					*		· ·	
Marker 1 3.6	61275000	00000 GH:	Z Fast G	] Trig: Free		Avg Type Avg Hold:	ALIGN AUTO : Pwr(RMS) >100/100	TRAC	MNov 17, 2022 CE 1 2 3 4 5 6 PE MWWWWWW ET A N N N N N	Peak Search
		IFGai	n:Low	Atten: 10	dB		Mkr	1 3.612	75 GHz 77 dBm	Next Peak
10 dB/div Re	f 0.00 dB	m						-03.0		
-10.0										Next Right
-20.0										
-30.0										Next Left
-40.0										Markar Daka
-50.0										Marker Delta
-60.0										
-70.0								<u> </u>	1	Mkr→CF
								manara	mar alberta	
-80.0	ก <sub>ารเป</sub> ล้างจะเขาะสมัยงจะไ	- Spithale/or Consequently	ware ware the							Mkr→RefLvl
-90.0										
Center 3.5550	0.687							Snan 1	50.0 MHz	More 1 of 2
#Res BW 1.0			#VBW			ŧ	#Sweep		1001 pts)	1012
MSG							STATUS	5		

Page 26 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	TUV
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

Р	ion	nain Proxy Ur protocol vers onseCode 100	REG.17	WINNF.FT.I	X	5.1.4.2.10
Peak Search	01:55:28 PM Nov 17, 2022	ALIGN AUTO	SENSE:INT			l Agilent Spectrum A 50 ລ
	TRACE 1 2 3 4 5 6 TYPE MWWWWW DET A N N N N N	vg Type: Pwr(RMS) g Hold:>100/100	Trig: Free Run Atten: 10 dB		185000 Input	larker 1 3.61
NextPea	3.611 85 GHz -68.893 dBm	Mkr1		n	0.00 dBr	
Next Righ						10.0
Next Le						30.0
Marker Delt						40.0
Mkr→C						60.0
Mkr→RefLv	mon un hum		einstration-magazitum for one	a the ample of the state of the	7 <b>6114'0107</b>	80.0
<b>Mor</b> 1 of	Span 150.0 MHz 9.4 ms (1001 pts)	#Sweep 2	-	#VBW		enter 3.55500 Res BW 1.0 M
	/	STATUS				SG

Page 27 of 73         Report Issued: 11/22/2022         Report File #: TR- 7169012035-CBRS-002			
	Page 27 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002

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Client	Ericsson	
Product		
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

6.1.4.2.12	2 X	WINNF.FT.D	0.REG.19	Domain Proxy Group Error (responseCode 201)				Р
	rum Analyzer - Sv							
Marker 1	50 Ω 3.61350000	00000 GHz	AC SENSE:INT		ALIGNAUTO Pwr(RMS)	TRAC	MNov 17, 2022 E 1 2 3 4 5 6 PE MWWWWW	Peak Search
	Inpu	it: RF PNO: Fast 🖵 IFGain:Low	Atten: 10 dB	Argh lold.		DE	ET A N N N N N	NextPeak
	Ref 0.00 dB	m			Mkr1		50 GHz 80 dBm	Νεχιγεακ
Log								Next Dight
-10.0								Next Right
-20.0	+ +							
-30.0								Next Left
(0.0								
-40.0								Marker Delta
-50.0	+							
-60.0								Mkr→CF
-70.0							1	WIKI→CF
the loss of the		warman and the second	Contract - Marketon Marketon Marketon		und and a state of the state of	and	with hill marine	
-80.0								Mkr→RefLvl
-90.0								
								More
Center 3.55 #Res BW 1		#VBW	I	#	Sweep 2		50.0 MHz 1001 pts)	1 of 2
MSG					STATUS			

Page 28 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002

i.

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	TUV
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

### Check the device registration and authorization with the SAS, Confirm that the device changes its operating power and/or channel in response to a command from the SAS and Confirm that the device correctly configures based on the different license classes.

ISG				STATUS	, , , , , , , , , , , , , , , , , , , ,	
Center 3.5 #Res BW 1		#VBW		#Sweep 1	Span 150.0 MHz 00 ms (1001 pts)	1 of:
						Mor
-90.0						
80.0			At			Mkr→RefL
70.0					monthe	
70.0					∳ <sup>1</sup>	Mkr→C
-60.0						
50.0						
40.0						Marker Delt
30.0						Next Le
20.0						
10.0						Next Rigi
						Next Righ
10 dB/div	Ref 0.00 dBm			WIKI	-69.640 dBm	
		n:Low Atten: 10 d	В	Mkr1	3.613 50 GHz	NextPea
Marker 1	3.61350000000 GH	: Fast 😱 Trig: Free F	Run Avg Hol	e: Pwr(RMS) d:>100/100	TRACE 1 2 3 4 5 6 TYPE MWWWWW DET A N N N N N	Peak Search
Agilent Spect	rum Analyzer - Swept SA 50 Ω	AC SENS	E:INT	ALIGN AUTO	02:17:21 PM Nov 17, 2022	
			LILLIUCL)	during te	est.	
1			Code=400 FERENCE)		G message o transmission	Р
6.3.4.2.	WINNF.FT.C.GR		ssful Grant		for 60 seconds	D

	Page 29 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002
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Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

Ρ

	or for 60 secon age sent. No tr		me	=401	successful ponseCode	GRA.2	NNF.FT.C.(	WIN	6.3.4.2.2
	y test.	uning te	) 44	NFLICT)	RANT_CC				R Anthony Council
Peak Search	TRACE 1 2 3 4 5 6		ALIGNAUTO	Avg Type	SENSE:INT	GHz	yzer - Swept SA 3000000000 (	50 Q	KI I
	DET A N N N N N		>100/100	Avg Hold:	g: Free Run ten: 10 dB	PNO: Fast Gain:Low	Input: RF	010120	
Next Peak	.612 30 GHz 69.865 dBm		Mkr				00 dBm	Ref 0.0	0 dB/div
Next Right									0.0
									20.0
Next Left									80.0
Marker Delta	F								40.0
Marker Deila									50.0
Mkr→CF	[							_	50.0
Wiki→Cr						_		_	70.0
Mkr→RefLvl	now woman	an survey of							80.0
									90.0
More									
1 of 2	pan 150.0 MHz ms (1001 pts) _		#Sweep			#VBW			Center 3.55 Res BW 1.
		s	STATUS						SG

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Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

.4.4.1.2	WINNF.FT.		Domain Prox Success Case	e (first	-	nitor RF . Ensure	e that:	rt of n does not	
			Heartbeat Re	sponse)		stari hea • Afte stari tran grar	t until tim rtbeat re r transm ts, meas smission nted chai quencyLo	ne of first sponse or after. ission ure that is within the nnel	
	rum Analyzer - Swept S								
	50 Ω 47.2002 s Input: RF	PNO: Fast		#Avg Type: Pw Avg Hold:/10		05:08:23 PMI TRACE TYPE DET	Nov 16, 2022 1 2 3 4 5 6 A WWWWWW A N N N N N	Marker→	
dB/div	Ref 0.00 dBm	II GUILLOW				Mkr1 4 -11.20		Mkr→CF	
	<b>♦</b> <sup>1</sup>						*	Mkr→CF Step	
								Mkr→Start	
								Mkr→Stop	
							L	Mkr∆⊸Span	
0									
0								Mkr∆→CF	
.0								Mkr→RefLvl	
es BW 1.0	55000000 GHz ) MHz	#VBW		Sw	· · ·	Sp 100.0 s (10	an 0 Hz 001 pts)		
ì					STATUS				

Page 31 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002
---------------	---------------------------	--

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

6.4.4.2.1	WINNF.FT.C.HBT.3	Heartbeat responseCode=105 (DEREGISTER)	within 60 se	transmission conds of the sponse which ponseCode
Marker 1 2	rum Analyzer - Swept SA 50 Ω 225.000 s Input: RF PNO: Fast C IFGain:Low Ref 0.00 dBm	#Avg Type: Py		Marker→ Mkr→CF
-10.0				Mkr→CF Step
-20.0				Mkr→Start
-40.0				Mkr→Stop
-60.0				Mkr∆→Span
-80.0				Mkr∆→CF
Center 3.55 Res BW 1.0	55000000 GHz ) MHz #VB	W Si	Span 0 Hz weep 400.0 s (1001 pts)	Mkr→RefLvl

Page 32 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

6.4.4.2.3	WINNF.FT.C.HBT.5	Heartbeat responseCode=501 (SUSPENDED_GRANT) in First Heartbeat	Monitor RF transmission from start of test. Ensure there is no transmission during the test	р
		Response		

Agilent Spe	ectrum Analyzer - Sw 50 ຊ	ept SA	AC	SENSE:INT	ALIGNAUTO	06:12:08 PMNov 16, 2022	
	225.000 s	: RF PNO: Fast IFGain:Low	Trig: Fi	ee Run	#Avg Type: Pwr(RMS Avg Hold:/100		Marker→
0 dB/div	Ref 0.00 dBr	n				Mkr1 225.0 s -80.016 dBm	Mkr→C
10.0							Mkr→CF Step
20.0							Mkr→Star
40.0							WiKi → Stai
50.0							Mkr→Sto
60.0							Mkr∆→Spa
70.0				1			
30.0							Mkr∆→Cl
	.555000000 GH	z				Span 0 Hz	Mkr→RefLv
les BW			BW		Sweep	400.0 s (1001 pts)	
G					STATUS	Input Overload;ADC	over range

Page 33 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

6.4.4.2.4	WINNF.FT.C.HBT.6	Heartbeat	Monitor RF transmission. Ensure:	
		responseCode=501	<ul> <li>CBSD stops transmission</li> </ul>	р
		(SUSPENDED_GRANT)	within 60 seconds of	
		in Subsequent Heartbeat	heartbeatResponse which	
		Response	contains responseCode=501	

50 Q	AC	SENSE:INT	ALIGN AUTO	06:19:05 PMNov 16, 2022	Marker→
larker 1 148.600 s Input: Rf	PNO: Fast 😱	Trig: Free Run Atten: 10 dB	#Avg Type: Pwr(RMS) Avg Hold:/100	TYPE A WWWWW DET A N N N N N	
0 dB/div Ref 0.00 dBm				Mkr1 148.6 s -20.237 dBm	Mkr→C
0.0					Mkr→CF Ste
0.0	∳ <sup>1</sup>			L	
0.0					Mkr→Sta
0.0					Mkr→Sto
0.0				L	Mkr∆→Spa
0.0					ткт∆⊸өра
0.0					Mkr∆→C
0.0					Mire Defi
enter 3.555000000 GHz es BW 1.0 MHz	#VBW -	-	Sweep 4	Span 0 Hz 00.0 s (1001 pts)	Mkr→RefL

	Page 34 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002
--	---------------	---------------------------	--

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

	WINNF.FT.C.HBT.7	Heartbeat responseCode=502 (UNSYNC_OP_PARAM )	within 60 se heartbeatRe contains res	transmission	р
	50 Ω 47.800 S Input: RF PNO: Fast ⊂	#Avg Type: P		Marker→	
10 dB/div F	Ref 0.00 dBm	Atten: 10 dB	Mkr1 147.8 s -24.781 dBm	Mkr→CF	
-10.0				Mkr→CF Step	
-20.0	↓ ↓ ↓ ↓ ↓			 Mkr→Start	
-30.0					
-50.0				Mkr→Stop	
-60.0				Mkr∆→Span	
-70.0					
-80.0				Mkr∆→CF	
-90.0					
Center 3.55 Res BW 1.0	5000000 GHz MHz #VBV	/ S	Span 0 Hz weep 400.0 s (1001 pts)	Mkr→RefLvl	
MSG			STATUS 🚹 Input Overload;ADC	over range	

Page 35 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

6.4.4.2. 6	 X	WINNF.FT.D.H BT.8	Domain Proxy Heartbeat responseCode=500 (TEMINATED_GR ANT)	Monitor RF transmission. CBSDs will have different behavior: • CBSD1: will continue to transmit to end of test (this is not a pass/fail criteria, but check)	Ρ
				<ul> <li>CBSD2: must stop transmission within 60 seconds of being sent heartbeatResponse with responseCode = 500</li> </ul>	

	pectrum Analyzer - Swept S	A				
Marker	50 Ω 1 192.200 s Input: RF		ig: Free Run tten: 10 dB	ALIGN AUTO #Avg Type: Pwr(RMS) Avg Hold:/100	06:35:54 PMNov 16, 2022 TRACE 1 2 3 4 5 6 TYPE A WWWWW DET A N N N N N	Marker→
10 dB/div Log	Ref 0.00 dBm				Mkr1 192.2 s -16.434 dBm	Mkr→CF
-10.0	1		1			Mkr→CF Step
-20.0						Mkr→Start
-40.0						Mkr→Stop
-60.0						Mkr∆→Span
-80.0						Mkr∆→CF
	3.555000000 GHz 1.0 MHz	#VBW		Sweep	Span 0 Hz 100.0 s (1001 pts)	Mkr→RefLvl
MSG					Input Overload;ADC	over range

Page 36 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

6.4.4.3.1	WINNF.FT.C.HBT.9	Heartbeat Resp		Monitor RF from st	art of test to 60	
		Absent (First I	Heartbeat)	seconds after last		
			ŕ	heartbeatRespons		
				sent. CBSD should	I not transmit at	
				any time during tes	st	
	rum Analyzer - Swept SA					
l Jorkor 1	50 Ω 26.6000 s	AC SENSE:INT	ALIGN A #Avg Type: Pwr(			
harker 1	20.0000 S Input: RF PNO: Fast G	🖵 Trig: Free Run	Avg Hold:/100	TYPE A WWWWW DET A N N N N N		
	IFGain:Low	Atten: 10 dB		,	Markerd	
				Mkr1 26.60 s		
0 dB/div	Ref 0.00 dBm			-80.268 dBm		
, og						
10.0					Marker 2	
20.0						
					Marker 3	
30.0					ivial Kel J	
40.0						
					Marker 4	
50.0						
60.0					Marker 5	
					warker 5	
70.0						
	,1					
80.0					Marker 6	
90.0						
					More	
enter 3.5	55000000 GHz	*		Span 0 Hz		
Res BW 1.0	0 MHz #VB	<b>∿/</b>	Swe	ep 400.0 s (1001 pts)		
				TATUS		

Page 37 of 73         Report Issued: 11/22/2022         Report File #: TR- 7169012035-CBRS-002
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ir.

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

6.4.4.3.2	WINNF.FT.C.HBT.10	Heartbeat Response Absent (Subsequent Heartbeat)	Monitor RF transmis CBSD must transmission transmitExp seconds, wh transmitExp from last su heartbeatRe message	stop n within ireTime+60 nere ireTime is ccessful	Ρ
	rum Analyzer - Swept SA				
w Marker 1 2		#Avg Type: Py	INAUTO D6:57:16 PM Nov 16, 2022 wr(RMS) TRACE 1 2 3 4 5 6	Select Marker	
	Input: RF PNO: Fast G IFGain:Low	☐ Trig: Free Run Avg Hold:/1 Atten: 10 dB	00 TYPE A WWWWW DET A N N N N N		
10 dB/div	Ref 0.00 dBm		Mkr1 242.6 s -70.094 dBm	Marker 1	
10 dB/div				Marker 2	
-20.0				Marker 3	
-40.0				Marker 4	
-60.0				Marker 5	
-80.0				Marker 6	
Center 3.55 Res BW 1.0	55000000 GHz ) MHz #VBV	V S1	Span 0 Hz weep 400.0 s (1001 pts)	More 1 of 2	
MSG			STATUS		

Test Harness logs and timing on graph was verified, the EUT passed the requirement.

	Page 38 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002
--	---------------	---------------------------	--

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

6.5.4.2.2	WINNF.FT.D.MES.2	Domain Proxy Registration Response	No RF monitoring	Р
		contains		
		measReportConfig		

Pass. "measreportconfig" in logs. All other requirements verified.

Page 39 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

6.5.4.2.3	WINNF.FT.C.MES.3	Grant Response contains	No RF monitoring	
		measReportConfig		Р

Pass. "measreportconfig" in logs. All other requirements verified.

Page 40 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

6.5.4.2.5	WINNF.FT.D.MES.5	Domain Proxy Heartbeat Response contains	No RF monitoring	Р
		measReportConfig		

Pass. "measreportconfig" in logs. All other requirements verified.

Page 41 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

6.6.4.1.2	WINNF.FT.D.RLQ			Monitor RF transm			
		Relinquishme	nt	CBSD stops transmission a			
				any time prior to se	ending the		
				relinquishmentReq			
Agilent Spectr	rum Analyzer - Swept SA						
	<sup>50 Ω</sup> 184.600 s	AC SENSE:INT	ALIGN #Avg Type: Pwr				
	Input: RF PNO: F	ast Trig: Free Run	Avg Hold:/100				
	IFGain:L	.ow Atten: 10 dB			Morkerd		
0 dB/div	Ref 0.00 dBm			Mkr1 184.6 s -18.462 dBm			
			1 1				
					Marker 2		
0.0	1	<b>A</b> 1					
0.0							
.0.0					Marker 3		
30.0			-		Warker 3		
0.0							
					Marker 4		
50.0							
0.0							
					Marker 5		
0.0							
80.0					Marker 6		
0.0							
					More		
enter 3.55 es BW 1.0	5000000 GHz	*VBW	Sw	Span 0 Hz (eep 400.0 s (1001 pts)			
G	7 11112 7			status			
	1 1.1 1			514105			

Test Harness logs and timing on graph was verified, the EUT passed the requirement.

Shutdown time taken from Domain Proxy logs, and shutdown confirmed by RF monitoring.

Page 42 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

	T			
6.7.4.1.2	WINNF.FT.D.DRG.2	Domain Proxy Successful Deregistration	Monitor RF transmi CBSD stops any time prior to set relinquishmentRequi deregistrationReque (whichever is sent f	s transmission at H nding the test message or est message irst)
	rum Analyzer - Swept SA			
Marker 1		AC SENSE:INT ALIGN #Avg Type: Pwr	IAUTO 07:21:33 PM Nov 16, 2022 r(RMS) TRACE 1 2 3 4 5 6	Select Marker
10 dB/div	Input: RF PNO: Fast FGain:Low	Tuin Ena Dun Aunthald 400		Marker 1
-10.0				Marker 2
-20.0	<b>1</b>			Marker 3
-40.0				Marker 4
-60.0				Marker 5
-80.0				Marker 6
	55000000 GHz 0 MHz #VBW		Span 0 Hz /eep 400.0 s (1001 pts)	More 1 of 2
MSG			STATUS 🚹 Input Overload;ADC	over range

Test Harness logs and timing on graph was verified, the EUT passed the requirement.

Shutdown time taken from Domain Proxy logs, and shutdown confirmed by RF monitoring.

Page 43 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	TÜV
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

Confirm that the device transmits at a power level less than or equal to the maximum power level approved by the SAS.

7.1.4.1.	Х	Х	WINNF.PT.C.H	UUT RF Transmit	Power Spectral	
1			BT	Power Measurement	Density test case.	Р
					Assume we use 1 carrier bandwidth (say, 5 or 10 MHz), one frequency (say middle channel in band) for test. Measure at max transmit power, and reduce in steps of 3 dB to minimum declared transmit power.	

#### Test Table

		Raw	Raw	External	Conducted				EIRP 1 MHz	EIRP 10 MHz	Margin
Freq	1MHz EIRP limit (target) dBm	10 MHz		Losses (dB)	dBm/MHz	Antenna gain dBi	Ports	Port gain (dB)	dBm/MHz	dBm	dB
3555-Low	34	0.85	-8.01	14.39	6.38	11	32	15.05	32.43	41.29	1.57
3555-High	37	3.77	-5.08	14.39	9.31	11	32	15.05	35.36	44.21	1.64
3630-low	34	0.62	-8.22	14.44	6.22	11	32	15.05	32.27	41.11	1.73
3630-high	37	3.62	-5.56	14.44	8.88	11	32	15.05	34.93	34.93	2.07
3695-low	34	0.84	-7.94	14.53	6.59	11	32	15.05	32.64	41.42	1.36
3695-high	37	3.73	-5.06	14.53	9.47	11	32	15.05	35.52	44.31	1.48

Page 44 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002
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Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

#### 3555 low power

AC SENSE:INT ALIGN AUTO 10:56:39 AMNov 16, 2022 Center Freq: 3.55500000 GHz Radio Std: None	Gate
Trig: Free Run Avg Hold: 25/25 m:Low #Atten: 30 dB Radio Device: BTS Mkr1 3.558 GHz -8.0168 dBm	Ga
	Gate Vie
s	Gate Vie Sweep Tin 20.0 r
	Gate Del 13.692 r
Span 20 MHz #VBW 3 MHz #Sweep 200 ms	Sate Leng 3.6000 r
Power Spectral Density Ga	te Methoo LC
10 MHz -9.15 dBm/MHz	<b>Mo</b> 1 of

Page 45 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

#### 3555-High power

	50 Ω		A		NSE:INT reg: 3.55500	0000 GHz	ALIGN AUTO	10:51:19 A	MNov 16, 2022 : None	Sweep/Contro
) dB/div	Gate: LO Inpu Ref 0 dBr		⊶ iain:Low		e Run 0 dB	Avg Hold	Mkr	Radio Dev 1 3.557		Sweep Tin 200 r Auto <u>M</u>
10							A COLUMN			
20	_	1								Sweep Setu
30		/					+			
40							+			Pau
50							<u> </u>	Lan		
60 <b></b>										
70 80										
90										
enter 3.5 Res BW				#VE	зw змн	z		Spa #Swee	n 20 MHz p 200 ms	
Chann	el Power				Power	Spect	ral Dens	ity		Gat [On, LC
	3.77	dBm/	10 MH2	z	-6.23 dBm/MHz					
										Poir 10
3							STATUS			

Page 46 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

#### 3630 low power

	<sup>50 Ω</sup> 33.692 ms	Center	Freq: 3.635000	000 GHz	IGN AUTO	11:02:03 / Radio Std	MNov 16, 2022 : None		Gate
) dB/div	Gate: LO Input: RF IFGai Ref 0 dBm	Trig: From #Atten:		Avg Hold: 25		Radio Dev r1 3.63 -8.22	<sup>vice: BTS</sup> 325 GHz 60 dBm	<u>On</u>	Ga
10		<b>₽</b> 1			Non Non			On	Gate Vie
30 40 50						L			Gate Vie Sweep Tin 20.0 r
60 70 80									Gate Del 13.692 i
enter 3.6 Res BW 1		#V	/BW/3MHz				n 20 MHz p 200 ms		Gate Leng 3.6000 r
Chann	el Power		Power	Spectral	Dens	ity		G	ate Metho
	0.62 dBm/ 1	0 MHz		-9.38	3 dBi	m/MHz			<b>М</b> о 1 о
3					STATUS				

Page 47 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002

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Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

#### 3630-high power

13.692 ms		Cente	er Freq: 3.6350						Gate
	IFGain:	Low #Atter				1 3.631	84 GHz	<u>On</u>	Ga
		T annun in	14114141414141		mmon h			On	Gate Vie
									Gate Vie veep Tir 20.0 r
								C	ate Del 13.692 r
35 GHz MHz		#				Spa #Swee	n 20 MHz p 200 ms	Ga	ate Leng 3.6000 (
el Power			Powe	r Spect	ral Dens	sity		Gate	e Metho
3.62	dBm/ 10	) MHz		-6	.38 dB	m/MHz			<b>М</b> о 1 о
	Ref 0 dBm	r 13.692 ms ate: L0 Input: RF IFGain: Ref 0 dBm Solution B5 GHz MHz Power	r 13.692 ms       Center         iate: L0       Input: RF         IFGain:Low       #Atter         Ref 0 dBm       Immediate the second se	Ref 0 dBm     Center Freq: 3.6350       Ref 0 dBm     #Atten: 30 dB       35 GHz     #VBW 3 Miller	13.692 ms     Center Freq: 3.635000000 GHz       iate: L0     Input: RF       IFGain:Low     #Atten: 30 dB         Ref 0 dBm         Imput: RF         IFGain:Low         Ref 0 dBm         Imput: RF         IFGain:Low         Ref 0 dBm         Imput: RF         Ref 0 dBm         Imput: RF         Imput: RF            Ref 0 dBm <td>13.692 ms iate: L0       Input: RF IFGain:Low       Center Freq: 3.635000000 GHz Trig: Free Run       Avg Hold: 25/25         Ref 0 dBm       Mkr         Imput: RF       Imput: RF       Mkr         Ref 0 dBm       Imput: RF       Imput: RF         Imput: RF       Imput: RF       Imput: RF         State: L0       Input: RF       Imput: RF         Imput: RF       Imput: RF       Imput: RF         Ref 0 dBm       Imput: RF       Imput: RF         Imput: RF       Imput: RF       Imput: RF         Ref 0 dBm       Imput: RF       Imput: RF         Imput: RF       Imput: RF       Imput: RF         Ref 0 dBm       Imput: RF       Imput: RF         Imput: RF       Imput: RF       Imput: RF         Ref 0 dBm       Imput: RF       Imput: RF         Imput: RF       Imput: RF       Imput: RF         Ref 0 dBm       Imput: RF       Imput: RF</td> <td>r 13.692 ms iate: L0       Input: RF IFGain:Low       Center Freq: 3.635000000 GHz Avg Hold: 25/25       Radio Std Radio Dev Mkr1 3.631         Ref 0 dBm       -5.26        </td> <td>13.692 ms       Center Freq: 3.635000000 GHz       Radio Std: None         rate: L0       Input: RF       IFGain:Low       Avg Hold: 25/25       Radio Device: BTS         Mkr1       3.63184 GHz       -5.2662 dBm       -5.2662 dBm         Imput: RF       Imput: RF       -5.2662 dBm       -5.2662 dBm         Imput: RF</td> <td>13.692 ms       Center Freq: 3.635000000 GHz       Radio Std: None         iate: L0       Input: RF       FGain:Low       Avg Hold: 25/25       Radio Device: BTS         Mkr1       3.63184 GHz       On       On         Ref       0 dBm       -5.2662 dBm       On         On       On       On       On         State: L0       Input: RF       Input: RF       Input: RF       Input: RF         Ref       0 dBm       -5.2662 dBm       On       On         On       On       On       On       On         Imput: RF       Imput: RF       Imput: RF       Imput: RF       Imput: RF         Ref       0 dBm       -5.2662 dBm       On       On         On       Imput: RF       Imput: RF       Imput: RF       Imput: RF         Ref       0 dBm       -5.2662 dBm       On       On         Imput: RF       Imput: RF       Imput: RF       Imput: RF       Imput: RF         Ref       0 dBm       Imput: RF       Imput: RF       Imput: RF       Imput: RF         Ref       0 dBm       Imput: RF       Imput: RF       Imput: RF       Imput: RF       Imput: RF         So GHz       Imput: RF       Imput: R</td>	13.692 ms iate: L0       Input: RF IFGain:Low       Center Freq: 3.635000000 GHz Trig: Free Run       Avg Hold: 25/25         Ref 0 dBm       Mkr         Imput: RF       Imput: RF       Mkr         Ref 0 dBm       Imput: RF       Imput: RF         Imput: RF       Imput: RF       Imput: RF         State: L0       Input: RF       Imput: RF         Imput: RF       Imput: RF       Imput: RF         Ref 0 dBm       Imput: RF       Imput: RF         Imput: RF       Imput: RF       Imput: RF         Ref 0 dBm       Imput: RF       Imput: RF         Imput: RF       Imput: RF       Imput: RF         Ref 0 dBm       Imput: RF       Imput: RF         Imput: RF       Imput: RF       Imput: RF         Ref 0 dBm       Imput: RF       Imput: RF         Imput: RF       Imput: RF       Imput: RF         Ref 0 dBm       Imput: RF       Imput: RF	r 13.692 ms iate: L0       Input: RF IFGain:Low       Center Freq: 3.635000000 GHz Avg Hold: 25/25       Radio Std Radio Dev Mkr1 3.631         Ref 0 dBm       -5.26	13.692 ms       Center Freq: 3.635000000 GHz       Radio Std: None         rate: L0       Input: RF       IFGain:Low       Avg Hold: 25/25       Radio Device: BTS         Mkr1       3.63184 GHz       -5.2662 dBm       -5.2662 dBm         Imput: RF       Imput: RF       -5.2662 dBm       -5.2662 dBm         Imput: RF	13.692 ms       Center Freq: 3.635000000 GHz       Radio Std: None         iate: L0       Input: RF       FGain:Low       Avg Hold: 25/25       Radio Device: BTS         Mkr1       3.63184 GHz       On       On         Ref       0 dBm       -5.2662 dBm       On         On       On       On       On         State: L0       Input: RF       Input: RF       Input: RF       Input: RF         Ref       0 dBm       -5.2662 dBm       On       On         On       On       On       On       On         Imput: RF       Imput: RF       Imput: RF       Imput: RF       Imput: RF         Ref       0 dBm       -5.2662 dBm       On       On         On       Imput: RF       Imput: RF       Imput: RF       Imput: RF         Ref       0 dBm       -5.2662 dBm       On       On         Imput: RF       Imput: RF       Imput: RF       Imput: RF       Imput: RF         Ref       0 dBm       Imput: RF       Imput: RF       Imput: RF       Imput: RF         Ref       0 dBm       Imput: RF       Imput: RF       Imput: RF       Imput: RF       Imput: RF         So GHz       Imput: RF       Imput: R

Page 48 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002

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Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

#### 3695 low power

	<sup>50 Ω</sup> <b>13.692 ms</b>		eq: 3.695000000 GH	ALIGN AUTO Iz Iold:>25/25	11:15:54 AMNov 16, 20 Radio Std: None	22 Gate
0 dB/div	Gate: LO Input: RF IFGai Ref 0 dBm				Radio Device: BTS 1 3.69206 GH -7.9447 dBn	z Ga
-10			***********************			Gate Vie
-30 -40 -50 -60						Gate Vie Sweep Tin 20.0 n
-70						Gate Del 13.692 r
enter 3.6 Res BW		#VB\	N/ 3 MHz		Span 20 MH #Sweep 200 m	Gate Leng Z 3.6000 r
Chann	el Power		Power Spe	ctral Dens	sity	Gate Method
	<b>0.84</b> dBm/ 1	0 MHz	-	9.16 dB	m/MHz	<b>Mo</b> 1 o
G				STATUS	5	

Page 49 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

#### 3695-high power

ate Delay	13.662 r	ns out: RF		Center	SENSE:INT Freq: 3.69500 ee Run	00000 GHz Avg Hol	ALIGN AUTO	Radio Std:	MNov 16, 2022 None		Gate
	Ref 0 dE	IF	Gain:Low	#Atten:	30 dB			Radio Dev 1 3.691 -5.06	06 CU-	<u>On</u>	Ga
20		1	The Later and				The second			On	Gate Vie
30		/									
50		{					<u> </u>				Gate Vie Sweep Tir 20.0
70											Gate Del 13.662
90	011-							0	- 00 Mile		Gate Leng
enter 3.695 Res BW 1 N				#V	/ВЖ ЗМН	z		spa #Sweep	n 20 MHz 200 ms		3.6000
Channel	Power				Power	r Spect	ral Dens	sity		G	ate Metho
	3.73	dBm	/ 10 MH	Iz		-6	. <b>27</b> dB	m/MHz			
											<b>M</b> o 1 o
à							STATUS				

Page 50 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002

110

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

### DOT CBRS Radio: WINNF / Security Test Case Analysis

#### 1. WINNF.FT.C.SCS.1

#### Packet Capture Sequence

WI	NNF.FT.C.SCS.1_20	22-11-17-happy_test_1.pd	cap		
ile F	dit View Go	Canture Analyze S	tatistics Telephony Wire	lerr Toolr Hel	
6.10	1 O 🔤 🖻	XCKSS	27 £ 📜 🗖 Q. '	ચ્ચ્ 👥	
Appl	y a display filter <	Ctrl-/>			
ю.	Time	Source	Destination	Protocol	Length Info
	1 0.000000	10.10.3.13	10.10.3.84	TCP	74 37586 + 5001 [SVN] Seq=0 Win=29200 Len=0 MSS=1460 SACK_PERM=1 TSval=3712115343 TSecr=0 WS=128
	2 0.000757	10.10.3.84	10.10.3.13	TCP	74 5001 + 37586 [SYN, ACK] Seq=0 Ack=1 Win=28960 Len=0 MSS=1460 SACK_PERM=1 TSval=3712136145 TSecr=3712115343 WS=128
	3 0.000782	10.10.3.13	10.10.3.84	TCP	66 37586 → 5001 [ACK] Seq=1 Ack=1 Win=29312 Len=0 TSval=3712115343 TSecr=3712136145
	4 0.003243	10.10.3.13	10.10.3.84	TLSv1.2	352 Client Hello
	5 0.003604	10.10.3.84	10.10.3.13	TCP	66 5001 → 37586 [ACK] Seq=1 Ack=287 Win=30080 Len=0 TSval=3712136148 TSecr=3712115346
	6 0.003703	10.10.3.84	10.10.3.13	TLSv1.2	3394 Server Hello, Certificate, Certificate Request, Server Hello Done
	7 0.003714	10.10.3.13	10.10.3.84	TCP	66 37586 → 5001 [ACK] Seq=287 Ack=3329 Win=35968 Len=0 TSval=3712115346 TSecr=3712136148
	8 0.010455	10.10.3.13	10.10.3.84	TLSv1.2	3747 Certificate, Client Key Exchange, Certificate Verify
	9 0.010492	10.10.3.13	10.10.3.84	TLSv1.2	72 Change Cipher Spec
	10 0.010503	10.10.3.13	10.10.3.84	TLSv1.2	111 Encrypted Handshake Message
	11 0.011156	10.10.3.84	10.10.3.13	TCP	66 5001 → 37586 [ACK] Seg=3329 Ack=3968 Win=37504 Len=0 T5val=3712136156 TSecr=3712115353
	12 0.013475	10.10.3.84	10.10.3.13	TCP	66 5001 → 37586 [ACK] Seq=3329 Ack=4019 Win=37504 Len=0 T5val=3712136158 TSecr=3712115353
	13 0.013485	10.10.3.84	10.10.3.13	TLSv1.2	117 Change Cipher Spec, Encrypted Handshake Message
	14 0.014606	10,10.3.13	10.10.3.84		1764 Application Data
	15 0.015075	10.10.3.84	10.10.3.13	TCP	66 5001 → 37586 [ACK] Seq=3380 Ack=5717 Win=40832 Len=0 TSval=3712136159 TSecr=3712115357
	16 0.078229	10.10.3.84	10.10.3.13	TLSv1.2	112 Application Data
	17 0.117892	10.10.3.13	10.10.3.84	TCP	66 37586 → 5001 [ACK] Seq=5717 Ack=3426 Win=35968 Len=0 TSval=3712115461 TSecr=3712136223
	18 0.118256	10.10.3.84	10.10.3.13	TLSv1.2	557 Application Data, Application Data, Application Data, Application Data, Application Data, Application Data, Application Data
	19 0.118279	10.10.3.13	10.10.3.84	TCP	66 37586 → 5001 [ACK] Seq=S717 Ack=3917 Win=38784 Len=0 TSval=3712115461 TSecr=3712136263
	20 1.163907	10.10.3.13	10.10.3.84		1162 Application Data
	21 1.166100	10.10.3.84	10.10.3.13	TLSv1.2	
	22 1.166124	10.10.3.13	10.10.3.84	TCP	66 37586 + 5001 [ACK] Seq=6813 Ack=3963 Win=38784 Len=0 TSval=3712116509 TSecr=3712137311
	23 1.166332	10.10.3.84	10.10.3.13	TLSv1.2	
	24 1.166340	10.10.3.13	10.10.3.84	TCP	66 37586 + 5001 [ACK] Seq=6813 Ack=4712 Win=41728 Len=0 TSval=3712116509 TSecr=3712137311

#### WINNF test requirements:

WINNF test requirements from WINNF-TS-0122-V1.0.2 CBRS CBSD Test Specification:

2	<ul> <li>Make sure that Mutual authentication happens between UUT and the SAS Test Harness.</li> <li>Make sure that UUT uses TLS v1.2</li> <li>Make sure that cipher suites from one of the following is selected,</li> <li>TLS_RSA_WITH_AES_128_GCM_SHA256</li> <li>TLS_RSA_WITH_AES_256_GCM_SHA384</li> <li>TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA2 56</li> <li>TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA3 84</li> <li>TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256</li> </ul>	PASS
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#### Analysis of WINNF Test Requirements

1. From Client Hello: TLS version = TLS 1.2

Page 51 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	TÜV
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

> Frame 4: 352 bytes on wire (2816 bits), 352 bytes captured (2816 bits) > Ethernet II, Src: fa:16:3e:f6:32:cb (fa:16:3e:f6:32:cb), Dst: fa:16:3e:b0:f3:e6 (fa:16:3e:b0:f3:e6) > Internet Protocol Version 4, Src: 10.10.3.13, Dst: 10.10.3.84 > Transmission Control Protocol, Src Port: 37586, Dst Port: 5001, Seq: 1, Ack: 1, Len: 286 Transport Layer Security Y TLSv1.2 Record Layer: Handshake Protocol: Client Hello Content Type: Handshake (22) Version: TLS 1.2 (0x0303) Length: 281 ✓ Handshake Protocol: Client Hello Handshake Type: Client Hello (1) Length: 277 Version: TLS 1.2 (0x0303) Random: 555e75a845ef20741d1c2502edded93ffcc6c68d5b81fcd646640089ce175e73 GMT Unix Time: May 21, 2015 20:17:44.000000000 Eastern Daylight Time Random Bytes: 45ef20741d1c2502edded93ffcc6c68d5b81fcd646640089ce175e73 Session ID Length: 0 Cipher Suites Length: 86

2. Cipher suite list from Client Hello is from WINNF approved list:

Cipher Suites (43 suites)

Cipher Suite: TLS ECDHE ECDSA WITH AES 256 GCM SHA384 (0xc02c) Cipher Suite: TLS\_ECDHE\_ECDSA\_WITH\_AES\_128\_GCM\_SHA256 (0xc02b) Cipher Suite: TLS\_ECDHE\_RSA\_WITH\_AES\_256\_GCM\_SHA384 (0xc030) Cipher Suite: TLS\_ECDHE\_RSA\_WITH\_AES\_128\_GCM\_SHA256 (0xc02f) Cipher Suite: TLS\_DHE\_RSA\_WITH\_AES\_256\_GCM\_SHA384 (0x009f) Cipher Suite: TLS\_DHE\_DSS\_WITH\_AES\_256\_GCM\_SHA384 (0x00a3) Cipher Suite: TLS\_DHE\_RSA\_WITH\_AES\_128\_GCM\_SHA256 (0x009e) Cipher Suite: TLS\_DHE\_DSS\_WITH\_AES\_128\_GCM\_SHA256 (0x00a2) Cipher Suite: TLS ECDHE ECDSA WITH AES 256 CBC SHA384 (0xc024) Cipher Suite: TLS\_ECDHE\_RSA\_WITH\_AES\_256\_CBC\_SHA384 (0xc028) Cipher Suite: TLS\_ECDHE\_ECDSA\_WITH\_AES\_128\_CBC\_SHA256 (0xc023) Cipher Suite: TLS\_ECDHE\_RSA\_WITH\_AES\_128\_CBC\_SHA256 (0xc027) Cipher Suite: TLS\_DHE\_RSA\_WITH\_AES\_256\_CBC\_SHA256 (0x006b) Cipher Suite: TLS\_DHE\_DSS\_WITH\_AES\_256\_CBC\_SHA256 (0x006a) Cipher Suite: TLS\_DHE\_RSA\_WITH\_AES\_128\_CBC\_SHA256 (0x0067) Cipher Suite: TLS\_DHE\_DSS\_WITH\_AES\_128\_CBC\_SHA256 (0x0040) Cipher Suite: TLS\_ECDH\_ECDSA\_WITH\_AES\_256\_GCM\_SHA384 (0xc02e) Cipher Suite: TLS\_ECDH\_RSA\_WITH\_AES\_256\_GCM\_SHA384 (0xc032) Cipher Suite: TLS\_ECDH\_ECDSA\_WITH\_AES\_128\_GCM\_SHA256 (0xc02d) Cipher Suite: TLS\_ECDH\_RSA\_WITH\_AES\_128\_GCM\_SHA256 (0xc031) Cipher Suite: TLS ECDH ECDSA WITH AES 256 CBC SHA384 (0xc026) Cipher Suite: TLS\_ECDH\_RSA\_WITH\_AES\_256\_CBC\_SHA384 (0xc02a) Cipher Suite: TLS\_ECDH\_ECDSA\_WITH\_AES\_128\_CBC\_SHA256 (0xc025) Cipher Suite: TLS\_ECDH\_RSA\_WITH\_AES\_128\_CBC\_SHA256 (0xc029) Cipher Suite: TLS\_ECDHE\_ECDSA\_WITH\_AES\_256\_CBC\_SHA (0xc00a) Cipher Suite: TLS\_ECDHE\_RSA\_WITH\_AES\_256\_CBC\_SHA (0xc014) Cipher Suite: TLS\_ECDHE\_ECDSA\_WITH\_AES\_128\_CBC\_SHA (0xc009)

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

Cipher Suite: TLS\_ECDHE\_RSA\_WITH\_AES\_128\_CBC\_SHA (0xc013) Cipher Suite: TLS DHE RSA WITH AES 256 CBC SHA (0x0039) Cipher Suite: TLS\_DHE\_DSS\_WITH\_AES\_256\_CBC\_SHA (0x0038) Cipher Suite: TLS DHE RSA WITH AES 128 CBC SHA (0x0033) Cipher Suite: TLS\_DHE\_DSS\_WITH\_AES\_128\_CBC\_SHA (0x0032) Cipher Suite: TLS\_ECDH\_ECDSA\_WITH\_AES\_256\_CBC\_SHA (0xc005) Cipher Suite: TLS\_ECDH\_RSA\_WITH\_AES\_256\_CBC\_SHA (0xc00f) Cipher Suite: TLS\_ECDH\_ECDSA\_WITH\_AES\_128\_CBC\_SHA (0xc004) Cipher Suite: TLS ECDH RSA WITH AES 128 CBC SHA (0xc00e) Cipher Suite: TLS RSA WITH AES 256 GCM SHA384 (0x009d) Cipher Suite: TLS\_RSA\_WITH\_AES\_128\_GCM\_SHA256 (0x009c) Cipher Suite: TLS RSA WITH AES 256 CBC SHA256 (0x003d) Cipher Suite: TLS\_RSA\_WITH\_AES\_128\_CBC\_SHA256 (0x003c) Cipher Suite: TLS RSA WITH AES 256 CBC SHA (0x0035) Cipher Suite: TLS\_RSA\_WITH\_AES\_128\_CBC\_SHA (0x002f) Cipher Suite: TLS\_EMPTY\_RENEGOTIATION\_INFO\_SCSV (0x00ff)

3. Cipher suite chosen (from Server Hello): TLS\_RSA\_WITH\_AES\_256\_GCM\_SHA384 (0x009d)

a display filter .	. <ct l-=""></ct>			
Time	Source	Destination	Protocol	Length Info
1 0.000000	10.10.3.13	10.10.3.84	TCP	74 37586 + 5001 [SYM] Seq=0 Win=29200 Len=0 MSS=1460 SACK_PERM=1 TSval=3712115343 TSecr=0 WS=128
2 0.000757	10.10.3.84	10.10.3.13	TCP	74 5001 - 37586 [SYN, ACK] Seq=0 Ack=1 Win=28960 Len=0 MSS=1460 SACK_PERM=1 TSval=3712136145 TSecr=3712115343 WS=128
3 0.000782	10,10.3.13	10.10.3.84	TCP	66 37586 → 5001 [ACK] Seq=1 Ack=1 Win=29312 Len=0 TSval=3712115343 TSecr=3712136145
4 0.003243	10.10.3.13	10.10.3.84		352 Client Hello
5 0.003604	10.10.3.84	10.10.3.13	TCP	66 5001 + 37586 [ACK] Seq=1 Ack=287 Win=30080 Len=0 TSval=3712136148 TSecr=3712115346
6 0.003703	10.10.3.84	10.10.3.13		3394 Server Hello, Certificate, Certificate Request, Server Hello Done
7 0.003714	10.10.3.13	10.10.3.84	TCP	66 37586 → 5001 [ACK] Seq=287 Ack=3329 Win=35968 Len=0 TSval=3712115346 TSecr=3712136148
8 0.010455	10.10.3.13	10.10.3.84		3747 Certificate, Client Key Exchange, Certificate Verify
9 0.010492	10.10.3.13	10.10.3.84	TLSv1.2	72 Change Cipher Spec
10 0.010503	10.10.3.13	10.10.3.84		111 Encrypted Handshake Message
11 0.011156	10.10.3.84	10.10.3.13	TCP	66 5001 → 37586 [ACK] Seq=3329 Ack=3968 Win=37504 Len=0 TSval=3712136156 TSecr=3712115353
12 0.013475	10.10.3.84	10.10.3.13	TCP	66 5001 → 37586 [ACK] Seq=3329 Ack=4019 Win=37504 Len=0 TSval=3712136158 TSecr=3712115353
13 0.013485	10.10.3.84	10.10.3.13		117 Change Cipher Spec, Encrypted Handshake Message
14 0.014606	10.10.3.13	10.10.3.84		1764 Application Data
15 0.015075	10.10.3.84	10.10.3.13	TCP	66 5001 + 37586 [ACK] Seq=3380 Ack=5717 Win=40832 Len=0 TSval=3712136159 TSecr=3712115357
16 0.078229	10.10.3.84	10.10.3.13		112 Application Data
17 0.117892	10.10.3.13	10.10.3.84	TCP	66 37586 → 5001 [ACK] Seq=5717 Ack=3426 Win=35968 Len=0 TSval=3712115461 TSecr=3712136223
18 0.118256	10.10.3.84	10.10.3.13		557 Application Data, Application Data, Application Data, Application Data, Application Data, Application Data
19 0.118279	10.10.3.13	10.10.3.84	TCP	66 37586 → 5001 [ACK] Seq=5717 Ack=3917 Win=38784 Len=0 TSval=3712115461 TSecr=3712136263
20 1.163907	10.10.3.13	10.10.3.84		1162 Application Data
21 1.166100	10.10.3.84	10.10.3.13		112 Application Data
22 1.166124	10.10.3.13	10.10.3.84	TCP	66 37586 → 5001 [ACK] Seq=6813 Ack=3963 Win=38784 Len=0 TSval=3712116509 TSecr=3712137311
23 1.166332	10.10.3.84	10.10.3.13		815 Application Data, Applicat
24 1.166340	10.10.3.13	10.10.3.84	TCP	66 37586 → 5001 [ACK] Seq=6813 Ack=4712 Win=41728 Len=0 TSval=3712116509 TSecr=3712137311
	/pe: Handshake (22) FLS 1.2 (0x0303)			
Length: 8	ı ' '			
	Protocol: Server Hel			
Length	ike Type: Server Hell	· (2)		
	: TLS 1.2 (0x0303)			
		36b64df23d9f3822483dd	Andreha 8c5775	367380h1+1
		980 16:18:53.00000000		
		a36b64df23d9f3822483d		
	1 ID Length: 32	00004012000100224000	abbeacebabes//	Jord Store
		203d76e92ee256eac635a	70a475a5615ade	48hb97ca8e2149
		AES 256 GCM SHA384 (0		
	sion Method: null (0			
	ions Length: 5	/		
	ion: renegotiation in	fo (len=1)		
	<pre>: renegotiation_info</pre>			
		·/		
	th: 1			

4. The Registration request message arrived at the Test Harness,

Page 53 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

so authentication was completed.

Page 54 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	TUV
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

#### 2. WINNF.FT.C.SCS.2

#### Packet Capture Sequence

of a tick file	XC Q == = T		a Touls Hel		
		1 1 1 1 1 1 1 1 1	- 11		
Title	Sinece	Destination	Protocol 6	aderith John	
3448 5.387836	18.18.8.61	18.18.8.124		195 Client Hello	
3441 0.687328	10.10.0.124	18.10.0.01	TDI	00 3008 + 53072 [ADV] Seq-1 Ack-138 Min-13104 Lan-0 TS-al-1139202050 TS-cc1540548105	
3442 6,887561	18,10.0,124	10,10,0.61	TLSV1.2	1862 Server Hello	
3443 5.887571	10.10.0,01	10,20,9.124	TLP	55 5072 - 5088 (ADX) 560-138 Ack-2707 Win-16800 Len-8 TSval-1548540185 TSec-1159282890	
3444 6.887581	18-38.8-124	10,18.0.61		416 Certificate, Certificate Request, Server Hello Done	
5445 0.887585 3446 6.821453	10,12.8,61	18, 10, 8, 124	TER	00 35872 + 3880 [ACM] 5eq=138 4ck=3147 Winv18712 Lanv8 T5val=1548040185 T5acr=1138282880	
3447 G. 324810	11111110,10,00,58	TT021125011207	MDP TEP	194 38578 + 36571 Len+132 78 42552 + 4100 (Son) Sette Userteide Lenee Moseteide Sack PERMIS Trail-Iseberation Talored Works	
3448 6-325:51	18.38.9.574	18.18.8.61	TUP	74 BUR + 42/202 CM, AKU SOMA ACH- MACHINE CAME INSTALLA SAL PARA CAMPAGINA TAN TAN TAN TAN TAN TAN TAN TAN TAN T	
5445 6.825270	10.10.01	16.20.0.124	TEF	00 42153 - 6180 [ACK] Seg-1 Ack-1 Min-14268 Level Thesh-1540(45261 Thesh-1135082114	
3450 6,827794	10,10.0,61	10,10,0.124	TOP	326 42352 + 8100 [PSH, 4CK] Sep-1 Adv-1 HDv-14208 Lev-260 TSval-1540649209 TSecv-1129282114 [TCP segment of a reaccessived PCW]	
3453 5,827836	18,38.8,61	18,10,9,124	CESP	142 Request	
3452 E-826845	18.38.8.124	18.18.8.61	TLP	66 8198 × 42352 [401] Seq=1 Ack=261 MIN=15184 Len=8 TSv81=1129282117 TSecr=1548649285	
5453 0.828900	18,12.8.124	16,10,8.61	TEP	00 5188 = 42332 [ACM] Seq41 Ack+337 Min+13184 Lan+8 TSval+1139252117 TSec+-1548648395	
3454 6,831897 3455 6,848731	10,10,0,01 10,10,0,124	10,10,0.63	TOP	66 36578 + 0000 [ADX] Segv14259 Ackv11414 WInv501 Lenv0 75va1v1340640210 TSecrv1347315566 2405 Austronee	
3455 6,341711	10,10,0,224	10,20,9,50	TUP	2402 Response 56 42322 + 8100 [AOI] 5eg-337 Ack-2451 MIn-1606 (Jen-0 T5/a)-1548649221 T5ec/=1129282132	
3417 C. 344610	10.10.0.01	16,10 8,124	102	B) ALDS: * blue [AD] Support ALEASIN HURIDON LINE INVESTIGATION (ALIGN HURIDON) ALIGN ALIGN ALIGN ALIGN A	
3458 6,844691	10.30.0.124	10,10,0,6L	TOP	ec 8100 - 42552 [739, 404] Seg-0403 Ack-817 Mix-15100 Lenve TSval-4180081253 75eu1540e04231	
3430 5,844670	10,30.0,01	10,10,9.124	TLP	16 42352 + 8100 (ACK) Sep-336 Ack-2454 Min-10006 Len-0 Toyal-1540549222 TSec-1139202133	
3468 6.844833	18.38.8.124	18.18.8.61	TUP	66 8188 + 42352 [40:] Seq=2454 Ack=381 Win+15U84 Len+8 TSval=113928213 TSecr=1548649222	
5461 0.852530	16,10.6.61	16,16,8,124	713+L-2	75 Alert (Level: fatal, Description: Certificate Universe)	
3462 6,053030	10.30.0.EI	19,19,9,174	709	ee 39471 = 3000 [430, 401] Sept137 ACK-3147 Min-19713 Len-0 TSv01-3540449131 75ecr-11304000	
3463 6,851258 3464 6,851258	10,10,0,124	18.10.0.124	TLP	25 5800 × 55072 (Fil), HCB 25021147 ACX-110 MIN-15108 Lenne TSVAL-1157082342 TS602-1548049238 86 5972 → 5000 (ACC) 500-138 ACX-3140 MIN-19712 Lenne TSVAL-1548049231 TS602-1137232142	
3405 0.057640	18.10.8.61	18,10,8.03	HTTP	BE STATZ * SOME [Work] Schulde economic annexation contractive contraction of the statistic s	
3466 6.861925	18.10.0.03	10,10,0.01	HTTP/3_	587 HTTP/1.1 200 DK , levelsript Object Rotation (application/jion)	
3467 6,861939	18,10,0,61	10,10,0.63	TCP	66 38578 - 9200 [ACM] Seg-13006 Ack-11935 Win-S02 Len-0 TSvol-1540649239 TSecr-1547315636	
3465 6.876601	::ffff:10.10.0.52	ff82::#f81:359	UDP	191 65283 + 65282 Len=129	
3469 6,395639	18,10.0,51	10.10.0.63	TOP	215 58578 → 9200 [PSH, ACH] Seq=15006 Ack+11935 Min=582 Len=149 T5val=1540649273 TSecr=1547315636 [TCP segment of a reassembled PDU]	
5478 6.896117	18.10.0.65	10.10.0.61	HTTP	S1 HTTP/1.1 100 Continus	
			housed (append		
	bytes on wire (19964 bi facilitieshifash (fac				
Ethernet II, Srci Internet Protocol	fn:16:3e:41:fn:8b (fa: Version 4, Src: 10.10.	16:3e:41:fa:8b), Ds 0.124, Dst: 10.10.0	st: fm:16:3e: 0.61	17(b4)ec (fa:16)3e:17(b4)ec)	
Ethernet II, Srci Enternet Protocol Fransmission Cont	fm:16:3e:41:fm:8b (fm: Version 4, Src: 10.10. rol Protocol, Src Port:	16:3e:41:fa:8b), Ds 0.124, Dst: 10.10.0	st: fm:16:3e: 0.61	17(b4)ec (fa:16)3e:17(b4)ec)	
Ethernet II, Src: Enternet Protocol Fransmission Cont Typertext Transm	fa:16:3e:41:fa:8b (fa: Version 4, Src: 10.10. Frol Protocol, Src Port: Protocol	16:3e:41:fa:8b), Ds 0.124, Dst: 10.10.0	st: fm:16:3e: 0.61	17(b4)ec (fa:16)3e:17(b4)ec)	
ithernet II, Srci Internet Protocol Fransmission Cont Sportast Transfe Online Certificat	fa:16:3e:41:fa:8b (fa: Version 4, Src: 10.10. Frol Protocol, Src Port: Protocol E Status Protocol	16:3e:41:fa:8b), Ds 0.124, Dst: 10.10.0	st: fm:16:3e: 0.61	17(b4)ec (fa:16)3e:17(b4)ec)	-
ithernet II, Srci Internet Protocol Fransmission Cont Sportast Transfe Daline Certificat responseStatus	fa:16:3e:41:fa:8b (fa: Version 4, Src: 10.10. Frol Protocol, Src Port: Protocol	16:3e:41:fa:8b), Ds 0.124, Dst: 10.10.0	st: fm:16:3e: 0.61	17(b4)ec (fa:16)3e:17(b4)ec)	
ithernet II, Srci Internet Protocol Fransmission Cont Sportast Transfe Duline Certificat responseStatus * responseBytes	fa:16:3e:41:fa:8b (fa: Version 4, Src: 10.10. Frol Protocol, Src Port: Protocol E Status Protocol	16:3e:41:fa:8b), Ds e.124, Dst: 10.10.0 8100, Dst Port: 42	st: f#:16:3e: 8.61 2352, Seq: 1,	17(b4)ec (fa:16)3e:17(b4)ec)	
thernet II, Srci Internet Protocol Fransmission Cont Speriast Transmo Deline Certificat responseStatus responseSytes ResponseTyp @ 8asicOCSPRe	<pre>fail6i3ei41(fai8b (fai Version 4, Sec: 18.18, rol Protocol, Src Port) re Status Protocol : successful (0) e Id: 1.5.6.1.5.5.7.48. sponse</pre>	16:3e:41:fa:8b), Ds e.124, Dst: 10.10.0 8100, Dst Port: 42	st: f#:16:3e: 8.61 2352, Seq: 1,	17(b4)ec (fa:16)3e:17(b4)ec)	
ithernet II, Srci Internet Protocol Iranselssion Cont Igentext Transfe Doline Certificat responsebytes Responsebytes Responsebytes V BasicO/SPRe V BuBespon	fail6:30:41:fa:80 (fai Version 4, Src: 10.10. rol Protocol, Src Porti re Protocol re Status Protocol : successful (0) e Id: 1.5.6.1.5.5.7.40. sponse masData	16:3e:41:fa:8b), Ds e.124, Dst: 10.10.0 8100, Dst Port: 42	st: f#:16:3e: 8.61 2352, Seq: 1,	17(b4)ec (fa:16)3e:17(b4)ec)	
ithernet II, Srci Internet Protocol Ignetist Transf Mine Certificat responseStatus ResponseSytes ResponseTyp * 8sicOCSPHe * tbsRespon > responseSytes	<pre>fail6i3ei4lifai8b (fai Version 4, Sre: 10.10. rol Protocol, Src Parti re Pertocol is Status Protocol : successful (%) e 1d: 1.5.6.1.5.5.7.40. sponse nasData dor'Di byName (1)</pre>	16:3e:41:fa:8b), Ds 0.124, Dst: 10.10.0 8100, Dst Port: 42 1.1 (id-pkix-ocsp-b	st: f#:16:3e: 8.61 2352, Seq: 1,	17(b4)ec (fa:16)3e:17(b4)ec)	
ithernet II, Srci Internet Protocol Iransmission Cont Appendent Transfe Unline Certificat responseBytes ResponseBytes ResponseBytes 8 AssicOCSPRe 9 tobBespon 9 respon produm	<pre>friid:le:41:friB0 (fai ) Version 4, Sre: 18:10; rol Protocol, Src Port; e Status Protocol : successful (0) e 1d: 1.5.6.1.5.5.7.48; sponse nambata der/D1 byMame (1) cadA: 2019-02-05 14:27;</pre>	16:3e:41:fa:8b), Ds 0.124, Dst: 10.10.0 8100, Dst Port: 42 1.1 (id-pkix-ocsp-b	st: f#:16:3e: 8.61 2352, Seq: 1,	17(b4)ec (fa:16)3e:17(b4)ec)	
ithernet II, Srci Internet Protocol Transdision Cont Typertaxt Transfe Deline Certificat responseBytes ResponseType V BasicOCSPRe V theRespon Proba V respon proba V respon	<pre>fmli63e+41.fml06 (fml Version 4, Sec: 10.10, rol Protocol, Sec Part in Protocol : successful (0) e 1d: 1.5.6.1.5.5.7.40; sponse netData nderID: byName (1) cmdAt: 2010-02.614:27: netSi 11:200</pre>	16:3e:41:fa:8b), Ds 0.124, Dst: 10.10.0 8100, Dst Port: 42 1.1 (id-pkix-ocsp-b	st: f#:16:3e: 8.61 2352, Seq: 1,	17(b4)ec (fa:16)3e:17(b4)ec)	
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#### Requirements:

WINNF test requirements from WINNF-TS-0122-V1.0.2 CBRS CBSD Test Specification:

2	<ul> <li>Make sure that UUT uses TLS v1.2 for security establishment.</li> <li>Make sure UUT selects the correct cipher suite.</li> <li>UUT shall use CRL or OCSP to verify the validity of the server certificate.</li> <li>Make sure that Mutual authentication does not happen between UUT and the SAS Test Harness.</li> </ul>	PASS	FAIL	
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Analysis of WINNF Test Requirements

1. From Client Hello can read: TLS version = TLS 1.2

	Page 55 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002
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Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	TÜV
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

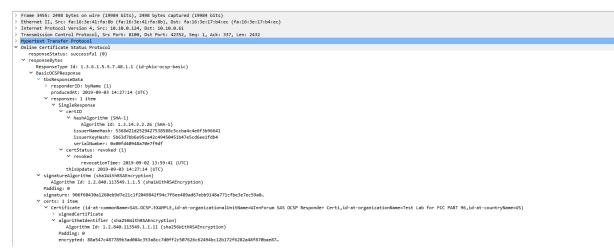
> Frame 3442: 2862 bytes on wire (22896 bits), 2862 bytes captured (22896 bits) > Ethernet II, Src: fa:16:3e:41:fa:8b (fa:16:3e:41:fa:8b), Dst: fa:16:3e:17:b4:ec (fa:16:3e:17:b4:ec) > Internet Protocol Version 4, Src: 10.10.0.124, Dst: 10.10.0.61 > Transmission Control Protocol, Src Port: 5000, Dst Port: 55972, Seq: 1, Ack: 130, Len: 2796 Transport Layer Security Y TLSv1.2 Record Layer: Handshake Protocol: Server Hello Content Type: Handshake (22) Version: TLS 1.2 (0x0303) Length: 81 ✓ Handshake Protocol: Server Hello Handshake Type: Server Hello (2) Length: 77 Version: TLS 1.2 (0x0303) Random: 5d6e7842d84d8cbfc7078fe9e913fcf7eb0fe3354f54f192c27204d2031e9aae Session ID Length: 32 Session ID: e50dd1e43d8d5028f12ae61800ad52ffd4fe63dce8630ea523a1fd33b4cc72a4 Cipher Suite: TLS RSA WITH AES 128 GCM SHA256 (0x009c) Compression Method: null (0) Extensions Length: 5 > Extension: renegotiation\_info (len=1)

2. From Client Hello, cipher suite list is from WINNF approved list:

TLS\_RSA\_WITH\_AES\_128\_GCM\_SHA25 TLS\_ECDHE\_ECDSA\_WITH\_AES\_128\_GCM\_SHA256 TLS\_ECDHE\_RSA\_WITH\_AES\_128\_GCM\_SHA256

3. From Server Hello, cipher suite chosen:

TLS\_RSA\_WITH\_AES\_128\_GCM\_SHA256 4. Read OSCP Request/Response to/from server:



5. Authentication exchange ends with TLS Alert message (i.e. authentication fails):

Page 56 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

>	Frame	3461: 73 bytes on wire (584 bits), 73 bytes captured (584 bits)
>	Ether	net II, Src: fa:16:3e:17:b4:ec (fa:16:3e:17:b4:ec), Dst: fa:16:3e:41:fa:8b (fa:16:3e:41:fa:8b)
>	Inter	net Protocol Version 4, Src: 10.10.0.61, Dst: 10.10.0.124
>	Trans	mission Control Protocol, Src Port: 55972, Dst Port: 5000, Seq: 130, Ack: 3147, Len: 7
~	Trans	port Layer Security
	Y TL	Sv1.2 Record Layer: Alert (Level: Fatal, Description: Certificate Unknown)
		Content Type: Alert (21)
		Version: TLS 1.2 (0x0303)
		Length: 2
	~	Alert Message
		Level: Fatal (2)
		Description: Certificate Unknown (46)

6. Registration request message is not received at Test Harness (authentication fails)

Page 57 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	SUD
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

#### 3. WINNF.FT.C.SCS.3

#### Packet Capture Sequence

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Apply a deplay filter <chi-></chi->							
No.	Time	Source	Destination	Protocol	Length Info		
	1 0,000000	10.10.3.13	10.10.3.84	TCP	74 41586 → 5001 [SYN] Seq=0 Win=29200 Len=0 MSS=1460 SACK_PERM=1 TSval=3728859469 TSecr=0 WS=128		
	2 0.000358	10.10.3.84	10.10.3.13	TCP	74 5001 + 41586 [SYN, ACK] Seq=0 Ack=1 Win=28960 Len=0 MSS=1460 SACK_PERM=1 TSval=3728880271 TSecr=3728859469 WS=128		
	3 0,000388	10.10.3.13	10.10.3.84	TCP	66 41586 → 5001 [ACK] Seq=1 Ack=1 Win=29312 Len=0 TSval=3728859470 TSecr=3728880271		
	4 0.084432	10.10.3.13	10.10.3.84	TLSv1.2	352 Client Hello		
	5 0.005027	10.10.3.84	10.10.3.13	TCP	66 5001 + 41586 [ACK] Seq=1 Ack=287 Win=30080 Len=0 TSval=3728880276 TSecr=3728859474		
	6 0.005039	10.10.3.84	10.10.3.13	TLSv1.2	3398 Server Hello, Certificate, Certificate Request, Server Hello Done		
	7 0,005056	10.10.3.13	10.10.3.84	TCP	66 41586 → 5001 [ACK] Seq=287 Ack=3333 Win=35968 Len=0 TSval=3728859474 TSecr=3728880276		
	8 0.009178	10.10.3.13	10.10.3.84	TLSv1.2	73 Alert (Level: Fatal, Description: Certificate Unknown)		
	9 0.009328	10.10.3.13	10.10.3.84	TCP	66 41586 → 5001 [FIN, ACK] Seq=294 Ack=3333 Win=35968 Len=0 TSval=3728859478 TSecr=3728880276		
	10 0.009643	10.10.3.84	10.10.3.13	TCP	66 5001 + 41586 [FIN, ACK] Seq=3333 Ack=295 Win=30080 Len=0 TSval=3728880280 TSecr=3728859478		
L .	11 0.009660	10.10.3.13	10.10.3.84	TCP	66 41586 → 5001 [ACK] Seq=295 Ack=3334 Win=35968 Len=0 TSval=3728859479 TSecr=3728880280		

#### WINNF Test Requirements:

WINNF test requirements from WINNF-TS-0122-V1.0.2 CBRS CBSD Test Specification:

2	<ul> <li>Make sure that UUT uses TLS v1.2 for security establishment.</li> <li>Make sure UUT selects the correct cipher suite.</li> <li>UUT shall use CRL or OCSP to verify the validity of the server certificate.</li> </ul>	PASS
	• Make sure that Mutual authentication does not happen between UUT and the SAS Test Harness.	

Analysis of WINNF Test Requirements

#### 1. From Client Hello can read: TLS version = TLS 1.2

ŀ	Frame 4: 352 bytes on wire (2816 bits), 352 bytes captured (2816 bits)
Þ	Ethernet II, Src: fa:16:3e:f6:32:cb (fa:16:3e:f6:32:cb), Dst: fa:16:3e:b0:f3:e6 (fa:16:3e:b0:f3:e6)
ŀ	Internet Protocol Version 4, Src: 10.10.3.13, Dst: 10.10.3.84
ŀ	Transmission Control Protocol, Src Port: 41586, Dst Port: 5001, Seq: 1, Ack: 1, Len: 286
1	Transport Layer Security
	✓ TLSv1.2 Record Layer: Handshake Protocol: Client Hello
	Content Type: Handshake (22)
	Version: TLS 1.2 (0x0303)
	Length: 281
	➤ Handshake Protocol: Client Hello
	Handshake Type: Client Hello (1)
	Length: 277
	Version: TLS 1.2 (0x0303)
	Random: c7f386730d0a51b7ae0a0db37555ebb95dab0cf68892309fb8d125332cc27888
	GMT Unix Time: Apr 20, 2076 12:27:31.000000000 Eastern Daylight Time
	Random Bytes: 0d0a51b7ae0a0db37555bbb95dab0cf68892309fb8d125332cc27888
	Session ID Length: 0
	Cipher Suites Length: 86

#### list:

**Cipher Suites** 

Cipher Suite: TLS\_ECDH\_ECDSA\_WITH\_AES\_128\_GCM\_SHA256 (0xc02d) Cipher Suite: TLS\_ECDH\_ECDSA\_WITH\_AES\_256\_CBC\_SHA384 (0xc026) Cipher Suite: TLS\_RSA\_WITH\_AES\_256\_GCM\_SHA384 (0x009d) Cipher Suite: TLS\_RSA\_WITH\_AES\_128\_GCM\_SHA256 (0x009c)

Page 58 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	TUV
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

#### 3. From Server Hello, cipher suite chosen: TLS\_RSA\_WITH\_AES\_256\_GCM\_SHA384 (0x009d)

-					
-	ply a display filter <	Ctrl-/>			
lo.	Time	Source	Destination	Protocol L	
	1 0.000000	10.10.3.13	10.10.3.84	TCP	74 41586 → 5001 [SYN] Seq=0 Win=29200 Len=0 MSS=1460 SACK_PERM=1 TSval=3728859469 TSecr=0 WS=128
	2 0.000358	10.10.3.84	10.10.3.13	TCP	74 5001 → 41586 [SYN, ACK] Seq=0 Ack=1 Win=28960 Len=0 MSS=1460 SACK_PERM=1 TSval=3728880271 TSecr=3728859469 WS=1.
	3 0.000388	10.10.3.13	10.10.3.84	TCP	66 41586 → 5001 [ACK] Seq=1 Ack=1 Win=29312 Len=0 TSval=3728859470 TSecr=3728880271
	4 0.004432	10.10.3.13	10.10.3.84		352 Client Hello
	5 0.005027	10.10.3.84	10.10.3.13	TCP	66 5001 → 41586 [ACK] Seq=1 Ack=287 Win=30080 Len=0 TSval=3728880276 TSecr=3728859474
	6 0.005039	10.10.3.84	10.10.3.13		3398 Server Hello, Certificate, Certificate Request, Server Hello Done
	7 0.005056	10.10.3.13	10.10.3.84	TCP	66 41586 + 5001 [ACK] Seq=287 Ack=3333 Win=35968 Len=0 TSval=3728859474 TSecr=3728880276
	8 0.009178	10.10.3.13	10.10.3.84	TLSv1.2	
	9 0,009328	10.10.3.13	10.10.3.84	TCP	66 41586 + 5001 [FIN, ACK] Seq=294 Ack=3333 Win=35968 Len=0 TSval=3728859478 TSecr=3728880276
	10 0.009643	10.10.3.84	10.10.3.13	TCP	66 5001 + 41586 [FIN, ACK] Seq=3333 Ack=295 Win=30080 Len=0 TSval=3728880280 TSecr=3728859478
Fr Et In	hernet II, Src: ternet Protocol	fa:16:3e:b0:f3:e6 Version 4, Src: 10	0.10.3.84, Dst: 10.10.	Dst: fa:16:3e: .3.13	f6:32:cb (fa:16:3e:f6:32:cb)
Fr Et Ir Tr	ame 6: 3398 byt hernet II, Src: ternet Protocol ansmission Cont ansport Layer S TLSv1.2 Record	es on wire (27184   fa:16:3e:b0:f3:e6 Version 4, Src: 1 rol Protocol, Src   ecurity	pits), 3398 bytes cap1 (fa:16:3e:b0:f3:e6),	tured (27184 bi Dst: fa:16:3e: .3.13 41586, Seq: 1,	its) f6:32:cb (fa:16:3e:f6:32:cb)
Et	ame 6: 3398 byt hernet II, Src: ternet Protocol ansmission Cont ansport Layer S TLSV1.2 Record Content Typ Version: TL	es on wire (27184   fa:16:3e:b0:f3:e6 Version 4, Src: 1 rol Protocol, Src I ecurity Layer: Handshake F	bits), 3398 bytes cap (fa:16:3e:b0:f3:e6), 8.10.3.84, Dst: 10.10 Port: 5001, Dst Port:	tured (27184 bi Dst: fa:16:3e: .3.13 41586, Seq: 1,	its) f6:32:cb (fa:16:3e:f6:32:cb)
Fr Et Ir Tr	ame 6: 3398 byt hernet II, Src: ternet Protocol ansmission Cont ansport Layer S TLSv1.2 Record Content Typ Version: TL Length: 81	es on wire (27184 fa:16:3e:b0:f3:e6 Version 4, Src: 1 rol Protocol, Src I ecurity Layer: Handshake (22) 5 1.2 (0x0303)	bits), 3398 bytes capi (fa:16:3e:b0:f3:e6), 3.10.3.84, Dst: 10.10. Port: 5001, Dst Port: Protocol: Server Hello	tured (27184 bi Dst: fa:16:3e: .3.13 41586, Seq: 1,	its) f6:32:cb (fa:16:3e:f6:32:cb)
Fr Et Ir Tr	ame 6: 3398 byt hernet II, Src: ternet Protocol ansmission Cont Tisv1.2 Record Content Typ Version: TL Length: 81 * Handshake P Handshake Length: 1	es on wire (27184 fa:16:3e:b0:f3:e6 Version 4, Src: 11 rol Protocol, Src ecurity Layer: Handshake 12 5 1.2 (0x0303) rotocol: Server Hell 77	bits), 3398 bytes capt (fa:16:3e:b8:f3:e6), 3.10.3.84, Dst: 10.10 Poort: 5001, Dst Port: Protocol: Server Hello	tured (27184 bi Dst: fa:16:3e: .3.13 41586, Seq: 1,	its) f6:32:cb (fa:16:3e:f6:32:cb)
Fr Et Ir Tr Tr	ame 6: 3398 byt hernet II, Src: ternet Protocol ansmission Cont ansport Layer S TLSVL2 Record Content Typ Version: TL Length: 81 Handshake P Handshake Length: 7 Version:	es on wire (27184 fa:16:3e:b0:f3:e6 Version 4, Src: 1 rol Protocol, Src: ecurity Layer: Handshake f e: Handshake (22) 5 1.2 (0x0303) rotocol: Server Hell 77 TL5 1.2 (0x0303)	bits), 3398 bytes cap (fa:16:3e:b8:f3:e6), 3.10.3.84, Dst: 10.10 Jort: 5001, Dst Port: Protocol: Server Hellc lo o (2)	tured (27184 bi Dst: fa:16:3e: 3.13 41586, Seq: 1,	ts) f6:32:cb (fa:16:3e:f6:32:cb) . Ack: 287, Len: 3332
Fr Et Ir Tr Tr	ame 6: 3398 byt hernet II, Src: ternet Protocol ansmission Cont ansport Layer S TLSUL2 Record Content Typ Version: TL Length: 81 * Handshake P Handshake Length: 2 Version: * Random: 2 6H Ur	es on wire (27184 fa:16:3e:b0:f3:e6 Version 4, Src: 1 rol Protocol, Src: 1 courity Layer: Handshake 1 e: Handshake (22) 5 1.2 (0x0303) rotocol: Server Hell 77 TL5 1.2 (0x0303) a3e\$51cd627b5653J4 ix Time: Feb 18, 2	bits), 3398 bytes capt (fa:16:3e:b8:f3:e6), 3.10.3.84, Dst: 10.10 Poort: 5001, Dst Port: Protocol: Server Hello	tured (27184 bi Dst: fa:16:3e: 3.13 41586, Seq: 1, o 7848c7a4988ff5 0 Eastern Stan	ts) .f6:32:cb (fa:16:3e:f6:32:cb) . Ack: 287, Len: 3332 5a25e20e26 dard Time
Fr Et Ir Tr Tr	ame 6: 3398 byt hernet II, Src: ternet Protocol anspission Cont ansport Layer S Content Typ Version: TU- Length: 81 * Handshake P Handshake N Handshake J Kength: Version: * Random: a GMT U Random	es on wire (27184 fa:16:3e:b0:f3:e6 Version 4, Src: 1 rol Protocol, Src: 1 courity Layer: Handshake 1 e: Handshake (22) 5 1.2 (0x0303) rotocol: Server Hell 77 TL5 1.2 (0x0303) a3e\$51cd627b5653J4 ix Time: Feb 18, 2	<pre>bits), 3398 bytes capt (fa.16:3e:b0:f3:e6), 3.10.3.84, Ost 10.10, 0.74: 5001, Dst Port: 'rotocol: Server Hello lo o (2) 0ed809541e0345cd95b3e 057 05:49:49.0000000</pre>	tured (27184 bi Dst: fa:16:3e: 3.13 41586, Seq: 1, o 7848c7a4988ff5 0 Eastern Stan	ts) .f6:32:cb (fa:16:3e:f6:32:cb) . Ack: 287, Len: 3332 5a25e20e26 dard Time
Fr Et Ir Tr	ame 6: 3398 byt hernet II, Src: ternet Protocol ansmission Cont ansport Layer S TLSV1.2 Record Content Typy Version: TL Length: 81 * Handshake P Handshake Length: 7 Version: * Random: a GMT Ur Random Session J	es on wire (27184 fa:16:3e:b0:f3:e6 Version 4, Src: 1 rol Protocol, Src: ecurity Layer: Handshake 1 e: Handshake (22) sotocol: Server Hell 77 TLS 1.2 (0x9303) Josefoldc827b566314 ix Time: Feb 16, 2 Bytes: c827b56631 bu Faght 32	<pre>bits), 3398 bytes capt (fa.16:3e:b0:f3:e6), 3.10.3.84, Ost 10.10, 0.74: 5001, Dst Port: 'rotocol: Server Hello lo o (2) 0ed809541e0345cd95b3e 057 05:49:49.0000000</pre>	tured (27184 bi Dst: fa:16:3e: 3.13 41586, Seq: 1, 3 7848c7a4988ff5 0 Eastern Stan e7848c7a4988ff5	ts) f6:32:cb (fa:16:3e:f6:32:cb) . Ack: 287, Len: 3332 Sa25e20c26 dard Time S5a25e20c26

#### 4. Authentication exchange ends with TLS Alert message (i.e.

#### authentication fails):

Ap	ply a display filter <	Ctrl-/>			
lo.	Time	Source	Destination	Protocol L	ength Info
	1 0.000000	10.10.3.13	10.10.3.84	TCP	74 41586 → 5001 [SYN] Seq=0 Win=29200 Len=0 MSS=1460 SACK_PERM=1 TSval=3728859469 TSecr=0 WS=128
	2 0.000358	10.10.3.84	10.10.3.13	TCP	74 5001 + 41586 [SYN, ACK] Seq=0 Ack=1 Win=28960 Len=0 MSS=1460 SACK_PERM=1 TSval=3728880271 TSecr=3728859469 WS=13
	3 0.000388	10.10.3.13	10.10.3.84	TCP	66 41586 → 5001 [ACK] Seq=1 Ack=1 Win=29312 Len=0 TSval=3728859470 TSecr=3728880271
	4 0.004432	10.10.3.13	10.10.3.84	TLSv1.2	352 Client Hello
	5 0.005027	10.10.3.84	10.10.3.13	TCP	66 5001 → 41586 [ACK] Seq=1 Ack=287 Win=30080 Len=0 TSval=3728880276 TSecr=3728859474
	6 0.005039	10.10.3.84	10.10.3.13	TLSv1.2	3398 Server Hello, Certificate, Certificate Request, Server Hello Done
	7 0.005056	10.10.3.13	10.10.3.84	TCP	66 41586 → 5001 [ACK] Seq=287 Ack=3333 Win=35968 Len=0 TSval=3728859474 TSecr=3728880276
	8 0.009178	10.10.3.13	10.10.3.84	TLSv1.2	73 Alert (Level: Fatal, Description: Certificate Unknown)
	9 0.009328	10.10.3.13	10.10.3.84	TCP	66 41586 → 5001 [FIN, ACK] Seq=294 Ack=3333 Win=35968 Len=0 TSval=3728859478 TSecr=3728880276
	10 0.009643	10.10.3.84	10.10.3.13	TCP	66 5001 + 41586 [FIN, ACK] Seq=3333 Ack=295 Win=30080 Len=0 TSval=3728880280 TSecr=3728859478
	11 0,009660	10.10.3.13	10,10.3.84	TCP	66 41586 → 5001 [ACK] Seq=295 Ack=3334 Win=35968 Len=0 TSval=3728859479 TSecr=3728880280
Fr			), 73 bytes captured ( (fa:16:3e:f6:32:cb),		b0:f3:e6 (fa:16:3e:b0:f3:e6)
Fr	thernet II, Src: Iternet Protocol	fa:16:3e:f6:32:cb Version 4, Src: 10	(fa:16:3e:f6:32:cb), 0.10.3.13, Dst: 10.10.	Dst: fa:16:3e: 3.84	
Et	chernet II, Src: nternet Protocol ransmission Cont	fa:16:3e:f6:32:cb Version 4, Src: 10 rol Protocol, Src F	(fa:16:3e:f6:32:cb),	Dst: fa:16:3e: 3.84	
Fr Et In Tr	thernet II, Src: nternet Protocol ansmission Cont ansport Layer S	fa:16:3e:f6:32:cb Version 4, Src: 10 rol Protocol, Src F ecurity	(fa:16:3e:f6:32:cb), 3.10.3.13, Dst: 10.10. Port: 41586, Dst Port:	Dst: fa:16:3e:1 3.84 5001, Seq: 28	7, Ack: 3333, Len: 7
Fr Et In Tr	chernet II, Src: nternet Protocol cansmission Cont cansport Layer S TLSv1.2 Record Content Typ	fa:16:3e:f6:32:cb Version 4, Src: 16 rol Protocol, Src F ecurity Layer: Alert (Leve e: Alert (21)	(fa:16:3e:f6:32:cb), 0.10.3.13, Dst: 10.10.	Dst: fa:16:3e:1 3.84 5001, Seq: 28	7, Ack: 3333, Len: 7
Fr Et In Tr Tr	chernet II, Src: nternet Protocol cansmission Cont cansport Layer S TLSv1.2 Record Content Typ	fa:16:3e:f6:32:cb Version 4, Src: 16 rol Protocol, Src f ecurity Layer: Alert (Leve	(fa:16:3e:f6:32:cb), 3.10.3.13, Dst: 10.10. Port: 41586, Dst Port:	Dst: fa:16:3e:1 3.84 5001, Seq: 28	7, Ack: 3333, Len: 7

# 5. Registration request message is not received at Test Harness (Authentication fails)

Page 59 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	SUD
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

#### 4. WINNF.FT.C.SCS.4

#### Packet Capture Sequence

▲ ■ 点 ② ● <mark>] □ 】 】 】 ③ ④</mark> ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ● ●					
	Time	Source	Destination	Protocol	Length Info
	1 0.000000	10.10.3.13	10.10.3.84	TCP	74 41354 + 5001 [SYN] Seq=0 Win=29200 Len=0 MSS=1460 SACK_PERM=1 TSval=3728013260 TSecr=0 WS=128
	2 0.000959	10.10.3.84	10.18.3.13	TCP	74 5001 → 41354 [SYN, ACK] Seq=0 Ack=1 Win=28960 Len=0 MSS=1460 SACK_PERM=1 TSval=3728034062 TSecr=3728013260 WS=128
	3 0.000977	10.10.3.13	10.10.3.84	TCP	66 41354 → 5001 [ACK] Seq=1 Ack=1 Win=29312 Len=0 TSval=3728013261 TSecr=3728034062
	4 0.003961	10.10.3.13	10.10.3.84	TLSv1.2	384 Client Hello
	5 0.004273	10.10.3.84	10.10.3.13	TCP	66 5001 → 41354 [ACK] Seq=1 Ack=319 Win=30080 Len=0 TSval=3728034066 TSecr=3728013264
	6 0.004416	10.10.3.84	10.10.3.13	TLSv1.2	3389 Server Hello, Certificate, Certificate Request, Server Hello Done
	7 0.004428	10.10.3.13	10.10.3.84	TCP	66 41354 + 5001 [ACK] Seq=319 Ack=3324 Win=35968 Len=0 TSval=3728013264 TSecr=3728034066
	8 0.020823	10.10.3.13	10.10.3.84	TLSv1.2	73 Alert (Level: Fatal, Description: Certificate Unknown)
	9 0.021521	10.10.3.84	10.10.3.13	TCP	66 5001 + 41354 [FIN, ACK] Seq=3324 Ack=326 Win=30080 Len=0 TSval=3728034083 TSecr=3728013281
	18 0.021833	18.10.3.13	10.18.3.84	TCP	66 41354 + 5001 [FIN, ACK] Seq=326 Ack=3325 Win=35968 Len=0 TSval=3728013282 TSecr=3728034083
	11 0.022078	10.10.3.84	10.10.3.13	TCP	66 5001 → 41354 [ACK] Seq=3325 Ack=327 Win=30080 Len=0 TSval=3728034084 TSecr=3728013282

#### WINNF Test Requirements:

#### WINNF test requirements from WINNF-TS-0122-V1.0.2 CBRS CBSD Test Specification:

2	<ul> <li>Make sure that UUT uses TLS v1.2 for security establishment.</li> <li>Make sure UUT selects the correct cipher suite.</li> <li>UUT shall use CRL or OCSP to verify the validity of the server certificate.</li> <li>Make sure that Mutual authentication does not happen between UUT and the SAS Test Harness.</li> </ul>	PASS	FAIL
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#### Analysis of WINNF Test Requirements

#### 1. From Client Hello can read: TLS version = TLS 1.2

<b>N</b> [29	pply a display filter <	:Ctrl-/>		
о.	Time	Source	Destination	Protocol Length Info
	1 0.000000	10.10.3.13	10.10.3.84	TCP 74 41354 + 5001 [SYN] Seq=0 Win=29200 Len=0 MSS=1460 SACK_PERM=1 TSval=3728013260 TSecr=0 WS=128
	2 0.000959	10.10.3.84	10.10.3.13	TCP 74 5001 + 41354 [SYN, ACK] Seq=0 Ack=1 Win=28960 Len=0 MSS=1460 SACK_PERM=1 TSval=3728034062 TSecr=3728013260 WS=1
	3 0.000977	10.10.3.13	10.10.3.84	TCP 66 41354 → 5001 [ACK] Seq=1 Ack=1 Win=29312 Len=0 TSval=3728013261 TSecr=3728034062
	4 0.003961	10.10.3.13	10.10.3.84	TLSv1.2 384 Client Hello
	5 0.004273	10.10.3.84	10.10.3.13	TCP 66 5001 → 41354 [ACK] Seq=1 Ack=319 Win=30080 Len=0 TSval=3728034066 TSecr=3728013264
	6 0.004416	10.10.3.84	10.10.3.13	TLSv1.2 3389 Server Hello, Certificate, Certificate Request, Server Hello Done
	7 0.004428	10.10.3.13	10.10.3.84	TCP 66 41354 → 5001 [ACK] Seq=319 Ack=3324 Win=35968 Len=0 TSval=3728013264 TSecr=3728034066
	8 0.020823	10.10.3.13	10.10.3.84	TLSv1.2 73 Alert (Level: Fatal, Description: Certificate Unknown)
	9 0.021521	10.10.3.84	10.10.3.13	TCP 66 5001 → 41354 [FIN, ACK] Seq=3324 Ack=326 Win=30080 Len=0 TSval=3728034083 TSecr=3728013281
	10 0.021833	10.10.3.13	10.10.3.84	TCP 66 41354 + 5001 [FIN, ACK] Seq=326 Ack=3325 Win=35968 Len=0 TSval=3728013282 TSecr=3728034083 TCP 66 5001 + 41354 [ACK] Seq=3325 Ack=327 Win=30080 Len=0 TSval=372804084 TSecr=3728013282
_				
FE	thernet II, Src:	fa:16:3e:f6:32:cb		Dst: fa:16:3e:b0:f3:e6 (fa:16:3e:b0:f3:e6)
FEI	thernet II, Src: internet Protocol	fa:16:3e:f6:32:cb Version 4, Src: 1	(fa:16:3e:f6:32:cb), 0.10.3.13, Dst: 10.10.	Dst: fa:16:3e:b0:f3:e6 (fa:16:3e:b0:f3:e6) .3.84
FEIT	thernet II, Src: internet Protocol ransmission Cont	fa:16:3e:f6:32:cb Version 4, Src: 1 rol Protocol, Src	(fa:16:3e:f6:32:cb), 0.10.3.13, Dst: 10.10.	Dst: fa:16:3e:b0:f3:e6 (fa:16:3e:b0:f3:e6)
FEITT	thernet II, Src: nternet Protocol ransmission Cont ransport Layer S	fa:16:3e:f6:32:cb Version 4, Src: 1 rol Protocol, Src ecurity	(fa:16:3e:f6:32:cb), 0.10.3.13, Dst: 10.10. Port: 41354, Dst Port:	Dst: fa:16:3e:b0:f3:e6 (fa:16:3e:b0:f3:e6) 3.84 : 5001, Seq: 1, Ack: 1, Len: 318
FEITT	thernet II, Src: internet Protocol ransmission Cont ransport Layer S r TLSv1.2 Record	fa:16:3e:f6:32:cb Version 4, Src: 1 rol Protocol, Src 1 ecurity Layer: Handshake 1	(fa:16:3e:f6:32:cb), 0.10.3.13, Dst: 10.10.	Dst: fa:16:3e:b0:f3:e6 (fa:16:3e:b0:f3:e6) 3.84 : 5001, Seq: 1, Ack: 1, Len: 318
FEITT	thernet II, Src: internet Protocol ransmission Cont ransport Layer S * TLSv1.2 Record Content Type	fa:16:3e:f6:32:cb Version 4, Src: 1 rol Protocol, Src ecurity Layer: Handshake M e: Handshake (22)	(fa:16:3e:f6:32:cb), 0.10.3.13, Dst: 10.10. Port: 41354, Dst Port:	Dst: fa:16:3e:b0:f3:e6 (fa:16:3e:b0:f3:e6) 3.84 : 5001, Seq: 1, Ack: 1, Len: 318
FEITT	thernet II, Src: internet Protocol ransmission Cont ransport Layer S r TLSv1.2 Record Content Type Version: TLS	fa:16:3e:f6:32:cb Version 4, Src: 1 rol Protocol, Src: 1 ecurity Layer: Handshake 4 e: Handshake (22) 5 1.2 (0x0303)	(fa:16:3e:f6:32:cb), 0.10.3.13, Dst: 10.10. Port: 41354, Dst Port:	Dst: fa:16:3e:b0:f3:e6 (fa:16:3e:b0:f3:e6) 3.84 : 5001, Seq: 1, Ack: 1, Len: 318
FEITT	thernet II, Src: internet Protocol ransmission Cont ransport Layer S * TLSv1.2 Record Content Type Version: TLS Length: 313	fa:16:3e:f6:32:cb Version 4, Src: 1 rol Protocol, Src ecurity Layer: Handshake 1 e: Handshake (22) S 1.2 (0x0303)	(fa:16:3e:f6:32:cb), 0.10.3.13, Dst: 10.10. Port: 41354, Dst Port: Protocol: Client Hello	Dst: fa:16:3e:b0:f3:e6 (fa:16:3e:b0:f3:e6) 3.84 : 5001, Seq: 1, Ack: 1, Len: 318
> E > I > T > T	thernet II, Src: internet Protocol ransmission Cont ransport Layer S r TLSv1.2 Record Content Type Version: TLS	fa:16:3e:f6:32:cb Version 4, Src: 1 rol Protocol, Src: 1 ecurity Layer: Handshake 4 e: Handshake (22) 5 1.2 (0x0303)	(fa:16:3e:f6:32:cb), 0.10.3.13, Dst: 10.10. Port: 41354, Dst Port:	Dst: fa:16:3e:b0:f3:e6 (fa:16:3e:b0:f3:e6) 3.84 : 5001, Seq: 1, Ack: 1, Len: 318
FEITT	ithernet II, Src: internet Protocol ransmission Cont ransport Layer S * TLSv1.2 Record Content Type Version: TLS Length: 313 * Handshake Pr	fa:16:3e:f6:32:cb Version 4, Src: 1 rol Protocol, Src: ecurity Layer: Handshake (22) 5 1.2 (0x0303) rotocol: Client Hel	(fa:16:30:f6:32:cb), 0.10.3.13, Dst: 10.10. Port: 41354, Dst Port: Protocol: Client Hello	Dst: fa:16:3e:b0:f3:e6 (fa:16:3e:b0:f3:e6) 3.84 : 5001, Seq: 1, Ack: 1, Len: 318
FEITT	ithernet II, Src: internet Protocol ransmission Cont ransport Layer S * TLSv1.2 Record Content Type Version: TLS Length: 313 * Handshake Pr	fa:16:3e:f6:32:cb Version 4, Src: 1 rol Protocol, Src: ecurity Layer: Handshake (22) S 1.2 (0x0303) rotocol: Client Hell = Type: Client Hell	(fa:16:30:f6:32:cb), 0.10.3.13, Dst: 10.10. Port: 41354, Dst Port: Protocol: Client Hello	Dst: fa:16:3e:b0:f3:e6 (fa:16:3e:b0:f3:e6) 3.84 : 5001, Seq: 1, Ack: 1, Len: 318

#### 2. From Client Hello, cipher suite list is from WINNF approved list:

#### **Cipher Suites**

Cipher Suite: TLS\_ECDH\_ECDSA\_WITH\_AES\_128\_GCM\_SHA256 (0xc02d) Cipher Suite: TLS\_ECDH\_ECDSA\_WITH\_AES\_256\_CBC\_SHA384 (0xc026)

Page 60 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	SUD
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

#### Cipher Suite: TLS\_RSA\_WITH\_AES\_256\_GCM\_SHA384 (0x009d) Cipher Suite: TLS\_RSA\_WITH\_AES\_128\_GCM\_SHA256 (0x009c)

#### 3. From Server Hello, cipher suite chosen: TLS\_RSA\_WITH\_AES\_256\_GCM\_SHA384 (0x009d)

App	▲ ■ ② ◎   <mark>-</mark> □ № № ◎ 空 〒 ④ = ◎ 全 ④ = ◎ Q Q Q II    Apply a deplay filter <ctrl-></ctrl->							
lo.	Time	Source	Destination	Protocol L				
	1 0.000000	10.10.3.13	10.10.3.84	TCP	74 41354 + 5001 [SYN] Seq=0 Win=29200 Len=0 MSS=1460 SACK_PERM=1 TSval=3728013260 TSecr=0 WS=128			
	2 0.000959	10.10.3.84	10,10.3.13	TCP	74 5001 + 41354 [SYN, ACK] Seq=0 Ack+1 Win+28960 Len=0 MSS=1460 SACK_PERM=1 TSval=3728034062 TSecr=3728013260 WS=1			
	3 0.000977	10.10.3.13	10.10.3.84	TCP	66 41354 → 5001 [ACK] Seq=1 Ack=1 Win=29312 Len=0 TSval=3728013261 TSecr=3728034062			
	4 0.003961	10.10.3.13	10.10.3.84	TLSv1.2	384 Client Hello			
	5 0.004273	10.10.3.84	10.10.3.13	TCP	66 5001 → 41354 [ACK] Seq=1 Ack=319 Win=30080 Len=0 TSval=3728034066 TSecr=3728013264			
	6 0.004416	10.10.3.84	10.10.3.13		3389 Server Hello, Certificate, Certificate Request, Server Hello Done			
	7 0.004428	10.10.3.13	10.10.3.84	TCP	66 41354 → 5001 [ACK] Seq=319 Ack=3324 Win=35968 Len=0 TSval=3728013264 TSecr=3728034066			
	8 0.020823	10.10.3.13	10.10.3.84	TLSv1.2	73 Alert (Level: Fatal, Description: Certificate Unknown)			
	9 0.021521	10.10.3.84	10.10.3.13	TCP	66 5001 → 41354 [FIN, ACK] Seq=3324 Ack=326 Win=30080 Len=0 TSval=3728034083 TSecr=3728013281			
	10 0.021833	10.10.3.13 10.10.3.84	10.10.3.84 10.10.3.13	TCP	66 41354 → 5001 [FIN, ACK] Seq=326 Ack=3325 Win=35968 Len=0 T5val=3728013282 TSecr=3728034083 66 5001 → 41354 [ACK] Seq=3325 Ack=327 Win=30080 Len=0 TSval=3728034084 TSecr=3728013282			
	ernet II, Src:							
> Int		Version 4, Src: 10	.10.3.84, Dst: 10.10.	3.13				
> Int	ernet Protocol	Version 4, Src: 16 rol Protocol, Src F		3.13				
Int Tra	ernet Protocol Insmission Cont Insport Layer S	Version 4, Src: 10 rol Protocol, Src F security	0.10.3.84, Dst: 10.10. Port: 5001, Dst Port:	3.13 41354, Seq: 1,				
> Int > Tra > Tra	ernet Protocol ensmission Cont ensport Layer S TLSv1.2 Record Content Typ	Version 4, Src: 16 crol Protocol, Src F security Layer: Handshake F e: Handshake (22)	.10.3.84, Dst: 10.10.	3.13 41354, Seq: 1,				
Int Tra	ernet Protocol insmission Cont insport Layer S TLSv1.2 Record Content Typ Version: TL	Version 4, Src: 10 rol Protocol, Src f security Layer: Handshake F	0.10.3.84, Dst: 10.10. Port: 5001, Dst Port:	3.13 41354, Seq: 1,				
> Int > Tra > Tra Y	ernet Protocol ansmission Cont ansport Layer S TLSv1.2 Record Content Typ Version: TL Length: 81	Version 4, Src: 16 rol Protocol, Src F ecurity Layer: Handshake F e: Handshake (22) S 1.2 (0x0303)	9.10.3.84, Dst: 10.10. Port: 5001, Dst Port: Protocol: Server Hello	3.13 41354, Seq: 1,				
> Int > Tra > Tra Y	ernet Protocol ansmission Cont ansport Layer S TLSv1.2 Record Content Typ Version: TL Length: 81 Y Handshake P	Version 4, Src: 16 rol Protocol, Src F ecurity Layer: Handshake F e: Handshake (22) S 1.2 (0x0303) rotocol: Server Hel	9.10.3.84, Dst: 10.10. Port: 5001, Dst Port: Protocol: Server Hello	3.13 41354, Seq: 1,				
Int Tra	ernet Protocol Insmission Cont Insport Layer S TLSv1.2 Record Content Typ Version: TL Length: 81 ¥ Handshake P Handshake	Version 4, Src: 16 rol Protocol, Src f iecurity Layer: Handshake F e: Handshake (22) S 1.2 (0x0303) rotocol: Server Hell e Type: Server Hell	9.10.3.84, Dst: 10.10. Port: 5001, Dst Port: Protocol: Server Hello	3.13 41354, Seq: 1,				
Int Tra Tra	ernet Protocol Insmission Cont Insport Layer S TLSv1.2 Record Content Typ Version: TL Length: 81 ♥ Handshake P Handshak Length:	Version 4, Src: 10 rol Protocol, Src f iecurity Layer: Handshake F e: Handshake (22) S 1.2 (0x0303) rotocol: Server Hell 77	9.10.3.84, Dst: 10.10. Port: 5001, Dst Port: Protocol: Server Hello	3.13 41354, Seq: 1,				
Int Tra Tra	ternet Protocol insmission Cont insport Layer S TLSv1.2 Record Content Typ Version: TL Length: 81 ¥ Handshake P Handshake Length: Version:	Version 4, Src: 16 rol Protocol, Src f ecurity Layer: Handshake 7 5 1.2 (0x0303) rotocol: Server Hell 77 TL5 1.2 (0x0303)	9.10.3.84, Dst: 10.10 Port: 5001, Dst Port: Protocol: Server Hello lo o (2)	3.13 41354, Seq: 1,	Ack: 319, Len: 3323			
Int Tra Tra	ernet Protocol insmission Cont insport Layer S TLSV1.2 Record Content Typ Version: TL Length: 81 V Handshake P Handshake Length: Version: V Random: 0	Version 4, Src: 10 rrol Protocol, Src f ecurity Layer: Handshake (22) S 1.2 (0x0303) rotocol: Server Hell 77 TLS 1.2 (0x0303) Disef58465491af5823	9.10.3.84, Dst: 10.10. Port: 5001, Dst Port: Protocol: Server Hello 10 o (2) 9f55a7006361713bfc6ee	3.13 41354, Seq: 1,	Ack: 319, Len: 3323			
Int Tra Tra	ernet Protocol unsmission Cont unsport Layer S Content Typ Version: TL Length: 81 * Handshake P Handshake Length: Version: * Random: & Random:	L Version 4, Src: 11 irol Protocol, Src f eccurity Layer: Handshake F e: Handshake (22) S 1.2 (0x0303) rotocol: Server Hell 77 TLS 1.2 (0x0303) obsef58465491afb023 ix Time: Jan 17, 1	9,10,3,84, Dit: 10,10 Dort: 5001, Dit Port: rotocol: Server Hello 0 (2) 9f55a7006361713bfc6ee 976 19:23:32,00000000	3.13 41354, Seq: 1, 9e6f048d4ecabc3 0 Eastern Stand	Ack: 319, Len: 3323 9d7598c21 ard Time			
Int Tra Tra	ernet Protocol mismission Cont insport Layer S TLSv1.2 Record Content Typ Version: TL Length: 81 * Handshake P Handshak Length: Version: * Random: GNT U, Randor	<pre>L Version 4, Src: 14 irrol Protocol, Src f ecurity Layer: Handshake (22) S 1.2 (0x0303) rotocol: Server Hell 77 TLS 1.2 (0x0303) obSef58465401afb822 nix Time: Jan 17, 1 m Bytes: 65491afb82</pre>	9.10.3.84, Dst: 10.10. Port: 5001, Dst Port: Protocol: Server Hello 10 o (2) 9f55a7006361713bfc6ee	3.13 41354, Seq: 1, 9e6f048d4ecabc3 0 Eastern Stand	Ack: 319, Len: 3323 9d7598c21 ard Time			
Int Tra Tra	eenet Protocol nnsmission Cont Insport Layer S TLSv1.2 Record Content Typ Version: TL Length: 81 > Handshake P Handshake Length: Version: > Random: 4 GMT UN Random Session 1	L Version 4, Src: 11 crol Protocol, Src F eccurity Layer: Handshake F e: Handshake (22) S 1.2 (0x0303) rotocol: Server Hell 77 TLS 1.2 (0x0303) Disef5846341afb823 nix Time: Jan 17, 1 m Sytes: 65491afb82 D Length: 32	9,10,3,84, Dit: 10,10 Dort: 5001, Dit Port: rotocol: Server Hello 0 (2) 9f55a7006361713bfc6ee 976 19:23:32,00000000	3.13 41354, Seq: 1, 9e6f048d4ecabc3 Ø Eastern Stanc e9e6f048d4ecabc3	Ack: 319, Len: 3323 9d7598c21 ard Time 19d7596c21			

#### Y Extension: renegatiation info (len=1)

## 4. Authentication exchange ends with TLS Alert message (i.e.

#### authentication fails):

Appl	y a display filter $<$	Ctrl-/>				
	Time	Source	Destination	Protocol L	Length Info	
	1 0.00000	10.10.3.13	10.10.3.84	TCP	74 41354 → 5001 [SYN] Seq=0 Win=29200 Len=0 MSS=1460 SACK_PERM=1 TSval=3728013260 TSecr=0 WS=128	
	2 0.000959	10.10.3.84	10.10.3.13	TCP	74 5001 + 41354 [SYN, ACK] Seq=0 Ack=1 Win=28960 Len=0 MSS=1460 SACK_PERM=1 TSval=3728034062 TSecr=3728013260 WS=12	
	3 0.000977	10.10.3.13	10.10.3.84	TCP	66 41354 → 5001 [ACK] Seq=1 Ack=1 Win=29312 Len=0 TSval=3728013261 TSecr=3728034062	
	4 0.003961	10.10.3.13	10.10.3.84	TLSv1.2	384 Client Hello	
	5 0.004273	10.10.3.84	10.10.3.13	TCP	66 5001 → 41354 [ACK] Seq=1 Ack=319 Win=30080 Len=0 TSval=3728034066 TSecr=3728013264	
	6 0.004416	10.10.3.84	10.10.3.13	TLSv1.2	3389 Server Hello, Certificate, Certificate Request, Server Hello Done	
	7 0.004428	10.10.3.13	10.10.3.84	TCP	66 41354 → 5001 [ACK] Seq=319 Ack=3324 Win=35968 Len=0 TSval=3728013264 TSecr=3728034066	
	8 0.020823	10.10.3.13	10.10.3.84	TLSv1.2	73 Alert (Level: Fatal, Description: Certificate Unknown)	
	0 0.020025					
	9 0.021521	10.10.3.84	10.10.3.13	TCP	66 5001 → 41354 [FIN, ACK] Seq=3324 Ack=326 Win=30080 Len=0 TSval=3728034083 TSecr=3728013281	
	9 0.021521 10 0.021833	10.10.3.84 10.10.3.13	10.10.3.84	TCP	66 41354 → 5001 [FIN, ACK] Seq=326 Ack=3325 Win=35968 Len=0 TSval=3728013282 TSecr=3728034083	
	9 0.021521	10.10.3.84				
	9 0.021521 10 0.021833	10.10.3.84 10.10.3.13	10.10.3.84	TCP	66 41354 → 5001 [FIN, ACK] Seq=326 Ack=3325 Win=35968 Len=0 TSval=3728013282 TSecr=3728034083	
	9 0.021521 10 0.021833 11 0.022078	10.10.3.84 10.10.3.13 10.10.3.84	10.10.3.84	ТСР ТСР	66 41354 → 5001 [FIN, ACK] Seq=326 Ack=3325 Win=35968 Len=0 TSval=3728013282 TSecr=3728034083	
Fra	9 0.021521 10 0.021833 11 0.022078 me 8: 73 bytes	10.10.3.84 10.10.3.13 10.10.3.84 on wire (584 bits)	10.10.3.84 10.10.3.13 , 73 bytes captured (	TCP TCP 584 bits)	66 41354 → 5001 [FIN, ACK] Seq=326 Ack=3325 Win=35968 Len=0 TSval=3728013282 TSecr=3728034083	
Fra	9 0.021521 10 0.021833 11 0.022078 me 8: 73 bytes ernet II, Src:	10.10.3.84 10.10.3.13 10.10.3.84 on wire (584 bits) fa:16:3e:f6:32:cb	10.10.3.84 10.10.3.13 , 73 bytes captured (	TCP TCP 584 bits) Dst: fa:16:3e:	66 41354 → 5001 [FIN, ACK] Seq=326 Ack=3325 Win=35968 Len=0 TSval=3728013282 TSecr=3728034083 66 5001 → 41354 [ACK] Seq=3325 Ack=327 Win=30080 Len=0 TSval=3728034084 TSecr=3728013282	
Fra Eth Int	9 0.021521 10 0.021833 11 0.022078 me 8: 73 bytes ernet II, Src: ernet Protocol	10.10.3.84 10.10.3.13 10.10.3.84 on wire (584 bits) fa:16:32:t6	10.10.3.84 10.10.3.13 , 73 bytes captured ( (fa:16:3e:f6:32:cb),	TCP TCP 584 bits) Dst: fa:16:3e: 3.84	66 41354 + 5001 [FIN, ACK] Seq=326 Ack=3325 Win=35968 Len=0 TSval=3728013282 TSecr=3728034083 66 5001 + 41354 [ACK] Seq=3225 Ack=327 Win=30080 Len=0 TSval=3728034004 TSecr=3728013282 b0:f3:e6 (fa:16:3e:b0:f3:e6)	
Fra Eth Int Tra	9 0.021521 10 0.021833 11 0.022078 me 8: 73 bytes ernet II, Src: ernet Protocol	10.10.3.84 10.10.3.13 10.10.3.84 on wire (584 bits) fa:16:3e:f6:32:cb Version 4, Src: 10 rol Protocal, Src P	10.10.3.84 10.10.3.13 , 73 bytes captured ( (fa:16:3e:f6:32:cb), .10.3.13, Dst: 10.10.	TCP TCP 584 bits) Dst: fa:16:3e: 3.84	66 41354 + 5001 [FIN, ACK] Seq=326 Ack=3325 Win=35968 Len=0 TSval=3728013282 TSecr=3728034083 66 5001 + 41354 [ACK] Seq=3225 Ack=327 Win=30080 Len=0 TSval=3728034004 TSecr=3728013282 b0:f3:e6 (fa:16:3e:b0:f3:e6)	
Fra Eth Int Tra Tra	9 0.021521 10 0.021833 11 0.022078 me 8: 73 bytes ernet II, Src: ernet Protocol nsmission Cont nsport Layer S	10.10.3.84 10.10.3.13 10.10.3.84 on wire (584 bits) fa:16:3e:f6:32:cb Version 4, Src: 10 rol Protocol, Src P curvity	10.10.3.84 10.10.3.13 , 73 bytes captured ( (fa:16:3e:f6:32:cb), .10.3.13, Dst: 10.10.	TCP TCP 584 bits) Dst: fa:16:3e: 3.84 5001, Seq: 31	66 41354 + 5001 [FIN, ACK] Seq=326 Ack=325 Win=35968 Len=0 TSval=3728013282 TSecr=3728034083 66 5001 + 41354 [ACK] Seq=3325 Ack=327 Win=30080 Len=0 TSval=3728034084 TSecr=3728013282 b0:f3:e6 (fa:16:3e:b0:f3:e6) 19, Ack: 3324, Len: 7	
Fra Eth Int Tra Tra	9 0.021521 10 0.021833 11 0.022078 mme 8: 73 bytes ernet II, Src: ernet Protocol nsmission Cont nsport Layer S TLSv1.2 Record	10.10.3.84 10.10.3.13 10.10.3.84 on wire (584 bits) fa:16:3e:f6:32:cb Version 4, Src: 10 rol Protocol, Src P curvity	10.10.3.84 10.10.3.13 , 73 bytes captured ( (fa:16:3e:f6:32:cb), .10.3.13, Dst: 10.10. ort: 41354, Dst Port:	TCP TCP 584 bits) Dst: fa:16:3e: 3.84 5001, Seq: 31	66 41354 + 5001 [FIN, ACK] Seq=326 Ack=325 Win=35968 Len=0 TSval=3728013282 TSecr=3728034083 66 5001 + 41354 [ACK] Seq=3325 Ack=327 Win=30080 Len=0 TSval=3728034084 TSecr=3728013282 b0:f3:e6 (fa:16:3e:b0:f3:e6) 19, Ack: 3324, Len: 7	
Fra Eth Int Tra Tra	9 0.021521 10 0.021833 11 0.022078 me 8: 73 bytes ernet TL, Srcc: ernet Protocol nsmission Cont nsport Layer S. TLSV1.2 Record Content Type	10.10.3.84 10.10.3.13 10.10.3.84 0 nwire (584 bits) fa:16:3e:16:32:cb Version 4, Src: 10 rol Protocol, Src P ecurity Layer: Alert (Leve	10.10.3.84 10.10.3.13 , 73 bytes captured ( (fa:16:3e:f6:32:cb), .10.3.13, Dst: 10.10. ort: 41354, Dst Port:	TCP TCP 584 bits) Dst: fa:16:3e: 3.84 5001, Seq: 31	66 41354 + 5001 [FIN, ACK] Seq=326 Ack=325 Win=35968 Len=0 TSval=3728013282 TSecr=3728034083 66 5001 + 41354 [ACK] Seq=3325 Ack=327 Win=30080 Len=0 TSval=3728034084 TSecr=3728013282 b0:f3:e6 (fa:16:3e:b0:f3:e6) 19, Ack: 3324, Len: 7	
Fra Eth Int Tra Tra	9 0.021521 10 0.021833 11 0.022078 me 8: 73 bytes ernet II, Src: ernet Protocol nsmission Cont nsport Layer S TLSv1.2 Record Content Type	10.10.3.84 10.10.3.13 10.10.3.84 on wire (584 bits) fa:16:3e:f6:32:cb Version 4, Src: 10 rol Protocol, Src P ecurity Layer: Alert (Leve :: Alert (21)	10.10.3.84 10.10.3.13 , 73 bytes captured ( (fa:16:3e:f6:32:cb), .10.3.13, Dst: 10.10. ort: 41354, Dst Port:	TCP TCP 584 bits) Dst: fa:16:3e: 3.84 5001, Seq: 31	66 41354 + 5001 [FIN, ACK] Seq=326 Ack=325 Win=35968 Len=0 TSval=3728013282 TSecr=3728034083 66 5001 + 41354 [ACK] Seq=3325 Ack=327 Win=30080 Len=0 TSval=3728034084 TSecr=3728013282 b0:f3:e6 (fa:16:3e:b0:f3:e6) 19, Ack: 3324, Len: 7	
Fra Eth Int Tra Tra	9 0.021521 10 0.021833 11 0.022078 11 0.022078 ernet II, Src: ernet Protocol nsmission Cont nsport Layer S TLSV1.2 Record Content Typy Version: TLS	<pre>10.10.3.84 10.10.3.13 10.10.3.84 10.10.3.84 10.10.3.84 10.10.3.84 10.10.3.84 10.10.10.10.10.10.10.10.10.10.10.10.10.1</pre>	10.10.3.84 10.10.3.13 , 73 bytes captured ( (fa:16:3e:f6:32:cb), .10.3.13, Dst: 10.10. ort: 41354, Dst Port:	TCP TCP 584 bits) Dst: fa:16:3e: 3.84 5001, Seq: 31	66 41354 + 5001 [FIN, ACK] Seq=326 Ack=325 Win=35968 Len=0 TSval=3728013282 TSecr=3728034083 66 5001 + 41354 [ACK] Seq=3325 Ack=327 Win=30080 Len=0 TSval=3728034084 TSecr=3728013282 b0:f3:e6 (fa:16:3e:b0:f3:e6) 19, Ack: 3324, Len: 7	
Fra Eth Int Tra Tra	9 0.021521 10 0.021833 11 0.022078 11 0.022078 ernet II, Src: ernet Protocol nsmission Cont nsport Layer S Loght, 2 Length; 2	10.10.3.84 10.10.3.13 10.10.3.84 on wire (584 bits) fa:16:32:f6:32:f6 Version 4, Src: 10 rol Protocol, Src F euvrity Layer: Alert (Leve :: Alert (21) 1.2 (9x0303) ge	10.10.3.84 10.10.3.13 , 73 bytes captured ( (fa:16:3e:f6:32:cb), .10.3.13, Dst: 10.10. ort: 41354, Dst Port:	TCP TCP 584 bits) Dst: fa:16:3e: 3.84 5001, Seq: 31	66 41354 + 5001 [FIN, ACK] Seq=326 Ack=325 Win=35968 Len=0 TSval=3728013282 TSecr=3728034083 66 5001 + 41354 [ACK] Seq=3325 Ack=327 Win=30080 Len=0 TSval=3728034084 TSecr=3728013282 b0:f3:e6 (fa:16:3e:b0:f3:e6) 19, Ack: 3324, Len: 7	

Page 61 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

5. Registration request message is not received at Test Harness (authentication fails)

Page 62 of 73         Report Issued: 11/22/2022         Report File #: TR- 7169012035-CBRS-002
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Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	TUV
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

#### 5. WINNF.FT.C.SCS.5

#### Packet Capture Sequence

Apply's display filter <ctl></ctl>					
lo.	Time	Source	Destination	Protocol	Length Info
	1 0.000000	10.10.3.13	10.10.3.84	TCP	74 41798 + 5001 [SYN] Seq=0 Win=29200 Len=0 MSS=1460 SACK_PERM=1 TSval=3729597078 TSecr=0 WS=128
	2 0.000834	10.10.3.84	10.10.3.13	TCP	74 5001 + 41798 [SYN, ACK] Seq=0 Ack=1 Win=28960 Len=0 MSS=1460 SACK_PERM=1 TSval=3729617880 TSecr=3729597078 WS=128
	3 0.000858	10.10.3.13	10.10.3.84	TCP	66 41798 → 5001 [ACK] Seq=1 Ack=1 Win=29312 Len=0 TSval=3729597078 TSecr=3729617880
	4 0.004065	10.10.3.13	10.10.3.84	TLSv1.2	352 Client Hello
	5 0.004407	10.10.3.84	10.10.3.13	TCP	66 5001 + 41798 [ACK] Seq=1 Ack=287 Win=30080 Len=0 TSval=3729617884 TSecr=3729597082
	6 0.004610	10.10.3.84	10.10.3.13	TLSv1.2	3427 Server Hello, Certificate, Certificate Request, Server Hello Done
	7 0.004627	10.10.3.13	10.10.3.84	TCP	66 41798 → 5001 [ACK] Seq=287 Ack=3362 Win=35968 Len=0 TSval=3729597082 TSecr=3729617884
	8 0.008965	10,10.3.13	10.10.3.84	TLSv1.2	73 Alert (Level: Fatal, Description: Certificate Unknown)
	9 0.009456	10.10.3.84	10.10.3.13	TCP	66 5001 + 41798 [FIN, ACK] Seq=3362 Ack=294 Win=30080 Len=0 TSval=3729617889 TSecr=3729597087
	10 0.012614	10.10.3.13	10.10.3.84	TCP	66 41798 + 5001 [FIN, ACK] Seq=294 Ack=3363 Win=35968 Len=0 T5val=3729597090 TSecr=3729617889
-	11 0.012856	10.10.3.84	10.10.3.13	TCP	66 5001 + 41798 [ACK] Seq=3363 Ack=295 Win=30080 Len=0 TSval=3729617892 TSecr=3729597090

#### WINNF Test Requirements:

#### WINNF test requirements from WINNF-TS-0122-V1.0.2 CBRS CBSD Test Specification:

	•	Make sure that UUT uses TLS v1.2 for security establishment.	· · · · · · · · · · · · · · · · · · ·	
	•	Make sure UUT selects the correct cipher suite.		
2	•	UUT shall use CRL or OCSP to verify the validity of the server certificate.	PASS	FAIL
	•	Make sure that Mutual authentication does not happen between UUT and the SAS Test Harness.		

Analysis of WINNF Test Requirements

#### 1. From Client Hello can read: TLS version = TLS 1.2

	pply a display filter <	Ctrl-/>			
о.	Time	Source	Destination	Protocol	Length Info
	1 0.000000	10.10.3.13	10.10.3.84	TCP	74 41798 + 5001 [SYN] Seq=0 Win=29200 Len=0 MSS=1460 SACK_PERM=1 TSval=3729597078 TSecr=0 WS=128
	2 0.000834	10.10.3.84	10.10.3.13	TCP	74 5001 + 41798 [SYN, ACK] Seq=0 Ack=1 Win=28960 Len=0 MSS=1460 SACK_PERM=1 TSval=3729617880 TSecr=3729597078 WS=
	3 0.000858	10.10.3.13	10.10.3.84	TCP	66 41798 → 5001 [ACK] Seq=1 Ack=1 Win=29312 Len=0 TSval=3729597078 TSecr=3729617880
	4 0.004065	10.10.3.13	10.10.3.84	TLSv1.2	
	5 0.004407	10.10.3.84	10.10.3.13	TCP	66 5001 + 41798 [ACK] Seq=1 Ack=287 Win=30080 Len=0 TSval=3729617884 TSecr=3729597082
	6 0.004610	10.10.3.84	10.10.3.13	TLSv1.2	3427 Server Hello, Certificate, Certificate Request, Server Hello Done
	7 0.004627	10.10.3.13	10.10.3.84	TCP	66 41798 → 5001 [ACK] Seq=287 Ack=3362 Win=35968 Len=0 TSval=3729597082 TSecr=3729617884
	8 0.008965	10.10.3.13	10.10.3.84	TLSv1.2	73 Alert (Level: Fatal, Description: Certificate Unknown)
	9 0.009456	10.10.3.84	10.10.3.13	TCP	66 5001 → 41798 [FIN, ACK] Seq=3362 Ack=294 Win=30080 Len=0 TSval=3729617889 TSecr=3729597087
	10 0.012614	10.10.3.13	10.10.3.84	TCP	66 41798 + 5001 [FIN, ACK] Seq=294 Ack=3363 Win=35968 Len=0 TSval=3729597090 TSecr=3729617889
	11 0.012856	10.10.3.84	10.10.3.13	ТСР	66 5001 → 41798 [ACK] Seq=3363 Ack=295 Win=30080 Len=0 TSval=3729617892 TSecr=3729597090
L .					66 5001 → 41798 [ACK] Seq=3363 Ack=295 Win=30080 Len=0 TSval=3729617892 TSecr=3729597090
> F	rame 4: 352 byte	s on wire (2816 bi	ts), 352 bytes capture	ed (2816 bits)	66 5001 + 41798 [ACK] Seq=3363 Ack=295 Win=30088 Len=0 TSval=3729617892 TSecr=3729597090
> F > E	rame 4: 352 byte thernet II, Src:	s on wire (2816 bi fa:16:3e:f6:32:cb	ts), 352 bytes capture (fa:16:3e:f6:32:cb),	ed (2816 bits) Dst: fa:16:3e	66 5001 → 41798 [ACK] Seq=3363 Ack=295 Win=30080 Len=0 TSval=3729617892 TSecr=3729597090
F	rame 4: 352 byte thernet II, Src: nternet Protocol	s on wire (2816 bi fa:16:3e:f6:32:cb Version 4, Src: 10	ts), 352 bytes capture (fa:16:3e:f6:32:cb), 0.10.3.13, Dst: 10.10.	ed (2816 bits) Dst: fa:16:3e 3.84	66 5001 + 41798 [ACK] Seq=3363 Ack=295 Win=30088 Len=0 TSval=3729617892 TSecr=3729597090 ) e:b0:f3:e6 (fa:16:3e:b0:f3:e6)
> F	rame 4: 352 byte thernet II, Src: nternet Protocol ransmission Cont	s on wire (2816 bi fa:16:3e:f6:32:cb Version 4, Src: 1 rol Protocol, Src 1	ts), 352 bytes capture (fa:16:3e:f6:32:cb),	ed (2816 bits) Dst: fa:16:3e 3.84	66 5001 + 41798 [ACK] Seq=3363 Ack=295 Win=30088 Len=0 TSval=3729617892 TSecr=3729597090 ) e:b0:f3:e6 (fa:16:3e:b0:f3:e6)
FIN	rame 4: 352 byte thernet II, Src: nternet Protocol ransmission Cont ransport Layer S	s on wire (2816 bi fa:16:3e:f6:32:cb Version 4, Src: 1 rol Protocol, Src 1 ecurity	ts), 352 bytes capture (fa:16:3e:f6:32:cb), 0.10.3.13, Dst: 10.10. Port: 41798, Dst Port:	ed (2816 bits) Dst: fa:16:3e 3.84 5001, Seq: 1	66 5001 + 41798 [ACK] Seq=3363 Ack=295 Win=30088 Len=0 TSval=3729617892 TSecr=3729597090 ) e:b0:f3:e6 (fa:16:3e:b0:f3:e6)
F	rame 4: 352 byte thernet II, Src: nternet Protocol ransmission Cont ransport Layer S r TLSv1.2 Record	s on wire (2816 bi fa:16:3e:f6:32:cb .Version 4, Src: 10 rol Protocol, Src 1 ecurity Layer: Handshake F	ts), 352 bytes capture (fa:16:3e:f6:32:cb), 0.10.3.13, Dst: 10.10.	ed (2816 bits) Dst: fa:16:3e 3.84 5001, Seq: 1	66 5001 + 41798 [ACK] Seq=3363 Ack=295 Win=30088 Len=0 TSval=3729617892 TSecr=3729597090 ) e:b0:f3:e6 (fa:16:3e:b0:f3:e6)
F	rame 4: 352 byte thernet II, Src: nternet Protocol ransmission Cont ransport Layer S / TLSv1.2 Record Content Typ	s on wire (2816 bi fa:16:3e:f6:32:f6 Version 4, Src: 11 rol Protocol, Src I ecurity Layer: Handshake fe : Handshake (22)	ts), 352 bytes capture (fa:16:3e:f6:32:cb), 0.10.3.13, Dst: 10.10. Port: 41798, Dst Port:	ed (2816 bits) Dst: fa:16:3e 3.84 5001, Seq: 1	66 5001 + 41798 [ACK] Seq=3363 Ack=295 Win=30088 Len=0 TSval=3729617892 TSecr=3729597090 ) e:b0:f3:e6 (fa:16:3e:b0:f3:e6)
F	rame 4: 352 byte thernet II, Src: nternet Protocol ransmission Cont ransport Layer S / TLSV1.2 Record Content Type Version: TLS	s on wire (2816 bi fa:16:3e:f6:32:cb Version 4, Src: 11 rol Protocol, Src i ecurity Layer: Handshake (22) e: Handshake (22) 5.1.2 (0x0303)	ts), 352 bytes capture (fa:16:3e:f6:32:cb), 0.10.3.13, Dst: 10.10. Port: 41798, Dst Port:	ed (2816 bits) Dst: fa:16:3e 3.84 5001, Seq: 1	66 5001 → 41798 [ACK] Seq=3363 Ack-295 Win=30080 Len=0 TSval=3729617892 TSecr=3729597090 ) ::b0:f3:e6 (fa:16:3e:b0:f3:e6)
F	rame 4: 352 byte thernet II, Src: ransmission Cont ransport Layer S * TLSV1.2 Record Content Typy Version: TL Length: 281	s on wire (2816 bi fa:16:3e:f6:32:cb Version 4, Src: 11 rol Protocol, Src i ecurity Layer: Handshake (22) e: Handshake (22) 5.1.2 (0x0303)	ts), 352 bytes capture (fa:16:3e:f6:32:cb), 0.10.3.13, Dst: 10.10, Port: 41798, Dst Port: Protocol: Client Hello	ed (2816 bits) Dst: fa:16:3e 3.84 5001, Seq: 1	66 5001 + 41798 [ACK] Seq=3363 Ack=295 Win=30088 Len=0 TSval=3729617892 TSecr=3729597090 ) e:b0:f3:e6 (fa:16:3e:b0:f3:e6)
F	rame 4: 352 byte thernet II, Src: nternet Protocol ransport Layer S < TLSV1.2 Record Content Typ Version: TL Length: 281 < Handhake Pi	s on wire (2816 bi fa:16:3e:f6:32:cb Version 4, Src: 11 rol Protocol, Src 1 ecurity Layer: Handshake f e: Handshake (22) S 1.2 (9x0303) rotocol: Client Hel	ts), 352 bytes captures (fa:16:32:65;32:05), 0.18:3.3, Dot:1 0:10, Port: 41798, Dst Port: Protocol: Client Hello 110	ed (2816 bits) Dst: fa:16:3e 3.84 5001, Seq: 1	66 5001 + 41798 [ACK] Seq=3363 Ack=295 Win=30088 Len=0 TSval=3729617892 TSecr=3729597090 ) e:b0:f3:e6 (fa:16:3e:b0:f3:e6)
F	rame 4: 352 byte thernet II, Src: nternet Protocol ransport Layer S < TLSV1.2 Record Content Typ Version: TL Length: 281 < Handhake Pi	s on wire (2816 bi fa:16:3e:f6:32:cb Version 4, Src: 11 rol Protocol, Src I ecurity Layer: Handshake f22) 5 1.2 (0x0303) rotocol: Client Hell Type: Client Hell	ts), 352 bytes captures (fa:16:32:65;32:05), 0.18:3.3, Dot:1 0:10, Port: 41798, Dst Port: Protocol: Client Hello 110	ed (2816 bits) Dst: fa:16:3e 3.84 5001, Seq: 1	66 5001 → 41798 [ACK] Seq=3363 Ack-295 Win=30080 Len=0 TSval=3729617892 TSecr=3729597690 ) ::b0:f3:e6 (fa:16:3e:b0:f3:e6)

#### **Cipher Suites**

Cipher Suite: TLS\_ECDH\_ECDSA\_WITH\_AES\_128\_GCM\_SHA256 (0xc02d) Cipher Suite: TLS\_ECDH\_ECDSA\_WITH\_AES\_256\_CBC\_SHA384 (0xc026)

Page 63 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

#### Cipher Suite: TLS\_RSA\_WITH\_AES\_256\_GCM\_SHA384 (0x009d) Cipher Suite: TLS\_RSA\_WITH\_AES\_128\_GCM\_SHA256 (0x009c)

3. From Server Hello, cipher suite chosen:

#### TLS\_RSA\_WITH\_AES\_256\_GCM\_SHA384 (0x009d)

	1 2 💿 📘 🗅				
	ply a display filter <			1.000.001	
No.	Time	Source	Destination		Length Info
	1 0.000000	10.10.3.13	10.10.3.84	TCP	74 41798 + 5001 [SYN] Seq=0 Win=29200 Len=0 MSS=1460 SACK_PERM=1 TSval=3729597078 TSecr=0 WS=128
_	2 0.000834	10.10.3.84	10.10.3.13	TCP	74 5001 → 41798 [SYN, ACK] Seq=0 Ack=1 Win=28960 Len=0 MSS=1460 SACK_PERM=1 TSval=3729617880 TSecr=3729597078 WS=1
	3 0.000858	10.10.3.13	10.10.3.84	TCP	66 41798 → 5001 [ACK] Seq=1 Ack=1 Win=29312 Len=0 TSval=3729597078 TSecr=3729617880
	4 0.004065	10.10.3.13	10.10.3.84	TLSv1.2	
	5 0.004407	10.10.3.84	10.10.3.13	TCP	66 5001 → 41798 [ACK] Seq=1 Ack=287 Win=30080 Len=0 TSval=3729617884 TSecr=3729597082
	6 0.004610	10.10.3.84	10.10.3.13		3427 Server Hello, Certificate, Certificate Request, Server Hello Done
	7 0.004627	10.10.3.13	10.10.3.84	TCP	66 41798 + 5001 [ACK] Seq=287 Ack=3362 Win=35968 Len=0 TSval=3729597082 TSecr=3729617884
	8 0.008965	10.10.3.13	10.10.3.84	TLSv1.2	73 Alert (Level: Fatal, Description: Certificate Unknown)
	9 0.009456	10.10.3.84	10.10.3.13	TCP	66 5001 → 41798 [FIN, ACK] Seq=3362 Ack=294 Win=30080 Len=0 TSval=3729617889 TSecr=3729597087
	10 0.012614	10.10.3.13 10.10.3.84	10.10.3.84 10.10.3.13	TCP	66 41798 → 5001 [FIN, ACK] Seq=294 Ack=3363 Win=35968 Len=0 TSval=3729597090 TSecr=3729617889 66 5001 → 41798 [ACK] Seq=3363 Ack=295 Win=30080 Len=0 TSval=3729617892 TSecr=3729597090
Fr			pits), 3427 bytes capt (fa:16:3e:b0:f3:e6).		its) :f6:32:cb (fa:16:3e:f6:32:cb)
> Fr > Et > In	hernet II, Src: ternet Protocol	fa:16:3e:b0:f3:e6 Version 4, Src: 10	(fa:16:3e:b0:f3:e6), 0.10.3.84, Dst: 10.10.	Dst: fa:16:3e 3.13	:f6:32:cb (fa:16:3e:f6:32:cb)
> Fr > Et > In > Tr	hernet II, Src: ternet Protocol	fa:16:3e:b0:f3:e6 Version 4, Src: 10 rol Protocol, Src	(fa:16:3e:b0:f3:e6),	Dst: fa:16:3e 3.13	:f6:32:cb (fa:16:3e:f6:32:cb)
> Fr > Et > In > Tr * Tr	hernet II, Src: ternet Protocol ansmission Cont ansport Layer S TLSv1.2 Record Content Typ	fa:16:3e:b0:f3:e6 Version 4, Src: 1 rol Protocol, Src ecurity	(fa:16:3e:b0:f3:e6), 0.10.3.84, Dst: 10.10.	Dst: fa:16:3e 3.13 41798, Seq: 1	:f6:32:cb (fa:16:3e:f6:32:cb)
> Et > In > Tr > Tr	hernet II, Src: ternet Protocol ansmission Cont ansport Layer S TLSv1.2 Record Content Typ Version: TL Length: 81	fa:16:3e:b0:f3:e6 Version 4, Src: 10 rol Protocol, Src Vecurity Layer: Handshake f e: Handshake (22) S 1.2 (0x0303)	(fa:16:3e:b0:f3:e6), 8.10.3.84, Dst: 10.10. Port: 5001, Dst Port: Protocol: Server Hello	Dst: fa:16:3e 3.13 41798, Seq: 1	:f6:32:cb (fa:16:3e:f6:32:cb)
<ul> <li>&gt; Fr</li> <li>&gt; Et</li> <li>&gt; In</li> <li>&gt; Tr</li> <li>&gt; Tr</li> </ul>	hernet II, Src: ternet Protocol ansmission Cont ansport Layer S TLSV1.2 Record Content Typ Version: TL Length: 81 Y Handshake P	fa:16:3e:b0:f3:e6 Version 4, Src: 1 irol Protocol, Src iecurity Layer: Handshake (22) 5 1.2 (0x0303) rotocol: Server Hel	(fa:16:3e:b0:f3:e6), 3.10.3.84, Dst: 10.10. Port: 5001, Dst Port: Protocol: Server Hello	Dst: fa:16:3e 3.13 41798, Seq: 1	:f6:32:cb (fa:16:3e:f6:32:cb)
> Fr > Et > In > Tr	hernet II, Src: ternet Protocol ansmission Cont ansport Layer S TLSV1.2 Record Content Typ Version: TL Length: 81 ~ Handshake P Handshak Length:	fa:16:3e:b0:f3:e6 Version 4, Src: 11 urol Protocol, Src 1 ecurity Layer: Handshake (22) S 1.2 (0x0303) rotocol: Server Hell 77	(fa:16:3e:b0:f3:e6), 3.10.3.84, Dst: 10.10. Port: 5001, Dst Port: Protocol: Server Hello	Dst: fa:16:3e 3.13 41798, Seq: 1	:f6:32:cb (fa:16:3e:f6:32:cb)
Fr Et In Tr	hernet II, Src: ternet Protocol ansmission Cont ansport Layer S TLSV1.2 Record Content Typ Version: TL Length: 81 * Handshake Length: 1 Version: Version: * Random: 1	fa:16:3e:bb:f3:eb Version 4, Src: 1 rol Protocol, Src i ecurity Layer: Handshake (22) 5 1.2 (0x0303) rotocol: Server Hell 77 TL5 1.2 (0x0303) TL5 1.2 (0x0303)	(fa:16:3e:b0:f3:e6), 3.10.3.84, Dst: 10.10. 3.10.7t: 5001, Dst Port: Protocol: Server Hellc 10 0 (2) 8d25a044f218f0ace5c7a	Dst: fa:16:3e 3.13 41798, Seq: 1	:f6:32:cb (fa:16:3e:f6:32:cb) , Ack: 287, Len: 3361 242221d35dd
> Fr > Et > In > Tr Y Tr	hernet II, Src: ternet Protocol ansmission Cont ansport Layer S TLSV1.2 Record Content Typ Version: TL Length: 81 V Handshake P Handshakk Length: Version: Version: GMT U Random	fa:16:3e:bb/f3:eb/f3:eb/ Version 4, Src: 1 ron2 Protocol, Src : ecurity Layer: Handshake (22) S 1.2 (0x0303) rotocol: Server Hel 77 TLS 1.2 (0x0303) b6620555dcf88690515 six Time: Dec 18, 2 m Bytes: dcf8869051	(fa:16:3e:b0:f3:e6), 3.10.3.84, Dst: 10.10. Port: 5001, Dst Port: Protocol: Server Hello lo o (2)	Dst: fa:16:3e 3.13 41796, Seq: 1 5 feb50b3a679f62 0 Eastern Stam	:f6:32:cb (fa:16:3e:f6:32:cb) , Ack: 287, Len: 3361 242221d35dd dard Time
> Fr > Et > In > Tr	hernet II, Src ternet Protocol ansmission Cont ansport Layer S TLSv1.2 Record Content Typ Version: TL Length: 81 V Handshake P Handshake Length: ' Version: ' Random: GWT U Rando Session :	fa:16:3e:bb.f3:eb /version 4, Src: 1 rol Protocol, Src /ecurity Layer: Handshake 1 e: Handshake (22) rotocol: Server Hell 77 TLS 1.2 (0x0303) b0620555dcf8069051 ix Time: Dec 16, 2 m Bytes: dcf8669051 ju Films 22	(fails:3e:b0:f3:e0), 3.10.3.64, DSt: 10.10 Port: 5001, Dst Port: Protocol: Server Hello 10 0 (2) 8025a044f218f0ace5c7a 66 00:53:25.00000000	Dst: fa:16:3e 3.13 41798, Seq: 1 9 feb50b3a679f62 0 Eastern Stam afeb50b3a679f6	:f6:32:cb (fa:16:3e:f6:32:cb) , Ack: 207, Len: 3361 242221d35dd dard Time 542221d35dd

#### 4. Authentication exchange ends with TLS Alert message (i.e.

#### authentication fails):

Page 64 of 73

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o.	Time	Source	Destination	Protocol	length Info
	1 0.000000	10.10.3.13	10.10.3.84	TCP	74 41798 + 5001 [5YN] Seq=0 Win=29200 Len=0 MSS=1460 5ACK_PERM=1 TSval=3729597078 TSecr=0 WS=128
	2 0.000834	10.10.3.84	10.10.3.13	TCP	74 5001 → 41798 [SYN, ACK] Seq=0 Ack=1 Win=28960 Len=0 MSS=1460 SACK_PERM=1 TSval=3729617880 TSecr=3729597078 WS=12
	3 0.000858	10.10.3.13	10.10.3.84	TCP	66 41798 → 5001 [ACK] Seq=1 Ack=1 Win=29312 Len=0 TSval=3729597078 TSecr=3729617880
	4 0.004065	10.10.3.13	10.10.3.84	TLSv1.2	352 Client Hello
	5 0.004407	10.10.3.84	10.10.3.13	TCP	66 5001 -> 41798 [ACK] Seq=1 Ack=287 Win=30080 Len=0 TSval=3729617884 TSecr=3729597082
	6 0.004610	10.10.3.84	10.10.3.13		3427 Server Hello, Certificate, Certificate Request, Server Hello Done
	7 0.004627	10.10.3.13	10.10.3.84	TCP	66 41798 → 5001 [ACK] Seq=287 Ack=3362 Win=35968 Len=0 TSval=3729597082 TSecr=3729617884
	8 0.008965	10.10.3.13	10.10.3.84	TLSv1.2	73 Alert (Level: Fatal, Description: Certificate Unknown)
	9 0.009456	10.10.3.84	10.10.3.13	TCP	66 5001 → 41798 [FIN, ACK] Seq=3362 Ack=294 Win=30080 Len=0 TSval=3729617889 TSecr=3729597087
	10 0.012614 11 0.012856	10.10.3.13 10.10.3.84	10.10.3.84 10.10.3.13	TCP TCP	66 41798 → 5001 [FIN, ACK] Seq=294 Ack=3363 Win=35968 Len=0 TSval=3729597090 TSecr=3729617889 66 5001 + 41798 [ACK] Seq=3363 Ack=295 Win=30000 Len=0 TSval=3729617892 TSecr=3729597090

Report Issued: 11/22/2022

Report File #: TR- 7169012035-CBRS-002

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

5. Registration request message is not received at Test Harness (Authentication fails)

Page 65 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	SUD
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

### Test Equipment

Instrument	Manufacturer	Type No.	Serial No	Calibration Period (months)	Calibration Due
Power Supply	Xantrex	XKW 60-50	E00109863	O/P Mon	-
Signal Analyzer	Agilent	MXA	SSG013930	24 months	2024-04-26
Attenuator	Pasternack	PE7004-10	N/S	O/P Mon	-
Switching Control Unit	Hewlett Packard	11713A	3748A060876	O/P Mon	-
RF Switch Unit	Burnsco	RARFSW 4x1	001	O/P Mon	-
Power Supply	Leader	730-3D	9801135	O/P Mon	-

Page 66 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002
	-	

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	SUD
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

## Appendix A – EUT & Client Provided Details

Page 67 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	SUD
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

#### General EUT Description

Manufacturer	Ericsson
Address Product Name	Torshamnsgatan 23 Kista SE-16480 Stockholm Sweden AIR 3268 B48
Product Number	KRD 901 254/1 (with antenna, security unlocked) KRD 901 254/11** (with antenna, security locked) KRD 901 254/3 (CAB/RDNB board for testing purpose, security unlocked) KRD 901 254/31* (CAB/RDNB board for testing purpose, security locked) Note*: Tested unit
Sorial Number(a)	Note**: This will be the marketed, sold unit. E23E345115
Serial Number(s)	
Software Version	CXP9024418/15-R52A165_R13A190
Hardware Version	R1B
Test Specification/Issue/Date	FCC CFR 47 Part 96: 2022

Page 68 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	SUD
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

#### **Technical Description**

AIR 3268 B48 is a single-band TDD Antenna Integrated Radio unit with 32 transmitters and 32 receivers and 64 dual-polarized antenna elements supporting 3550-3700MHz. It has an enhanced Common Public Radio Interface (eCPRI) and 16/8 downlink/uplink layer multi-user MIMO supporting LTE, and is NR prepared.

The Equipment Under Test (EUT) is shown in the photograph below. A full technical description

can be found in the Manufacturer's documentation.



EUT Configuration

Please see Appendix B for close up pictures of the unit as configured during testing Cables and earthing when applicable were connected as per manufacturer's specification.

Page 69 of 73         Report Issued: 11/22/2022         Report File #: TR- 7169012035-CBRS-002	Page 69 of 73
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Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	SUD
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

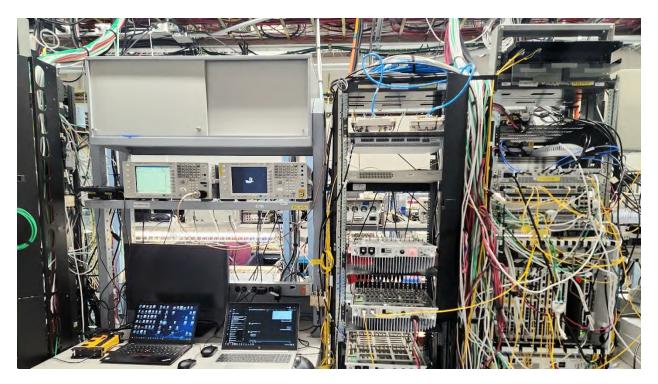
## Appendix B – EUT, Peripherals, and Test Setup Photos

Page 70 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

### Test setup

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Page 71 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002

Client	Ericsson	
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

## Appendix C – Additional Test Information

Page 72 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002

Client	Ericsson		
Product	KRD 901 254 Air 3268 B48 (3550-3700MHz)	TÜV	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada	

Test equipment used for Dec 2019 testing

Instrument	Manufacturer	Type No.	Serial No	Calibration Period (months)	Calibration Due
THG	Fluke	77 IV	34770264	12	18-Apr-2020
DVM	VWR	61161-378	170120564	24	17-Feb-2021
Power Supply	Xantrex	XKW 60-50	E00109863	O/P Mon	-
Spectrum Analyser	Keysight	N9020A	MY49100827	24	27-Dec-2021
Attenuator	Pasternack	PE7004-10	N/S	O/P Mon	-
Switching Control Unit	Hewlett Packard	11713A	3748A060876	O/P Mon	-
RF Switch Unit	Burnsco	RARFSW 4x1	001	O/P Mon	-
Power Supply	Leader	730-3D	9801135	O/P Mon	-

Page 73 of 73	Report Issued: 11/22/2022	Report File #: TR- 7169012035-CBRS-002