Test Report

As per

FCC Part 96 SAS requirements (CBRS Test Plan)



Add value. **Inspire trust**.

on the Ericsson Remote Radio Air 6488 B48 KRD901160 (3550-3700MHz) FCC ID(s): TA8AKRD901160 **TA8BKRD901160**

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.

Scott Drysdale. Test Personnel

5000 Drysdale

Glen Westwell Report Reviewer



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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	TUV
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

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Appendix D – Additional Test Information	
Confirm that the device transmits at a power level less than or equ	ual to the maximum power
level approved by the SAS	

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Report Scope

This report addresses the EMC verification testing and test results of the **Ericsson Remote Radio Air 6488 B48 KRD 901160 (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.

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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 6488 B48 KRD 901160 (3550-3700 MHz)
EUT passed all tests performed	Yes
Tests conducted by	Scott Drysdale

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

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Test Results Summary

Section as	per Working D	Ocument 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	Х		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	X	Х	WINNF.FT.C.R EG.7	Registration due to change of an installation parameter	Test waits until transmission starts, then trigger an	Р

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					 installationParam change. Record time at which transmission stops. Time must be within 60 seconds of the installationPa ram change taking effect. 	
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	Х		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

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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	Х	WINNF.FT.C.R EG.20	Category A CBSD location update		N/A
6.3.4.2. 1	X	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

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					 heartbeat response or after. After transmission starts, meas ure that transmission is within the granted channel (frequencyLo w, freque ncyHigh) 	
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.	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

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					responseCod	
6.4.4.2. 2	X		WINNF.FT.C.H BT.4	Heartbeat responseCode=500 (TERMINATED_G RANT)	e = 105	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	р
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	р
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	р
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

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					 (this is not a pass/fail criteria, but check) CBSD2: must stop transmission within 60 seconds of being sent heartbeatRe sponse with responseCod e = 500 	
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.	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

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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	Х		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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6.7.4.1.		X	WINNF.FT.D.D	Domain Proxy	Monitor RF	
2			RG.2	Successful	transmission. Ensure	Р
2			K0.2	Deregistration		1
				Deregistration	• 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	X	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	
					information	
6.8.4.2.	Х	Х	WINNF.FT.C.SC	TLS failure due to	No RF transmission	
2			S.3	expired server	during test	Р
				certificate	Check the tcpdump	
					for the TLS	
					information	
6.8.4.2.	Х	Х	WINNF.FT.C.SC	TLS failure when	No RF transmission	
3			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	P
1			BT	Power Measurement	Density test case.	Р
					Assume we use 1	
					carrier bandwidth	

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	(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.

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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 901 160/2 model, 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)
 - v. C6 UUT supports installation parameter change (WINNF.FT.C.REG.7)
- 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 in Dec 2019 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.

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Additional testing for power spectral density (PSD) requirements were evaluated in Aug 2024, the original EUT firmware was changed to support NR Air Interface. (as defined in WINNF-TS-0122-V1.0.2, section 5.3.4). All other parameters were deemed to not be affected as there was no other changes.

Logs are kept on file.

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Applicable Standards, Specifications and Methods

ANSI C63.26:2015	American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services
CFR47 FCC Part 96	Code of Federal Regulations – Citizens Broadband Radio Service
WINNF-TS-0122	Conformance and Performance Test Technical Specification;
	CBSD/DP as Unit Under Test (UUT)
19 December 2017	Working Document
(before 25 Nov, 2020)	
WINNF-TS-0122	Conformance and Performance Test Technical Specification;
Version V1.0.2	CBSD/DP as Unit Under Test (UUT)
25 November 2020	Working Document
(After 25 November, 2020)	
ISO/IEC 17025:2017	General requirements for the competence of testing and calibration laboratories

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Document Revision Status

7169006619 000:September 16, 2019	First release
7169006619 001: September 17, 2019	Minor typo fixes as per client request.
7169007158 000: December 20, 2019 changed FCC ID. See justifications for	Added appendix C for additional testing performed, further details.
7169015031 000: Aug 23, 2024 See Justifications for further details.	Added appendix D for additional testing performed.
7169015031 001: Aug 26, 2024	Added reference to ANSI C 63.26 as per review.
7169015031 002: Sept 4, 2024	Minor revisions as per client request.

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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.

 $\mathbf{A}\mathbf{M}$ – 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

 \mathbf{RF} – Radio Frequency

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

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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.

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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)
Sept 3 – 5, 2019	All	SD	20-23	40-55	96.106
Dec 18, 2019	PSD retesting	SD	20-23	40-55	96.106
Aug 21, 2024	PSD retesting	SD	22.0	40-55	101.5

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Detailed Test Results Section

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Authorization transmit after it receives authorization from a SAS.

Section	DP	Test Case ID	Test Case Title	Pass / Fail
6.1.4.1.2	Х	WINNF.FT.D.REG.2	Domain Proxy Multi-Step	
			registration	Р

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6.1.4.1.6	Х	WINNF.FT.D	.REG.6	Domain Pr	roxy Sing	le-Step	D
						D with CPI	Р
				signed data	a		
Agilent Spectrum Ar			concernation		utou orr	0.05.45.444.0-0.00.0010	
Center Freq			SENSE:INT Trig: Free Run Atten: 10 dB	Avg Type: L Avg Hold:>1	Log-Pwr	9:25:15 AM Sep 03, 2019 TRACE 1 2 3 4 5 6 TYPE MWWWWW DET PNNNN	Trace/Det Select Trace
10 dB/div Re	Offset 52.6 f 40.00 dl	dB Bm					1
-og 30.0							Clear Write
20.0							Trace Average
0.00							Max Hold
-20.0	nordel-toget	(กระทักส์กรุ่งกับสุขยาย เกมาะการเกมาะการเกมาะการเกม	uppelderse-Antonomication	when a surface of the second	nelinen in heren ander	blurslavilytrichusterer	Min Hold
40.0							View/Blank Trace On
-50.0 Center 3.5700 Res BW 1.8 M		VBW 5	0 MHz		Sweep 1.0	pan 200.0 MHz 0 ms (1001 pts)	More 1 of 3
MSG					STATUS		

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	TUV
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

Р	change of neter	ion due t ation par		.REG.7	INNF.FT.C	X W	6.1.4.1.7
Marker	0:06:03 AM Sep 03, 2019 TRACE 1 2 3 4 5 6 TYPE WWWWWW	ALIGN OFF	Avg Typ	SENSE:INT		50 Ω AC	Agilent Spectrum Ar <mark>XI</mark> TRI Marker 195.
Select Marker 1	Mkr1 95.40 s -4.99 dBm			Atten: 10 dB	PNO: Fast ++ IFGain:Low	Offset 52.6 dB	Rei
Norma	*					40.00 dBm	10 dB/div Re
							20.0
Delt							0.00
Fixed					·····		-10.0
Of							-20.0
Properties							-30.0
Mor 1 of	Span 0 Hz					00000 GHz	-50.0 Center 3.5550
	0.0 s (1001 pts)	Sweep		3.0 MHz*	#VBW		Res BW 1.0 N

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

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	TUV
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

6.1.4.2.2	X	WINNF.FT.D	.REG.9	Domain			P
				Required			Р
				(response	eCode 1)2)	
Agilent Spectrum An			SENSE:INT		ALIGN OFF	09:29:50 AM Sep 03, 2019	
Center Freq		DOOO GHz PNO: Fast 🖵	Trig: Free Run		: Log-Pwr	12 3 4 5 6 TRACE 1 2 3 4 5 6 TYPE MWANNAM DET P. N.N.N.N.N.	Trace/Det
	Offset 52.6 f 40.00 dl		Atten: 10 dB				Select Trace
30.0							Clear Write
20.0							Trace Average
0.00							Max Hold
-20.0	Incolio-determinations/	นระบะษาปองกร่างเป็นสารายในสา	Alternesseenheetheetheetheethe	wheelinghandidan	ilterenter of hits	r hadenaar denteen aan ar webe	Min Hold
-40.0							View/Blank Trace On
Center 3.5700			60 MHz		Swoon	Span 200.0 MHz 1.00 ms (1001 pts)	More 1 of
	nz				Sweep		
50					LO STATUS		

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	SUD
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

6.1.4.2.4	Х	WINNF.FT.D	.REG.11	Domain Proxy P		5
				registration (resp 200)	oonseCode	Р
gilent Spectrum Ar	nalyzer - Swep	ot SA		200)		
Center Freq	F 50 Ω	AC	SENSE:INT	ALIGN OFF Avg Type: Log-Pwr Avg Hold:>100/100	09:33:33 AM Sep 03, 2019 TRACE 1 2 3 4 5 6 TYPE MWWWWW	Trace/Det
Rei	f Offset 52,6	IFGain:Low	Atten: 10 dB		DET PNNNN	Select Trace
^{og}	f 40.00 dl	BM				
30.0						Clear Write
20.0						
10.0						Trace Averag
0.00						Max Hol
10.0						Maxinor
20.0	dreamlabelu	unantrilation after a proper for the star	mulantodelland	nontrine and the set of a set of the set of	southwarmonenenenenenenenenenen	
20.0						Min Hol
30.0						
40.0						View/Blank
						Trace On
50.0						
						Mor
Center 3.5700 Res BW 1.8 M		VBW	50 MHz	Sweep	Span 200.0 MHz 1.00 ms (1001 pts)	1 of:
ISG				To STATU		

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	SUD
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

6.1.4.2.6	X	WINNF.F	T.D.REG.13	3	Domain paramete	•		e 103)	Р
Agilent Spectrum Ana	ilyzer - Swep	t SA							
Center Freq	50 Q 8.57000			Run		ALIGN OFF : Log-Pwr >100/100	TRAC	A Sep 03, 2019	Trace/Det
		IFGain:Lov					DE		Select Trace
Ref 10 dB/div Ref	Offset 52.6 40.00 dl	dB 3m							· · · ·
30.0									Clear Write
20.0									
10.0									Trace Average
0.00									
-10.0									Max Hold
-20.0	uphiles have been	and a stand of the stand of the	(Antonio and the former and	elylpulari		hertetarthistory of a gr	ubidutergewidentee	n dal waaddad	
-30.0									Min Hold
-40.0									View/Blank
									Trace On
-50.0									More
Center 3.5700 Res BW 1.8 M		VE	3W 50 MHz			Sween	Span 20 1.00 ms (*	00.0 MHz	1 of 3
MSG	1-	VI.						roo r proj	

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	SUD
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

6.1.4.2.8	X	WINN	F.FT.D	.REG.1	5			lacklisted Code 101)		Р
Agilent Spectrum Ana (X) T RF Center Freq 3	50 Ω	AC 000 GH PN	0: Fast 😱	SE Trig: Free Atten: 10		Avg Typ	ALIGN OFF e: Log-Pwr :>100/100	TYPE	ep 03, 2019 2 3 4 5 6 4 4 4 4 4 5 6	Trace/Det
	Offset 52.6 40.00 dB	dB	ain:Low	Aden. IV						Select Trace
30.0										Clear Write
20.0										Trace Average
-10.0										Max Hold
-20.0	ronterentro	ontrong low spectra	/~ ^{le} f~witffler	Hypersolaria	ansental My	and the second second second	mi-thindyneyr	gri-nelinautu-yh	netrallerrational	Min Hold
-30.0										View/Blank
-50.0										Trace On More
Center 3.5700 Res BW 1.8 Mł			VBW (50 MHz			Sweep	Span 200 1.00 ms (10	0.0 MHz 101 pts)	1 of 3

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	TUV
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

6.1.4.2.	10	Х	WINN	NF.FT.D	0.REG.1		Domain I SAS prot response	cocol ver	sion	ted	Ρ
Agilent Spectr	um Analyz	zer - Swep	t SA								
X T	RF	50 Ω			SE	NSE:INT		ALIGN OFF		M Sep 03, 2019	Trace/Det
Center F	req 3.:	570000	PI	12 10: Fast 😱 Gain:Low	Trig: Free Atten: 10		Avg Hold:	:: Log-Pwr >100/100	TY	CE 123456 PE MWWWWWW ET P N N N N N	Select Trace
10 dB/div	Ref Of Ref 4	fset 52.6 0.00 dE	dB 3m								1
Log											Clear Write
20.0											
10.0											Trace Average
0.00											
-10.0											Max Hold
-20.0	honollins	hennathand	Moharhalton	annan an ann an Anna an Anna an Anna an Anna an Anna Ann	ohart Malapore	howhower	erhollow from the	halanananana	solart.pt.Jergerather	in the way of the second s	
-30.0											Min Hold
-40.0											View/Blank
											Trace On
-50.0											More
Center 3.									Span 2	00.0 MHz	1 of 3
Res BW 1	.8 MHz	-		VBW	50 MHz					(1001 pts)	
MSG											

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	TUV
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

6.1.4.2.12	X	WINN	F.FT.D.	REG.19		Domain I (response			or	Р
Agilent Spectrum Ana	lyzer - Swep	ot SA			I	` 1		,		
Center Freq 3	50 Ω .570000	0000 GHz		SENSI		Avg Type Avg Hold:	ALIGN OFF	TRAC	M Sep 03, 2019 E 1 2 3 4 5 6 E MMMMMM	Trace/Det
			: Fast 😱 in:Low	Atten: 10 d		inglinea.		DE	PNNNNN	Select Trace
10 dB/div Ref	Offset 52.6 40.00 dl	6 dB Bm								1
30.0										Clear Write
20.0										Trace Average
0.00										Max Hold
-10.0 -20.0	~hipmal-witha-	haddaad ah dhaddaa	melliphelip	Kand Mars hand your and you	where the all	Wergh Transform Maria	Allangerounger	/Warnahingangangangangangangangangangangan kanangangan kanangangan kanangangangangangangangangangangangangan	had an east of the	Min Hold
-30.0										Min Hold
-40.0										View/Blank Trace On
-50.0										More
Center 3.5700 Res BW 1.8 MH			VBW 5	0 MHz					00.0 MHz 1001 pts)	1 of 3
MSG							I STATUS			

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1 age 52 01 94	Report Issued. 9/4/2024	Report File #. 7 109013031-0BR3-002

1.0

1.0

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	
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.

6.3.4.2. 1	WINNF	.FT.C.GRA.1	Unsuccessful responseCode	=400	after R	r for 60 seconds EG message	Р
			(INTERFERE	ENCE)	during	No transmission test.	
Agilent Spectru	i <mark>m Analyzer - Swe</mark> RF 50 Ω		SENSE:INT		ALIGN OFF	11:25:58 AM Sep 03, 2019	
	me 1.00 ms	3	Tain France Dam	Avg Typ		TRACE 1 2 3 4 5 6	Trace/Det
		PNO: Fast G IFGain:Low	Atten: 10 dB	Avginoid		TYPE M WAAAAAAA DET A N N N N N	Select Trace
10 dB/div	Ref Offset 52. Ref 40.00 d	6 dB I Bm			Mk	r1 3.588 6 GHz -18.158 dBm	1
							Clear Write
30.0							
20.0							
10.0							Trace Average
0.00							
-10.0							Max Hold
fortelance	attration and and	mound and the former she	angligh.conframeters.Pspratulefslifter.Lab	whilestrates	and an and the	when black for manual and	
-20.0							Min Hold
-30.0							
-40.0							View/Blank
-50.0							Trace On
							More
Center 3.6 Res BW 1.		#VB	₩ 3.0 MHz*		Sweep	Span 200.0 MHz 1.00 ms (1001 pts)	1 of 3
MSG					STATUS		

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

6.3.4.2.2	WINNF.FT.C.G	res	successful G ponseCode= RANT_CON	401		ent. No t	nds after REG ransmission	Р
Agilent Spectrum M T Sweep Tim	PN		SENSE:INT ig: Free Run ten: 10 dB	Aug Type: RMS Avg Hold:>100/1	TRACE	Sep 03, 2019 1 2 3 4 5 6 M WMMM A N N N N N N		
	Ref Offset 52.6 dB Ref 40.00 dBm				Mkr1 3.588 -17.12	6 GHz 3 dBm		
30.0								
10.0								
-10.0		<u></u> 1						
-20.0	LANAL HUMPH CALMER STREET	an hall of a for the	ennennen her streen he	athonstantinabilities and a second	Wimhernesselferstredenbest	nefskepisenskapek		
-30.0								
-50.0								
Center 3.62 Res BW 1.8		#VBW 3.0	MH7*	Swe	Span 20 ep 1.00 ms (1	0.0 MHz		
MSG					STATUS			

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

6.4.4.1.2	WINNF.FT.D.HBT.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, measure that transmission is within the granted channel (frequencyLow, frequenc yHigh) 	Ρ
UXI T	m Analyzer - Swept SA RF 50 Ω AC 568.000 μs	SENSE:INT ALIG		
10 dB/div	Ref Offset 52.6 dB Ref 40.00 dBm	Trin Free Pres	Mkr1 668.0 µs -26.09 dBm	
30.0			* Clear Write	
20.0			Trace Average	
0.00			Max Hold	
-20.0 1			Min Hold	
-40.0			View/Blank Trace On	
			More	

Center 3.555000000 GHz Res BW 1.8 MHz	#VBW 3.0 MHz*	Sweep	Span 0 Hz 60.00 s (1001 pts)	1 of 3
MSG		I STATUS		

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

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

6.4.4.2.1	WINNF.FT.C		Heartbeat responseCode (DEREGISTE		Monitc that:	CBSD st within 60 heartbea	mission. Ensure ops transmission seconds of the tResponse which responseCode	Ρ
UXI T	RF 50 Ω AC ne 300.0 s s Ref Offset 52.6 dB Ref 40.00 dBm	PNO: Fast 🏳 IFGain:Low	SENSE:INT Trig: Free Run Atten: 10 dB	ALIGN Avg Type: RMS	Mk	30:26 PM Sep 03, 2 TRACE 2 3 4 TYPE WWWWW DET A NN N r1 353.7 I -25.67 dB	Select Trace	
30.0						*	Clear Write	
10.0 0.00							Trace Average	
-10.0 -20.0 -1							Max Hold Min Hold	
-30.0							View/Blank Trace On	
-50.0 Center 3.5 Res BW 2.	55000000 GHz 0 MHz	#VBW	3.0 MHz*	Swe	eep 300.	Span 0 0 s (1001 p	Hz 1 of 3	

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

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	
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 Spect	rum Analyzer - Swept SA					
	RF 50 Ω AC		SENSE:INT	ALIGN OFF Avg Type: RMS	12:33:17 PM Sep 03, 2019	Trace/Det
sweep 1	ime 300.0 s	PNO: Fast 😱 IFGain:Low	Trig: Free Run Atten: 10 dB	Nig Type. Tuno	TRACE 123456 TYPE WWWWWW DET A N N N N	Select Trace
I0 dB/div	Ref Offset 52.6 dB Ref 40.00 dBm				Mkr1 353.7 µs -25.66 dBm	1
30.0					*	Clear Write
20.0						Trace Average
0.00						Max Hole
20.0						Min Hol
30.0 40.0						View/Blank Trace On
50.0						More
Center 3. Res BW 2	555000000 GHz 2.0 MHz	#VBW	3.0 MHz*	Sweep	Span 0 Hz 300.0 s (1001 pts)	1 of 3
SG				STATUS		

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	
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	 CBSD stops transmission 	р
		(SUSPENDED_GRANT)	within 60 seconds of	
		in Subsequent Heartbeat	heartbeatResponse which	
		Response	contains responseCode=501	

T	RF 50 Ω AC		SENSE:INT	ALIGN OFF	12:35:40 PM Sep 03, 2019	
veep Ti	me 300.0 s			Avg Type: RMS	TRACE 1 2 3 4 5 6	Trace/Det
		PNO: Fast 😱 IFGain:Low	Trig: Free Run Atten: 10 dB		DET A N N N N	Select Trace
dB/div	Ref Offset 52.6 dB Ref 40.00 dBm				Mkr1 353.7 µs -25.66 dBm	
g					*	Clear Write
.0						Clear Wri
.0						
						Trace Avera
0						Max Ho
.0						Maxine
0 1						
<u>, </u>						Min Ho
0						
o						View/Blan
o						Trace Or
						Mo
nter 3.5	555000000 GHz	40 (15)44			Span 0 Hz	1 0
s BW 2	.0 MHZ	#VBW	3.0 MHz*	Sweep	300.0 s (1001 pts)	

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

6.4.4.2.5	WINNF.FT.C.HBT.7	Heartbeat responseCode=502 (UNSYNC_OP_PAR)	• CBSD si within 60 heartbea	ops transmission P seconds of tResponse which responseCode=502
W ⊤ Sweep Tim	n Analyzer - Swept SA RF 50 Q AC PNO: Fast IF Gain:Low Ref Offset 52.6 dB Ref 40.00 dBm	Trig: Free Run	▲ ALIGN OFF 12:38:21 PM Sep 03, ype: RMS TRACE 123 4 TYPE WWWW DET A NNN Mkr1 353.7 -25.65 dE	Select Trace
30.0			,	Clear Write
0.00				Trace Average Max Hold
-10.0 -20.0 • 1				Min Hold
-40.0				View/Blank Trace On
Center 3.55 Res BW 2.0	55000000 GHz) MHz #V	BW 3.0 MHz*	Span 0 Sweep 300.0 s (1001 p	More Hz 1 of 3 ts)

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	TUV
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	Monitor RF transmission. CBSDs will have different behavior:	Ρ
			(TEMINATED_GR ANT)	 CBSD1: will continue to transmit to end of test (this is not a pass/fail criteria, but check) CBSD2: must stop transmission within 60 seconds of being sent heartbeatResponse with responseCode = 500 	



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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

6.4.4.3.1	WINNF.FT	Г.С.НВТ.9	Heartbeat	Response				art of test to 60	
			Absent (F	First Heartbea		econds a			Р
								e message was	
								not transmit at	
						ny time o	during tes	t	
	n Analyzer - Swept Si			je v		\sim			
	RF 50 Ω AC		SENSE:	Avg Typ	ALIGN OFF e: RMS	TRA	PM Sep 03, 2019 CE 1 2 3 4 5 6	Trace/Det	
0001120.0	000000 11112	PNO: Fast 🖵	Trig: Free Ru Atten: 10 dB	in Avg Hold	:>100/100	T			
		IFGain:Low	Atten: 10 dB		D.41-			Select Trace	
	Ref Offset 52.6 dl				IVIK	-26.0	00 GHz 82 dBm	1	
10 dB/div Log	Ref 40.00 dBn	n				-20.0	62 UDIII		
30.0	_							Clear Write	
20.0									
								Trace Average	
10.0									
0.00									
10.0								Max Hold	
-10.0									
-20.0									
-20.0 1								Min Hold	
-30.0	<u> </u>	within the second and have shown a pro-	howenterforment	Viewand	* Harrison and the	ที่สาวการที่สาวการที่	MANIN MAN		
-40.0								View/Blank	
								Trace On	
-50.0									
								Mars	
Center 3.62								More 1 of 3	
Res BW 18		#VBW	3.0 MHz*		Sween	5pan / 1.00 ms	20.00 MHz (1001 pts)	1013	
MSG		<i>"</i>			STATI		(1001 pt3)		
					No share				

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

message	
Agilent Spectrum Analyzer - Swept SA	
W T RF 50.0. AC SENSE;INT ALIGN OFF 12:49:20 PM Sep 03, 2019 Sweep Time 360.0 s PNO: Wide IFGain:Low Trig: Free Run Atten: 10 dB Trace I 2 3 4 5 6 Trace/Det Bef Offect 52.6 dB Mkr1 3.615 Gs 1	
Ref Offset 52.6 dB INKT 5.015 GS 1 10 dB/div Ref 40.00 dBm dBm 1	
30.0 Clear Write	
20.0	
10.0 Trace Average	
0.00 Max Hold	
-20.0 1	
-40.0 View/Blank Trace On	
Center 3.555000000 GHz Span 0 Hz 1 of 3	
Res BW 180 kHz #VBW 3.0 MHz* Sweep 360.0 s (1001 pts)	
MSG STATUS	

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	
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.

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	
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.

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

measkeportcomg		6.5.4.2.5	WINNF.FT.D.MES.5	Domain Proxy Heartbeat Response contains measReportConfig	No RF monitoring	Р
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Pass. "measreportconfig" in logs. All other requirements verified.

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

6.6.4.1.2	2 WINNF.FT.I	D.RLQ.2	Domain Proxy				ssion. Ensure:
			Relinquishmen	nt		1	transmission at
					any time pr		
					relinguishm	entRequ	est message.
	rum Analyzer - Swept SA RF 50 Ω AC		SENSE:INT	ALIGN	OFF 01:16:18 PM	Sep.03, 2019	
	ime 360.5 s	1		Avg Type: RMS		123456 WWWWWWW	Trace/Det
		PNO: Wide G	Trig: Free Run Atten: 10 dB		DET	ANNNN	Select Trace
0 dB/div	Ref Offset 52.6 dB Ref 40.00 dBm				Mkr1 3.(615 Gs dBm	1
						*	Clear Write
.0							
0.0							Trace Average
00							
0.0							Max Hold
0.0 <mark>1</mark> ——							Min Hold
0.0							View/Blank
40.0 50.0							Trace On
							More
tes BW 1	555000000 GHz 80 kHz	#VBW	3.0 MHz*		ep 360.5 s (1	oan 0 Hz 001 pts)	1 of 3
SG				I SI	TATUS		

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

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

6.7.4.1.2	2 WINNF.FT.I	D.DRG.2	Domain Proxy	^v Successful	Monitor R	F transmi	ission. Ensure:	
			Deregistration		• CE	SD stops	s transmission at	Р
			-		any time p	rior to se	nding the	
							lest message or	
							est message	
					(whicheve			
						I IS Sellt I		
	rum Analyzer - Swept SA RF 50 Ω AC		SENSE:INT	ALIGN	<u> </u>	M Sep 03, 2019		
	ime 360.5 s		SENSE:1NT	Avg Type: RMS	TRAC	E 123456	Trace/Det	
		PNO: Wide 😱	Trig: Free Run Atten: 10 dB		TY			
		IFGain:Low	Atten: 10 dB				Select Trace	
	Ref Offset 52.6 dB				MKr1 3	.615 Gs	1	
10 dB/div Log	Ref 40.00 dBm					dBm		
3						*		
30.0							Clear Write	
20.0								
							_	
10.0							Trace Average	
1010								
0.00								
							Max Hold	
-10.0							maxiroid	
	· · · · · · · · · · · · · · · · · · ·							
-20.0 1								
							Min Hold	
-30.0								
-40.0							View/Blank	
							Trace On	
-50.0								
							More	
Center 3.	555000000 GHz	#\ /D\44	2 0 MILI-*		S	pan 0 Hz	1 of 3	
Res BW 1	80 KHZ	#VBW	3.0 MHz*		eep 360.5 s (TOUT pts)		
MSG				I 🔊 s	TATUS			

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

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	TUV
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

	1MHz EIRP	Raw	Raw	External	Raw				EIRP 1MHz	EIRP 10 MHz	margin
Freq	limit (target) dBm	10 MHz	1MHz	Losses (dB)	dBm/MHz	antenna gain dBi	port s	port gain (dB)	dBm/MHz	dBm	dB
3555-Low	34	-18.9	-27.7	19.93	-7.77	22	64	18.0618	32.2918	41.0918	1.7082
3555-High	37	-15.87	-24.6	19.93	-4.67	22	64	18.0618	35.3918	44.1218	1.6082
3630-low	34	-17.91	-26.29	19.93	-6.36	22	64	18.0618	33.7018	42.0818	0.2982
3630-high	37	-14.93	-23.2	19.93	-3.27	22	64	18.0618	36.7918	45.0618	0.2082
3695-low	34	-17.33	-26.27	19.93	-6.34	22	64	18.0618	33.7218	42.6618	0.2782
3695-high	37	-14.31	-24.31	19.93	-4.38	22	64	18.0618	35.6818	45.6818	1.3182

Note: 3555 MHz and 3630 MHz were performed under max hold of average as worst case.

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	TUV
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

3555 low power

L	rum Analyzer - Cl 50 Ω ne 100 ms		AC		E:INT 1: 3.55500000		GNAUTO	08:48:36 P Radio Std:	M Sep 05, 2019 None	Trace	/Detector
) dB/div	Gate: LO Inpu	ut: RF #IF!	Gain:Low	Trig: Free R #Atten: 10 d	un A	vg Hold: 25/			^{ice: BTS} 98 GHz 40 dBm		
20				¹						с	lear Writ
.40 .50 .60		[-\- 				Averag
70 80 90								L	hand an and an		Max Hol
enter 3.5 Res BW 7				#VBW	/ 3 MHz			Spa #Sweep	n 20 MHz) 100 ms		Min Ho
Chann	el Power			F	Power S	pectral	Dens	ity		Auto	Detecto Average <u>Ma</u>
	-18.87	dBm	10 MHz			-28.87	dB	m/MHz			
start	a 🏉 🖨 🐚		gilent Spectrum Ana	📔 USB D	I5K (F:)					(🕄 🔟 8:48 P

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	TUV
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

3555-High power

Trace/Detector		Radio Std: Radio Dev 3.554		0000 GHz Avg Hold	SENSE:INT r Freq: 3.5550 ree Run : 10 dB	Trig: F	FGain:Low	nput: RF #II	50 Ω 0.00 dBn ate: L0 Ir Ref 0 d	Value
Clear Wri					● ¹					
Averaç										
Max Ho		L								
Min Ho	n 20 MHz) 100 ms	Spa #Sweep		z	VBW 3 MH	#				nter 3.5 es BW 1
Detecto Average Auto <u>Ma</u>		-		Specti	Powe				el Power	Channe
		m/MHz	37 dBi	-25.		Iz	n/ 10 MH	7 dBm	-15.8	
< 10 8:59 F					USB DISK (F:)	Ana	Agilent Spectrum		aa 🏉 🕫 🐚	start

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	TUV
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

3630 low power

	0.00 dBm nte: L0 In Ref 0 dE	put: RF #IF	Gain:Low	Center F Trig: Fre #Atten: 1	e Run	00000 GHz Avg Hold				Marker–
						1				
						.				
		/					$ \rightarrow $			
	, 							1		
								Lannar		
er 3.63									D 20 MHz	
BW 1				#VE	BW 3 MH	lz		#Swee	n 20 MHz p 100 ms	
nanne	l Power				Powe	r Spect	ral Dens	ity		
	-17.90	dBm	/ 10 MHz	2		-27	. 90 dB	m/MHz		

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	TUV
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

3630-high power

ef Value	50 Ω 0.00 dBm Gate: L0 Ing	out: RF			ISE:INT eq: 3.63000 Run		LIGNAUTO	09:09:59 P Radio Std	M Sep 05, 2019 None	Amptd/Y Scale
0 dB/div	Ref 0 dE	#IF	Gain:Low	#Atten: 10				Radio Dev 1 3.627 -23.2	46 GHz 25 dBm	Ref Valu 0.00 dBr
-10			● ¹							Attenuation [10 dB]
-30		/								Scale/D i 10.0 d
-60								Lanna		
90	3 GHz							Spa	n 20 MHz	Presel Cent
Res BW 1				#VB	W З МН	z		#Swee	o 100 ms	
Channe	el Power				Power	Spectra	al Dens	ity		Presel Adju 0 ⊦
	-14.93	dBm.	/ 10 MHz	:		-24.9	3 dВ	m/MHz	ĺ	Mo 1 of
start	m 🏉 🕫 🐚		gilent Spectrum An		B DISK (F:)				F	 (10) 9:09 F

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

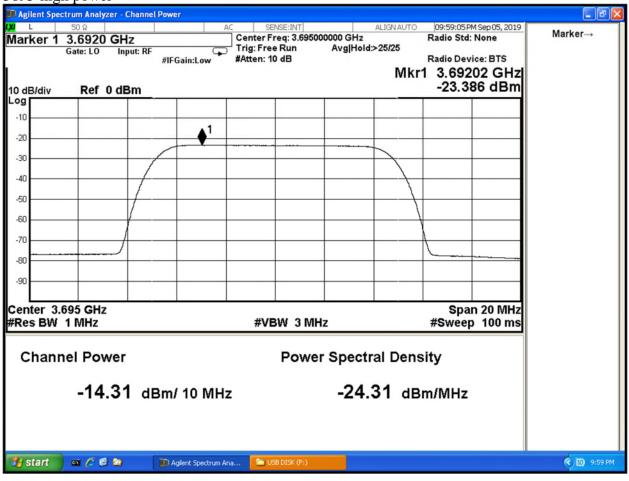
3695 low power

	Gate: LO Input: RF	#IFGain:Low	Center Freq: 3.695 Trig: Free Run #Atten: 10 dB	6000000 GHz Avg Hold:>:		Radio Std: Radio Dev	ice: BTS	Save State
dB/div	Ref 0 dBm					-26.2	08 GHz 70 dBm	Sidle
		1						Trace (+ State)
0					$\overline{\}$			
0 0 0								Da (Export Trace 1
nter 3.69 es BW 1			#VBW 3 N			Spa #Swaar	n 20 MHz 0 100 ms	Screer Image
	el Power			er Spectra	l Dens			
	-17.33 dB	m/ 10 MH	z	-27.3	3 dBi	m/MHz		

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

3695-high power



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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	SUD
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

DOT CBRS Radio: WINNF / Security Test Case Analysis

WINNF Security Test Case Analysis

WINNF.FT.C.SCS.1

IF.FT.C.SCS.1.pcap St. View Do Explan	e Analyze Statistics Telepho	ny Wirelass Tools Hal	p		- a >
4 0 1 3 8 5	See ST 1	<u>a</u> aaa <u>n</u>			
+ == 25.00.0.124 58.ml					- Egrester
Time	Source	Destrution	Protocol	Length 3rdu	
	138.648138 19.18.9.61	18.19.8.124	TL5V1-2	195 Client Hello	
	:38.041257 10.18.0.124	10.10.0.61	TL5v1.2	2862 Server Hello	
	:38,641466 10.10.0.124	10,10.0.61	TL5v1,2	543 Certificate, Certificate Request, Server Hello Dome	
	138.642778 10.10.0.61	10,10.0,124	TL541.2	422 Certificate, Client Key Exchange	
	:38.645176 10.10.0.61	10.10.0.124	TL5v1.2	335 Certificate Verify	
	:38,645280 10.10.0.61	10,10.0,124	TL5v1,2	72 Change Cipher Spec	
	138.645358 10.10.0.61	18,10.8,124	TLSV1/2	111 Encrypted Handshake Message	
	138.645885 10.10.0.124	10,10.0.61	TLSv1.2	117 Change Cipher Spec, Encrypted Handshake Message	
	:38.647369 10.18.0.61	10,10.0,124	TL5V1.2	327 Application Data	
	138.647478 10.10.0.61	18.10.8.124	TL5v1.2	246 Application Data	
78 2019-09-03 14:07:	:38.669968 10.18.0.124	10,10.0,61	TLSv1,2	112 Application Data	
83 2019-09-03 14:07:	:38.709411 10.10.0.124	10.10.0.51	TLSVI.2	555 Application Data, Application Data, Application Data, Application Data, Application Data, Application Data,	
17 2019-09-03 14:07:	:41.639121 10.18.0.61	18.18.8.124	TL5v1.2	195 Client Hello	
19 2019-09-03 14:07:	141.639518 10.10.0.124	10.10.0.61	TLSv1.2	2862 Server Hello	
21 2019-09-03 14:07:	:41.619731 10.18.0.124	10.10.0.51	TL5VI.2	543 Certificate, Certificate Request, Server Hello Done	
26 2019-09-03 14:07:	:41.041304 10.18.0.61	18.10.8.124	TL5v1.2	422 Certificate, Client Key Exchange	
28 2019-09-03 14:07	141.643718 10.10.0.61	10.10.0.124	TLSv1.2	335 Certificate Verify	
29 2019-09-03 14:07:	:41.643747 10.18.0.61	18.10.0.124	TLSVI.2	72 Change Cipher Spec	
38 2019-29-05 14:87:	141.041958 10.18.0.61	10.10.0.124	TL5v1.2	111 Excrypted Handshake Ressage	
12 2019-09-05 14:07	141.644142 10.10.0.124	10,10.0.61	TLSv1,2	117 Change Cipler Spec, Encrypted Handshake Hessage	
	:41.645525 10.10.0.61	18.10.0.124	TLSVL.2	327 Application Data	
	141.545687 10.10.0.61	10.10.0.124	TL5v1.2	343 Application Data	
	:41.665847 10.18.0.124	10.10.0.51	TLSVE.2	112 Application Data	
	:41.705439 10.18.0.124	10.10.0.51	715/1.2	55 Application Data, Application Data, Application Data, Application Data, Application Data, Application Data	
	141.737432 10.10.0.61	10.10.0.114	TL5v1.2	195 Client Hello	
	:41.727828 10.18.0.124	10.10.0.61	TL5/L.2	2862 Server Hells	
	:41.728864 10.18.0.124	10.10.0.51	71341.2	S43 Certificate Certificate Request, Server Hello Done	
	141.729188 10.10.0.01	10.10.0.124	TLSV1.2	422 Certificate, Client Key Echange	
	:41.731322 10.10.0.61	10.10.0.124	TLSV1.2	42 Certificate, claims my schwarge 335 Certificate Verify	
	141.751322 10.10.0.61	10.10.0.124	TL5V1.2		
	141.731485 10.10.0.01	10.10.0.124	TL5v1.2	72 Change Cipher Spec	
	141.731922 10.10.0.01	10,10.0,124	TLSV1.2	111 Excrypted Handshake Pessage	
				117 Change Cipher Spec, Encrypted Handshake Message	
	:41.740913 10.10.0.61	10.10.0.124	TL5+1.2	329 Application Data	
	:41,748972 10.10.0.01	10,10.0,124	TL5V1.2	244 Application Data	
	141.742784 10.10.0.124	10,10.0,51	TL541.2	112 Application Data	
	:41.752628 10.18.0.124	10,10.0.61	TLS#3,2	Bil Application Data, Application Data, Application Data, Application Data, Application Data, Application Data, Application Data	
	:44.656597 10.18.0.01	10,10.0,124	TL5VI.2	195 Client Hello	
	:44.657829 10.18.0.124	18,19.8,51	TL5#1-2	2062 Server Hello	
	:44.637266 10.10.0.124	10,10,0,61	TL5+1+2	543 Certificate, Certificate Regyest, Server Helio Done	
93 2019-09-03 14:07:	:44.658463 10.10.0.61	10.10.0.124	TL5VI.2	422 Certificate, Client Kay Exchange	
	:44.641316 10.18.0.61	18,10.8,124	TL5#1,2	335 Certificate Verify	
96 2019-09-03 14:07:	144.641345 10.10.0.61	10,10.0,124	TLSV1.2	72 Change Ciphen Spec	
97 2019-09-03 14:07:	:44.641529 10.18.0.61	10.10.0.124	TL5VI.2	111 Encrypted Handshake Ressage	
99 2019-09-03 14:07:	:44.041799 10.18.0.124	18,10.6,51	TL5+1,2	117 Change Cipher Spec, Encrypted Handshake Meisage	
98 2019-09-03 14:07:	144.643589 10.10.0.61	10,10.0,124	TLSv1.2	329 Apolication Data	
	:44.641662 10.18.0.61	10.10.0.124	TLSVL.2	244 Application Data	
	:44.045470 10.18.0.124	18.10.6.61	TL5#1.2	112 Application Data	
	144.685469 10.10.0.124	10.10.0.51	TL5v1.2	Bil Application Data, Application Data, Application Data, Application Data, Application Data, Application Data	

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	TUV
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

WINNF test requirements:

WINNF test requirements from WINNF-TS-0122-V1.0.0 CBRS CBSD Test Specification:

2

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	TUV
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

Analysis of WINNF Test Requirements

1. From Client Hello: TLS version = TLS 1.2

```
> Frame 658: 195 bytes on wire (1560 bits), 195 bytes captured (1560 bits)
> Ethernet 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)
> Internet Protocol Version 4, Src: 10.10.0.61, Dst: 10.10.0.124
> Transmission Control Protocol, Src Port: 55482, Dst Port: 5000, Seq: 1, Ack: 1, Len: 129
 Transport Layer Security
  ✓ TLSv1.2 Record Layer: Handshake Protocol: Client Hello
        Content Type: Handshake (22)
        Version: TLS 1.2 (0x0303)
        Length: 124
     ✓ Handshake Protocol: Client Hello
          Handshake Type: Client Hello (1)
          Length: 120
          Version: TLS 1.2 (0x0303)
        > Random: 5d6e73aaa319bed5672f75f9f4ac9b12db5d59130b44f1cc...
          Session ID Length: 0
          Cipher Suites Length: 6

    Cipher Suites (3 suites)

             Cipher Suite: TLS_RSA_WITH_AES_128_GCM_SHA256 (0x009c)
             Cipher Suite: TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256 (0xc02b)
             Cipher Suite: TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256 (0xc02f)
          Compression Methods Length: 1
        > Compression Methods (1 method)
          Extensions Length: 73
        > Extension: supported_groups (len=22)
        > Extension: ec_point_formats (len=2)
        > Extension: signature_algorithms (len=28)
        > Extension: extended_master_secret (len=0)
```

- > Extension: extended_master_secret (len
 > Extension: renegotiation_info (len=1)
 - Cipher suite list from Client Hello 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. Cipher suite chosen (from Server Hello): TLS_RSA_WITH_AES_128_GCM_SHA256

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	TUV
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

> Frame 660: 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: 55482, Seq: 1, Ack: 130, Len: 2796 ✓ Transport Layer Security ✓ 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: 5d6e73b5267853f94c269c3818f0a575ac5d562d15e544eb... Session ID Length: 32 Session ID: 22698059d7a584ee0cd7b1905af413c1fa4241c12a49862c... Cipher Suite: TLS_RSA_WITH_AES_128_GCM_SHA256 (0x009c) Compression Method: null (0) Extensions Length: 5 > Extension: renegotiation_info (len=1)

4. The Registration request message arrived at the Test Harness, so authentication was completed.

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

WINNF.FT.C.SCS.2

NF FT.C. ACS.Lpnap				-
SAN View Gu Capture Analyse Statistics Telephon		124 1		
	0.0.0.U			
dr 15 10.0.124				19
Time Stars	Destrution	Protocol	Langth 2nts	
414 2019-09-00 14:27:03.566848 10.10.0.51	10.1H.9.124	TCP	66 55972 + SHMB (ACK) Senal Ackal Vinal4206 Lenal T5vala1540649128 T5ecra1139262039	
440 2019-09-00 14:27:03.625164 10.10.0.61	10.10.0.124	TLS+1.2	195 Client Wello	
441 2019-89-01 14:27:83.62547E 18.10.8.124	10.18.9.61	TCP	66 5000 + 51972 (ACK) Seq=1 Ack=130 Win=ISI04 Len+0 T5val=III9282006 T5ecr=1540640185	
442 2019-89-05 14:27:85.625789 18.10.8.124	10.10.0.61	TL5+1.7	2D62 Server Hello	
445 2019-09-05 14:27:05.625719 10.10.0.51	10.18.0.124	TCP	66 50972 + 3000 [ACK] Seq=130 Ack+2797 Win+15006 Len=0 TSVAl=1540649155 TSecr=1139382095	
444 2019-89-85 14:27:85.625729 18.10.8.124	10.18.0.61	TL5r1.7	416 Certificate, Certificate Request, Servier HeILs Done	
445 2010-00-05 14:27:05.629733 10.10.0.51	10.18.0.124	TCP	66 55072 × 5000 [ACK] Seq=138 Ack=3147 kin=19712 Len=0 T5val=1540649185 T5ecr=1139282896	
447 2019-89-85 14:27:83.643184 18.18.8.81	18.10.9.124	FCP	74 42552 + 8180 [SYM] Seq+0 Win+14100 Len+0 MS5+1410 SACK_PEMN=1 TS+01+1540045283 TSecr+0 KS+120	
448 2019 09 08 14:27:03.643400 10,10.0.324	10.19.0.61	TCP	74 8100 = 42352 [SYN, ACK] Seq-0 ACK-1 Win-13980 Lm-0 MS5-1410 SACK_PERM-1 TSyu1-119252114 TSec+-1540540308 WS-120	
449 2019-H9-85 14:27:H3.543418 1H.10.8.51	18.18.8.124	TCP	66 42352 = 8100 [4CK] Seq=1 Ack=1 Win=14200 ien=0 75vsI=1540649205 75ecr=1139202114	
450 2019-09-03 14:27:03.645942 10.10.0.61	10.10,0.124	TCP	326 42352 + 8100 [PSH, ACK] Seg=1 Ack=1 k1n=14208 Len=260 T5val=1540640205 T5ecr=1130202114 [TCP segment of a reassembled PDU]	
451 2019-09-05 14:27:03.645984 10.10.0.81	30.1H.D.124	0(5P	142 Request	
452 2019-09-03 14:27:03.646193 10.10.0.124	10.10,0.61	TCP	66 8100 + 42352 [ACK] Seq=1 Ack=261 Win=15184 Len=0 TSval=1139282117 T5ecr=1540649205	
455 2019-09-00 14:27:03.646207 10.10.0.124	10.1H.9.61	TCP	66 8100 + 42352 [ACK] Seq+1 Ack+337 Win+IS104 Len+0 TSvA]+II19282117 TSecr+1540649205	
455 2019-09-05 14:27:03.061079 10.10.0.124	10.10.0.01	0C5P	2098 Response	
456 2019-89-81 14:27:83.661897 10.10.0.8.61	10.18.0.174	TCP	66 42352 + #198 [ACK] Seq+337 Ack+2433 Win+16896 Len+0 TSvml+1548649221 TSerr+1139282132	
457 2019-88-05 14:27:85.053764 LR. 50.0,81	10.10 0.114	TÇP	66 A2152 - 8100 [FIN, ACK] Sep-332 Ack-2413 Win-16800 1er-6 75-91-1540648122 75ecr=1138182132	
456 2019-00-01 14:27:05.662000 10.10.0.0.124	10.10.01	TCP	EM MIGH + 42352 [FIN, ACK] Seg-2432 Ack-557 Win-15104 Len-D TSval-1199282133 TSec-1540640221	
450 2019-89-85 14:27:85.062818 18.10.6.61	38.18.0.174	TCP	66 42352 + 8180 [ACK] 54q+338 Ark+2434 Min+16896 Lan+6 TSval+1548649222 TSecr+1139282133	
468 2019-09-05 14:27:05.662981 10.10.0,124	10.18.0.61	TCP	66 8108 + 42352 [ACK] Seq=2454 Ack+338 Win=15104 Len=0 T5val=1230282133 T5err=1540640222	
461 2019-09-05 14:27:03.676707 10.10.0.051	18.18.8.124	115(1.7	73 Alert (Level: Fatal, Description: Certificate Unknown)	
462 2019-09-08 14:27-09.671178 10.88.0.81	10.10.0.124	TCP	66 96972 × 5888 [FIN, ACK] Sep-137 Ack=3147 U[n=19713 Lense TSval=1568649231 TSecr=1130282896	
458 2010-00-08 14:27:93.671/03 10.10.0.128	10.10.61	TCP	db 5688 + 53973 [FD9, ACK] Sep-3147 ACK-158 Win-35104 Lense TSval=1139362147 TSec==15488489238	
404 2019-09-05 14:27:85.071486 18.10.8.63	10.10.174	TCP	66 51572 = 5880 [ACK] Seq=138 Ack=5148 Min=19712 Len=8 T5cal=1548048231 T5ecr=1139262142	
805 2010-09-05 14:27:05.857789 10.10.0.51	10,19,07.134	TCP	74 55975 + 3980 [399] Seq-0 Win-14100 Lan-0 Min-1410 SACK_PTEN-1 TSyel-1540551447 (Secr-0 MS-120	
007 2019-00-00 14:27:05.088130-10.10.0-124	10.10.0.01	TEP	74 5088 + 51878 [SWW, ACK] Sep-R Ack-1 Min-13008 Lan-8 953-1418 5ACK_PERM-1 75x81-1189284358 FSec1548051447 MS-128	
508 2019-09-05 14:27:05.888217 10.10.0.51	10.18.0.124	TCP	66 55078 + 5000 [ACK] Seq=1 Ack=1 Win=14288 ion=0 T5val=1540651448 T5ecr=1130284350	
509 2019-09-05 14:27:05.001620 10.10.0.651	18.18.8.124	0.5/1.1	195 Client Hello	
610 2019-09-03 14:27:05.093918 10.10.0.124	10.10,0.61	TCP	66 5000 + 55978 [ACK] Seq=1 Ack+130 Win+15104 Len=0 TSys1+1139284365 TSecr=1540651453	
511 2019-W9-05 14:27:W5.894W14 1W.10.0.124	30.10.0.61	TL5v1.2	3212 Server Hello, Certificate, Certificate Request, Server Hello Done	
612 2019-09-03 14:27:05.094023 10.10.0.61	10.10.0124	TCP	66 95978 → 5000 [ACK] Seq=130 Ack>3147 kLn=16896 Len=0 T5val=1540651453 75etr=1139284363	
020 2019-09-00 LA(27)05-901598 LM.00.0.61	10.1M.0.12A	TCP	74 AZI68 + 4180 (SVB) Senio Win+JAI88 Len+8 MS5+1410 SACK_PEBNLT TSVA1+L548651461 TSecr+0 WS+128	
01 2019-09-08 14:27:05.001029 10 10 0.324	10-10,0-01	TOP	74 8180 - 41948 [SYM, ACK] Sep-8 Ack-1 Min-12888 Len-8 MS3-1418 SACK_PERMI TSys1=1124264377 TECC=1348653461 MS-128	
622 2019-N9-01 14:27:N5.98(944 10.10.0.8)	10.10.024	TCP	66 42360 + 8300 (ACC) Seq+3 ACk+3 Win+14266 Len+8 T5val=1540653461 T5ecr=1339264373	
625 2019-89-05 14:27:85.909388 18.20.8.61	20.10.0.174	TCP	326 42368 + 4348 [PSH, ACK] Septi Ack+1 Win+14268 Len+268 TSval+1548653409 TSecr+1139384375 [TCP segment of a restambled PDU]	
124 2010-09-00 14:27:05.000320 10.10.0.01	10.10.134	0.32	142 Request	
625 2010-89-05 14:27:85.009582 18.10.0.124	28.18.0.61	TCP	66 8188 = 42368 [ACK] Septi Ack=201 kis=15184 Ler=0 Thya]=1138254588 Thecr=1548651469	
526 2019-80-85 14:27:85.007620 10.18.0,124	10.18,0.61	TCP	de 5100 = 42150 [ACK] Seq=1 Ack=337 kin=19104 Lon=0 Tival=119234500 Ther=1540651460	
627 2019-80-05 14:27:85.926918 18.10.0.124	18.18.8.61	TOP	1454 EIBE = 42338 [ACK] Smp=1 Ack=337 Win=15184 Lem=1996 TSval=1139284391 TSecr=1548651469 [TCP segment of a reasonabled PDs]	
628 2019 09 03 14:27:05.020048 10.10.0.51	10.10.0.124	TCP	66 42368 = 8108 [ACK] 5eq-337 Ack=1399 Win=18896 Lem=8 T5val=1548651488 TSer=1139254391	
829 2019-09-05 14:27:05.920961 10.10.0.124	18.18.8.61	0(5P	1108 Response	
630 2019-09-03 14:27:05.020966 10.10.0.61	10.10.0.124	TCP	66 42360 + 8100 [ACK] Seq-337 Ack-2433 W1=19712 Lem-0 T5val-1540651480 T5etr-1159264391	
631 2019-N9-00 14/27/N5.921180 18.00.00.01	10-1M-D.124	TCP	66 41960 + 6100 (FTM, ACH) Sep-037 Ack-2419 Win-19712 Lev-0 TSval-1540651400 TSecr-119924491	
637 1019-09-08 14:37 05.02103 10.10.0.124	10,10,0,61	TCP	66 8100 - 42360 [MIN, ACK] Sep-2433 Ack-538 Min-15104 Len-0 75yaI=1130364392 TSec=-1540631488	
635 2919-09-00 14:27(05.921946 10.10.0.61	10.EH.0.124	1CP	66 #2360 + #100 [4CK] Seq=338 46x=2434 46x=19712 Len=8 T5/n1=15486651481 T5ecr=1139284392	
634 2019-09-03 14:27:05.925666 10.10.0.61	10.10.0.124	71.5(1.2	73 Alert (Level: Fatal, Description: Certificate Unknown)	
ANG 2019-09-88 14:21:05.925758 10.18.0.81	10.10.LZ4	702	AN SUITE + SHOP [FIN, ACK] SAPILAT ACHILING LAND LAND LAND TOVALLISABELIANS TRACT-LINDALAS	
656 3819-89-88 14:27:85.926147 18.08.8,324	26.18,8.01	TCP	60 5050 - 51876 [FIN, ACK] Septilar Ack-130 Win-(5186 Land 75-al-11)0264051485	

WINNF Test Requirements:

WINNF test requirements from WINNF-TS-0122-V1.0.0 CBRS CBSD Test Specification:

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

Analysis of WINNF Test Requirements

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

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

>	Frame 3440: 195 bytes on wire (1560 bits), 195 bytes captured (1560 bits)							
>	Ethernet 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)							
>	Internet Protocol Version 4, Src: 10.10.0.61, Dst: 10.10.0.124							
>	Transmission Control Protocol, Src Port: 55972, Dst Port: 5000, Seq: 1, Ack: 1, Len: 129							
~	Transport Layer Security							
	✓ TLSv1.2 Record Layer: Handshake Protocol: Client Hello							
	Content Type: Handshake (22)							
	Version: TLS 1.2 (0x0303)							
	Length: 124							
	✓ Handshake Protocol: Client Hello							
	Handshake Type: Client Hello (1)							
	Length: 120							
	Version: TLS 1.2 (0x0303)							
	Random: 5d6e7837c5e3315b08e80a896946254509886b3c5b562820							
	Session ID Length: 0							
	Cipher Suites Length: 6							
	✓ Cipher Suites (3 suites)							
	Cipher Suite: TLS_RSA_WITH_AES_128_GCM_SHA256 (0x009c)							
	Cipher Suite: TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256 (0xc02b)							
	Cipher Suite: TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256 (0xc02f)							
	Compression Methods Length: 1							
	> Compression Methods (1 method)							
	Extensions Length: 73							
	Extension: supported_groups (len=22)							
	<pre>> Extension: ec_point_formats (len=2)</pre>							
	Extension: signature_algorithms (len=28)							
	> Extension: extended_master_secret (len=0)							
	Extension, conceptiation info (lon-1)							

- > 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

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	SUD
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 ✓ 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: 5d6e7842d84d8cbfc7078fe9e913fcf7eb0fe3354f54f192... Session ID Length: 32 Session ID: e50dd1e43d8d5028f12ae61800ad52ffd4fe63dce8630ea5... Cipher Suite: TLS_RSA_WITH_AES_128_GCM_SHA256 (0x009c) Compression Method: null (0) Extensions Length: 5 > Extension: renegotiation_info (len=1) 4. Read OSCP Request/Response to/from server: > Frame 3451: 142 bytes on wire (1136 bits), 142 bytes captured (1136 bits) > Ethernet 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)

```
> Internet Protocol Version 4, Src: 10.10.0.61, Dst: 10.10.0.124
```

> Transmission Control Protocol, Src Port: 42352, Dst Port: 8100, Seq: 261, Ack: 1, Len: 76

```
> [2 Reassembled TCP Segments (336 bytes): #3450(260), #3451(76)]
```

```
> Hypertext Transfer Protocol
```

```
v Online Certificate Status Protocol
v tbsRequest
v requestList: 1 item
v Request
v reqCert
v hashAlgorithm (SHA-1)
Algorithm Id: 1.3.14.3.2.26 (SHA-1)
issuerNameHash: 5368d21d2529427538588c5ccba4c4e6f3b96641
issuerKeyHash: 5b63d7bb6e95ca42c49450451b47e5cd6ee1fdb4
serialNumber: 18248749012425898463
```

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

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

```
> Frame 3461: 73 bytes on wire (584 bits), 73 bytes captured (584 bits)
> Ethernet 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)
> Internet Protocol Version 4, Src: 10.10.0.61, Dst: 10.10.0.124
> Transmission Control Protocol, Src Port: 55972, Dst Port: 5000, Seq: 130, Ack: 3147, Len: 7
		 Transport Layer Security
		 TLSv1.2 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)

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	TUV
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

WINNF.FT.C.SCS.3

WINNF,FT,C.SC53,pcap					- 0
Edit View Go Ca	ture Analyze Statistics Telephon	ny Wireless Tools He	p		
HAR DS	R 9 STIC				
p.mit/ 10.13.0.134					Deresion-
Time	Severa	Definition	Protocol	Length Drfp	
896 2619 01 03 14	12124,635344 18.28.8.51	18, 18, 8, 124	TOP	74 55588 - 5888 [578] Sep-8 win-14388 Lev-8 M54-1418 54KL /5WH-1 75val-1520770196 75ecr-48 M-128	
091 2019-09-03 14	12:24.637057 10.10.0.124	10.10.0.61	TEP	74 5000 = 53560 [5YB, ACK] Segue Acksl Wine13880 Lene0 H55-14[0 SACK_FERMe] 75val=1138403105 75ecr=15398770196 WS=120	
802 2010-00-03 14	12:24.037071 10.10.0.01	19.10.9.124	TCP	EE 11558 → 5000 [ACK] Seq=1 Ack=1 Win=14200 Len=0 TSval=1530770197 TSecr=1138403105	
893 2619-85-83 14	12:24.637587 18:38.6.61	18.18.8.124	TL5/1.2	195 Client Hello	
894 2013-09-03 14	12124,637096 10,10.0,124	10.10.0.01	TCP	66 5000 + 53560 [ACK] Seq=1 Ack+130 Win+15104 Len=0 T5val=1130403105 T5ecr=1535770157	
895 2019-09-03 14	12:24.637957 18.10.8.124	19.10.0.01	TL5V1.2	3213 Server Hells, Certificate, Certificate Request, Server Hello Done	
896 2619-09-03 14	12:24.637964 18.18.8.61	18.18.8.124	10*	66 55588 = 5000 [ACK] Seq=130 Ack=3148 Min=18896 Len=0 TSvaI=1539770197 TSecr=1138A89106	
897 2019-09-03 14	12:24,648499 10,10.0,61	10.10.0.134	TLSV1.1	73 Alert (Level: Fatal, Description: Certificate Unknown)	
305 2010-05-03 L4	12:24.640924 10,10.0,61	10.10.014	TCP	EK 51550 - 5000 (FIN, ACK) Sec-137 Ack-3148 Win-16896 Lan-0 TSval-1559770200 TSec-1333483105	
351 2613-01-03 14	12:24.641861 18:18.8:124	10.10,0.61	TOP	66 5880 * 55568 [F19, 4CX] Sep-8148 Ack=157 WIn=15184 Len=0 TSval=1138483189 TSecr=1559778288	
900 2019-09-03 14	12124,641072 10,10.0,61	10.10.0.124	TCP	66 25568 → 5000 [ACK] Seg=138 Ack=3149 W1n=16896 Len=0 T5va1=1535770200 T5ecr=1138403109	
981 2819-89-93 14	12:24.641150 10.10.0.124	19.10.9.51	TCP	EE 5000 + 55560 [ACK] Seq43149 Ack4138 Win+15104 Len+0 TSval+1130403109 TSecr+1539770200	
1098 2019 09 03 14	12:25.634391 10:10.0.51	10.18.9.124	TOP	74 55554 + 5008 [5Y8] Sey+8 Win+14108 Lon-8 M5+1418 SACK_PERM+1 T5val=1528772194 TSecr+8 M5+128	
1091 1019-09-03 14	12:25.534840 10.10.0.124	10.10,0.61	TCP	74 5000 = 53564 [5VN, ACK] Segue Ack=1 MIn=13580 Levre M55=1410 SAD(_FERM=1 T3v#1=1138405103 T5ecr=1339772194 M5=128	
1892 2019-09-03 14	12:25.634358 10.10.0.61	19.10.9.124	TCP	66 15558 + 5000 [ACK] Seg+I Ack+I Win+14200 Len+0 T5val+1519772194 T5ecr+1138405103	
1093 2013-09-03 14	12:26.635341 18,18.6.61	10.18,0.124	TL5+1.7	195 Client Hello	
1094 2019-09-03 14	12:24.635686 10,10.0,124	10.10.0.61	TCP	66 5000 = 53564 [ACK] 5eg+1 Ack+130 Win+15104 Len=0 T5val=1130405104 T5ecr+1530772195	
1005 2019-09-03 14	12:25.635751 10.10.0.124	19.10.0.51	TLSV1.2	3213 Server Hells, Certificate, Certificate Request, Server Hello Done	
1095 2619-09-05 14	12:26.635764 18.10.8.61	18.18.8.124	TOP	66 55554 - 5868 [ACK] Seq=138 Ack=3148 Win=18896 Len=0 TSval=1539/72195 TSecr=1138485184	
1097 2010-09-03 14	12:25.637459 10,10.0,61	10.10,0.124	TLSv1.2	73 Alert (Level: Fatal, Description: Certificate Unknown)	
1095 2010-05-01 14	12:26.637518 10.30.0.51	19.18.9.174	TCP	SE \$\$554 - 5000 [FIN, ACK] Secult7 Acks148 wins16096 Lens0 TSvn1x1539772197 TSecr-1133065104	
1099 2013-09-03 14	12:28.63780% 10,18.0,124	10.16,0.61	TOP	06 5000 = 55554 [FIN, ACK] imp-5148 Ack-138 Win-15104 Lerr-0 75val-1130405106 [Sec-15307/2197	
1100 2010-09-03 14	12:25.637817 10,10.0.61	10.10,0.124	TCP	66 59564 → 5080 [ACK] Seg+138 Ack+3149 Win+16296 Len+0 TSval+1539772197 T5ecr+1138405106	
1257 2019-09-03 14	12:29.613865 10.10.0.61	10.10.0.126	UDP	79 E341 - E301 Lenv37	
1258 2018-09-05 14	12:29.616541 10.18.8.124	10.10.0.01	LICP	196 8381 → 5381 ian+154	

WINNF Test Requirements:

WINNF test requirements from WINNF-TS-0122-V1.0.0 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
	 Make sure that Mutual authentication does not happen between UUT and the SAS Test Harness. 	
		1

Analysis of WINNF Test Requirements

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

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	TÜV
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

```
> Frame 893: 195 bytes on wire (1560 bits), 195 bytes captured (1560 bits)
> Ethernet 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)
> Internet Protocol Version 4, Src: 10.10.0.61, Dst: 10.10.0.124
> Transmission Control Protocol, Src Port: 55560, Dst Port: 5000, Seq: 1, Ack: 1, Len: 129
✓ Transport Layer Security
   ✓ TLSv1.2 Record Layer: Handshake Protocol: Client Hello
        Content Type: Handshake (22)
        Version: TLS 1.2 (0x0303)
        Length: 124
     ✓ Handshake Protocol: Client Hello
           Handshake Type: Client Hello (1)
           Length: 120
           Version: TLS 1.2 (0x0303)
        Random: 5d6e74c8e3b9907c8bf1d8d3b2e41de44ff3d4d88a2df236...
           Session ID Length: 0
           Cipher Suites Length: 6
        Cipher Suites (3 suites)
             Cipher Suite: TLS_RSA_WITH_AES_128_GCM_SHA256 (0x009c)
             Cipher Suite: TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256 (0xc02b)
             Cipher Suite: TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256 (0xc02f)
           Compression Methods Length: 1
        > Compression Methods (1 method)
           Extensions Length: 73
        > Extension: supported_groups (len=22)
        > Extension: ec_point_formats (len=2)
        > Extension: signature_algorithms (len=28)
        > Extension: extended master secret (len=0)
```

- > 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

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	TUV
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

> Frame 895: 3213 bytes on wire (25704 bits), 3213 bytes captured (25704 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: 55560, Seg: 1, Ack: 130, Len: 3147 ✓ Transport Layer Security ✓ 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: 5d6e74d363b38c017e0456ec16e593567a70151d81f72696... Session ID Length: 32 Session ID: 9736c983db797e9cedf3a8d3ff5cde8d50f9f0d983a75c99... Cipher Suite: TLS_RSA_WITH_AES_128_GCM_SHA256 (0x009c) Compression Method: null (0) Extensions Length: 5 Extension: renegotiation info (len=1) > TLSv1.2 Record Layer: Handshake Protocol: Certificate > TLSv1.2 Record Layer: Handshake Protocol: Multiple Handshake Messages

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

```
> Frame 897: 73 bytes on wire (584 bits), 73 bytes captured (584 bits)
> Ethernet 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)
> Internet Protocol Version 4, Src: 10.10.0.61, Dst: 10.10.0.124
> Transmission Control Protocol, Src Port: 55560, Dst Port: 5000, Seq: 130, Ack: 3148, Len: 7
> Transport Layer Security
> TLSv1.2 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)
```

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

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	TUV
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

WINNF.FT.C.SCS.4

Packet Capture Sequence

Edit View Go Capture Analyze Sta					
- 4 0 · D 8 0 9		4441			
addy == 33.10.0.124					ES - Dureston.
Time Bru	713	Destination	Professol	Kangdh Tafa	
613 2019 48 88 14:16:24 0:595 10	18.8.01	38.06.8.124	TOP	74 35146 - 5000 [319] Seg-6 #10-14166 1cm-8 /15-1418 34(K_PENI-1 75-61-1548838195 75-61-4 Mo-178	
614 2019-09-03 14:16:24.638646 10.	10.0.124	10-10.0.61	TOP	74 3000 = 35048 [SVN, ACX] Seput Ack-1 kin-13900 Len-0 955-1410 SACK PERMA1 73va1+1130043105 TSecr+1340010195 kS+120	
615 2019-09-05 14:16:24.636663 10.	18.8.61	10.10.0.124	TCP	66 3568E = 508E [ACK] Seg=I Ack=I Win=1420E Len=0 TSval=1540010196 TSec==1131643105	
636 2819-89-85 14:16:24.648684 18.	18.8.61	18.18.8.124	11.5+12	195 Client Hella	
637 2019-09-03 14:16:24.648943 10.	10,0,124	10,10,0,61	TCP	66 5000 - 3564F [ACK] Seg=1 Ack+130 Min=15104 Len=0 75val=1130643116 75ecr=1540010206	
618 2019-09-05 14:16:24.647118 10.	18.8.124	10.10.0.61	TLSv1.2	5243 Server Hells, Certificate, Certificate Request, Server Hello Dane	
639 2819-89-85 14:16:24.647131 18.	10.0.01	18.18.8.124	TCP	86 35648 > 5688 [ADX] Seg=138 Ack=3178 Min=16896 Len=0 TSval=1546018267 T5ec/=1138643116	
640 3019-09-03 14:16:24.657290 10.	10,0,61	10,10,0,124	715+1.2	73 Alert (Level: Fatal, Description: Certificate Unknown)	
641 2019-09-01 14:16:24.657460 IM.	18.9.51	10.10.0.124	TCP	56 55646 - 5000 [FDN, ADX] Seq=107 Ack=3178 Win+16695 Lene0 TSVm1=1540010217 TSec==1130043316	
542 2019-09-05 14:16:24.653814 10.	18.8.174	18.18.0.61	TOP	NS 5000 - 55640 [/IN, ACC] Smg-5170 Ack-110 Win-15104 Len-0 Towai-1130643127 Tiers-1540010217	
643 3019-09-03 14:16:24.658040 10.	10.0.61	10.10.0.124	TCP	66 \$5648 ~ 5000 [ACK] Segw138 Ack+3179 W1n+16896 Len+0 T5vn1+1540010217 T5ecr+1138643127	
1019 2019-09-05 14:16:29.634572 10.	18.9.51	10.10.0.124	TCP	76 \$5652 - 5000 (SVU) Segr0 Min+14100 Len+0 MSS-1410 SACK_PERM+1 TSval+1540015194 TSecr+0 MS-120	
1188 2819-89-85 14:16:29.634814 18.	28.8.124	10.10.0.01	TOP	74 5800 = 55552 [SVN, ACK] Srq=0 Ack=1 Win=13900 Len=0 953=1410 SACK PERM=1 95yal=1132040105 75ecr=1540015194 yd=120	
1101 2019-09-03 14:16:29.634845 10.	18,0,61	10.10.0.124	TCP	66 55632 - 5000 [ACK] Seg=1 Ack=1 WIn=14200 Len=0 75val=1540015194 75ecr=1138640103	
1102 2019-00-05 14:16:29.635598 10.		10.18.0.124	TL5v1.2	195 Client Helln	
1103 2019-09-05 14:16:29.635849 10.	18.8.124	10.18.0.61	TOP	06 5000 - 55652 [ACK] Seq=1 Ack=130 Min=15104 Len=0 T5val=1130040104 T5ecr=1540015195	
1104 2019-09-03 14:16:29.635755 10.	18.0.134	10.10.0.61	TL5v1.2	3B62 Server Hello	
1185 2019-09-01 14:16:29.635765 18.	10.0.61	10.18.0.124	TCP	66 55652 - 5000 [ACK] Seq=130 Ack+2797 Win+16096 Len+0 TSvnl+1540015195 T5ecr=1130640104	
1106 2019-09-05 14:10:29.635776 18.	18.8.124	10.18.0.61	TL5#1.2	447 Certificate, Certificate Request, Server Hello Done	
1107 2019-09-03 14:16:29.635782 10.		10.10.0.124	TCP	66 55652 + 5000 [ACK] Seq=130 Ack=3170 W1n=19712 Len=0 TSval=1540015195 TSecr=1138640104	
1188 2019-09-05 14:16:29.630613 18.		10.10.0.124	TLSV1.2	73 Alert (Level: Fatal, Description: Certificate Unknown)	
1189 3819-89-85 14:18:29.638683 18.		10.18.0.124	TCP	UE 15657 - 5088 [FIN, ACK] Seq=137 Ack=3178 Win=18712 Lan=8 TSval=1546815188 TSex==1130848104	
1110 2019-09-03 14:16:29,638059 10.	30,9,124	10.10.0.61	TCP	66 5000 = 55652 [FIN, ACK] Seq=3178 ACk=130 Win=15104 Len=0 T5vpl=1138648108 T5ec=4540815108	
1111 2019-09-05 14:16:29.630973 18.	10.8.51	18.18.8.124	TCP	66 55652 - 5000 (ACK) Seg=130 Ack=3179 k1n=19712 Len=0 75vn1=3540015150 TSec7=1130640306	

WINNF Test Requirements:

WINNF test requirements from WINNF-TS-0122-V1.0.0 CBRS CBSD Test Specification:

	P	
	 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
	 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

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	TÜV
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

>	Frame 636: 195 bytes on wire (1560 bits), 195 bytes captured (1560 bits)			
>	Ethernet 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			
>	Internet Protocol Version 4, Src: 10.10.0.61, Dst: 10.10.0.124			
> Transmission Control Protocol, Src Port: 55648, Dst Port: 5000, Seg: 1, Ack: 1, Len: 129				
~	Transport Layer Security			
	 TLSv1.2 Record Layer: Handshake Protocol: Client Hello Content Type: Handshake (22) Version: TLS 1.2 (0x0303) Length: 124 Handshake Protocol: Client Hello Handshake Type: Client Hello (1) Length: 120 			
	Version: TLS 1.2 (0x0303)			
	Random: 5d6e75b8e4794caba494c3d4e26398551122b1995d332a19			
	Session ID Length: 0			
	Cipher Suites Length: 6			
	V Cipher Suites (3 suites)			
	Cipher Suite: TLS RSA WITH AES 128 GCM SHA256 (0x009c)			
	Cipher Suite: TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256 (0xc02b)			
	Cipher Suite: TLS ECDHE RSA WITH AES 128 GCM SHA256 (0xc025)			
	Compression Methods Length: 1			
	> Compression Methods (1 method)			
	Extensions Length: 73			
	> Extension: supported groups (len=22)			
	<pre>> Extension: ec_point_formats (len=2)</pre>			
	<pre>> Extension: signature algorithms (len=28)</pre>			
	> Extension: extended master secret (len=0)			
	<pre>> Extension: renegotiation_info (len=1)</pre>			

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

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	SUD
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

>	Frame 638: 3243 bytes on wire (25944 bits), 3243 bytes captured (25944 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: 55648, Seq: 1, Ack: 130, Len: 3177			
~	Transport Layer Security			
	✓ 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: 5d6e75c348790b56a8a2b2e56c0448af8a18c8b5f0ca8790			
	Session ID Length: 32			
	Session ID: 51f334de8b50d6a093491444515eaa5feb9995af54e66e30			
	Cipher Suite: TLS_RSA_WITH_AES_128_GCM_SHA256 (0x009c)			
	Compression Method: null (0)			
	Extensions Length: 5			
	Extension: renegotiation_info (len=1)			
	> TLSv1.2 Record Layer: Handshake Protocol: Certificate			

> TLSv1.2 Record Layer: Handshake Protocol: Multiple Handshake Messages

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

	authentication rans).			
>	Frame 640: 73 bytes on wire (584 bits), 73 bytes captured (584 bits)			
>	Ethernet 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)			
Þ	Internet Protocol Version 4, Src: 10.10.0.61, Dst: 10.10.0.124			
>	Transmission Control Protocol, Src Port: 55648, Dst Port: 5000, Seq: 130, Ack: 3178, Len: 7			
1	Transport Layer Security			
	TLSv1.2 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)			

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

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	TUV
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

WINNF.FT.C.SCS.5

Packet Capture Sequence

WINNEFT.C.SC5.5 pcrp		· · · ·		- 0
e Edit View Go Cepture Analyze Statistics Teles	show Windess Tools Hele			
# 2 0 1 3 8 0 9 + = = T 1 5				
static == 12.00.124				Darmin.
True Soutce	Dedination	Protocol	Langth John	
72 2019-09-03 14:19:37.615993 10.30.0.61	10.10.0.124	UDP	79 8341 + 8341 Lens 87	
73 2819-89-85 14:19:57.617154 18.10.8.124	10.10.0.61	UDP	196 8381 + 8381 Lan+154	
730 2019 09 03 14:19:41.637005 10.10.0.51	19,10,9,124	104	14 35714 - 5000 (SYN) Seg-0 VIN-14100 Len-0 MSS-1410 SACK /FEM-1 73val-1540207197 TSecr-0 WS-128	
731 2019-09-03 14/19/41 637516 10.30.0.124	19.10.9.61	TOP	74 5080 + 35714 (5VN, ACK) Septe Ack+1 WIN+13908 Lenve PSS+1418 SACK #SRN+1 TSVa1+1138848107 TSec1+1548287197 MS+128	
732 3819-89-85 14:19:41.637538 18.18.8.61	18.18.8.124	TCP	05 35714 + 5900 [ACK] Seg+1 Ack+1 Min+14200 Len+0 73val+1548207157 75ecr+1158340187	
733 2019-09-03 14:19:41.648976 10.10.0.51	10.10.0.124	TL5/1.2	105 Cliest Hello	
734 2019-09-03 14:19:41.649684 10:10.0.124	10.10.0.61	TOP	66 5000 + 55714 (ACK) Seg-1 Ack+130 MIn+15104 Let+0 T5V61+1130540119 75ecr+1540207200	
735 3819-09-05 14:19:41.669878 10.10.0.124	10.10.0.61	TL:503.2	3196 Server Hello, Certificate, Certificate Request, Server Hello Done	
738 2019-09-03 14:19:41.649894 10.10.0.61	19.10.9.124	TOP	66 56714 - 5000 [ACK] Seg-130 Ack-f131 kin-18006 Lan-0 T5val-1540207200 TSecr-1138040119	
737 2019-09-03 14:19:41.663011 18:10.0.51	18.18.8.124	TLSH1.2	73 Alert (Level: Fatal, Bescription: Certificate Unknows)	
736 7019-00-03 14:19:41.663113 10.10.0.61	10.10.0.174	TOP	00 35714 - 5000 (*78, 800) Septis7 Acks131 Min+16800 Lenv0 75val+1540207333 75ecr+1138840159	
739 2019-09-03 14:19:41.084551 10.10.0.124	19.10,9.61	TEP	56 5089 - 35714 [YIN, ACE] Seg-S121 Ack-138 win-15104 Lan-0 TSval-1138548134 TSec1546287222	
748 2819-89-83 14:19:41.664553 18:18.8.61	18.18.8.124	TOP	65 55714 + 5008 [ADX] Sep-138 AdX-3132 Min-16896 Len+8 TSval-1540287224 TSecr-1138040134	
1056 2019-09-03 14:19:44.635738 10.10.0.61	10,10,0,124	TCF	74 95718 + 5000 (5/0) Septe Minut4100 Lenve MSS+1410 SACK P18Hx1 T5va1+1540210195 TSecr+0 KS+128	
1857 2019-09-01 14:19:44.00164 10.10.0.124	19.10.9.51	TOP	74 5082 - 35716 [599, ACE] Septe Actor Minor 1950 Lense PSS-1418 SACE PERMI TSVal-1138843185 TSecre1548210195 KS-128	
1058 2819-09-05 14:19:44.635194 10:10.0.61	18.18.9.124	TOP	85 55715 + 5008 [ACK] Sep+1 Ack+1 Min+14208 Len+8 75val+1548218195 75ecr+1138843185	
1061 2019-09-03 14:19:44.637659 10,10.0.61	10.10.0.124	TLS/1.2	195 Cliest Wello	
1862 2019-09-05 14:19:44.637874 10.10.0.124	19.10.9.61	TOP	66 5000 + 55718 (ACS) Seg-1 Ack+150 kin+15104 ken+0 TSval+1130543107 TSecr+1540210197	
1063 2819-89-85 14:19:44.637983 18.10.8.124	18.18.8.61	TL5y1.7	2862 Server Hello	
1054 2019-09-03 14:19:44.637991 10.10.0.61	10.10.0.124	TOP	66 35718 = 5008 [ACK7 Seg=138 Ack=1797 Win=16896 Len=0 75val=1540210197 75ecr=1138843107	
1855 2019-09-03 14:19:44.633885 10.10.0.124	10.10.0.51	TLSV1.2	400 Certificate, Certificate Request, Server Hells Done	
1050 3019-09-05 14:19:44.030010 10.10.0.61	18.10.0.124	TEP	08 55715 + 5000 [ADE] Seg-130 Ark=3131 Min=19712 Len=8 T3val=1540218197 TSecr=1138043187	
1067 2019-09-03 14:19:44.639612 10.10.0.61	10.10.0.124	TL:5/2.2	75 Alert (Level: Fatal, Description: Certificate Unknows)	
1068 2019-09-03 14:19:44.639661 10.30.0.01	10.18.0.124	104	65 55718 + 5000 [FIN, ACK] Sop-137 Ack+3131 Adn+19712 Len+8 75val+1548218139 75ecr+1136843187	
1068 2819-09-09 14:19:44.639947 10,10.0,124	10.10,0.01	70#	06 3000 - 35710 [FIN, ACC] Secilli Ackelig Win-15104 (an-0 75va)-113034109 75ec1540210100	
1070 2019-09-03 14:19:44.039001 10.10.0.01	10.10.0.124	TOP	66 35715 = 5000 [ACK] Seg-138 Ark-3132 Win-19712 Len-0 T5val-1540210100 TSecr-1138843100	

WINNF Test Requirements:

WINNF test requirements from WINNF-TS-0122-V1.0.0 CBRS CBSD Test Specification:

2	 Make sure that UUT uses TLS v1.2 for security establishment. Make sure UUT selects the correct cipher suite. UUT shall use CRL or OCSP to verify the validity of the server service sets. 	PASS
	 Certificate. 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

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

```
> Frame 733: 195 bytes on wire (1560 bits), 195 bytes captured (1560 bits)
Ethernet 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)
> Internet Protocol Version 4, Src: 10.10.0.61, Dst: 10.10.0.124
> Transmission Control Protocol, Src Port: 55714, Dst Port: 5000, Seq: 1, Ack: 1, Len: 129
✓ Transport Layer Security
  ✓ TLSv1.2 Record Layer: Handshake Protocol: Client Hello
        Content Type: Handshake (22)
        Version: TLS 1.2 (0x0303)
        Length: 124
     ✓ Handshake Protocol: Client Hello
           Handshake Type: Client Hello (1)
           Length: 120
           Version: TLS 1.2 (0x0303)
        > Random: 5d6e767d62c21254967019646a3fc8da4d00c8eca5e78cc9...
           Session ID Length: 0
           Cipher Suites Length: 6
        ✓ Cipher Suites (3 suites)
             Cipher Suite: TLS_RSA_WITH_AES_128_GCM_SHA256 (0x009c)
             Cipher Suite: TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256 (0xc02b)
             Cipher Suite: TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256 (0xc02f)
           Compression Methods Length: 1
        Compression Methods (1 method)
           Extensions Length: 73
         > Extension: supported_groups (len=22)
        > Extension: ec_point_formats (len=2)
        > Extension: signature_algorithms (len=28)
        > Extension: extended_master_secret (len=0)
```

- > 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

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	TUV
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

> > >	Frame 735: 3196 bytes on wire (25568 bits), 3196 bytes captured (25568 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: 55714, Seq: 1, Ack: 130, Len: 3130 Transport Layer Security
	✓ 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: 5d6e768814d017b54b1c55f0176bf996f1b41c32231ba2fd
	Session ID Length: 32
	Session ID: fb8025d3eec7ffc9f97f61f574942c6276f822812fac30f4
	Cipher Suite: TLS_RSA_WITH_AES_128_GCM_SHA256 (0x009c)
	Compression Method: null (0)
	Extensions Length: 5
	Extension: renegotiation_info (len=1)
	> TLSv1.2 Record Layer: Handshake Protocol: Certificate
	> TLSv1.2 Record Layer: Handshake Protocol: Multiple Handshake Messages

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

ec)

```
> Frame 737: 73 bytes on wire (584 bits), 73 bytes captured (584 bits)
> Ethernet 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)
> Internet Protocol Version 4, Src: 10.10.0.61, Dst: 10.10.0.124
> Transmission Control Protocol, Src Port: 55714, Dst Port: 5000, Seq: 130, Ack: 3131, Len: 7
> Transport Layer Security
> TLSv1.2 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)
```

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

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	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	12 months	2020-01-15
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	-

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	TUV
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

Appendix A – EUT & Client Provided Details

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

General EUT Description

Manufacturer	Ericsson
Address	Torshamnsgatan 23 Kista SE-16480 Stockholm Sweden
Product Name	Radio 6488 B48
Product Number	 KRD 901 160/2 (with un-secuity software and RDNB board for testing purpose). KRD 901 160/21 (with secuity software and RDNB board for testing purpose). KRD 901 160/1 (with un-secuity software and antenna). KRD 901 160/11 (with secuity software and antenna).
Serial Number(s)	D829153166
Software Version	CXP 901 3268/15_R79GC
Hardware Version	R1A
Test Specification/Issue/Date	FCC CFR 47 Part 96: 2018

Note: For the testing performed in Dec 2019, the following EUT details were additionally recorded:

Node HW: AAS-1 fru_2048 AIR6488B48 1 OFF ON OFF N/A KRD901160/2 R1A D829153166 20190628 4 (OK) 62.0 0.08

ENM/DC Version: ENM 19.12 (ISO Version: 1.79.131) AOM 901 151 R1CX/2

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	TUV
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

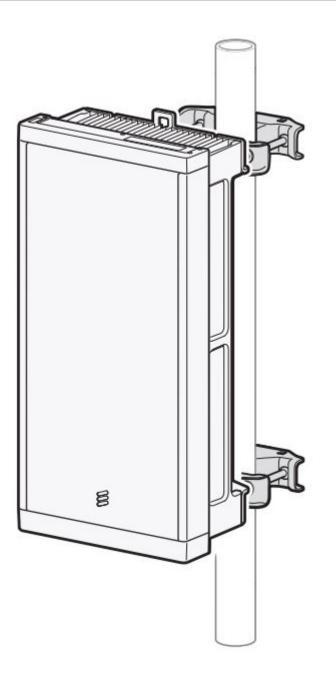
Technical Description

The Equipment Under Test (EUT) Radio 6488 B48 KRD 901 160 is an Ericsson AB Radio Unit working in the public mobile service (3550-3700 MHz) band which provides communication connections to 3550-3700 MHz network. The Radio 6488 B48 KRD 901 160 operates from a - 48V DC or a 120V AC power supply.

The Equipment Under Test (EUT) is shown in the photograph below. A full technical description can be found in the Manufacturer's documentation.

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	TUV
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada



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.

Domain Proxy Software Version: = 1.36.1 (ENM version ENM 19.14)

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	TUV
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

Appendix B – EUT, Peripherals, and Test Setup Photos

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	TÜV
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

Test setup

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<Photos kept on file>

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	TÜV
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

Appendix C – Additional Test Information

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	
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	X	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

1001 101							-				-
		Raw	Raw	Extern al	Conduct ed				EIRP 1MHz	EIRP	marg in
										10 MHz	
Freq	1MHz EIRP limit (target) dBm	10 MHz	1MHz	Losses (dB)	dBm/M Hz	antenna gain dBi	po rts	port gain (dB)	dBm/M Hz	dBm	dB
3555- High	37	-33.08	-40.31	41.93	1.62	17.00	64	18.06	36.68	43.91	0.32
3630- high	37	-33.01	-41.85	42.26	0.41	17.00	64	18.06	35.47	44.31	1.53
3695- high	37	-32.74	-40.82	42.33	1.51	17.00	64	18.06	36.57	44.65	0.43
3555- High	37	-27.94	-35.54	41.93	6.39	11.00	64	18.06	35.45	43.05	1.55
3630- high	37	-27.11	-34.76	42.26	7.50	11.00	64	18.06	36.56	44.21	0.44
3695- high	37	-27.48	-35.93	42.33	6.40	11.00	64	18.06	35.46	43.91	1.54

Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	TUV
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

3555-High power – 17 dBi gain

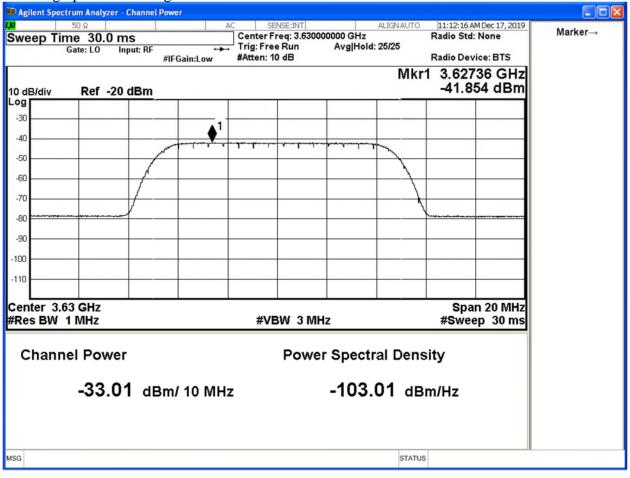
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Agilent Spectrum		nannel Powe	er:							
50 sarker 1 3.5					ENSE:INT Freg: 3.55500		ALIGN AUTO	11:01:25 A	M Dec 17, 2019	Marker
Gate:		ıt: RF	↔ Gain:Low		e Run	Avg Hold:	25/25	Radio Dev	vice: BTS	Select Marke
	tef -10 d	Bm					Mkr1	3.553 -40.3	48 GHz 09 dBm	1
•g -20										
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60		<u> </u>					- \			
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80 	of American American							-tooka (it-in-a)	And a state of the second s	
00										
enter 3.555								Spa	n 20 MHz	
Res BW 1 M	Hz			#V	вм змн	z		Swe	ep 1 ms	
Channel I	Power				Power	Spectra	al Densi	ity		Propertie
-	33.08	dBm	/ 10 MH	7		-103.0)8 dBr	n/Hz		
		4211		-						Mo
										1 c
G							STATUS			

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	TUV
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

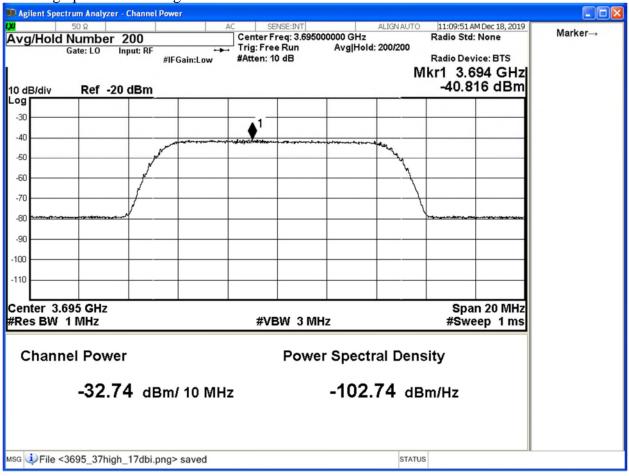
3630-high power 17 dBi gain



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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	TUV
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

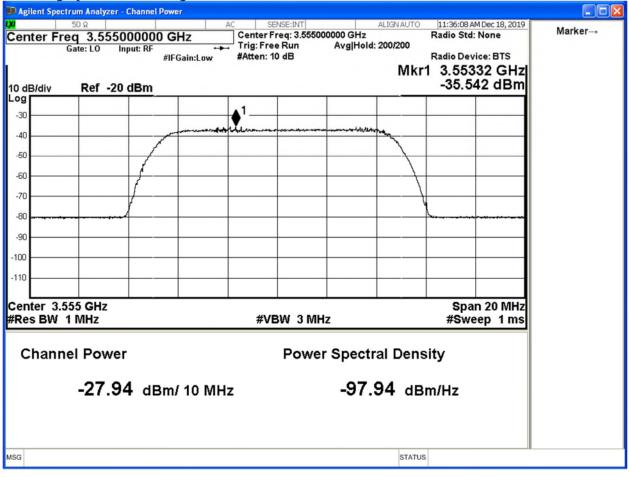
3695-high power – 17 dbi gain



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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

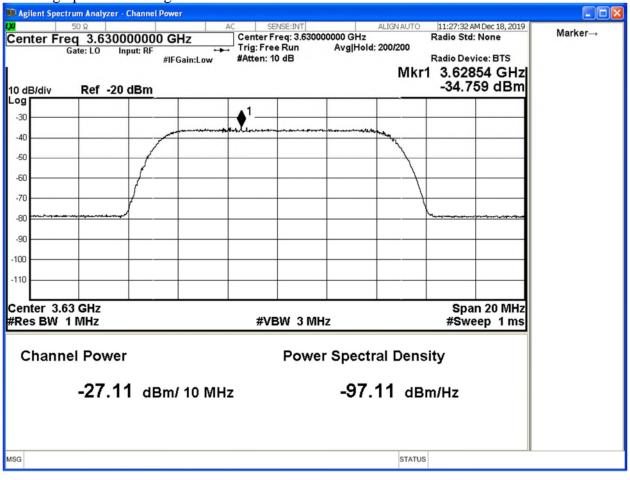
3555-High power – 11 dBi gain



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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

3630-high power 11 dBi gain



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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

3695-high power – 11 dbi gain

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💷 Agilent Spectrum A	nalyzer - Channel Powe	ar -						
Gate:		Trig	SENSE:INT Inter Freq: 3.695 II: Free Run II: 10 dB			Radio Std: 1 Radio Devid kr1 3.6 9	e: BTS	Freq / Channel
-30			1	4	helennen er			Center Freq 3.695000000 GHz
-60								
-80						`		
-100								CF Ste
Center 3.695 G Res BW 1 MH			#VBW 3М	Hz		Span #Swee	20 MHz ep 1 ms	2.000000 MH <u>Auto</u> Ma
Channel F	ower		Powe	er Spectra	al Dens	ity		
-2	2 7.48 dBm	10 MHz		-97.4	18 dB	m/Hz		
SG					STATUS			
ISG					STATUS			

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	TUV
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

Test equipment used for Dec 2019 testing

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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	-

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

Appendix D – Additional Test Information

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	
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	Χ	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(s)

1 MHz EIRP (PSD)

		Raw	External	Conducted				EIRP 1 MHz	Margin 1 MHz
Freq	1MHz EIRP limit (target) dBm	1 MHz dBm	Losses (dB)	dBm/MHz	Antenna gain dBi	Ports	Port gain (dB)	dBm/MHz	dB
3560	34	-27.13	31.5	4.37	11	64	18.06	33.43	0.57
3560	37	-24.3	31.5	7.2	11	64	18.06	36.26	0.74
3650	34	-27.75	31.5	3.75	11	64	18.06	32.81	1.19
3650	37	-24.48	31.5	7.02	11	64	18.06	36.08	0.92
3690	34	-27.31	31.5	4.19	11	64	18.06	33.25	0.75
3690	37	-24.33	31.5	7.17	11	64	18.06	36.23	0.77

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	SUD
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

10 MHz EIRP (PSD)

		Raw	External	Conducted				EIRP 10 MHz	Margin 10 MHz
Freq	10MHz EIRP limit (target) dBm	10 MHz dBm	Losses (dB)	dBm/MHz	Antenna gain dBi	Ports	Port gain (dB)	dBm/10 MHz	dB
3560	44	-17.67	31.5	13.83	11	64	18.06	42.89	1.11
3560	47	-15.1	31.5	16.40	11	64	18.06	45.46	1.54
3650	44	-18.67	31.5	12.83	11	64	18.06	41.89	2.11
3650	47	-15.62	31.5	15.88	11	64	18.06	44.94	2.06
3690	44	-18.41	31.5	13.09	11	64	18.06	42.15	1.85
3690	47	-15.36	31.5	16.14	11	64	18.06	45.20	1.80

20 MHz EIRP (for information purposes)

		External				EIRP 20 MHz
Freq	20 MHz (dBm)	Losses (dB)	Antenna gain dBi	Ports	Port gain (dB)	dBm
3560	-15.13	31.5	11	64	18.06	45.43
3560	-12.6	31.5	11	64	18.06	47.96
3650	-16.04	31.5	11	64	18.06	44.52
3650	-12.97	31.5	11	64	18.06	47.59
3690	-15.85	31.5	11	64	18.06	44.71
3690	-12.8	31.5	11	64	18.06	47.76

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

3560-High power - 11 dBi gain



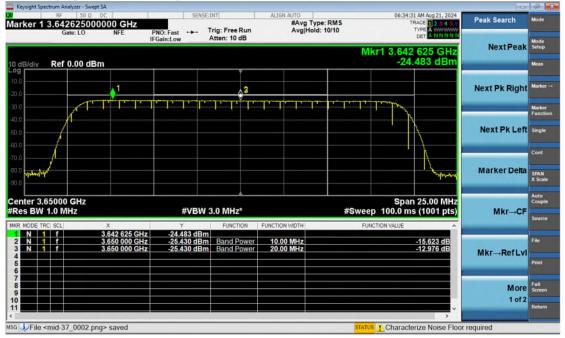
3560-low power - 11 dBi gain

RF 50 Ω	DC	SENS	EINT	ALIGN AUTO		06:16:40 AM Aug 21, 2024	
Delay 6.300 ms Gate: LO	NFE	PNO: Fast	Trig: Free Run			TRACE 1 2 3 4 5 1 TYPE A WWWWW	
		FGain:Low	Atten: 10 dB				Gat
					Mk	r1 3.562 625 GHz	<u>On</u> O
v Ref 0.00 dE	3m					-27.136 dBm	
			Ĭ				
							Gate View
				<u> </u>			On <u>O</u>
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Gate Delay 6.300 ms #Avg Type: RMS Trace Delay 6.300 ms Gate: LO NFE PNO: Fast	Catalifan						
						1	Gate View
1						X	Setup
						h	Gate Dela
						1.	6.300 m
and her						- Anner	0.300 m
							Gate Lengt
SW 1.0 MHz		#VBW	3.0 MHz*		#Sweep	100.0 ms (1001 pts)	3.7000 m
				FUNCTION WIDTH	FUNC	TION VALUE	
		-27.136 dBn	n Band Power	10.00 MHz		-17 673 dB	
	3.560 000 GHz	-27.421 dBr	n Band Power	20.00 MHz		-15.133 dB	Gate Method
++-							LO
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						1 Characterize Noise Flo	

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Client	Ericsson		
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	TÜV	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada	

3650-high power - 11 dBi gain



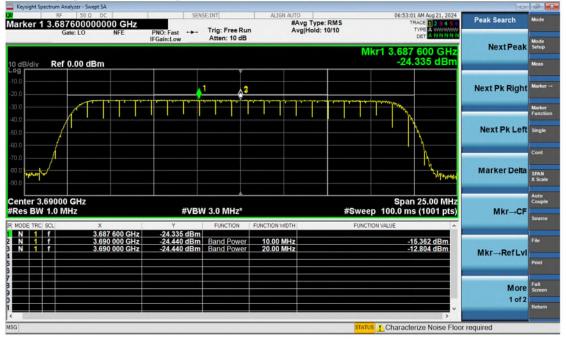
3650-low power - 11 dBi gain

RF 50 Ω	DC	SENSE:1	NT	ALIGN AUTO		06:25:24 AM Aug 21, 2024		
ker 1 3.6419500 Gate: LO	NFE PI		rig: Free Run	#Avg Type Avg Hold:	e: RMS 10/10	TRACE 1 2 3 4 5 6 TYPE A WAYMANY DET A NN NN N	Peak Search	ľ
	IFO	Gain:Low	Atten: 10 dB		Milered	3.641 950 GHz	NextPeak	K M
3/div Ref 0.00 d	Bm				WIKT	-27.757 dBm		
			The second secon					
	_ ↓ 1						Next Pk Right	
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d. www.						- Annual	Marker Delta	5 ×
ter 3.65000 GHz						0 25 00 MU		
BW 1.0 MHz		#VBW 3	.0 MHz*		#Sweep 1	Span 25.00 MHz 00.0 ms (1001 pts)	Mkr→CF	
IODE TRC SCL	X 3.641 950 GHz	¥ -27.757 dBm	FUNCTION	FUNCTION WIDTH	FUNCTIO	N VALUE A		5
N 1 f N 1 f	3.650 000 GHz 3.650 000 GHz	-28.103 dBm -28.103 dBm	Band Power	10.00 MHz 20.00 MHz		- <u>18.673 dB</u> -16.044 dB	ويلاحق واللو	F
	3.000 000 012	-20,100 000	Dariu Power	20.00 mm2		-10,044 00	Mkr→RefLvi	1
							-	
							More	
							1 of 2	•
						Characterize Noise Floor		

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Client	Ericsson		
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	TÜV	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada	

3690-high power - 11 dbi gain



3690-low power – 11 dbi gain 42:21 AM Aug 21, 2024 ALIGN / Peak Search #Avg Type: RMS Avg|Hold: 10/10 Marker 1 3.685500000000 GHz Gate: LO NFE 345 Trig: Free Run Atten: 10 dB PNO: Fast IFGain:Low DET Mode Setup **NextPeak** Mkr1 3.685 500 GHz -27.313 dBm Ref 0.00 dBm Next Pk Right Marker T ÷. Ť Next Pk Left Marker Delta SPAN K Scale Center 3.69000 GHz #Res BW 1.0 MHz Span 25.00 MHz #Sweep 100.0 ms (1001 pts) #VBW 3.0 MHz* Mkr→CF -18.414 dBm -15.856 dBm 3 690 000 GHz -28.048 dBm Band Powe 10.00 MHz 20.00 MHz N Mkr-Ref Lv More 1 of 2 MSG Characterize Noise Floor required

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Client	Ericsson	
Product	Ericsson Remote Radio Air 6488 B48 KRD 901160	TUV
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	Canada

Test equipment used for Aug 2024 testing

Instrument	Manufacturer	Type No.	Serial No	Calibration Period (months)	Calibration Due
Power Supply	Xantrex	XKW 60-50	E00109863	O/P Mon	-
Spectrum Analyser	Keysight	N9030B	MY61330816	12	24-Apr-2025
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	-

EUT Details used for Aug 2024 Testing:

KRD 901 160/2 R1B Serial Number: D829305451 Software Version CXP2010174/2-R17A247 Hardware Version R1B ENM/DC SW Version: ENM 24.15, AOM 901 151

Test setup photo(s) kept on file.

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