

Test Report

As per

FCC Part 96 SAS requirements (CBRS Test Plan)

on the

**Ericsson Remote Radio Unit
KRY 901 516/3 DOT 44Kr B48 (3550-3700MHz)
&
KRY 901 516/4 DOT 41Kr B48 (3550-3700MHz)**



**Add value.
Inspire trust.**

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

Testing produced for

Ericsson Canada

See Appendix A for full
client & EUT details.

Steve McFarlane
Test Personnel

A handwritten signature in blue ink that reads 'Steve McFarlane'.

Scott Drysdale
Report Reviewer

A handwritten signature in blue ink that reads 'Scott Drysdale'.



Testing Laboratory
Certificate #2955.19



Client	Ericsson	
Product	KRY 901 516/3 DOT 4459 B48 (3550-3700MHz) KRY 901 516/4 DOT 4469 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

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Report Scope

This report addresses the WINNForum verification testing and test results of the **KRY 901 516/3 DOT 44Kr B48 (3550-3700MHz) & KRY 901 516/4 DOT 41Kr B48 (3550-3700MHz)** 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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Summary

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

Equipment Under Test (EUT)	KRY 901 516/4 DOT 41Kr B48 (3550-3700MHz) Note: Non-Tested Variant Dot 44Kr B48 - KRY 901 516/3 (See Appendix A Technical Description for a similarity description)
EUT passed all tests performed	Yes
Tests conducted by	Steve McFarlane
FCC ID:	TA8AKRY901516-4


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

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Test Results Summary

Section as per Working Document WINNF-TS-0122


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.	P
6.1.4.1.3	X	--	WINNF.FT.C.R EG.3	Single-Step registration for Category A CBSD	Monitor for 60 seconds after REG message sent. No transmission during test.	N/A
6.1.4.1.4	--	X	WINNF.FT.D.R EG.4	Domain Proxy Single-Step registration for Cat A CBSD (Note: Mandatory for without CPI, if EUT will always have signed CPI – asked for email waiver)	Monitor for 60 seconds after REG message sent. No transmission during test.	N/A
6.1.4.1.5	X	--	WINNF.FT.C.R EG.5	Single-Step registration for CBSD with CPI signed data	Monitor for 60 seconds after REG message sent. No transmission during test.	N/A
6.1.4.1.6	--	X	WINNF.FT.D.R EG.6	Domain Proxy Single-Step registration for CBSD with CPI signed data	Monitor for 60 seconds after REG message sent. No transmission during test.	P
6.1.4.1.7	X	X	WINNF.FT.C.R EG.7	Registration due to change of an installation parameter	Test waits until transmission starts, then trigger an	N/A

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					installationParam change. <ul style="list-style-type: none"> Record time at which transmission stops. Time must be within 60 seconds of the installationParam change taking effect. 	
6.1.4.2.1	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.	P
6.1.4.2.3	X	--	WINNF.FT.C.R EG.10	Pending registration (responseCode 200)	Monitor for 60 seconds after REG message sent. No transmission during test.	N/A
6.1.4.2.4	--	X	WINNF.FT.D.R EG.11	Domain Proxy Pending registration (responseCode 200)	Monitor for 60 seconds after REG message sent. No transmission during test.	P
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.	P
6.1.4.2.7	X	--	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.	P
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.	P
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.	P
6.1.4.3.1	X	X	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.	P
6.3.4.2.2	X	X	WINNF.FT.C.G RA.2	Unsuccessful Grant responseCode=401 (GRANT_CONFLICT)	Monitor for 60 seconds after REG message sent. No transmission during test.	P
6.4.4.1.1	X	--	WINNF.FT.C.H BT.1	Heartbeat Success Case (first Heartbeat Response)	Monitor RF from start of test. Ensure that: <ul style="list-style-type: none"> • Transmission does not start until time of first 	N/A

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					<p>heartbeat response or after.</p> <ul style="list-style-type: none"> After transmission starts, measure that transmission is within the granted channel (frequencyLow, frequencyHigh) 	
6.4.4.1.2	--	X	WINNF.FT.D.H BT.2	Domain Proxy Heartbeat Success Case (first Heartbeat Response)	<p>Monitor RF from start of test. Ensure that:</p> <ul style="list-style-type: none"> Transmission does not start until time of first heartbeat response or after. After transmission starts, measure that transmission is within the granted channel (frequencyLow, frequencyHigh) 	P
6.4.4.2.1	X	X	WINNF.FT.C.H BT.3	Heartbeat responseCode=105 (DEREGISTER)	<p>Monitor RF transmission. Ensure that:</p> <ul style="list-style-type: none"> CBSD stops transmission within 60 seconds of the heartbeatResponse which contains 	P

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					responseCode = 105	
6.4.4.2.2	X	--	WINNF.FT.C.H BT.4	Heartbeat responseCode=500 (TERMINATED_GRANT)		N/A
6.4.4.2.3	X	X	WINNF.FT.C.H BT.5	Heartbeat responseCode=501 (SUSPENDED_GRANT) in First Heartbeat Response	Monitor RF transmission from start of test. Ensure there is no transmission during the test	P
6.4.4.2.4	X	X	WINNF.FT.C.H BT.6	Heartbeat responseCode=501 (SUSPENDED_GRANT) in Subsequent Heartbeat Response	Monitor RF transmission. Ensure: <ul style="list-style-type: none"> • CBSD stops transmission within 60 seconds of heartbeatResponse which contains responseCode=501 	P
6.4.4.2.5	X	X	WINNF.FT.C.H BT.7	Heartbeat responseCode=502 (UNSYNC_OP_PARAMETER)	Monitor RF transmission. Ensure: <ul style="list-style-type: none"> • CBSD stops transmission within 60 seconds of heartbeatResponse which contains responseCode=502 	P
6.4.4.2.6	--	X	WINNF.FT.D.H BT.8	Domain Proxy Heartbeat responseCode=500 (TERMINATED_GRANT)	Monitor RF transmission. CBSDs will have different behavior: <ul style="list-style-type: none"> • CBSD1: will continue to transmit to end of test 	P

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					<p>(this is not a pass/fail criteria, but check)</p> <ul style="list-style-type: none"> • CBSD2: must stop transmission within 60 seconds of being sent heartbeatResponse with responseCode = 500 	
6.4.4.3.1	X	X	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	P
6.4.4.3.2	X	X	WINNF.FT.C.H BT.10	Heartbeat Response Absent (Subsequent Heartbeat)	Monitor RF transmission. Verify: <ul style="list-style-type: none"> • CBSD must stop transmission within transmitExpirationTime+60 seconds, where transmitExpirationTime is from last successful heartbeatResponse message 	P
6.5.4.2.1	X	--	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	P

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6.5.4.2.3	X	X	WINNF.FT.C.MES.3	Grant Response contains measReportConfig	No RF monitoring	P
6.5.4.2.4	X	--	WINNF.FT.C.MES.4	Heartbeat Response contains measReportConfig	No RF monitoring	N/A
6.5.4.2.5	--	X	WINNF.FT.D.MES.5	Domain Proxy Heartbeat Response contains measReportConfig	No RF monitoring	P
6.6.4.1.1	X	--	WINNF.FT.C.RLQ.1	Successful Relinquishment	Monitor RF transmission. Ensure: <ul style="list-style-type: none"> • CBSD stops transmission at any time prior to sending the relinquishmentRequest message. 	N/A
6.6.4.1.2	--	X	WINNF.FT.D.RLQ.2	Domain Proxy Successful Relinquishment	Monitor RF transmission. Ensure: <ul style="list-style-type: none"> • CBSD stops transmission at any time prior to sending the relinquishmentRequest message. 	P
6.7.4.1.1	X	--	WINNF.FT.C.DRG.1	Successful Deregistration	Monitor RF transmission. Ensure: <ul style="list-style-type: none"> • CBSD stops transmission at any time prior to sending the relinquishmentRequest message or deregistrationRequest message (whichever is sent first) 	N/A


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

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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.


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

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

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

Note, where graph sweeps are incomplete, this was used to set the time stamp of when the events occurred. This can be accomplished by determining the time at which the graph was captured and subtracting the remaining time. For example if there was a 30 second sweep, and 9 out of 10 is complete, that means the end occurred at the 27 second mark. 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 UTC in the logs.

Logs are kept on file.

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Applicable Standards, Specifications and Methods

ANSI C63.4:2014 Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

CFR47 FCC Part 96 Code of Federal Regulations – Citizens Broadband Radio Service

WINNF-TS-0122 Conformance and Performance Test Technical Specification;
Version V1.0.0 CBSD/DP as Unit Under Test (UUT)
19 December 2017 Working Document


ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories

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Document Revision Status

Revision 000: June 17, 2022 First Issue. Based on 7169011341B-CBRS-005.

Revision 001: June 20, 2022 Minor typographical error corrected as per request kept on file.

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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.

AM – Amplitude Modulation

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

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

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

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

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

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

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


LISN – Line Impedance Stabilization Network

NCR – No Calibration Required

NSA – Normalized Site Attenuation

RF – Radio Frequency

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


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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 (°C)	Humidity (%)	Pressure (kPa)
May 11-13, 2022	All	SM	20-23	40-55	96.106

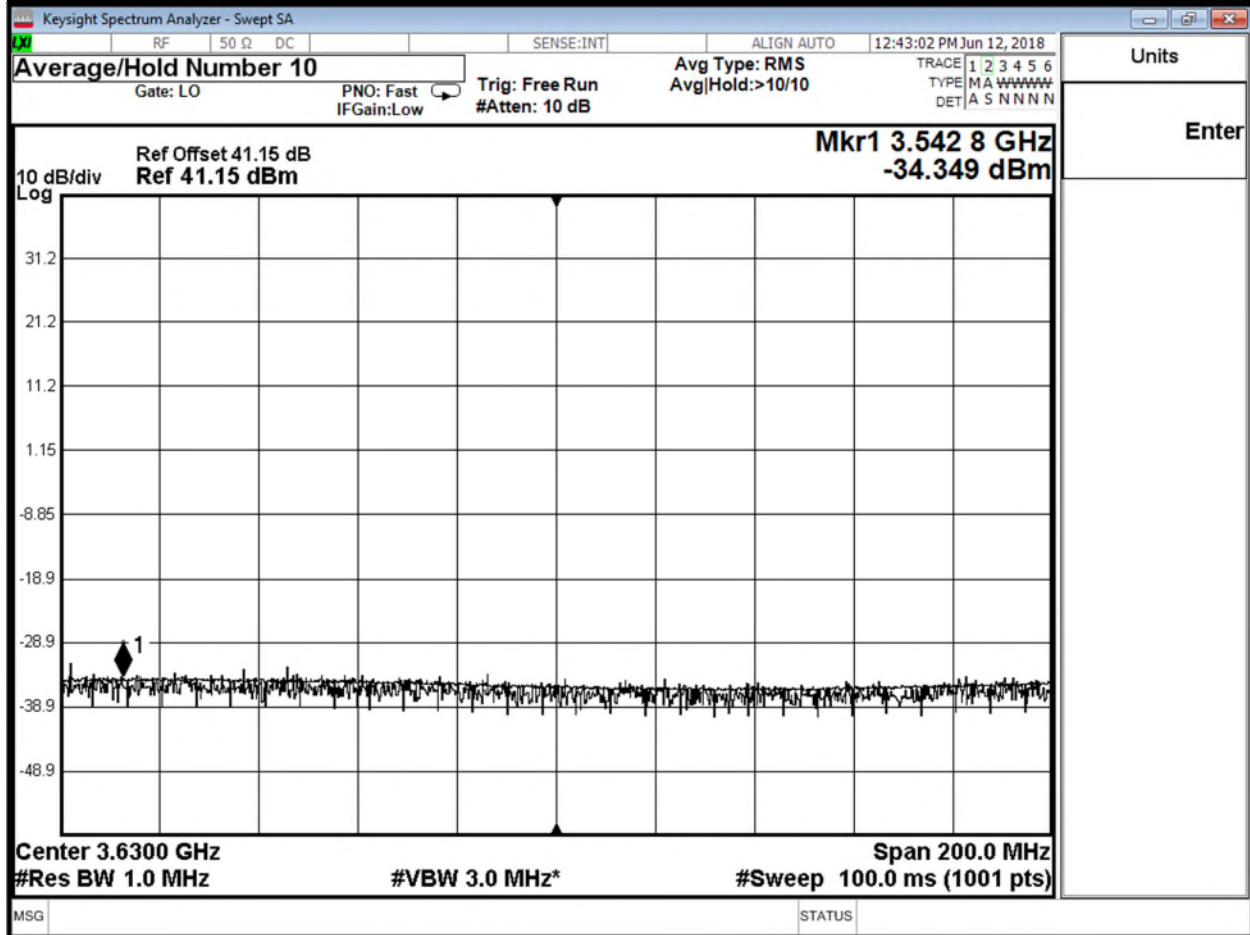
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Detailed Test Results Section

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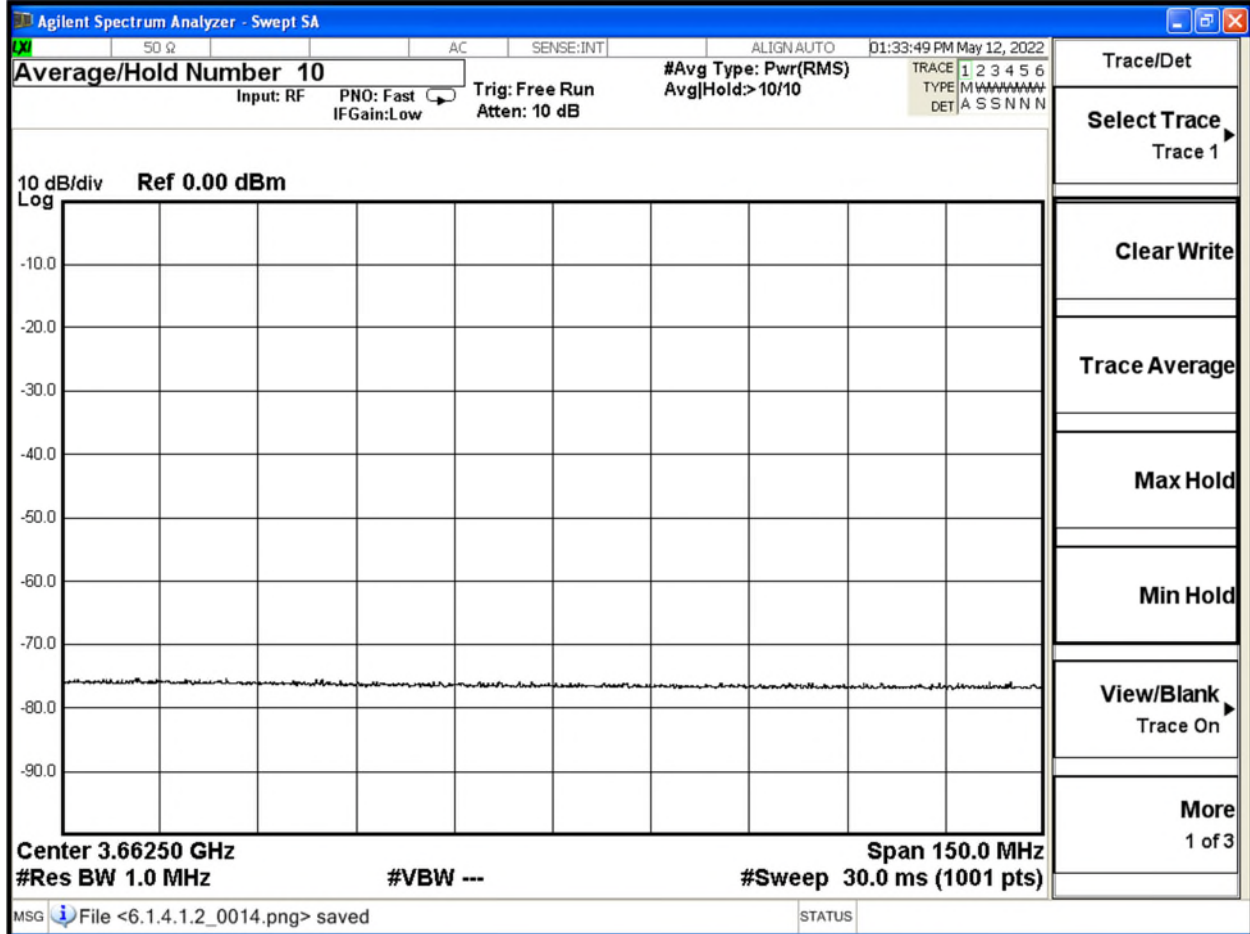
Authorization transmit after it receives authorization from a SAS.


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



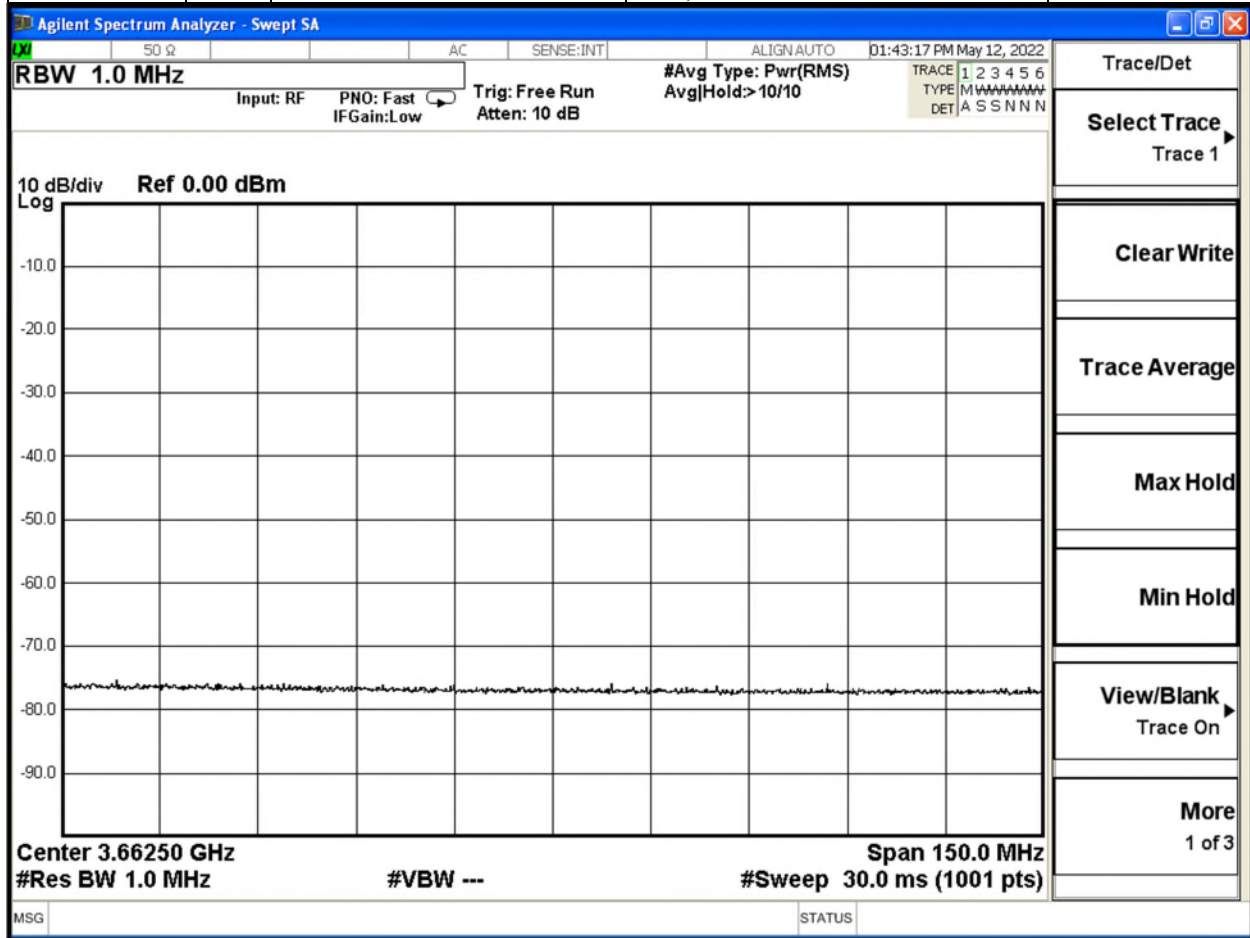
Client	Ericsson	 Canada
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6.1.4.2.2	X	WINNF.FT.D.REG.9	Domain Proxy Missing Required parameters (responseCode 102)	P
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6.1.4.2.4	X	WINNF.FT.D.REG.11	Domain Proxy Pending registration (responseCode 200)	P
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6.1.4.2.6	X	WINNF.FT.D.REG.13	Domain Proxy Invalid parameters (responseCode 103)	P
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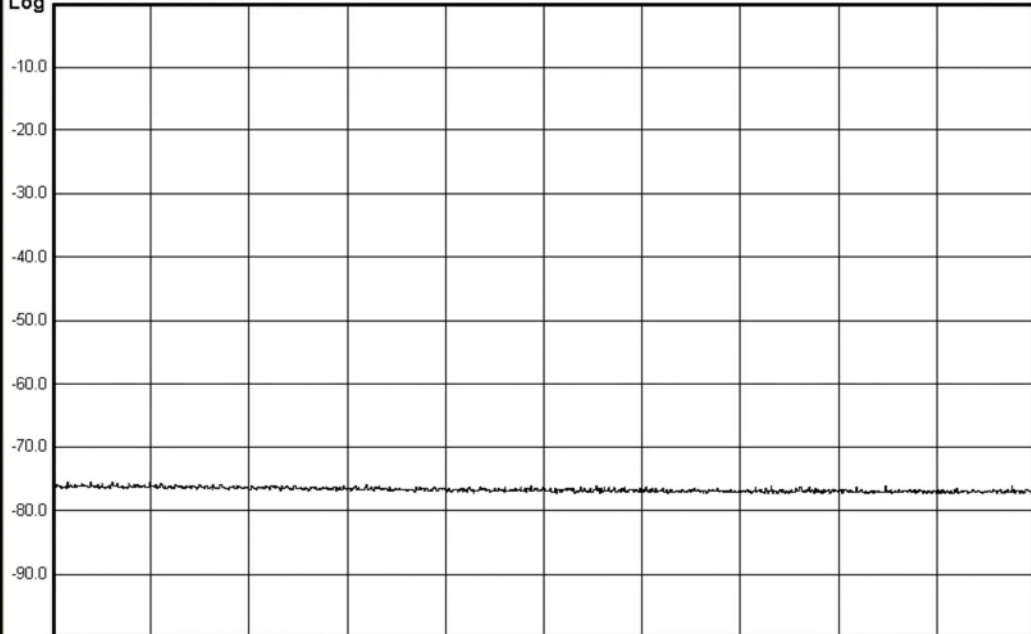
Agilent Spectrum Analyzer - Swept SA

50 Ω AC SENSE:INT ALIGN AUTO D1:46:30 PM May 12, 2022

RBW 1.0 MHz Input: RF PNO: Fast IFGain:Low Trig: Free Run Atten: 10 dB #Avg Type: Pwr(RMS) Avg|Hold:>10/10

TRACE 1 2 3 4 5 6
TYPE M M M M M M M M
DET A S S N N N

10 dB/div Ref 0.00 dBm Log



Center 3.66250 GHz Span 150.0 MHz
#Res BW 1.0 MHz #VBW --- #Sweep 30.0 ms (1001 pts)

MSG STATUS

Trace/Det

Select Trace Trace 1

Clear Write


Trace Average

Max Hold

Min Hold

View/Blank Trace On

More 1 of 3

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6.1.4.2.8	X	WINNF.FT.D.REG.15	Domain Proxy Blacklisted CBSD (responseCode 101)	P
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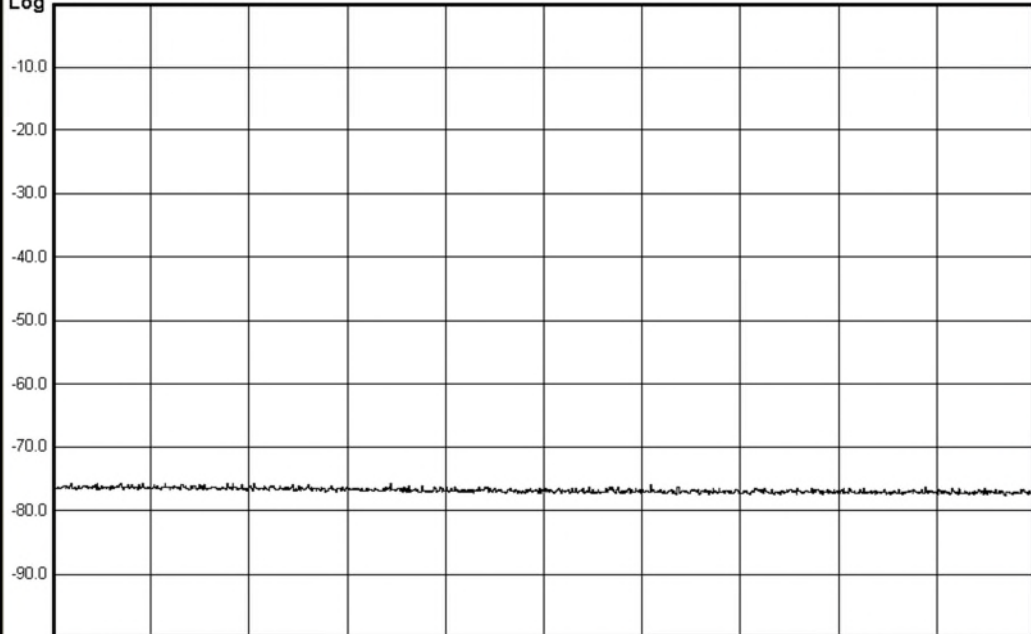
Agilent Spectrum Analyzer - Swept SA

50 Ω AC SENSE:INT ALIGN AUTO D1:49:02 PM May 12, 2022

RBW 1.0 MHz Input: RF PNO: Fast IFGain:Low Trig: Free Run Atten: 10 dB #Avg Type: Pwr(RMS) AvgHold:>10/10

TRACE 1 2 3 4 5 6
TYPE M W W W W W W W
DET A S S N N N

10 dB/div Ref 0.00 dBm
Log



Center 3.66250 GHz Span 150.0 MHz
#Res BW 1.0 MHz #VBW --- #Sweep 30.0 ms (1001 pts)

MSG STATUS

Trace/Det

Select Trace
Trace 1

Clear Write


Trace Average

Max Hold

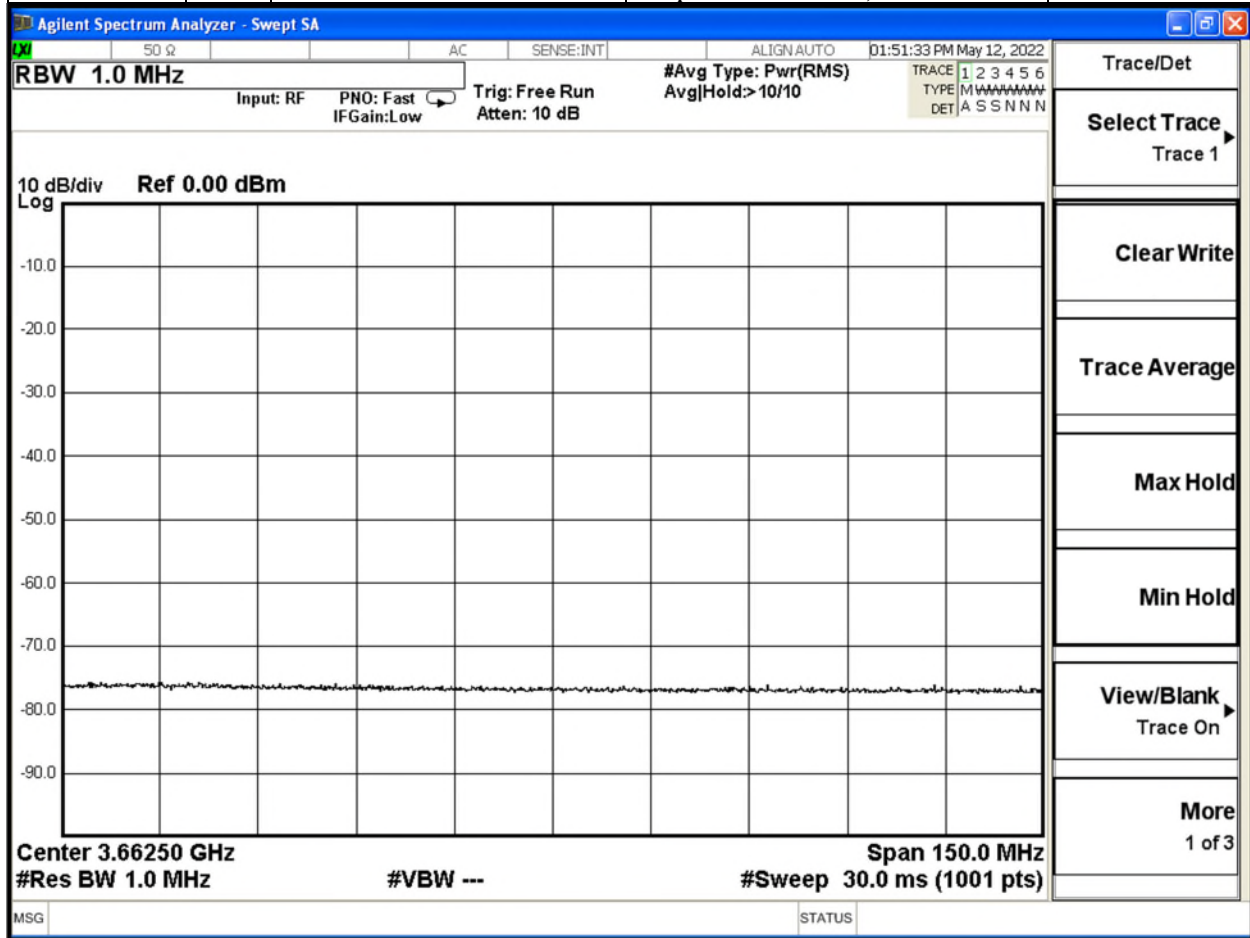
Min Hold


View/Blank
Trace On

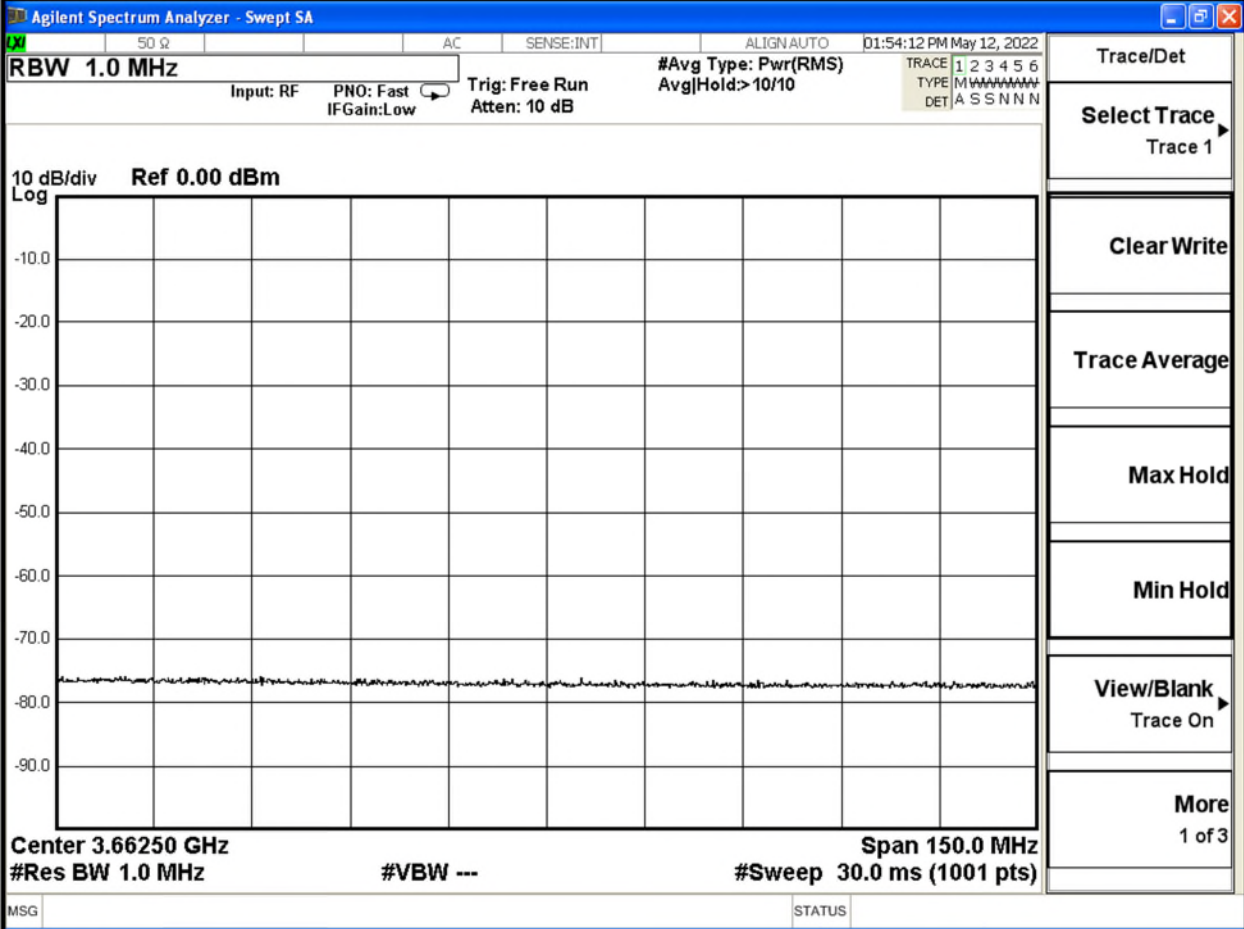
More
1 of 3


Client	Ericsson	
Product	KRY 901 516/3 DOT 4459 B48 (3550-3700MHz) KRY 901 516/4 DOT 4469 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

6.1.4.2.10	X	WINNF.FT.D.REG.17	Domain Proxy Unsupported SAS protocol version responseCode 100)	P
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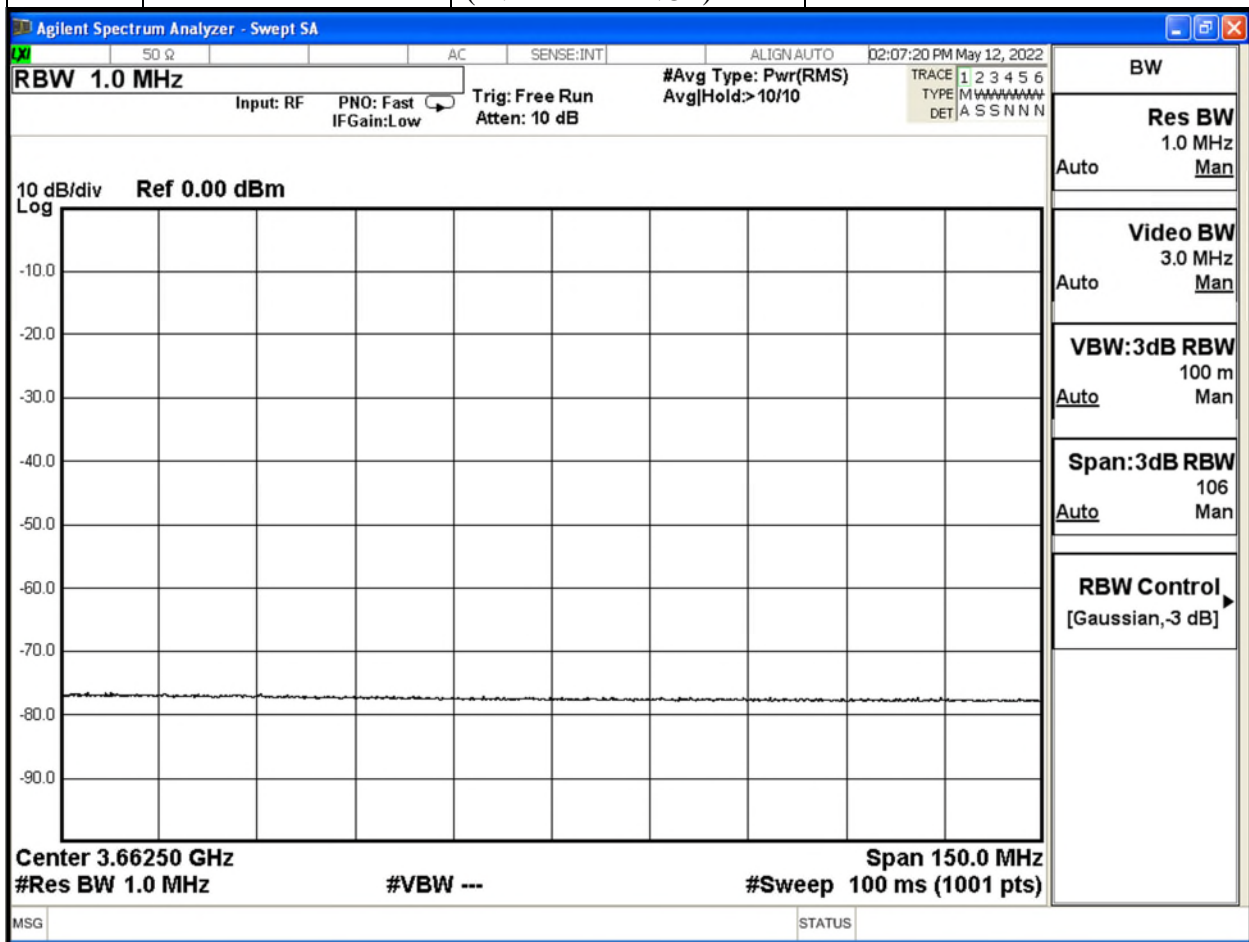
Client	Ericsson	
Product	KRY 901 516/3 DOT 4459 B48 (3550-3700MHz) KRY 901 516/4 DOT 4469 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	


6.1.4.2.12	X	WINNF.FT.D.REG.19	Domain Proxy Group Error (responseCode 201)	P
 <p>The screenshot shows an Agilent Spectrum Analyzer interface. The main display is a log plot with a vertical axis from -90.0 to 10.0 dB/div and a horizontal axis from 3.66250 GHz to 3.81250 GHz (span 150.0 MHz). The plot shows a flat noise floor at approximately -80.0 dBm. The interface includes various control panels for RBW (1.0 MHz), Res BW (1.0 MHz), Span (150.0 MHz), and Sweep (30.0 ms). A right-hand menu contains options like 'Trace/Det', 'Select Trace', 'Clear Write', 'Trace Average', 'Max Hold', 'Min Hold', 'View/Blank', and 'More'.</p>				
MSG	STATUS			

Client	Ericsson	
Product	KRY 901 516/3 DOT 4459 B48 (3550-3700MHz) KRY 901 516/4 DOT 4469 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

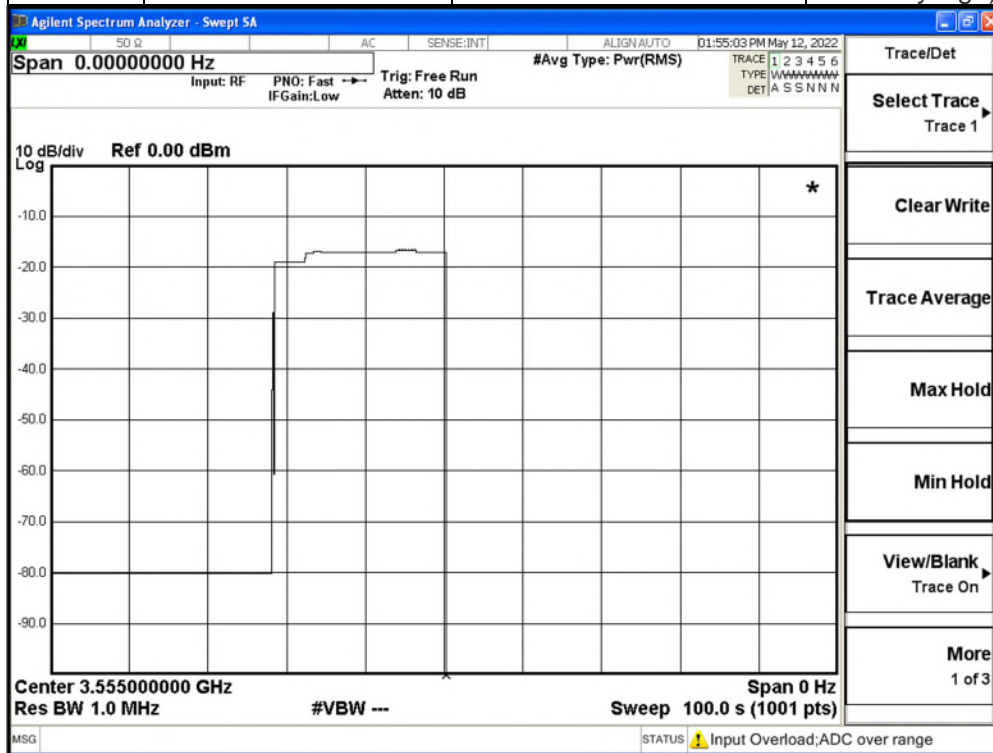
Check the device registration and authorization with the SAS, Confirm that the device changes its operating power and/or channel in response to a command from the SAS and Confirm that the device correctly configures based on the different license classes.


6.3.4.2.1	WINNF.FT.C.GRA.1	Unsuccessful Grant responseCode=400 (INTERFERENCE)	Monitor for 60 seconds after REG message sent. No transmission during test.	P
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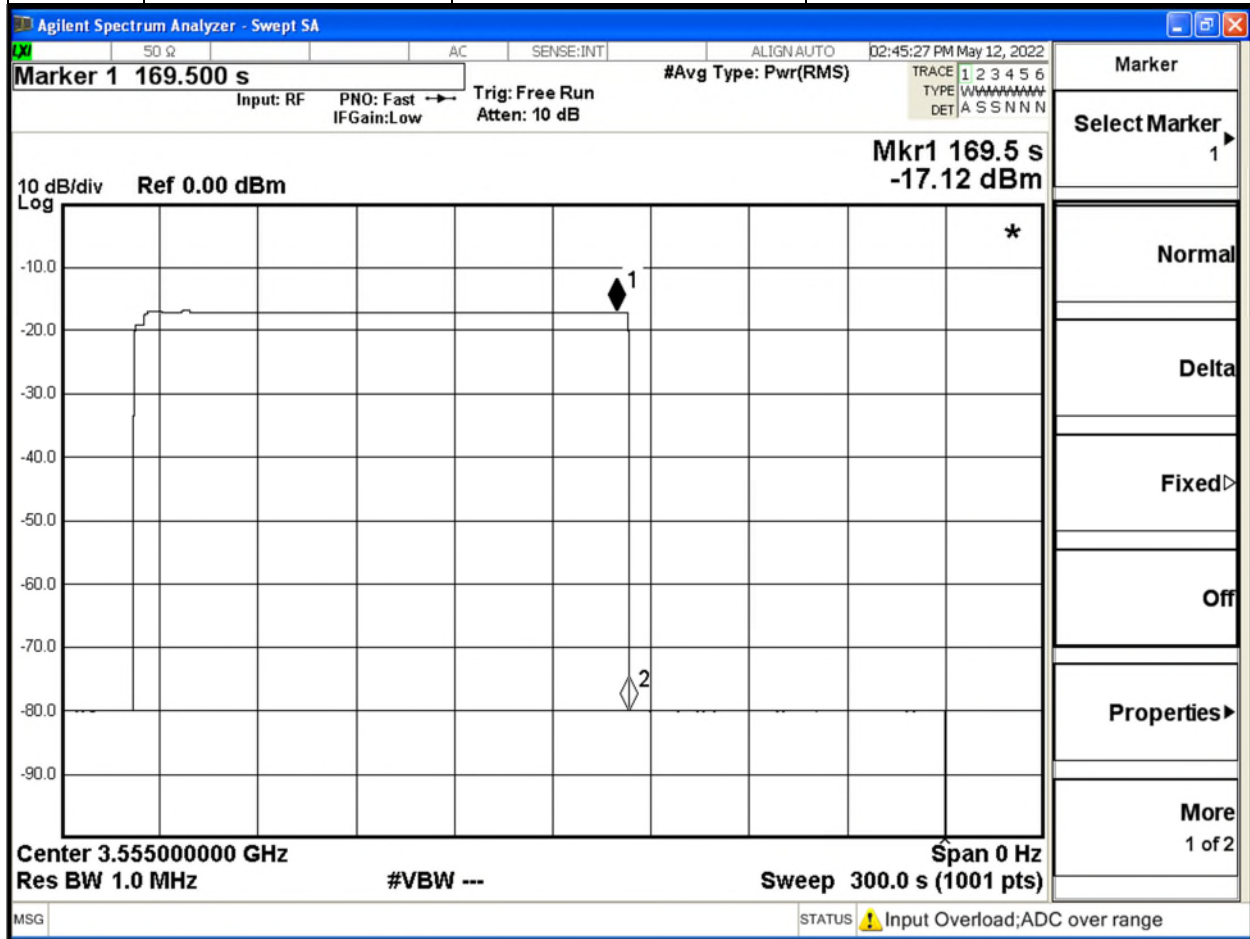
Client	Ericsson	
Product	KRY 901 516/3 DOT 4459 B48 (3550-3700MHz) KRY 901 516/4 DOT 4469 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	


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: <ul style="list-style-type: none"> • Transmission does not start until time of first heartbeat response or after. • After transmission starts, measure that transmission is within the granted channel (frequencyLow, frequencyHigh) 	P
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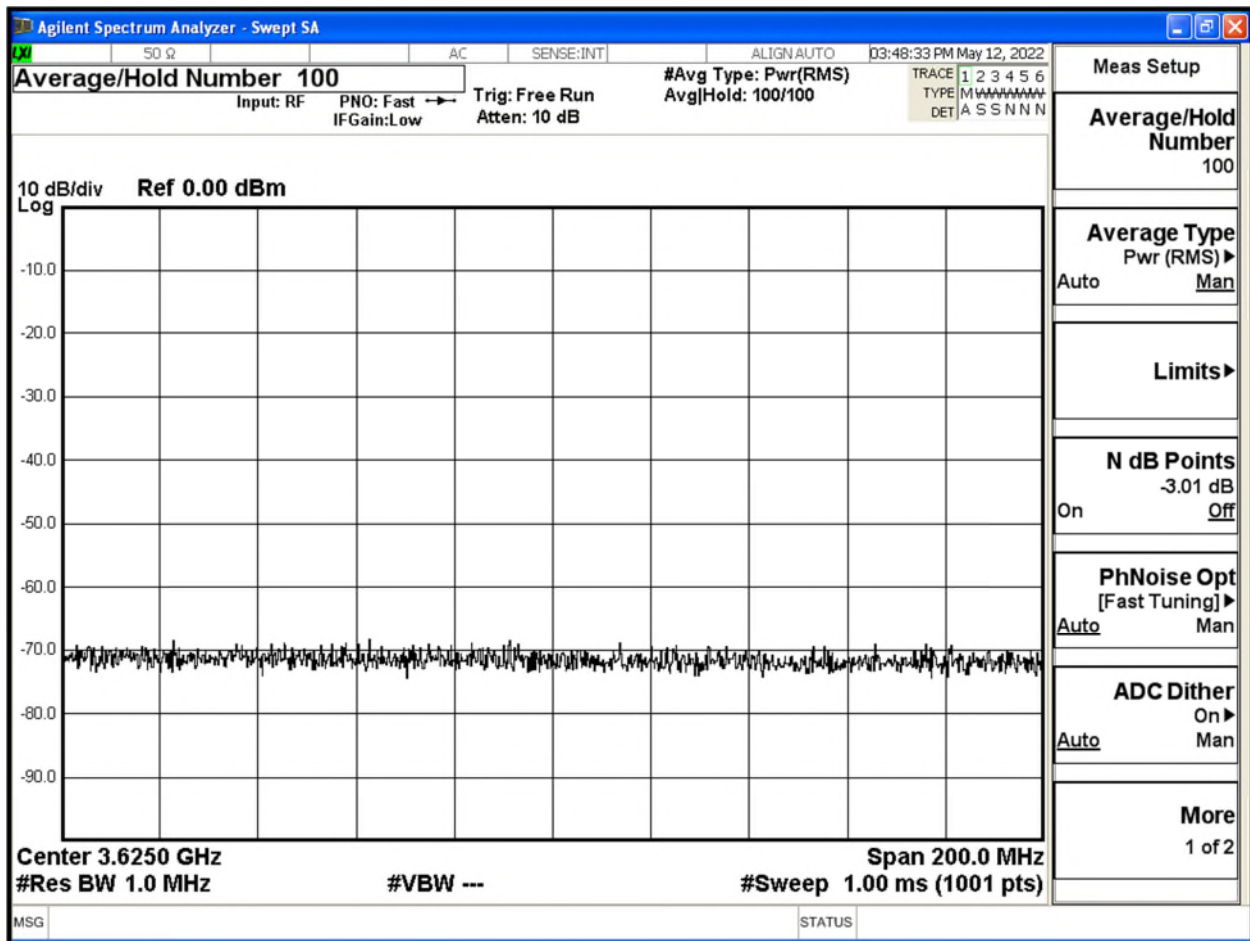
Client	Ericsson	
Product	KRY 901 516/3 DOT 4459 B48 (3550-3700MHz) KRY 901 516/4 DOT 4469 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	


6.4.4.2.1	WINNF.FT.C.HBT.3	Heartbeat responseCode=105 (DEREGISTER)	Monitor RF transmission. Ensure that: <ul style="list-style-type: none"> • CBSD stops transmission within 60 seconds of the heartbeatResponse which contains responseCode = 105 	P
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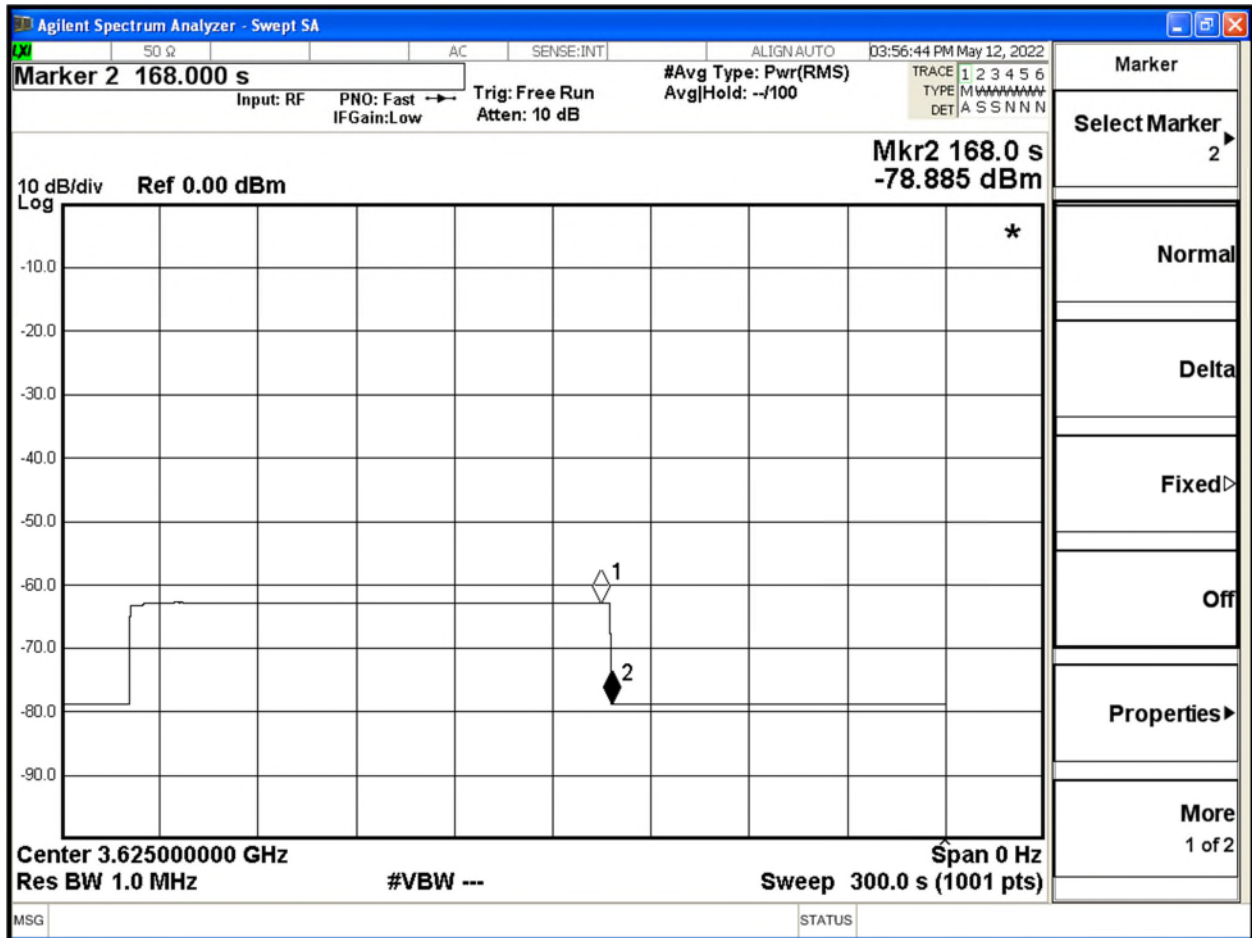
Client	Ericsson	
Product	KRY 901 516/3 DOT 4459 B48 (3550-3700MHz) KRY 901 516/4 DOT 4469 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	


6.4.4.2.3	WINNF.FT.C.HBT.5	Heartbeat responseCode=501 (SUSPENDED_GRANT) in First Heartbeat Response	Monitor RF transmission from start of test. Ensure there is no transmission during the test	p
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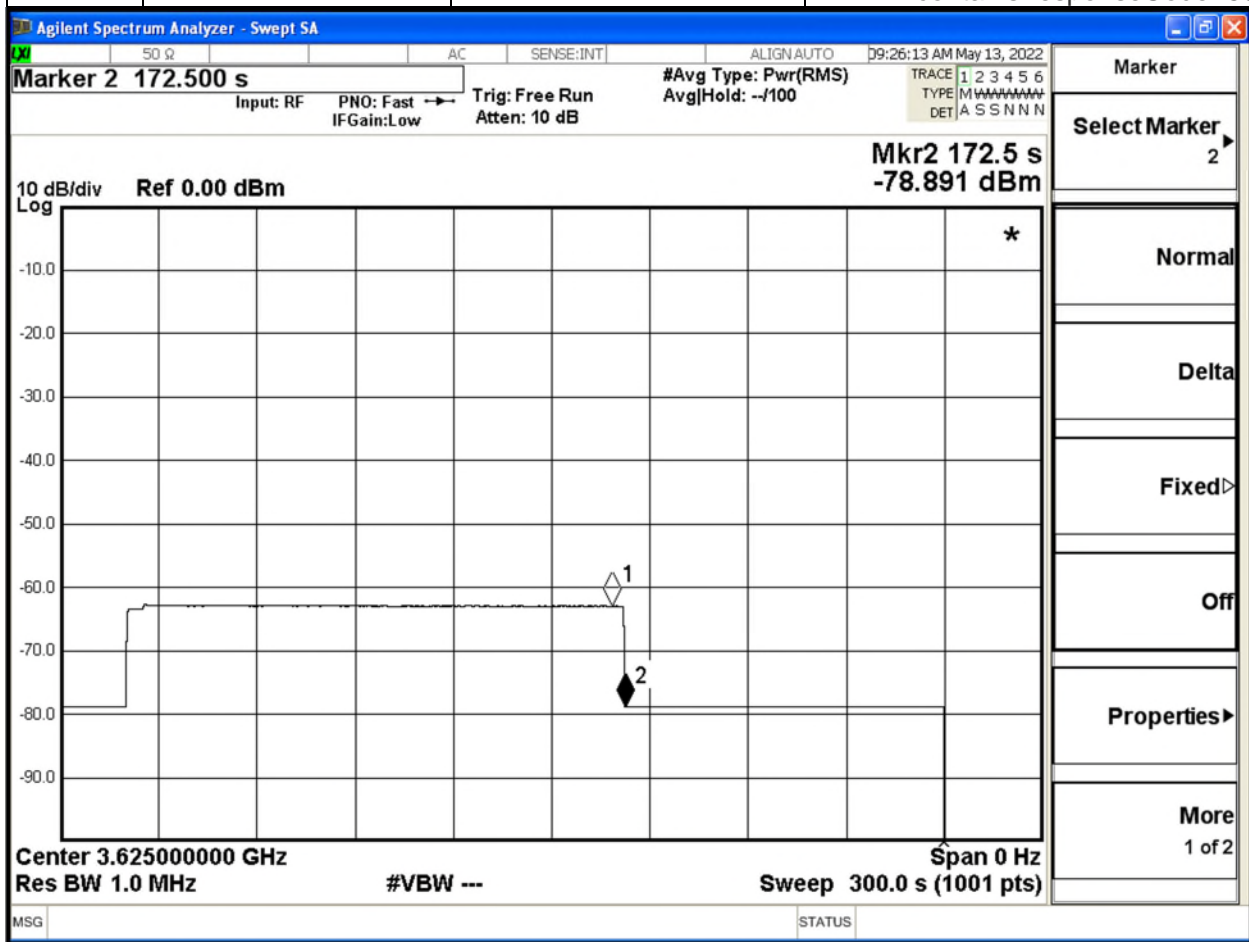
Client	Ericsson	
Product	KRY 901 516/3 DOT 4459 B48 (3550-3700MHz) KRY 901 516/4 DOT 4469 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	


6.4.4.2.4	WINNF.FT.C.HBT.6	Heartbeat responseCode=501 (SUSPENDED_GRANT) in Subsequent Heartbeat Response	Monitor RF transmission. Ensure: <ul style="list-style-type: none"> • CBSD stops transmission within 60 seconds of heartbeatResponse which contains responseCode=501 	p
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Client	Ericsson	
Product	KRY 901 516/3 DOT 4459 B48 (3550-3700MHz) KRY 901 516/4 DOT 4469 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

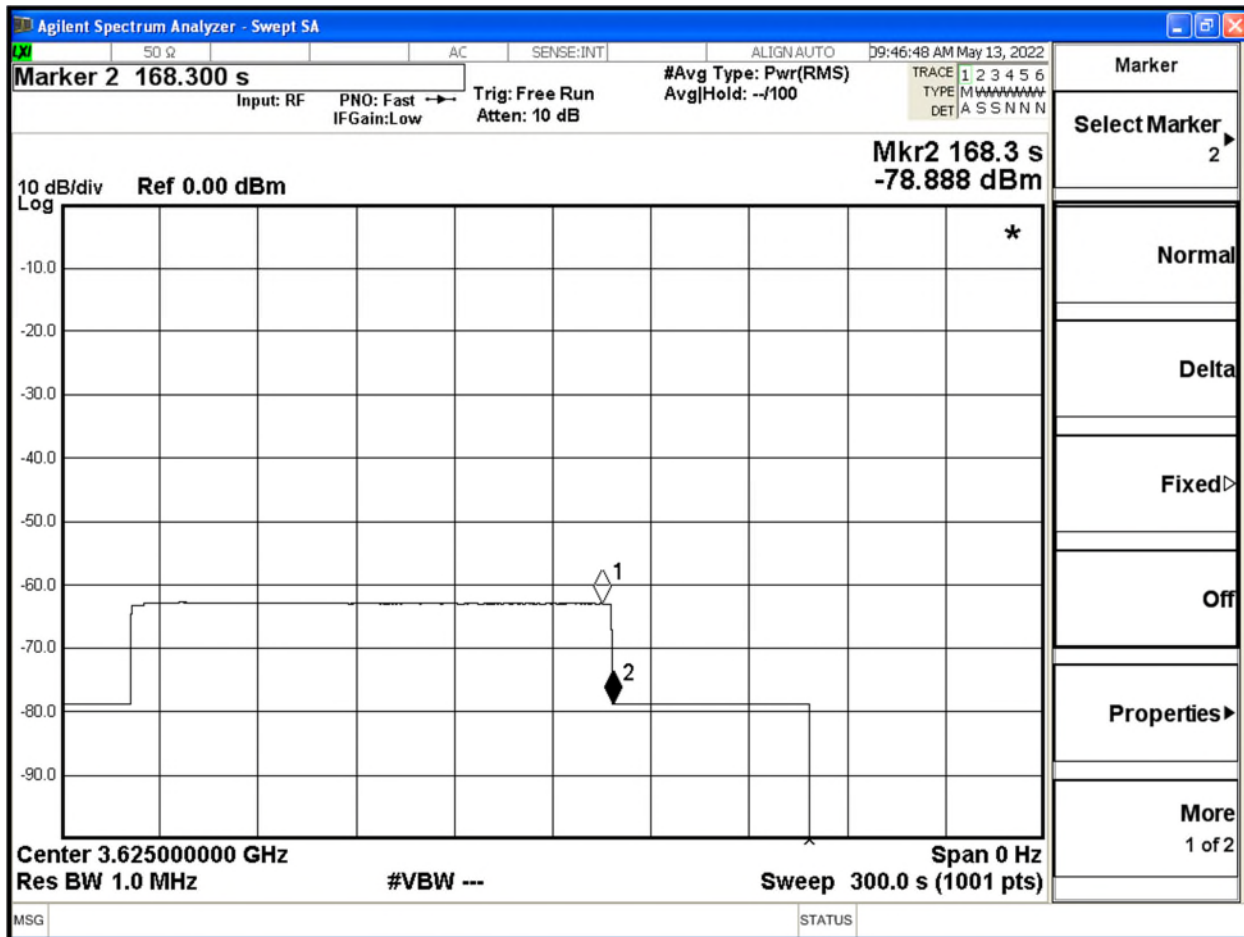
6.4.4.2.5	WINNF.FT.C.HBT.7	Heartbeat responseCode=502 (UNSYNC_OP_PARAM)	Monitor RF transmission. Ensure: <ul style="list-style-type: none"> • CBSD stops transmission within 60 seconds of heartbeatResponse which contains responseCode=502 	p
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Client	Ericsson	
Product	KRY 901 516/3 DOT 4459 B48 (3550-3700MHz) KRY 901 516/4 DOT 4469 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

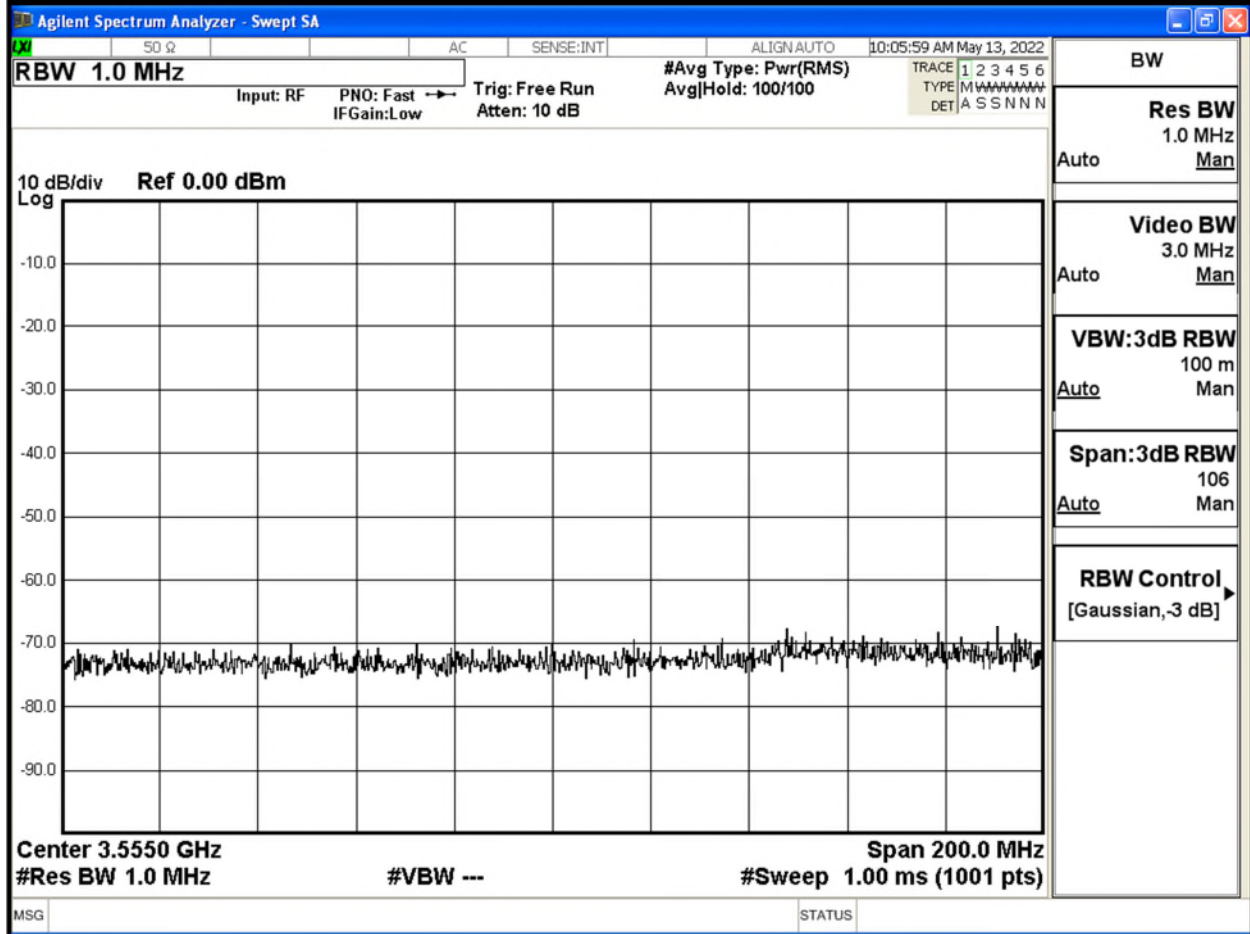
6.4.4.2.6	--	X	WINNF.FT.D.H BT.8	Domain Proxy Heartbeat responseCode=500 (TEMINATED_GRANT)	Monitor RF transmission. CBSDs will have different behavior: <ul style="list-style-type: none"> • CBSD1: will continue to transmit to end of test (this is not a pass/fail criteria, but check) • CBSD2: must stop transmission within 60 seconds of being sent heartbeatResponse with responseCode = 500 	P
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Client	Ericsson	 Canada
Product	KRY 901 516/3 DOT 4459 B48 (3550-3700MHz) KRY 901 516/4 DOT 4469 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	



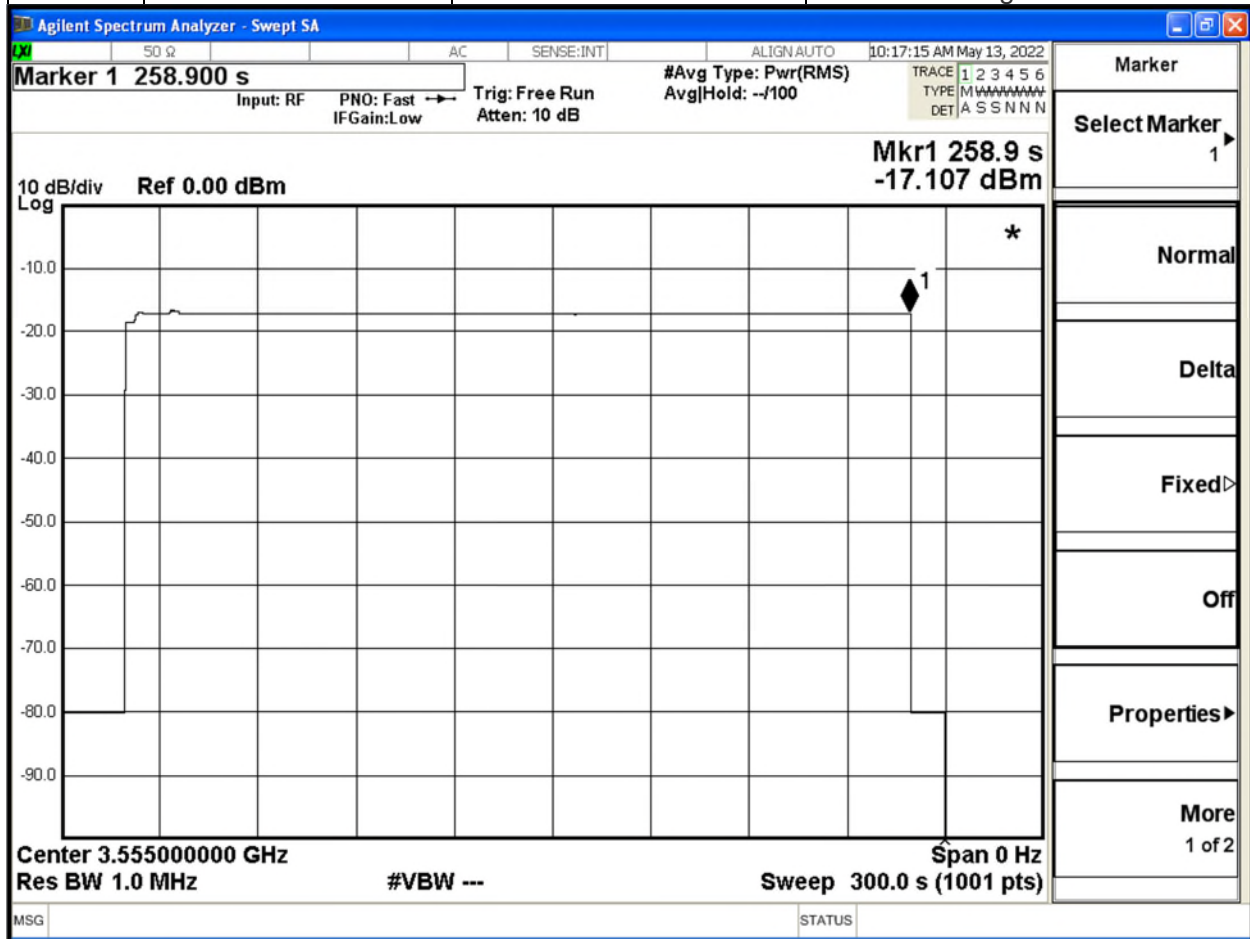
Client	Ericsson	
Product	KRY 901 516/3 DOT 4459 B48 (3550-3700MHz) KRY 901 516/4 DOT 4469 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	


6.4.4.3.1	WINNF.FT.C.HBT.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	P
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Client	Ericsson	
Product	KRY 901 516/3 DOT 4459 B48 (3550-3700MHz) KRY 901 516/4 DOT 4469 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	


6.4.4.3.2	WINNF.FT.C.HBT.10	Heartbeat Response Absent (Subsequent Heartbeat)	Monitor RF transmission. Verify: <ul style="list-style-type: none"> • CBSD must stop transmission within transmitExpireTime+60 seconds, where transmitExpireTime is from last successful heartbeatResponse message 	P
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Client	Ericsson	
Product	KRY 901 516/3 DOT 4459 B48 (3550-3700MHz) KRY 901 516/4 DOT 4469 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	


6.5.4.2.2	WINNF.FT.D.MES.2	Domain Proxy Registration Response contains measReportConfig	No RF monitoring	P
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Pass saw “measreportconfig” in logs

Client	Ericsson	
Product	KRY 901 516/3 DOT 4459 B48 (3550-3700MHz) KRY 901 516/4 DOT 4469 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	


6.5.4.2.3	WINNF.FT.C.MES.3	Grant Response contains measReportConfig	No RF monitoring	P
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Pass saw “measreportconfig” in logs

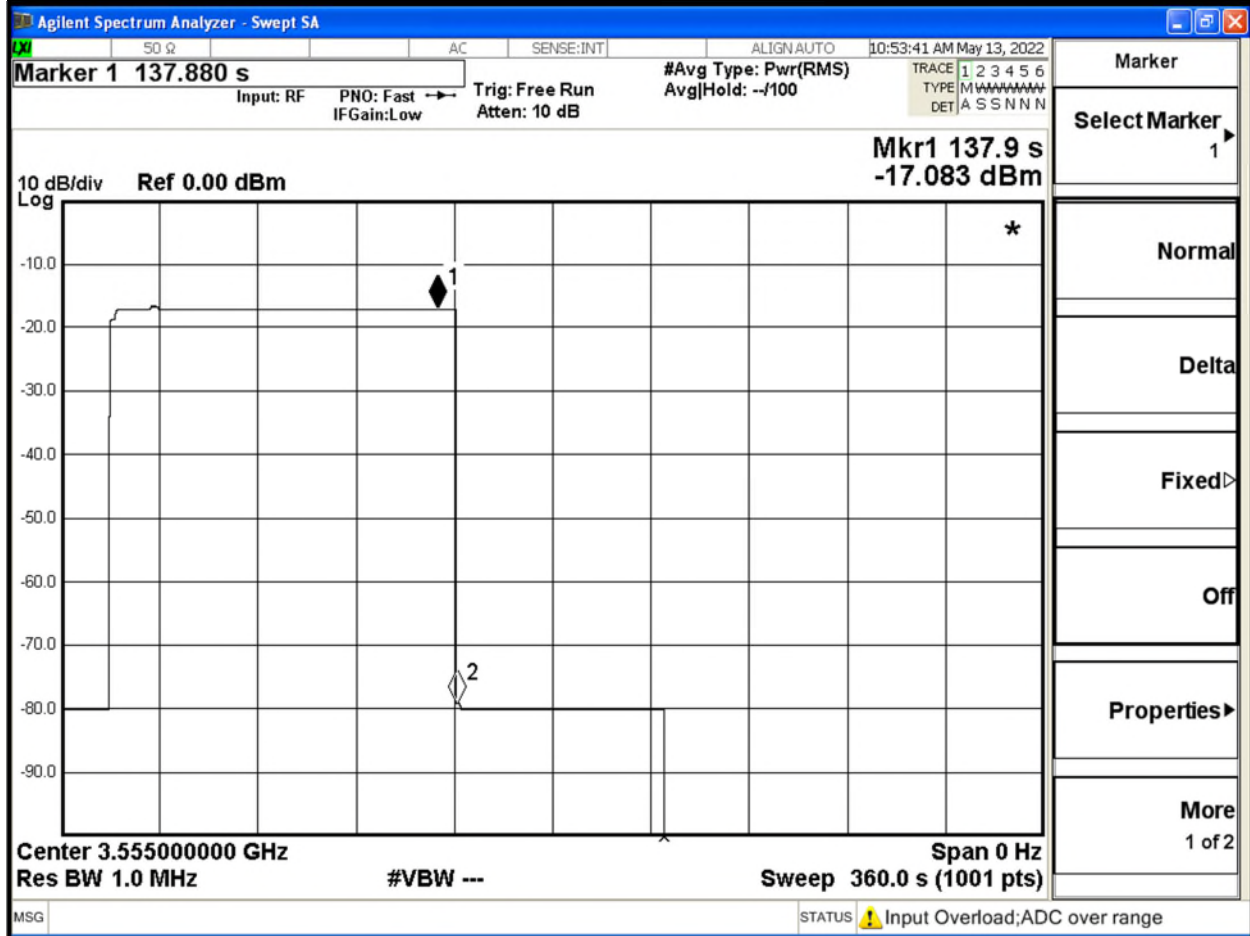
Client	Ericsson	
Product	KRY 901 516/3 DOT 4459 B48 (3550-3700MHz) KRY 901 516/4 DOT 4469 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	


6.5.4.2.5	WINNF.FT.D.MES.5	Domain Proxy Heartbeat Response contains measReportConfig	No RF monitoring	P
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Pass saw “measreportconfig” in logs

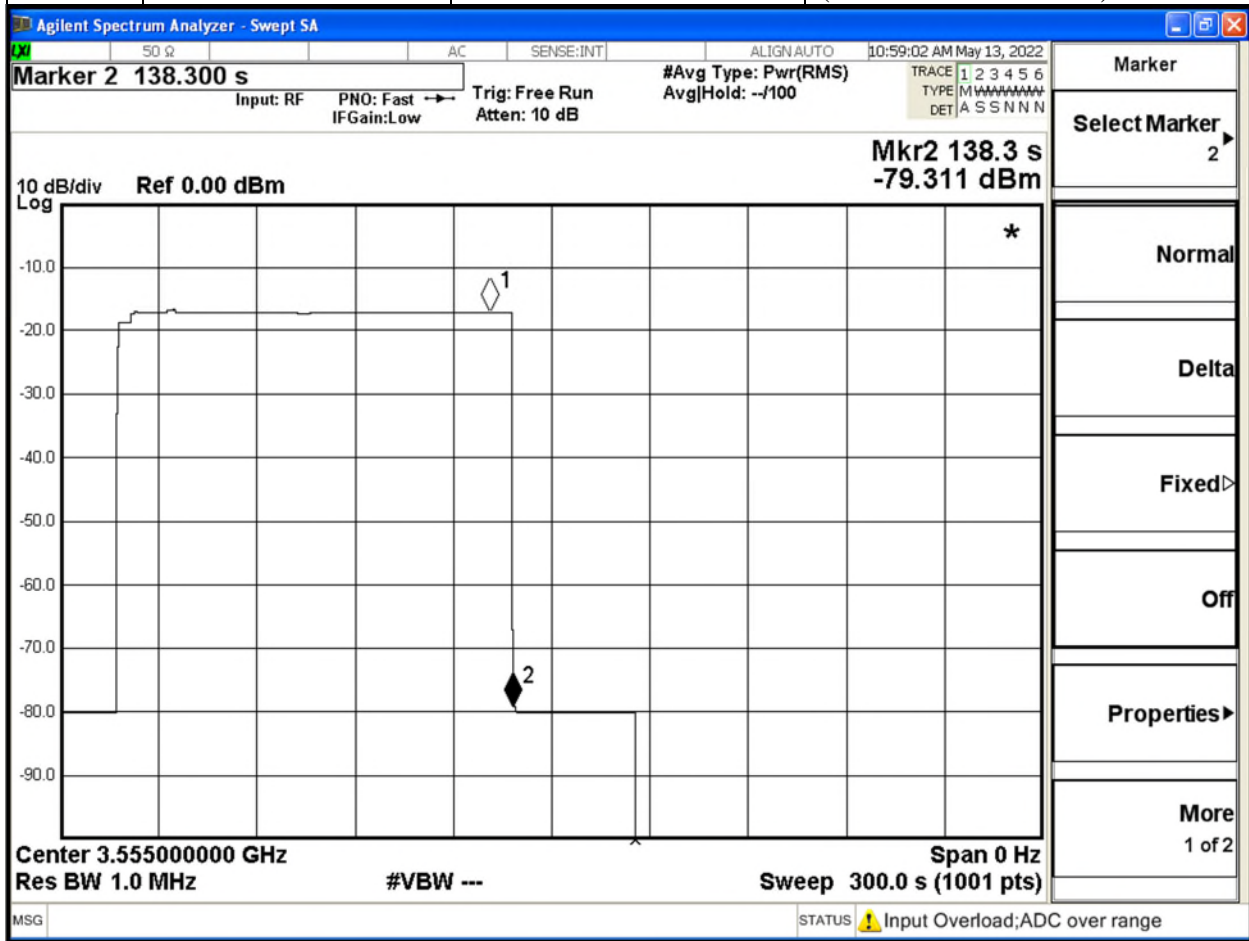
Client	Ericsson	
Product	KRY 901 516/3 DOT 4459 B48 (3550-3700MHz) KRY 901 516/4 DOT 4469 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	


6.6.4.1.2	WINNF.FT.D.RLQ.2	Domain Proxy Successful Relinquishment	Monitor RF transmission. Ensure: <ul style="list-style-type: none"> • CBSD stops transmission at any time prior to sending the relinquishmentRequest message. 	P
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Client	Ericsson	
Product	KRY 901 516/3 DOT 4459 B48 (3550-3700MHz) KRY 901 516/4 DOT 4469 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	


6.7.4.1.2	WINNF.FT.D.DRG.2	Domain Proxy Successful Deregistration	Monitor RF transmission. Ensure: <ul style="list-style-type: none"> • CBSD stops transmission at any time prior to sending the relinquishmentRequest message or deregistrationRequest message (whichever is sent first) 	P
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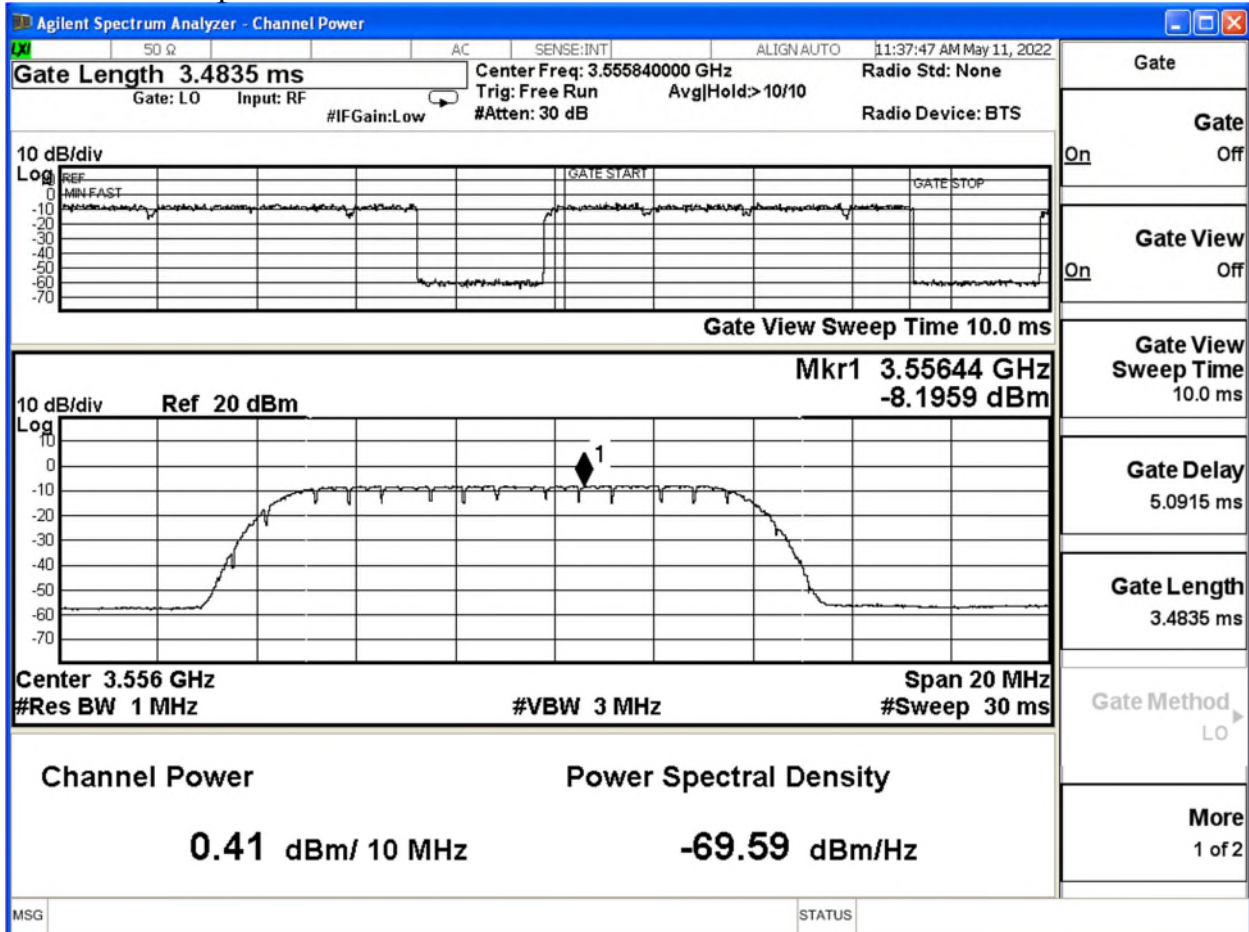
Client	Ericsson	
Product	KRY 901 516/3 DOT 4459 B48 (3550-3700MHz) KRY 901 516/4 DOT 4469 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	


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

7.1.4.1.1	X	X	WINNF.PT.C.H BT	UUT RF Transmit Power Measurement	Power Spectral Density test case. 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.	P
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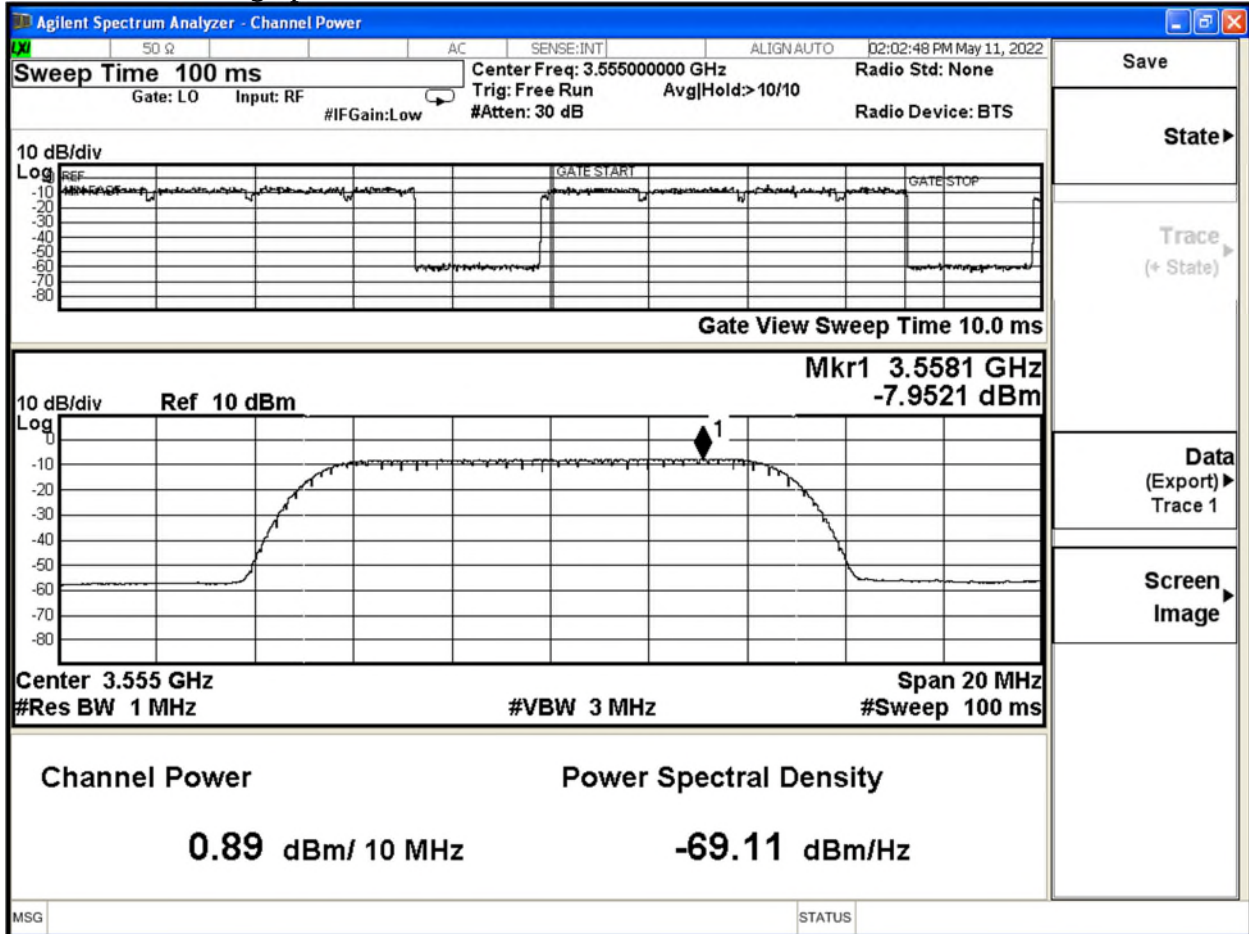
Client	Ericsson	 Canada
Product	KRY 901 516/3 DOT 4459 B48 (3550-3700MHz) KRY 901 516/4 DOT 4469 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	


3555 MHz Low power



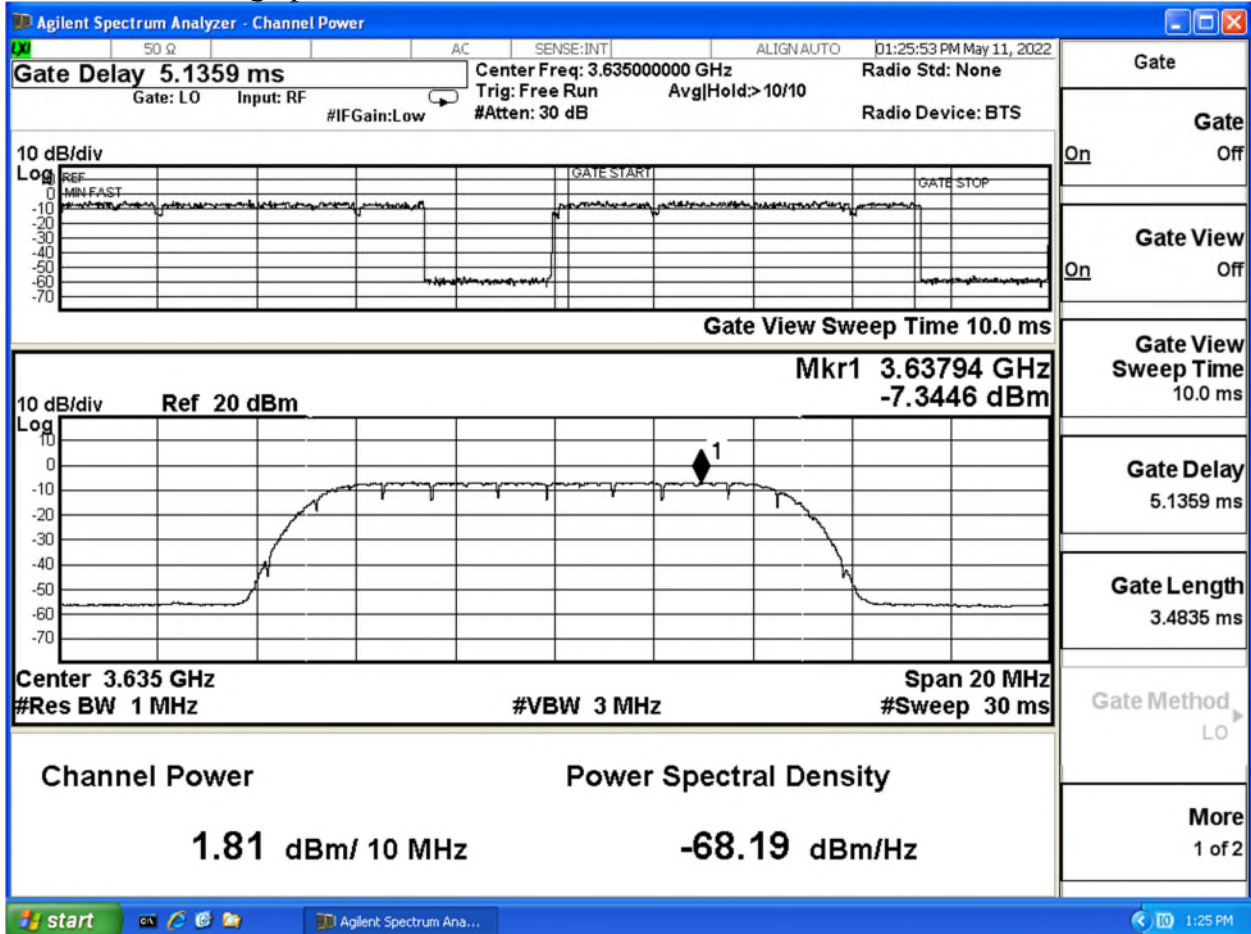
Client	Ericsson	 Canada
Product	KRY 901 516/3 DOT 4459 B48 (3550-3700MHz) KRY 901 516/4 DOT 4469 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	


PSD 3555 MHz High power



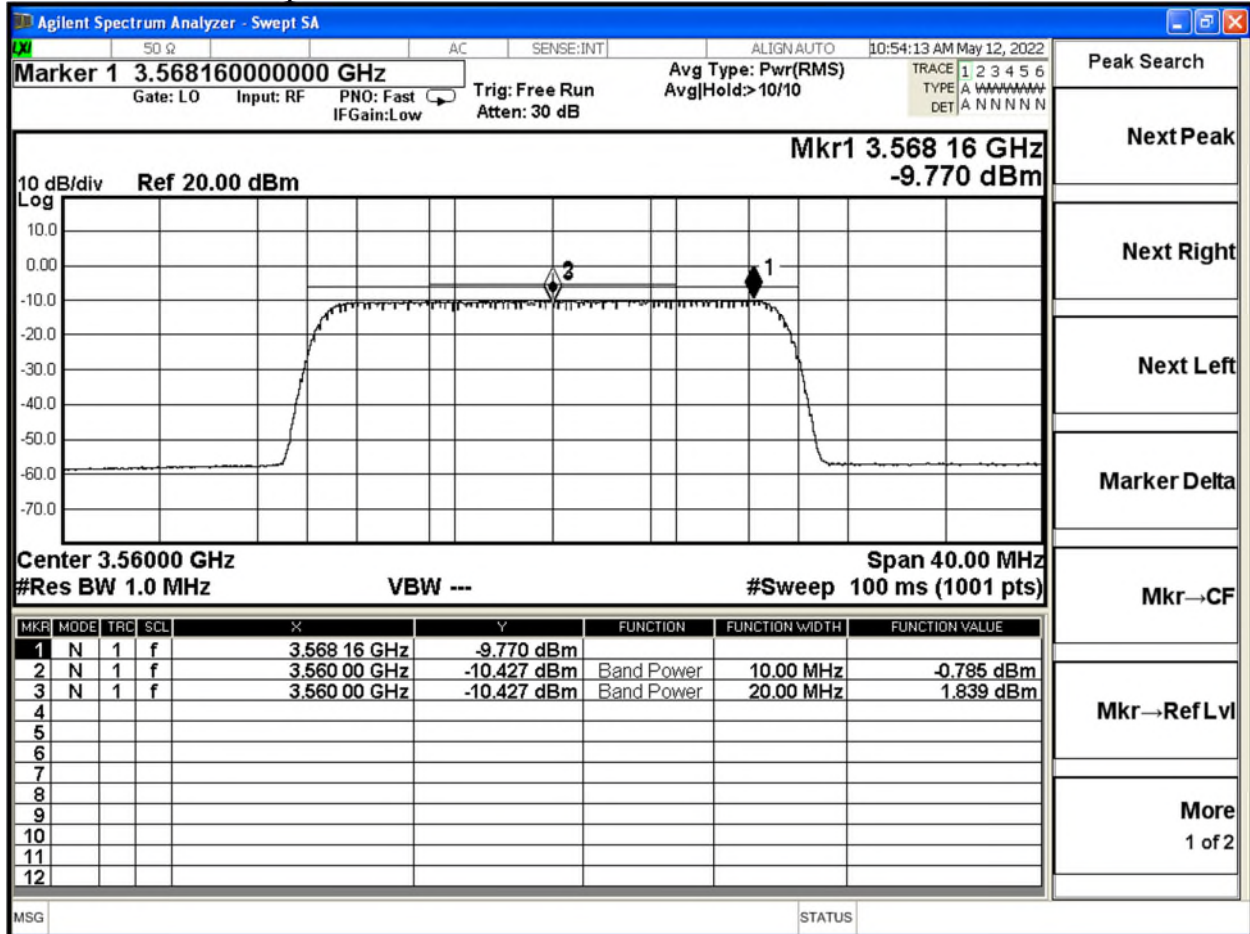
Client	Ericsson	 Canada
Product	KRY 901 516/3 DOT 4459 B48 (3550-3700MHz) KRY 901 516/4 DOT 4469 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

PSD 3635 MHz High power




Client	Ericsson	 Canada
Product	KRY 901 516/3 DOT 4459 B48 (3550-3700MHz) KRY 901 516/4 DOT 4469 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

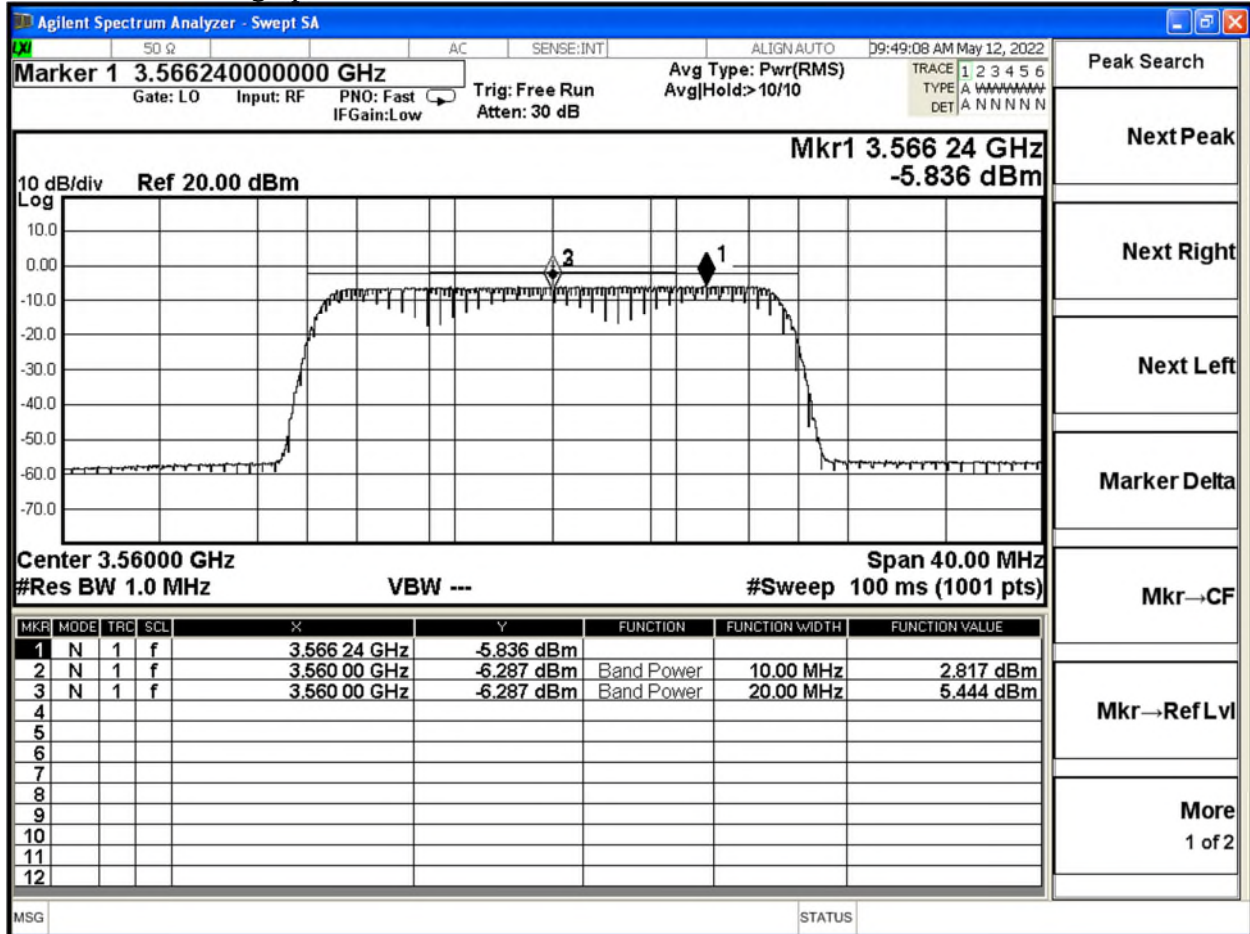
PSD 3560 MHz Low power




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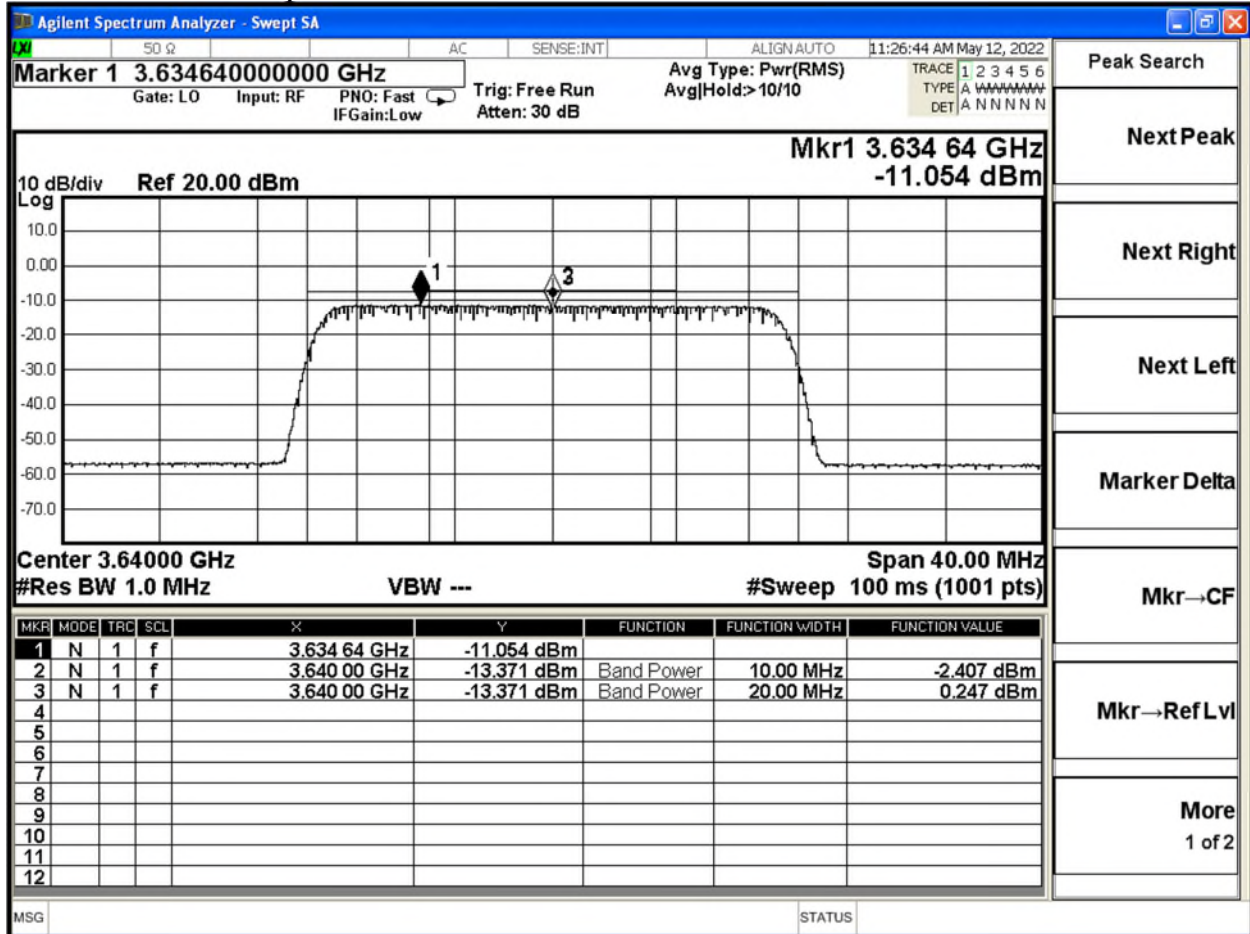
Client	Ericsson	 Canada
Product	KRY 901 516/3 DOT 4459 B48 (3550-3700MHz) KRY 901 516/4 DOT 4469 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

PSD 3560 MHz High power




Client	Ericsson	 Canada
Product	KRY 901 516/3 DOT 4459 B48 (3550-3700MHz) KRY 901 516/4 DOT 4469 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

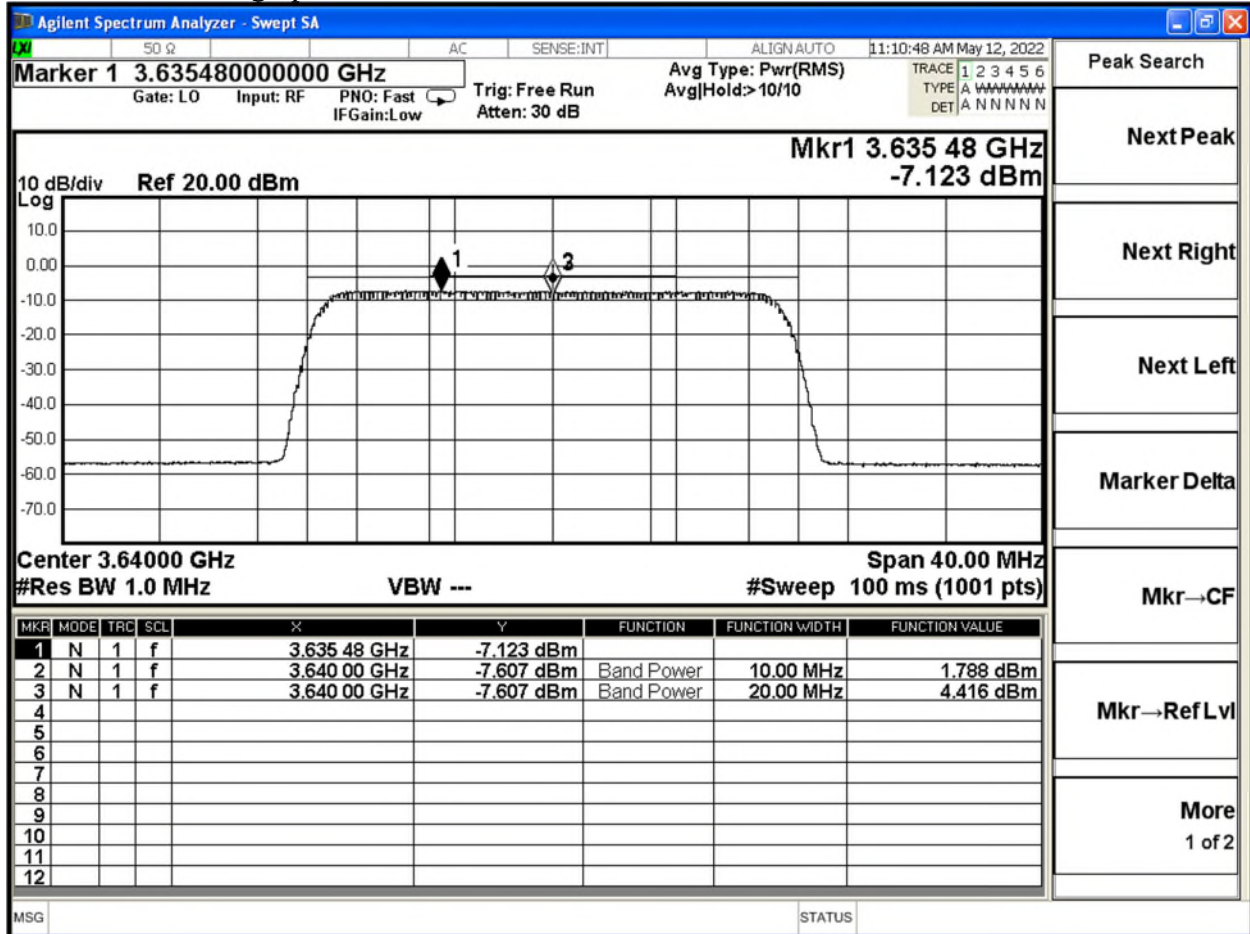
PSD 3640 MHz Low power




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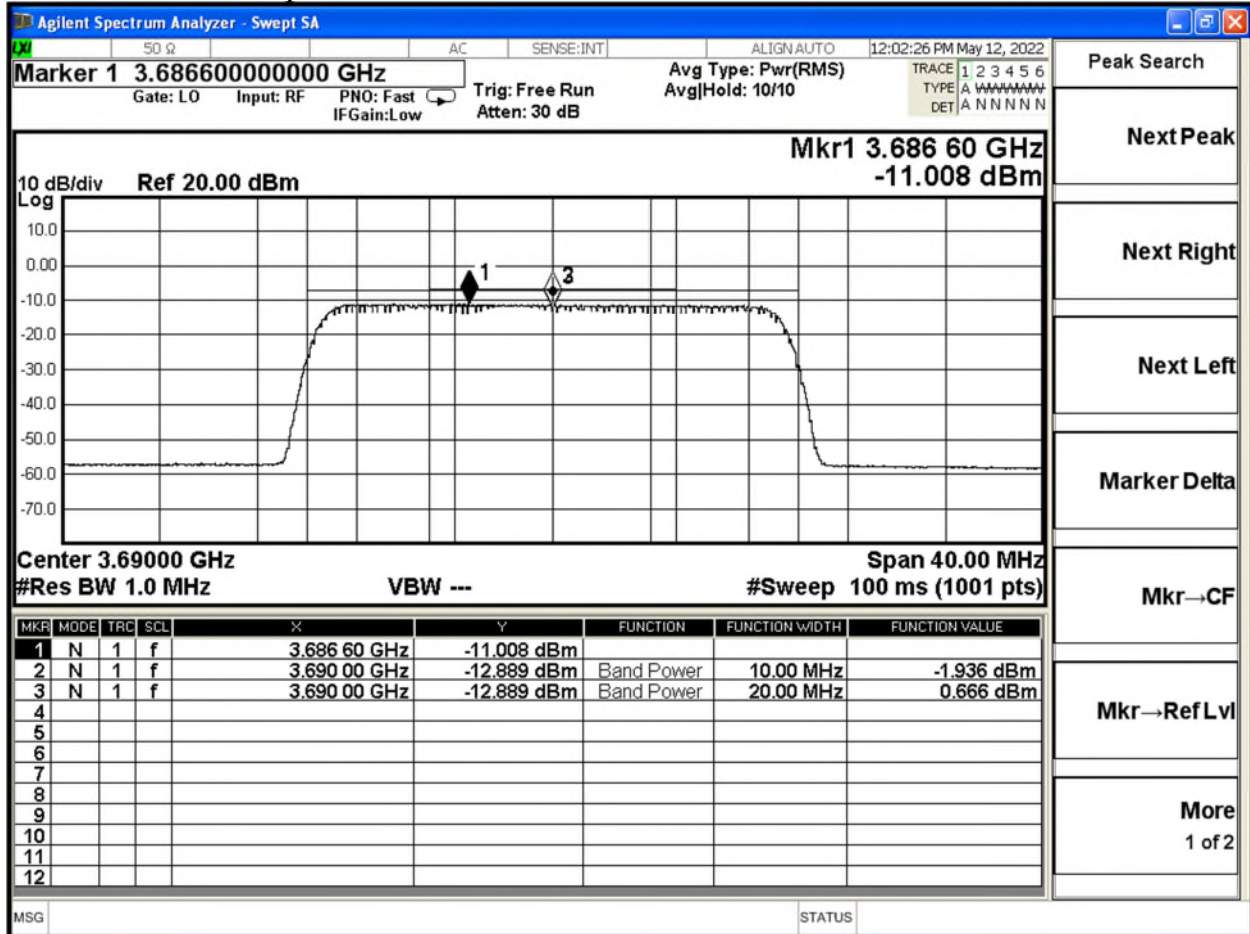
Client	Ericsson	 Canada
Product	KRY 901 516/3 DOT 4459 B48 (3550-3700MHz) KRY 901 516/4 DOT 4469 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	


PSD 3640 MHz High power



Client	Ericsson	 Canada
Product	KRY 901 516/3 DOT 4459 B48 (3550-3700MHz) KRY 901 516/4 DOT 4469 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

PSD 3690 MHz Low power



Client	Ericsson	
Product	KRY 901 516/3 DOT 4459 B48 (3550-3700MHz) KRY 901 516/4 DOT 4469 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

LTE
10MHz


			SA Channel power			SA Marker max value						
Freq	1 MHz EIRP limit (target) dBm	Max EIRP used by DC	Raw dBm/10 MHz	Raw 1 MHz dBm/MHz	External Losses (dB)	Raw dBm/MHz per port	Antenna max gain (dBi)	Number of RF Ports	Port gain (dB)	EIRP 1 MHz (dBm/MHz) total EIRP	Margin (dB)	EIRP 10 MHz total EIRP
	dBm/MHz	dBm/MHz	dBm/10 MHz		dB		dBi	#	dB	dBm/MHz	dB	dBm
3555	20	20	2.9	8.6353	14.3	-5.66	5.29	4	6.02	19.95	0.05	28.51
3555	18	18	0.9	6.52	14.3	-7.78	5.29	4	6.02	17.83	0.17	26.51
3635	20	20	1.81	6.74	14.3	-7.56	5.29	4	6.02	18.05	1.95	27.42
3635	18	18	-0.4	5.1785	14.3	-9.12	5.29	4	6.02	16.49	1.51	25.21
3695	20	20	1.7	7.4908	14.3	-6.81	5.29	4	6.02	18.80	1.20	27.31
3695	18	18	-0.37	5.46	14.3	-8.84	5.29	4	6.02	16.77	1.23	25.24

Note: EIRP Target was the SAS grant target value.

NR
20MHz

	SAS Grant		SA Channel power			SA Marker max value						
Freq	1 MHz EIRP limit (target) dBm	Max EIRP used by DC	Raw dBm/10 MHz	Raw 1 MHz dBm/MHz	External Losses (dB)	Raw dBm/MHz per port	Antenna max gain (dBi)	Number of RF Ports	Port gain (dB)	EIRP 1 MHz (dBm/MHz) total EIRP	Margin (dB)	EIRP 10 MHz total EIRP
	dBm/MHz	dBm/MHz	dBm/10 MHz		dB		dBi	#	dB	dBm/MHz	dB	dBm
3560	20	20	2.82	8.5	14.3	-5.80	5.29	4	6.02	19.81	0.19	28.43
3560	16	16	-0.8	4.58	14.3	-9.72	5.29	4	6.02	15.89	0.11	24.81
3640	20	20	1.78	7.25	14.3	-7.05	5.29	4	6.02	18.56	1.44	27.39
3640	16	16	-2.4	3.247	14.3	-11.05	5.29	4	6.02	14.56	1.44	23.21
3690	20	20	1.72	7.41	14.3	-6.89	5.29	4	6.02	18.72	1.28	27.33
3690	16	16	-1.94	3.31	14.3	-10.99	5.29	4	6.02	14.62	1.38	23.67

Note: EIRP Target was the SAS grant target value.

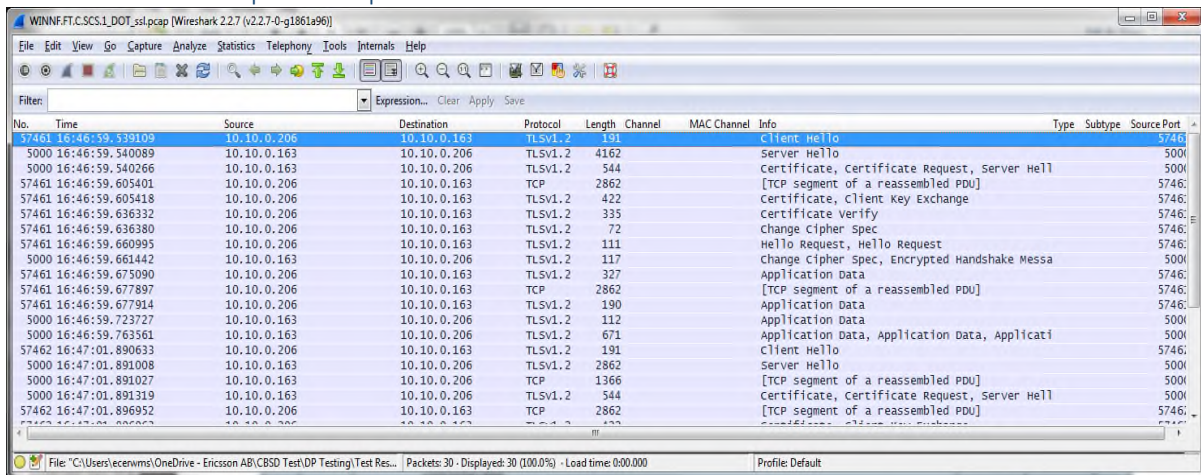
Client	Ericsson	
Product	KRY 901 516/3 DOT 4459 B48 (3550-3700MHz) KRY 901 516/4 DOT 4469 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

DOT CBRS Radio: WINNF / Security Test Case Analysis

WINNF Security Test Case Analysis

WINNF.FT.C.SCS.1


Packet Capture Sequence



No.	Time	Source	Destination	Protocol	Length	Channel	MAC Channel	Info	Type	Subtype	Source Port
57461	16:46:59.539109	10.10.0.206	10.10.0.163	TLsv1.2	191			Client Hello			5746
5000	16:46:59.540089	10.10.0.163	10.10.0.206	TLsv1.2	4162			Server Hello			5000
5000	16:46:59.540266	10.10.0.163	10.10.0.206	TLsv1.2	544			Certificate, Certificate Request, Server Hell			5000
57461	16:46:59.605401	10.10.0.206	10.10.0.163	TCP	2862			[TCP segment of a reassembled PDU]			5746
57461	16:46:59.605418	10.10.0.206	10.10.0.163	TLsv1.2	422			Certificate, Client Key Exchange			5746
57461	16:46:59.636332	10.10.0.206	10.10.0.163	TLsv1.2	335			Certificate verify			5746
57461	16:46:59.636380	10.10.0.206	10.10.0.163	TLsv1.2	72			Change cipher spec			5746
57461	16:46:59.660995	10.10.0.206	10.10.0.163	TLsv1.2	111			Hello Request, Hello Request			5746
5000	16:46:59.661442	10.10.0.163	10.10.0.206	TLsv1.2	117			Change cipher spec, Encrypted Handshake Messa			5000
57461	16:46:59.675090	10.10.0.206	10.10.0.163	TLsv1.2	327			Application data			5746
57461	16:46:59.677897	10.10.0.206	10.10.0.163	TCP	2862			[TCP segment of a reassembled PDU]			5746
57461	16:46:59.677914	10.10.0.206	10.10.0.163	TLsv1.2	190			Application data			5746
5000	16:46:59.723727	10.10.0.163	10.10.0.206	TLsv1.2	112			Application data			5000
5000	16:46:59.763561	10.10.0.163	10.10.0.206	TLsv1.2	671			Application data, Application Data, Applicati			5000
57462	16:47:01.890633	10.10.0.206	10.10.0.163	TLsv1.2	191			Client Hello			5746
5000	16:47:01.891008	10.10.0.163	10.10.0.206	TLsv1.2	2862			Server Hello			5000
5000	16:47:01.891027	10.10.0.163	10.10.0.206	TCP	1366			[TCP segment of a reassembled PDU]			5000
5000	16:47:01.891319	10.10.0.163	10.10.0.206	TLsv1.2	544			Certificate, Certificate Request, Server Hell			5000
57462	16:47:01.896952	10.10.0.206	10.10.0.163	TCP	2862			[TCP segment of a reassembled PDU]			5746

WINNF test requirements:


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

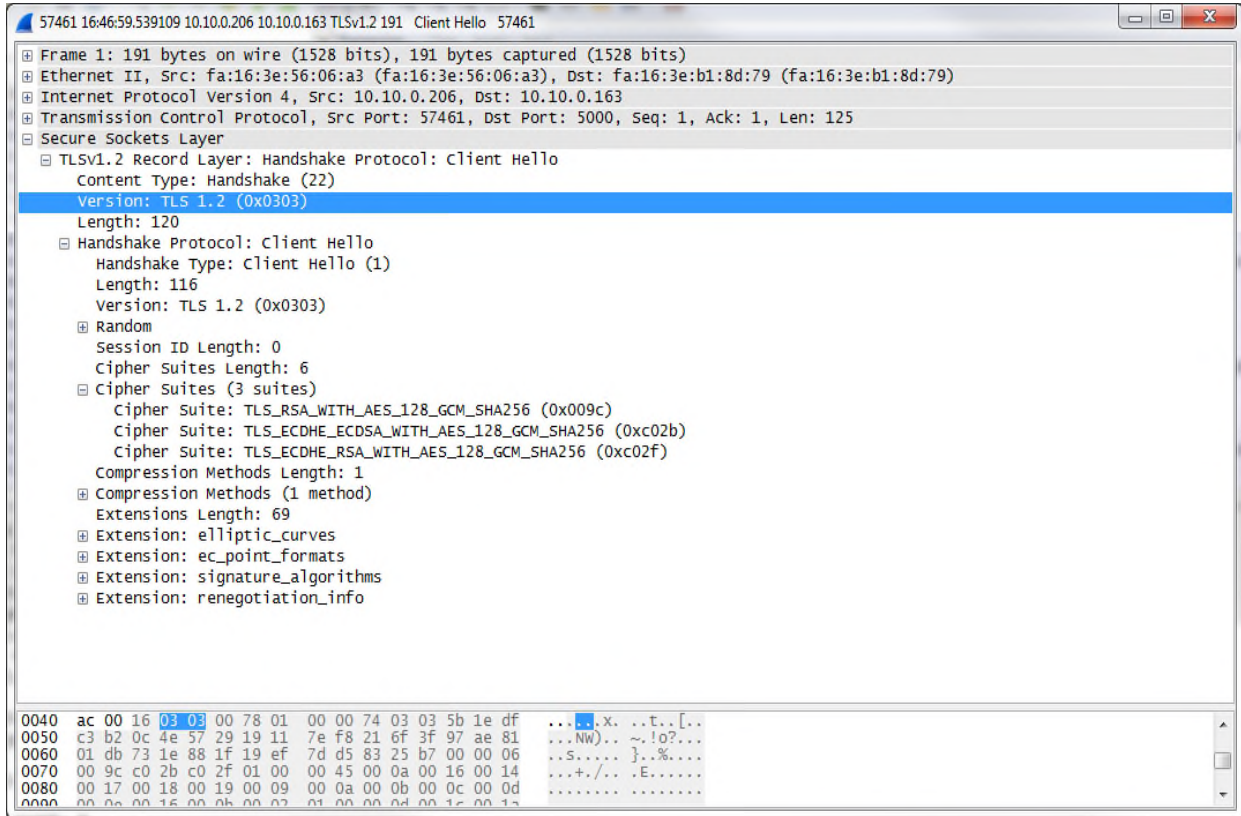
Client	Ericsson	
Product	KRY 901 516/3 DOT 4459 B48 (3550-3700MHz) KRY 901 516/4 DOT 4469 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

2	<ul style="list-style-type: none"> • Make sure that Mutual authentication happens between UUT and the SAS Test Harness. • Make sure that UUT uses TLS v1.2 • Make sure that cipher suites from one of the following is selected, <ul style="list-style-type: none"> • TLS_RSA_WITH_AES_128_GCM_SHA256 • TLS_RSA_WITH_AES_256_GCM_SHA384 • TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256 • TLS_ECDHE_ECDSA_WITH_AES_256_GCM_SHA384 • TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256 	PASS	FAIL
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Analysis of WINNF Test Requirements

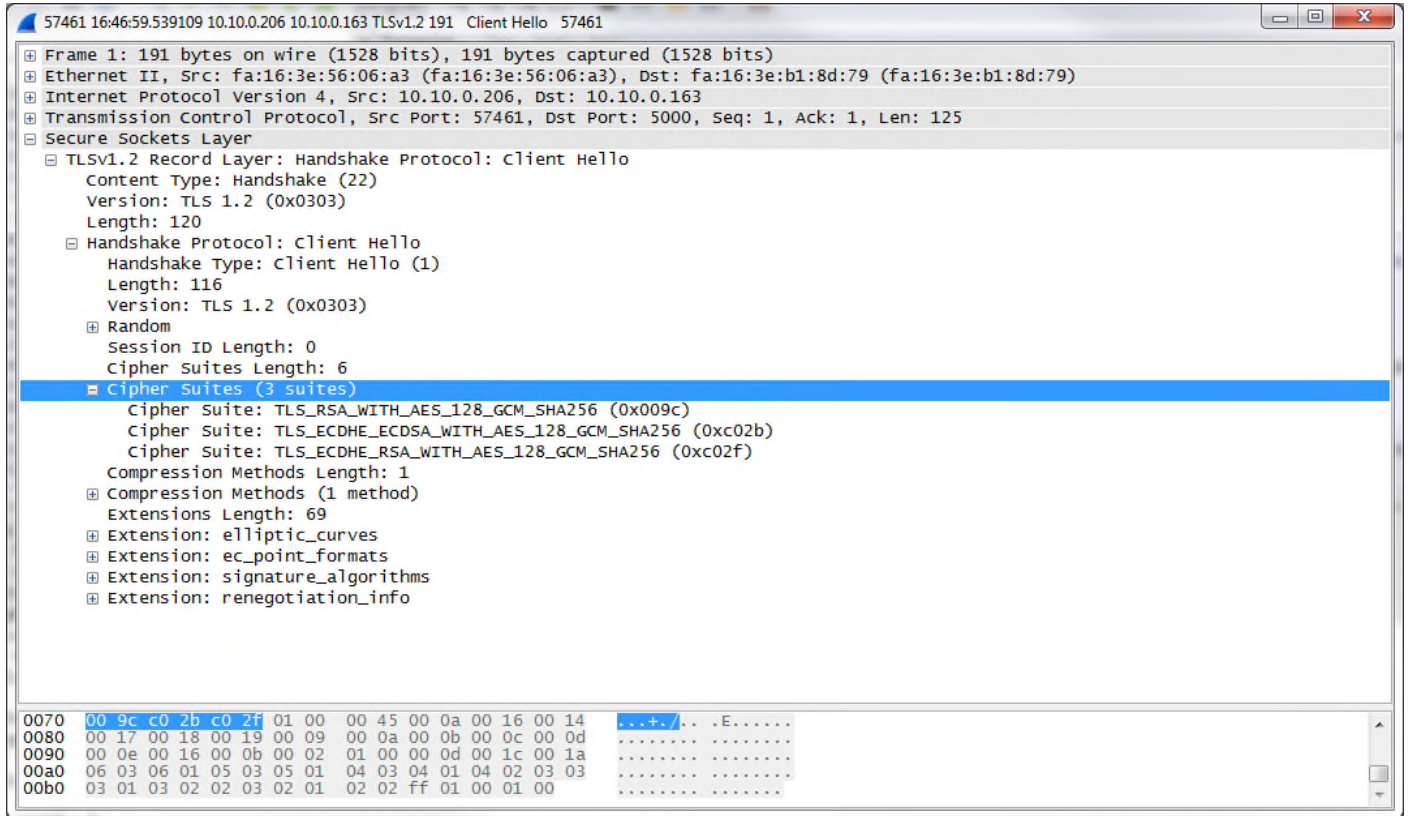
1. From Client Hello: TLS version = TLS 1.2

Client	Ericsson	
Product	KRY 901 516/3 DOT 4459 B48 (3550-3700MHz) KRY 901 516/4 DOT 4469 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	




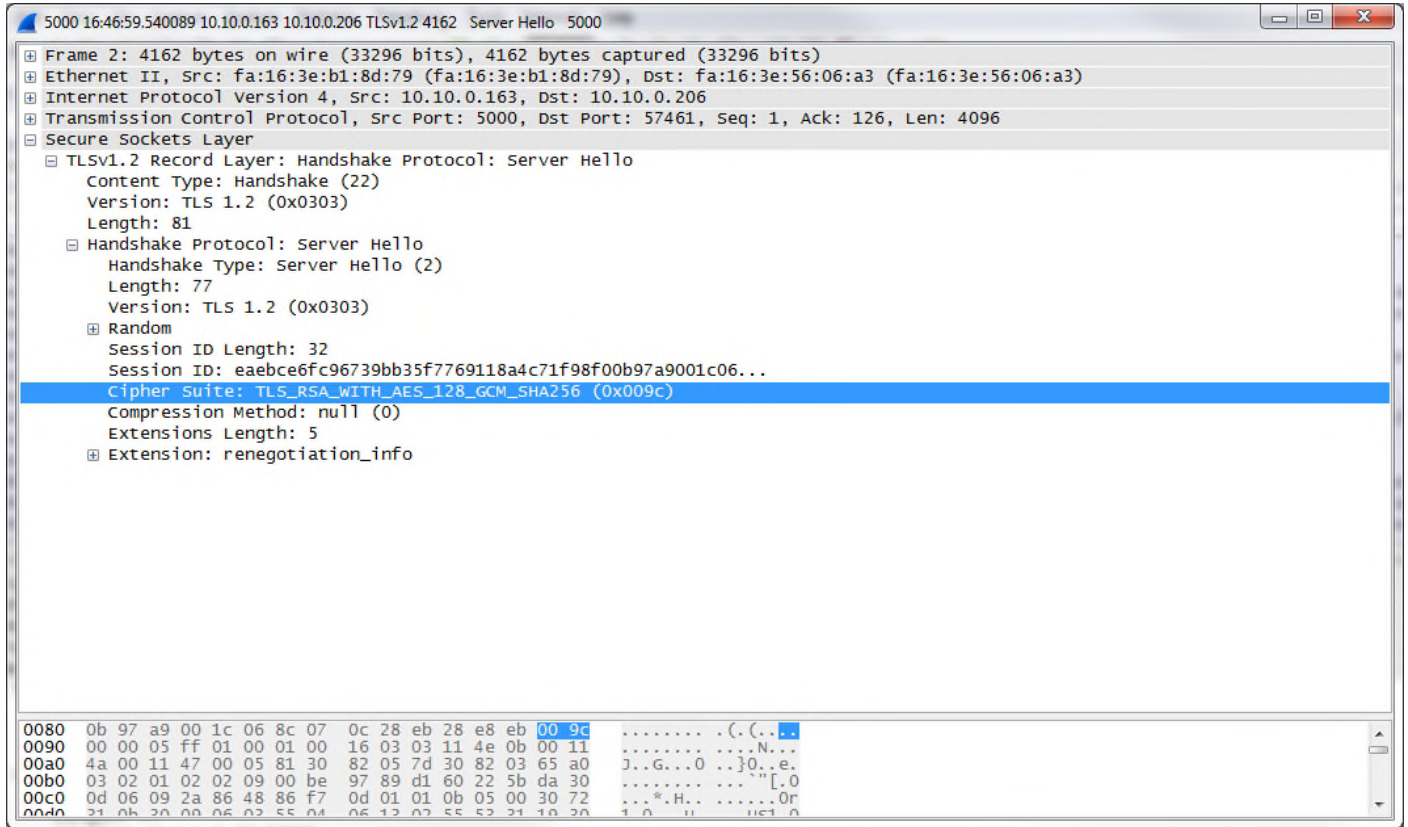
2. Cipher suite list from Client Hello is from WINNF approved list:
 TLS_RSA_WITH_AES_128_GCM_SHA25
 TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256
 TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256

Client	Ericsson	
Product	KRY 901 516/3 DOT 4459 B48 (3550-3700MHz) KRY 901 516/4 DOT 4469 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	




3. Cipher suite chosen (from Server Hello):
 TLS_RSA_WITH_AES_128_GCM_SHA256

Client	Ericsson	
Product	KRY 901 516/3 DOT 4459 B48 (3550-3700MHz) KRY 901 516/4 DOT 4469 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

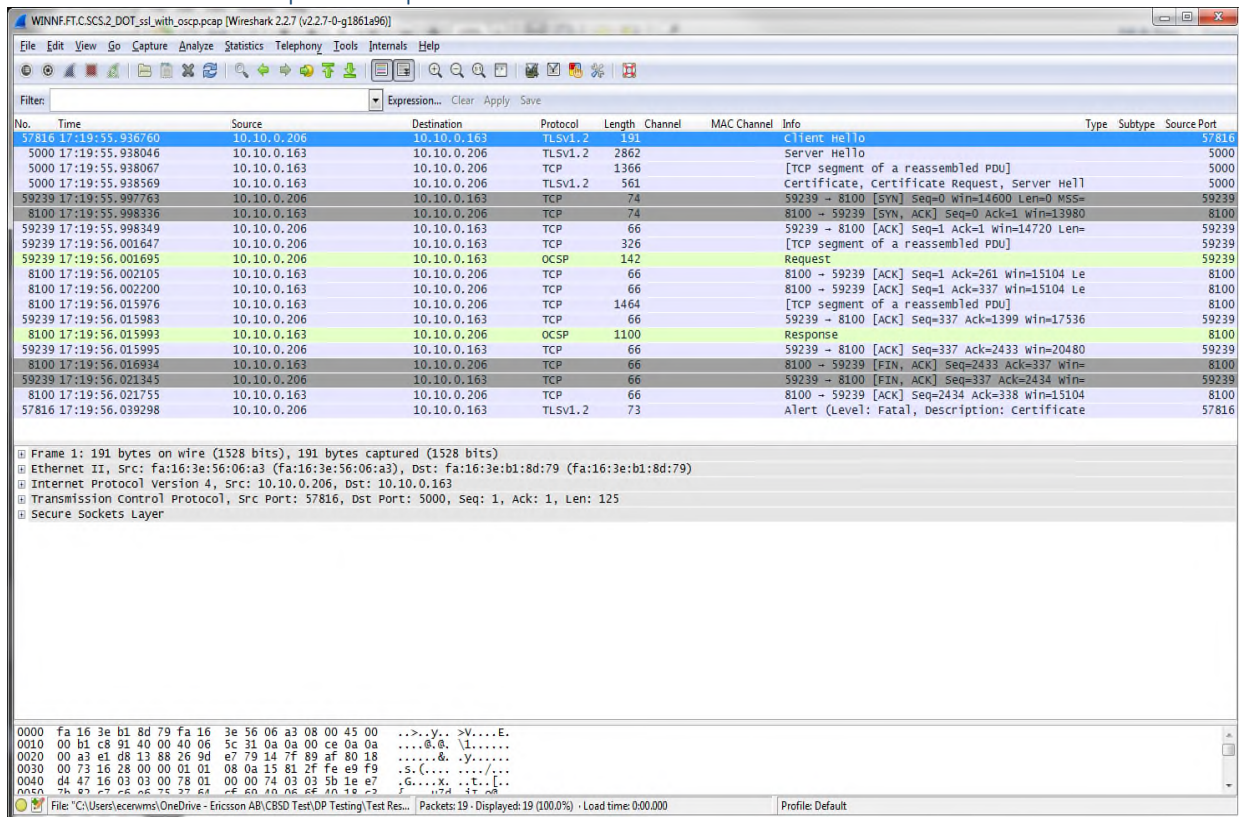


4. The Registration request message arrived at the Test Harness, so authentication was completed.

Client	Ericsson	
Product	KRY 901 516/3 DOT 4459 B48 (3550-3700MHz) KRY 901 516/4 DOT 4469 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

WINNF.FT.C.SCS.2

Packet Capture Sequence



The packet capture shows a TLS handshake between source IP 10.10.0.206 and destination IP 10.10.0.163. The handshake steps are as follows:

- Client Hello:** Seq=1, Len=125
- Server Hello:** Seq=1, Len=125
- Certificate:** Seq=1, Len=125
- OCSP Request:** Seq=1, Len=125
- OCSP Response:** Seq=1, Len=125
- Alert (Level: Fatal, Description: Certificate):** Seq=1, Len=125


WINNF Test Requirements:

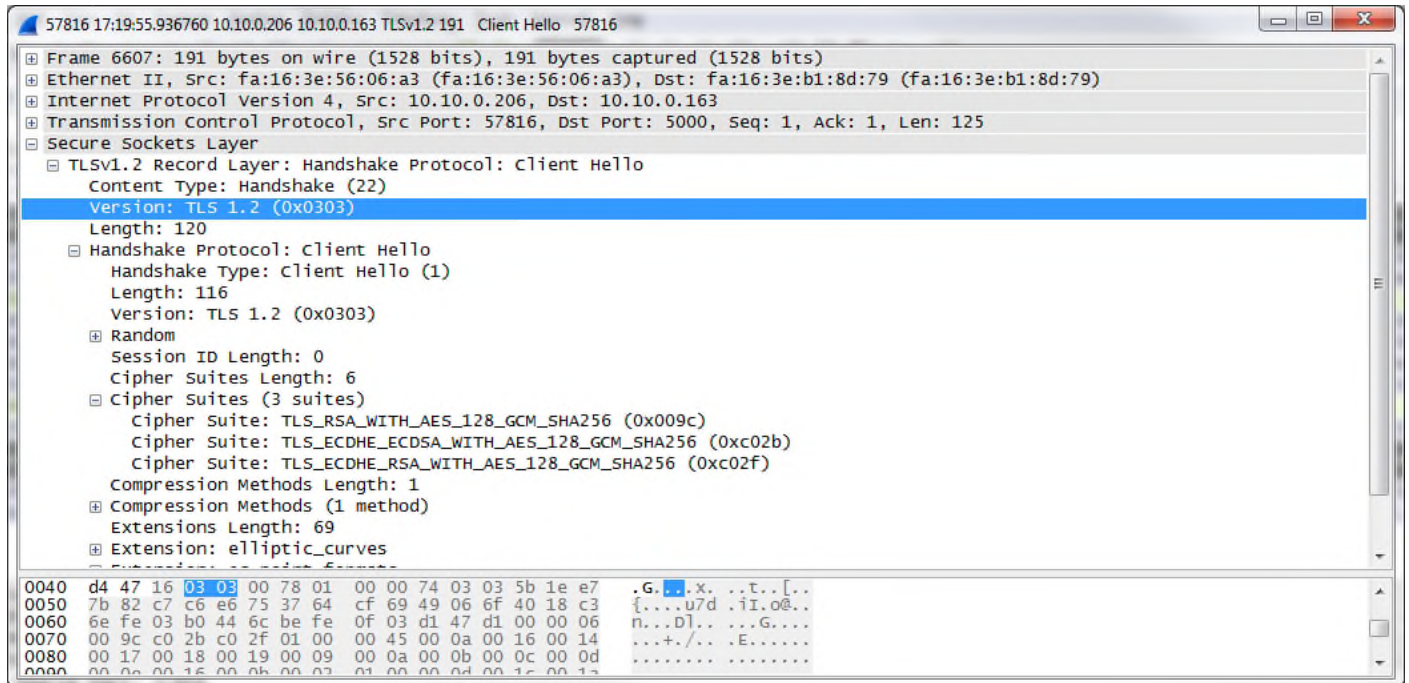
WINNF test requirements from WINNF-TS-0122-V1.0.0 CBRS CBSD Test Specification:

2	<ul style="list-style-type: none"> • 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 UUT and the SAS Test Harness. 	PASS	FAIL
---	--	------	------

Analysis of WINNF Test Requirements


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

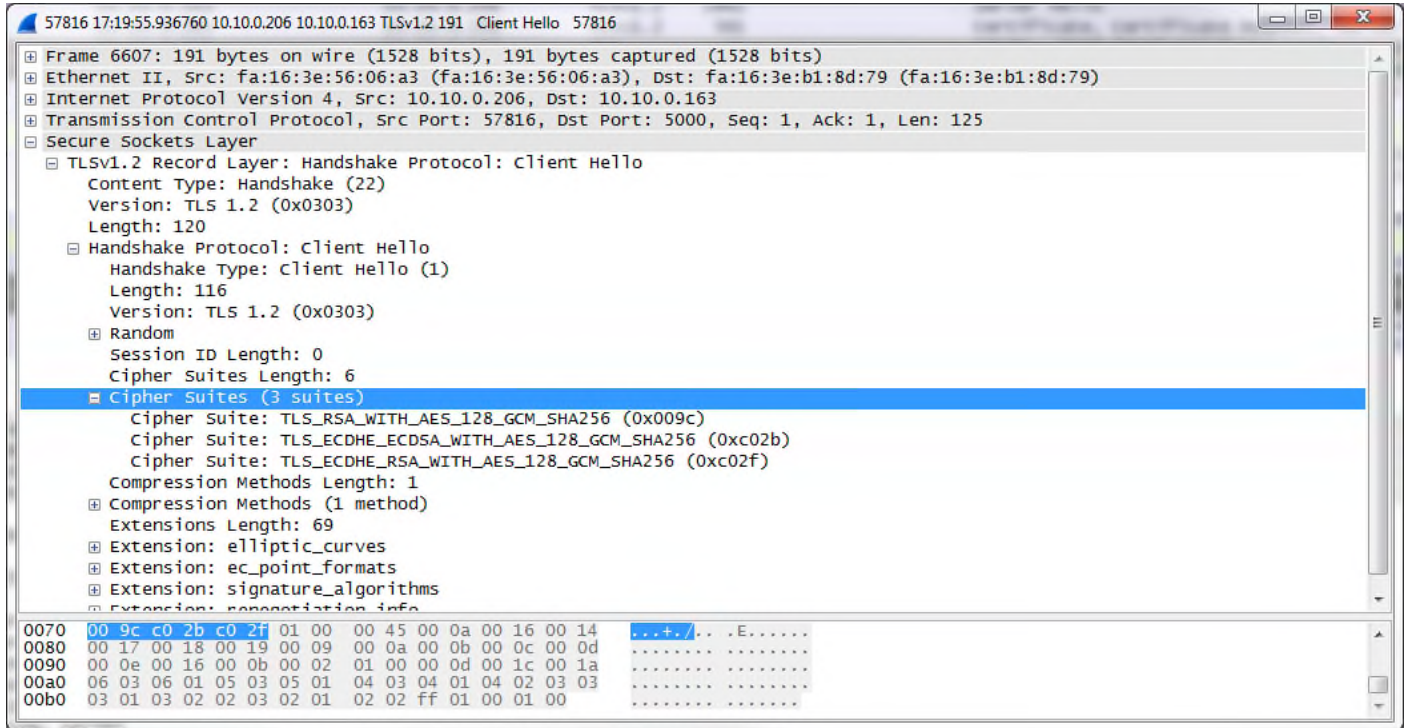
Client	Ericsson	
Product	KRY 901 516/3 DOT 4459 B48 (3550-3700MHz) KRY 901 516/4 DOT 4469 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	




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

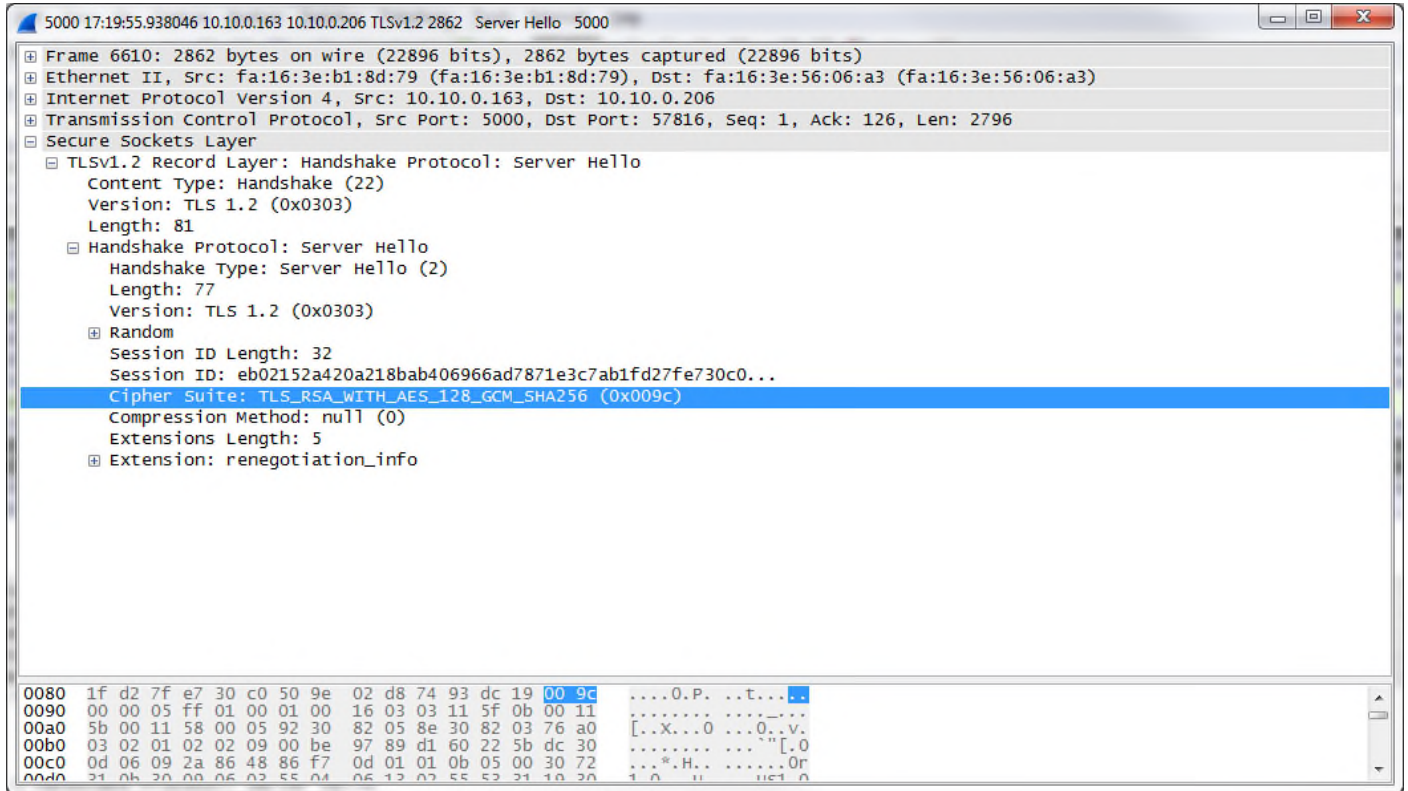
TLS_RSA_WITH_AES_128_GCM_SHA25
 TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256
 TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256

Client	Ericsson	
Product	KRY 901 516/3 DOT 4459 B48 (3550-3700MHz) KRY 901 516/4 DOT 4469 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	




- From Server Hello, cipher suite chosen:
TLS_RSA_WITH_AES_128_GCM_SHA256

Client	Ericsson	
Product	KRY 901 516/3 DOT 4459 B48 (3550-3700MHz) KRY 901 516/4 DOT 4469 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	



4. Read OSCP Request/Response to/from server:

Client	Ericsson	
Product	KRY 901 516/3 DOT 4459 B48 (3550-3700MHz) KRY 901 516/4 DOT 4469 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	

59239 17:19:56.001695 10.10.0.206 10.10.0.163 OCSP 142 Request 59239


- ⊕ Frame 6631: 142 bytes on wire (1136 bits), 142 bytes captured (1136 bits)
- ⊕ Ethernet II, Src: fa:16:3e:56:06:a3 (fa:16:3e:56:06:a3), Dst: fa:16:3e:b1:8d:79 (fa:16:3e:b1:8d:79)
- ⊕ Internet Protocol Version 4, Src: 10.10.0.206, Dst: 10.10.0.163
- ⊕ Transmission Control Protocol, Src Port: 59239, Dst Port: 8100, Seq: 261, Ack: 1, Len: 76
- ⊕ [2 Reassembled TCP Segments (336 bytes): #6630(260), #6631(76)]
- ⊕ Hypertext Transfer Protocol
- ⊕ Online Certificate Status Protocol
 - ⊖ tbsRequest
 - ⊖ requestList: 1 item
 - ⊖ Request
 - ⊖ reqCert
 - ⊖ hashAlgorithm (SHA-1)
 - Algorithm Id: 1.3.14.3.2.26 (SHA-1)
 - issuerNameHash: 5368d21d2529427538588c5ccb4c4e6f3b96641
 - issuerKeyHash: 28dfa5dc7e01810db98617066e4d66400f514713
 - serialNumber: 13733597121043651548

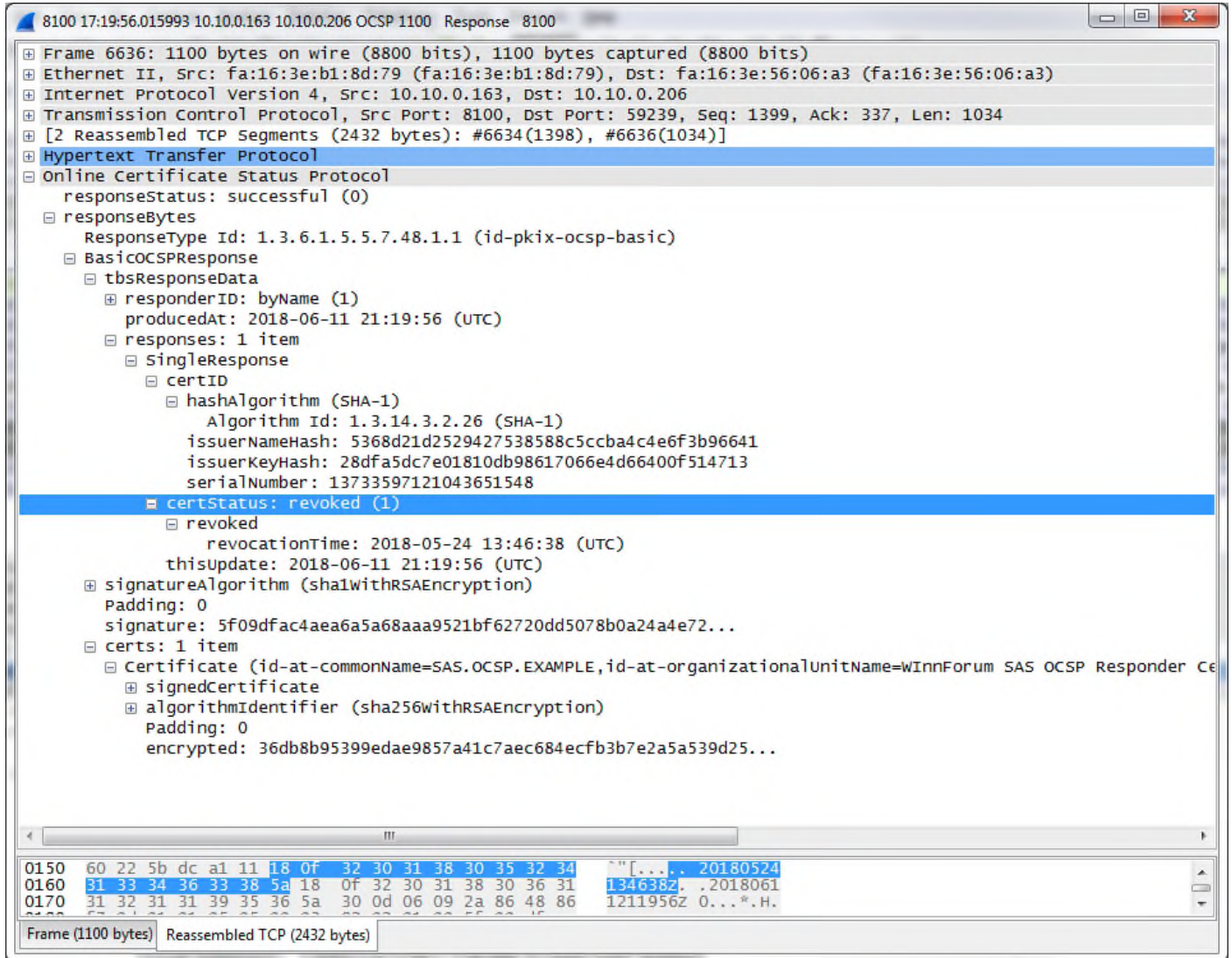
```

0100  0d 0a 0d 0a 30 4a 30 48 30 46 30 44 30 42 30 09  ....0J0H 0F0D0B0.
0110  06 05 2b 0e 03 02 1a 05 00 04 14 53 68 d2 1d 25  ..+..... ..sh..%
0120  29 42 75 38 58 8c 5c cb a4 c4 e6 f3 b9 66 41 04  )Bu8X.\. ....fA.

```

Frame (142 bytes) Reassembled TCP (336 bytes)

Client	Ericsson	
Product	KRY 901 516/3 DOT 4459 B48 (3550-3700MHz) KRY 901 516/4 DOT 4469 B48 (3550-3700MHz)	
Standard(s)	FCC Part 96 SAS requirements (CBRS Test Plan)	



8100 17:19:56.015993 10.10.0.163 10.10.0.206 OCSP 1100 Response 8100

- Frame 6636: 1100 bytes on wire (8800 bits), 1100 bytes captured (8800 bits)
- Ethernet II, Src: fa:16:3e:b1:8d:79 (fa:16:3e:b1:8d:79), Dst: fa:16:3e:56:06:a3 (fa:16:3e:56:06:a3)
- Internet Protocol Version 4, Src: 10.10.0.163, Dst: 10.10.0.206
- Transmission Control Protocol, Src Port: 8100, Dst Port: 59239, Seq: 1399, Ack: 337, Len: 1034
- [2 Reassembled TCP Segments (2432 bytes): #6634(1398), #6636(1034)]
- Hypertext Transfer Protocol
- Online Certificate Status Protocol
 - responsestatus: successful (0)
 - responseBytes
 - ResponseType Id: 1.3.6.1.5.5.7.48.1.1 (id-pkix-ocsp-basic)
 - BasicOCSPResponse
 - tbsResponseData
 - responderID: byName (1)
 - producedAt: 2018-06-11 21:19:56 (UTC)
 - responses: 1 item
 - SingleResponse
 - certID
 - hashAlgorithm (SHA-1)
 - Algorithm Id: 1.3.14.3.2.26 (SHA-1)
 - issuerNameHash: 5368d21d2529427538588c5ccba4c4e6f3b96641
 - issuerKeyHash: 28dfa5dc7e01810db98617066e4d66400f514713
 - serialNumber: 13733597121043651548
 - certStatus: revoked (1)
 - revoked
 - revocationTime: 2018-05-24 13:46:38 (UTC)
 - thisUpdate: 2018-06-11 21:19:56 (UTC)
 - signatureAlgorithm (sha1withRSAEncryption)
 - Padding: 0
 - signature: 5f09dfac4aea6a5a68aaa9521bf62720dd5078b0a24a4e72...
 - certs: 1 item
 - Certificate (id-at-commonName=SAS.OCSP.EXAMPLE,id-at-organizationalUnitName=WinnForum SAS OCSP Responder Ce
 - signedCertificate
 - algorithmIdentifier (sha256withRSAEncryption)
 - Padding: 0
 - encrypted: 36db8b95399edae9857a41c7aec684ecfb3b7e2a5a539d25...


0150 60 22 5b dc a1 11 18 0f 32 30 31 38 30 35 32 34 ~"[...].20180524

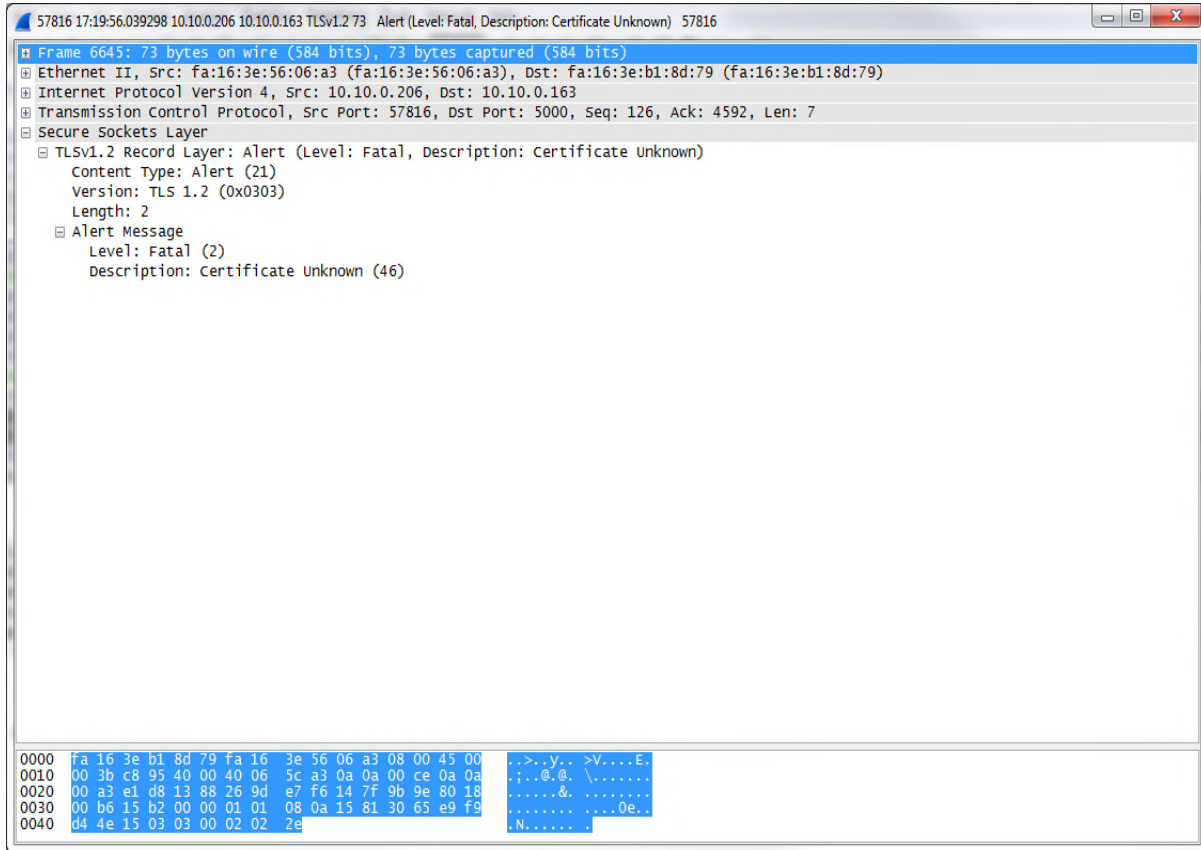
0160 31 33 34 36 33 38 5a 18 0f 32 30 31 38 30 36 31 134638Z].2018061

0170 31 32 31 31 39 35 36 5a 30 0d 06 09 2a 86 48 86 1211956Z 0...*.H.


Frame (1100 bytes) Reassembled TCP (2432 bytes)

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

| | | |
|-------------|--|---|
| Client | Ericsson |  |
| Product | KRY 901 516/3 DOT 4459 B48 (3550-3700MHz)
KRY 901 516/4 DOT 4469 B48 (3550-3700MHz) | |
| Standard(s) | FCC Part 96 SAS requirements (CBRS Test Plan) | |

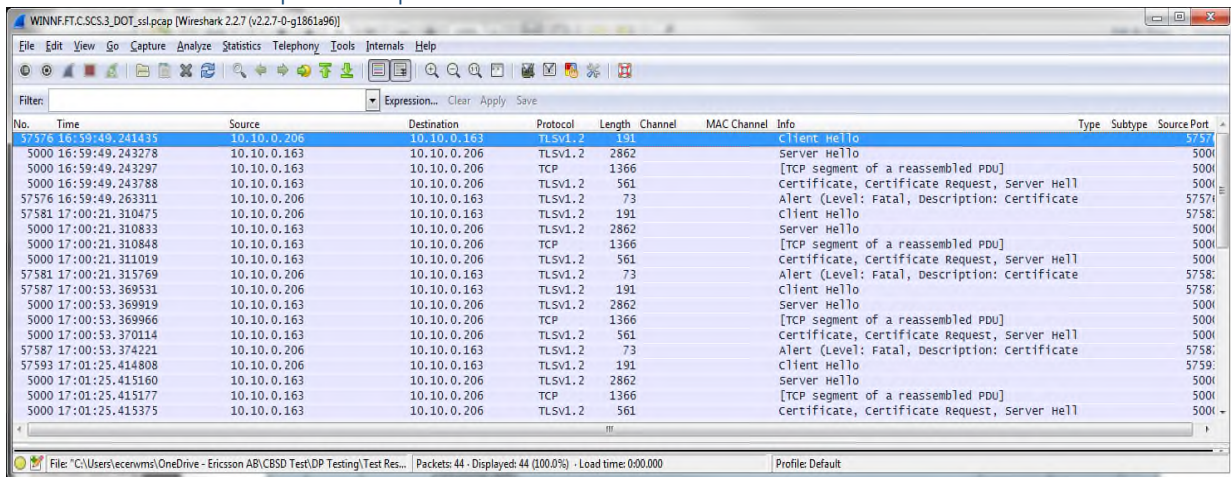


6. Registration request message is not received at Test Harness (authentication fails)

| | | |
|-------------|--|---|
| Client | Ericsson |  |
| Product | KRY 901 516/3 DOT 4459 B48 (3550-3700MHz)
KRY 901 516/4 DOT 4469 B48 (3550-3700MHz) | |
| Standard(s) | FCC Part 96 SAS requirements (CBRS Test Plan) | |

WINNF.FT.C.SCS.3

Packet Capture Sequence



| No. | Time | Source | Destination | Protocol | Length | Channel | MAC Channel | Info | Type | Subtype | Source Port |
|-------|-----------------|-------------|-------------|----------|--------|---------|-------------|---|------|---------|-------------|
| 57576 | 16:59:49.241435 | 10.10.0.206 | 10.10.0.163 | TLSv1.2 | 191 | | | Client Hello | | | 57576 |
| 5000 | 16:59:49.243278 | 10.10.0.163 | 10.10.0.206 | TLSv1.2 | 2862 | | | Server Hello | | | 5000 |
| 5000 | 16:59:49.243297 | 10.10.0.163 | 10.10.0.206 | TCP | 1366 | | | [TCP segment of a reassembled PDU] | | | 5000 |
| 5000 | 16:59:49.243788 | 10.10.0.163 | 10.10.0.206 | TLSv1.2 | 561 | | | Certificate, Certificate Request, Server Hell | | | 5000 |
| 57576 | 16:59:49.263311 | 10.10.0.206 | 10.10.0.163 | TLSv1.2 | 73 | | | Alert (Level: Fatal, Description: Certificate | | | 57576 |
| 57581 | 17:00:21.310475 | 10.10.0.206 | 10.10.0.163 | TLSv1.2 | 191 | | | Client Hello | | | 57581 |
| 5000 | 17:00:21.310833 | 10.10.0.163 | 10.10.0.206 | TLSv1.2 | 2862 | | | Server Hello | | | 5000 |
| 5000 | 17:00:21.310848 | 10.10.0.163 | 10.10.0.206 | TCP | 1366 | | | [TCP segment of a reassembled PDU] | | | 5000 |
| 5000 | 17:00:21.311019 | 10.10.0.163 | 10.10.0.206 | TLSv1.2 | 561 | | | Certificate, Certificate Request, Server Hell | | | 5000 |
| 57581 | 17:00:21.315769 | 10.10.0.206 | 10.10.0.163 | TLSv1.2 | 73 | | | Alert (Level: Fatal, Description: Certificate | | | 57581 |
| 57587 | 17:00:53.369531 | 10.10.0.206 | 10.10.0.163 | TLSv1.2 | 191 | | | Client Hello | | | 57587 |
| 5000 | 17:00:53.369919 | 10.10.0.163 | 10.10.0.206 | TLSv1.2 | 2862 | | | Server Hello | | | 5000 |
| 5000 | 17:00:53.369966 | 10.10.0.163 | 10.10.0.206 | TCP | 1366 | | | [TCP segment of a reassembled PDU] | | | 5000 |
| 5000 | 17:00:53.370114 | 10.10.0.163 | 10.10.0.206 | TLSv1.2 | 561 | | | Certificate, Certificate Request, Server Hell | | | 5000 |
| 57587 | 17:00:53.374221 | 10.10.0.206 | 10.10.0.163 | TLSv1.2 | 73 | | | Alert (Level: Fatal, Description: certificate | | | 57587 |
| 57593 | 17:01:25.414808 | 10.10.0.206 | 10.10.0.163 | TLSv1.2 | 191 | | | Client Hello | | | 57593 |
| 5000 | 17:01:25.415160 | 10.10.0.163 | 10.10.0.206 | TLSv1.2 | 2862 | | | Server Hello | | | 5000 |
| 5000 | 17:01:25.415177 | 10.10.0.163 | 10.10.0.206 | TCP | 1366 | | | [TCP segment of a reassembled PDU] | | | 5000 |
| 5000 | 17:01:25.415375 | 10.10.0.163 | 10.10.0.206 | TLSv1.2 | 561 | | | Certificate, certificate Request, Server Hell | | | 5000 |


WINNF Test Requirements:

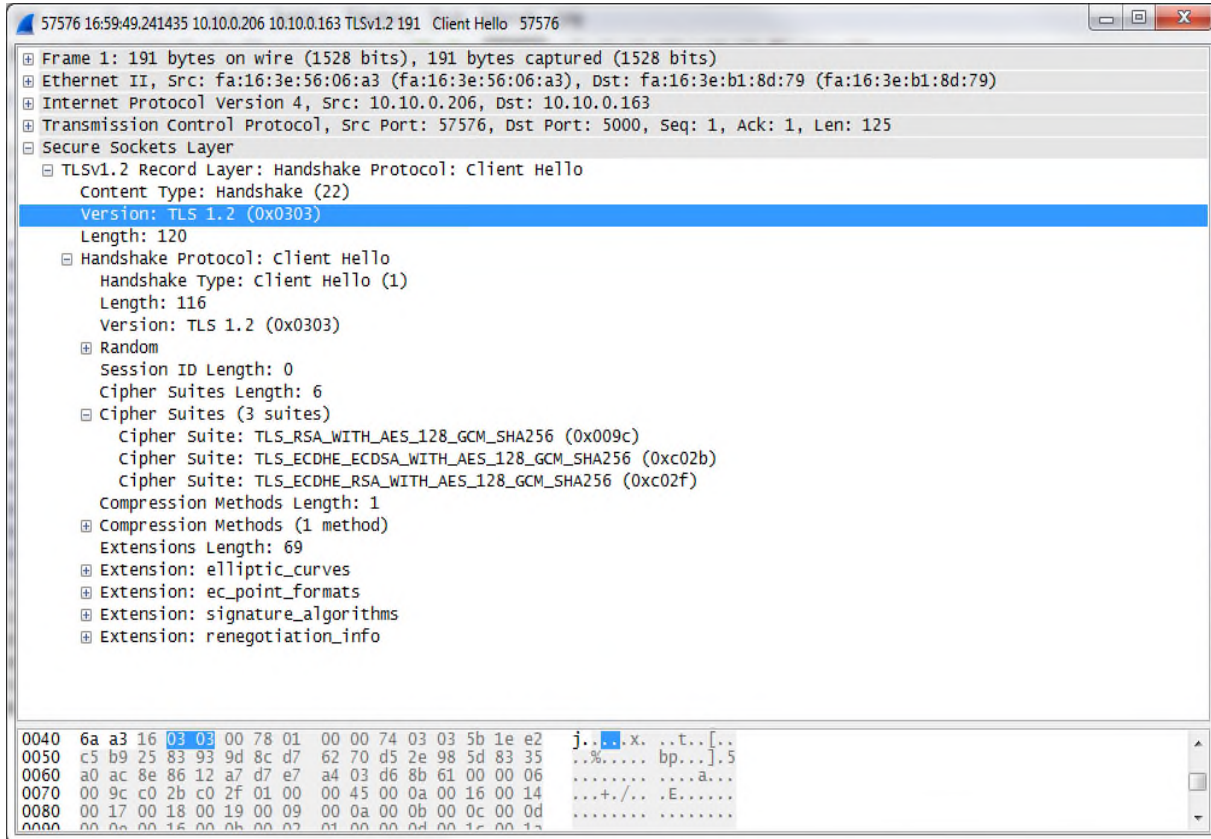
WINNF test requirements from WINNF-TS-0122-V1.0.0 CBRS CBSD Test Specification:

| | | | |
|---|--|------|------|
| 2 | <ul style="list-style-type: none"> 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 UUT and the SAS Test Harness. | PASS | FAIL |
|---|--|------|------|

Analysis of WINNF Test Requirements


- From Client Hello can read: TLS version = TLS 1.2

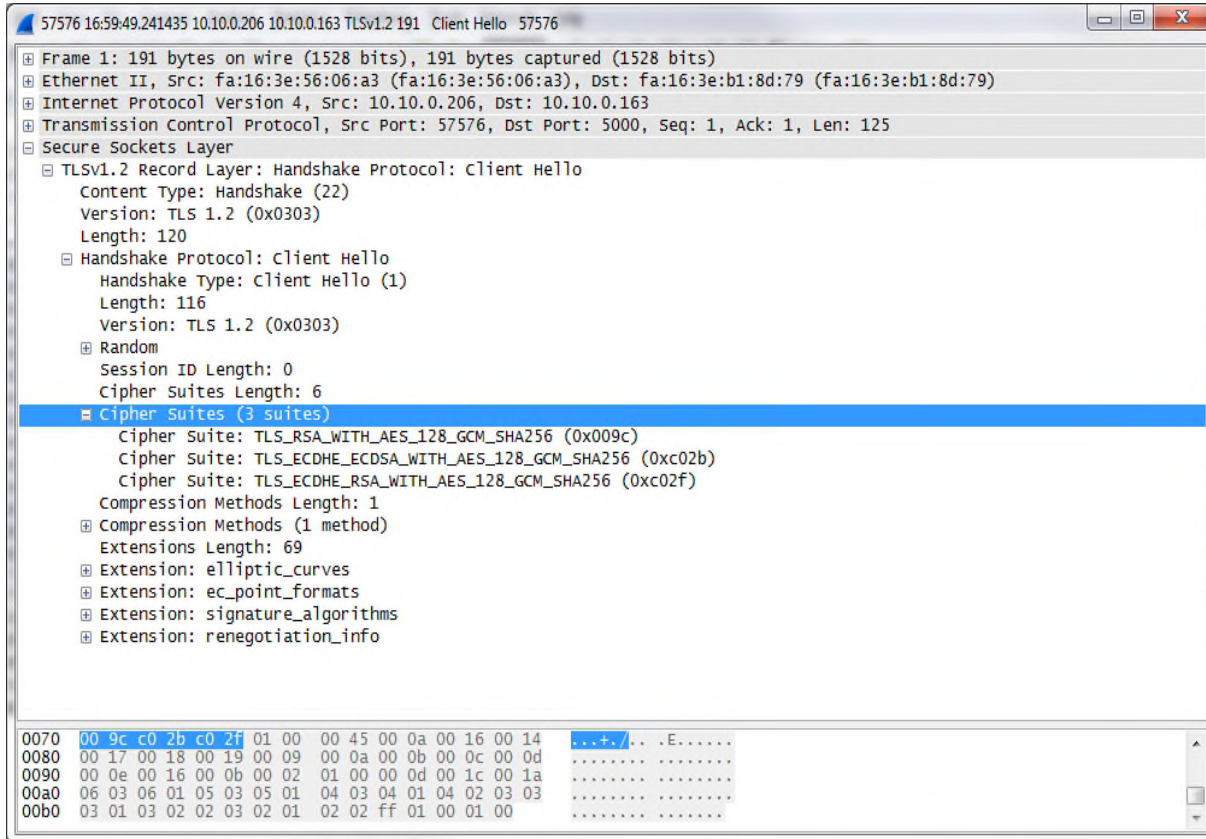
| | | |
|-------------|--|---|
| Client | Ericsson |  |
| Product | KRY 901 516/3 DOT 4459 B48 (3550-3700MHz)
KRY 901 516/4 DOT 4469 B48 (3550-3700MHz) | |
| Standard(s) | FCC Part 96 SAS requirements (CBRS Test Plan) | |




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

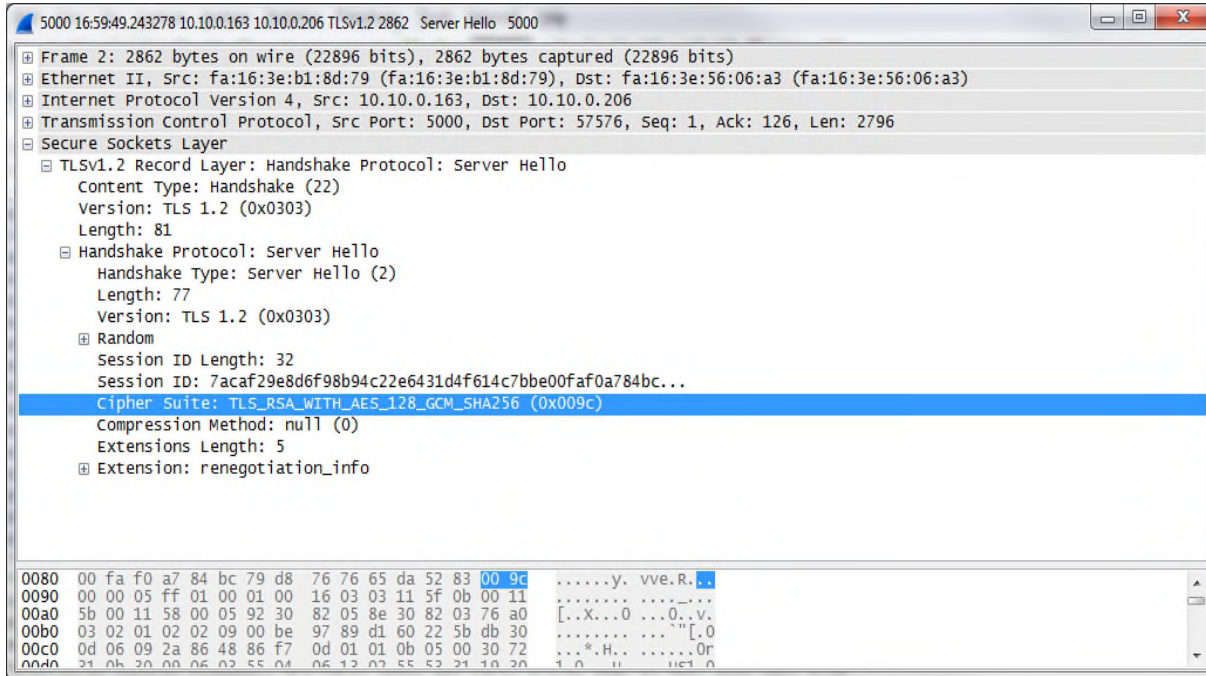
TLS_RSA_WITH_AES_128_GCM_SHA256
 TLS_ECDHE_ECDSA_WITH_AES_128_GCM_SHA256
 TLS_ECDHE_RSA_WITH_AES_128_GCM_SHA256

| | | |
|-------------|--|---|
| Client | Ericsson |  |
| Product | KRY 901 516/3 DOT 4459 B48 (3550-3700MHz)
KRY 901 516/4 DOT 4469 B48 (3550-3700MHz) | |
| Standard(s) | FCC Part 96 SAS requirements (CBRS Test Plan) | |




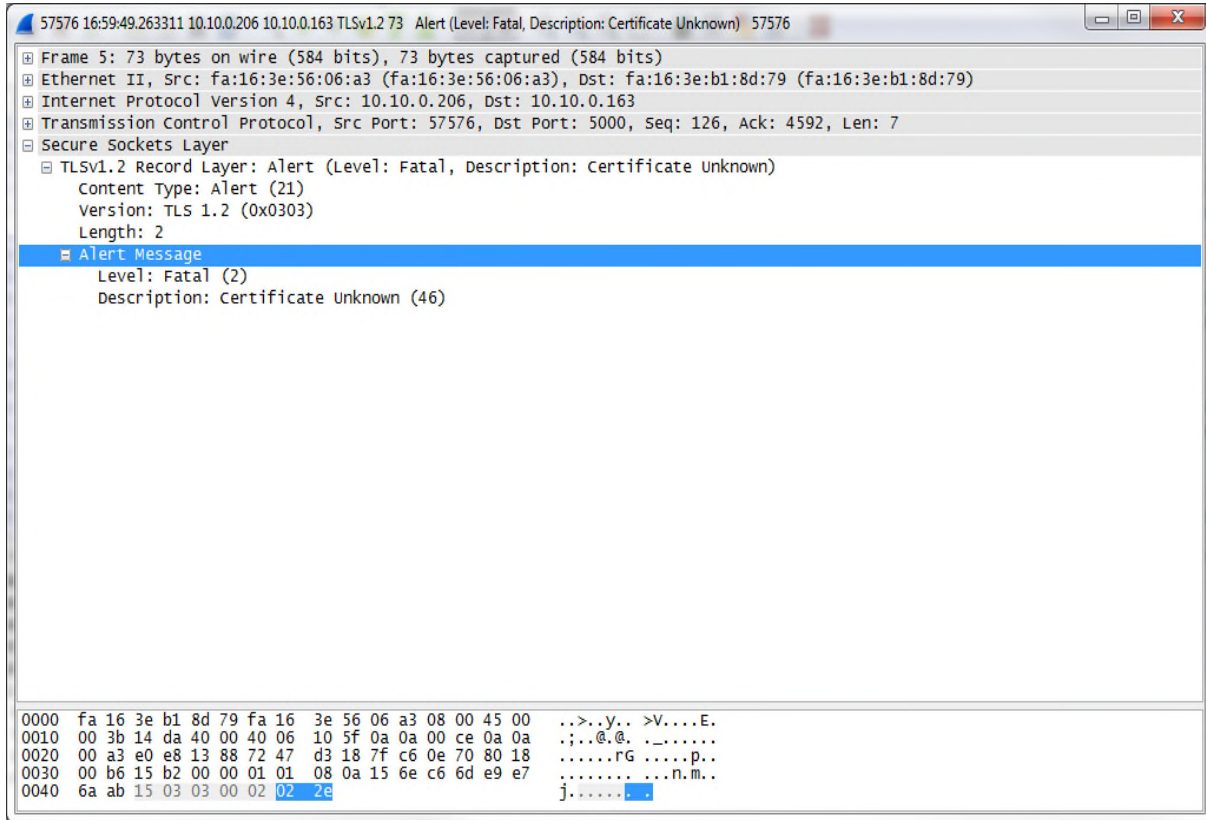
3. From Server Hello, cipher suite chosen:
TLS_RSA_WITH_AES_128_GCM_SHA256

| | | |
|-------------|--|---|
| Client | Ericsson |  |
| Product | KRY 901 516/3 DOT 4459 B48 (3550-3700MHz)
KRY 901 516/4 DOT 4469 B48 (3550-3700MHz) | |
| Standard(s) | FCC Part 96 SAS requirements (CBRS Test Plan) | |



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

| | | |
|-------------|--|---|
| Client | Ericsson |  |
| Product | KRY 901 516/3 DOT 4459 B48 (3550-3700MHz)
KRY 901 516/4 DOT 4469 B48 (3550-3700MHz) | |
| Standard(s) | FCC Part 96 SAS requirements (CBRS Test Plan) | |



57576 16:59:49.263311 10.10.0.206 10.10.0.163 TLSv1.2 73 Alert (Level: Fatal, Description: Certificate Unknown) 57576


- Frame 5: 73 bytes on wire (584 bits), 73 bytes captured (584 bits)
- Ethernet II, Src: fa:16:3e:56:06:a3 (fa:16:3e:56:06:a3), Dst: fa:16:3e:b1:8d:79 (fa:16:3e:b1:8d:79)
- Internet Protocol Version 4, Src: 10.10.0.206, Dst: 10.10.0.163
- Transmission Control Protocol, Src Port: 57576, Dst Port: 5000, Seq: 126, Ack: 4592, Len: 7
- Secure Sockets Layer
 - 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)

```

0000  fa 16 3e b1 8d 79 fa 16 3e 56 06 a3 08 00 45 00  ..>..y.. >V....E.
0010  00 3b 14 da 40 00 40 06 10 5f 0a 0a 00 ce 0a 0a  .;..@.@. _.....
0020  00 a3 e0 e8 13 88 72 47 d3 18 7f c6 0e 70 80 18  .....rG .....p..
0030  00 b6 15 b2 00 00 01 01 08 0a 15 6e c6 6d e9 e7  .....n.m..
0040  6a ab 15 03 03 00 02 2e                j.....

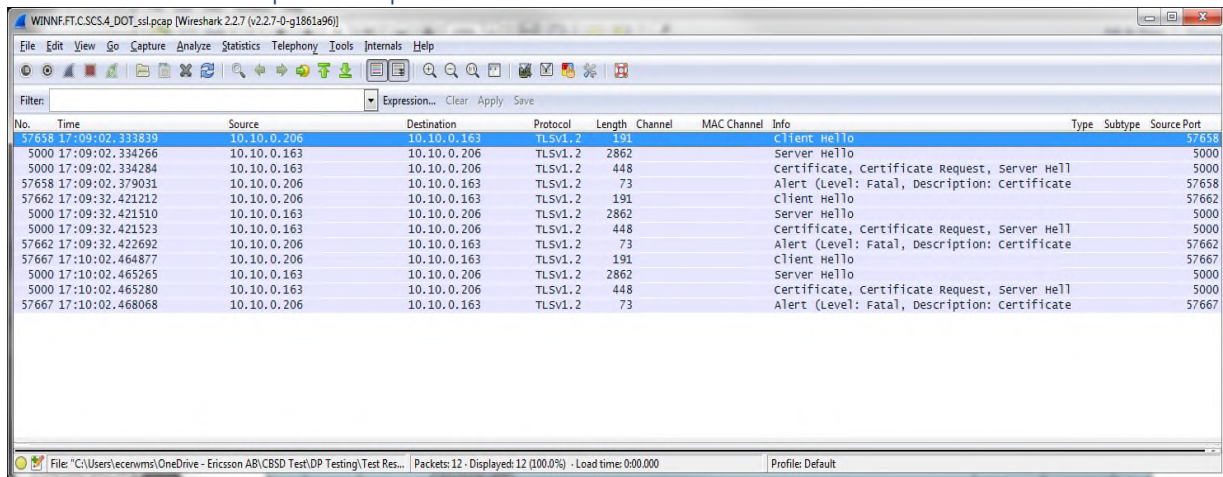
```

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

| | | |
|-------------|--|---|
| Client | Ericsson | 
Canada |
| Product | KRY 901 516/3 DOT 4459 B48 (3550-3700MHz)
KRY 901 516/4 DOT 4469 B48 (3550-3700MHz) | |
| Standard(s) | FCC Part 96 SAS requirements (CBRS Test Plan) | |

WINNF.FT.C.SCS.4

Packet Capture Sequence



| No. | Time | Source | Destination | Protocol | Length | Channel | MAC Channel | Info | Type | Subtype | Source Port |
|-------|-----------------|-------------|-------------|----------|--------|---------|-------------|---|------|---------|-------------|
| 57658 | 17:09:02.333839 | 10.10.0.206 | 10.10.0.163 | TLSv1.2 | 191 | | | Client Hello | | | 57658 |
| 5000 | 17:09:02.334266 | 10.10.0.163 | 10.10.0.206 | TLSv1.2 | 2862 | | | Server Hello | | | 5000 |
| 5000 | 17:09:02.334284 | 10.10.0.163 | 10.10.0.206 | TLSv1.2 | 448 | | | Certificate, Certificate Request, Server Hell | | | 5000 |
| 57658 | 17:09:02.379031 | 10.10.0.206 | 10.10.0.163 | TLSv1.2 | 73 | | | Alert (Level: Fatal, Description: Certificate | | | 57658 |
| 57662 | 17:09:32.421212 | 10.10.0.206 | 10.10.0.163 | TLSv1.2 | 191 | | | Client Hello | | | 57662 |
| 5000 | 17:09:32.421510 | 10.10.0.163 | 10.10.0.206 | TLSv1.2 | 2862 | | | Server Hello | | | 5000 |
| 5000 | 17:09:32.421523 | 10.10.0.163 | 10.10.0.206 | TLSv1.2 | 448 | | | Certificate, Certificate Request, server Hell | | | 5000 |
| 57662 | 17:09:32.422692 | 10.10.0.206 | 10.10.0.163 | TLSv1.2 | 73 | | | Alert (Level: Fatal, Description: certificate | | | 57662 |
| 57667 | 17:10:02.464877 | 10.10.0.206 | 10.10.0.163 | TLSv1.2 | 191 | | | Client Hello | | | 57667 |
| 5000 | 17:10:02.465265 | 10.10.0.163 | 10.10.0.206 | TLSv1.2 | 2862 | | | Server Hello | | | 5000 |
| 5000 | 17:10:02.465280 | 10.10.0.163 | 10.10.0.206 | TLSv1.2 | 448 | | | Certificate, Certificate Request, Server Hell | | | 5000 |
| 57667 | 17:10:02.468068 | 10.10.0.206 | 10.10.0.163 | TLSv1.2 | 73 | | | Alert (Level: Fatal, Description: certificate | | | 57667 |


WINNF Test Requirements:

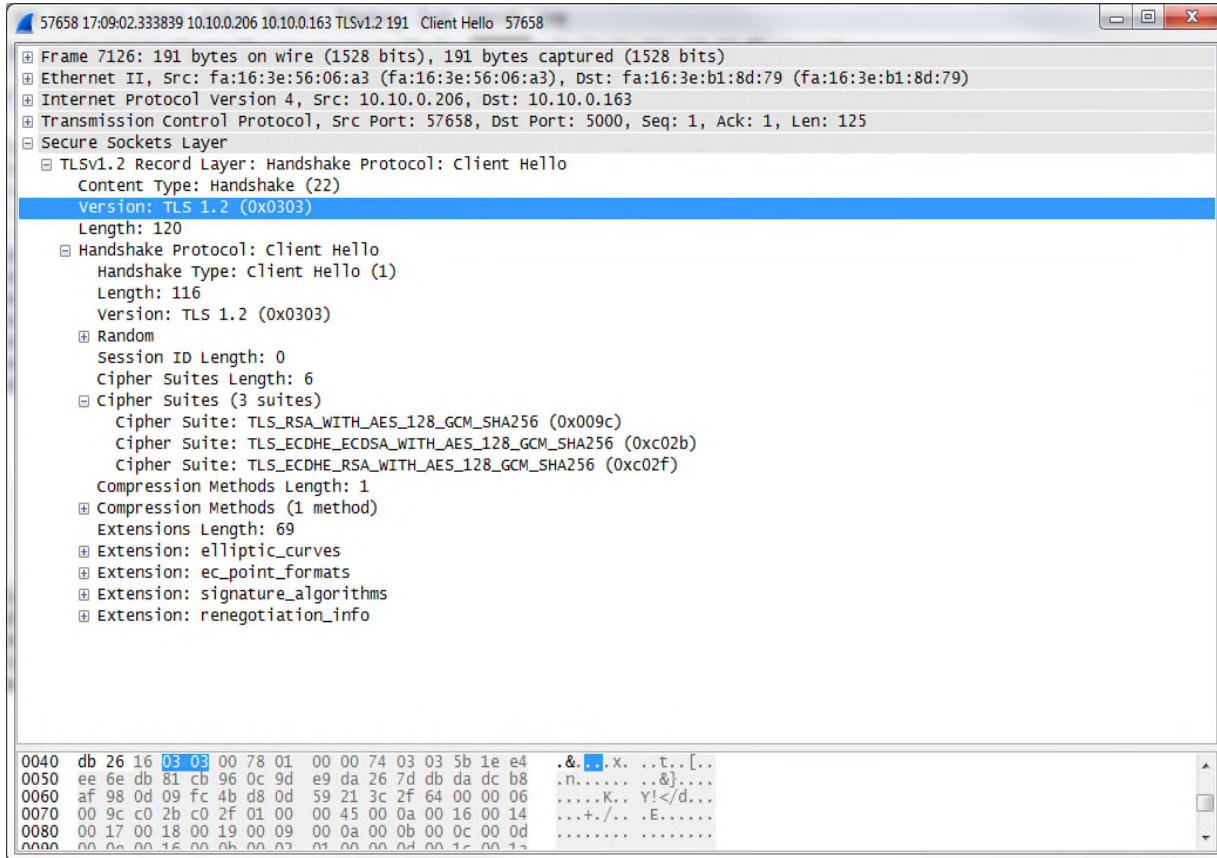
WINNF test requirements from WINNF-TS-0122-V1.0.0 CBRS CBSD Test Specification:

| | | | |
|---|---|------|------|
| 2 | <ul style="list-style-type: none"> • 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 UUT and the SAS Test Harness. | PASS | FAIL |
|---|---|------|------|

Analysis of WINNF Test Requirements


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

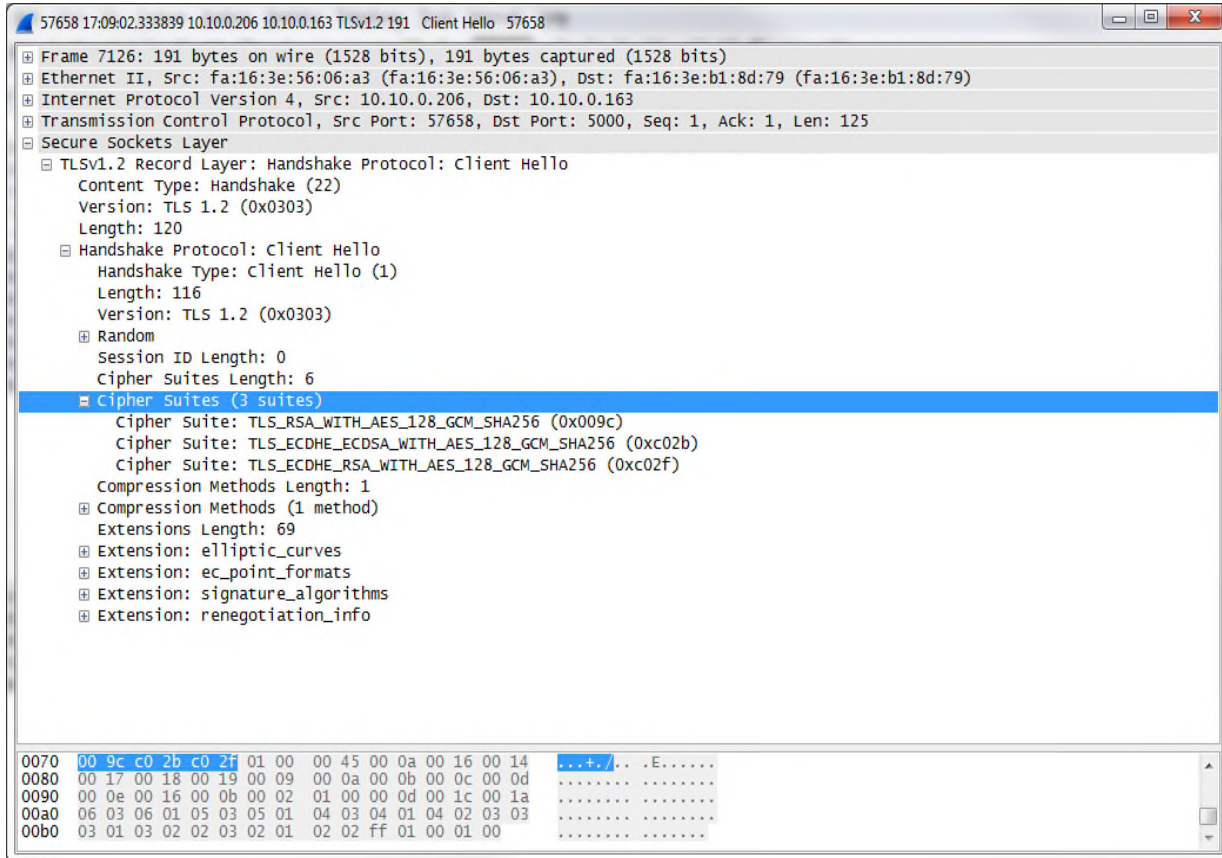
| | | |
|-------------|--|---|
| Client | Ericsson |  |
| Product | KRY 901 516/3 DOT 4459 B48 (3550-3700MHz)
KRY 901 516/4 DOT 4469 B48 (3550-3700MHz) | |
| Standard(s) | FCC Part 96 SAS requirements (CBRS Test Plan) | |



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

| | | |
|-------------|--|---|
| Client | Ericsson |  |
| Product | KRY 901 516/3 DOT 4459 B48 (3550-3700MHz)
KRY 901 516/4 DOT 4469 B48 (3550-3700MHz) | |
| Standard(s) | FCC Part 96 SAS requirements (CBRS Test Plan) | |



57658 17:09:02.333839 10.10.0.206 10.10.0.163 TLSv1.2 191 Client Hello 57658

- Frame 7126: 191 bytes on wire (1528 bits), 191 bytes captured (1528 bits)
- Ethernet II, Src: fa:16:3e:56:06:a3 (fa:16:3e:56:06:a3), Dst: fa:16:3e:b1:8d:79 (fa:16:3e:b1:8d:79)
- Internet Protocol Version 4, Src: 10.10.0.206, Dst: 10.10.0.163
- Transmission Control Protocol, Src Port: 57658, Dst Port: 5000, Seq: 1, Ack: 1, Len: 125
- Secure Sockets Layer
 - TLSv1.2 Record Layer: Handshake Protocol: Client Hello
 - Content Type: Handshake (22)
 - Version: TLS 1.2 (0x0303)
 - Length: 120
 - Handshake Protocol: Client Hello
 - Handshake Type: Client Hello (1)
 - Length: 116
 - Version: TLS 1.2 (0x0303)
 - Random
 - 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: 69
 - Extension: elliptic_curves
 - Extension: ec_point_formats
 - Extension: signature_algorithms
 - Extension: renegotiation_info

0070 00 9c c0 2b c0 2f 01 00 00 45 00 0a 00 16 00 14 ...+./...E.....


0080 00 17 00 18 00 19 00 09 00 0a 00 0b 00 0c 00 0d

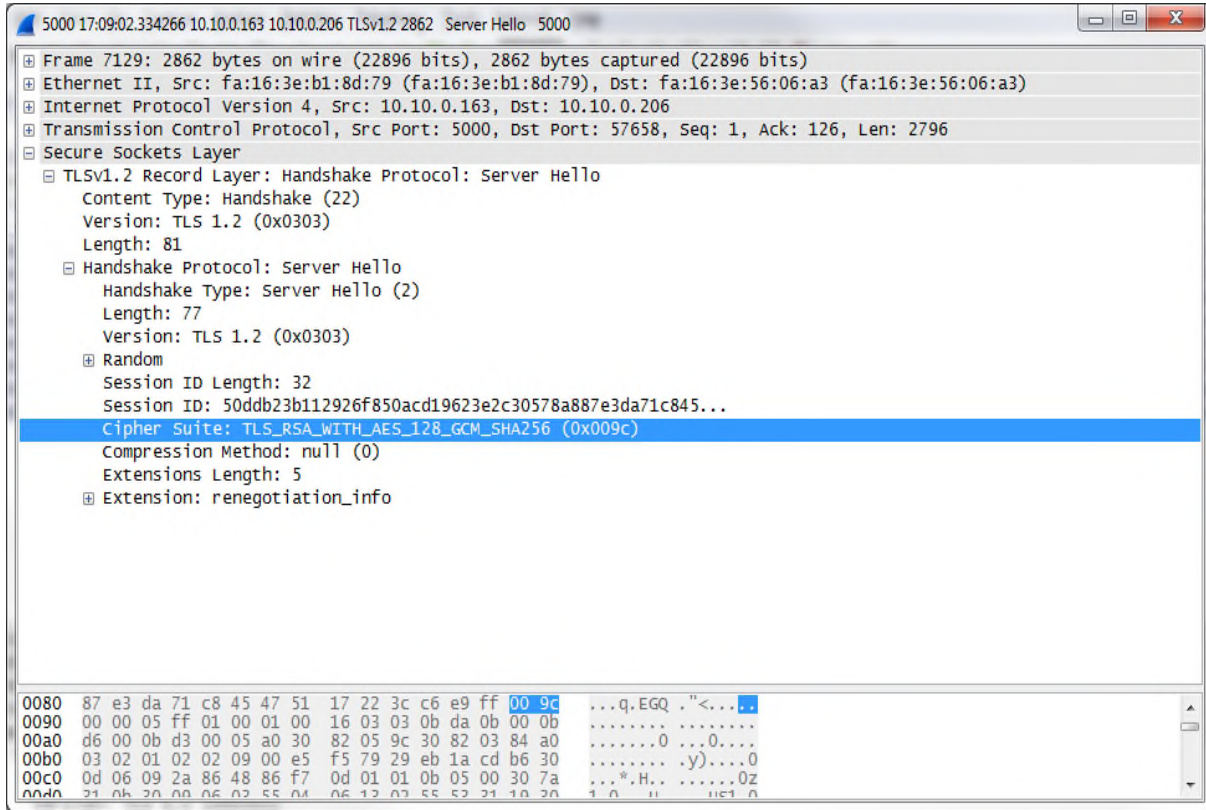
0090 00 0e 00 16 00 0b 00 02 01 00 00 0d 00 1c 00 1a

00a0 06 03 06 01 05 03 05 01 04 03 04 01 04 02 03 03

00b0 03 01 03 02 02 03 02 01 02 02 ff 01 00 01 00

3. From Server Hello, cipher suite chosen:
 TLS_RSA_WITH_AES_128_GCM_SHA256

| | | |
|-------------|--|---|
| Client | Ericsson |  |
| Product | KRY 901 516/3 DOT 4459 B48 (3550-3700MHz)
KRY 901 516/4 DOT 4469 B48 (3550-3700MHz) | |
| Standard(s) | FCC Part 96 SAS requirements (CBRS Test Plan) | |




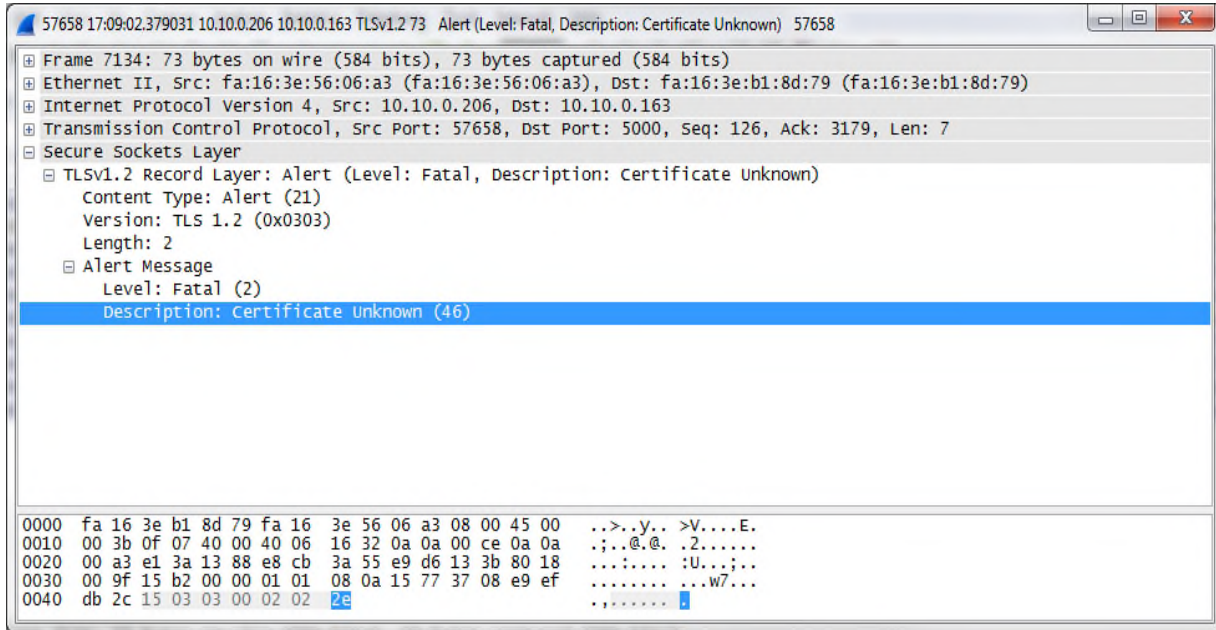
5000 17:09:02.334266 10.10.0.163 10.10.0.206 TLSv1.2 2862 Server Hello 5000

- Frame 7129: 2862 bytes on wire (22896 bits), 2862 bytes captured (22896 bits)
- Ethernet II, Src: fa:16:3e:b1:8d:79 (fa:16:3e:b1:8d:79), Dst: fa:16:3e:56:06:a3 (fa:16:3e:56:06:a3)
- Internet Protocol Version 4, Src: 10.10.0.163, Dst: 10.10.0.206
- Transmission Control Protocol, Src Port: 5000, Dst Port: 57658, Seq: 1, Ack: 126, Len: 2796
- Secure Sockets Layer
 - 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
 - Session ID Length: 32
 - Session ID: 50ddb23b112926f850acd19623e2c30578a887e3da71c845...
 - Cipher Suite: TLS_RSA_WITH_AES_128_GCM_SHA256 (0x009c)**
 - Compression Method: null (0)
 - Extensions Length: 5
 - Extension: renegotiation_info

0080 87 e3 da 71 c8 45 47 51 17 22 3c c6 e9 ff 00 9c ...q.EGQ ."<...
0090 00 00 05 ff 01 00 01 00 16 03 03 0b da 0b 00 0b0
00a0 d6 00 0b d3 00 05 a0 30 82 05 9c 30 82 03 84 a000
00b0 03 02 01 02 02 09 00 e5 f5 79 29 eb 1a cd b6 30y).....0
00c0 0d 06 09 2a 86 48 86 f7 0d 01 01 0b 05 00 30 7a ...*.H.,0z
00d0 21 0b 20 00 06 02 55 04 06 12 03 55 e2 21 10 20 1 n u uc1 n

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

| | | |
|-------------|--|---|
| Client | Ericsson |  |
| Product | KRY 901 516/3 DOT 4459 B48 (3550-3700MHz)
KRY 901 516/4 DOT 4469 B48 (3550-3700MHz) | |
| Standard(s) | FCC Part 96 SAS requirements (CBRS Test Plan) | |



57658 17:09:02.379031 10.10.0.206 10.10.0.163 TLSv1.2 73 Alert (Level: Fatal, Description: Certificate Unknown) 57658

- Frame 7134: 73 bytes on wire (584 bits), 73 bytes captured (584 bits)
- Ethernet II, Src: fa:16:3e:56:06:a3 (fa:16:3e:56:06:a3), Dst: fa:16:3e:b1:8d:79 (fa:16:3e:b1:8d:79)
- Internet Protocol Version 4, Src: 10.10.0.206, Dst: 10.10.0.163
- Transmission Control Protocol, Src Port: 57658, Dst Port: 5000, Seq: 126, Ack: 3179, Len: 7
- Secure Sockets Layer
 - 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)

```

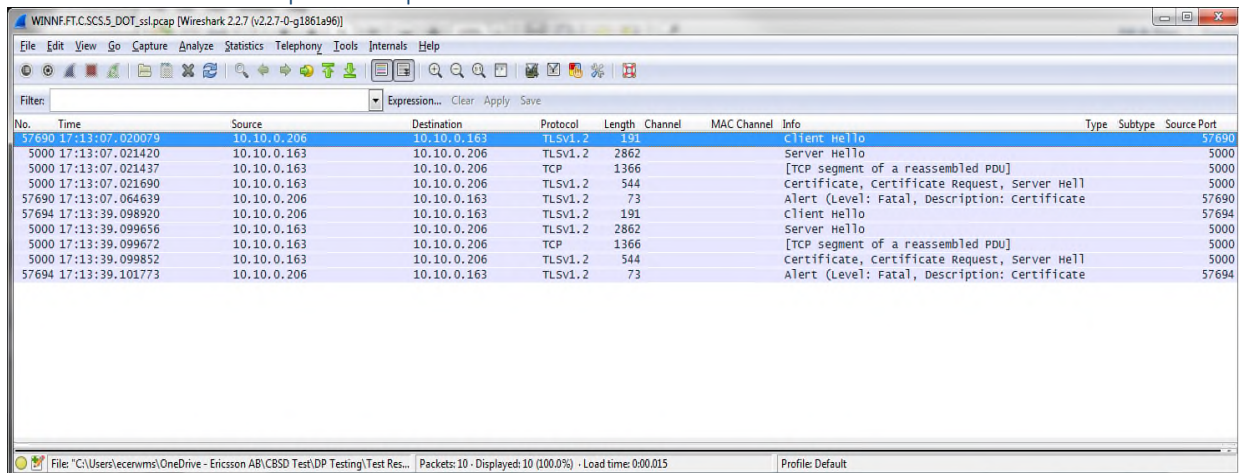
0000  fa 16 3e b1 8d 79 fa 16 3e 56 06 a3 08 00 45 00  ..>..y.. >V....E.
0010  00 3b 0f 07 40 00 40 06 16 32 0a 0a 00 ce 0a 0a  ;:..@.@. .2.....
0020  00 a3 e1 3a 13 88 e8 cb 3a 55 e9 d6 13 3b 80 18  .....:U...;...
0030  00 9f 15 b2 00 00 01 01 08 0a 15 77 37 08 e9 ef  .....:w7...
0040  db 2c 15 03 03 00 02 02 2e                .....

```


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

WINNF.FT.C.SCS.5

Packet Capture Sequence



| No. | Time | Source | Destination | Protocol | Length | Channel | MAC Channel | Info | Type | Subtype | Source Port |
|-------|-----------------|-------------|-------------|----------|--------|---------|-------------|--|------|---------|-------------|
| 57690 | 17:13:07.020079 | 10.10.0.206 | 10.10.0.163 | TLSv1.2 | 191 | | | Client Hello | | | 57690 |
| 5000 | 17:13:07.021420 | 10.10.0.163 | 10.10.0.206 | TLSv1.2 | 2862 | | | Server Hello | | | 5000 |
| 5000 | 17:13:07.021437 | 10.10.0.163 | 10.10.0.206 | TCP | 1366 | | | [TCP segment of a reassembled PDU] | | | 5000 |
| 5000 | 17:13:07.021690 | 10.10.0.163 | 10.10.0.206 | TLSv1.2 | 544 | | | Certificate, Certificate Request, Server Hello | | | 5000 |
| 57690 | 17:13:07.064639 | 10.10.0.206 | 10.10.0.163 | TLSv1.2 | 73 | | | Alert (Level: Fatal, Description: Certificate Unknown) | | | 57690 |
| 57694 | 17:13:39.098920 | 10.10.0.206 | 10.10.0.163 | TLSv1.2 | 191 | | | Client Hello | | | 57694 |
| 5000 | 17:13:39.099656 | 10.10.0.163 | 10.10.0.206 | TLSv1.2 | 2862 | | | Server Hello | | | 5000 |
| 5000 | 17:13:39.099672 | 10.10.0.163 | 10.10.0.206 | TCP | 1366 | | | [TCP segment of a reassembled PDU] | | | 5000 |
| 5000 | 17:13:39.099852 | 10.10.0.163 | 10.10.0.206 | TLSv1.2 | 544 | | | Certificate, Certificate Request, Server Hello | | | 5000 |
| 57694 | 17:13:39.101773 | 10.10.0.206 | 10.10.0.163 | TLSv1.2 | 73 | | | Alert (Level: Fatal, Description: Certificate Unknown) | | | 57694 |

| | | |
|-------------|--|---|
| Client | Ericsson |  |
| Product | KRY 901 516/3 DOT 4459 B48 (3550-3700MHz)
KRY 901 516/4 DOT 4469 B48 (3550-3700MHz) | |
| Standard(s) | FCC Part 96 SAS requirements (CBRS Test Plan) | |

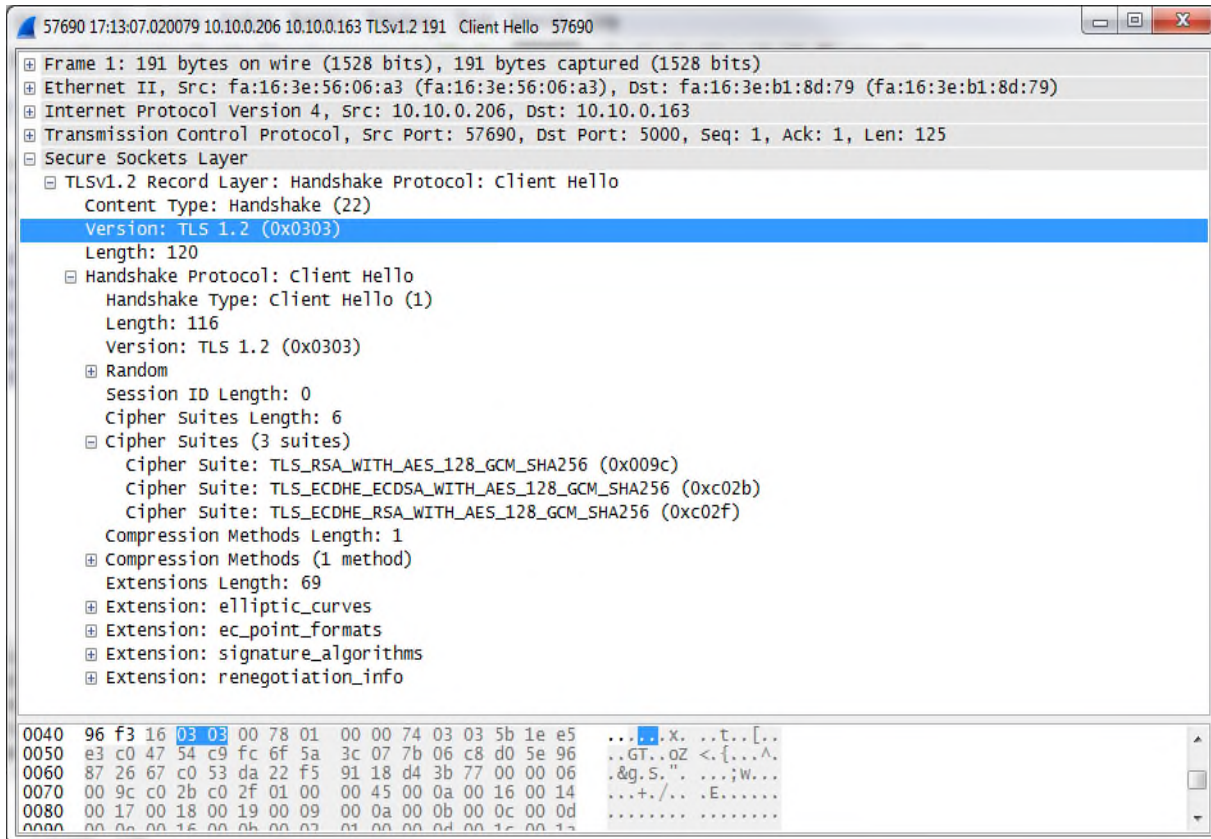
WINNF Test Requirements:

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

| | | | |
|---|--|------|------|
| 2 | <ul style="list-style-type: none"> • 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 UUT and the SAS Test Harness. | PASS | FAIL |
|---|--|------|------|

Analysis of WINNF Test Requirements

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



The screenshot shows a Wireshark capture of a TLS Client Hello message. The packet list pane shows:

- Frame 1: 191 bytes on wire (1528 bits), 191 bytes captured (1528 bits)
- Ethernet II, Src: fa:16:3e:56:06:a3 (fa:16:3e:56:06:a3), Dst: fa:16:3e:b1:8d:79 (fa:16:3e:b1:8d:79)
- Internet Protocol Version 4, Src: 10.10.0.206, Dst: 10.10.0.163
- Transmission Control Protocol, Src Port: 57690, Dst Port: 5000, Seq: 1, Ack: 1, Len: 125
- Secure Sockets Layer
 - TLSv1.2 Record Layer: Handshake Protocol: Client Hello
 - Content Type: Handshake (22)
 - Version: TLS 1.2 (0x0303)**
 - Length: 120
 - Handshake Protocol: Client Hello
 - Handshake Type: client Hello (1)
 - Length: 116
 - Version: TLS 1.2 (0x0303)
 - Random
 - 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: 69
 - Extension: elliptic_curves
 - Extension: ec_point_formats
 - Extension: signature_algorithms
 - Extension: renegotiation_info


The packet bytes pane shows the raw data for the highlighted version field:

```

0040 96 f3 16 03 03 00 78 01 00 00 74 03 03 5b 1e e5  ...x. .t.. [..
0050 e3 c0 47 54 c9 fc 6f 5a 3c 07 7b 06 c8 d0 5e 96  ..GT..oZ <.{...^
0060 87 26 67 c0 53 da 22 f5 91 18 d4 3b 77 00 00 06  ..&g.S." . .;w...
0070 00 9c c0 2b c0 2f 01 00 00 45 00 0a 00 16 00 14  ...+/. .E.....
0080 00 17 00 18 00 19 00 09 00 0a 00 0b 00 0c 00 0d  .....
0090 00 0c 00 16 00 0b 00 07 01 00 00 0d 00 15 00 13  .....

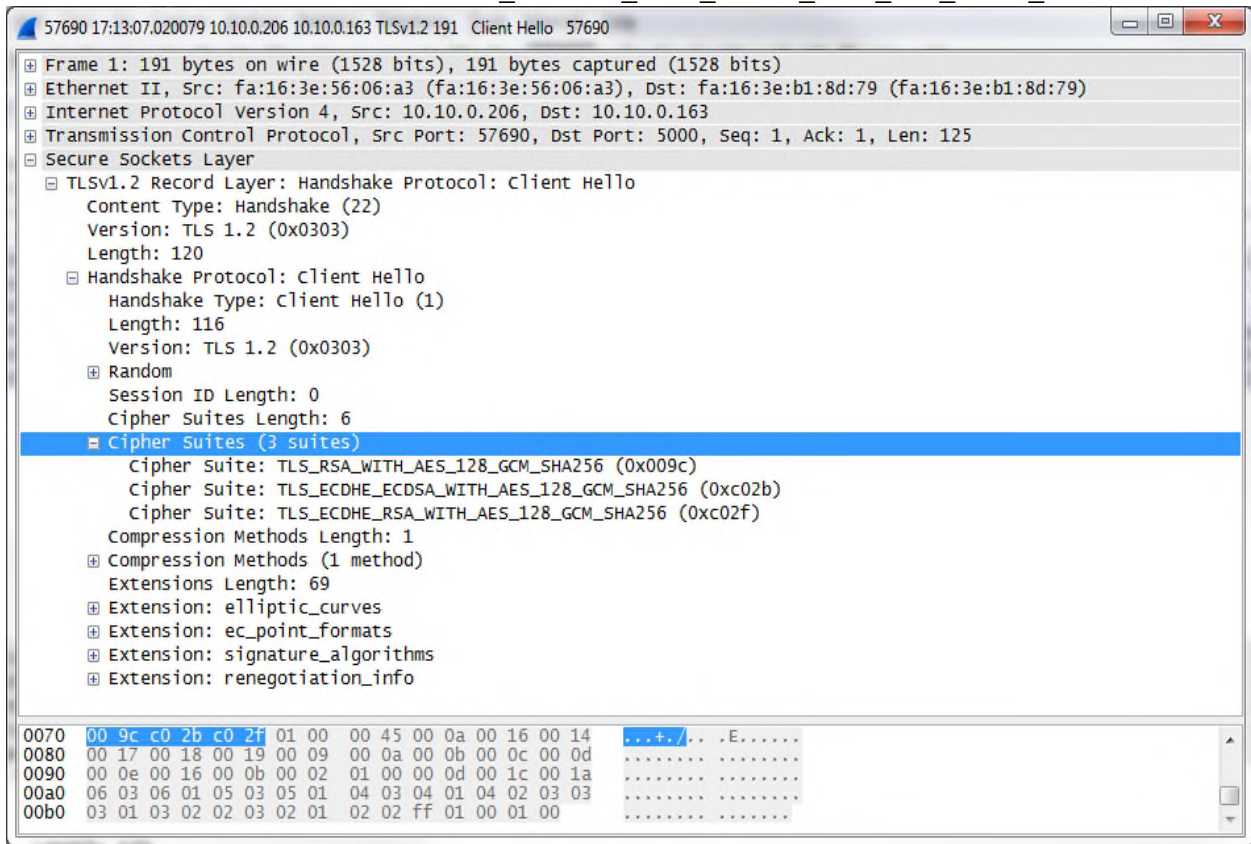
```

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| | | |
|-------------|--|---|
| Client | Ericsson |  |
| Product | KRY 901 516/3 DOT 4459 B48 (3550-3700MHz)
KRY 901 516/4 DOT 4469 B48 (3550-3700MHz) | |
| Standard(s) | FCC Part 96 SAS requirements (CBRS Test Plan) | |

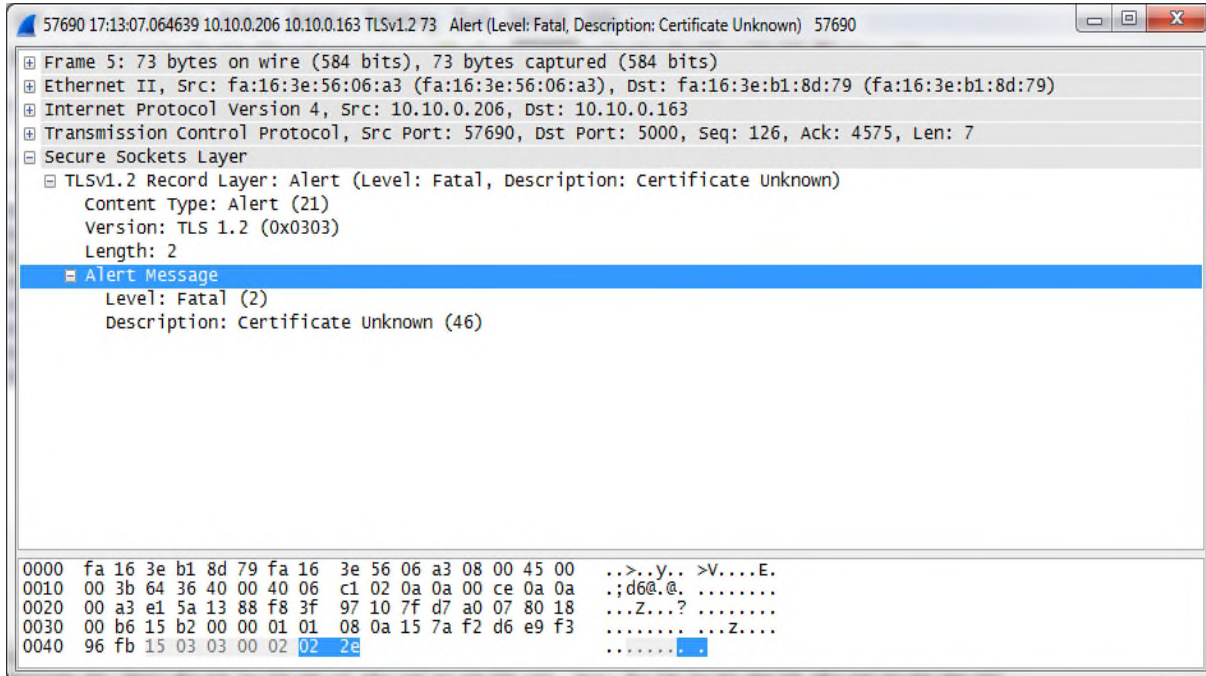
2. From Client Hello, cipher suite list is from WINNF approved list:

TLS_RSA_WITH_AES_128_GCM_SHA256
 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

| | | |
|-------------|--|---|
| Client | Ericsson |  |
| Product | KRY 901 516/3 DOT 4459 B48 (3550-3700MHz)
KRY 901 516/4 DOT 4469 B48 (3550-3700MHz) | |
| Standard(s) | FCC Part 96 SAS requirements (CBRS Test Plan) | |




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

| | | |
|-------------|--|---|
| Client | Ericsson |  |
| Product | KRY 901 516/3 DOT 4459 B48 (3550-3700MHz)
KRY 901 516/4 DOT 4469 B48 (3550-3700MHz) | |
| Standard(s) | FCC Part 96 SAS requirements (CBRS Test Plan) | |


Test Equipment

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

| | | |
|-------------|--|---|
| Client | Ericsson |  |
| Product | KRY 901 516/3 DOT 4459 B48 (3550-3700MHz)
KRY 901 516/4 DOT 4469 B48 (3550-3700MHz) | |
| Standard(s) | FCC Part 96 SAS requirements (CBRS Test Plan) | |


Appendix A – EUT & Client Provided Details

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| | | |
|-------------|--|---|
| Client | Ericsson |  |
| Product | KRY 901 516/3 DOT 4459 B48 (3550-3700MHz)
KRY 901 516/4 DOT 4469 B48 (3550-3700MHz) | |
| Standard(s) | FCC Part 96 SAS requirements (CBRS Test Plan) | |

General EUT Description

| | | |
|-------------------------------|---|--------|
| Manufacturer | Ericsson | |
| Address | Torshamnsgatan 23
Kista
SE-16480
Stockholm
Sweden | |
| Product Name | Dot 41Kr B48
Dot 44Kr B48 (Non-Tested Variant. See Technical Description for a similarity description) | |
| Product Number | KRY 901 516/4
KRY 901 516/3 (Non-Tested Variant. See Technical Description for a similarity description) | |
| Serial Number(s) | TD3W213284 & TD3W229778 | |
| Software Version | CXP9024418/15-R52A165_R13A190 | |
| Domain Proxy Software Version | ERICdomainproxyservice_CXP9035414 | 1.10.1 |
| Hardware Version | R1A | |
| Test Specification/Issue/Date | FCC CFR 47 Part 96: 2017 | |

| | | |
|-------------|--|---|
| Client | Ericsson |  |
| Product | KRY 901 516/3 DOT 4459 B48 (3550-3700MHz)
KRY 901 516/4 DOT 4469 B48 (3550-3700MHz) | |
| Standard(s) | FCC Part 96 SAS requirements (CBRS Test Plan) | |

Technical Description

Dot 41Kr B48 (KRY 901 516/4) are Remote Radio Units forming part of the Ericsson Radio Base Station (RBS) equipment. The Dot provides radio access for mobile and fixed devices and is intended for the indoor environment. The radio operates over 4 Transmit ports in MRO (NR); Single, Multi-Carrier, and MIMO transmission with a maximum rated RF Output of 0.25W per port over an operational temperature of 5°C to +40°C. The unit is designed to be ceiling or wall mounted.

The Dot 44Kr and Dot 41Kr radios are identical except that Dot 44Kr has internal antennas and Dot 41Kr has external ports.


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




EUT Configuration

Please see Appendix B for close up pictures of the unit as configured during testing

- Cables and earthing when applicable were connected as per manufacturer's specification.

| | | |
|-------------|--|---|
| Client | Ericsson |  |
| Product | KRY 901 516/3 DOT 4459 B48 (3550-3700MHz)
KRY 901 516/4 DOT 4469 B48 (3550-3700MHz) | |
| Standard(s) | FCC Part 96 SAS requirements (CBRS Test Plan) | |

Appendix B – EUT, Peripherals, and Test Setup Photos

| | | |
|-------------|--|---|
| Client | Ericsson | 
Canada |
| Product | KRY 901 516/3 DOT 4459 B48 (3550-3700MHz)
KRY 901 516/4 DOT 4469 B48 (3550-3700MHz) | |
| Standard(s) | FCC Part 96 SAS requirements (CBRS Test Plan) | |

Test setup

