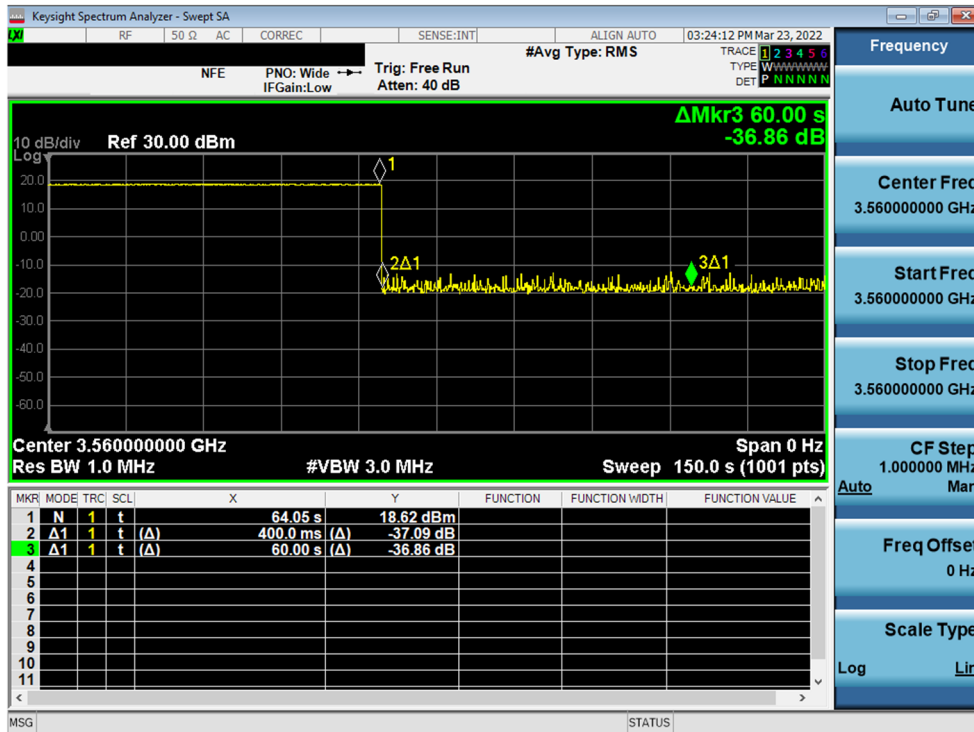


Test Plots:



Plot 19. Conducted Measurement - RF transmission stops (WINNF.FT.C.RLQ.1)

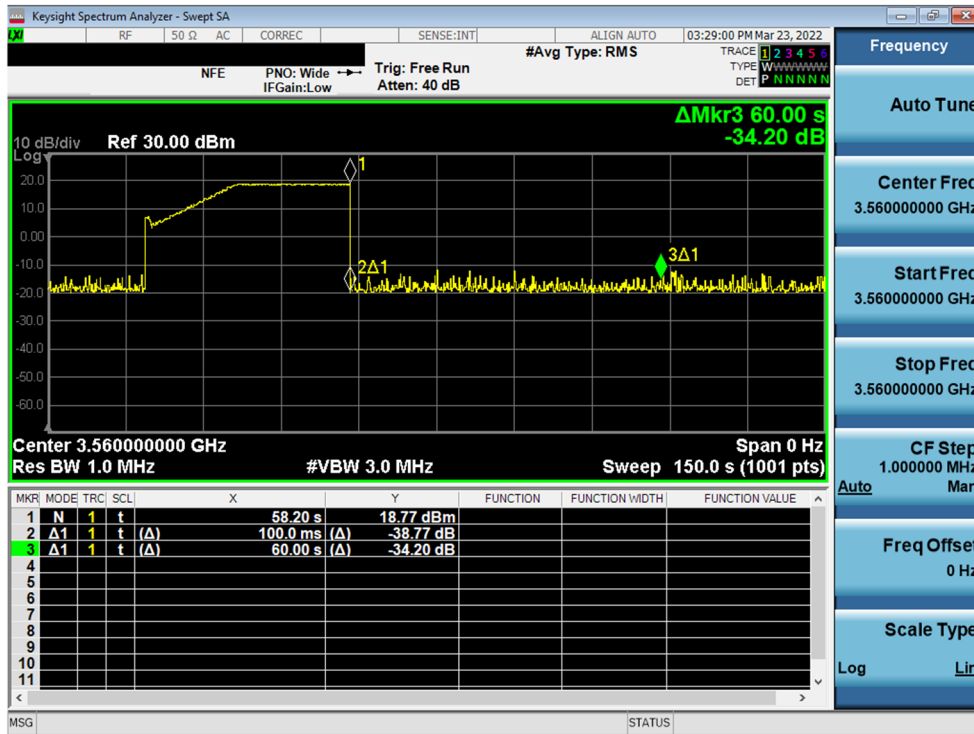
FCC ID: A3LRT4401-48A1	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2204040047-01.A3L	Test Dates: 3/24/2022 – 3/31/2022	EUT Type: LTE/NR Base Station	Page 41 of 69

A20 [WINNF.FT.C.DRG.1] Successful Deregistration

	Test Execution Steps	PASS	FAIL
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> • UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness • UUT has successfully registered with SAS Test Harness, with cbsdId=C • UUT has received a valid grant with grantId = G • UUT is in Grant State AUTHORIZED and is actively transmitting within the bounds of its grant. <p>Invoke trigger to deregister UUT from the SAS Test Harness</p>	--	--
2	UUT sends a Relinquishment request and receives Relinquishment response with responseCode=0	--	--
3	UUT sends Deregistration Request to SAS Test Harness with cbsdId = C.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	<p>SAS Test Harness shall approve the request with a Deregistration Response message with parameters:</p> <ul style="list-style-type: none"> • cbsdId = C • responseCode = 0 	--	--
5	After completion of step 3, SAS Test Harness will not provide any additional positive response (responseCode=0) to further request messages from the UUT	--	--
6	<p>Monitor the RF output of the UUT from start of test until 60 seconds after Step 4 is complete. This is the end of the test. Verify:</p> <ul style="list-style-type: none"> • UUT stopped RF transmission at any time between triggering the deregistration and either A OR B occurs: <ul style="list-style-type: none"> A. UUT sending a Registration Request message, as this is not mandatory B. UUT sending a Deregistration Request message 	<input checked="" type="checkbox"/>	<input type="checkbox"/>

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Test Plots:



Plot 20. Conducted Measurement - RF transmission stops within 60s. The SAS message is indicated by Marker 1 (X) (WINNF.FT.C.DRG.1)

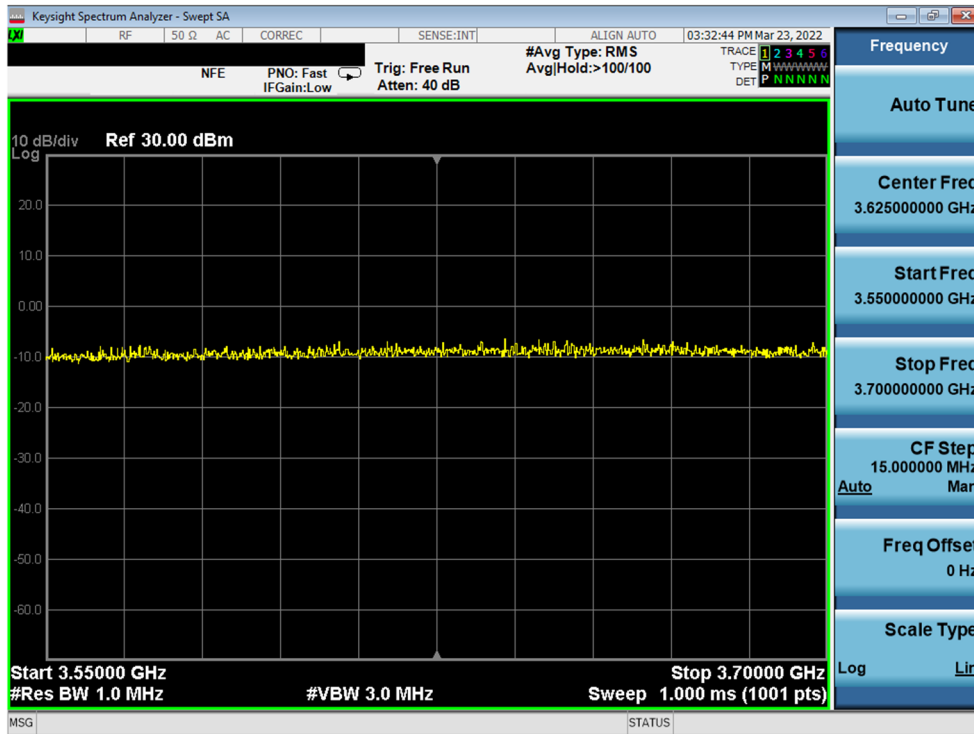
FCC ID: A3LRT4401-48A1		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2204040047-01.A3L	Test Dates: 3/24/2022 – 3/31/2022	EUT Type: LTE/NR Base Station		Page 43 of 69

A21 [WINNF.FT.C.SCS.1] Successful TLS connection between UUT and SAS Test Harness

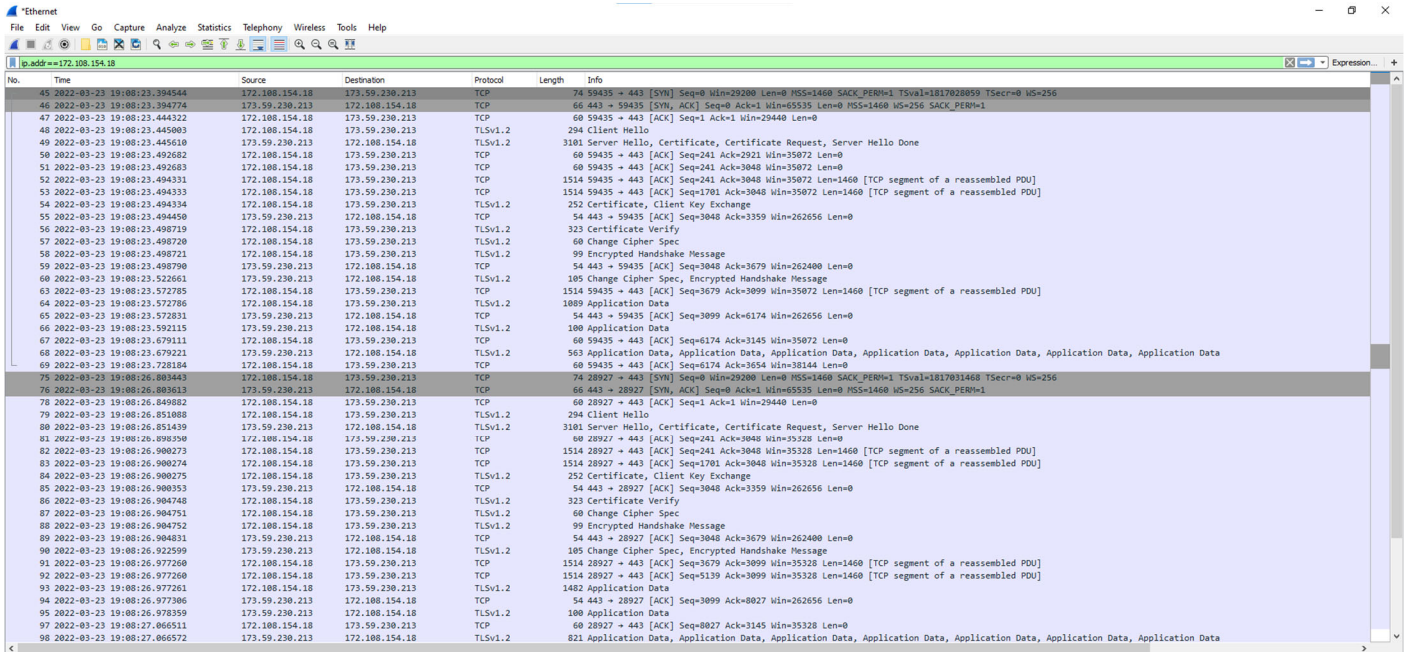
	Test Execution Steps	PASS	FAIL
1	<ul style="list-style-type: none"> • UUT shall start CBSD-SAS communication with the security procedure • The UUT shall establish a TLS handshake with the SAS Test Harness using configured certificate. • Configure the SAS Test Harness to accept the security procedure and establish the connection 	<input checked="" type="checkbox"/>	<input type="checkbox"/>
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, • 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 	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	<p>A successful registration is accomplished using one of the test cases described in section 6.1.4.1, depending on CBSD capability.</p> <ul style="list-style-type: none"> • UUT sends a registration request to the SAS Test Harness and the SAS Test Harness sends a Registration Response with responseCode = 0 and cbsdId. 	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	<p>Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify:</p> <ul style="list-style-type: none"> • UUT shall not transmit RF 	<input checked="" type="checkbox"/>	<input type="checkbox"/>

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Test Plots:



Plot 21. Conducted Measurement – No RF transmission in entire band at anytime (WINNF.FT.C.SCS.1)



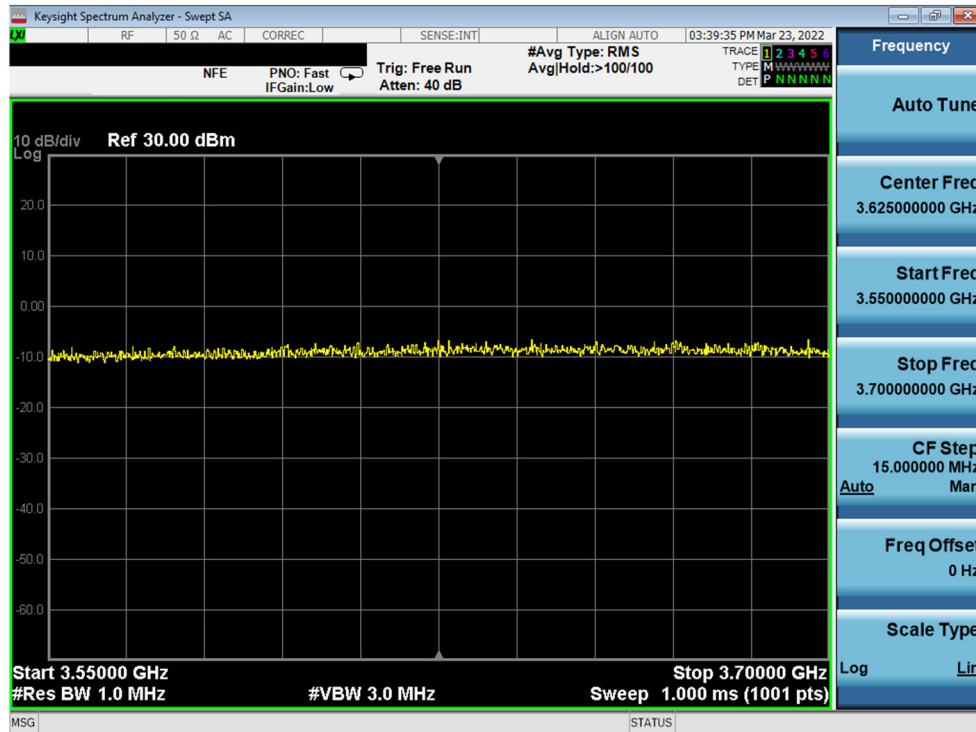
Plot 22. WireShark Screenshot – Successful Handshake (WINNF.FT.C.SCS.1)

FCC ID: A3LRT4401-48A1		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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A22 [WINNF.FT.C.SCS.2] TLS failure due to revoked certificate

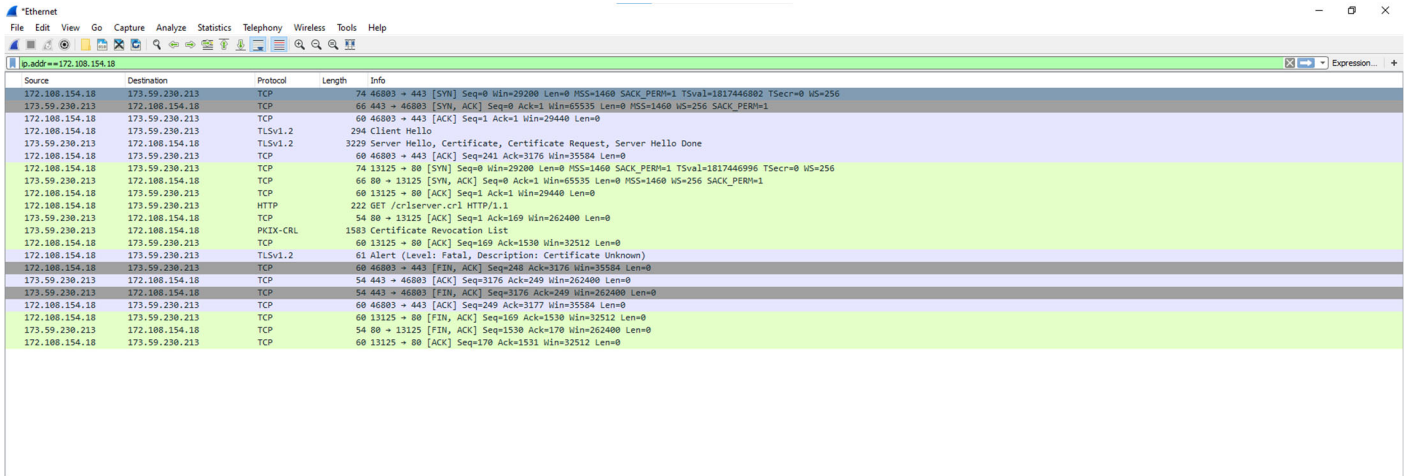
	Test Execution Steps	PASS	FAIL
1	• UUT shall start CBSD-SAS communication with the security procedure	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	<ul style="list-style-type: none"> • Make sure that UUT uses TLS v1.2 for security establishment. • Make sure UUT selects the correct cipher 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 	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	UUT may retry for the security procedure which shall fail	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	SAS Test-Harness shall not receive any Registration request or any application data.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: <ul style="list-style-type: none"> • UUT shall not transmit RF 	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Test Plots:



Plot 23. Conducted Measurement – No RF transmission in entire band at anytime (WINNF.FT.C.SCS.2)

FCC ID: A3LRT4401-48A1	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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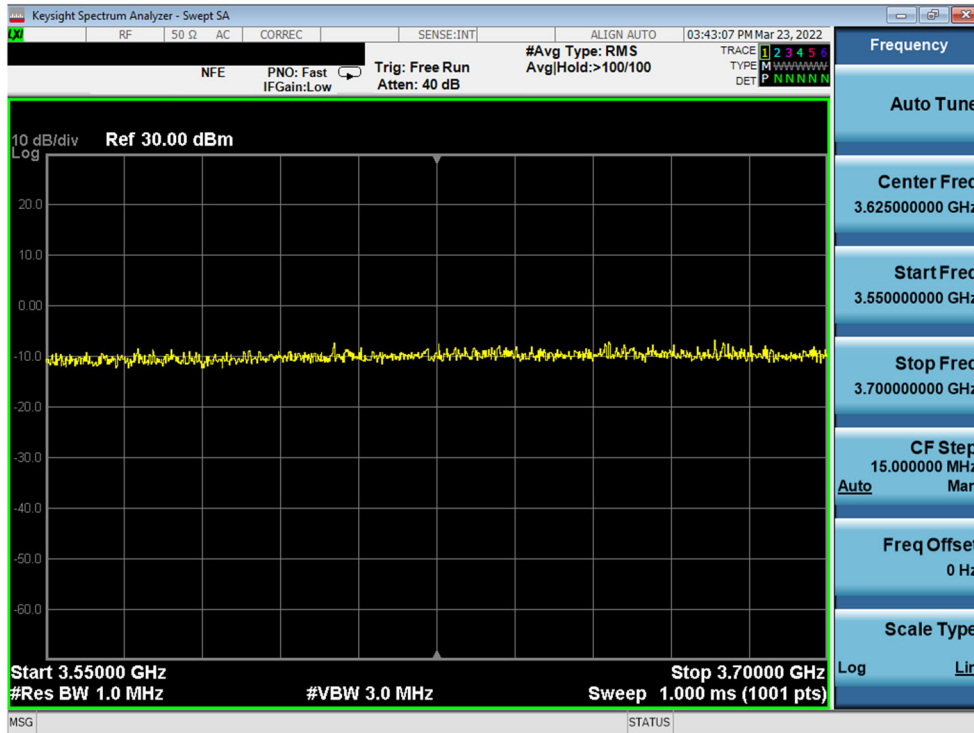
Plot 24. Wireshark Screenshot - Failed Handshake (WINNF.FT.C.SCS.2)

FCC ID: A3LRT4401-48A1	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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A23 [WINNF.FT.C.SCS.3] TLS failure due to expired server certificate

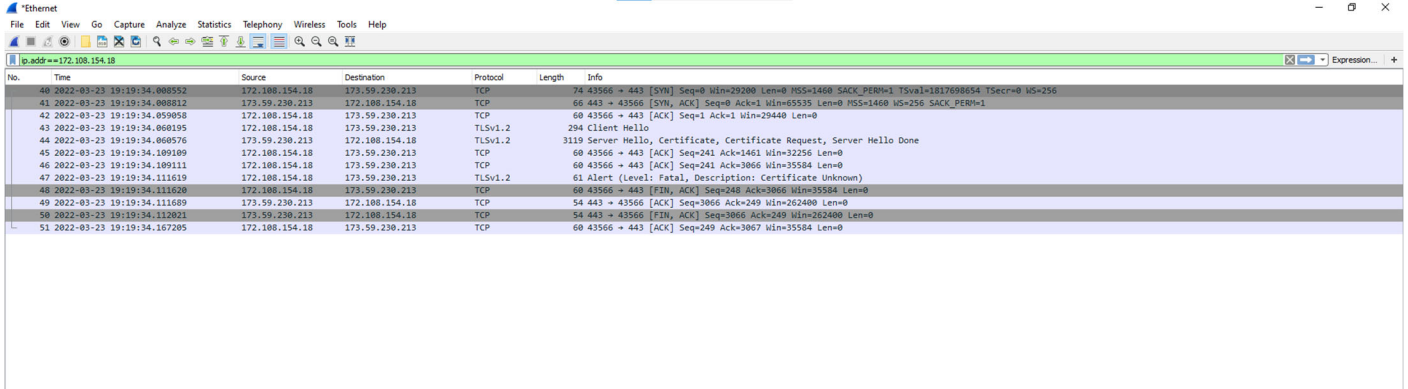
	Test Execution Steps	PASS	FAIL
1	<ul style="list-style-type: none"> UUT shall start CBSD-SAS communication with the security procedure 	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	<ul style="list-style-type: none"> Make sure that UUT uses TLS v1.2 for security establishment. Make sure 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. 	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	UUT may retry for the security procedure which shall fail	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	SAS Test-Harness shall not receive any Registration request or any application data.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: <ul style="list-style-type: none"> UUT shall not transmit RF 	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Test Plots:



Plot 25. Conducted Measurement – No RF transmission in entire band at anytime (WINNF.FT.C.SCS.3)

FCC ID: A3LRT4401-48A1		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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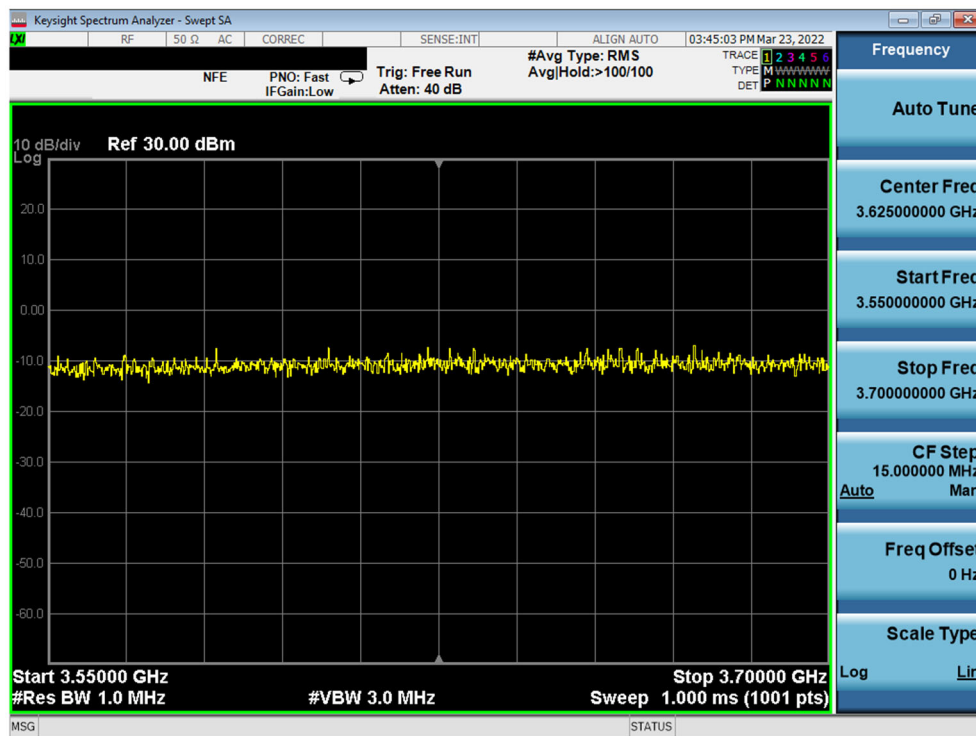
Plot 26. Wireshark Screenshot - Failed Handshake (WINNF.FT.C.SCS.3)

FCC ID: A3LRT4401-48A1	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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A24 [WINNF.FT.C.SCS.4] TLS failure when SAS Test Harness certificate is issued by an unknown CA

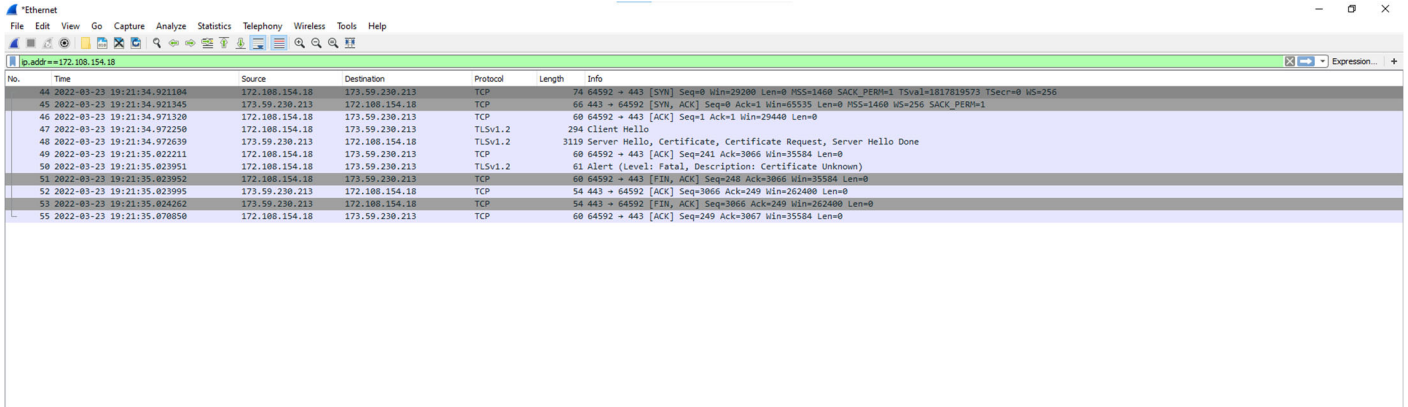
Test Execution Steps		PASS	FAIL
1	• UUT shall start CBSD-SAS communication with the security procedure	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	• Make sure that UUT uses TLS v1.2 for security establishment. • Make sure UUT selects the correct cipher suite. • UUT shall use CRL or OCSP to verify the validity of the server certificate. • Make sure that Mutual authentication does not happen between UUT and the SAS Test Harness.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	UUT may retry for the security procedure which shall fail	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	SAS Test-Harness shall not receive any Registration request or any application data.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: • UUT shall not transmit RF	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Test Plots:



Plot 27. Conducted Measurement – No RF transmission in entire band at anytime (WINNF.FT.C.SCS.4)

FCC ID: A3LRT4401-48A1	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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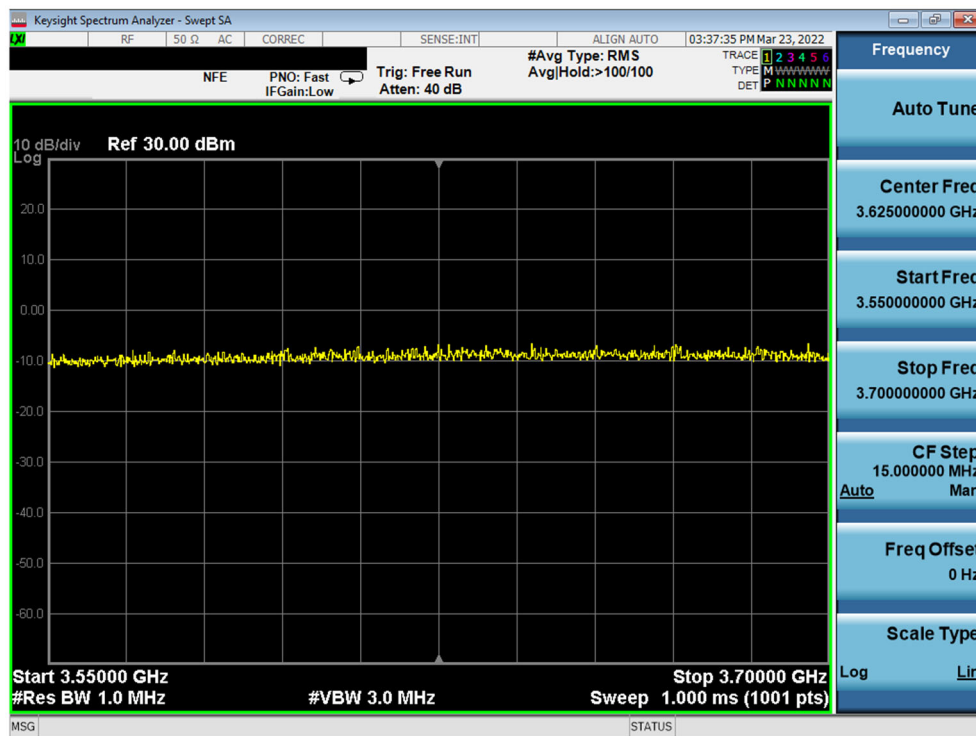
Plot 28. Wireshark Screenshot - Failed Handshake (WINNF.FT.C.SCS.4)

FCC ID: A3LRT4401-48A1	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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A25 [WINNF.FT.C.SCS.5] TLS failure when certificate at the SAS Test Harness is corrupted

	Test Execution Steps	PASS	FAIL
1	• UUT shall start CBSD-SAS communication with the security procedure	<input checked="" type="checkbox"/>	<input type="checkbox"/>
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 UUT and the SAS Test Harness.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	UUT may retry for the security procedure which shall fail	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	SAS Test-Harness shall not receive any Registration request or any application data.	--	--
5	Monitor the RF output of the UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: • UUT shall not transmit RF	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Test Plots:



Plot 29. Conducted Measurement – No RF transmission in entire band at anytime (WINNF.FT.C.SCS.5)

FCC ID: A3LRT4401-48A1		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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*Ethernet

File Edit View Go Capture Analyze Statistics Telephony Wireless Tools Help

ip.addr==172.108.154.18

No.	Time	Source	Destination	Protocol	Length	Info
50	2022-03-23 19:11:39.158528	172.108.154.18	173.59.230.213	TCP	74	65315 → 443 [SYN] Seq=0 Win=29208 Len=0 MSS=1460 SACK_PERM=1 TSval=1817223809 TSecr=0 IS=256
51	2022-03-23 19:11:39.158738	173.59.230.213	172.108.154.18	TCP	66	443 → 65315 [SYN, ACK] Seq=0 Ack=1 Win=65335 Len=0 MSS=1460 IS=256 SACK_PERM=1
52	2022-03-23 19:11:39.213868	172.108.154.18	173.59.230.213	TCP	60	65315 → 443 [ACK] Seq=1 Ack=1 Win=29440 Len=0
53	2022-03-23 19:11:39.214289	172.108.154.18	173.59.230.213	TLV1.2	294	Client Hello
54	2022-03-23 19:11:39.214473	173.59.230.213	172.108.154.18	TLV1.2	3181	Server Hello, Certificate, Certificate Request, Server Hello Done
55	2022-03-23 19:11:39.263615	172.108.154.18	173.59.230.213	TCP	60	65315 → 443 [ACK] Seq=241 Ack=3048 Win=35328 Len=0
56	2022-03-23 19:11:39.264832	172.108.154.18	173.59.230.213	TCP	1514	65315 → 443 [ACK] Seq=241 Ack=3048 Win=35328 Len=1460 [TCP segment of a reassembled PDU]
57	2022-03-23 19:11:39.264833	172.108.154.18	173.59.230.213	TCP	1514	65315 → 443 [ACK] Seq=1781 Ack=3048 Win=35328 Len=1460 [TCP segment of a reassembled PDU]
58	2022-03-23 19:11:39.264834	172.108.154.18	173.59.230.213	TLV1.2	252	Certificate, Client Key Exchange
59	2022-03-23 19:11:39.264915	173.59.230.213	172.108.154.18	TCP	54	443 → 65315 [ACK] Seq=3048 Ack=3359 Win=262656 Len=0
60	2022-03-23 19:11:39.266368	172.108.154.18	173.59.230.213	TLV1.2	323	Certificate Verify
61	2022-03-23 19:11:39.266369	172.108.154.18	173.59.230.213	TLV1.2	60	Change Cipher Spec
62	2022-03-23 19:11:39.266370	172.108.154.18	173.59.230.213	TLV1.2	99	Encrypted Handshake Message
63	2022-03-23 19:11:39.266427	173.59.230.213	172.108.154.18	TCP	54	443 → 65315 [ACK] Seq=3048 Ack=3679 Win=262400 Len=0
64	2022-03-23 19:11:39.288411	173.59.230.213	172.108.154.18	TLV1.2	105	Change Cipher Spec, Encrypted Handshake Message
65	2022-03-23 19:11:39.342096	172.108.154.18	173.59.230.213	TCP	1514	65315 → 443 [ACK] Seq=3679 Ack=3099 Win=35328 Len=1460 [TCP segment of a reassembled PDU]
66	2022-03-23 19:11:39.342097	172.108.154.18	173.59.230.213	TLV1.2	927	Application Data
67	2022-03-23 19:11:39.342167	173.59.230.213	172.108.154.18	TCP	54	443 → 65315 [ACK] Seq=3099 Ack=6012 Win=262656 Len=0
68	2022-03-23 19:11:39.349907	173.59.230.213	172.108.154.18	TLV1.2	103	Application Data
69	2022-03-23 19:11:39.448395	172.108.154.18	173.59.230.213	TCP	60	65315 → 443 [ACK] Seq=6012 Ack=3148 Win=35328 Len=0
70	2022-03-23 19:11:39.448451	173.59.230.213	172.108.154.18	TLV1.2	1055	Application Data, Application Data, Application Data, Application Data, Application Data, Application Data
71	2022-03-23 19:11:39.489565	172.108.154.18	173.59.230.213	TCP	60	65315 → 443 [ACK] Seq=6812 Ack=4149 Win=30400 Len=0

Plot 30. Wireshark Screenshot - Failed Handshake (WINNF.FT.C.SCS.5)

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A26 [WINNF.PT.C.HBT.1] UUT RF Transmit Power Measurement

	Test Execution Steps	PASS	FAIL
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> • UUT has successfully completed SAS Discovery and Authentication with the SAS Test Harness • UUT has registered with the SAS, with CBSID ID = C • UUT has a single valid grant G with parameters {lowFrequency = FL, highFrequency = FH, maxEirp = Pi}, with grant in AUTHORIZED state, and grantExpireTime set to a value far past the duration of this test case <p><i>Note: in order for the UUT to request a grant with the parameters {lowFrequency, highFrequency, maxEirp}, the SAS Test Harness may need to provide appropriate guidance in the availableChannel object of the spectrumInquiry response message, and the operationParam object of the grant response message. Alternately, the UUT vendor may provide the ability to set those parameters on the UUT so that the UUT will request a grant with those parameters.</i></p>	--	--
2	<p>UUT and SAS Test Harness perform a series of Heartbeat Request/Response cycles, which continues until the other test steps are complete. Messaging for each cycle is as follows:</p> <ul style="list-style-type: none"> • UUT sends Heartbeat Request, including: <ul style="list-style-type: none"> o cbsdId = C o grantId = G • SAS Test Harness responds with Heartbeat Response, including: <ul style="list-style-type: none"> o cbsdId = C o grantId = G o transmitExpireTime = current UTC time + 200 seconds o responseCode = 0 	--	--
3	<p>Tester performs power measurement on RF interface(s) of UUT, and verifies it complies with the maxEirp setting, Pi. The RF measurement method is out of scope of this document, but may include additional configuration of the UUT, as required, to fulfil the requirements of the power measurement method.</p> <p><i>Note: it may be required for the vendor to provide a method or configuration to bring the UUT to a mode which is required by the measurement methodology. Any such mode is vendor-specific and depends upon UUT behavior and the measurement methodology.</i></p>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

FCC ID: A3LRT4401-48A1	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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A27 WINNF.PT.C.HBT.1 - RF Power Measurements:

Testing is performed per KDB 971168 D01 and KDB 662911 D01 and across the transmit dynamic range of 37dBm/MHz to 23dBm/MHz for 20MHz Bandwidth. Per manufacturer, Tx0, Tx1, Tx2, and Tx3 produce correlated signals per KDB 662911 D01, with Tx0 and Tx2 cross-polarized with Tx1 and Tx3. The PSD of each transmitter was measured and summed in linear terms and then the antenna gain was added to yield the maxEIRP.

The summed maxEIRP is calculated per the following formula:

$$\text{Summed maxEIRP} = \text{ConductedPower(Tx0+Tx2)} + \text{AntGain(Tx0+Tx2)} + \text{ConductedPower(Tx1+Tx3)} + \text{AntGain(Tx1+Tx3)}$$

Frequency [MHz]	Bandwidth [Mhz]	SAS Granted max EIRP [dbm / MHz]	Tx0 Conducted PSD [dBm]	Tx1 Conducted PSD [dBm]	Tx2 Conducted PSD [dBm]	Tx3 Conducted PSD [dBm]	Directional Antenna Gain [dBi]	EIRP Tx0 + Tx2 [dBm / MHz]	EIRP Tx1 + Tx3 [dBm / MHz]	Summed max EIRP [dBm/MHz]	Margin [dB]
3620	20	37	12.33	13.39	12.49	12.39	11.50	26.92	27.43	30.19	-6.81
3620	20	27	3.76	4.64	4.2	3.91	11.50	18.50	18.80	21.66	-5.34
3620	20	23	0.13	0.79	0.1	-0.11	11.50	14.63	14.87	17.76	-5.24

Table 7-1 RF Output Power Measurements - NR (WINNF.PT.C.HBT.1)

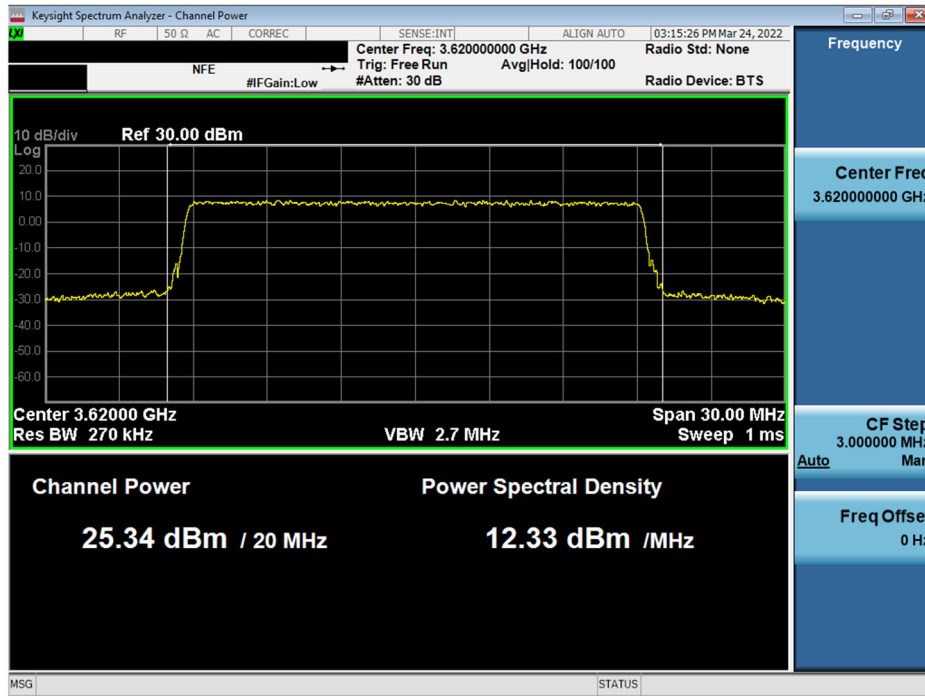
Frequency [MHz]	Bandwidth [Mhz]	SAS Granted max EIRP [dbm / MHz]	Tx0 Conducted PSD [dBm]	Tx1 Conducted PSD [dBm]	Tx2 Conducted PSD [dBm]	Tx3 Conducted PSD [dBm]	Directional Antenna Gain [dBi]	EIRP Tx0 + Tx2 [dBm / MHz]	EIRP Tx1 + Tx3 [dBm / MHz]	Summed max EIRP [dBm/MHz]	Margin [dB]
3620	20	37	12.12	12.63	12.19	12.12	11.50	26.67	26.89	29.79	-7.21
3620	20	32	8.93	9.64	9.18	8.92	11.50	23.57	23.81	26.70	-5.30
3620	20	27	3.98	4.85	4.26	4.13	11.50	18.63	19.02	21.84	-5.16

Table 7-2 RF Output Power Measurements - LTE (WINNF.PT.C.HBT.1)

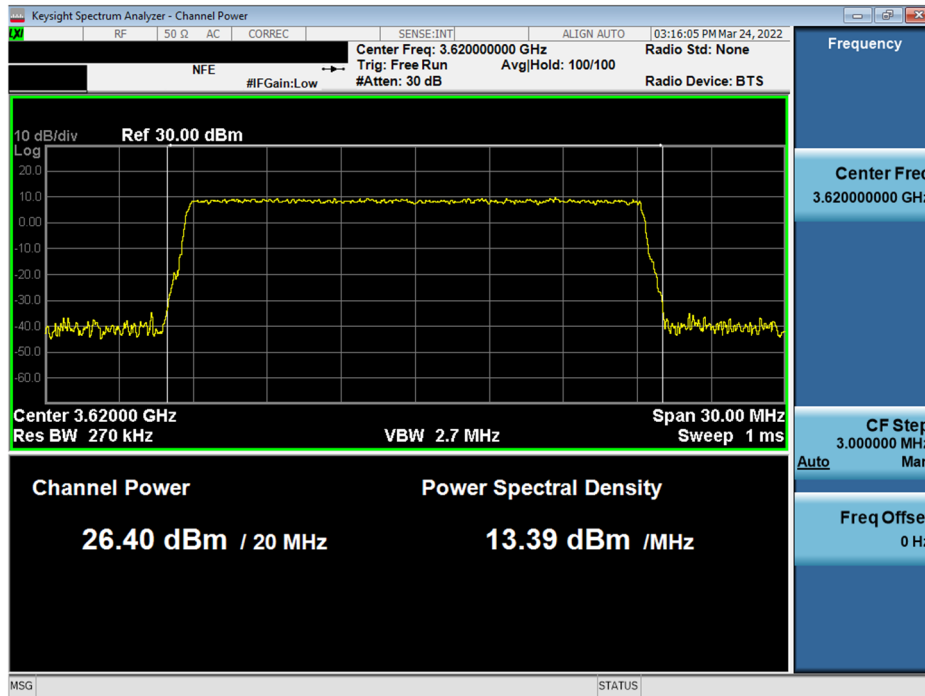
FCC ID: A3LRT4401-48A1	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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V1.0

Test Plots - NR:

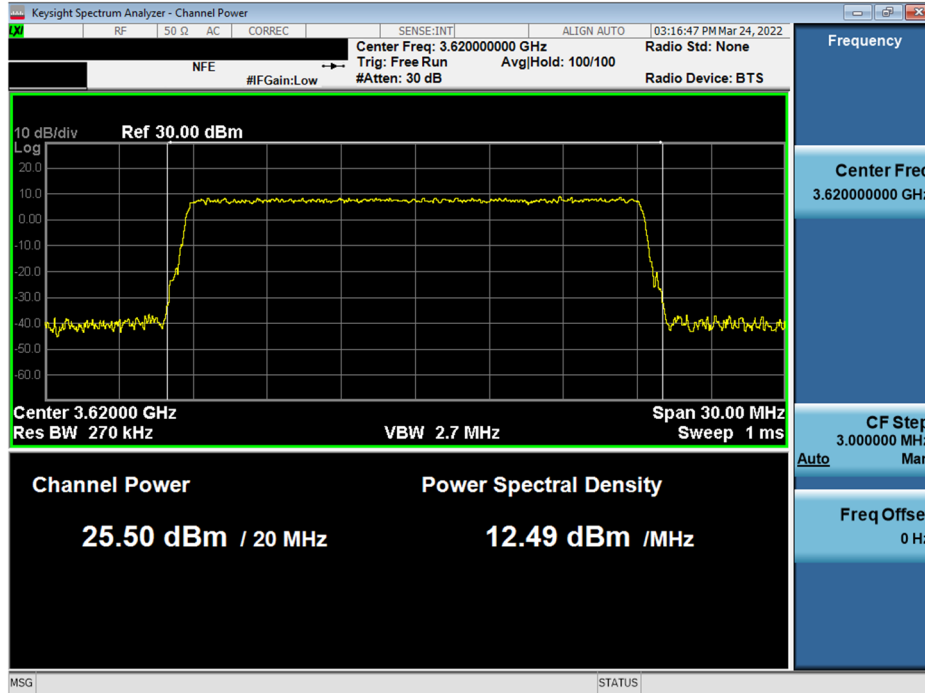


Plot 31. Conducted PSD, Mid-Channel SAS Granted maxEIRP 37 – ANT0

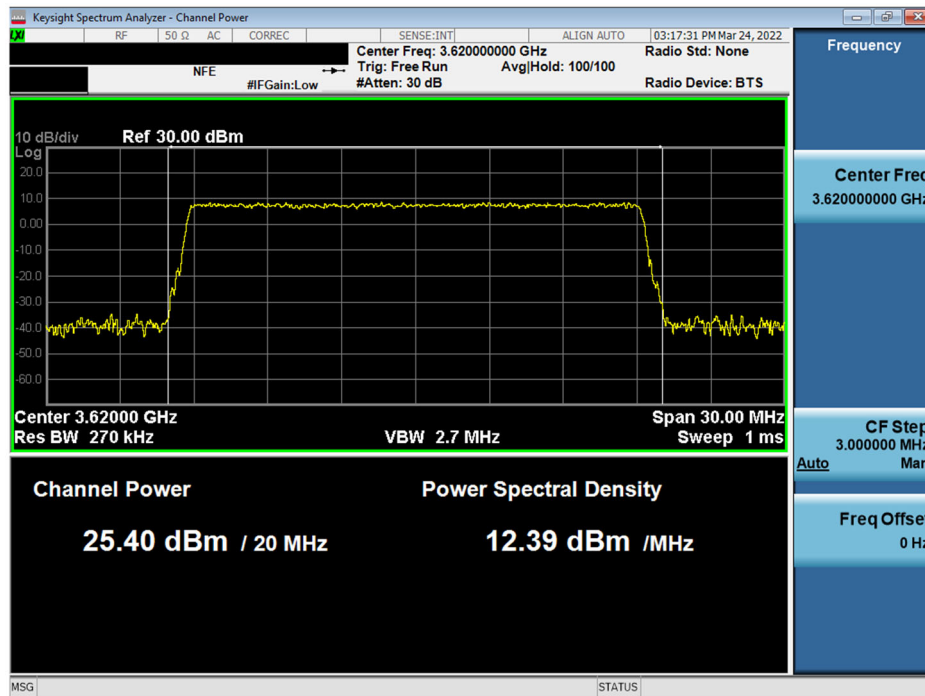


Plot 32. Conducted PSD, Mid-Channel SAS Granted maxEIRP 37 – ANT1

FCC ID: A3LRT4401-48A1	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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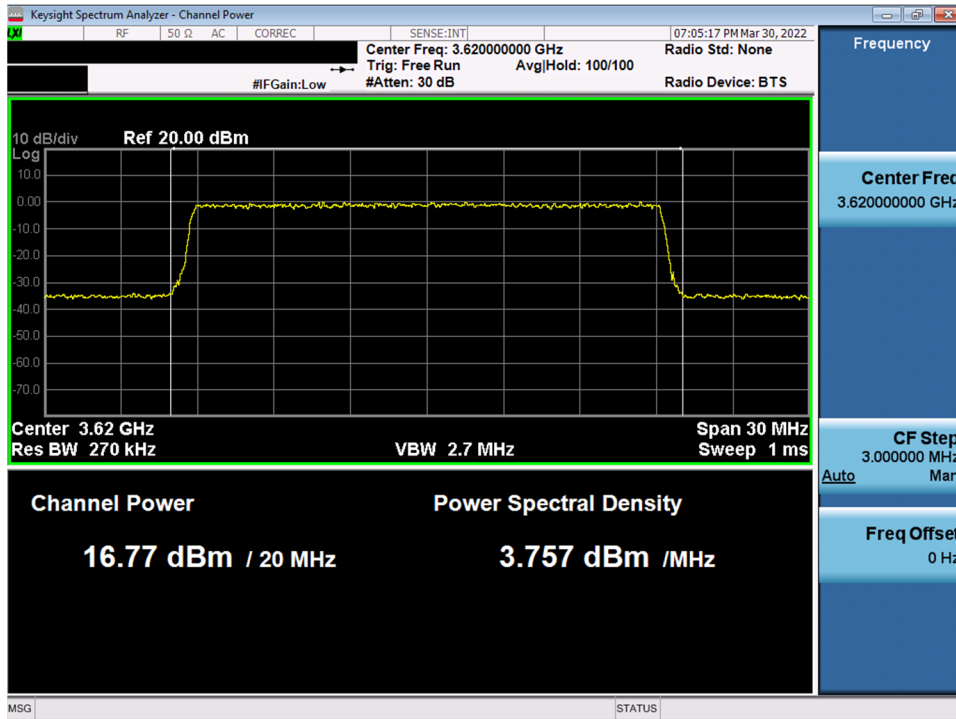


Plot 33. Conducted PSD, Mid-Channel SAS Granted maxEIRP 37 – ANT2

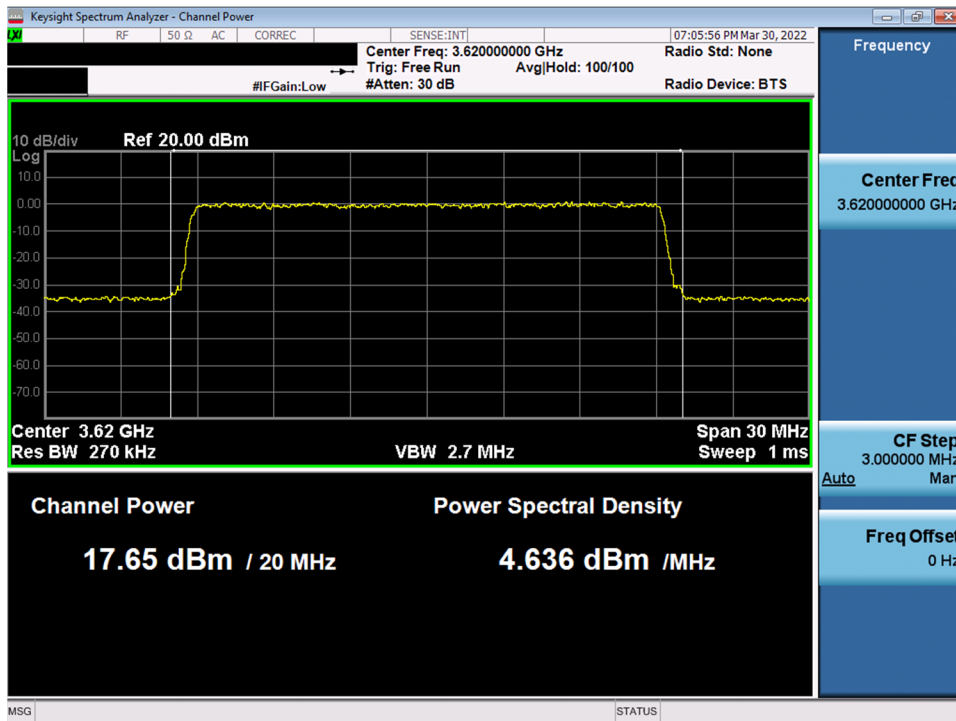


Plot 34. Conducted PSD, Mid-Channel SAS Granted maxEIRP 37 – ANT3

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Plot 35. Conducted PSD, Mid-Channel SAS Granted maxEIRP 27 – ANT0



Plot 36. Conducted PSD, Mid-Channel SAS Granted maxEIRP 27 – ANT1

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Test Report S/N: 1M2204040047-01.A3L	Test Dates: 3/24/2022 – 3/31/2022	EUT Type: LTE/NR Base Station	Page 58 of 69