



WINNF-TS-0122 Test Report

APPLICANT	Celona Inc.
EQUIPMENT	Baicells Nova-436Q
BRAND NAME	Baicells
MODEL NAME	mBS31001
FCC ID	2AWNPMBS31001D
REFERENCE	WINNF-TS-0122 Version V1.0.1

The product was received on Feb. 19, 2020 and testing was started from Feb. 19, 2020 and completed on Mar. 26, 2020. We, Sporton International (USA) Inc., would like to declare that the tested sample has been evaluated in accordance with the test procedures given in WINNF-TS-0122 Version V1.0.1 and has been in compliance with the applicable technical standards.

The report must not be used by the client to claim product certification, approval, or endorsement by A2LA or any agency of government.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International (USA) Inc., the test report shall not be reproduced except in full.



Approved by: Neil Kao

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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FG200410001	01	Initial issue of report	Apr. 24, 2020
FG200410001	02	Only FCCID number changes without any HW/SW change.	Nov. 11, 2020



1. Administration Data

1.1 Testing Laboratory

Test Site	Sporton International (USA) Inc.
Test Site Location	1175 Montague Expressway, Milpitas, CA 95035 TEL : 408 9043300
Test Engineer	Thomas Chen
Temperature	20-24°C, 68-75.2°F
Relative Humidity	45-53%

1.2 Applicant

Company Name	Celona, Inc.
Address	10061 Bubb Road, Cupertino, 95014



2. General Information

2.1 Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT Type	Baicells Nova-436Q
Brand Name	Baicells
Model Name	mBS31001
FCC ID	2AWNPMB31001D
Professional Installation	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
UUT Category	<input type="checkbox"/> Category A <input checked="" type="checkbox"/> Category B
Unit Under Test in Test ID	<input checked="" type="checkbox"/> UUT with Domain Proxy <input type="checkbox"/> UUT without Domain Proxy
CBSD FW Version	BaiBS_QRTB_2.0.4
CBSD Serial Number	1202000240199PP0033 1202000240199PP0020
Domain Proxy HW Version	J31145-311
Domain Proxy SW Version	DP 1.0.1

2.2 Protocol Test Summary

Section	Test Case ID	Test Case Title	Test Result
1	WINNF.FT.D.REG.6	Domain Proxy Single-Step registration for CBSD with CPI signed data	PASS
2	WINNF.FT.D.REG.9	Domain Proxy Missing Required parameters (responseCode 102)	PASS
3	WINNF.FT.D.REG.11	Domain Proxy Pending registration (responseCode 200)	PASS
4	WINNF.FT.D.REG.13	Domain Proxy Invalid parameters (responseCode 103)	PASS
5	WINNF.FT.D.REG.15	Domain Proxy Blacklisted CBSD (responseCode 101)	PASS
6	WINNF.FT.D.REG.17	Domain Proxy Unsupported SAS protocol version (responseCode 100)	PASS
7	WINNF.FT.D.REG.19	Domain Proxy Group Error (responseCode 201)	PASS
8	WINNF.FT.C.GRA.1	Unsuccessful Grant responseCode=400 (INTERFERENCE)	PASS
9	WINNF.FT.C.GRA.2	Unsuccessful Grant responseCode=401 (GRANT_CONFLICT)	PASS
10	WINNF.FT.D.HBT.2	Domain Proxy Heartbeat Success Case (first Heartbeat Response)	PASS
11	WINNF.FT.C.HBT.3	Heartbeat responseCode=105 (DEREGISTER)	PASS
12	WINNF.FT.C.HBT.5	Heartbeat responseCode=501 (SUSPENDED_GRANT) in First Heartbeat Response	PASS
13	WINNF.FT.C.HBT.6	Heartbeat responseCode=501 (SUSPENDED_GRANT) in Subsequent Heartbeat Response	PASS
14	WINNF.FT.C.HBT.7	Heartbeat responseCode=502 (UNSYNC_OP_PARAM)	PASS
15	WINNF.FT.D.HBT.8	Domain Proxy Heartbeat responseCode=500 (TERMINATED_GRANT)	PASS
16	WINNF.FT.C.HBT.9	Heartbeat Response Absent (First Heartbeat)	PASS
17	WINNF.FT.C.HBT.10	Heartbeat Response Absent (Subsequent Heartbeat)	PASS
18	WINNF.FT.C.HBT.11	Successful Grant Renewal in Heartbeat Test Case	PASS
19	WINNF.FT.D.RLQ.2	Domain Proxy Successful Relinquishment	PASS
20	WINNF.FT.D.RLQ.4	Domain Proxy Unsuccessful Relinquishment, responseCode=102	PASS
21	WINNF.FT.D.RLQ.6	Domain Proxy Unsuccessful Relinquishment, responseCode=103	PASS
22	WINNF.FT.D.DRG.2	Domain Proxy Successful Deregistration	PASS
23	WINNF.FT.D.DRG.4	Domain Proxy Deregistration responseCode=102	PASS
24	WINNF.FT.C.DRG.5	Deregistration responseCode=103	PASS

Section	Test Case ID	Test Case Title	Test Result
25	WINNF.FT.C.SCS.1	Successful TLS connection between UUT and SAS Test Harness	PASS
26	WINNF.FT.C.SCS.2	TLS failure due to revoked certificate	PASS
27	WINNF.FT.C.SCS.3	TLS failure due to expired server certificate	PASS
28	WINNF.FT.C.SCS.4	TLS failure when SAS Test Harness certificate is issue by unknown CA	PASS
29	WINNF.FT.C.SCS.5	TLS failure when certificate at the SAS Test Harness is corrupted	PASS
30	WINNF.PT.C.HBT	UUT RF Transmit Power Measurement	PASS

2.3 Support Equipment

Description	Model	Hardware Version	Software Version	Date of reception
Domain Proxy Software	Intel NUC7i7BNH	J31145-311	DP 1.0.1	Not Applicable

2.4 Test Equipment List

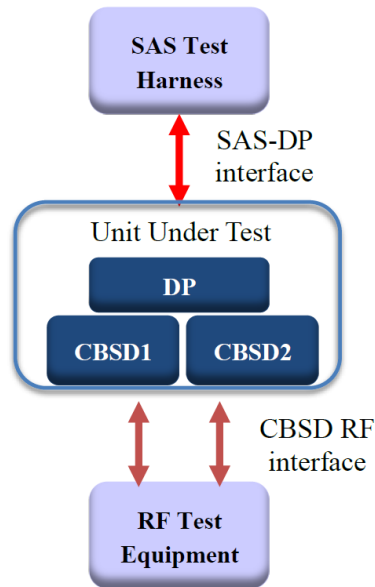
Name	Manufacturer	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
Spectrum Analyzer	Rohde & Schwarz	ESR7	102177	Jun. 27, 2019	Jun. 26, 2020
Spectrum Analyzer	Rohde & Schwarz	ESU	100123	Sep. 04, 2019	Sep. 03, 2020

3. Measurement Environment

Measurement Environment Information	
SAS Test Harness version	1.0.0.3
Operating System	Windows 10
TLS version	V 1.2
Python version	V 2.7

Conditional Test Case		
<input type="checkbox"/>	C1	Mandatory for UUT which supports multi-step registration message
<input type="checkbox"/>	C2	Mandatory for UUT which supports single-step registration with no CPI-signed data in the registration message. By definition, this is a subset of Category A devices which determine all registration information, including location, without CPI intervention.
<input checked="" type="checkbox"/>	C3	Mandatory for UUT which supports single-step registration containing CPIsigned data in the registration message.
<input type="checkbox"/>	C4	Mandatory for UUT which supports RECEIVED_POWER_WITHOUT_GRANT measurement report type
<input type="checkbox"/>	C5	Mandatory for UUT which supports RECEIVED_POWER_WITH_GRANT measurement report type.
<input type="checkbox"/>	C6	Mandatory for UUT which supports parameter change being made at the UUT and prior to sending a deregistration.

3.1 Test configuration with Domain Proxy



3.2 Standards

WINNF-TS-0122 Version 1.0.1, "Conformance and Performance Test Technical Specification; CBSD/DP as Unit Under Test (UUT)", 28 September 2018

WINNF-TS-0016 Version 1.2.4, "Spectrum Access System (SAS) - Citizens Broadband Radio Service Device (CBSD) Interface Technical Specification", 26 June 2019

4. Protocol Test Results

4.1 [WINNF.FT.D.REG.6] Domain Proxy Single-Step registration for CBSD with CPI signed data

#	Test Execution Steps	Results
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 is in the Unregistered state • All of the required and REG-Conditional parameters shall be configured and CPI signature provided 	--
2	<p>The DP with two CBSDs sends Registration requests in the form of one 2-element Array or as individual messages to the SAS Test Harness:</p> <ul style="list-style-type: none"> • The required <i>userId</i>, <i>fccId</i> and <i>cbsdSerialNumber</i> and REG-Conditional <i>cbsdCategory</i>, <i>airInterface</i>, <i>measCapability</i> and <i>cpiSignatureData</i> registration parameters shall be sent from the CBSD and conform to proper format and acceptable ranges. • Any optional registration parameters that may be included in the message shall be verified that they conform to proper format and are within acceptable ranges. 	PASS
3	<ul style="list-style-type: none"> • SAS Test Harness sends a CBSD Registration Response in the form of one 2-element Array or as individual messages as follows: <ul style="list-style-type: none"> – <i>cbsdId</i> = <i>Ci</i> – <i>measReportConfig</i> for each CBSD shall not be included. – <i>responseCode</i> = 0 for each CBSD 	--
4	<p>After completion of step 3, SAS Test Harness will not provide any positive response (<i>responseCode</i>=0) to further request messages from the UUT.</p>	--
5	<p>Monitor the RF output of each 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 	PASS

4.2 [WINNF.FT.D.REG.9] Domain Proxy Missing Required parameters (responseCode 102)

#	Test Execution Steps	Results
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> • UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness • UUT is in the Unregistered state 	--
2	The DP with two CBSDs sends a Registration request in the form of one 2-element Array or as individual messages to SAS Test Harness.	--
3	SAS Test Harness sends a CBSD Registration Response in the form of one 2-element Array or as individual messages as follows: <ul style="list-style-type: none"> – SAS response does not include a <i>cbsdId</i>. – <i>responseCode</i> = Ri for CBSD1 and CBSD2 	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (<i>responseCode</i> =0) to further request messages from the UUT.	--
5	Monitor the RF output of each 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 	PASS

4.3 [WINNF.FT.D.REG.11] Domain Proxy Pending registration (responseCode 200)

#	Test Execution Steps	Results
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> • UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness • UUT is in the Unregistered state 	--
2	The DP with two CBSDs sends a Registration request in the form of one 2-element Array or as individual messages to SAS Test Harness.	--
3	SAS Test Harness sends a CBSD Registration Response in the form of one 2-element Array or as individual messages as follows: <ul style="list-style-type: none"> – SAS response does not include a <i>cbsdId</i>. – <i>responseCode</i> = Ri for CBSD1 and CBSD2 	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (<i>responseCode</i> =200) to further request messages from the UUT.	--
5	Monitor the RF output of each 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 	PASS

4.4 [WINNF.FT.D.REG.13] Domain Proxy Invalid parameters (responseCode 103)

#	Test Execution Steps	Results
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> • UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness • UUT is in the Unregistered state 	--
2	The DP with two CBSDs sends a Registration request in the form of one 2-element Array or as individual messages to SAS Test Harness.	--
3	SAS Test Harness sends a CBSD Registration Response in the form of one 2-element Array or as individual messages as follows: <ul style="list-style-type: none"> – SAS response does not include a <i>cbsdId</i>. – <i>responseCode</i> = Ri for CBSD1 and CBSD2 	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (<i>responseCode</i> R1 = 0 for CBSD1 and R2 = 103 for CBSD2) to further request messages from the UUT.	--
5	Monitor the RF output of each 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 	PASS

4.5 [WINNF.FT.D.REG.15] Domain Proxy Blacklisted CBSD (responseCode 101)

#	Test Execution Steps	Results
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> • UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness • UUT is in the Unregistered state 	--
2	The DP with two CBSDs sends a Registration request in the form of one 2-element Array or as individual messages to SAS Test Harness.	--
3	SAS Test Harness sends a CBSD Registration Response in the form of one 2-element Array or as individual messages as follows: <ul style="list-style-type: none"> – SAS response does not include a <i>cbsdId</i>. – <i>responseCode</i> = Ri for CBSD1 and CBSD2 	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (<i>responseCode</i> R1 = 0 for CBSD1 and R2 = 101 for CBSD2) to further request messages from the UUT.	--
5	Monitor the RF output of each 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 	PASS

**4.6 [WINNF.FT.D.REG.17] Domain Proxy Unsupported SAS protocol version
(responseCode 100)**

#	Test Execution Steps	Results
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> • UUT has successfully completed SAS Discovery and Authentication with SAS Test Harness • UUT is in the Unregistered state 	--
2	The DP with two CBSDs sends a Registration request in the form of one 2-element Array or as individual messages to SAS Test Harness.	--
3	SAS Test Harness sends a CBSD Registration Response in the form of one 2-element Array or as individual messages as follows: <ul style="list-style-type: none"> – SAS response does not include a <i>cbsdId</i>. – <i>responseCode</i> = Ri for CBSD1 and CBSD2 	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (<i>responseCode</i> (Ri) = 100 for each CBSD) to further request messages from the UUT.	--
5	Monitor the RF output of each 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 	PASS

4.7 [WINNF.FT.D.REG.19] Domain Proxy Group Error (responseCode 201)

#	Test Execution Steps	Results
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 is in the Unregistered state 	--
2	The DP with two CBSDs sends a Registration request in the form of one 2-element Array or as individual messages to SAS Test Harness.	--
3	<p>SAS Test Harness sends a CBSD Registration Response in the form of one 2-element Array or as individual messages as follows:</p> <ul style="list-style-type: none"> – SAS response does not include a <i>cbsdId</i>. – <i>responseCode</i> = Ri for CBSD1 and CBSD2 	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (<i>responseCode</i> R1 = 0 for CBSD1 and R2 = 201 for CBSD2) to further request messages from the UUT.	--
5	<p>Monitor the RF output of each 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 	PASS

4.8 [WINNF.FT.C.GRA.1] Unsuccessful Grant responseCode=400 (INTERFERENCE)

#	Test Execution Steps	Results
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> • UUT has registered successfully with SAS Test Harness, with <i>cbsdId = C</i> 	--
2	UUT sends valid Grant Request.	--
3	SAS Test Harness sends a Grant Response message, including <ul style="list-style-type: none"> • <i>cbsdId=C</i> • <i>responseCode = R</i> 	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (<i>responseCode=0</i>) to further request messages from the UUT.	--
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 	PASS

4.9 [WINNF.FT.C.GRA.2] Unsuccessful Grant responseCode=401 (GRANT_CONFLICT)

#	Test Execution Steps	Results
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> • UUT has registered successfully with SAS Test Harness, with <i>cbsdId = C</i> 	--
2	UUT sends valid Grant Request.	--
3	SAS Test Harness sends a Grant Response message, including <ul style="list-style-type: none"> • <i>cbsdId=C</i> • <i>responseCode = R</i> 	--
4	After completion of step 3, SAS Test Harness will not provide any positive response (<i>responseCode=401</i>) to further request messages from the UUT.	--
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 	PASS

4.10 [WINNF.FT.D.HBT.2] Domain Proxy Heartbeat Success Case (first Heartbeat Response)

#	Test Execution Steps	Results
1	Ensure the following conditions are met for test entry:	--
	<ul style="list-style-type: none"> DP has two CBSD registered successfully with SAS Test Harness, with <i>cbsdId</i> = Ci, i={1,2} 	
2	DP sends a message: <ul style="list-style-type: none"> If message is a Spectrum Inquiry Request, go to step 3 If message is a Grant Request, go to step 5 	--
3	DP sends a Spectrum Inquiry Request message for each CBSD. This may occur in a separate message per CBSD, or together in a single message with array of 2. Verify Spectrum Inquiry Request message is formatted correctly for each CBSD, including for CBSDi, i={1,2}: <ul style="list-style-type: none"> <i>cbsdId</i> = Ci List of frequencyRange objects sent by DP are within the CBRS frequency range 	PASS
4	If a separate Spectrum Inquiry Request message was sent for each CBSD, the SAS Test Harness shall respond to each Spectrum Inquiry Request message with a separate Spectrum Inquiry Response message. If a single Spectrum Inquiry Request message was sent containing a 2-object array (one per CBSD), the SAS Test Harness shall respond with a single Spectrum Inquiry Response message containing a 2-object array. Verify parameters for each CBSD within the Spectrum Inquiry Response message are as follows, for CBSDi, i={1,2}: <ul style="list-style-type: none"> <i>cbsdId</i> = Ci <i>availableChannel</i> is an array of availableChannel objects <i>responseCode</i> = 0 	--

#	Test Execution Steps	Results
5	<p>DP sends a Grant Request message for each CBSD. This may occur in a separate message per CBSD, or together in a single message with array of 2. Verify Grant Request message is formatted correctly for each CBSD, including for CBSD_i, $i=\{1,2\}$:</p> <ul style="list-style-type: none"> • <i>cbsdId</i> = C • maxEIRP is at or below the limit appropriate for CBSD category as defined by Part 96 • operationFrequencyRange, F_i, sent by UUT is a valid range within the CBRS band 	PASS
6	<p>If a separate Grant Request message was sent for each CBSD, the SAS Test Harness shall respond to each Grant Request message with a separate Grant Response message.</p>	--
	<p>If a single Grant Request message was sent containing a 2-object array (one per CBSD), the SAS Test Harness shall respond with a single Grant Response message containing a 2-object array.</p> <p>Verify parameters for each CBSD within the Grant Response message are as follows, for CBSD_i, $i=\{1,2\}$:</p> <ul style="list-style-type: none"> • <i>cbsdId</i> = C_i • <i>grantId</i> = G_i = a valid grant ID • <i>grantExpireTime</i> = UTC time greater than duration of the test • <i>responseCode</i> = 0 	
7	<p>Ensure DP sends first Heartbeat Request message for each CBSD. This may occur in a separate message per CBSD, or together in a single message with array of 2. Verify Heartbeat Request message is formatted correctly for each CBSD, including, for CBSD_i $i=\{1,2\}$:</p> <ul style="list-style-type: none"> • <i>cbsdId</i> = C_i, $i=\{1,2\}$ • <i>grantId</i> = G_i, $i=\{1,2\}$ • <i>operationState</i> = "GRANTED" 	PASS

#	Test Execution Steps	Results
8	<p>If a separate Heartbeat Request message was sent for each CBSD by the DP, the SAS Test Harness shall respond to each Heartbeat Request message with a separate Heartbeat Response message.</p> <p>If a single Heartbeat Request message was sent by the DP containing a 2-object array (one per CBSD), the SAS Test Harness shall respond with a single Heartbeat Response message containing a 2-object array.</p> <p>Verify parameters for each CBSD within the Heartbeat Response message are as follows, for CBSDi:</p> <ul style="list-style-type: none"> • <i>cbsdId</i> = Ci • <i>grantId</i> = Gi • <i>transmitExpireTime</i> = current UTC time + 200 seconds • <i>responseCode</i> = 0 	--
9	<p>For further Heartbeat Request messages sent from DP after completion of step 8, validate message is sent within latest specified heartbeatInterval for CBSDi:</p> <ul style="list-style-type: none"> • <i>cbsdId</i> = Ci • <i>grantId</i> = Gi • <i>operationState</i> = "AUTHORIZED" <p>and SAS Test Harness responds with a Heartbeat Response message including the following parameters, for CBSDi</p> <ul style="list-style-type: none"> • <i>cbsdId</i> = Ci • <i>grantId</i> = Gi • <i>transmitExpireTime</i> = current UTC time + 200 seconds 	PASS
	<ul style="list-style-type: none"> • <i>responseCode</i> = 0 	
10	<p>Monitor the RF output of the UUT from start of test until UUT transmission commences. Monitor the RF output of the UUT from start of test until RF transmission commences. Verify:</p> <ul style="list-style-type: none"> • UUT does not transmit at any time prior to completion of the first heartbeat response • UUT transmits after step 8 is complete, and its transmission is limited to within the bandwidth range Fi. 	PASS

4.11 [WINNF.FT.C.HBT.3] Heartbeat responseCode=105 (DEREGISTER)

#	Test Execution Steps	Results
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> • UUT has registered successfully with SAS Test Harness • UUT has a valid single grant as follows: <ul style="list-style-type: none"> ○ valid <i>cbsdId</i> = C ○ valid <i>grantId</i> = G ○ grant is for frequency range F, power P ○ <i>grantExpireTime</i> = UTC time greater than duration of the test • UUT is in AUTHORIZED state and is transmitting within the grant bandwidth F on RF interface 	--
2	UUT sends a Heartbeat Request message. Ensure Heartbeat Request message is sent within Heartbeat Interval specified in the latest Heartbeat Response, and formatted correctly, including: <ul style="list-style-type: none"> • <i>cbsdId</i> = C • <i>grantId</i> = G • <i>operationState</i> = "AUTHORIZED" 	PASS
3	SAS Test Harness sends a Heartbeat Response message, including the following parameters: <ul style="list-style-type: none"> • <i>cbsdId</i> = C • <i>grantId</i> = G 	--
	<ul style="list-style-type: none"> • <i>transmitExpireTime</i> = T = Current UTC time • <i>responseCode</i> = 105 (DEREGISTER) 	
4	After completion of step 3, SAS Test Harness shall not allow any further grants to the UUT.	--
5	Monitor the RF output of the UUT. Verify: <ul style="list-style-type: none"> • UUT shall stop transmission within (T + 60 seconds) of completion of step 3 	PASS

4.12 [WINNF.FT.C.HBT.5] Heartbeat responseCode=501 (SUSPENDED_GRANT) in First Heartbeat Response

#	Test Execution Steps	Results
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> • UUT has registered successfully with SAS Test Harness • UUT has a valid single grant as follows: <ul style="list-style-type: none"> ○ valid <i>cbsdId</i> = C ○ valid <i>grantId</i> = G ○ grant is for frequency range F, power P ○ <i>grantExpireTime</i> = UTC time greater than duration of the test • UUT is in GRANTED, but not AUTHORIZED state (i.e. has not performed its first Heartbeat Request) 	--
2	UUT sends a Heartbeat Request message. Verify Heartbeat Request message is formatted correctly, including: <ul style="list-style-type: none"> • <i>cbsdId</i> = C • <i>grantId</i> = G • <i>operationState</i> = "GRANTED" 	PASS
3	SAS Test Harness sends a Heartbeat Response message, including the following parameters: <ul style="list-style-type: none"> • <i>cbsdId</i> = C • <i>grantId</i> = G • <i>transmitExpireTime</i> = T = current UTC time • <i>responseCode</i> = 501 (SUSPENDED_GRANT) 	--
4	After completion of step 3, SAS Test Harness shall not allow any further grants to the UUT.	--
5	Monitor the SAS-CBSD interface. Verify either A OR B occurs: <p>A. UUT sends a Heartbeat Request message. Ensure message is sent within latest specified <i>heartbeatInterval</i>, and is correctly formatted with parameters:</p> <ul style="list-style-type: none"> • <i>cbsdId</i> = C • <i>grantId</i> = G • <i>operationState</i> = "GRANTED" <p>B. UUT sends a Relinquishment request message. Ensure message is correctly formatted with parameters:</p> <ul style="list-style-type: none"> • <i>cbdsId</i> = C • <i>grantId</i> = G <p>Monitor the RF output of the UUT. Verify:</p> <ul style="list-style-type: none"> • UUT does not transmit at any time 	PASS

4.13 [WINNF.FT.C.HBT.6] Heartbeat responseCode=501 (SUSPENDED_GRANT) in Subsequent Heartbeat Response

#	Test Execution Steps	Results
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> • UUT has registered successfully with SAS Test Harness • UUT has a valid single grant as follows: <ul style="list-style-type: none"> ○ valid <i>cbsdId</i> = C ○ valid <i>grantId</i> = G ○ grant is for frequency range F, power P ○ <i>grantExpireTime</i> = UTC time greater than duration of the test • UUT is in AUTHORIZED state and is transmitting within the grant bandwidth F on RF interface 	--
2	UUT sends a Heartbeat Request message. Verify Heartbeat Request message is sent within latest specified heartbeatInterval, and is formatted correctly, including: <ul style="list-style-type: none"> • <i>cbsdId</i> = C • <i>grantId</i> = G • <i>operationState</i> = "AUTHORIZED" 	PASS
3	SAS Test Harness sends a Heartbeat Response message, including the following parameters: <ul style="list-style-type: none"> • <i>cbsdId</i> = C • <i>grantId</i> = G • <i>transmitExpireTime</i> = T = current UTC time • <i>responseCode</i> = 501 (SUSPENDED_GRANT) 	--
4	After completion of step 3, SAS Test Harness shall not allow any further grants to the UUT.	--

#	Test Execution Steps	Results
5	<p>Monitor the SAS-CBSD interface. Verify either A OR B occurs:</p> <p>A. UUT sends a Heartbeat Request message. Ensure message is sent within latest specified heartbeatInterval, and is correctly formatted with parameters:</p> <ul style="list-style-type: none"> • <i>cbsdId</i> = C • <i>grantId</i> = G • <i>operationState</i> = "GRANTED" <p>B. UUT sends a Relinquishment Request message. Ensure message is correctly formatted with parameters:</p> <ul style="list-style-type: none"> • <i>cbsdId</i> = C • <i>grantId</i> = G <p>Monitor the RF output of the UUT. Verify:</p>	PASS
	<ul style="list-style-type: none"> • UUT shall stop transmission within (<i>T</i> + 60 seconds) of completion of step 3 	

4.14 [WINNF.FT.C.HBT.7] Heartbeat responseCode=502 (UNSYNC_OP_PARAM)

#	Test Execution Steps	Results
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> • UUT has registered successfully with SAS Test Harness • UUT has a valid single grant as follows: <ul style="list-style-type: none"> ○ valid <i>cbsdId</i> = C ○ valid <i>grantId</i> = G ○ grant is for frequency range F, power P ○ <i>grantExpireTime</i> = UTC time greater than duration of the test • UUT is in AUTHORIZED state and is transmitting within the grant bandwidth F on RF interface 	--
2	UUT sends a Heartbeat Request message. Verify Heartbeat Request message is sent within latest specified <i>heartbeatInterval</i> , and is formatted correctly, including: <ul style="list-style-type: none"> • <i>cbsdId</i> = C • <i>grantId</i> = G • <i>operationState</i> = "AUTHORIZED" 	PASS
3	SAS Test Harness sends a Heartbeat Response message, including the following parameters: <ul style="list-style-type: none"> • <i>cbsdId</i> = C • <i>grantId</i> = G • <i>transmitExpireTime</i> = T = Current UTC Time • <i>responseCode</i> = 502 (UNSYNC_OP_PARAM) 	--
4	After completion of step 3, SAS Test Harness shall not allow any further grants to the UUT.	--
5	Monitor the SAS-CBSD interface. Verify: <ul style="list-style-type: none"> • UUT sends a Grant Relinquishment Request message. Verify message is correctly formatted with parameters: <ul style="list-style-type: none"> ○ <i>cbdsId</i> = C ○ <i>grantId</i> = G Monitor the RF output of the UUT. Verify: <ul style="list-style-type: none"> • UUT shall stop transmission within (T+60) seconds of completion of step 3. 	PASS

4.15 [WINNF.FT.D.HBT.8] Domain Proxy Heartbeat responseCode=500
(TERMINATED_GRANT)

#	Test Execution Steps	Results
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> • DP has two CBSD registered successfully with SAS Test Harness • Each CBSD {1,2} has a valid single grant as follows: <ul style="list-style-type: none"> ○ valid <i>cbsdId</i> = Ci, i={1,2} ○ valid <i>grantId</i> = Gi, i={1,2} ○ grant is for frequency range Fi, power Pi ○ <i>grantExpireTime</i> = UTC time greater than duration of the test • Both CBSD are in AUTHORIZED state and transmitting within their granted bandwidth on RF interface 	--
2	<p>DP sends a Heartbeat Request message for each CBSD. This may occur in a separate message per CBSD, or together in a single message with array of size 2.</p> <p>Verify Heartbeat Request message is sent within latest specified <i>heartbeatInterval</i>, and is formatted correctly for each CBSD, including, for CBSDi i={1,2}:</p> <ul style="list-style-type: none"> • <i>cbsdId</i> = Ci, i = {1,2} • <i>grantId</i> = Gi, i = {1,2} • <i>operationState</i> = "AUTHORIZED" 	PASS

#	Test Execution Steps	Results
3	<p>If separate Heartbeat Request message was sent for each CBSD by the DP, the SAS Test Harness shall respond to each Heartbeat Request message with a separate Heartbeat Response message.</p> <p>If a single Heartbeat Request message was sent by the DP containing a 2-object array (one per CBSD), the SAS Test Harness shall respond with a single Heartbeat Response message containing a 2-object array.</p> <p>Parameters for each CBSD within the Heartbeat Response message should be as follows, for CBSDi:</p> <ul style="list-style-type: none"> • <i>cbsdId</i> = Ci • <i>grantId</i> = Gi • For CBSD1: <ul style="list-style-type: none"> ○ <i>transmitExpireTime</i> = current UTC time + 200 seconds ○ <i>responseCode</i> = 0 • For CBSD2: <ul style="list-style-type: none"> ○ <i>transmitExpireTime</i> = T = current UTC time ○ <i>responseCode</i> = 500 (TERMINATED_GRANT) 	--
4	<p>After completion of step 3, SAS Test Harness shall not allow any further grants to the UUT.</p> <p>If CBSD sends further Heartbeat Request messages for CBSD1, SAS Test Harness shall respond with a Heartbeat Response message with parameters:</p> <ul style="list-style-type: none"> • <i>cbsdId</i> = C1 • <i>grantId</i> = G1 • <i>transmitExpireTime</i> = current UTC time + 200 seconds • <i>responseCode</i> = 0 • Heartbeat Request message is within <i>heartbeatInterval</i> of previous Heartbeat Request message 	--
5	<p>Monitor the RF output of CBSD2. Verify:</p> <ul style="list-style-type: none"> • CBSD2 shall stop transmission within bandwidth F2 within (T + 60 seconds) of completion of step 3 	PASS

4.16 [WINNF.FT.C.HBT.9] Heartbeat Response Absent (First Heartbeat)

#	Test Execution Steps	Results
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> • UUT has registered successfully with SAS Test Harness • UUT has a valid single grant as follows: <ul style="list-style-type: none"> ○ valid <i>cbsdlid</i> = C ○ valid <i>grantId</i> = G ○ grant is for frequency range F, power P ○ <i>grantExpireTime</i> = UTC time greater than duration of the test • UUT is in GRANTED, but not AUTHORIZED state (i.e. has not performed its first Heartbeat Request) 	--
2	UUT sends a Heartbeat Request message. Ensure Heartbeat Request message is sent within latest specified <i>heartbeatInterval</i> , and is formatted correctly, including: <ul style="list-style-type: none"> • <i>cbsdlid</i> = C • <i>grantId</i> = G 	PASS
	<ul style="list-style-type: none"> • <i>operationState</i> = "GRANTED" 	
3	After completion of Step 2, SAS Test Harness does not respond to any further messages from UUT to simulate loss of network connection	--
4	Monitor the RF output of the UUT from start of test to 60 seconds after step 3. Verify: <ul style="list-style-type: none"> • At any time during the test, UUT shall not transmit on RF interface 	PASS

4.17 [WINNF.FT.C.HBT.10] Heartbeat Response Absent (Subsequent Heartbeat)

#	Test Execution Steps	Results
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> • UUT has registered successfully with SAS Test Harness • UUT has a valid single grant as follows: <ul style="list-style-type: none"> ○ valid <i>cbsdId</i> = C ○ valid <i>grantId</i> = G ○ grant is for frequency range F, power P ○ <i>grantExpireTime</i> = UTC time greater than duration of the test • UUT is in AUTHORIZED state and is transmitting within the grant bandwidth F on RF interface 	--
2	UUT sends a Heartbeat Request message. Verify Heartbeat Request message is sent within the latest specified <i>heartbeatInterval</i> , and is formatted correctly, including: <ul style="list-style-type: none"> • <i>cbsdId</i> = C • <i>grantId</i> = G • <i>operationState</i> = "AUTHORIZED" 	PASS
3	SAS Test Harness sends a Heartbeat Response message, with the following parameters: <ul style="list-style-type: none"> • <i>cbsdId</i> = C • <i>grantId</i> = G • <i>transmitExpireTime</i> = current UTC time + 200 seconds • <i>responseCode</i> = 0 	--
4	After completion of Step 3, SAS Test Harness does not respond to any further messages from UUT	--
5	Monitor the RF output of the UUT. Verify: <ul style="list-style-type: none"> • UUT shall stop all transmission on RF interface within (<i>transmitExpireTime</i> + 60 seconds), using the <i>transmitExpireTime</i> sent in Step 3. 	PASS

4.18 [WINNF.FT.C.HBT.11] Successful Grant Renewal in Heartbeat Test Case

#	Test Execution Steps	Results
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> • UUT has registered successfully with SAS Test Harness • UUT has a valid single grant as follows: <ul style="list-style-type: none"> ○ valid <i>cbsdId</i> = C ○ valid <i>grantId</i> = G ○ grant is for frequency range F, power P • UUT is in AUTHORIZED state and is transmitting within the grant bandwidth F on RF interface. • Grant has the following parameters at the start of the test: <ul style="list-style-type: none"> ○ <i>grantExpireTime</i> = UTC time equal to time at start of test + 300 seconds = Tgrant_expire ○ <i>transmitExpireTime</i> = UTC time equal to time at start of test + 200 seconds ○ <i>heartbeatInterval</i> = 60 seconds 	--
2	UUT sends a Heartbeat Request message. If Heartbeat Request message contains grantRenew = TRUE, go to Step 6, else go to Step 3.	--
3	Verify Heartbeat Request message is sent within the latest specified <i>heartbeatInterval</i> , and is formatted correctly, including: <ul style="list-style-type: none"> • <i>cbsdId</i> = C • <i>grantId</i> = G • <i>operationState</i> = "AUTHORIZED" 	PASS
4	SAS Test Harness sends a Heartbeat Response message, with the following parameters: <ul style="list-style-type: none"> • <i>cbsdId</i> = C • <i>grantId</i> = G • <i>transmitExpireTime</i> = current UTC + 200 seconds • <i>grantExpireTime</i> = same as Step 1 • <i>responseCode</i> = 0 	--
5	Go to Step 2	--

#	Test Execution Steps	Results
6	Verify Heartbeat Request message is sent within the latest specified heartbeatInterval, and is formatted correctly, including: <ul style="list-style-type: none"> • <i>cbsdId</i> = C • <i>grantId</i> = G 	PASS
	<ul style="list-style-type: none"> • <i>operationState</i> = "AUTHORIZED" • <i>grantRenew</i> = TRUE 	
7	SAS Test Harness sends a Heartbeat Response message, with the following parameters: <ul style="list-style-type: none"> • <i>cbsdId</i> = C • <i>grantId</i> = G • <i>grantExpireTime</i> = UTC time set far in the future • <i>transmitExpireTime</i> = current UTC time + 200 seconds • <i>responseCode</i> = 0 	--
8	Continue to respond to any subsequentHeartbeat Request from CBSD with Heartbeat Response with the following parameters: <ul style="list-style-type: none"> • <i>cbsdId</i> = C • <i>grantId</i> = G • <i>transmitExpireTime</i> = same as Step 7 • <i>responseCode</i> = 0 	--
9	Monitor RF transmission of UUT from start of test until Tgrant_expire + 60 seconds and ensure UUT continues to transmit throughout the time period.	PASS

4.19 [WINNF.FT.D.RLQ.2] Domain Proxy Successful Relinquishment

#	Test Execution Steps	Results
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> • DP has successfully completed SAS Discovery and Authentication with SAS Test Harness • DP has successfully registered 2 CBSD with SAS Test Harness, each with <i>cbsdId=Ci</i>, <i>i={1,2}</i> • DP has received a valid grant with <i>grantId = Gi</i>, <i>i={1,2}</i> for each CBSD • Both CBSD are in Grant State AUTHORIZED and actively transmitting within the bounds of their grants. <p>Invoke trigger to relinquish each UUT Grant from the SAS Test Harness</p>	--
2	<p>Verify DP sends a Relinquishment Request message for each CBSD. This may occur in a separate message per CBSD, or together in a single message with array of 2.</p> <p>Verify Relinquishment Request message contains all required parameters properly formatted for each CBSD, specifically, for CBSDi:</p> <ul style="list-style-type: none"> • <i>cbsdId = Ci</i> • <i>grantId = Gi</i> 	PASS
3	<p>If a separate Relinquishment Request message was sent for each CBSD by the DP, the SAS Test Harness shall respond to each request message with a separate response message.</p> <p>If a single Relinquishment Request message was sent by the DP containing a 2-object array (one per CBSD), the SAS Test Harness shall respond with a single Response message containing a 2-object array.</p> <p>Parameters for each CBSD within the Relinquishment Response shall be as follows:</p> <ul style="list-style-type: none"> • <i>cbsdId = Ci</i> • <i>grantId = Gi</i> • <i>responseCode = 0</i> 	--
4	<p>After completion of step 3, SAS Test Harness will not provide any additional positive response (<i>responseCode=0</i>) to further request messages from the UUT.</p>	--



#	Test Execution Steps	Results
5	Monitor the RF output of each 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 stop RF transmission at any time between triggering the relinquishments and UUT sending the relinquishment requests for each CBSD.	PASS

4.20 [WINNF.FT.D.RLQ.4] Domain Proxy Unsuccessful Relinquishment, responseCode=102

#	Test Execution Steps	Results
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> • DP has successfully completed SAS Discovery and Authentication with SAS Test Harness • DP has successfully registered 2 CBSD with SAS Test Harness, each with <i>cbsdId=Ci, i={1,2}</i> • DP has received a valid grant with <i>grantId = Gi, i={1,2}</i> for each CBSD • Both CBSD are in Grant State AUTHORIZED and actively transmitting within the bounds of their grants. <p>Invoke trigger on UUT to Relinquish Grant from the SAS Test Harness</p>	--
2	<p>DP with two CBSDs sends Relinquishment Request with two objects to the SAS Test Harness.</p> <p>This may occur in a separate message per CBSD, or together in a single message with array of 2.</p> <p>Verify DP sends a Relinquishment Request message for each CBSD. This may occur in a separate message per CBSD, or together in a single message with array of 2.</p> <p>Verify Relinquishment Request message contains all required parameters properly formatted for each CBSD, specifically, for CBSDi:</p> <ul style="list-style-type: none"> • <i>cbsdId = Ci</i> • <i>grantId = Gi</i> 	--
3	<p>If a separate Relinquishment Request message was sent for each CBSD by the DP, the SAS Test Harness shall respond to each request message with a separate response message.</p> <p>If a single Relinquishment Request message was sent by the DP containing a 2-object array (one per CBSD), the SAS Test Harness shall respond with a single Response message containing a 2-object array.</p> <p>Parameters for each CBSD within the Relinquishment Response Message shall be as follows:</p> <ul style="list-style-type: none"> • <i>cbsdId = Ci</i> • No <i>grantId</i> <p><i>responseCode = Ri</i></p>	--

#	Test Execution Steps	Results
4	After completion of step 3, SAS Test Harness will not provide any positive response (<i>responseCode=0</i>) to further request messages from the UUT.	--
5	Monitor the RF output of each UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: A. UUT stopped RF transmission at any time between triggering the relinquishment and UUT sending the relinquishment request	PASS

4.21 [WINNF.FT.D.RLQ.6] Domain Proxy Unsuccessful Relinquishment, responseCode=103

#	Test Execution Steps	Results
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> • DP has successfully completed SAS Discovery and Authentication with SAS Test Harness • DP has successfully registered 2 CBSD with SAS Test Harness, each with <i>cbsdId=Ci</i>, <i>i={1,2}</i> • DP has received a valid grant with <i>grantId = Gi</i>, <i>i={1,2}</i> for each CBSD • Both CBSD are in Grant State AUTHORIZED and actively transmitting within the bounds of their grants. <p>Invoke trigger on UUT to Relinquish Grant from the SAS Test Harness</p>	--
2	<p>DP with two CBSDs sends Relinquishment Request with two objects to the SAS Test Harness.</p> <p>This may occur in a separate message per CBSD, or together in a single message with array of 2.</p> <p>Verify DP sends a Relinquishment Request message for each CBSD. This may occur in a separate message per CBSD, or together in a single message with array of 2.</p> <p>Verify Relinquishment Request message contains all required parameters properly formatted for each CBSD, specifically, for CBSDi:</p> <ul style="list-style-type: none"> • <i>cbsdId = Ci</i> • <i>grantId = Gi</i> 	--
3	<p>If a separate Relinquishment Request message was sent for each CBSD by the DP, the SAS Test Harness shall respond to each request message with a separate response message.</p> <p>If a single Relinquishment Request message was sent by the DP containing a 2-object array (one per CBSD), the SAS Test Harness shall respond with a single Response message containing a 2-object array.</p> <p>Parameters for each CBSD within the Relinquishment Response Message shall be as follows:</p> <ul style="list-style-type: none"> • <i>cbsdId = Ci</i> • No <i>grantId</i> <p><i>responseCode = Ri</i></p>	--



#	Test Execution Steps	Results
4	After completion of step 3, SAS Test Harness will not provide any positive response (<i>responseCode=103</i>) to further request messages from the UUT.	--
5	Monitor the RF output of each UUT from start of test until 60 seconds after Step 3 is complete. This is the end of the test. Verify: A. UUT stopped RF transmission at any time between triggering the relinquishment and UUT sending the relinquishment request	PASS

4.22 [WINNF.FT.D.DRG.2] Domain Proxy Successful Deregistration

#	Test Execution Steps	Results
1	Ensure the following conditions are met for test entry: <ul style="list-style-type: none"> • Each UUT has successfully registered with SAS Test Harness • Each UUT is in the authorized state • DP has successfully completed SAS Discovery and Authentication with SAS Test Harness • DP has successfully registered 2 CBSD with SAS Test Harness, each with <i>cbsdId=Ci</i>, <i>i={1,2}</i> • DP has received a valid grant with <i>grantId = Gi</i>, <i>i={1,2}</i> for each CBSD • Both CBSD are in Grant State AUTHORIZED and actively transmitting within the bounds of their grants. Invoke trigger to deregister each UUT from the SAS Test Harness	--
2	UUT sends a Relinquishment request and receives Relinquishment response with <i>responseCode=0</i>	--
3	Verify DP sends a Deregistration Request message for each CBSD. This may occur in a separate message per CBSD, or together in a single message with array of 2. Verify Deregistration Request message contains all required parameters properly formatted for each CBSD, specifically, for CBSDi: <ul style="list-style-type: none"> • <i>cbsdId = Ci</i> 	PASS
4	If a separate Deregistration Request message was sent for each CBSD by the DP, the SAS Test Harness shall respond to each request message with a separate response message. If a single Deregistration Request message was sent by the DP containing a 2-object array (one per CBSD), the SAS Test Harness shall respond with a single Response message containing a 2-object array. Parameters for each CBSD within the Deregistration Response shall be as follows: <ul style="list-style-type: none"> • <i>cbsdId = Ci</i> • <i>responseCode = 0</i> 	--
5	After completion of step 4, SAS Test Harness will not provide any positive response (<i>responseCode=0</i>) to further request messages from the UUT.	--

#	Test Execution Steps	Results
6	<p>Monitor the RF output of each 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:<ol style="list-style-type: none">A. UUT sending a Registration Request message, as this is not mandatoryB. UUT sending a Deregistration Request message	PASS

4.23 [WINNF.FT.D.DRG.4] Domain Proxy Deregistration responseCode=102

#	Test Execution Steps	Results
1	<p>Ensure the following conditions are met for test entry:</p> <ul style="list-style-type: none"> DP has successfully completed SAS Discovery and Authentication with SAS Test Harness DP has successfully registered 2 CBSD with SAS Test Harness, each with <i>cbsdId=Ci</i>, <i>i={1,2}</i> DP has received a valid grant with <i>grantId = Gi</i>, <i>i={1,2}</i> for each CBSD Both CBSD are in Grant State AUTHORIZED and actively transmitting within the bounds of their grants. <p>Invoke trigger to deregister each UUT from the SAS Test Harness</p>	--
2	UUT sends a Relinquishment request and receives Relinquishment response with <i>responseCode=0</i> for each CBSD	--
3	<p>Verify DP sends a Deregistration Request message for each CBSD. This may occur in a separate message per CBSD, or together in a single message with array of 2.</p> <p>Verify Deregistration Request message contains all required parameters properly formatted for each CBSD, specifically, for CBSDi:</p> <ul style="list-style-type: none"> <i>cbsdId = Ci</i> 	--
4	<p>If a separate Deregistration Request message was sent for each CBSD by the DP, the SAS Test Harness shall respond to each request message with a separate response message.</p> <p>If a single Deregistration Request message was sent by the DP containing a 2-object array (one per CBSD), the SAS Test Harness shall respond with a single Response message containing a 2-object array.</p> <p>Parameters for each CBSD within the Deregistration Response Message shall be as follows:</p> <ul style="list-style-type: none"> No <i>cbsdId</i> in either response <i>responseCode = Ri</i> 	--
5	After completion of step 3, SAS Test Harness will not provide any positive response (<i>responseCode=0</i>) to further request messages from the UUT.	--

#	Test Execution Steps	Results
6	<p>Monitor the RF output of each 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 mandatoryB. UUT sending a Deregistration Request message	PASS

4.24 [WINNF.FT.C.DRG.5] Deregistration responseCode=103

#	Test Execution Steps	Results
1	Ensure the following conditions are met for test entry: <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 <i>cbsdId=C</i> • UUT has received a valid grant with <i>grantId = G</i> • UUT is in Grant State AUTHORIZED and is actively transmitting within the bounds of its grant. Invoke trigger to deregister UUT from the SAS Test Harness	--
2	UUT sends a Relinquishment request and receives Relinquishment response with <i>responseCode=0</i>	--
3	UUT sends Deregistration Request to SAS Test Harness with <i>cbsdId = C</i>	--
4	The SAS Test Harness sends the Deregistration Response Message to UUT with: <ul style="list-style-type: none"> • No <i>cbsdId</i> • <i>responseCode = 103</i> 	--
5	After completion of step 3, SAS Test Harness will not provide any positive response (<i>responseCode=0</i>) to further request messages from the UUT.	--
6	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: <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 	PASS

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

#	Test Execution Steps	Results
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 	PASS
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
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 <i>responseCode = 0</i> and <i>cbstdId</i>. 	PASS
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 	PASS

4.26 [WINNF.FT.C.SCS.2] TLS failure due to revoked certificate

#	Test Execution Steps	Results
1	<ul style="list-style-type: none">UUT shall start CBSD-SAS communication with the security procedures	PASS
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
3	UUT may retry for the security procedure which shall fail	PASS
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	PASS

4.27 [WINNF.FT.C.SCS.3] TLS failure due to expired server certificate

#	Test Execution Steps	Results
1	<ul style="list-style-type: none">• UUT shall start CBSD-SAS communication with the security procedures	PASS
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
3	UUT may retry for the security procedure which shall fail.	PASS
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	PASS

4.28 [WINNF.FT.C.SCS.4] TLS failure when SAS Test Harness certificate is issued by an unknown CA

#	Test Execution Steps	Results
1	<ul style="list-style-type: none"> UUT shall start CBSD-SAS communication with the security procedures 	PASS
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
3	UUT may retry for the security procedure which shall fail.	PASS
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 	PASS

4.29 [WINNF.FT.C.SCS.5] TLS failure when certificate at the SAS Test Harness is corrupted

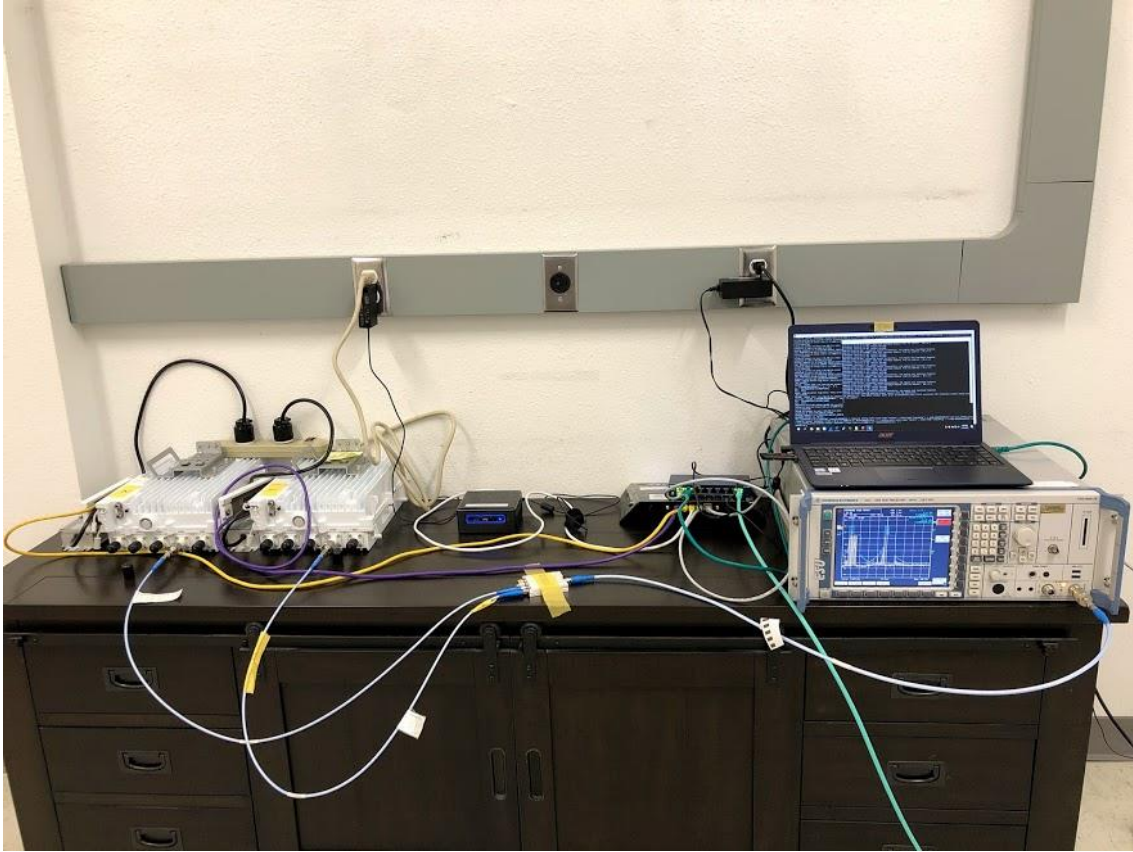
#	Test Execution Steps	Results
1	<ul style="list-style-type: none"> UUT shall start CBSD-SAS communication with the security procedures 	PASS
2	<ul style="list-style-type: none"> Make sure that UUT uses TLS v1.2 for security establishment. Make sure UUT selects the correct cipher suite. UUT shall use 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
3	UUT may retry for the security procedure which shall fail.	PASS
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 	PASS

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

#	Test Execution Steps	Results
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"> ○ cbsdId = C ○ grantId = G • SAS Test Harness responds with Heartbeat Response, including: <ul style="list-style-type: none"> ○ cbsdId = C ○ grantId = G ○ transmitExpireTime = current UTC time + 200 seconds ○ responseCode = 0 	--

#	Test Execution Steps	Results
3	<p>Tester performs power measurement on RF interface(s) of UUT, and verifies it complies with the maxEirp setting, P_i. 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>	PASS

Appendix A. Setup Plot



Appendix B. RF measurement plots

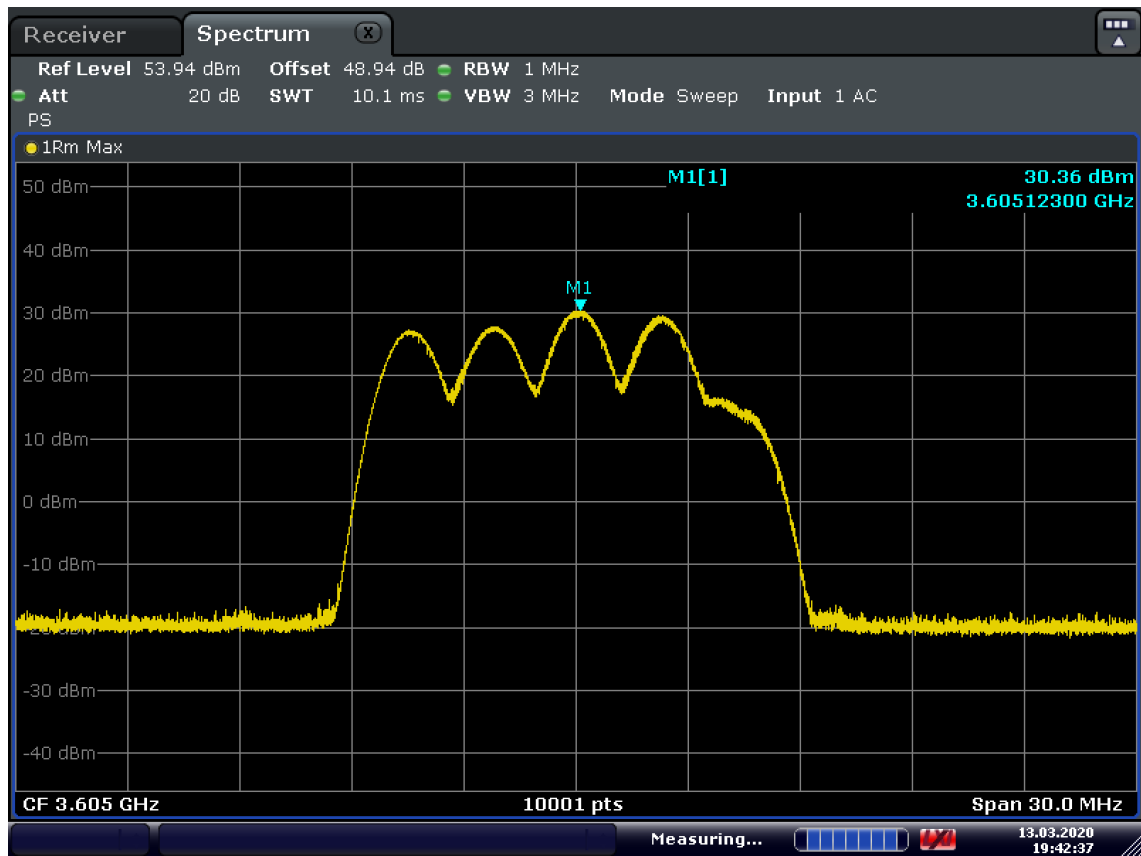
Report Clause 4.30 [WINNF.PT.C.HBT] UUT RF Transmit Power Measurement

SAS authorizes MaxEirp (dBm/MHz)	UUT EIRP PSD (dBm/MHz)
31	30.36 dBm
32	31.36 dBm
33	32.45 dBm
34	33.41 dBm
35	34.39 dBm
36	35.36 dBm
37	36.5 dBm

Note : The Ref Offset **48.94** dB includes the antenna gain **17** dBi and cable path loss **31.94** dB.

SAS authorizes MaxEirp 31 (dBm/MHz)

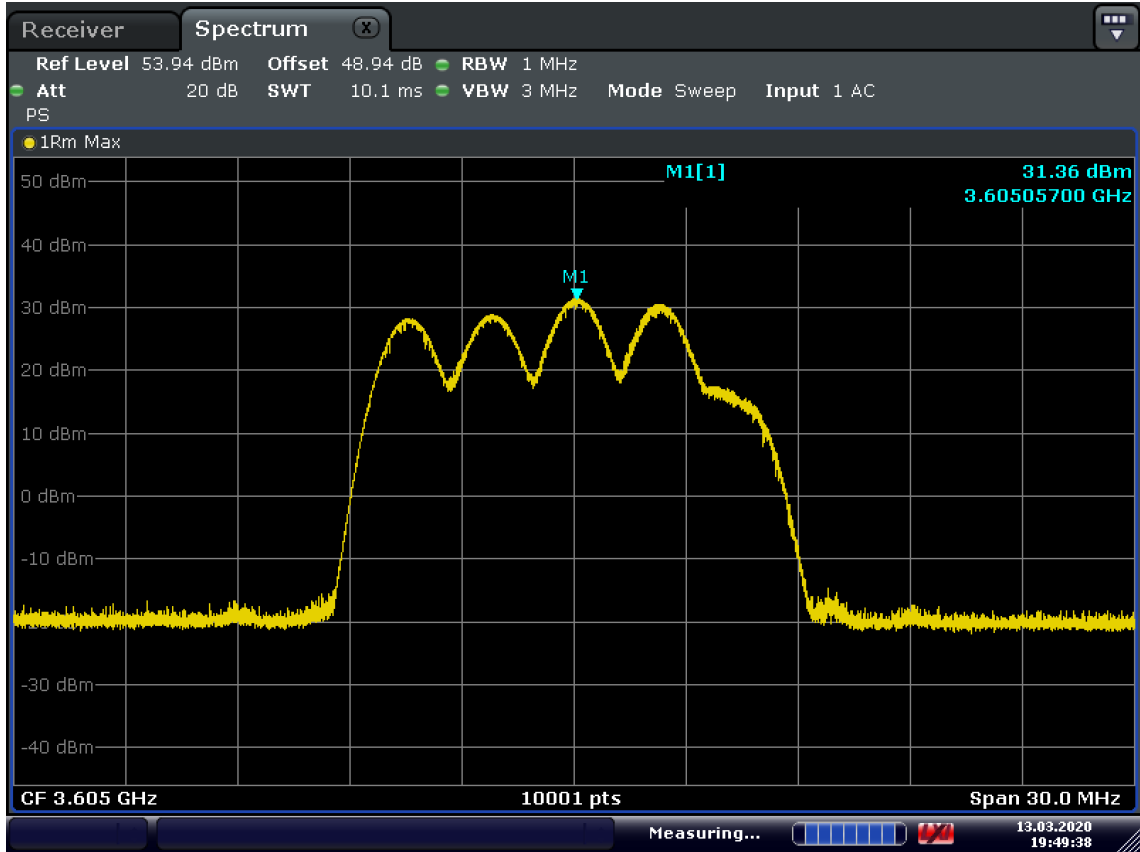
UUT EIRP PSD 30.36 (dBm/MHz)





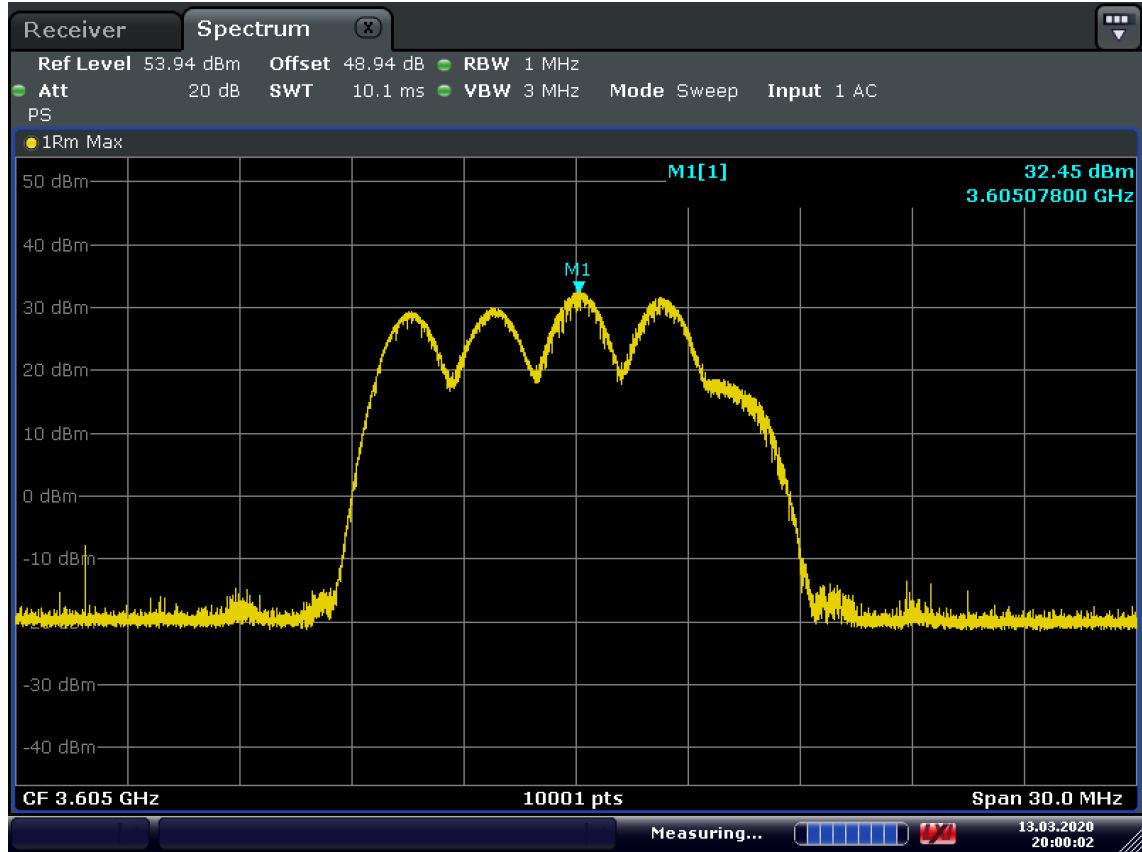
SAS authorizes MaxEirp 32 (dBm/MHz)

UUT EIRP PSD 31.36 (dBm/MHz)



SAS authorizes MaxEirp 33 (dBm/MHz)

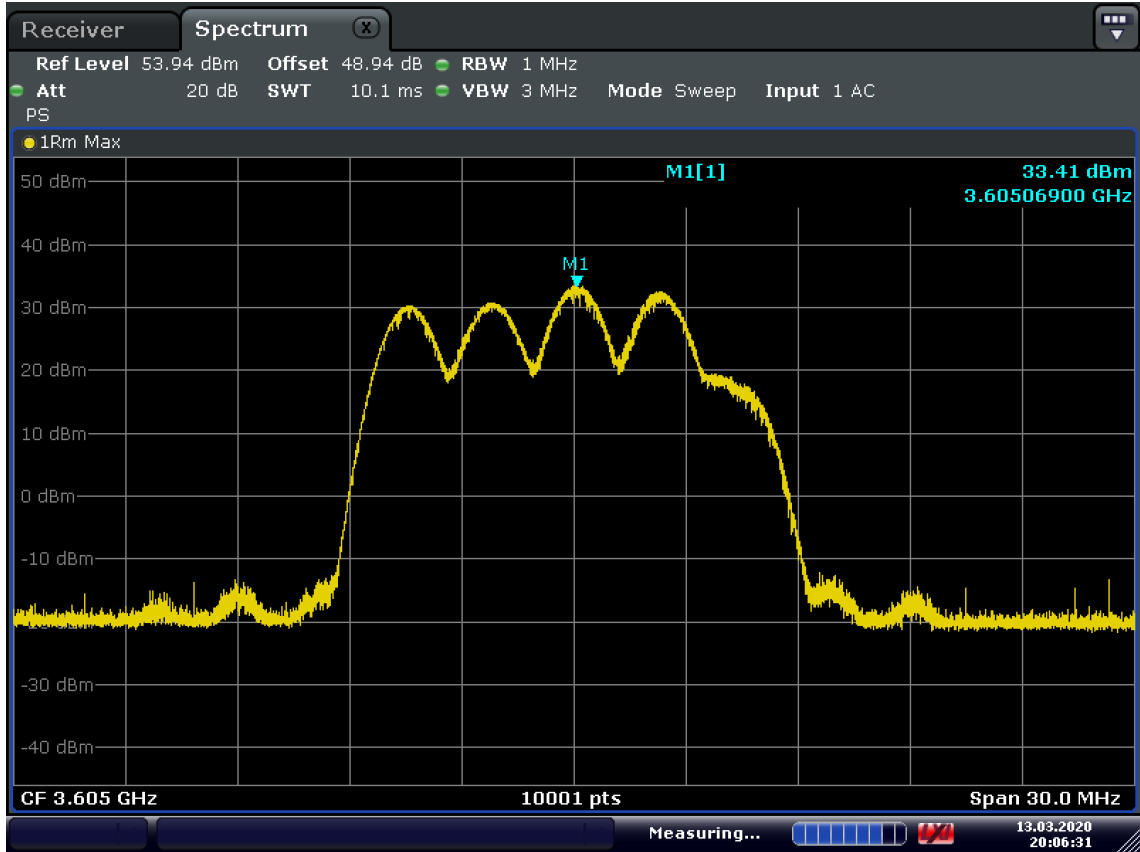
UUT EIRP PSD 32.45 (dBm/MHz)





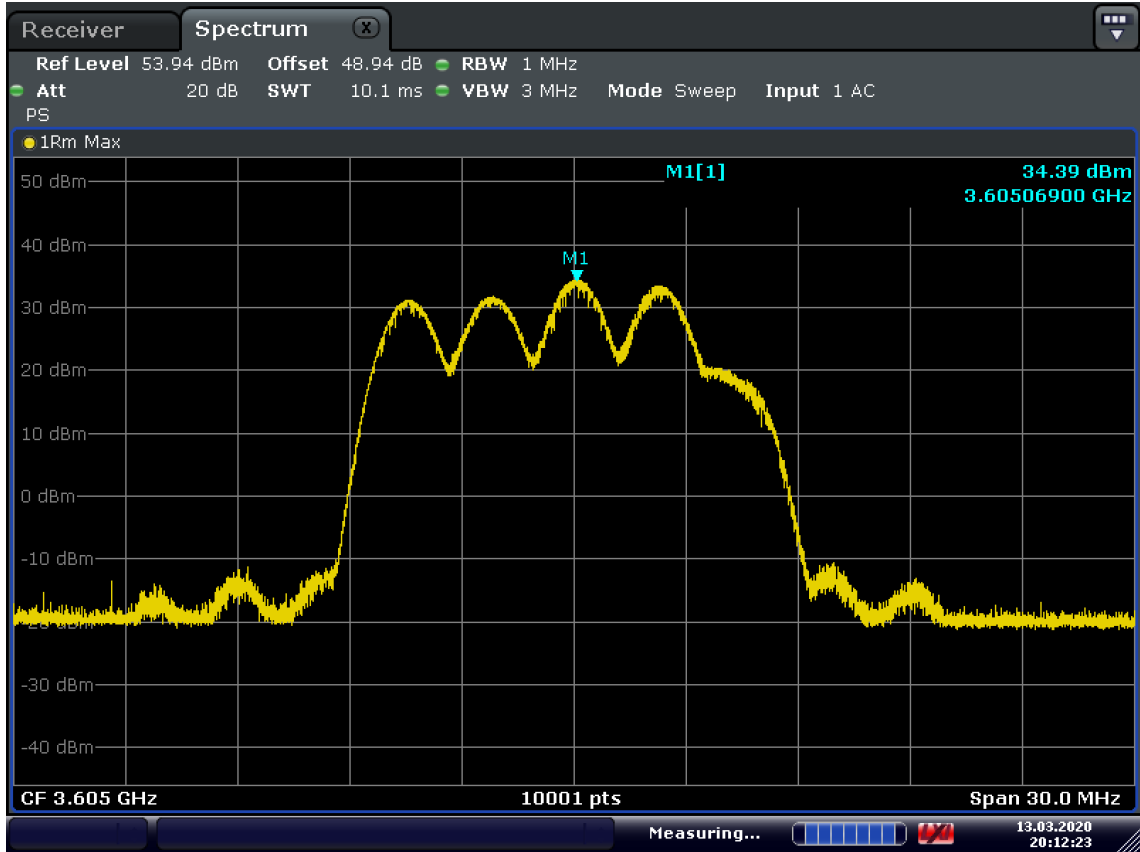
SAS authorizes MaxEirp 34 (dBm/MHz)

UUT EIRP PSD 33.41 (dBm/MHz)



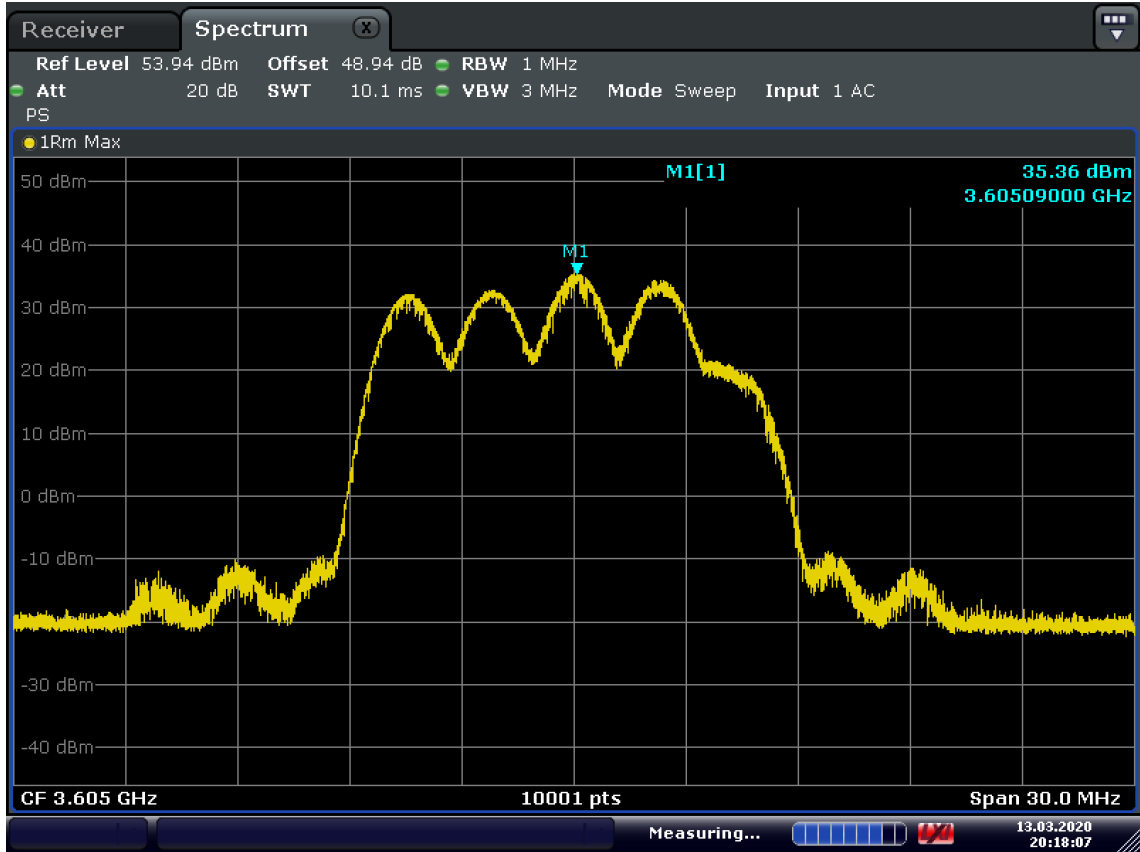
SAS authorizes MaxEirp 35 (dBm/MHz)

UUT EIRP PSD 34.39 (dBm/MHz)



SAS authorizes MaxEirp 36 (dBm/MHz)

UUT EIRP PSD 35.36 (dBm/MHz)



SAS authorizes MaxEirp 37 (dBm/MHz)

UUT EIRP PSD 36.5 (dBm/MHz)

