Test report No:

NIE: 02590RCB.001A1

a2LA ACCREDITED
Test Lab
Cert 2764.01

Test report
Test and Certification for Citizens Broadband Radio Service (CBRS): WINNF-TS-0122

Identification of item tested	CPE9000-PRO-1D-3X
Trademark	Telrad
Model and /or type reference	WLTMS-110_B48
Other identification of the product	FCC ID: ARA-CPE9000PRO3X HW version: v01 SW version: 01.01.02.151.01
Features	CPE-CBSD Category: A CPE-CBSD with Domain Proxy TD LTE Category 6 UE, 3GPP Release 10
Manufacturer	Telrad Networks Ltd 1 Bat Sheva Street, P.O.B. 6118, Lod, Israel 711600
Test method requested, standard	940660 D02 CPE-CBSD Handshake Procedures v01 WINNF-TS-0122
Approved by (name / position & signature)	Gonzalo Casado (Lab Manager)
Date of issue	10/31/2019
Report template No	FDT08_22

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Abbreviations

Abbreviation	Meaning
CBRS	Citizens Broadband Radio Services
CBSD	Citizens Broadband Radio Service Device
DP	Domain Proxy
DUT	Device Under Test
SAS	Spectrum Access System
UUT	Unit Under Test
CPI	Certified Professional Installer
N/A	Not Applicable
SA	Spectrum Analyzer

Uncertainty

Uncertainty (factor k=2) was calculated according to the DEKRA Certification internal document PODT000.

Data provided by the client

DEKRA declines any responsibility with respect to the information provided by the client and that may affect the validity of results.

Usage of samples

Samples undergoing test have been selected by: the client

Sample M/01 is composed of the following elements:

Control Nº	Description	Model	Serial Nº	Date of reception
2590.001	CPE-CBSD	WLTMS-110_B48	GMK171204000024	5-Aug-19
2590.002	CPE-CBSD	WLTMS-110_B48	GMK171204000043	5-Aug-19

1. Sample M/01 has undergone the test(s) specified in subclause "Test method requested".

Supported Features

Condition	Feature Description	Supported
DP	CBSD with Domain Proxy	Y
CPE	CBSD is CPE-CBSD device	Y

Identification of the client

Same as manufacturer

Testing period and place

Test Location	DEKRA Certification Inc 405 Glenn Drive, Suite 12, Sterling, Virginia, USA, 20164
Date (start)	2019-Aug-05
Date (finish)	2019-Oct-30

Document history

Report number	Date	Description
02590RCB.001	2019-Sept-17	First release
02590RCB.001A1	2019-Oct-31	Second release(Modifications performed are described in the subclause "Modifications to the reference test report")

Modifications to the reference test report

It was introduced the following modifications in respect to the test report number 02590RCB.001 related with the same samples, in the next clauses and sub-clauses:

| Clauses/ Sub-Clauses	Modification	Justification
Cover	Updated report dated and report approval contact	Test Report modification
Test Results Summary	Increased number of test cases	New test performed
Appendix A	Added KDB.CPE.7 test result	New test performed
Appendix C	Modified test steps for CPE.KDB.4 and added test steps for CPE.KDB.7 test case	New test performed
Appendix D	Added Signal Analyzer screenshots and results table for test case CPE.KDB.4	Requested by TCB

Remarks and comments

Testing performed by Gonzalo Casado

List of equipment used during the test

Test Equipment				
Description	Model	Control Number	SW Version	Serial Number
Signal Analyzer	MXA N9020A	0382	A.04.26	R9-L2D1V
Test SAS Harness	N/A	N/A	Test Harness:1.0.3	N/A
Compliant CBSD	CMP.XT-BS-3.4.3.7	-	7.0	95032353 & LKT-COMPACT3X

Test Setup Diagram
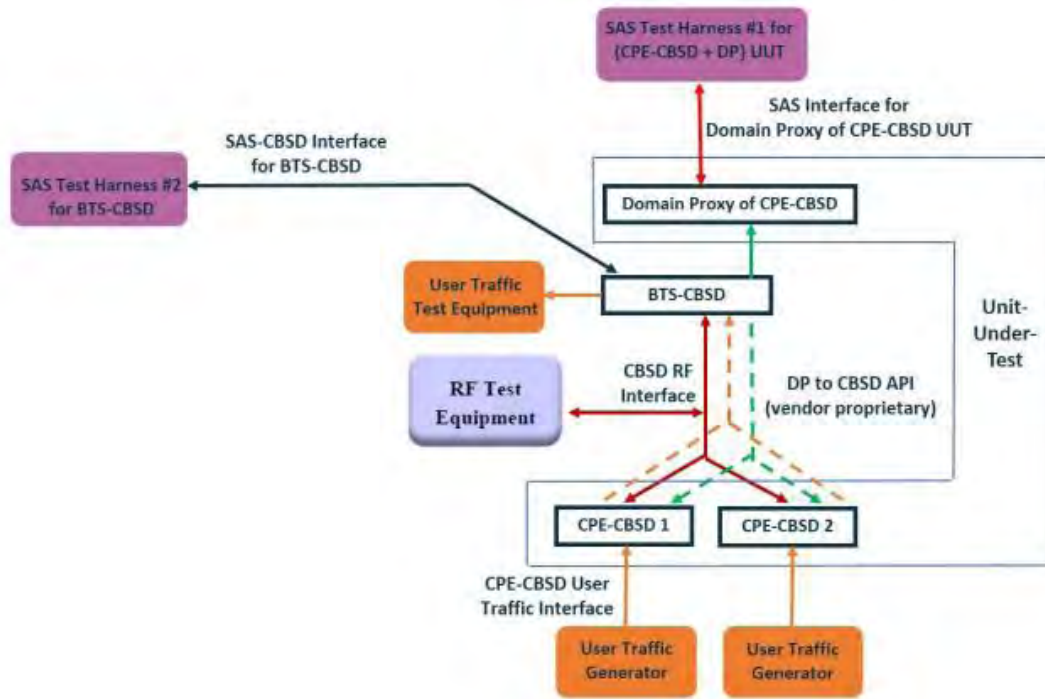
Note: Only one CPE-CBSD unit used

Testing verdicts

Not applicable :	N/A
Pass :	P
Fail :	F
Not measured :	N/M

Test Results Summary

Test Cases Verdicts	Number of Test Cases
Not applicable :	0
Pass :	6
Fail :	0
Not measured :	0
Total Number of Test Cases	6

Appendix A: Test results

Test Case Name	Description	Verdict	Date	Sample
WINNF.FT.D.REG.6	Domain Proxy Single-Step registration for CBSD with CPI signed data	P	9-Aug-19	M/01
CPE.KDB.1	CPE Handshake transmissions are used only for communicating to the SAS for registration and authorization of the device	P	7-Aug-19	M/01
CPE.KDB.3	CPE Handshake transmissions are on a channel used by or indicated by the BTS-CBSD after receiving an authorization signal from the BTS-CBSD	P	7-Aug-19	M/01
CPE.KDB.4	CPE Handshake transmissions are limited in duration and duty cycle to the minimum time necessary to get a grant from the SAS; this time should not exceed 1 second within any 10-second period, 10seconds within any 300-second period, or 20 seconds within any 3600-second period	P	30-Oct-19	M/01
CPE.KDB.6	In the event the CPE-CBSD needs to reconnect to a SAS or renew its connection for registration and (re)authorization purposes, the device can use the same or a shortened protocol to reestablish connection.	P	9-Aug-19	M/01
CPE.KDB.7	Verify that the CPE-CBSD register with SAS even with transmit power level below 23dBm EIRP	P	30-Oct-19	M/01

Notes:

- Signal Analyzer Screenshots for test cases CPE.KDB.3, CPE.KDB.4 and CPE.KDB.7 included in appendix D
- Test cases steps described in appendix C
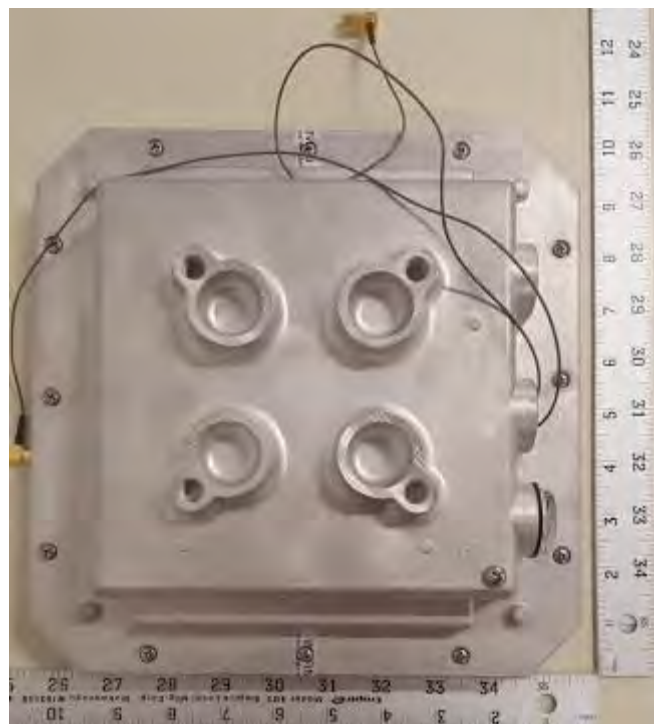
Appendix B: Photographs

Figure B1. Top View of DUT

Figure B2. DUT rear view

Appendix C: Test Cases Details

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

This test is mandatory for DP with CBSDs which report all Required and REG-Conditional parameters in the Registration request to the SAS using CPI signed data. This test validates that each of the required and REG-Conditional parameters appear within the registration request message. This test case applies to Domain Proxy supervising two CBSDs.

All Category B devices, and Category A devices not able to determine its own location require installation by a CPI. This test is for devices where the CPI enters data into the CBSD and this information along with the CPI signature are sent in the request message. Excluded from this test are devices which require the CPI to enter the information into a SAS interface. These devices would follow the multiple step registration test [WINNF.FT.D.REG.2].

#	Test Execution Steps	Results	
1	Ensure the following conditions are met for test entry: • 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) CPE.KDB.1: CPE Handshake transmissions are used only for communicating to the SAS for registration and authorization of the device

Test Case applicable only to CPE-CBSD

#	Test Execution Steps
1	Connect a laptop to DUT and start a ping to an equipment connected behind CBSD
2	Verify that Laptop doesn't have ping connectivity to the machine targeted in step #1
3	Start test WINNF-0122 WINNF.FT.C.HBT.10
4	Verify that Laptop has ping connectivity to the machine targeted in step #1 once it has been authorized by the SAS and with a valid Grant
5	Wait until execution of test WINNF.FT.C.HBT.10 is completed
6	Verify that Laptop doesn't have ping connectivity to the machine targeted in step #1

3) CPE.KDB.3: CPE Handshake transmissions are on a channel used by or indicated by the BTS-CBSD after receiving an authorization signal from the BTS-CBSD

Test Case applicable only to CPE-CBSD

#	Test Execution Steps
1	Note the channel and channel BW used by the CBSD-CBSD
2	Power cycle DUT and verify that the CPE doesn't have a valid grant

3	Verify using a SA that the CPE is using the channel and channel BW used by the CBSD-CBSD

4)   CPE.KDB.4: CPE Handshake transmissions are limited in duration and duty cycle to the minimum time necessary to get a grant from the SAS; this time should not exceed 1 second within any 10-second period, 10seconds within any 300-second period, or 20 seconds within any 3600-second period

Test Case applicable only to CPE-CBSD

#	Test Execution Steps
1	Start test WINNF-0122 WINNF.FT.C.GRA.1
2	Keep CPE-CBSD in registered state with SAS, but no grant.
3	Measure CPE-CBSD transmission durations
4	Verify that CPE-CBDS transmission duration doesn't exceed 1 second within 10seconds, 10 seconds within 300seconds and 20seconds within 3600seconds

5)   CPE.KDB.6: In the event the CPE-CBSD needs to reconnect to a SAS or renew its connection for registration and (re)authorization purposes, the device can use the same or a shortened protocol to reestablish connection.

Test Case applicable only to CPE-CBSD

| #	Test Execution Steps
1	Configure SA to perform a new sweep of 1ms only when it detects signal from the DUT
2	Start test WINNF-0122 WINNF.FT.C.HBT.10
3	Wait until execution of test WINNF.FT.C.HBT.10 is completed
4	Start a timer once the first transmission from DUT is detected and start counting the number of sweeps performed. This is, count each transmission from DUT detected
5	Wait ten seconds
6	Verify that the number of data transmissions from DUT is less than 1000 (Totally one second of data transmissions)
7	Repeat steps #1 through 5 verifying that the DUT sends less than 10000 data transmissions of 1ms in 300seconds and less than 20000 data transmissions of 1m in 3600secods

6)   CPE.KDB.7: Verify that the CPE-CBSD register with SAS even with transmit power level below 23dBm EIRP

Test Case applicable only to CPE-CBSD

#	Test Execution Steps
1	Adjust RF path attenuation between CPE-CBSD and CBSD so that the CPE-CBSD transmit power is below 23dBm EIRP
2	Start test WINNF-0122 WINNF.FT.C.HBT.10
3	Once CPE-CBSD is registered with SAS, verify transmit power is below 23dBm

Appendix D: Spectrum Analyzer Screenshots

1. CPE.KDB.3
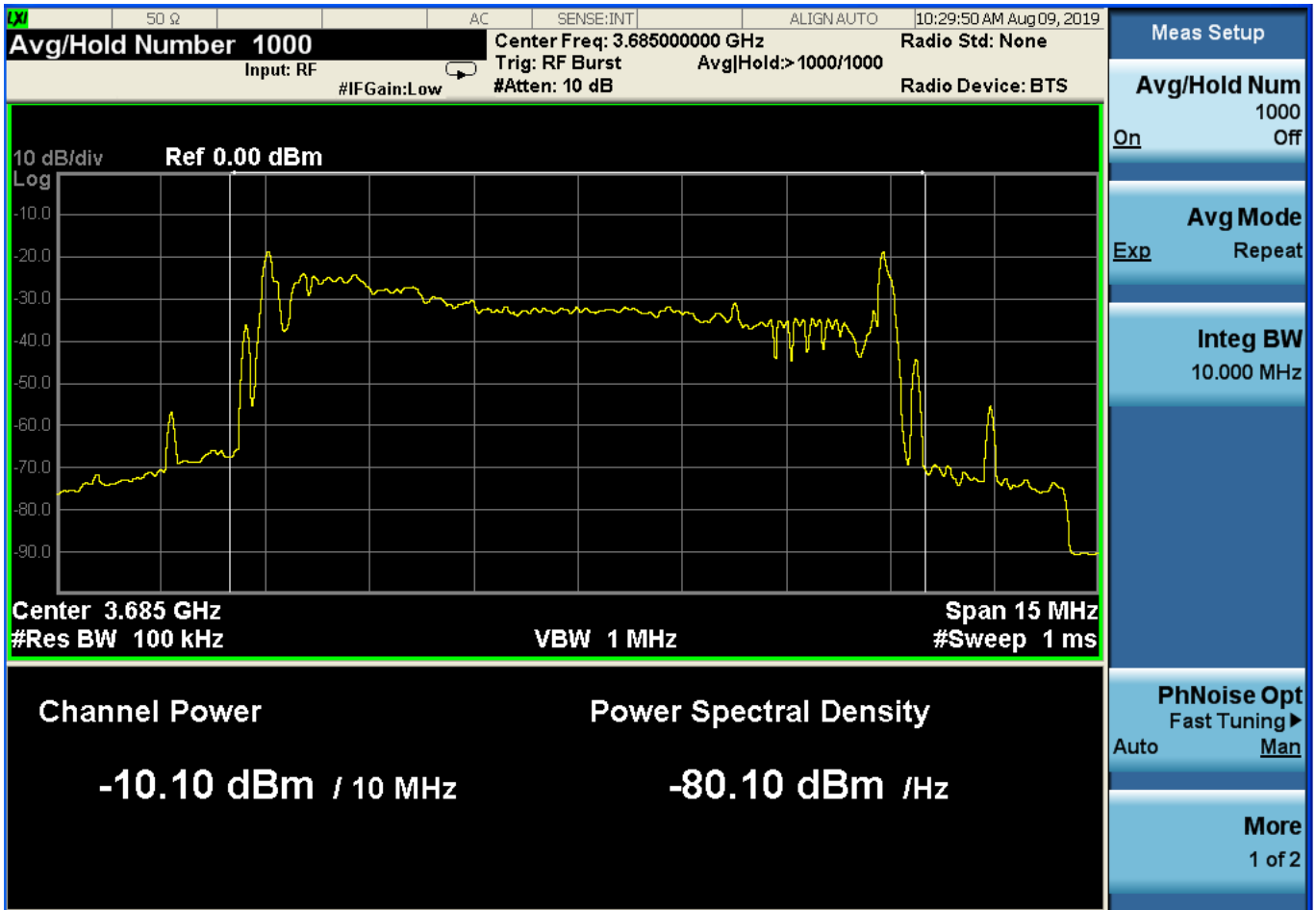
Capture showing DUT using 10MHz Channel Bandwidth at 3685MHz frequency.

2. CPE.KDB.4: Results for CPE-CBSD transmission duty cycle without grant

Time Period (s)	Time Limit (s)	DUT Tx Duration Measured (s)	Result	Measurement time resolution	Sweep time	Sweep points
10	**1**	**0.2**	PASS	1ms	10s	10000
300	**10**	**3.74**	PASS	7.5ms	300s	40001
3600	**20**	**9.84**	PASS	1ms	40s	40000

Note: The 3600-period test was measured by doing 90 consecutive automatic sweeps of 40seconds. The value reported is the aggregated time of all the sweeps where signal was detected by the signal analyzer
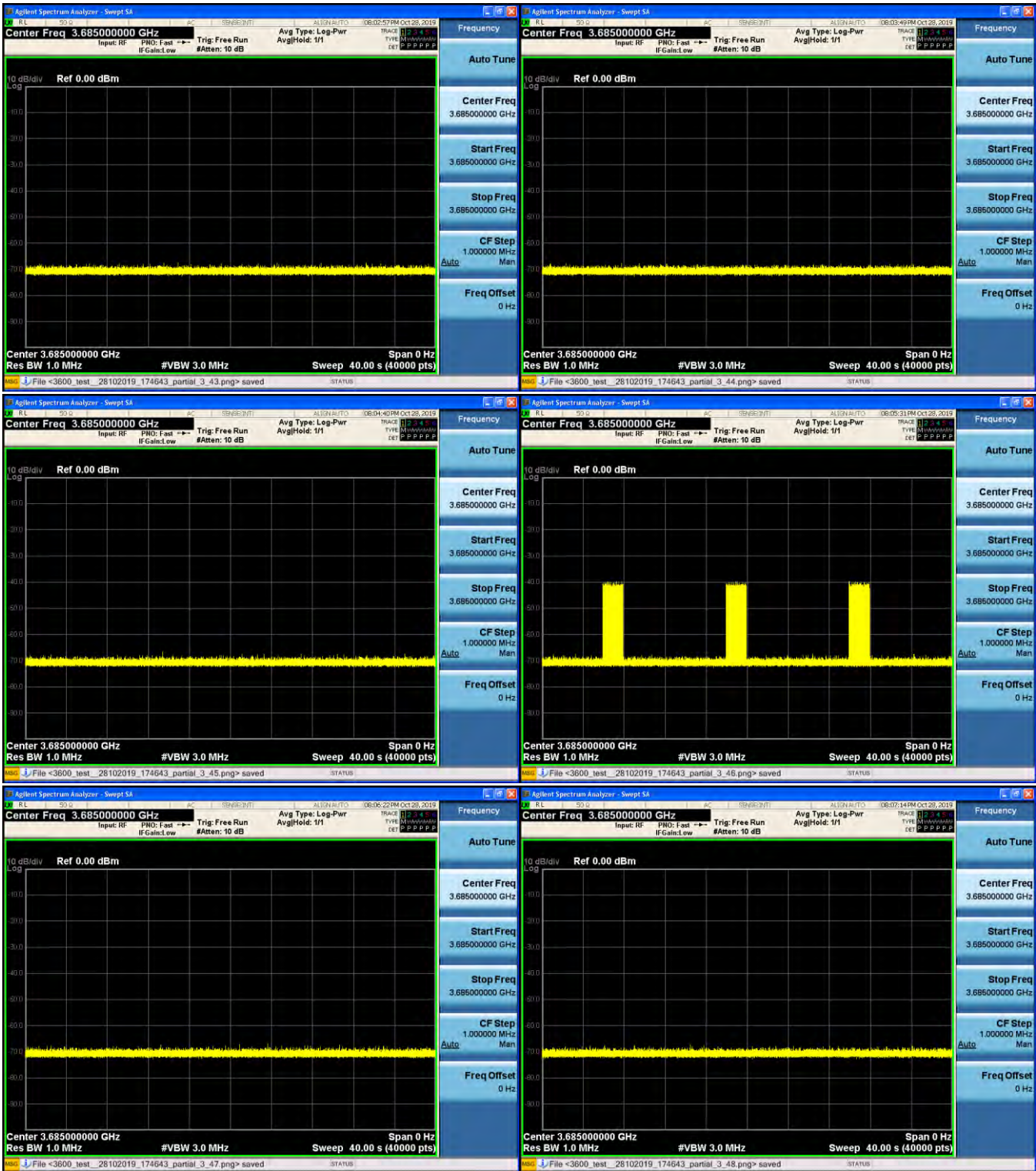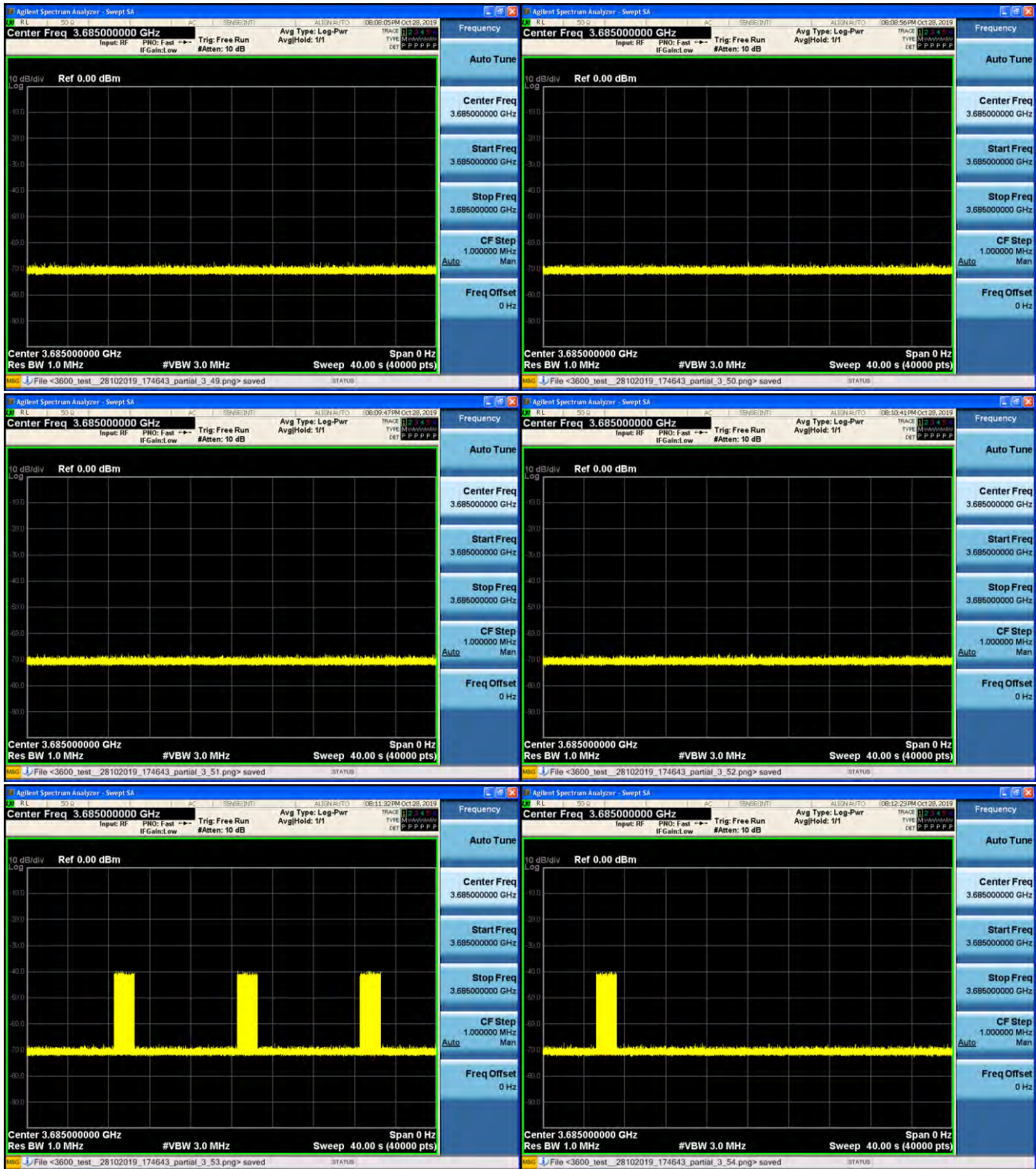
2.1. 1 seconds within 10 second period
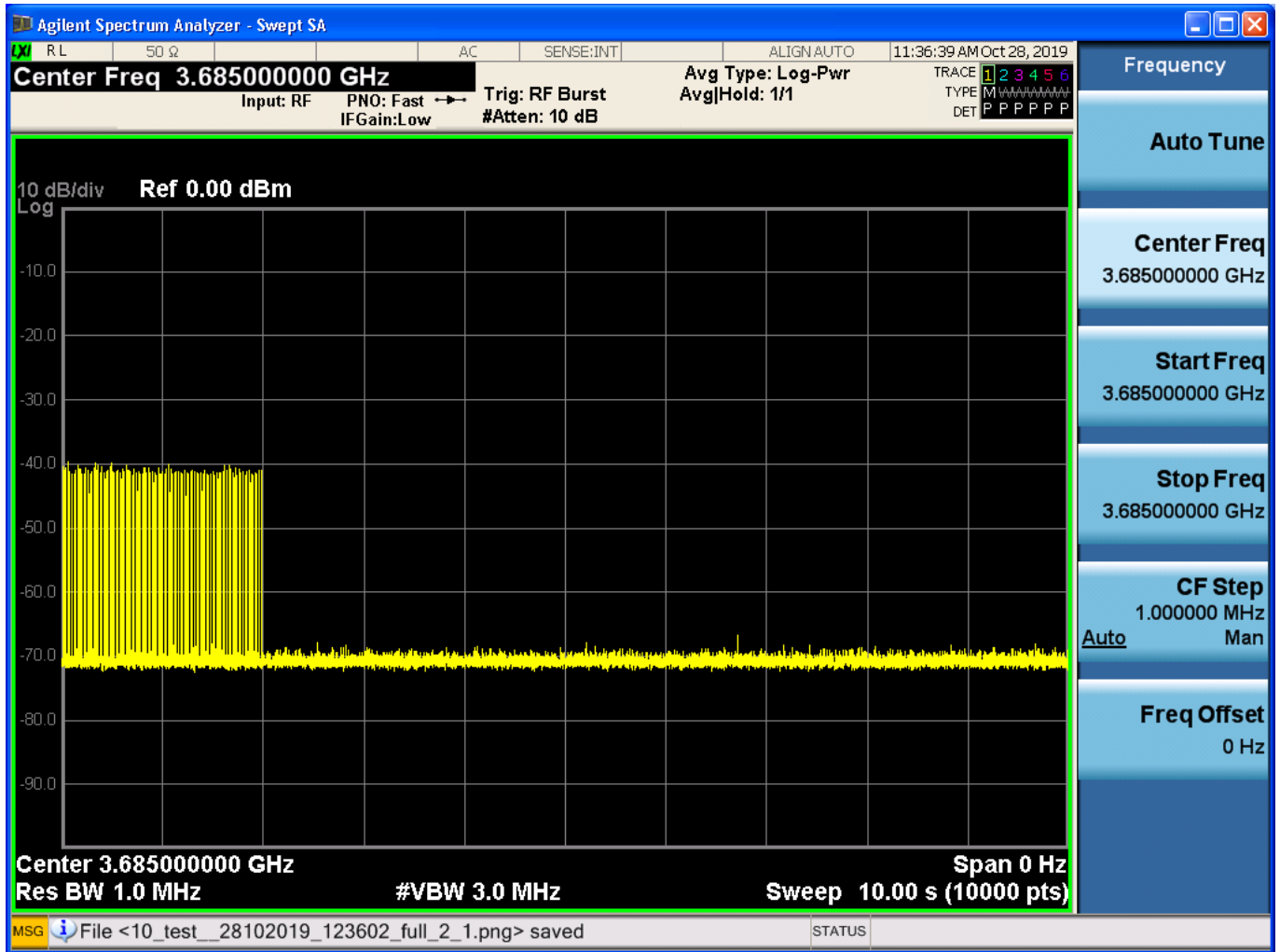
2.2. 10 seconds within 300 second period
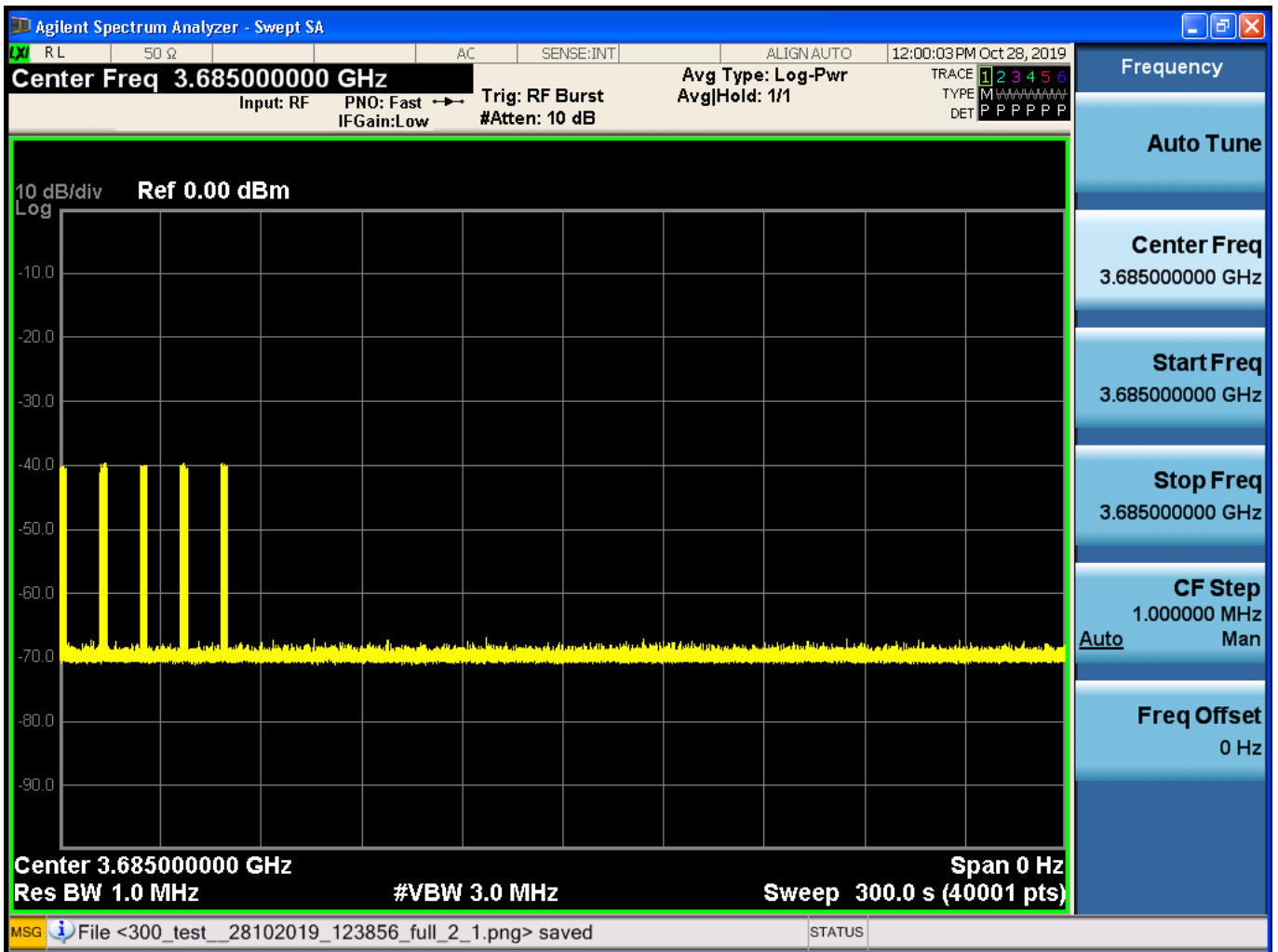
2.3. 20 seconds within 3600 second period

Note: The 3600-period test was measured by doing 90 consecutive automatic sweeps of 40seconds. The value reported is the aggregated time of all the sweeps where signal was detected by the signal analyzer
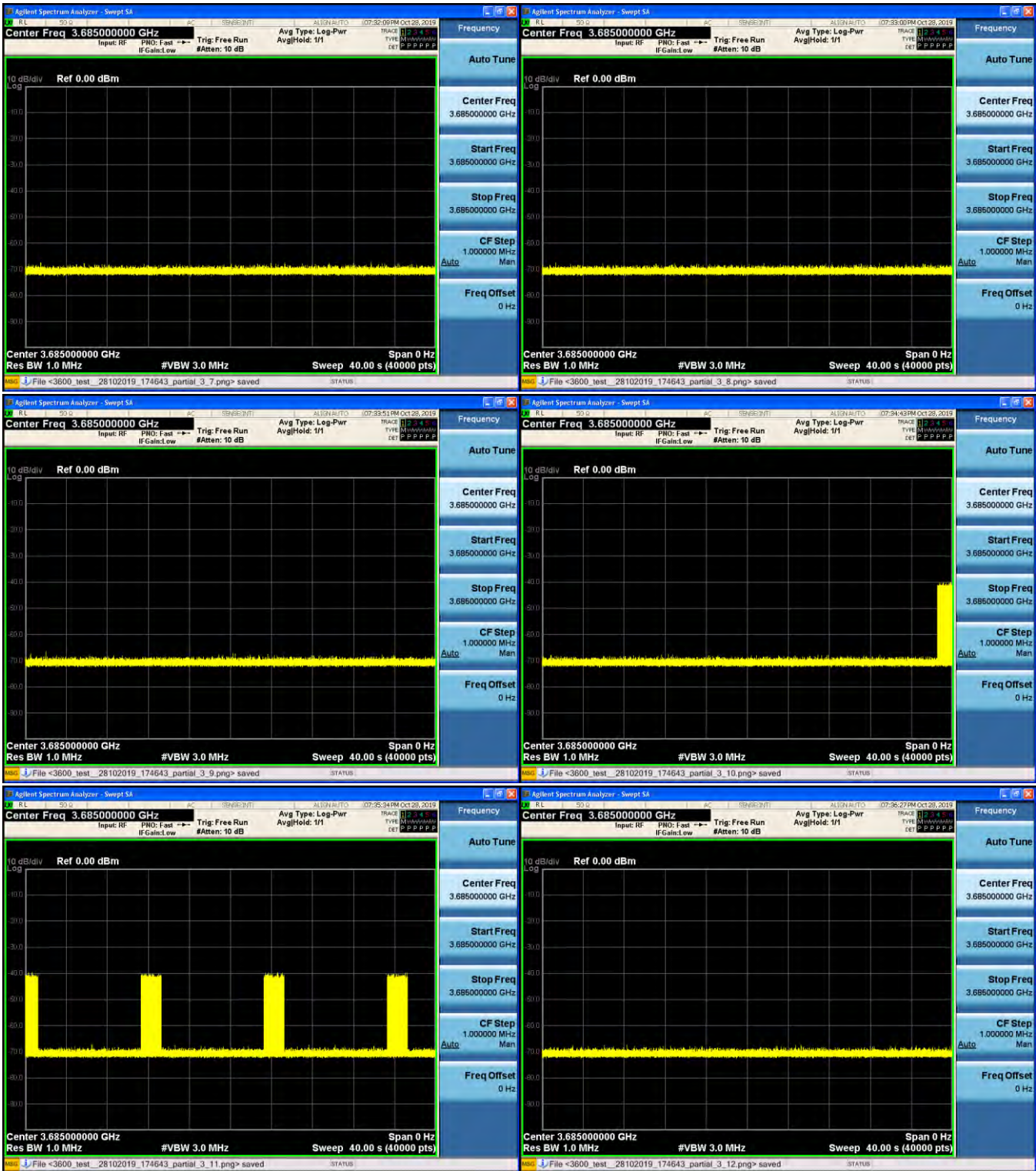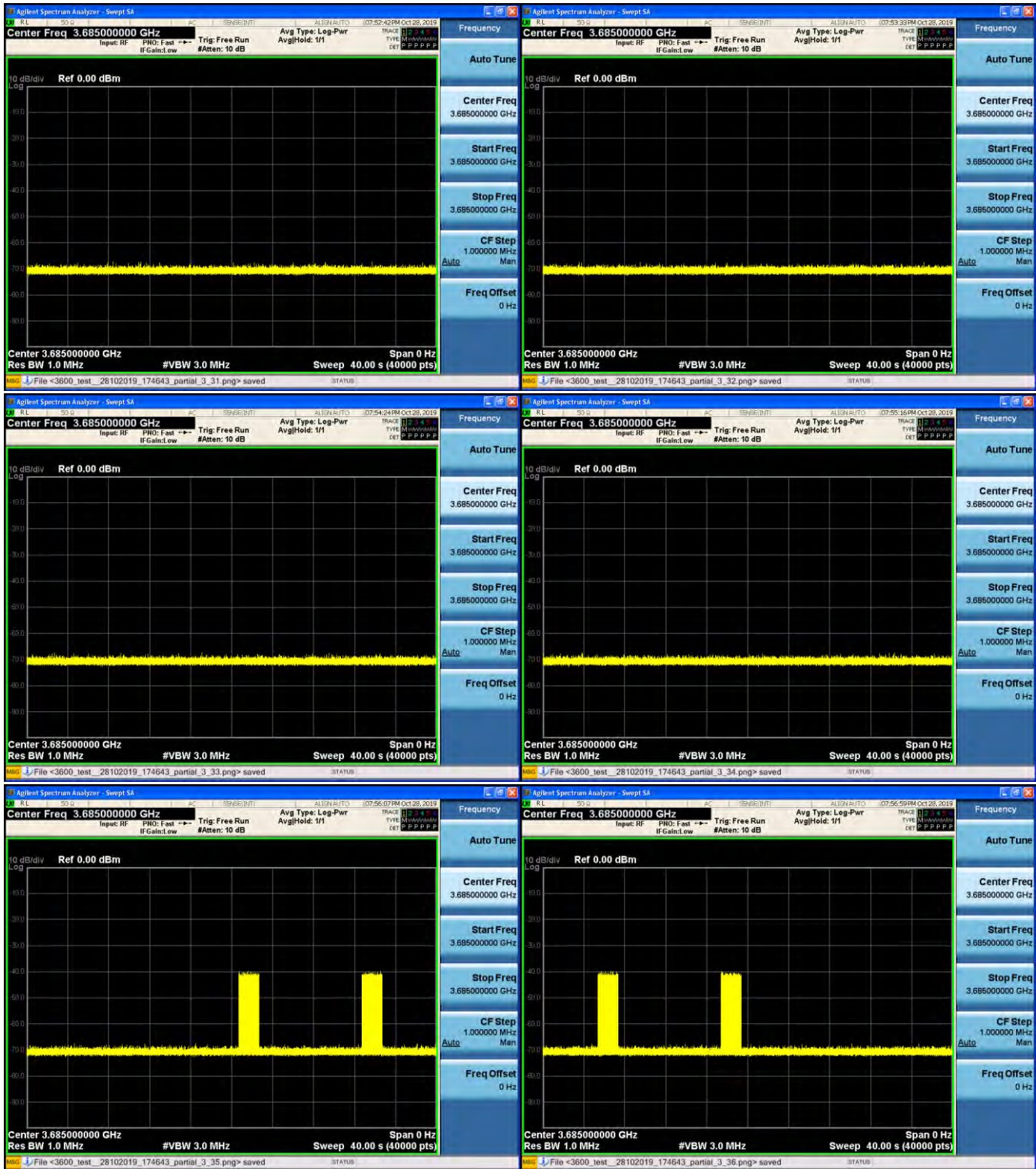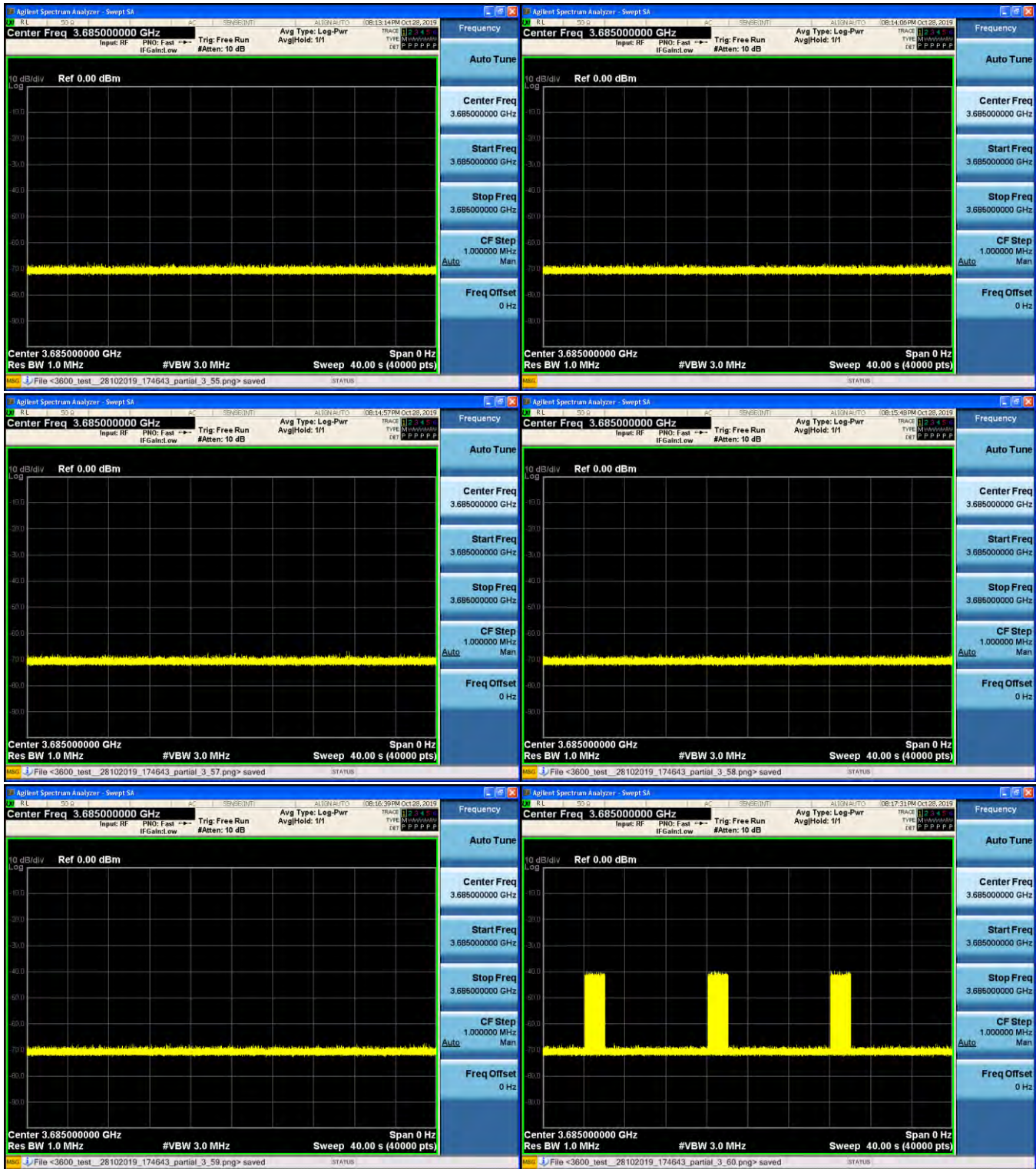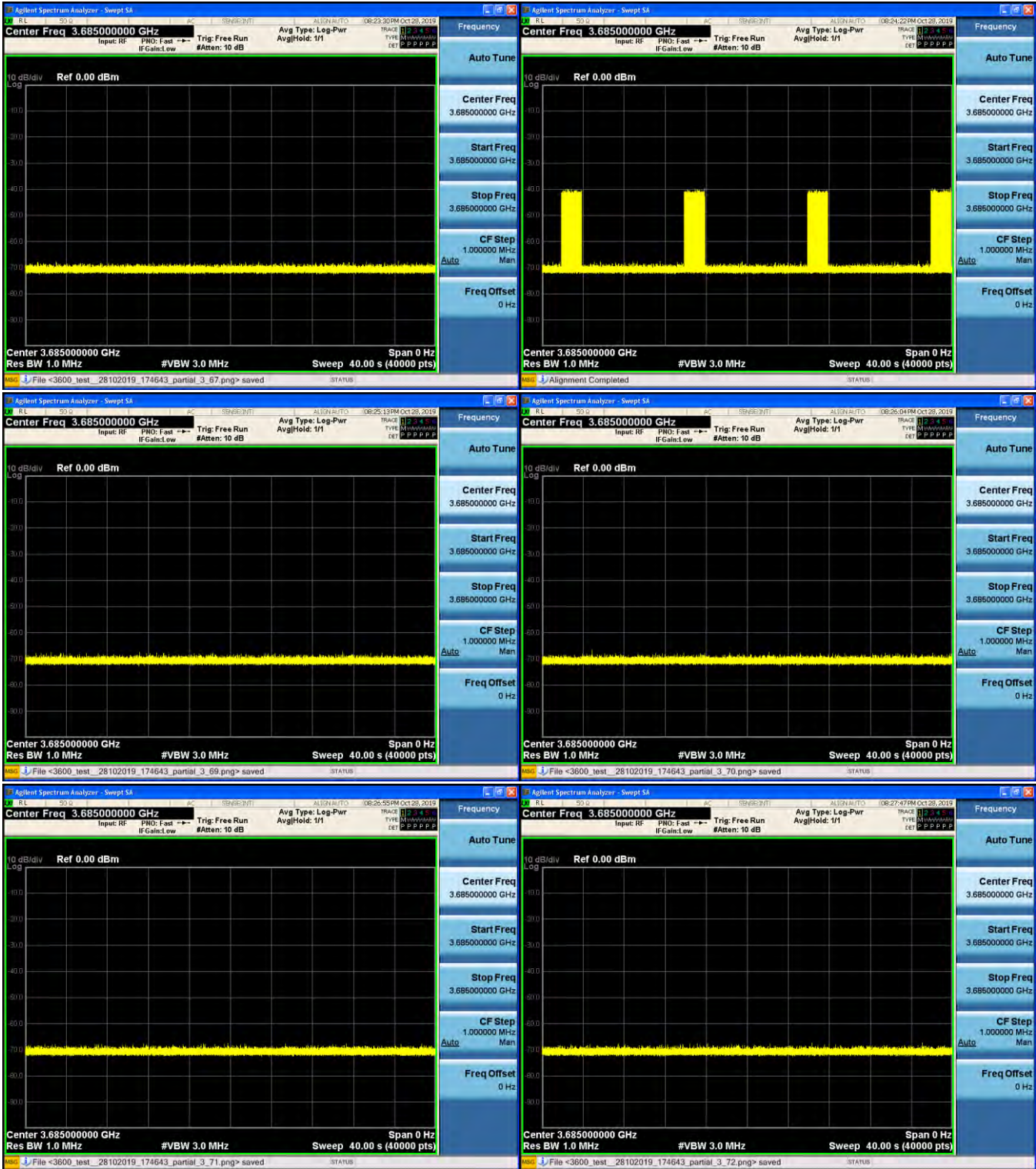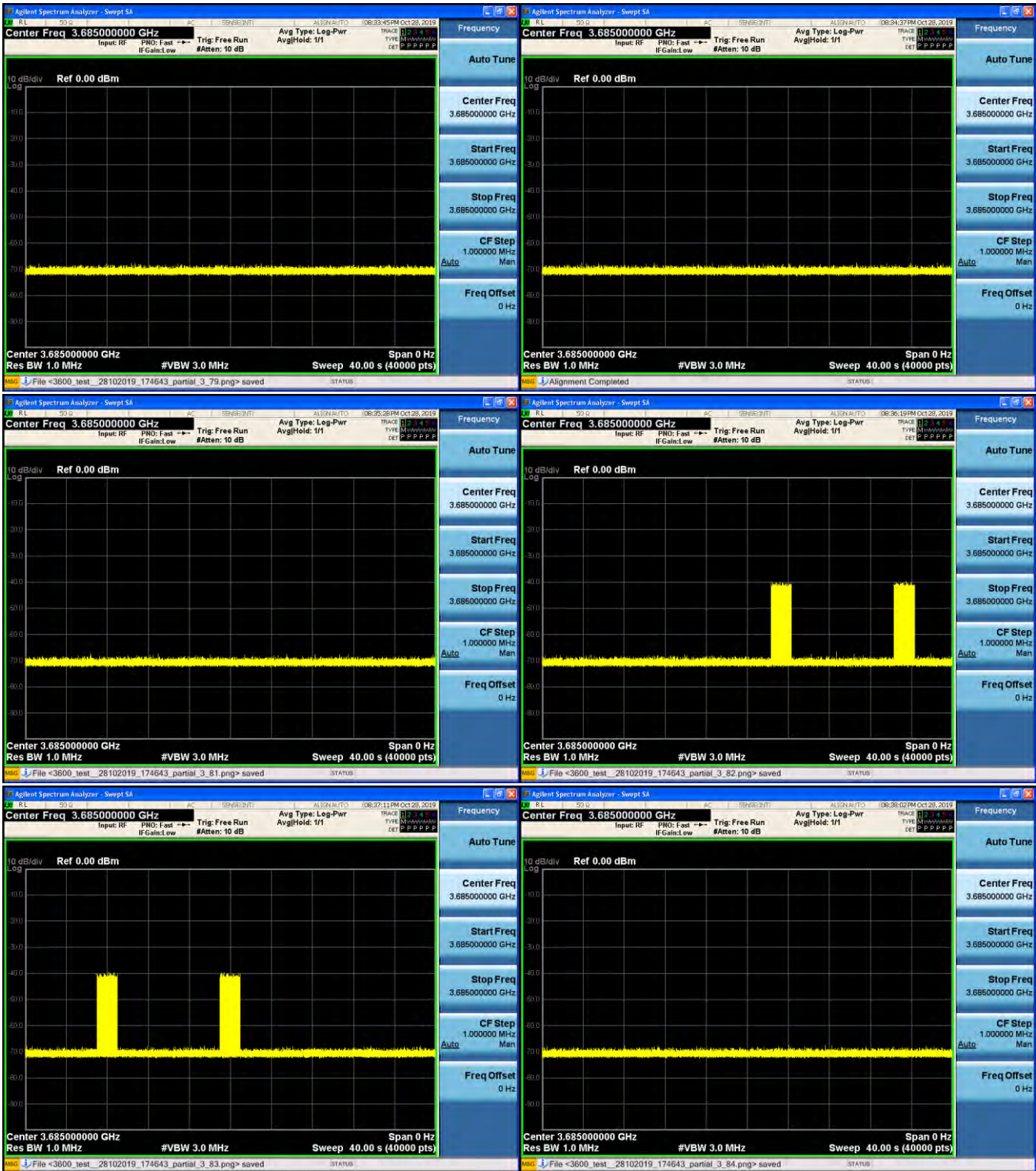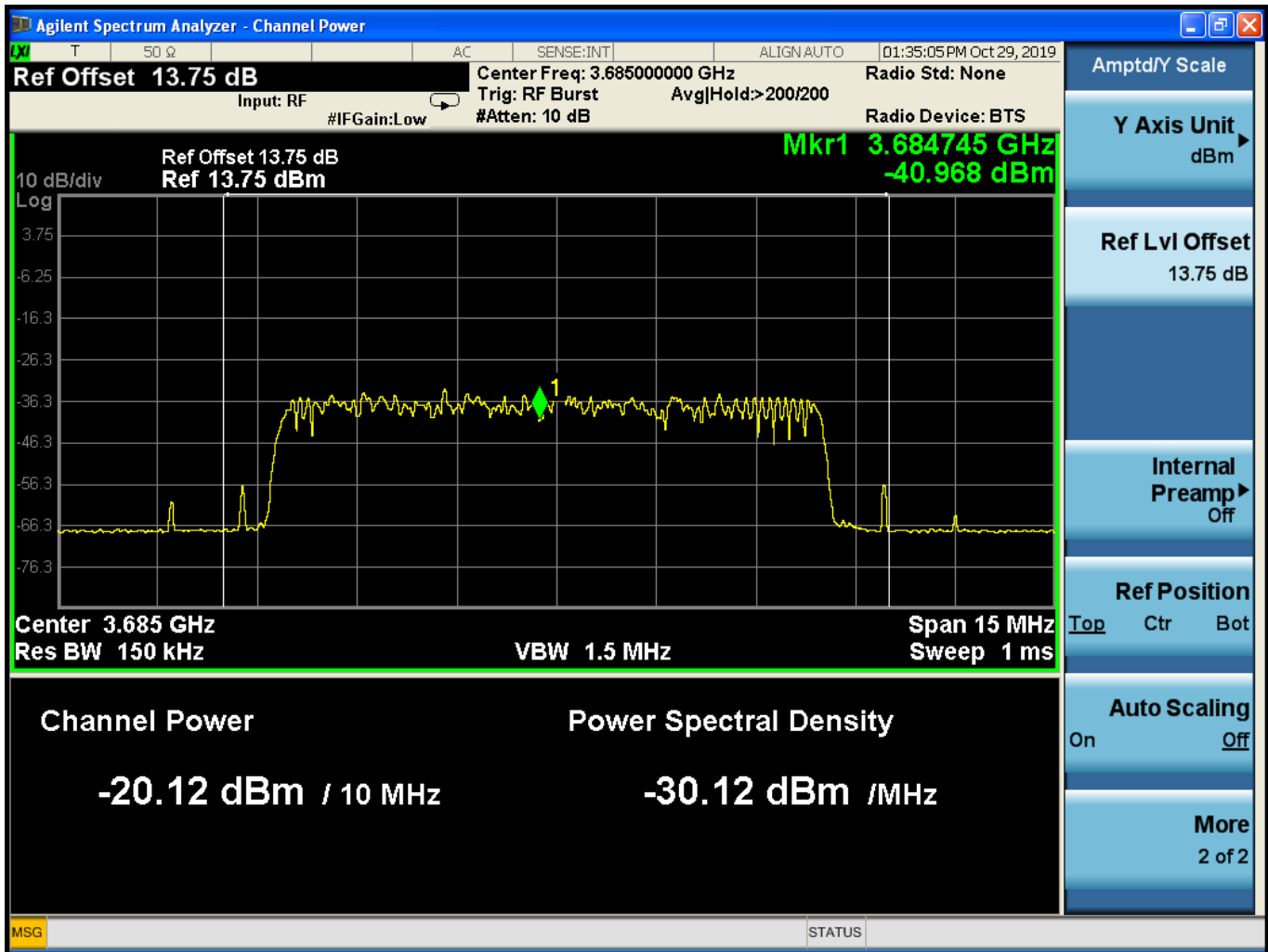
3. CPE.KDB.7: Verify CPE-CBSD can register with SAS with transmit power below 23dBm EIRP

Note 1: Measured CPE-CBSD EIRP is -4.62 dBm EIRP

Note 2: Test setup RF path losses (13.75dB) considered in signal analyzer measurement using ref. offset parameter