WINNF-TS-0122 Test Report

Applicant	:	**Smawave Technology Co. ,Ltd**
Equipment	:	**5G ODU_NA**
Brand Name	:	**smawave**
Model Name	:	**SRE620-b**
FCC ID	:	**2AU8HSRE620-BH**
Reference	:	**WINNF-TS-0122 Version V1.0.2**
TEST DATE(S)	:	**Jul. 08, 2023**

We, Sporton International Inc. (Kunshan), would like to declare that the tested sample has been evaluated in accordance with the test procedures given in WINNF-TS-0122 Version V1.0.2 and has been in compliance with the applicable technical standards.

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

Jason Jia

Approved by: Jason Jia

Sporton International Inc. (Kunshan)
No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300
People's Republic of China

Table of Contents

Revision History

Report No.	Version	Description	Issued Date
FG342001-01D	01	Initial issue of report	Jul. 17, 2023

1. Administration Data

1.1 Testing Laboratory

Sporton International Inc. (Kunshan) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Test Site	Sporton International Inc. (Kunshan)
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158
Test Site No.	Sporton Site No.
	DFS02-KS
Test Engineer	Chad Wang
Temperature	20 ~ 25 ℃
Relative Humidity	46 ~ 55 %

2. General Information

2.1 Applicant

Company Name	**Smawave Technology Co. ,Ltd**
Address	3/F, Building 8, 1001 North Qinzhou Road，Xuhui District, Shanghai, China

2.2 Manufacturer

Company Name	**Smawave Technology Co. ,Ltd**
Address	3/F, Building 8, 1001 North Qinzhou Road，Xuhui District, Shanghai, China

2.3 Description of Equipment Under Test (EUT)

Product Feature & Specification	
Equipment	5G ODU_NA
Brand Name	smawave
Model Name	SRE620-b
FCC ID	2AU8HSRE620-BH
IMEI Code	863109050026090
Professional Installation	☒ Yes ☐ No
UUT Under Test Type	☐ BTS-CBSD product (Base Station) ☒ CPE-CBSD product (Customer Premises Equipment)
UUT Category	☐ Category A ☒ Category B
Unit Under Test in Test ID	☐ UUT with Domain Proxy ☒ UUT without Domain Proxy
UUT Antenna Gain	<Ant.0>: 16.32 dBi <Ant.3>: 15.92 dBi
UUT HW Version	V1.0
UUT SW Version	Codium_FW_5G_1.0.8
Device Power Class	5G NR n48: Power Class 3

2.4 Re-use of Measured Data

2.4.1 Introduction Section

This application re-uses data collected on a similar device. The subject device of this application (Model: SRE620-b, FCC ID: 2AU8HSRE620-BH) is electrically identical to the reference device (Model: SRE620-b, FCC ID: 2AU8HSRE620-B) for the portions of the circuitry corresponding to the data being re-used. Based on their similarity, the FCC Part 96(WINNF-TS-0122) for 5GNR n48 (equipment class: CBD) reuse the original model's result and do spot-check, following the FCC KDB 484596 D01 Referencing Test Data v01.

The applicant takes full responsibility that the test data as referenced in this report represent compliance for this FCC ID: 2AU8HSRE620-BH.

2.4.2 Model Difference Information

The **main** difference between FCC ID: 2AU8HSRE620-B and FCC ID: 2AU8HSRE620-BH is as below:

- Remove LTE B41, 5G NR n41.
- Change to high gain antenna for LTE B48 & 5G NR n48;

Other differences and all the details of similarity and difference can be found in the confidential documents (SRE620-b_Operational Description of Product Equality Declaration).

2.4.3 Reference detail Section:

Rule Part	Equipment Class	Frequency Band (MHz)	Reference FCC ID (Parent)	Type Grant/ Permissive Change	Reference Title	FCC ID Filling (Variant)	Report Title/Section
96 (WINNF-TS-0122)	CBD (NR)	n48 (Part96)	2AU8HSRE620-B	Original Grant	FG342001D	2AU8HSRE620-BH	All sections applicable (Except for Power&EIRP)

2.4.4 Spot Check Verification Data Section

Conducted power test against the variant model based on the worst-case condition from the original model was performed in this filing to demonstrate the test data from original model remains representative for the variant model.

All test procedures follow the related section of parent report.

Summary for power spot check for each rule entry and technology is listed as below:

Test Item	Mode	2AU8HSRE620-B Parent Worst mode Test Result	2AU8HSRE620-BH Variant Check Test Result	Difference (dB)
UUT MaxEIRP (dBm/MHz)	n48	19.10	18.20	0.9

Conclusion:
Max EIRP test against the variant model based on the worst-case condition from the original model was performed in this filing to demonstrate the test data from original model remains representative for the variant model.

Based on the spot check test result, the test data from the original model is representative for the variant model. The power level spot check is shown within expected level compliant to limit line.

We confirm that the test data reuse policy of FCC KDB 484596 D01 Referencing Test Data v01 has been followed and the test data as referenced from the parent model report represents compliance with new FCC ID.

2.5 Protocol Test Summary

Section	Test Case ID	Test Case Title	Test Result
7.1.4.1.1	WINNF.PT.C.HBT	UUT RF Transmit Power Measurement	PASS

2.6 Support Equipment

Name	Manufacturer	Type/Model	Serial Number	FCC ID
Airspeed 2900	Airspan	Airspeed 2900	ED0863016574	PIDAS2900

2.7 Test Equipment List

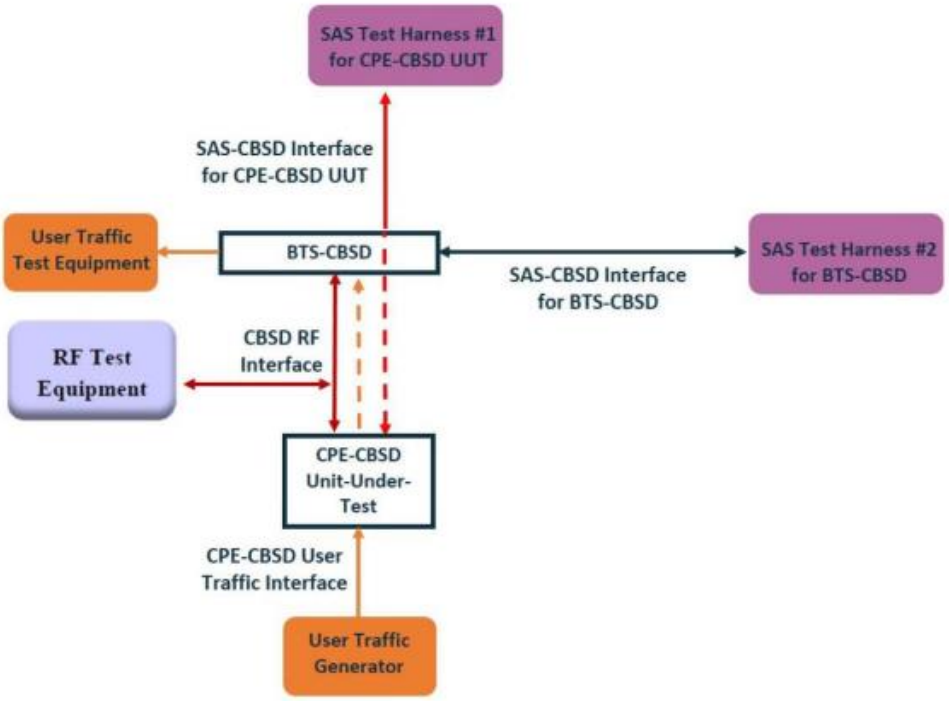
Name	Manufacturer	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
Signal Analyzer	R&S	FSV7	101472	Jan. 05, 2023	Jan. 04, 2024
Oscilloscope	R&S	RTE1202	101334	Oct. 12, 2022	Oct. 11, 2023

3. Measurement Environment

Measurement Environment Information	
SAS Test Harness version	1.0.0.3
Operating System	Windows 10
TLS version	V1.2
Python version	V2.7

Conditional Test Case		
Support (Yes / No)	**Condition**	**Definition**
Yes	**C1**	Mandatory for UUT which supports multi-step registration message
No	**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.
No	**C3**	Mandatory for UUT which supports single-step registration containing CPIsigned data in the registration message.
No	**C4**	Mandatory for UUT which supports RECEIVED_POWER_WITHOUT_GRANT measurement report type
Yes	**C5**	Mandatory for UUT which supports RECEIVED_POWER_WITH_GRANT measurement report type.
Yes	**C6**	Mandatory for UUT which supports parameter change being made at the UUT and prior to sending a deregistration.

3.1 Test configuration without Domain Proxy



CPE-CBSD as UUT, BTS-CBSD direct communication.

3.2 Standards

[n.1]. FCC KDB 940660 D02 CPE-CBSD Handshake Procedures v02, 22 October 2019

[n.2]. WINNF-TS-0122 Version 1.0.2, “Conformance and Performance Test Technical Specification; CBSD/DP as Unit Under Test (UUT)”, 25 November 2020

[n.3]. WINNF-TS-0016 Version 1.2.6, “SAS to CBSD Technical Specification”, 25 November 2020

3.3 Protocol test procedure

The test cases for SAS<->CBSD protocol in [n.2] apply for CPE-CBSD device type. Following the [n.1], when running the test cases in [n.2] for CPE-CBSD device type, verify that

1. CPE-CBSD can begin transmitting its RF only after receiving radio signal from its compatible BTS-CBSD.
2. For all CPE-CBSD RF transmissions, the CPE-CBSD UUT radio frequency range and bandwidth are less or equal to the frequency range and bandwidth of its compatible BTS-CBSD.
3. Judging the last execution step appearing in [n.2] with “User data traffics” instead of “RF transmission.”

3.4 Time test for getting Grant Procedure

Use the WinnForum SAS Harness run test case WINNF.FT.C.GRA.1. Without answering the last question in WINNF.FT.C.GRA.1 will keep UUT’s grant request being rejected, then measure the time.

4. Protocol Test Results

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

#	Test Execution Steps	Results
1	Ensure the following conditions are met for test entry: • UUT has successfully completed SAS Discovery and Authentication with the SAS Test Harness • UUT has registered with the SAS, with CBSD ID = C • UUT has a single valid grant G with parameters {lowFrequency = F_L, highFrequency = F_H, maxEirp = P_i}, with grant in AUTHORIZED state, and grantExpireTime set to a value far past the duration of this test case 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.	--

2	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:
	• UUT sends Heartbeat Request, including:
	  ○ cbsdId = C
	  ○ grantId = G
	• SAS Test Harness responds with Heartbeat Response, including:
	  ○ cbsdId = C
	  ○ grantId = G
	  ○ transmitExpireTime = current UTC time + 200 seconds
	  ○ responseCode = 0
		--

3	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. 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.	PASS

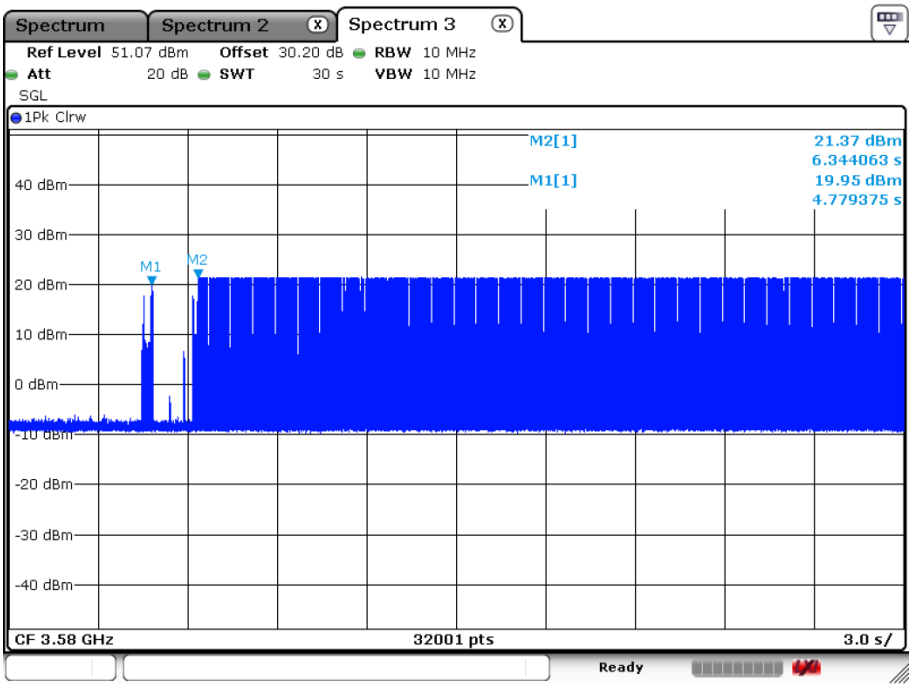
5. UUT register with the SAS irrespective of power levels

5.1 Test Procedure

1. Set the SAS test harness to grant UUT with the highest EIRP higher than 23 dBm.
2. Check if UUT has successfully registered with SAS test harness, when operating EIRP less than 23 dBm.
3. After the UUT granted/authorized by the SAS, it can transmit with power less than the max EIRP granted from SAS.

5.2 Result

The UUT can register with SAS under above operating conditions to meet the FCC criteria that the UUT will register with the SAS irrespective of power levels at which the device is set to operate – even below 23 dBm.



The UUT successfully registered with SAS Test Harness, when operating EIRP less than 23 dBm
Test Result: PASS

Note: The Ref Offset 30.2 dB includes the antenna gain 16.32 dBi and cable path loss 13.88 dB.

Marker 1: The UUT successfully registered with SAS Test Harness, when operating 19.95 dBm EIRP.

Marker 2: After the UUT granted/authorized by the SAS, it can transmit with power less than the maxEIRP granted from SAS.

END of this report

Appendix B. RF measurement plots

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

Report Clause 4.1 [WINNF.PT.C.HBT] UUT RF Transmit Power Measurement

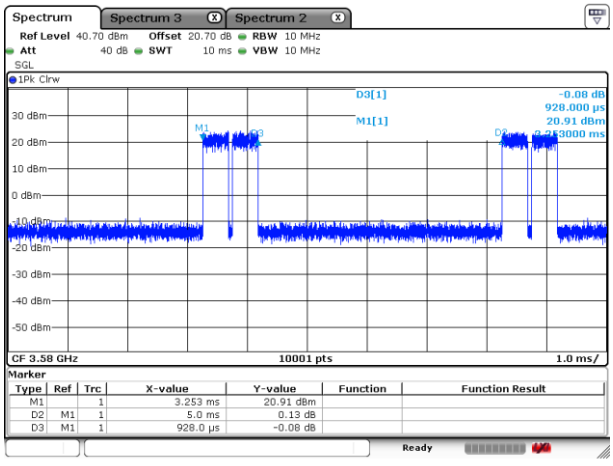
Center Frequency [MHz]	Bandwidth [MHz]	Granted maxEIRP [dBm/MHz]	Conducted PSD [dBm/MHz]	Duty Cycle Factor [dB]	Antenna Gain [dBi]	UUT MaxEIRP [dBm/MHz]
3580	20	20	-5.43	7.31	16.32	18.20 dBm
		18	-7.37			16.26 dBm
		16	-9.76			13.87 dBm
		14	-11.81			11.82 dBm
		12	-13.77			9.86 dBm
		10	-14.68			8.95 dBm

Note:

1. The total path loss is offset with 20.70 dB.
2. The maximum EIRP is calculated from max output power and max antenna gain, only the maximum EIRP for Ant. 0 is shown in the report.

Duty Cycle factor:

Spectrum Analyzer



Note: The duty cycle value is 18.46%, add 10log(1/duty cycle) to the measured power level to compute the average power during continuous transmission.

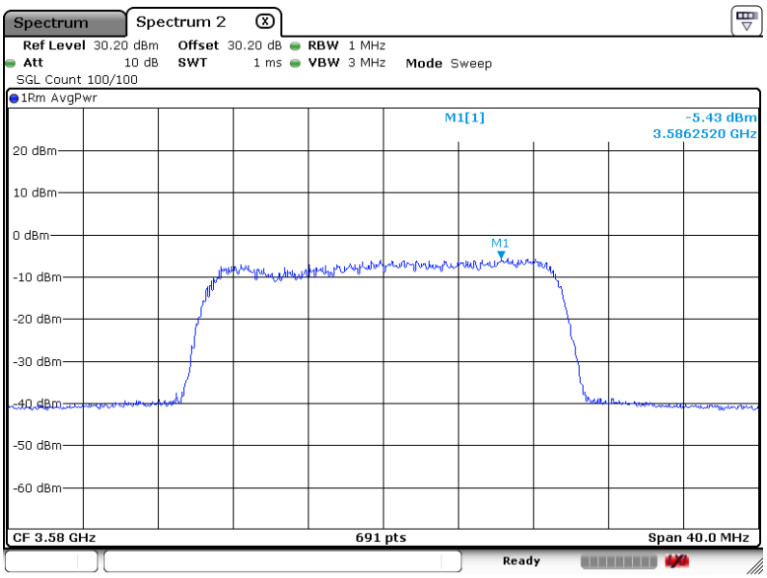
B.1.1 Test Procedure

[WINNF.PT.C.HBT] UUT RF Transmit Power Measurement defined in clause 4.1 of this test report.

B.1.2 Test Result

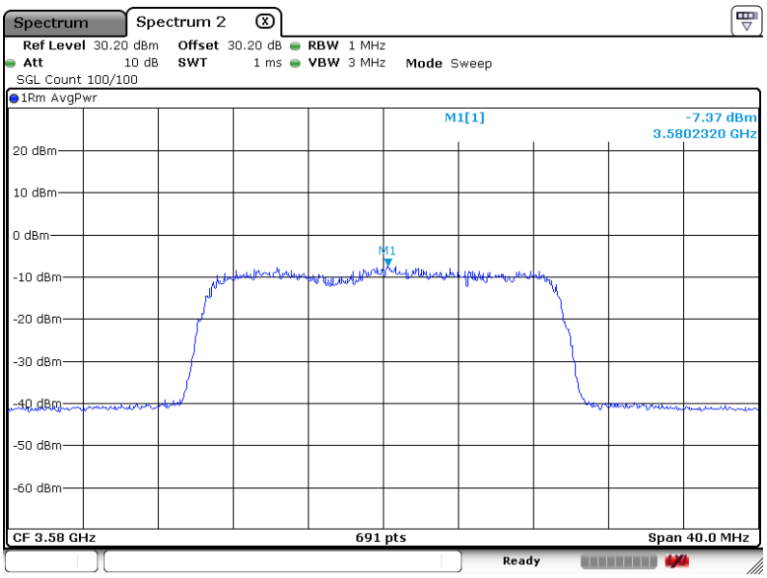
SAS Granted MaxEIRP 20 [dBm/MHz]

UUT Center Frequency 3580 MHz, Bandwidth 20 MHz, MaxEIRP 18.20 [dBm/MHz]



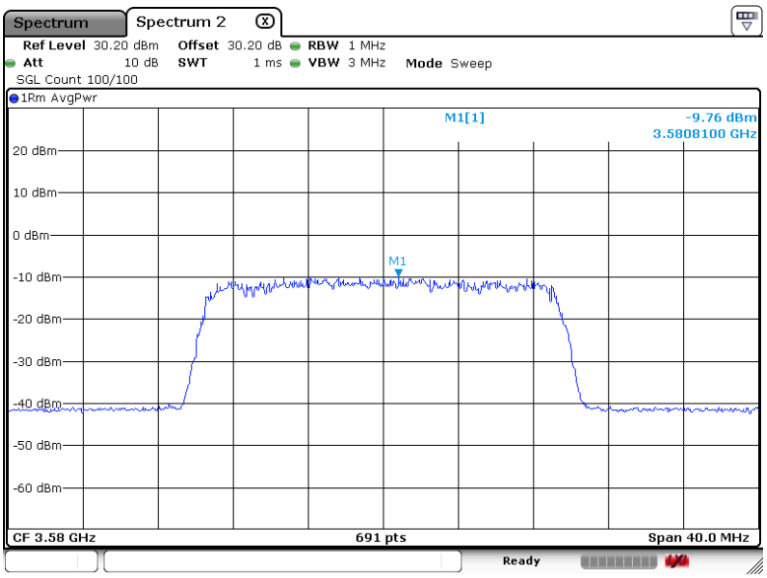
SAS Granted MaxEIRP 18 [dBm/MHz]

UUT Center Frequency 3580 MHz, Bandwidth 20 MHz,MaxEIRP 16.26 [dBm/MHz]



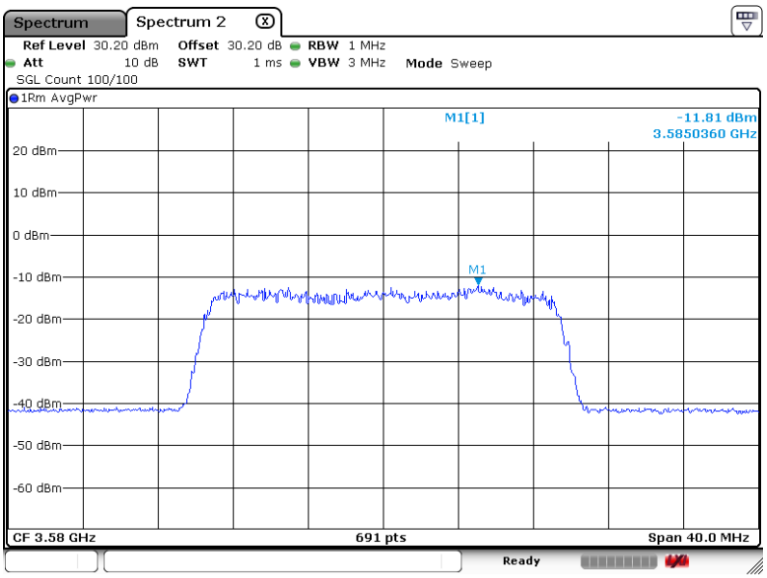
SAS Granted MaxEIRP 16 [dBm/MHz]

UUT Center Frequency 3580 MHz, Bandwidth 20 MHz, MaxEIRP 13.87 [dBm/MHz]



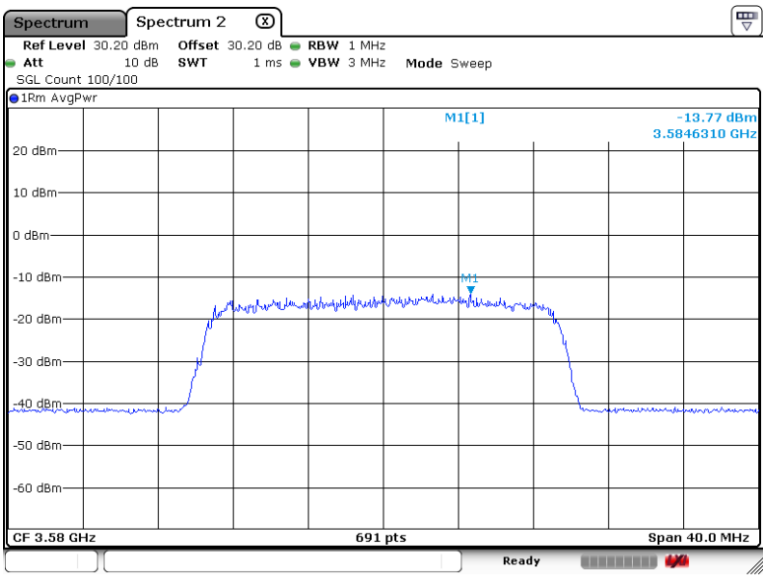
SAS Granted MaxEIRP 14 [dBm/MHz]

UUT Center Frequency 3580 MHz, Bandwidth 20 MHz, MaxEIRP 11.82 [dBm/MHz]



SAS Granted MaxEIRP 12 [dBm/MHz]

UUT Center Frequency 3580 MHz, Bandwidth 20 MHz, MaxEIRP 9.86 [dBm/MHz]



SAS Granted MaxEIRP 10 [dBm/MHz]

UUT Center Frequency 3580 MHz, Bandwidth 20 MHz, MaxEIRP 8.95 [dBm/MHz]