FCC PART 20 TEST REPORT

for

ZoneDAS

Model No.: ZoneDAS

FCC ID: 2ASQXZONEDAS

of

Applicant: ZQAM Communications Corp.
Address: 3F., No.6, Innovation Road II, Science Park, Hsinchu 30076, Taiwan

Tested and Prepared

by

Worldwide Testing Services (Taiwan) Co., Ltd.

FCC Registration No.: TW1477, TW0020, TW1072

Industry Canada filed test laboratory Reg. No. IC 5679A-1, IC 5107A-1

A2LA Accredited No.: 2732.01

Report No.: W6M21812-18679-P-20

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Worldwide Testing Services(Taiwan) Co., Ltd.

Report Number: W6M21812-18679-P-20
FCC ID: 2ASQXZONEDAS

Certification of Test Report

Applicant : ZQAM Communications Corp.
3F., No.6, Innovation Road II, Science Park, Hsinchu 30076, Taiwan

Manufacturer : ZQAM Communications Corp.
3F., No.6, Innovation Road II, Science Park, Hsinchu 30076, Taiwan

Tested Equipment :

Type Description	: ZoneDAS
Model Number	: ZoneDAS
Brand Name	: ZQAM Communications
Operation Frequency	: Please see chapter 2.3
Antenna type / Gain	: Metal Antenna / WCDMA Band II: 5.1 dBi, Band V: 2 dBi LTE Band II: 5.1 dBi, Band IV: 4.4 dBi, Band V: 2 dBi Band XII: 0.2 dBi, Band XIII: 1.4 dBi
RF Output Power	: WCDMA Band II: 22.66 dBm, Band V: 22.03 dBm LTE Band II: 23.42 dBm, Band IV: 21.59 dBm, Band V: 22.52 dBm, Band XII: 23.24 dBm Band XIII: 22.23 dBm
Power Supply	: 120 Va.c.

Regulation Applied : 47CFR Part 20 (2018-10)

Test Method : 47CFR Part 20 (2018-10), KDB 935210 D05 v01r02

I HEREBY CERTIFY THAT: The test results written in this report were derived conscientiously in accordance with the requirements and procedures of 47CFR Part 2(2017), KDB 935210 D05 v01r02 and it was found that the device described above is in compliance with the applicable limits specified in 47CFR Part 20.

Note:

1. The result of this test report is valid only in connection to the sample has been tested at the laboratory of Worldwide Testing Services (Taiwan) Co. Ltd.
2. This test report shall always be duplicated in full pages unless the written approval of the testing laboratory is obtained.

Test Engineer:

Date	WTS-Lab.	Name	Signature
March 12, 2019		Kent Lin	Kent Lin

Technical responsibility for area of testing:

Date	WTS	Name	Signature
March 12, 2019		Kevin Wang	Kevin Wang

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1. Summary

1.1 Description of tested equipment

This equipment under tested, ZoneDAS, is a ZoneDAS.
This test report only contains test requirements specified in 47CFR Part 20 for WCDMA and LTE function. For other functions; please refer to separate test report with respect to the relevant test standard and specification.

1.2 Date of testing processing

Date of receipt of test item: January 04, 2019
Date of test: From January 07, 2019 to March 12, 2019
Other Information: None

1.3 Modification Information

No modification was made during the all test items been performed.

1.4 Test standards

Technical standard: **FCC Part 2(2017), KDB 935210 D05 v01r02**
47CFR Part 20 (2018-10)

Deviation from test standard: None

1.5 Summary of test result

Harmonized Standard Requirements and Conformance Test Specifications				
Item	Test Content	KDB Clause	FCC Reference	Test Result
3.2	AGC threshold level	935210 D05 v01r02 ch3.2	- -	Pass
4.2	Out-of-band rejection	935210 D05 v01r02 ch3.3	- -	Pass
5.2	Input vs output comparison	935210 D05 v01r02 ch3.4	- -	Pass
6.2	Mean output power and amplifier gain	935210 D05 v01r02 ch3.5	§2.1046, §27.50(a)	Pass
7.2	Out-of-band/out-of-block (including intermodulation) and spurious emissions	935210 D05 v01r02 ch3.6	- -	Pass
8.2	Frequency stability	935210 D05 v01r02 ch3.7	§2.1055, §27.54	Pass
9.2	Radiated spurious emissions	935210 D05 v01r02 ch3.8	§2.1053, §27.53(a)	Pass

2. General Information

2.1 Testing laboratory

2.1.1 Location

OATS
No.5-1, Shuang Sing Village,
LiShuei Rd., Wanli Township,
Taipei County 207, Taiwan (R.O.C.)
Company
Worldwide Testing Services (Taiwan) Co., Ltd.
6F, NO. 58, LANE 188, RUEY-KUANG RD.
NEIHU, TAIPEI 114, TAIWAN R.O.C.
Tel : 886-2-66068877
Fax : 886-2-66068879

2.1.2 Details of accreditation status

Accredited testing laboratory
A2LA-registration number: 2732.01
FCC filed test laboratory Reg. No. TW1477, TW0020, TW1072
Industry Canada filed test laboratory Reg. No. IC 5679A-1, IC 5107A-1

2.1.3 Test location, where different from Worldwide Testing Services (Taiwan) Co., Ltd.

Name:	./.
Accredited number:	./.
Street:	./.
Town:	./.
Country:	./.
Telephone:	./.
Fax:	./.

2.2 Details of approval holder

Name:	ZQAM Communications Corp.
Street:	3F., No.6, Innovation Road II, Science Park,
Town:	Hsinchu 30076,
Country:	Taiwan
Telephone:	03-567-9581
Fax:	03-567-9582

Manufacturer: (if different from applicant)

Name:	./.
Street:	./.
Town:	./.
Country:	./.

2.3 Description of Tested System

The EUT was tested alone without the Accessories or Peripherals.

Equipment	Model No.	Series No.	Software	Cable information	Note
No accessories were used with this EUT.					

Frequencies Selected to be investigated:

WCDMA		
Band	Uplink	Downlink
WCDMA Band II	MHz	MHz
CH 9262	1852.4	1932.4
CH 9400	1880	1960
CH 9538	1907.6	1987.6
WCDMA Band V	MHz	MHz
CH 4132	826.4	871.4
CH 4183	836.6	881.6
CH 4233	846.6	891.6

LTE
Band II

Test Frequency ID	Bandwidth [MHz]	N_{UL}	Frequency of Uplink [MHz]	N_{DL}	Frequency of Downlink [MHz]
Low Range	1.4	18607	1850.7	607	1930.7
	3	18615	1851.5	615	1931.5
	5	18625	1852.5	625	1932.5
	10	18650	1855	650	1935
	15 [1]	18675	1857.5	675	1937.5
	20 [1]	18700	1860	700	1940
Mid Range	1.4/3/5/10 15 [1]/20 [1]	18900	1880	900	1960
High Range	1.4	19193	1909.3	1193	1989.3
	3	19185	1908.5	1185	1988.5
	5	19175	1907.5	1175	1987.5
	10	19150	1905	1150	1985
	15 [1]	19125	1902.5	1125	1982.5
	20 [1]	19100	1900	1100	1980
NOTE 1: Bandwidth for which a relaxation of the specified UE receiver sensitivity requirement (TS 36.101 [27] Clause 7.3) is allowed.					

Band IV

Test Frequency ID	Bandwidth [MHz]	N_{UL}	Frequency of Uplink [MHz]	N_{DL}	Frequency of Downlink [MHz]
Low Range	1.4	19957	1710.7	1957	2110.7
	3	19965	1711.5	1965	2111.5
	5	19975	1712.5	1975	2112.5
	10	20000	1715	2000	2115
	15	20025	1717.5	2025	2117.5
	20	20050	1720	2050	2120
Mid Range	1.4/3/5/10/15/20	20175	1732.5	2175	2132.5
High Range	1.4	20393	1754.3	2393	2154.3
	3	20385	1753.5	2385	2153.5
	5	20375	1752.5	2375	2152.5
	10	20350	1750	2350	2150
	15	20325	1747.5	2325	2147.5
	20	20300	1745	2300	2145

Band V

Test Frequency ID	Bandwidth [MHz]	N_{UL}	Frequency of Uplink [MHz]	N_{DL}	Frequency of Downlink [MHz]
Low Range	1.4	20407	824.7	2407	869.7
	3	20415	825.5	2415	870.5
	5	20425	826.5	2425	871.5
	10 [1]	20450	829	2450	874
Mid Range	1.4/3/5 10 [1]	20525	836.5	2525	881.5
High Range	1.4	20643	848.3	2643	893.3
	3	20635	847.5	2635	892.5
	5	20625	846.5	2625	891.5
	10 [1]	20600	844	2600	889
NOTE 1: Bandwidth for which a relaxation of the specified UE receiver sensitivity requirement (TS 36.101 [27] Clause 7.3) is allowed.					

Band XII

Test Frequency ID	Bandwidth [MHz]	N_{UL}	Frequency of Uplink [MHz]	N_{DL}	Frequency of Downlink [MHz]
Low Range	1.4	23017	699.7	5017	729.7
	3	23025	700.5	5025	730.5
	5 [1]	23035	701.5	5035	731.5
	10 [1]	23060	704	5060	734
Mid Range	1.4/3 5 [1]/10 [1]	23095	707.5	5095	737.5
High Range	1.4	23173	715.3	5173	745.3
	3	23165	714.5	5165	744.5
	5 [1]	23155	713.5	5155	743.5
	10 [1]	23130	711	5130	741
NOTE 1: Bandwidth for which a relaxation of the specified UE receiver sensitivity requirement (TS 36.101 [27] Clause 7.3) is allowed.					

Test Frequency ID	Bandwidth [MHz]	N_{UL}	Frequency of Uplink [MHz]	N_{DL}	Frequency of Downlink [MHz]
Low Range	5 [1]	23205	779.5	5205	748.5
	10 [1]	23230	782	5230	751
Mid Range	5 [1]/10 [1]	23230	782	5230	751
High Range	5 [1]	23255	784.5	5255	753.5
	10 [1]	23230	782	5230	751
NOTE 1: Bandwidth for which a relaxation of the specified UE receiver sensitivity requirement (TS 36.101 [27] Clause 7.3) is allowed.					

Antenna Type: Metal Antenna

Antenna Gain: WCDMA
Band II: 5.1 dBi, Band V: 2 dBi
LTE
Band II: 5.1 dBi, Band IV: 4.4 dBi, Band V: 2 dBi
Band XII: 0.2 dBi, Band XIII: 1.4 dBi

Power supply: 120 Va.c.

2.4 Test environment

Relative humidity content: 54 %
Air pressure: 86-103 Kpa

2.5 General Test Requirement

Radiated Emission: For investigated frequency is equal to or below 1GHz, the RBW and VBW of the spectrum analyzer was 100 kHz and 100 kHz respectively with an appropriate sweep speed.

For investigated frequency is above 1GHz, both of RBW and VBW of the spectrum analyzer were 1 MHz with an appropriate sweep speed. The analyzer was calibrated in dB above a microvolt at the output of the antenna.

The table used for radiated measurements is capable of continuous rotation. The spectrum was scanned from 30 MHz to the frequency specified as follows:

(1) If the intentional radiator operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

(2) If the intentional radiator operates at or above 10 GHz and below 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 100 GHz, whichever is lower.

(3) If the intentional radiator operates at or above 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 200 GHz, whichever is lower, unless specified otherwise elsewhere in the rules.

For hand-held devices, a exploratory test was performed with three (3) orthogonal planes to determine the highest emissions.

When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. The antenna was placed in both the horizontal and vertical planes.

Test item Name	Uncertainty
Estimation Result of Uncertainty of Conducted spurious emission	Expanded Uncertainty：1.726 dB
Estimation Result of Uncertainty of Radiated Emission(3M)	Expanded Uncertainty： 0.009-30 MHz：2.17 dB 30-1000 MHz：3.57 dB 1-18 GHz：2.60 dB 18-40 GHz：2.58 dB
Estimation Result of Uncertainty of Radiated Emission(10M)	Expanded Uncertainty： 0.009-30MHz：2.05 dB 30-1000 MHz：3.37 dB
Estimation Result of Uncertainty of Bandwidth Measurement 20 dB Bandwidth, Occupied bandwidth, Channel bandwidth, Necessary Bandwidth	Expanded Uncertainty：0.45 kHz
Estimation Result of Uncertainty of Frequency Drift Measurement	Expanded Uncertainty：6.11 Hz
Estimation Result of Uncertainty of Conducted Output Power Measurement Output power	Expanded Uncertainty：1.72 dB

The decision rule is: Measurement uncertainty is not taken into account.

2.6 Test Equipment List

No.	Test equipment	Type	Serial No.	Manufacturer	Cal. Date	Next Cal. Date
ETSTW-CE 001	EMI TEST RECEIVER	ESHS10	842121/013	R&S	2018/5/30	2019/5/29
ETSTW-CE 003	AC POWER SOURCE	APS-9102	D161137	GW	Function Test	
ETSTW-CE 004	ZWEILEITER-V-NETZNACHBILDUNG TWO-LINE V-NETWORK	ESH3-Z5	840731/011	R&S	2018/11/1	2019/10/31
ETSTW-CE 006	IMPULSBEGRENZER PULSE LIMITER	ESH3-Z2	100226	R&S	2018/8/21	2019/8/20
ETSTW-CE 008	HF-EICHLEITUNG RF STEP ATTENUATOR 139dB DPSP	334.6010.02	844581/024	R&S	Function Test	
ETSTW-CE 009	TEMP.&HUMIDITY CHAMBER	GTH-225-40-1P-U	MAA0305-009	GIANT FORCE	2018/7/13	2019/7/12
ETSTW-CE 016	TWO-LINE V-NETWORK	ENV216	100050	R&S	2018/9/25	2019/9/24
ETSTW-CE 028	MXE EMI Receiver	N9038A	MY53220110	Agilent	2018/7/16	2019/7/15
ETSTW-RE 003	EMI TEST RECEIVER	ESI 26	831438/001	R&S	2018/5/30	2019/5/29
ETSTW-RE 004	EMI TEST RECEIVER	ESI 40	832427/004	R&S	2018/5/21	2019/5/20
ETSTW-RE 012	TUNABLE BANDREJECT FILTER	D.C 0309	146	K&L	Function Test	
ETSTW-RE 013	TUNABLE BANDREJECT FILTER	D.C 0336	397	K&L	Function Test	
ETSTW-RE 018	MICROWAVE HORN ANTENNA	AT4560	27212	AR	2018/7/13	2019/7/12
ETSTW-RE 027	Passive Loop Antenna	6512	00034563	ETS-Lindgren	2018/7/12	2019/7/11
ETSTW-RE 030	Double-Ridged Guide Horn Antenna	3117	00035224	ETS-Lindgren	2018/3/26	2019/3/25
ETSTW-RE 042	Biconical Antenna	HK116	100172	R&S	2019/1/29	2020/1/28
ETSTW-RE 043	Log-Periodic Dipole Antenna	HL223	100166	R&S	2018/4/13	2019/4/12
ETSTW-RE 044	Log-Periodic Antenna	HL050	100094	R&S	2018/4/26	2019/4/25
ETSTW-RE 045	ESA-E SERIES SPECTRUM ANALYZER	E4404B	MY45111242	Agilent	Pre-test Use	
ETSTW-RE 050	Attenuator 10dB	50HF-010-1	None	JFW	2019/2/26	2020/2/28
ETSTW-RE 051	Attenuator 6dB	50HF-006-1	None	JFW	2019/2/26	2020/2/28
ETSTW-RE 053	Attenuator 3dB	50HF-003-1	None	JFW	2019/2/26	2020/2/28
ETSTW-RE 055	SPECTRUM ANALYZER	FSU 26	200074	R&S	2019/2/26	2020/2/28
ETSTW-RE 060	Attenuator 30dB	5015-30	F651012z-01	ATM	2019/2/26	2020/2/28
ETSTW-RE 062	Amplifier Module	CHC 2	None	KMIC	2018/3/30	2019/3/29
ETSTW-RE 064	Bluetooth Test Set	MT8852B-042	6K00005709	Anritsu	Function Test	
ETSTW-RE 069	Double-Ridged Guide Horn Antenna	3117	00069377	ETS-Lindgren	Function Test	
ETSTW-RE 072	CELL SITE TEST SET	8921A	3339A00375	HP	2018/9/17	2019/9/16
ETSTW-RE 088	SOLID STATE AMPLIFIER	KMA180265A01	99057	KMIC	2018/9/18	2019/9/17
ETSTW-RE 091	Match Pad	MDCS1500	None	WOKEN	2018/4/16	2019/4/15
ETSTW-RE 099	DC Block	50DB-007-1	None	JFW	2019/2/13	2020/2/12
ETSTW-RE 112	AC POWER SOURCE	TFC-1005	T-0A023536	T-Power	Function test	
ETSTW-RE 115	2.4GHz Notch Filter	N0124411	473874	MICROWAVE CIRCUITS	2019/1/15	2020/1/14
ETSTW-RE 120	RF Player	MP9200	MP9210-111022	ADIVIC	Function test	

ETSTW-RE 122	SIGNAL GENERATOR	SMF100A	102149	R&S	2018/5/29	2019/5/28
ETSTW-RE 125	5GHz Notch filter	5NSL11-5200/E221.3-O/O	1	K&L Microwave	2018/8/8	2019/8/7
ETSTW-RE 126	5GHz Notch filter	5NSL12-5800/E221.3-O/O	1	K&L Microwave	2018/8/8	2019/8/7
ETSTW-RE 127	RF Switch Box	RFS-01	None	WTS	2019/2/26	2020/2/28
ETSTW-RE 128	5.3GHz Notch filter	N0153001	SN487233	Microwave Circuits	2018/8/8	2019/8/7
ETSTW-RE 129	5.5GHz Notch filter	N0555984	SN487234	Microwave Circuits	2018/8/8	2019/8/7
ETSTW-RE 130	Handheld RF Spectrum Analyzer	N9340A	CN0147000204	Agilent	Pre-test Use	
ETSTW-RE 142	Amplifier	8447D	2805A03378	Agilent	2018/3/30	2019/3/29
ETSTW-RE 147	Bi-log Hybrid Antenna	MCTD 2786B	BLB16M04005	ETC	2018/3/23	2019/3/22
ETSTW-RE 151	Thermohygrometer	608-h1	45104376	TESTO	2018/8/17	2019/8/16
ETSTW-EMI 011	USB Compact Modulator	SFC-U	101689	R&S	2018/5/10	2019/5/9
ETSTW-EMS 008	Exposure Level Tester	ELT-400	G-0009	Narda	2018/7/17	2019/7/16
ETSTW-GSM 002	Universal Radio Communication Tester	CMU 200	109439	R&S	2019/2/26	2020/2/28
ETSTW-GSM 003	Radio Communication Analyzer	MT8820C	6201342073	Anritsu	2019/2/26	2020/2/28
ETSTW-GSM 004	Wideband Radio Communication Tester	CMW500	128092	R&S	2018/10/19	2019/10/18
ETSTW-GSM 019	Band Reject Filter	WRCTF824/849-822/851-40 /12+9SS	3	WI	2019/1/14	2020/1/13
ETSTW-GSM 020	Band Reject Filter	WRCD1747/1748-1743/1752-32/5SS	1	WI	2019/1/14	2020/1/13
ETSTW-GSM 021	Band Reject Filter	WRCD1879.5/1880.5-1875.5/1884.5-32/5SS	3	WI	2019/1/14	2020/1/13
ETSTW-GSM 022	Band Reject Filter	WRCT901.9/903.1-904.25-50/8SS	1	WI	2019/1/14	2020/1/13
ETSTW-GSM 023	Power Divider	4901.19.A	None	SUHNER	2018/9/12	2019/9/11
ETSTW-GSM 024	Radio Communication Analyzer	MT8821C	None	Anritsu	2019/2/26	2020/2/28
ETSTW-GSM 025	Band Reject Filter	BRM19835	001	Micro-Tronics	2018/8/9	2019/8/8
ETSTW-Cable 011	SMA to N type Cable	RGU-400	None	THERMAX	Pre-test Use NCR	
ETSTW-Cable 016	BNC Cable	Switch Box	B Cable 1	Schwarz beck	2019/2/21	2020/2/20
ETSTW-Cable 017	BNC Cable	X Cable	B Cable 2	Schwarz beck	2019/2/21	2020/2/20
ETSTW-Cable 018	BNC Cable	Y Cable	B Cable 3	Schwarz beck	2019/2/21	2020/2/20
ETSTW-Cable 019	BNC Cable	Z Cable	B Cable 4	Schwarz beck	2019/2/21	2020/2/20
ETSTW-Cable 020	N TYPE Cable	OATS Cable 1	N30N30-L335-15M	JYE BAO CO.,LTD.	2018/7/2	2019/7/1
ETSTW-Cable 026	Microwave Cable	SUCOFLEX 104	279075	HUBER+SUHNER	2019/2/26	2020/2/28
ETSTW-Cable 027	Microwave Cable	SUCOFLEX 104	279083	HUBER+SUHNER	2018/5/14	2019/5/13
ETSTW-Cable 028	Microwave Cable	FA147A0015M2020	30064-2	UTIFLEX	2018/9/18	2019/9/17
ETSTW-Cable 029	Microwave Cable	FA147A0015M2020	30064-3	UTIFLEX	2018/9/18	2019/9/17
ETSTW-Cable 030	Microwave Cable	SUCOFLEX 104（S_Cable 9）	279067	HUBER+SUHNER	2019/2/26	2020/2/28
ETSTW-Cable 031	Microwave Cable	SUCOFLEX 104（S_Cable 10）	238092	HUBER+SUHNER	2018/3/30	2019/3/29
ETSTW-Cable 043	Microwave Cable	SUCOFLEX 104	317576	HUBER+SUHNER	2018/3/30	2019/3/29
ETSTW-Cable 048	Microwave Cable	SUCOFLEX 104	325519	HUBER+SUHNER	2018/3/30	2019/3/29

ETSTW-Cable 058	Microwave Cable	SUCOFLEX 104	none	HUBER+SUHNER	2018/6/9	2019/6/8
ETSTW-Cable 064	Microwave Cable	SUCOFLEX 104	MY28891	HUBER+SUHNER	2018/3/30	2019/3/29
ETSTW-Cable 066	SMA type cable	32022	None	ASTROLAB	2018/8/30	2019/8/29
ETSTW-Cable 071	N TYPE CABLE	EMCCFD400-NM-NM-25000	170239	EMCI	2018/6/9	2019/6/8
WTSTW-SW 002	EMI TEST SOFTWARE	EZ_EMC	None	Farad	Version ETS-03A1	
WTSTW-SW 006	EMI TEST SOFTWARE	e3	None	AUDIX	Version 9.161014	
WTSTW-SW 008	Signal studio	Agilent	None	AUDIX	Version 2.0.0.1	

3. AGC threshold level

3.1 Test procedure

a) Connect a signal generator to the input of the EUT.

b) Connect a spectrum analyzer or power meter to the output of the EUT using appropriate attenuation as necessary.

c) The signal generator should initially be configured to produce either of the required test signals (i.e., broadband or narrowband).

d) Set the signal generator frequency to the center frequency of the EUT operating band.

e) While monitoring the output power of the EUT, measured using the methods of 3.5.3 or 3.5.4, increase the input level until a 1 dB increase in the input signal power no longer causes a 1 dB increase in the output signal power.

f) Record this level as the AGC threshold level.

g) Repeat the procedure with the remaining test signal.

3.2 Test Results

WCDMA
Band II

WCDMA Band II - Down Link				
note	Freq(MHz)	Input level(dBm)	Output level(dBm)	Gain
AGC threshold+3dB	1932.4	10	21.74	11.74
AGC threshold		7	21.55	14.55
		6	20.72	14.72

WCDMA Band II - Down Link				
note	Freq(MHz)	Input level(dBm)	Output level(dBm)	Gain
AGC threshold+3dB	1960	9	22.14	13.14
AGC threshold		6	21.66	15.66
		5	21.5	16.5

WCDMA Band II - Down Link				
note	Freq(MHz)	Input level(dBm)	Output level(dBm)	Gain
AGC threshold+3dB	1987.6	10	22.31	12.31
AGC threshold		7	22.66	15.66
		6	21.66	15.66

WCDMA Band II - Up Link				
note	Freq(MHz)	Input level(dBm)	Output level(dBm)	Gain
AGC threshold+3dB	1852.4	-31	-17.96	13.04
AGC threshold		-33	-18.47	14.53
		-34	-19.04	14.96

WCDMA Band II - Up Link				
note	Freq(MHz)	Input level(dBm)	Output level(dBm)	Gain
AGC threshold+3dB	1880	-32	-18.34	13.66
AGC threshold		-34	-18.72	15.28
		-35	-19.15	15.85

WCDMA Band II - Up Link				
note	Freq(MHz)	Input level(dBm)	Output level(dBm)	Gain
AGC threshold+3dB	1907.6	-31	-18.3	12.7
AGC threshold		-33	-19.29	13.71
		-34	-19.91	14.09

Band V

WCDMA Band V - Down Link				
note	Freq(MHz)	Input level(dBm)	Output level(dBm)	Gain
AGC threshold+3dB	871.4	11	22.03	11.03
AGC threshold		8	21.91	13.91
		7	21.53	14.53

WCDMA Band V - Down Link				
note	Freq(MHz)	Input level(dBm)	Output level(dBm)	Gain
AGC threshold+3dB	881.6	10	21.64	11.64
AGC threshold		7	21.93	14.93
		6	21.38	15.38

WCDMA Band V - Down Link				
note	Freq(MHz)	Input level(dBm)	Output level(dBm)	Gain
AGC threshold+3dB	891.6	10	20.86	10.86
AGC threshold		7	21.15	14.15
		6	20.63	14.63

WCDMA Band V - Up Link				
note	Freq(MHz)	Input level(dBm)	Output level(dBm)	Gain
AGC threshold+3dB	826.4	-26	-18.61	7.39
AGC threshold		-29	-18.3	10.7
		-30	-18.95	11.05

WCDMA Band V - Up Link				
note	Freq(MHz)	Input level(dBm)	Output level(dBm)	Gain
AGC threshold+3dB	836.6	-26	-18.87	7.13
AGC threshold		-29	-18.16	10.84
		-30	-18.93	11.07

WCDMA Band V - Up Link				
note	Freq(MHz)	Input level(dBm)	Output level(dBm)	Gain
AGC threshold+3dB	846.6	-25	-18.18	6.82
AGC threshold		-28	-17.31	10.69
		-29	-18.05	10.95

LTE
Band II

LTE Band II 20MHz Bandwidth - Down Link				
note	Freq(MHz)	Input level(dBm)	Output level(dBm)	Gain
AGC threshold+3dB	1940	10	22.2	12.2
AGC threshold		7	22.94	15.94
		6	21.88	15.88

LTE Band II 20MHz Bandwidth - Down Link				
note	Freq(MHz)	Input level(dBm)	Output level(dBm)	Gain
AGC threshold+3dB	1960	10	21.56	11.56
AGC threshold		7	22.42	15.42
		6	21.45	15.45

LTE Band II 20MHz Bandwidth - Down Link				
note	Freq(MHz)	Input level(dBm)	Output level(dBm)	Gain
AGC threshold+3dB	1980	10	23.39	13.39
AGC threshold		7	23.42	16.42
		6	22.36	16.36

LTE Band II 20MHz Bandwidth - Up Link				
note	Freq(MHz)	Input level(dBm)	Output level(dBm)	Gain
AGC threshold+3dB	1860	-33	-19.42	13.58
AGC threshold		-36	-20.82	15.18
		-37	-21.44	15.56

LTE Band II 20MHz Bandwidth - Up Link				
note	Freq(MHz)	Input level(dBm)	Output level(dBm)	Gain
AGC threshold+3dB	1880	-34	-20.58	13.42
AGC threshold		-37	-21.77	15.23
		-38	-22.44	15.56

LTE Band II 20MHz Bandwidth - Up Link				
note	Freq(MHz)	Input level(dBm)	Output level(dBm)	Gain
AGC threshold+3dB	1900	-33	-19.52	13.48
AGC threshold		-36	-20.95	15.05
		-37	-21.7	15.3

Band IV

LTE Band IV 20MHz Bandwidth - Down Link				
note	Freq(MHz)	Input level(dBm)	Output level(dBm)	Gain
AGC threshold+3dB	2120	9	20.83	11.83
AGC threshold		6	20.98	14.98
		5	19.95	14.95

LTE Band IV 20MHz Bandwidth - Down Link				
note	Freq(MHz)	Input level(dBm)	Output level(dBm)	Gain
AGC threshold+3dB	2132.5	10	20.78	10.78
AGC threshold		7	20.74	13.74
		6	20.62	14.62

LTE Band IV 20MHz Bandwidth - Down Link				
note	Freq(MHz)	Input level(dBm)	Output level(dBm)	Gain
AGC threshold+3dB	2145	9	21.59	12.59
AGC threshold		6	21.52	15.52
		5	20.61	15.61

LTE Band IV 20MHz Bandwidth - Up Link				
note	Freq(MHz)	Input level(dBm)	Output level(dBm)	Gain
AGC threshold+3dB	1720	-30	-16.25	13.75
AGC threshold		-33	-17.99	15.01
		-34	-18.71	15.29

LTE Band IV 20MHz Bandwidth - Up Link				
note	Freq(MHz)	Input level(dBm)	Output level(dBm)	Gain
AGC threshold+3dB	1732.5	-30	-15.42	14.58
AGC threshold		-33	-16.97	16.03
		-34	-17.65	16.35

LTE Band IV 20MHz Bandwidth - Up Link				
note	Freq(MHz)	Input level(dBm)	Output level(dBm)	Gain
AGC threshold+3dB	1745	-30	-16.07	13.93
AGC threshold		-33	-17.75	15.25
		-34	-18.48	15.52

Band V

LTE Band V 10MHz Bandwidth - Down Link				
note	Freq(MHz)	Input level(dBm)	Output level(dBm)	Gain
AGC threshold+3dB	874	11	22.11	11.11
AGC threshold		8	22.52	14.52
		7	21.99	14.99

LTE Band V 10MHz Bandwidth - Down Link				
note	Freq(MHz)	Input level(dBm)	Output level(dBm)	Gain
AGC threshold+3dB	881.5	11	21.32	10.32
AGC threshold		8	22.16	14.16
		7	21.51	14.51

LTE Band V 10MHz Bandwidth - Down Link				
note	Freq(MHz)	Input level(dBm)	Output level(dBm)	Gain
AGC threshold+3dB	889	10	21.38	11.38
AGC threshold		7	21.29	14.29
		6	20.72	14.72

LTE Band V 10MHz Bandwidth - Up Link				
note	Freq(MHz)	Input level(dBm)	Output level(dBm)	Gain
AGC threshold+3dB	829	-29	-17.6	11.4
AGC threshold		-32	-19.34	12.66
		-33	-20.09	12.91

LTE Band V 10MHz Bandwidth - Up Link				
note	Freq(MHz)	Input level(dBm)	Output level(dBm)	Gain
AGC threshold+3dB	836.5	-29	-17.9	11.1
AGC threshold		-32	-19.79	12.21
		-33	-20.57	12.43

LTE Band V 10MHz Bandwidth - Up Link				
note	Freq(MHz)	Input level(dBm)	Output level(dBm)	Gain
AGC threshold+3dB	844	-29	-19.36	9.64
AGC threshold		-32	-21.33	10.67
		-33	-22.12	10.88

Band XII

LTE Band XII 10MHz Bandwidth - Down Link				
note	Freq(MHz)	Input level(dBm)	Output level(dBm)	Gain
AGC threshold+3dB	734	10	23.06	13.06
AGC threshold		7	22.93	15.93
		6	22.08	16.08

LTE Band XII 10MHz Bandwidth - Down Link				
note	Freq(MHz)	Input level(dBm)	Output level(dBm)	Gain
AGC threshold+3dB	737.5	10	22.81	12.81
AGC threshold		7	23.24	16.24
		6	22.67	16.67

LTE Band XII 10MHz Bandwidth - Down Link				
note	Freq(MHz)	Input level(dBm)	Output level(dBm)	Gain
AGC threshold+3dB	741	10	21.46	11.46
AGC threshold		7	21.35	14.35
		6	20.39	14.39

LTE Band XII 10MHz Bandwidth - Up Link				
note	Freq(MHz)	Input level(dBm)	Output level(dBm)	Gain
AGC threshold+3dB	704	-31	-14.96	16.04
AGC threshold		-34	-16.97	17.03
		-35	-17.76	17.24

LTE Band XII 10MHz Bandwidth - Up Link				
note	Freq(MHz)	Input level(dBm)	Output level(dBm)	Gain
AGC threshold+3dB	707.5	-31	-14.89	16.11
AGC threshold		-34	-16.86	17.14
		-35	-17.61	17.39

LTE Band XII 10MHz Bandwidth - Up Link				
note	Freq(MHz)	Input level(dBm)	Output level(dBm)	Gain
AGC threshold+3dB	711	-31	-14.29	16.71
AGC threshold		-34	-16.11	17.89
		-35	-16.84	18.16

Band XIII

LTE Band XIII 10MHz Bandwidth - Down Link				
note	Freq(MHz)	Input level(dBm)	Output level(dBm)	Gain
AGC threshold+3dB	751	11	21.98	10.98
AGC threshold		8	22.23	14.23
		7	21.3	14.3

LTE Band XIII 10MHz Bandwidth - Up Link				
note	Freq(MHz)	Input level(dBm)	Output level(dBm)	Gain
AGC threshold+3dB	782	-32	-21.43	10.57
AGC threshold		-35	-20.33	14.67
		-36	-21.07	14.93

Test equipment: ETSTW-RE 050, ETSTW-RE 055, ETSTW-RE 134

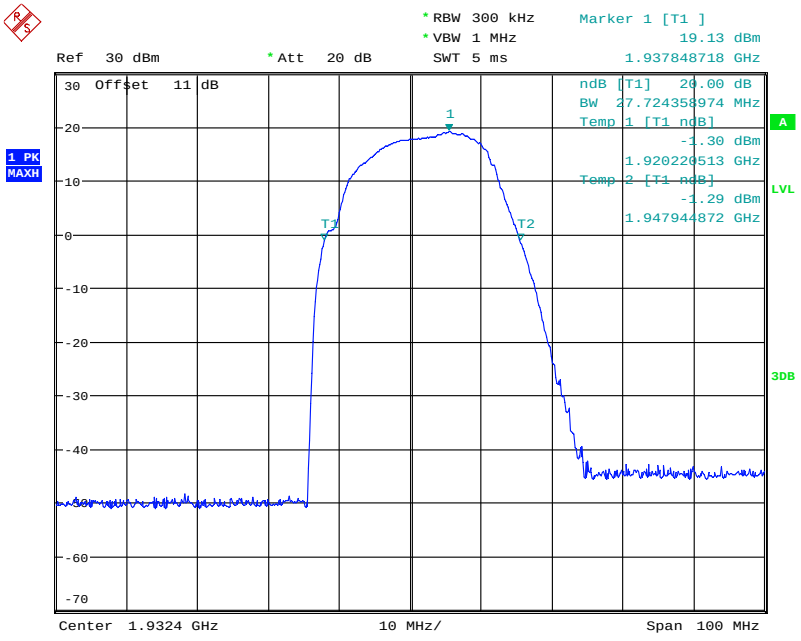
4. Out-of-band rejection

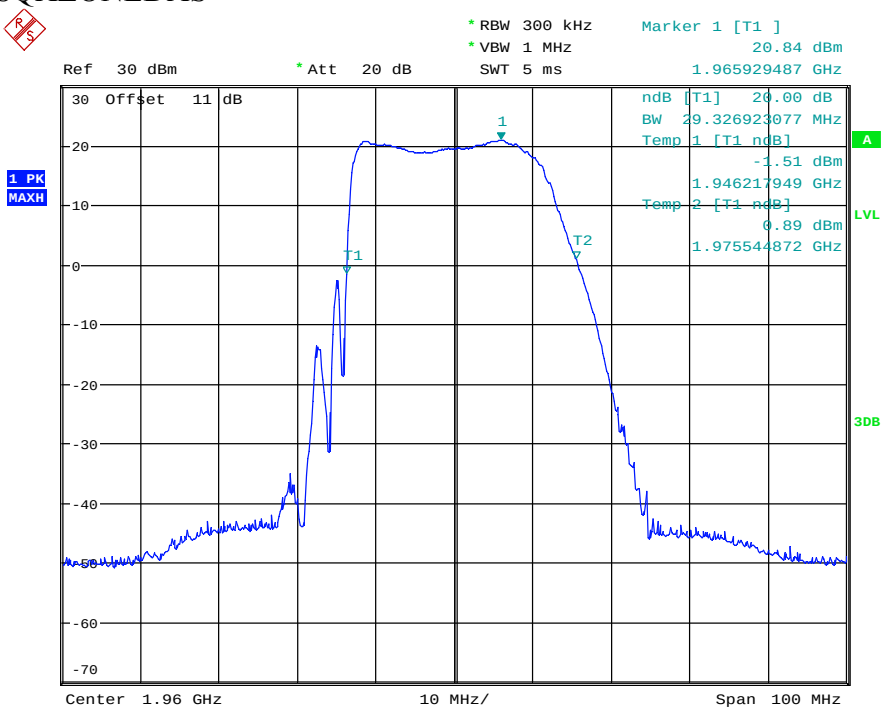
4.1 Test procedure

a) Connect a signal generator to the input of the EUT.
b) Configure a swept CW signal with the following parameters:
1) Frequency range = ± 250 % of the passband, for each applicable CMRS band (see also KDB Publication 935210 D02 [R7] and KDB Publication 634817 [R5] about selection of frequencies for testing and for grant listings).
2) Level = a sufficient level to affirm that the out-of-band rejection is > 20 dB above the noise floor and will not engage the AGC during the entire sweep.
3) Dwell time = approximately 10 ms.
4) Number of points = SPAN/(RBW/2).
c) Connect a spectrum analyzer to the output of the EUT using appropriate attenuation.
d) Set the span of the spectrum analyzer to the same as the frequency range of the signal generator.
e) Set the resolution bandwidth (RBW) of the spectrum analyzer to be 1 % to 5 % of the EUT passband, and the video bandwidth (VBW) shall be set to ≥ 3 × RBW.
f) Set the detector to Peak Max-Hold and wait for the spectrum analyzer's spectral display to fill.
g) Place a marker to the peak of the frequency response and record this frequency as f0.
h) Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display, such that each marker is at or slightly below the −20 dB down amplitude, to determine the 20 dB bandwidth.
i) Capture the frequency response of the EUT.
j) Repeat for all frequency bands applicable for use by the EUT.

4.2 Test Results

WCDMA
Band II





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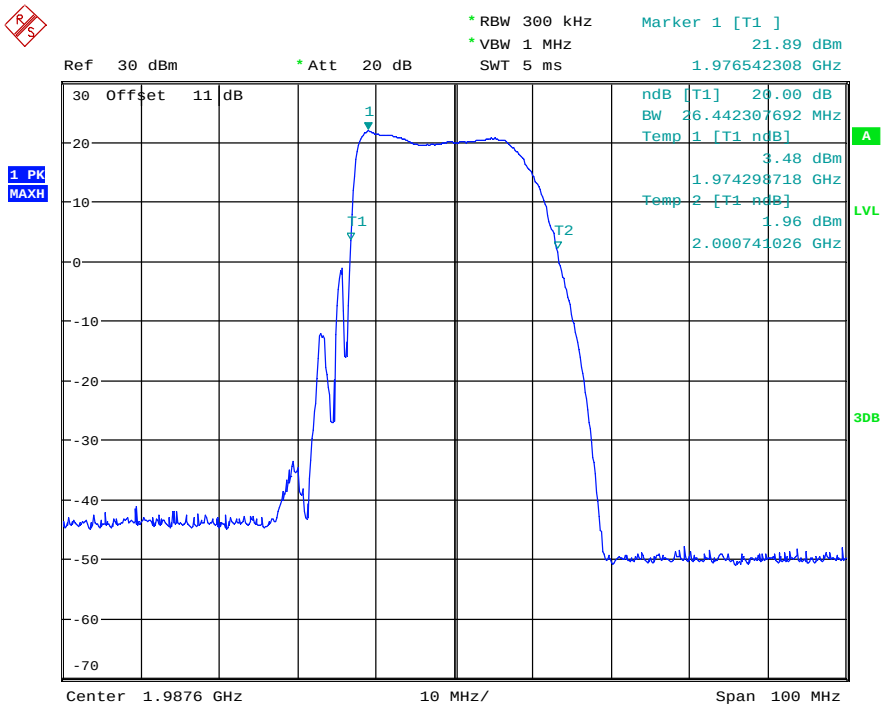

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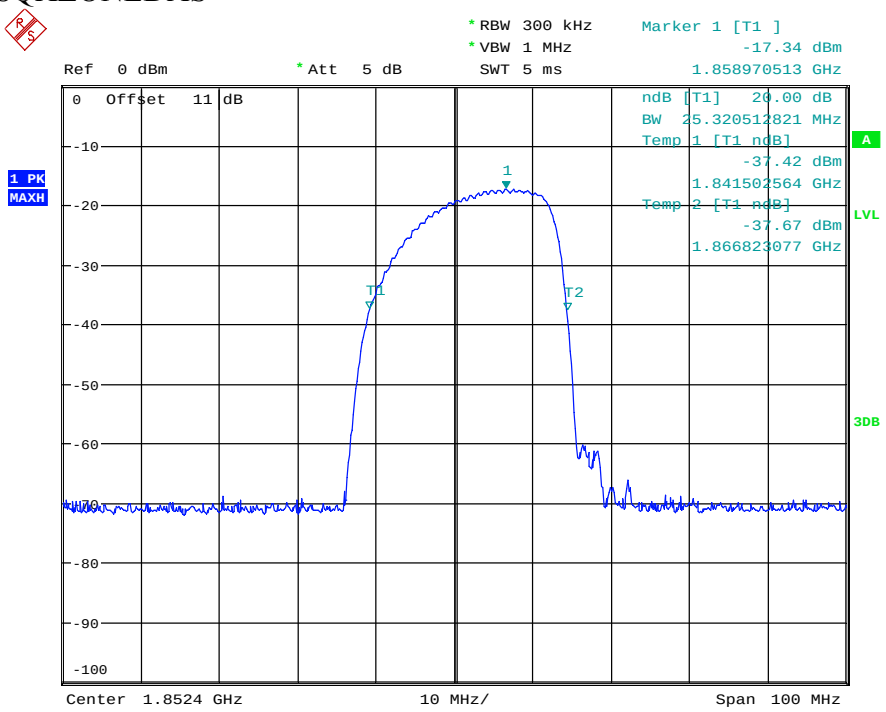

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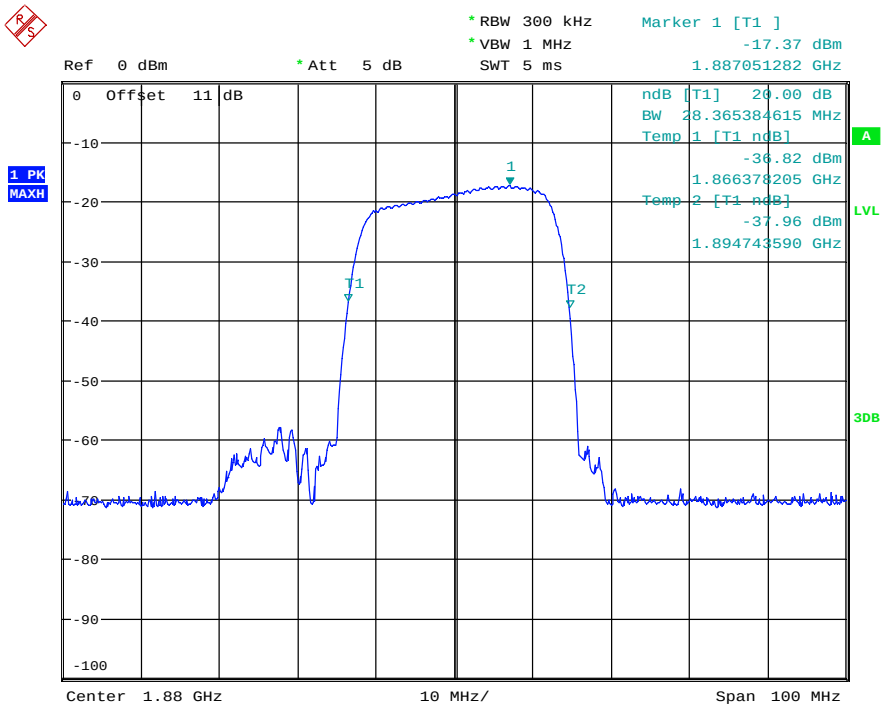

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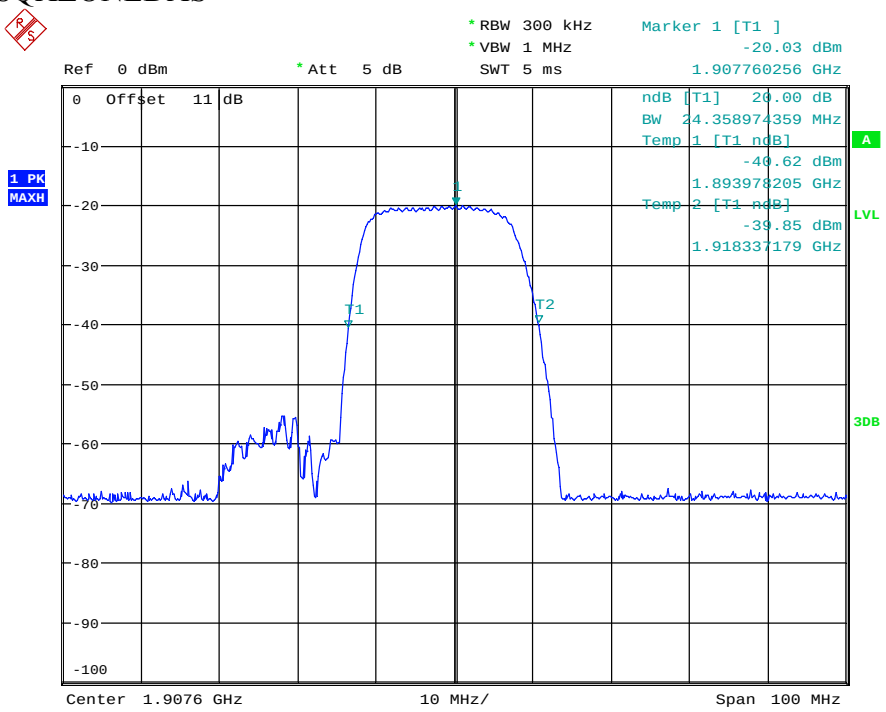
FCC ID: 2ASQXZONEDAS



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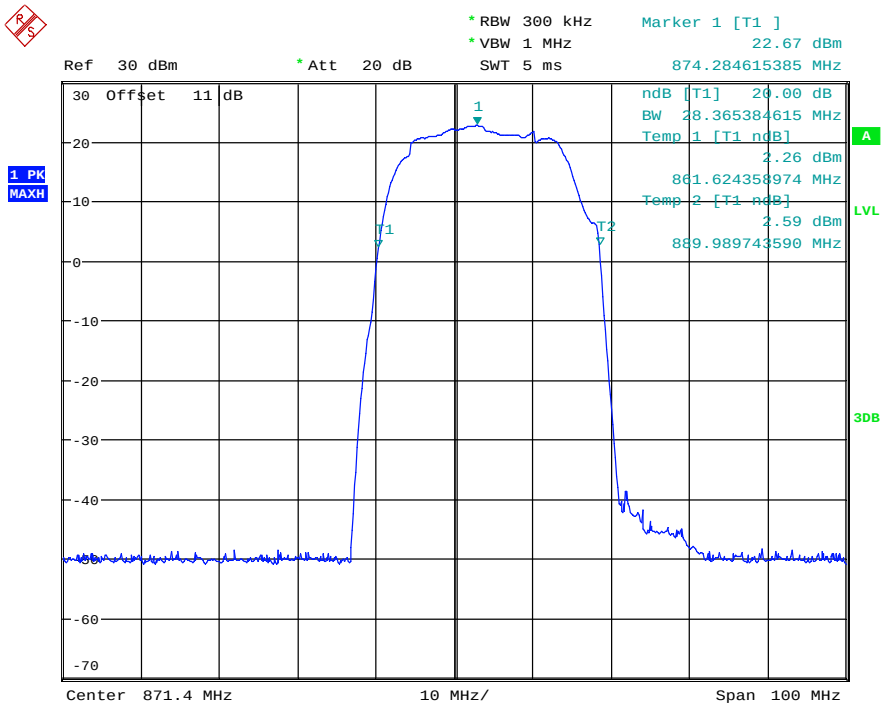
Band V



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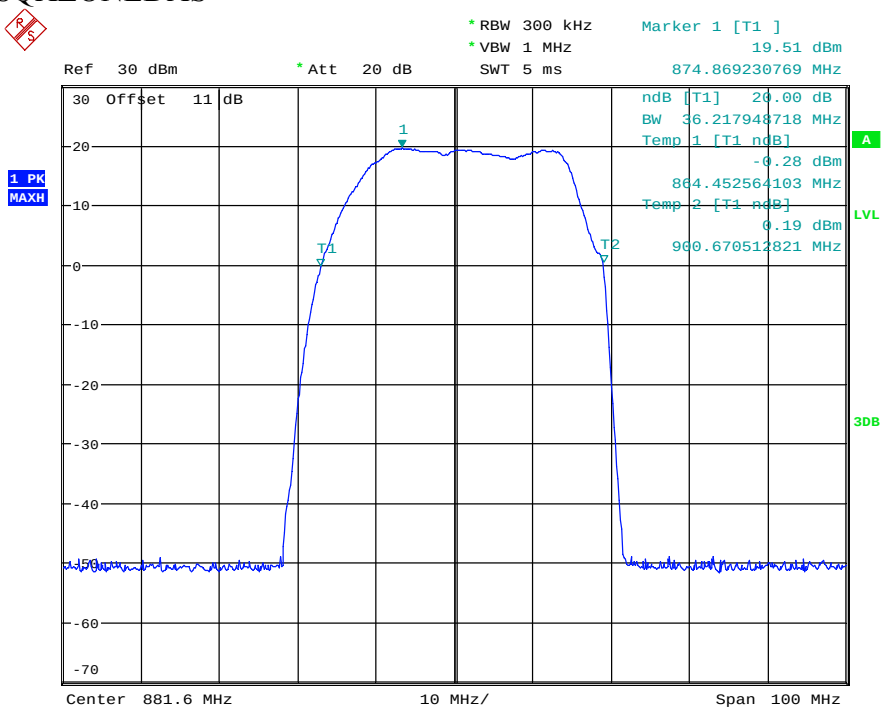

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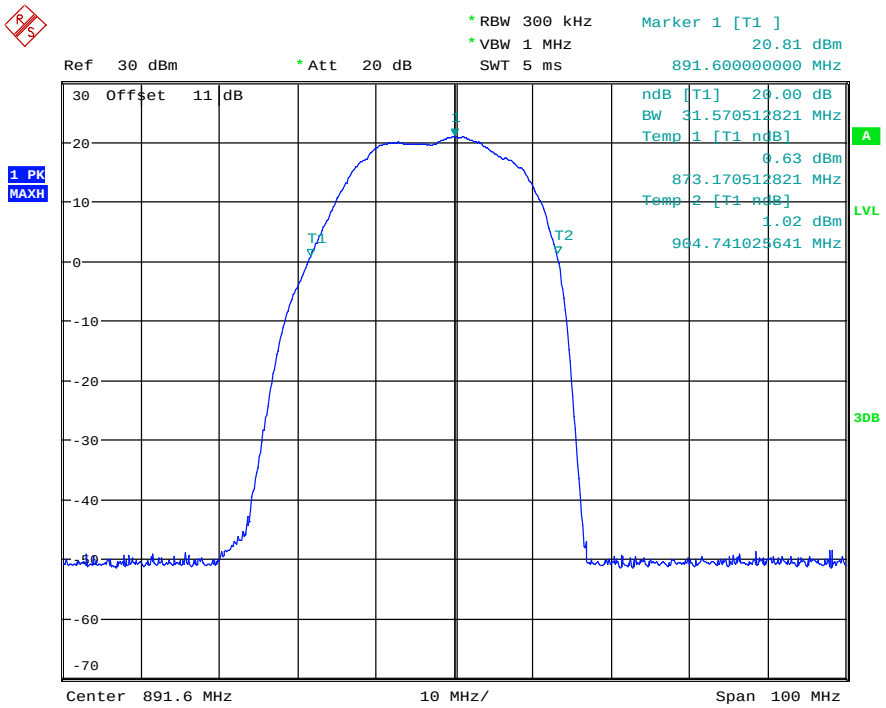

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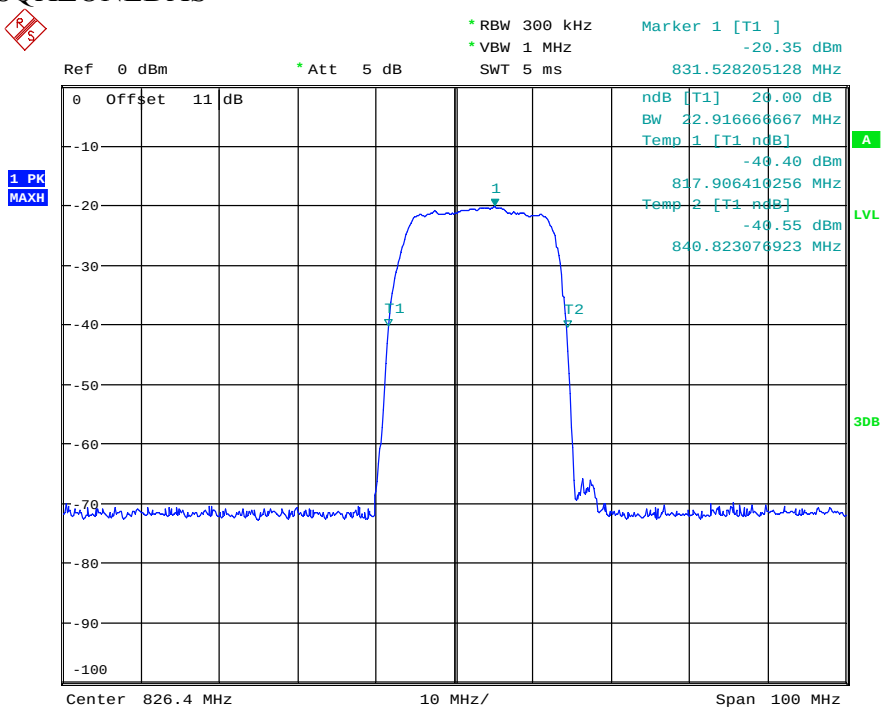

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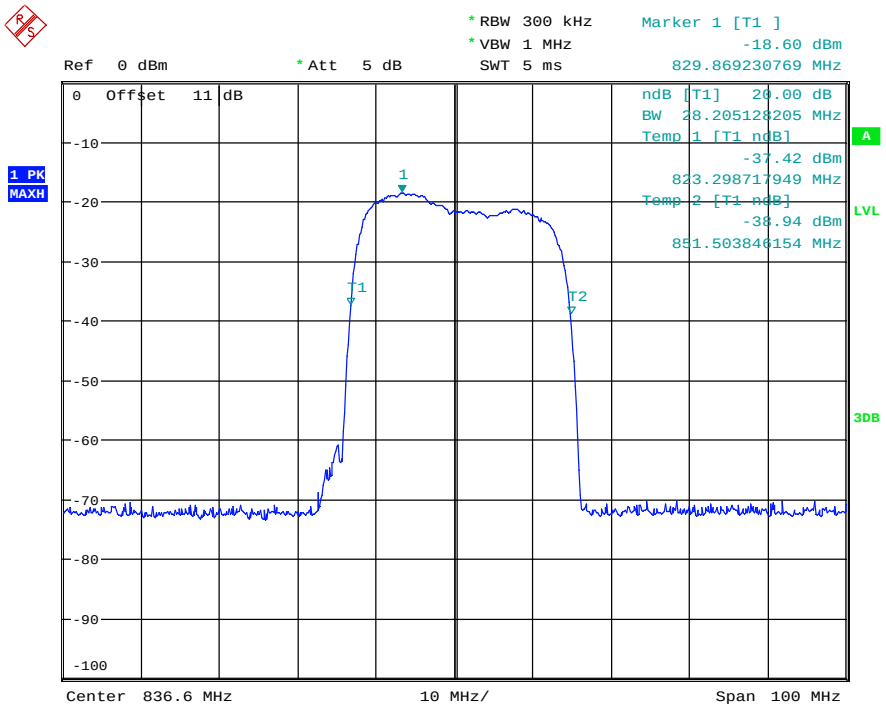

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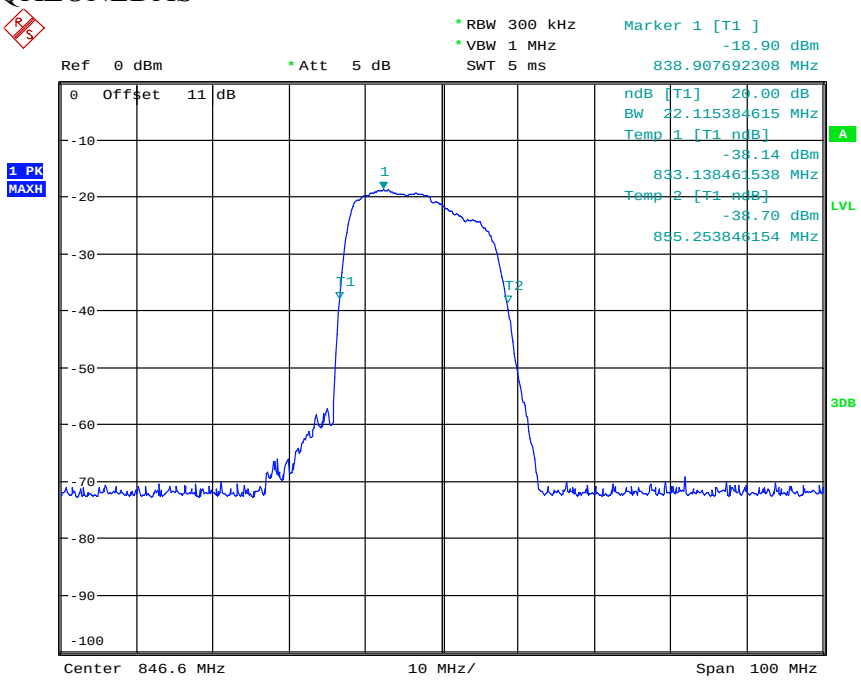

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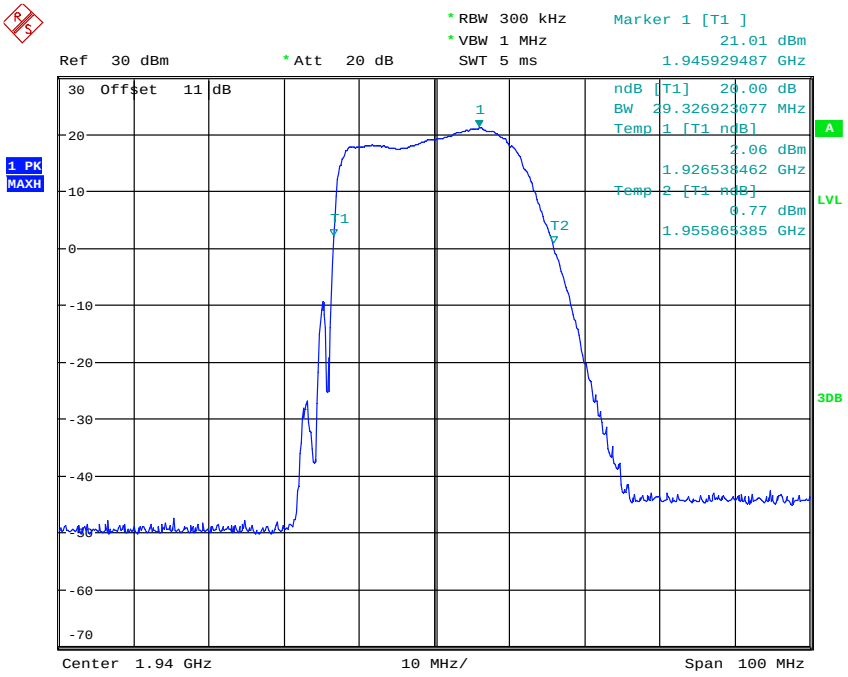
LTE
Band II



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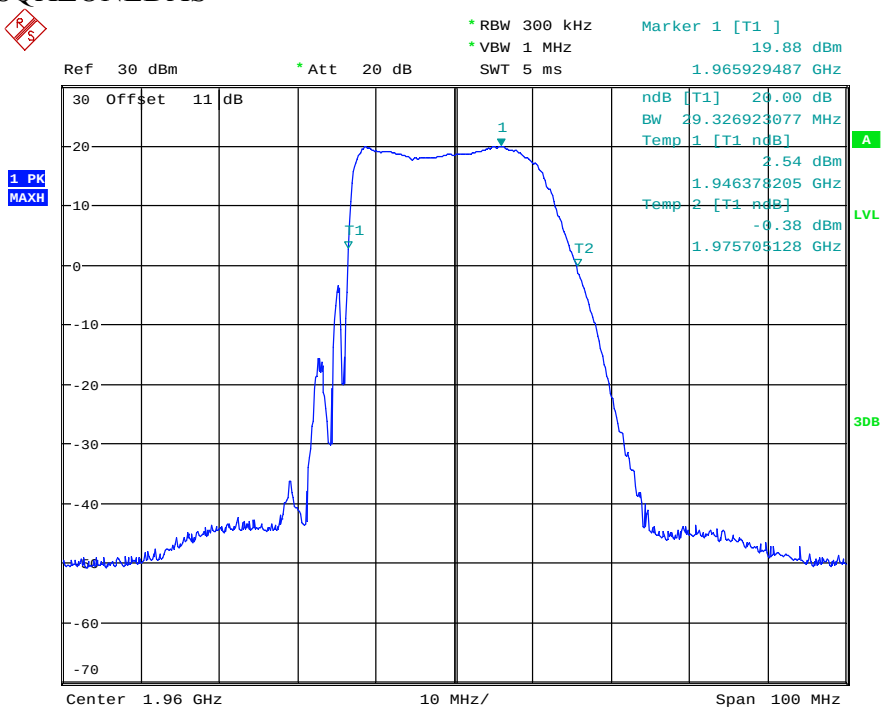

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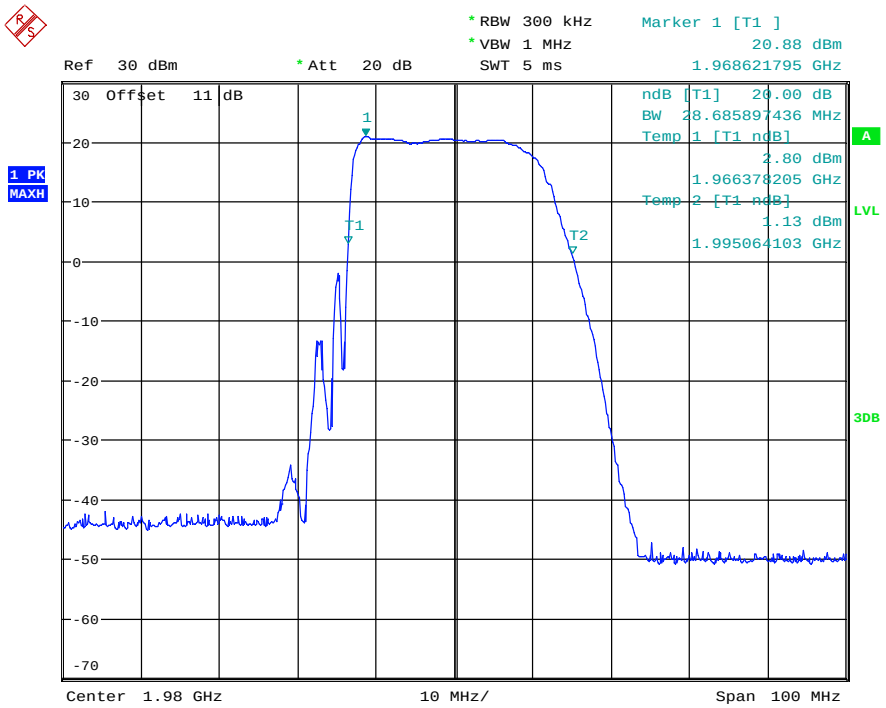

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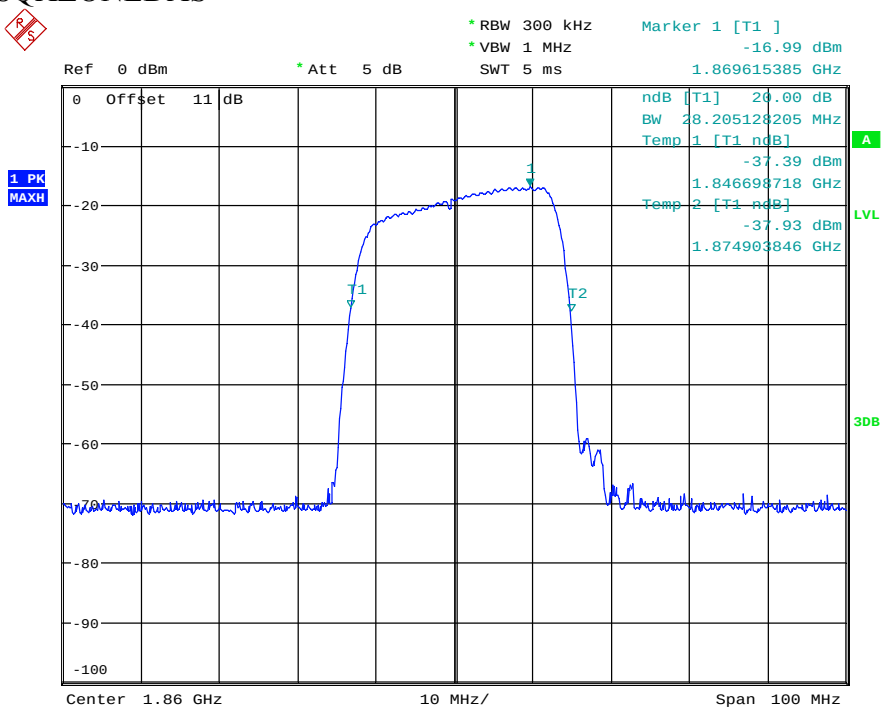

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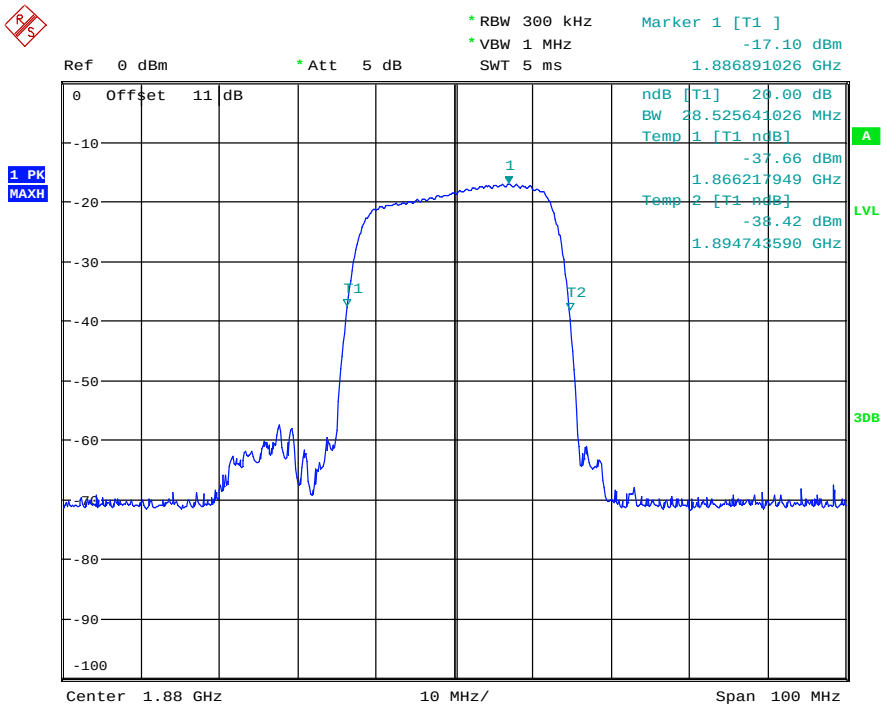

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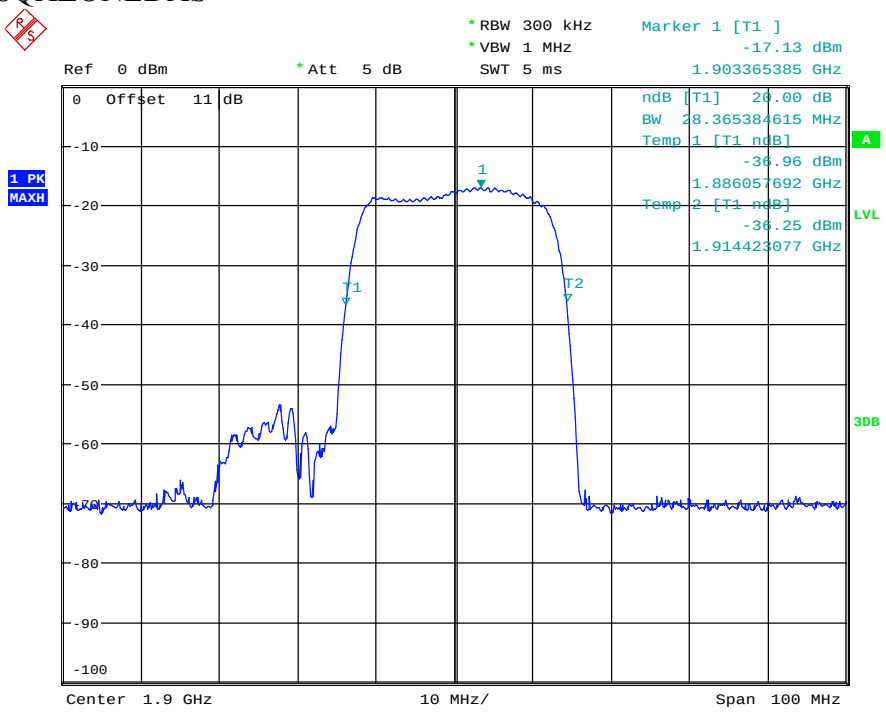

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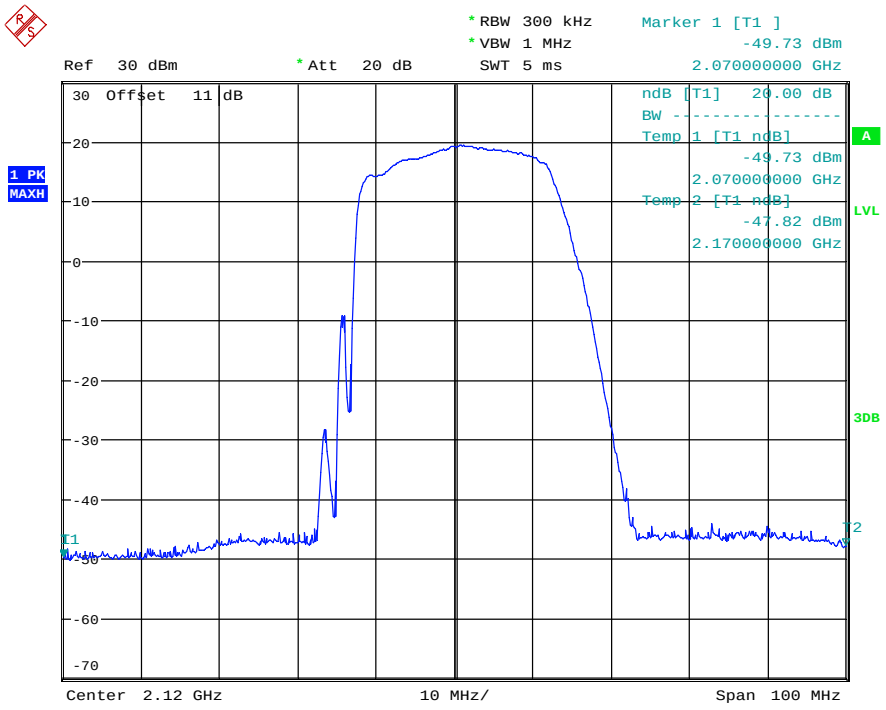
Band IV



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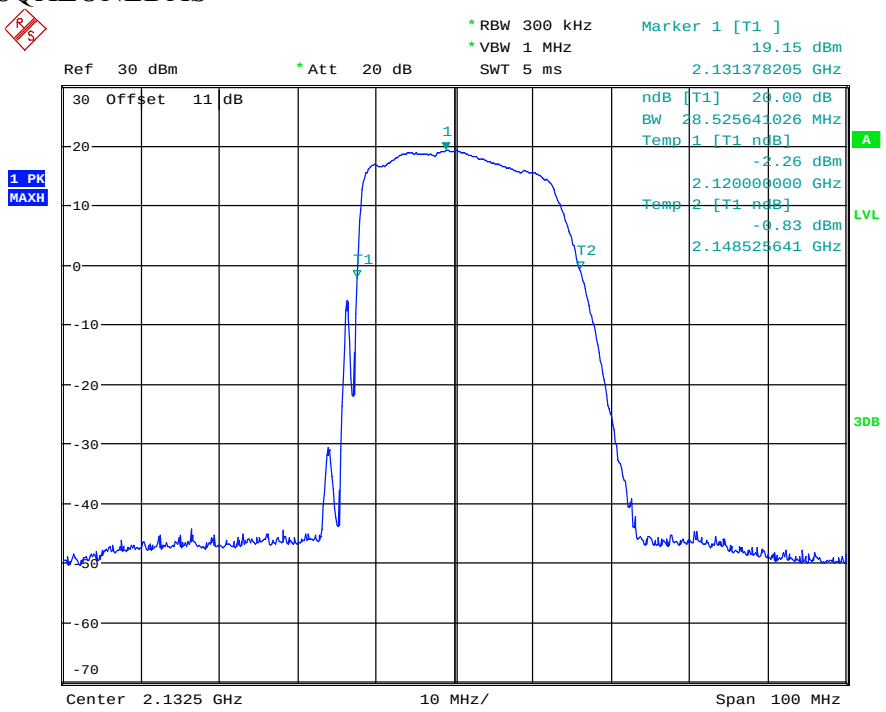

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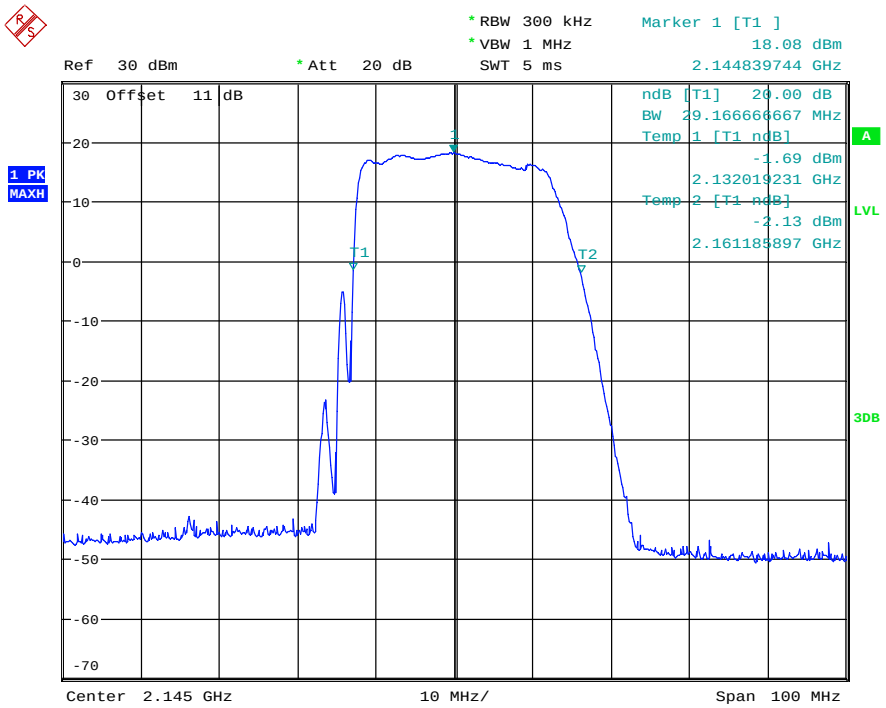

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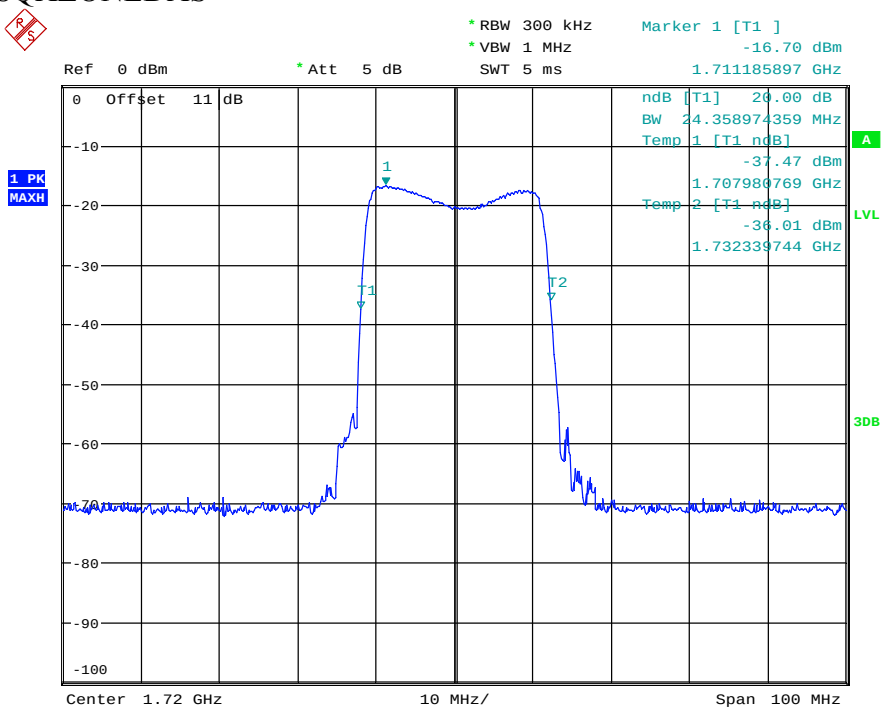

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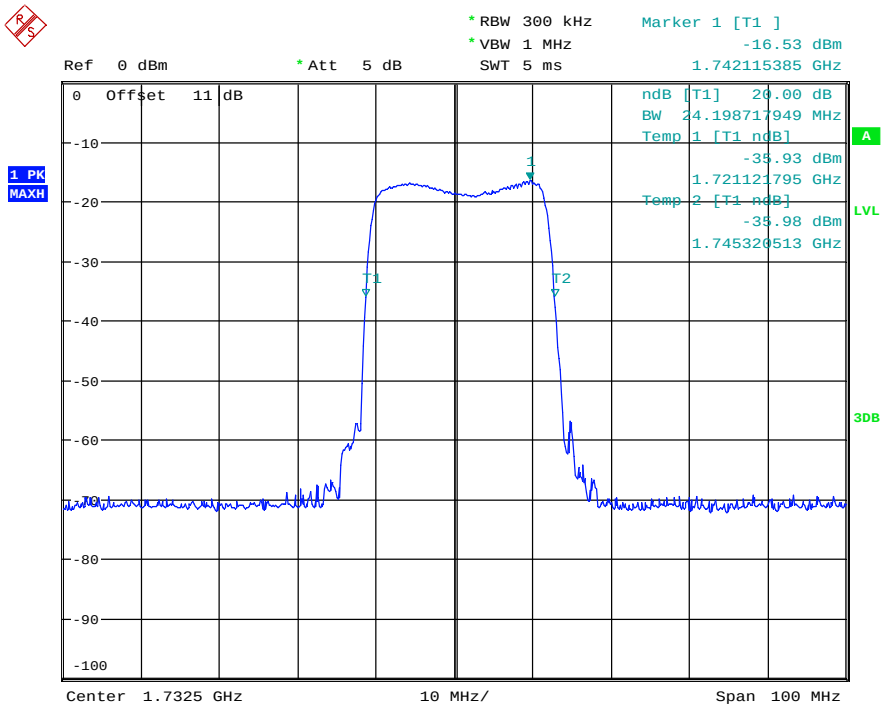

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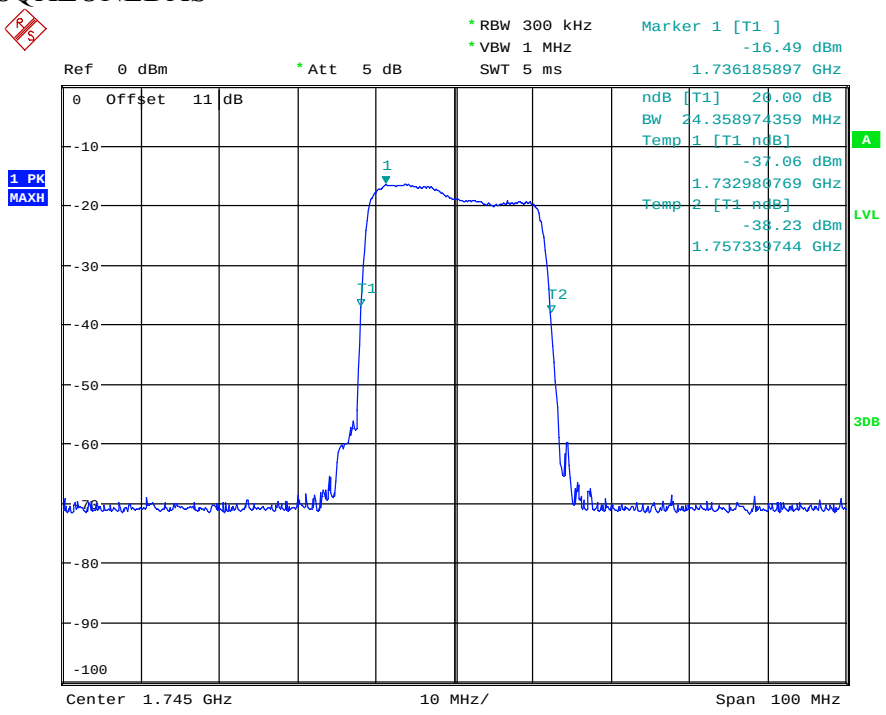

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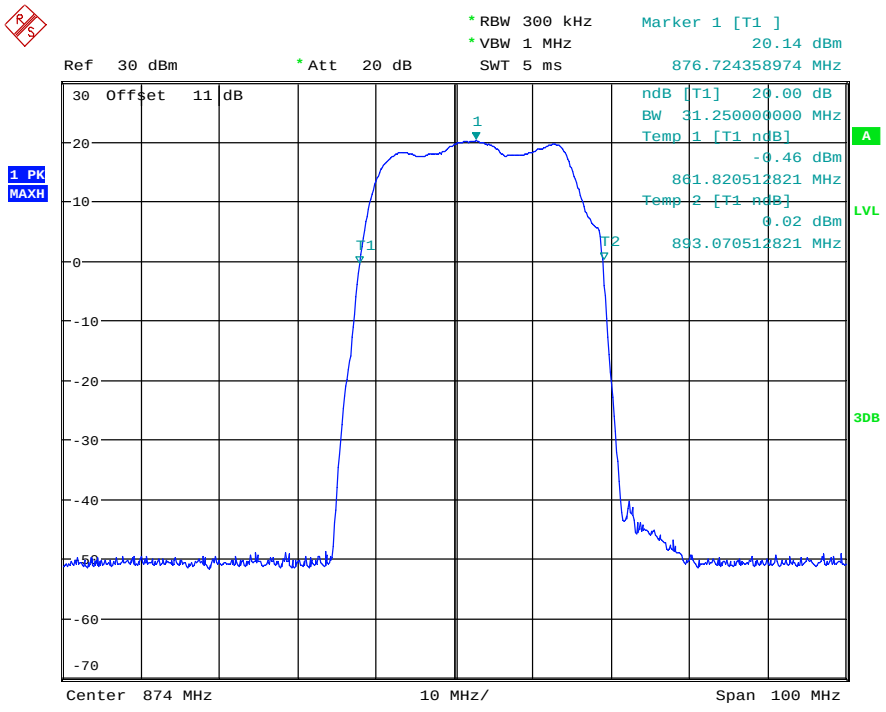
Band V



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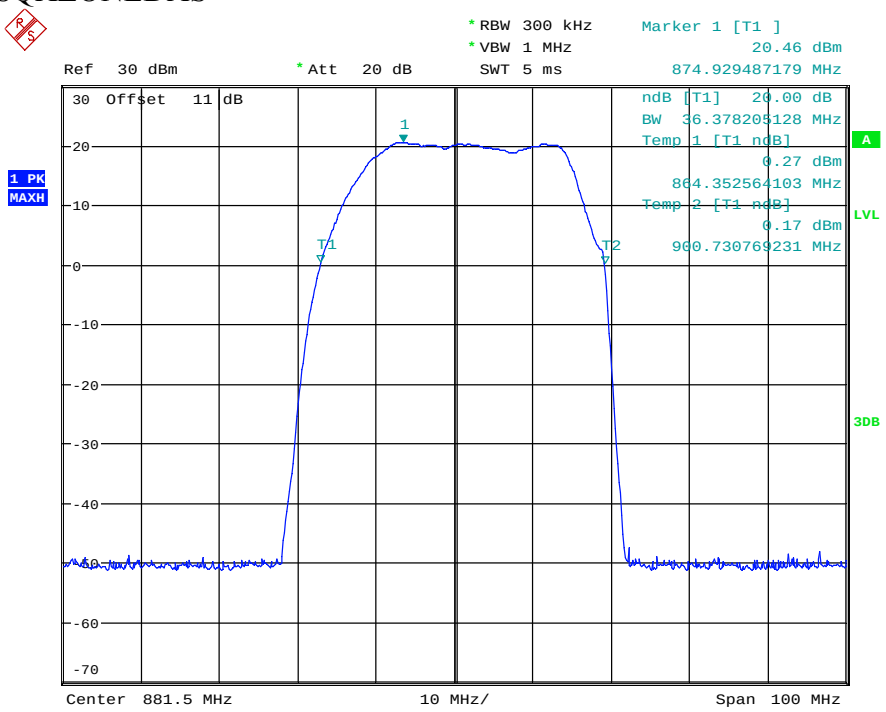

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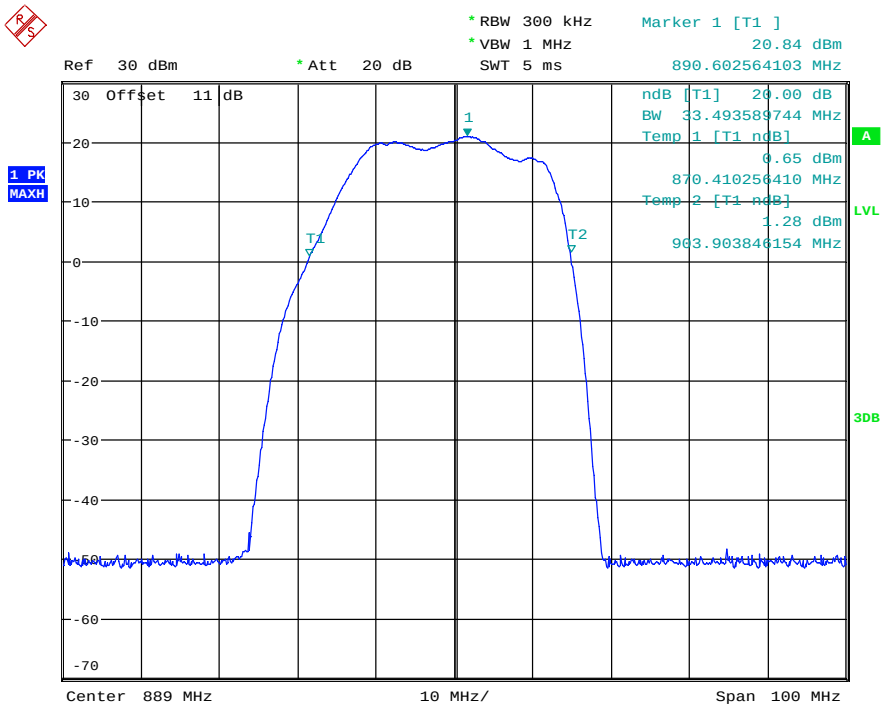

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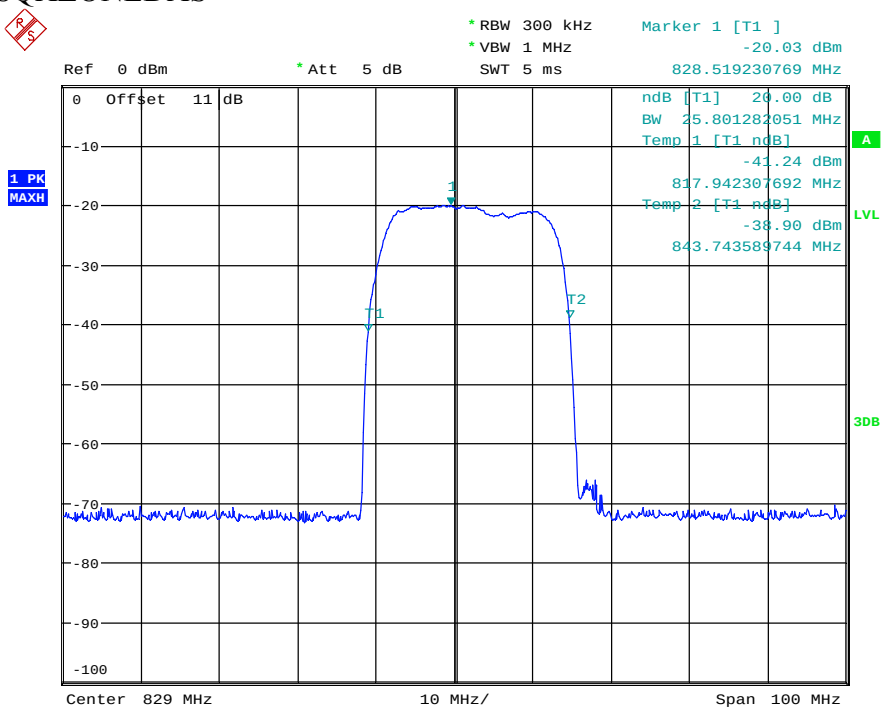

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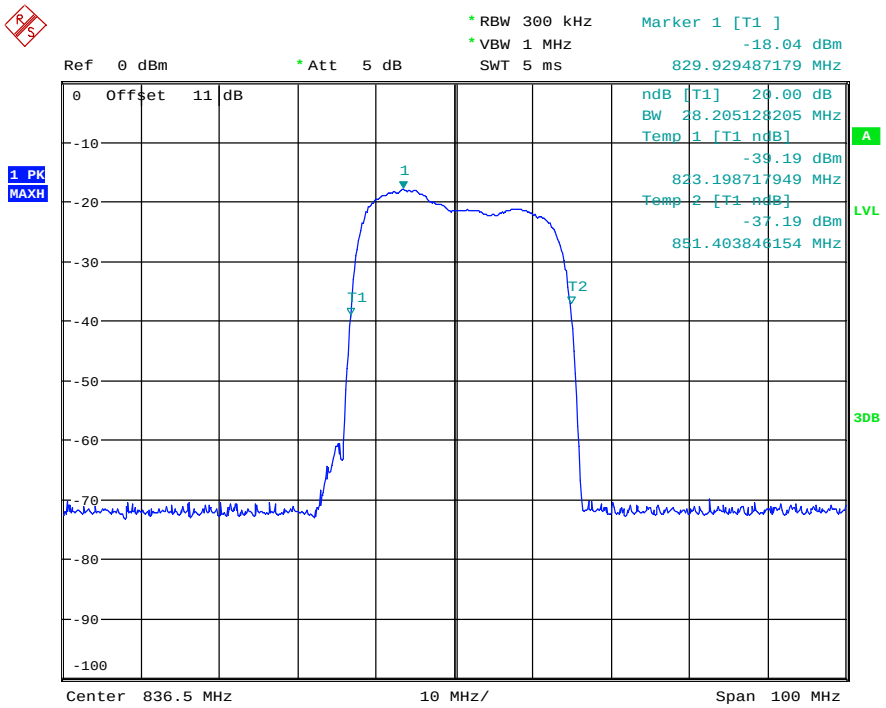

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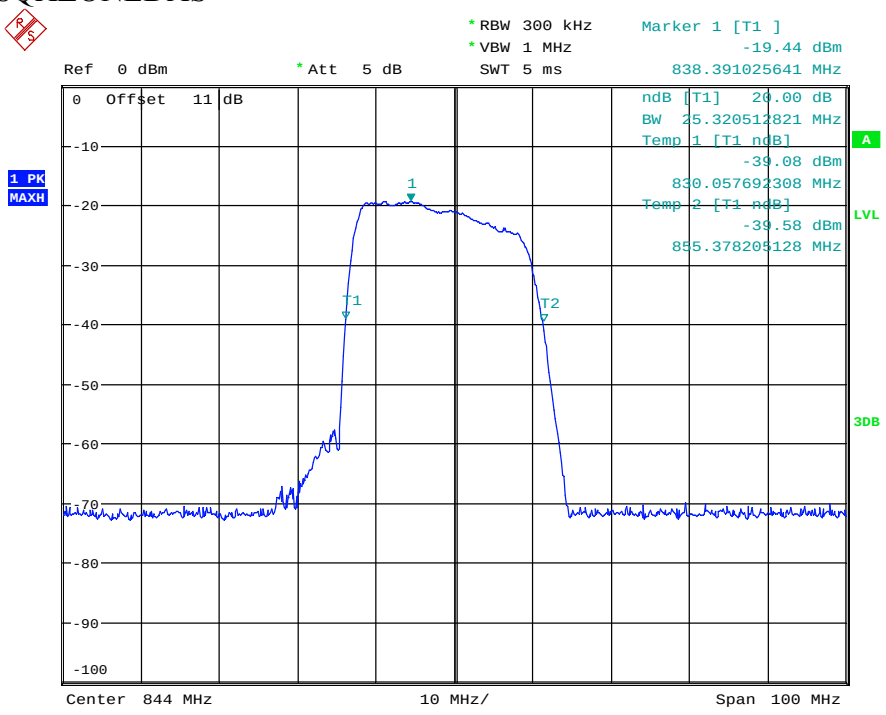

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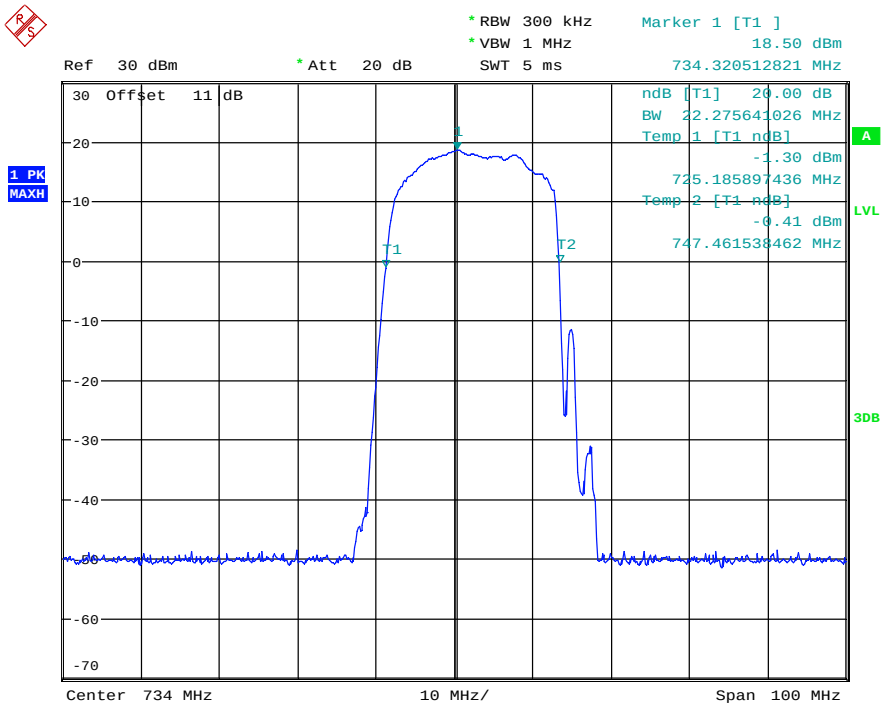
Band XII



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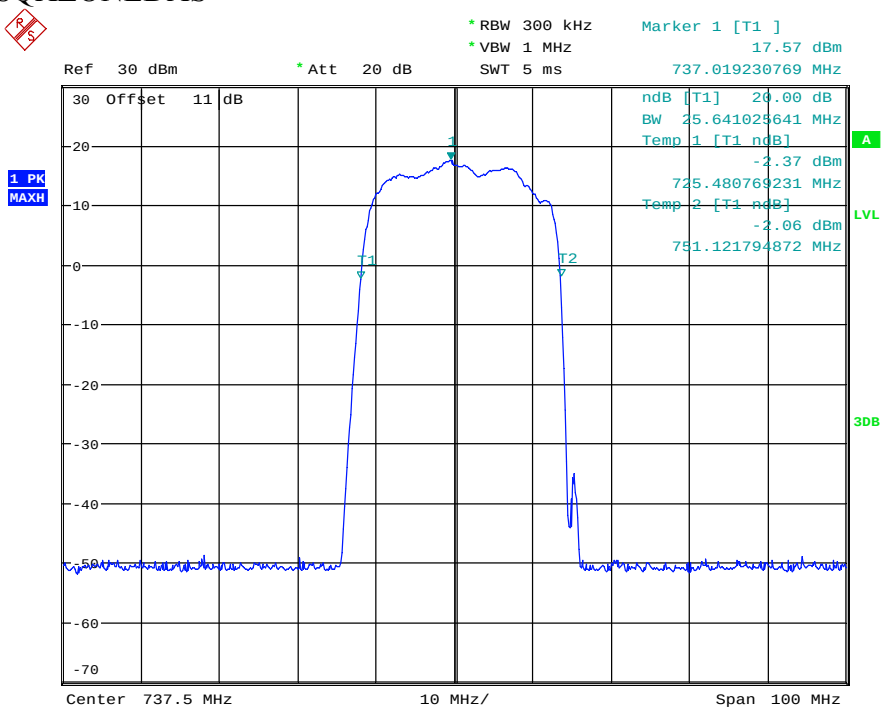

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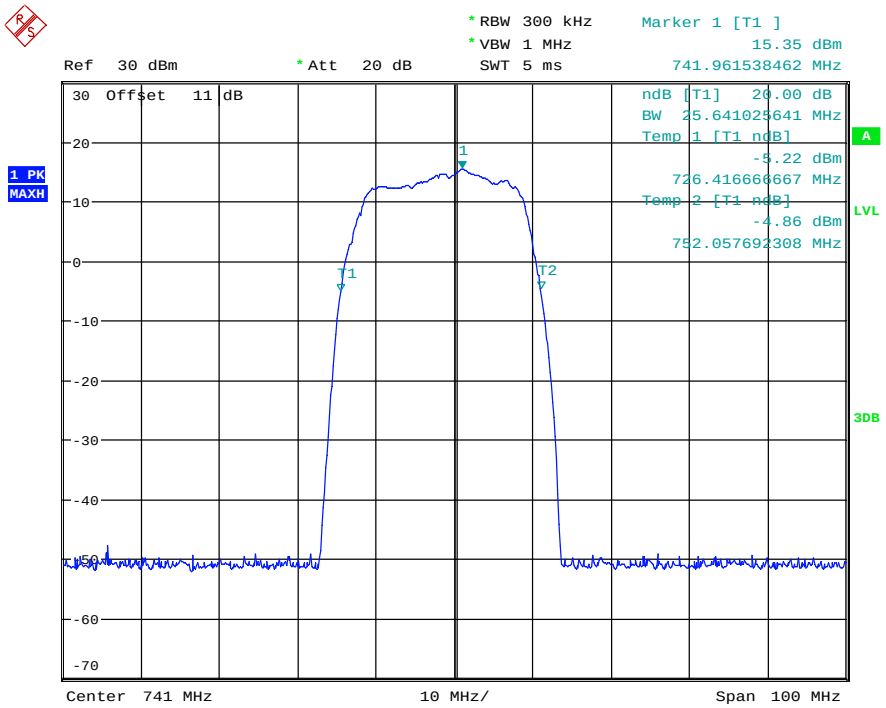

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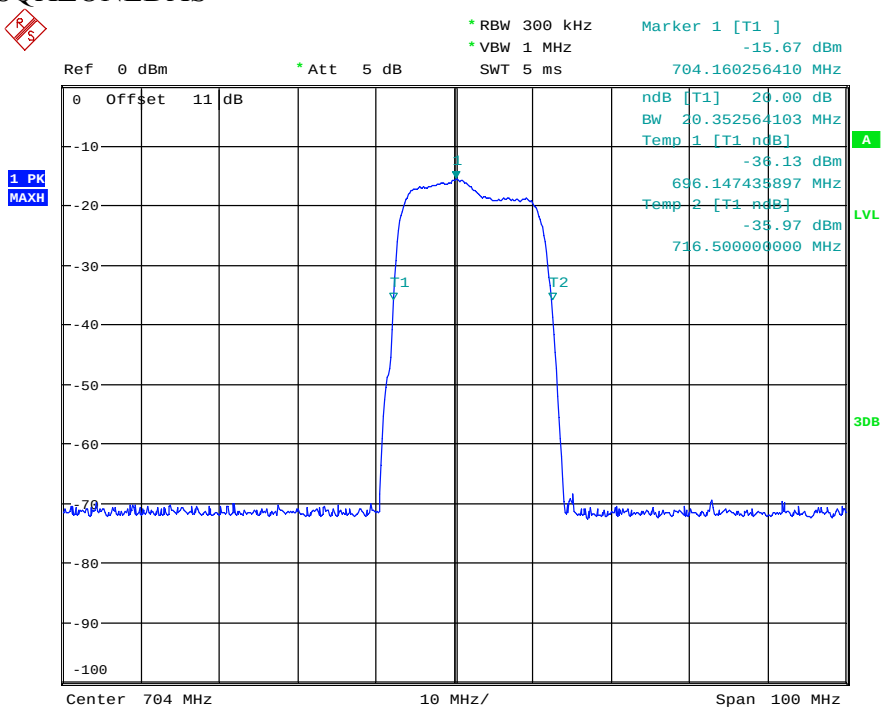

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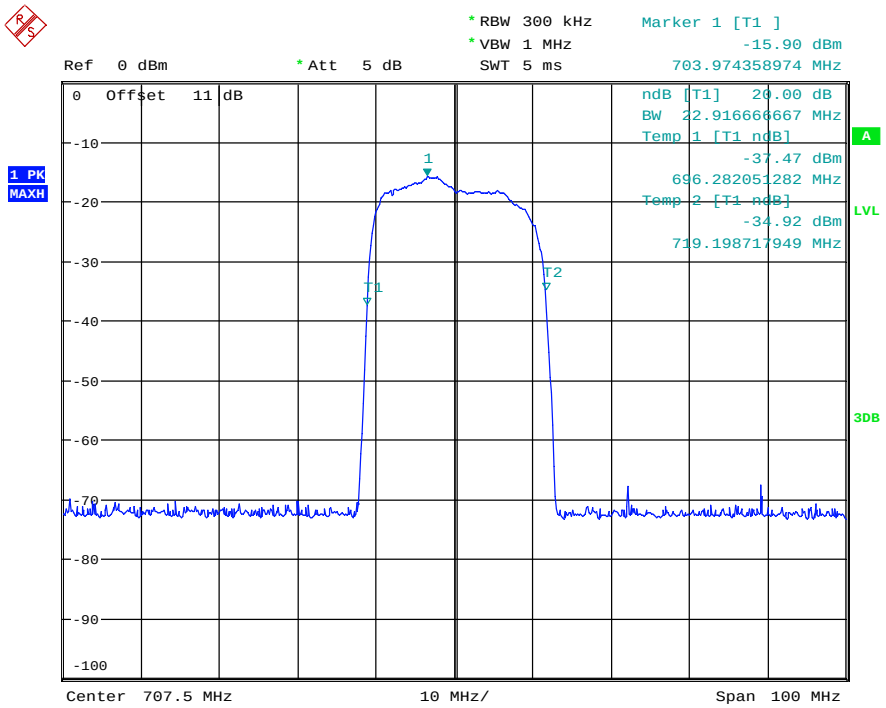
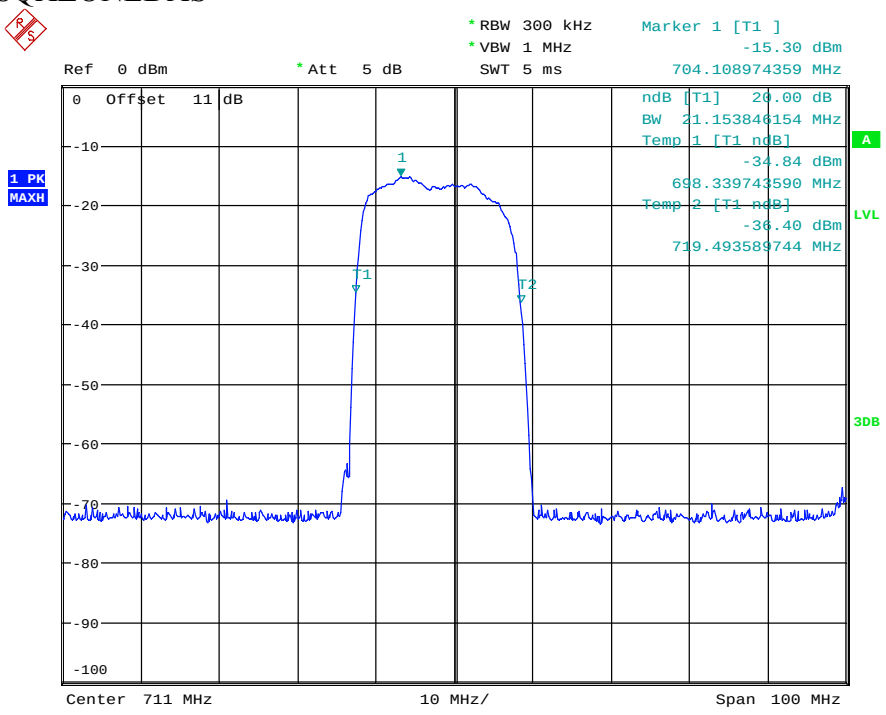
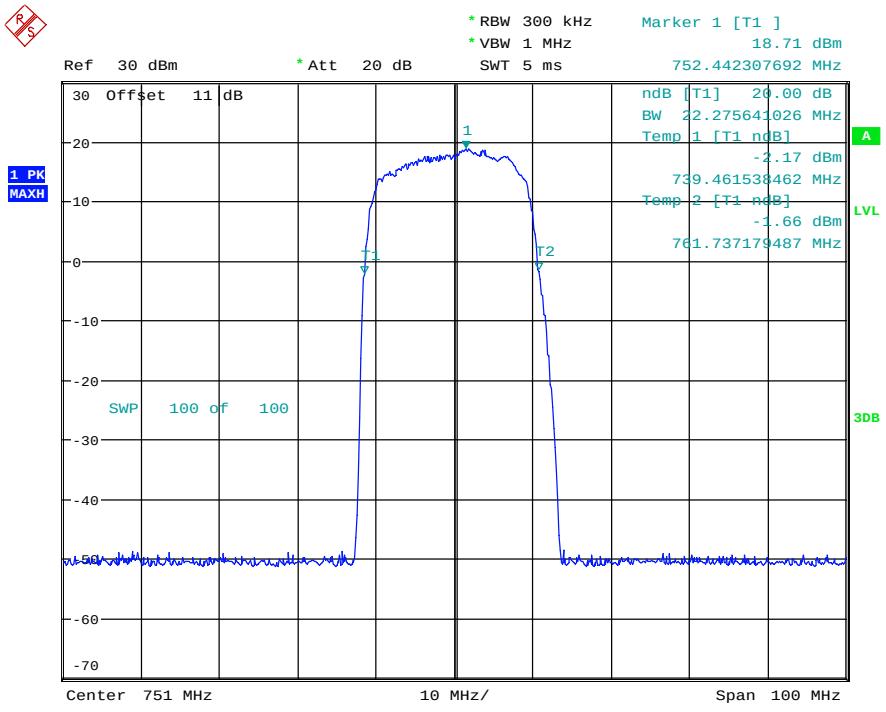


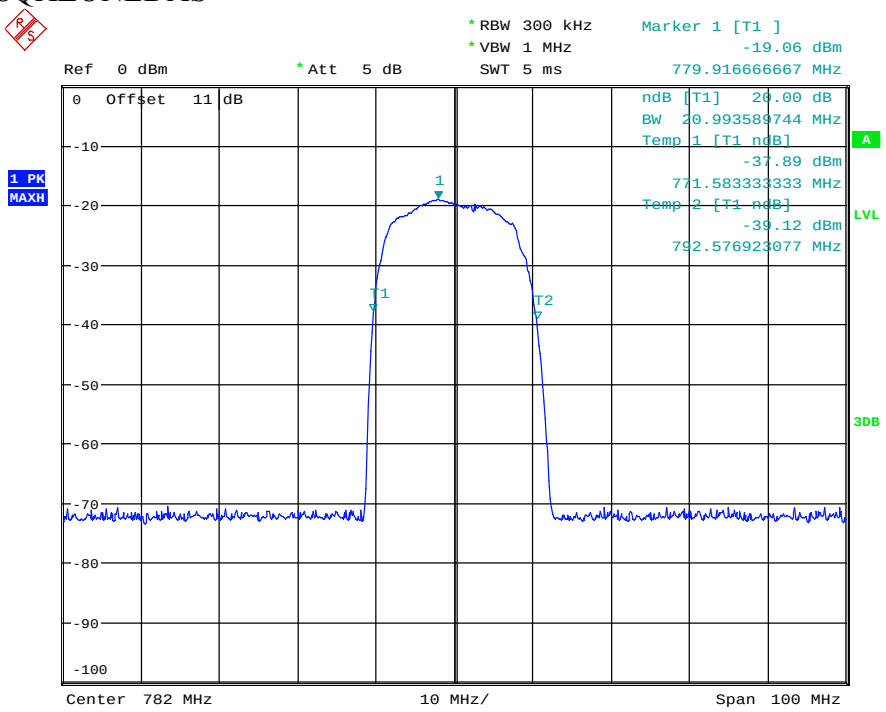
Date: 15.JAN.2019 19:15:51

Report Number: W6M21812-18679-P-20
FCC ID: 2ASQXZONEDAS



Band XIII





Test equipment: ETSTW-RE 050, ETSTW-RE 055, ETSTW-RE 134

5. Input-versus-output signal comparison

5.1 Test procedure

a) Connect a signal generator to the input of the EUT.
b) Configure the signal generator to transmit the AWGN signal.
c) Configure the signal amplitude to be just below the AGC threshold level (see 3.2), but not more than 0.5 dB below.
d) Connect a spectrum analyzer to the output of the EUT using appropriate attenuation.
e) Set the spectrum analyzer center frequency to the center frequency of the operational band under test. The span range of the spectrum analyzer shall be between 2 times to 5 times the emission bandwidth (EBW) or alternatively, the OBW.
f) The nominal RBW shall be in the range of 1 % to 5 % of the anticipated OBW, and the VBW shall be ≥ 3 × RBW.
g) Set the reference level of the instrument as required to preclude the signal from exceeding the maximum spectrum analyzer input mixer level for linear operation. In general, the peak of the spectral envelope must be more than [10 log (OBW / RBW)] below the reference level.
Steps f) and g) may require iteration to enable adjustments within the specified tolerances.
h) The noise floor of the spectrum analyzer at the selected RBW shall be at least 36 dB below the reference level.
i) Set spectrum analyzer detection function to positive peak.
j) Set the trace mode to max hold.
k) Determine the reference value: Allow the trace to stabilize. Set the spectrum analyzer marker to the highest amplitude level of the displayed trace (this is the reference value) and record the associated frequency as f0.
l) Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display, such that each marker is at or slightly below the −26 dB down amplitude. The 26 dB EBW (alternatively OBW) is the positive frequency difference between the two markers. If the spectral envelope crosses the −26 dB down amplitude at multiple points, the lowest or highest frequency shall be selected as the frequencies that are the furthest removed from the center frequency at which the spectral envelope crosses the −26 dB down amplitude point.
m) Repeat steps e) to l) with the input signal connected directly to the spectrum analyzer (i.e., input signal measurement).
n) Compare the spectral plot of the input signal (determined from step m) to the output signal (determined from step l) to affirm that they are similar (in passband and rolloff characteristic features and relative spectral locations), and include plot(s) and descriptions in test report.
o) Repeat the procedure [steps e) to n)] with the input signal amplitude set to 3 dB above the AGC threshold.
p) Repeat steps e) to o) with the signal generator set to the narrowband signal.
q) Repeat steps e) to p) for all frequency bands authorized for use by the EUT.

Report Number: W6M21812-18679-P-20
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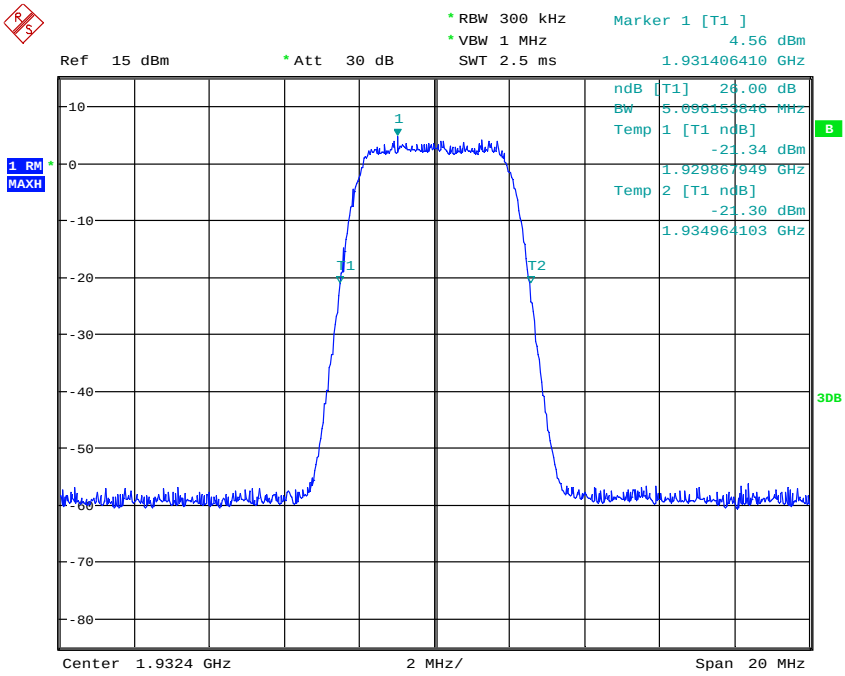
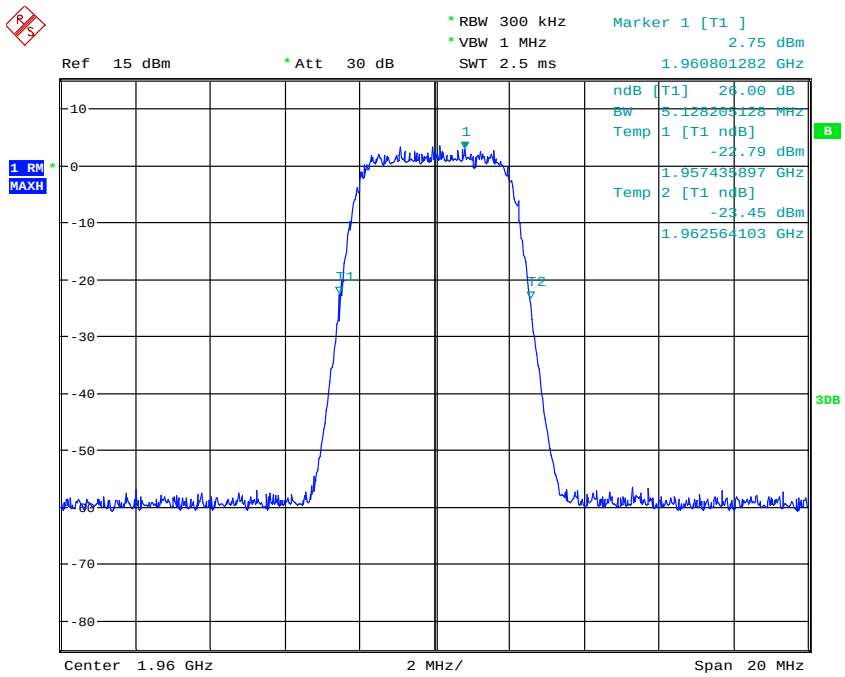
5.2 Test Results

WCDMA
Band II
Downlink
Input



Date: 16.JAN.2019 15:04:06



Date: 16.JAN.2019 15:11:43

Report Number: W6M21812-18679-P-20
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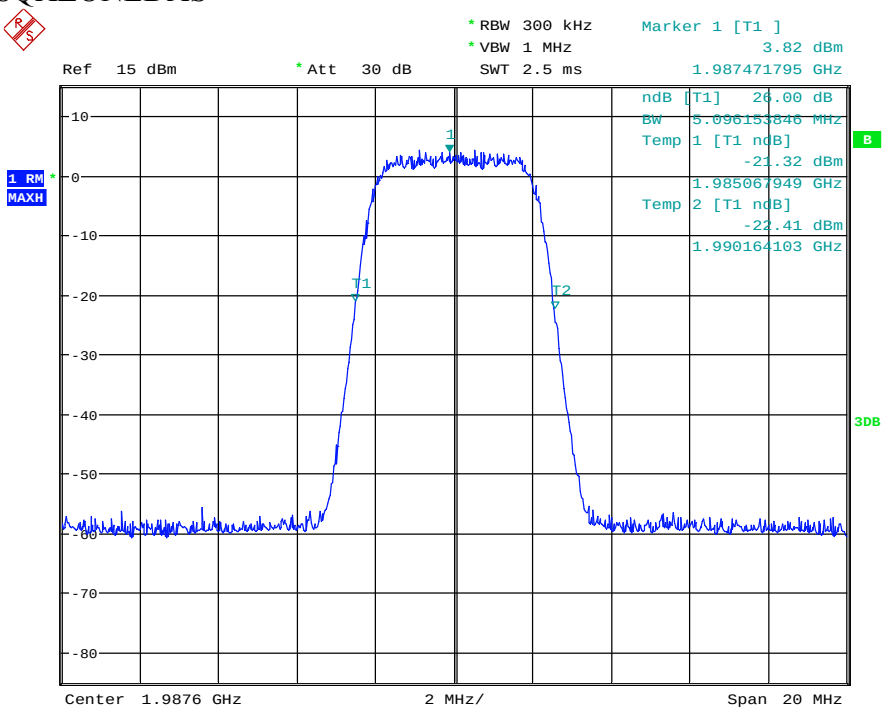

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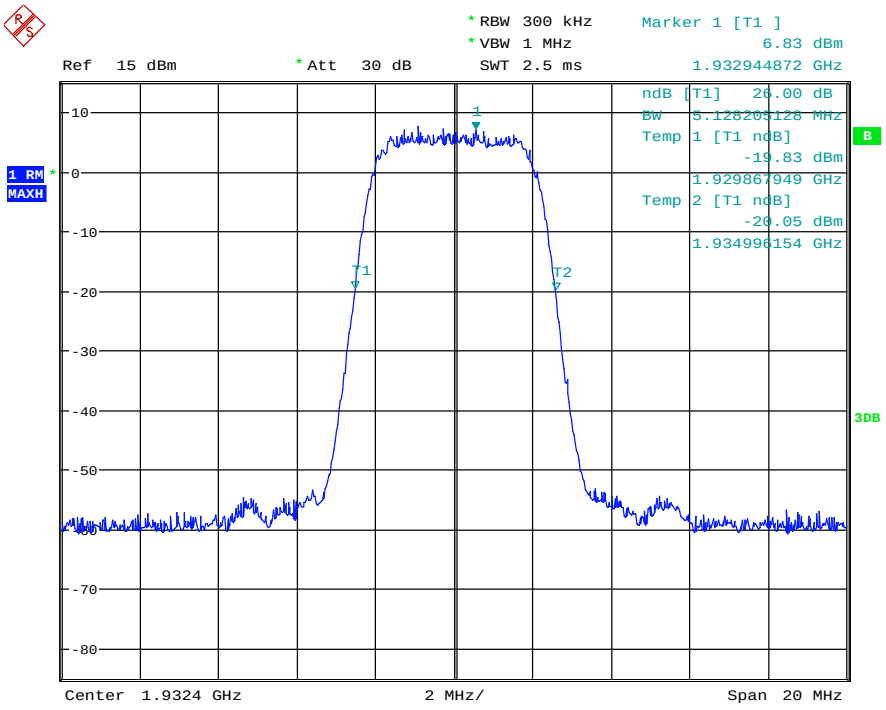
+3dB



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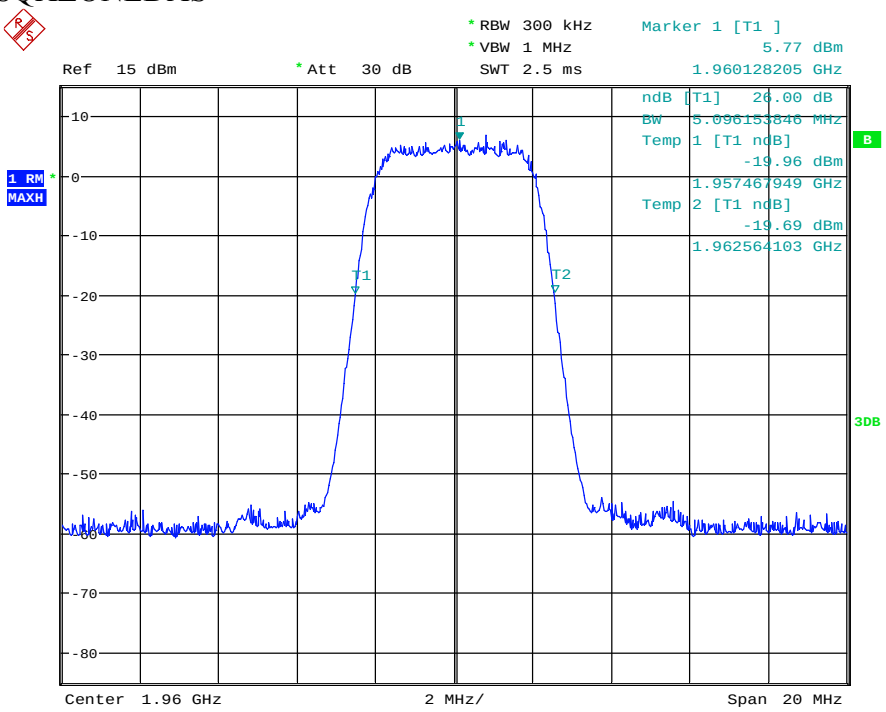

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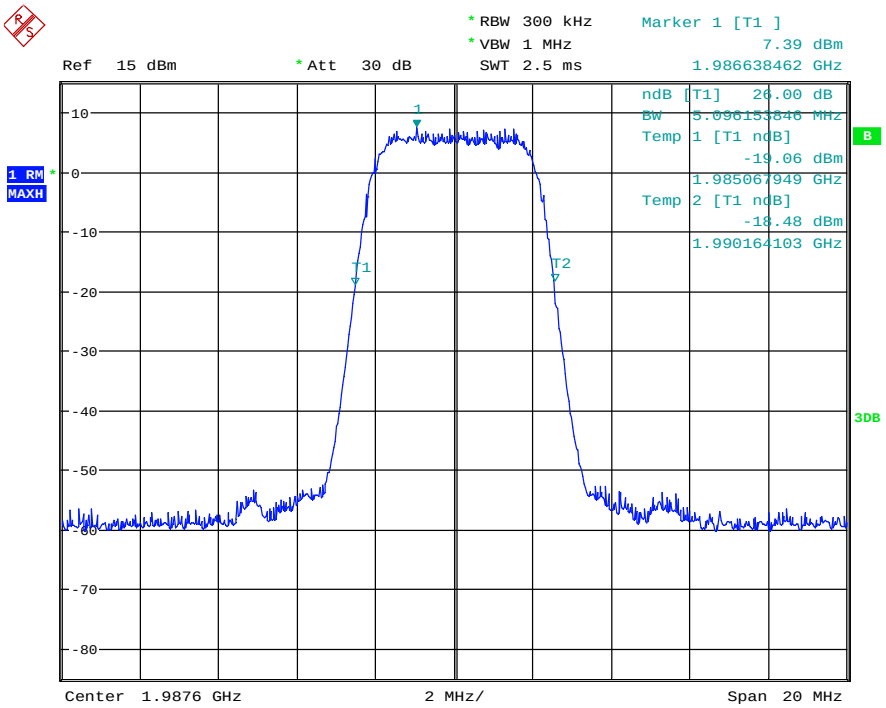

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Report Number: W6M21812-18679-P-20
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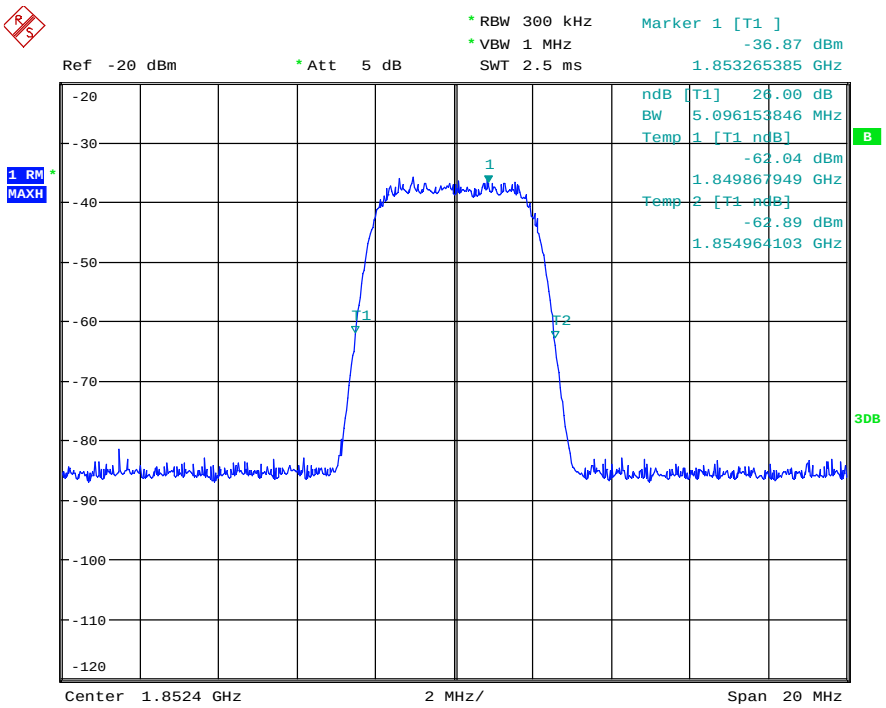
Uplink



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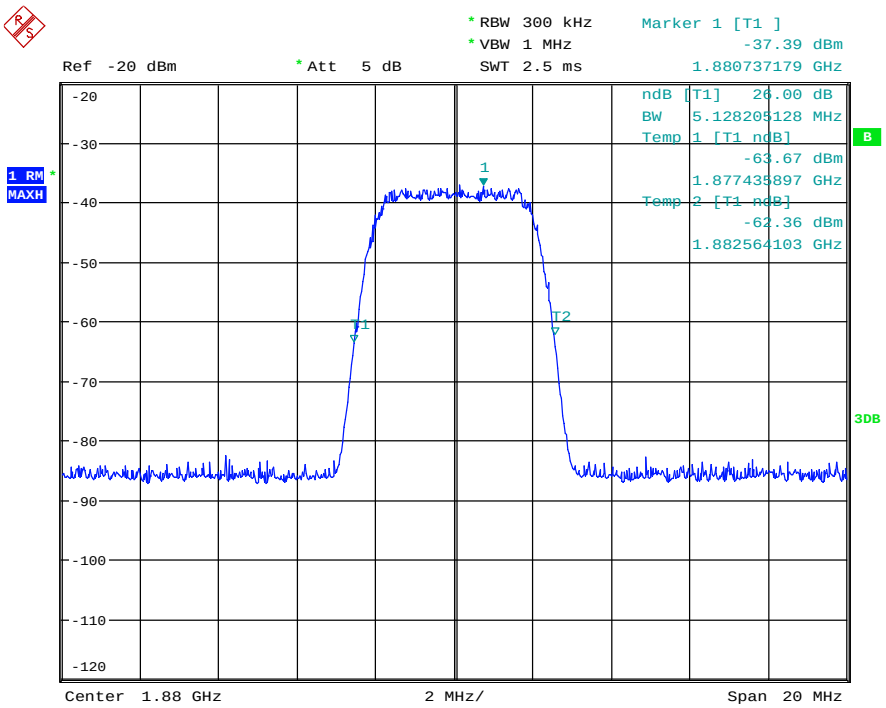

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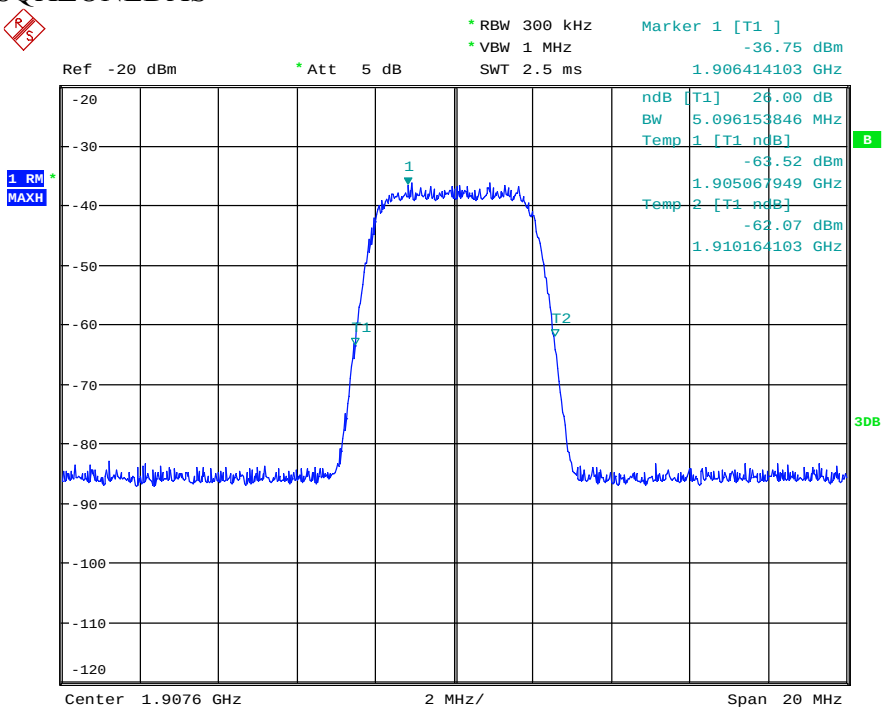

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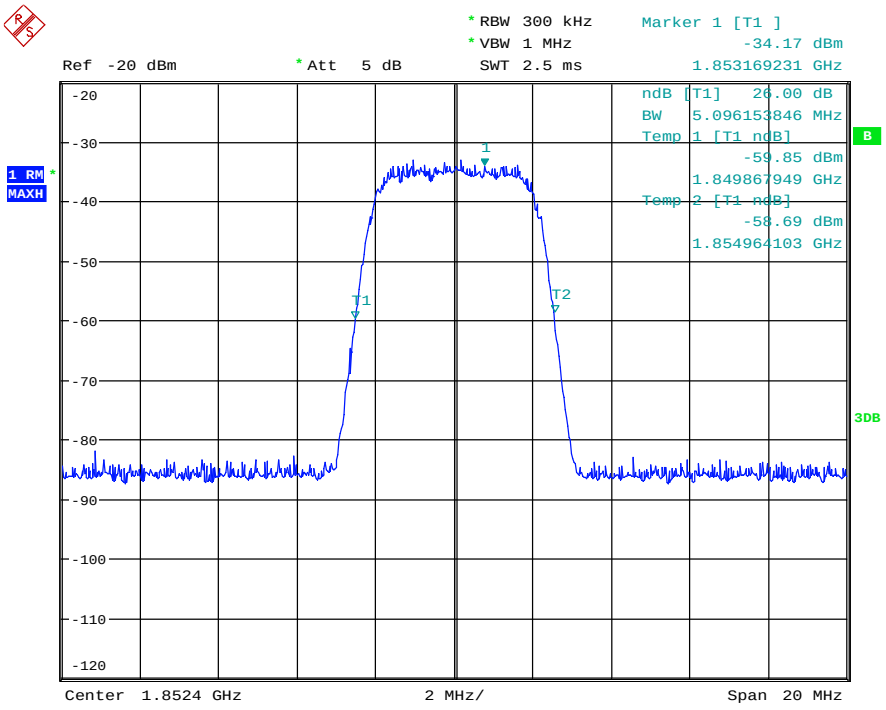
+3dB



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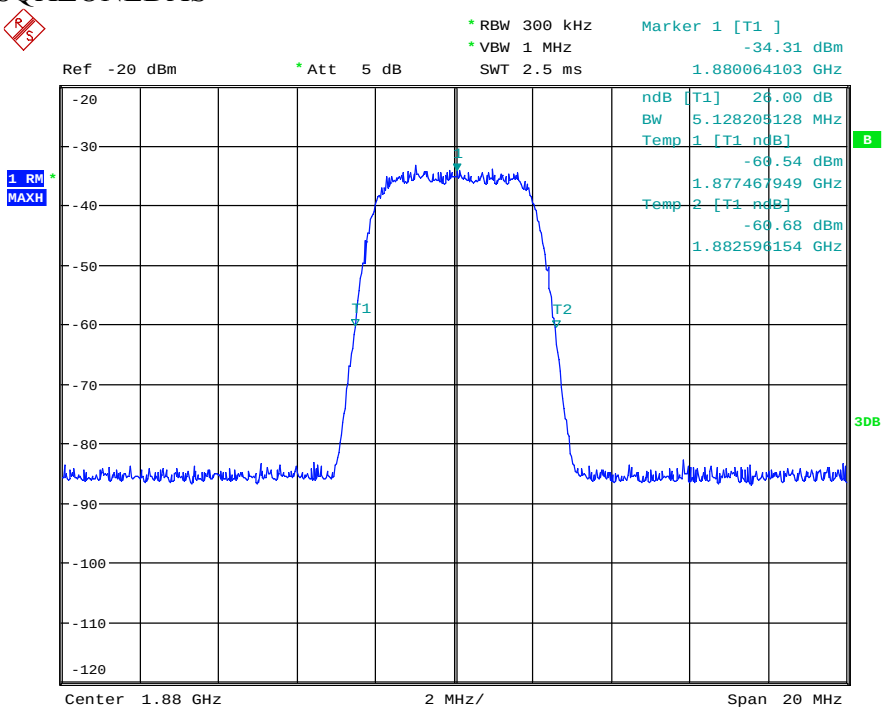

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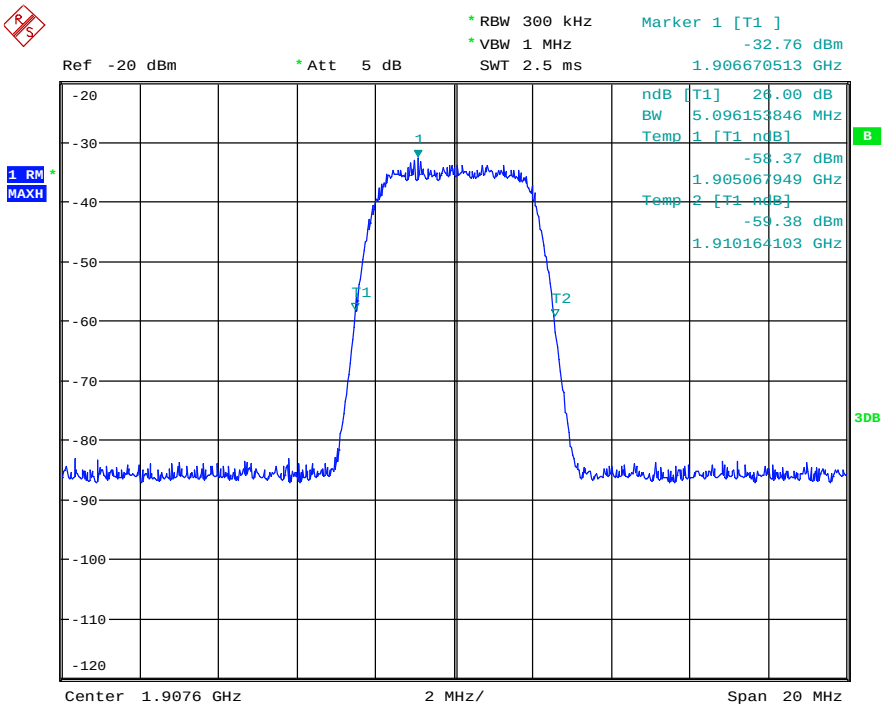

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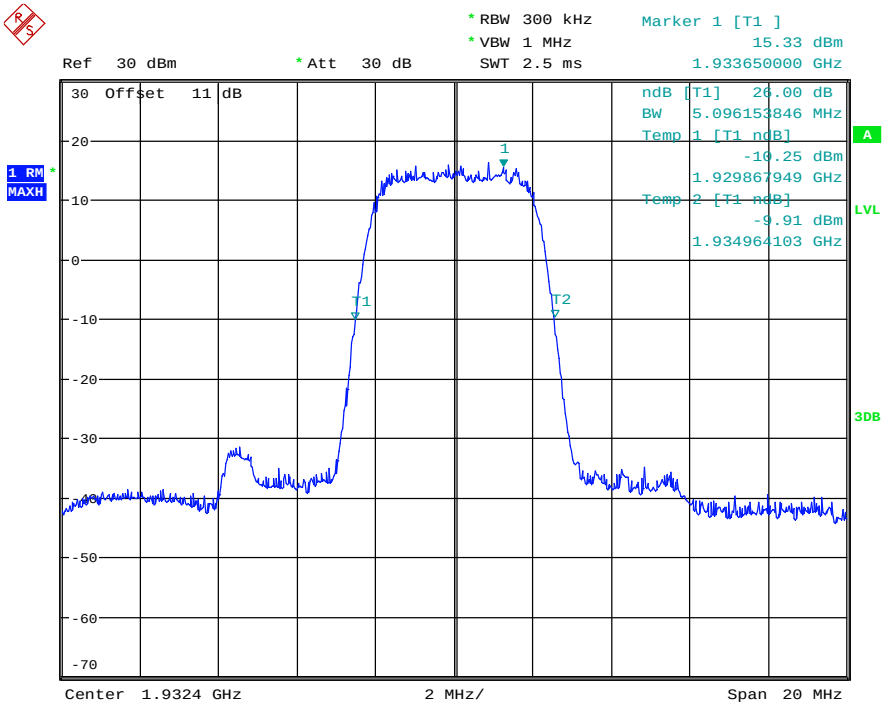
Output
Downlink



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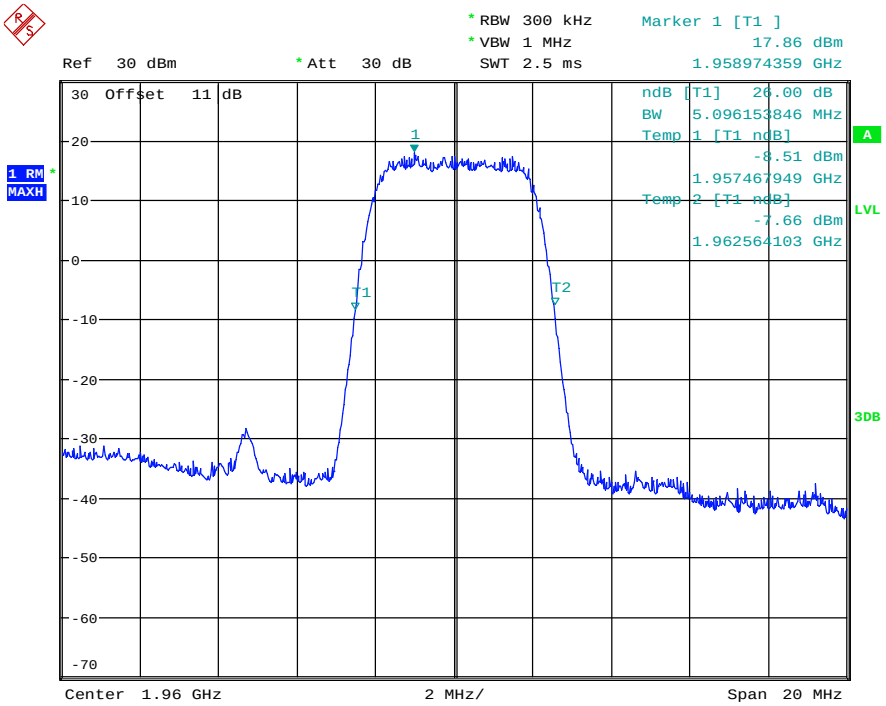

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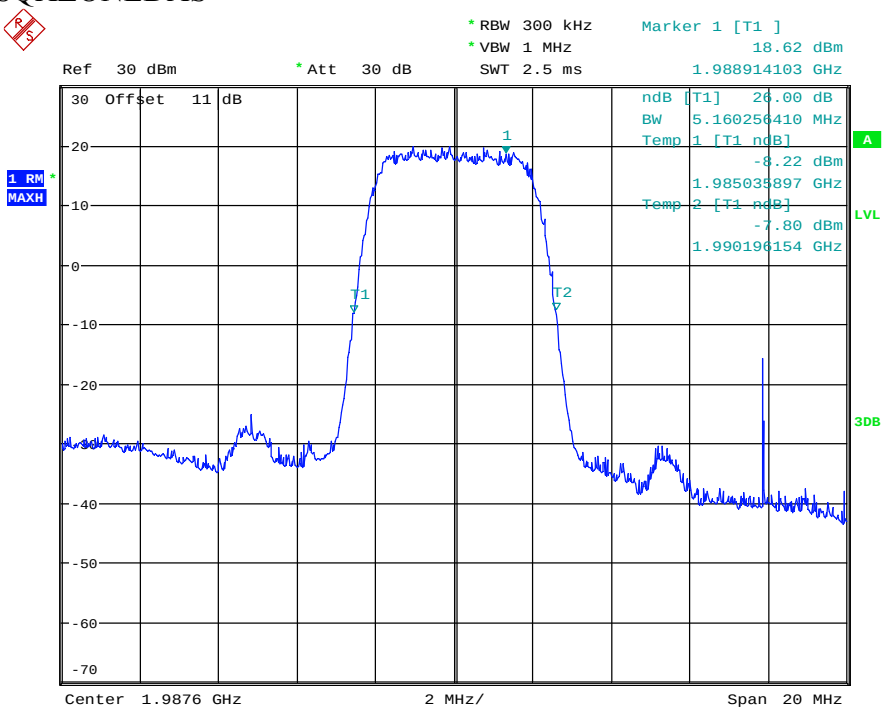

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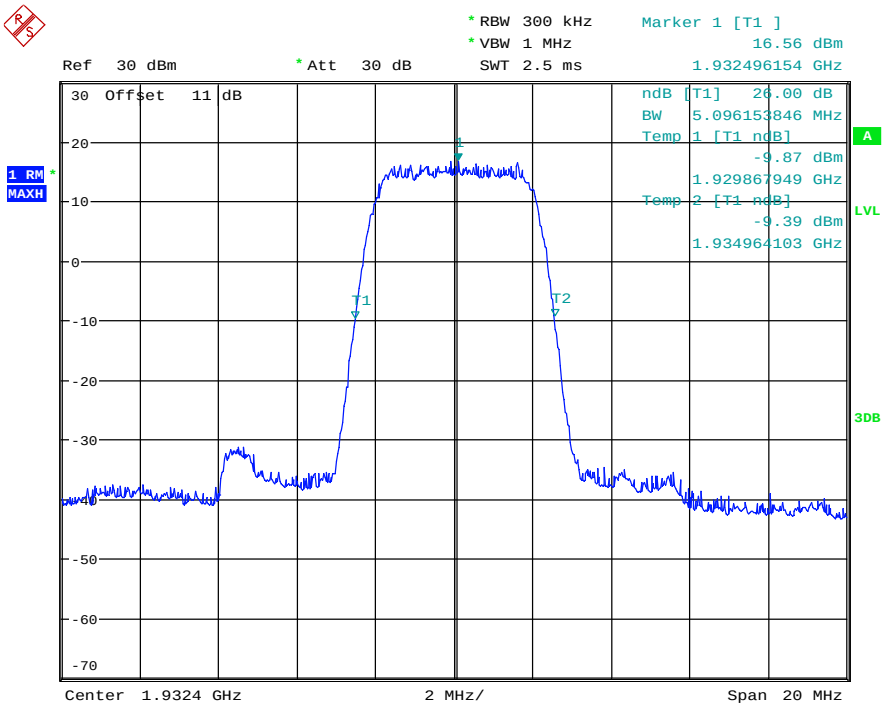

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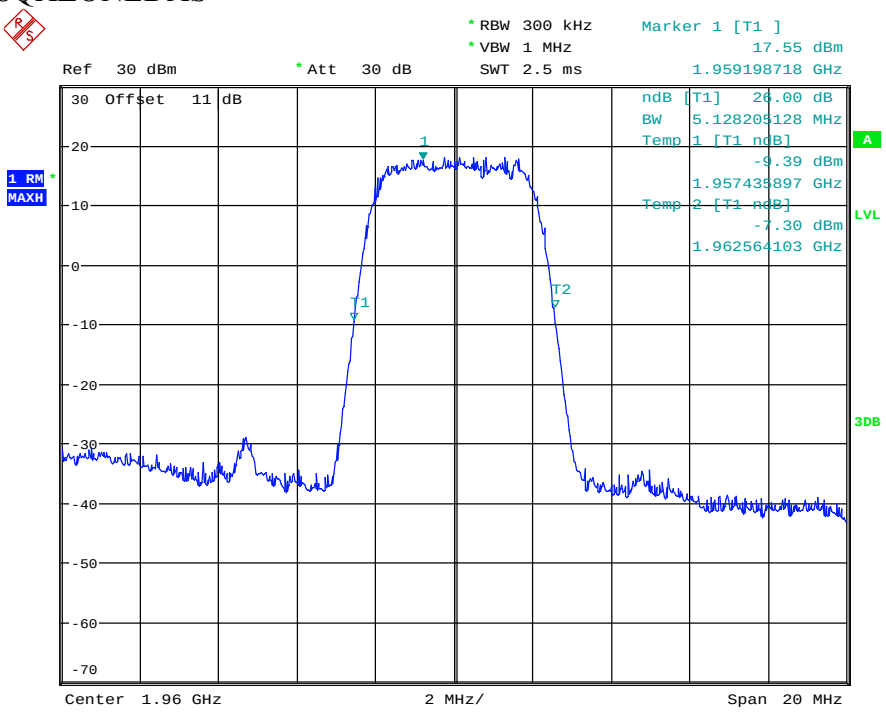

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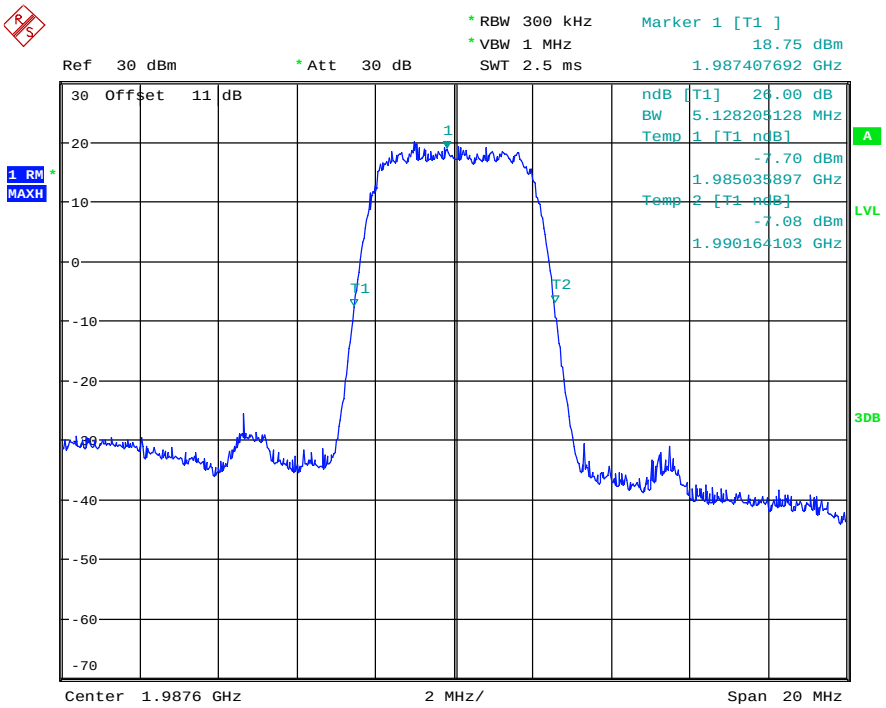

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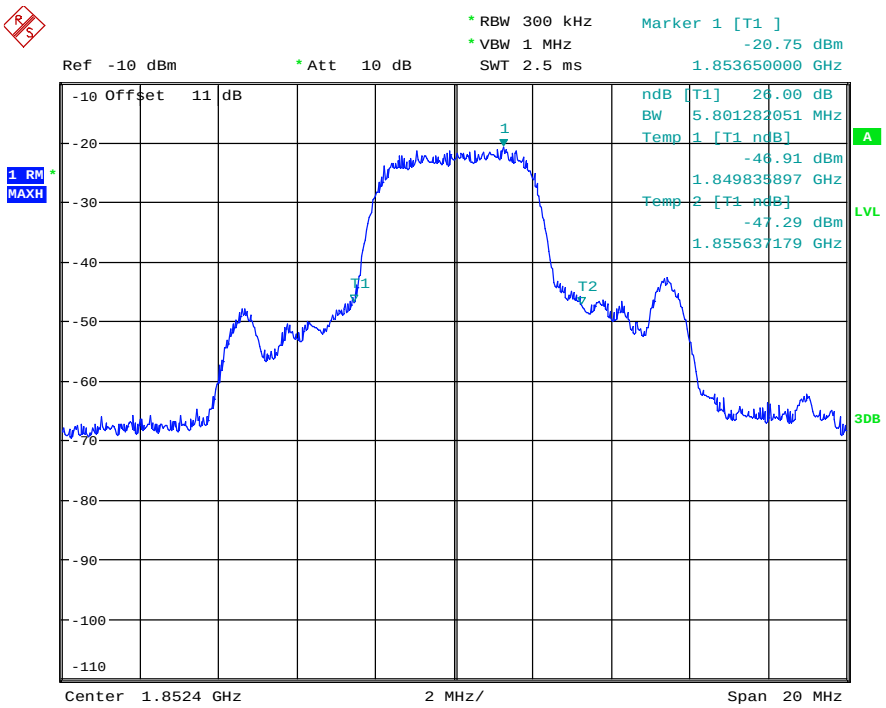
Uplink



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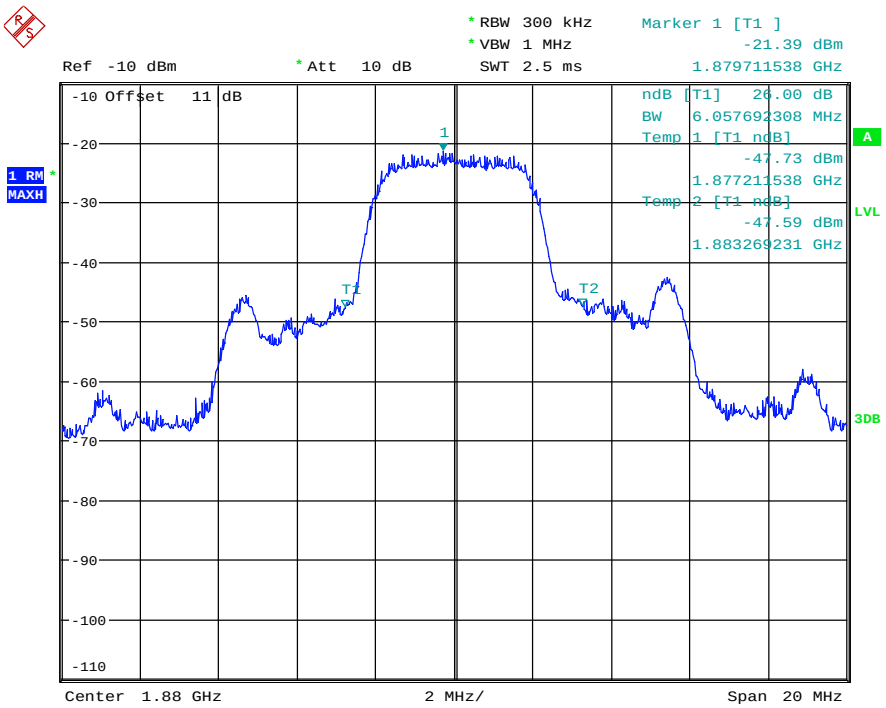

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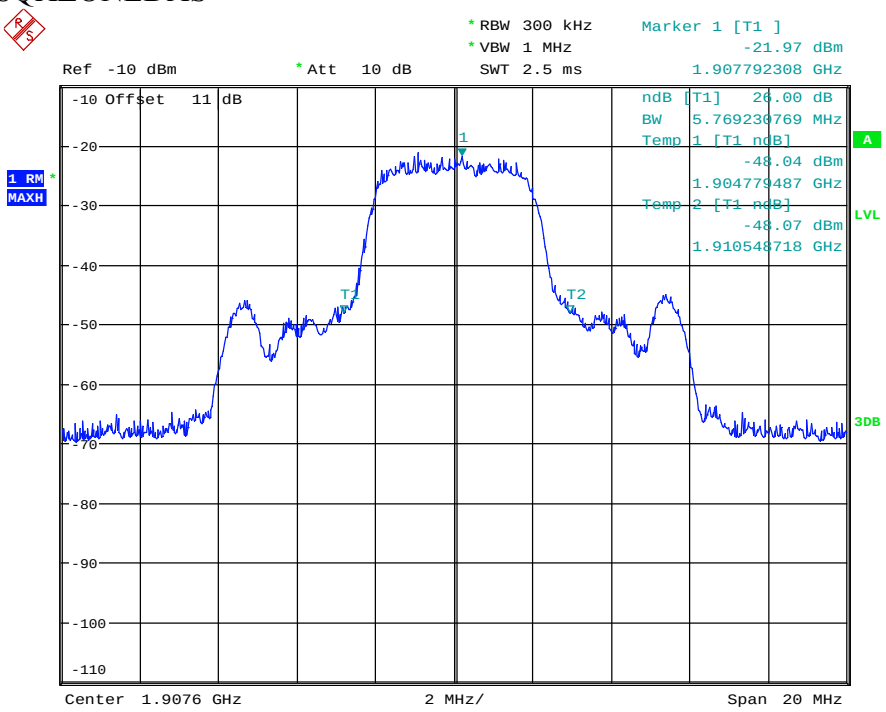

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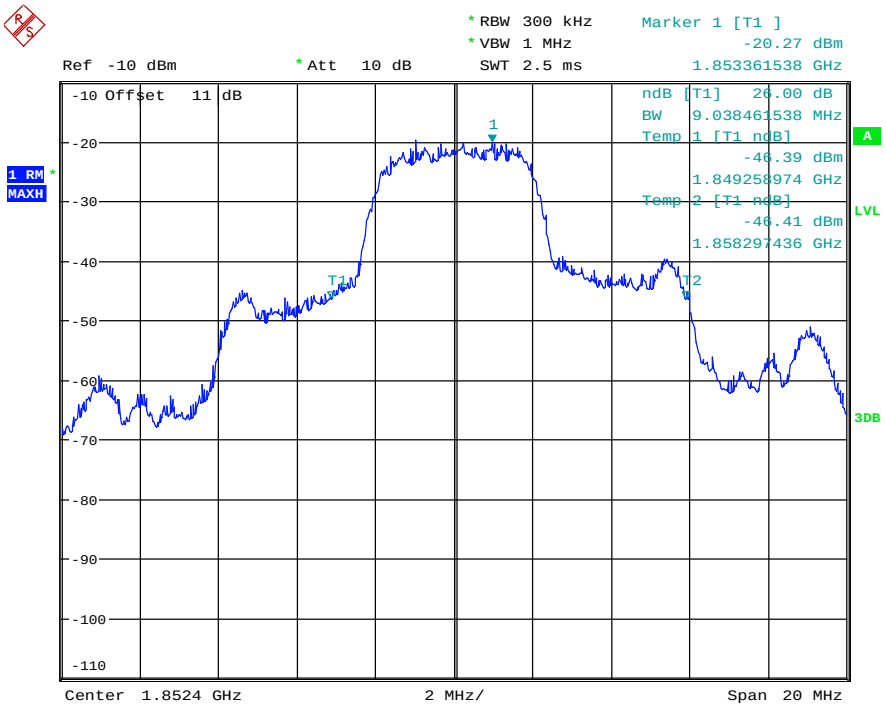
+3dB



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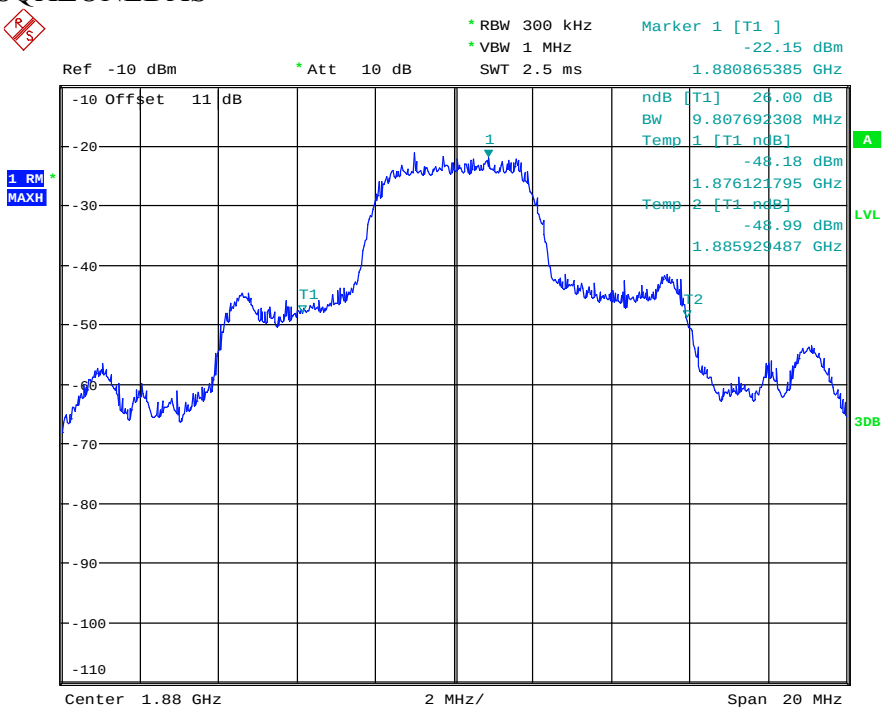

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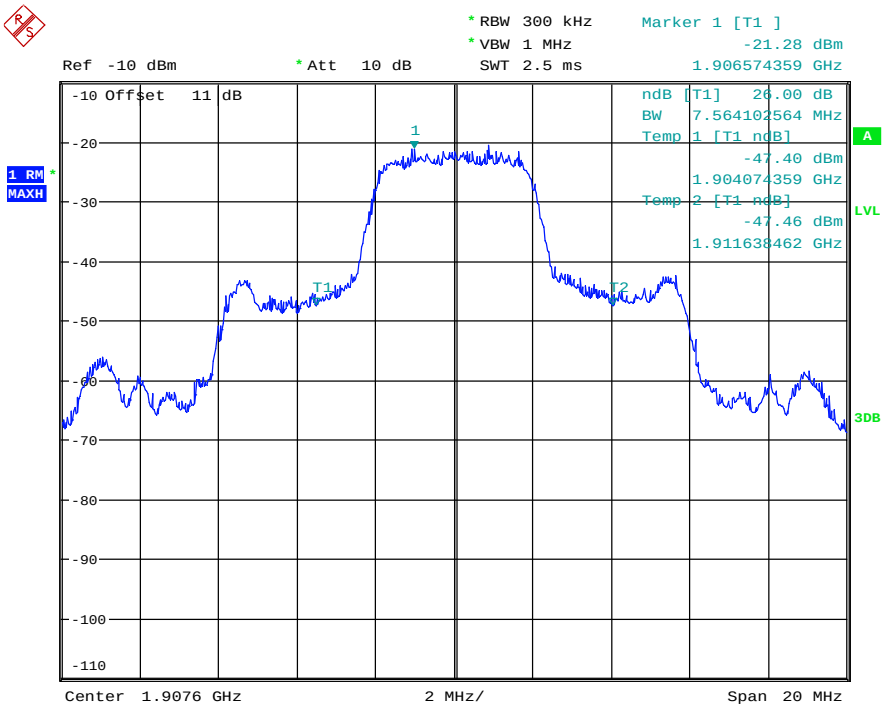

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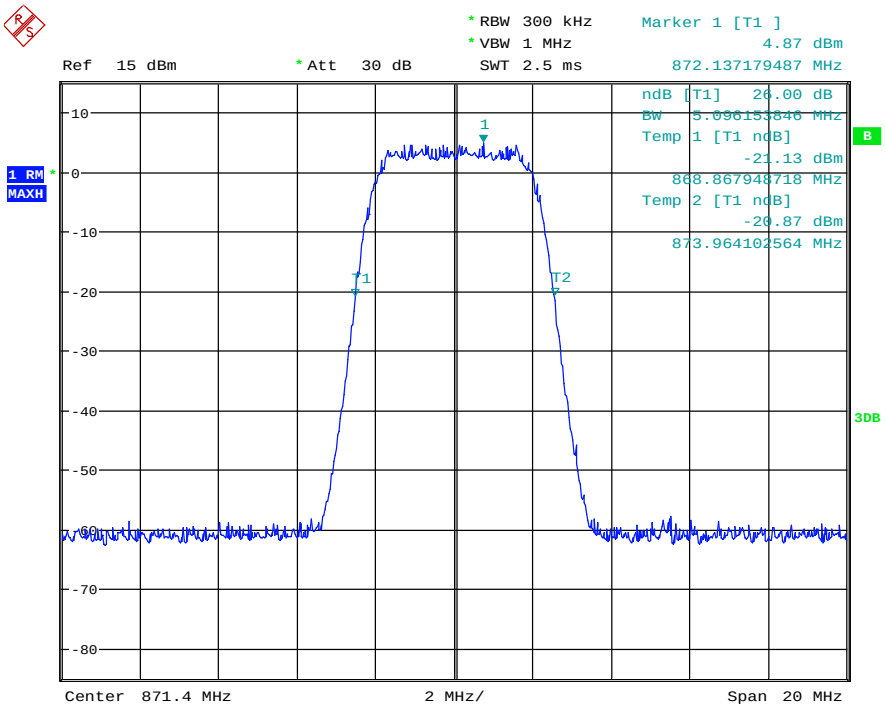
Band V
Input
Downlink



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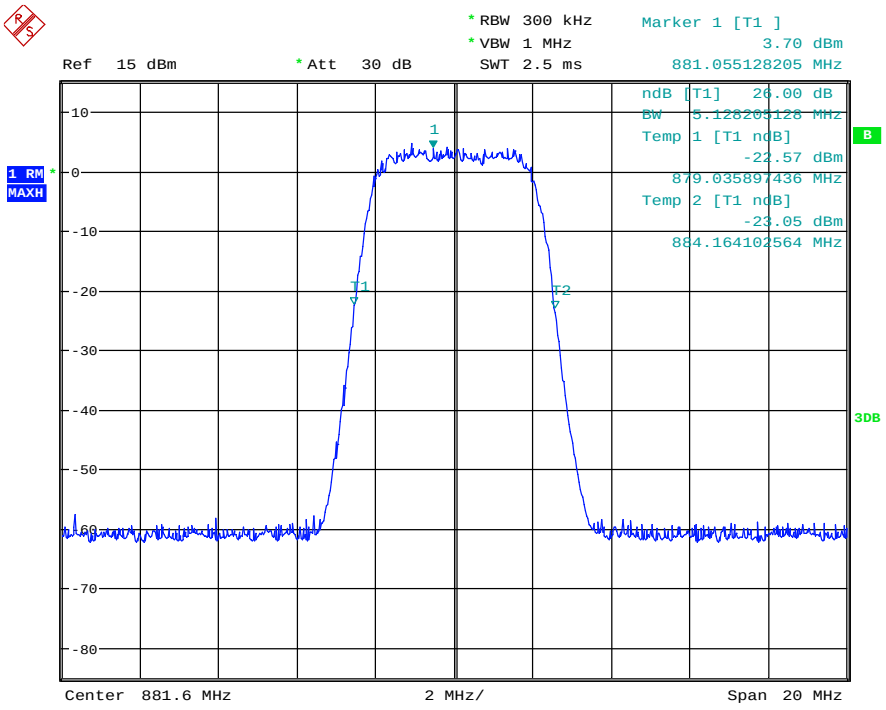

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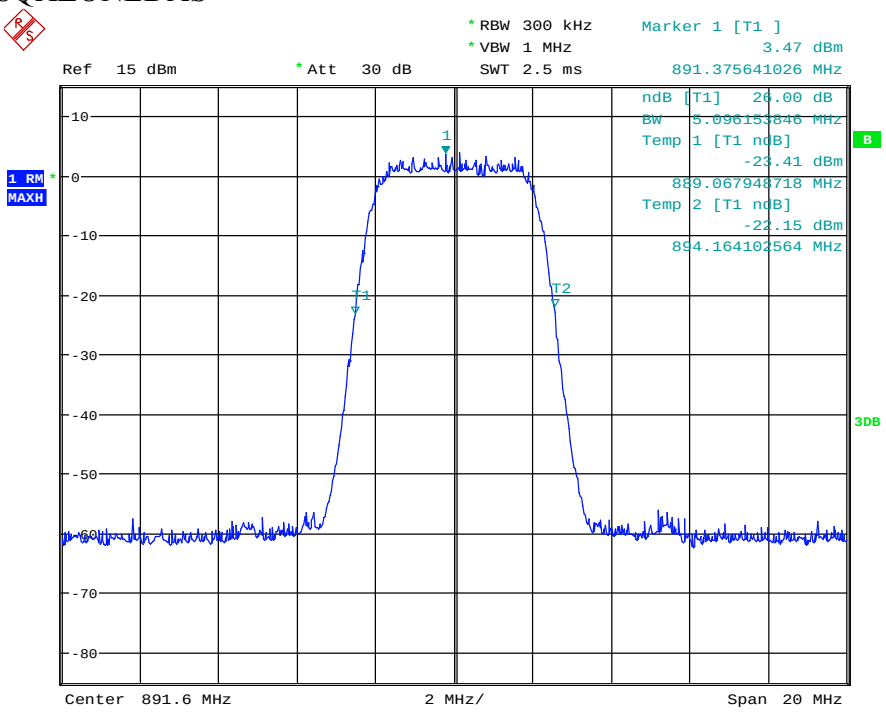

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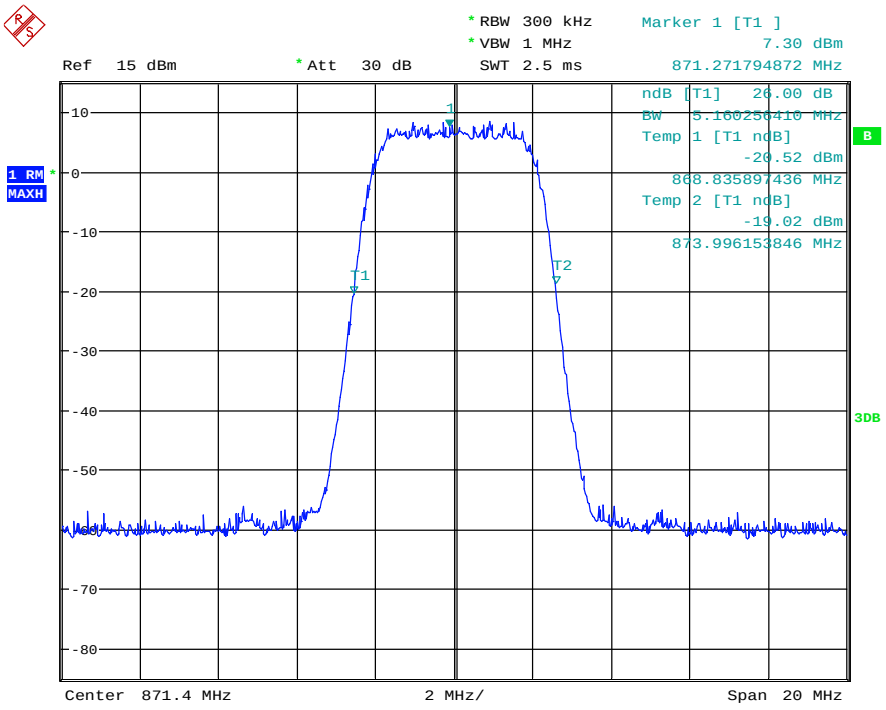
+3dB



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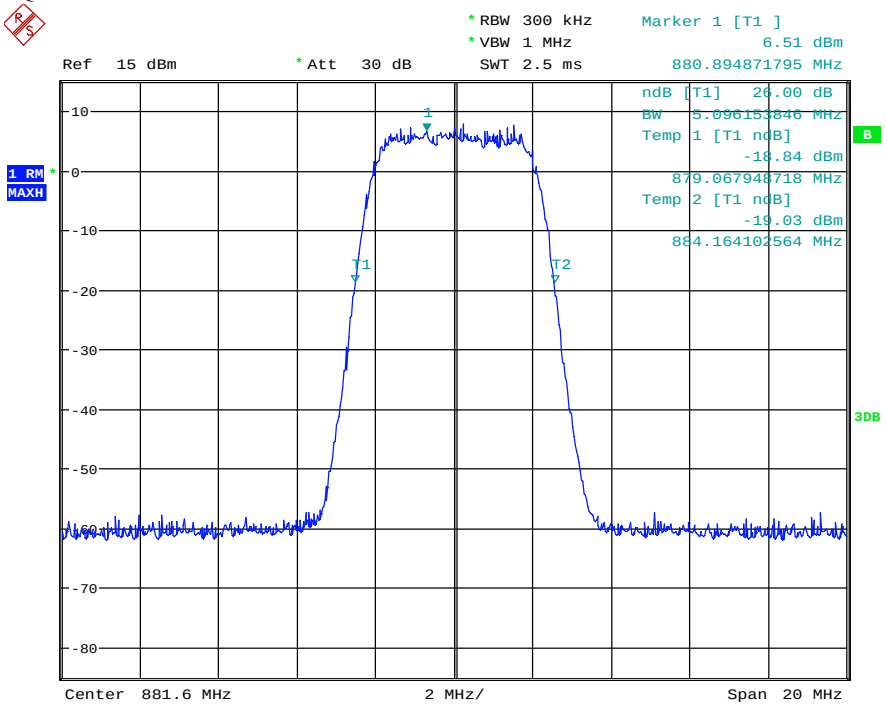

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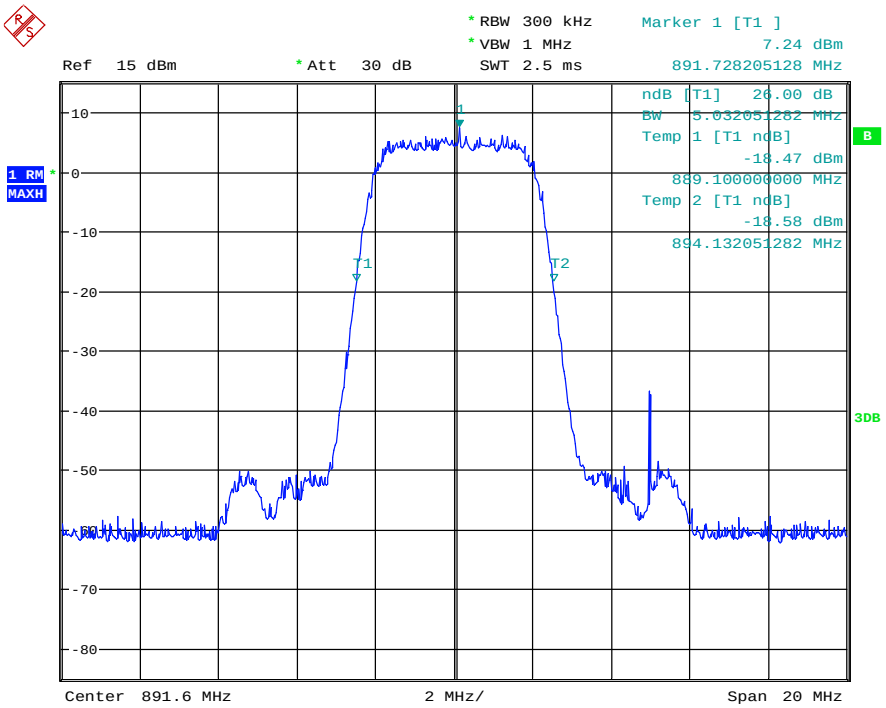

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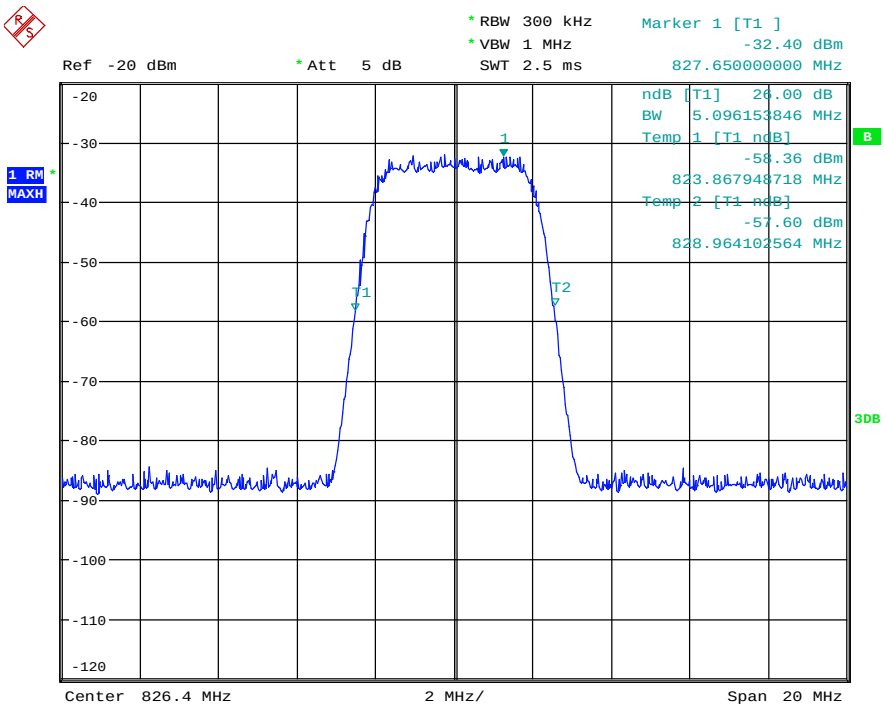

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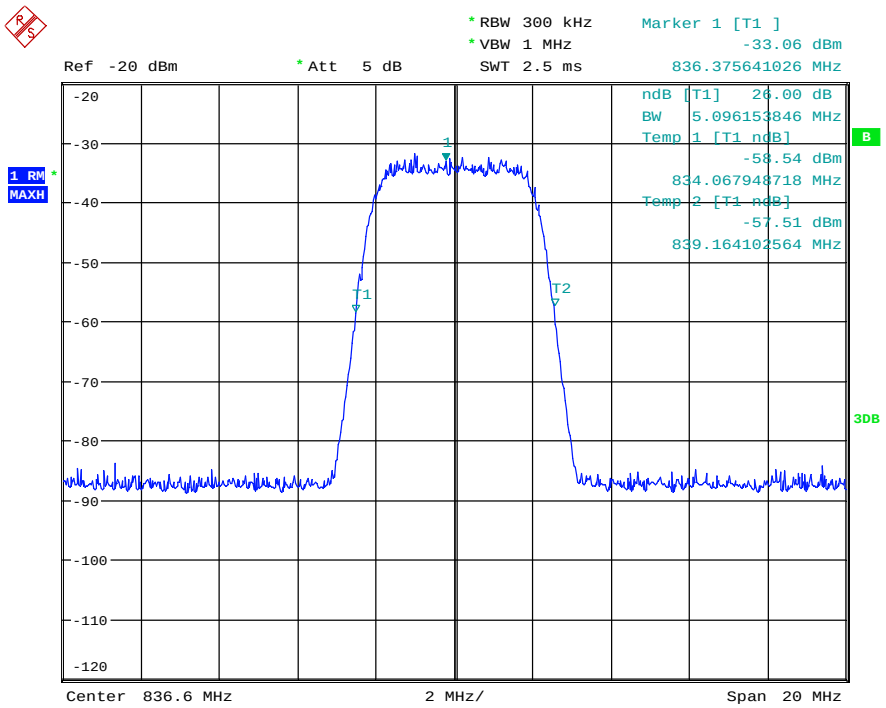

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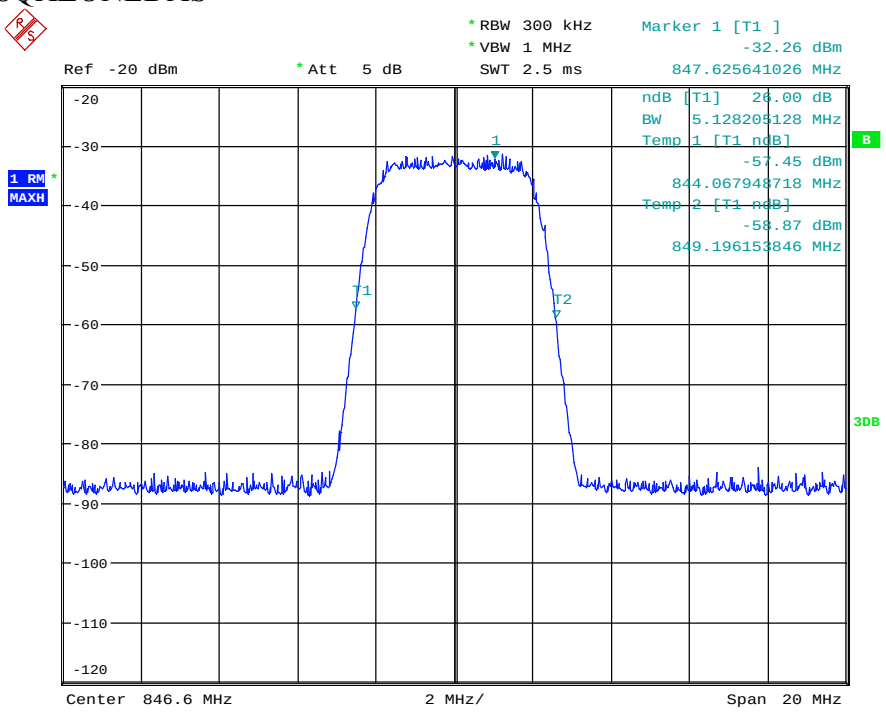

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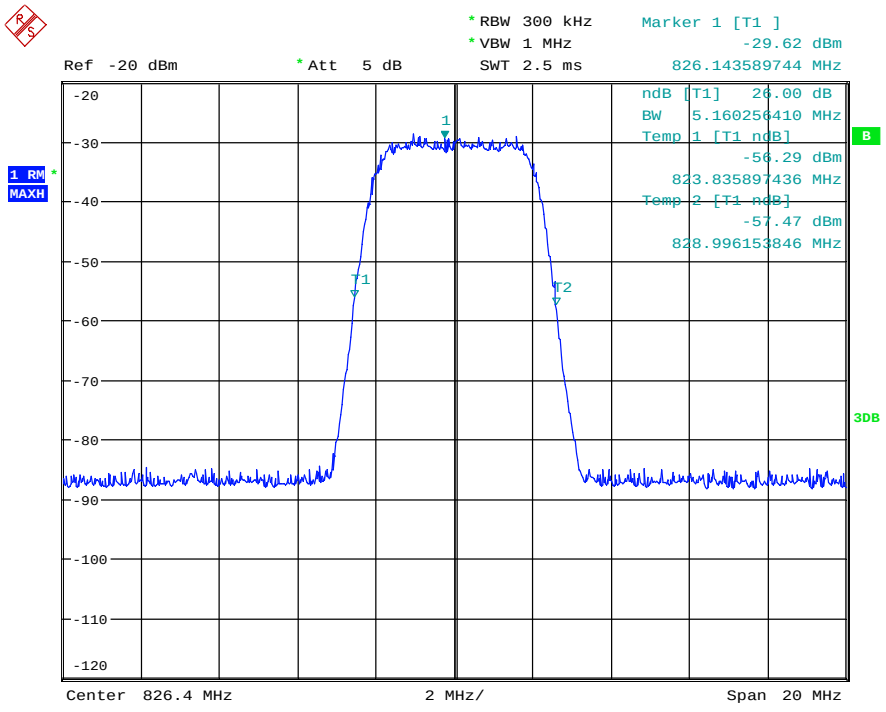

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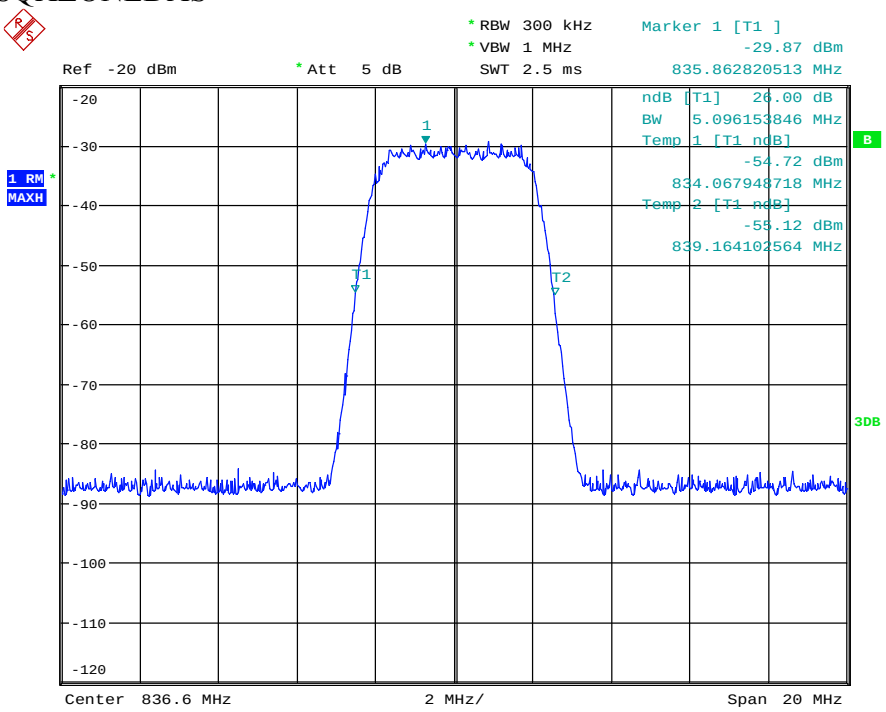

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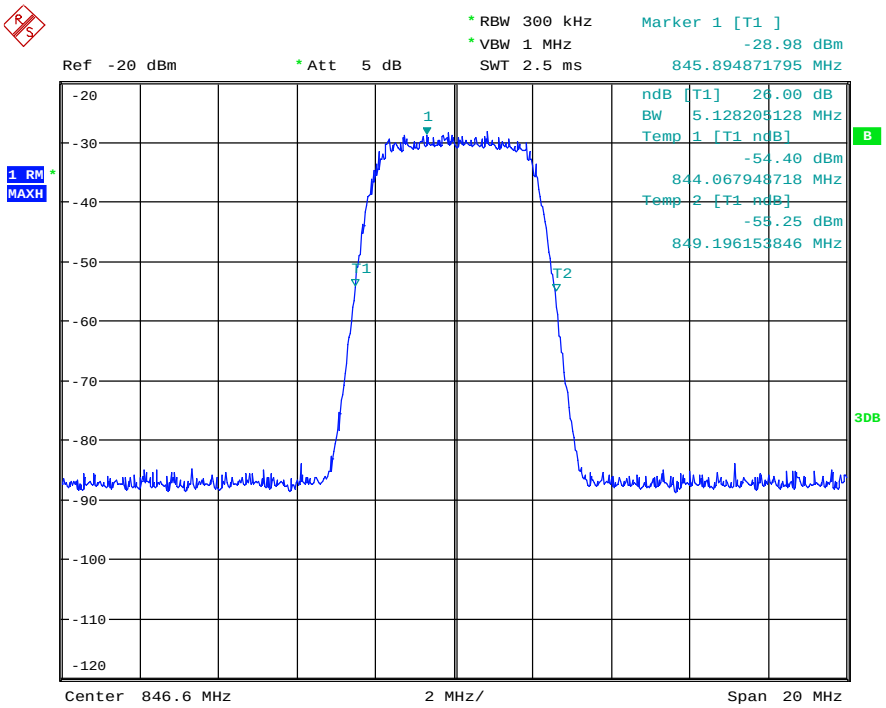

Date: 12.JAN.2019 15:12:51

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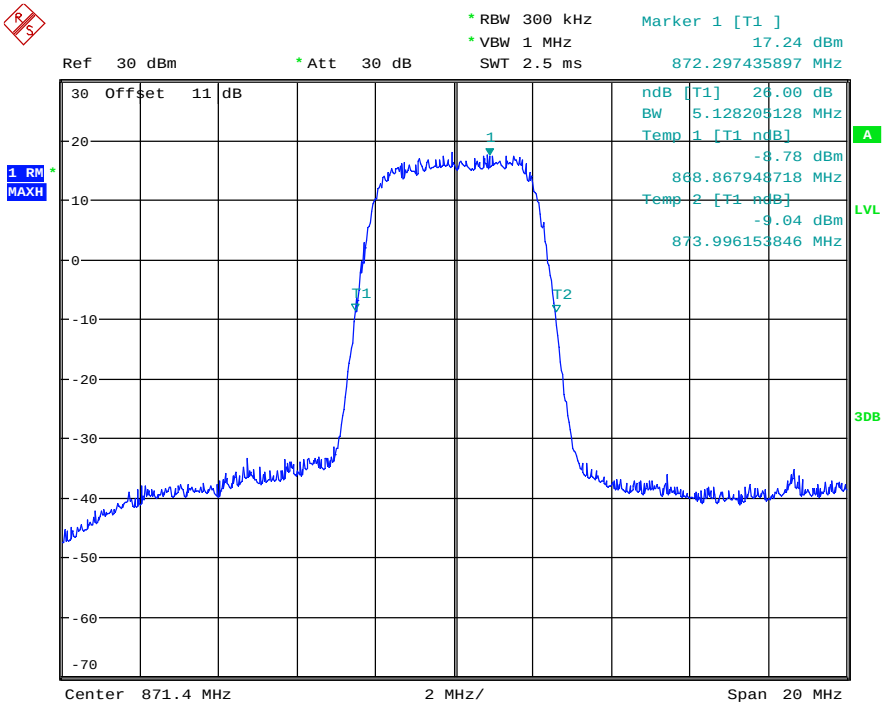
Output
Downlink



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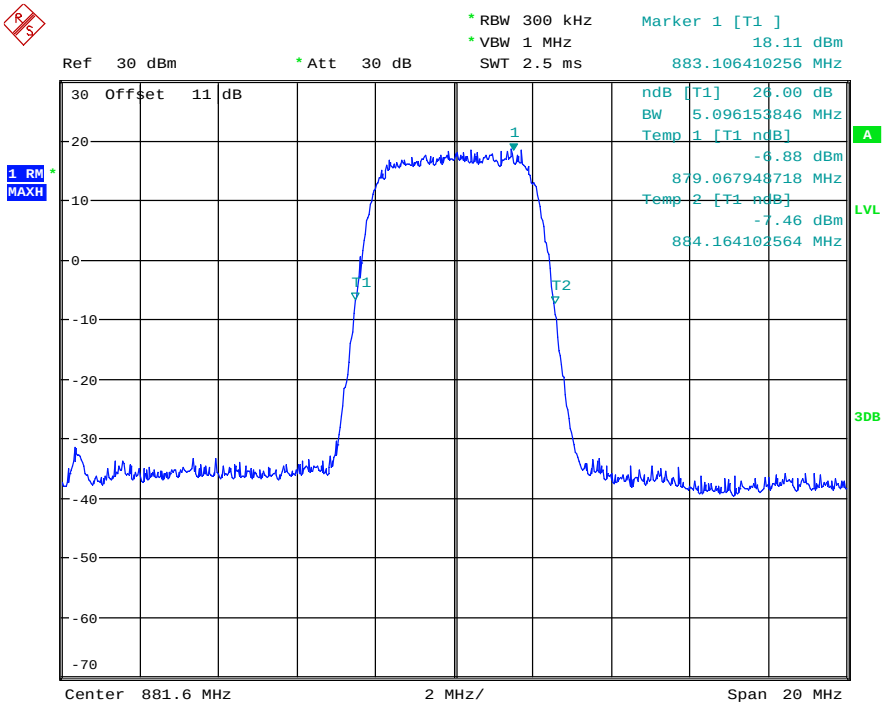

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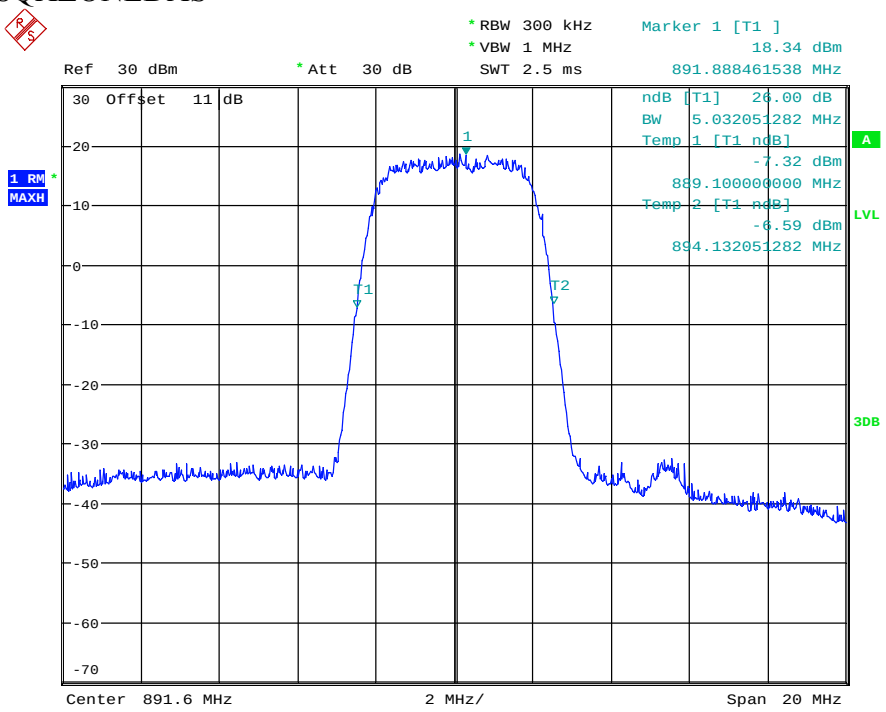

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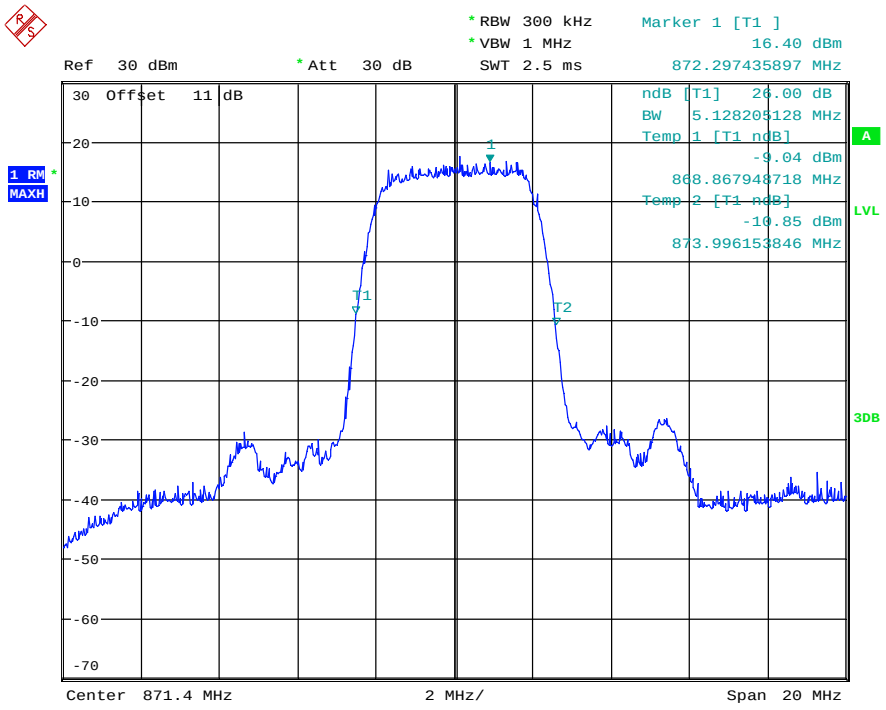
+3dB



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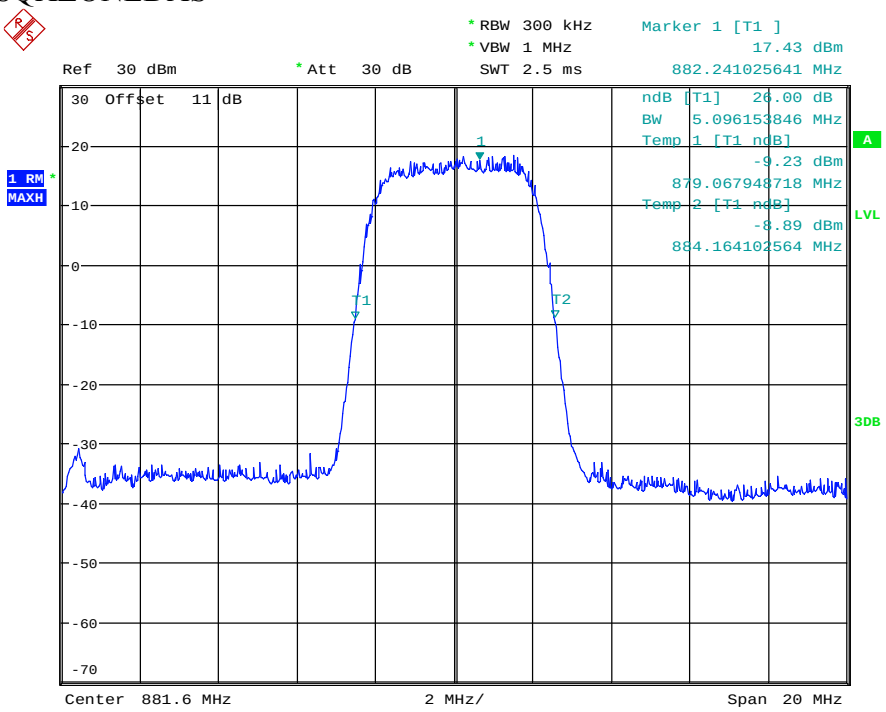

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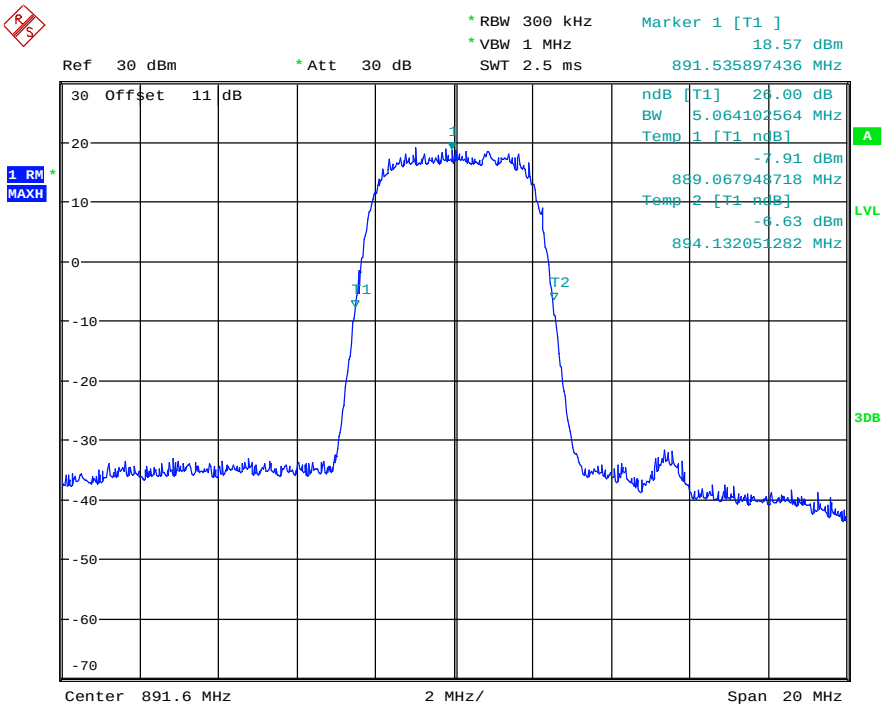

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Report Number: W6M21812-18679-P-20
FCC ID: 2ASQXZONEDAS
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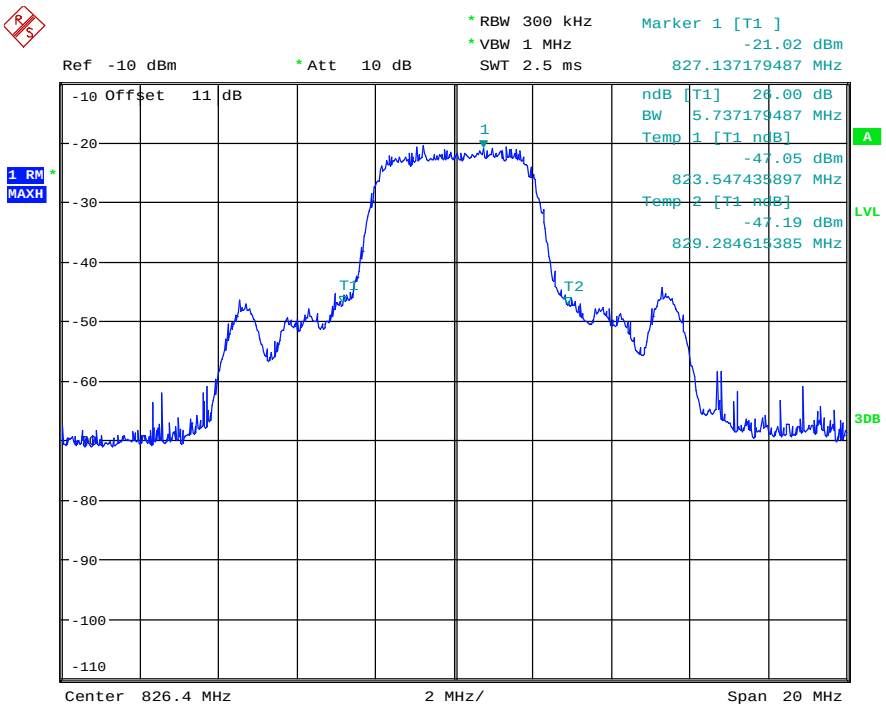

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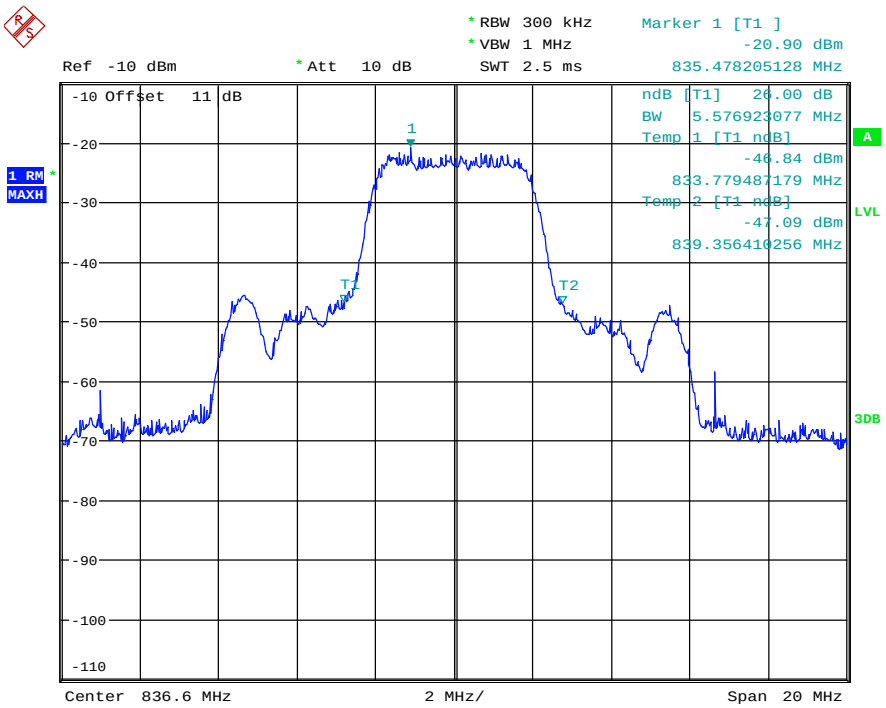

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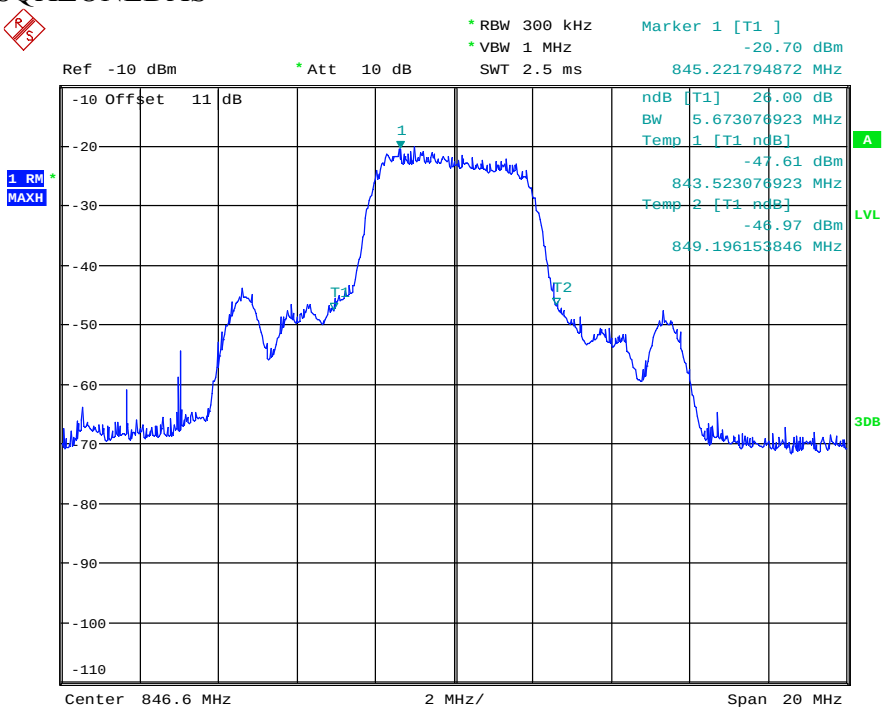

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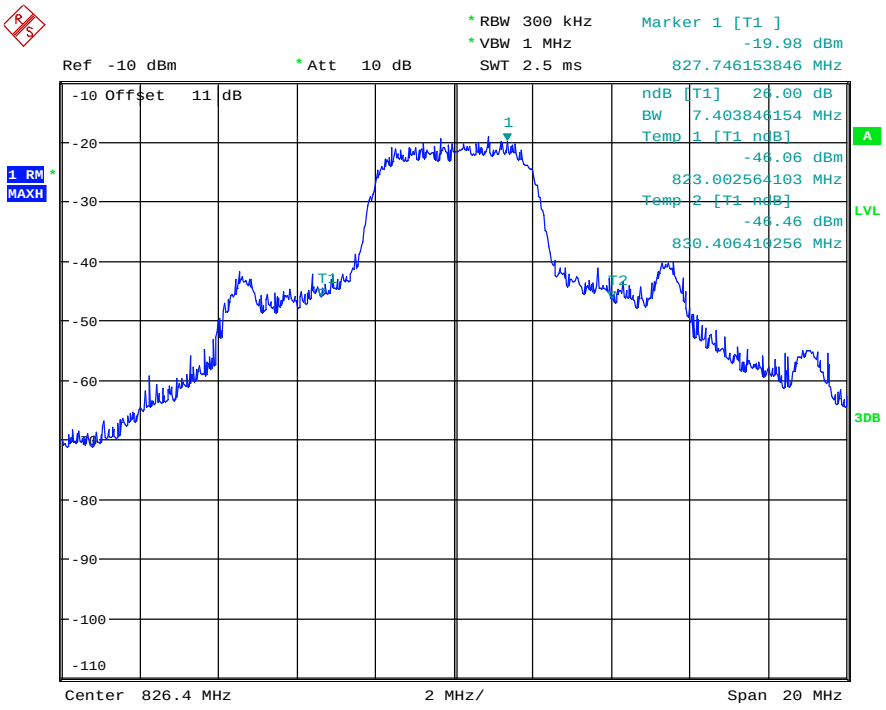

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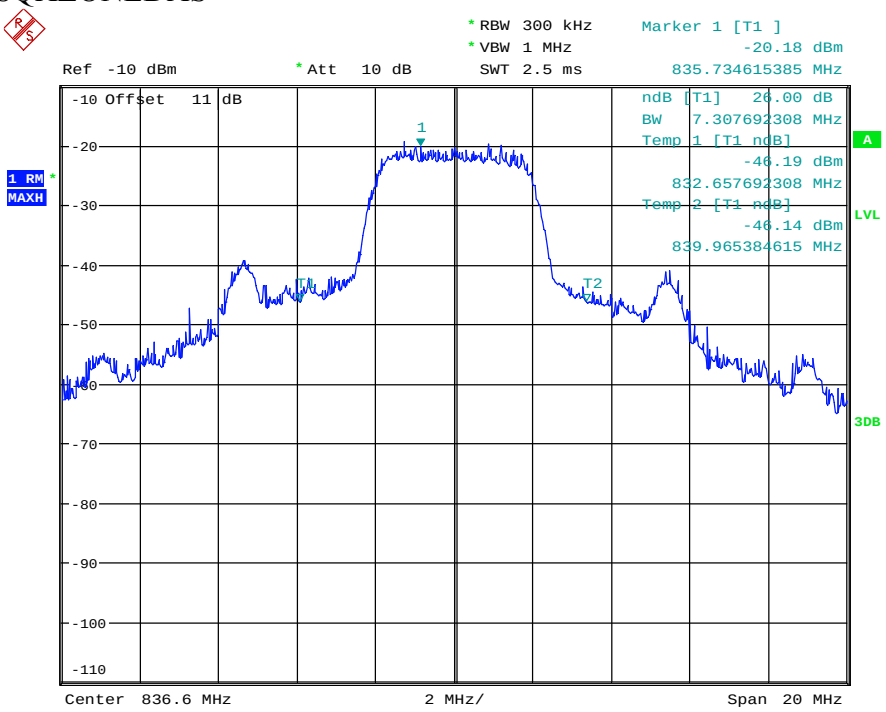

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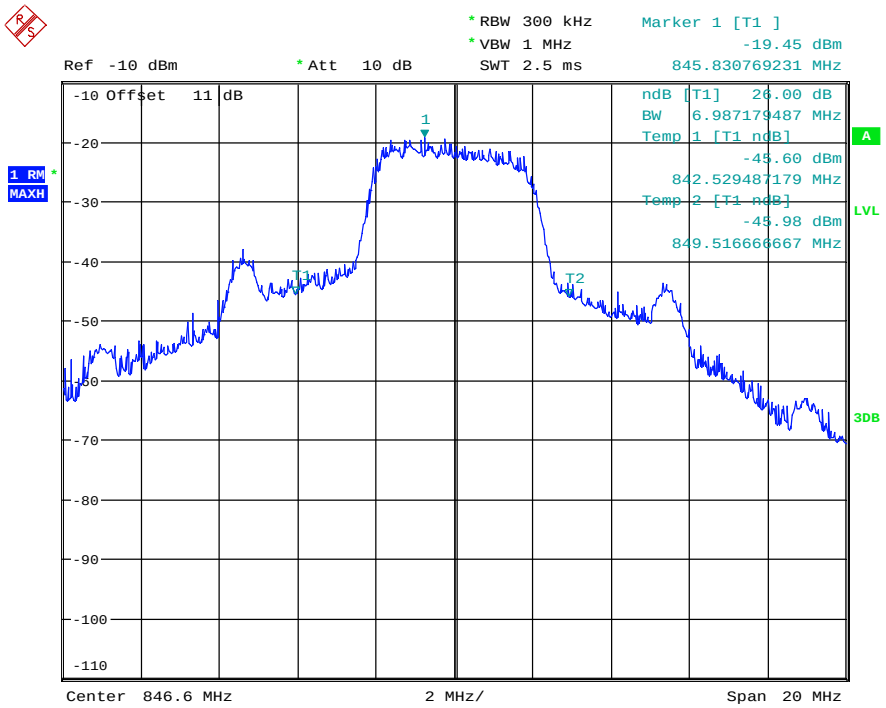

Date: 12.JAN.2019 15:12:10

Report Number: W6M21812-18679-P-20
FCC ID: 2ASQXZONEDAS
LTE
Band II
Input
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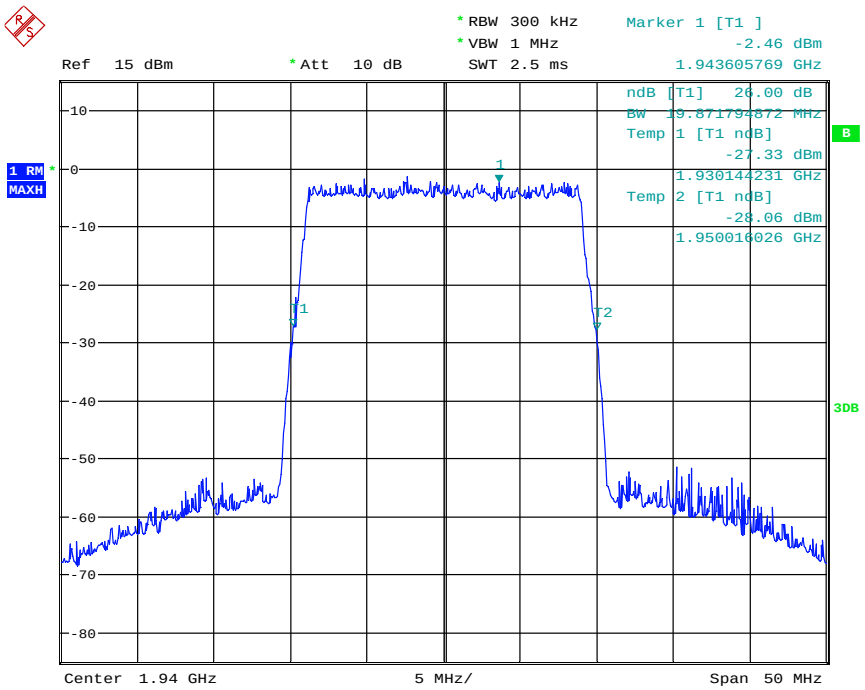

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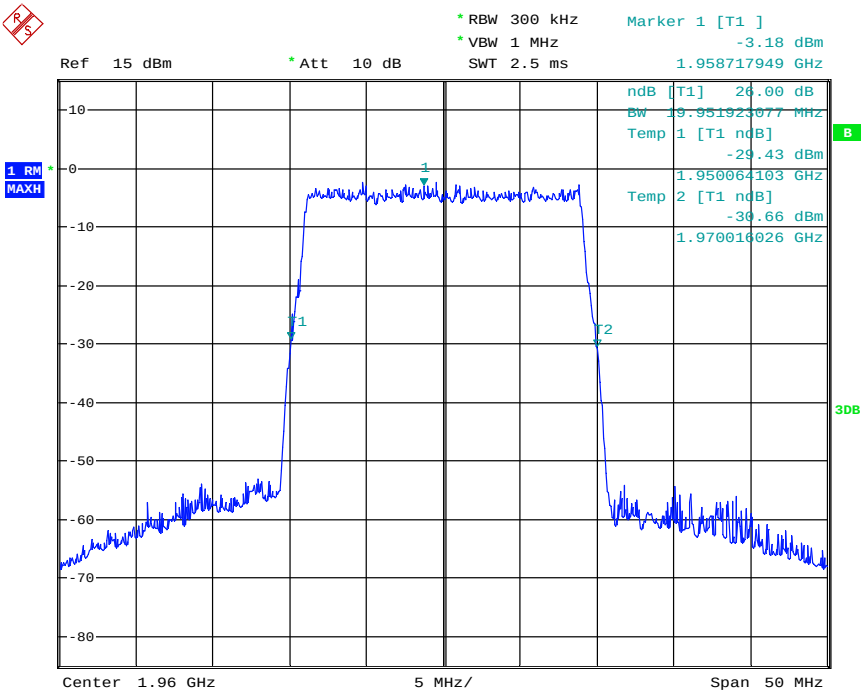

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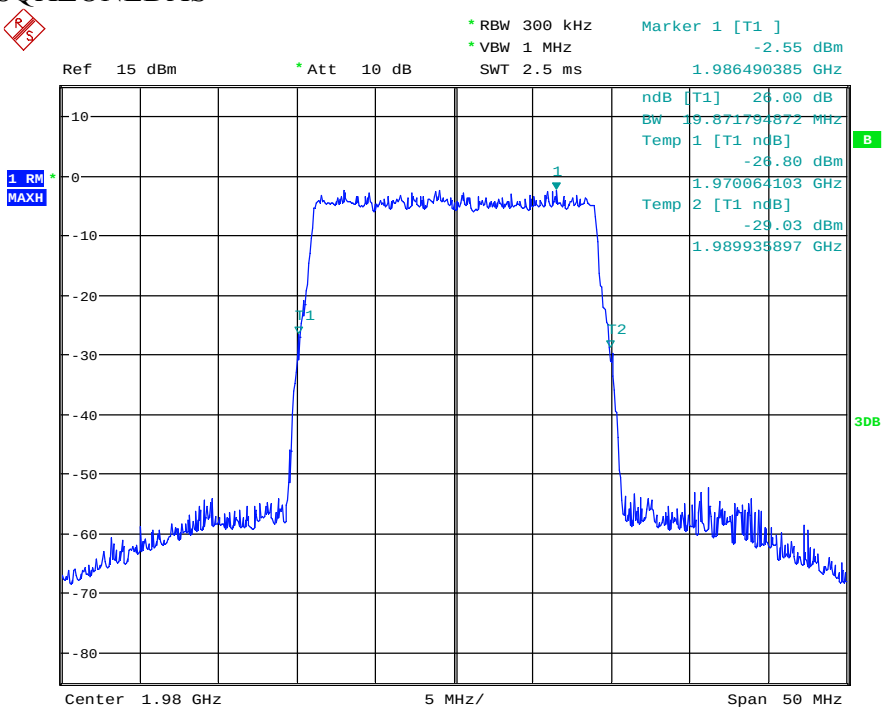

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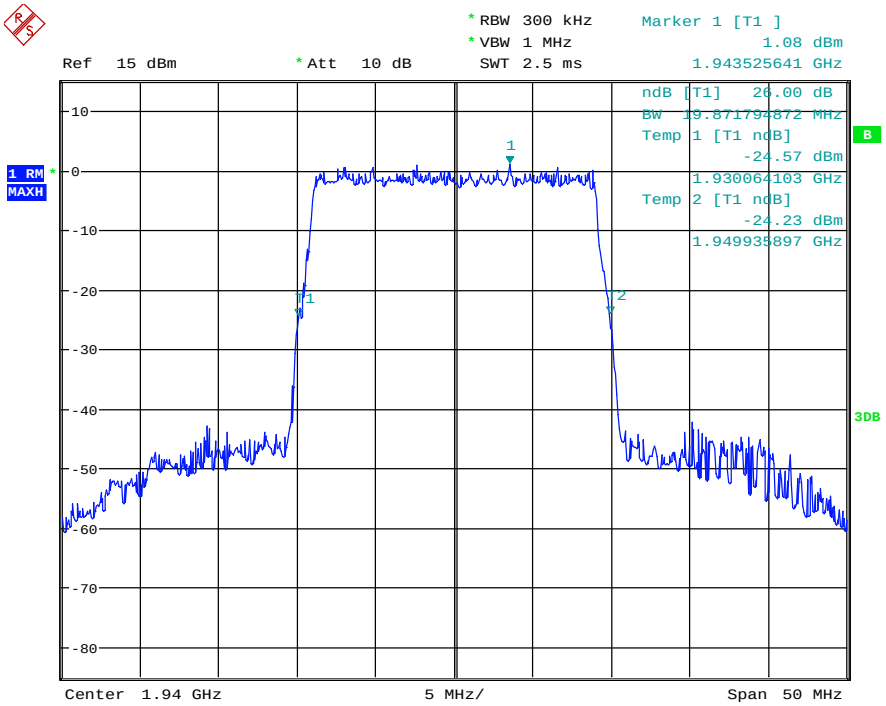

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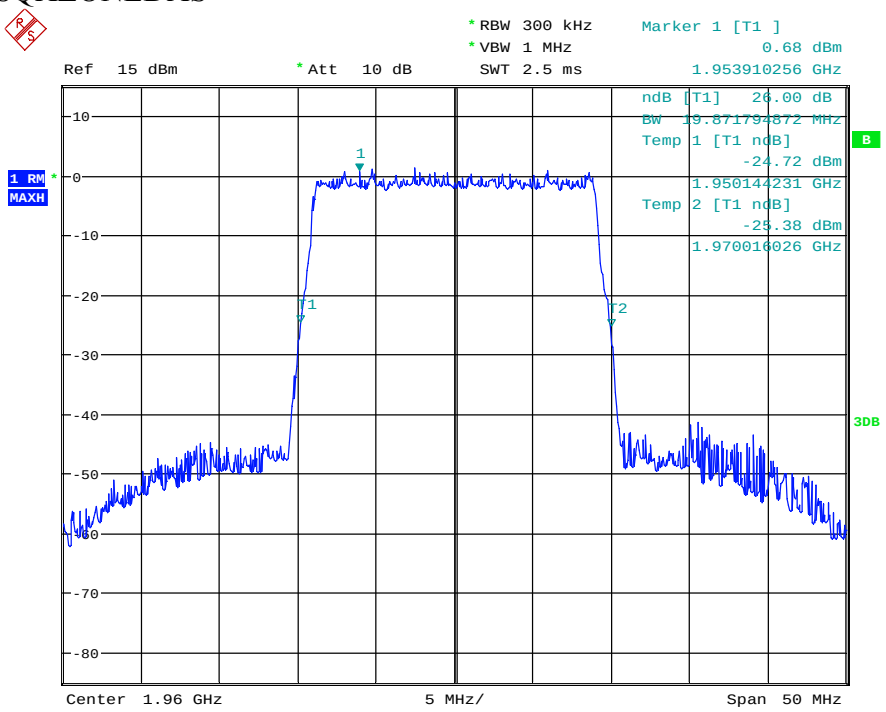

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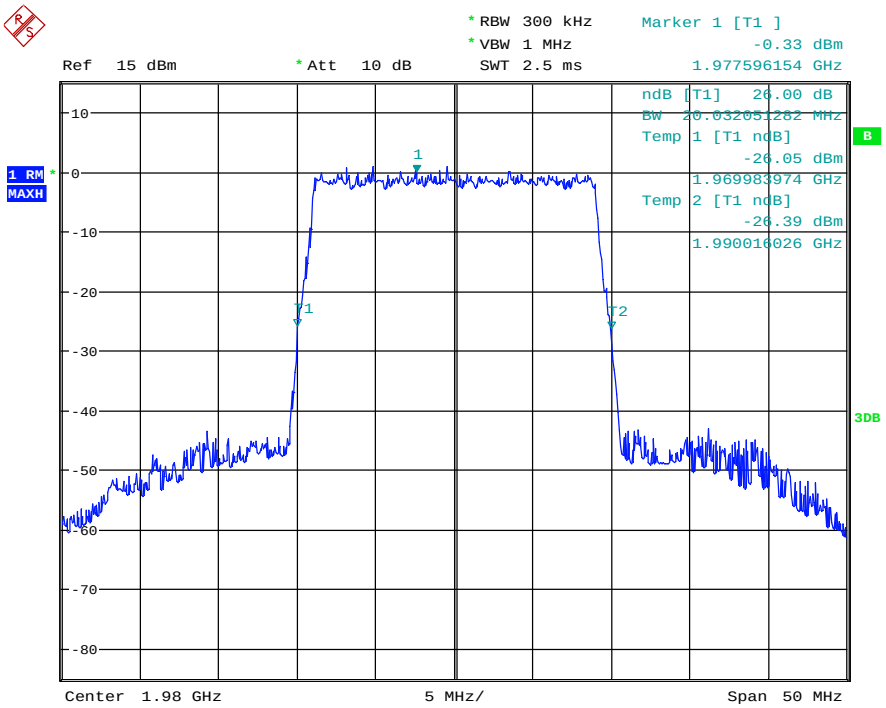

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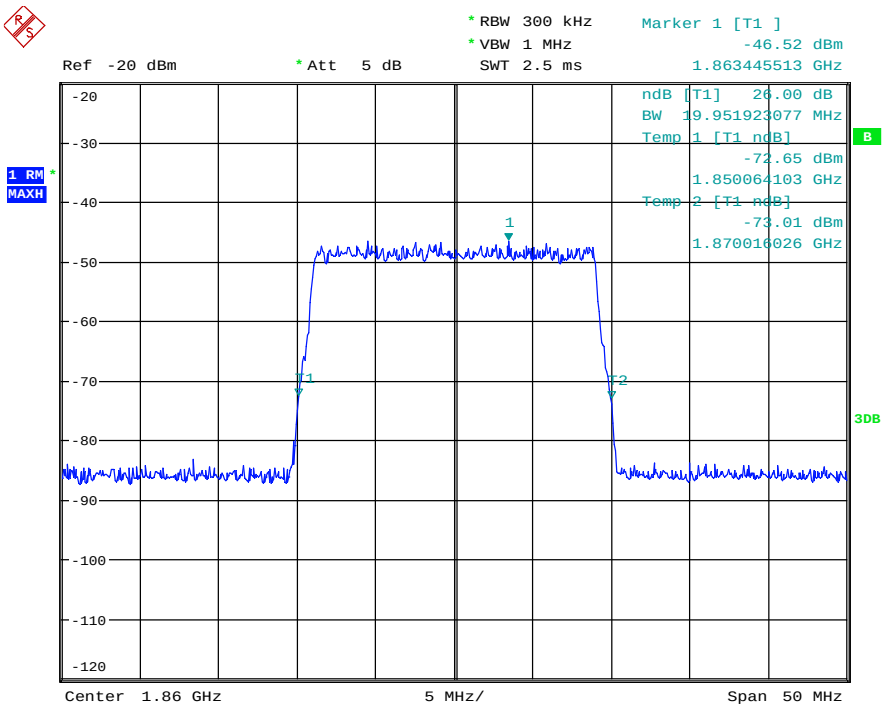
Report Number: W6M21812-18679-P-20
FCC ID: 2ASQXZONEDAS
Uplink



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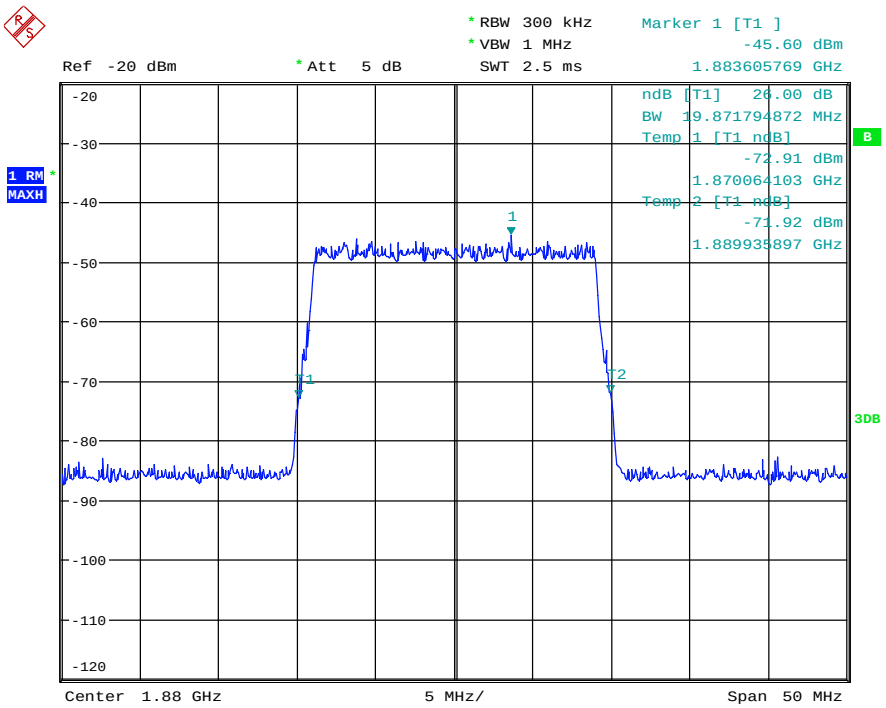

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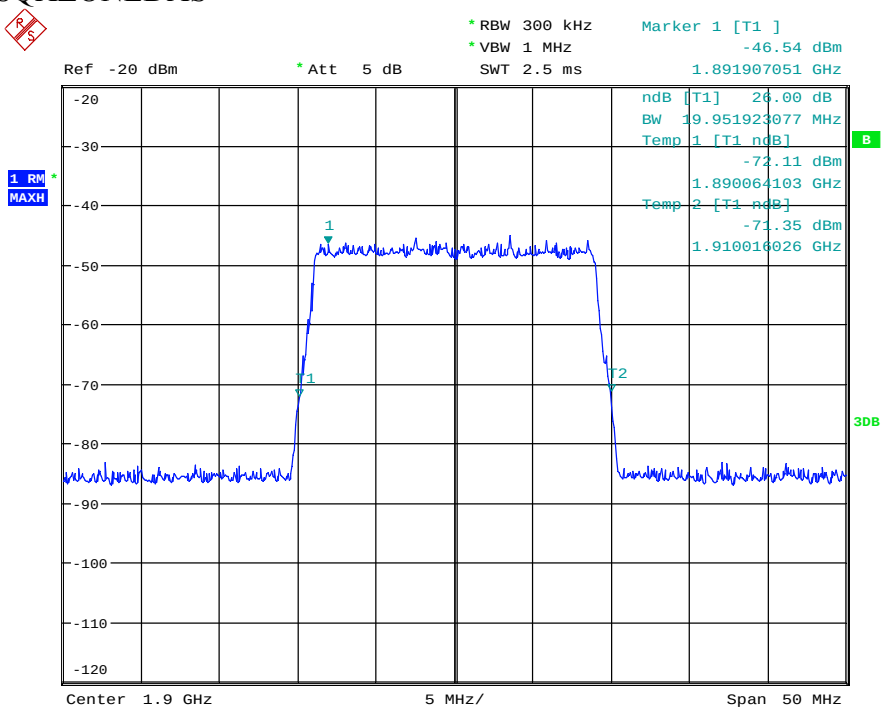

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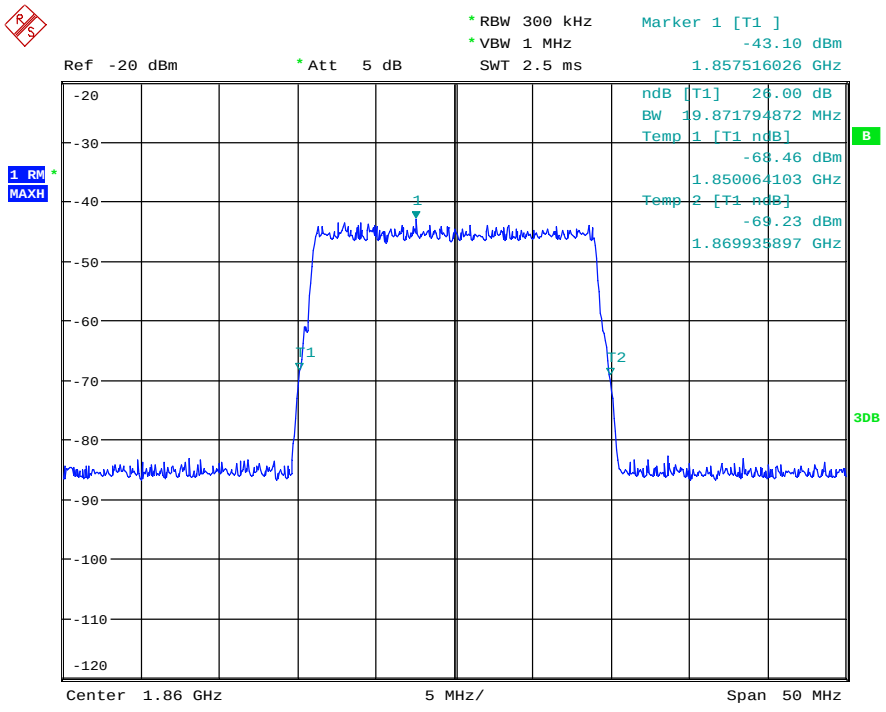

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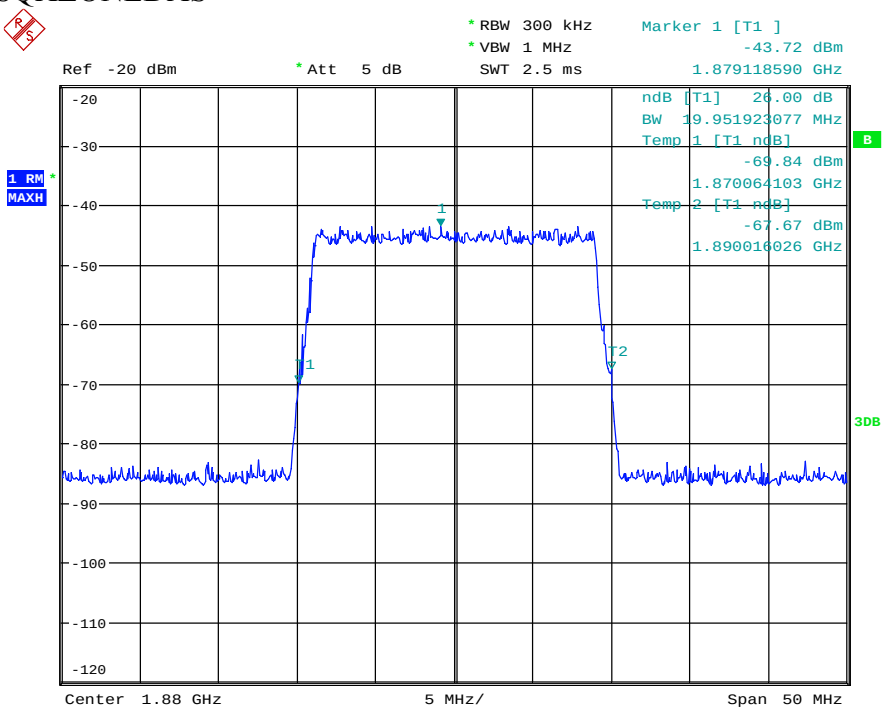

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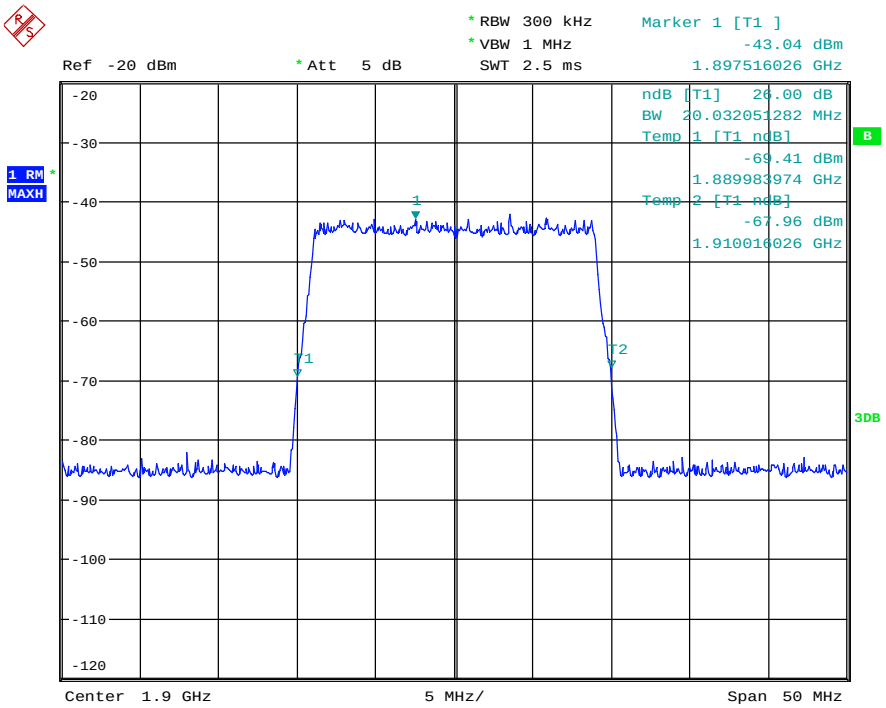

Date: 12.JAN.2019 14:16:41

Report Number: W6M21812-18679-P-20
FCC ID: 2ASQXZONEDAS
Output
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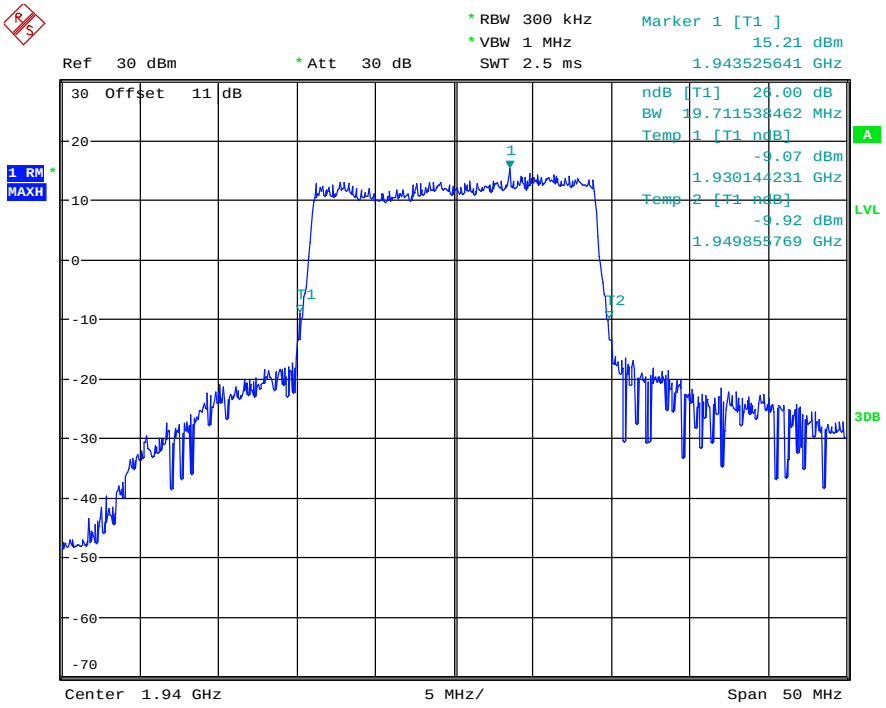

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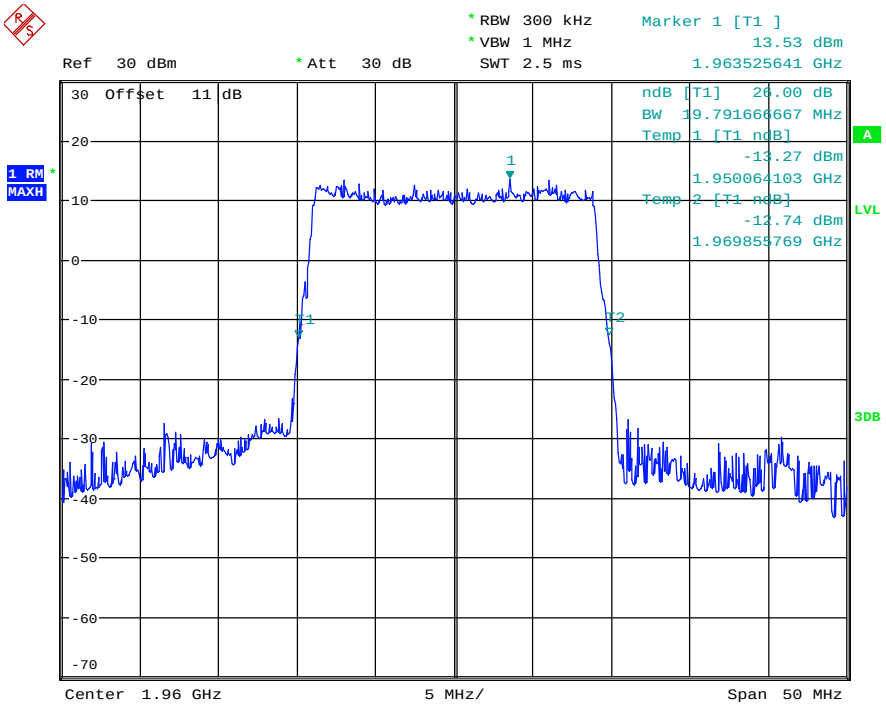

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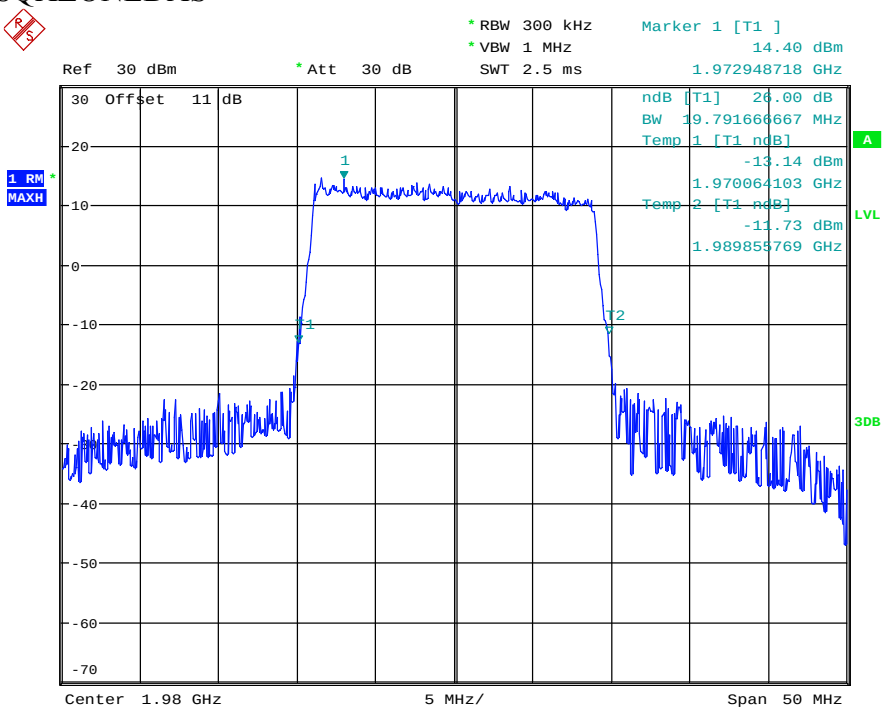

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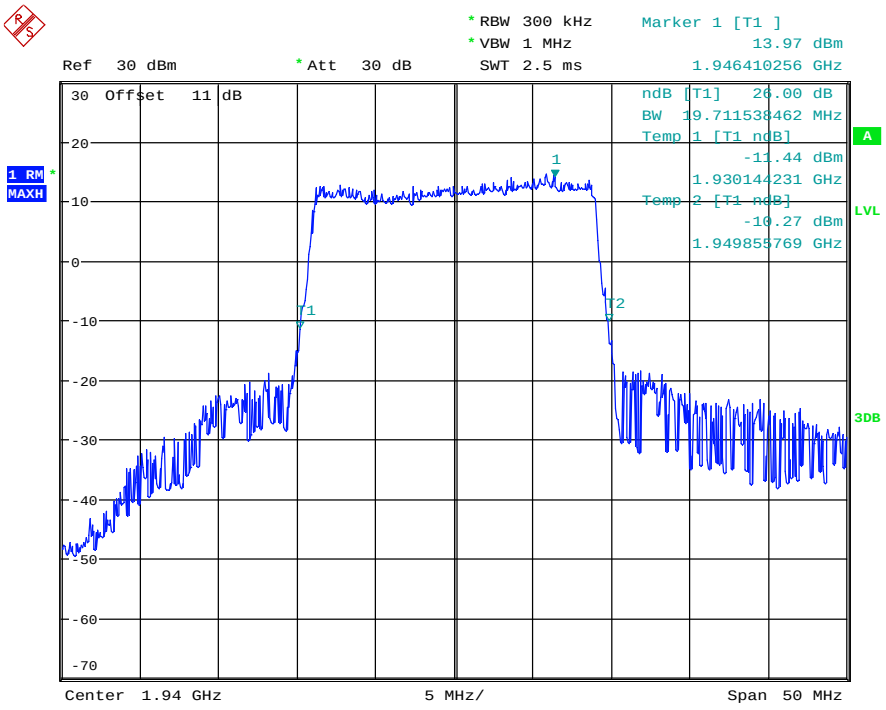

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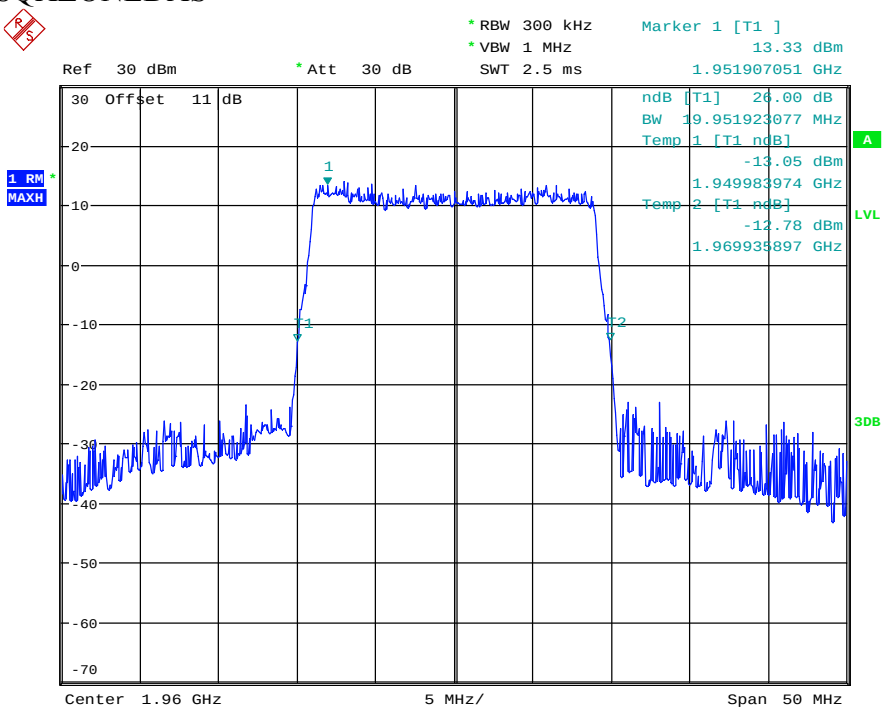

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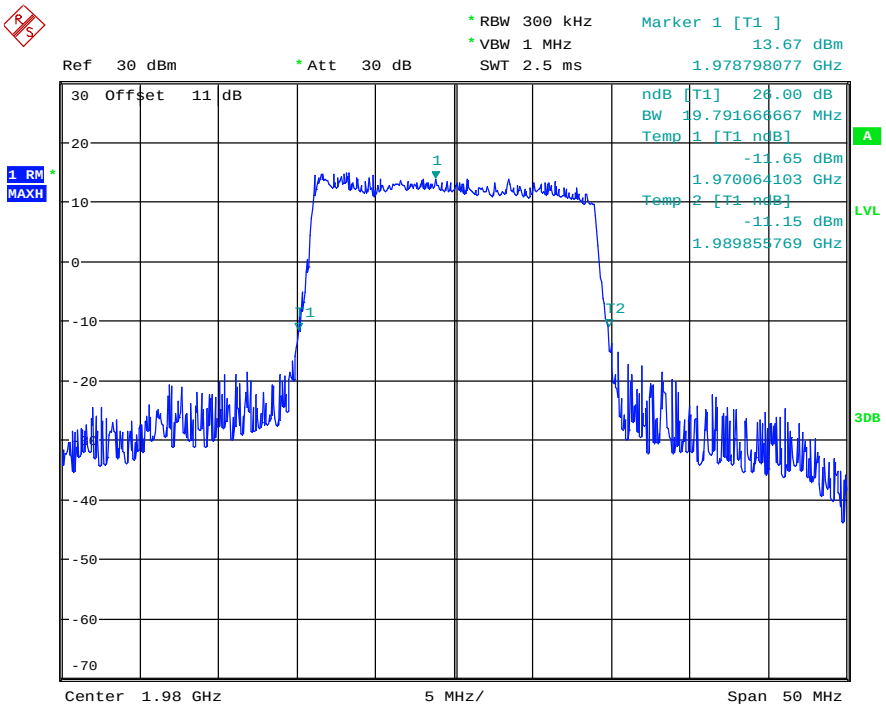

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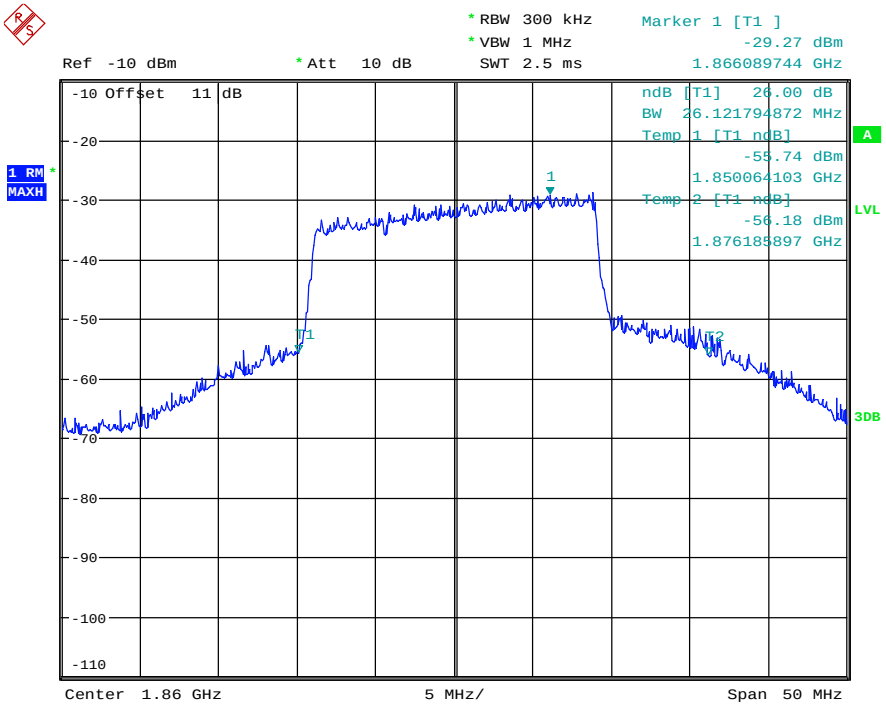

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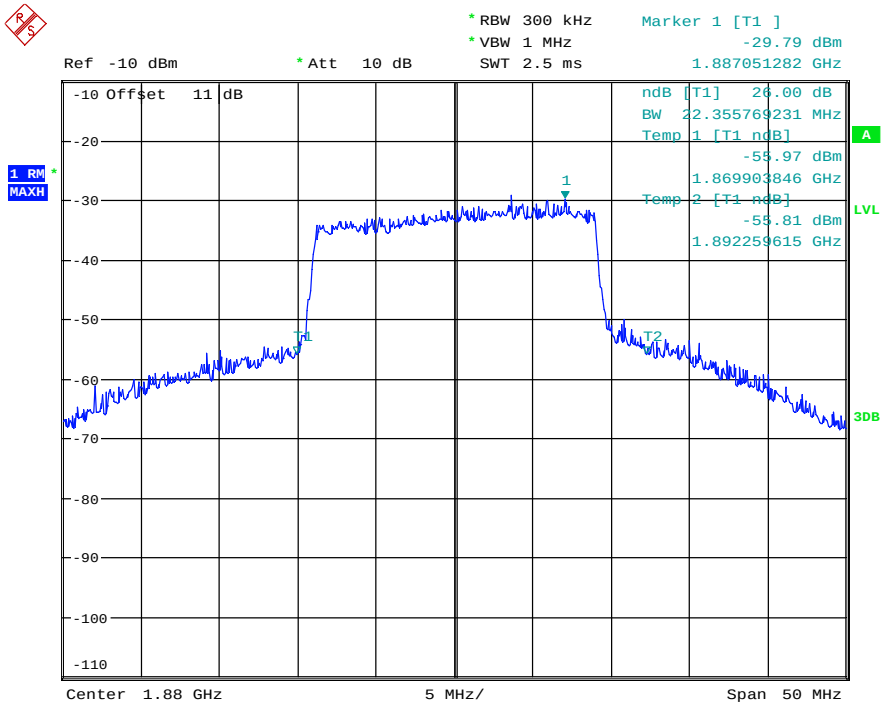

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Report Number: W6M21812-18679-P-20
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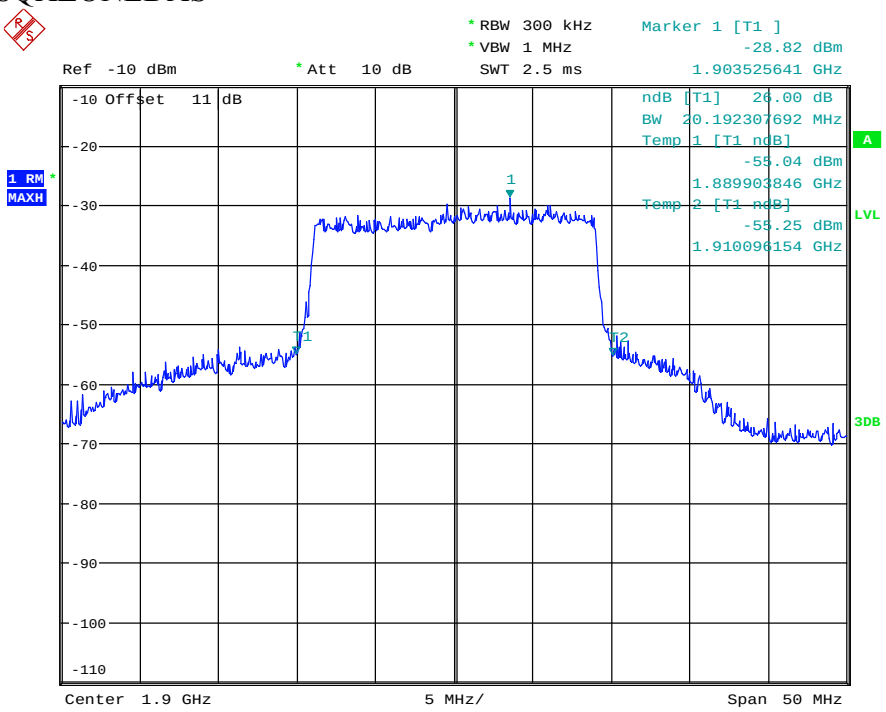

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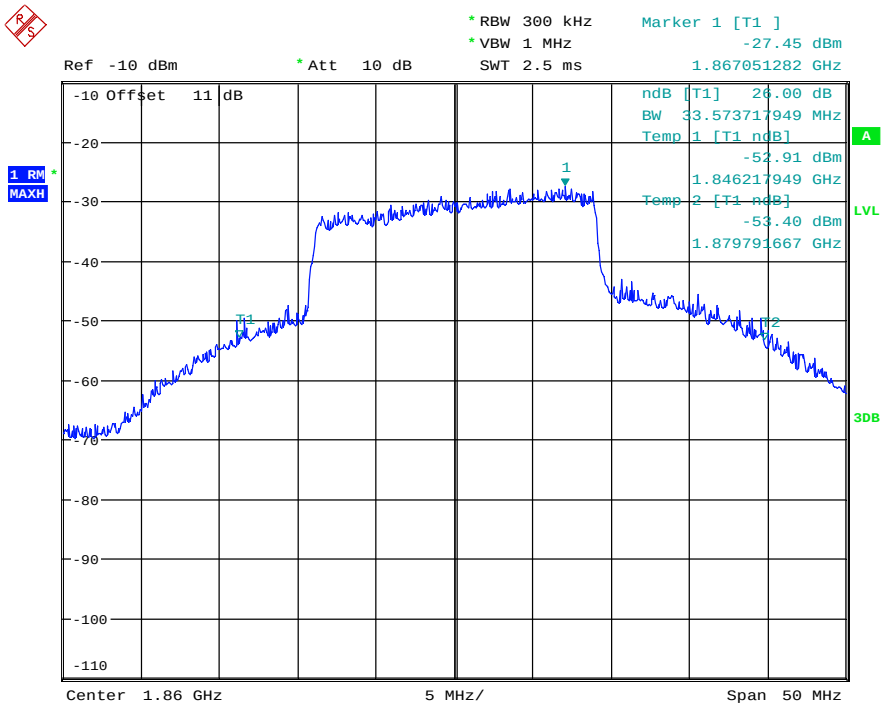

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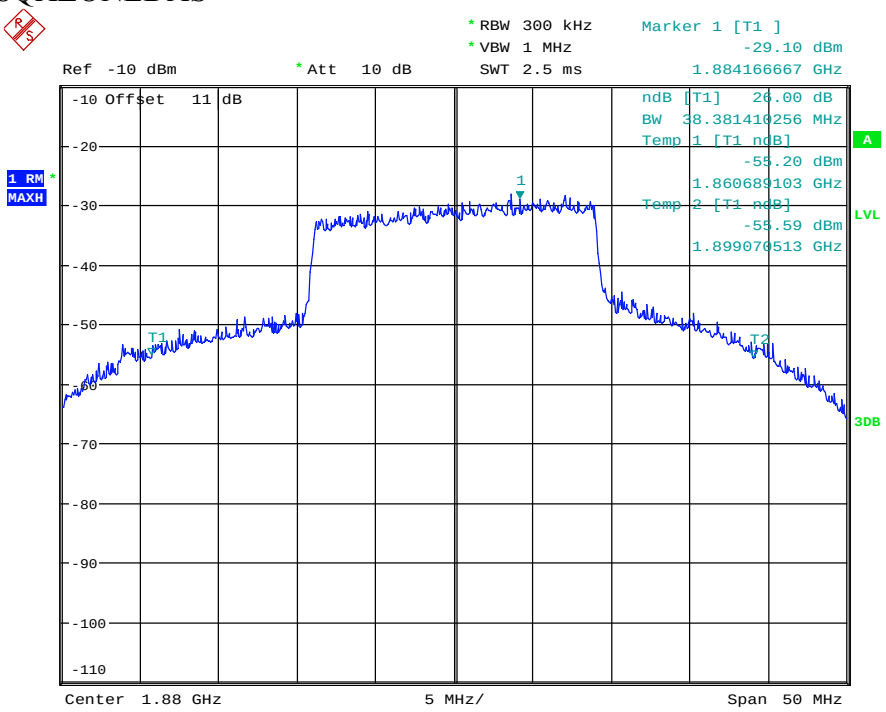

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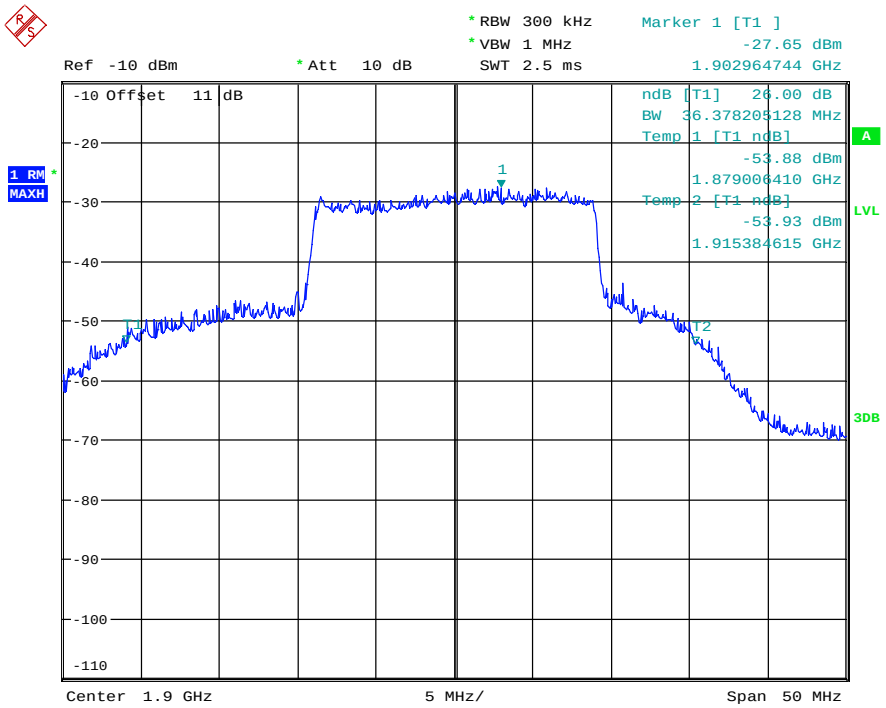

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Report Number: W6M21812-18679-P-20
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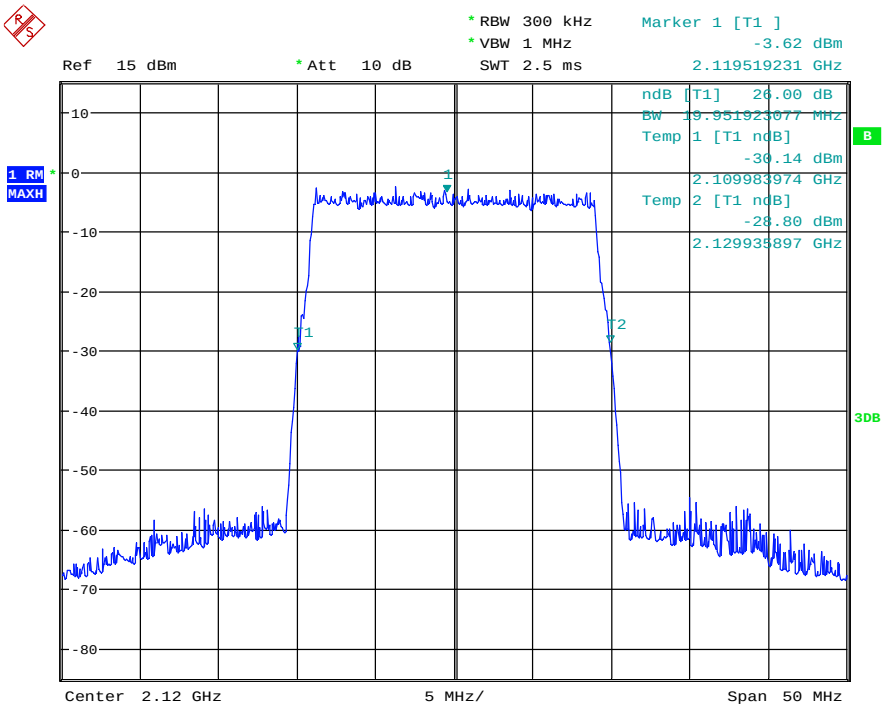

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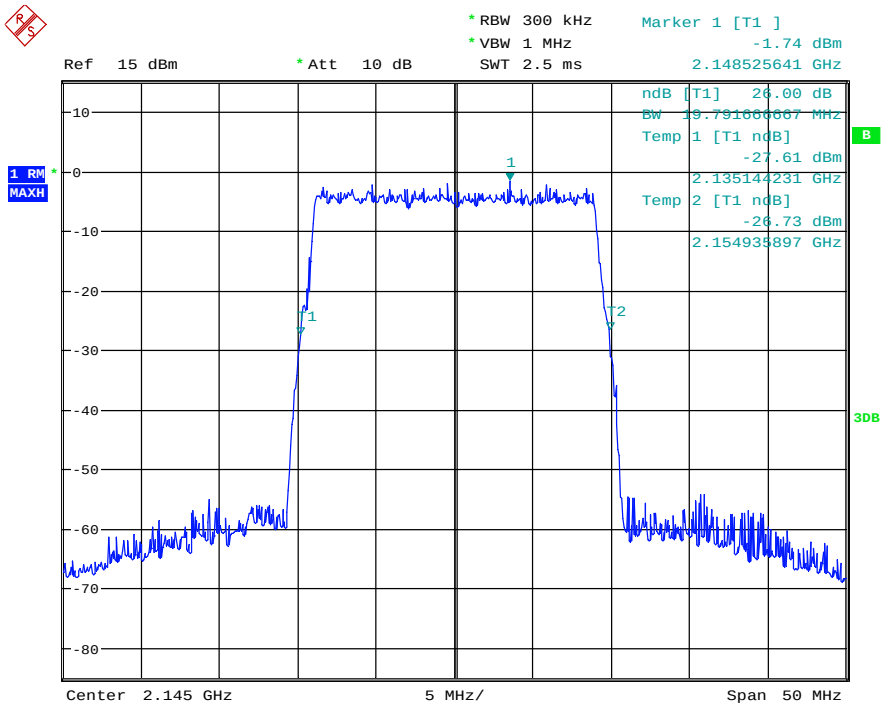

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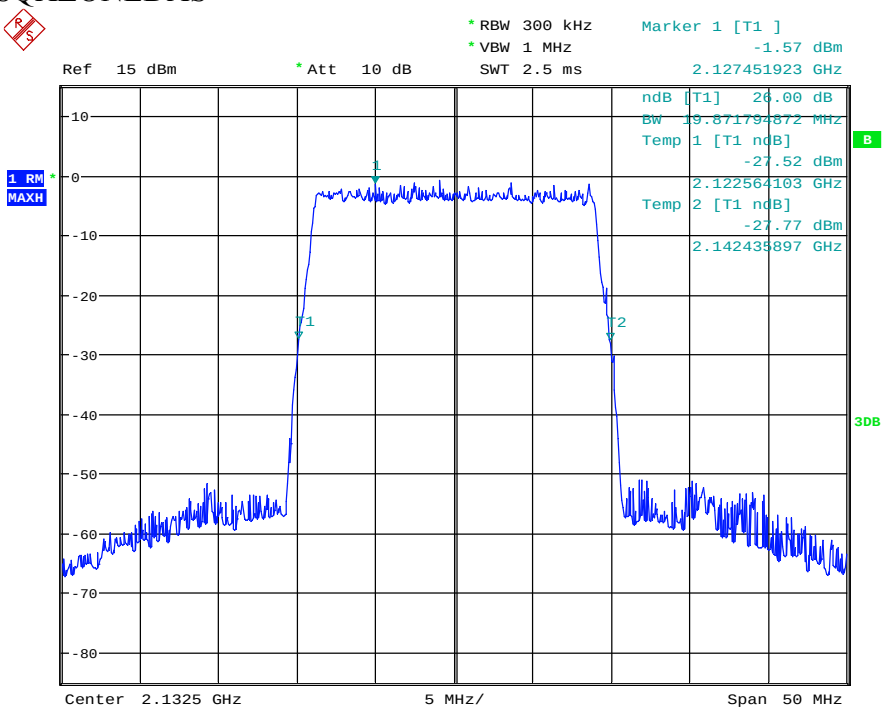

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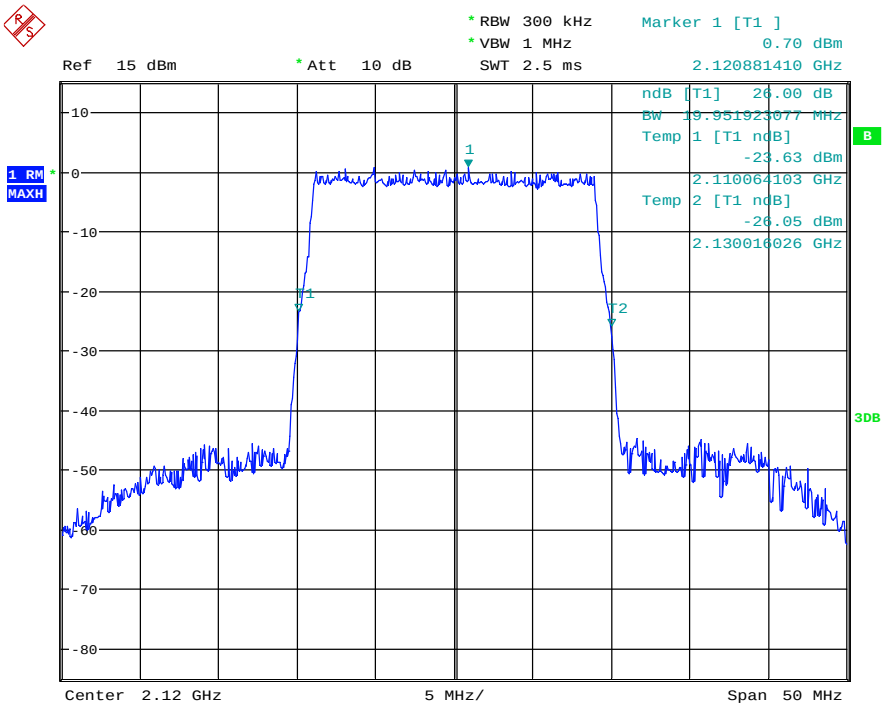

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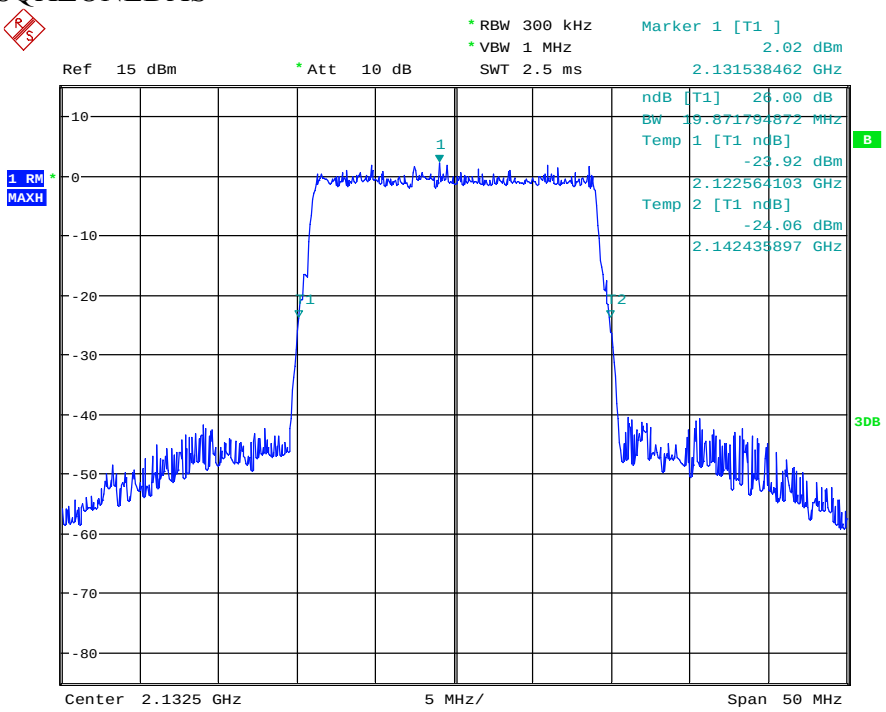

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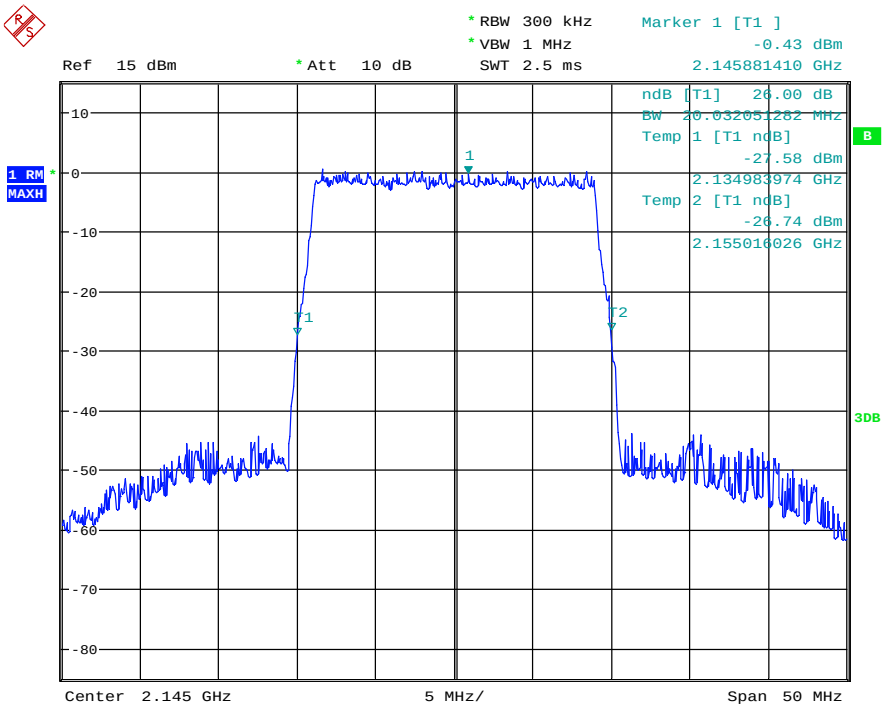

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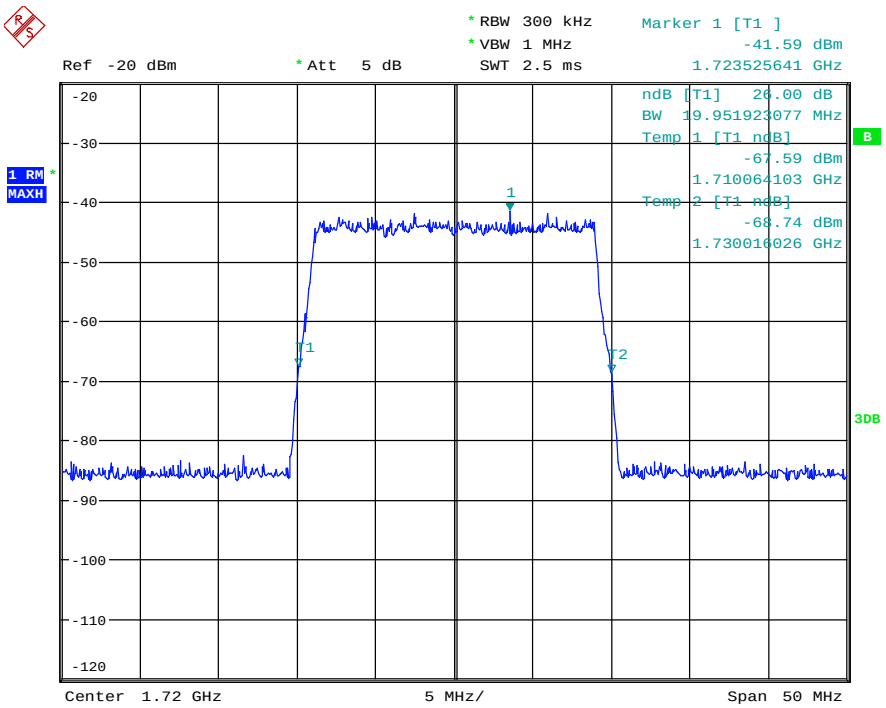
Report Number: W6M21812-18679-P-20
FCC ID: 2ASQXZONEDAS
Uplink



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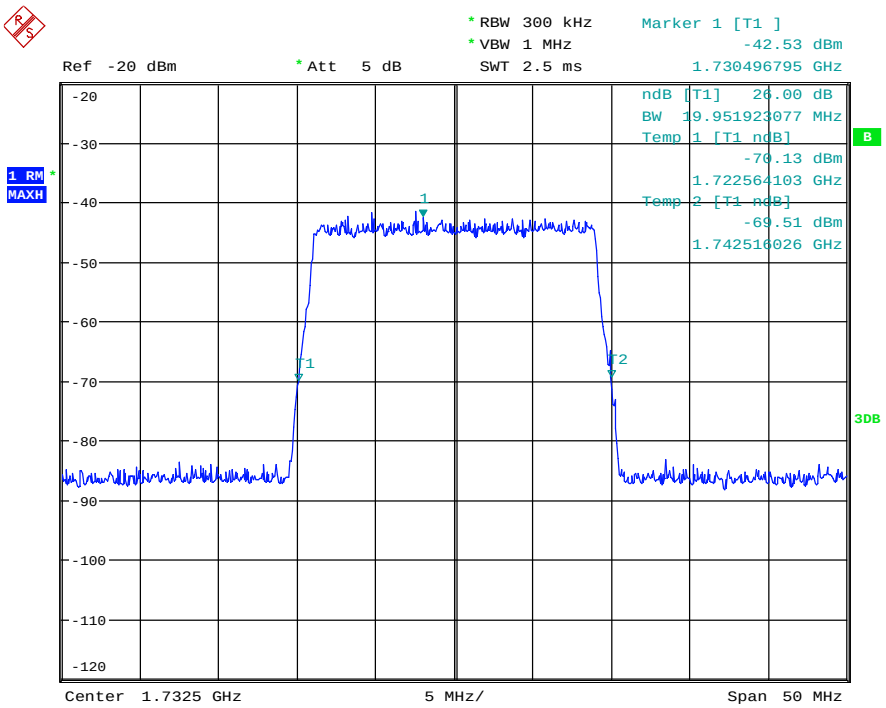

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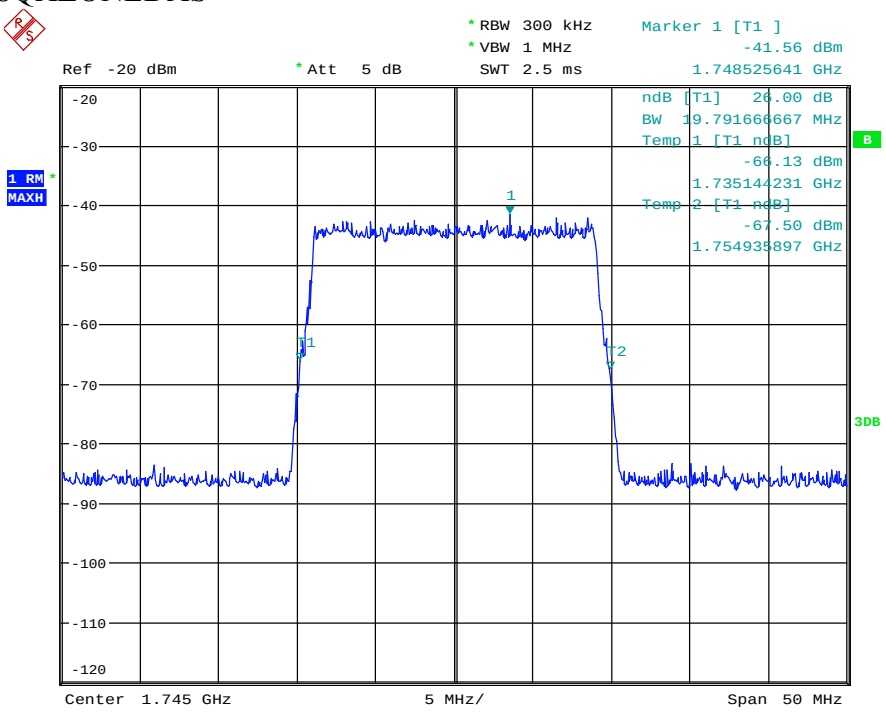

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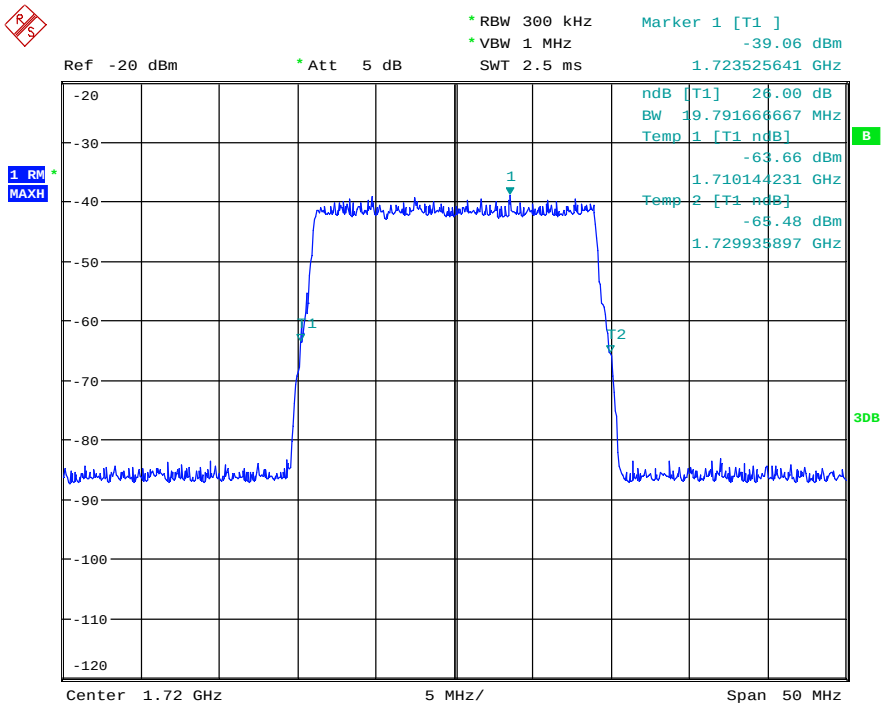

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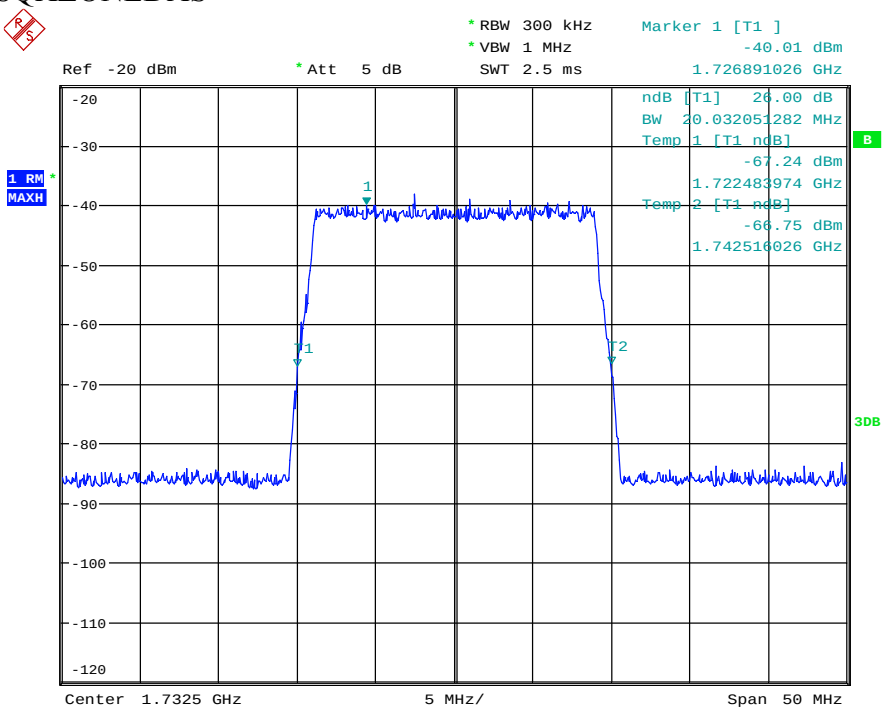

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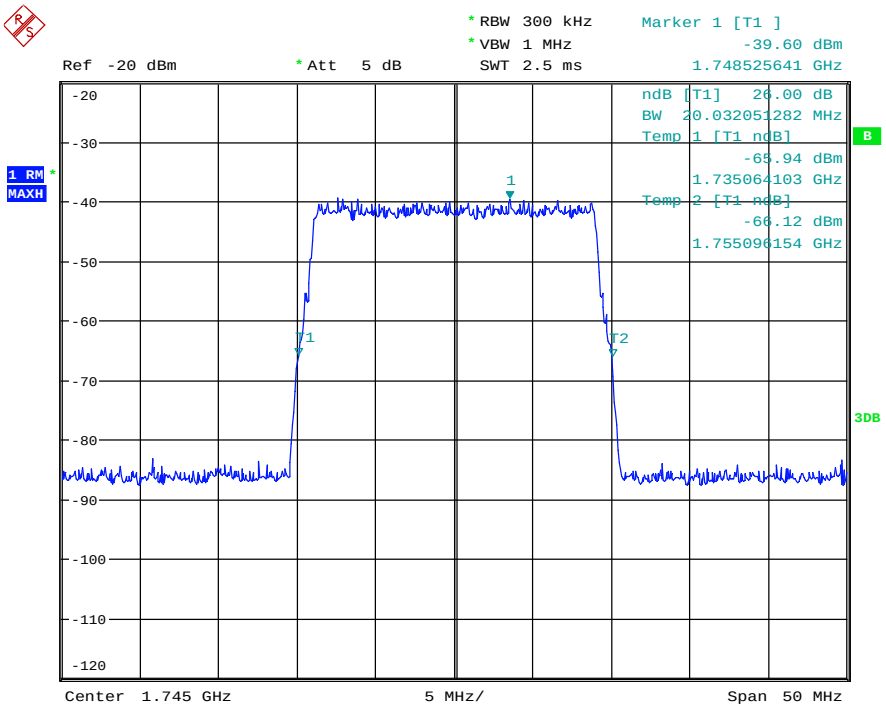

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Report Number: W6M21812-18679-P-20
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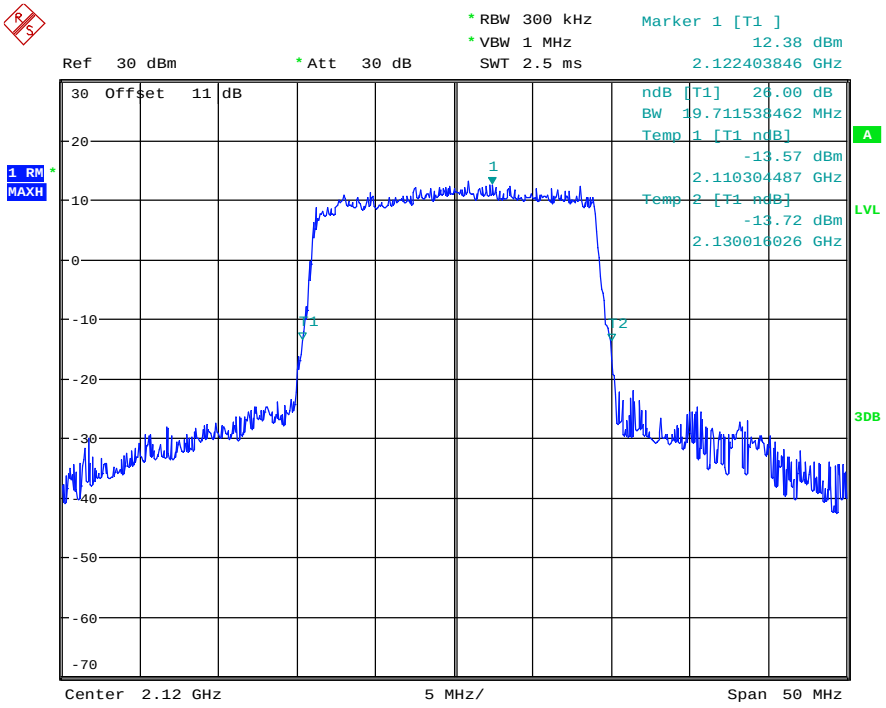
Output
Downlink



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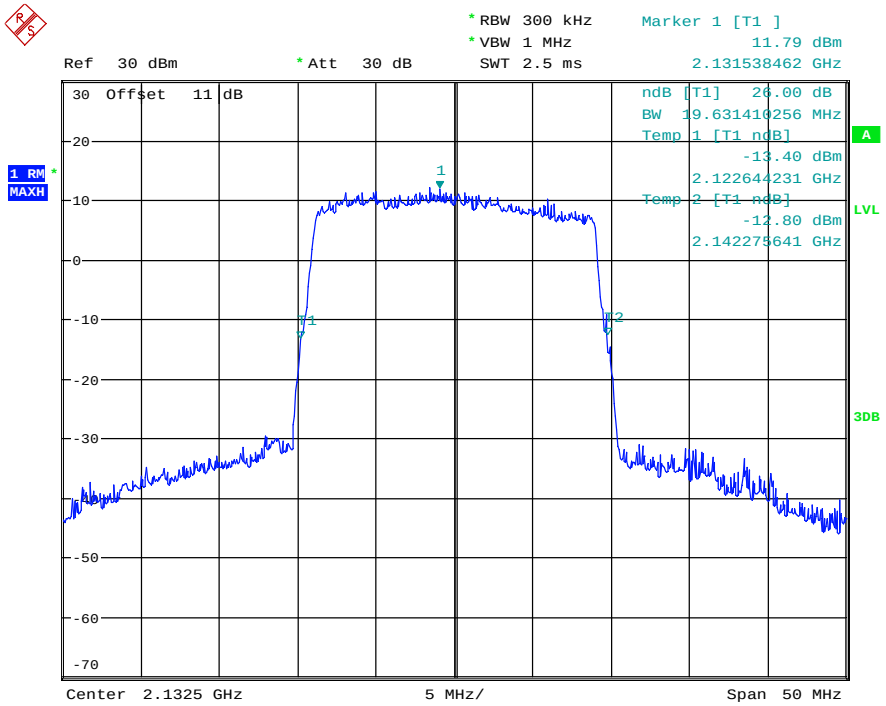

Date: 16.JAN.2019 14:04:20

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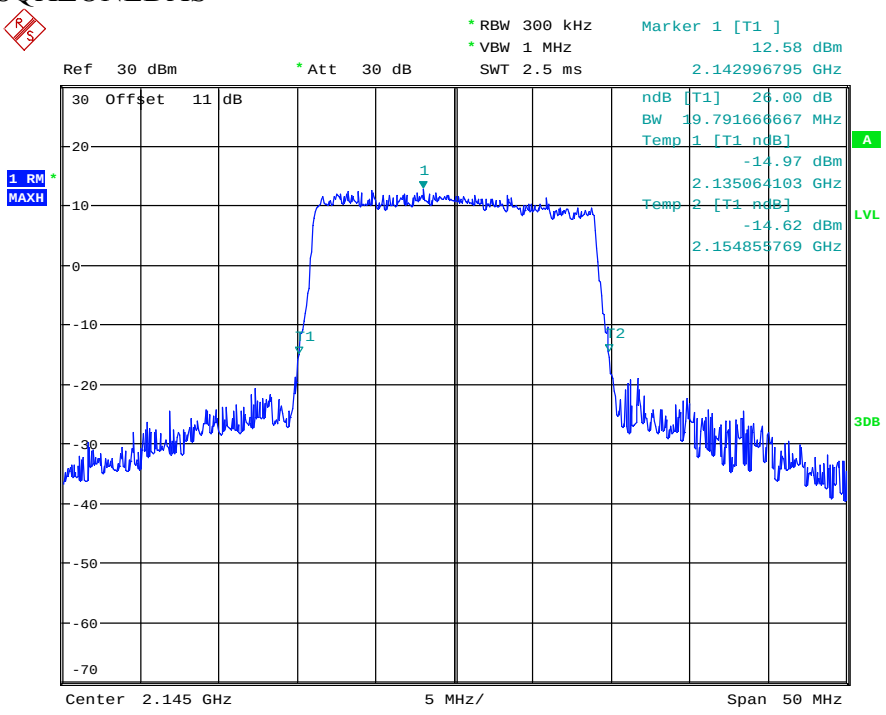

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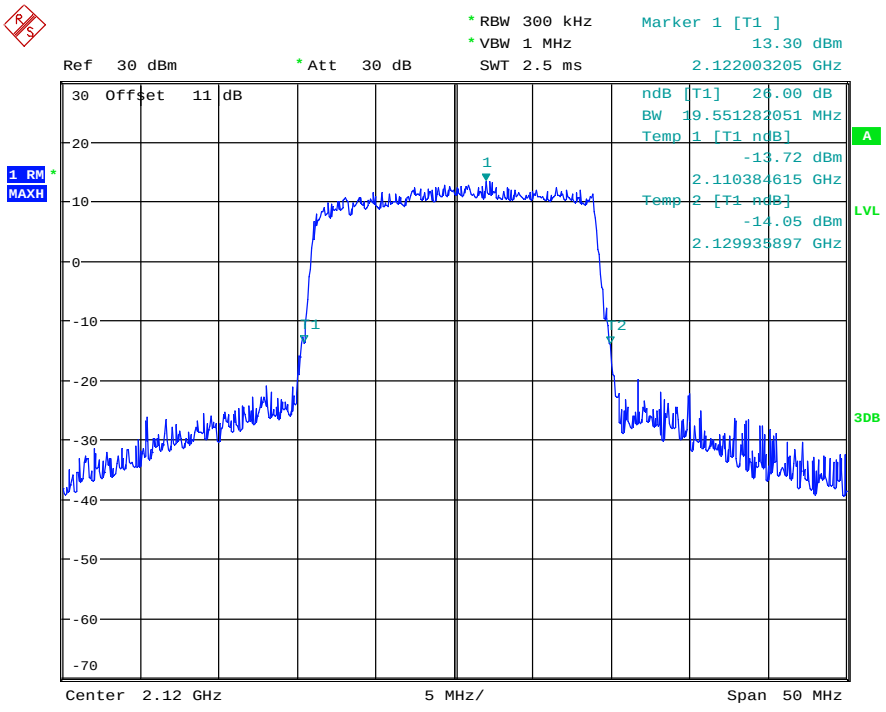

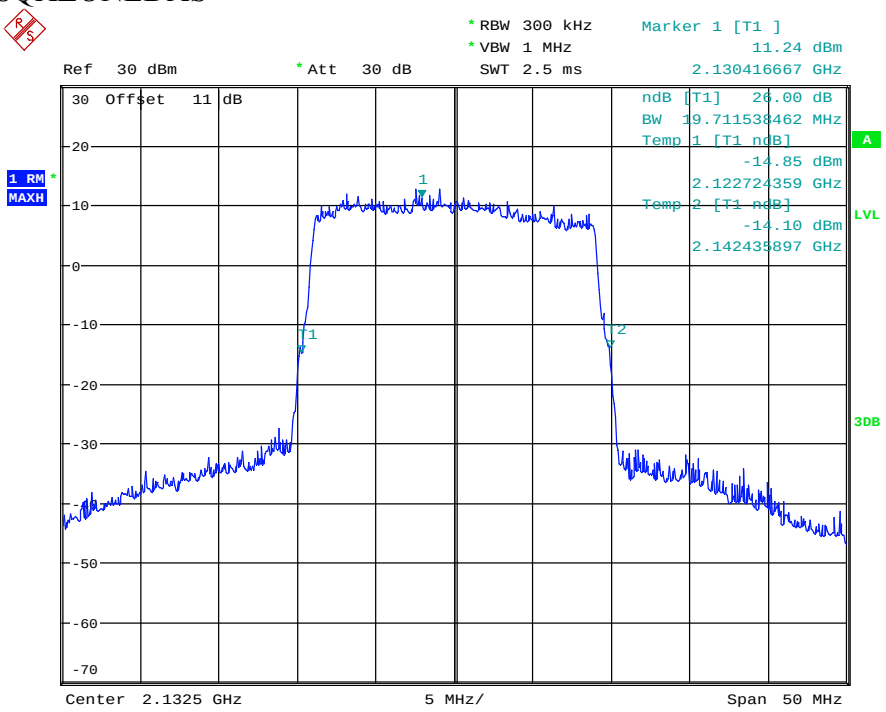

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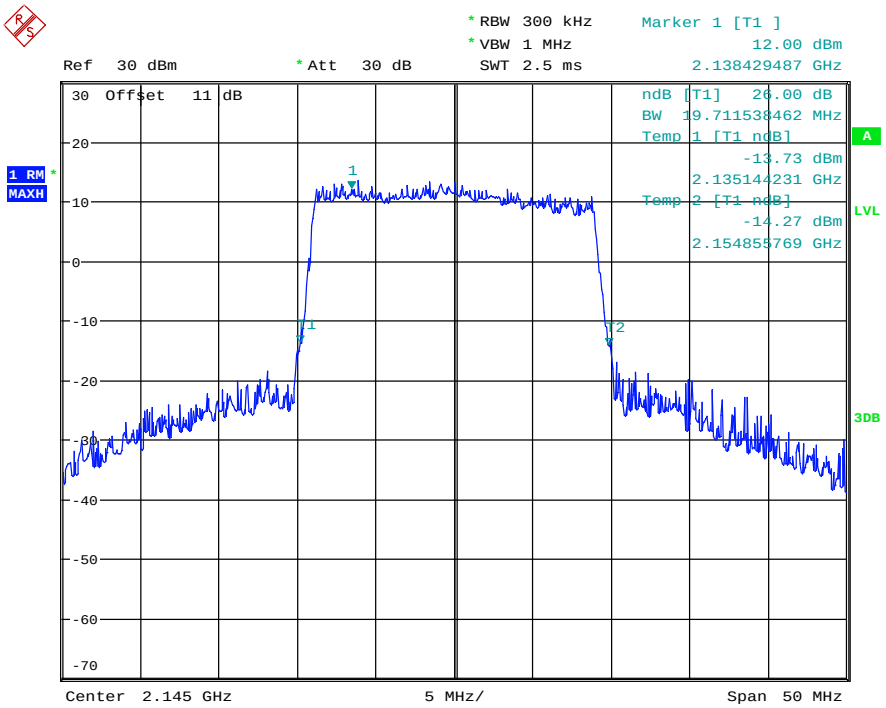

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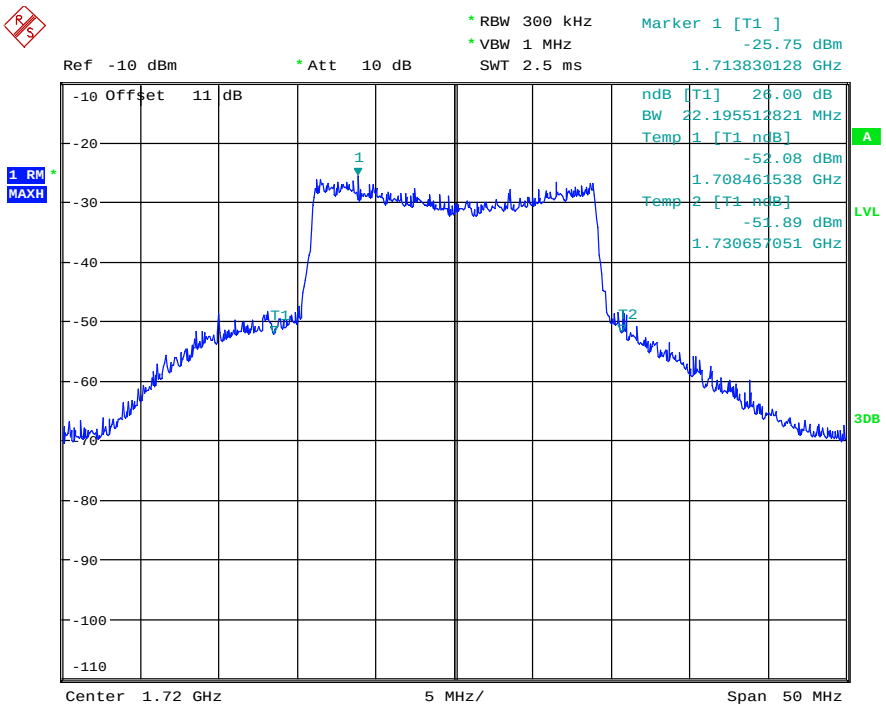
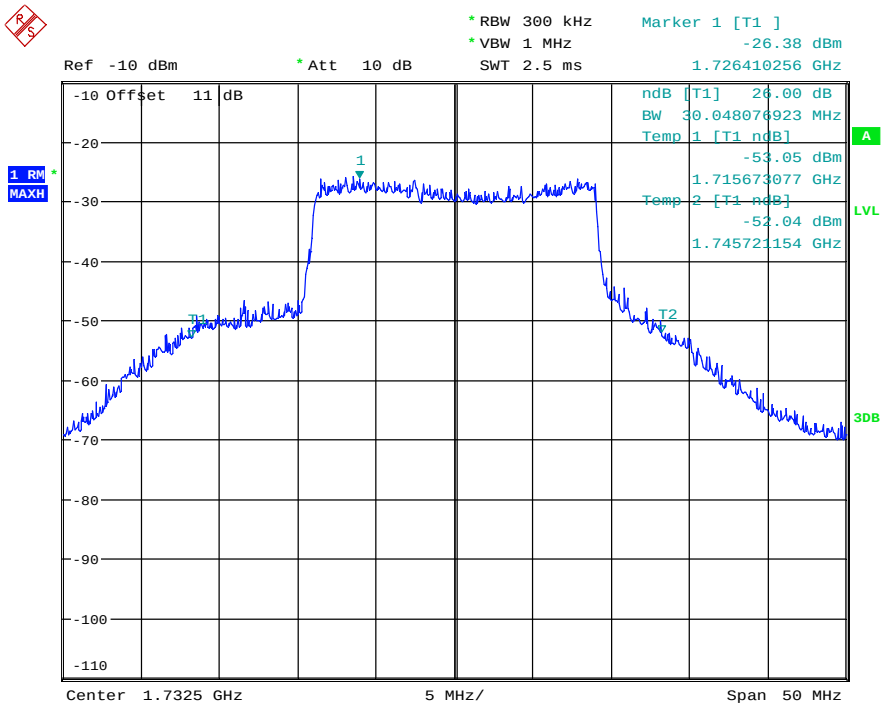
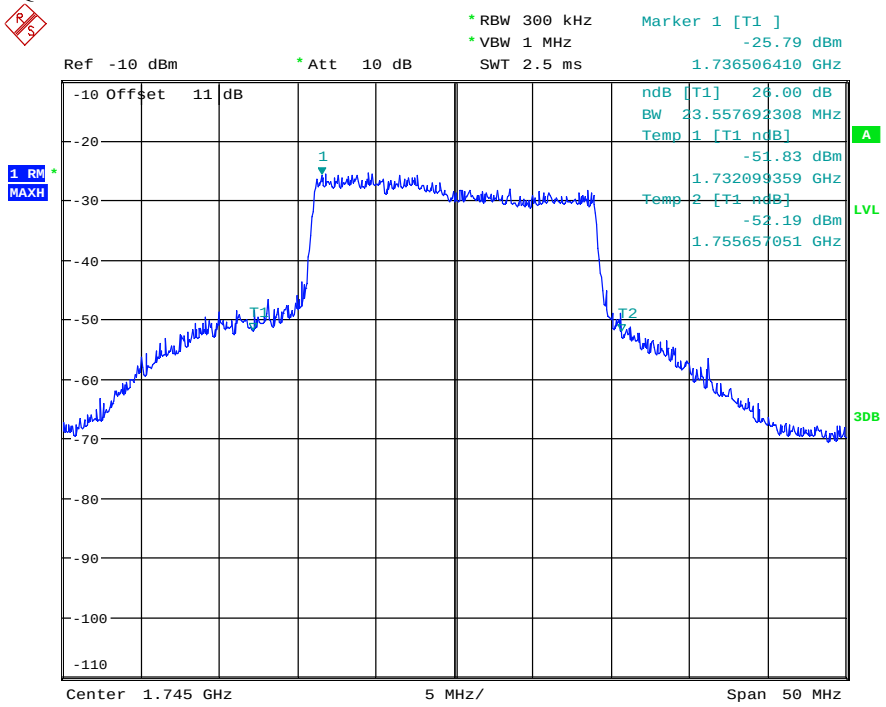


Date: 12.JAN.2019 14:24:29



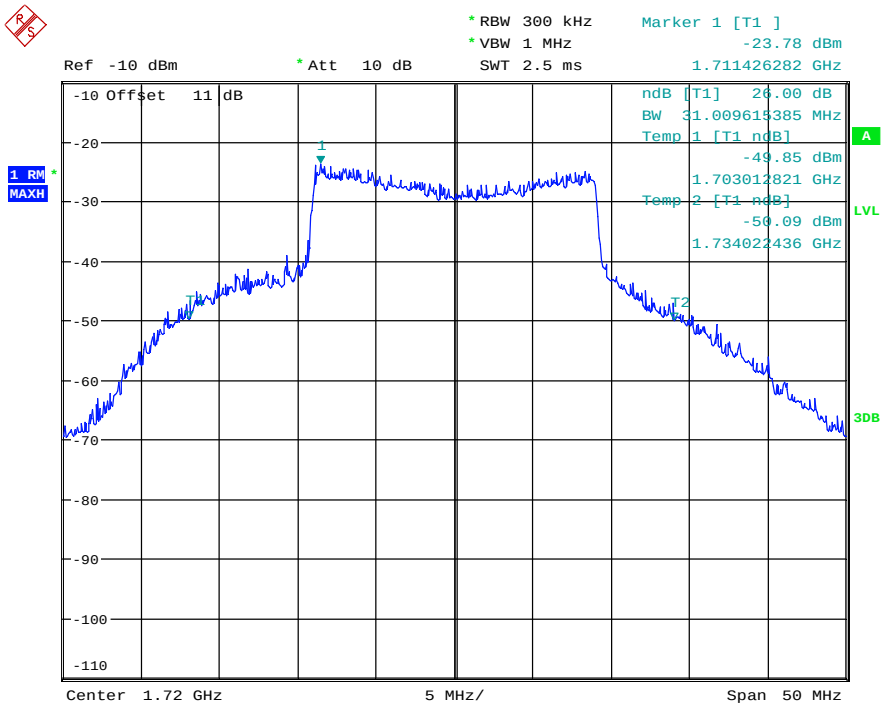
Date: 12.JAN.2019 14:25:59

Report Number: W6M21812-18679-P-20
FCC ID: 2ASQXZONEDAS

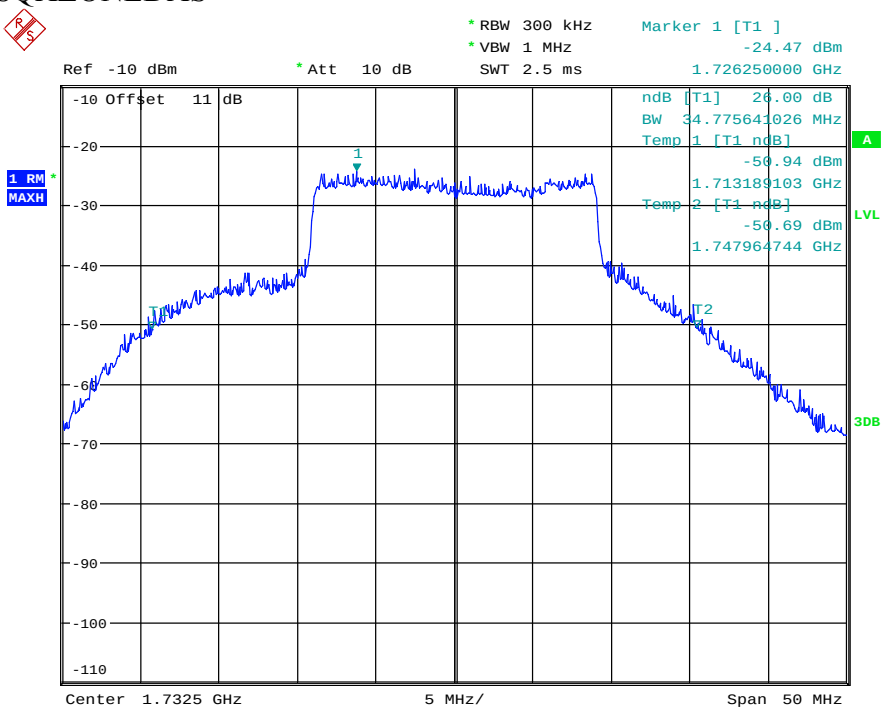


Date: 12.JAN.2019 14:29:42

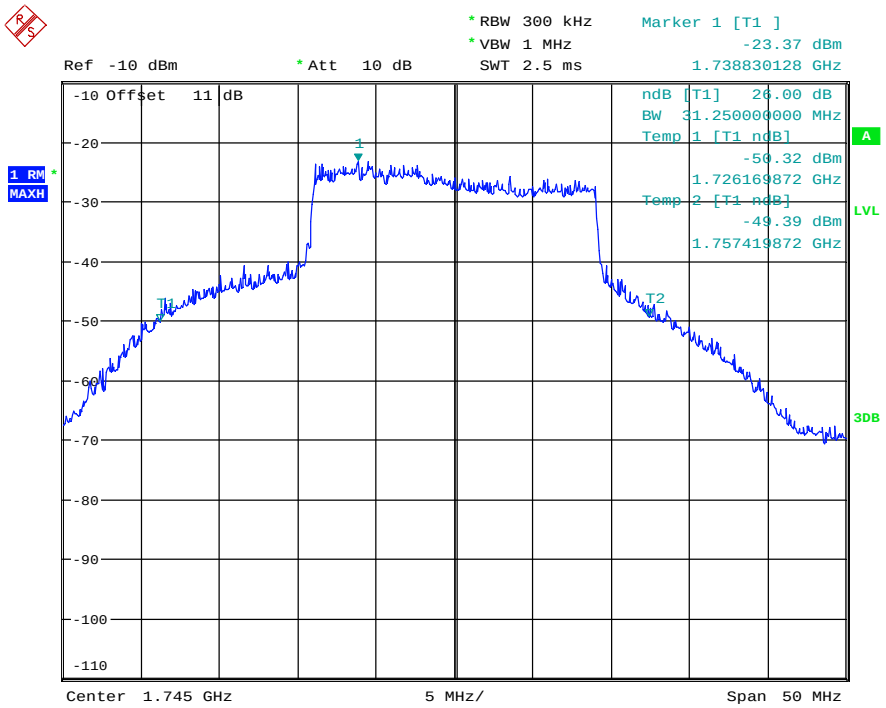
+3dB



Date: 12.JAN.2019 14:24:08

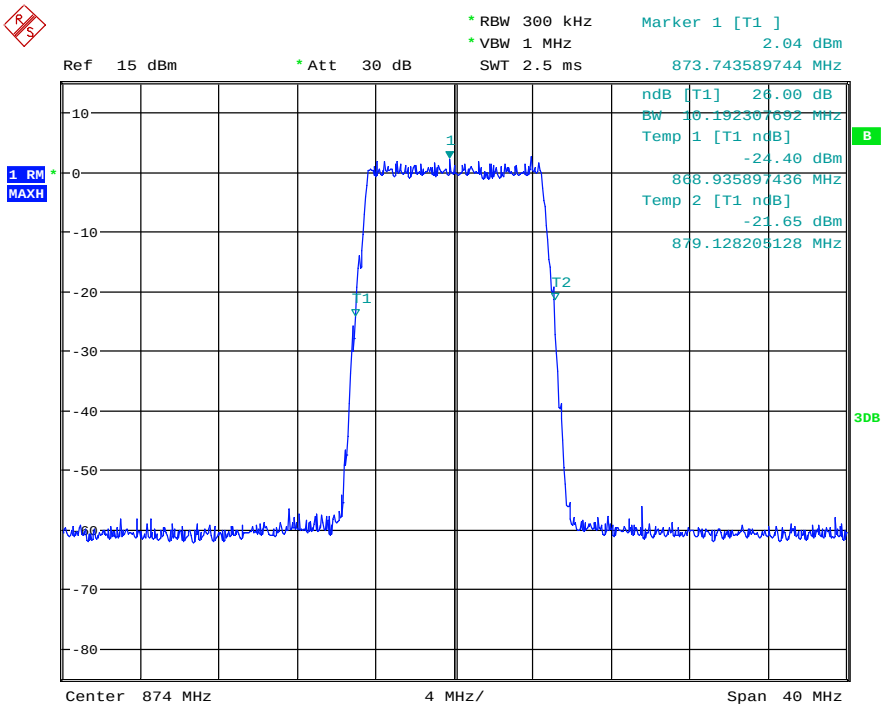


Date: 12.JAN.2019 14:26:21

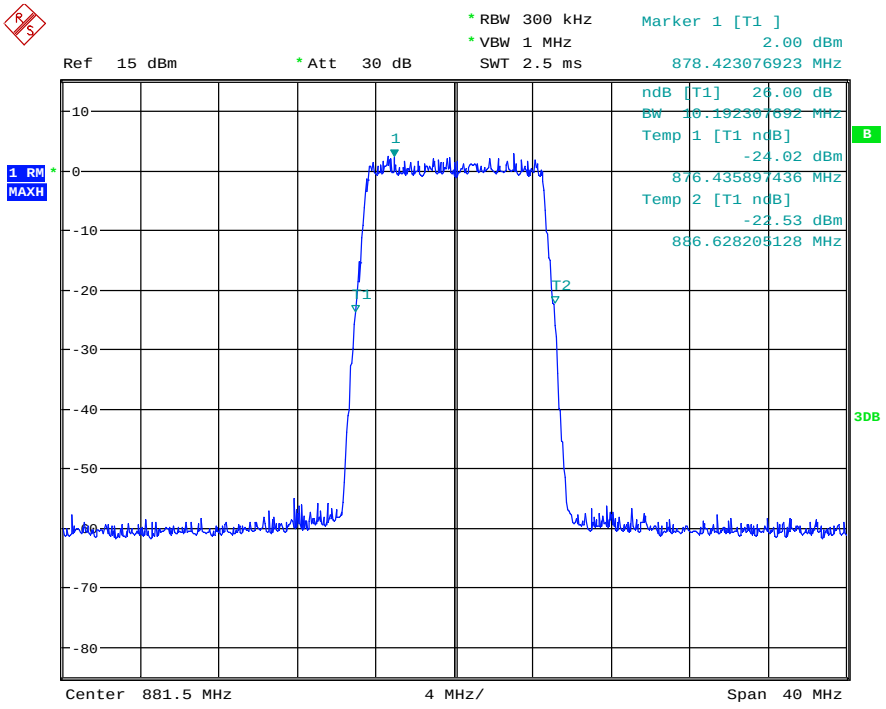


Date: 12.JAN.2019 14:29:22

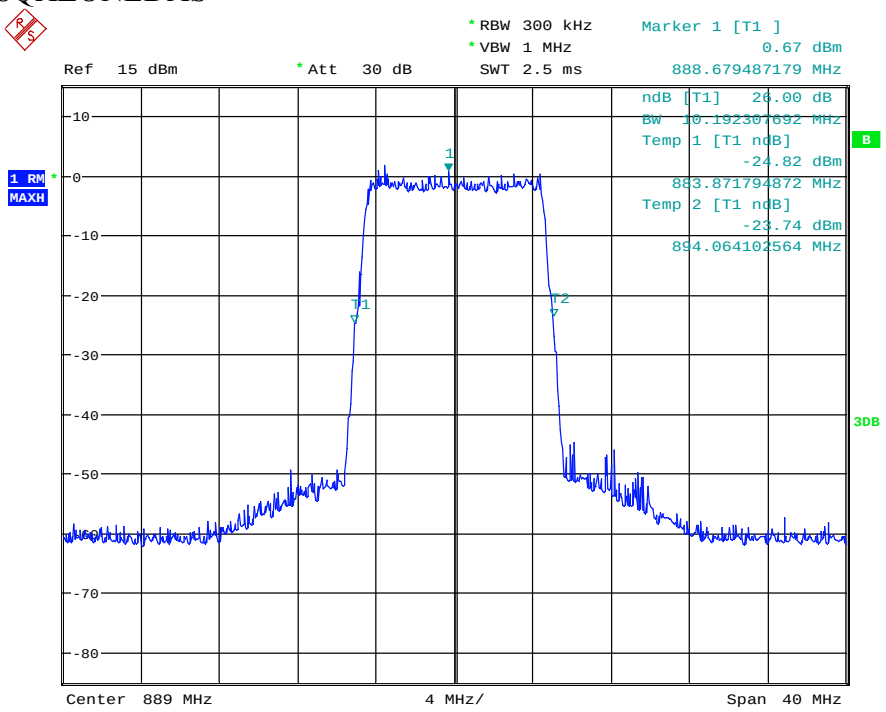
Report Number: W6M21812-18679-P-20
FCC ID: 2ASQXZONEDAS
Band V
Input
Downlink



Date: 16.JAN.2019 14:19:03

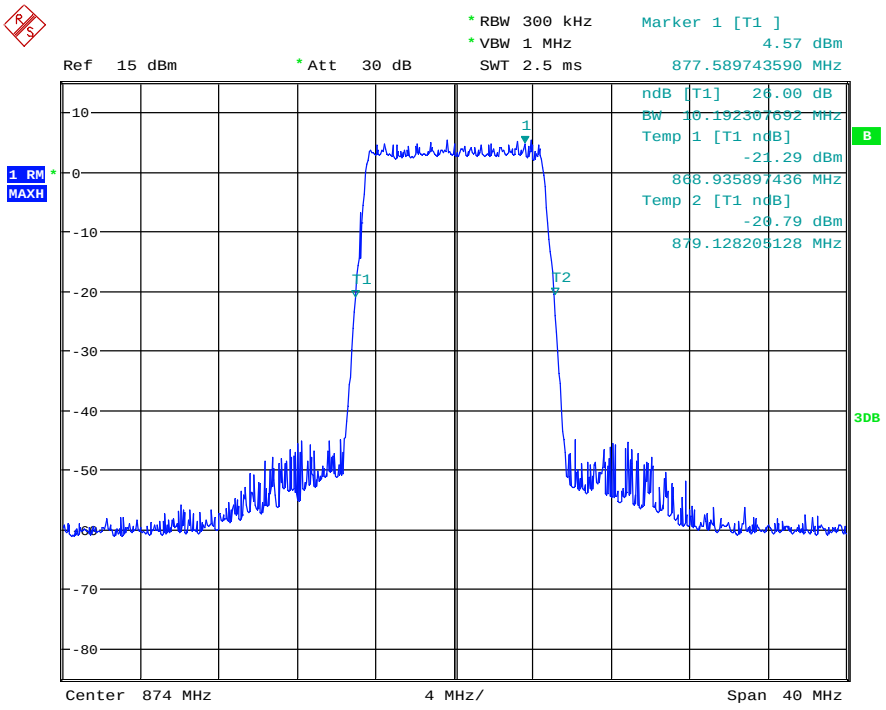


Date: 16.JAN.2019 14:19:39

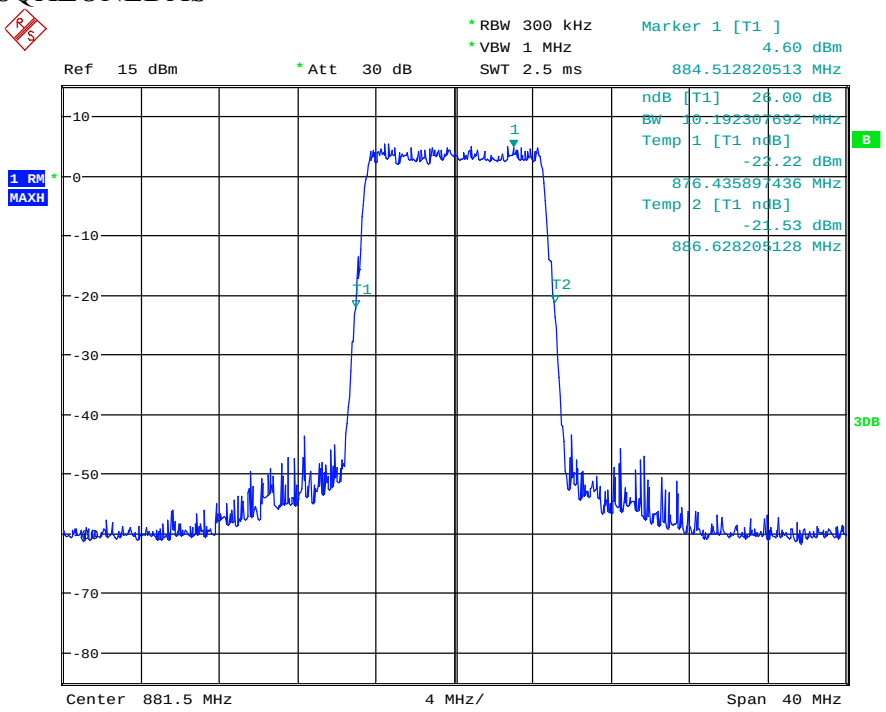


Date: 16.JAN.2019 14:25:41

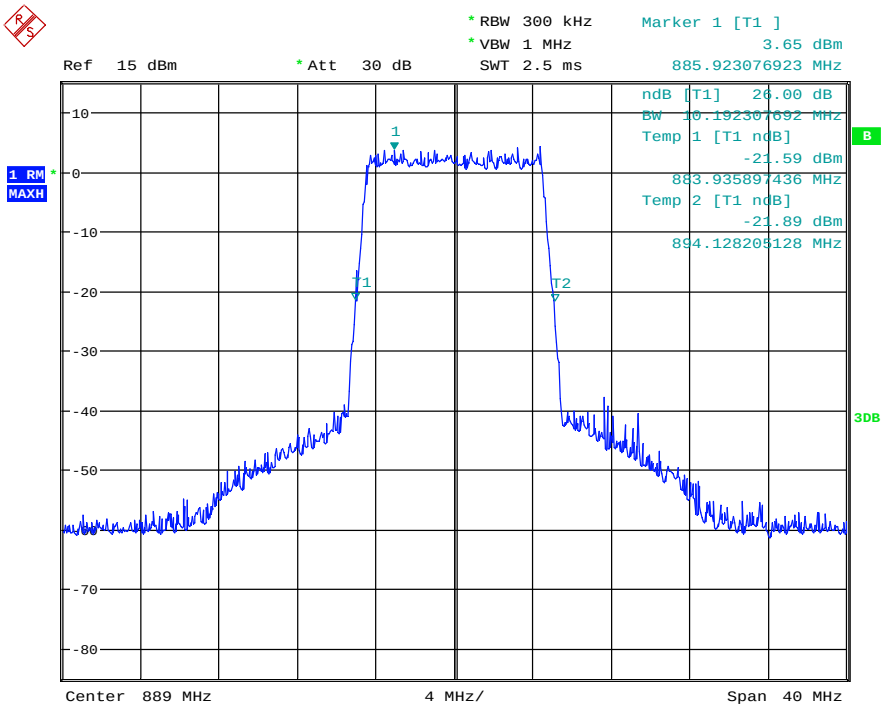
+3dB



Date: 16.JAN.2019 14:18:47

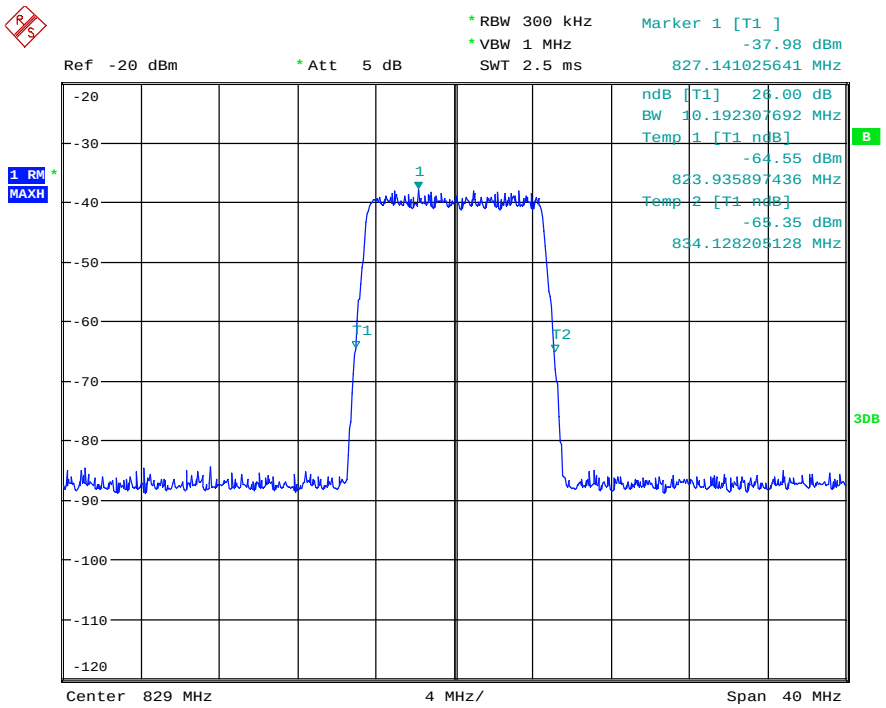


Date: 16.JAN.2019 14:20:00

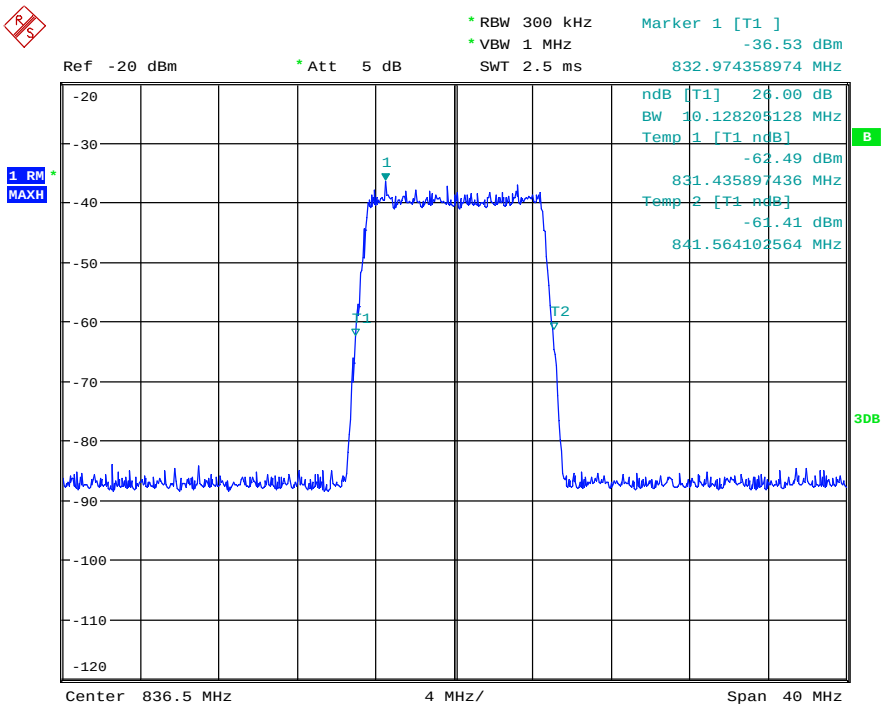


Date: 16.JAN.2019 14:25:22

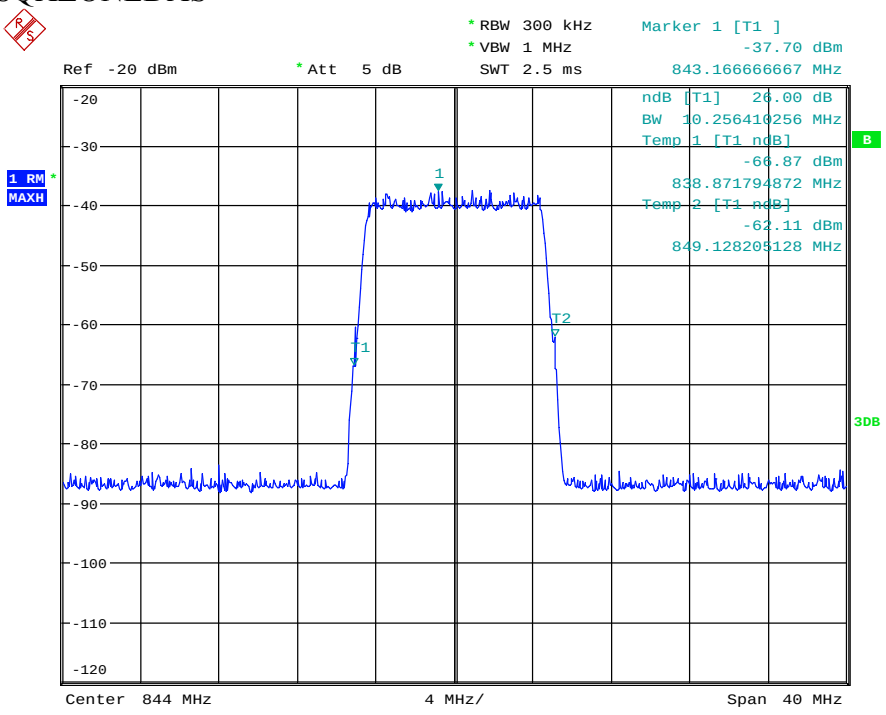
Report Number: W6M21812-18679-P-20
FCC ID: 2ASQXZONEDAS
Uplink



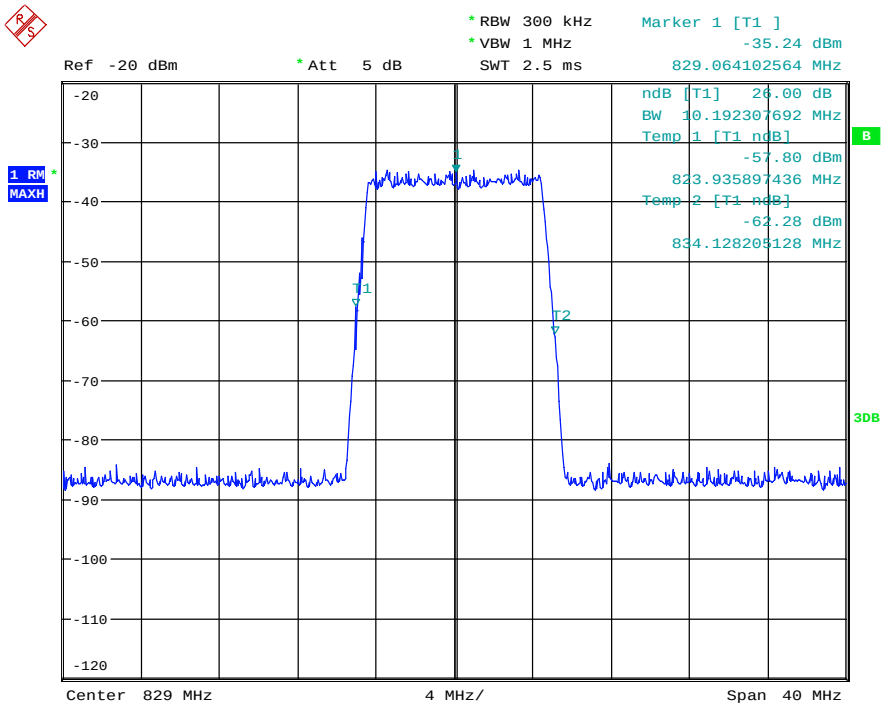
Date: 12.JAN.2019 14:44:28

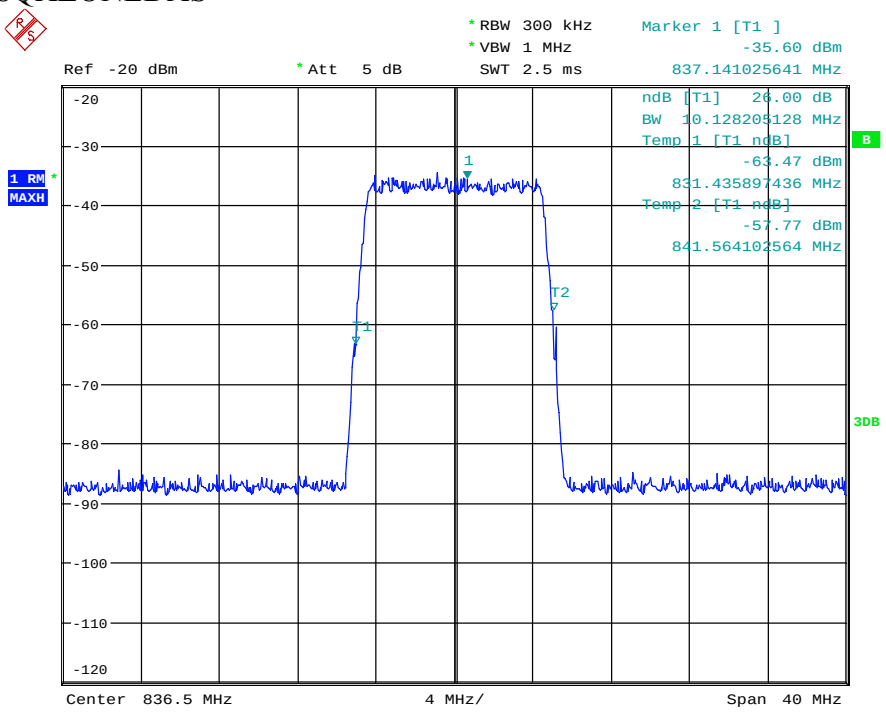


Date: 12.JAN.2019 14:45:35

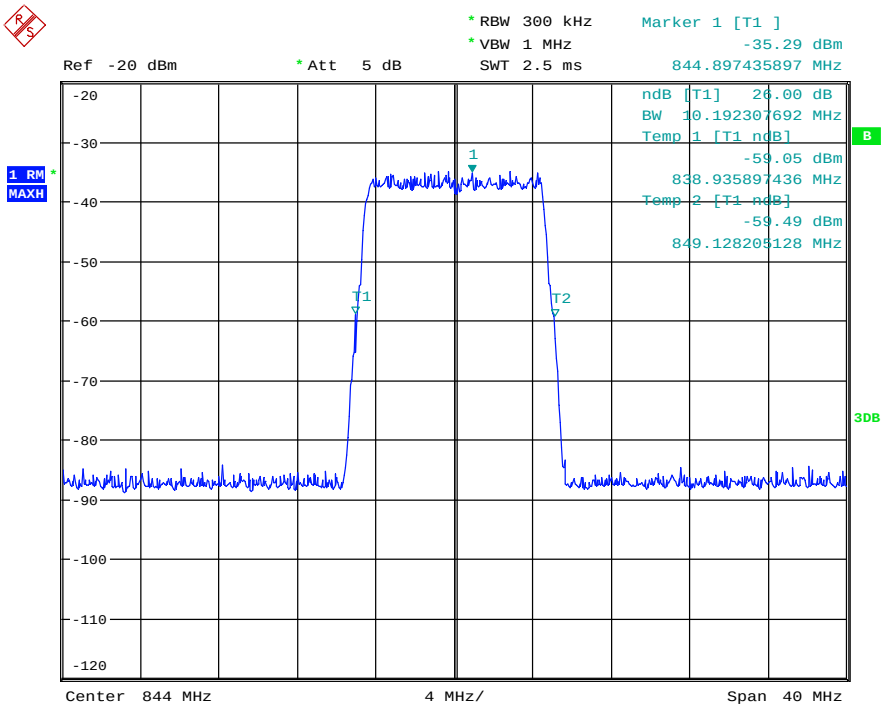

*RBW 300 kHz
*VBW 1 MHz
Ref -20 dBm
*Att 5 dB
SWT 2.5 ms
Marker 1 [T1]
-37.70 dBm
843.166666667 MHz
ndB [T1] 26.00 dB
BW 10.256410256 MHz
Temp 1 [T1 ndB]
-66.87 dBm
838.871794872 MHz
Temp 2 [T1 ndB]
-62.11 dBm
849.128205128 MHz
1 RM
MAXH
B
3DB
T1
T2
Center 844 MHz
4 MHz/
Span 40 MHz
Date: 12.JAN.2019 14:49:45

+3dB


*RBW 300 kHz
*VBW 1 MHz
Ref -20 dBm
*Att 5 dB
SWT 2.5 ms
Marker 1 [T1]
-35.24 dBm
829.064102564 MHz
ndB [T1] 26.00 dB
BW 10.192307692 MHz
Temp 1 [T1 ndB]
-57.80 dBm
823.935897436 MHz
Temp 2 [T1 ndB]
-62.28 dBm
834.128205128 MHz
1 RM
MAXH
B
3DB
T1
T2
Center 829 MHz
4 MHz/
Span 40 MHz
Date: 12.JAN.2019 14:44:12

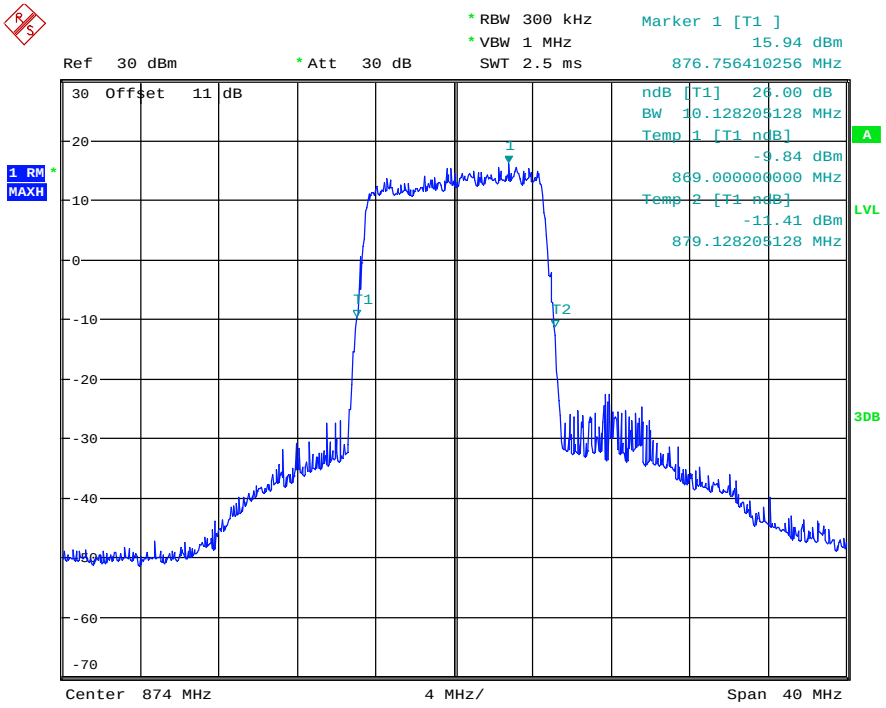


Date: 12.JAN.2019 14:45:54

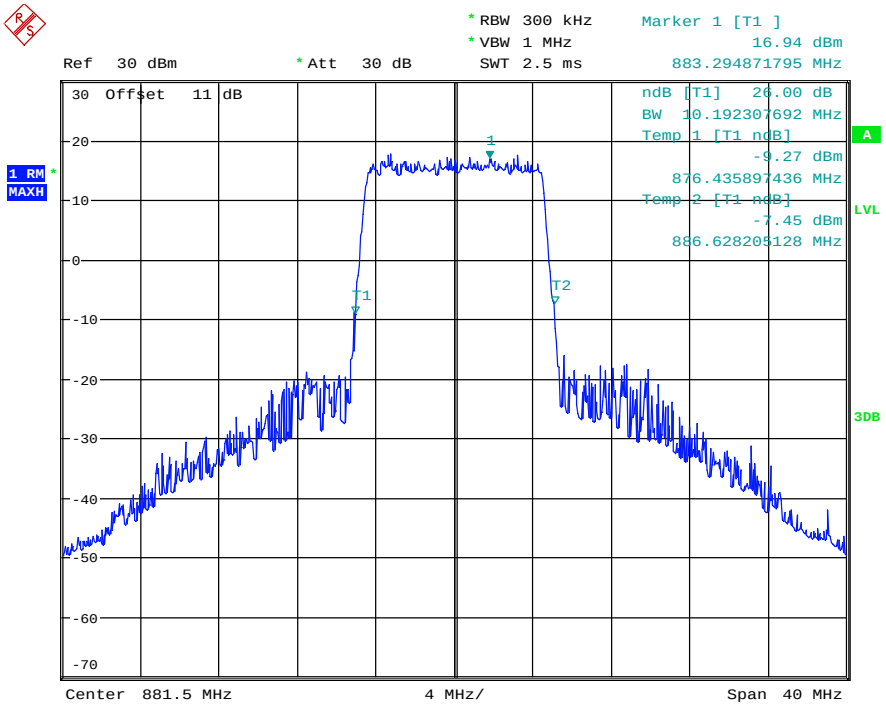


Date: 12.JAN.2019 14:50:03

Report Number: W6M21812-18679-P-20
FCC ID: 2ASQXZONEDAS
Output
Downlink

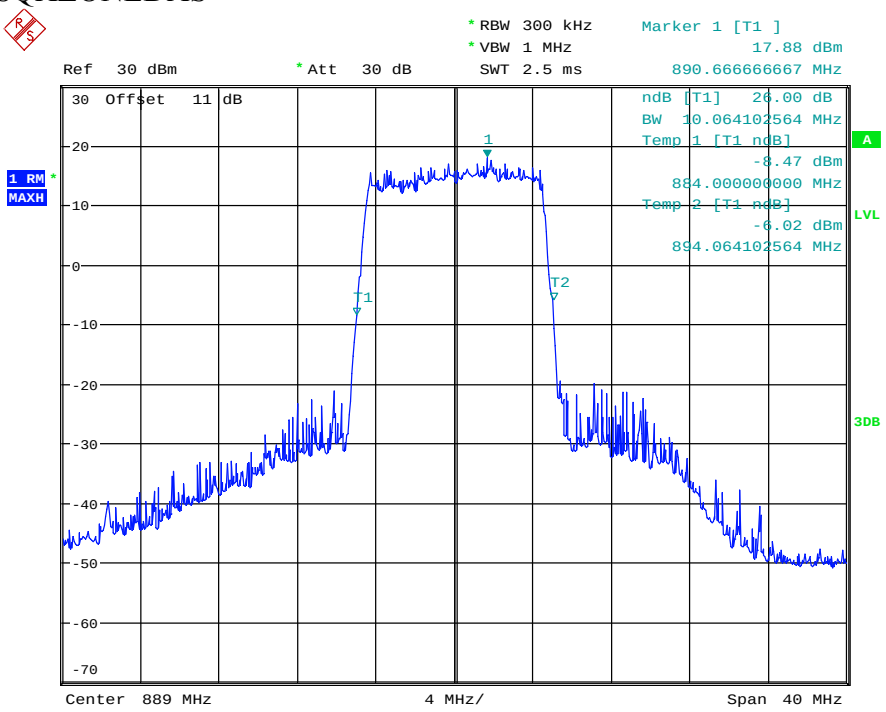


Date: 16.JAN.2019 14:17:34



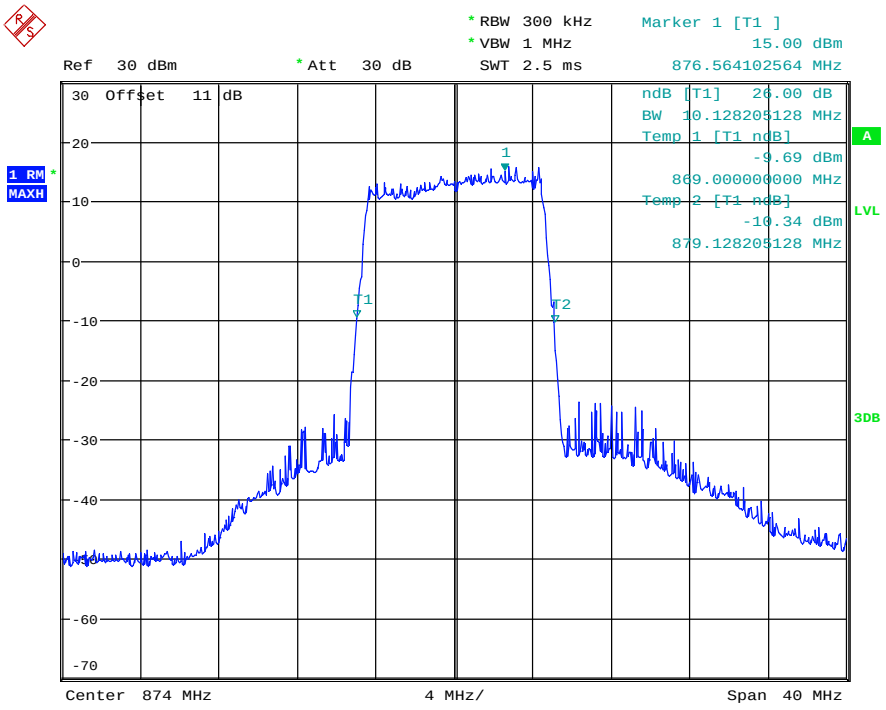
Date: 16.JAN.2019 14:21:40

Report Number: W6M21812-18679-P-20
FCC ID: 2ASQXZONEDAS

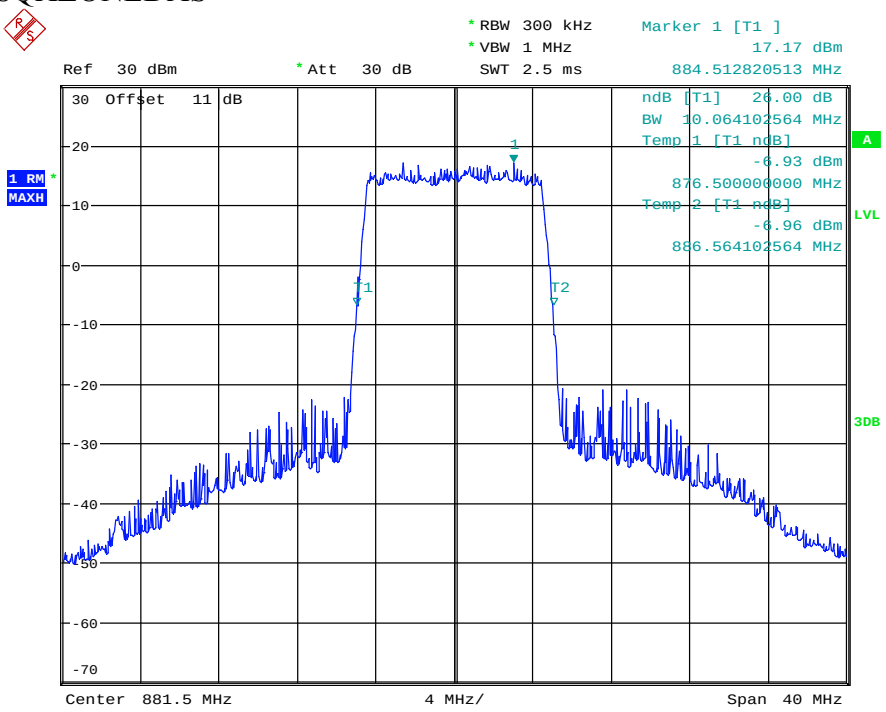


Date: 16.JAN.2019 14:24:14

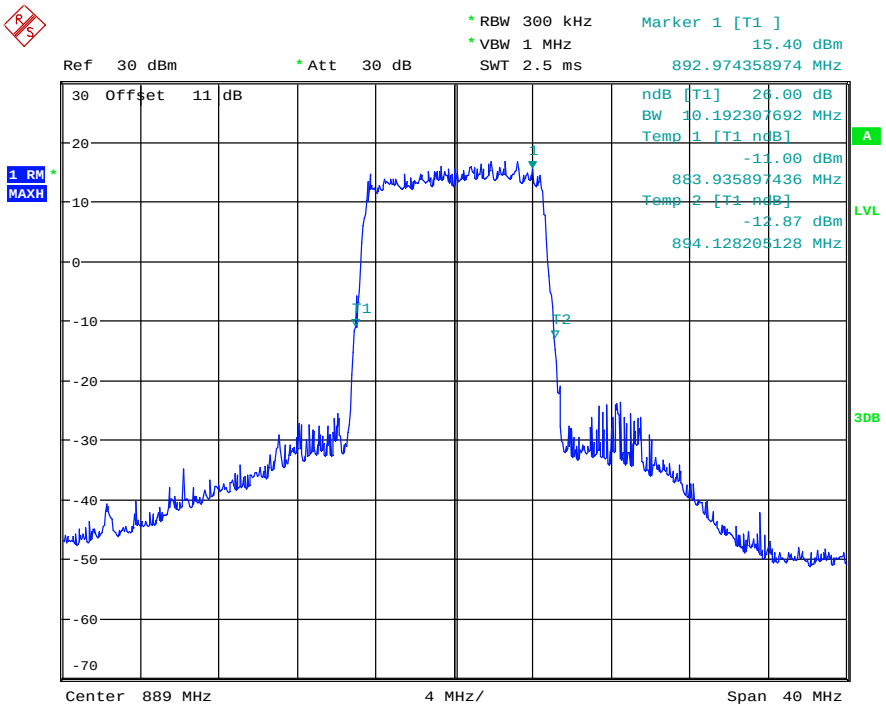
+3dB



Date: 16.JAN.2019 14:17:52

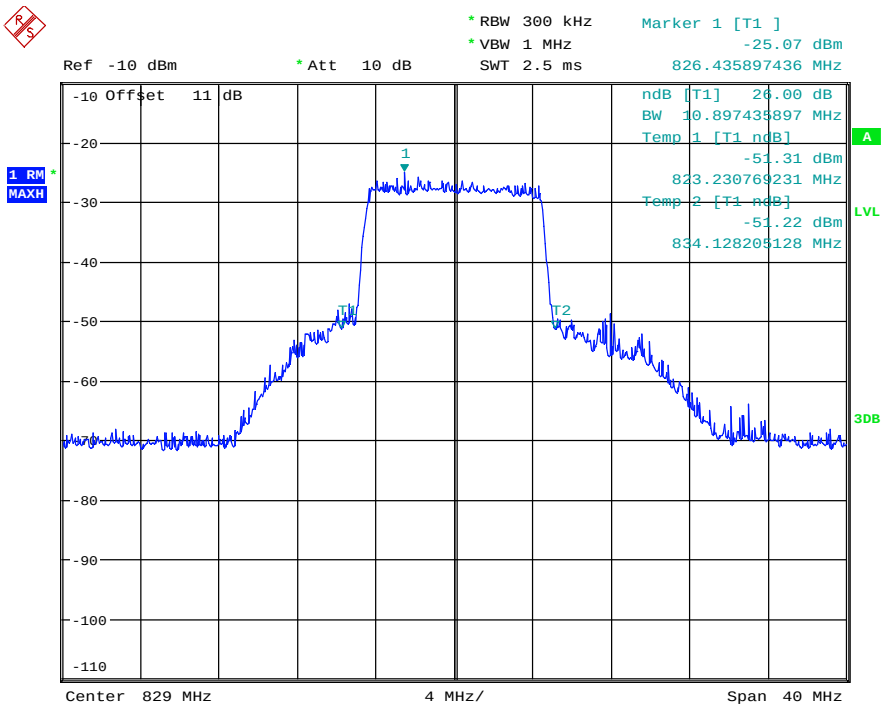


Date: 16.JAN.2019 14:22:07

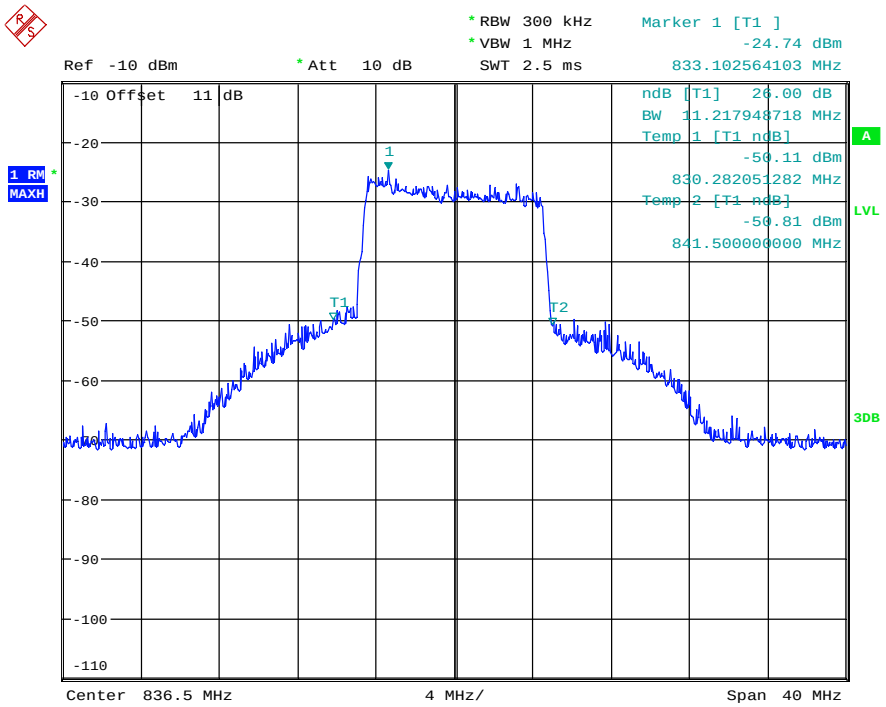


Date: 16.JAN.2019 14:24:33

Report Number: W6M21812-18679-P-20
FCC ID: 2ASQXZONEDAS
Uplink

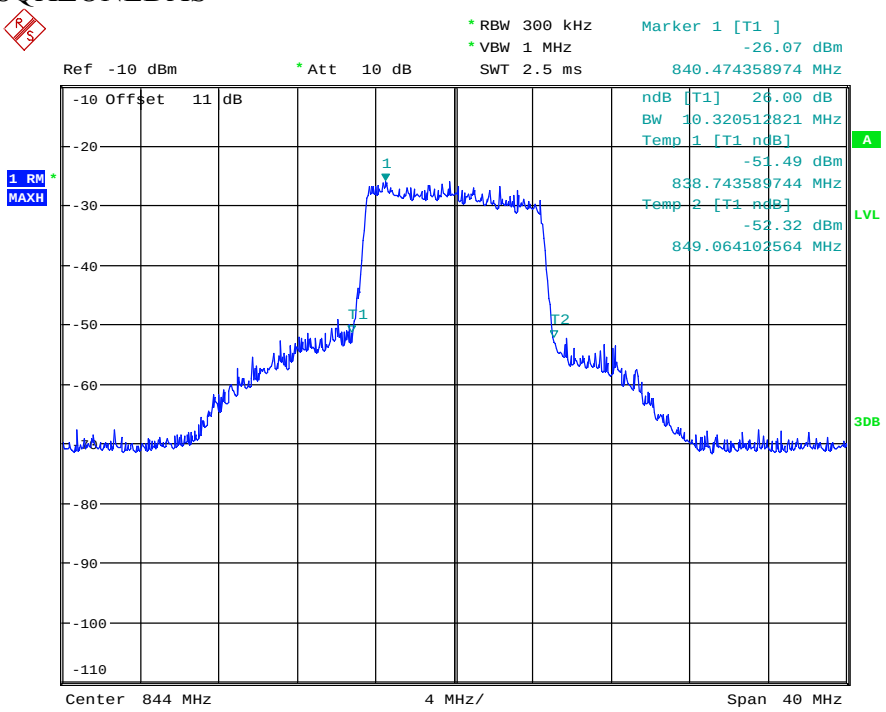


Date: 12.JAN.2019 14:42:52



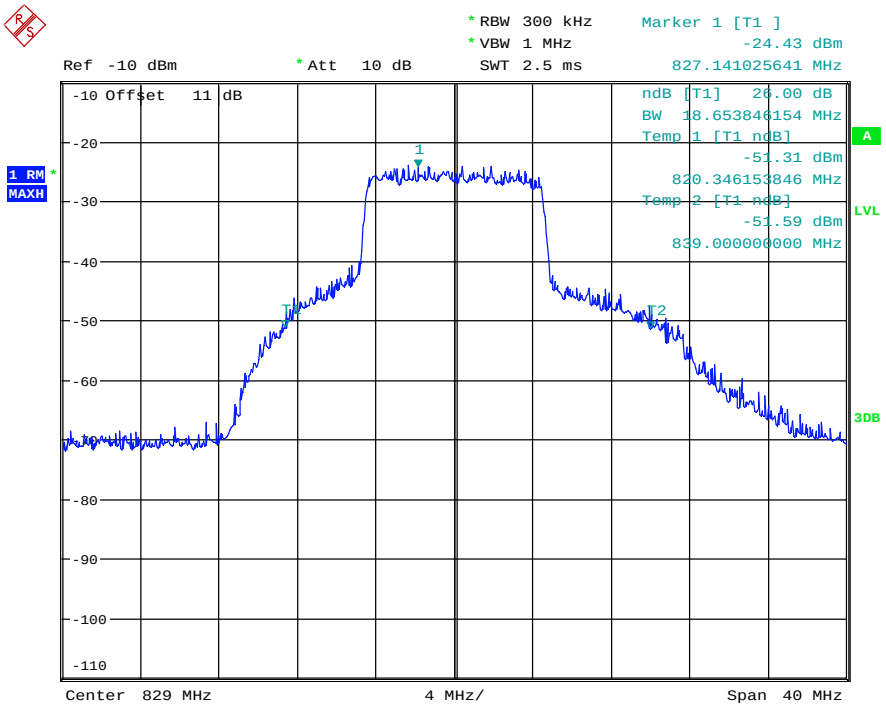
Date: 12.JAN.2019 14:47:09

Report Number: W6M21812-18679-P-20
FCC ID: 2ASQXZONEDAS

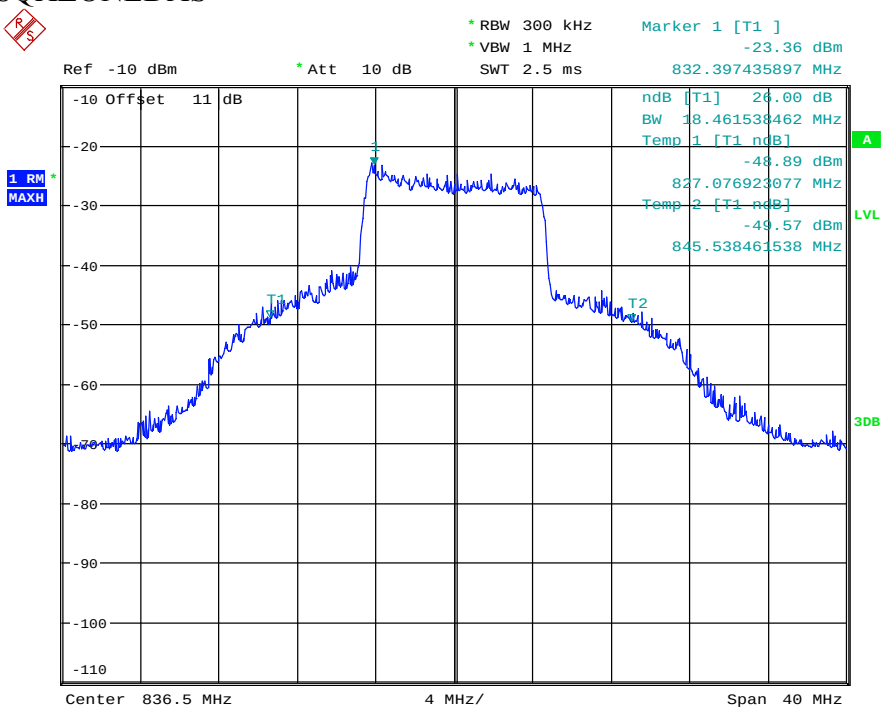


Date: 12.JAN.2019 14:48:42

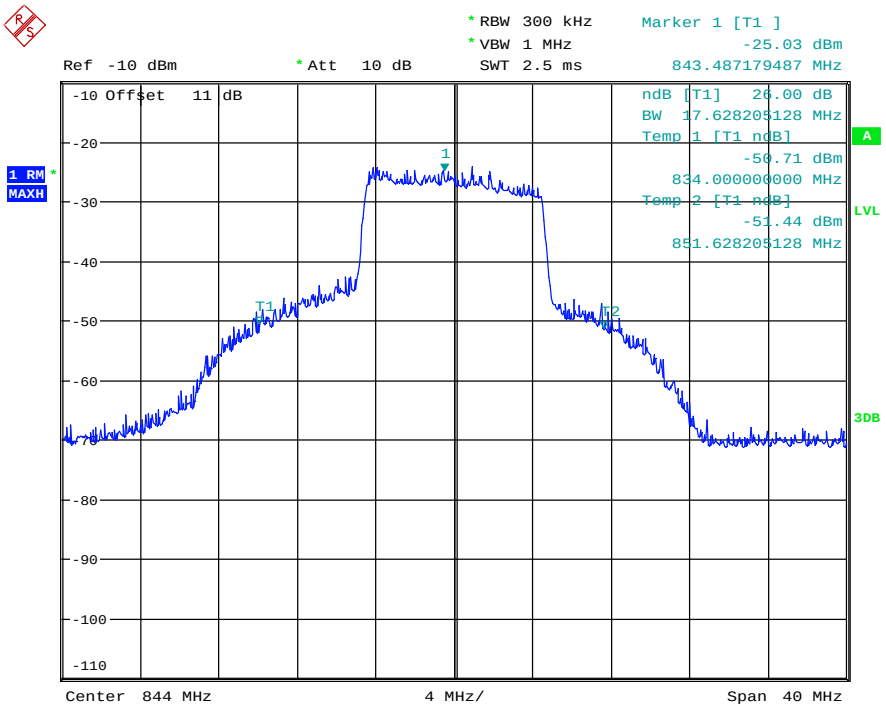
+3dB



Date: 12.JAN.2019 14:43:11

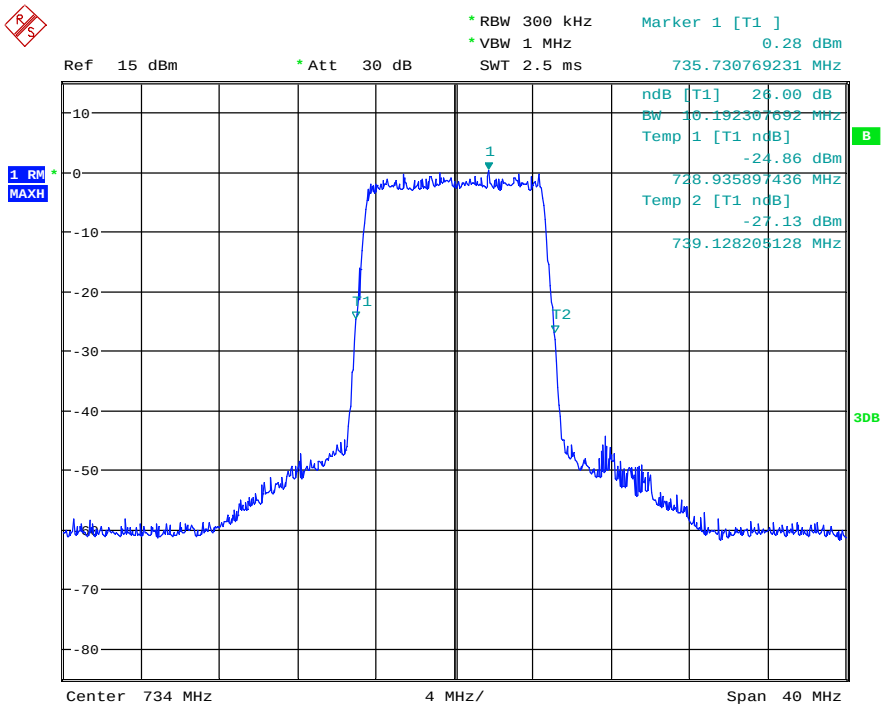


Date: 12.JAN.2019 14:46:51

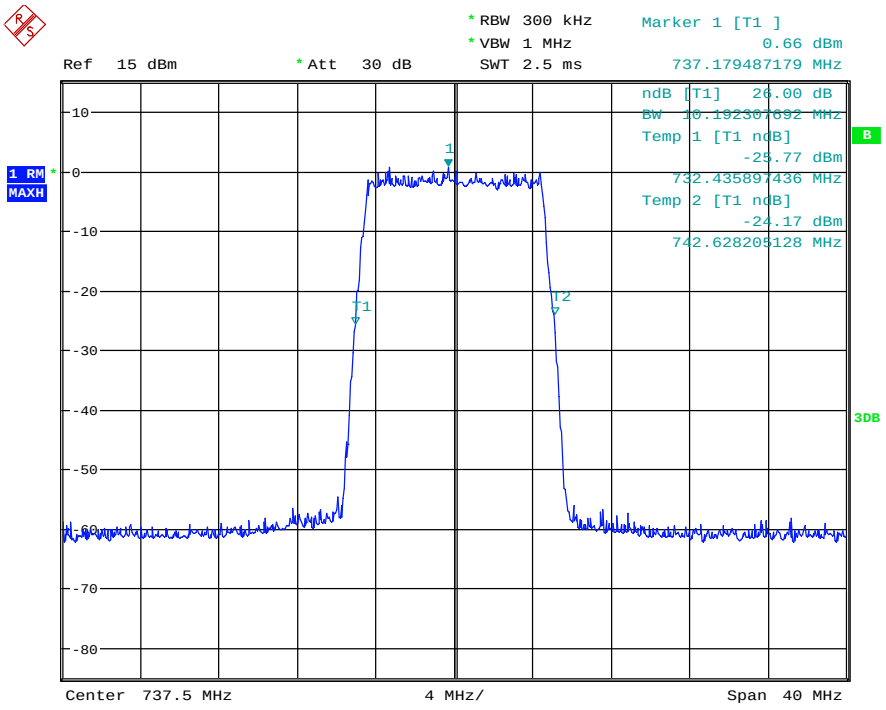


Date: 12.JAN.2019 14:48:22

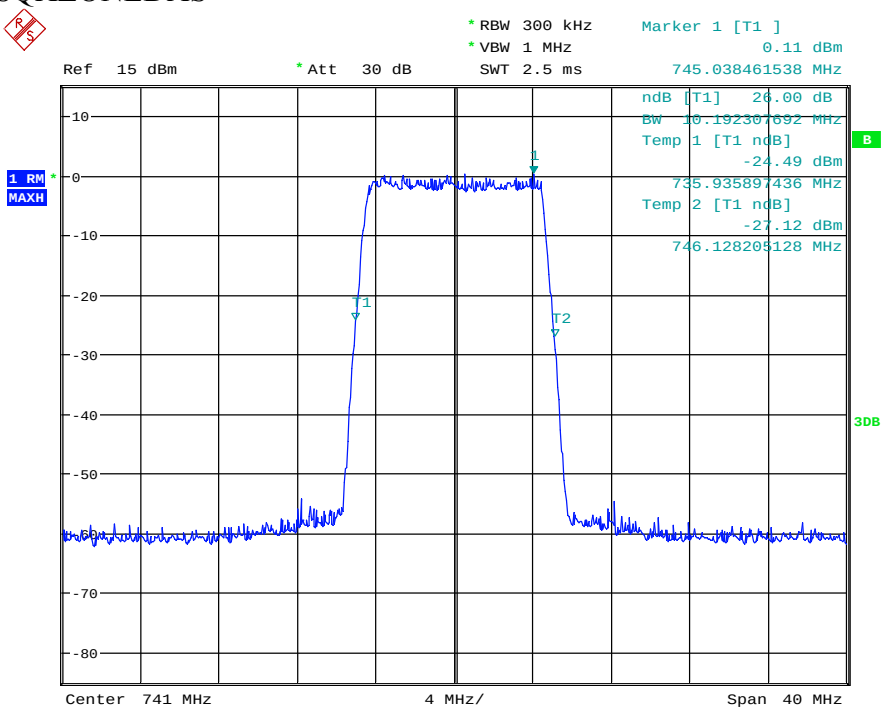
Report Number: W6M21812-18679-P-20
FCC ID: 2ASQXZONEDAS
Band XII
Input
Downlink



Date: 16.JAN.2019 14:28:05

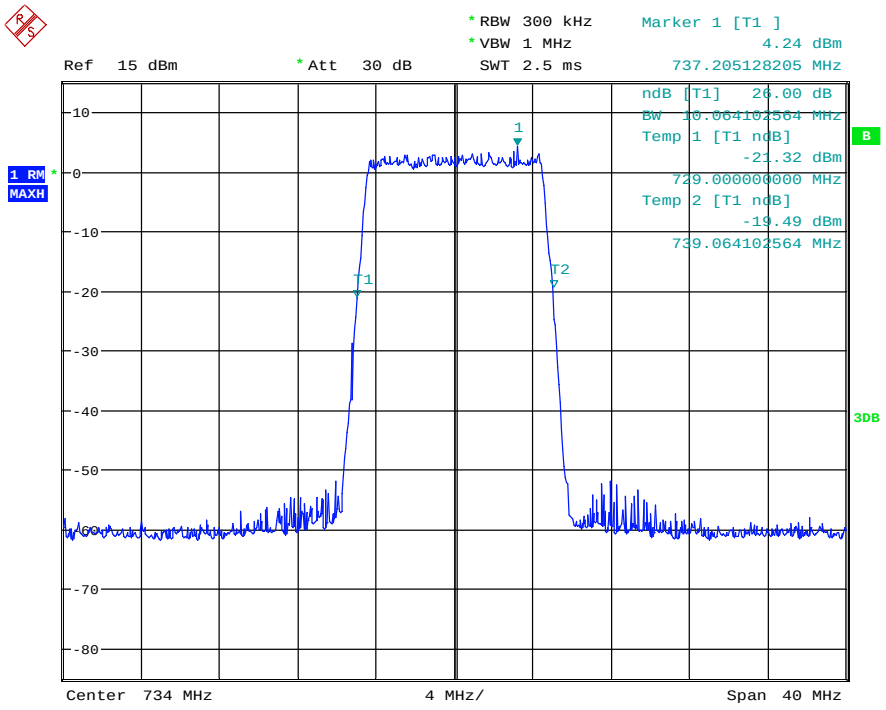


Date: 16.JAN.2019 14:34:07

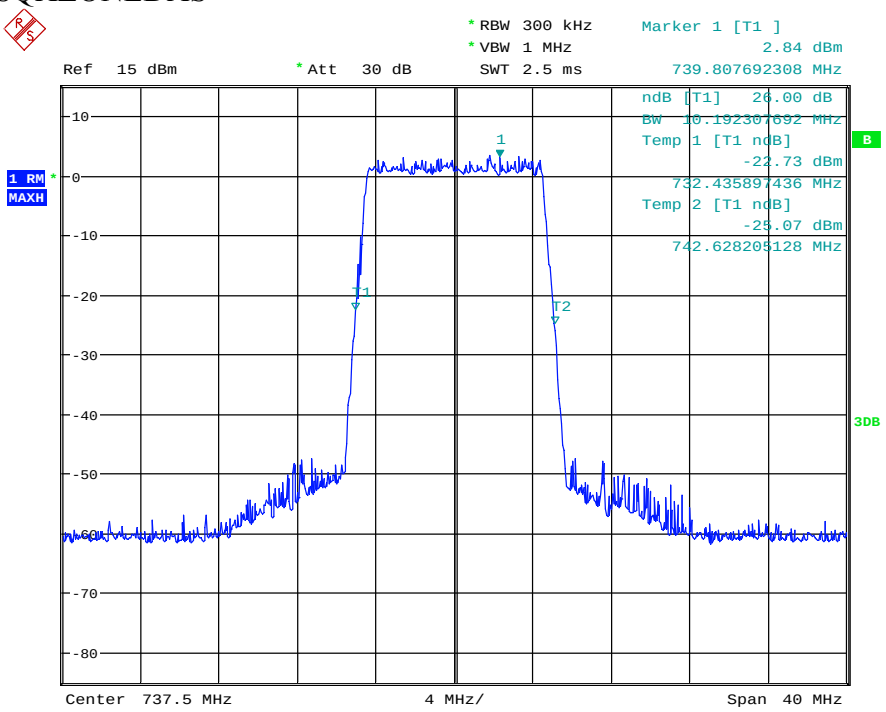


Date: 16.JAN.2019 14:35:34

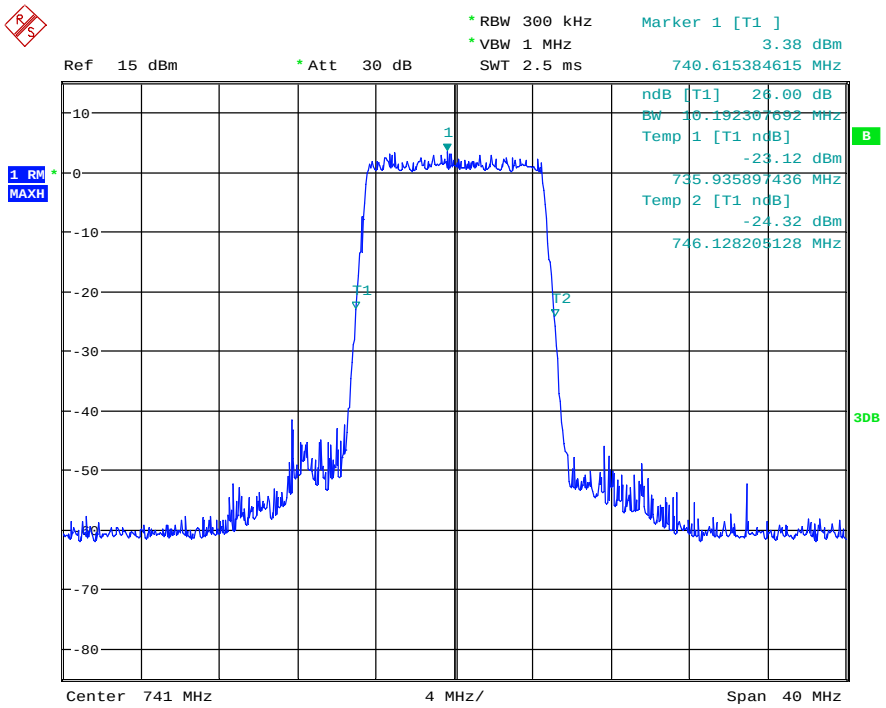
+3dB



Date: 16.JAN.2019 14:28:27

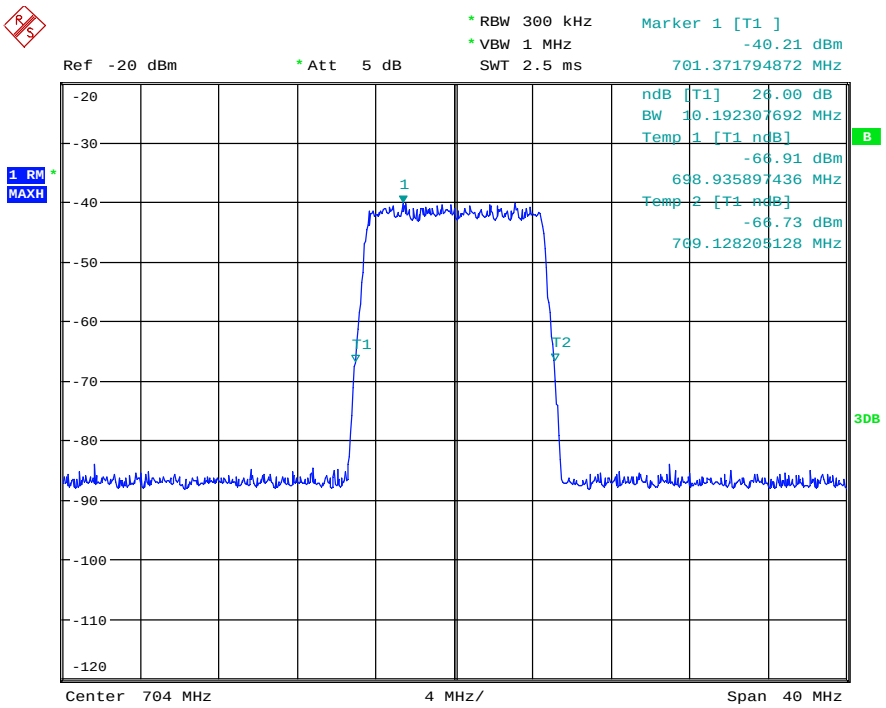


Date: 16.JAN.2019 14:33:44

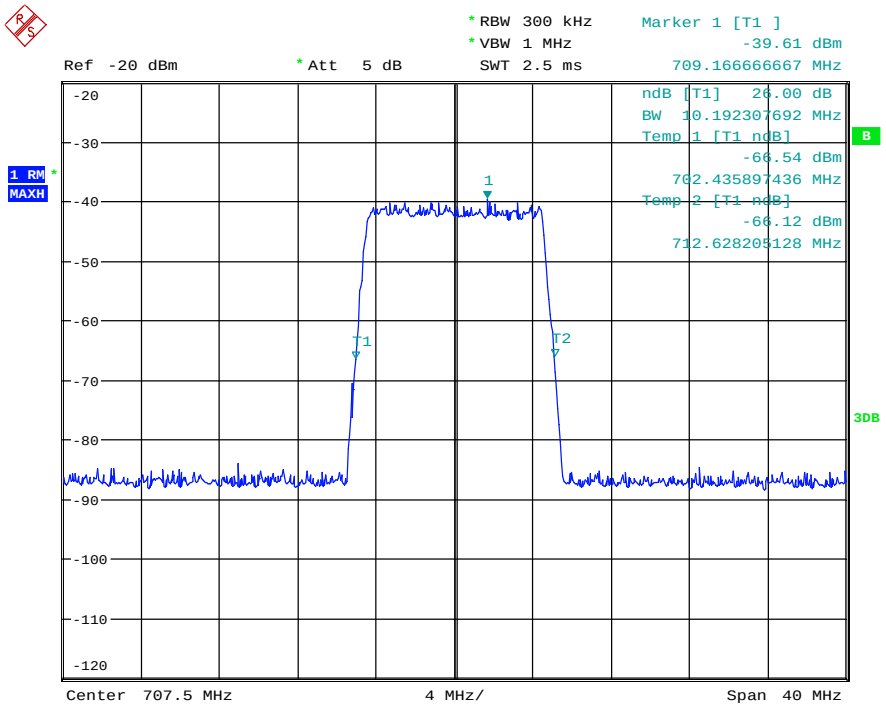


Date: 16.JAN.2019 14:35:55

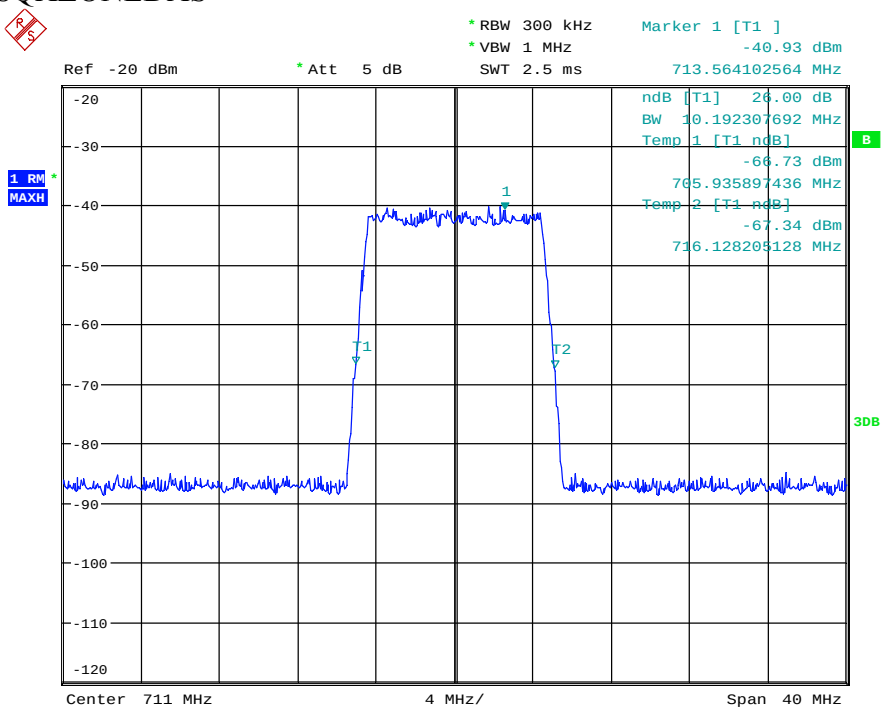
Report Number: W6M21812-18679-P-20
FCC ID: 2ASQXZONEDAS
Uplink



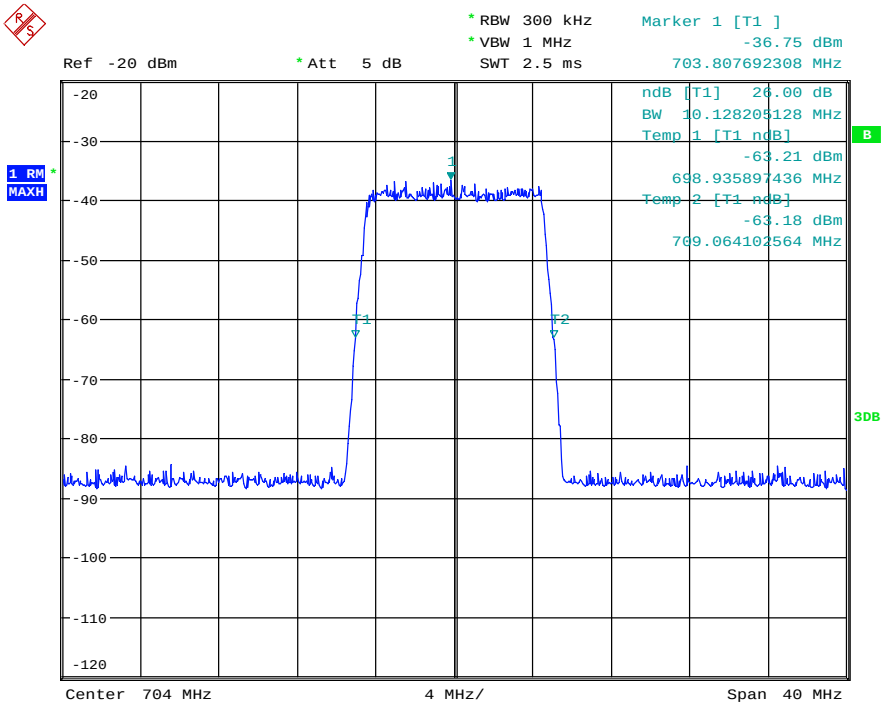
Date: 12.JAN.2019 14:52:34

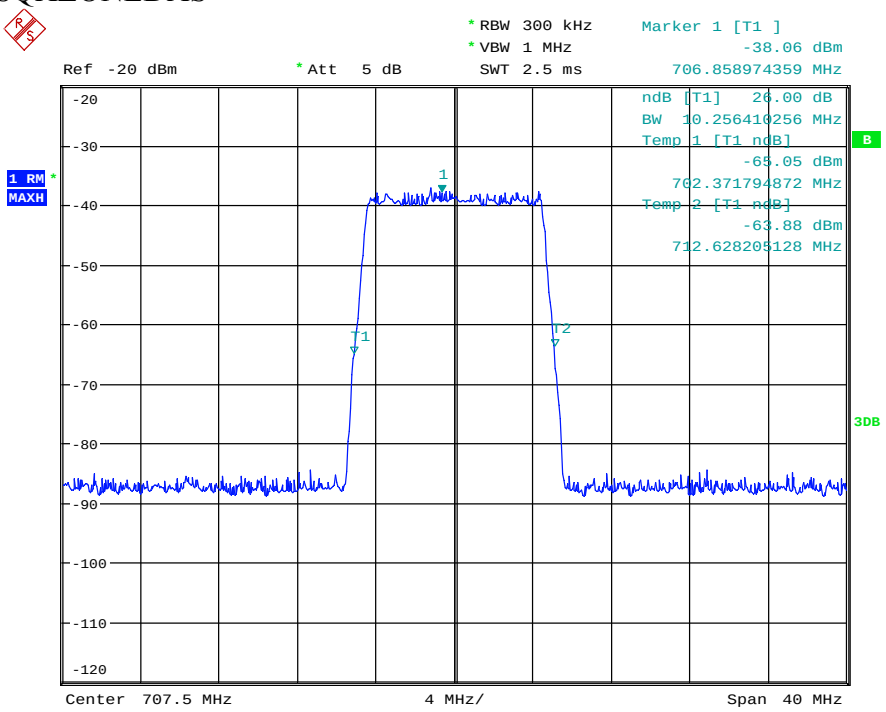


Date: 12.JAN.2019 14:58:45

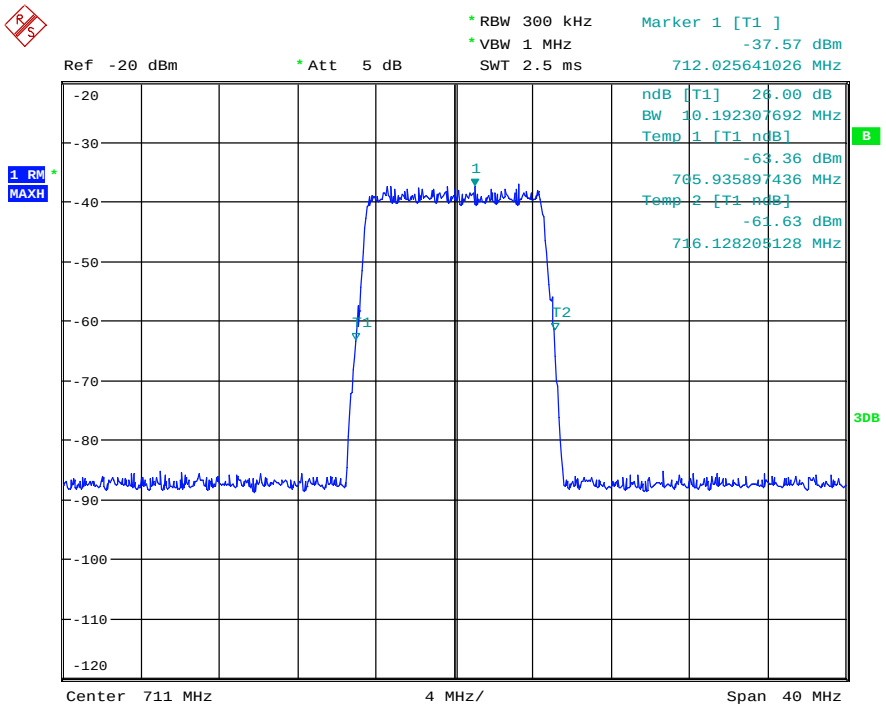

RBW 300 kHz
VBW 1 MHz
SWT 2.5 ms
Marker 1 [T1]
-40.93 dBm
713.564102564 MHz
Ref -20 dBm
Att 5 dB
ndB [T1] 26.00 dB
BW 10.192307692 MHz
Temp 1 [T1 ndB]
-66.73 dBm
705.935897436 MHz
Temp 2 [T1 ndB]
-67.34 dBm
716.128205128 MHz
1 RM
MAXH
B
3DB
Center 711 MHz
4 MHz/
Span 40 MHz
Date: 12.JAN.2019 15:00:36

+3dB


RBW 300 kHz
VBW 1 MHz
SWT 2.5 ms
Marker 1 [T1]
-36.75 dBm
703.807692308 MHz
Ref -20 dBm
Att 5 dB
ndB [T1] 26.00 dB
BW 10.128205128 MHz
Temp 1 [T1 ndB]
-63.21 dBm
698.935897436 MHz
Temp 2 [T1 ndB]
-63.18 dBm
709.064102564 MHz
1 RM
MAXH
B
3DB
Center 704 MHz
4 MHz/
Span 40 MHz
Date: 12.JAN.2019 14:52:55

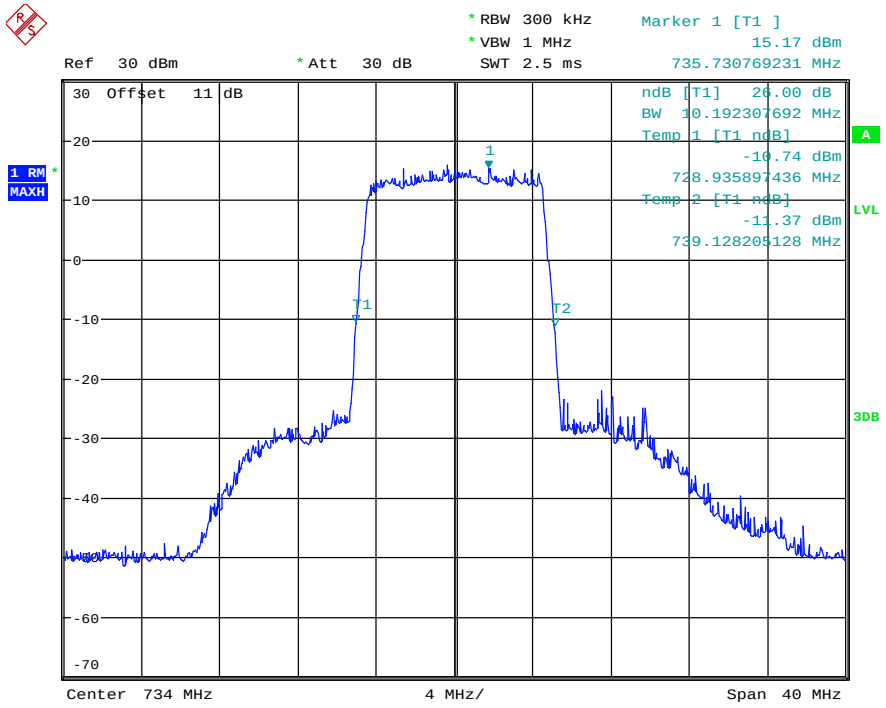


Date: 12.JAN.2019 14:59:04

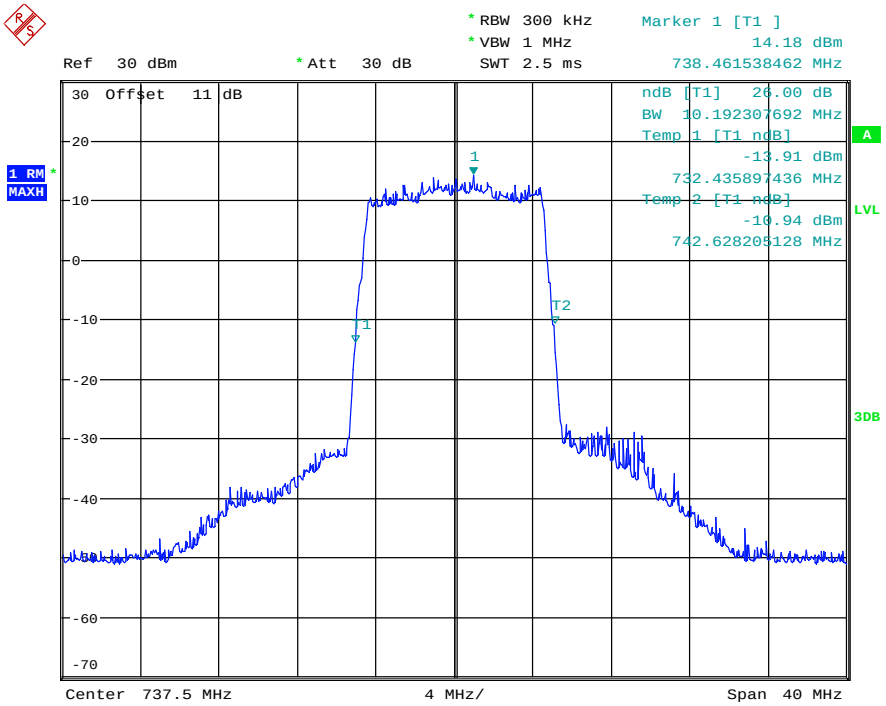


Date: 12.JAN.2019 15:00:54

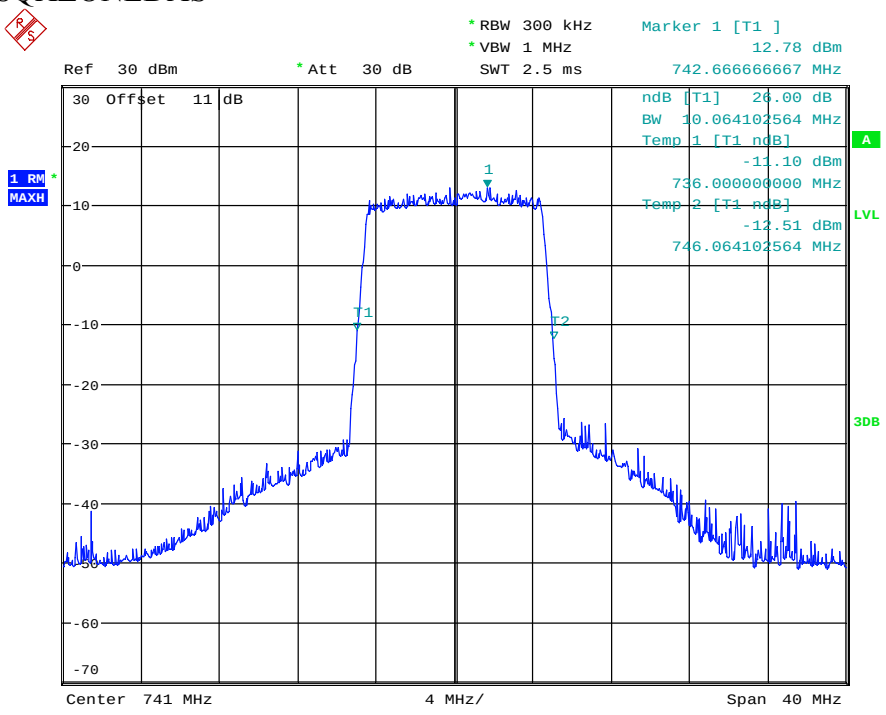
Report Number: W6M21812-18679-P-20
FCC ID: 2ASQXZONEDAS
Output
Downlink



Date: 16.JAN.2019 14:30:19

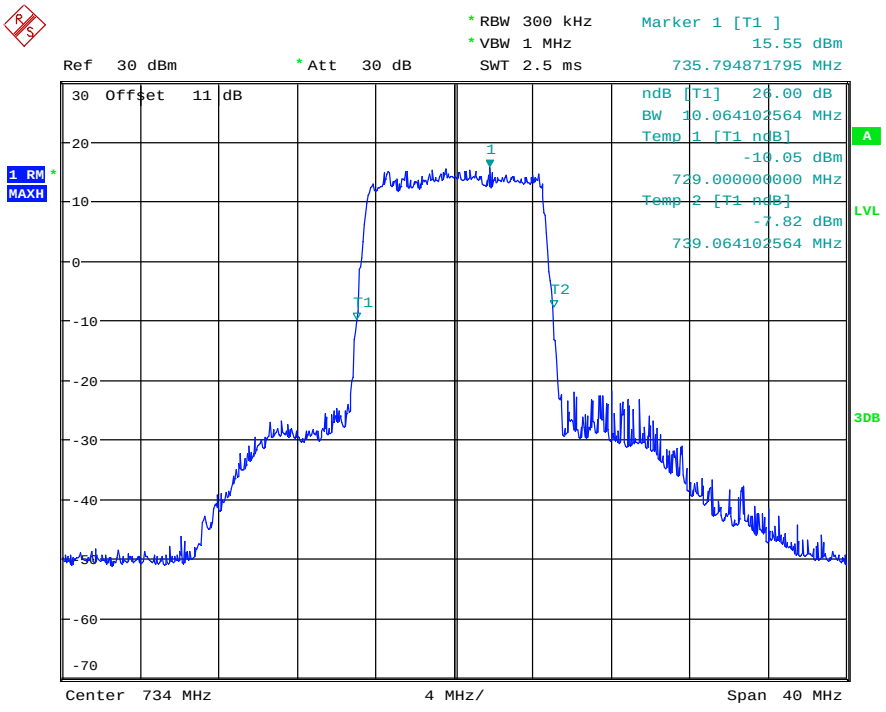


Date: 16.JAN.2019 14:32:29

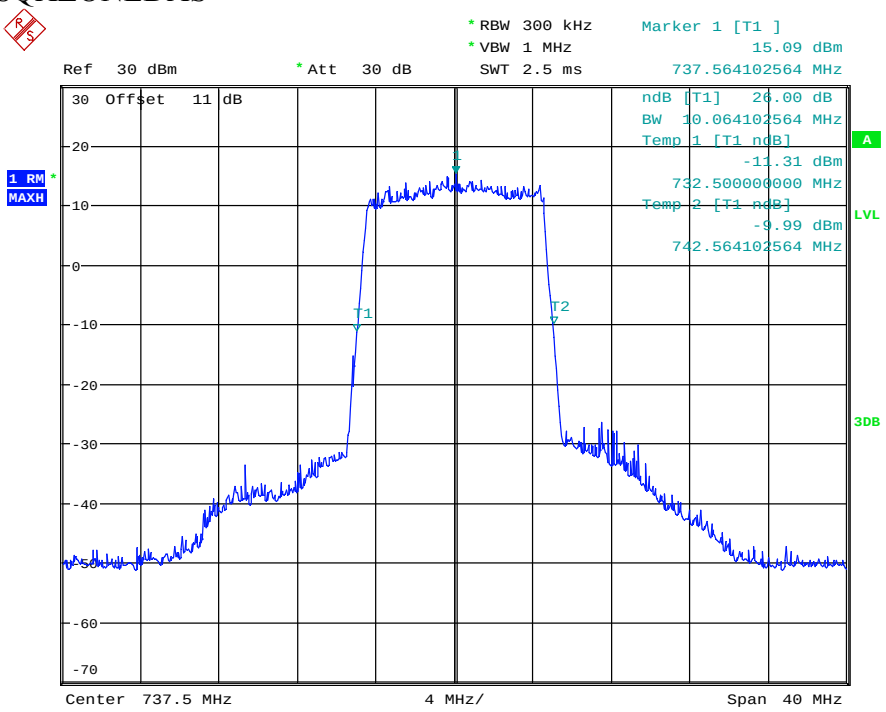


Date: 16.JAN.2019 14:37:42

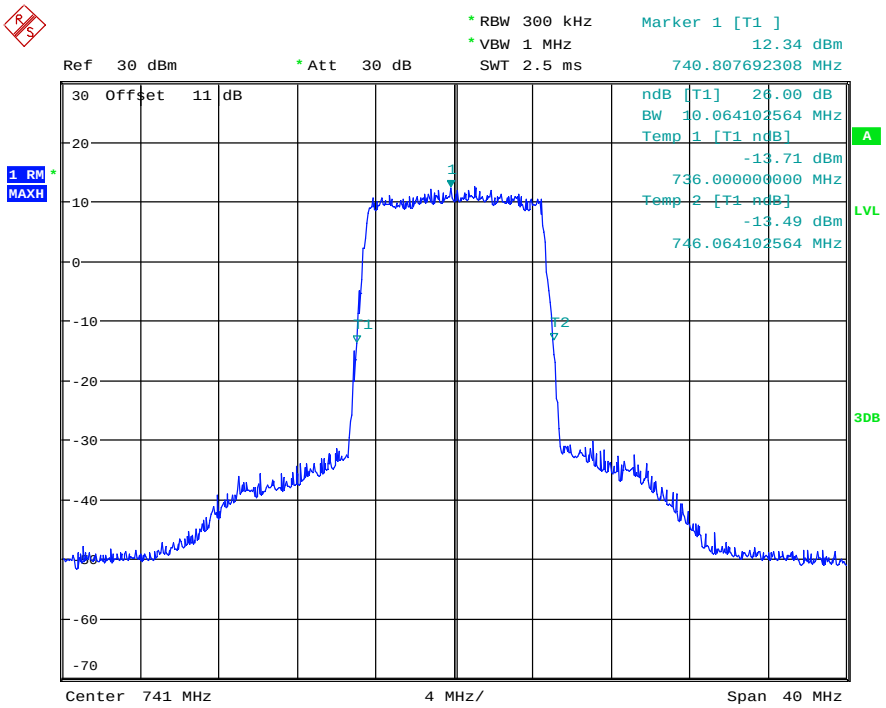
+3dB



Date: 16.JAN.2019 14:30:46

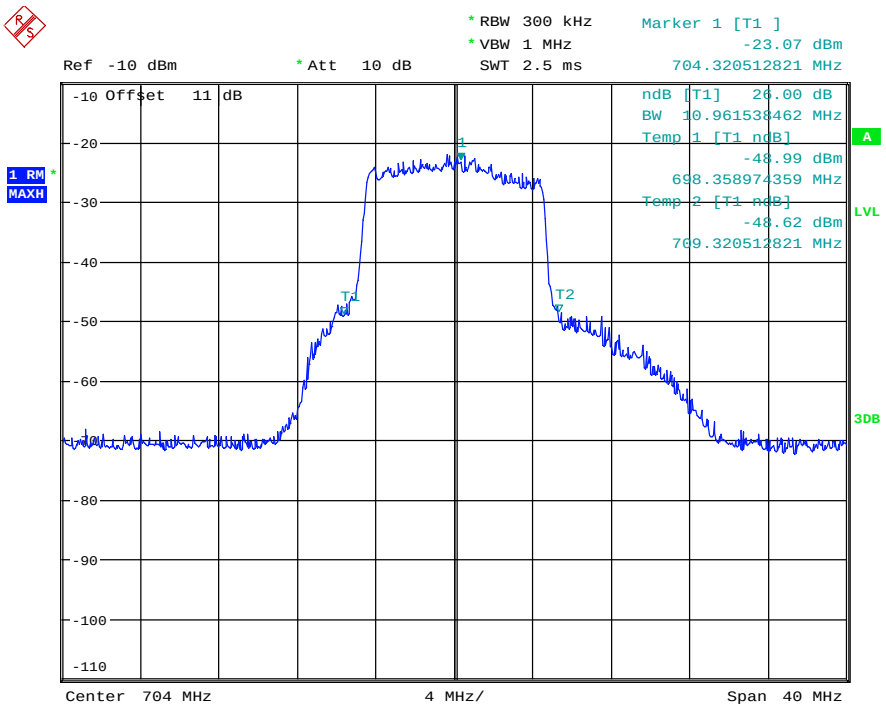


Date: 16.JAN.2019 14:32:52



Date: 16.JAN.2019 14:38:05

Report Number: W6M21812-18679-P-20
FCC ID: 2ASQXZONEDAS
Uplink



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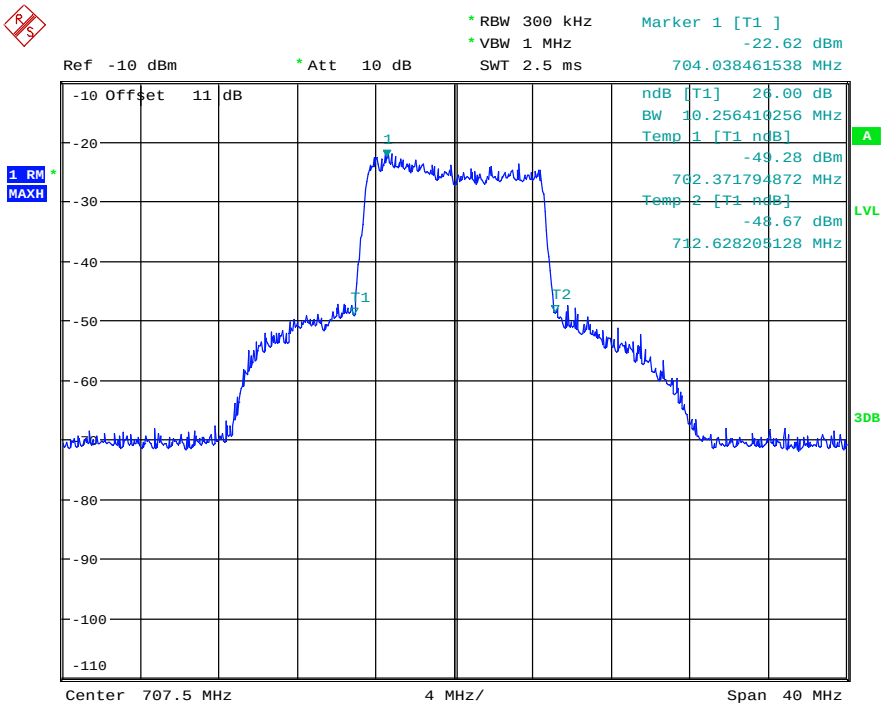

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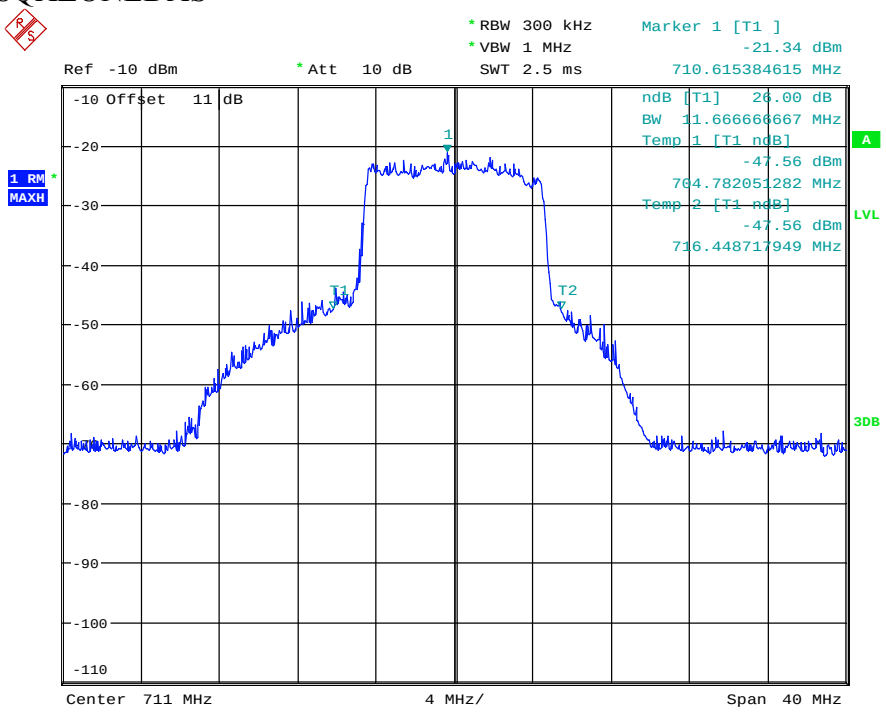

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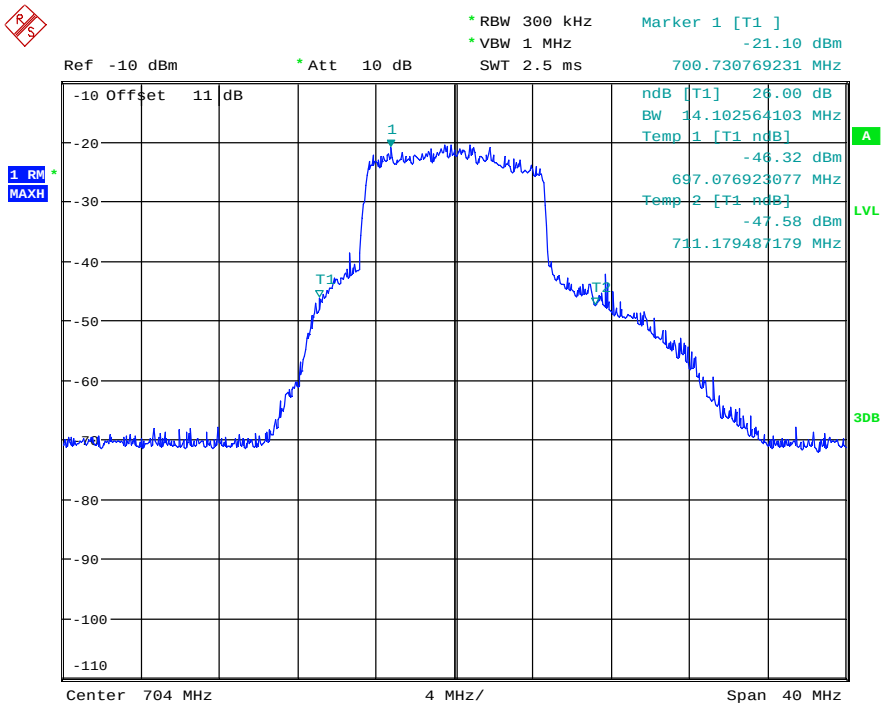
+3dB



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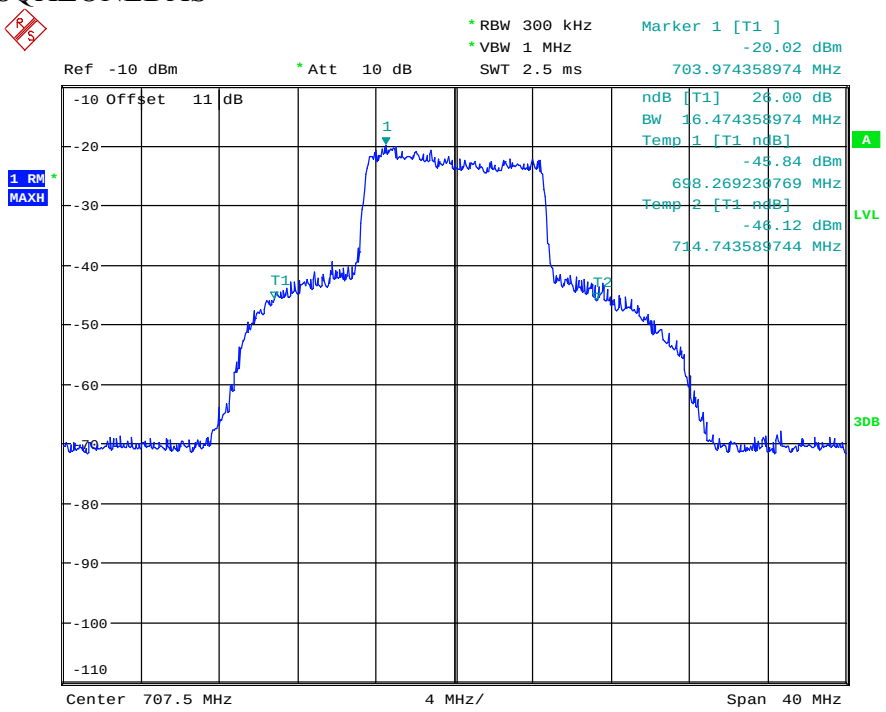

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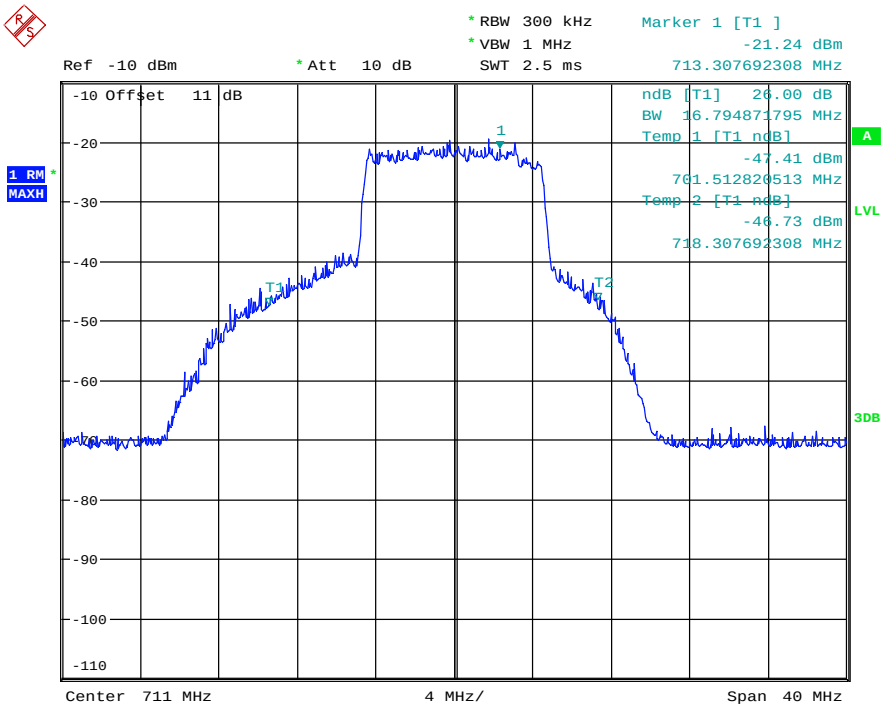

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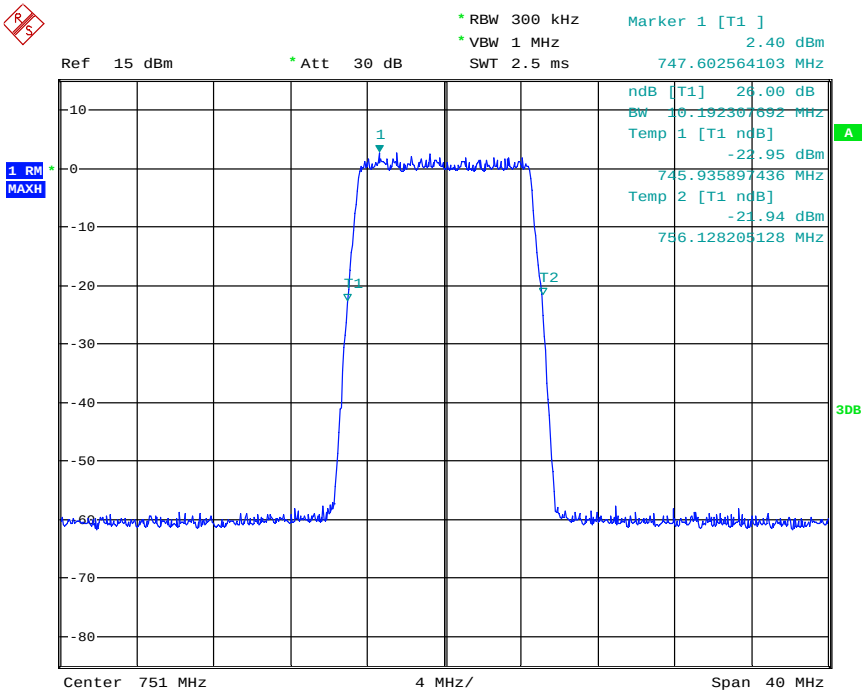
Report Number: W6M21812-18679-P-20
FCC ID: 2ASQXZONEDAS
Band XIII
Input
Downlink



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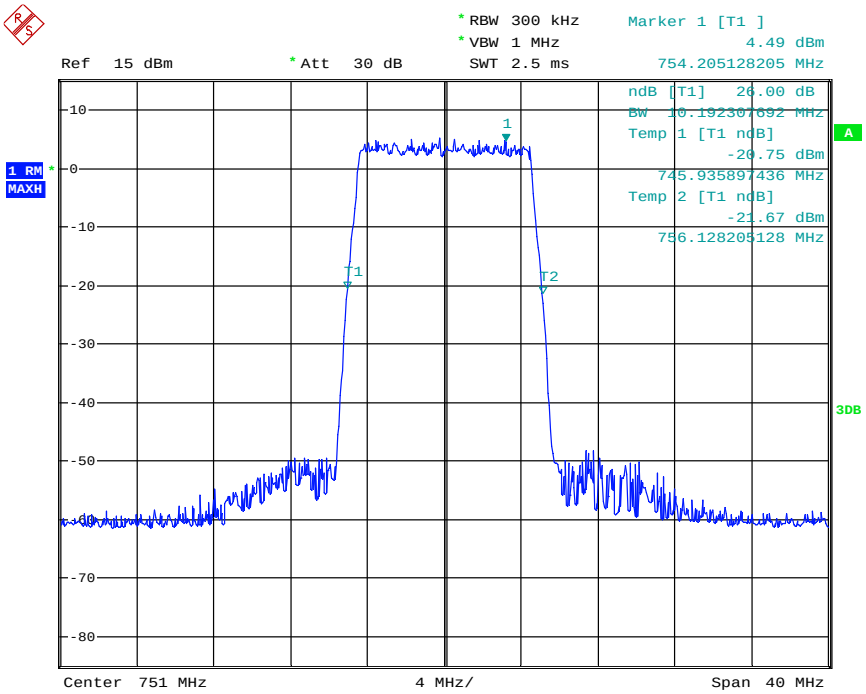

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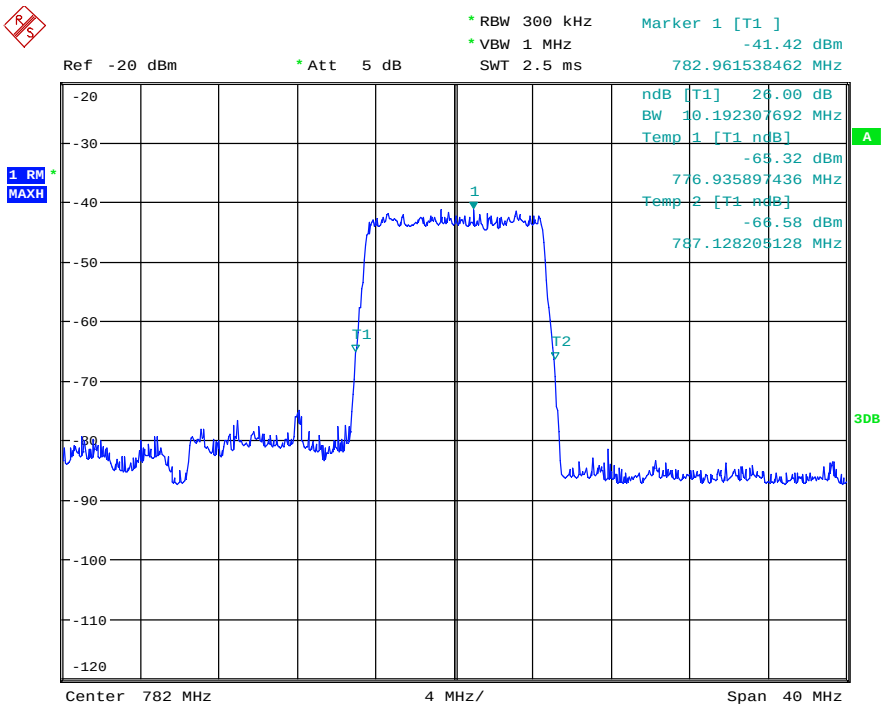

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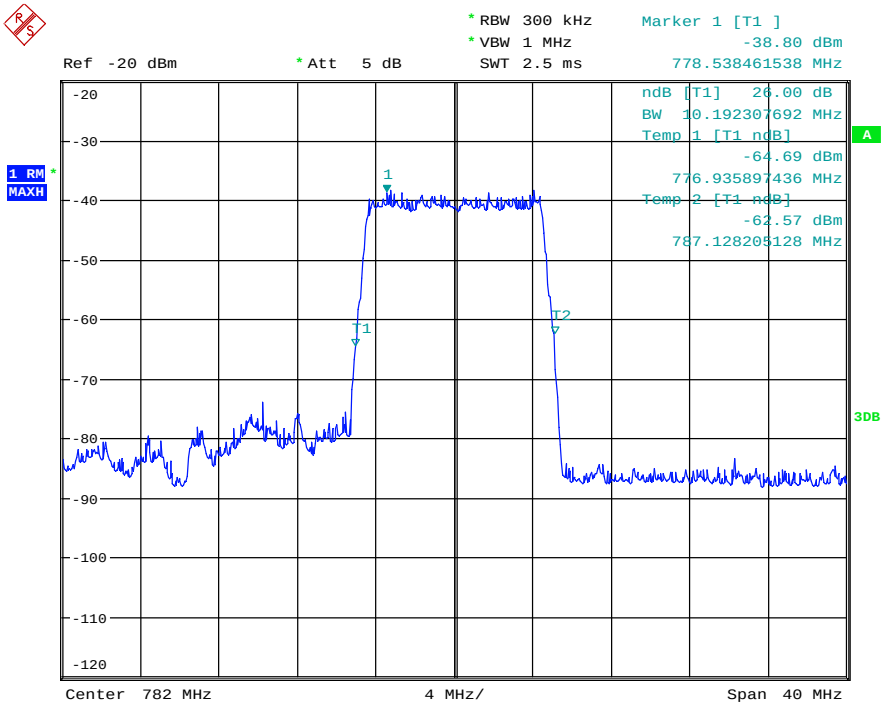
+3dB



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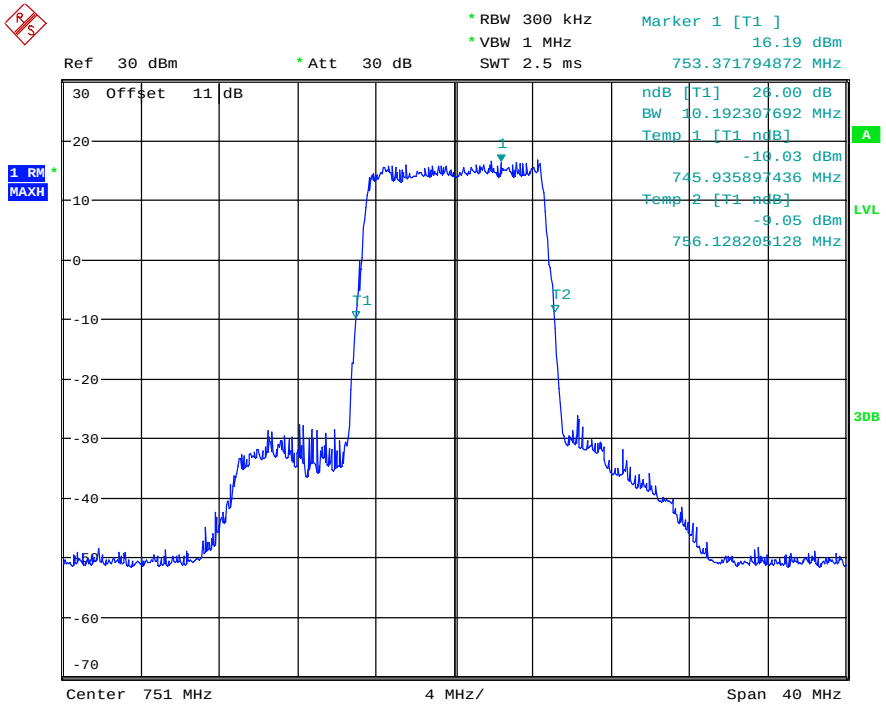
Output
Downlink



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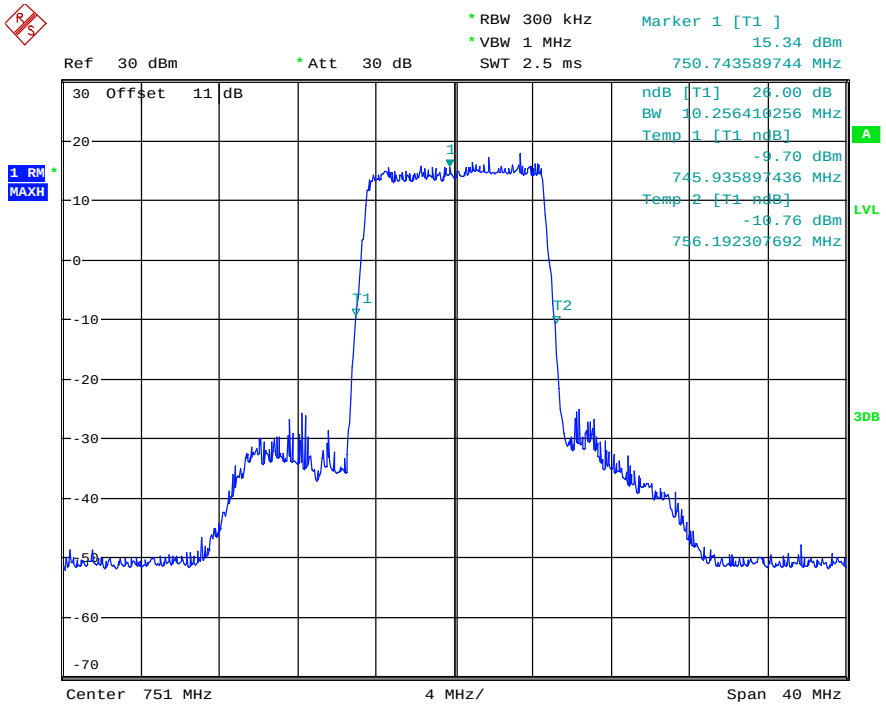
+3dB



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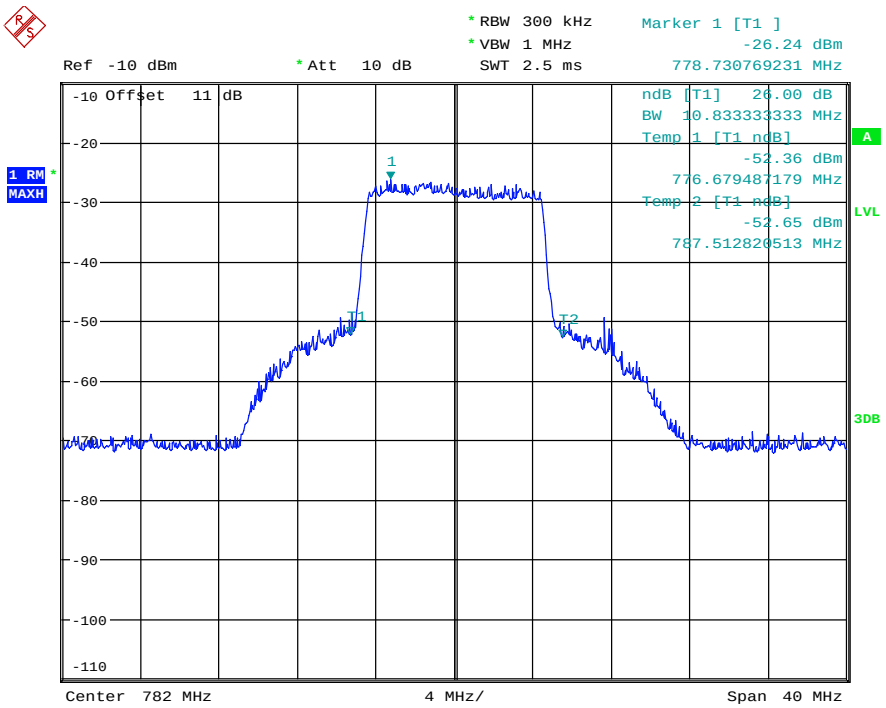

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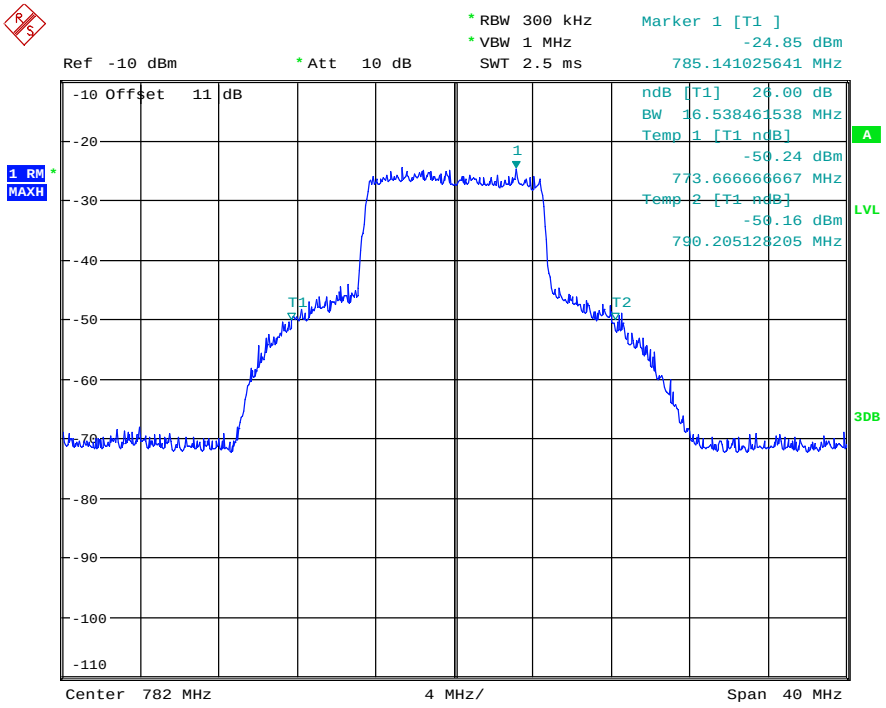
+3dB



Date: 26.FEB.2019 19:10:50

Test equipment: ETSTW-RE 050, ETSTW-RE 055, ETSTW-RE 134

6. Mean output power and amplifier/booster gain

6.1 Test procedure

6.1.1 General

The guidance in the following subclauses is provided for performing the measurement of mean input and output power of a CMRS non-consumer amplifier, repeater, or industrial booster, to compute the gain of the device.

a) Adjust the internal gain control of the EUT to the maximum gain for which the equipment certification is being sought. Any EUT attenuation settings shall be set to their minimum value.
b) Input power levels (uplink and downlink) should be set to maximum input ratings while confirming that the device is not capable of operating in saturation (non-linear mode) at the rated input levels, including during the performance of the input/output power measurements.

6.1.2 Measuring the EUT mean input and output power

a) Connect a signal generator to the input of the EUT.
b) Configure to generate the AWGN (broadband) test signal.
c) The frequency of the signal generator shall be set to the frequency f0 as determined from 3.3.
d) Connect a spectrum analyzer or power meter to the output of the EUT using appropriate attenuation as necessary.
e) Set the signal generator output power to a level that produces an EUT output level that is just below the AGC threshold (see 3.2), but not more than 0.5 dB below.
f) Measure and record the output power of the EUT; use 3.5.3 or 3.5.4 for power measurement.
g) Remove the EUT from the measurement setup. Using the same signal generator settings, repeat the power measurement at the signal generator port, which was used as the input signal to the EUT, and record as the input power. EUT gain may be calculated as described in 3.5.5.
h) Repeat steps f) and g) with input signal amplitude set to 3 dB above the AGC threshold level.
i) Repeat steps e) to h) with the narrowband test signal.
j) Repeat steps e) to i) for all frequency bands authorized for use by the EUT.

6.2 Test Results

Explanation: For test results, please refer to CH 3.2.

Test equipment: ETSTW-RE 050, ETSTW-RE 055, ETSTW-RE 134

7. Measuring out-of-band/out-of-block (including intermodulation) emissions and spurious emissions

7.1 Test procedure

7.1.1 General

Refer to the applicable rule part(s) for specified limits on unwanted (out-of-band/out-of-block and spurious) emissions.
Spurious emissions shall be measured using a single test signal sequentially tuned to the low, middle, and high channels or frequencies within each authorized frequency band of operation.
Out-of-band/out-of-block emissions (including intermodulation products) shall be measured under each of the following two stimulus conditions:

a) two adjacent test signals sequentially tuned to the lower and upper frequency band/block edges;

b) a single test signal, sequentially tuned to the lowest and highest frequencies or channels within the frequency band/block under examination.

NOTE—Single-channel boosters that cannot accommodate two simultaneous signals within the passband may be excluded from the test stipulated in step a).

7.1.2 Out-of-band/out-of-block emissions conducted measurements

a) Connect a signal generator to the input of the EUT.
If the signal generator is not capable of generating two modulated carriers simultaneously, then two discrete signal generators can be connected with an appropriate combining network to support this two-signal test.

b) Set the signal generator to produce two AWGN signals as previously described (e.g., 4.1 MHz OBW).

c) Set the center frequencies such that the AWGN signals occupy adjacent channels, as defined by industry standards such as 3GPP or 3GPP2, at the upper edge of the frequency band or block under test.

d) Set the composite power levels such that the input signal is just below the AGC threshold (see 3.2), but not more than 0.5 dB below. The composite power can be measured using the procedures provided in KDB Publication 971168 [R8], but it will be necessary to expand the power integration bandwidth so as to include both of the transmit channels. Alternatively, the composite power can be measured using an average power meter as described in KDB Publication 971168 [R8].

e) Connect a spectrum analyzer to the output of the EUT using appropriate attenuation as necessary.

f) Set the RBW = reference bandwidth in the applicable rule section for the supported frequency band (typically 1 % of the EBW or 100 kHz or 1 MHz)

g) Set the VBW = 3 × RBW.

h) Set the detector to power averaging (rms) detector.

i) Set the Sweep time = auto-couple.

j) Set the spectrum analyzer start frequency to the upper block edge frequency, and the stop frequency to the upper block edge frequency plus 300 kHz or 3 MHz, for frequencies below and above 1 GHz, respectively.

k) Trace average at least 100 traces in power averaging (rms) mode.

l) Use the marker function to find the maximum power level.

m) Capture the spectrum analyzer trace of the power level for inclusion in the test report.

n) Repeat steps k) to m) with the composite input power level set to 3 dB above the AGC threshold.

o) Reset the frequencies of the input signals to the lower edge of the frequency block or band under test.

p) Reset the spectrum analyzer start frequency to the lower block edge frequency minus 300 kHz or 3 MHz, for frequencies below and above 1 GHz, respectively, and the stop frequency to the lower band or block edge frequency.

q) Repeat steps k) to n).

r) Repeat steps a) to q) with the signal generator configured for a single test signal tuned as close as possible to the block edges.

s) Repeat steps a) to r) with the narrowband test signal.

t) Repeat steps a) to s) for all authorized frequency bands or blocks used by the EUT.

7.1.3 Spurious emissions conducted measurements

a) Connect a signal generator to the input of the EUT.

b) Set the signal generator to produce the broadband test signal as previously described (i.e., 4.1 MHz OBW AWGN).

c) Set the center frequency of the test signal to the lowest available channel within the frequency band or block.

d) Set the EUT input power to a level that is just below the AGC threshold (see 3.2), but not more than 0.5 dB below.

e) Connect a spectrum analyzer to the output of the EUT using appropriate attenuation as necessary.

f) Set the RBW = reference bandwidth in the applicable rule section for the supported frequency band of operation (e.g., reference bandwidth is typically 100 kHz or 1 MHz).

g) Set the VBW ≥ 3 × RBW.

h) Set the Sweep time = auto-couple.

i) Set the spectrum analyzer start frequency to the lowest RF signal generated in the equipment, without going below 9 kHz, and the stop frequency to the lower band/block edge frequency minus 100 kHz or 1 MHz, as specified in the applicable rule part. The number of measurement points in each sweep must be ≥ (2 × span/RBW), which may require that the measurement range defined by the start and stop frequencies be subdivided, depending on the available number of measurement points provided by the spectrum analyzer.4

j) Select the power averaging (rms) detector function.

k) Trace average at least 10 traces in power averaging (rms) mode.

l) Use the peak marker function to identify the highest amplitude level over each measured frequency range. Record the frequency and amplitude and capture a plot for inclusion in the test report.

m) Reset the spectrum analyzer start frequency to the upper band/block edge frequency plus 100 kHz or 1 MHz, as specified in the applicable rule part, and the spectrum analyzer stop frequency to 10 times the highest frequency of the fundamental emission (see Section 2.1057). The number of measurement points in each sweep must be ≥ (2 × span/RBW), which may require that the measurement range defined by the start and stop frequencies be subdivided, depending on the available number of measurement points provided by the spectrum analyzer.

n) Trace average at least 10 traces in power averaging (rms) mode.

o) Use the peak marker function to identify the highest amplitude level over each of the measured frequency ranges. Record the frequency and amplitude and capture a plot for inclusion in the test report; also provide tabular data, if required.

p) Repeat steps i) to o) with the input test signals firstly tuned to a middle band/block frequency/channel, and then tuned to a high band/block frequency/channel.

q) Repeat steps b) to p) with the narrowband test signal.

r) Repeat steps b) to q) for all authorized frequency bands/blocks used by the EUT.

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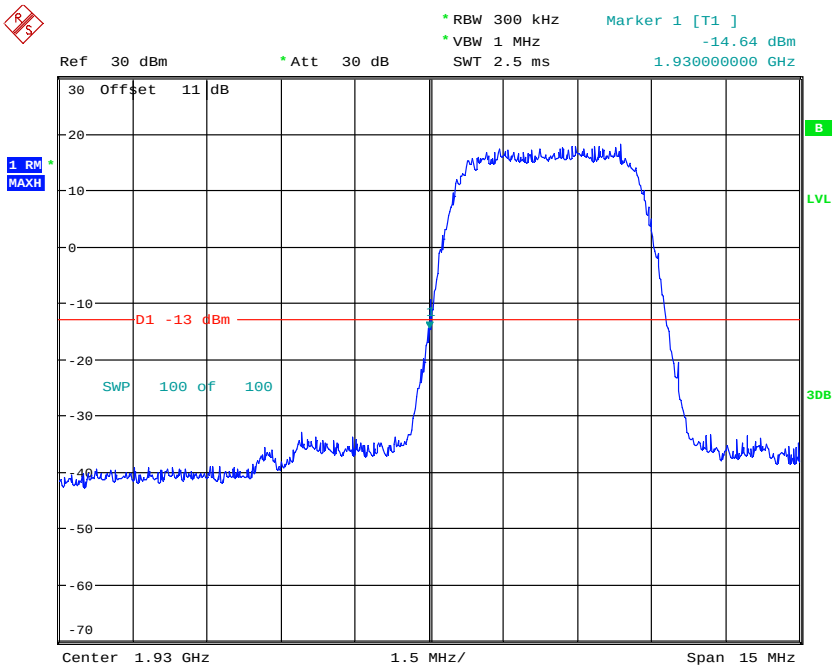
7.2 Test Results

Measuring out-of-band/out-of-block (including intermodulation) emissions

WCDMA
Band II
Downlink
One



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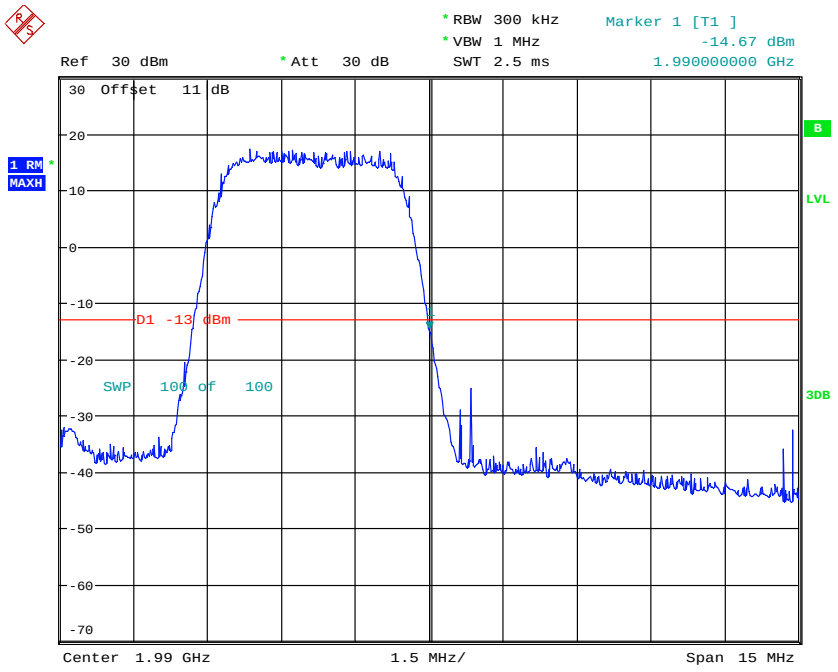

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Report Number: W6M21812-18679-P-20
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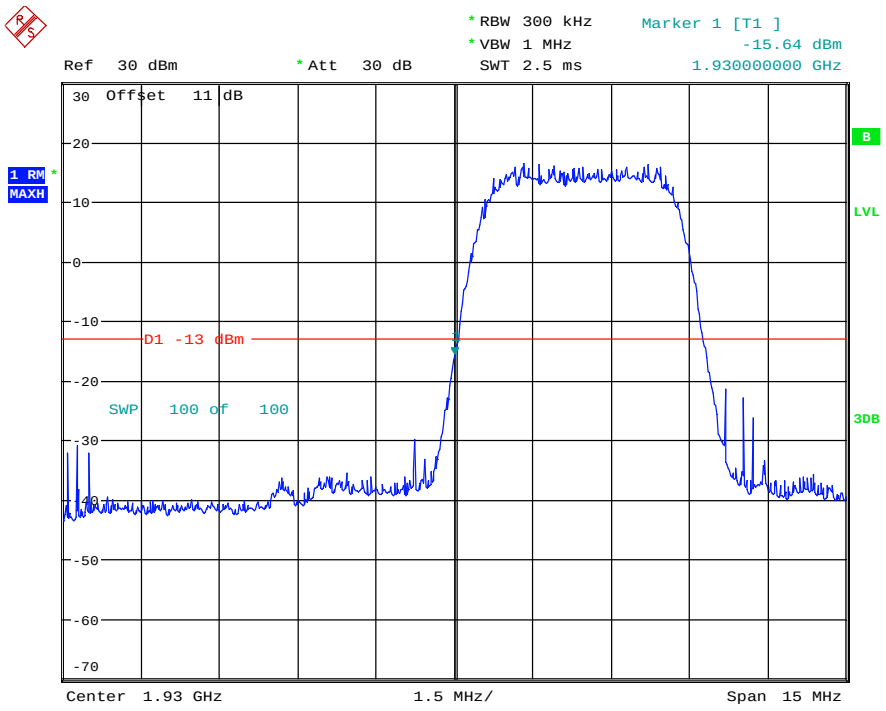
One+3dB



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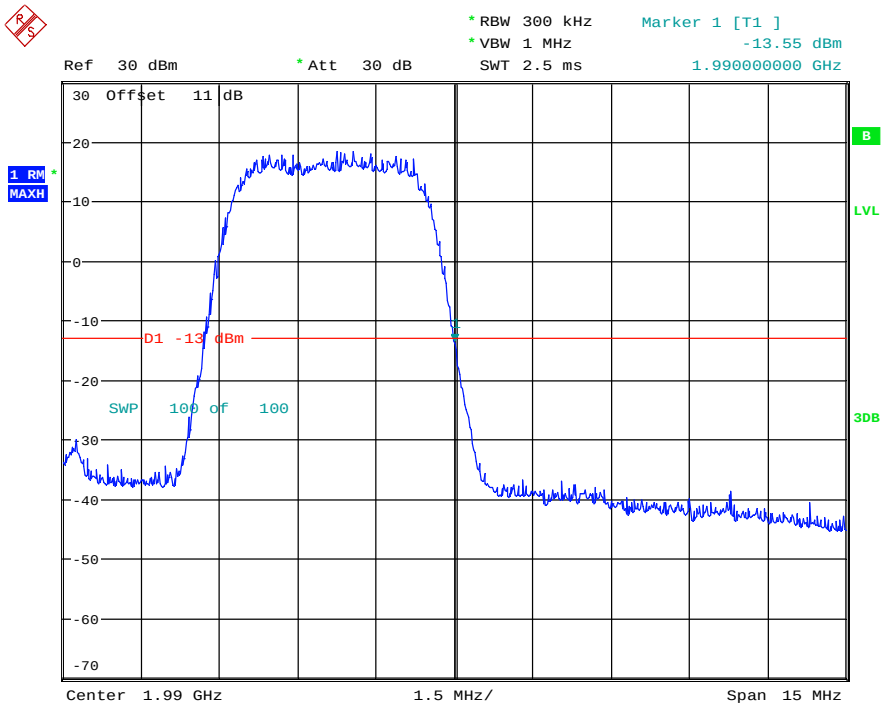

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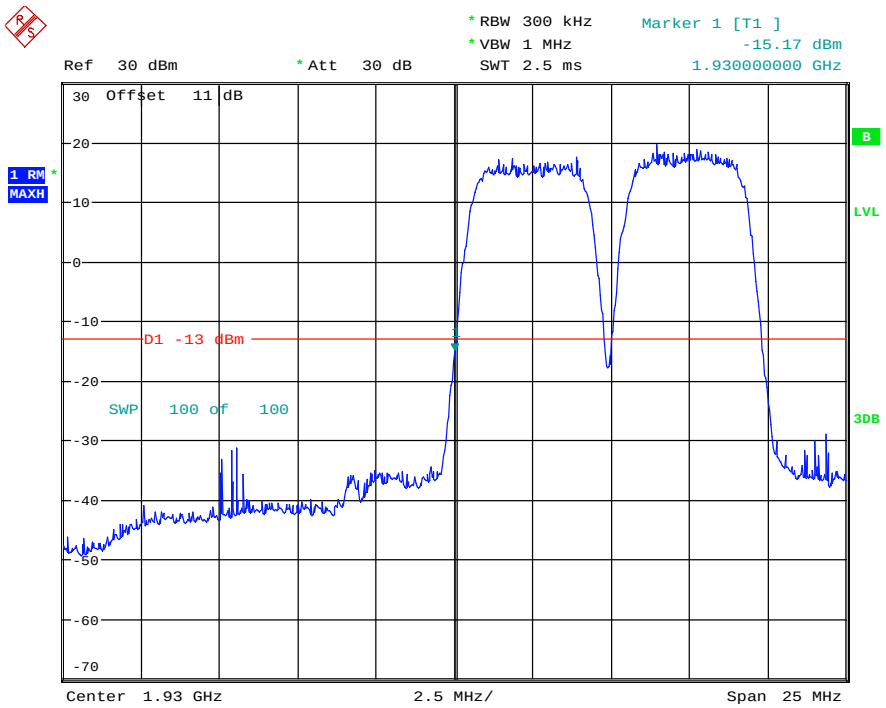

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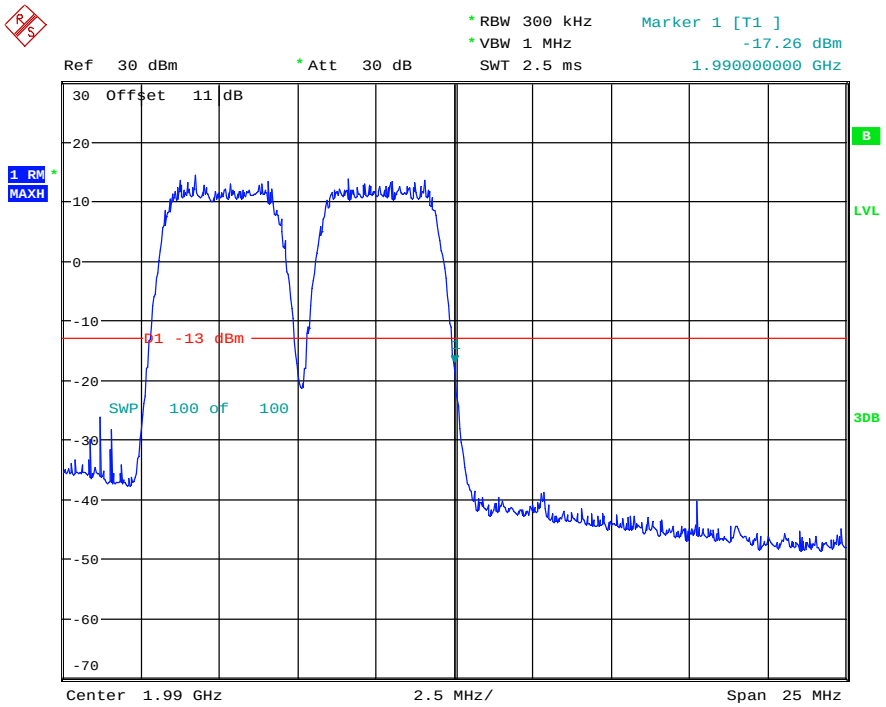

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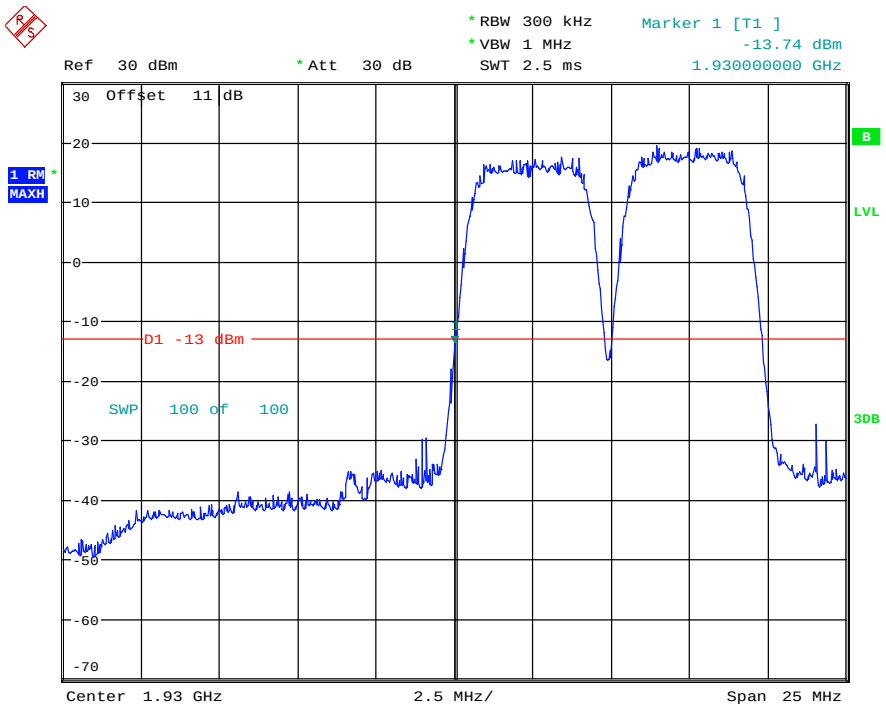
Two+3 dB



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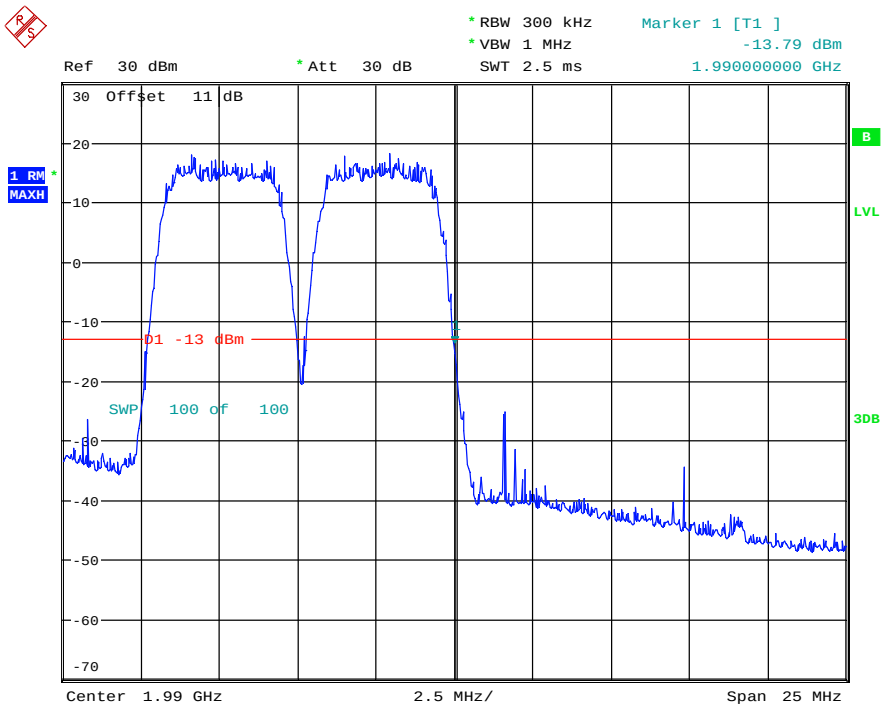

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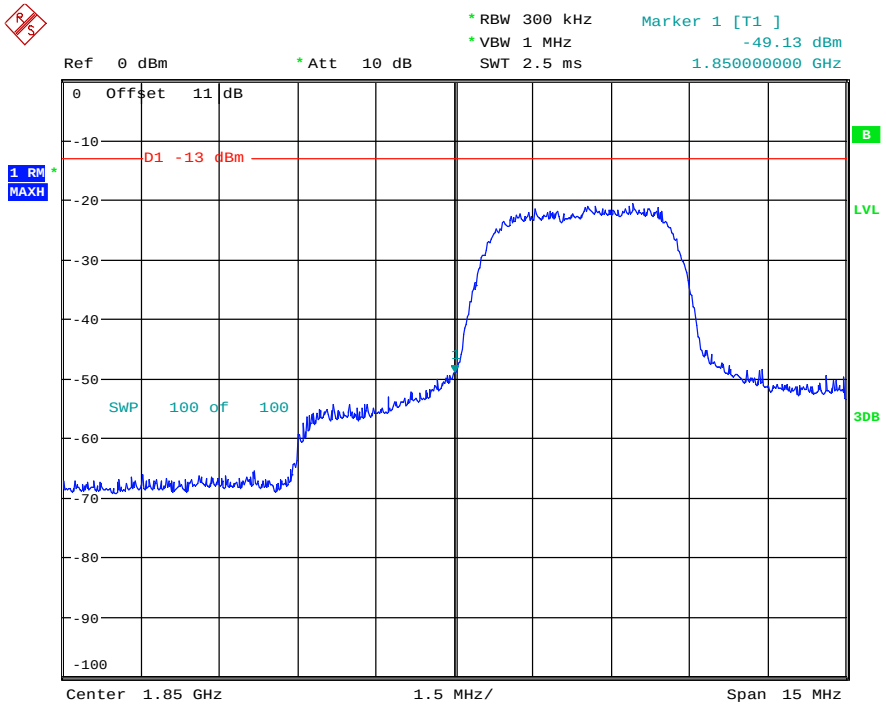
Uplink
One



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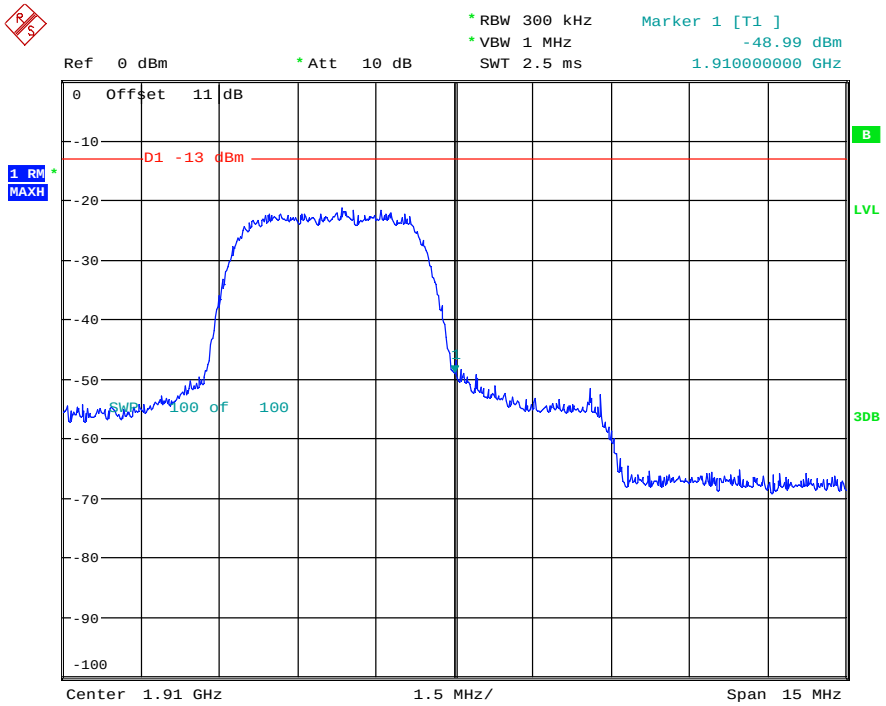

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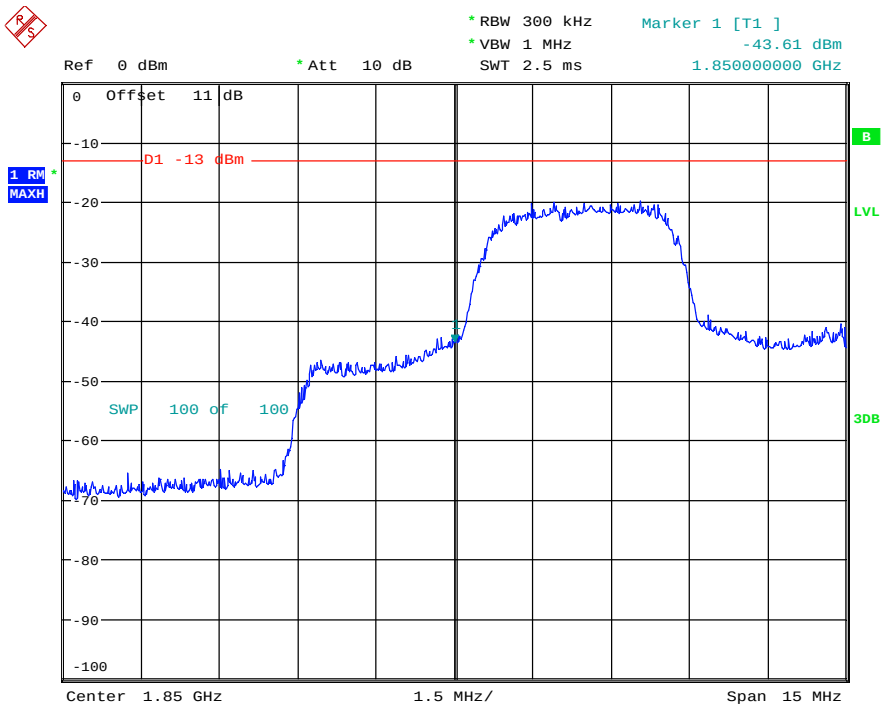

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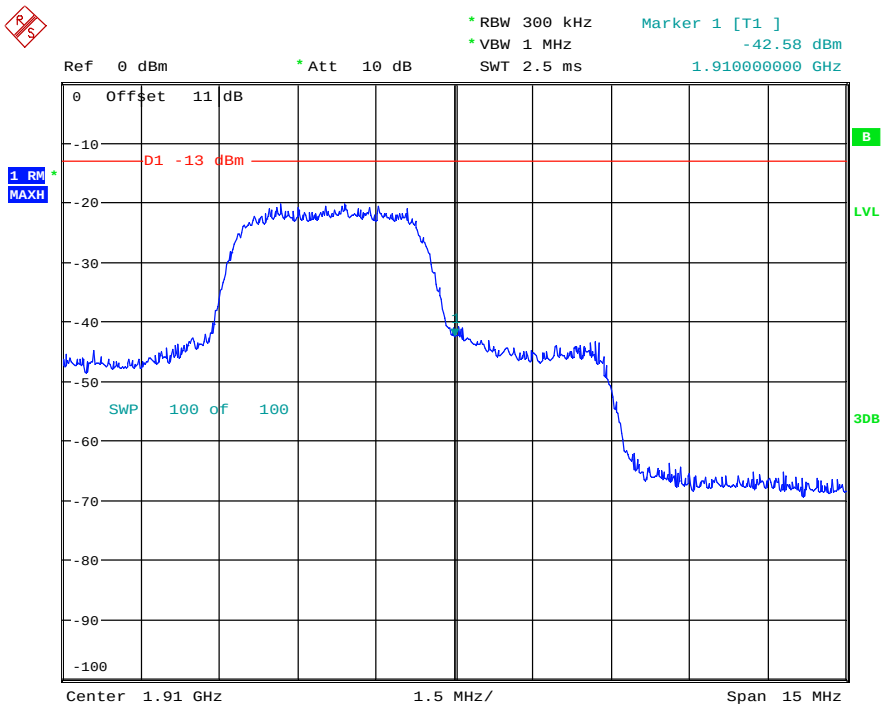

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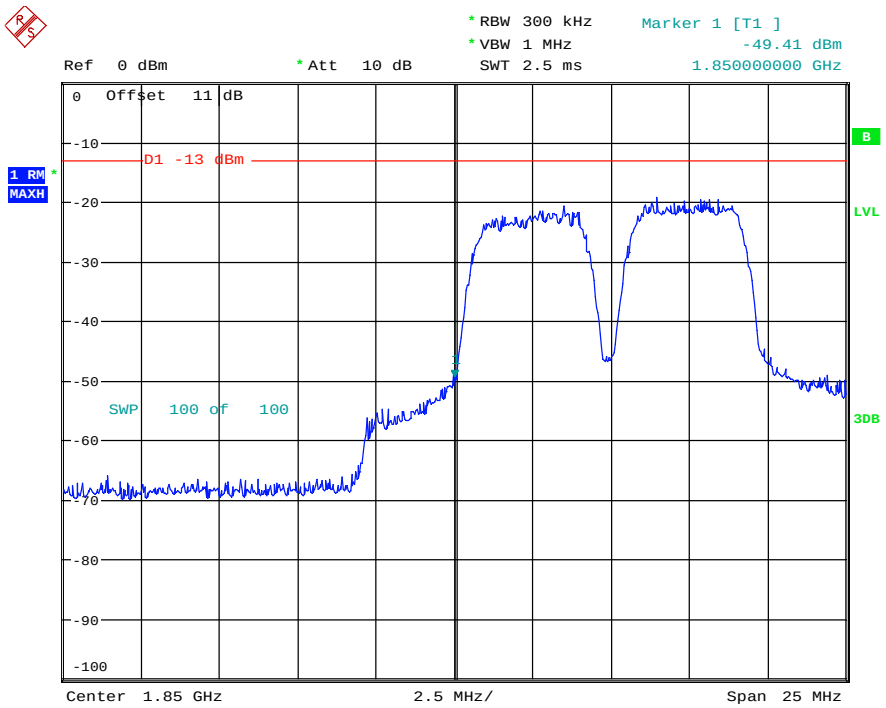

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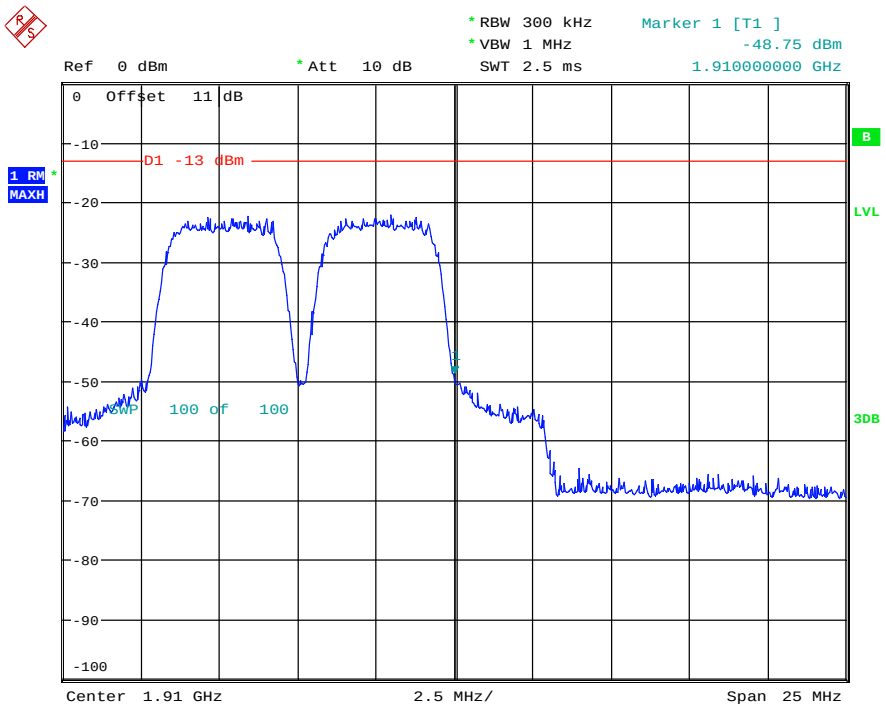

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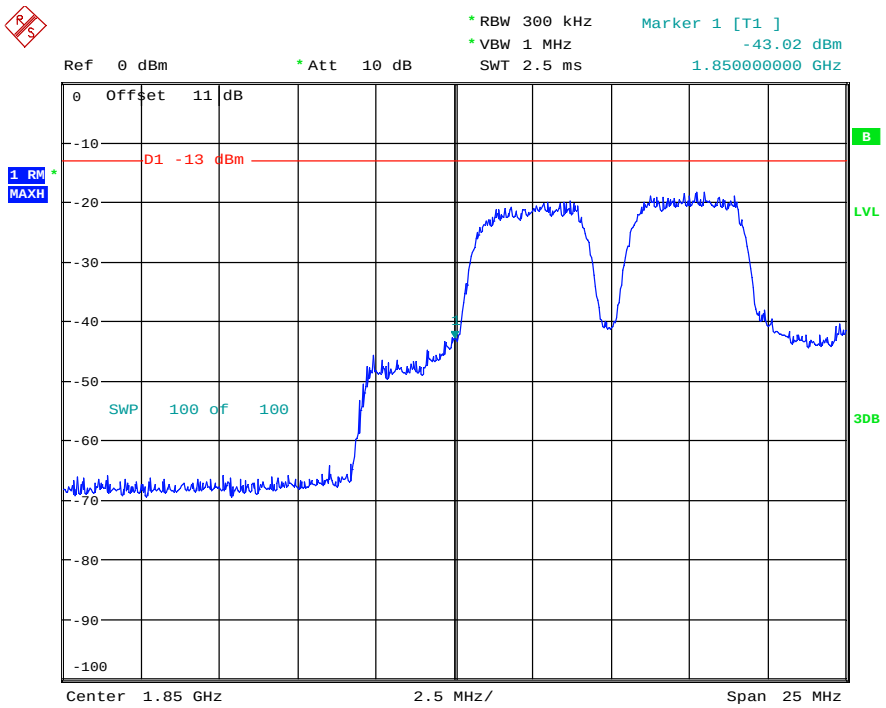
Report Number: W6M21812-18679-P-20
FCC ID: 2ASQXZONEDAS
Two+3dB



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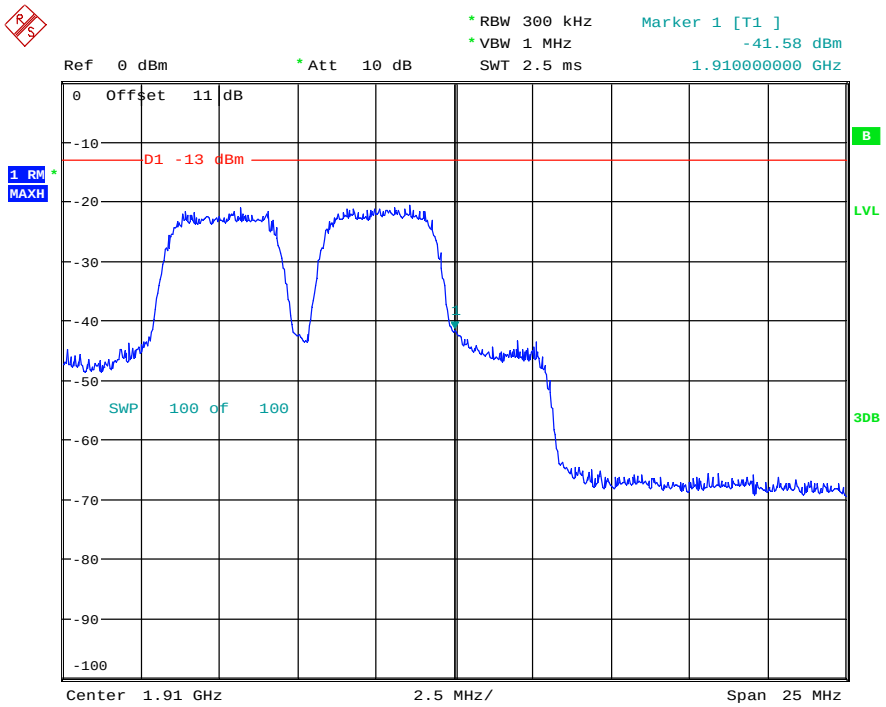

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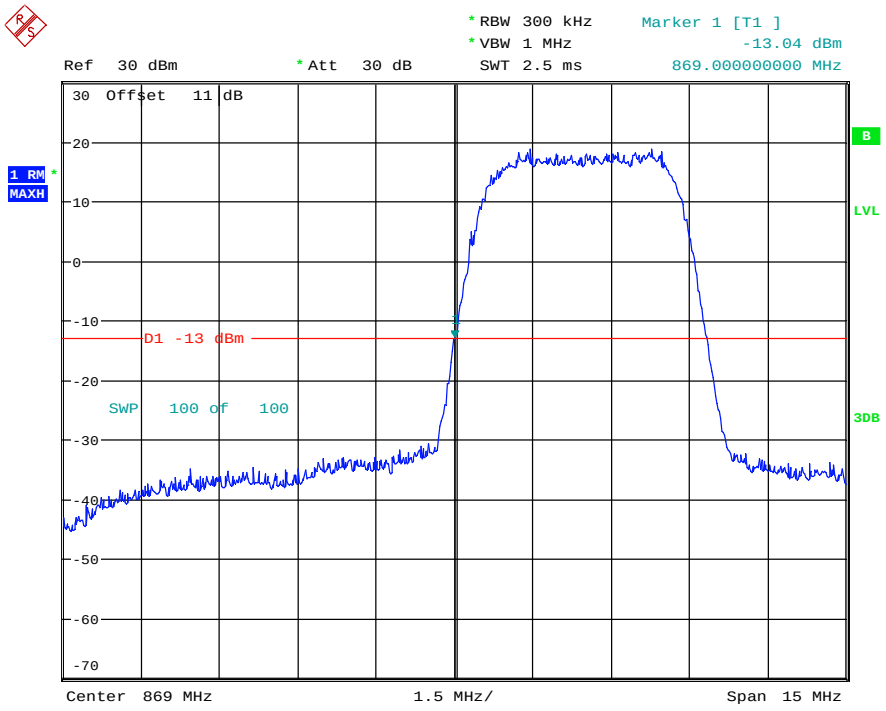
Band V
Downlink
One



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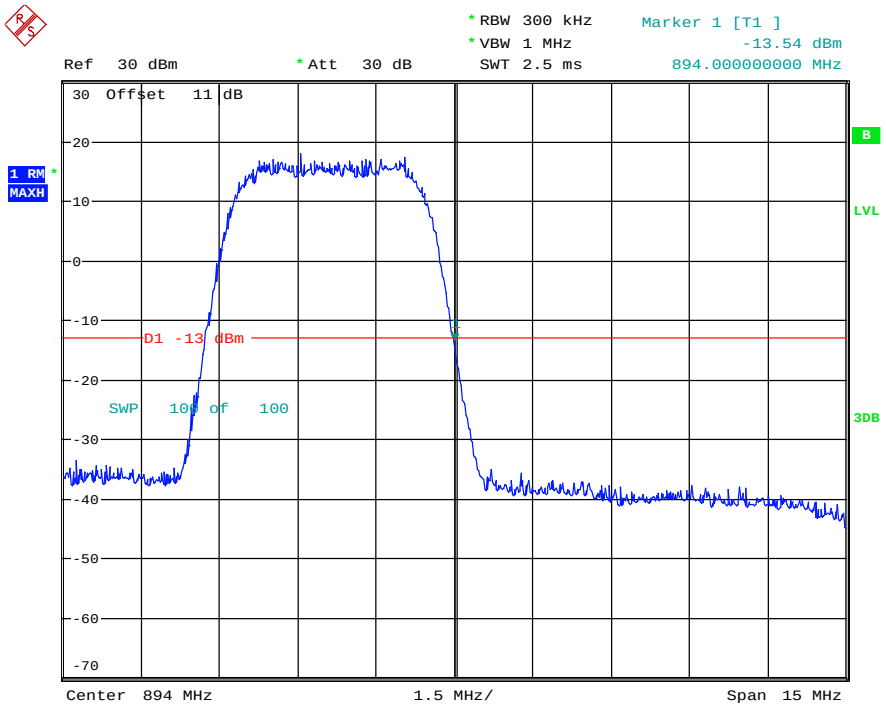

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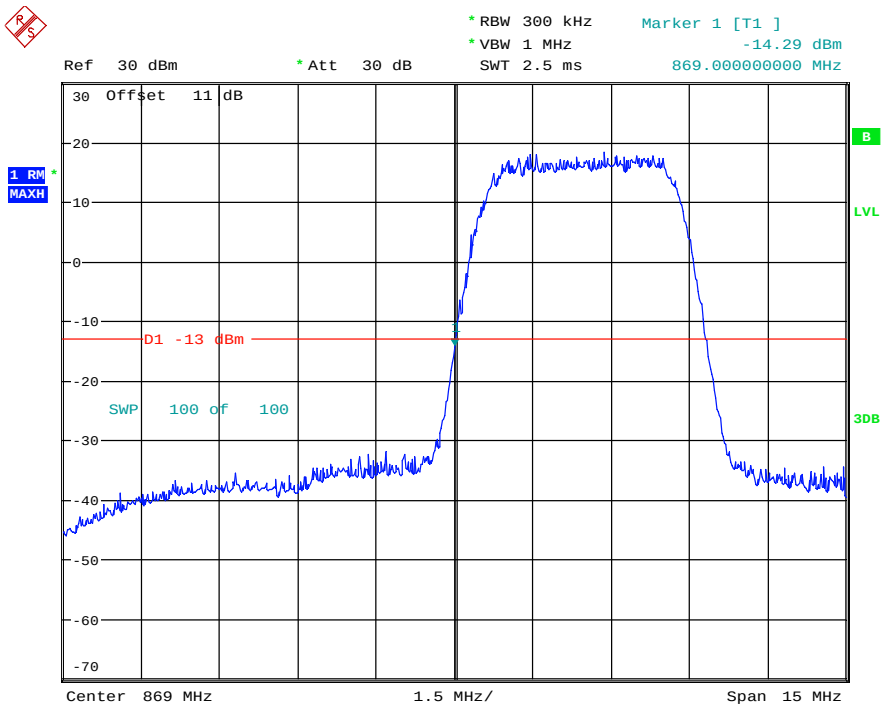

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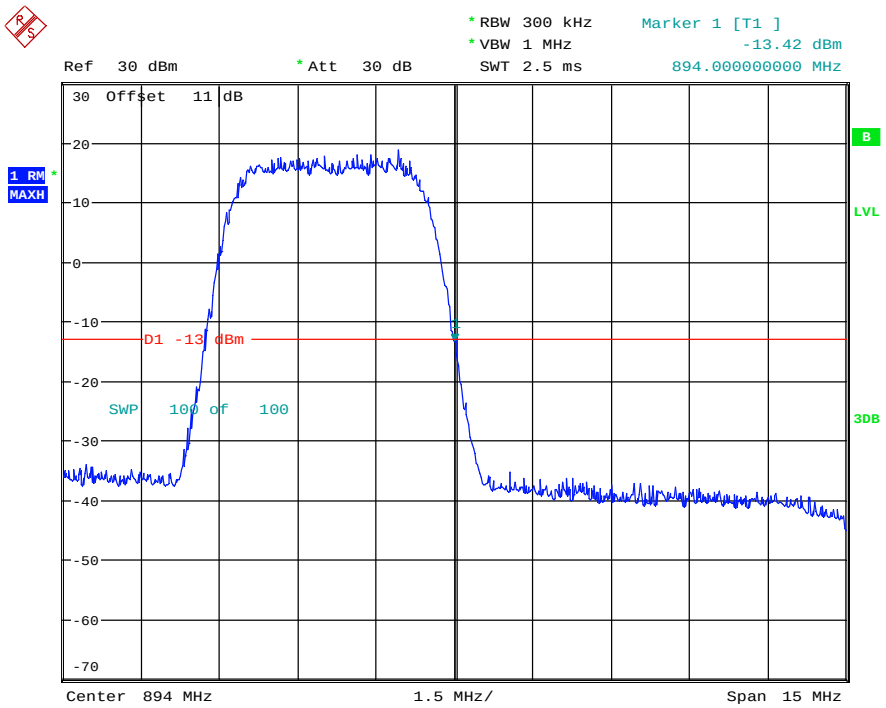

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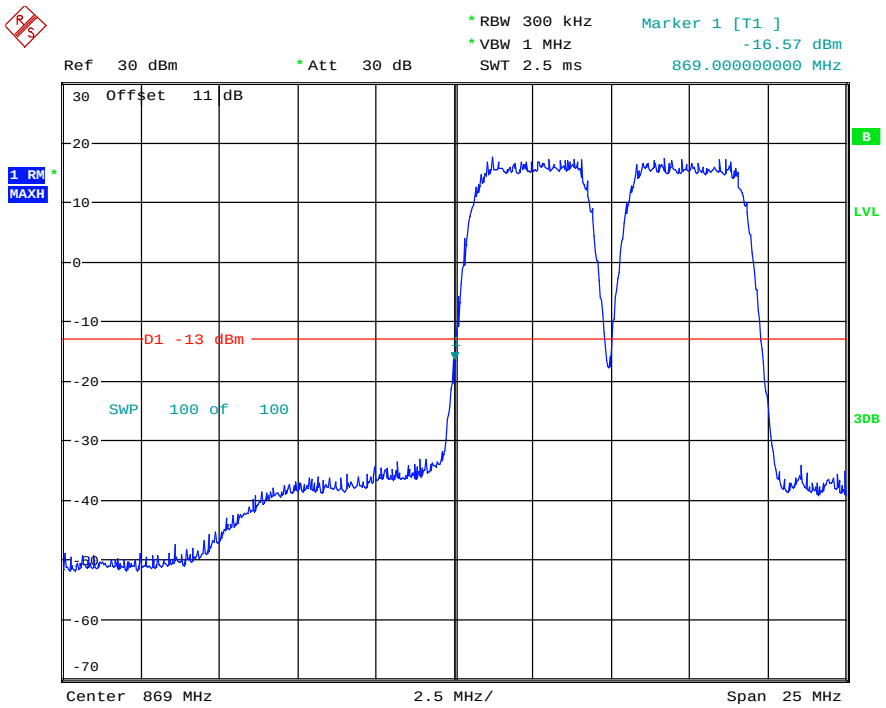

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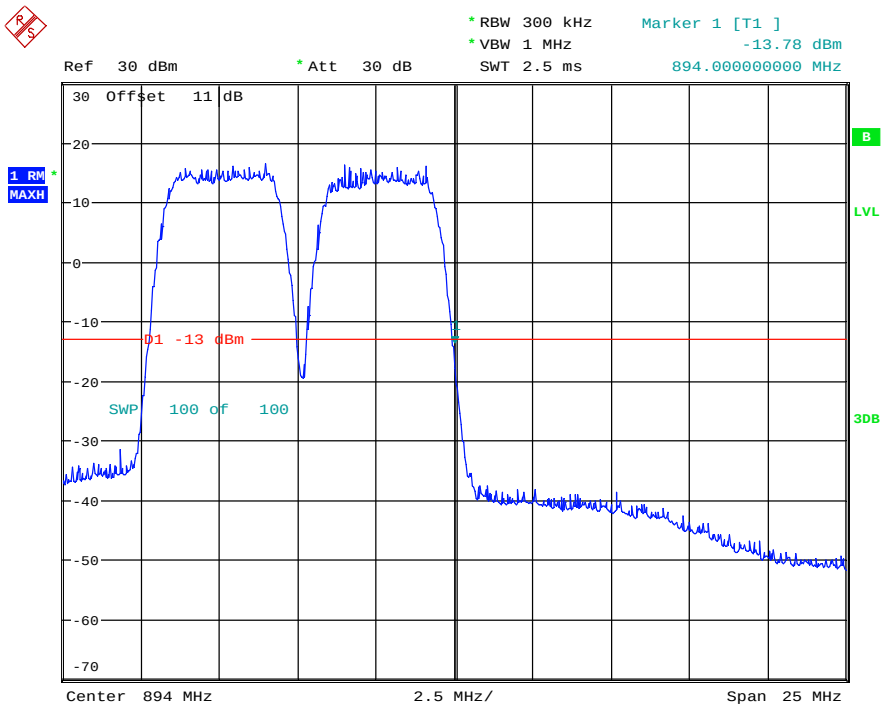

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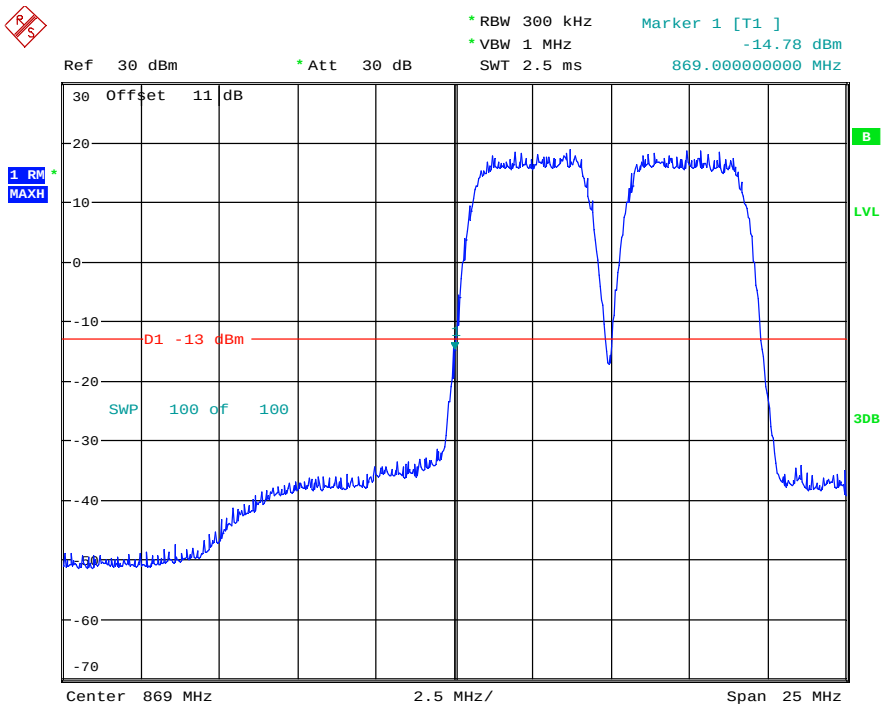
Report Number: W6M21812-18679-P-20
FCC ID: 2ASQXZONEDAS
Two+3dB



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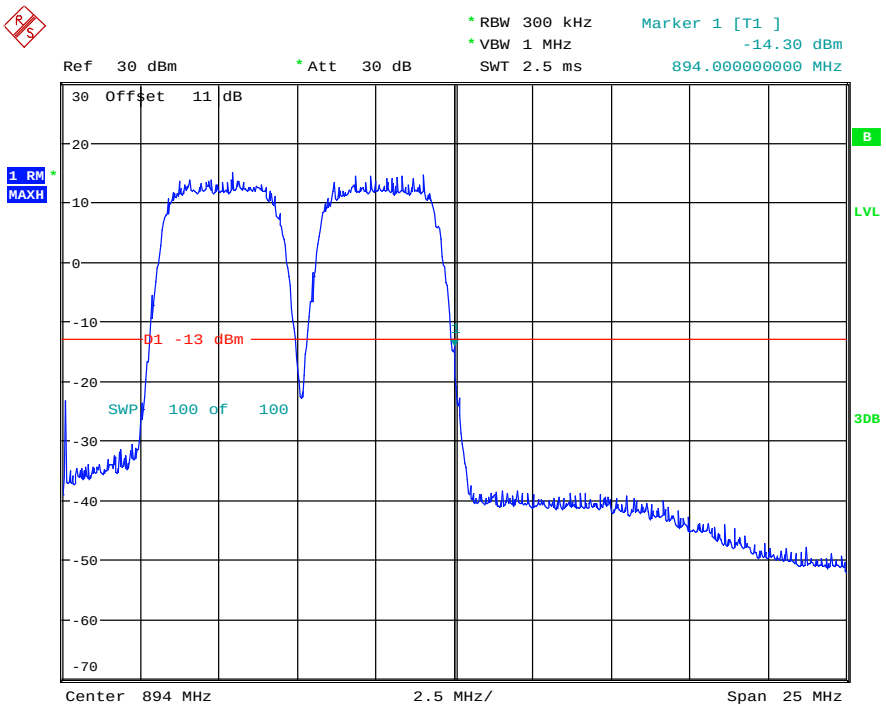

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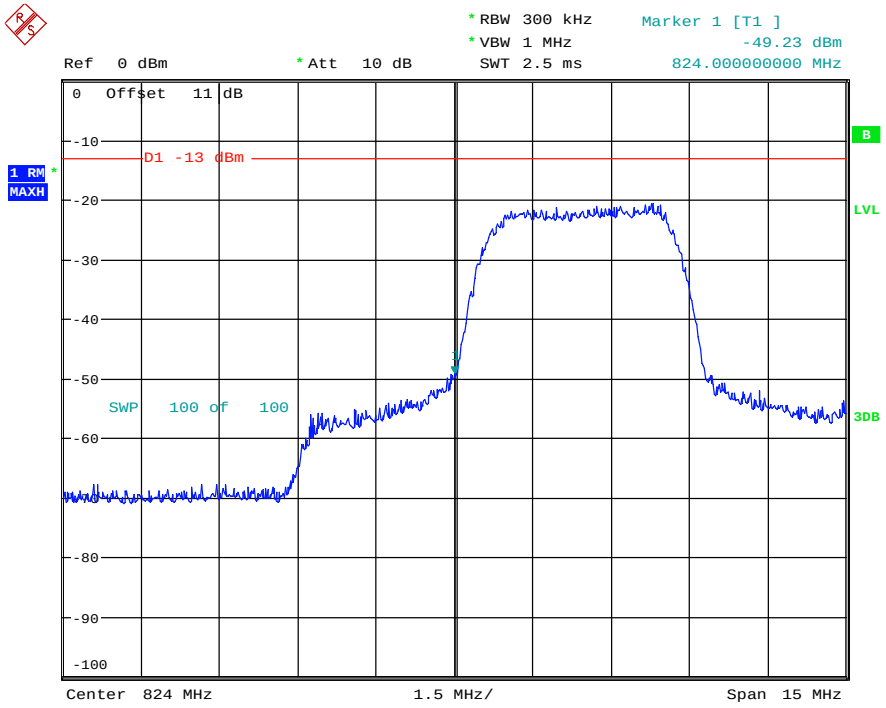
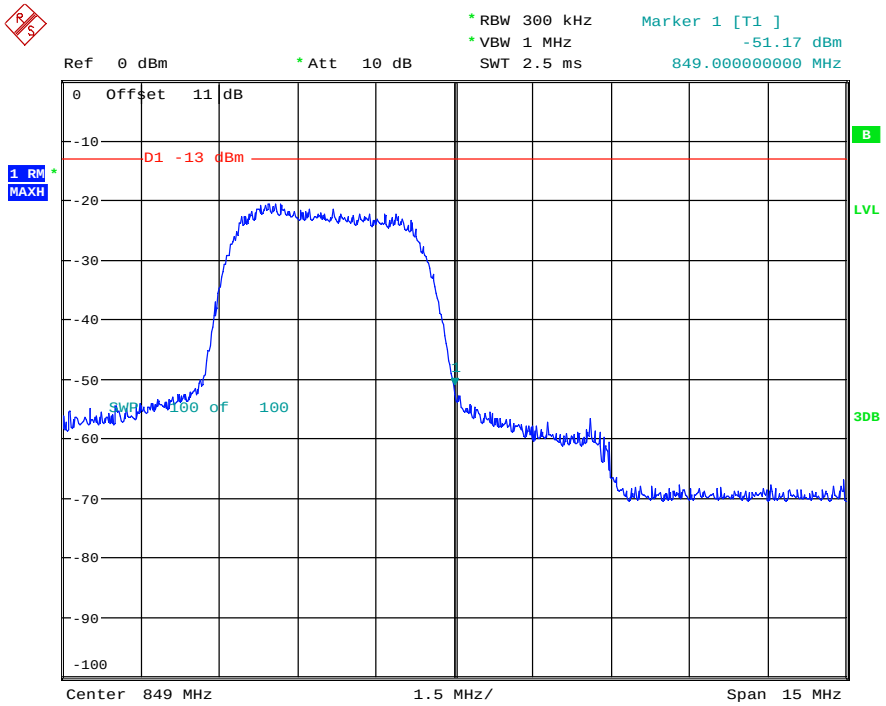
FCC ID: 2ASQXZONEDAS
Uplink
One



Date: 10.JAN.2019 16:15:00



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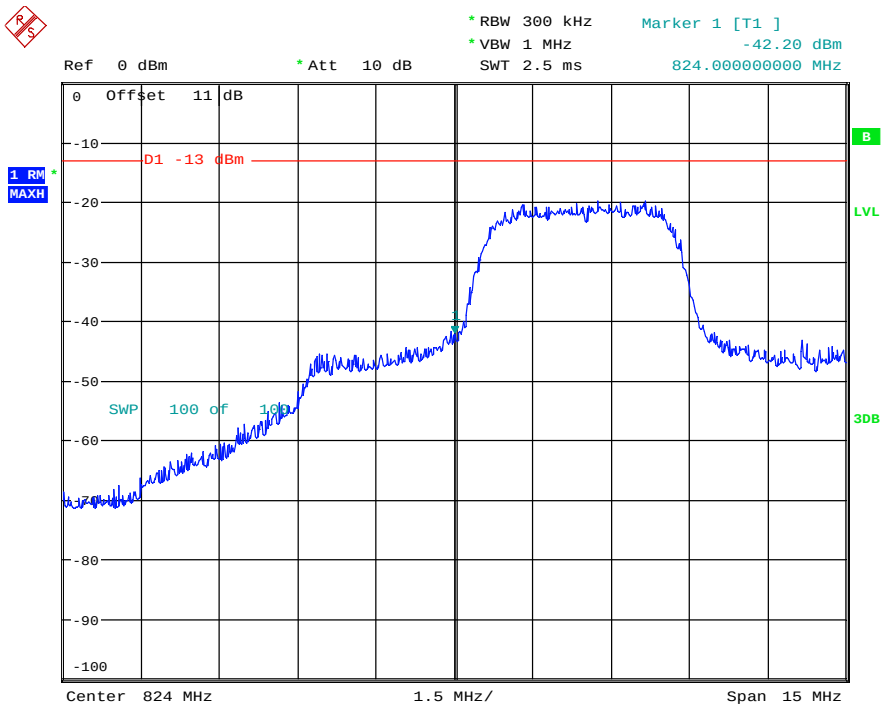

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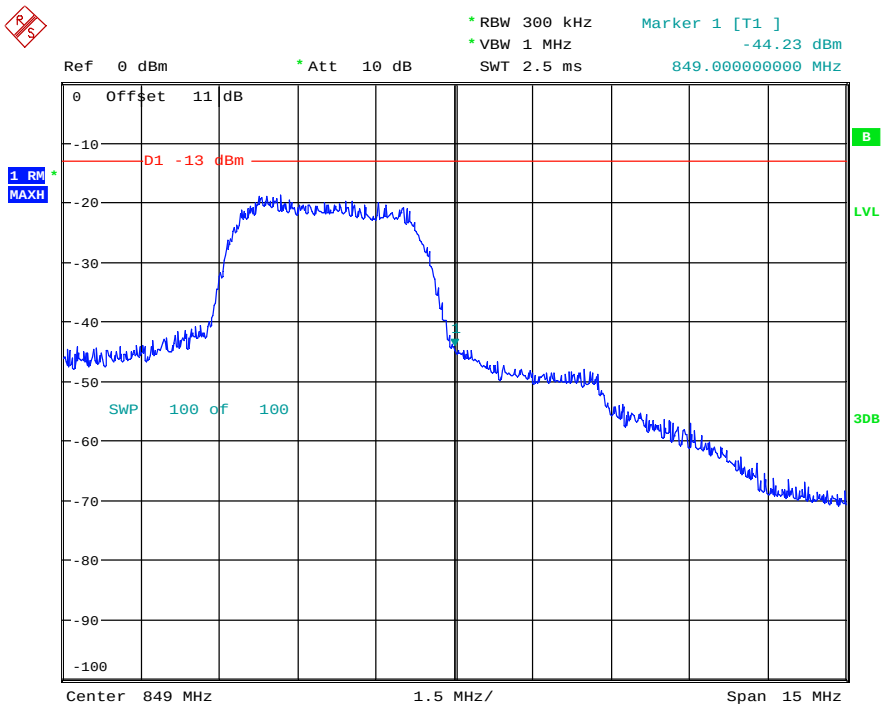

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Report Number: W6M21812-18679-P-20
FCC ID: 2ASQXZONEDAS
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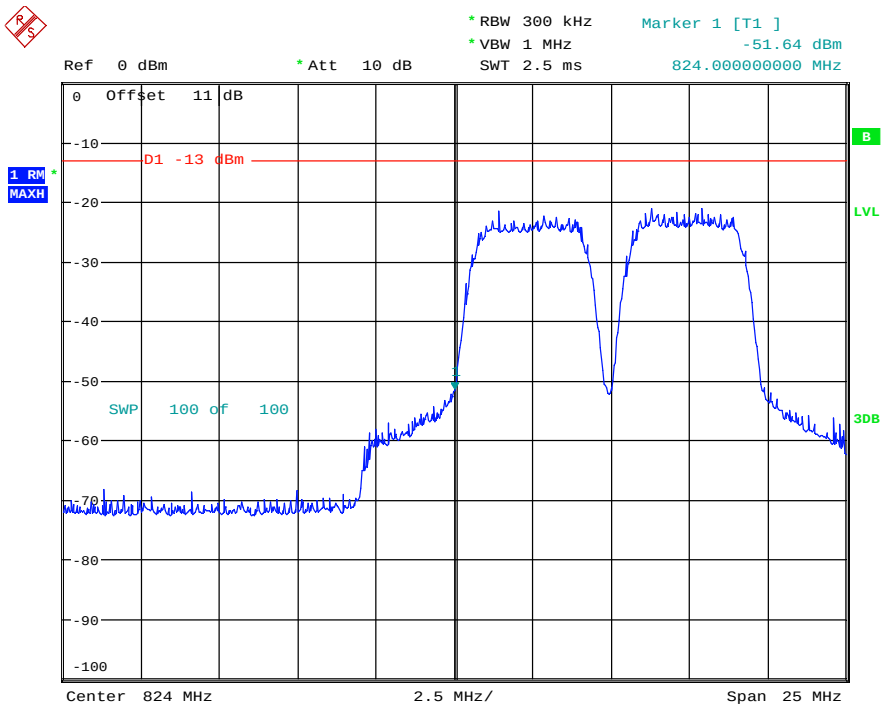
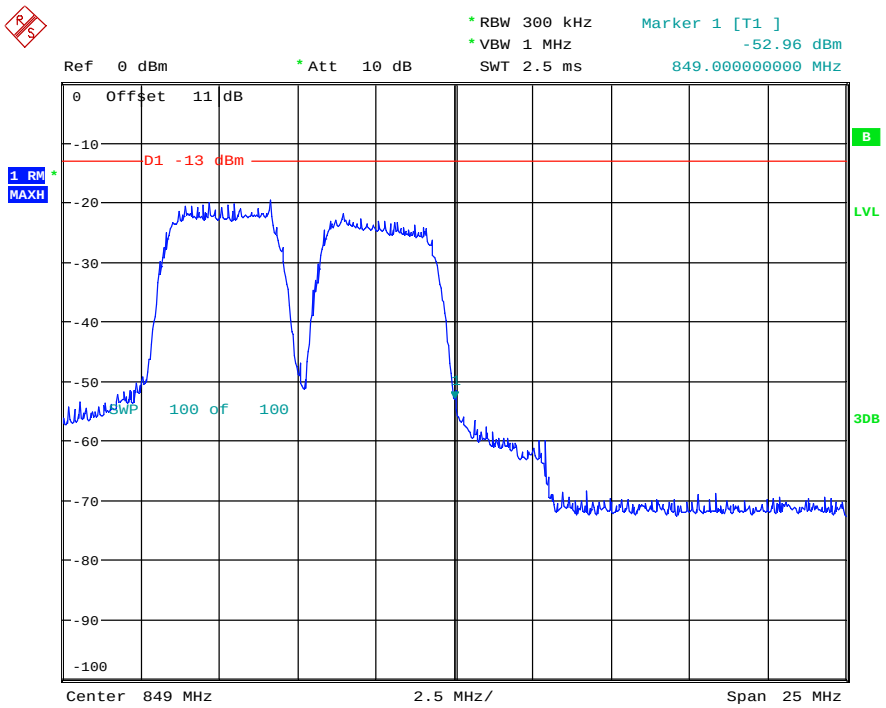


Date: 10.JAN.2019 16:15:25



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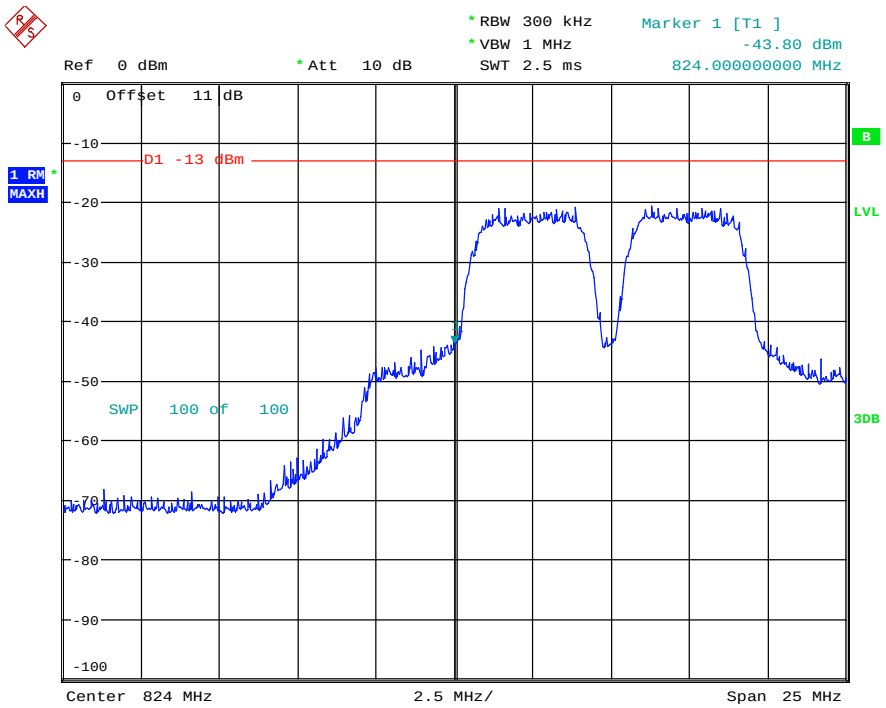

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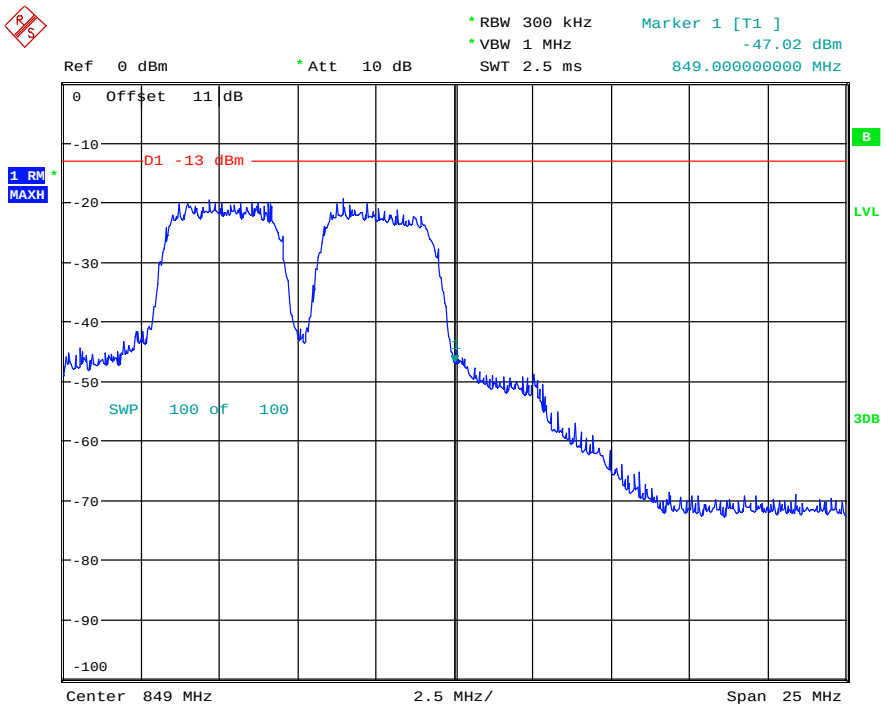

Date: 10.JAN.2019 16:18:40

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LTE
Band II
Downlink
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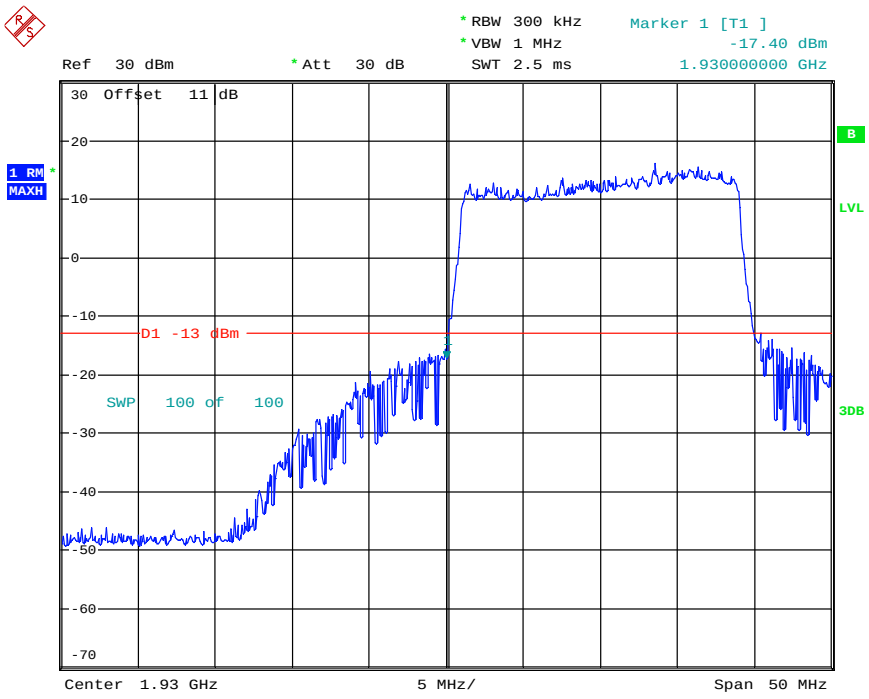

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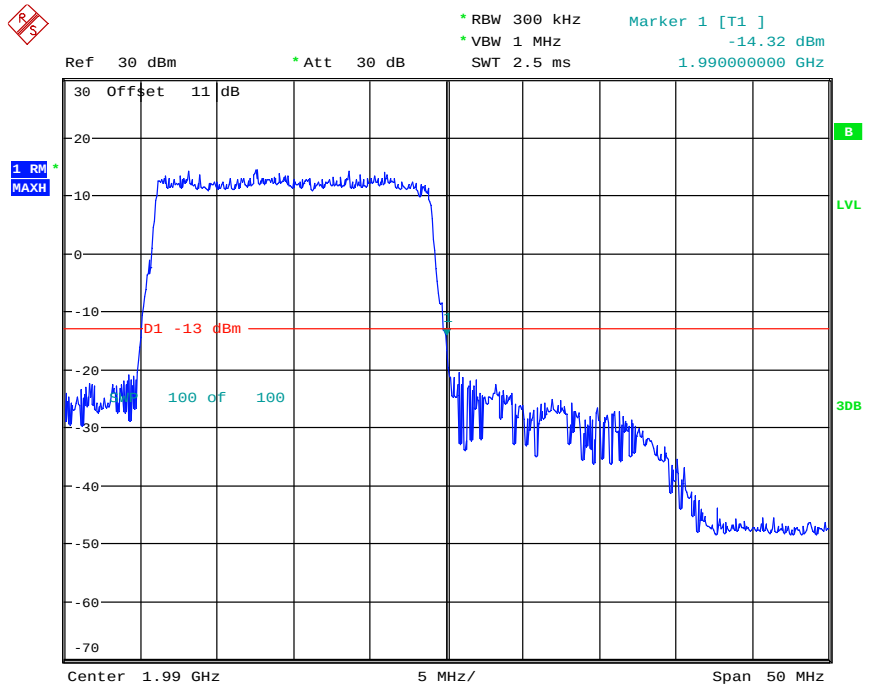

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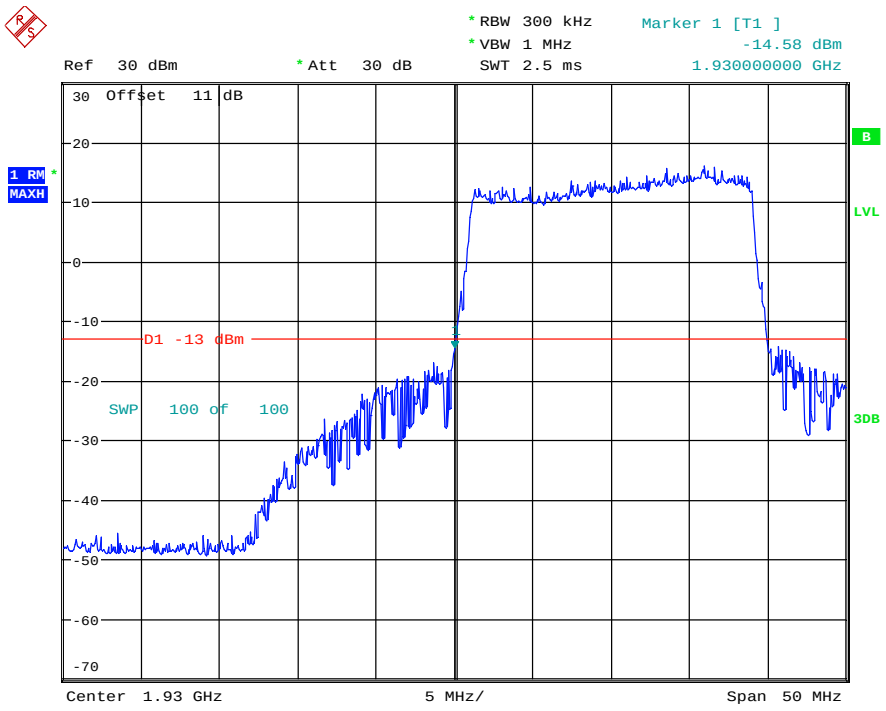

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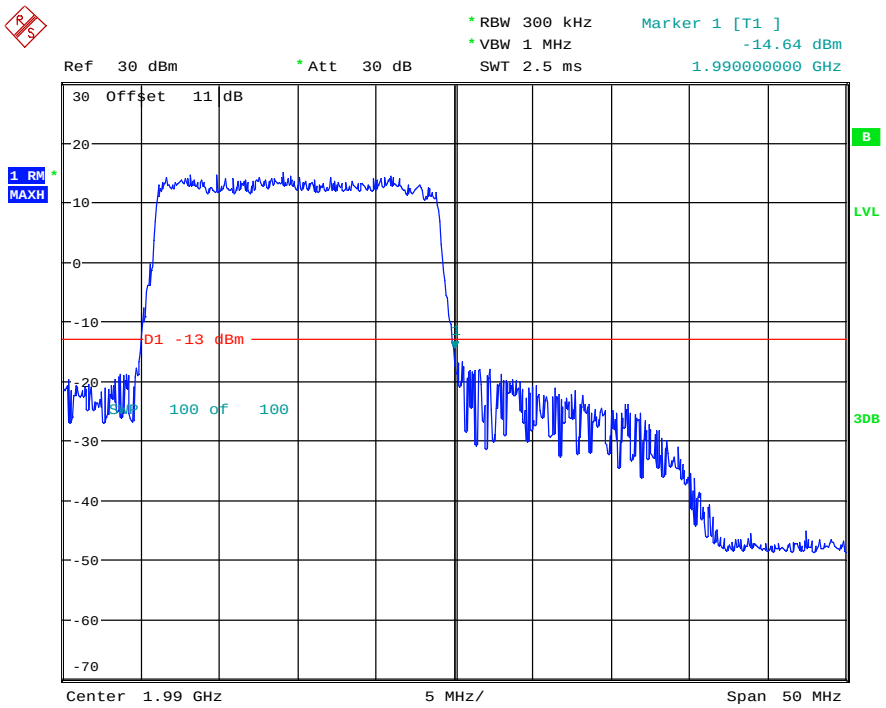

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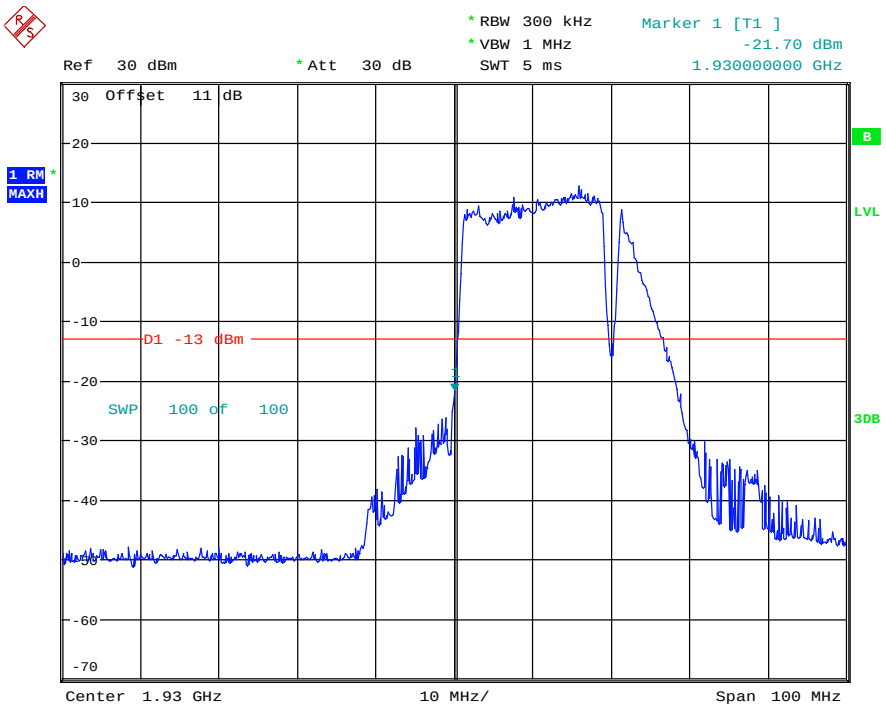

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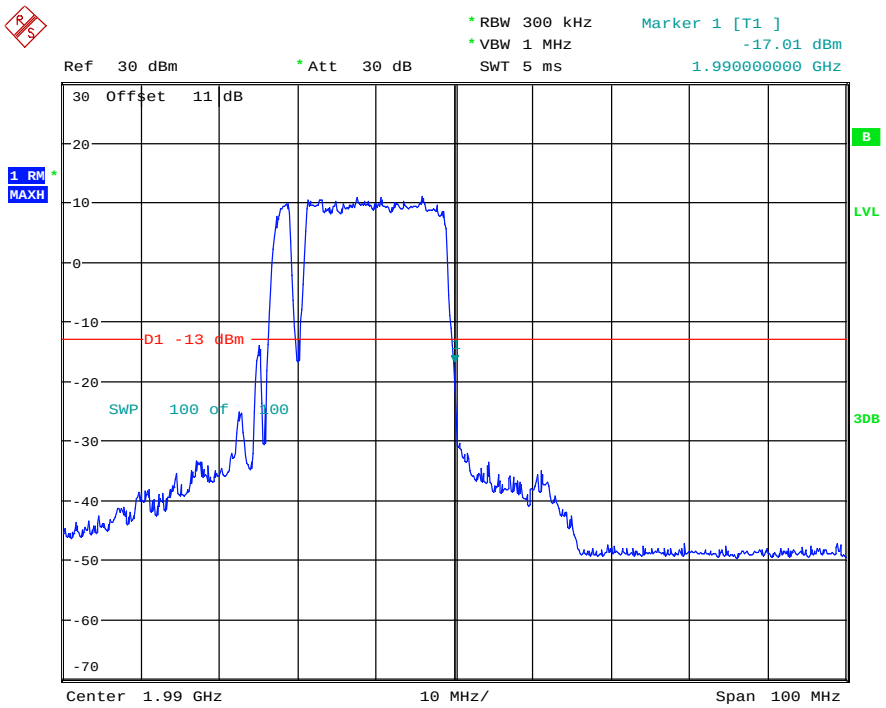

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Report Number: W6M21812-18679-P-20
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Uplink
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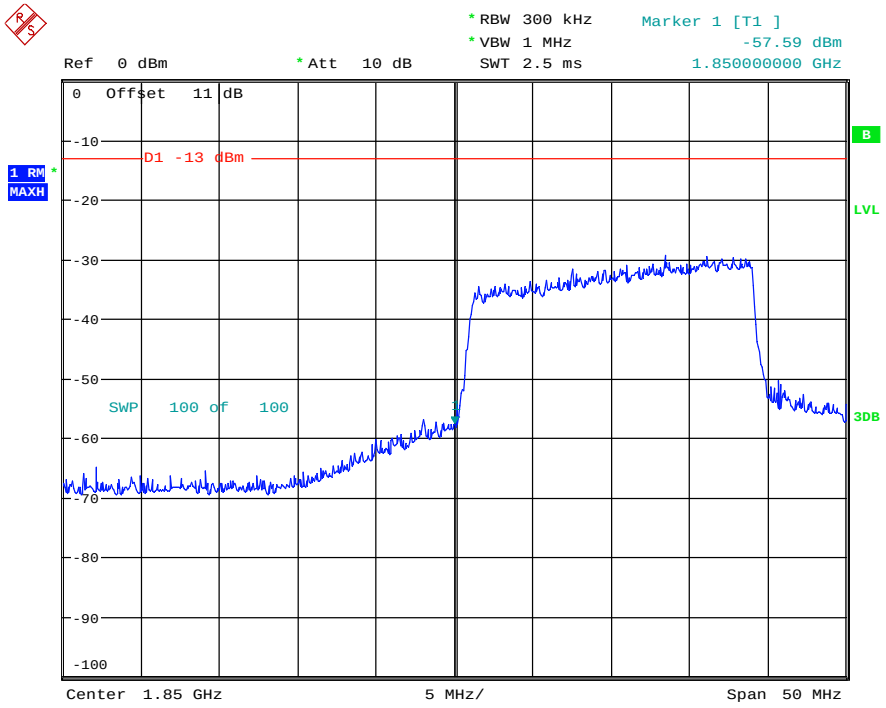

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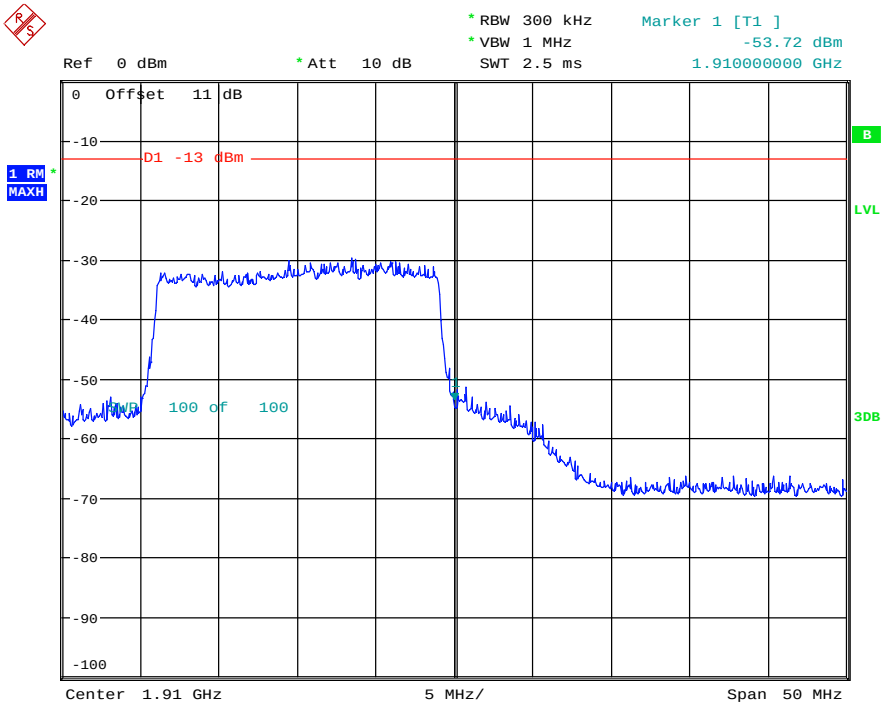

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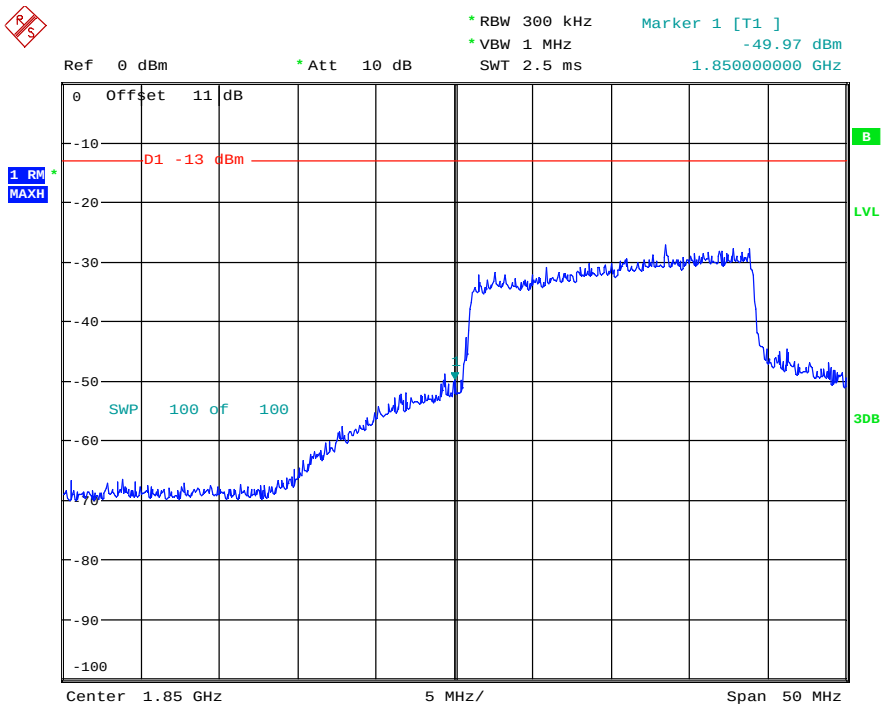
One+3dB



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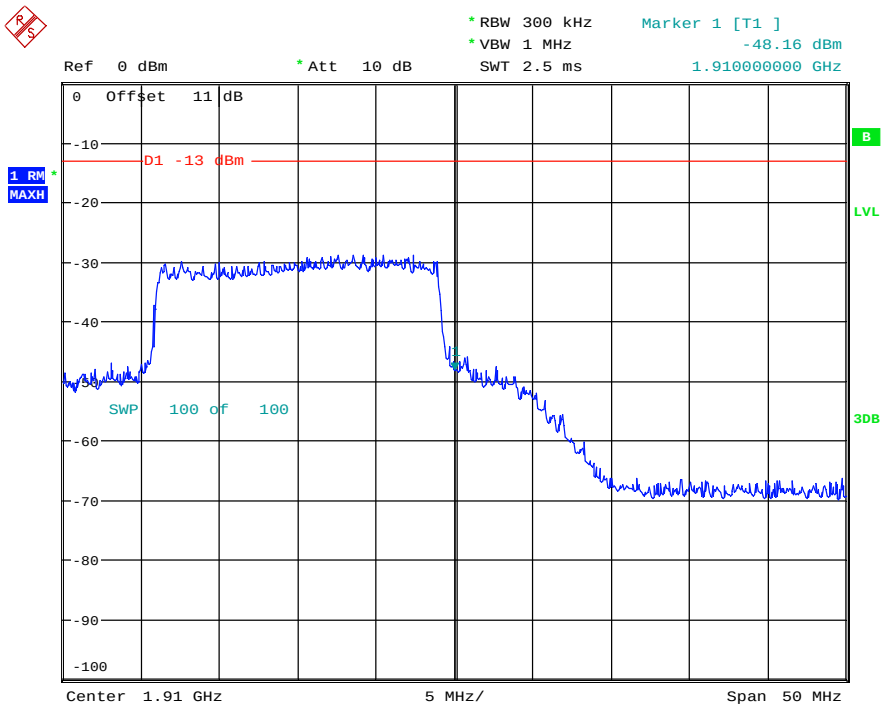

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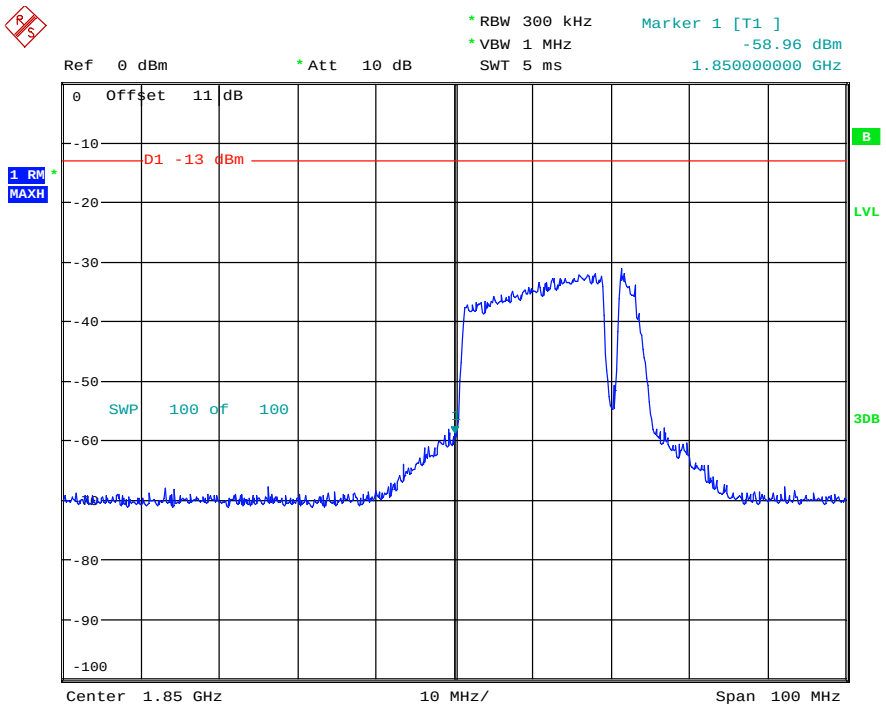

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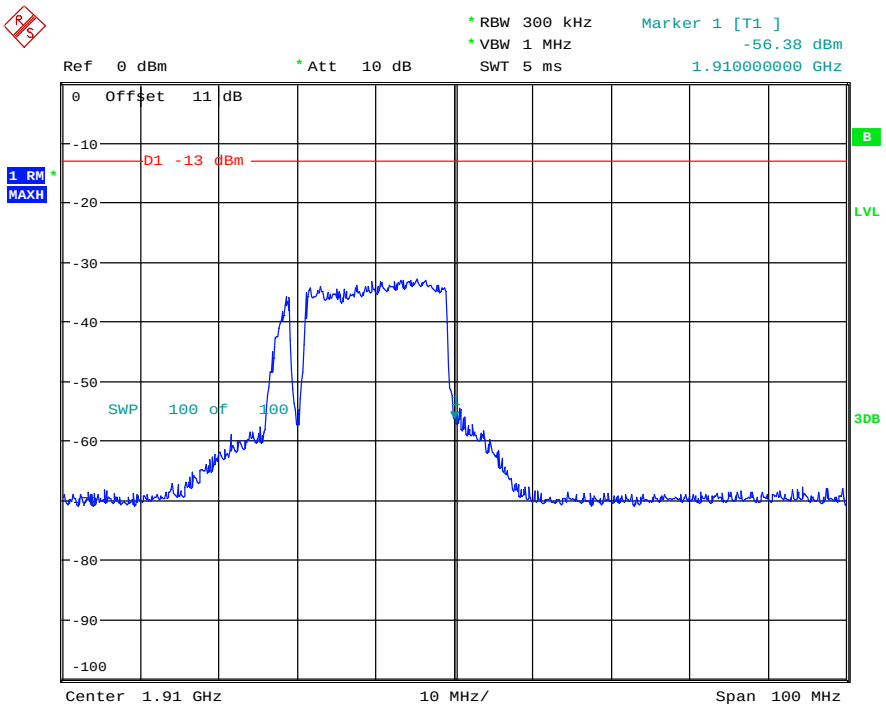

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Report Number: W6M21812-18679-P-20
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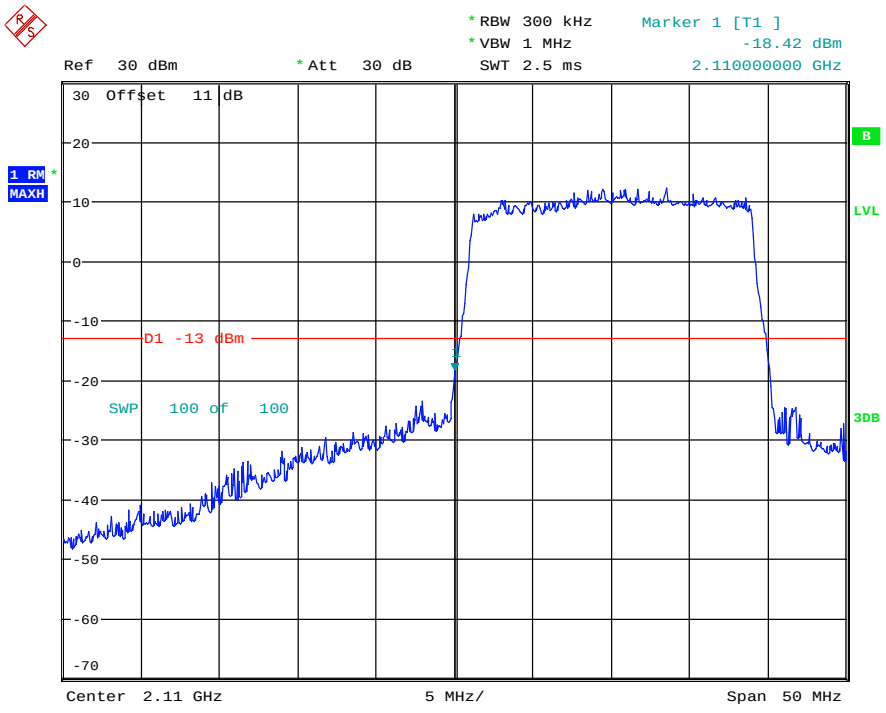
Band IV
Downlink
One



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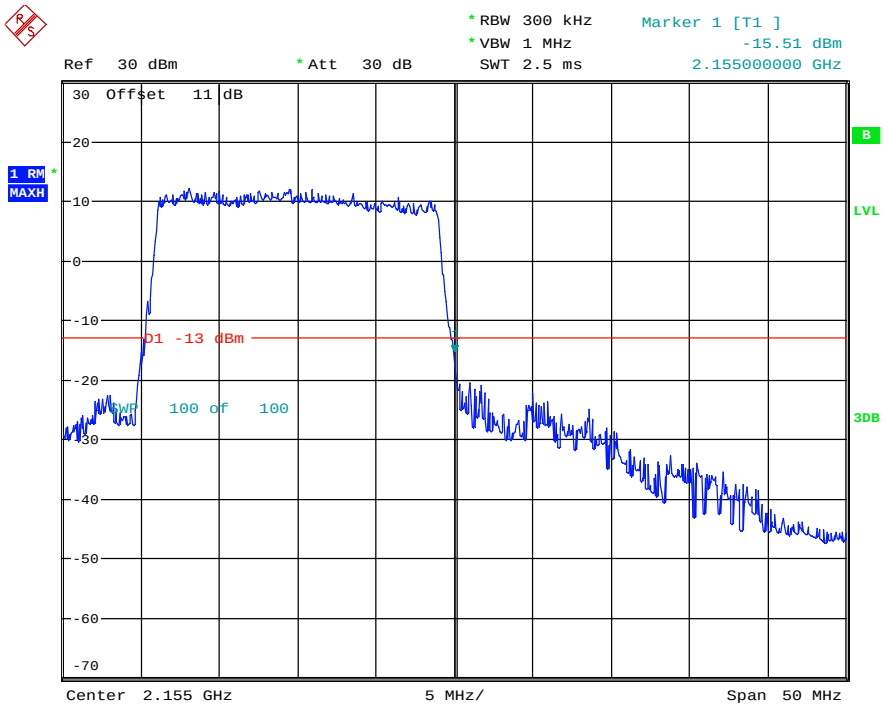

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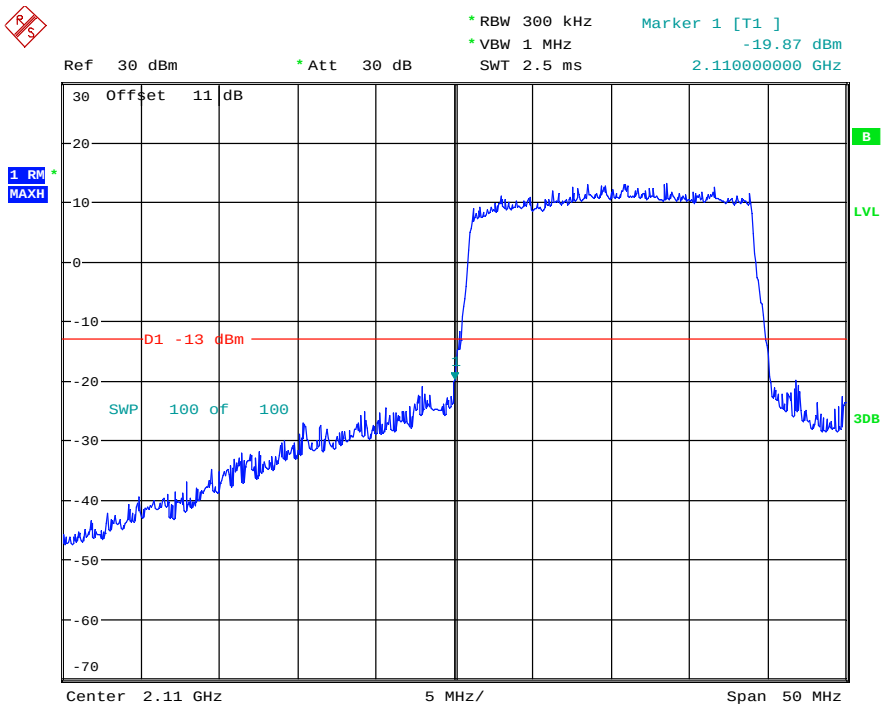

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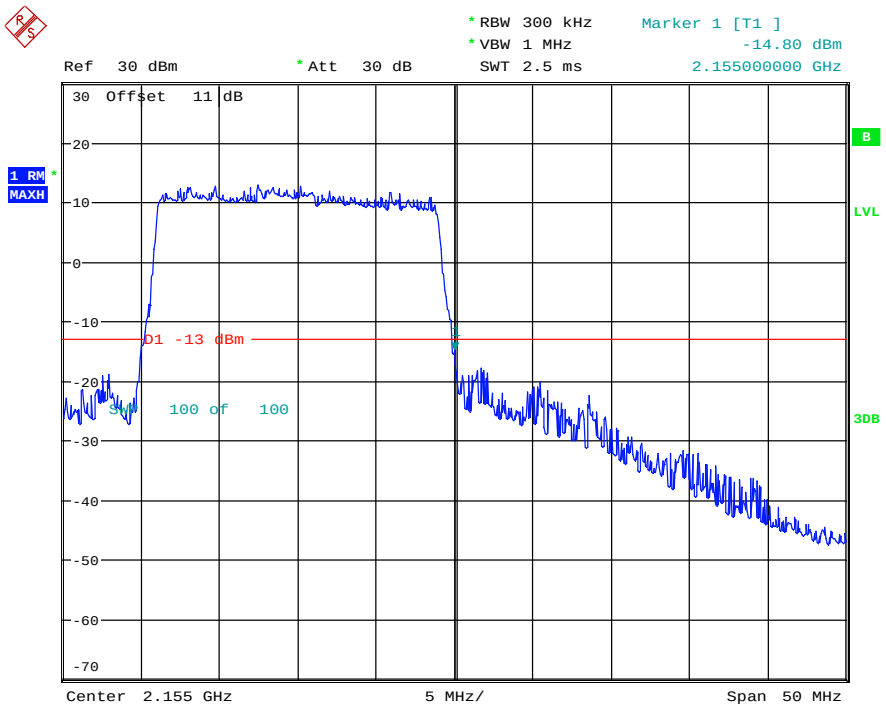

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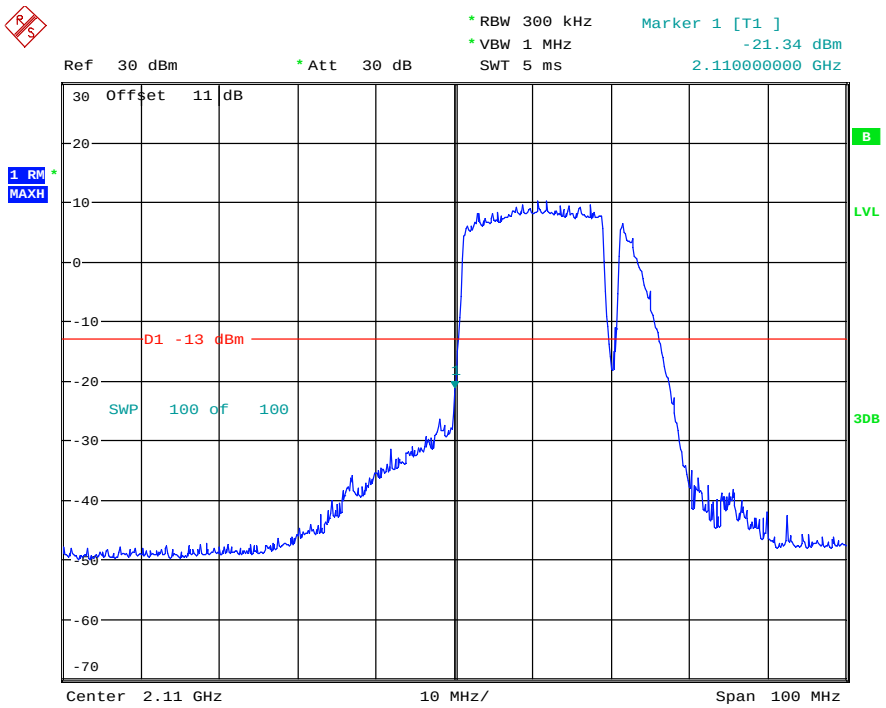

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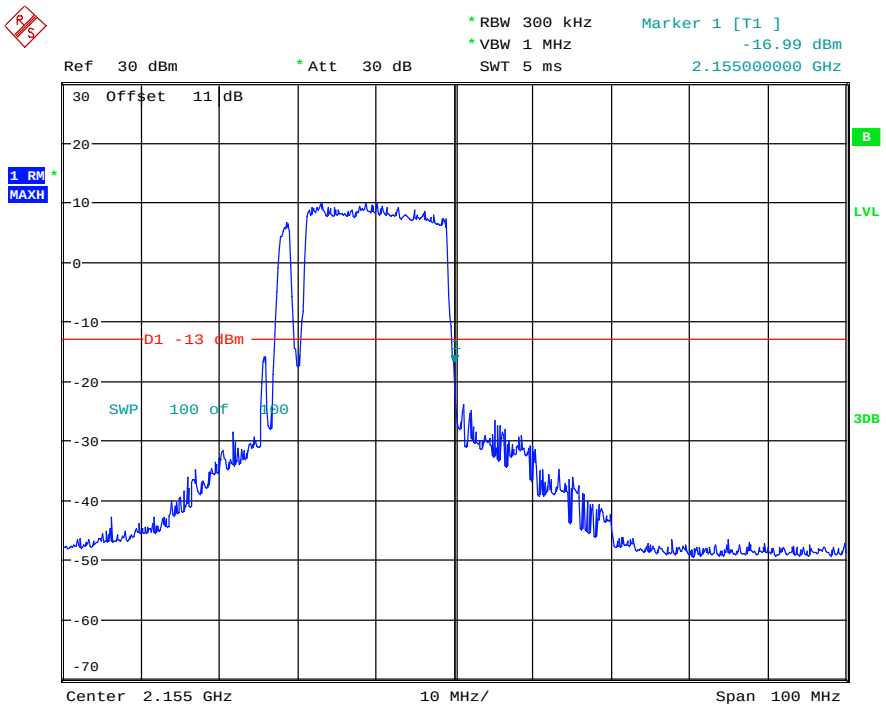

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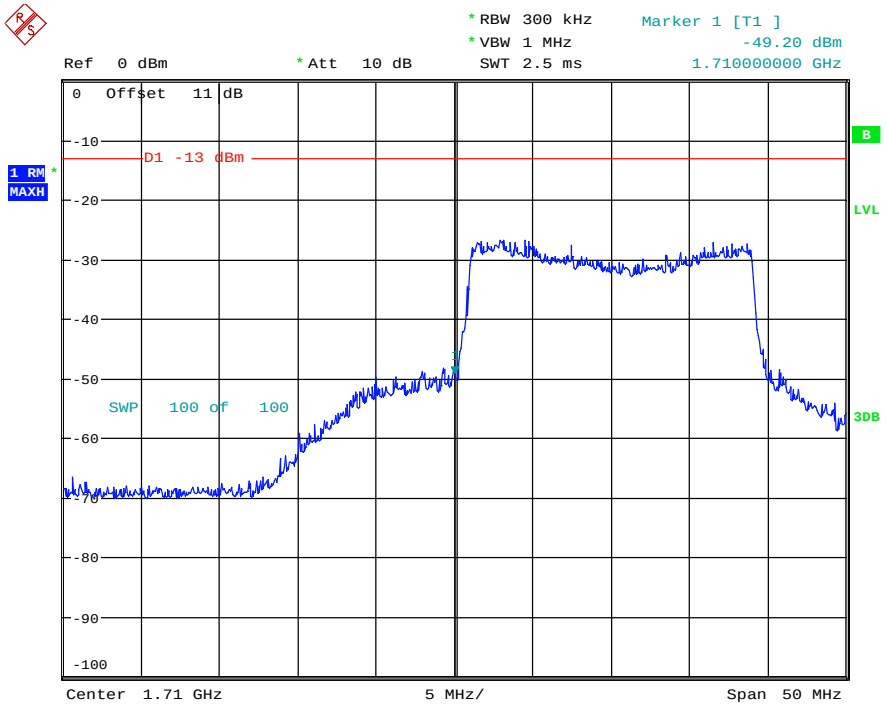
Report Number: W6M21812-18679-P-20
FCC ID: 2ASQXZONEDAS
Uplink
One



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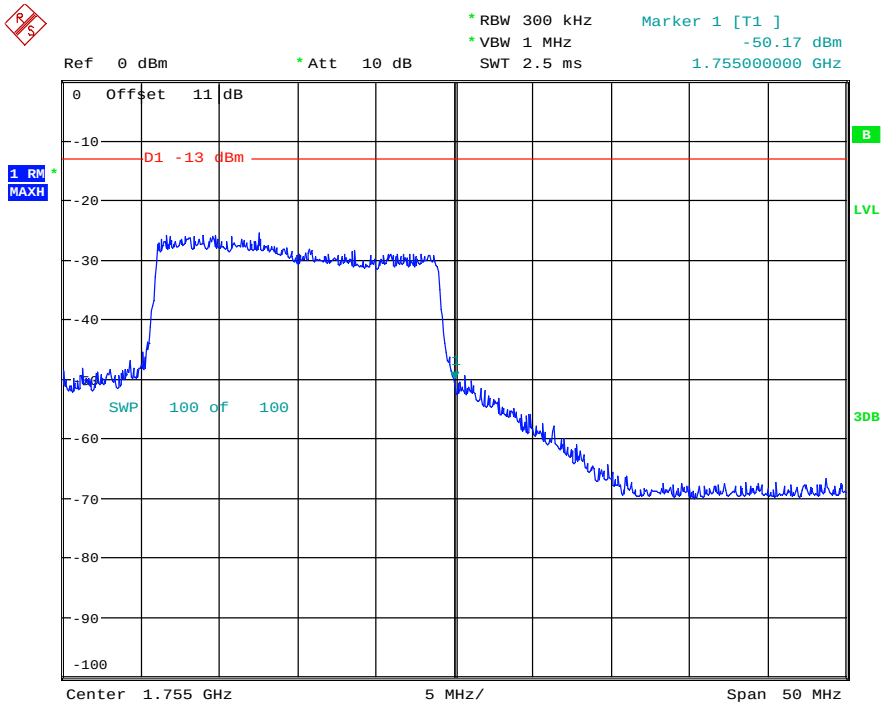

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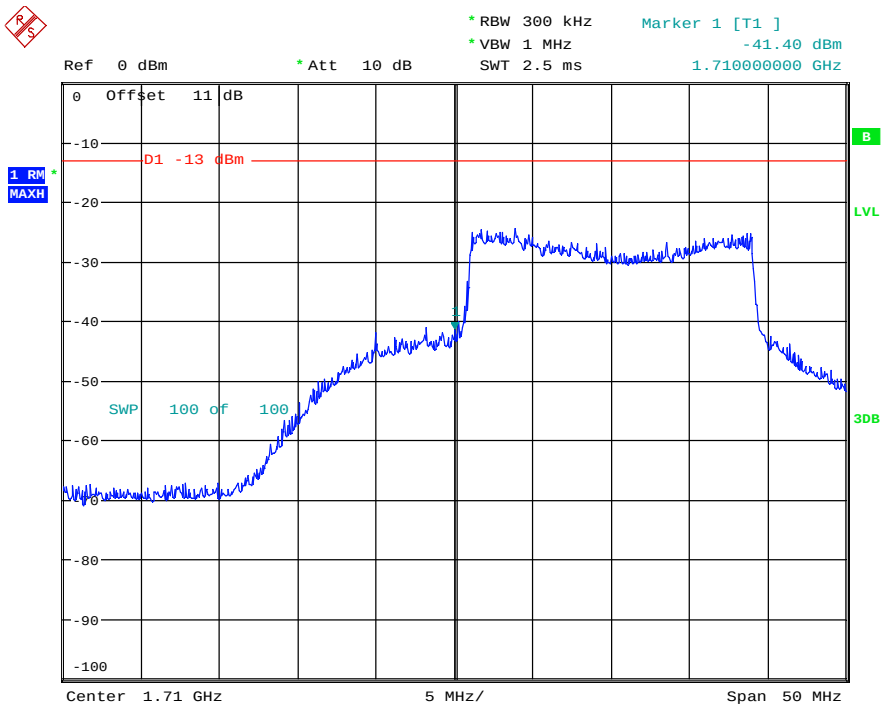

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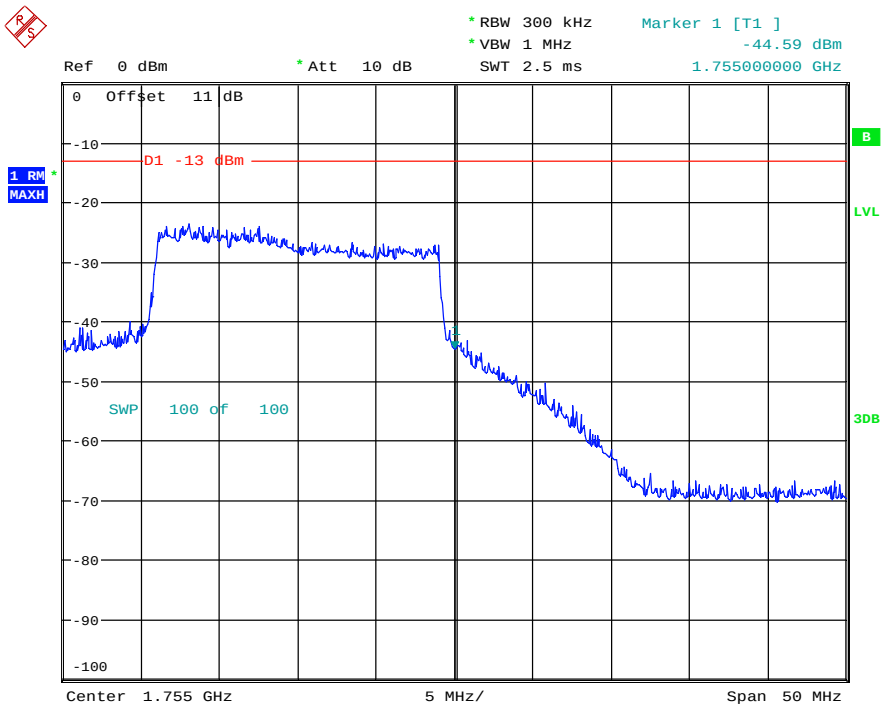

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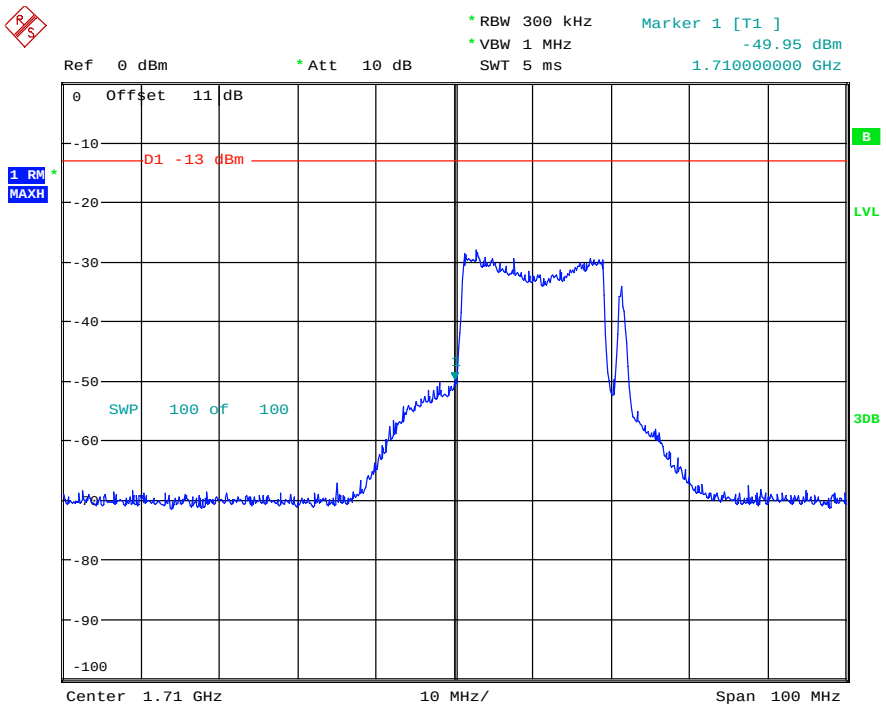

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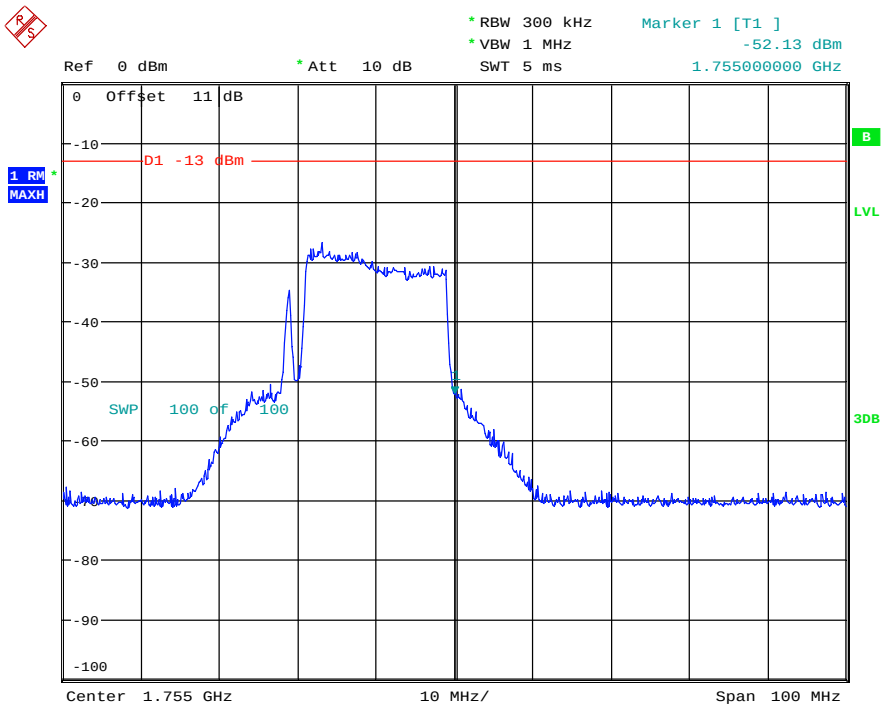

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Report Number: W6M21812-18679-P-20
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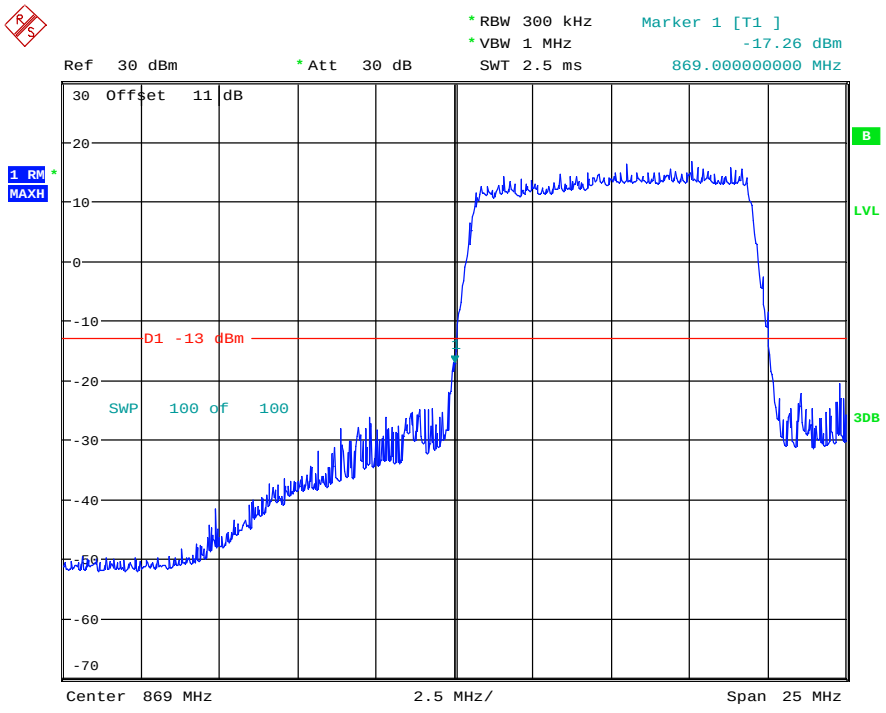
Band V
Downlink
One



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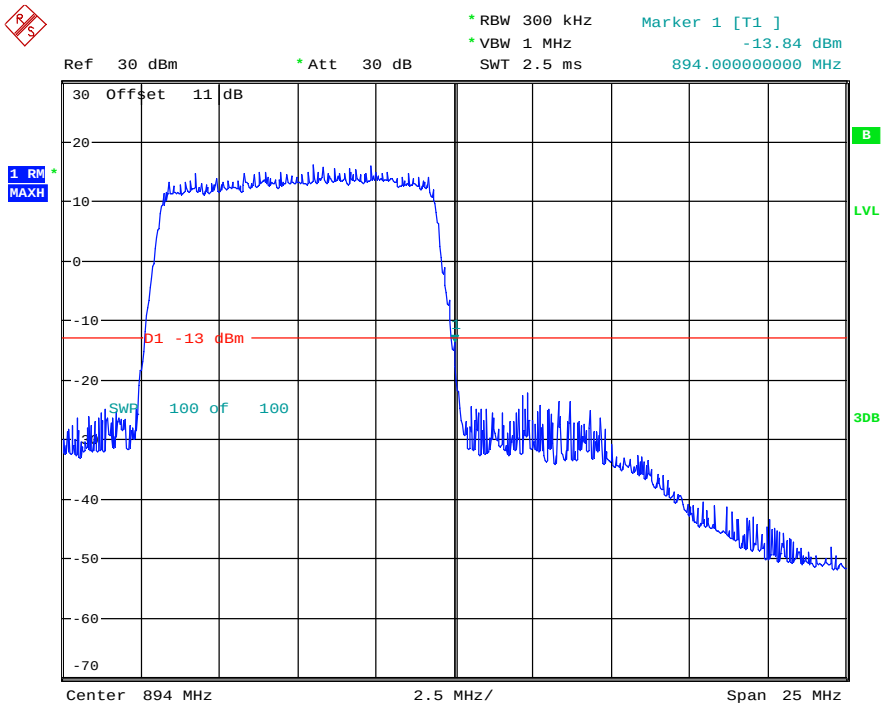

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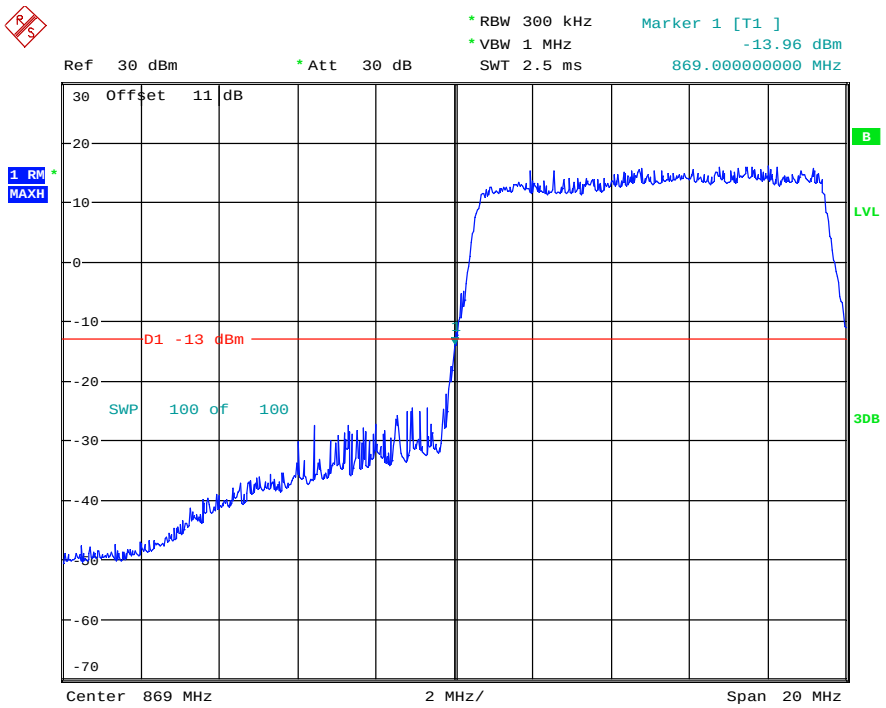
FCC ID: 2ASQXZONEDAS
One+3dB



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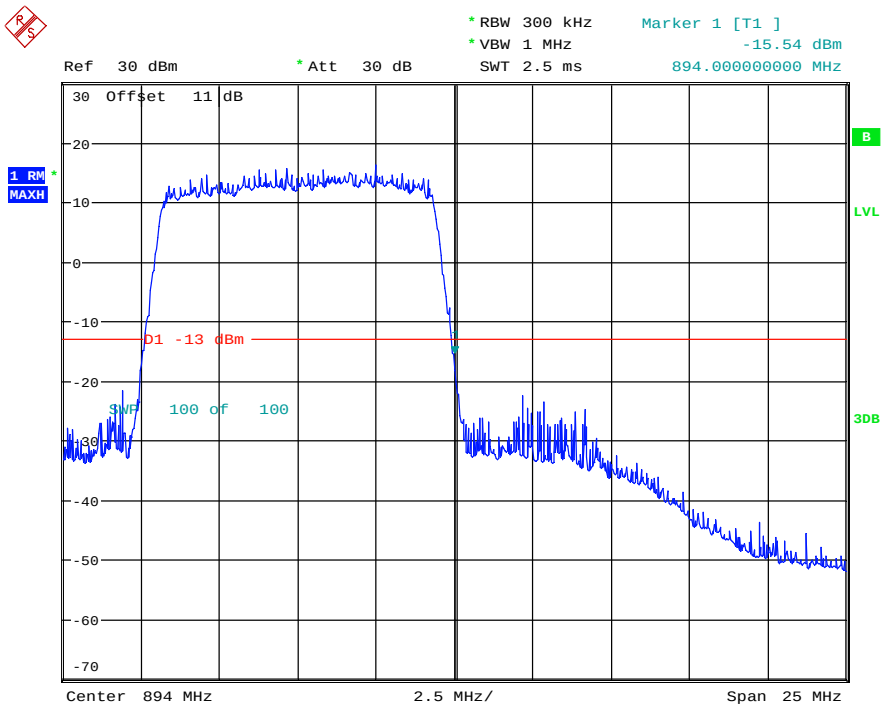

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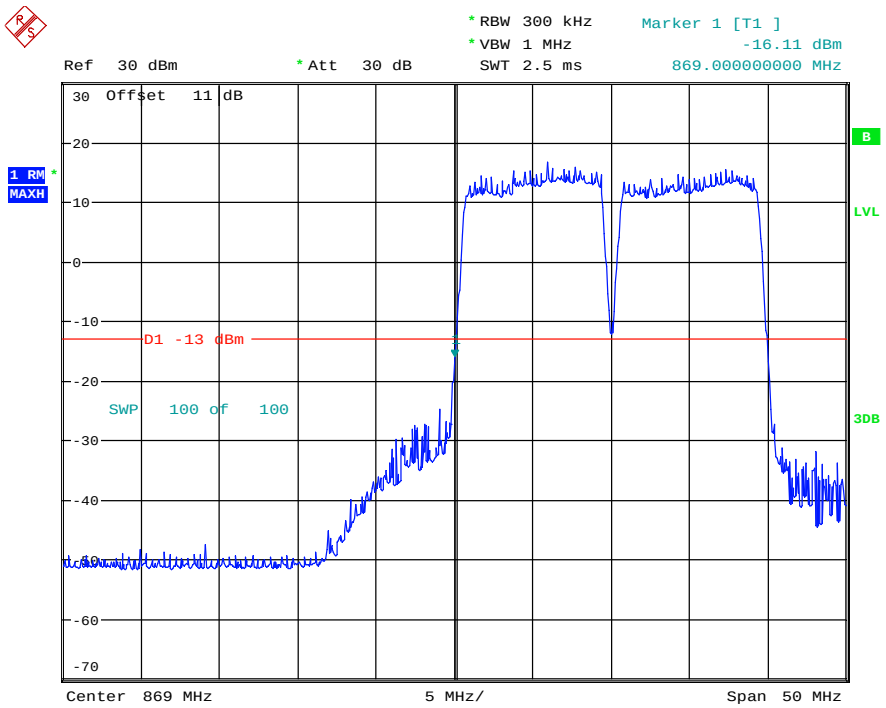

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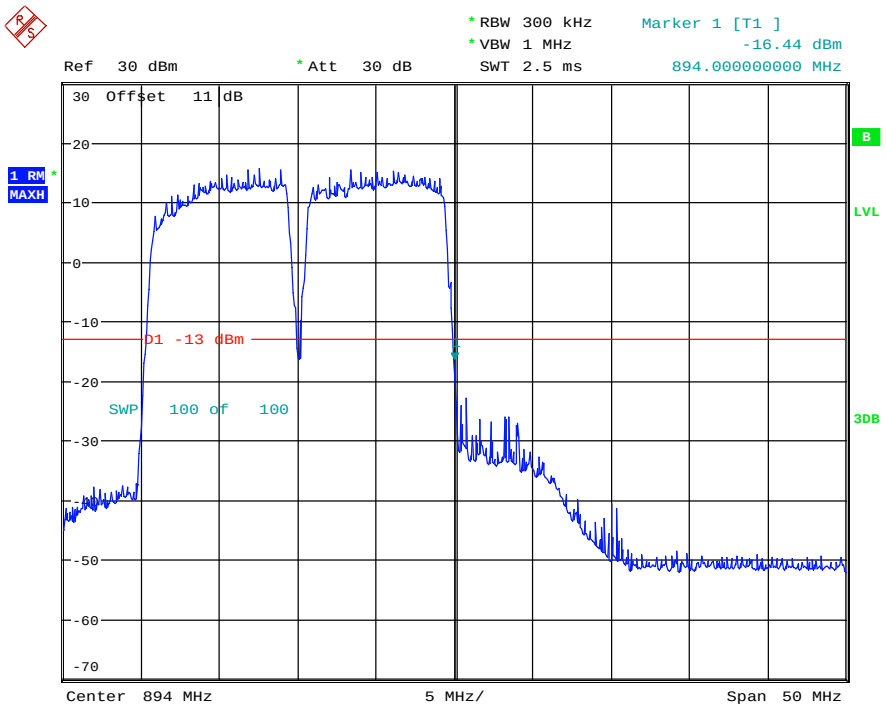

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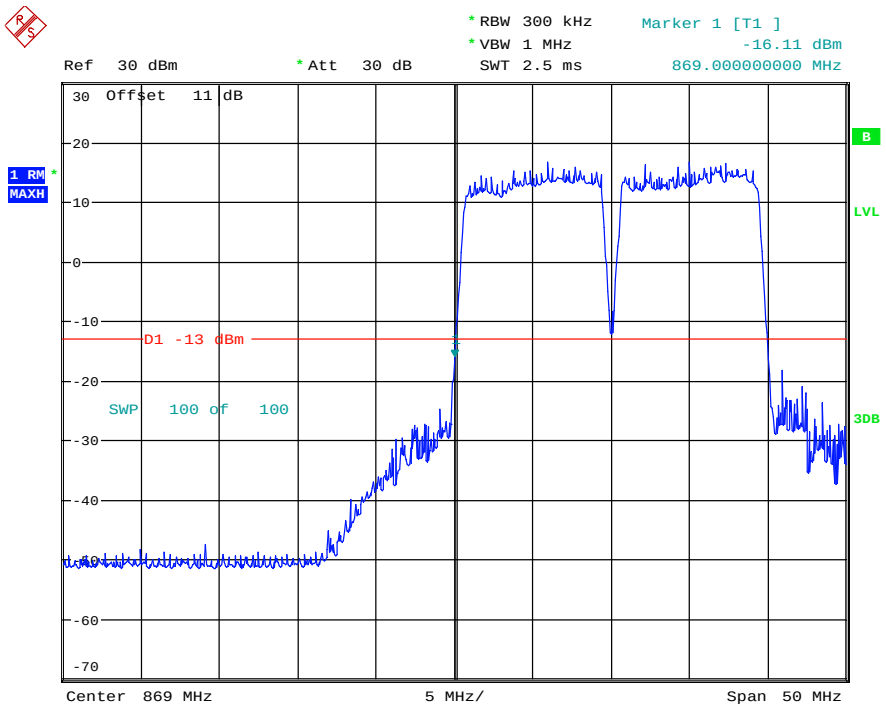
Two+3dB



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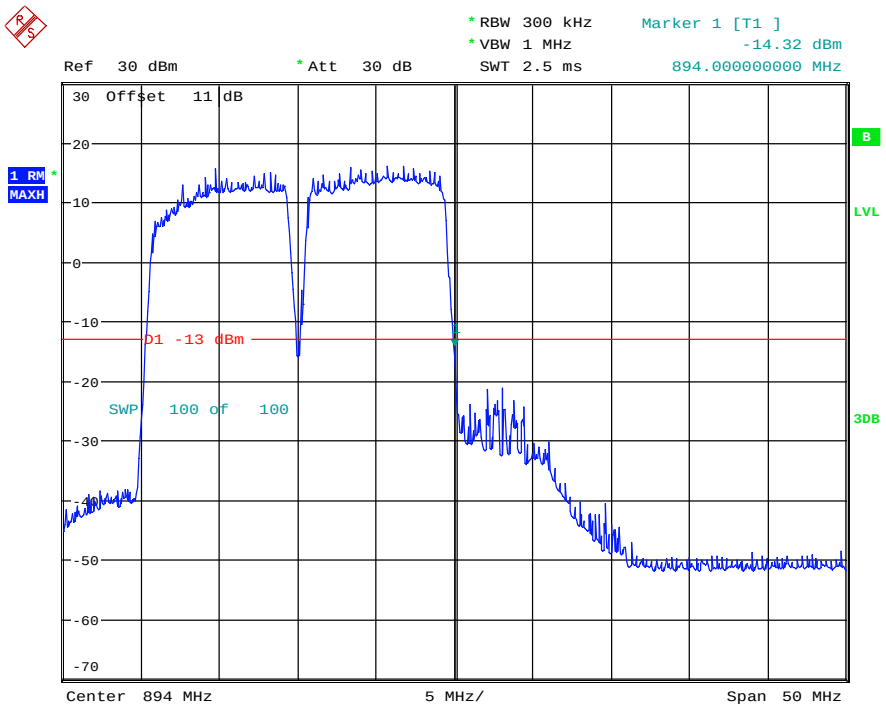

Date: 10.JAN.2019 15:11:48

Report Number: W6M21812-18679-P-20
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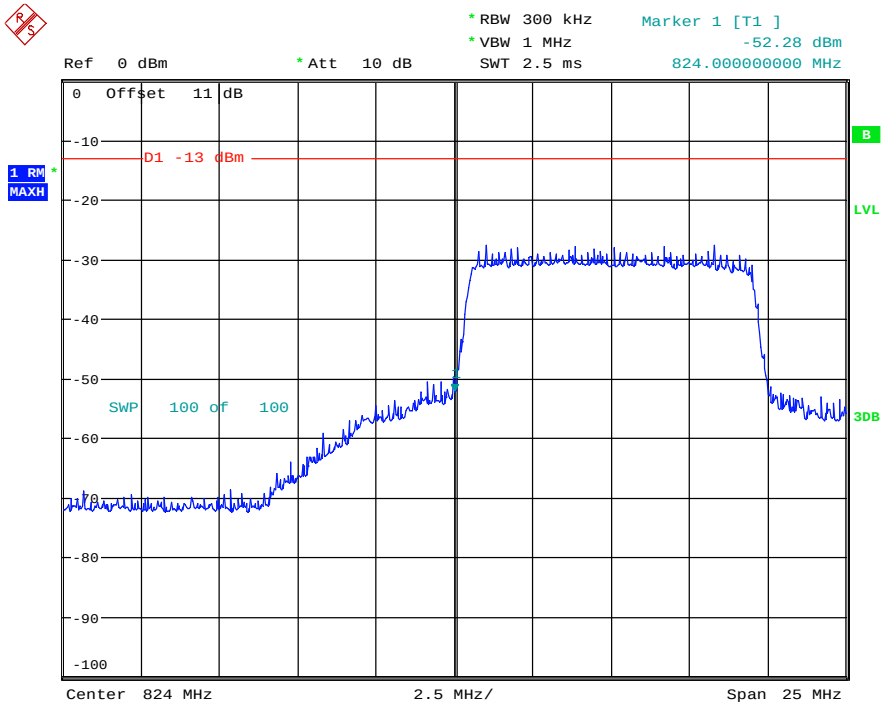
Uplink
One



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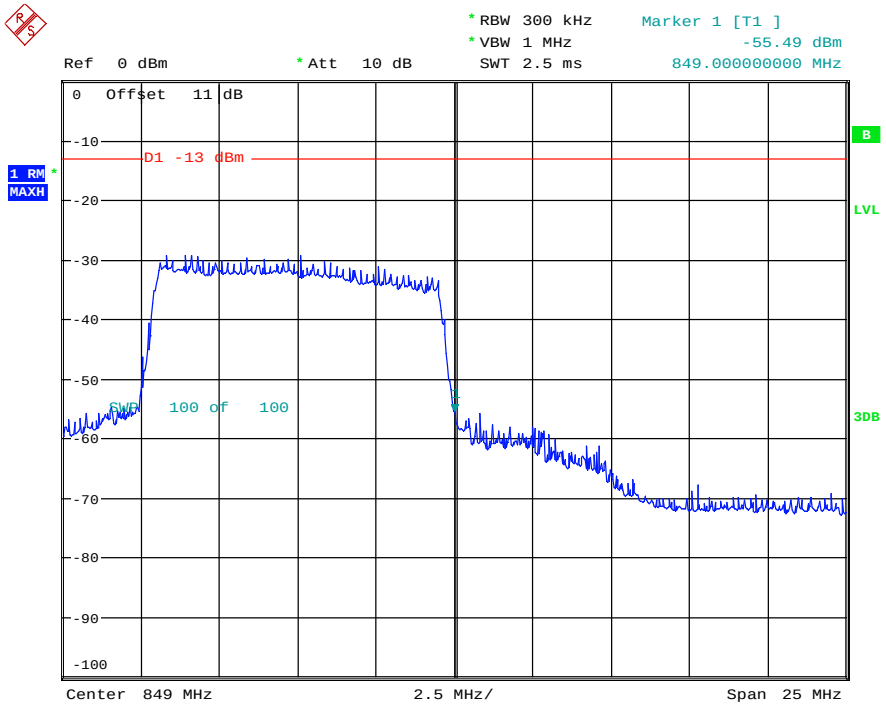

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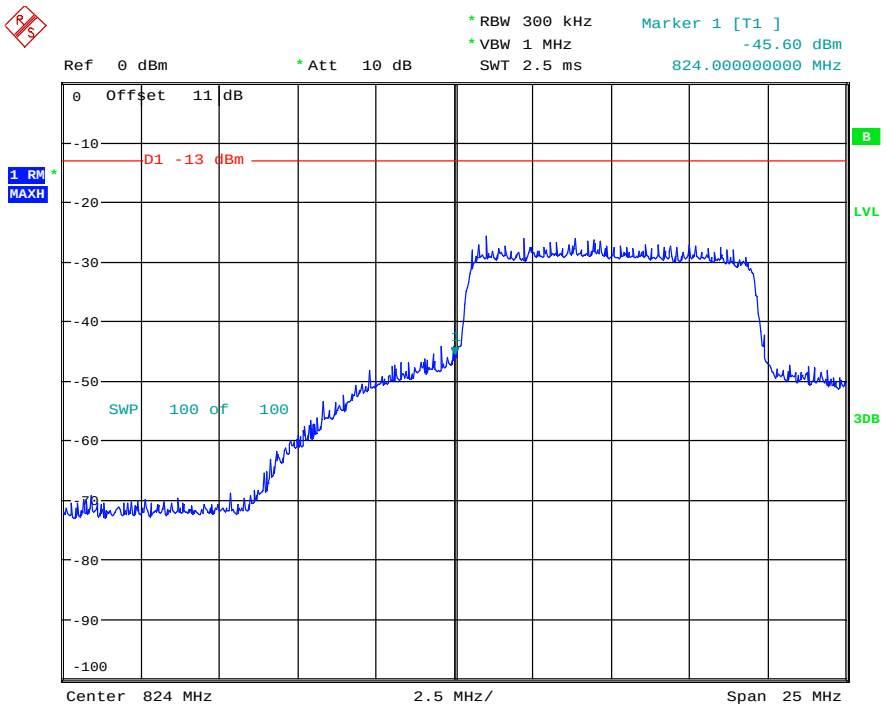

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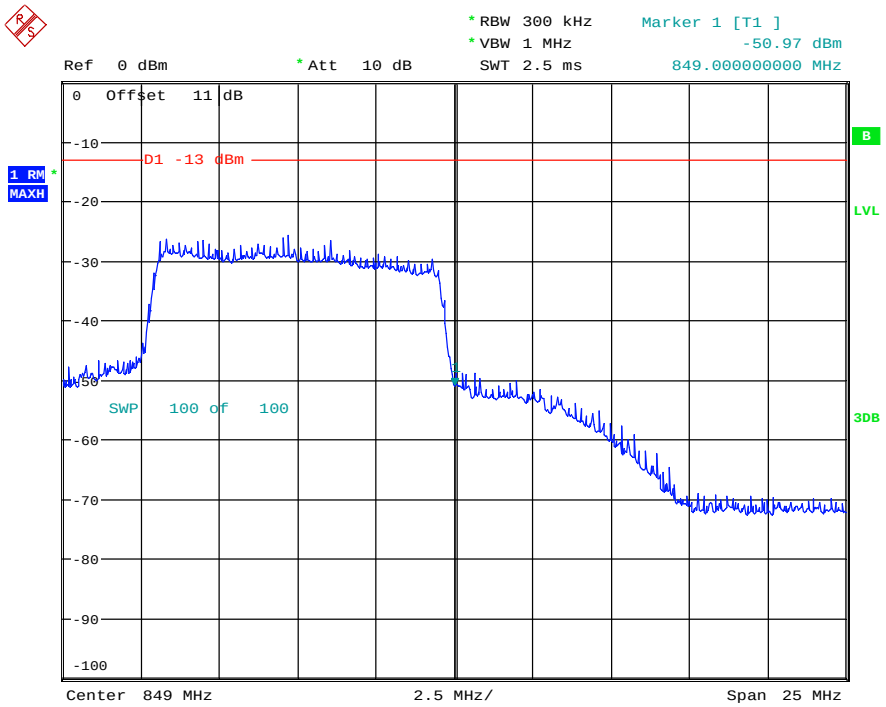

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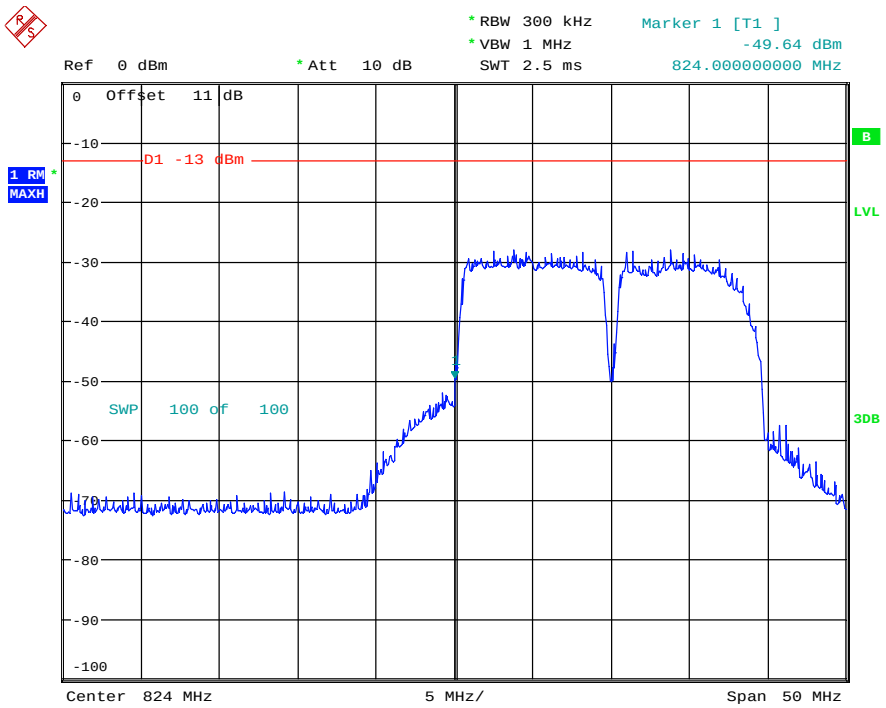

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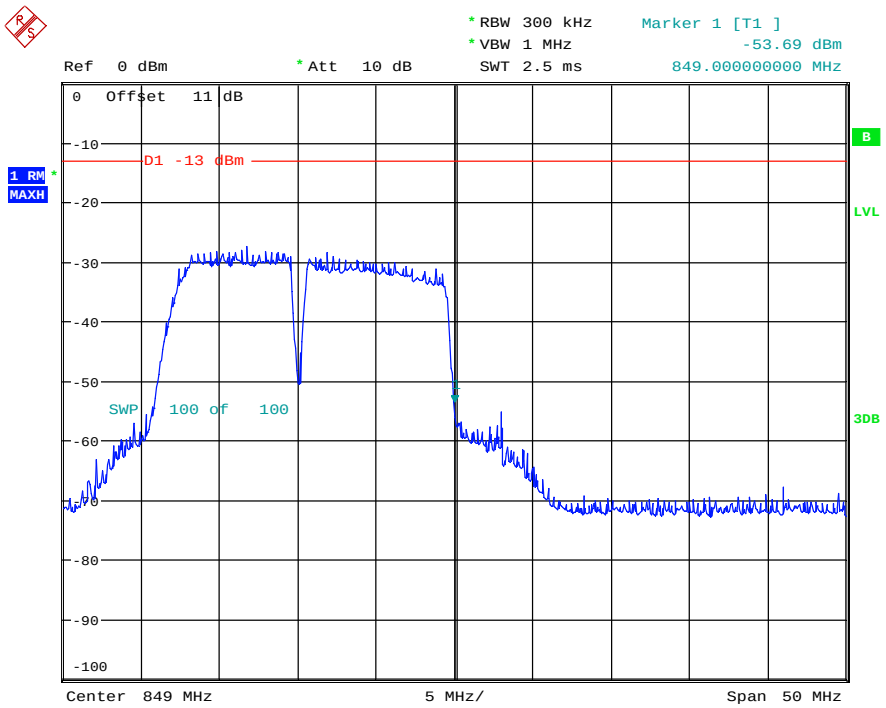

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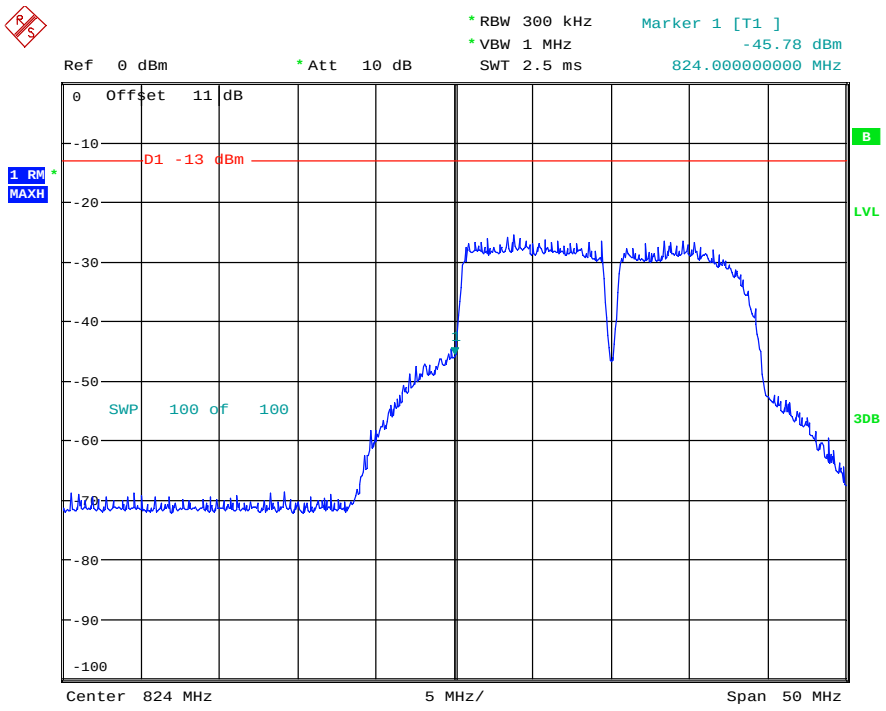
Report Number: W6M21812-18679-P-20
FCC ID: 2ASQXZONEDAS
Two+3dB



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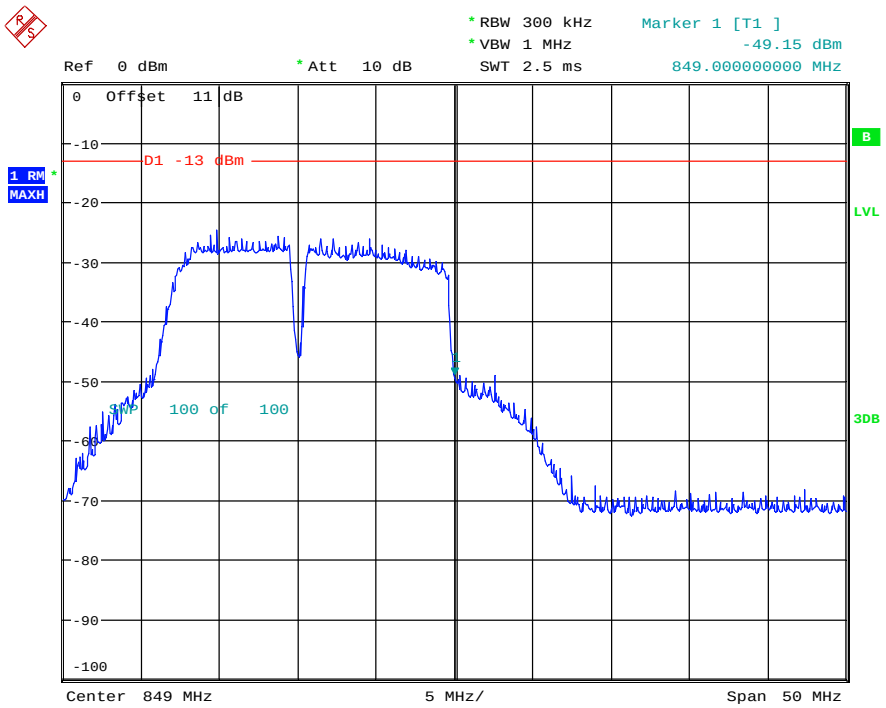
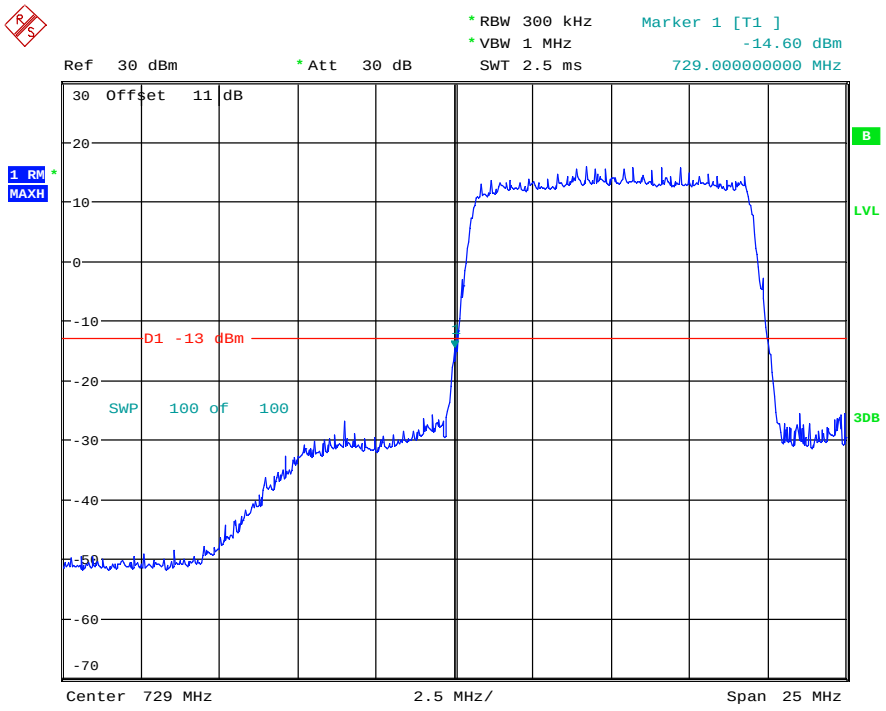


Date: 10.JAN.2019 15:19:52

Report Number: W6M21812-18679-P-20
FCC ID: 2ASQXZONEDAS
Band XII
Downlink
One



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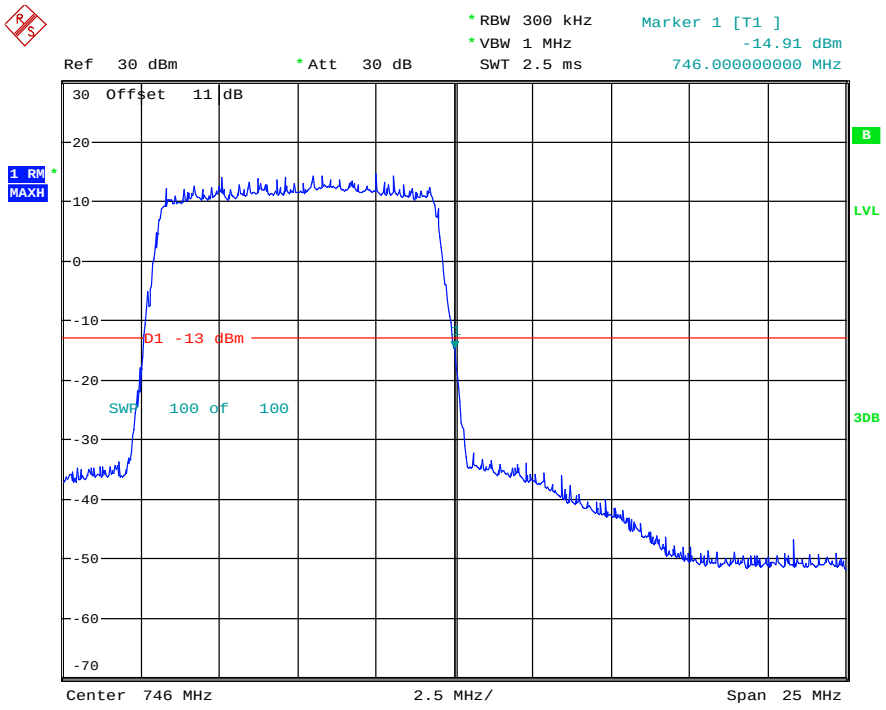
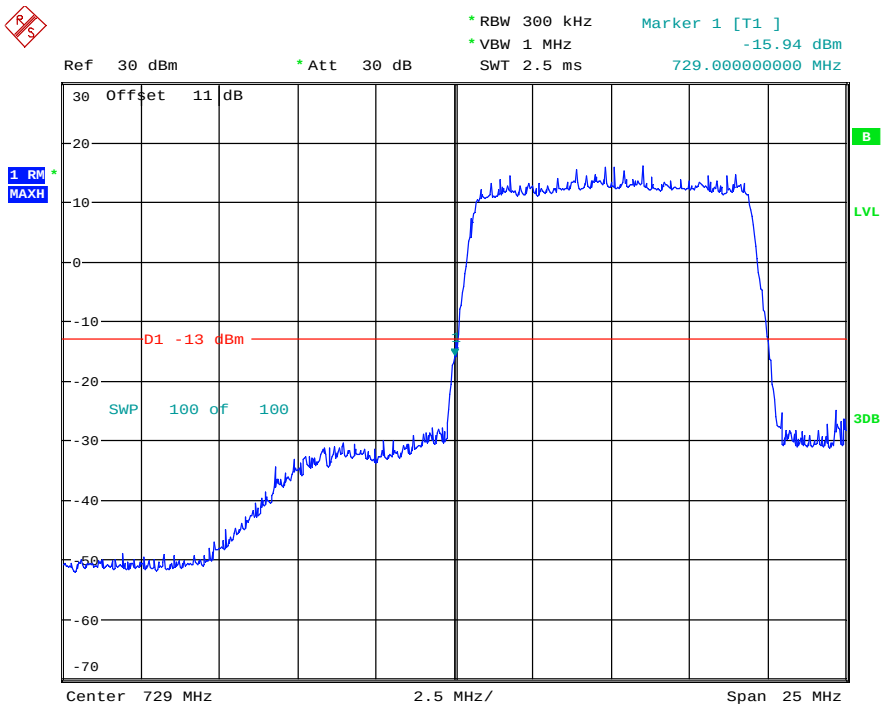


Date: 10.JAN.2019 15:53:08



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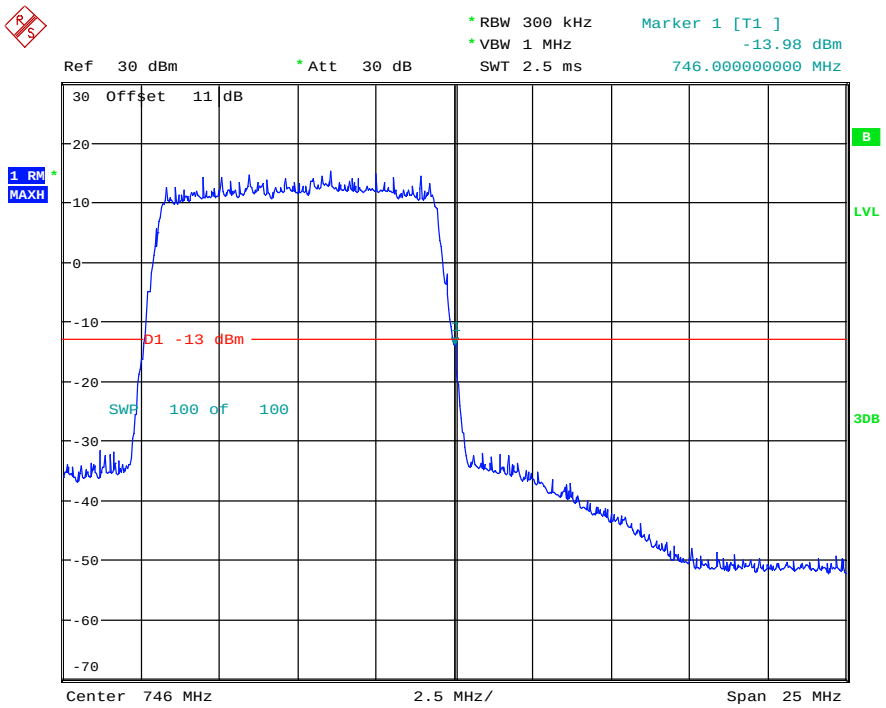
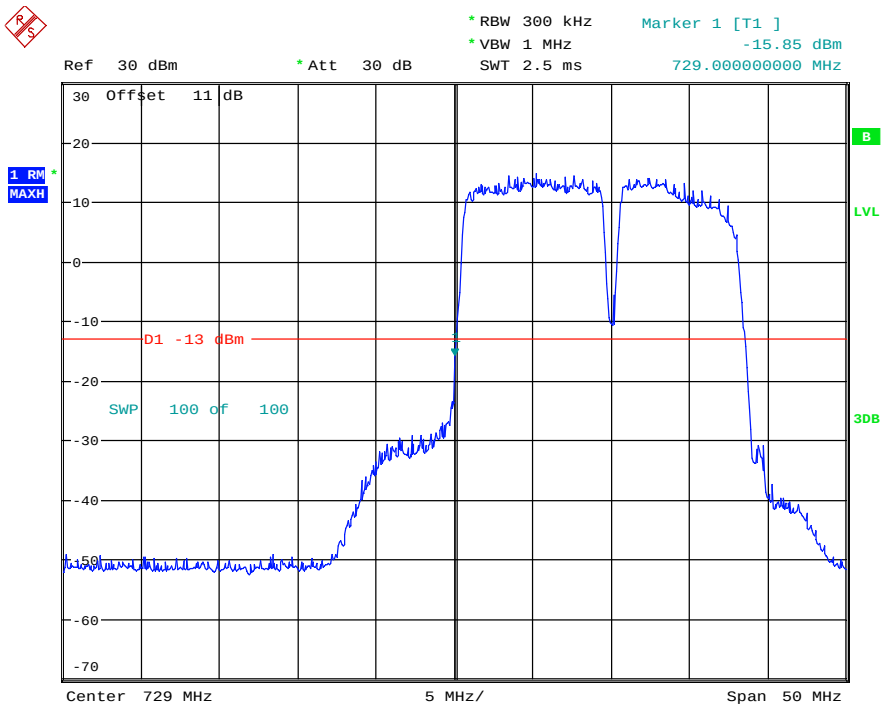
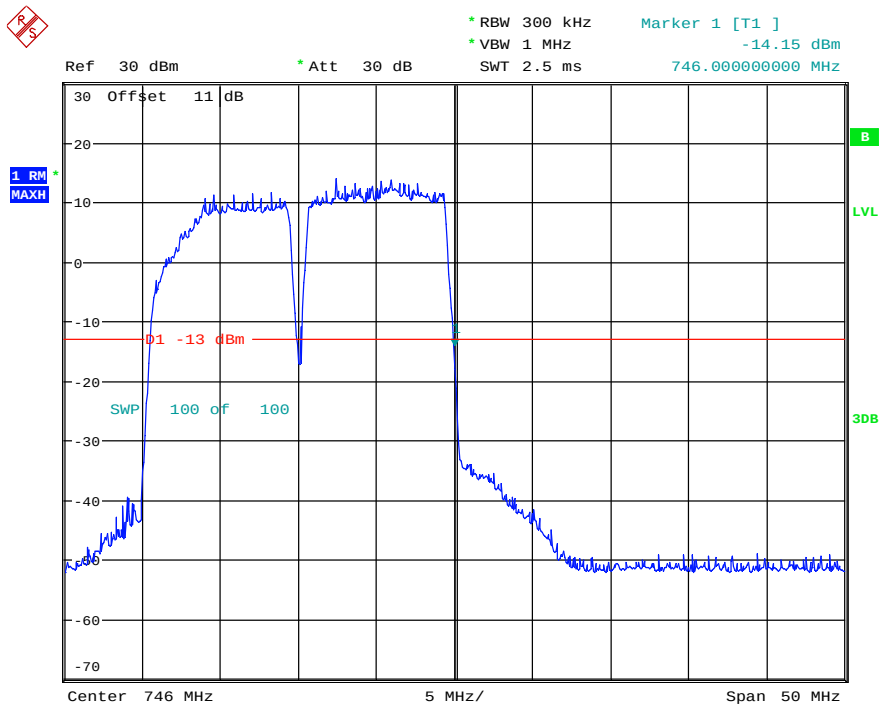


Date: 10.JAN.2019 15:54:16

Report Number: W6M21812-18679-P-20
FCC ID: 2ASQXZONEDAS
Two

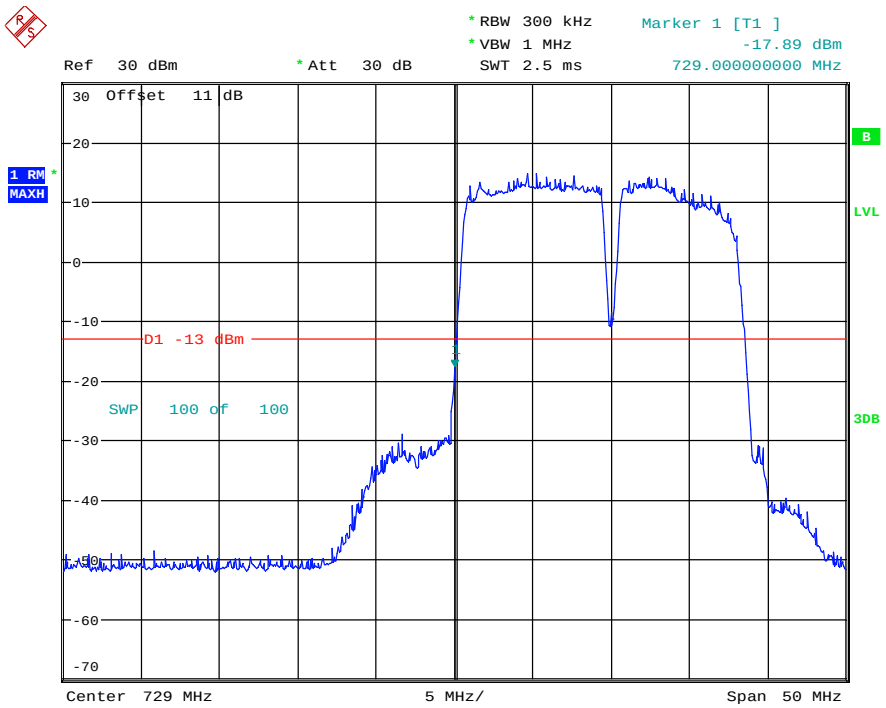


Date: 10.JAN.2019 15:50:10



Date: 10.JAN.2019 15:53:31

Report Number: W6M21812-18679-P-20
FCC ID: 2ASQXZONEDAS
Two+3dB



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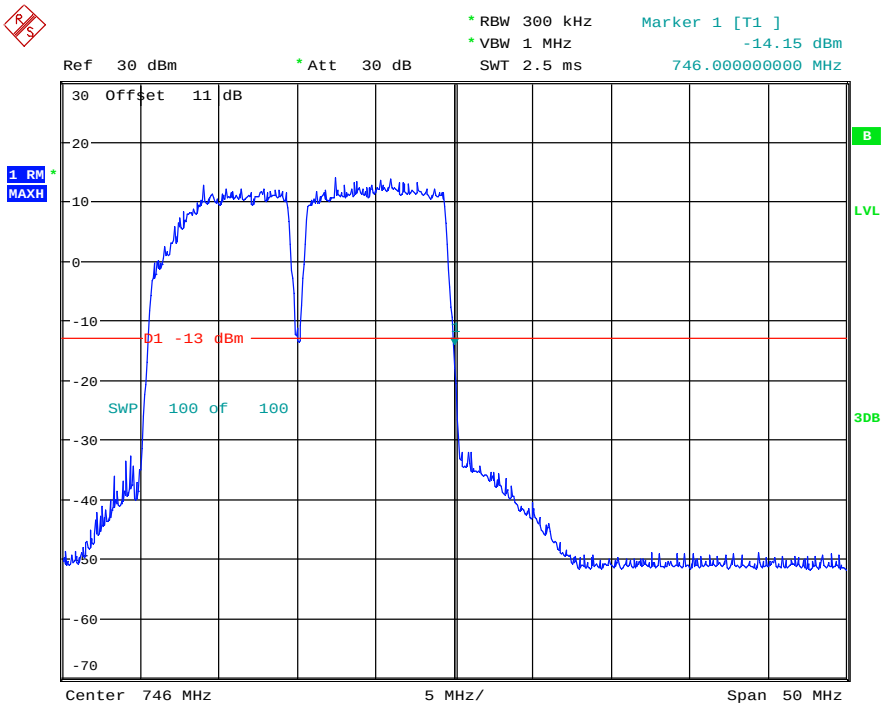
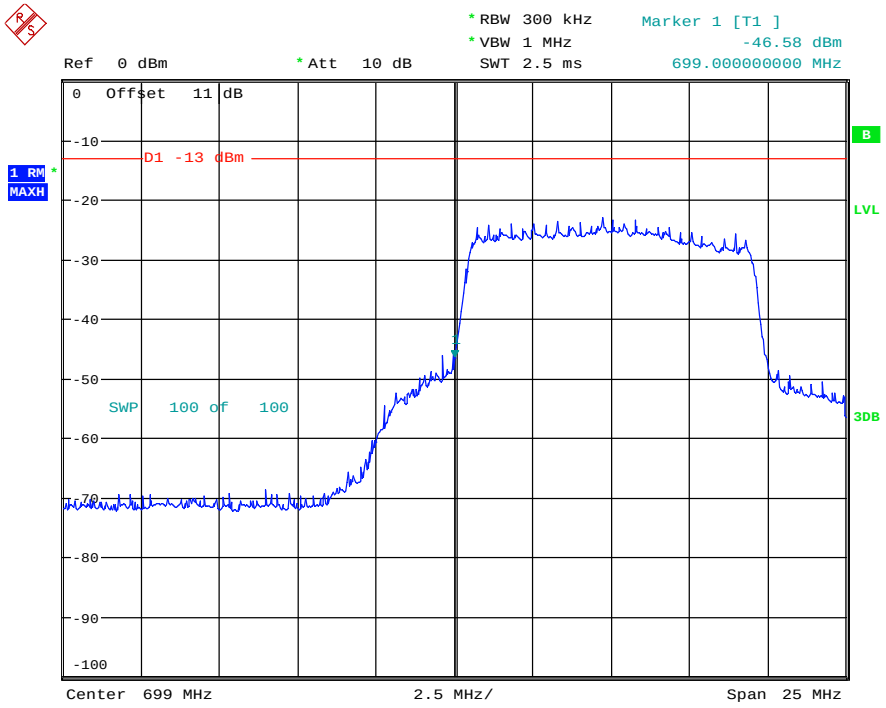


Date: 10.JAN.2019 15:53:55

Report Number: W6M21812-18679-P-20
FCC ID: 2ASQXZONEDAS
Uplink
One



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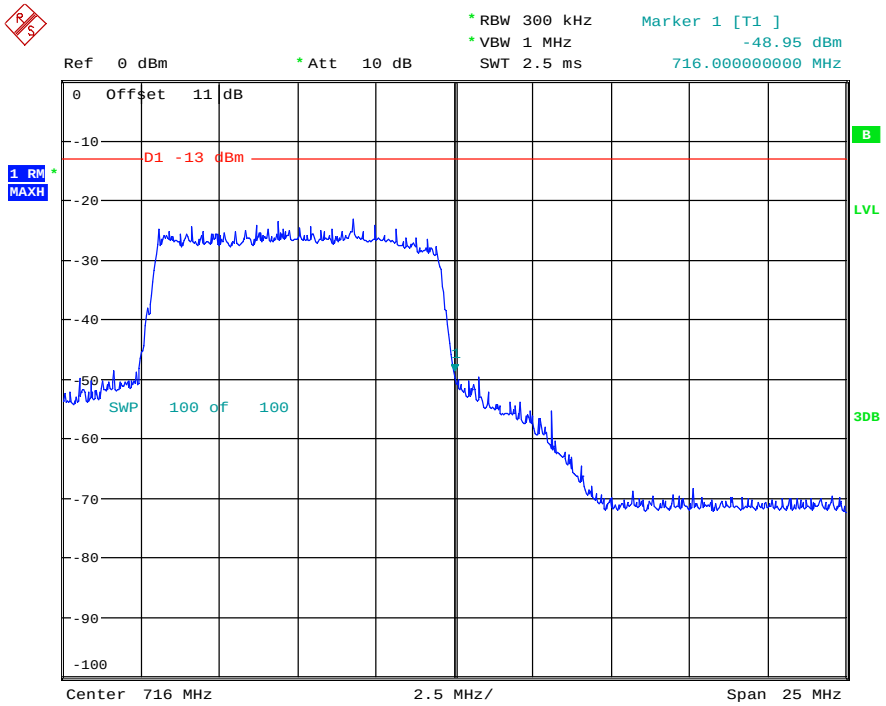

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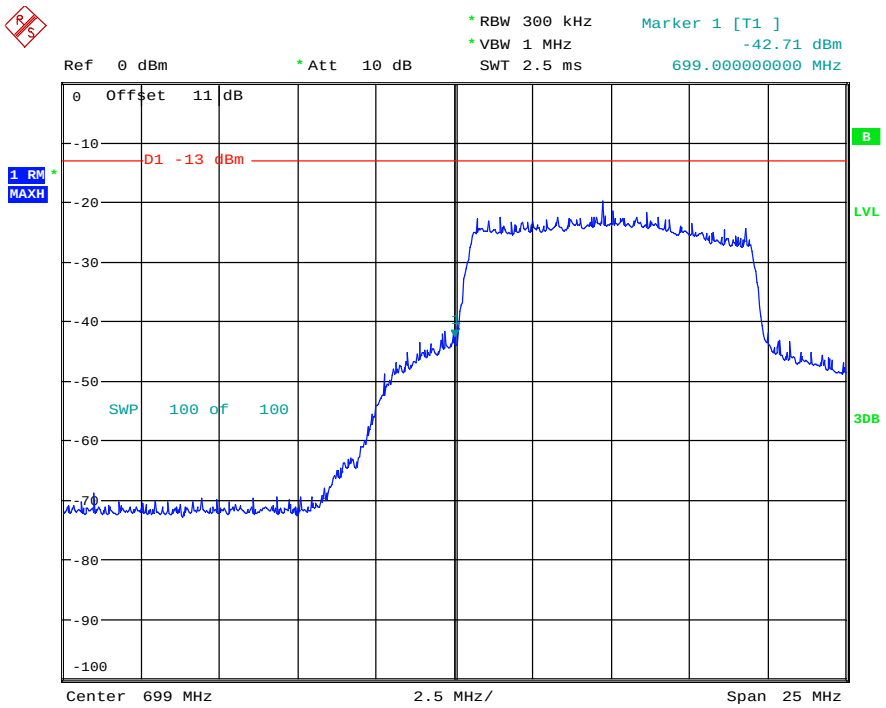
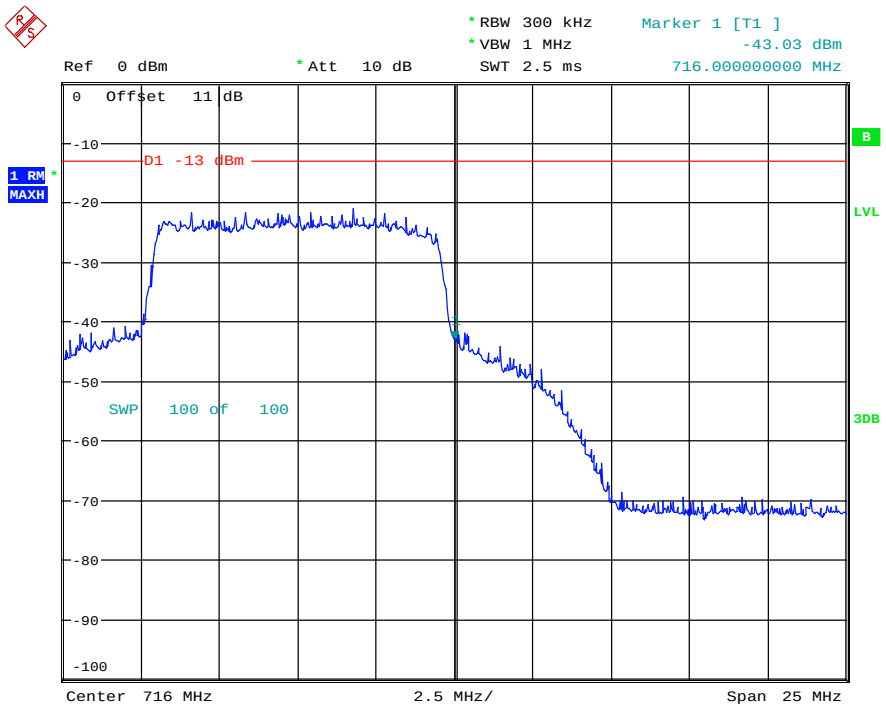
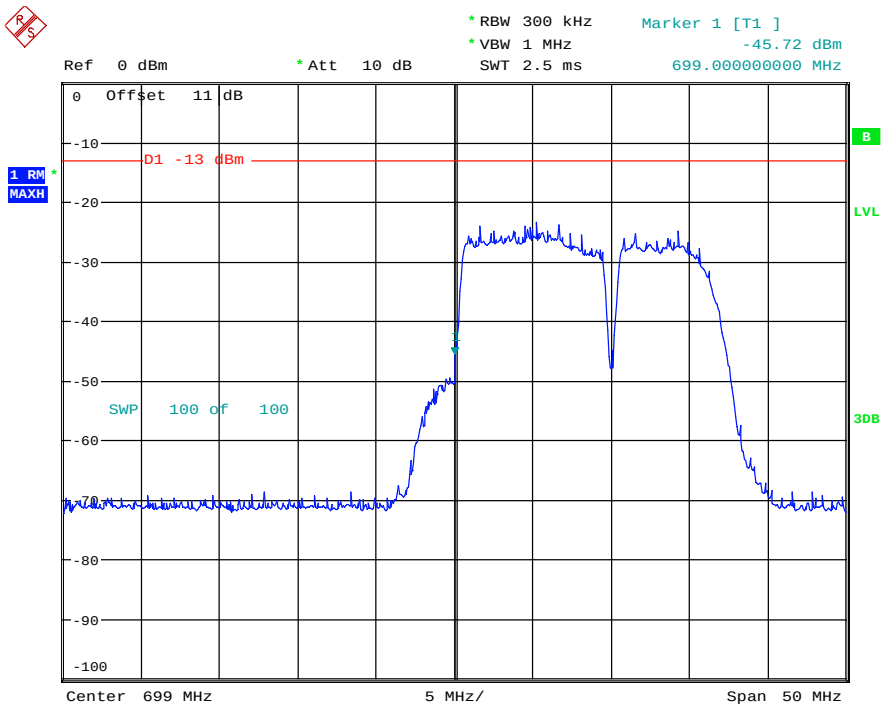


Date: 10.JAN.2019 15:27:49



Date: 10.JAN.2019 15:30:30

Report Number: W6M21812-18679-P-20
FCC ID: 2ASQXZONEDAS
Two



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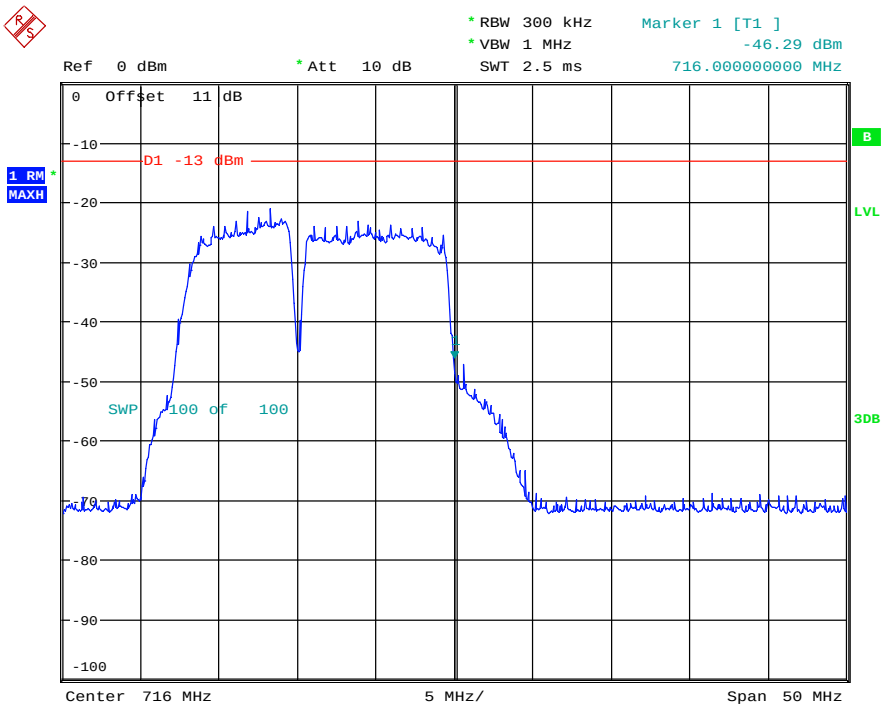

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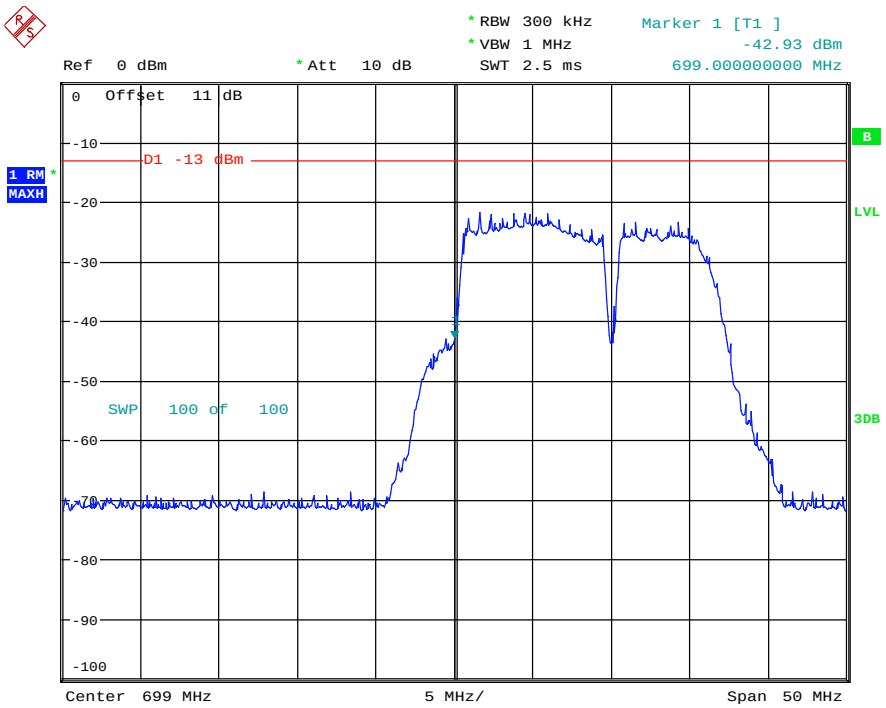
Report Number: W6M21812-18679-P-20
FCC ID: 2ASQXZONEDAS
Two+3dB



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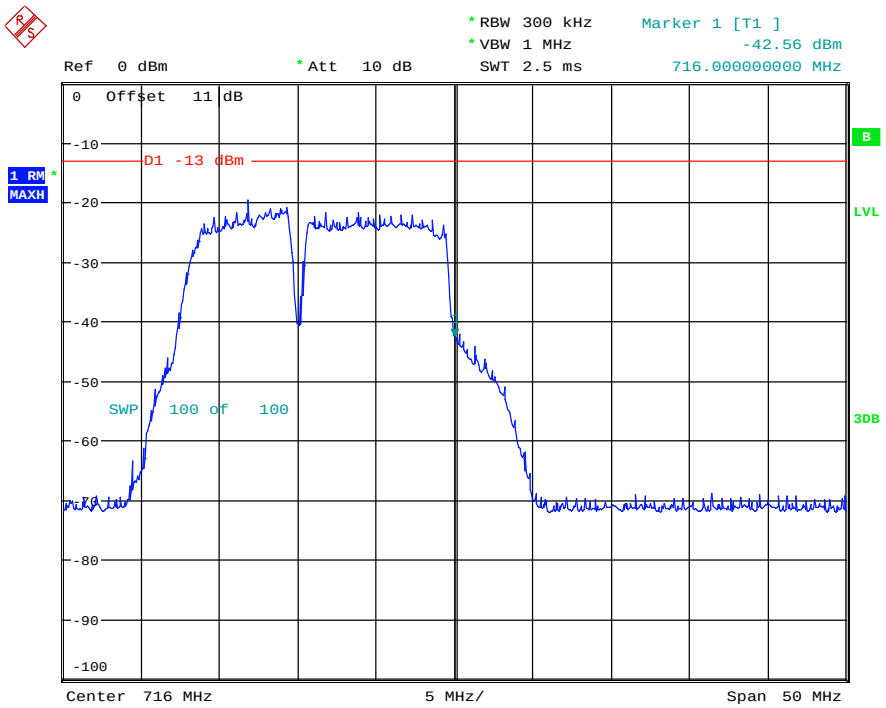
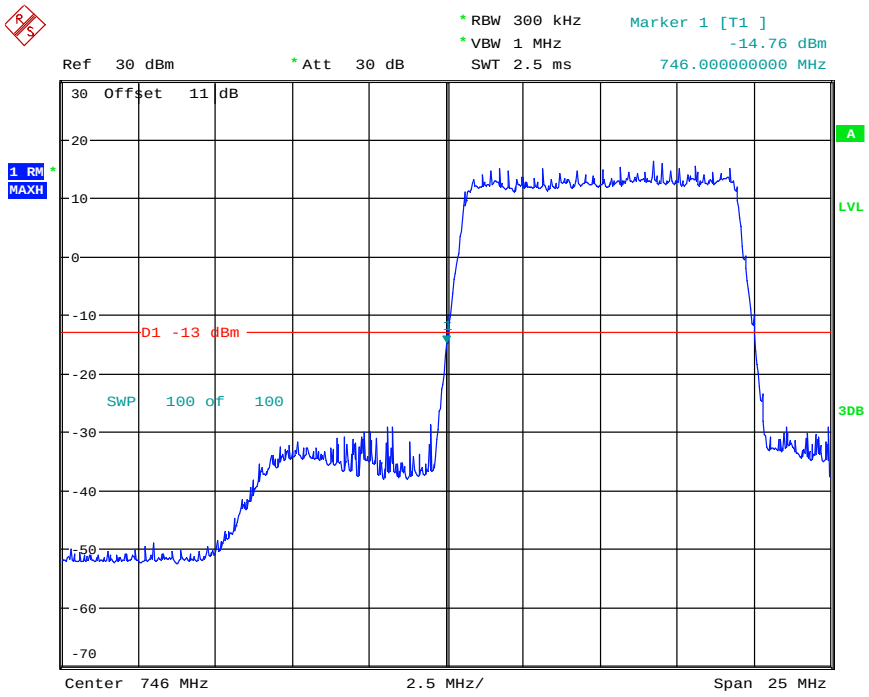


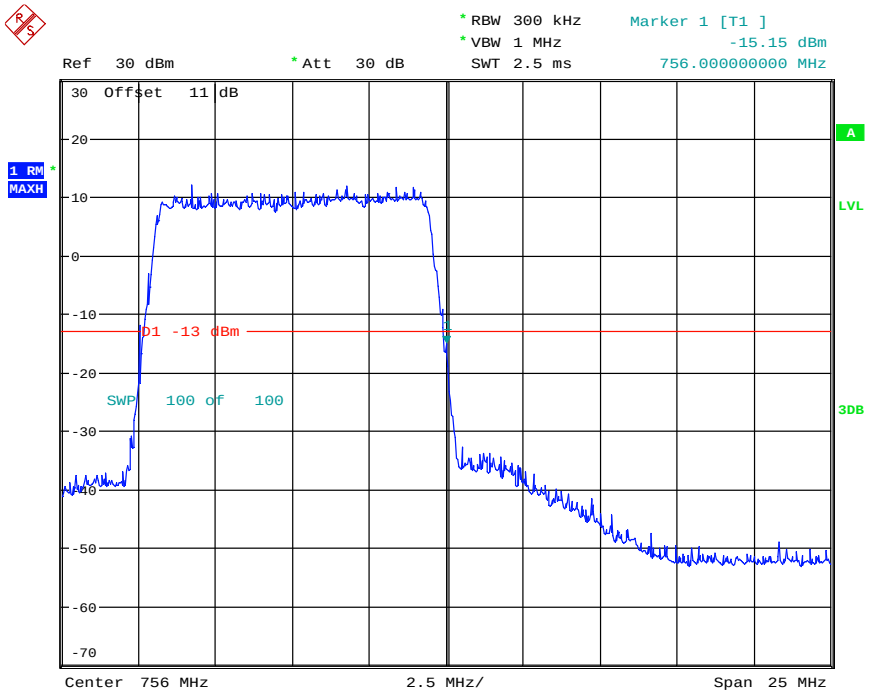
Date: 10.JAN.2019 15:30:13

Report Number: W6M21812-18679-P-20
FCC ID: 2ASQXZONEDAS
Band XIII
Downlink
One Low



Date: 26.FEB.2019 19:27:29

One High



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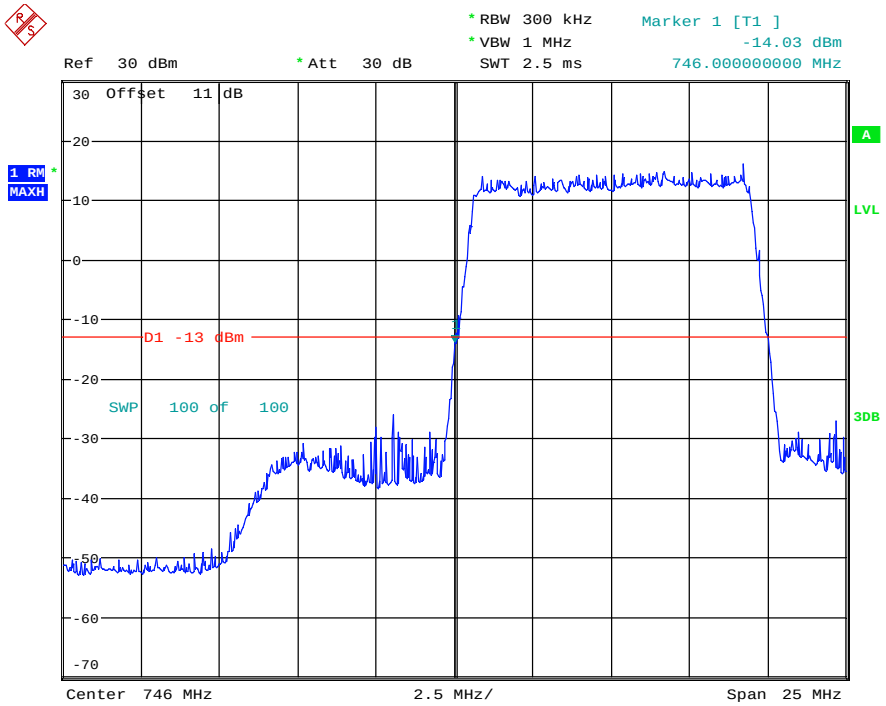
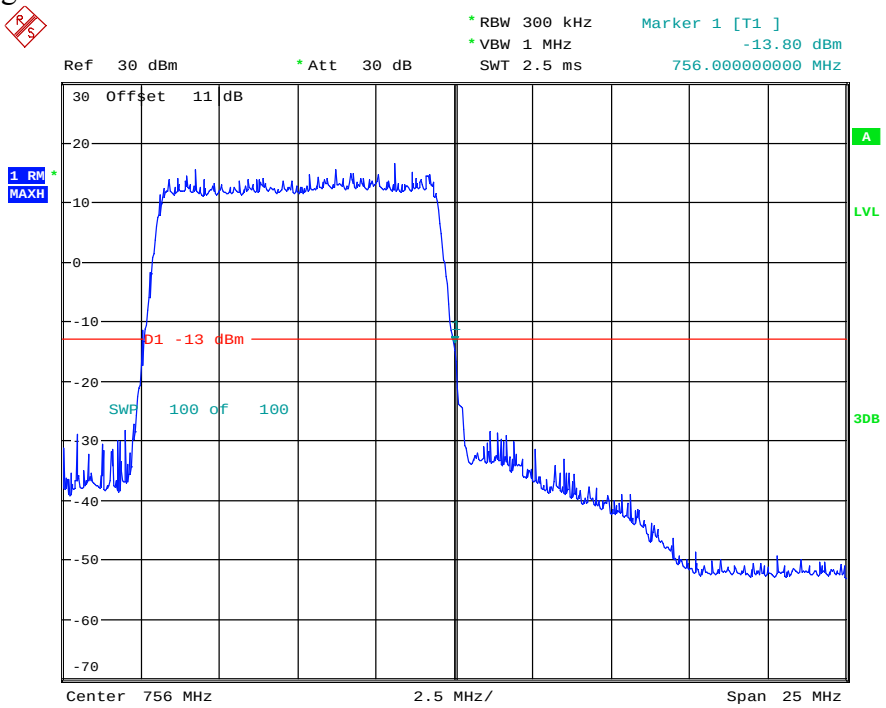
Report Number: W6M21812-18679-P-20
FCC ID: 2ASQXZONEDAS

One+3dB Low



Date: 26.FEB.2019 19:28:09

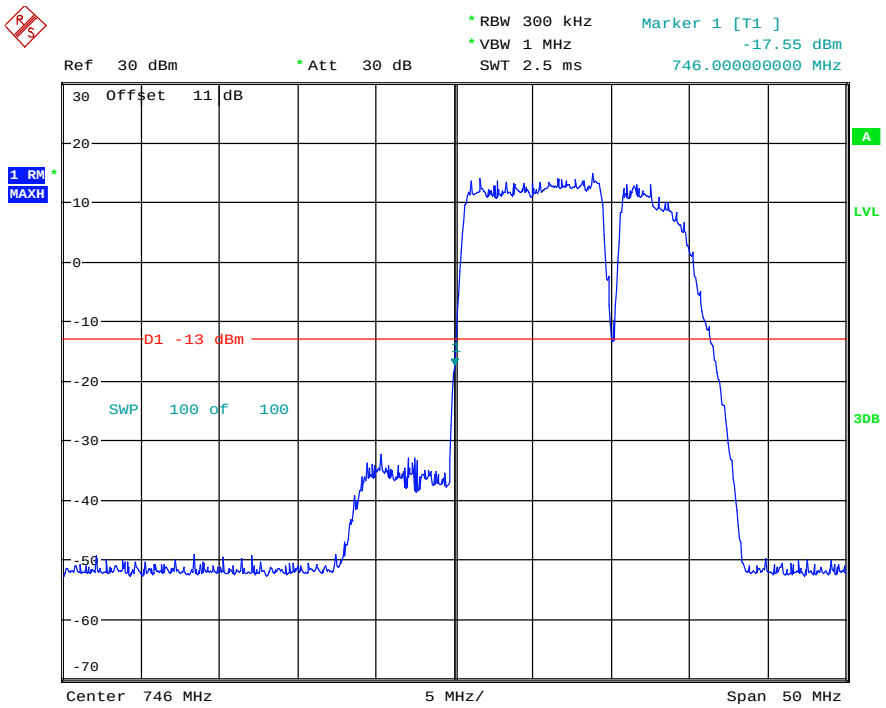
One+3dB High



Date: 26.FEB.2019 19:32:49

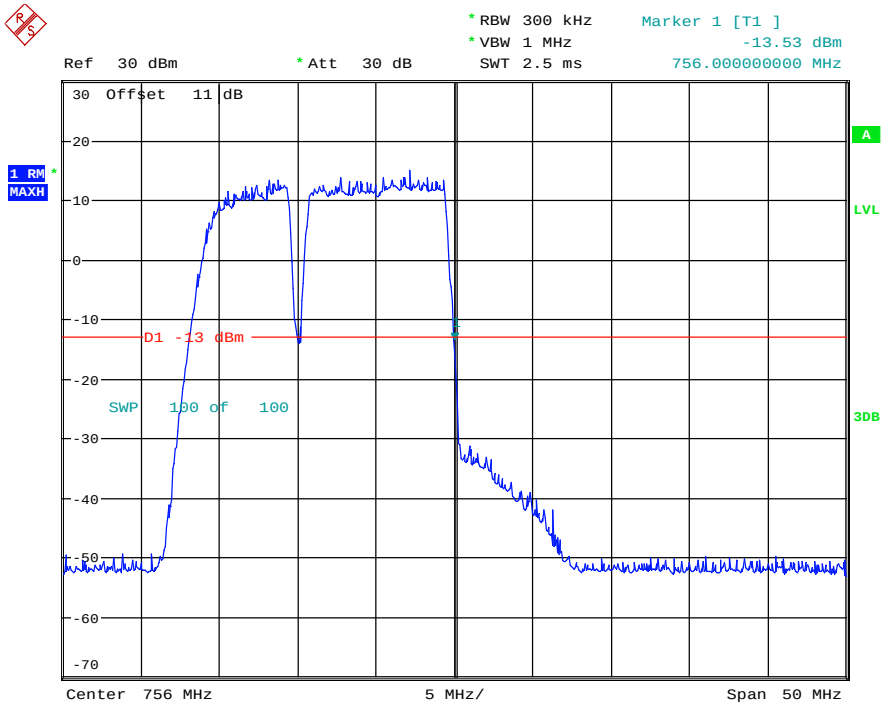
Report Number: W6M21812-18679-P-20
FCC ID: 2ASQXZONEDAS

Two Low



Date: 26.FEB.2019 19:29:55

Two High



Date: 26.FEB.2019 19:30:51

Report Number: W6M21812-18679-P-20
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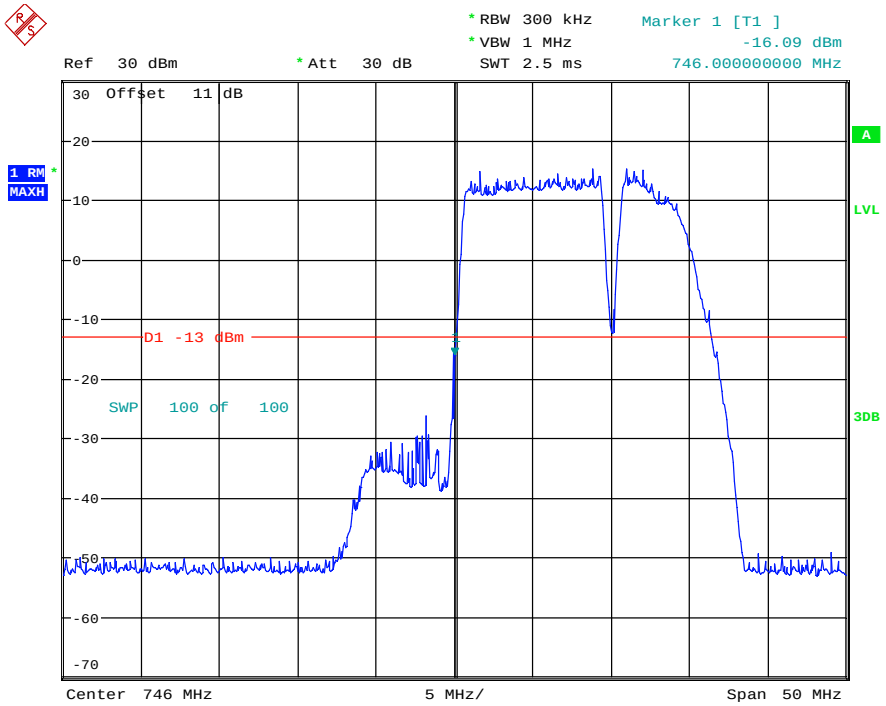
Two+3dB Low



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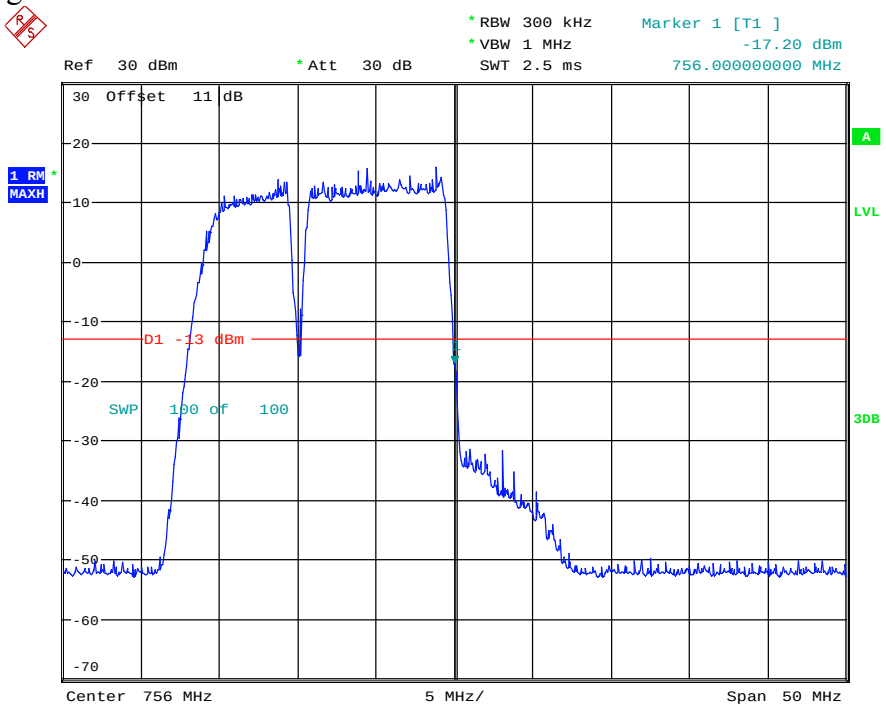
Two+3dB High

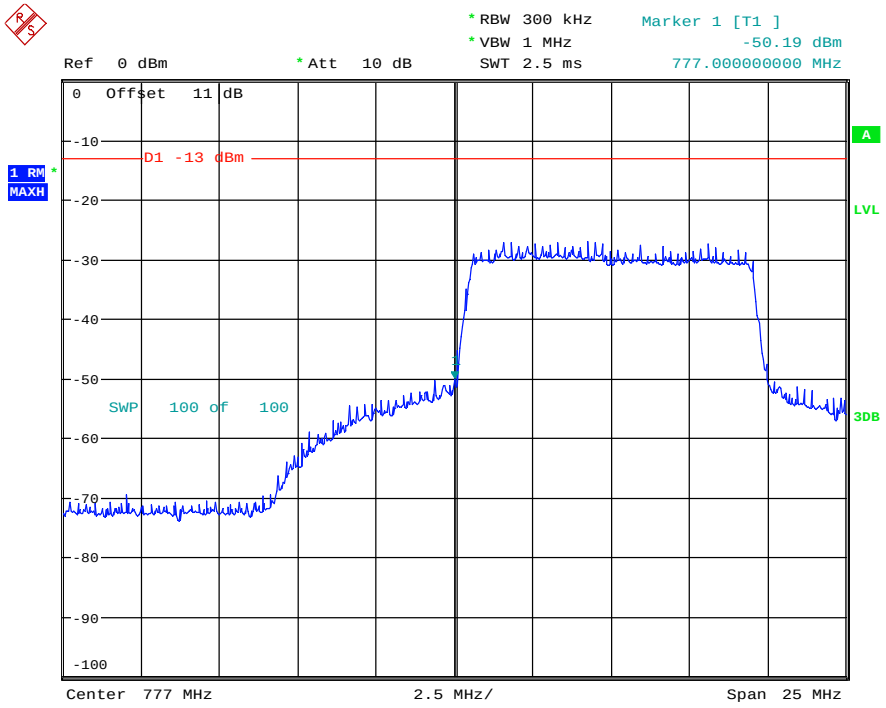


Date: 26.FEB.2019 19:32:02

Report Number: W6M21812-18679-P-20
FCC ID: 2ASQXZONEDAS

Uplink

One Low



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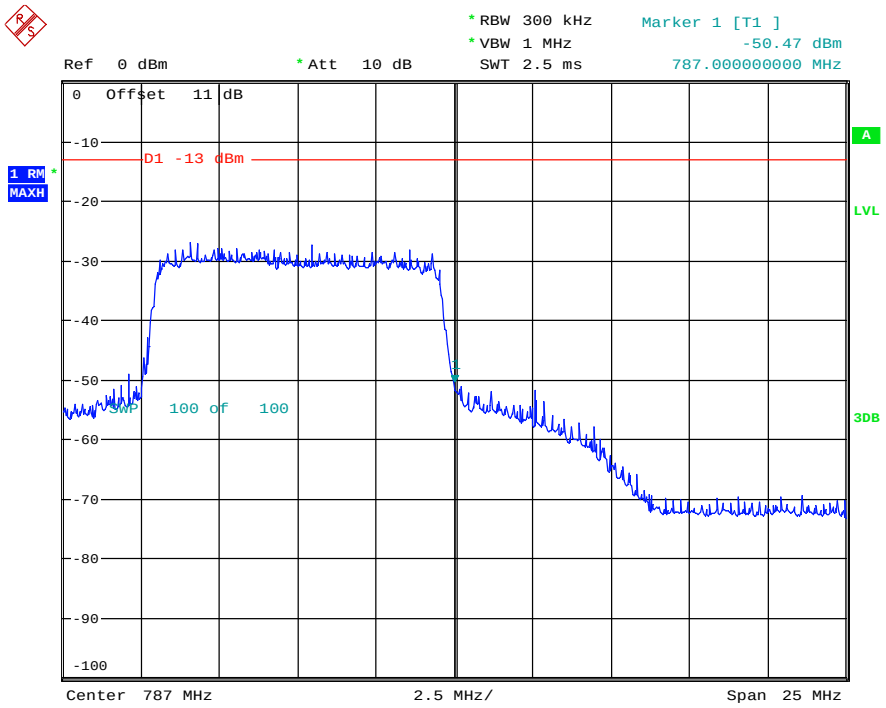
One High



Date: 26.FEB.2019 19:18:30

Report Number: W6M21812-18679-P-20
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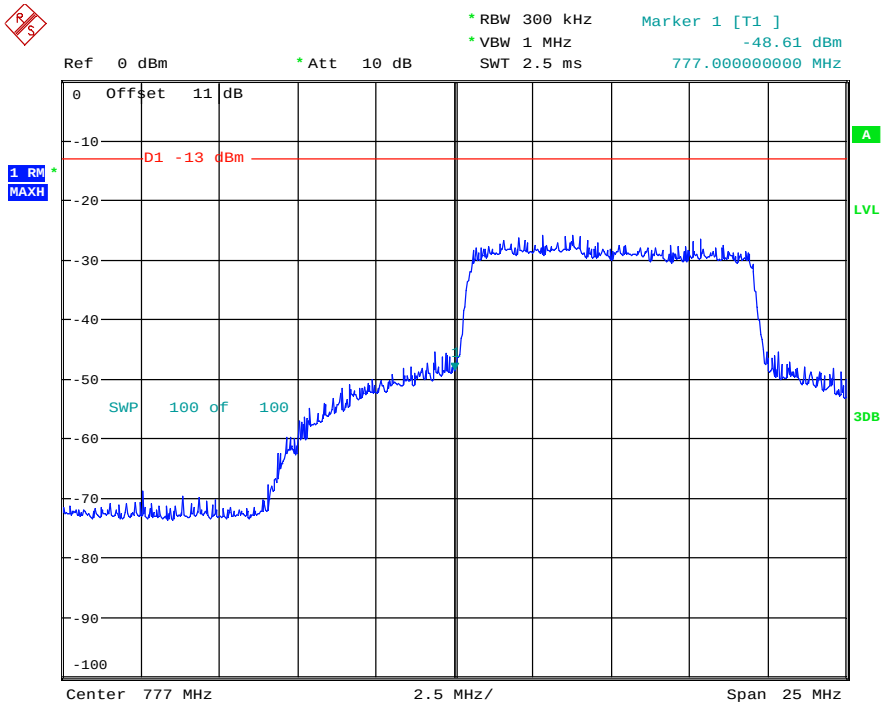
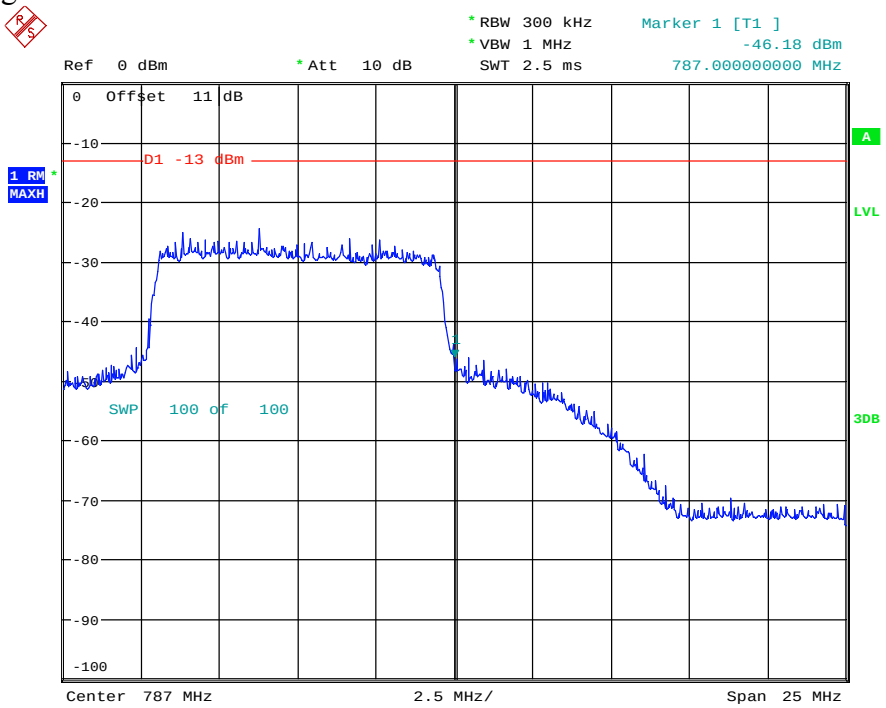
One+3dB Low



Date: 26.FEB.2019 19:17:24

One+3dB High



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Report Number: W6M21812-18679-P-20
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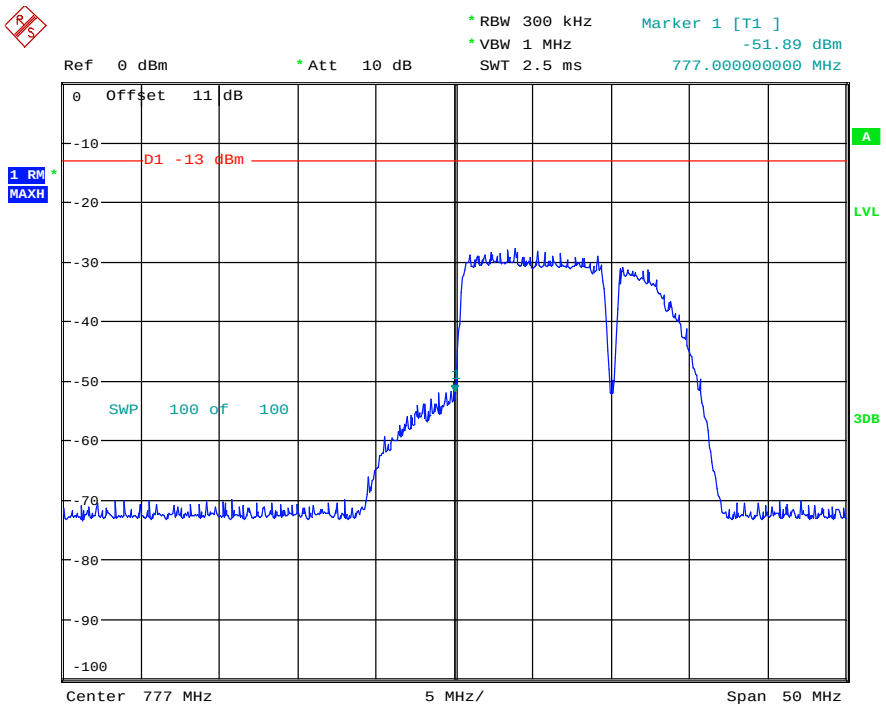
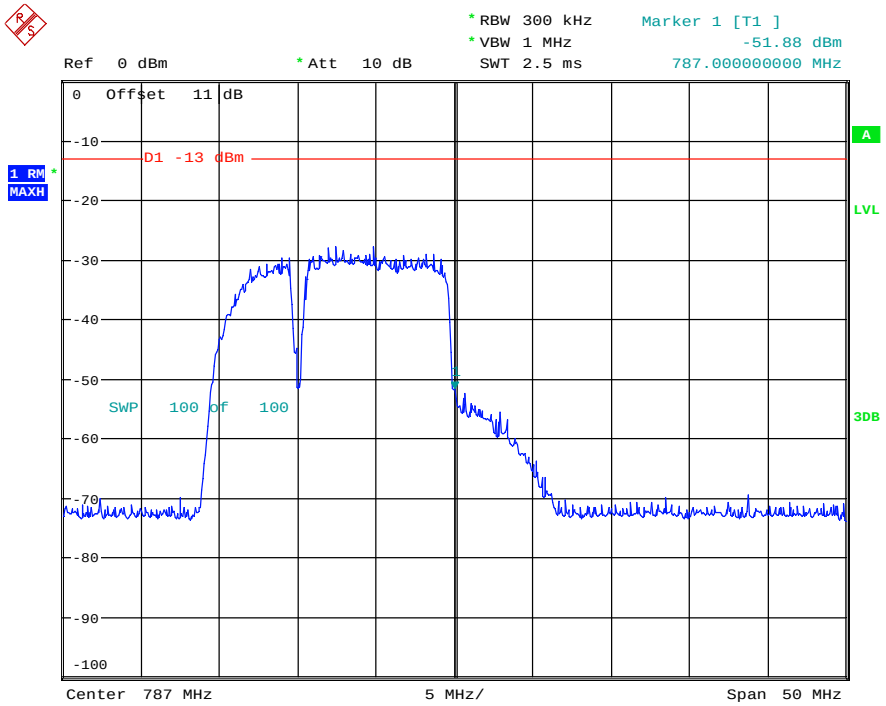
Two Low



Date: 26.FEB.2019 19:16:15

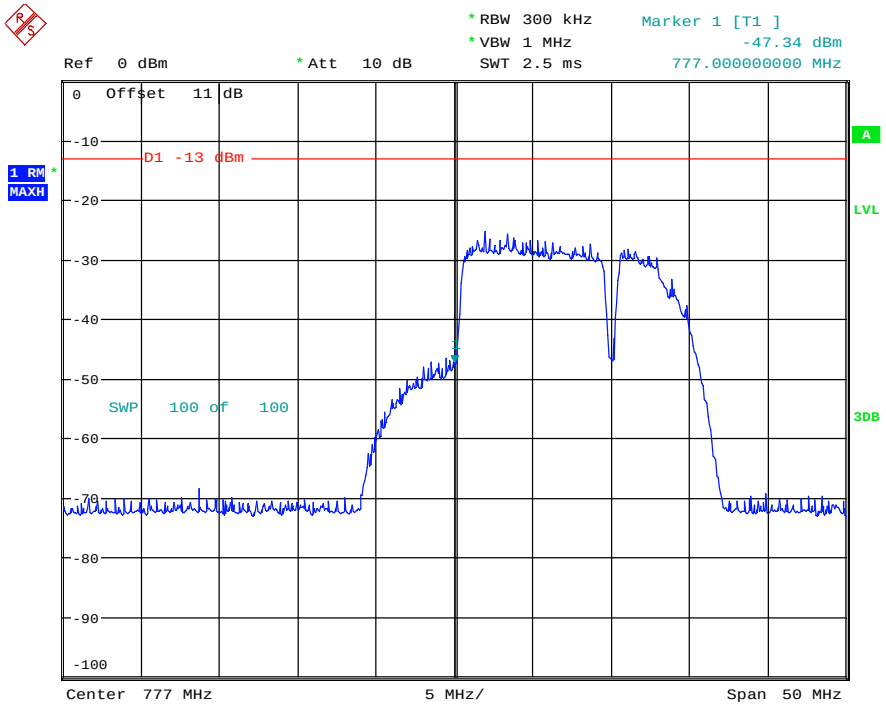
Two High



Date: 26.FEB.2019 19:19:58

Report Number: W6M21812-18679-P-20
FCC ID: 2ASQXZONEDAS

Two+3dB Low



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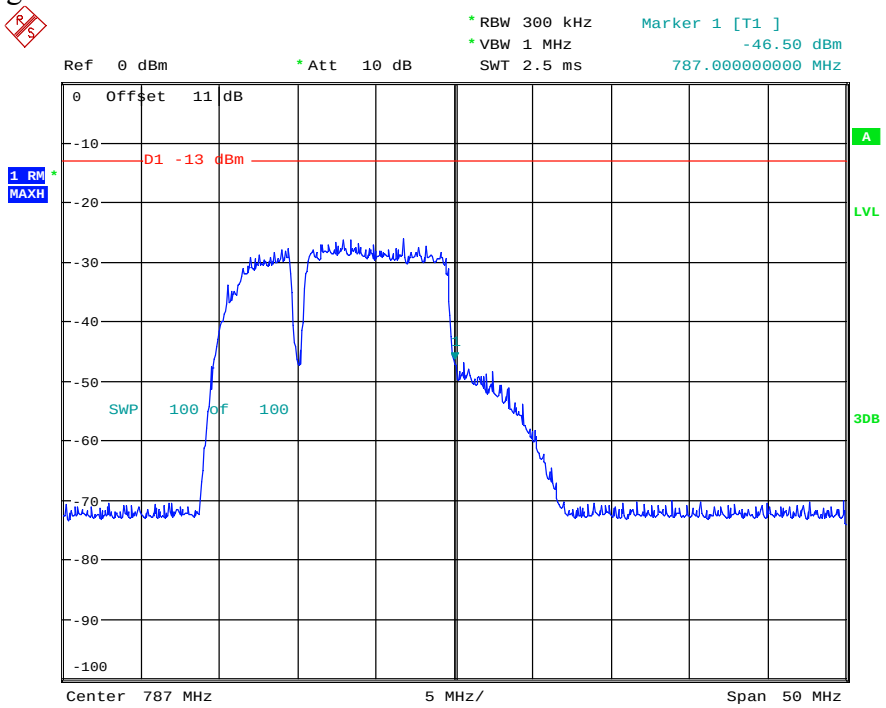
Two+3dB High

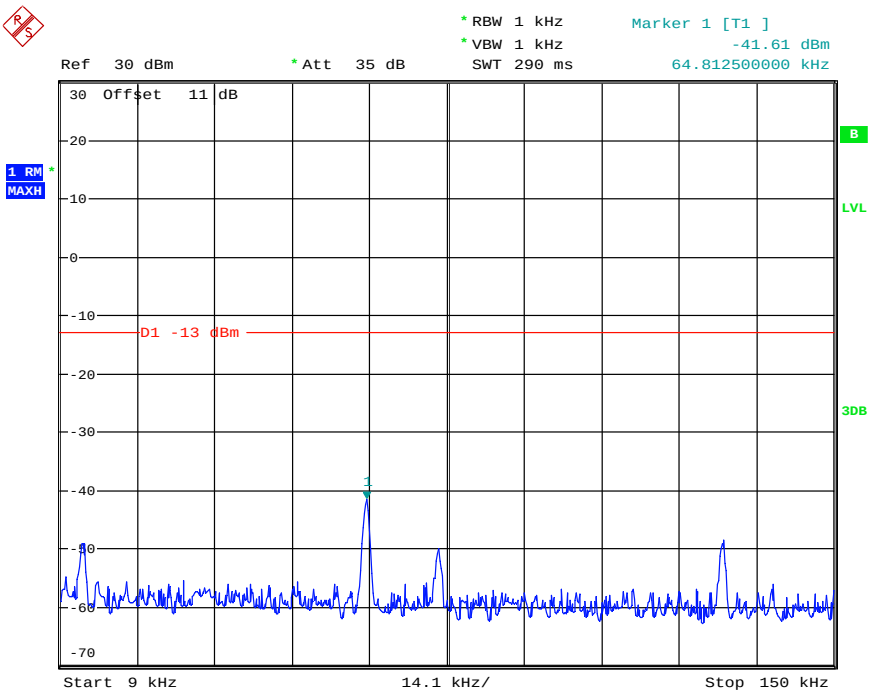


Date: 26.FEB.2019 19:19:32

Report Number: W6M21812-18679-P-20
FCC ID: 2ASQXZONEDAS

Spurious emissions conducted measurements

WCDMA
Band II
Downlink



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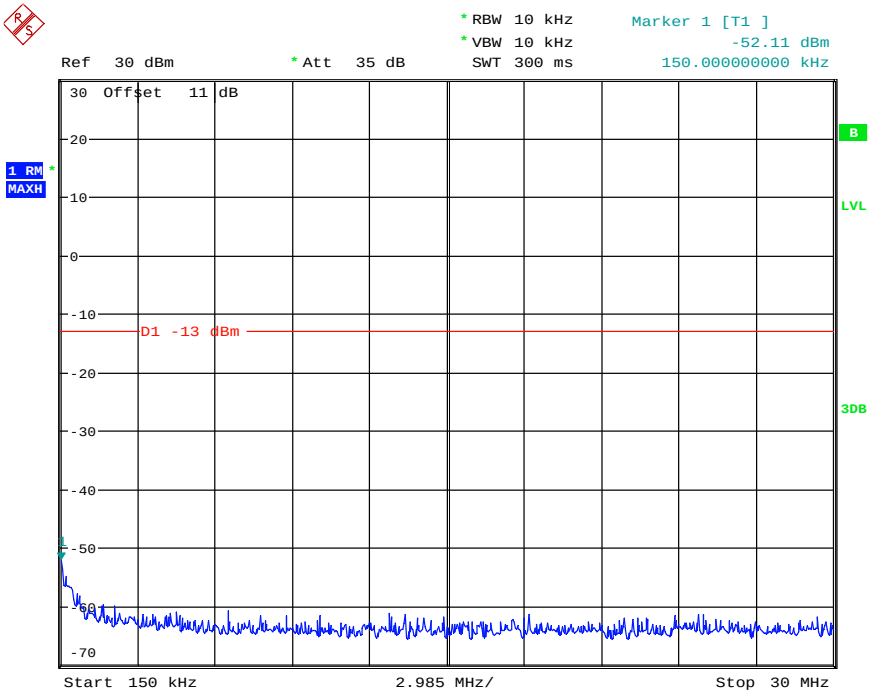

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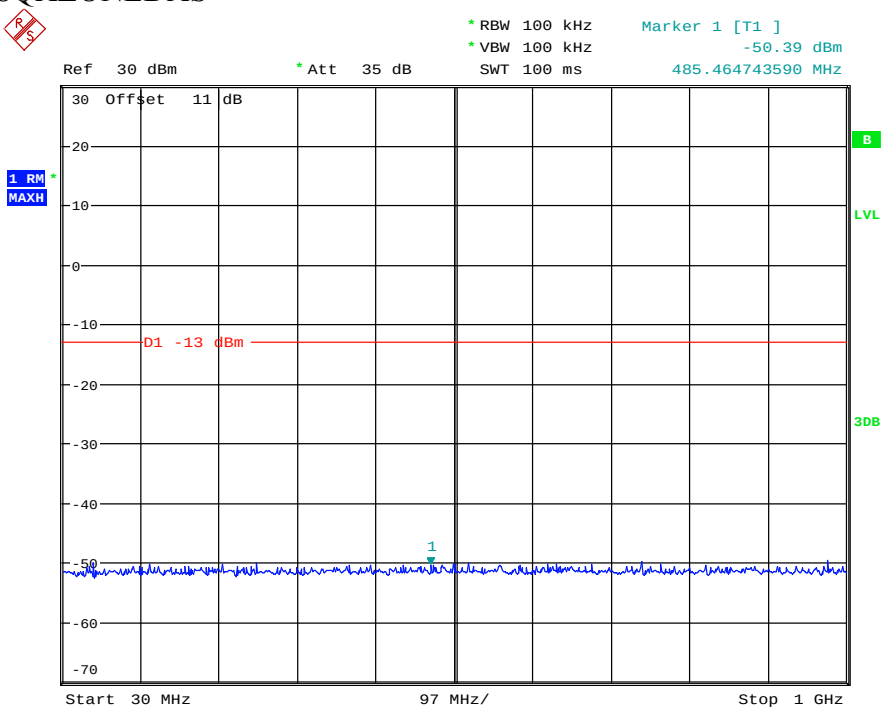

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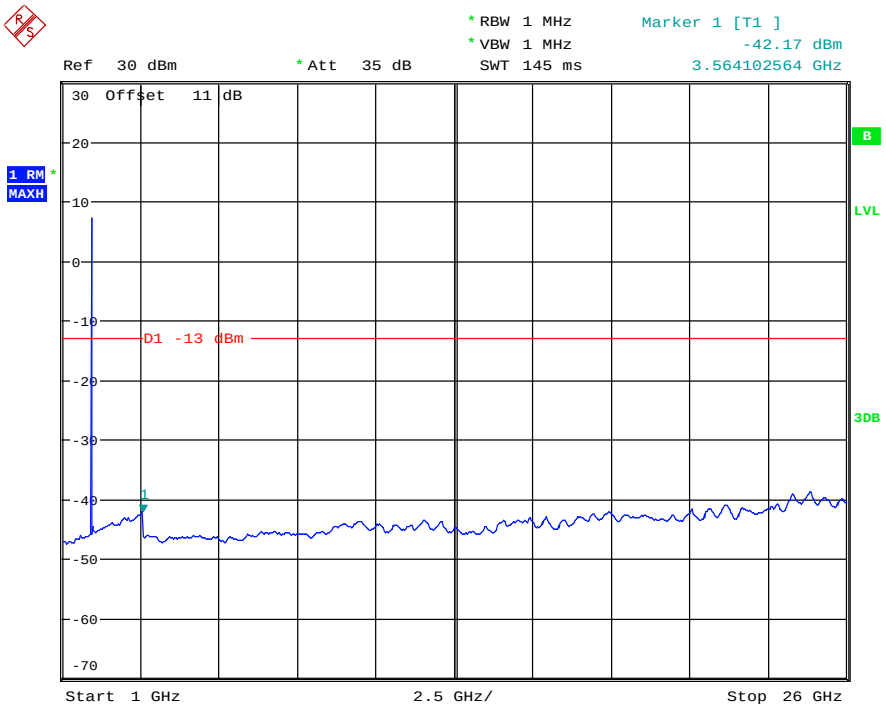

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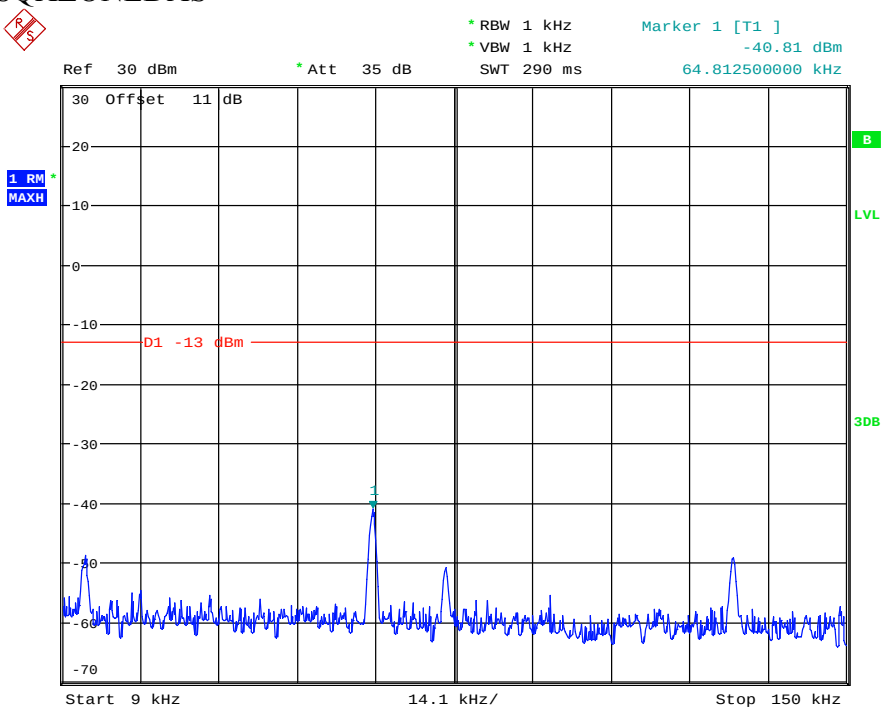

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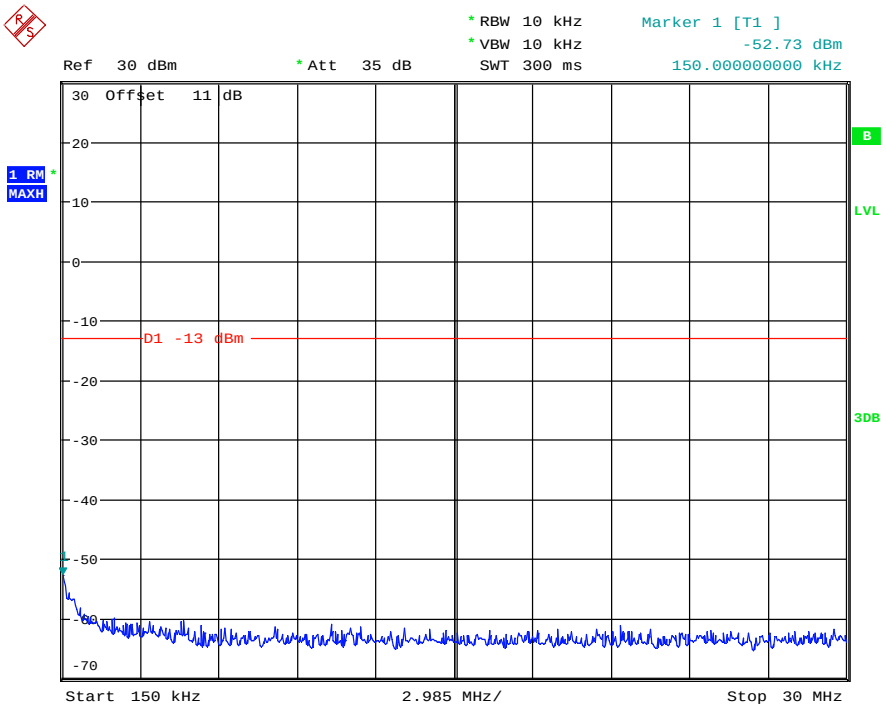

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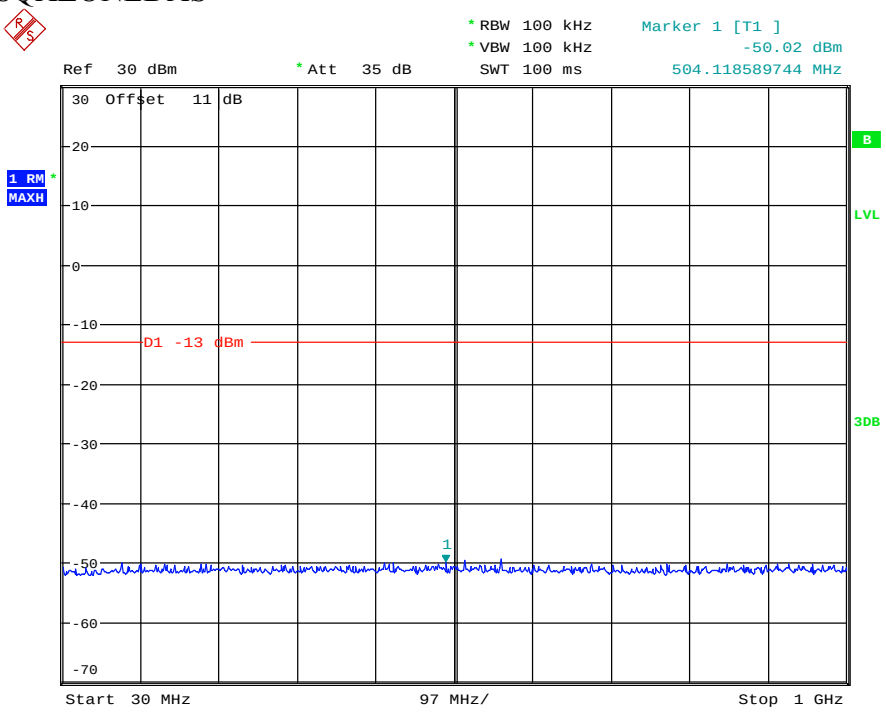

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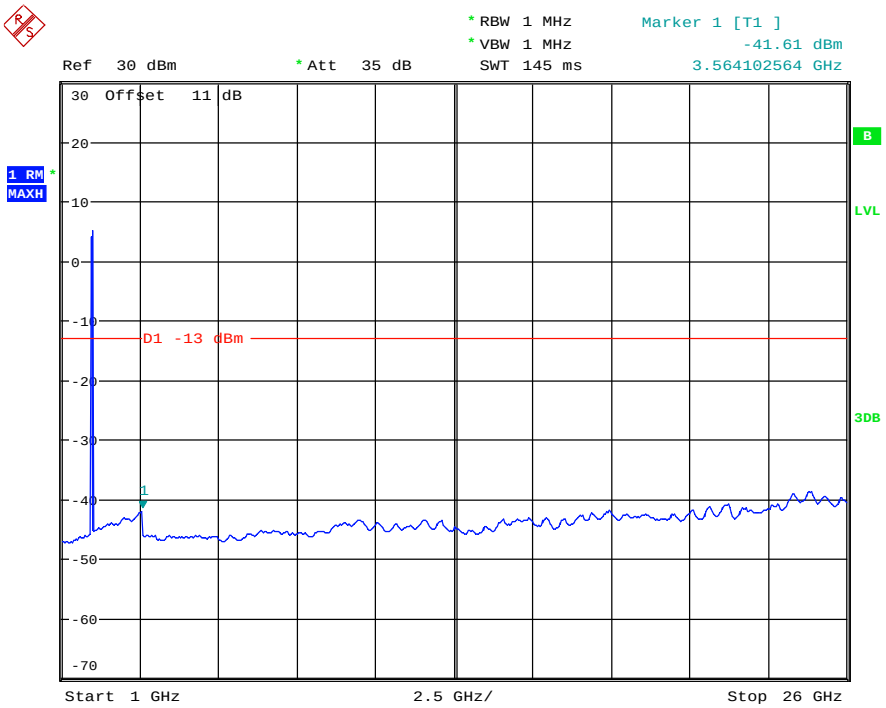

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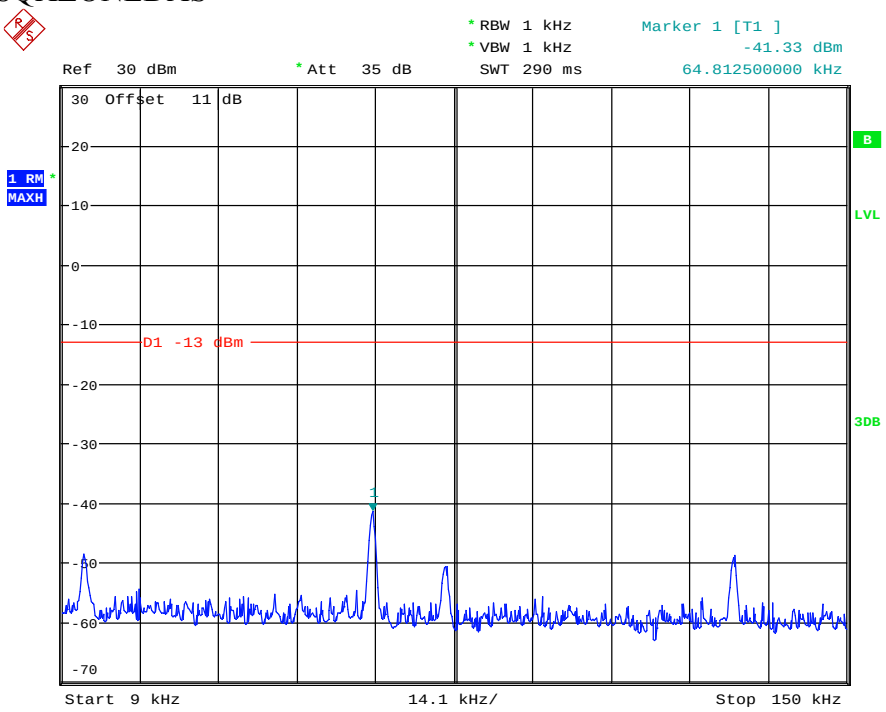

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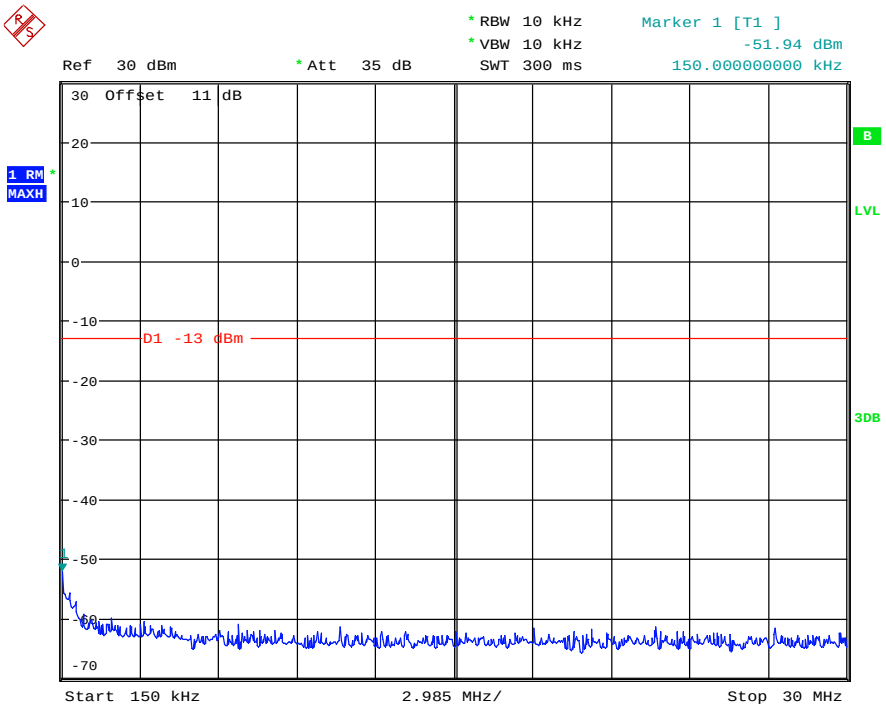

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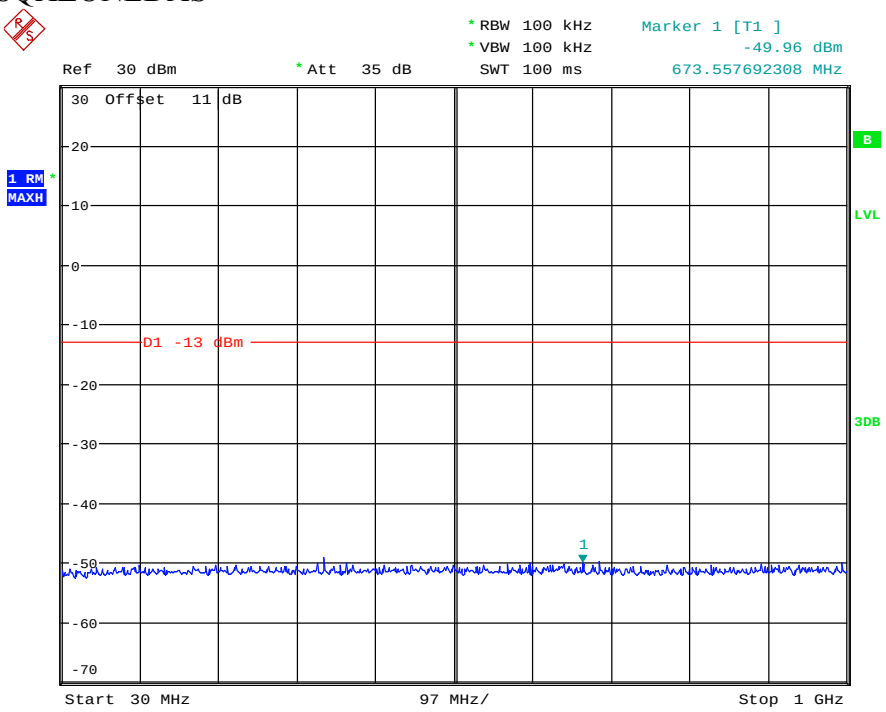

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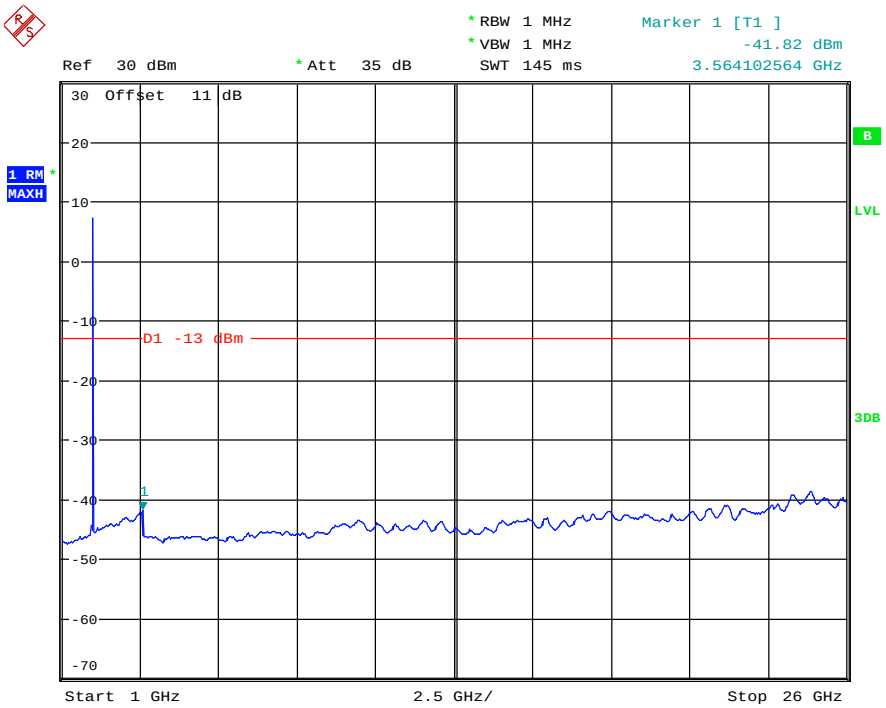

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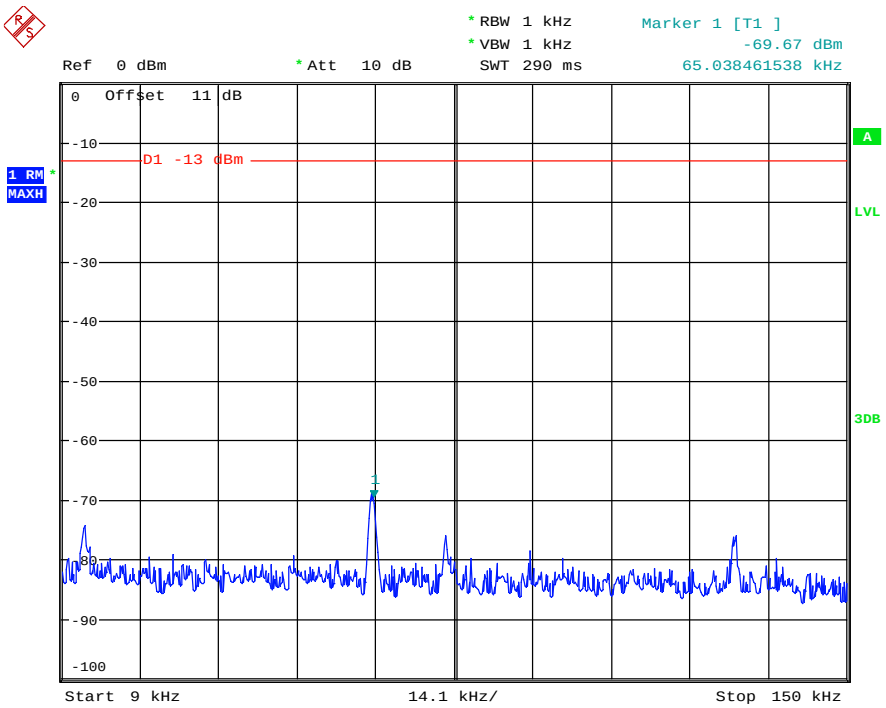

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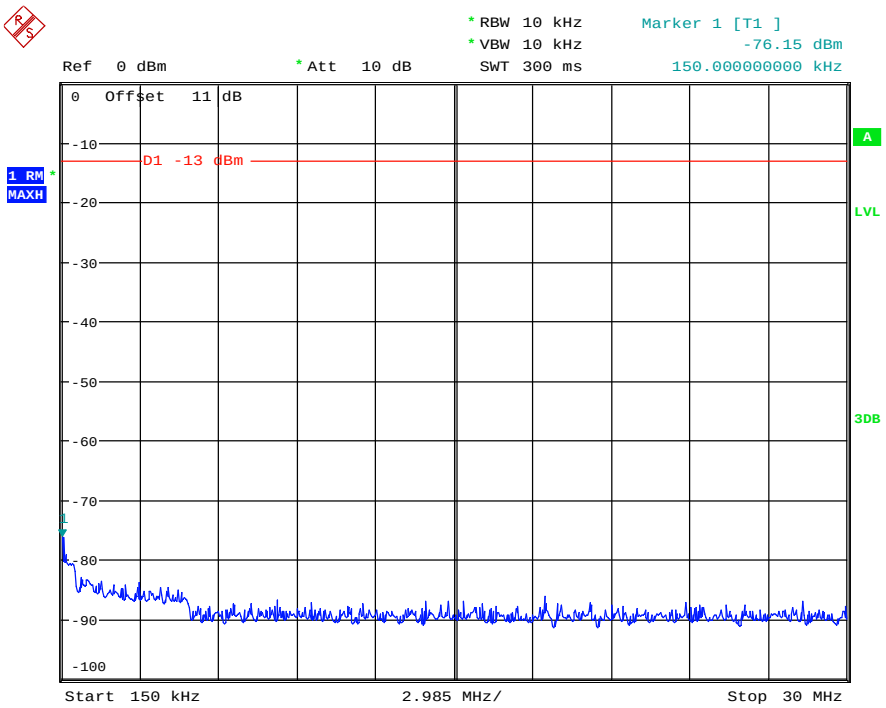

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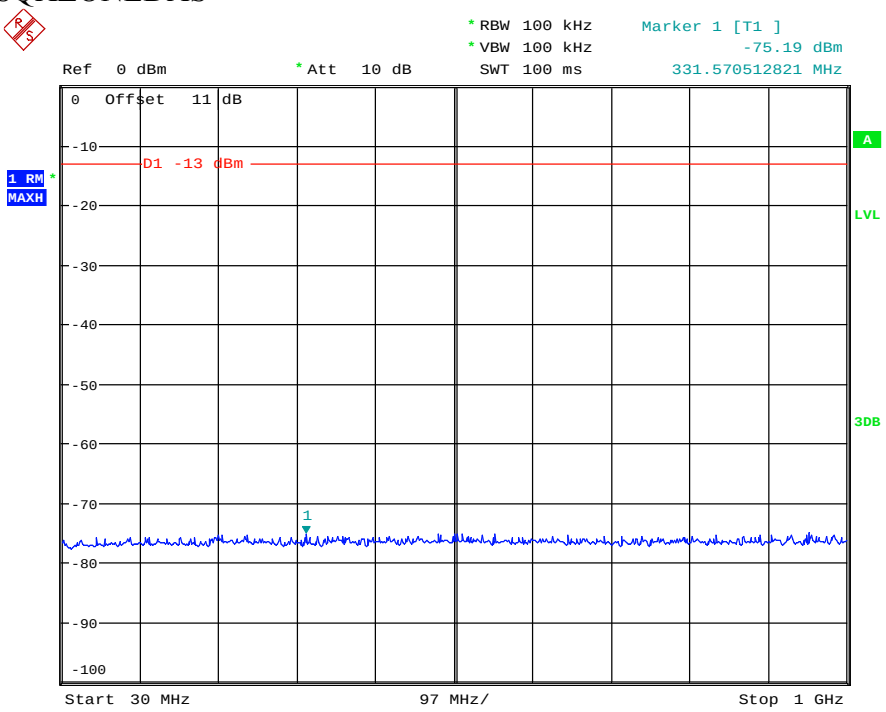

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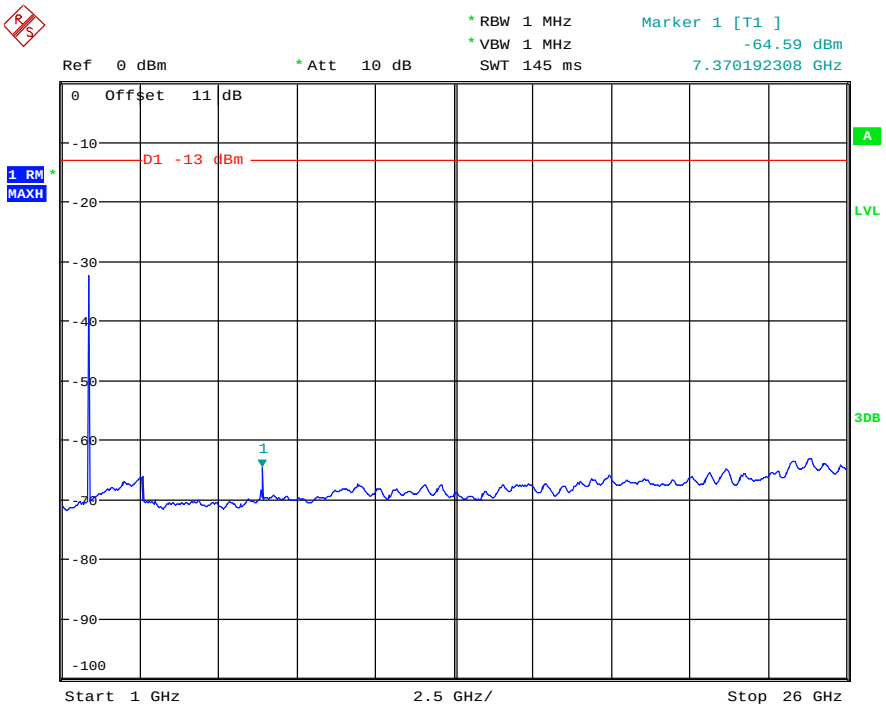

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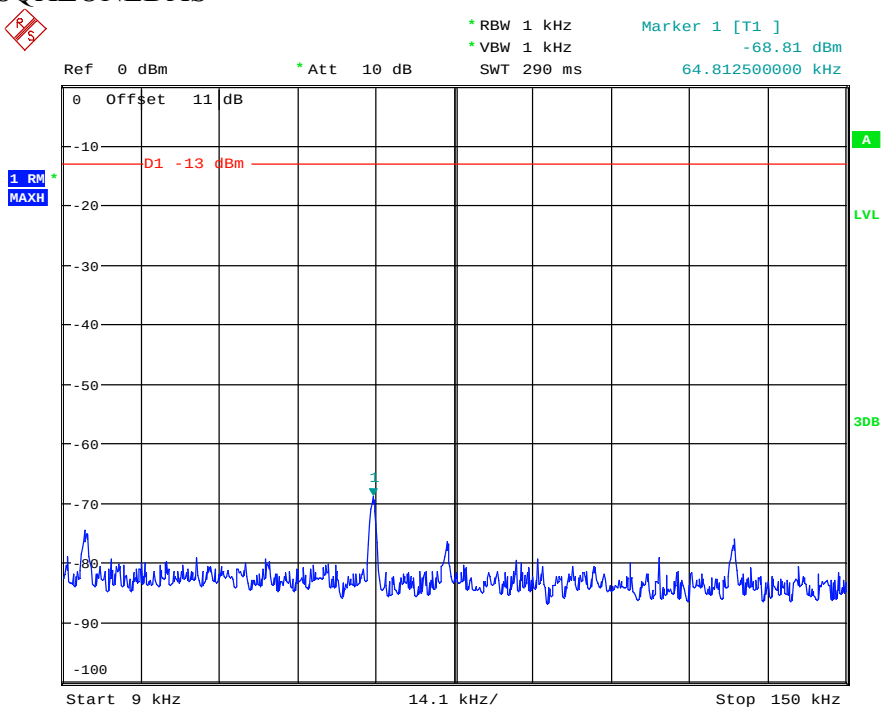

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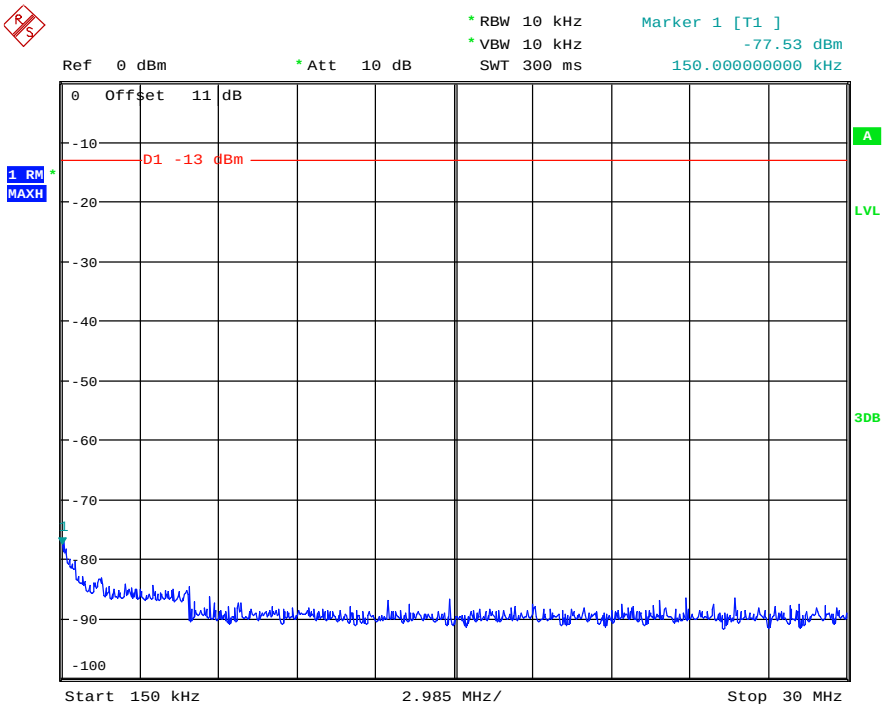

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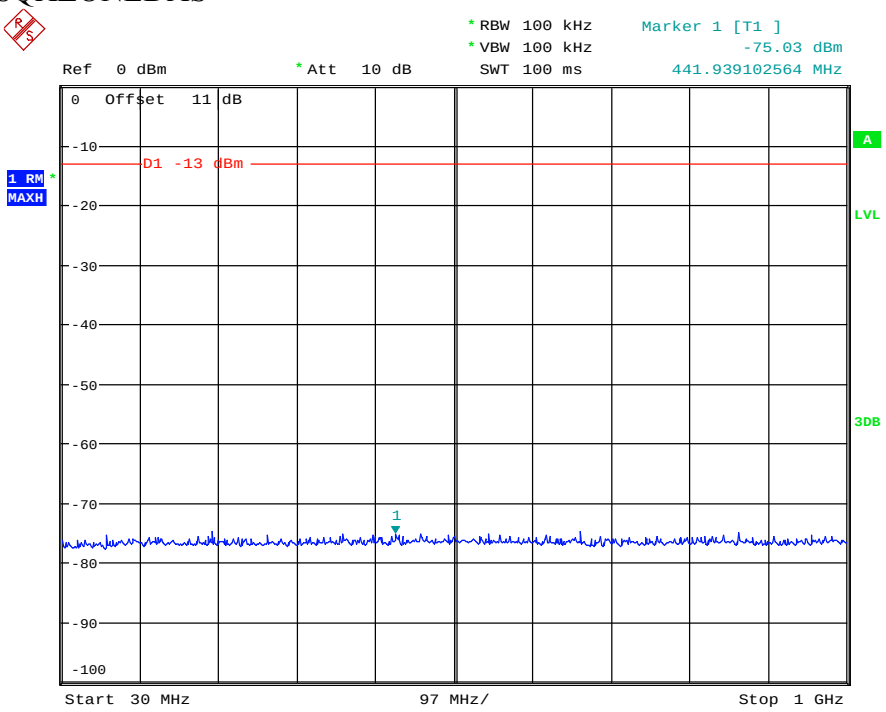

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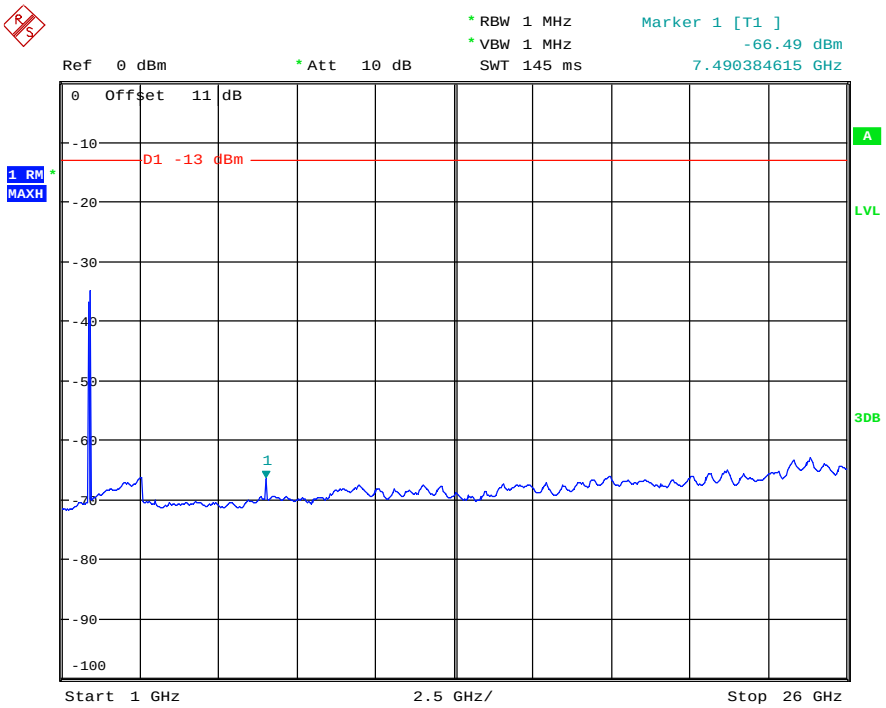

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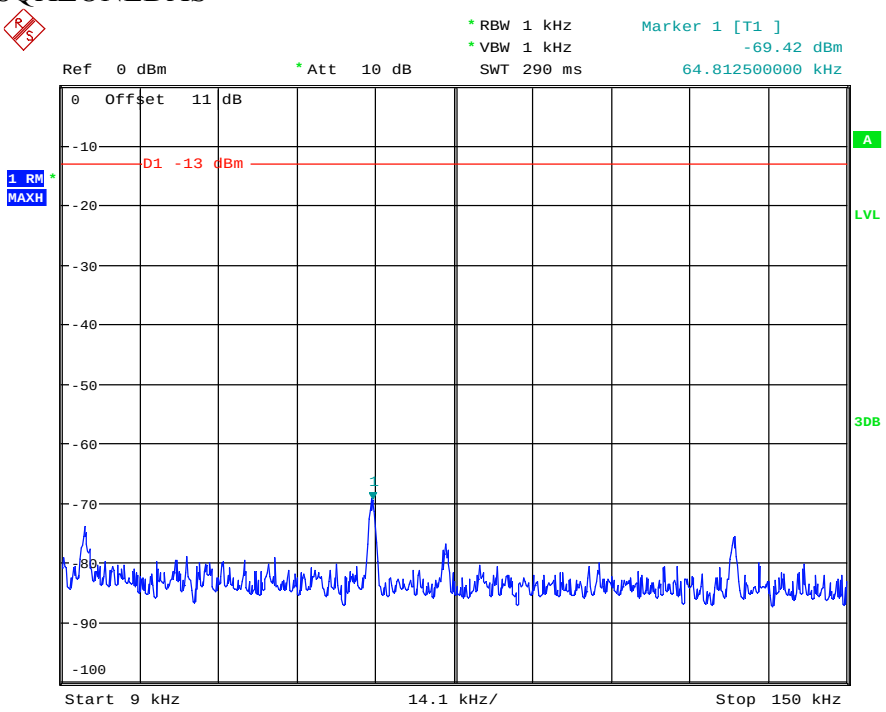

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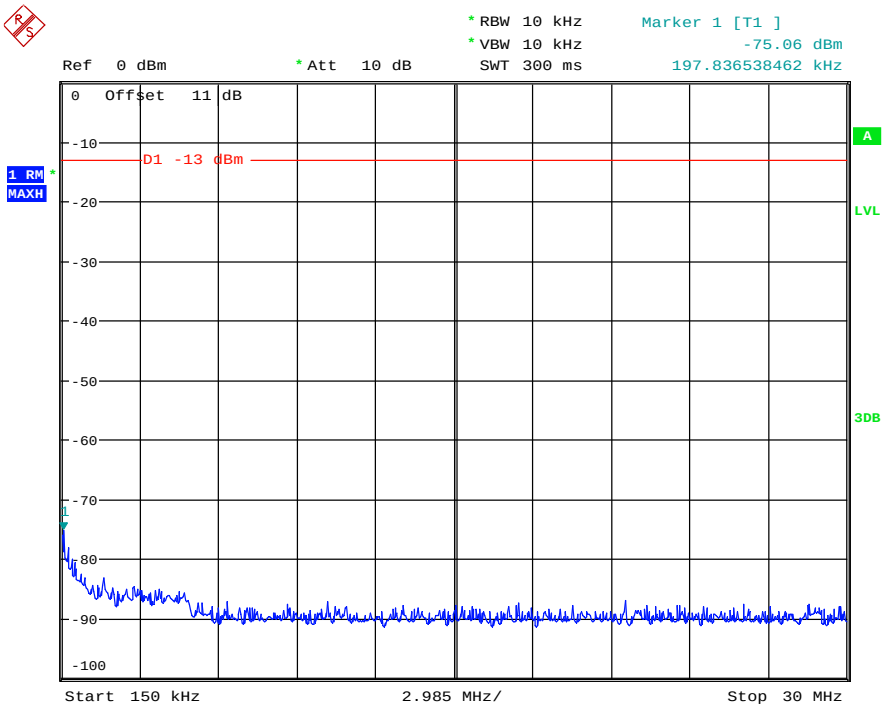
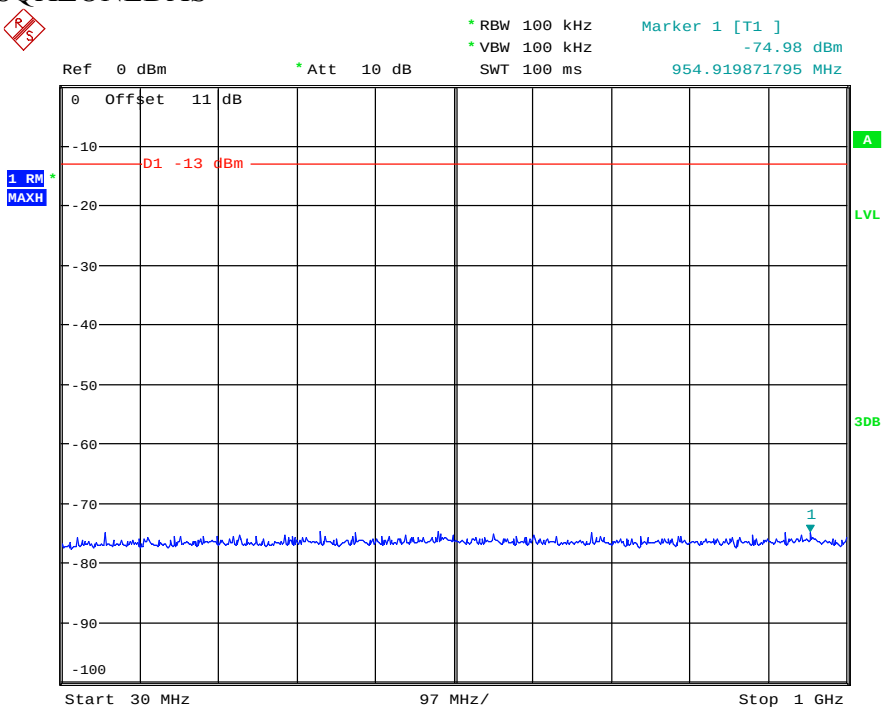


Date: 12.JAN.2019 13:53:10



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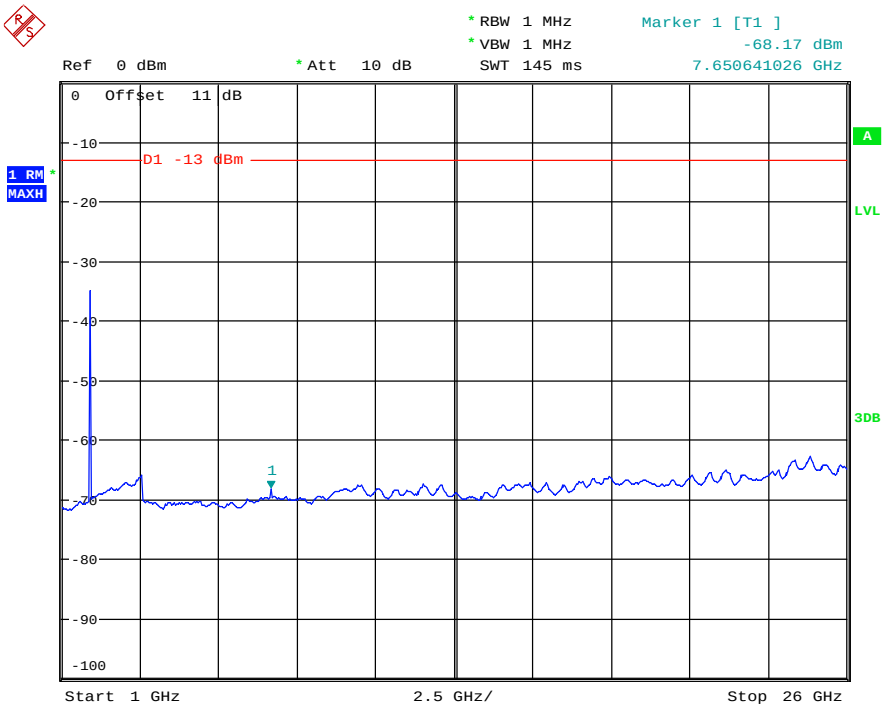

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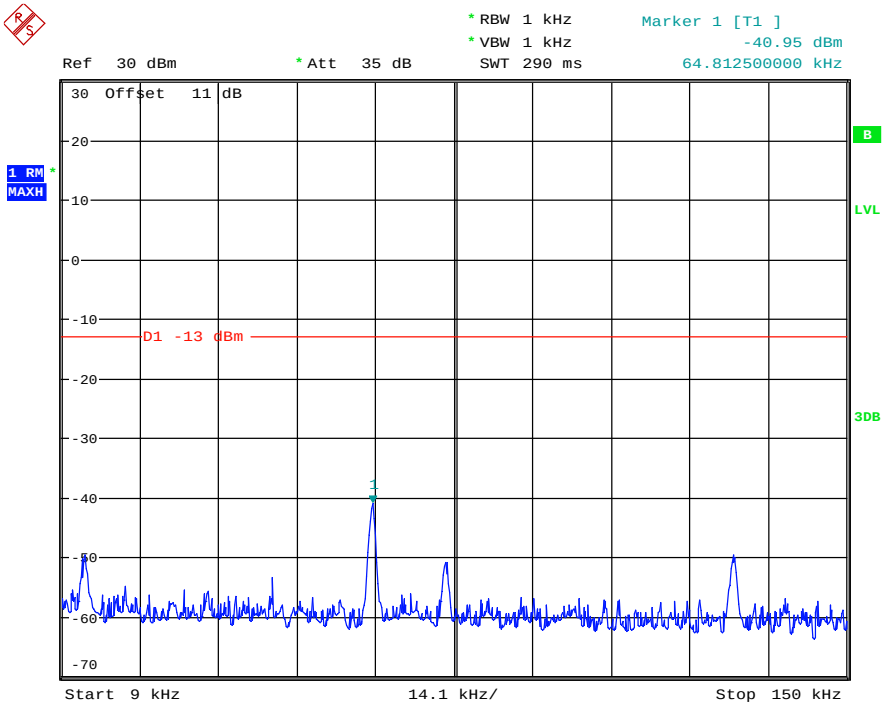

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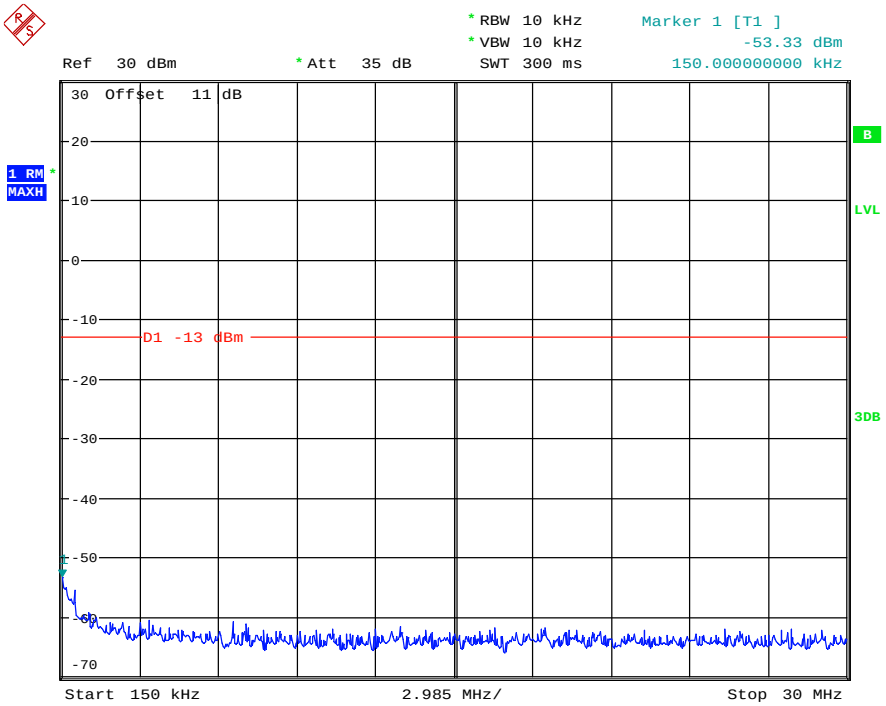

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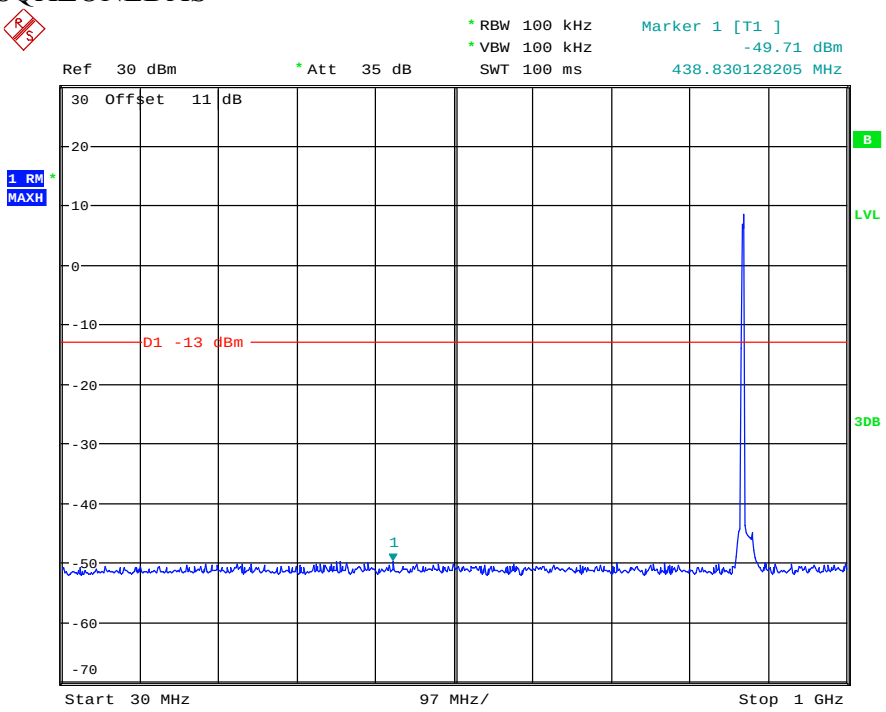

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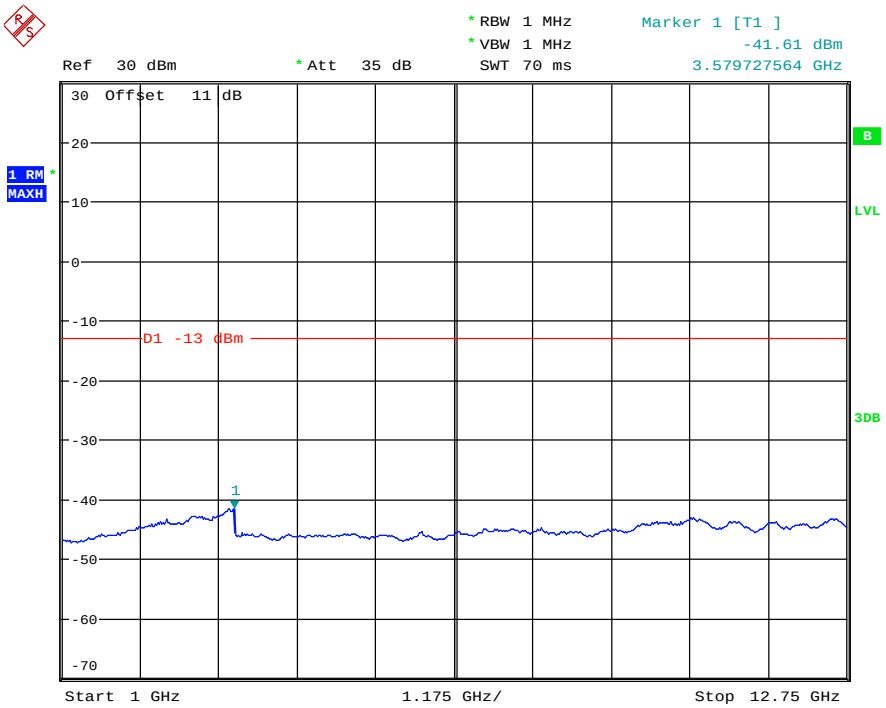

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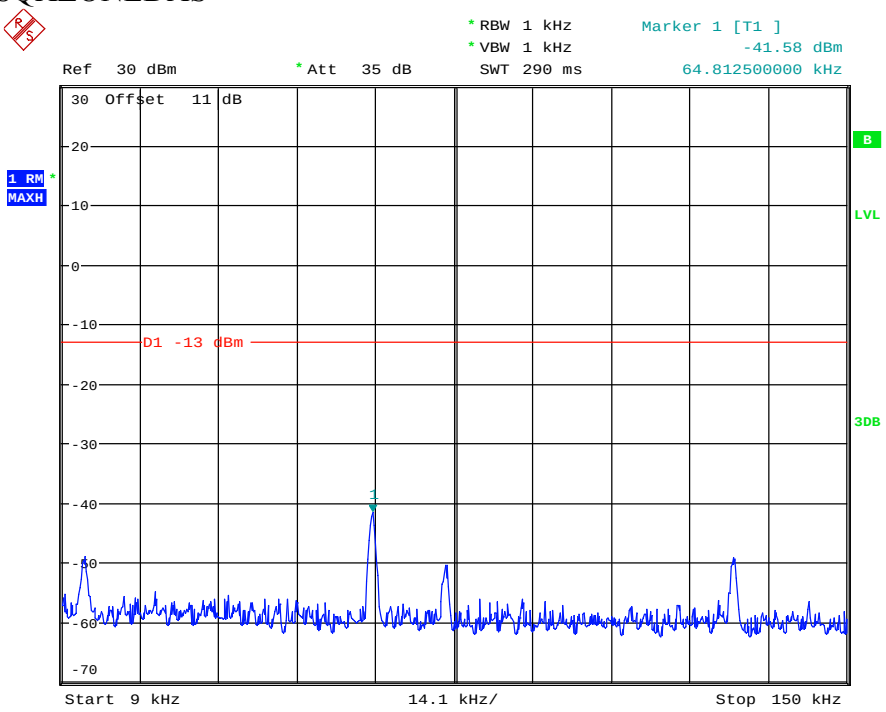

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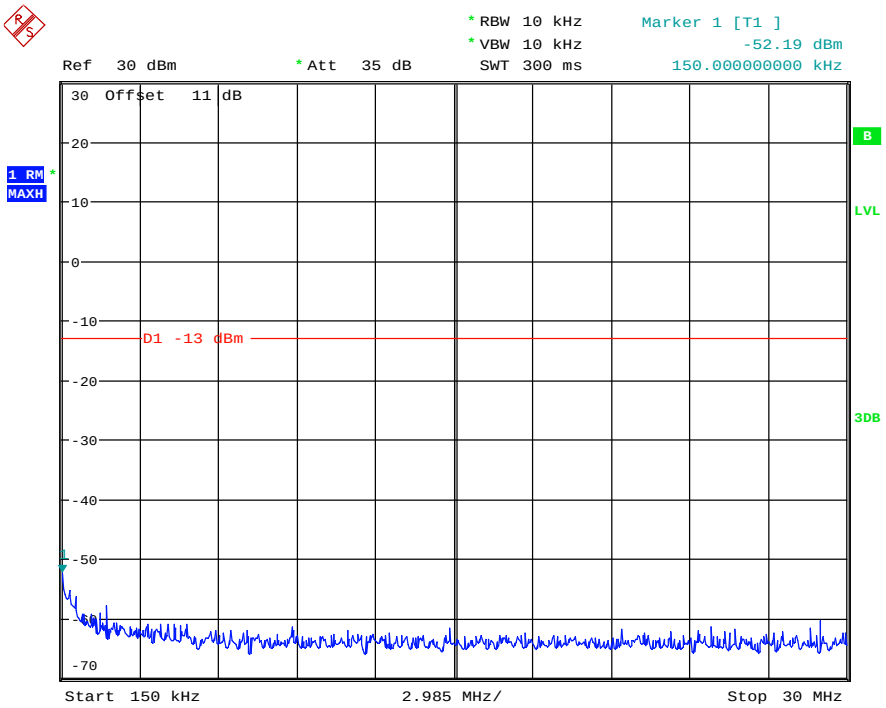

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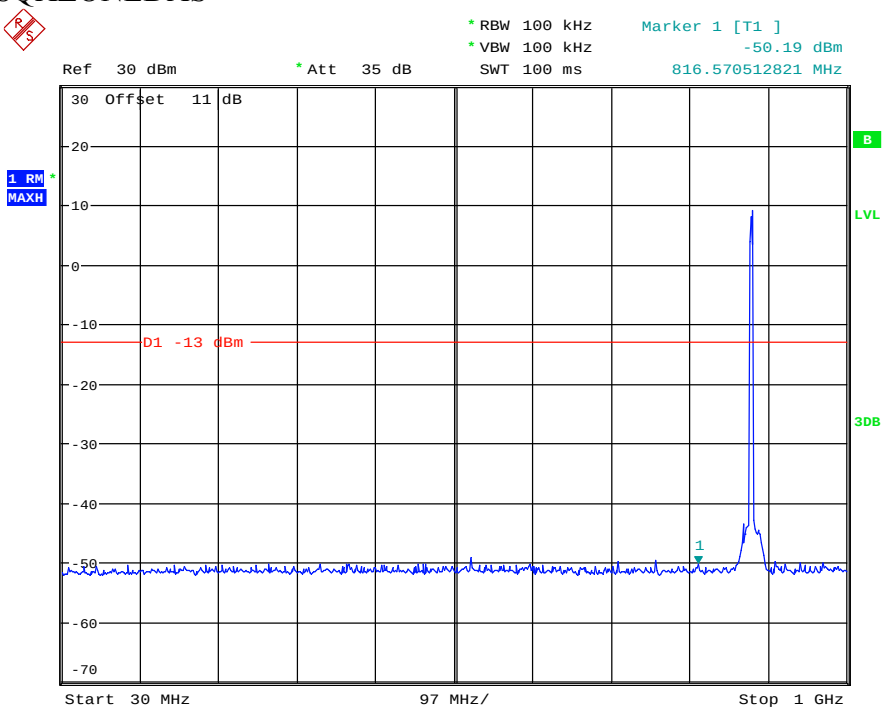

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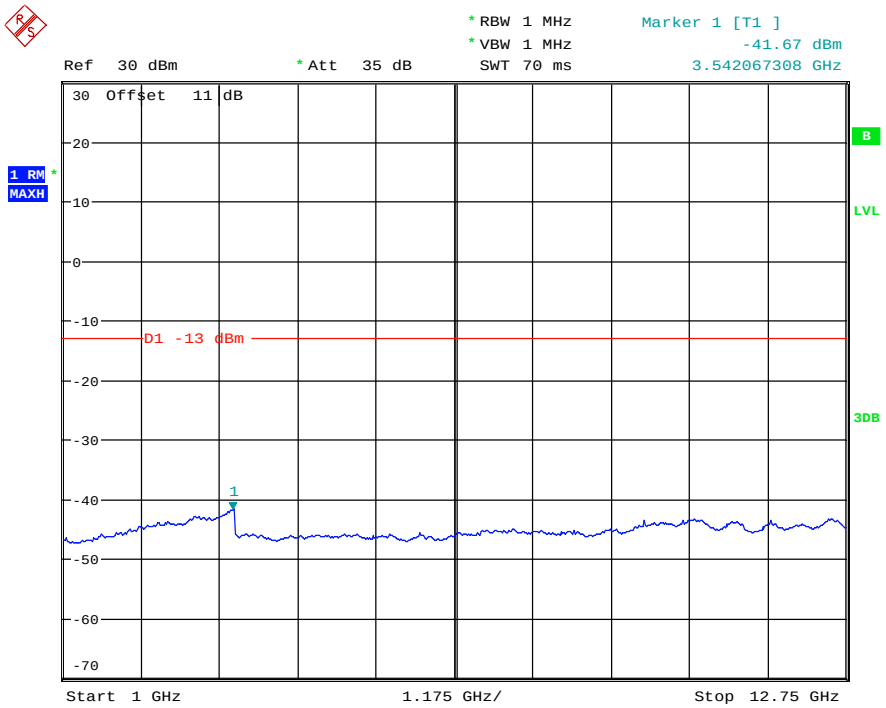

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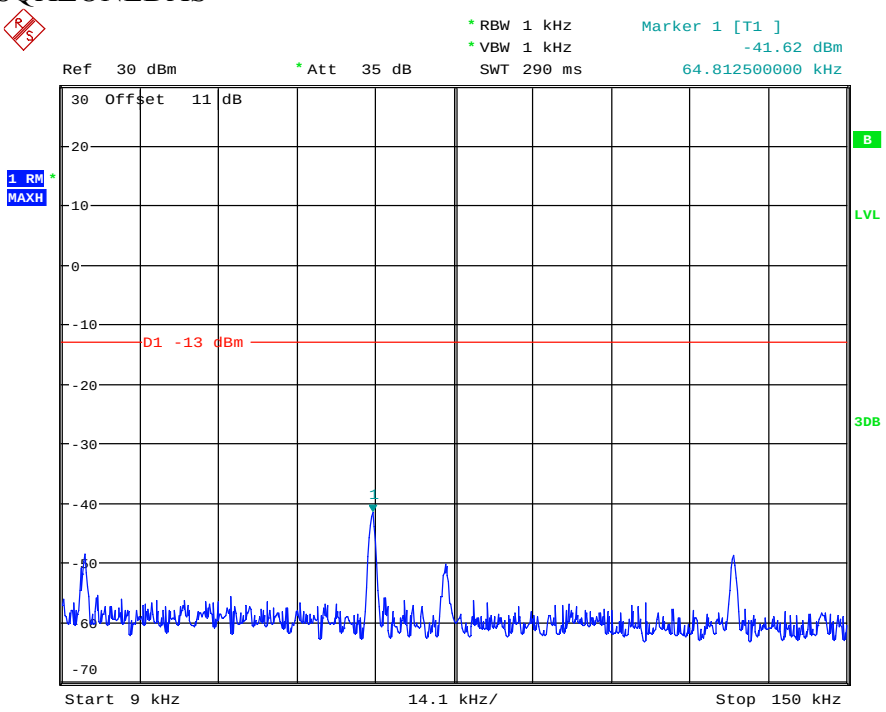

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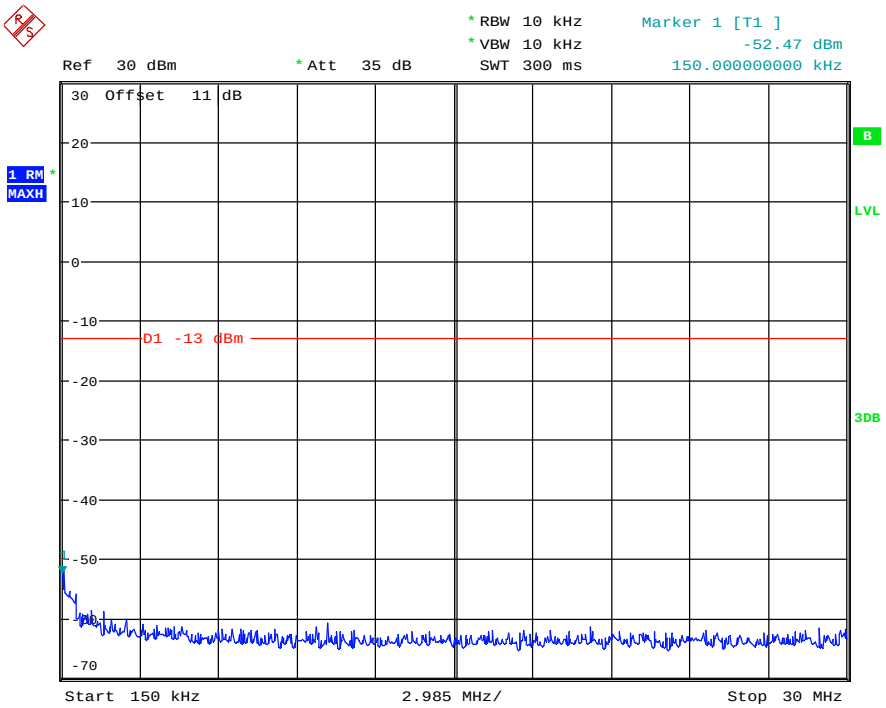

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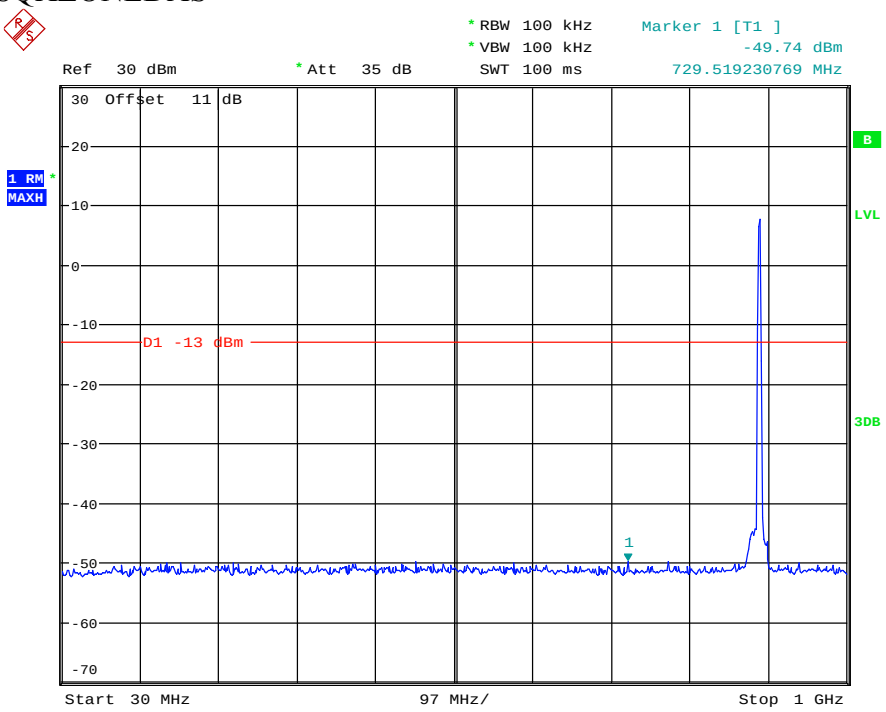

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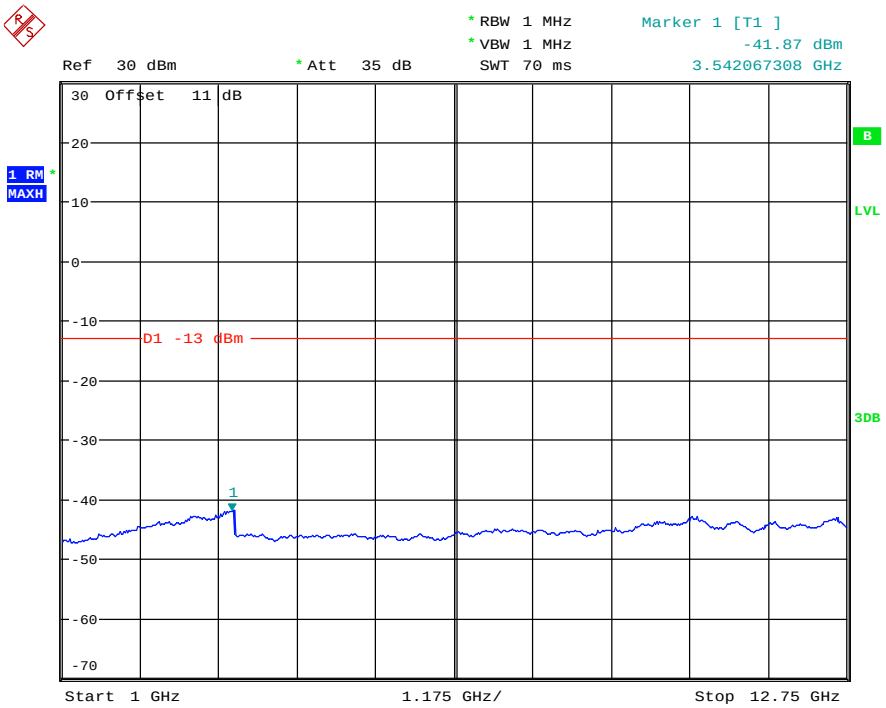

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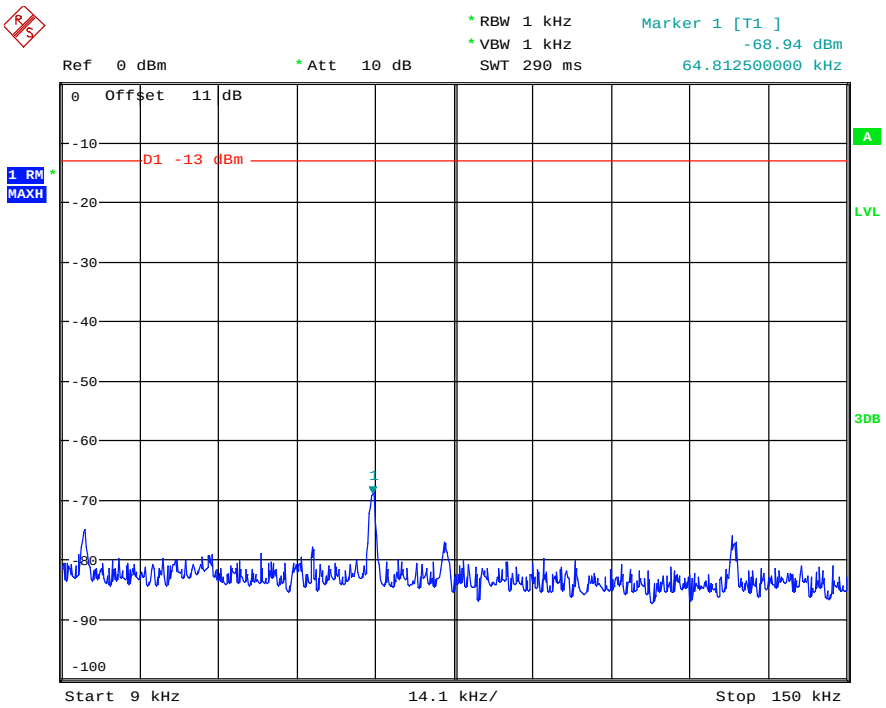

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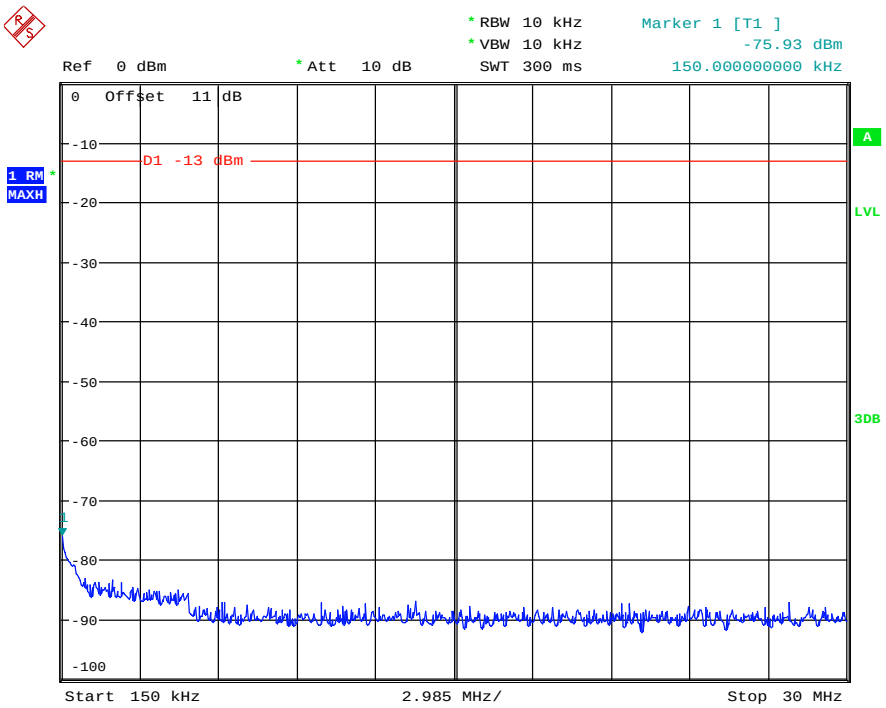

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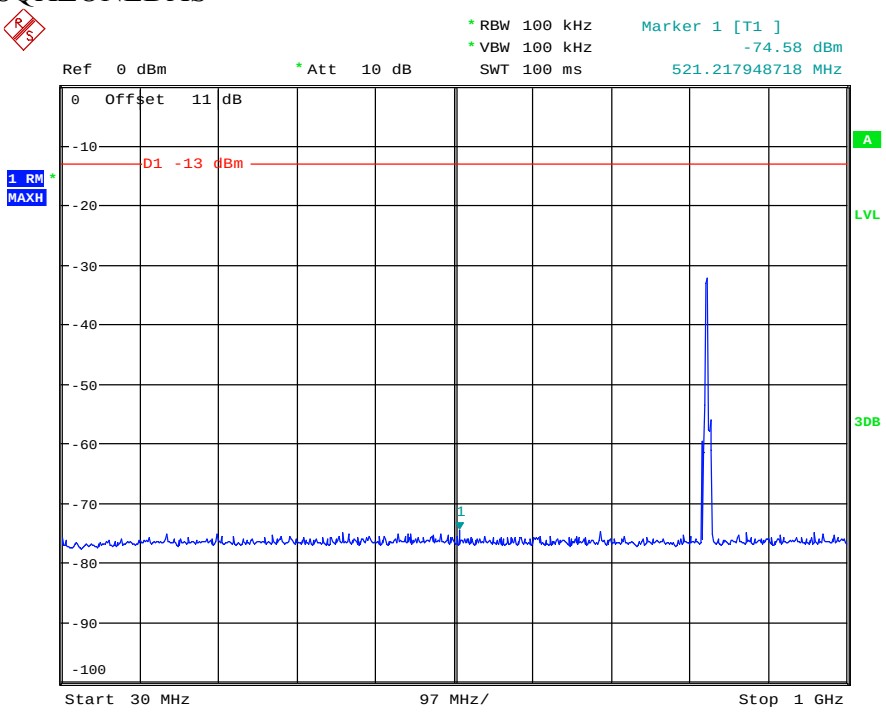

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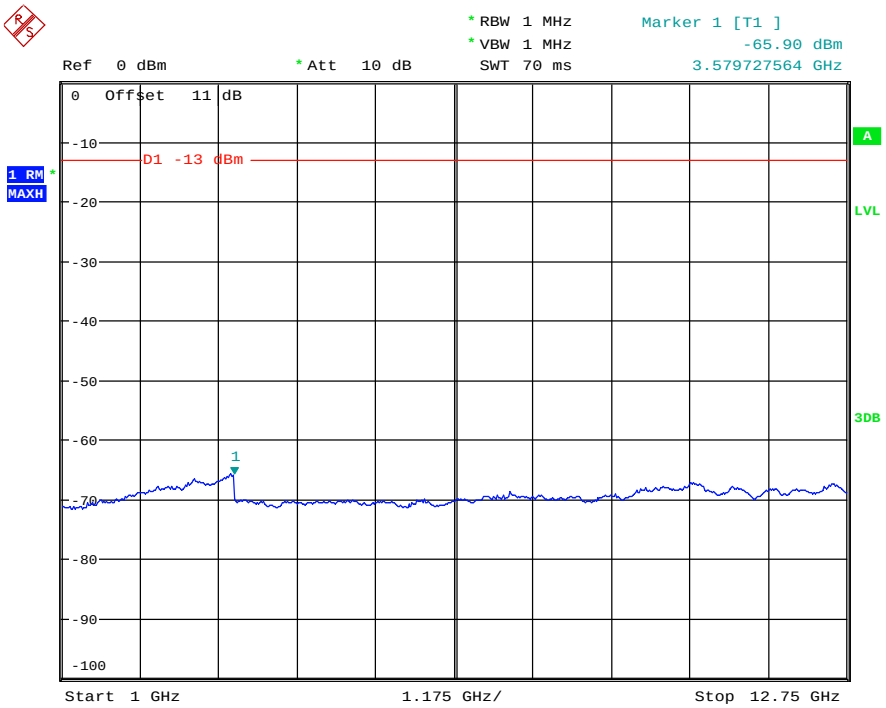

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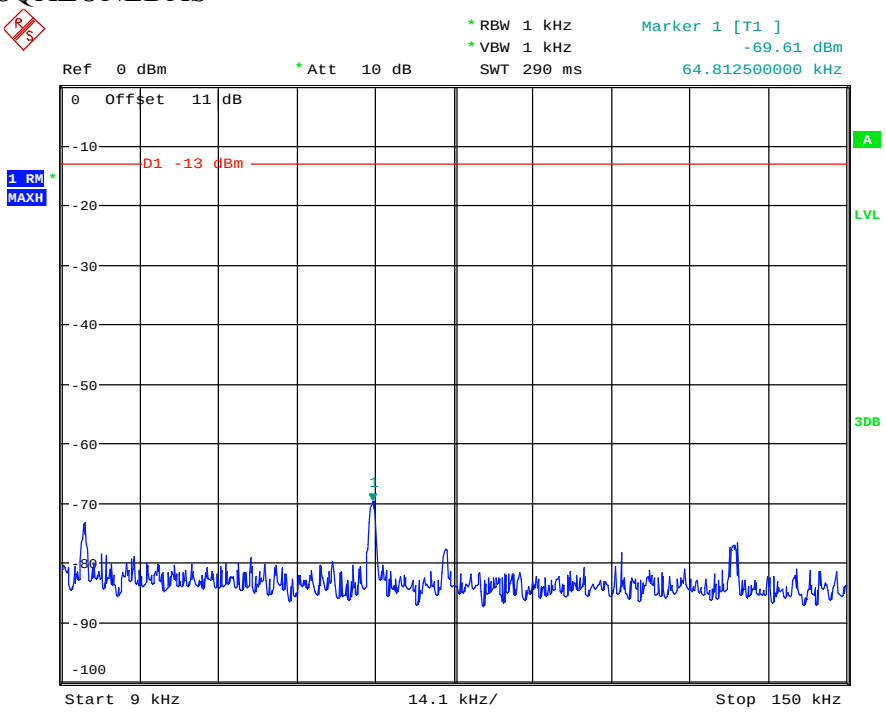

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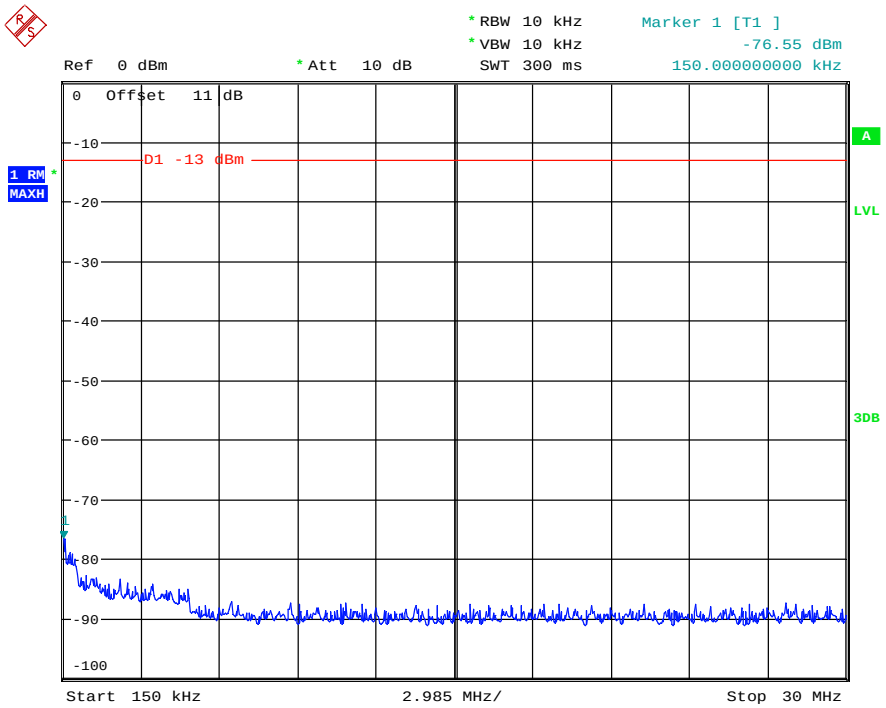

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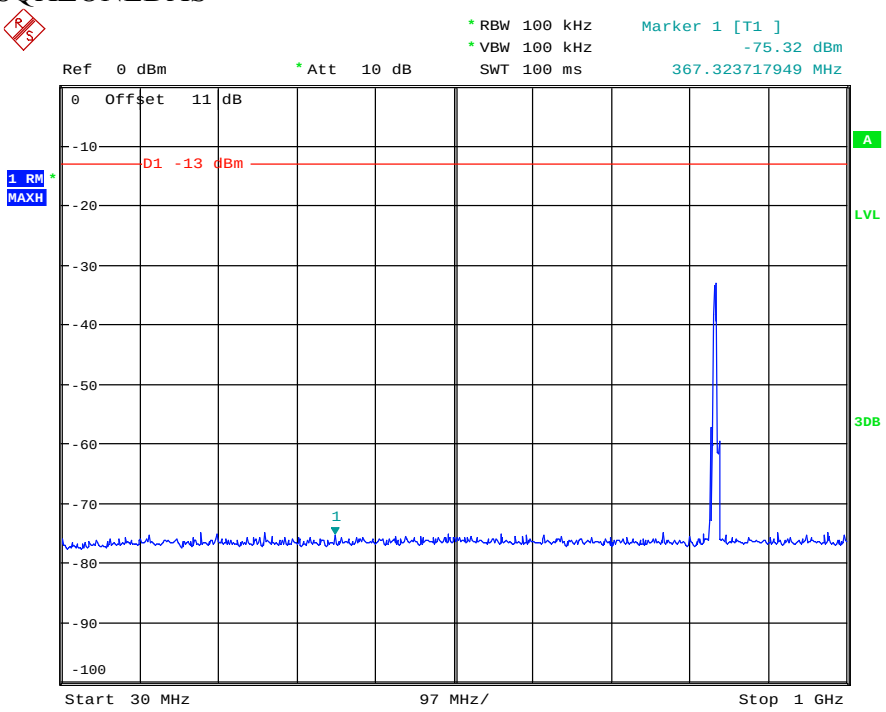

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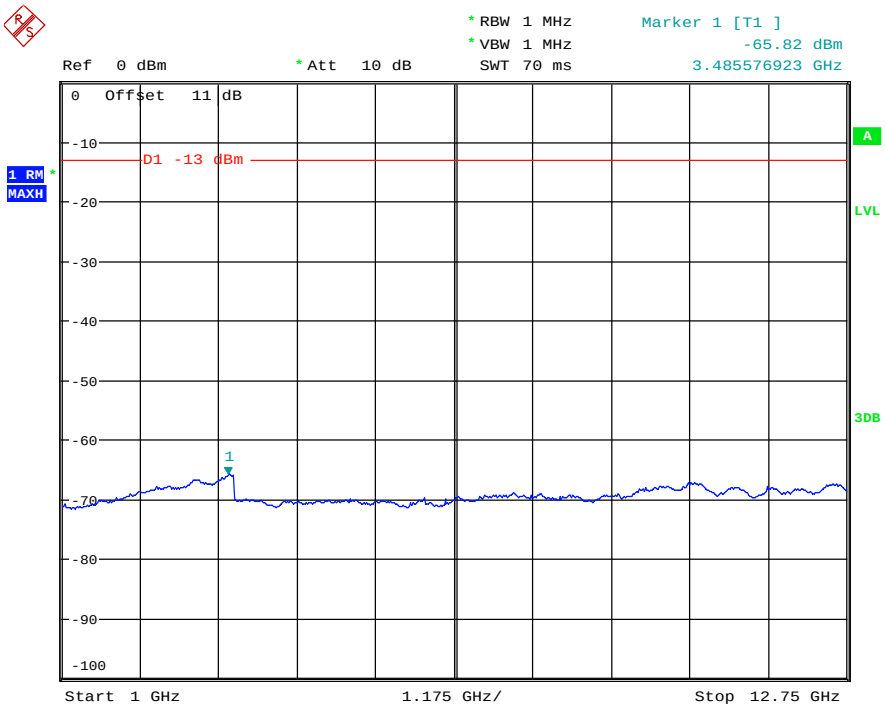

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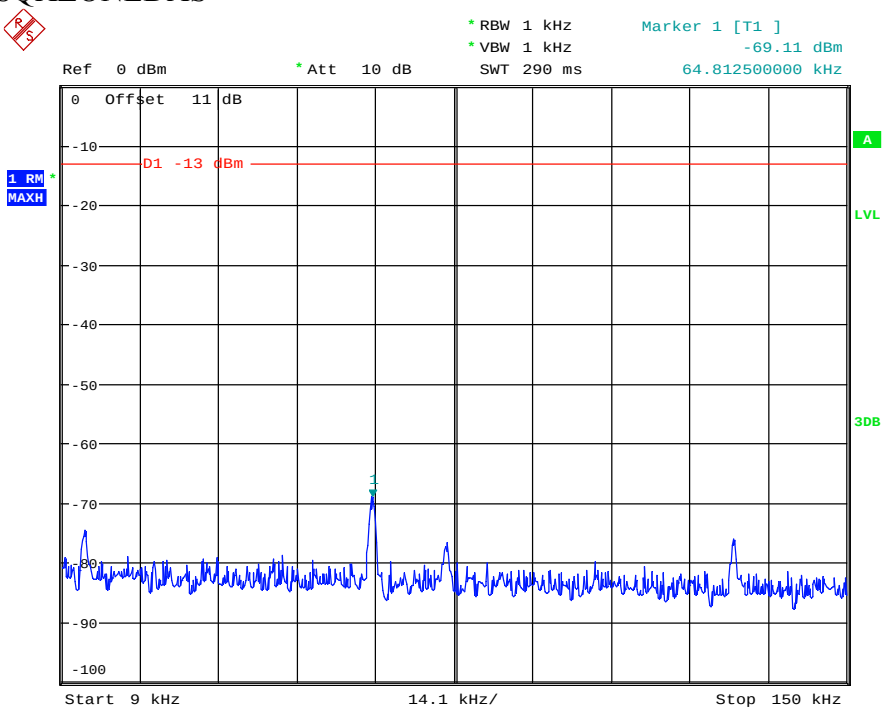

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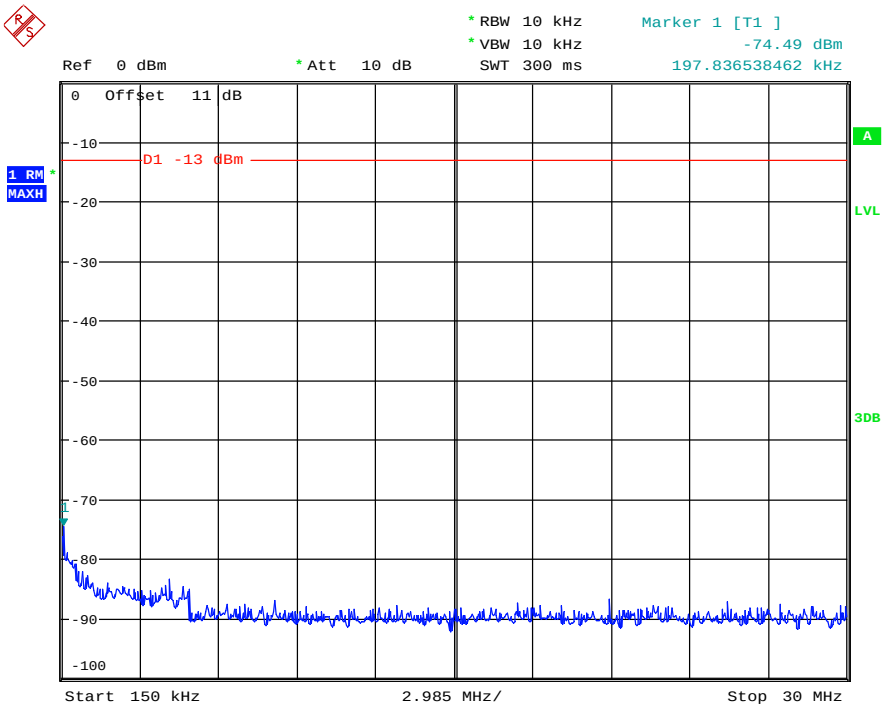

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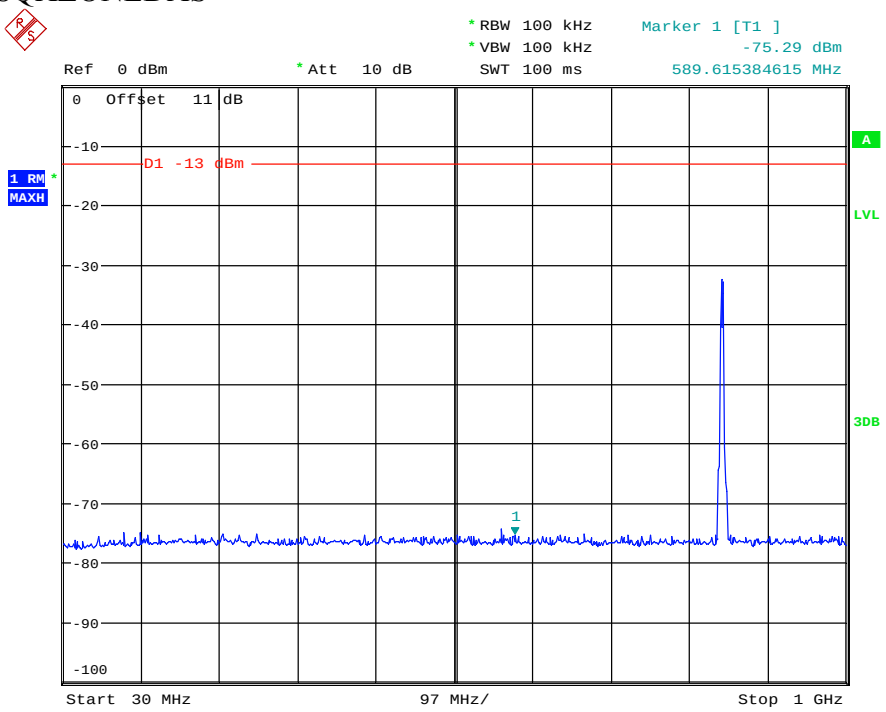

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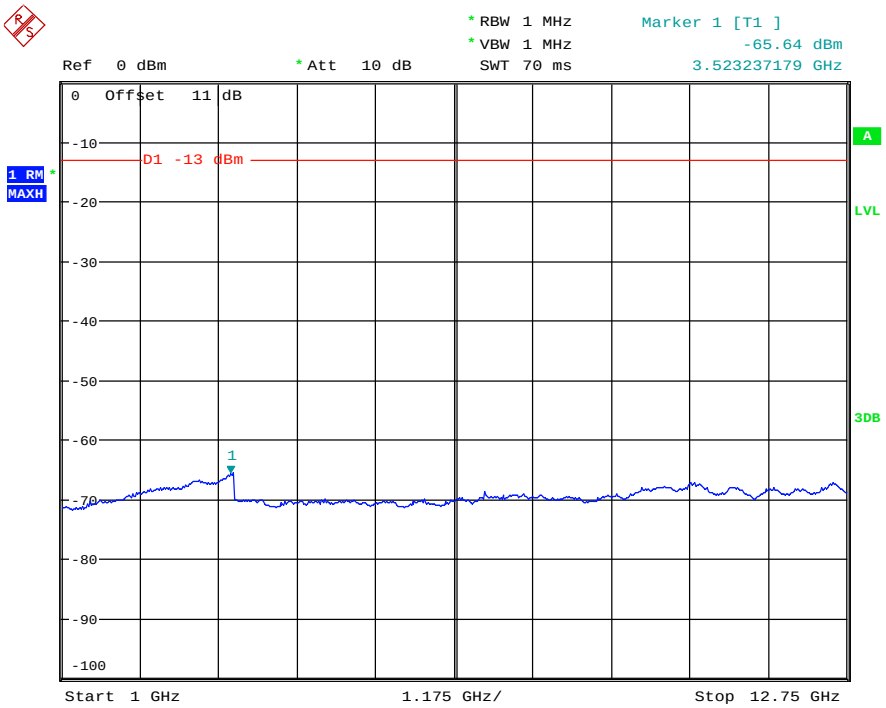

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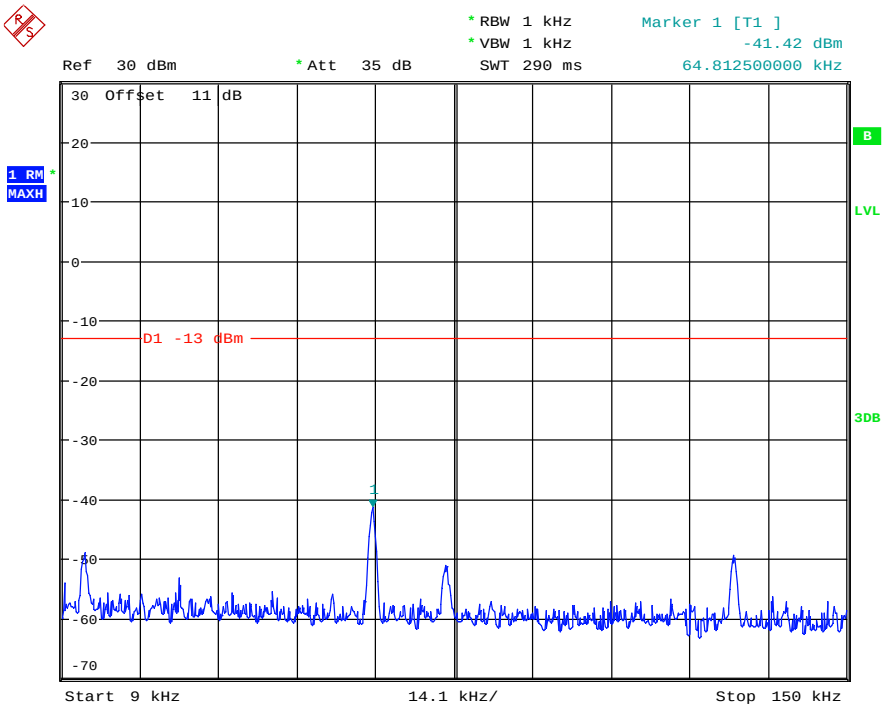

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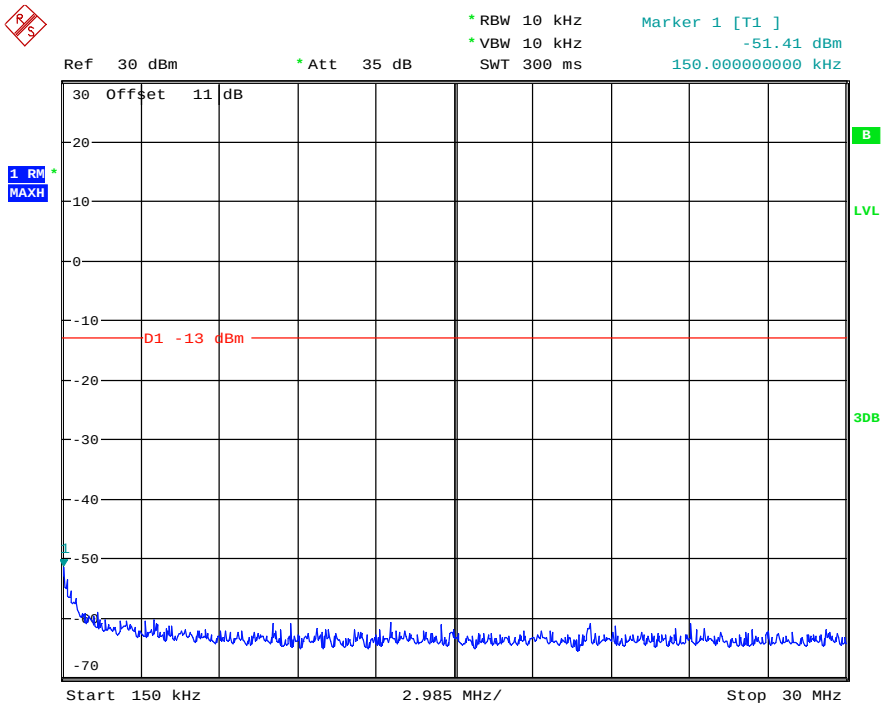

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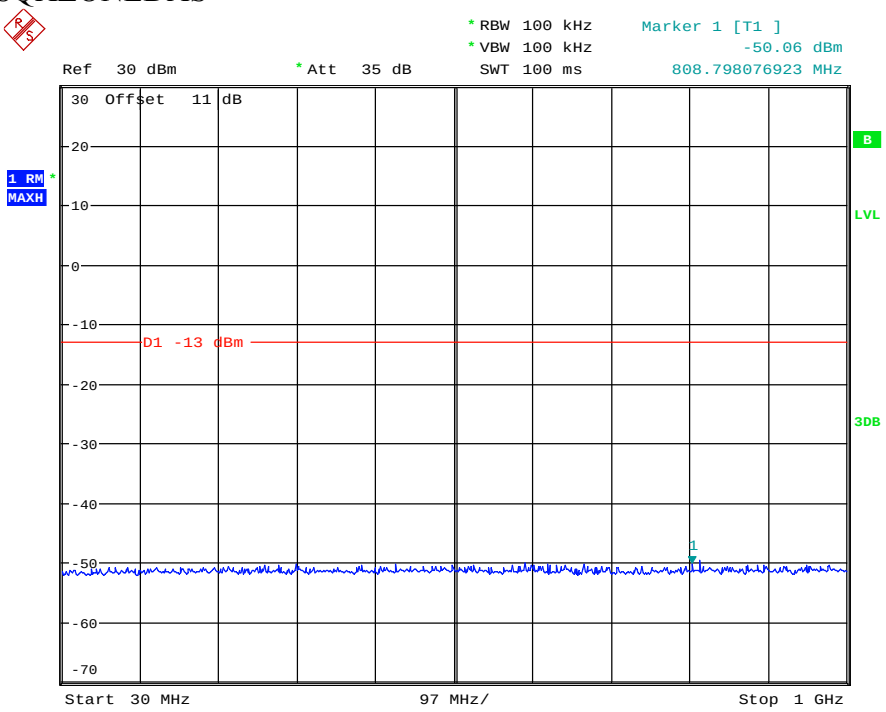

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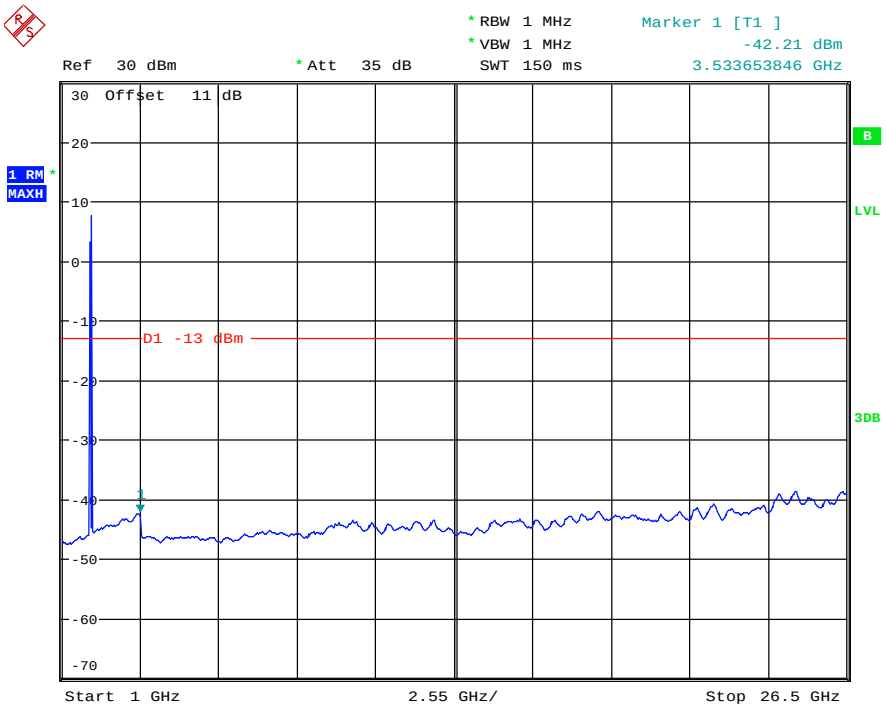

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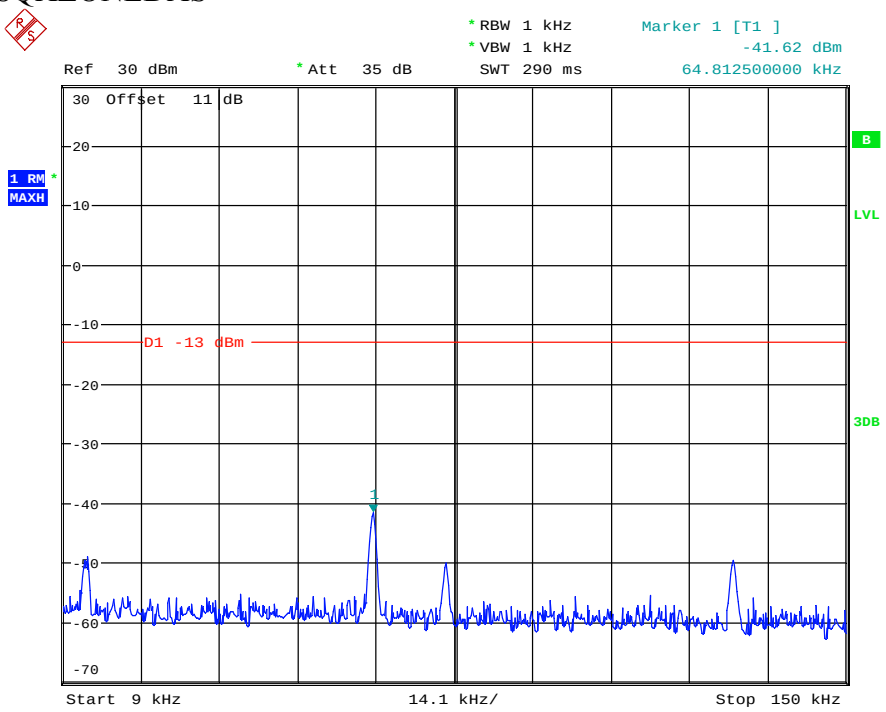

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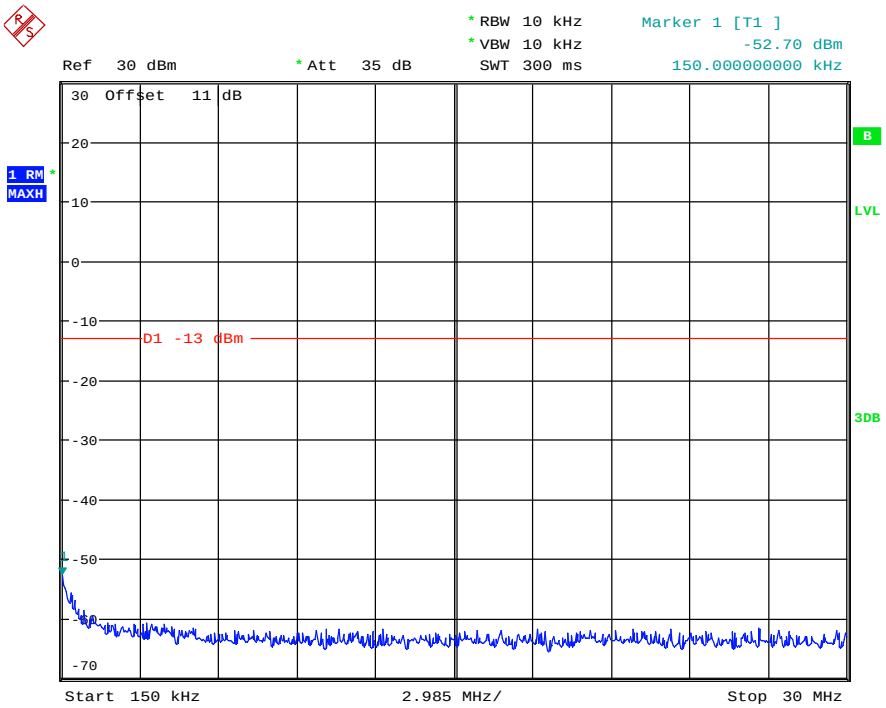

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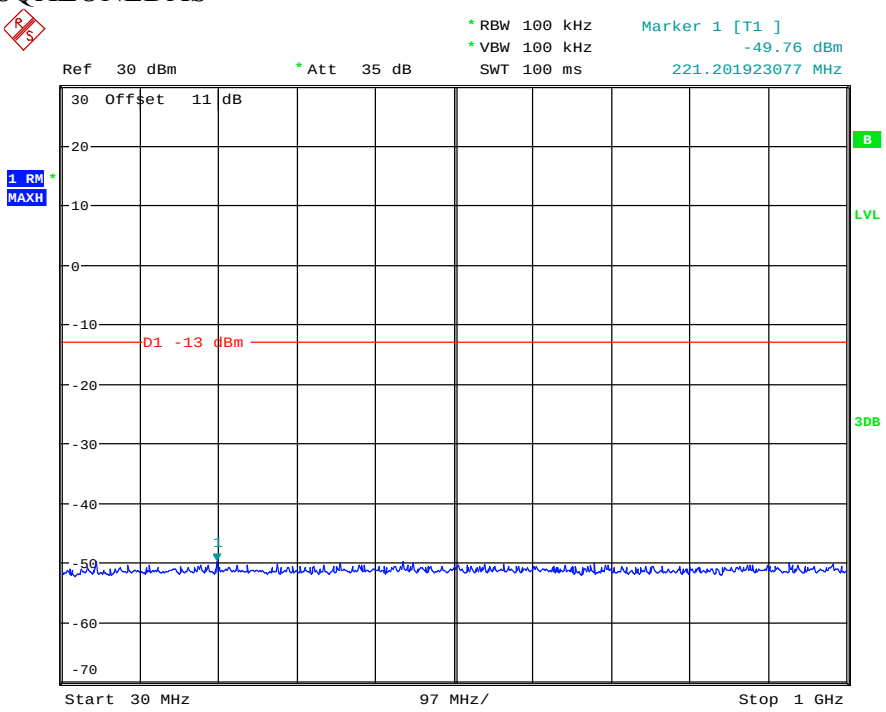

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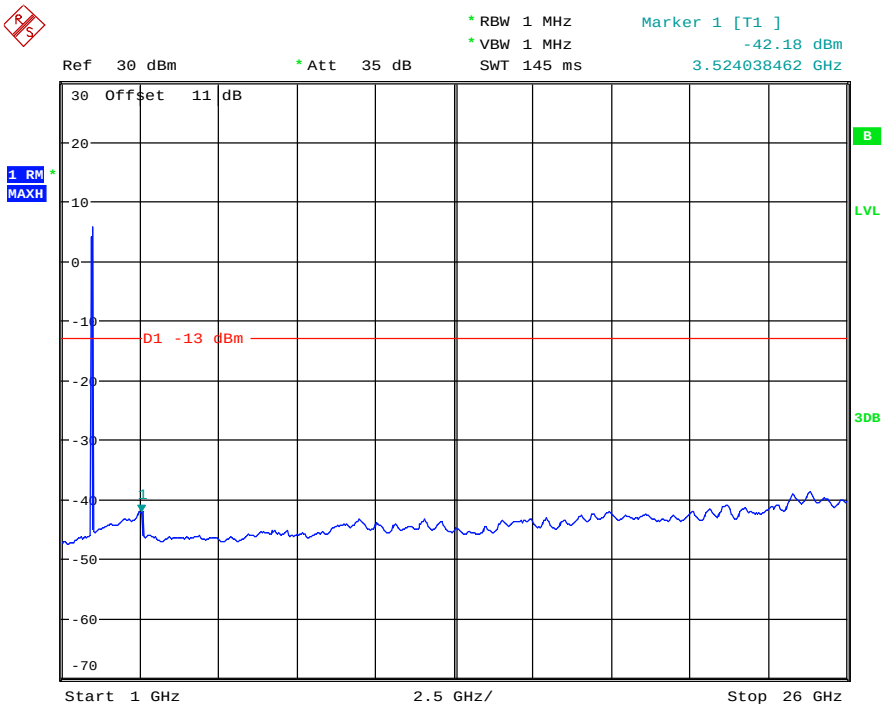

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