



Test Report No.:
FCCSZ2024-0011-RF

RF Test Report

FCC ID : OWWI117756S
EUT : SLW 5G
MODEL : PRO25T-6S-IOT,PRO25T-6S-BTW,PRO20T-6S-BTW
BRAND NAME : N/A
APPLICANT : SHENZHEN HUAPTEC CO., LTD
Classification of Test : N/A

CVC Testing Technology (Shenzhen) Co., Ltd.



Applicant		Name : SHENZHEN HUAPTEC CO., LTD	
		Address :3rd FL,E BLDG, Sogood Science Park, SanWei community, Hangcheng Street, Bao'an District, Shenzhen, China	
Manufacturer		Name : SHENZHEN HUAPTEC CO., LTD	
		Address :3rd FL,E BLDG, Sogood Science Park, SanWei community, Hangcheng Street, Bao'an District, Shenzhen, China	
Equipment Under Test		Name :SLW 5G	
		Model/Type:PRO25T-6S-IOT	
		Additional Model:PRO25T-6S-BTW,PRO20T-6S-BTW	
		Trade mark : N/A	
		Serial NO.:N/A	
		Sampe NO.:2-1	
Date of Receipt.	2024.03.12	Date of Testing	2024.03.12~2024.03.29
Test Specification		Test Result	
FCC CFR 47 Part 20		PASS	
Evaluation of Test Result	The equipment under test was found to comply with the requirements of the standards applied.		
	Seal of CVC Issue Date: 2024.03.29		
Tested by: <u>Liang Jiatong</u> Name Signature	Reviewed by: <u>Mo Xianbiao</u> Name Signature	Approved by: <u>Dong Sanbi</u> Name Signature	
Other Aspects: NONE.			
Abbreviations:OK, Pass= passed Fail = failed N/A= not applicable EUT= equipment, sample(s) under tested			

This test report relates only to the EUT, and shall not be reproduced except in full, without written approval of CVC.

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
FCCSZ2024-0011-RF	Original release	2024.03.29

1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 20,RSS 131				
FCC STANDARD SECTION	IC STANDARD SECTION	TEST TYPE AND LIMIT	RESULT	REMARK
§ 2.1046; § 22.913; § 24.232; § 22.913; § 27.50	RSS 131 9.3	RF Output Power& AGC threshold level	PASS	See section 3.1
§ 2.1047	/	Modulation Characteristics	N/A	EUT was a signal booster.
§ 2.1049; § 22.917; § 24.238; §27.53	RSS 131 9.2	Input-versus-output signal comparison(Bandwidth)	PASS	See section 3.2
§ 2.1051; § 22.917; § 24.238; §27.53	/	Spurious Emissions at Antenna Terminal& Intermodulation	PASS	See section 3.3
§ 2.1053; § 22.917; § 24.238; §27.53	/	Band Edge	PASS	See section 3.4
§ 2.1053; § 22.917; § 24.238; §27.53	/	Field Strength of Spurious Radiation	PASS	See section 3.5
§ 20.21	RSS 131 9.1	Out of Band Rejection	PASS	See section 3.6
§ 2.1055; § 22.355; § 24.235; § 27.54	RSS 131 9.4	Frequency stability	N/A	EUT was a signal booster.

1.1 LIST OF TEST AND MEASUREMENT INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial Number	Cal. interval	Cal. Due
Radiation Spurious(1GHz-40GHz)					/
Signal&Spectrum Analyzer	Rohde&Schwarz	FSV 40	101898	1 year	2024.5.21
EMI Test Receiver	Rohde&Schwarz	ESR3	102693	1 year	2024.5.25
Antenna(30MHz~1001MHz)	SCHWARZBECK	VULB 9168	1133	1 year	2025.2.21
Horn antenna(1GHz-18GHz)	ETS	3117	227611	1 year	2025.3.25
Horn antenna(18GHz-40GHz)	QMS	QMS-00880	22051	1 year	2025.3.25
3m anechoic chamber	MORI	966	CS0300011	3 year	2026.5.18
Filter group(RSE-BT/WiFi)	Rohde&Schwarz	WiFi /BT Variant 1	100820	1 year	2024.5.21
Filter group(RSE-Cellular)	Rohde&Schwarz	Cellular Variant 1	100768	1 year	2024.5.21
Preamplifier(10kHz-1GHz)	Rohde&Schwarz	SCU-01F	100299	1 year	2024.5.21
Preamplifier(1GHz-18GHz)	Rohde&Schwarz	SCU-18F	100799	1 year	2024.5.21
Preamplifier(1GHz-18GHz)	Rohde&Schwarz	SCU-18F	100801	1 year	2024.5.21
Preamplifier(18Gz-40GHz)	Rohde&Schwarz	SCU-40A	101209	1 year	2024.5.21
#2 control room	MORI	433	CS0300028	3 year	2024.5.21
Temperature and humidity meter	/	C193561517	C193561517	1 year	2024.5.21
Radiation Spurious(Below 1GHz)					/
EMI Test Receiver	Rohde&Schwarz	ESR 26	101718	1 year	2024.5.25
Loop antenna (8.3k~30MHz)	Rohde&Schwarz	HFH2-Z2E	100951	1 year	2024.5.26
Antenna(30MHz~1000MHz)	SCHWARZBECK	VULB 9168	1132	1 year	2025.2.14
3m anechoic chamber	MORI	966	CS0200019	3 year	2026.5.18
Attenuator	/	SJ-5dB	607684	1 year	2025.2.21
#1 control room	MORI	433	CS0300028	3 year	2026.5.16
Temperature and humidity meter	/	C193561473	CS0200071	1 year	2024.5.21
Antenna Port Test System					/
Signal&Spectrum Analyzer	Rohde&Schwarz	FSV 30	104408	1 year	2024.5.21
#3Shielding room	MORI	443	N/A	3 year	2026.5.16
Wideband radio communication tester	Rohde&Schwarz	CMW 500	168778	1 year	2024.5.25
Analog signal Generator (100kHz ~ 40GHz)	Rohde&Schwarz	SMB 100A	181934	1 year	2024.5.21
Vector signal Generator (9kHz ~ 6GHz)	Keysight	N5182B	MY57301451	1 year	2024.4.25
Vector signal Generator (9kHz ~ 6GHz)	Rohde&Schwarz	SGT 100A	111724	1 year	2024.5.21
RF control unit(BT/WiFi)	Tonscend	JS0806-2-8CH	20E8060261	1 year	2024.5.21

1.2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

No.	Item	Measurement Uncertainty
1	Conducted emission test	+/-2.7 dB
2	Radiated emission 9kHz-30MHz	+/-5.6 dB
3	Radiated emission 30MHz-1GHz	+/-4.6 dB
4	Radiated emission 1GHz-18GHz	+/-4.4 dB
5	Radiated emission 18GHz-40GHz	+/-5.1 dB
6	RF power	+/-0.9 dB
7	Power Spectral Density	+/-0.8 dB
8	Conducted spurious emissions	+/-2.7 dB
9	Transmission Time	+/-0.27%
10	Occupied Bandwidth	+/-1.86%

Remark: 95% Confidence Levels, k=2.

1.3 TEST LOCATION

The tests and measurements refer to this report were performed by EMC testing Lab. of CVC Testing Technology (Shenzhen) Co., Ltd.

Lab Address: No. 1301, Guanguang Road, Xinlan Community, Guanlan Street, Longhua District, Shenzhen City, Guangdong Province 518110 P.R.China

Post Code: 518110 Tel: 0755-23763060-8805

Fax: 0755-23763060 E-mail: sz-kf@cvc.org.cn

FCC(Test firm designation number: CN1363)

IC(Test firm CAB identifier number: CN0137)

CNAS(Test firm designation number: L16091)

2 GENERAL INFORMATION

2.1 GENERAL PRODUCT INFORMATION

PRODUCT	SLW 5G	
BRAND	N/A	
TEST MODEL	PRO25T-6S-IOT	
ADDITIONAL MODEL	PRO25T-6S-BTW,PRO20T-6S-BTW	
POWER SUPPLY	DC12V from adapter	
FREQUENCY RANGE	Uplink	Downlink
	663 ~ 698MHz	617 ~ 652MHz
	698 ~ 716MHz	728 ~ 746MHz
	776 ~ 787MHz	746 ~ 757MHz
	824 ~ 849 MHz	869 ~ 894 MHz
	1850 ~ 1915MHz	1930 ~ 1995MHz
	1710 ~ 1755MHz	2110 ~ 2155MHz
ANTENNA TYPE(Note 3)	See section 2.2	
I/O PORTS	Refer to user's manual	
CABLE SUPPLIED	N/A	
Note: <ol style="list-style-type: none"> For more detailed features description, please refer to the manufacturer's specifications or the User's Manual. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report. Since the above data and/or information is provided by the client, CVC is not responsible for the authenticity, integrity and results of the data and information and/or the validity of the conclusion. PRO25T-6S-IOT and PRO25T-6S-BTW are same electrically identical, only the appearance is different PRO25T-6S-BTW and PRO20T-6S-BTW are similar in appearance and size, there is only a difference in model name 		



2.2 PRODUCT ANTENNA GAIN & CABLE LOSS

Downlink

FCC Band Name	Frequency Range(MHz)	Panel antenna*(dBi)	Cable loss*(dB)
600 MHz Service	617-652	8	4.6
Lower 700 MHz	728-746	8	4.8
Upper 700 MHz	746-757	8	5.01
Cellular	869-894	8	5.35
Broadband PCS	1930-1995	10	8.01
AWS-1	2110-2155	10	8.36

Note: The antenna gain and cable loss was provided by applicant.

Uplink

FCC Band Name	Frequency Range(MHz)	Panel antenna*(dBi)	Cable loss*(dB)
600 MHz Service	663-698	8	4.6
Lower 700 MHz	698-716	8.5	4.8
Upper 700 MHz	776-787	8.5	5.01
Cellular	824-849	8.5	5.35
Broadband PCS	1850-1915	9	8.01
AWS-1	1710-1755	9	7.45

Note: The antenna gain and cable loss was provided by applicant.

2.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product, according to the specifications of the manufacturers. It must comply with the requirements of the following standards:

FCC Part 20.21 – Signal Boosters

RSS-131 Issue 4(2022-12)

ANSI C63.26-2015

Part 22 Subpart H - Public Mobile Services

Part 24 Subpart E - Personal Communication Services

Part 27 – Miscellaneous wireless communications services

KDB 935210 D02 Signal Boosters Certification v04r02

KDB 935210 D05 Indus Booster Basic Meas v01r04

All test items have been performed and recorded as per the above standards.

2.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Support Equipment							
NO	Description	Brand	Model No.	Serial Number	Supplied by		
1	Laptop	Lenovo	K4e-ARE120	MP20kshe	Lab		
Support Cable							
NO	Description	Quantity (Number)	Length (cm)	Detachable (Yes/ No)	Shielded (Yes/ No)	Cores (Number)	Supplied by

3 TEST TYPES AND RESULTS

3.1 RF OUTPUT POWER

3.1.1 Standard Applicable

According to FCC §2.1046 and §22.913 (a), the maximum effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 500 Watts.

According to FCC §2.1046 and §24.232(a)

(1) Base stations with an emission bandwidth of 1 MHz or less are limited to 1640 watts equivalent isotropically radiated power (EIRP) with an antenna height up to 300 meters HAAT, except as described in paragraph (b) below.

(2) Base stations with an emission bandwidth greater than 1 MHz are limited to 1640 watts/MHz equivalent isotropically radiated power (EIRP) with an antenna height up to 300 meters HAAT, except as described in paragraph (b) below.

(3) Base station antenna heights may exceed 300 meters HAAT with a corresponding reduction in power; see Tables 1 and 2 of this section.

According to §27.50(b), Fixed and base stations transmitting a signal in the 746-757 MHz and 776-787 MHz bands with an emission bandwidth greater than 1 MHz must not exceed an ERP of 1000 watts/MHz and an antenna height of 305 m HAAT, except that antenna heights greater than 305 m HAAT are permitted if power levels are reduced below 1000 watts/MHz ERP in accordance with Table 3 of this section.

According to §27.50(c), Fixed and base stations transmitting a signal in the 746-757 MHz and 776-787 MHz bands with an emission bandwidth greater than 1 MHz must not exceed an ERP of 1000 watts/MHz and an antenna height of 305 m HAAT, except that antenna heights greater than 305 m HAAT are permitted if power levels are reduced below 1000 watts/MHz ERP in accordance with Table 3 of this section.

Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP.

According to §27.50(d)(2), The power of each fixed or base station transmitting in the 1995-2000 MHz, the 2110-2155 MHz 2155-2180 MHz band, or 2180-2200 MHz band and situated in any geographic location other than that described in paragraph (d)(1) of this section is limited to:

(i) An equivalent isotropically radiated power (EIRP) of 1640 watts when transmitting with an emission bandwidth of 1 MHz or less;

(ii) An EIRP of 1640 watts/MHz when transmitting with an emission bandwidth greater than 1 MHz.

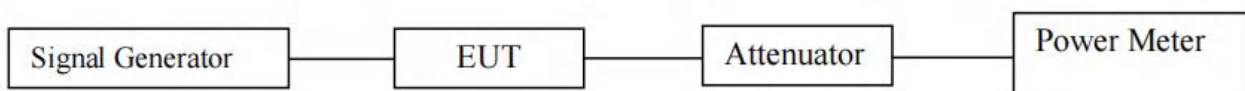
According to §27.50(d)(4), Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP. Fixed stations operating in the 1710-1755 MHz band are limited to a maximum antenna height of 10 meters above ground. Mobile and portable stations operating in these bands must employ a means for limiting power to the minimum necessary for successful communications.

3.1.2 Measurement procedure

Conducted method:

According to KDB 935210 D05 Indus Booster Basic Meas v01r04 clause 3.5

3.1.3 Test setup



3.1.4 Test results
AGC Level - Downlink:

Mode	Frequency (MHz)	Operation Band	Signal type	AGC level(dBm)	Conducted Output Power (dBm)	ERP (dBm)	Gain (dB)
Downlink	678.8	600MHz Band	AWGN	-50.9	17.22	20.62	68.12
	699.1	Lower700 MHz	AWGN	-52.5	17.35	20.55	69.85
	781.5	Upper700MHz	AWGN	-51.7	18.53	21.52	70.23
	835.3	cellular	AWGN	-55.0	17.11	19.76	72.11
	1866.3	PCS	AWGN	-57.9	16.17	18.16	74.07
	1732.6	AWS-1	AWGN	-58.1	17.07	18.71	75.17
	678.8	600MHz Band	GSM	-50.9	15.98	19.38	66.88
	699.1	Lower700 MHz	GSM	-52.5	16.48	19.68	68.98
	781.5	Upper700MHz	GSM	-51.7	17.74	20.73	69.44
	835.3	cellular	GSM	-55.0	16.23	18.88	71.23
	1866.3	PCS	GSM	-57.9	15.83	17.82	73.73
	1732.6	AWS-1	GSM	-58.1	16.29	17.93	74.39

Note:

1. $ERP = \text{Conducted Output Power(dBm)} + \text{AntennaGain(dBd)} - \text{Cable loss(dB)}$
2. $\text{AntennaGain(dBd)} = \text{AntennaGain(dBi)} - 2.15$

AGC Level - Uplink:

Mode	Frequency (MHz)	Operation Band	Signal type	AGC level(dBm)	Conducted Output Power (dBm)	ERP (dBm)	Gain (dB)
Uplink	633	600MHz Band	AWGN	-39.1	22.29	25.69	64.39
	734.2	Lower700 MHz	AWGN	-41.7	21.17	24.87	65.87
	750.8	Upper700MHz	AWGN	-40.7	22.38	25.87	66.08
	876.88	cellular	AWGN	-40.8	23.22	26.37	67.02
	1968.1	PCS	AWGN	-41.4	25.8	26.79	70.2
	2135.5	AWS-1	AWGN	-41.2	25.91	27.46	70.11
	633	600MHz Band	GSM	-39.1	21.15	24.55	63.25
	734.2	Lower700 MHz	GSM	-41.7	20.21	23.91	64.91
	750.8	Upper700MHz	GSM	-40.7	21.16	24.65	64.86
	876.88	cellular	GSM	-40.8	22.07	25.22	65.87
	1968.1	PCS	GSM	-41.4	24.52	25.51	68.92
	2135.5	AWS-1	GSM	-41.2	24.76	26.31	68.96

Note:

1. $ERP = \text{Conducted Output Power(dBm)} + \text{AntennaGain(dBd)} - \text{Cable loss(dB)}$
2. $\text{AntennaGain(dBd)} = \text{AntennaGain(dBi)} - 2.15$

AGC + 3db Level - Downlink:

Mode	Frequency (MHz)	Operation Band	Signal type	AGC+3db level(dBm)	Conducted Output Power (dBm)	ERP (dBm)	Gain (dB)
Downlink	678.8	600MHz Band	AWGN	-47.9	16.81	20.21	64.71
	699.1	Lower700 MHz	AWGN	-49.5	17.22	20.42	66.72
	781.5	Upper700MHz	AWGN	-48.7	18.17	21.16	66.87
	835.3	cellular	AWGN	-52.0	16.94	19.59	68.94
	1866.3	PCS	AWGN	-54.9	16.59	18.58	71.49
	1732.6	AWS-1	AWGN	-55.1	17.03	18.67	72.13
	678.8	600MHz Band	GSM	-47.9	15.56	18.96	63.46
	699.1	Lower700 MHz	GSM	-49.5	16.53	19.73	66.03
	781.5	Upper700MHz	GSM	-48.7	17.49	20.48	66.19
	835.3	cellular	GSM	-52.0	15.02	17.67	67.02
	1866.3	PCS	GSM	-54.9	15.29	17.28	70.19
	1732.6	AWS-1	GSM	-55.1	14.73	16.37	69.83

Note:

1. $ERP = \text{Conducted Output Power(dBm)} + \text{AntennaGain(dBd)} - \text{Cable loss(dB)}$
2. $\text{AntennaGain(dBd)} = \text{AntennaGain(dBi)} - 2.15$

AGC + 3db Level - Uplink:

Mode	Frequency (MHz)	Operation Band	Signal type	AGC+3db level(dBm)	Conducted Output Power (dBm)	ERP (dBm)	Gain (dB)
Uplink	633	600MHz Band	AWGN	-39.1	22.02	25.42	61.12
	734.2	Lower700 MHz	AWGN	-41.7	20.83	24.53	62.53
	750.8	Upper700MHz	AWGN	-40.7	22.15	25.64	62.85
	876.88	cellular	AWGN	-40.8	23.01	26.16	63.81
	1968.1	PCS	AWGN	-41.4	25.91	26.90	67.31
	2135.5	AWS-1	AWGN	-41.2	25.77	27.32	66.97
	633	600MHz Band	GSM	-39.1	21.03	24.43	60.13
	734.2	Lower700 MHz	GSM	-41.7	20.02	23.72	61.72
	750.8	Upper700MHz	GSM	-40.7	20.98	24.47	61.68
	876.88	cellular	GSM	-40.8	21.94	25.09	62.74
	1968.1	PCS	GSM	-41.4	25.37	26.36	66.77
	2135.5	AWS-1	GSM	-41.2	24.33	25.88	65.53

Note:

1. $ERP = \text{Conducted Output Power(dBm)} + \text{AntennaGain(dBd)} - \text{Cable loss(dB)}$
2. $\text{AntennaGain(dBd)} = \text{AntennaGain(dBi)} - 2.15$

3.2 INPUT-VS-OUTPUT SIGNAL COMPARISON(BANDWIDTH) MEASUREMENT

3.2.1 Standard Applicable

FCC §2.1049, §22.917, §22.905, §24.238 & §27.53.

According to RSS-131, Clause 9.2

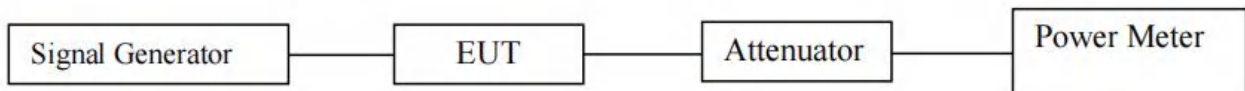
The spectral growth of the 26 dB bandwidth or occupied bandwidth of the output signal shall be less than 5% of the input signal spectrum.

3.2.2 Measurement procedure

According to KDB 935210 D05 Indus Booster Basic Meas v01r04 clause 3.4

A 26 dB bandwidth measurement shall be performed on the input signal and the output signal (alternatively, the 99% OBW can be measured and used) to demonstrate compliance to the technical requirements specified in §90.219(e)(4)(i) and (ii). See KDB Publication 971168 for more information regarding measuring the OBW.

3.2.3 Test setup

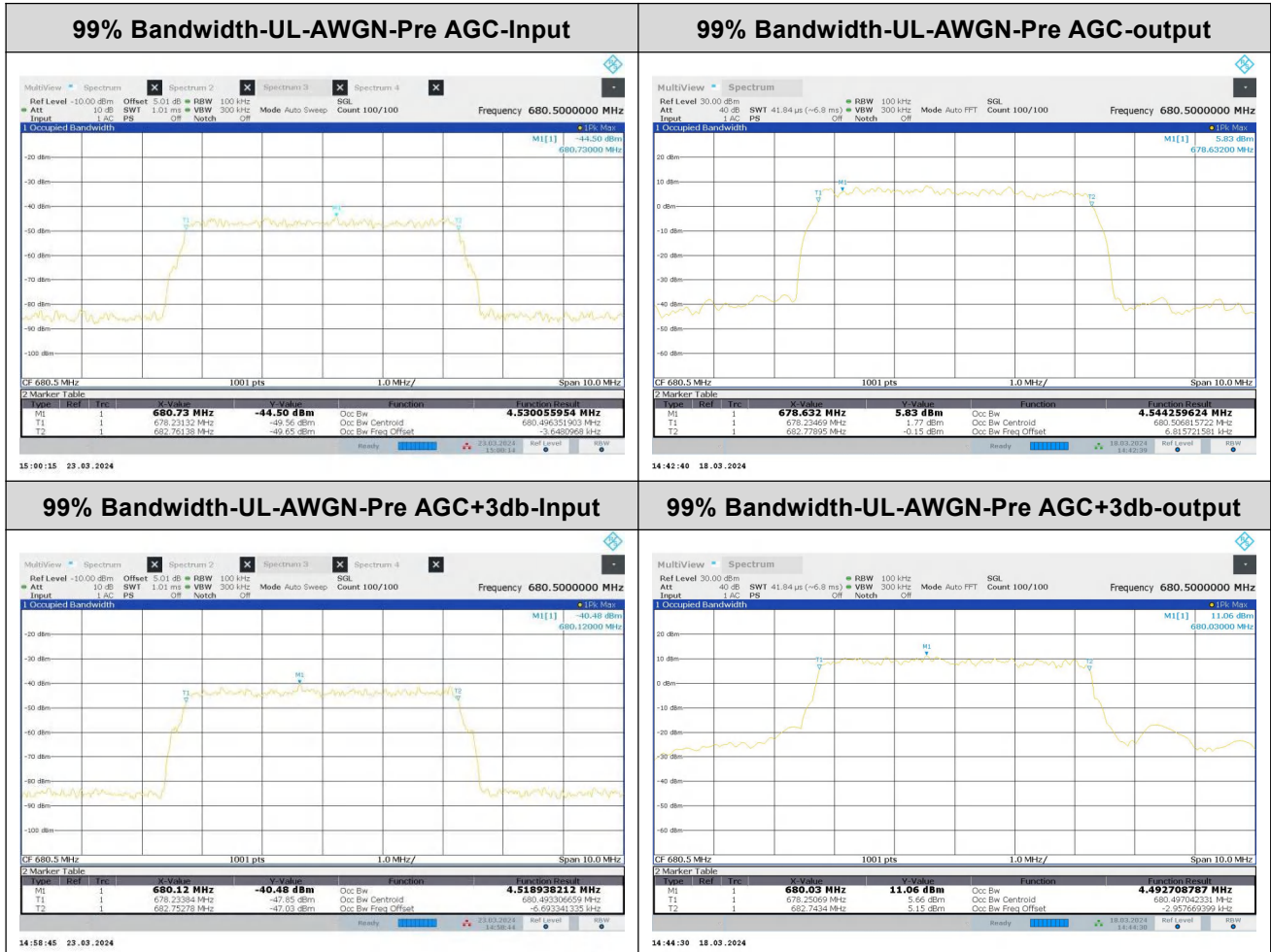


3.2.4 Test results
600 MHz Service

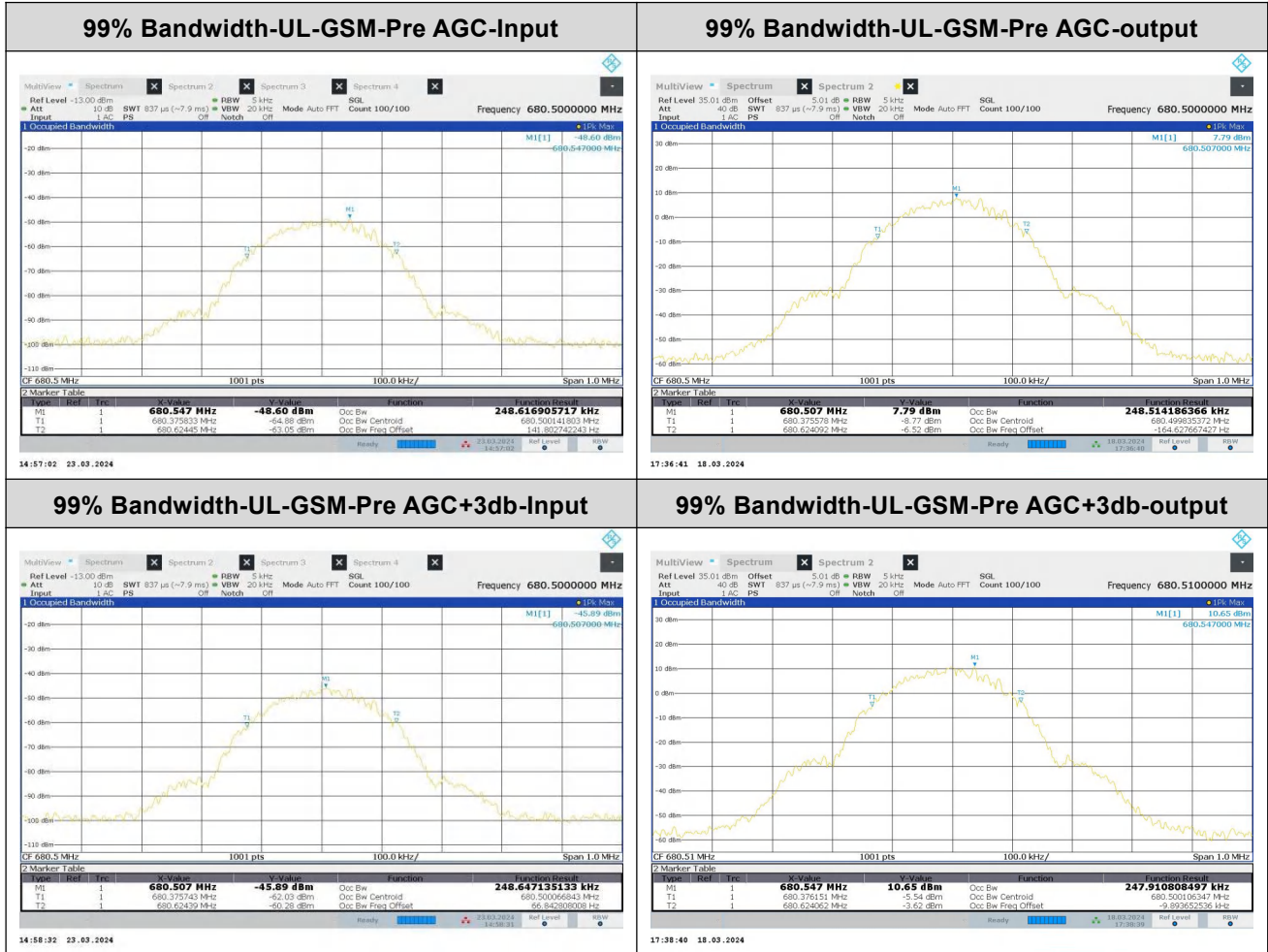
Mode	SignalType	Signal Level	Frequency (MHz)	99% Bandwidth (MHz)		26dB Bandwidth (MHz)	
				Input	Output	Input	Output
				Uplink	AWGN	Pre-AGC	680.5
3dB above AGC	680.5	4.518	4.492			5.080	5.090
GSM	Pre-AGC	680.5	0.248		0.248	0.307	0.308
	3dB above AGC	680.5	0.248		0.247	0.309	0.309
Downlink	AWGN	Pre-AGC	634.5	4.508	4.522	5.110	5.080
		3dB above AGC	634.5	4.569	4.476	5.130	5.080
	GSM	Pre-AGC	634.5	0.248	0.247	0.312	0.308
		3dB above AGC	634.5	0.248	0.247	0.309	0.307



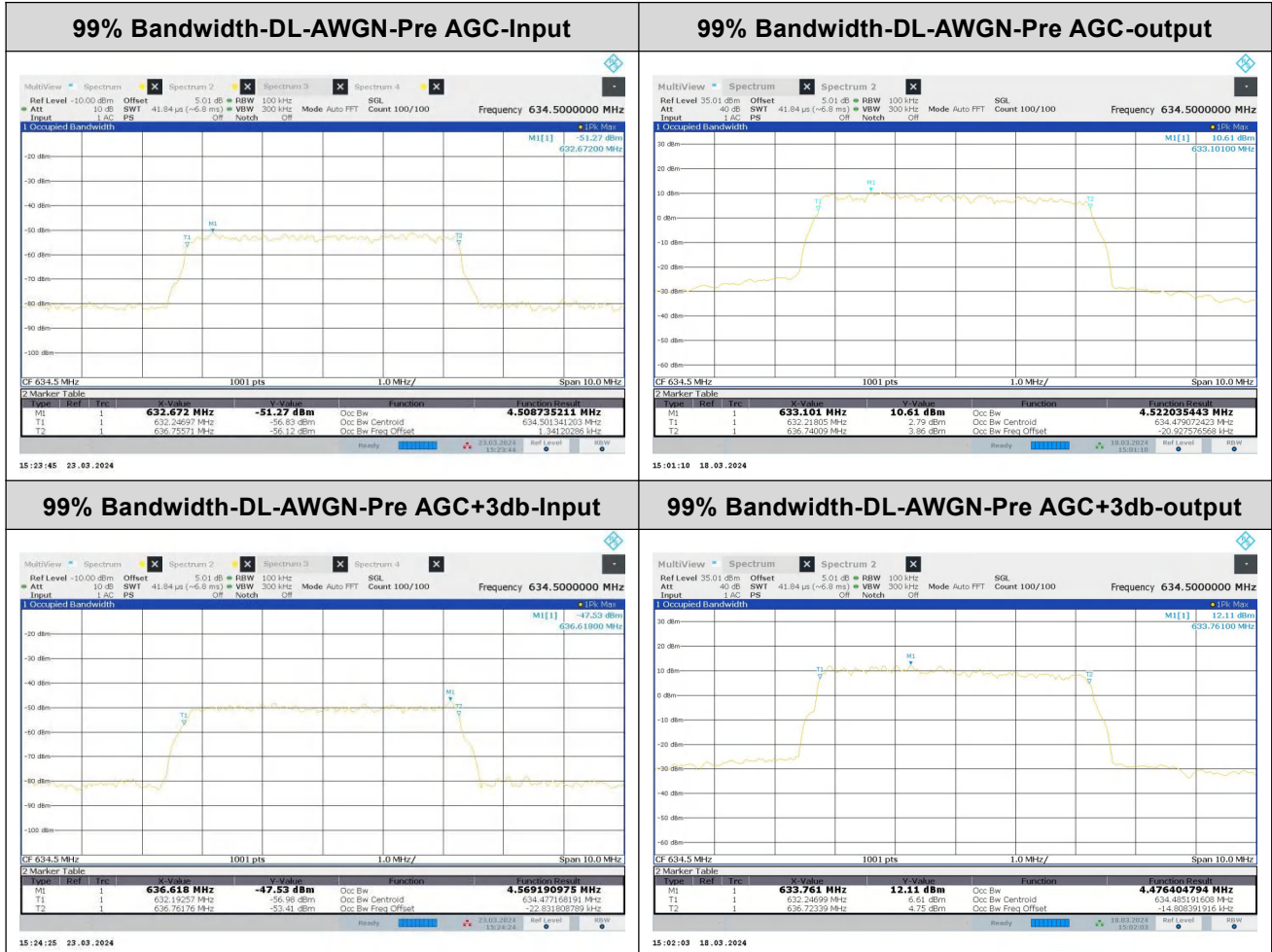
600 MHz Service



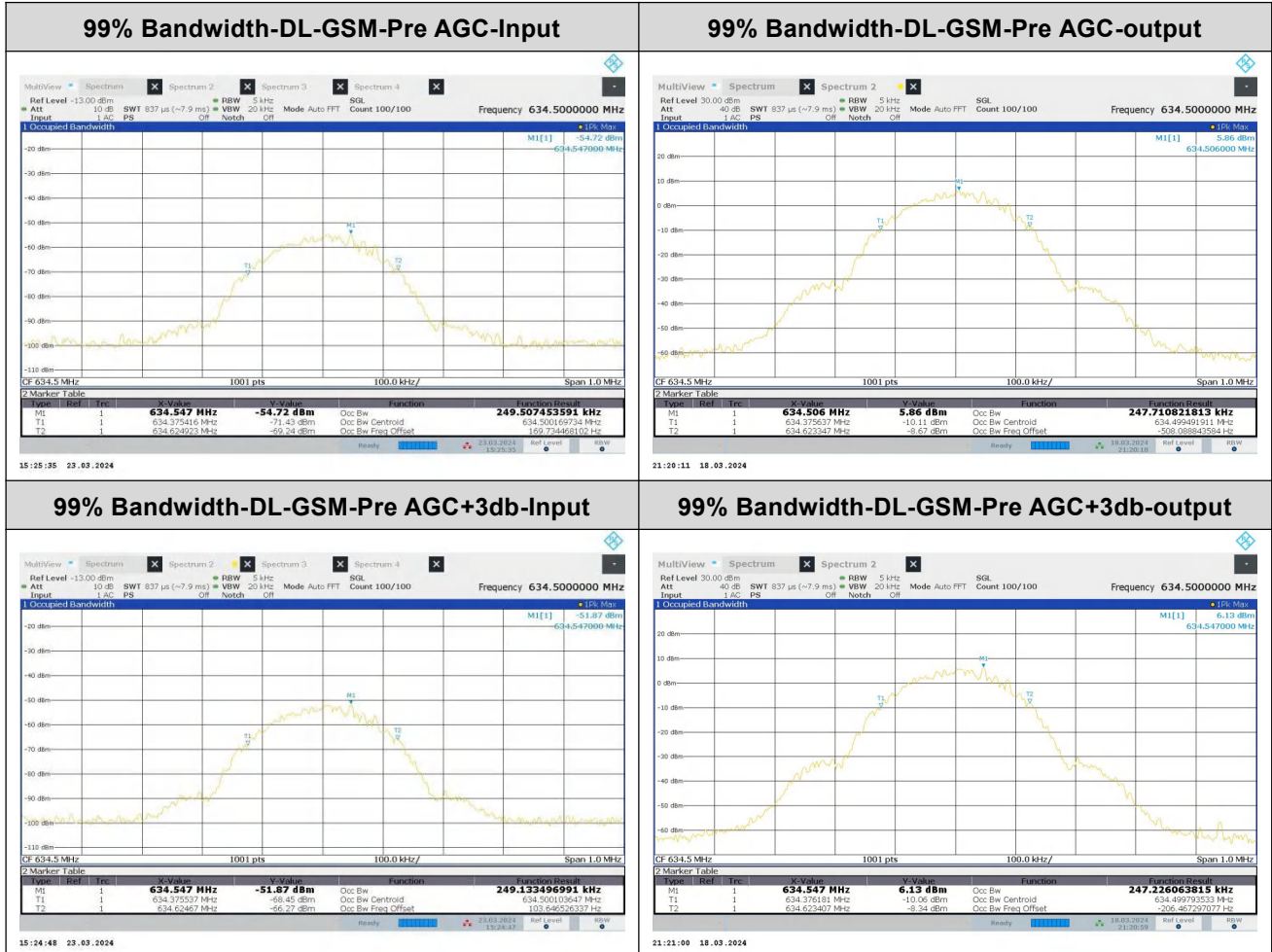
600 MHz Service



600 MHz Service

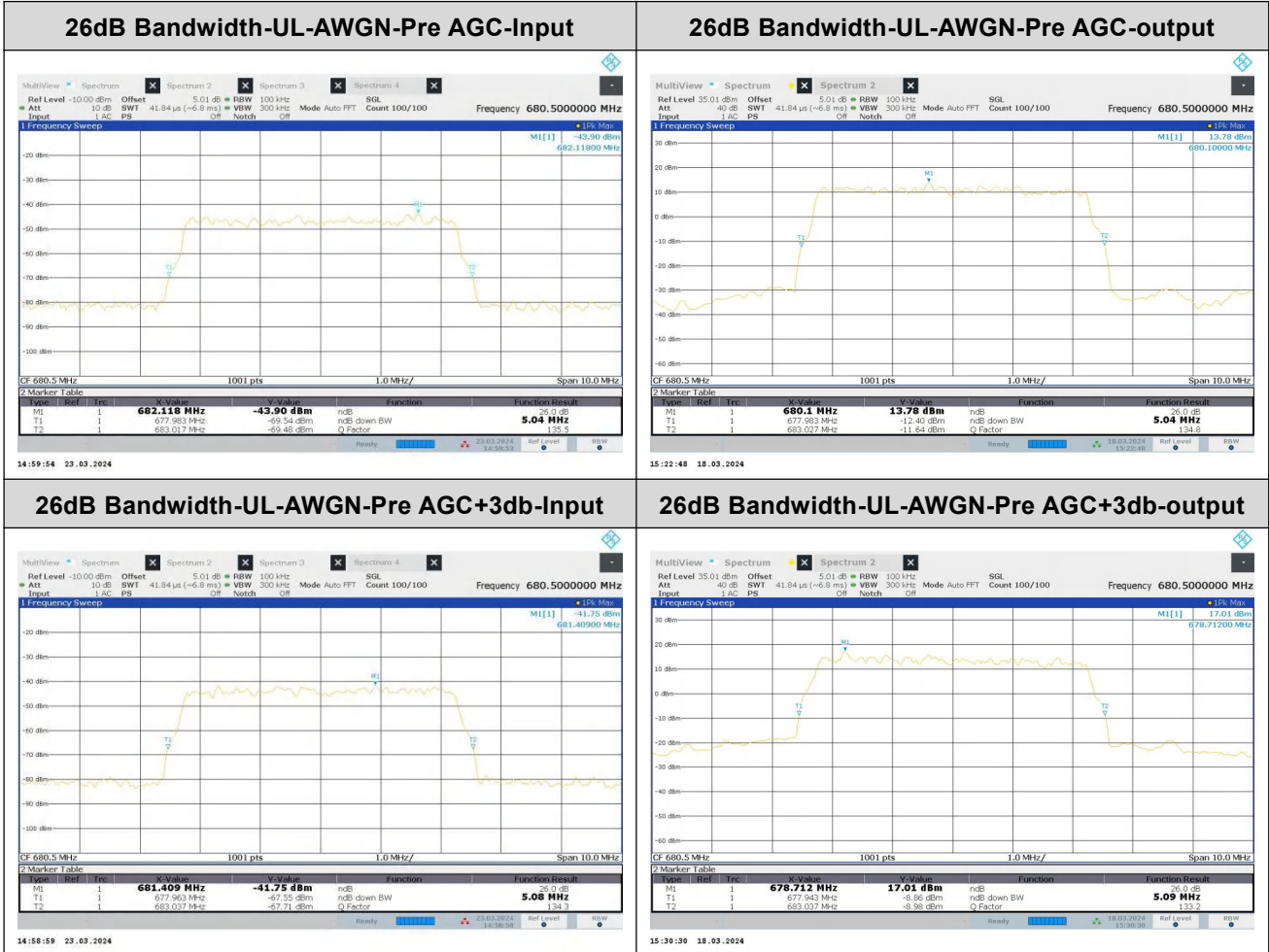


600 MHz Service

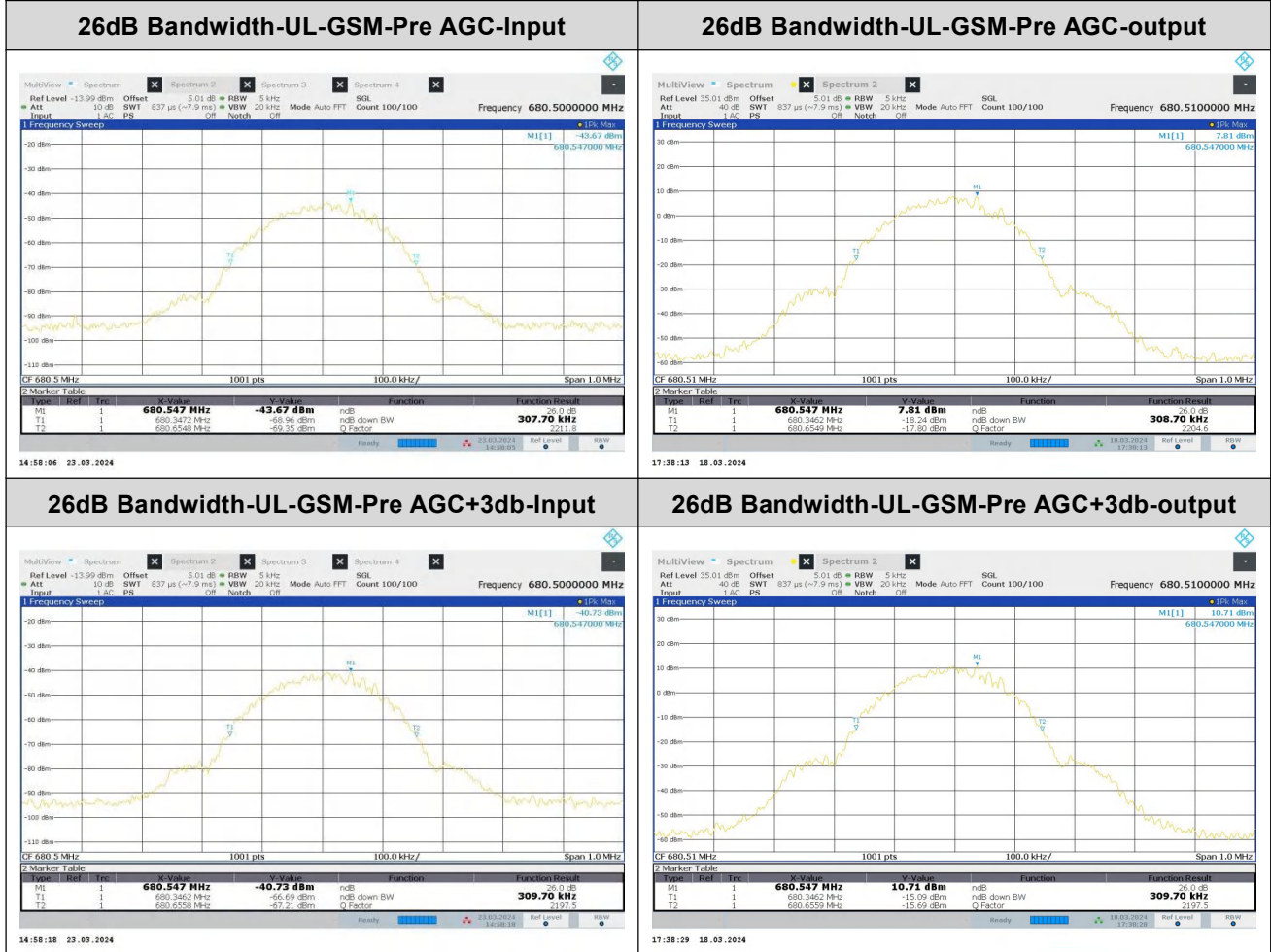




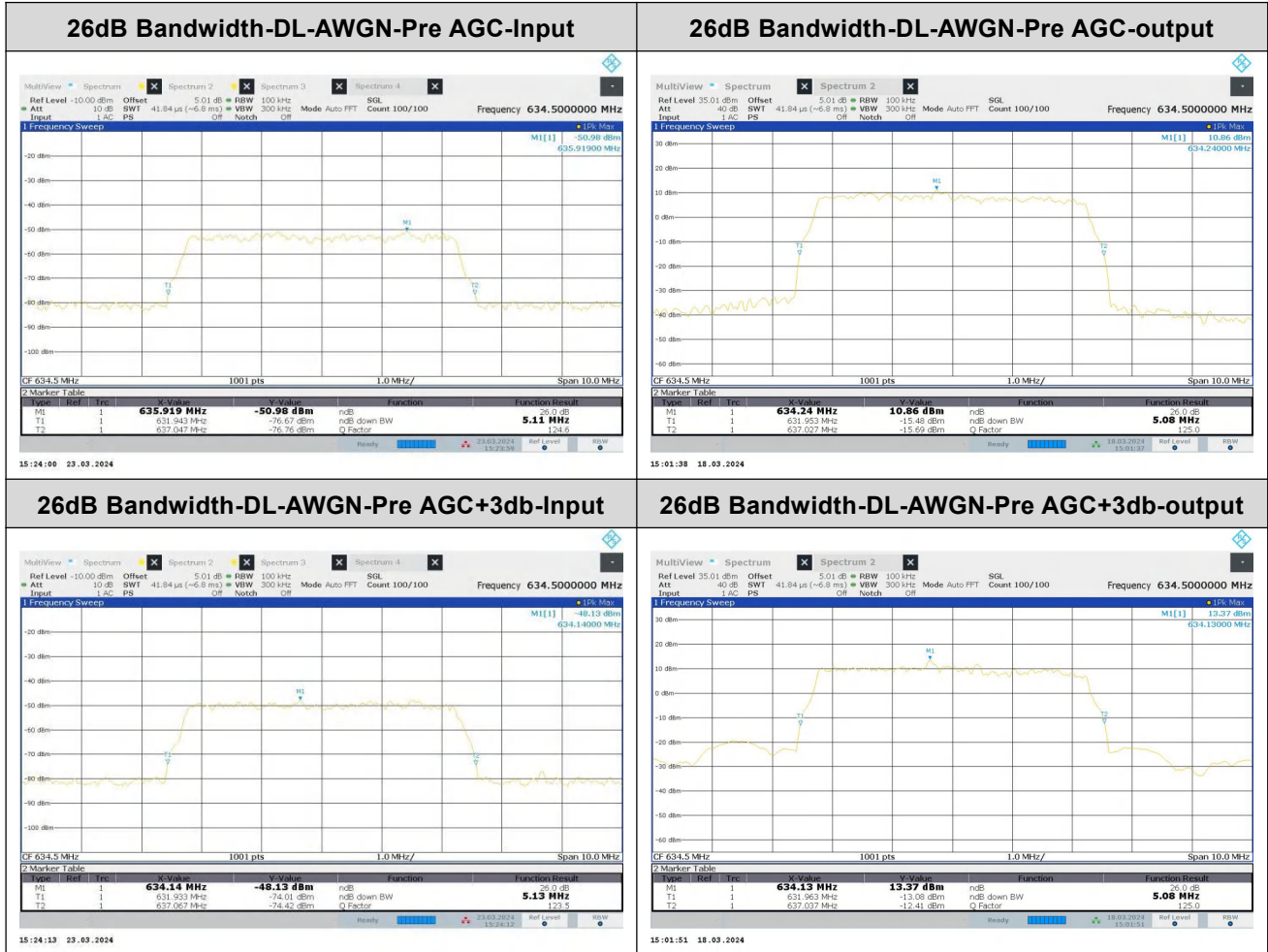
600 MHz Service



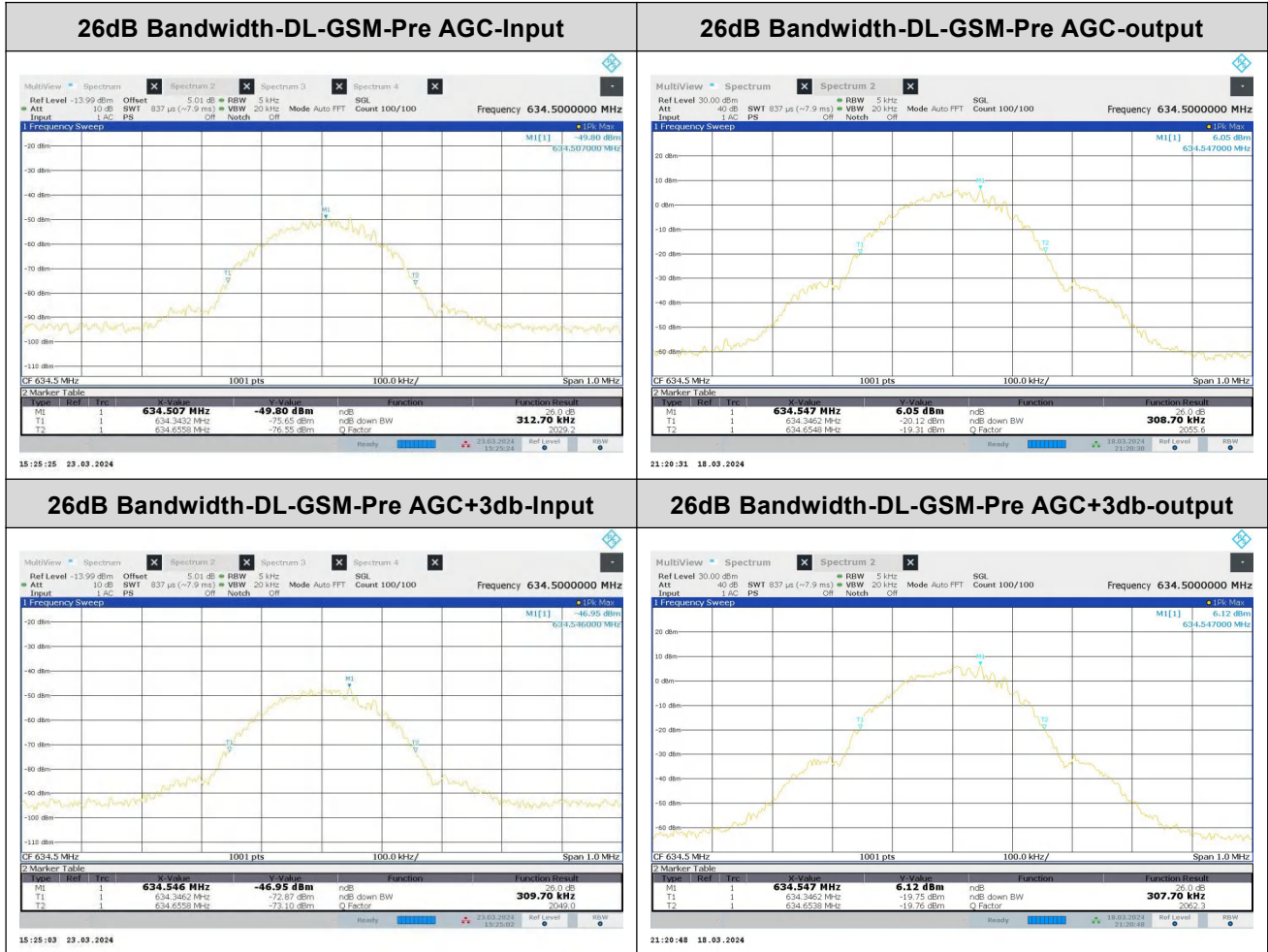
600 MHz Service



600 MHz Service



600 MHz Service

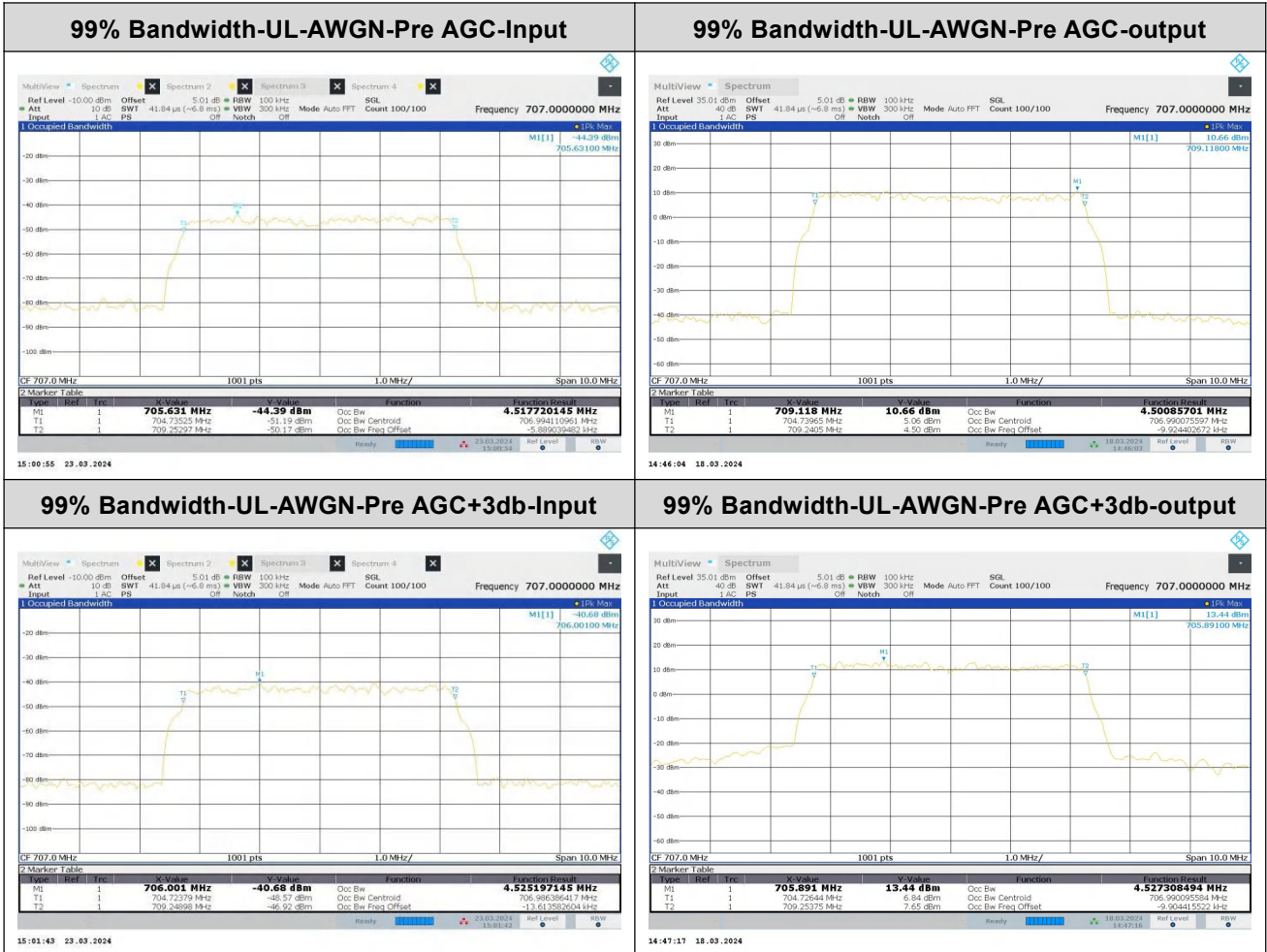


Lower 700 MHz

Mode	Signal Type	Signal Level	Frequency (MHz)	99% Bandwidth (MHz)		26dB Bandwidth (MHz)	
				Input	Output	Input	Output
Uplink	AWGN	Pre-AGC	707	4.517	4.500	5.090	5.080
		3dB above AGC	707	4.525	4.527	5.080	5.110
	GSM	Pre-AGC	707	0.248	0.248	0.305	0.308
		3dB above AGC	707	0.249	0.248	0.309	0.308
Downlink	AWGN	Pre-AGC	737	4.492	4.519	5.040	5.080
		3dB above AGC	737	4.521	4.559	5.120	5.080
	GSM	Pre-AGC	737	0.249	0.248	0.308	0.308
		3dB above AGC	737	0.248	0.245	0.308	0.308

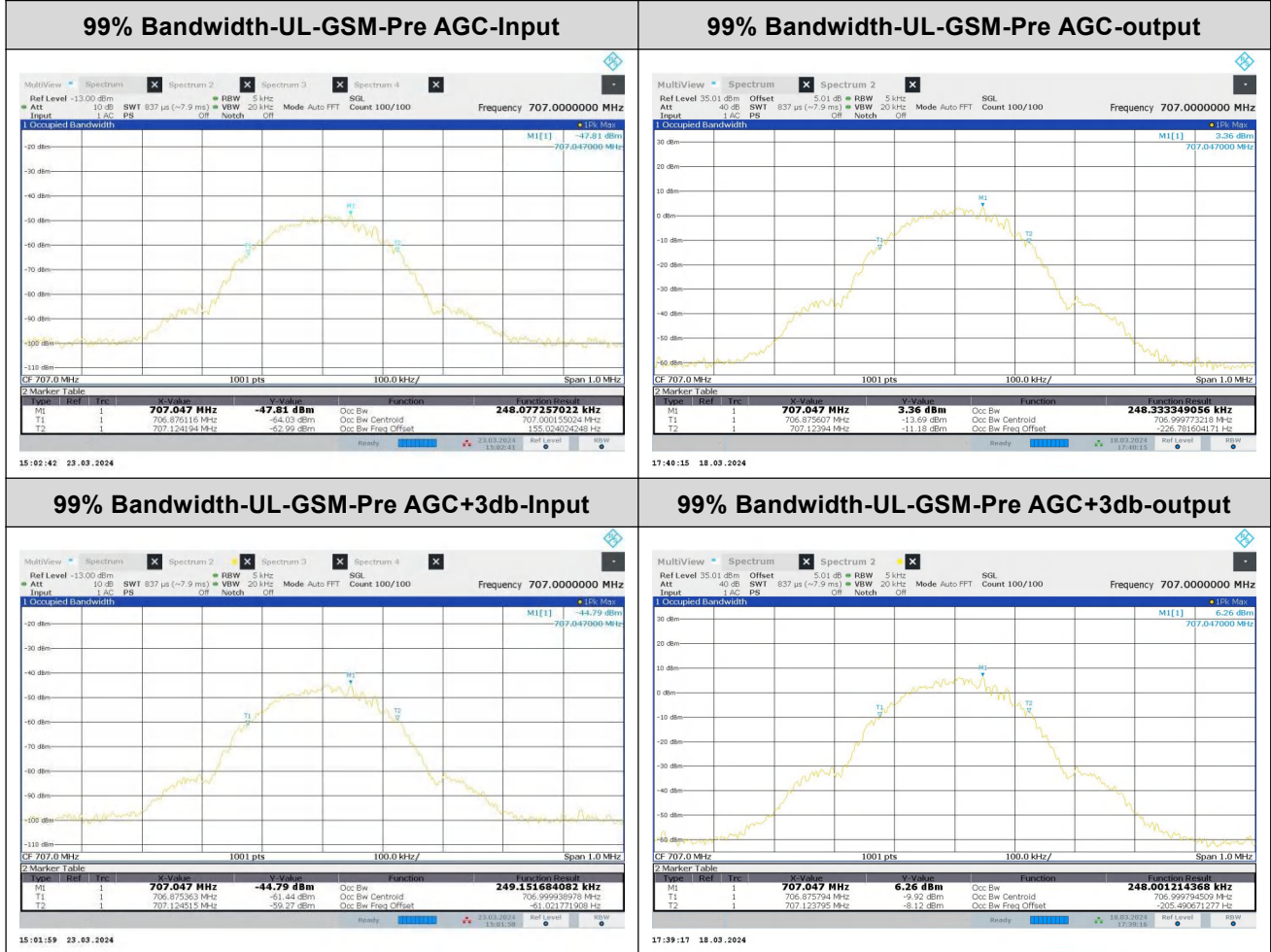
* Since the AGC Threshold level and AGC + 3 dB level for downlink are as low as -80 dBm, which is about the noise floor, the input levels are adjusted in order to get the right input 99% OBW and -26 dB BW when testing.

Lower 700 MHz



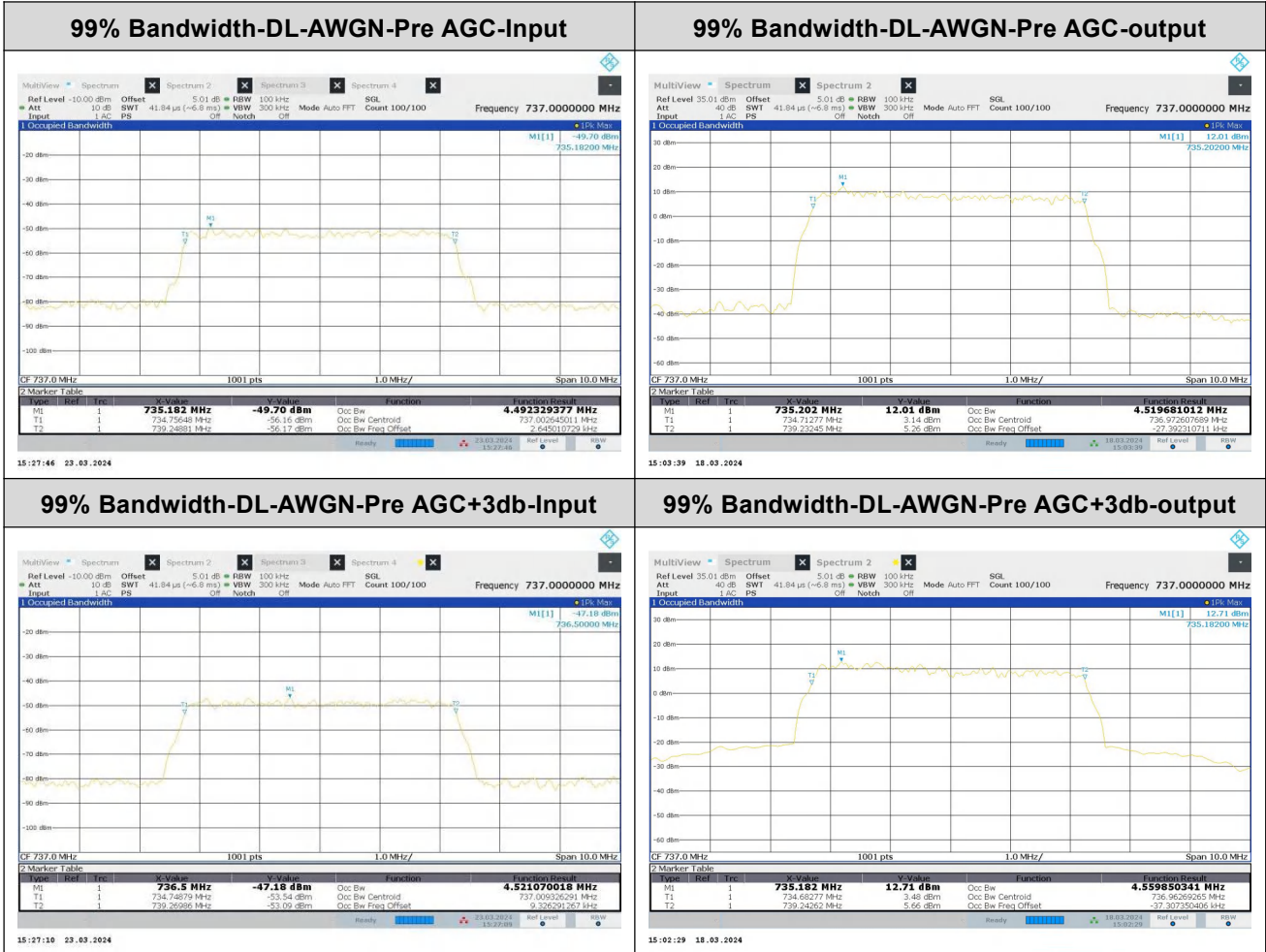


Lower 700 MHz





Lower 700 MHz





Lower 700 MHz

