



RADIO TEST REPORT

FCC ID : Z8H89FT0069

Equipment : ePMP 6 GHz Force 4600C SM / ePMP 4600L 6 GHz 2x2
Access Point

Brand Name : Cambium Networks

Model Name : ePMP 6 GHz Force 4600C SM / ePMP 4600L 6 GHz 2x2
Access Point

Model Number : C068940P151A

Applicant : Cambium Networks Inc.
3800 Golf Road, Suite 360 Rolling Meadows, IL 60008,
USA

Manufacturer : Cambium Networks, Ltd.
Ashburton, TQ13 7UP, UK

Standard : 47 CFR FCC Part 15.407

The product was received on Jun. 19, 2025, and testing was started from Jun. 27, 2025 and completed on Jun. 28, 2025. We, Sporton International Inc. Hsinchu Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2013 and shown compliance with the applicable technical standards.

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

Approved by: Sam Chen

Sporton International Inc. Hsinchu Laboratory

No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)



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TEL : 886-3-656-9065
FAX : 886-3-656-9085
Report Template No.: CB-A12_5 Ver2.0



Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
1.1.2	15.203	Antenna Requirement	PASS	-
2.6	15.407(d)	Contention-Based Protocol	PASS	-

Conformity Assessment Condition:

1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacture who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
2. The measurement uncertainty please refer to each test result in the chapter "Measurement Uncertainty".

Disclaimer:

The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

Reviewed by: Sam Chen

Report Producer: Sandy Chuang



1 General Description

1.1 Information

1.1.1 RF General Information

For IEEE:

Frequency Range (MHz)	IEEE Std. 802.11	Ch. Frequency (MHz)	Channel Number
5925-6425	ax (HEW20)	5955-6415	1-93 [24]
6525-6875		6535-6855	117-181 [17]
5925-6425	ax (HEW40)	5965-6405	3-91 [12]
6525-6875		6565-6845	123-179 [8]
5925-6425	ax (HEW80)	5985-6385	7-87 [6]
6525-6875		6625-6785	135-167 [3]
5925-6425	ax (HEW160)	6025-6345	15-79 [3]
6525-6875		6665	143 [1]

Band	Mode	BWch (MHz)	Nant
5.925-6.425GHz	802.11ax HEW20	20	2TX
5.925-6.425GHz	802.11ax HEW40	40	2TX
5.925-6.425GHz	802.11ax HEW80	80	2TX
5.925-6.425GHz	802.11ax HEW160	160	2TX
6.525-6.875GHz	802.11ax HEW20	20	2TX
6.525-6.875GHz	802.11ax HEW40	40	2TX
6.525-6.875GHz	802.11ax HEW80	80	2TX
6.525-6.875GHz	802.11ax HEW160	160	2TX

Note:

- ♦ HEW20, HEW40, HEW80 and HEW160 use a combination of OFDMA-BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM modulation.
- ♦ BWch is the nominal channel bandwidth.

**For Non IEEE:**

Frequency Range (MHz)	Mode	Ch. Frequency (MHz)
6525-6875	80	6835
6525-6875	160	6795

Band	Mode	BWch (MHz)	Nant
6.525-6.875GHz	80	80	2TX
6.525-6.875GHz	160	160	2TX

Note:

- ♦ 80 and 160 use a combination of OFDMA-BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM modulation.
- ♦ BWch is the nominal channel bandwidth.

1.1.2 Antenna Information

For Dish Antenna:

Ant.	Port	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	
						UNII3	UNII5&7
1	1	Cambium	ePMP 6GHz 2x2 Dish Antenna	Dish (Directional Ant.)	RP-SMA	25.21	28.7
	2	Cambium	ePMP 6GHz 2x2 Dish Antenna	Dish (Directional Ant.)	RP-SMA	25.21	28.7

Note 1: The Dish antenna is cross polarization.

For Sector Antenna:

Ant.	Ant. CH	Port	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	
							UNII3&5	UNII7
1	0	-	Cambium	ePMP 2x2 6GHz MU-MIMO Sector Antenna	Sector (Directional Ant.)	RP-SMA	18	18.73
	1	1	Cambium	ePMP 2x2 6GHz MU-MIMO Sector Antenna	Sector (Directional Ant.)	RP-SMA	18	18.73
	2	2	Cambium	ePMP 2x2 6GHz MU-MIMO Sector Antenna	Sector (Directional Ant.)	RP-SMA	18	18.73
	3	-	Cambium	ePMP 2x2 6GHz MU-MIMO Sector Antenna	Sector (Directional Ant.)	RP-SMA	18	18.73

Note 2: The Sector antenna has four CH ports. Only two CH ports (CH1 and CH2) were used for the EUT. The Sector antenna is cross polarization: CH 1 is vertical and CH 2 is horizontal.

Note 3: The above information was declared by manufacturer.

Note 4: Directional gain information for Dish antenna

Type	Maximum Output Power	Power Spectral Density
Non-BF	Directional gain = Max.gain + array gain. For power measurements on IEEE 802.11 devices Array Gain = 0 dB (i.e., no array gain) for N ANT ≤ 4	$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$
BF	$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$	$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$

Ex.

Directional Gain (NSS1) formula :

$$DirectionalGain = 10 \cdot \log \left[\frac{\sum_{j=1}^{N_{SS}} \left\{ \sum_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$$

$$NSS1(g1,1) = 10^{G1/20} ; NSS1(g1,2) = 10^{G2/20} ; NSS1(g1,3) = 10^{G3/20} ; NSS1(g1,4) = 10^{G4/20}$$

$$g_{j,k} = (NSS1(g1,1) + NSS1(g1,2) + NSS1(g1,3) + NSS1(g1,4))^2$$

$$DG = 10 \log[(NSS1(g1,1) + NSS1(g1,2) + NSS1(g1,3) + NSS1(g1,4))^2 / N_{ANT}] \Rightarrow 10$$

$$\log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20} + 10^{G4/20})^2 / N_{ANT}]$$



Where;
Dish ANT
Cross-Polarized Antenna
6G UNII-5 G1= 28.70 dBi ; G2= 28.70 dBi ;DG= 28.70 dBi
6G UNII-7 G1= 28.70 dBi ; G2= 28.70 dBi ;DG= 28.70 dBi

Note 5: For 5GHz function**For IEEE 802.11a/n/ac/ax (2TX/2RX):**

Port 1 and Port 2 can be used as transmitting/receiving antenna.

Port 1 and Port 2 could transmit/receive simultaneously.

For 6GHz function**For IEEE 802.11ax (2TX/2RX):**

Port 1 and Port 2 can be used as transmitting/receiving antenna.

Port 1 and Port 2 could transmit/receive simultaneously.

1.1.3 EUT Operational Condition

EUT Power Type	From PoE		
Beamforming Function	☐	With beamforming	☒ Without beamforming
Device Type	☐	Indoor Access Point	☐ Subordinate
	☐	Indoor Client	☒ Standard Power Access Point
	☐	Dual Client	☒ Standard Client
	☒	Fixed Client	☐ Very Low Power
Condition of EUT	☐	Indoor	☒ Outdoor
Channel Puncturing Function	☐	Supported Static Puncturing	
	☐	Supported Dynamic Puncturing (Reduce BW)	
	☒	Unsupported	
	Note: The EUT doesn't support puncturing for CBP.		
Support RU	☒	Full RU	☐ Partial RU
Software / Firmware Version for CBP	5.10.1-RC1		

Note: The above information was declared by manufacturer.

1.1.4 Table for Multiple Listing

The two models are identical except for the difference listed below:

EUT	Equipment Name / Model Name	Model Number	WLAN Antenna
1	ePMP 6 GHz Force 4600C SM	C068940P151A	Dish Antenna
2	ePMP 4600L 6 GHz 2x2 Access Point		Sector Antenna

Note: The above information was declared by manufacturer.

1.1.5 Table for EUT Supports Function

Function	5GHz Support Band	6GHz Support Band		Support IEEE Mode in 6GHz	Support Non-IEEE Mode in 6GHz
Master	UNII 3	UNII 5	Standard Power Access Point (6SD)	V	X
		UNII 7		V	V
Client	UNII 3	UNII 5	Standard Client (6FX)	V	X
			Fixed Client (6FC)	V	X
		UNII 7	Standard Client (6FX)	V	X
			Fixed Client (6FC)	V	V

Note: The above information was declared by manufacturer.

1.1.6 Table for Permissive Change

This product is an extension of original one reported under Sporton project number: FR140145-09.

Below is the table for the change of the product with respect to the original one.

Modifications	Performance Checking
Add Contention-Based Protocol test for Standard Client (6FX) mode.	Contention-Based Protocol



1.2 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ 47 CFR FCC Part 15.407
- ♦ ANSI C63.10-2013
- ♦ FCC KDB 789033 D02 v02r01

The following reference test guidance is not within the scope of accreditation of TAF.

- ♦ FCC KDB 987594 D02 v03
- ♦ FCC KDB 662911 D01 v02r01
- ♦ FCC KDB 412172 D01 v01r01

1.3 Testing Location Information

Testing Location Information				
Test Lab. : Sporton International Inc. Hsinchu Laboratory				
Hsinchu ADD: No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)				
(TAF: 3787) TEL: 886-3-656-9065 FAX: 886-3-656-9085				
Test site Designation No. TW3787 with FCC.				
Conformity Assessment Body Identifier (CABID) TW3787 with ISED.				

Test Condition	Test Site No.	Test Engineer	Test Environment (°C / %)	Test Date
RF Conducted	DF02-CB	Edmund Tsai	21.9~22.8 / 58~61	Jun. 27, 2025~ Jun. 28, 2025

1.4 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2))

Test Items	Uncertainty	Remark
Conducted Emission	2.5 dB	Confidence levels of 95%



2 Test Configuration of EUT

2.1 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests	
Tests Item	Contention Based Protocol
Test Condition	Conducted measurement at transmit chains
Test Mode	Only the lowest antenna gain was selected to test.
1	EUT + Sector Ant.

Note: The PoE listed below is for measurement only and would not be marketed.
Its information is listed below:

Support Unit	Brand	Model Number
PoE	Cambium	NET-P30-56IN

2.2 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

2.3 Accessories

N/A

2.4 Support Equipment

Support Equipment				
No.	Equipment	Brand Name	Model Name	FCC ID
A	Notebook	DELL	E4300	N/A
B	Notebook	DELL	E6230	N/A
C	AP	Cambium	Force 4625	N/A
D	PoE	Cambium	NET-P30-56IN	N/A

2.5 Transmitter Test Result

2.6 Contention Based Protocol

2.6.1 Contention Based Protocol Limit

EUT can detect an AWGN signal with 90% (or better) level of certainty.

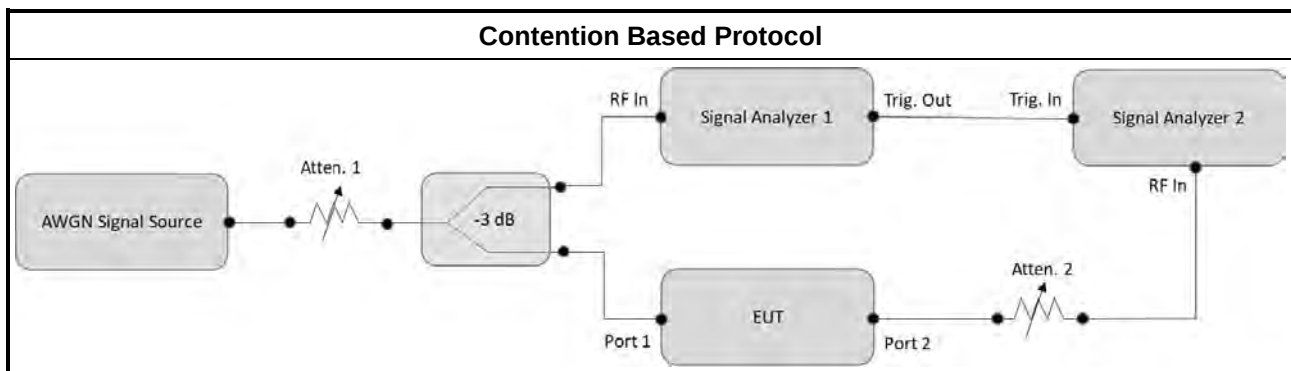
2.6.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

2.6.3 Test Procedures

Test Method	
■	For Contention Based Protocol shall be measured using following options below:
☒	Refer as FCC KDB 987594 D02, I) Contention Based Protocol.

2.6.4 Test Setup



2.6.5 Test Result of Contention Based Protocol

Refer as Appendix A



3 Test Equipment and Calibration Data

Instrument	Brand	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101025	9kHz ~ 40GHz	Nov. 08, 2024	Nov. 07, 2025	Conducted (DF02-CB)
Signal generator	R&S	SMB100A	181239	1MHz-40GHz	Jan. 08, 2025	Jan. 07, 2026	Conducted (DF02-CB)
Vector Signal Generator	R&S	SMM100A	101894	100kHz ~ 7.5GHz	Oct. 28, 2024	Oct. 27, 2025	Conducted (DF02-CB)
RF Power Divider	STI	2 Way	DV-8G -05	1 ~ 8GHz	Oct. 02, 2024	Oct. 01, 2025	Conducted (DF02-CB)
RF Power Divider	STI	2 Way	DV-8G -06	1 ~ 8GHz	Oct. 02, 2024	Oct. 01, 2025	Conducted (DF02-CB)
RF Power Divider	STI	2 Way	DV-8G -07	1 ~ 8GHz	Oct. 02, 2024	Oct. 01, 2025	Conducted (DF02-CB)
RF Power Divider	STI	2 Way	DV-8G -08	1 ~ 8GHz	Oct. 02, 2024	Oct. 01, 2025	Conducted (DF02-CB)
RF Cable-high	Woken	RG402	Cable-60	1~18 GHz	Oct. 01, 2024	Sep. 30, 2025	Conducted (DF02-CB)
RF Cable-high	Woken	RG402	Cable-61	1~18 GHz	Oct. 01, 2024	Sep. 30, 2025	Conducted (DF02-CB)
RF Cable-high	Woken	RG402	Cable-63	1~18 GHz	Oct. 01, 2024	Sep. 30, 2025	Conducted (DF02-CB)
100MS/s Digitizer	N.I	USB-5133	F65206	N/A	Mar. 26, 2025	Mar. 25, 2026	Conducted (DF02-CB)

Note: Calibration Interval of instruments listed above is one year.

Contention Based Protocol Threshold Level 802.11ax HEW20										
UNII Band	Channel	Bandwidth (MHz)	Frequency (MHz)	Interference frequency (MHz)		EUT Status	Injected AWGN Power (dBm)	Ant Gain (dBi)	Detection Power(dBm)	Detection Limit (dBm)
5	53	20	6215	Center	6215	OFF	-48.00	18.00	-66.00	≤ -62
						Minimal	-49.00	18.00	-67.00	≤ -62
						ON	-64.00	18.00	-82.00	≤ -62
7	149	20	6695	Center	6695	OFF	-48.00	18.00	-66.00	≤ -62
						Minimal	-49.00	18.00	-67.00	≤ -62
						ON	-64.00	18.00	-82.00	≤ -62

Contention Based Protocol Threshold Level 802.11ax HEW160										
UNII Band	Channel	Bandwidth (MHz)	Frequency (MHz)	Interference frequency (MHz)		EUT Status	Injected AWGN Power (dBm)	Ant Gain (dBi)	Detection Power(dBm)	Detection Limit (dBm)
5	47	160	6185	Low edge	6110	OFF	-49.00	18.00	-67.00	≤ -62
						Minimal	-50.00	18.00	-68.00	≤ -62
						ON	-64.00	18.00	-82.00	≤ -62
				Center	6185	OFF	-48.00	18.00	-66.00	≤ -62
						Minimal	-49.00	18.00	-67.00	≤ -62
						ON	-64.00	18.00	-82.00	≤ -62
				High edge	6260	OFF	-52.00	18.00	-70.00	≤ -62
						Minimal	-53.00	18.00	-71.00	≤ -62
						ON	-64.00	18.00	-82.00	≤ -62
7	143	160	6665	Low edge	6590	OFF	-48.00	18.00	-66.00	≤ -62
						Minimal	-49.00	18.00	-67.00	≤ -62
						ON	-64.00	18.00	-82.00	≤ -62
				Center	6665	OFF	-49.00	18.00	-67.00	≤ -62
						Minimal	-50.00	18.00	-68.00	≤ -62
						ON	-64.00	18.00	-82.00	≤ -62
				High edge	6740	OFF	-51.00	18.00	-69.00	≤ -62
						Minimal	-52.00	18.00	-70.00	≤ -62
						ON	-64.00	18.00	-82.00	≤ -62

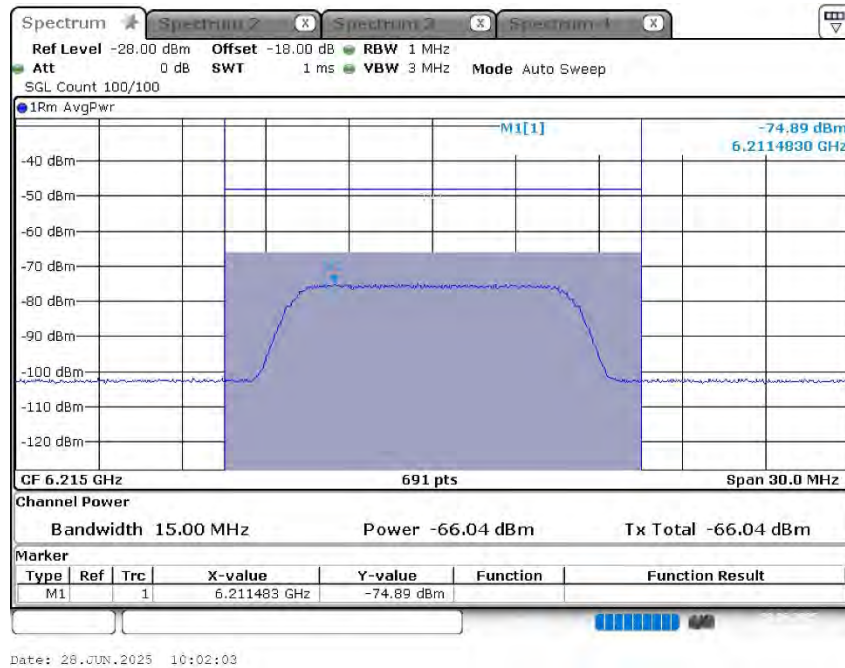
Contention Based protocol 802.11ax HEW20											
UNII Band	Channel	Bandwidth (MHz)	Frequency (MHz)	Interference frequency (MHz)		AWGN Threshold Level (dBm)	EUT Status	Number of Detected (out of 10 times)	Detection Probability (%)	Limit (%)	Test Result
5	53	20	6215	Center	6215	-66.00	OFF	9	90	90	Pass
7	149	20	6695	Center	6695	-66.00	OFF	9	90	90	Pass

Contention Based protocol 802.11ax HEW160											
UNII Band	Channel	Bandwidth (MHz)	Frequency (MHz)	Interference frequency (MHz)		AWGN Threshold Level (dBm)	EUT Status	Number of Detected (out of 10 times)	Detection Probability (%)	Limit (%)	Test Result
5	47	160	6185	Low edge	6110	-67.00	OFF	9	90	90	Pass
				Center	6185	-66.00	OFF	9	90	90	Pass
				High edge	6260	-70.00	OFF	10	100	90	Pass
7	143	160	6665	Low edge	6590	-66.00	OFF	9	90	90	Pass
				Center	6665	-67.00	OFF	9	90	90	Pass
				High edge	6740	-70.00	OFF	9	90	90	Pass

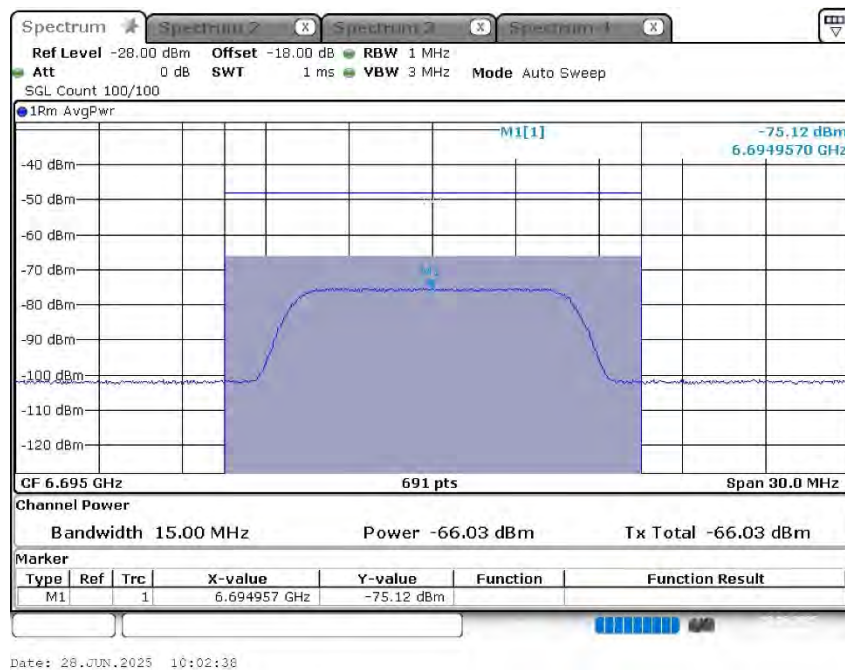
Incumbent signal (AWGN) Plot

Bandwidth: 20MHz

Frequency (MHz): 6215 MHz

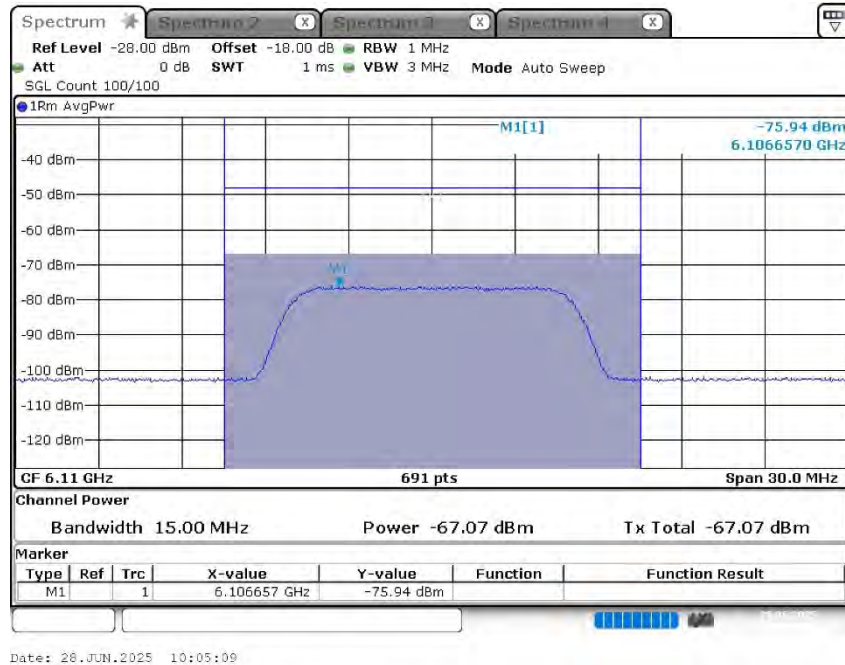


Frequency (MHz): 6695 MHz

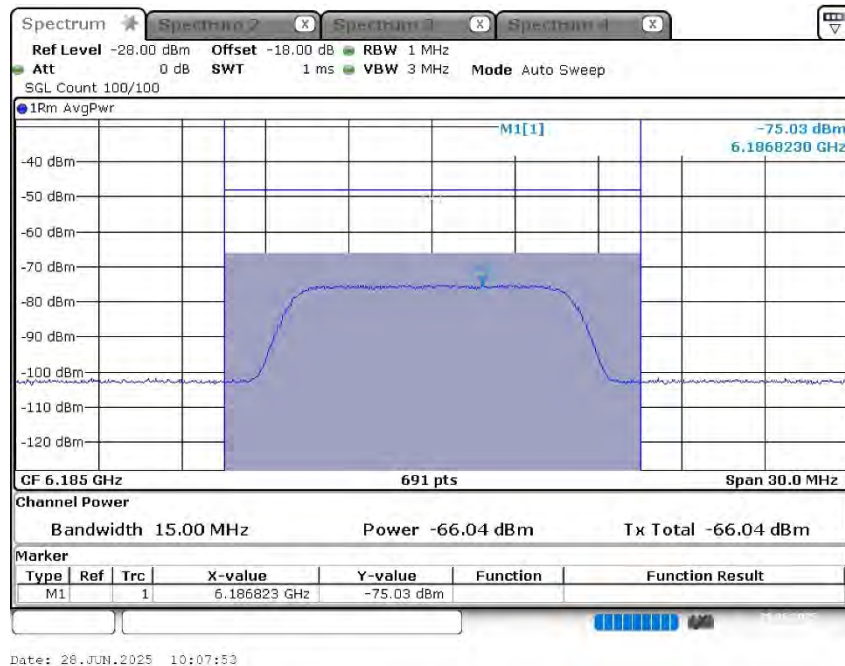


Bandwidth: 160MHz

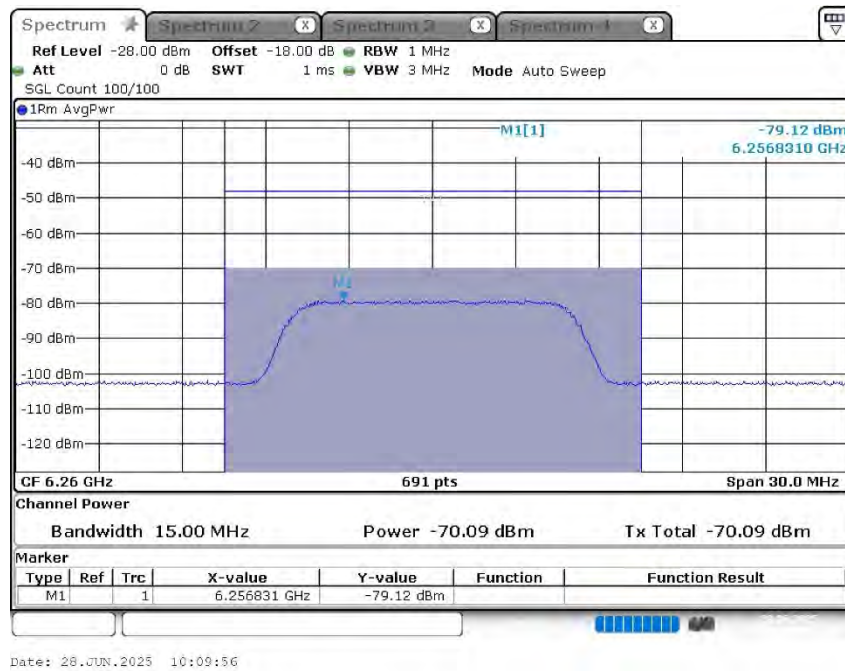
Frequency (MHz): 6110 MHz



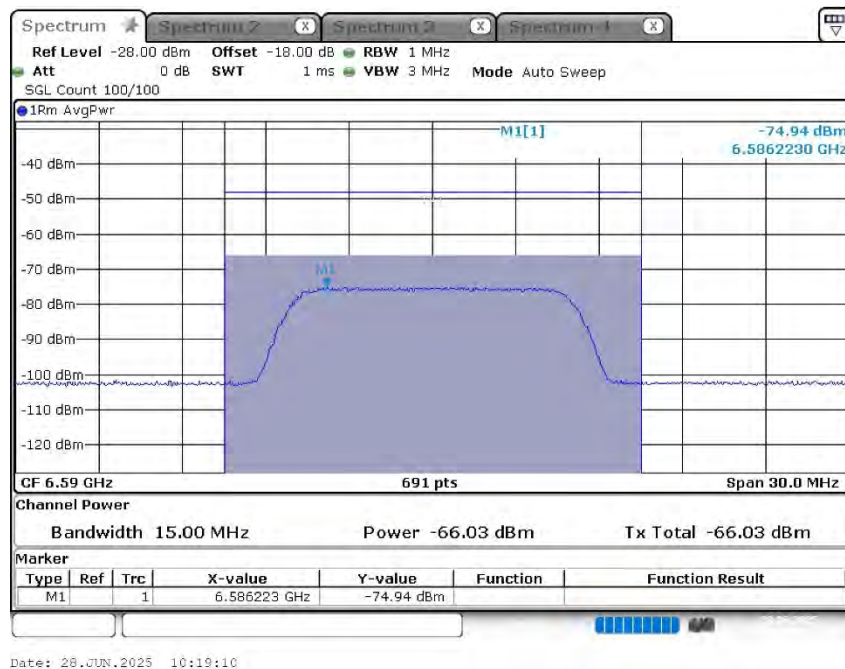
Frequency (MHz): 6185 MHz



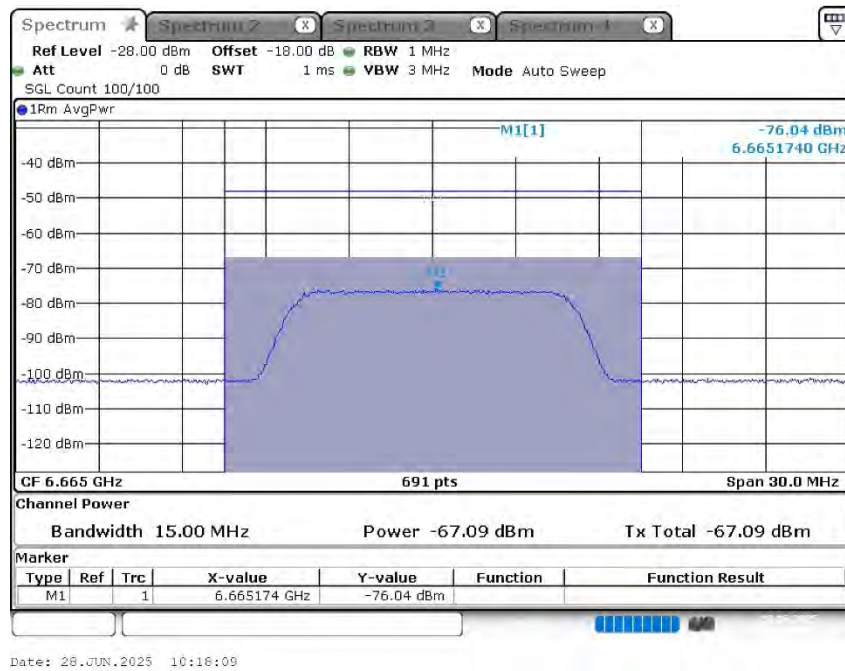
Frequency (MHz): 6260 MHz



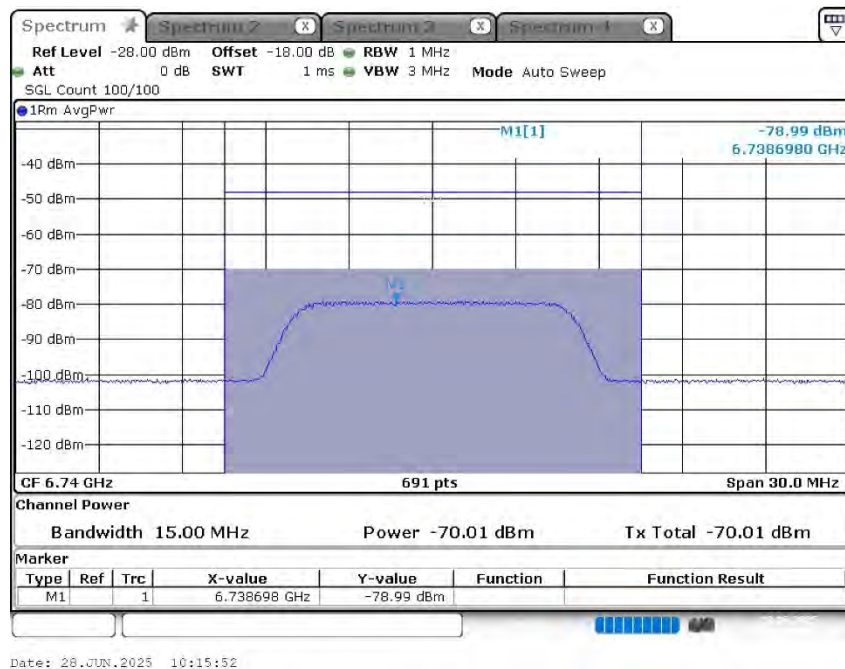
Frequency (MHz): 6590 MHz



Frequency (MHz): 6665 MHz



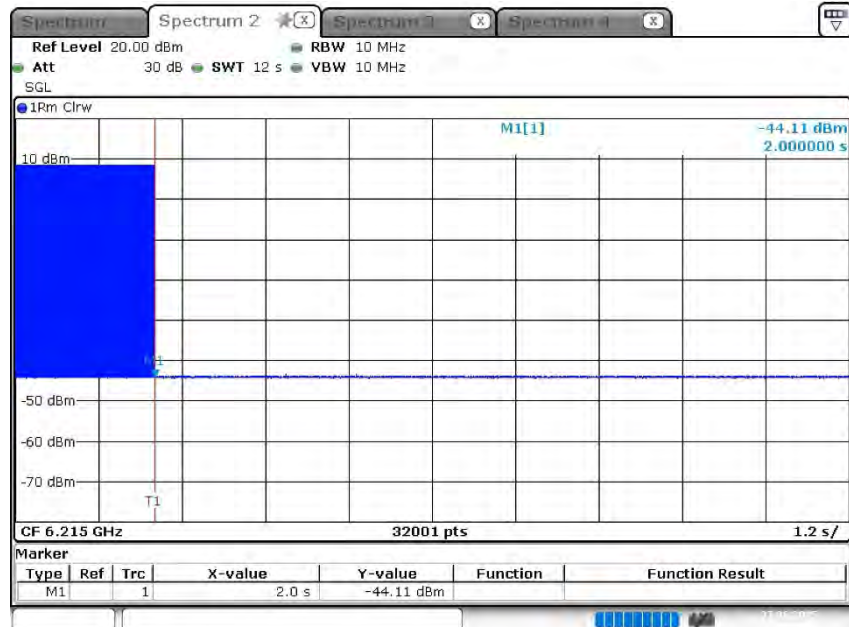
Frequency (MHz): 6740 MHz



Contention-Based Protocol Plot

Bandwidth: 20MHz

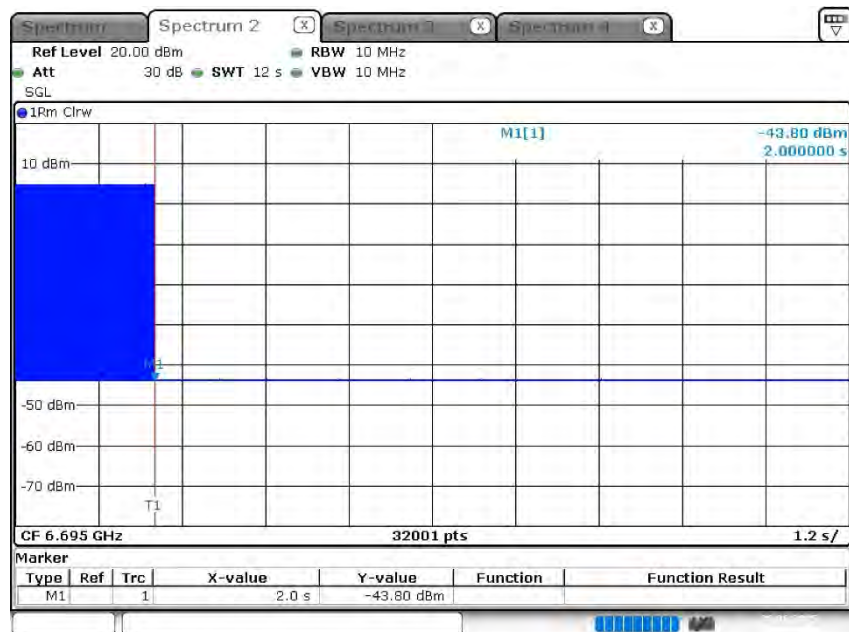
Test CH 53 ; Incumbent signal 6215 MHz



Date: 27.JUN.2025 10:17:58

Note : M1 : Inject AWGN signal

Test CH 149 ; Incumbent signal 6695 MHz

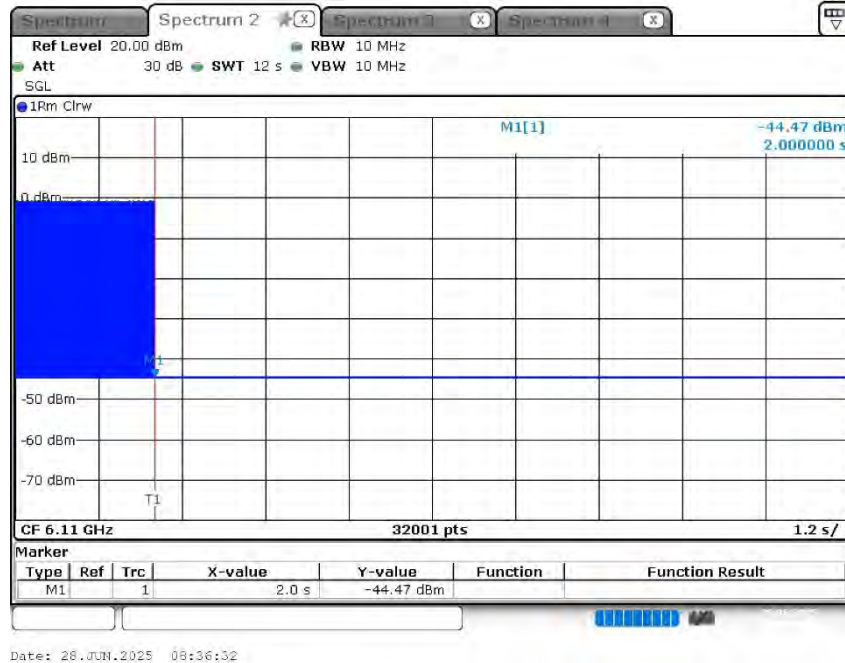


Date: 28.JUN.2025 08:04:34

Note : M1 : Inject AWGN signal

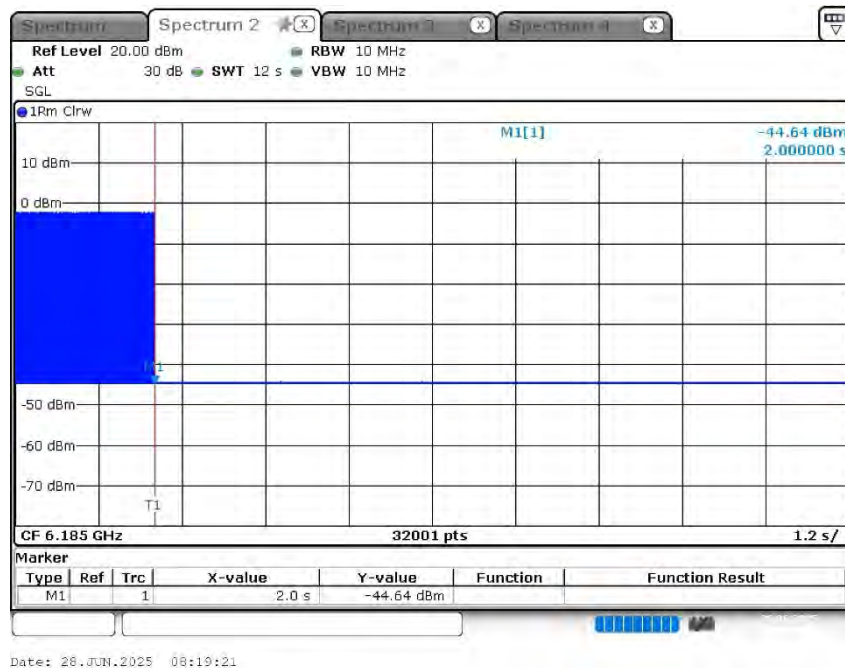
Bandwidth: 160MHz

Test CH 47 ; Incumbent signal 6110 MHz



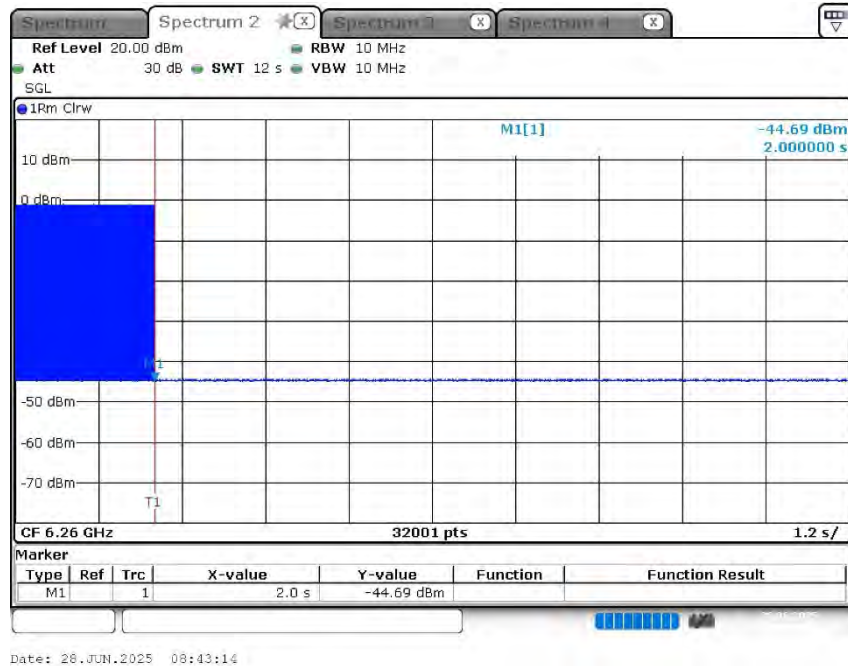
Note : M1 : Inject AWGN signal

Test CH 47 ; Incumbent signal 6185 MHz



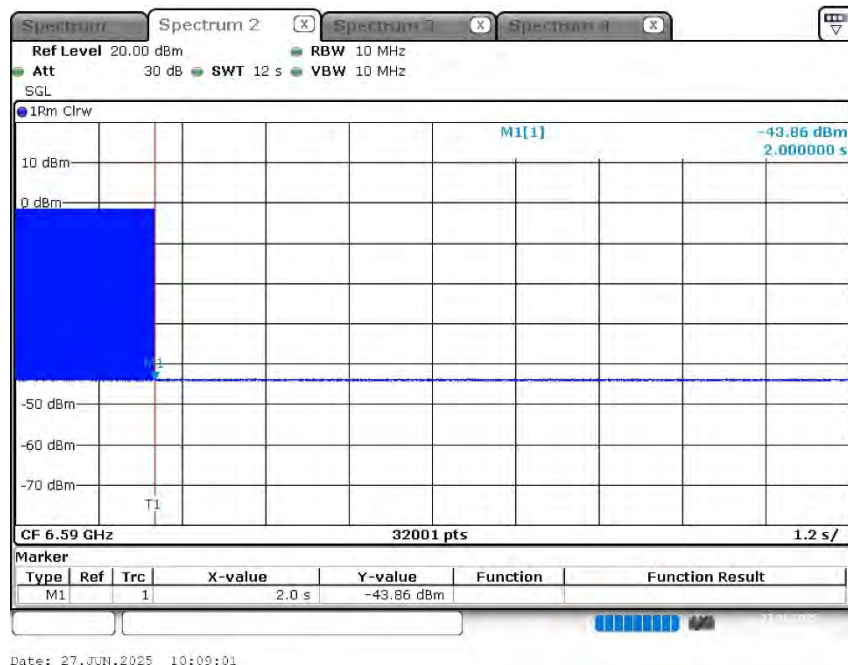
Note : M1 : Inject AWGN signal

Test CH 47 ; Incumbent signal 6260 MHz



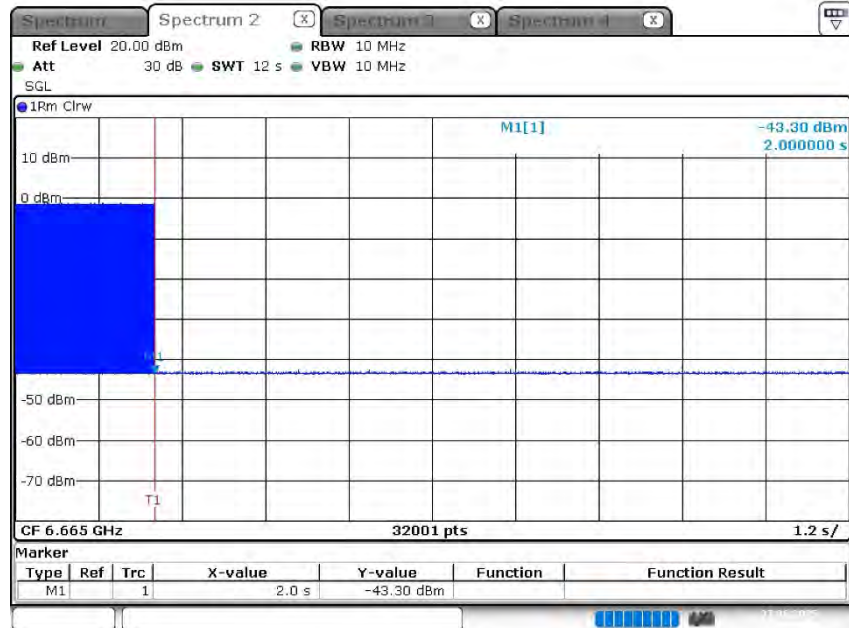
Note : M1 : Inject AWGN signal

Test CH 143 ; Incumbent signal 6590 MHz



Note : M1 : Inject AWGN signal

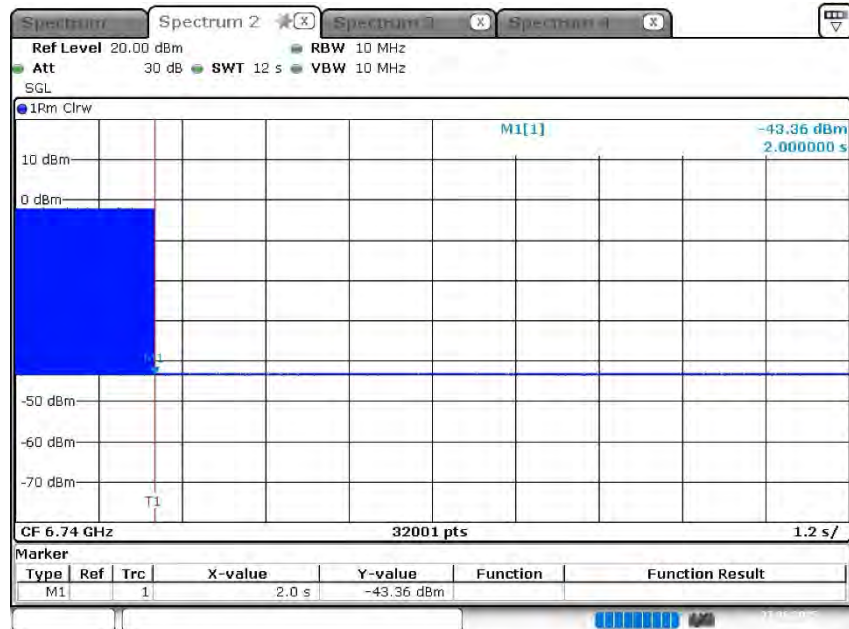
Test CH 143 ; Incumbent signal 6665 MHz



Date: 27.JUN.2025 09:58:15

Note : M1 : Inject AWGN signal

Test CH 143 ; Incumbent signal 6740 MHz



Date: 27.JUN.2025 10:02:32

Note : M1 : Inject AWGN signal