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Middlefield, Ohio 44062
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PCII TEST REPORT

Manufacturer: Datacolor, Inc.
5 Princess Road
Lawrenceville, New Jersey 08648-2301 USA

Applicant: Same as Above

Product Name: Bluetooth Module

Product Description: Bluetooth Module

**Operating Voltage/Freq.
of EUT During Testing:** 3.0 V ~ 3.6 V

Model: ESP32-C3-MINI-1-N4

FCC ID: 2BGE7-P300

Testing Commenced: 2025-01-16

Testing Ended: 2025-01-27

Summary of Test Results: **In Compliance, with Modifications***

The EUT complies with the EMC requirements when manufactured identically as the unit tested in this report, including any required modifications and/or manufacturer's statement. Any changes to the design or build of this unit subsequent to this testing may deem it non-compliant.

**Test report reflects limited testing for PCII due to change in RF Exposure category to Portable.*

Rules:

- **FCC Part 15 Subpart C, Section 15.247**
- **ANSI C63.10:2013**



Order No(s): F233318-C1

Applicant: Datacolor, Inc.
Model: ESP32-C3-MINI-1-N4

Evaluation Conducted by:

Erik Tobin, EMC Engineer

Report Reviewed by:

Ken Littell, Vice President of Operations

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1 ADMINISTRATIVE INFORMATION

1.1 Measurement Location:

F2 Labs in Middlefield, Ohio. Site description and attenuation data are on file with the FCC's Sampling and Measurement Branch at the FCC Laboratory in Columbia, MD.

1.2 Measurement Procedure:

All measurements were performed according to ANSI C63.10 and recommended FCC procedure of measurement under Section 15.247 and in KDB558074. A list of the measurement equipment can be found in Section 6.

1.3 Uncertainty Budget:

The uncertainty in EMC measurements arises from several factors which affect the results, some associated with environmental conditions in the measurement room, the test equipment being used and the measurement techniques adopted.

The measurement uncertainty budgets detailed below are calculated from the test and calibration data and are expressed with a 95% confidence factor. Note: Only measurements listed below which relate to tests included in this Test Report are applicable to it.

Measurement Range	Expanded Uncertainty	Combined Uncertainty
Radiated Emissions <1 GHz @ 3m	±5.07dB	±2.54dB
Radiated Emissions <1 GHz @10m	±5.09dB	±2.55dB
Radiated Emissions 1 GHz to 2.7 GHz	±3.62dB	±1.81dB
Radiated Emissions 2.7 GHz to 18 GHz	±3.10dB	±1.55dB
AC Power Line Conducted Emissions, 150kHz to 30 MHz	±2.76dB	±1.38dB

This Uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

1.4 Document History

Document Number	Description	Issue Date	Approved By
F2P33318-C1-02E	First Issue	2025-01-30	K. Littell



2 SUMMARY OF TEST RESULTS

Test Name	Standard(s)	Results
Conducted Output Power	CFR 47 Part 15.247(b)(2) / KDB558074	Complies

Modifications Made to the Equipment
- Bluetooth power was lowered to 7dBm setting to meet Conducted Output Power requirements. - Wi-Fi radio attenuation was set to 60dB.



3 TABLES OF MEASURED RESULTS

BLE

Test	Low Channel 2402 MHz	Mid Channel 2440 MHz	High Channel 2480 MHz
1Mbps			
Conducted Output Power	0.2606 mW / -5.84 dBm	0.1832 mW / -7.37 dBm	0.1698 mW / -7.70 dBm
E.I.R.P. w/3.96dBi Antenna	0.65 mW -1.88 dBm	0.46 mW -3.41 dBm	0.42 mW -3.74 dBm
E.I.R.P. Limit to meet SAR Exclusion at 5mm	1 mW / 0 dBm	1 mW / 0 dBm	1 mW / 0 dBm
2Mbps			
Conducted Output Power	0.27669 mW / -5.58 dBm	0.2360 mW / -6.27 dBm	0.1803 mW / -7.44 dBm
E.I.R.P. w/3.96dBi Antenna	0.69 mW/ -1.62 dBm	0.59 mW/ -2.31 dBm	0.45 mW/ -3.48 dBm
E.I.R.P. Limit to meet SAR Exclusion at 5mm	1 mW / 0 dBm	1 mW / 0 dBm	1 mW / 0 dBm



Wi-Fi

Test	Low Channel 2412 MHz	Mid Channel 2437 MHz	High Channel 2462 MHz
802.11b			
Conducted Output Power	0.327 mW / -4.86 dBm	0.250 mW / -6.02 dBm	0.198 mW / -7.04 dBm
Limit	0.402 mW / -3.96 dBm	0.402 mW / -3.96 dBm	0.402 mW / -3.96 dBm
E.I.R.P. w/3.96dBi Antenna	0.813 mW / -0.9 dBm	0.622 mW -2.06 dBm	0.492 mW -3.08 dBm
E.I.R.P. Limit	1 mW / 0 dBm	1 mW / 0 dBm	1 mW / 0 dBm
802.11g			
Conducted Output Power	0.238 mW / -6.24 dBm	0.179 mW / -7.46 dBm	0.132 mW / -8.8 dBm
Limit	0.402 mW / -3.96 dBm	0.402 mW / -3.96 dBm	0.402 mW / -3.96 dBm
E.I.R.P. w/3.96dBi Antenna	0.592 mW / -2.28 dBm	0.447 mW -3.5 dBm	0.328 mW -4.84 dBm
E.I.R.P. Limit	1 mW / 0 dBm	1 mW / 0 dBm	1 mW / 0 dBm
802.11n HT20			
Conducted Output Power	0.195 mW / -7.09 dBm	0.136 mW / -8.67 dBm	0.105 mW / -8.8 dBm
Limit	0.402 mW / -3.96 dBm	0.402 mW / -3.96 dBm	0.402 mW / -9.8 dBm
E.I.R.P. w/3.96dBi Antenna	0.486 mW / -3.13 dBm	0.338 mW -4.71 dBm	0.261 mW -5.84 dBm
E.I.R.P. Limit	1 mW / 0 dBm	1 mW / 0 dBm	1 mW / 0 dBm

**Wi-Fi, cont'd**

Test	Low Channel 2412 MHz	Mid Channel 2437 MHz	High Channel 2462 MHz
802.11n HT40			
Conducted Output Power	0.161 mW / -7.93 dBm	0.129 mW / -8.9 dBm	0.120 mW / -9.2 dBm
Limit	0.402 mW / -3.96 dBm	0.402 mW / -3.96 dBm	0.402 mW / -3.96 dBm
E.I.R.P. w/3.96dBi Antenna	0.401 mW / -0.397 dBm	0.321 mW -4.94 dBm	0.299 mW -5.24 dBm
E.I.R.P. Limit	1 mW / 0 dBm	1 mW / 0 dBm	1 mW / 0 dBm



4 ENGINEERING STATEMENT

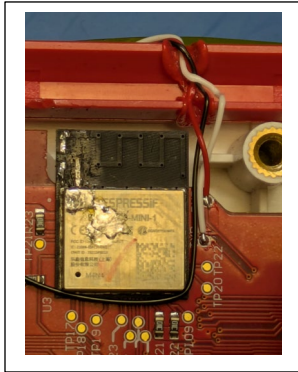
This report has been prepared on behalf of Datacolor, Inc. to provide documentation for the testing described herein. This equipment has been tested and found to comply with Part 15.247 of the FCC Rules using ANSI C63.10 and KDB558074 standards. The test results found in this test report relate only to the items tested.



5 EUT INFORMATION AND DATA

5.1 Equipment Under Test:

Product: Bluetooth Module
Model(s): ESP32-C3-MINI-1-N4
Serial No.: 8838316
FCC ID: 2BGE7-P300



5.2 Trade Name:

Datacolor

5.3 Power Supply:

3.0 V ~ 3.6 V

5.4 Applicable Rules:

CFR 47, Part 15.247, subpart C

5.5 Antenna:

On-board PCB antenna

5.6 Accessories:

Device	Manufacturer	Model Number	Serial Number
Spectrophotometer	Datacolor, Inc.	P300*	8838316
Laptop	Dell	P626	None Specified
Power Supply	Dell	LA65NM130	None Specified

**Denotes actual model as worst-case representative of product family that includes models P100, P200 and P300.*



5.7 Test Item Condition:

The equipment to be tested was received in good condition.

5.8 Testing Algorithm:

EUT was tested on low, mid and high channels in the 2.4 GHz band. The highest emissions were recorded in the data tables.

**6 LIST OF MEASUREMENT INSTRUMENTATION**

Equipment Type	Asset Number	Manufacturer	Model	Serial Number	Calibration Due Date
Shielded Chamber	CL166-E	Albatross Projects	B83117-DF435-T261	US140023	2025-01-31
Receiver	CL151	Rohde & Schwarz	ESU40	100319	2025-04-09
Low Loss Cable Set	--	Pasternack	PE3C0666-252 / PE3C066-50CM	None Spec.	2025-04-09
Temp/Hum Rec	CL293	Thermpro	TP50	1	2025-05-31
Temp/Hum Rec	CL232	Extech	445814	01	2025-05-19



7 CONDUCTED OUTPUT POWER

The EUT antenna port was fitted with an SMA connector and directly connected to the input of the receiver. The peak power output was measured.

7.1 Requirements:

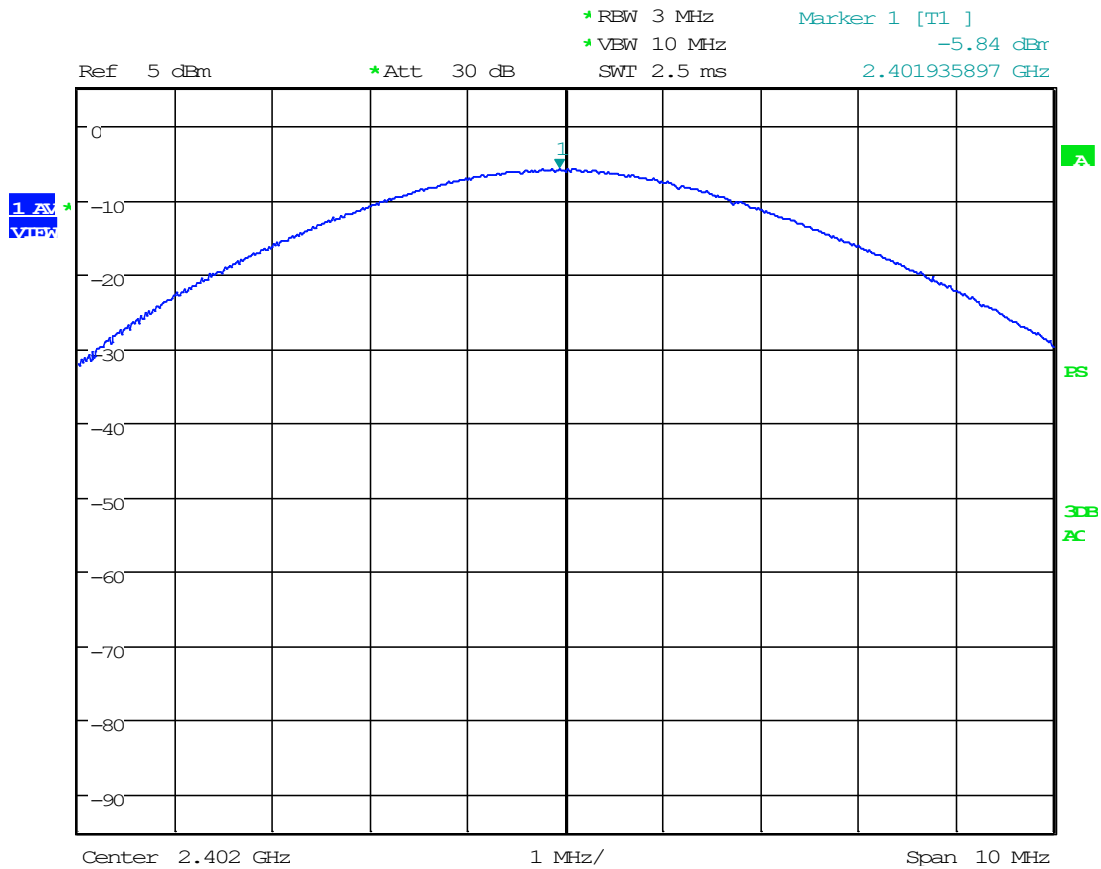
The peak power output shall be 1 watt (30 dBm) or less when using an antenna with a gain of less than 6dBi. For antennas having a gain of more than 6dBi, the limit is reduced by 1dB for every dB the antenna gain is over 6dBi.



7.2 Conducted Output Power Test Data

Test Date:	2025-01-16	Test Engineer:	E. Tobin
Standards:	CFR 47 Part 15.247(b)(3); KDB558074	Air Temperature:	21.0°C
		Relative Humidity:	38%

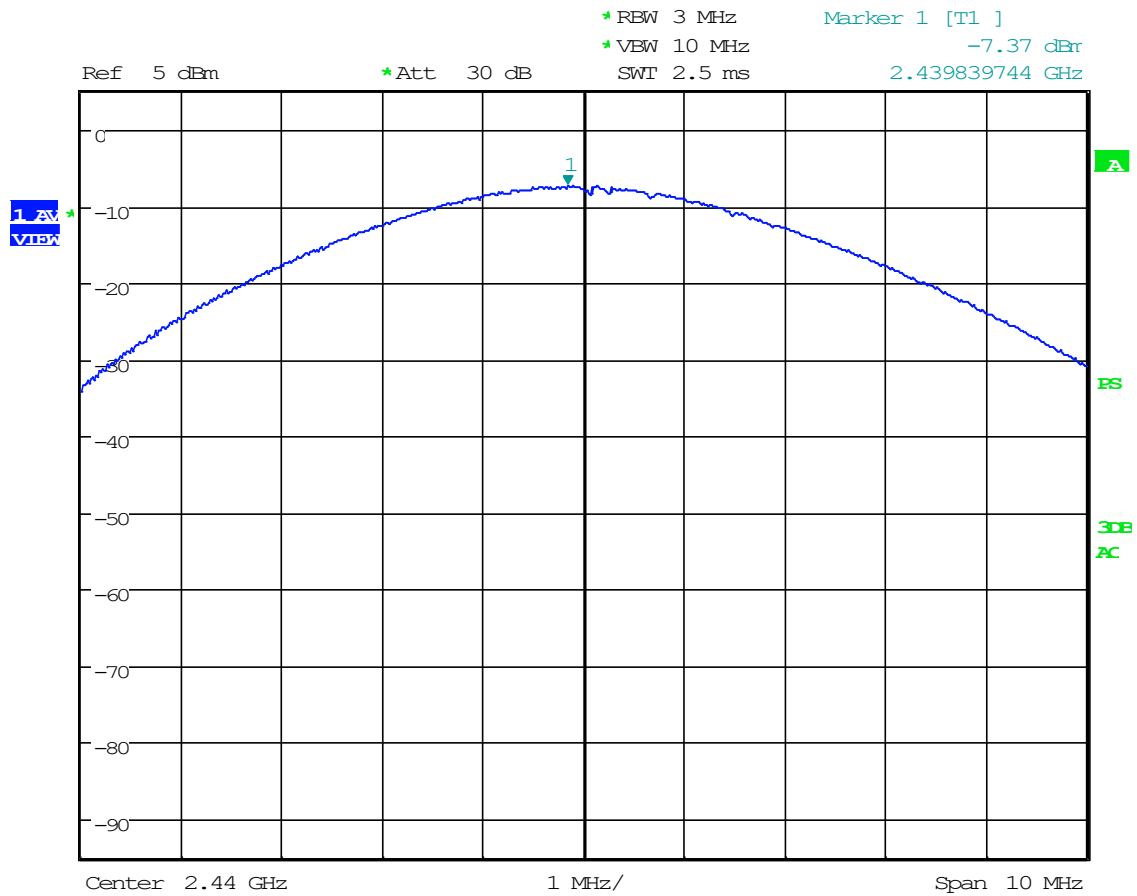
1MB: Low Channel



Date: 17.JAN.2025 09:58:04



1MB: Mid Channel



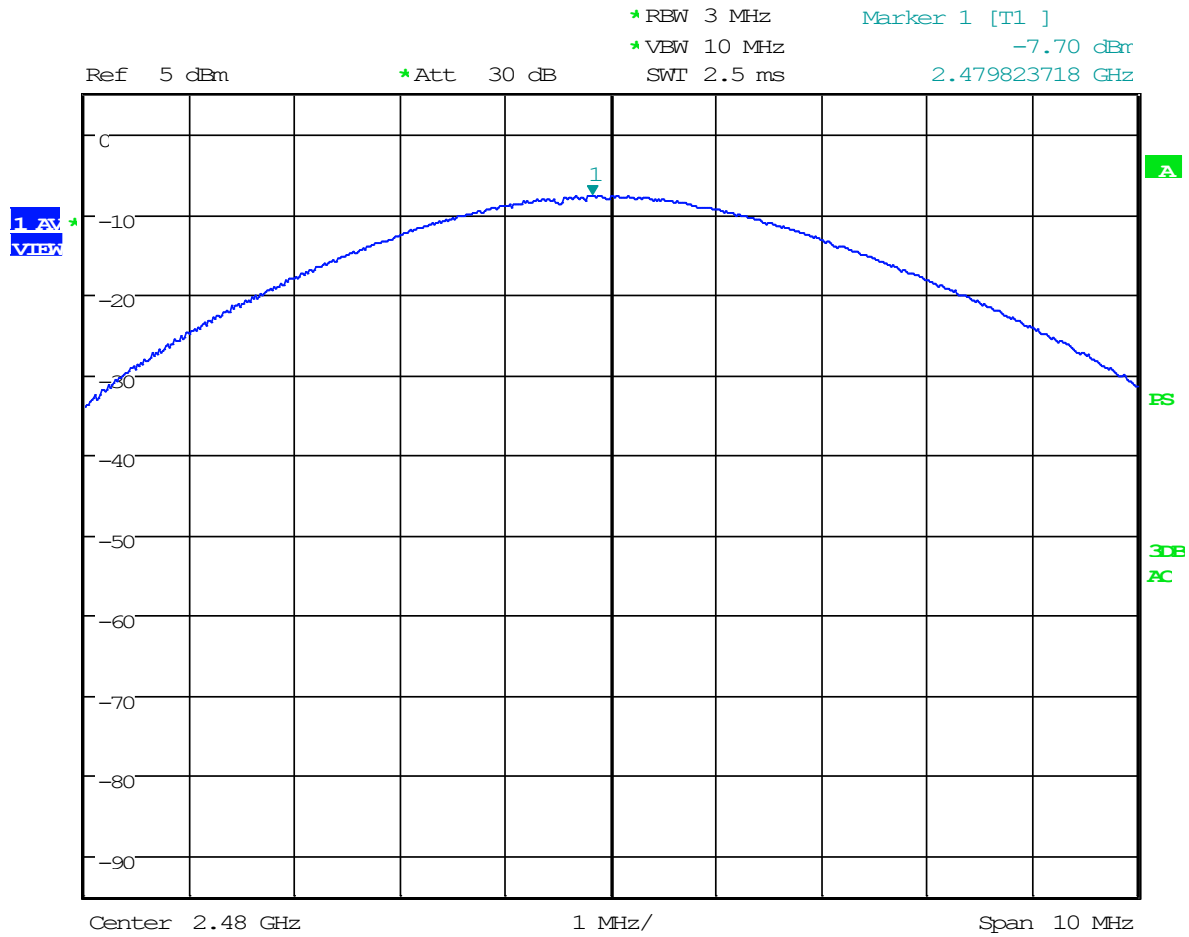
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Order No(s): F233318-C1

Applicant: Datacolor, Inc.
Model: ESP32-C3-MINI-1-N4

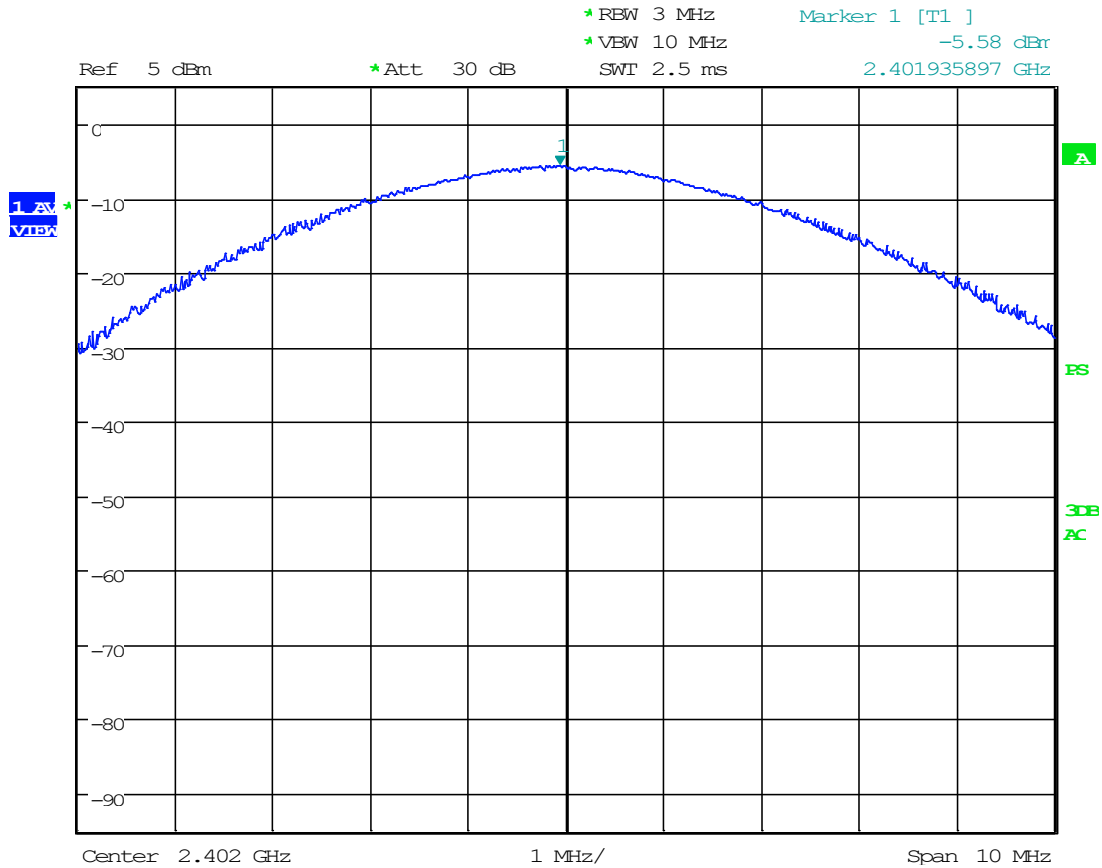
1MB: High Channel



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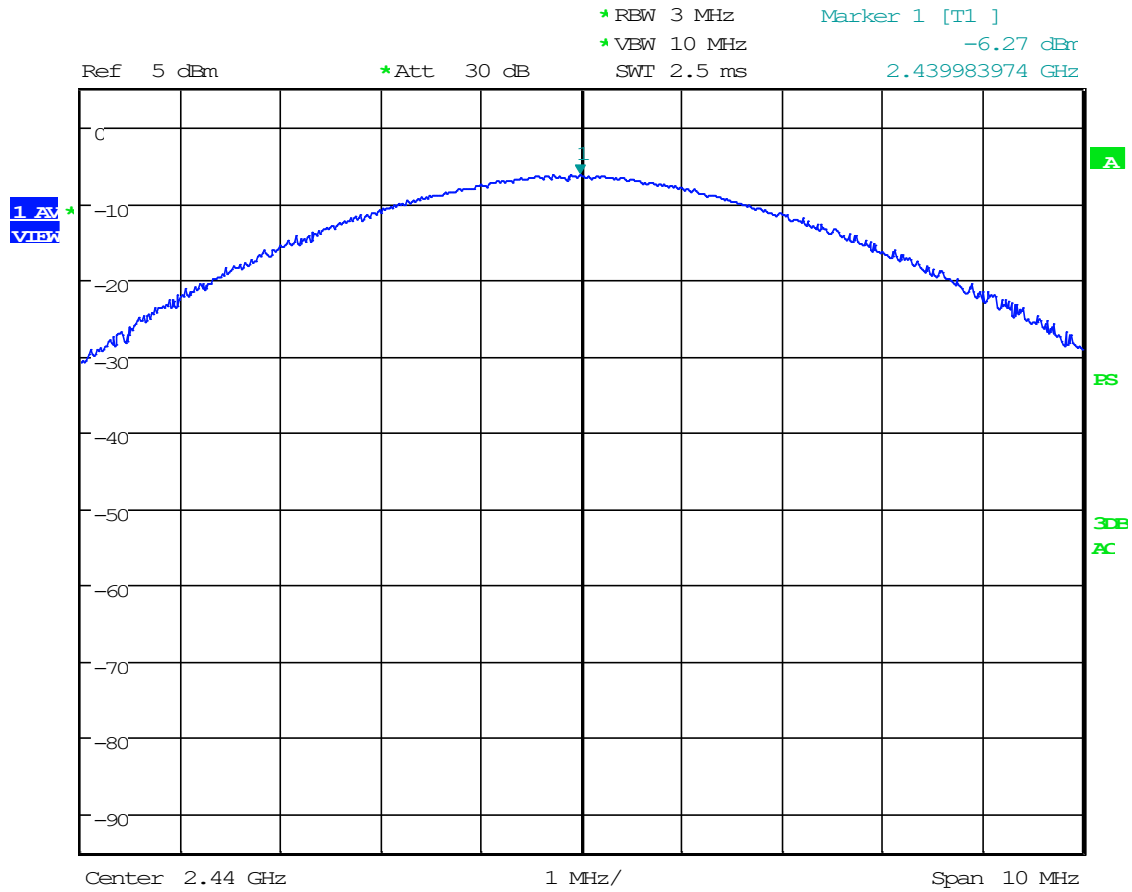
2MB: Low Channel



Date: 17.JAN.2025 13:20:34



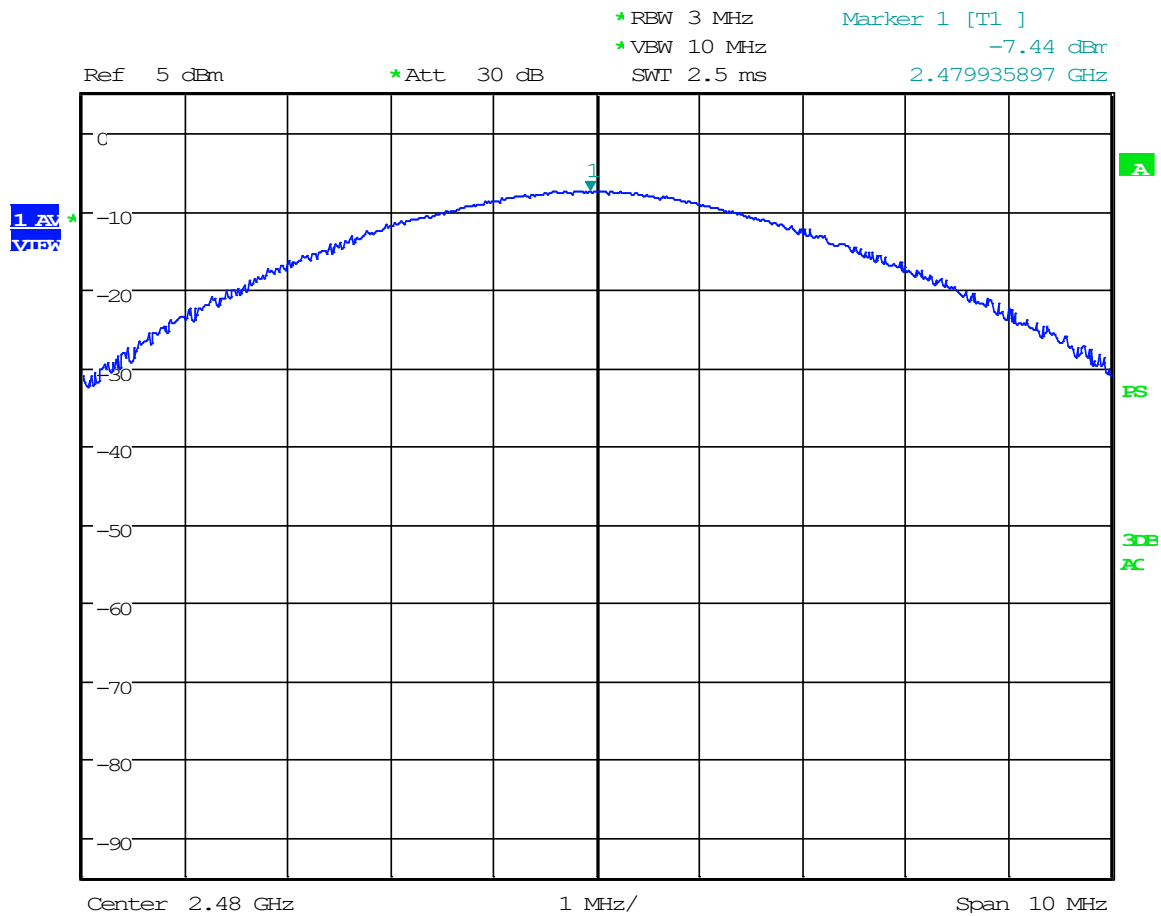
2MB: Mid Channel



Date: 17.JAN.2025 13:21:13



2MB: High Channel



Date: 17.JAN.2025 13:21:43

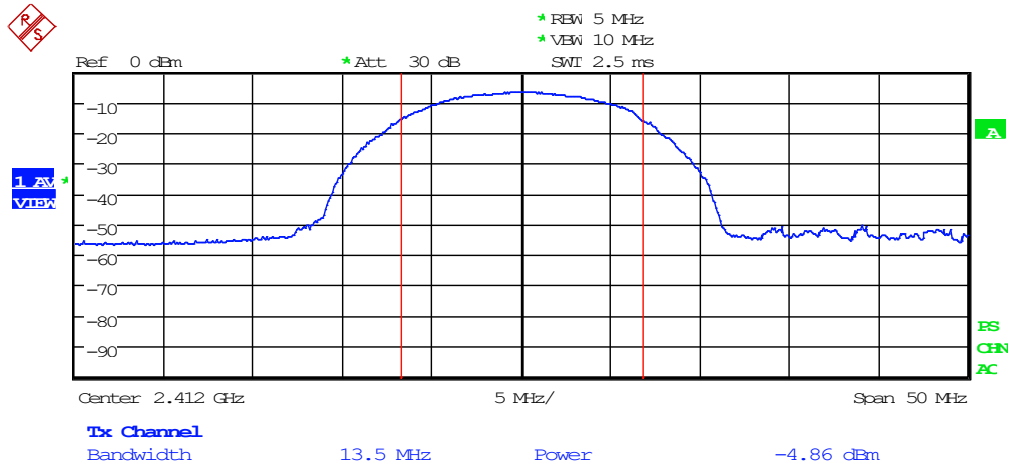


Order No(s): F233318-C1

Applicant: Datacolor, Inc.
Model: ESP32-C3-MINI-1-N4

Test Date:	2025-01-27	Test Engineer:	E. Tobin
Standards:	CFR 47 Part 15.247(b)(3); KDB558074	Air Temperature:	21.0°C
		Relative Humidity:	25%

Wi-Fi, 802.11b: Low Channel



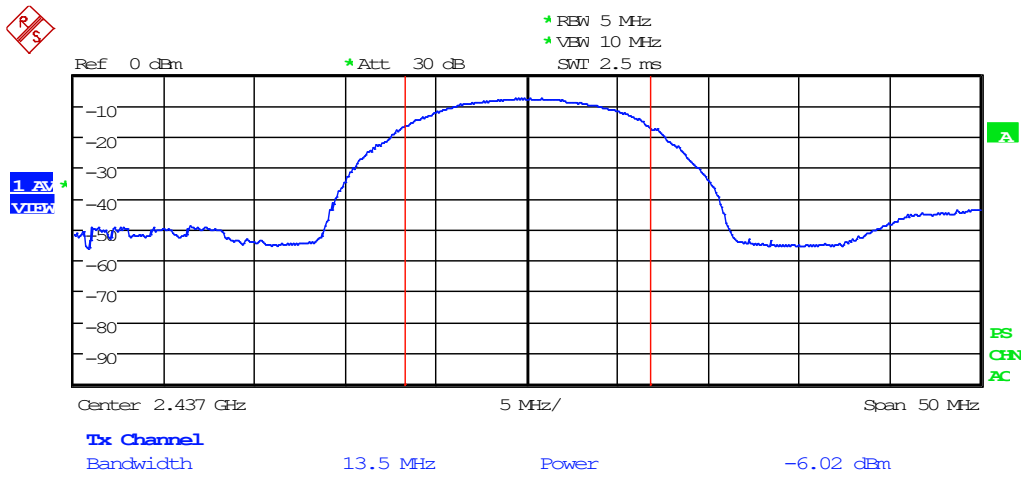
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Order No(s): F233318-C1

Applicant: Datacolor, Inc.
Model: ESP32-C3-MINI-1-N4

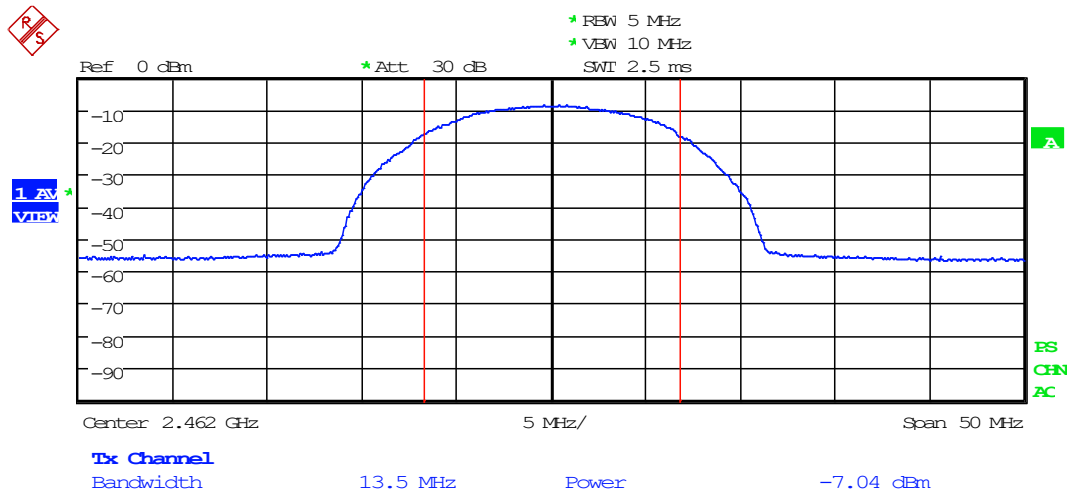
Wi-Fi, 802.11b: Mid Channel



Date: 27.JAN.2025 12:01:25



Wi-Fi, 802.11b: High Channel



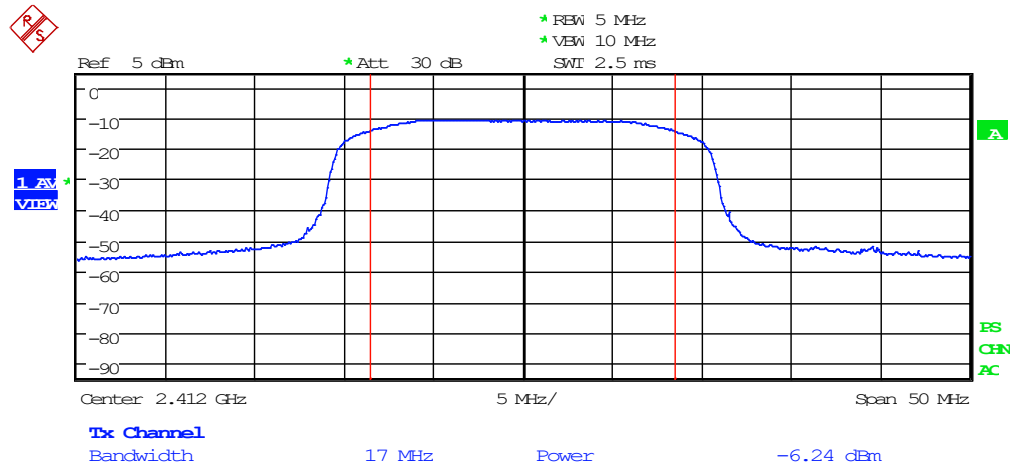
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Order No(s): F233318-C1

Applicant: Datacolor, Inc.
Model: ESP32-C3-MINI-1-N4

Wi-Fi, 802.11g: Low Channel



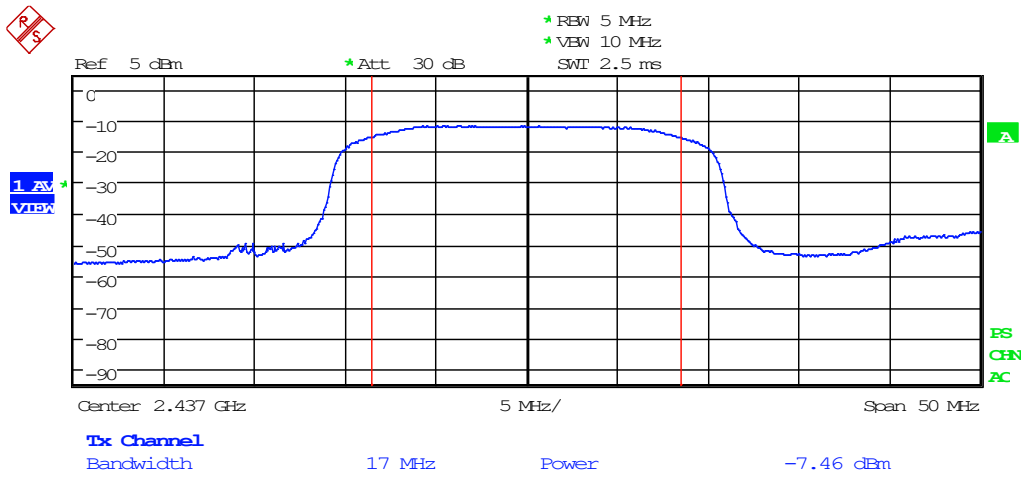
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Order No(s): F233318-C1

Applicant: Datacolor, Inc.
Model: ESP32-C3-MINI-1-N4

Wi-Fi, 802.11g: Mid Channel



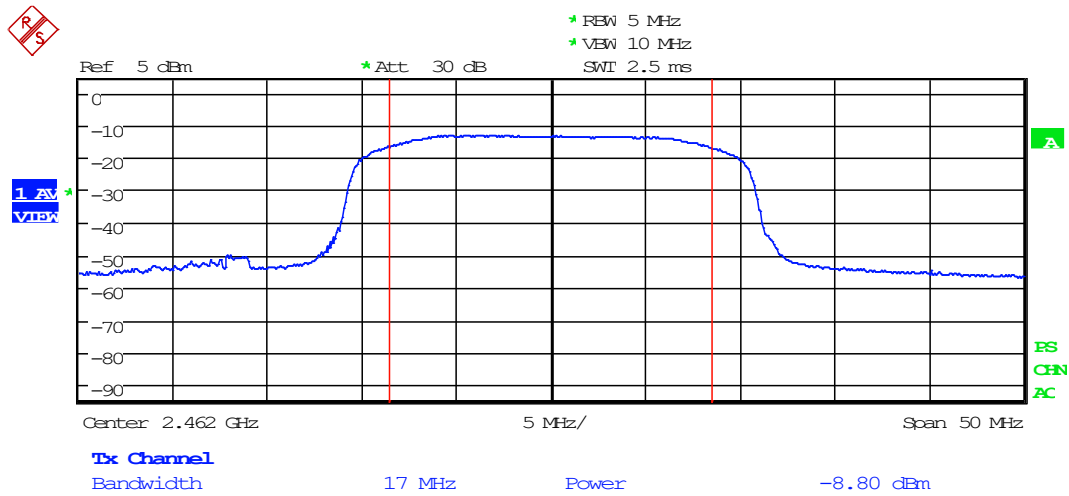
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Order No(s): F233318-C1

Applicant: Datacolor, Inc.
Model: ESP32-C3-MINI-1-N4

Wi-Fi, 802.11g: High Channel



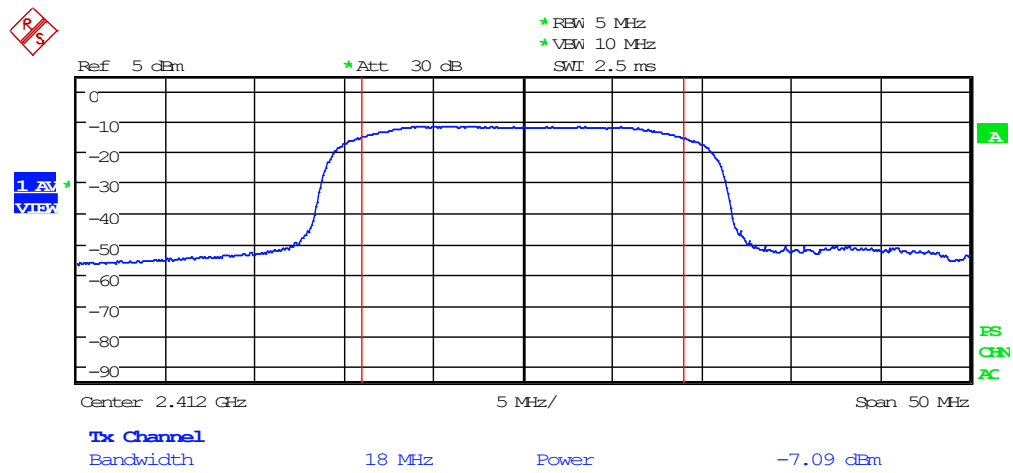
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Order No(s): F233318-C1

Applicant: Datacolor, Inc.
Model: ESP32-C3-MINI-1-N4

Wi-Fi, 802.11n, HT20: Low Channel



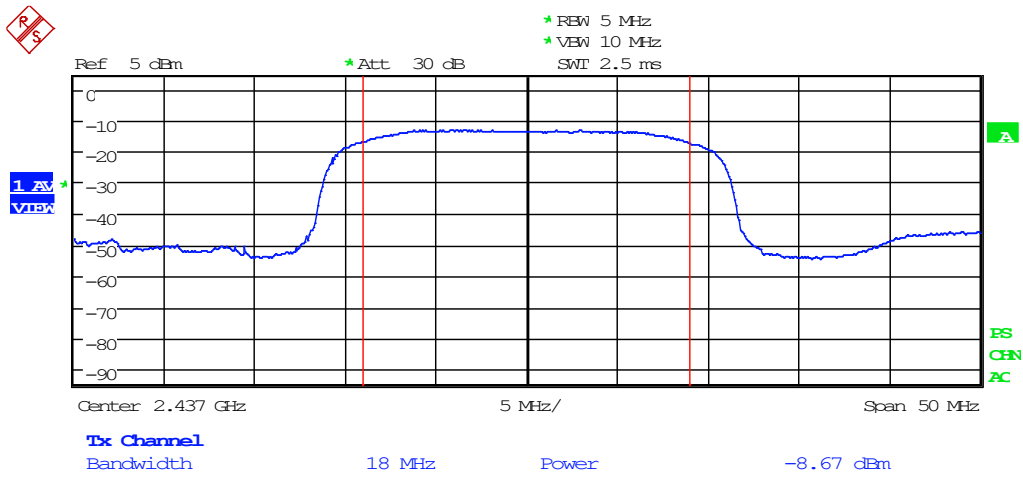
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Order No(s): F233318-C1

Applicant: Datacolor, Inc.
Model: ESP32-C3-MINI-1-N4

Wi-Fi, 802.11n, HT20: Mid Channel



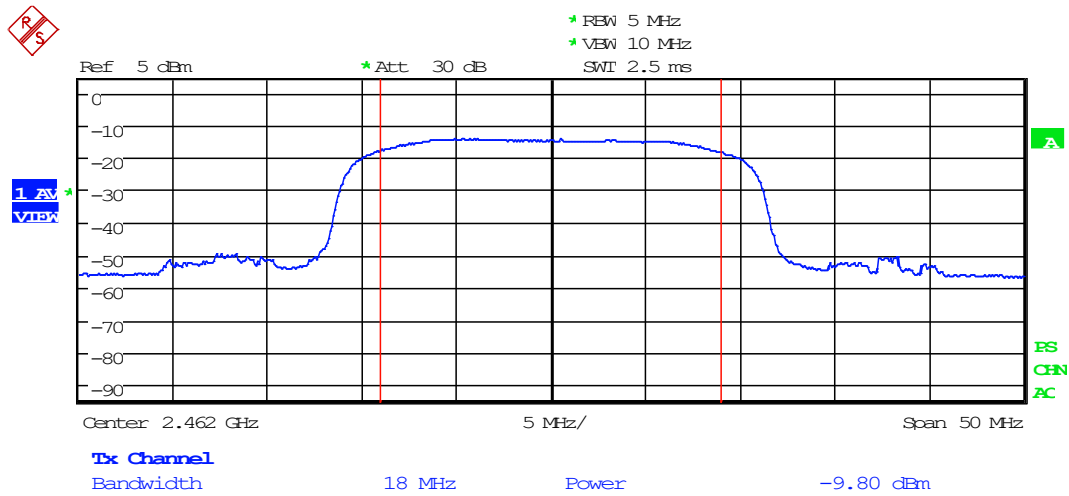
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Order No(s): F233318-C1

Applicant: Datacolor, Inc.
Model: ESP32-C3-MINI-1-N4

Wi-Fi, 802.11n, HT20: High Channel



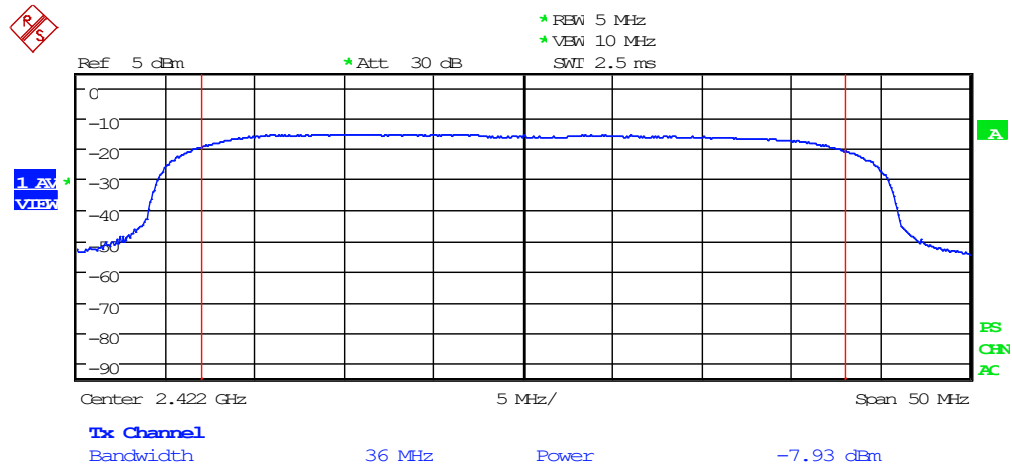
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Order No(s): F233318-C1

Applicant: Datacolor, Inc.
Model: ESP32-C3-MINI-1-N4

Wi-Fi, 802.11n, HT40: Low Channel



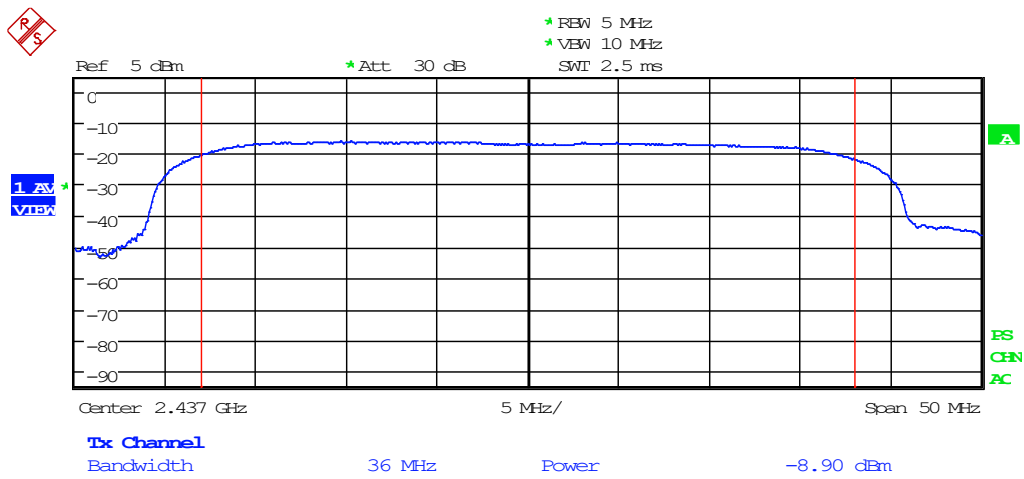
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Order No(s): F233318-C1

Applicant: Datacolor, Inc.
Model: ESP32-C3-MINI-1-N4

Wi-Fi, 802.11n, HT40: Mid Channel



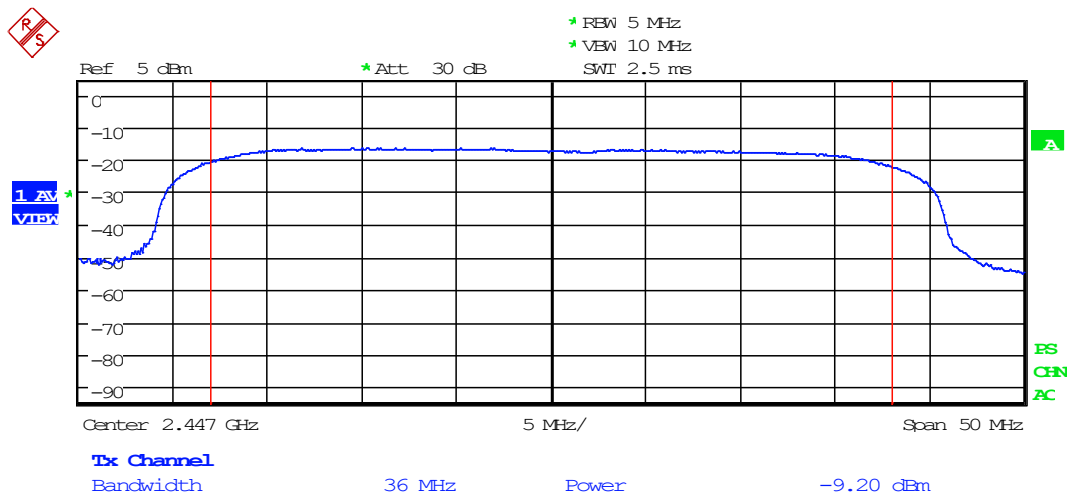
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Order No(s): F233318-C1

Applicant: Datacolor, Inc.
Model: ESP32-C3-MINI-1-N4

Wi-Fi, 802.11n, HT40: High Channel



Date: 27.JAN.2025 12:13:34



8 TEST SETUP PHOTOGRAPH(S)

Conducted Output Power

