



FCC PART 15C TEST REPORT No.23T04Z80397-012

for

TCL Communication Ltd.

GSM/UMTS/LTE Mobile phone

T435D, T435SP, T435S, T435V, T435WS

FCC ID: 2ACCJH178

with

Hardware Version: 03

Software Version: 9JS6

Issued Date: 2024-01-17

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of CTTL.

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No.23T04Z80397-012

REPORT HISTORY

Report Number	Revision	Description	Issue Date
23T04Z80397-012	Rev.0	1st edition	2024-01-17

Note: the latest revision of the test report supersedes all previous version.

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1. Test Laboratory

1.1. Introduction & Accreditation

Telecommunication Technology Labs, CAICT is an ISO/IEC 17025:2017 accredited test laboratory under American Association for Laboratory Accreditation (A2LA) with lab code 7049.01, and is also an FCC accredited test laboratory (CN1349), and ISED accredited test laboratory (CAB identifier:CN0066). The detail accreditation scope can be found on A2LA website.

1.2. Testing Location

Location 1:CTTL(Huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing,
P. R. China100191

Location 2:CTTL(BDA)

Address: No.18A, Kangding Street, Beijing Economic-Technology
Development Area, Beijing, 100176, P. R. China

1.3. Testing Environment

Normal Temperature: 15-35°C
Relative Humidity: 20-75%

1.4. Project date

Testing Start Date: 2023-12-21
Testing End Date: 2024-01-17

1.5. Signature



Dong Jiaxuan
(Prepared this test report)



Zheng Wei
(Reviewed this test report)



Pang Shuai
(Approved this test report)



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2. Client Information

2.1. Applicant Information

Company Name: TCL Communication Ltd.
Address: 5/F, Building 22E, 22 Science Park East Avenue, Hong Kong Science Park, Shatin, NT, Hong Kong
City: Hong Kong
Country: China
Telephone: +86 755 3661 1621
Fax: +86 755 3661 2000-81722

2.2. Manufacturer Information

Company Name: TCL Communication Ltd.
Address: 5/F, Building 22E, 22 Science Park East Avenue, Hong Kong Science Park, Shatin, NT, Hong Kong
City: Hong Kong
Country: China
Telephone: +86 755 3661 1621
Fax: +86 755 3661 2000-81722

3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

Description	GSM/UMTS/LTE Mobile phone
Model name	T435D, T435SP, T435S, T435V, T435WS
FCC ID	2ACCJH178
With WLAN Function	Yes
Frequency Band	ISM 2400MHz~2483.5MHz
Type of Modulation	DSSS/CCK/OFDM
Number of Channels	11
Antenna	Integral Antenna
MAX Conducted Power	26.16dBm
Nominal Voltage	3.8V

3.2. Internal Identification of EUT

EUT ID*	SN or IMEI	HW Version	SW Version	Date of receipt
UT41a	016495000011480	03	9JS6	2023-12-26
UT39a	016495000011589	03	9JS6	2023-12-26

*EUT ID: is used to identify the test sample in the lab internally.

UT39a is used for Conduction test, UT41a is used for Radiation test.

3.3. Internal Identification of AE

AE ID*	Description	SN
AE1	Battery	/
AE2	Battery	/
AE3	Charger1	/
AE4	Charger2	/
AE5	Data Cable	/
AE1		
Model	TLi017D7	
Manufacturer	Veken	
Capacity(mAh)	1780mAh	
AE2		
Model	TLi017DA	
Manufacturer	TIANMAO	
Capacity(mAh)	1780mAh	
AE3		
Model	UC11US	
Manufacturer	PUAN	
Length of cable	/	
AE4		
Model	UC11US	
Manufacturer	JUWEI	



Length of cable /
AE5
Model CDA0000254C1
Manufacturer JUWEI
Length of cable /

*AE ID: is used to identify the test sample in the lab internally.

EUT set-up No.	Combination of EUT and AE	Remarks
Set.1	EUT1 + AE1/2 + AE3/4 +AE5	/

3.4. General Description

The Equipment under Test (EUT) is a model of GSM/UMTS/LTE Mobile phone with integrated antenna and inbuilt battery.

It consists of normal options: travel charger, USB cable.

Manual and specifications of the EUT were provided to fulfil the test.

Samples undergoing test were selected by the client.

3.5. Interpretation of the Test Environment

For the test methods, the test environment uncertainty figures correspond to an expansion factor $k=2$.

Measurement Uncertainty

Parameter	Uncertainty
temperature	0.48°C
humidity	2 %
DC voltages	0.003V

4. Reference Documents

4.1. Documents supplied by applicant

EUT feature information is supplied by the applicant or manufacturer, which is the basis of testing.

4.2. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part15	FCC CFR 47, Part 15, Subpart C: 15.205 Restricted bands of operation; 15.209 Radiated emission limits, general requirements; 15.247 Operation within the bands 902-928MHz, 2400-2483.5 MHz, and 5725-5850 MHz.	2021
ANSI C63.10	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices Federal Communications Commission Office of Engineering and Technology Laboratory Division GUIDANCE FOR COMPLIANCE MEASUREMENTS ON	2013
KDB 558074 D01	DIGITAL TRANSMISSION SYSTEM, FREQUENCY HOPPING SPREAD SPECTRUM SYSTEM, AND HYBRID SYSTEM DEVICES OPERATING UNDER SECTION 15.247 OF THE FCC RULES	2019

5. LABORATORY ENVIRONMENT

Conducted RF performance testing is performed in shielding room.

EMC performance testing is performed in Semi-anechoic chamber.

6. Test Results

6.1. Summary of Test Results

SUMMARY OF MEASUREMENT RESULTS	Sub-clause of Part15C	Sub-clause of IC	Verdict
Maximum Peak Output Power	15.247 (b)	/	P
Peak Power Spectral Density	15.247 (e)	/	P
Occupied 6dB Bandwidth	15.247 (a)	/	P
Band Edges Compliance	15.247 (d)	/	P
Transmitter Spurious Emission - Conducted	15.247 (d)	/	P
Transmitter Spurious Emission - Radiated	15.247, 15.205, 15.209	/	P
AC Powerline Conducted Emission	15.107, 15.207	/	P

Please refer to **ANNEX A** for detail.

Terms used in Verdict column

P	Pass, The EUT complies with the essential requirements in the standard.
NP	Not Perform, The test was not performed by CTTL
NA	Not Applicable, The test was not applicable
F	Fail, The EUT does not comply with the essential requirements in the standard

6.2. Statements

CTTL has evaluated the test cases as listed in section 6.1 of this report for the EUT specified in section 3 according to the standards or reference documents listed in section 4.

This report only deals with the WLAN function among the features described in section 3.

6.3. Test Conditions

For this report, all the test cases are tested under normal temperature and normal voltage, and also under norm humidity, the specific condition is shown as follows:

Temperature	26°C
Voltage	3.8V
Humidity	44%

7. Test Facilities Utilized

Conducted test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Period	Calibration Due date
1	Vector Signal Analyzer	FSQ40	200089	Rohde & Schwarz	1 year	2024-07-04
2	Vector Signal Analyzer	FSW67	104051	Rohde & Schwarz	1 year	2024-03-06
3	Test Receiver	ESU26	100235	R&S	1 year	2024-05-09
4	LISN	ENV216	101459	R&S	1 year	2024-06-04
5	Attenuator	10dB/2W	/	Rosenberger	/	/
6	Shielding Room	S81	/	ETS-Lindgren	/	/

Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Period	Calibration Due date
1	Test Receiver	ESW44	103015	R&S	1 year	2024-02-11
2	EMI Antenna	3115	00146404	ETS-Lindgren	1 year	2024-06-05

Test software list:

Test Item	Test Software	Software Vendor
Radiated Emission	EMC32	R&S
Conducted Emission	EMC32	R&S

8. Measurement Uncertainty

8.1. Maximum Output Power

Measurement Uncertainty: 0.387dB,k=1.96

8.2. Peak Power Spectral Density

Measurement Uncertainty: 0.705dB,k=1.96

8.3. DTS 6-dB Signal Bandwidth

Measurement Uncertainty: 60.80Hz,k=1.96

8.4. Band Edges Compliance

Measurement Uncertainty : 0.62dB,k=1.96

8.5. Transmitter Spurious Emission

Conducted (k=1.96)

Frequency Range	Uncertainty(dB)
$30\text{MHz} \leq f \leq 2\text{GHz}$	1.22
$2\text{GHz} \leq f \leq 3.6\text{GHz}$	1.22
$3.6\text{GHz} \leq f \leq 8\text{GHz}$	1.22
$8\text{GHz} \leq f \leq 12.75\text{GHz}$	1.51
$12.75\text{GHz} \leq f \leq 26\text{GHz}$	1.51
$26\text{GHz} \leq f \leq 40\text{GHz}$	1.59

8.6. Radiated Unwanted Emission

Frequency Range	Uncertainty(dB) k=2
9kHz-30MHz	/
$30\text{MHz} \leq f \leq 1\text{GHz}$	5.29
$1\text{GHz} \leq f \leq 18\text{GHz}$	5.62
$18\text{GHz} \leq f \leq 40\text{GHz}$	3.52

8.7. AC Power-line Conducted Emission

Measurement Uncertainty : 3.10dB,k=2

ANNEX A: Detailed Test Results

A.1. Measurement Method

A.1.1. Conducted Measurements

Connect the EUT to the test system as Fig.A.1.1.1 shows.

Set the EUT to the required work mode.

Set the EUT to the required channel.

Set the Vector Signal Analyzer and start measurement.

Record the values. Vector Signal Analyzer

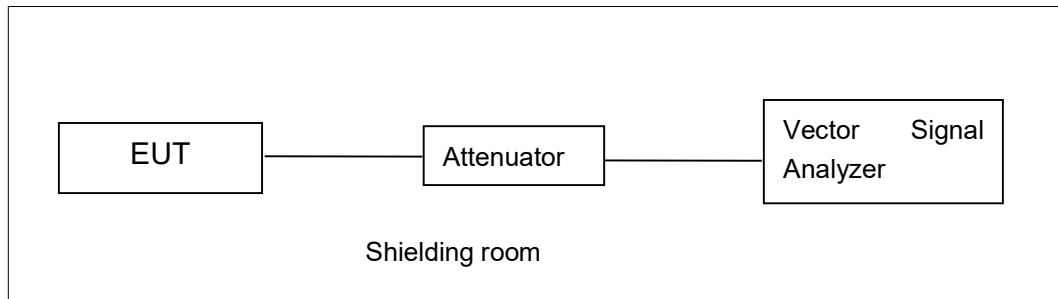


Fig.A.1.1.1: Test Setup Diagram for Conducted Measurements

A.1.2. Radiated Emission Measurements

The measurement is made according to ANSI C63.10

The radiated emission test is performed in semi-anechoic chamber. The EUT was placed on a non-conductive table with 80cm above the ground plane for measurement below 1GHz and 1.5m above the ground plane for measurement above 1GHz. The measurement antenna was placed at a distance of 3 meters from the EUT. The test is carried out on both vertical and horizontal polarization and only maximization result of both polarizations is kept. During the test, the turntable is rotated from 0° to 360° and the measurement antenna is moved from 1m to 4m to get the maximization result. The maximization process was repeated with the EUT positioned in each of its three orthogonal orientation.

A.2. Maximum Output Power

Method of Measurement: See ANSI C63.10-2013-clause 11.9.1.3

The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall use a fast-responding diode detector.

Measurement Limit:

Standard	Limit (dBm)
FCC CRF Part 15.247(b)	< 30

A.2.1. Peak Output Power-conducted

EUT ID: UT39a

Measurement Results:

802.11b/g mode

Mode	Data Rate (Mbps)	Test Result (dBm)		
		2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)
802.11b	1	21.92	22.59	21.67
	2	/	/	/
	5.5	/	/	/
	11	/	/	/
802.11g	6	25.67	26.01	25.27
	9	/	/	/
	12	/	/	/
	18	/	/	/
	24	/	/	/
	36	/	/	/
	48	/	/	/
54	/	/	/	

The data rate 1Mbps and 6Mbps are selected as worst condition, and the following cases are performed with this condition.

802.11n-HT20 mode

Mode	Data Rate (Index)	Test Result (dBm)		
		2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)
802.11n (20MHz)	MCS0	25.73	26.04	25.31
	MCS1	/	/	/
	MCS2	/	/	/
	MCS3	/	/	/
	MCS4	/	/	/
	MCS5	/	/	/
	MCS6	/	/	/
	MCS7	/	/	/

The data rate MCS0 selected as worst condition, and the following cases are performed with this condition.

802.11n-HT40 mode

Mode	Data Rate (Index)	Test Result (dBm)		
		2422MHz (Ch3)	2437MHz (Ch6)	2452 MHz (Ch9)
802.11n (40MHz)	MCS0	25.46	26.16	25.43
	MCS1	/	/	/
	MCS2	/	/	/
	MCS3	/	/	/
	MCS4	/	/	/
	MCS5	/	/	/
	MCS6	/	/	/
	MCS7	/	/	/

The data rate MCS0 is selected as worst condition, and the following cases are performed with this condition.

The duty cycle

TestMode	Antenna	Frequency[MHz]	Duty Cycle [%]
11B	Ant1	2412	97.73
11G	Ant1	2412	87.74
11N20SISO	Ant1	2412	86.39
11N40SISO	Ant1	2422	76.19

Conclusion: Pass

A.3. Peak Power Spectral Density

Method of Measurement: See ANSI C63.10-2013-clause 11.10.2

- a) Set analyzer center frequency to DTS channel center frequency.
- b) Set the span to 1.5 times the DTS bandwidth.
- c) Set the RBW to RBW = 3 kHz.
- d) Set the VBW = 10 kHz.
- e) Detector = peak.
- f) Sweep time = auto couple.
- g) Trace mode = max hold.
- h) Allow trace to fully stabilize.
- i) Use the peak marker function to determine the maximum amplitude level within the RBW.

Measurement Limit:

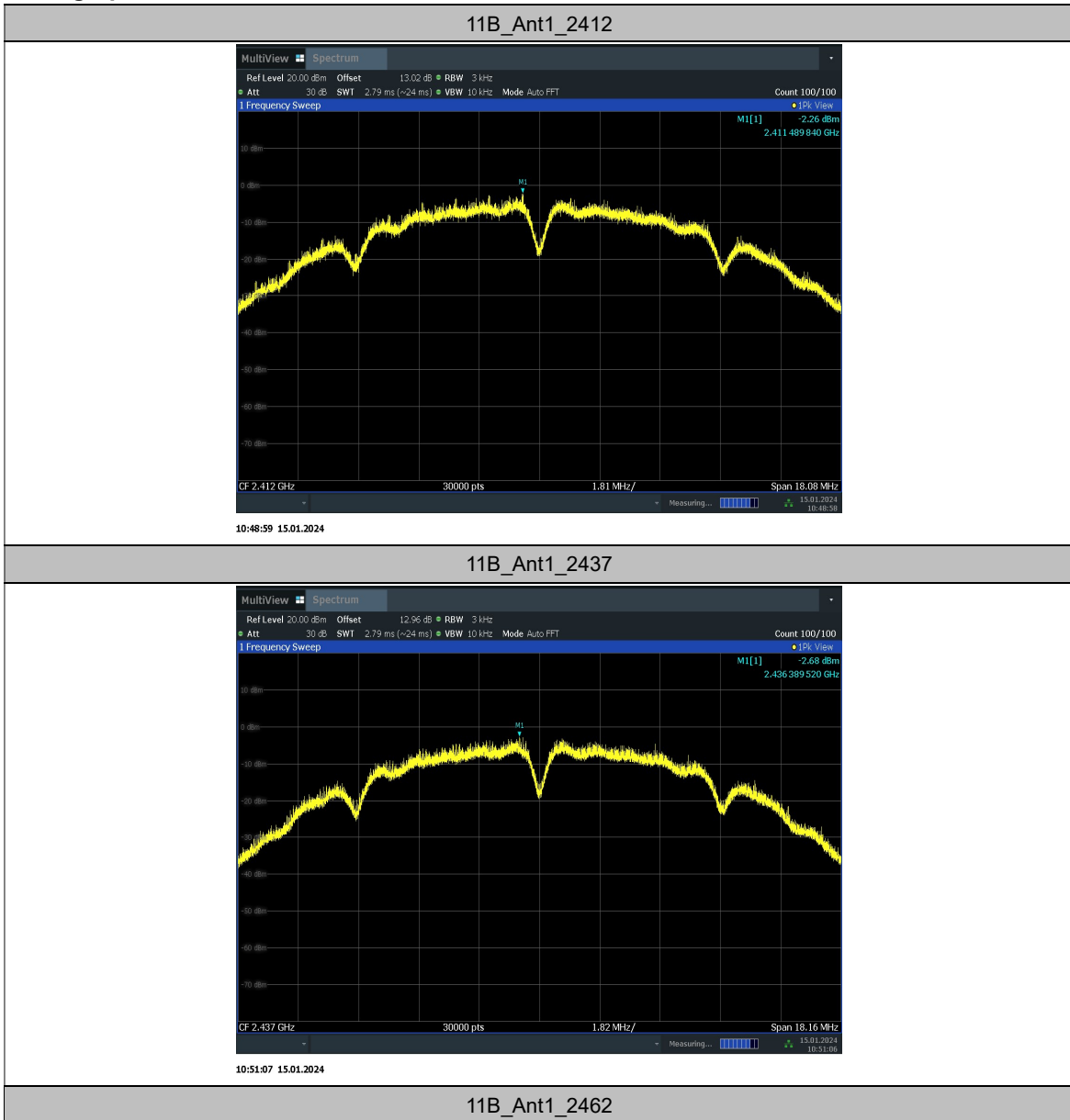
Standard	Limit
FCC CRF Part 15.247(e)	< 8 dBm/3 kHz

EUT ID: UT39a

Measurement Results:

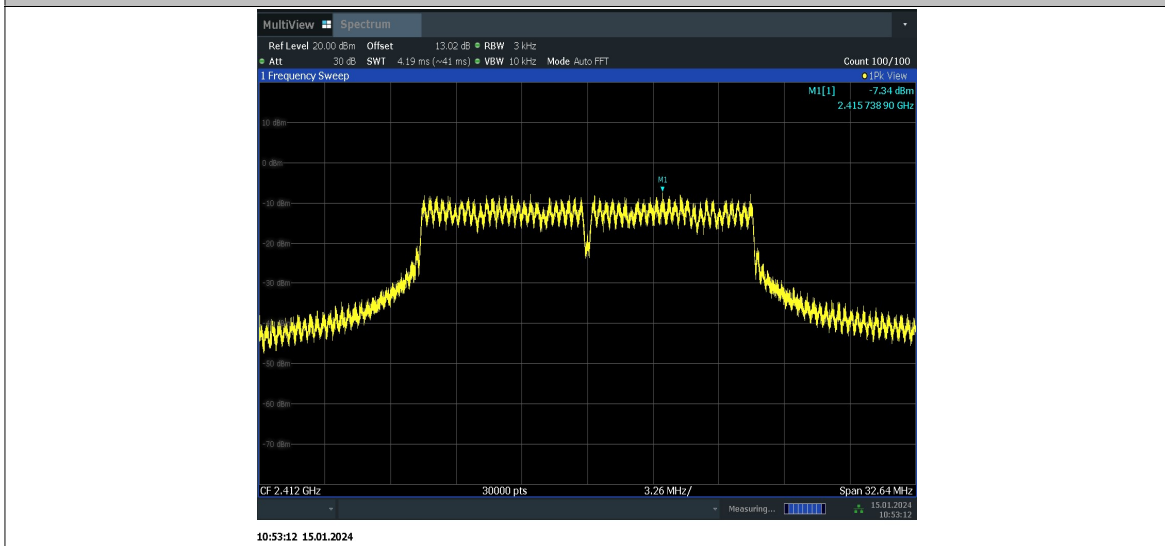
TestMode	Antenna	Frequency[MHz]	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
11B	Ant1	2412	-2.26	≤8.00	PASS
		2437	-2.68	≤8.00	PASS
		2462	-1.96	≤8.00	PASS
11G	Ant1	2412	-7.34	≤8.00	PASS
		2437	-6.62	≤8.00	PASS
		2462	-7.55	≤8.00	PASS
11N20SISO	Ant1	2412	-7.02	≤8.00	PASS
		2437	-7.63	≤8.00	PASS
		2462	-8.08	≤8.00	PASS
11N40SISO	Ant1	2422	-9.64	≤8.00	PASS
		2437	-9.71	≤8.00	PASS
		2452	-10.69	≤8.00	PASS

Test graphs as below:





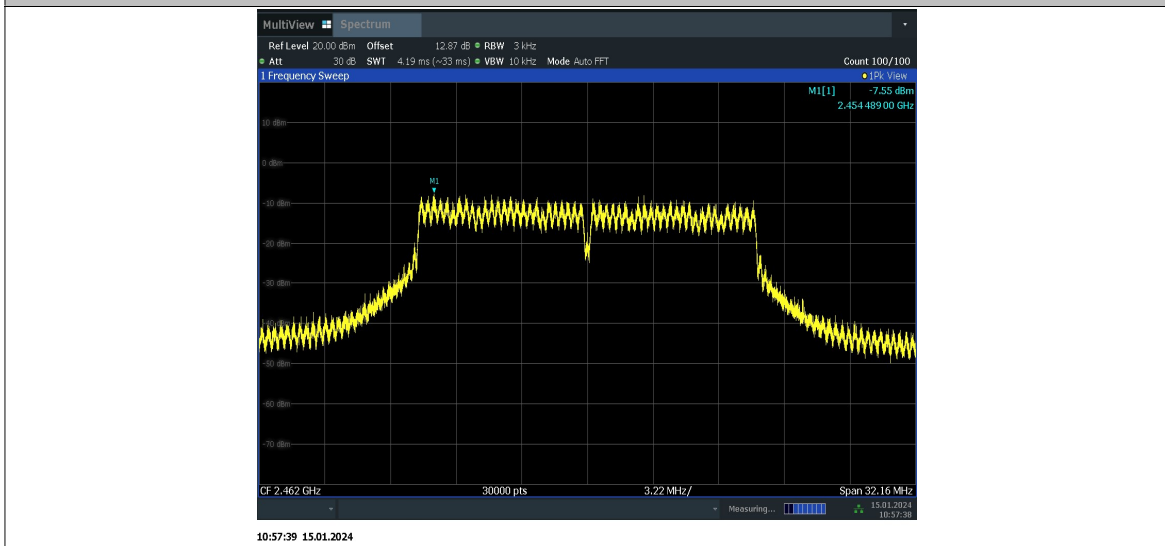
11G_Ant1_2412



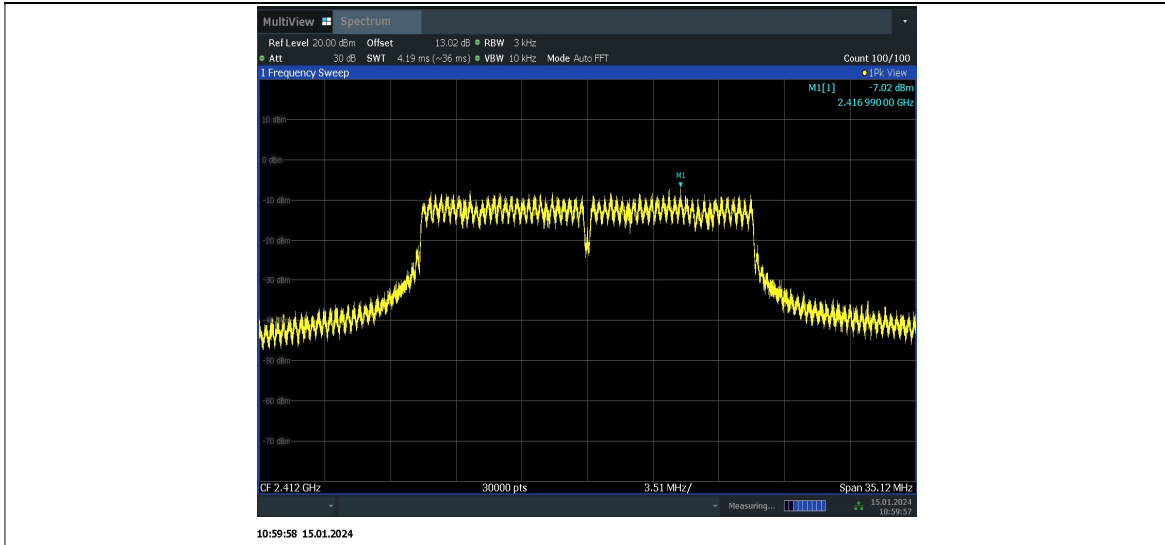
11G_Ant1_2437



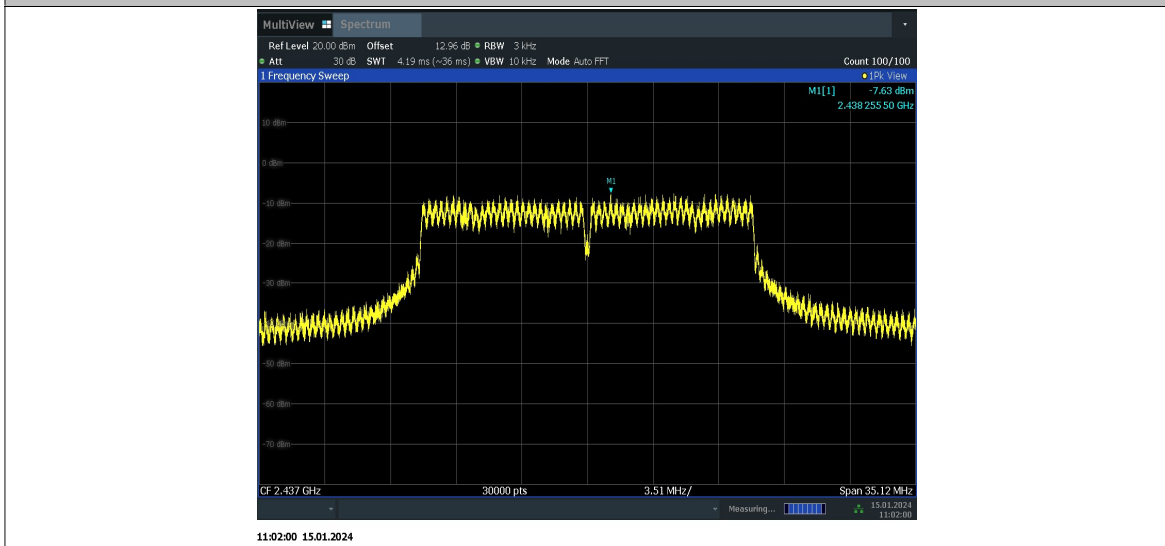
11G_Ant1_2462



11N20SISO_Ant1_2412



11N20SISO_Ant1_2437

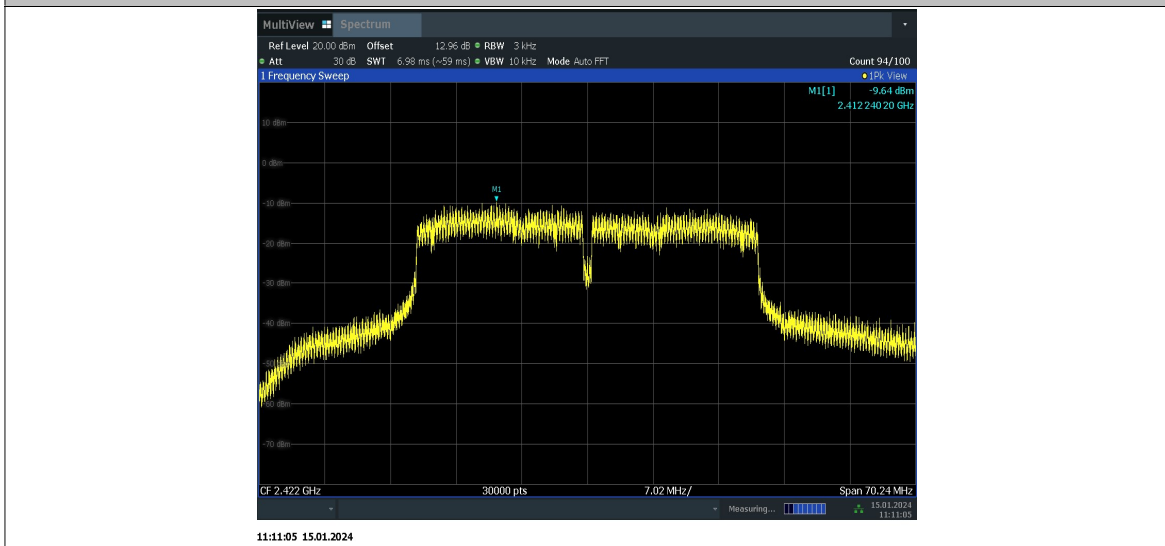


11N20SISO_Ant1_2462



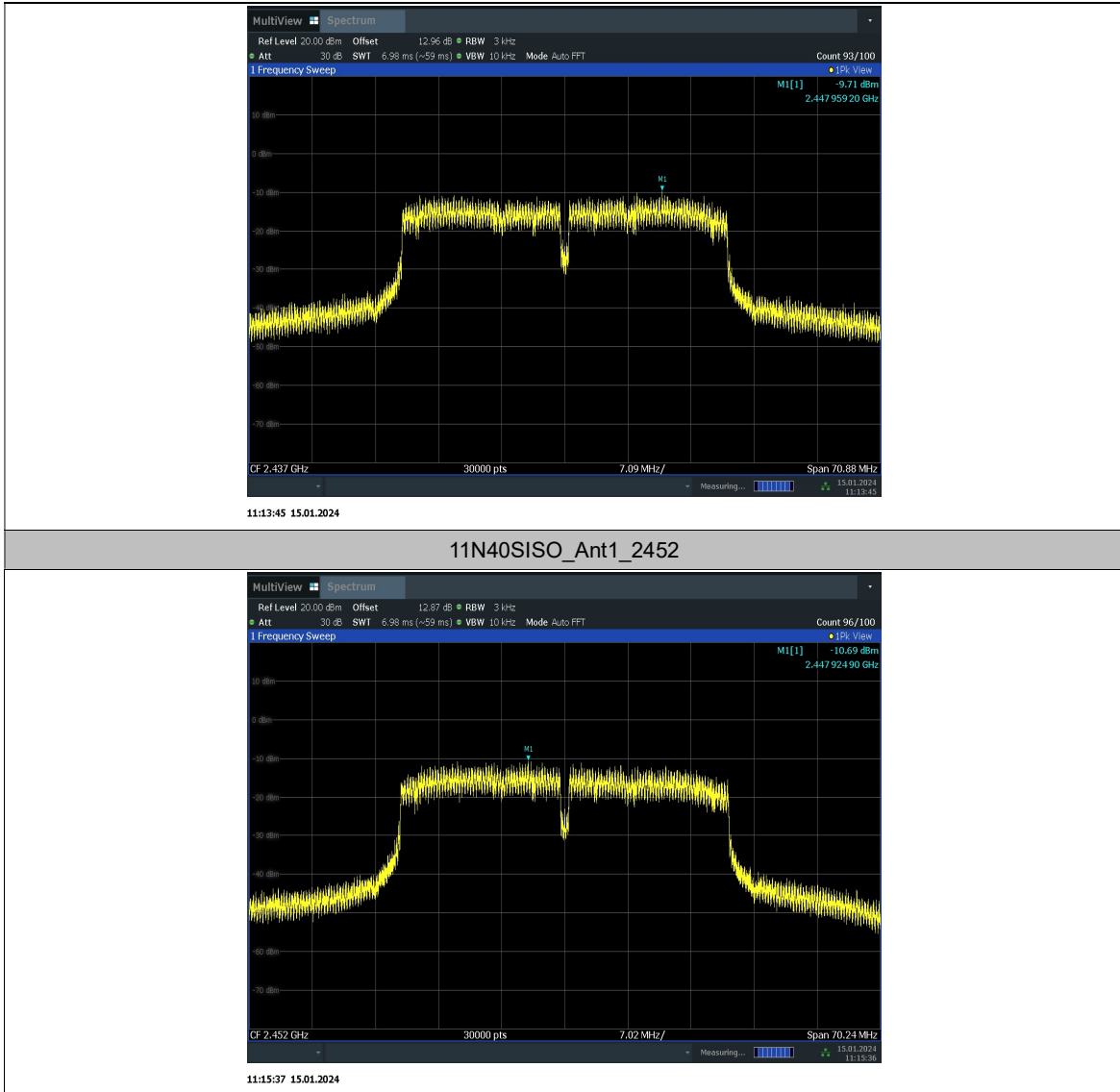
11:04:24 15.01.2024

11N40SISO_Ant1_2422



11:11:05 15.01.2024

11N40SISO_Ant1_2437



Conclusion: Pass

A.4. DTS 6-dB Signal Bandwidth

Method of Measurement: See ANSI C63.10-2013 section 11.8.1.

- a) Set RBW = 100 kHz.
- b) Set the video bandwidth (VBW) = 300 kHz.
- c) Detector = Peak.
- d) Trace mode = max hold.
- e) Sweep = auto couple.
- f) Allow the trace to stabilize.
- g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

Measurement Limit:

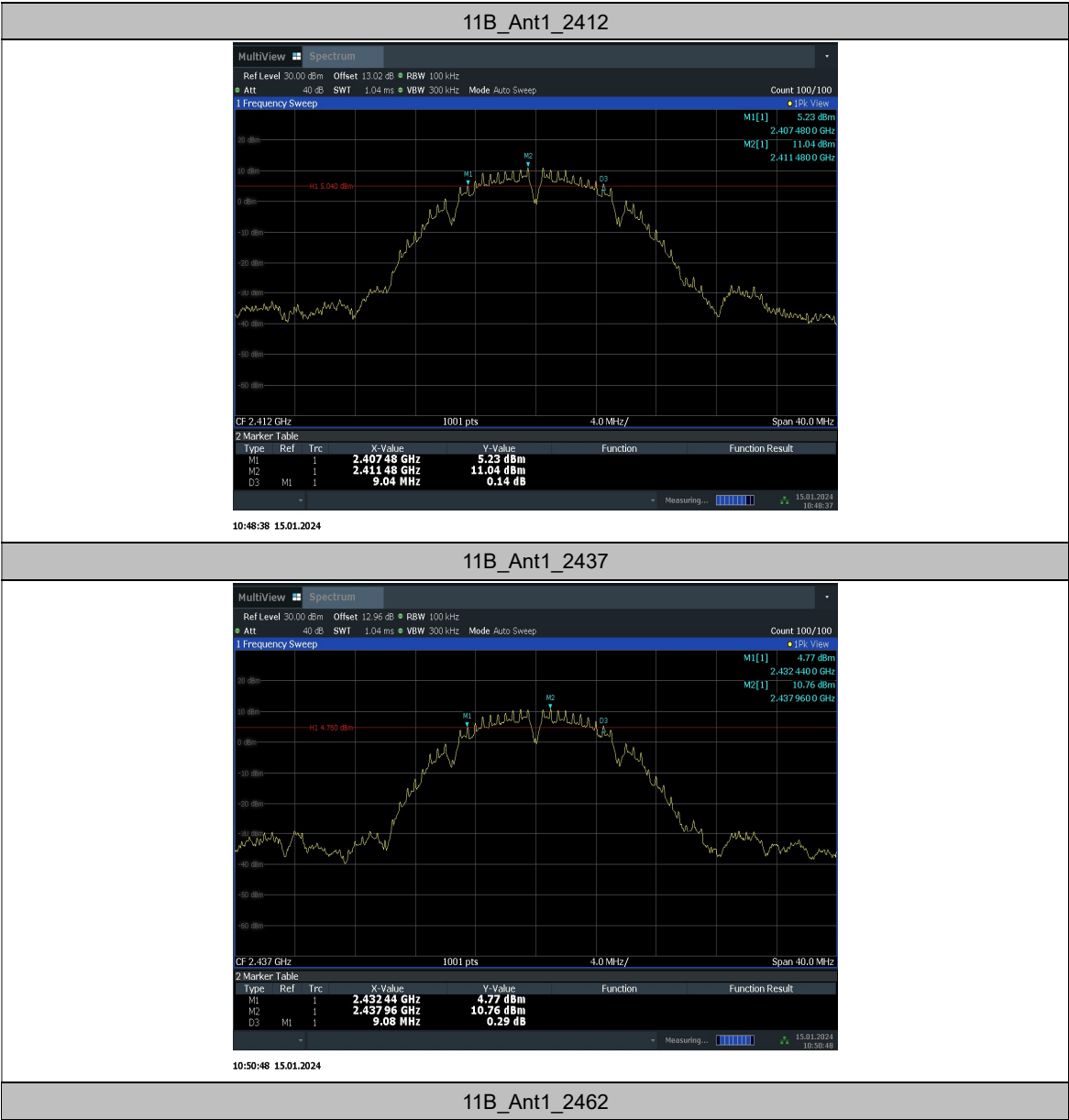
Standard	Limit (kHz)
FCC 47 CFR Part 15.247 (a)	≥ 500

EUT ID: UT39a

Measurement Result:

TestMode	Antenna	Frequency[MHz]	DTS BW [MHz]	Verdict
11B	Ant1	2412	9.04	PASS
		2437	9.08	PASS
		2462	8.52	PASS
11G	Ant1	2412	16.32	PASS
		2437	16.36	PASS
		2462	16.08	PASS
11N20SISO	Ant1	2412	17.56	PASS
		2437	17.56	PASS
		2462	17.16	PASS
11N40SISO	Ant1	2422	35.12	PASS
		2437	35.44	PASS
		2452	35.12	PASS

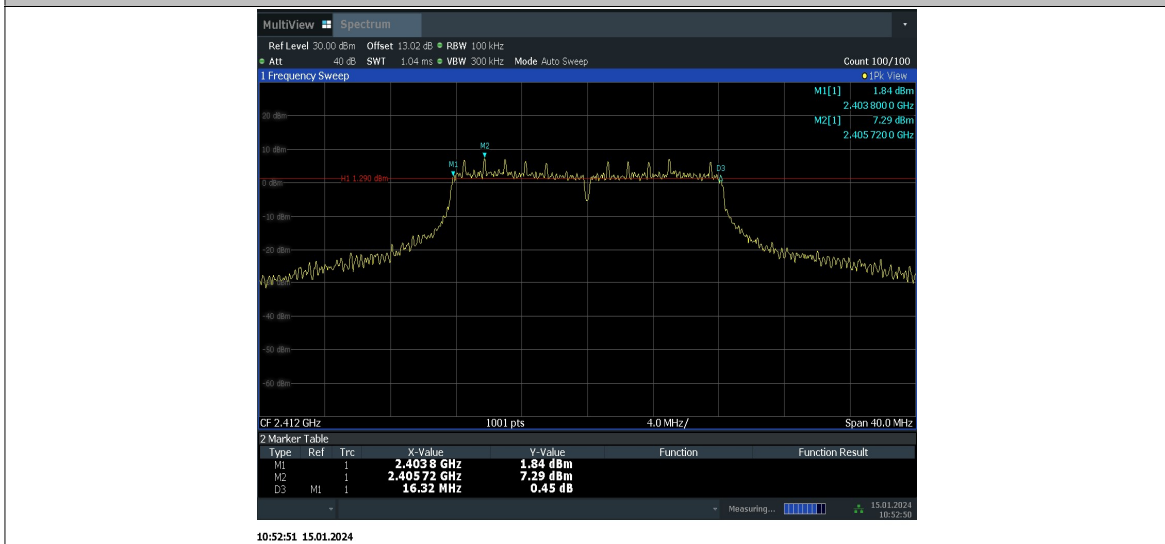
Test graphs as below:



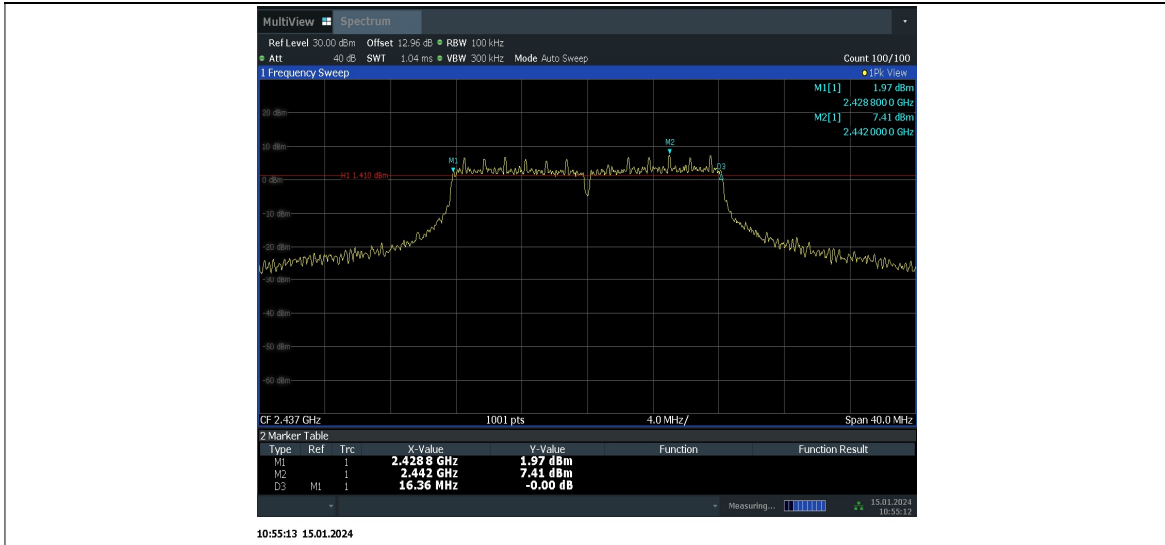
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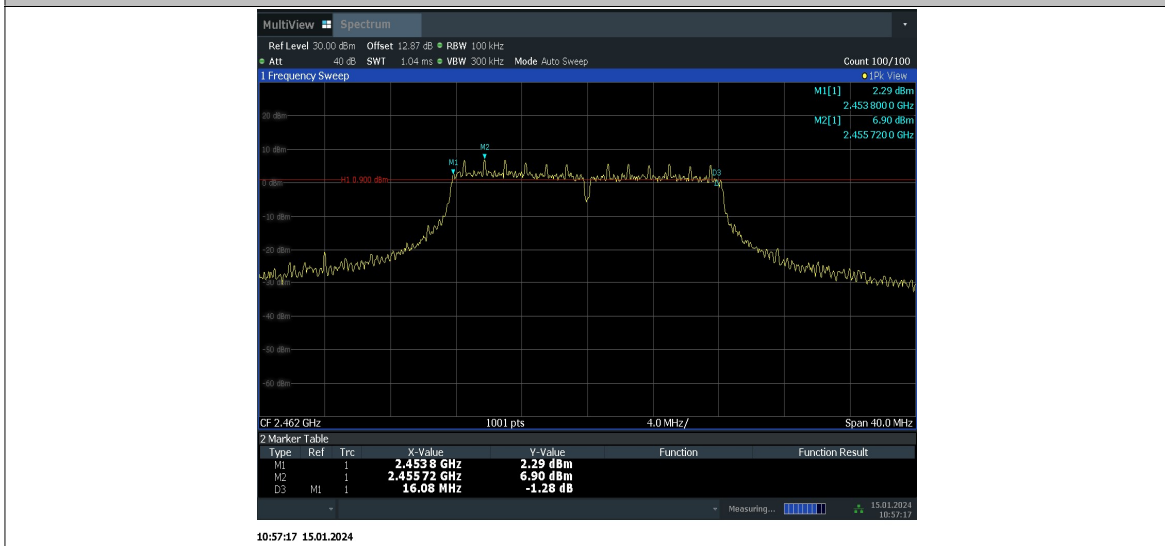
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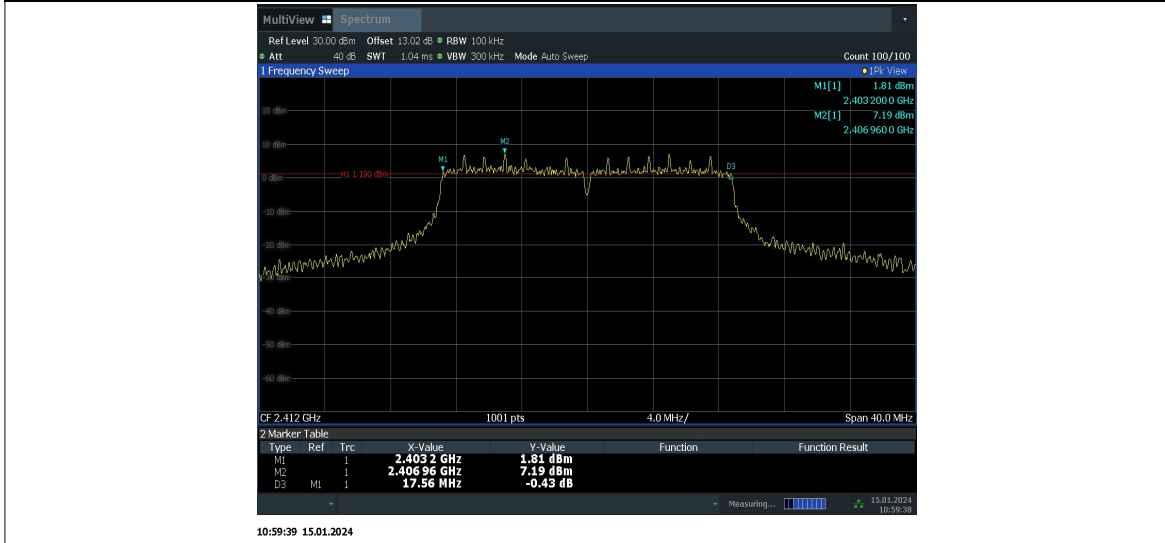
11G_Ant1_2437



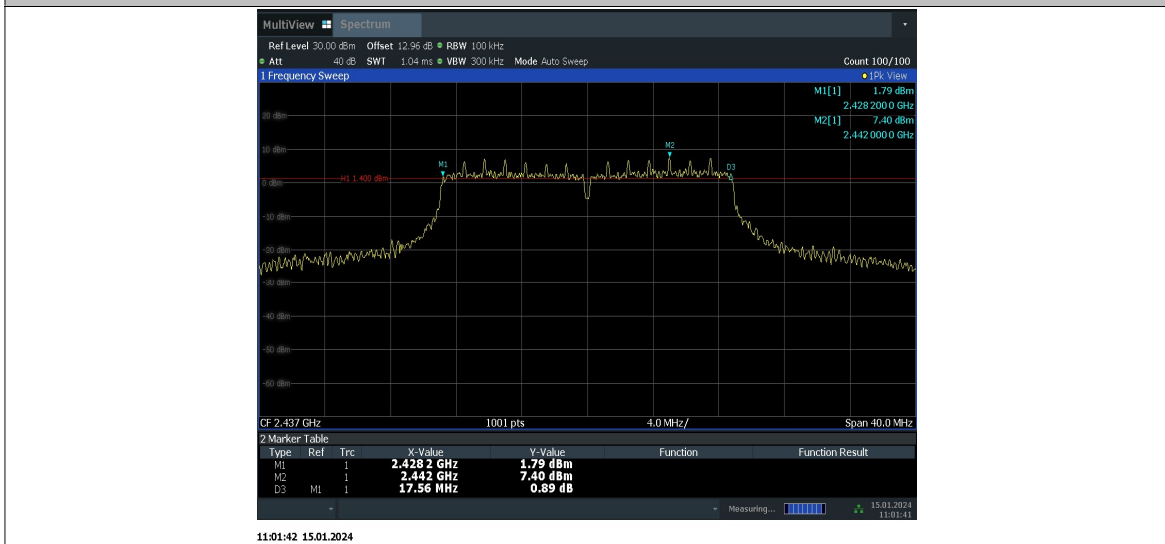
11G_Ant1_2462



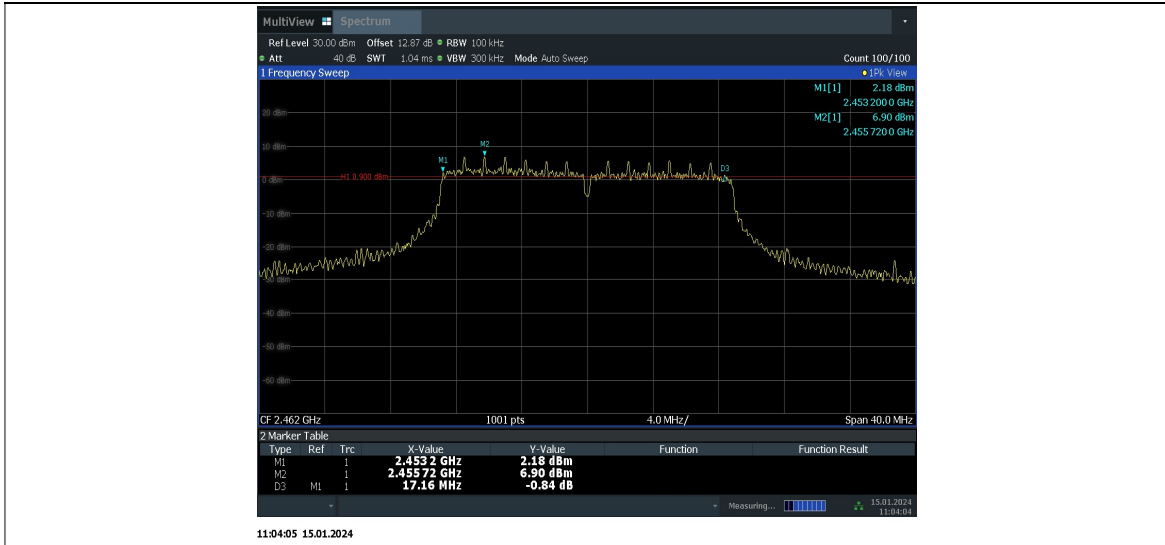
11N20ISO_Ant1_2412



11N20SISO_Ant1_2437



11N20SISO_Ant1_2462



11N40SISO_Ant1_2422



11N40SISO_Ant1_2437