FCC PART 15C
TEST REPORT
No.24T04Z200129-006

for

Samsung Electronics Co., Ltd.

Multi-band GSM/WCDMA/LTE Mobile Phone with Bluetooth, WLAN

SM-A065M/DS,SM-A065M

FCC ID:ZCASMA065M

with

Hardware Version: REV1.0

Software Version: A065M.001

Issued Date: 2024-06-25

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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REPORT HISTORY

Report Number	Revision	Description	Issue Date
24T04Z200129-006	Rev.0	1st edition	2024-06-25

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, P. R. China 100176

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1.3. Testing Environment

Normal Temperature: 15-35°C

Relative Humidity: 20-75%

1.4. Project date

Testing Start Date: 2024-05-20

Testing End Date: 2024-06-25

1.5. Signature

姚兴宇

Yao Xingyu

(Prepared this test report)

郑伟

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:	Samsung Electronics Co., Ltd.
Address/Post:	19 Chapin Rd.,Building D Pine Brook, NJ 07058
Contact:	Jenni Chun
Email:	j1.chun@samsung.com
Telephone:	+1-201-937-4203

2.2. Manufacturer Information

Company Name:	Samsung Electronics Co., Ltd.
Address/Post:	Samsung R5, Maetan dong 129, Samsung ro Youngtong gu, Suwon city 443 742, Korea
Contact:	Sunghoon Cho
Email:	ggobi.cho@samsung.com
Telephone:	+82-10-2722-4159
Fax:	/

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

3.1. About EUT

Description	Multi-band GSM/WCDMA/LTE Mobile Phone with Bluetooth, WLAN
Model name	SM-A065M/DS,SM-A065M
FCC ID	ZCASMA065M
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	24.14dBm
Nominal Voltage	3.85V

3.2. Internal Identification of EUT

EUT ID*	SN or IMEI	HW Version	SW Version	Date of receipt
UT12a	2404200129UT12a	REV1.0	A065M.001	2024-05-20
UT10a	2404200129UT10a	REV1.0	A065M.001	2024-05-20

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

UT12a is used for Conduction test, UT10a is used for Radiation test.

3.3. Internal Identification of AE

AE ID*	Name	Model	Manufacturer
AE1-1	Battery	HQ-7160SS	SCUD (FUJIAN) Electronics Co., Ltd.
AE1-2	Battery	HQ-7160SD	SCUD (FUJIAN) Electronics Co., Ltd.
AE1-3	Battery	HQ-7160NA	Ningde Amperex technology limited
AE2-1*	Adapter	EP-TA800	SOLUM CO.,LTD.
AE2-2*	Adapter	EP-T1510	DONGYANG E&P INC.
AE2-3*	Adapter	EP-TA200	RFTECH ELECTRONICS (HUIZHOU) CO., LTD
AE3-1	Date Cable1 C-C	EP-DN980BWE	RFTECH ELECTRONICS (HUIZHOU) CO., LTD
AE3-2	Date Cable2 C-C	EP-DN980BWE	Guangxi Broad Telecommunication Co.,Ltd.
AE3-3	Date Cable3 C-C	EP-DN980BWE	Cresyn electronics(Dongguan)Co;Ltd.
AE3-4	Date Cable4 C-C	EP-DN980BWE	ASAP TECHNOLOGY(JIANGXI) CO.,LTD.
AE4*	Date Cable5 C-A	EP-DR140AWE	Cresyn electronics(Dongguan)Co;Ltd.
AE5*	Headset	EHS61ASFWE	Dongguan YoungBo Electronics

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

*AE2-1, AE2-2, AE2-3, AE4 and A5 are not the AE for EUT, provided by the client for relevant tests.

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3.4. General Description

The Equipment under Test (EUT) is a model of Multi-band GSM/WCDMA/LTE Mobile Phone with Bluetooth, WLAN 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	2013
KDB 558074 D01	Federal Communications Commission Office of Engineering and Technology Laboratory Division GUIDANCE FOR COMPLIANCE MEASUREMENTS ON DIGITAL TRANSMISSION SYSTEM, FREQUENCY HOPPING SPREAD SPECTRUM SYSTEM, AND HYBRID SYSTEM DEVICES OPERATING UNDER SECTION 15.247 OF THE FCC RULES	2019

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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**
DTS 6-dB Signal Bandwidth	15.247 (a)	/	**P**
Band Edges Compliance	15.247 (d)	/	**P**
Transmitter Spurious Emission - Conducted	15.247 (d)	/	**P**
Radiated Unwanted Emission	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	3.85V
Humidity	44%

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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	2025-04-01
3	Attenuator	10dB/2W	/	Rosenberger	/	/
4	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	2025-01-18
2	Test Receiver	FSV30	101047	R&S	1 year	2024-10-08
3	Test Receiver	ESU26	100376	R&S	1 year	2024-06-29
4	Loop Antenna	HFH2-Z2	829324/007	R&S	1 year	2025-01-04
5	EMI Antenna	VULB9163	302	Schwarzbeck	1 year	2024-08-28
6	EMI Antenna	3117	00139065	ETS-Lindgren	1 year	2024-10-22
7	EMI Antenna	LB-180400-25-C-KF	2110084000006	A-INFO	1 year	2025-05-15

AC Power Line Conducted Emission

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Period	Calibration Due date
1	LISN	ENV216	101459	R&S	1 year	2025-05-16
2	Test Receiver	ESCI	100766	R&S	1 year	2025-04-18

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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

Frequency Range	Uncertainty(dB) k=1.96
30MHz ≤ f ≤ 2GHz	1.22
2GHz ≤ f ≤3.6GHz	1.22
3.6GHz ≤ f ≤8GHz	1.22
8GHz ≤ f ≤12.75GHz	1.51
12.75GHz ≤ f ≤26GHz	1.51
26GHz ≤ f ≤40GHz	1.59

8.6. Radiated Unwanted Emission

Frequency Range	Uncertainty(dB) k=2
9kHz-30MHz	3.96
30MHz ≤ f ≤ 1GHz	5.73
1GHz ≤ f ≤18GHz	5.62
18GHz ≤ f ≤40GHz	3.52

8.7. AC Power-line Conducted Emission

Measurement Uncertainty : 3.10dB,k=2

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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

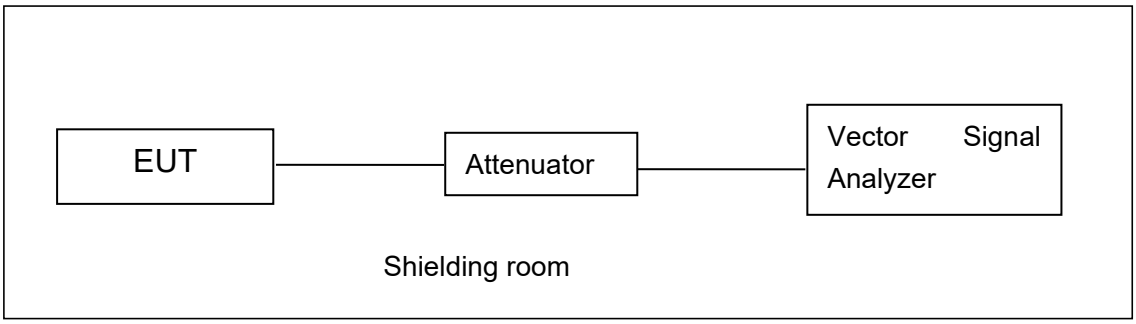

Fig.A.1.1.1: Test Setup Diagram for Conducted Measurements

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 orientations.

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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 Antenna Gain

Antenna gain is -0.9dBi and the value is supplied by the applicant or manufacturer.

A.2.2. Peak Output Power-conducted

EUT ID: UT12a

Measurement Results:

802.11b/g mode

Mode	Data Rate (Mbps)	Test Result (dBm)		
		2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)
802.11b	1	16.40	/	/
	2	16.82	/	/
	5.5	17.91	/	/
	11	19.54	19.57	19.22
802.11g	6	23.54	/	/
	9	23.84	/	/
	12	23.46	/	/
	18	23.54	/	/
	24	24.14	24.00	22.75
	36	23.06	/	/
	48	23.30	/	/
	54	23.28	/	/

The data rate 11Mbps and 24Mbps are selected as worst condition, and the following cases are performed with this condition.

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802.11n-HT20 mode

Mode	Data Rate (Index)	Test Result (dBm)		
		2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)
802.11n (20MHz)	MCS0	23.66	23.59	21.36
	MCS1	23.34	/	/
	MCS2	23.01	/	/
	MCS3	23.62	/	/
	MCS4	23.65	/	/
	MCS5	22.68	/	/
	MCS6	22.64	/	/
	MCS7	22.65	/	/

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

Duty cycle

Mode	11b	11g	11n-20M
Duty Cycle	95%	87%	96%

Conclusion: Pass

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A.3. Peak Power Spectral Density

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: UT12a

Measurement Results:

802.11b/g mode

Mode	Channel	Power Spectral Density (dBm/3 kHz)	Conclusion
802.11b	1	-8.72	**P**
	6	-9.62	**P**
	11	-9.31	**P**
802.11g	1	-8.49	**P**
	6	-7.79	**P**
	11	-9.48	**P**

802.11n-HT20 mode

Mode	Channel	Power Spectral Density (dBm/3 kHz)	Conclusion
802.11n (HT20)	1	-8.32	**P**
	6	-9.49	**P**
	11	-11.20	**P**

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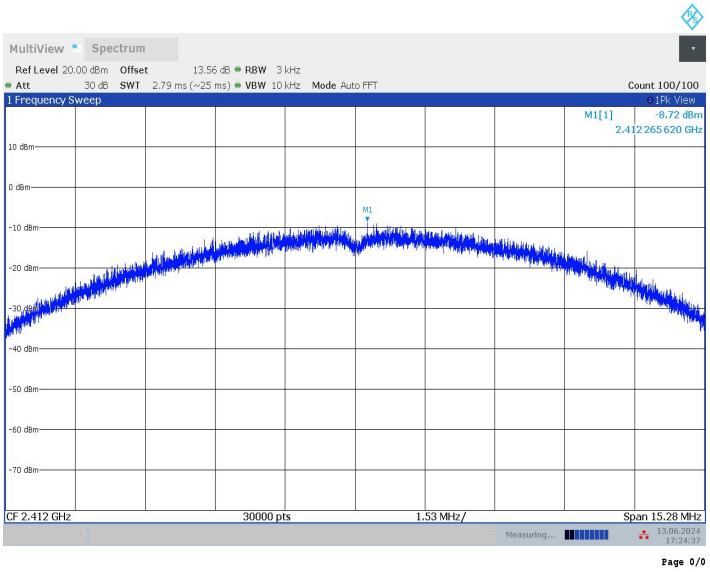
Test graphs as below:

11B_2412



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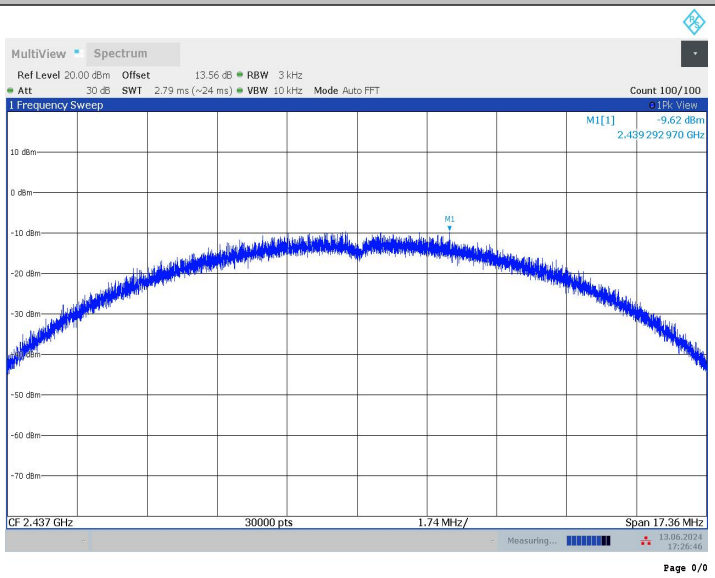

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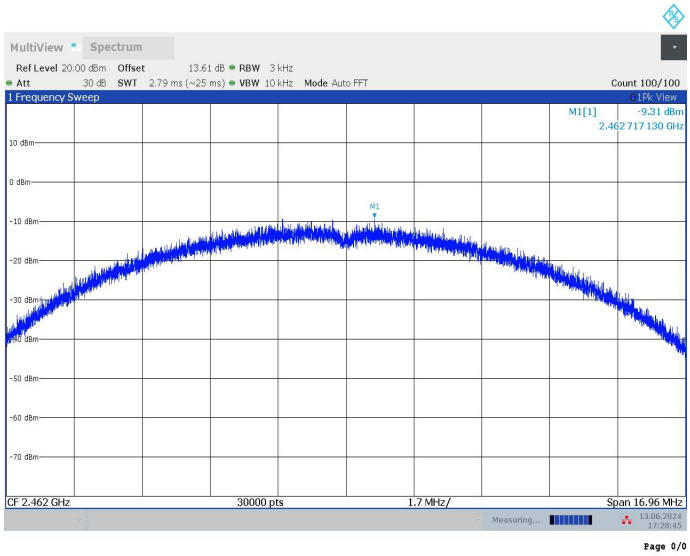

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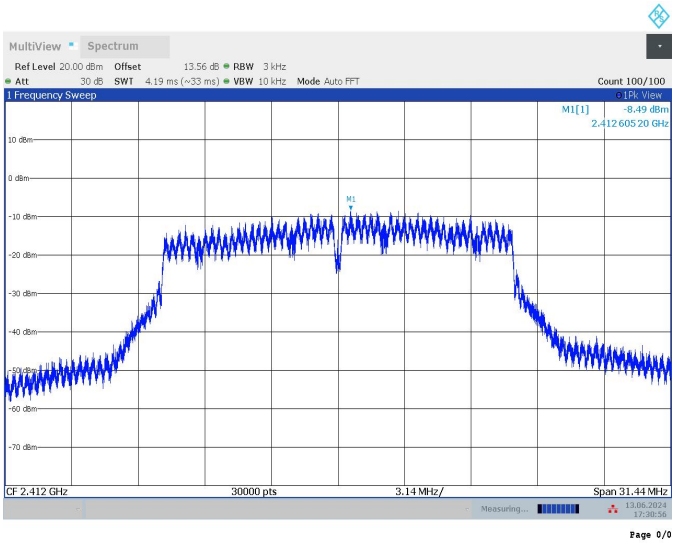

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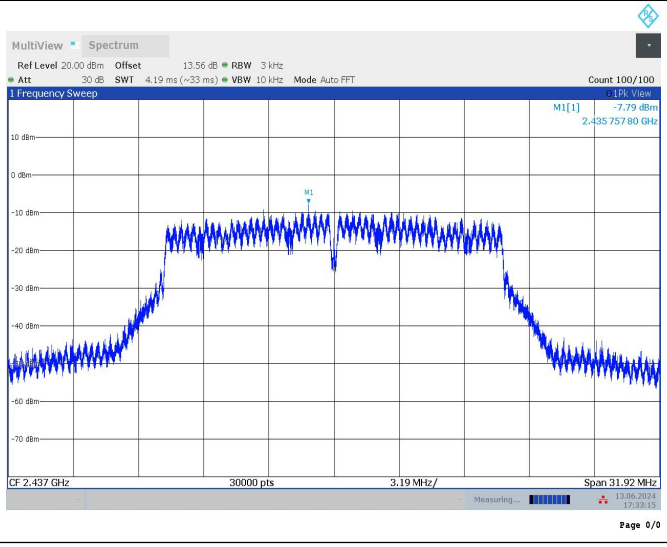

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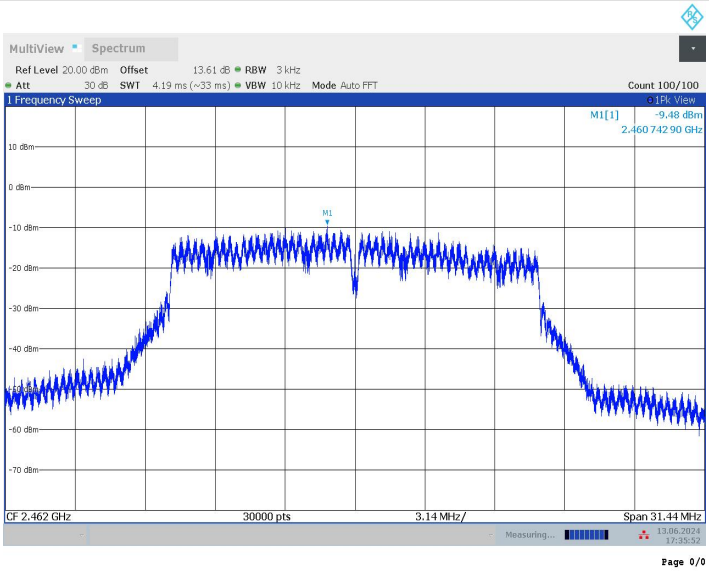
11G_2462



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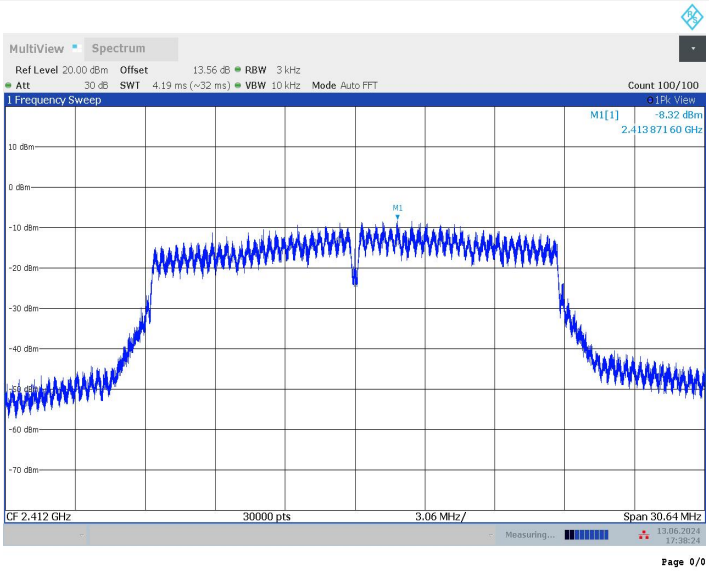

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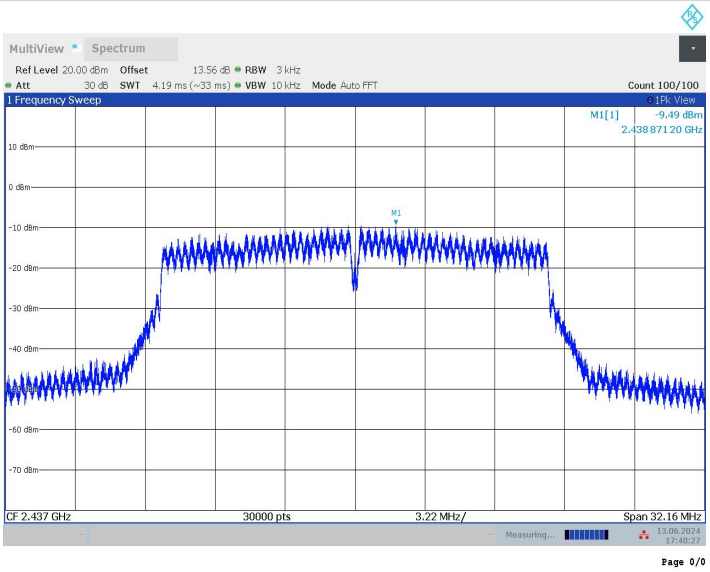

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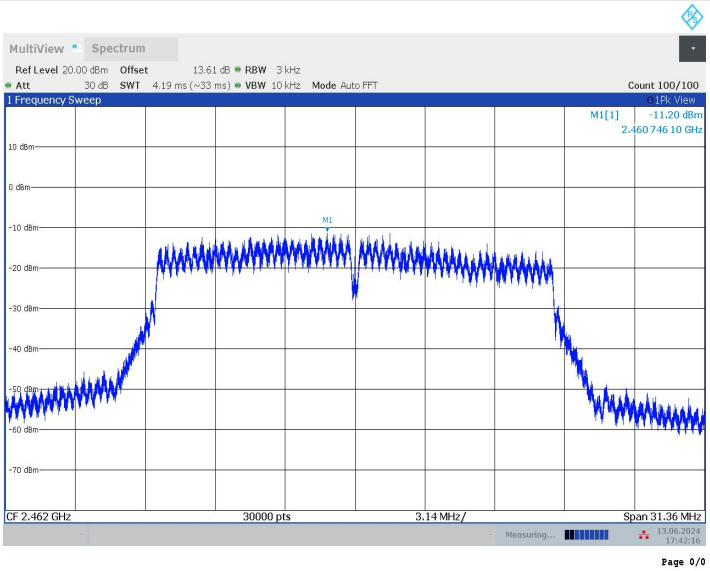

Conclusion: Pass

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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: UT12a

Measurement Result:

802.11b/g mode

Mode	Channel	DTS Bandwidth (kHz)	conclusion
802.11b	1	7.64	**P**
	6	8.68	**P**
	11	8.48	**P**
802.11g	1	15.72	**P**
	6	15.96	**P**
	11	15.72	**P**

802.11n-HT20 mode

Mode	Channel	DTS Bandwidth (kHz)	conclusion
802.11n (HT20)	1	15.32	**P**
	6	16.08	**P**
	11	15.68	**P**

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Test graphs as below:

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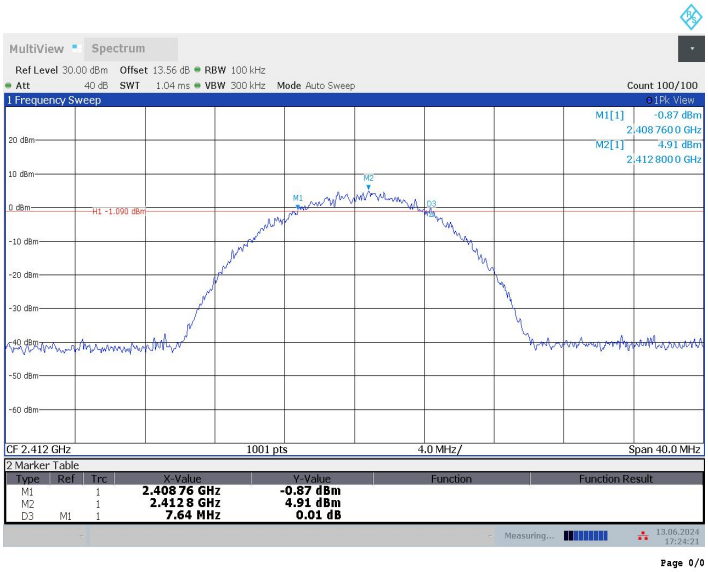

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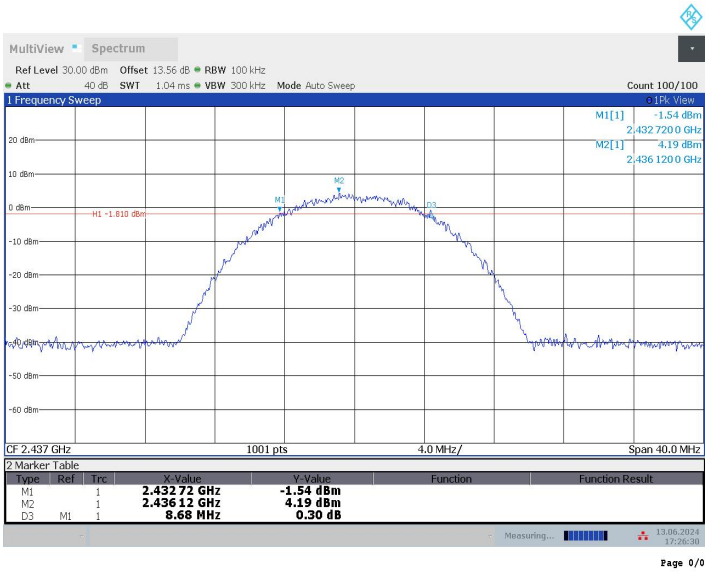

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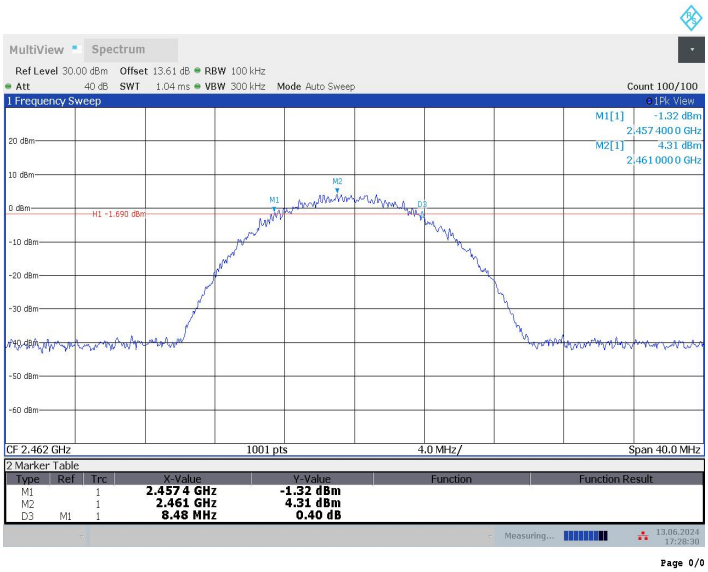

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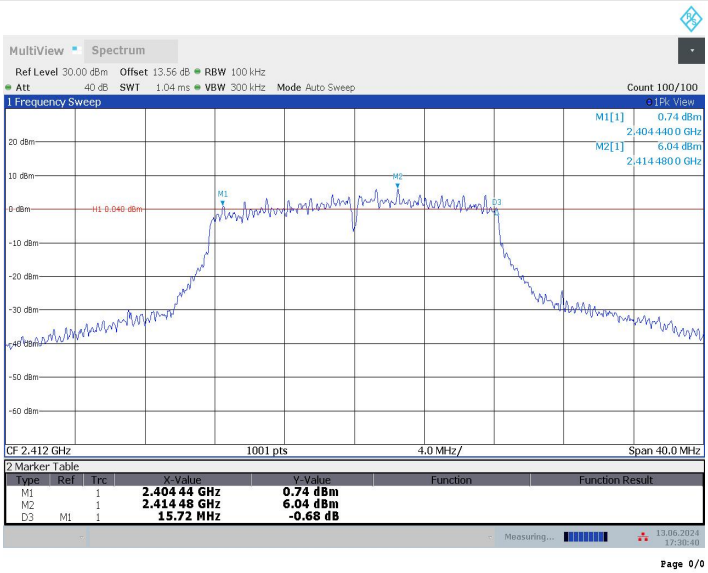

11G_2437

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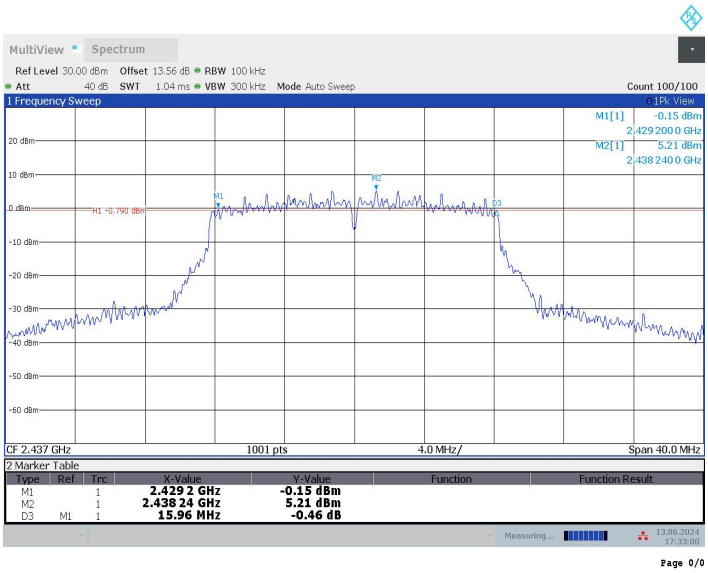

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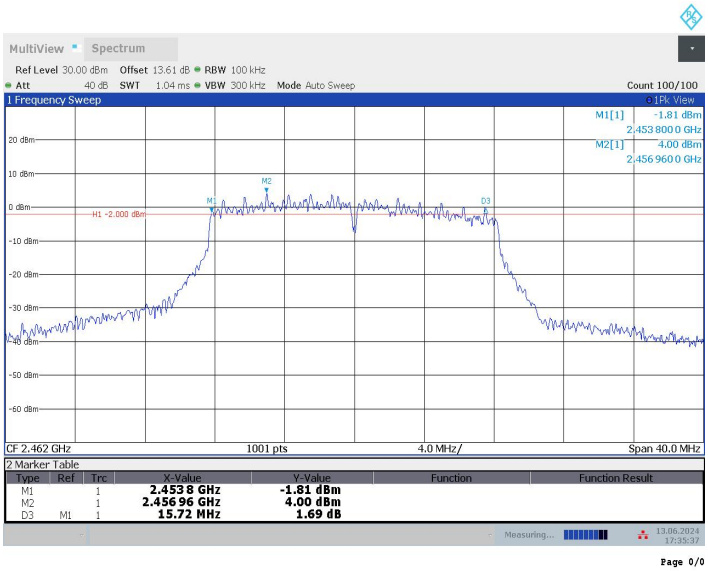

11N20SISO_2412

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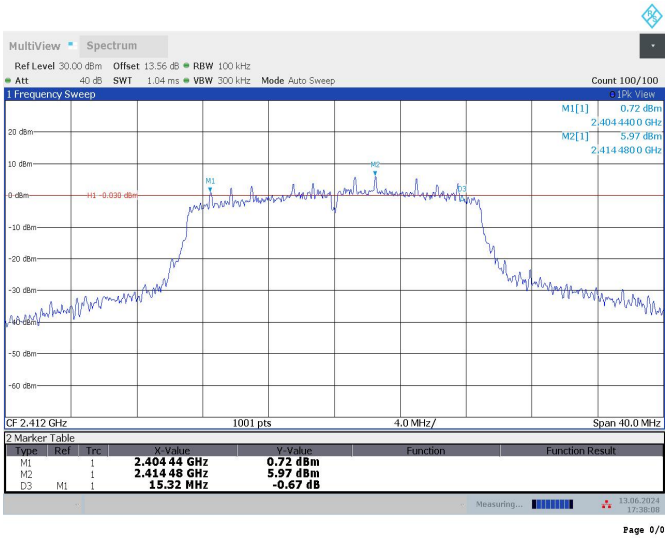

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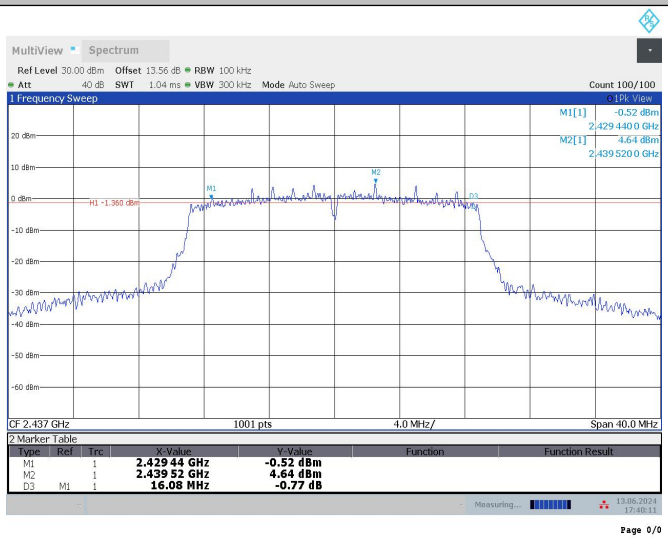

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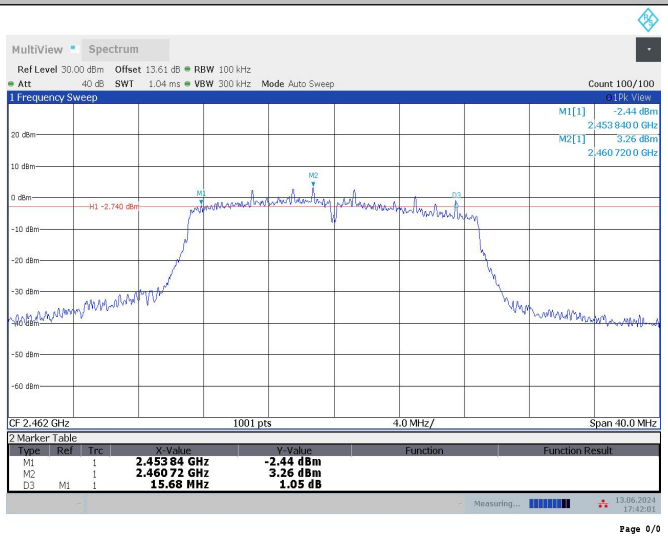

Conclusion: Pass

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A.5. Band Edges Compliance

Method of Measurement: See ANSI C63.10-2013-clause 6.10.4

Connect the spectrum analyzer to the EUT using an appropriate RF cable connected to the EUT output. Configure the spectrum analyzer settings as described below.

a) Set Span = 100MHz
b) Sweep Time: coupled
c) Set the RBW= 100 kHz
c) Set the VBW= 300 kHz
d) Detector: Peak
e) Trace: Max hold

Measurement Limit:

Standard	Limit (dBc)
FCC 47 CFR Part 15.247 (d)	> 20

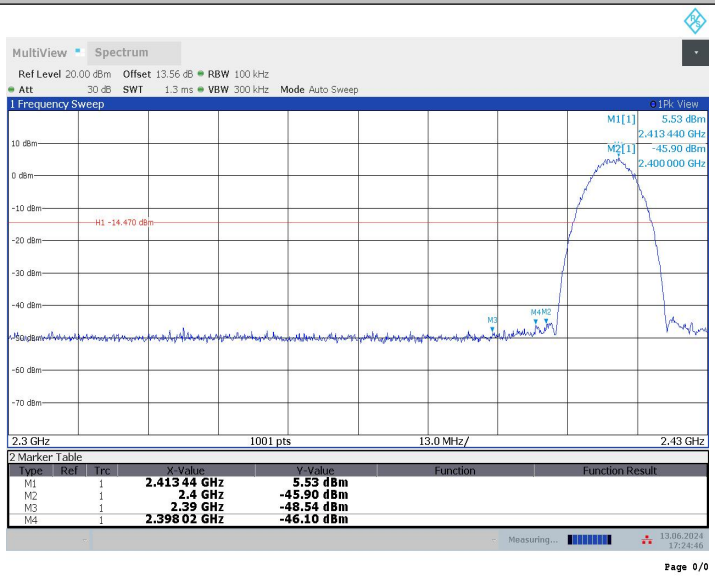
EUT ID: UT12a

Measurement Result:

TestMode	ChName	Frequency[MHz]	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
11B	Low	2412	5.53	-46.1	≤-14.47	PASS
	High	2462	5.00	-46.73	≤-15	PASS
11G	Low	2412	6.36	-29.79	≤-13.64	PASS
	High	2462	4.61	-45.75	≤-15.39	PASS
11N20SISO	Low	2412	6.17	-29.07	≤-13.83	PASS
	High	2462	3.55	-46.91	≤-16.45	PASS

Test graphs as below:

11B_Low_2412



11B_High_2462

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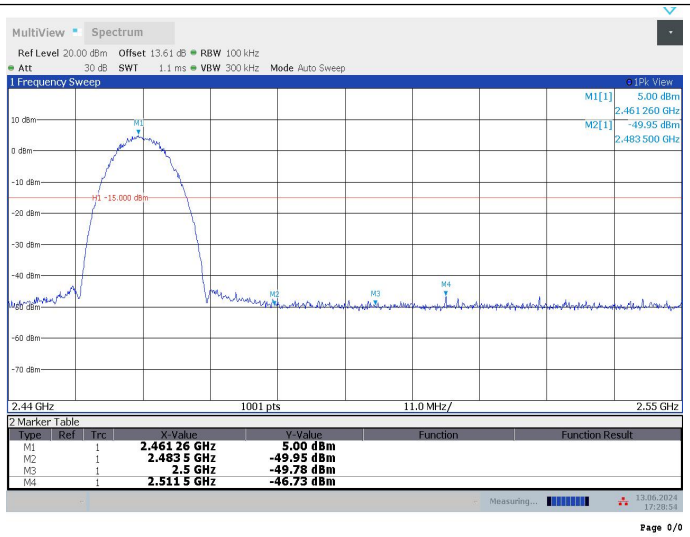
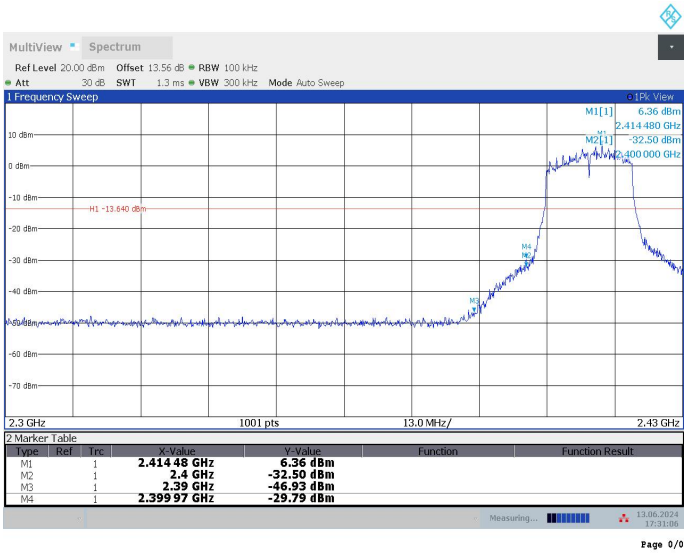
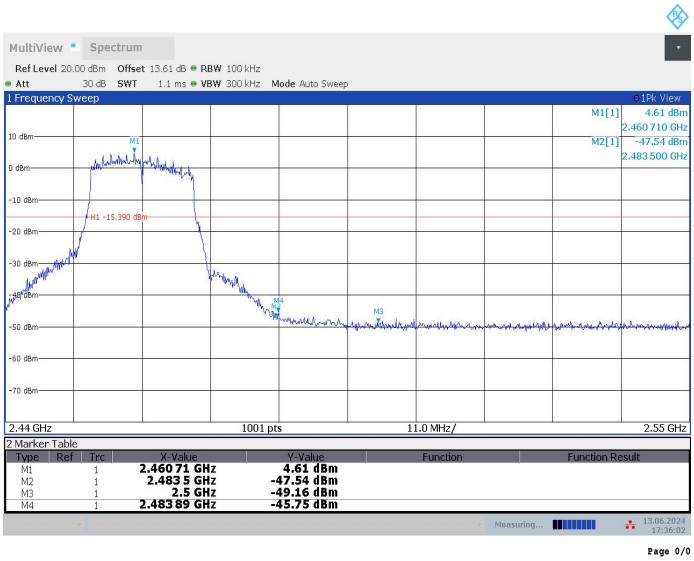


11G_Low_2412



11G_High_2462



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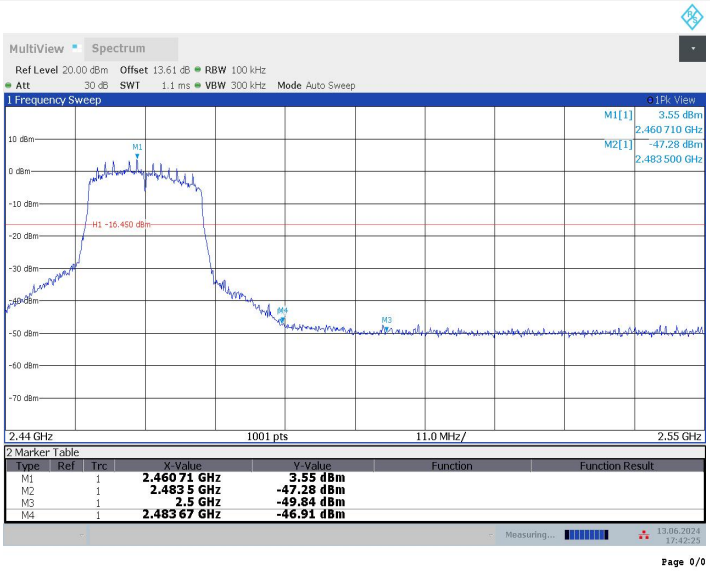
11N20SISO_Low_2412

11N20SISO_High_2462



Conclusion: Pass

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A.6. Transmitter Spurious Emission– Conducted

Method of Measurement: See ANSI C63.10-2013-clause 11.11

Establish a reference level by using the following procedure:

a) Set instrument center frequency to DTS channel center frequency
b) Set the span to ≥ 1.5 times the DTS bandwidth
c) Set the RBW= 100 kHz
d) Set the VBW= 300 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 PSD level

Note that the channel found to contain the maximum PSD level can be used to establish the reference level.

Establish an emission level by using the following procedure:

a) Set the center frequency and span to encompass frequency range to be measured.
b) Set the RBW = 100 kHz.
c) Set the VBW = 300 kHz.
d) Detector = peak.
e) Sweep time = auto couple.
f) Trace mode = max hold.
g) Allow trace to fully stabilize.
h) Use the peak marker function to determine the maximum amplitude level.

Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) is attenuated by at least the minimum requirements specified in 11.11. Report the three highest emissions relative to the limit.

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247 (d)	20dB below peak output power in 100 kHz bandwidth

EUT ID: UT12a

Measurement Results:

TestMode	Frequency[MHz]	FreqRange [Mhz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B	2412	Reference	4.96	4.96	---	PASS
		30~1000	4.96	-41.15	≤-15.04	PASS
		1000~26500	4.96	-45.17	≤-15.04	PASS
	2437	Reference	5.57	5.57	---	PASS
		30~1000	5.57	-56.41	≤-14.43	PASS
		1000~26500	5.57	-49.54	≤-14.43	PASS
	2462	Reference	5.01	5.01	---	PASS

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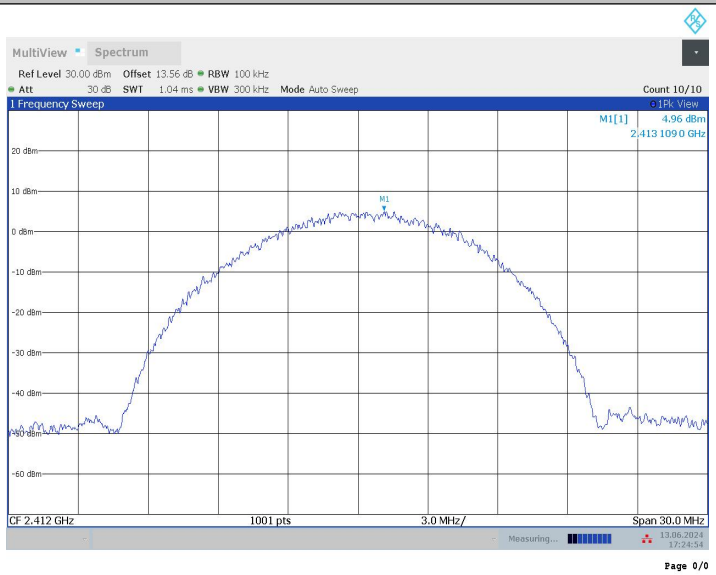
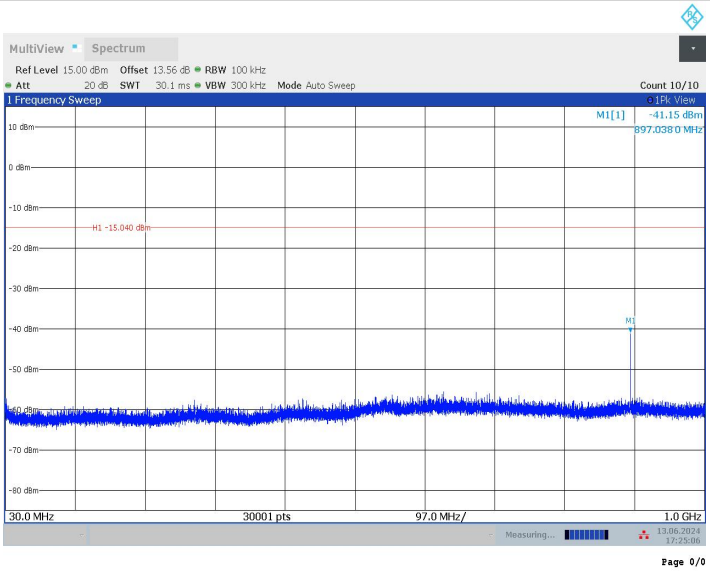
		30~1000	5.01	-55.77	≤-14.99	PASS
		1000~26500	5.01	-44.07	≤-14.99	PASS
11G	2412	Reference	5.99	5.99	---	PASS
		30~1000	5.99	-55.51	≤-14.01	PASS
		1000~26500	5.99	-48.76	≤-14.01	PASS
	2437	Reference	5.23	5.23	---	PASS
		30~1000	5.23	-55.53	≤-14.77	PASS
		1000~26500	5.23	-49.83	≤-14.77	PASS
	2462	Reference	4.15	4.15	---	PASS
		30~1000	4.15	-55.59	≤-15.85	PASS
		1000~26500	4.15	-49.7	≤-15.85	PASS
11N20SISO	2412	Reference	5.84	5.84	---	PASS
		30~1000	5.84	-56.63	≤-14.16	PASS
		1000~26500	5.84	-48.82	≤-14.16	PASS
	2437	Reference	5.26	5.26	---	PASS
		30~1000	5.26	-55.66	≤-14.74	PASS
		1000~26500	5.26	-49.47	≤-14.74	PASS
	2462	Reference	3.06	3.06	---	PASS
		30~1000	3.06	-55.5	≤-16.94	PASS
		1000~26500	3.06	-49.68	≤-16.94	PASS

Test graphs as below:

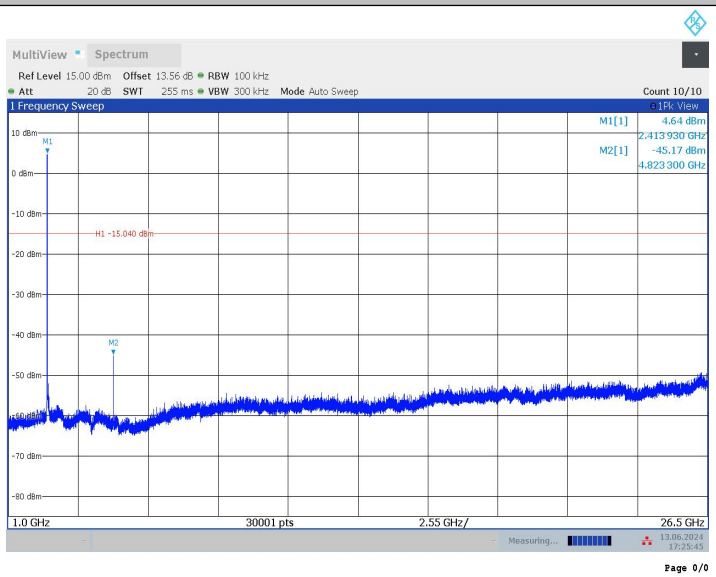
11B_2412_0~Reference



11B_2412_30~1000



11B_2412_1000~26500



11B_2437_0~Reference

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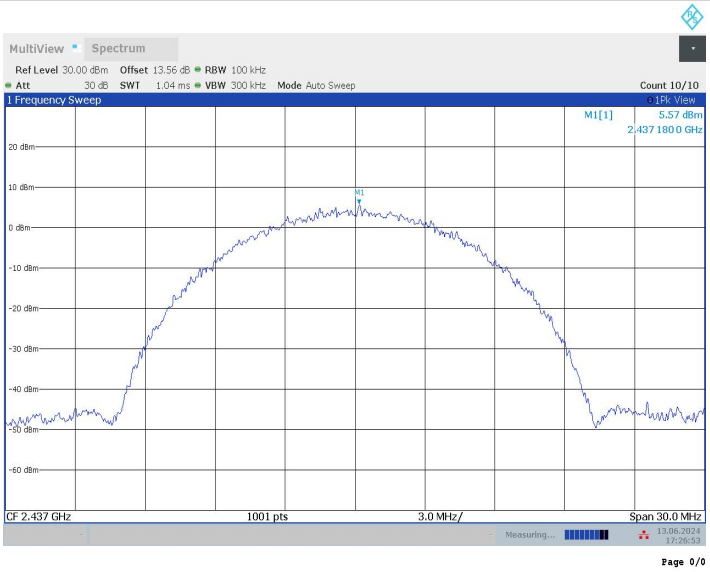

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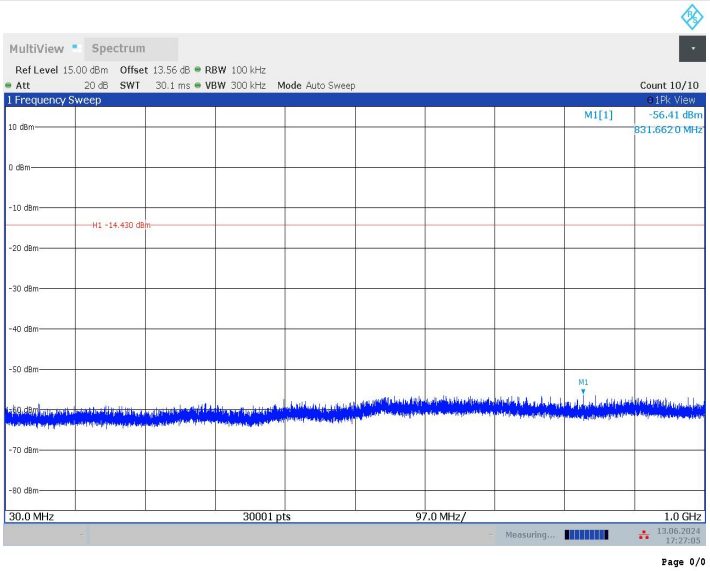

11B_2437_1000~26500

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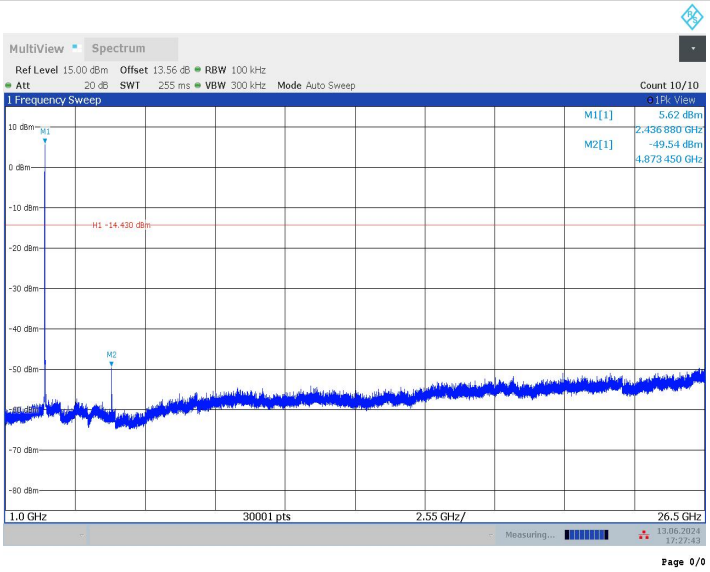

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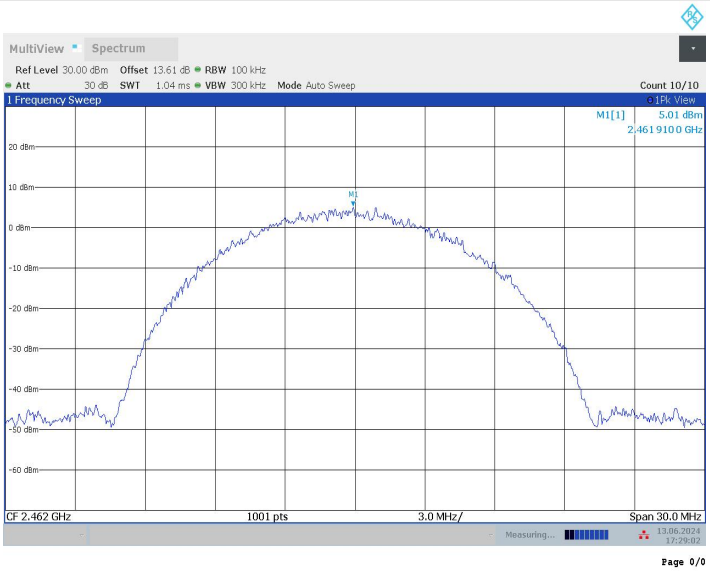

11B_2462_30~1000

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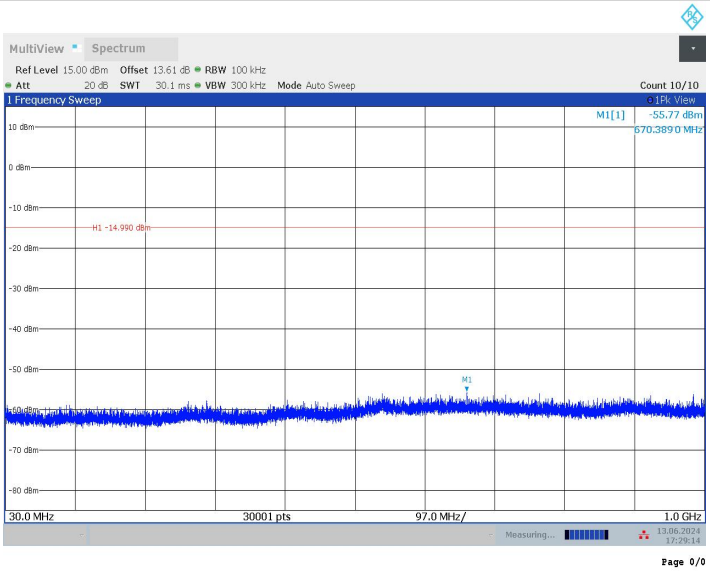

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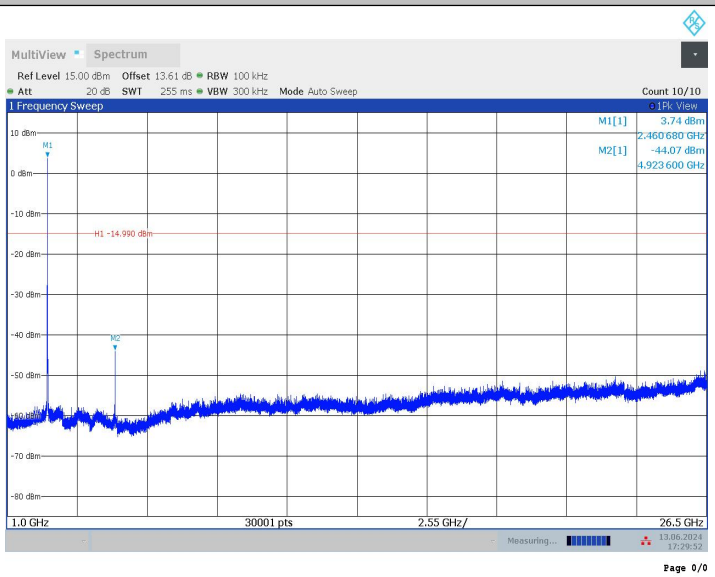

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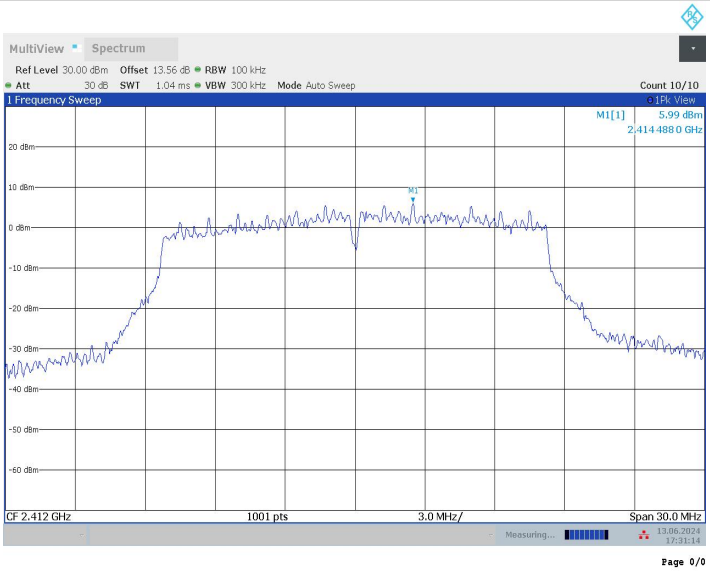

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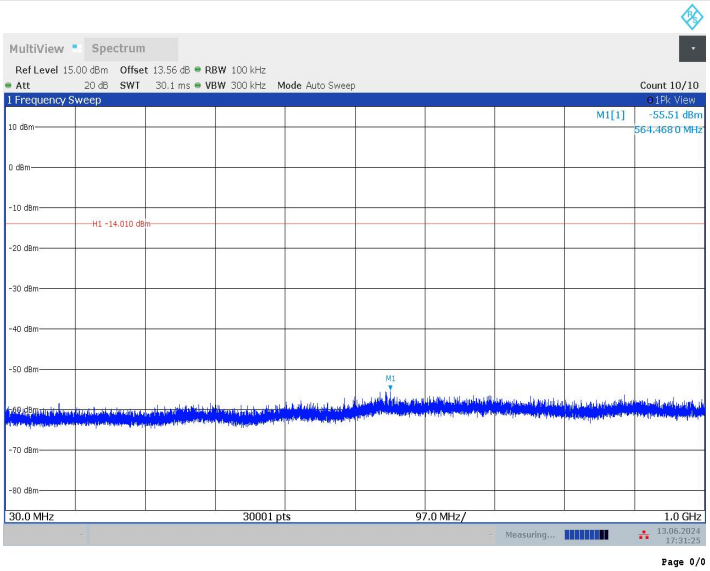

11G_2412_1000~26500

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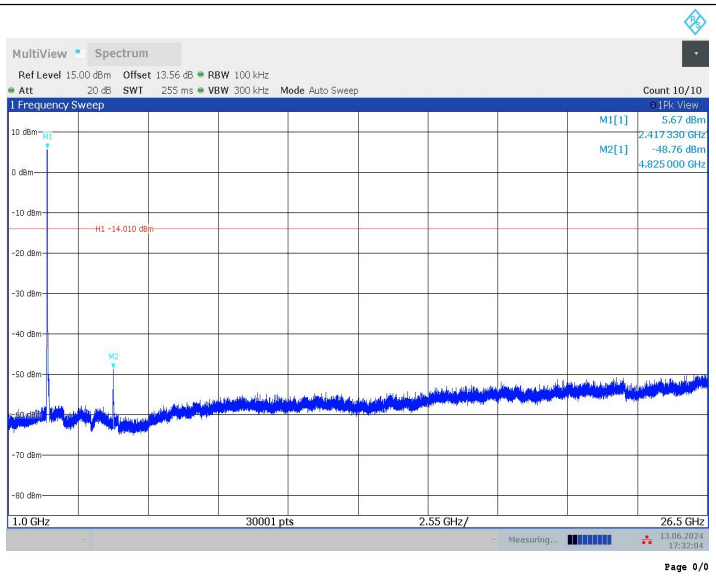

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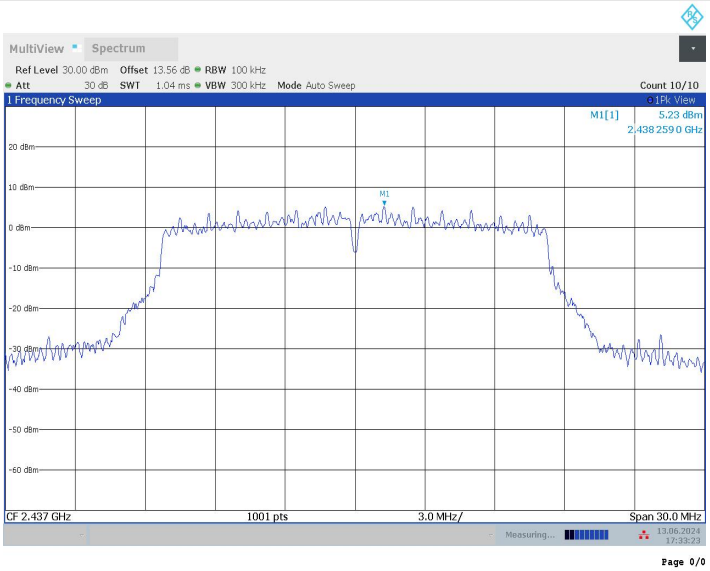

11G_2437_30~1000

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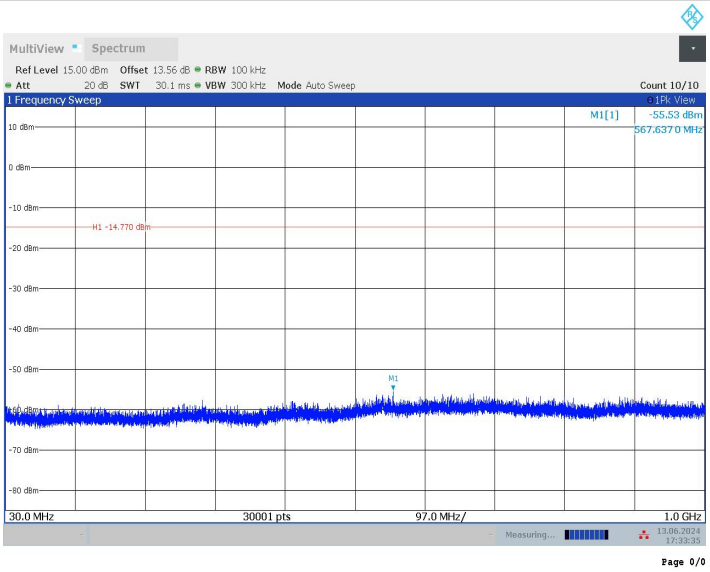

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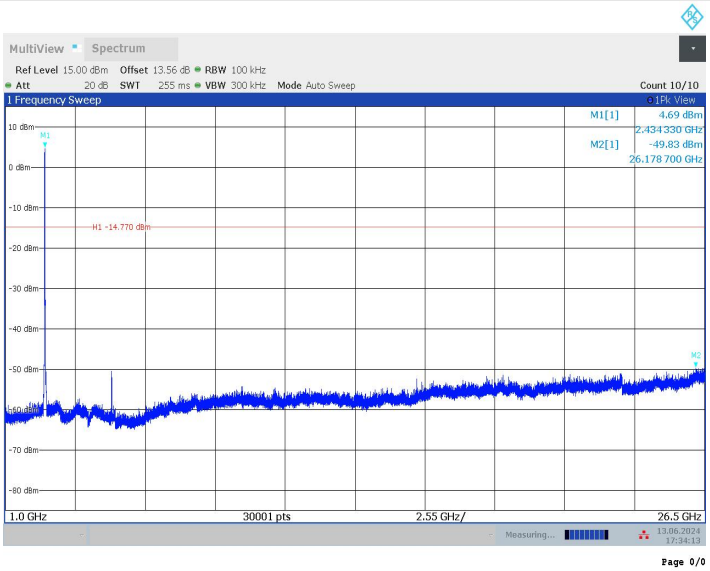

11G_2462_0~Reference

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