FCC PART 15C
TEST REPORT
No.24T04Z200128-005

for

Samsung Electronics Co., Ltd.

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

SM-A065F/DS

FCC ID: ZCASMA065F

with

Hardware Version: REV1.0

Software Version: A065F.001

Issued Date: 2024-06-24

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.

Test Laboratory:

CTTL-Telecommunication Technology Labs, CAICT

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
24T04Z200128-005	Rev.0	1st edition	2024-06-24

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: 2024-06-14

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:	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

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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-A065F/DS
FCC ID	ZCASMA065F
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	24.07dBm
Nominal Voltage	3.85V

3.2. Internal Identification of EUT

EUT ID*	SN or IMEI	HW Version	SW Version	Date of receipt
UT08a	2404200128UT08a	REV1.0	A065F.001	2024-05-20
UT11a	2404200128UT11a	REV1.0	A065F.001	2024-05-20

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

UT08a is used for Conduction test, UT11a 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

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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

5. LABORATORY ENVIRONMENT

Conducted RF performance testing is performed in shielding room.

EMC performance testing is performed in Semi-anechoic chamber.

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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**
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	2025-04-06
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

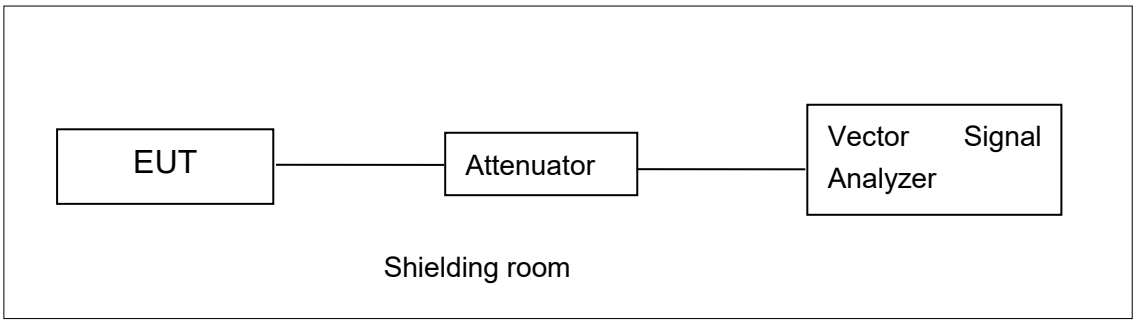

Fig.A.1.1.1: Test Setup Diagram for Conducted Measurements

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: UT08a

Measurement Results:

802.11b/g mode

Mode	Data Rate (Mbps)	Test Result (dBm)		
		2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)
802.11b	1	17.09	/	/
	2	17.43	/	/
	5.5	18.69	/	/
	11	20.04	19.78	19.55
802.11g	6	23.76	/	/
	9	23.79	/	/
	12	23.59	/	/
	18	23.70	/	/
	24	24.07	23.83	22.20
	36	23.34	/	/
	48	23.52	/	/
	54	23.48	/	/

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	23.80	/	/
	MCS1	23.38	/	/
	MCS2	23.57	/	/
	MCS3	23.94	23.87	22.00
	MCS4	23.80	/	/
	MCS5	22.87	/	/
	MCS6	22.79	/	/
	MCS7	22.82	/	/

The data rate MCS3 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%	87%

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: UT08a

Measurement Results:

802.11b/g mode

Mode	Channel	Power Spectral Density (dBm/3 kHz)		Conclusion
802.11b	1	Fig.A.3.1	-8.63	**P**
	6	Fig.A.3.2	-8.99	**P**
	11	Fig.A.3.3	-8.49	**P**
802.11g	1	Fig.A.3.4	-7.89	**P**
	6	Fig.A.3.5	-8.97	**P**
	11	Fig.A.3.6	-10.31	**P**

802.11n-HT20 mode

Mode	Channel	Power Spectral Density (dBm/3 kHz)		Conclusion
802.11n (HT20)	1	Fig.A.3.7	-8.16	**P**
	6	Fig.A.3.8	-8.87	**P**
	11	Fig.A.3.9	-10.93	**P**

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Test graphs as below:

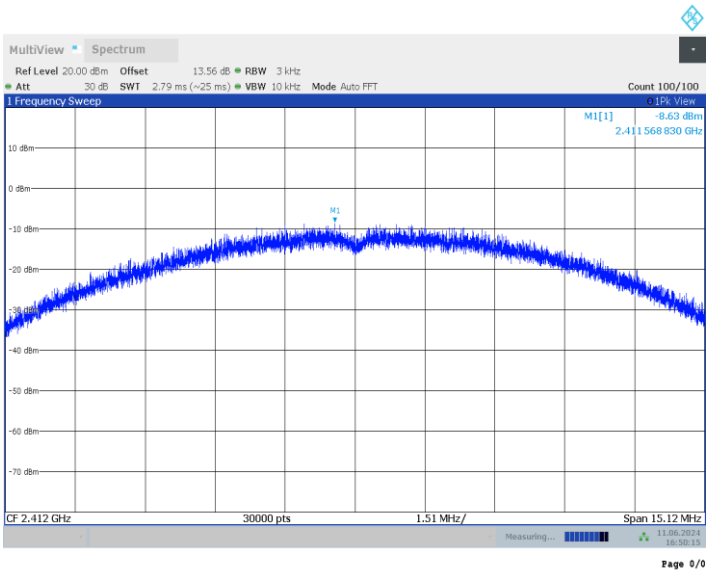

Fig.A.3.1 Power Spectral Density(802.11b,Ch1)

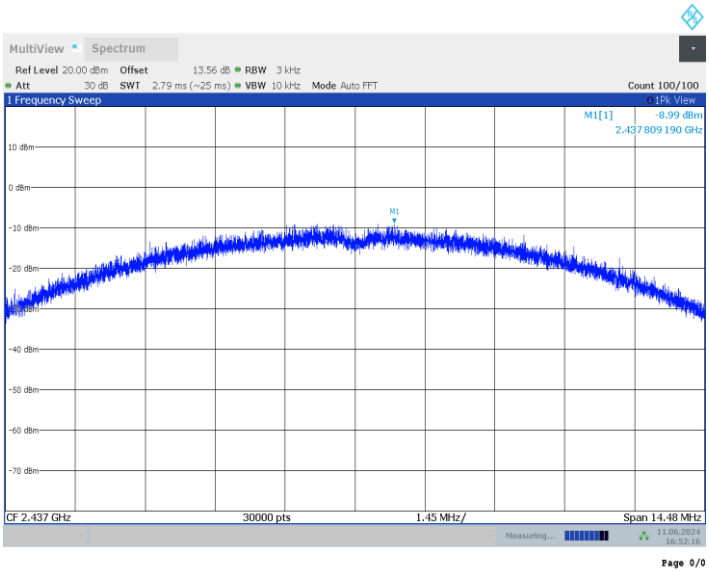

Fig.A.3.2 Power Spectral Density (802.11b, Ch 6)

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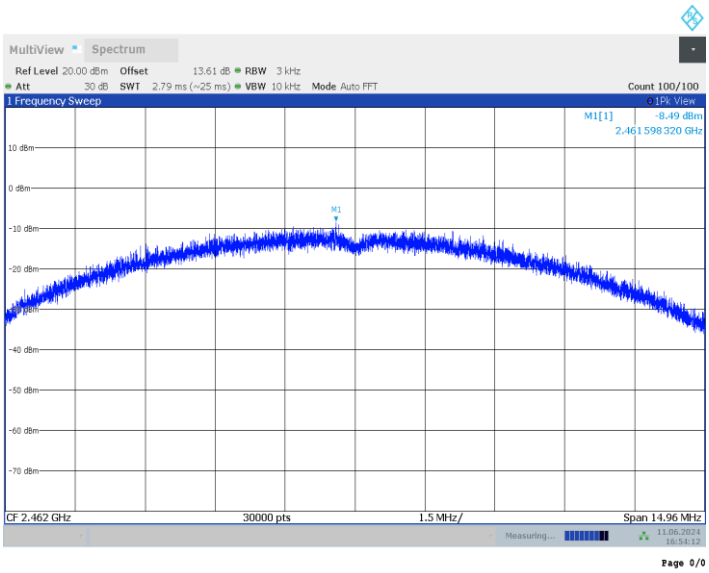

Fig.A.3.3 Power Spectral Density (802.11b, Ch 11)

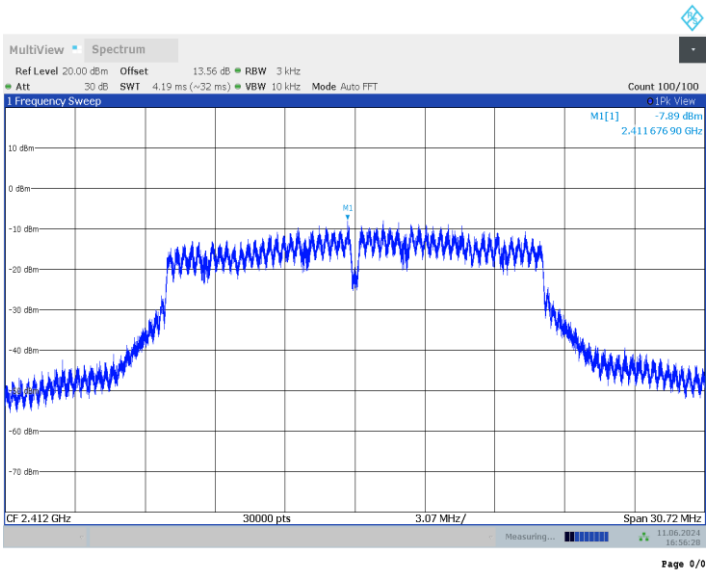

Fig.A.3.4 Power Spectral Density (802.11g, Ch 1)

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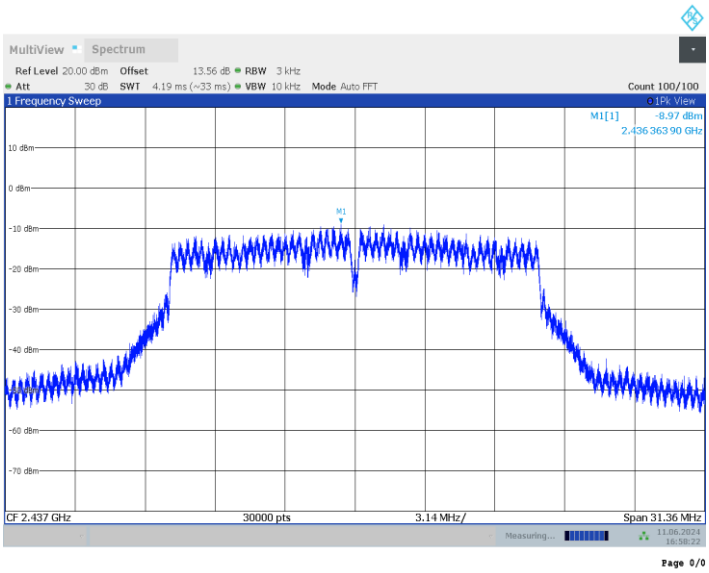

Fig.A.3.5 Power Spectral Density (802.11g, Ch 6)

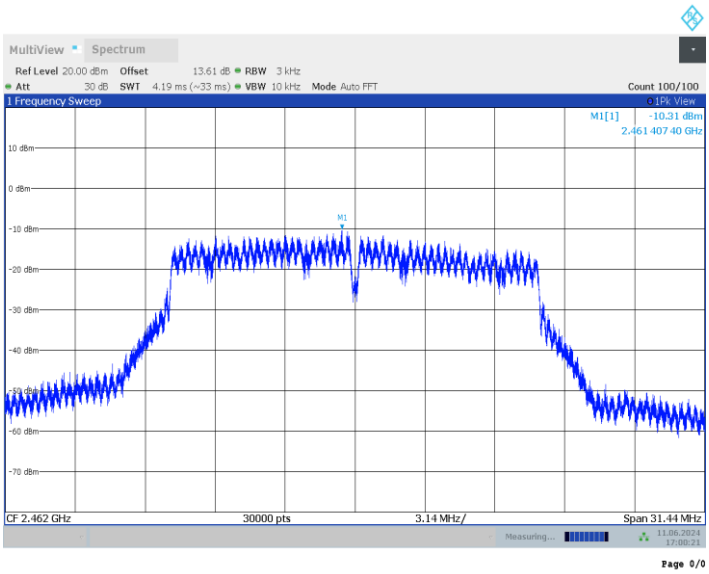

Fig.A.3.6 Power Spectral Density (802.11g, Ch 11)

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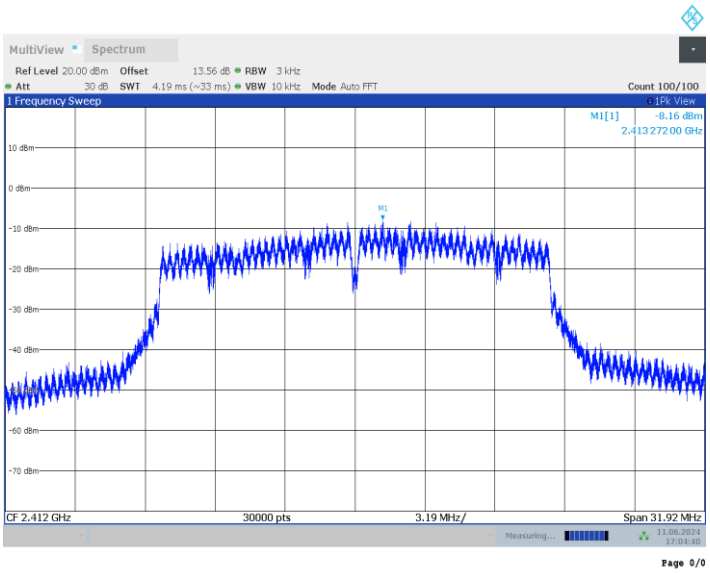

Fig.A.3.7 Power Spectral Density (802.11n-HT20, Ch 1)

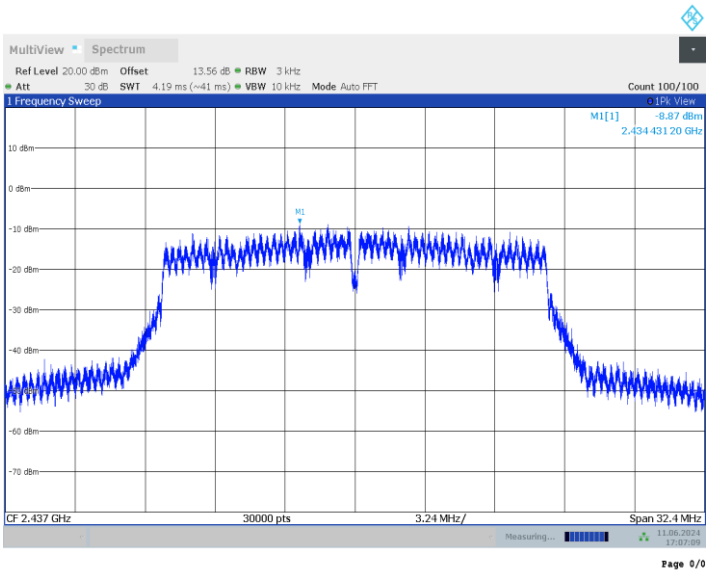

Fig.A.3.8 Power Spectral Density (802.11n-HT20, Ch 6)

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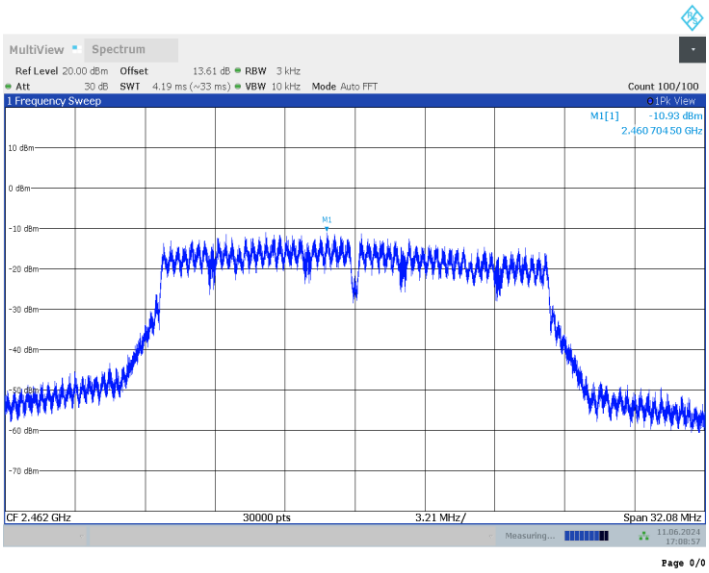

Fig.A.3.9 Power Spectral Density (802.11n-HT20, Ch 11)

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: UT08a

Measurement Result:

802.11b/g mode

Mode	Channel	DTS Bandwidth (MHz)		conclusion
802.11b	1	Fig.A.4.1	7.56	**P**
	6	Fig.A.4.2	7.24	**P**
	11	Fig.A.4.3	7.48	**P**
802.11g	1	Fig.A.4.4	15.36	**P**
	6	Fig.A.4.5	15.68	**P**
	11	Fig.A.4.6	15.72	**P**

802.11n-HT20 mode

Mode	Channel	DTS Bandwidth (MHz)		conclusion
802.11n (HT20)	1	Fig.A.4.7	15.96	**P**
	6	Fig.A.4.8	16.20	**P**
	11	Fig.A.4.9	16.04	**P**

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Test graphs as below:

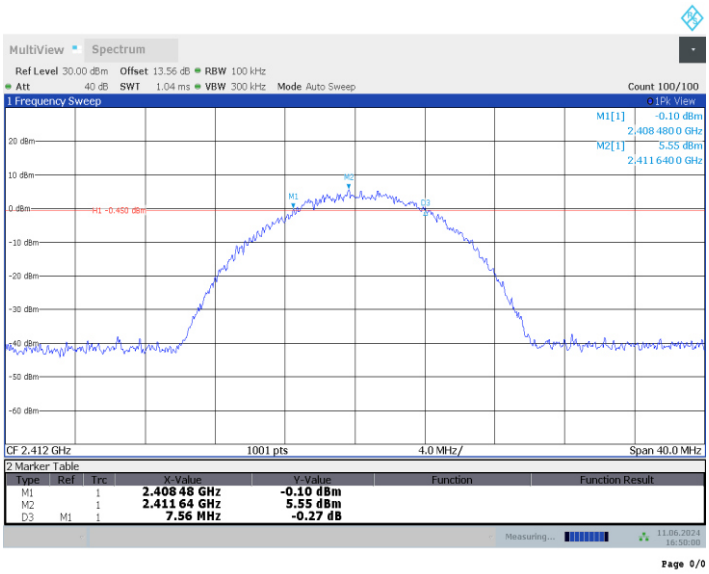

Fig.A.4.1 DTS Bandwidth(802.11b,Ch 1)

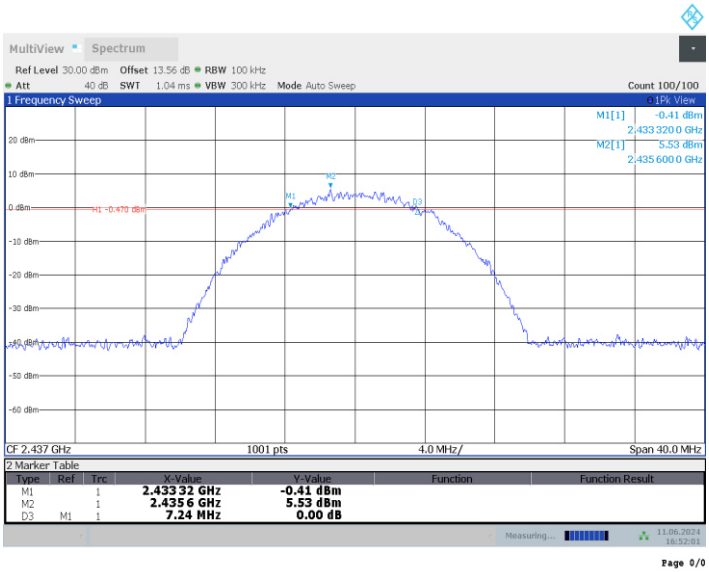

Fig.A.4.2 DTS Bandwidth (802.11b, Ch 6)

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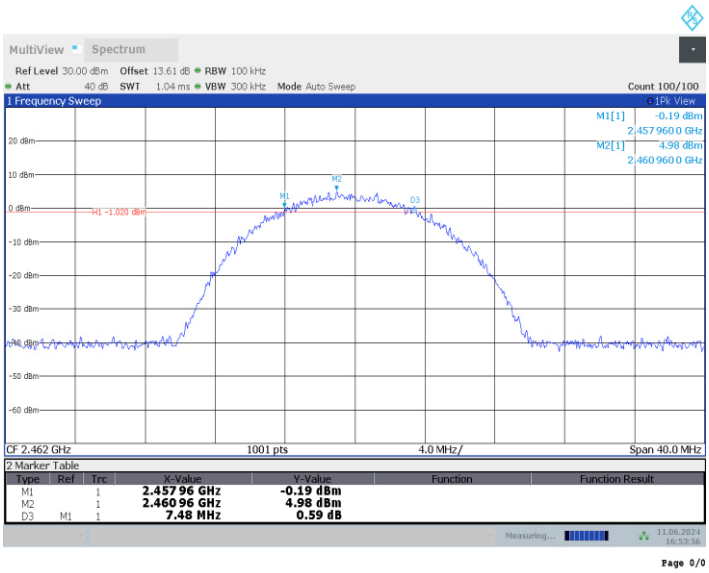

Fig.A.4.3 DTS Bandwidth (802.11b, Ch 11)

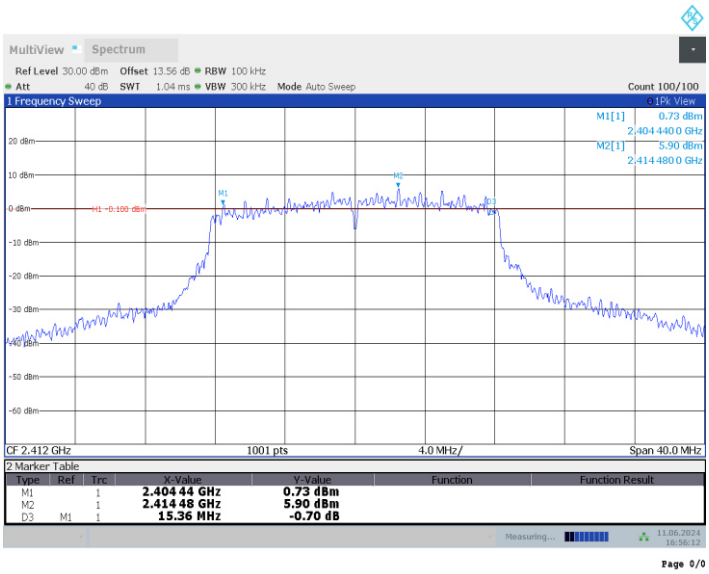

Fig.A.4.4 DTS Bandwidth (802.11g, Ch 1)

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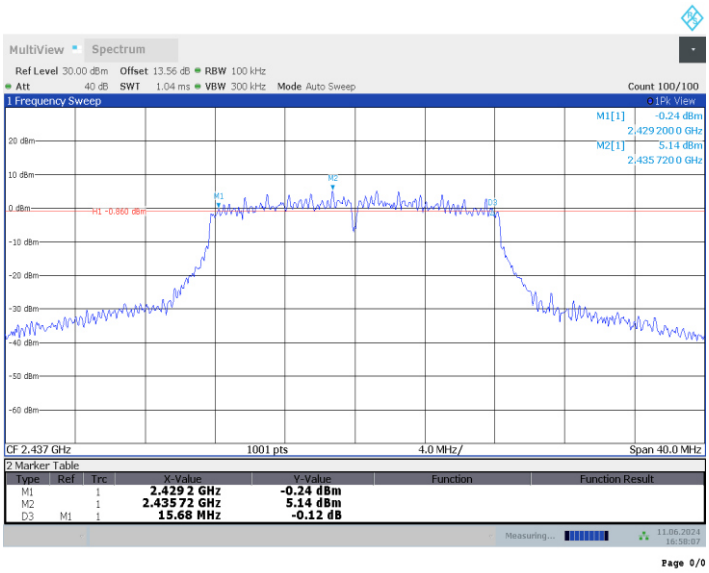

Fig.A.4.5 DTS Bandwidth (802.11g, Ch 6)

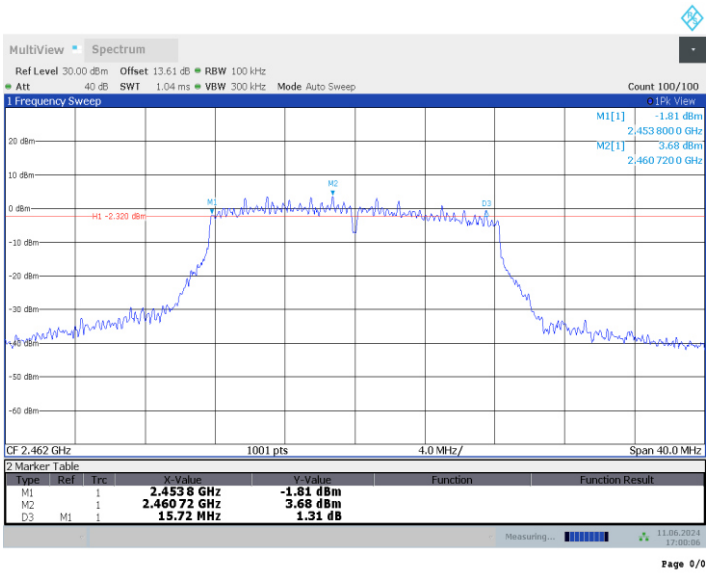

Fig.A.4.6 DTS Bandwidth (802.11g, Ch 11)

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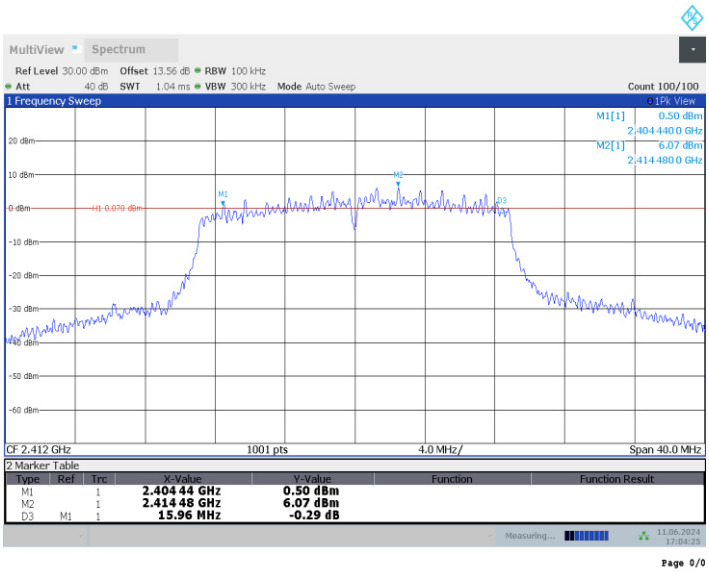

Fig.A.4.7 DTS Bandwidth (802.11n-20MHz, Ch 1)

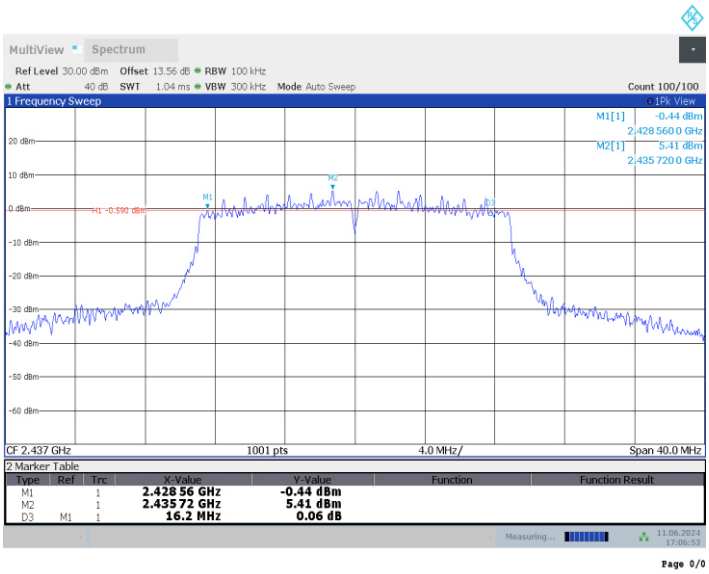

Fig.A.4.8 DTS Bandwidth (802.11n-HT20, Ch 6)

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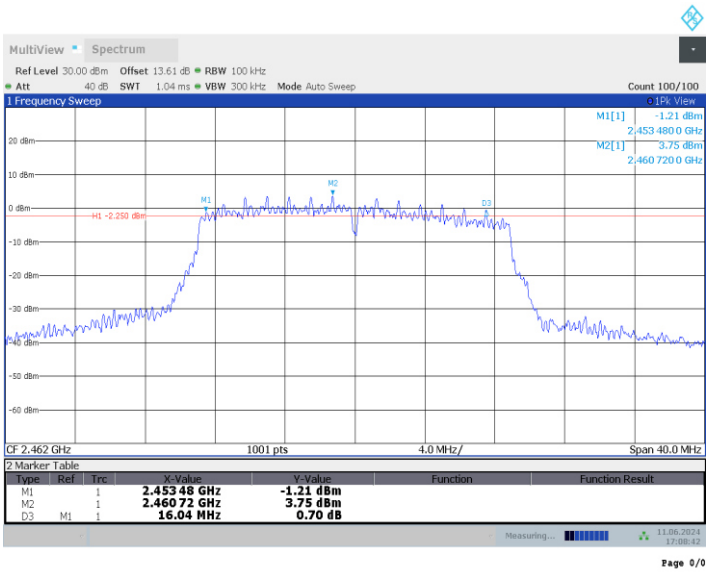

Fig.A.4.9 DTS Bandwidth (802.11n-HT20, Ch 11)

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: UT08a

Measurement Result:

802.11b/g mode

Mode	Channel	Test Results	Conclusion
802.11b	1	Fig.A.5.1	**P**
	11	Fig.A.5.2	**P**
802.11g	1	Fig.A.5.3	**P**
	11	Fig.A.5.4	**P**

802.11n-HT20 mode

Mode	Channel	Test Results	Conclusion
802.11n (HT20)	1	Fig.A.5.5	**P**
	11	Fig.A.5.6	**P**

Test graphs as below:

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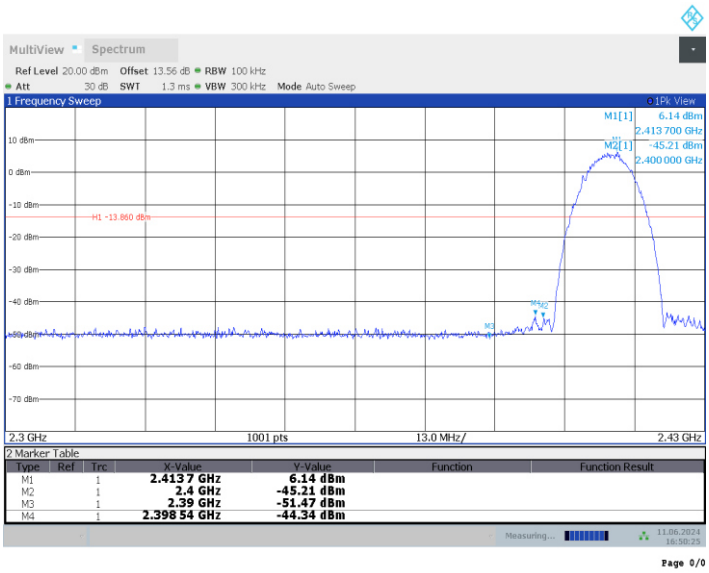

Fig.A.5.1 Band Edges (802.11b, Ch 1)

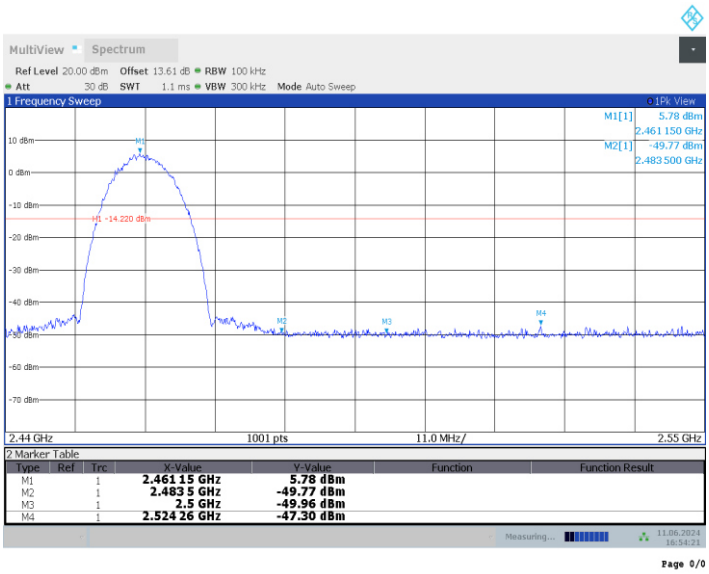

Fig.A.5.2 Band Edges (802.11b, Ch 11)

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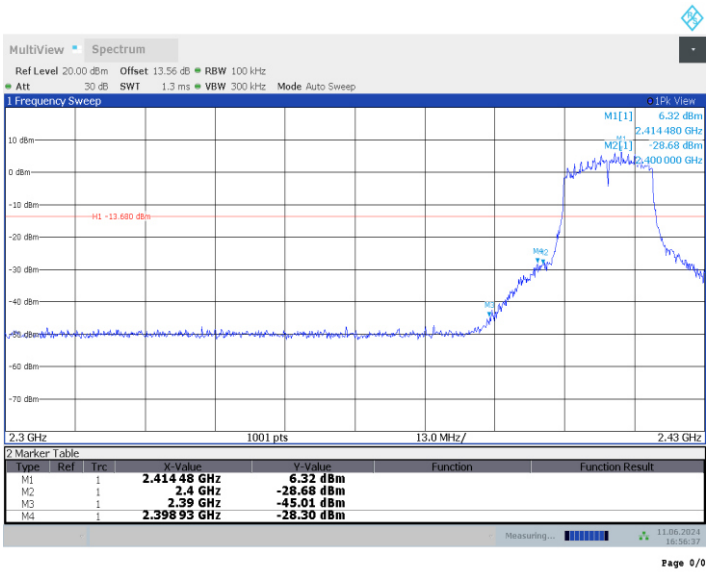

Fig.A.5.3 Band Edges (802.11g, Ch 1)

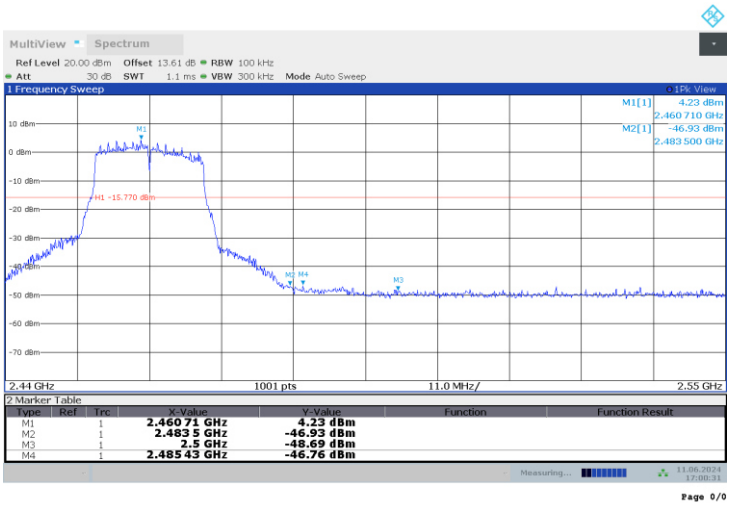

Fig.A.5.4 Band Edges (802.11g, Ch 11)

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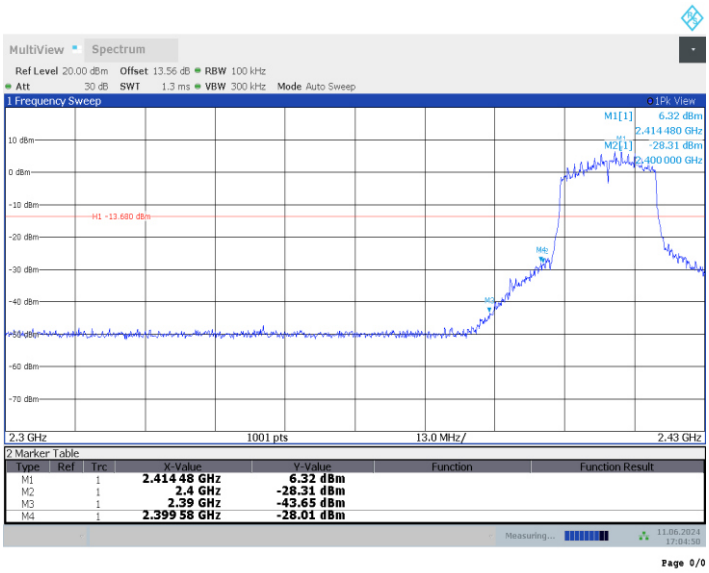

Fig.A.5.5 Band Edges (802.11n, Ch 1)

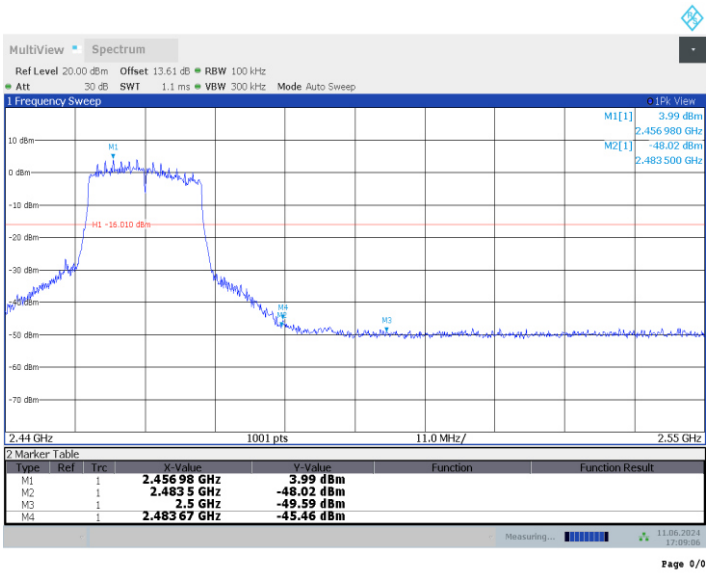

Fig.A.5.6 Band Edges (802.11n, Ch 11)

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: UT08a

Measurement Results:

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802.11b mode

MODE	Channel	Frequency Range	Test Results	Conclusion
802.11b	1	2.412 GHz	Fig.A.6.1	**P**
		30 MHz ~ 1 GHz	Fig.A.6.2	**P**
		1 GHz ~ 26 GHz	Fig.A.6.3	**P**
	6	2.437 GHz	Fig.A.6.4	**P**
		30 MHz ~ 1 GHz	Fig.A.6.5	**P**
		1 GHz ~ 26 GHz	Fig.A.6.6	**P**
	11	2.462 GHz	Fig.A.6.7	**P**
		30 MHz ~ 1 GHz	Fig.A.6.8	**P**
		1 GHz ~ 26 GHz	Fig.A.6.9	**P**

802.11g mode

MODE	Channel	Frequency Range	Test Results	Conclusion
802.11g	1	2.412 GHz	Fig.A.6.10	**P**
		30 MHz ~ 1 GHz	Fig.A.6.11	**P**
		1 GHz ~ 26 GHz	Fig.A.6.12	**P**
	6	2.437 GHz	Fig.A.6.13	**P**
		30 MHz ~ 1 GHz	Fig.A.6.14	**P**
		1 GHz ~ 26 GHz	Fig.A.6.15	**P**
	11	2.462 GHz	Fig.A.6.16	**P**
		30 MHz ~ 1 GHz	Fig.A.6.17	**P**
		1 GHz ~ 26 GHz	Fig.A.6.18	**P**

802.11n-HT20 mode

MODE	Channel	Frequency Range	Test Results	Conclusion
802.11n (HT20)	1	2.412 GHz	Fig.A.6.19	**P**
		30 MHz ~ 1 GHz	Fig.A.6.20	**P**
		1 GHz ~ 26 GHz	Fig.A.6.21	**P**
	6	2.437 GHz	Fig.A.6.22	**P**
		30 MHz ~ 1 GHz	Fig.A.6.23	**P**
		1 GHz ~ 26 GHz	Fig.A.6.24	**P**
	11	2.462 GHz	Fig.A.6.25	**P**
		30 MHz ~ 1 GHz	Fig.A.6.26	**P**
		1 GHz ~ 26 GHz	Fig.A.6.27	**P**

Test graphs as below:

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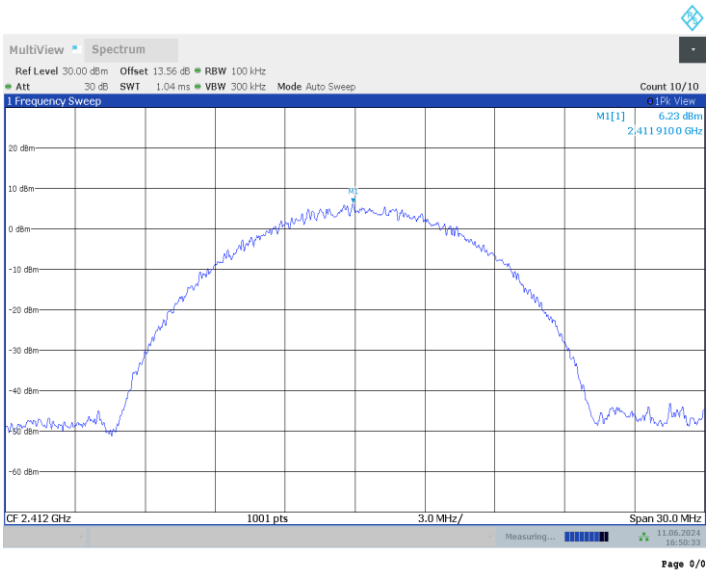

Fig.A.6.1 Transmitter Spurious Emission - Conducted (802.11b, Ch1, Center Frequency)

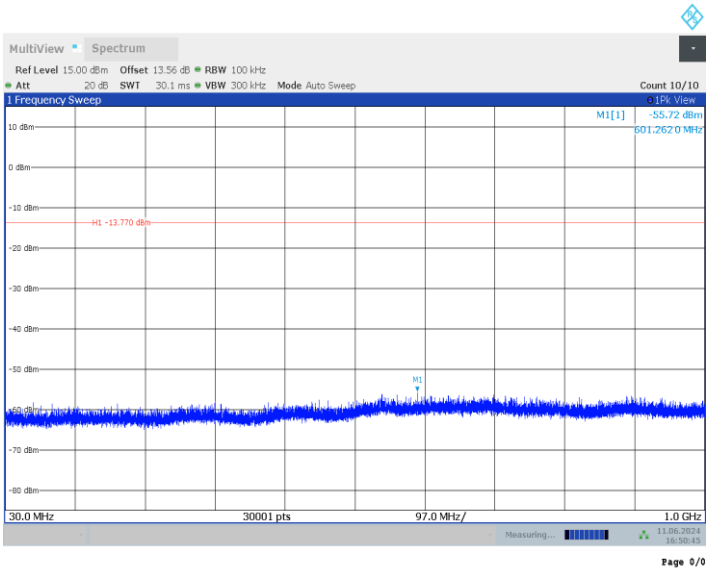

Fig.A.6.2 Transmitter Spurious Emission - Conducted (802.11b, Ch1, 30 MHz-1 GHz)

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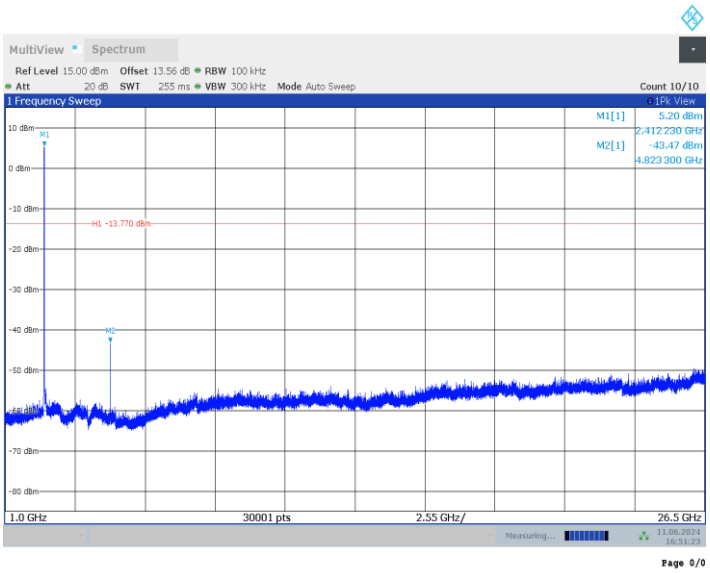

Fig.A.6.3 Transmitter Spurious Emission - Conducted (802.11b, Ch1, 1 GHz-26 GHz)

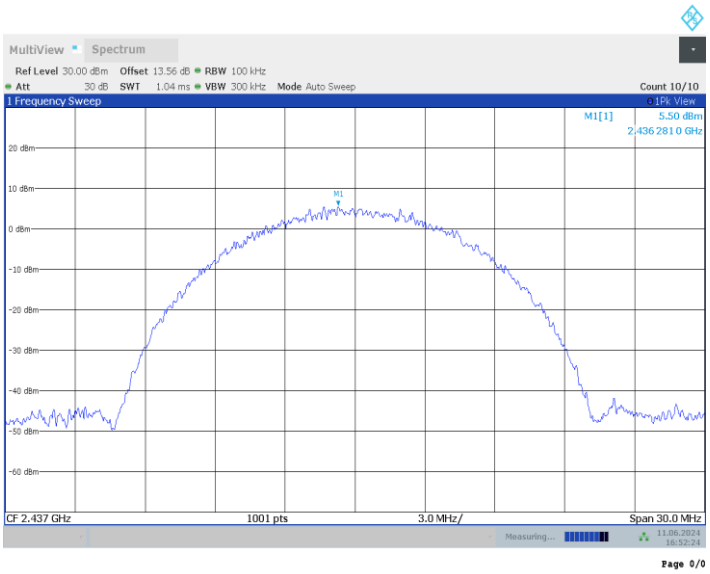

Fig.A.6.4 Transmitter Spurious Emission - Conducted (802.11b, Ch6, Center Frequency)

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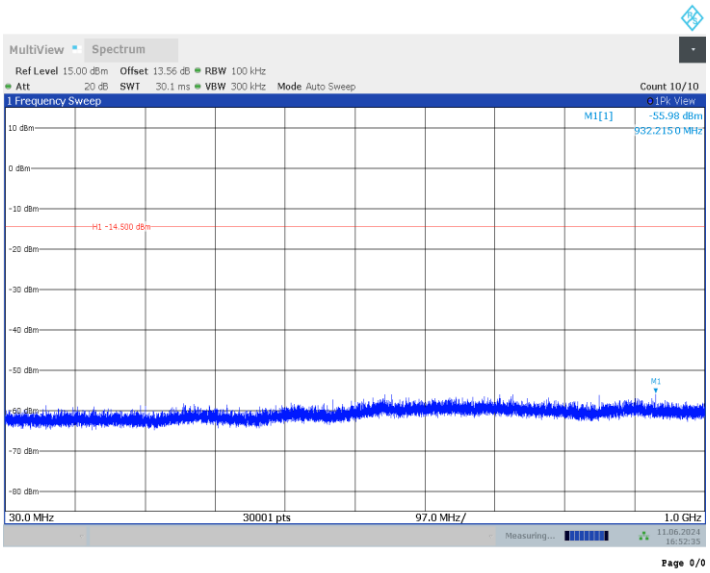

Fig.A.6.5 Transmitter Spurious Emission - Conducted (802.11b, Ch6, 30 MHz-1 GHz)

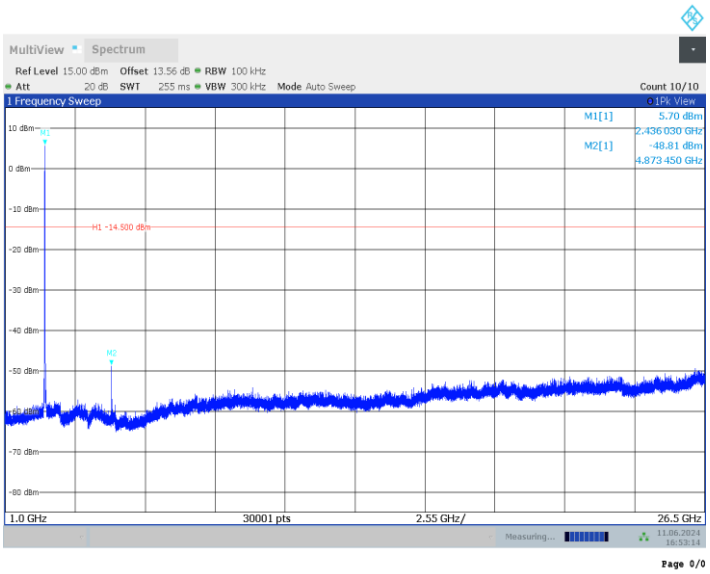

Fig.A.6.6 Transmitter Spurious Emission - Conducted (802.11b, Ch6, 1 GHz-26 GHz)

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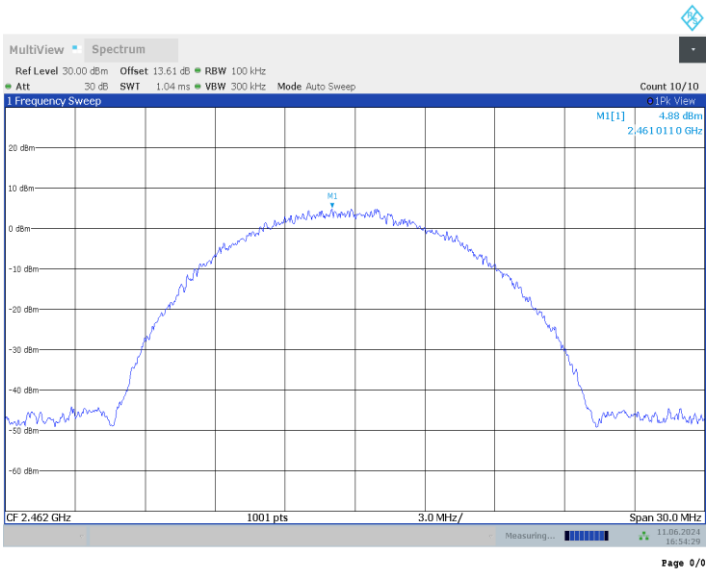

Fig.A.6.7 Transmitter Spurious Emission - Conducted (802.11b, Ch11, Center Frequency)

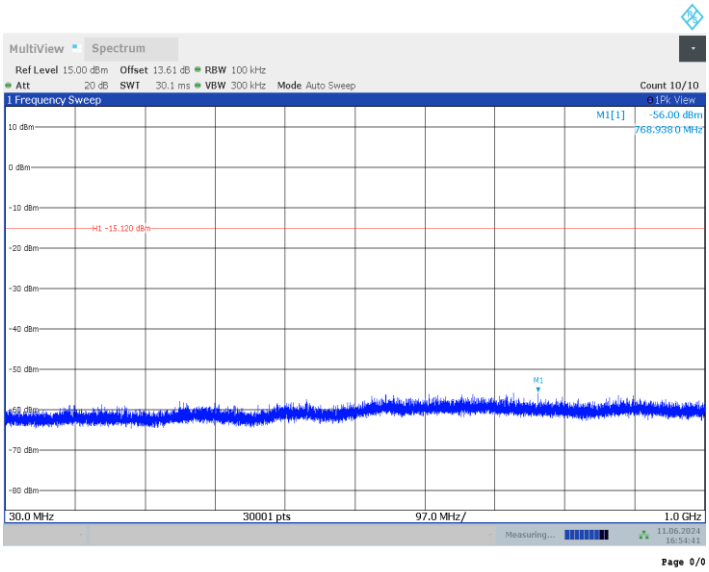

Fig.A.6.8 Transmitter Spurious Emission - Conducted (802.11b, Ch11, 30 MHz-1 GHz)

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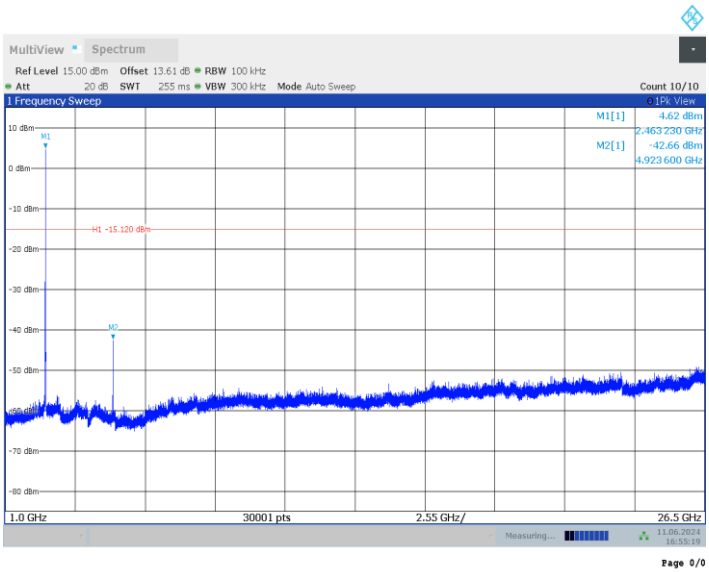

Fig.A.6.9 Transmitter Spurious Emission - Conducted (802.11b, Ch11, 1 GHz-26 GHz)

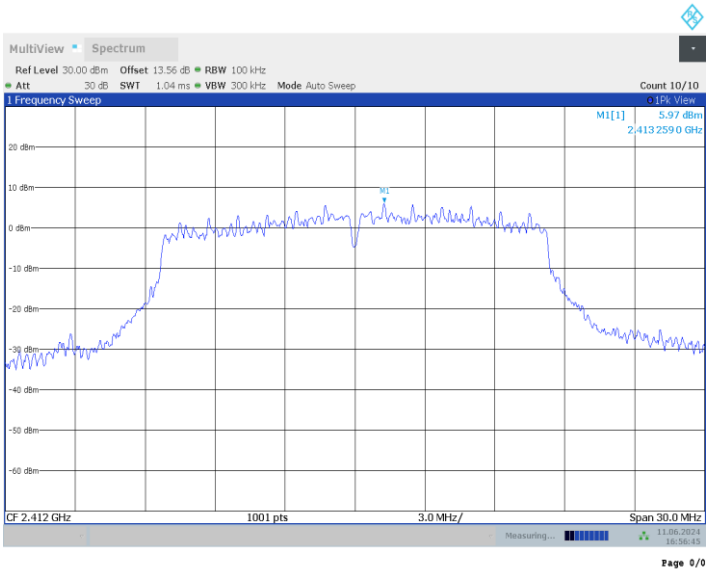

Fig.A.6.10 Transmitter Spurious Emission - Conducted (802.11g, Ch1, Center Frequency)

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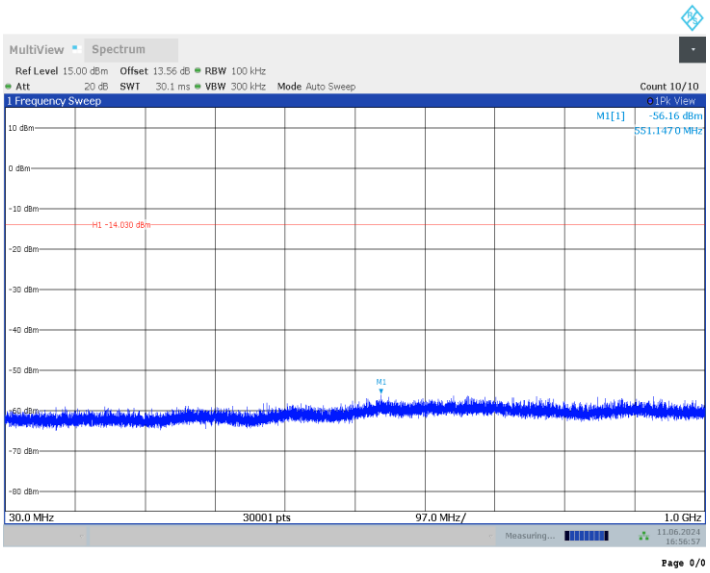

Fig.A.6.11 Transmitter Spurious Emission - Conducted (802.11g, Ch1, 30 MHz-1 GHz)

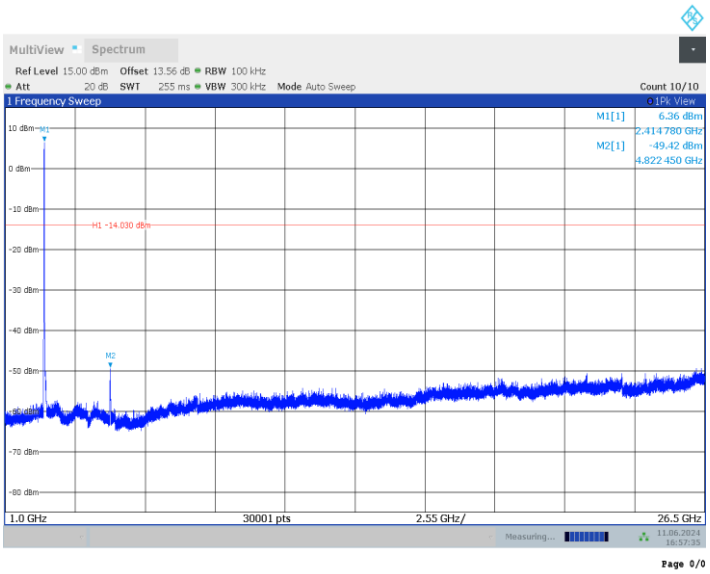

Fig.A.6.12 Transmitter Spurious Emission - Conducted (802.11g, Ch1, 1 GHz-26 GHz)

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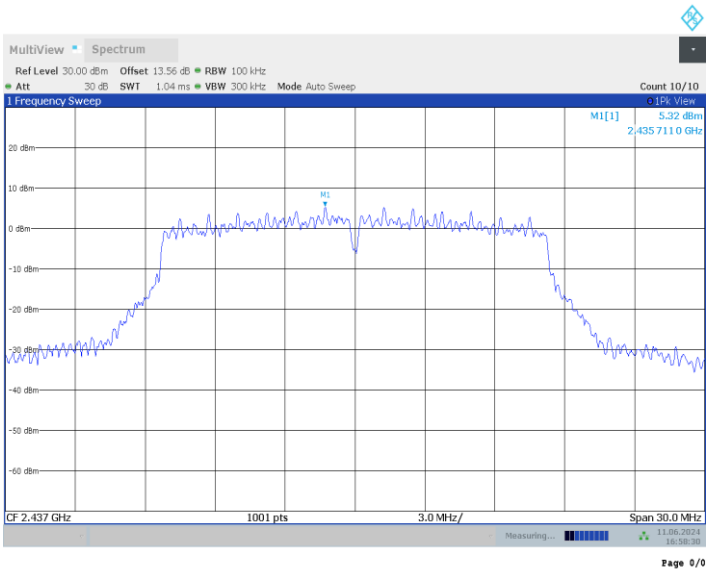

Fig.A.6.13 Transmitter Spurious Emission - Conducted (802.11g, Ch6, Center Frequency)

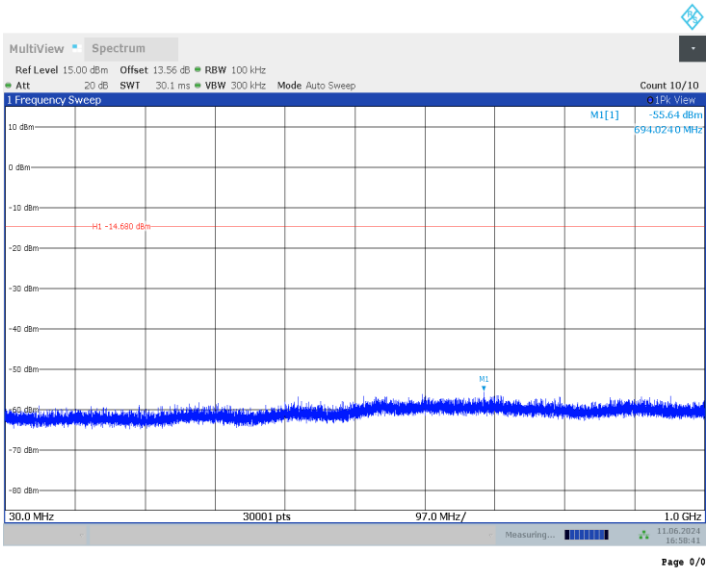

Fig.A.6.14 Transmitter Spurious Emission - Conducted (802.11g, Ch6, 30 MHz-1 GHz)

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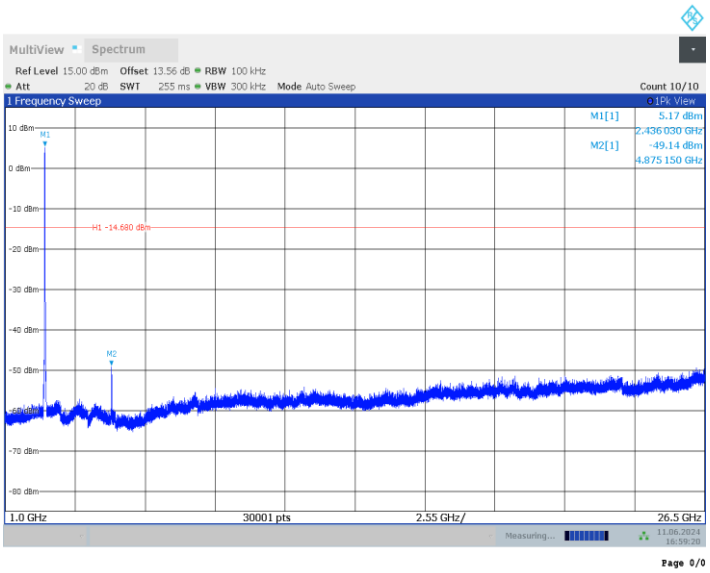

Fig.A.6.15 Transmitter Spurious Emission - Conducted (802.11g, Ch6, 1 GHz-26 GHz)

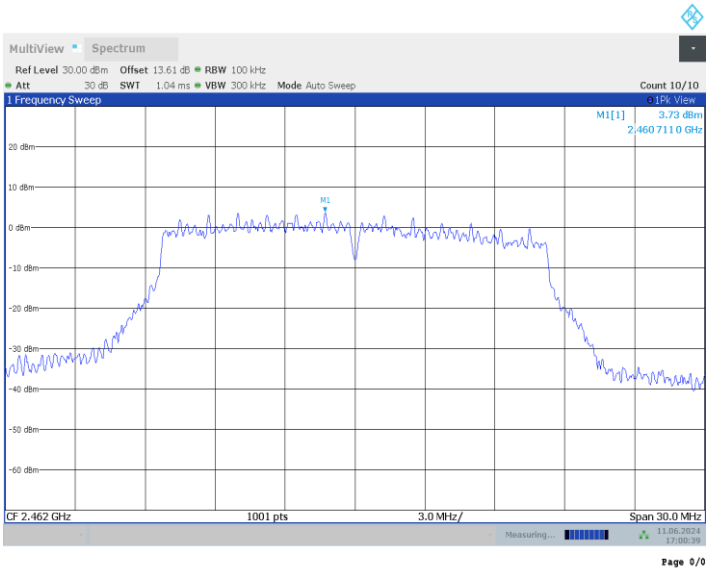

Fig.A.6.16 Transmitter Spurious Emission - Conducted (802.11g, Ch11, Center Frequency)

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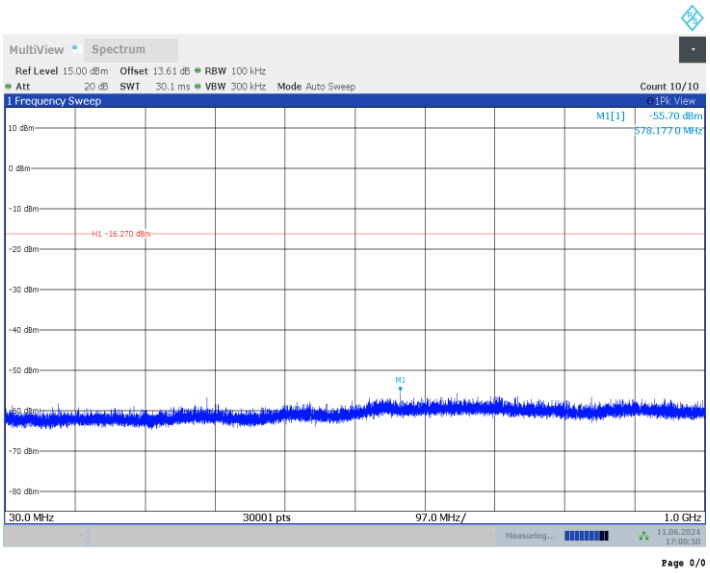

Fig.A.6.17 Transmitter Spurious Emission - Conducted (802.11g, Ch11, 30 MHz-1 GHz)

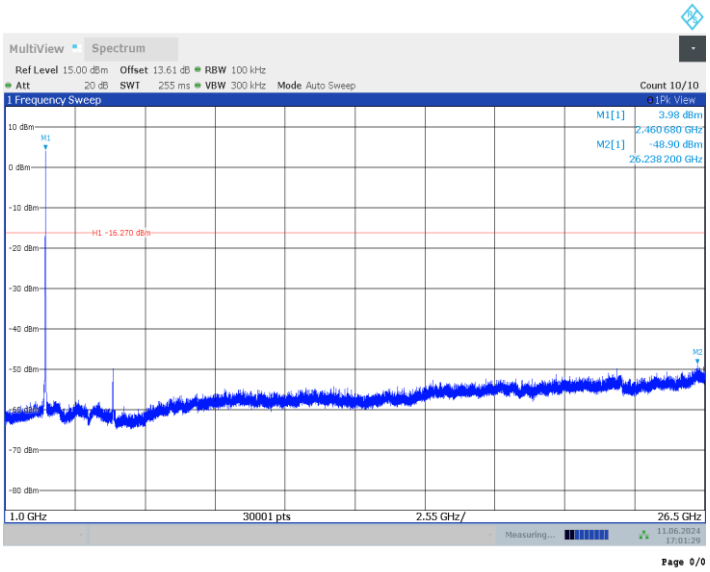

Fig.A.6.18 Transmitter Spurious Emission - Conducted (802.11g, Ch11, 1 GHz-26GHz)

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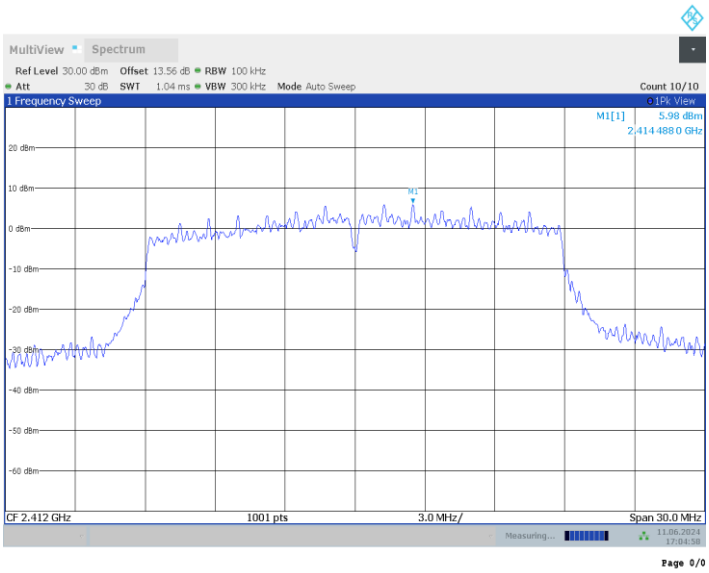

Fig.A.6.19 Transmitter Spurious Emission - Conducted (802.11n-HT20, Ch1, Center Frequency)

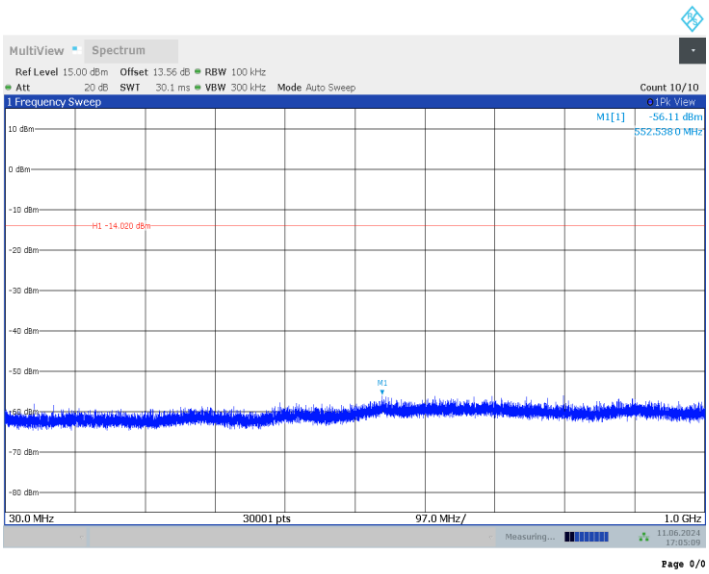

Fig.A.6.20 Transmitter Spurious Emission - Conducted (802.11n-HT20, Ch1, 30 MHz-1 GHz)

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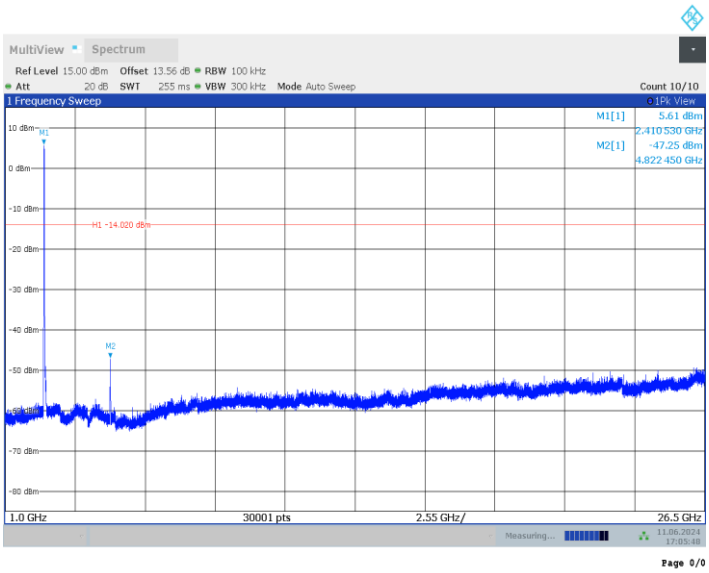

Fig.A.6.21 Transmitter Spurious Emission - Conducted (802.11n-HT20, Ch1, 1 GHz-26 GHz)

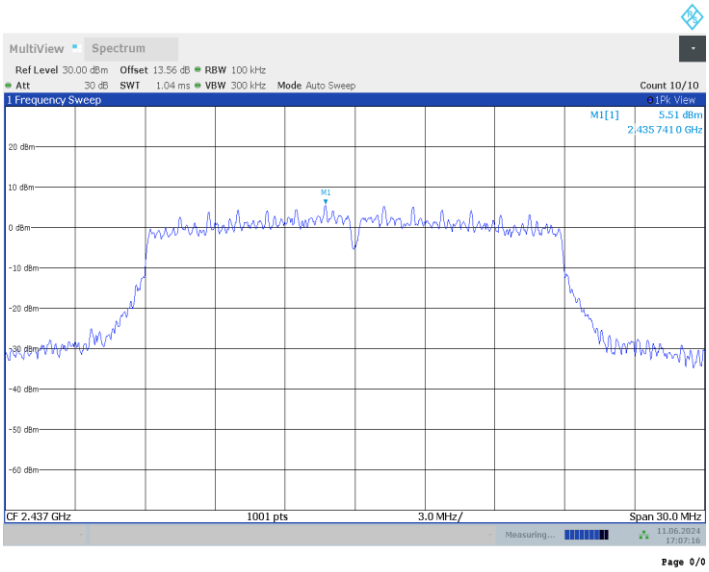

Fig.A.6.22 Transmitter Spurious Emission - Conducted (802.11n-HT20, Ch6, Center Frequency)

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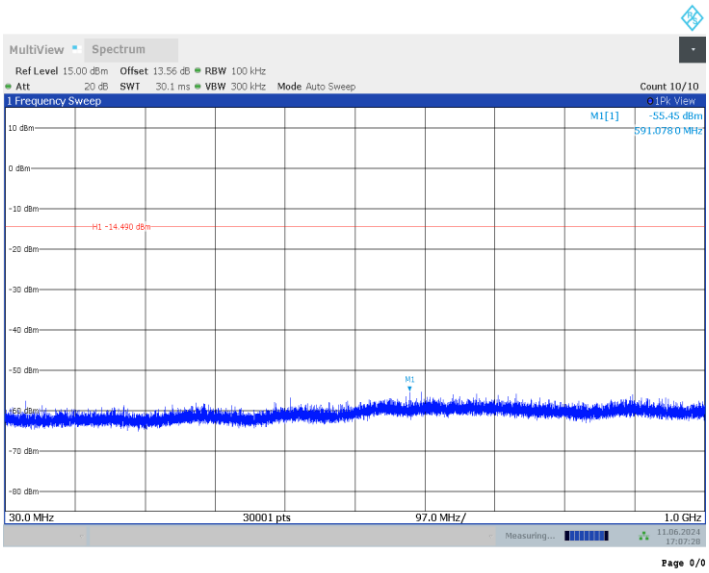

Fig.A.6.23 Transmitter Spurious Emission - Conducted (802.11n-HT20, Ch6, 30 MHz-1 GHz)

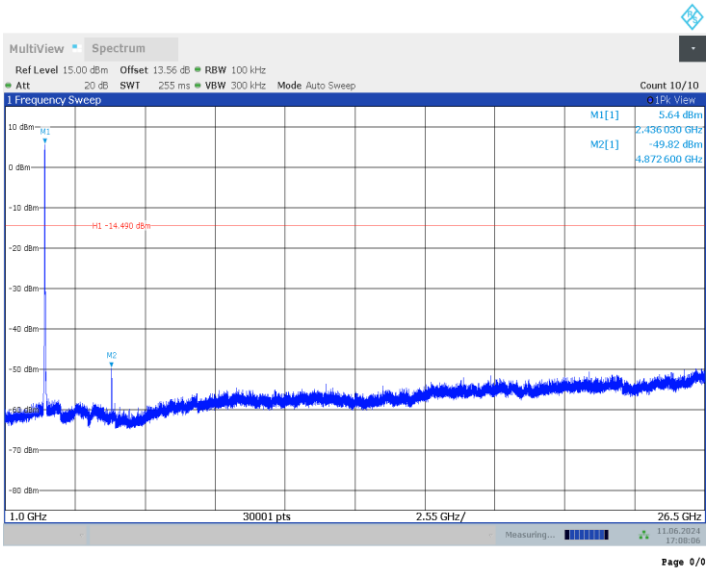

Fig.A.6.24 Transmitter Spurious Emission - Conducted (802.11n-HT20, Ch6, 1 GHz-26 GHz)

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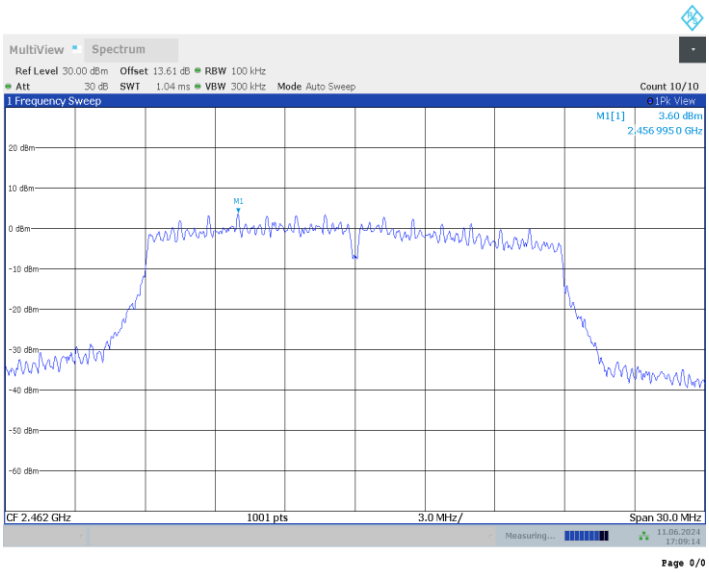

Fig.A.6.25 Transmitter Spurious Emission - Conducted (802.11n-HT20, Ch11, Center Frequency)

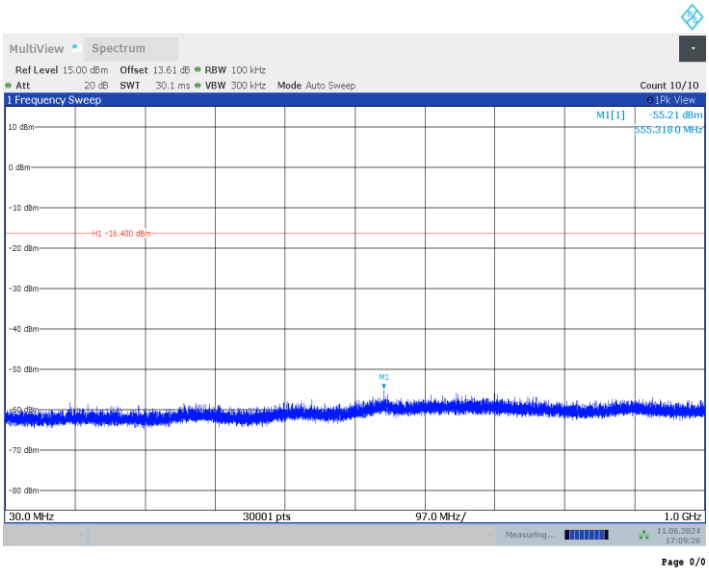

Fig.A.6.26 Transmitter Spurious Emission - Conducted (802.11n-HT20, Ch11, 30 MHz-1 GHz)

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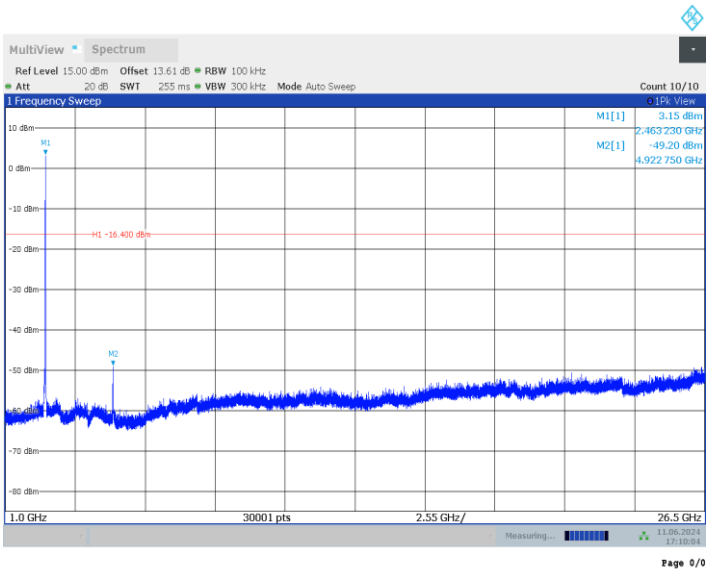

Fig.A.6.27 Transmitter Spurious Emission - Conducted (802.11n-HT20, Ch11, 1 GHz-26 GHz)

Conclusion: Pass

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A.7. Radiated Unwanted Emission

Limits

Measurement Limit

Standard	Limit
FCC 47 CFR Part 15.247, 15.205, 15.209	20dB below peak output power

In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

Limit in restricted band

Frequency (MHz)	Field strength(μV/m)	Measurement distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30

Frequency of emission (MHz)	Field strength (uV/m)	Field strength (dBuV/m)	Measurement distance (m)
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

Note: When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor.

Test setup

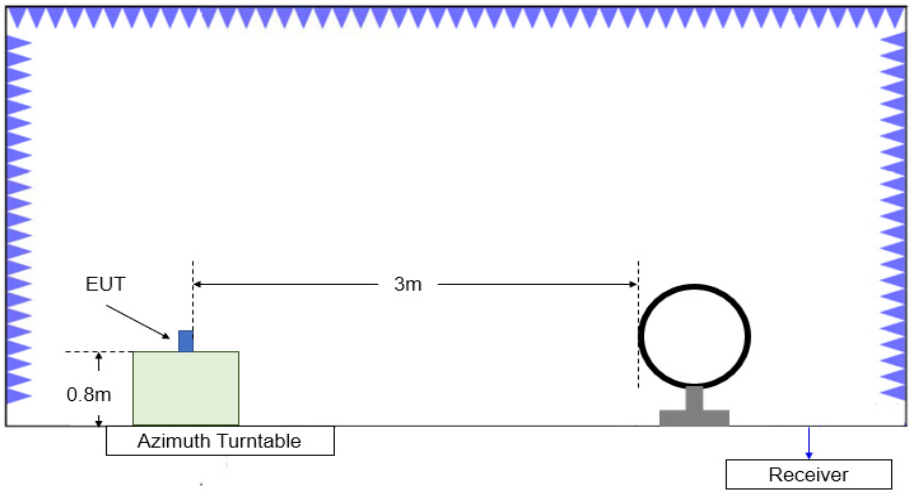

Figure A.2.1. Test Site Diagram (9kHz-30MHz)

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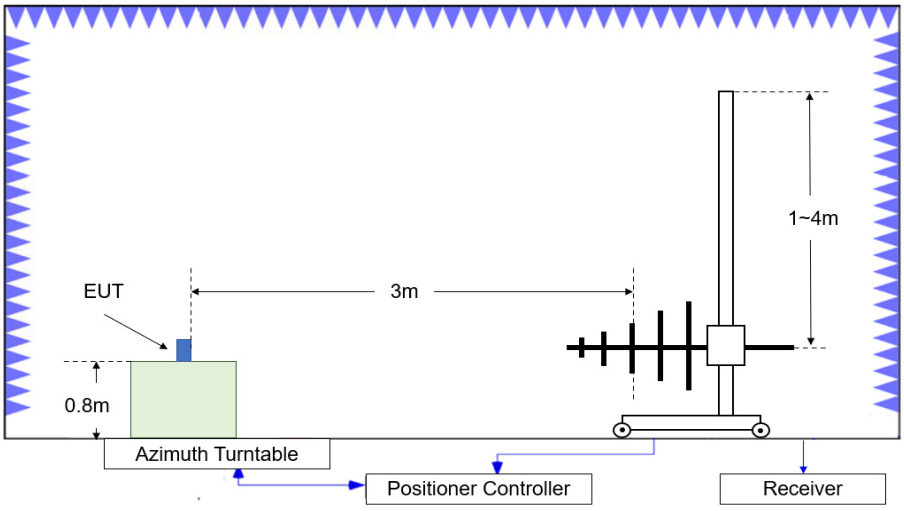

Figure A.2.2. Test Site Diagram (30MHz-1GHz)

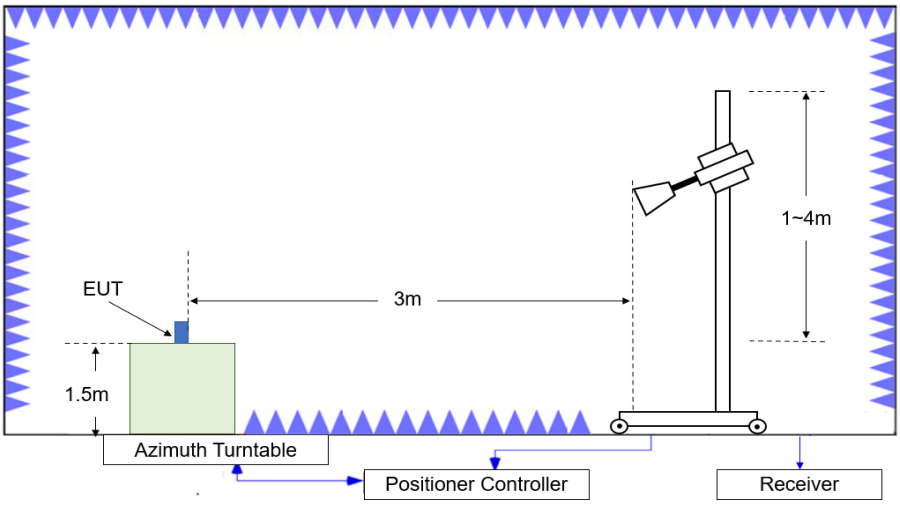

Figure A.2.3. Test Site Diagram (1GHz-40GHz)

Test Procedures

Radiated unwanted emissions from the EUT were measured according to ANSI C63.10.

Test setting

Frequency of emission (MHz)	RBW/VBW	Sweep Time(s)
30-1000	100kHz/300kHz	5
1000-3000	1MHz/3MHz	15
3000-18000	1MHz/3MHz	40
18000-26500	1MHz/3MHz	20

Sample Calculation

A "reference path loss" is established and the A_{Rpl} is the attenuation of “reference path loss”, and including the gain of receive antenna, the gain of the preamplifier, the cable loss.

P_{Mea} is the field strength recorded from the instrument.

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The measurement results are obtained as described below:

Result=P_{Mea}+$A_{Rpl=}$ P_{Mea}+Cable Loss+Antenna Factor

Test note

1. The EUT is operating at its maximum duty cycle and its maximum power control level.
2. Investigation has been done on all modes and modulations/data rates. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.
3. Spurious emissions for all channels were investigated and almost the same below 1GHz. According to FCC 47 CFR §15.31, emission levels are not report much lower than the limit by over 20dB
4. Measurement frequencies were performed from 9 kHz to the 10th harmonic of highest fundamental frequency.

Test Result

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Peak

802.11b

Ch1

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2373.840	60.88	48.15	31.64	-18.92	74.00	13.12	H
2382.380	61.18	48.28	31.69	-18.79	74.00	12.82	V
4824.000	53.23	-33.56	34.10	52.69	74.00	20.77	V
7236.000	42.02	-31.64	35.70	37.95	74.00	31.98	V
9648.000	46.21	-29.73	36.80	39.15	74.00	27.79	V
12060.000	47.02	-28.80	38.86	36.95	74.00	26.98	V

Ch6

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2421.600	60.99	48.13	31.84	-18.99	74.00	13.01	V
2472.400	60.86	47.12	32.13	-18.38	74.00	13.14	V
4873.500	52.60	-33.48	34.10	51.98	74.00	21.40	V
7311.000	43.83	-31.67	35.72	39.78	74.00	30.17	V
9748.000	44.42	-30.00	36.90	37.52	74.00	29.58	V
12185.000	46.46	-29.14	38.99	36.61	74.00	27.54	H

Ch11

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2484.125	62.09	46.56	32.24	-16.71	74.00	11.91	H
2493.525	61.12	46.09	32.34	-17.30	74.00	12.88	V
4923.500	51.85	-33.16	34.10	50.91	74.00	22.15	H
7386.000	43.75	-31.40	35.80	39.35	74.00	30.25	V
9848.000	44.81	-30.29	37.00	38.10	74.00	29.19	H
12310.000	46.56	-29.24	38.90	36.90	74.00	27.44	H

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802.11g

Ch1

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2389.170	65.50	48.35	31.74	-14.58	74.00	8.50	V
2389.590	65.15	48.35	31.74	-14.94	74.00	8.85	V
4824.000	50.12	-33.56	34.10	49.58	74.00	23.88	V
7236.000	42.70	-31.64	35.70	38.63	74.00	31.30	V
9648.000	47.04	-29.73	36.80	39.97	74.00	26.96	H
12060.000	47.74	-28.80	38.86	37.67	74.00	26.26	V

Ch6

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2410.400	61.26	48.19	31.82	-18.75	74.00	12.74	H
2465.200	60.97	47.42	32.05	-18.51	74.00	13.03	V
4874.000	49.58	-33.48	34.10	48.96	74.00	24.42	H
7311.000	42.43	-31.67	35.72	38.38	74.00	31.57	V
9748.000	44.52	-30.00	36.90	37.62	74.00	29.48	H
12185.000	46.43	-29.14	38.99	36.58	74.00	27.57	V

Ch11

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2483.600	65.37	46.58	32.24	-13.44	74.00	8.63	H
2483.775	64.28	46.57	32.24	-14.53	74.00	9.72	H
4916.000	51.98	-33.05	34.10	50.93	74.00	22.02	H
7386.000	43.57	-31.40	35.80	39.17	74.00	30.43	H
9848.000	43.17	-30.29	37.00	36.46	74.00	30.83	V
12310.000	46.50	-29.24	38.90	36.84	74.00	27.50	H

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802.11n-HT20

Ch1

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2388.960	64.11	48.35	31.73	-15.97	74.00	9.89	H
2389.940	64.32	48.36	31.74	-15.77	74.00	9.68	V
4822.000	52.38	-33.55	34.10	51.83	74.00	21.62	V
7236.000	43.72	-31.64	35.70	39.66	74.00	30.28	H
9648.000	45.69	-29.73	36.80	38.62	74.00	28.31	V
12060.000	47.93	-28.80	38.86	37.87	74.00	26.07	V

Ch6

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2359.200	61.01	48.26	31.56	-18.81	74.00	12.99	V
2515.200	61.39	45.05	32.46	-16.12	74.00	12.61	H
4874.000	52.26	-33.48	34.10	51.64	74.00	21.74	H
7311.000	43.56	-31.67	35.72	39.51	74.00	30.44	H
9748.000	44.76	-30.00	36.90	37.86	74.00	29.24	V
12185.000	46.81	-29.14	38.99	36.96	74.00	27.19	H

Ch11

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2484.000	69.07	46.56	32.24	-9.74	74.00	4.93	V
2484.650	67.98	46.54	32.25	-10.80	74.00	6.02	V
4922.500	51.15	-33.14	34.10	50.20	74.00	22.85	H
7386.000	43.10	-31.40	35.80	38.70	74.00	30.90	V
9848.000	44.13	-30.29	37.00	37.42	74.00	29.87	H
12310.000	46.81	-29.24	38.90	37.15	74.00	27.19	V

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Average

802.11b

Ch1

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2347.400	46.00	48.16	31.49	-33.65	54.00	8.00	V
2383.400	43.40	48.29	31.70	-36.59	54.00	10.60	V
4824.000	50.72	-33.56	34.10	50.18	54.00	3.28	V
7236.000	30.89	-31.64	35.70	26.83	54.00	23.11	H
9648.000	33.98	-29.73	36.80	26.92	54.00	20.02	H
12060.000	35.36	-28.80	38.86	25.29	54.00	18.64	V

Ch6

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2417.400	49.16	48.19	31.84	-30.86	54.00	4.84	V
2456.800	49.74	47.62	31.97	-29.85	54.00	4.26	V
4874.000	49.93	-33.48	34.10	49.30	54.00	4.07	H
7311.000	31.26	-31.67	35.72	27.21	54.00	22.74	V
9748.000	33.35	-30.00	36.90	26.45	54.00	20.65	V
12185.000	34.82	-29.14	38.99	24.97	54.00	19.18	H

Ch11

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2483.600	49.60	46.58	32.24	-29.21	54.00	4.40	V
2583.600	49.64	37.90	32.53	-20.79	54.00	4.36	V
4924.000	50.31	-33.16	34.10	49.38	54.00	3.69	H
7386.000	31.27	-31.40	35.80	26.87	54.00	22.73	V
9848.000	32.49	-30.29	37.00	25.79	54.00	21.51	H
12310.000	35.24	-29.24	38.90	25.58	54.00	18.76	H

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802.11g

Ch1

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2389.600	47.47	48.35	31.74	-32.62	54.00	6.53	V
2390.000	47.70	48.36	31.74	-32.40	54.00	6.30	V
4824.000	40.73	-33.56	34.10	40.19	54.00	13.27	V
7236.000	30.87	-31.64	35.70	26.80	54.00	23.13	V
9648.000	33.94	-29.73	36.80	26.88	54.00	20.06	H
12060.000	35.36	-28.80	38.86	25.30	54.00	18.64	V

Ch6

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2411.400	48.37	48.19	31.82	-31.64	54.00	5.63	V
2464.200	50.17	47.46	32.04	-29.33	54.00	3.83	V
4874.000	38.57	-33.48	34.10	37.95	54.00	15.43	V
7311.000	31.11	-31.67	35.72	27.05	54.00	22.89	V
9748.000	33.31	-30.00	36.90	26.41	54.00	20.69	V
12185.000	34.91	-29.14	38.99	25.06	54.00	19.09	H

Ch11

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2483.600	50.15	46.58	32.24	-28.66	54.00	3.85	V
2483.800	50.09	46.57	32.24	-28.72	54.00	3.91	V
4924.000	35.80	-33.16	34.10	34.86	54.00	18.20	V
7386.000	31.20	-31.40	35.80	26.80	54.00	22.80	V
9848.000	32.30	-30.29	37.00	25.59	54.00	21.70	H
12310.000	35.19	-29.24	38.90	25.52	54.00	18.81	H

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802.11n-HT20

Ch1

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2352.200	45.95	48.18	31.51	-33.74	54.00	8.05	V
2389.000	47.47	48.35	31.73	-32.62	54.00	6.53	V
4824.000	38.79	-33.56	34.10	38.24	54.00	15.21	V
7236.000	30.83	-31.64	35.70	26.76	54.00	23.17	V
9648.000	34.01	-29.73	36.80	26.95	54.00	19.99	V
12060.000	35.36	-28.80	38.86	25.30	54.00	18.64	V

Ch6

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2409.200	47.61	48.20	31.82	-32.40	54.00	6.39	V
2470.800	49.50	47.20	32.11	-29.81	54.00	4.50	V
4874.000	38.63	-33.48	34.10	38.01	54.00	15.37	V
7311.000	31.12	-31.67	35.72	27.07	54.00	22.88	H
9748.000	33.13	-30.00	36.90	26.23	54.00	20.87	V
12185.000	34.75	-29.14	38.99	24.90	54.00	19.25	V

Ch11

Frequency (MHz)	Measurement Result (dBuV/m)	Cable Loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Pol. (H/V)
2527.400	49.47	44.26	32.51	-27.30	54.00	4.53	V
2554.200	49.62	41.56	32.59	-24.53	54.00	4.38	V
4919.000	35.59	-33.10	34.10	34.59	54.00	18.41	H
7386.000	31.19	-31.40	35.80	26.79	54.00	22.81	V
9848.000	32.26	-30.29	37.00	25.55	54.00	21.74	V
12310.000	35.01	-29.24	38.90	25.35	54.00	18.99	V

Conclusion: Pass

Note: the spurious emission above 18G is noise only and did not show on the report.

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Band edge compliance

802.11b mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11b	1	2.31GHz~2.43GHz---L	Fig.1	**P**
	11	2.45GHz~2.50GHz---H	Fig.2	**P**

802.11g mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11g	1	2.31GHz~2.43GHz---L	Fig.3	**P**
	10	2.45GHz~2.50GHz---H	Fig.4	**P**
	11	2.45GHz~2.50GHz---H	Fig.5	**P**

802.11n-HT20 mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11n (HT20)	1	2.31GHz~2.43GHz---L	Fig.6	**P**
	10	2.45GHz~2.50GHz---H	Fig.7	**P**
	11	2.45GHz~2.50GHz---H	Fig.8	**P**

Test graphs as below:

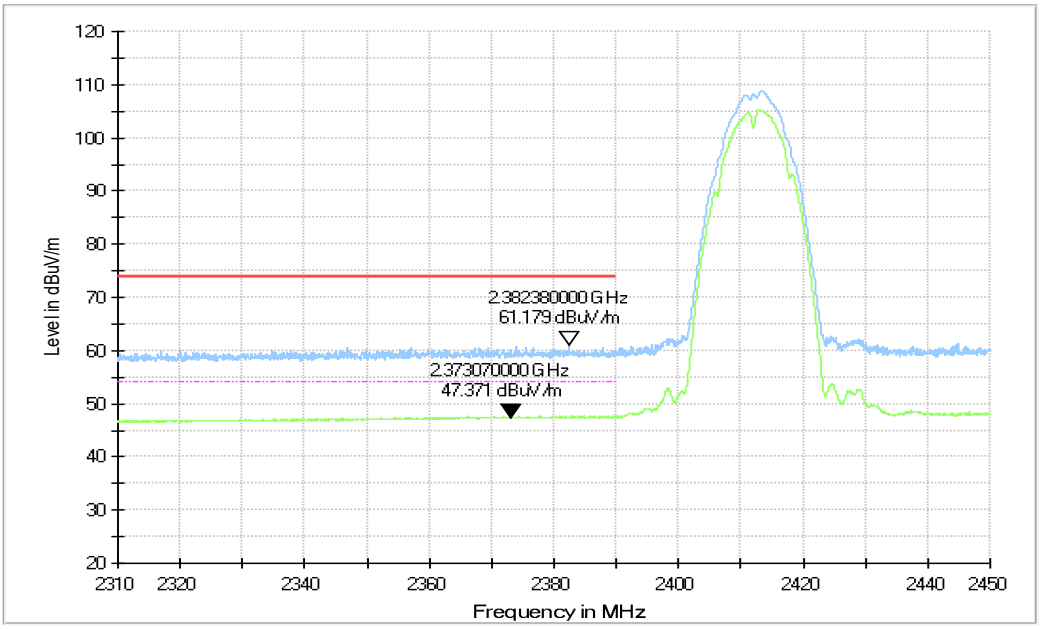

Fig. 7.1 Transmitter Spurious Emission - Radiated (Power): 802.11b, ch1, 2.31 GHz – 2.43GHz

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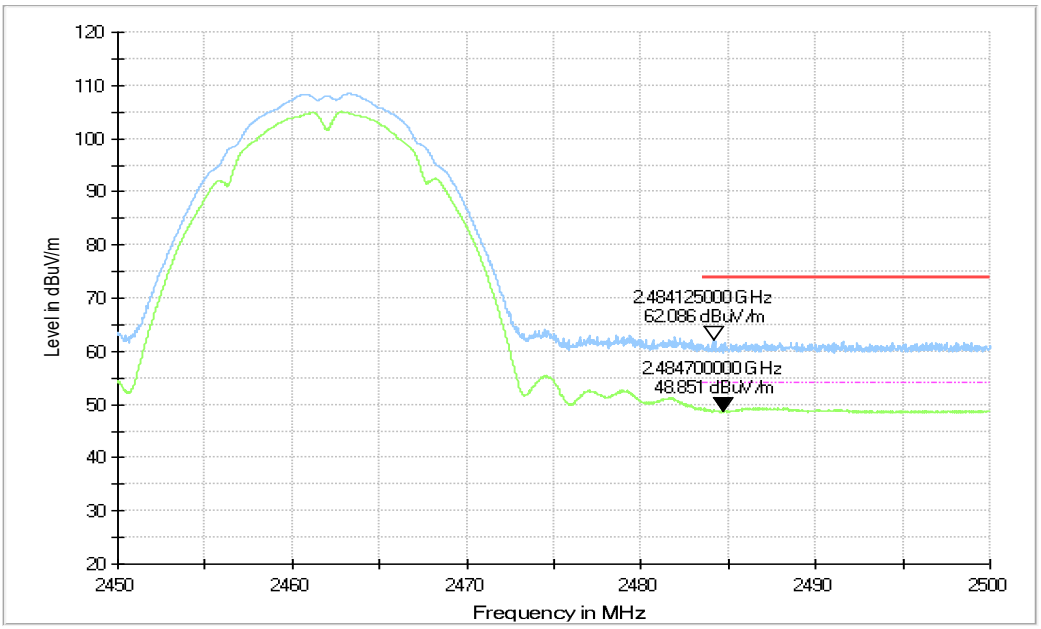

Fig. 7.2 Transmitter Spurious Emission - Radiated (Power): 802.11b, ch11, 2.45 GHz - 2.50GHz

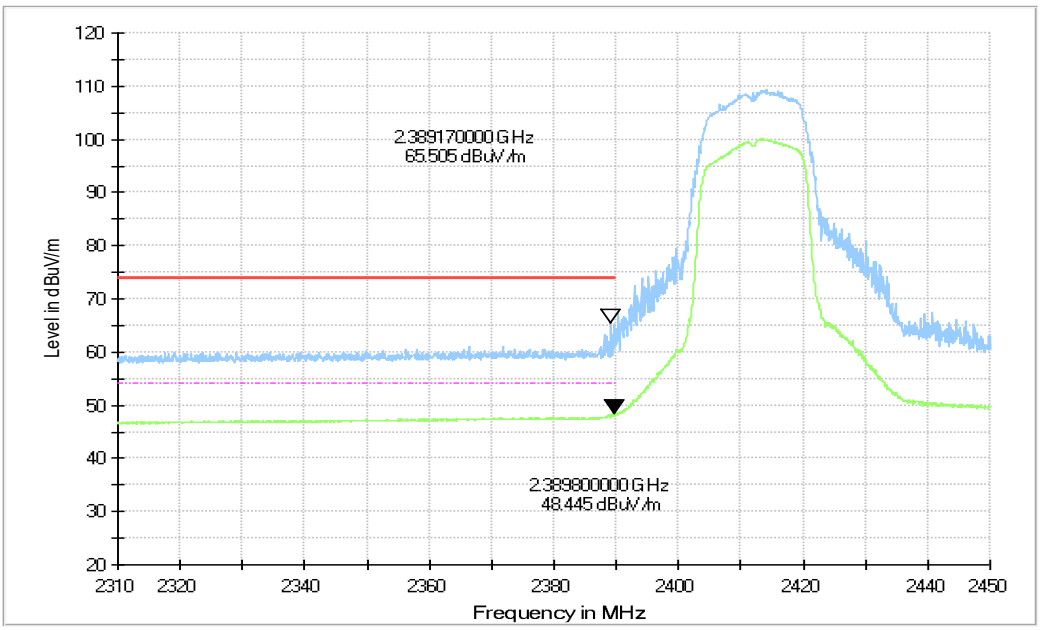

Fig. 7.3 Transmitter Spurious Emission - Radiated (Power): 802.11g, ch1, 2.31 GHz - 2.43GHz

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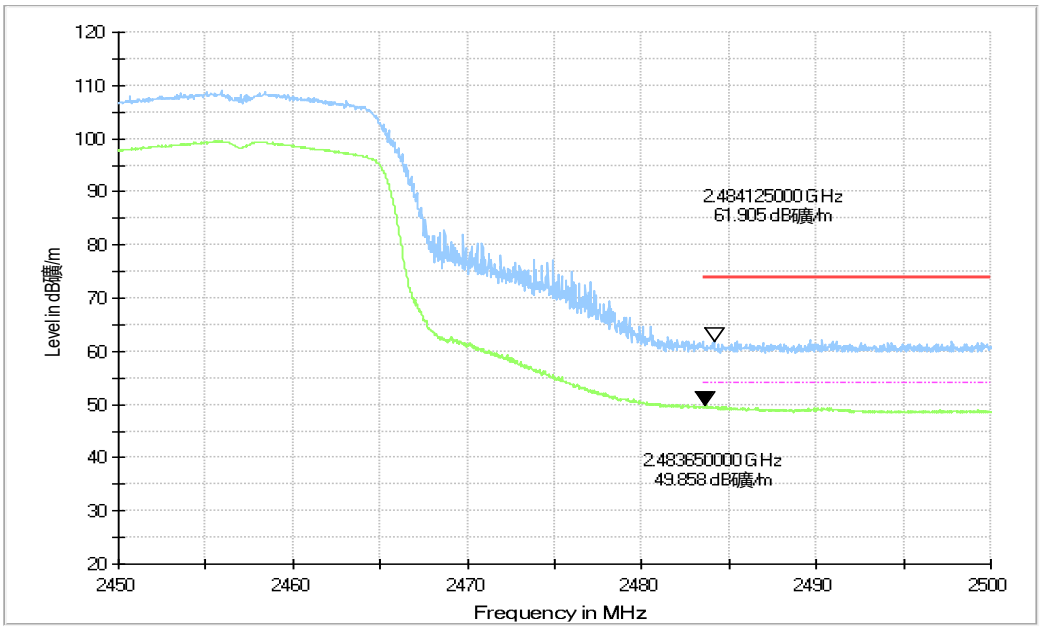

Fig. 7.4 Transmitter Spurious Emission - Radiated (Power): 802.11g, ch10, 2.45 GHz - 2.50GHz

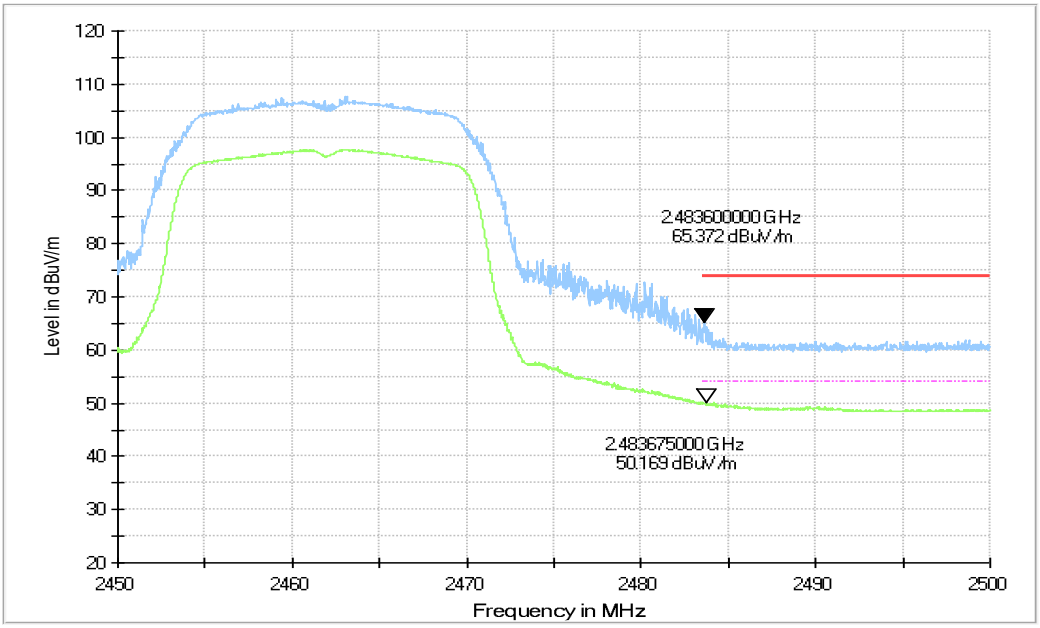

Fig. 7.5 Transmitter Spurious Emission - Radiated (Power): 802.11g, ch11, 2.45 GHz - 2.50GHz

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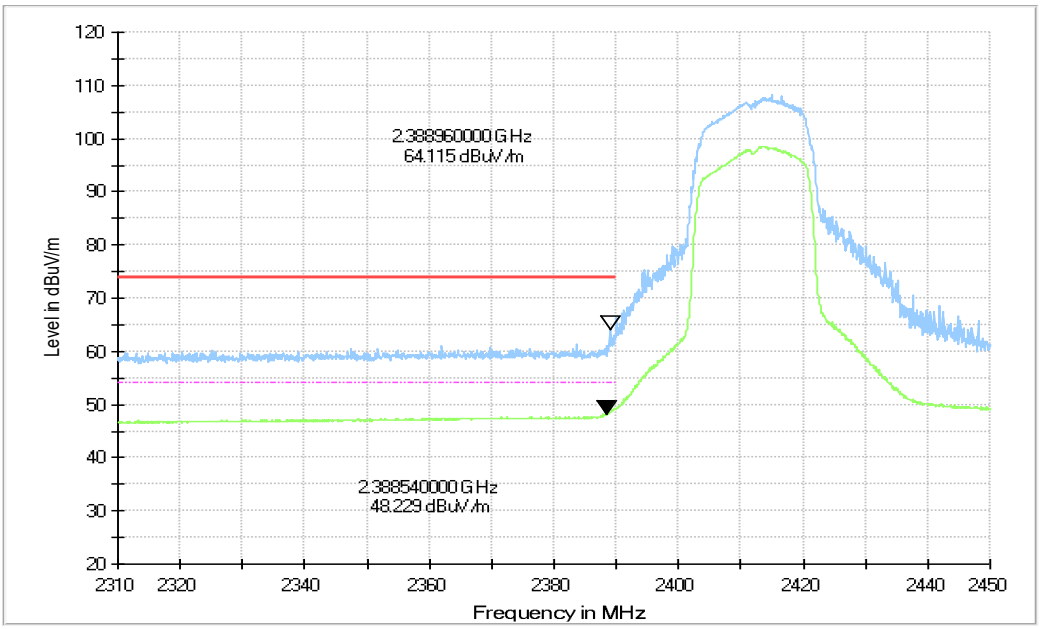

Fig. 7.6 Transmitter Spurious Emission - Radiated (Power): 802.11n-HT20, ch1, 2.31 GHz - 2.43GHz

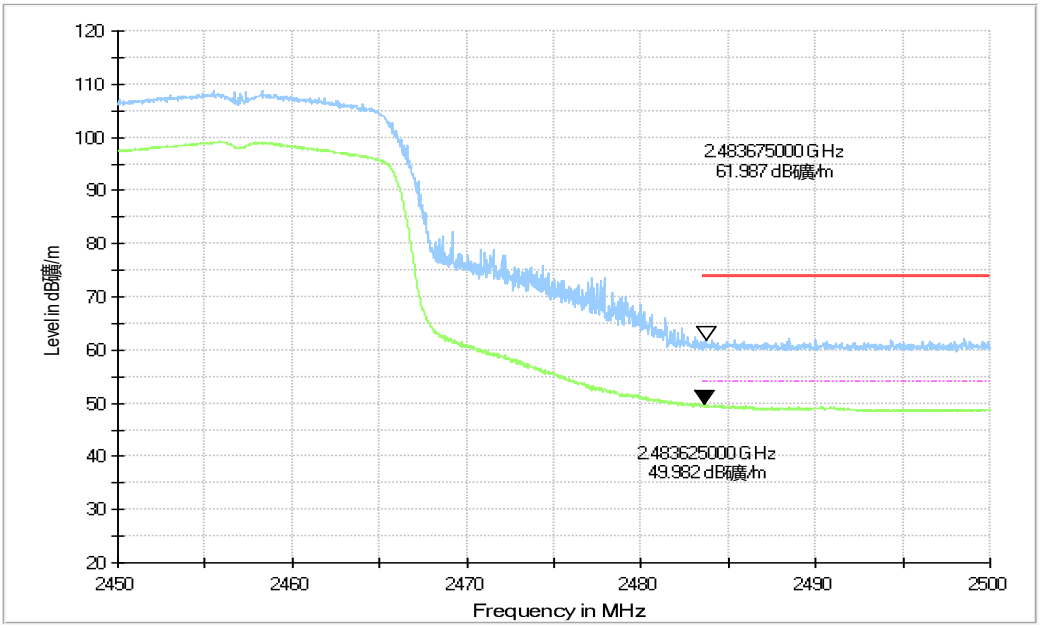

Fig. 7.7 Transmitter Spurious Emission - Radiated (Power): 802.11n-HT20, ch10, 2.45 GHz - 2.50GHz

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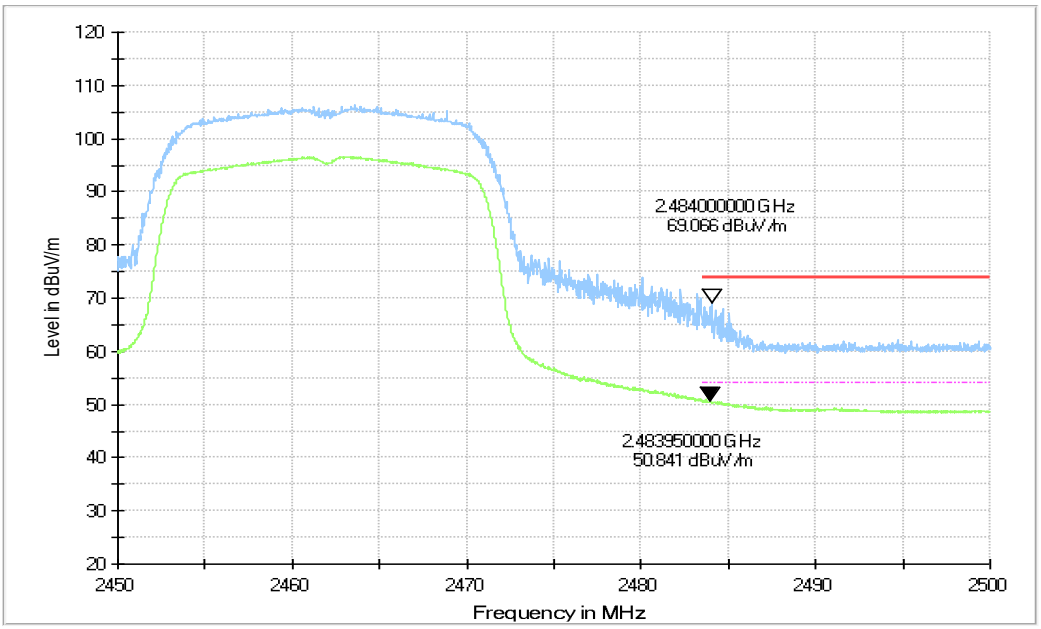

Fig. 7.8 Transmitter Spurious Emission - Radiated (Power): 802.11n-HT20, ch11, 2.45 GHz - 2.50GHz

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A.8. AC Power-line Conducted Emission

Summary

All AC line conducted spurious emissions are measured with a receiver connected to a grounded LISN while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates and modes were investigated for conducted spurious emissions. Only the conducted emissions of the configuration that produced the worst case emissions are reported in this section

Method of Measurement:

See Clause 6.2 of ANSI C63.10 specifically.

See Clause 4 and Clause 5 of ANSI C63.10 generally.

The conducted emissions from the AC port of the EUT are measured in a shielding room. The EUT is connected to a Line Impedance Stabilization Network (LISN). An overview sweep with peak detection was performed. The measurements were performed with a quasi-peak detector and if required, an average detector.

The conducted emission measurements were made with the following detector of the test receiver: Quasi-Peak / Average Detector.

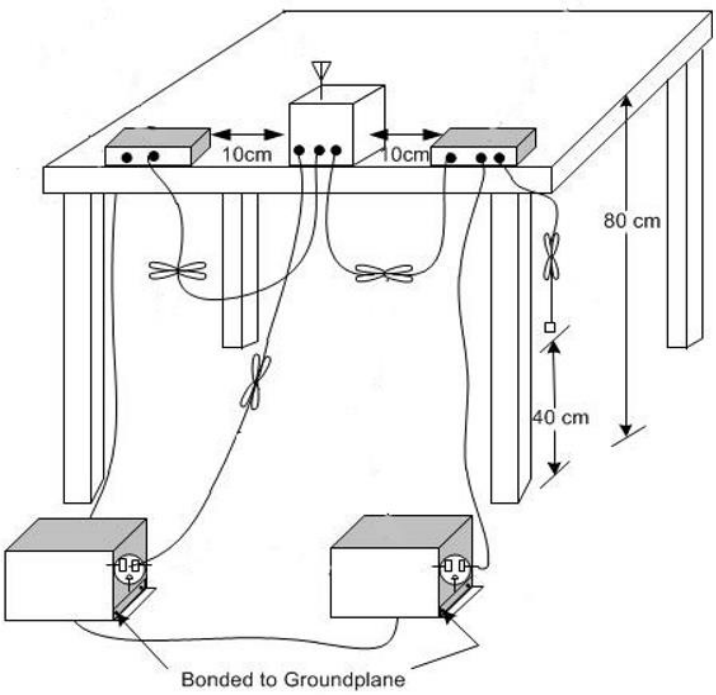
The measurement bandwidth is:

Frequency of Emission (MHz)	RBW/IF bandwidth
0.15-30	9kHz

Test Condition:

Voltage（V）	Frequency（Hz）
120	60

Test setup



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Measurement Result and limit:

WLAN (Quasi-peak Limit)

Frequency range (MHz)	Quasi-peak Limit (dBμV)	Result (dBμV)		Conclusion
		With charger		
		802.11b	Idle	
0.15 to 0.5	66 to 56	Fig.A.8.1	Fig.A.8.2	**P**
0.5 to 5	56			
5 to 30	60			
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.				

WLAN (Average Limit)

Frequency range (MHz)	Average Limit (dBμV)	Result (dBμV)		Conclusion
		With charger		
		802.11b	Idle	
0.15 to 0.5	56 to 46	Fig.A.8.1	Fig.A.8.2	**P**
0.5 to 5	46			
5 to 30	50			
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.				

Conclusion: Pass

Test graphs as below:

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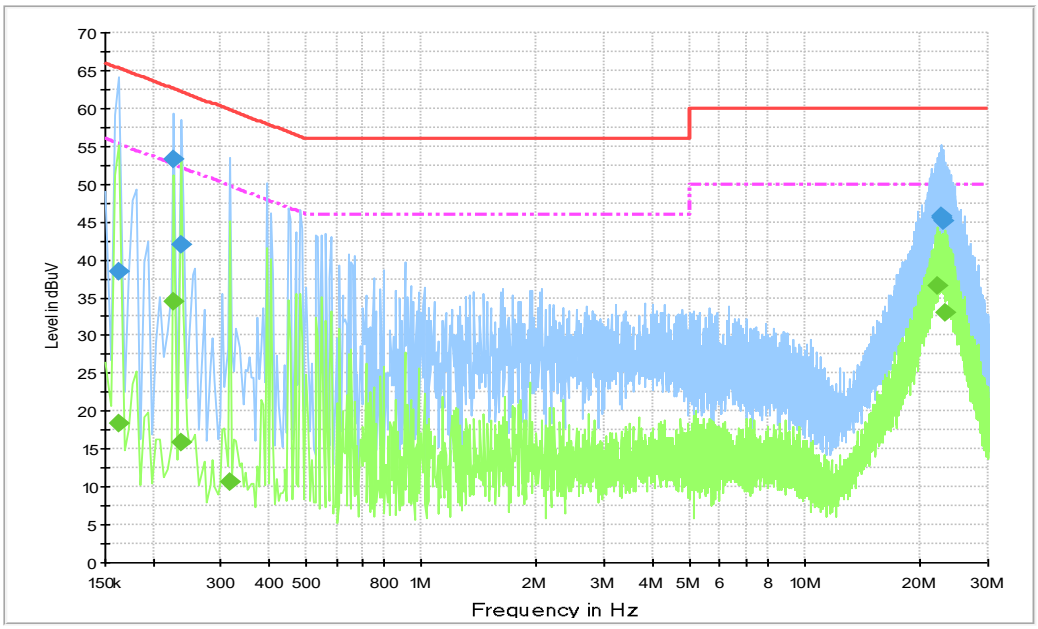

Fig.A.8.1 AC Powerline Conducted Emission-802.11b

Note: The graphic result above is the maximum of the measurements for both phase line and neutral line.

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.163500	38.4	2000.0	9.000	N	20.1	26.9	65.3
0.226500	53.4	2000.0	9.000	N	20.0	9.2	62.6
0.235500	42.0	2000.0	9.000	N	20.0	20.3	62.3
22.614000	45.6	2000.0	9.000	L1	20.1	14.4	60.0
22.690500	45.8	2000.0	9.000	L1	20.1	14.2	60.0
22.875000	45.2	2000.0	9.000	L1	20.1	14.8	60.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.163500	18.4	2000.0	9.000	N	20.1	36.9	55.3
0.226500	34.6	2000.0	9.000	N	20.0	18.0	52.6
0.235500	15.8	2000.0	9.000	L1	20.0	36.4	52.3
0.316500	10.7	2000.0	9.000	N	20.1	39.1	49.8
22.141500	36.6	2000.0	9.000	L1	20.1	13.4	50.0
23.194500	33.1	2000.0	9.000	N	20.3	16.9	50.0

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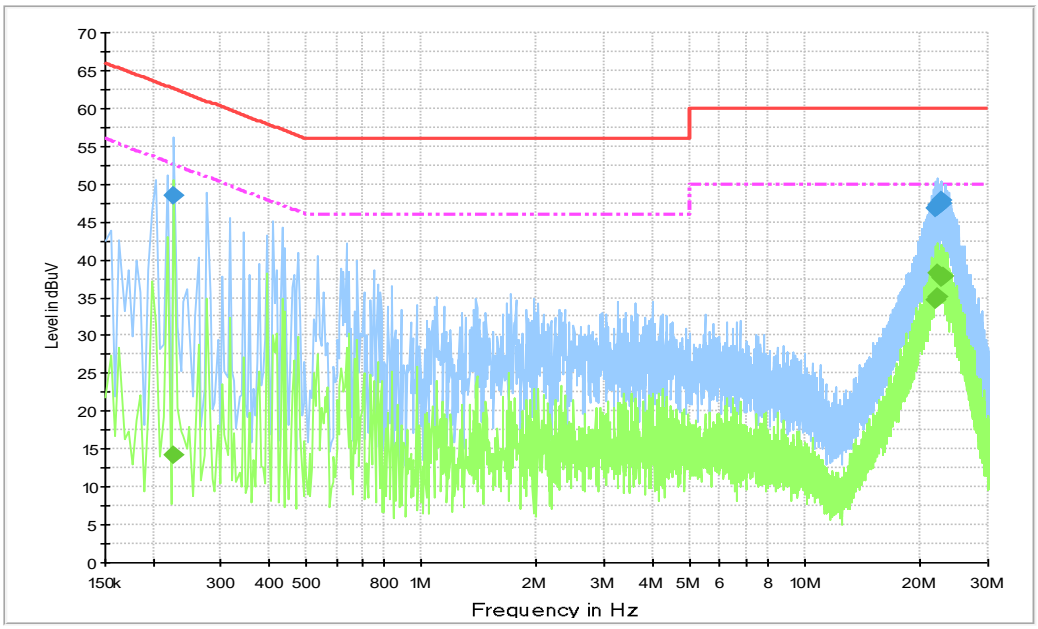

Fig.A.8.2 AC Powerline Conducted Emission-Idle

Note: The graphic result above is the maximum of the measurements for both phase line and neutral line.

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.226500	48.6	2000.0	9.000	N	20.0	14.0	62.6
21.957000	46.8	2000.0	9.000	L1	20.1	13.2	60.0
22.024500	47.0	2000.0	9.000	L1	20.1	13.0	60.0
22.168500	47.2	2000.0	9.000	L1	20.1	12.8	60.0
22.582500	47.8	2000.0	9.000	L1	20.1	12.2	60.0
22.749000	47.4	2000.0	9.000	L1	20.1	12.6	60.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.226500	14.2	2000.0	9.000	N	20.0	38.4	52.6
21.934500	34.6	2000.0	9.000	N	20.3	15.4	50.0
22.056000	35.2	2000.0	9.000	N	20.3	14.8	50.0
22.254000	38.2	2000.0	9.000	L1	20.1	11.8	50.0
22.605000	37.6	2000.0	9.000	N	20.3	12.4	50.0
22.812000	37.9	2000.0	9.000	L1	20.1	12.1	50.0

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ANNEX B: EUT parameters

Disclaimer: The antenna gain and worse case provided by the client may affect the validity of the measurement results in this report, and the client shall bear the impact and consequences arising therefrom.

ANNEX C: Accreditation Certificate

Accredited Laboratory

A2LA has accredited

TELECOMMUNICATION TECHNOLOGY LABS, CAICT

Beijing, People's Republic of China

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated April 2017*).

Presented this 26th day of June 2023.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 7049.01
Valid to July 31, 2024

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.

*****END OF REPORT*****

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