FCC PART 15C
TEST REPORT
No.24T04Z101051-005

for

TCL Communication Ltd.

Tablet PC

9465X

FCC ID：2ACCJB223

with

Hardware Version: 05

Software Version: 6HS2

Issued Date: 2024-06-20

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

No. 52, Huayuan North Road, Haidian District, Beijing, P. R. China 100191.

Tel:+86(0)10-62304633-2512, Fax:+86(0)10-62304633-2504

Email: cttl_terminals@caict.ac.cn, website: www.caict.ac.cn

©Copyright. All rights reserved by CTTL.

REPORT HISTORY

Report Number	Revision	Description	Issue Date
24T04Z101051-005	Rev.0	1st edition	2024-06-20

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

©Copyright. All rights reserved by CTTL.

CONTENTS

1. TEST LABORATORY 5

1.1. INTRODUCTION & ACCREDITATION 5
1.2. TESTING LOCATION 5
1.3. TESTING ENVIRONMENT 6
1.4. PROJECT DATE 6
1.5. SIGNATURE 6

2. CLIENT INFORMATION 7

2.1. APPLICANT INFORMATION 7
2.2. MANUFACTURER INFORMATION 7

3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT (AE) 8

3.1. ABOUT EUT 8
3.2. INTERNAL IDENTIFICATION OF EUT 8
3.3. INTERNAL IDENTIFICATION OF AE 8
3.4. GENERAL DESCRIPTION 9
3.5. INTERPRETATION OF THE TEST ENVIRONMENT 9

4. REFERENCE DOCUMENTS 9

4.1. DOCUMENTS SUPPLIED BY APPLICANT 9
4.2. REFERENCE DOCUMENTS FOR TESTING 9

5. LABORATORY ENVIRONMENT 10

6. TEST RESULTS 10

6.1. SUMMARY OF TEST RESULTS 10
6.2. STATEMENTS 10
6.3. TEST CONDITIONS 10

7. TEST FACILITIES UTILIZED 11

8. MEASUREMENT UNCERTAINTY 12

8.1. MAXIMUM OUTPUT POWER 12
8.2. PEAK POWER SPECTRAL DENSITY 12
8.3. DTS 6-DB SIGNAL BANDWIDTH 12
8.4. BAND EDGES COMPLIANCE 12
8.5. TRANSMITTER SPURIOUS EMISSION 12
8.6. RADIATED UNWANTED EMISSION 12
8.7. AC POWER-LINE CONDUCTED EMISSION 12

ANNEX A: DETAILED TEST RESULTS 13

A.1. MEASUREMENT METHOD 13

A.2. MAXIMUM OUTPUT POWER 14

©Copyright. All rights reserved by CTTL.

A.2.1 ANTENNA GAIN 14
A.2.2. PEAK OUTPUT POWER-CONDUCTED 14
A.3. PEAK POWER SPECTRAL DENSITY 15
A.4. DTS 6-DB SIGNAL BANDWIDTH 22
A.5. BAND EDGES COMPLIANCE 29
A.6. TRANSMITTER SPURIOUS EMISSION 34
A.6.1 TRANSMITTER SPURIOUS EMISSION – CONDUCTED 34
A.7. RADIATED UNWANTED EMISSION 54
A.8. AC POWER-LINE CONDUCTED EMISSION 69
A.9. ANTENNA REQUIREMENT 73
ANNEX B: EUT PARAMETERS 73
ANNEX C: ACCREDITATION CERTIFICATE 73

©Copyright. All rights reserved by CTTL.

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(huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing, 100191, P. R. China

©Copyright. All rights reserved by CTTL.

1.3. Testing Environment

Normal Temperature: 15-35°C

Relative Humidity: 20-75%

1.4. Project date

Testing Start Date: 2024-05-17

Testing End Date: 2024-06-20

1.5. Signature



Yao Xingyu

(Prepared this test report)



Zheng Wei

(Reviewed this test report)



Pang Shuai

(Approved this test report)

©Copyright. All rights reserved by CTTL.

2. Client Information

2.1. Applicant Information

Company Name:	TCL Communication Ltd.
Address/Post:	5/F, Building 22E, 22 Science Park East Avenue, Hong Kong Science Park, Shatin, NT, Hong Kong
City:	Hong Kong
Postal Code:	/
Country:	China
Contact Person:	Ting Wang
Contact Email:	ting.wang.hz@tcl.com
Telephone:	+86 752 2639091
Fax:	/

2.2. Manufacturer Information

Company Name:	TCL Communication Ltd.
Address/Post:	5/F, Building 22E, 22 Science Park East Avenue, Hong Kong Science Park, Shatin, NT, Hong Kong
City:	Hong Kong
Postal Code:	/
Country:	China
Contact Person:	Ting Wang
Contact Email:	ting.wang.hz@tcl.com
Telephone:	+86 752 2639091
Fax:	/

©Copyright. All rights reserved by CTTL.

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

3.1. About EUT

Description	Tablet PC
Model name	9465X
FCC ID	2ACCJB223
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	26.55dBm
Nominal Voltage	3.8V
Extreme High Voltage	4.2V
Extreme Low Voltage	3.5V

3.2. Internal Identification of EUT

EUT ID*	SN or IMEI	HW Version	SW Version	Date of receipt
UT07a	9TIVTOOZ49C67TNZ	05	6HS2	2024-05-17
EUT1(UT01a)	W8F6B6PRT8IRNVNF	05	6HS2	2024-05-21

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

UT07a is used for Conduction test, UT01a is used for Radiation test.

3.3. Internal Identification of AE

AE ID*	Description	Note	Manufacturer
AE1	Battery	2853B7PL-2P	Gaoyuan
AE2	Charger	UT-681E-5200MY	Shenzhen Baijunda Electronic CO.,Ltd
AE3	USB cable	XB.003.1071.0003	Huizhou Besiter power technology Co., Ltd

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

©Copyright. All rights reserved by CTTL.

3.4. General Description

The Equipment under Test (EUT) is a model of Tablet PC 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

©Copyright. All rights reserved by CTTL.

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
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	3.8V
Humidity	44%

©Copyright. All rights reserved by CTTL.

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	LISN	ENV216	101200	R&S	1 Year	2025-05-17
4	Test Receiver	ESCI	100344	R&S	1 Year	2025-05-01
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	103144	R&S	1 Year	2024-12-26
2	EMI Antenna	VULB9163	01223	R&S	1 Year	2024-08-18
3	EMI Antenna	3115	00167250	R&S	1 Year	2025-05-11
4	EMI Antenna	3116	2663	R&S	1 Year	2025-03-21

Test Software

Test Item	Test Software and Version	Software Vendor
Radiated Continuous Emission	EMC32 V11.50.20	R&S
Conducted Emission	EMC32 V8.53.0	R&S

©Copyright. All rights reserved by CTTL.

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)
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	/
30MHz ≤ f ≤ 1GHz	4.72
1GHz ≤ f ≤18GHz	4.84
18GHz ≤ f ≤40GHz	5.12

8.7. AC Power-line Conducted Emission

Measurement Uncertainty : 3.08dB,k=2

©Copyright. All rights reserved by CTTL.

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

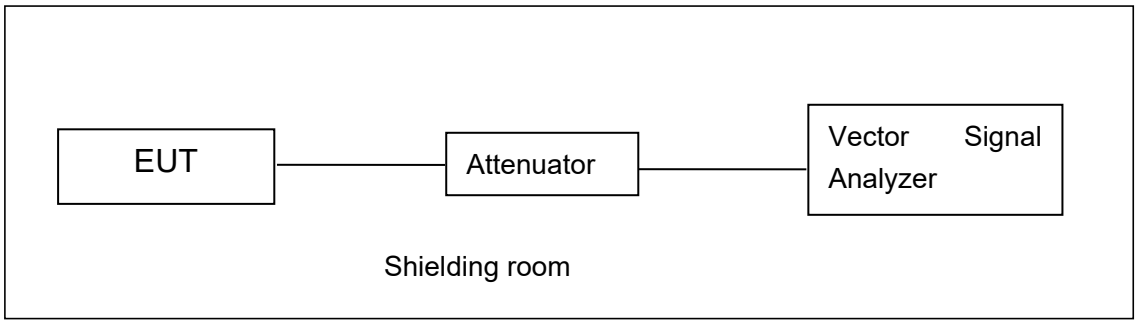


Fig.A.1.1.1: Test Setup Diagram for Conducted Measurements

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

©Copyright. All rights reserved by CTTL.

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 -1.6dBi and the value is supplied by the applicant or manufacturer.

A.2.2. Peak Output Power-conducted

EUT ID: UT07a

Measurement Results:

802.11b/g mode

Mode	Data Rate (Mbps)	Test Result (dBm)		
		2412MHz (Ch1)	2437MHz (Ch6)	2462 MHz (Ch11)
802.11b	1	21.85	21.13	21.71
802.11g	6	26.32	26.05	26.55

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	24.28	24.09	24.38

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

©Copyright. All rights reserved by CTTL.

802.11n-HT40 mode

Mode	Data Rate (Index)	Test Result (dBm)		
		2422MHz (Ch3)	2437MHz (Ch6)	2452 MHz (Ch9)
802.11n (40MHz)	MCS0	23.09	23.05	23.08

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

The duty cycle of all mode are 100%

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: UT07a

Measurement Results:

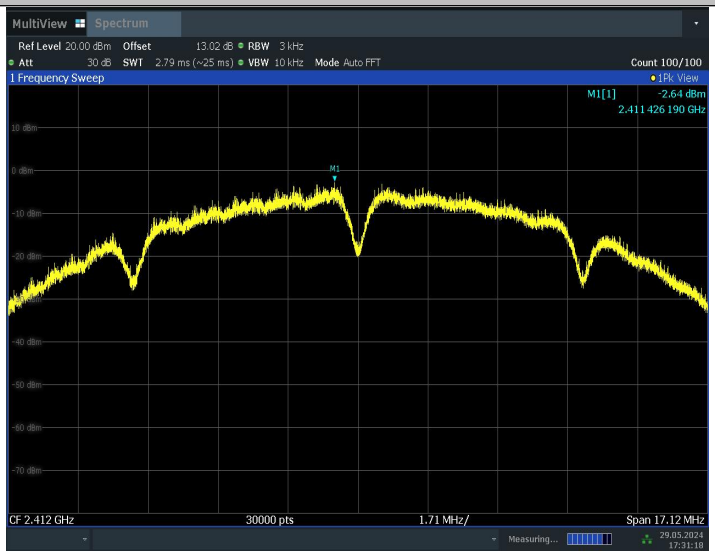
TestMode	Frequency[MHz]	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
11B	2412	-2.64	≤8.00	PASS
	2437	-2.49	≤8.00	PASS
	2462	-2.53	≤8.00	PASS
11G	2412	-6.66	≤8.00	PASS
	2437	-6.37	≤8.00	PASS
	2462	-6.00	≤8.00	PASS
11N20SISO	2412	-8.42	≤8.00	PASS
	2437	-8.61	≤8.00	PASS
	2462	-8.08	≤8.00	PASS

©Copyright. All rights reserved by CTTL.

11N40SISO	2422	-11.96	≤8.00	PASS
	2437	-11.74	≤8.00	PASS
	2452	-11.95	≤8.00	PASS

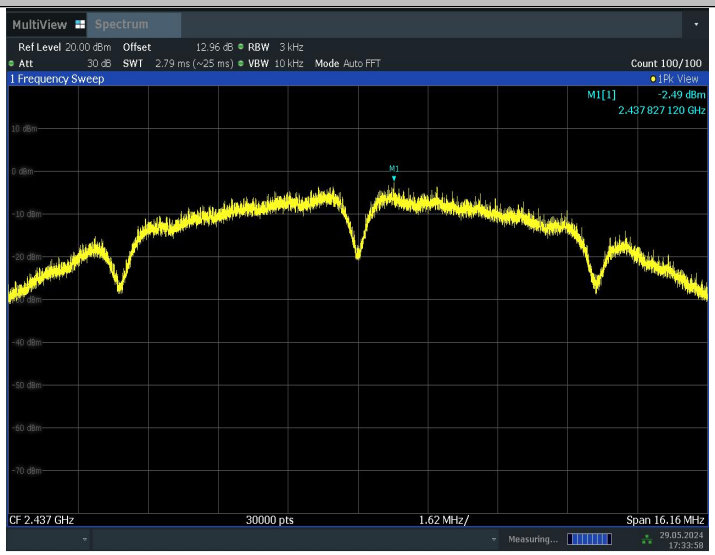
Test graphs as below:

11B_2412



17:31:18 29.05.2024

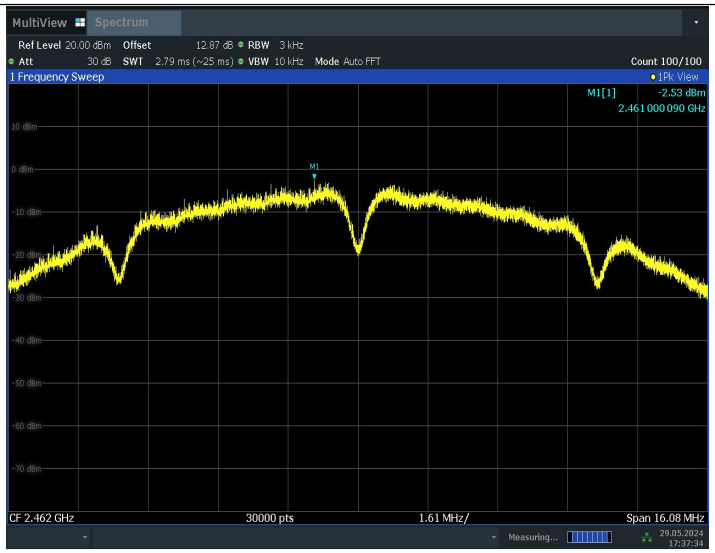
11B_2437



17:33:59 29.05.2024

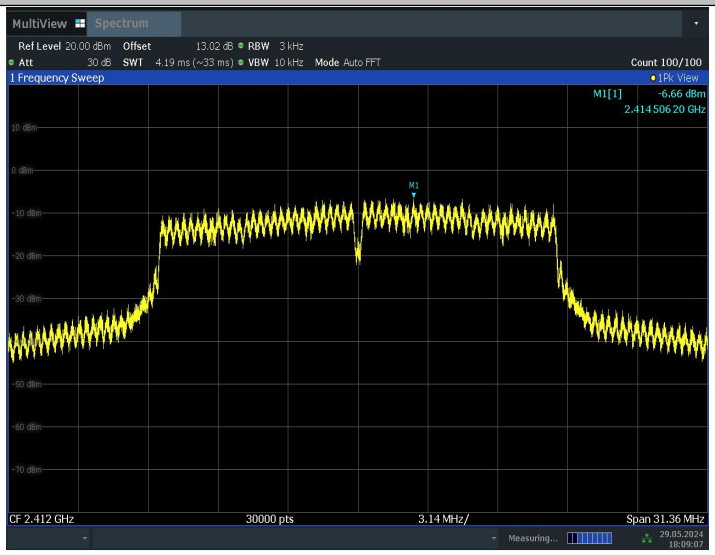
11B_2462

©Copyright. All rights reserved by CTTL.



17:37:34 29.05.2024

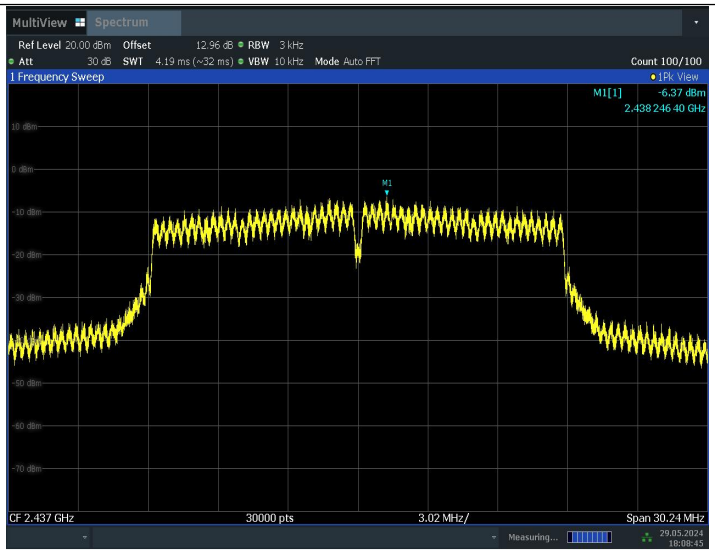
11G_2412



18:09:07 29.05.2024

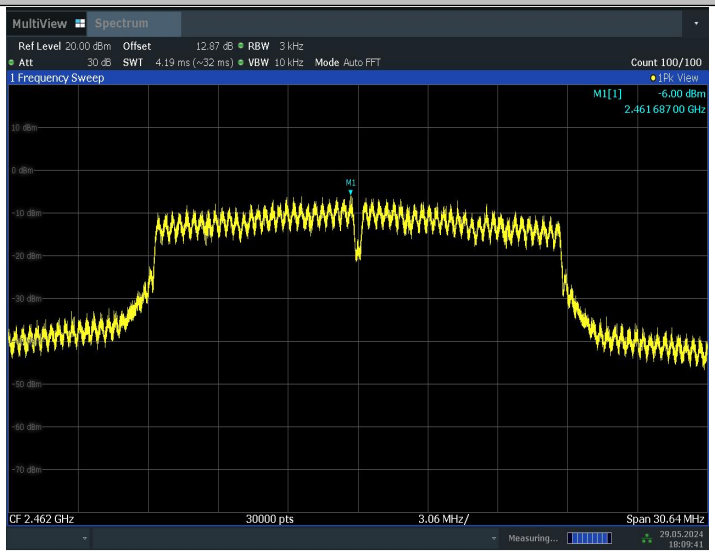
11G_2437

©Copyright. All rights reserved by CTTL.



18:08:46 29.05.2024

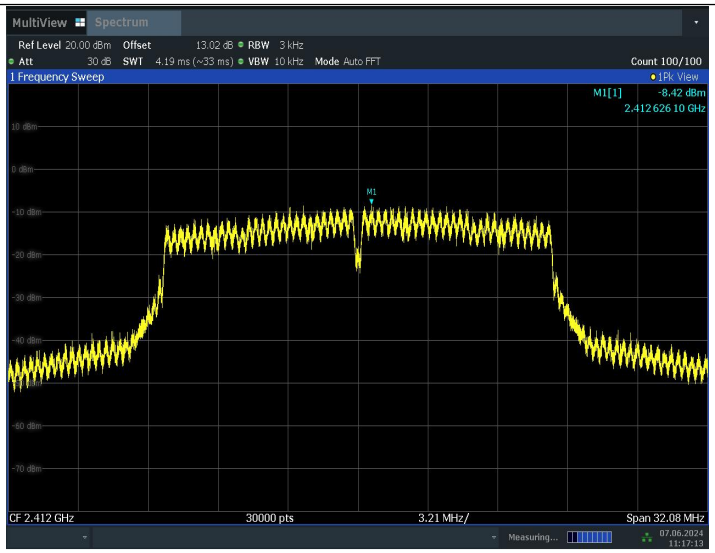
11G_2462



18:09:42 29.05.2024

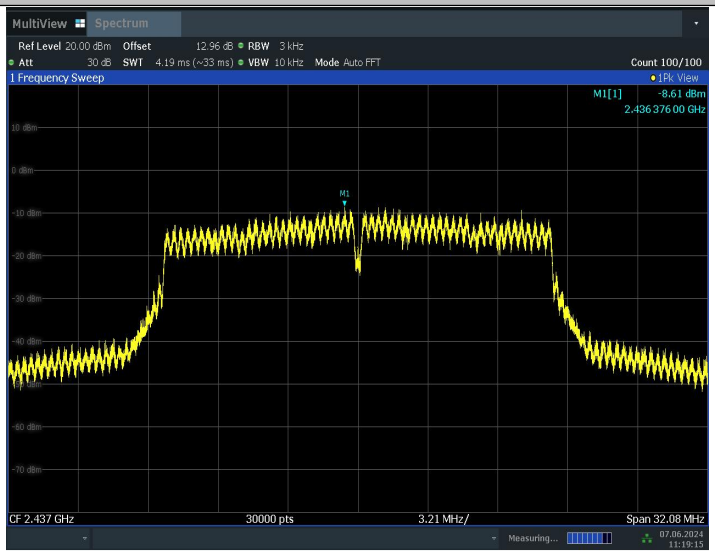
11N20SISO_2412

©Copyright. All rights reserved by CTTL.



11:17:14 07.06.2024

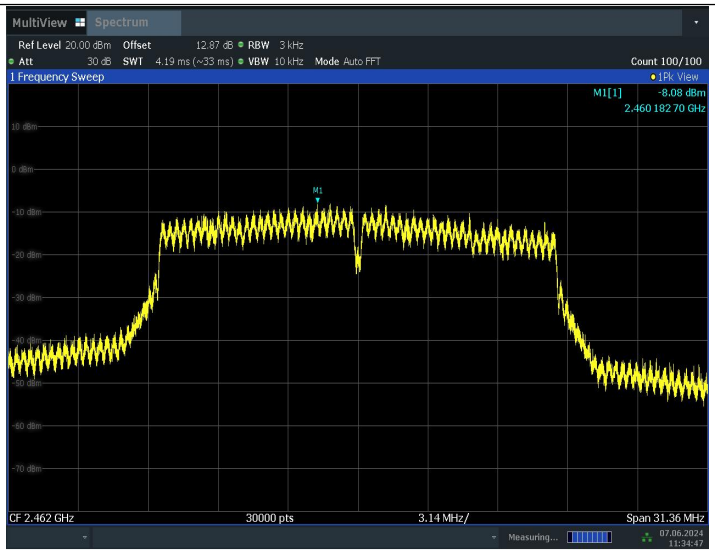
11N20SISO_2437



11:19:16 07.06.2024

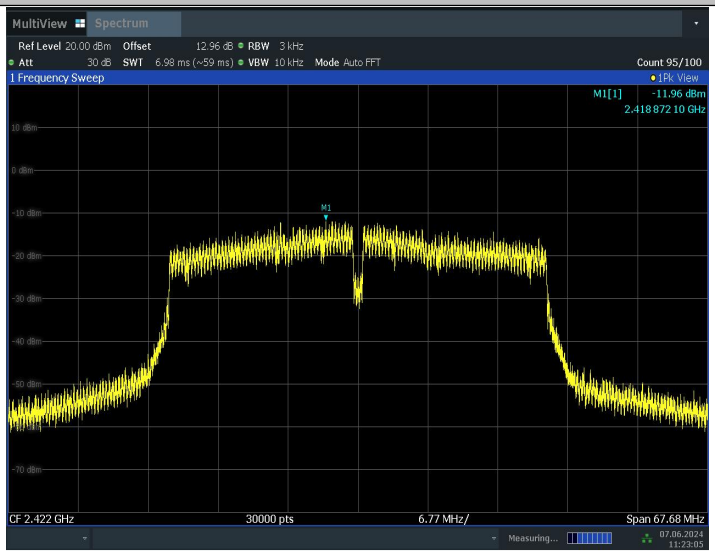
11N20SISO_2462

©Copyright. All rights reserved by CTTL.



11:34:47 07.06.2024

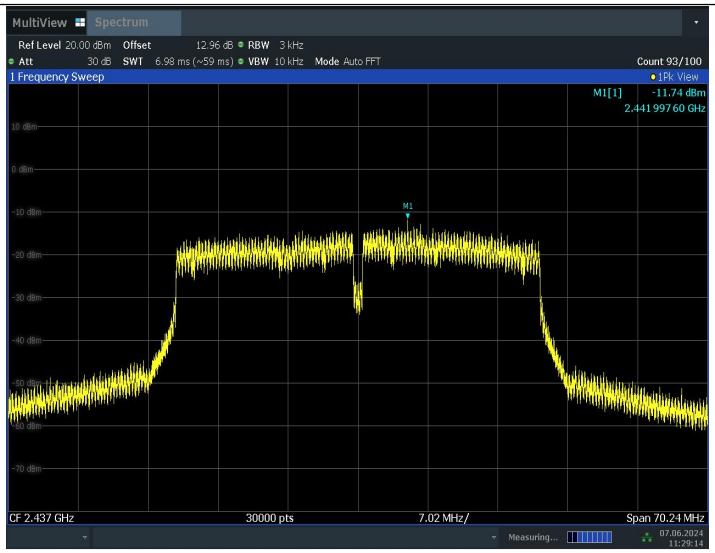
11N40SISO_2422



11:23:06 07.06.2024

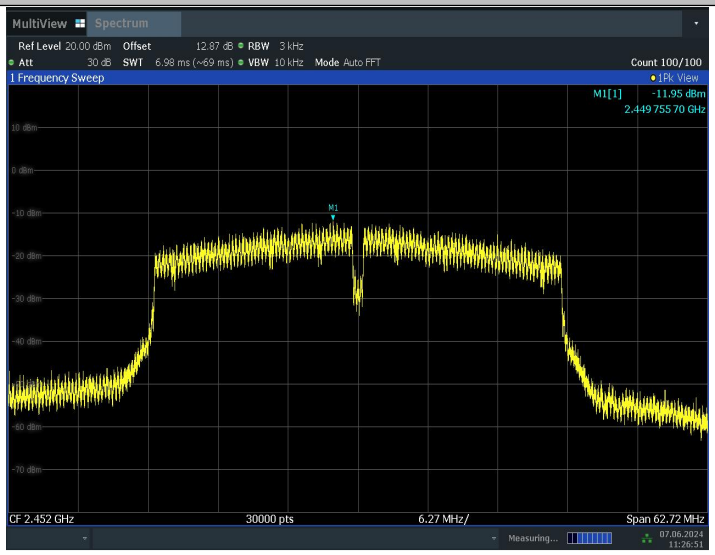
11N40SISO_2437

©Copyright. All rights reserved by CTTL.



11:29:14 07.06.2024

11N40SISO_2452



11:26:52 07.06.2024

Conclusion: Pass

©Copyright. All rights reserved by CTTL.

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: UT07a

Measurement Result:

TestMode	Frequency[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	2412	8.56	2407.96	2416.52	0.5	PASS
	2437	8.08	2432.96	2441.04	0.5	PASS
	2462	8.04	2457.96	2466.00	0.5	PASS
11G	2412	15.68	2404.44	2420.12	0.5	PASS
	2437	15.12	2429.44	2444.56	0.5	PASS
	2462	15.32	2454.24	2469.56	0.5	PASS
11N20SISO	2412	16.04	2404.48	2420.52	0.5	PASS
	2437	16.04	2429.44	2445.48	0.5	PASS
	2462	15.68	2453.84	2469.52	0.5	PASS
11N40SISO	2422	33.84	2405.68	2439.52	0.5	PASS
	2437	35.12	2419.40	2454.52	0.5	PASS
	2452	31.36	2435.68	2467.04	0.5	PASS

©Copyright. All rights reserved by CTTL.

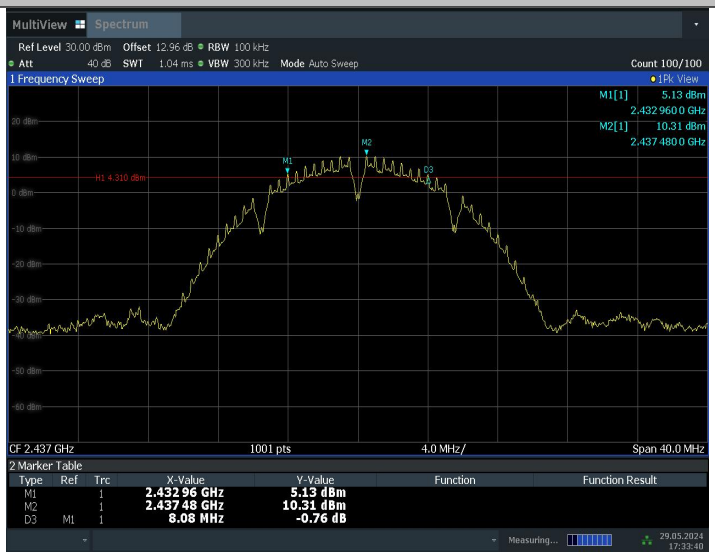
Test graphs as below:

11B_2412



17:30:57 29.05.2024

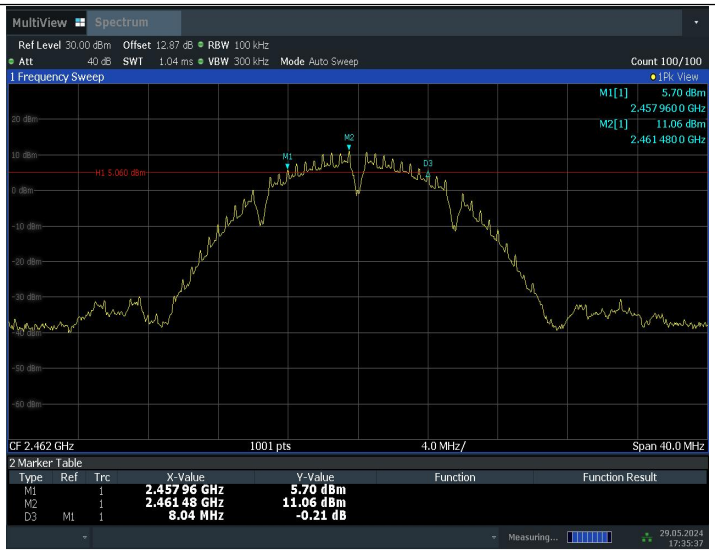
11B_2437



17:33:40 29.05.2024

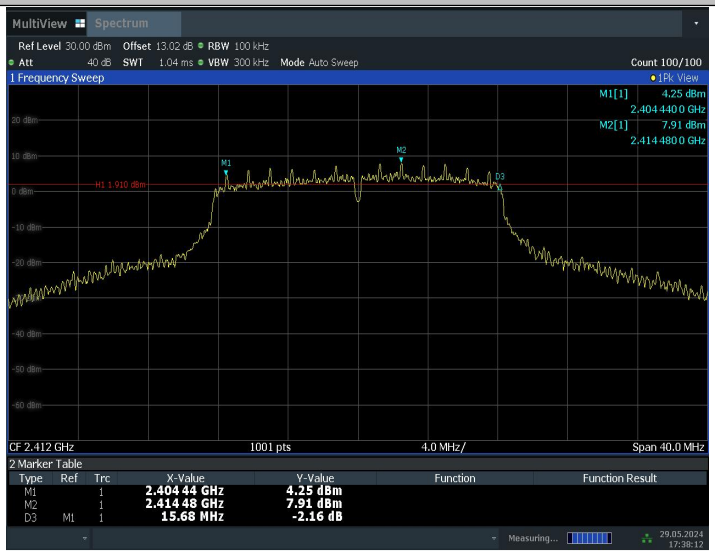
11B_2462

©Copyright. All rights reserved by CTTL.



17:35:38 29.05.2024

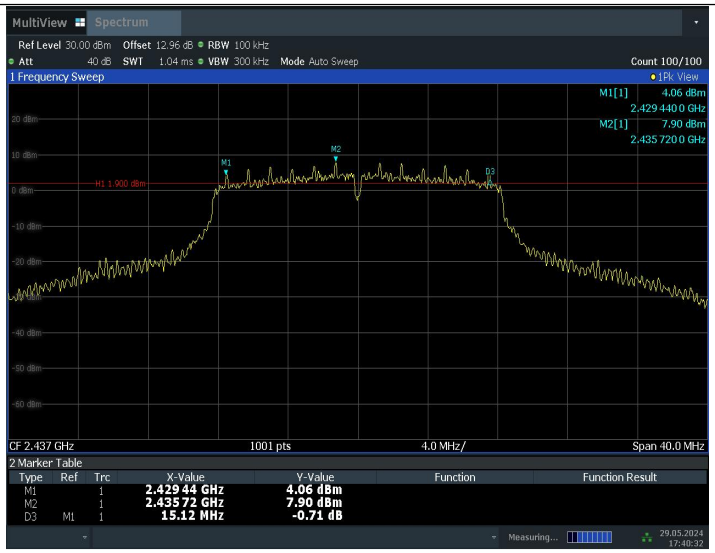
11G_2412



17:38:13 29.05.2024

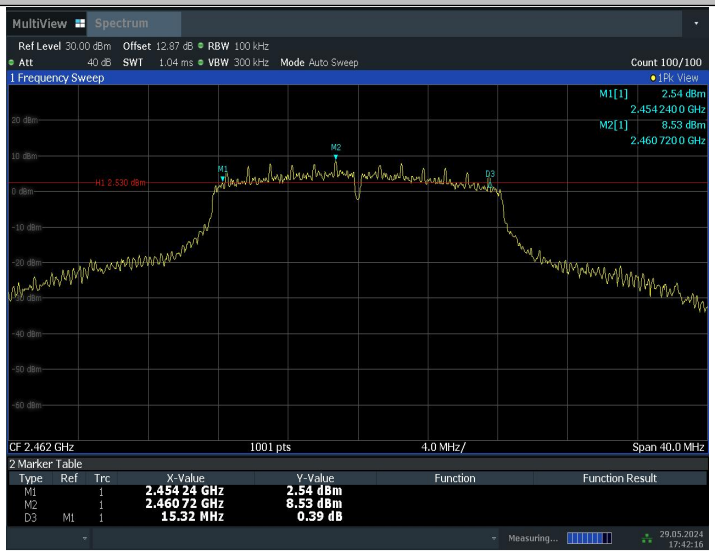
11G_2437

©Copyright. All rights reserved by CTTL.



17:40:33 29.05.2024

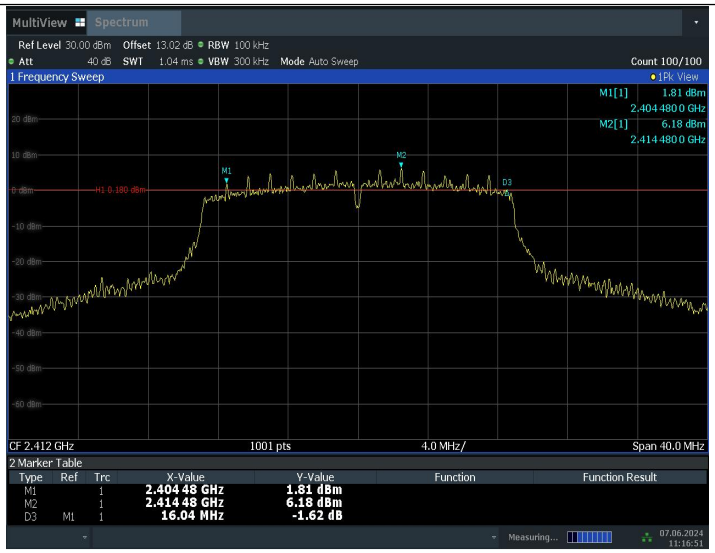
11G_2462



17:42:17 29.05.2024

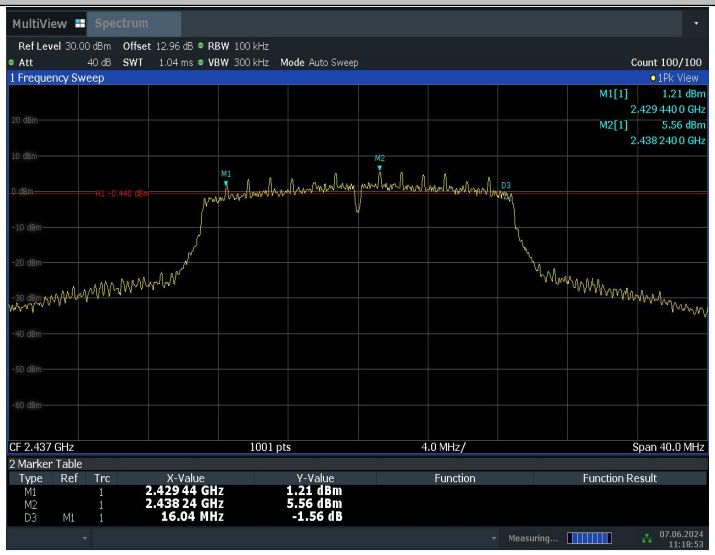
11N20SISO_2412

©Copyright. All rights reserved by CTTL.



11:16:51 07.06.2024

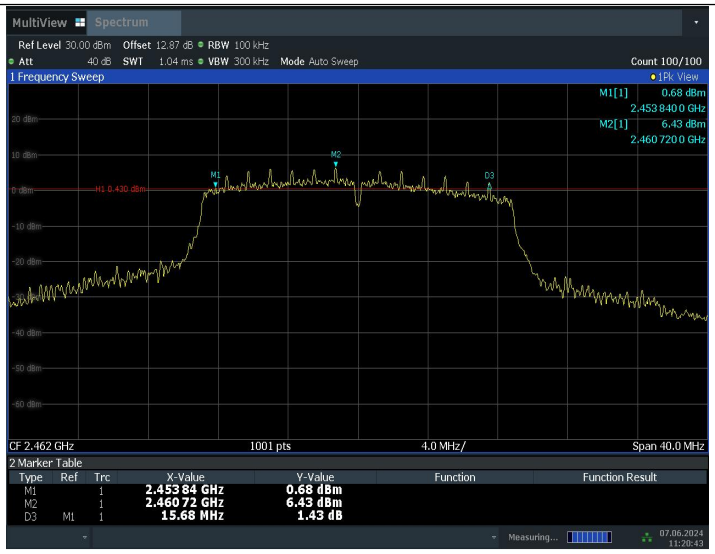
11N20SISO_2437



11:18:53 07.06.2024

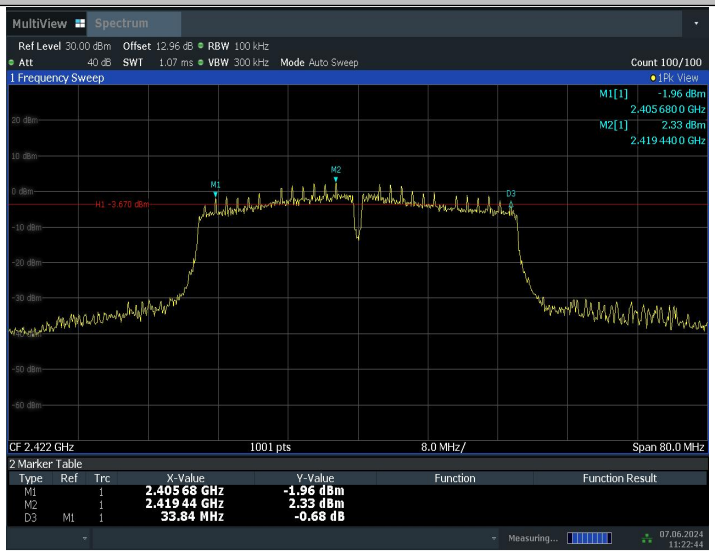
11N20SISO_2462

©Copyright. All rights reserved by CTTL.



11:20:44 07.06.2024

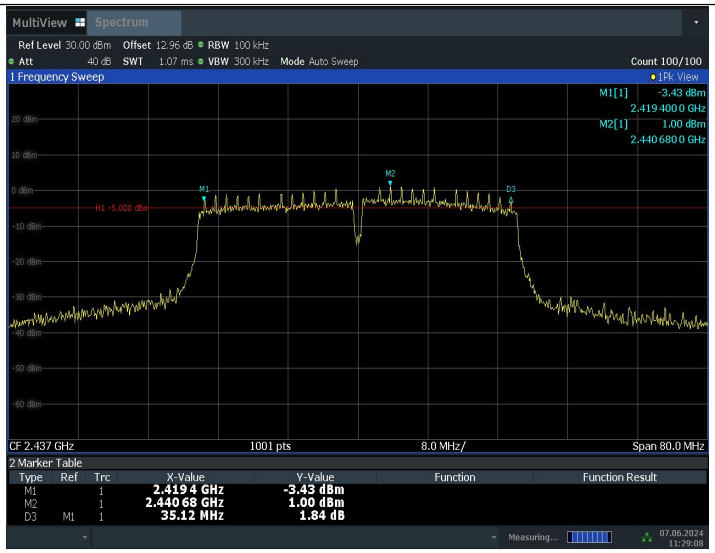
11N40SISO_2422



11:22:45 07.06.2024

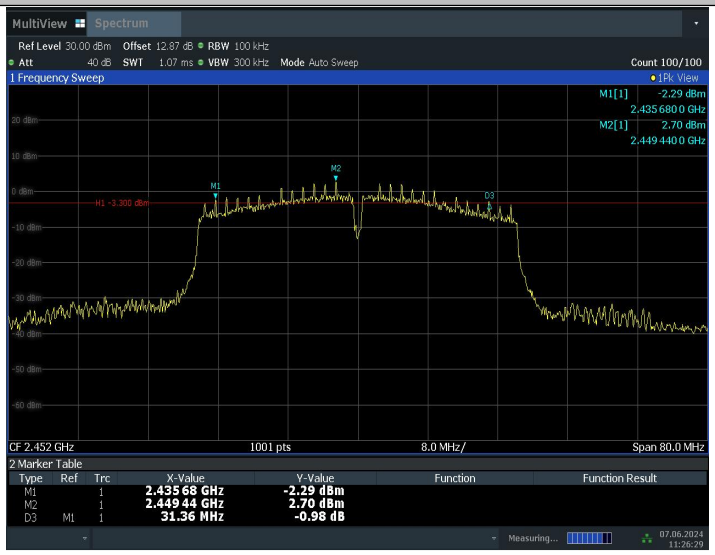
11N40SISO_2437

©Copyright. All rights reserved by CTTL.



11:29:08 07.06.2024

11N40SISO_2452



11:26:30 07.06.2024

Conclusion: Pass

©Copyright. All rights reserved by CTTL.

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

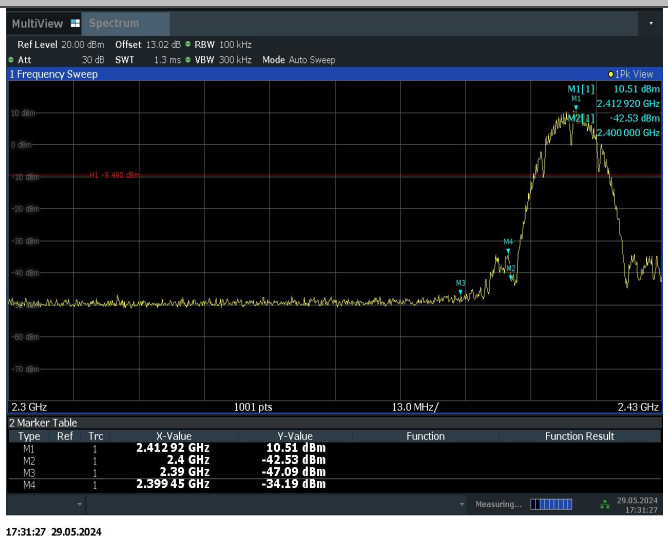
EUT ID: UT07a

Measurement Result:

TestMode	ChName	Frequency[MHz]	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
11B	Low	2412	10.51	-34.19	≤-9.49	PASS
	High	2462	10.83	-45.04	≤-9.17	PASS
11G	Low	2412	8.00	-19.58	≤-12	PASS
	High	2462	8.45	-36.04	≤-11.55	PASS
11N20SISO	Low	2412	6.14	-24.85	≤-13.86	PASS
	High	2462	6.49	-39.01	≤-13.51	PASS
11N40SISO	Low	2422	2.83	-30.86	≤-17.17	PASS
	High	2452	2.76	-35.61	≤-17.24	PASS

Test graphs as below:

11B_Low_2412



©Copyright. All rights reserved by CTTL.

11B_High_2462
 17:36:07 29.05.2024
11G_Low_2412
 17:38:44 29.05.2024
11G_High_2462

©Copyright. All rights reserved by CTTL.



17:42:45 29.05.2024

11N20SISO_Low_2412



11:17:23 07.06.2024

11N20SISO_High_2462

©Copyright. All rights reserved by CTTL.



11:21:14 07.06.2024

11N40SISO_Low_2422



11:23:16 07.06.2024

11N40SISO_High_2452

©Copyright. All rights reserved by CTTL.



11:27:02 07.06.2024

Conclusion: Pass

©Copyright. All rights reserved by CTTL.

A.6. Transmitter Spurious Emission

A.6.1 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: UT07a

Measurement Results:

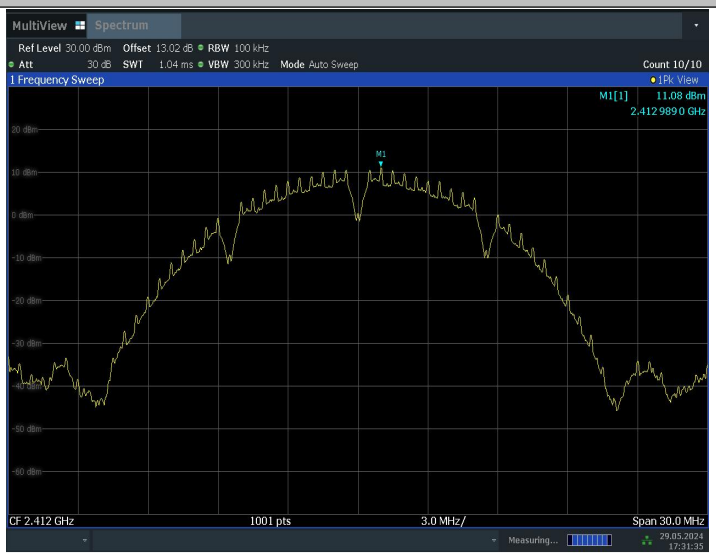
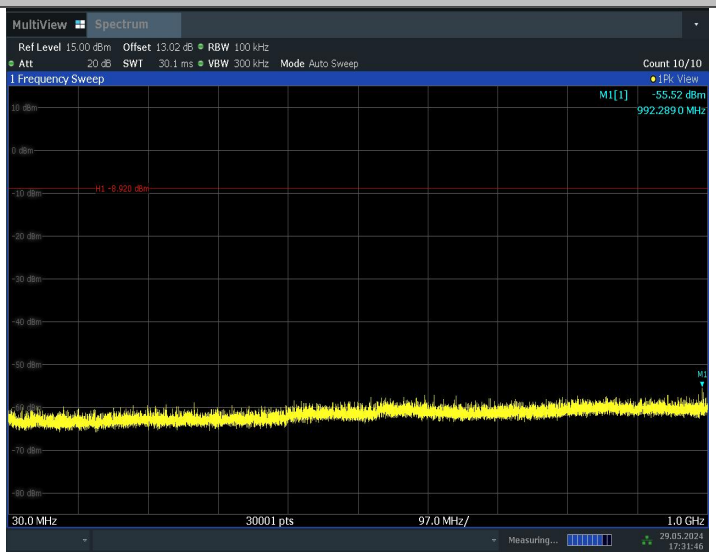
TestMode	Frequency[MHz]	FreqRange [Mhz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B	2412	Reference	11.08	11.08	---	PASS
		30~1000	11.08	-55.52	≤-8.92	PASS
		1000~26500	11.08	-44.22	≤-8.92	PASS
	2437	Reference	10.27	10.27	---	PASS
		30~1000	10.27	-56.41	≤-9.73	PASS

©Copyright. All rights reserved by CTTL.

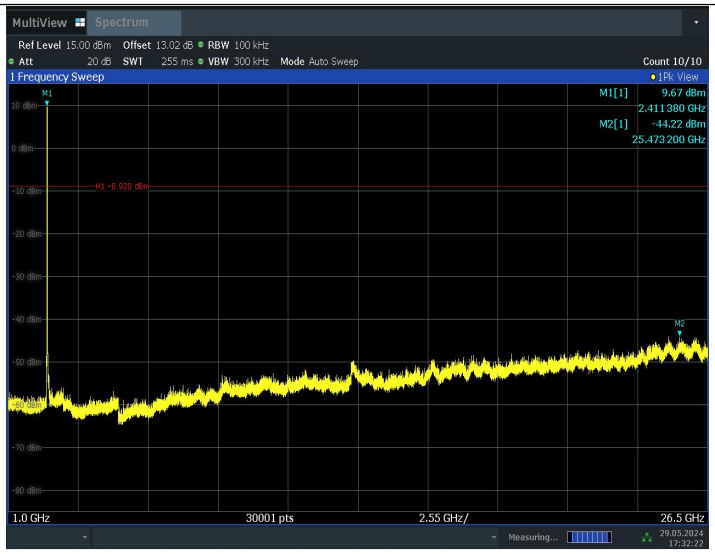
		1000~26500	10.27	-43.96	≤-9.73	PASS
	2462	Reference	11.05	11.05	---	PASS
		30~1000	11.05	-56.96	≤-8.95	PASS
		1000~26500	11.05	-43.49	≤-8.95	PASS
11G	2412	Reference	8.09	8.09	---	PASS
		30~1000	8.09	-56.71	≤-11.91	PASS
		1000~26500	8.09	-44.02	≤-11.91	PASS
	2437	Reference	7.94	7.94	---	PASS
		30~1000	7.94	-55.72	≤-12.06	PASS
		1000~26500	7.94	-44.45	≤-12.06	PASS
	2462	Reference	8.64	8.64	---	PASS
		30~1000	8.64	-56.99	≤-11.36	PASS
		1000~26500	8.64	-43.89	≤-11.36	PASS
11N20SISO	2412	Reference	6.32	6.32	---	PASS
		30~1000	6.32	-56.54	≤-13.68	PASS
		1000~26500	6.32	-43.54	≤-13.68	PASS
	2437	Reference	5.75	5.75	---	PASS
		30~1000	5.75	-56.73	≤-14.25	PASS
		1000~26500	5.75	-42.79	≤-14.25	PASS
	2462	Reference	6.63	6.63	---	PASS
		30~1000	6.63	-55.98	≤-13.37	PASS
		1000~26500	6.63	-44.35	≤-13.37	PASS
11N40SISO	2422	Reference	2.84	2.84	---	PASS
		30~1000	2.84	-56.83	≤-17.16	PASS
		1000~26500	2.84	-42.78	≤-17.16	PASS
	2437	Reference	1.23	1.23	---	PASS
		30~1000	1.23	-56.64	≤-18.77	PASS
		1000~26500	1.23	-44.16	≤-18.77	PASS
	2452	Reference	2.79	2.79	---	PASS
		30~1000	2.79	-56.93	≤-17.21	PASS
		1000~26500	2.79	-43.72	≤-17.21	PASS

©Copyright. All rights reserved by CTTL.

Test graphs as below:

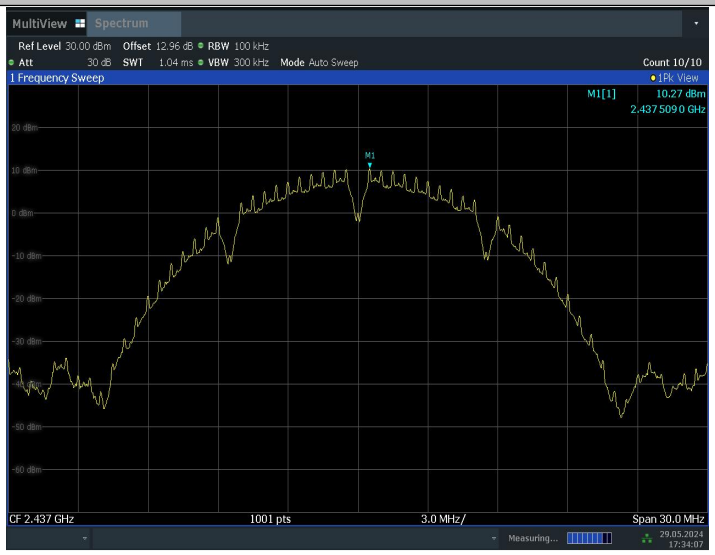
11B_2412_0~Reference
 17:31:35 29.05.2024
11B_2412_30~1000
 17:31:46 29.05.2024
11B_2412_1000~26500

©Copyright. All rights reserved by CTTL.



17:32:22 29.05.2024

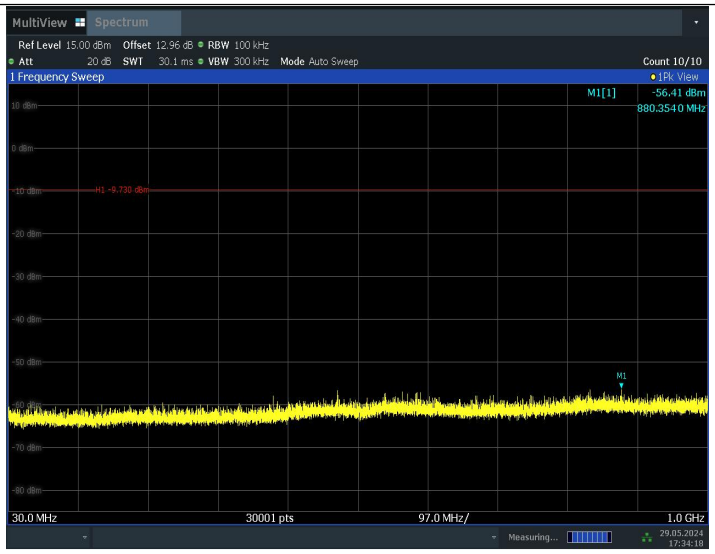
11B_2437_0~Reference



17:34:07 29.05.2024

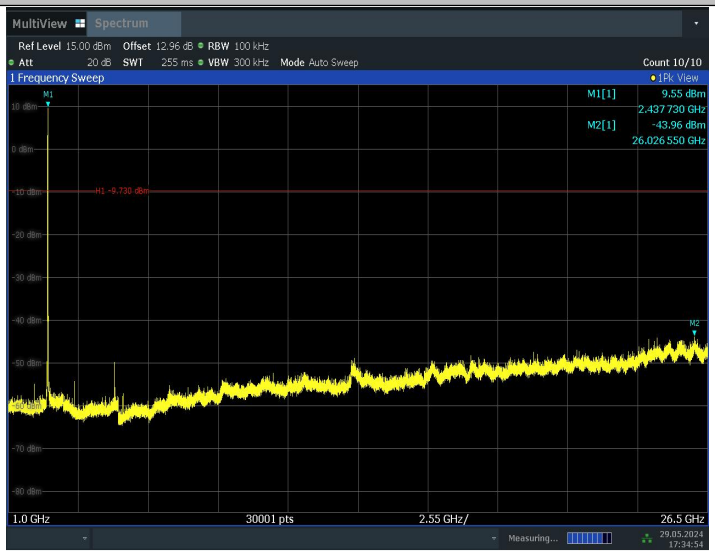
11B_2437_30~1000

©Copyright. All rights reserved by CTTL.



17:34:18 29.05.2024

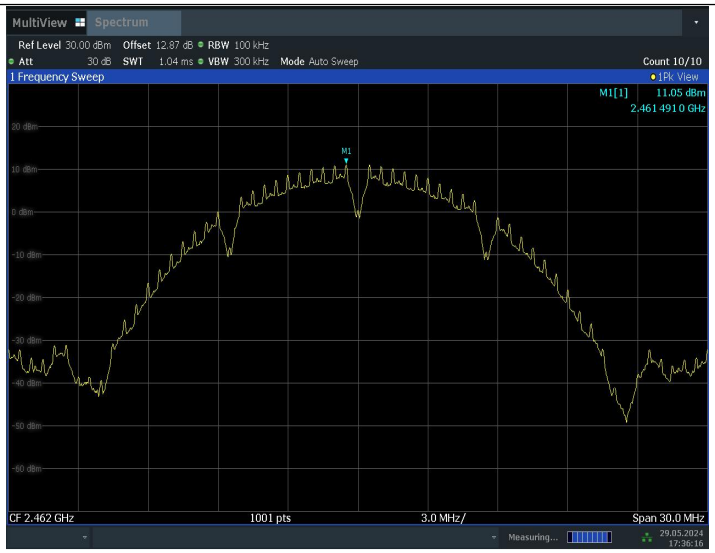
11B_2437_1000~26500



17:34:54 29.05.2024

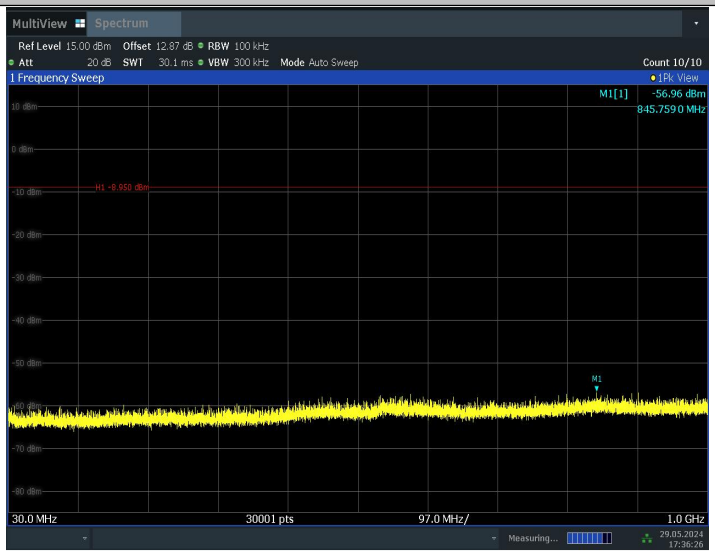
11B_2462_0~Reference

©Copyright. All rights reserved by CTTL.



17:36:16 29.05.2024

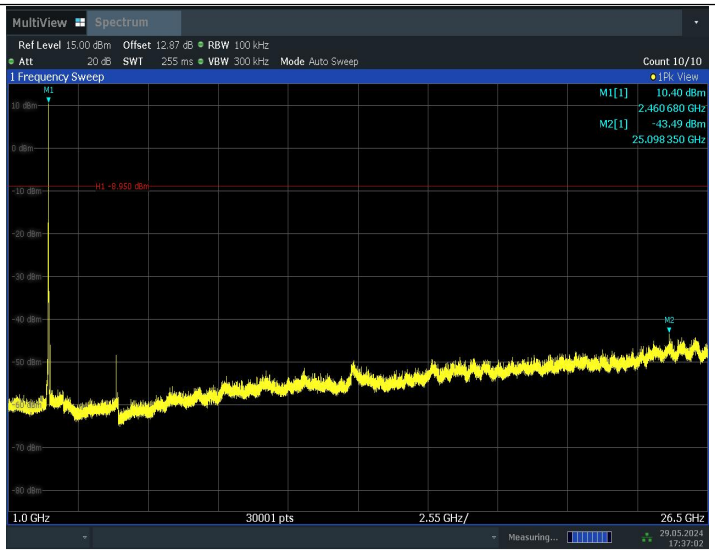
11B_2462_30~1000



17:36:27 29.05.2024

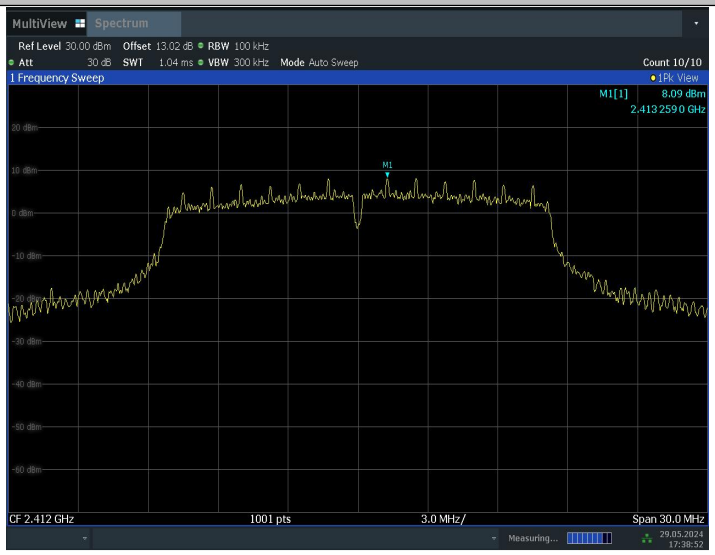
11B_2462_1000~26500

©Copyright. All rights reserved by CTTL.



17:37:03 29.05.2024

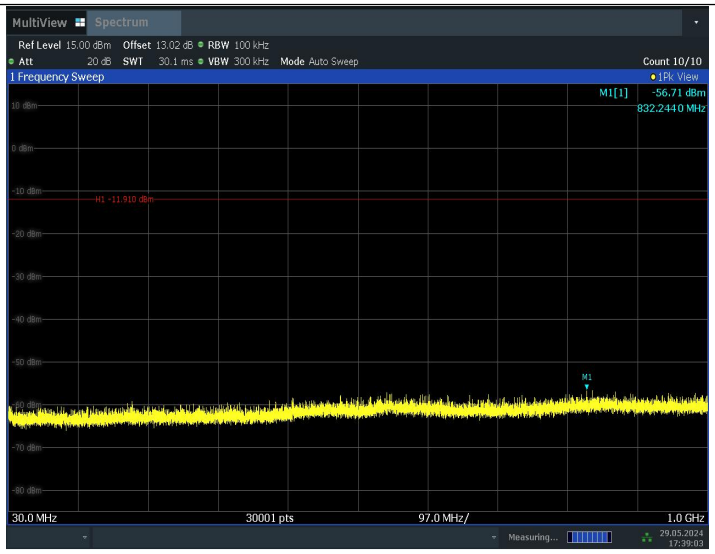
11G_2412_0~Reference



17:38:53 29.05.2024

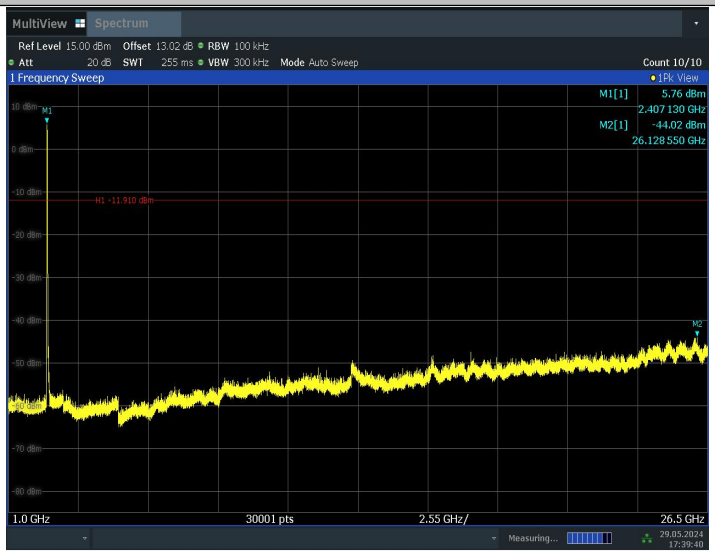
11G_2412_30~1000

©Copyright. All rights reserved by CTTL.



17:39:04 29.05.2024

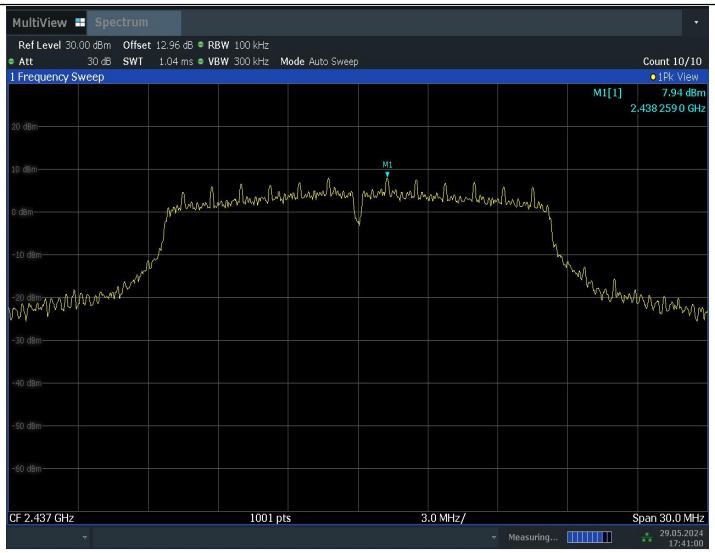
11G_2412_1000~26500



17:39:40 29.05.2024

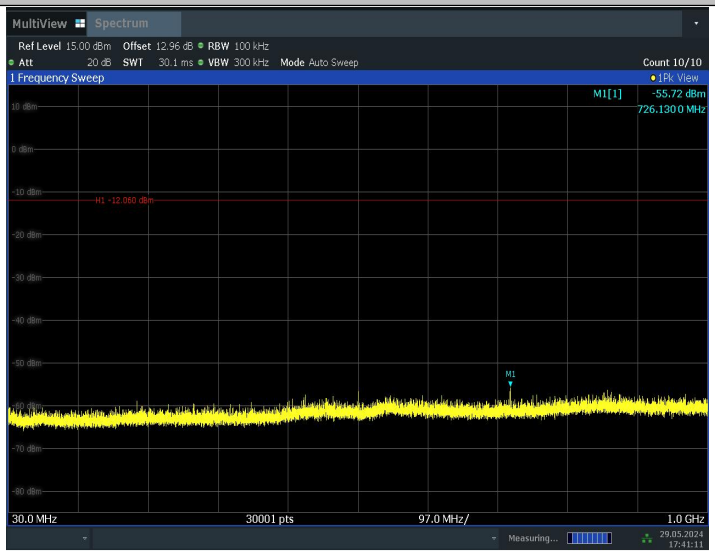
11G_2437_0~Reference

©Copyright. All rights reserved by CTTL.



17:41:01 29.05.2024

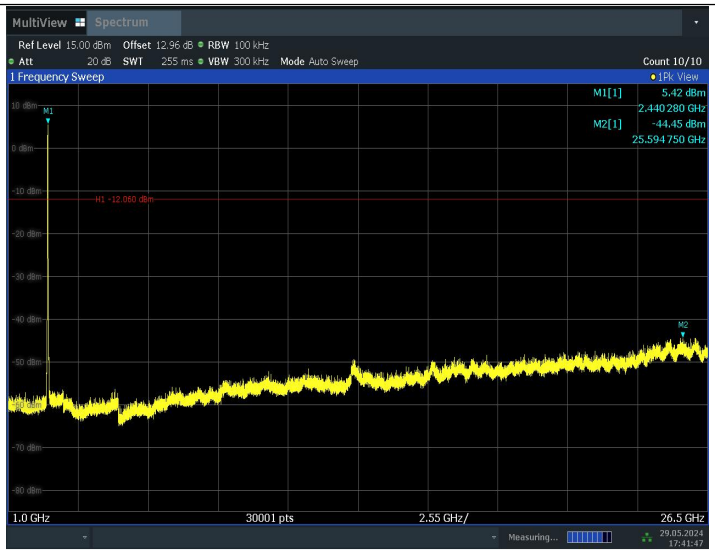
11G_2437_30~1000



17:41:12 29.05.2024

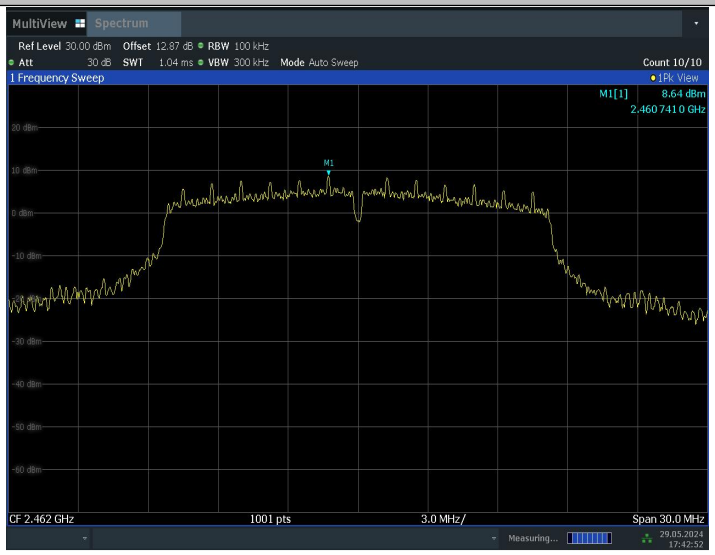
11G_2437_1000~26500

©Copyright. All rights reserved by CTTL.



17:41:48 29.05.2024

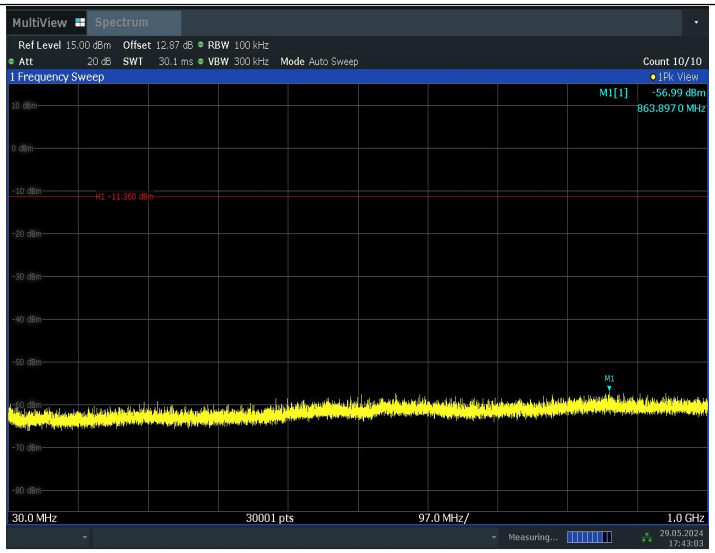
11G_2462_0~Reference



17:42:53 29.05.2024

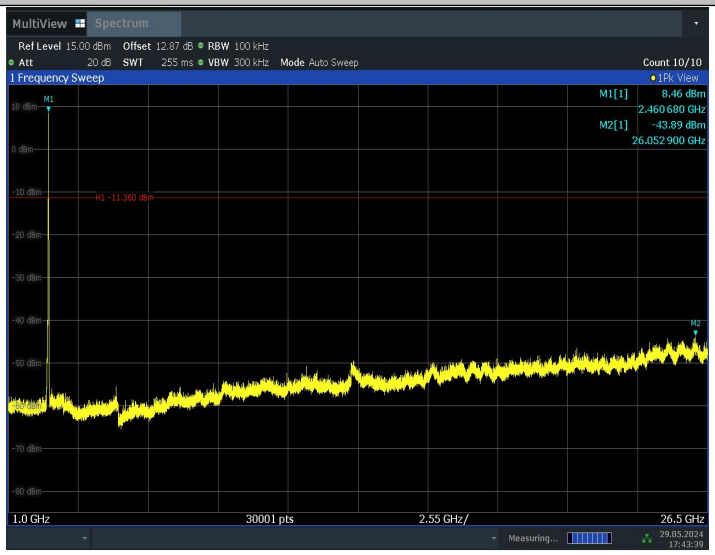
11G_2462_30~1000

©Copyright. All rights reserved by CTTL.



17:43:04 29.05.2024

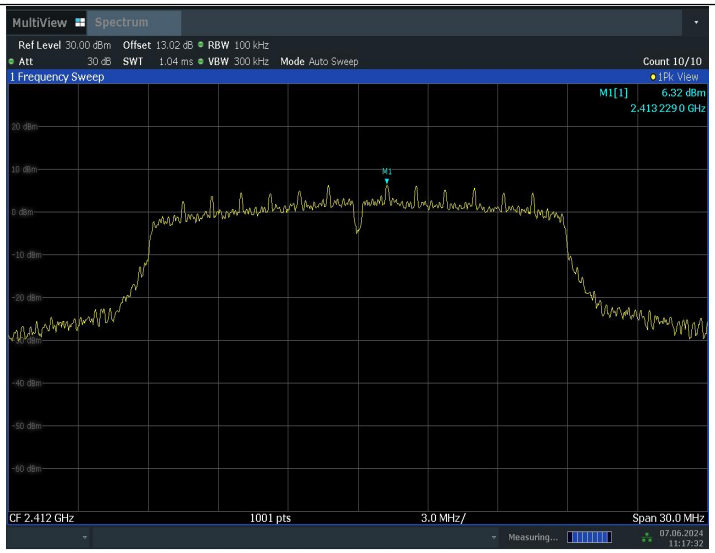
11G_2462_1000~26500



17:43:40 29.05.2024

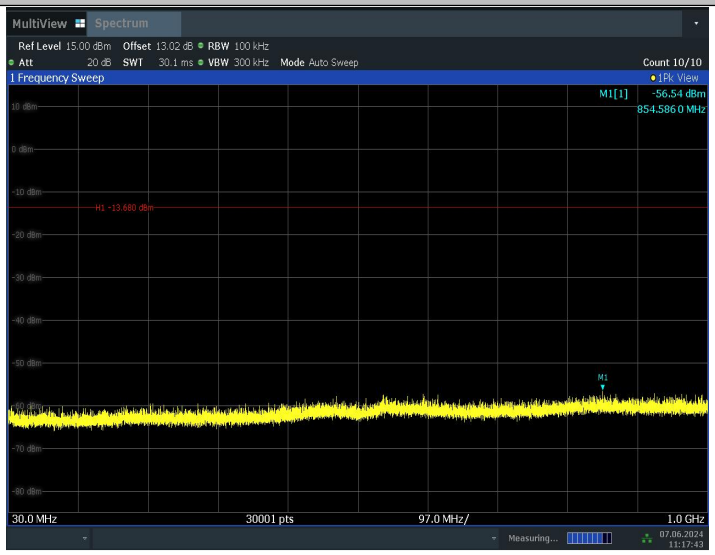
11N20SISO_2412_0~Reference

©Copyright. All rights reserved by CTTL.



11:17:32 07.06.2024

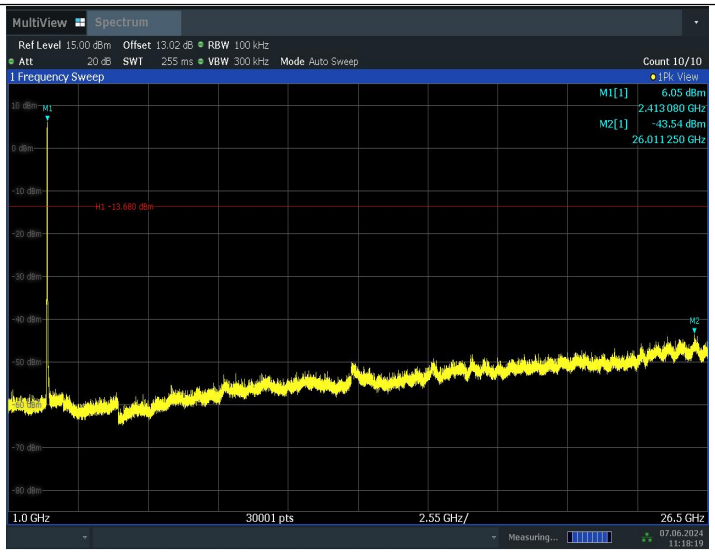
11N20SISO_2412_30~1000



11:17:43 07.06.2024

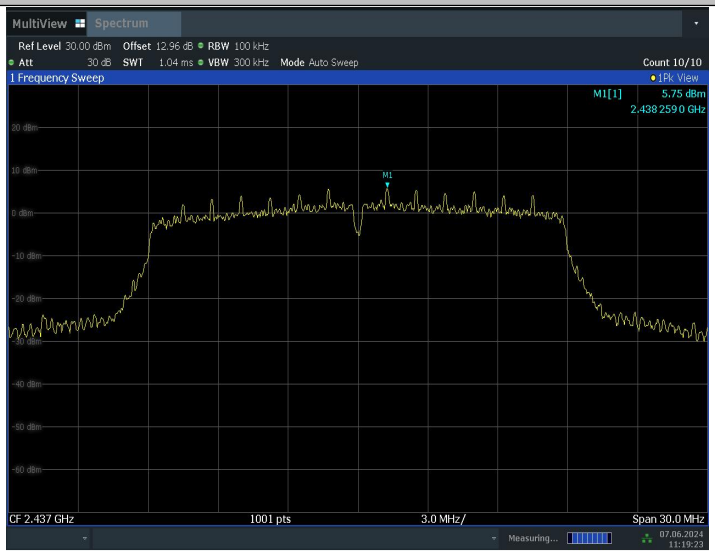
11N20SISO_2412_1000~26500

©Copyright. All rights reserved by CTTL.



11:18:19 07.06.2024

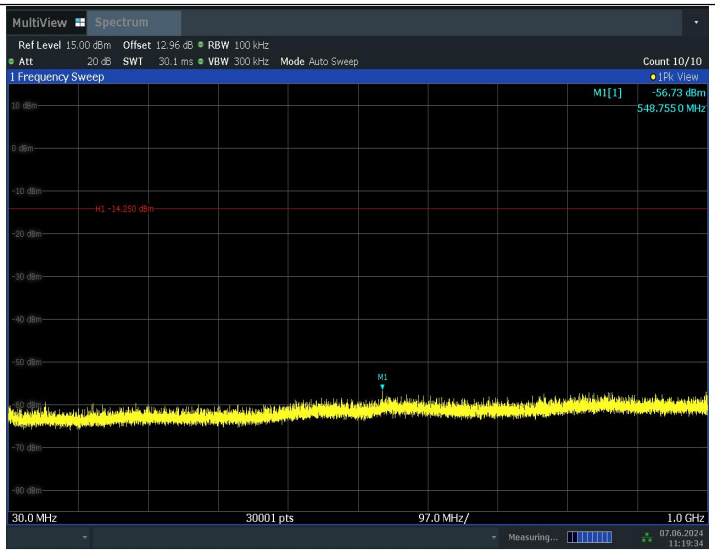
11N20SISO_2437_0~Reference



11:19:24 07.06.2024

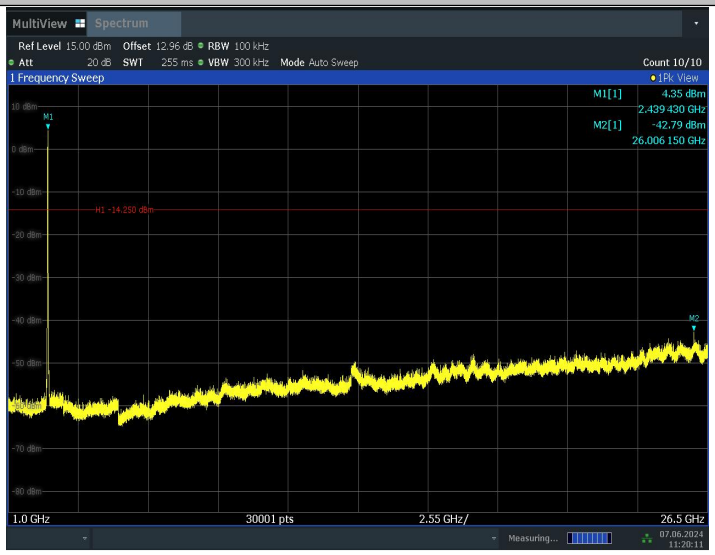
11N20SISO_2437_30~1000

©Copyright. All rights reserved by CTTL.



11:19:35 07.06.2024

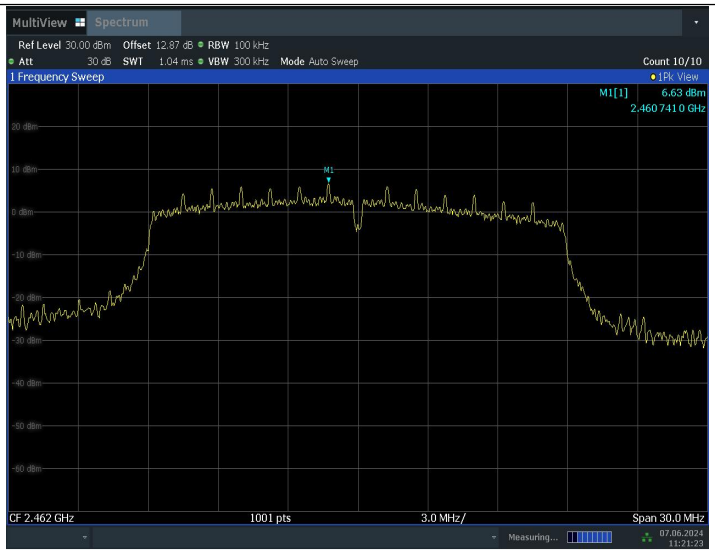
11N20SISO_2437_1000~26500



11:20:11 07.06.2024

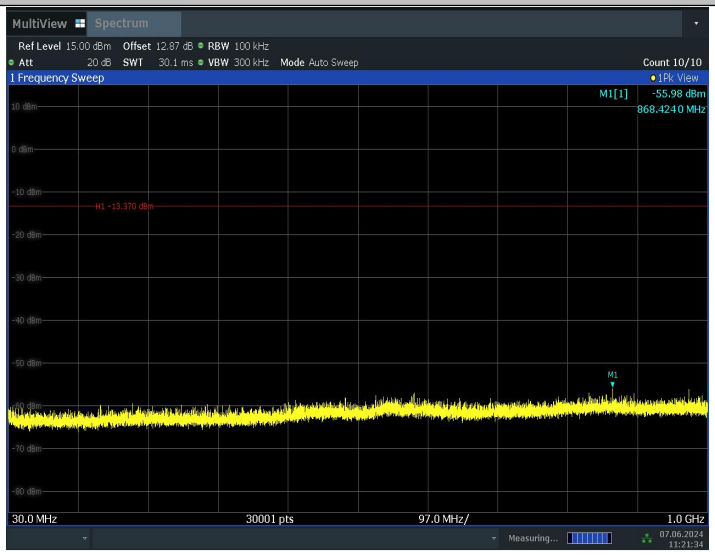
11N20SISO_2462_0~Reference

©Copyright. All rights reserved by CTTL.



11:21:23 07.06.2024

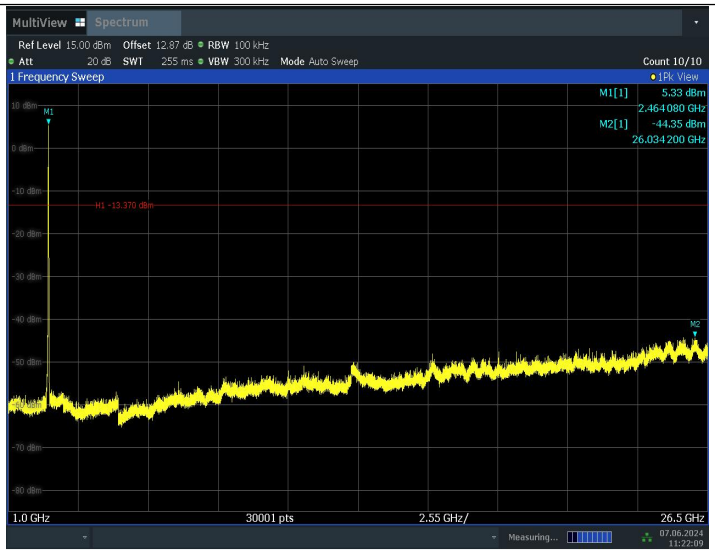
11N20SISO_2462_30~1000



11:21:34 07.06.2024

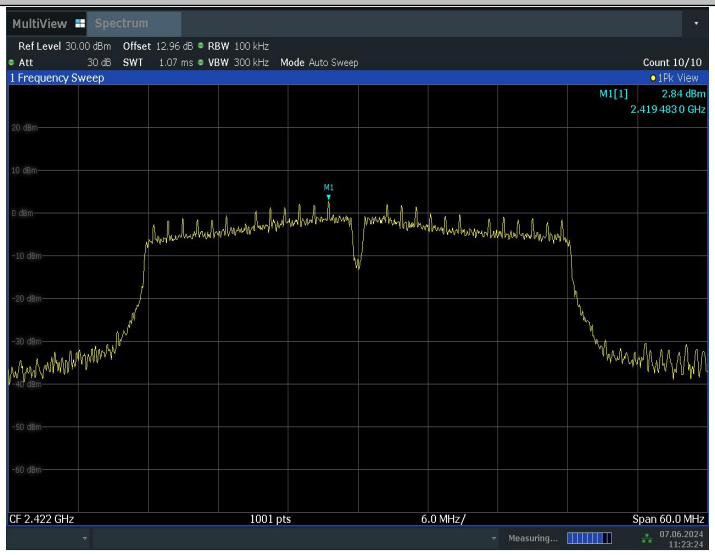
11N20SISO_2462_1000~26500

©Copyright. All rights reserved by CTTL.



11:22:10 07.06.2024

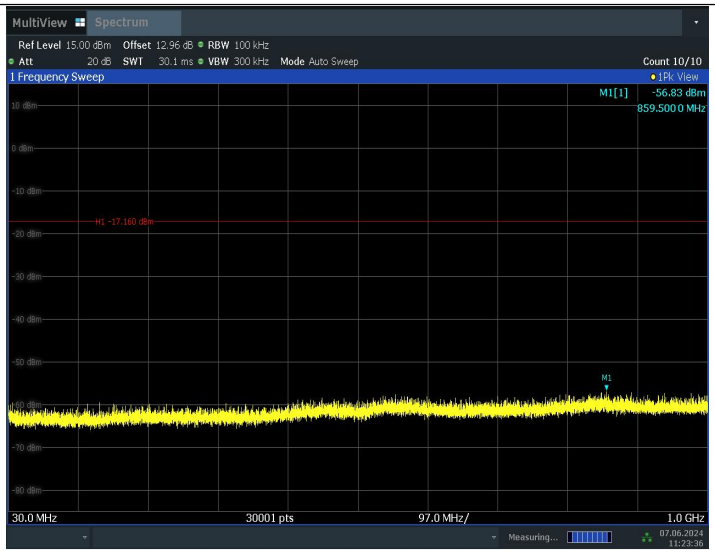
11N40SISO_2422_0~Reference



11:23:25 07.06.2024

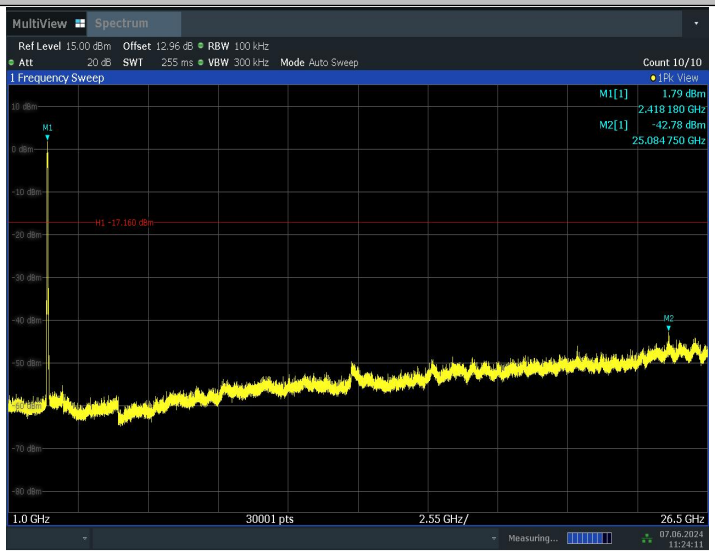
11N40SISO_2422_30~1000

©Copyright. All rights reserved by CTTL.



11:23:36 07.06.2024

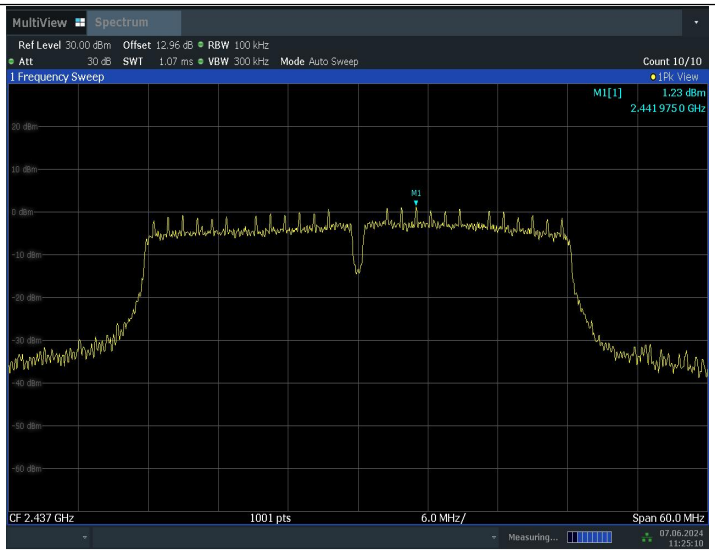
11N40SISO_2422_1000~26500



11:24:12 07.06.2024

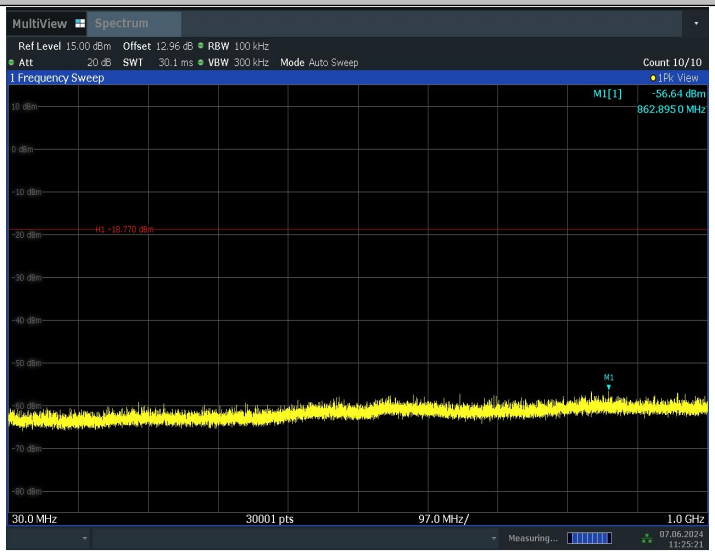
11N40SISO_2437_0~Reference

©Copyright. All rights reserved by CTTL.



11:25:11 07.06.2024

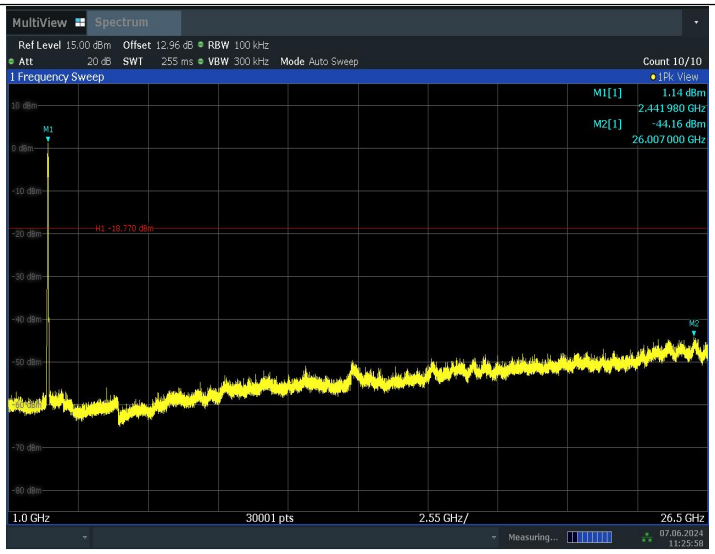
11N40SISO_2437_30~1000



11:25:22 07.06.2024

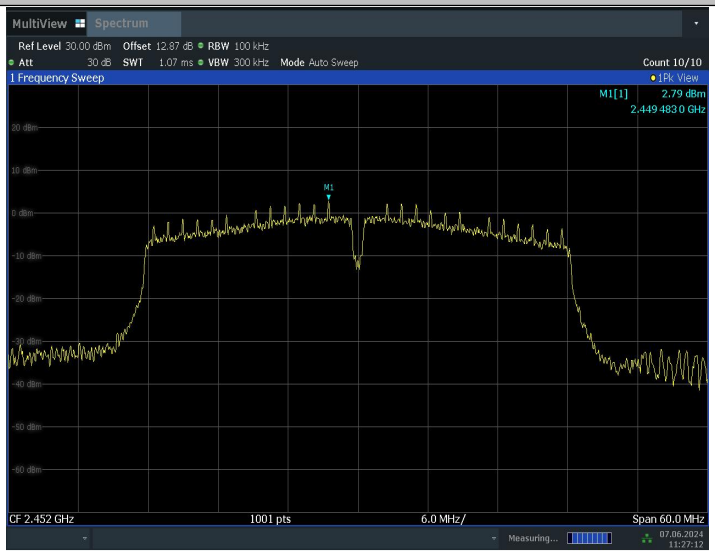
11N40SISO_2437_1000~26500

©Copyright. All rights reserved by CTTL.



11:25:58 07.06.2024

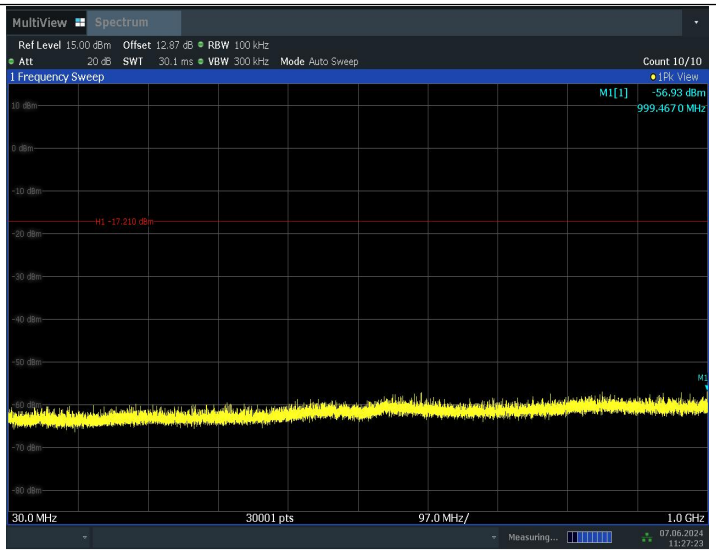
11N40SISO_2452_0~Reference



11:27:12 07.06.2024

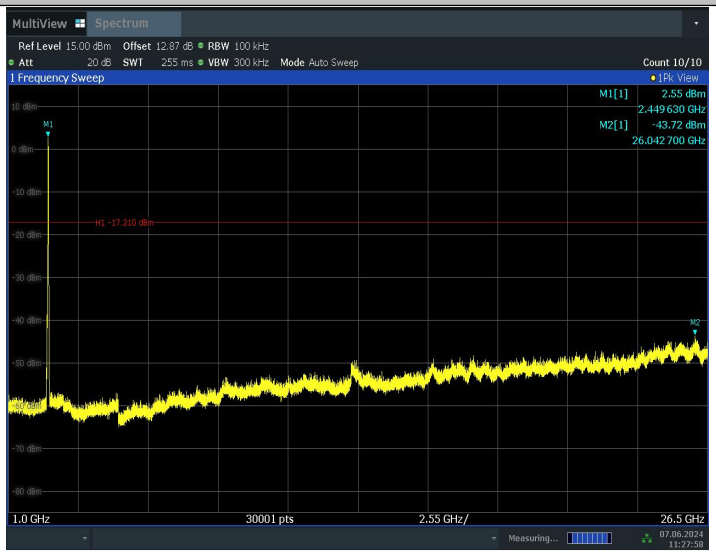
11N40SISO_2452_30~1000

©Copyright. All rights reserved by CTTL.



11:27:23 07.06.2024

11N40SISO_2452_1000~26500



11:27:59 07.06.2024

Conclusion: Pass

©Copyright. All rights reserved by CTTL.

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

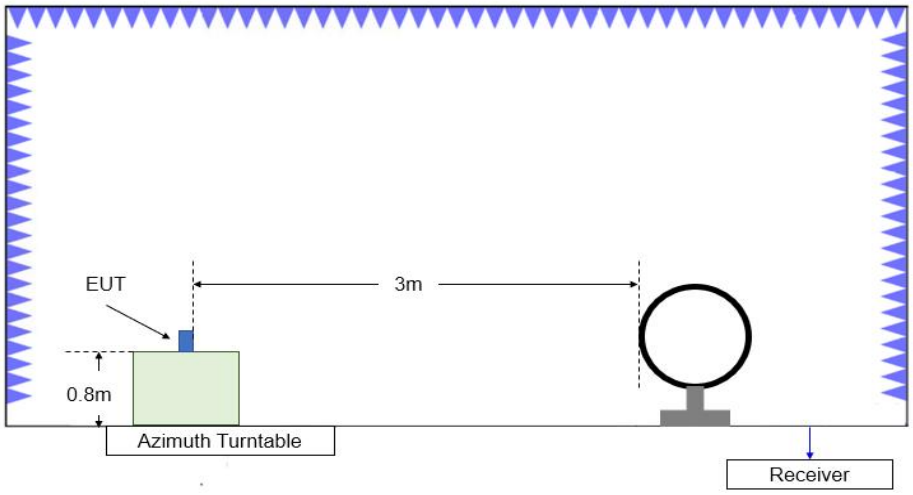


Figure A.7.1. Test Site Diagram (9kHz-30MHz)

©Copyright. All rights reserved by CTTL.

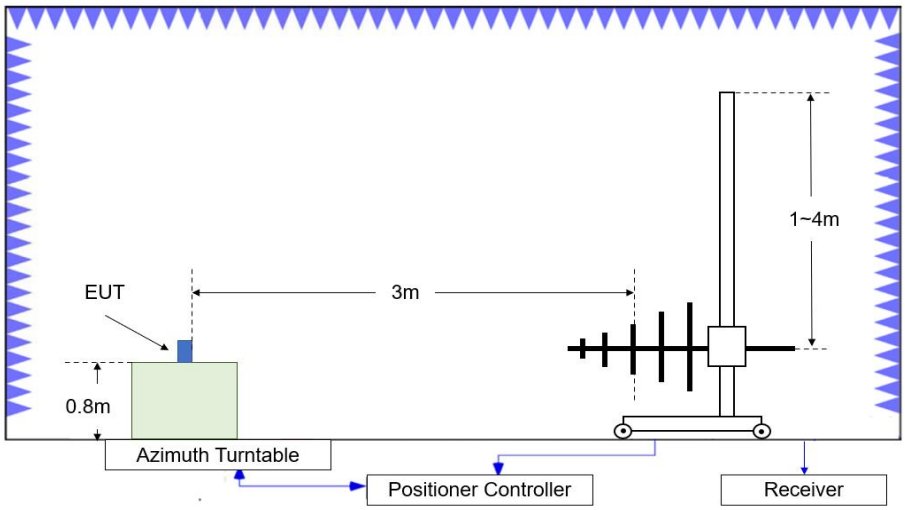


Figure A.7.2. Test Site Diagram (30MHz-1GHz)

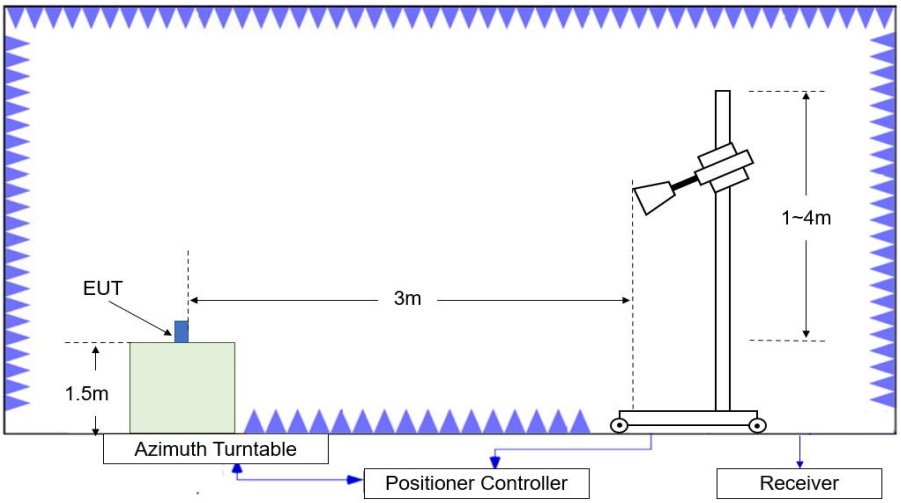


Figure A.7.3. Test Site Diagram (1GHz-40GHz)

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.

©Copyright. All rights reserved by CTTL.

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 10^{th} harmonic of highest fundamental frequency or 40GHz, whichever is lower.

©Copyright. All rights reserved by CTTL.

Test Result

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)
4824.000	54.84	-37.70	33.00	59.54	74.00	19.16	V
17943.500	51.94	-29.40	46.00	35.34	74.00	22.06	V
13739.500	48.60	-31.00	41.10	38.50	74.00	25.40	H
12784.000	46.50	-31.50	39.80	38.20	74.00	27.50	V
8749.000	45.61	-34.80	37.90	42.51	74.00	28.39	H
2370.100	53.73	-19.60	28.20	45.13	74.00	20.27	H

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)
4873.500	53.48	-37.50	33.40	57.58	74.00	20.52	H
17578.000	51.47	-29.60	45.10	35.87	74.00	22.53	H
13664.000	48.97	-31.00	41.00	38.97	74.00	25.03	H
12308.000	46.39	-32.10	39.00	39.49	74.00	27.61	V
9214.500	44.87	-34.30	37.60	41.57	74.00	29.13	V
7308.000	44.58	-35.40	36.60	43.38	74.00	29.42	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)
17600.500	51.98	-29.60	45.10	36.38	74.00	22.02	H
4924.000	51.05	-37.60	33.30	55.35	74.00	22.95	V
14054.000	49.10	-31.10	41.60	38.60	74.00	24.90	V
12769.000	46.26	-31.80	39.60	38.36	74.00	27.74	V
9176.000	44.68	-34.70	37.70	41.68	74.00	29.32	V
2487.800	55.45	-19.70	28.20	46.95	74.00	18.55	H

©Copyright. All rights reserved by CTTL.

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)
17612.000	51.77	-29.60	45.10	36.17	74.00	22.23	H
14096.000	49.36	-30.20	41.70	37.86	74.00	24.64	V
12761.500	47.25	-31.80	39.60	39.35	74.00	26.75	V
4823.500	46.43	-37.70	33.00	51.13	74.00	27.57	V
9186.500	45.01	-34.70	37.70	42.01	74.00	28.99	V
2389.600	64.18	-19.80	28.20	55.78	74.00	9.82	H

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)
17607.500	51.91	-29.60	45.10	36.31	74.00	22.09	H
13810.500	49.33	-30.90	41.20	39.03	74.00	24.67	H
4874.500	47.70	-37.50	33.40	51.80	74.00	26.30	V
12999.000	46.47	-31.90	40.10	38.27	74.00	27.53	V
8699.000	45.76	-34.40	37.70	42.46	74.00	28.24	V
7147.000	45.21	-35.60	35.90	44.91	74.00	28.79	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)
17968.000	51.33	-29.40	46.00	34.73	74.00	22.67	V
13604.500	48.46	-31.30	40.80	38.96	74.00	25.54	H
12944.500	46.39	-31.40	40.00	37.79	74.00	27.61	H
4922.500	45.73	-37.60	33.30	50.03	74.00	28.27	V
9518.000	45.06	-33.80	37.60	41.26	74.00	28.94	H
2486.400	66.87	-19.70	28.20	58.37	74.00	7.13	H

©Copyright. All rights reserved by CTTL.

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)
17600.500	51.73	-29.60	45.10	36.13	74.00	22.27	H
14187.500	48.92	-30.20	41.70	37.42	74.00	25.08	H
4824.500	48.21	-37.70	33.00	52.91	74.00	25.79	V
12762.500	47.78	-31.80	39.60	39.88	74.00	26.22	H
9500.500	44.92	-34.60	37.70	41.82	74.00	29.08	V
2389.300	67.78	-19.80	28.20	59.38	74.00	6.22	H

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)
17618.000	51.90	-29.60	45.10	36.30	74.00	22.10	V
13705.000	49.15	-31.00	41.00	39.15	74.00	24.85	H
4874.500	47.27	-37.50	33.40	51.37	74.00	26.73	V
12746.000	46.46	-31.80	39.60	38.56	74.00	27.54	V
9325.500	44.88	-34.10	37.80	41.18	74.00	29.12	H
7319.000	44.52	-35.40	36.60	43.32	74.00	29.48	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)
17623.500	51.87	-29.60	45.10	36.27	74.00	22.13	V
13732.000	49.45	-31.00	41.10	39.35	74.00	24.55	V
12774.000	46.97	-31.50	39.80	38.67	74.00	27.03	H
4919.500	45.18	-37.60	33.30	49.48	74.00	28.82	H
9492.000	44.87	-34.60	37.70	41.77	74.00	29.13	V
2485.200	63.23	-19.70	28.20	54.73	74.00	10.77	H

©Copyright. All rights reserved by CTTL.

802.11n-HT40

Ch3

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)
17974.000	51.96	-29.40	46.00	35.36	74.00	22.04	V
14099.500	49.04	-30.20	41.70	37.54	74.00	24.96	H
12686.000	46.70	-31.90	39.50	39.10	74.00	27.30	V
8020.000	44.84	-35.10	36.90	43.04	74.00	29.16	H
7429.500	44.56	-35.50	36.50	43.56	74.00	29.44	V
2389.200	65.08	-19.80	28.20	56.68	74.00	8.92	H

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)
17601.000	51.64	-29.60	45.10	36.04	74.00	22.36	V
14173.000	49.27	-30.20	41.70	37.77	74.00	24.73	V
11852.000	47.58	-32.80	39.10	41.18	74.00	26.42	H
9419.000	45.76	-33.60	37.90	41.46	74.00	28.24	H
7553.000	44.77	-35.50	36.30	43.97	74.00	29.23	H
4873.500	42.25	-37.50	33.40	46.35	74.00	31.75	V

Ch9

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)
17594.000	52.89	-29.60	45.10	37.29	74.00	21.11	V
14102.500	49.39	-30.20	41.70	37.89	74.00	24.61	H
11542.000	46.64	-32.90	39.10	40.44	74.00	27.36	V
4902.500	44.98	-37.60	33.30	49.28	74.00	29.02	V
9511.500	44.98	-33.80	37.60	41.18	74.00	29.02	H
2490.000	68.75	-19.70	28.20	60.25	74.00	5.25	H

©Copyright. All rights reserved by CTTL.

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)
4824.000	52.46	-37.70	33.00	57.16	54.00	1.54	V
17983.500	42.37	-29.40	46.00	25.77	54.00	11.63	H
13753.000	39.24	-31.00	41.10	29.14	54.00	14.76	V
12760.500	36.68	-31.80	39.60	28.78	54.00	17.32	H
7237.000	36.64	-35.60	36.40	35.84	54.00	17.36	V
2388.200	42.24	-19.80	28.20	33.84	54.00	11.76	H

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)
4874.000	51.25	-37.50	33.40	55.35	54.00	2.75	H
17601.000	42.08	-29.60	45.10	26.48	54.00	11.92	H
14180.000	39.01	-30.20	41.70	27.51	54.00	14.99	V
12761.000	36.69	-31.80	39.60	28.79	54.00	17.31	V
7309.500	36.16	-35.40	36.60	34.96	54.00	17.84	H
8854.500	35.08	-34.50	37.80	31.78	54.00	18.92	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)
4924.000	49.53	-37.60	33.30	53.83	54.00	4.47	V
17624.500	41.92	-29.50	45.40	26.02	54.00	12.08	V
14081.500	38.99	-30.20	41.70	27.49	54.00	15.01	V
12753.000	36.65	-31.80	39.60	28.75	54.00	17.35	H
8979.000	35.11	-34.70	37.70	32.11	54.00	18.89	V
2486.900	45.86	-19.70	28.20	37.36	54.00	8.14	H

©Copyright. All rights reserved by CTTL.

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)
17606.500	42.72	-29.60	45.10	27.12	54.00	11.28	H
13725.000	39.10	-31.00	41.10	29.00	54.00	14.90	H
4826.000	38.35	-37.70	33.00	43.05	54.00	15.65	H
11908.000	36.88	-32.40	39.10	30.18	54.00	17.12	V
9507.000	35.41	-33.80	37.60	31.61	54.00	18.59	H
2389.800	49.22	-19.80	28.20	40.82	54.00	4.78	H

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)
17625.500	42.43	-29.50	45.40	26.53	54.00	11.57	H
4873.500	39.23	-37.50	33.40	43.33	54.00	14.77	V
13662.000	39.20	-31.30	40.90	29.60	54.00	14.80	H
11875.500	36.82	-32.80	39.10	30.42	54.00	17.18	H
9507.000	35.37	-33.80	37.60	31.57	54.00	18.63	H
7314.500	35.25	-35.40	36.60	34.05	54.00	18.75	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)
17538.500	42.27	-29.20	44.90	26.57	54.00	11.73	H
13761.500	39.53	-31.00	41.10	29.43	54.00	14.47	V
12838.500	36.57	-31.90	39.90	28.57	54.00	17.43	V
4918.500	36.51	-37.60	33.30	40.81	54.00	17.49	V
9096.000	35.38	-34.60	37.70	32.28	54.00	18.62	H
2485.200	50.59	-19.70	28.20	42.09	54.00	3.41	H

©Copyright. All rights reserved by CTTL.

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)
17597.000	42.01	-29.60	45.10	26.41	54.00	11.99	V
14092.000	40.04	-30.20	41.70	28.54	54.00	13.96	V
4829.000	38.41	-37.70	33.00	43.11	54.00	15.59	H
12854.000	36.71	-31.90	39.90	28.71	54.00	17.29	V
7242.000	35.28	-35.60	36.40	34.48	54.00	18.72	H
2389.900	52.63	-19.80	28.20	44.23	54.00	1.37	H

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)
17972.500	42.29	-29.40	46.00	25.69	54.00	11.71	V
13708.500	39.54	-31.00	41.00	29.54	54.00	14.46	H
4874.500	38.39	-37.50	33.40	42.49	54.00	15.61	V
11874.000	36.59	-32.80	39.10	30.19	54.00	17.41	V
8991.500	35.71	-34.70	37.70	32.71	54.00	18.29	V
7328.500	34.76	-35.90	36.60	34.06	54.00	19.24	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)
17594.000	42.41	-29.60	45.10	26.81	54.00	11.59	H
13804.000	39.26	-30.90	41.20	28.96	54.00	14.74	V
12650.500	37.36	-31.80	39.40	29.76	54.00	16.64	V
4921.000	37.14	-37.60	33.30	41.44	54.00	16.86	V
9299.500	35.47	-34.50	37.60	32.37	54.00	18.53	H
2485.000	47.93	-19.70	28.20	39.43	54.00	6.07	H

©Copyright. All rights reserved by CTTL.

802.11n-HT40

Ch3

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)
17625.000	42.31	-29.50	45.40	26.41	54.00	11.69	H
13703.500	39.93	-31.00	41.00	29.93	54.00	14.07	V
11913.000	36.88	-32.40	39.10	30.18	54.00	17.12	H
7438.500	35.38	-35.50	36.50	34.38	54.00	18.62	H
9506.500	35.32	-33.80	37.60	31.52	54.00	18.68	V
2389.600	50.62	-19.80	28.20	42.22	54.00	3.38	H

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)
17969.000	42.32	-29.40	46.00	25.72	54.00	11.68	V
13724.000	39.34	-31.00	41.10	29.24	54.00	14.66	V
12846.500	36.76	-31.90	39.90	28.76	54.00	17.24	H
9414.000	35.31	-33.60	37.90	31.01	54.00	18.69	V
7431.000	34.67	-35.50	36.50	33.67	54.00	19.33	H
4878.500	33.68	-37.50	33.40	37.78	54.00	20.32	H

Ch9

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)
17594.000	42.66	-29.60	45.10	27.06	54.00	11.34	V
13740.000	39.67	-31.00	41.10	29.57	54.00	14.33	V
4903.000	37.41	-37.60	33.30	41.71	54.00	16.59	V
12656.500	36.95	-31.80	39.40	29.35	54.00	17.05	V
9405.500	35.43	-34.10	37.90	31.63	54.00	18.57	H
2485.700	52.05	-19.70	28.20	43.55	54.00	1.95	H

©Copyright. All rights reserved by CTTL.

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
	11	2.45GHz~2.50GHz---H	Fig.4	P

802.11n-HT20 mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11n (HT20)	1	2.31GHz~2.43GHz---L	Fig.5	P
	11	2.45GHz~2.50GHz---H	Fig.6	P

802.11n-HT40 mode

Mode	Channel	Frequency Range	Test Results	Conclusion
802.11n (HT40)	3	2.31GHz~2.43GHz---L	Fig.7	P
	9	2.45GHz~2.50GHz---H	Fig.8	P

Test graphs as below:

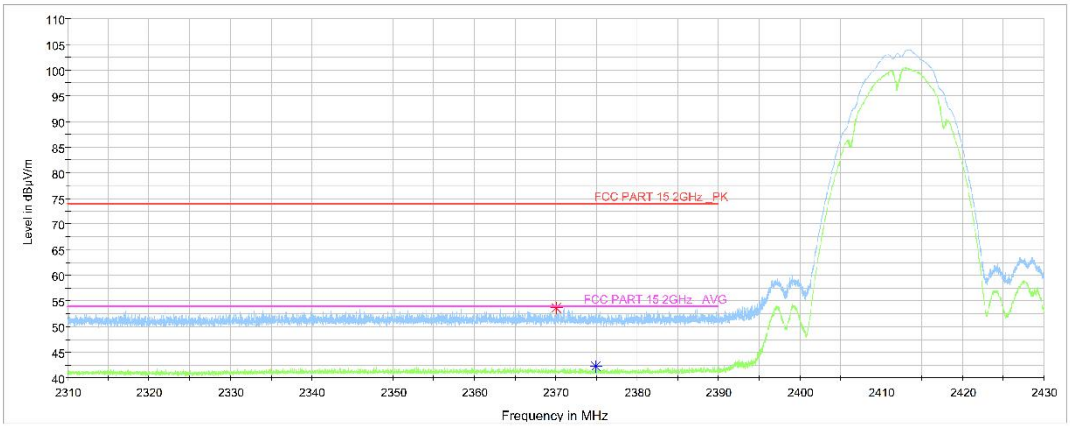


Fig.1 Transmitter Spurious Emission - Radiated (Power): 802.11b, ch1, 2.31 GHz – 2.43GHz

©Copyright. All rights reserved by CTTL.

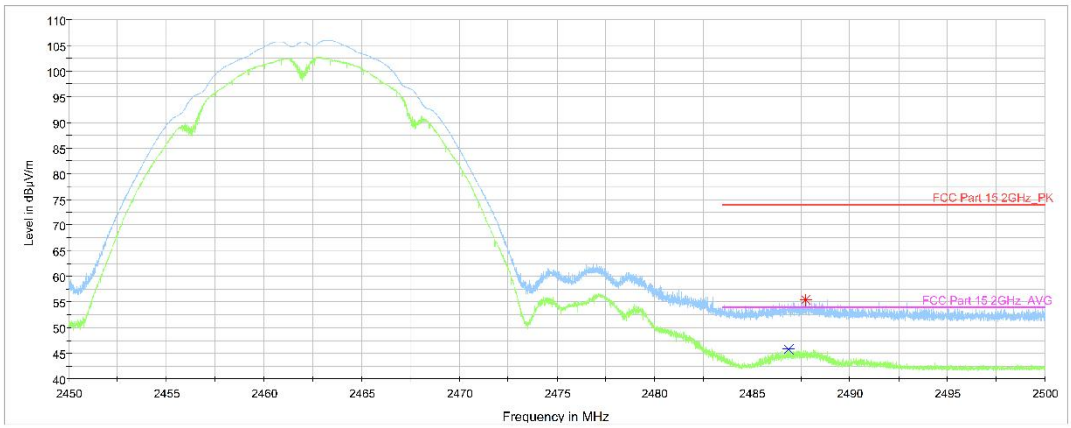


Fig.2 Transmitter Spurious Emission - Radiated (Power): 802.11b, ch11, 2.45 GHz - 2.50GHz

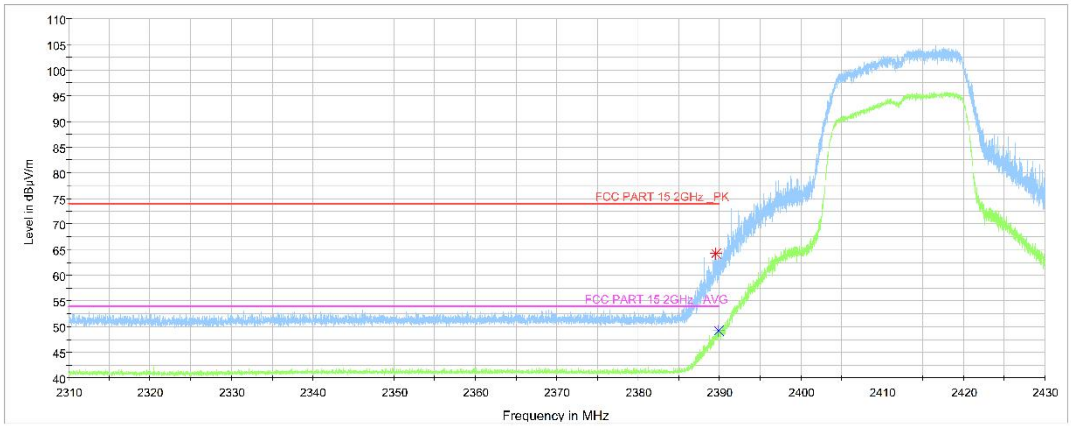


Fig.3 Transmitter Spurious Emission - Radiated (Power): 802.11g, ch1, 2.31 GHz - 2.43GHz

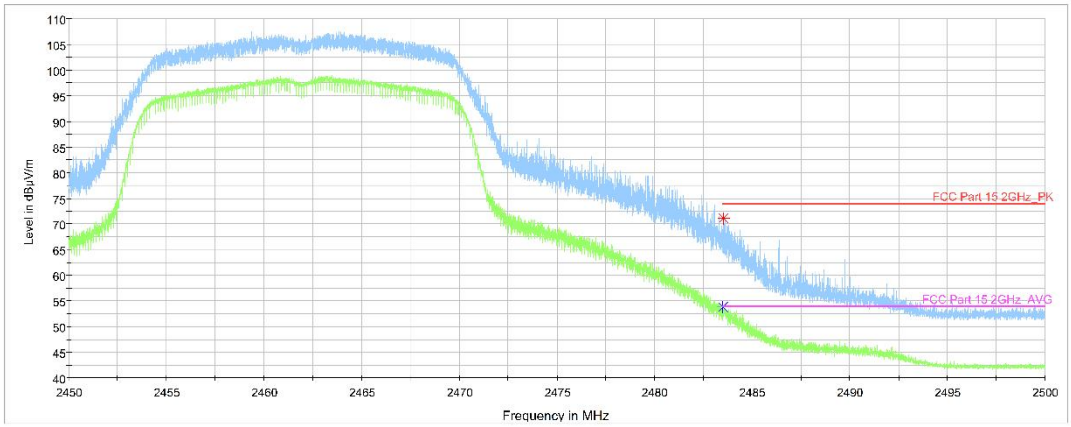


Fig.4 Transmitter Spurious Emission - Radiated (Power): 802.11g, ch11, 2.45 GHz - 2.50GHz

©Copyright. All rights reserved by CTTL.

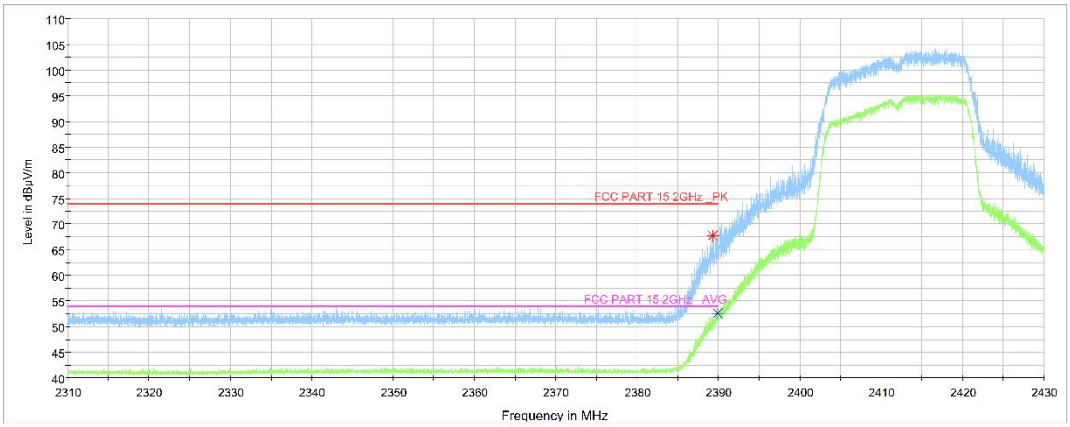


Fig.5 Transmitter Spurious Emission - Radiated (Power): 802.11n-HT20, ch1, 2.31 GHz - 2.43GHz

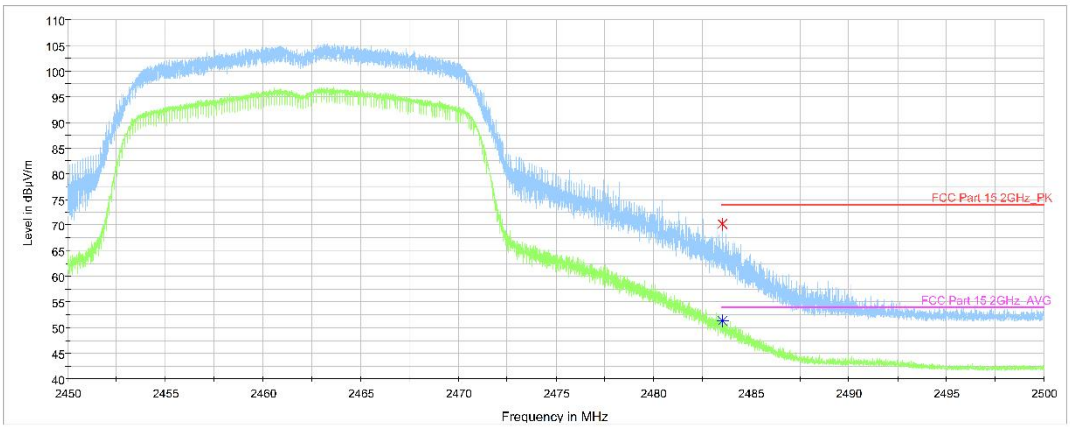


Fig.6 Transmitter Spurious Emission - Radiated (Power): 802.11n-HT20, ch11, 2.45 GHz - 2.50GHz

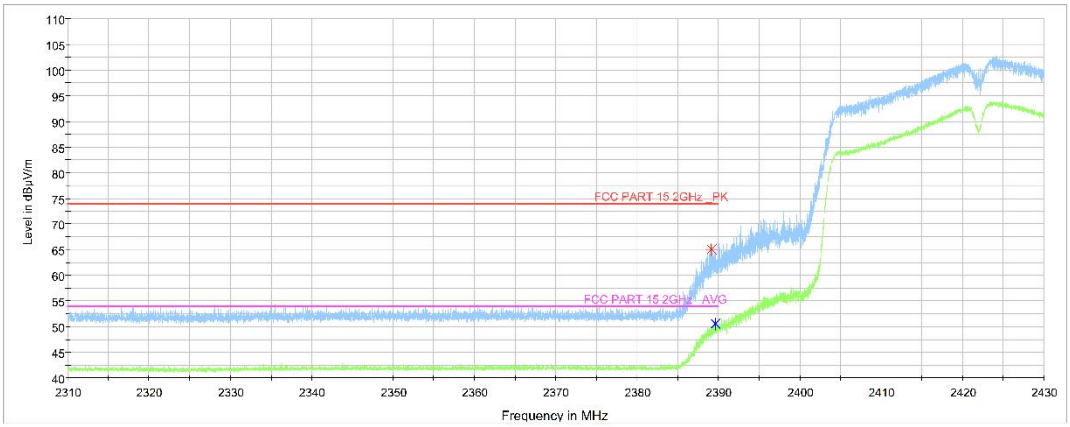


Fig.7 Transmitter Spurious Emission - Radiated (Power): 802.11n-HT40, ch3, 2.31 GHz - 2.43GHz

©Copyright. All rights reserved by CTTL.

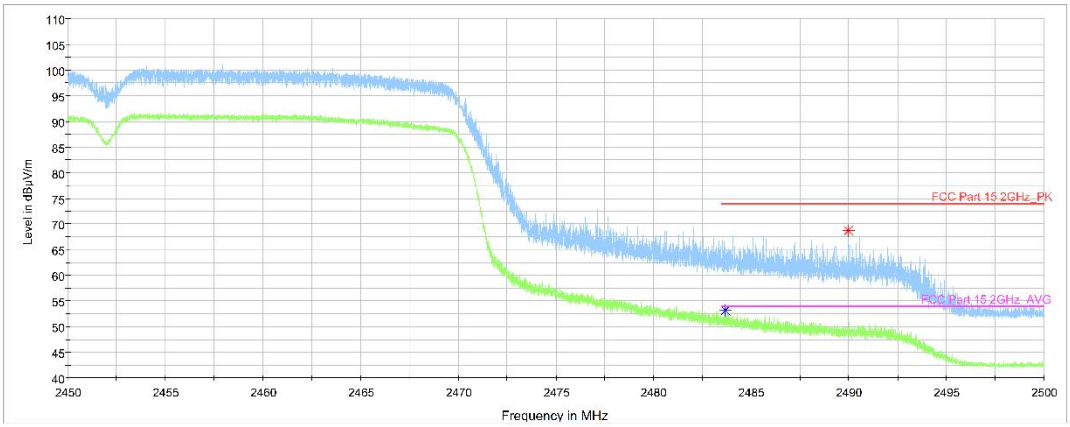


Fig.8 Transmitter Spurious Emission - Radiated (Power): 802.11n-HT40, ch9, 2.45 GHz - 2.50GHz

©Copyright. All rights reserved by CTTL.

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.

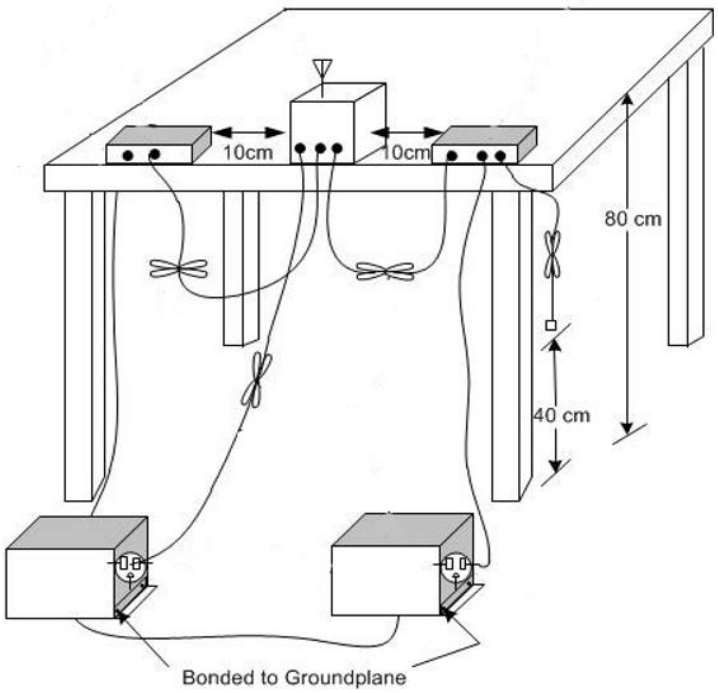
The measurement bandwidth is:

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

Test Condition:

Voltage（V）	Frequency（Hz）
120	60

Test setup



©Copyright. All rights reserved by CTTL.

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:

©Copyright. All rights reserved by CTTL.

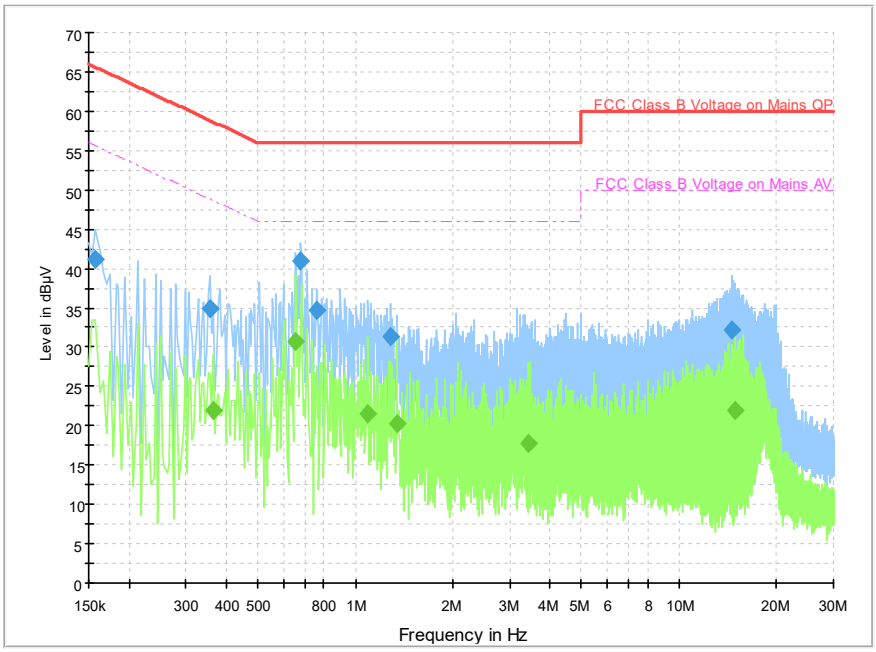


Fig.A.8.1 AC Powerline Conducted Emission-802.11b

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	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.158000	**41.1**	**2000.0**	**9.000**	**On**	**L1**	**19.9**	**24.4**	**65.6**	
0.354000	**34.9**	**2000.0**	**9.000**	**On**	**L1**	**19.9**	**24.0**	**58.9**	
0.678000	**40.9**	**2000.0**	**9.000**	**On**	**L1**	**20.0**	**15.1**	**56.0**	
0.762000	**34.7**	**2000.0**	**9.000**	**On**	**N**	**19.8**	**21.3**	**56.0**	
1.286000	**31.4**	**2000.0**	**9.000**	**On**	**L1**	**19.9**	**24.6**	**56.0**	
14.558000	**32.1**	**2000.0**	**9.000**	**On**	**N**	**19.8**	**27.9**	**60.0**	

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.366000	**22.0**	**2000.0**	**9.000**	**On**	**L1**	**19.9**	**26.6**	**48.6**	
0.654000	**30.7**	**2000.0**	**9.000**	**On**	**L1**	**20.0**	**15.3**	**46.0**	
1.094000	**21.5**	**2000.0**	**9.000**	**On**	**L1**	**19.9**	**24.5**	**46.0**	
1.342000	**20.3**	**2000.0**	**9.000**	**On**	**L1**	**19.9**	**25.7**	**46.0**	
3.422000	**17.7**	**2000.0**	**9.000**	**On**	**L1**	**19.8**	**28.3**	**46.0**	
14.834000	**21.8**	**2000.0**	**9.000**	**On**	**L1**	**20.0**	**28.2**	**50.0**	

©Copyright. All rights reserved by CTTL.

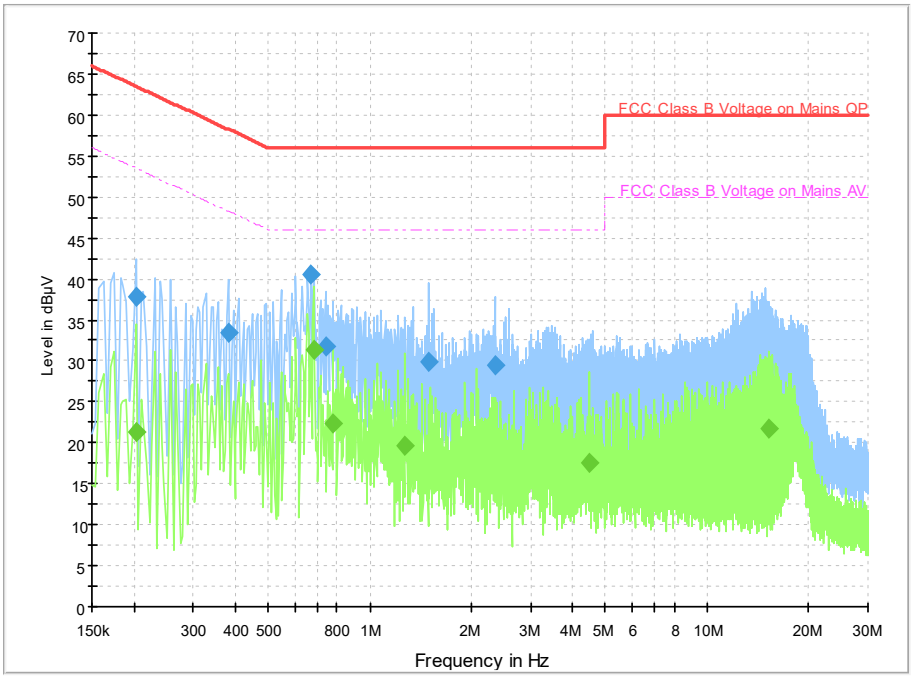


Fig.A.8.2 AC Powerline Conducted Emission-Idle

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	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.202000	**37.8**	**2000.0**	**9.000**	**On**	**L1**	**19.8**	**25.7**	**63.5**	
0.382000	**33.5**	**2000.0**	**9.000**	**On**	**L1**	**19.9**	**24.7**	**58.2**	
0.670000	**40.4**	**2000.0**	**9.000**	**On**	**L1**	**20.0**	**15.6**	**56.0**	
0.738000	**31.8**	**2000.0**	**9.000**	**On**	**L1**	**20.0**	**24.2**	**56.0**	
1.498000	**30.0**	**2000.0**	**9.000**	**On**	**L1**	**19.9**	**26.0**	**56.0**	
2.346000	**29.4**	**2000.0**	**9.000**	**On**	**L1**	**19.8**	**26.6**	**56.0**	

Final Result 2

Frequency (MHz)	CAverage (dBµV)	Meas. Time	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)	Comment
0.202000	**21.4**	**2000.0**	**9.000**	**On**	**L1**	**19.8**	**32.1**	**53.5**	
0.682000	**31.3**	**2000.0**	**9.000**	**On**	**L1**	**20.0**	**14.7**	**46.0**	
0.778000	**22.4**	**2000.0**	**9.000**	**On**	**L1**	**19.9**	**23.6**	**46.0**	
1.274000	**19.6**	**2000.0**	**9.000**	**On**	**L1**	**19.9**	**26.4**	**46.0**	
4.490000	**17.6**	**2000.0**	**9.000**	**On**	**L1**	**19.8**	**28.4**	**46.0**	
15.242000	**21.8**	**2000.0**	**9.000**	**On**	**L1**	**20.0**	**28.2**	**50.0**	

©Copyright. All rights reserved by CTTL.

A.9. Antenna Requirement

The antenna of the device is permanently attached. There are no provisions for connection to an external antenna.

The unit complies with the requirement of FCC Part 15.203.

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*****

©Copyright. All rights reserved by CTTL.