





FCC PART 15C TEST REPORT

No.23T04Z80846-11

for

TCL Communication Ltd.

GSM/UMTS/LTE/NR Mobile phone

T613P

FCC ID:2ACCJH182

with

Hardware Version: 05

Software Version: 6FSE

Issued Date: 2024-02-06

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
23T04Z80846-11	Rev.0	1st edition	2024-02-06

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(huayuan North Road)

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

100191, P. R. China





1.3. Testing Environment

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

1.4. Project date

Testing Start Date: 2023-12-15 Testing End Date: 2024-02-06

1.5. Signature

姚兴宇

Yao Xingyu (Prepared this test report)

Zheng Wei

(Reviewed this test report)

Pang Shuai

(Approved this test report)





2. Client Information

2.1. Applicant Information

Company Name: TCL Communication Ltd.

5/F, Building 22E, 22 Science Park East Avenue, Hong Kong Science Address:

Park, Shatin, NT, Hong Kong

City: Hong Kong

Postal Code: /

Country: China

Telephone: +86 755 3661 1621

Fax: +86 755 3661 2000-81722

2.2. Manufacturer Information

Company Name: TCL Communication Ltd.

5/F, Building 22E, 22 Science Park East Avenue, Hong Kong Science

Park, Shatin, NT, Hong Kong

City: Hong Kong

Postal Code: /

Address:

Country: China

Telephone: +86 755 3661 1621

Fax: +86 755 3661 2000-81722





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

3.1. About EUT

Description GSM/UMTS/LTE/NR Mobile phone

Model name T613P

FCC ID 2ACCJH182

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 23.75dBm Nominal Voltage 3.87V Extreme High Voltage 4.45V Extreme Low Voltage 3.6V

3.2. <u>Internal Identification of EUT</u>

EUT ID*	SN or IMEI	HW Version	SW Version	Date of receipt
EUT2	356497200001582/	05	6FSE	2023-12-19
	356497200001681			
EUT1	356497200001855/	05	6FSE	2024-01-08
	356497200001954			ZUZ4-U 1-UO

^{*}EUT ID: is used to identify the test sample in the lab internally. EUT2 is used for Conduction test, EUT1 is used for Radiation test.

3.3. Internal Identification of AE used during the test

AE ID*	Description	Type
AE1	Dummy battery	
AE2	Charger	805A-018A-1A
AE3	Charger	HJ-FC001K7-US

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





3.4. General Description

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

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

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

Samples undergoing test were selected by the client.

3.5. Interpretation of the Test Environment

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

Measurement Uncertainty

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

4. Reference Documents

4.1. Documents supplied by applicant

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

4.2. Reference Documents for testing

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

Reference	Title	Version
	FCC CFR 47, Part 15, Subpart C:	
	15.205 Restricted bands of operation;	
FCC Part15	15.209 Radiated emission limits, general requirements;	2021
	15.247 Operation within the bands 902-928MHz,	
	2400-2483.5 MHz, and 5725-5850 MHz.	
ANSI C63.10	American National Standard of Procedures for Compliance	2013
ANSI C03.10	Testing of Unlicensed Wireless Devices	2013
	Federal Communications Commission Office of	
	Engineering and Technology Laboratory Division	
	GUIDANCE FOR COMPLIANCE MEASUREMENTS ON	
KDB 558074 D01	DIGITAL TRANSMISSION SYSTEM, FREQUENCY	2019
	HOPPING SPREAD SPECTRUM SYSTEM, AND HYBRID	
	SYSTEM DEVICES OPERATING UNDER SECTION	
	15.247 OF THE FCC RULES	





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)	1	Р
Peak Power Spectral Density	15.247 (e)	1	Р
Occupied 6dB Bandwidth	15.247 (a)	1	Р
Band Edges Compliance	15.247 (d)	1	Р
Transmitter Spurious Emission - Conducted	15.247 (d)	1	Р
Radiated Unwanted Emission	15.247, 15.205, 15.209	1	Р
AC Powerline Conducted Emission	15.107, 15.207	1	Р

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

Terms used in Verdict column

Р	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. <u>Test Conditions</u>

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 3.87V Humidity 44%





7. <u>Test Facilities Utilized</u>

Conducted test system

No.	Equipment	Model	Serial Manufacturer		Model Serial	Manufacturar	Calibration	Calibration
NO.	Equipment	Wiodei	Number	Manufacturer	Period	Due date		
1	Vector Signal	FSQ40	200089	Rohde &	1 year	2024-07-04		
'	Analyzer	F3Q40	200069	Schwarz	i yeai	2024-07-04		
2	Vector Signal	FSW67	104051	Rohde &	1 year	2024-03-06		
	Analyzer	F3W01	104051	Schwarz	i yeai	2024-03-00		
3	LISN	ENV216	101200	Rohde &	1 year	2024-06-05		
	LION	ENVZIO	101200	Schwarz	i yeai	2024-00-03		
4	Test Receiver	ESCI	100344	Rohde &	1 year	2024-02-21		
	rest Receiver	ESCI	100344	Schwarz	1 year	2024-02-21		
5	Attenuator	10dB/2W	1	Rosenberger	1	1		
6	Shielding Room	S81	1	ETS-Lindgren	/	1		

Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Period	Calibration Due date
1	Test Receiver	ESW44	103144	Rohde & Schwarz	1 year	2024-07-08
2	EMI Antenna	VULB9163	01222	Schwarzbeck	1 year	2024-02-28
3	EMI Antenna	3115	6914	ETS-Lindgren	1 year	2024-04-25





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. <u>Transmitter Spurious Emission</u>

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





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

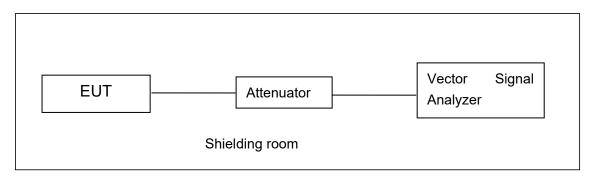


Fig.A.1.1.1: Test Setup Diagram for Conducted Measurements

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





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 -2.3dBi and the value is supplied by the applicant or manufacturer.

A.2.2. Peak Output Power-conducted

EUT ID: EUT2

Measurement Results:

802.11b/g mode

	Data Rate	Test Result (dBm)			
Mode		2412MHz	2437MHz	2462 MHz	
(Mbps)	(Ch1)	(Ch6)	(Ch11)		
802.11b	1	19.86	19.60	19.67	
802.11g	6	23.55	23.41	22.71	

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

802.11n-HT20 mode

	Doto Boto	Test Result (dBm)			
Mode	Data Rate (Index)	2412MHz 2437MHz 2462 M (Ch1) (Ch6) (Ch11			
802.11n (20MHz)	MCS0	23.08	23.18	22.50	

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





802.11n-HT40 mode

	Dete Bete	Test Result (dBm)			
Mode	Data Rate (Index)	2422MHz 2437MHz 2452 MHz (Ch3) (Ch6) (Ch9)			
802.11n (40MHz)	MCS0	23.75	23.22	23.28	

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: EUT2

Measurement Results:

802.11b/g mode

Mode	Channel	-	ctral Density /3 kHz)	Conclusion
	1	Fig.A.3.1	-4.43	Р
802.11b	6	Fig.A.3.2	-3.98	Р
	11	Fig.A.3.3	-4.39	Р
	1	Fig.A.3.4	-9.69	Р
802.11g	6	Fig.A.3.5	-9.74	Р
	11	Fig.A.3.6	-10.56	Р





802.11n-HT20 mode

Mode	Channel	Power Spectral Density (dBm/3 kHz)		Conclusion
902 11n	1	Fig.A.3.7	-11.22	Р
802.11n	6	Fig.A.3.8	-11.11	Р
(HT20)	11	Fig.A.3.9	-11.04	Р

802.11n-HT40 mode

Mode	Channel	-	ctral Density 3 kHz)	Conclusion
000 11n	3	Fig.A.3.10	-14.14	Р
802.11n (HT40)	6	Fig.A.3.11	-13.55	Р
(1140)	9	Fig.A.3.12	-12.51	Р

Test graphs as below:

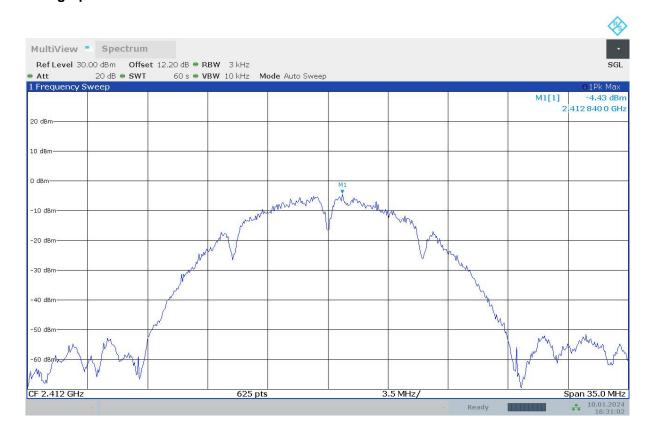


Fig.A.3.1 Power Spectral Density(802.11b,Ch1)





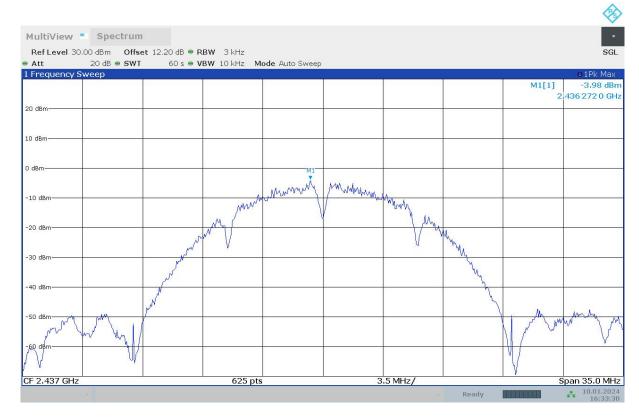


Fig.A.3.2 Power Spectral Density (802.11b, Ch 6)

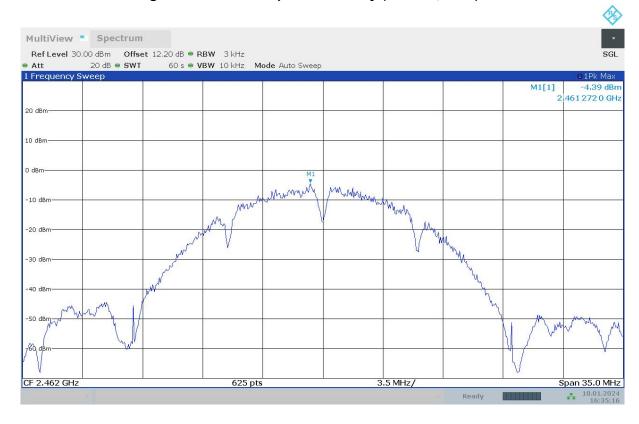


Fig.A.3.3 Power Spectral Density (802.11b, Ch 11)





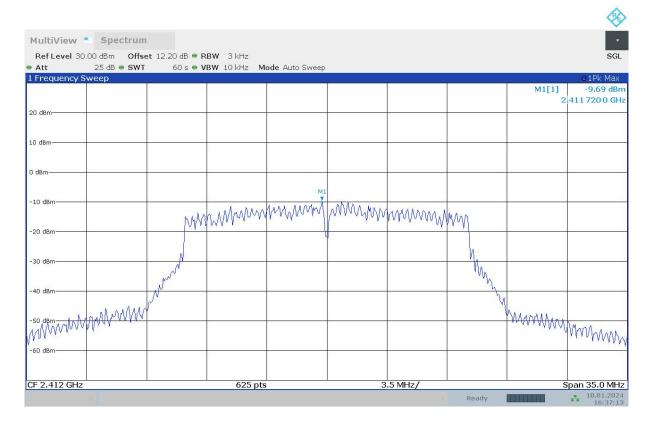


Fig.A.3.4 Power Spectral Density (802.11g, Ch 1)

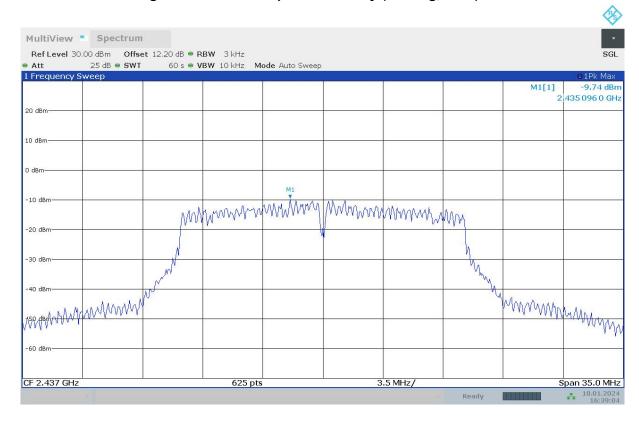


Fig.A.3.5 Power Spectral Density (802.11g, Ch 6)





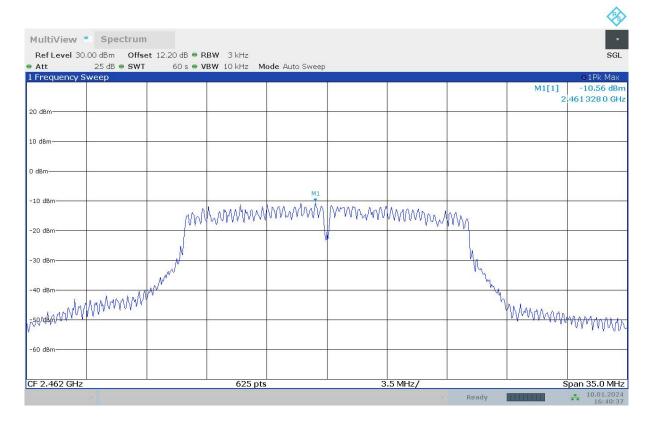


Fig.A.3.6 Power Spectral Density (802.11g, Ch 11)

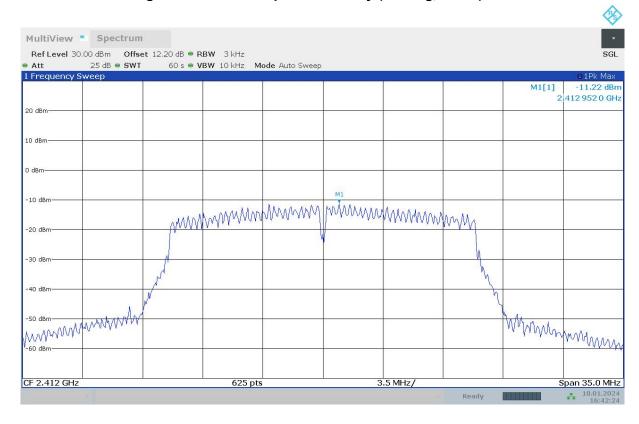


Fig.A.3.7 Power Spectral Density (802.11n-HT20, Ch 1)





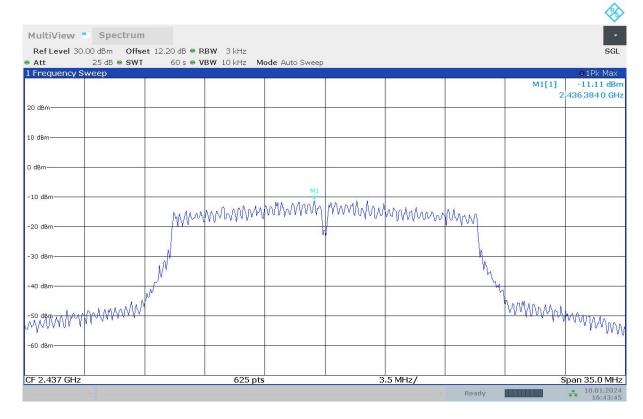


Fig.A.3.8 Power Spectral Density (802.11n-HT20, Ch 6)

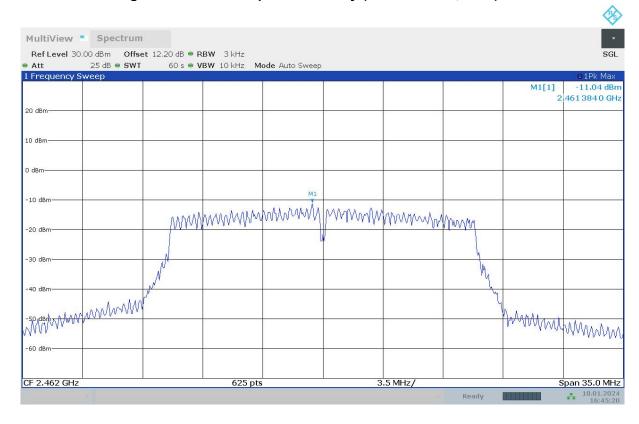


Fig.A.3.9 Power Spectral Density (802.11n-HT20, Ch 11)





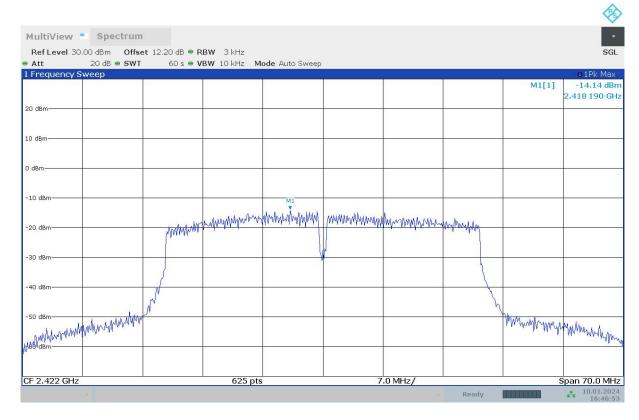


Fig.A.3.10 Power Spectral Density (802.11n-HT40, Ch 3)

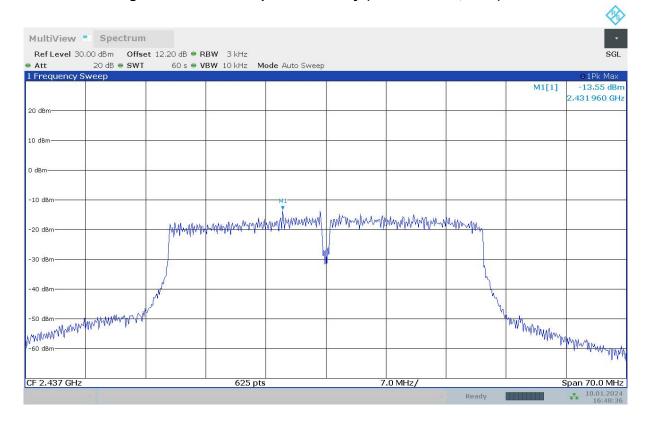


Fig.A.3.11 Power Spectral Density (802.11n-HT40, Ch 6)





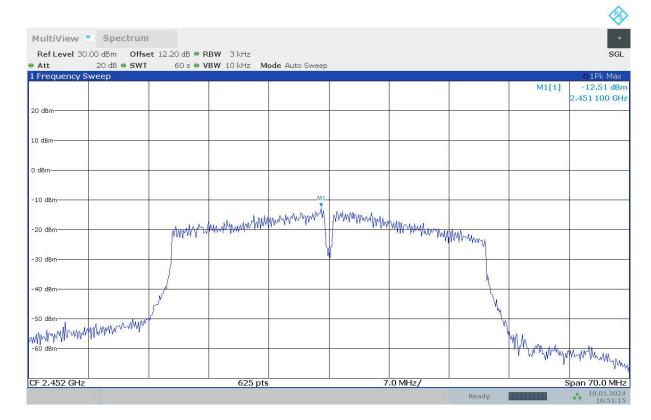


Fig.A.3.12 Power Spectral Density (802.11n-HT40, Ch 9)

Conclusion: Pass





A.4. DTS 6-dB Signal Bandwidth

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

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

Measurement Limit:

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

EUT ID: EUT2

Measurement Result:

802.11b/g mode

Mode	Channel	DTS Bandwidth (MHz)		conclusion
	1	Fig.A.4.1	9.08	Р
802.11b	6	Fig.A.4.2	8.52	Р
	11	Fig.A.4.3	8.56	Р
	1	Fig.A.4.4	16.36	Р
802.11g	6	Fig.A.4.5	16.36	Р
	11	Fig.A.4.6	16.36	Р

802.11n-HT20 mode

Mode	Channel		DTS Bandwidth (MHz)	
000 44=	1	Fig.A.4.7	17.56	Р
802.11n	6	Fig.A.4.8	17.64	Р
(HT20)	11	Fig.A.4.9	17.60	Р

802.11n-HT40 mode

Mode	Channel	DTS Bandwidth (MHz)		conclusion
802.11n (HT40)	3	Fig.A.4.10	36.32	Р
	6	Fig.A.4.11	36.40	Р
	9	Fig.A.4.12	30.48	Р





Test graphs as below:



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



17:15:11 24.01.2024

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







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



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







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



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





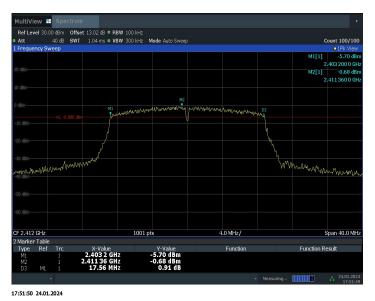


Fig.A.4.7 DTS Bandwidth (802.11n-20MHz, Ch 1)

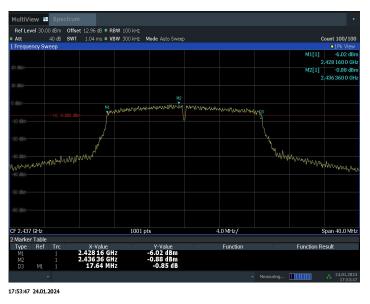


Fig.A.4.8 DTS Bandwidth (802.11n-HT20, Ch 6)



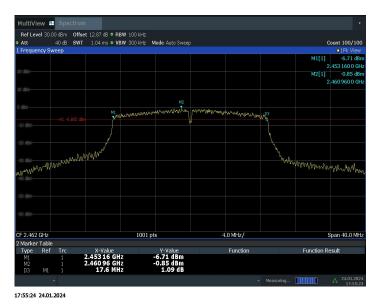


Fig.A.4.9 DTS Bandwidth (802.11n-HT20, Ch 11)



Fig.A.4.10 DTS Bandwidth (802.11n-40MHz, Ch 3)







Fig.A.4.11 DTS Bandwidth (802.11n-HT40, Ch 6)



Fig.A.4.12 DTS Bandwidth (802.11n-HT40, Ch 9)

Conclusion: Pass





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 = 100MHzb) Sweep Time: coupledc) Set the RBW= 100 kHzc) Set the VBW= 300 kHz

d) Detector: Peake) Trace: Max hold

Measurement Limit:

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

EUT ID: EUT2

Measurement Result:

802.11b/g mode

Mode	Channel	Test Results	Conclusion	
902 11h	1	Fig.A.5.1	Р	
802.11b	11	Fig.A.5.2	Р	
802.11g	1	Fig.A.5.3	Р	
	11	Fig.A.5.4	Р	

802.11n-HT20 mode

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

802.11n-HT40 mode

Mode	Channel	Test Results	Conclusion
802.11n	3	Fig.A.5.7	Р
(HT40)	9	Fig.A.5.8	Р

Test graphs as below:





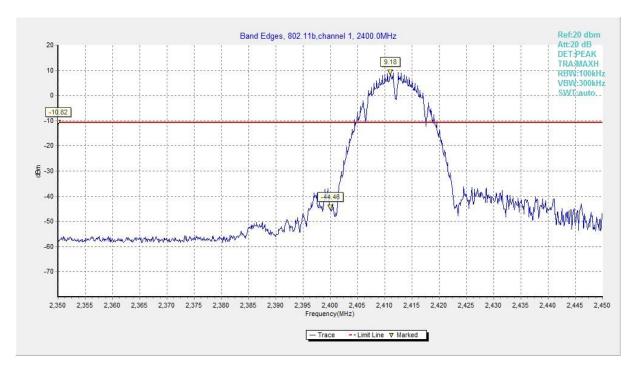


Fig.A.5.1 Band Edges (802.11b, Ch 1)



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





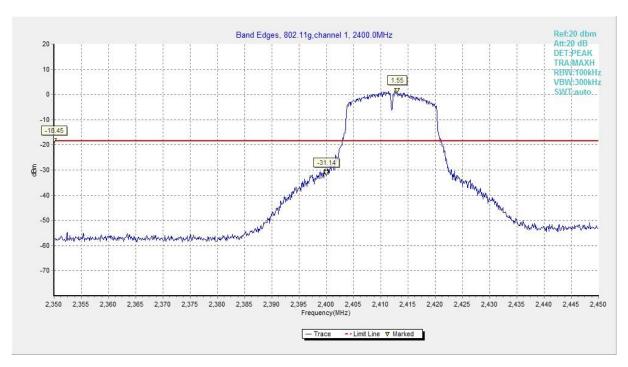


Fig.A.5.3 Band Edges (802.11g, Ch 1)



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







Fig.A.5.5 Band Edges (802.11n-HT20, Ch 1)



Fig.A.5.6 Band Edges (802.11n-HT20, Ch 11)





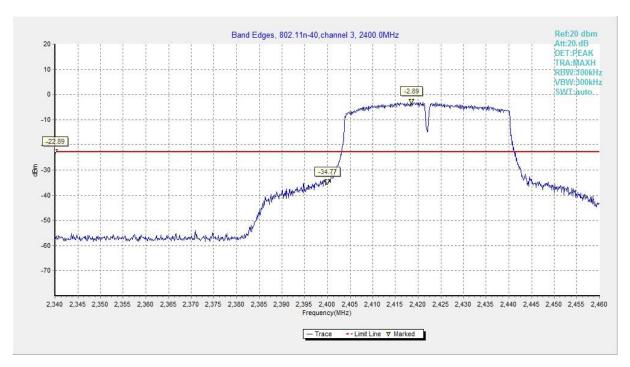


Fig.A.5.7 Band Edges (802.11n-HT40, Ch 3)



Fig.A.5.8 Band Edges (802.11n-HT40, Ch 9)

Conclusion: Pass





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		
ECC 47 CED Dort 15 247 (d)	20dB below peak output power in 100 kHz		
FCC 47 CFR Part 15.247 (d)	bandwidth		

EUT ID: EUT2

Measurement Results:

TestMode	Frequency[MHz]	FreqRange	RefLevel	Result	Limit	Verdict
		[Mhz]	[dBm]	[dBm]	[dBm]	
11B	2412	Reference	9.47	9.47		PASS
		30~1000	9.47	-56.95	≤-10.53	PASS
		1000~26500	9.47	-43.1	≤-10.53	PASS
	2437	Reference	8.56	8.56		PASS
		30~1000	8.56	-56.64	≤-11.44	PASS





		1000~26500	8.56	-40.3	≤-11.44	PASS
		Reference	8.75	8.75		PASS
	2462	30~1000	8.75	-56.66	≤-11.25	PASS
	2.02	1000~26500	8.75	-43.94	≤-11.25	PASS
		Reference	1.27	1.27		PASS
	2412	30~1000	1.27	-56.98	≤-18.73	PASS
	2112	1000~26500	1.27	-43.56	≤-18.73	PASS
		Reference	0.87	0.87		PASS
11G	2437	30~1000	0.87	-55.79	≤-19.13	PASS
110	2401	1000~26500	0.87	-43.64	≤-19.13	PASS
-		Reference	1.25	1.25	<u></u>	PASS
	2462	30~1000	1.25	-56.81	 ≤-18.75	PASS
	2402	1000~26500	1.25	-44.09	≤-18.75 ≤-18.75	PASS
	0440	Reference	0.32	0.32		PASS
	2412	30~1000	0.32	-56.73	≤-19.68	PASS
-		1000~26500	0.32	-44.15	≤-19.68	PASS
		Reference	-0.48	-0.48		PASS
11N20SISO	2437	30~1000	-0.48	-55.78	≤-20.48	PASS
		1000~26500	-0.48	-43.75	≤-20.48	PASS
	2462	Reference	-0.79	-0.79		PASS
		30~1000	-0.79	-56.54	≤-20.79	PASS
		1000~26500	-0.79	-44.14	≤-20.79	PASS
	2422	Reference	-3.10	-3.10		PASS
		30~1000	-3.10	-57.01	≤-23.1	PASS
		1000~26500	-3.10	-43.7	≤-23.1	PASS
11N40SISO	2437	Reference	-3.57	-3.57		PASS
		30~1000	-3.57	-56.5	≤-23.57	PASS
		1000~26500	-3.57	-43.28	≤-23.57	PASS
	2452	Reference	-1.67	-1.67		PASS
		30~1000	-1.67	-56.74	≤-21.67	PASS
		1000~26500	-1.67	-43.99	≤-21.67	PASS





Test graphs as below:

