TEST REPORT

FCC ID: 2ADYY-T14RA-1

Product: Laptop Computer

Model No.: T14RA

Trade Mark: TECNO

Report No.: WSCT-ANAB-R&E240900045A-BT

Issued Date: 14 October 2024

WSIT

Issued for:

TECNO MOBILE LIMITED

FLAT N 16/F BLOCK B UNIVERSAL INDUSTRIAL CENTRE 19-25 SHAN MEI STREET FOTAN NT HONGKONG

Issued By:

World Standardization Certification & Testing Group(Shenzhen) Co., Ltd. Building A-B, Baoli'an Industrial Park, No. 58 and 60, Tangtou Avenue, Shiyan Street, Bao'an District, Shenzhen City, Guangdong Province, China 5

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W5 CT

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Report No.: WSCT-ANAB-R&E240900045A-BT

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Report No.: WSCT-ANAB-R&E240900045A-BT

1. Test Certification

Product: Laptop Computer

WSET

W5 CT

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Model No.:

T14RA

Additional Model:

TECNO

W5 CT

WS CT

Applicant:

TECNO MOBILE LIMITED

Address:

FLAT N 16/F BLOCK B UNIVERSAL INDUSTRIAL CENTRE 19-25

SHAN MEI STREET FOTAN NT HONGKONG

W5 ET

Manufacturer:

W517

TECNO MOBILE LIMITED

Address:

FLAT N 16/F BLOCK B UNIVERSAL INDUSTRIAL CENTRE 19-25

SHAN MEI STREET FOTAN NT HONGKONG

Date of Test:

29 August 2024 to 11 October 2024

Applicable Standards:

FCC CFR Title 47 Part 15 Subpart C Section 15.247

The above equipment has been tested by World Standardization Certification & Testing Group(Shenzhen)Co., Ltd. and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

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Tested By:

Seat May

(Wang Xiang)

Checked By:

(Qin Shuiguan)

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Approved By:

(Li Huaibi)

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Test Result Summary 2.

	Weeks March	T WEE CT	WEET
/	Requirement	CFR 47 Section	Result
	Antenna Requirement	§15.203/§15.247 (c)	PASS
CT°	AC Power Line Conducted Emission	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	PASS PASS
	Conducted Peak Output W5 [7] Power W5 [§15.247 (b)(1) §2.1046	W5 L PASS
CT*	20dB Occupied Bandwidth	§15.247 (a)(1) §2.1049	PASS
7.0	Carrier Frequencies Separation	§15.247 (a)(1)	PASS
	Hopping Channel Number	§15.247 (a)(1)	W5 C PASS
7	Dwell Time	§15.247 (a)(1)	PASS
CT°	Radiated Emission	§15.205/§15.209 W-§2.1053, §2.1057 W-5 ET	PASS _{V5 CT}
	Band Edge	§15.247(d) §2.1051, §2.1057	PASS

Note:

1. PASS: Test item meets the requirement.

2. Fail: Test item does not meet the requirement.

3. N/A: Test case does not apply to the test object.

4. The test result judgment is decided by the limit of test standard.

W5 C1 WS ET W5 CT W5 E

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W5CT

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EUT Description 3.

	Product Name:	Laptop Computer W5CT W5CT	V5 ET
\times	Model :	T14RA	
WSCT	Trade Mark:	TECNO	,
4W2/5/	Operation Frequency:	2402MHz~2480MHz	\checkmark
	Channel Separation:	1MHz	
	Number of Channel:	79	V5 CT
X	Modulation Type:	GFSK, π/4-DQPSK, 8-DPSK	
WSET	Modulation W5 [7] Technology:	FHSS WSET WSET WSET	
	Antenna Type:	Integral Antenna	X
	Antenna Gain:	1.86dBi WS.CT WS.CT	NSCT
WSCT	WSET	Adapter: FC498U INPUT: 100-240V~50/60Hz 1.5A MAX OUTPUT: PD:5V==3A 9V==3A 12V==3A 20V==3.25A	,
	EUT Power Rating	PPS:3.3—11V==-5A MAX Rechargeable Li-ion Polymer Battery: 528282-3S1P Nominal Voltage: 11.61V Rated Capacity:6460mAh/75Wh	NS ET
X		Typical Capacity: 6550mAh/76.04Wh Limited Charge Voltage: 13.35V	
WSCT	Remark:	N/A.	

•	W5CT [®]	W5 CT°	W5 CT	W5 ET	W5 CT"
X	X	X	\times		X
W5 CT	W5 C1	W5 L	7° W5	<i>[7</i>]	NS CT

WS CT



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World Standardization Certification & Testing Group (Shenzhen) Co., ltd.



W5 CT



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Configuration differences

emigaration amereness					
Configuration/ Processor	TDP				
T14RA (i5-1335U)	15W W5				
T14RA (i7-1355U)	15W				
T14RA (i5-13420H)	30W				
T14RA (i7-13620H)	W5 30W W5 L1				
T14RA (i7-13700H)	30W				
Note: These models of TDP are different, and the T14RA					
(17-13620H) is the ma	ain test model reported				

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W5 C1

W5 CI WSEI WSEI

W5 CT W5 CT WS ET W5 C1 W5 CI

W5 CI WS ET W5 CI W5 E1

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Operation Frequency each of channel for GFSK, π/4-DQPSK, 8DPSK

	9 0 0 1 0 1 0 1 0 1		,		, , ,		,	
,	Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
	0	2402MHz	20	2422MHz	40	2442MHz	60	2462MHz
	1	2403MHz	21	2423MHz	41	2443MHz	61	2463MHz
6		W5 CT		WSET		WSET		WITT
	10	2412MHz	30	2432MHz	50	2452MHz	70	2472MHz
	11	2413MHz	31	2433MHz	51	2453MHz	71	2473MHz
	/		<u></u>				/	
7	ZM18Z7	2420MHz	38	2440MHz	58	2460MHz	78	2480MHz
7	19	2421MHz	39	2441MHz	59	2461MHz		- \
	Remark:	Channel 0 3	9 &78 ha	ve been tes	ted for G	$FSK \pi/4-DC$	DPSK, 8F	OPSK /

Remark: Channel 0, 39 &78 have been tested for GFSK, $\pi/4$ -DQPSK, 8DPSK modulation mode.

WSL	7° W	S C T	SET	VS CT	W5CT
WSCT	WSCT	WSET	W5 CT	WSET	
WSI	T W	$\langle $	\times	WSET	WSET
WSET	WSET	WSET	WSET	WSET	
	T W	SET W	SET	WSCT	WS CT
W5 I	\times	\times	\times	\times	W5 ET
	WSET	WSET	WSET	WSET	WS CT

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WSET

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Genera Information 4.

4.1. Test environment and mode

Operating Environment:	
Temperature:	25.0 °C
Humidity:	56 % RH
Atmospheric Pressure:	1010 mbar

Test Mode:

Engineering mode:		Keep the EUT in continuous transmitting
		by select channel and modulations with
	A	Fully-charged battery

The sample was placed 0.8m & 1.5m for the measurement below & above 1GHz above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.

Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Equipment	Model No.	Serial No.	FCC ID	Trade Name
Adapter	FC498U	/	1	TECNO

Note:

- 1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
- 2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.
- 3. For conducted measurements (Output Power, 20dB Occupied Bandwidth, Carrier Frequencies Separation, Hopping Channel Number, Dwell Time, Spurious Emissions), the antenna of EUT is connected to the test equipment via temporary antenna connector, the antenna connector is soldered on the antenna port of EUT, and the temporary antenna connector is listed in the Test Instruments.





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Facilities and Accreditations 5.

5.1. Facilities

All measurement facilities used to collect the measurement data are located at World Standardization Certification & Testing Group (Shenzhen) Co., Ltd. Building A-B, Baoli'an Industrial Park, No. 58 and 60, Tangtou Avenue, Shiyan Street, Bao'an District, Shenzhen City, Guangdong Province, China

The sites are constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 32. All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

5.2. ACCREDITATIONS

CNAS - Registration Number: L3732

China National Accreditation Service for Conformity Assessment. The test firm Registration Number: L3732

FCC - Designation Number: CN1303

World Standardization Certification & Testing Group(Shenzhen) CO., LTD. has been accredited as a testing laboratory by FCC(Federal Communications Commission). The test firm Designation Number: CN1303.

ANAB - Certificate Number: AT-3951

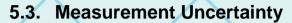
The EMC Laboratory has been accredited by the American Association for Laboratory Accreditation (ANAB). Certification Number: AT-3951

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The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based $^{V - U}$ on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

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W5CT°	No.	Item	MU
	1	Duty Cycle and Tx-Sequence and Tx-Gap	±1%
	2	Dwell Time and Minimum Frequency Occupation	±1.2%
	3	Medium Utilisation Factor	±1.3%
X	4	Occupied Channel Bandwidth	±2.4%
W5ET°	5	Transmitter Unwanted Emission in the out-of Band	±1.3%
	6	Transmitter Unwanted Emissions in the Spurious Domain	±2.5%
	7 W = 7	Receiver Spurious Emissions	±2.5%
	8	Conducted Emission Test	±3.2dB
	9	RF power, conducted	±0.16dB
W5CT°	10	Spurious emissions, conducted 7 W5 [7]	±0.21dB
	11	All emissions, radiated(<1GHz)	±4.7dB
	12	All emissions, radiated(>1GHz)	±4.7dB
	13	Temperature	±0.5°C
	14	Humidity	±2.0%

W5 CT WS ET WS CT W5 E1





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W5CT

5.4. MEASUREMENT INSTRUMENTS

	5.4. WEASU			\wedge			
_	NAME OF EQUIPMENT	MANUFACTURER	MODEL	SERIAL NUMBER	Calibration Date	Calibration Due.	'5 C T
	Test software		EZ-EMC	CON-03A	-	Χ-	
	Test software	- /	MTS8310	WSCT	- /	VS CT	
_	EMI Test Receiver	R&S	ESCI	100005	11/05/2023	11/04/2024	
	LISN	AFJ	LS16	16010222119	11/05/2023	11/04/2024	
	LISN(EUT)	Mestec	AN3016	04/10040	11/05/2023	11/04/2024	'5 <i>E T</i>
<	Universal Radio Communication Tester	R&S	CMU 200	1100.0008.02	11/05/2023	11/04/2024	
c i	Coaxial cable	Megalon	LMR400	N/A	11/05/2023	11/04/2024	
	GPIB cable	Megalon	GPIB	N/A	11/05/2023	11/04/2024	
	Spectrum Analyzer	R&S	FSU	100114	11/05/2023	11/04/2024	\wedge
	Pre Amplifier	H.P.ET	HP8447E 5 /	2945A02715	11/05/2023	11/04/2024	15 C T
	Pre-Amplifier	CDSI	PAP-1G18-38		11/05/2023	11/04/2024	
	Bi-log Antenna	SCHWARZBECK	VULB9168	01488	11/05/2023	11/04/2024	
5	9*6*6 Anechoic	ET V	YS CT .	W.S ET	11/05/2023	11/04/2024	
	Horn Antenna	COMPLIANCE ENGINEERING	CE18000	<u></u>	11/05/2023	11/04/2024	X
	Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-631	11/05/2023	11/04/2024	15 E T
_	Cable	TIME MICROWAVE	LMR-400	N-TYPE04	11/05/2023	11/04/2024	
	System-Controller	ccs	N/A	N/A	N.C.R	N.C.R	
7	Turn Table	ccs	V5 / N/A	N/A	N.C.R	N.C.R	
	Antenna Tower	ccs	N/A	N/A	N.C.R	N.C.R	
	RF cable	Murata	MXHQ87WA300 0	-	11/05/2023	11/04/2024	
	Loop Antenna	EMCO	6502W5L	00042960	11/05/2023	11/04/2024	rs et
1	Horn Antenna	SCHWARZBECK	BBHA 9170	1123	11/05/2023	11/04/2024	
1	Power meter	Anritsu	ML2487A	6K00003613	11/05/2023	11/04/2024	
7	Power sensor	Anritsu	MX248XD	WSU	11/05/2023	11/04/2024	
	Spectrum Analyzer	Keysight	N9010B	MY60241089	11/05/2023	11/04/2024	X

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Test Results and Measurement Data 6.

6.1. 5 Antenna requirement

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Standard requirement:

FCC Part15 C Section 15.203 /247(c)

15.203 requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.247(c) (1)(i) requirement:

(i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

E.U.T Antenna:

The Bluetooth antenna is a Integral Antenna. it meets the standards, and the best case gain of the antenna is 1.86dBi.



6.2.

World Standardization Certification & Testing Group (Shenzhen) Co.,ltd.





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Conducted Emission

W5 CT

	6.2.1. Test Specification	T WSET WSET WS	ET"
X	Test Requirement:	FCC Part15 C Section 15.207	
WSET	Test Method: 5 [7]	ANSI C63.10:2014 W5 [7] W5 [7]	
	Frequency Range:	150 kHz to 30 MHz	
	Receiver setup:	RBW=9 kHz, VBW=30 kHz, Sweep time=auto	ET.
WSET	Limits:	Frequency range (MHz) Limit (dBuV) Quasi-peak Average 0.15-0.5 66 to 56* 56 to 46* 0.5-5 56 46 5-30 60 50	
	\times	Reference Plane	X
	WSET WSE	40cm 80cm LISN	· / / °
WSET	Test Setup: WS CT WS CT	Test table/Insulation plane Remark: E.U.T AC power EMI Receiver E.U.T. Equipment Under Test LISN: Line Impedence Stabilization Network Test table height=0.8m	T.T
	Test Mode:	Refer to item 4.1	
WSET	WSET WSET Test Procedure:	 The E.U.T is connected to an adapter through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). Both sides of A.C. line are checked for maximum 	ICT .
	WSET WSE	conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2014 on conducted measurement.	A Group (
	rest Result.	1 AGG	She





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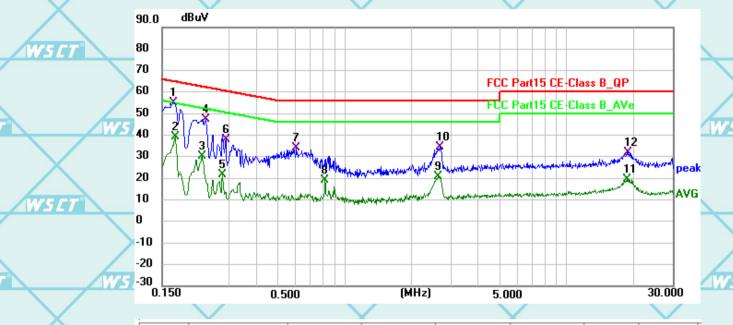


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6.2.2. Test data(worst case)

Conducted Emission on Line Terminal of the power line (150 kHz to 30MHz) The worst mode is GFSK

W5CT°



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	
1 *	0.1680	34.38	20.72	55.10	65.06	-9.96	QP	
2	0.1725	18.59	20.71	39.30	54.84	-15.54	AVG	
3	0.2265	9.60	20.67	30.27	52.58	-22.31	AVG	W5
4	0.2355	26.53	20.67	47.20	62.25	-15.05	QP	
5	0.2805	0.87	20.64	21.51	50.80	-29.29	AVG	
6	0.2895	17.19	20.64	37.83	60.54	-22.71	QP	
7	0.6045	13.44	20.53	33.97	56.00	-22.03	QP	
8	0.8160	-1.37	20.59	19.22	46.00	-26.78	AVG	
9	2.6430	0.30	20.60	20.90	46.00	-25.10	AVG	WS
10	2.6835	14.02	20.60	34.62	56.00	-21.38	QP	
11	18.7800	-0.56	20.24	19.68	50.00	-30.32	AVG	
12	18.9780	11.86	20.24	32.10	60.00	-27.90	QP	

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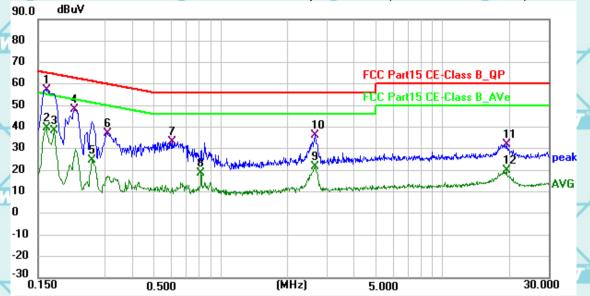






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Conducted Emission on Neutral Terminal of the power line (150 kHz to 30MHz)



	No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	
	1 *	0.1635	36.37	20.72	57.09	65.28	-8.19	QP	Ī
	2	0.1635	18.74	20.72	39.46	55.28	-15.82	AVG	
	3	0.1770	17.64	20.71	38.35	54.63	-16.28	AVG	
	4	0.2175	27.35	20.68	48.03	62.91	-14.88	QP	
	5	0.2625	4.12	20.65	24.77	51.35	-26.58	AVG	Ī
	6	0.3075	16.60	20.63	37.23	60.04	-22.81	QP	
1	7	0.6000	12.67	20.52	33.19	56.00	-22.81	QP	
	8	0.8160	-1.76	20.59	18.83	46.00	-27.17	AVG	
	9	2.6520	1.15	20.60	21.75	46.00	-24.25	AVG	
	10	2.6655	15.53	20.60	36.13	56.00	-19.87	QP	
	11	19.3335	11.70	20.25	31.95	60.00	-28.05	QP	
	12	19.3335	-0.18	20.25	20.07	50.00	-29.93	AVG	

Note1:

Freq. = Emission frequency in MHz

Reading level $(dB\mu V)$ = Receiver reading

Corr. Factor (dB) = LISN factor + Cable loss

Measurement $(dB\mu V)$ = Reading level $(dB\mu V)$ + Corr. Factor (dB)

Limit (dBµV) = Limit stated in standard

 $Margin (dB) = Measurement (dB\mu V) - Limits (dB\mu V)$

Q.P. =Quasi-Peak AVG =average

* is meaning the worst frequency has been tested in the frequency range 150 kHz to 30MHz.

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W5 ET





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6.3. Maximum Conducted (Average) Output Power

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6.3.1. Test Specification 5

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	Test Requirement:	FCC Part15 C Section 15.247 (b)(3)
CT	Test Method:	ANSI C63.10:2014
	Limit:	Section 15.247 (b) The maximum peak conducted output power of the intentional radiator shall not exceed the following: (1) For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band 0.125 watts.
L /	Test Setup:	Spectrum Analyzer EUT 7 WS ET
	Test Mode:	Transmitting mode with modulation
CT CT	Test Procedure:	Use the following spectrum analyzer settings: Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel RBW > the 20 dB bandwidth of the emission being measured VBW ≥ RBW Sweep = auto Detector function = peak Trace = max hold Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission.
	Test Result:	PASS

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6.3.2. Test Data

W5 C1

W5 E1

W5 E1

	GFSK mode					
100	Test channel	Peak Output Power (dBm)	Limit (dBm)	Result		
10	Lowest	9.89	20.97	PASS		
_	Middle	9.86	20.97	PASS		
	Highest	9.54	20.97	PASS		

7	Pi/4DQPSK mode					
	Test channel	Peak Output Power (dBm)	Limit (dBm)	Result		
-0)	Lowest	9.635	20.97	PASS 77		
	Middle	9.59	20.97	PASS		
	Highest	9.18	20.97	PASS		

7						
	8DPSK mode					
	Test channel Peak Output Power (dBm)		Limit (dBm)	Result		
	Lowest	9.66	20.97	PASS		
	Middle	9.69	20.97	PASS		
	Highest	W5 [T 9.4	20.97	75 T PASS		

Test plots as follows:

W5CT	WSET	W5 E	7 W	SET	WS ET
	WSLT	W5 LT	W5 CT	W5 ET	W5ET*
				\checkmark	
			\		

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#Video BW 6.0 MHz

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Span 10.00 MHz Sweep 1.33 ms (10001 pts)

Page 18

Center 2.441000 GHz #Res BW 2.0 MHz

W5 C1

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Mahahaha World Standardization Certification & Testing Group (Shenzhen) Co., ltd. **ac-MRA** Mahalalaha WS CT Report No.: WSCT-ANAB-R&E240900045A-BT Power NVNT 1-DH5 2480MHz Ant1 **+** Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) KEYSIGHT Input: RF PNO: Fast Gate: Off IF Gain: Low Sig Track: Off Avg Type: Log-Power Avg|Hold: 100/100 Trig: Free Run Mkr1 2.479 950 GHz 1 Spectrum Ref LvI Offset 2.33 dB Ref Level 20.00 dBm 9.54 dBm Scale/Div 10 dB



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Mahahaha World Standardization Certification & Testing Group (Shenzhen) Co., ltd. **ac-MRA** Mahalalaha WSET Report No.: WSCT-ANAB-R&E240900045A-BT Power NVNT 2-DH5 2441MHz Ant1 **+** Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) KEYSIGHT Input: RF PNO: Fast Gate: Off IF Gain: Low Sig Track: Off Avg Type: Log-Power Avg|Hold: 100/100 Trig: Free Run Mkr1 2.440 911 GHz 1 Spectrum Ref LvI Offset 2.28 dB Ref Level 20.00 dBm 9.59 dBm Scale/Div 10 dB #Video BW 6.0 MHz Center 2.441000 GHz #Res BW 2.0 MHz Span 10.00 MHz Sweep 1.33 ms (10001 pts) ? Sep 11, 2024 # 5 C Power NVNT 2-DH5 2480MHz Ant1 Spectrum Analyzer 1 Swept SA + Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) KEYSIGHT Input: RF PNO: Fast Gate: Off IF Gain: Low Sig Track: Off Avg Type: Log-Power Avg|Hold: 100/100 Trig: Free Run #Atten: 30 dB Preamp: Off Mkr1 2.479 915 GHz Ref Lvl Offset 2.33 dB Ref Level 20.00 dBm 9.18 dBm Scale/Div 10 dB #Video BW 6.0 MHz Center 2.480000 GHz #Res BW 2.0 MHz Span 10.00 MHz Sweep 1.33 ms (10001 pts) Sep 11, 2024 11:17:53 AM ation& Tesus ADD: Building A-B, Baoli'an Industrial Park, No.58 and 60, Tangtou Avenue, Shiyan Street, Bao'an District, Shenzhen City, Guangdong Province, China. 深圳世标检测认证股份有限公司 TEL: 0086-755-26996192 26996053 26996144 FAX: 0086-755-86376605

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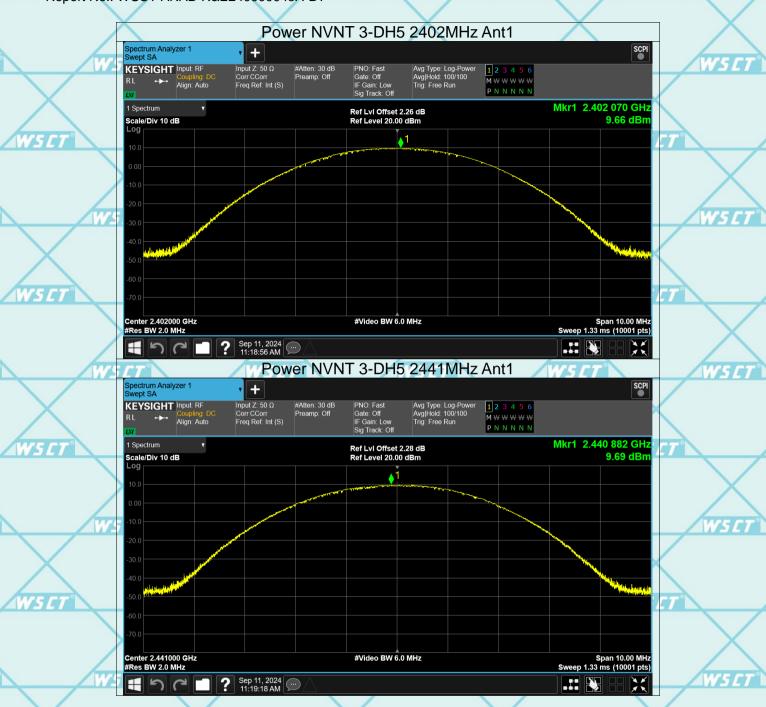
WSCT-ANAB-R&E240900045A-BT

Power NVNT 3-DH5 2402MHz Ant1

Spectrum Analyzer 1
Swept SA







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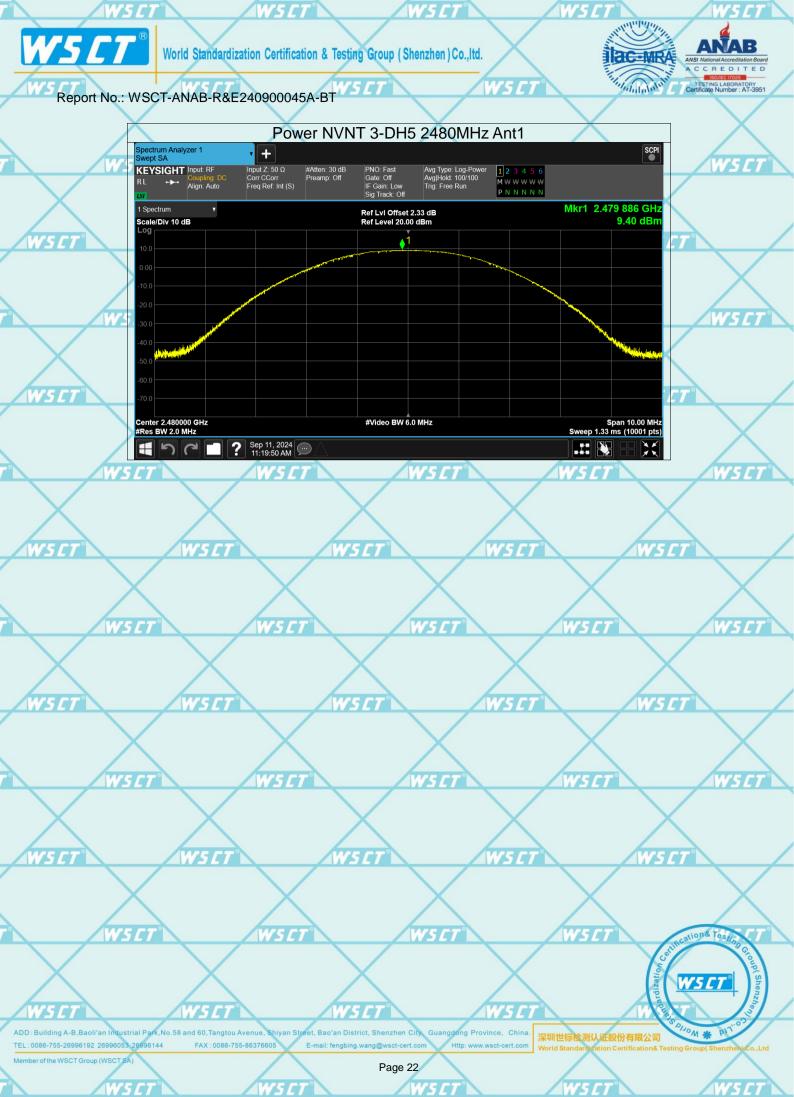
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ET WSET









Report No.: WSCT-ANAB-R&E240900045A-BT

W5 CT

6.4. 20dB Occupy Bandwidth

6.4.1. Test Specification

WS ET

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X	Test Requirement:	FCC Part15 C Section 15.247 (a)(1)	
WSET	Test Method:	ANSI C63.10:2014 W5 [T] W5 [T]	
	Limit:	N/A	\times
X	Test Setup:	Spectrum Analyzer EUT	WSET
WSET	Test Mode:	Transmitting mode with modulation W5LT	
WSET	Test Procedure:	 The testing follows ANSI C63.10:2014 Measurement Guidelines. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement. Set to the maximum power setting and enable the EUT transmit continuously. Use the following spectrum analyzer settings for 20dB Bandwidth measurement. Span = approximately 2 to 5 times the 20 dB bandwidth, centered on a hopping channel; 1%≤ RBW ≤5% of the 20 dB bandwidth; VBW≥3RBW; Sweep = auto; Detector function = peak; Trace = max hold. Measure and record the results in the test report. 	WS CT
	Test Result:	PASS	

W5 CT

WSET

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W5 CT



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Report No.: WSCT-ANAB-R&E240900045A-BT

W5 CT

6.4.2. Test data

/						
7.4	Test channel	-20dB Occupy Bandwidth (MHz)				
	rest cridiffier	GFSK	π/4-DQPSK	8DPSK	Conclusion	
	Lowest	0.8097	1.251	1.259	PASS	
	Middle	0.8089	1.265	1.252	PASS _{V5}	
/	Highest	0.8139	1.276	1.248	PASS	

WS CT Test plots as follows: W5 C W5 CT W5 C7 W5 C1 W5 C1 W5 C7 W5 CT W5 C7 WS C1 W5 E1 WSCI W5 CT W5 CT WS ET W5 CT W5C1 W5 CI W5 E W5C W5 CI W5 CT W5C1 WS ET WS CT W5 E1

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W5 CT

Page 24 W5CT WSET

W5CT

Mahahaha World Standardization Certification & Testing Group (Shenzhen) Co., ltd. **ac-MRA** Mahalalak W5 CT Report No.: WSCT-ANAB-R&E240900045A-BT Test Graphs -20dB Bandwidth NVNT 1-DH5 2402MHz Ant1 SCPI Spectrum Analyzer 1 Occupied BW **+** Center Freq: 2.402000000 GHz Avg|Hold: 100/100 Radio Std: None nput Z: 50 Ω Trig: Free Run Gate: Off #IF Gain: Low KEYSIGHT Input: RF Atten: 30 dB Preamp: Off Corr CCorr Freq Ref: Int (S) Mkr3 2.402399000 GHz Ref LvI Offset 4.26 dB Ref Value 24.26 dBm -12.03 dBm Scale/Div 10.0 dB 3

#Video BW 91.000 kHz

Measure Trace

% of OBW Powe

Total Power

-20dB Bandwidth NVNT 1-DH5 2441MHz Ant1 SCPI Spectrum Analyzer 1 Occupied BW + Center Freq: 2.441000000 GHz Avg|Hold: 100/100 Radio Std: None KEYSIGHT Input: RF nput Z: 50 Ω Atten: 30 dB Preamp: Off Trig: Free Run Gate: Off #IF Gain: Low Corr CCorr Freq Ref: Int (S) Mkr3 2.441400000 GHz 1 Graph Ref LvI Offset 4.28 dB Ref Value 24.28 dBm -12.74 dBm Scale/Div 10.0 dB 3 Center 2.441000 GHz #Res BW 30.000 kHz #Video BW 91.000 kHz Span 2 MHz Sweep 2.67 ms (10001 pts) Measure Trace Trace 1 Occupied Bandwidth 746.41 kHz Total Power 17.2 dBm % of OBW Power Transmit Freq Error x dB Bandwidth -4.578 kHz 808.9 kHz 99.00 % -20.00 dB Sep 10, 2024 ...

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Center 2.402000 GHz #Res BW 30.000 kHz

5

Occupied Bandwidth 753.95 kHz

? Sep 10, 2024 4:51:59 PM

Transmit Freq Error x dB Bandwidth

-5.833 kHz 809.7 kHz

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Span 2 MHz Sweep 2.67 ms (10001 pts)

16.9 dBm

99.00 % -20.00 dB

**

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Mahahaha World Standardization Certification & Testing Group (Shenzhen) Co., ltd. **ac-MRA** CCREDITED Mahalalak W5 CT Report No.: WSCT-ANAB-R&E240900045A-BT -20dB Bandwidth NVNT 2-DH5 2441MHz Ant1 Spectrum Analyzer 1 Occupied BW + Center Freq: 2.441000000 GHz Avg|Hold: 100/100 Radio Std: None Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) KEYSIGHT Input: RF Trig: Free Run Gate: Off #IF Gain: Low Atten: 30 dB Preamp: Off Mkr3 2.441621000 GHz 1 Graph Ref LvI Offset 4.28 dB Ref Value 24.28 dBm -12.89 dBm Scale/Div 10.0 dB Center 2.441000 GHz #Res BW 30.000 kHz Span 2 MHz Sweep 2.67 ms (10001 pts) #Video BW 91.000 kHz Measure Trace Trace 1 1.1601 MHz 15.1 dBm Total Power % of OBW Power x dB Transmit Freq Error x dB Bandwidth -11.537 kHz 1.265 MHz 99.00 % -20.00 dB -20dB Bandwidth NVNT 2-DH5 2480MHz Ant1//5 Spectrum Analyzer 1 Occupied BW + Center Freq: 2.480000000 GHz Avg|Hold: 100/100 Radio Std: None Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) Trig: Free Run Gate: Off #IF Gain: Low KEYSIGHT Input: RF Atten: 30 dB Preamp: Off Mkr3 2.480627000 GHz Ref LvI Offset 4.33 dB -13.40 dBm Scale/Div 10.0 dB Ref Value 24.33 dBm **▲**3 Span 2 MHz Sweep 2.67 ms (10001 pts) Center 2.480000 GHz #Res BW 30.000 kHz #Video BW 91,000 kHz Measure Trace Trace 1

Occupied Bandwidth
1.1613 MHz Total Power 14.6 dBm % of OBW Powe x dB -10.977 kHz 1.276 MHz 99.00 % -20.00 dB Transmit Freq Error x dB Bandwidth

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Mahahaha World Standardization Certification & Testing Group (Shenzhen) Co., ltd. **ac-MRA** CCREDITED Mahalalak W5 CT Report No.: WSCT-ANAB-R&E240900045A-BT -20dB Bandwidth NVNT 3-DH5 2402MHz Ant1 Spectrum Analyzer 1 Occupied BW + Center Freq: 2.402000000 GHz Avg|Hold: 100/100 Radio Std: None Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) KEYSIGHT Input: RF Trig: Free Run Gate: Off #IF Gain: Low Atten: 30 dB Preamp: Off Mkr3 2.402624000 GHz 1 Graph Ref LvI Offset 4.26 dB Ref Value 24.26 dBm -12.96 dBm Scale/Div 10.0 dB <u> 3</u> Center 2.402000 GHz #Res BW 30.000 kHz Span 2 MHz Sweep 2.67 ms (10001 pts) #Video BW 91.000 kHz Measure Trace Trace 1

> Sep 10, 2024 5:01:14 PM ** -20dB Bandwidth NVNT 3-DH5 2441MHz Ant1//5 Spectrum Analyzer 1 Occupied BW + Center Freq: 2.441000000 GHz Avg|Hold: 100/100 Radio Std: None Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) Trig: Free Run Gate: Off #IF Gain: Low KEYSIGHT Input: RF Atten: 30 dB Preamp: Off Mkr3 2.441620000 GHz Ref Lvl Offset 4.28 dB Ref Value 24.28 dBm -15.35 dBm Scale/Div 10.0 dB Center 2.441000 GHz #Res BW 30.000 kHz Span 2 MHz Sweep 2.67 ms (10001 pts) #Video BW 91,000 kHz Measure Trace Trace 1 Occupied Bandwidth
> 1.1555 MHz Total Power 15.3 dBm % of OBW Powe x dB -5.352 kHz 1.252 MHz 99.00 % -20.00 dB Transmit Freq Error x dB Bandwidth

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1.1627 MHz

Transmit Freq Error x dB Bandwidth

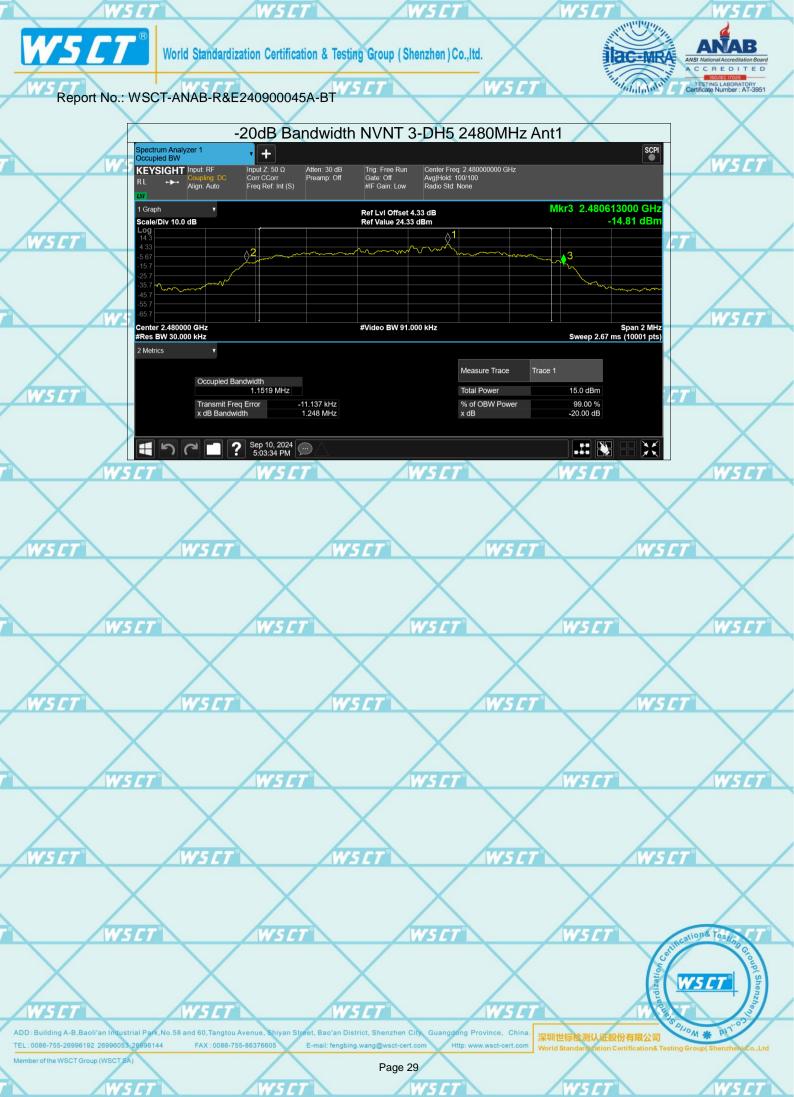
-5.950 kHz 1.259 MHz

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15.5 dBm

99.00 % -20.00 dB

Total Power % of OBW Power x dB









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6.5. Carrier Frequencies Separation

6.5.1. Test Specification 5

(WSET)

IWS ET

W5 C7

X	Test Requirement:	FCC Part15 C Section 15.247 (a)(1)	
W5 CT	Test Method:	ANSI C63.10:2014 W5 [T] W5 [T]	
	Limit:	Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.	WSET
WSET	Test Setup:	Spectrum Analyzer EUT W5.5.7	
	Test Mode:	Hopping mode	
WSET	Test Procedure:	 The testing follows ANSI C63.10:2014 Measurement Guidelines. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement. Set to the maximum power setting and enable the EUT transmit continuously. Enable the EUT hopping function. Use the following spectrum analyzer settings: Span = wide enough to capture the peaks of two adjacent channels; RBW is set to approximately 30% of the channel spacing, adjust as necessary to best identify the center of each individual channel; VBW≥RBW; Sweep = auto; Detector function = peak; Trace = max hold. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. Record the value in report. 	WSET
	Test Result:	PASS	

	W3L/			
		X	X	
WSET	WSCT	WSET	WSET	WSCT

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W5 CT

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W5 CT

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W5 C7

WS C1

W5 CT

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W5 CT



6.5.2. Test data

1	GFSK mode					
	Test channel	Carrier Frequencies Separation (MHz)	Limit (MHz)	Result		
0	Lowest	1.04	0.540	PASS		
	Middle	0.958	0.539	PASS		
	Highest	1	0.543	PASS		

	Pi/4 DQPSK mode						
0	Test channel	Result					
	Lowest	1	0.834	PASS			
	Middle	1	0.843	PASS			
_	Highest	WSCT 1 W	5 <i>CT</i> 0.851	5 CT PASS			

	8DPSK mode					
Test channel		Carrier Frequencies Separation (MHz)	Limit (MHz)	Result		
	Lowest	0.998	0.839	PASS		
	Middle	1.002	0.835	PASS		
7	Highest	1.008	0.832	PASS		

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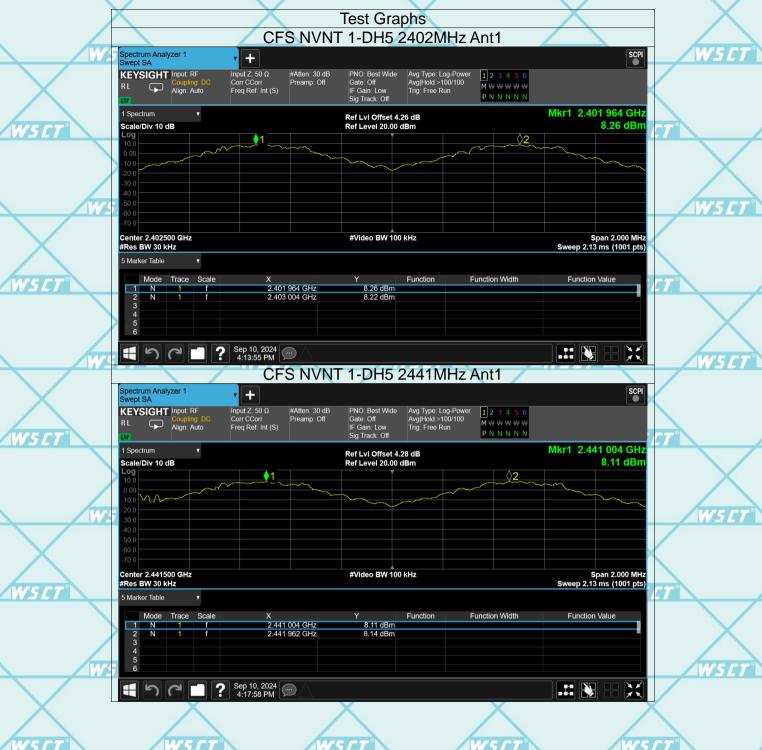
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Test Graphs

CFS NVNT 1-DH5 2402MHz Ant1

Spectrum Analyzer 1
Swept SA
WSCT-ANAB-R&E240900045A-BT





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Mahahaha World Standardization Certification & Testing Group (Shenzhen) Co., ltd. **ac-MRA** WSET Report No.: WSCT-ANAB-R&E240900045A-BT CFS NVNT 1-DH5 2480MHz Ant1 **+** Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) KEYSIGHT Input: RF PNO: Best Wide Gate: Off IF Gain: Low Sig Track: Off Avg Type: Log-Power Avg|Hold:>100/100 Trig: Free Run Coupling: L Align: Auto Mkr1 2.479 006 GHz Ref LvI Offset 4.33 dB Ref Level 20.00 dBm 7.81 dBm Scale/Div 10 dB Center 2.479500 GHz #Res BW 30 kHz #Video BW 100 kHz Span 2.000 MHz Sweep 2.13 ms (1001 pts) Function Width Function Value 2.479 006 GHz 2.480 006 GHz Test Graphs W5CT CFS NVNT 2-DH5 2402MHz Ant1 Spectrum Analyzer 1
Swept SA SCPI **+** Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) KEYSIGHT Input: RF #Atten: 30 dB Preamp: Off Avg Type: Log-Power Avg|Hold:>100/100 Trig: Free Run PNO: Best Wide Align: Auto Mkr1 2.402 126 GHz Ref LvI Offset 2.26 dB Ref Level 20.00 dBm 9.09 dBm Scale/Div 10 dB Center 2.402500 GHz #Res BW 30 kHz Span 2.000 MHz Sweep 2.13 ms (1001 pts) #Video BW 100 kHz Function Value Function Width ? Oct 12, 2024 3:13:12 PM CFS NVNT 2-DH5 2441MHz Ant1 tion& Test W5 C1

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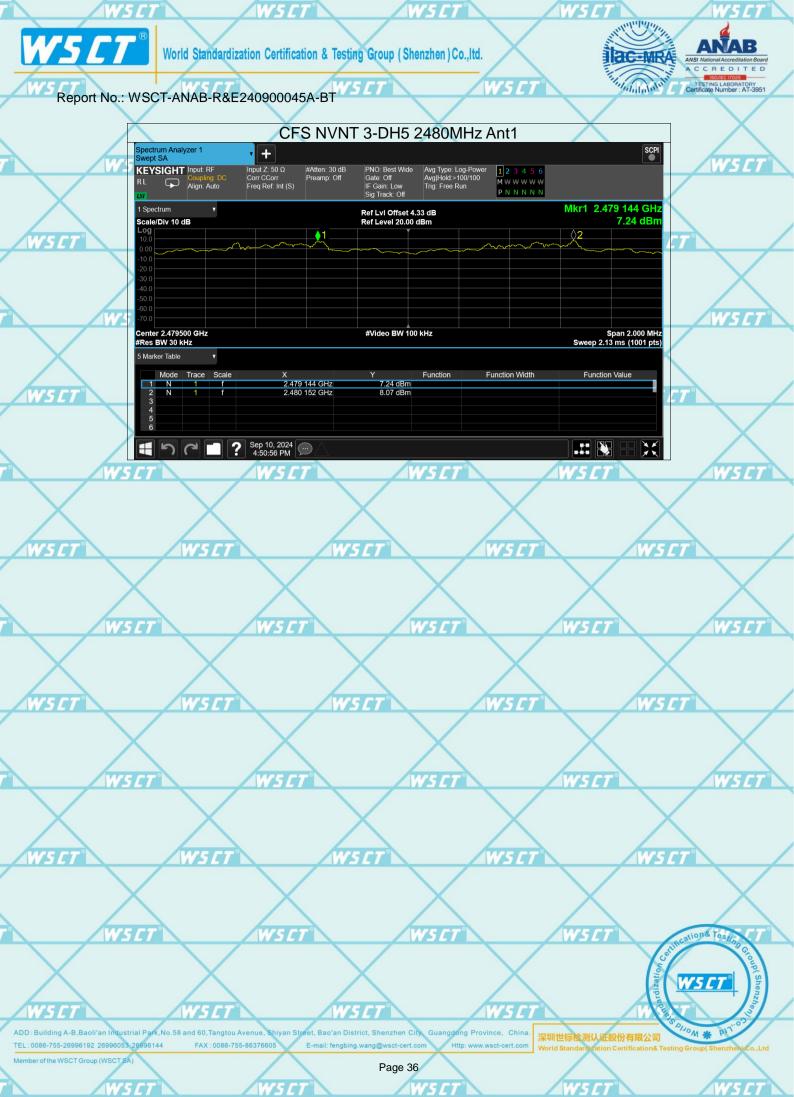
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W5ET"

W5CT°



Malalahah World Standardization Certification & Testing Group (Shenzhen) Co., ltd. **ac-MRA** Mahalalak WSET Report No.: WSCT-ANAB-R&E240900045A-BT CFS NVNT 3-DH5 2402MHz Ant1 **+** Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) KEYSIGHT Input: RF PNO: Best Wide Gate: Off IF Gain: Low Sig Track: Off Avg Type: Log-Power Avg|Hold:>100/100 Trig: Free Run #Atten: 30 dB Preamp: Off Coupling: L Align: Auto Mkr1 2.402 156 GHz 1 Spectrum Ref LvI Offset 4.26 dB Ref Level 20.00 dBm 8.22 dBm Scale/Div 10 dB ◊2 Center 2.402500 GHz #Res BW 30 kHz #Video BW 100 kHz Span 2.000 MHz Sweep 2.13 ms (1001 pts) Function Width Function Value CFS NVNT 3-DH5 2441MHz Ant1 Spectrum Analyzer 1 Swept SA + Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) KEYSIGHT Input: RF PNO: Best Wide Gate: Off IF Gain: Low Sig Track: Off #Atten: 30 dB Preamp: Off 1 2 3 4 5 6 Mkr1 2.441 154 GHz Ref LvI Offset 4.28 dB Ref Level 20.00 dBm 8.38 dBm Scale/Div 10 dB Center 2.441500 GHz #Res BW 30 kHz Span 2.000 MHz Sweep 2.13 ms (1001 pts) #Video BW 100 kHz Function Value Function Width Sep 10, 2024 4:47:33 PM ation& Tesus ADD: Building A-B, Baoli'an Industrial Park, No. 58 and 60, Tangtou Avenue, 深圳世标检测认证股份有限公司 FAX: 0086-755-86376605 Page 35 VS CI









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W5CT"

6.6. Hopping Channel Number

W5CT

W5 CT

W5CT

6.6.1. Test Specification

			_
WSET	Test Requirement:	FCC Part15 C Section 15.247 (a)(1)	
	Test Method:	ANSI C63.10:2014	
	Limit:	Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.	
WSET	Test Setup:	Spectrum Analyzer EUT	WS ET
	Test Mode:	Hopping mode	
W5 CT	Test Procedure:	 The testing follows ANSI C63.10:2014 Measurement Guidelines. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement. Set to the maximum power setting and enable the EUT transmit continuously. Enable the EUT hopping function. Use the following spectrum analyzer settings: Span = the frequency band of operation; set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller; VBW≥RBW; Sweep = auto; Detector function = peak; Trace = max hold. The number of hopping frequency used is defined as the number of total channel. Record the measurement data in report. 	
	Test Result:	PASS PASS	
	M2L/ M2L	WEIT WEIT	WSCT"

AWS LT

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W5 CT

W5 CT

WS CT

WSCT

WSET

W5 CT

WSET

WS CT

W5 CT

WSCT

WELT

4W5CT

DD: Building A-B,Baoli'an Industrial Park,No.58 and 60,Tangtou Avenue, Shiyan Street, Bao'an District, Shenzhen City Guangdong Province, Chi EL: 0086-755-26996192 26996053 26996144 FAX: 0086-755-86376605 E-mail: fengbing.wang@wsct-cert.com Http: www.wsct-cert.c 深圳世标检测认证股份有限公司 # 內1

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WS CT WS CT



W5CT"





W5E

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W5 CT

6.6.2. Test data

Mode	Hopping channel numbers	Limit	Result
GFSK, P/4-DQPSK, 8DPSK	79	15	PASS

Test plots as follows:

W5 C1 W5E7 WSEI

W5CI W5 E7 W5 C7 W5 CI W5 CI

W5 E1 WS CI WS CI WSEI

W5 CT W5 CT WS ET W5E1 W5 C1

W5 E WSE W5 C W5C

WSEI

W5 CI WS ET W5 C1 W5 C1

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W5 C1

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Mkr1 2.402 004 0 GHz Ref Lvl Offset 4.26 dB Ref Level 20.00 dBm 10.47 dBm Stop 2.48350 GHz Sweep 8.00 ms (1001 pts) Start 2.40000 GHz #Res BW 100 kHz #Video BW 300 kHz Function Width Function Value ? Sep 10, 2024 ** Hopping No. NVNT 2-DH5 2402MHz Ant1 SCPI + KEYSIGHT Input: RF Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) M W W W W P N N N N N Mkr1 2.401 837 0 GHz Ref LvI Offset 4.26 dB Ref Level 20.00 dBm 10.47 dBm Start 2.40000 GHz #Res BW 100 kHz #Video BW 300 kHz Stop 2.48350 GHz Sweep 8.00 ms (1001 pts) X 2.401 837 0 GHz 2.480 160 0 GHz Function Value 10.47 dBm

WSET WSET WSET WSET

WSCT WSCT WSCT WSCT

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? Sep 10, 2024 4:26:45 PM

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