



TEST REPORT

WSET

FCC ID: 2AXYP-OPN-672

Product: Open-Ear Bluetooth Headphones

Model No.: OPN-672

Trade Mark: oraimo

Report No.: WSCT-ANAB-R&E241000050A-BT

Issued Date: 17 October 2024

Issued for:

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

Issued By:

WSET

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, Guangdong, China.

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Page 1

W5 C1



Report No.: WSCT-ANAB-R&E241000050A-BT

TABLE OF CONTENTS

	WSET WSET	WSLT	WSET	WSET
\/l.	Test Certification			3
2.	Test Result Summary			4
W5 []3.	EUT Description	WSET	WSCI	5
4.	Genera Information			7
	4.1. TEST ENVIRONMENT AND MODE			7
/	4.2. DESCRIPTION OF SUPPORT UNITS	WSIT	WSET	WSET
5.	Facilities and Accreditations			8
	5.1. FACILITIES			8
WSET	5.2. ACCREDITATIONS	W5 E T	/W5[1	8
	5.3. MEASUREMENT UNCERTAINTY			9
	5.4. MEASUREMENT INSTRUMENTS			10
6.	Test Results and Measurement	Data	WSCT	1V5 ET
	6.1. ANTENNA REQUIREMENT			11
	6.2. CONDUCTED EMISSION			12
WSET	6.3. CONDUCTED OUTPUT POWER	WSCT	WSTI	14
	6.4. 20DB OCCUPY BANDWIDTH			21
	6.5. HOPPING CHANNEL NUMBER			35
	6.6. DWELL TIME			
	6.7. PSEUDORANDOM FREQUENCY HOPPING SEC	QUENCE		49
	6.8. CONDUCTED BAND EDGE MEASUREMENT			
WSET	6.9. CONDUCTED SPURIOUS EMISSION MEASURE	MENT	WETT	53
	6.10. RADIATED SPURIOUS EMISSION MEASUREM			63
7.	Test Setup Photographs	X	X	74
	WSCT WSCT	WSCT	WSCT	WSET
	X	X		
WSET	WSET WSET	WSCI	WSEI	
			X	



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W5 [7

Report No.: WSCT-ANAB-R&E241000050A-BT

1. **Test Certification**

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WSLT Product: Open-Ear Bluetooth Headphones

OPN-672 Model No.:

Additional oraimo

WSET Model:

ORAIMO TECHNOLOGY LIMITED Applicant: FLAT N 16/F BLOCK B UNIVERSAL INDUSTRIAL CENTRE 19-25

SHAN MEI STREET FOTAN NT HONGKONG

ORAIMO TECHNOLOGY LIMITED Manufacturer: FLAT N 16/F BLOCK B UNIVERSAL INDUSTRIAL CENTRE 19-25

SHAN MEI STREET FOTAN NT HONGKONG

Date of receipt: 11 September

Date of Test: 12 September 2024 to 16 October 2024

Applicable FCC CFR Title 47 Part 15 Subpart C Section 15.247 Standards:

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: Checked By:

(Qin Shuiguan) (Wang Xiang)

Approved By: Date: (Li Huaibi)

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Page 3

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Report No.: WSCT-ANAB-R&E241000050A-BT

2. **Test Result Summary**

	WSTT	WSFT	WSTT
/	Requirement	CFR 47 Section	Result
\	Antenna Requirement	§15.203/§15.247 (c)	PASS
	AC Power Line Conducted Emission	§15.207	N/A
_	Maximum conducted output power	§15.247 (b)(1) §2.1046	W5 [PASS
	20dB Occupied Bandwidth	§15.247 (a)(1) §2.1049	PASS
	Carrier Frequencies Separation	§15.247 (a)(1)	PASS
	Hopping Channel Number	§15.247 (a)(1)	W5 PASS
	Dwell Time	§15.247 (a)(1)	PASS
	Radiated Emission	§15.205/§15.209 §2.1053, §2.1057	PASS _{V5[T]}
	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 E1

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Report No.: WSCT-ANAB-R&E241000050A-BT

3. EUT Description

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Product Name:	Open-Ear Bluetooth Headphones	N5 CT
Model :	OPN-672	
Trade Mark:	oraimo ws.r. ws.r.	
Software version:	V0.3.2	$ egthinspace{-1mm} olimits = -1mm or -1mm or$
Hardware version:	V03-00	\wedge
Operation Frequency:	2402MHz~2480MHz	N5 ET
Channel Separation:	1MHz	
Number of Channel:	79 WS CT WS CT	
Modulation Type:	GFSK, π/4-DQPSK, 8-DPSK	\bigvee
Antenna Type:	FPC Antenna	W/67-24
Antenna Gain:	2.05dBi	12/7
Operating Voltage:	Li-ion Battery : 591222 Rated Voltage: 3.8V Rated Capacity: 150mAh 0.57Wh	
Remark:	N/A.	\bigvee
A. I		

Note: 1. N/A stands for no applicable.

2. Antenna gain provided by the customer.

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Page 5

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Report No.: WSCT-ANAB-R&E241000050A-BT

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Operation Frequency each of channel for GFSK, $\pi/4$ -DQPSK, 8DPSK

	Operatio	nt requent	y caon o	onamic i	of Oit,	III DQI OI	t, obi oi	
7	Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
	0	2402MHz	20	2422MHz	40	2442MHz	60	2462MHz
1	1	2403MHz	21	2423MHz	41	2443MHz	61	2463MHz
0		W5 ET		WSET	\	W.S.C.T		WSET
	10	2412MHz	30	2432MHz	50	2452MHz	70	2472MHz
	11	2413MHz	31	2433MHz	51	2453MHz	71	2473MHz
	1		() ()		6000		(STORY)	
7	18	2420MHz	38	2440MHz	58	2460MHz	78	2480MHz
	19	2421MHz	39	2441MHz	59	2461MHz		- X
	Domark:	Pomark: Channel 0, 20, 979 have been tested for CESK, #// DODSK, 9DDSK						

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

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Page 6

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WSET







Report No.: WSCT-ANAB-R&E241000050A-BT

Genera Information

4.1. Test environment and mode

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

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Engineering mode:	V	Keep the EUT in continuous transmitting
		by select channel and modulations with
WSCT	WELT	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
\times	X	X	1	X /

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
- 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.

Page 7

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Report No.: WSCT-ANAB-R&E241000050A-BT

5. Facilities and Accreditations

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, Guangdong, China.

The sites are constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22. 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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\searrow				_	\times
WSL	T WS	ET WS	W-	ET W	SET
	WSET	WSCT	WSET	WSCT	WSET
WSI	T WS	UT WS		W	SET
	WSET	WSLT	WSET	WSET	acation& Testino

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Page 8

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Report No.: WSCT-ANAB-R&E241000050A-BT

5.3. Measurement Uncertainty

The reported uncertainty of measurement y ± U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

ET	No.	Item	MU
	1	Duty Cycle and Tx-Sequence and Tx-Gap	±1%
	2	Dwell Time and Minimum Frequency Occupation	±1.2%
$\overline{}$	3	Medium Utilisation Factor	±1.3%
\times	4	Occupied Channel Bandwidth	±2.4%
ET	5	Transmitter Unwanted Emission in the out-of Band	±1.3%
	6	Transmitter Unwanted Emissions in the Spurious Domain	±2.5%
	7 W.S./	Receiver Spurious Emissions	±2.5%
$\overline{}$	8	Conducted Emission Test	±3.2dB
\setminus	9	RF power, conducted	±0.16dB
ET	10	Spurious emissions, conducted W5.17	±0.21dB
	11	All emissions, radiated(<1GHz)	±4.7dB
	12	All emissions, radiated(>1GHz)	±4.7dB
$\overline{}$	13	Temperature	±0.5°C
	14	Humidity	±2.0%

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5.4. MEASUREMENT INSTRUMENTS

	0.19	KEMENT INOT					/
_	NAME OF EQUIPMENT	MANUFACTURER	MODEL	SERIAL NUMBER	Calibration Date	Calibration Due.	2
	Test software		EZ-EMC	CON-03A	-	<u> </u>	
7	Test software	E7 -	MTS8310	WSCT	- /	VSET	
	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	AN3016/5/	04/10040	11/05/2023	11/04/2024	7
	Universal Radio Communication Tester	R&S	CMU 200	1100.0008.02	11/05/2023	11/04/2024	
7	Coaxial cable	Megalon /	/ S LMR400	N/A [T	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	
_	Pre Amplifier	H.P.CT	HP8447E	2945A02715	11/05/2023	11/04/2024	7
1	Pre-Amplifier	CDSI	PAP-1G18-38		11/05/2023	11/04/2024	
	Bi-log Antenna	SCHWARZBECK	VULB9168	01488	7/29/2024	7/28/2025	
4	9*6*6 Anechoic		7-1-1-1	Wift	11/05/2023	11/04/2024	
	Horn Antenna	COMPLIANCE ENGINEERING	CE18000		11/05/2023	11/04/2024	
	Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-631	11/05/2023	11/04/2024	7
/	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	6502	00042960	11/05/2023	11/04/2024	4
/	Horn Antenna	SCHWARZBECK	BBHA 9170	1123	11/05/2023	11/04/2024	
	Power meter	Anritsu	ML2487A	6K00003613	11/05/2023	11/04/2024	
7	Power sensor	Anritsu	MX248XD	/ WELL	11/05/2023	11/04/2024	
	Spectrum Analyzer	Keysight	N9010B	MY60241089	11/05/2023	11/04/2024	
							/

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Page 10







Report No.: WSCT-ANAB-R&E241000050A-BT

6. Test Results and Measurement Data

6.1. 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. The use of a 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 FPC Antenna. it meets the standards, and the best case gain of the antenna is 2.05dBi.

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Page 11





Report No.: WSCT-ANAB-R&E241000050A-BT

Conducted Emission 6.2.

6.2.1. Test Specification

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/	Test Requirement:	FCC Part15 C Section 15.207
7°	Test Method: 5 C7	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
	Limits:	Frequency range (MHz) Limit (dBuV) 0.15-0.5 66 to 56* 56 to 46* 0.5-5 56 46 5-30 60 50
		Reference Plane
7	WSET WSE	40cm 80cm LISN
	Test Setup: W5 [7	E.U.T AC power EMI Receiver
	WSET WSE	Remark: E.U.T. Equipment Under Test LISN: Line Impedence Stabilization Network Test table height=0.8m Refer to item 4.1
	WSCT	 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.
	Test Procedure:	2. 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).
	WSET WSE	3. Both sides of A.C. line are checked for maximum 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.
	Test Result:	N/A W5G
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6.2.2. EUT OPERATING CONDITIONS

The EUT is working in the Normal link mode. All modes have been tested and normal link mode is worst.

Devices subject to Part 15 must be tested for all available U.S. voltages and frequencies (such as a nominal 120 VAC, 60 Hz and 240 VAC, 50 Hz) for which the device is capable of operation. So, The configuration 120 VAC, 60 Hz and 240 VAC, 50 Hz were tested respectively, but only the worst configuration (120 VAC, 60 Hz) shown here.

Test data	a T powered by battery	not applicable	SET WS	CT WSCT
WSGT	WSET	W5 CT	WSET	WSLT
WSI			SET WS	$\langle \times$
WSCI	WSET	WSET	WSET	WSCT
WSI			$\langle \hspace{0.1cm} \rangle$	UT WSCT
WSCT	WSLT	WSET	WSET	WSLT
WSI			SET WS	\times
WSCI	WSET	WSET	WSET	WSCI
WSI	$\langle \hspace{0.1cm} \rangle$		$\langle \hspace{0.1cm} \rangle$	\times
WSCT	WSCT	WSEE	WS CT	CT Control of Control

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Page 13

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Report No.: WSCT-ANAB-R&E241000050A-BT

Conducted Output Power 6.3.

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6.3.1. Test Specification

WSET	Test Requirement:	FCC Part15 C Section 15.247 (b)(3)	
AUP 151	Test Method:	ANSI C63.10:2014	
WSET	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.	WSC
	Test Setup:	Spectrum Analyzer EUT	WSE
	Test Mode:	Transmitting mode with modulation	
WSET	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.	WSE
	Test Result:	PASS	1
			1017



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Report No.: WSCT-ANAB-R&E241000050A-BT

6.3.2. Test Data

,	GFSK mode						
	Test channel	Maximum conducted output power (dBm)	Limit (dBm)	Result			
	Lowest	6.96	20.97	PASS			
	Middle	8.49	20.97	PASS			
	Highest	8.68	20.97	PASS			

7	Pi/4DQPSK mode						
	Test channel	Maximum conducted output power (dBm)	Limit (dBm)	Result			
į	Lowest	6.98 5 7 7	20.97	PASS			
	Middle	8.51	20.97	PASS			
	Highest	8.68	20.97	PASS			

•								
	8DPSK mode							
0	Test channel	Maximum conducted output power (dBm)	Limit (dBm)	Result				
	Lowest	6.99	20.97	PASS				
	Middle	8.52	20.97	PASS				
	Highest	W5 [T 8.69	75 CT 20.97	VS ET PASS				

Test plots as follows:

WSET	WSET	WSET	WSET	WSCT

WSET	WSET	WSET	WSET	WSET

		_				A.
WSET	NS CT		V5 ET	W5 ET	W5CT	

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Page 15



World Standardization Certification & Testing Group (Shenzhen) Co.,ltd. IIac-MRA Report No.: WSCT-ANAB-R&E241000050A-BT Power NVNT 1-DH5 2480MHz Ant1 SCPI + Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) PNO: Fast Gate: Off IF Gain: Low Sig Track: Off KEYSIGHT Input RF #Atten: 30 dB Preamp: Off Avg Type: Log-Power Avg|Hold: 100/100 Trig: Free Run 1 2 3 4 5 6 M W W W W W P N N N N N Mkr1 2.479 973 GHz Ref LvI Offset 0.33 dB Ref Level 20.00 dBm 8.67 dBm Scale/Div 10 dB



WSCT WSCT WSCT WSCT

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Report No.: WSCT-ANAB-R&E241000050A-BT

Power NVNT 2-DH5 2441MHz Ant1

Spectrum Analyzer 1
Swept SA

KEYSIGHT Input RF
Coupling DC
Align Auto Freq Ref. Int (S)

Pearup Off Ball NO Offset 0.28 dB

Ref. VI Offset 0.28 dB

MKr1 2.440 78 GHz



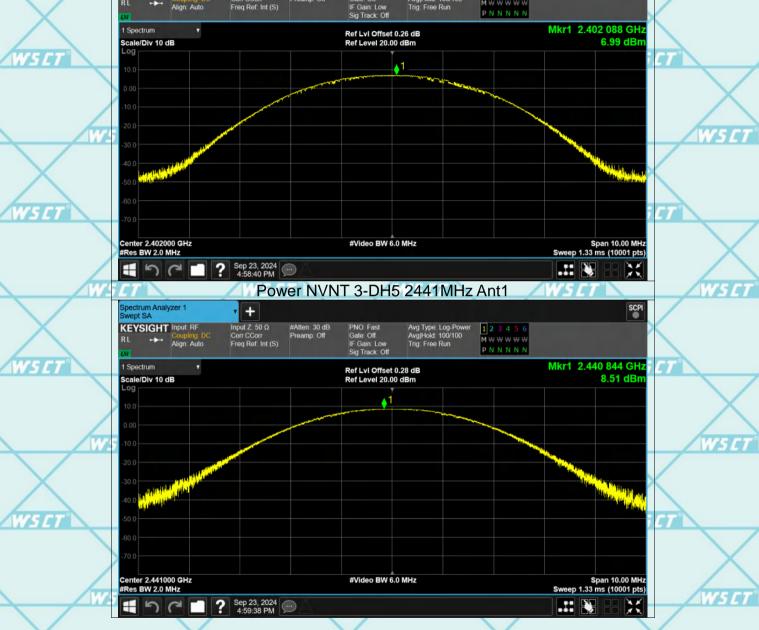
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WSGT WSGT WSGT

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World Standardization Certification & Testing Group (Shenzhen) Co.,ltd. IIac-MRA WSE Report No.: WSCT-ANAB-R&E241000050A-BT Power NVNT 3-DH5 2402MHz Ant1 SCPI + Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) PNO: Fast Gate: Off IF Gain: Low Sig Track: Off KEYSIGHT Input RF #Atten: 30 dB Preamp: Off Avg Type: Log-Power Avg|Hold: 100/100 Trig: Free Run M W W W W W Mkr1 2.402 088 GHz Ref LvI Offset 0.26 dB Ref Level 20.00 dBm 6.99 dBm Scale/Div 10 dB

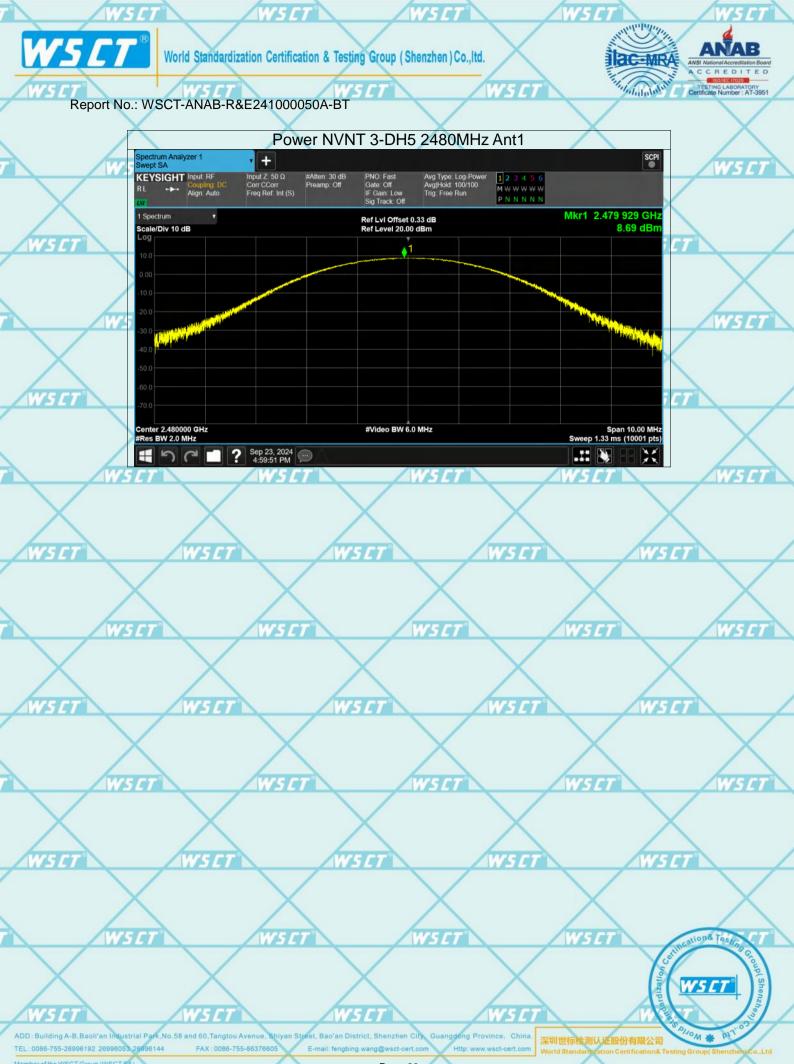


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ADD: Building A-B,Baoli'an Industrial Park,No.58 and 60, Tangtou Avenue, Shiyan Steet, Bao'an District, Shenzhen City, Guangdong Province, Chin TEL: 0086-755-26996192 26996053,26996144 FAX: 0086-755-86376605 E-mail: fengbing.wang@wsct-cert.com Http://www.wsct-cert.com

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Page 20

WELL

WSCT WSCT





Report No.: WSCT-ANAB-R&E241000050A-BT

20dB Occupy Bandwidth

6.4.1. Test Specification

- 4				
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	100		V All	

WSET

W5C1

X	Test Requirement:	FCC Part15 C Section 15.247 (a)(1)	
ET	Test Method:	ANSI C63.10:2014 W5.77 W5.77	
	Limit:	N/A	X
Z	Test Setup:	Spectrum Analyzer EUT	WSET
ET	Test Mode:	Transmitting mode with modulation W5 [7]	
TET	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. 	WSET
	Test Result:	PASS	

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WSET



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Report No.: WSCT-ANAB-R&E241000050A-BT

6.4.2. Test data

7	Test channel	200	dB Occupy Band	width (MHz)		
	rest channel	GFSK	π/4-DQPSK	8DPSK	Conclusion	/
	Lowest	0.9842	1.271	1.165	PASS	
	Middle	0.9647//5/	1.200	1.238	PASSVS	6
1	Highest	0.9517	1.316	1.266	PASS	

WSET	Middle	0.9647//5	1.200	1.238	PASSVS	CT /
	Highest	0.9517	1.316	1.266	PASS	
Test pl	lots as follows:			_		
W	ET.	WSET	WSET		W5 ET	WSET
\times	\times	\rightarrow		X		
7111	777	- August			/11/20	
WSET	WSET	W5		WSET	W5	
	<	X	X		X	X
WS	ET	WSET	WSET		VSET	WSET
						/
					/	
WSET	WSET	W.5	T	WSET	W-5	CT
	/		\sim		\vee	
WS		WSET	WSET		WSET	WSET
X	X	\rightarrow		X		
WSET	WSET	W5	-	WSET	WS	
	/			112/3/1		7
		X	X		X	X
W.5	CT	W5ET	WSET		WSET	WSET
WSET	WSCT	W.5	7	WSET	W.5	CT .
	<	\times	\times		\vee	\times
						WSCT Shenzhou
W.5		WSET	WSET		WSET	riffications Testing Q
X	X	\rightarrow		X	Zation	WSCT She
WSET	WSET	W5	7	WSET	The state of the s	

mber of the WSCT Group (WSCT 8)

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World Standardization Certification & Testing Group (Shenzhen) Co.,ltd. IIac-MRA Report No.: WSCT-ANAB-R&E241000050A-BT Test Graphs -20dB Bandwidth NVNT 1-DH5 2402MHz Ant1 pectrum Analyzer 1 ccupied BW + KEYSIGHT Input RF Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) Atten: 30 dB Mkr3 2.402497000 GHz Ref LvI Offset 2.26 dB Ref Value 22.26 dBm -14.36 dBm Scale/Div 10.0 dB **▲**3 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 Occupied Bandwidth 912.91 kHz Total Power 15.2 dBm Transmit Freq Error x dB Bandwidth 5.054 kHz 984.2 kHz % of OBW Power x dB 99.00 % -20.00 dB 1 5 6 7 Sep 23, 2024 9 4:43:17 PM X II 🔊 -20dB Bandwidth NVNT 1-DH5 2441MHz Ant1 SCPI pectrum Analyzer 1 ocupied 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 Atten: 30 dB Preamp: Off Mkr3 2.441493000 GHz Ref Lvi Offset 2.28 dB Ref Value 22.28 dBm -10.78 dBm Scale/Div 10.0 dB **₄**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 914.85 kHz Total Power 17.3 dBm 99.00 % -20.00 dB Transmit Freq Error x dB Bandwidth 10.323 kHz 964.7 kHz % of OBW Powe x dB .:: 队 ation& Tes TEL: 0086-755-26996192 26996053 26996144 FAX: 0086-755-86376605 Page 23

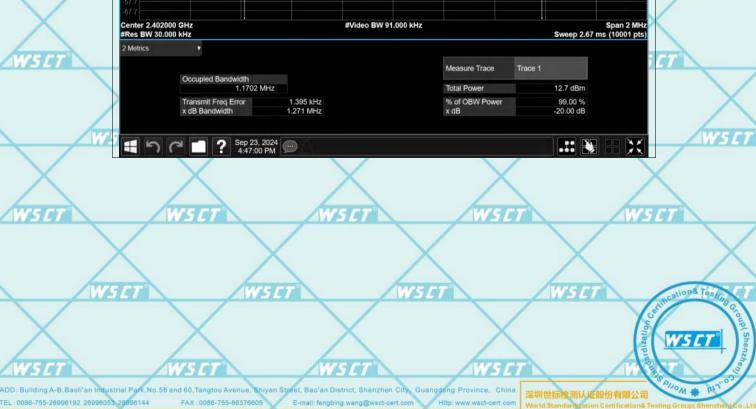
World Standardization Certification & Testing Group (Shenzhen) Co., ltd.

Report No.: WSCT-ANAB-R&E241000050A-BT

-20dB Bandwidth NVNT 1-DH5 2480MHz Ant1







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Report No.: WSCT-ANAB-R&E241000050A-BT

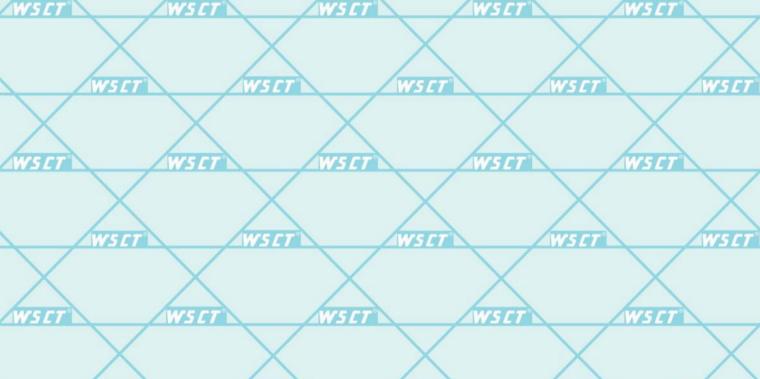
-20dB Bandwidth NVNT 3-DH5 2480MHz Ant1

Spectrum Analyzer 1

Occupied BW

KEYSIGHT Input RF Inpu









Report No.: WSCT-ANAB-R&E241000050A-BT

Carrier Frequencies Separation

6.4.3. Test Specification

A744 / WA74	WATER WATER	WSLI
st Requirement:	FCC Part15 C Section 15.247 (a)(1)	
st Method:	ANSI C63.10:2014	
nit:	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.	WSLT
st Setup:	Spectrum Analyzer EUT	
st Mode:	Hopping mode W5CT W5CT	
st 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: 	WSET
	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. 6. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. Record the value in report.	WSET
st Result:	PASS'5[T] W5[T] W5[T]	/
	at Method: at Setup: at Mode:	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. Set Setup: Spectrum Analyzer I. The testing follows ANSI C63.10:2014 Measurement Guidelines. 2. 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. 3. Set to the maximum power setting and enable the EUT transmit continuously. 4. Enable the EUT hopping function. 5. 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. 6. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. Record the value in report.

	WSET	WSET	W	TT /	WSET	W5 ET
X		X	X	X	X	
WSET		WSET	WSET	WSIT	WSCT	

WSCT WSCT



W5ET

WSET

WSIT

AWSET 1

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World Standard zation Certification& Testing Groups Shenzheni Co...Li

W5 CT



W5 C1

Report No.: WSCT-ANAB-R&E241000050A-BT

6.4.4. Test data

W5 ET

- 4						
	GFSK mode					
1	Test channel	channel Carrier Frequencies Limit (Separation (MHz)		Result		
	Lowest	0.994	0.656	PASS		
	Middle	1.008	0.643	PASS		
	Highest	0.996	0.634	PASS		

	Pi/4 DQPSK mode						
100	Test channel	Carrier Frequencies Separation (MHz)	Limit (2/3*20dB BW MHz)	Result			
	Lowest	1.002	0.847	PASS			
	Middle	0.994	0.800	PASS			
7	Highest	WSET 1	/5 <i>LT</i> 0.877	SCT PASS			

	8DPSK mode				
8	Test channel Carrier Frequencie Separation (MHz)		Limit (2/3*20dB BW MHz)	Result	
	Lowest	1	0.777	PASS	
	Middle	1.002	0.825	PASS	
-	Highest	1.002	0.844	PASS	

Test plots as follows:

4	WSET	WSET	WSET	WSET	WSET

WSC	WSET	WSET	W5 ET	WSET

WELT	WELT	MISIT	WELT	WELT

WSET	WSET	WSET	WSET

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tion& Test

World Standardization Certification & Testing Group (Shenzhen) Co.,ltd. IIac-MRA Report No.: WSCT-ANAB-R&E241000050A-BT Test Graphs CFS NVNT 1-DH5 2402MHz Ant1 + KEYSIGHT Input RF Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) 1 2 3 4 5 6 M W W W W W P N N N N N #Atten: 30 dB Mkr1 2.402 008 GHz Ref LvI Offset 4.26 dB Ref Level 20.00 dBm 10.34 dBm Scale/Div 10 dB Center 2.402500 GHz #Res BW 30 kHz #Video BW 100 kHz Span 2.000 MHz Sweep 2.13 ms (1001 pts) Function Value 10.34 dBm 10.09 dBm 2.402 008 GHz 2.403 002 GHz Sep 23, 2024 3:35:02 PM X .: N CFS NVNT 1-DH5 2441MHz Ant1 SCPI + KEYSIGHT Input: RF Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) M W W W W W Align: Auto Mkr1 2.440 998 GHz Ref LvI Offset 4.28 dB Ref Level 20.00 dBm 11.87 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 III 队 ation& Tes TEL: 0086-755-26996192 26996053 26996144 FAX: 0086-755-86376605 Page 30

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

WSCT-ANAB-R&E241000050A-BT

CFS NVNT 1-DH5 2480MHz Ant1

Spectrum Analyzer 1

Swept SA

KEYSIGHT Input RF
Coupling DC
Corr Corr Corr
Freq Ref. Int (S)

Proamp. Off
Freamp. Off
Freamp.



WSCT WSCT WSCT WSCT

WSET WSET WSE

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World Standardization Certification & Testing Group (Shenzhen) Co.,ltd. IIac-MRA Report No.: WSCT-ANAB-R&E241000050A-BT CFS NVNT 2-DH5 2441MHz Ant1 SCPI + Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) PNO: Best Wide Gate: Off IF Gain: Low Sig Track: Off KEYSIGHT Input RF #Atten: 30 dB Preamp: Off 1 2 3 4 5 6 M W W W W W P N N N N N Align: Auto Mkr1 2.441 006 GHz Ref LvI Offset 4.28 dB Ref Level 20.00 dBm 11.84 dBm Scale/Div 10 dB #Video BW 100 kHz Span 2.000 MHz Sweep 2.13 ms (1001 pts) Center 2.441500 GHz #Res BW 30 kHz Function Value Function Width 11.84 dBm 12.29 dBm ? Sep 23, 2024:: 💸 CFS NVNT 2-DH5 2480MHz Ant1 + Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) PNO: Best Wide Gate: Off IF Gain: Low Sig Track: Off KEYSIGHT Input RF Mkr1 2.479 002 GHz Ref LvI Offset 4.33 dB Ref Level 20.00 dBm 12.47 dBm Scale/Div 10 dB Span 2.000 MHz Sweep 2.13 ms (1001 pts) Center 2.479500 GHz #Res BW 30 kHz #Video BW 100 kHz Function Width Function Value ation& Tes TEL: 0086-755-26996192 26996053 26996144 FAX: 0086-755-86376605

World Standardization Certification & Testing Group (Shenzhen) Co.,ltd. IIac-MRA Report No.: WSCT-ANAB-R&E241000050A-BT CFS NVNT 3-DH5 2402MHz Ant1 SCPI + Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) PNO: Best Wide Gate: Off IF Gain: Low Sig Track: Off KEYSIGHT Input RF #Atten: 30 dB Preamp: Off M W W W W W Align: Auto Mkr1 2.402 006 GHz Ref LvI Offset 4.26 dB Ref Level 20.00 dBm 10.62 dBm Scale/Div 10 dB

> Center 2.402500 GHz #Res BW 30 kHz



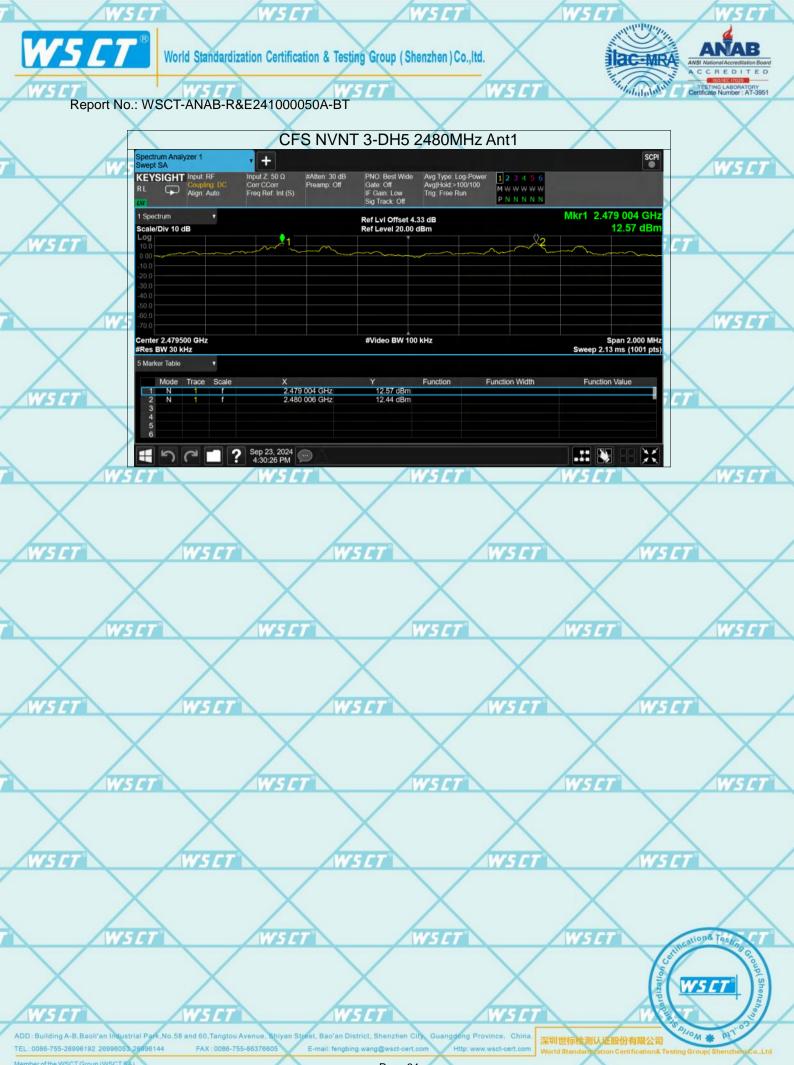
#Video BW 100 kHz

Span 2.000 MHz Sweep 2.13 ms (1001 pts)

ation& Tes

Function Value

Function Width



Page 34





W5C1

WSE

W5 CT



W5C1

Report No.: WSCT-ANAB-R&E241000050A-BT

6.5. Hopping Channel Number

6.5.1. Test Specification

WSCT	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.	WSCI
WSLT	Test Setup:	Spectrum Analyzer EUT W.5.E.T.	Walti
	Test Mode:	Hopping mode	
WSET		 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 	WSET
WSET	Test Procedure:	 EUT transmit continuously. 4. Enable the EUT hopping function. 5. 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. 6. The number of hopping frequency used is defined as the number of total channel. 7. Record the measurement data in report. 	WSET
	Test Result:	PASS PASS	WSIII

WSET WSET WSET WSET

WSET

WS ET WS ET

WSCT Standard Testing Coup (Shenze)

W5ET"

W5ET

WSET

AWSET

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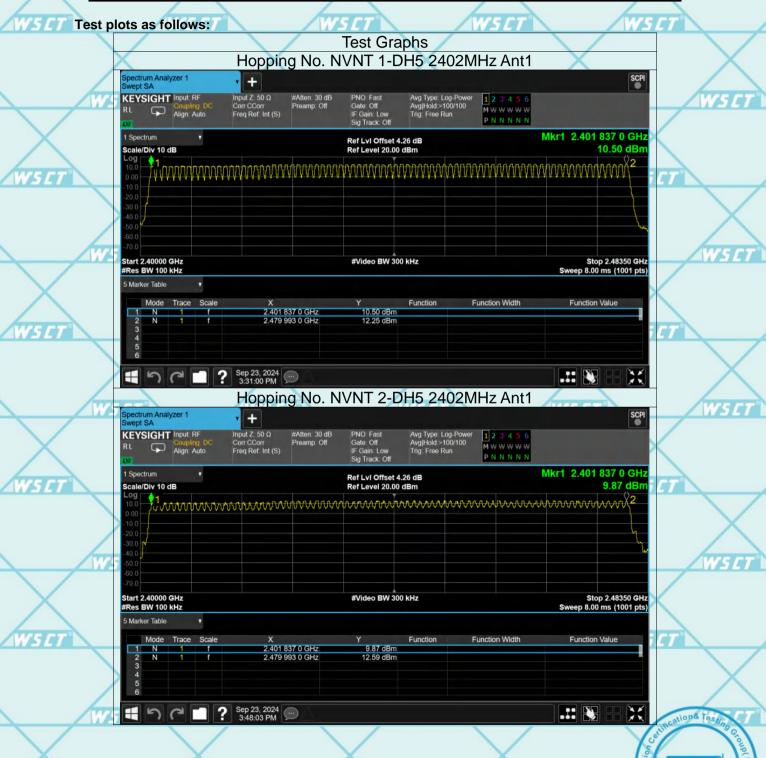




Report No.: WSCT-ANAB-R&E241000050A-BT

6.5.2. Test data

_	Mode	Hopping channel numbers	Limit	Result	1
	GFSK, P/4-DQPSK, 8DPSK	79	15	PASS	

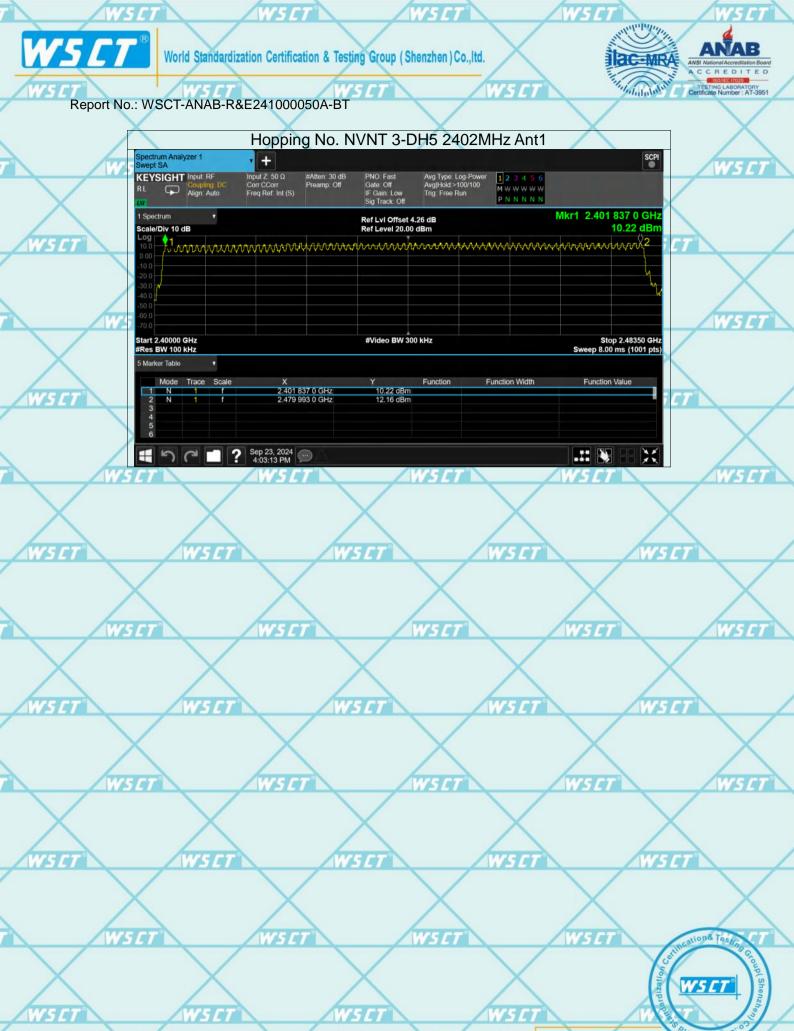


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and 60, Tangtou Avenue, Shiyan Steet, Bao'an District, Shenzhen City, Guangdong Province, China
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Report No.: WSCT-ANAB-R&E241000050A-BT

6.6. Dwell Time

W5 C

WSE

W5E

6.6.1. Test Specification

- 41					
	7 7	1 -	W 20	7 0	
	177	(Black)	7.40	/ /	

WSET

W5ET"

W5 CT

			•
\	Test Requirement:	FCC Part15 C Section 15.247 (a)(1)	
7	Test Method:	ANSI C63.10:2014 W5 ET W5 ET	
_	Limit:	The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.	WSI
	Test Setup:	Spectrum Analyzer EUT	
7°	Test Mode:	Hopping mode W5 [7]	
	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 = zero span, centered on a hopping channel; RBW shall be ≤ channel spacing and where possible RBW should be set >> 1 / T, where T is the expected dwell time per channel; VBW≥RBW; Sweep = as necessary to capture the entire dwell time per hopping channel; Detector function = peak; Trace = max hold. Measure and record the results in the test report. 	WSI
	Test Result:	PASS	1
_	CUEITE CONTRACTOR	A VIETE A VIETE	WAL

WSET WSET WSET

WSET

W5 ET

WSET

AWS ET



WSET

WSET

FAX: 0086-755-86376605

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





Report No.: WSCT-ANAB-R&E241000050A-BT

6.6.2. Test Data

WSFT WSFT

WSCT

	Mode	Frequency	Pulse Time	Total Dwell	Burst	Period Time	Limit	Verdict	
		(MHz)	(ms)	Time (ms)	Count	(ms)	(ms)		
	1-DH1	2402	0.405	127.575	315	31600	400	Pass	
	1-DH1	2441	0.405	128.79	318	31600	400	Pass	C.
Ų.	1-DH1	2480	0.403	127.348	316	31600	400	Pass	3
3	1-DH3	2402	1.661	270.743	163	31600	400	Pass	
	1-DH3	2441	1.66	250.66	151	31600	400	Pass	
	1-DH3	2480	1.661	265.76	160	31600	400	Pass	
	1-DH5	2402	2.909	305.445	105	31600	400	Pass	
4	1-DH5	2441	2.907	281.979	97	31600	400	Pass	
4	1-DH5	2480	2.908	363.5	125	31600	400	Pass	J

Note: 1. In normal mode, hopping rate is 1600 hops/s with 6 slots in 79 hopping channels.

For DH1, With channel hopping rate (1600/2/79) in Occupancy Time Limit (0.4×79) (s), Hops Over Occupancy Time comes to $(1600/2/79) \times (0.4 \times 79) = 320$ hops

For DH3, With channel hopping rate (1600 / 4 / 79) in Occupancy Time Limit (0.4 x 79) (s), Hops Over Occupancy Time comes to $(1600 / 4 / 79) \times (0.4 \times 79) = 160$ hops

For DH5, With channel hopping rate (1600 / 6 / 79) in Occupancy Time Limit (0.4 x 79) (s), Hops Over Occupancy Time comes to $(1600 / 6 / 79) \times (0.4 \times 79) = 106.67$ hops

2. Dwell Time(s) = Hops Over Occupancy Time (hops) x Package Transfer Time

Test plots as follows:

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WSET WSET WSET WSET WSET

WSET WSET WSET WSET

WSGT WSGT WSGT WSGT

WSCT WSCT WSCT WSCT

WSGT WSGT

WSCT WSCT WSCT WSCT

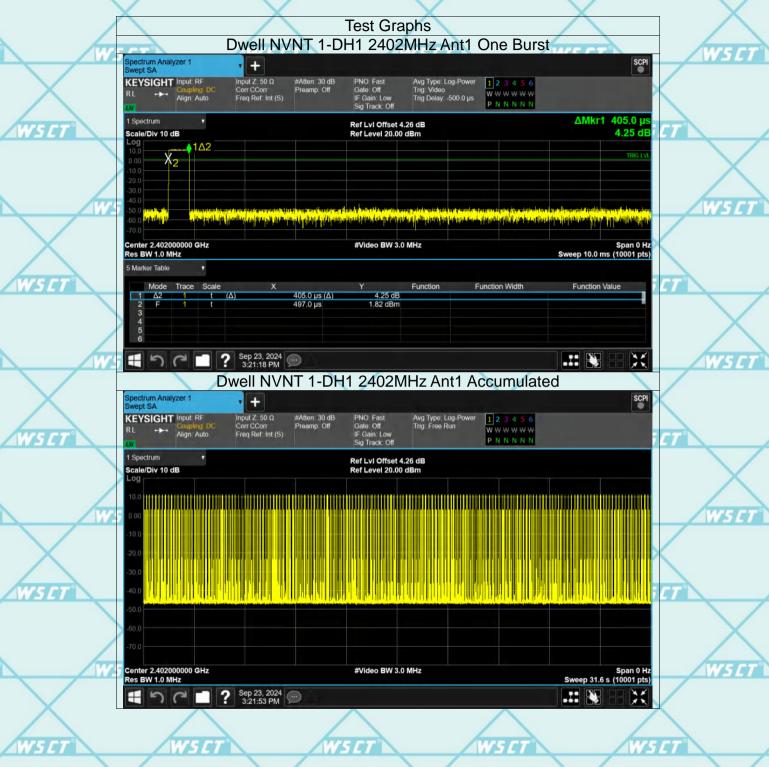
CDD: Building A-B, Baoli an Industrial Park, No. 58 and 60, tangtou Avenue, Shiyan Street, Bao an District, Shenzhen City, Guanggong Province, Chin EL: 0086-755-26996192 26996053 26996144 FAX: 0086-755-86376605 E-mail: fengbing.wang@wsct-cert.com Http://www.wsct-cert.com

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W5CT® World Standardization Certification & Testing Group (Shenzhen) Co., ltd. Report No.: WSCT-ANAB-R&E241000050A-BT







tion& Tes FAX:0086-755-86376605

W5CT® World Standardization Certification & Testing Group (Shenzhen) Co., ltd. Iac-MRA Report No.: WSCT-ANAB-R&E241000050A-BT Dwell NVNT 1-DH1 2441MHz Ant1 One Burst SCPI + Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) PNO: Fast Gate: Off IF Gain: Low Sig Track: Off Avg Type: Log-Power Trig: Video Trig Delay: -500.0 μs KEYSIGHT Input RF #Atten: 30 dB Preamp: Off W W W W W W W P N N N N N ΔMkr1 405.0 μs Ref LvI Offset 4.28 dB Ref Level 20.00 dBm -4.24 dB Scale/Div 10 dB 1Δ2

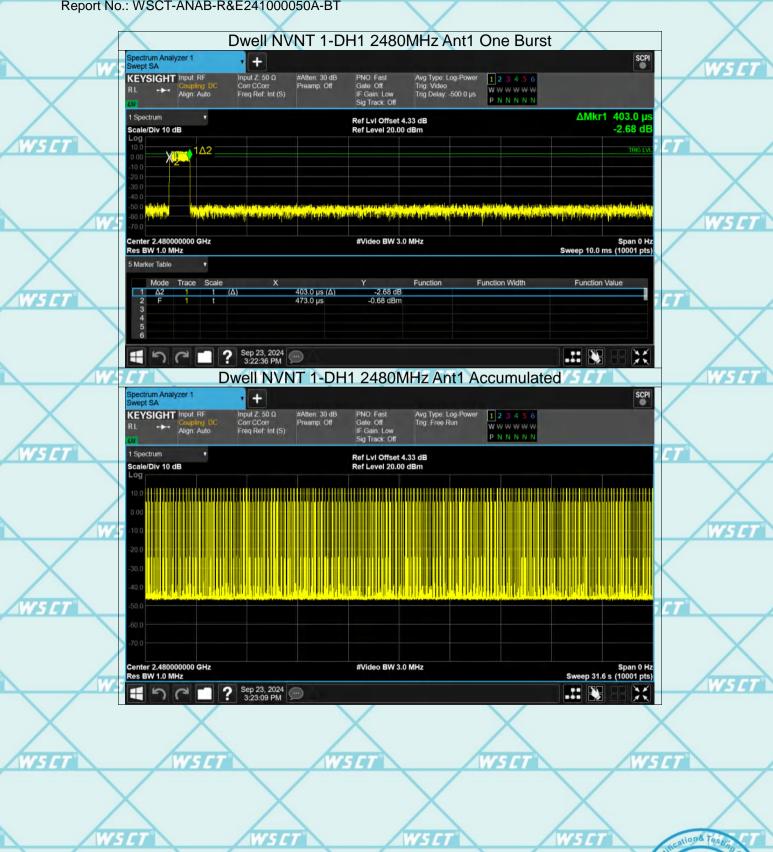
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WSC

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Report No.: WSCT-ANAB-R&E241000050A-BT

Dwell NVNT 1-DH3 2441MHz Ant1 One Burst

Spectrum Analyzer 1
Swept SA

KEYSIGHT Input RF
Coupling DC
Coupling





TEL: 0086-755-26996192 26996053 26996144

FAX: 0086-755-86376605

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





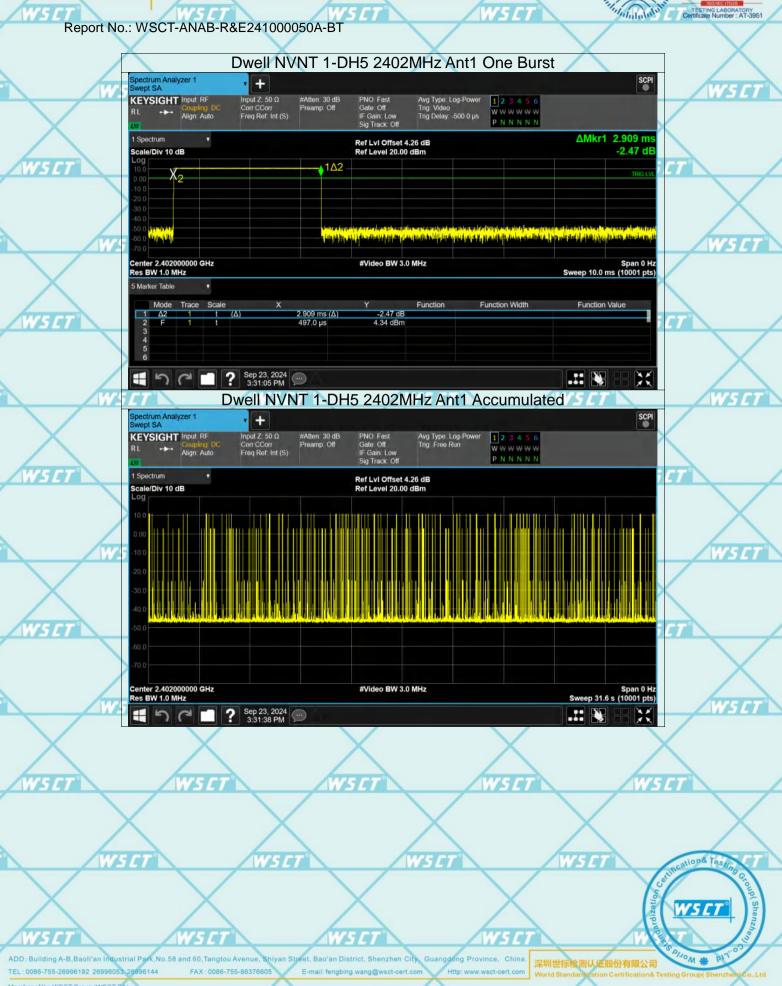




W5 CT











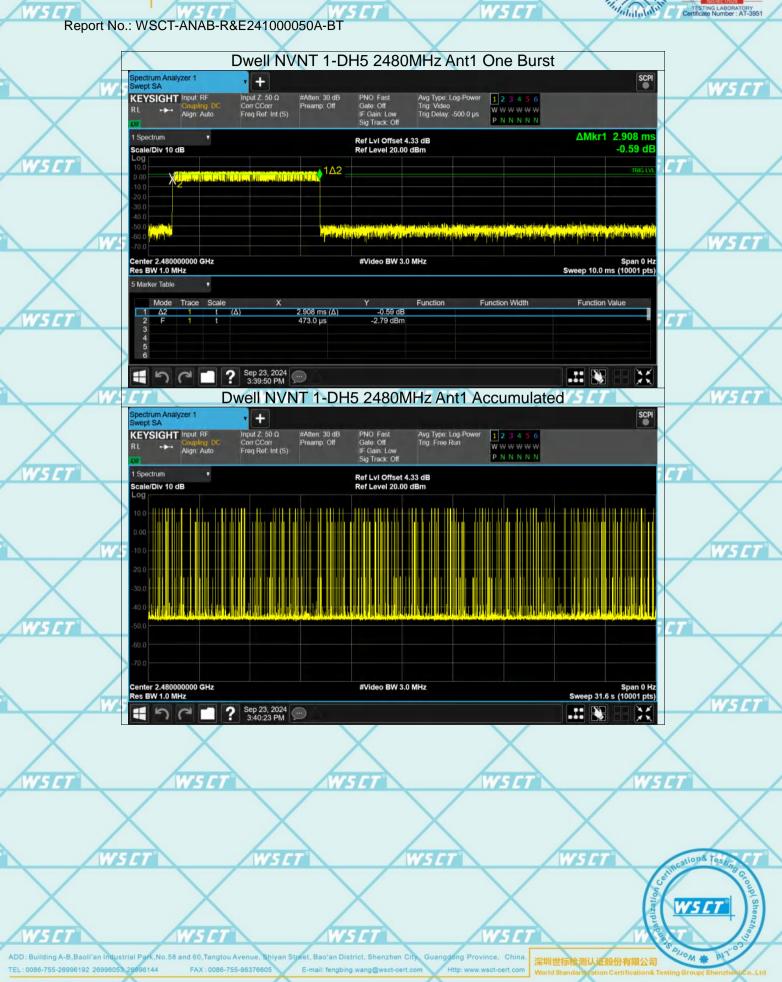
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ANSI National Accreditation Board
A C C R E D I T E D

















Report No.: WSCT-ANAB-R&E241000050A-BT

6.7. Pseudorandom Frequency Hopping Sequence

Test Requirement: FCC Part15 C Section 15.247 (a)(1) requirement:

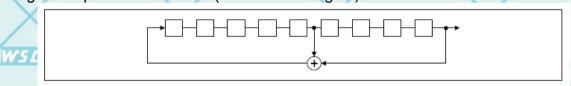
Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

Alternatively. 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, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a Pseudorandom ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

EUT Pseudorandom Frequency Hopping Sequence

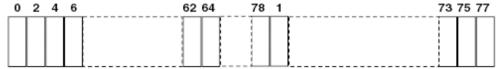
The pseudorandom sequence may be generated in a nine-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage. And the result is fed back to the input of the first stage. The sequence begins with the first one of 9 consecutive ones; i.e. the shift register is initialized with nine ones.

- Number of shift register stages: 9
- Length of pseudo-random sequence: 2⁹-1 = 511 bits
- Longest sequence of zeros: 8 (non-inverted signal)



Linear Feedback Shift Register for Generation of the PRBS sequence

An example of Pseudorandom Frequency Hopping Sequence as follow:



Each frequency used equally on the average by each transmitter.

The system receivers have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shift frequencies in synchronization with the transmitted signals.

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Report No.: WSCT-ANAB-R&E241000050A-BT

6.8. Conducted Band Edge Measurement

6.8.1. Test Specification

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/	Test Requirement:	FCC Part15 C Section 15.247 (d)	
7	Test Method:	ANSI C63.10:2014 W5 [7] W5 [7]	
7	Limit:	In any 100 kHz bandwidth outside the intentional radiation frequency band, the radio frequency power shall be at least 20 dB below the highest level of the radiated power. In addition, radiated emissions which fall in the restricted bands must also comply with the radiated emission limits.	WS
7	Test Setup:	Spectrum Analyzer EUT	
	Test Mode:	Transmitting mode with modulation	
7		 The testing follows the guidelines in Band-edge Compliance of RF Conducted Emissions of ANSI C63.10:2014 Measurement Guidelines. Set to the maximum power setting and enable the EUT transmit continuously. 	W5
	Test Procedure:	 Set RBW = 100 kHz (≥1% span=10MHz), VBW = 300 kHz (≥RBW). Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100kHz RBW. The attenuation shall be 30 dB instead of 20 dB when RMS conducted output power procedure is used. Enable hopping function of the EUT and then repeat step 2 and 3. 	W.5
	Test Result:	Measure and record the results in the test report. PASS	WS
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Report No.: WSCT-ANAB-R&E241000050A-BT

Conducted Spurious Emission Measurement 6.9.

6.9.1. Test Specification 5 []

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				-

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Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	ANSI C63.10:2014
Limit:	In any 100 kHz bandwidth outside the intentional radiation frequency band, the radio frequency power shall be at least 20 dB below the highest level of the radiated power. In addition, radiated emissions which fall in the restricted bands must also comply with the radiated emission limits.
Test Setup:	Spectrum Analyzer EUT
Test Mode:	Transmitting mode with modulation
Test Procedure:	 The testing follows the guidelines in Spurious RF Conducted Emissions of 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. Set RBW = 100 kHz, VBW = 300kHz, scan up through 10th harmonic. All harmonics / spurs must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100 kHz RBW. Measure and record the results in the test report. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
Test Result:	PASS
(T)	





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Report No.: WSCT-ANAB-R&E241000050A-BT

Tx. Spurious NVNT 1-DH5 2480MHz Ant1







World Standardization Certification & Testing Group (Shenzhen) Co.,ltd. IIac-MRA Report No.: WSCT-ANAB-R&E241000050A-BT Tx. Spurious NVNT 2-DH5 2402MHz Ant1 Ref SCPI + Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) PNO: Best Wide Gate: Off IF Gain: Low Sig Track: Off Avg Type: Log-Power Avg|Hold: 100/100 Trig: Free Run KEYSIGHT Input RF 1 2 3 4 5 6 M W W W W W P N N N N N #Atten: 20 dB Preamp: Off Mkr1 2.401 986 5 GHz Ref LvI Offset 2.26 dB Ref Level 12.26 dBm 8.19 dBm Scale/Div 10 dB #Video BW 300 kHz Center 2.4020000 GHz #Res BW 100 kHz ? Sep 23, 2024 🖫 456 Tx. Spurious NVNT 2-DH5 2402MHz Ant1 Emission + Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) KEYSIGHT Input RF #Atten: 20 dB Preamp: Off MWWWW Mkr1 2.401 7 GHz Ref LvI Offset 2.26 dB Ref Level 12.26 dBm 2.46 dBm Scale/Div 10 dB

Stop 26.50 GHz Sweep ~2.53 s (30001 pts) #Video BW 300 kHz Start 30 MHz #Res BW 100 kHz Function Function Width Function Value 2.46 dBm -38.80 dBm -38.80 dBm -63.07 dBm -52.88 dBm 4.804 3 GHz 7.206 0 GHz 9.607 7 GHz

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Page 57

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Report No.: WSCT-ANAB-R&E241000050A-BT

Tx. Spurious NVNT 2-DH5 2441MHz Ant1 Ref

Spectrum Analyzer 1
Swept SA

KEYSIGHT Input RF
Coupling DC Corr CCorr Preamp. Off Gate Off Avg Hold 100/100

Preamp. Off Gate Off Avg Hold 100/100

Tx. Spurious NVNT 2-DH5 2441MHz Ant1 Ref

Spectrum Analyzer 1
Swept SA

KEYSIGHT Input RF
Coupling DC Corr CCorr Preamp. Off Gate Off Avg Hold 100/100

REPORT NO.: WSCT-ANAB-R&E241000050A-BT



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World Standardization Certification & Testing Group (Shenzhen) Co.,ltd. IIac-MRA Report No.: WSCT-ANAB-R&E241000050A-BT Tx. Spurious NVNT 2-DH5 2480MHz Ant1 Ref SCPI + Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) PNO: Best Wide Gate: Off IF Gain: Low Sig Track: Off KEYSIGHT Input RF Avg Type: Log-Power Avg|Hold: 100/100 Trig: Free Run 1 2 3 4 5 6 M W W W W W P N N N N N #Atten: 20 dB Preamp: Off Mkr1 2.479 994 0 GHz Ref LvI Offset 2.33 dB Ref Level 12.33 dBm 10.20 dBm Scale/Div 10 dB



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World Standardization Certification & Testing Group (Shenzhen) Co.,ltd. IIac-MRA Report No.: WSCT-ANAB-R&E241000050A-BT Tx. Spurious NVNT 3-DH5 2441MHz Ant1 Ref SCPI Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) PNO: Best Wide Gate: Off IF Gain: Low Sig Track: Off KEYSIGHT Input RF Avg Type: Log-Power Avg|Hold: 100/100 Trig: Free Run 1 2 3 4 5 6 M W W W W W P N N N N N #Atten: 20 dB Preamp: Off



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Report No.: WSCT-ANAB-R&E241000050A-BT

Tx. Spurious NVNT 3-DH5 2480MHz Ant1 Ref

Spectrum Analyzer 1
Swept SA

KEYSIGHT Input RF
RL Augn. Auto Freq Ref. Int (S)

Report No.: WSCT-ANAB-R&E241000050A-BT

| Augn. Auto | Ref. | Ref.









Report No.: WSCT-ANAB-R&E241000050A-BT

Radiated Spurious Emission Measurement

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ú	6.10.1. Test Specification					
۲.	o. ro. rest Specification					
	Test Requirement:	FCC Part15	C Sectio	n 15.209		
0	Test Method:	ANSI C63.10):2014	W5	ET	WSET
	Frequency Range:	9 kHz to 25 (GHz			
	Measurement Distance:	3 m				
_	Antenna Polarization: W5 C	Horizontal &	Vertical		W5	ET
		Frequency	Detector	RBW	VBW	Remark
		9kHz- 150kHz	Quasi-pea	ak 200H	z 1kHz	Quasi-peak Value
1	Receiver Setup:	150kHz- 30MHz	Quasi-pea	ak 9kHz	30kHz	Quasi-peak Value
		30MHz-1GHz	Quasi-pea	ak 100KH	z 300KHz	Quasi-peak Value
	\times		Peak	1MH:	z 3MHz	Peak Value
		Above 1GHz	Peak	1MH:	z 10Hz	Average Value
	WSET WSE		WSE	Field	Strength	Measurement
7		Frequen	су		olts/meter)	Distance (meters)
	\times	0.009-0.4	190	2400	/F(KHz)	300
		0.490-1.7	705	24000	O/F(KHz)	30
8	WSET	1.705-3	0		30	30
	111111111111111111111111111111111111111	30-88	_	_	100	3
	1:	88-216			150	3
	Limit:	216-96	0		200	3

WS ET

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	4-7-1-1-1	WSIT	
Frequency	Field Strength (microvolts/meter)	Measurement Distance (meters)	Detector
Above 4011-	500	3	Average
Above 1GHz	5000	3	Peak

500

For radiated emissions below 30MHz

Above 960

WSET WSE

Test setup:

Distance = 3m Computer Pre -Amplifier EUT Receiver Ground Plane

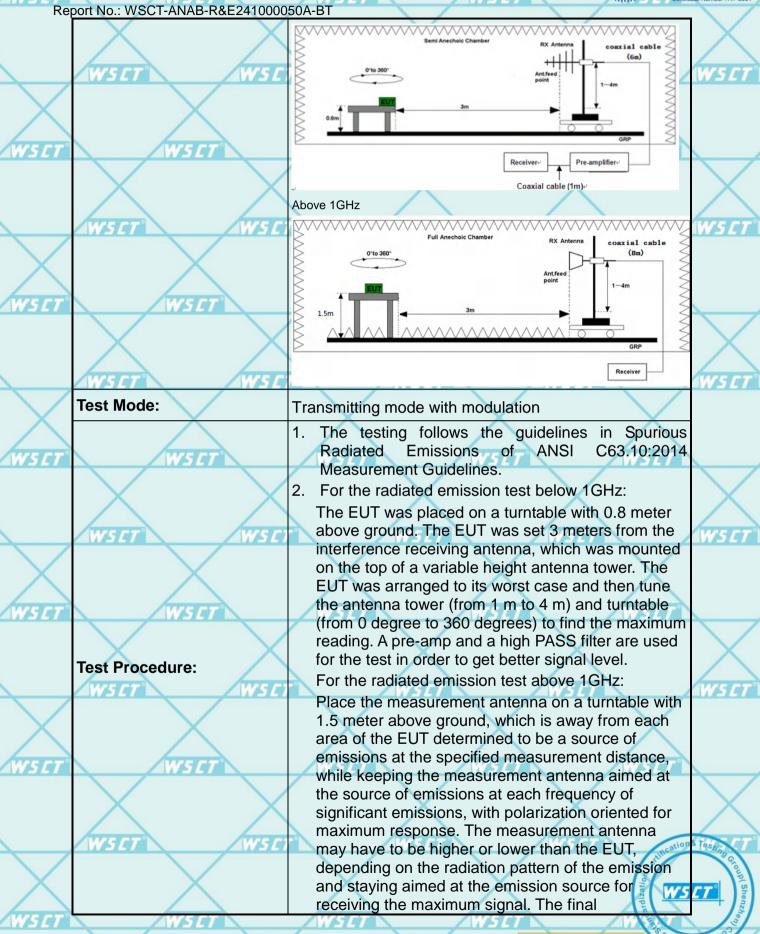
30MHz to 1GHz

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EL: 0086-755-26996192 26996053 26996144





Report No.: WSCT-ANAB-R&E241000050A-BT

Ke	port No WSC1-ANAB-R&E241000	USUA-D			
	\times		easurement antenna elev		1 X
			aximizes the emissions.		
	WSET WS		ntenna elevation for maxi		W5 C
		re	estricted to a range of heigh		
X	X		bove the ground or refere		
			Set to the maximum pow		e
W5 CT	WSET		EUT transmit continuously		
			Jse the following spectrur		
	I X X		(1) Span shall wide enou์ู		X
			emission being measu		
	WSET WS L		(2) Set RBW=100 kHz for		W5 E
			for f>1GHz ; VBW≥RE		
X	X			tor function = peak; Trac	е
		/	= max hold for peak		
WS CT	WSET		(3) For average measure		
			correction factor meth		
	X			On time/100 millisecond	
			On time $=N1*L1+N2*L$	_2++Nn-1*LNn-1+Nn*L	
	WSET WSE	4 4	Where N1 is number	of type 1 pulses, L1 is	W5 L
			length of type 1 pulse	es, etc.	
X	X		Average Emission Le	evel = Peak Emission	
		4	Level + 20*log(Duty of	cycle)	A
W5ET"	WSET		Corrected Reading: Ar	ntenna Factor + Cable	
			Loss + Read Level - P		
	Test results:	PAS			
	Anna Anna	FAS.			- August
	/ W-1-1		W-51-1	WATE	W5 E

Note 1: The symbol of "--" in the table which means not application.

Note 2: For the test data above 1 GHz, According the ANSI C63.10-2013, where limits are specified for both average and peak (or quasi-peak) detector functions, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement.

Note 3: The low frequency, which started from 9 kHz to 30 MHz, was pre-scanned and the result which was 20 dB

lower than the limit line per 15.31(o) was not reported.

Note 4: The EUT is working in the Normal link mode below 1 GHz. All modes have been tested and normal link mode is worst.

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Report No.: WSCT-ANAB-R

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



ANAB
ANSI National Accreditation Board
A C C R E D I T E D
ESCRIPTION
OF THE TIME LABORATORY

Report No.: WSCT-ANAB-R&E241000050A-BT

6.10.2. Test Data

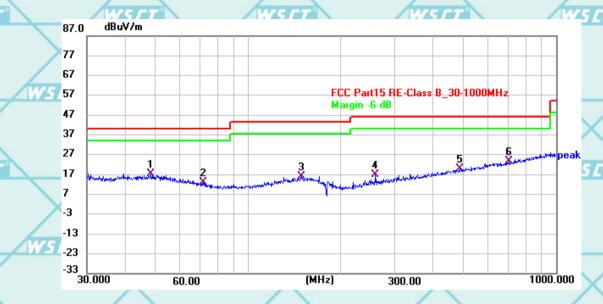
Please refer to following diagram for individual

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Below 1GHz



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No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	SET
1	48.4378	36.34	-18.99	17.35	40.00	-22.65	QP	
2	71.7376	35.67	-22.52	13.15	40.00	-26.85	QP	
-3	149.0278	35.52	-19.42	16.10	43.50	-27.40	QP	_/
4	259.6887	38.72	-21.59	17.13	46.00	-28.87	QP	Y
5	490.5296	35.46	-15.69	19.77	46.00	-26.23	QP	
6 *	703.3007	35.74	-12.09	23.65	46.00	-22.35	QP	SET

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WSE

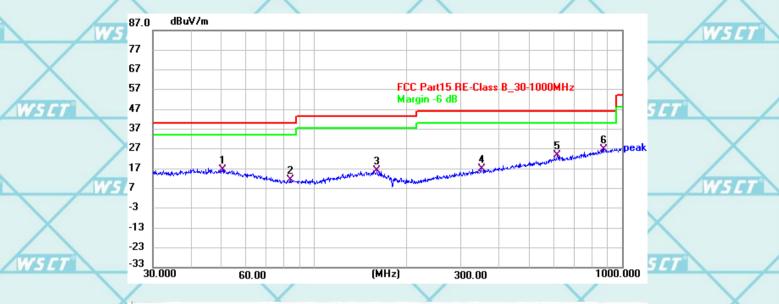






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Report No.: WSCT-ANAB-R&E241000050A-BT Vertical:



	No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	
	1	50.6082	35.64	-18.98	16.66	40.00	-23.34	QP	İ
İ	2	83.8891	35.12	-23.91	11.21	40.00	-28.79	QP	İ
1	3	160.6271	35.74	-19.66	16.08	43.50	-27.42	QP	t
-	4	349,2500	36.11	-19.05	17.06	46.00	-28.94	QP	Ī
×	5	616.6420	36.95	-13.29	23.66	46.00	-22.34	QP	İ
	6 *	872.9481	36.70	-9.95	26.75	46.00	-19.25	QP	Ī

Note1:

Freq. = Emission frequency in MHz

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

Corr. Factor (dB) = Antenna factor + Cable loss - Amplifier factor.

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

Limit (dBµV) = Limit stated in standard

Margin (dB) = Measurement (dB μ V) – Limits (dB μ V)

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Above 1GHz

WSEI

Note 1: The marked spikes near 2400 MHz with circle should be ignored because they are Fundamental

Note 2: The spurious above 18G is noise only, do not show on the report.

GFSK

Low channel: 2402MHz

Horizontal:



Su	sputed Data Lis	t								
N	o. Freq. [MHz]	Reading [dB(uV)]	Factor [dB]	Level [dB(uV)]	Limit [dB]	Margin [dB]	Deg [°]	Polarity	Trace	Verdict
1	2435.6250	49.36	7.69	41.67	74	-24.64	-0.1	Horizontal	PK	Pass
1	2435.6250	37.23	7.69	29.54	54	-16.77	-0.1	Horizontal	AV	Pass
2	3418.7500	49.44	9.46	39.98	74	-24.56	192.2	Horizontal	PK	Pass
2	3418.7500	36.88	9.46	27.42	54	-17.12	192.2	Horizontal	AV	Pass
3	5695.6250	56.62	21.26	35.36	74	-17.38	321.3	Horizontal	PK	Pass
3	5695.6250	46.95	21.26	25.69	54	-7.05	321.3	Horizontal	AV	Pass
4	10719.0000	44.13	39.11	5.02	74	-29.87	220.5	Horizontal	PK	Pass
4	10719.0000	36.58	39.11	-2.53	54	-17.42	220.5	Horizontal	AV	Pass
5	13635.0000	48.08	40.55	7.53	74	-25.92	313.8	Horizontal	PK	Pass
5	13635.0000	41.55	40.55	1	54	-12.45	313.8	Horizontal	AV	Pass
6	17998.5000	52.92	46.49	6.43	74	-21.08	225.3	Horizontal	PK	Pass
6	17998.5000	46.67	46.49	0.18	54	-7.33	225.3	Horizontal	AV	Pass

	WSET	WSCT	WSET	WSCT	WSET
X			X	X	X

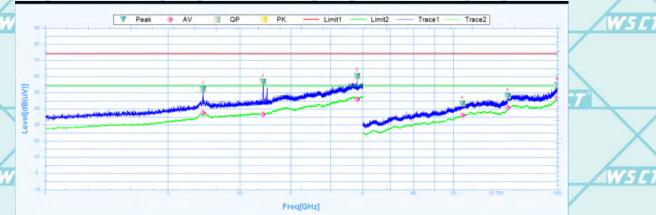






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Vertical:



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Suspi	uted Data Lis	t.							-	
NO.	Freq. [MHz]	Reading [dB(uV)]	Factor [dB]	Level [dB(uV)]	Limit [dB]	Margin [dB]	Deg [°]	Polarity	Trace	Verdict
1	2436.8750	52.34	7.7	44.64	74	-21.66	16.5	Vertical	PK	Pass
1	2436.8750	37.41	7.7	29.71	54	-16.59	16.5	Vertical	AV	Pass
2	3418.7500	56.72	9.46	47.26	74	-17.28	195.8	Vertical	PK	Pass
2	3418.7500	36.72	9.46	27.26	54	-17.28	195,8	Vertical	AV	Pass
3	5811.2500	60.33	20.76	39.57	74	-13.67	52.2	Vertical	PK	Pass
3	5811.2500	45.82	20.76	25.06	54	-8.18	52.2	Vertical	AV	Pass
4	10530.0000	43.25	38.84	4.41	74	-30.75	4.2	Vertical	PK	Pass
4	10530.0000	35.89	38.84	-2.95	54	-18.11	4.2	Vertical	AV	Pass
5	13614.0000	47.93	40.5	7.43	74	-26.07	299.2	Vertical	PK	Pass
5	13614.0000	40.86	40.5	0.36	54	-13.14	299.2	Vertical	AV	Pass
6	17992.5000	54.75	46.45	8.3	74	-19.25	98.4	Vertical	PK	Pass
6	17992.5000	46.76	46.45	0.31	54	-7.24	98.4	Vertical	AV	Pass

W5 ET

W5 C1

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ation& Test W5 [1







Report No.: WSCT-ANAB-R&E241000050A-BT

Middle channel: 2440MHz

Horizontal:

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Susputed Data List Freq. [MHz] Level [dB(uV)] Reading Factor Margin Limit Deg Polarity Verdict [dB(uV)] [dB] [dB] [dB] 2479.3750 46.35 7.84 38.51 74 -27.65 292.6 Horizontal PK Pass 2479.3750 37.29 7.84 29.45 54 -16.71 292.6 Pass Horizontal ΑV 4392.5000 52.61 13.76 38.85 74 -21.39 338.9 PK Pass 4392.5000 41.71 13.76 27.95 54 -12.29 338,9 AV Pass Horizontal 5744.3750 71.57 21.15 50.42 74 -2.43 159.9 Horizontal PK 5744.3750 46.66 21.15 25.51 54 -7.34 159.9 Horizontal ΑV Pass 10980.0000 45.16 39.47 5.69 74 -28.84 1.5 Horizontal PK Pass 4 10980.0000 37.15 39.47 -2.32 54 -16.85 1.5 Horizontal ΑV Pass 13977.0000 49.51 41.44 8.07 74 -24.49 8 Horizontal PK Pass 13977.0000 42.07 41.44 0.63 54 -11.93 8 Horizontal AV Pass 17998.5000 53.89 46.49 7.4 74 -20.11 231.2 Horizontal PK Pass 6 17998.5000 46.61 0.12 54 46.49 -7.39231.2 Horizontal AV Pass

WSET WSET WSET WSET

WSGT WSGT WSGT

WSET WSET WSET WSET

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W5 ET



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Vertical:



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Suspi	Susputed Data List										
NO.	Freq. [MHz]	Reading [dB(uV)]	Factor [dB]	Level [dB(uV)]	Limit [dB]	Margin [dB]	Deg [°]	Polarity	Trace	Verdict	
1	2425.6250	46.95	7.66	39.29	74	-27.05	162.3	Vertical	PK	Pass	
1	2425.6250	36.22	7.66	28.56	54	-17.78	162.3	Vertical	AV	Pass	
2	3436.2500	59.85	9.49	50.36	74	-14.15	188.6	Vertical	PK	Pass	
2	3436.2500	37.37	9.49	27.88	54	-16.63	188.6	Vertical	AV	Pass	
3	5753.1250	68.36	21.1	47.26	74	-5.64	40.4	Vertical	PK	Pass	
3	5753.1250	46.69	21.1	25.59	54	-7.31	40.4	Vertical	AV	Pass	
4	9631.5000	39.42	37.84	1.58	74	-34.58	273	Vertical	PK	Pass	
4	9631.5000	32.9	37.84	-4.94	54	-21.1	273	Vertical	AV	Pass	
5	11941.5000	46.43	38.65	7.78	74	-27.57	273	Vertical	PK	Pass	
5	11941.5000	38.15	38.65	-0.5	54	-15.85	273	Vertical	AV	Pass	
6	17976.0000	53.26	46,34	6.92	74	-20.74	208.6	Vertical	PK	Pass	
6	17976.0000	46.52	46,34	0.18	54	-7.48	208.6	Vertical	AV	Pass	

W5 ET

W5 CT W5E

W5 ET

W5E7

Page 71

WS ET

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W5 [1







Report No.: WSCT-ANAB-R&E241000050A-BT

High channel: 2480MHz

17947.5000

46.15

46.15

Horizontal:

Peak AV OP PK Limit1 Limit2 Trace1 Trace2

Freq[GHz]

54

-7.85

1.4

Horizontal

AV

Pass

Susputed Data List Freq. [MHz] Level [dB(uV)] Reading Factor Margin Deg Polarity Verdict [dB(uV)] [dB] [dB] 2438.1250 48.8 7.7 41.1 -25.2 -0.1 PK Pass 74 Horizontal 2438.1250 37.6 7.7 29.9 54 -16.4 -0.1 Horizontal AV Pass 3455.6250 56.47 9.53 46.94 74 -17.53 3.4 PK Pass 2 Horizontal 37.29 27.76 -16.71 2 3455.6250 9.53 54 3.4 Horizontal AV Pass 5949.3750 57.57 22.04 35.53 74 -16.43 321.2 PK 3 Horizontal Pass 5949.3750 47.26 22.04 25.22 54 -6.74 321.2 AV Pass Horizontal 4 10543.5000 43.72 38.86 4.86 74 -30.28 54.2 PK Horizontal Pass 4 10543.5000 36.01 38.86 -2.85 54 -17.99 54.2 Horizontal AV Pass 13665.0000 48.29 40.63 7.66 74 -25.71 301.7 Horizontal PK Pass 13665.0000 41.3 40.63 0.67 54 -12.7 301.7 Horizontal AV Pass 17947.5000 53.81 46.15 7.66 74 -20.19 1.4 PK Pass 6 Horizontal

WSCT WSCT WSCT WSCT

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WSU WSU WSU

WSET WSET WSET WSET

WSET WSET WSET

WSET WSET WSET

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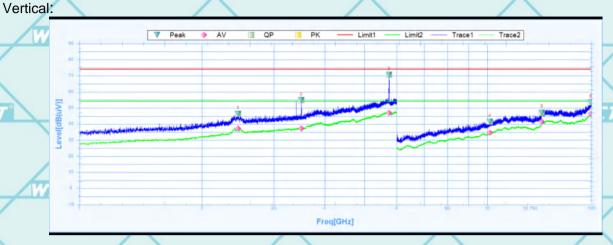
WSET







Report No.: WSCT-ANAB-R&E241000050A-BT



Suspu	ited Data Lis	t				-				
NO.	Freq. [MHz]	Reading [dB(uV)]	Factor [dB]	Level [dB(uV)]	Limit [dB]	Margin [dB]	Deg [°]	Polarity	Trace	Verdict
1	2448.7500	46.38	7.74	38.64	74	-27.62	0	Vertical	PK	Pass
1	2448.7500	37.24	7.74	29.5	54	-16.76	0	Vertical	AV	Pass
2	3504.3750	54.96	9.67	45.29	74	-19.04	103.8	Vertical	PK	Pass
2	3504.3750	37.29	9.67	27.62	54	-16.71	103.8	Vertical	AV	Pass
3	5744.3750	70.67	21.15	49.52	74	-3.33	0	Vertical	PK	Pass
3	5744.3750	47.01	21.15	25.86	54	-6.99	0	Vertical	AV	Pass
4	10150.5000	41.48	38.31	3.17	74	-32.52	89	Vertical	PK	Pass
4	10150.5000	34.73	38.31	-3.58	54	-19.27	89	Vertical	AV	Pass
5	13617.0000	47.1	40.5	6.6	74	-26.9	245.6	Vertical	PK	Pass
5	13617.0000	41.51	40.5	1.01	54	-12.49	245.6	Vertical	AV	Pass
3	17961.0000	53.34	46.24	7.1	74	-20.66	53.1	Vertical	PK	Pass
6	17961.0000	46.29	46.24	0.05	54	-7.71	53.1	Vertical	AV	Pass

Note: /5

- The emission levels of other frequencies are very lower than the limit and not show in test report.
- Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.
- Data of measurement shown "---"in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.
- Measurements were conducted in all three modulation (GFSK, Pi/4 DQPSK, 8DPSK), and the worst case Mode (GFSK) was submitted only.
 - 5. EUT has been tested in unfolded states, and the report only reflects data in the unfolded state (worst-case scenario)

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