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TEST REPORT

FCC ID: 2ADYY-K16SDA

Product: Laptop Computer

Model No.: K16SDA

Trade Mark: TECNO

Report No.: WSCT-A2LA-R&E240300014A-BT

Issued Date: 06 June 2024

Issued for:

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.
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Note: The results contained in this report pertain only to the tested sample. This report shall not be reproduced, except in full, without written approval of World Standardization Certification & Testing Group(Shenzhen) Co., Ltd. This report must not be used by the client to claim product certification, approval, or any agency of the U.S. Government.

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Certificate #5768.01

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Report No.: WSCT-A2LA-R&E240300014A-BT







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1. Test Certification

Product:

Laptop Computer

Model No .:

K16SDA

Additional

TECNO

Applicant:

TECNO MOBILE LIMITED

Address:

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

SHAN MEI STREET FOTAN NT HONGKONG

Manufacturer:

TECNO MOBILE LIMITED

Address:

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

SHAN MEI STREET FOTAN NT HONGKONG

Date of Test:

09 April 2024 to 05 June 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.

Tested By:

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Checked By:

N O rezul

(Wang Xiang)

(Mo Peiyun)

Approved By:

(Liu Fuxin)

Date:

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(Liu ruxin)

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2. Test Result Summary

	AUZTA AUZTA	THE PARTY OF THE P	AVET HE
7	Requirement	CFR 47 Section	Result
	Antenna Requirement	§15.203/§15.247 (c)	PASS
	AC Power Line Conducted Emission	§15.207	PASS
	Conducted Peak Output Power	§15.247 (b)(1) §2.1046	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)	PASS
7	Dwell Time	§15.247 (a)(1)	PASS
1	Radiated Emission	§15.205/§15.209 §2.1053, §2.1057	PASS
	Band Edge	§15.247(d) §2.1051, §2.1057	PASS
		The state of the s	A LOUIS AND

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.

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3. EUT Description

Product Name:	Laptop Computer W5///
Model:	K16SDA
Trade Mark:	TECNO
Operation Frequency:	2402MHz~2480MHz
Channel Separation:	1MHz
Number of Channel:	79
Modulation Type:	GFSK, π/4-DQPSK, 8-DPSK
Modulation Technology:	FHSS W5147
Antenna Type:	FPC Antenna
Antenna Gain:	3.52dBi
Rechargeable Li-Polymer Battery:	Model: K16S Nominal Voltage: 11.55V Rated Capacity: 6060mAh Rated nergy: 70.00Wh Limited Charge Voltage: 13.2V
Adapter:	Adapter: E065-1R200325VU Input: 100-240V~,50/60Hz,1.5A Output: 20.0V3.25A
Remark:	N/A.



WATER AVAILABLE

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Operation Frequency e	ach of channel for G	FSK, π/4-DQPSK, 8DPSK
------------------------------	----------------------	-----------------------

7	Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
	0	2402MHz	20	2422MHz	40	2442MHz	60	2462MHz
	1	2403MHz	21	2423MHz	41	2443MHz	61	2463MHz
		ATTEN		17/19	/	17490		ATTEST OF
	10	2412MHz	30	2432MHz	50	2452MHz	70	2472MHz
	11	2413MHz	31	2433MHz	51	2453MHz	71	2473MHz
							-	
7	18	2420MHz	38	2440MHz	58	2460MHz	78	2480MHz
	19	2421MHz	39	2441MHz	59	2461MHz		

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

	VI-19	WATER	VI-14	17279	WETTER
A77.57.5					777
	VI-10 0	WASTER	NVET 4	WESTER	WETH
VI FI					19.0
	NV5191	WETGE	N/FIG.	WETGE	MEIGI
NIE 91		AVI S			
	X	TVATA A	N/ATO	W/65191	NISTON
1	stication & Testing		/		1

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4. Genera Information

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
ATTENDED TO THE PARTY OF THE PA	by select channel and modulations with 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.

4.2. 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	Adapter	1	1	ADAPTER

Note:

- 1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
- 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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5. Facilities and Accreditations

5.1. Facilities

All measurement facilities used to collect the measurement data are located at Building A-B, Baoshi Science & Technology Park, Baoshi Road, Bao'an District, Shenzhen, Guangdong, China of the World Standardization Certification & Testing Group(Shenzhen) CO., LTD

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.

A2LA - Certificate Number: 5768.01

The EMC Laboratory has been accredited by the American Association for Laboratory Accreditation (A2LA). Certification Number: 5768.01



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5.3. Measurement Uncertainty

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The reported uncertainty of measurement $y \pm U$, 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 %.

	No.	Item	MU
100	1	Conducted Emission Test	±3.2dB
	2	RF power, conducted	±0.16dB
	3	Spurious emissions, conducted	±0.21dB
7	4	All emissions, radiated(<1GHz)	±4.7dB
	5	All emissions, radiated(>1GHz)	±4.7dB
	6	Temperature W597	±0.5°C
	7	Humidity	±2.0%

	MATERIA	WATER	N/SI4	WESTER	NET 4
N. K.	7787				5101
	775191	WHITE	NVF14	NIF1 a	WESTER
NVE	AT ATTE				-14
	WEIGH	Witte	WET OF THE	WATER	Wister
NVE	AV S				5100
	X	WATER	WESTER	N/65191	N/FT#
	Setting Gages				X

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5.4. MEASUREMENT INSTRUMENTS

J.T. WILAGO	KLWILITINGTI	COVILIATO			www.ws	ct-c
NAME OF EQUIPMENT	MANUFACTURER	MODEL	SERIAL NUMBER	Calibration Date	Calibration Due.	Z
Test software		EZ-EMC	CON-03A	-	X	
Test software	- 1	MTS8310	1747	- 1	ATHE	
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	7
Universal Radio Communication Tester	R&S	CMU 200	1100.0008.02	11/05/2023	11/04/2024	
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	
Pre Amplifier	H.P.	HP8447E	2945A02715	11/05/2023	11/04/2024	Z
Pre-Amplifier	CDSI	PAP-1G18-38		11/05/2023	11/04/2024	
Bi-log Antenna	SUNOL Sciences	JB3	A021907	11/05/2023	11/04/2024	
9*6*6 Anechoic	S	FIFE	AVETER	11/05/2023	11/04/2024	
Horn Antenna	COMPLIANCE ENGINEERING	CE18000		11/05/2023	11/04/2024	1
Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-631	11/05/2023	11/04/2024	
Cable	TIME MICROWAVE	LMR-400	N-TYPE04	11/05/2023	11/04/2024	ě
System-Controller	ccs	N/A	N/A	N.C.R	N.C.R	
Turn Table	ccs	N/A	N/A	N.C.R	N.C.R	
Antenna Tower	ccs	N/A	N/A	N.C.R	N.C.R	t
RF cable	Murata	MXHQ87WA300 0	-	11/05/2023	11/04/2024	
Loop Antenna	EMCO	6502	00042960	11/05/2023	11/04/2024	7
Horn Antenna	SCHWARZBECK	BBHA 9170	1123	11/05/2023	11/04/2024	
Power meter	Anritsu	ML2487A	6K00003613	11/05/2023	11/04/2024	
Power sensor	Anritsu	MX248XD	AUSTEI	11/05/2023	11/04/2024	
Spectrum Analyzer	Keysight	N9010B	MY60241089	11/05/2023	11/04/2024	\
			No.			



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6. Test Results and Measurement Data

6.1. Antenna requirement

Standard requirement:

FCC Part15 C Section 15.203 /247(c)

15.203 requirement:

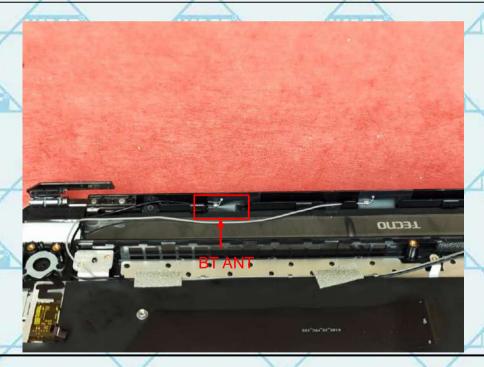
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit 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 3.52dBi.





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Conducted Emission 6.2.

6.2.1. Test Specification	
Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.10:2014
Frequency Range:	150 kHz to 30 MHz
Receiver setup:	RBW=9 kHz, VBW=30 kHz, Sweep time=auto
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
	Reference Plane
Test Setup:	40cm 80cm LISN Filter AC power
NIETE AVETE	Receiver Remark: E.U.T. Equipment Under Test LISN: Line Impedence Stabilization Network Test table height=0.8m
Test Mode:	Refer to item 4.1
WISET	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:	 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). Poth sides of A.C. line are absolved for maximum.
ation & Testino	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:	PASS

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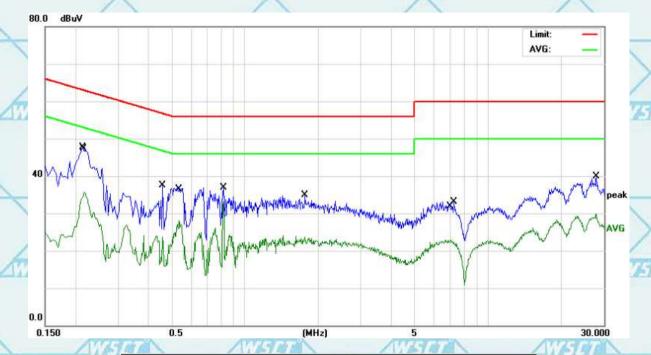
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6.2.2. Test data

Please refer to following diagram for individual Adapter (the worst case)

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



	No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
			MHz	dBuV	dB	dBuV	dBuV	dB	Detector
	1		0.2140	37.28	10.45	47.73	63.04	-15.31	QP
	2		0.2180	25.28	10.45	35.73	52.89	-17.16	AVG
5	3		0.4580	26.95	10.51	37.46	56.73	-19.27	QP
/	4		0.5340	17.63	10.52	28.15	46.00	-17.85	AVG
5	5		0.8139	26.36	10.54	36.90	56.00	-19.10	QP
	6	*	0.8139	22.54	10.54	33.08	46.00	-12.92	AVG
	7		1.7580	12.98	10.67	23.65	46.00	-22.35	AVG
	8		1.7660	24.28	10.67	34.95	56.00	-21.05	QP
	9		7.0540	12.14	10.78	22.92	50.00	-27.08	AVG
	10		7.2420	22.28	10.78	33.06	60.00	-26.94	QP
1	11		27.8860	28.72	11.17	39.89	60.00	-20.11	QP
,	12		27.8860	18.69	11.17	29.86	50.00	-20.14	AVG



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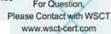


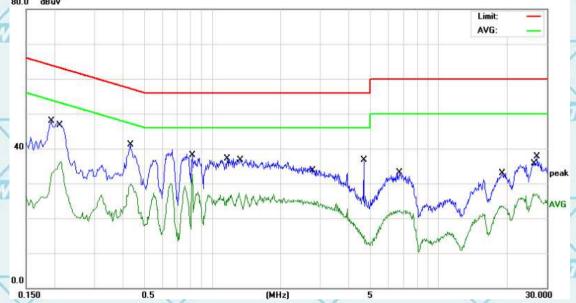


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Certificate #5768.01

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





	No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
			MHz	dBuV	dB	dBuV	dBuV	dB	Detector
	1		0.1940	37.39	10.45	47.84	63.86	-16.02	QP
	2		0.2140	25.85	10.45	36.30	53.04	-16.74	AVG
ć	3		0.4340	30.62	10.50	41.12	57.18	-16.06	QP
ĺ	4	*	0.8139	22.08	10.54	32.62	46.00	-13.38	AVG
	5		1.1620	26.61	10.58	37.19	56.00	-18.81	QP
	6		1.3140	16.64	10.60	27.24	46.00	-18.76	AVG
	7		2.7980	14.25	10.72	24.97	46.00	-21.03	AVG
ĺ	8		4.6540	26.03	10.74	36.77	56.00	-19.23	QP
	9		6.7300	22.32	10.77	33.09	60.00	-26.91	QP
	10		19.0860	12.49	11.08	23.57	50.00	-26.43	AVG
	11		26.3260	15.96	11.14	27.10	50.00	-22.90	AVG
	12		27.1700	26.57	11.16	37.73	60.00	-22.27	QP
ı									

Note1:

Freq. = Emission frequency in MHz

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

Corr. Factor (dB) = Antenna 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 μ V) – Limits (dB μ 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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6.3. Conducted Output Power

6.3.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.247 (b)(3)		
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.		
Test Setup:	Spectrum Analyzer EUT		
Test Mode:	Transmitting mode with modulation		
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 PASS		











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6.3.2. Test Data

>	GFSK mode					
	Test channel	Peak Output Power (dBm)	Limit (dBm)	Result		
	Lowest	16	20.97	PASS		
	Middle	15.94	20.97	PASS		
	Highest	15.65	20.97	PASS		

	Alleran	201122222	7.3 3.30	2 of all all 2	
Pi/4DQPSK mode					
	Test channel	Peak Output Power (dBm)	Limit (dBm)	Result	
b	Lowest	17.31	20.97	PASS	
	Middle	11.49	20.97	PASS	
	Highest	11.3	20.97	PASS	

r		MARIE TO THE STATE OF THE PARTY	C. J. Standard Standard	the state of the s	
8DPSK mode					
	Test channel	Peak Output Power (dBm)	Limit (dBm)	Result	
	Lowest	12.14	20.97	PASS	
	Middle	11.9	20.97	PASS	
	Highest	11.7	20.97	PASS	

Test plots as follows:

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GFSK Modulation

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May 31, 2024 9:58:54 AM

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Span 10.00 MHz Sweep 1.33 ms (10001 pts)

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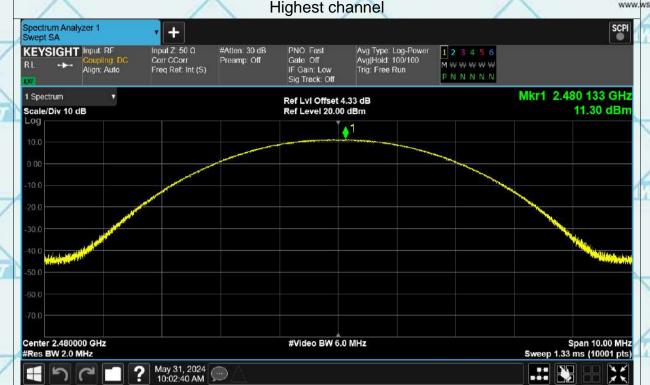
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Center 2.480000 GHz #Res BW 2.0 MHz

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Span 10.00 MHz Sweep 1.33 ms (10001 pts)

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AVETON AVETON AVETON

#Video BW 6.0 MHz

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6.4. 20dB Occupy Bandwidth

6.4.1. Test Specification

	Test Requirement:	FCC Part15 C Section 15.247 (a)(1)	
	Test Method:	ANSI C63.10:2014	c
	Limit:	N/A	
7	Test Setup:	Spectrum Analyzer EUT	
	Test Mode:	Transmitting mode with modulation	
	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. 	The Part of the Pa
	Test Result:	PASS	



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6.4.2. Test data

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Test channel	-20dB Occupy Bandwidth (MHz)					
rest channel	GFSK	π/4-DQPSK	8DPSK	Conclusion		
Lowest	0.959	1.368	1.347	PASS		
Middle	0.953	1.367	1.347	PASS		
Highest	0.951	1.367	1.349	PASS		

	Highest	0.951	1.367	1.349	PASS	
Te	st plots as follows:	WATER	W-7-97		15191	WETER
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	WEST OF THE SECOND	WHO	WEIGH		7319	WHAT
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	VF191	Western .	11111		(F) 4 6	75188
VI5141	WESTER	Wist		V/5101	\(\text{V}(4)	
	1/5/94	WESTER .	77579.0		1/5/4/	VI65191
VIE 191	WASTER	77.65		WATER	NE STATE	
	X	1759.0	VI-191		7/5/4/	77/5741
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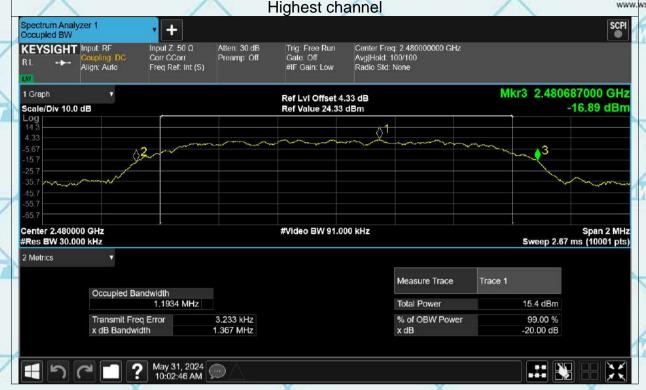
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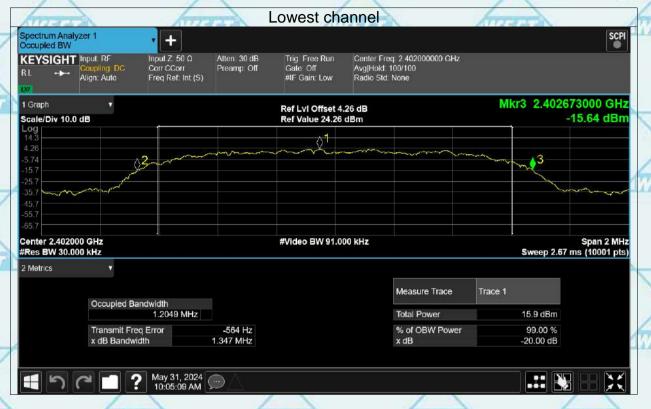


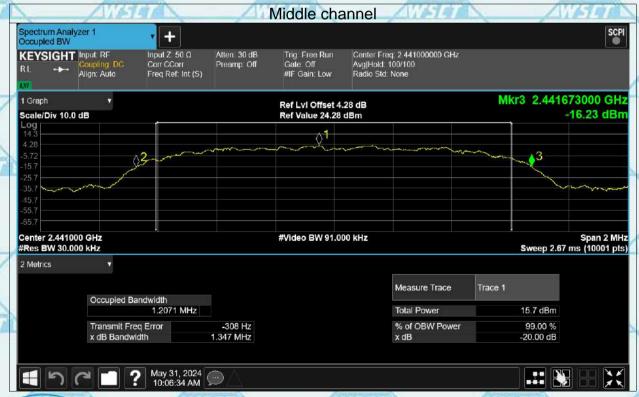
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-245 Hz

1.349 MHz





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Transmit Freq Error

May 31, 2024 10:07:35 AM

x dB Bandwidth



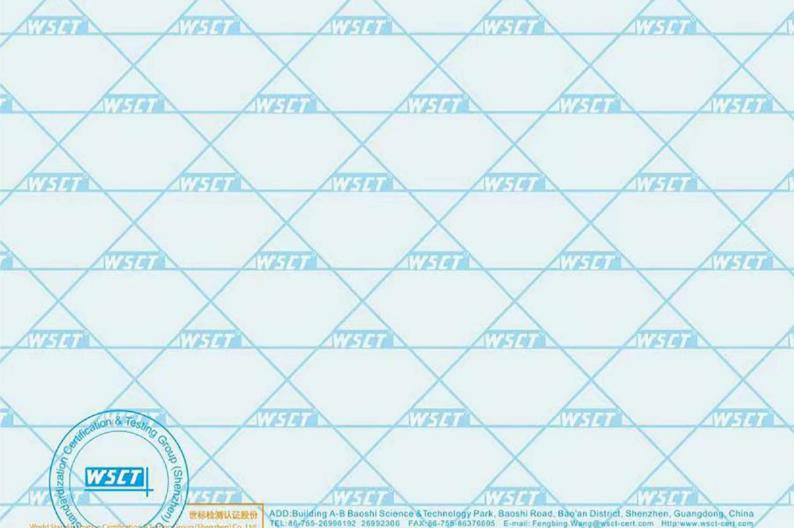
% of OBW Power

x dB

99.00 %

-20.00 dB

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6.5. Carrier Frequencies Separation

6.5.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2014
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.
Test Setup:	Spectrum Analyzer EUT
Test Mode:	Hopping mode
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.
Test Result:	PASS



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6.5.2. Test data

	GFSK mode					
6	Test channel Carrier Frequencies Separation (MHz)		Limit (MHz)	Result		
2	Lowest	0.916	2/3*20dB BW	PASS		
	Middle	0.984	2/3*20dB BW	PASS		
6	Highest	0.988	2/3*20dB BW	PASS		

	Pi/4 DQPSK mode					
Test channel		Carrier Frequencies Separation (MHz)	Limit (MHz)	Result		
	Lowest	1.144	2/3*20dB BW	PASS		
	Middle	1.006	2/3*20dB BW	PASS		
	Highest	0.854	2/3*20dB BW	PASS		

	8DPSK mode			
	Test channel	Carrier Frequencies Separation (MHz)	Limit (MHz)	Result
	Lowest	1.024	2/3*20dB BW	PASS
	Middle	1.162	2/3*20dB BW	PASS
7	Highest	1.19	2/3*20dB BW	PASS

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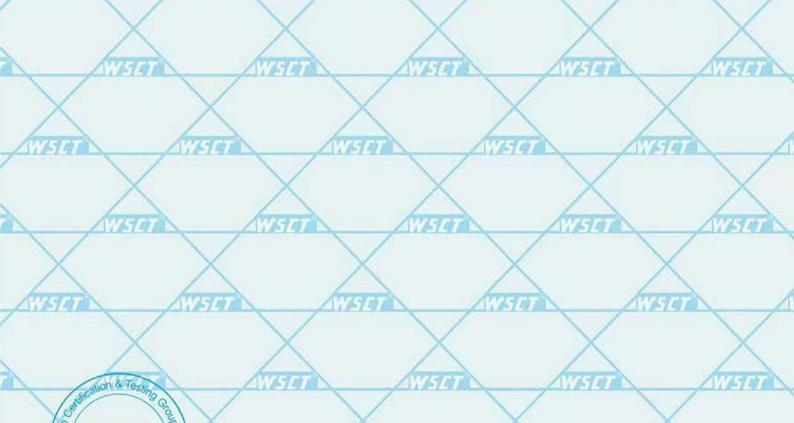
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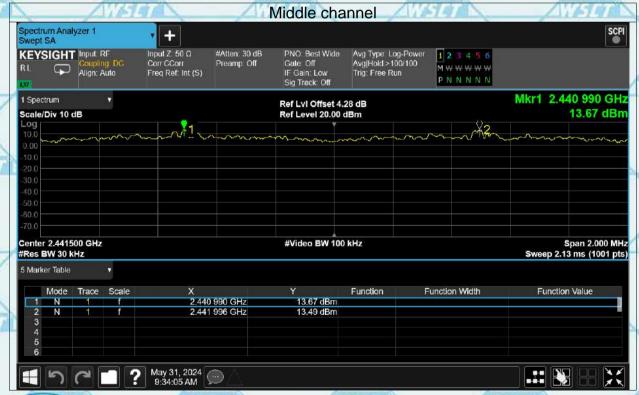
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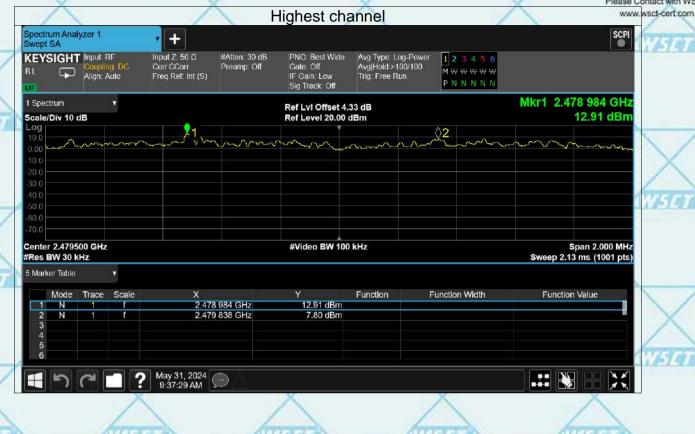


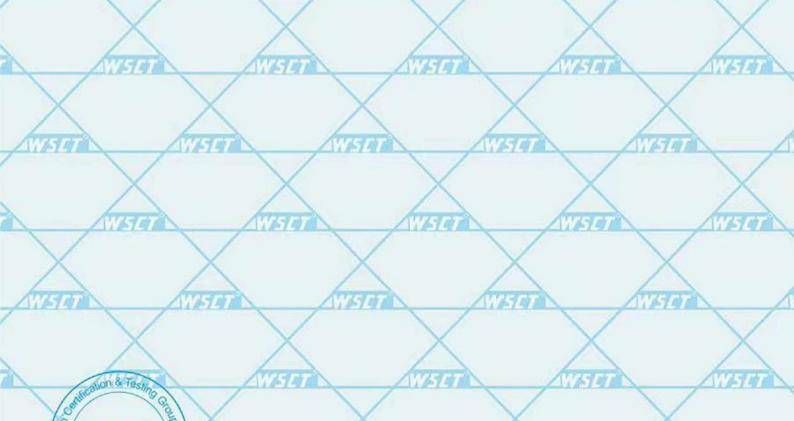
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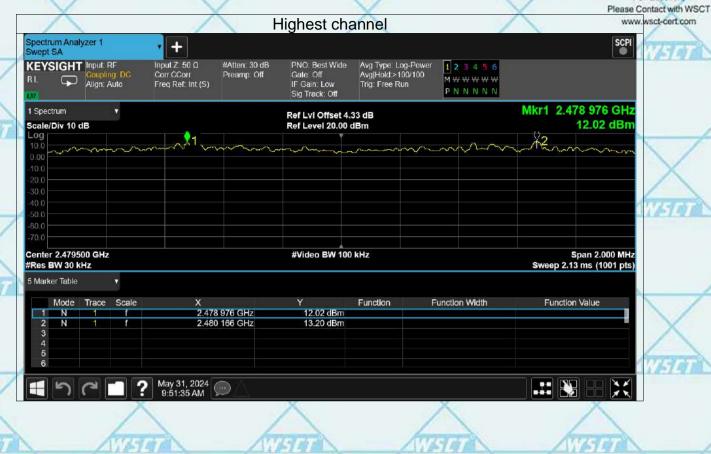


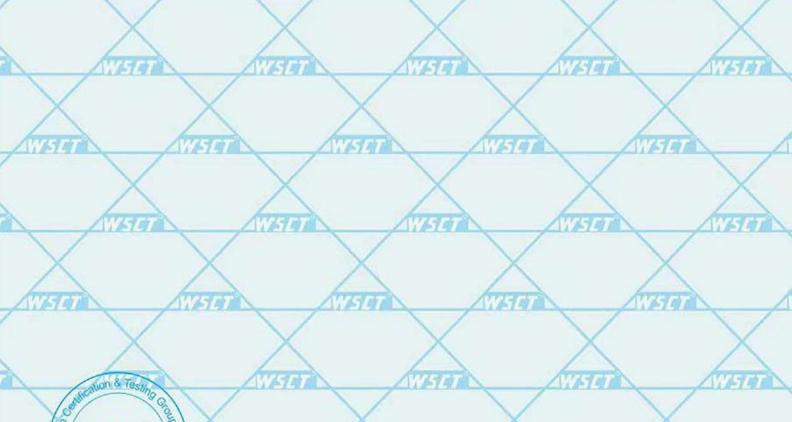
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6.6. Hopping Channel Number

6.6.1. Test Specification

FCC Part15 C Section 15.247 (a)(1)
ANSI C63.10:2014
Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.
Spectrum Analyzer EUT
Hopping mode
 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. 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.
PASS



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Limit





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Mode

6.6.2. Test data

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Result

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X	GFSK, P/4-DQPSK, 8DPS	5K 79	15	PASS	
ATHIA	Test plots as follows:	ATT TO THE REAL PROPERTY.	WHA	AVETO	
	\times	$\langle \rangle$	\times		X
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	λ	\searrow	X		X
	AVE	AWA	Wista		F74M
VISTA II	WEIGH	VI651916	WEIGT	1679.0	,
711-191		X	X		X
	NVETE AVET	WETS	W/5/9		F140
X	X	X	X	X	
11794	Water	NV5197	17214	WASTON	$\overline{}$
<u>.</u>		X	X		X
South	wing & Testing God Book Book Book Book Book Book Book Bo	W-71	WSI		7-744
ardizati	Shenzi	N75193	WATER	17274	1
World Star Saultzet	世际检算以证数份 ADD: TEL:8	Building A-B Baoshi Science & Techno 6 755-26996192 26992306 FAX 66 75	ology Park, Baoshi Road, Bao'an Dis 5-86376605 E-mail: Fengbing Wang@y	trict, Shenzhen, Guangdong sct-cert.com Http://www.wsct-	China cert com

Hopping channel

numbers

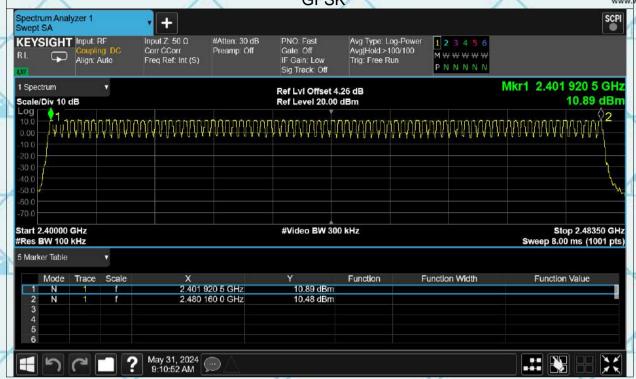


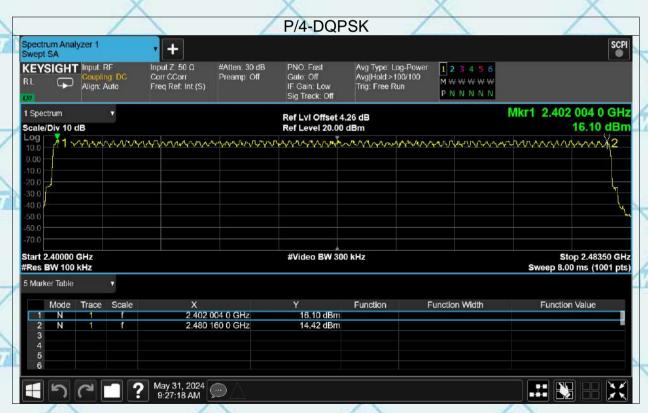




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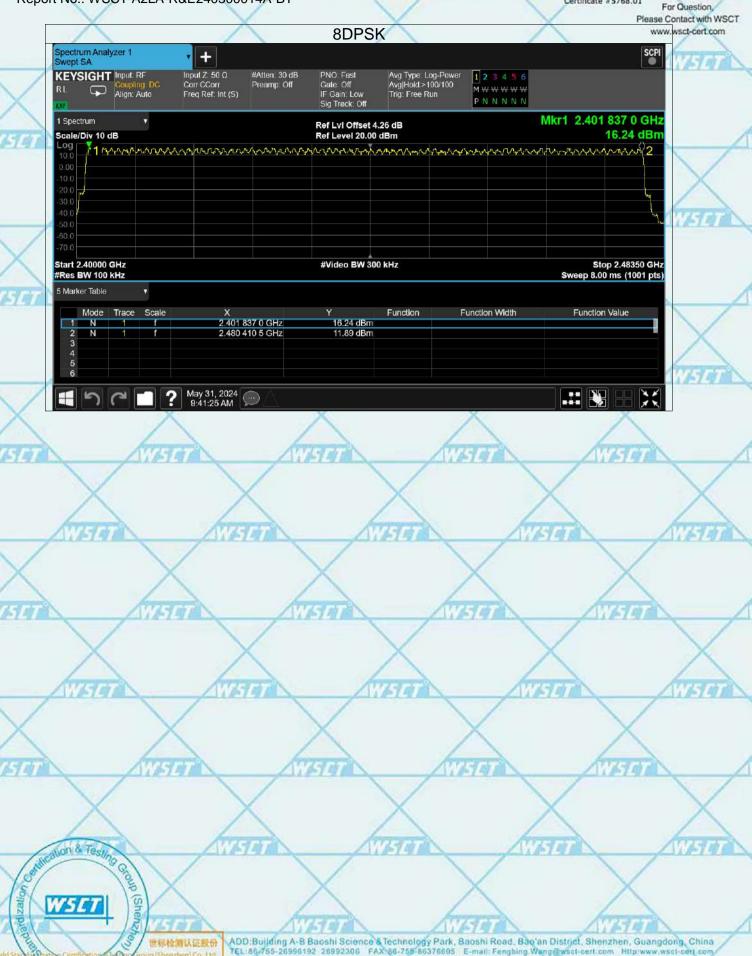




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6.7. Dwell Time

6.7.1. Test Specification

	Test Requirement:	FCC Part15 C Section 15.247 (a)(1)
	Test Method:	ANSI C63.10:2014
	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.
	Test Setup:	Spectrum Analyzer EUT
	Test Mode:	Hopping mode
	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.
	Test Result:	PASS
L	Validation (Validation)	Account to the second











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6.7.2. Test Data

								1.
	Mode	Frequency (MHz)	Pulse Time (ms)	Total Dwell Time (ms)	Burst Count	Period Time (ms)	Limit (ms)	Verdict
	1-DH1	2402	0.383	121.794	318	31600	400	Pass
_	1-DH1	2441	0.383	121.794	318	31600	400	Pass
n	1-DH1	2480	0.383	121.794	318	31600	400	Pass
	1-DH3	2402	1.639	252.406	154	31600	400	Pass
	1-DH3	2441	1.639	242.572	148	31600	400	Pass
1	1-DH3	2480	1.639	260.601	159	31600	400	Pass
	1-DH5	2402	2.887	306.022	106	31600	400	Pass
	1-DH5	2441	2.886	326.118	113	31600	400	Pass
	1-DH5	2480	2.887	285.813	99	31600	400	Pass

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 (0.4×79) (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 (0.4×79) (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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Certificate #5768.01 For Question





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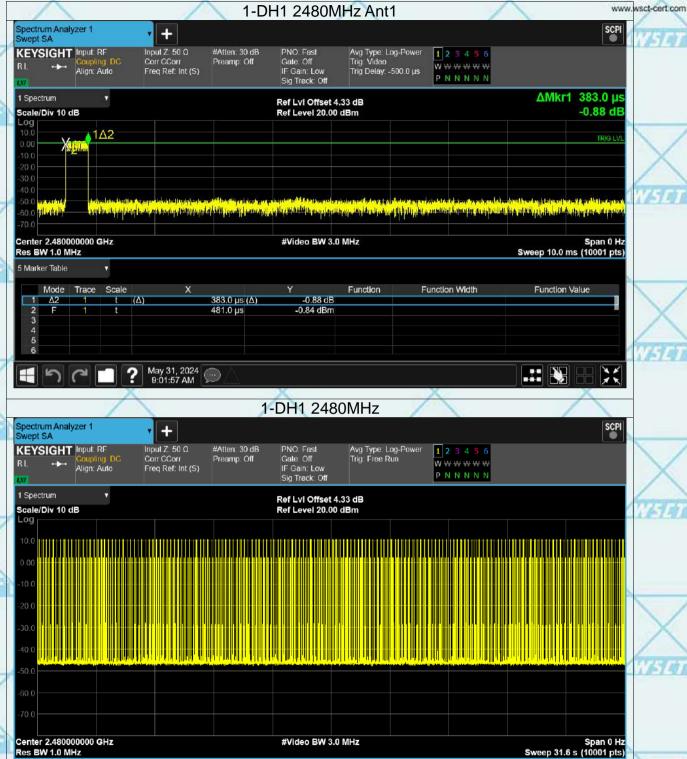






Report No.: WSCT-A2LA-R&E240300014A-BT







May 31, 2024 9:02:30 AM



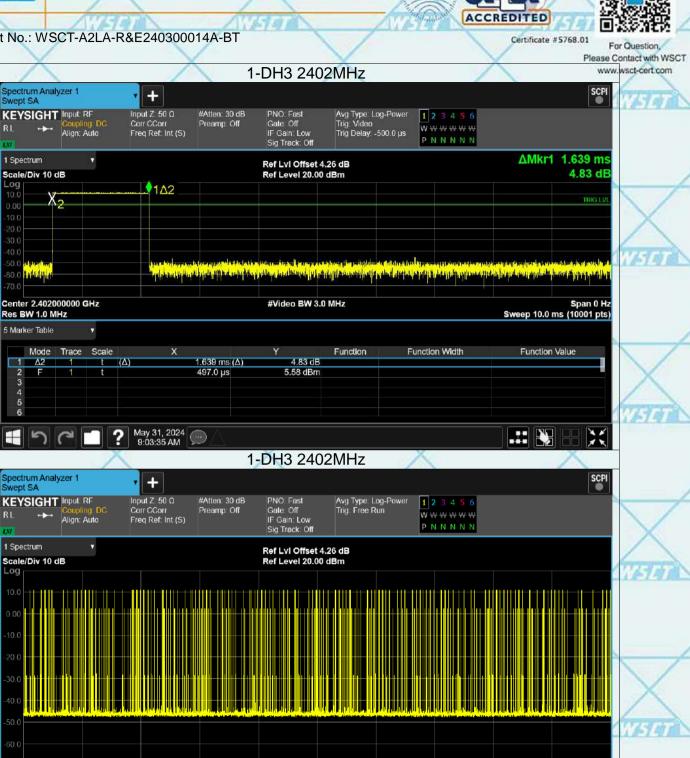
Log

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Center 2.402000000 GHz

May 31, 2024 9:04:08 AM

Res BW 1.0 MHz

#Video BW 3.0 MHz

Span 0 Hz Sweep 31.6 s (10001 pts)









Report No.: WSCT-A2LA-R&E240300014A-BT







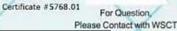








Report No.: WSCT-A2LA-R&E240300014A-BT









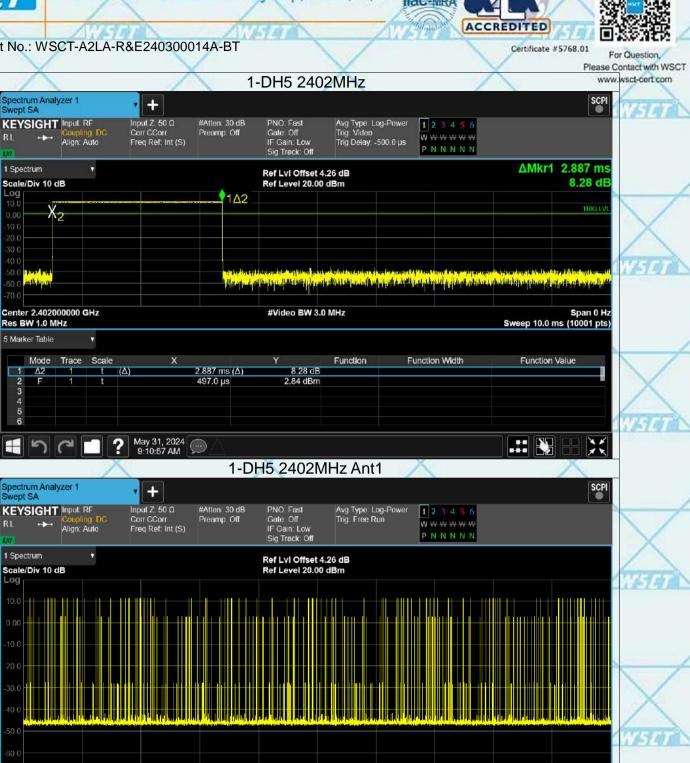
Log

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Center 2.402000000 GHz

May 31, 2024 9:11:30 AM

Res BW 1.0 MHz

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#Video BW 3.0 MHz

Span 0 Hz Sweep 31.6 s (10001 pts)



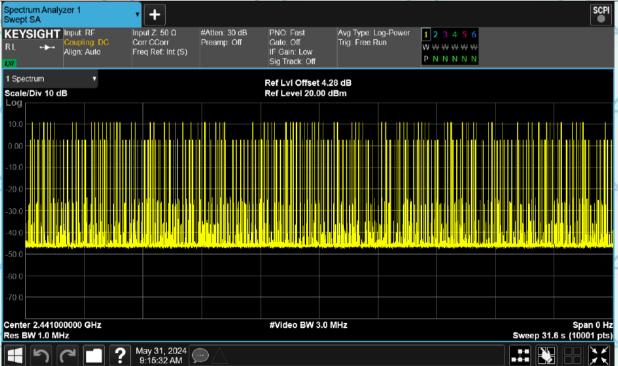
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Report No.: WSCT-A2LA-R&E240300014A-BT

ACCREDITED Certificate #5768.01 For Question, Please Contact with WSCT 1-DH5 2441MHz www.wsct-cert.com Spectrum Analyzer 1 SCPI + Input Z: 50 Ω #Atten: 30 dB PNO Fast Gate Off Avg Type: Log-Power Trig: Video KEYSIGHT Input RF Corr CCorr Preamp Off WWWWWW IF Gain: Low Sig Track: Off Trig Delay: -500.0 µs Freq Ref: Int (S) PNNNNN 1 Spectrum ΔMkr1 2.886 ms Ref LvI Offset 4.28 dB Ref Level 20.00 dBm Scale/Div 10 dB -0.04 dB $1\Delta 2$ ng tak kabulah kalah ng kang katigan ing tang nakah nati katiga panah hiji na minan nakan mbana katiga palah n Manah nakat ing mang panggan ing tang na nakah ng ng ng napan ng ng palah nakat na nakat ng nahan ng nakah ng nakat na Center 2.441000000 GHz Span 0 Hz Sweep 10.0 ms (10001 pts) #Video BW 3.0 MHz Res BW 1.0 MHz 5 Marker Table v Function Width Function Value Mode Function 2.886 ms (Δ) 498.0 µs 10.83 dBm May 31, 2024 9:14:59 AM 1-DH5 2441MHz SCPI + PNO: Fast Gate: Off Avg Type: Log-Power Trig: Free Run Input Z: 50 Ω #Atten: 30 dB 1 2 3 4 5 6 Preamp: Off **w** ₩ ₩ ₩ ₩ Align: Auto Freq Ref: Int (S) IF Gain: Low Sig Track: Off PNNNNN Ref LvI Offset 4.28 dB





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Report No.: WSCT-A2LA-R&E240300014A-BT

ACCREDITED Certificate #5768.01 For Question, Please Contact with WSCT 1-DH5 2480MHz www.wsct-cert.com Spectrum Analyzer 1 SCPI + Input Z: 50 Ω #Atten: 30 dB Preamp: Off PNO Fast Gate Off Avg Type: Log-Power Trig: Video KEYSIGHT Input RF Corr CCorr WWWWWW Align: Auto IF Gain: Low Sig Track: Off Trig Delay: -500.0 µs Freq Ref: Int (S) PNNNNN 1 Spectrum ΔMkr1 2.887 ms Ref LvI Offset 4.33 dB Ref Level 20.00 dBm -6.52 dB Scale/Div 10 dB $1\Delta 2$ TRIGIN History to the state of the class of the state of the sta Center 2.480000000 GHz Span 0 Hz Sweep 10.0 ms (10001 pts) #Video BW 3.0 MHz Res BW 1.0 MHz 5 Marker Table v Function Width Function Value Mode Function 2.887 ms (Δ) -6.52 dB 497.0 µs 15.07 dBm May 31, 2024 9:19:43 AM 1-DH5 2480MHz Spectrum Analyzer 1 Swept SA SCPI + PNO: Fast Gate: Off Avg Type: Log-Power Trig: Free Run Input Z: 50 Ω #Atten: 30 dB KEYSIGHT Input: RF 1 2 3 4 5 6 Preamp: Off **w** ₩ ₩ ₩ ₩ Align: Auto Freq Ref: Int (S) IF Gain: Low Sig Track: Off PNNNNN 1 Spectrum Ref LvI Offset 4.33 dB Scale/Div 10 dB Ref Level 20.00 dBm



Center 2.480000000 GHz

May 31, 2024 9:20:16 AM

Res BW 1.0 MHz

#Video BW 3.0 MHz

Span 0 Hz Sweep 31.6 s (10001 pts)







Report No.: WSCT-A2LA-R&E240300014A-BT

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6.8. Pseudorandom Frequency Hopping Sequence

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

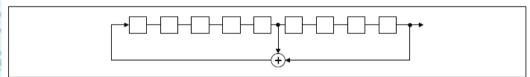
Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

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

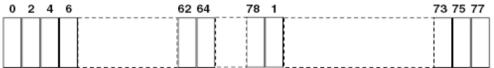
The pseudorandom sequence may be generated in a nine-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage. And the result is fed back to the input of the first stage. The sequence begins with the first one of 9 consecutive ones; i.e. the shift register is initialized 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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6.9. Conducted Band Edge Measurement

6.9.1. Test Specification

	Test Requirement:	FCC Part15 C Section 15.247 (d)
	Test Method:	ANSI C63.10:2014
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.
	Test Setup:	Spectrum Analyzer EUT
	Test Mode:	Transmitting mode with modulation
	Test Procedure:	 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. 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. Measure and record the results in the test report.
	Test Result:	PASS
	NAAA-N-	



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6.9.2. Test Data

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GFSK Modulation (the worst case)



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6.10. Conducted Spurious Emission Measurement

6.10.1. Test Specification

FCC Part15 C Section 15.247 (d)
ANSI C63.10:2014
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.
Spectrum Analyzer EUT
Transmitting mode with modulation
 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.
PASS









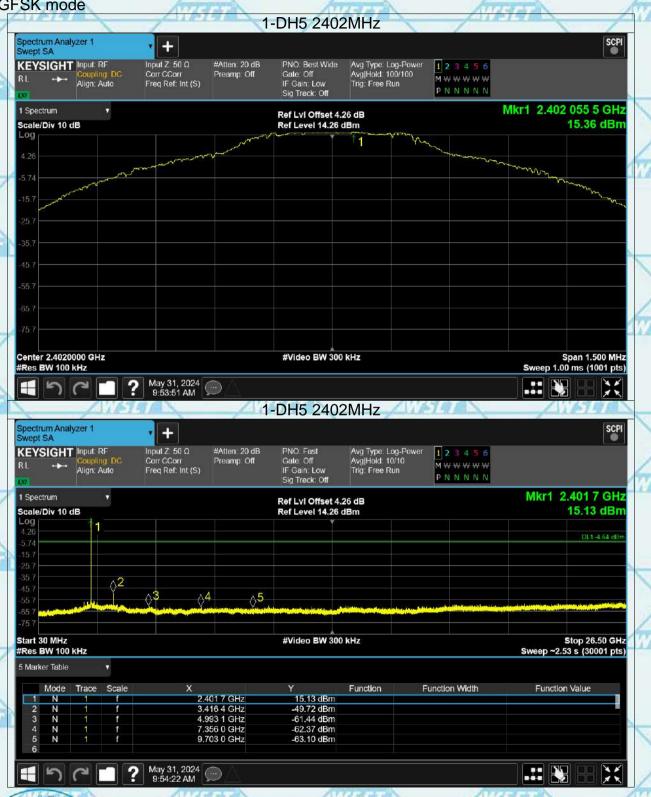


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Test Data GFSK mode





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Report No.: WSCT-A2LA-R&E240300014A-BT Pi/4DQPSK mode

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Report No.: WSCT-A2LA-R&E240300014A-BT Certificate #5768.01 For Question, 8DPSK mode Please Contact with WSCT 3-DH5 2402MHz www.wsct-cert.com Spectrum Analyzer 1 Swept SA SCPI + Input Z: 50 Ω #Atten: 20 dB Preamp: Off PNO. Best Wide Gate: Off Avg Type: Log-Power Avg[Hold: 100/100 KEYSIGHT Input RF Corr CCorr MWWWWW IF Gain: Low Sig Track: Off Freq Ref: Int (S) Trig: Free Run PNNNNN 1 Spectrum Mkr1 2,402 096 0 GHz Ref LvI Offset 4.26 dB Scale/Div 10 dB Ref Level 14.26 dBm 7.82 dBm 4 26 Center 2.4020000 GHz #Res BW 100 kHz Span 1.500 MHz Sweep 1.00 ms (1001 pts) #Video BW 300 kHz May 31, 2024 10:05:13 AM 3-DH5 2402MHz Spectrum Analyzer 1 Swept SA SCPI + Avg Type Log-Power Avg|Hold: 10/10 Trig: Free Run PNO Fast Gate Off Input Z: 50 Ω #Atten: 20 dB KEYSIGHT Input RF 1 2 3 4 5 6 Corr CCorr Freq Ref: Int (S) Preamp Off MWWWW Align: Auto IF Gain: Low Sig Track: Off PNNNNN Mkr1 2.401 7 GHz Ref LvI Offset 4.26 dB 7.69 dBm Scale/Div 10 dB Ref Level 14.26 dBm DL1-12-18 dB **♦**5 **∂3 ∆4** Start 30 MHz #Video BW 300 kHz Stop 26.50 GHz #Res BW 100 kHz Sweep ~2.53 s (30001 pts) 5 Marker Table Function Width Function Value Scale Function Mode 2.401 7 GHz 7.69 dBm 3.402 3 GHz 4.760 2 GHz 7.073 7 GHz 9.751 5 GHz -47.08 dBm 2 3 4 5 6 N -62.47 dBm -62.34 dBm -61.16 dBm



May 31, 2024 10:05:44 AM



1 Spectrum

4 29

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Start 30 MHz

5 Marker Table

Mode

May 31, 2024 10:07:09 AM

-62.16 dBm







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6.11. Radiated Spurious Emission Measurement

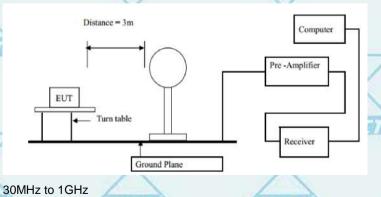
6.11.1. Test Specification

7	6.11.1. Test Specification	/		1			
	Test Requirement:	FCC Part15	C Sectio	n 15.209		X	
2	Test Method:	ANSI C63.10):2014	11499		11494	
	Frequency Range:	9 kHz to 25 (GHz		1	/	
	Measurement Distance:	3 m					
,	Antenna Polarization:	Horizontal &	Vertical		ATE	4	1
		Frequency	Detecto	RBW	VBW	Remark	
	X	9kHz- 150kHz	Quasi-pea	ak 200Hz	1kHz	Quasi-peak Value	
>	Receiver Setup:	150kHz- 30MHz	Quasi-pea	ak 9kHz	30kHz	Quasi-peak Value	
		30MHz-1GHz	Quasi-pea	ak 100KHz	300KHz	Quasi-peak Value	1
		Above 1GHz	Peak	1MHz	3MHz	Peak Value	
		Above IGHZ	Peak	1MHz	10Hz	Average Value	
7	SVETO SVETO	Frequen	cy //5/57	Field Stre (microvolts	111111111111111111111111111111111111111	Measurement Distance (meters)	5
		0.009-0.4	190	2400/F(KHz)	300	il
		0.490-1.7	' 05	24000/F	(KHz)	30	
1		1.705-3	0	30		30	1
	176746	30-88		100		/35/	L
		88-216		150		3	
	Limit:	216-96	0	200		3	

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

For radiated emissions below 30MHz

Test setup:



WSET

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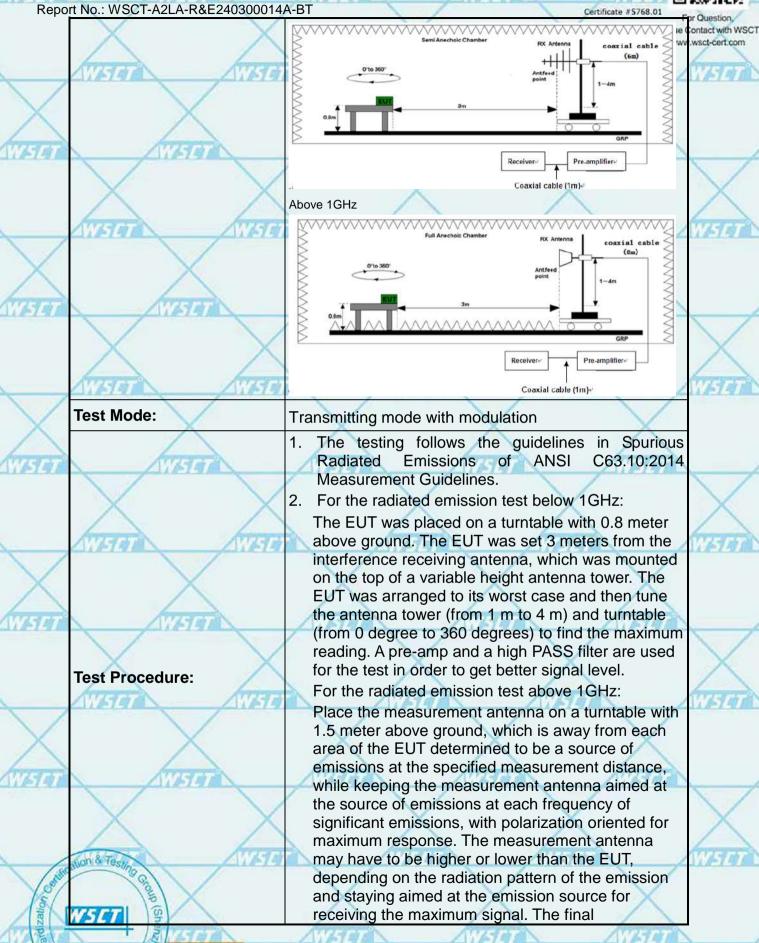
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Report No.: WSCT-A2LA-R		A settlement almost	Certificate #5768.01	For Question,
X			ion shall be that which	te Contact with WS0
		the emissions. The	emeasurement	
17574			m emissions shall be	2 W/5/57
			s of from 1 m to 4 m	
X		round or referenc		
			setting and enable th	е
WHITE WHI	2 All 1 2 A	nit continuously.	WSIT	
	4. Use the fol	lowing spectrum a	nalyzer settings:	
	(1) Span s	hall wide enough	to fully capture the	
	emissi	on being measure	d;	
ATT TO BE	(2) Set RE	W=100 kHz for f	< 1 GHz, RBW=1MHz	17772
TIPI S		GHz ; VBW≥RBW		ZIEITE
			function = peak; Trac	е
		hold for peak		
house house			ent: use duty cycle	
11619		tion factor method		
			n time/100 millisecond	9
			·+Nn-1*LNn-1+Nn*L	
				-
1777	and the second of the second o	A Company of the Comp	type 1 pulses, L1 is	Z 1479 B
		of type 1 pulses,		
X			I = Peak Emission	
	Level	+ 20*log(Duty cyc	ie)	
AVSTA	Correc	ted Reading: Ante	nna Factor + Cable	
	Loss +	Read Level - Prea	amp Factor = Level	\ /
Test results:	PASS	X	X	X
100.100.101	17.00			
11574	A STATE OF THE STA	1414	116141	ATTE
X	X	X	X	
WS 41	WATER	AWSLT	AVISTOT	
			1/	1/
X	X	X	X	X
				/ \
AVEIGN	WSG	1/2/4/	WEIGH	AWSET



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6.11.2. Test Data

Please refer to following diagram for individual

Below 1GHz

Adapter (the worst case)

Horizontal:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	14
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1	,	30.3173	30.38	-2.59	27.79	40.00	-12.21	QP
2	1	49.7068	26.34	-2.09	24.25	40.00	-15.75	QP
3		104.1701	32.72	-5.18	27.54	43.50	-15.96	QP
4	*	279.0436	45.19	-3.19	42.00	46.00	-4.00	QP
5	Z	711.6734	28.89	5.20	34.09	46.00	-11.91	QP
6		942.1305	26.70	8.08	34.78	46.00	-11.22	QP

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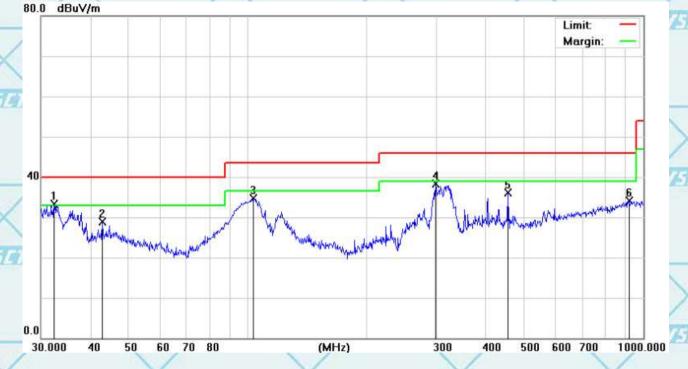


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Vertical:

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							100		
	No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	141
7			MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
	1	*	32.4059	35.80	-2.53	33.27	40.00	-6.73	QP
6	2	1	42.8998	30.68	-1.82	28.86	40.00	-11.14	QP
4.4	3	16	103.4421	40.08	-5.31	34.77	43.50	-8.73	QP
	4		298.2681	40.91	-2.57	38.34	46.00	-7.66	QP
_	5	1	454.3100	35.03	1.07	36.10	46.00	-9.90	QP
1	6		919.2866	26.15	7.93	34.08	46.00	-11.92	QP

Note1:

Freq. = Emission frequency in MHz

Reading level (dBµV) = 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)

e 150 kHz to 30MHz.



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Above 1GHz

GFSK

4	Frog	Low channel: 2402MHz								
	Freq. (MHz)	Ant.Pol	Emission I	_evel(dBuV)	Limit 3m	(dBuV/m)	Ove	r(dB)		
	(IVITZ)	H/V	PK	AV	PK	AV	PK	AV		
	4804	V	59.89	41.32	74	54	-14.11	-12.68		
	7206	V	58.98	39.34	74	54	-15.02	-14.66		
	4804	Η	59.56	40.06	74	54	-14.44	-13.94		
	7206	H	59.23	40.23	74	54	-14.77	-13.77		

	ATTICK TO MA			20.7		41	F J _ B _ L _ 2476		
1	Freq. (MHz)	Middle channel: 2441MHz							
		Ant.Pol	Emission Level(dBuV)		Limit 3m(dBuV/m)		Over(dB)		
		H/V	PK	AV	PK	AV	PK	AV	
١	4882	V	60.13	41.40	74	54	-13.87	-12.60	
	7323	V	58.71	40.42	74	54	-15.29	-13.58	
	4882	Τ	59.81	40.03	74	54	-14.19	-13.97	
	7323	Η	59.40	40.40	74	54	-14.60	-13.60	

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Frog	High channel: 2480MHz							
Freq. (MHz)	Ant.Pol	Emission Level(dBuV)		Limit 3m(dBuV/m)		Over(dB)		
(IVITIZ)	H/V	PK	AV	PK	AV	PK	AV	
4960	V	59.58	40.95	74	54	-14.42	-13.05	
7440		58.71	40.87	74	54	-15.29	-13.13	
4960	Н	58.58	39.58	74	54	-15.42	-14.42	
7440	Н	59.01	40.01	74	54	-14.99	-13.99	

Note:

- 1. The emission levels of other frequencies are very lower than the limit and not show in test report.
- 2. Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.
- 3. 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.

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Report No.: WSCT-A2LA-R&E240300014A-BT Restricted Bands Requirements

Test result for GFSK Mode (the worst case)

restresult for Grant in		iode (the worst case)		ATTI THE REAL PROPERTY.		ATT I will not all	
Frequency	Reading	Correct Factor	Emission Level	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	H/V	
A. Carrier	MISS		Low Cha	nnel	111111		Arra
2387	61.31	-8.94	52.37	74	-21.63	F	PK
2387	42.52	-8.94	33.58	54	-20.42	Н	AV
2387	62.54	-8.94	53.60	74	-20.40	V	PK
2387	45.32	-8.94	36.38	54	-17.62	V	AV
2390	69.04	-8.73	60.31	74	-13.69	Η	PK
2390	47.00	-8.73	38.27	54	-15.73	н	AV
2390	65.01	-8.73	56.28	74	-17.72	V	PK
2390	48.85	-8.73	40.12	54	-13.88	V	AV
X		X	High Cha	nnel		X	
2483.5	69.45	-8.17	61.28	74	-12.72	H	PK
2483.5	51.25	-8.17	43.08	54	-10.92	ALET	AV
2483.5	67.41	-8.17	59.24	74	-14.76	V	PK
2483.5	47.98	-8.17	39.81	54	-14.19	V	AV
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Note: Freq. = Emission frequency in MHz Reading level $(dB\mu V)$ = Receiver reading

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

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

Limit ($dB\mu V$) = Limit stated in standard Margin (dB) = Level ($dB\mu V$) – Limits ($dB\mu V$)

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

WSCT Start S

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