

WSET

TEST REPORT

FCC ID: 2ADYY-BD04AIR

Product: TWS Earphone

Model No.: BD04 Air

WSET W5ET

Trade Mark: TECNO

Report No.: WSCT-ANAB-R&E240800038A-LE

Issued Date: 28 August 20245

WSET

Issued for:

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TECNO MOBILE LIMITED FLAT N 16/F BLOCK B UNIVERSAL INDUSTRIAL CENTRE 19-25 W5 C SHAN MEI STREET FOTAN NT HONGKONG

Issued By:

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

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Test Certification

TWS Earphone **Product:**

Model No.: BD04 Air

TECNO Trade Mark:

TECNO MOBILE LIMITED Applicant: W/

FLAT N 16/F BLOCK B UNIVERSAL INDUSTRIAL CENTRE

WSET

19-25 SHAN MEI STREET FOTAN NT HONGKONG

TECNO MOBILE LIMITED Manufacturer:

FLAT N 16/F BLOCK B UNIVERSAL INDUSTRIAL CENTRE

19-25 SHAN MEI STREET FOTAN NT HONGKONG

15 August 2024 to 28 August 2024 Date of Test:

Applicable FCC CFR Title 47 Part 15 Subpart C Section 15.247 155

KDB 558074 D01 DTS Meas Guidance v04 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.

War Xiar Tested By:

Checked By:

WSET

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(Chen Xu)

(Wang Xiang)

Approved By:

Date: 28 August

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(Li Huaibi)

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Test Result Summary 2.

	AUGE CT. AUGE	TOWERT	AUG CT.	W5ET
$\overline{}$	Requirement	CFR 47 Section	Result	W-757
	Antenna requirement	§15.203/§15.247 (c)	PASS	
7	AC Power Line Conducted Emission	W5 ET §15.207	NA WSET	
	Conducted Peak Output W5 [7] Power W5 [§15.247 (b)(3) §2.1046	W5 PASS	WSCT
	6dB Emission Bandwidth	§15.247 (a)(2) §2.1049	PASS	
	Power Spectral Density	§15.247 (e)	PASS	
	Band Edge W5.0	1§5.247(d) §2.1051, §2.1057	PASS	W5 CT
	Spurious Emission	§15.205/§15.209 §2.1053, §2.1057	PASS	

1. PASS: Test item meets the requirement.

Note:

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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W5 C1 WS ET W5 CT W5 E1

W5 E1

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EUT Description 3.

	Product Name:	TWS Earphone WSCT WSCT	V5 CT
	Model :	BD04 Air	
	Trade Mark:	TECNO	
7	Operation Frequency:	2402MHz~2480MHz	
	Channel Separation:	2MHz	X
	Number of Channel:	407 WSET WSET	V5 ET
/	Modulation Technology:	GFSK	
7	Antenna Type:	Chip Antenna	
	Antenna Gain:	2.7dBi	
	WSET	Li-ion Polymer Battery: 721435 Nominal Voltage: 3.7V Rated Capacity: 320mAh	V5 ET
	Operating Voltage	Rated Energy: 1.184Wh Limited Charge Voltage: 4.2V Li-ion Polymer Battery: XD451011 Nominal Voltage: 3.7V	
	\times	Rated Capacity: 35mAh Rated Energy: 0.1295Wh Limited Charge Voltage: 4.2V	X
		NITA" WSET" WSET	V 5CT

Operation Frequency each of channel

		A I I d all the same	~		_			A I I d all and a did to
	Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
	0	2402MHz	10	2422MHz	20	2442MHz	30	2462MHz
	1	2404MHz	11	2424MHz	21	2444MHz	31	2464MHz
_	WS ET		AWS CT	•	WS CI		W5 C	7°
	8	2418MHz	18	2438MHz	28	2458MHz	38	2478MHz
	9	2420MHz	19	2440MHz	29	2460MHz	39	2480MHz
>	Remark: Channel 0, 19 & 39 have been tested.							

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Genera Information 4.

4.1. Test environment and mode

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

Test Mode:

Engineering mode: Keep the EUT in continuous transmitting by select channel and modulations(The value of duty cycle is 98.46%) with Fully-charged battery.

The sample was placed (0.1m below 1GHz, 1.5m above 1GHz) above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.

Description of Support Units

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

Equipment	Model No.	Serial No.	FCC ID	Trade Name
Adapter	XCU32	\times	1	/

Note:

- 1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
- 2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.
- 3. For conducted measurements (Output Power, 6dB Emission Bandwidth, Power Spectral Density, 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

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

The sites are constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22. All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

5.2.ACCREDITATIONS

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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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 %.

	No.	Item	MU	
W5 CT	1	Power Spectral Density	±3.2dB	
	2	Duty Cycle and Tx-Sequence and Tx-Gap	±1%	X
	3 _{W5} [Medium Utilisation Factor W5 77	±1.3%	W5CT [®]
	4	Occupied Channel Bandwidth	±2.4%	
	5	Transmitter Unwanted Emission in the out-of Band	±1.3%	
WSET"	6	Transmitter Unwanted Emissions in the Spurious Domain	±2.5%	
	7	Receiver Spurious Emissions	±2.5%	X
	8W5C	Conducted Emission Test W5 [7]	±3.2dB	W5 ET
	9	RF power, conducted	±0.16dB	
	10	Spurious emissions, conducted	±0.21dB	
<u> WSET</u>	11	All emissions, radiated(<1GHz)	±4.7dB	
	12	All emissions, radiated(>1GHz)	±4.7dB	X
	13 <i>V5 L</i>	Temperature WSET WSET WS	±0.5°C	W5 ET
X	14	Humidity	±2.0%	

WSCT	W5 CT	WSET	W5 C1	W5	ET°
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W5	7° W	'S CT°	WSET	WSET	WSCT
WSET	WSET	WSET	WSE	WS	Ter 1

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5.4.MEASUREMENT INSTRUMENTS

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_	NAME OF EQUIPMENT	MANUFACTURER	MODEL	SERIAL NUMBER	Calibration Date	Calibration Due.	75 C T
\langle	Test software		EZ-EMC	CON-03A	-	Χ-	
r i	Test software	-	MTS8310	WSCT	- /	VS CT	
	EMI Test Receiver	R&S	ESCI	100005	11/05/2023	11/04/2024	7
	LISN	AFJ	LS16	16010222119	11/05/2023	11/04/2024	\times
	LISN(EUT)	Mestec	AN3016	04/10040	11/05/2023	11/04/2024	'S C T
<	Universal Radio Communication Tester	R&S	CMU 200	1100.0008.02	11/05/2023	11/04/2024	
C	Coaxial cable	Megalon	/s LMR400	N/A	11/05/2023	11/04/2024	
	GPIB cable	Megalon	GPIB	N/A	11/05/2023	11/04/2024	
	Spectrum Analyzer	R&S	FSU	100114	11/05/2023	11/04/2024	\wedge
	Pre Amplifier	H.P. <i>ET</i>	HP8447E 5 /	2945A02715	11/05/2023	11/04/2024	15 ET
	Pre-Amplifier	CDSI	PAP-1G18-38	-\	11/05/2023	11/04/2024	
/	Bi-log Antenna	SCHWARZBECK	VULB9168	01488	11/05/2023	11/04/2024	
C	9*6*6 Anechoic	<i>ET V</i>	V5 CT L	W.S CT	11/05/2023	11/04/2024	
	Horn Antenna	COMPLIANCE ENGINEERING	CE18000		11/05/2023	11/04/2024	X
	Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-631	11/05/2023	11/04/2024	rs et
	Cable	TIME MICROWAVE	LMR-400	N-TYPE04	11/05/2023	11/04/2024	361
	System-Controller	ccs	N/A	N/A	N.C.R	N.C.R	
C i	Turn Table	ccs	V5/7N/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	6502W51	00042960	11/05/2023	11/04/2024	rs et
1	Horn Antenna	SCHWARZBECK	BBHA 9170	1123	11/05/2023	11/04/2024	
	Power meter	Anritsu	ML2487A	6K00003613	11/05/2023	11/04/2024	
4	Power sensor	Anritsu	MX248XD	WSET	11/05/2023	11/04/2024	
	Spectrum Analyzer	Keysight	N9010B	MY60241089	11/05/2023	11/04/2024	X

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Test Results and Measurement Data 6.

6.1. Antenna requirement

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Standard requirement:

FCC Part15 C Section 15.203 /247(c)

15.203 requirement:

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

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

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

E.U.T Antenna:

The Bluetooth antenna is a Chip Antenna. it meets the standards, and the best case gain of the antenna is 2.7dBi.

Please refer to the attachment "BD04 Air (R) Internal Photo" for the antenna location

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6.2. Conducted Emission

6.2.1. Test Specification

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6.	2.1. Test Specification	WELL WELL	UP 14 B
X	Test Requirement:	FCC Part15 C Section 15.207	
WSET	Test Method: 5 [7]	ANSI C63.10:2014 W5 [T] W5 [T]	
	Frequency Range:	150 kHz to 30 MHz	\times
	Receiver setup:	RBW=9 kHz, VBW=30 kHz, Sweep time=auto	W5 CT
WSET	Limits:	Frequency range Limit (dBuV) (MHz) Quasi-peak Average 0.15-0.5 66 to 56* 56 to 46* 0.5-5 56 46 5-30 60 50	
	X	Reference Plane	X
	WSET WSE	J/	WSET
WSET	Test Setup:	E.U.T Adapter Filter AC power	
	WSET WSE	Remark E.U.T: Equipment Under Test LISN: Line Impedence Stabilization Network Test table height=0.8m	WSET
\times	Test Mode:	Charging + Transmitting Mode	
WSCT	WSET	1. The E.U.T is connected to an adapter through a line impedance stabilization network (L.I.S.N.). This	
	X	provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main	A. Carrier and Co.
X	Test Procedure:	coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).	W5147
<u> </u>	WSET	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.	X
	Test Result:	N/A	esting Gro

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1W5C

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AWSET

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:

Note: EUT is powered by batteries and cannot transmit normally while charging. This project does not require testing

WSET	WSET	WSET	WSET	WSET
	W.S	$\langle \hspace{0.1cm} \rangle$	$\langle \hspace{0.1cm} \rangle$	$\langle \times $
WSCT	WSET	WSET	WSET	WSET
	WS	$\langle \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$	$\langle \hspace{0.1cm} \rangle$	$\langle \times $
WSCT	WSLT	WSCT	WSET	WSET
	WS	$\langle \hspace{0.1cm} \rangle$		$\langle \times$
WSET	WSCT	WSET	WSET	WSET
W/s	$\langle \hspace{0.1cm} \rangle$	$\langle \hspace{0.1cm} \rangle$	$\langle \hspace{0.1cm} \rangle$	
WSET	WSET	WSET	WSET	WSCT WSCT
				(P) (100)

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6.3. Conducted Output Power

6.3.1. Test Specification W5 [T]

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W5 CT

X	Test Requirement:	FCC Part15 C Section 15.247 (b)(3)	
WSET	Test Method:	KDB558074 W5 [T] W5 [T]	
	Limit:	30dBm	\times
	Test Setup:		WSET
X		Spectrum Analyzer EUT	
WSET	Test Mode:	Refer to item 4.1	
		 The testing follows the Measurement Procedure of FCC KDB No. 558074 DTS D01 Meas. Guidance v04. Set spectrum analyzer as following: 5 77 	WSET
WSCT	Test Procedure:	 a) Set the RBW ≥ DTS bandwidth. b) Set VBW ≥ 3 x RBW. c) Set span ≥ 3 x RBW d) Sweep time = auto couple. 	
		e) Detector = peak. f) Trace mode = max hold. g) Allow trace to fully stabilize. h) Use peak marker function to determine the peak	WSCT
X	Test Result:	amplitude level. PASS	
ATTI	ATTENDED TO		

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6.3.2. Test Data

W5C1

	BLE 1M					
	Test channel	Maximum Conducted Output Power (dBm)	Limit (dBm)	Result		
	Lowest	8.06	30.00	PASS		
1	Middle	7.94	30.00	PASS		
	Highest	7.53	30.00	PASS		

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Test plots as follows:

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W5 CT W5 CT

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6.4. Emission Bandwidth

6.4.1. Test Specification V5 51

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W5 C1

W5C7

X	Test Requirement:	FCC Part15 C Section 15.247 (a)(2)	
W5CT	Test Method:	KDB558074 W5_T W5_T	
	Limit:	>500kHz	\times
\bigvee	Test Setup:	Spectrum Analyzer EUT	WSET
	Test Mode:	Defeate item 4.4	
W5CT°	rest mode.		
	Test Procedure:	 The testing follows FCC KDB Publication No. 558074 DTS D01 Meas. Guidance v04. Set to the maximum power setting and enable the EUT transmit continuously. Make the measurement with the spectrum analyzer's 	WSET
WS CT		resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. The 6dB bandwidth must	
		be greater than 500 kHz. 4. Measure and record the results in the test report.	\mathbf{X}
	Test Result:	PASS	
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6.4.2. Test data

BLE	1M	CT		NA.	E F	7

E1M	WELT	WE	CT.	
Test channel	6dB Emission Bandwidth (kHz)			
rest channel	BT LE mode	Limit	Result	
Lowest	0.515	>500k	W5 CT	
Middle	0.534	>500k	PASS	
Highest	0.588	>500k		

W5 CT

BLE 2M

	Test channel	6dB Emission I	Bandwidth (kHz)	
rest charmer		BT LE mode	Limit	Result
	Lowest	W 0.843	W5>500k	W5 CT
Ī	Middle	0.872	>500k	PASS
	Highest	0.887	>500k	

WSET N Test plots as follows:

/	W5CT	W5CT [®]	WS CT	WS CT	W5 CT

W5CT [®]	W5CT°	W5 ET	W5CT [®]	W5CT [®]

WSCT WSCT WSCT WSCT WSCT

WSCT	W5 ET	WSET	WSET	W5CT°
------	-------	------	------	-------

W5CT°	WSET	WSET	WSET	W5CT

W5LT°	WSET	WSET	W5 ET	scation& Testin
				Series Se

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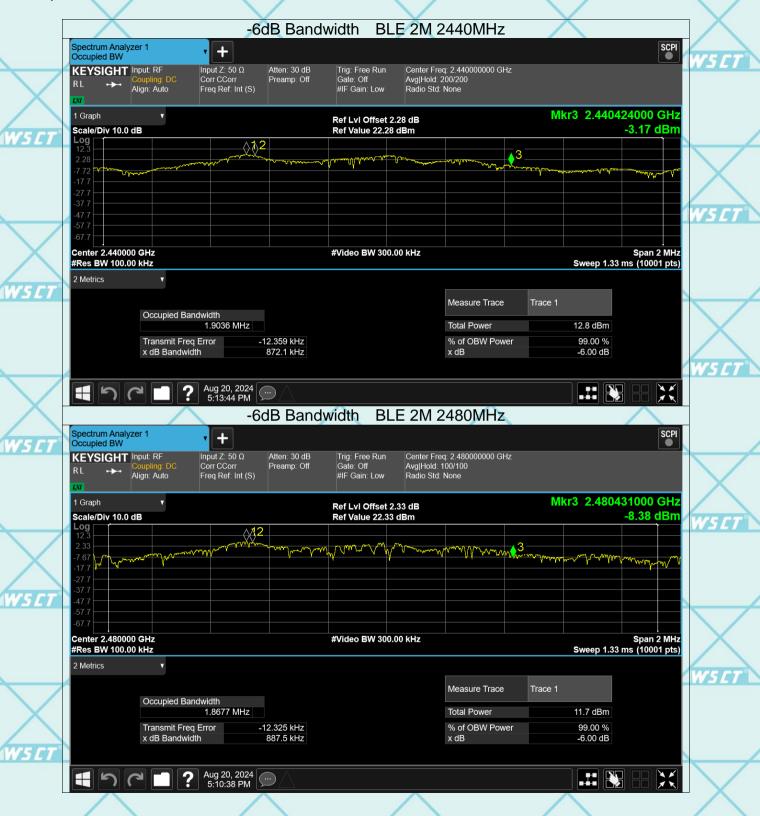
ANSI National Accreditation Board

A C C R E D I T E D

SOME 17035

TESTING LABORATORY

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6.5. Power Spectral Density

6.5.1. Test Specification

	WSCT	T WSTT WSTT	W5C1
7	Test Requirement:	FCC Part15 C Section 15.247 (e)	
	Test Method:	KDB558074	
0	Limit:	The peak power spectral density shall not be greater than 8dBm in any 3kHz band at any time interval of continuous transmission.	X
7	Test Setup:	Spectrum Analyzer EUT	W5 C1
	Test Mode:	Refer to item 4.1	
	Test Procedure:	 The testing follows Measurement Procedure 10.2 Method PKPSD of FCC KDB Publication No.558074 D01 DTS Meas. Guidance v04 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. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW): 3 kHz ≤ RBW ≤ 100 kHz. Video bandwidth VBW ≥ 3 x RBW. In order to make an accurate measurement, set the span to 1.5 times DTS Channel Bandwidth. (6dB BW) Detector = peak, Sweep time = auto couple, Trace mode = max hold, Allow trace to fully stabilize. Use the peak marker function to determine the maximum power level. Measure and record the results in the test report. 	WSI
	Test Result:	PASS	X

6.5.2. Test Instruments W5 CT

	RF Test Room												
6	Equipment	Manufacturer Model		Serial Number	Calibration Due								
	Spectrum Analyzer	R&S	FSU	200054	Nov. 04, 2024								
	RF cable (9kHz-26.5GHz)	тст	RE-06	N/A	Nov. 04, 2024								
1	Antenna Connector	TCT	RFC-01	N/A	Nov. 04, 2024								

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

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6.5.3. Test data

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	Test channel	Power Spectral Density (dBm/3kHz)						
-	rest charmer	BLE 1M	Limit	Result				
	Lowest	-12.64	8 dBm/3kHz					
	Middle	-12.34	8 dBm/3kHz	PASS				
	Highest	-12.28	8 dBm/3kHz					

	Test channel	Power Spectral Density (dBm/3kHz)						
7	rest chamber	BLE 2M	Limit	Result				
	Lowest	-14.33	8 dBm/3kHz					
9	Middle	w-14.24	8 dBm/3kHz	PASS				
	Highest	-14.38	8 dBm/3kHz					

Test plots as follows:

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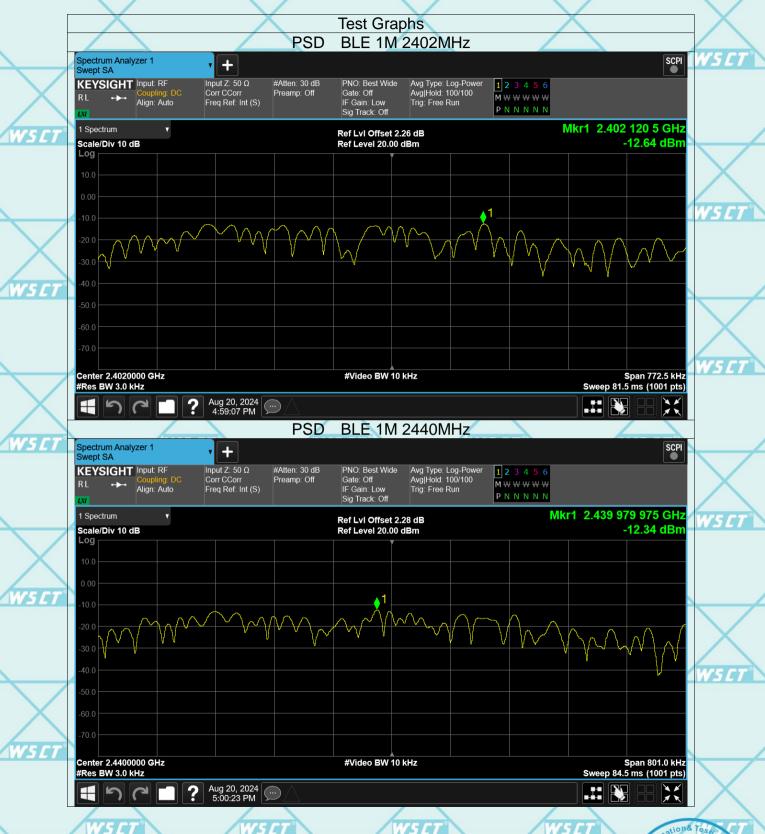
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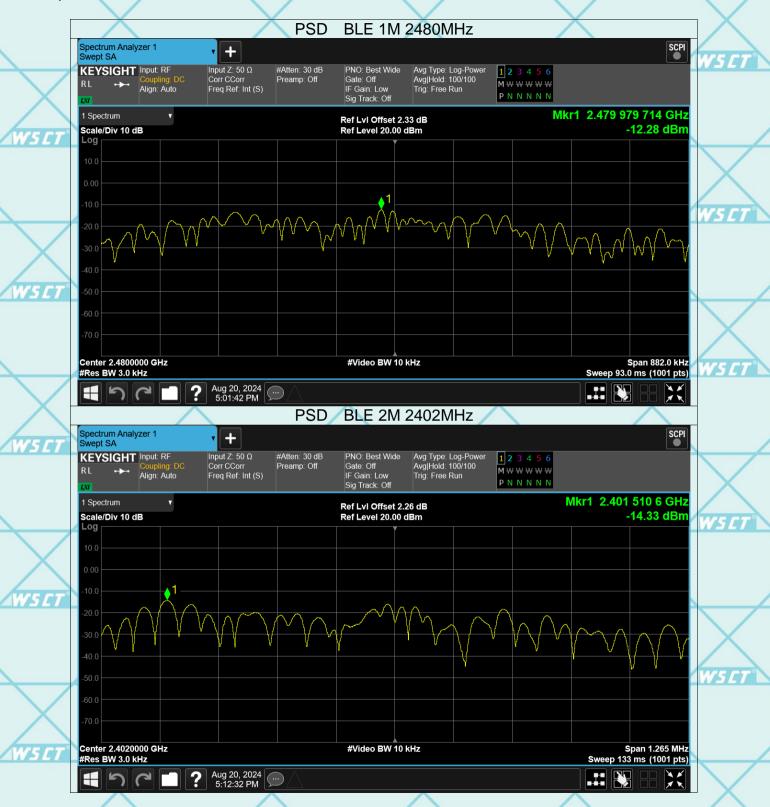
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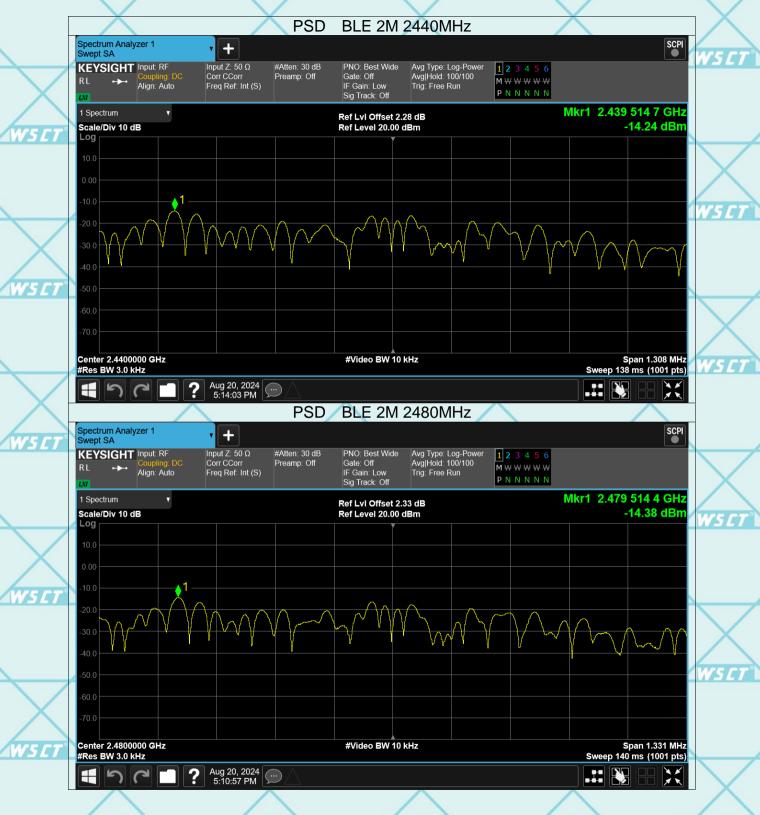
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6.6. Conducted Band Edge and Spurious Emission Measurement

6.6.1. Test Specification

0.	6.1. rest specification	T WSCT WSCT	(W5 ET")
\times	Test Requirement:	FCC Part15 C Section 15.247 (d)	
V5 CT°	Test Method:	KDB558074	
VSCT	Limit:	In any 100 kHz bandwidth outside of the authorized frequency band, the emissions which fall in the non-restricted bands shall be attenuated at least 20 dB / 30dB relative to the maximum PSD level in 100 kHz by RF conducted measurement and radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).	WSET
<i>P151</i>	Test Setup:	Spectrum Analyzer EUT	WSET
\bigvee	Test Mode:	Refer to item 4.1	
VS ET	Test Procedure:	 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=300 kHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB per 15.247(d). 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. 	WSET
	Test Result:	PASS	X

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World Standardization Certification & Testing Group (Shenzhen) Co..ltd. **ac-MRA** W5 CT Report No.: WSCT-ANAB-R&E240800038A-LE Conducted RF Spurious Emission Test Graphs BLE 1M 2402MHz Ant1 Ref Tx. Spurious Spectrum Analyzer 1 Swept SA SCPI + Input Z: 50 Ω Corr CCorr Freq Ref: Int (S) #Atten: 30 dB Preamp: Off Avg Type: Log-Power Avg|Hold: 100/100 Trig: Free Run KEYSIGHT Input: RF PNO: Best Wide M ₩ ₩ ₩ ₩ Align: Auto PNNNNN Mkr1 2.401 767 5 GHz Ref LvI Offset 2.26 dB Ref Level 20.00 dBm 7.71 dBm Scale/Div 10 dB myyy

Center 2.4020000 GHz #Video BW 300 kHz Span 1.500 MHz #Res BW 100 kHz

| Aug 20, 2024 | | A

Spectrum Analyzer 1 SCPI + . wept SA Input Z: 50 Ω KEYSIGHT Input: RF #Atten: 30 dB PNO: Fast Avg Type: Log-Power Avg|Hold: 10/10 Corr CCorr Freq Ref: Int (S) Preamp: Off ___ M ₩ ₩ ₩ ₩ ₩ Align: Auto IF Gain: Low Sig Track: Off Trig: Free Run PNNNN Mkr1 2.401 7 GHz Ref Lvl Offset 2.26 dB 2.85 dBm Ref Level 20.00 dBm DL1 -12 29 dB Stop 26.50 GHz Sweep ~2.53 s (30001 pts) Start 30 MHz #Res BW 100 kHz #Video BW 300 kHz 5 Marker Table Function Width Trace Scale Function Function Value Mode 2.401 7 GHz 2.85 dBm 2 2 2 2 7.206 9 GHz 4.803 4 GHz 7.206 9 GHz 9.732 1 GHz -44.19 dBm -51.11 dBm -44.19 dBm

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-53.96 dBm

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6.7. Radiated Spurious Emission Measurement

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6.	7.1. Test Specification		W-151		LIFE	74		WELST.
X	Test Requirement:	FCC Part15	C Section	15.209			X	
WS ET	Test Method:	ANSI C63.10):2014	WSIT	4	1	VSCT	
	Frequency Range:	9 kHz to 25 (GHz					
	Measurement Distance:	3 m						X
	Antenna Polarization: W5	Horizontal &	Vertical		W5	T		W5 ET
\bigvee	Operation mode:	Refer to item	4.1					
$/ \setminus$		Frequency	Detector	RBW	VBW	Re	emark	
NS ET	W5 CT°	9kHz- 150kHz	Quasi-pea		1kHz		eak Value	
	Receiver Setup:	150kHz- 30MHz	Quasi-pea	k 9kHz	30kHz	Quasi-p	eak Value	
		30MHz-1GHz	Quasi-pea	k 100KHz	300KHz	Quasi-p	eak Value	X
		Above 1GHz	Peak	1MHz	3MHz	196	k Value	
	W5CT W5CI	ALBOVO TOTIZ	Peak	1MHz	10Hz	Avera	ge Value	W5C1
\/				Field Stre	enath	Measi	urement	
X	X	Frequen	су	(microvolts	•		e (meters)	
		0.009-0.4	190	2400/F(H			300	
<i>N5 </i>	WS ET*	0.490-1.7	_	24000/F(KHz)		305 []	
		1.705-3		30		_	30	\/
	X	30-88		100			3	X
	Limit:	88-216 216-96		150 200			3	
	WSC1 WSC1	Above 9		500	WS		3	1W5 <i>C1</i>
\ /		7.50100						
X	X			1101	Measurei	ment	X	
WS CT	WSET	Frequency		ld Strength ovolts/meter)	Distand (meter		Detector	
		AL 4011		500	3		Average	
	\times	Above 1GHz		5000	3		Peak	
	WSET WSET	For radiated emissions below 30MHz					WSCI	
		Di	stance = 3m			Computer	一	
		<u> </u>			Pre -	-Amplifier		

Test setup:

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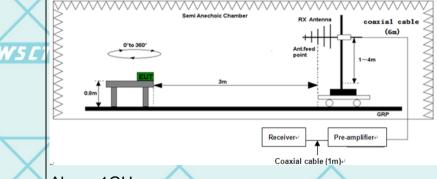
Ground Plane 30MHz to 1GHz

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Above 1GHz

Coaxial cable (1m)

Test Procedure:

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 For the radiated emission test below 1GHz: The EUT was placed on a turntable with 0.1 meter above ground. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high PASS filter are used for the test in order to get better signal level. For the radiated emission test above 1GHz: Place the measurement antenna on a turntable with 1.5 meter above ground, which is away from each

area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which

maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 mys

above the ground or reference ground plane





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2. Corrected Reading: Antenna Factor + Cable Loss +
Read Level - Preamp Factor = Level

3. For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

4. Use the following spectrum analyzer settings:

 Span shall wide enough to fully capture the emission being measured;

(2) Set RBW=100 kHz for f < 1 GHz; VBW ≥RBW; Sweep = auto; Detector function = peak; Trace = max hold;

(3) Set RBW = 1 MHz, VBW= 3MHz for f 1 GHz for peak measurement.

For average measurement: VBW = 10 Hz, when duty cycle is no less than 98 percent. VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

Test results: PASS

Note: Freq. = Emission frequency in MHz Reading level (dBµV) = Receiver reading

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

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

Limit (dB μ V) = Limit stated in standard Margin (dB) = Level (dB μ V) – Limits (dB μ V)

Test mode:

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Refer to section 4.1 for details

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6.7.2. Test Data(Worst case)

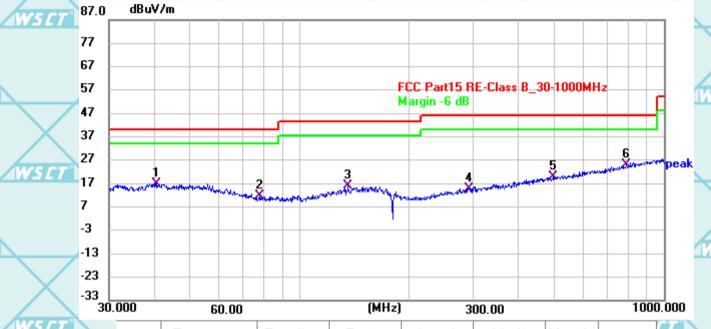
Please refer to following diagram for individual

Below 1GHz

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The worst mode is BLE 2M

Horizontal:



								_
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)		_	Detector	
1	40.6481	36.09	-18.95	17.14	40.00	-22.86	QP	
2	77.8312	35.44	-23.72	11.72	40.00	-28.28	QP	
3	136.2208	36.18	-20.14	16.04	43.50	-27.46	QP	/
4	292.5708	35.41	-20.52	14.89	46.00	-31.11	QP	1
5	498.5498	35.43	-15.51	19.92	46.00	-26.08	QP	9
6 *	791.6591	36.15	-11.15	25.00	46.00	-21.00	QP	
	1 2 3 4 5	No. (MHz) 1 40.6481 2 77.8312 3 136.2208 4 292.5708 5 498.5498	No. (MHz) (dBuV) 1 40.6481 36.09 2 77.8312 35.44 3 136.2208 36.18 4 292.5708 35.41 5 498.5498 35.43	No. (MHz) (dBuV) (dB/m) 1 40.6481 36.09 -18.95 2 77.8312 35.44 -23.72 3 136.2208 36.18 -20.14 4 292.5708 35.41 -20.52 5 498.5498 35.43 -15.51	No. (MHz) (dBuV) (dB/m) (dBuV/m) 1 40.6481 36.09 -18.95 17.14 2 77.8312 35.44 -23.72 11.72 3 136.2208 36.18 -20.14 16.04 4 292.5708 35.41 -20.52 14.89 5 498.5498 35.43 -15.51 19.92	No. (MHz) (dBuV) (dB/m) (dBuV/m) (dBuV/m) 1 40.6481 36.09 -18.95 17.14 40.00 2 77.8312 35.44 -23.72 11.72 40.00 3 136.2208 36.18 -20.14 16.04 43.50 4 292.5708 35.41 -20.52 14.89 46.00 5 498.5498 35.43 -15.51 19.92 46.00	No. (MHz) (dBuV) (dB/m) (dBuV/m) (dBuV/m) (dBuV/m) (dB) 1 40.6481 36.09 -18.95 17.14 40.00 -22.86 2 77.8312 35.44 -23.72 11.72 40.00 -28.28 3 136.2208 36.18 -20.14 16.04 43.50 -27.46 4 292.5708 35.41 -20.52 14.89 46.00 -31.11 5 498.5498 35.43 -15.51 19.92 46.00 -26.08	No. (MHz) (dBuV) (dB/m) (dBuV/m) (dBuV/m) (dBuV/m) (dB) Detector 1 40.6481 36.09 -18.95 17.14 40.00 -22.86 QP 2 77.8312 35.44 -23.72 11.72 40.00 -28.28 QP 3 136.2208 36.18 -20.14 16.04 43.50 -27.46 QP 4 292.5708 35.41 -20.52 14.89 46.00 -31.11 QP 5 498.5498 35.43 -15.51 19.92 46.00 -26.08 QP

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WSET

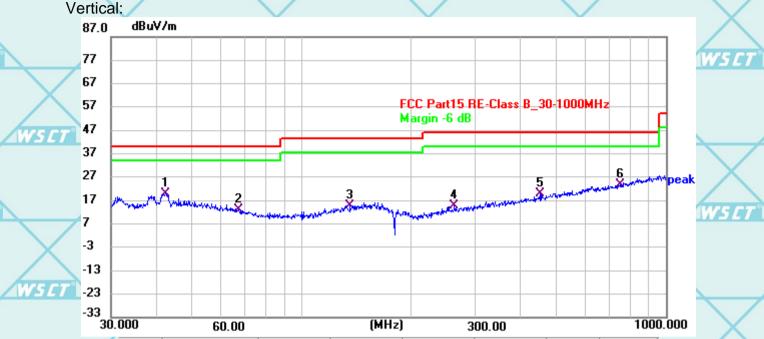






Report No.: WSCT-ANAB-R&E240800038A-LE

W5 CT



W	No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	
\sim	1 *	42.3207	38.80	-18.88	19.92	40.00	-20.08	QP	
	2	67.2611	34.56	-21.67	12.89	40.00	-27.11	QP	
W5CT"	3	136.2208	35.08	-20.14	14.94	43.50	-28.56	QP	67 °
	4	263.3569	36.16	-21.53	14.63	46.00	-31.37	QP	
/	5	453.7130	36.06	-16.32	19.74	46.00	-26.26	QP	
W	6	750.7661	35.47	-11.71	23.76	46.00	-22.24	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)

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W5 CT





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W5CT

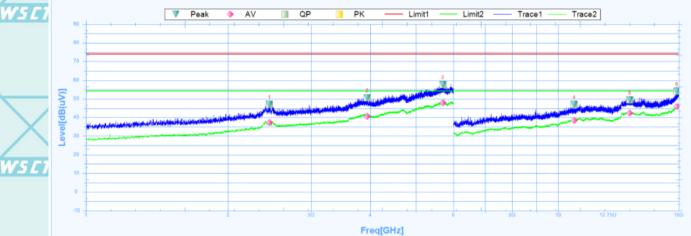
Above 1GHz(The worst mode is BLE 1M)

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

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

Low channel: 2402MHz

Horizontal:



V5 CT

	Suspu	ited Data Lis	it								
	NO.	Freq. [MHz]	Reading [dB(uV)]	Factor [dB]	Level [dB(uV)]	Limit [dB]	Margin [dB]	Deg [°]	Polarity	Trace	Verdict
Ţ	1	2446.2500	46.98	27.42	19.56	74	-27.02	233.7	Horizontal	PK	Pass
	1	2446.2500	37.39	27.42	9.97	54	-16.61	233.7	Horizontal	AV	Pass
	2	3941.2500	50.45	29.56	20.89	74	-23.55	273	Horizontal	PK	Pass
	2	3941.2500	40.7	29.56	11.14	54	-13.3	273	Horizontal	AV	Pass
	3	5697.5000	57.63	32.32	25.31	74	-16.37	275.4	Horizontal	PK	Pass
	3	5697.5000	47.86	32.32	15.54	54	-6.14	275.4	Horizontal	AV	Pass
	4	10818.0000	47.06	14.81	32.25	74	-26.94	260.2	Horizontal	PK	Pass
	4	10818.0000	38.45	14.81	23.64	54	-15.55	260.2	Horizontal	AV	Pass
	5	14176.5000	49.5	18.95	30.55	74	-24.5	322.5	Horizontal	PK	Pass
	5	14176.5000	42.41	18.95	23.46	54	-11.59	322.5	Horizontal	AV	Pass
L	6	17841.0000	54.06	22.88	31.18	74	-19.94	228	Horizontal	PK	Pass
	6	17841.0000	45.92	22.88	23.04	54	-8.08	228	Horizontal	AV	Pass

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World Standard ration Certification & Testing Group(Shenzhen) Co.,Lt

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YSET WSET

W5







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W5 CT

Vertical:



75 C T	Suspu	Susputed Data List												
FIT	NO.	Freq. [MHz]	Reading [dB(uV)]	Factor [dB]	Level [dB(uV)]	Limit [dB]	Margin [dB]	Deg [°]	Polarity	Trace	Verdict			
	1	2446.2500	46.51	27.42	19.09	74	-27.49	360.1	Vertical	PK	Pass			
	1	2446.2500	37.79	27.42	10.37	54	-16.21	360.1	Vertical	AV	Pass			
	2	3890.0000	49.99	29.44	20.55	74	-24.01	0.5	Vertical	PK	Pass			
\/	2	3890.0000	41.64	29.44	12.2	54	-12.36	0.5	Vertical	AV	Pass			
X	3	5702.5000	58.07	32.32	25.75	74	-15.93	112.9	Vertical	PK	Pass			
	3	5702.5000	48.2	32.32	15.88	54	-5.8	112.9	Vertical	AV	Pass			
75 C T	4	10585.5000	45.93	14.26	31.67	74	-28.07	-0.1	Vertical	PK	Pass			
	4	10585.5000	38.16	14.26	23.9	54	-15.84	-0.1	Vertical	AV	Pass			
	5	14148.0000	50.14	18.98	31.16	74	-23.86	349.4	Vertical	PK	Pass			
	5	14148.0000	41.98	18.98	23	54	-12.02	349.4	Vertical	AV	Pass			
	6	17968.5000	53.62	23.71	29.91	74	-20.38	53.4	Vertical	PK	Pass			
	6	17968.5000	46.72	23.71	23.01	54	-7.28	53.4	Vertical	AV	Pass			

WSET	WSET	WSET	WSET	WSCT	,
W.5	$\langle \hspace{0.1cm} \rangle$				VSCT*
WSET	WSET	WSET	WSCT	WSCT	
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X	X	X	X	Continuation & To.	. 2

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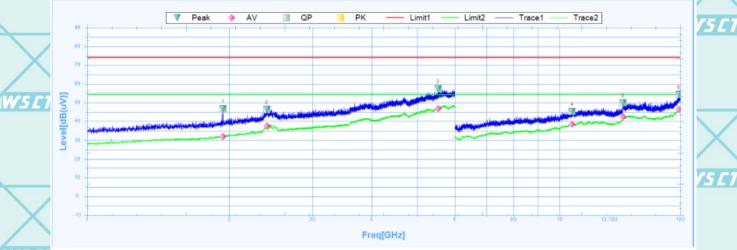


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W5ET

Middle channel: 2440MHz

Horizontal:



W5[T]

W5 CT

W5 E

W5E

L	Susputed Data List											
	NO.	Freq. [MHz]	Reading [dB(uV)]	Factor [dB]	Level [dB(uV)]	Limit [dB]	Margin [dB]	Deg [°]	Polarity	Trace	Verdict	
	1	1938.7500	46.85	25.62	21.23	74	-27.15	115.3	Horizontal	PK	Pass	
	1	1938.7500	32.01	25.62	6.39	54	-21.99	115.3	Horizontal	AV	Pass	
	2	2399.3750	46.36	27.26	19.1	74	-27.64	0.5	Horizontal	PK	Pass	
	2	2399.3750	37.5	27.26	10.24	54	-16.5	0.5	Horizontal	AV	Pass	
	3	5529.3750	57.31	32.05	25.26	74	-16.69	360.1	Horizontal	PK	Pass	
ç	3	5529.3750	46.88	32.05	14.83	54	-7.12	360.1	Horizontal	AV	Pass	
4	4	10623.0000	45.24	14.4	30.84	74	-28.76	359.1	Horizontal	PK	Pass	
	4	10623.0000	38.3	14.4	23.9	54	-15.7	359.1	Horizontal	AV	Pass	
	5	13603.5000	49.88	17.98	31.9	74	-24.12	337.8	Horizontal	PK	Pass	
	5	13603.5000	42.27	17.98	24.29	54	-11.73	337.8	Horizontal	AV	Pass	
	6	17877.0000	54.3	23.12	31.18	74	-19.7	299.8	Horizontal	PK	Pass	
,	6	17877.0000	46.24	23.12	23.12	54	-7.76	299.8	Horizontal	AV	Pass	

W5 E7 W5 CI W5 C W5 C1

W5 C7

W5C1 WS ET WS CT W5 E1

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W5 CT

W5C1



W5CT



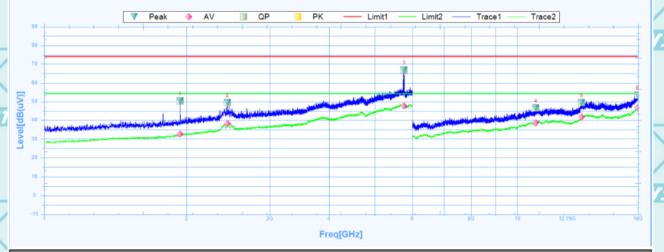


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W5 CT



Vertical:



W5CT

W5 C

W5 E

	Susputed Data List												
Ź	NO.	Freq. [MHz]	Reading [dB(uV)]	Factor [dB]	Level [dB(uV)]	Limit [dB]	Margin [dB]	Deg [°]	Polarity	Trace	Verdict		
	1	1938.1250	50.36	25.62	24.74	74	-23.64	360.1	Vertical	PK	Pass		
	1	1938.1250	32.59	25.62	6.97	54	-21.41	360.1	Vertical	AV	Pass		
	2	2438.7500	49.44	27.39	22.05	74	-24.56	93.8	Vertical	PK	Pass	_	
	2	2438.7500	38.2	27.39	10.81	54	-15.8	93.8	Vertical	AV	Pass		
	3	5763.1250	66.8	32.42	34.38	74	-7.2	79.4	Vertical	PK	Pass		
	3	5763.1250	47.69	32.42	15.27	54	-6.31	79.4	Vertical	AV	Pass		
3	4	10947.0000	46.5	15.33	31.17	74	-27.5	99	Vertical	PK	Pass		
24	4	10947.0000	38.55	15.33	23.22	54	-15.45	99	Vertical	AV	Pass		
	5	13675.5000	49.42	18.19	31.23	74	-24.58	234	Vertical	PK	Pass	1	
	5	13675.5000	41.76	18.19	23.57	54	-12.24	234	Vertical	AV	Pass		
	6	17974.5000	53.52	23.75	29.77	74	-20.48	354.2	Vertical	PK	Pass		
	6	17974.5000	46.77	23.75	23.02	54	-7.23	354.2	Vertical	AV	Pass	1	

W5 CI W5 E7 W5 C W5 C1

W5 CT

W5C1 WS ET WS CT W5 E1

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W5 CT



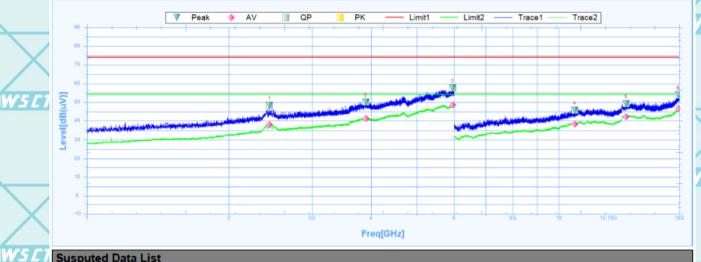


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High channel: 2480MHz

Horizontal:

W5 CT



W5 C

1	Susputed Data List										
	NO.	Freq. [MHz]	Reading [dB(uV)]	Factor [dB]	Level [dB(uV)]	Limit [dB]	Margin [dB]	Deg [°]	Polarity	Trace	Verdict
	1	2436.8750	48.25	27.39	20.86	74	-25.75	325.7	Horizontal	PK	Pass
	1	2436.8750	37.94	27.39	10.55	54	-16.06	325.7	Horizontal	AV	Pass
	2	3898.7500	50.11	29.46	20.65	74	-23.89	261.1	Horizontal	PK	Pass
	2	3898.7500	41.18	29.46	11.72	54	-12.82	261.1	Horizontal	AV	Pass
	3	5953.1250	57.59	32.72	24.87	74	-16.41	43.6	Horizontal	PK	Pass
7	3	5953.1250	48.46	32.72	15.74	54	-5.54	43.6	Horizontal	AV	Pass
1	4	10801.5000	45.62	14.77	30.85	74	-28.38	173.1	Horizontal	PK	Pass
	4	10801.5000	38.17	14.77	23.4	54	-15.83	173.1	Horizontal	AV	Pass
	5	13881.0000	49.29	18.77	30.52	74	-24.71	134.8	Horizontal	PK	Pass
	5	13881.0000	42.13	18.77	23.36	54	-11.87	134.8	Horizontal	AV	Pass
	6	17902.5000	53.85	23.28	30.57	74	-20.15	356.5	Horizontal	PK	Pass
	6	17902.5000	46.53	23.28	23.25	54	-7.47	356.5	Horizontal	AV	Pass

WSET	WSET	WSET	WSET	W	SET
	X	X	\times	\times	X
	WSET	WSET	WSET	WS CT	WSET
\times	\times	\times	\times		\times

AWS CT	WSET	W5 CT	WSCT	AWS CT

W5 CT WS ET WS CT W5 E1

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W5 CT







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NS E

	Suspu	ited Data Lis	st								
L	NO.	Freq. [MHz]	Reading [dB(uV)]	Factor [dB]	Level [dB(uV)]	Limit [dB]	Margin [dB]	Deg [°]	Polarity	Trace	Verdict
	1	2439.3750	46.12	27.39	18.73	74	-27.88	72.2	Vertical	PK	Pass
	1	2439.3750	38.04	27.39	10.65	54	-15.96	72.2	Vertical	AV	Pass
	2	3412.5000	48.97	28.45	20.52	74	-25.03	148.7	Vertical	PK	Pass
	2	3412.5000	37.68	28.45	9.23	54	-16.32	148.7	Vertical	AV	Pass
	3	5744.3750	56.81	32.39	24.42	74	-17.19	209.7	Vertical	PK	Pass
	3	5744.3750	47.54	32.39	15.15	54	-6.46	209.7	Vertical	AV	Pass
ş	4	10288.5000	45.34	13.25	32.09	74	-28.66	51	Vertical	PK	Pass
_	4	10288.5000	37.21	13.25	23.96	54	-16.79	51	Vertical	AV	Pass
	5	14103.0000	49.84	19.03	30.81	74	-24.16	281.8	Vertical	PK	Pass
	5	14103.0000	42.11	19.03	23.08	54	-11.89	281.8	Vertical	AV	Pass
	6	17901.0000	53.93	23.27	30.66	74	-20.07	-0.1	Vertical	PK	Pass
	6	17901.0000	46.68	23.27	23.41	54	-7.32	-0.1	Vertical	AV	Pass

Freq[GHz]

Note:

- All emissions not reported were more than 20dB below the specified limit or in the noise floor.
- Emission Level= Reading Level+Probe Factor +Cable Loss.
- Data of measurement within this frequency range shown "--" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

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

W5C1

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