



Report No.: TW2202033-01E File reference No.: 2022-03-03

Applicant: Shenzhen Bilian Electronic Co.,Ltd.

Product: IEEE 802.11a/b/g/n/ac 867Mbps WLAN + Bluetooth v5.1

USB Combo Module

Model No.: BL-M7663BU4

Trademark: N/A

Test Standards: FCC Part 15.247

Test result:

It is herewith confirmed and found to comply with the

requirements set up by ANSI C63.10, FCC Part 15.247 for the

evaluation of electromagnetic compatibility

Approved By

Terry Tong

Terry Tang

Manager

Dated: March 03, 2022

Results appearing herein relate only to the sample tested The technical reports is issued errors and omissions exempt and is subject to withdrawal at

SHENZHEN TIMEWAY TESTING LABORATORIES

Zone C, 1st Floor, Block B, Jun Xiang Da Building, Zhongshan Park Road West, Tong Le Village, Nanshan District, Shenzhen, China

Tel (755) 83448688, Fax (755) 83442996, E-Mail:info@timeway-lab.com

Report No.: TW2202033-01E Page 2 of 84

Date: 2022-03-03



Special Statement:

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19.

The testing quality system of our laboratory meets with ISO/IEC-17025 requirements, which is approved by CNAS. This approval result is accepted by MRA of APLAC.

Our test facility is recognized, certified, or accredited by the following organizations:

CNAS-LAB Code: L2292

The EMC Laboratory has been assessed and in compliance with CNAS-CL01 accreditation criteria for testing Laboratories (identical to ISO/IEC 17025:2005 General Requirements) for the Competence of testing Laboratories.

FCC-Registration No.: 744189

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 744189.

Industry Canada (IC) —Registration No.:5205A

The EMC Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 5205A.

A2LA (Certification Number:5013.01)

The EMC Laboratory has been accredited by the American Association for Laboratory Accreditation (A2LA). Certification Number:5013.01

Page 3 of 84

Report No.: TW2202033-01E

Date: 2022-03-03



Test Report Conclusion

Content

1.0	General Details	4
1.1	Test Lab Details.	4
1.2	Applicant Details	4
1.3	Description of EUT	4
1.4	Submitted Sample	4
1.5	Test Duration.	4
1.6	Test Uncertainty.	4
1.7	Test By	5
2.0	List of Measurement Equipment.	6
3.0	Technical Details	7
3.1	Summary of Test Results	7
3.2	Test Standards.	7
4.0	EUT Modification.	7
5.0	Power Line Conducted Emission Test.	8
5.1	Schematics of the Test	8
5.2	Test Method and Test Procedure.	8
5.3	Configuration of the EUT	8
5.4	EUT Operating Condition.	9
5.5	Conducted Emission Limit	9
5.6	Test Result.	9
6.0	Radiated Emission test	12
6.1	Test Method and Test Procedure.	12
6.2	Configuration of the EUT	13
6.3	EUT Operation Condition.	13
6.4	Radiated Emission Limit	13
7.0	20dB Bandwidth	26
8.0	Maximum Output Power	38
9.0	Carrier Frequency Separation.	41
10.0	Number of Hopping Channel	45
11.0	Time of Occupancy (Dwell Time)	49
12.0	Out of Band Measurement.	62
13.0	Antenna Requirement.	79
14.0	FCC ID Label.	80
15.0	Photo of Test Setup and FUT View	81

Report No.: TW2202033-01E Page 4 of 84

Date: 2022-03-03



1.0 General Details

1.1 Test Lab Details

Name: SHENZHEN TIMEWAY TESTING LABORATORIES.

Address: Zone C, 1st Floor, Block B, Jun Xiang Da Building, Zhongshan Park Road West, Tong Le

Village, Nanshan District, Shenzhen, China

Telephone: (755) 83448688 Fax: (755) 83442996

1.2 Applicant Details

Applicant: Shenzhen Bilian Electronic Co.,Ltd.

Address: Room 501, Building 3, No. 32, Dafu Road, Zhangge Community, Fucheng Street, Longhua

District, Shenzhen City

Telephone: -Fax: --

1.3 Description of EUT

Product: IEEE 802.11a/b/g/n/ac 867Mbps WLAN + Bluetooth v5.1 USB Combo Module

Manufacturer: Shenzhen Bilian Electronic Co.,Ltd.

Address: Room 501, Building 3, No. 32, Dafu Road, Zhangge Community, Fucheng Street,

Longhua District, Shenzhen City

Trademark: N/A

Model Number: BL-M7663BU4 Additional Model Number: N/A

Hardware Version: V1.0 Software Version: V1.0 Serial No.: 202112180155

Type of Modulation GFSK, 月/4DQPSK, 8DPSK for Bluetooth

Frequency range 2402-2480MHz for Bluetooth

Channel Spacing 1MHz for Bluetooth

Frequency Selection By software

Channel Number 79 channels for Bluetooth

Antenna: Ceramic Antenna. The gain of the antennas is 2.0dBi (Get from the antenna

specification provided the manufacturer)

Input Voltage: DC5.0V

1.4 Submitted Sample: 2 Samples

1.5 Test Duration

2022-02-15 to 2022-03-03

The report refers only to the sample tested and does not apply to the bulk.

This report is issued in confidence to the client and it will be strictly treated as such by the SHENZHEN TIMEWAY TESTING LABORATORIES. It may not be reproduced rather in its entirety or in part and it may not be used for adverting. The client to whom the report is issued may, however, show or send it . or a certified copy there of prepared by the SHENZHEN TIMEWAY TESTING LABORATORIES. to his customer. Supplier or others persons directly concerned. SHENZHEN TIMEWAY TESTING LABORATORIES. will not, without the consent of the client enter into any discussion of correspondence with any third party concerning the contents of the report.

In the event of the improper use of the report. The SHENZHEN TIMEWAY TESTING LABORATORIES. reserves the rights to withdraw it and to adopt any other remedies which may be appropriate.

Date: 2022-03-03



Page 5 of 84

1.6 Test Uncertainty

Conducted Emissions Uncertainty =3.6dB

Radiated Emissions below 1GHz Uncertainty =4.7dB

Radiated Emissions above 1GHz Uncertainty =6.0dB

Conducted Power Uncertainty =6.0dB

Occupied Channel Bandwidth Uncertainty = 5%

Note: The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.

1.7 Test Engineer

The sample tested by

Print Name: Andy Xing

Andy -xing

Date: 2022-03-03



2.0 Test Equipment					
Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
ESPI Test Receiver	R&S	ESPI 3	100379	2021-06-18	2022-06-17
TWO Line-V-NETW	R&S	EZH3-Z5	100294	2021-06-18	2022-06-17
TWO Line-V-NETW	R&S	EZH3-Z5	100253	2021-06-18	2022-06-17
Impuls-Begrenzer	R&S	ESH3-Z2	100281	2021-06-18	2022-06-17
Loop Antenna	EMCO	6507	00078608	2021-06-18	2022-06-17
Spectrum	R&S	FSIQ26	100292	2021-06-18	2022-06-17
Horn Antenna	A-INFO	LB-180400-KF	J211060660	2021-06-18	2022-06-17
Horn Antenna	R&S	BBHA 9120D	9120D-631	2021-07-02	2024-07-01
Power meter	Anritsu	ML2487A	6K00003613	2021-06-18	2022-06-17
Power sensor	Anritsu	MA2491A	32263	2021-06-18	2022-06-17
Bilog Antenna	Schwarebeck	VULB9163	9163/340	2021-07-02	2024-07-01
9*6*6 Anechoic			N/A	2021-07-02	2024-07-01
EMI Test Receiver	RS	ESVB	826156/011	2021-06-18	2022-06-17
EMI Test Receiver	RS	ESH3	860904/006	2021-06-18	2022-06-17
Spectrum	HP/Agilent	ESA-L1500A	US37451154	2021-06-18	2022-06-17
Spectrum	HP/Agilent	E4407B	MY50441392	2021-06-18	2022-06-17
Spectrum	RS	FSP	1164.4391.38	2022-01-14	2023-01-13
RF Cable	Zhengdi	ZT26-NJ-NJ-8M/F A		2021-06-18	2022-06-17
RF Cable	Zhengdi	7m		2021-06-18	2022-06-17
RF Switch	EM	EMSW18	060391	2021-06-18	2022-06-17
Pre-Amplifier	Schwarebeck	BBV9743	#218	2021-06-18	2022-06-17
Pre-Amplifier	HP/Agilent	8449B	3008A00160	2021-06-18	2022-06-17
LISN	SCHAFFNER	NNB42	00012	2022-01-05	2023-01-04

2.2 Automation Test Software

For Conducted Emission Test

Name	Version		
EZ-EMC	Ver.EMC-CON 3A1.1		

For Radiated Emissions

Name	Version
EMI Test Software BL410-EV18.91	V18.905
EMI Test Software BL410-EV18.806 High Frequency	V18.06

The report refers only to the sample tested and does not apply to the bulk.

This report released in confidence to the client and it will be strictly treated as such by the SHENZHEN TIMEWAY TESTING LABORATORIES. It may not be reproduced rather in its entirety or in part and it may not be used for adverting. The client to whom the report is issued may, however, show or send it . or a certified copy there of prepared by the SHENZHEN TIMEWAY TESTING LABORATORIES. to his customer. Supplier or others persons directly concerned. SHENZHEN TIMEWAY TESTING LABORATORIES. will not, without the consent of the client enter into any discussion of correspondence with any third party concerning the contents of the report.

In the event of the improper use of the report. The SHENZHEN TIMEWAY TESTING LABORATORIES. reserves the rights to withdraw it and to

adopt any other remedies which may be appropriate.

Page 7 of 84

Report No.: TW2202033-01E

Date: 2022-03-03



3.0 **Technical Details**

3.1 **Summary of test results**

The	EUT	has	been	tested	according	to	the	follo	wing	specifications:
		1140	~~~	cosca	accor anns	••	ULLU		*****	Specifications

Requirement	CFR 47 Section	Result	Notes
Antenna Requirement	15.203, 15.247(b)(4)	PASS	Complies
Maximum Peak Out Power	15.247 (b)(1), (4)	PASS	Complies
Carrier Frequency Separation	15.247(a)(1)	PASS	Complies
20dB Channel Bandwidth	15.247 (a)(1)	PASS	Complies
Number of Hopping Channels	15.247(a)(iii), 15.247(b)(1)	PASS	Complies
Time of Occupancy (Dwell Time)	15.247(a)(iii) PASS		Complies
Spurious Emission, Band Edge, and Restricted bands	15.247(d),15.205(a), 15.209 (a),15.109	PASS	Complies
Conducted Emissions	15.207(a), 15.107	PASS	Complies
RF Exposure	15.247(i), 1.1307(b)(1)	PASS	Complies

3.2 **Test Standards**

FCC Part 15 Subpart & Subpart C, Paragraph 15.247

4.0 **EUT Modification**

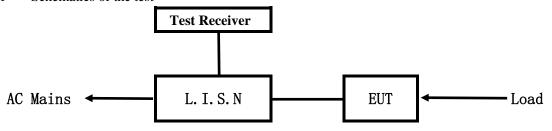
No modification by SHENZHEN TIMEWAY TESTING LABORATORIES.

Date: 2022-03-03



5. Power Line Conducted Emission Test

5.1 Schematics of the test

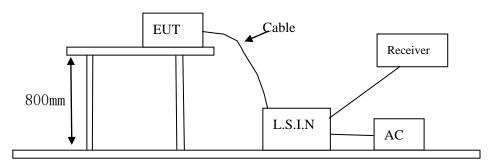


EUT: Equipment Under Test

5.2 Test Method and test Procedure

The EUT was tested according to ANSI C63.10-2013. The Frequency spectrum From 0.15MHz to 30MHz was investigated. The LISN used was 50ohm/50uH as specified by section 5.1 of ANSI C63.10-2013.

Test Voltage: 120V~ 60Hz Block diagram of Test setup



5.3 Configuration of The EUT

The EUT was configured according to ANSI C63.10-2013. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

A. EUT

Device	Manufacturer	Model	FCC ID	
IEEE 802.11a/b/g/n/ac 867Mbps WLAN	Shenzhen Bilian	BL-M7663BU4	2AL6KBL-M7663BU4	
+ Bluetooth v5.1 USB Combo Module	Electronic Co.,Ltd.	BL-M7003B04		

The report refers only to the sample tested and does not apply to the bulk.

This report is issued in confidence to the client and it will be strictly treated as such by the SHENZHEN TIMEWAY TESTING LABORATORIES. It may not be reproduced rather in its entirety or in part and it may not be used for adverting. The client to whom the report is issued may, however, show or send it . or a certified copy there of prepared by the SHENZHEN TIMEWAY TESTING LABORATORIES. to his customer. Supplier or others persons directly concerned. SHENZHEN TIMEWAY TESTING LABORATORIES. will not, without the consent of the client enter into any discussion of correspondence with any third party concerning the contents of the report.

Report No.: TW2202033-01E Page 9 of 84

Date: 2022-03-03



B. Internal Device

Device	Manufacturer	Model	Rating

C. Peripherals

Device	Manufacturer	Model	Rating
N/A			

5.4 EUT Operating Condition

Operating condition is according to ANSI C63.10-2013.

- A Setup the EUT and simulators as shown on follow
- B Enable AF signal and confirm EUT active to normal condition

5.5 Power line conducted Emission Limit according to Paragraph 15.207

Frequency	Limits (dB µ V)			
(MHz)	Quasi-peak Level	Average Level		
$0.15 \sim 0.50$	66.0~56.0*	56.0~46.0*		
$0.50 \sim 5.00$	56.0	46.0		
5.00 ~ 30.00	60.0	50.0		

Notes: 1. *Decreasing linearly with logarithm of frequency.

2. The tighter limit shall apply at the transition frequencies

5.6 Test Results

The frequency spectrum from 0.15MHz to 30MHz was investigated. All reading are quasi-peak values with a resolution bandwidth of 9kHz.

Date: 2022-03-03



A: Conducted Emission on Live Terminal (150kHz to 30MHz)

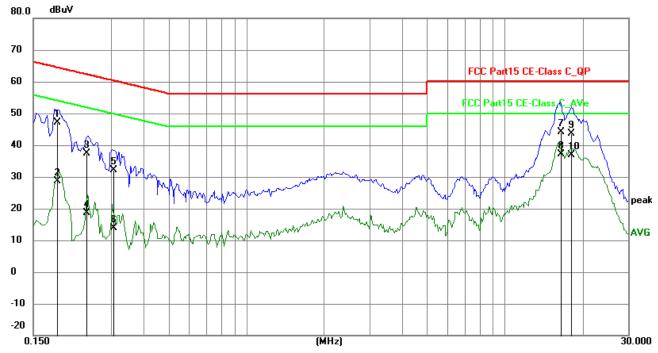
EUT Operating Environment

Humidity: 65%RH Atmospheric Pressure: 101 kPa Temperature: 26°C

EUT set Condition: Keep Bluetooth Transmitting

Results: Pass

Please refer to following diagram for individual



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1853	37.35	9.76	47.11	64.24	-17.13	QP	Р
2	0.1853	18.90	9.76	28.66	54.24	-25.58	AVG	Р
3	0.2416	27.57	9.75	37.32	62.04	-24.72	QP	Р
4	0.2416	8.86	9.75	18.61	52.04	-33.43	AVG	Р
5	0.3067	22.46	9.76	32.22	60.06	-27.84	QP	Р
6	0.3067	4.15	9.76	13.91	50.06	-36.15	AVG	Р
7	16.4160	33.68	10.46	44.14	60.00	-15.86	QP	Р
8	16.4160	26.76	10.46	37.22	50.00	-12.78	AVG	Р
9	18.1281	33.06	10.57	43.63	60.00	-16.37	QP	Р
10	18.1281	26.21	10.57	36.78	50.00	-13.22	AVG	Р

Date: 2022-03-03



B: Conducted Emission on Neutral Terminal (150kHz to 30MHz)

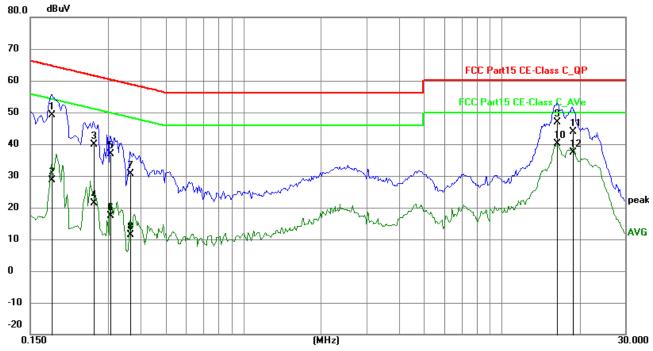
EUT Operating Environment

Humidity: 65%RH Atmospheric Pressure: 101 kPa Temperature: 26°C

EUT set Condition: Keep Bluetooth Transmitting

Results: Pass

Please refer to following diagram for individual



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1812	39.48	9.76	49.24	64.43	-15.19	QP	Р
2	0.1812	18.98	9.76	28.74	54.43	-25.69	AVG	Р
3	0.2631	30.24	9.75	39.99	61.33	-21.34	QP	Р
4	0.2631	11.62	9.75	21.37	51.33	-29.96	AVG	Р
5	0.3067	27.13	9.76	36.89	60.06	-23.17	QP	Р
6	0.3067	7.68	9.76	17.44	50.06	-32.62	AVG	Р
7	0.3645	20.87	9.76	30.63	58.63	-28.00	QP	Р
8	0.3645	1.60	9.76	11.36	48.63	-37.27	AVG	Р
9	16.3809	36.44	10.46	46.90	60.00	-13.10	QP	Р
10	16.3809	29.60	10.46	40.06	50.00	-9.94	AVG	Р
11	18.8205	33.39	10.61	44.00	60.00	-16.00	QP	Р
12	18.8205	26.75	10.61	37.36	50.00	-12.64	AVG	Р

The report refers only to the sample tested and does not apply to the bulk.

This report is issued in confidence to the client and it will be strictly treated as such by the SHENZHEN TIMEWAY TESTING LABORATORIES. It may not be reproduced rather in its entirety or in part and it may not be used for adverting. The client to whom the report is issued may, however, show or send it . or a certified copy there of prepared by the SHENZHEN TIMEWAY TESTING LABORATORIES. to his customer. Supplier or others persons directly concerned. SHENZHEN TIMEWAY TESTING LABORATORIES. will not, without the consent of the client enter into any discussion of correspondence with any third party concerning the contents of the report.

In the event of the improper use of the report. The SHENZHEN TIMEWAY TESTING LABORATORIES, reserves the rights to withdraw it and to

adopt any other remedies which may be appropriate.

Report No.: TW2202033-01E Page 12 of 84

Date: 2022-03-03

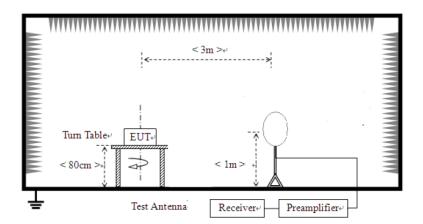


6 Radiated Emission Test

- 6.1 Test Method and test Procedure:
- (1) The EUT was tested according to ANSI C63.10-2013. The radiated test was performed at Timeway EMC Laboratory. This site is on file with the FCC laboratory division, Registration No. 744189
- (2) The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.10-2013.
- (3) The frequency spectrum from 30 MHz to 25GHz was investigated. All readings from 30 MHz to 1 GHz are quasi-peak values with a resolution bandwidth of 120 kHz. For measurement above 1GHz, peak values with RBW=VBW=1MHz and PK detector. AV value with RBW=1MHz, VBW=10Hz and PK detector. Measurements were made at 3 meters.
- (4) The antenna high is varied from 1 m to 4 m high to find the maximum emission for each frequency.
- (5) Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB of specification limit), and are distinguished with a "**QP**" in the data table.
- (6) The antenna polarization: Vertical polarization and Horizontal polarization.

Block diagram of Test setup

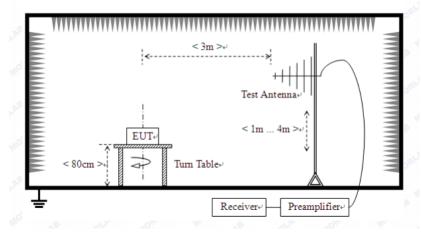
For radiated emissions from 9kHz to 30MHz



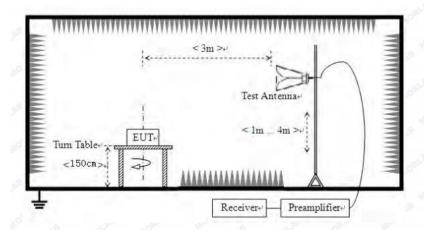
Date: 2022-03-03



For radiated emissions from 30MHz to1GHz



For radiated emissions above 1GHz



6.2 Configuration of The EUT Same as section 5.3 of this report

6.3 EUT Operating Condition Same as section 5.4 of this report.

6.4 Radiated Emission Limit

All emission from a digital device, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below:

Report No.: TW2202033-01E Page 14 of 84

Date: 2022-03-03



Frequencies in restricted band are complied to limit on Paragraph 15.209

Frequency Range (MHz)	Distance (m)	Field strength (dB µ V/m)
30-88	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

Note:

- 1. RF Voltage $(dBuV) = 20 \log RF \text{ Voltage } (uV)$
- 2. In the Above Table, the higher limit applies at the band edges.
- 3. Distance refers to the distance in meters between the measuring instrument antenna and the EUT
- 4. 8DPSK was the worst case because it has highest output power

Date: 2022-03-03



Page 15 of 84

Test result

General Radiated Emission Data and Harmonics Radiated Emission Data

Radiated Emission In Horizontal/Vertical (30MHz----1000MHz)

Keep Bluetooth Transmitting EUT set Condition:

Results: Pass

Page 16 of 84

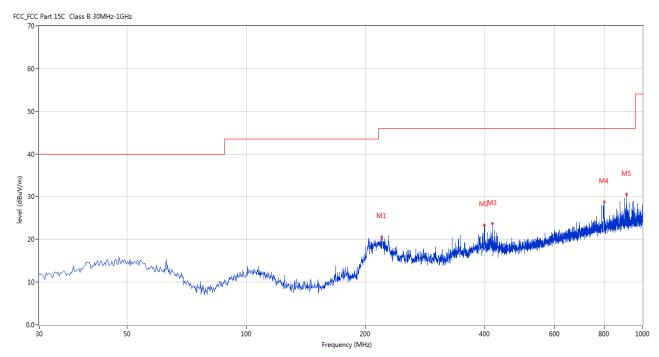
Report No.: TW2202033-01E

Date: 2022-03-03



Test Figure:

H



No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table (o)	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)			(cm)		
1	219.345	20.52	-13.32	46.0	-25.48	Peak	77.00	100	Horizontal	Pass
2	398.508	23.33	-8.65	46.0	-22.67	Peak	220.00	100	Horizontal	Pass
3	417.661	23.66	-8.08	46.0	-22.34	Peak	35.00	100	Horizontal	Pass
4	799.745	28.80	-2.97	46.0	-17.20	Peak	197.00	100	Horizontal	Pass
5	912.722	30.53	-1.80	46.0	-15.47	Peak	35.00	100	Horizontal	Pass

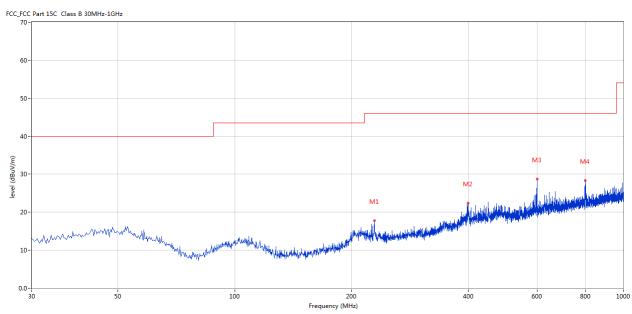
Report No.: TW2202033-01E Page 17 of 84

Date: 2022-03-03



Test Figure:

V



No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
1	228.800	17.75	-12.72	46.0	-28.25	Peak	150.00	100	Vertical	Pass
2	398.993	22.46	-8.62	46.0	-23.54	Peak	110.00	100	Vertical	Pass
3	599.975	28.73	-4.95	46.0	-17.27	Peak	40.00	100	Vertical	Pass
4	799.018	28.33	-3.00	46.0	-17.67	Peak	152.00	100	Vertical	Pass

Report No.: TW2202033-01E Page 18 of 84

Date: 2022-03-03



Operation Mode: Transmitting under Low Channel (2402MHz)

Frequency (MHz)	Level@3m (dBµV/m)	Antenna Polarity	Limit@3m (dB µ V/m)
4804		Н	74(Peak)/ 54(AV)
4804	1	V	74(Peak)/ 54(AV)
7206	-	H/V	74(Peak)/ 54(AV)
9608	1	H/V	74(Peak)/ 54(AV)
12010		H/V	74(Pe k)/ 54(AV)
14412		H/V	74(Peak)/ 54(AV)
16814		H/V	74(Peak)/ 54(AV)
19216		H/V	74(Peak)/ 54(AV)
21618		H/V	74(Peak)/ 54(AV)
24020		H/V	74(Peak)/ 54(AV)

Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit

2. Remark "---" means that the emissions level is too low to be measured

Operation Mode: Transmitting g under Middle Channel (2441MHz)

Frequency (MHz)	Level@3m (dB \(\mu \)V/m)	Antenna Polarity	Limit@3m (dB µ V/m)
4882	-	Н	74(Peak)/ 54(AV)
4882	-	V	74(Peak)/ 54(AV)
7323	-	H/V	74(Peak)/ 54(AV)
9764	-	H/V	74(Peak)/ 54(AV)
12205		H/V	74(Peak)/ 54(AV)
14646		H/V	74(Peak)/ 54(AV)
17087	-	H/V	74(Peak)/ 54(AV)
19528		H/V	74(Peak)/ 54(AV)
21969	-	H/V	74(Peak)/ 54(AV)
24410		H/V	74(Peak)/ 54(AV)

Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit

2. Remark "---" means that the emissions level is too low to be measured

Report No.: TW2202033-01E Page 19 of 84

Date: 2022-03-03



Operation Mode: Transmitting under High Channel (2480MHz)

	0 0	, ,	
Frequency (MHz)	Level@3m (dB μ V/m)	Antenna Polarity	Limit@3m (dB \(\mu \)V/m)
4960		Н	74(Peak)/ 54(AV)
4960		V	74(Peak)/ 54(AV)
7440		H/V	74(Peak)/ 54(AV)
9920	-	H/V	74(Peak)/ 54(AV)
12400		H/V	74(Peak)/ 54(AV)
14880		H/V	74(Peak)/ 54(AV)
17360		H/V	74(Peak)/ 54(AV)
19840		H/V	74(Peak)/ 54(AV)
22320		H/V	74(Peak)/ 54(AV)
24800		H/V	74(Peak)/ 54(AV)

Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit

^{2.} Remark "---" means that the emissions level is too low to be measured

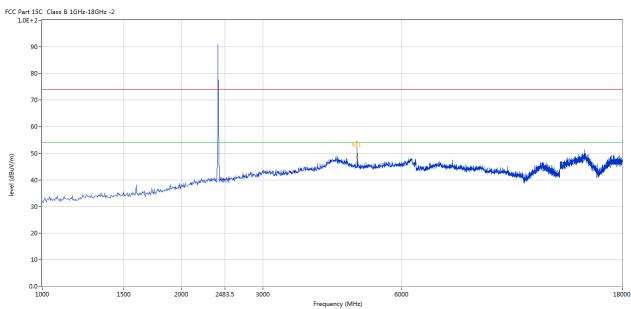
Page 20 of 84 Report No.: TW2202033-01E

Date: 2022-03-03



Please refer to the following test plots for details:

Low Channel: Horizontal



No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
1	4802.799	54.60	3.12	74.0	-19.40	Peak	145.00	100	Horizontal	Pass
1**	4802.799	48.45	3.12	54.0	-5.55	AV	145.00	100	Horizontal	Pass

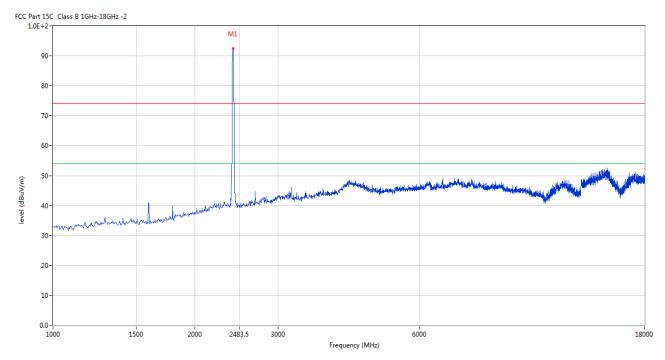
Page 21 of 84

Report No.: TW2202033-01E

Date: 2022-03-03



Low Channel: Vertical

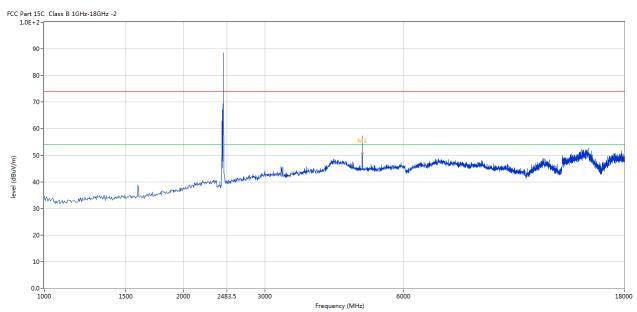


Report No.: TW2202033-01E Page 22 of 84

Date: 2022-03-03



Middle Channel: Horizontal



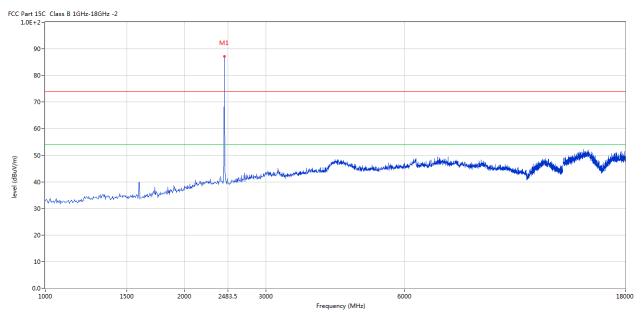
No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
1	4879.280	57.18	3.20	74.0	-16.82	Peak	150.00	100	Horizontal	Pass
1**	4879.280	50.65	3.20	54.0	-3.35	AV	150.00	100	Horizontal	Pass

Report No.: TW2202033-01E Page 23 of 84

Date: 2022-03-03



Middle Channel: Vertical

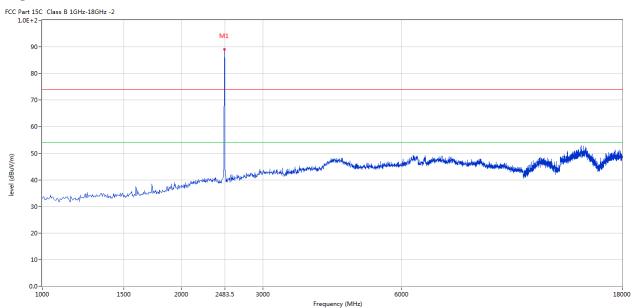


Report No.: TW2202033-01E Page 24 of 84

Date: 2022-03-03



High Channel: Horizontal



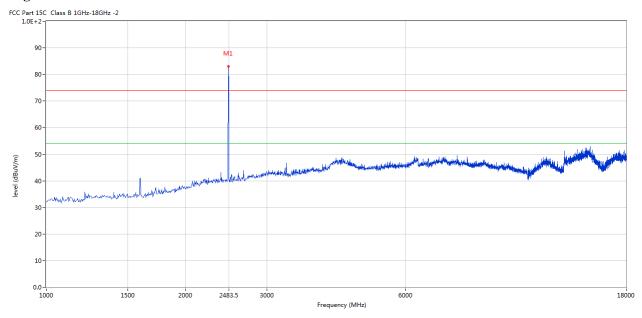
Page 25 of 84

Report No.: TW2202033-01E

Date: 2022-03-03



High Channel: Vertical



Note: 1. for the radiated emissions above 18G and below 30MHz, it is the floor noise.

2. the measured PK radiated emissions level less than the AV limit, so no necessary to take down the AV result

Report No.: TW2202033-01E Page 26 of 84

Date: 2022-03-03



7.0 20dB Bandwidth Measurement

7.1 Regulation

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

7.2 Limits of 20dB Bandwidth Measurement

N/A

7.3 Test Procedure.

- 1. Check the calibration of the measuring instrument (spectrum analyzer) using either an internal calibrator or a known signal from an external generator.
- 2. Set the spectrum analyzer as follows: Span =3MHz, RBW =30 kHz, VBW=100 kHz, Sweep = auto Detector function = peak, Trace = max hold
- 3. Measure the highest amplitude appearing on spectral display and record the level to calculate results. 6. Repeat above procedures until all frequencies measured were complete.

7.4 Test Result

Type of Modulation: GFSK

EUT	IEEE 802.11a/b/s	g/n/ac 867Mbps WLAN +	Model	BL-M7663BU4
	Bluetooth v5.	1 USB Combo Module		
Mode	Keep	Transmitting	Input Voltage	DC5.0V
Temperat	ure 2	24 deg. C,	Humidity	56% RH
Channel	Channel Frequency (MHz)	1 1		Pass/ Fail
Low	2402	1034		Pass
Middle	2441	1034		Pass
High	2480	2480 1034		Pass

Page 27 of 84

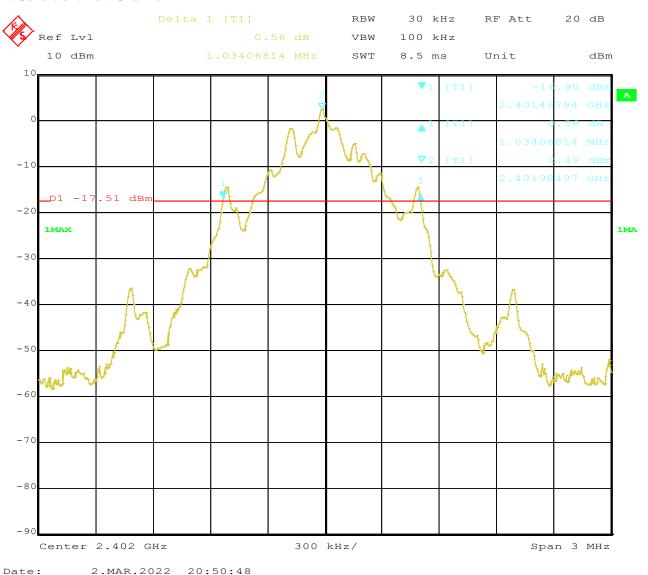
Report No.: TW2202033-01E

Date: 2022-03-03



Test Figure:

1. Condition: Low Channel



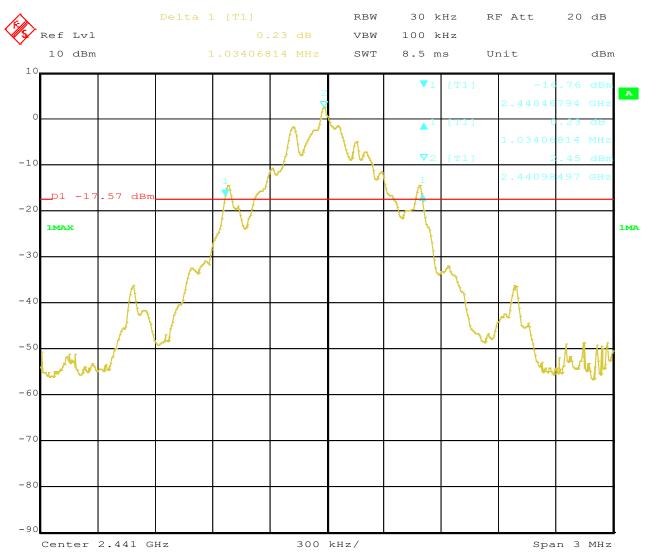
Page 28 of 84

Report No.: TW2202033-01E

Date: 2022-03-03



2. Condition: Middle Channel



2.MAR.2022 20:48:36 Date:

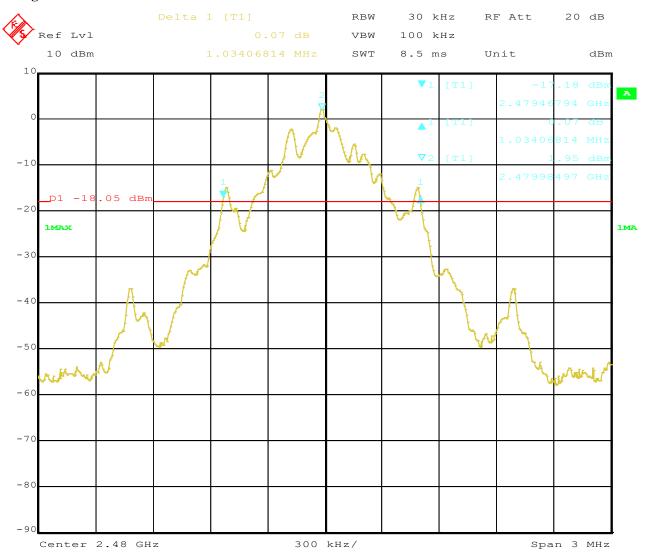
Page 29 of 84

Report No.: TW2202033-01E

Date: 2022-03-03



3. High Channel



2.MAR.2022 20:39:39 Date:

Date: 2022-03-03



Page 30 of 84

Test Result

Type of Modulation: Л/4DQPSK

EUT		g/n/ac 867Mbps WLAN + 1 USB Combo Module	Model	BL-M7663BU4
Mode	Keep	Transmitting	Input Voltage	DC5.0V
Temperature	2	24 deg. C,	Humidity	56% RH
Channel	Channel Frequency (MHz) 20 dB Bandwidth (kHz)		Maximum Limit (kHz)	Pass/ Fail
Low	2402	1136		Pass
Middle	2441	1136		Pass
High	2480	1136		Pass

Page 31 of 84

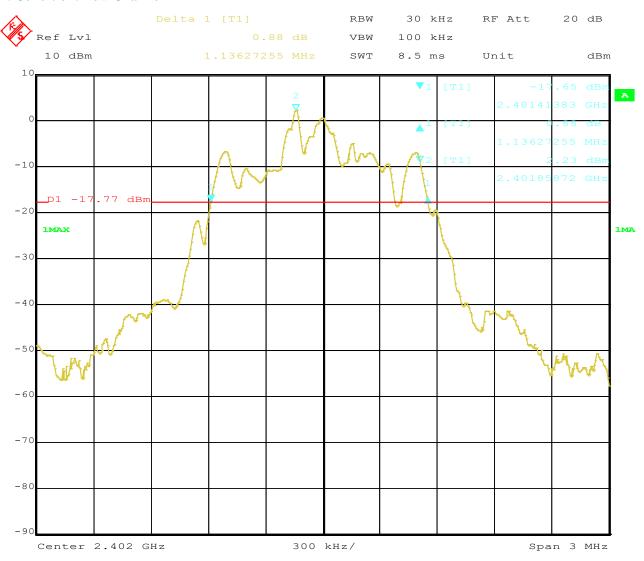
Report No.: TW2202033-01E

Date: 2022-03-03



Test Figure:

1. Condition: Low Channel



2.MAR.2022 19:51:50 Date:

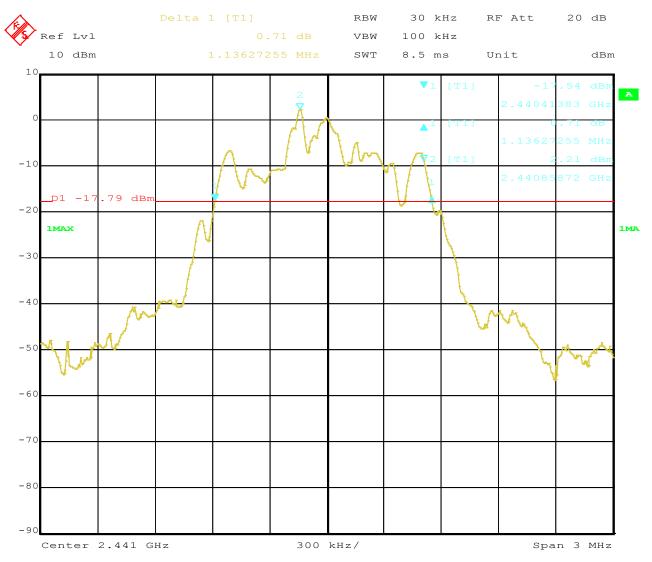
Page 32 of 84

Report No.: TW2202033-01E

Date: 2022-03-03



2. Condition: Middle Channel



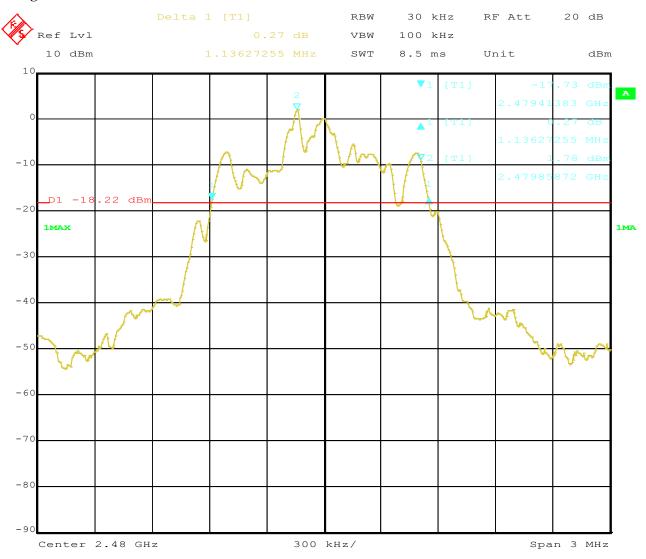
2.MAR.2022 19:54:50 Date:

Report No.: TW2202033-01E Page 33 of 84

Date: 2022-03-03



3. High Channel



2.MAR.2022 20:36:03 Date:

Date: 2022-03-03



Page 34 of 84

Test Result

Type of Modulation: 8DPSK

EUT		g/n/ac 867Mbps WLAN 1 USB Combo Module	Model	BL-M7663BU4
Mode	Keep	Transmitting	Input Voltage	DC5.0V
Temperature	24	4 deg. C,	Humidity	56% RH
Channel	Channel Frequency (MHz) 20 dB Bandwidth (kHz)		Maximum Limit (kHz)	Pass/ Fail
Low	2402	1257		Pass
Middle	2441	1251		Pass
High	2480	1256		Pass

Page 35 of 84

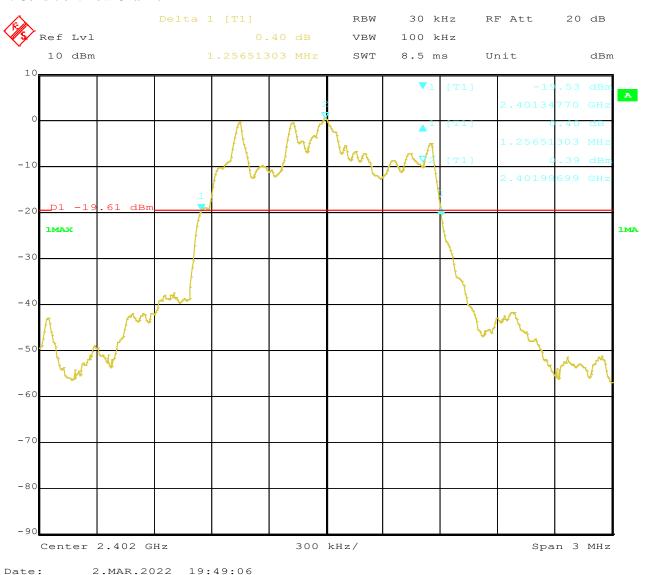
Report No.: TW2202033-01E

Date: 2022-03-03



Test Figure:

1. Condition: Low Channel



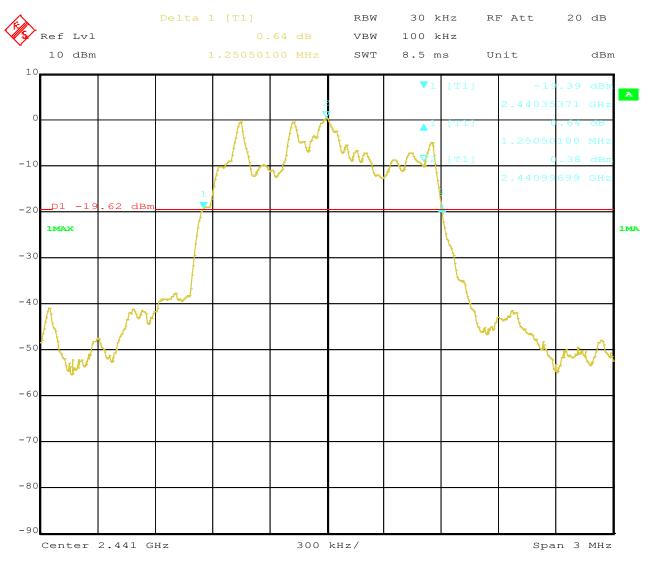
Page 36 of 84

Report No.: TW2202033-01E

Date: 2022-03-03



2. Condition: Middle Channel



2.MAR.2022 19:46:44 Date:

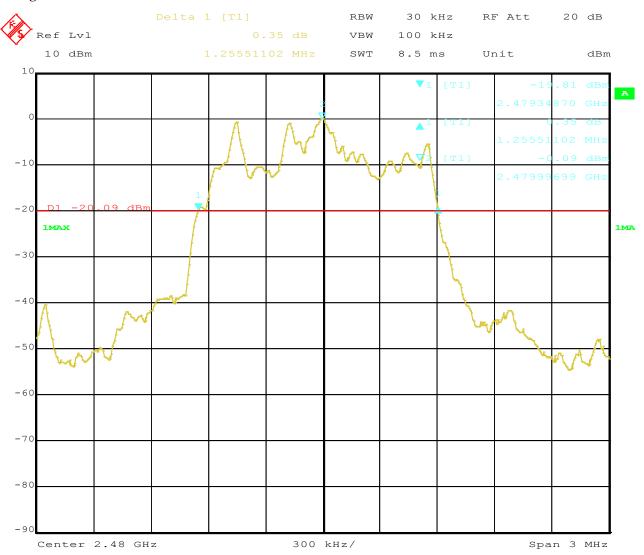
Page 37 of 84

Report No.: TW2202033-01E

Date: 2022-03-03



3. High Channel



2.MAR.2022 19:42:57 Date:

Report No.: TW2202033-01E

Date: 2022-03-03



Page 38 of 84

8. Maximum Output Power

8.1 Regulation

According to §15.247(b)(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 2400-2483.5MHz band:0.125 watts. According to §15.247(b)(4), the conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

8.2 Limits of Maximum Output Power

The Maximum Output Power Measurement is 30dBm.

8.3 Test Procedure

- 1. Check the calibration of the measuring instrument (spectrum analyzer) using either an internal calibrator or a known signal from an external generator.
- 2. Set the spectrum analyzer as follows: 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=3MHz; Sweep = 60s; Detector function = PK; Trace = max hold
- 3. Measure the highest amplitude appearing on spectral display and record the level to calculate results.
- 4. Repeat above procedures until all frequencies measured were complete.

Note: The Peak power were measured

Page 39 of 84

Report No.: TW2202033-01E

Date: 2022-03-03



8.4Test Results

Type of Modulation: GFSK

EUT	IEEE 802.11a/b/g/n/ac 867Mbps WLAN + Bluetooth v5.1 USB Combo Module		Model	BL-M7663BU4
Mode	Keep Transmitting		Input Voltage	DC5.0V
Temperature		24 deg. C,		56% RH
Channel			Pass/ Fail	
	(MHz)	Peak	(dBm)	
Low	2402	4.76	30	Pass
Middle	2441	4.76	30	Pass
High	2480	4.16	30	Pass

Note: 1. the result basic equation calculation as follow:

Max. Power Output = Power Reading + Cable loss + Attenuator

- 2. The worse case was recorded
- 3. The **Peak** power was measured

Type of Modulation: Л/4DQPSK

EUT		11a/b/g/n/ac 867Mbps WLAN + th v5.1 USB Combo Module	Model	BL-M7663BU4
Mode		Keep Transmitting	Input Voltage	DC5.0V
Temperature		24 deg. C,	Humidity	56% RH
Channel	Channel Frequency	Max. Power Output (dBm)	Peak Power Limit	Pass/ Fail
	(MHz)	Peak	(dBm)	
Low	2402	4.92	30	Pass
Middle	2441	4.92	30	Pass
High	2480	4.60	30	Pass

Note: 1. the result basic equation calculation as follow:

Max. Power Output = Power Reading + Cable loss + Attenuator

- 2. The worse case was recorded
- 3. The **Peak** power was measured

The report refers only to the sample tested and does not apply to the bulk.

This report is issued in confidence to the client and it will be strictly treated as such by the SHENZHEN TIMEWAY TESTING LABORATORIES. It may not be reproduced rather in its entirety or in part and it may not be used for adverting. The client to whom the report is issued may, however, show or send it . or a certified copy there of prepared by the SHENZHEN TIMEWAY TESTING LABORATORIES. to his customer. Supplier or others persons directly concerned. SHENZHEN TIMEWAY TESTING LABORATORIES. will not, without the consent of the client enter into any discussion of correspondence with any third party concerning the contents of the report.

In the event of the improper use of the report. The SHENZHEN TIMEWAY TESTING LABORATORIES, reserves the rights to withdraw it and to

adopt any other remedies which may be appropriate.

Report No.: TW2202033-01E

Date: 2022-03-03



Page 40 of 84

Type of Modulation: 8DPSK

EUT		IEEE 802.11a/b/g/n/ac 867Mbps WLAN + Bluetooth v5.1 USB Combo Module		BL-M7663BU4
Mode	Ke	Keep Transmitting		DC5.0V
Temperature	e	24 deg. C,		56% RH
Channel	Channel Frequency	Max. Power Output (dBm)	Peak Power Limit	Pass/ Fail
Chamier	(MHz)	Peak	(dBm)	
Low	2402	5.06	30	Pass
Middle	2441	4.92	30	Pass
High	2480	4.60	30	Pass

Note: 1. the result basic equation calculation as follow:

Max. Power Output = Power Reading + Cable loss + Attenuator

- 2. The worse case was recorded
- 3. The **Peak** power was measured

Report No.: TW2202033-01E

Date: 2022-03-03



Page 41 of 84

9. Carrier Frequency Separation

9.1 Regulation

According to §15.247(a)(1), 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.

9.2 Limits of Carrier Frequency Separation

The Maximum Power Spectral Density Measurement is 25kHz or two-thirds of the 20dB bandwidth of the hopping Channel which is great.

9.3 Test Procedure

- 1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 2. Set the spectrum analyzer as follows: Span = wide enough to capture the peaks of two adjacent channels: Resolution (or IF) Bandwidth (RBW) \geq 1% of the span; Video (or Average) Bandwidth (VBW) \geq RBW; Sweep = auto; Detector function = peak; Trace = max hold
- 3. Measure the separation between the peaks of the adjacent channels using the marker-delta function.
- 4. Repeat above procedures until all frequencies measured were complete.

Page 42 of 84

Report No.: TW2202033-01E

Date: 2022-03-03

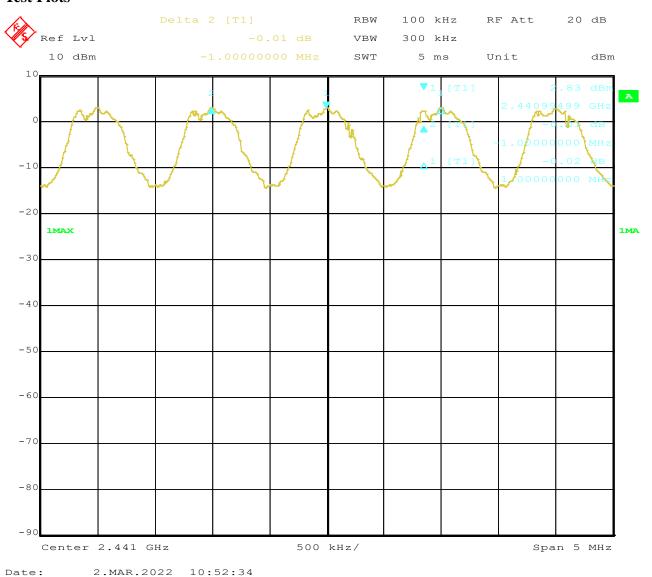


9.4Test Result

Type of Modulation: GFSK

EUT	IEEE 802.11a/b/g/n/ac 867	Model	BL	-M7663BU4	
	Bluetooth v5.1 USB Co				
Mode	Hopping On		Input Voltage		DC5.0V
Temperature	24 deg. C,		Humidity	56% RH	
Carrier l	Frequency Separation		Limit		Pass/ Fail
	1.000MHz	≥ 25 kHz or 2/3	3 of the 20 dB ban	dwidth	Pass

Test Plots



The report refers only to the sample tested and does not apply to the bulk.

This report is issued in confidence to the client and it will be strictly treated as such by the SHENZHEN TIMEWAY TESTING LABORATORIES. It may not be reproduced rather in its entirety or in part and it may not be used for adverting. The client to whom the report is issued may, however, show or send it . or a certified copy there of prepared by the SHENZHEN TIMEWAY TESTING LABORATORIES. to his customer. Supplier or others persons directly concerned. SHENZHEN TIMEWAY TESTING LABORATORIES. will not, without the consent of the client enter into any discussion of correspondence with any third party concerning the contents of the report.

In the event of the improper use of the report. The SHENZHEN TIMEWAY TESTING LABORATORIES. reserves the rights to withdraw it and to

adopt any other remedies which may be appropriate.

Page 43 of 84

Report No.: TW2202033-01E

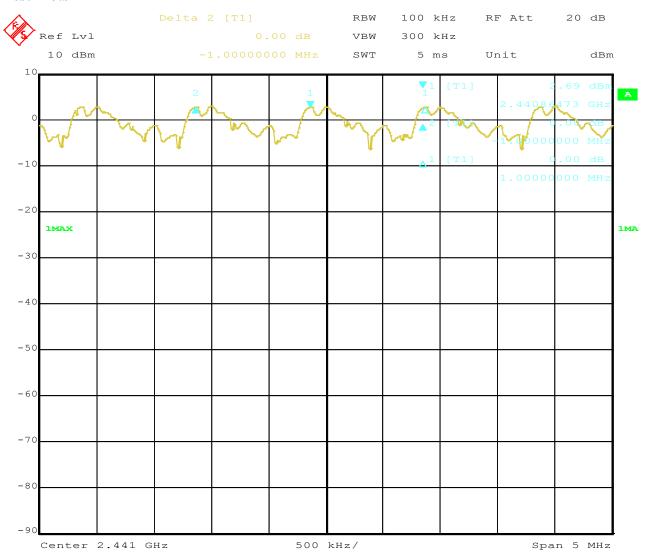
Date: 2022-03-03



Type of Modulation: $\pi/4DQPSK$

EUT	IEEE 802.11a/b/g/n/ac 867	Model	BL	-M7663BU4	
	Bluetooth v5.1 USB Co				
Mode	Hopping O	Input Voltage		DC5.0V	
Temperature	24 deg. C,		Humidity		56% RH
Carrier Frequency Separation			Limit		Pass/ Fail
	1.000MHz	≥ 25 kHz or 2	2/3 of 20 dB bandy	vidth	Pass

Test Plots



Date:

2.MAR.2022 13:47:21

Page 44 of 84

Report No.: TW2202033-01E

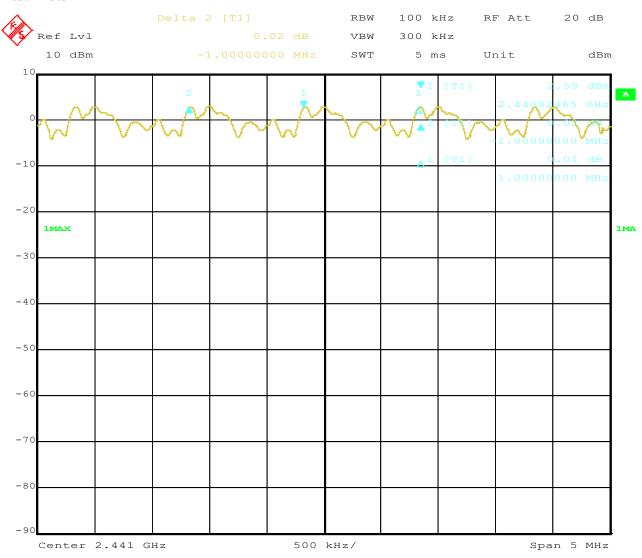
Date: 2022-03-03



Type of Modulation: 8DPSK

EUT	IEEE 802.11a/b/g/n/ac 867	Model	BL	-M7663BU4	
	Bluetooth v5.1 USB Co				
Mode	Hopping On		Input Voltage		DC5.0V
Temperature	24 deg. C,	24 deg. C,			56% RH
Carrier Frequency Separation			Limit		Pass/ Fail
	1.000MHz	≥ 25 kHz or 2	2/3 of 20 dB bands	width	Pass

Test Plots



Date:

2.MAR.2022 17:28:02

Report No.: TW2202033-01E

Date: 2022-03-03



Page 45 of 84

10. Number of Hopping Channels

10.1 Regulation

According to §15.247(a)(1)(iii), frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. 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. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used. According to §15.247(b)(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.

10.2 Limits of Number of Hopping Channels

The frequency hopping systems in the 2400-2483.5MHz band shall use at least 15 channels.

10.3 Test Procedure

- 1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 2. Set the spectrum analyzer as follows: Span = the frequency band of operation; RBW=100 kHz, VBW=300 kHz; Sweep = auto; Detector function = peak; Trace = max hold
- 3. Record the number of hopping channels.

Page 46 of 84

Report No.: TW2202033-01E

Date: 2022-03-03

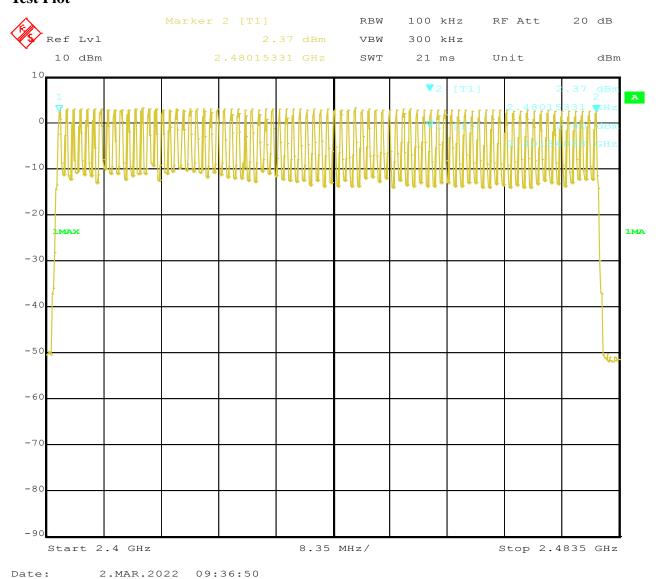


10.4Test Result

Type of Modulation: GFSK

EUT	IEEE 802.11a/b/g/n/ac		Model	BL	-M7663BU4		
	867Mbps WLAN + Bluetooth						
	v5.1 USB Combo Module						
Mode	Н	opping On	Input Voltage	DC5.0V			
Temperature	2	24 deg. C,	Humidity		56% RH		
Operating Free	quency Number of hopp		ping channels	Limit	Pass/ Fail		
2402-2480MHz		79	1	≥ 15	Pass		

Test Plot



The report refers only to the sample tested and does not apply to the bulk.

This report is issued in confidence to the client and it will be strictly treated as such by the SHENZHEN TIMEWAY TESTING LABORATORIES. It may not be reproduced rather in its entirety or in part and it may not be used for adverting. The client to whom the report is issued may, however, show or send it . or a certified copy there of prepared by the SHENZHEN TIMEWAY TESTING LABORATORIES. to his customer. Supplier or others persons directly concerned. SHENZHEN TIMEWAY TESTING LABORATORIES. will not, without the consent of the client enter into any discussion of correspondence with any third party concerning the contents of the report.

In the event of the improper use of the report. The SHENZHEN TIMEWAY TESTING LABORATORIES. reserves the rights to withdraw it and to

adopt any other remedies which may be appropriate.

Page 47 of 84

Report No.: TW2202033-01E

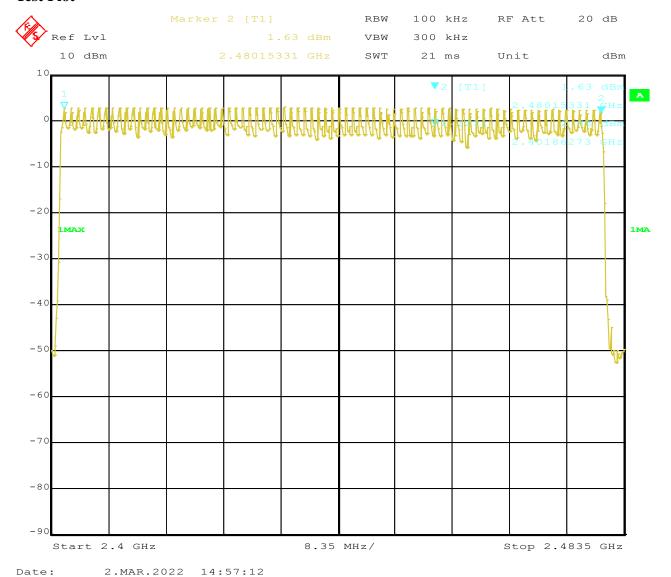
Date: 2022-03-03



Type of Modulation: Л/4DQPSK

EUT	IEEE 802.11a/b/g/n/ac		Mode	el	BI	L-M7663BU4
	867Mbps WLAN + Bluetooth					
	v5.1 USB Combo Module					
Mode	Hopping On		Input Volta			DC5.0V
Temperature		24 deg. C,	Hum	idity		56% RH
Operating Frequency		Number of hoppin channels	ıg	Lir	nit	Pass/ Fail
2402-2480MHz		79		≥ 1	15	Pass

Test Plot



The report refers only to the sample tested and does not apply to the bulk.

This report is issued in confidence to the client and it will be strictly treated as such by the SHENZHEN TIMEWAY TESTING LABORATORIES. It may not be reproduced rather in its entirety or in part and it may not be used for adverting. The client to whom the report is issued may, however, show or send it . or a certified copy there of prepared by the SHENZHEN TIMEWAY TESTING LABORATORIES. to his customer. Supplier or others persons directly concerned. SHENZHEN TIMEWAY TESTING LABORATORIES. will not, without the consent of the client enter into any

discussion of correspondence with any third party concerning the contents of the report.

In the event of the improper use of the report. The SHENZHEN TIMEWAY TESTING LABORATORIES, reserves the rights to withdraw it and to adopt any other remedies which may be appropriate.

Page 48 of 84

Report No.: TW2202033-01E

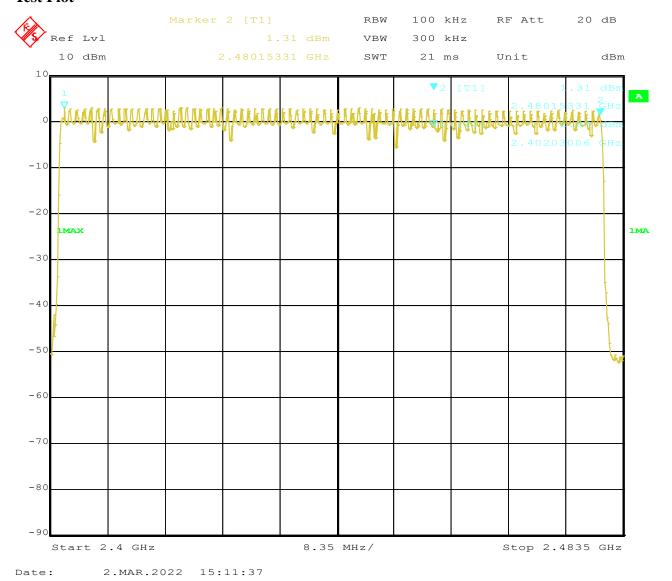
Date: 2022-03-03



Type of Modulation: 8DPSK

EUT	IEEE 802.11a/b/g/n/ac		Model		В	L-M7663BU4
	867Mbps WLAN + Bluetooth					
	v5.1 USI	B Combo Module				
Mode	Hopping On		Input V	Voltage DC5.0V		DC5.0V
Temperature	2	24 deg. C,	Humidi	ty		56% RH
Operating Frequency		Number of hopping channels		Liı	nit	Pass/ Fail
2402-2480MHz		79		≥	15	Pass

Test Plot



The report refers only to the sample tested and does not apply to the bulk.

This report is issued in confidence to the client and it will be strictly treated as such by the SHENZHEN TIMEWAY TESTING LABORATORIES. It may not be reproduced rather in its entirety or in part and it may not be used for adverting. The client to whom the report is issued may, however, show or send it . or a certified copy there of prepared by the SHENZHEN TIMEWAY TESTING LABORATORIES. to his customer. Supplier or others persons directly concerned. SHENZHEN TIMEWAY TESTING LABORATORIES. will not, without the consent of the client enter into any discussion of correspondence with any third party concerning the contents of the report.

In the event of the improper use of the report. The SHENZHEN TIMEWAY TESTING LABORATORIES. reserves the rights to withdraw it and to

adopt any other remedies which may be appropriate.

Report No.: TW2202033-01E

Date: 2022-03-03



Page 49 of 84

11. Time of Occupancy (Dwell Time)

11.1 Regulation

According to §15.247(a)(1)(iii), frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. 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. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

11.2 Limits of Carrier Frequency Separation

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

11.3 Test Procedure

- 1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
- 2. Set the spectrum analyzer as follows: Span = zero span, centered on a hopping channel; RBW = 1 MHz; VBW \geqslant RBW; Sweep = as necessary to capture the entire dwell time per hopping channel; Detector function = peak; Trace = max hold
- 3. Measure the dwell time using the marker-delta function.
- 4. Repeat above procedures until all frequencies measured were complete.
- 5. Repeat this test for different modes of operation (e.g., data rate, modulation format, etc.), if applicable.

Report No.: TW2202033-01E Page 50 of 84

Date: 2022-03-03



11.4 Test Result

Type of Modulation: GFSK

TOT YOU	TEEE 000 11 /	/ / / O.CT. EL XVII A.N.	37.11		TD.1	I Maccopill		
EUT	IEEE 802.11a/b	/g/n/ac 867Mbps WLAN +	Model		В.	L-M7663BU4		
	Bluetooth v5	.1 USB Combo Module						
Mode	Kee	p Transmitting	Input Voltage		ing Input Voltage			DC5.0V
Temperatur	re	24 deg. C,	Humidity		Humidity 5		56% RH	
Channel	Reading	Hoping Rate	Actual		Limit			
		DH5						
Middle	2.946ms	266.667 hop/s			0.314s	0.4s		
		DH3						
Middle	1.703ms	400 hop/s	0.272s 0.4s		0.4s			
	DH1							
Middle	0.421ms	800 hop/s		-	0.135s	0.4s		

Actual = Reading \times (Hopping rate / Number of channels) \times Test period, Test period = 0.4 [seconds / channel] \times 79 [channel] = 31.6 [seconds] NOTE: The EUT makes worst case 1600 hops per second or 1 time slot has a length of 625 μ s with 79 channels.

A DH5 Packet needs 5 time slot for transmitting and 1 time slot for receiving. Then the EUT makes worst case 266.667 hops per second with 79 channels.

A DH3 Packet needs 3 time slot for transmitting and 1 time slot for receiving. Then the EUT makes worst case 400 hops per second with 79 channels.

A DH1 Packet needs 1 time slot for transmitting and 1 time slot for receiving. Then the EUT makes worst case 800 hops per second with 79 channels.

Page 51 of 84

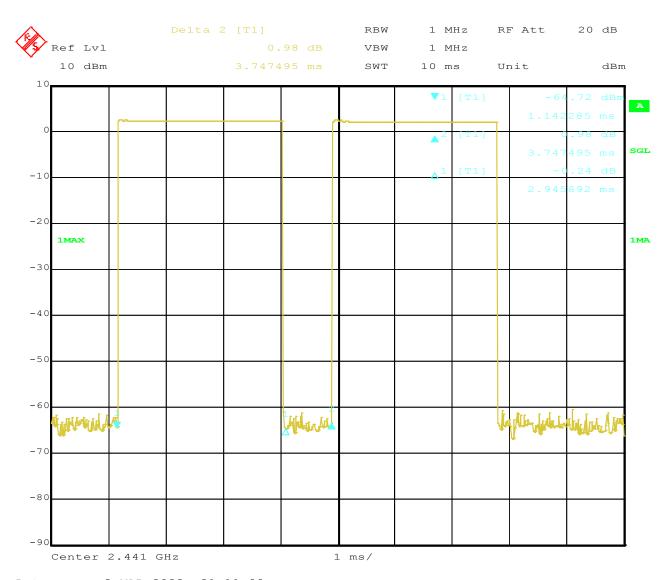
Report No.: TW2202033-01E

Date: 2022-03-03



Test Plots:

DH5



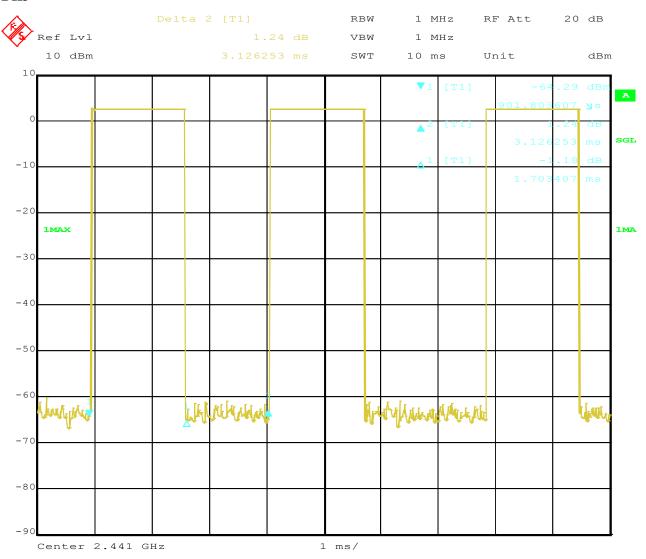
2.MAR.2022 21:11:00 Date:

Report No.: TW2202033-01E Page 52 of 84

Date: 2022-03-03



DH3



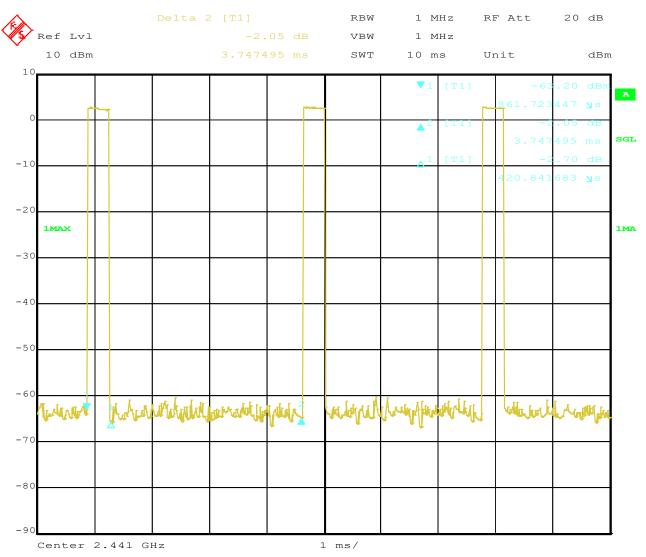
2.MAR.2022 21:10:19 Date:

Report No.: TW2202033-01E Page 53 of 84

Date: 2022-03-03



DH1



2.MAR.2022 21:09:36 Date:

Report No.: TW2202033-01E Page 54 of 84

Date: 2022-03-03



Test Result

Type of Modulation: Л/4DQPSK

EUT	IEEE 802.11a/b	IEEE 802.11a/b/g/n/ac 867Mbps WLAN +		lel	I	BL-M7663BU4
	Bluetooth v.	5.1 USB Combo Module				
Mode	Kee	ep Transmitting	Input Voltage			DC5.0V
Temperatur	re	24 deg. C,	Humidity			56% RH
Channel	Reading	Hoping Rate	Act		tual	Limit
		2DH5				
Middle	2.946ms	266.667 hop/s		0.3	14s	0.4s
		2DH3				
Middle	1.703ms	400 hop/s	0.272s		72s	0.4s
	2DH1					
Middle	0.421ms	800 hop/s	·	0.1	35s	0.4s

Actual = Reading \times (Hopping rate / Number of channels) \times Test period, Test period = 0.4 [seconds / channel] \times 79 [channel] = 31.6 [seconds] NOTE: The EUT makes worst case 1600 hops per second or 1 time slot has a length of 625 μ s with 79 channels.

A DH5 Packet needs 5 time slot for transmitting and 1 time slot for receiving. Then the EUT makes worst case 266.667 hops per second with 79 channels.

A DH3 Packet needs 3 time slot for transmitting and 1 time slot for receiving. Then the EUT makes worst case 400 hops per second with 79 channels.

A DH1 Packet needs 1 time slot for transmitting and 1 time slot for receiving. Then the EUT makes worst case 800 hops per second with 79 channels.

Page 55 of 84

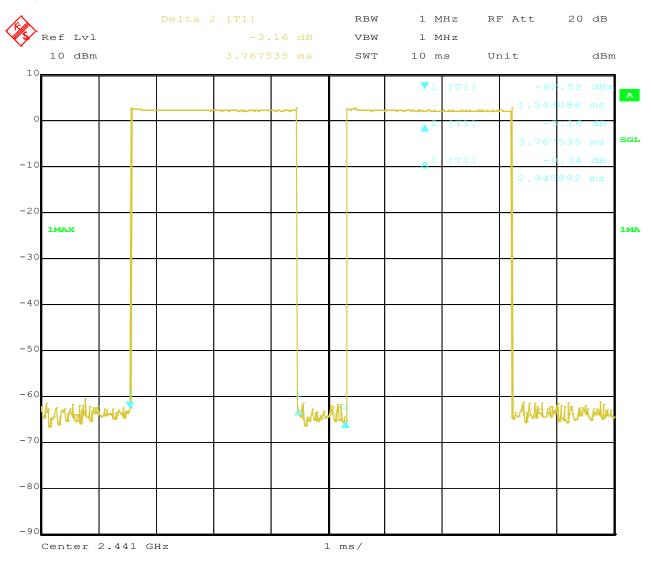
Report No.: TW2202033-01E

Date: 2022-03-03



Test Plots:

2DH5



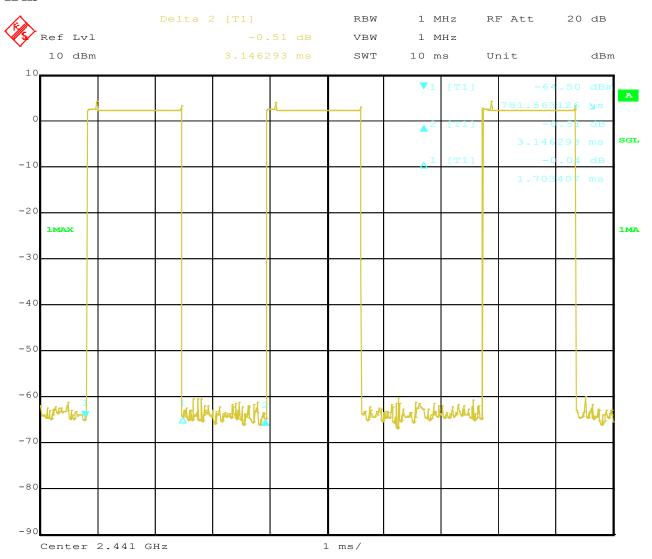
2.MAR.2022 21:09:06 Date:

Page 56 of 84 Report No.: TW2202033-01E

Date: 2022-03-03



2DH3



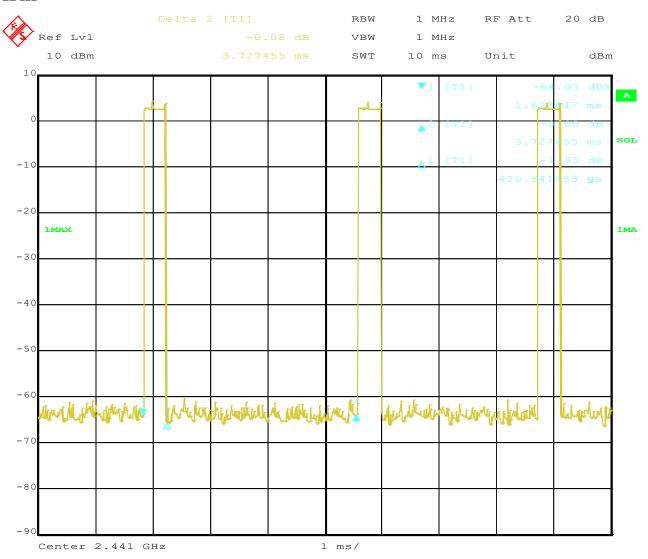
Date: 2.MAR.2022 21:08:30

Page 57 of 84 Report No.: TW2202033-01E

Date: 2022-03-03



2DH1



2.MAR.2022 21:07:38 Date:

Report No.: TW2202033-01E Page 58 of 84

Date: 2022-03-03



Type of Modulation: 8DPSK

EUT	IEEE 802.11a/b/g/n/ac 867Mbps WLAN +		Mod	del	I	BL-M7663BU4
	Bluetooth v.	5.1 USB Combo Module				
Mode	Ke	ep Transmitting	Input Voltage			DC5.0V
Temperature		24 deg. C,	Humi	dity		56% RH
Channel	Reading	Hoping Rate		Ac	tual	Limit
		3DH5				
Middle	2.966ms	266.667 hop/s		0.3	16s	0.4s
		3DH3				
Middle	1.683ms	400 hop/s	0.269		69s	0.4s
	3DH1					
Middle	0.441ms	800 hop/s		0.1	41s	0.4s

Actual = Reading \times (Hopping rate / Number of channels) \times Test period, Test period = 0.4 [seconds / channel] \times 79 [channel] = 31.6 [seconds] NOTE: The EUT makes worst case 1600 hops per second or 1 time slot has a length of 625 μ s with 79 channels.

A DH5 Packet needs 5 time slot for transmitting and 1 time slot for receiving. Then the EUT makes worst case 266.667 hops per second with 79 channels.

A DH3 Packet needs 3 time slot for transmitting and 1 time slot for receiving. Then the EUT makes worst case 400 hops per second with 79 channels.

A DH1 Packet needs 1 time slot for transmitting and 1 time slot for receiving. Then the EUT makes worst case 800 hops per second with 79 channels.

Page 59 of 84

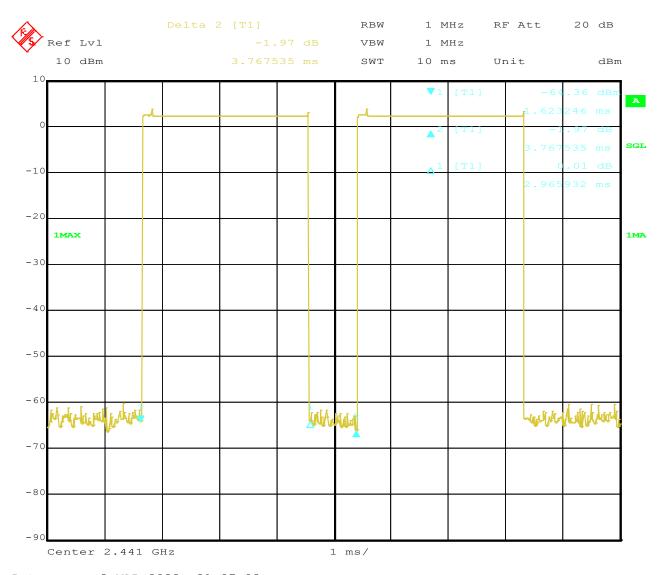
Report No.: TW2202033-01E

Date: 2022-03-03



Test Plots:

3DH5



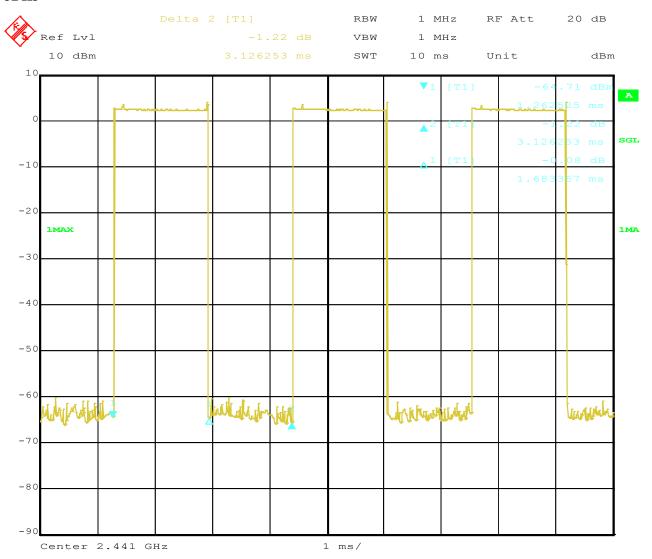
2.MAR.2022 21:07:02 Date:

Page 60 of 84 Report No.: TW2202033-01E

Date: 2022-03-03



3DH3



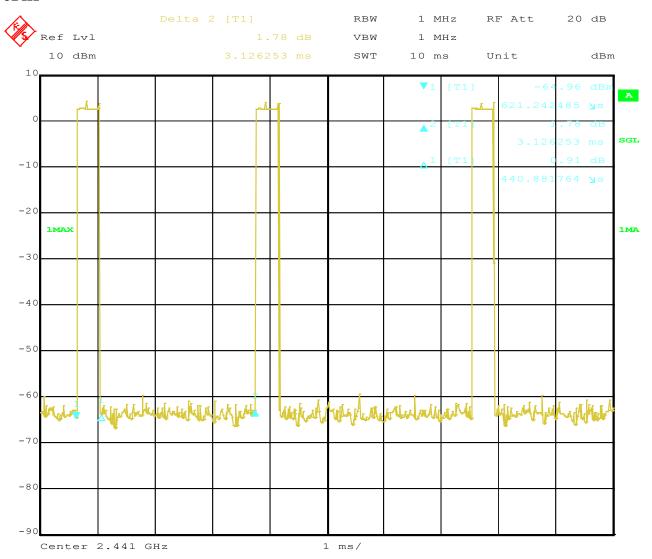
2.MAR.2022 21:06:26 Date:

Report No.: TW2202033-01E Page 61 of 84

Date: 2022-03-03



3DH1



2.MAR.2022 21:05:24 Date:

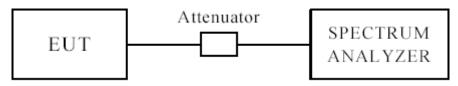
Report No.: TW2202033-01E Page 62 of 84

Date: 2022-03-03



12 Out of Band Measurement

12.1 Test Setup



The restricted band requirement based on radiated emission test; please see the clause 6 for the test setup

12.2 Limits of Out of Band Emissions Measurement

- 1. Below –20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).
- 2. Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209.

12.3 Test Procedure

For signals in the restricted bands above and below the 2.4-2.483GHz allocated band a measurement was made of radiated emission test. Peak values with RBW=VBW=1MHz and PK detector.

For bandage test, the spectrum set as follows: RBW=100kHz, VBW=300 kHz. A conducted measurement used

Note: 1. For band-edge measurement, the frequency from 30MHz-25GHz was tested. And It met the FCC rule.

Page 63 of 84

Report No.: TW2202033-01E

Date: 2022-03-03

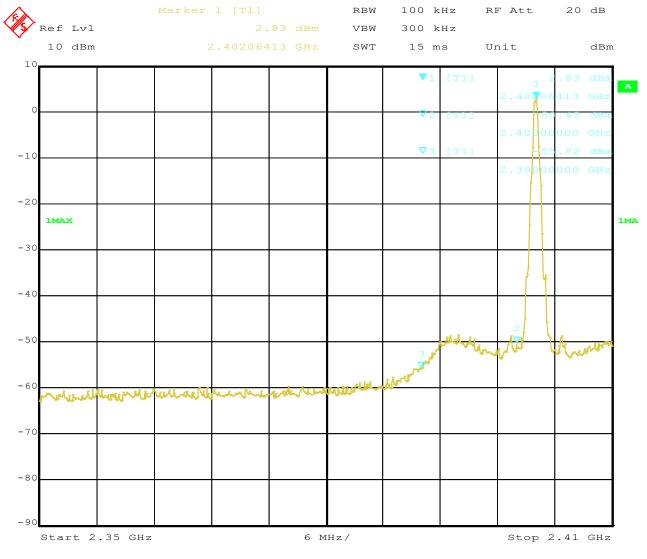


Type of Modulation: GFSK

Band Edge Test Result 12.4

Product:	IEEE 802.11a/b/g/n/ac 867Mbps WLAN	Test Mode:	BL-M7663BU4
	+ Bluetooth v5.1 USB Combo Module		
Mode	Keeping Transmitting	Input Voltage	DC5.0V
Temperature	24 deg. C	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



Date: 2.MAR.2022 19:29:58

Page 64 of 84

Report No.: TW2202033-01E

Date: 2022-03-03

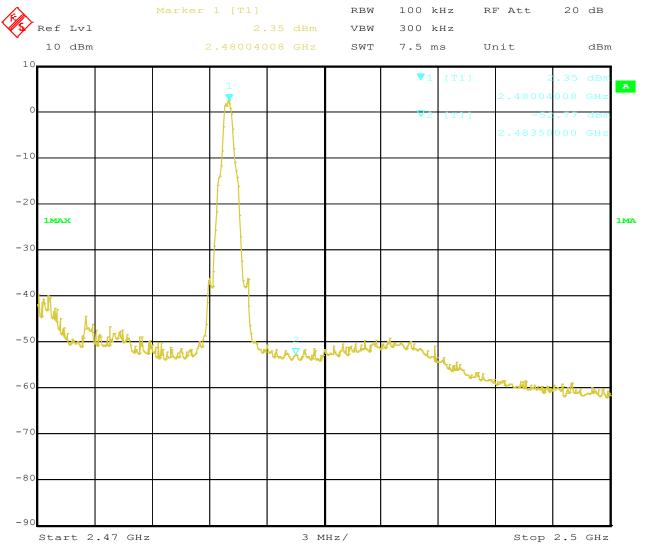


Type of Modulation: GFSK

12.4 Band Edge Test Result

Product:	IEEE 802.11a/b/g/n/ac 867Mbps WLAN +	Test Mode:	BL-M7663BU4
	Bluetooth v5.1 USB Combo Module		
Mode	Keeping Transmitting	Input Voltage	DC5.0V
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



Date: 2.MAR.2022 19:35:11

The report refers only to the sample tested and does not apply to the bulk.

This report is issued in confidence to the client and it will be strictly treated as such by the SHENZHEN TIMEWAY TESTING LABORATORIES. It may not be reproduced rather in its entirety or in part and it may not be used for adverting. The client to whom the report is issued may, however, show or send it . or a certified copy there of prepared by the SHENZHEN TIMEWAY TESTING LABORATORIES. to his customer. Supplier or others persons directly concerned. SHENZHEN TIMEWAY TESTING LABORATORIES. will not, without the consent of the client enter into any discussion of correspondence with any third party concerning the contents of the report.

In the event of the improper use of the report. The SHENZHEN TIMEWAY TESTING LABORATORIES. reserves the rights to withdraw it and to

adopt any other remedies which may be appropriate.

Page 65 of 84

Report No.: TW2202033-01E

Date: 2022-03-03

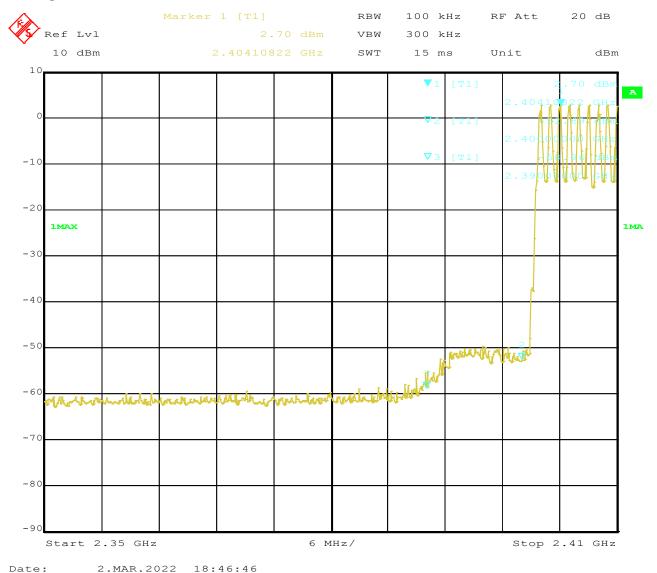


Type of Modulation: GFSK

Band Edge Test Result

Product:	IEEE 802.11a/b/g/n/ac 867Mbps WLAN	Test Mode:	BL-M7663BU4
	+ Bluetooth v5.1 USB Combo Module		
Mode	Hopping On	Input Voltage	DC5.0V
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



Page 66 of 84

Report No.: TW2202033-01E

Date: 2022-03-03

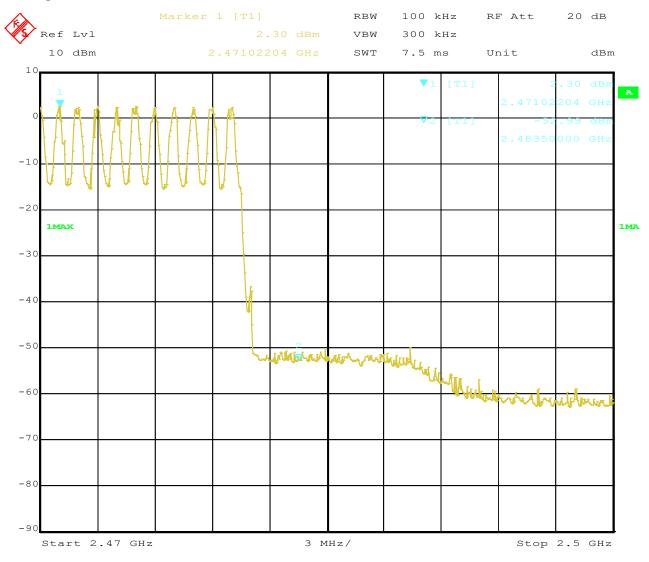


Type of Modulation: GFSK

Band Edge Test Result

Product:	IEEE 802.11a/b/g/n/ac 867Mbps WLAN +	Test Mode:	BL-M7663BU4
	Bluetooth v5.1 USB Combo Module		
Mode	Hopping On	Input Voltage	DC5.0V
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



Date: 2.MAR.2022 18:42:51

Page 67 of 84

Report No.: TW2202033-01E

Date: 2022-03-03

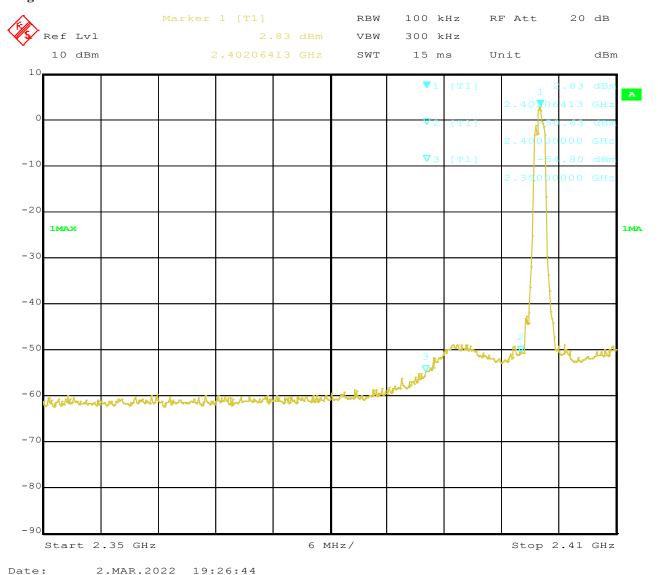


Type of Modulation: Л/4DQPSK

12.4 Out of Band Test Result

Product:	IEEE 802.11a/b/g/n/ac 867Mbps WLAN +	Test Mode:	BL-M7663BU4
	Bluetooth v5.1 USB Combo Module		
Mode	Keeping Transmitting	Input Voltage	DC5.0V
Temperature	24 deg. C	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



Page 68 of 84

Report No.: TW2202033-01E

Date: 2022-03-03

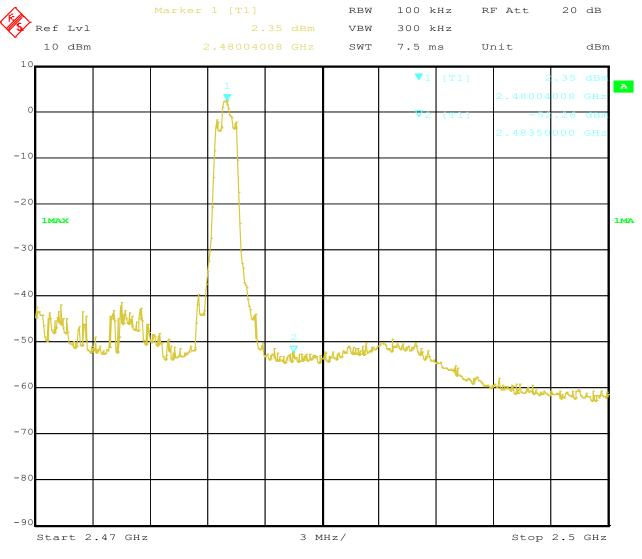


Type of Modulation: Л/4DQPSK

Band Edge Test Result 12.4

Product:	IEEE 802.11a/b/g/n/ac 867Mbps WLAN +	Test Mode:	BL-M7663BU4
	Bluetooth v5.1 USB Combo Module		
Mode	Keeping Transmitting	Input Voltage	DC5.0V
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



Date: 2.MAR.2022 19:37:07

Page 69 of 84

Report No.: TW2202033-01E

Date: 2022-03-03

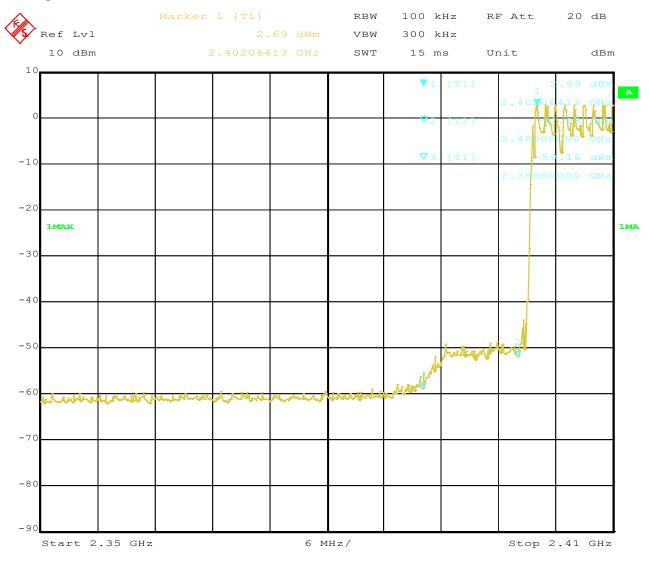


Type of Modulation: $\sqrt{1/4}$ DQPSK

Out of Band Test Result

Product:	IEEE 802.11a/b/g/n/ac 867Mbps WLAN +	Test Mode:	BL-M7663BU4
	Bluetooth v5.1 USB Combo Module		
Mode	Hopping On	Input Voltage	DC5.0V
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



Date: 2.MAR.2022 18:57:05

Page 70 of 84

Report No.: TW2202033-01E

Date: 2022-03-03

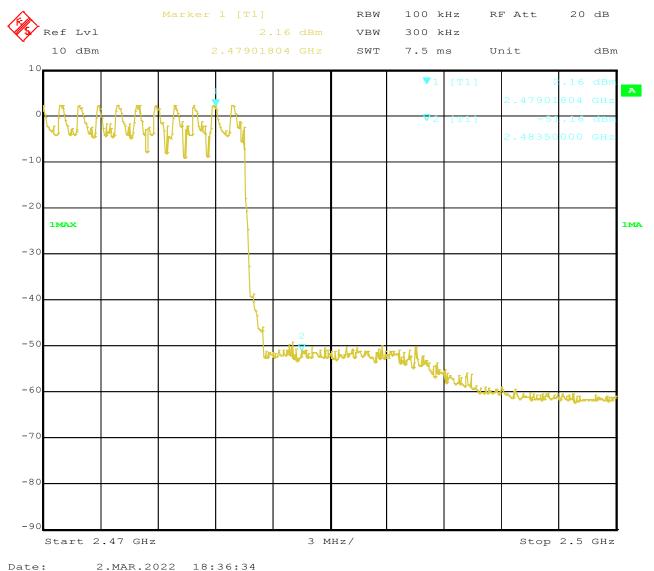


Type of Modulation: Л/4DQPSK

Out of Band Test Result

Product:	IEEE 802.11a/b/g/n/ac 867Mbps WLAN +	Test Mode:	BL-M7663BU4
	Bluetooth v5.1 USB Combo Module		
Mode	Hopping On	Input Voltage	DC5.0V
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



Page 71 of 84

Report No.: TW2202033-01E

Date: 2022-03-03

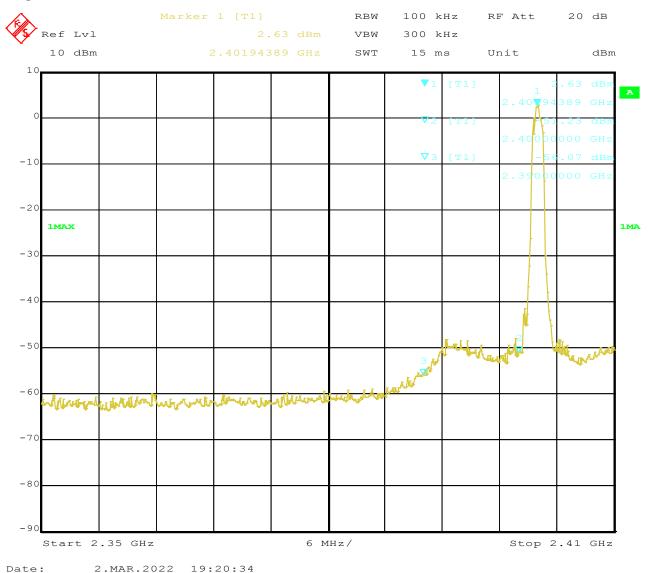


Type of Modulation: 8DPSK

12.4 Band Edge Test Result

Product:	IEEE 802.11a/b/g/n/ac 867Mbps WLAN +	Test Mode:	BL-M7663BU4
	Bluetooth v5.1 USB Combo Module		
Mode	Keeping Transmitting	Input Voltage	DC5.0V
Temperature	24 deg. C	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



Page 72 of 84

Report No.: TW2202033-01E

Date: 2022-03-03

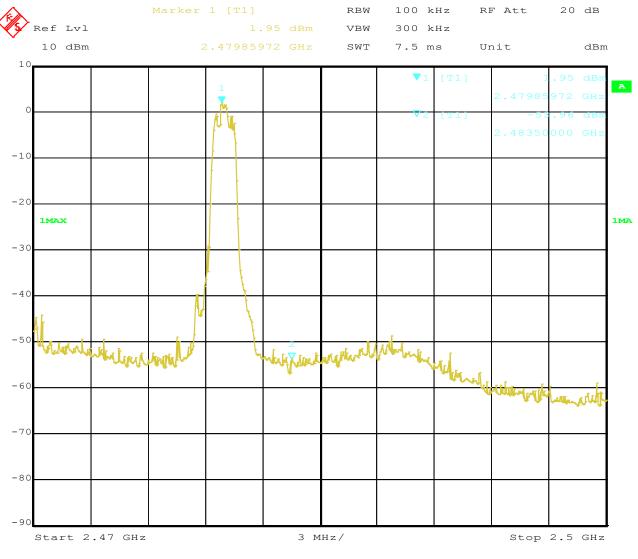


Type of Modulation: 8DPSK

12.4 Band Edge Test Result

Product:	IEEE 802.11a/b/g/n/ac 867Mbps WLAN +	Test Mode:	BL-M7663BU4
	Bluetooth v5.1 USB Combo Module		
Mode	Keeping Transmitting	Input Voltage	DC5.0V
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



Date: 2.MAR.2022 19:37:54

The report refers only to the sample tested and does not apply to the bulk.

This report is issued in confidence to the client and it will be strictly treated as such by the SHENZHEN TIMEWAY TESTING LABORATORIES. It may not be reproduced rather in its entirety or in part and it may not be used for adverting. The client to whom the report is issued may, however, show or send it . or a certified copy there of prepared by the SHENZHEN TIMEWAY TESTING LABORATORIES. to his customer. Supplier or others persons directly concerned. SHENZHEN TIMEWAY TESTING LABORATORIES. will not, without the consent of the client enter into any discussion of correspondence with any third party concerning the contents of the report.

In the event of the improper use of the report. The SHENZHEN TIMEWAY TESTING LABORATORIES. reserves the rights to withdraw it and to

adopt any other remedies which may be appropriate.

Page 73 of 84

Report No.: TW2202033-01E

Date: 2022-03-03

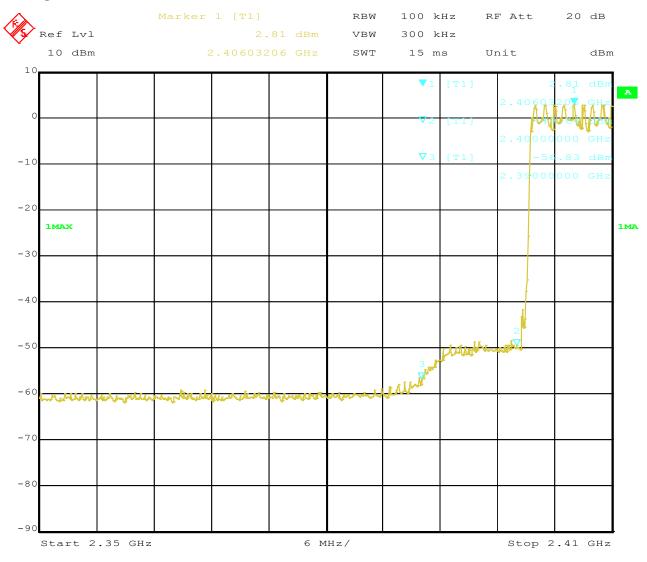


Type of Modulation: 8DPSK

Band Edge Test Result

Product:	IEEE 802.11a/b/g/n/ac 867Mbps WLAN	Test Mode:	BL-M7663BU4
	+ Bluetooth v5.1 USB Combo Module		
Mode	Hopping On	Input Voltage	DC5.0V
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



Date: 2.MAR.2022 19:18:44

Page 74 of 84

Report No.: TW2202033-01E

Date: 2022-03-03

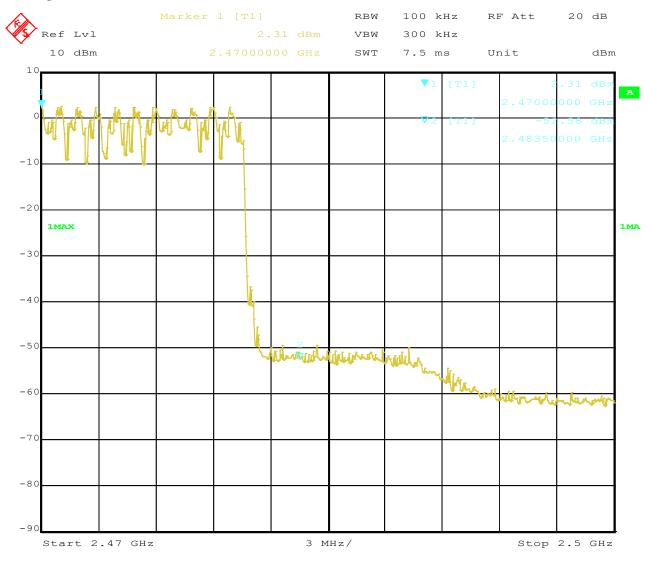


Type of Modulation: 8DPSK

Band Edge Test Result

Product:	IEEE 802.11a/b/g/n/ac 867Mbps WLAN	Test Mode:	BL-M7663BU4
	+ Bluetooth v5.1 USB Combo Module		
Mode	Hopping On	Input Voltage	DC5.0V
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

Test Figure:



Date: 2.MAR.2022 18:23:16

Page 75 of 84

Report No.: TW2202033-01E

Date: 2022-03-03



12.4 Restrict Band Measurement

	EUT	IEEE 802.	l 1 a/b/g/n/a	ac 867Mbps V	VLAN +		Model		BL-M76	63BU4
		Bluetoo	th v5.1 US	SB Combo Mo	odule					
	Mode		Keep Tra	nsmitting		Inp	ut Voltag	e	DC5	.0V
Te	mperature		24 de	eg. C,		Н	umidity		56%	RH
Те	st Result:		Pa	ass		Modu	ılation Ty	/pe	8DP	SK
Part 1 1.0E+2	5C Class B 1GHz-18GHz	-2								
90										
70	0-									
								/	\	
60	0-								$\overline{}$	
60 50						M1	Jacob Marie			الا ألامة الأما
50	0-	gogish Mark priordesses, see far	والمسابعة المسابعة المسابع المسابع المسابع المسا	and the same and the same same	المرساف الخاطب وسياف المتعاد	M1		A STATE OF THE STA	Min	
50		gayay film da kada da	ingandanife debugayanen	ustrik annahili (makan malahilik andahi	الإيباليافالمنافض سألفان	M1		uddin all die deed	4114	
50 40		ersjeld Marie josterfanskusjenten.	ingual and the beganning	alah and did a marana did da	والمتعارض والمتع	M1	WAR THE STREET	ultrate prod	MANA	to the second
50 40 30 20		gogijik d ^{ikk} d k <u>irik jiritelistatur, arti</u> ar	يدريه المرابع	idate ana philippe and philippe	والمعادلة	M1	_{thi} dhi da Madh	phile patrices	MINA	
50 40 30 20		ggypphilliphis by hydysteren y medja.	inginand an light should be suppressed.	istoite aanapolik kandanaanii ghiibib karaka dadah	الإراجة المتافقة والمتافقة	M1	night of the state	jill-pitered	MINA	A POPULATION OF THE POPULATION
50 40 30 20 10		gegynde M ^{hol} d k _{raft} e jaarde te kana meetine.	uşiyadənlik birlətiyayən isə		requency (MHz)	MI	night of the state	Jill-pitered	44144	2410
50 40 30 20 10		Results	Factor			M1 Detector	Table	Height	ANT	1
50 40 30 20 10	0			F	requency (MHz)				ANT	2410 Verdict

Note: The measured PK value less than the AV limit, no necessary to take down the AV measurement result.

Page 76 of 84 Report No.: TW2202033-01E

Date: 2022-03-03



12.4 Restrict Band Measurement

	EUT	IEEE 802	.11a/b/g/n/	ac 867Mbps	WLAN +	-	Model		BL-M76	63BU4
		Blueto	oth v5.1 U	SB Combo M	Iodule					
	Mode		Keep Tra	ansmitting		Inp	ut Voltage	e	DC5	.0V
Te	mperature		24 d	leg. C,		Н	umidity		56%	RH
Te	est Result:		P	ass		Modu	ılation Ty	/pe	8DP	SK
Part 1 1.0E+	15C Class B 1GHz-18GHz -	2								
9	10-									
								\sim	\	
8	50-									
									1	
7	0-							/	- IIV	
	60-								- V	
6						.11.11	41.1.1.			
5	50-	zzonala literaturaturaturaturaturaturaturaturaturatu	والمارية المارية	ecolum a di u ala da da	s thailliada a an an lea a bhean		المالم المالم المالم المالم	HAMIN		AL JAM
6 5 4	10 - 10 - 10 - 10 - 10 - 10 - 10 - 10 -	generally his soft, do the before	or a give the right and the surprise of the su	arakira, pinikira, kalenda elik	ورالم وراء ورود فراو المالية			Philippid J		4.,144
6 5 4	50-	ويوسيطينا بالمارسة والعندارة والم	يوباد وخواند منافئ وخلامات الدور	aradisə, ilə isə alkın də adda	يريا فإراض والمرافق في المالية	and the second second		Hiput		N.JM
66 56 44	10 - 10 - 10 - 10 - 10 - 10 - 10 - 10 -	e roment de de la company de	arajint kandika siki kasa kas	aradisini di unalembasila	ويتافي فالمخالف فأوافظ المخاط			Monay		AL, MA
66 56 44 36		jevenos dud aktivisto, dieste kadoler	og a glave had on the same of	dendeles, physiologisches desembles	يريا والمرابعة و	makan sa dida di jada	Jakada Japan Jakada da Jakada d	*Herid		WM
6 5 4 4 3 2 1 1 0 0 0		errandaldikunis, lisekhilada.	id a shire the book of the second	nending in the party make make a light	s thribbiglis stant and the sea		Alaka Japan Jaka Hara	Manage Control of the		WM
6 5 4 4 3 2 1 1 0 0 0		erano del deservita de la conseguir de la cons			equency (MHz)			Monday		2410
6 5 4 4 3 2 1 1 0 0 0		Results	Factor		Park I a cold a company and a feet of	Detector	Table	Height	ANT	
66 55 44 33 22 11	0-10-10-10-10-10-10-10-10-10-10-10-10-10			Fre	equency (MHz)	THE STATE OF THE S	Table (o)	Height (cm)	ANT	2410 Verdict

Note: The measured PK value less than the AV limit, no necessary to take down the AV measurement result.

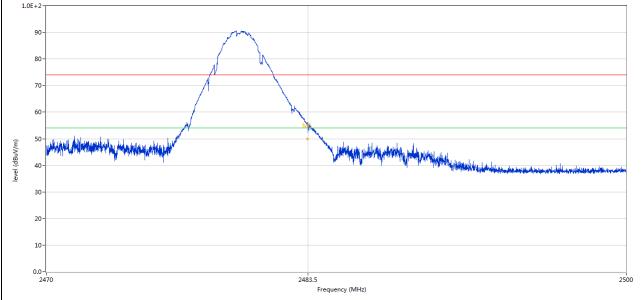
Report No.: TW2202033-01E Page 77 of 84

Date: 2022-03-03



12.4 Restrict Band Measurement

12.4 Resulted Da	ild Wedstrement		
EUT	IEEE 802.11a/b/g/n/ac 867Mbps WLAN +	Model	BL-M7663BU4
	Bluetooth v5.1 USB Combo Module		
Mode	Keep Transmitting	Input Voltage	DC5.0V
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Modulation Type	8DPSK
FCC Part 15C Class B 1GHz-18GHz -: 1.0E+2	2		



	No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
		(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
	1	2483.467	56.13	-3.57	74.0	-17.87	Peak	215.00	100	Horizontal	Pass
	1**	2483.467	49.96	-3.57	54.0	-4.04	AV	215.00	100	Horizontal	Pass
F				1				1	1	I.	

Page 78 of 84 Report No.: TW2202033-01E

Date: 2022-03-03



12.4 **Restrict Band Measurement**

	EUT	UT IEEE 802.11a/b/g/n/ac 867Mbps WLAN + Bluetooth v5.1 USB Combo Module					Model			63BU4
		Blueto			lodule					
	Mode		Keep Tra	ansmitting		Inpu	ıt Voltag	e	DC5	.0V
Te	mperature		24 d	leg. C,		Н	umidity		56%	RH
Te	est Result:		P	ass		Modu	lation Ty	/pe	8DP	SK
Part 1	.5C Class B 1GHz-18GHz -	2								
9	0-									
			~~							
8	0-			4						
			<u> </u>	_						
7	0-		1	X						
7			-/							
6	0-									
5		مرمون او بالدووراندوات						k 1 d	li li	
6		ingdaydaydaydaydayday			مسمارة ويالزاه ورواه ورواد	had been a flood bod on the	أوار او موجد المار المارات	handad adadaga	on the second	المسطيان
5	0-	ingdawikipila phinaid sain and			manda a la proposition de la compansión de	hall his say the old seld and discount of the	deda adama and dad	h Magashid Laidheile ag d	gada, phase blesses and	of the sample
6 5 4	0-	ingdhaidigeirightaid Laibe			mandadaha bilanda findiran madal	holk has she dhaddan bli a	deducation de	i kapaled aidhele aid	ignikasifikasi littera ve sihi	i delete mild
66 56 44 36	0-	ingdanishi gilingili na karanda			was hearly by a france of	hili ya ya kali da bi la	talia dan periodist	المراجعة المطارخة المرجعة	i quide sigle anni di Marque e della	adaba magal
6 5 4 4 3 2 2 1 1		nagalawa ka ji ka ji ka			manifestation de la companie	nd propholicitud and a	destandante es et el est	h hypothed and blocked	igadisiphismillibus och d	olaha, af
6 5 4 4 3 2 2 1 1	0-	ingdayilayilayilayilayilayilayilayilayilayil		2483.5 Fre	quency (MHz)	holik has sake de vila sila sila si	dedis-dis-an-social side	Lhypole of Laidhold and	tenkis phisimillibus or sub	2500
6 5 4 4 3 2 2 1 1		Results	Factor			Detector	Table	Height	ANT	
6 5 5 4 4 2 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0-	Results (dBuV/m)	Factor (dB)	Fre	quency (MHz)					2500

Note: 1. For Restricted band test, only the worst case was reported and 8DPSK was the worst case

Report No.: TW2202033-01E

Date: 2022-03-03



Page 79 of 84

13.0 Antenna Requirement

13.1 Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, 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.

And according to FCC 47 CFR Section 15.247 (b), if transmitter antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the mount in dB that the directional gain of the antenna exceeds 6 dBi.

13.2 Antenna Connected constructions

Ceramic antenna used. The gain of the antennas is 2.0dBi (Get from the antenna specification provided the manufacturer)

Report No.: TW2202033-01E Page 80 of 84

Date: 2022-03-03

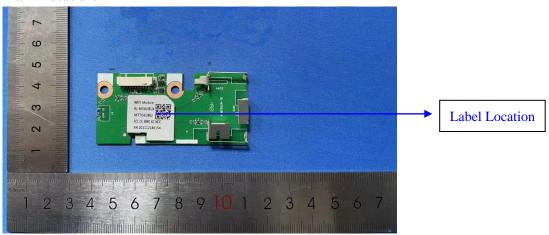


14.0 FCC ID Label

FCC ID: 2AL6KBL-M7663BU4

The label must not be a stick-on paper label. The label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

Mark Location:



Page 81 of 84

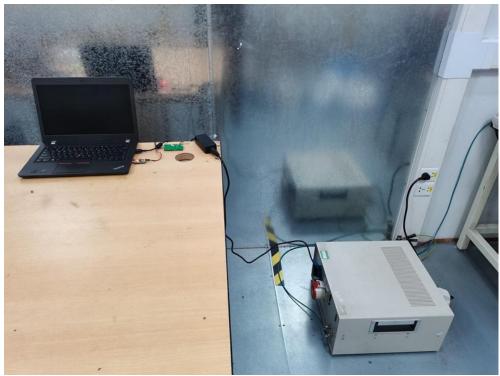
Report No.: TW2202033-01E

Date: 2022-03-03



15.0 **Photo of testing**

Conducted Emission Test Setup:



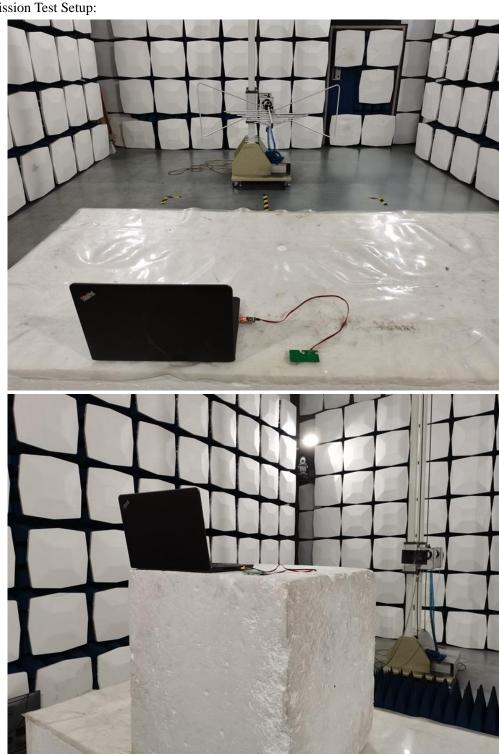
Page 82 of 84

Report No.: TW2202033-01E

Date: 2022-03-03



Radiated Emission Test Setup:



The report refers only to the sample tested and does not apply to the bulk.

This report is issued in confidence to the client and it will be strictly treated as such by the SHENZHEN TIMEWAY TESTING LABORATORIES. It may not be reproduced rather in its entirety or in part and it may not be used for adverting. The client to whom the report is issued may, however, show or send it . or a certified copy there of prepared by the SHENZHEN TIMEWAY TESTING LABORATORIES. to his customer. Supplier or others persons directly concerned. SHENZHEN TIMEWAY TESTING LABORATORIES. will not, without the consent of the client enter into any discussion of correspondence with any third party concerning the contents of the report.

In the event of the improper use of the report. The SHENZHEN TIMEWAY TESTING LABORATORIES. reserves the rights to withdraw it and to adopt any other remedies which may be appropriate.

adopt any other remedies which may be appropriate.

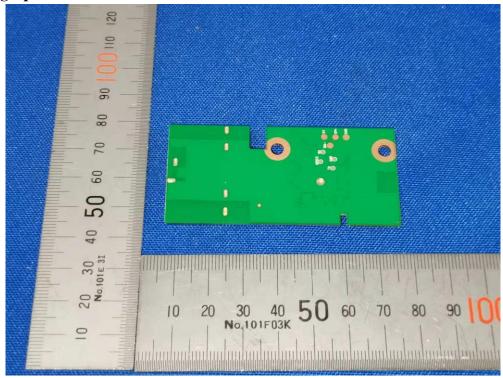
Page 83 of 84

Report No.: TW2202033-01E

Date: 2022-03-03



Photographs - EUT





Page 84 of 84

Report No.: TW2202033-01E

Date: 2022-03-03



Photographs - EUT



End of Report