

File Reference No.: 2022-04-24

Applicant: Zhejiang Dusun Electron Co., Ltd.

Product: Bluetooth Cloud Module

Model No.: DSM-055

Trademark: DUSUN

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 long

Terry Tang

Manager

Dated: April 24, 2022

Results appearing herein relate only to the sample tested

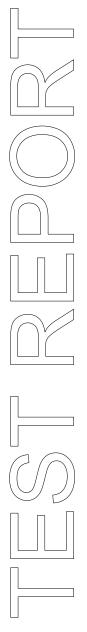
The technical reports is issued errors and omissions exempt and is subject to

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

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# **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 meet with ISO/IEC-17025 requirements, which is approved by CNAL. 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

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# **Test Report Conclusion**

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#### 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: Zhejiang Dusun Electron Co., Ltd.

Address: No.640 Fengqing ST. Deqing, Zhejiang, 313200, China

Telephone: +86-18768289112

Fax: --

## 1.3 Description of EUT

Product: Bluetooth Cloud Module

Manufacturer: Zhejiang Dusun Electron Co., Ltd.

Address: No.640 Fengqing ST. Deqing, Zhejiang, 313200, China

Trademark: DUSUN

Additional Trademark: N/A

Model Number: DSM-055

Additional Model N/A

Number:

Hardware Version: V1
Software Version: V1

Type of Modulation GFSK (Bluetooth BLE)

Frequency range 2402-2480MHz Frequency Selection By software

Channel Number 40

Rating: DC2V-3.6V

#### 1.4 Submitted Sample: 2 Sample

#### 1.5 Test Duration

2022-03-07 to 2022-04-24

## 1.6 Test Uncertainty

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

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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%

Conducted Emissions Uncertainty = 3.6dB

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: 2022-04-24



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
LISN	R&S	EZH3-Z5	100294	2021-06-18	2022-06-17
LISN	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	2022-07-01
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	2021-01-15	2022-04-24
RF Cable	Zhengdi	ZT26-NJ-NJ-8M/F		2021-06-18	2022-06-17
KI Cable	Zhengui	A		2021-00-18	2022-00-17
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
2.4G Band Filter	Micro-Tronics	BRM50701	S/N-041	2021-06-18	2022-06-17

#### 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

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adopt any other remedies which may be appropriate.

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#### 3.0 **Technical Details**

#### 3.1 **Summary of test results**

Standard	Test Type	Result	Notes
FCC Part 15, Paragraph 15.203	Antenna Requirement	Pass	Complies
FCC Part 15, Paragraph 15.207	<b>Conducted Emission Test</b>	Pass	Complies
FCC Part 15 Subpart C Paragraph 15.247(a)(2) Limit	Spectrum bandwidth of a Orthogonal Frequency Division Multiplex System Limit: 6dB bandwidth>500kHz	Pass	Complies
FCC Part 15, Paragraph 15.247(b)	Maximum peak output power Limit: max. 30dBm	Pass	Complies
FCC Part 15, Paragraph 15.205 & 15.209	Transmitter Radiated Emission Limit: Table 15.209	Pass	Complies
FCC Part 15, Paragraph 15.247(e)	Power Spectral Density Limit: max. 8dBm/3kHz	Pass	Complies
FCC Part 15, Paragraph 15.247(d)	Out of Band Emission and Restricted Band Radiation Limit: 20dB less than peak value of fundamental frequency Restricted band limit: Table 15.209	Pass	Complies

#### 3.2 **Test Standards**

FCC Part 15 Subpart & Subpart C, Paragraph 15.247

#### 4.0 **EUT Modification**

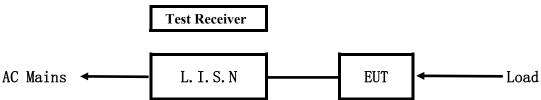
No modification by SHENZHEN TIMEWAY TESTING LABORATORIES.

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#### **5.Power Line Conducted Emission Test**

#### 5.1 Schematics of the test

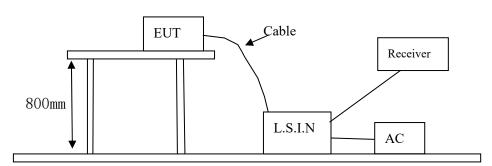


**EUT: Equipment Under Test** 

#### 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
Bluetooth Cloud Module	Zhejiang Dusun Electron Co., Ltd.	DSM-055	2AWWFDSM-055

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#### B. Internal Device

Device	Manufacturer	Model	Rating

# C. Peripherals

Device	Manufacturer	Model	Rating
PC	ThinkPad	R4	

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 $\mu$ 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			
$5.00 \sim 30.00$	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.

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

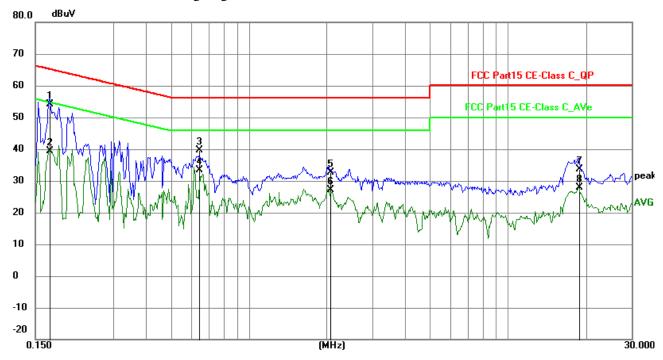
# **EUT Operating Environment**

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

**EUT set Condition: Keep 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	0.1695	44.25	9.77	54.02	64.98	-10.96	QP	Р
2	0.1695	29.60	9.77	39.37	54.98	-15.61	AVG	Р
3	0.6414	29.73	9.78	39.51	56.00	-16.49	QP	Р
4	0.6414	23.67	9.78	33.45	46.00	-12.55	AVG	Р
5	2.0610	22.75	9.80	32.55	56.00	-23.45	QP	Ъ
6	2.0610	17.34	9.80	27.14	46.00	-18.86	AVG	Р
7	18.7677	23.00	10.61	33.61	60.00	-26.39	QP	Р
8	18.7677	17.37	10.61	27.98	50.00	-22.02	AVG	Р

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

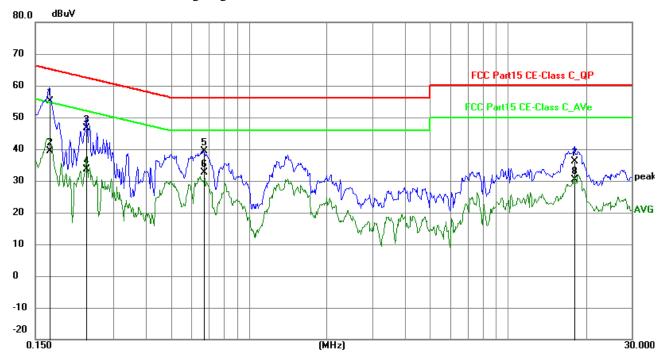
**EUT Operating Environment** 

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

**EUT set Condition: Keep 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	0.1695	45.24	9.77	55.01	64.98	-9.97	QP	Р
2	0.1695	29.67	9.77	39.44	54.98	-15.54	AVG	Р
3	0.2358	36.77	9.75	46.52	62.24	-15.72	QP	Р
4	0.2358	23.99	9.75	33.74	52.24	-18.50	AVG	Р
5	0.6687	29.53	9.78	39.31	56.00	-16.69	QP	Р
6	0.6687	22.77	9.78	32.55	46.00	-13.45	AVG	Р
7	18.0306	25.66	10.56	36.22	60.00	-23.78	QP	Р
8	18.0306	19.76	10.56	30.32	50.00	-19.68	AVG	Р

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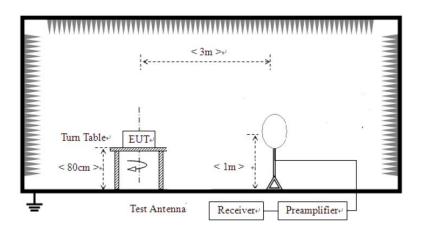


#### **6** Radiated Emission Test

- 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 25 GHz 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=1MHz VBW=3MHz and PK detector. AV value with RBW=1MHz, VBW=3MHz and RMS 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



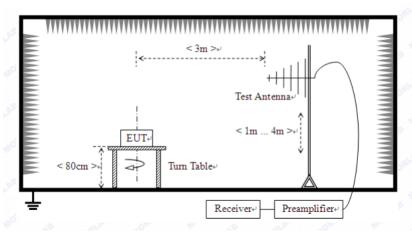
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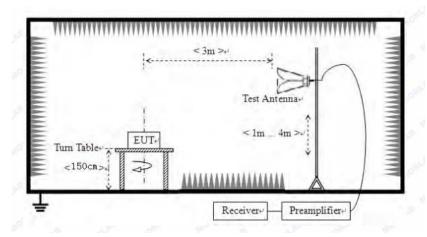
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For radiated emissions from 30MHz to1GHz



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:

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# Frequencies in restricted band are complied to limit on Paragraph 15.209

	-	
Frequency Range (MHz)	Distance (m)	Field strength (dB µ V/m)
0.009-0.490	3	20log(2400/F(kHz)) +40log (300/3)
0.490-1.705	3	20log(24000/F(kHz)) +40log (30/3)
1.705-30	3	69.5
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 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

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#### Test result

# General Radiated Emission Data and Harmonics Radiated Emission Data

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

**EUT set Condition:** Keep Bluetooth Transmitting

**Results:** Pass

# Test Figure:

CE\_EN 55032 Class B 30MHz-1GHz

50

40

20

M1

M2

20

M3

50

100

200

400

600

800

100

No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table (o)	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)			(cm)		
1	49.880	14.79	-11.36	40.0	-25.21	Peak	190.00	100	Horizontal	Pass
2	97.883	14.98	-13.75	40.0	-25.02	Peak	323.00	100	Horizontal	Pass
3	383.962	21.36	-9.16	47.0	-25.64	Peak	100.00	100	Horizontal	Pass
4	762.167	25.48	-3.24	47.0	-21.52	Peak	257.00	100	Horizontal	Pass

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#### Test result

# General Radiated Emission Data and Harmonics Radiated Emission Data

## Radiated Emission In Vertical (30MHz----1000MHz)

EUT set Condition: Keep Transmitting

**Results:** Pass

# Test Figure:

CE\_EN 53032 Class B 30MHz-1GHz

70

60

40

40

40

40

40

50

10

Frequency (MHz)

No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
1	53.517	15.81	-11.52	40.0	-24.19	Peak	344.00	100	Vertical	Pass
2	102.732	13.65	-13.39	40.0	-26.35	Peak	332.00	100	Vertical	Pass
3	383.962	21.15	-9.16	47.0	-25.85	Peak	360.00	100	Vertical	Pass
4	556.093	23.56	-6.19	47.0	-23.44	Peak	340.00	100	Vertical	Pass

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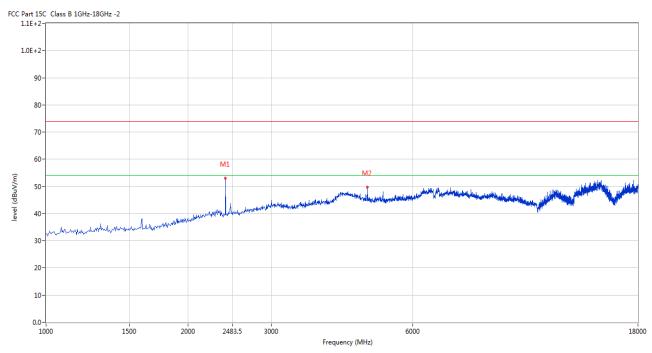
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## Data Rate: 1Mbps

Please refer to the following test plots for details:

#### Low Channel: Horizontal



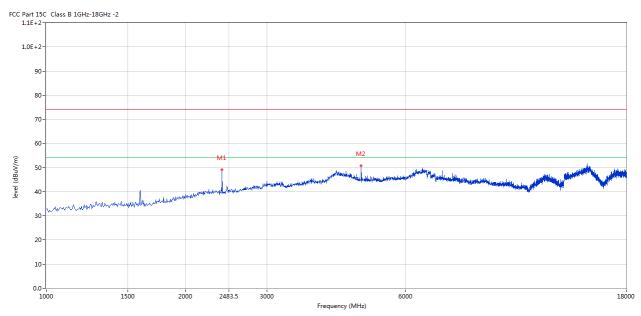
No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table (o)	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)			(cm)		
1	2402.009	53.12	-3.57	74.0	-20.88	Peak	312.00	100	Horizontal	Pass
2	4802.799	49.80	3.12	74.0	-24.20	Peak	1.00	100	Horizontal	Pass

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## Low Channel: Vertical



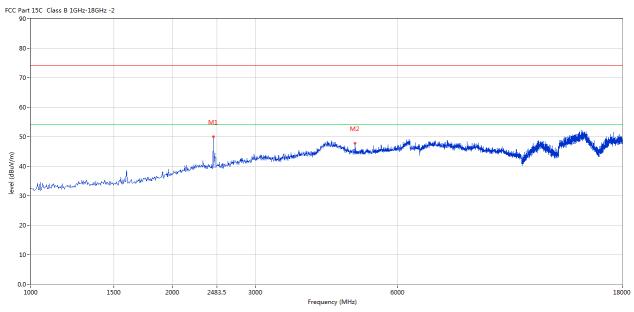
No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
1	2402.008	49.05	-3.57	74.0	-24.95	Peak	338.00	100	Vertical	Pass
2	4802.799	50.73	3.12	74.0	-23.27	Peak	254.00	100	Vertical	Pass

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## Middle Channel: Horizontal



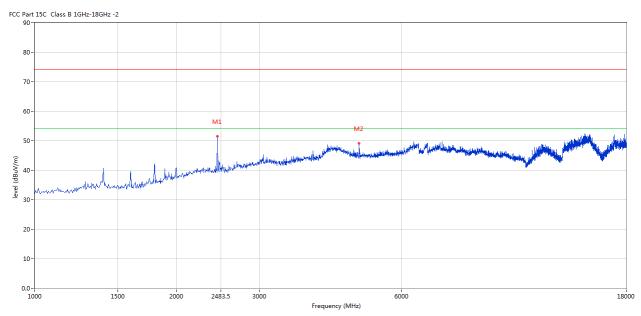
No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
1	2440.010	49.94	-3.57	74.0	-24.06	Peak	100.00	100	Horizontal	Pass
2	4879.280	47.75	3.20	74.0	-26.25	Peak	190.00	100	Horizontal	Pass

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## Middle Channel: Vertical



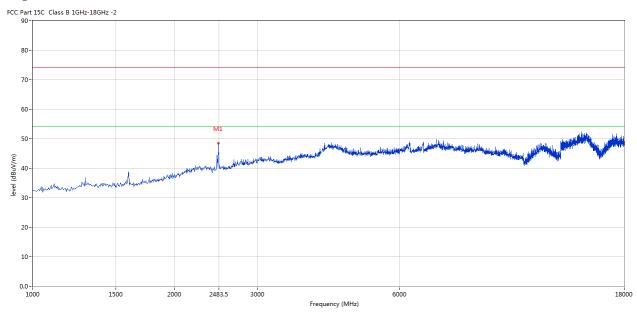
No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
1	2440.010	51.49	-3.57	74.0	-22.51	Peak	335.00	100	Vertical	Pass
2	4879.280	49.09	3.20	74.0	-24.91	Peak	235.00	100	Vertical	Pass

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# **High Channel: Horizontal**



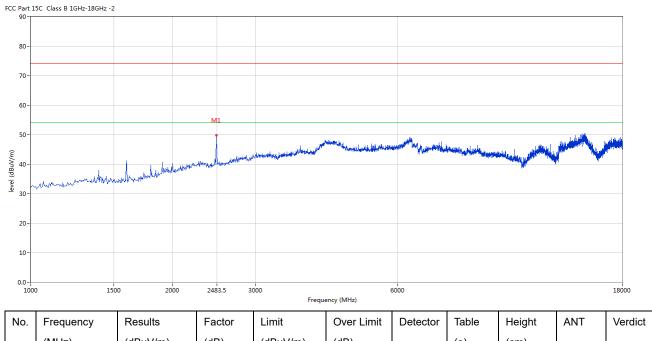
No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
1	2480.008	48.43	-3.57	74.0	-25.57	Peak	10.00	100	Horizontal	Pass

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## **High Channel: Vertical**



No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
1	2480.008	49.84	-3.57	74.0	-24.16	Peak	354.00	100	Vertical	Pass

Note: 1. Level = Reading + AF + Cable - Preamp

- 2. For the radiated emissions above 18G and below 30MHz, it is the floor noise.
- 3. The measured PK value less than the AV limit, no necessary to take down the AV measurement result.
- 4. A 2.4G Band filter used radiated emission measurement

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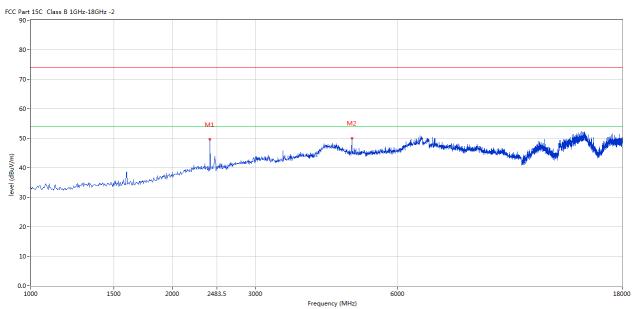
Date: 2022-04-24



# Data Rate: 2Mbps

Please refer to the following test plots for details:

#### Low Channel: Horizontal



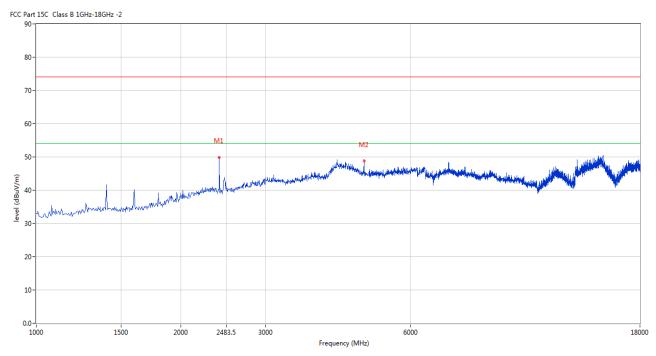
No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
1	2402.010	49.64	-3.57	74.0	-24.36	Peak	334.00	100	Horizontal	Pass
2	4802.799	50.04	3.12	74.0	-23.96	Peak	6.00	100	Horizontal	Pass

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#### Low Channel: Vertical



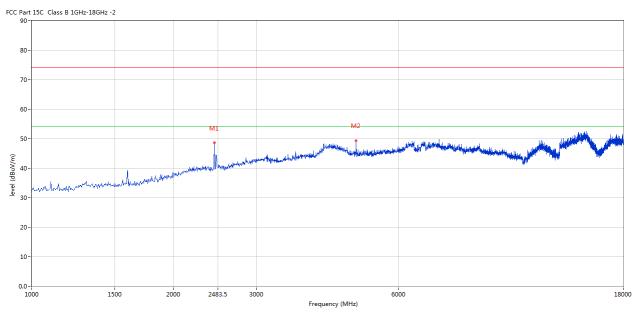
No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table (o)	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)			(cm)		
1	2402.009	49.88	-3.57	74.0	-24.12	Peak	312.00	100	Vertical	Pass
2	4802.799	48.74	3.12	74.0	-25.26	Peak	338.00	100	Vertical	Pass

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## Middle Channel: Horizontal



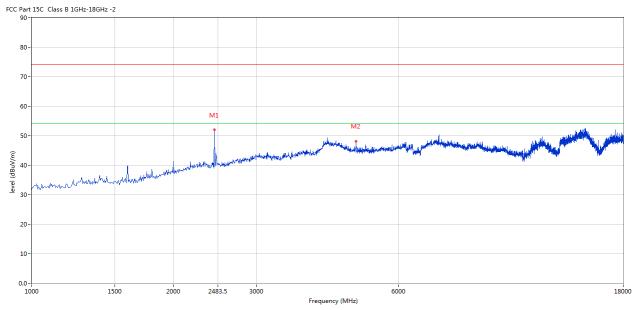
No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
1	2440.008	48.60	-3.57	74.0	-25.40	Peak	130.00	100	Horizontal	Pass
2	4879.280	49.34	3.20	74.0	-24.66	Peak	358.00	100	Horizontal	Pass

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## Middle Channel: Vertical



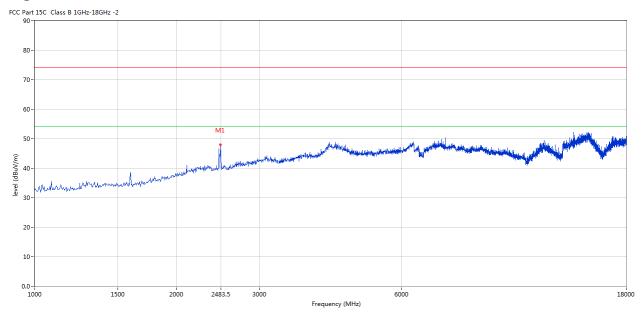
No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
1	2440.010	52.02	-3.57	74.0	-21.98	Peak	321.00	100	Vertical	Pass
2	4879.280	48.21	3.20	74.0	-25.79	Peak	123.00	100	Vertical	Pass

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# **High Channel: Horizontal**



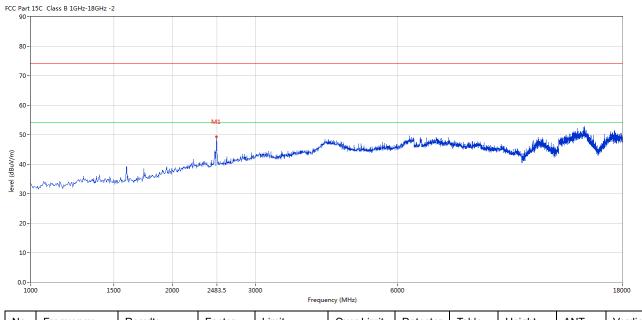
No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
1	2480.008	47.91	-3.57	74.0	-26.09	Peak	4.00	100	Horizontal	Pass

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#### **High Channel: Vertical**



No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
1	2480.008	49.39	-3.57	74.0	-24.61	Peak	0.00	100	Vertical	Pass

Note: 1. Level = Reading + AF + Cable - Preamp

- 2. For the radiated emissions above 18G and below 30MHz, it is the floor noise.
- 3. The measured PK value less than the AV limit, no necessary to take down the AV measurement result.
- 4. A 2.4G Band filter used radiated emission measurement

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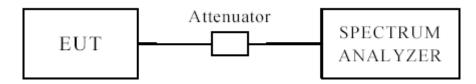
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## 7.0 6dB Bandwidth Measurement

## 7.1 Test Setup



# 7.2 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is >500 kHz

## 7.3 Test Procedure

- 1. Set resolution bandwidth (RBW) = 100 kHz
- 2. Set the video bandwidth (VBW)  $\geq$  3 x RBW.
- 3. Detector = Peak.
- 4. Trace mode =  $\max$  hold.
- 5. Sweep = auto couple.
- 6. Allow the trace to stabilize.
- 7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

#### 7.4 Test Result

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#### 6dB BW

**Data Rate: 1Mbps** 

EUT		Bluetooth Clo	Model		DSM-055			
Mode		Keep Trans	Input Voltage		DC3.3V			
Temperature		24 deg	Humidity	Humidity		56% RH		
Channel	Channel Frequency (MHz)		6 dB Bandwidth (kHz)		M	inimum Limit (kHz)	Pass/ Fail	
Low		2402	6	31		0.5	Pass	
Middle		2440	2440 6		0.5		Pass	
High	2480 6		25		0.5	Pass		

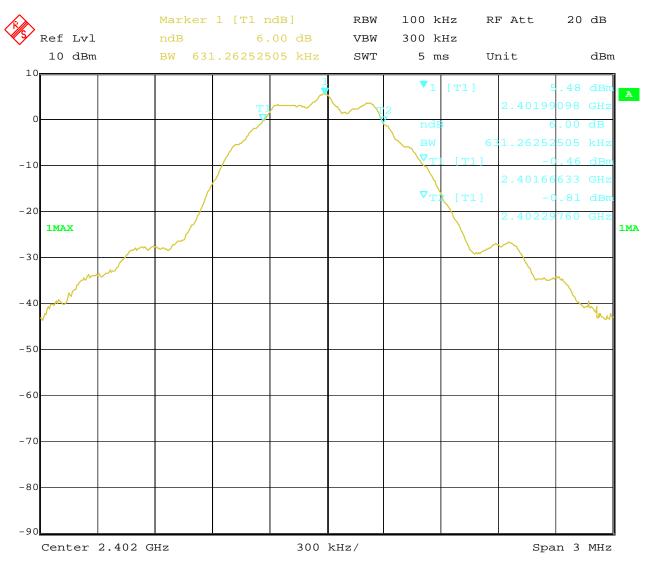
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# Test Figure:

# 1. Condition: Low Channel



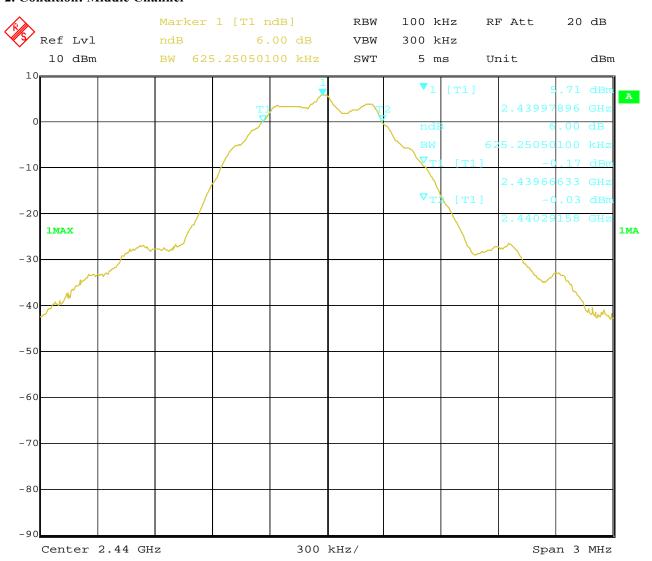
Date: 11.APR.2022 11:46:06

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Date: 2022-04-24



## 2. Condition: Middle Channel



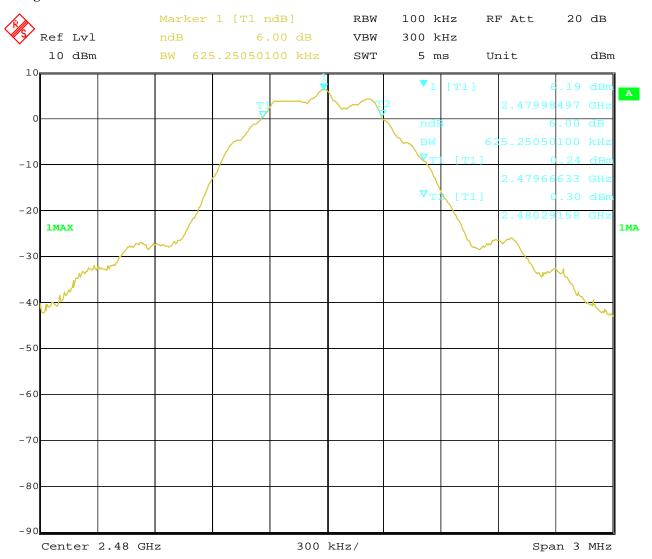
Date: 11.APR.2022 11:57:23

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# 3. High Channel



Date: 11.APR.2022 12:00:31

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# **Data Rate: 2Mbps**

EUT		Bluetooth Cloud Module		Model		DSM-055		
Mode		Keep Trans	Input Voltage		DC3.3V			
Temperature		24 deg	Humidity		56% RH			
Channel	Channel Frequency (MHz)		6 dB Bandwidth (kHz)		Minimum Limit (kHz)		Pass/ Fail	
Low	2402 11		02 0.5		Pass			
Middle		2440 11		112	0.5		Pass	
High	gh 2480 11		32		0.5	Pass		

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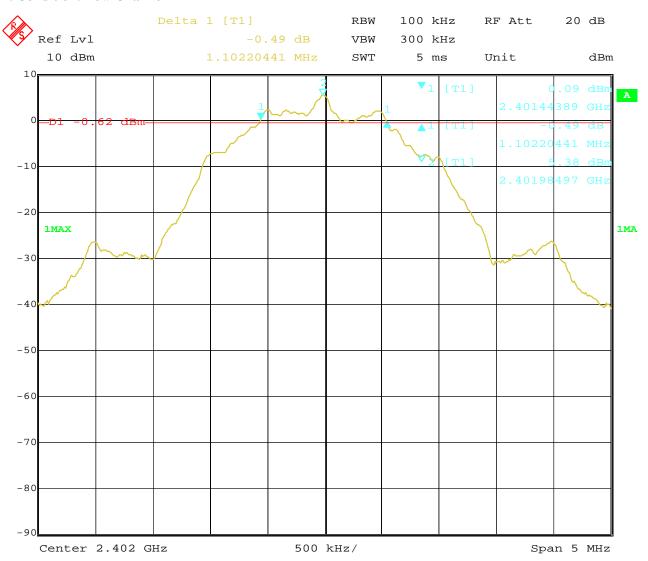
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Date: 2022-04-24



# Test Figure:

# 1. Condition: Low Channel



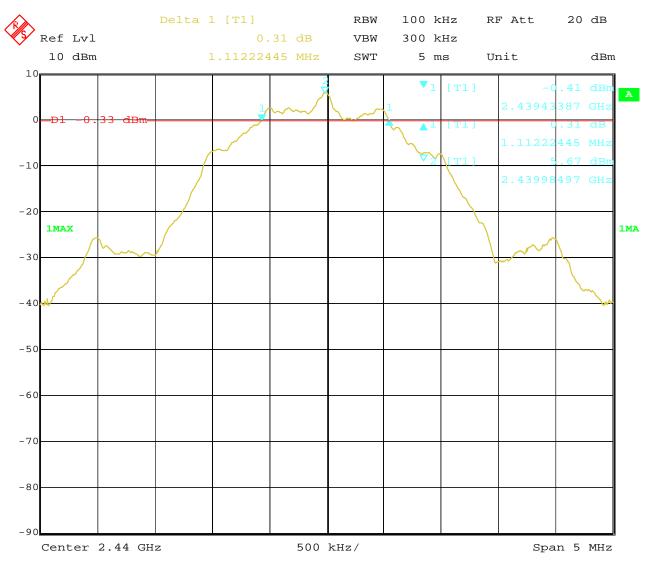
Date: 11.APR.2022 14:33:02

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#### 2. Condition: Middle Channel



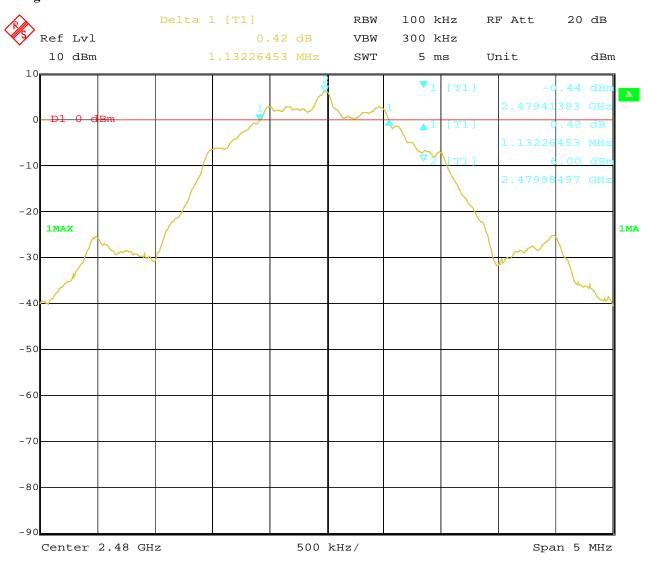
Date: 11.APR.2022 14:22:13

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# 3. High Channel



Date: 11.APR.2022 14:09:47

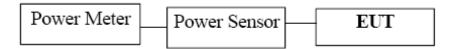
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# 8. Maximum Output Power

# 8.1 Test Setup



#### 8.2 Limits of Maximum Output Power

The Maximum Output Power Measurement is 30dBm.

#### **8.3 Test Procedure**

The RF power output was measured with a Power meter connected to the RF Antenna connector (conducted measurement) while EUT was operating in transmit mode at the appropriate centre frequency.

Note: the Peak power were measured.

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#### **8.4Test Results**

Data Rate: 1Mbps

EUT		Bluetooth Cloud	l Module	Model		DSM-05	55
Mode		Keep Transm	nitting	Input Voltage		DC3.3V	
Temperatu	re	24 deg. (	Ξ,	Humidity		56% RI	H
Channel	Cł	nannel Frequency	Мах	x. Power Output (dBi	m)	Peak Power Limit	Pass/ Fail
Chamier		(MHz)		Peak		(dBm)	
Low		2402		6.61		30	Pass
Middle		2440		6.93		30	Pass
High		2480		7.23		30	Pass

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

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

Data Rate: 2Mbps

EUT		Bluetooth Cloud	l Module	Model		DSM-05	55
Mode		Keep Transm	nitting	Input Voltage		DC3.3V	7
Temperatu	re	24 deg. (	Ξ,	Humidity		56% RF	I
Channel	Cl	nannel Frequency	Мах	x. Power Output (dB	m)	Peak Power Limit	Pass/ Fail
Chamer		(MHz)		Peak		(dBm)	
Low		2402		6.52		30	Pass
Middle		2440		6.87		30	Pass
High		2480		7.06		30	Pass

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

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

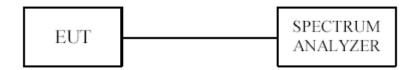
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# 9. Power Spectral Density Measurement

# 9.1 Test Setup



#### 9.2 Limits of Power Spectral Density Measurement

The Maximum Power Spectral Density Measurement is 8dBm/3kHz.

#### 9.3 Test Procedure

- 1. Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.
- 2. Set the RBW = 10 kHz.
- 3. Set the VBW  $\geq$  30 kHz.
- 4. Set the span to 1.5 times the DTS channel bandwidth.
- 5. Detector = peak.
- 6. Sweep time = auto couple.
- 7. Trace mode = max hold.
- 8. Allow trace to fully stabilize.
- 9. Use the peak marker function to determine the maximum amplitude level.
- 10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.
- 11. The resulting peak PSD level must be  $\leq 8 \text{ dBm/3kHz}$ .

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#### 9.4Test Result

Data Rate: 1Mbps

EUT		Bluete	ooth Cloud N	Module 1	Model			DSM-055
Mode		Keep Transmitting			Input Voltage		DC3.3V	
Temperat	ure		24 deg. C,		Humidit	y		56% RH
	Peak	Power	Cable	Final Po	wer Spectral	Max	ximum	
Channel	Re	ading	Loss	D	ensity	L	imit	Pass/ Fail
	(d	Bm)	(dB)	(dBn	n/10kHz)	(dBn	n/3kHz)	
Low	-2	2.99	0.2	-	-2.79		8	Pass
Middle	-2	2.42	0.2	-	-2.22		8	Pass
High	- 2	1.55	0.2	-	-1.35		8	Pass

Note: The result basic equation calculation as follow:

Peak Power Output = Peak Power Reading + Cable loss

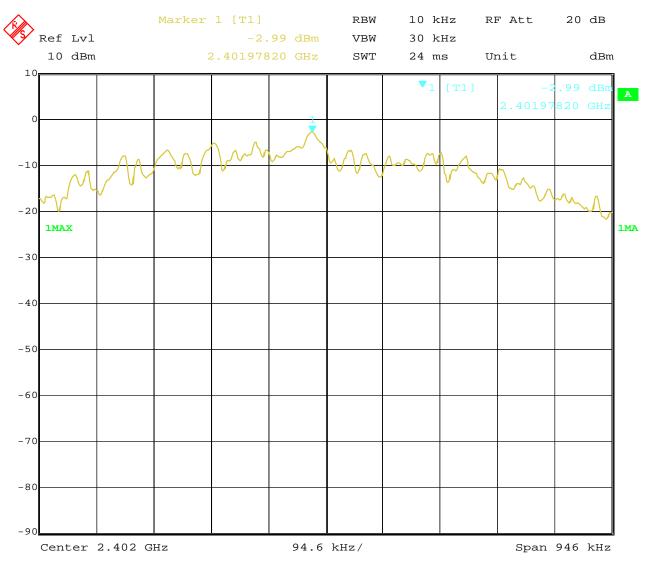
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# Test Figure:

# 1. Condition: Low Channel



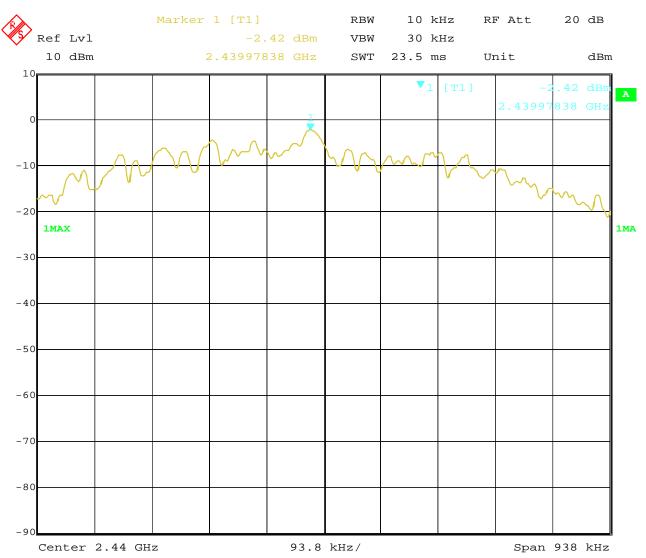
Date: 11.APR.2022 12:27:03

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#### 2. Condition: Middle Channel



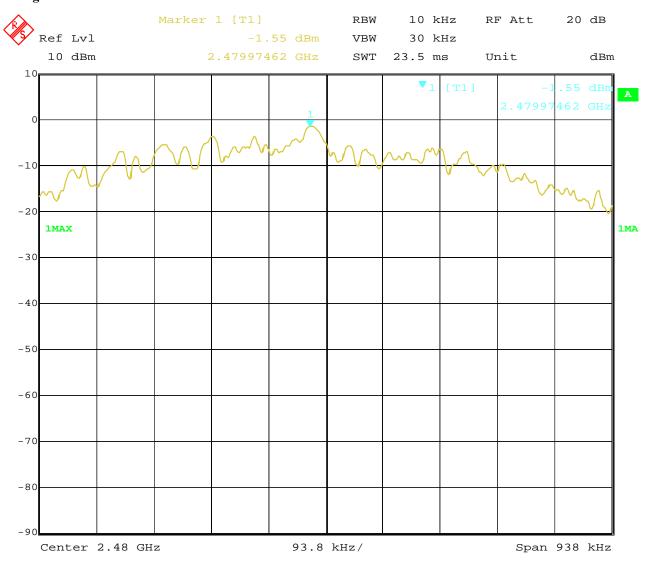
Date: 11.APR.2022 14:03:46

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# 3. High Channel



Date: 11.APR.2022 14:05:08

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Data Rate: 2Mbps

EUT		Bluete	ooth Cloud N	Module 1	Model			DSM-055
Mode		Ke	eep Transmitt	ing	Input Voltage			DC3.3V
Temperati	ure		24 deg. C,		Humidit	y		56% RH
	Peak	Power	Cable	Final Po	wer Spectral	Max	ximum	
Channel	Re	ading	Loss	D	ensity	L	imit	Pass/ Fail
	(d	lBm)	(dB)	(dBn	n/10kHz)	(dBn	n/3kHz)	
Low	-2	2.65	0.2	-	-2.45		8	Pass
Middle	-2	2.36	0.2	-	-2.16		8	Pass
High	-	1.88	0.2	-	-1.68		8	Pass

Note: The result basic equation calculation as follow:

Peak Power Output = Peak Power Reading + Cable loss

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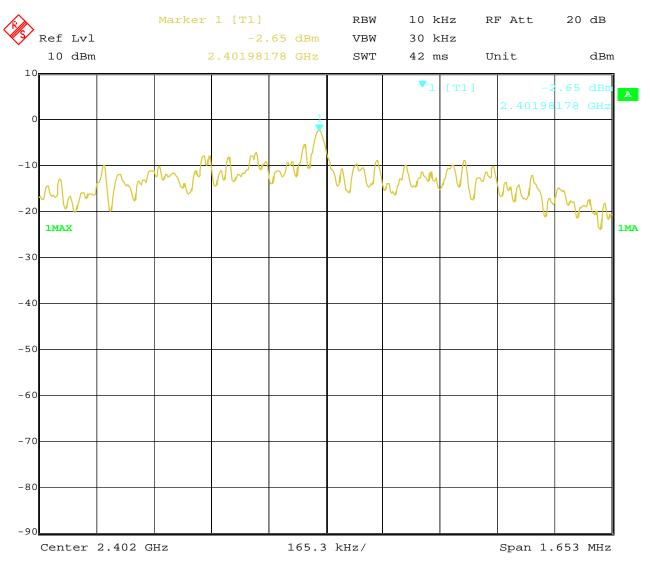
Report No.: TW2203084E

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# Test Figure:

# 1. Condition: Low Channel



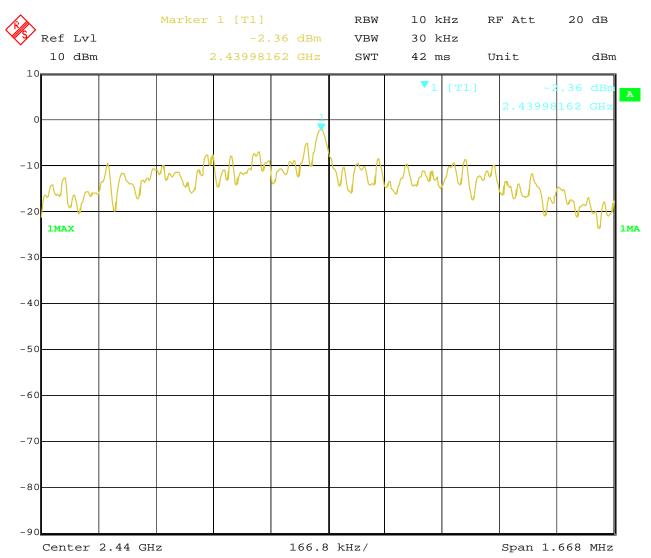
Date: 11.APR.2022 14:59:10

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#### 2. Condition: Middle Channel



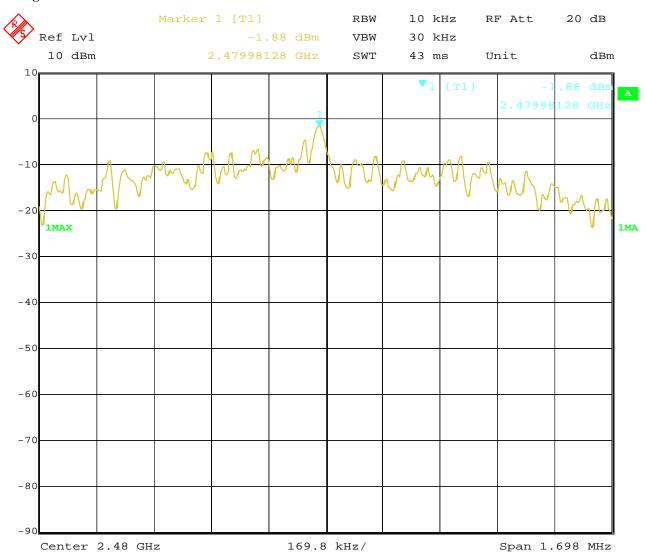
Date: 11.APR.2022 14:55:57

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# 3. High Channel



Date: 11.APR.2022 14:53:41

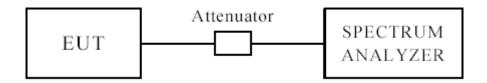
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# **10 Out of Band Measurement**

# 10.1 Test Setup for band edge



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

#### 10.2 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.

#### **10.3 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=1MHz, VBW=3MHz and PK detector. AV value with RBW=1MHz, VBW=3MHz and RMS detector)

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

#### 10.4 Test Result

Please see next pages

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

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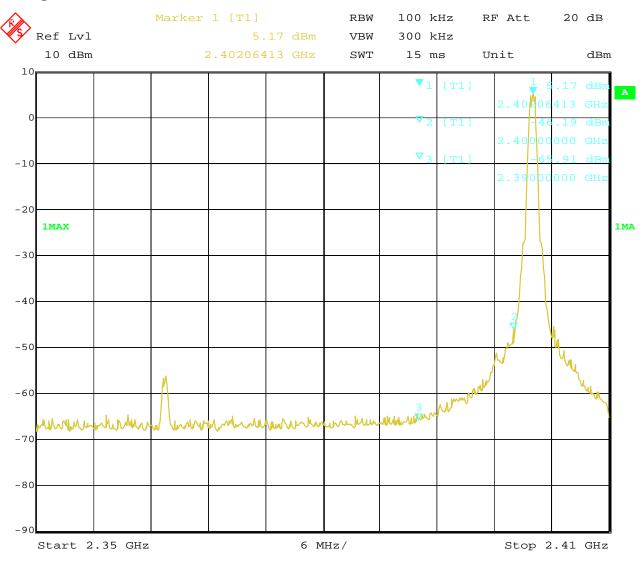


## Data Rate: 1Mbps

**10.4** Band-edge Measurement

EUT	Bluetooth Cloud Module	Model	DSM-055
Mode	Keep Transmitting	Input Voltage	DC3.3V
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

# **Test Figure:**



Date: 11.APR.2022 14:06:29

Date: 2022-04-24

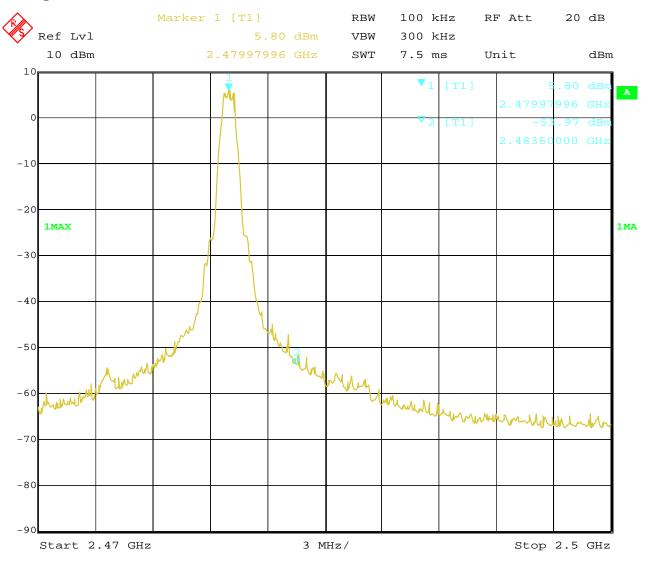


## Data Rate: 1Mbps

10.4 Band-edge Measurement

EUT	Bluetooth Cloud Module	Model	DSM-055
Mode	Keeping Transmitting	Input Voltage	DC3.3V
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

# **Test Figure:**



Date: 11.APR.2022 14:05:39

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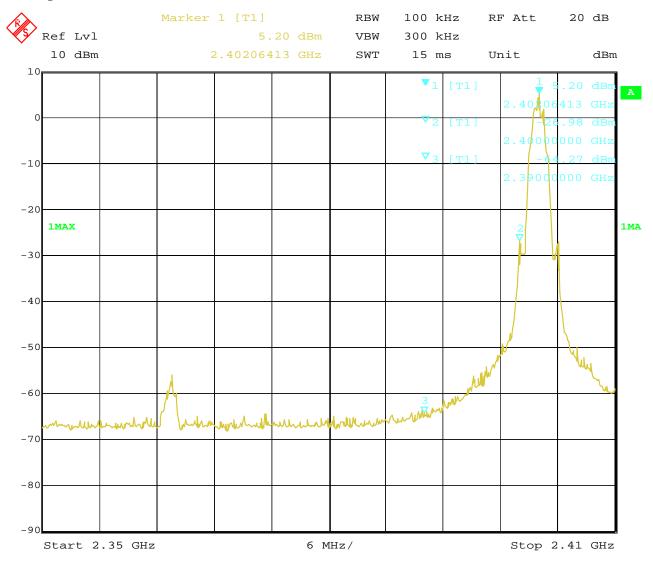


Data Rate: 2Mbps

**10.4** Band-edge Measurement Mode: 2M

EUT	Bluetooth Cloud Module	Model	DSM-055
Mode	Keep Transmitting	Input Voltage	DC3.3V
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

# **Test Figure:**



Date: 11.APR.2022 14:06:56

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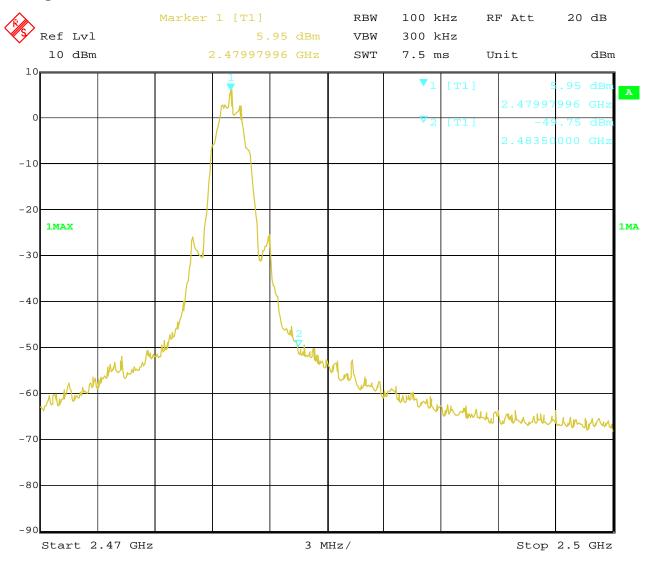
Mode: 2M

## Data Rate: 2Mbps

**10.4** Band-edge Measurement

EUT	Bluetooth Cloud Module	Model	DSM-055
Mode	Keeping Transmitting	Input Voltage	DC3.3V
Temperature	24 deg. C,	Humidity	56% RH
Test Result:	Pass	Detector	PK

# **Test Figure:**



Date: 11.APR.2022 14:08:56

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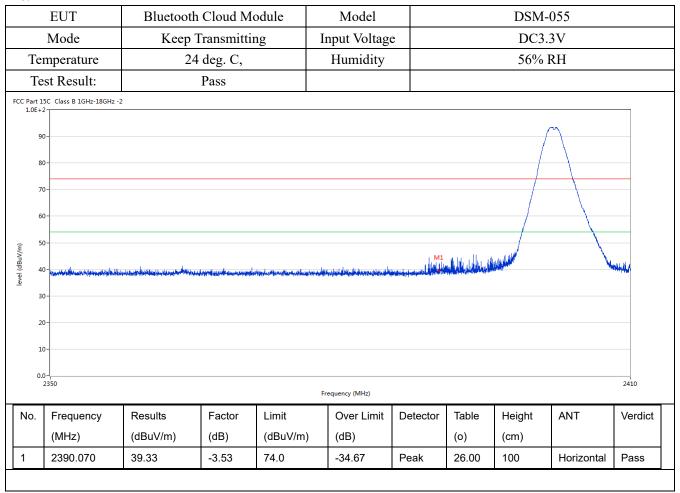
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Data Rate: 1Mbps

#### **10.4** Restrict Band Measurement



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

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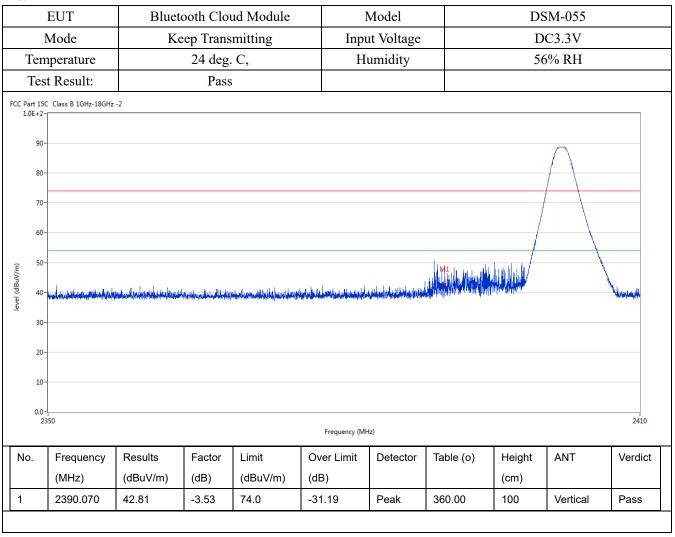
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Date: 2022-04-24



Data Rate: 1Mbps

#### **10.4** Restrict Band Measurement



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

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Data Rate: 1Mbps

#### 104 Restrict Band Measurement

	EUT	Bluetoo	oth Cloud	l Module	Mod	del		DSI	M-055	
	Mode	Kee	p Transm	nitting	Input V	oltage		DC	23.3V	
Ten	nperature		24 deg. (	Ξ,	Humi	idity		569	% RH	
Tes	st Result:		Pass							
	iC Class B 1GHz-18GHz	z -2								
1.0E+2 90										
80	_			$\overline{}$						
70										
60	-				M1					
50	-	. ilder de la constant de la constan								
50	- all any street fills he had been been	inderland to the state of the s			•	the land of the la	highlight and an all and an all and a shape from	and the state of the same of t	Harabahaharah keresa yang	and the second second
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40	- Hanneston Hills and Alberta	sidahanika militak pilak kara			•	the the transfer of the second	ishlininte, pinkan dikinish diploma	orable delivery de model de la constante de la	Marybridd atrocky fick difference and	used and buy dise
40 30	- All annotes of Alberta line has been deposited.	sirkhamata, artistikaja laik			•	the beautiful and	idheirida pirkan kandida kahapan	orithorately is employed, and the	dan di adam di pada di	
40 30 20	- All a grade of Alberta line has held to	ishbanik atliftik jelik			•		dellerjade, girkenden dellerkelye ome	nestra da la completa de la completa	lloodielisteelijaska kiiseesiassa	्रास्त्र के कार्यक्ष कर है। इस्त्र के कार्यक्ष कर किया है।
40 30 20 10	- All a grade of Alberta line has held to				•		dell'er protection de la descripción de la descr	nedera dariet enploya h <sub>es</sub> ater	Maghidhabadh Arid Balanga an	2500
40 30 20 10 0.0 2	- All annual of Albanic has been delegated and the second of the second	Results	Factor	Limit	2483.5		Table (o)	Height	ANT	
40 30 20 10 0.0 2	470		Factor (dB)	Limit (dBuV/m)	2483.5 Frequency (Mi	Hz)				2500
40 30 20 10	-4470 Frequency	Results			2483.5 Frequency (Mr	Hz)		Height		2500

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Data Rate: 1Mbps

#### 10.4 Restrict Band Measurement

U.7	Kestifet Da									
	EUT	Bluetooth	Cloud Mod	dule	Model			DSM-05	5	
	Mode	Keep T	ransmitting	2	Input Voltage			DC3.3V	•	
Te	mperature	24	deg. C,		Humidity			56% RH	[	
Т	est Result:	]	Pass							
CC Part : 1.0E+	15C Class B 1GHz-18GHz -	2								
8	30-									
7										
	50-		/							
(m/vbdb) 19491		the same and the s	<u>/                                      </u>		MI .	يند يادون و يادون المعادل على المعادل على المعادل على المعادل على المعادل المع	والمزيدانة أرارة المرتبطان	المستافا ليهو أرجوا أوالمار المطالعة	industrial of the second state of	Maddelik
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(w/\overline{\pi}\) (and (\pi)\) (and (\pi)\) (and (\pi)\) (and (\pi)\) (by (\	50		Factor (dB)	Limit (dBuV/	2483.5 Frequency (MHz)  Over Limit					2500
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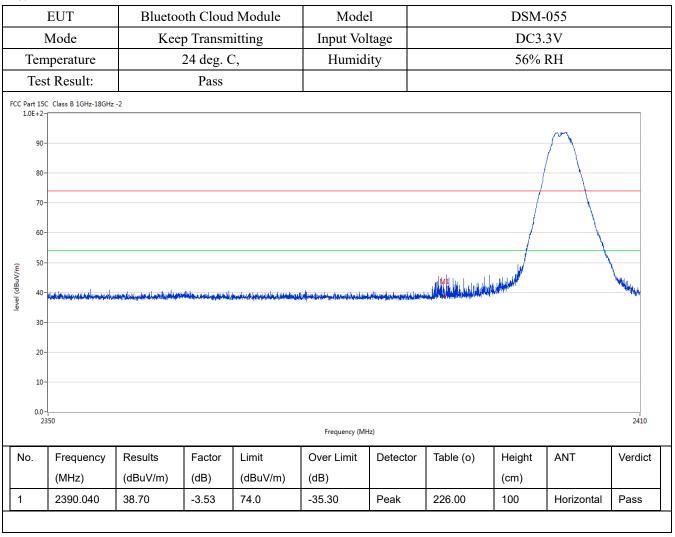
Report No.: TW2203084E

Date: 2022-04-24



Data Rate: 2Mbps

#### **10.4** Restrict Band Measurement



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

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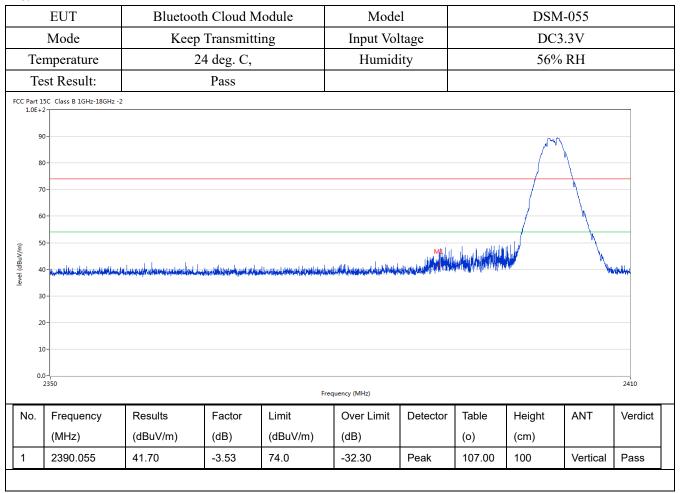
Report No.: TW2203084E

Date: 2022-04-24



Data Rate: 2Mbps

#### **10.4** Restrict Band Measurement



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

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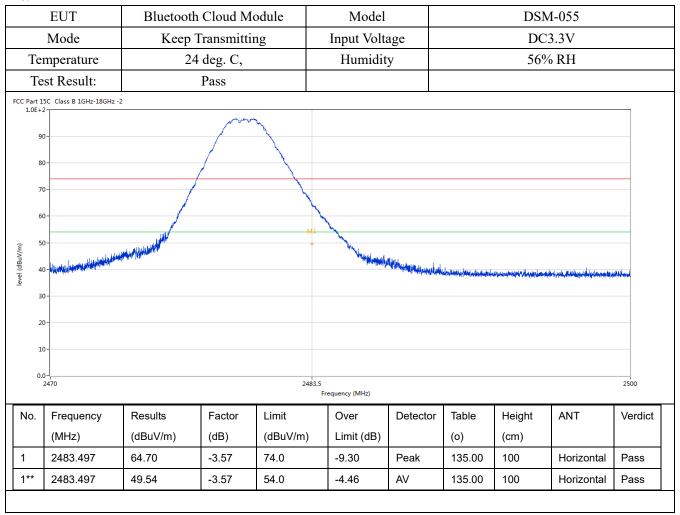
Report No.: TW2203084E

Date: 2022-04-24



Data Rate: 2Mbps

#### **10.4** Restrict Band Measurement



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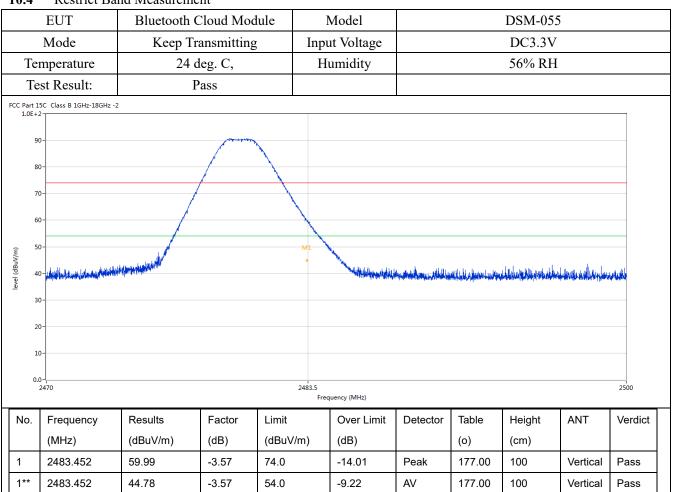
Report No.: TW2203084E

Date: 2022-04-24



Data Rate: 2Mbps

#### 10.4 Restrict Band Measurement



Date: 2022-04-24



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# 11.0 Antenna Requirement

#### 11.1 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.

#### 11.2 Antenna Connected construction

PCB antenna used. The gain of the antennas is 1.5dBi (Declared by the manufacturer)

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Date: 2022-04-24

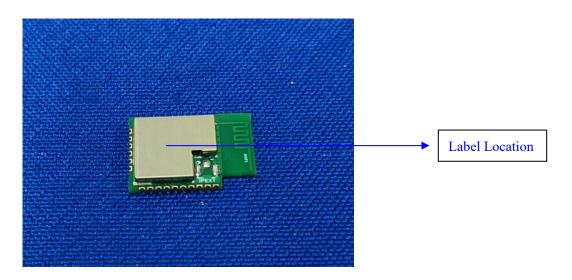


#### 12.0 FCC ID Label

# FCC ID: 2AWWFDSM-055

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:



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Date: 2022-04-24



# 13.0 Photo of testing

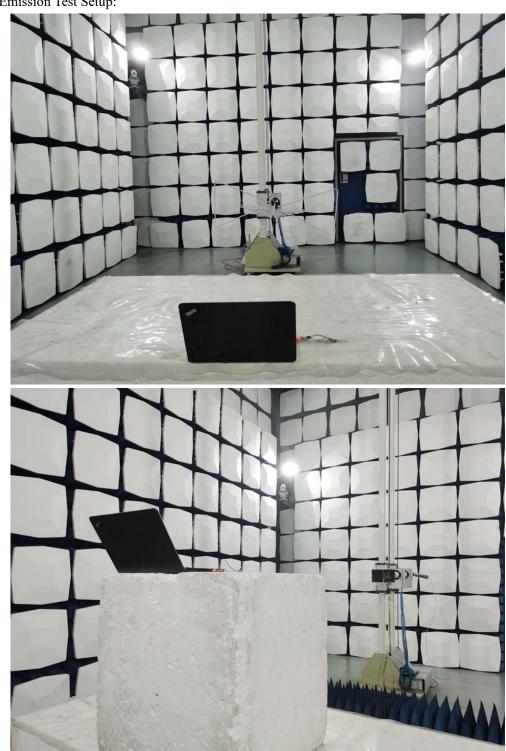
Conducted Emission Test Setup:



Date: 2022-04-24



## Radiated Emission Test Setup:



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

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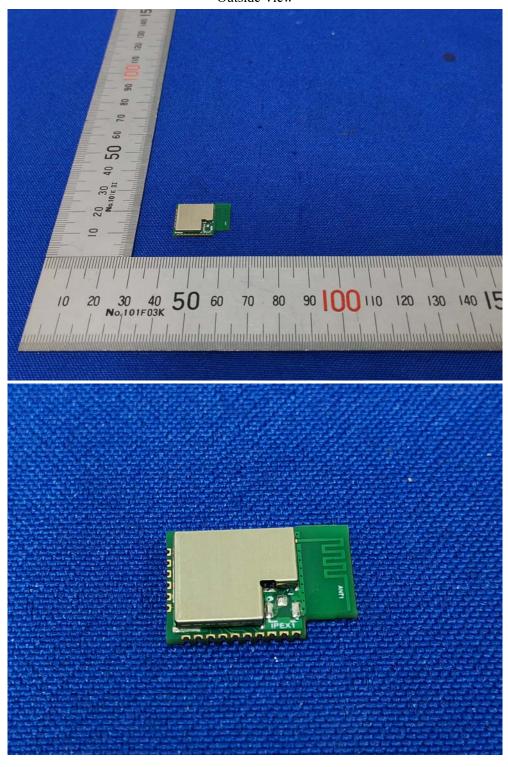
adopt any other remedies which may be appropriate.

Date: 2022-04-24



#### Photographs – EUT

Outside View



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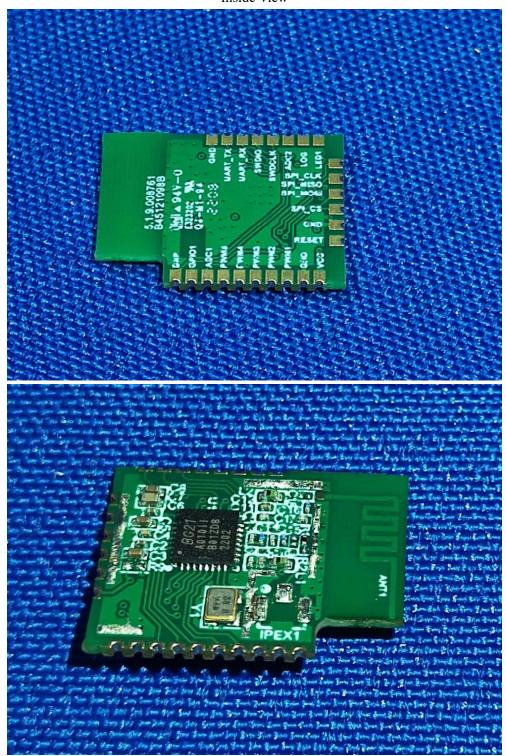
In the event of the improper use of the report. The SHENZHEN TIMEWAY TESTING LABORATORIES. reserves the rights to withdraw it and to

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Inside View



# End of the report

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