

Report No.:	TW2203084E
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 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



# **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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#### 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<br/>Village, Nanshan District, Shenzhen, ChinaTelephone:(755) 83448688Fax:(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

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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

Andy - Xing

The sample tested by

Print Name: Andy Xing

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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 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
2.4G 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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#### 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	Conducted Emission Test	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

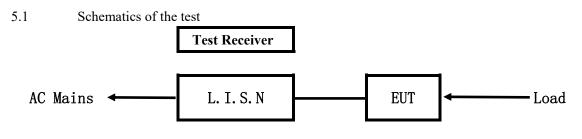
No modification by SHENZHEN TIMEWAY TESTING LABORATORIES.

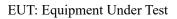
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# **5.**Power Line Conducted Emission Test



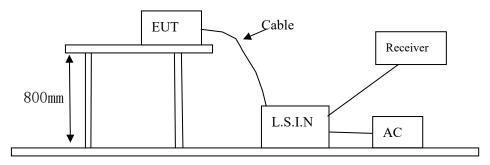


5.2 Test Method and test Procedure

The EUT was tested according to ANSI C63.10-2013. The Frequency spectrum From 0.15MHz to 30MHz was investigated. The LISN used was 500hm/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.

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

	1		
Frequenc	у	Limits (d	lBμV)
(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
$5.00 \sim 30.0$	00	60.0	50.0

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

2. The tighter limit shall apply at the transition frequencies

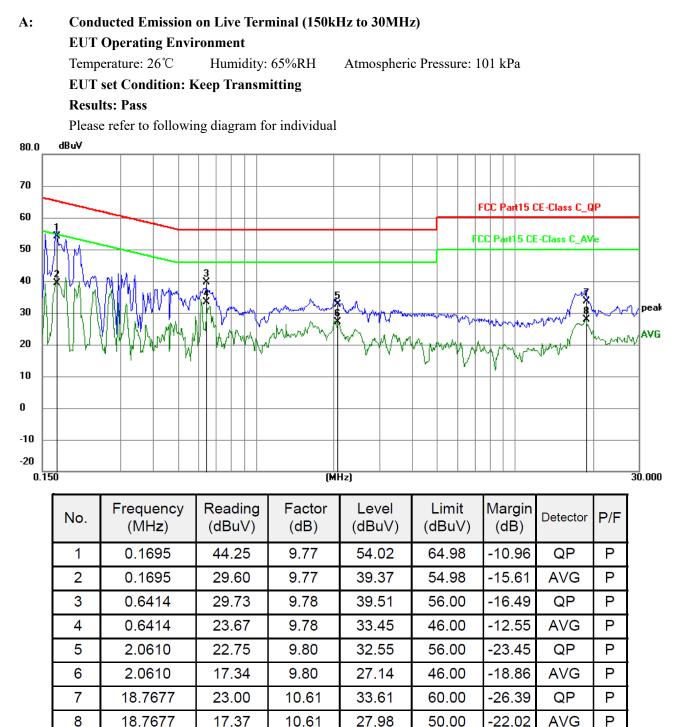
#### 5.6 Test Results

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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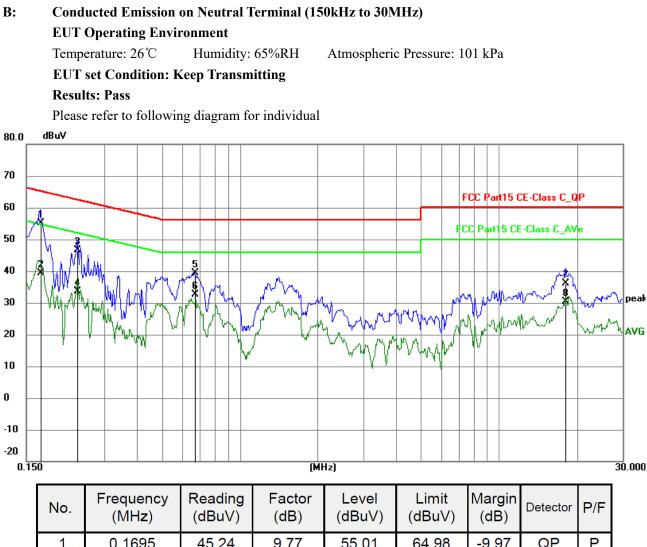




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INO.	(MHz)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dB)	Delector	F/F
1	0.1695	45.24	9.77	55.01	64.98	-9.97	QP	Р
2	0.1695	29.67	9.77	39.44	<mark>54.98</mark>	-15.54	AVG	Р
3	0.2358	36.77	9.75	46.52	62.24	-15.72	QP	Ρ
4	0.2358	23.99	9.75	33.74	52.24	-18.50	AVG	Ρ
5	0.6687	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	Ρ

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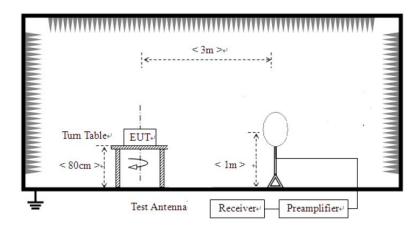


#### 6 Radiated Emission Test

- 6.1 Test Method and test Procedure:
- 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

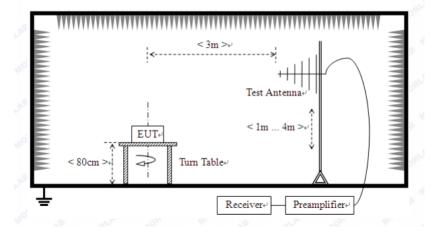


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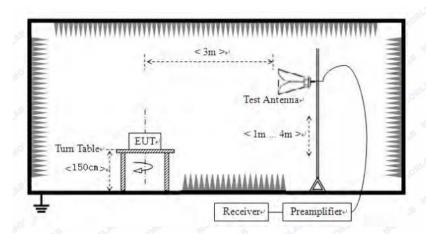
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For radiated emissions from 30MHz to1GHz



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 $\mu$ 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

3

4

383.962

762.167

21.36

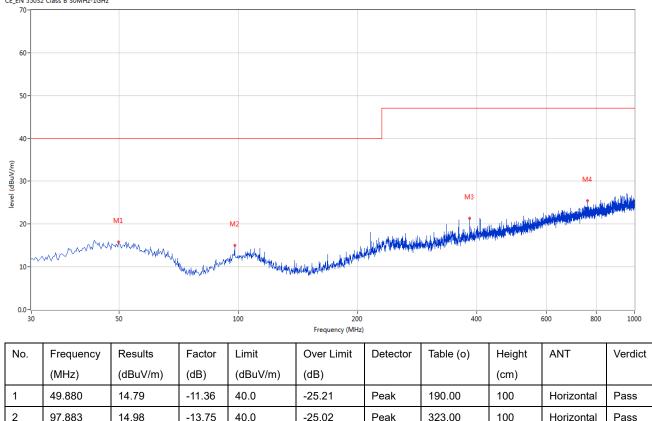
25.48

-9.16

-3.24

47.0

47.0



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-25.64

-21.52

Peak

Peak

100.00

257.00

100

100

Horizontal

Horizontal

Pass

Pass



# Test result General Radiated Emission Data and Harmonics Radiated Emission Data

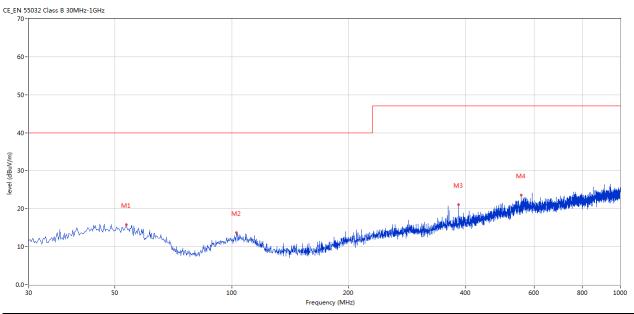
#### Radiated Emission In Vertical (30MHz----1000MHz)

Pass

EUT set Condition: Keep Transmitting

**Results:** 

Test Figure:



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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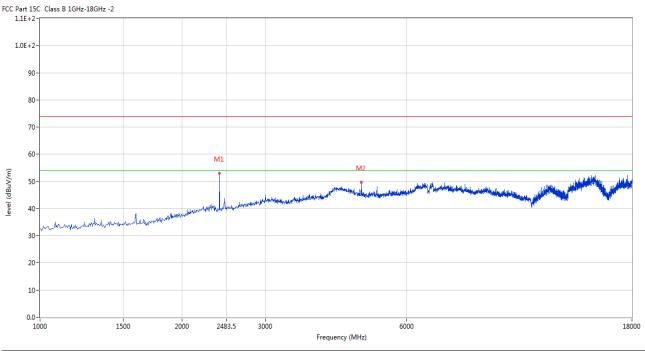
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#### Data Rate: 1Mbps

#### Please refer to the following test plots for details:

#### Low Channel: Horizontal



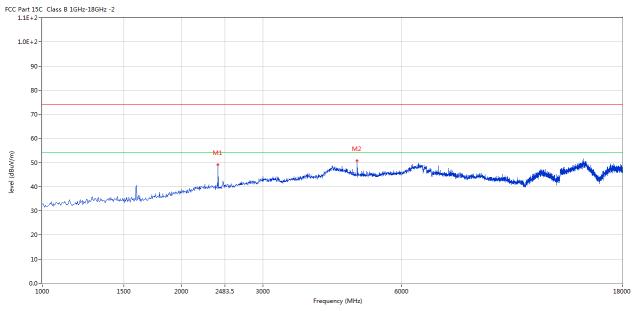
No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table (o)	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)			(cm)		
1	2402.009	53.12	-3.57	74.0	-20.88	Peak	312.00	100	Horizontal	Pass
2	4802.799	49.80	3.12	74.0	-24.20	Peak	1.00	100	Horizontal	Pass

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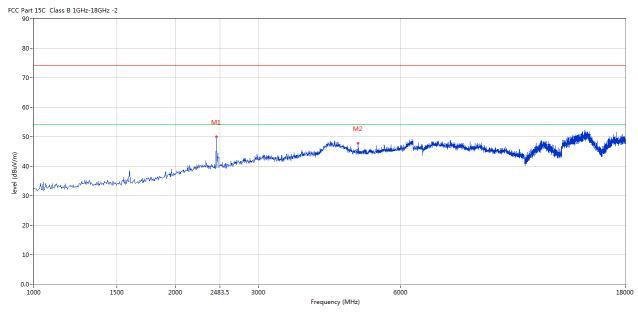
No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
1	2402.008	49.05	-3.57	74.0	-24.95	Peak	338.00	100	Vertical	Pass
2	4802.799	50.73	3.12	74.0	-23.27	Peak	254.00	100	Vertical	Pass

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

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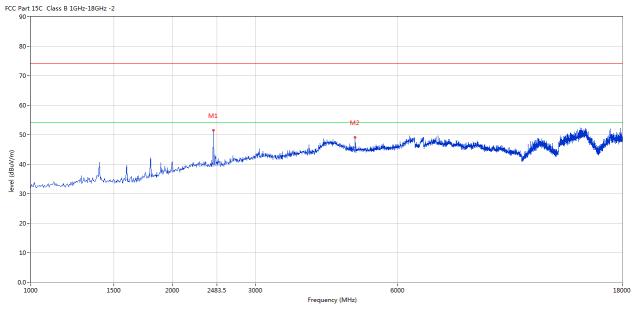
No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
1	2440.010	49.94	-3.57	74.0	-24.06	Peak	100.00	100	Horizontal	Pass
2	4879.280	47.75	3.20	74.0	-26.25	Peak	190.00	100	Horizontal	Pass

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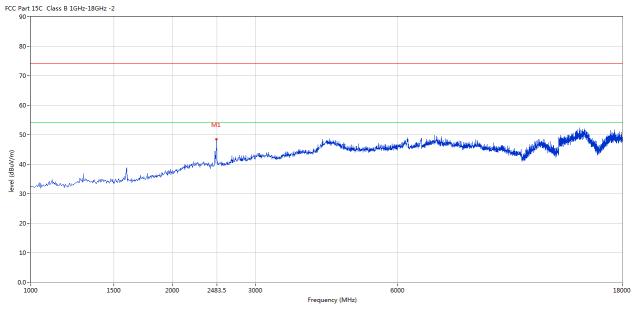
No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
1	2440.010	51.49	-3.57	74.0	-22.51	Peak	335.00	100	Vertical	Pass
2	4879.280	49.09	3.20	74.0	-24.91	Peak	235.00	100	Vertical	Pass

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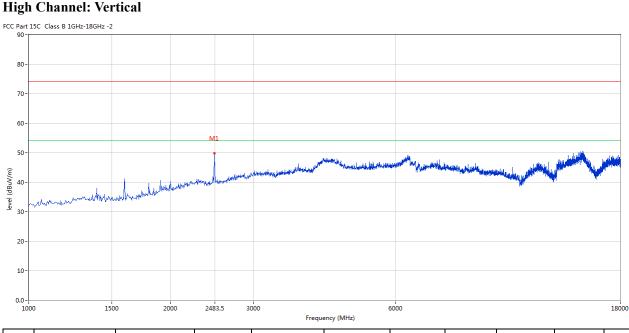


No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
1	2480.008	48.43	-3.57	74.0	-25.57	Peak	10.00	100	Horizontal	Pass

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

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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

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

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#### Data Rate: 2Mbps

1

2

2402.010

4802.799

49.64

50.04

-3.57

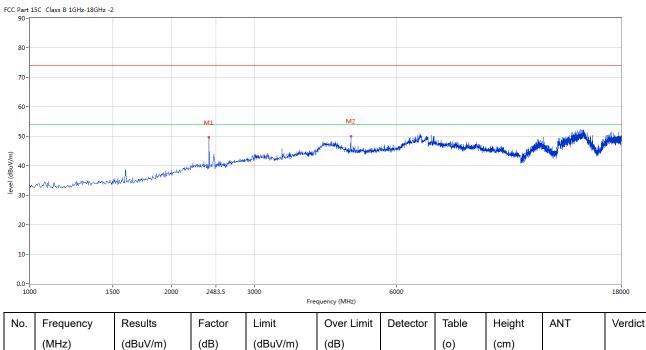
3.12

74.0

74.0

#### Please refer to the following test plots for details:

#### Low Channel: Horizontal



-24.36

-23.96

Peak

Peak

334.00

6.00

100

100

Horizontal

Horizontal

Pass

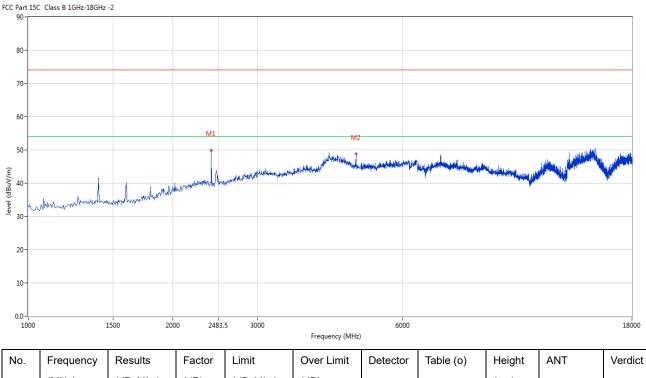
Pass

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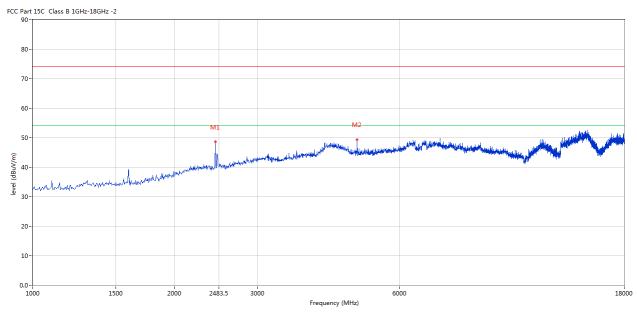
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)			(cm)		
1	2402.009	49.88	-3.57	74.0	-24.12	Peak	312.00	100	Vertical	Pass
2	4802.799	48.74	3.12	74.0	-25.26	Peak	338.00	100	Vertical	Pass

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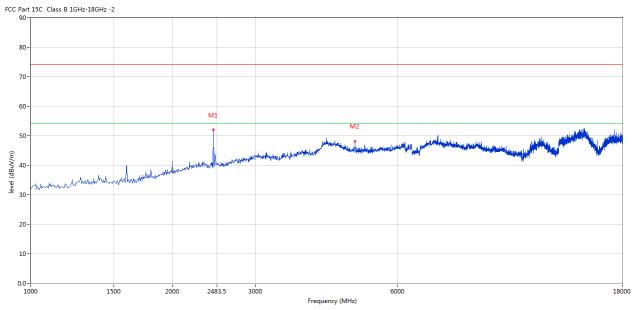
No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
1	2440.008	48.60	-3.57	74.0	-25.40	Peak	130.00	100	Horizontal	Pass
2	4879.280	49.34	3.20	74.0	-24.66	Peak	358.00	100	Horizontal	Pass

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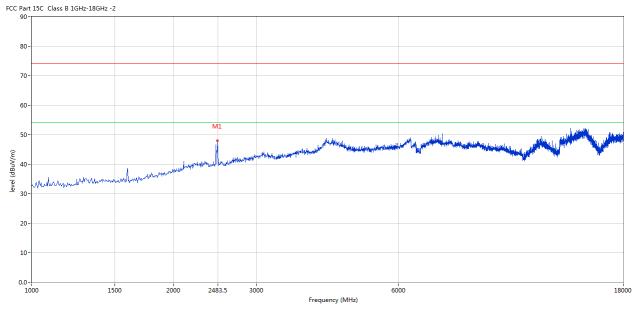
No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
1	2440.010	52.02	-3.57	74.0	-21.98	Peak	321.00	100	Vertical	Pass
2	4879.280	48.21	3.20	74.0	-25.79	Peak	123.00	100	Vertical	Pass

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

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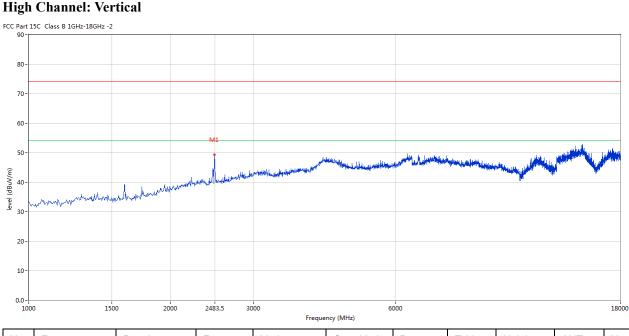


No.	Frequency	Results	Factor	Limit	Over Limit	Detector	Table	Height	ANT	Verdict
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dB)		(o)	(cm)		
1	2480.008	47.91	-3.57	74.0	-26.09	Peak	4.00	100	Horizontal	Pass

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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.

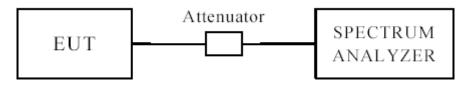
4. A 2.4G Band filter used radiated emission measurement

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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)  $\ge$  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

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

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# 6dB BW

#### Data Rate: 1Mbps

EUT		Bluetooth Cloud Module		Model		DSM-055		
Mode		Keep Transmitting		Input Voltage		DC3.3V		
Temperature		24 deg	. C,	Humidity	у		56% RH	
Channel		nannel Frequency (MHz)	0 42 21	andwidth Hz)	М	inimum Limit (kHz)	Pass/ Fail	
Low	2402		631			0.5	Pass	
Middle	2440		6	625		0.5	Pass	
High	High 2480		25		0.5	Pass		

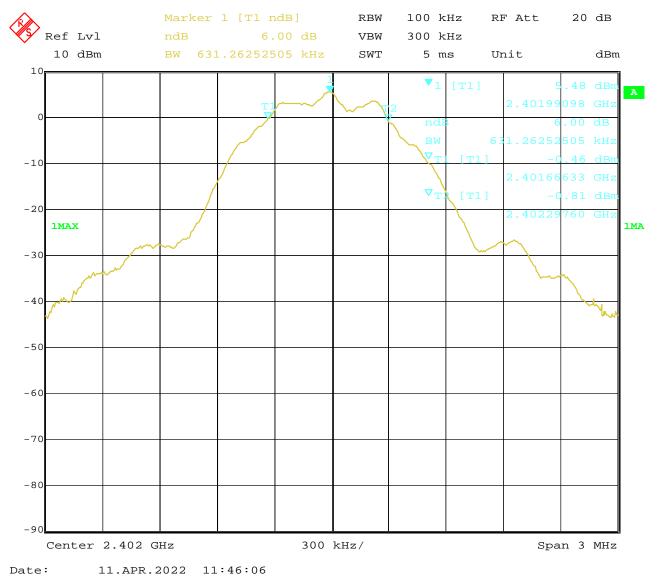
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# Test Figure: 1. Condition: Low Channel



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#### 2. Condition: Middle Channel



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#### 3. High Channel



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# Data Rate: 2Mbps

EUT		Bluetooth Clo	Model	Model		DSM-055		
Mode		Keep Transmitting		Input Voltage		DC3.3V		
Temperature		24 deg	. C,	Humidity	Humidity		56% RH	
Channel	Ch	annel Frequency (MHz)	0 42 2	andwidth Hz)		inimum Limit (kHz)	Pass/ Fail	
Low	2402		1102		0.5		Pass	
Middle	2440		1112			0.5	Pass	
High	High 2480		1132			0.5	Pass	

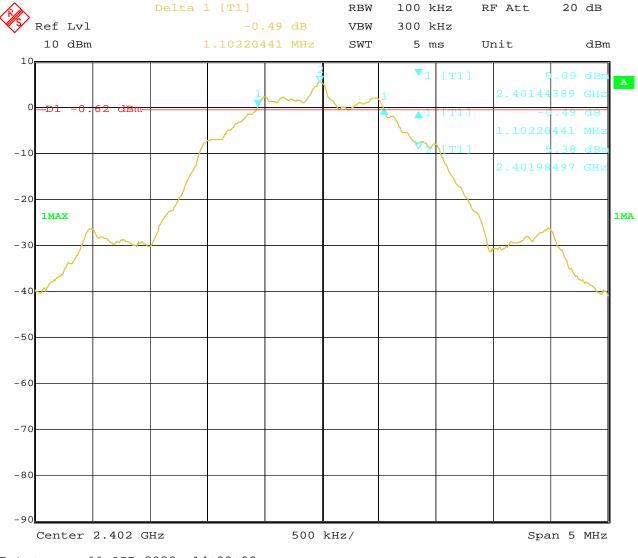
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# Test Figure: 1. Condition: Low Channel



Date:

11.APR.2022 14:33:02

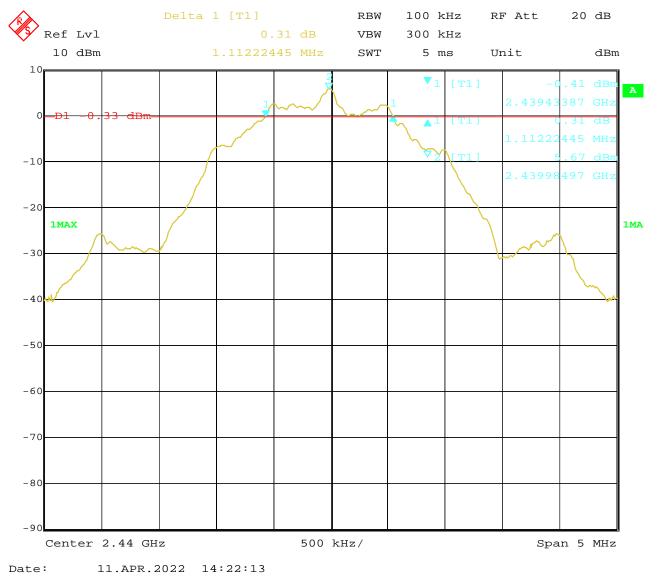
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#### 2. Condition: Middle Channel



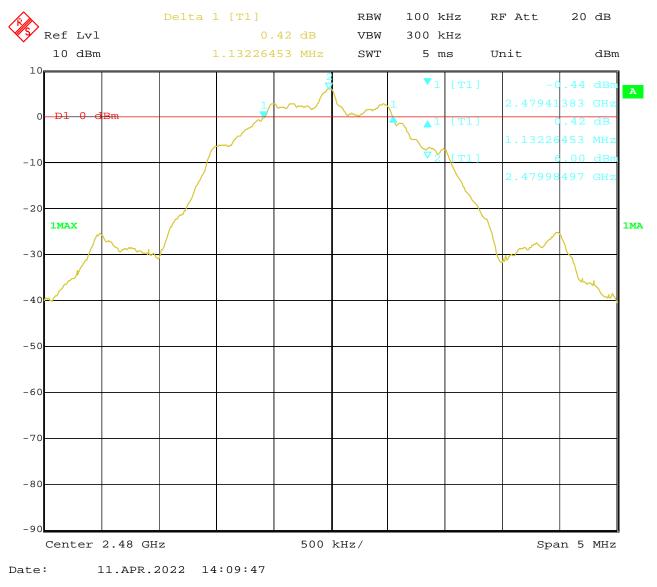
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#### 3. High Channel

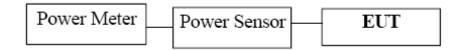


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8. Maximum Output Power 8.1 Test Setup



## 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	5
Mode		Keep Transm	itting	Input Voltage		DC3.3V	I
Temperatu	re	24 deg. (	ς,	Humidity		56% RH	I
Channel	Cł	nannel Frequency	Max	x. Power Output (dBi	m)	Peak Power Limit	Pass/ Fail
Chamler		(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	5
Mode		Keep Transm	nitting	Input Voltage		DC3.3V	T
Temperatu	re	24 deg. (	Ξ,	Humidity		56% RH	I
Channel	Cł	nannel Frequency	Max	k. Power Output (dB	m)	Peak Power Limit	Pass/ Fail
Chamler		(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

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

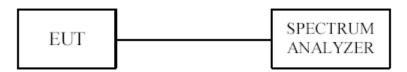
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## 9. Power Spectral Density Measurement

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		Bluet	ooth Cloud N	Iodule	Model			DSM-055
Mode		Ke	ep Transmitt	ing	Input Volta	age		DC3.3V
Temperat	ure		24 deg. C,		Humidit	у		56% RH
	Peak	Power	Cable	Final Po	wer Spectral	Max	kimum	
Channel	Re	ading	Loss	D	ensity	L	imit	Pass/ Fail
	(d	lBm)	(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	-	1.55	0.2		-1.35		8	Pass

Note: The result basic equation calculation as follow:

Peak Power Output = Peak Power Reading + Cable loss

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

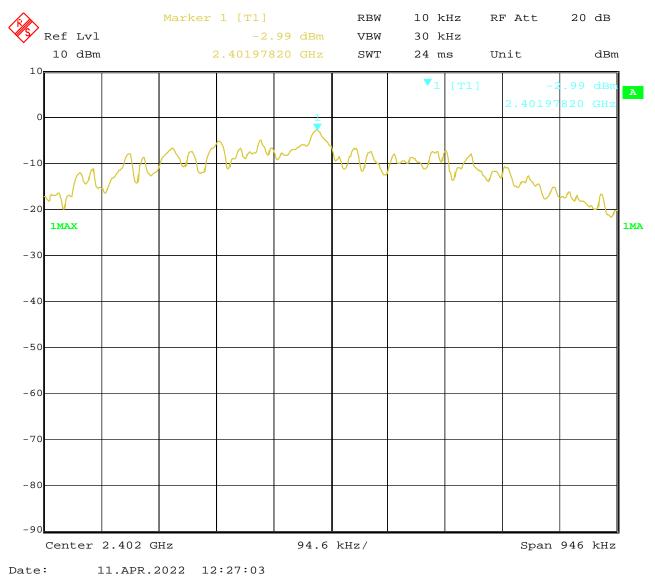
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## Test Figure: 1. Condition: Low Channel



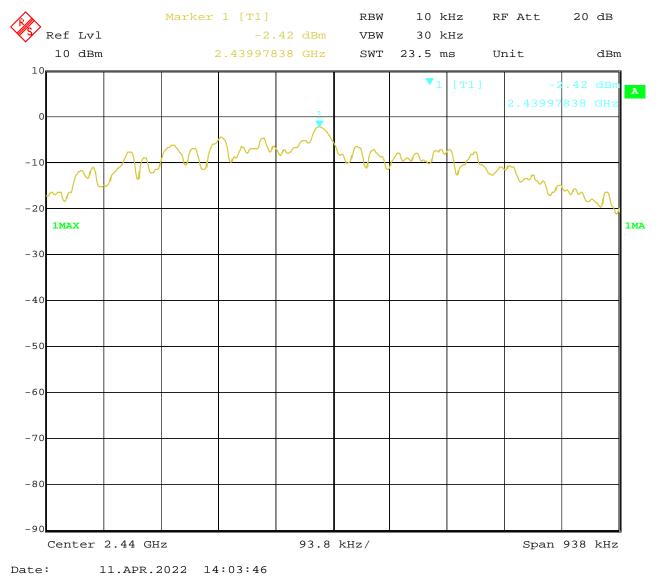
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#### 2. Condition: Middle Channel



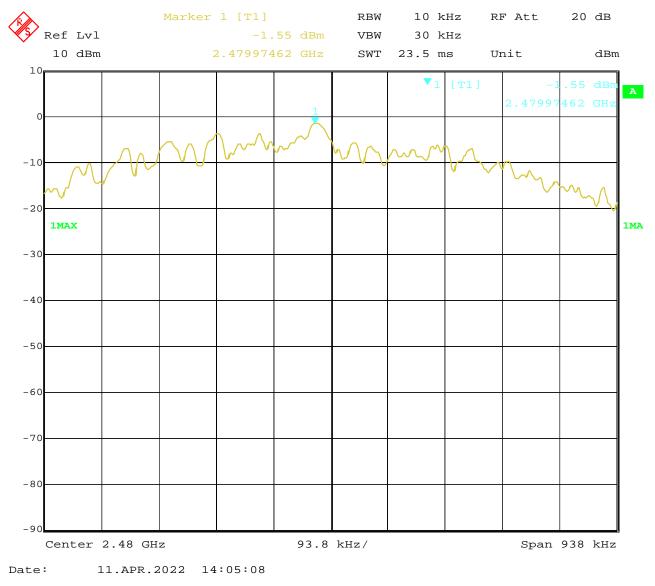
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#### 3. High Channel



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### Data Rate: 2Mbps

EUT		Bluet	ooth Cloud N	Iodule	Model			DSM-055
Mode		Ke	ep Transmitt	ing	Input Volta	age		DC3.3V
Temperat	ure		24 deg. C,		Humidit	у		56% RH
Channel	Re	A Power ading IBm)	Cable Loss (dB)	D	wer Spectral ensity n/10kHz)	L	kimum imit 1/3kHz)	Pass/ Fail
Low	-2	2.65	0.2	-	-2.45		8	Pass
Middle	-1	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

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

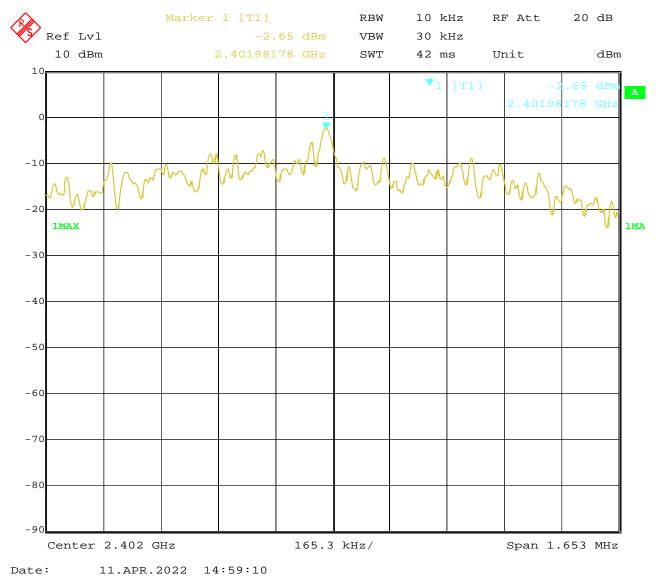
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## Test Figure: 1. Condition: Low Channel



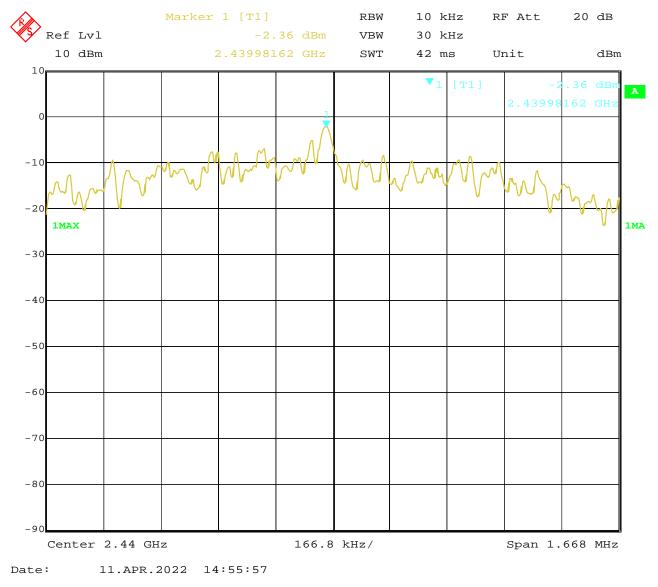
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#### 2. Condition: Middle Channel



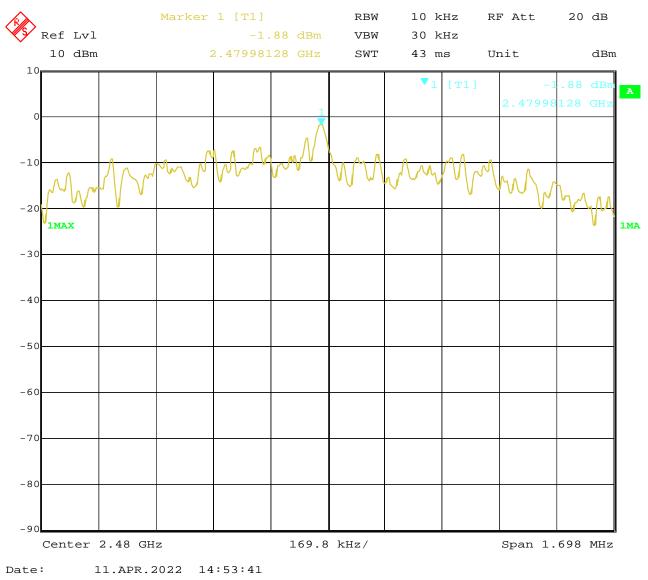
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3. High Channel

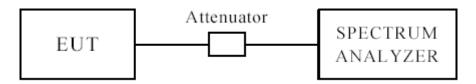


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**10 Out of Band Measurement 10.1 Test Setup for band edge** 



#### 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

-	Measurement		Γ					
EUT	Bluetooth Clo	ud Module	Model			DSM-05	55	
Mode	Keep Trans	smitting	Input Volta	ige		DC3.3V	Ι	
Temperature	24 deg	. C,	Humidity	у		56% RI	ł	
Test Result:	Pass	s	Detector	:		РК		
Test Figure:								
<b>A</b>	Marker	1 [T1]	RBW	100	) kHz	RF Att	20 dB	
Ref Lvl		5.17 0	dBm VBW	300	) kHz			
10 dBm	2	.40206413	GHZ SWT	15	5 ms	Unit	dBm	ı
10					1 [T1]	1	5.17 dBm	1_
						2.4000	6413 GHz	2
0				-	2 [T1]	- 4	6.19 dBm	
						2.4000	0000 GHz	
-10				,	<b>7</b> 3 [T1]	-6	5.91 dBm	
						2.3900	0000 GHz	
-20								
1MAX								1
-30								
-30								
-40						2		
						7		
-50							M.	
							Mr.	
-60	A				mmld	A.M.	Nul ve	
unnun		1 ml 1 1	La Karaka KAUA	AN A. AN	ampl *			
-70	man man	. Chan wanted that we	nham Jun					
-80								
00								
-90 Start 2.3	5 GHz	l	6 MHz/	1	I	Stop	2.41 GHz	1
	APR.2022 14	• • • • • • •				<b>L</b>		
Date: 11.	APK.2022 14	• 00 • 29						

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#### Data Rate: 1Mbps

10.4 Band-edge Measurement

10.4 Band-edge	e Measurement							
EUT	Bluetooth Cl	oud Module	Model			DSM-055		
Mode	Keeping Tr	ansmitting	Input Voltage	e		DC3.3V		
Temperature	24 de	g. C,	Humidity			56% RH		
Test Result:	Pa	SS	Detector			РК		
Test Figure:			1	I				
	Marker	1 [T1]	RBW	100 k	Hz RI	F Att	20	dB
Ref Lvl		5.80 di	Bm VBW	300 k	Hz			
10 dBm	2	2.47997996 G	Hz SWT	7.5 m	s Ui	nit		dBm
10		1		<b>V</b> 1	[T1]		.80	dBm
		M		· ±	[ ]	2.47997	. 80 996	2
0				₹2	[T1]	-53	.97	dBm
						2.48350		GHz
-10								
-20								11
INAX		/ \						10
-30								
10								
-40	, m							
-50 -60	Inumber		hymne					
-60			- the	mmille	ALLAN NU			
					A. W.W.H	www.w	uhln	M
-70								
-80								
-90	47 CH2	I	3 MHz/			Stop	25	CH 7
			5 11127			BCOP	2.5	0112
Date: 11	.APR.2022 14	:05:39						

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#### Data Rate: 2Mbps

.4 Band-edge EUT		Cloud Module	N	Iodel	Γ		Г	SM-05	5	
Mode		ansmitting		t Voltag				DC3.3V		
								56% RF		
Temperature Test Result:		eg. C,		midity etector				PK	1	
	P	ass	De	elector				PK		
st Figure:										
	Marke	r 1 [T1]		RBW		kHz	RF	Att	20 dB	
Ref Lvl		5.20		VBW		kHz			-	
10 dBm		2.40206413	GHz	SWT	15	ms	Uni	t	dB	m
10					•	1 [Т1	]	1	5.20 dB	m
							2	.4020	6413 GH:	z
0						2 [T1	]	-2	6.98 dB	m
								.4000		
-10					$\nabla$	3 [т1		-6	$4.27  \mathrm{dBi}$	
							2	. 3900	0000 GH:	Z
-20										
1MAX								2		
-30								Ĭ		
50										
-40										
-50									$\left  \right\rangle$	
	٨								- Milly	
-60		mound		h	3	m when				-
-70	mound has	mynerwere		r						
-80										
-90	5			,					0 41 755	┛
Start 2.3	5 GHZ		6 MHz/					stop i	2.41 GH:	Z

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#### Data Rate: 2Mbps

10.4 Band-edge N	Aeasurement	]	Mode: 2M			
EUT	Bluetooth Cloud Mod	ule	Model		DSM-05:	5
Mode	Keeping Transmittin	g	Input Voltage	e	DC3.3V	
Temperature	24 deg. C,		Humidity		56% RH	
Test Result:	Pass		Detector		РК	
Test Figure:						
<b>A</b>	Marker 1 [T1]		RBW	100 kHz	RF Att	20 dB
Ref Lvl	5	.95 dBr	n VBW	300 kHz		
10 dBm	2.47997	996 GH:	z SWT	7.5 ms	Unit	dBm
10				▼1 [T1	]	5.95 dBm
	Ma				2.4799	7996 GHz
0				▼2 [T1		9.75 dBm
					2.4835	0000 GHz
-10						
-20						1
-30		/				
-40						
-50	1 March	2 V.2				
-50 -60	I.m. Mala	Win	M		mentraline	
-60				twinkpung	may raha we	h Lin Lin.
-70						~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
-80			_			
-90						
Start 2.47	GHz	3	MHz/		Stop	2.5 GHz

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#### Data Rate: 1Mbps

10.4	Restrict Band Measurement
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	EUT	Bluetoot	h Cloud Module	Model			DSM	-055	
	Mode	Keep	Transmitting	Input Voltage	e		DC3	.3V	
Te	mperature	2	4 deg. C,	Humidity			56%	RH	
Te	est Result:		Pass						
2 Part 1 1.0E+2	5C Class B 1GHz-18GHz	-2							
91 81 71 61	0								
0								1	
50	0-	haumantantakan kuntanga kun <sup>d</sup> anga	dah fernikusaik suuraansoluotesutaatisotaat	ur, aluna eksistidas pidense sisueks	M1				makin king
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51 41 31 21 10	0	llein allen fordenske villen ek om berkondense	en herent sound	requency (MHz)	M1	n fichthe schilder in the			2410
50 44 30 20 10	0 	Results (dBuV/m)	Factor Limit	Frequency (MHz)	Detector	Table (o)	Height	ANT	

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

	EUT	Bluet	ooth Clou	ud Module	1	Model		D	SM-055	
	Mode	Ke	eep Trans	mitting	Inpu	ut Voltage		D	C3.3V	
Ter	mperature		24 deg.	С,	H	umidity		5	6% RH	
Te	st Result:		Pass							
C Part 19 1.0E+2	5C Class B 1GHz-18GHz 2-	z -2								
90	)									
80	)									
70	)-								$\vdash$	]
60	)-							/	+	
								1	\	
50	)-						M1			\
50 40		gradian discription data base dat	hanishu, nullai nalke dhiji	nin a human sing base i have that an pi	hydrafa ihi hann dan da dhan da fa	n silaa hadaa hadaa hadaa				Anna and
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. 40 30 20 10	)- <mark>val</mark> ino <b>batentur miter h</b> yte )- )-	Results	Factor	Limit			Table (o)	Height	ANT	2410
- 40 30 20 10	0				Frequency (Mł	+z)	Table (o)	Height (cm)	ANT	

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

ent

	EUT	Bluetoc	oth Cloud	l Module	Mo	del		DSN	M-055	
	Mode	Keej	p Transm	nitting	Input V	oltage		DC	3.3V	
Ter	mperature		24 deg. (	C,	Hum	idity		56%	% RH	
Te	st Result:		Pass							
C Part 1: 1.0E+2	5C Class B 1GHz-18GHz	-2								
1.00+2	2-			$\frown$						
90	)-		/							
80	)-									
70	)-									
			1		$\mathbf{N}$					
60	)-	1	(		M1					
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• 40 30	0	utions and a second second				Hinds of New Local Andrew	http://www.afficially.com	nillipadirist optimuksessel	hadan bada bada bada bada bada bada bada	interferensel in floor
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40 30 20 10	)				2483.5 Frequency (MI		1997-1916 - 1996 - 1996 - 1996 - 1996 - 1996 - 1996 - 1996 - 1996 - 1996 - 1996 - 1996 - 1996 - 1996 - 1996 - 1 	nille de vierne kreitik	herbeilennen kannen erne	2500
40 30 20 10		Results	Factor	Limit	2483.5		Table (o)	Height	ANT	2500
40 30 20 10	0		Factor (dB)	Limit (dBuV/m)	2483.5 Frequency (MI	Hz)	1			2500
40 30 20 10	Frequency	Results			2483.5 Frequency (MI Over Limit	Hz)	1	Height		

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#### Data Rate: 1Mbps

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

	EUT	Bluetooth	Cloud Modu	ule	Model			DSM-05	5	
	Mode	Кеер Т	ransmitting	Ir	nput Voltage			DC3.3V	r	
Te	mperature	24	deg. C,		Humidity			56% RH	[	
Те	est Result:		Pass							
C Part 1 1.0E+	15C Class B 1GHz-18GHz	-2								
	10 - 30 -		$\square$							
7	70-		/							
	50 -		1							
6		1	/							
	50-	/		MI						
5	50 - 10 - <mark>n h Hundradistikan di hesinda</mark>	have worth the		MI •	- Ale wind Married	en filler og stander star for star star star star star star star sta	hleraus, hladairdh	Hallfordagionskildadd	ünterholdusten Liebe	<b>H</b> addeladiyi
5 4 3	50 - 10 - <mark>- J. H. Western (H. Hone, H. Hone, H.</mark>	han and a start of the start of		M1 •	and a start of the	árdílátorisatorikasila		Massillen lagt i sea begid achd	ünleylerleben Lieben	for de la calega
5 4 3	50 - 10 - <mark>k. 1 karladat bad. kara k</mark> a 30 - 20 -	han marked		1M •	- Ale with different	indidana ing kadu	hlerouse de	haibler Lipian Instantis dat	a da phaide an an da bha	erablasija
5 4 3	50 - 10 - <mark>- J. H. Western (H. Hone, H. Hone, H.</mark>	Harr-reneted		•		den bibliowisa in the state of th	alder beste det det det det det det det det det d	in still og Leg i en skride atte	talayluulaaying kabu	Seable day
5 4 3 2 1	50 - 10 - <mark>k. 1 karladat bad. kara k</mark> a 30 - 20 -	hten		MI • 2483		in bibliores in the other	Jaron States	Muther Lipinsheide	a dag dag dag dag dag dag dag dag dag da	2500
(iii) 5 4 3 2 1	50 - 10 - 11 - 11 - 11 - 11 - 11 - 11 - 11 -	Results	Factor	•	3.5	Detector	Table	Height	ANT	
5 4 3 2 1	50 - 10		Factor (dB)	2483	3.5 Frequency (MHz)					
(iii / 5 iii / 1 3 2 1 0.	50	Results		2483 Limit	3.5 Frequency (MHz) Over Limit		Table	Height		2500 Verdict Pass

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#### Data Rate: 2Mbps

10.4	Restrict Band Measurement
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	EUT	Bluetoo	oth Cloud	l Module	Model	l		DSM-	-055	
	Mode	Kee	p Transm	itting	Input Volt	tage		DC3	.3V	
Teı	mperature		24 deg. (	2,	Humidit	ty		56%	RH	
Te	st Result:		Pass							
Part 1 1.0E+2	5C Class B 1GHz-18GHz	-2								
90	0-									
80	0-									
70	0-							/		
60	0-								-	
50	0-						nte e et			
50 40	0- 0- <mark>duðislan seiser vald hað lei meður s</mark> eis	anan daalaa daa daan daabdaga	alliless of the second second	na diniyê herî siyî din. li sanderiyê	lation to star where the star be	line of the second second second		habbalabalable		White the state
50 40 30	0 - Kundislatista og kalandista mangarata o	uneraluussia aleen kunkunkaan	alala, a an de ge avail d	na dan Alatan da katalan s	ho <b>f</b> orestandor <sub>ta</sub> ntaronai devidandar	dia ang pangan ka kina a		hite half and a second		AN A
40	0- <i>Uniterrationalistication</i> 0-	nsendara, de diverkantiger	and a sea to	graad naft het sei die kaarde ge	linforedinistry, iterentista selaretse	dia ang ng kang ng ka julay d		haddaladadadadadadadadadadadadadadadadad		
40 30	0- <mark>16-16-16-16-16-16-16-16-16-16-16-16-16-1</mark>	nnen kunne di werkendigen	winin, a an ta a an ta bh	an air ch feinn air cho, is sin dealann	lofendereinen derenten bestande	dina da parte di seri		hiddelain and a second s		
40 30 20 10	0- <mark>40#Jahosavid4.halovenovid</mark> 0	naendowy de diwekselige	ฟรีสโตรง ค.ศ. 1. อุงสุมหาร์ได	9	Frequency (MHz					2410
40 30 20 10	0- <b>54456444444444444444</b>	Results	Factor	Limit			Table (o)	Height	ANT	1
40 30 20 10	0- Euklahusuuvutu haliumusuulu 0- 0- 0- 2350				Frequency (MHz	2)			ANT	2410 Verdic

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: 2Mbps

10.4 Re	trict Band Measurem	ent
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	EUT	Bluetoc	oth Cloud Module	Mode	el		DSN	<i>I</i> -055	
	Mode	Keej	p Transmitting	Input Vo	ltage		DC	3.3V	
Te	mperature		24 deg. C,	Humid	lity		56%	6 RH	
Τe	est Result:		Pass						
1.0E+ 9 8 7	15C Class B 1GHz-18GHz 2- 10- 10- 10-	-2							
5 4 3 2 1	0	uterhanenskandenskandensk	hander viele is not we have the set of the set		how out and the state of the st				2410
5 4 3 2 1 0.	0 - 1, 10, 11, 11, 11, 11, 11, 11, 11, 11,			Frequency (MHz)					2410
5 4 3 2 1	0	Results (dBuV/m)	Factor Limit (dB) (dBuV/m)	Frequency (MHz)	Detector	Table (0)	Height (cm)	ANT	

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: 2Mbps

#### 10.4 Restrict Band Measurement

	EUT	Bluetoot	h Cloud M	odule	Model			DSN	M-055	
	Mode	Keep	Transmitti	ng	Input Volta	age		DC	23.3V	
Te	mperature	24	4 deg. C,		Humidit	у		56%	% RH	
Τe	est Result:		Pass							
C Part 1 1.0E+	15C Class B 1GHz-18GHz	-2								
9 8 7	2 10 	/								
		1			2					
		, JAL		M1	1					
. 5 . 4	50 - 10 - Ministry Indonesia (Made Ministry Made	and the state of the		M1	An Antiplements	Litering in the second second	alman and a factor for the state of the	an waa ahaa ka k	anter de service all déclarase collecteurs dans	all defensed
	50 - 10 - Minshin Hanning Mary India Arring Mark	and the light with the light of		M1	he beneficially	Arthicestapactocockate	al <mark>n, 1999, y 1999, y 1999, y 1999, y 1999, y</mark> 1999	เสราะนางจากรับไฟฟ์ (ไปสารสิต) ได้สาร	spin-topolo, at the gravity of streams to g	ill block
3		upper a light and the light of		M1	and the second second	literia, majora di pela	dr. www. few. atomatic	aluniaationista (Mariae) kataa	ydd yn a Malagard y blanadd y	ili iji mel
3	30-	up to Water Mark		M1	en vansiespeile	litikunastak	ณ์ๆ: Ress. (สินส. 1944)	an a	hit i, ya Alifa ya Uniya da ya A	dt hj mel
3 2 1 0.	10 20 .0			M1		lifihusesested	dr.two.fac.ukututut	Uning Carlos Carlos San	yle-i, yd., Hildsgordd ywdargodd ywdaroesty	
3 2 1 0.	10			2483:		lifthey-top-fortunal lab	d-1000,1000,100,000	elestantentiet (Incerforme	yik (, yik, Milley oʻl iyolen vestiy	2500
2 1 0.	10 20 .0	Results	Factor (dB)		5	Detector	Table (o)	Height (cm)	ANT	2500
2 1 0.	0- .0- .0- .0- .2470 Frequency	Results		Limit	5 Frequency (MHz) Over		Table	Height		

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#### Data Rate: 2Mbps

#### 10.4 Restrict Band Measurement

	EUT	Bluetooth (	Cloud Module	Ν	Model			DSM-055	5	
	Mode	Кеер Ти	ansmitting	Inpu	ut Voltage			DC3.3V		
Te	emperature	24 0	leg. C,	Hu	umidity			56% RH		
Te	est Result:	I	Pass							
1.0E+ 9 8	15C Class B 1GHz-18GHz - +2- 300 - 300 - 70 -	2								
5 (سلام) اوموا (Bu/V) 2 1 0	50 - 50 - 10 - 10 - 20 - 10 - 2470	us garante size in the		M1	guency (MHz)	An, Brief James - Athalia	antisti siteensi suutee	i hili hanga kili perminan kilum	ปะสิทธริส สาย	2500
evel (gBn//m) 3 1 0	50 - 10 - <mark>10 - 11 - 11 - 11 - 11 - 11 - 11 -</mark>	Results	Factor Lin	Freq		Detector	Table	Height	ANT	
5 اوبوا (dBuV/m) 1 2 2 1	50 - 40 - <b>10 - 11 - 11 - 11 - 11 - 11 - 11 - </b>			Freq	quency (MHz)				T	2500
5 اوبوا (dBuV/m) 2 1 0	50 - 10	Results		<sub>Freq</sub> nit BuV/m)	iuency (MHz) Over Limit		Table	Height	T	2500

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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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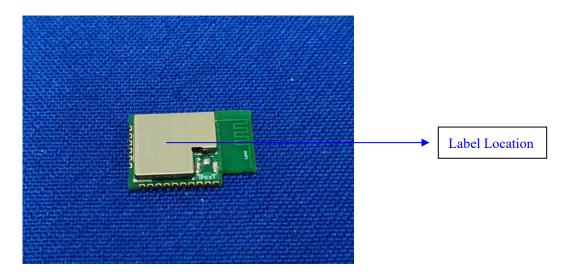
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#### 12.0 FCC ID Label

## 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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#### 13.0 Photo of testing

Conducted Emission Test Setup:



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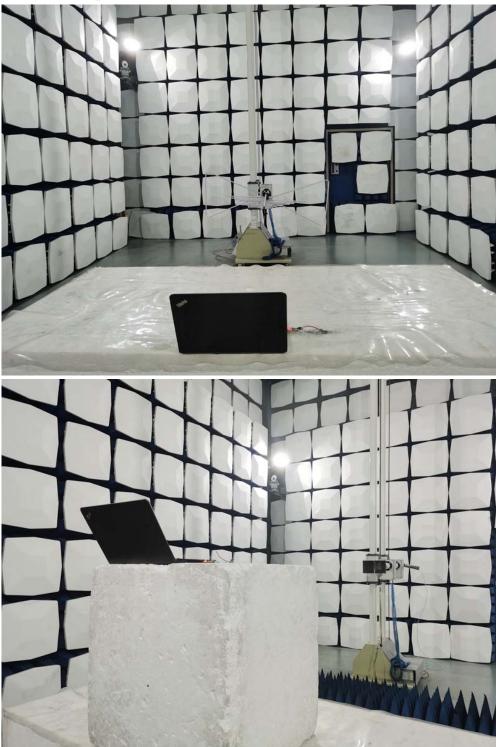
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Radiated Emission Test Setup:

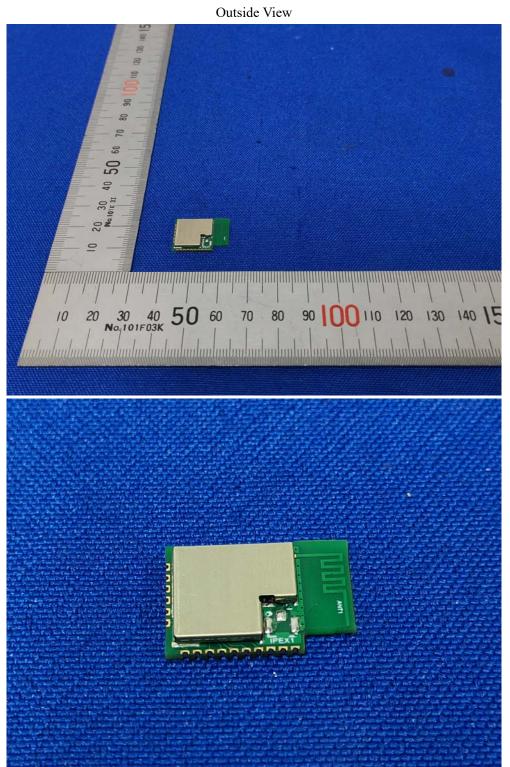


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Photographs-EUT



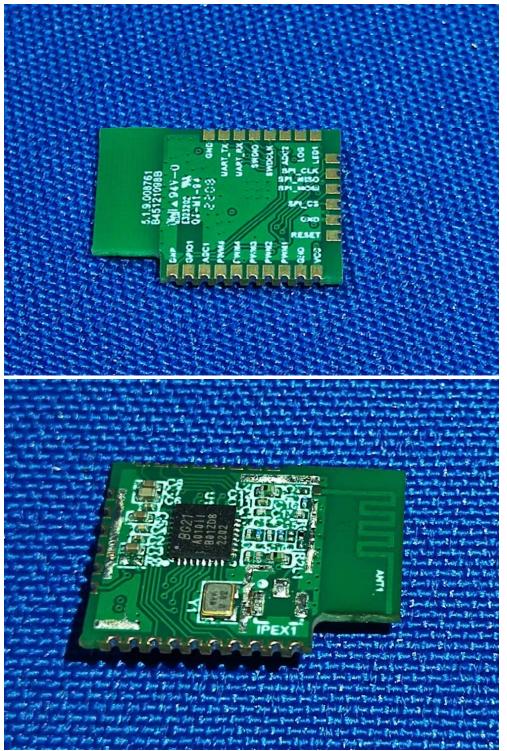
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Inside View



End of the report

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