

# **TEST REPORT**

Report No.:	BCTC2404568722-1E
Applicant:	SHENZHEN PETSUPER SMART TECHNOLOGY CO.,LTD
Product Name:	MINI Smart Feeder
Test Model:	PF02-3
Tested Date:	2024-04-19 to 2024-05-14
Issued Date:	2024-05-14
She	enzhen BCTC Testing Co., Ltd.



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## FCC ID: 2A74J-PF02-3

Product Name:	MINI Smart Feeder
Trademark:	Petsuper
Model/Type reference:	PF02-3 PF01-2, PF03-1
Prepared For:	SHENZHEN PETSUPER SMART TECHNOLOGY CO., LTD
Address:	B609, Building B, Huafeng International Robot Industrial Park, Hangcheng Avenue, Nanchang Community, Xixiang Street, Bao 'an District, Shenzhen, China
Manufacturer:	SHENZHEN PETSUPER SMART TECHNOLOGY CO., LTD
Address:	B609, Building B, Huafeng International Robot Industrial Park, Hangcheng Avenue, Nanchang Community, Xixiang Street, Bao 'an District, Shenzhen, China
Prepared By:	Shenzhen BCTC Testing Co., Ltd.
Address:	1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Zhancheng, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China
Sample Received Date:	2024-04-19
Sample tested Date:	2024-04-19 to 2024-05-14
Issue Date:	2024-05-14
Report No.:	BCTC2404568722-1E
Test Standards:	FCC Part15.247 ANSI C63.10-2013
Test Results:	PASS
Remark:	This is Bluetooth BLE radio test report.

Tested by:

Chen

Lei Chen/Project Handler

Approved by:

Zero Zhou/Reviewer

The test report is effective only with both signature and specialized stamp. This result(s) shown in this report refer only to the sample(s) tested. Without written approval of Shenzhen BCTC Testing Co., Ltd, this report can't be reproduced except in full. The tested sample(s) and the sample information are provided by the client.

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(Note: N/A Means Not Applicable)

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## 1. Version

Report No.	Issue Date	Description	Approved
BCTC2404568722-1E	2024-05-14	Original	Valid

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## 2. Test Summary

The Product has been tested according to the following specifications:

No.	Test Parameter	Clause No.	Results
1	Conducted Emission	15.207	PASS
2	6dB Bandwidth	15.247 (a)(2)	PASS
3	Peak Output Power	15.247 (b)	PASS
4	Radiated Spurious Emission	15.247 (d), 15.205	PASS
5	Power Spectral Density	15.247 (e)	PASS
6	Restricted Band of Operation	15.205	PASS
7	Band Edge (Out of Band Emissions)	15.247(d)	PASS
8	Antenna Requirement	15.203	PASS

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## 3. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

No.	ltem	Uncertainty
1	3m chamber Radiated spurious emission(9kHz-30MHz)	U=3.7dB
2	3m chamber Radiated spurious emission(30MHz-1GHz)	U=4.3dB
3	3m chamber Radiated spurious emission(1GHz-18GHz)	U=4.5dB
4	3m chamber Radiated spurious emission(18GHz-40GHz)	U=3.34dB
5	Conducted Emission(150kHz-30MHz)	U=3.20dB
6	Conducted Adjacent channel power	U=1.38dB
7	Conducted output power uncertainty Above 1G	U=1.576dB
8	Conducted output power uncertainty below 1G	U=1.28dB
9	humidity uncertainty	U=5.3%
10	Temperature uncertainty	Ü=0.59°Ċ

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## 4. Product Information And Test Setup

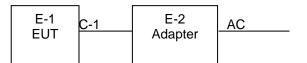
#### 4.1 Product Information

Model/Type reference:	PF02-3 PF01-2, PF03-1
Model differences:	All the model are the same circuit and RF module, except model names and appearance of the color.
Hardware Version:	N/A
Software Version:	N/A
Operation Frequency:	2402-2480MHz
Type of Modulation:	GFSK
Number Of Channel	40CH
Antenna installation:	FPC antenna
	3.26dBi
Antenna Gain:	Remark: The antenna gain of the product comes from the antenna report provided by the customer, and the test data is affected by the customer information. The antenna gain of the product is provided by the customer, and the test data is affected by the customer information.
Ratings:	DC 5V from adapter, DC 7.5V (5*1.5V) from battery
Adapter:	Model: AS0601A-0501000USL Input: AC 100-240V 50/60Hz 0.2A MAX Output: DC 5V 1A

## 4.2 Test Setup Configuration

See test photographs attached in *EUT TEST SETUP PHOTOGRAPHS* for the actual connections between Product and support equipment.

Conducted Emission:



Radiated Spurious Emission





## 4.3 Support Equipment

No.	Device Type	Brand	Model	Series No.	Note
E-1	MINI Smart Feeder	Petsuper	PF02-3	PF01-2, PF03-1	EUT
E-2	Adapter	N/A	AS0601A-05010 00USL	N/A	Auxiliary

ltem	Shielded Type	Ferrite Core	Length	Note
C-1	N/A	N/A	0.5M	DC cable unshielded

#### Notes:

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

2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.

## 4.4 Channel List

	Channel List				
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2402	11	2422	21	2442
02	2404	12	2424	22	2444
03	2406	13	2426	23	2446
~	~	~	~	~	~
09	2418	19	2438	39	2478
10	2420	20	2440	40	2480



## 4.5 Test Mode

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

For All Mode	Description	Modulation Type	
Mode 1	CH01		
Mode 2	CH20	GFSK	
Mode 3	CH40		
Mode 4	Link mode (Conducted Emission & Radiated emission)		

Note:

(1) The measurements are performed at the highest, middle, lowest available channels.

(2) Fully-charged battery is used during the test

#### 4.6 Table Of Parameters Of Text Software Setting

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters

Test software Version	BK32xx RF Test_V1.8.2				
Frequency	2402 MHz	2440 MHz	2480 MHz		
Parameters	DEF	DEF	DEF		

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## 5. Test Facility And Test Instrument Used

## 5.1 Test Facility

All measurement facilities used to collect the measurement data are located at Shenzhen BCTC Testing Co., Ltd. Address: 1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Zhancheng, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1-1 other equivalent standards. FCC Test Firm Registration Number: 712850 A2LA certificate registration number is: CN1212 ISED Registered No.: 23583 ISED CAB identifier: CN0017

Conducted Emissions Test							
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.		
Receiver	R&S	ESR3	102075	May 15, 2023	May 14, 2024		
LISN	R&S	ENV216	101375	May 15, 2023	May 14, 2024		
Software	Frad	EZ-EMC	EMC-CON 3A1	١	١		
Pulse limiter	Schwarzbeck	VTSD9561-F	01323	Sept. 22, 2023	Sept 21, 2024		

#### 5.2 Test Instrument Used

RF Conducted Test						
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.	
Power meter	Keysight	E4419	١	May 15, 2023	May 14, 2024	
Power Sensor (AV)	Keysight	E9300A	\	May 15, 2023	May 14, 2024	
Signal Analyzer20kH z-26.5GHz	Keysight	N9020A	MY49100060	May 15, 2023	May 14, 2024	
Spectrum Analyzer9kHz- 40GHz	R&S	FSP40	100363	May 15, 2023	May 14, 2024	
Radio frequency control box	MAIWEI	MW100-RFC B	Y			
Software	MAIWEI	MTS 8310	\ ······	$\cdot$	1	



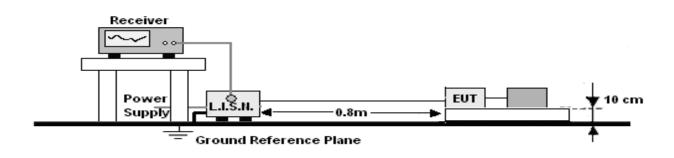
Radiated Emissions Test (966 Chamber01)						
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.	
966 chamber	ChengYu	966 Room	966	May 15, 2023	May 14, 2026	
Receiver	R&S	ESR3	102075	May 15, 2023	May 14, 2024	
Receiver	R&S	ESRP	101154	May 15, 2023	May 14, 2024	
Amplifier	Schwarzbeck	BBV9744	9744-0037	May 15, 2023	May 14, 2024	
TRILOG Broadband Antenna	Schwarzbeck	VULB9163	942	May 29, 2023	May 28, 2024	
Loop Antenna(9KHz -30MHz)	Schwarzbeck	FMZB1519B	00014	May 31, 2023	May 30, 2024	
Amplifier	SKET	LAPA_01G18 G-45dB	SK202104090 1	May 15, 2023	May 14, 2024	
Horn Antenna	Schwarzbeck	BBHA9120D	1541	May 31, 2023	May 30, 2024	
Amplifier(18G Hz-40GHz)	MITEQ	TTA1840-35- HG	2034381	May 15, 2023	May 14, 2024	
Horn Antenna(18G Hz-40GHz)	Schwarzbeck	BBHA9170	00822	May 31, 2023	May 30, 2024	
Spectrum Analyzer9kHz- 40GHz	R&S	FSP40	100363	May 15, 2023	May 14, 2024	
Software	Frad	EZ-EMC	FA-03A2 RE	/	\	

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## 6. Conducted Emissions

## 6.1 Block Diagram Of Test Setup



#### 6.2 Limit

	Limit	(dBuV)
FREQUENCY (MHz)	Quas-peak	Average
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00

Notes:

1. \*Decreasing linearly with logarithm of frequency.

2. The lower limit shall apply at the transition frequencies.

#### 6.3 Test Procedure

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

a. The Product was placed on a nonconductive table 0.8 m above the horizontal ground reference plane, and 0.4 m from the vertical ground reference plane, and connected to the main through Line Impedance Stability Network (L.I.S.N).

b. The RBW of the receiver was set at 9 kHz in 150 kHz ~ 30MHz with Peak and AVG detector in Max Hold mode. Run the receiver's pre-scan to record the maximum disturbance generated from Product in all power lines in the full band.

c. For each frequency whose maximum record was higher or close to limit, measure its QP and AVG values and record.

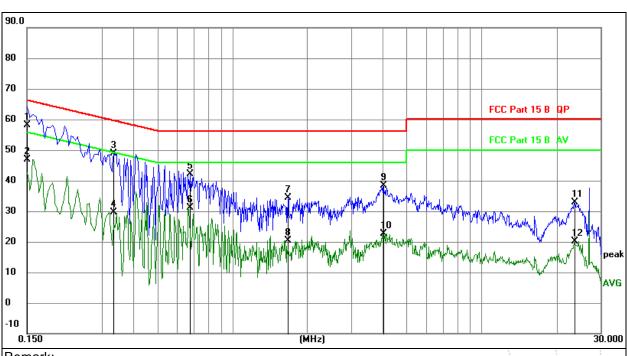
## 6.4 EUT Operating Conditions

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.



## 6.5 Test Result

Temperature:	<b>26</b> ℃	Relative Humidity:	54%
Pressure:	101KPa	Phase :	L
Test Mode:	Mode 4	Test Voltage :	AC 120V/60Hz



Remark:

1. All readings are Quasi-Peak and Average values.

2. Factor = Insertion Loss + Cable Loss.

3. Measurement=Reading Level+ Correct Factor

4. Over= Measurement-Limit

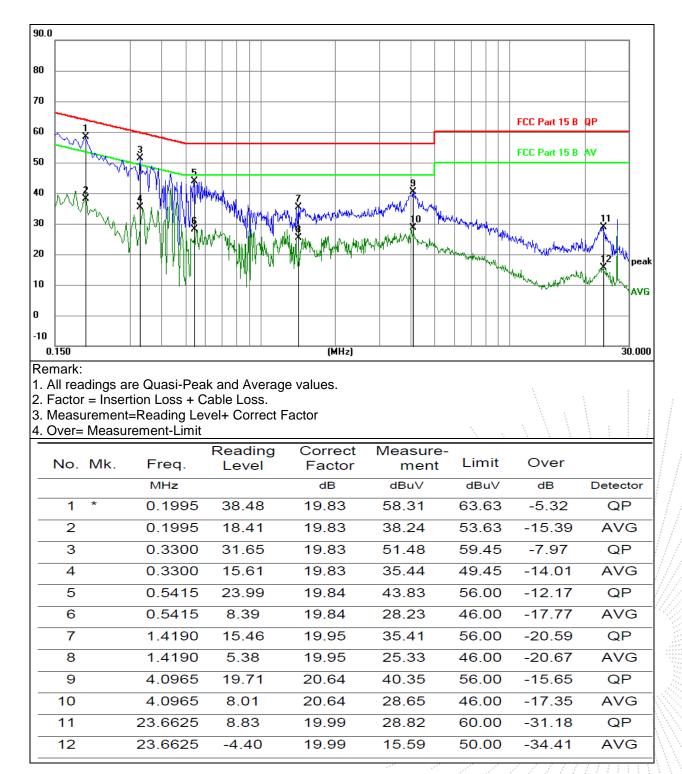
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz		dB	dBuV	dBuV	dB	Detector
1	*	0.1500	38.35	19.73	58.08	66.00	-7.92	QP
2		0.1500	27.15	19.73	46.88	56.00	-9.12	AVG
3		0.3338	29.02	19.83	48.85	59.36	-10.51	QP
4		0.3338	9.71	19.83	29.54	49.36	-19.82	AVG
5		0.6753	22.18	19.84	42.02	56.00	-13.98	QP
6		0.6753	11.41	19.84	31.25	46.00	-14.75	AVG
7		1.6713	14.49	19.95	34.44	56.00	-21.56	QP
8		1.6713	0.54	19.95	20.49	46.00	-25.51	AVG
9		4.0275	17.74	20.65	38.39	56.00	-17.61	QP
10		4.0275	1.86	20.65	22.51	46.00	-23.49	AVG
11		23.5112	13.01	19.99	33.00	60.00	-27.00	QP
12		23.5112	0.08	19.99	20.07	50.00	-29.93	AVG

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Temperature:	<b>26</b> ℃	Relative Humidity:	54%
Pressure:	101KPa	Phase :	N
Test Mode:	Mode 4	Test Voltage :	AC 120V/60Hz

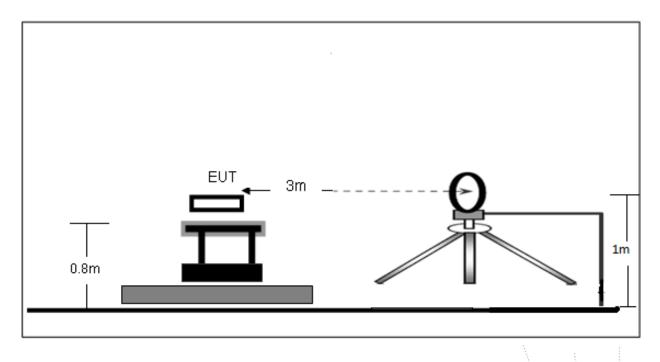




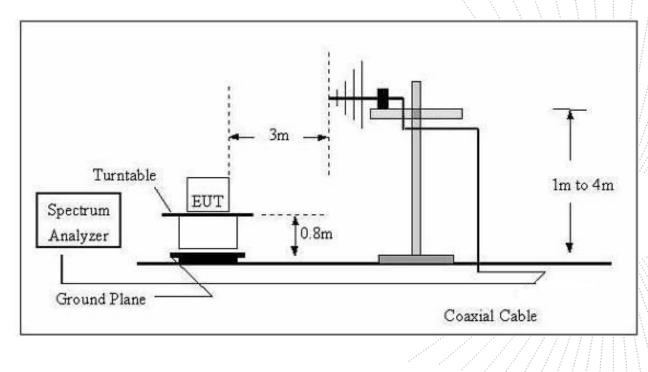
## 7. Radiated Emissions

## 7.1 Block Diagram Of Test Setup

#### (A) Radiated Emission Test-Up Frequency Below 30MHz

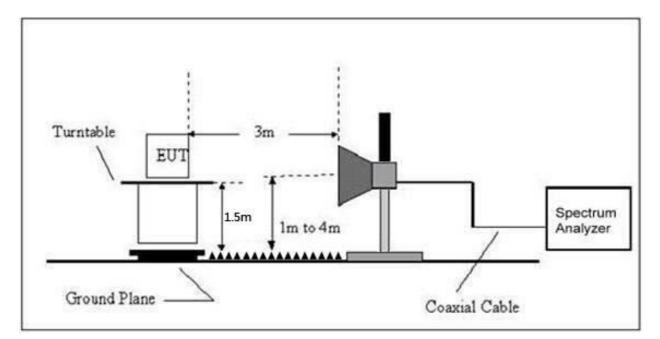


#### (B) Radiated Emission Test-Up Frequency 30MHz~1GHz





#### (C) Radiated Emission Test-Up Frequency Above 1GHz



## 7.2 Limit

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequency	Field Strength	Distance	Field Strength Limit at 3m Distance	
(MHz)	uV/m	(m)	uV/m	dBuV/m
0.009 ~ 0.490	2400/F(kHz)	300	10000 * 2400/F(kHz)	20log <sup>(2400/F(kHz))</sup> + 80
0.490 ~ 1.705	24000/F(kHz)	30	100 * 24000/F(kHz)	20log <sup>(24000/F(kHz))</sup> + 40
1.705 ~ 30	30	30	100 * 30	20log <sup>(30)</sup> + 40
30 ~ 88	100	3	100	20log <sup>(100)</sup>
88 ~ 216	150	3	150	20log <sup>(150)</sup>
216 ~ 960	200	3	200	20log <sup>(200)</sup>
Above 960	500	3	500	20log <sup>(500)</sup>

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Limit (d	BuV/m) (at 3M)
FREQUENCI (MHZ)	PEAK	AVERAGE
Above 1000	74	54

Notes:

(1)The limit for radiated test was performed according to FCC PART 15C.

(2)The tighter limit applies at the band edges.

(3) Emission level (dBuV/m)=20log Emission level (uV/m).



#### FREQUENCY RANGE OF RADIATED MEASUREMENT (For unintentional radiators)

Highest frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes (MHz)	Range (MHz)
Below 1.705	30
1.705 – 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	5 <sup>th</sup> harmonic of the highest frequency or 40 GHz, whichever is lower

#### 7.3 Test Procedure

Receiver Parameter	Setting
Attenuation	Auto
9kHz~150kHz	RBW 200Hz for QP
150kHz~30MHz	RBW 9kHz for QP
30MHz~1000MHz	RBW 120kHz for QP

Spectrum Parameter	Setting
1-25GHz	RBW 1 MHz /VBW 1 MHz for Peak, RBW 1 MHz / VBW 10Hz for Average

Below 1GHz test procedure as below:

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Above 1GHz test procedure as below:

g. Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 metre to 1.5 metre( Above 18GHz the distance is 1 meter and table is 1.5 metre).

h. Test the EUT in the lowest channel ,the middle channel ,the Highest channel. Note:

Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported.



Above 1GHz test procedure as below:

a. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

g. Test the EUT in the lowest channel, the Highest channel. Note:

Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported.

## 7.4 EUT Operating Conditions

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

#### 7.5 Test Result

#### Below 30MHz

Temperature:	<b>26</b> ℃	Relative Humidity:	54%
Pressure:	101KPa	Test Voltage :	AC 120V/60Hz
Test Mode:	Mode 4	Polarization :	

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
				PASS
				PASS

Note:

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor =40 log (specific distance/test distance)(dB);

Limit line = specific limits(dBuv) + distance extrapolation factor.



Between 30MHz – 1GHz				
Temperature:	<b>26</b> ℃	Relative Humidity:	54%	
Pressure:	101KPa	Phase :	Horizontal	
Test Mode:	Mode 4	Test Voltage :	AC 120V/60Hz	

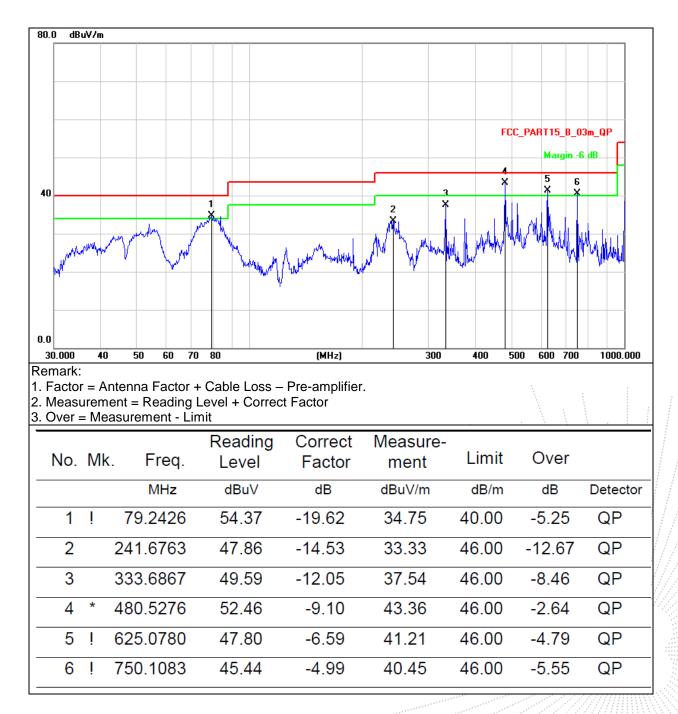


80.0 dBuV/m					
				FCC_PART1	5_B_03m_QP rgin -6 dB
40			2 X 1 X X	4 ×5 ×	
www.anderson.man.May	mm. MA	Market Market Market	NW/MADM4	AN AND A	4-1-1-11 MAL
0.0		(6411-2)	300 400	500 600	700 1000.000
Remark: 1. Factor = Antenna Factor 2. Measurement = Reading 3. Over = Measurement - Li	+ Cable Loss – Pi Level + Correct F		300 400		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1	2	87.9904	48.63	-13.49	35.14	46.00	-10.86	QP
2	* 3	33.1277	56.17	-12.07	44.10	46.00	-1.90	QP
3	3	51.7079	46.36	-11.46	34.90	46.00	-11.10	QP
4	5	01.1790	45.19	-8.65	36.54	46.00	-9.46	QP
5	5	28.2458	42.52	-9.61	32.91	46.00	-13.09	QP
6	7	50.1083	41.66	-4.99	36.67	46.00	-9.33	QP



Temperature:	<b>26</b> ℃	Relative Humidity:	54%
Pressure:	101KPa	Phase :	Vertical
Test Mode:	Mode 1	Test Voltage :	AC 120V/60Hz





	GFSK						
Polar	Fre- quency	Reading Level	Correct Factor	Measure- ment	Limits	Over	Detector
(H/V)	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	Туре
			Low c	hannel			
V	4804.00	68.39	-19.99	48.40	74.00	-25.60	PK
V	4804.00	59.94	-19.99	39.95	54.00	-14.05	AV
V	7206.00	58.06	-14.22	43.84	74.00	-30.16	PK
V	7206.00	48.40	-14.22	34.18	54.00	-19.82	AV
Н	4804.00	65.26	-19.99	45.27	74.00	-28.73	PK
Н	4804.00	54.48	-19.99	34.49	54.00	-19.51	AV
Н	7206.00	56.12	-14.22	41.90	74.00	-32.10	PK
Н	7206.00	47.89	-14.22	33.67	54.00	-20.33	AV
			Middle	channel			
V	4880.00	66.57	-19.84	46.73	74.00	-27.27	PK
V	4880.00	59.90	-19.84	40.06	54.00	-13.94	AV
V	7320.00	57.27	-13.90	43.37	74.00	-30.63	PK
V	7320.00	49.05	-13.90	35.15	54.00	-18.85	AV
Н	4880.00	62.26	-19.84	42.42	74.00	-31.58	PK
Н	4880.00	51.98	-19.84	32.14	54.00	-21.86	AV
Н	7320.00	54.30	-13.90	40.40	74.00	-33.60	PK
Н	7320.00	46.63	-13.90	32.73	54.00	-21.27	AV
			High c	hannel			
V	4960.00	68.93	-19.68	49.25	74.00	-24.75	PK
V	4960.00	60.54	-19.68	40.86	54.00	-13.14	AV
V	7440.00	60.96	-13.57	47.39	74.00	-26.61	PK
V	7440.00	51.56	-13.57	37.99	54.00	-16.01	AV
Н	4960.00	67.40	-19.68	47.72	74.00	-26.28	PK
Н	4960.00	58.14	-19.68	38.46	54.00	-15.54	AV
Н	7440.00	59.70	-13.57	46.13	74.00	-27.87	PK
Н	7440.00	51.17	-13.57	37.60	54.00	-16.40	AV

#### Between 1GHz – 25GHz

#### Remark:

1. Measurement = Reading Level + Correct Factor,

Correct Factor = Antenna Factor + Cable Loss - Pre-amplifier,

Over= Measurement - Limit

2.If peak below the average limit, the average emission was no test.

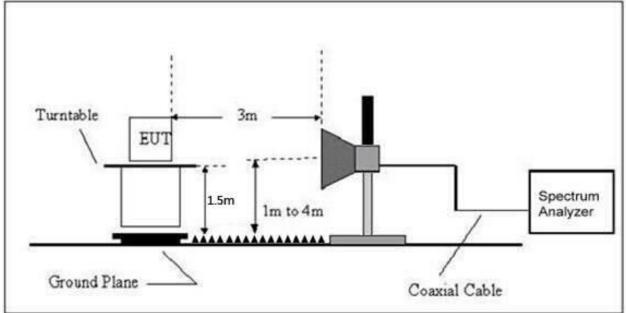
3. In restricted bands of operation, The spurious emissions below the permissible value more than 20dB 4. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.



## 8. Radiated Band Emission Measurement And Restricted Bands Of Operation

## 8.1 Block Diagram Of Test Setup

#### Radiated Emission Test-Up Frequency Above 1GHz



## 8.2 Limit

FCC Part15 C Section 15.209 and 15.205

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
<sup>1</sup> 0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	( <sup>2</sup> )
13.36-13.41			



#### LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Limit (dBu\	//m) (at 3M)
	PEAK	AVERAGE
Above 1000	74	54

Notes:

(1)The limit for radiated test was performed according to FCC PART 15C.

(2)The tighter limit applies at the band edges.

(3)Emission level (dBuV/m)=20log Emission level (uV/m).

#### 8.3 Test Procedure

Receiver Parameter	Setting
Attenuation	Auto
Start Frequency	2300MHz
Stop Frequency	2520
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average

Above 1GHz test procedure as below:

a. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

g. Test the EUT in the lowest channel, the Highest channel. Note:

Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported.

## 8.4 EUT operating Conditions

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.



## 8.5 Test Result

	Polar (H/V)	Fre- quency	Reading Level	Correct Factor	Measure- ment (dBuV/m)	Limits (dBuV/m)		Result
		(MHz)	(dBuV/m)	(dB)	PK	PK	AV	
			L	ow Channe	l 2402MHz			
	Н	2390.00	72.92	-25.43	47.49	74.00	54.00	PASS
	Н	2400.00	76.97	-25.40	51.57	74.00	54.00	PASS
	V	2390.00	72.08	-25.43	46.65	74.00	54.00	PASS
GFSK	V	2400.00	75.67	-25.40	50.27	74.00	54.00	PASS
0150			F	ligh Channe	l 2480MHz			
	Н	2483.50	77.31	-25.15	52.16	74.00	54.00	PASS
	Н	2500.00	69.95	-25.10	44.85	74.00	54.00	PASS
	V	2483.50	75.91	-25.15	50.76	74.00	54.00	PASS
Dama	V	2500.00	72.56	-25.10	47.46	74.00	54.00	PASS

#### Remark:

1. Measurement = Reading Level + Correct Factor,

Correct Factor = Antenna Factor + Cable Loss - Pre-amplifier,

Over= Measurement - Limit

2. If the PK measured levels comply with average limit, then the average level were deemed to comply with average limit.

3 In restricted bands of operation, The spurious emissions below the permissible value more than 20dB 4. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

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## 9. Power Spectral Density Test

## 9.1 Block Diagram Of Test Setup



#### 9.2 Limit

FCC Part15 (15.247) , Subpart C					
Section	Test Item	Limit	Frequency Range (MHz)	Result	
15.247	Power Spectral Density	8 dBm (in any 3KHz)	2400-2483.5	PASS	

#### LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

#### 9.3 Test Procedure

- 1. Set analyzer center frequency to DTS channel center frequency.
- 2. Set the span to 1.5 times the DTS bandwidth.
- 3. Set the RBW to: 3 kHz
- 4. Set the VBW  $\geq$  3 x RBW.
- 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 within the RBW,
- 10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

#### 9.4 EUT Operating Conditions

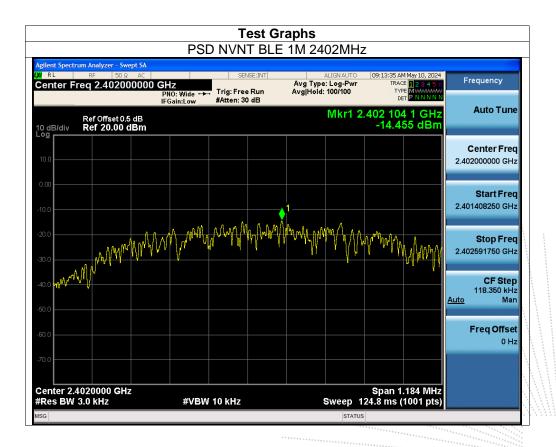
The EUT tested system was configured as the statements of 4.6 Unless otherwise a special operating condition is specified in the follows during the testing. Note: Power Spectral Density(dBm)=Reading+Cable Loss

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## 9.5 Test Result

Temperature:26°CTest Mode:GFSK			Relative Humidity:	: 54%	54%	
		Test Voltage: AC 12		AC 120V/6	//60Hz	
Condition	Mode	Frequency (MHz)	Conducted PSD (dBm)	Limit (dBm)	Verdict	
NVNT	BLE 1M	2402	-14.46	8	Pass	
NVNT	BLE 1M	2440	-14.2	8	Pass	
NVNT	BLE 1M	2480	-14.65	8	Pass	





RL RF 50 Ω AC enter Freq 2.440000000		ALIGNAUTO Avg Type: Log-Pwr Avg Hold: 200/200	09:16:36 AM May 10, 2024 TRACE 1 2 3 4 5 6 TYPE MWWWWW	Frequency
Ref Offset 0.5 dB	IFGain:Low #Atten: 30 dB		40 105 3 GHz -14.198 dBm	Auto Tur
dB/div Ref 20.00 dBm				<b>Center Fre</b> 2.440000000 GH
.0		1		<b>Start Fre</b> 2.439408250 GF
20 MANNAMAN	W. M.	Maral Maral / Jun	MMM MMM	<b>Stop Fre</b> 2.440591750 GH
an mhangh ha à ,				<b>СF Ste</b> 118.350 kF <u>Auto</u> Ма
				Freq Offs 0 F
enter 2.4400000 GHz			Span 1.184 MHz	
Res BW 3.0 kHz	#VBW 10 kHz	Cwoon 12		
3		Sweep 124 STATUS	1.8 ms (1001 pts)	
	PSD NVNT BLE	STATUS	4.8 ms (1001 pts)	
i <mark>lent Spectrum Analyzer - Swept SA</mark> RL RF 50 Ω AC	PSD NVNT BLE	status 1M 2480MHz	09:19:13 AM May 10, 2024 TRACE 12 3 4 5 6 TYPE MUMANNIN DET P NINNIN	Frequency
lent Spectrum Analyzer - Swept SA RL RF 50Ω AC enter Freq 2.480000000 Ref Offset 0.5 dB	PSD NVNT BLE	Aug Type: Log-Pwr Avg Type: Log-Pwr Avg Jihold: 200/200	09:19:13 AM May 10, 2024 TRACE 12 3 4 5 5 TYPE M	
Ient Spectrum Analyzer - Swept SA RL RF 50 Ω AC enter Freq 2.480000000 Ref Offset 0.5 dB Ref 20.00 dBm	PSD NVNT BLE	Aug Type: Log-Pwr Avg Type: Log-Pwr Avg Jihold: 200/200	09:19:13 AM May 10, 2024 TRACE 23 4 5 G TYPE MAWMANN DET PUNIN N. 80 107 5 GHz	Auto Tur Center Fre
Ilent Spectrum Analyzer - Swept SA RL RF 50 Ω AC enter Freq 2.480000000 Ref Offset 0.5 dB dB/div Ref 20.00 dBm	PSD NVNT BLE	AUGNAUTO AVG TYPE: Log-Pwr AvgIHold: 200/200 MKr1 2.4	09:19:13 AM May 10, 2024 TRACE 2 3 4 5 6 TYPE MANNAN 00 107 5 GHz -14.647 dBm	Auto Tur Center Fre 2.48000000 GF Start Fre
Ilent Spectrum Analyzer - Swept SA RL RF 50 Q AC enter Freq 2.480000000 Ref Offset 0.5 dB Ref 20.00 dBm	PSD NVNT BLE	Aug Type: Log-Pwr Avg Type: Log-Pwr Avg Jihold: 200/200	09:19:13 AM May 10, 2024 TRACE 2 3 4 5 6 TYPE MANNAN 00 107 5 GHz -14.647 dBm	Auto Tur Center Fre 2.48000000 GH Start Fre 2.479396250 GH Stop Fre 2.480603750 GH
Ilent Spectrum Analyzer - Swept SA RL RF 502 AC enter Freq 2.480000000 AB/div Ref Offset 0.5 dB Ref 20.00 dBm 00 00 00 00 00 00 00 00 00 0	PSD NVNT BLE SENSE:INT OGHZ PNO: Wide Trig: Free Run IFGain:Low A no M A A no M A A no M A A no M	AUGNAUTO AVG TYPE: Log-Pwr AvgIHold: 200/200 MKr1 2.4	09:19:13 AM May 10, 2024 TRACE 2 3 4 5 6 TYPE MANNAN BED 107 5 GHz -14.647 dBm	Auto Tur Center Fre 2.480000000 GH Start Fre 2.479396250 GH Stop Fre 2.480603750 GH CF Ste 120.750 kH
enter Freq 2.480000000 Ref Offset 0.5 dB Ref 20.00 dBm	PSD NVNT BLE SENSE:INT OGHZ PNO: Wide Trig: Free Run IFGain:Low A no M A A no M A A no M A A no M	AUGNAUTO AVG TYPE: Log-Pwr AvgIHold: 200/200 MKr1 2.4	09:19:13 AM May 10, 2024 TRACE 2 3 4 5 6 TYPE MANNAN BED 107 5 GHz -14.647 dBm	Auto Tur Center Fre 2.480000000 GH Start Fre 2.479396250 GH Stop Fre 2.480603750 GH CF Ste 120.750 kH



## 10. Bandwidth Test

## 10.1 Block Diagram Of Test Setup



#### 10.2 Limit

FCC Part15 (15.247) , Subpart C						
Section	Test Item	Limit	Frequency Range (MHz)	Result		
15.247(a)(2)	Bandwidth	>= 500KHz (6dB bandwidth)	2400-2483.5	PASS		

## 10.3 Test Procedure

- 1. Set 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 frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

## 10.4 EUT Operating Conditions

The EUT tested system was configured as the statements of 4.6 Unless otherwise a special operating condition is specified in the follows during the testing. Note: Power Spectral Density(dBm)=Reading+Cable Loss

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## 10.5 Test Result

Temperature:26°C			Relative Humidity:		54%	
Test Mode:	GFSK		Test Voltage:		AC 120V/60	OHz
		Ι				
Condition	Mode	Frequency (MHz)	-6 dB Bandwidth (MHz)	Ba	nit -6 dB ndwidth (MHz)	Verdict
NVNT	BLE 1M	2402	0.789		0.5	Pass
NVNT	BLE 1M	2440	0.789		0.5	Pass
NVNT	BLE 1M	2480	0.805		0.5	Pass





		dth NVNT BLE	1M 2441MH	Z	
gilent Spectrum Analyzer - Occupied B RL RF 50 Ω AC Center Freq 2.440000000	GHz Cent	SENSE:INT er Freq: 2.440000000 GHz	Radio S	12 AM May 10, 2024 Std: None	Frequency
	Trig:	FreeRun Avg Hol n:30 dB	d: 300/300 Radio E	evice: BTS	
Ref Offset 0.5 dB			Mkr1 2.439	8413 GHz 6759 dBm	
0 dB/div Ref 20.50 dBn	n		0.76		
500					Center Freq 2.440000000 GHz
9.50	A Property Million	Amo - a standard - b hill your			
19.5 29.5 39.5 <b></b>	AY		A CALLER AND A CAL	)	
				And Marked and	
19.5				_	
9.5					
enter 2.44 GHz				Span 3 MHz	
Res BW 100 kHz		#VBW 300 kHz		p 1.333 ms	CF Step 300.000 kHz
Occupied Bandwidt	h				<u>Auto</u> Man
1.	3328 MHz				Freq Offset
Transmit Freg Error	5.145 kHz	OBW Power	99.00 %		0 Hz
x dB Bandwidth	789.2 kHz	x dB	-6.00 dB		
G			STATUS		
	-6dB Bandwid	th NVNT BLE		1	
ilent Construction Inc. Inc.			1M 2480MH	Z	
RL RF 50Ω AC	GHz Cent	SENSE:INT er Freq: 2.480000000 GHz	ALIGN AUTO 09:18:4 Radio 5 d: 300/300	D AM May 10, 2024 Std: None Device: BTS	Frequency
RL RF 50Ω AC enter Freq 2.480000000 Ref Offset 0.5 dB	GHz Cent rig: #IFGain:Low #Atte	SENSE:INT er Freq: 2.480000000 GHz Free Run Avg Hol	ALIGNAUTO 09:18:4 Radio 5 d: 300/300 Radio D Mkr1	0 AM May 10, 2024 Std: None Device: BTS <b>2,48 GHZ</b>	Frequency
RL     RF     50 Ω     Ac       enter Freq 2.480000000     Ref 0ffset 0.5 dB     Ref 0ffset 0.5 dB       0 dB/div     Ref 20.50 dBn     9	GHz Cent rig: #IFGain:Low #Atte	SENSE:INT er Freq: 2.480000000 GHz Free Run Avg Hol	ALIGNAUTO 09:18:4 Radio 5 d: 300/300 Radio D Mkr1	10 AM May 10, 2024 Std: None Device: BTS	Frequency
RL     RF     50 Ω     Ac       enter Freq 2.480000000     Ref 0ffset 0.5 dB     Ref 0ffset 0.5 dB       0 dB/div     Ref 20.50 dBn     OdBn       0 5     0.5     Ref 20.50 dBn     Ref 20.50 dBn	GHz Cent rig: #IFGain:Low #Atte	SENSE:INT er Freq: 2.480000000 GHz Free Run Avg Hol	ALIGNAUTO 09:18:4 Radio 5 d: 300/300 Radio D Mkr1	0 AM May 10, 2024 Std: None Device: BTS <b>2,48 GHZ</b>	Center Freq
RL     RF     50.Ω     AC       enter Freq 2.480000000     Ref 0ffset 0.5 dB     0       0 dB/div     Ref 0ffset 0.5 dB     0       0 s     0     0     0	I GHz Cent #IFGain:Low #Atte	SENSE:INT er Freq: 2.480000000 GHz Free Run Avg Hol	ALIGNAUTO 09:18:4 Radio 5 d: 300/300 Radio D Mkr1	0 AM May 10, 2024 Std: None Device: BTS <b>2,48 GHZ</b>	
RL     RF     50.Ω     AC       enter Freq 2.480000000     Ref 0ffset 0.5 dB     0       0 dB/div     Ref 0ffset 0.5 dB     0       0 s     0     0     0	I GHz Cent #IFGain:Low #Atte	SENSE:INT er Freq: 2.480000000 GHz Free Run Avg Hol	ALIGNAUTO 09:18: Radio 5 d: 300/300 Radio 0 Mkr1 -0.84	0 AM May 10, 2024 Std: None Device: BTS <b>2,48 GHZ</b>	Center Freq
RL     RF     50.Ω     AC       enter Freq 2.480000000     Ref 0ffset 0.5 dB     0       0 dB/div     Ref 0ffset 0.5 dB     0       0 s     0     0     0	I GHz Cent #IFGain:Low #Atte	SENSE:INT er Freq: 2.480000000 GHz Free Run Avg Hol	ALIGNAUTO 09:18:4 Radio 5 d: 300/300 Radio D Mkr1	0 AM May 10, 2024 Std: None Device: BTS <b>2,48 GHZ</b>	Center Freq
RL     RF     50.0     Ac       enter Freq 2.480000000     Ref 0ffset 0.5 dB     0       0 dB/div     Ref 20.50 dBn     0       0 f5/0     0     0       95     0     0       95     0     0	I GHz Cent #IFGain:Low #Atte	SENSE:INT er Freq: 2.480000000 GHz Free Run Avg Hol	ALIGNAUTO 09:18: Radio 5 d: 300/300 Radio 0 Mkr1 -0.84	0 AM May 10, 2024 Std: None Device: BTS 2.48 GHz 1440 dBm	Center Freq
RL     RF     50.0     AC       enter Freq 2.48000000     Ref 0ffset 0.5 dB     0       0 dB/div     Ref 20.50 dBn     0       0 50     0     0     0       9 0     0     0     0       9 0     0     0     0       9 0     0     0     0       9 0     0     0     0       9 0     0     0     0       9 0     0     0     0       9 0     0     0     0       9 0     0     0     0       9 0     0     0     0       9 0     0     0     0       9 0     0     0     0       9 0     0     0     0       9 0     0     0     0       9 0     0     0     0       9 0     0     0     0       9 0     0     0     0       9 0     0     0     0	I GHz Cent #IFGain:Low #Atte	SENSE:INT er Freq: 2.480000000 GHz Free Run Avg Hol	ALIGNAUTO 09:18: Radio 5 d: 300/300 Radio 0 Mkr1 -0.84	0 AM May 10, 2024 Std: None Device: BTS 2.48 GHz 1440 dBm	Center Freq
RL     RF     50.0     Ac.       enter Freq 2.480000000     Ref 0ffset 0.5 dB     Ref 20.50 dBn       0 dB/div     Ref 20.50 dBn     Ref 20.50 dBn       9	I GHz Cent #IFGain:Low #Atte	SENSE:INT er Freq: 2.480000000 GHz Free Run Avg Hol	ALIGNAUTO 09:18: Radio 5 d: 300/300 Radio C Mkr1 -0.84	10 AM May 10, 2024 Std: None Device: BTS 2.48 GHz 1440 dBm	Center Freq
RL     RF     50.0     Ac.       enter Freq 2.480000000     Ref 0ffset 0.5 dB     Ref 20.50 dBn       0 dB/div     Ref 20.50 dBn     Ref 20.50 dBn       9 5     9.5     9.5 <td>A Cent #IFGain:Low #Atte</td> <td>SENSE:INT er Freq: 2.480000000 GHz Free Run Avg Hol</td> <td>ALIGNAUTO 09:18: Radio 5 d: 300/300 Radio 1 Mkr1 -0.84</td> <td>0 AM May 10, 2024 Std: None Device: BTS 2.48 GHz 1440 dBm</td> <td>Center Freq</td>	A Cent #IFGain:Low #Atte	SENSE:INT er Freq: 2.480000000 GHz Free Run Avg Hol	ALIGNAUTO 09:18: Radio 5 d: 300/300 Radio 1 Mkr1 -0.84	0 AM May 10, 2024 Std: None Device: BTS 2.48 GHz 1440 dBm	Center Freq
RL     RF     50.0     AC       enter Freq 2.48000000     Ref Offset 0.5 dB     Ref 20.50 dBn     Ref 20.50 dBn       0 dB/div     Ref 20.50 dBn     Ref 20.50 dBn     Ref 20.50 dBn     Ref 20.50 dBn       9 5     9 5     9 5     9 5     9 5     9 5     9 5       9 5     9 5     9 5     9 5     9 5     9 5     9 5       9 5 <td>GHz Cent Tris #IFGain:Low 74tte</td> <td>SENSE:INT er Freq: 2.48000000 GHz Free Run Avg Hol n: 30 dB</td> <td>ALIGNAUTO 09:18: Radio 5 d: 300/300 Radio 1 Mkr1 -0.84</td> <td>io AM May 10, 2024 Std: None Device: BTS 2.48 GHz 440 dBm</td> <td>Center Freq 2.48000000 GHz CF Step</td>	GHz Cent Tris #IFGain:Low 74tte	SENSE:INT er Freq: 2.48000000 GHz Free Run Avg Hol n: 30 dB	ALIGNAUTO 09:18: Radio 5 d: 300/300 Radio 1 Mkr1 -0.84	io AM May 10, 2024 Std: None Device: BTS 2.48 GHz 440 dBm	Center Freq 2.48000000 GHz CF Step
RL     RF     50.0     AC       enter Freq 2.48000000     Ref Offset 0.5 dB     Ref 20.50 dBn     Ref 20.50 dBn       0 dB/div     Ref 20.50 dBn     Ref 20.50 dBn     Ref 20.50 dBn     Ref 20.50 dBn       9 5     9 5     9 5     9 5     9 5     9 5     9 5       9 5     9 5     9 5     9 5     9 5     9 5     9 5       9 5 <td>GHz Cent #FGain:Low #Atte</td> <td>SENSE:INT er Freq: 2.48000000 GHz Free Run Avg Hol n: 30 dB</td> <td>ALIGNAUTO 09:18: Radio 5 d: 300/300 Radio 1 Mkr1 -0.84</td> <td>io AM May 10, 2024 Std: None Device: BTS 2.48 GHz 440 dBm</td> <td>Center Freq 2.48000000 GHz 300.000 kHz Auto Man</td>	GHz Cent #FGain:Low #Atte	SENSE:INT er Freq: 2.48000000 GHz Free Run Avg Hol n: 30 dB	ALIGNAUTO 09:18: Radio 5 d: 300/300 Radio 1 Mkr1 -0.84	io AM May 10, 2024 Std: None Device: BTS 2.48 GHz 440 dBm	Center Freq 2.48000000 GHz 300.000 kHz Auto Man
RL     RF     50.2     AC       enter Freq 2.480000000     Ref Offset 0.5 dB     Ref 20.50 dBn       0 dB/div     Ref 20.50 dBn     Ref 20.50 dBn	h 3208 MHz	SENSE:INT er Freq: 2.48000000 GHz Free Run Avg Hol n: 30 dB	ALIGNAUTO 09:18:4 Radio 5 d: 300/300 Radio 1 Mkr1 -0.84	io AM May 10, 2024 Std: None Device: BTS 2.48 GHz 440 dBm	Center Freq 2.48000000 GHz CF Step 300.000 kHz
Ref Offset 0.5 dB Ref Offset 0.5 dB Ref 20.50 dBn 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	GHz Cent #FGain:Low #Atte	sense:INT er Freq: 2.48000000 GHz Free Run Avg Hol n: 30 dB	ALIGNAUTO 09:18: Radio 5 d: 300/300 Radio 1 Mkr1 -0.84	io AM May 10, 2024 Std: None Device: BTS 2.48 GHz 440 dBm	Center Freq 2.480000000 GHz 300.000 kHz Auto Freq Offset
Rt PF 500 AC enter Freq 2.480000000 Ref Offset 0.5 dB Ref 20.50 dBn og control Ref 20.50 dBn og control Ref 20.50 dBn og control Ref 20.50 dBn control Ref	h 3208 MHz 10.534 kHz	SENSE:INT er Freq: 2.48000000 GHz Freq: 2.48000000 GHz Avg Hol 1 1 1 4 VBW 300 kHz OBW Power	ALIGNAUTO 09:18:4 Radio 5 d: 300/300 Radio 0 Mkr1 -0,84	io AM May 10, 2024 Std: None Device: BTS 2.48 GHz 440 dBm	Center Freq 2.48000000 GHz CF Step 300.000 kHz Auto Freq Offset
Ref Offset 0.5 dB renter Freq 2.480000000 Ref Offset 0.5 dB renter 2.48 GHz Res BW 100 kHz Occupied Bandwidt 1. Transmit Freq Error	h 3208 MHz 10.534 kHz	SENSE:INT er Freq: 2.48000000 GHz Freq: 2.48000000 GHz Avg Hol 1 1 1 4 VBW 300 kHz OBW Power	ALIGNAUTO 09:18:4 Radio 5 d: 300/300 Radio 0 Mkr1 -0,84	io AM May 10, 2024 Std: None Device: BTS 2.48 GHz 440 dBm	Center Freq 2.48000000 GHz CF Step 300.000 kHz Auto Freq Offset



## 11. Peak Output Power Test

## 11.1 Block Diagram Of Test Setup



#### 11.2 Limit

FCC Part15 (15.247) , Subpart C						
Section	Test Item	Limit	Frequency Range (MHz)	Result		
15.247(b)(3)	Peak Output Power	1 watt or 30dBm	2400-2483.5	PASS		

#### 11.3 Test Procedure

a. The EUT was directly connected to the Power meter

## 11.4 EUT Operating Conditions

The EUT tested system was configured as the statements of 4.6 Unless otherwise a special operating condition is specified in the follows during the testing. Note: Power Spectral Density(dBm)=Reading+Cable Loss

#### 11.5 Test Result

Temperature:	<b>26</b> ℃	Relative Humidity:	54%
Test Mode:	GFSK	Test Voltage:	AC 120V/60Hz

Condition	Mode	Frequency (MHz)	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	BLE 1M	2402	1.98		Pass
NVNT	BLE 1M	2440	2.29	30	Pass
NVNT	BLE 1M	2480	1.76	30	Pass



## 12. 100 KHz Bandwidth Of Frequency Band Edge

## 12.1 Block Diagram Of Test Setup



#### 12.2 Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

#### 12.3 Test Procedure

Using the following spectrum analyzer setting:

- a) Set the RBW = 100KHz.
- b) Set the VBW = 300KHz.
- c) Sweep time = auto couple.
- d) Detector function = peak.
- e) Trace mode = max hold.
- f) Allow trace to fully stabilize..

## 12.4 EUT Operating Conditions

The EUT tested system was configured as the statements of 4.6 Unless otherwise a special operating condition is specified in the follows during the testing. Note: Power Spectral Density(dBm)=Reading+Cable Loss

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## 12.5 Test Result





gilant Spactrum Applyzor - Surg		age NVNI	BLE 1M 2480N	ЛНz	
gilent Spectrum Analyzer - Swep RL RF 50 Ω Center Freq 2.480000	AC	SENSE:INT Trig: Free Run #Atten: 30 dB	ALIGNAUTO Avg Type: Log-Pwr Avg Hold: 500/500	09:22:50 AM May 10, 2024 TRACE 1 2 3 4 5 6 TYPE MWWWW DET P N N N N N	Frequency
Ref Offset 0.5 o 0 dB/div Ref 20.00 dB	dB	Shaten. SV 4E	Mkr1	2.479 840 GHz 0.410 dBm	Auto Tun
og 10.0		<u></u> 1			<b>Center Fre</b> 2.480000000 GH
0.00		- Ann			<b>Start Fre</b> 2.476000000 GH
80.0		<i></i>	Mr.		<b>Stop Fre</b> 2.484000000 GH
10.0 50.0 wm/h-1/metry/hur/1/	IN MY MAN		- My marine	ho ha ha	CF Ste 800.000 kH <u>Auto</u> Ma
20.0				. Aa, Movi M	Freq Offse 0 H
Center 2.480000 GHz	#\/B\	( 200 kHz	Swoop 4	Span 8.000 MHz .000 ms (1001 pts)	
Res BW 100 kHz	#484	/ 300 kHz	sweep		
			STATUC	•	
	Band Edge	NVNT BLE	1M 2480MHz I		
RL RF 50 Ω	AC	NVNT BLE	1M 2480MHz I	Emission 09:22:56 AM May 10, 2024	Frequency
RL RF 50 Ω	AC		ALIGNAUTO Avg Type: Log-Pwr Avg Hold: 300/300	D9:22:56 AM May 10, 2024	
RL RF 50 Ω enter Freq 2.526000 Ref Offset 0.5 0 dB/div Ref 20.00 dl	AC AC PNO: Fast IFGain:Low dB	SENSE:INT	ALIGNAUTO Avg Type: Log-Pwr Avg Hold: 300/300	09:22:56 AM May 10, 2024	
RL     RF     50 Ω       enter Freq 2.526000     Ref Offset 0.5 1     Ref 0.6 1       0 dB/div     Ref 20.00 dl     Ref 20.00 dl       9     1     1       10 0     1     1	AC AC PNO: Fast IFGain:Low dB	SENSE:INT	ALIGNAUTO Avg Type: Log-Pwr Avg Hold: 300/300	Consisting 10,2024	Auto Tun Center Fre
RL     RF     50 Ω       center Freq 2.526000     Ref Offset 0.5     G       0 dB/div     Ref 20.00 dI     Ref 20.00 dI       0 00     1     0     0       0 00     1     0     0       0 00     1     0     0       0 00     1     0     0       0 00     1     0     0       0 00     1     0     0	AC AC PNO: Fast IFGain:Low dB	SENSE:INT	ALIGNAUTO Avg Type: Log-Pwr Avg Hold: 300/300	Emission 09:22:56 AM May 10, 2024 TRACE 12 3 4 5 6 TYPE MAXMANN N DET PINNNNN r1 2.479 9 GHz	Auto Tun Center Fre 2.526000000 GH Start Fre
RL     RF     50 Ω       center Freq 2.526000     Ref Offset 0.5     dB/div     Ref 20.00 dI       0 dB/div     Ref 20.00 dI     dB/div     Ref 20.00 dI       0 dB/div     Ref 20.00 dI     dB/div     dB/div       0 dB/div     Ref 20.00 dI     dB/div	AC AC PNO: Fast IFGain:Low dB	SENSE:INT	ALIGNAUTO Avg Type: Log-Pwr Avg Hold: 300/300	Consisting 10,2024	Auto Tun Center Fre 2.52600000 GH Start Fre 2.476000000 GH Stop Fre
Ref Offset 0.5 / 0 dB/div Ref 20.00 dI 0 00 0	or SA AC DOOD GHz PNO: Fast IFGain:Low dB Bm 	SENSE:INT Trig: Free Run #Atten: 30 dB	1M 2480MHz	Consisting 10,2024	Auto Tun Center Fre 2.52600000 GH Start Fre 2.476000000 GH Stop Fre 2.576000000 GH CF Ste 10.000000 MH
Ref Offset 0.5 0 dB/div Ref 20.00 dI	et SA AC DOOD GHz PNO: Fast → IFGain:Low dB Bm 4 4 4 4 4 4 4 4 4 4 4 4 4	SENSE:INT	1M 2480MHz ALIGNAUTO Avg Type: Log-Pwr AvgJHold: 300300 MK	Emission 109:22:56 AM May 10, 2024 TRACE 11 23:4 5 C TYPE MUMANNA C 12 3:4 5 C TYPE MUMANNA C 12 5:5 C TYPE MUMAN	Auto Tun Center Fre 2.52600000 GH Start Fre 2.476000000 GH Stop Fre 2.576000000 GH CF Ste 10.000000 MH







RL RF 50 Ω AC Center Freg 2.44000000		SENSE:INT	Avg Type:		9:16:40 AM May 10, 2024 TRACE 1 2 3 4 5 6	Frequency
	PNO: Wide ↔ IFGain:Low	Trig: Free Run #Atten: 30 dB	Avg Hold: /		TRACE 123456 TYPE MWWWWW DET PNNNNN	
Ref Offset 0.5 dB 0 dB/div Ref 20.00 dBm				Mkr1 2.4	39 826 0 GHz 0.623 dBm	Auto Tun
10.0						Center Fre 2.440000000 GH
	- Marine	han the second	M. M	Anna Arrian	www.	Start Fre 2.439250000 G⊢
					Month and a second s	<b>Stop Fre</b> 2.440750000 G⊦
.0.0						CF Ste 150.000 kH <u>Auto</u> Ma
50.0						Freq Offso 0 ⊦
70.0					Spap 1 500 Mile	
enter 2.4400000 GHz Res BW 100 kHz	#VB	№ 300 kHz	s		Span 1.500 MHz 10 ms (1001 pts)	
G				STATUS		
	. Spuriou	s NVNT BLE	E 1M 244	0MHz E	mission	
gilent Spectrum Analyzer - Swept SA RL RF 50 Q AC Center Freq 13.26500000		SENSE:INT → Trig: Free Run #Atten: 30 dB	Avg Type: Avg Hold: /	Log-Pwr	9:17:11 AM May 10, 2024 TRACE 1 2 3 4 5 6 TYPE MWWWWW DET P N N N N N	Frequency
Ref Offset 0.5 dB 0 dB/div Ref 20.00 dBm	II Gain.Low			Mkr1	2.439 7 GHz 0.589 dBm	Auto Tun
						Center Fre 13.265000000 G⊦
	<mark>2</mark>				-19.38 dBm	Start Fre 30.000000 M⊦
	<u>5</u>					Stop Fre
70.0						26.500000000 GH
4 4 00 BUL	#\/B)	N 300 kHz			Stop 26.50 GHz 30 s (30001 pts)	<b>CF Ste</b> 2.647000000 G⊦
Kart 30 MHz Res BW 100 kHz	#VD1	V I	FUNCTION FUNC	CTION WIDTH	FUNCTION VALUE	<u>Auto</u> Ma

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gilent Spectrum Analyzer - Swept SA		urious NVN	T BLE TIM 2480		
RL RF 50 Ω AC Center Freq 2.48000000	IO GHz PNO: Wide ↔	SENSE:INT → Trig: Free Run #Atten: 30 dB	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 100/100	09:19:28 AM May 10, 2024 TRACE 123456 TYPE MWWWW DET PNNNNN	Frequency
Ref Offset 0.5 dB 0 dB/div Ref 20.00 dBm	IFGain:Low	#Atten: 30 dB	Mkr1 :	2.479 838 0 GHz 0.172 dBm	Auto Tun
					Center Fre 2.480000000 G⊦
0.0 mm AMM MAAA	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Manapart	m from white	Marine Marine	<b>Start Fre</b> 2.479250000 GH
					<b>Stop Fre</b> 2.480750000 GH
0.0					CF Ste 150.000 kH <u>Auto</u> Ma
50.0					Freq Offso 0 ⊦
enter 2.4800000 GHz				Span 1.500 MHz	
Res BW 100 kHz	#VBV	V 300 kHz			
			STATI	1.000 ms (1001 pts) <sup>JS</sup>	
	. Spurious	s NVNT BL		R	
<mark>gilent Spectrum Analyzer - Swept SA RL RF 50 Ω AC</mark>	000 GHz	SENSE:INT	STATI E 1M 2480MHz ALIGNAUTO Avg Type: Log-Pwr	US Emission	Frequency
T) gilent Spectrum Analyzer - Swept SA RL RF 50.0 AC enter Freq 13.2650000 Ref Offset 0.5 dB	000 GHz PNO: Fast ↔ IFGain:Low	SENSE:INT	E 1M 2480MHz ALIGNAUTO Avg Type: Log-Pwr Avg Hold: 20/20	2 Emission 09:20:27 AM May 10, 2024 TRACE 12 3 4 5 6 TYPE MYNHWA per MYNHWA Kr1 2.480 2 GHz	
RL RF 50 Ω AC   enter Freq 13.2650000   Ref Offset 0.5 dB   0 dB/div Ref 20.00 dBm   0 0 0	000 GHz PNO: Fast ↔ IFGain:Low	SENSE:INT	E 1M 2480MHz ALIGNAUTO Avg Type: Log-Pwr Avg Hold: 20/20	US 2 Emission 09:20:27 AM May 10, 2024 09:20:27 AM May 10, 2024	Auto Tur Center Fre
T) gilent Spectrum Analyzer - Swept SA RL RF 50.0 AC enter Freq 13.2650000 Ref Offset 0.5 dB	00 GHz PN0: Fast → IFGain:Low	SENSE:INT	E 1M 2480MHz ALIGNAUTO Avg Type: Log-Pwr Avg Hold: 20/20	2 Emission 09:20:27 AM May 10, 2024 TRACE 12 3 4 5 6 TYPE MYNHWA per MYNHWA Kr1 2.480 2 GHz	Frequency Auto Tun Center Fre 13.26500000 GH Start Fre 30.00000 MH
T> RL RF 500 AC enter Freq 13.2650000 Ref Offset 0.5 dB Ref 20.00 dBm 9 1 1 1 1 1 1 1 1 1 1 1 1 1	000 GHz PNO: Fast ↔ IFGain:Low	SENSE:INT	E 1M 2480MHz ALIGNAUTO Avg Type: Log-Pwr Avg Hold: 20/20	US 2 Emission 109:20:27 AM May 10, 2024 TRACE 12 3 4 5 G TYPE WINNING PET PINNING kr1 2.480 2 GHz -0.225 dBm	Auto Tur Center Fre 13.265000000 GF Start Fre
RL RF 5000 AC enter Freq 13.2650000 BB/div Ref 20.00 dBm Ref 20.00 dBm R	00 GHz PN0: Fast → IFGain:Low ¢ <sup>2</sup> ¢ <sup>2</sup> ¢ <sup>5</sup>	SENSE:INT	E 1M 2480MHz	25 Emission 26 Emission 199:20:27 AM May 10, 2024 TRACE 12 3 4 5 6 TYPE MYMAN AND 199:20:27 AM May 10, 2024 TRACE 12 4 80 2 GHz 199:20:27 AM May 10, 2024 199:20:27 AM May 10,	Auto Tur Center Fre 13.26500000 GF Start Fre 30.000000 MF Stop Fre
Silent Spectrum Analyzer - Sovert SA     RL   RF   50x AC     enter Freq 13.26500000   Bm     0   0   0	00 GHz PN0: Fast → IFGain:Low ¢ <sup>2</sup> ¢ <sup>2</sup> ¢ <sup>5</sup>	SENSE:INT	E 1M 2480MHz	25 Emission 26 Emission 199:20:27 AM May 10, 2024 TRACE 12 3 4 5 6 TYPE MYMAN AND 199:20:27 AM May 10, 2024 TRACE 12 4 80 2 GHz 199:20:27 AM May 10, 2024 199:20:27 AM May 10,	Auto Tur Center Fre 13.26500000 GH Start Fre 30.000000 MH Stop Fre 26.50000000 GH CF Ste 2.647000000 GH



## 13. Antenna Requirement

#### 13.1 Limit

15.203 requirement: For intentional device, according to 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.

#### 13.2 Test Result

The EUT antenna is FPC antenna, fulfill the requirement of this section.



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## 14. EUT Photographs

## EUT Photo 1



#### EUT Photo 2



## NOTE: Appendix-Photographs Of EUT Constructional Details.

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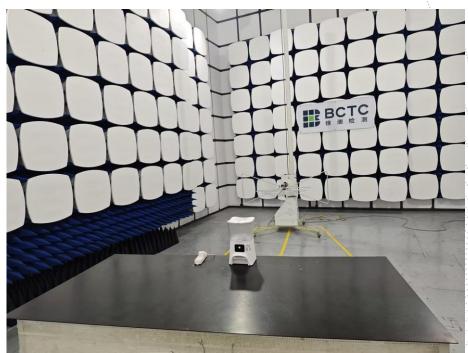


## **15. EUT Test Setup Photographs**

## **Conducted Measurement Photo**



**Radiated Measurement Photos** 



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## STATEMENT

1. The equipment lists are traceable to the national reference standards.

2. The test report can not be partially copied unless prior written approval is issued from our lab.

3. The test report is invalid without the "special seal for inspection and testing".

4. The test report is invalid without the signature of the approver.

5. The test process and test result is only related to the Unit Under Test.

6. Sample information is provided by the client and the laboratory is not responsible for its authenticity.

7. The quality system of our laboratory is in accordance with ISO/IEC17025.

8. If there is any objection to this test report, the client should inform issuing laboratory within 15 days from the date of receiving test report.

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\*\*\*\*\* END \*\*\*\*\*

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