

# **TEST** Report

Applicant:	Shenzhen Flanger Musical Instruments Co., Limited
Address of Applicant:	F/513, FENGSHANG ERA BLDG D,514, JIAN'AN 1ST ROAD, WENHUI COMMUNITY, XINAN STREET, BAO'AN DISTRICT SHENZHEN, CHINA
Manufacturer :	Shenzhen Flanger Musical Instruments Co., Limited
Address of Manufacturer :	F/513, FENGSHANG ERA BLDG D,514, JIAN'AN 1ST ROAD, WENHUI COMMUNITY, XINAN STREET, BAO'AN DISTRICT SHENZHEN, CHINA
Equipment Under Test (El	(TL
Product Name:	Guitar intelligent pedal
Model No.:	KE1
Series model:	AE-1, FE-1, LE-1, SE-1, GE-1, EP-05
Trade Mark:	N/A
FCC ID:	2BHAE-KE1
Applicable standards: Date of sample receipt:	FCC CFR Title 47 Part 15 Subpart C Section 15.247 Feb. 06, 2025
Date of Test:	Feb. 06, 2025 ~ Feb. 11, 2025
Date of report issued:	Feb. 11, 2025
Test Result :	PASS *

\* In the configuration tested, the EUT complied with the standards specified above.



# 1. Version

Version No.	Date	Description
00	Feb. 11, 2025	Original

Tested/ Prepared By

Heber He Date:

Feb. 11, 2025

**Project Engineer** 

Bruce Zhu Date:

Feb. 11, 2025

Reviewer



Feb. 11, 2025

Approved By :

Check By:



# 2. Contents

1. VERSION	2
2. CONTENTS	3
3. TEST SUMMARY	4
4. GENERAL INFORMATION	5
<ul> <li>4.1. GENERAL DESCRIPTION OF EUT</li> <li>4.2. TEST MODE</li> <li>4.3. DESCRIPTION OF SUPPORT UNITS</li> <li>4.4. DEVIATION FROM STANDARDS</li> <li>4.5. ABNORMALITIES FROM STANDARD CONDITIONS</li> <li>4.6. TEST FACILITY</li> <li>4.7. TEST LOCATION</li> <li>4.8. ADDITIONAL INSTRUCTIONS</li> </ul>	7 7 7 7 7 7
5. TEST INSTRUMENTS LIST	8
6. TEST RESULTS AND MEASUREMENT DATA	9
6. TEST RESULTS AND MEASUREMENT DATA	
<ul> <li>6.1. CONDUCTED EMISSIONS</li> <li>6.2. CONDUCTED PEAK OUTPUT POWER</li> <li>6.3. 20DB EMISSION BANDWIDTH</li> <li>6.4. FREQUENCIES SEPARATION</li> <li>6.5. HOPPING CHANNEL NUMBER</li> <li>6.6. DWELL TIME</li> <li>6.7. BAND EDGE</li> <li>6.7.1. Conducted Emission Method</li> <li>6.7.2. Radiated Emission Method</li> <li>6.8. SPURIOUS EMISSION</li> <li>6.8.1. Conducted Emission Method</li> <li>6.8.2. Radiated Emission Method</li> </ul>	



# 3. Test Summary

Test Item	Section in CFR 47	Result
Antenna Requirement	15.203/15.247 (c)	Pass
AC Power Line Conducted Emission	15.207	Pass
Conducted Peak Output Power	15.247 (b)(1)	Pass
20dB Occupied Bandwidth	15.247 (a)(1)	Pass
Carrier Frequencies Separation	15.247 (a)(1)	Pass
Hopping Channel Number	15.247 (a)(1)(iii)	Pass
Dwell Time	15.247 (a)(1)(iii)	Pass
Radiated Emission	15.205/15.209	Pass
Band Edge	15.247(d)	Pass

#### Remarks:

- 1. Pass: The EUT complies with the essential requirements in the standard.
- 2. Test according to ANSI C63.10:2013

#### **Measurement Uncertainty**

Test Item	Frequency Range	Measurement Uncertainty	Notes			
Radiated Emission	30~1000MHz	4.37 dB	(1)			
Radiated Emission	1~18GHz	5.40 dB	(1)			
Radiated Emission	18-40GHz	5.45 dB	(1)			
Conducted Disturbance 0.15~30MHz 2.68 dB (1)						
Note (1): The measurement unc	ertainty is for coverage factor of k	=2 and a level of confidence of §	95%.			



# 4. General Information

# 4.1. General Description of EUT

Product Name:	Guitar intelligent pedal
Model No.:	KE1
Series model:	AE-1, FE-1, LE-1, SE-1, GE-1, EP-05
Test sample(s) ID:	HTT202502084-1(Engineer sample) HTT202502084-2(Normal sample)
Operation Frequency:	2402MHz~2480MHz
Channel numbers:	79
Channel separation:	1MHz
Modulation type:	GFSK, π/4-DQPSK
Antenna Type:	Wire Antenna
Antenna gain:	3.04 dBi
Power Supply:	DC 3.7V From Battery and DC 5V From External Circuit
Adapter Information (Auxiliary test provided by the lab):	Mode: GS-0500200 Input: AC100-240V, 50/60Hz, 0.3A max Output: DC 5V, 2A



Operation Frequency each of channel								
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency	
1	2402MHz	21	2422MHz	41	2442MHz	61	2462MHz	
2	2403MHz	22	2423MHz	42	2443MHz	62	2463MHz	
3	2404MHz	23	2424MHz	43	2444MHz	63	2464MHz	
4	2405MHz	24	2425MHz	44	2445MHz	64	2465MHz	
5	2406MHz	25	2426MHz	45	2446MHz	65	2466MHz	
6	2407MHz	26	2427MHz	46	2447MHz	66	2467MHz	
7	2408MHz	27	2428MHz	47	2448MHz	67	2468MHz	
8	2409MHz	28	2429MHz	48	2449MHz	68	2469MHz	
9	2410MHz	29	2430MHz	49	2450MHz	69	2470MHz	
10	2411MHz	30	2431MHz	50	2451MHz	70	2471MHz	
11	2412MHz	31	2432MHz	51	2452MHz	71	2472MHz	
12	2413MHz	32	2433MHz	52	2453MHz	72	2473MHz	
13	2414MHz	33	2434MHz	53	2454MHz	73	2474MHz	
14	2415MHz	34	2435MHz	54	2455MHz	74	2475MHz	
15	2416MHz	35	2436MHz	55	2456MHz	75	2476MHz	
16	2417MHz	36	2437MHz	56	2457MHz	76	2477MHz	
17	2418MHz	37	2438MHz	57	2458MHz	77	2478MHz	
18	2419MHz	38	2439MHz	58	2459MHz	78	2479MHz	
19	2420MHz	39	2440MHz	59	2460MHz	79	2480MHz	
20	2421MHz	40	2441MHz	60	2461MHz			

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
The lowest channel	2402MHz
The middle channel	2441MHz
The Highest channel	2480MHz

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 Shenzhen, Guangdong, China



## 4.2. Test mode

Transmitting mode Keep the EUT in continuously transmitting mode.

Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.

#### 4.3. Description of Support Units

None.

#### 4.4. Deviation from Standards

None.

#### 4.5. Abnormalities from Standard Conditions

None.

#### 4.6. Test Facility

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

#### FCC-Registration No.: 779513 Designation Number: CN1319

Shenzhen HTT Technology Co.,Ltd. has been accredited on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

#### A2LA-Lab Cert. No.: 6435.01

Shenzhen HTT Technology Co.,Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.10 and CISPR 16-1-4:2010.

#### 4.7. Test Location

All tests were performed at:

Shenzhen HTT Technology Co.,Ltd.

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Fax: 0755-23595201

#### 4.8. Additional Instructions

Test Software	Special AT test command provided by manufacturer to Keep the EUT in continuously transmitting mode and hopping mode
Power level setup	Default



#### Cal.Due date Inventory Cal.Date Item **Test Equipment** Model No. Manufacturer No. (mm-dd-yy) (mm-dd-yy) 3m Semi- Anechoic Shenzhen C.R.T HTT-E028 1 9\*6\*6 Aug. 10 2024 Aug. 09 2027 technology co., LTD Chamber Shenzhen C.R.T 2 Control Room 4.8\*3.5\*3.0 HTT-E030 Aug. 10 2024 Aug. 09 2027 technology co., LTD 3 **EMI Test Receiver** ESCI7 HTT-E022 Apr. 26 2024 Apr. 25 2025 Rohde&Schwar HTT-E037 Apr. 26 2024 4 Rohde&Schwar FSP Apr. 25 2025 Spectrum Analyzer 5 Coaxial Cable ZDecl ZT26-NJ-NJ-0.6M HTT-E018 Apr. 26 2024 Apr. 25 2025 6 Coaxial Cable ZDecl ZT26-NJ-SMAJ-2M HTT-E019 Apr. 26 2024 Apr. 25 2025 7 Coaxial Cable ZDecl ZT26-NJ-SMAJ-0.6M HTT-E020 Apr. 26 2024 Apr. 25 2025 8 Coaxial Cable ZDecl ZT26-NJ-SMAJ-8.5M HTT-E021 Apr. 26 2024 Apr. 25 2025 Composite logarithmic 9 Schwarzbeck VULB 9168 HTT-E017 May. 21 2024 May. 20 2025 antenna May. 19 2025 10 Schwarzbeck BBHA9120D May. 20 2024 Horn Antenna HTT-E016 11 Loop Antenna Zhinan ZN30900C HTT-E039 Apr. 26 2024 Apr. 25 2025 12 OBH100400 HTT-E040 Horn Antenna Beijing Hangwei Dayang Apr. 26 2024 Apr. 25 2025 low frequency 13 Sonoma Instrument 310 HTT-E015 Apr. 26 2024 Apr. 25 2025 Amplifier high-frequency 14 HP 8449B HTT-E014 Apr. 26 2024 Apr. 25 2025 Amplifier Variable frequency power Shenzhen Anbiao 15 ANB-10VA HTT-082 Apr. 26 2024 Apr. 25 2025 Instrument Co., Ltd supply 16 **EMI Test Receiver** Rohde & Schwarz ESCS30 HTT-E004 Apr. 26 2024 Apr. 25 2025 17 Artificial Mains Rohde & Schwarz ESH3-Z5 HTT-E006 May. 23 2024 May. 22 2025 18 HTT-E038 May. 23 2024 Artificial Mains Rohde & Schwarz ENV-216 May. 22 2025 19 Z302S-NJ-BNCJ-1.5M HTT-E001 Cable Line Robinson Apr. 26 2024 Apr. 25 2025 20 Attenuator Robinson 6810.17A HTT-E007 Apr. 26 2024 Apr. 25 2025 Variable frequency power Shenzhen Yanghong YF-650 (5KVA) 21 HTT-E032 Apr. 26 2024 Apr. 25 2025 Electric Co., Ltd supply Shenzhen C.R.T 22 Control Room 8\*4\*3.5 HTT-E029 Aug. 10 2024 Aug. 09 2027 technology co., LTD 23 DC power supply Agilent E3632A HTT-E023 Apr. 26 2024 Apr. 25 2025 HTT-E024 24 **EMI Test Receiver** Agilent N9020A Apr. 26 2024 Apr. 25 2025 25 Agilent N5181A HTT-E025 Apr. 26 2024 Apr. 25 2025 Analog signal generator 26 Vector signal generator Agilent N5182A HTT-E026 Apr. 26 2024 Apr. 25 2025 27 U2021XA HTT-E027 Apr. 25 2025 Power sensor Keysight Apr. 26 2024 Temperature and Shenzhen Anbiao 28 TH10R HTT-074 Apr. 27 2025 Apr. 28 2024 humidity meter Instrument Co., Ltd Radiated Emission Test 29 Farad EZ-EMC N/A N/A N/A Software Conducted Emission 30 Farad EZ-EMC N/A N/A N/A Test Software 31 **RF** Test Software panshanrf TST N/A N/A N/A

# 5. Test Instruments list

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# 6. Test results and Measurement Data

# 6.1. Conducted Emissions

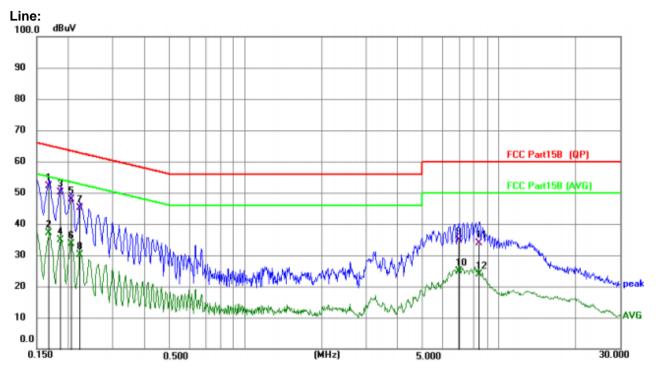
Test Requirement:	FCC Part15 C Section 15.207	,					
Test Method:	ANSI C63.10:2013						
Test Frequency Range:	150KHz to 30MHz						
Class / Severity:	Class B	Class B					
Receiver setup:	RBW=9KHz, VBW=30KHz, S	weep time=auto					
Limit:		Limit	t (dBuV)				
	Frequency range (MHz)	Quasi-peak		rage			
	0.15-0.5	66 to 56*		o 46*			
	0.5-5	56		6			
	5-30	60	5	0			
Test setup:							
Test procedure:	<ul> <li>* Decreases with the logarithm of the frequency.</li> <li>Reference Plane</li> <li>ISN 40cm 80cm Filter AC power</li> <li>Full Filter AC power</li> <li>Fequipment Under Test LISN Line Impedence Stabilization Network</li> <li>Test table height=0.8m</li> <li>The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 500hm/50uH coupling impedance for the measuring equipment.</li> <li>The peripheral devices are also connected to the main power through a LISN that provides a 500hm/50uH coupling impedance with 500hm termination. (Please refer to the block diagram of the test setup and photographs).</li> <li>Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative</li> </ul>						
Test Instruments:	according to ANSI C63.10: Refer to section 6.0 for details			-			
Test mode:	Refer to section 5.2 for details						
Test environment:		nid.: 52%	Press.:	1012mbar			
Test voltage:	AC 120V, 60Hz	I	1	1			
Test results:	Pass						
	1						

Remark: Based on all tested data, the EUT complied with the FCC Part 15.207 standard limit for a wireless device, and with the worst case as below:



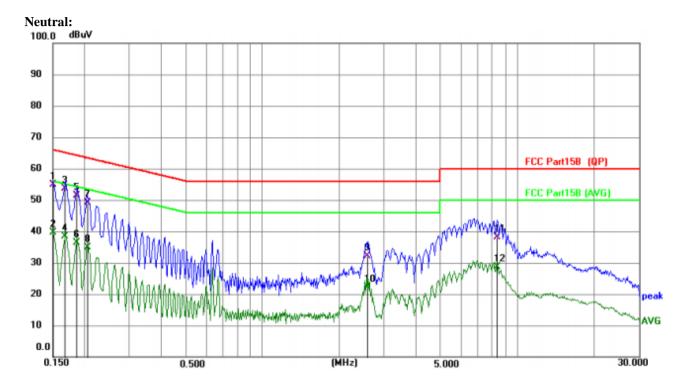
Report No.: HTT202502084F01

#### Measurement data:



No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
	MHz		dB	dBuV	dBuV	dB	Detector
1 *	0.1677	42.07	10.07	52.14	65.07	-12.93	QP
2	0.1677	26.95	10.07	37.02	55.07	-18.05	AVG
3	0.1855	40.00	10.14	50.14	64.24	-14.10	QP
4	0.1855	24.85	10.14	34.99	54.24	-19.25	AVG
5	0.2044	37.63	10.19	47.82	63.43	-15.61	QP
6	0.2044	23.55	10.19	33.74	53.43	-19.69	AVG
7	0.2220	34.92	10.21	45.13	62.74	-17.61	QP
8	0.2220	19.96	10.21	30.17	52.74	-22.57	AVG
9	6.9294	24.67	10.12	34.79	60.00	-25.21	QP
10	6.9294	14.84	10.12	24.96	50.00	-25.04	AVG
11	8.3706	23.86	10.10	33.96	60.00	-26.04	QP
12	8.3706	13.70	10.10	23.80	50.00	-26.20	AVG





No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz		dB	dBuV	dBuV	dB	Detector
1	*	0.1502	44.74	10.15	54.89	65.99	-11.10	QP
2		0.1502	29.53	10.15	39.68	55.99	-16.31	AVG
3		0.1678	43.33	10.21	53.54	65.07	-11.53	QP
4		0.1678	28.23	10.21	38.44	55.07	-16.63	AVG
5		0.1860	41.23	10.21	51.44	64.21	-12.77	QP
6		0.1860	26.15	10.21	36.36	54.21	-17.85	AVG
7		0.2046	38.82	10.20	49.02	63.42	-14.40	QP
8		0.2046	24.66	10.20	34.86	53.42	-18.56	AVG
9		2.5781	22.02	10.23	32.25	56.00	-23.75	QP
10		2.5781	11.98	10.23	22.21	46.00	-23.79	AVG
11		8.3491	28.06	10.19	38.25	60.00	-21.75	QP
12		8.3491	18.37	10.19	28.56	50.00	-21.44	AVG

#### Notes:

- 1. An initial pre-scan was performed on the line and neutral lines with peak detector.
- 2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
- 3. Final Level =Receiver Read level + LISN Factor + Cable Los

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#### Test Requirement: FCC Part15 C Section 15.247 (b)(3) ANSI C63.10:2013 Test Method: Limit: 30dBm(for GFSK),20.97dBm(for EDR) Power sensor and Spectrum analyzer Test setup: E.U.T Non-Conducted Table Ground Reference Plane **Test Instruments:** Refer to section 6.0 for details Test mode: Refer to section 5.2 for details Pass Test results: 52% Press.: Test environment: Temp.: 25 °C Humid.: 1012mbar

# 6.2. Conducted Peak Output Power

#### **Measurement Data**

Mode	ТΧ	Frequency	Packet	Packet Maximum Peak Conducted Output Power (dBm)		
Туре	(MHz)	Туре	ANT1	Limit	Verdict	
		2402	DH5	-0.98	<=20.97	Pass
GFSK	SISO	2441	DH5	-1.70	<=20.97	Pass
		2480	DH5	-2.93	<=20.97	Pass
		2402	2DH5	-0.21	<=20.97	Pass
Pi/4DQPSK	SISO	2441	2DH5	-0.86	<=20.97	Pass
		2480	2DH5	-2.07	<=20.97	Pass



# Test Requirement:FCC Part15 C Section 15.247 (a)(2)Test Method:ANSI C63.10:2013Limit:N/ATest setup:Spectrum AnalyzerImage: Construct of the setup:Image: Construct of the setup:Non-Conducted TableNon-Conducted Table

#### 6.3. 20dB Emission Bandwidth

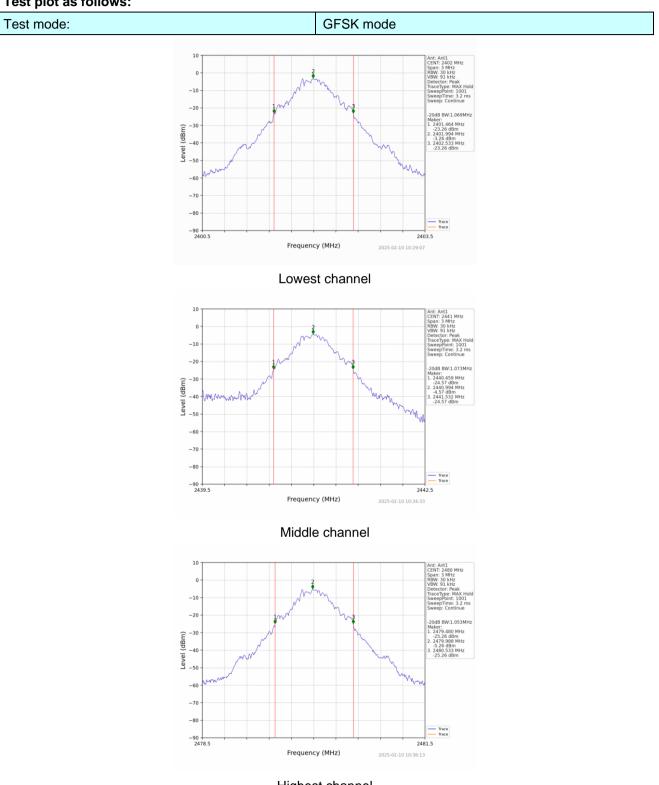
	Ground Reference Plane							
Test Instruments:	Refer to see	Refer to section 6.0 for details						
Test mode:	Refer to see	ction 5.2 for a	details					
Test results:	Pass							
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar		

#### **Measurement Data**

Mode	ТΧ	Frequency	Packet	ANT	20dB Bandy	width (MHz)	Verdict
Туре	Туре	(MHz)	Туре	ANT	Result	Limit	verdict
		2402	DH5	1	1.069	/	Pass
GFSK	SISO	2441	DH5	1	1.073	/	Pass
		2480	DH5	1	1.053	/	Pass
		2402	2DH5	1	1.345	/	Pass
Pi/4DQPSK	SISO	2441	2DH5	1	1.346	/	Pass
		2480	2DH5	1	1.346	/	Pass

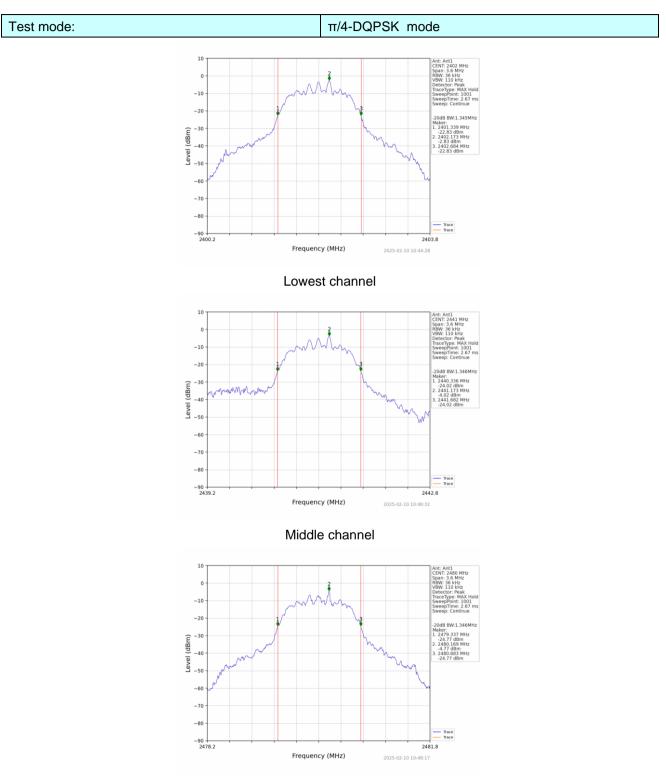


#### Test plot as follows:



Highest channel





Highest channel



# 6.4. Frequencies Separation

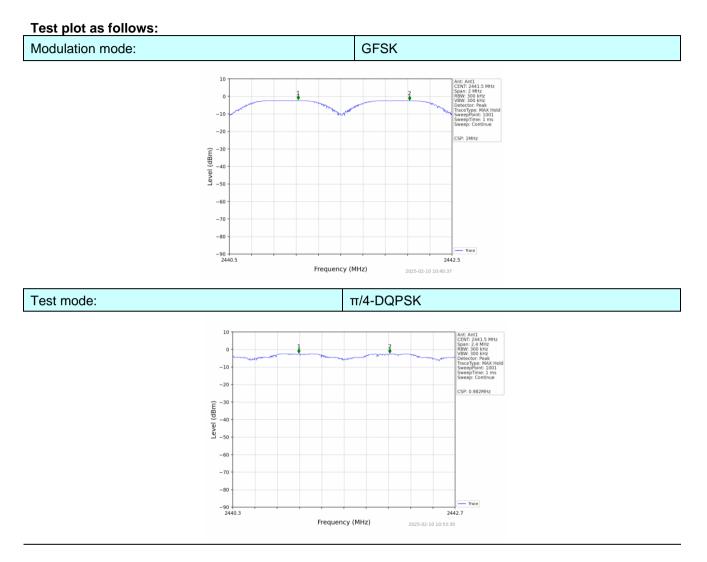
Test Requirement:	FCC Part1	5 C Section 1	5.247 (a)(1)					
Test Method:	ANSI C63.	10:2013						
Receiver setup:	RBW=100	KHz, VBW=30	00KHz, detec	tor=Peak				
Limit:		IB bandwidth K ∶ 0.025MH	Iz or 2/3 of	the 20dB b	oandwidth (	whichever is		
Test setup:	Sp							
Test Instruments:	Refer to se	ction 6.0 for a	details					
Test mode:	Refer to se	ction 5.2 for a	details					
Test results:	Pass	Pass						
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar		

#### Measurement Data

				Ant1			
Mode	ТΧ	Frequency	Packet	Channel Separation	20dB Bandwidth	Limit	Verdict
woue	Туре	(MHz)	Туре	(MHz)	(MHz)	(MHz)	verdict
GFSK	SISO	HOPP	DH5	1.000	1.073	>=0.715	Pass
Pi/4DQPSK	SISO	HOPP	2DH5	0.982	1.346	>=0.897	Pass

Remark: We have tested all mode at high, middle and low channel, and recorded worst case at middle







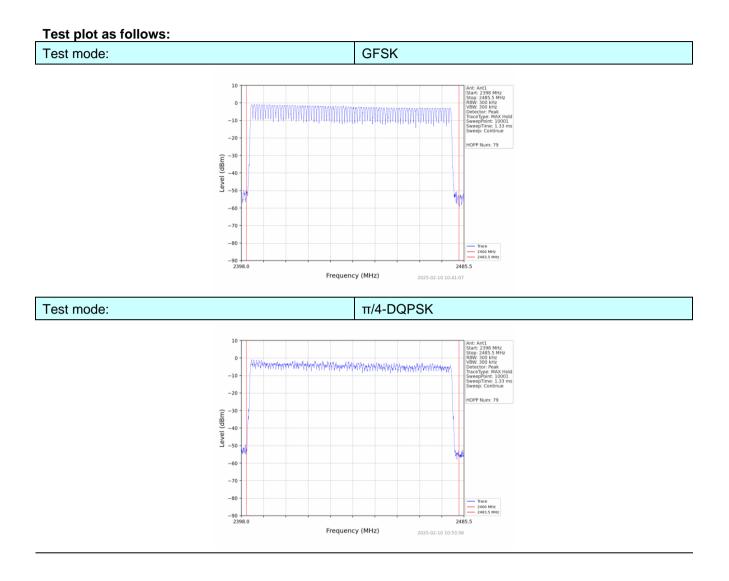
Test Requirement:	FCC Part15	FCC Part15 C Section 15.247 (a)(1)(iii)								
Test Method:	ANSI C63.1	0:2013								
Receiver setup:	RBW=100k Detector=P	Hz, VBW=30 eak	0kHz, Frequ	ency range=2	2400MHz-24	83.5MHz,				
Limit:	15 channels	15 channels								
Test setup:	Spe			2.U.T						
Test Instruments:	Refer to see	ction 6.0 for c	letails							
Test mode:	Refer to see	ction 5.2 for c	letails							
Test results:	Pass	Pass								
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar				

# 6.5. Hopping Channel Number

#### **Measurement Data:**

Mode	Hopping channel numbers	Limit	Result
GFSK	79	245	Pass
π/4-DQPSK	79	≥15	Pass







# 6.6. Dwell Time

Test Requirement:	FCC Part15	5 C Section 1	5.247 (a)(1)(i	iii)					
Test Method:	ANSI C63.1	0:2013							
Receiver setup:	RBW=1MH	z, VBW=1M⊦	lz, Span=0H	z, Detector=F	Peak				
Limit:	0.4 Second	0.4 Second							
Test setup:	Sp								
Test Instruments:	Refer to see	ction 6.0 for c	letails						
Test mode:	Refer to see	ction 5.2 for c	letails						
Test results:	Pass	Pass							
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar			



#### **Measurement Data**

Modulation	Packet	Burst time (ms)	Dwell time (ms)	Limit (ms)	Result	
	DH1	0.380	119.700			
GFSK	DH3	1.638	248.976	400	Pass	
	DH5	2.884	282.632			
	2-DH1	0.390	124.800			
π/4DQPSK	2-DH3	1.650	268.950	400	Pass	
	2-DH5	2.892	306.552			

Note:We have tested all mode at high, middle and low channel, and recoreded worst case at middle channel.

Dwell time=Pulse time (ms) x (1600  $\div$  2  $\div$  79) x31.6 Second for DH1, 2-DH1

Dwell time=Pulse time (ms) × (1600  $\div$  4  $\div$  79) ×31.6 Second for DH3, 2-DH3

Dwell time=Pulse time (ms) x (1600  $\div$  6  $\div$  79) x31.6 Second for DH5, 2-DH5



Test plot as follows:

#### Report No.: HTT202502084F01

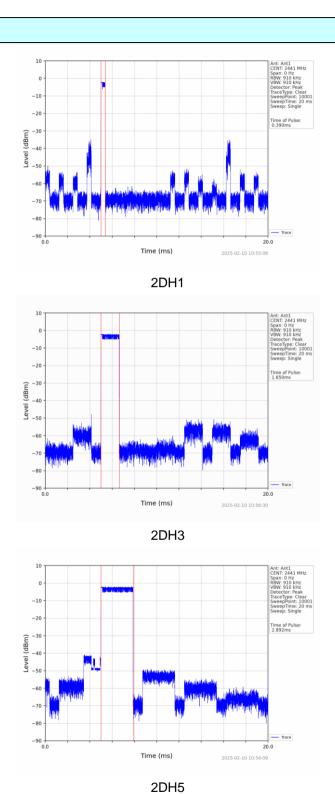
#### GFSK mode 10 Span: 0 Hz RBW: 910 kHz VBW: 910 kHz 0 -10 -20 Time of Pulse 0.380ms -30 Level (dBm) -40 -5 -60 -70 -80 -90 + 0.0 Trace 20.0 Time (ms) 2025-02-10 10:42:16 DH1 10 Ant: Ant1 CENT: 2441 MH Span: 0 Hz RBW: 910 kHz VBW: 910 kHz nt1 2441 MHz -10 -20 Time of Pulse 1.638ms (mgp) -40 -40 -50 -60 -70 -80 Trace -90 20.0 Time (ms) 2025-02-10 10:43:11 DH3 10 Ant: Ant1 CENT: 2441 I Span: 0 Hz RBW: 1 MHz VBW: 1 MHz Detector: Pe TraceType: C SweepPoint: SweepTime: Sweep: Singl C -10 -20 Time of Pulse 2.884ms -30 Level (dBm) -40 -50 -60 -70 -80 -90 +-0.0 Trace 20.0 Time (ms) 2025-02-10 10:41:21

DH5

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#### π/4-DQPSK mode

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# 6.7. Band Edge

## 6.7.1. Conducted Emission Method

Test Requirement:	FCC Part15	5 C Section 1	5.247 (d)					
Test Method:	ANSI C63.1	0:2013						
Receiver setup:	RBW=100k	RBW=100kHz, VBW=300kHz, Detector=Peak						
Limit:	spectrum in is produced the 100 kHz the desired							
Test setup:	Spec	Measurement.  Spectrum Analyzer  E.U.T  Non-Conducted Table  Ground Reference Plane						
Test Instruments:	Refer to see	ction 6.0 for c	letails					
Test mode:	Refer to see	ction 5.2 for c	letails					
Test results:	Pass							
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar		



Test plot as follows:

GFSK Mode:

#### Report No.: HTT202502084F01

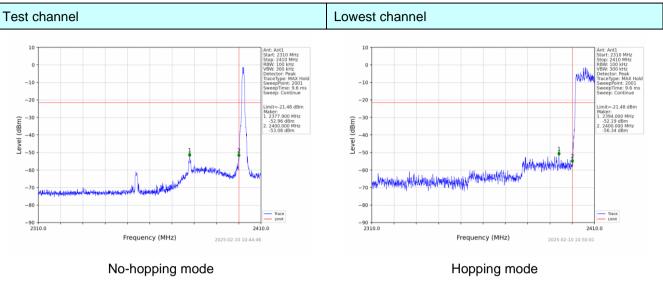
#### Test channel Lowest channel 10 -10 -10 -20 -20 -21.51 dBn 21.51 dB iker: 2378.050 MHz -50.96 dBm 2400.000 MHz -54.38 dBm (dBm) -30 -31 Level (dBm) -40 -40 ) -+--50 -50 MANAMAN -60 -6 -70 -70 -80 -8 Trace Limit -90 2410.0 2410.0 Frequency (MHz) Frequency (MHz) 2025-02-10 10:29:25 2025-02-10 10:37:48 No-hopping mode Hopping mode Test channel: Highest channel 10 0 -10 -10 -20 -21 51 dB 21 51 d aker: 2494.848 MHz -59.73 dBm 2483.500 MHz -62.41 dBm (dBm) -30 (dBm) aker: 2495.044 MHz -53.64 dBm 2483.500 MHz -62.38 dBm -3 -40 -40 -40 –40 –50 -40 –40 –50 monnan -60 -60 -70 -70 -80 -80 Trace Limit Trace Limit -90 2472.0 2500.0 2500.0 Frequency (MHz) Frequency (MHz) 2025-02-10 10:36:31 2025-02-10 10:38:04

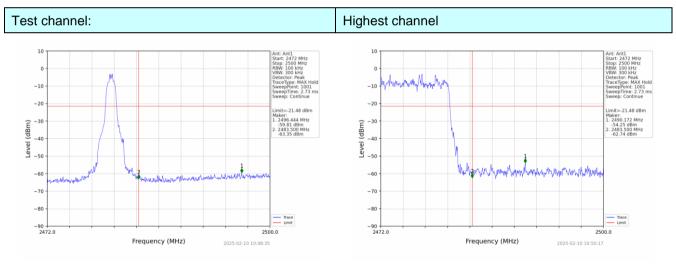
No-hopping mode

Hopping mode



#### π/4-DQPSK Mode:





No-hopping mode

Hopping mode



6.7.2. Radiated E	Emission Me	thod						
Test Requirement:	FCC Part15	C Section 1	5.209 and 15	.205				
Test Method:	ANSI C63.1	0:2013						
Test Frequency Range:		estrict bands lata was sho		, only the w	orst band's (ź	2310MHz to		
Test site:	Measureme	nt Distance:						
Receiver setup:	Frequenc					emark		
	Above 1G	Hz Pea		Hz 3MH		k Value		
	E.	Pea		Hz 10H		ige Value		
Limit:	Fre	equency		dBuV/m @3i 54.00		emark		
	Abo	ve 1GHz		74.00		ige Value k Value		
	Turn Tables <150cm;	- A-	< 1m Receiver+					
Test Procedure:	<ul> <li>ground a determine</li> <li>2. The EUT antenna, tower.</li> <li>3. The ante ground to horizonta measure</li> <li>4. For each and then and then and the romaximum</li> <li>5. The test-Specified</li> <li>6. If the emilimit specified</li> </ul>	<ul> <li>Receiver Preamplifier</li> <li>1. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.</li> <li>2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</li> <li>3. 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.</li> <li>4. 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.</li> <li>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</li> <li>6. 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</li> </ul>						
Test Instruments:	Refer to sec	tion 6.0 for d	etails					
Test mode:	Refer to sec	tion 5.2 for d	etails					
Test results:	Pass							
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar		

#### Padiated Emission Method 7 0

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#### **Measurement Data**

Remark: GFSK, Pi/4 DQPSK all have been tested, only worse case GFSK is reported.

Operation Mode: GFSK

Freque	ncy(MHz)	:	24	02	Pola	arity:	Н		NL
Frequency (MHz)	Emis Le <sup>v</sup> (dBu	vel	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre- amplifier (dB)	Correction Factor (dB/m)
2390.00	59.72	PK	74	14.28	61.11	27.2	4.31	32.9	-1.39
2390.00	46.23	AV	54	7.77	47.62	27.2	4.31	32.9	-1.39
Freque	ncy(MHz)	:	24	02	Pola	arity:		VERTICAL	
Frequency (MHz)	Emis Le <sup>.</sup> (dBu	vel	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre- amplifier (dB)	Correction Factor (dB/m)
2390.00	59.56	PK	74	14.44	60.95	27.2	4.31	32.9	-1.39
2390.00	45.96	AV	54	8.04	47.35	27.2	4.31	32.9	-1.39
Freque	ncy(MHz)	:	24	80	P olarity:		н	IORIZONTA	AL.
Frequency (MHz)	Emis Le <sup>v</sup> (dBu	vel	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre- amplifier (dB)	Correction Factor (dB/m)
2483.50	56.53	PK	74	17.47	57.46	27.4	4.47	32.8	-0.93
2483.50	45.00	AV	54	9.00	45.93	27.4	4.47	32.8	-0.93
Freque	ncy(MHz)	:	24	80	Pola	arity:		VERTICAL	
Frequency (MHz)	Emis Le <sup>v</sup> (dBu	vel	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre- amplifier (dB)	Correction Factor (dB/m)
2483.50	54.50	PK	74	19.50	55.43	27.4	4.47	32.8	-0.93
2483.50	45.12	AV	54	8.88	46.05	27.4	4.47	32.8	-0.93

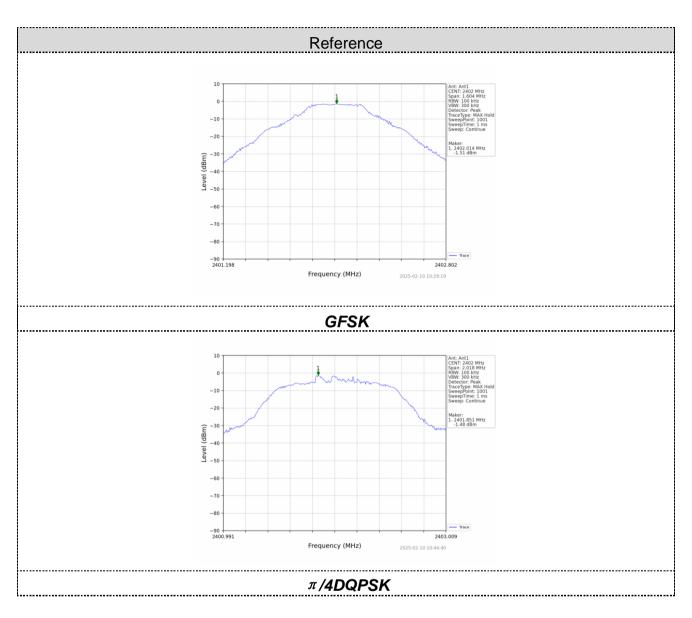


6.8.	Spurious	Emission
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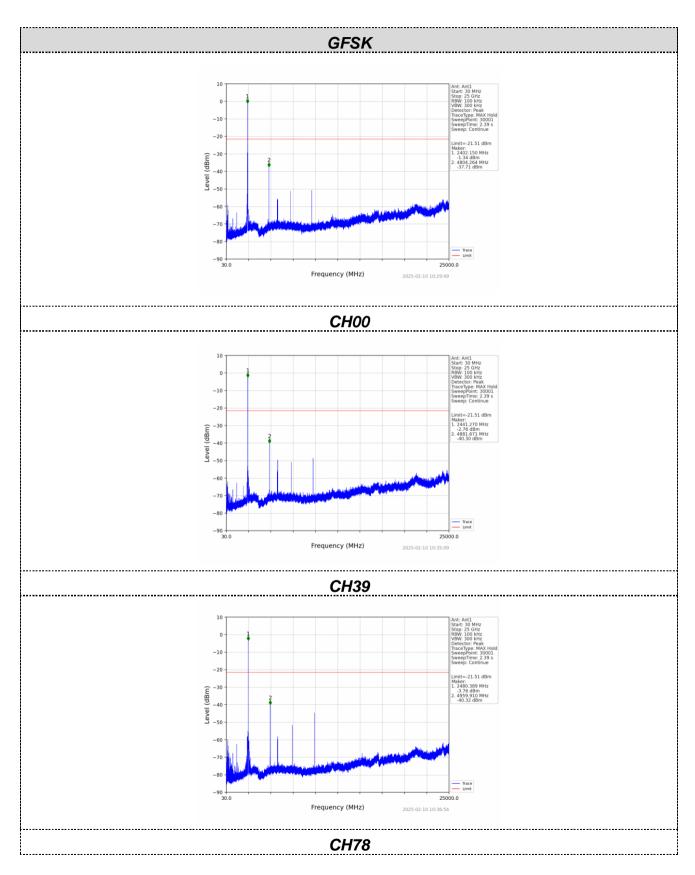
# 6.8.1. Conducted Emission Method

Test Requirement:	FCC Part15 C	Section 2	15.247 (d)								
Test Method:	ANSI C63.10:2	2013									
Limit:	In any 100 kH: spectrum inter is produced by the 100 kHz ba the desired po measurement.	ntional rac / the inter andwidth wer, base	liator is opera ntional radiato within the ba	ating, the radio or shall be at l nd that contai	o frequency east 20 dB t ns the highe	power that below that in est level of					
Test setup:	Spectr	Spectrum Analyzer         E.U.T         Non-Conducted Table									
Test Instruments:	Refer to section	on 6.0 for	details								
Test mode:	Refer to section	on 5.2 for	details								
Test results:	Pass										
Test environment:	Temp.: 2	Temp.:         25 °C         Humid.:         52%         Press.:         1012mbar									





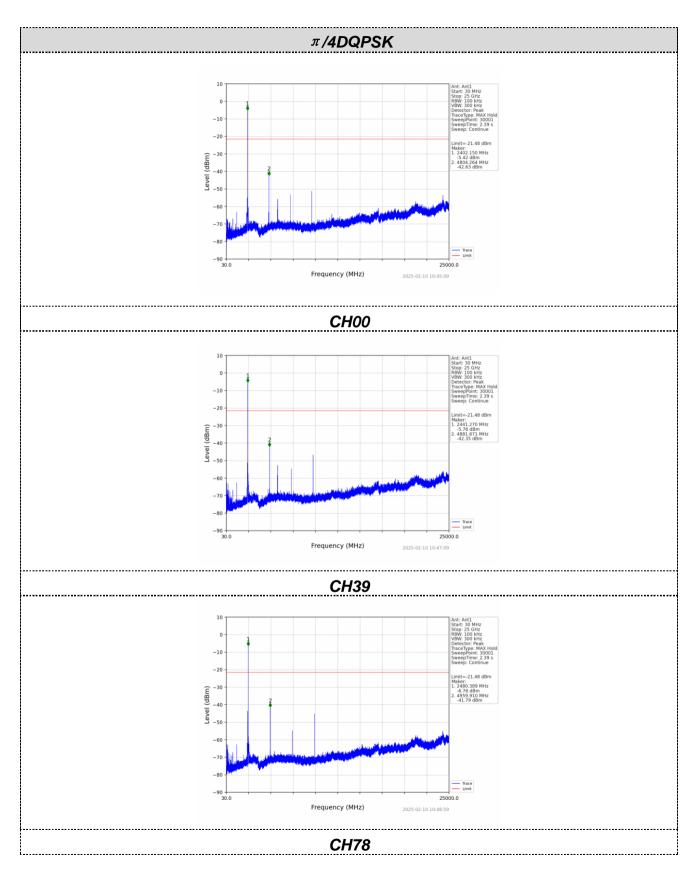




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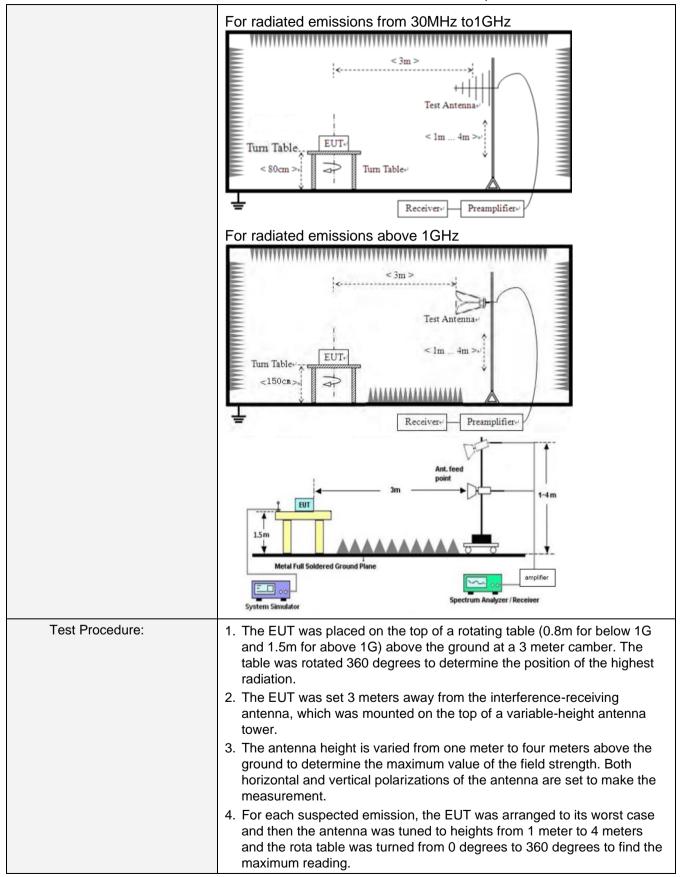
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6.8.2. Radiated E	mission Method							
Test Requirement:	FCC Part15 C Section	on 15	5.209					
Test Method:	ANSI C63.10:2013							
Test Frequency Range:	9kHz to 25GHz							
Test site:	Measurement Distar	nce: 3	3m					
Receiver setup:	Frequency	۵	Detector	RBV	N	VBW	'	Value
	9KHz-150KHz	Qı	uasi-peak	200	Ηz	600Hz	z	Quasi-peak
	150KHz-30MHz	Qı	lasi-peak	9KH	lz	30KH:	z	Quasi-peak
	30MHz-1GHz	Qı	lasi-peak	120K	Hz	300KH	lz	Quasi-peak
	Above 1GHz		Peak	1M⊦	łz	3MHz	z	Peak
	7,5076 16112		Peak	1M⊦	lz	10Hz		Average
Limit:	Frequency		Limit (u∖	//m)	V	alue	Ν	leasurement Distance
	0.009MHz-0.490M	Hz	2400/F(k	(Hz)		QP		300m
	0.490MHz-1.705M	Hz	24000/F(KHz)		QP		30m	
	1.705MHz-30MH	Z	30		QP		30m	
	30MHz-88MHz		100			QP		
	88MHz-216MHz	_	150			QP		
	216MHz-960MH	Z				QP		3m
	960MHz-1GHz		500		QP			
	Above 1GHz		500		Average			
			5000		Peak			
Test setup:	For radiated emiss	ions	from 9kH	z to 30	MH	Z		_
	<pre></pre>							

# 6.8.2. Radiated Emission Method







	Report No.: HTT202502084F01								
		,	stem was set imum Hold M		etect Function	and Specified			
	6. 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.								
Test Instruments:	Refer to se	ction 6.0 for	details						
Test mode:	Refer to se	ction 5.2 for	details						
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar			
Test voltage:	AC 120V, 60Hz								
Test results:	Pass								

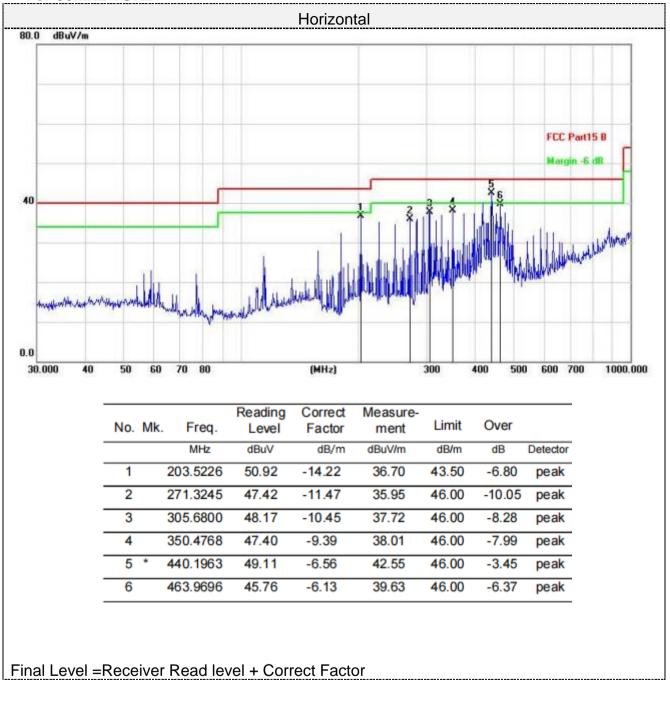
#### Measurement data:

Remarks:

- 1. During the test, pre-scan the GFSK,  $\pi/4$ -DQPSK modulation, and found the GFSK modulation which it is worse case.
- 2. Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.
- 3. Radiated emission test from 9 KHz to 10th harmonic of fundamental was verified, and no emission found except system noise floor in 9 KHz to 30MHz and not recorded in this report.
- 4. Based on all tested data, the EUT complied with the FCC Part 15.207 standard limit for a wireless device, and with the worst case as DH5 2402MHz as below:



# For 30MHz-1GHz

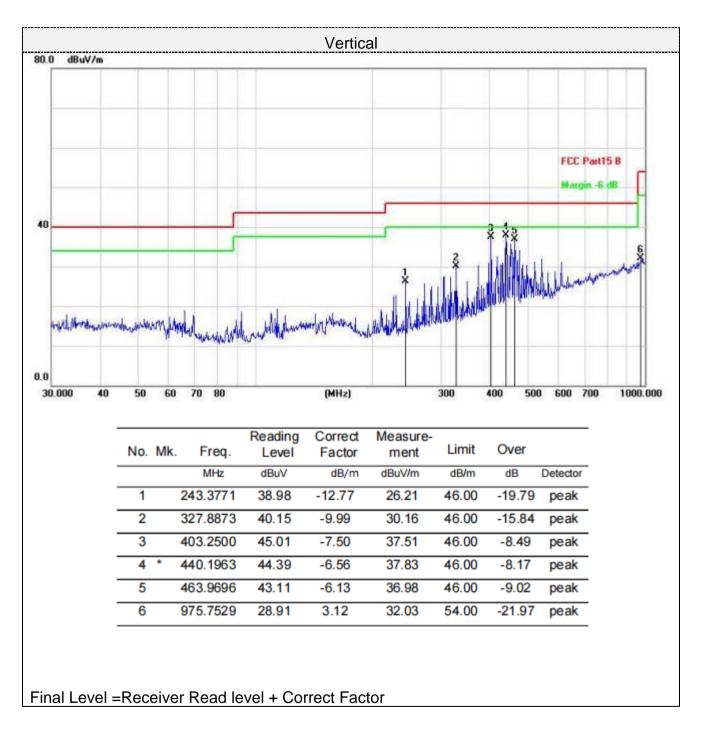


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# For 1GHz to 25GHz

Remark: For test above 1GHz GFSK,Pi/4 DQPSK were test at Low, Middle, and High channel; only the worst result of GFSK was reported as below:

Freque	Frequency(MHz):			2402		Polarity:		HORIZONTAL			
Frequency (MHz)		sion vel V/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre- amplifier (dB)	Correction Factor (dB/m)		
4804.00	59.41	PK	74	14.59	53.71	31	6.5	31.8	5.7		
4804.00	41.81	AV	54	12.19	36.11	31	6.5	31.8	5.7		
7206.00	52.72	PK	74	21.28	40.07	36	8.15	31.5	12.65		
7206.00	44.73	AV	54	9.27	32.08	36	8.15	31.5	12.65		

Freque	Frequency(MHz):			2402		Polarity:		VERTICAL			
Frequency (MHz)	Emis Le <sup>.</sup> (dBu		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre- amplifier (dB)	Correction Factor (dB/m)		
4804.00	58.93	PK	74	15.07	53.23	31	6.5	31.8	5.7		
4804.00	43.22	AV	54	10.78	37.52	31	6.5	31.8	5.7		
7206.00	52.57	PK	74	21.43	39.92	36	8.15	31.5	12.65		
7206.00	43.10	AV	54	10.90	30.45	36	8.15	31.5	12.65		

Freque	Frequency(MHz):			2441		Polarity:		HORIZONTAL			
Frequency (MHz)	Le	sion vel V/m)	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre- amplifier (dB)	Correction Factor (dB/m)		
4882.00	60.75	PK	74	13.25	54.59	31.2	6.61	31.65	6.16		
4882.00	44.85	AV	54	9.15	38.69	31.2	6.61	31.65	6.16		
7323.00	53.21	PK	74	20.79	40.26	36.2	8.23	31.48	12.95		
7323.00	43.07	AV	54	10.93	30.12	36.2	8.23	31.48	12.95		

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Freque	Frequency(MHz):			2441		Polarity:		VERTICAL		
Frequency (MHz)	Emis Le <sup>.</sup> (dBu	vel	Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre- amplifier (dB)	Correction Factor (dB/m)	
4882.00	60.86	PK	74	13.14	54.70	31.2	6.61	31.65	6.16	
4882.00	44.14	AV	54	9.86	37.98	31.2	6.61	31.65	6.16	
7323.00	52.67	PK	74	21.33	39.72	36.2	8.23	31.48	12.95	
7323.00	43.95	AV	54	10.05	31.00	36.2	8.23	31.48	12.95	

Freque	Frequency(MHz):			2480		Polarity:		HORIZONTAL		
Frequency (MHz)	Emis Le <sup>v</sup> (dBu)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre- amplifier (dB)	Correction Factor (dB/m)	
4960.00	62.58	PK	74	11.42	55.92	31.4	6.76	31.5	6.66	
4960.00	42.66	AV	54	11.34	36.00	31.4	6.76	31.5	6.66	
7440.00	53.50	PK	74	20.50	40.20	36.4	8.35	31.45	13.3	
7440.00	45.92	AV	54	8.08	32.62	36.4	8.35	31.45	13.3	

Freque	Frequency(MHz):			2480		Polarity:		VERTICAL			
Frequency (MHz)	Emis Lev (dBu		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre- amplifier (dB)	Correction Factor (dB/m)		
4960.00	63.94	PK	74	10.06	57.28	31.4	6.76	31.5	6.66		
4960.00	42.23	AV	54	11.77	35.57	31.4	6.76	31.5	6.66		
7440.00	54.34	PK	74	19.66	41.04	36.4	8.35	31.45	13.3		
7440.00	44.45	AV	54	9.55	31.15	36.4	8.35	31.45	13.3		

#### Remark:

(1) Data of measurement within this frequency range shown "--- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

(2) When the test results of Peak Detected below the limits of Average Detected, the Average Detected is not need completed.

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# 6.9. Antenna Requirement

# 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited

# FCC CFR Title 47 Part 15 Subpart C Section 15.247(c) (1) (I):

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

#### Antenna Connected Construction

The maximum gain of antenna was 3.04 dBi.

Remark: The antenna gain is provided by the customer, if the data provided by the customer is not accurate, Shenzhen HTT Technology Co., Ltd. does not assume any responsibility.



# 7. Test Setup Photo

Reference to the **appendix I** for details.

# 8. EUT Constructional Details

Reference to the **appendix II** for details.

-----End-----