



Shenzhen HTT Technology Co., Ltd.

TEST REPORT

FCC Rules and Regulations Part PART 15.249

Report Reference No.....: HTT202412157F02

FCC ID.....: 2BAQF-TF-GK02

Compiled by

(position+printed name+signature.. File administrators

Supervised by

(position+printed name+signature.. Project Engineer

Approved by

(position+printed name+signature.. RF Manager

Date of issue..... Dec. 10, 2024

Heber He

Bruce Zhu

Kevin Han



Testing Laboratory Name Shenzhen HTT Technology Co.,Ltd.

Address..... 1F, Building B, Huafeng International Robotics Industrial Park,
Hangcheng Road,Nanchang Community, Xixiang Street, Bao'an
District, Shenzhen, Guangdong, China

Applicant's name Shenzhen Qishun Innovation Technology Development Co., LTD

Address 1906, Block A, RongchuangZhihui Building, Minzhi Street, Longhua
District, Shenzhen

Standard FCC Rules and Regulations Part PART 15.249

Shenzhen HTT Technology Co.,Ltd. All rights reserved.

This publication may be reproduced in whole or in part for non-commercial purposes as long as the Shenzhen HTT Technology Co.,Ltd. is acknowledged as copyright owner and source of the material. Shenzhen HTT Technology Co.,Ltd. takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.

Test item description Aluminum Mechanical keyboard

Trade Mark TRANSFORMERS

Manufacturer Shenzhen Qishun Innovation Technology Development Co., LTD

Model/Type reference..... TF-GK02

Listed Models N/A

Modulation GFSK

Frequency..... 2402-2480MHz

Ratings DC 3.7V From Battery and DC 5V From External Circuit

Result..... PASS

TEST REPORT

Equipment under Test : Aluminum Mechanical keyboard

Model /Type : TF-GK02

Listed Models : N/A

Applicant : **Shenzhen Qishun Innovation Technology Development Co., LTD**

Address : 1906, Block A, RongchuangZhihui Building, Minzhi Street, Longhua District, Shenzhen

Manufacturer : **Shenzhen Qishun Innovation Technology Development Co., LTD**

Address : 1906, Block A, RongchuangZhihui Building, Minzhi Street, Longhua District, Shenzhen

Test Result:	PASS
--------------	------

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

Contents

1. TEST STANDARDS.....	4
2. SUMMARY.....	5
2.1. General Remarks	5
2.2. Product Description	5
2.3. Equipment Under Test	5
2.4. Short description of the Equipment under Test (EUT)	5
2.5. EUT operation mode	5
2.6. Block Diagram of Test Setup.....	6
2.7. Modifications	6
3. TEST ENVIRONMENT	7
3.1. Address of the test laboratory	7
3.2. Test Facility	7
3.3. Environmental conditions	7
3.4. Summary of measurement results	8
3.5. Statement of the measurement uncertainty	8
3.6. Equipments Used during the Test	8
4. TEST CONDITIONS AND RESULTS.....	10
4.1. AC Power Conducted Emission.....	10
4.2. Radiated Emission and Band Edges	13
4.3. 20dB Bandwidth Measurement	20
4.4. Antenna Requirement	22
5. TEST SETUP PHOTOS OF THE EUT	23
6. TEST PHOTOS OF THE EUT.....	23

1. TEST STANDARDS

The tests were performed according to following standards:

FCC Rules Part 15.249: Operation within the bands 902 - 928 MHz, 2400 - 2483.5 MHz, 5725 - 5875 MHz, and 24.0 - 24.25 GHz.

ANSI C63.10:2013 : American National Standard for Testing Unlicensed Wireless Devices

ANSI C63.4: 2014: –American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40GHz
Range of 9 kHz to 40GHz

2. SUMMARY

2.1. General Remarks

Date of receipt of test sample	:	Dec. 04, 2024
Testing commenced on	:	Dec. 04, 2024
Testing concluded on	:	Dec. 10, 2024

2.2. Product Description

Name of EUT	Aluminum Mechanical keyboard
Model Number	TF-GK02
List Model:	N/A
Power Rating	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
Sample ID:	HTT202412157-1#(Engineer sample) HTT202412157-2#(Normal sample)
Operation frequency	2402-2480MHz
Modulation	GFSK
Antenna Type	PCB antenna
Antenna Gain	1.68 dBi

2.3. Equipment Under Test

Power supply system utilised

Power supply voltage	:	☐ 230V / 50 Hz	☐ 120V / 60Hz
		☐ 12 V DC	☐ 24 V DC
		☒ Other (specified in blank below)	

DC 3.7V From Battery and DC 5V From External Circuit

2.4. Short description of the Equipment under Test (EUT)

This is a Aluminum Mechanical keyboard

For more details, refer to the user's manual of the EUT.

2.5. EUT operation mode

The Applicant use Key to control the EUT for staying in continuous transmitting and receiving mode for testing .There is 79 channels provided to the EUT. Channel Low,Mid and High was selected to test.

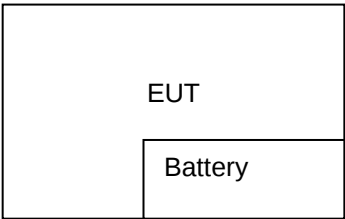
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2402MHz	21	2422MHz	41	2442MHz	61	2462MHz
2	2403MHz	22	2423MHz	42	2443MHz	62	2463MHz
3	2404MHz	23	2424MHz	43	2444MHz	63	2464MHz

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		

Test frequency:

Channel	Frequency (MHz)
Low	2402
Mid	2441
High	2480

2.6. Block Diagram of Test Setup



2.7. Modifications

No modifications were implemented to meet testing criteria.

3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Shenzhen HTT Technology Co.,Ltd.

1F, Building B, Huafeng International Robotics Industrial Park, Hangcheng Road,Nanchang Community, Xixiang Street, Bao'an District, Shenzhen, Guangdong, China

3.2. 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 listed 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.

3.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Radiated Emission:

Temperature:	23 ° C
Humidity:	48 %
Atmospheric pressure:	950-1050mbar

AC Main Conducted testing:

Temperature:	24 ° C
Humidity:	45 %
Atmospheric pressure:	950-1050mbar

Conducted testing:

Temperature:	24 ° C
Humidity:	45 %
Atmospheric pressure:	950-1050mbar

3.4. Summary of measurement results

FCC PART 15.249		
FCC Part 15.249(a)	Field Strength of Fundamental	PASS
FCC Part 15.209	Spurious Emission	PASS
FCC Part 15.209	Band edge	PASS
FCC Part 15.215(c)	20dB bandwidth	PASS
FCC Part 15.207	Conducted Emission	PASS
FCC Part 15.203	Antenna Requirement	PASS

3.5. Statement of the measurement uncertainty

Measurement Uncertainty

Conducted Emission Expanded Uncertainty	=	2.68 dB, k=2
Radiated emission expanded uncertainty(9kHz-30MHz)	=	2.54dB, k=2
Radiated emission expanded uncertainty(30MHz-1000MHz)	=	4.37 dB, k=2
Radiated emission expanded uncertainty(1~18GHz)	=	5.40 dB, k=2
Radiated emission expanded uncertainty(18-40GHz)	=	5.45 dB, k=2

3.6. Equipments Used during the Test

Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	Shenzhen C.R.T technology co., LTD	9*6*6	HTT-E028	Aug. 10 2024	Aug. 09 2027
2	Control Room	Shenzhen C.R.T technology co., LTD	4.8*3.5*3.0	HTT-E030	Aug. 10 2024	Aug. 09 2027
3	EMI Test Receiver	Rohde&Schwarz	ESCI7	HTT-E022	Apr. 26 2024	Apr. 25 2025
4	Spectrum Analyzer	Rohde&Schwarz	FSP	HTT-E037	Apr. 26 2024	Apr. 25 2025
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
9	Composite logarithmic antenna	Schwarzbeck	VULB 9168	HTT-E017	May. 21 2024	May. 20 2025
10	Horn Antenna	Schwarzbeck	BBHA9120D	HTT-E016	May. 20 2024	May. 19 2025
11	Loop Antenna	Zhinan	ZN30900C	HTT-E039	Apr. 26 2024	Apr. 25 2025
12	Horn Antenna	Beijing Hangwei Dayang	OBH100400	HTT-E040	Apr. 26 2024	Apr. 25 2025
13	low frequency Amplifier	Sonoma Instrument	310	HTT-E015	Apr. 26 2024	Apr. 25 2025
14	high-frequency Amplifier	HP	8449B	HTT-E014	Apr. 26 2024	Apr. 25 2025
15	Variable frequency power supply	Shenzhen Anbiao Instrument Co., Ltd	ANB-10VA	HTT-082	Apr. 26 2024	Apr. 25 2025
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	Artificial Mains	Rohde & Schwarz	ENV-216	HTT-E038	May. 23 2024	May. 22 2025
19	Cable Line	Robinson	Z302S-NJ-BNCJ-1.5M	HTT-E001	Apr. 26 2024	Apr. 25 2025
20	Attenuator	Robinson	6810.17A	HTT-E007	Apr. 26 2024	Apr. 25 2025
21	Variable frequency power	Shenzhen Yanghong	YF-650 (5KVA)	HTT-E032	Apr. 26 2024	Apr. 25 2025

	supply	Electric Co., Ltd				
22	Control Room	Shenzhen C.R.T technology co., LTD	8*4*3.5	HTT-E029	Aug. 10 2024	Aug. 09 2027
23	DC power supply	Agilent	E3632A	HTT-E023	Apr. 26 2024	Apr. 25 2025
24	EMI Test Receiver	Agilent	N9020A	HTT-E024	Apr. 26 2024	Apr. 25 2025
25	Analog signal generator	Agilent	N5181A	HTT-E025	Apr. 26 2024	Apr. 25 2025
26	Vector signal generator	Agilent	N5182A	HTT-E026	Apr. 26 2024	Apr. 25 2025
27	Power sensor	Keysight	U2021XA	HTT-E027	Apr. 26 2024	Apr. 25 2025
28	Temperature and humidity meter	Shenzhen Anbiao Instrument Co., Ltd	TH10R	HTT-074	Apr. 28 2024	Apr. 27 2025
29	Radiated Emission Test Software	Farad	EZ-EMC	N/A	N/A	N/A
30	Conducted Emission Test Software	Farad	EZ-EMC	N/A	N/A	N/A
31	RF Test Software	panshanrf	TST	N/A	N/A	N/A

Note: The Cal.Interval was one year.

4. TEST CONDITIONS AND RESULTS

4.1. AC Power Conducted Emission

TEST CONFIGURATION



TEST PROCEDURE

- 1, The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10.
- 2, Support equipment, if needed, was placed as per ANSI C63.10.
- 3, All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
- 4, If a EUT received DC power from the USB Port of Notebook PC, the PC's adapter received power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
- 5, All support equipments received AC power from a second LISN, if any.
- 6, The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7, Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.

AC Power Conducted Emission Limit

For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following :

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

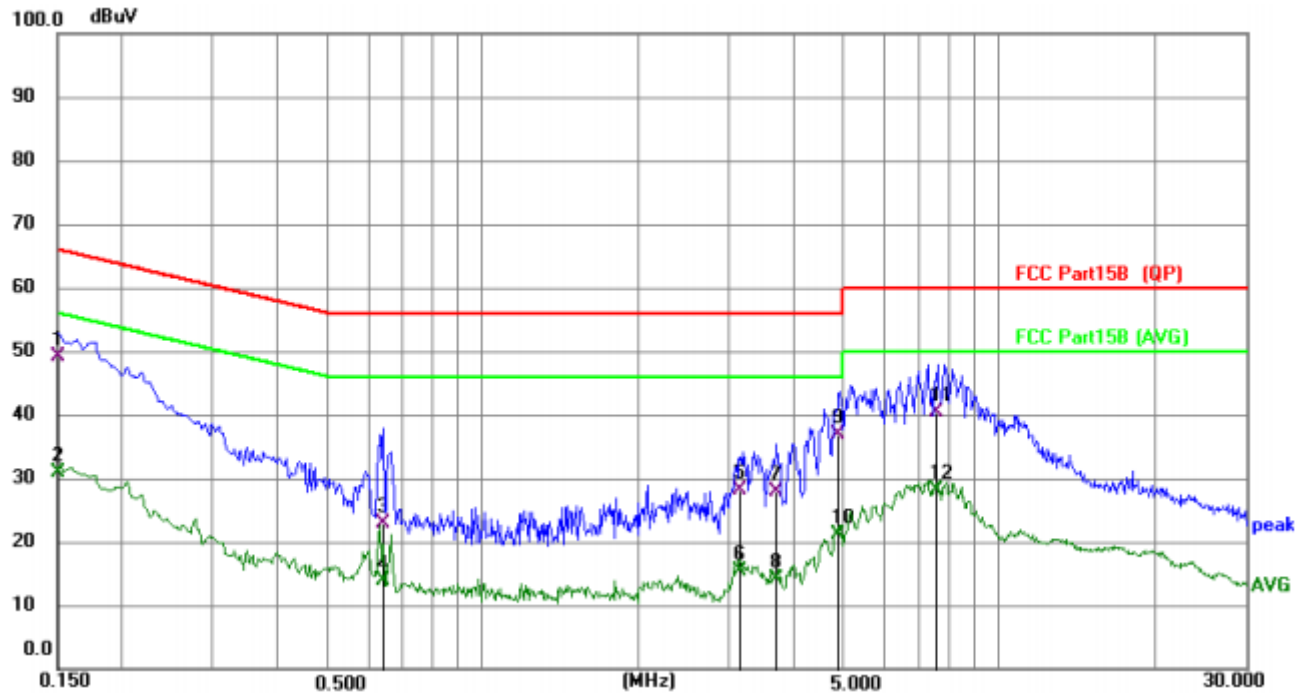
* Decreases with the logarithm of the frequency.

TEST RESULTS

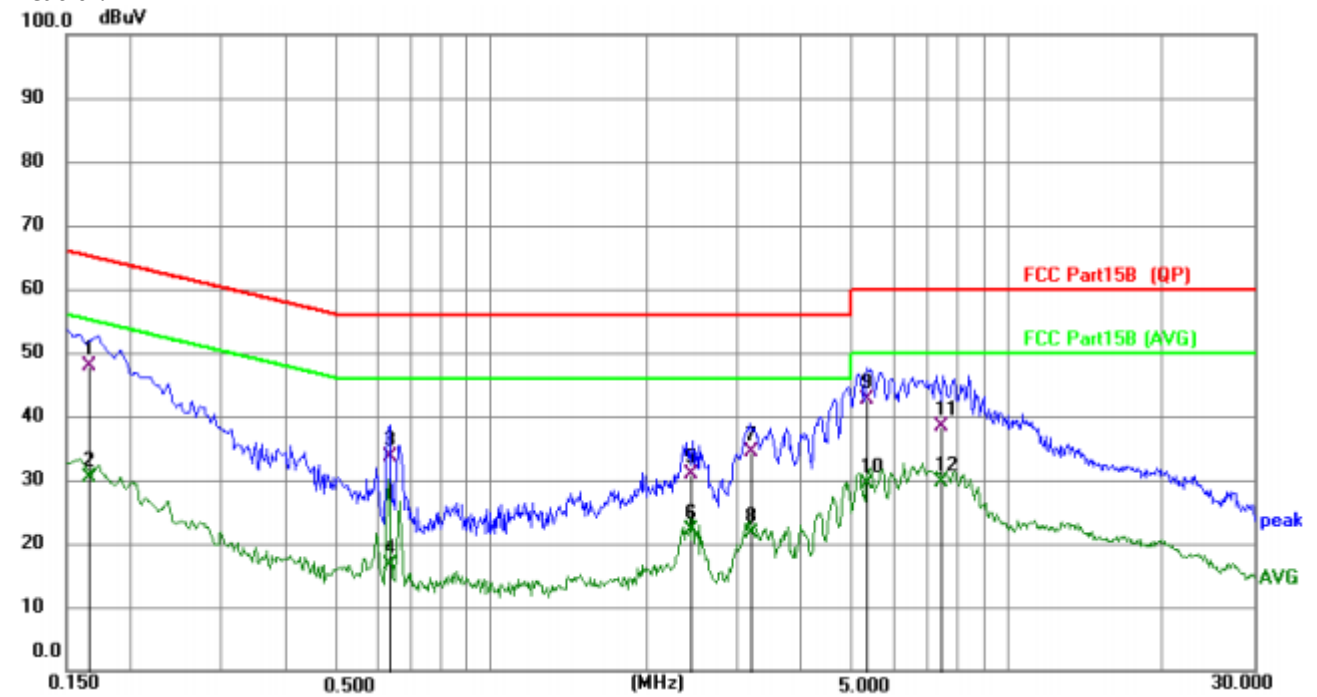
Remark: Both high and low voltages have been tested to show only the worst low voltage test data.

Measurement data:

Line:



No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	
		MHz	Level	Factor	ment			
				dB	dBuV	dBuV	dB	Detector
1	*	0.1510	39.02	10.16	49.18	65.94	-16.76	QP
2		0.1510	20.60	10.16	30.76	55.94	-25.18	AVG
3		0.6404	12.61	10.32	22.93	56.00	-33.07	QP
4		0.6404	3.45	10.32	13.77	46.00	-32.23	AVG
5		3.1560	17.52	10.51	28.03	56.00	-27.97	QP
6		3.1560	4.90	10.51	15.41	46.00	-30.59	AVG
7		3.7094	17.36	10.57	27.93	56.00	-28.07	QP
8		3.7094	3.52	10.57	14.09	46.00	-31.91	AVG
9		4.9119	26.21	10.61	36.82	56.00	-19.18	QP
10		4.9119	10.53	10.61	21.14	46.00	-24.86	AVG
11		7.5557	29.74	10.63	40.37	60.00	-19.63	QP
12		7.5557	17.55	10.63	28.18	50.00	-21.82	AVG

Neutral:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz		dB	dBuV	dBuV	dB	Detector
1	*	0.1662	37.82	10.18	48.00	65.15	-17.15	QP
2		0.1662	20.19	10.18	30.37	55.15	-24.78	AVG
3		0.6391	23.20	10.36	33.56	56.00	-22.44	QP
4		0.6391	6.36	10.36	16.72	46.00	-29.28	AVG
5		2.4512	20.38	10.42	30.80	56.00	-25.20	QP
6		2.4512	11.77	10.42	22.19	46.00	-23.81	AVG
7		3.1838	23.91	10.46	34.37	56.00	-21.63	QP
8		3.1838	11.22	10.46	21.68	46.00	-24.32	AVG
9		5.3713	32.09	10.59	42.68	60.00	-17.32	QP
10		5.3713	18.85	10.59	29.44	50.00	-20.56	AVG
11		7.5088	27.75	10.72	38.47	60.00	-21.53	QP
12		7.5088	18.82	10.72	29.54	50.00	-20.46	AVG

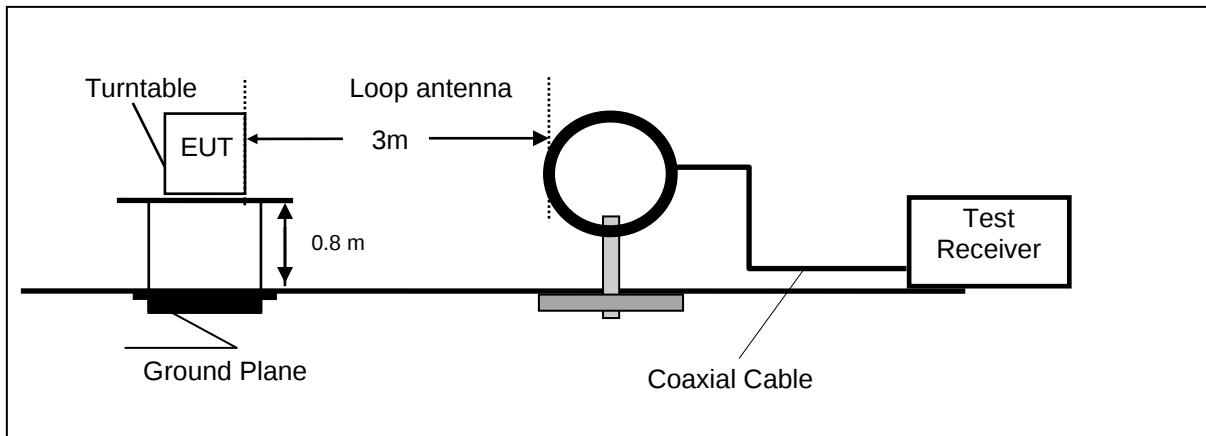
Notes:

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

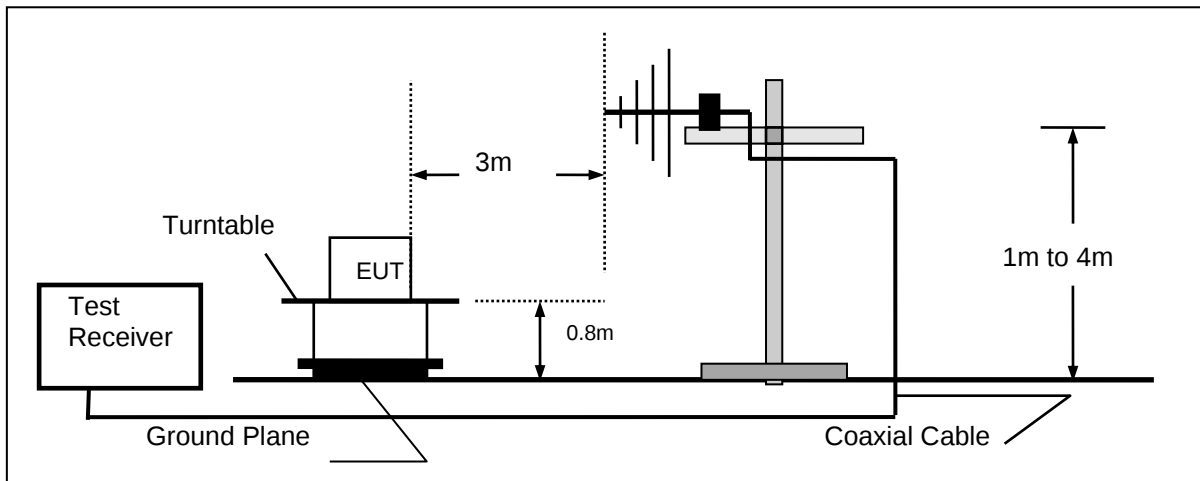
4.2. Radiated Emission and Band Edges

TEST CONFIGURATION

Frequency range 9 KHz – 30MHz



Frequency range 30MHz – 1000MHz



Frequency range above 1GHz-25GHz



TEST PROCEDURE

1. The EUT was placed on a turn table which is 0.8m above ground plane when testing frequency range 9 KHz –25GHz.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0°C to 360°C to acquire the highest emissions from EUT.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.
5. The EUT minimum operation frequency was 26MHz and maximum operation frequency was 1910MHz.so radiated emission test frequency band from 9KHz to 25GHz.
6. The distance between test antenna and EUT as following table states:

Test Frequency range	Test Antenna Type	Test Distance
9KHz-30MHz	Active Loop Antenna	3
30MHz-1GHz	Ultra-Broadband Antenna	3
1GHz-18GHz	Double Ridged Horn Antenna	3
18GHz-25GHz	Horn Antenna	1

7. Setting test receiver/spectrum as following table states:

Test Frequency range	Test Receiver/Spectrum Setting	Detector
9KHz-150KHz	RBW=200Hz/VBW=3KHz, Sweep time=Auto	QP
150KHz-30MHz	RBW=9KHz/VBW=100KHz, Sweep time=Auto	QP
30MHz-1GHz	RBW=120KHz/VBW=1000KHz, Sweep time=Auto	QP
1GHz-40GHz	Peak Value: RBW=1MHz/VBW=3MHz, Sweep time=Auto Average Value: RBW=1MHz/VBW=10Hz, Sweep time=Auto	Peak

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

$$\text{Transd}=AF +CL-AG$$

RADIATION LIMIT

According 15.249, the field strength of emissions from intentional radiators operated within 2400MHz-2483.5 MHz shall not exceed 94dBμV/m (50mV/m):

FCC PART 15.249(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a)

Radiated emission limits

Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
0.009-0.49	3	$20\log(2400/F(\text{KHz}))+40\log(300/3)$	$2400/F(\text{KHz})$
0.49-1.705	3	$20\log(24000/F(\text{KHz}))+40\log(30/3)$	$24000/F(\text{KHz})$
1.705-30	3	$20\log(30)+40\log(30/3)$	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

TEST RESULTS

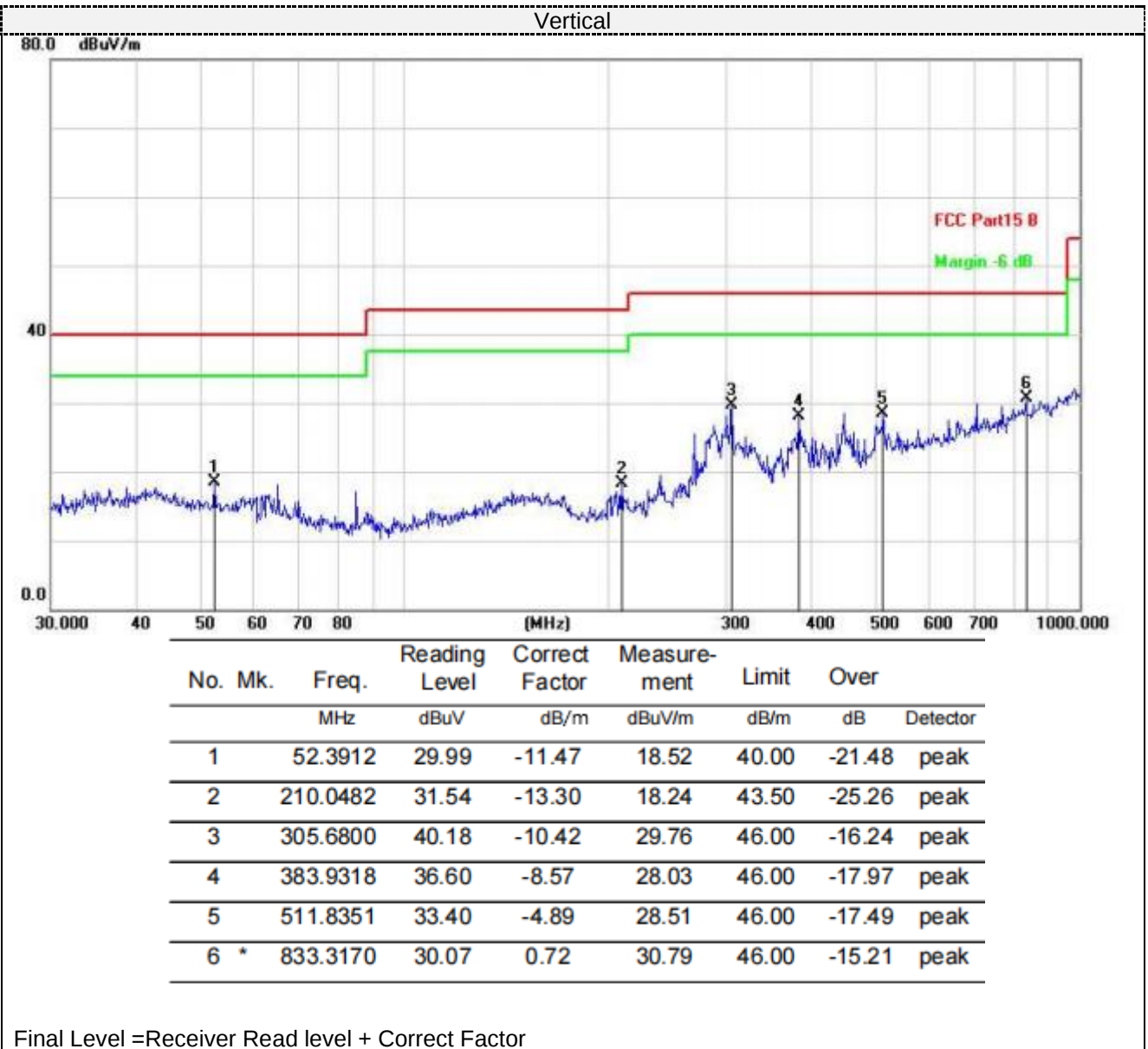
Remark:

1. This test was performed with EUT in X, Y, Z position and the worse case was found when EUT in X position.
2. Both modes of GFSK were tested at Low, Middle, and High channel and recorded worst mode at GFSK
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.

For 30MHz-1GHz**Horizontal**

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dB/m	Over dB	Detector
1		62.4313	32.82	-12.03	20.79	40.00	-19.21	peak
2		117.7724	32.42	-13.27	19.15	43.50	-24.35	peak
3		256.5210	43.44	-11.44	32.00	46.00	-14.00	peak
4	*	287.9904	46.75	-10.98	35.77	46.00	-10.23	peak
5		447.9821	34.34	-6.37	27.97	46.00	-18.03	peak
6		768.7481	30.62	-0.31	30.31	46.00	-15.69	peak

Final Level = Receiver Read level + Correct Factor



For 1GHz to 25GHz

Frequency(MHz):			2402		Polarity:		HORIZONTAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2402.00	87.55	PK	114	26.45	87.75	27.5	5	32.7	-0.2
2402.00	76.03	AV	94	17.97	76.23	27.5	5	32.7	-0.2
4804.00	59.63	PK	74	14.37	53.93	31	6.5	31.8	5.7
4804.00	44.16	AV	54	9.84	38.46	31	6.5	31.8	5.7
7206.00	53.93	PK	74	20.07	41.28	36	8.15	31.5	12.65
7206.00	45.01	AV	54	8.99	32.36	36	8.15	31.5	12.65

Frequency(MHz):			2402		Polarity:		VERTICAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2402.00	87.04	PK	114	26.96	87.24	27.5	5	32.7	-0.2
2402.00	76.97	AV	94	17.03	77.17	27.5	5	32.7	-0.2
4804.00	60.04	PK	74	13.96	54.34	31	6.5	31.8	5.7
4804.00	45.58	AV	54	8.42	39.88	31	6.5	31.8	5.7
7206.00	54.45	PK	74	19.55	41.80	36	8.15	31.5	12.65
7206.00	44.90	AV	54	9.10	32.25	36	8.15	31.5	12.65

Frequency(MHz):			2441		Polarity:		HORIZONTAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2441.00	86.94	PK	114	27.06	86.89	27.55	5.1	32.6	0.05
2441.00	76.77	AV	94	17.23	76.72	27.55	5.1	32.6	0.05
4882.00	61.38	PK	74	12.62	55.22	31.2	6.61	31.65	6.16
4882.00	43.68	AV	54	10.32	37.52	31.2	6.61	31.65	6.16
7323.00	53.16	PK	74	20.84	40.21	36.2	8.23	31.48	12.95
7323.00	46.05	AV	54	7.95	33.10	36.2	8.23	31.48	12.95

Frequency(MHz):			2441		Polarity:		VERTICAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2441.00	89.24	PK	114	24.76	89.19	27.55	5.1	32.6	0.05
2441.00	76.72	AV	94	17.28	76.67	27.55	5.1	32.6	0.05
4882.00	62.12	PK	74	11.88	55.96	31.2	6.61	31.65	6.16
4882.00	44.60	AV	54	9.40	38.44	31.2	6.61	31.65	6.16
7323.00	54.71	PK	74	19.29	41.76	36.2	8.23	31.48	12.95
7323.00	44.25	AV	54	9.75	31.30	36.2	8.23	31.48	12.95

Frequency(MHz):			2480		Polarity:		HORIZONTAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2480.00	89.08	PK	114	24.92	88.84	27.6	5.14	32.5	0.24
2480.00	47.00	AV	94	47.00	46.76	27.6	5.14	32.5	0.24
4960.00	61.47	PK	74	12.53	54.81	31.4	6.76	31.5	6.66
4960.00	42.58	AV	54	11.42	35.92	31.4	6.76	31.5	6.66
7440.00	53.86	PK	74	20.14	40.56	36.4	8.35	31.45	13.3
7440.00	46.60	AV	54	7.40	33.30	36.4	8.35	31.45	13.3

Frequency(MHz):			2480		Polarity:		VERTICAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2480.00	91.20	PK	114	22.80	90.96	27.6	5.14	32.5	0.24
2480.00	77.75	AV	94	16.25	77.51	27.6	5.14	32.5	0.24
4960.00	63.46	PK	74	10.54	56.80	31.4	6.76	31.5	6.66
4960.00	43.37	AV	54	10.63	36.71	31.4	6.76	31.5	6.66
7440.00	56.50	PK	74	17.50	43.20	36.4	8.35	31.45	13.3
7440.00	46.71	AV	54	7.29	33.41	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.

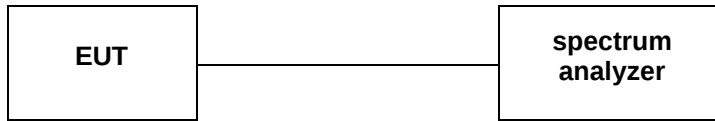
Results of Band Edges Test (Radiated)

Operation Mode: GFSK

Frequency(MHz):			2402		Polarity:		HORIZONTAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2390.00	60.18	PK	74	13.82	61.57	27.2	4.31	32.9	-1.39
2390.00	44.83	AV	54	9.17	46.22	27.2	4.31	32.9	-1.39
Frequency(MHz):			2402		Polarity:		VERTICAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2390.00	58.64	PK	74	15.36	60.03	27.2	4.31	32.9	-1.39
2390.00	45.72	AV	54	8.28	47.11	27.2	4.31	32.9	-1.39
Frequency(MHz):			2480		Polarity:		HORIZONTAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2483.50	56.23	PK	74	17.77	57.16	27.4	4.47	32.8	-0.93
2483.50	44.84	AV	54	9.16	45.77	27.4	4.47	32.8	-0.93
Frequency(MHz):			2480		Polarity:		VERTICAL		
Frequency (MHz)	Emission Level (dBuV/m)		Limit (dBuV/m)	Margin (dB)	Raw Value (dBuV)	Antenna Factor (dB/m)	Cable Factor (dB)	Pre-amplifier (dB)	Correction Factor (dB/m)
2483.50	54.58	PK	74	19.42	55.51	27.4	4.47	32.8	-0.93
2483.50	44.29	AV	54	9.71	45.22	27.4	4.47	32.8	-0.93

4.3. 20dB Bandwidth Measurement

TEST CONFIGURATION



TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 30KHz RBW and 300KHz VBW.

The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

LIMIT

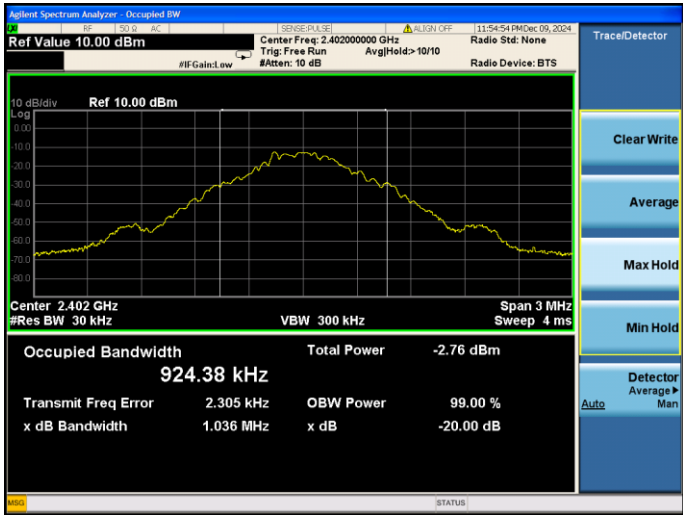
N/A

TEST RESULTS

Modulation	Channel	20dB bandwidth (MHz)	Result
GFSK	Low	1.036	PASS
	Mid	1.043	
	High	1.037	

Note: 1.The test results including the cable lose.

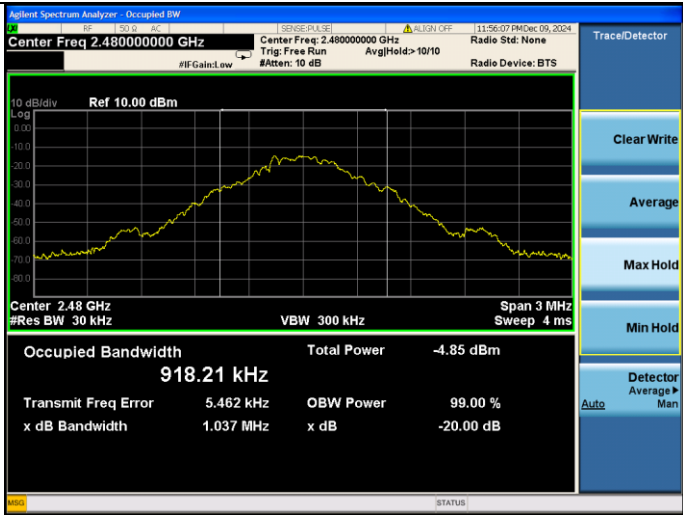
GFSK



Low



Mid



High

4.4. 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.

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

Antenna Information

The maximum gain of antenna was 1.68 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.

5. Test Setup Photos of the EUT

Reference to the **appendix I** for details

6. Test Photos of the EUT

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

.....**End of Report**.....