FCC REPORT
(Bluetooth)

Applicant:	Qbic Technology Co., Ltd
Address of Applicant:	26F.-12, No.99, Sec. 1, Xintai 5th Rd., Xizhi Dist., New Taipei City 22175, Taiwan (R.O.C.)
Equipment Under Test (EUT)	
Product Name:	Panel PC
Model No.:	TD-1050 PRO
Trade mark:	Qbic
FCC ID:	2AF82-TD1050HPRO
Applicable standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.247
Date of sample receipt:	19 Jan., 2022
Date of Test:	19 Jan., to 03 Mar., 2022
Date of report issued:	13 Apr., 2022
Test Result:	PASS *

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

2 Version

Version No.	Date	Description
00	*03 Mar., 2022*	*Original*
01	*22 Mar., 2022*	*1. Updated Page 4/7/8/26~32.*
02	*30 Mar., 2022*	*1. Updated Page 12~23/26~33.*
03	*13 Apr., 2022*	*1. Updated Page29/33.*

Tested by: Mike.ou ***Date:*** *13 Apr., 2022*

Test Engineer

Reviewed by: Winner Zhang ***Date:*** *13 Apr., 2022*

Project Engineer

3 Contents

Page

1 COVER PAGE 1

2 VERSION 2

3 CONTENTS 3

4 TEST SUMMARY 4

5 GENERAL INFORMATION 5

5.1 CLIENT INFORMATION 5
5.2 GENERAL DESCRIPTION OF E.U.T. 5
5.3 TEST ENVIRONMENT AND MODE 6
5.4 DESCRIPTION OF SUPPORT UNITS 6
5.5 MEASUREMENT UNCERTAINTY 6
5.6 ADDITIONS TO, DEVIATIONS, OR EXCLUSIONS FROM THE METHOD 6
5.7 LABORATORY FACILITY 6
5.8 LABORATORY LOCATION 6
5.9 TEST INSTRUMENTS LIST 7

6 TEST RESULTS AND MEASUREMENT DATA 8

6.1 ANTENNA REQUIREMENT 8
6.2 CONDUCTED OUTPUT POWER 9
6.2.1 Re-test statement 9
6.2.2 Test Results 9
6.3 EMISSIONS IN RESTRICTED FREQUENCY BANDS 11
6.4 SPURIOUS EMISSION 24
6.4.1 Radiated Emission Method 24

7 APPENDIX 34

8 TEST SETUP PHOTOGRAPH-DSS 35

8.1 TEST SETUP OF JIANYAN TESTING GROUP SHENZHEN CO., LTD. 35
8.2 TEST SETUP OF SGS-CSTC STANDARDS TECHNICAL SERVICES, CO LTD. SHENZHEN BRANCH. 36

4 Test Summary

Test Items	Section in CFR 47	Result
Antenna Requirement	15.203 & 15.247 (b)	Pass
AC Power Line Conducted Emission	15.207	Pass[1]
Conducted Peak Output Power	15.247 (b)(1)	Pass[2]
20dB Occupied Bandwidth	15.247 (a)(1)	Pass[1]
Carrier Frequencies Separation	15.247 (a)(1)	Pass[1]
Hopping Channel Number	15.247 (a)(1)	Pass[1]
Dwell Time	15.247 (a)(1)	Pass[1]
Conducted Band Edge	15.247(d)	Pass[1]
Emissions in Restricted Frequency Bands	15.205 & 15.209	Pass[2]
Conducted Spurious Emission	15.247(d)	Pass[1]
Radiated Spurious Emission	15.205 & 15.209	Pass[2]

Remark:

1. *Pass[1]: Items data are refer from the original report issued by SGS-CSTC Standards Technical Services, Co., Ltd.Shenzhen Branch.(Date of Test: 2019/3/14-2019/5/9).The detailed data refer to Appendix- Bluetooth*
2. *Pass[2]: These items are tested by JianYan Testing Group Shenzhen Co., Ltd.*
3. *The cable insertion loss used by "RF Output Power" and other conduction measurement items is 0.5dB (provided by the customer).*

Test Method:	*ANSI C63.10-2013* *KDB 558074 D01 15.247 Meas Guidance v05r02*

5 General Information

5.1 Client Information

Applicant:	Qbic Technology Co., Ltd
Address:	26F.-12, No.99, Sec. 1, Xintai 5th Rd., Xizhi Dist., New Taipei City 22175, Taiwan (R.O.C.)
Manufacturer:	Qbic Technology Co., Ltd
Address:	26F.-12, No.99, Sec. 1, Xintai 5th Rd., Xizhi Dist., New Taipei City 22175, Taiwan (R.O.C.)
Factory:	TPV Electronics(Fujian) Co., Ltd.
Address:	Rongqiao Economic and Technological Development Zone, Fuqing City, Fujian Province, P.R.China

5.2 General Description of E.U.T.

Product Name:	Panel PC
Model No.:	TD-1050 PRO
Operation Frequency:	2402MHz~2480MHz
Transfer rate:	1/2/3 Mbits/s
Number of channel:	79
Modulation type:	GFSK, π/4-DQPSK, 8DPSK
Modulation technology:	FHSS
Antenna Type:	Integrated Antenna
Antenna gain:	1.1 dBi
Power supply:	☒ AC/DC Adapter
Test Sample Condition:	The test samples were provided in good working order with no visible defects.

Operation Frequency each of channel for GFSK, π/4-DQPSK, 8DPSK							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
0	2402MHz	20	2422MHz	40	2442MHz	60	2462MHz
1	2403MHz	21	2423MHz	41	2443MHz	61	2463MHz
2	2404MHz	22	2424MHz	42	2444MHz	62	2464MHz
3	2405MHz	23	2425MHz	43	2445MHz	63	2465MHz
4	2406MHz	24	2426MHz	44	2446MHz	64	2466MHz
5	2407MHz	25	2427MHz	45	2447MHz	65	2467MHz
…	…	…	…	…	…	…	…
15	2417MHz	35	2437MHz	55	2457MHz	75	2477MHz
16	2418MHz	36	2438MHz	56	2458MHz	76	2478MHz
17	2419MHz	37	2439MHz	57	2459MHz	77	2479MHz
18	2420MHz	38	2440MHz	58	2460MHz	78	2480MHz
19	2421MHz	39	2441MHz	59	2461MHz		
Remark: Channel 0, 39 &78 selected for GFSK, π/4-DQPSK and 8DPSK.							

5.3 Test environment and mode

Operating Environment:	
Temperature:	24.0 °C
Humidity:	54 % RH
Atmospheric Pressure:	1010 mbar
Test Modes:	
Non-hopping mode:	Keep the EUT in continuous transmitting mode with worst case data rate.
Hopping mode:	Keep the EUT in hopping mode.
Remark	GFSK (1 Mbps) is the worst case mode.
Radiated Emission: The sample was placed 0.8m (below 1GHz)/1.5m (above 1GHz) above the ground plane of 3m chamber*. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.	

5.4 Description of Support Units

The EUT has been tested as an independent unit.

5.5 Measurement Uncertainty

Parameter	Expanded Uncertainty (Confidence of 95%)
Radiated Emission (9kHz ~ 30MHz electric field) for 3m SAC	3.13 dB
Radiated Emission (9kHz ~ 30MHz magnetic field) for 3m SAC	3.13 dB
Radiated Emission (30MHz ~ 1GHz) for 3m SAC	4.45 dB
Radiated Emission (1GHz ~ 18GHz) for 3m SAC	5.34 dB
Radiated Emission (18GHz ~ 40GHz) for 3m SAC	5.34 dB

5.6 Additions to, deviations, or exclusions from the method

No

5.7 Laboratory Facility

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

- **FCC - Designation No.: CN1211**

JianYan Testing Group Shenzhen Co., Ltd. has been accredited as a testing laboratory by FCC(Federal Communications Commission). The test firm Registration No. is 727551.

- **ISED – CAB identifier.: CN0021**

The 3m Semi-anechoic chamber and 10m Semi-anechoic chamber of JianYan Testing Group Shenzhen Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

- **CNAS - Registration No.: CNAS L15527**

JianYan Testing Group Shenzhen Co., Ltd. is accredited to ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration laboratories for the competence of testing. The Registration No. is CNAS L15527.

- **A2LA - Registration No.: 4346.01**

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: https://portal.a2la.org/scopepdf/4346-01.pdf

5.8 Laboratory Location

JianYan Testing Group Shenzhen Co., Ltd.
Address: No.101, Building 8, Innovation Wisdom Port, No.155 Hongtian Road, Huangpu Community, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, People's Republic of China.
Tel: +86-755-23118282, Fax: +86-755-23116366
Email: info-JYTee@lets.com, Website: http://jyt.lets.com

5.9 Test Instruments list

Radiated Emission:					
Test Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Cal.Date (mm-dd-yy)**	**Cal.Due date (mm-dd-yy)**
3m SAC	ETS	RFD-100	Q1984	04-14-2021	04-13-2024
BiConiLog Antenna	SCHWARZBECK	VULB9163	9163-1246	03-07-2021	03-06-2022
Biconical Antenna	SCHWARZBECK	VUBA 9117	9117#359	06-17-2021	06-17-2022
Horn Antenna	SCHWARZBECK	BBHA9120D	912D-916	03-07-2021	03-06-2022
Broad-Band Horn Antenna	SCHWARZBECK	BBHA9170	1067	04-02-2021	04-01-2022
Broad-Band Horn Antenna	SCHWARZBECK	BBHA9170	1068	04-02-2021	04-01-2022
EMI Test Receiver	Rohde & Schwarz	ESRP7	101070	03-03-2021	03-02-2022
				02-17-2022	02-16-2023
Spectrum analyzer	Rohde & Schwarz	FSP30	101454	03-03-2021	03-02-2022
				02-17-2022	02-16-2023
Spectrum analyzer	Keysight	N9010B	MY60240202	10-27-2021	10-26-2022
Band Reject Filter Group	Tonscend	JS0806	21B8060367	04-06-2021	04-05-2022
Low Pre-amplifier	SCHWARZBECK	BBV9743B	00305	03-07-2021	03-06-2022
High Pre-amplifier	SKET	LNPA_0118G-50	MF280208233	03-07-2021	03-06-2022
Cable	Qualwave	JYT3M-1G-NN-8M	JYT3M-1	03-07-2021	03-06-2022
Cable	Qualwave	JYT3M-18G-NN-8M	JYT3M-2	03-07-2021	03-06-2022
Cable	Qualwave	JYT3M-1G-BB-5M	JYT3M-3	03-07-2021	03-06-2022
Cable	Bost	JYT3M-40G-SS-8M	JYT3M-4	04-02-2021	04-01-2022
EMI Test Software	Tonscend	TS+	Version:3.0.0.1		

Conducted method:					
Test Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Date (mm-dd-yy)**	**Cal. Due date (mm-dd-yy)**
Spectrum Analyzer	Keysight	N9010B	MY60240202	10-27-2021	10-26-2022
Power Detector Box	MWRF-test	MW100-PSB	MW201020JYT	11-19-2021	11-18-2022
RF Control Box	MWRF-test	MW100-RFCB	MW200927JYT	N/A	N/A
DC Power Supply	Keysight	E3642A	MY60296194	11-27-2020	11-26-2023
Test Software	MWRF-tes	MTS 8310	Version: 2.0.0.0		

6 Test results and measurement data

6.1 Antenna Requirement

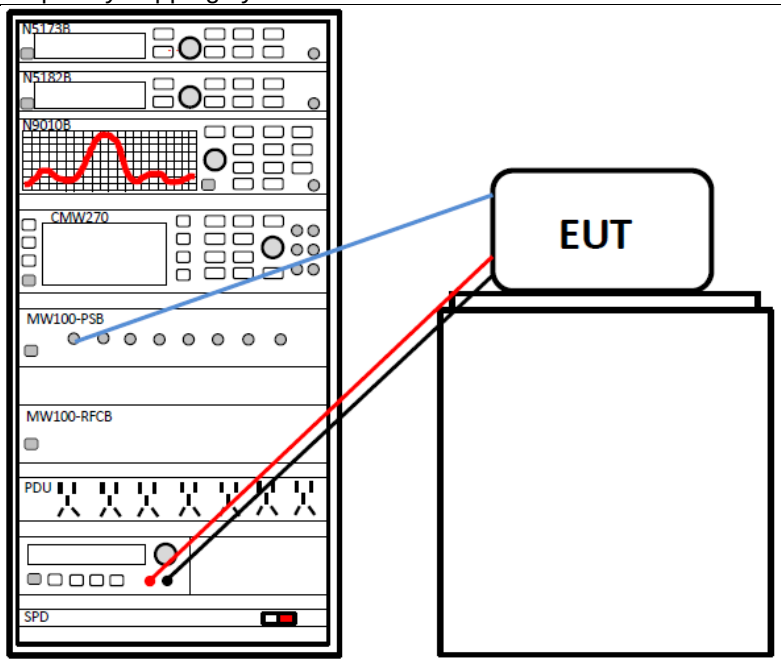
Standard requirement:	FCC Part 15 C Section 15.203 & 247(b)
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a 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. 15.247(b) (4) requirement: (4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.	
E.U.T Antenna:	
The Bluetooth antenna is an Integrated Antenna which permanently attached, and the best case gain of the antenna is 1.1 dBi.	

6.2 Conducted Output Power

6.2.1 Re-test statement

Re-test statement: The EUT is operating at the same power level with the original testing of SGS-CSTC Standards Technical Services, Co Ltd. Shenzhen Branch.

6.2.2 Test Results

Test Requirement:	FCC Part 15 C Section 15.247 (b)(1)
Receiver setup:	RBW=1MHz, VBW=3MHz, Detector=Peak (If 20dB BW ≤1 MHz) RBW=2MHz, VBW=6MHz, Detector=Peak (If 20dB BW > 1 MHz and < 3MHz)
Limit:	For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.
Test setup:	
Test Instruments:	Refer to section 5.9 for details
Test mode:	Non-hopping mode
Test results:	Pass

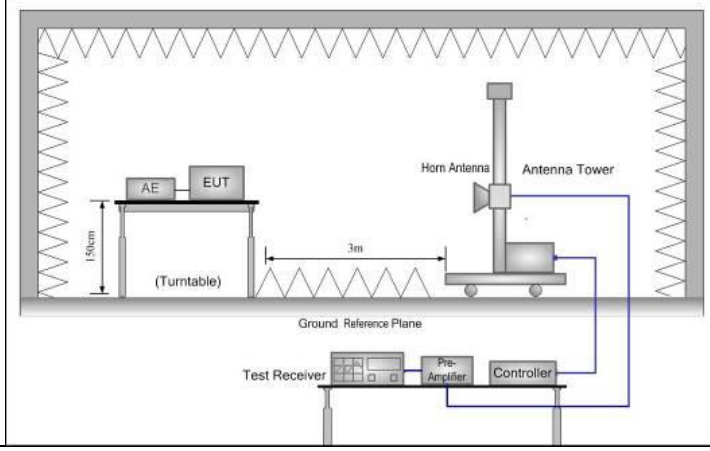
Measurement Data:

Mode	Test Channel	The Original Reports Level [dBm]	Re-Test Reports Level [dBm]	Power level
8DPSK	Lowest	10.05	10.43	7
	Middle	9.80	10.29	7
	Highest	9.47	9.58	7

Remark:

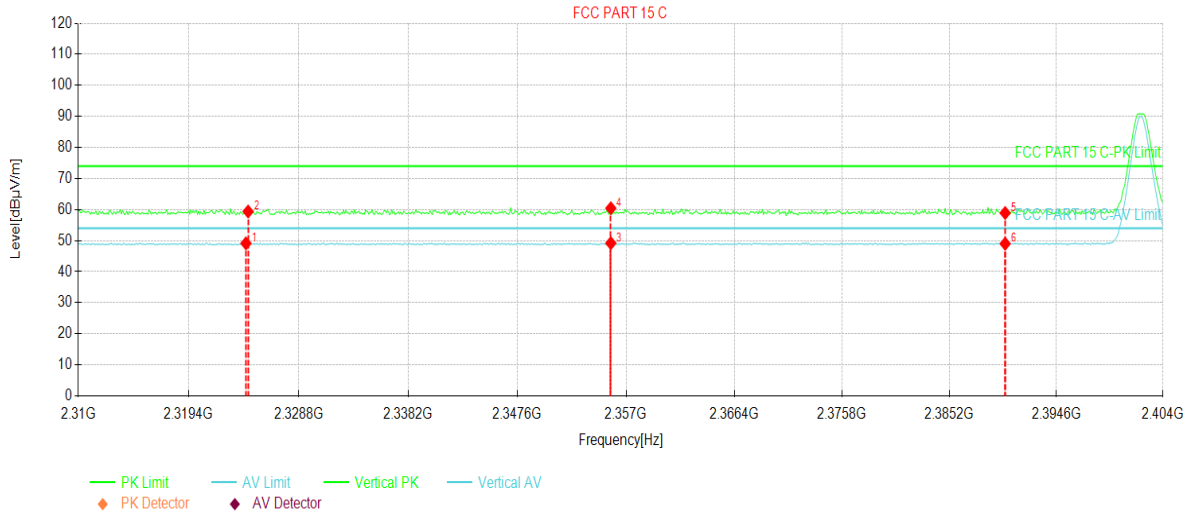
	The Original Reports	Re-Test Reports
File name:	test report BT	Test Report BT rev1
Test location:	SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch	JianYan Testing Group Shenzhen Co., Ltd.
The output power is re-test at JianYan Testing Group Shenzhen Co., Ltd.		

6.3 Emissions in Restricted Frequency Bands

<table>
<tr><td>Test Requirement:</td><td colspan="5">FCC Part 15 C Section 15.209 and 15.205</td></tr>
<tr><td>Test Frequency Range:</td><td colspan="5">2310 MHz to 2390 MHz and 2483.5 MHz to 2500 MHz</td></tr>
<tr><td>Test Distance:</td><td colspan="5">3m</td></tr>
<tr><td rowspan="3">Receiver setup:</td><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Remark</td></tr>
<tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr>
<tr><td>RMS</td><td>1MHz</td><td>3MHz</td><td>Average Value</td></tr>
<tr><td rowspan="3">Limit:</td><td colspan="2">Frequency</td><td colspan="2">Limit (dBuV/m @3m)</td><td>Remark</td></tr>
<tr><td colspan="2" rowspan="2">Above 1GHz</td><td colspan="2">54.00</td><td>Average Value</td></tr>
<tr><td colspan="2">74.00</td><td>Peak Value</td></tr>
<tr><td>Test setup:</td><td colspan="5"> 
</td></tr>
<tr><td>Test Procedure:</td><td colspan="5">1. The EUT was placed on the top of a rotating table 1.5meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
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.
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.
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.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
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.</td></tr>
<tr><td>Test Instruments:</td><td colspan="5">Refer to section 5.9 for details</td></tr>
<tr><td>Test mode:</td><td colspan="5">Non-hopping mode</td></tr>
<tr><td>Test results:</td><td colspan="5">Passed</td></tr>
</table>

GFSK Mode:

Product Name:	Panel PC	**Product Model:**	TD-1050 PRO
Test By:	Mike	**Test mode:**	DH1 Tx mode
Test Channel:	Lowest channel	**Polarization:**	Vertical
Test Voltage:	AC 120/60Hz	**Environment:**	Temp: 21.8℃ Huni: 57%



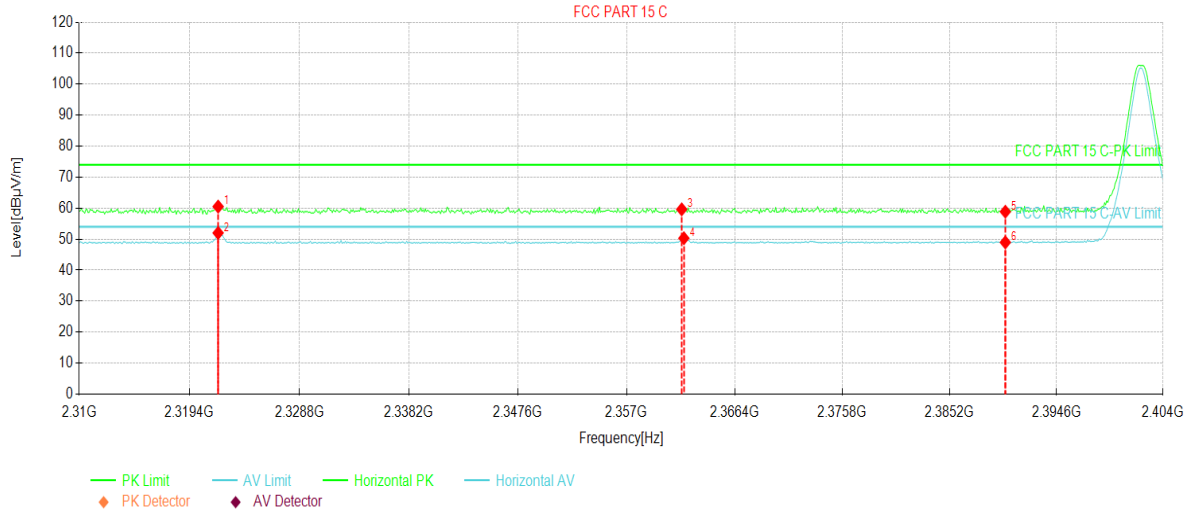
Suspected Data List

NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Angle [°]	Height [cm]	Trace	Polarity
1	2324.2	13.75	49.12	35.37	54.00	4.88	264	150	AV	Vertical
2	2324.4	24.01	59.38	35.37	74.00	14.62	301	142	PK	Vertical
3	2355.6	13.59	49.19	35.60	54.00	4.81	158	160	AV	Vertical
4	2355.6	24.82	60.42	35.60	74.00	13.58	176	157	PK	Vertical
5	2390.0	23.05	58.89	35.84	74.00	15.11	333	130	PK	Vertical
6	2390.0	13.16	49.00	35.84	54.00	5.00	301	137	AV	Vertical

Remark:

1. *Final Level = Receiver Read level + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).*
2. *The emission levels of other frequencies are lower than the limit 20dB and not show in test report.*

Product Name:	Panel PC	Product Model:	TD-1050 PRO
Test By:	Mike	Test mode:	DH1 Tx mode
Test Channel:	Lowest channel	Polarization:	Horizontal
Test Voltage:	AC 120/60Hz	Environment:	Temp: 21.8℃ Huni: 57%



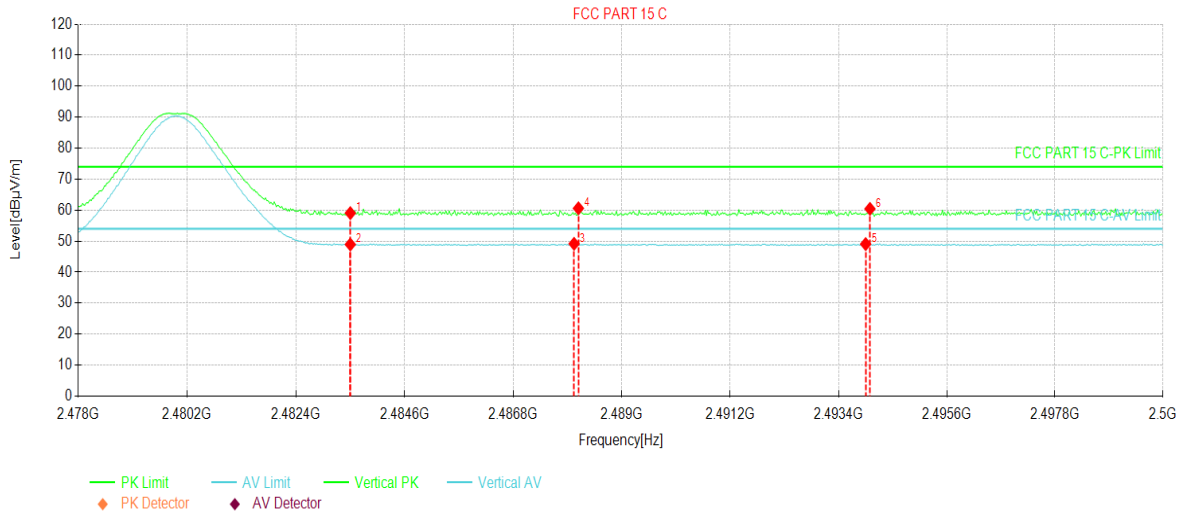
Suspected Data List

NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Angle [°]	Height [cm]	Trace	Polarity
1	2321.8	25.15	60.51	35.36	74.00	13.49	190	130	PK	Horizontal
2	2321.8	16.65	52.01	35.36	54.00	1.99	210	139	AV	Horizontal
3	2361.7	23.97	59.61	35.64	74.00	14.39	305	140	PK	Horizontal
4	2361.9	14.66	50.30	35.64	54.00	3.70	343	146	AV	Horizontal
5	2390.0	23.02	58.86	35.84	74.00	15.14	340	150	PK	Horizontal
6	2390.0	13.12	48.96	35.84	54.00	5.04	321	162	AV	Horizontal

Remark:

1. *Final Level = Receiver Read level + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).*
2. *The emission levels of other frequencies are lower than the limit 20dB and not show in test report.*

Product Name:	Panel PC	Product Model:	TD-1050 PRO
Test By:	Mike	Test mode:	DH1 Tx mode
Test Channel:	Highest channel	Polarization:	Vertical
Test Voltage:	AC 120/60Hz	Environment:	Temp: 21.8℃ Huni: 57%



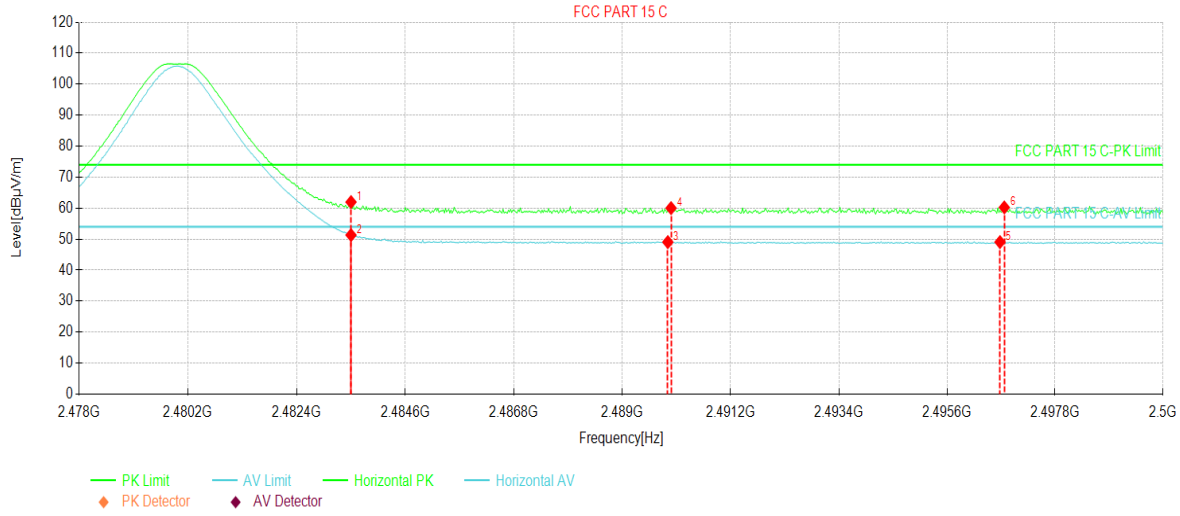
Suspected Data List

NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Angle [°]	Height [cm]	Trace	Polarity
1	2483.5	23.33	59.05	35.72	74.00	14.95	323	134	PK	Vertical
2	2483.5	13.20	48.92	35.72	54.00	5.08	351	143	AV	Vertical
3	2488.0	13.44	49.15	35.71	54.00	4.85	269	152	AV	Vertical
4	2488.1	24.89	60.60	35.71	74.00	13.4	289	164	PK	Vertical
5	2493.9	13.37	49.06	35.69	54.00	4.94	155	158	AV	Vertical
6	2494.0	24.73	60.42	35.69	74.00	13.58	182	170	PK	Vertical

Remark:

1. *Final Level = Receiver Read level + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).*
2. *The emission levels of other frequencies are lower than the limit 20dB and not show in test report.*

Product Name:	Panel PC	Product Model:	TD-1050 PRO
Test By:	Mike	Test mode:	DH1 Tx mode
Test Channel:	Highest channel	Polarization:	Horizontal
Test Voltage:	AC 120/60Hz	Environment:	Temp: 21.8℃ Huni: 57%



Suspected Data List

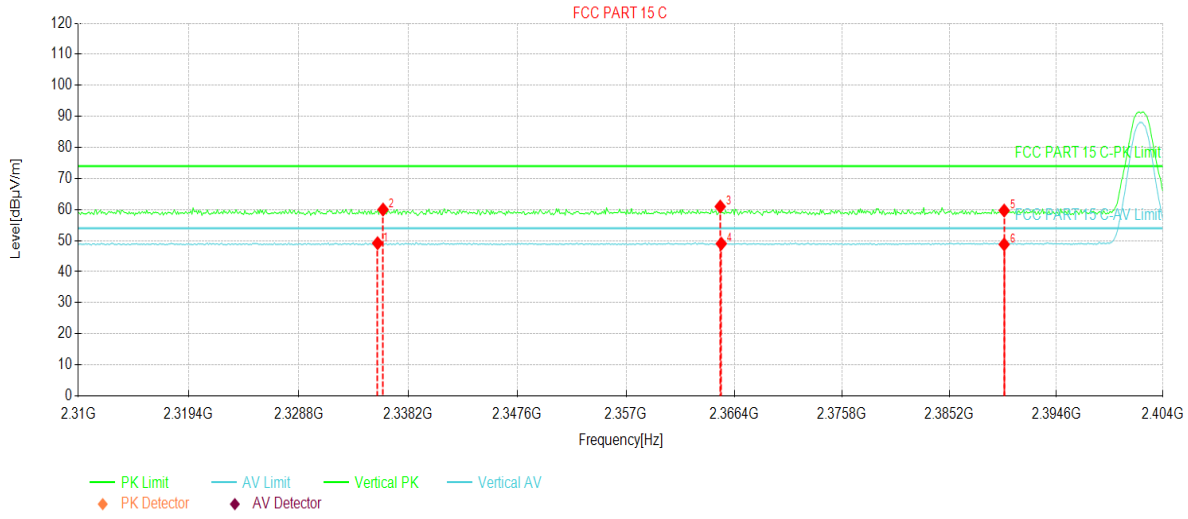
NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Angle [°]	Height [cm]	Trace	Polarity
1	2483.5	26.25	61.97	35.72	74.00	12.03	248	142	PK	Horizontal
2	2483.5	15.60	51.32	35.72	54.00	2.68	271	139	AV	Horizontal
3	2489.9	13.36	49.06	35.70	54.00	4.94	345	150	AV	Horizontal
4	2489.9	24.32	60.02	35.70	74.00	13.98	3	156	PK	Horizontal
5	2496.6	13.38	49.07	35.69	54.00	4.93	313	160	AV	Horizontal
6	2496.7	24.55	60.24	35.69	74.00	13.76	335	154	PK	Horizontal

Remark:

1. *Final Level = Receiver Read level + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).*
2. *The emission levels of other frequencies are lower than the limit 20dB and not show in test report.*

π/4-DQPSK mode

Product Name:	Panel PC	**Product Model:**	TD-1050 PRO
Test By:	Mike	**Test mode:**	2DH1 Tx mode
Test Channel:	Lowest channel	**Polarization:**	Vertical
Test Voltage:	AC 120/60Hz	**Environment:**	Temp: 21.8℃ Huni: 57%

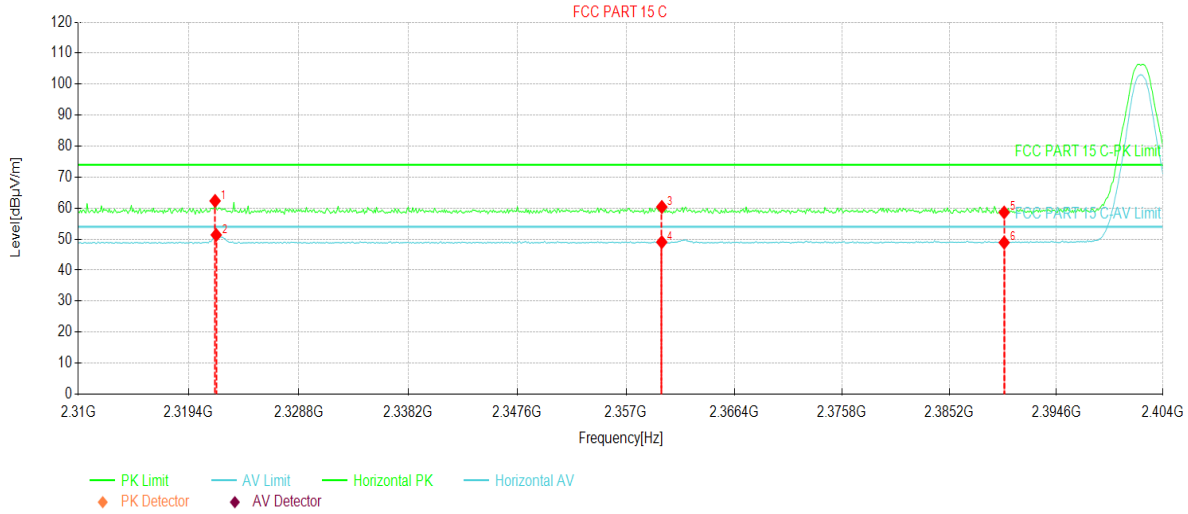


Suspected Data List										
NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Angle [°]	Height [cm]	Trace	Polarity
1	2335.5	13.71	49.16	35.45	54.00	4.84	307	140	AV	Vertical
2	2336.0	24.55	60.01	35.46	74.00	13.99	336	134	PK	Vertical
3	2365.1	25.30	60.96	35.66	74.00	13.04	14	150	PK	Vertical
4	2365.2	13.36	49.02	35.66	54.00	4.98	350	161	AV	Vertical
5	2390.0	23.84	59.68	35.84	74.00	14.32	290	154	PK	Vertical
6	2390.0	12.93	48.77	35.84	54.00	5.23	312	163	AV	Vertical

Remark:

1. *Final Level = Receiver Read level + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).*
2. *The emission levels of other frequencies are lower than the limit 20dB and not show in test report.*

Product Name:	Panel PC	Product Model:	TD-1050 PRO
Test By:	Mike	Test mode:	2DH1 Tx mode
Test Channel:	Lowest channel	Polarization:	Horizontal
Test Voltage:	AC 120/60Hz	Environment:	Temp: 21.8℃ Huni: 57%

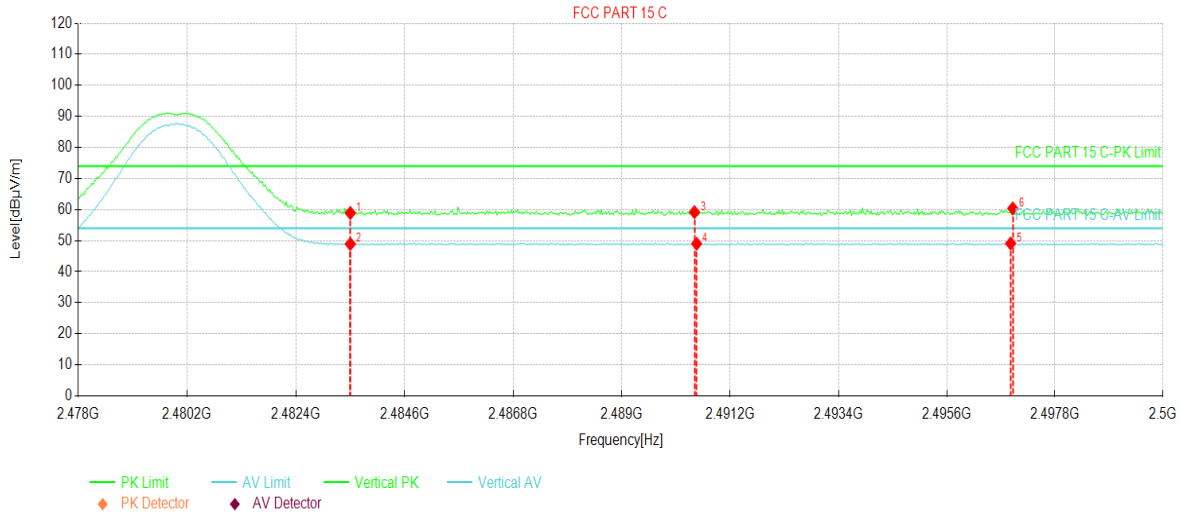


Suspected Data List										
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Angle [°]	Height [cm]	Trace	Polarity
1	2321.6	26.98	62.33	35.35	74.00	11.67	301	153	PK	Horizontal
2	2321.7	16.01	51.36	35.35	54.00	2.64	355	161	AV	Horizontal
3	2360.1	24.77	60.40	35.63	74.00	13.60	30	140	PK	Horizontal
4	2360.1	13.41	49.04	35.63	54.00	4.96	358	148	AV	Horizontal
5	2390.0	22.78	58.62	35.84	74.00	15.38	265	138	PK	Horizontal
6	2390.0	13.06	48.90	35.84	54.00	5.10	293	130	AV	Horizontal

Remark:

1. *Final Level = Receiver Read level + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).*
2. *The emission levels of other frequencies are lower than the limit 20dB and not show in test report.*

Product Name:	Panel PC	Product Model:	TD-1050 PRO
Test By:	Mike	Test mode:	2DH1 Tx mode
Test Channel:	Highest channel	Polarization:	Vertical
Test Voltage:	AC 120/60Hz	Environment:	Temp: 21.8℃ Huni: 57%



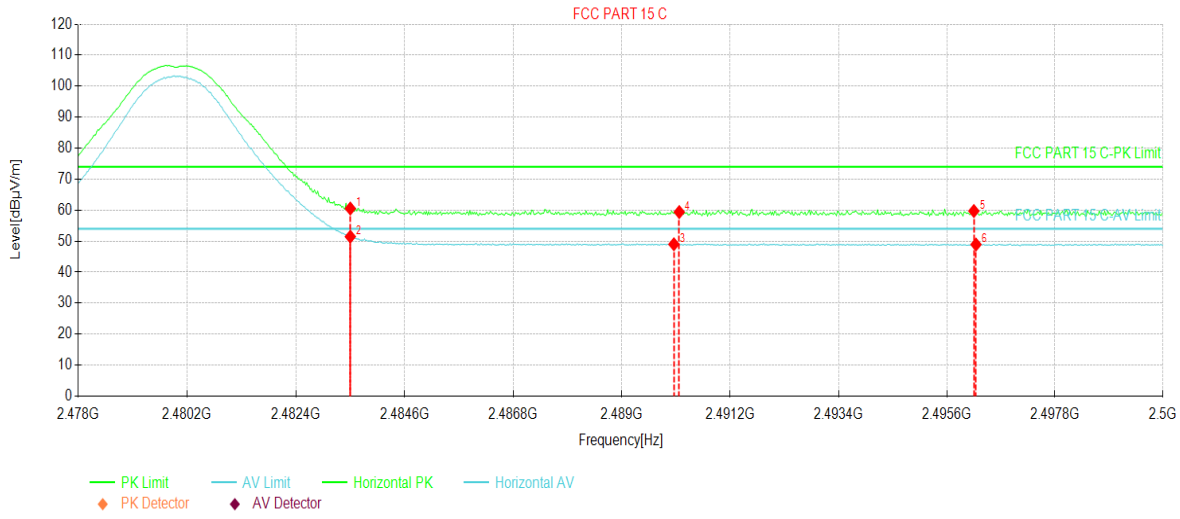
Suspected Data List

NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Angle [°]	Height [cm]	Trace	Polarity
1	2483.5	23.18	58.90	35.72	74.00	15.10	169	153	PK	Vertical
2	2483.5	13.19	48.91	35.72	54.00	5.09	193	148	AV	Vertical
3	2490.4	23.48	59.18	35.70	74.00	14.82	328	130	PK	Vertical
4	2490.5	13.29	48.99	35.70	54.00	5.01	303	137	AV	Vertical
5	2496.8	13.40	49.09	35.69	54.00	4.91	286	150	AV	Vertical
6	2496.9	24.67	60.36	35.69	74.00	13.64	297	142	PK	Vertical

Remark:

1. *Final Level = Receiver Read level + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).*
2. *The emission levels of other frequencies are lower than the limit 20dB and not show in test report.*

Product Name:	Panel PC	Product Model:	TD-1050 PRO
Test By:	Mike	Test mode:	2DH1 Tx mode
Test Channel:	Highest channel	Polarization:	Horizontal
Test Voltage:	AC 120/60Hz	Environment:	Temp: 21.8℃ Huni: 57%



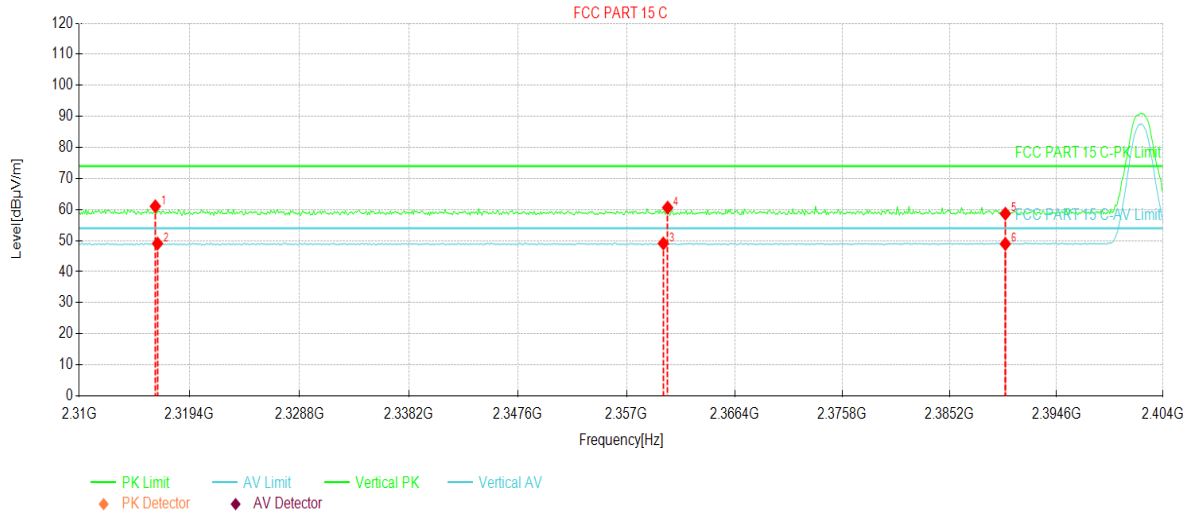
Suspected Data List										
NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Angle [°]	Height [cm]	Trace	Polarity
1	2483.5	24.81	60.53	35.72	74.00	13.47	333	134	PK	Horizontal
2	2483.5	15.73	51.45	35.72	54.00	2.55	301	146	AV	Horizontal
3	2490.0	13.31	49.01	35.70	54.00	4.99	16	151	AV	Horizontal
4	2490.1	23.69	59.39	35.70	74.00	14.61	351	157	PK	Horizontal
5	2496.1	24.04	59.73	35.69	74.00	14.27	266	161	PK	Horizontal
6	2496.1	13.23	48.92	35.69	54.00	5.08	290	169	AV	Horizontal

Remark:

1. *Final Level = Receiver Read level + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).*
2. *The emission levels of other frequencies are lower than the limit 20dB and not show in test report.*

8DPSK mode

Product Name:	Panel PC	**Product Model:**	TD-1050 PRO
Test By:	Mike	**Test mode:**	3DH1 Tx mode
Test Channel:	Lowest channel	**Polarization:**	Vertical
Test Voltage:	AC 120/60Hz	**Environment:**	Temp: 21.8℃ Huni: 57%

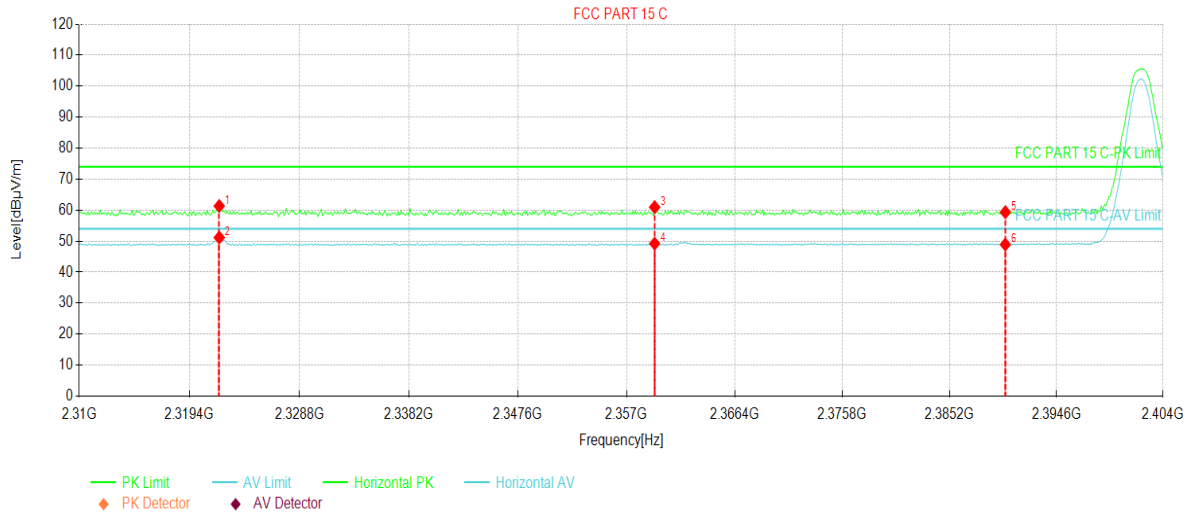


Suspected Data List										
NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Angle [°]	Height [cm]	Trace	Polarity
1	2316.4	25.73	61.05	35.32	74.00	12.95	231	151	PK	Vertical
2	2316.6	13.72	49.04	35.32	54.00	4.96	280	140	AV	Vertical
3	2360.1	13.46	49.09	35.63	54.00	4.91	320	162	AV	Vertical
4	2360.5	24.99	60.62	35.63	74.00	13.38	351	154	PK	Vertical
5	2390.0	22.82	58.66	35.84	74.00	15.34	301	133	PK	Vertical
6	2390.0	13.10	48.94	35.84	54.00	5.06	336	144	AV	Vertical

Remark:

1. *Final Level = Receiver Read level + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).*
2. *The emission levels of other frequencies are lower than the limit 20dB and not show in test report.*

Product Name:	Panel PC	Product Model:	TD-1050 PRO
Test By:	Mike	Test mode:	3DH1 Tx mode
Test Channel:	Lowest channel	Polarization:	Horizontal
Test Voltage:	AC 120/60Hz	Environment:	Temp: 21.8℃ Huni: 57%



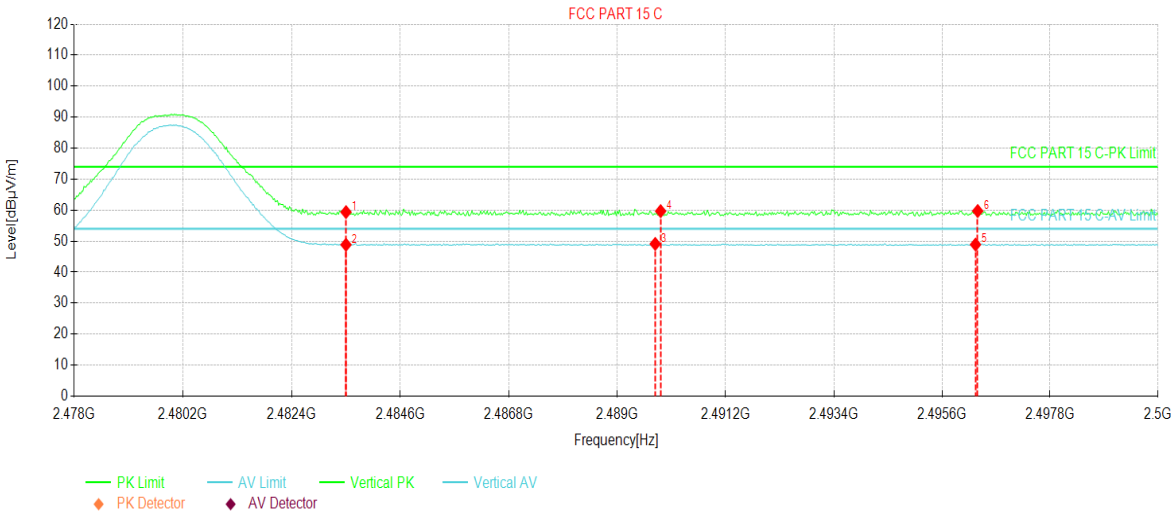
Suspected Data List

NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Angle [°]	Height [cm]	Trace	Polarity
1	2321.9	25.98	61.34	35.36	74.00	12.66	189	131	PK	Horizontal
2	2321.9	15.81	51.17	35.36	54.00	2.83	202	140	AV	Horizontal
3	2359.4	25.33	60.95	35.62	74.00	13.05	341	150	PK	Horizontal
4	2359.4	13.59	49.21	35.62	54.00	4.79	319	158	AV	Horizontal
5	2390.0	23.52	59.36	35.84	74.00	14.64	15	163	PK	Horizontal
6	2390.0	13.06	48.90	35.84	54.00	5.10	352	154	AV	Horizontal

Remark:

1. *Final Level = Receiver Read level + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).*
2. *The emission levels of other frequencies are lower than the limit 20dB and not show in test report.*

Product Name:	Panel PC	Product Model:	TD-1050 PRO
Test By:	Mike	Test mode:	3DH1 Tx mode
Test Channel:	Highest channel	Polarization:	Vertical
Test Voltage:	AC 120/60Hz	Environment:	Temp: 21.8℃ Huni: 57%



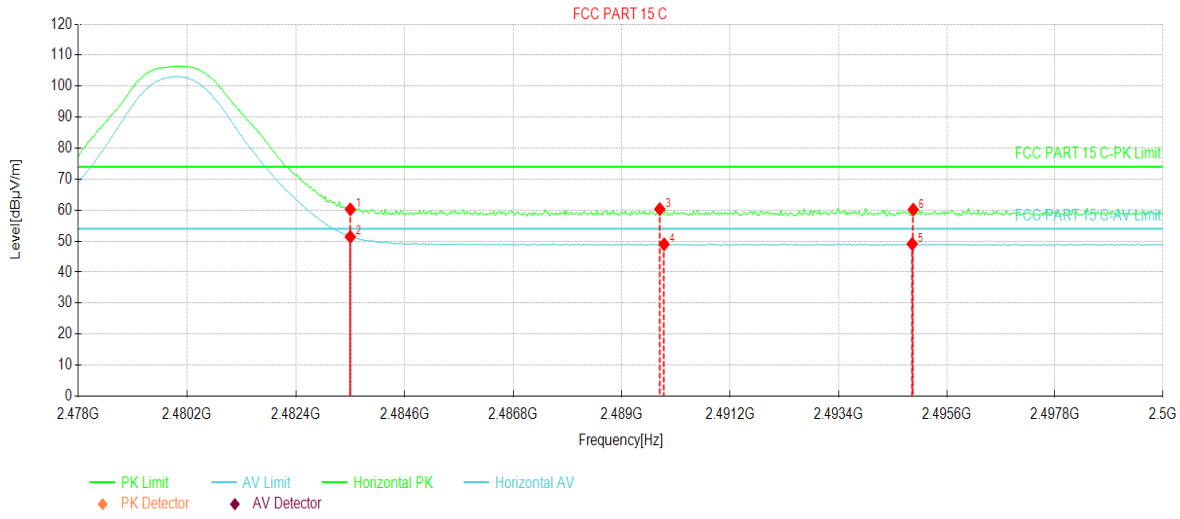
Suspected Data List

NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Angle [°]	Height [cm]	Trace	Polarity
1	2483.5	23.66	59.38	35.72	74.00	14.62	326	136	PK	Vertical
2	2483.5	13.12	48.84	35.72	54.00	5.16	334	145	AV	Vertical
3	2489.7	13.41	49.11	35.70	54.00	4.89	279	152	PK	Vertical
4	2489.8	23.98	59.68	35.70	74.00	14.32	285	159	AV	Vertical
5	2496.2	13.20	48.89	35.69	54.00	5.11	319	160	AV	Vertical
6	2496.3	24.03	59.72	35.69	74.00	14.28	340	168	PK	Vertical

Remark:

1. *Final Level = Receiver Read level + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).*
2. *The emission levels of other frequencies are lower than the limit 20dB and not show in test report.*

Product Name:	Panel PC	Product Model:	TD-1050 PRO
Test By:	Mike	Test mode:	3DH1 Tx mode
Test Channel:	Highest channel	Polarization:	Horizontal
Test Voltage:	AC 120/60Hz	Environment:	Temp: 21.8℃ Huni: 57%



Suspected Data List

NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Angle [°]	Height [cm]	Trace	Polarity
1	2483.5	24.55	60.27	35.72	74.00	13.73	350	143	PK	Horizontal
2	2483.5	15.67	51.39	35.72	54.00	2.61	319	152	AV	Horizontal
3	2489.7	24.64	60.34	35.70	74.00	13.66	250	136	PK	Horizontal
4	2489.8	13.27	48.97	35.70	54.00	5.03	267	149	AV	Horizontal
5	2494.8	13.40	49.09	35.69	54.00	4.91	305	155	AV	Horizontal
6	2494.9	24.48	60.17	35.69	74.00	13.83	348	164	PK	Horizontal

Remark:

1. *Final Level = Receiver Read level + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).*
2. *The emission levels of other frequencies are lower than the limit 20dB and not show in test report.*

6.4 Spurious Emission

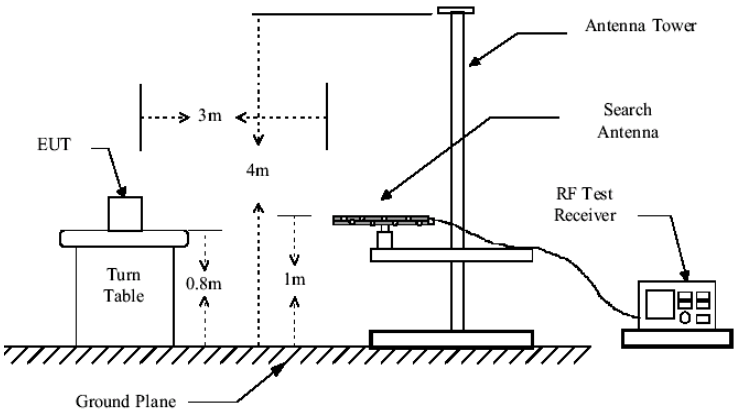
6.4.1 Radiated Emission Method

Test Requirement:	FCC Part 15 C Section 15.209				
Test Frequency Range:	9 kHz to 25 GHz				
Test Distance:	3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Remark
	30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		RMS	1MHz	3MHz	Average Value

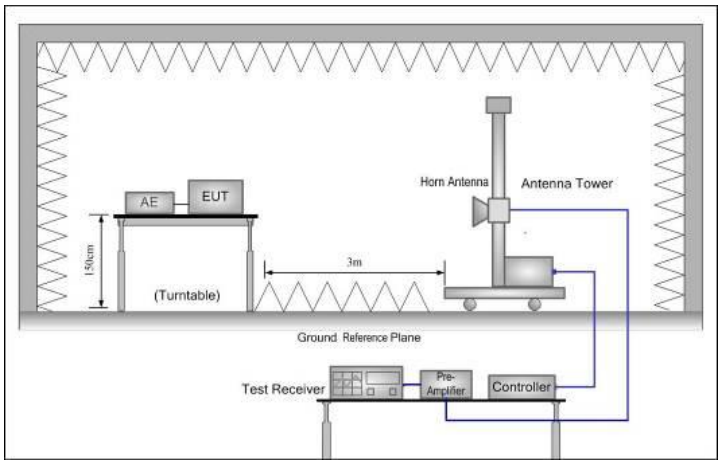
Limit:	Frequency	Limit (dBuV/m @3m)	Remark
	30MHz-88MHz	40.0	Quasi-peak Value
	88MHz-216MHz	43.5	Quasi-peak Value
	216MHz-960MHz	46.0	Quasi-peak Value
	960MHz-1GHz	54.0	Quasi-peak Value
	Above 1GHz	54.0	Average Value
		74.0	Peak Value

Test setup:

Below 1GHz



Above 1GHz



Test Procedure:

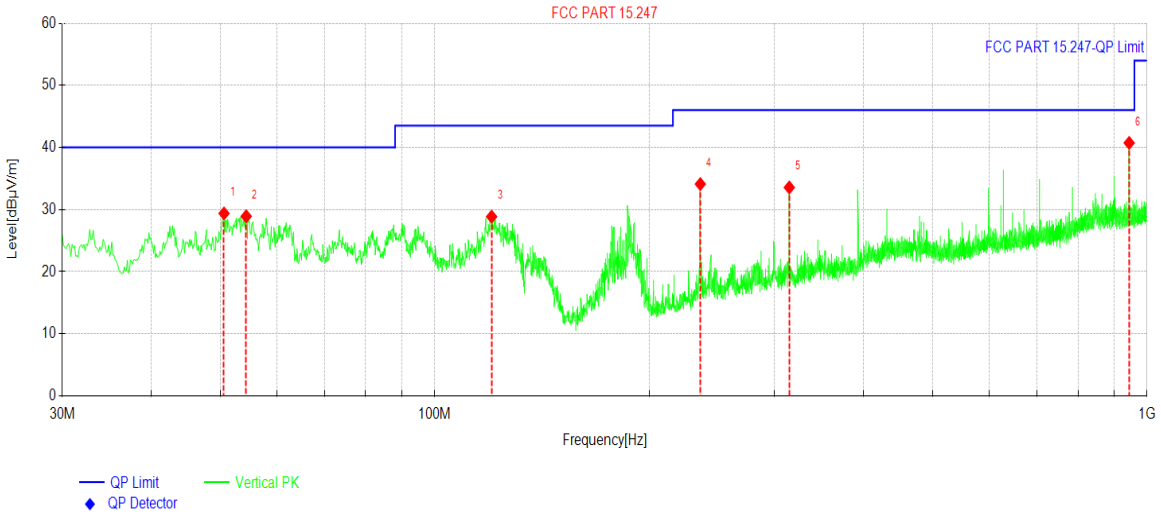
1. The EUT was placed on the top of a rotating table 0.8m(below 1GHz) /1.5m(above 1GHz) above the ground at a 3 meter chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

	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. 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. 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. 5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. 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 section 5.9 for details
Test mode:	Non-hopping mode
Test results:	Pass
Remark:	1. Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis is the worst case. 2. 9 kHz to 30 MHz is noise floor and lower than the limit 20dB, so only shows the data of above 30MHz in this report.

Measurement Data (worst case):

Below 1GHz:

Product Name:	Panel PC	**Product Model:**	TD-1050 PRO
Test By:	Mike	**Test mode:**	BT Tx mode
Test Frequency:	30 MHz ~ 1 GHz	**Polarization:**	Vertical
Test Voltage:	AC 120/60Hz	**Environment:**	Temp: 21.2℃ Huni: 52%

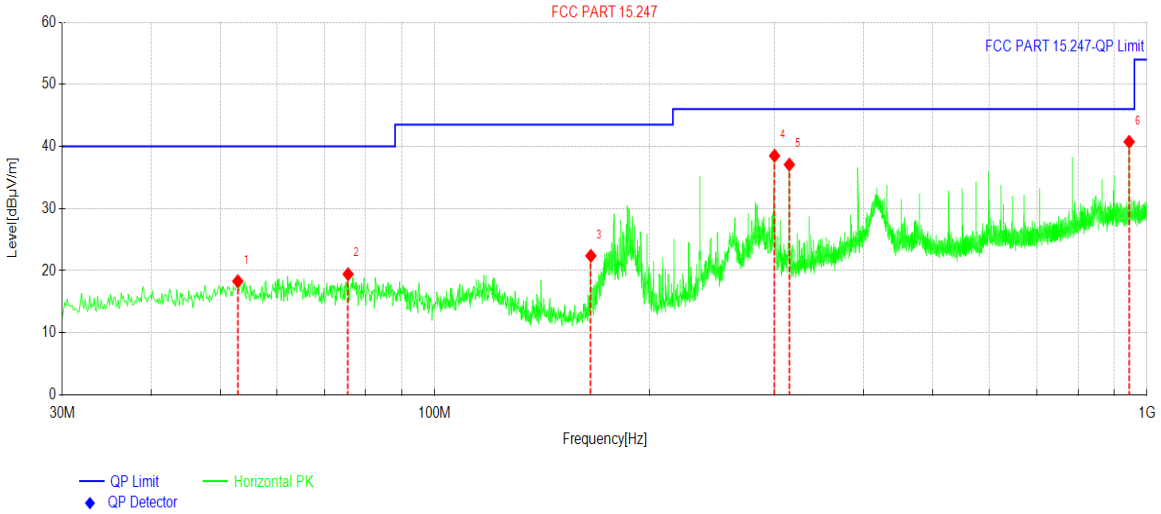


NO.	Freq. [MHz]	Reading [dBuV/m]	Level [dBuV/m]	Factor [dB]	Limit [dBuV/m]	Margin [dB]	Angle [°]	Height [cm]	Trace	Polarity
1	50.612	44.08	29.38	-14.70	40.00	10.62	326	100	PK	Vertical
2	54.371	43.55	28.92	-14.63	40.00	11.08	146	103	PK	Vertical
3	120.21	44.91	28.86	-16.05	43.50	14.64	353	127	PK	Vertical
4	236.00	48.56	34.11	-14.45	46.00	11.89	264	143	PK	Vertical
5	314.69	45.92	33.56	-12.36	46.00	12.44	347	132	PK	Vertical
6	944.10	41.86	40.73	-1.13	46.00	5.27	2	113	PK	Vertical

Remark:

1. *Final Level = Receiver Read level + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).*
2. *The emission levels of other frequencies are lower than the limit 20dB and not show in test report.*

Product Name:	Panel PC	Product Model:	TD-1050 PRO
Test By:	Mike	Test mode:	BT Tx mode
Test Frequency:	30 MHz ~ 1 GHz	Polarization:	Horizontal
Test Voltage:	AC 120/60Hz	Environment:	Temp: 21.2℃ Huni: 52%



NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Angle [°]	Height [cm]	Trace	Polarity
1	52.916	32.95	18.30	-14.65	40.00	21.70	53	106	PK	Horizontal
2	75.590	36.56	19.43	-17.13	40.00	20.57	64	100	PK	Horizontal
3	165.67	39.57	22.39	-17.18	43.50	21.11	356	125	PK	Horizontal
4	300.02	51.21	38.50	-12.71	46.00	7.50	342	103	PK	Horizontal
5	314.69	49.44	37.08	-12.36	46.00	8.92	258	137	PK	Horizontal
6	944.10	41.88	40.75	-1.13	46.00	5.25	197	115	PK	Horizontal

Remark:

1. *Final Level = Receiver Read level + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).*
2. *The emission levels of other frequencies are lower than the limit 20dB and not show in test report.*

Above 1GHz:

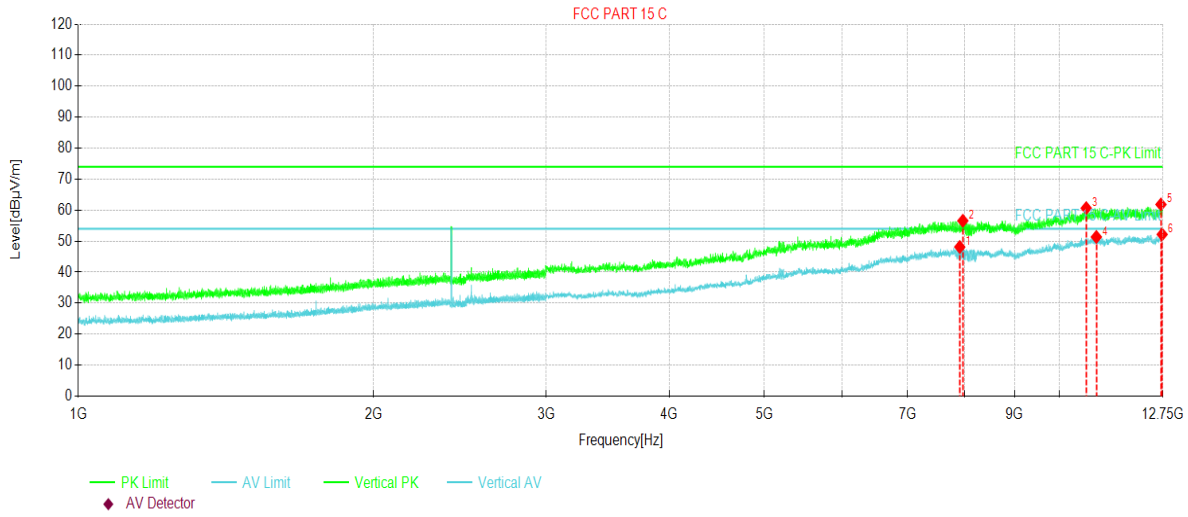
Remark:

1. When testing spurs above 1GHz, use Band Reject Filter Group to filter out fundamental signal

2. Tested all modulation modes and found that GFSK is the worst case mode, the report only reflects the worst mode

GFSK:

Product Name:	Panel PC	**Product Model:**	TD-1050 PRO
Test By:	Mike	**Test mode:**	BT Tx Low CH
Test Frequency:	1 GHz ~ 25 GHz	**Polarization:**	Vertical
Test Voltage:	AC 120/60Hz	**Environment:**	Temp: 21.2℃ Huni: 52%



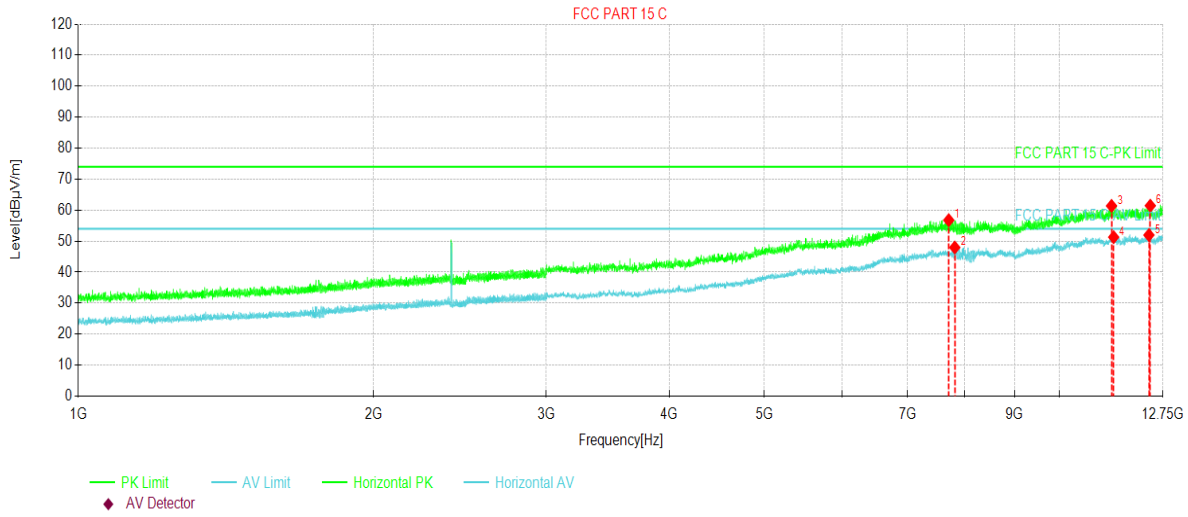
Suspected Data List

NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Angle [°]	Height [cm]	Trace	Polarity
1	7914.00	47.13	48.12	0.99	54.00	5.88	252	134	AV	Vertical
2	7971.28	55.65	56.58	0.93	74.00	17.42	230	145	PK	Vertical
3	10647.66	53.57	60.66	7.09	74.00	13.34	343	157	PK	Vertical
4	10904.81	44.03	51.34	7.31	54.00	2.66	318	140	AV	Vertical
5	12689.06	53.49	61.83	8.34	74.00	12.17	333	151	PK	Vertical
6	12725.63	43.78	52.18	8.40	54.00	1.82	357	138	AV	Vertical

Remark:

1. *Final Level = Receiver Read level + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).*
2. *The emission levels of above 12.75GHz are lower than the limit 20dB and not show in test report.*

Product Name:	Panel PC	Product Model:	TD-1050 PRO
Test By:	Mike	Test mode:	BT Tx Low CH
Test Frequency:	1 GHz ~ 25 GHz	Polarization:	Horizontal
Test Voltage:	AC 120/60Hz	Environment:	Temp: 21.2℃ Huni: 52%



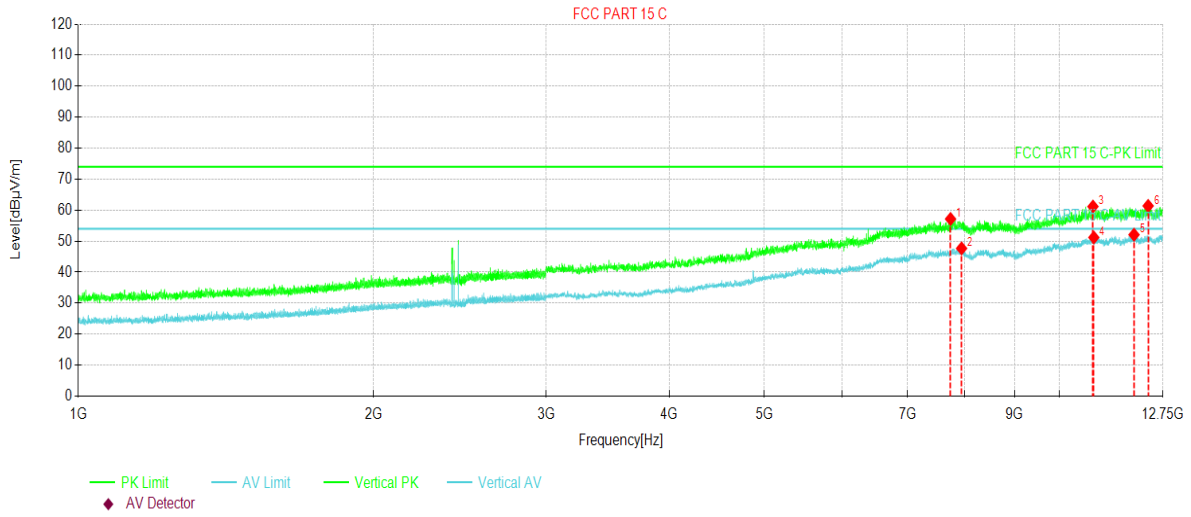
Suspected Data List

NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Angle [°]	Height [cm]	Trace	Polarity
1	7711.67	56.17	56.77	0.60	74.00	17.23	20	153	PK	Horizontal
2	7821.38	46.93	47.95	1.02	54.00	6.05	358	142	AV	Horizontal
3	11300.92	53.28	61.37	8.09	74.00	12.63	191	125	PK	Horizontal
4	11356.91	43.73	51.28	7.55	54.00	2.72	209	138	AV	Horizontal
5	12335.63	44.14	51.97	7.83	54.00	2.03	321	120	AV	Horizontal
6	12375.83	53.60	61.44	7.84	74.00	12.56	316	163	PK	Horizontal

Remark:

3. *Final Level = Receiver Read level + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).*
4. *The emission levels of above 12.75GHz are lower than the limit 20dB and not show in test report.*

Product Name:	Panel PC	Product Model:	TD-1050 PRO
Test By:	Mike	Test mode:	BT Tx Mid CH
Test Frequency:	1 GHz ~ 25 GHz	Polarization:	Vertical
Test Voltage:	AC 120/60Hz	Environment:	Temp: 21.2℃ Huni: 52%



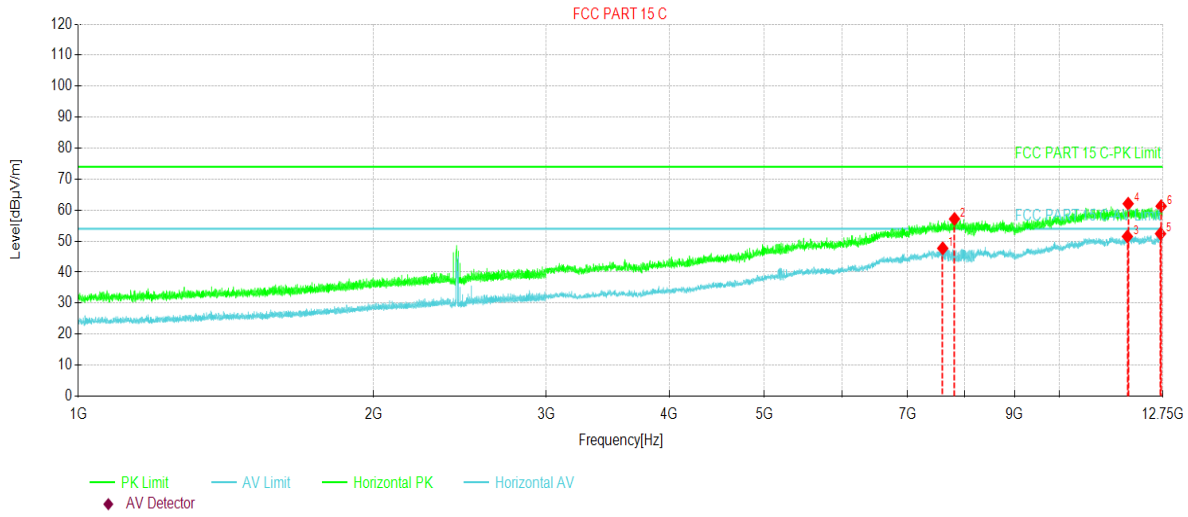
Suspected Data List										
NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Angle [°]	Height [cm]	Trace	Polarity
1	7744.59	56.39	57.15	0.76	74.00	16.85	189	162	PK	Vertical
2	7948.13	46.70	47.66	0.96	54.00	6.34	230	147	AV	Vertical
3	10818.28	54.00	61.17	7.17	74.00	12.83	23	132	PK	Vertical
4	10840.22	44.00	51.20	7.20	54.00	2.80	358	150	AV	Vertical
5	11911.50	44.58	52.08	7.50	54.00	1.92	170	139	AV	Vertical
6	12313.69	53.54	61.37	7.83	74.00	12.63	158	153	PK	Vertical

Remark:

5. Final Level = Receiver Read level + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).

6. The emission levels of above 12.75GHz are lower than the limit 20dB and not show in test report.

Product Name:	Panel PC	Product Model:	TD-1050 PRO
Test By:	Mike	Test mode:	BT Tx Mid CH
Test Frequency:	1 GHz ~ 25 GHz	Polarization:	Horizontal
Test Voltage:	AC 120/60Hz	Environment:	Temp: 21.2℃ Huni: 52%



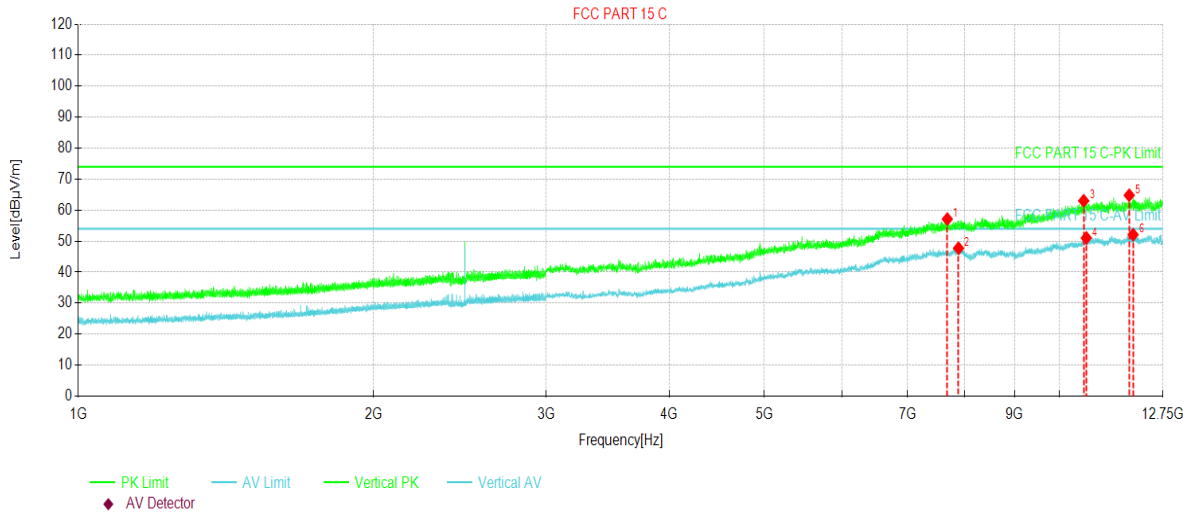
Suspected Data List

NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Angle [°]	Height [cm]	Trace	Polarity
1	7603.22	46.67	47.68	1.01	54.00	6.32	14	134	AV	Horizontal
2	7816.50	56.15	57.17	1.02	74.00	16.83	356	151	PK	Horizontal
3	11727.47	43.50	51.50	8.00	54.00	2.50	210	142	AV	Horizontal
4	11750.63	54.11	62.07	7.96	74.00	11.93	265	158	PK	Horizontal
5	12675.66	44.10	52.40	8.30	54.00	1.60	323	162	AV	Horizontal
6	12693.94	52.91	61.27	8.36	74.00	12.73	348	150	PK	Horizontal

Remark:

7. *Final Level = Receiver Read level + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).*
8. *The emission levels of above 12.75GHz are lower than the limit 20dB and not show in test report.*

Product Name:	Panel PC	Product Model:	TD-1050 PRO
Test By:	Mike	Test mode:	BT Tx High CH
Test Frequency:	1 GHz ~ 25 GHz	Polarization:	Vertical
Test Voltage:	AC 120/60Hz	Environment:	Temp: 21.2℃ Huni: 52%



Suspected Data List

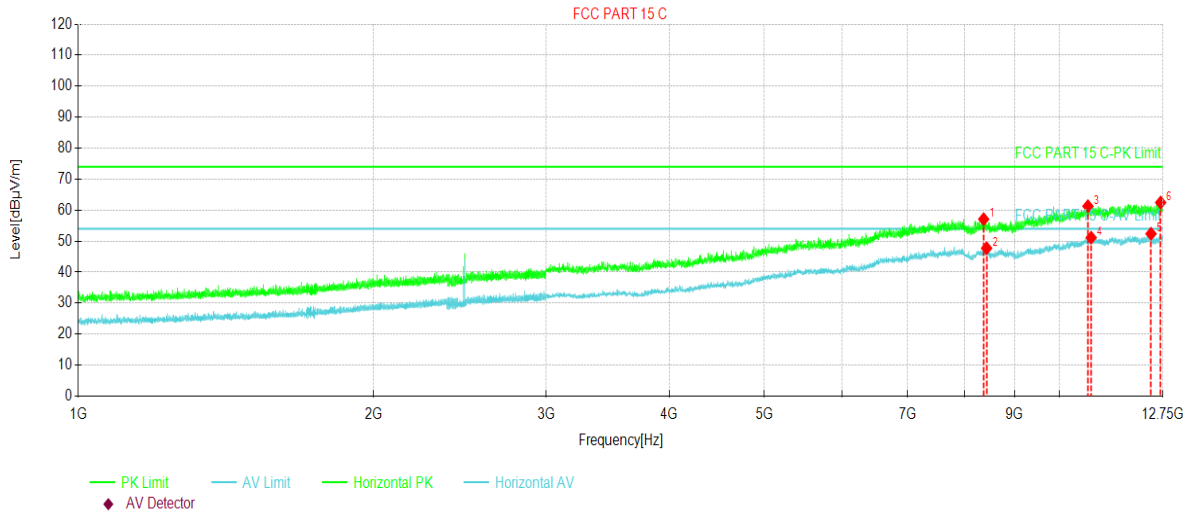
NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Angle [◦]	Height [cm]	Trace	Polarity
1	7686.09	56.50	57.12	0.62	74.00	16.88	214	131	PK	Vertical
2	7890.84	46.70	47.71	1.01	54.00	6.29	267	152	AV	Vertical
3	10584.28	56.16	63.02	6.86	74.00	10.98	305	147	PK	Vertical
4	10651.31	43.92	51.02	7.10	54.00	2.98	351	162	AV	Vertical
5	11778.66	56.88	64.79	7.91	74.00	9.21	157	150	PK	Vertical
6	11887.13	44.57	52.09	7.52	54.00	1.91	183	171	AV	Vertical

Remark:

9. Final Level = Receiver Read level + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).

10. The emission levels of above 12.75GHz are lower than the limit 20dB and not show in test report.

Product Name:	Panel PC	Product Model:	TD-1050 PRO
Test By:	Mike	Test mode:	BT Tx High CH
Test Frequency:	1 GHz ~ 25 GHz	Polarization:	Horizontal
Test Voltage:	AC 120/60Hz	Environment:	Temp: 21.2℃ Huni: 52%



Suspected Data List

NO.	Freq. [MHz]	Reading [dBµV/m]	Level [dBµV/m]	Factor [dB]	Limit [dBµV/m]	Margin [dB]	Angle [°]	Height [cm]	Trace	Polarity
1	8371.03	55.36	57.09	1.73	74.00	16.91	308	130	PK	Horizontal
2	8428.31	46.14	47.72	1.58	54.00	6.28	273	148	AV	Horizontal
3	10690.31	54.04	61.27	7.23	74.00	12.73	30	150	PK	Horizontal
4	10773.19	43.97	51.14	7.17	54.00	2.86	354	169	AV	Horizontal
5	12397.78	44.55	52.39	7.84	54.00	1.61	291	142	AV	Horizontal
6	12679.31	54.13	62.44	8.31	74.00	11.56	332	133	PK	Horizontal

Remark:

1. *Final Level = Receiver Read level + Factor(Antenna Factor + Cable Loss – Preamplifier Factor).*
2. *The emission levels of above 12.75GHz are lower than the limit 20dB and not show in test report.*

7 Appendix

The below Appendix was detail result tested by SGS-CSTC Standards Technical Services, Co., Ltd.Shenzhen Branch.(Date of Test: 2019/3/14-2019/5/9).

Appendix	*Item*
Appendix- Bluetooth	*Bluetooth*