



RADIO TEST REPORT

Report No: STS1510002F03

Issued for

Joyplus International Enterprise Limited

805 Technology Building, Duoli Industrial Park, Shangmeilin, Meihua Road, Futian Dist., Shenzhen China

L A B

Product Name:	Tablet PC
Brand Name:	JOYPLUS
Model No.:	QI-10X
Series Model:	QI-116X,QI-120X
FCC ID:	Z4UQI-10X
Test Standard:	FCC Part 15.247

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TEST RESULT CERTIFICATION

Applicant'sname	Joyplus International Enterprise Limited
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	Shenzhen YunHui Digital Technology Co.,Ltd
Address	2/F,Block A1,Rixin Technology Park,506 Huarong Rd,Dalang, Longhua Dist.,Shenzhen ,China
Product description	
Product name	Tablet PC
Brand name	JOYPLUS
Model and/or type reference	QI-10X
Standards	FCC Part 15.247
Test procedure	ANSI C63.10-2013

This device described above has been tested by STS, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Date of Test	
Date (s) of performance of tests.	23 Nov. 2015 ~30 Nov. 2015
Date of Issue	01 Dec. 2015
Test Result	Pass

Technical Manager:

(Vita Li)

Authorized Signatory:

(Bovey Yang)



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Revision History

Rev.	Issue Date	Report NO.	Effect Page	Contents
00	01 Dec. 2015	STS1510002F03	ALL	Initial Issue





1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.247), Subpart C				
Standard Section	Test Item	Judgment	Remark	
15.207	Conducted Emission	PASS		
15.247(a)(1)	Hopping Channel Separation	PASS		
15.247(b)(1)	Peak Output Power	PASS		
15.247(c)	Radiated Spurious Emission	PASS		
15.247(d)	Conducted Spurious Emission	PASS		
15.247(a)(iii)	Number of Hopping Frequency	PASS		
15.247(a)(iii)	Dwell Time	PASS		
15.247(a)(1)	Bandwidth	PASS		
15.205	Band Edge Emission	PASS		
15.203	Antenna Requirement	PASS		

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report





1.1 TEST FACTORY

Shenzhen STS Test Services Co., Ltd.

Add.: 1/F., Building B, Zhuoke Science Park, No.190, Chongqing Road,

Fuyong Street, Bao'an District, Shenzhen, Guangdong, China

CNAS Registration No.: L7649;

FCC Registration No.: 842334; IC Registration No.: 12108A-1

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $\mathbf{y} \pm \mathbf{U}$, where expended uncertainty \mathbf{U} is based on a standard uncertainty multiplied by a coverage factor of $\mathbf{k=2}$, providing a level of confidence of approximately 95 % $^{\circ}$

No.	Item	Uncertainty
1	Conducted Emission (9KHz-150KHz)	±2.88dB
2	Conducted Emission (150KHz-30MHz)	±2.67dB
3	RF power,conducted	±0.70dB
4	Spurious emissions,conducted	±1.19dB
5	All emissions,radiated(<1G) 30MHz-200MHz	±2.83dB
6	All emissions,radiated(<1G) 200MHz-1000MHz ±2.94dB	
7	All emissions,radiated(>1G)	±3.03dB
8	Temperature	±0.5°C
9	Humidity	±2%





2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	Tablet PC
Trade Name	JOYPLUS
Model Name	QI-10X
Series Model	QI-116X,QI-120X
Model Difference	Only different in model name
Channel List	Please refer to the Note 2.
Bluetooth	Frequency:2402 – 2480 MHz Modulation: GFSK(1Mbps), π/4-DQPSK(2Mbps), 8-DPSK(3Mbps)
Adapter	Input: AC100-240V, 350mA, 50/60 Hz Output: DC 5V, 2000mA
Battery	Rated Voltage: 3.7V capacity:6500mAh
Hardware version number	
Software versioning number	
Connecting I/O Port(s)	Please refer to the User's Manual

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.



2.

Channel List					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	27	2429	54	2456
01	2403	28	2430	55	2457
02	2404	29	2431	56	2458
03	2405	30	2432	57	2459
04	2406	31	2433	58	2460
05	2407	32	2434	59	2461
06	2408	33	2435	60	2462
07	2409	34	2436	61	2463
08	2410	35	2437	62	2464
09	2411	36	2438	63	2465
10	2412	37	2439	64	2466
11	2413	38	2440	65	2467
12	2414	39	2441	66	2468
13	2415	40	2442	67	2469
14	2416	41	2443	68	2470
15	2417	42	2444	69	2471
16	2418	43	2445	70	2472
17	2419	44	2446	71	2473
18	2420	45	2447	72	2474
19	2421	46	2448	73	2475
20	2422	47	2449	74	2476
21	2423	48	2450	75	2477
22	2424	49	2451	76	2478
23	2425	50	2452	77	2479
24	2426	51	2453	78	2480
25	2427	52	2454		
26	2428	53	2455		

3. Table for Filed Antenna

Ant	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	JOYPLUS	QI-10X	PIFA Antenna	N/A	0.5	BT Antenna

The EUT antenna is PIFA Antenna. no antenna other than that furnished by the responsible party shall be used with the device.



2.2 DESCRIPTION OF TEST MODES

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

Pretest Mode	Description
Mode 1	CH00
Mode 2	CH39
Mode 3	CH78
Mode 4	Charging + Keeping TX mode

For Conducted Emission				
Final Test Mode Description				
Mode 4	Charging + Keeping TX mode			

For Radiated Emission					
Final Test Mode	Description				
Mode 1	CH00				
Mode 2	CH39				
Mode 3	CH78				
Mode 4	Charging + Keeping TX mode				

Note:

- (1) The measurements are performed at the highest, middle, lowest available channels.
- (2) We have be tested for all avaiable U.S. voltage and frequencies(For 120V,50/60Hz and 240V, 50/60Hz) for which the device is capable of operation.

2.3 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING

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

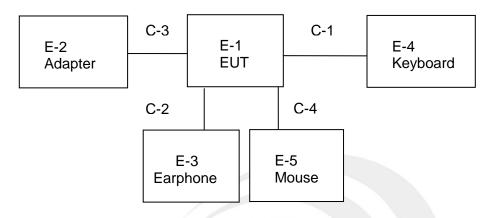
Test software Version	Test program: N/A				
Frequency	2402 MHz 2441 MHz 2480 MHz				
Parameters(1Mbps)	DEF	DEF	DEF		



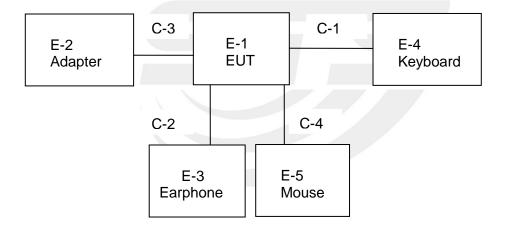
2.4 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

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

Radiated Spurious Emission Test



Conducted Emission Test





2.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Serial No.	Note
E-1	Tablet PC	JOYPLUS	QI-10X	N/A	EUT
E-2	Adapter	FLYPOWER	PS10A050K2000JU	3X06399004	EUT
E-3	Earphone	N/A	N/A	28970262WS	EUT
E-4	Keyboard	HP	PR1101U	DKUSB1B06Q42209FBK800	N/A
E-5	Mouse	MOTOSPEED	F66	697738-001	N/A

Item	Shielded Type	Ferrite Core	Length	Note
C-1	Unshielded	NO	82cm	/
C-2	Unshielded	NO	107cm	/
C-3	Unshielded	NO	120cm	/
C-4	Unshielded	NO	100cm	/

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in <code>"Length_"</code> column.
- (3) "YES" is means "shielded" "with core"; "NO" is means "unshielded" "without core".



2.6 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation Test equipment

Radiation rest equipment					
Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Spectrum Analyzer	Agilent	E4407B	MY50140340	2015.10.25	2016.10.24
Test Receiver	R&S	ESCI	101427	2015.10.25	2016.10.24
Bilog Antenna	TESEQ	CBL6111D	34678	2015.11.25	2016.11.24
Horn Antenna	Schwarzbeck	BBHA 9120D(1201)	9120D-1343	2015.03.06	2016.03.05
50Ω Coaxial Switch	Anritsu	MP59B	6200264416	2015.06.06	2016.06.05
PreAmplifier	Agilent	8449B	60538	2015.10.25	2016.10.24
Loop Antenna	ARA	PLA-1030/B	1029	2015.06.08	2016.06.07
USB RF power sensor	DARE	RPR3006W	15I00041SNO03	2015.10.25	2016.10.24

Conduction Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
EMI Test Receiver	R&S	ESPI	102086	2015.11.20	2016.11.19
LISN	R&S	ENV216	101242	2015.10.25	2016.10.24
LISN	EMCO	3810/2NM	000-23625	2015.10.25	2016.10.24

RF Connected Test

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
USB RF power sensor	DARE	RPR3006W	15I00041SNO03	2015.10.25	2016.10.24
Spectrum Analyzer	Agilent	E4407B	MY50140340	2015.10.25	2016.10.24
Signal Analyzer	Agilent	N9020A	MY49100060	2015.11.18	2016.11.17



3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION LIMITS

Operating frequency band. In case the emission fall within the restricted band specified on Part 15.247&207(a) limit in the table below has to be followed.

Class B	Standard	
Quasi-peak	Average	Standard
66 - 56 *	56 - 46 *	CISPR
56.00	46.00	CISPR
60.00	50.00	CISPR
	Quasi-peak 66 - 56 * 56.00	66 - 56 * 56 - 46 * 56.00 46.00

0.15 -0.5	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	56.00	46.00	FCC
5.0 -30.0	60.00	50.00	FCC

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

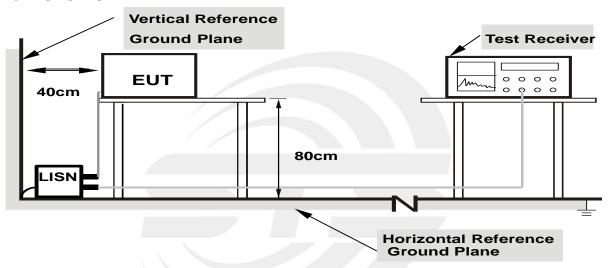
Receiver Parameters	Setting	
Attenuation	10 dB	
Start Frequency	0.15 MHz	
Stop Frequency	30 MHz	
IF Bandwidth	9 kHz	



3.1.2 TEST PROCEDURE

- a. The EUT was placed 0.4 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item -EUT Test Photos.

3.1.3 TEST SETUP



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

3.1.4 EUT OPERATING CONDITIONS

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



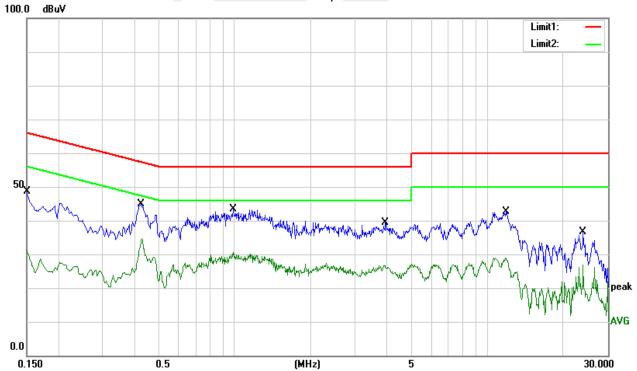
3.1.5 TEST RESULTS

EUT:	Tablet PC	Model Name.:	QI-10X
Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	1010hPa	Phase:	L
Test Voltage:	DC 5V from Adapter AC120V/60Hz	Test Mode:	Mode 4

Frequency	Reading	Correct	Result	Limit	Margin	Remark
(MHz)	(dBuV)	Factor(dB)	(dBuV)	(dBuV)	(dB)	Remaik
0.1500	37.31	11.20	48.51	66.00	-17.49	QP
0.1500	20.28	11.20	31.48	56.00	-24.52	AVG
0.4260	34.68	10.12	44.80	57.33	-12.53	QP
0.4260	24.31	10.12	34.43	47.33	-12.90	AVG
0.9860	33.52	9.90	43.42	56.00	-12.58	QP
0.9860	20.60	9.90	30.50	46.00	-15.50	AVG
3.9580	29.09	10.19	39.28	56.00	-16.72	QP
3.9580	16.16	10.19	26.35	46.00	-19.65	AVG
11.8620	32.21	10.36	42.57	60.00	-17.43	QP
11.8620	18.14	10.36	28.50	50.00	-21.50	AVG
23.8940	26.11	10.57	36.68	60.00	-23.32	QP
23.8940	16.20	10.57	26.77	50.00	-23.23	AVG

Remark:

1. Factor = Antenna Factor + Cable Loss - Pre-amplifier.





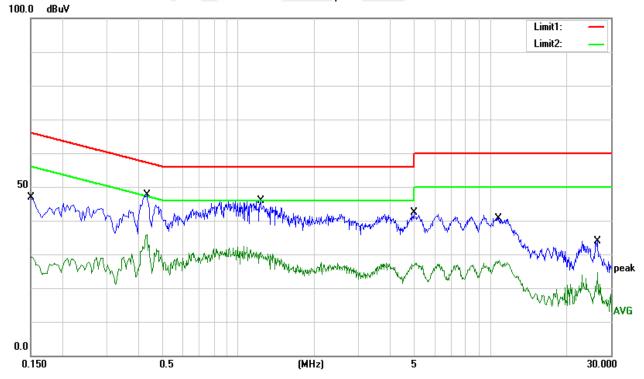


EUT:	Tablet PC	Model Name.:	QI-10X
Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	1010hPa	Phase:	N
Test Voltage:	DC 5V from Adapter AC120V/60Hz	Test Mode:	Mode 4

Frequency	Reading	Correct	Result	Limit	Margin	Domork
(MHz)	(dBuV)	Factor(dB)	(dBuV)	(dBuV)	(dB)	Remark
0.1500	35.63	11.20	46.83	66.00	-19.17	QP
0.1500	18.05	11.20	29.25	56.00	-26.75	AVG
0.4350	37.77	9.96	47.73	57.16	-9.43	QP
0.4350	24.57	9.96	34.53	47.16	-12.63	AVG
1.2340	35.90	10.00	45.90	56.00	-10.10	QP
1.2340	19.52	10.00	29.52	46.00	-16.48	AVG
4.9780	32.11	10.20	42.31	56.00	-13.69	QP
4.9780	16.53	10.20	26.73	46.00	-19.27	AVG
10.7900	30.42	10.28	40.70	60.00	-19.30	QP
10.7900	17.35	10.28	27.63	50.00	-22.37	AVG
26.5500	23.11	10.71	33.82	60.00	-26.18	QP
26.5500	13.88	10.71	24.59	50.00	-25.41	AVG

Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.





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3.2 RADIATED EMISSION MEASUREMENT

3.2.1 RADIATED EMISSION LIMITS

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on Part 15247&205(a), then the Part 15 247&209(a) limit in the table below has to be followed.

LIMITS OF RADIATED EMISSION MEASUREMENT (30MHz - 1000MHz)

2111110 01 111 1211 12 21111001011 1112 100112 111 10001111 10001111				
Frequencies	Field Strength	Measurement Distance		
(MHz)	(micorvolts/meter)	(meters)		
0.009~0.490	2400/F(KHz)	300		
0.490~1.705	24000/F(KHz)	30		
1.705~30.0	30	30		
30~88	100	3		
88~216	150	3		
216~960	200	3		
Above 960	500	3		

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

EDEOLIENCY (MU=)	Class B (dBuV/m) (at 3M)			
FREQUENCY (MHz)	PEAK	AVERAGE		
Above 1000	74	54		

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

FREQUENCY RANGE OF RADIATED MEASUREMENT (For unintentional radiators)

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

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Spectrum Parameter	Setting	
Attenuation	Auto	
Detector	Peak	
Start Frequency	1000 MHz(Peak/AV)	
Stop Frequency	10th carrier harmonic(Peak/AV)	
RB / VB (emission in restricted	1 MHz / 1 MHz - AV/ 10 Hz	
band)	1 MHz / 1 MHz, AV=10 Hz	

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

3.2.2 TEST PROCEDURE

- a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- b. The EUT was placed on the top of a rotating table 0.8 meters(above 1GHz is 1.5 m) above the ground at a 3 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The height of the equipment or of the substitution antenna shall be 0.8 m(above 1GHz is 1.5 m); the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos. Note:

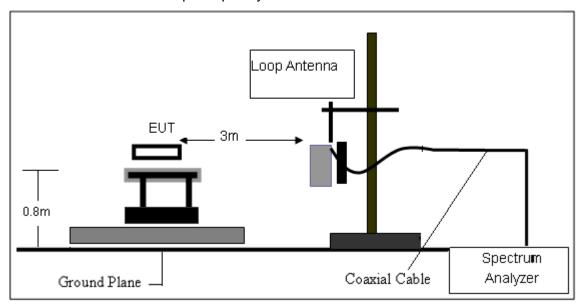
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

3.2.3 DEVIATION FROM TEST STANDARD No deviation

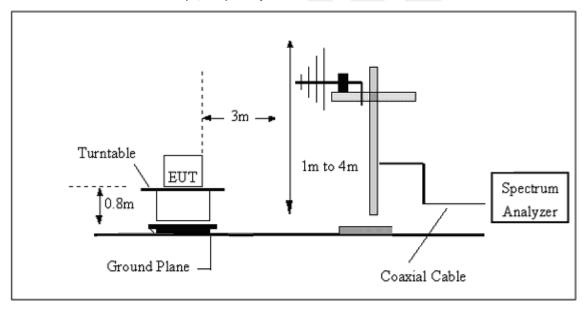


3.2.4 TEST SETUP

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

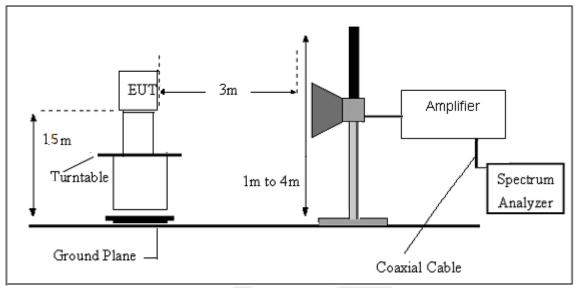


(B) Radiated Emission Test-Up Frequency 30MHz~1GHz





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



3.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.



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3.2.6 TEST RESULTS

Below 30MHz

EUT:	Tablet PC	Model Name.:	QI-10X
Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	1010hPa	Test Mode:	Mode 4
Test Voltage:	DC 5V from Adapter AC120V/60Hz		

Freq.	Reading	Limit	Margin	State	Test Result
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F	rest Result

NOTE:

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

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

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



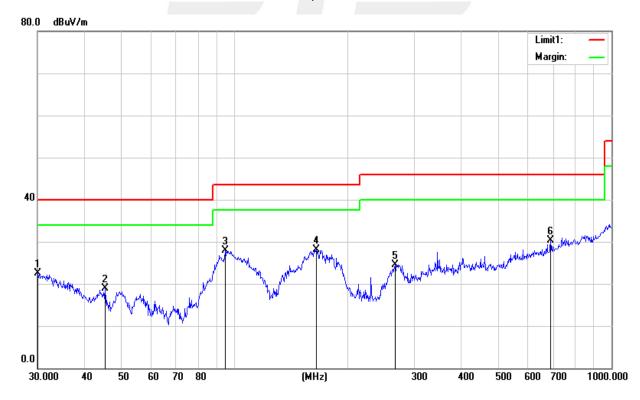
Between 30-1000MHz

EUT:	Tablet PC	Model Name.:	QI-10X
Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	1010hPa	Phase:	Horizontal
Test Voltage:	DC 5V from Adapter AC120V/60Hz	Test Mode:	Mode 4

Frequency	Reading	Correct	Result	Limit	Margin	Remark
(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
30.1053	3.92	18.65	22.57	40.00	-17.43	QP
45.3755	8.34	10.58	18.92	40.00	-21.08	QP
94.4284	17.89	10.08	27.97	43.50	-15.53	QP
164.9075	17.09	11.04	28.13	43.50	-15.37	QP
266.6090	9.79	14.78	24.57	46.00	-21.43	QP
689.5643	6.96	23.36	30.32	46.00	-15.68	QP

Remark:

1. Factor = Antenna Factor + Cable Loss - Pre-amplifier.





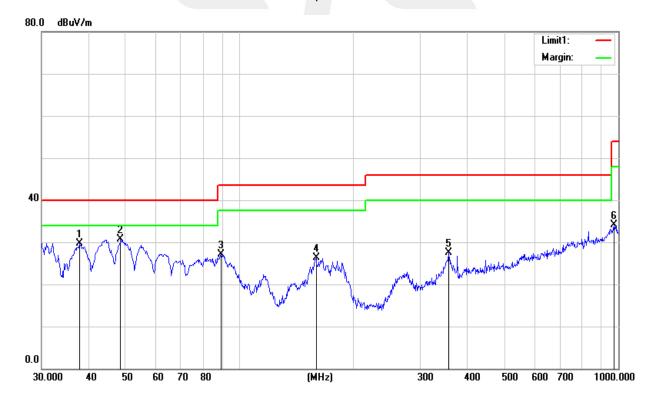


EUT:	Tablet PC	Model Name.:	QI-10X
Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	1010hPa	Phase:	Vertical
Test Voltage:	DC 5V from Adapter AC120V/60Hz	Test Mode:	Mode 4

Frequency	Reading	Correct	Result	Limit	Margin	Remark
(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
37.8121	15.12	14.64	29.76	40.00	-10.24	QP
48.5016	21.81	8.88	30.69	40.00	-9.31	QP
89.2762	17.69	9.43	27.12	43.50	-16.38	QP
159.2250	14.60	11.64	26.24	43.50	-17.26	QP
356.6757	11.16	16.41	27.57	46.00	-18.43	QP
972.3374	5.07	28.98	34.05	54.00	-19.95	QP

Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.





Above 1000 MHz

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector	Commont
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре	Comment
		Lo	ow Channel (2402	MHz)			
4804.20	62.67	-3.62	59.05	74	-14.95	PK	Vertical
4804.22	43.77	-3.62	40.15	54	-13.85	AV	Vertical
7206.13	58.53	-0.9	57.63	74	-16.37	PK	Vertical
7206.12	38.10	-0.9	37.20	54	-16.80	AV	Vertical
4803.99	58.44	-3.65	54.79	74	-19.21	PK	Horizontal
4803.99	40.51	-3.65	36.86	54	-17.14	AV	Horizontal
		N	lid Channel (2441	MHz)			
4882.09	63.95	-3.65	60.30	74	-13.70	PK	Vertical
4882.07	47.79	-3.65	44.14	54	-9.86	AV	Vertical
7323.22	59.43	-0.84	58.59	74	-15.41	PK	Vertical
7323.20	42.42	-0.84	41.58	54	-12.42	AV	Vertical
4882.18	59.87	-3.68	56.19	74	-17.81	PK	Horizontal
4882.15	43.67	-3.68	39.99	54	-14.01	AV	Horizontal
		Н	igh Channel (2480	MHz)			
4960.26	60.07	-3.59	56.48	74	-17.52	PK	Vertical
4960.30	44.25	-3.59	40.66	54	-13.34	AV	Vertical
7440.32	59.49	-0.83	58.66	74	-15.34	PK	Vertical
7440.30	44.03	-0.83	43.20	54	-10.80	AV	Vertical
4960.33	60.01	-3.59	56.42	74	-17.58	PK	Horizontal
4960.30	44.24	-3.59	40.65	54	-13.35	AV	Horizontal

Note:

- 1) 30MHz~25GHz:(Scan with GFSK, π/4-DQPSK,8DPSK, the worst case is GFSK Mode)
- 2) Factor = Antenna Factor + Cable Loss Pre-amplifier.

Emission Level = Meter Reading + Factor

Margin = Limit - Emission Leve



Band edge

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector	0
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре	Comment
			GFSK				
2390.0	66.95	-12.99	53.96	74	-20.04	PK	Vertical
2390.0	52.53	-12.99	39.54	54	-14.46	AV	Vertical
2390.0	67.52	-12.99	54.53	74	-19.47	PK	Horizontal
2390.0	51.67	-12.99	38.68	54	-15.32	AV	Horizontal
2483.6	68.88	-12.78	56.10	74	-17.90	PK	Vertical
2483.6	52.03	-12.78	39.25	54	-14.75	AV	Vertical
2483.6	69.02	-12.78	56.24	74	-17.76	PK	Horizontal
2483.6	52.14	-12.78	39.36	54	-14.64	AV	Horizontal
			π/4-DQPSK				
2390.0	68.78	-12.99	55.79	74	-18.21	PK	Vertical
2390.0	51.88	-12.99	38.89	54	-15.11	AV	Vertical
2390.0	68.10	-12.99	55.11	74	-18.89	PK	Horizontal
2390.0	52.84	-12.99	39.85	54	-14.15	AV	Horizontal
2483.6	68.92	-12.78	56.14	74	-17.86	PK	Vertical
2483.6	53.51	-12.78	40.73	54	-13.27	AV	Vertical
2483.6	68.86	-12.78	56.08	74	-17.92	PK	Horizontal
2483.6	52.31	-12.78	39.53	54	-14.47	AV	Horizontal
			8DPSK				
2390.0	68.98	-12.99	55.99	74	-18.01	PK	Vertical
2390.0	52.76	-12.99	39.77	54	-14.23	AV	Vertical
2390.0	67.88	-12.99	54.89	74	-19.11	PK	Horizontal
2390.0	53.70	-12.99	40.71	54	-13.29	AV	Horizontal
2483.6	68.86	-12.78	56.08	74	-17.92	PK	Vertical
2483.6	52.51	-12.78	39.73	54	-14.27	AV	Vertical
2483.6	68.82	-12.78	56.04	74	-17.96	PK	Horizontal
2483.6	52.14	-12.78	39.36	54	-14.64	AV	Horizontal

Low measurement frequencies is range from 2310 to 2400 MHz, high measurement frequencies is range from 2483.5 to 2500 MHz.

Only show the worst point data of the emissions in the frequency 2310-2400 MHz and 2483.5-2500 MHz.





Hopping

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector	
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре	Comment
			GFSK				
2390.0	66.49	-12.99	53.50	74	-20.50	PK	Vertical
2390.0	54.13	-12.99	41.14	54	-12.86	AV	Vertical
2390.0	65.98	-12.99	52.99	74	-21.01	PK	Horizontal
2390.0	52.00	-12.99	39.01	54	-14.99	AV	Horizontal
2483.5	66.05	-12.78	53.27	74	-20.73	PK	Vertical
2483.5	51.72	-12.78	38.94	54	-15.06	AV	Vertical
2483.5	66.48	-12.78	53.70	74	-20.30	PK	Horizontal
2483.5	53.09	-12.78	40.31	54	-13.69	AV	Horizontal
			π/4-DQPSK				
2390.0	66.44	-12.99	53.45	74	-20.55	PK	Vertical
2390.0	53.54	-12.99	40.55	54	-13.45	AV	Vertical
2390.0	65.66	-12.99	52.67	74	-21.33	PK	Horizontal
2390.0	51.71	-12.99	38.72	54	-15.28	AV	Horizontal
2483.5	66.11	-12.78	53.33	74	-20.67	PK	Vertical
2483.5	52.13	-12.78	39.35	54	-14.65	AV	Vertical
2483.5	67.23	-12.78	54.45	74	-19.55	PK	Horizontal
2483.5	52.54	-12.78	39.76	54	-14.24	AV	Horizontal
			8DPSK				
2390.0	66.94	-12.99	53.95	74	-20.05	PK	Vertical
2390.0	54.17	-12.99	41.18	54	-12.82	AV	Vertical
2390.0	65.46	-12.99	52.47	74	-21.53	PK	Horizontal
2390.0	51.86	-12.99	38.87	54	-15.13	AV	Horizontal
2483.5	65.63	-12.78	52.85	74	-21.15	PK	Vertical
2483.5	51.78	-12.78	39.00	54	-15.00	AV	Vertical
2483.5	66.76	-12.78	53.98	74	-20.02	PK	Horizontal
2483.5	52.95	-12.78	40.17	54	-13.83	AV	Horizontal

Low measurement frequencies is range from 2310 to 2400 MHz, high measurement frequencies is range from 2483.5 to 2500 MHz.

Only show the worst point data of the emissions in the frequency 2310-2400 MHz and 2483.5-2500 MHz.



4. CONDUCTED SPURIOUS EMISSIONS

4.1 REQUIREMENT

According to FCC section 15.247(d), in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

4.2 TEST PROCEDURE

According to FCC section 15.247(d), in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

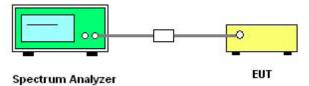
Spectrum Parameter	Setting	
Detector	Peak	
Start/Stop Frequency	30 MHz to 10th carrier harmonic	
RB / VB (emission in restricted band)	100 KHz/300 KHz	
Trace-Mode:	Max hold	

For Band edge

Spectrum Parameter	Setting	
Detector Peak		
Start/Stan Eraguanay	Lower Band Edge: 2310 – 2404 MHz	
Start/Stop Frequency	Upper Band Edge: 2478 – 2500 MHz	
RB / VB (emission in restricted band)	100 KHz/300 KHz	
Trace-Mode:	Max hold	

Remark: Hopping on and Hopping off mode all have been tested, only worst case hopping off is reported.

4.3 TEST SETUP



The EUT which is powered by the Battery, is coupled to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 500hm; the path loss as the factor is calibrated to correct the reading. Make the measurement with the spectrum analyzer's resolution bandwidth(RBW) = 100 kHz. In order to make an accurate measurement, set the span greater than RBW.

4.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

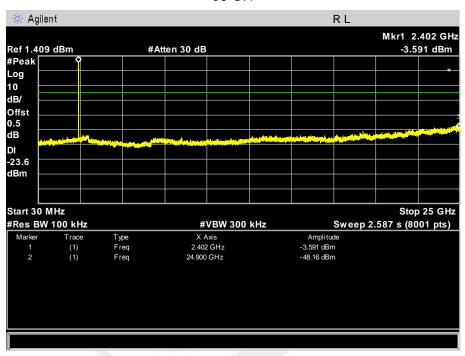


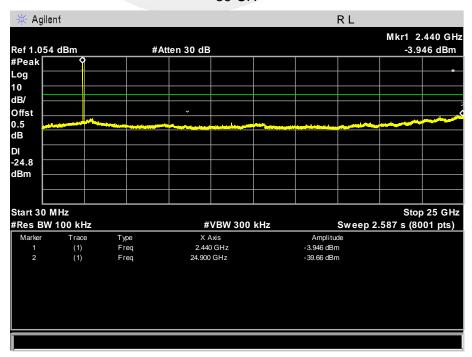


4.5 TEST RESULTS

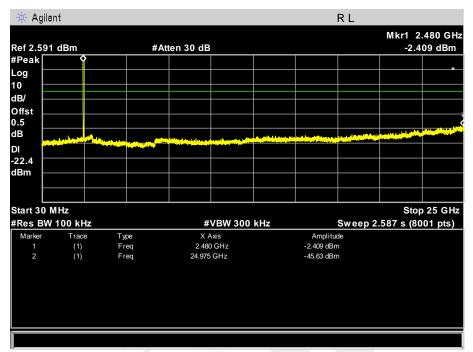
EUT:	Tablet PC	Model Name :	QI-10X
Temperature:	25 ℃	Relative Humidity:	50%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	GFSK(1Mbps)-00/39/78 CH		

00 CH







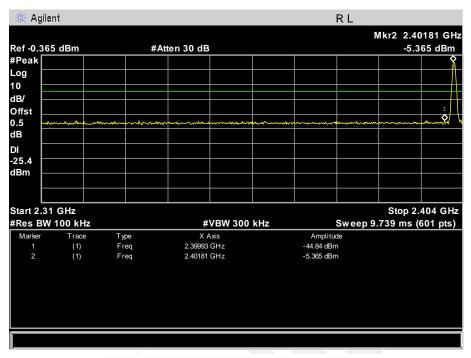


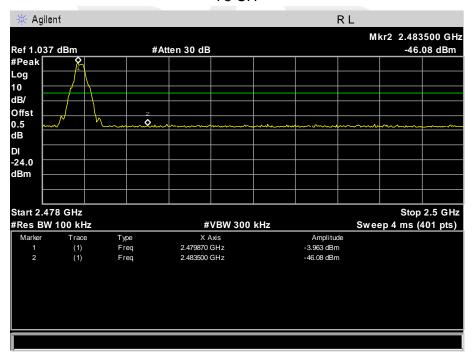




For Band edge

00 CH



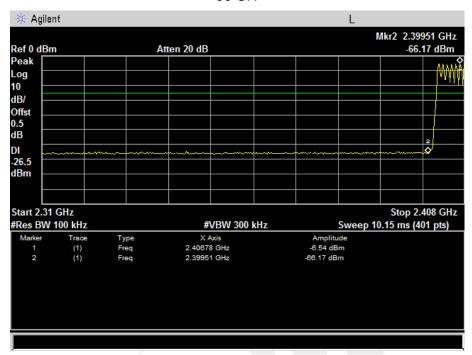


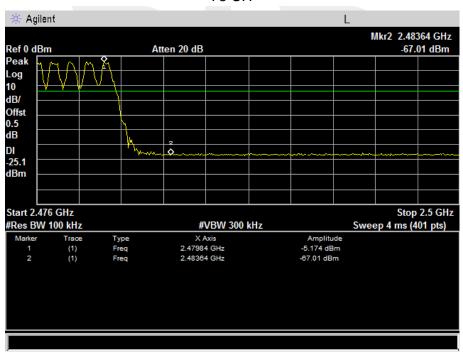




For Hopping Band edge

00 CH

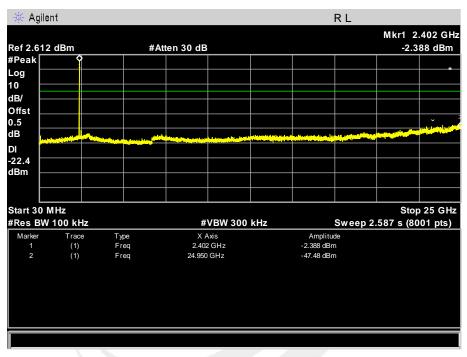




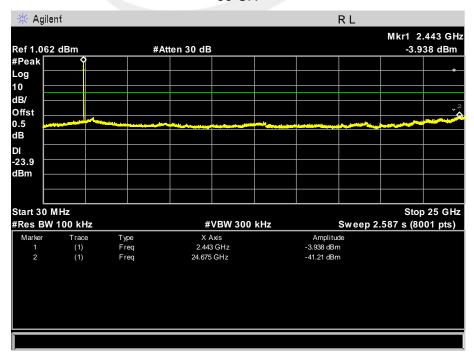


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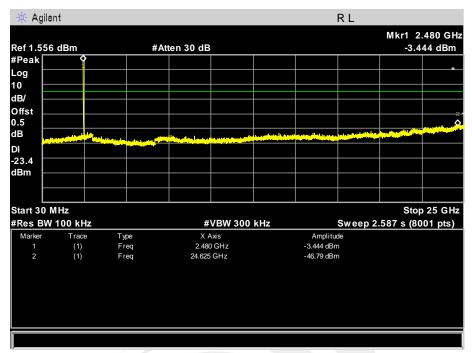
EUT:	Tablet PC	Model Name :	QI-10X		
Temperature :	25 ℃	Relative Humidity:	50%		
Pressure :	1012 hPa	Test Voltage :	DC 3.7V		
Test Mode :	π/4-DQPSK(2Mbps) –00/39/78 CH				



39 CH





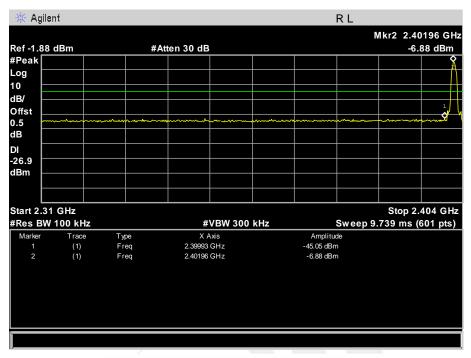


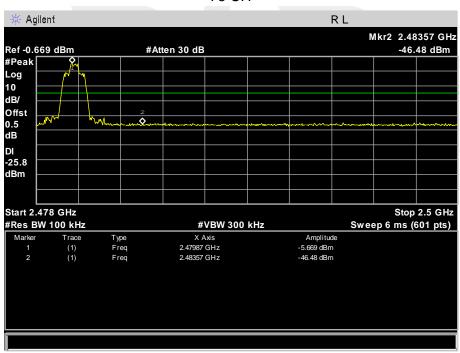




For Band edge

00 CH



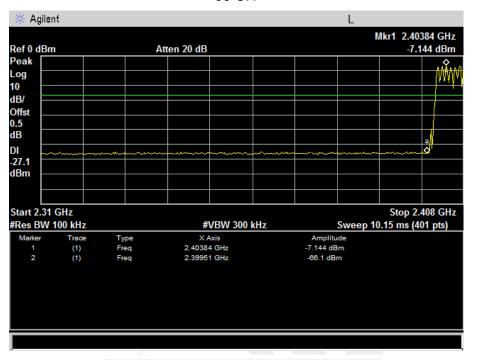


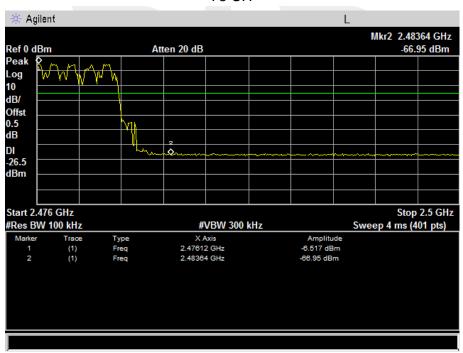




For Hopping Band edge

00 CH

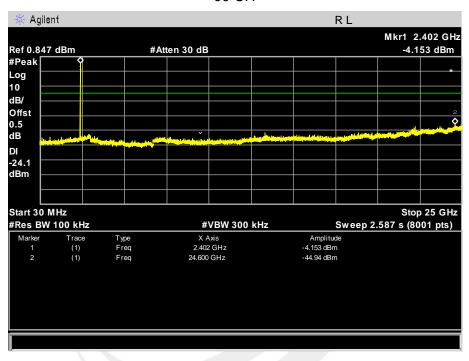




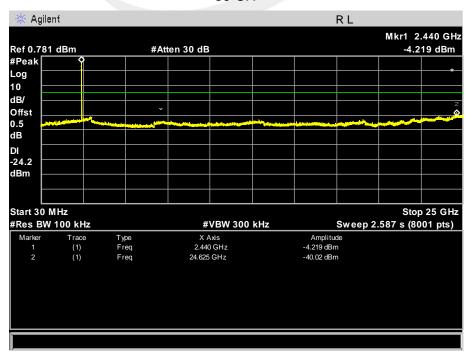


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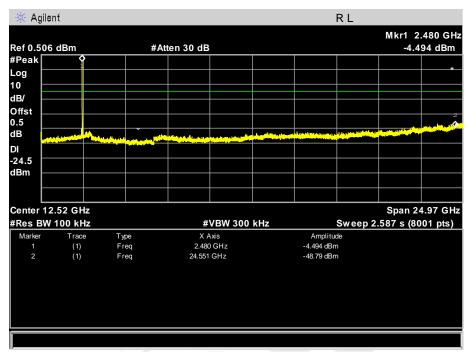
EUT:	Tablet PC	Model Name :	QI-10X	
Temperature :	25 ℃	Relative Humidity:	50%	
Pressure :	1012 hPa Test Voltage : DC 3.7V			
Test Mode :	8-DPSK(3Mbps) -00/39/78 CH			



39 CH





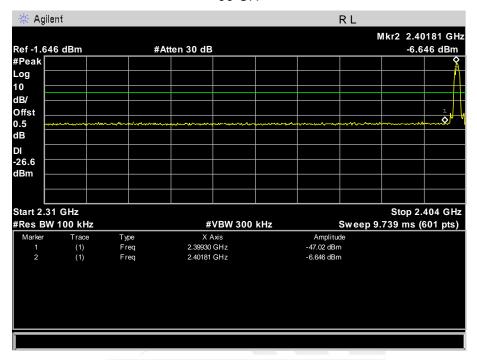


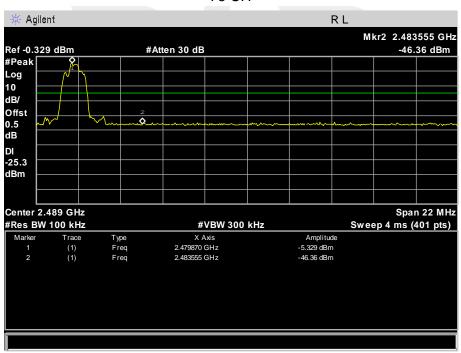




For Band edge

00 CH





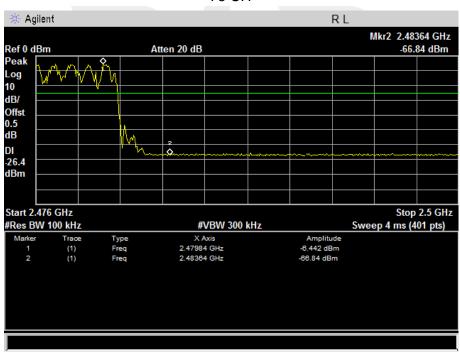




For Hopping Band edge

00 CH







5. NUMBER OF HOPPING CHANNEL

5.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247 (a)(1)(iii)	Number of Hopping Channel	≥15	2400-2483.5	PASS

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> Operating Frequency Range
RB	100 KHz
VB	100 KHz
Detector	Peak
Trace	Max Hold
Sweep Time Auto	

5.2 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- b. Spectrum Setting: RBW= 100K, VBW=100K, Sweep time = Auto.

5.3 TEST SETUP

EUT	SPECTRUM
	ANALYZER

5.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.





5.5 TEST RESULTS

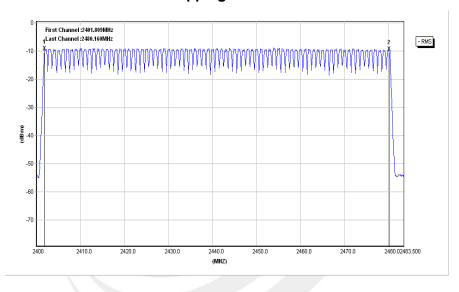
EUT:	Tablet PC	Model Name :	QI-10X
Temperature :	25 ℃	Relative Humidity:	60%
Pressure :	1015 hPa	Test Voltage :	DC 3.7V
Test Mode :	Hopping Mode		

Number of Hopping Channel

79

Report No.: STS1510002F03

Hopping channel







6. AVERAGE TIME OF OCCUPANCY

6.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section Test Item Limit Frequency Range (MHz) Result				Result
15.247 (a)(1)(iii)	Average Time of Occupancy	0.4sec	2400-2483.5	PASS

6.2 TEST PROCEDURE

- a. The transmitter output (antenna port) was connected to the spectrum analyzer
- b. Set RBW of spectrum analyzer to 1MHz and VBW to 3MHz.
- c. Use a video trigger with the trigger level set to enable triggering only on full pulses.
- d. Sweep Time is more than once pulse time.
- Set the center frequency on any frequency would be measure and set the frequency span to e. zero span.
- f. Measure the maximum time duration of one single pulse.
- g. Set the EUT for DH5, DH3 and DH1 packet transmitting.
- h. Measure the maximum time duration of one single pulse.
- i. DH5 Packet permit maximum 1600/79 / 6 = 3.37 hops per second in each channel (5 time slots RX, 1 time slot TX). So, the dwell time is the time duration of the pulse times 3.37 x 31.6 = 106.6 within 31.6 seconds.
- j. DH3 Packet permit maximum 1600 / 79 / 4 = 5.06 hops per second in each channel (3 time slots RX, 1 time slot TX). So, the dwell time is the time duration of the pulse times $5.06 \times 31.6 = 160$ within 31.6 seconds.
- k. DH1 Packet permit maximum 1600 / 79 / 2 = 10.12 hops per second in each channel (1 time slot RX, 1 time slot TX). So, the dwell time is the time duration of the pulse times $10.12 \times 31.6 = 320$ within 31.6 seconds.

6.3 TEST SETUP

EUT	SPECTRUM
	ANALYZER

6.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

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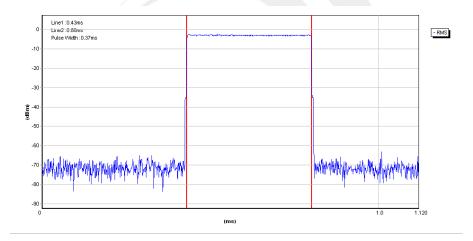


6.5 TEST RESULTS

EUT:	Tablet PC	Model Name :	QI-10X
Temperature :	25 ℃	Relative Humidity:	50%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	GFSK(1Mbps)-DH1/DH3/DH5		

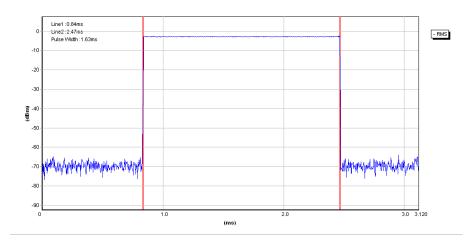
Data Packet	Frequency	Pulse Duration (ms)	Dwell Time (s)	Limits(s)
DH1	2441 MHz	0.370	0.118	0.4
DH3	2441 MHz	1.630	0.261	0.4
DH5	2441 MHz	2.880	0.307	0.4

CH39-DH1

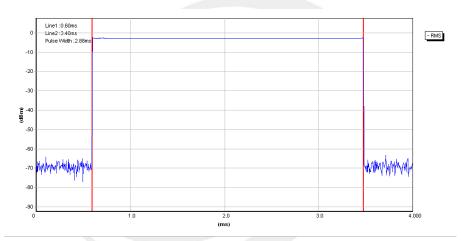




CH39-DH3



CH39-DH5



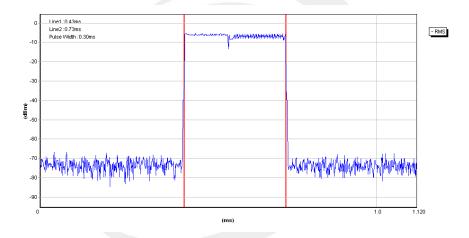


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EUT:	Tablet PC	Model Name :	QI-10X	
Temperature :	25 ℃	Relative Humidity:	50%	
Pressure :	1012 hPa	Test Voltage :	DC 3.7V	
Test Mode :	est Mode : π/4-DQPSK(2Mbps) –2DH1/2DH3/2DH5			

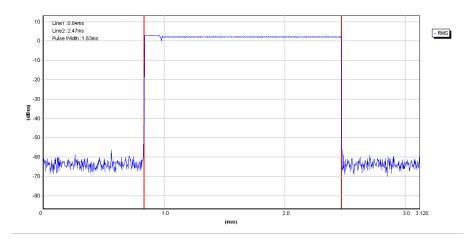
Data Packet	Frequency	Pulse Duration (ms)	Dwell Time (s)	Limits(s)
2DH1	2441 MHz	0.300	0.096	0.4
2DH3	2441 MHz	1.630	0.261	0.4
2DH5	2441 MHz	2.880	0.307	0.4

CH39-2DH1

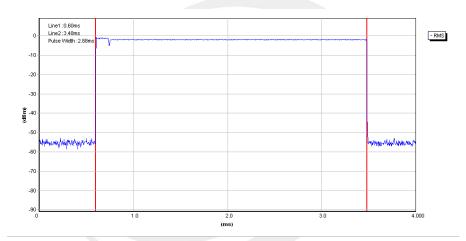




CH39-2DH3



CH39-2DH5



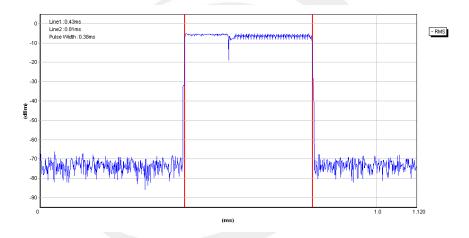


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EUT:	Tablet PC	Model Name :	QI-10X	
Temperature :	25 ℃	Relative Humidity:	50%	
Pressure :	1012 hPa Test Voltage : DC 3.7V			
Test Mode : 8DPSK(3Mbps) –3DH1/3DH3/3DH5				

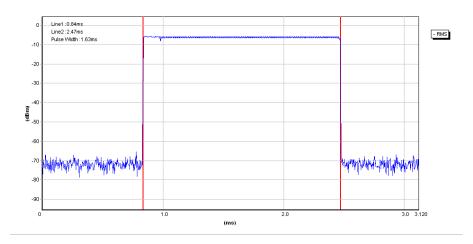
Data Packet	Frequency	Pulse Duration (ms)	Dwell Time (s)	Limits(s)
3DH1	2441 MHz	0.380	0.122	0.4
3DH3	2441 MHz	1.630	0.261	0.4
3DH5	2441 MHz	2.890	0.308	0.4

CH39-3DH1

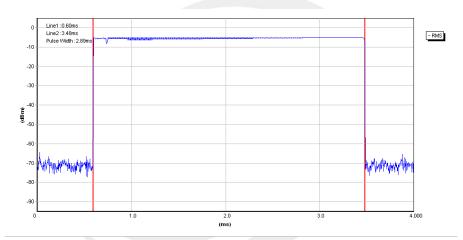




CH39-3DH3



CH39-3DH5





7. HOPPING CHANNEL SEPARATION MEASUREMEN

7.1 APPLIED PROCEDURES / LIMIT

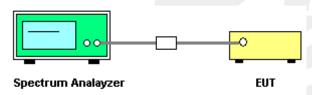
Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 20 dB bandwidth of the hopping channel, whichever is greater.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> Measurement Bandwidth or Channel Separation
RB	30 kHz (20dB Bandwidth) / 30 kHz (Channel Separation)
VB	100 kHz (20dB Bandwidth) / 100 kHz (Channel Separation)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

7.2 TEST PROCEDURE

- a. The transmitter output (antenna port) was connected to the spectrum analyser in peak hold mode.
- b. The resolution bandwidth of 30 kHz and the video bandwidth of 100 kHz were utilised for 20 dB bandwidth measurement.
- C. The resolution bandwidth of 30 kHz and the video bandwidth of 100 kHz were utilised for channel separation measurement.

7.3 TEST SETUP



7.4 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.





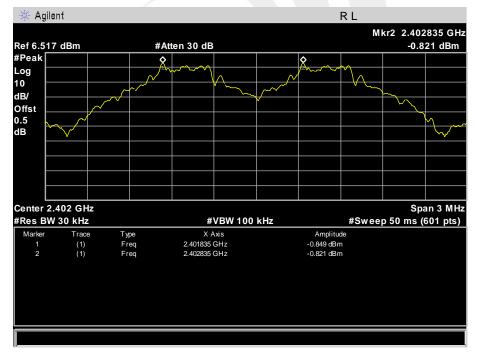
7.5 TEST RESULTS

EUT:	Tablet PC	Model Name :	QI-10X
Temperature :	25 ℃	Relative Humidity:	50%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	CH00 / CH39 /CH78 (GFSK(1Mbps) Mode)		

Frequency	Ch. Separation (MHz)	Limit	Result
2402 MHz	1.000	0.826	Complies
2441 MHz	1.000	0.911	Complies
2480 MHz	1.005	0.869	Complies

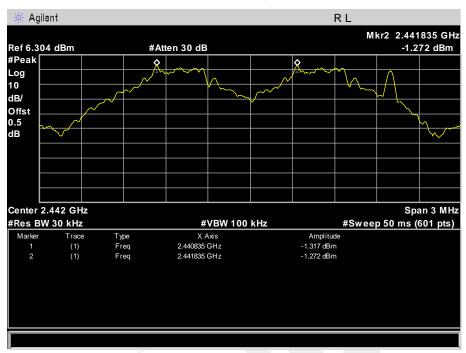
For GFSK: Ch. Separation Limits: >20dB bandwidth

CH00 -1Mbps

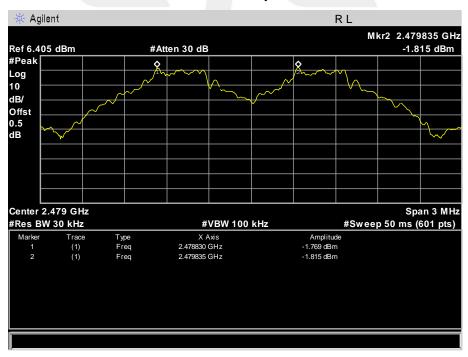




CH39 -1Mbps



CH78 -1Mbps





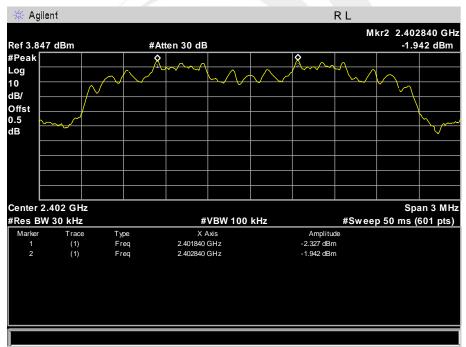
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EUT:	Tablet PC	Model Name :	QI-10X
Temperature:	25 ℃	Relative Humidity:	50%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	CH00 / CH39 /CH78 (π/4-DQPSK(2Mbps) Mode)		

Frequency	Ch. Separation (MHz)	Limit	Result
2402 MHz	1.000	0.867	Complies
2441 MHz	1.000	0.859	Complies
2480 MHz	1.000	0.863	Complies

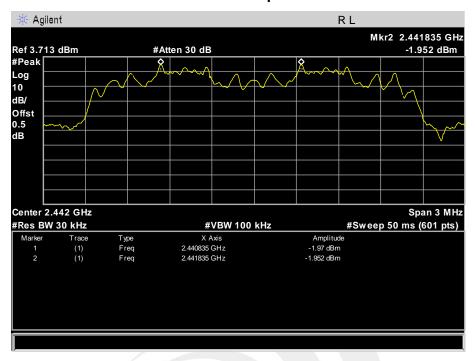
For $\pi/4$ -DQPSK(2Mbps): Ch. Separation Limits: > two-thirds 20dB bandwidth



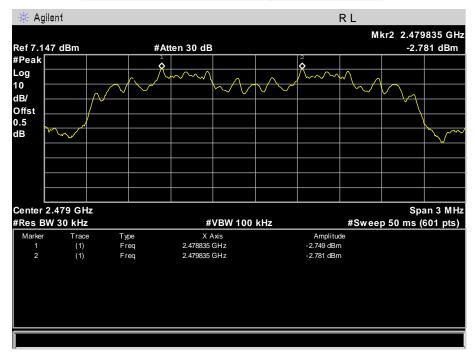




CH39 -2Mbps



CH78 -2Mbps





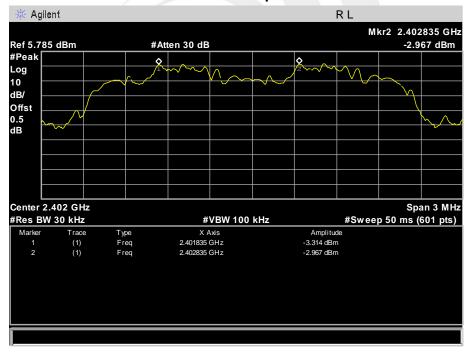
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EUT:	Tablet PC	Model Name :	QI-10X
Temperature :	25 ℃	Relative Humidity:	50%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	CH00 / CH39 /CH78 (8-DPSK(3Mbps)Mode)		

Frequency	Ch. Separation (MHz)	Limit	Result
2402 MHz	1.000	0.855	Complies
2441 MHz	1.000	0.850	Complies
2480 MHz	1.000	0.852	Complies

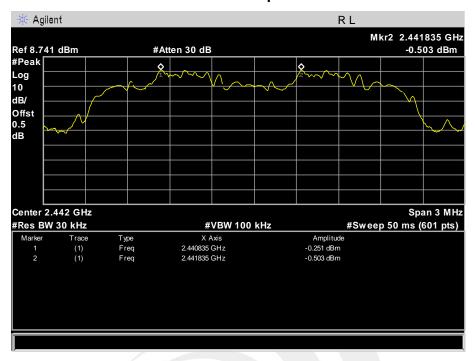
For 8-DPSK(3Mbps):

Ch. Separation Limits: > two-thirds 20dB bandwidth CH00 -3Mbps

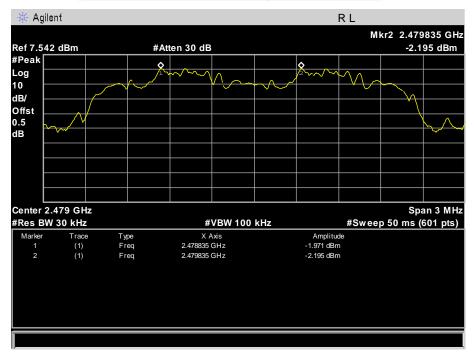




CH39 -3Mbps



CH78 -3Mbps







8. BANDWIDTH TEST

8.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247), Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247 (a)(1)	Bandwidth	(20dB bandwidth)	2400-2483.5	PASS

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> Measurement Bandwidth or Channel Separation
RB	30 kHz (20dB Bandwidth) / 30 kHz (Channel Separation)
VB	100 kHz (20dB Bandwidth) / 100 kHz (Channel Separation)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

8.2 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- b. Spectrum Setting: RBW= 30KHz, VBW=100KHz, Sweep time = Auto.

8.3 TEST SETUP

EUT	SPECTRUM
	ANALYZER

8.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

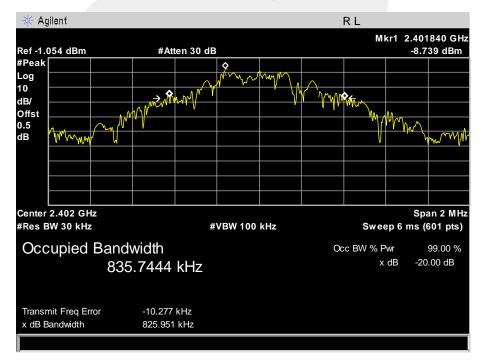


8.5 TEST RESULTS

EUT:	Tablet PC	Model Name :	QI-10X
Temperature :	25 ℃	Relative Humidity:	50%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	GFSK(1Mbps)CH00 / CH39 /C78		

Frequency	20dB Bandwidth (MHz)	Result
2402 MHz	0.826	PASS
2441 MHz	0.911	PASS
2480 MHz	0.869	PASS

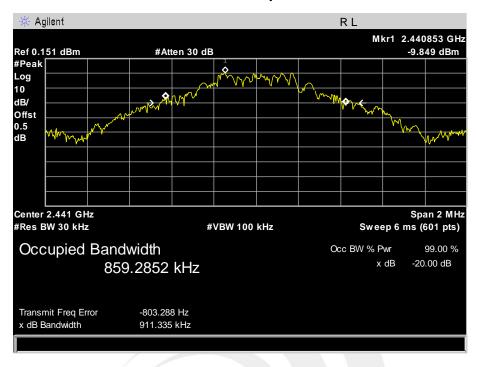
CH00 -1Mbps



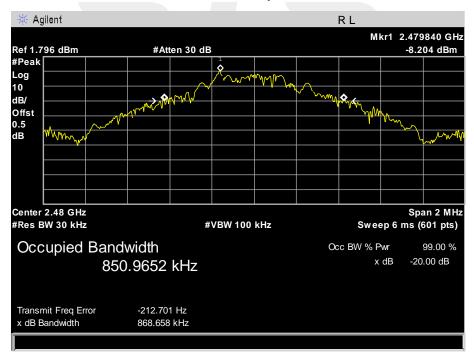




CH39 -1Mbps



CH78 -1Mbps



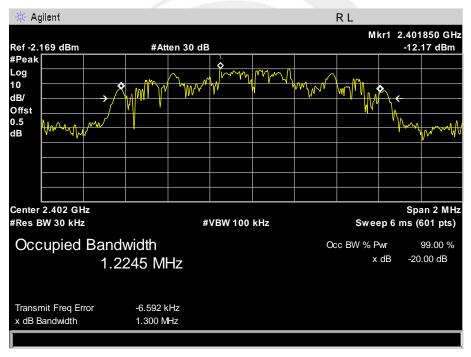


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EUT:	Tablet PC	Model Name :	QI-10X
Temperature :	25 ℃	Relative Humidity:	50%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	/lode : π/4-DQPSK(2Mbps)CH00 / CH39 /C78		

Frequency	20dB Bandwidth(MHz)	Result
2402 MHz	1.300	PASS
2441 MHz	1.289	PASS
2480 MHz	1.295	PASS

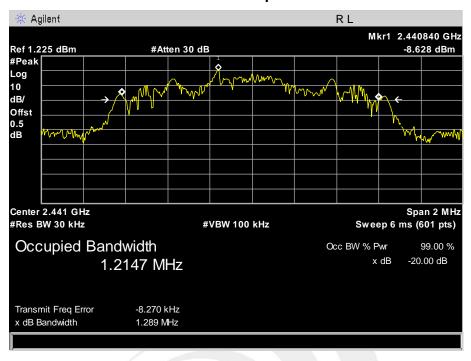
CH00 -2Mbps



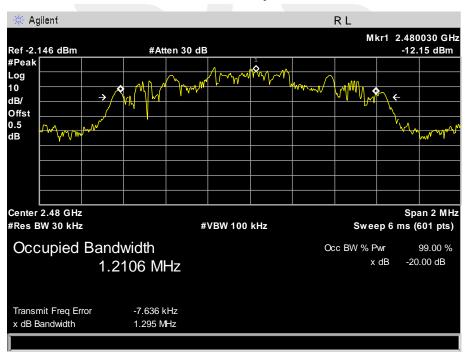




CH39 -2Mbps



CH78 -2Mbps



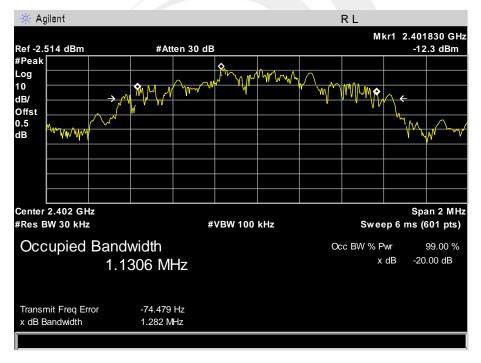


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EUT:	Tablet PC	Model Name :	QI-10X
Temperature :	25 ℃	Relative Humidity:	50%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	lode : 8DPSK(3Mbps)CH00 / CH39 /C78		

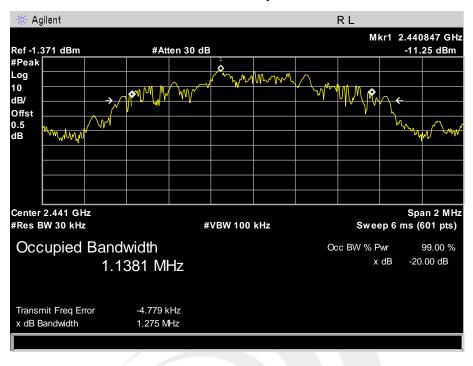
Frequency	20dB Bandwidth (MHz)	Result
2402 MHz	1.282	PASS
2441 MHz	1.275	PASS
2480 MHz	1.278	PASS

CH00 -3Mbps

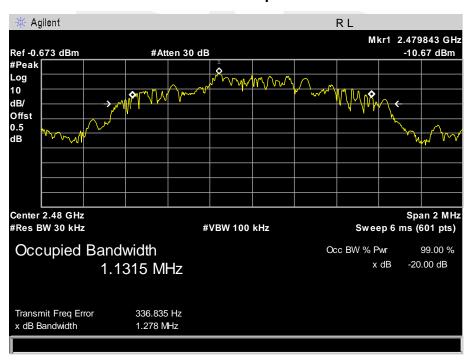




CH39 -3Mbps



CH78 -3Mbps





9. PEAK OUTPUT POWER TEST

9.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247	Peak	1 W or 0.125W		
(b)(i)	Output Power	Or if channel separation > 2/3 bandwidthprovided the systems operatewith an output power no greater than125 mW(20.96dBm)	2400-2483.5	PASS

9.2 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- b. Spectrum Setting : GFSK(1Mbps):RBW= 1MHz, VBW= 3MHz, Sweep time = Auto.
- c. Spectrum Setting: $\pi/4$ -DQPSK(2Mbps):RBW= 3MHz, VBW= 3MHz, Sweep time = Auto.
- d. Spectrum Setting: 8-DPSK(3Mbps):RBW= 3MHz, VBW= 3MHz, Sweep time = Auto.

9.3 TEST SETUP

EUT	SPECTRUM
	ANALYZER

9.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.





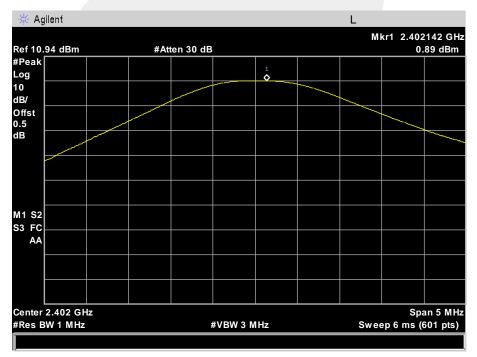
9.5 TEST RESULTS

EUT:	Tablet PC	Model Name :	QI-10X
Temperature :	25 ℃	Relative Humidity:	60%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	CH00/ CH39 /CH78 GFSK(1Mbps)		

Test Channel	Frequency (MHz)	Peak Output Power (dBm)	LIMIT (dBm)
CH00	2402	0.890	30
CH39	2441	0.558	30
CH78	2480	-0.069	30

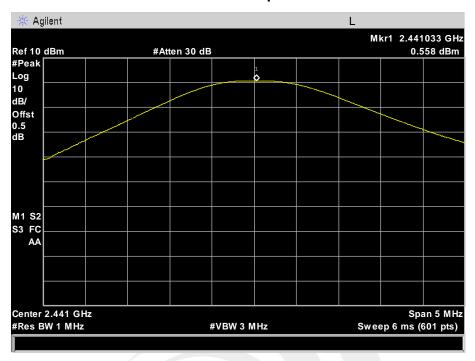
Note: the channel separation > bandwidth

CH00 -1Mbps

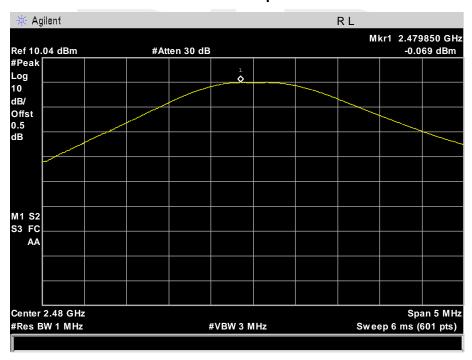




CH39 -1Mbps



CH78 -1Mbps





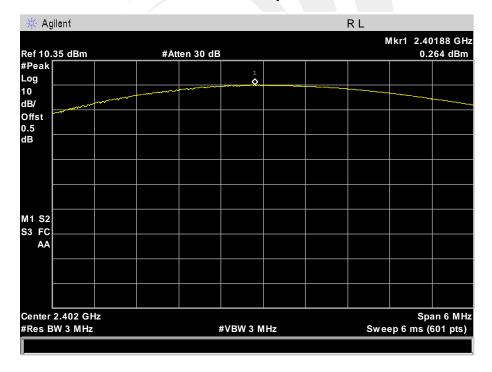
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EUT:	Tablet PC	Model Name :	QI-10X
Temperature :	25 ℃	Relative Humidity:	60%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	CH00/ CH39 /CH78 π/4-DQPSK(2Mbps)		

Test Channel	Frequency (MHz)	Peak Output Power (dBm)	LIMIT (dBm)
CH00	2402	0.264	20.96
CH39	2441	0.157	20.96
CH78	2480	-0.524	20.96

Note: the channel separation >2/3 bandwidth

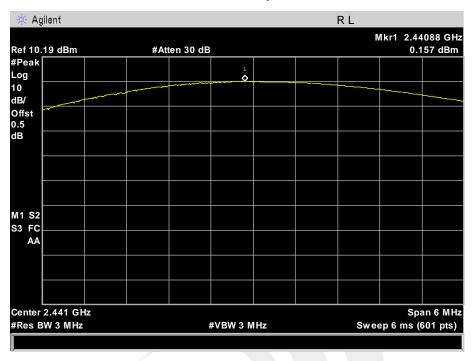
CH00 -2Mbps



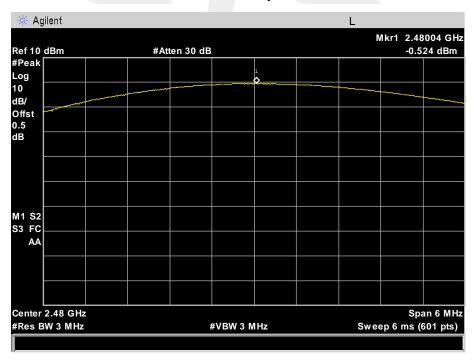




CH39 -2Mbps



CH78 -2Mbps





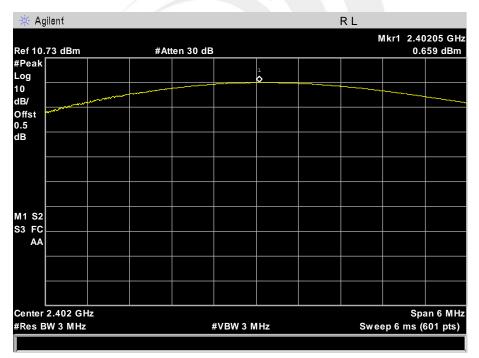
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EUT:	Tablet PC	Model Name :	QI-10X
Temperature :	25 ℃	Relative Humidity:	60%
Pressure :	1012 hPa	Test Voltage :	DC 3.7V
Test Mode :	CH00/ CH39 /CH78 8-DPSK(3Mbps)		

Test Channel	Frequency (MHz)	Peak Output Power (dBm)	LIMIT (dBm)
CH00	2402	0.659	20.96
CH39	2441	0.343	20.96
CH78	2480	-0.259	20.96

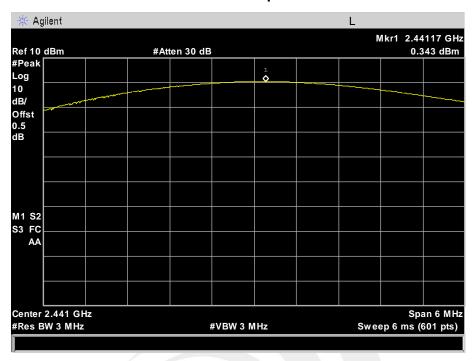
Note: the channel separation >2/3 bandwidth

CH00 -3Mbps

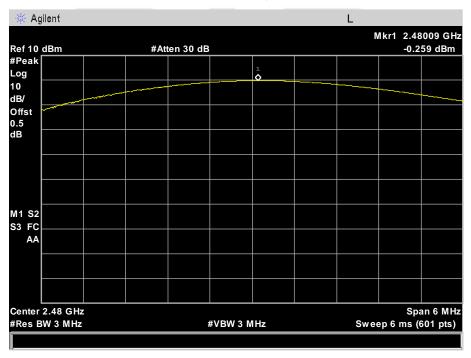




CH39 -3Mbps



CH78 -3Mbps





10. ANTENNA REQUIREMENT

10.1 STANDARD REQUIREMENT

15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

10.2 EUT ANTENNA

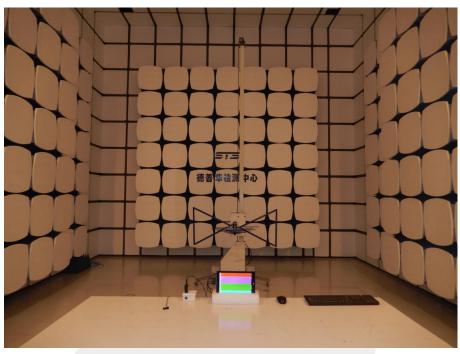
The EUT antenna is PIFA Antenna. It comply with the standard requirement.

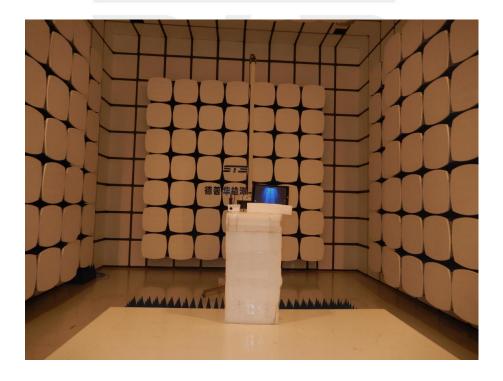




APPENDIX- PHOTOS OF TEST SETUP









Conducted Measurement Photos



* * * * * END OF THE REPORT * * * *