



of

Report No: FCC 1405030-02 File reference No: 2014-05-21 Applicant: Shenzhen Jingwah Information Technology Co., Ltd. Product: Tablet PC Model No: P9, Q9, PTAB940, PTAB941, W909 Trademark: Polaroid Test Standards: FCC Part 15.247 It is herewith confirmed and found to comply with the Test result: requirements set up by ANSI C63.4, ,FCC Part 15 Subpart C, Paragraph 15.247 regulations for the evaluation electromagnetic compatibility

Approved By

Jack Chung

Jack Chung Manager

Dated:

May 21, 2014

Results appearing herein relate only to the sample tested The technical reports is issued errors and omissions exempt and is subject to withdrawal at

# SHENZHEN TIMEWAY TECHNOLOGY CONSULTING CO LTD

5/F,Block 4, Anhua Industrial Zone.,No.8 TaiRan Rd.CheGongMiao,FuTian District, Shenzhen.CHINA.

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# **Special Statement:**

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19.

The testing quality system of our laboratory meets with ISO/IEC-17025 requirements, which is approved by CNAS. This approval result is accepted by MRA of APLAC.

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

# **CNAS-LAB Code: L2292**

The EMC Laboratory has been assessed and in compliance with CNAS-CL01 accreditation criteria for testing Laboratories (identical to ISO/IEC 17025:1999 General Requirements) for the Competence of testing Laboratories.

# FCC-Registration No.: 899988

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission. The acceptance letter from the FCC is maintained in our files. Registration No.:899988.

# IC- Registration No.: IC5205A-02

The EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada. The acceptance letter from the IC is maintained in our files. Registration No.: IC 5205A-02.

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## 1.0 General Details

### Test Lab Details 1.1

Name :	SHENZHEN TIMEWAY TECHNOLOGY CONSULTING CO., LTD	
Address:	5/F,Block 4, Anhua Industrial Zone.,No.8 TaiRan Rd.CheGongMiao,FuTian Dist	rict
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Registration 1	Number: 899988	
For 3m & 10	mOATS	
Site Listed wi	vith Industry Canada of Ottawa, Canada	
Registration 1	Number: IC: 5205A-02	
For 3m & 10	m OATS	

# 1.2 Applicant Details

Applicant:	Shenzhen Jingwah Information Technology Co., Ltd.
Address:	4F, Bldg 4, Jinghua Square, No.1 Huafa North Road, Futian District, Shenzhen, China
Telephone:	
Fax:	

# 1.3 Description of EUT

Product:	Tablet PC
Manufacturer:	Shenzhen Jingwah Information Technology Co., Ltd.
Address:	4F, Bldg 4, Jinghua Square, No.1 Huafa North Road, Futian District,
	Shenzhen, China
Brand Name:	Polaroid
Model Number:	W909
Additional Model Numb	er: P9, Q9, PTAB940, PTAB941
Power Adapter	Model No.: FJ-SW0502000DU
	Input: 100-240V, 50/60Hz, 0.3A Max; Output: 5V, 2000mA
Type of Modulation	GFSK, JI/4DQPSK, 8DPSK
Frequency range	2402-2480MHz for Bluetooth

Channel Spacing 1MHz for Bluetooth

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adopt any other remedies which may be appropriate.

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Frequency SelectionBy softwareChannel Number79 channel for Bluetooth

Antenna:

Integral Antenna with maximum gain 2.0dBi

- 1.4 Submitted Sample: 2 Samples
- 1.5 Test Duration 2014-05-04 to 2014-05-20
- 1.6 Test Uncertainty Conducted Emissions Uncertainty =3.6dB Radiated Emissions Uncertainty =4.7dB
- 1.7 Test Engineer

Terry Tang

The sample tested by

Print Name: Terry Tang

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2.0		Test Equip	ments		
Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
ESPI Test Receiver	ROHDE&SCHWARZ	ESPI 3	100379	2013-08-23	2014-08-22
TWO Line-V-NETW	ROHDE&SCHWARZ	EZH3-Z5	100294	2013-08-23	2014-08-22
TWO Line-V-NETW	ROHDE&SCHWARZ	EZH3-Z5	100253	2013-08-23	2014-08-22
Ultra Broadband ANT	ROHDE&SCHWARZ	HL562	100157	2013-08-25	2014-08-24
ESDV Test Receiver	ROHDE&SCHWARZ	ESDV	100008	2013-08-23	2014-08-22
Impuls-Begrenzer	ROHDE&SCHWARZ	ESH3-Z2	100281	2013-08-24	2014-08-23
System Controller	СТ	SC100	-		
Printer	EPSON	PHOTO EX3	CFNH234850		
Computer	IBM	8434	1S8434KCE99BLXL O*	-	-
Loop Antenna	EMCO	6502	00042960	2013-08-23	2014-08-22
ESPI Test Receiver	ROHDE&SCHWARZ	ESI26	838786/013	2013-08-23	2014-08-22
3m OATS			N/A	2013-08-22	2014-08-21
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170265	2013-08-24	2014-08-23
Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-631	2013-08-24	2014-08-23
Power meter	Anritsu	ML2487A	6K00003613	2013-08-24	2014-08-23
Power sensor	Anritsu	MA2491A	32263	2013-08-24	2014-08-23
Bilog Antenna	Schwarebeck	VULB9163	9163/340	2013-08-21	2014-08-20
LISN	AFJ	LS16C	10010947251	2013-08-21	2014-08-20
LISN (Three Phase)	Schwarebeck	NSLK 8126	8126453	2013-08-23	2014-08-22
9*6*6 Anechoic			N/A	2013-08-22	2014-08-21
EMI Test Receiver	RS	ESCS30	100139	2013-08-23	2014-08-22
LISN	AFJ	LS16C	10010947251	2013-08-23	2014-08-22
LISN (Three Phase)	Schwarebeck	NSLK 8126	8126453	2013-08-23	2014-08-22

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#### 3.0 **Technical Details**

#### 3.1 **Summary of test results**

Requirement	CFR 47 Section	Result	Notes
Antenna Requirement	15.203, 15.247(b)(4)	PASS	Complies
Maximum Peak Out Power	15.247 (b)(1), (4)	PASS	Complies
Carrier Frequency Separation	15.247(a)(1)	PASS	Complies
20dB Channel Bandwidth	15.247 (a)(1)	PASS	Complies
Number of Hopping Channels	15.247(a)(iii), 15.247(b)(1)	PASS	Complies
Time of Occupancy (Dwell Time)	15.247(a)(iii)	PASS	Complies
Spurious Emission, Band Edge, and Restricted bands	15.247(d),15.205(a), 15.209 (a),15.109	PASS	Complies
<b>Conducted Emissions</b>	15.207(a), 15.107	PASS	Complies
<b>RF</b> Exposure	15.247(i), 1.1307(b)(1)	PASS	Complies

#### 3.2 **Test Standards**

FCC Part 15 Subpart & Subpart C, Paragraph 15.247

### 4.0 **EUT Modification**

No modification by Shenzhen Timeway Technology Consulting Co., Ltd

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adopt any other remedies which may be appropriate.

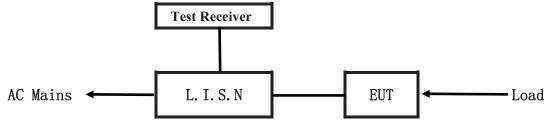
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## 5. **Power Line Conducted Emission Test**

5.1 Schematics of the test

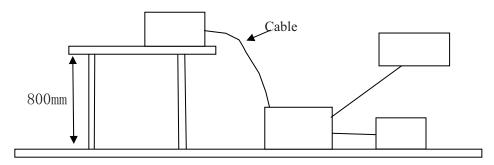
5.2



EUT: Equipment Under Test

Test Method and test Procedure The EUT was tested according to ANSI C63.4-2003.The Frequency spectrum From 0.15MHz to 30MHz was investigated. The LISN used was 50ohm/50uH as specified by section 5.1 of ANSI C63.4 –2003. Test Voltage: 120V~60Hz

Block diagram of Test setup



5.3 Configuration of The EUT

The EUT was configured according to ANSI C63.4-2003. All interface ports were connected to the appropriate peripherals. All peripherals and cables are listed below.

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# A. EUT

Device	Manufacturer	Model	FCC ID	
Tablet PC	Shenzhen Jingwah Information	P9, Q9, PTAB940,	FCC ID: RBD-W909	
Tablet PC	Technology Co., Ltd.	PTAB941, W909	FCC ID. KDD- W 909	

# B. Internal Device

Device	Manufacturer	Model	Rating

# C. Peripherals

Device	Manufacturer Model FCC ID/DOC		Cable		

# 5.4 EUT Operating Condition

Operating condition is according to ANSI C63.4 -2003.

- A Setup the EUT and simulators as shown on follow
- B Enable AF signal and confirm EUT active to normal condition

# 5.5 Power line conducted Emission Limit according to Paragraph 15.107, 15.207

Frequency	Class A Lim	nits (dB µ V)	Class B Limits (dB µ V)		
(MHz)	Quasi-peak Level	Quasi-peak Level Average Level		Average Level	
$0.15 \sim 0.50$	79.0	66.0	66.0~56.0*	56.0~46.0*	
$0.50~\sim~5.00$	73.0	60.0	56.0	46.0	
$5.00~\sim~30.00$	73.0	60.0	60.0	50.0	

Notes: 1. \*Decreasing linearly with logarithm of frequency.

2. The tighter limit shall apply at the transition frequencies

### 5.6 Test Results

The frequency spectrum from 0.15MHz to 30MHz was investigated. All reading are quasi-peak values with a resolution bandwidth of 9kHz.

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 A:
 Conducted Emission on Live Terminal (150kHz to 30MHz)

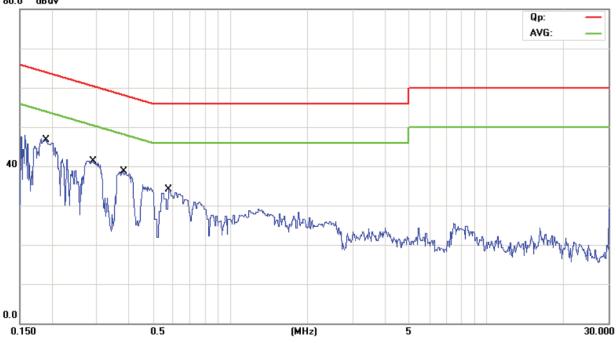
 EUT Operating Environment
 EUT Operating Environment

 Temperature: 26°C
 Humidity: 65%RH
 Atmospheric Pressure: 101 KPa

 EUT set Condition: Keep Bluetooth Transmitting
 Equipment Level: Class B

 Results: PASS
 Please refer to following diagram for individual





No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.1890	43.70	0.00	43.70	64.08	-20.38	QP	
2		0.1890	13.40	0.00	13.40	54.08	-40.68	AVG	
3		0.2877	37.70	0.00	37.70	60.59	-22.89	QP	
4		0.2877	10.80	0.00	10.80	50.59	-39.79	AVG	
5		0.3803	33.60	0.00	33.60	58.27	-24.67	QP	
6		0.3803	11.10	0.00	11.10	48.27	-37.17	AVG	
7		0.5763	27.50	0.00	27.50	56.00	-28.50	QP	
8		0.5763	7.20	0.00	7.20	46.00	-38.80	AVG	

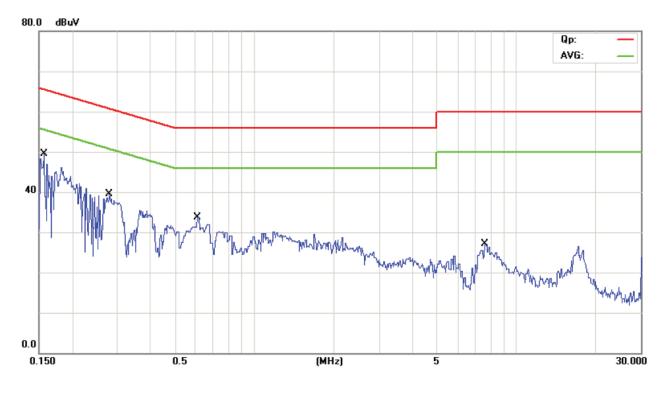
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B: Conducted Emission on Neutral Terminal (150kHz to 30MHz)
 EUT Operating Environment

 Temperature: 26°C
 Humidity: 65%RH
 Atmospheric Pressure: 101 KPa
 EUT set Condition: Keep Bluetooth Transmitting
 Equipment Level: Class B
 Results: Pass
 Please refer to following diagram for individual



No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	0.1562	14.60	0.00	14.60	65.66	-51.06	QP	
2	0.1562	-7.90	0.00	-7.90	55.66	-63.56	AVG	
3 *	0.2781	33.60	0.00	33.60	60.87	-27.27	QP	
4	0.2781	5.60	0.00	5.60	50.87	-45.27	AVG	
5	0.6100	27.50	0.00	27.50	56.00	-28.50	QP	
6	0.6100	-0.20	0.00	-0.20	46.00	-46.20	AVG	
7	7.6084	19.90	0.00	19.90	60.00	-40.10	QP	
8	7.6084	4.50	0.00	4.50	50.00	-45.50	AVG	

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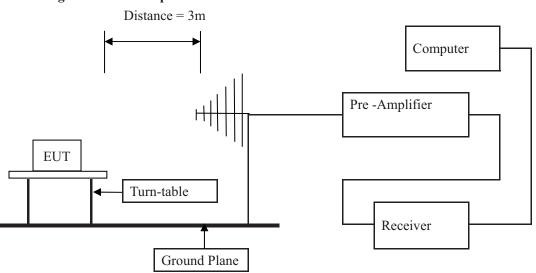
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### 6 Radiated Emission Test

# 6.1 Test Method and test Procedure:

- The EUT was tested according to ANSI C63.4 –2003. The radiated test was performed at Timeway Laboratory. This site is on file with the FCC laboratory division, Registration No.899988
- (2) The EUT, peripherals were put on the turntable which table size is 1m x 1.5 m, table high 0.8 m. All set up is according to ANSI C63.4-2003.
- (3) The frequency spectrum from 30 MHz to 25GHz was investigated. All readings from 30 MHz to 1 GHz are quasi-peak values with a resolution bandwidth of 120 kHz. For measurement above 1GHz, peak values with RBW=VBW=1MHz and PK detector. AV value with RBW=1MHz, VBW=10Hz and PK detector. Measurements were made at 3 meters.
- (4) The antenna high is varied from 1 m to 4 m high to find the maximum emission for each frequency.
- (5) Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dB of specification limit), and are distinguished with a "**QP**" in the data table.
- (6) The antenna polarization : Vertical polarization and Horizontal polarization.



# **Block diagram of Test setup**

- 6.2 Configuration of The EUT Same as section 5.3 of this report
- 6.3 EUT Operating Condition

Same as section 5.4 of this report.

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# 6.4 Radiated Emission Limit

All emission from a digital device, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below:

### Frequencies in restricted band are complied to limit on Paragraph 15.209 and 15.109 and RSS-210

Frequency Range (MHz)	Distance (m)	Field strength (dB $\mu$ V/m)
30-88	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

Note: 1. RF Voltage  $(dBuV) = 20 \log RF$  Voltage (uV)

2. In the Above Table, the higher limit applies at the band edges.

3. Distance refers to the distance in meters between the measuring instrument antenna and the EUT

4. This is a handhold device. The radiated emissions should be tested under 3-axes position (Lying, Side, and Stand), After pre-test. It was found that the worse radiated emission was get at the lying position.5. GFSK was the worse case because it has highest output power

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# **Test result** General Radiated Emission Data and Harmonics Radiated Emission Data

### Radiated Emission In Horizontal (30MHz----1000MHz)

EUT set Condition: Keep Bluetooth Transmitting

**Results:** 

Pass

Frequency (MHz)	Level@3m (dB $\mu$ V/m)	Antenna Polarity	Limit@3m (dB µ V/m)
177.160	26.45	Н	43.50
346.520	36.18	Н	46.00
148.520	26.50	Н	43.50
128.720	27.89	V	43.50
878.520	37.77	V	46.00
148.480	24.75	V	43.50

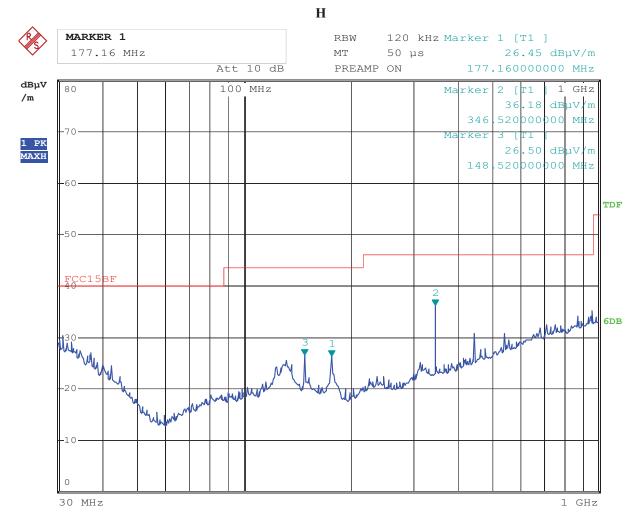
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Test Figure:



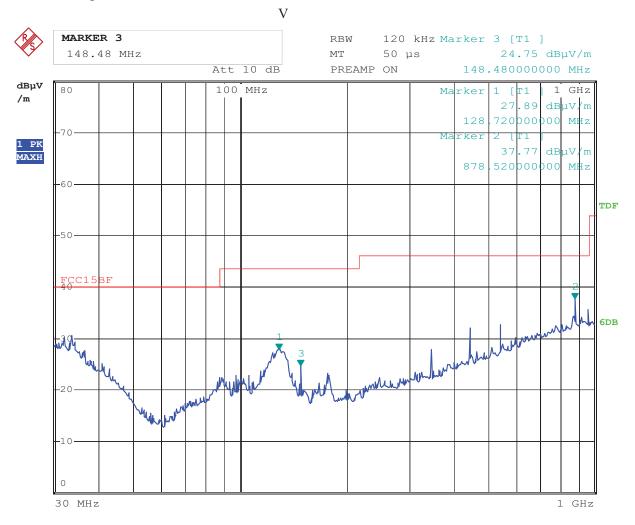
Date: 20.MAY.2014 17:18:54

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Test Figure:



Date: 20.MAY.2014 17:17:03

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	8	· · · · · · · · · · · · · · · · · · ·	
Frequency (MHz)	Level@3m (dB $\mu$ V/m)	Antenna Polarity	Limit@3m (dB µ V/m)
2402	89.86 (PK)	Н	Fundamental Frequency
2402	90.22 (PK)	V	Fundamental Frequency
4804		Н	74(Peak)/ 54(AV)
4804		V	74(Peak)/ 54(AV)
7206		H/V	74(Peak)/ 54(AV)
9608		H/V	74(Peak)/ 54(AV)
12010		H/V	74(Peak)/ 54(AV)
14412		H/V	74(Peak)/ 54(AV)
16814		H/V	74(Peak)/ 54(AV)
19216		H/V	74(Peak)/ 54(AV)
21618		H/V	74(Peak)/ 54(AV)
24020		H/V	74(Peak)/ 54(AV)

### **Operation Mode: Transmitting under Low Channel (2402MHz)**

Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit

2. Remark "---" means that the emissions level is too low to be measured

<b>Operation Mode: Transmitting</b>	under Middle Channel (2441MHz)
-------------------------------------	--------------------------------

operation froue. Transmitting and Fridade Channel (24416112)					
Frequency (MHz)	Level@3m (dB $\mu$ V/m)	Antenna Polarity	Limit@3m (dB µ V/m)		
2441	90.25 (PK)	Н	Fundamental Frequency		
2441	91.37 (PK)	V	Fundamental Frequency		
4882		Н	74(Peak)/ 54(AV)		
4882		V	74(Peak)/ 54(AV)		
7323		H/V	74(Peak)/ 54(AV)		
9764		H/V	74(Peak)/ 54(AV)		
12205		H/V	74(Peak)/ 54(AV)		
14646		H/V	74(Peak)/ 54(AV)		
17087		H/V	74(Peak)/ 54(AV)		
19528		H/V	74(Peak)/ 54(AV)		
21969		H/V	74(Peak)/ 54(AV)		
24410		H/V	74(Peak)/ 54(AV)		

Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit

2. Remark "---" means that the emissions level is too low to be measured

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	<u> </u>	· · · · ·	i
Frequency (MHz)	Level@3m (dB $\mu$ V/m)	Antenna Polarity	Limit@3m (dB µ V/m)
2480	89.11 (PK)	Н	Fundamental Frequency
2480	90.98 (PK)	V	Fundamental Frequency
4960		Н	74(Peak)/ 54(AV)
4960		V	74(Peak)/ 54(AV)
7440		H/V	74(Peak)/ 54(AV)
9920		H/V	74(Peak)/ 54(AV)
12400		H/V	74(Peak)/ 54(AV)
14880		H/V	74(Peak)/ 54(AV)
17360		H/V	74(Peak)/ 54(AV)
19840		H/V	74(Peak)/ 54(AV)
22320		H/V	74(Peak)/ 54(AV)
24800		H/V	74(Peak)/ 54(AV)

### **Operation Mode: Transmitting under High Channel (2480MHz)**

Note: 1. Level = Reading + AF + Cable - Preamp + Filter - Dist, Margin = Level - Limit

2. Remark "---" means that the emissions level is too low to be measured

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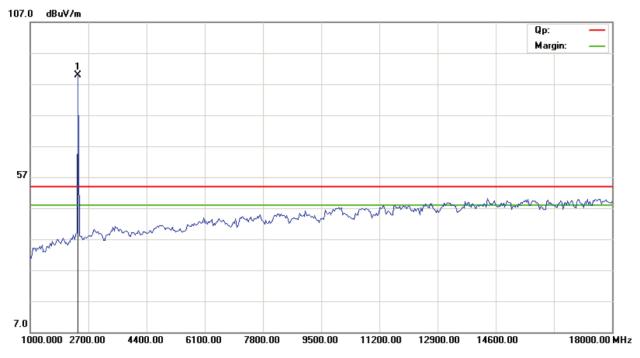
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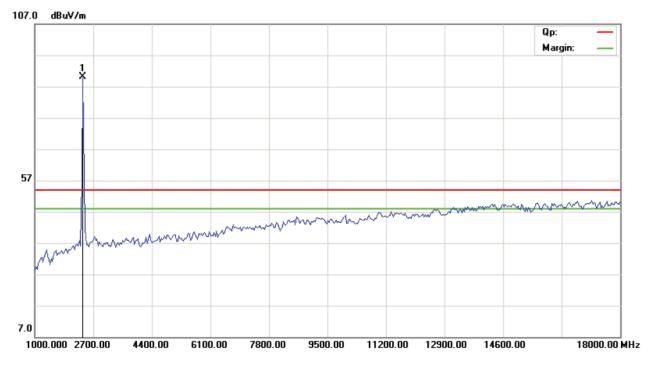


Please refer to the following test plots for details:

# Low Channel: Horizontal



### Low Channel : Vertical

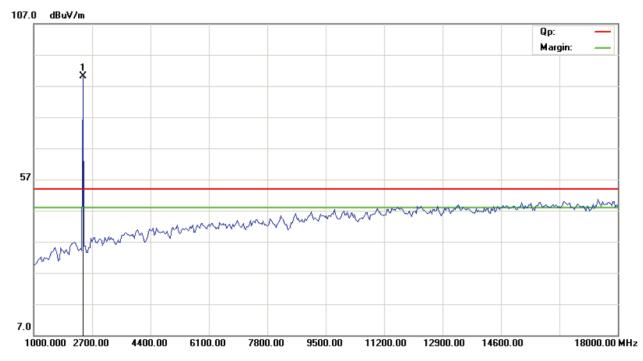


The report refers only to the sample tested and does not apply to the bulk.

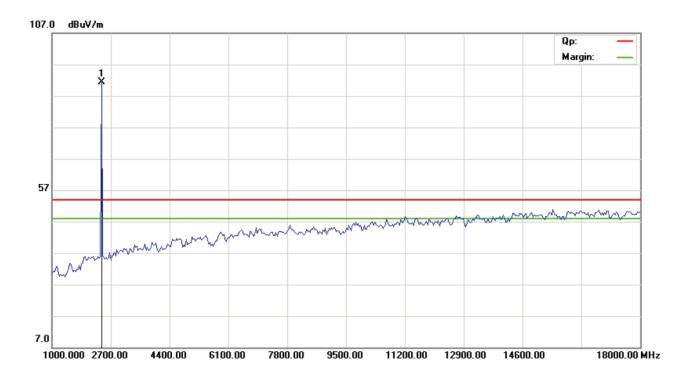
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Middle Channel :: Vertical

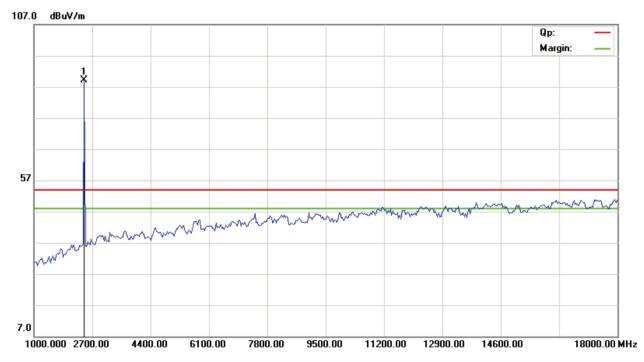


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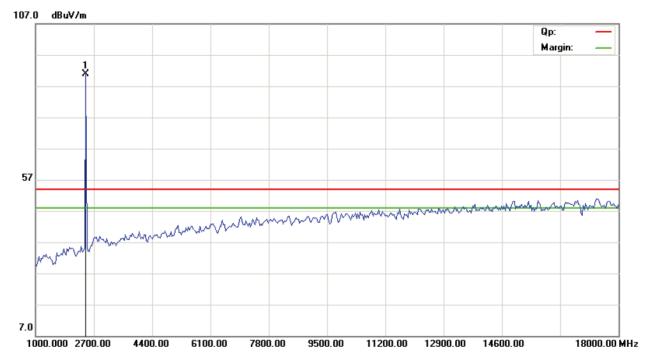
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### **High Channel : Vertical**



## Note: for the radiated emissions above 18G, it is the floor noise.

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# 7.0 20dB Bandwidth Measurement

# 7.1 Regulation

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

# 7.2 Limits of 20dB Bandwidth Measurement

N/A

# 7.3 Test Procedure.

1. Check the calibration of the measuring instrument (spectrum analyzer) using either an internal calibrator or a known signal from an external generator.

2. Set the spectrum analyzer as follows: Span =5MHz, VBW =30 kHz, RBW=100 kHz, Sweep = auto Detector function = peak, Trace = max hold

3. Measure the highest amplitude appearing on spectral display and record the level to calculate results. 6. Repeat above procedures until all frequencies measured were complete.

# 7.4 Test Result

Type	of	Modu	lation:	GFSK
- 1 - 2	•••	1110000		

EUT		Tablet PC		P9, Q9, PTAB940, PTAB941, W909
Mode	K	eep Transmitting	Input Voltage	DC3.7V
Temperat	ıre	24 deg. C, Humidity		56% RH
Channel	Channel Frequency (MHz)			Pass/ Fail
Low	2402	864		Pass
Middle	2441	852		Pass
High	2480	870		Pass

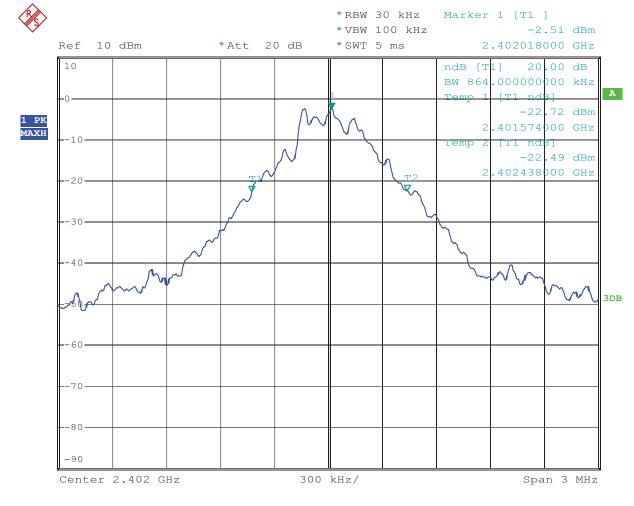
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### Test Figure:





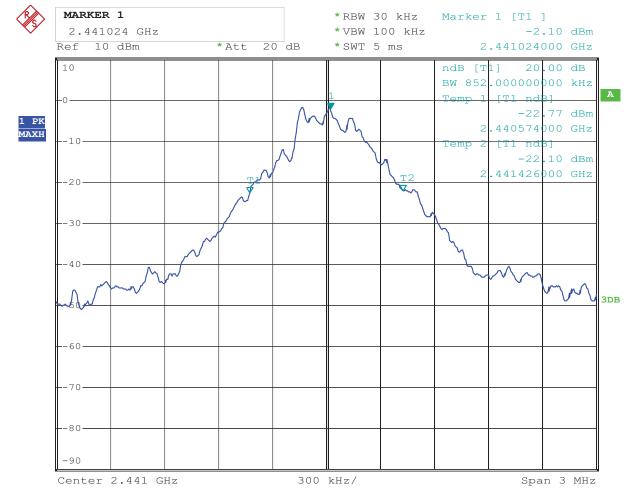
Date: 20.MAY.2014 15:32:18

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Date: 20.MAY.2014 15:35:33

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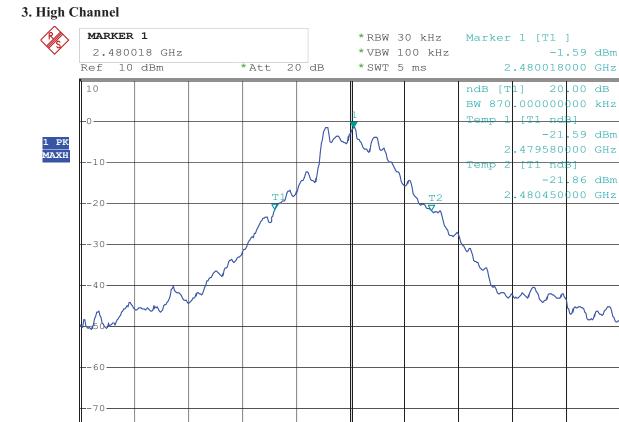
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A

3DB

Span 3 MHz



Date: 20.MAY.2014 15:36:56

Center 2.48 GHz

-80

-90

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300 kHz/



# **Test Result Type of Modulation:** Л/4DQPSK

EUT		Tablet PC		Tablet PC Model		P9, Q9, PTAB940, PTAB941, W909
Mode	K	eep Transmitting	Input Voltage	DC3.7V		
Temperat	ure	24 deg. C, Humidity		56% RH		
Channel	Channel Frequency (MHz)	20 dB Bandwidth (kHz)	Maximum Limit (kHz)	Pass/ Fail		
Low	2402	1230		Pass		
Middle	2441	1236		Pass		
High	2480	1218		Pass		

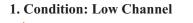
The report refers only to the sample tested and does not apply to the bulk.

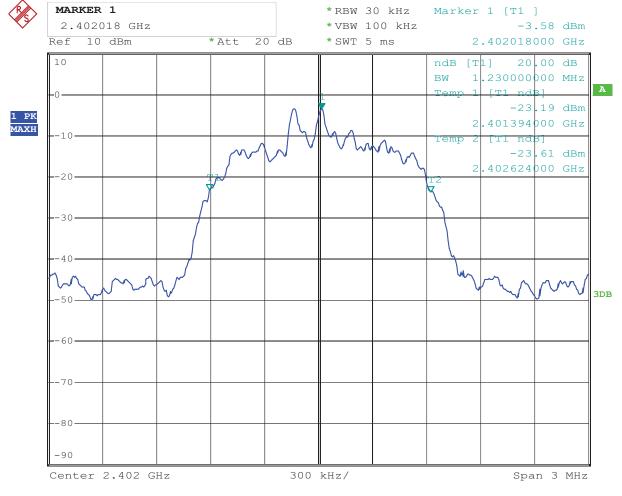
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### Test Figure:





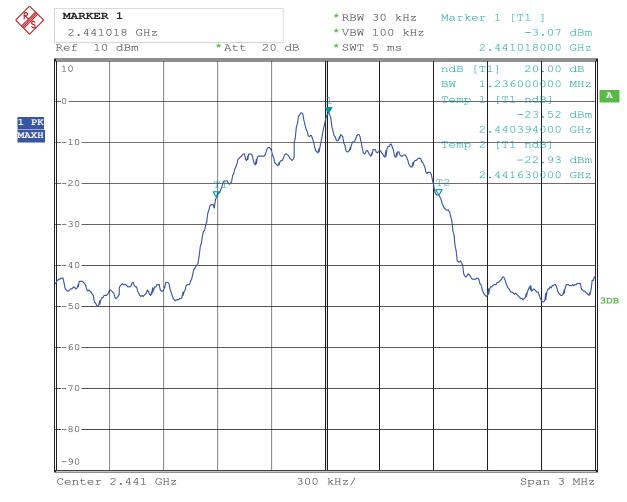
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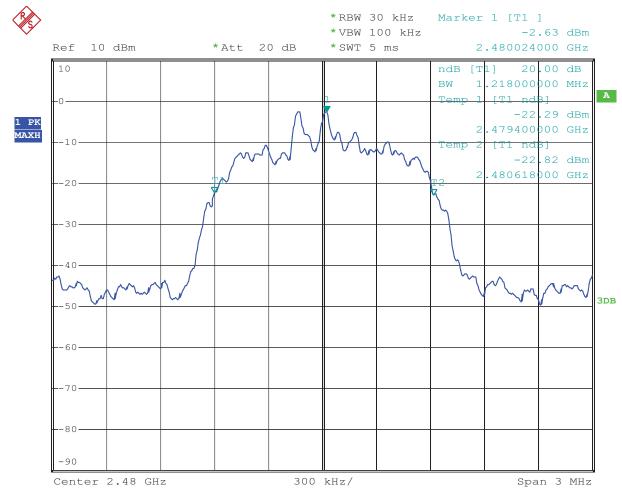
Date: 20.MAY.2014 15:29:00

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3. High Channel



Date: 20.MAY.2014 15:27:11

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# Test Result Type of Modulation: 8DPSK

EUT		Tablet PC		Tablet PC   Model		P9, Q9, PTAB940, PTAB941, W909
Mode	Ke	eep Transmitting	Input Voltage	DC3.7V		
Temperat	ure	24 deg. C,		56% RH		
Channel	Channel Frequency (MHz)	20 dB Bandwidth (kHz)	Maximum Limit (kHz)	Pass/ Fail		
Low	2402	1218		Pass		
Middle	2441	1218		Pass		
High	2480	1218		Pass		

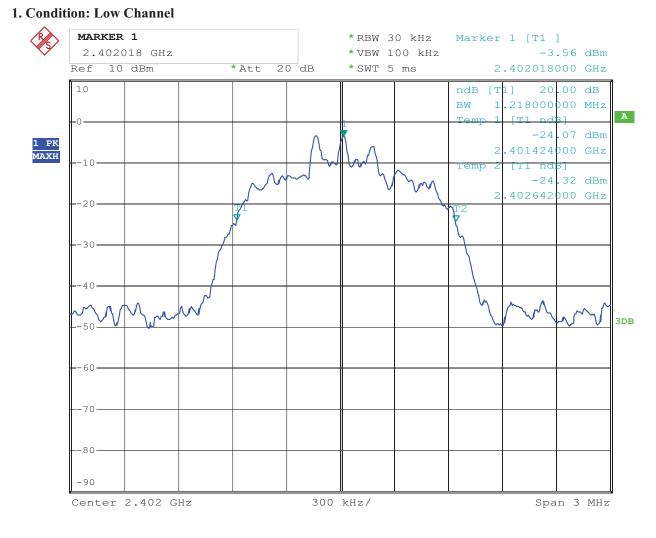
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### Test Figure:



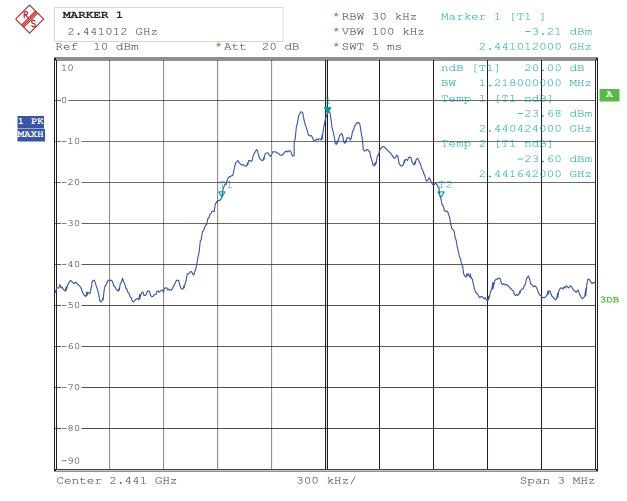
Date: 20.MAY.2014 15:24:52

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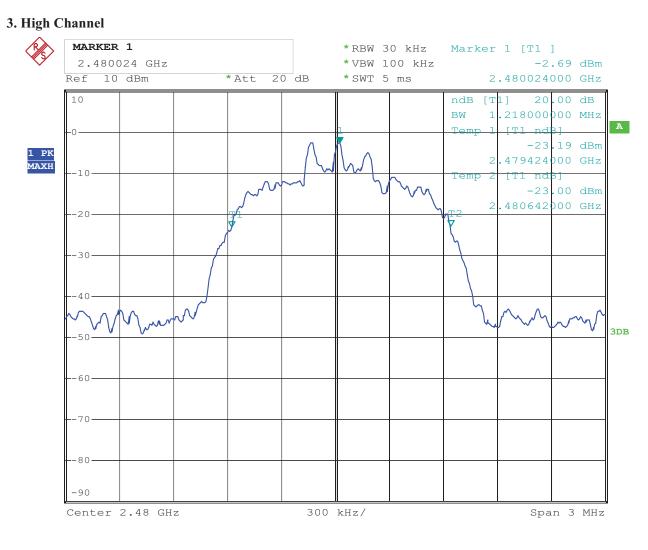


Date: 20.MAY.2014 15:24:10

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# 8. Maximum Peak Output Power

### 8.1 Regulation

According to \$15.247(b)(1), for frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5MHz band:0.125 watts. According to \$15.247(b)(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.

### 8.2 Limits of Maximum Peak Output Power

The Maximum Peak Output Power Measurement is 30dBm.

### **8.3 Test Procedure**

1. Check the calibration of the measuring instrument (spectrum analyzer) using either an internal calibrator or a known signal from an external generator.

2. Set the spectrum analyzer as follows: Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel; RBW > the 20 dB bandwidth of the emission being measured; VBW = RBW=3MHz; Sweep = auto; Detector function = peak; Trace = max hold

3. Measure the highest amplitude appearing on spectral display and record the level to calculate results.

4. Repeat above procedures until all frequencies measured were complete.

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# 8.4Test Results Type of Modulation: GFSK

EUT		Tablet PC		el	P9, Q9, PTAB940, PTAB941, W909
Mode	Ke	ep Transmitting	Input	Voltage	DC3.7V
Temperature	2	24 deg. C, Hu		idity	56% RH
Channel	Channel Frequency (MHz)	Peak Power Output (dBm)		Peak Power Limit (dBm)	Pass/ Fail
Low	2402	-0.50		30	Pass
Middle	2441	0.02		30	Pass
High	2480	0.39		30	Pass

Note: 1. the result basic equation calculation as follow:

- Peak Power Output = Peak Power Reading + Cable loss + Attenuator
- 2. The worse case was recorded

### **Type of Modulation:** Л/4DQPSK

EUT		Tablet PC		el	P9, Q9, PTAB940, PTAB941, W909
Mode	Ke	eep Transmitting	Input	Voltage	DC3.7V
Temperature	2	24 deg. C, Hu		idity	56% RH
Channel	Channel Frequency (MHz)	Peak Power Output (dBm)		Peak Power Limit (dBm)	Pass/ Fail
Low	2402	-1.60		30	Pass
Middle	2441	-1.05		30	Pass
High	2480	-0.65		30	Pass

Note: 1. the result basic equation calculation as follow:

Peak Power Output = Peak Power Reading + Cable loss + Attenuator

2. The worse case was recorded

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## **Type of Modulation: 8DPSK**

EUT		Tablet PC		el	P9, Q9, PTAB940, PTAB941, W909
Mode	Ke	Keep Transmitting		ıt Voltage	DC3.7V
Temperature		24 deg. C,		umidity	56% RH
Channel	Channel Frequency (MHz)	Peak Power Output (dBm	)	Peak Power Limit (dBm)	Pass/ Fail
Low	2402 -1.41			30	Pass
Middle	2441 -0.90			30	Pass
High	2480	-0.53		30	Pass

Note: 1. the result basic equation calculation as follow:

Peak Power Output = Peak Power Reading + Cable loss + Attenuator

2. The worse case was recorded

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## 9. Carrier Frequency Separation

#### 9.1 Regulation

According to §15.247(a)(1), frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

## 9.2 Limits of Carrier Frequency Separation

The Maximum Power Spectral Density Measurement is 25kHz or two-thirds of the 20dB bandwidth of the hopping Channel which is great.

## 9.3 Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.

2. Set the spectrum analyzer as follows: Span = wide enough to capture the peaks of two adjacent channels: Resolution (or IF) Bandwidth (RBW)  $\geq 1\%$  of the span; Video (or Average) Bandwidth (VBW)  $\geq$  RBW; Sweep = auto; Detector function = peak; Trace = max hold

3. Measure the separation between the peaks of the adjacent channels using the marker-delta function.

4. Repeat above procedures until all frequencies measured were complete.

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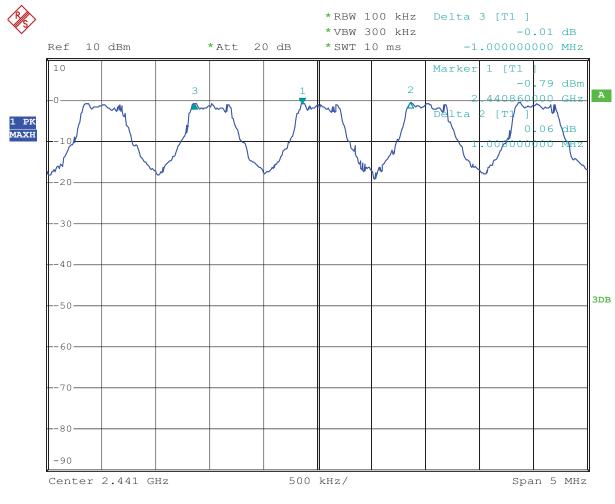


## 9.4Test Result

#### **Type of Modulation: GFSK**

EUT	Tablet PC		Model	P9, Q	9, PTAB940, PTAB941, W909	
Mode	Hopping On		Input Voltage		DC3.7V	
Temperature	24 deg. C,		Humidity	56% RH		
Carrier Frequency Separation		Limit			Pass/ Fail	
1.000MHz		$\geq 25$ kHz or 2	2/3 of 20 dB bandy	width	Pass	

## **Test Plots**



Date: 20.MAY.2014 13:11:09

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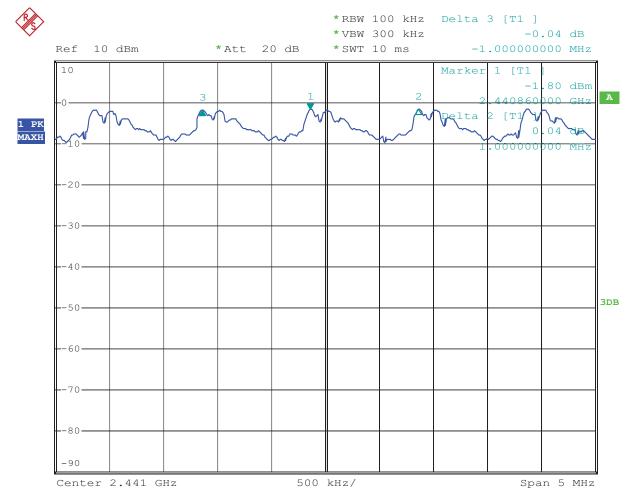
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**Type of Modulation:** Л/4DQPSK

EUT	Tablet PC	Model	P9, Q	9, PTAB940, PTAB941, W909	
Mode	Hopping On		Input Voltage	DC3.7V	
Temperature	24 deg. C,	Humidity			56% RH
Carrier I	Carrier Frequency Separation		Limit		Pass/ Fail
1.000MHz		$\geq 25$ kHz or 2	2/3 of 20 dB bandy	width	Pass

## **Test Plots**



Date: 20.MAY.2014 13:07:48

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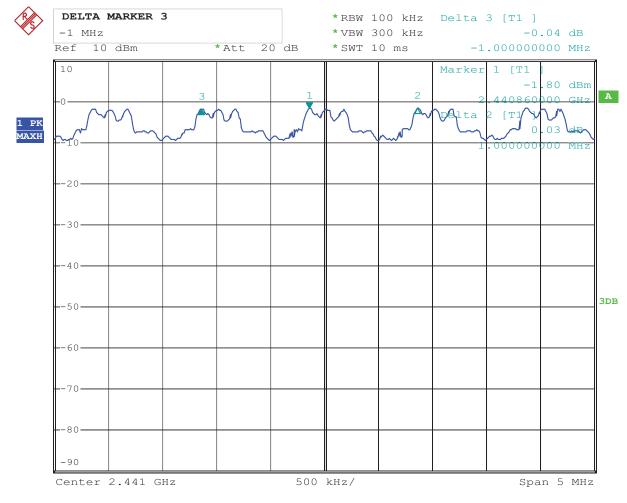
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#### Type of Modulation: 8DPSK

EUT	Tablet PC	Model	P9, Q	9, PTAB940, PTAB941, W909		
Mode	Hopping On		Input Voltage	DC3.7V		
Temperature	rature 24 deg. C,		Humidity	56% RH		
Carrier Frequency Separation			Limit	-	Pass/ Fail	
	1.000MHz	$\geq 25$ kHz or 2	2/3 of 20 dB bandy	width	Pass	

#### **Test Plots**



Date: 20.MAY.2014 13:00:57

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# **10. Number of Hopping Channels**

### **10.1 Regulation**

According to §15.247(a)(1)(iii), frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used. According to §15.247(b)(1), for frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

## 10.2 Limits of Number of Hopping Channels

The frequency hopping systems in the 2400-2483.5MHz band shall use at least 15 channels.

## **10.3 Test Procedure**

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.

2. Set the spectrum analyzer as follows: Span = the frequency band of operation; RBW=100 kHz, VBW=300 kHz; Sweep = auto; Detector function = peak; Trace = max hold

3. Record the number of hopping channels.

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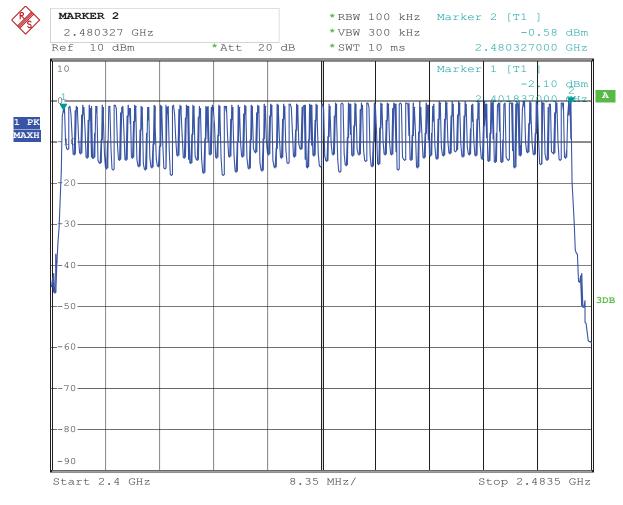


#### 10.4Test Result

#### **Type of Modulation: GFSK**

EUT		Tablet PC	Model	P9, Q9, PTAB940,		
LUI			Widdel	PTAB941, W909		
Mode	Hopping On		Input Voltage	DC3.7V		
Temperature		24 deg. C,	Humidity	56% RH		
Operating Frequency Number of hop		Number of hop	ping channels	Limit	Pass/ Fail	
2402-2480MHz		79	9 $\geq 15$ Pass		Pass	

#### **Test Plot**



Date: 20.MAY.2014 12:43:06

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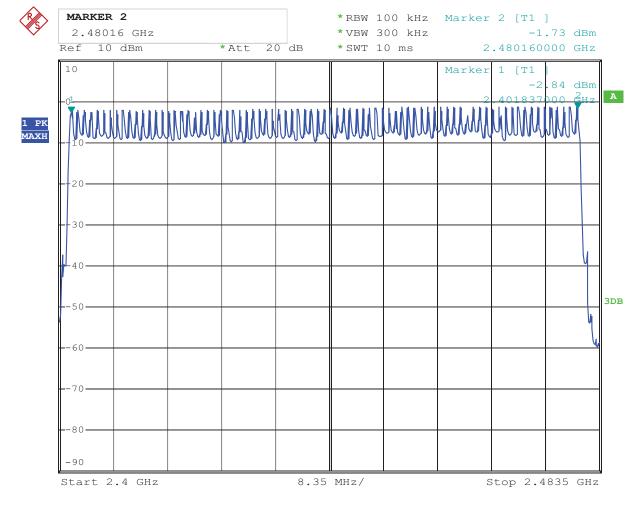
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## Type of Modulation: $\pi/4DQPSK$

EUT		Tablet PC		Model		Q9, PTAB940, AB941, W909
Mode	Hopping On		Input Voltage		DC3.7V	
Temperature		24 deg. C,	Humidity		56% RH	
Operating Frequency		Number of hopp channels	oing	Liı	mit	Pass/ Fail
2402-2480MHz		79		2	15	Pass

## **Test Plot**



Date: 20.MAY.2014 12:47:44

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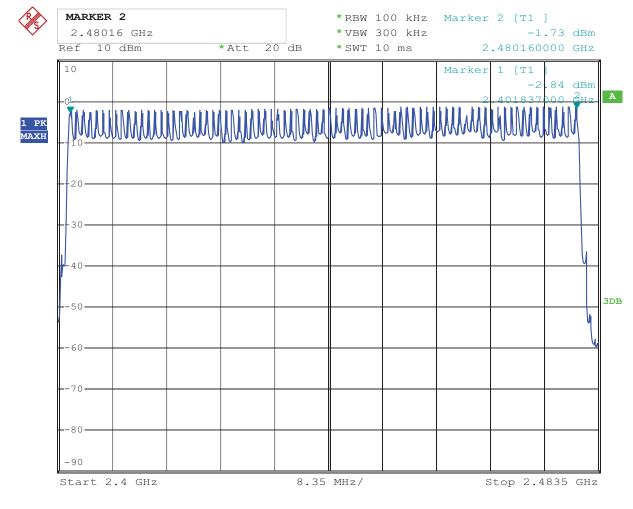
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## Type of Modulation: 8DPSK

EUT	Tablet PC		Model			, Q9, РТАВ940, ГАВ941, W909	
Mode	Hopping On		Input Voltage			DC3.7V	
Temperature		24 deg. C,	Humidity		56% RH		
Operating Frequer	ncy Number of hopp channels		oing	Liı	nit	Pass/ Fail	
2402-2480MHz	2402-2480MHz 79			2	15	Pass	

#### **Test Plot**



Date: 20.MAY.2014 12:47:44

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## 11. Time of Occupancy (Dwell Time)

## 11.1 Regulation

According to §15.247(a)(1)(iii), frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

## 11.2 Limits of Carrier Frequency Separation

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed

## **11.3 Test Procedure**

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.

2. Set the spectrum analyzer as follows: Span = zero span, centered on a hopping channel; RBW = 1 MHz; VBW

RBW; Sweep = as necessary to capture the entire dwell time per hopping channel; Detector function = peak; Trace = max hold

3. Measure the dwell time using the marker-delta function.

4. Repeat above procedures until all frequencies measured were complete.

5. Repeat this test for different modes of operation (e.g., data rate, modulation format, etc.), if applicable.

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#### 11.4 Test Result

#### **Type of Modulation: GFSK**

EUT	Tablet	PC	Model		P9, Q9, PTAB940, PTAB941, W909
Mode	Keep Tran	smitting Inpu		/oltage	DC3.7V
Temperature	e 24 deg	g. C,	Humid	ity	56% RH
Channel	Reading (ms)	Hoping Ra	ate	Actual	Limit
Low	2.96	266.667 hc	op/s	0.316 s	6 0.4s
Middle	2.96	266.667 hop		0.316 \$	6 0.4s
High	2.98	266.667 ho	op/s	0.318 s	6 0.4s

Actual = Reading × (Hopping rate / Number of channels) × Test period, Test period = 0.4 [seconds / channel] × 79 [channel] = 31.6 [seconds] NOTE: The EUT makes worst case 1600 hops per second or 1 time slot has a length of 625µs with 79 channels. A DH5 Packet needs 5 time slot for transmitting and 1 time slot for receiving. Then the EUT makes worst case 266.667 hops per second with 79 channels.

#### Note: DH5 was the worse case

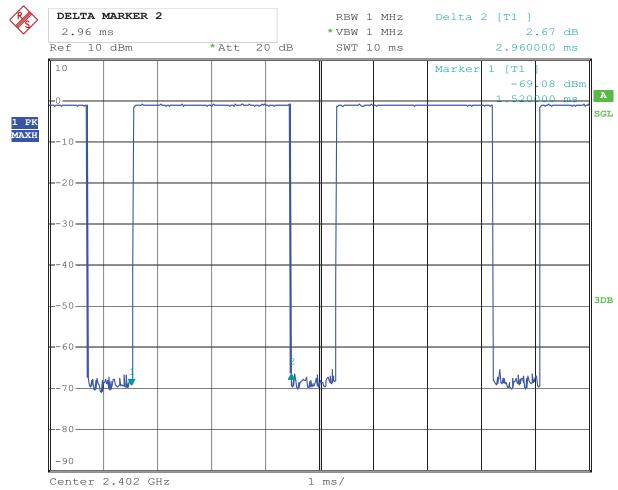
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Test Plots:

Low Channel:



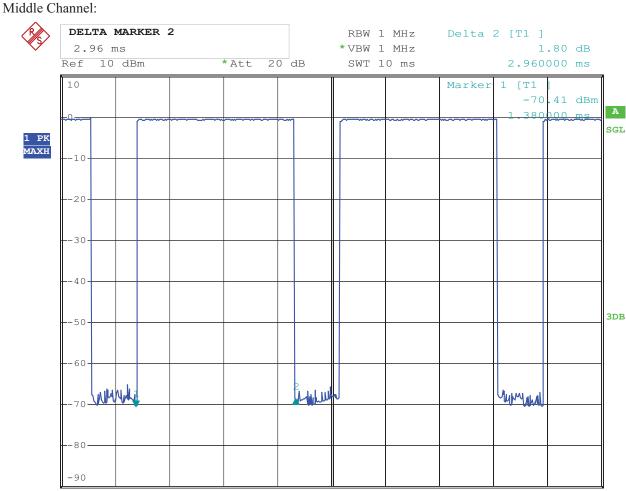
Date: 20.MAY.2014 15:56:26

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Center 2.441 GHz

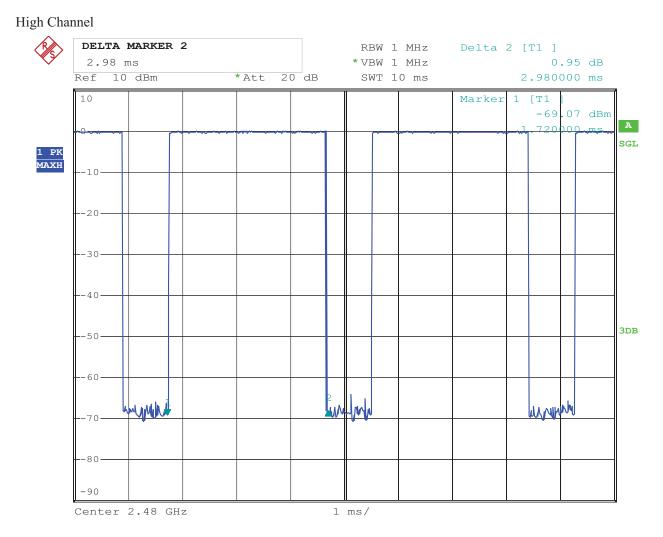
1 ms/

Date: 20.MAY.2014 15:57:32

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## **Test Result Type of Modulation:** *Π*/**4DQPSK**

EUT		Tablet P	C Model				P9, Q9, PTAB940, PTAB941, W909
Mode		Keep Transn	nitting	itting Input Voltage			DC3.7V
Temperature	e	24 deg. (	C,	Humidity		y 56% RH	
Channel		Reading (ms)	Hoping	Rate	Actı	ıal	Limit
Low		2.96	266.667	hop/s	/s 0.31		0.4s
Middle		3.02	266.667	hop/s	0.32	22 s	0.4s
High		2.98	266.667	hop/s	0.31	l 8 s	0.4s

Actual = Reading × (Hopping rate / Number of channels) × Test period, Test period = 0.4 [seconds / channel] × 79 [channel] = 31.6 [seconds] NOTE: The EUT makes worst case 1600 hops per second or 1 time slot has a length of 625 $\mu$ s with 79 channels. A DH5 Packet needs 5 time slot for transmitting and 1 time slot for receiving. Then the EUT makes worst case 266.667 hops per second with 79 channels.

#### Note: DH5 was the worse case

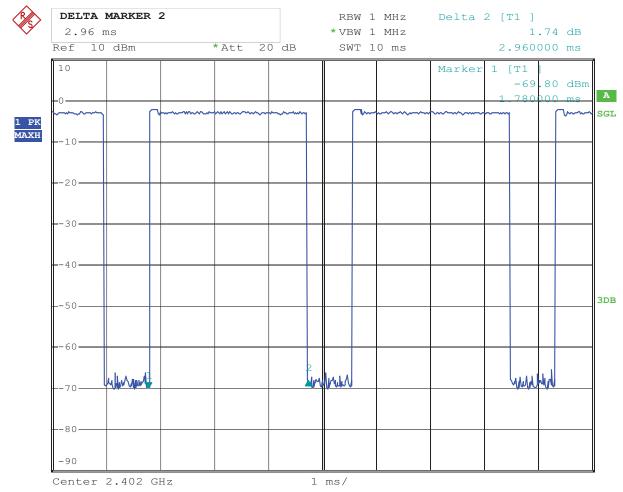
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## Test Plots:

Low Channel:



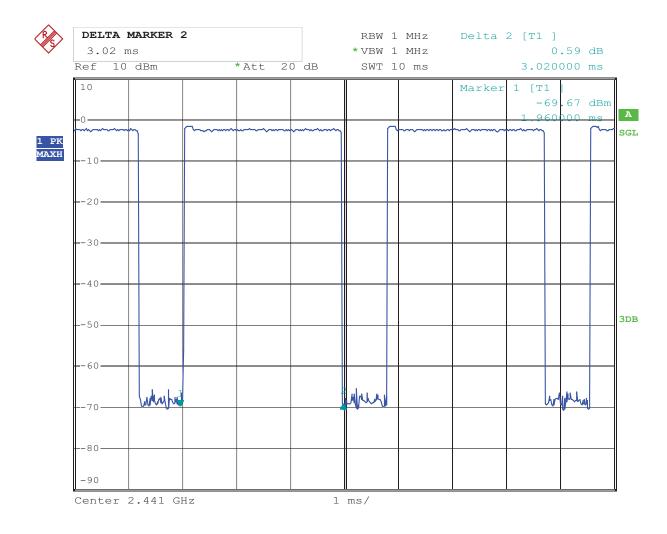
Date: 20.MAY.2014 15:55:02

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#### Middle Channel:



Date: 20.MAY.2014 15:53:20

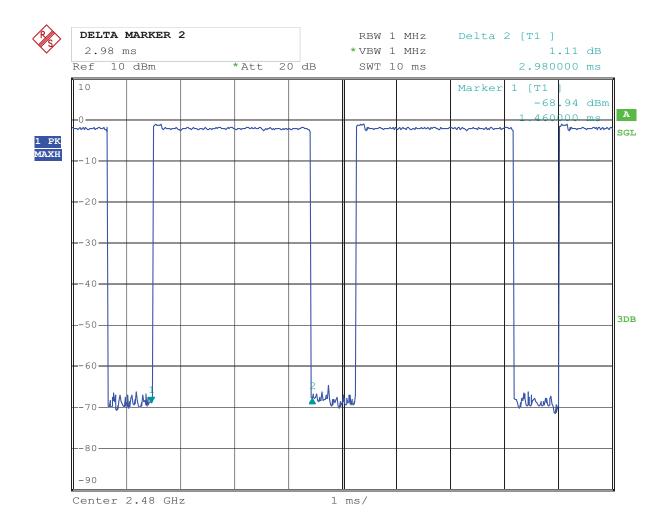
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#### High Channel



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### Type of Modulation: 8DPSK

EUT	Tablet PC   Model			, î	Q9, PTAB940, AB941, W909		
Mode	Keep Transmitting Input Voltage		ıge		DC3.7V		
Temperature	e	24 deg. (	C,	Humidity		56% RH	
Channel		Reading (ms)	Hoping	g Rate	Actu	al	Limit
Low		2.96	266.667	' hop/s	0.31	6 s	0.4s
Middle		2.96	96 266.667		7 hop/s 0.31		0.4s
High		2.98	266.667	' hop/s	0.31	8 s	0.4s

Actual = Reading × (Hopping rate / Number of channels) × Test period, Test period = 0.4 [seconds / channel] × 79 [channel] = 31.6 [seconds] NOTE: The EUT makes worst case 1600 hops per second or 1 time slot has a length of 625µs with 79 channels. A DH5 Packet needs 5 time slot for transmitting and 1 time slot for receiving. Then the EUT makes worst case 266.667 hops per second with 79 channels.

#### Note: DH5 was the worse case

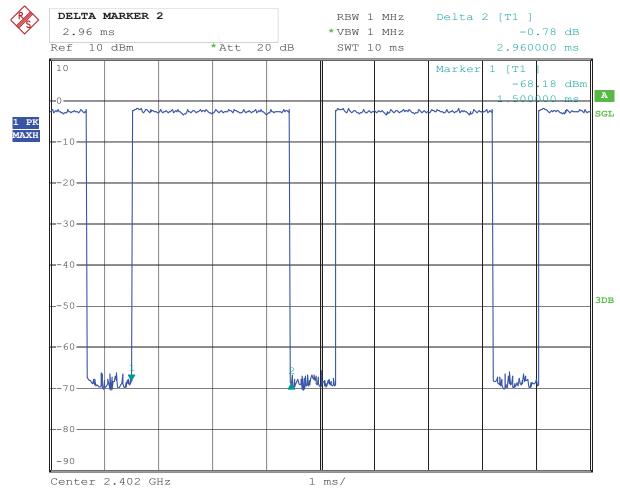
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## Test Plots:

Low Channel:



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Middle Channel:



17 dBm

00 ms А

SGL

3DB

DELTA MARKER 2 RBW 1 MHz Delta 2 [T1 ] \*VBW 1 MHz 2.96 ms 0.04 dB Ref 10 dBm \*Att 20 dB SWT 10 ms 2.960000 ms 10 Marker 1 [T1 -69 660 20 1 PK MAXH -10 -20 - 30 -40 -50 -60 JAM. MIAN MA 0

Date: 20.MAY.2014 15:49:33

Center 2.441 GHz

-80

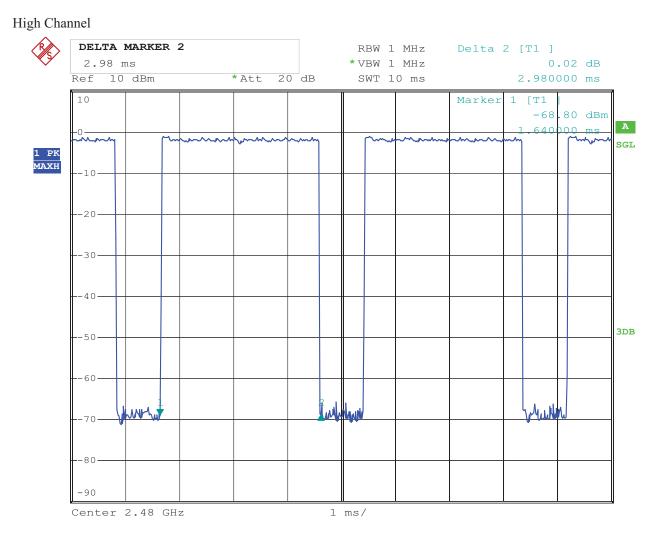
-90

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1 ms/





Date: 20.MAY.2014 15:50:40

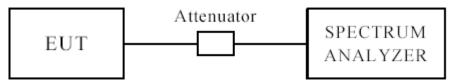
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## 12 Out of Band Measurement

12.1 Test Setup



The restricted band requirement based on radiated emission test; please see the clause 6 for the test setup

## 12.2 Limits of Out of Band Emissions Measurement

- 1. Below –20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).
- 2. Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209.

## **12.3 Test Procedure**

For signals in the restricted bands above and below the 2.4-2.483GHz allocated band a measurement was made of radiated emission test. Peak values with RBW=VBW=1MHz and PK detector. For bandage test, the spectrum set as follows: RBW=100, VBW=300 kHz. A conducted measurement used

Note: 1. For band-edge measurement, the frequency from 30MHz-25GHz was tested. And It met the FCC rule.

2. For Restrict band measurement, only the worse case was recorded.

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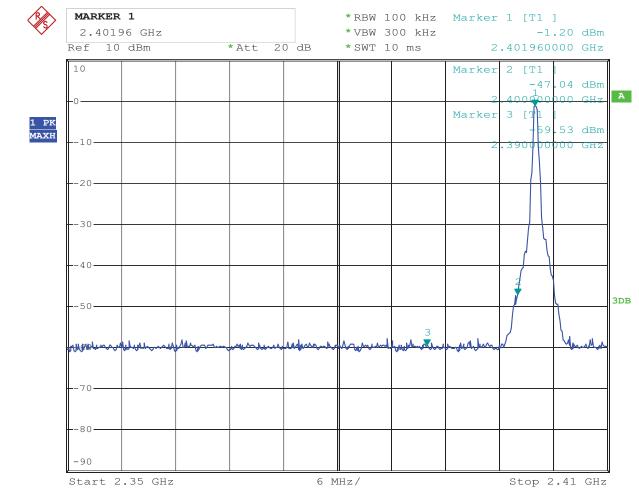


**Type of Modulation: GFSK** 

#### 12.4 Out of Band Test Result

Product:		Tablet PC	Test Mode:	Low Channel
Mode	Kee	ping Transmitting	Input Voltage	DC3.7V
Temperature		24 deg. C	Humidity	56% RH
Test Result:		Pass	Detector	РК
The Max. FS in	PK (dBµV/m)	38.9		74(dBµV/m)
Restrict Band	AV(dBµV/m)		Limit	54(dBµV/m)
2390MHz				

#### **Test Figure:**



Date: 20.MAY.2014 13:14:08

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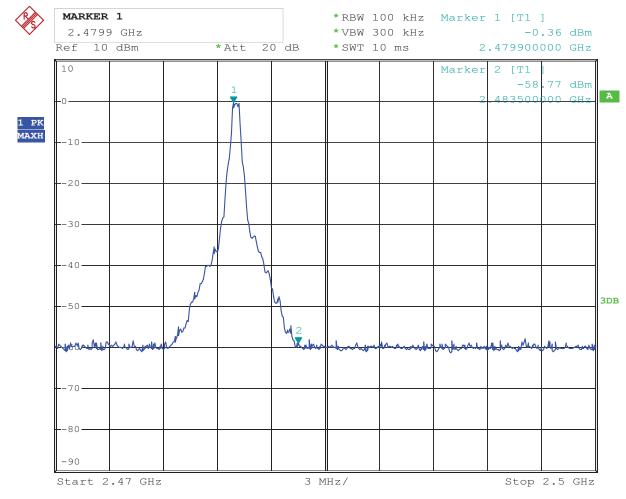


**Type of Modulation: GFSK** 

#### 12.4 Out of Band Test Result

Product:	Tablet PC		Test Mode:	High Channel
Mode	Kee	ping Transmitting	Input Voltage	DC3.7V
Temperature		24 deg. C,	Humidity	56% RH
Test Result:		Pass	Detector	РК
The Max. FS in	PK (dBµV/m)	39.3		74(dBµV/m)
Restrict Band	AV(dBµV/m)		Limit	54(dBµV/m)
2483.5MHz				

#### **Test Figure:**



Date: 20.MAY.2014 13:15:08

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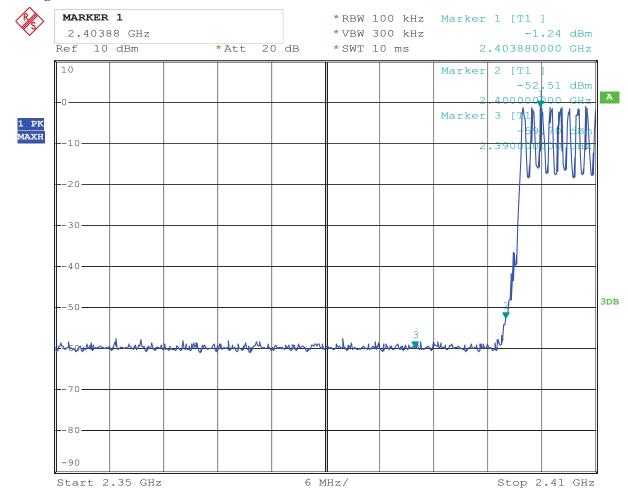


**Type of Modulation: GFSK** 

#### 12.4 Out of Band Test Result

Product:		Tablet DC	Test Made	Hominomodo
Product:		Tablet PC	Test Mode:	Hopping mode
Mode		Hopping On	Input Voltage	DC3.7V
Temperature		24 deg. C,	Humidity	56% RH
Test Result:		Pass	Detector	РК
The Max. FS in	PK (dBµV/m)	37.0		74(dBµV/m)
Restrict Band	AV(dBµV/m)		Limit	54(dBµV/m)
2390MHz				

#### **Test Figure:**



Date: 20.MAY.2014 13:12:56

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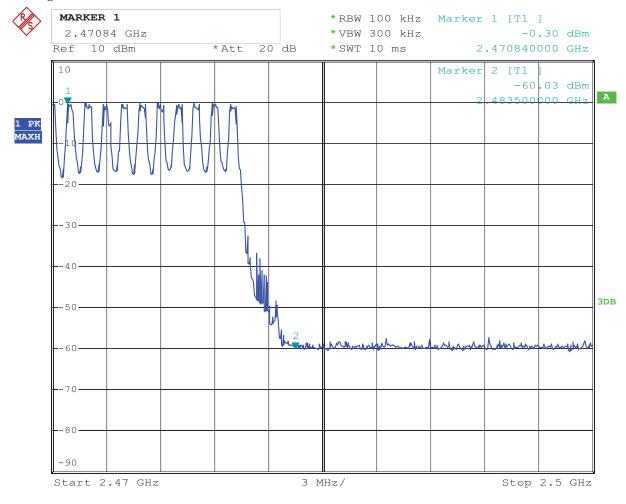


**Type of Modulation: GFSK** 

#### 12.4 Out of Band Test Result

Product:	Tablet PC		Test Mode:	Hopping mode
Mode	Hopping On		Input Voltage	DC3.7V
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	РК
The Max. FS in	PK (dBµV/m)	37.5		74(dBµV/m)
Restrict Band	AV(dBµV/m)		Limit	54(dBµV/m)
2483.5MHz				

#### **Test Figure:**



Date: 20.MAY.2014 13:16:37

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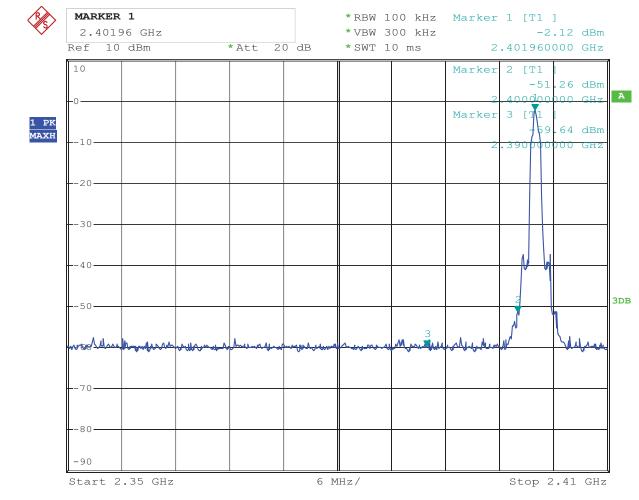


Type of Modulation:  $\Pi/4QPSK$ 

#### **12.4** Out of Band Test Result

Product:	Tablet PC		Test Mode:	Low Channel
Mode	Keeping Transmitting		Input Voltage	DC3.7V
Temperature	24 deg. C		Humidity	56% RH
Test Result:	Pass		Detector	РК
The Max. FS in	PK (dBμV/m) 37.1			74(dBµV/m)
Restrict Band	AV(dBµV/m)		Limit	54(dBµV/m)
2390MHz				

#### **Test Figure:**



Date: 20.MAY.2014 15:10:32

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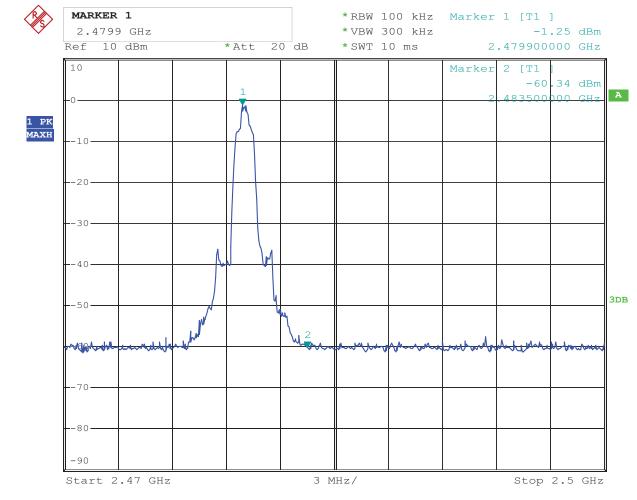


Type of Modulation:  $\Pi/4QPSK$ 

#### 12.4 Out of Band Test Result

Product:	Tablet PC		Test Mode:	High Channel
Mode	Keeping Transmitting		Input Voltage	DC3.7V
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	РК
The Max. FS in	PK (dBµV/m) 38.9			74(dBµV/m)
Restrict Band	AV(dBµV/m)		Limit	54(dBµV/m)
2483.5MHz				

#### **Test Figure:**



Date: 20.MAY.2014 15:09:26

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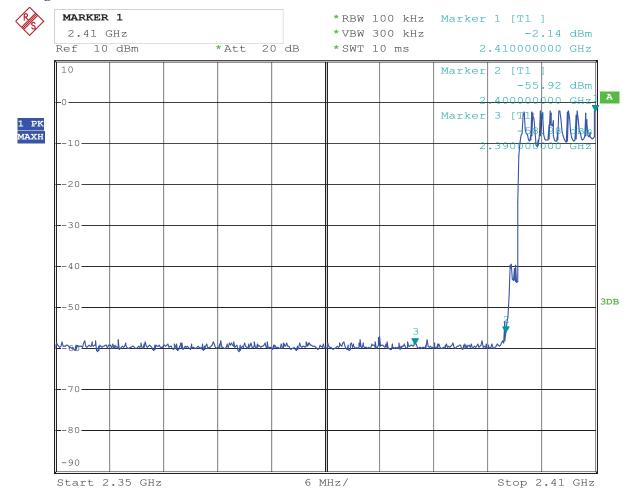


Type of Modulation:  $\Pi/4QPSK$ 

#### **12.4** Out of Band Test Result

Product:	Tablet PC		Test Mode:	Hopping mode
Mode	Hopping On		Input Voltage	DC3.7V
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	РК
The Max. FS in	PK (dBµV/m) 38.1			74(dBµV/m)
Restrict Band	AV(dBµV/m)		Limit	54(dBµV/m)
2390MHz				

#### **Test Figure:**



Date: 20.MAY.2014 15:12:43

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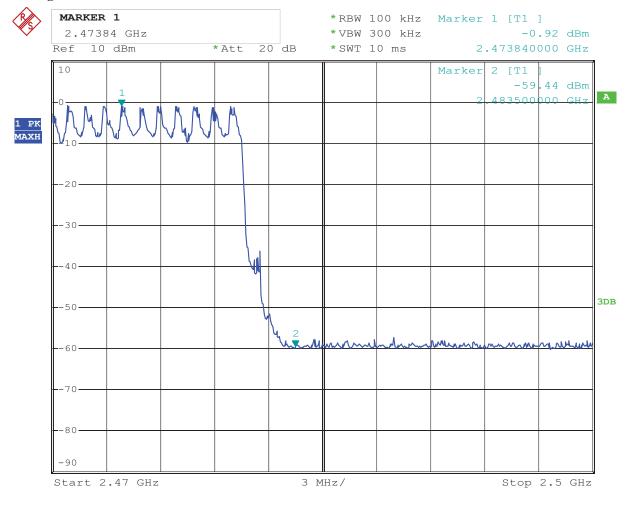


Type of Modulation:  $\Pi/4QPSK$ 

#### 12.4 Out of Band Test Result

Product:	Tablet PC		Test Mode:	Hopping mode
Mode	Hopping On		Input Voltage	DC3.7V
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	РК
The Max. FS in	PK (dBµV/m)	39.2		74(dBµV/m)
Restrict Band	AV(dBµV/m)		Limit	54(dBµV/m)
2483.5MHz				

#### **Test Figure:**



Date: 20.MAY.2014 15:08:43

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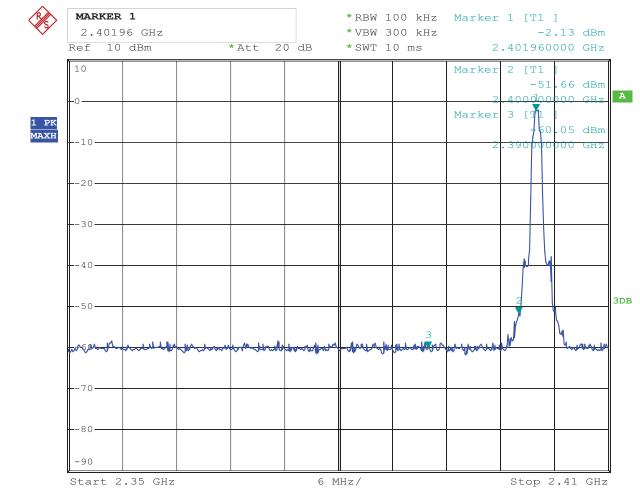


**Type of Modulation: 8DPSK** 

#### **12.4** Out of Band Test Result

Product:	Tablet PC		Test Mode:	Low Channel
Mode	Keeping Transmitting		Input Voltage	DC3.7V
Temperature	24 deg. C		Humidity	56% RH
Test Result:	Pass		Detector	РК
The Max. FS in	PK (dBμV/m) 37.9			74(dBµV/m)
Restrict Band	AV(dBµV/m)		Limit	54(dBµV/m)
2390MHz				

#### **Test Figure:**



Date: 20.MAY.2014 15:17:21

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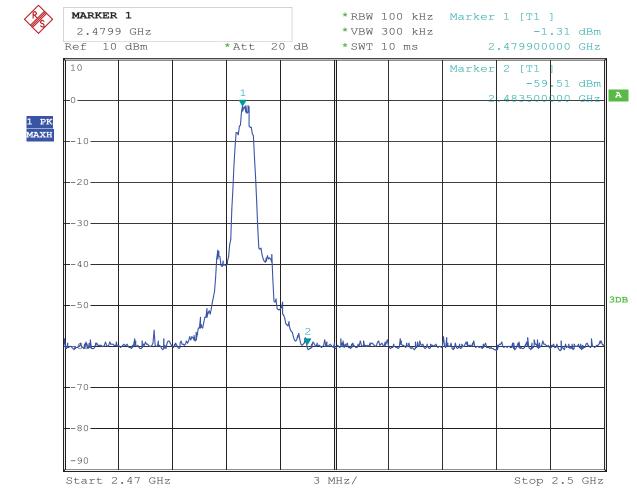


**Type of Modulation: 8DPSK** 

#### 12.4 Out of Band Test Result

Product:	Tablet PC		Test Mode:	High Channel
Mode	Keeping Transmitting		Input Voltage	DC3.7V
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	РК
The Max. FS in	PK (dBµV/m) 39.6			74(dBµV/m)
Restrict Band	AV(dBµV/m)		Limit	54(dBµV/m)
2483.5MHz				

#### **Test Figure:**



Date: 20.MAY.2014 15:18:30

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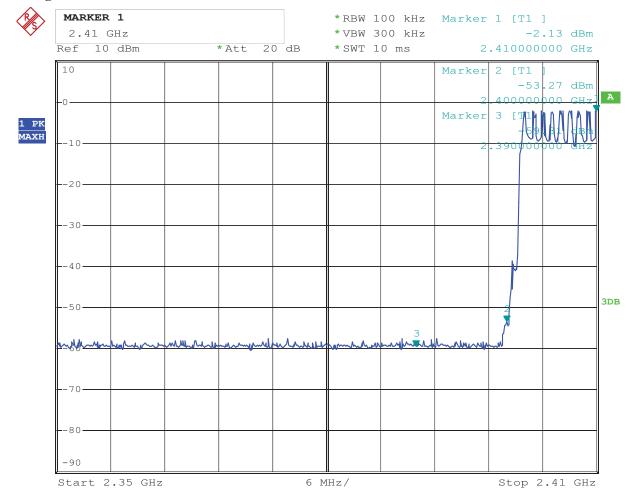


**Type of Modulation: 8DPSK** 

#### 12.4 Out of Band Test Result

Product:	Tablet PC		Test Mode:	Hopping mode
Mode	Hopping On		Input Voltage	DC3.7V
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	РК
The Max. FS in	PK (dBµV/m)	37.7		74(dBµV/m)
Restrict Band	AV(dBµV/m)		Limit	54(dBµV/m)
2390MHz				

#### **Test Figure:**



Date: 20.MAY.2014 15:16:32

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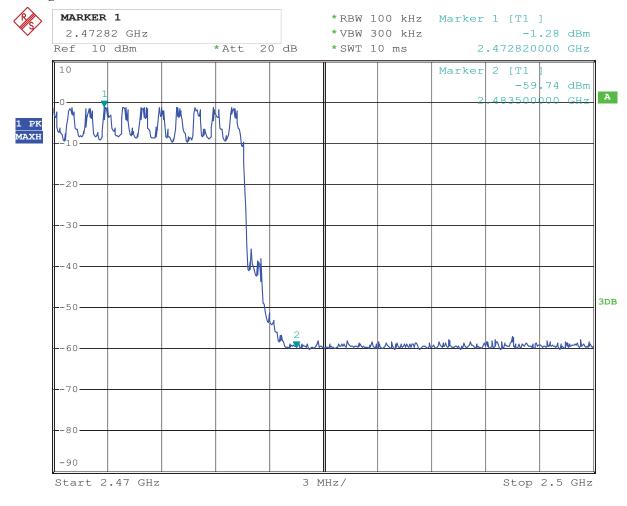


**Type of Modulation: 8DPSK** 

#### 12.4 Out of Band Test Result

Product:	Tablet PC		Test Mode:	Hopping mode
Mode	Hopping On 1		Input Voltage	DC3.7V
Temperature	24 deg. C,		Humidity	56% RH
Test Result:	Pass		Detector	РК
The Max. FS in	PK (dBµV/m)	38.7		74(dBµV/m)
Restrict Band	AV(dBµV/m)		Limit	54(dBµV/m)
2483.5MHz				

#### **Test Figure:**



Date: 20.MAY.2014 15:20:40

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## 13.0 Antenna Requirement

#### 13.1 Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitter antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the mount in dB that the directional gain of the antenna exceeds 6 dBi.

#### 13.2 Antenna Connected constructions

Integral antenna used. The maximum Gain of the antennas is 2.0dBi.

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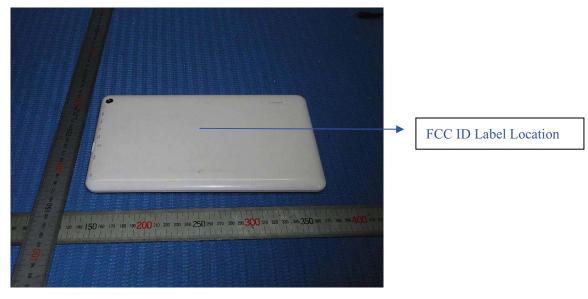
#### 14.0 FCC ID Label

#### FCC ID: RBD-W909

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The label must not be a stick-on paper label. The label on these products must be permanently affixed to the product and readily visible at the time of purchase and must last the expected lifetime of the equipment not be readily detachable.

#### Mark Location:



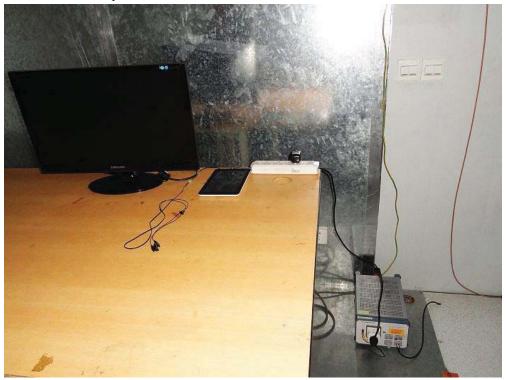
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#### 15.0 Photo of testing

Conducted Emission Test Setup:



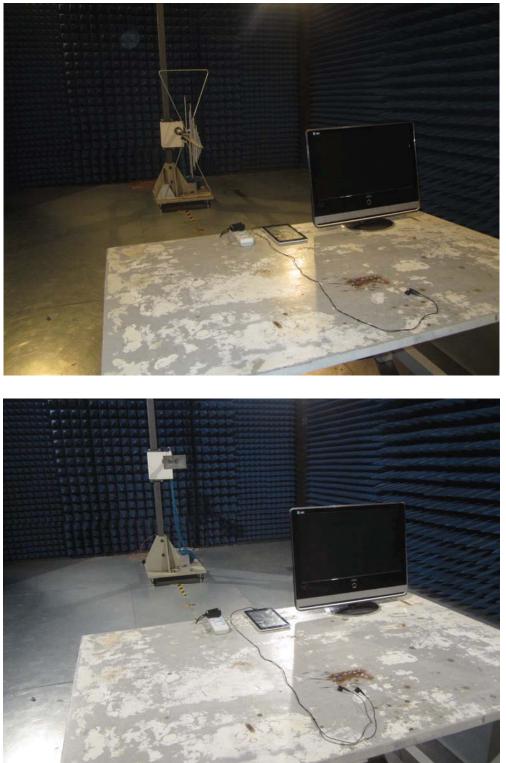
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Radiated Emission Test Setup:



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## **Photographs – EUT**

Outside view





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Outside view



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Outside view



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Inside view



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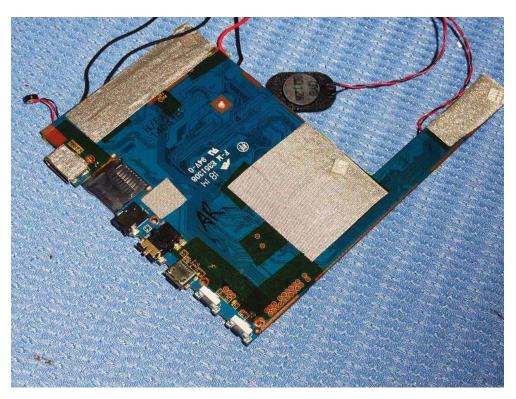
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Inside view





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Inside view



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Inside view



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