

Report No: File reference No:	FCC 1704045-02 2017-04-19
Applicant:	Shenzhen Jingwah Information Technology Co., Ltd.
Product:	Tablet PC
Model No:	M7057, 3GR, 3G-16, S813G, 3G-32, G10, Xtab 832
Trademark:	N/A
Test Standards:	FCC Part 15.247
Test result:	It is herewith confirmed and found to comply with the requirements set up by ANSI C63.10, FCC Part 15.247 for the evaluation of electromagnetic compatibility

Approved By

Jack Chung

Jack Chung

Manager

Dated:

April 19, 2017

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 TESTING LABORATORIES

Room 512-519, 5/F., East Tower, Building 4, Anhua Industrial Zone, Futian District, Shenzhen, Guangdong, China Tel (755) 83448688, Fax (755) 83442996, E-Mail:info@timeway-lab.com



# **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 17025:2005 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.

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#### 1.0 **General Details**

#### 1.1 Test Lab Details

SHENZHEN TIMEWAY TESTING LABORATORIES. Name : Room 512-519,5/F., East Tower, Building 4, Anhua Industrial Zone, Futian Address: District, Shenzhen, Guangdong China Telephone: (755) 83448688 (755) 83442996 Fax: Site on File with the Federal Communications Commission - United Sates Registration Number: 899988 For 3m & 10 m OATS Site Listed with Industry Canada of Ottawa, Canada Registration 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:	N/A				
Model Number:	M7057				
Additional Model Number	er: 3GR, 3G-16, S813G, 3G-32, G10, Xtab 832				
Power Adapter	Model No.: K-T5A				
	Input: 100-240V, 50/60Hz, 0.2A Max; Output: 5V, 1.5A				
Type of Modulation	GFSK, JI/4DQPSK, 8DPSK for Bluetooth				
Frequency range	2402-2480MHz for Bluetooth				
Channel Spacing	1MHz for Bluetooth				
Frequency Selection	y software				
Channel Number	79 channel for Bluetooth				
Antenna:	Integral Antenna and the maximum Gain of this antenna is 1.4dBi;				

1.4 Submitted Sample: 2 Samples

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- 1.5 Test Duration 2017-04-10 to 2017-04-19
- 1.6 Test Uncertainty Conducted Emissions Uncertainty =3.6dB Radiated Emissions Uncertainty =4.7dB
- Test Engineer 1.7

The sample tested by

Terry Tang

Print Name: Terry Tang

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2.0 Test Equipment					
Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
ESPI Test Receiver	R&S	ESPI 3	100379	2016-08-22	2017-08-21
TWO	R&S	EZH3-Z5	100294	2016-08-22	2017-08-21
Line-V-NETW		L2113-23	100274	2010-00-22	2017-00-21
TWO	R&S	EZH3-Z5	100253	2016-08-22	2017-08-21
Line-V-NETW			100233	2010 00 22	2017 00 21
	R&S				
Ultra Broadband		HL562	100157	2016-08-23	2017-08-22
ANT					
	R&S	ESDV	100008	2016-08-22	2017-08-21
ESDV Test Receiver					
Impuls-Begrenzer	R&S	ESH3-Z2	100281	2016-08-22	2017-08-21
System Controller	СТ	SC100	-		
Printer	EPSON	PHOTO EX3	CFNH234850		
Computer	IBM	8434	1S8434KCE99BLXLO*	-	-
Loop Antenna	EMCO	6502	00042960	2016-08-23	2017-08-22
ESPI Test Receiver	R&S	ESI26	838786/013	2016-08-22	2017-08-21
3m OATS			N/A	2016-08-24	2017-08-23
Horn Antenna	R&S	BBHA 9170	BBHA9170265	2016-08-24	2017-08-23
Horn Antenna	R&S	BBHA 9120D	9120D-631	2016-08-24	2017-08-23
Power meter	Anritsu	ML2487A	6K00003613	2016-08-22	2017-08-21
Power sensor	Anritsu	MA2491A	32263	2016-08-22	2017-08-21
Bilog Antenna	Schwarebeck	VULB9163	9163/340	2016-08-23	2017-08-21
LISN	AFJ	LS16C	10010947251	2016-08-22	2017-08-21
LISN (Three Phase)	Schwarebeck	NSLK 8126	8126453	2016-08-23	2017-08-22
9*6*6 Anechoic			N/A	2016-08-24	2017-08-23
EMI Test Receiver	RS	ESCS30	100139	2016-08-22	2017-08-21
RF Cable	SCHWARZBEC		_	2016-08-23	2017-08-22
KI Cable	К			2010-06-23	2017-00-22
Pre-Amplifier	HP	8447D	2727A05017	2016-08-05	2017-08-04
Pre-Amplifier	EM	EM30265		2016-08-05	2017-08-04

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#### 3.0 **Technical Details**

#### 3.1 Summary of test results

The EUT has been tested according to the following specifications:					
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 Exposure</b>	15.247(i), 1.1307(b)(1)	PASS	Complies		
	I	1			

#### 3.2 **Test Standards**

FCC Part 15 Subpart & Subpart C, Paragraph 15.247

#### 4.0 **EUT Modification**

No modification by SHENZHEN TIMEWAY TESTING LABORATORIES.

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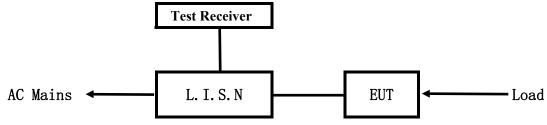
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## 5. **Power Line Conducted Emission Test**

5.1 Schematics of the test

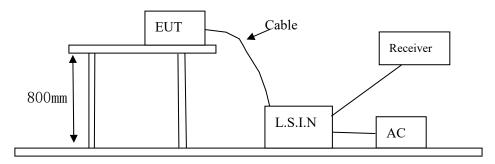


EUT: Equipment Under Test

5.2 Test Method and test Procedure

The EUT was tested according to ANSI C63.10-2013. The Frequency spectrum From 0.15MHz to 30MHz was investigated. The LISN used was 50ohm/50uH as specified by section 5.1 of ANSI C63.10–2013. Test Voltage: 120V~60Hz

Block diagram of Test setup



5.3 Configuration of The EUT

The EUT was configured according to ANSI C63.10-2013. 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	M7057, 3GR, 3G-16, S813G,	RBD-M7057
	Technology Co., Ltd.	3G-32, G10, Xtab 832	KBD-M/03/

### 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 C63.10-2013.

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

-								
	Frequency	Frequency Class A Limits (dB µ V)		Class B Limits (dB µ V)				
	(MHz)	Quasi-peak Level Average Level		Quasi-peak Level Average L				
	$0.15~\sim~0.50$	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			

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

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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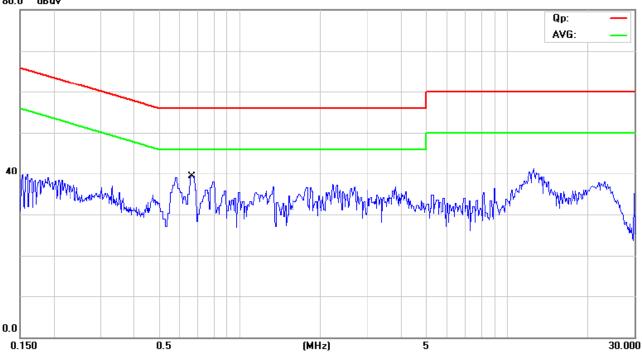
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 A: Conducted Emission on Live Terminal (150kHz to 30MHz) EUT Operating Environment Temperature: 26°C Humidity: 65%RH Atmospheric Pressure: 101 KPa EUT set Condition: Charging and Keep Bluetooth Transmitting Equipment Level: Class B Results: PASS Please refer to following diagram for individual





No. Mk.	Freq.			Measure- ment	Limit	Over		
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1 *	0.6614	28.00	10.48	38.48	56.00	-17.52	QP	
2	0.6614	-10.30	10.48	0.18	46.00	-45.82	AVG	

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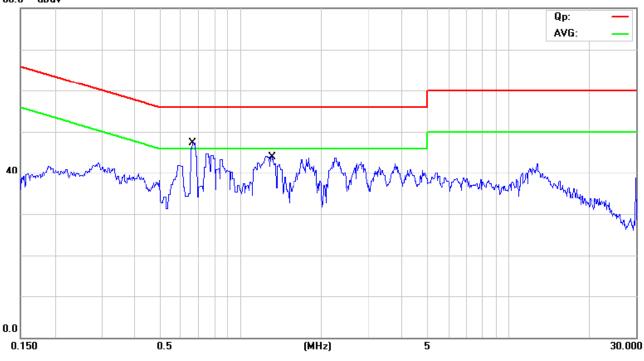
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B: Conducted Emission on Neutral Terminal (150kHz to 30MHz) **EUT Operating Environment** Humidity: 65%RH Atmospheric Pressure: 101 KPa Temperature: 26°C EUT set Condition: Charging and Keep Bluetooth Transmitting **Equipment Level: Class B Results: 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	0.6660	35.60	10.48	46.08	56.00	-9.92	QP	
2 *	0.6660	26.50	10.48	36.98	46.00	-9.02	AVG	
3	1.3114	29.80	10.89	40.69	56.00	-15.31	QP	
4	1.3114	16.50	10.89	27.39	46.00	-18.61	AVG	

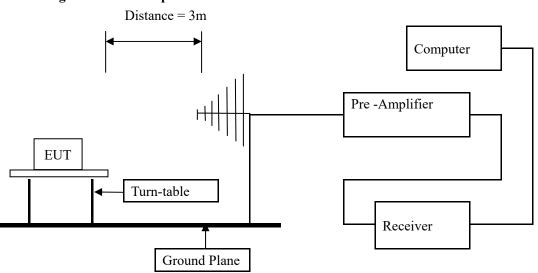
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### 6 Radiated Emission Test

- 6.1 Test Method and test Procedure:
- The EUT was tested according to ANSI C63.10-2013. The radiated test was performed at Timeway EMC Laboratory. This site is on file with the FCC laboratory division, Registration No. 8999988
- (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 C63.10-2013.
- (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/Vertical (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)
155.880	31.83	Н	43.50
991.760	39.86	Н	54.00
30.120	31.96	Н	40.00
85.080	27.64	V	40.00
925.960	39.81	V	46.00
33.040	35.95	V	40.00

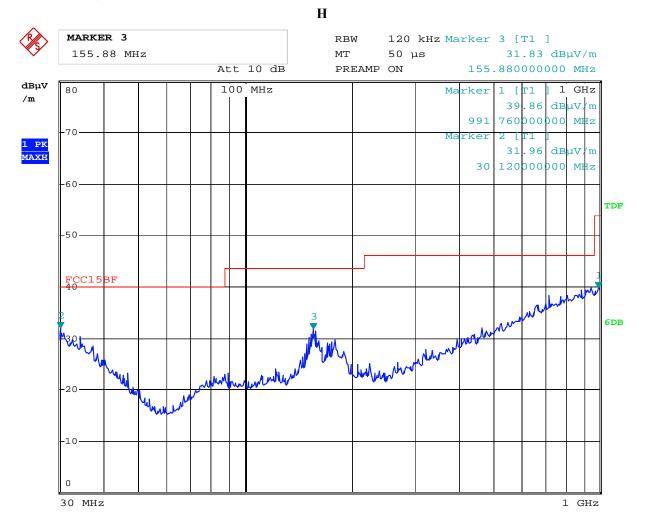
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Test Figure:



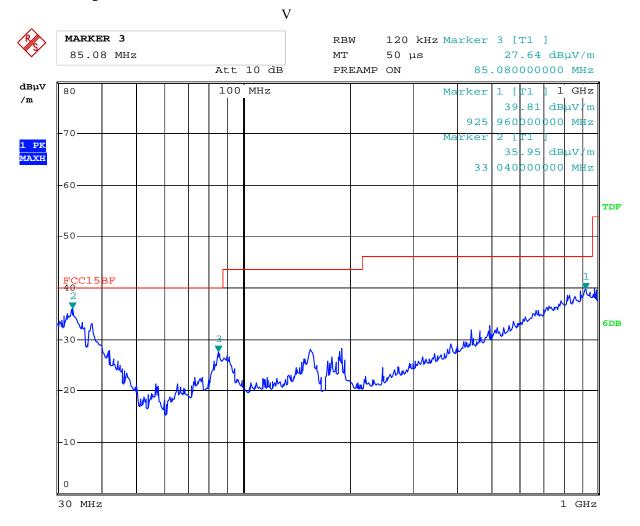
Date: 11.APR.2017 10:18:14

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Test Figure:



Date: 11.APR.2017 10:15:06

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operation mode. Transmitting under Low Channel (240241112)							
Frequency (MHz)	Level@3m (dB $\mu$ V/m)	Antenna Polarity	Limit@3m (dB µ V/m)				
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

Frequency (MHz)	Level@3m (dB $\mu$ V/m)	Antenna Polarity	Limit@3m (dB µ V/m)				
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)				

### **Operation Mode: Transmitting g under Middle Channel (2441MHz)**

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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Operation Mode: Transmitting under High Channel (2480MHZ)							
Frequency (MHz)	Level@3m (dB $\mu$ V/m)	Antenna Polarity	Limit@3m (dB µ V/m)				
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)				

### **Oneration 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

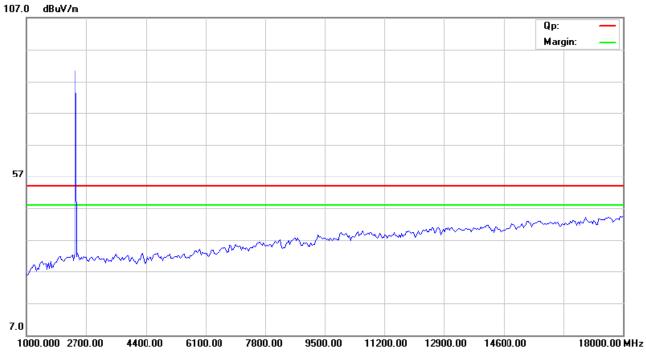
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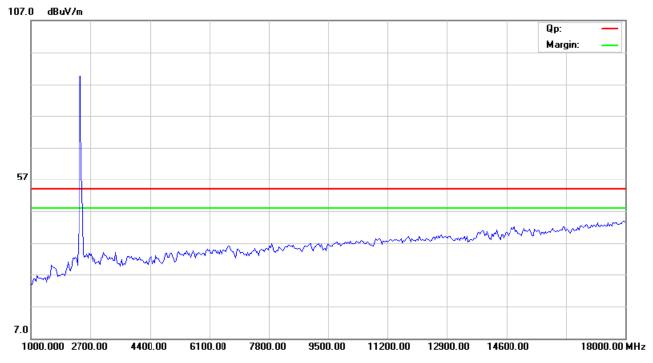


# Please refer to the following test plots for details:

# Low Channel: Horizontal



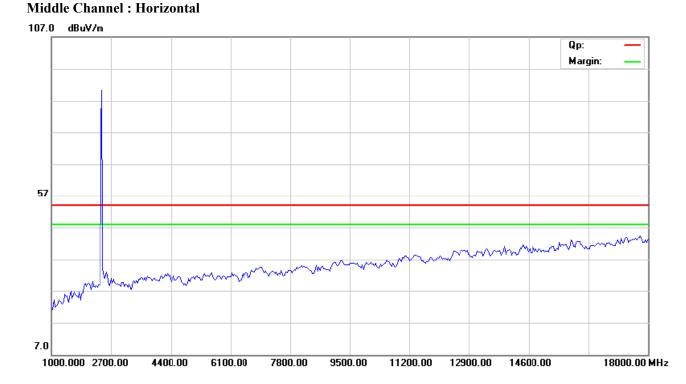
### Low Channel : Vertical



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### Middle Channel : Vertical

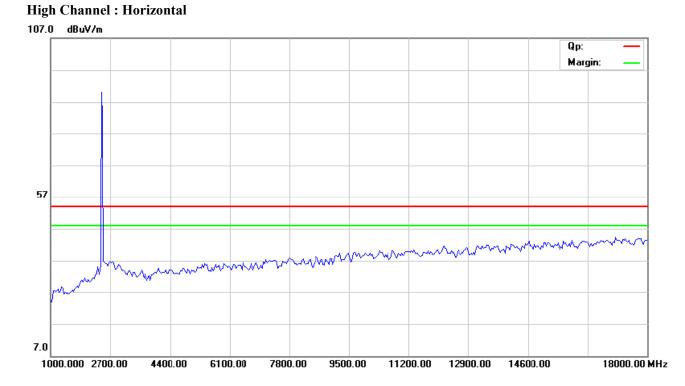
107.0 dBuV/m

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

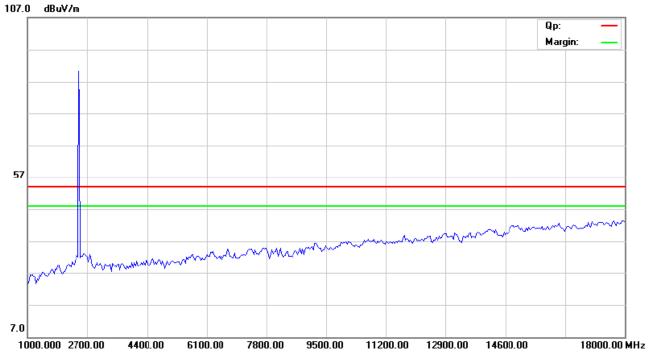
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### Note: for the radiated emissions above 18G, it is the floor noise.

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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 =3MHz, RBW =30 kHz, VBW=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 Modulation: GFSK**

EUT		Tablet PC		Tablet PCModel		M7057
Mode	Ke	Keep Transmitting		Keep Transmitting		DC3.7V
Temperat	ure	e 24 deg. C,		56% RH		
Channel	Channel Frequency (MHz)			Pass/ Fail		
Low	2402 908			Pass		
Middle	2441	2441 902		Pass		
High	2480	2480 902		Pass		

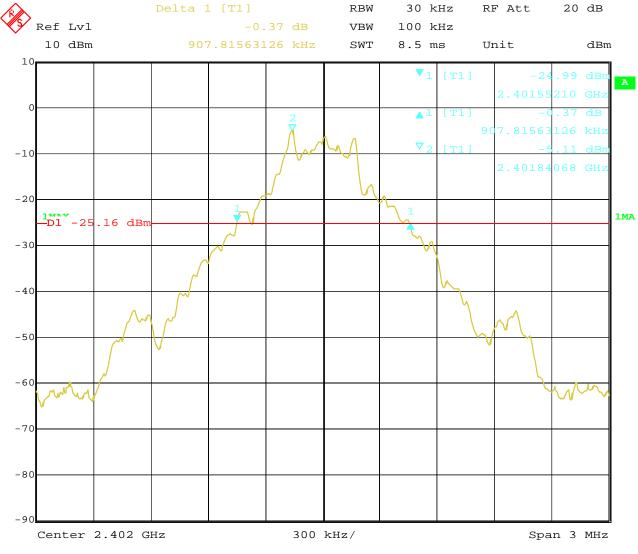
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## Test Figure: 1. Condition: Low Channel





13.APR.2017 13:01:48

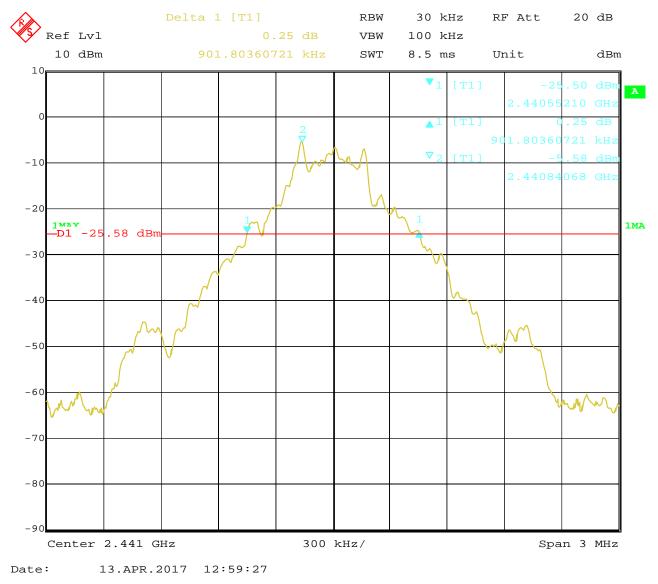
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### 2. Condition: Middle Channel



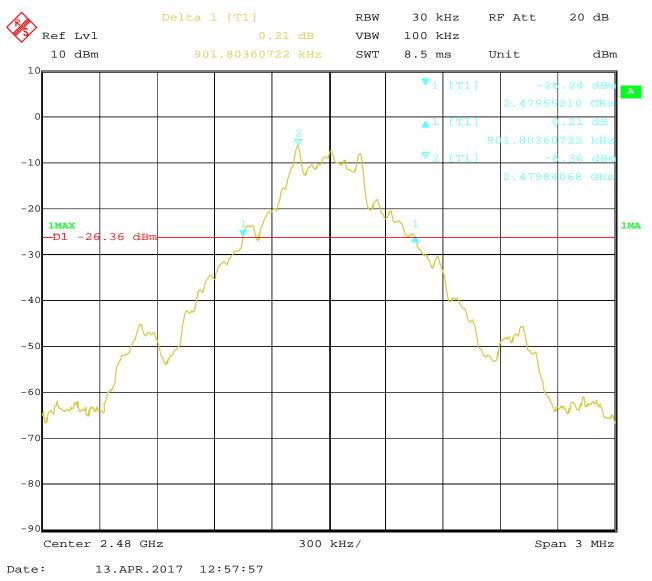
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### 3. High Channel



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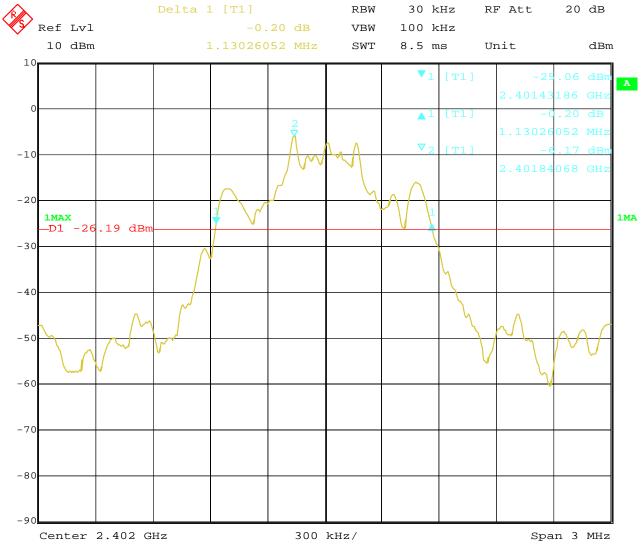
# **Test Result Type of Modulation:** Л/4DQPSK

EUT		Tablet PC		M7057		
Mode	Ke	Keep Transmitting		Keep Transmitting		DC3.7V
Temperat	ure	e 24 deg. C,		56% RH		
Channel	Channel Frequency (MHz)	20 dB Bandwidth (kHz)	Maximum Limit (kHz)	Pass/ Fail		
Low	2402 1130			Pass		
Middle	2441	2441 1130		Pass		
High	2480			Pass		

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# Test Figure: 1. Condition: Low Channel





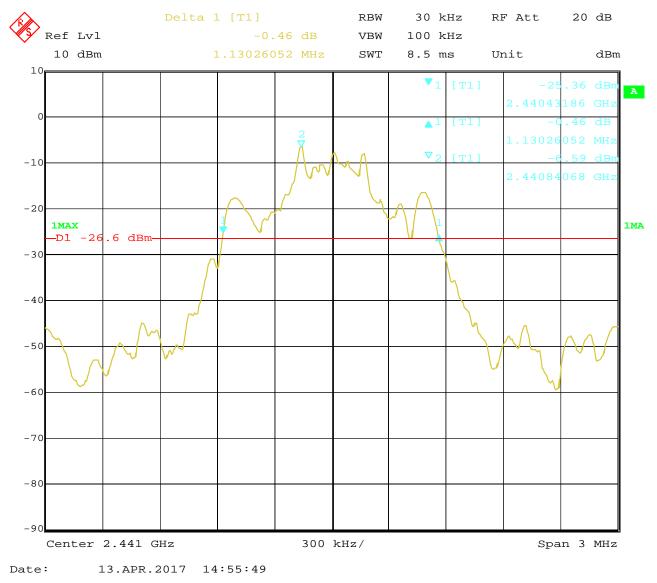
13.APR.2017 14:54:31

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### 2. Condition: Middle Channel



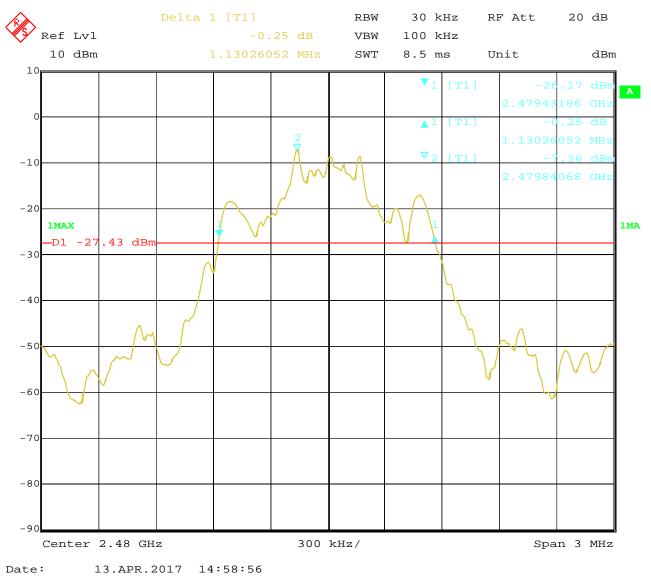
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### 3. High Channel



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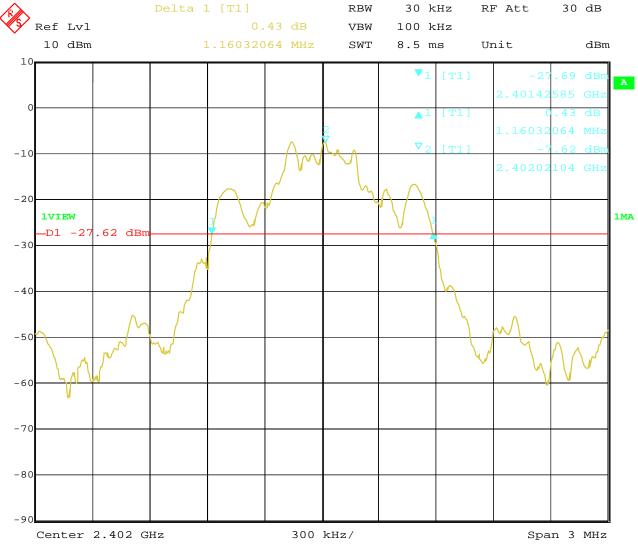
# **Test Result Type of Modulation: 8DPSK**

EUT		Tablet PC		M7057		
Mode	Ke	Keep Transmitting		Keep Transmitting In		DC3.7V
Temperat	ure	24 deg. C,		56% RH		
Channel	Channel Frequency (MHz)	20 dB Bandwidth (kHz)	Maximum Limit (kHz)	Pass/ Fail		
Low	2402 1160			Pass		
Middle	2441	2441 1160		Pass		
High	2480	2480 1160		Pass		

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# Test Figure: 1. Condition: Low Channel





18.APR.2017 17:03:57

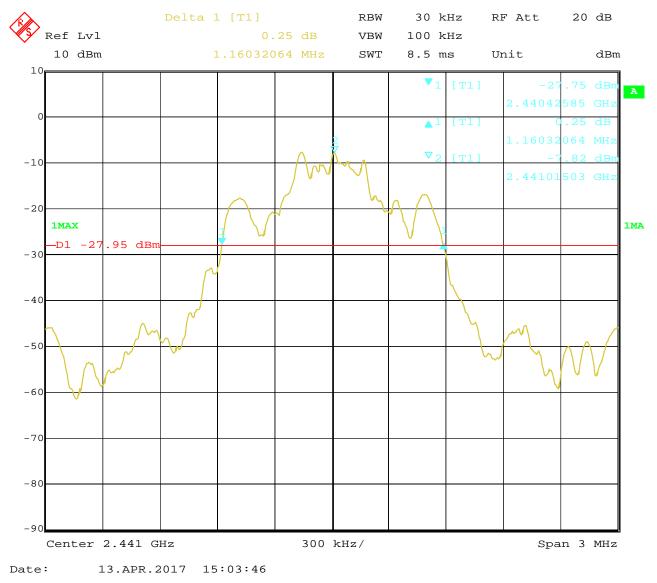
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### 2. Condition: Middle Channel



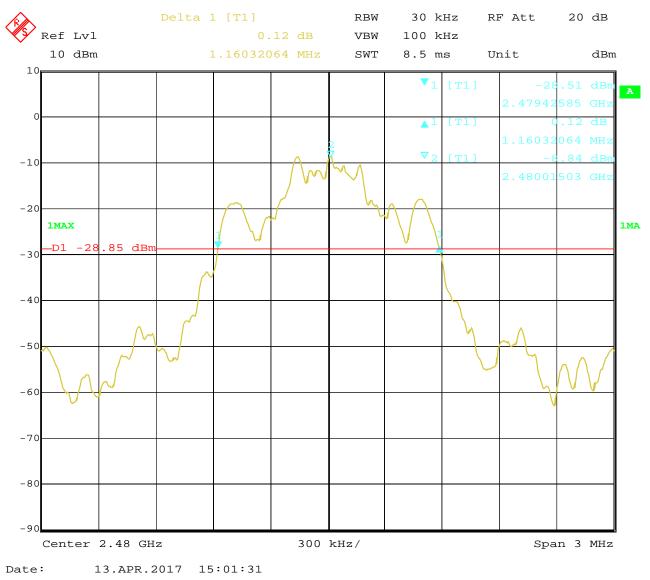
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### 3. High Channel



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# 8. Maximum 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 Output Power

The Maximum 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 = 60s; Detector function = RMS; 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			Aodel	M7057
Mode	Ke	ep Transmitting	Input Voltage		DC3.7V	
Temperature	e	24 deg. C,		Humidity		56% RH
Channel Frequency (MHz)		Max. Power Output (dBm)		)	Peak Power Limit	Pass/ Fail
	()	Average	Peak		(dBm)	
Low	2402	-11.44	-1.90		30	Pass
Middle	2441	-12.12 -2.18			30	Pass
High	2480	-12.57	-3.11		30	Pass

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

Max. Power Output = Power Reading + Cable loss + Attenuator

- 2. The worse case was recorded
- 3. The Average power was measured

### **Type of Modulation:** Л/4DQPSK

EUT		Tablet PC			Aodel	M7057
Mode	Ke	Keep Transmitting			Voltage	DC3.7V
Temperature	2	24 deg. C,		Humidity		56% RH
Channel	Channel Frequency (MHz)	Max. Power Output (dBm)			Peak Power Limit	Pass/ Fail
		Average	Peak		(dBm)	
Low	2402	-12.53	-2.67		30	Pass
Middle	2441	-12.77	-12.77 -2.99		30	Pass
High	2480	-13.49	-3.69		30	Pass

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

Max. Power Output = Power Reading + Cable loss + Attenuator

- 2. The worse case was recorded
- 3. The Average power was measured

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adopt any other remedies which may be appropriate.



**Type of Modulation: 8DPSK** 

EUT		Tablet PC		Model		M7057
Mode	Ke	ep Transmitting	p Transmitting Inp		t Voltage	DC3.7V
Temperature		24 deg. C,			umidity	56% RH
Channel	Channel Frequency	Max. Power Output (dBm)		)	Peak Power	Pass/ Fail
Chamier	(MHz)	Average	Peak		Limit (dBm)	
Low	2402	-12.64	-2.18		30	Pass
Middle	2441	-12.89	-3.11		30	Pass
High	2480	-13.66	-3.81		30	Pass

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

Max. Power Output = Power Reading + Cable loss + Attenuator

2. The worse case was recorded

3. The Average power was measured

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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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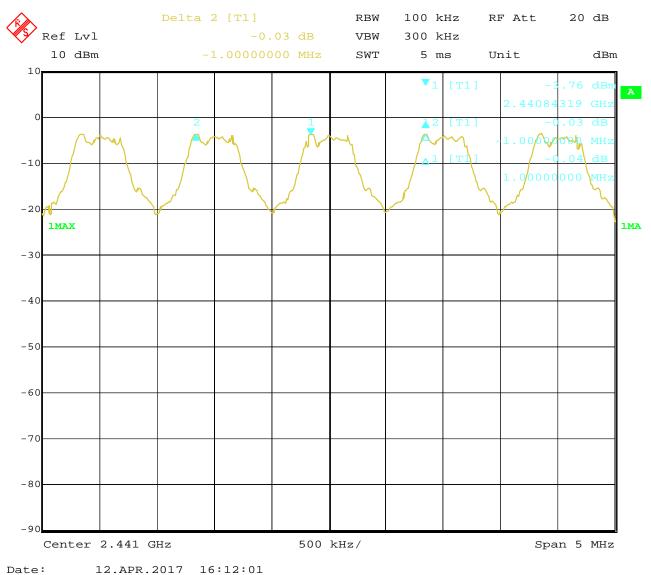


#### 9.4Test Result

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

EUT	Tablet PC		Model		M7057
Mode	Hopping O	n	Input Voltage	DC3.7V	
Temperature	24 deg. C,		Humidity		56% RH
Carrier I	Frequency Separation		Limit		Pass/ Fail
	1.000MHz	$\geq$ 25 kHz or 2/3	of the 20 dB ban	dwidth	Pass

#### **Test Plots**



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

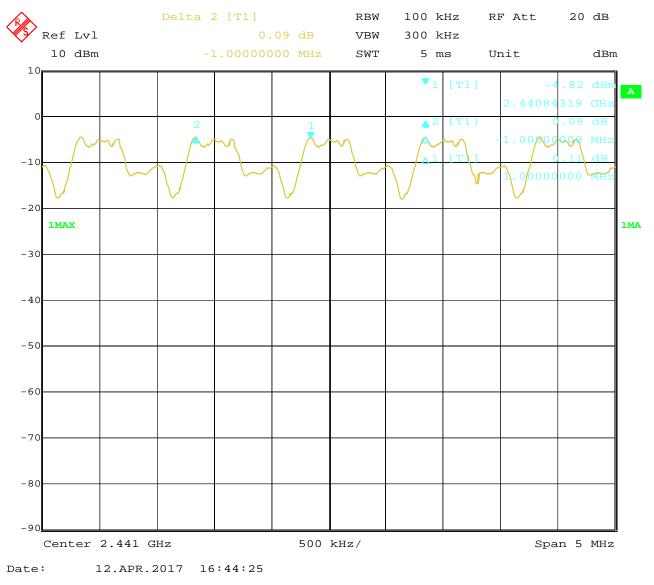
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#### **Type of Modulation:** Л/4DQPSK

EUT	Tablet PC		Model		M7057
Mode	Hopping O	n	Input Voltage		DC3.7V
Temperature	24 deg. C,		Humidity		56% RH
Carrier I	Frequency Separation		Limit		Pass/ Fail
	1.000MHz $\geq 25$ kHz or		/3 of 20 dB bandy	width	Pass

#### **Test Plots**



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

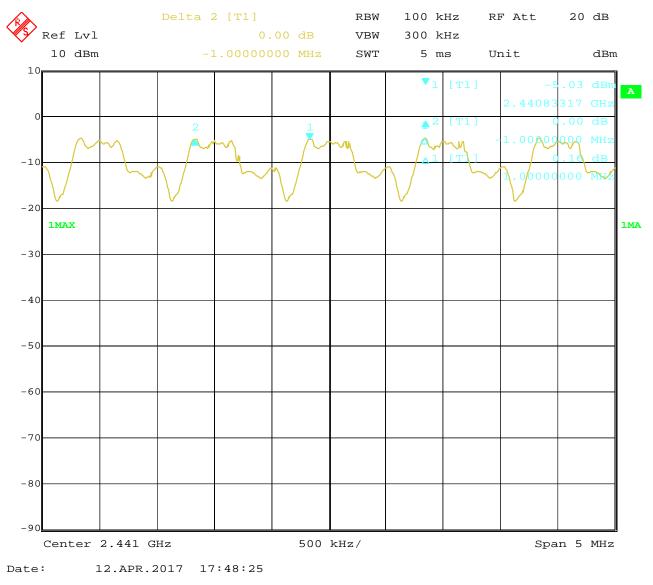
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#### **Type of Modulation: 8DPSK**

EUT	Tablet PC		Model		M7057
Mode	Hopping O	n	Input Voltage		DC3.7V
Temperature	24 deg. C,		Humidity		56% RH
Carrier I	Frequency Separation		Limit		Pass/ Fail
1.000MHz		$\geq 25$ kHz or 2	/3 of 20 dB bandw	vidth	Pass

#### **Test Plots**



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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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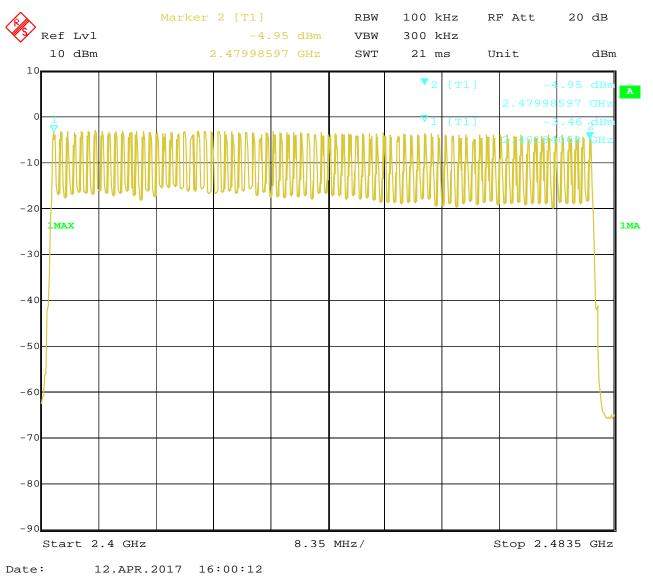


#### **10.4Test Result**

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

EUT		Tablet PC	Model		M7057	
Mode		Hopping On	Input Voltage	DC3.7V		
Temperature		24 deg. C,	Humidity	56% RH		
Operating Frequency		Number of hop	ping channels	Pass/ Fail		
2402-2480MHz 79			≥15	Pass		

#### **Test Plot**



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

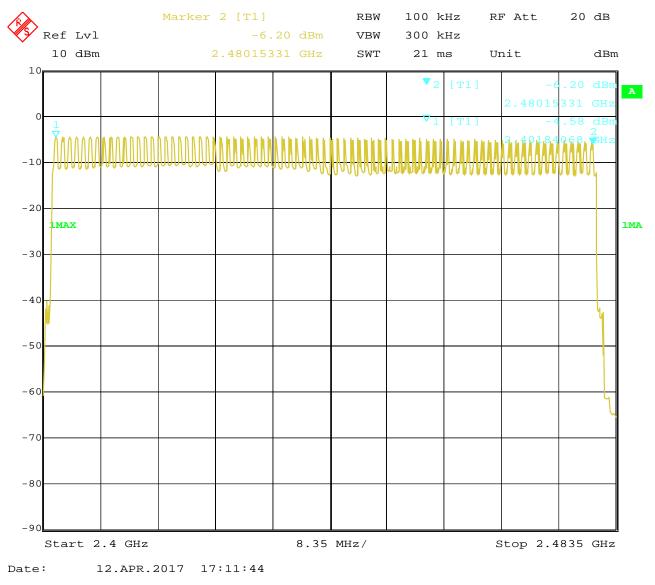
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### **Type of Modulation:** Л/4DQPSK

EUT		Tablet PC	Model			M7057
Mode		Hopping On	Input V	oltage		DC3.7V
Temperature	24 deg. C,		Humidi	ity		56% RH
Operating Frequer	ncy	Number of hopp channels	oing	Liı	nit	Pass/ Fail
2402-2480MHz		79		2	15	Pass

### **Test Plot**



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

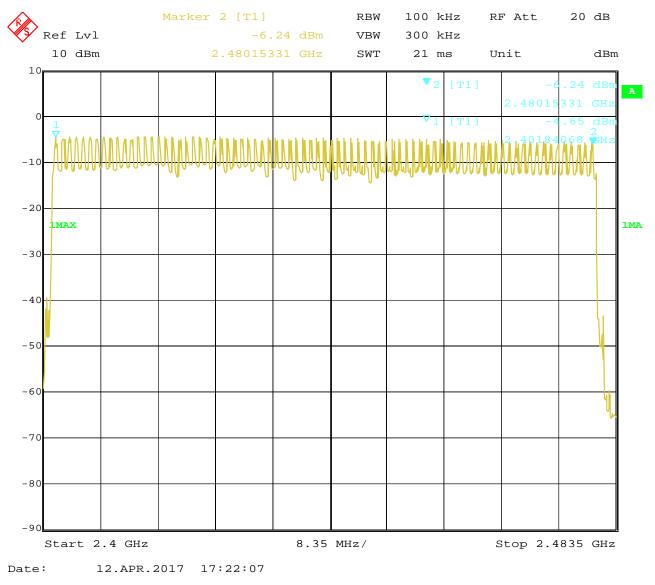
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**Type of Modulation: 8DPSK** 

EUT		Tablet PC	Model			M7057
Mode		Hopping On	Input V	oltage		DC3.7V
Temperature		24 deg. C,	Humidi	ity		56% RH
Operating Freque	ncy	Number of hopp channels	oing	Liı	nit	Pass/ Fail
2402-2480MHz		79		2	15	Pass

#### **Test Plot**



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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	Tab	let PC	Model		M7057	
Mode	Keep Tr	ansmitting	Input Voltage	]	DC3.7V	
Temperatur	e 24 d	leg. C,	Humidity	56% RH		
Channel	Reading	Hoping Rate		Actual	Limit	
			DH5			
Middle	0.20ms	266.667	266.667 hop/s		0.4s	
			DH3			
Middle	0.20ms	400 hop/s		0.032s	0.4s	
			DH1			
Middle	0.20ms	800 h	nop/s	0.064s	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.

A DH3 Packet needs 3 time slot for transmitting and 1 time slot for receiving. Then the EUT makes worst case 400 hops per second with 79 channels.

A DH1 Packet needs 1 time slot for transmitting and 1 time slot for receiving. Then the EUT makes worst case 800 hops per second with 79 channels.

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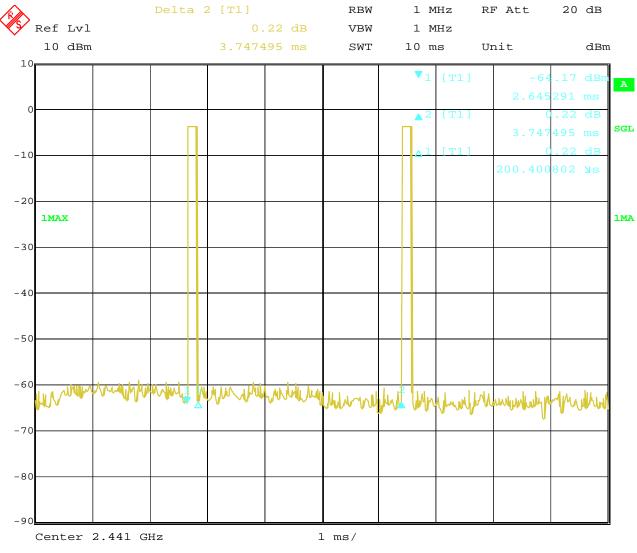
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Test Plots:

### DH5

Middle Channel:



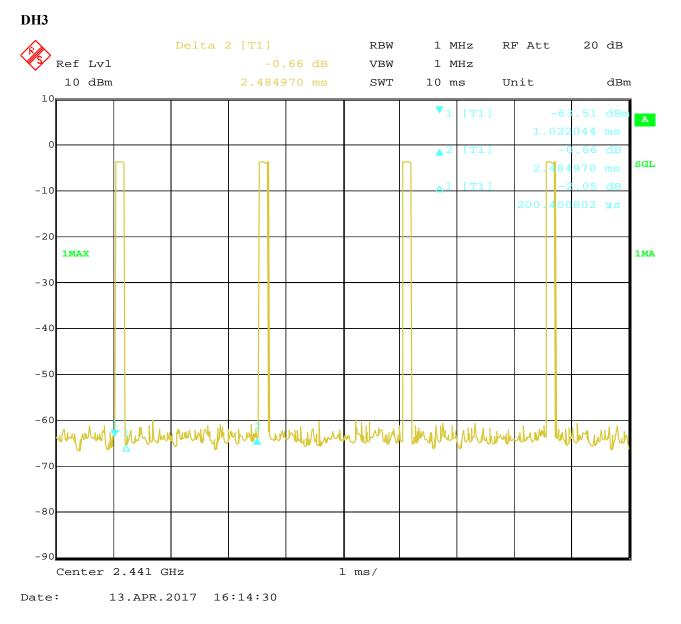


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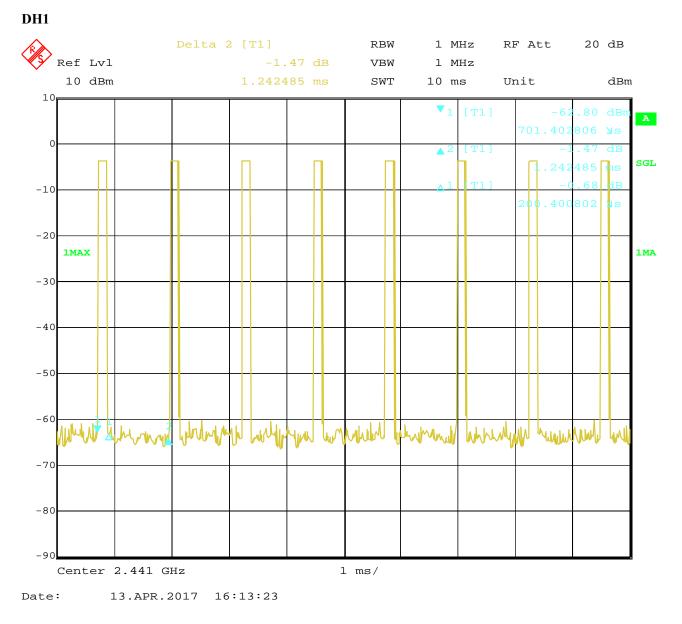


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#### Test Result

#### **Type of Modulation:** Л/4DQPSK

EUT	Tab	let PC	Model	N	M7057	
Mode	Keep Tr	ansmitting	Input Voltage	E	DC3.7V	
Temperatur	e 24 c	leg. C,	Humidity	56% RH		
Channel	Reading	Hoping Rate		Actual	Limit	
			DH5			
Middle	0.22ms	266.66	7 hop/s	0.0235s	0.4s	
			DH3			
Middle	0.26ms	400 hop/s		0.0416s	0.4s	
			DH1			
Middle	0.20ms	800 H	nop/s	0.064s	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.

A DH3 Packet needs 3 time slot for transmitting and 1 time slot for receiving. Then the EUT makes worst case 400 hops per second with 79 channels.

A DH1 Packet needs 1 time slot for transmitting and 1 time slot for receiving. Then the EUT makes worst case 800 hops per second with 79 channels.

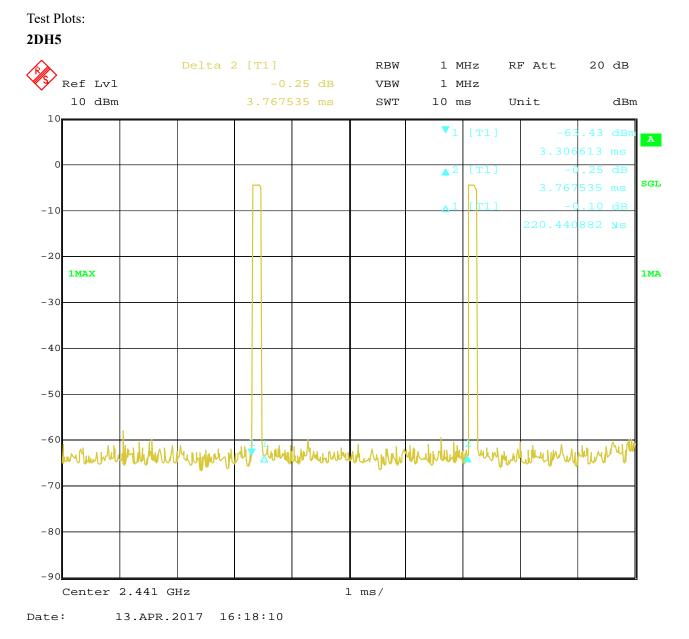
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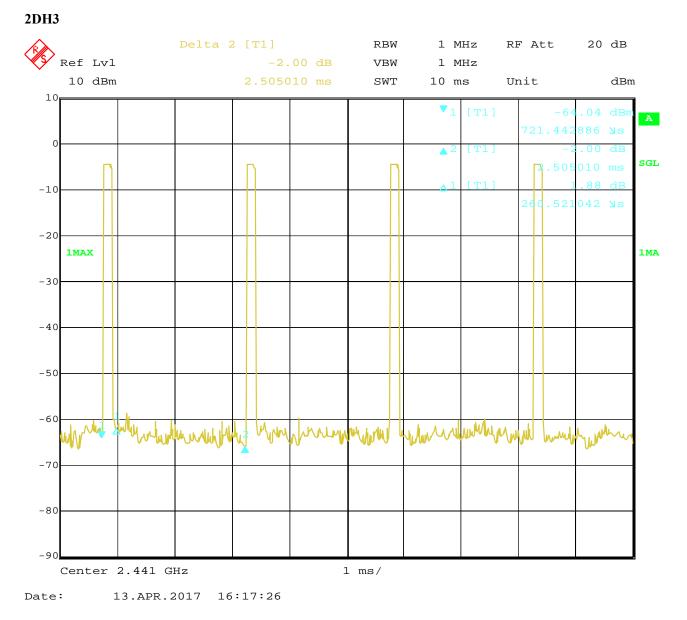
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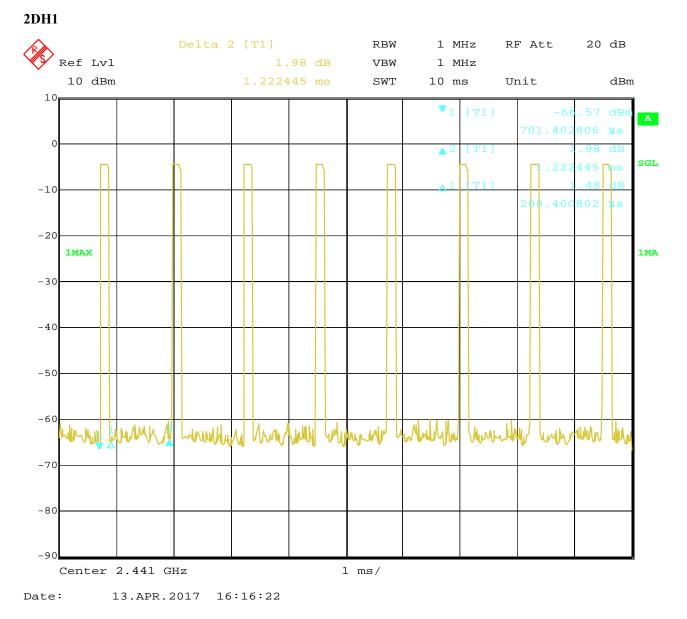




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**Type of Modulation: 8DPSK** 

EUT	Tab	let PC	Model	N	17057	
Mode	Keep Tr	ansmitting	Input Voltage	D	C3.7V	
Temperature	e 24 d	leg. C,	Humidity	56% RH		
Channel	Reading	Hoping Rate		Actual	Limit	
			DH5			
Middle	0.22ms	266.667	7 hop/s	0.0235s	0.4s	
			DH3			
Middle	0.20ms	400 hop/s		0.032s	0.4s	
			DH1			
Middle	0.20ms	800 h	nop/s	0.064s	0.4s	

Actual = Reading  $\times$  (Hopping rate / Number of channels)  $\times$  Test period, Test period = 0.4 [seconds / channel]  $\times$  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.

A DH3 Packet needs 3 time slot for transmitting and 1 time slot for receiving. Then the EUT makes worst case 400 hops per second with 79 channels.

A DH1 Packet needs 1 time slot for transmitting and 1 time slot for receiving. Then the EUT makes worst case 800 hops per second with 79 channels.

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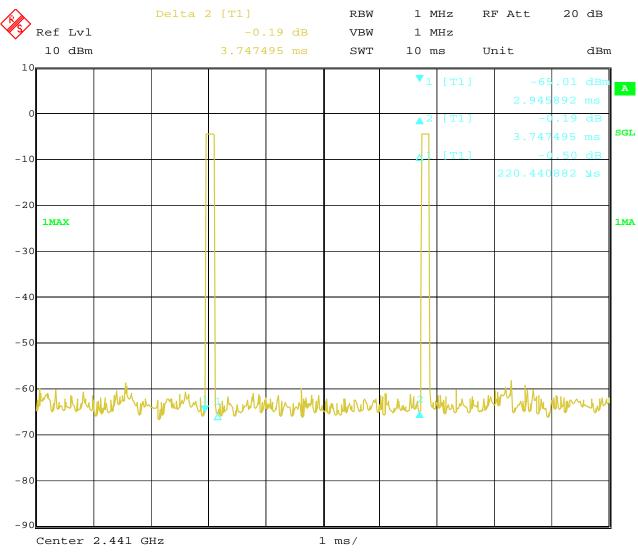
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## Test Plots: 3DH5



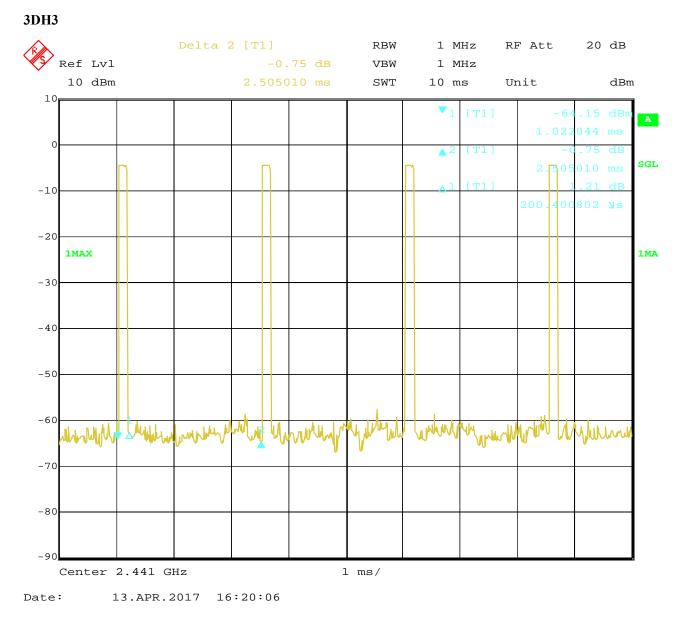
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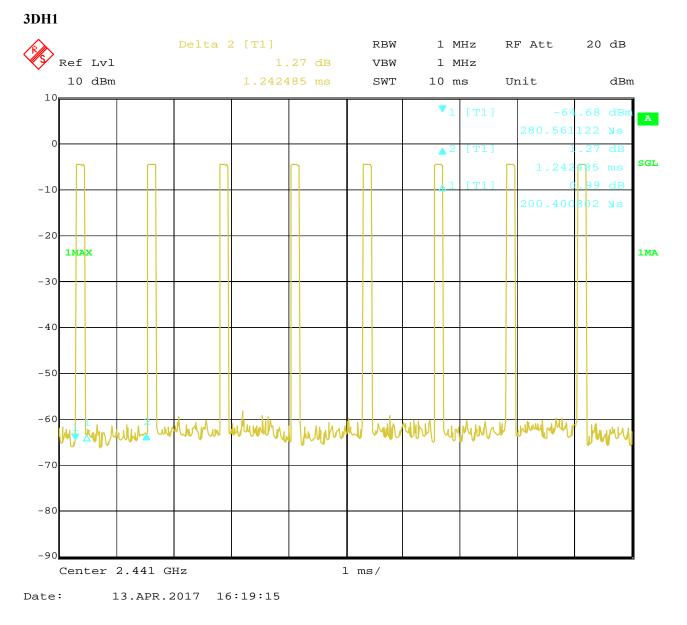
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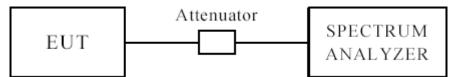
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12 Out of Band Measurement

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=100kHz, 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. 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.

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**Type of Modulation: GFSK** 

#### Out of Band Test Result 12.4

Product:			olet PC			Test Mod		Low Channel	
Aode		Keeping	Transmitti	ng		Input Vo	ltage	DC3	.7V
Temperature		24	deg. C			Humidit	y	56%	RH
Test Result:		]	Pass			Detector		PI	X
The Max. FS in	PK (dBµV/n	1)	2	44.3				74(dBµ	uV/m)
Restrict Band	AV(dBµV/m	l)				Lim	nit	54(dBj	ιV/m)
2390MHz									
<b>Fest Figure:</b>									
	Marker	1 [T1]		RBW	100	kHz R	F Att	20 di	в
Ref Lvl		-3	.42 dBm	VBW	300	kHz			
10 dBm		2.40194	389 GHz	SWT	15	ms U	nit	d	Bm
10					▼ 1	[T1]		-3.42 di	Bm
							2.401	94389 GI	A Iz
0					▼ 2	2 [T1]	ŧ	64.71 di	Зm
					_		2.400	00000 GI	
-10					▼ 3	3 [T1]		<u>65.91 d</u>	
							2.390	00000 GI	Iz
-20									
1MAX									1M
-30									
-40									
-50									
-60					3		2		
under	munant	Mohn	manne	mon	month	mon	m	horner	~~
-70		• • · · · •	¥*	• • •					
-80									
-90									
Start 2.3	5 GHz		бM	Hz/			Stop	2.41 GH	Iz

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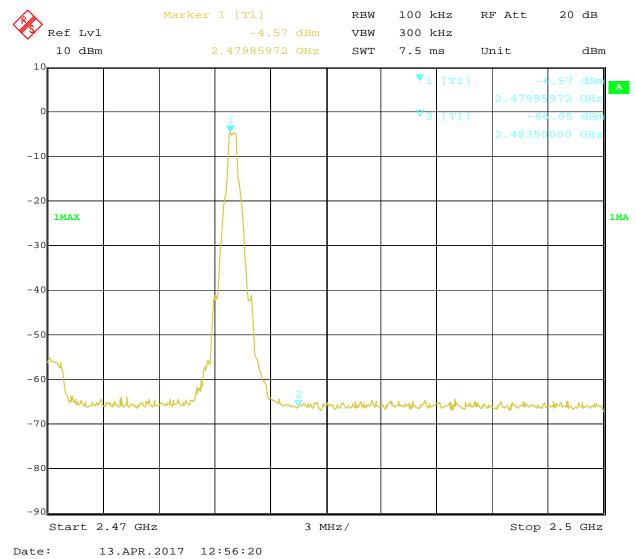


**Type of Modulation: GFSK** 

#### Out of Band Test Result 12.4

Product:		Tablet PC	Test Mode:	High Channel
Mode	Keep	ping Transmitting	Input Voltage	DC3.7V
Temperature		24 deg. C,	Humidity	56% RH
Test Result:		Pass		РК
The Max. FS in	PK (dBµV/m)	42.6		74(dBµV/m)
Restrict Band	$AV(dB\mu V/m)$		Limit	54(dBµV/m)
2483.5MHz				

**Test Figure:** 



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**Type of Modulation: GFSK** 

#### Out of Band Test Result 12.4

Product:		Tablet PC				Hopping mode	
Mode		Hopping On		Input V	/oltage	DC3.7V	
Temperature		24 deg. C,		Hum	idity	56% RH	
Test Result:		Pass		Dete	ector	РК	
The Max. FS in	PK (dBµV/m)	42.6	5			74(dBµV/m	I)
Restrict Band	AV(dBµV/m)			Liı	nit	54(dBµV/m	I)
2390MHz							
<b>Fest Figure:</b>							
	Marker 1		RBW	100 kHz	RF A	tt 20 dB	
Ref Lvl		-3.52 dBm	VBW	300 kHz	• •	15	
10 dBm	2.	40891784 GHz	SWT	15 ms	Unit	dBm	
				▼1 [т:	L ]	-3.52 dBm	A
0						40891 <mark>784 GHz</mark>	
				▼2 [T]	2.4	-65.24 dBm	
1.0				<b>∇</b> 3 [T]		-66.07 dBm	
-10					2.3	390000000 GHz	
						\ U \ \ U \ U \ U	
-20 1MAX							1M
THAN							
- 3 0							
-40							
- 5 0							
-60							
mennem	n Manum	mennelemente	when	uniter mun	mun		
-70							
- 80							
-90							
Start 2.3	5 GHz	6 M	Hz/		St	cop 2.41 GHz	

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**Type of Modulation: GFSK** 

#### Out of Band Test Result 12.4

Product:		Tablet PC				Test Mode:		le:	Н	oppir	ıg mo	de
Mode		Hopping On				Input Voltage		DC3.7V				
Temperature		24 deg. C,				Humidity		56% RH				
Test Result:		Pass				Ι	Detecto	r		Р	Κ	
The Max. FS in	PK (dBµV/m)		41.8						7	/4(dB	μV/m	ı)
Restrict Band	$AV(dB\mu V/m)$						Limit		4	54(dB	μV/m	ı)
2483.5MHz												
<b>Fest Figure:</b>												
	Marker 1			RBW	100			RF A	Att	20	dB	
Ref Lvl	2	-4.47		VBW	300			TT			10	
10 dBm 10	۷.	47288577	GHZ	SWT	7.5		s	Unit		1	dBm	
						1	[T1]		- 4	.47	dBm	A
0								2.	47288		GHz	
						• 2	[T1]	2	-60 48350		dBm GHz	
-10	1 /1 /1 /1 /1 /1 /1 /1	$\gamma$						۷.	40550		GHZ	
-10												
-20	<u> </u>											
1MAX												1M2
-30												
-40												
		4										
-50												
-60												
		year	North	June	mumu	m	Monn	m	wm	meler	un	
-70												
-80												
-90												
Start 2.4	7 GHz		3 M	Hz/					Stop	2.5	GHz	

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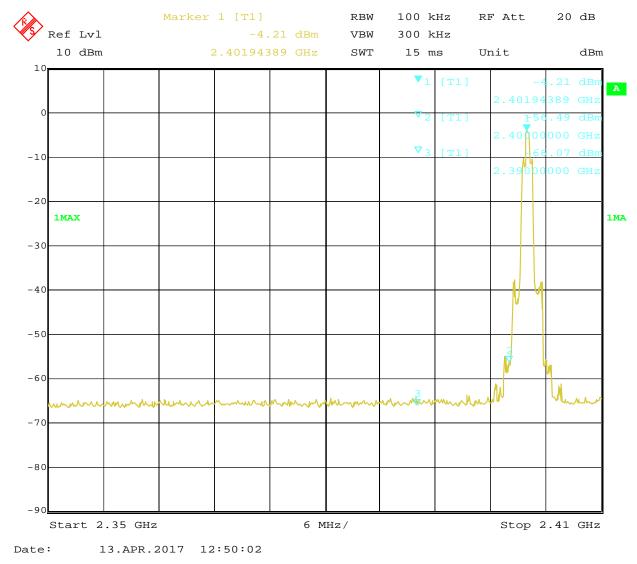


**Type of Modulation:** Л/4DQPSK

#### Out of Band Test Result 12.4

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)	47.1		74(dBµV/m)
Restrict Band	AV(dBµV/m)		Limit	54(dBµV/m)
2390MHz				

#### **Test Figure:**



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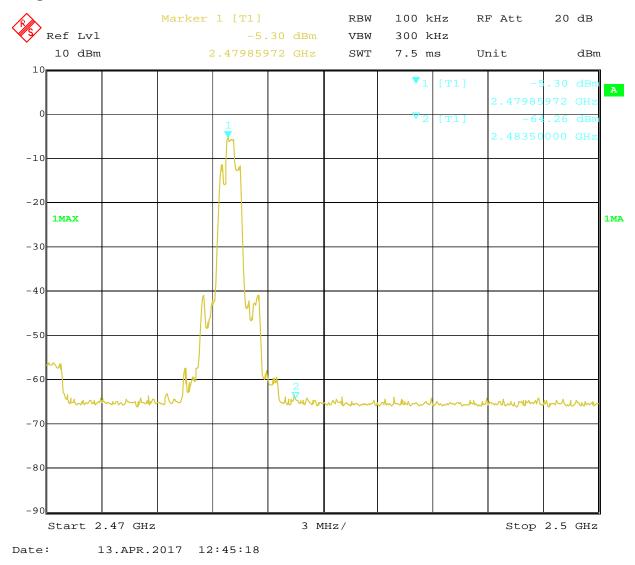


## Type of Modulation: Л/4DQPSK

#### Out of Band Test Result 12.4

Product:	Tablet PC		Test Mode:	High Channel
Mode	Keej	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)	42.5		74(dBµV/m)
Restrict Band	AV(dBµV/m)		Limit	54(dBµV/m)
2483.5MHz				

#### **Test Figure:**



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### **Type of Modulation:** Л/4DQPSK

#### Out of Band Test Result 12.4

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)	45.0			74(dBµV/m)	
Restrict Band	AV(dBµV/m)			Limit	54(dBµV/m)	
2390MHz						
fest Figure:						
	Marker 1	[T1]	RBW 1	100 kHz RF A	Att 20 dB	
Ref Lvl		-4.48 dBm		300 kHz		
10 dBm	2.	40290581 GHz	SWT	15 ms Unit	dBm	
10				▼1 [T1]	-4.48 dBm	
0				_	40290581 GHz	
0				V2 [T1]	- <u></u> ∮1.00 dBm	
				2. ▼ <sub>3 [T1]</sub>	4000000000	
-10					39000000 GH2	
-20						
1MAX					1M	
- 3 0						
-40						
- 5 0						
-60					2	
A Marson Marson	A to all a line and the a surface	web which we were and an and	Martin market	hat many land	L .	
-70						
- 8 0						
- 6 0						
-90	5 GHz	6 MI	Hz/	S	top 2.41 GHz	

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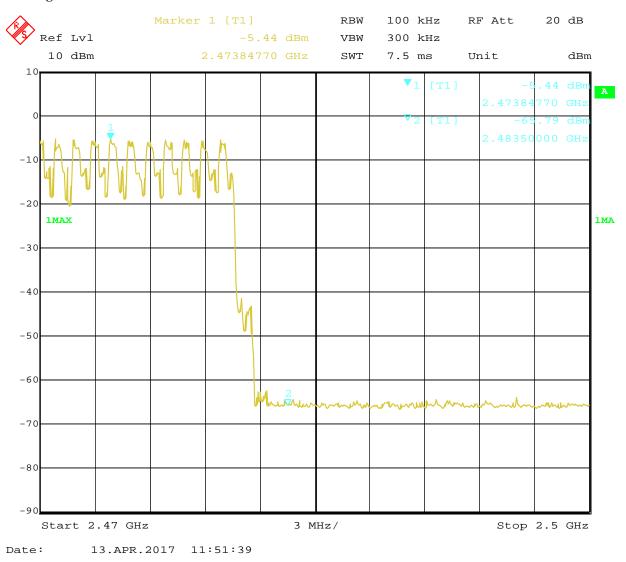


## Type of Modulation: Л/4DQPSK

#### Out of Band Test Result 12.4

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)	42.0		74(dBµV/m)
Restrict Band	AV(dBµV/m)		Limit	54(dBµV/m)
2483.5MHz				

#### **Test Figure:**



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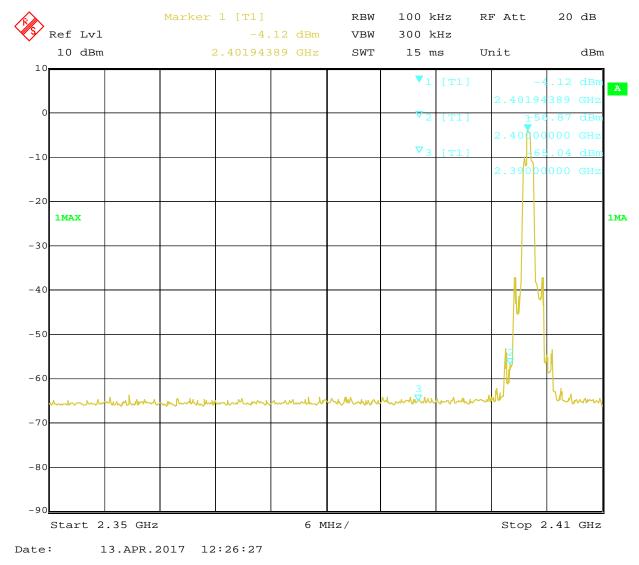


**Type of Modulation: 8DPSK** 

#### Out of Band Test Result 12.4

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)	46.3		74(dBµV/m)
Restrict Band	AV(dBµV/m)		Limit	54(dBµV/m)
2390MHz				

#### **Test Figure:**



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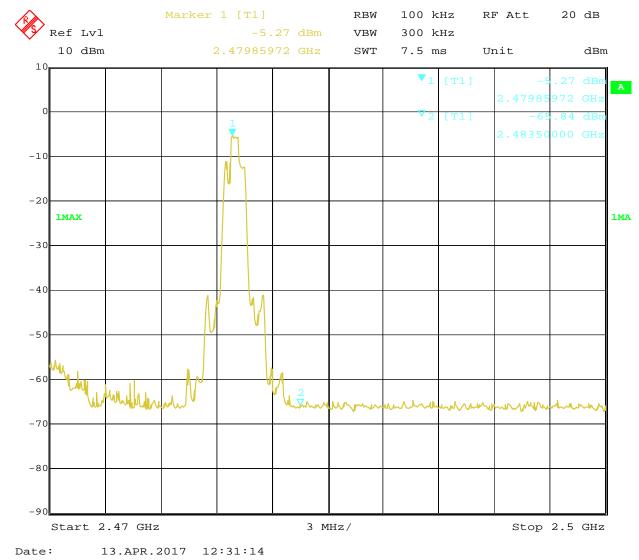


**Type of Modulation: 8DPSK** 

#### Out of Band Test Result 12.4

Product:	Tablet PC		Test Mode:	High Channel
Mode	Keej	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)	42.5		74(dBµV/m)
Restrict Band	AV(dBµV/m)		Limit	54(dBµV/m)
2483.5MHz				

**Test Figure:** 



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**Type of Modulation: 8DPSK** 

#### Out of Band Test Result 12.4

Product:	Tablet PC				Test Mode:	Hopping mode	
Mode		Hopping On		In	put Voltage	DC3.7V	
Temperature		24 deg. C,			Humidity	56% RH	
Test Result:	Pass				Detector	РК	
The Max. FS in	PK (dBµV/m)	2	14.8			74(dBµV/m)	
Restrict Band	AV(dBµV/m)				Limit	54(dBµV/m)	
2390MHz							
Test Figure:							
Ŕ	Marker 1	[T1]	RBW	100 }	KHZ RFA	Att 20 dB	
🛛 Ref Lvl		-4.18 dH	Bm VBW	300 ]			
10 dBm	2.	40494990 GH	Iz SWT	15 r	ns Unit	dBm	
10				<b>v</b> 1	[T1]	-4.18 dBm	
					2.	40494990 GHz	
0				₹2	[T1]	-57. <u>1</u> 43 dBm	
				<b>⊽</b> 3		400000 GHZ	
-10				<u> </u>		39D00000 GHz	
					۷.	SSDOGIOU BHZ	
-20							
1MAX						1M	
- 3 0							
-40							
- 5 0							
						2	
- 6 0						7	
				3 In Al			
70		man and the for					
-70							
-80							
-90			5 MHz/			top 2.41 GHz	

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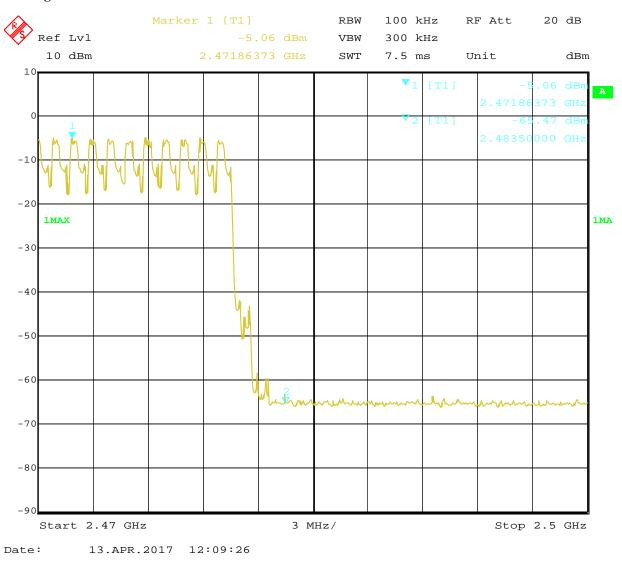


**Type of Modulation: 8DPSK** 

#### Out of Band Test Result 12.4

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)	41.6		74(dBµV/m)
Restrict Band	AV(dBµV/m)	AV(dBμV/m)		54(dBµV/m)
2483.5MHz				

**Test Figure:** 



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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 1.4dBi.

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#### 14.0 FCC ID Label

#### FCC ID: RBD-M7057

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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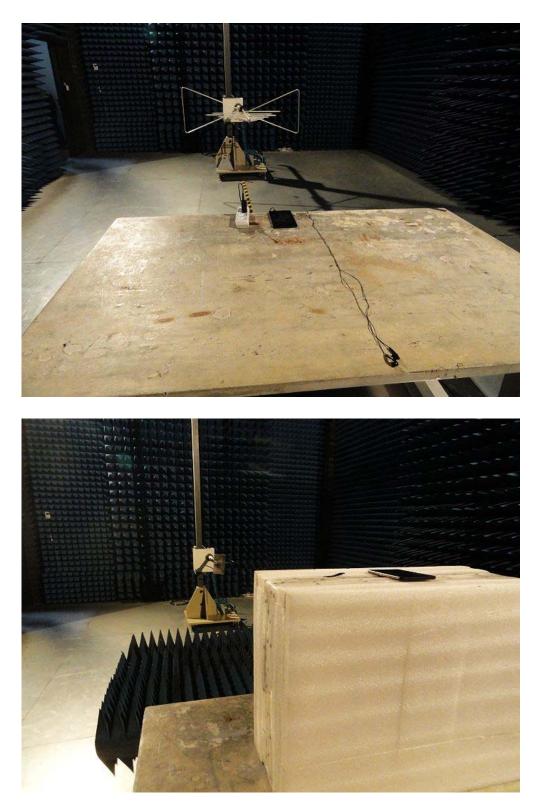
15.0 Photo of testing Conducted Emission Test Setup:



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Radiated Emission Test Setup:

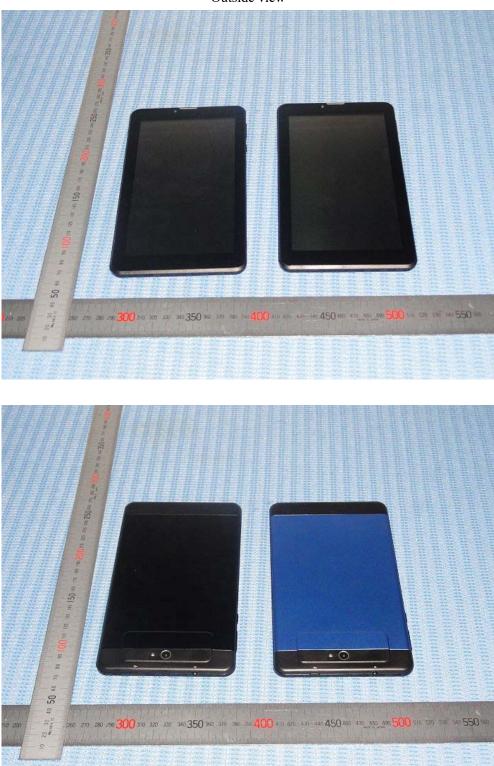


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## **Photographs – EUT**

Outside view



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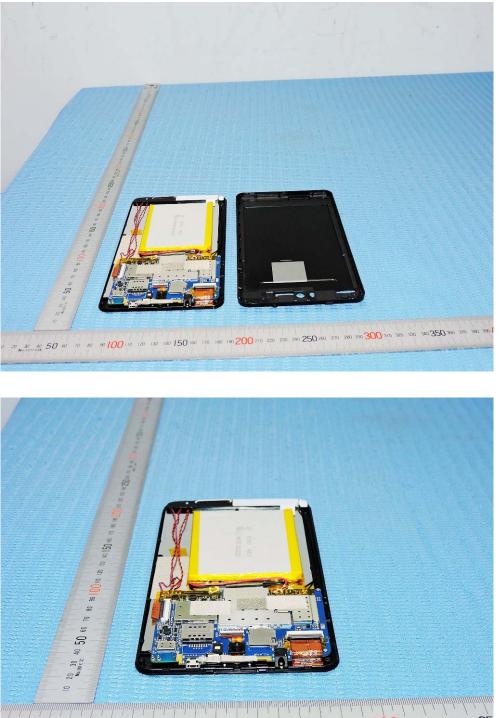
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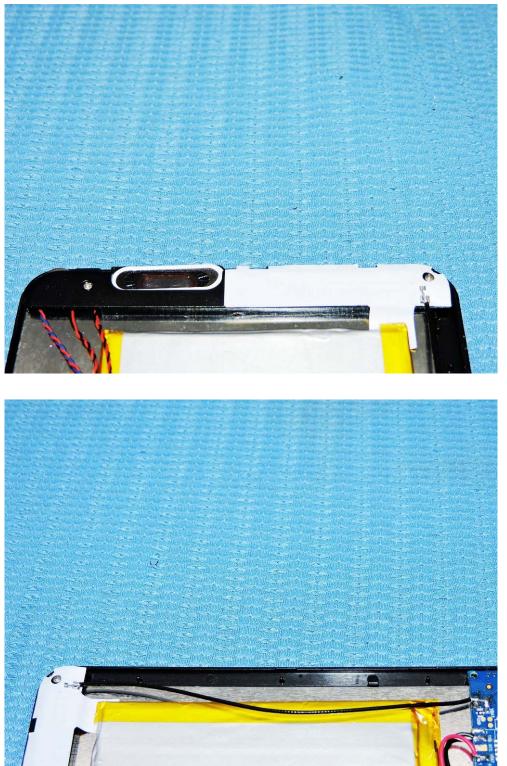
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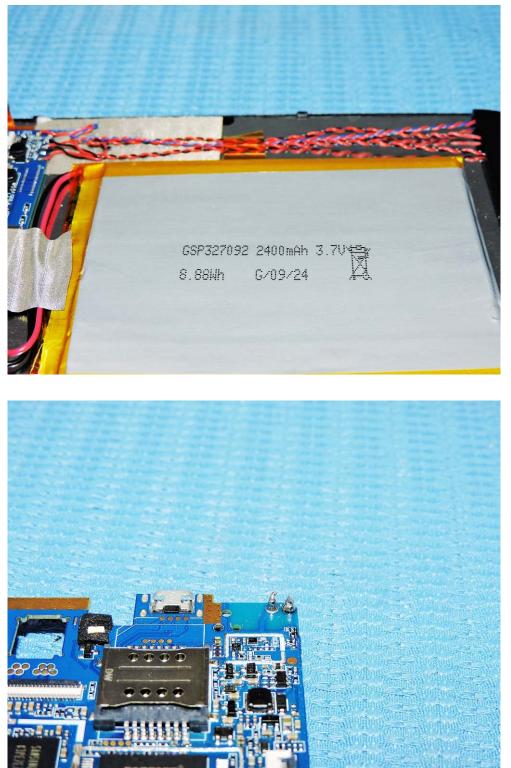
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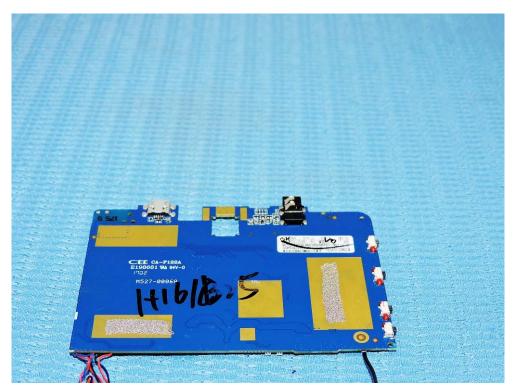


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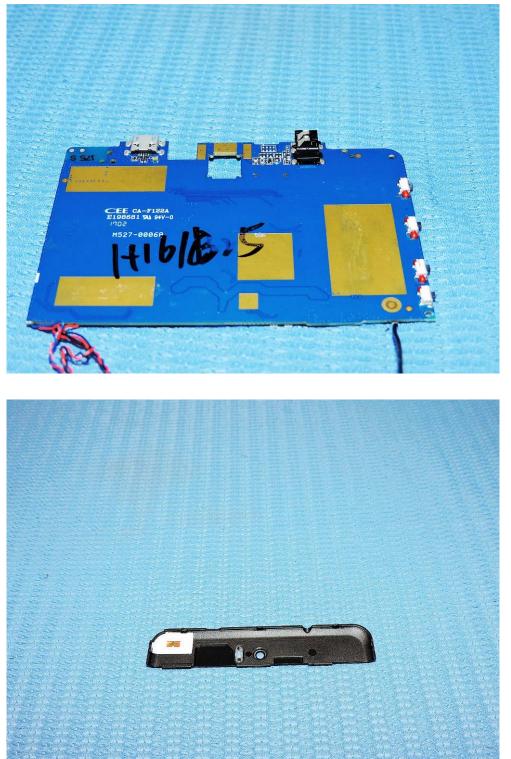




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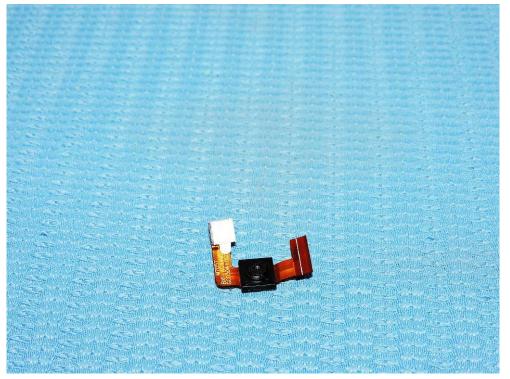
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Inside view



End of the report

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