

# Shenzhen Toby Technology Co., Ltd.

Report No.: TB-FCC140200
Page: 1 of 75

# FCC Radio Test Report FCC ID: 2ABES-GURUBOOK5

## **Original Grant**

Report No. : TB-FCC140200

**Applicant**: Pathway Innovations and Technologies, Inc.

**Equipment Under Test (EUT)** 

**EUT Name**: Gurubook 5/MID

Model No. : Gurubook 5

Series Model : Gurubook 8, Gurubook 12, Gurubook 13, Gurubook 16

No.

Brand Name : HoverCam

**Receipt Date** : 2014-08-18

**Test Date** : 2014-08-19 to 2014-09-05

**Issue Date** : 2014-09-10

**Standards** : FCC Part 15, Subpart C (15.247:2013)

Test Method : ANSI C63.4:2003

Conclusions : PASS

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

The EUT technically complies with the FCC requirements

Test/Witness Engineer :

Approved& Authorized

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in the report.

TB-RF-074-1. 0



# **Contents**

COI	NIENIS	
1.	GENERAL INFORMATION ABOUT EUT	4
	1.1 Client Information	∠
	1.2 General Description of EUT (Equipment Under Test)	∠
	1.3 Block Diagram Showing the Configuration of System Tested	
	1.4 Description of Support Units	<i>.</i>
	1.5 Description of Test Mode	<i>.</i>
	1.6 Description of Test Software Setting	
	1.7 Test Facility	8
2.	TEST SUMMARY	9
3.	CONDUCTED EMISSION TEST	10
	3.1 Test Standard and Limit	10
	3.2 Test Setup	
	3.3 Test Procedure	
	3.4 Test Equipment Used	11
	3.5 EUT Operating Mode	11
	3.6 Test Data	11
4.	RADIATED EMISSION TEST	14
	4.1 Test Standard and Limit	14
	4.2 Test Setup	15
	4.3 Test Procedure	
	4.4 EUT Operating Condition	16
	4.5 Test Equipment	17
5.	RESTRICTED BANDS REQUIREMENT	32
	5.1 Test Standard and Limit	32
	5.2 Test Setup	32
	5.3 Test Procedure	
	5.4 EUT Operating Condition	33
	5.5 Test Equipment	33
6.	NUMBER OF HOPPING CHANNEL	46
	6.1 Test Standard and Limit	46
	6.2 Test Setup	
	6.3 Test Procedure	46
	6.4 EUT Operating Condition	46
	6.5 Test Equipment	46
	6.6 Test Data	46
7.	AVERAGE TIME OF OCCUPANCY	48
	7.1 Test Standard and Limit	
	7.2 Test Setup	
	7.3 Test Procedure	



 $\textbf{Report No.:} \quad \textbf{TB-FCC140200}$ 

Page: 3 of 75

	7.4 EUT Operating Condition	48
	7.5 Test Equipment	48
	7.6 Test Data	49
8.	CHANNEL SEPARATION AND BANDWIDTH TEST	61
	8.1 Test Standard and Limit	61
	8.2 Test Setup	61
	8.3 Test Procedure	
	8.4 EUT Operating Condition	61
	8.5 Test Equipment	62
	8.6 Test Data	62
9.	PEAK OUTPUT POWER TEST	70
	9.1 Test Standard and Limit	70
	9.2 Test Setup	70
	9.3 Test Procedure	
	9.4 EUT Operating Condition	70
	9.5 Test Equipment	70
	9.6 Test Data	70
10.	ANTENNA REQUIREMENT	75
	10.1 Standard Requirement	75
	10.2 Antenna Connected Construction	
	10.3 Result	



Page: 4 of 75

## 1. General Information about EUT

#### 1.1 Client Information

**Applicant**: Pathway Innovations and Technologies, Inc.

Address : 9833 Pacific Heights Blvd., Suite D, San Diego, CA 92121

**Manufacturer**: ShenZhen KerunVisual Technology Co., LTD.

**Address**: 6th Floor Building 2, District 2, South Honghualing Industrial Zone,

No.1213 Liuxian Road, Nanshan Branch, Shenzhen City,

Guangdong, China

## 1.2 General Description of EUT (Equipment Under Test)

EUT Name	:	Gurubook 5/MID			
Models No.	:	Gurubook 5, Gurubook 8, Gurubook 12, Gurubook 13, Gurubook 16			
Model	:	All the other models are iden	All the other models are identical in the same PCB layout, interior structure		
Difference		and electrical circuits, The o	only difference is model name for commercial		
		purpose.			
		Operation Frequency:			
		Bluetooth:2402~2480MHz			
Product		Number of Channel:	Bluetooth:79 Channels see note (2)		
Description	:	Max Peak Output Power:	GFSK: -2.094 dBm (Conducted Power)		
		Antenna Gain:	0 dBi FPC Antenna		
		Modulation Type:	GFSK 1Mbps(1 Mbps)		
			π /4-DQPSK(2 Mbps)		
			8-DPSK(3 Mbps)		
Power Supply	:	DC power supplied by AC/	DC Adapter		
		DC Voltage supplied from	Li-Polymer battery.		
Power Rating	:	AC/DC Adapter:			
		Input: AC 100~240V 50/60Hz 0.35A Output: DC 5V 2A			
		DC 3.7V 2800mAh from Li-ion battery			
Connecting I/O	:	The equipent have USB port for link with PC.			
Port(S)		Please refer to the User's I	Manual		

**Note:** The equipment with Bluetooth and Wifi(802.11b/g/n) function, WiFi(802.11b/g/n) have test comply with FCC Part 15C Rules. More detailed features description, please refer to the manufacturer's specifications or the User's Manual.

#### Note:

- (1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
- (2) This Test Report is FCC Part 15.247 for Bluetooth, and test procedure in accordance with Public Notice: DA 00-705.

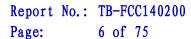


Page: 5 of 75

## (3) Channel List:

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

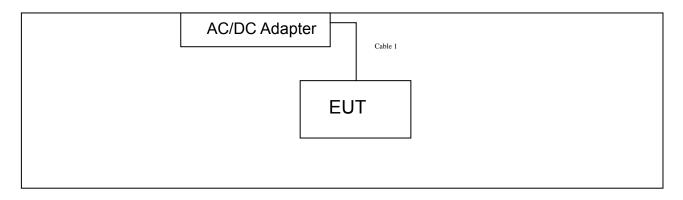
<sup>(4)</sup> The Antenna information about the equipment is provided by the applicant.





1.3 Block Diagram Showing the Configuration of System Tested

#### TX Mode



## 1.4 Description of Support Units

Equipment Information							
Name Model FCC ID/DOC Manufacturer Used "√"							
Cable Information							
Number	Number Shielded Type Ferrite Core Length Note						
Cable 1 No No 1.0M Accessori							

## 1.5 Description of Test Mode

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

For Conducted Test		
Final Test Mode	Description	
Mode 1	AC Charging with BT TX Mode	

For Radiated Test		
Final Test Mode Description		
Mode 1	AC Charging with BT TX Mode	
Mode 2	TX Mode(GFSK) Channel 00/39/78	
Mode 3	TX Mode( π /4-DQPSK) Channel 00/39/78	



7 of 75

Page:

Mode 4	TX Mode(8-DPSK) Channel 00/39/78
Mode 5	Hopping Mode(GFSK)
Mode 6	Hopping Mode( π /4-DQPSK)
Mode 7	Hopping Mode(8-DPSK)

#### Note:

(1) For all test, we have verified the construction and function in typical operation. And all the test modes were carried out with the EUT in transmitting operation in maximum power with all kinds of data rate. We have pretested all the test mode above.

According to ANSI C63.4 standards, the measurements are performed at the highest, middle, lowest available channels, and the worst case data rate as follows:

TX Mode: GFSK (1 Mbps)
TX Mode: 8-DPSK (3 Mbps)

(2) The EUT is considered a portable unit; it was pre-tested on the positioned of each 3 axis, X-plane, Y-plane and Z-plane. The worst case was found positioned on X-plane as the normal use. Therefore only the test data of this X-plane was used for radiated emission measurement test.

#### 1.6 Description of Test Software Setting

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

Test Software Version	Test Program: Test Program: MTK Test. apk			
Frequency	2402 MHz	2441MHz	2480 MHz	
GFSK	DEF	DEF	DEF	
π /4-DQPSK	DEF	DEF	DEF	
8-DPSK	DEF	DEF	DEF	



Page: 8 of 75

## 1.7 Test Facility

The testing was performed by the Shenzhen Toby Technology Co., Ltd., in their facilities located at:

1A/F., Bldg.6, Yusheng Industrial Zone, The National Road No.107 Xixiang Section 467, Xixiang, Bao'an, Shenzhen, Guangdong, China.

At the time of testing, the following bodies accredited the Laboratory:

#### **CNAS (L5813)**

The Laboratory has been accredited by CNAS to ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories for the competence in the field of testing. And the Registration No.: CNAS L5813.

#### FCC List No.: (811562)

The Laboratory is listed in the United States of American Federal Communications Commission (FCC), and the registration number is 811562.

#### IC Registration No.: (11950A-1)

The Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing. The site registration: Site# 11950A-1.



Page: 9 of 75

# 2. Test Summary

FCC Part 15 Subpart C(15.247)					
Standard Section	Test Item	Judgment	Remark		
15.203	Antenna Requirement	PASS	N/A		
15.207	Conducted Emission	PASS	N/A		
15.205	Restricted Bands	PASS	N/A		
15.247(a)(1)	Hopping Channel Separation	PASS	N/A		
15.247(a)(1)	Dwell Time	PASS	N/A		
15.247(b)(1)	Peak Output Power	PASS	N/A		
15.247(b)(1)	Number of Hopping Frequency	PASS	N/A		
15.247(c)	Radiated Spurious Emission	PASS	N/A		
15.247(c)	Antenna Conducted Spurious Emission	PASS	N/A		
15.247(a) 20dB Bandwidth		PASS	N/A		
Note: N/A is an abbreviation for Not Applicable.					



Page: 10 of 75

## 3. Conducted Emission Test

#### 3.1 Test Standard and Limit

3.1.1Test Standard FCC Part 15.207

#### 3.1.2 Test Limit

#### **Conducted Emission Test Limit**

Eroguanov	Maximum RF Line Voltage (dBμV)		
Frequency	Quasi-peak Level	Average Level	
150kHz~500kHz	66 ~ 56 *	56 ~ 46 *	
500kHz~5MHz	56	46	
5MHz~30MHz	60	50	

#### Notes:

- (1) \*Decreasing linearly with logarithm of the frequency.
- (2) The lower limit shall apply at the transition frequencies.
- (3) The limit decrease in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

## 3.2 Test Setup



#### 3.3 Test Procedure

The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/50uH of coupling impedance for the measuring instrument.

Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.



Report No.: TB-FCC140200 Page: 11 of 75

I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

LISN at least 80 cm from nearest part of EUT chassis

The bandwidth of EMI test receiver is set at 9kHz, and the test frequency band is from 0.15MHz to 30MHz.

## 3.4 Test Equipment Used

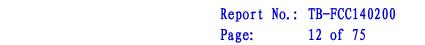
Description	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due Date
EMI Test	ROHDE&		400004	Aug. 08, 2014	Aug. 07, 2015
Receiver	SCHWARZ	ESCI	100321	Aug. 00, 2014	Aug. 07, 2015
50ΩCoaxial	Anritsu	MP59B	X10321	Aug. 08, 2014	Aug. 07, 2015
Switch	Aiiiisu	MESSE	X10321	Aug. 08, 2014	Aug. 07, 2013
L.I.S.N	Rohde & Schwarz	ENV216	101131	Aug. 08, 2014	Aug. 07, 2015
L.I.S.N	SCHWARZBECK	NNBL 8226-2	8226-2/164	Aug. 08, 2014	Aug. 07, 2015

## 3.5 EUT Operating Mode

Please refer to the description of test mode.

#### 3.6 Test Data

Please see the next page.



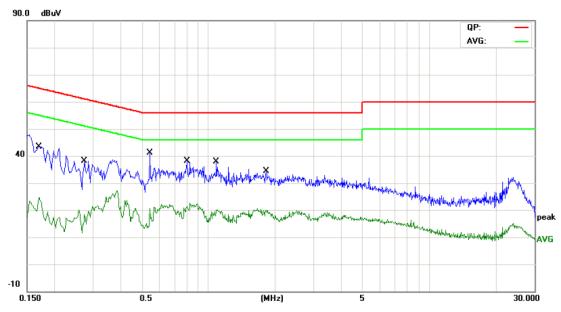


EUT:	Gurubook 5/I	MID	Model	Name :		GURUBO	OK5			
Temperature:	25 °C Relative Humidity:					55%				
Test Voltage:	AC 120V/60	AC 120V/60 Hz								
Terminal:	Line									
Test Mode:	_	AC Charging with TX GFSK Mode 2402 MHz								
Remark:										
90.0 dBuV	, , , , , , , , , , , , , , , , , , ,									
35.0 454						QP: AVG:				
-10 0.150	0.5	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	Manda Maria	Leprobal May proposed and a service of the service	M Japanda M. M.	the feelberg on prophetic operation	peak AVG			
No. Mk. Fre	Reading q. Level	Correct Factor	Measure- ment	Limit	Over					
MH	z dBuV	dB	dBuV	dBuV	dB	Detector	Comment			
1 0.186	30 24.37	9.99	34.36	64.21	-29.85	QP				
2 0.186	5.00	9.99	14.99	54.21	-39.22	AVG				
3 0.281	19.28	10.02	29.30	60.76	-31.46	QP				
4 0.281	19 5.40	10.02	15.42	50.76	-35.34	AVG				
5 * 0.389	99 26.39	10.02	36.41	58.06	-21.65	QP				
6 0.389	99 13.28	10.02	23.30	48.06	-24.76	AVG				
7 1.050	00 15.74	10.06	25.80	56.00	-30.20	QP				
8 1.050	00 5.11	10.06	15.17	46.00	-30.83	AVG				
9 1.738	30 17.16	10.06	27.22	56.00	-28.78	QP				
10 1.738	30 7.73	10.06	17.79	46.00	-28.21	AVG				
11 6.922	20 10.41	10.06	20.47	60.00	-39.53	QP				
12 6.922	20 1.07	10.06	11.13	50.00	-38.87	AVG				



Page: 13 of 75

EUT:	Gurubook 5/MID	Model Name :	GURUBOOK5				
Temperature:	25 ℃	Relative Humidity:	55%				
Test Voltage:	AC 120V/60 Hz	AC 120V/60 Hz					
Terminal:	Neutral						
Test Mode:	AC Charging with TX GF	SK Mode 2402 MHz					
Remark:	Only worst case is reported						
90.0 dBuV							
			QP: — AVG: —				



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBu∀	dBuV	dB	Detector	Comment
1	*	0.1700	28.00	9.96	37.96	64.96	-27.00	QP	
2		0.1700	12.68	9.96	22.64	54.96	-32.32	AVG	
3		0.2740	17.38	10.02	27.40	60.99	-33.59	QP	
4		0.2740	1.84	10.02	11.86	50.99	-39.13	AVG	
5		0.5420	16.17	10.04	26.21	56.00	-29.79	QP	
6		0.5420	5.30	10.04	15.34	46.00	-30.66	AVG	
7		0.7980	18.05	10.10	28.15	56.00	-27.85	QP	
8		0.7980	8.63	10.10	18.73	46.00	-27.27	AVG	
9		1.0859	17.79	10.06	27.85	56.00	-28.15	QP	
10		1.0859	8.15	10.06	18.21	46.00	-27.79	AVG	
11		1.8220	16.05	10.06	26.11	56.00	-29.89	QP	
12		1.8220	7.68	10.06	17.74	46.00	-28.26	AVG	

<sup>\*:</sup>Maximum data x:Over limit !:over margin



Page: 14 of 75

## 4. Radiated Emission Test

## 4.1 Test Standard and Limit

4.1.1 Test Standard FCC Part 15.209

4.1.2 Test Limit

#### Radiated Emission Limit (9 kHz~1000MHz)

Naciated Linission Linit (3 KHZ 1000MHZ)							
Frequency (MHz	Field Strength (microvolt/meter)	Measurement Distance (meters)					
0.009~0.490	2400/F(KHz)	300					
0.490~1.705	24000/F(KHz)	30					
1.705~30.0	30	30					
30~88	100	3					
88~216	150	3					
216~960	200	3					
Above 960	500	3					

## Radiated Emission Limit (Above 1000MHz)

Frequency	Class B (dBuV/m)(at 3m)		
(MHz)	Peak	Average	
Above 1000	74	54	

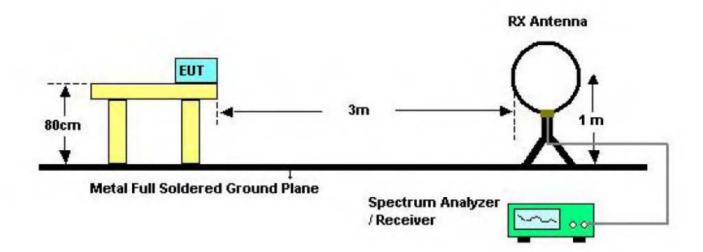
#### Note:

- (1) The tighter limit applies at the band edges.
- (2) Emission Level (dBuV/m)=20log Emission Level (uV/m)

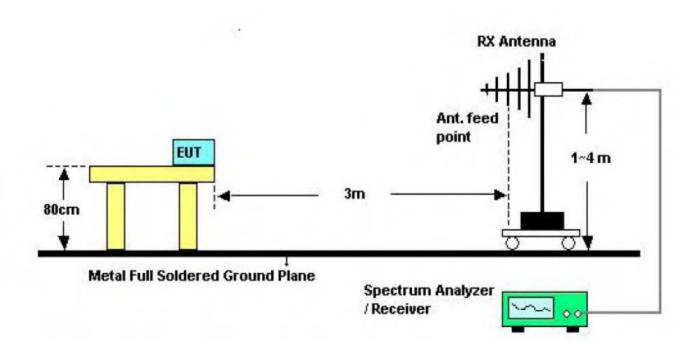


Page: 15 of 75

## 4.2 Test Setup



Bellow 30MHz Test Setup



Bellow 1000MHz Test Setup



Turntable

EUT

0.8 m lm to 4m

Coaxial Cable

Above 1GHz Test Setup

#### 4.3 Test Procedure

- (1) The measuring distance of 3m shall be used for measurements at frequency up to 1GHz and above 1 GHz. The EUT was placed on a rotating 0.8m high above the ground, the table was rotated 360 degrees to determine the position of the highest radiation.
- (2) The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set to make measurement.
- (3) The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- (4) If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit Bellow 1 GHz, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed. But the Peak Value and average value both need to comply with applicable limit above 1 GHz.
- (5) Testing frequency range below 1GHz the measuring instrument use VBW=120 kHz with Quasi-peak detection.
- (6) Testing frequency range above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10 Hz with Peak Detector for Average Values.
- (7) For the actual test configuration, please see the test setup photo.

## 4.4 EUT Operating Condition

The Equipment Under Test was set to Continual Transmitting in maximum power in TX mode.



Page: 17 of 75

## 4.5 Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Mar. 20, 2014	Mar. 19, 2015
Spectrum Analyzer	Rohde & Schwarz	FSP30	DE25181	Aug. 08, 2014	Aug. 07, 2015
EMI Test Receiver	Rohde & Schwarz	ESCI	101165	Aug. 08, 2014	Aug. 07, 2015
Bilog Antenna	ETS-LINDGREN	3142E	00117537	Mar. 07, 2014	Mar.06, 2015
Horn Antenna	ETS-LINDGREN	3117	00143207	Mar. 07, 2014	Mar.06, 2015
Pre-amplifier	HP	11909A	185903	Mar. 07, 2014	Mar.06, 2015
Pre-amplifier	HP	8447B	3008A00849	Mar. 07, 2014	Mar.06, 2015
Cable	HUBER+SUHNER	100	SUCOFLEX	Mar. 07, 2014	Mar.06, 2015
Signal Generator	Rohde & Schwarz	SML03	IKW682-054	Feb. 11, 2014	Feb.10, 2015
Positioning Controller	ETS-LINDGREN	2090	N/A	N/A	N/A

#### 4.6 Test Data

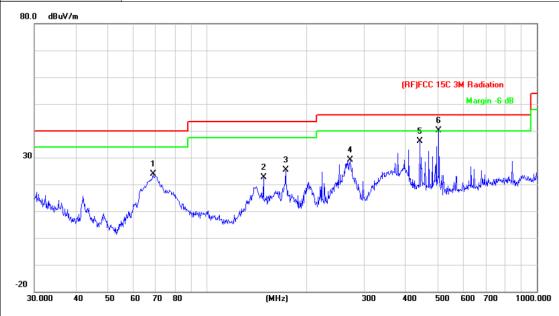
Remark: During testing above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10 Hz with Peak Detector for Average Values.

Test data please refer the following pages.



18 of 75 Page:

EUT:	Gurubook 5/MID	Model Name :	GURUBOOK5		
Temperature:	25 ℃	Relative Humidity:	55%		
Test Voltage:	AC 120V/60 Hz				
Ant. Pol.	Horizontal				
Test Mode:	TX GFSK Mode 2402MHz				
Remark:	Only worst case is reported				



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		68.6310	47.58	-23.74	23.84	40.00	-16.16	peak
2		148.4410	43.85	-21.30	22.55	43.50	-20.95	peak
3		173.2051	46.33	-20.98	25.35	43.50	-18.15	peak
4		272.2776	46.71	-17.63	29.08	46.00	-16.92	peak
5		441.7426	48.84	-12.61	36.23	46.00	-9.77	peak
6	*	504.7062	51.53	-11.41	40.12	46.00	-5.88	peak

<sup>\*:</sup>Maximum data x:Over limit !:over margin



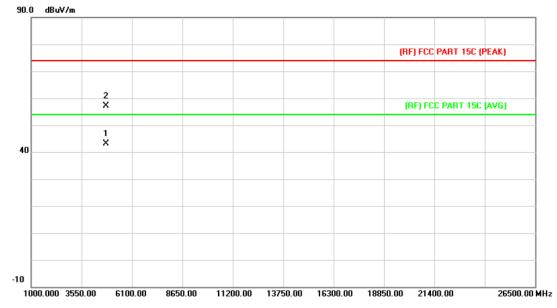
Report No.: TB-FCC140200 Page: 19 of 75

EUT:	Gurubook 5/MID	Model Name :	GURUBOOK5					
Temperature:	25 ℃	Relative Humidi	ty: 55%					
Test Voltage:	AC 120V/60 Hz							
Ant. Pol.	Vertical	Vertical						
Test Mode:	TX GFSK Mode 2	402MHz						
Remark:	Only worst case is	s reported						
80.0 dBuV/m								
			(RF)FCC 15C 3M Radiation Margin -6 dB					
30 X	2							
many Market	3 4	5	gert de state de formagnet en reger de prinsipale, color de segle en en gast en de seu					
	January Market	Mary Mary Mary Mary Mary Mary Mary Mary	And a sale of female property of the sale					
	1	·						
30.000 40 50	60 70 80	(MHz) 300	400 500 600 700 1000.000					
No. Mk. Fr	Reading eq. Level	Correct Measure- Factor ment L	imit Over					
Mi	Hz dBuV	dB/m dBuV/m	dBuV/m dB Detector					
1 * 42.8	998 52.88	-21.39 31.49	40.00 -8.51 peak					
2 63.3	132 52.68	-24.22 28.46	40.00 -11.54 peak					
3 100.5	5806 38.01	-21.82 16.19	43.50 -27.31 peak					
4 124.1	1330 39.36	-22.37 16.99	43.50 -26.51 peak					
5 162.6	36.55	-20.68 15.87	43.50 -27.63 peak					
6 264.7	7457 31.72	-17.80 13.92	46.00 -32.08 peak					
	over limit !:over margin	ect Factor						



Page: 20 of 75

EUT:	Gurubook 5/MID	Model Name :	GURUBOOK5			
Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage:	AC 120V/60 Hz	AC 120V/60 Hz				
Ant. Pol.	Horizontal					
Test Mode:	TX GFSK Mode 2402MH	z				
Remark:	No report for the emission which more than 10 dB below the prescribed limit.					

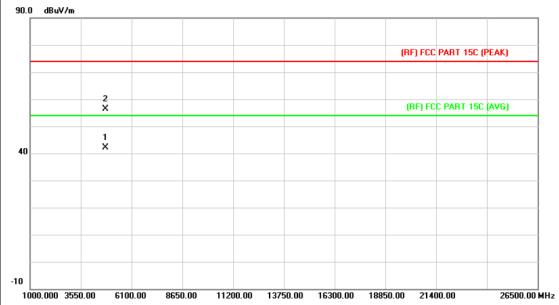


No	. Mk	. Freq.	_	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4803.208	29.57	13.44	43.01	54.00	-10.99	AVG
2		4803.544	43.79	13.44	57.23	74.00	-16.77	peak



Page: 21 of 75

EUT:	Gurubook 5/MID	Model Name :	GURUBOOK5		
Temperature:	25 ℃	Relative Humidity:	55%		
Test Voltage:	AC 120V/60 Hz				
Ant. Pol.	Vertical				
Test Mode:	TX GFSK Mode 2402MHz				
Remark:	No report for the emission which more than 10 dB below the prescribed limit.				

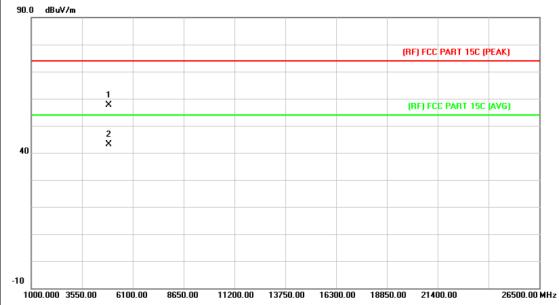


No	o. Mł	k. Freq.	_	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4803.214	28.68	13.44	42.12	54.00	-11.88	AVG
2		4803.365	42.95	13.44	56.39	74.00	-17.61	peak



Page: 22 of 75

EUT:	Gurubook 5/MID	Model Name :	GURUBOOK5				
Temperature:	25 ℃	55%					
Test Voltage:	AC 120V/60 Hz	AC 120V/60 Hz					
Ant. Pol.	Horizontal						
Test Mode:	TX GFSK Mode 2441MH	Z					
Remark:	No report for the emission which more than 10 dB below the prescribed limit.						

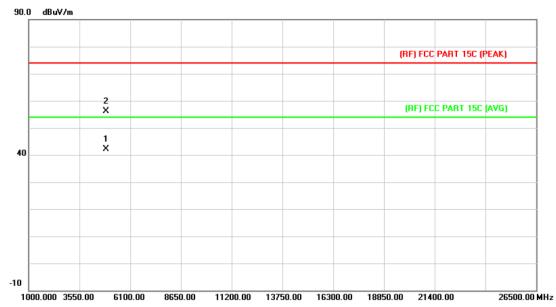


No	. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4881.654	43.69	13.90	57.59	74.00	-16.41	peak
2	*	4881.954	29.14	13.90	43.04	54.00	-10.96	AVG



Page: 23 of 75

EUT:	Gurubook 5/MID	Model Name :	GURUBOOK5				
Temperature:	25 ℃	Relative Humidity:	55%				
Test Voltage:	AC 120V/60 Hz						
Ant. Pol.	Vertical	Vertical					
Test Mode:	TX GFSK Mode 2441MH	z					
Remark:	No report for the emission which more than 10 dB below the prescribed limit.						

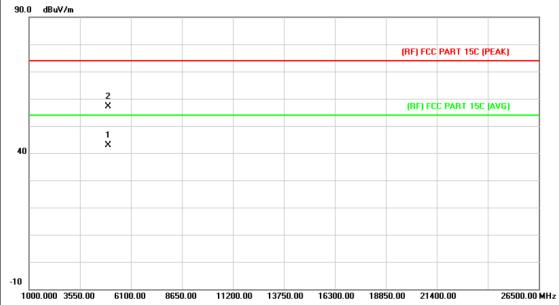


No	. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4881.324	28.18	13.90	42.08	54.00	-11.92	AVG
2		4881.647	42.22	13.90	56.12	74.00	-17.88	peak



Page: 24 of 75

EUT:	Gurubook 5/MID	Model Name :	GURUBOOK5				
Temperature:	25 ℃	Relative Humidity:	55%				
Test Voltage:	AC 120V/60 Hz	AC 120V/60 Hz					
Ant. Pol.	Horizontal						
Test Mode:	TX GFSK Mode 2480MH	z					
Remark:	No report for the emission which more than 10 dB below the prescribed limit.						
	prescribed littlit.						

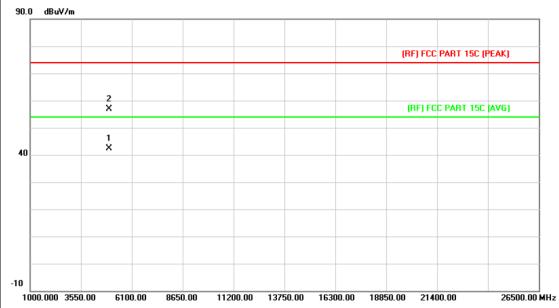


No	. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4959.324	28.62	14.36	42.98	54.00	-11.02	AVG
2		4959.644	42.78	14.36	57.14	74.00	-16.86	peak



Page: 25 of 75

EUT:	Gurubook 5/MID	Model Name :	GURUBOOK5				
Temperature:	25 ℃	Relative Humidity:	55%				
Test Voltage:	AC 120V/60 Hz	AC 120V/60 Hz					
Ant. Pol.	Vertical						
Test Mode:	TX GFSK Mode 2480MF	z					
Remark:	No report for the emission which more than 10 dB below the						
	prescribed limit.						

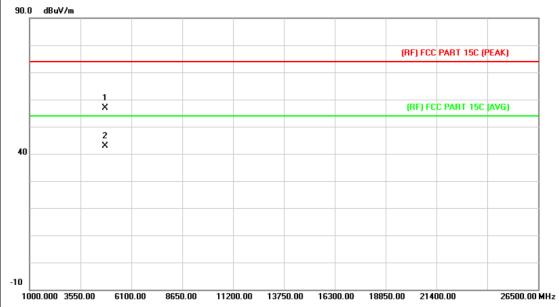


N	lo.	Mk.	Freq.			Measure- ment	Limit	Over	
			MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	,	*	4959.357	28.09	14.36	42.45	54.00	-11.55	AVG
2			4959.685	42.42	14.36	56.78	74.00	-17.22	peak



Page: 26 of 75

EUT:	Gurubook 5/MID	Model Name :	GURUBOOK5				
Temperature:	25 ℃	Relative Humidity:	55%				
Test Voltage:	AC 120V/60 Hz	AC 120V/60 Hz					
Ant. Pol.	Horizontal	Horizontal					
Test Mode:	TX 8-DPSK Mode 2402M	1Hz					
Remark:	No report for the emission which more than 10 dB below the						
	prescribed limit.						

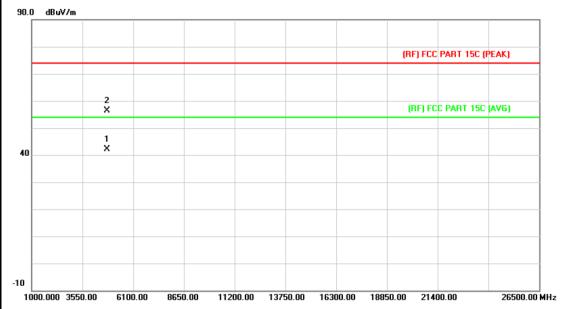


No	Mk.	Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4803.215	43.45	13.44	56.89	74.00	-17.11	peak
2	*	4803.611	29.35	13.44	42.79	54.00	-11.21	AVG



Page: 27 of 75

EUT:	Gurubook 5/MID	Model Name :	GURUBOOK5					
Temperature:	25 ℃	Relative Humidity:	55%					
Test Voltage:	AC 120V/60 Hz	AC 120V/60 Hz						
Ant. Pol.	Vertical							
Test Mode:	TX 8-DPSK Mode 2402N	1Hz						
Remark:	No report for the emission which more than 10 dB below the							
	prescribed limit.		prescribed limit.					

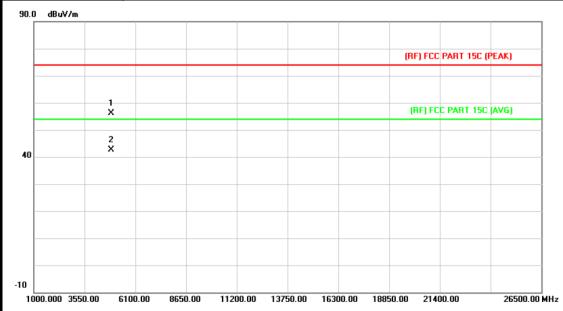


N	o. Mł	k. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4803.465	28.64	13.44	42.08	54.00	-11.92	AVG
2		4803.675	43.01	13.44	56.45	74.00	-17.55	peak



Page: 28 of 75

EUT:	Gurubook 5/MID	Model Name :	GURUBOOK5				
Temperature:	25 ℃	Relative Humidity:	55%				
Test Voltage:	AC 120V/60 Hz	AC 120V/60 Hz					
Ant. Pol.	Horizontal						
Test Mode:	TX 8-DPSK Mode 2441N	ИНz					
Remark:	No report for the emission which more than 10 dB below the						
	prescribed limit.						

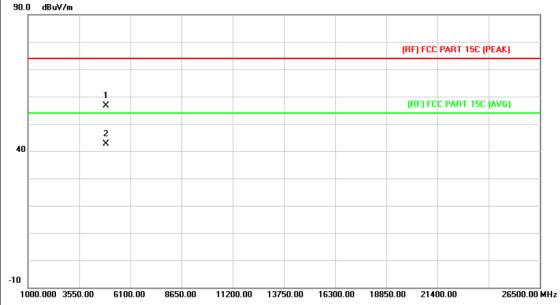


No	. Mk	Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4881.457	42.34	13.90	56.24	74.00	-17.76	peak
2	*	4881.914	28.62	13.90	42.52	54.00	-11.48	AVG



Page: 29 of 75

EUT:	Gurubook 5/MID	Model Name :	GURUBOOK5		
Temperature:	25 ℃	Relative Humidity:	55%		
Test Voltage:	AC 120V/60 Hz				
Ant. Pol.	Vertical				
Test Mode:	TX 8-DPSK Mode 2441M	1Hz			
Remark:	No report for the emission which more than 10 dB below the prescribed limit.				
90.0 db.//m					

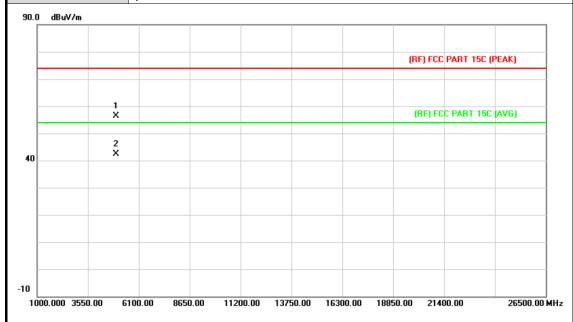


No.	Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4881.356	42.73	13.90	56.63	74.00	-17.37	peak
2	*	4881.546	28.64	13.90	42.54	54.00	-11.46	AVG



Report No.: TB-FCC140200 Page: 30 of 75

EUT:	Gurubook 5/MID	Model Name :	GURUBOOK5		
Temperature:	25 ℃	Relative Humidity:	55%		
Test Voltage:	AC 120V/60 Hz				
Ant. Pol.	Horizontal				
Test Mode:	TX 8-DPSK Mode 2480N	1Hz			
Remark:	No report for the emission which more than 10 dB below the				
	prescribed limit.				

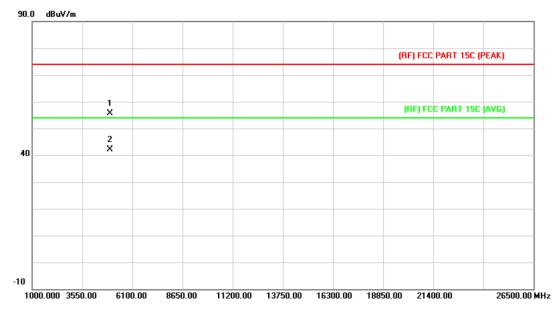


No	. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4959.784	42.10	14.36	56.46	74.00	-17.54	peak
2	*	4960.011	27.99	14.36	42.35	54.00	-11.65	AVG



Page: 31 of 75

EUT:	Gurubook 5/MID	Model Name :	GURUBOOK5				
Temperature:	25 ℃	Relative Humidity:	55%				
Test Voltage:	AC 120V/60 Hz	AC 120V/60 Hz					
Ant. Pol.	Vertical						
Test Mode:	TX 8-DPSK Mode 2480N	1Hz					
Remark:	No report for the emission which more than 10 dB below the prescribed limit.						



No.	Mk.	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4959.154	41.38	14.36	55.74	74.00	-18.26	peak
2	*	4959.786	27.76	14.36	42.12	54.00	-11.88	AVG



Report No.: TB-FCC140200 Page: 32 of 75

5. Restricted Bands Requirement

# 5.1 Test Standard and Limit

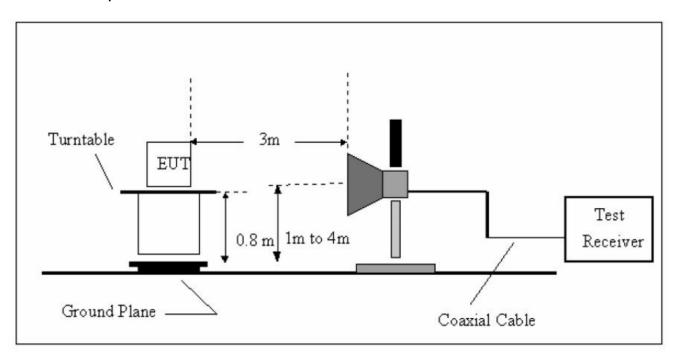
5.1.1 Test Standard FCC Part 15.209 FCC Part 15.205

5.1.2 Test Limit

Class B (dBuV/m)(at 3m)			
Peak	Average		
74	54		
74	54		
	Peak 74		

Note: All restriction bands have been tested, only the worst case is reported.

#### 5.2 Test Setup



#### 5.3 Test Procedure

- (1) The measuring distance of 3m shall be used for measurements at frequency up to 1GHz and above 1 GHz. The EUT was placed on a rotating 0.8m high above ground, the table was rotated 360 degrees to determine the position of the highest radiation.
- (2) The Test antenna shall vary between 1m and 4m, Both Horizontal and Vertical antenna are set to make measurement.
- (3) The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked



Report No.: TB-FCC140200 Page: 33 of 75

and then Quasi Peak detector mode re-measured.

(4) If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit Bellow 1 GHz, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed. But the Peak Value and average value both need to comply with applicable limit above 1 GHz.

- (5) Testing frequency range below 1GHz the measuring instrument use VBW=120 kHz with Quasi-peak detection.
- (6) Testing frequency range above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10 Hz with Peak Detector for Average Values.
- (7) For the actual test configuration, please see the test setup photo.

### 5.4 EUT Operating Condition

The Equipment Under Test was set to Continual Transmitting in maximum power.

## 5.5 Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Mar. 20, 2014	Mar. 19, 2015
Spectrum Analyzer	Rohde & Schwarz	FSP30	DE25181	Aug. 08, 2014	Aug. 07, 2015
EMI Test Receiver	Rohde & Schwarz	ESCI	101165	Aug. 08, 2014	Aug. 07, 2015
Bilog Antenna	ETS-LINDGREN	3142E	00117537	Mar. 07, 2014	Mar.06, 2015
Horn Antenna	ETS-LINDGREN	3117	00143207	Mar. 07, 2014	Mar.06, 2015
Pre-amplifier	HP	11909A	185903	Mar. 07, 2014	Mar.06, 2015
Pre-amplifier	HP	8447B	3008A00849	Mar. 07, 2014	Mar.06, 2015
Cable	HUBER+SUHNE R	100	SUCOFLEX	Mar. 07, 2014	Mar.06, 2015
Signal Generator	Rohde & Schwarz	SML03	IKW682-054	Feb. 11, 2014	Feb.10, 2015
Positioning Controller	ETS-LINDGREN	2090	N/A	N/A	N/A

#### 5.6 Test Data

All restriction bands have been tested, only the worst case is reported.

Remark: During testing above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10Hz with Peak Detector for Average Values.

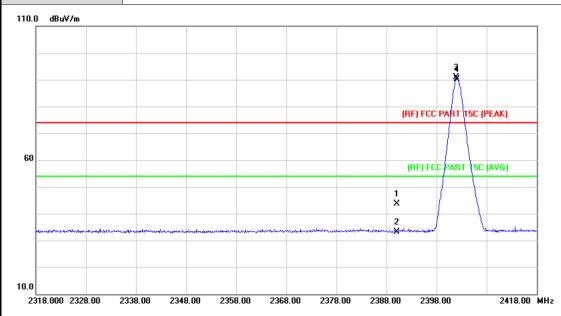
Test data please refer the following pages.



Page: 34 of 75

## (1) Radiation Test

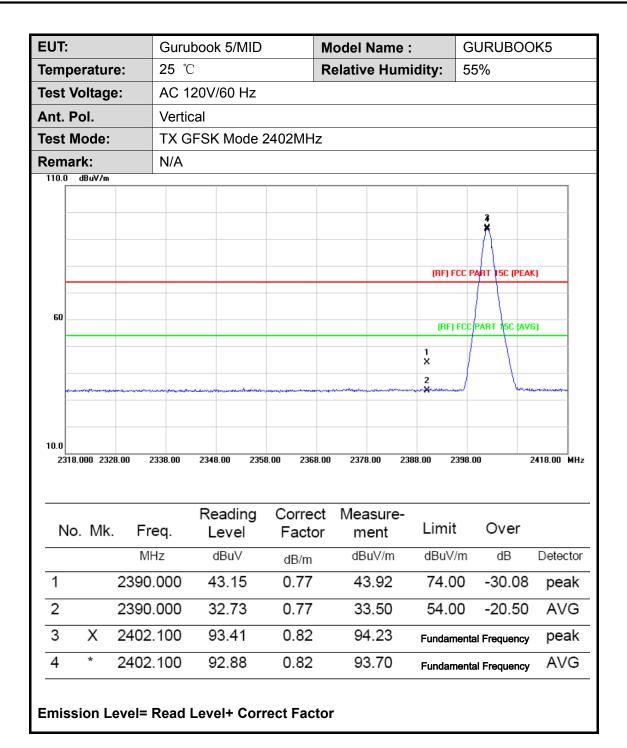
EUT:	Gurubook 5/MID	Model Name :	GURUBOOK5			
Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage:	AC 120V/60 Hz					
Ant. Pol.	Horizontal					
Test Mode:	TX GFSK Mode 2402MHz					
Remark:	N/A					



1	No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
			MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1			2390.000	42.83	0.77	43.60	74.00	-30.40	peak
2			2390.000	32.25	0.77	33.02	54.00	-20.98	AVG
3	,	X	2401.900	90.07	0.82	90.89	Fundamental Frequency		peak
4	,	*	2402.100	89.41	0.82	90.23	Fundamental Frequency		AVG



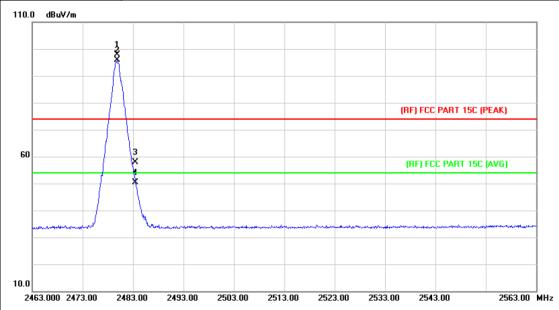
Page: 35 of 75





Page: 36 of 75

EUT:	Gurubook 5/MID	Model Name :	GURUBOOK5			
Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage:	AC 120V/60 Hz					
Ant. Pol.	Horizontal					
Test Mode:	Test Mode: TX GFSK Mode 2480 MHz					
Remark:	N/A					

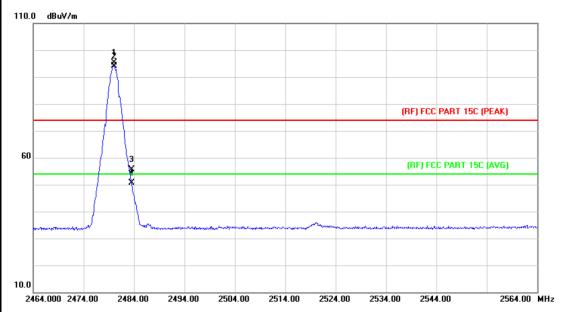


No. Mk.		Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
			MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		X	2479.800	96.77	1.15	97.92	Fundamental Frequency		peak
2		*	2479.800	94.85	1.15	96.00	Fundamental Frequency		AVG
3			2483.500	56.63	1.17	57.80	74.00	-16.20	peak
4			2483.500	49.21	1.17	50.38	54.00	-3.62	AVG



Page: 37 of 75

EUT:	Gurubook 5/MID	Model Name :	GURUBOOK5	
Temperature:	25 ℃	Relative Humidity:	55%	
Test Voltage:	AC 120V/60 Hz			
Ant. Pol.	Vertical			
Test Mode:	TX GFSK Mode 2480 MHz			
Remark:	N/A			
			l.	

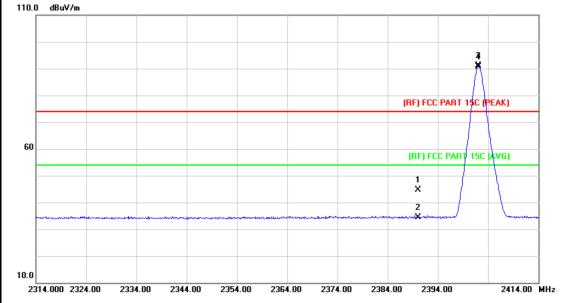


No.	Mk.	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	Χ	2480.000	94.16	1.15	95.31	Fundamenta	I Frequency	peak
2	*	2480.000	92.94	1.15	94.09	Fundamenta	I Frequency	AVG
3		2483.500	54.40	1.17	55.57	74.00	-18.43	peak
4		2483.500	49.40	1.17	50.57	54.00	-3.43	AVG



Page: 38 of 75

EUT:	Gurubook 5/MID	Model Name :	GURUBOOK5			
Temperature:	25 ℃	Relative Humidity:	55%			
Test Voltage:	AC 120V/60 Hz					
Ant. Pol.	Horizontal	Horizontal				
Test Mode:	TX 8-DPSK Mode 2402MHz					
Remark:	N/A					
110.0 dBuV/m						
			3			
			↑ N			



N	lo. M	۱k.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
			MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1			2390.000	43.91	0.77	44.68	74.00	-29.32	peak
2			2390.000	33.56	0.77	34.33	54.00	-19.67	AVG
3	Х		2402.000	90.23	0.82	91.05	Fundamenta	al Frequency	peak
4	*		2402.100	89.76	0.82	90.58	Fundamenta	al Frequency	AVG



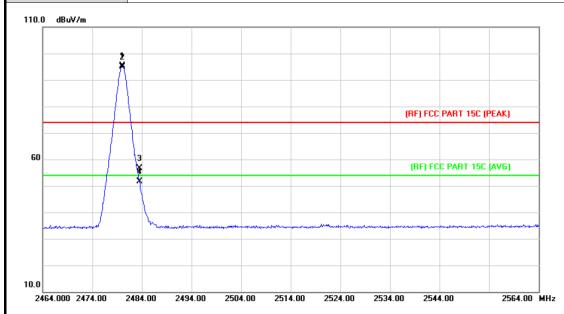
Page: 39 of 75

EUT	:		Guru	book 5/MID		Model	Name	:	GURUBOC	K5
Tem	peratu	re:	25 ℃			<b>Relative Humidity:</b> 55%			55%	
Test	Voltag	e:	AC 1	20V/60 Hz				·		
Ant.	Pol.		Verti	cal						
Test	Mode:		TX 8	-DPSK Mod	e 2402M	Hz				
Ren	nark:		N/A	N/A						
110.0	0 dBuV/m									
10.0 23	314.000 232	24.00 2	334.00	2344.00 235	4.00 2364	.00 237	4.00 23	(RF) FC	## PART 15C (PEAL 15C (AV)	
N	lo. Mk	. Fre	eq.	Reading Level	Correct Facto		asure- ent	Limit	Over	
		MH		dBuV	dB/m	dB	uV/m	dBuV/m	n dB	Detector
1		2390.	000	44.10	0.77	44	4.87	74.00	-29.13	peak
2		2390.	000	33.47	0.77	34	4.24	54.00	-19.76	AVG
_	*	2402.	100	92.87	0.82	9:	3.69	Fundamen	ital Frequency	AVG
3						•				



Page: 40 of 75

EUT:	Gurubook 5/MID	Model Name :	GURUBOOK5	
Temperature:	25 ℃	Relative Humidity:	55%	
Test Voltage:	AC 120V/60 Hz			
Ant. Pol.	Horizontal			
Test Mode:	TX 8-DPSK Mode 2480MHz			
Remark:	N/A			

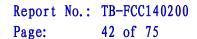


No	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB	Detector
1	Χ	2480.000	94.32	1.15	95.47	Fundamenta	I Frequency	peak
2	*	2480.100	93.83	1.15	94.98	Fundamenta	l Frequency	AVG
3		2483.500	55.41	1.17	56.58	74.00	-17.42	peak
4		2483.500	50.41	1.17	51.58	54.00	-2.42	AVG



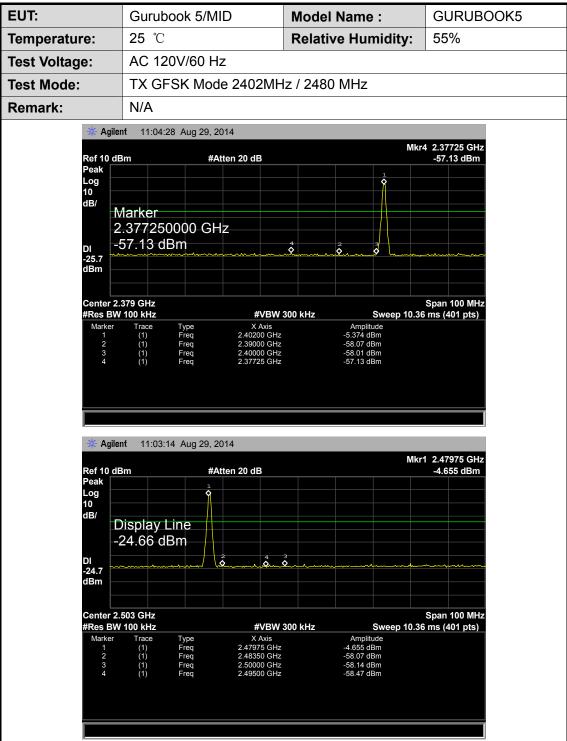
Page: 41 of 75

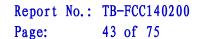
UT:			Guru	book 5/MIC		/lodel Name	:	GURUBO(	OK5
empe	ratur	e:	25 °C	25 ℃ Relative Hum				55%	
est Vo	oltag	e:	AC 1	C 120V/60 Hz					
nt. Po	ol.		Verti	cal					
est M	ode:		TX 8	TX 8-DPSK Mode 2480MHz					
Remar	k:		N/A						
110.0	dBuV/m								
60	riashta	***************************************	3					C PART 15C (PEA	
10.0 2464.0	000 247	74.00 2	2484.00	2494.00 25	04.00 2514.0	0 2524.00 2	2534.00 254	14.00	2564.00 MH
No.	Mk.	Fre	eq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MH	Ηz	dBuV	dB/m	dBuV/m	dBuV/n	n dB	Detector
1	Χ	2480.	.000	94.98	1.15	96.13	Fundamer	ntal Frequency	peak
2	*	2480.	.000	94.44	1.15	95.59	Fundamer	tal Frequency	AVG
2					4.47	57.03	74.00	-16.97	peak
3		2483.	500	55.86	1.17	37.03		10.07	poun





(2) Conducted Test







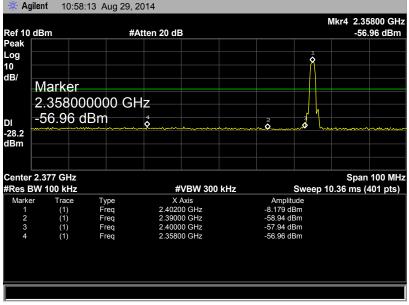
EUT: Gurubook 5/MID **Model Name: GURUBOOK5** 25 ℃ Temperature: **Relative Humidity:** 55% **Test Voltage:** AC 120V/60 Hz **Test Mode: GFSK Hopping Mode** Remark: N/A \* Agilent 11:20:35 Aug 29, 2014 Mkr4 2.35148 GHz Ref 10 dBm #Atten 20 dB -56.73 dBm Log 10 dB/ <u>^^^{}</u> Marker 2.351476649 GHz -56.73 dBm & -24.1 dBm Center 2.379 GHz #Res BW 100 kHz Span 100 MHz Sweep 10.36 ms (401 pts) **#VBW 300 kHz** X Axis 2.41823 GHz 2.39000 GHz 2.40000 GHz 2.35148 GHz Type Freq Freq Freq Freq (1) (1) (1) (1) (1) Agilent 11:31:01 Aug 29, 2014 Mkr4 2.48975 GHz Ref 10 dBm Peak #Atten 20 dB -57.81 dBm Log 10 dB/ <del>MAMAMANANANA</del> Marker 2.489750000 GHz -57.81 dBm 🝰 👶 DI -23.3 dBm Center 2.51 GHz #Res BW 100 kHz Span 100 MHz **#VBW 300 kHz** Sweep 10.36 ms (401 pts) X Axis 2.47025 GHz 2.48350 GHz 2.50000 GHz 2.48975 GHz Amplitude -3.29 dBm -57.38 dBm -57.03 dBm Type Freq Freq Freq Freq (1) (1) (1) (1)

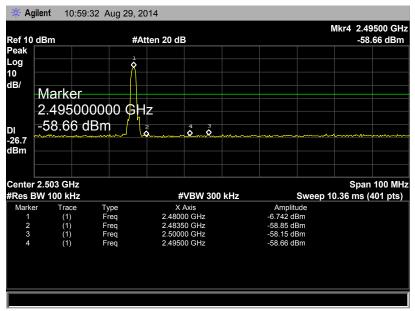
-57.81 dBm

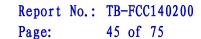


Page: 44 of 75

EUT:	Gurubook 5/MID	Model Name :	GURUBOOK5	
Temperature:	<b>25</b> ℃	Relative Humidity:	55%	
Test Voltage:	AC 120V/60 HZ			
Test Mode:	TX 8-DPSK Mode 2402MHz / 2480 MHz			
Remark:	N/A			
We then				

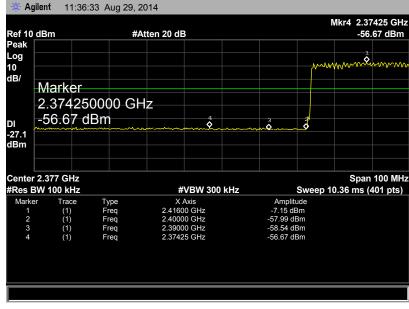


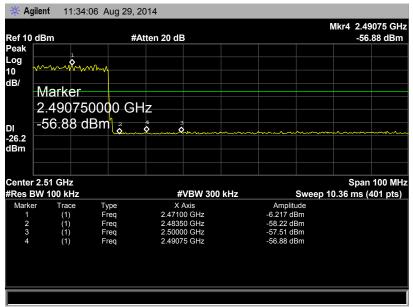






EUT: Gurubook 5/MID **Model Name: GURUBOOK5** 25 ℃ **Relative Humidity:** Temperature: 55% **Test Voltage:** AC 120V/60 HZ **Test Mode:** 8-DPSK Hopping Mode Remark: N/A \* Agilent 11:36:33 Aug 29, 2014 Mkr4 2.37425 GHz







Page: 46 of 75

# 6. Number of Hopping Channel

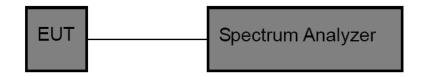
# 6.1 Test Standard and Limit

6.1.1 Test Standard FCC Part 15.247 (a)(1)

6.1.2 Test Limit

Section	Test Item	Limit
15.247	Number of Hopping Channel	>15

# 6.2 Test Setup



## 6.3 Test Procedure

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Spectrum Setting: RBW=100 KHz, VBW=100 KHz, Sweep time= Auto.

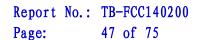
# 6.4 EUT Operating Condition

The EUT was set to the Hopping Mode by the Customer.

# 6.5 Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Mar. 20, 2014	Mar. 19, 2015

# 6.6 Test Data





EUT: Gurubook 5/MID Model Name : GURUBOOK5

Temperature: 25 ℃ Relative Humidity: 55%

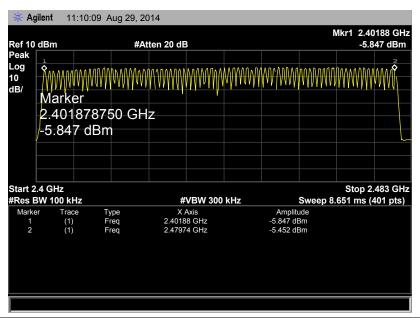
Test Voltage: AC 120V/60 HZ

Test Mode: Hopping Mode (GESK/ 8-DPSK)

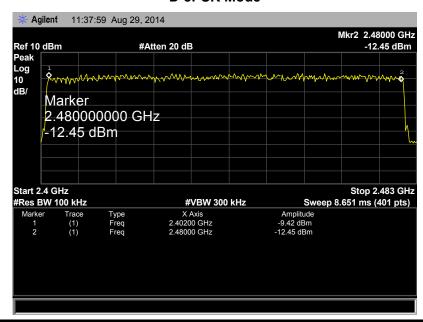
Test Mode:	Hopping Mod	e (GFSK/ 8-DPSK)

Frequency Range	Quantity of Hopping Channel	Limit
240211117-249011117	79	>15
2402MHz~2480MHz	79	>15

#### **GFSK Mode**



#### **D-8PSK Mode**





Page: 48 of 75

# 7. Average Time of Occupancy

## 7.1 Test Standard and Limit

5.1.1 Test Standard FCC Part 15.247 (a)(1)

5.1.2 Test Limit

Section	Test Item	Limit
15.247(a)(1)/ RSS-210	Average Time of	0.4.000
Annex 8(A8.1d)	Occupancy	0.4 sec

# 7.2 Test Setup



## 7.3 Test Procedure

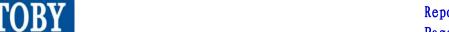
- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Spectrum Setting: RBW=1MHz, VBW=1MHz.
- (3) Use video trigger with the trigger level set to enable triggering only on full pulses.
- (4) Sweep Time is more than once pulse time.
- (5) Set the center frequency on any frequency would be measure and set the frequency span to zero.
- (6) Measure the maximum time duration of one single pulse.
- (7) Set the EUT for packet transmitting.
- (8) Measure the maximum time duration of one single pulse.

# 7.4 EUT Operating Condition

The EUT was set to the Hopping Mode by the Customer.

# 7.5 Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Mar. 20, 2014	Mar. 19, 2015

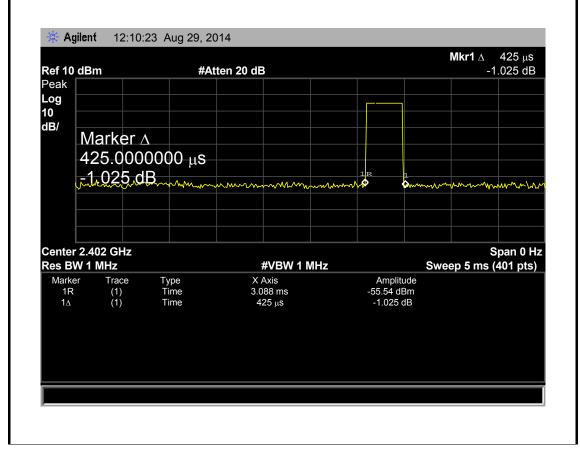


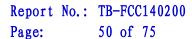
Report No.: TB-FCC140200 Page: 49 of 75

# 7.6 Test Data

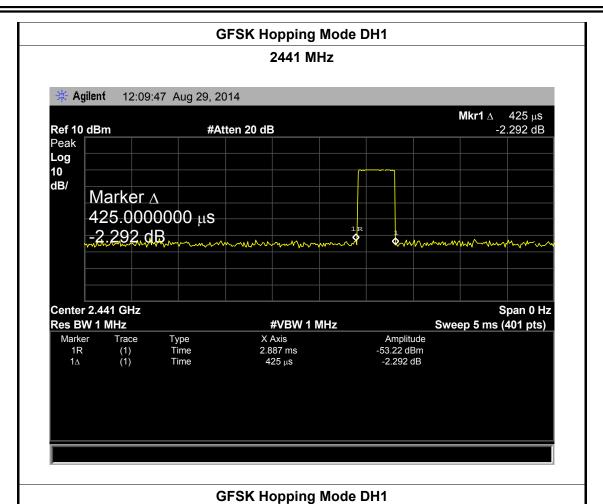
EUT:		Gurubook	book 5/MID Model Name : GURUBOOK		IBOOK5		
Temperature:	1	25 ℃		Relative Humidity: 55		55%	
Test Voltage:		AC 120V/	60 HZ				
Test Mode:		Hopping I	Mode (GFSK D	H1)			
Channel	Pu	lse Time	Total of	Period Time	Lir	nit	Result
(MHz)		(ms)	Dwell (ms)	(s)	(m	ıs)	Result
2402		0.425	136.00				
2441		0.425	136.00	31.60	40	00	PASS
2480		0.425	136.00				
			GFSK Hoppi	na Mode DH1			

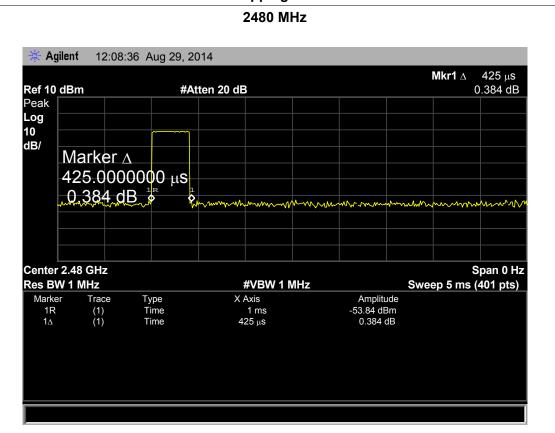
# **GFSK Hopping Mode DH1**









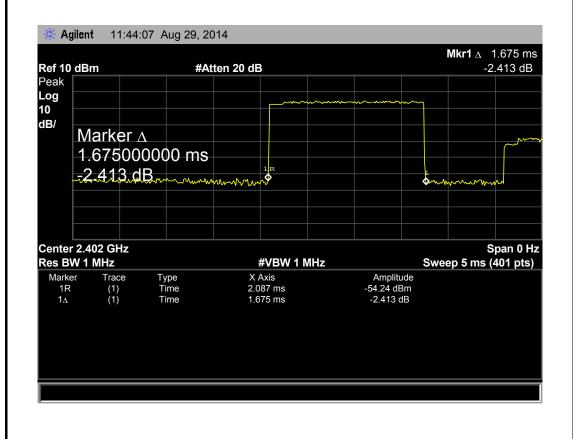


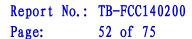


Page: 51 of 75

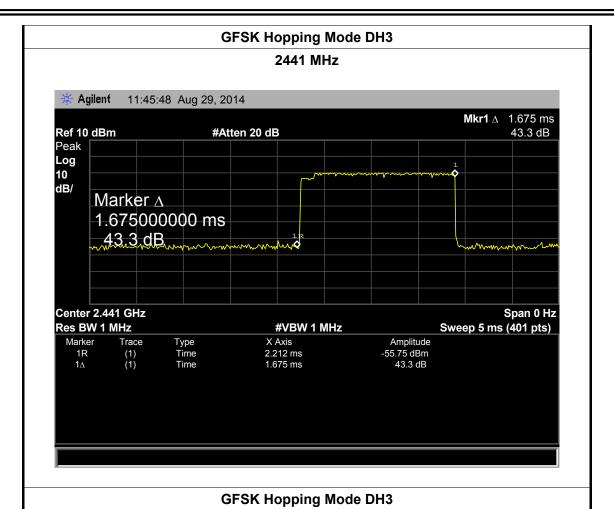
EUT:	T: Gurubook 5/MID		Model Name		GURU	IBOOK5	
Temperature:	rature: 25 $^{\circ}$ Relative Humidity: 55%						
Test Voltage:	Voltage: AC 120V/		60 HZ	IZ			
Test Mode:		Hopping I	Mode (GFSK D	H3)			
Channel	Pu	lse Time	Total of	Period Time	Lir	nit	Result
(MHz)		(ms)	Dwell (ms)	(s)	(m	ıs)	Result
2402		1.675	268.00				
2441		1.675	268.00	31.60	40	00	PASS
2480		1.675	268.00				
			GFSK Hoppin	ng Mode DH3			

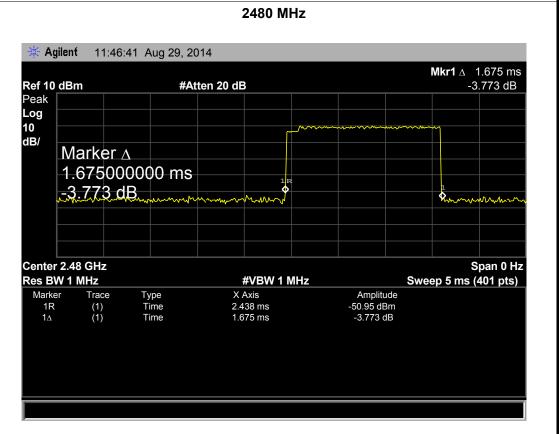
#### 0.400 1411









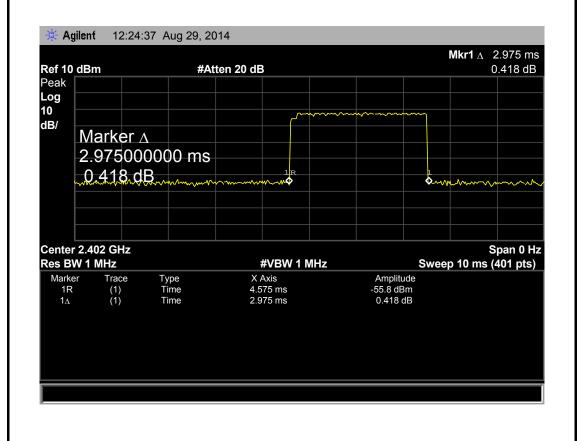


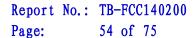


Page: 53 of 75

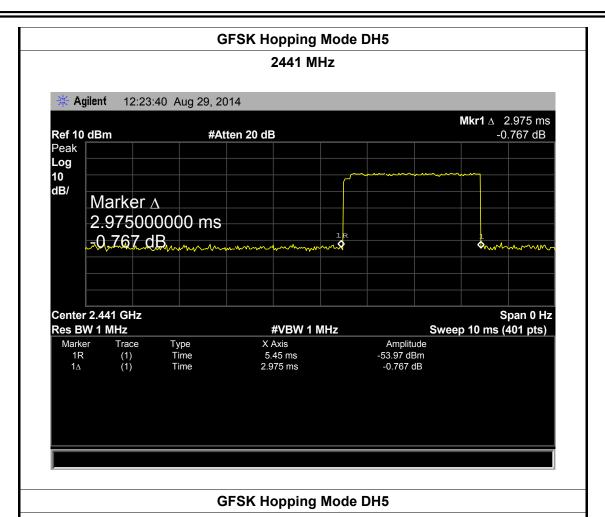
EUT:		Gurubook 5/MID <b>Model Name</b> : GURUBOOK		BOOK5			
Temperature:		25 °C Relative Humidity: 55%					
Test Voltage:		AC 120V/	60 HZ				
Test Mode:		Hopping I	Mode (GFSK D	H5)			
Channel	Pu	lse Time	Total of	Period Time	Lir	nit	Result
(MHz)		(ms)	Dwell (ms)	(s)	(m	ıs)	Result
2402		2.975	317.33				
2441		2.975	317.33	31.60	40	00	PASS
2480		2.975	317.33				
			GESK Honni	na Mode DH5			

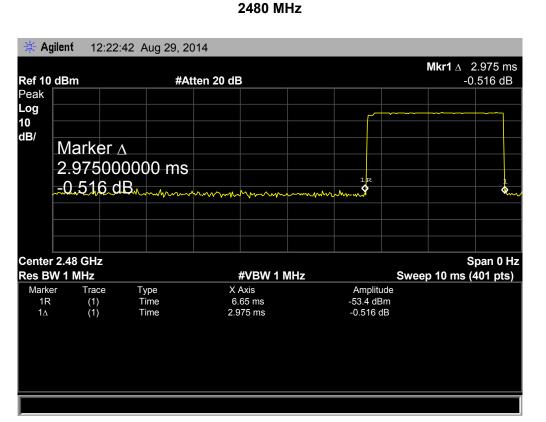
### **GFSK Hopping Mode DH5**







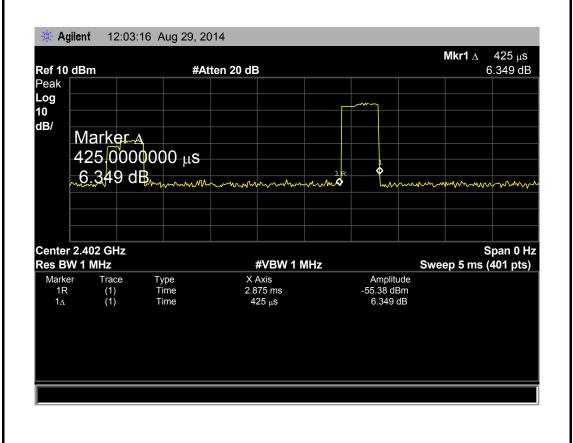


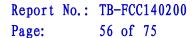




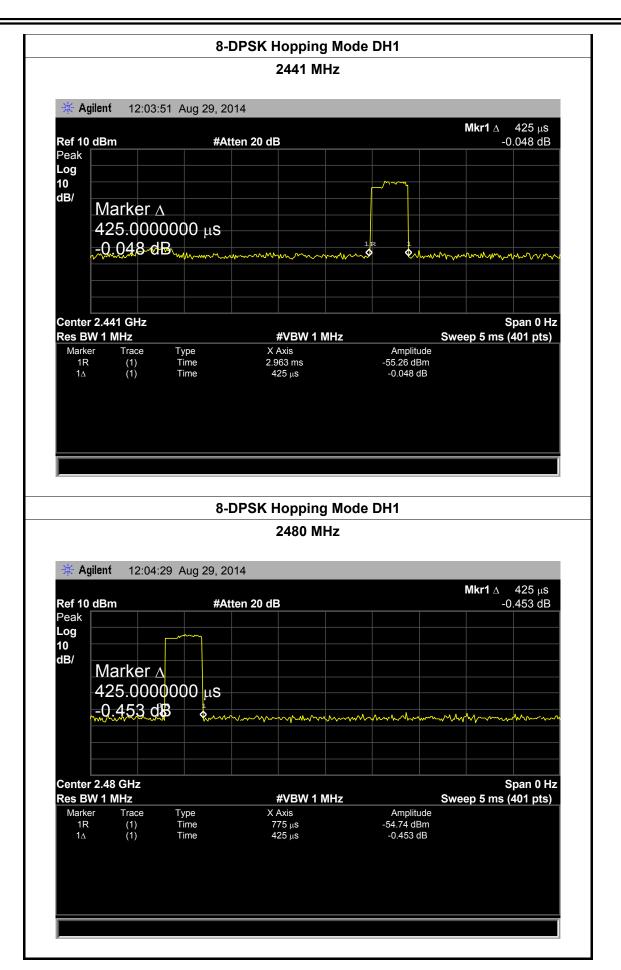
Page: 55 of 75

EUT:	Gurubook 5/MID Model Name :		GURU	BOOK5			
Temperature:		25 ℃	25 ℃ Relative Humidity: 55%				
Test Voltage:	Itage: AC 120V/60 HZ						
Test Mode:		Hopping N	Mode (8-DPSK	DH1)			
Channel	Pu	Ise Time	Total of	Period Time	Lir	nit	Result
(MHz)		(ms)	Dwell (ms)	(s)	(m	ıs)	Result
2402		0.425	136.00				
2441		0.425	136.00	31.60	40	00	PASS
2480		0.425	136.00				
			8-DPSK Hopp	ing Mode DH1			





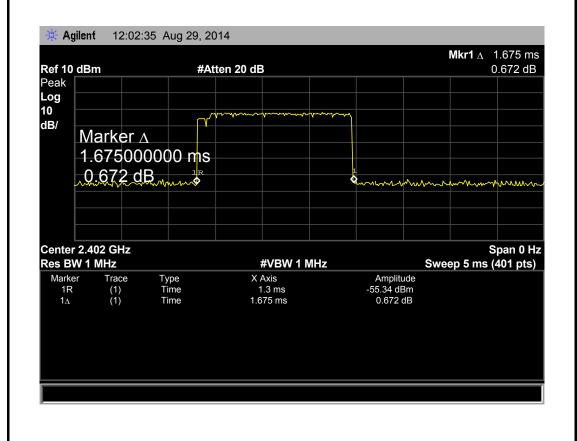


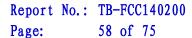




Page: 57 of 75

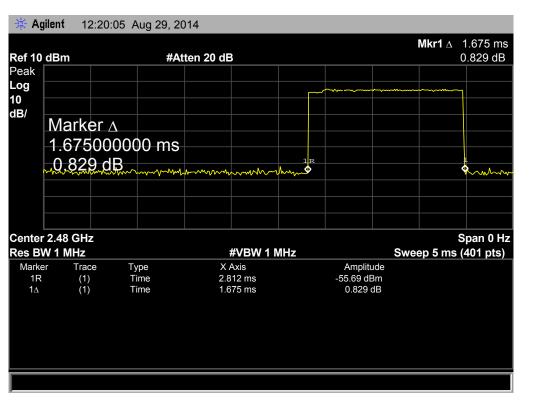
EUT:		Gurubook	5/MID	Model Name :		GURUBOOK5	
Temperature	Temperature: 25 °C		25 ℃		umidity: 55%		
Test Voltage:		AC 120V/	60 HZ				
Test Mode:		Hopping I	Mode (8-DPSK	DH3)			
Channel	Pu	lse Time	Total of	Period Time	Lir	nit	Result
(MHz)		(ms)	Dwell (ms)	(s)	(m	ıs)	Result
2402		1.675	268.00				
2441		1.675	268.00	31.60	40	00	PASS
2480		1.675	268.00				
			8-DPSK Hopp	ing Mode DH3			







8-DPSK Hopping Mode DH3 2441 MHz Agilent 12:01:42 Aug 29, 2014 **Mkr1**  $\Delta$  1.65 ms #Atten 20 dB 50.12 dB Ref 10 dBm Peak Log 10 dB/ Marker A 1.650000000 ms 50,12 dB Center 2.441 GHz Span 0 Hz Res BW 1 MHz #VBW 1 MHz Sweep 5 ms (401 pts) Marker X Axis Amplitude Trace Туре 2.875 ms 1.65 ms -54.43 dBm 50.12 dB 1R 1∆ (1) (1) Time Time 8-DPSK Hopping Mode DH3 2480 MHz

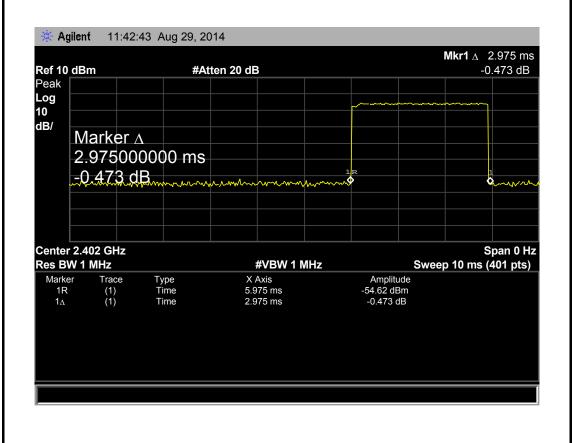




Page: 59 of 75

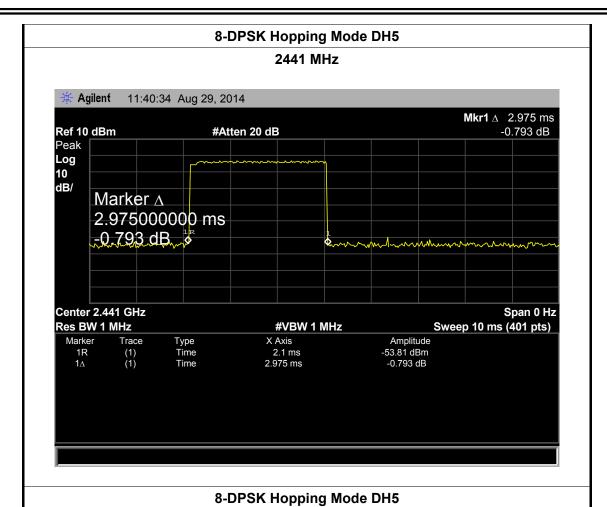
EUT:		Gurubook	5/MID	Model Name		GURUBOOK5	
Temperature:		25 °C Relative Humidity: 55%					
Test Voltage: AC 120V/		60 HZ					
Test Mode:		Hopping I	Mode (8-DPSK	DH5)			
Channel	Pu	Ise Time	Total of	Period Time	Lir	nit	Result
(MHz)		(ms)	Dwell (ms)	(s)	(m	ıs)	Result
2402		2.975	317.33				
2441		2.975	317.33	31.60	40	00	PASS
2480		2.975	317.33				
			8-DPSK Honn	ing Mode DH5			

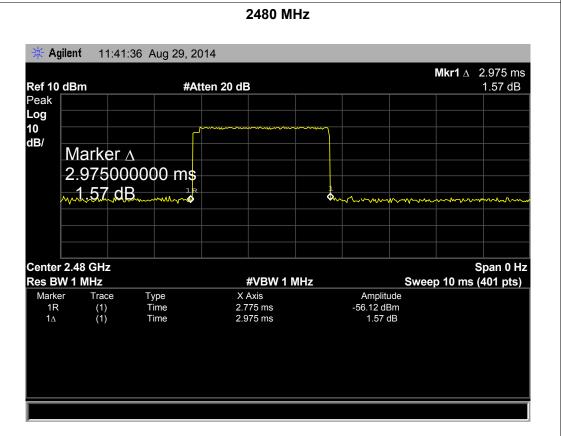
### 8-DPSK Hopping Mode DH5













Report No.: TB-FCC140200 Page: 61 of 75

8. Channel Separation and Bandwidth Test

# 8.1 Test Standard and Limit

8.1.1 Test Standard FCC Part 15.247

8.1.2 Test Limit

Test Item	Limit	Frequency Range(MHz)
Bandwidth	<=1 MHz	2400~2483.5
	(20dB bandwidth)	
	>25KHz or >two-thirds of	
Channel Separation	the 20 dB bandwidth	2400~2483.5
	Which is greater	

# 8.2 Test Setup



# 8.3 Test Procedure

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Spectrum Setting:

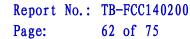
Channel Separation: RBW=30 kHz, VBW=100 kHz.

Bandwidth: RBW=30 kHz, VBW=100 kHz.

- (3) The bandwidth is measured at an amplitude level reduced 20dB from the reference level. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst –case (i.e the widest) bandwidth.
- (4) Measure the channel separation the spectrum analyzer was set to Resolution Bandwidth:30 kHz, and Video Bandwidth:100 kHz. Sweep Time set auto.

# 8.4 EUT Operating Condition

The EUT was set to the Hopping Mode for Channel Separation Test and continuously transmitting for the Bandwidth Test.



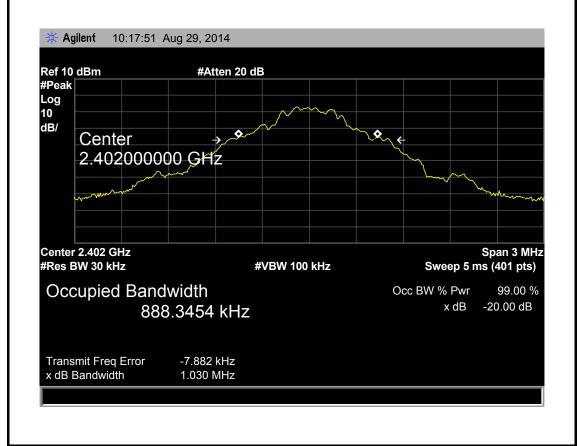


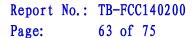
8.5 Test Equipment

Description	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Mar. 20, 2014	Mar. 19, 2015

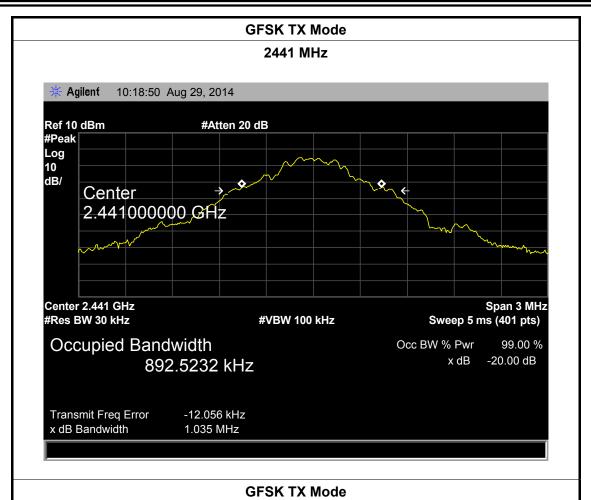
# 8.6 Test Data

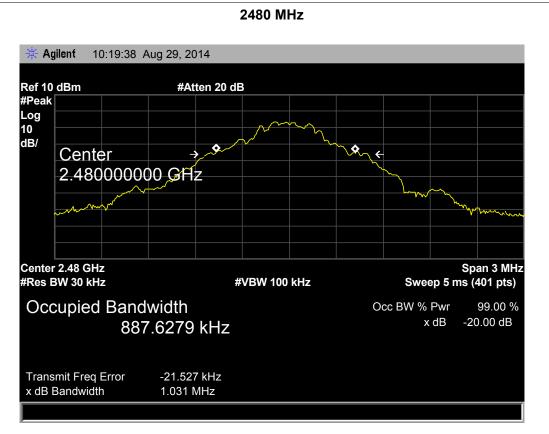
EUT:	Gurubook 5/MID	Model Name :	GURUBOOK5
Temperature:	<b>25</b> ℃	Relative Humidity:	55%
Test Voltage:	AC 120V/60 HZ		
Test Mode:	TX Mode (GFSK)		
Channel frequence	cy 99% OBW (kHz)	20dB Bandwidth	20dB Bandwidth
(MHz)		(kHz)	*2/3 (kHz)
(MHz) 2402	888.3454	( <b>kHz</b> ) 1030.00	* <b>2/3 (kHz)</b> 686.66
,	888.3454 892.5232	` ,	` ,
2402		1030.00	686.66









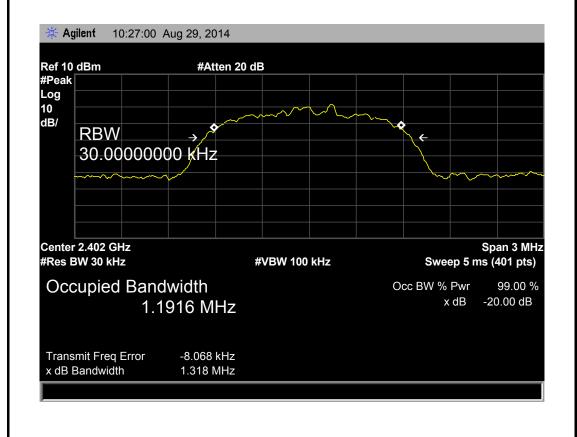


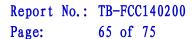


Page: 64 of 75

EUT:	Gurubook 5/MID	Model Name :	GURUBOOK5	
Temperature:	25 ℃	Relative Humidity:	55%	
Test Voltage:	AC 120V/60 HZ			
Test Mode:	TX Mode (8-DPSK)			
Channel frequency 99% OBW (kHz)		20dB Bandwidth	20dB Bandwidth	
(MHz)		(kHz)	*2/3 (kHz)	
2402	1191.60	1318.00	878.67	
2441	1194.50	1316.00	877.33	
2480	1196.50	1316.00	877.33	

# 8-DPSK TX Mode 2402 MHz







8-DPSK TX Mode 2441 MHz 10:21:32 Aug 29, 2014 Agilent Ref 10 dBm #Atten 20 dB #Peak Log 10 dB/ Center 2.441000000 GHz Center 2.441 GHz Span 3 MHz #Res BW 30 kHz **#VBW 100 kHz** Sweep 5 ms (401 pts) Occupied Bandwidth Occ BW % Pwr 99.00 % -20.00 dB 1.1945 MHz x dB Transmit Freq Error -13.398 kHz x dB Bandwidth 1.316 MHz 8-DPSK TX Mode

#### 2480 MHz Agilent 10:20:24 Aug 29, 2014 Ref 10 dBm #Atten 20 dB #Peak Log 10 dB/ Center **←** 2.480000000 GHz Span 3 MHz Center 2.48 GHz #Res BW 30 kHz **#VBW 100 kHz** Sweep 5 ms (401 pts) Occupied Bandwidth Occ BW % Pwr 99.00 % -20.00 dB x dB 1.1965 MHz Transmit Freq Error -23.503 kHz x dB Bandwidth 1.316 MHz

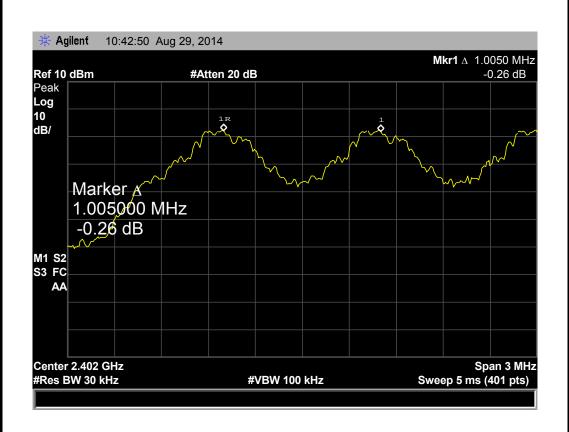


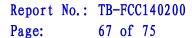
Page: 66 of 75

EUT:	Gurubook 5/MID	Model Name :	GURUBOOK5
Temperature:	<b>25</b> ℃	Relative Humidity:	55%
Test Voltage:	AC 120V/60 HZ		
Test Mode:	Hopping Mode (GFSK)		

	rispania meas (e. e.t.)					
Channel frequency (MHz)		Separation Read Value	Separation Limit (kHz)			
		(kHz)				
2402		1005.00	686.66			
2441		1005.00	690.00			
2480		1005.00	687.33			

# **GFSK Hopping Mode**

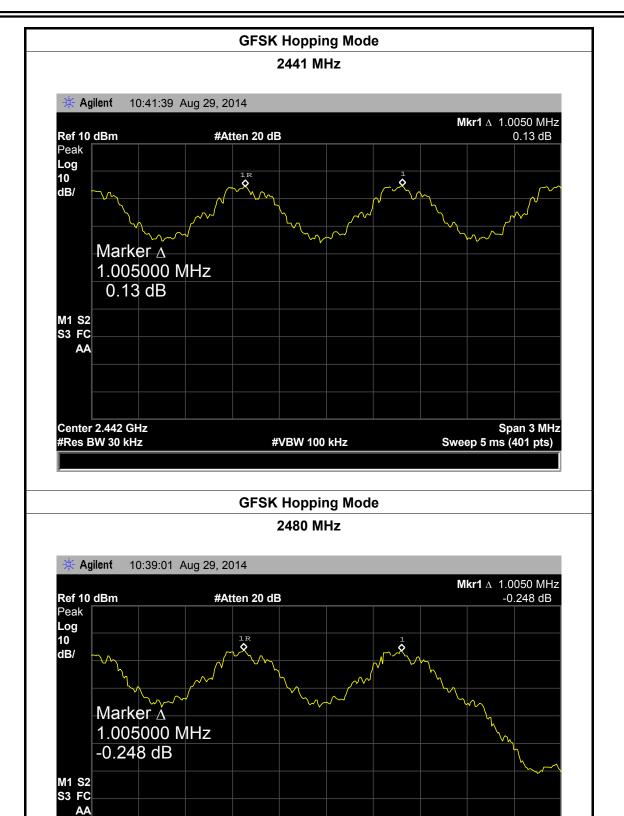






Center 2.479 GHz

#Res BW 30 kHz



**#VBW 100 kHz** 

Span 3 MHz

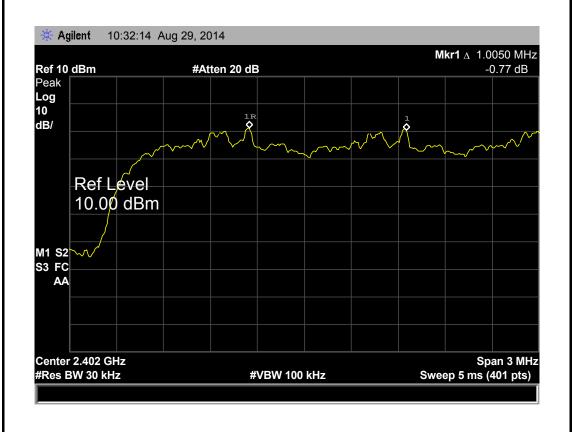
Sweep 5 ms (401 pts)

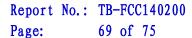


Page: 68 of 75

EUT:	Gurubook 5/MID		Model Name :		GURUBOOK5	
Temperature:	25 ℃		Relative Humidity:		55%	
Test Voltage:	AC 120V/60 HZ					
Test Mode:	Hopping Mode (8-DPSK)					
Channel frequen	hannel frequency (MHz) Separation Read		Read Value	Separation Limit (kHz)		
		(kHz)				
2402 100		5.00	878.67			
2441 100		5.00 877.33		877.33		
2480 100		5.00		877.33		
		8-DPSK Ho	pping Mode			



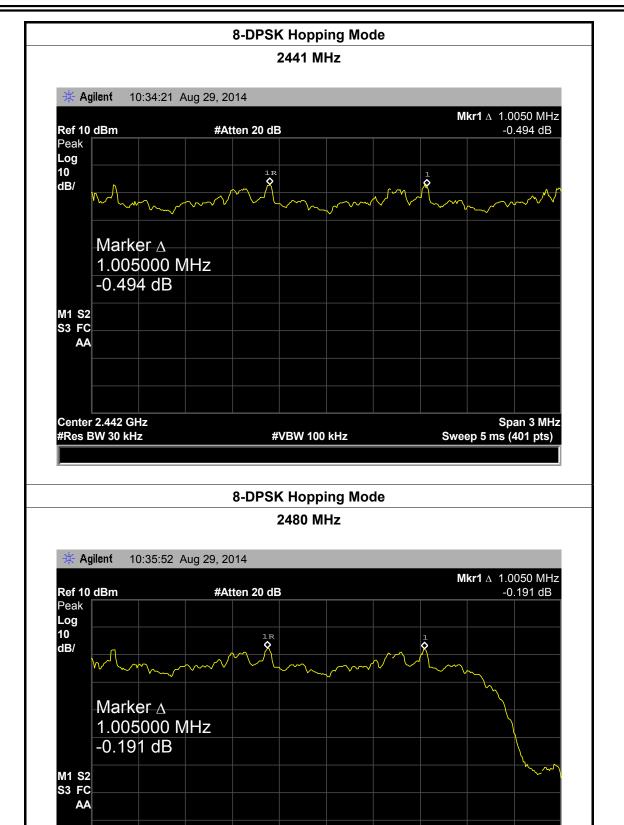






Center 2.479 GHz

#Res BW 30 kHz



**#VBW 100 kHz** 

Span 3 MHz

Sweep 5 ms (401 pts)



Page: 70 of 75

# 9. Peak Output Power Test

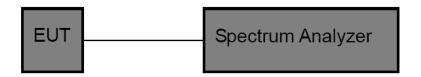
# 9.1 Test Standard and Limit

9.1.1 Test Standard FCC Part 15.247 (b) (1)

9.1.2 Test Limit

Test Item	Limit	Frequency Range(MHz)	
Peak Output Power	Hopping Channels>75 Power<1W(30dBm)	2400~2483.5	
	Other <125 mW(21dBm)		

# 9.2 Test Setup



# 9.3 Test Procedure

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Spectrum Setting:

Peak Detector: RBW=1 MHz, VBW=3 MHz for bandwidth less than 1MHz. RBW=3 MHz, VBW=3 MHz for bandwidth more than 1MHz.

# 9.4 EUT Operating Condition

The EUT was set to continuously transmitting in the max power during the test.

# 9.5 Test Equipment

Description	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Mar. 20, 2014	Mar. 19, 2015

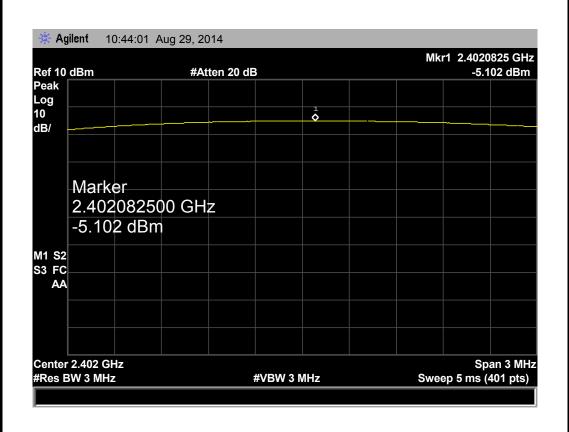
# 9.6 Test Data

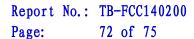


Page: 71 of 75

EUT:	Gurubook 5/MID		Model Name :		GURUBOOK5
Temperature:	25 ℃		Relative Humidity:		55%
Test Voltage:	AC 120V/60 HZ				
Test Mode:	TX Mode	TX Mode (GFSK)			
Channel frequency (MHz) Test Res		ult (dBm)		Limit (dBm)	
2402		-5.1	102		
2441	2441 -2.0		)94		21
2480 -3.9		934			

## **GFSK TX Mode**

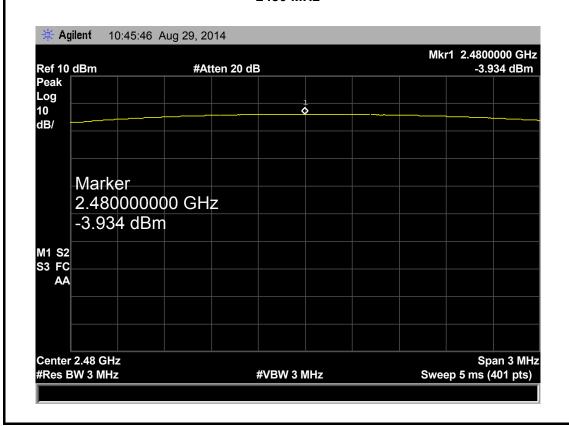






**GFSK TX Mode** 2441 MHz Agilent 10:47:06 Aug 29, 2014 Mkr1 2.4411425 GHz #Atten 20 dB -2.904 dBm Ref 10 dBm Peak Log 10 dB/ Marker 2.441142500 GHz -2.904 dBm M1 S2 S3 FC AA Center 2.441 GHz Span 3 MHz #Res BW 3 MHz #VBW 3 MHz Sweep 5 ms (401 pts)

#### **GFSK TX Mode**

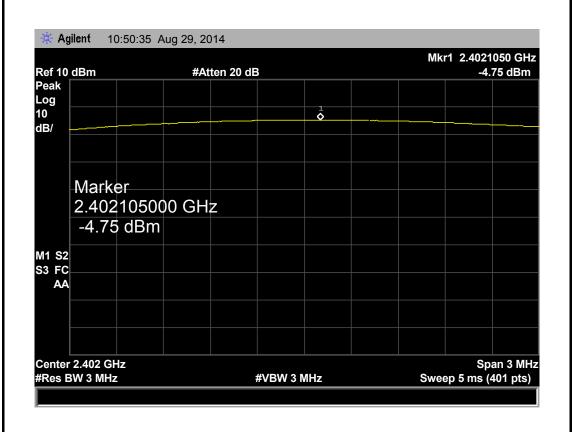


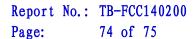


Page: 73 of 75

EUT:	Gurubook 5/MID		Model Name :		GURUBOOK5
Temperature:	25 ℃		Relative Humidity:		55%
Test Voltage:	AC 120V/60 HZ				
Test Mode:	TX Mode (8-DPSK)				
Channel frequency (MHz) Test Res		ult (dBm)		Limit (dBm)	
2402	-4.7		.750		
2441 -2.5		524		21	
2480 -3.5					

## 8-DPSK TX Mode

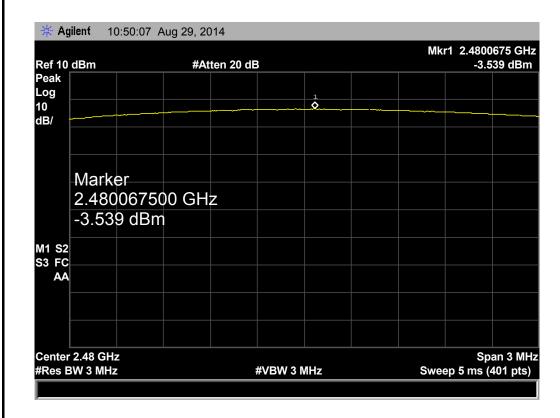






8-DPSK TX Mode 2441 MHz Agilent 10:49:40 Aug 29, 2014 Mkr1 2.4410525 GHz #Atten 20 dB -2.524 dBm Ref 10 dBm Peak Log 1 10 dB/ Marker 2.441052500 GHz -2.524 dBm M1 S2 S3 FC AA Center 2.441 GHz Span 3 MHz #Res BW 3 MHz #VBW 3 MHz Sweep 5 ms (401 pts)

#### 8-DPSK TX Mode





Page: 75 of 75

# 10. Antenna Requirement

# 10.1 Standard Requirement

10.1.1 Standard FCC Part 15.203

# 10.1.2 Requirement

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

## 10.2 Antenna Connected Construction

The directional gains of the antenna used for transmitting is 0 dBi, and the antenna connector is de-signed with permanent attachment and no consideration of replacement. Please see the EUT photo for details.

# 10.3 Result

The EUT antenna is a FPC Antenna. It complies with the standard requirement.