

APPLICATION FOR CERTIFICATION
On Behalf of
ALLIS COMMUNICATIONS CO., LTD.
GPS Security System
Product Type : GX-188
Model No. : (1)G5 (2)G4
Brand: ALLISCOM
FCC ID : VWM-GX188-BT01

Prepared for : ALLIS COMMUNICATIONS CO., LTD.
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TEST REPORT CERTIFICATION

Applicant : ALLIS COMMUNICATIONS CO., LTD.
 Manufacturer : ALLIS COMMUNICATIONS CO., LTD.
 EUT Description : GPS Security System
 Product Type : GX-188
 FCC ID : VWM-GX188-BT01
 (A) Model Number : (1)G5 (2)G4
 (B) Serial Number : 700006 (for G5)
 (C) Brand : ALLISCOM
 (D) Power Supply : DC 7V ~ 40V
 (E) Test Voltage : DC 12V (Via DC Power Supply)

Measurement Procedure Used:

FCC RULES AND REGULATIONS PART 15 SUBPART B & C, Sep. 2007
 AND ANSI C63.4/2003
 AND FCC Public Notice DA 00-705, Mar. 2000

(System Unit with FCC CFR 47 Part 15B, §15.107 and §15.109)
 (Transmitter Unit with FCC CFR 47 Part 15C, §15.207 and §15.209 and §15.247)

The device described above was tested by Audix Technology Corporation to determine the maximum emission levels emanating from the device. The maximum emission levels were compared to the FCC Part 15 subpart B and C limits.

The measurement results are contained in this test report and Audix Technology Corporation is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliant with the FCC official limits.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of Audix Technology Corporation.

Date of Test: Dec. 13 ~ 20, 2007

Prepared by: Cherry Wang Jan. 16, 2008
 (Cherry Wang/Section Manager)

Test Engineer: Ben Cheng Jan. 16, 2008
 (Ben Cheng/Section Manager)

Approved & Authorized Signer: Leon Liu Jan. 16, 2008
 (Leon Liu/Vice President)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

Applicant : ALLIS COMMUNICATIONS CO., LTD.
 10-3Fl., No. 31-1, Lane 169, Kang Ning St.,
 Hsi Chih City, Taipei Hsien, 221 Taiwan R.O.C

Manufacturer : ALLIS COMMUNICATIONS CO., LTD.
 10-3Fl., No. 31-1, Lane 169, Kang Ning St.,
 Hsi Chih City, Taipei Hsien, 221 Taiwan R.O.C

Description : GPS Security System

Product Type : GX-188

FCC ID : VWM-GX188-BT01

Model Number : (1)G5 (2)G4
 Above two models the differences are in accessories,
 the model G5 is representative selected to test in this
 report.
 The details of the differences are as follows:

Provision of the package	G5	G4
	Luxurious	Standard
External waterproof GPS antenna MMCX	✓	✓
Firmware update switching cable RS232	✓	✓
Infrared dialer	✓	✓
GSM call speaker	✓	✓
Call microphone	✓	✓
RF remote control set	✓	✓
Bluetooth module	✓	✓
Human body infrared sensor set	✓	✓
Relay set (for power-off)	✓	
Rechargeable battery 1800mAh/Made in Japan	✓	

Brand : ALLISCOM

Serial Number : 700006 (For G5 Receiver Unit)

Radio Technology	:	FHSS Modulation
Fundamental Range	:	2402MHz ~ 2480MHz
Channel Number	:	79
Bluetooth Antenna Gain (Peak Gain)	:	V-CUT: -0.844dB H-CUT: -2.862dB
UPS Backup Battery	:	ACC, Model: 103450-J (4.35V/1800mAh)
Remote Control Antenna	:	Cable: Non-Shielded, Undetachable, 1.0m

Accessories ---

External GPS Antenna	:	ACC, Model: M827B-S Cable: Shielded, Undetachable, 5.0m
GSM Call Speaker	:	ACC Cable: Non-Shielded, Undetachable, 2.0m
Call Microphone	:	ACC Cable: Non-Shielded, Undetachable, 3.0m
Infrared Dialer (IR)	:	ACC IR Cable: Non-Shielded, Detachable, 2.0m
Human Body Sensor (PIR)	:	ACC PIR Cable: Non-Shielded, Detachable, 2.0m
LED Wire Control Switch	:	ACC BT/MS Cable: Non-Shielded, Detachable, 2.0m
Power off Relay	:	REC, Model: LD-12F Cable: Non-Shielded, Detachable, 0.2m
C/E Cable	:	Non-Shielded, Detachable, 2.0m
7~40V Power Cord	:	Non-Shielded, Detachable, 2.0m
Firmware Update Switching	:	Non-Shielded, Detachable, 1.5m
RS232 Cable (RS-232 only for the manufacturer to update new software, the customer cannot be use the function at usual.)	:	
Date of Receipt of Sample	:	Nov. 26, 2007
Date of Test	:	Dec. 13 ~ 20, 2007

Remark:

1. This EUT is a transmitter unit of the GPS security system, the transmitter unit integrated circuits include MCU, GSM module, GPS module, Bluetooth module, RF remote control module, and etc.
2. This test report of EM-F960619 is for the Bluetooth transmitting and receiving modes, the RF remote control transmitting is reported in report of EM-F960618. FCC ID number is IXV-TX3314S. The GPS and RF remote control receiver is tested and reported in report of EM-F960617.
3. The GSM module (SIM300) had gotten the TCB approval certificate, the FCC ID number is UDV-0606020060001.
4. The IR transmitting and receiving modes have checked and complied with the Part 15 subpart B radiated limit, we are sure of both the IR transmitter and receiver action has triggered.

1.2. Tested Supporting System Details

1.2.1. SIM CARD (INSTALLED IN EUT)

Part Name	:	Test SIM S9650
Part Model	:	HP8922 Option 007
Vendor	:	HP

1.2.2. DC POWER SUPPLY

Model Number	:	3303A
Serial Number	:	721773
Manufacturer	:	Topward
Power Cord	:	Non-Shielded, Detachable, 1.8m

1.2.3. BT TEST JIG

Model Number	:	N/A
Serial Number	:	N/A
Vendor	:	Apm Communication Inc.

** PATTERN TEST SYSTEM **

1.2.4. GPS SIGNAL GENERATOR

Model Number	:	GS-50
Serial Number	:	N/A
Manufacturer	:	Welnavigate Inc.
Power Cord	:	Non-Shielded, Detachable, 1.8m
GPS Antenna	:	ACC, PA175-S Cable: Non-Shielded, Undetachable, 3.0m

1.2.5. REMOTE CONTROL (TRANSMITTER)

Model Number	:	TX3314S
Serial Number	:	N/A
FCC ID	:	IXV-TX3314S
Manufacturer	:	AutoMicro Technology Inc.

1.2.6. NOTEBOOK PC

Model Number	:	PP2130
Serial Number	:	5Y32KSQZ40ME
BSMI ID	:	3912A556
FCC ID	:	By DoC
Brand	:	COMPAQ
Manufacturer	:	LG Electronics Ltd.
AC Adapter	:	Compaq, M/N PPP009L (LITE-ON, M/N PA-1650-02C)
Power Cord	:	Shielded, Undetachable, 1.8m, Non-Shielded, Detachable, 1.8m

1.2.7. BLUETOOTH USB DONGLE

Model Number : MY-006
 Serial Number : N/A
 Manufacturer : BlueXpert

1.2.8. UNIVERSAL RADIO COMMUNICATION TESTER

Model Number : CMU200
 Serial Number : 102280
 Manufacturer : Rhode & Schwartz
 Power Cord : Non-Shielded, Detachable, 1.8m

1.2.9. HORN ANTENNA

Model Number : 3115
 Serial Number : 9609-4927
 Manufacturer : EMCO
 Cable : Shielded, Detachable, 2.0m

1.3. Description of Test Facility

Name of Firm : **Audix Technology Corporation**
EMC Department
 No. 53-11, Tin-Fu Tsun, Lin-Kou,
 Taipei, Taiwan.

Test Site : **Semi-Anechoic Chamber**
 (AC) No. 53-11, Tin-Fu Tsun, Lin-Kou,
 Taipei, Taiwan.

Federal Communication Commission
 Registration Number: 90993
 Date of Renewal: May 16, 2006

NVLAP Lab. Code : 200077-0
 (NVLAP is a NATA accredited body under Mutual Recognition Agreement)

1.4. Measurement Uncertainty

Test Item	Frequency Range	Uncertainty (dB)
Conduction Test	150kHz~30MHz	±1.73dB
Radiation Test (Distance: 3m)	30MHz~300MHz	±2.91dB
	300MHz~1000MHz	±2.94dB
	Above 1GHz	± 5.02dB

Remark : Uncertainty = $ku_c(y)$

Test Item	Uncertainty
20dB Bandwidth	± 0.2kHz
Carrier Frequency Separation	± 0.2kHz
Time Of Occupancy	± 0.03sec
Maximum peak Output power	± 0.52dBm
Emission Limitations	± 0.13dB
Band Edges	± 0.13dB

2. POWERLINE CONDUCTED EMISSION MEASUREMENT

【The EUT only employs DC power for operation, no conductive emission limits are required according to FCC Part 15 section §15.107(d) and § 15.207(c)】

3. RADIATED EMISSION MEASUREMENT

3.1. Test Equipment

The following test equipment was used during the radiated emission measurement:

3.1.1. For Frequency 30MHz~1000MHz (at Semi-Anechoic Chamber)

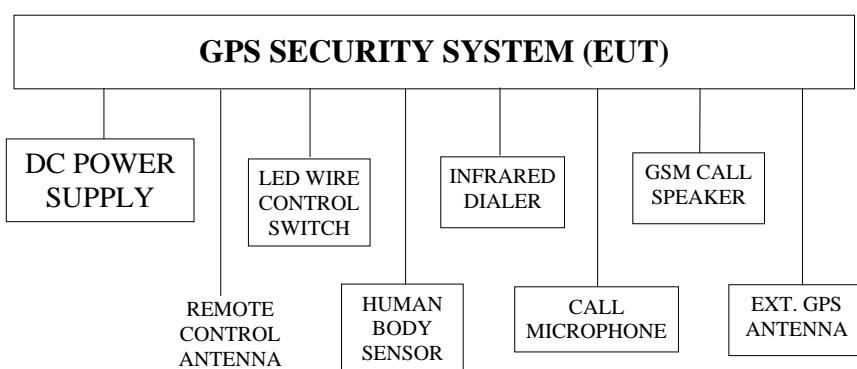
Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	E7405A	MY42000134	Jun. 27, 07'	Jun. 26, 08'
2.	Test Receiver	R & S	ESCS30	100265	Sep. 04, 07'	Sep. 03, 08'
3.	Pre-Amplifier	HP	8447D	2944A06305	Mar. 03, 07'	Mar. 02, 08'
4.	Biconical Antenna	CHASE	VBA6106A	1264	Apr. 11, 07'	Apr. 10, 08'
5.	Log Periodic Antenna	Schwarzbeck	UHALP910 8-A	0139	Apr. 11, 07'	Apr. 10, 08'

3.1.2. For Frequency Above 1GHz (at Semi-Anechoic Chamber)

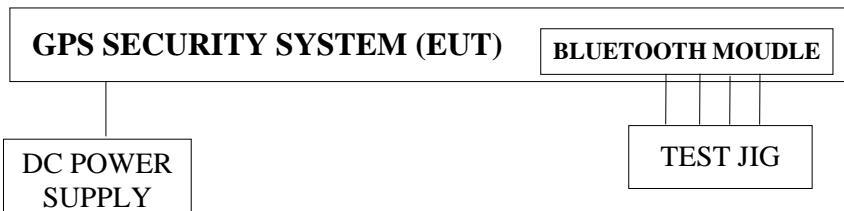
Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	E7405A	MY42000134	Jun. 27, 07'	Jun. 26, 08'
2.	Pre-Amplifier	HP	8449B	3008A01284	Jun. 22, 07'	Jun. 21, 08'
3.	2.4GHz Notch Filter	EWT	EWT-14-00 70	G2	Dec. 07, 07'	Dec. 06, 08'
4.	Horn Antenna	EMCO	3115	9112-3775	May 23, 07'	May 22, 08'
5.	Horn Antenna	EMCO	3116	2653	Oct. 04, 07'	Oct. 03, 08'

3.2. Test Setup

3.2.1. For System Operating mode



3.2.2. For Bluetooth Transmitting and Receiving modes



(OUTSIDE CHAMBER)**PARTNER TEST SYSTEM (For System Operating Mode)****3.2.3. Semi-Anechoic Chamber (3m) Setup Diagram for 30-1000MHz****ANTENNA TOWER**

ANTENNA ELEVATION VARIES FROM 1 TO 4 METERS

3 METERS

EUT

TURN TABLE

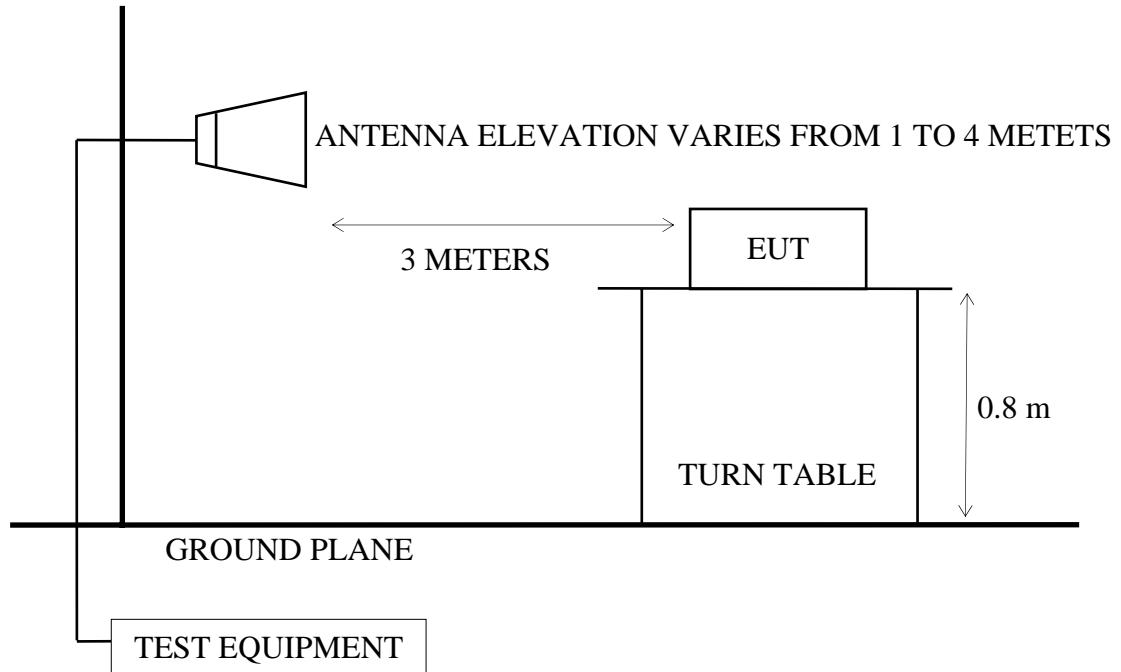
0.8m

GROUND PLANE

TEST EQUIPMENT

3.2.4. Semi-Anechoic Chamber (3m) Setup Diagram for above 1GHz

ANTENNA TOWER



3.3. Radiated Emission Limits

3.3.1. §15.209 and §15.109 Class B Radiated Emission Limits

Frequency MHz	Distance Meters	Field Strengths Limits	
		μ V/m	$\text{dB}\mu$ V/m
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
Above 960	3	500	54.0
Above 1000	3	74.0 $\text{dB}\mu$ V/m (Peak) 54.0 $\text{dB}\mu$ V/m (Average)	

Remark :

- (1) Emission level ($\text{dB}\mu$ V/m) = $20 \log$ Emission level (μ V/m)
- (2) The tighter limit applies at the edge between two frequency bands.
- (3) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
- (4) The limits in this table are based on CFR 47 Part 15.205(a)(b) and Part 15.209 (a).
- (5) The over 1GHz limit, FCC limit is used based on CFR 47 Part 15.35 (b) and Part 15.205(b) & Part 15.209(e) and Part 15.207(c).

3.4. Operating Condition of EUT

Test Mode: System Operating

- 3.4.1. Setup the EUT and simulator as shown on 3.2.1 and 3.2.3~3.2.4.
- 3.4.2. Turn on the power of all equipment.
- 3.4.3. Setup the Notebook pc to drive the EUT through the Bluetooth USB dongle and software program “BlueSoleil”. Data of GPS the positions code was communicated through the GPS signal generator and Notebook pc and Bluetooth USB dongle. The software program “GX-Data Logger” was use and the GPS message was displayed on screen of notebook pc. The EUT was on the normal function during the test.

Test Mode: Bluetooth Transmitting and Receiving

- 3.4.4. Setup the EUT (GPS Security System) and simulator as shown on 3.2.2 and 3.2.3~3.2.4.
- 3.4.5. Turn on the power of all equipment.
- 3.4.6. Setup the Notebook pc to drive the EUT through the Bluetooth USB dongle and software program “BlueSoleil”. Data was communicated through the Notebook pc and Bluetooth USB dongle. The software program “GX-Data Logger” was use and the message was displayed on screen of notebook pc. The EUT was on the continuous transmitting and receiving condition during the test.
- 3.4.7. Setup the Notebook pc to drive the EUT through the BT Test Jig and software program “Silicon Wave WDS Tools”. The EUT was on the continuous transmitting and receiving condition during the test.

3.5. Test Procedure

The EUT and its simulators were placed on a turn table which was 0.8 meter above the ground. The turn table rotated 360 degrees to determine the position of the maximum emission level. EUT was set at 3 meters away from the receiving antenna which was mounted on an antenna tower. The antenna moved up and down between 1 to 4 meters to find out the maximum emission level. Broadband antennas (broadband and log periodical or horn antenna) were used as a receiving antenna. Both horizontal and vertical polarization of the antenna were set on measurement. In order to find the maximum emission, all of the interface cables were manipulated according to FCC ANSI C63.4-2003 regulation, and the measurement guideline was according to FCC Public Notice DA 00-705.

The bandwidth of the R&S Test Receiver ESCS30 was set at 120kHz. (For 30MHz to 1000MHz)

The resolution bandwidth and video bandwidth of test spectrum analyzer is 1MHz for peak detection (PK) at frequency above 1GHz.

The resolution bandwidth of test spectrum analyzer is 1MHz and the video bandwidth is 10Hz for average detection (AV) at frequency above 1GHz.

The frequency range from 30MHz to 25GHz (Up to 10th harmonics from fundamental frequency) was checked.

3.6. Radiated Emission Measurement Results

PASSED. All the emissions not reported below are too low against the official limits.

EUT : GPS Security System M/N : G5

Test Date : Dec. 20, 2007 Temperature : 28 Humidity : 63%

For Frequency Range 30MHz~1000MHz:

The EUT with following test modes were performed during this section testing and all the test results are listed in section 3.6.1.

No.	Test Mode and Frequency	Reference Test Data No.	
		Horizontal	Vertical
1.	System Operating Mode	# 7	# 8
2.	Bluetooth Transmitting	2402MHz (CH0)	# 5
3.		2441MHz (CH39)	# 5
4.		2480MHz (CH78)	# 5
5.	Bluetooth Receiving	2441MHz (CH39)	# 5
			# 6

* Above all final readings were measured with Quasi-Peak detector.

For Frequency above 1GHz:

The EUT with following test modes were performed during this section testing and all the test results are listed in section 3.6.2.

No.	Test Mode and Frequency	
1.	Bluetooth Transmitting	2402MHz (CH0)
2.		2441MHz (CH39)
3.		2480MHz (CH78)
4.	Bluetooth Receiving	2441MHz (CH39)

* Above all final readings were measured with Peak detector and Average detector.

For Restricted Bands:

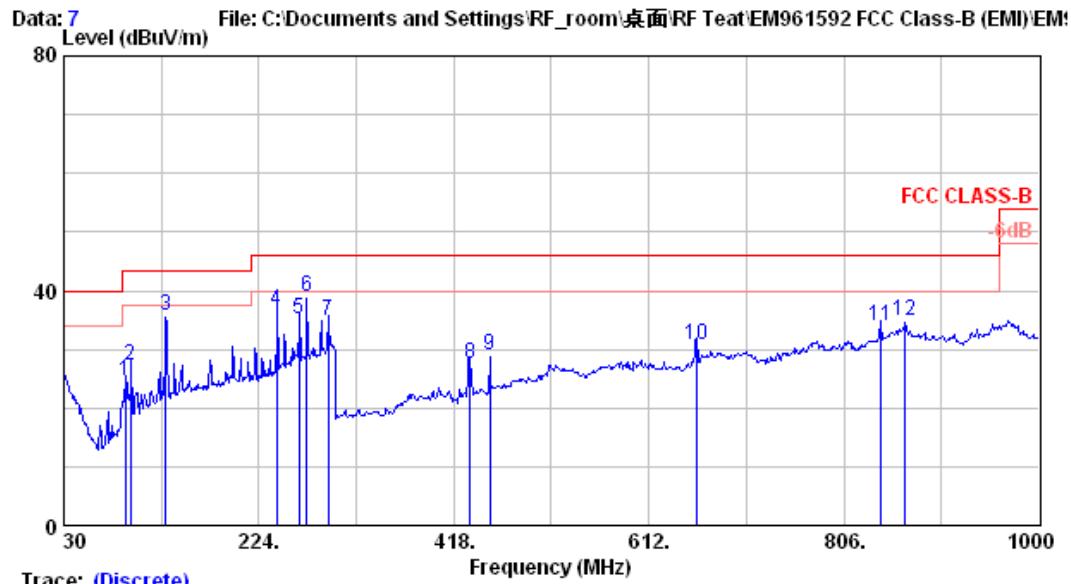
The EUT was tested in restricted bands and all the test results are listed in section 3.6.3. (The restricted bands defined in part 15.205(a))

No.	Test Mode and Frequency	Reference Test Data No.	
		Horizontal	Vertical
1.	Bluetooth Transmitting	2402MHz (CH0)	# 1, # 4
2.		2480MHz (CH78)	# 8, # 5
			# 7, # 6

3.6.1. 30MHz~ 1000MHz Frequency Range Measurement Result



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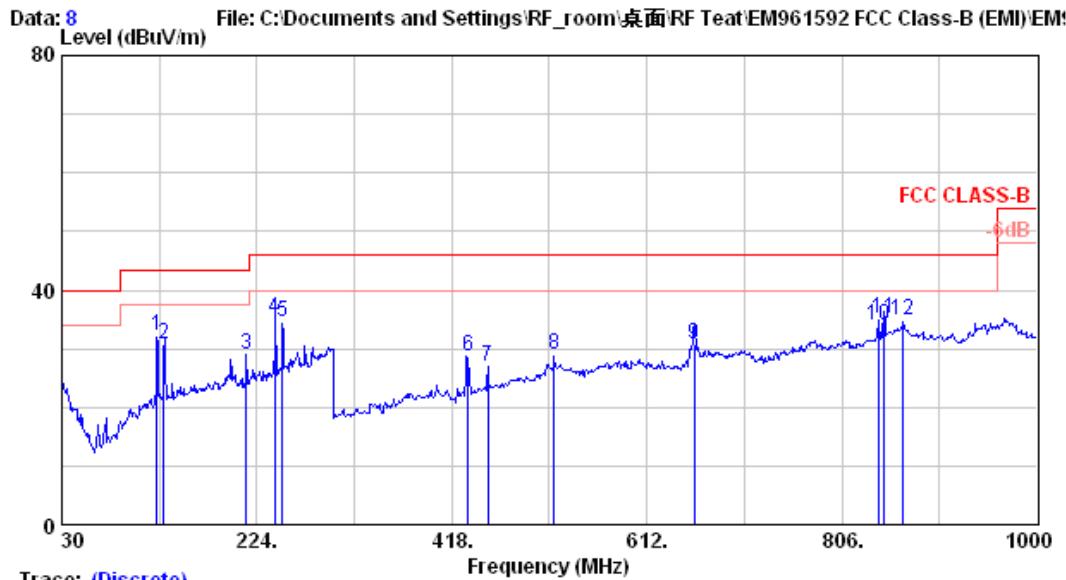
Site no. : A/C Chamber Data no. : 7
 Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : HORIZONTAL
 Limit : FCC CLASS-B
 Env. / Ins. : ESCS30 28°C/63% Engineer : Henning_Chang
 EUT : GPS Security System M/N:G5
 Power Rating : DC 12V
 Test Mode : Operating

		Ant.	Cable	Emission				
	Freq.	Factor	Loss	Reading	Level	Limits	Margin	Remark
	(MHz)	(dB/m)	(dB)	(dB μ V)	(dB μ V/m)	(dB μ V/m)	(dB)	
1	91.290	15.90	2.00	6.60	24.50	43.50	19.00	
2	96.690	16.75	2.05	8.34	27.15	43.50	16.35	
3	131.790	19.83	2.40	13.62	35.85	43.50	7.65	
4	241.680	23.16	3.40	10.06	36.62	46.00	9.38	
5	264.090	24.60	3.67	7.03	35.30	46.00	10.70	
6	271.380	25.06	3.70	10.22	38.98	46.00	7.02	@
7	292.980	26.24	3.90	4.61	34.75	46.00	11.25	
8	433.920	17.33	5.20	5.12	27.65	46.00	18.35	
9	454.000	17.70	5.50	5.79	28.99	46.00	17.01	
10	659.100	22.30	6.40	2.17	30.87	46.00	15.13	
11	841.800	25.11	7.10	1.75	33.96	46.00	12.04	
12	866.300	25.89	7.20	1.91	35.00	46.00	11.00	

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.
 3. The worst emission was detected at 271.380MHz with corrected signal level of 38.98dB μ V/m (limit is 46.00dB μ V/m) when the antenna was at horizontal polarization and was at 4m high and the turn table was at 280°.
 4. 0°was the table front facing the antenna. Degree is calculated from 0°clockwise facing the antenna.



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Trace: (Discrete)

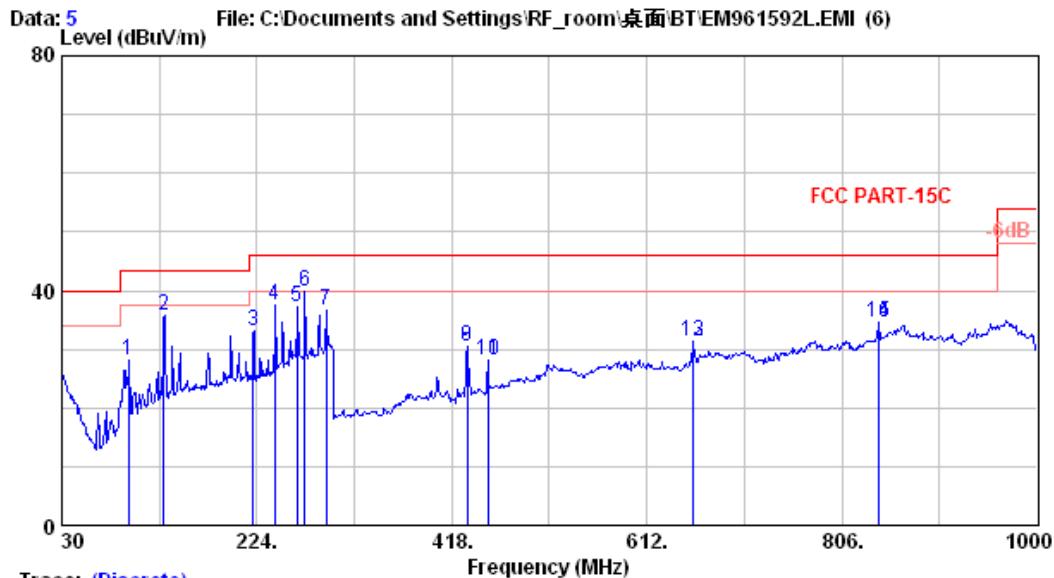
Site no. : A/C Chamber Data no. : 8
 Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : VERTICAL
 Limit : FCC CLASS-B
 Env. / Ins. : ESCS30 28°C/63% Engineer : Henning_Chang
 EUT : GPS Security System M/N:G5
 Power Rating : DC 12V
 Test Mode : Operating

Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Emission			
			Reading (dB μ V)	Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)
1 124.230	19.32	2.30	10.60	32.21	43.50	11.29
2 131.790	19.83	2.40	8.67	30.90	43.50	12.60
3 213.060	21.76	3.10	4.28	29.14	43.50	14.36
4 241.680	23.16	3.40	8.57	35.13	46.00	10.87
5 249.510	23.74	3.50	7.22	34.46	46.00	11.54
6 433.920	17.33	5.20	6.26	28.79	46.00	17.21
7 454.000	17.70	5.50	3.79	26.99	46.00	19.01
8 519.800	19.99	6.90	2.11	29.00	46.00	17.00
9 659.100	22.30	6.40	2.17	30.87	46.00	15.13
10 841.800	25.11	7.10	1.75	33.96	46.00	12.04
11 847.400	25.43	7.10	2.76	35.29	46.00	10.71
12 866.300	25.92	7.20	1.89	35.00	46.00	11.00

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.
 3. The worst emission was detected at 847.400MHz with corrected signal level of 35.29dB μ V/m (limit is 46.00dB μ V/m) when the antenna was at vertical polarization and was at 1m high and the turn table was at 175°.
 4. 0° was the table front facing the antenna. Degree is calculated from 0°clockwise facing the antenna.



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 Email:ttmc@ttmc.com



Trace: (Discrete)

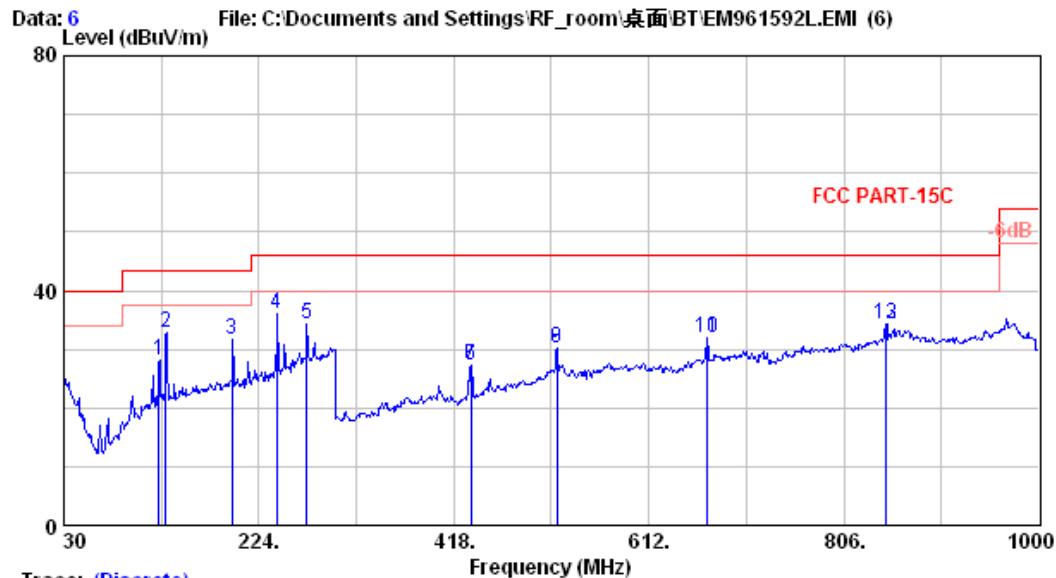
Site no. : A/C Chamber Data no. : 5
 Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : HORIZONTAL
 Limit : FCC PART-15C
 Env. / Ins. : ESCS 30 28°C/63% Engineer : Henning_Chang
 EUT : GPS Security System M/N:G5
 Power Rating : DC 12V
 Test Mode : BT 2402MHz

	Freq.	Ant. Factor	Cable Loss	Emission Reading	Emission Level	Limits	Margin	Remark
	(MHz)	(dB/m)	(dB)	(dB μ V)	(dB μ V/m)	(dB μ V/m)	(dB)	
1	96.690	16.75	2.05	9.34	28.15	43.50	15.35	
2	131.790	19.83	2.40	13.62	35.85	43.50	7.65	
3	220.350	21.91	3.30	7.86	33.07	46.00	12.93	
4	241.680	23.16	3.40	11.06	37.62	46.00	8.38	
5	264.090	24.60	3.67	9.03	37.30	46.00	8.70	
6	271.380	25.06	3.70	11.22	39.98	46.00	6.02	
7	292.980	26.24	3.90	6.61	36.75	46.00	9.25	
8	433.700	17.33	5.20	7.92	30.45	46.00	15.55	
9	433.700	17.33	5.20	7.92	30.45	46.00	15.55	
10	454.000	17.70	5.50	4.79	27.99	46.00	18.01	
11	454.000	17.70	5.50	4.79	27.99	46.00	18.01	
12	658.400	22.21	6.40	2.84	31.45	46.00	14.55	
13	658.400	22.21	6.40	2.84	31.45	46.00	14.55	
14	842.500	25.19	7.10	2.25	34.54	46.00	11.46	
15	842.500	25.19	7.10	2.25	34.54	46.00	11.46	

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.



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Site no. : A/C Chamber Data no. : 6
 Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : VERTICAL
 Limit : FCC PART-15C
 Env. / Ins. : ESCS 30 28°C/63% Engineer : Henning_Chang
 EUT : GPS Security System M/N:G5
 Power Rating : DC 12V
 Test Mode : BT 2402MHz

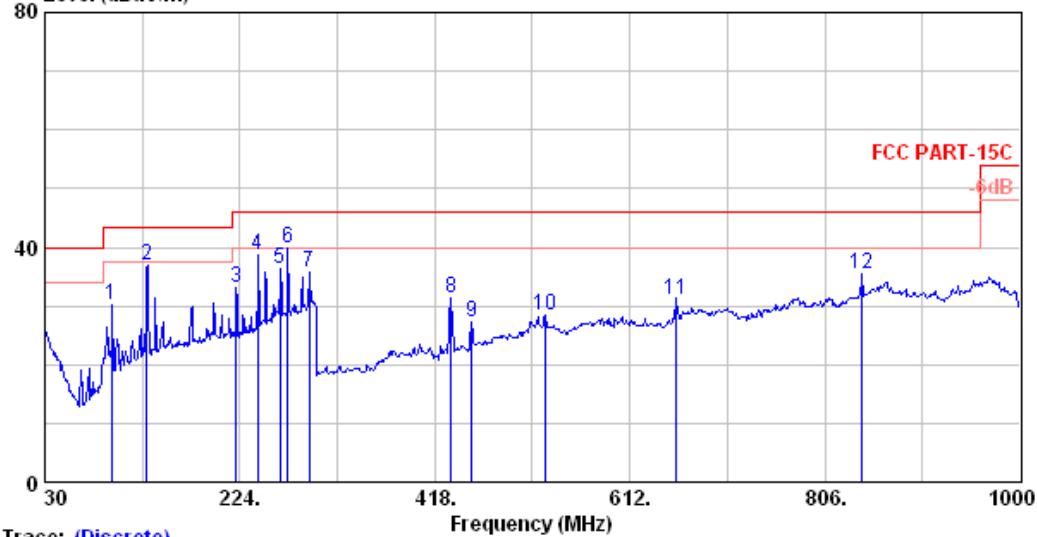
Freq. (MHz)	Ant. Factor	Cable Loss (dB/m)	Emission			
			Reading (dB μ V)	Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)
1 124.230	19.32	2.30	6.60	28.21	43.50	15.29
2 131.790	19.83	2.40	10.67	32.90	43.50	10.60
3 197.400	22.02	3.00	6.75	31.77	43.50	11.73
4 241.680	23.16	3.40	9.57	36.13	46.00	9.87
5 271.380	25.06	3.70	5.58	34.34	46.00	11.66
6 435.100	17.41	5.30	4.58	27.29	46.00	18.71
7 435.100	17.41	5.30	4.58	27.29	46.00	18.71
8 520.500	19.97	6.90	3.43	30.30	46.00	15.70
9 520.500	19.97	6.90	3.43	30.30	46.00	15.70
10 669.600	22.82	6.40	2.69	31.90	46.00	14.10
11 669.600	22.82	6.40	2.69	31.90	46.00	14.10
12 847.400	25.43	7.10	1.76	34.29	46.00	11.71
13 847.400	25.43	7.10	1.76	34.29	46.00	11.71

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.



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 Email:ttemc@ttemc.com

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Trace: (Discrete)

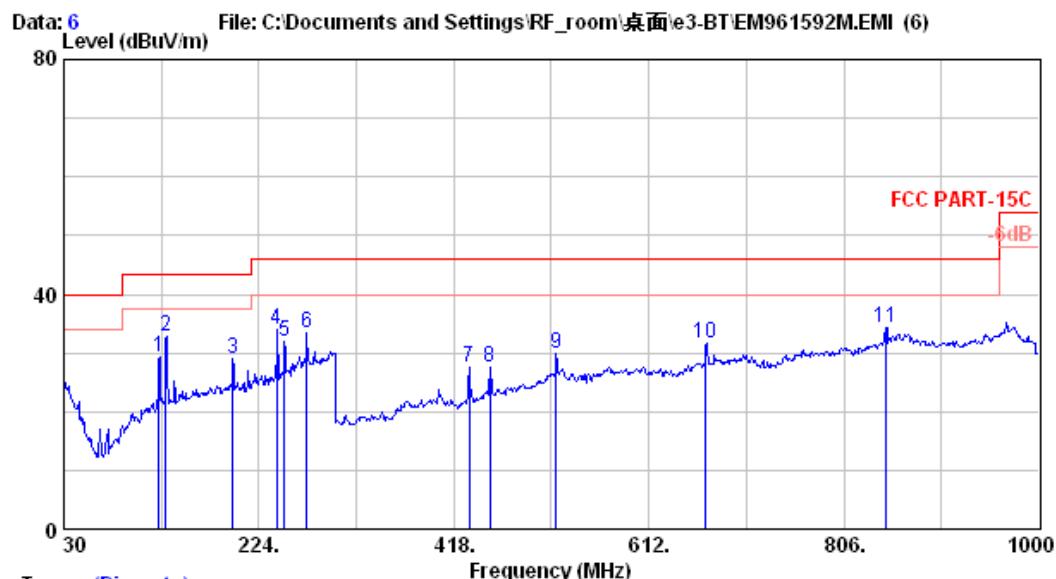
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 Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : HORIZONTAL
 Limit : FCC PART-15C
 Env. / Ins. : ESC830 28°C/63% Engineer : Henning_Chang
 EUT : GPS Security System M/N:G5
 Power Rating : DC 12V
 Test Mode : BT 2441MHz

Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Emission			
			Reading (dB μ V)	Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)
1 96.690	16.75	2.05	37.65	30.15	43.50	13.35
2 131.790	19.83	2.40	40.72	36.85	43.50	6.65
3 220.080	21.91	3.30	33.81	33.24	46.00	12.76
4 241.680	23.16	3.40	37.81	38.62	46.00	7.38
5 264.090	24.60	3.67	33.76	36.30	46.00	9.70
6 271.380	25.06	3.70	36.94	39.98	46.00	6.02
7 292.980	26.24	3.90	31.31	35.75	46.00	10.25
8 434.400	17.36	5.24	35.47	31.39	46.00	14.61
9 454.700	17.72	5.50	30.64	27.14	46.00	18.86
10 528.200	19.69	6.90	28.79	28.46	46.00	17.54
11 657.700	22.17	6.40	29.71	30.96	46.00	15.04
12 842.500	25.19	7.10	30.43	35.54	46.00	10.46

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.



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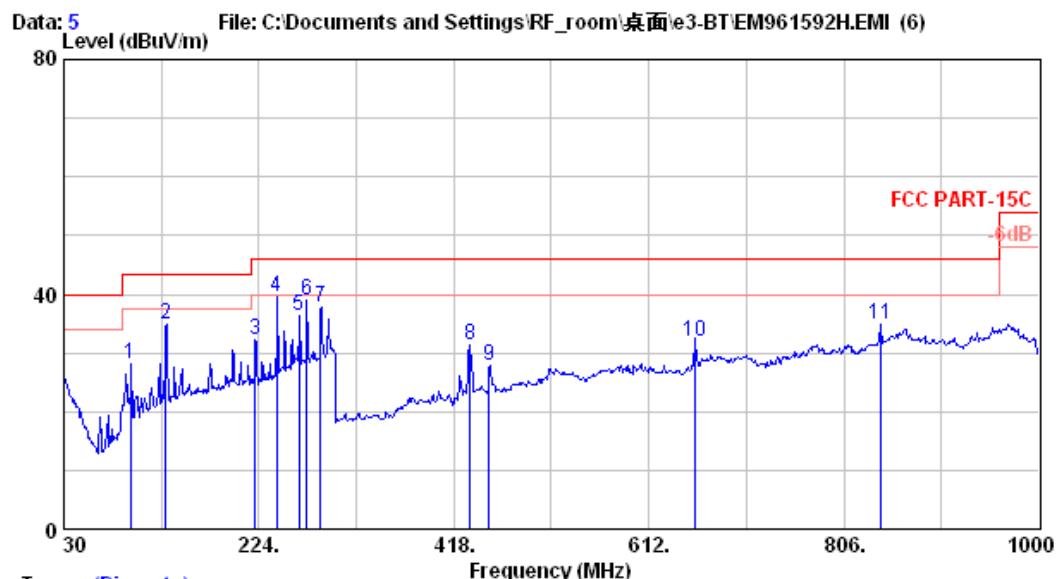
Site no. : A/C Chamber Data no. : 6
 Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : VERTICAL
 Limit : FCC PART-15C
 Env. / Ins. : ESCS30 28°C/63% Engineer : Henning_Chang
 EUT : GPS Security System M/N:G5
 Power Rating : DC 12V
 Test Mode : BT 2441MHz

Freq. (MHz)	Ant. Cable		Emission				Remark
	Factor (dB/m)	Loss (dB)	Reading (dB μ V)	Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	
1 124.230	19.32	2.30	33.74	29.21	43.50	14.29	
2 131.790	19.83	2.40	36.77	32.90	43.50	10.60	
3 197.940	22.02	3.00	29.83	29.05	43.50	14.45	
4 241.680	23.16	3.40	33.33	34.13	46.00	11.87	
5 249.240	23.74	3.50	30.33	31.83	46.00	14.17	
6 271.380	25.06	3.70	30.30	33.34	46.00	12.66	
7 433.700	17.33	5.20	31.81	27.67	46.00	18.33	
8 454.000	17.70	5.50	30.92	27.40	46.00	18.60	
9 519.800	19.99	6.90	29.99	30.00	46.00	16.00	
10 668.900	22.82	6.40	29.64	31.51	46.00	14.49	
11 848.100	25.43	7.10	28.92	34.30	46.00	11.70	

Remarks: 1. Emission Level = Antenna Factor + Cable Loss + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.



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Site no. : A/C Chamber Data no. : 5
 Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : HORIZONTAL
 Limit : FCC PART-15C
 Env. / Ins. : ESCS30 28°C/63% Engineer : Henning_Chang
 EUT : GPS Security System M/N:G5
 Power Rating : DC 12V
 Test Mode : BT 2480MHz

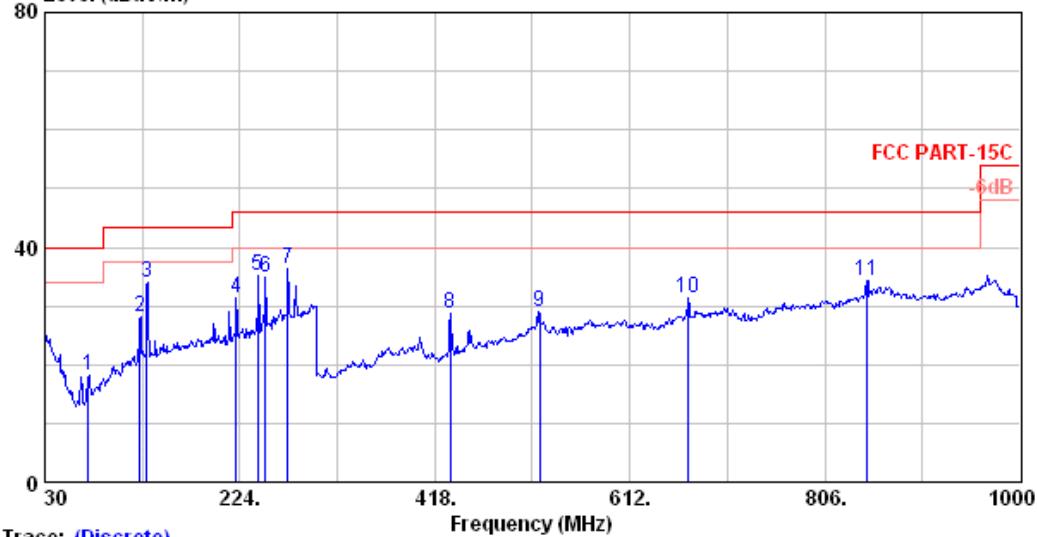
Freq. (MHz)	Ant. Cable		Emission			
	Factor (dB/m)	Loss (dB)	Reading (dB μ V)	Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)
1 96.690	16.75	2.05	35.65	28.15	43.50	15.35
2 131.790	19.83	2.40	38.72	34.85	43.50	8.65
3 220.080	21.91	3.30	32.81	32.24	46.00	13.76
4 241.680	23.16	3.40	38.81	39.62	46.00	6.38
5 264.090	24.60	3.67	33.76	36.30	46.00	9.70
6 271.380	25.06	3.70	35.94	38.98	46.00	7.02
7 285.690	25.56	3.80	34.10	37.75	46.00	8.25
8 434.400	17.36	5.24	35.47	31.39	46.00	14.61
9 453.300	17.67	5.40	31.45	27.80	46.00	18.20
10 657.700	22.17	6.40	30.71	31.96	46.00	14.04
11 841.800	25.11	7.10	29.92	34.96	46.00	11.04

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.



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 Level (dBuV/m)



Trace: (Discrete)

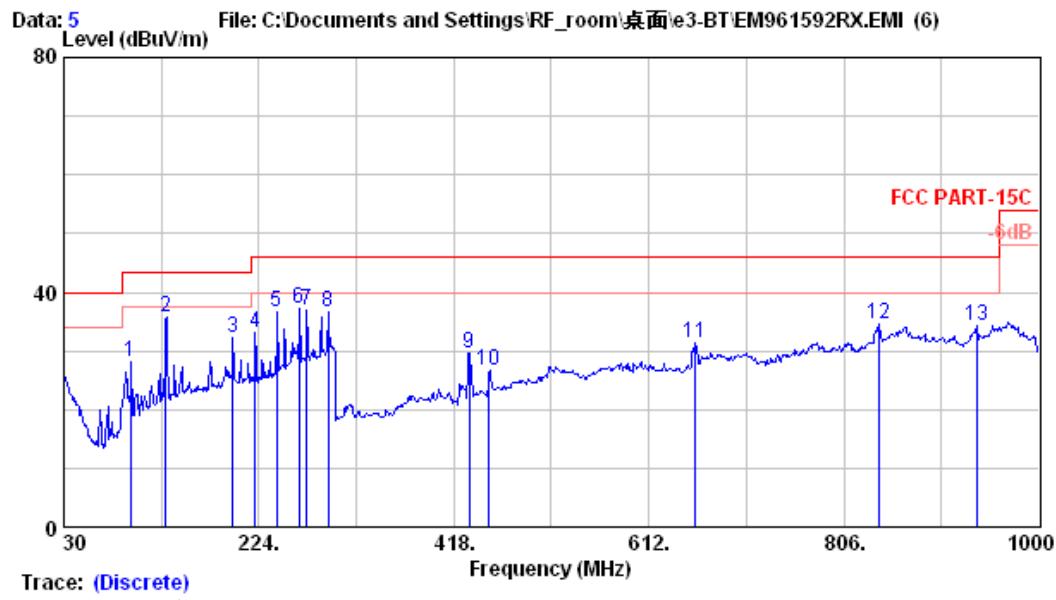
Site no. : A/C Chamber Data no. : 6
 Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : VERTICAL
 Limit : FCC PART-15C
 Env. / Ins. : ESCS30 28°C/63% Engineer : Henning_Chang
 EUT : GPS Security System M/N:G5
 Power Rating : DC 12V
 Test Mode : BT 2480MHz

Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Emission			
			Reading (dB μ V)	Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)
1 72.930	12.42	1.80	30.22	18.09	40.00	21.91
2 124.230	19.32	2.30	32.74	28.21	43.50	15.29
3 131.790	19.83	2.40	37.77	33.90	43.50	9.60
4 220.080	21.91	3.30	31.99	31.43	46.00	14.57
5 241.680	23.16	3.40	34.33	35.13	46.00	10.87
6 249.240	23.74	3.50	33.33	34.83	46.00	11.17
7 271.380	25.06	3.70	33.30	36.34	46.00	9.66
8 433.700	17.33	5.20	32.81	28.67	46.00	17.33
9 521.900	19.91	6.90	28.98	28.89	46.00	17.11
10 670.300	22.83	6.40	29.41	31.30	46.00	14.70
11 848.100	25.43	7.10	28.92	34.30	46.00	11.70

Remarks: 1. Emission Level = Antenna Factor + Cable Loss + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.



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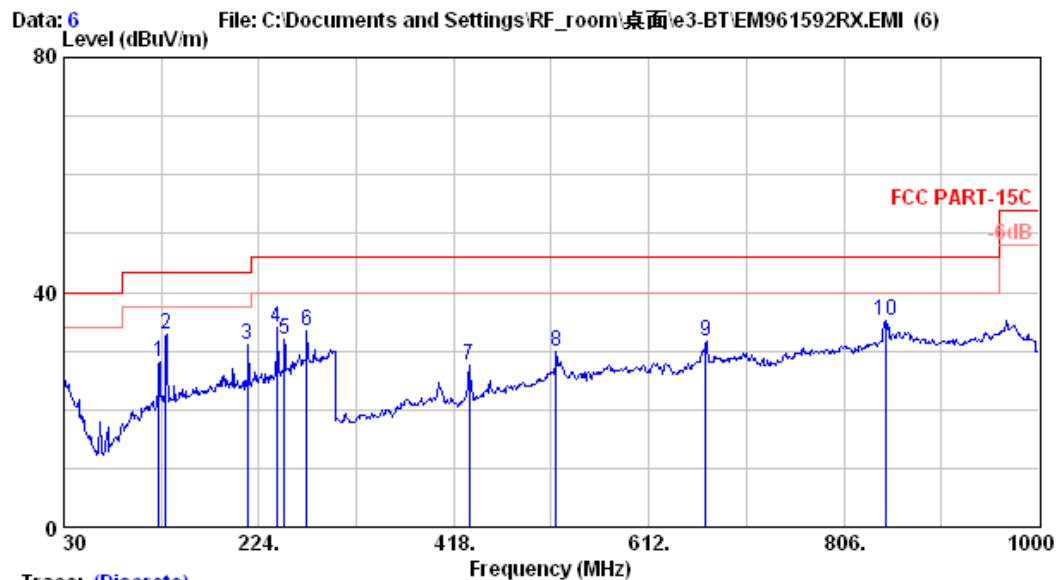
Site no. : A/C Chamber Data no. : 5
 Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : HORIZONTAL
 Limit : FCC PART-15C
 Env. / Ins. : ESCS30 24°C/39% Engineer : Henning_Chang
 EUT : GPS Security System M/N:G5
 Power Rating : DC 12V
 Test Mode : BT RX-2441MHz

Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Emission			
			Reading (dB μ V)	Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)
1 96.690	16.75	2.05	35.65	28.15	43.50	15.35
2 131.790	19.83	2.40	39.72	35.85	43.50	7.65
3 197.940	22.02	3.00	33.15	32.37	43.50	11.13
4 220.080	21.91	3.30	33.81	33.24	46.00	12.76
5 241.680	23.16	3.40	35.81	36.62	46.00	9.38
6 264.090	24.60	3.67	34.76	37.30	46.00	8.70
7 271.380	25.06	3.70	33.94	36.98	46.00	9.02
8 292.980	26.24	3.90	32.31	36.75	46.00	9.25
9 433.000	17.28	5.20	33.74	29.55	46.00	16.45
10 453.300	17.67	5.40	30.45	26.80	46.00	19.20
11 658.400	22.21	6.40	30.17	31.45	46.00	14.55
12 840.400	25.01	7.10	29.69	34.62	46.00	11.38
13 938.400	25.31	7.50	28.44	34.37	46.00	11.63

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.



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 Email:ttemc@ttemc.com



Site no. : A/C Chamber Data no. : 6
 Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : VERTICAL
 Limit : FCC PART-15C
 Env. / Ins. : ESC830 24*C/39% Engineer : Henning_Chang
 EUT : GPS Security System M/N:G5
 Power Rating : DC 12V
 Test Mode : BT RX-2441MHz

Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Emission			
			Reading (dB μ V)	Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)
1 124.230	19.32	2.30	32.74	28.21	43.50	15.29
2 131.790	19.83	2.40	36.77	32.90	43.50	10.60
3 212.790	21.75	3.13	31.84	30.93	43.50	12.57
4 241.680	23.16	3.40	33.33	34.13	46.00	11.87
5 249.240	23.74	3.50	30.33	31.83	46.00	14.17
6 271.380	25.06	3.70	30.30	33.34	46.00	12.66
7 433.700	17.33	5.20	31.81	27.67	46.00	18.33
8 519.800	19.99	6.90	29.99	30.00	46.00	16.00
9 668.900	22.82	6.40	29.64	31.51	46.00	14.49
10 847.400	25.43	7.10	29.91	35.29	46.00	10.71

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.

3.6.2. Above 1GHz Frequency Range Measurement Results

Date of Test : Dec. 20, 2007 Temperature : 28
 EUT : GPS Security System (Transmitter) Humidity : 63%
 Test Mode : Transmitting Mode, Frequency:
2402MHz (CH0) Test Voltage : DC 12V

	Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dB μ V	Meter Reading Horizontal dB μ V/m	Emission Level Horizontal dB μ V/m	Limits dB	Margin
Peak	1325.920	25.34	4.91	7.09	37.34	74.00	36.66
	1456.960	25.35	5.31	13.65	44.31	74.00	29.69
	1734.160	26.60	7.07	6.50	40.17	74.00	33.83
	1994.560	27.78	5.91	5.61	39.30	74.00	34.70
Average	1325.920	25.34	4.91	2.20	32.45	54.00	21.55
	1456.960	25.39	5.31	5.93	36.63	54.00	17.37
	1734.160	26.60	7.07	-0.15	33.52	54.00	20.48
	1994.560	27.78	5.91	-1.52	32.17	54.00	21.83

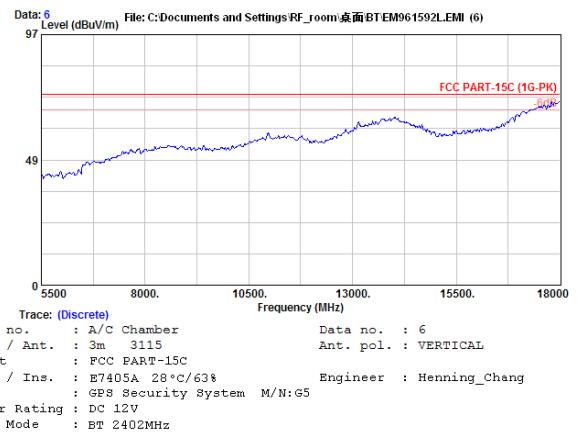
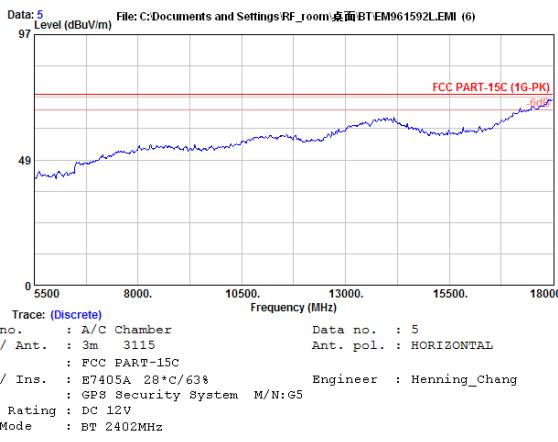
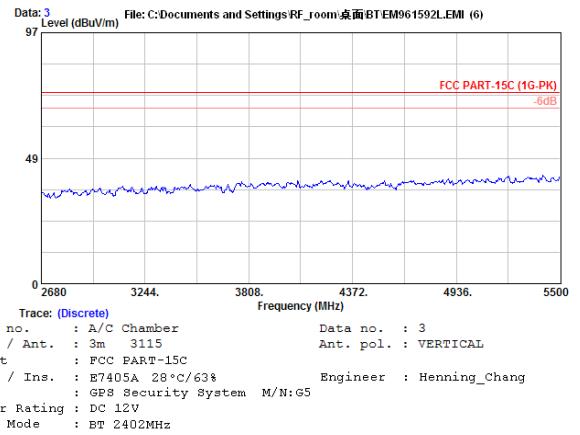
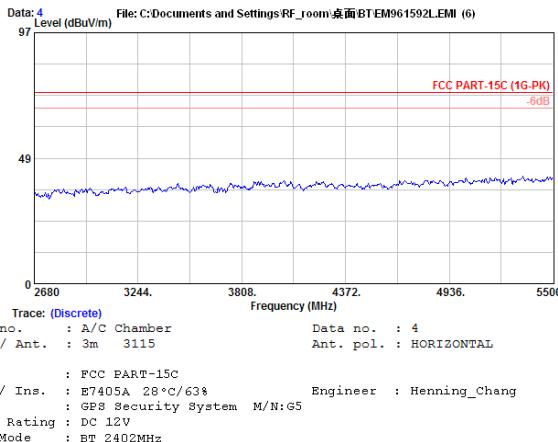
	Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dB μ V	Meter Reading Vertical dB μ V/m	Emission Level Vertical dB μ V/m	Limits dB	Margin
Peak	1191.520	25.29	4.56	11.89	41.74	74.00	32.26
	1465.360	25.39	5.33	9.84	40.56	74.00	33.44
	1720.720	26.55	6.96	4.48	37.99	74.00	36.01
Average	1191.520	25.29	4.56	6.89	36.74	54.00	17.26
	1465.360	25.39	5.33	2.44	33.16	54.00	20.84
	1720.720	26.55	6.96	-1.47	32.04	54.00	21.96

Remark : 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.
 2. Measurement was up to 25GHz, but the emissions level were too low against the official limit and not report.

Date of Test : Dec. 20, 2007 Temperature : 28

EUT : GPS Security System (Transmitter) Humidity : 63%

Test Mode : Transmitting Mode, Frequency: 2402MHz (CH0) Test Voltage : DC 12V



Remark : Measurement was up to 25GHz, but the emissions level were too low against the official limit and not report.

Date of Test : Dec. 20, 2007 Temperature : 28

EUT : GPS Security System (Transmitter) Humidity : 63%

Test Mode : Transmitting Mode, Frequency:
2441MHz (CH39) Test Voltage : DC 12V

	Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dB μ V	Meter Reading Horizontal dB μ V/m	Emission Level Horizontal dB μ V/m	Limits dB	Margin
Peak	1456.960	25.39	5.31	11.60	42.30	74.00	31.70
	1729.120	26.58	7.04	7.56	41.18	74.00	32.82
	1986.160	27.73	5.95	8.98	42.66	74.00	31.34
Average	1456.960	25.39	5.31	6.04	36.74	54.00	17.26
	1729.120	26.58	7.04	2.18	35.80	54.00	18.20
	1986.160	27.73	5.95	4.36	38.04	54.00	15.96

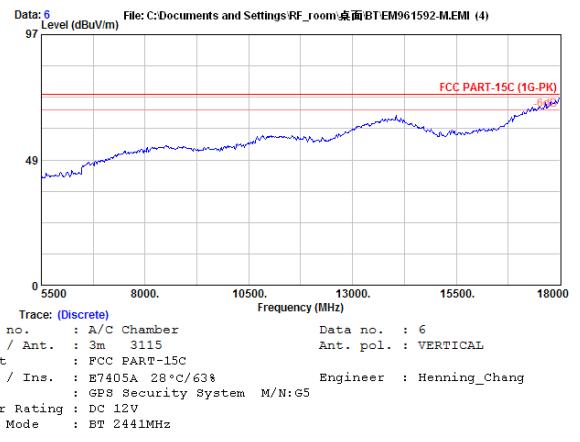
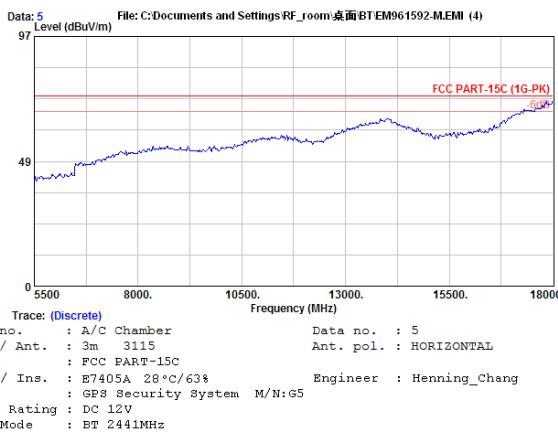
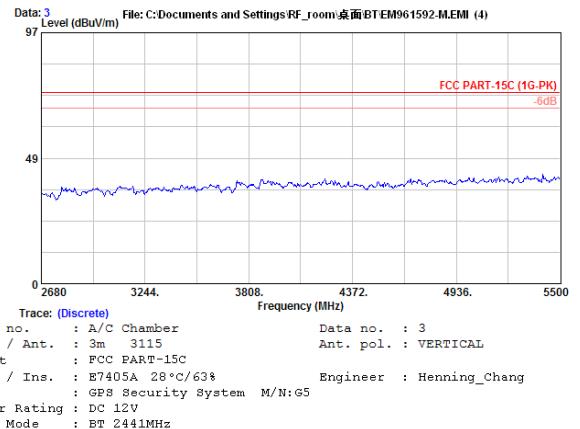
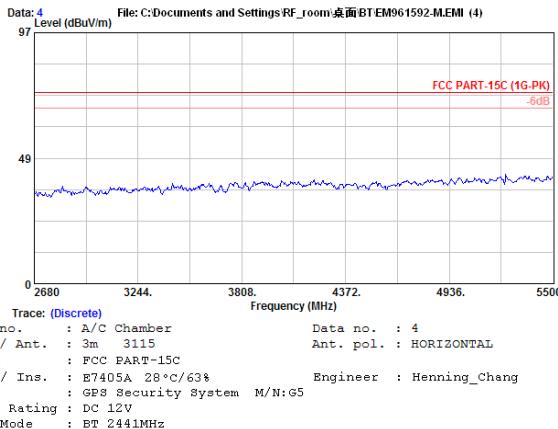
	Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dB μ V	Meter Reading Vertical dB μ V/m	Emission Level Vertical dB μ V/m	Limits dB	Margin
Peak	1191.520	25.29	4.56	7.08	36.93	74.00	37.07
	1460.320	25.39	5.31	9.46	40.16	74.00	33.84
	1591.360	25.90	6.09	5.14	37.13	74.00	36.87
	1729.120	26.58	7.04	5.00	38.62	74.00	35.38
Average	1191.520	25.29	4.56	0.82	30.67	54.00	23.33
	1460.320	25.39	5.31	3.98	34.68	54.00	19.32
	1591.360	25.90	6.09	0.30	32.29	54.00	21.71
	1729.120	26.58	7.04	-0.24	33.38	54.00	20.62

Remark : 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.
2. Measurement was up to 25GHz, but the emissions level were too low against the official limit and not report.

Date of Test : Dec. 20, 2007 Temperature : 28

EUT : GPS Security System (Transmitter) Humidity : 63%

Test Mode : Transmitting Mode, Frequency: 2441MHz (CH39) Test Voltage : DC 12V



Remark : Measurement was up to 25GHz, but the emissions level were too low against the official limit and not report.

Date of Test : Dec. 20, 2007 Temperature : 28

EUT : GPS Security System (Transmitter) Humidity : 63%

Test Mode : Transmitting Mode, Frequency:
2480MHz (CH78) Test Voltage : DC 12V

	Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dB μ V	Meter Reading Horizontal dB μ V/m	Emission Level Horizontal dB μ V/m	Limits dB	Margin
Peak	1465.360	25.39	5.33	10.43	41.15	74.00	32.85
	1729.120	26.58	7.04	6.03	39.65	74.00	34.35
	1989.520	27.75	5.91	5.29	38.95	74.00	35.05
Average	1465.360	25.39	5.33	6.90	37.62	54.00	16.38
	1729.120	26.58	7.04	-0.02	33.60	54.00	20.40
	1989.520	27.75	5.91	-0.99	32.67	54.00	21.33

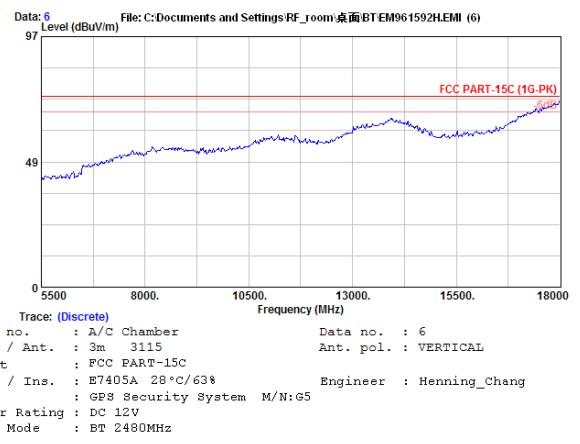
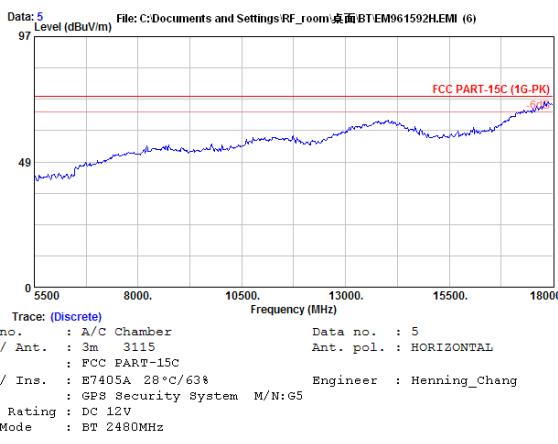
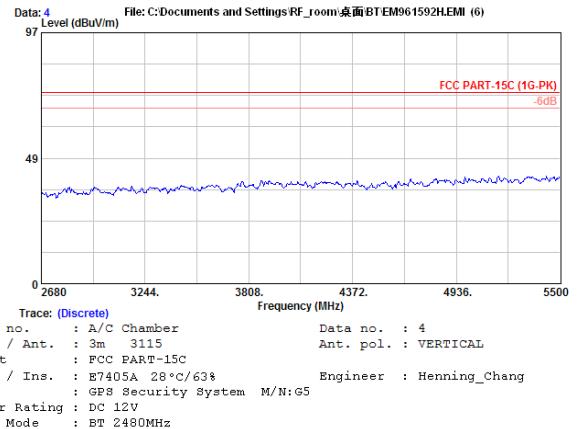
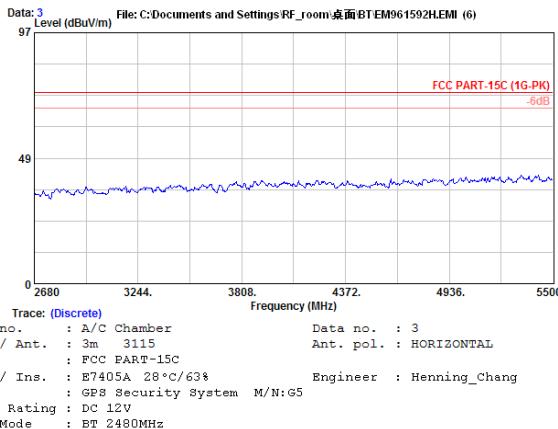
	Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dB μ V	Meter Reading Vertical dB μ V/m	Emission Level Vertical dB μ V/m	Limits dB	Margin
Peak	1196.560	25.29	4.58	8.57	38.44	74.00	35.56
	1460.320	25.39	5.31	8.53	39.23	74.00	34.77
	1729.120	26.58	7.04	4.52	38.14	74.00	35.86
Average	1196.560	25.29	4.58	4.63	34.50	54.00	19.50
	1460.320	25.35	5.31	3.19	33.85	54.00	20.15
	1729.120	26.58	7.04	-1.03	32.59	54.00	21.41

Remark : 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.
2. Measurement was up to 25GHz, but the emissions level were too low against the official limit and not report.

Date of Test : Dec. 20, 2007 Temperature : 28

EUT : GPS Security System (Transmitter) Humidity : 63%

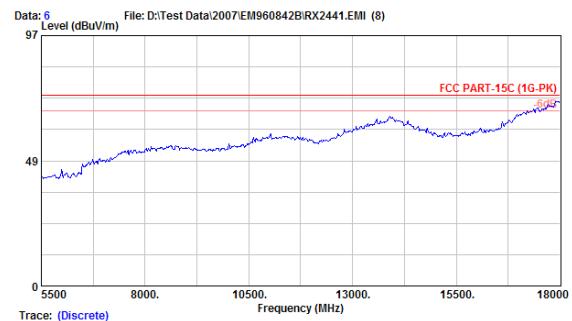
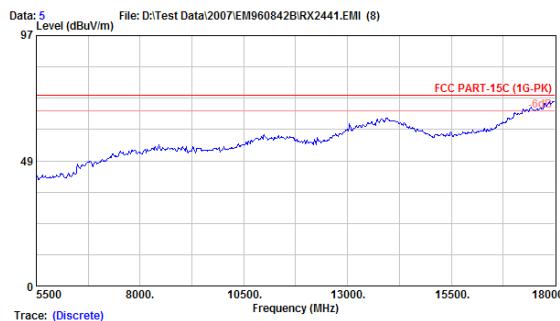
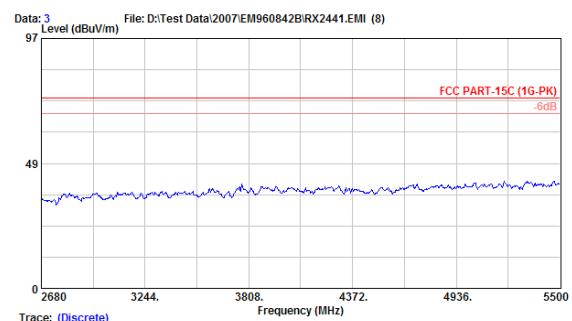
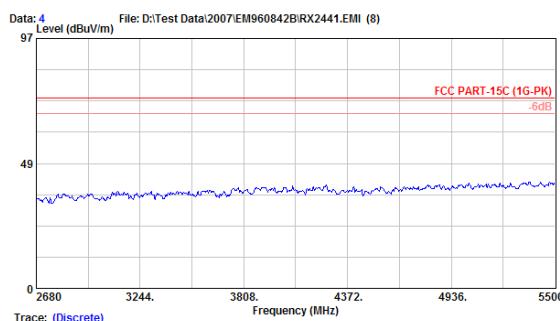
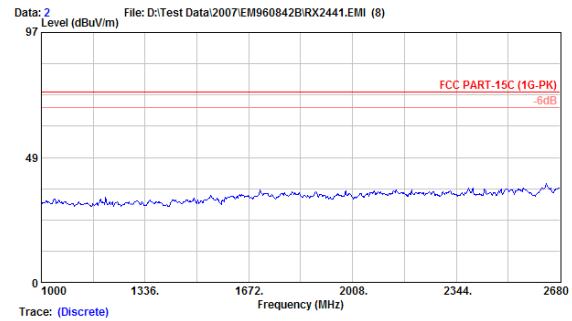
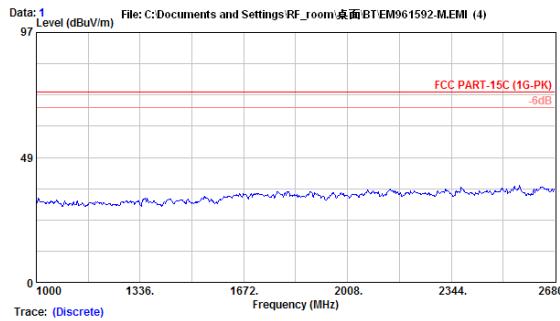
Test Mode : Transmitting Mode, Frequency: 2480MHz (CH78) Test Voltage : DC 12V



Remark : Measurement was up to 25GHz, but the emissions level were too low against the official limit and not report.

Date of Test : Dec. 20, 2007 Temperature : 28

EUT : GPS Security System (Transmitter) Humidity : 63%

Test Mode : Receiving Mode, Frequency: 2441MHz Test Voltage : DC 12V
(CH39)

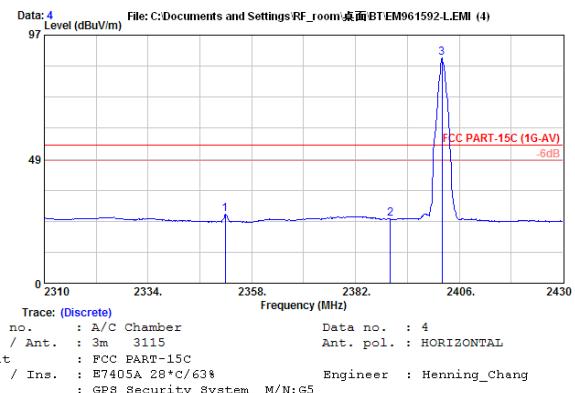
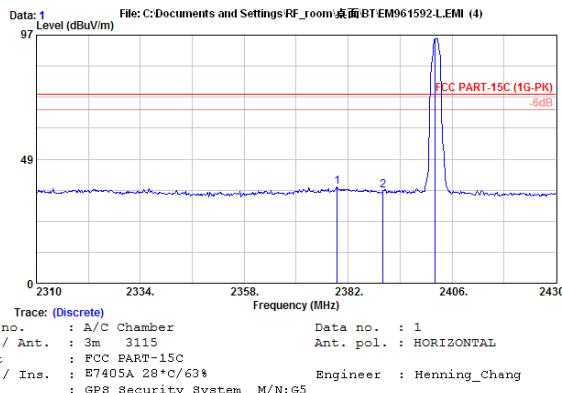
Remark : Measurement was up to 25GHz, but the emissions level were too low against the official limit and not report.

3.6.3. Restricted Bands Measurement Results

Date of Test : Dec. 20, 2007 Temperature : 28
 EUT : GPS Security System (Transmitter) Humidity : 63%
 Test Mode : Transmitting Mode, Frequency: 2402MHz (CH0) Test Voltage : DC 12V

	Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dB μ V	Meter Reading Horizontal dB μ V/m	Emission Level Horizontal dB μ V/m	Limits dB	Margin dB
Peak *	2379.480	28.58	6.32	2.89	37.79	74.00	36.21
Average *	2351.880	28.53	6.29	-7.83	26.99	54.00	27.01

Remark : 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.
 2. Low frequency section (spurious in the restricted band 2310-2390MHz).
 3. '*' The field strength of emission appearing within Part 15.205(a) shall not exceed the limits shown in section 15.209.



Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Emission Reading (dB μ V)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Remark
1 2379.480	28.58	6.32	2.89	37.79	74.00	36.21	Peak
2 2390.040	28.59	6.34	1.34	36.28	74.00	37.72	Peak
3 2402.040	28.62	6.36	60.69	95.66	74.00	-21.66	Peak

Remarks: 1. Emission Level = Antenna Factor + Cable Loss + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.

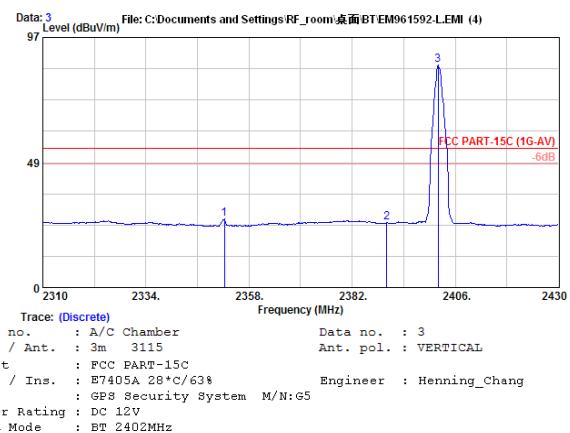
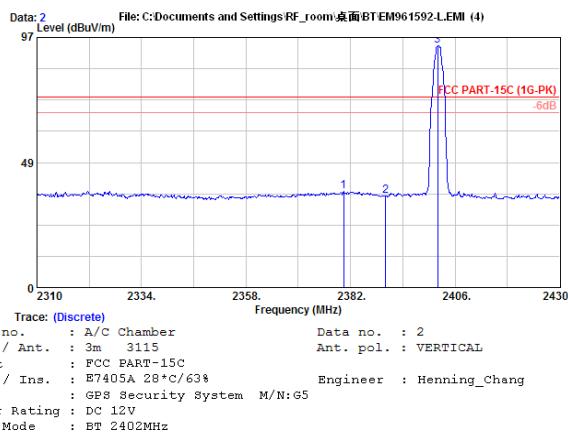
Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Emission Reading (dB μ V)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Remark
1 2351.880	28.53	6.29	-7.83	26.99	54.00	27.01	Average
2 2390.040	28.59	6.34	-9.88	25.06	54.00	28.94	Average
3 2402.040	28.62	6.36	53.07	88.04	54.00	-34.04	Average @

Remarks: 1. Emission Level = Antenna Factor + Cable Loss + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.

Date of Test : Dec. 20, 2007 Temperature : 28
 EUT : GPS Security System (Transmitter) Humidity : 63%
 Test Mode : Transmitting Mode, Frequency: 2402MHz (CH0) Test Voltage : DC 12V

	Emission Frequency	Antenna Factor	Cable Loss	Meter Reading	Emission Level	Limits	Margin
	MHz	dB/m	dB μ V	Vertical dB μ V/m	Vertical dB μ V/m	dB	
Peak *	2380.440	28.58	6.33	2.52	37.43	74.00	36.57
Average *	2352.240	28.53	6.29	-8.20	26.62	54.00	27.38

Remark : 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.
 2. Low frequency section (spurious in the restricted band 2310-2390MHz).
 3. '*' The field strength of emission appearing within Part 15.205(a) shall not exceed the limits shown in section 15.209.



Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB μ V)	Emission Reading (dB μ V/m)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Remark
1 2380.440	28.58	6.33	2.52	37.43	74.00	36.57	Peak
2 2390.040	28.59	6.34	0.50	35.44	74.00	38.56	Peak
3 2402.040	28.62	6.38	58.69	93.66	74.00	-19.66	Peak X

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.

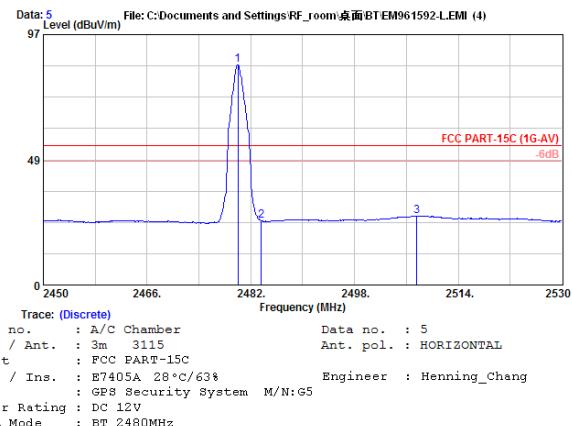
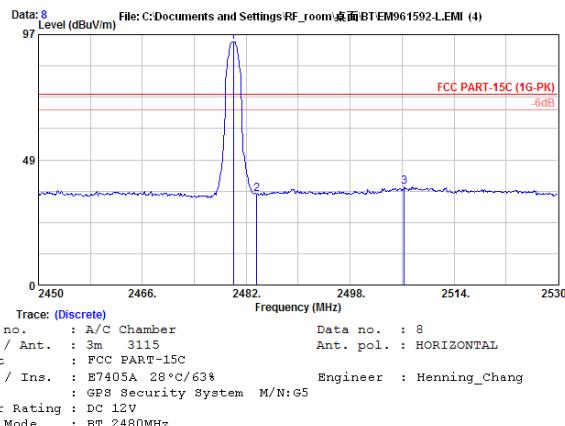
Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB μ V)	Emission Reading (dB μ V/m)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Remark
1 2352.240	28.53	6.29	-8.20	26.62	54.00	27.38	Average
2 2390.040	28.59	6.34	-9.85	25.09	54.00	28.91	Average
3 2402.040	28.62	6.38	51.52	86.49	54.00	-32.49	Average 0

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.

Date of Test : Dec. 20, 2007 Temperature : 28
 EUT : GPS Security System (Transmitter) Humidity : 63%
 Test Mode : Transmitting Mode, Frequency: 2480MHz (CH78) Test Voltage : DC 12V

	Emission Frequency	Antenna Factor	Cable Loss	Meter Reading	Emission Level	Limits	Margin
	MHz	dB/m	dB μ V	dB μ V/m	dB μ V/m	dB	dB
Peak *	2483.500	28.77	6.45	0.08	35.30	74.00	38.70
Average *	2483.500	28.77	6.45	-10.28	24.94	54.00	29.06

Remark : 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.
 2. Low frequency section (spurious in the restricted band 2483.5-2500MHz).
 3. '*' The field strength of emission appearing within Part 15.205(a) shall not exceed the limits shown in section 15.209.



	Ant.	Cable	Emission				
Freq.	Factor	Loss	Reading	Level	Limits	Margin	Remark
(MHz)	(dB/m)	(dB)	(dB μ V)	(dB μ V/m)	(dB μ V/m)	(dB)	
1	2480.000	28.76	6.44	99.13	94.22	74.00	-20.22 Peak 0
2	2483.500	28.77	6.45	40.19	35.30	74.00	38.70 Peak
3	2506.320	28.83	6.48	42.76	37.96	74.00	36.04 Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.

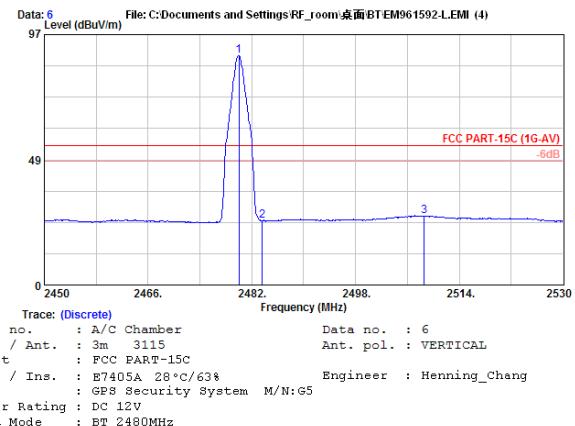
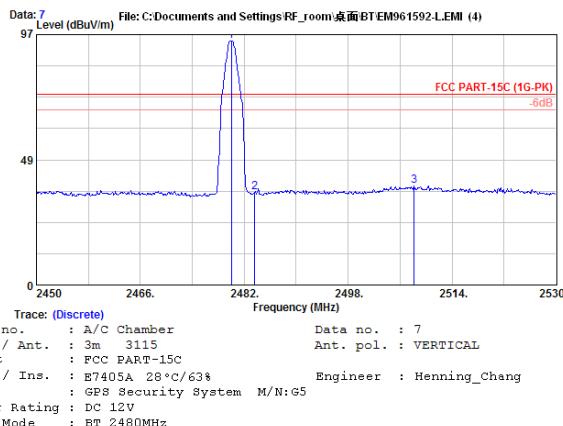
	Ant.	Cable	Emission				
Freq.	Factor	Loss	Reading	Level	Limits	Margin	Remark
(MHz)	(dB/m)	(dB)	(dB μ V)	(dB μ V/m)	(dB μ V/m)	(dB)	
1	2480.000	28.76	6.44	50.02	85.23	54.00	-31.23 Average @
2	2483.500	28.77	6.45	-10.28	24.94	54.00	29.06 Average
3	2507.600	28.83	6.48	-8.78	26.53	54.00	27.47 Average

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.

Date of Test : Dec. 20, 2007 Temperature : 28
 EUT : GPS Security System (Transmitter) Humidity : 63%
 Test Mode : Transmitting Mode, Frequency: 2480MHz (CH78) Test Voltage : DC 12V

	Emission Frequency	Antenna Factor	Cable Loss	Meter Reading	Emission Level	Limits	Margin
	MHz	dB/m	dB μ V	Vertical dB μ V/m	Vertical dB μ V/m	dB	
Peak *	2483.500	28.77	6.45	0.83	36.05	74.00	37.95
Average *	2483.500	28.77	6.45	-10.50	24.72	54.00	29.28

Remark : 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.
 2. Low frequency section (spurious in the restricted band 2483.5-2500MHz).
 3. '*' The field strength of emission appearing within Part 15.205(a) shall not exceed the limits shown in section 15.209.



Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Emission Reading (dB μ V)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Remark
1 2480.000	28.76	6.44	59.40	94.60	74.00	-20.60	Peak @
2 2483.500	28.77	6.45	0.83	36.05	74.00	37.95	Peak
3 2508.160	28.83	6.48	2.94	38.26	74.00	35.74	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.

Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Emission Reading (dB μ V)	Emission Level (dB μ V/m)	Limits (dB μ V/m)	Margin (dB)	Remark
1 2480.000	28.76	6.44	53.58	88.78	54.00	-34.78	Average @
2 2483.500	28.77	6.45	-10.50	24.72	54.00	29.28	Average
3 2508.560	28.83	6.48	-8.53	26.79	54.00	27.21	Average

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.

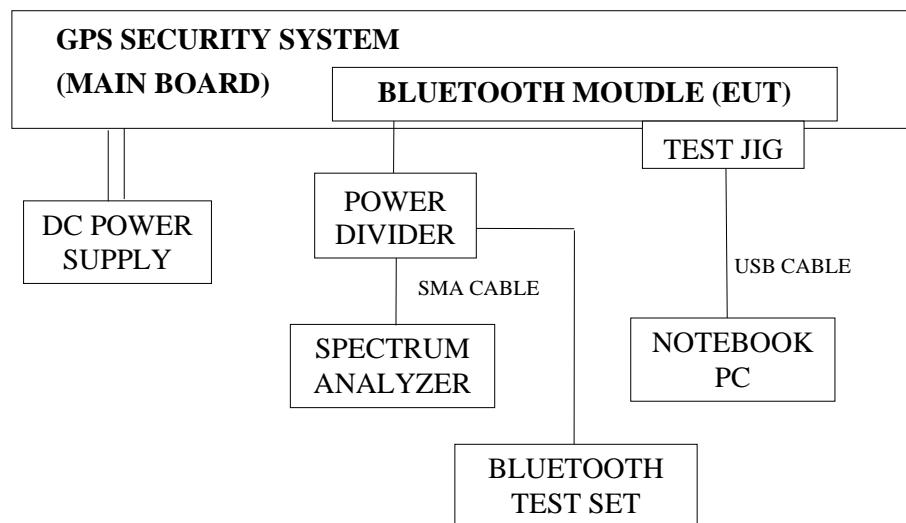
4. 20dB BANDWIDTH MEASUREMENT

4.1. Test Equipment

The following test equipment was used during the 20dB bandwidth measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	E4446A	US44300366	Aug. 13, 07'	Aug. 12, 08'
2.	Bluetooth Test Set	Anritsu	MT8852B	6K00005697	Nov. 27, 07'	Nov. 26, 08'
3.	Power Divider	Anritsu	K240C	019728	May 15, 07'	May 14, 08'

4.2. Block Diagram of Test Setup



4.3. Specification Limits (§15.247(a)(1))

Alternatively, frequency hopping systems operating in the 2400-2483.5MHz band may have hopping channel carrier frequencies that are separated by 25kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater.

4.4. Operating Condition of EUT

- 4.4.1. Setup the EUT and simulator as shown on 4.2.
- 4.4.2. Turn on the power of all equipment.
- 4.4.3. Setup the software program “Silicon Wave WDS Tools” to drive the EUT and through both of the BT Test Jig and Bluetooth Test Set to control the Bluetooth Module. The EUT was on the continuous transmitting condition during the test.
- 4.4.4. Setup the Low-Mid-Hi of the channels through Bluetooth Test Set.

4.5. Test Procedure

The transmitter output was connected to the spectrum analyzer. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100kHz RBW and 100kHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

The measurement guideline was according to FCC Public Notice DA 00-705.

4.6. Test Results

PASSED. All the test results are attached in next pages.

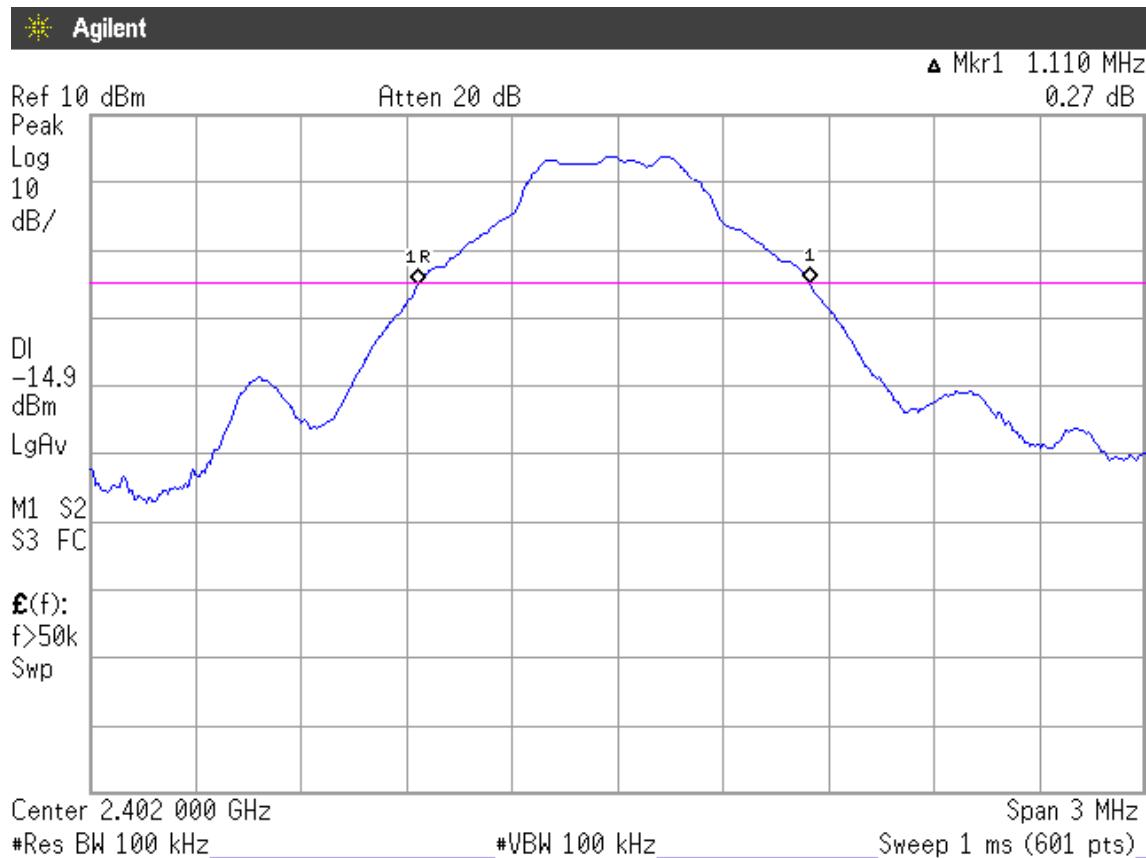
Test Date : Dec. 18, 2007 Temperature : 28 Humidity : 36%

Test Voltage: DC 12V

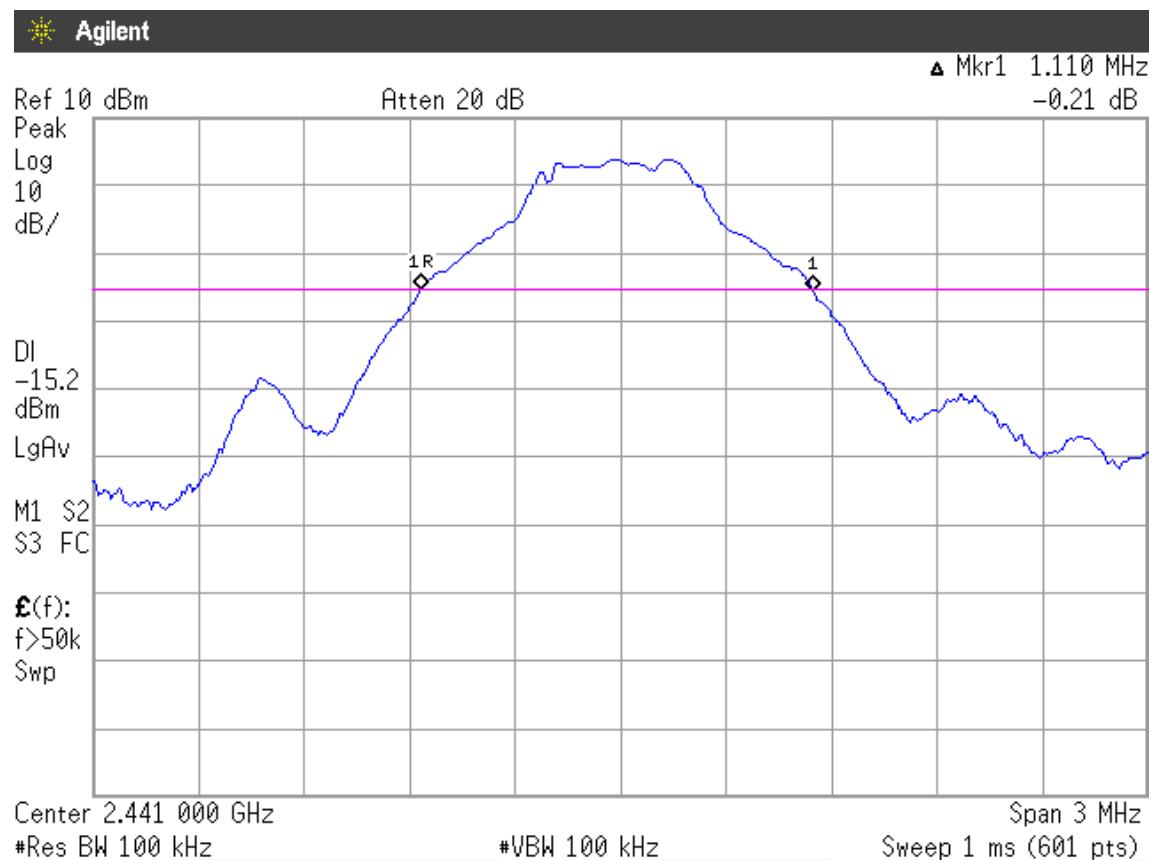
No.	Channel	Test Frequency	20dB Bandwidth	2/3 (20dB Bandwidth)
1.	0	2402MHz	1.110MHz	0.740MHz
2.	39	2441MHz	1.110MHz	0.740MHz
3.	78	2480MHz	1.115MHz	0.743MHz

The maximum two-thirds of the 20dB bandwidth shall be at maximum 0.740MHz.

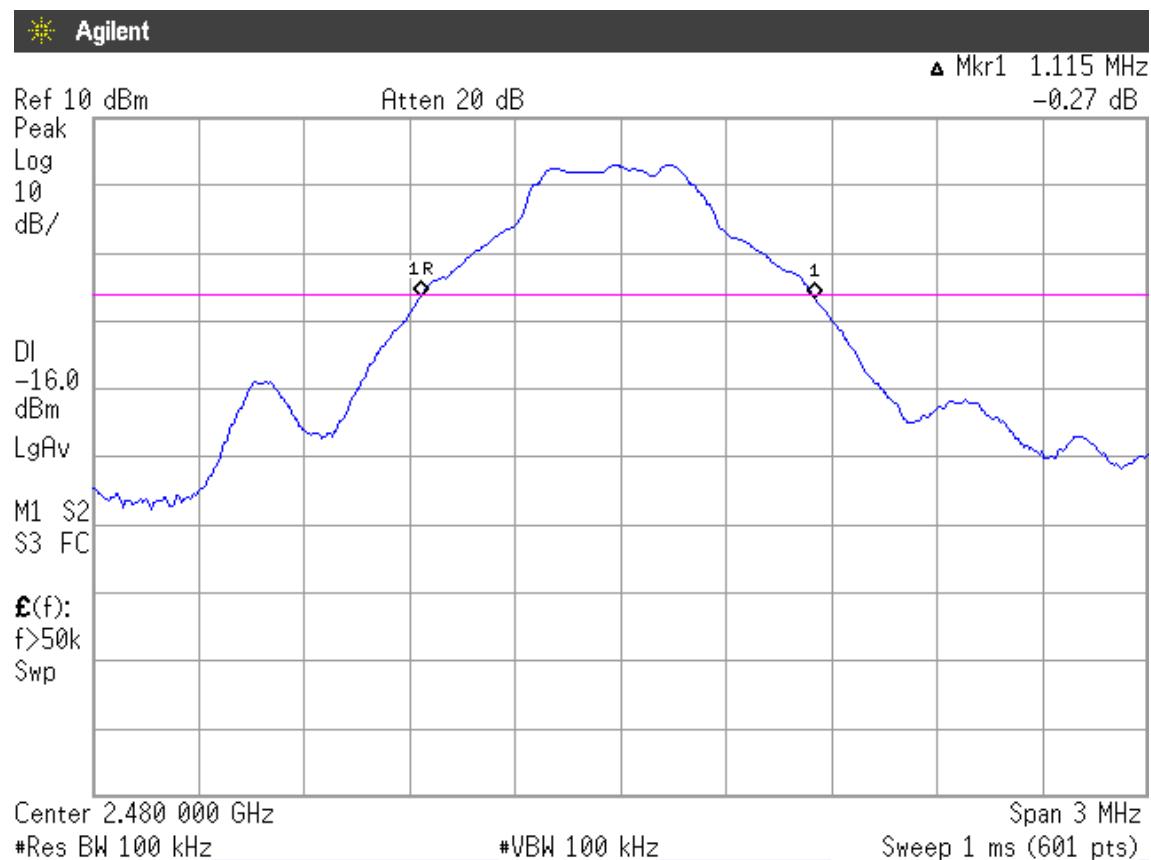
4.6.1. Channel 0, Frequency: 2402MHz



4.6.2. Channel 39, Frequency: 2441MHz



4.6.3. Channel 78, Frequency: 2480MHz



5. CARRIER FREQUENCY SEPARATION MEASUREMENT

5.1. Test Equipment

The following test equipment was used during the carrier frequency separation measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	E4446A	US44300366	Aug. 13, 07'	Aug. 12, 08'
2.	Bluetooth Test Set	Anritsu	MT8852B	6K00005697	Nov. 27, 07'	Nov. 26, 08'
3.	Power Divider	Anritsu	K240C	019728	May 15, 07'	May 14, 08'

5.2. Block Diagram of Test Setup

The same as section 4.2.

5.3. Specification Limits (§15.247(a)(1))

Alternatively, frequency hopping systems operating in the 2400-2483.5MHz band may have hopping channel carrier frequencies that are separated by 25kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater.

5.4. Operating Condition of EUT

Same as carrier frequency separation measurement which was listed in section 4.4.

5.5. Test Procedure

The transmitter output was connected to the spectrum analyzer. The channel separation was measured by spectrum analyzer with 100kHz RBW and 100kHz VBW. The video bandwidth not to be smaller than resolution bandwidth, the peak was marked on adjacent bandwidth, the between of peak is carrier frequency separation. The measurement guideline was according to FCC Public Notice DA 00-705.

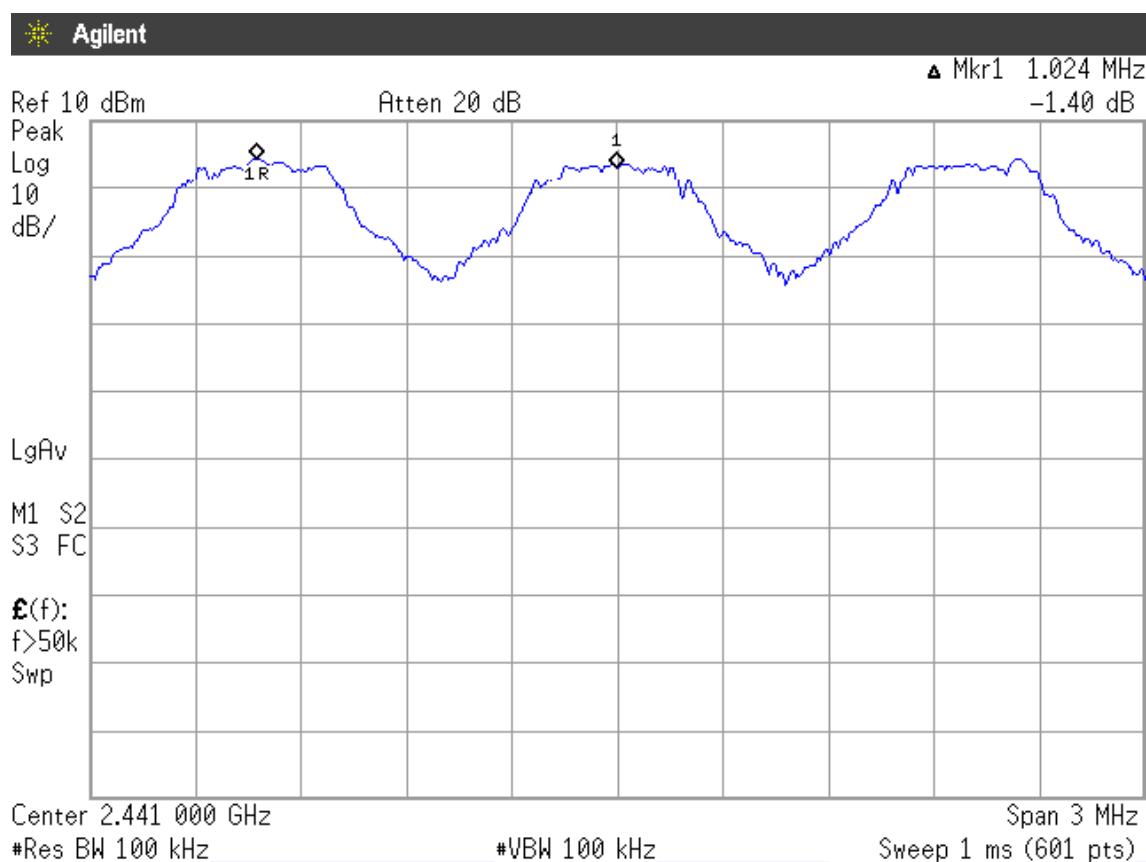
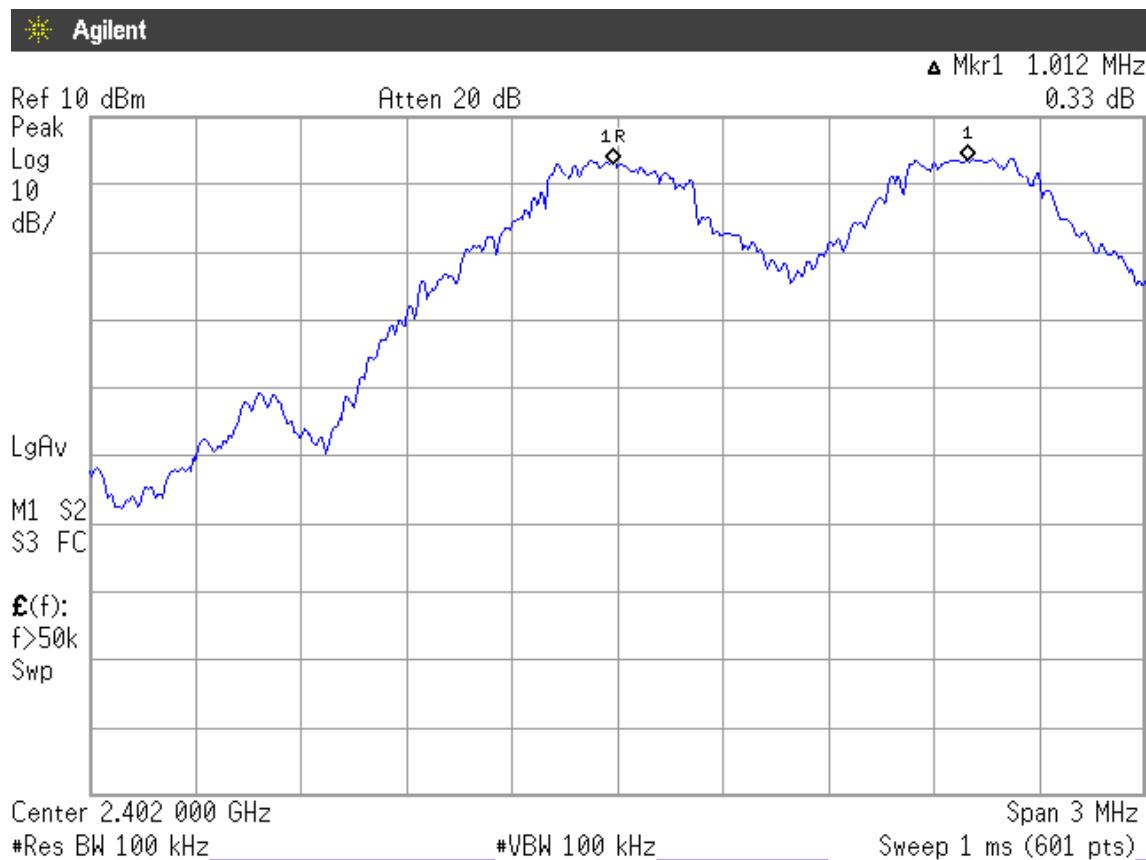
5.6. Test Results

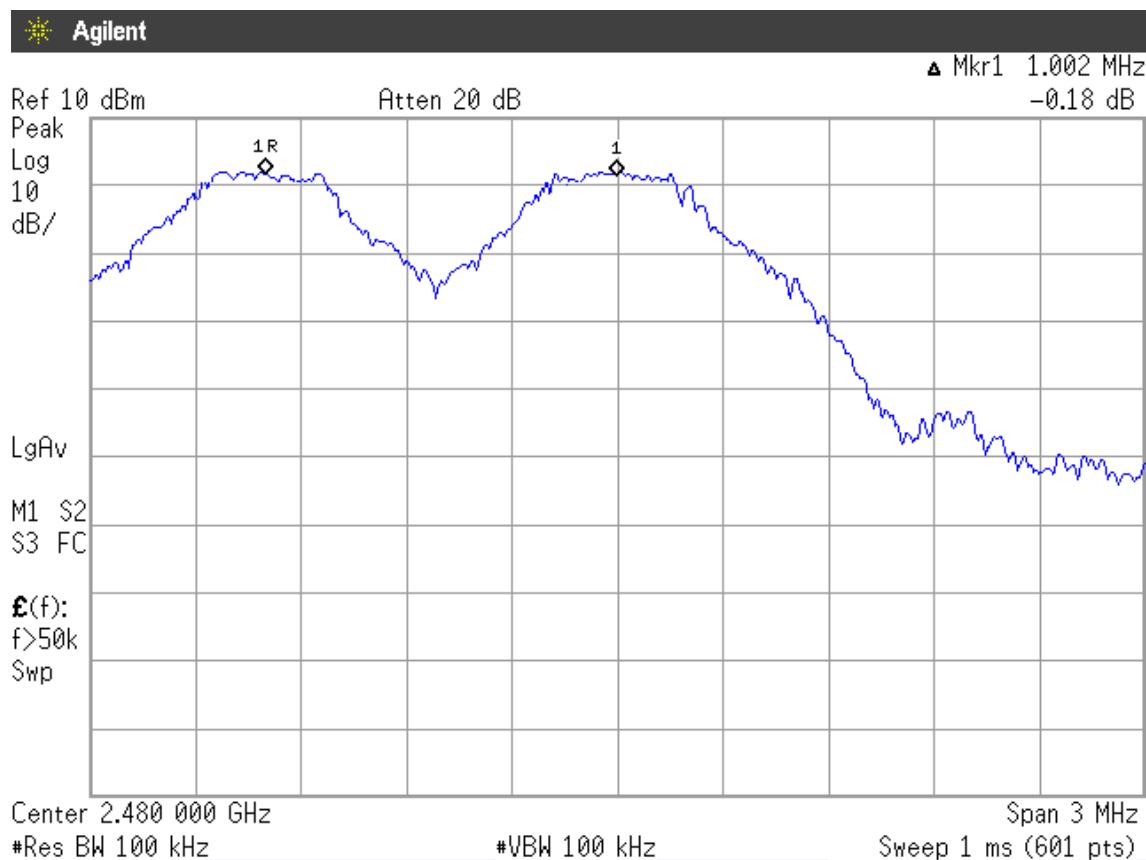
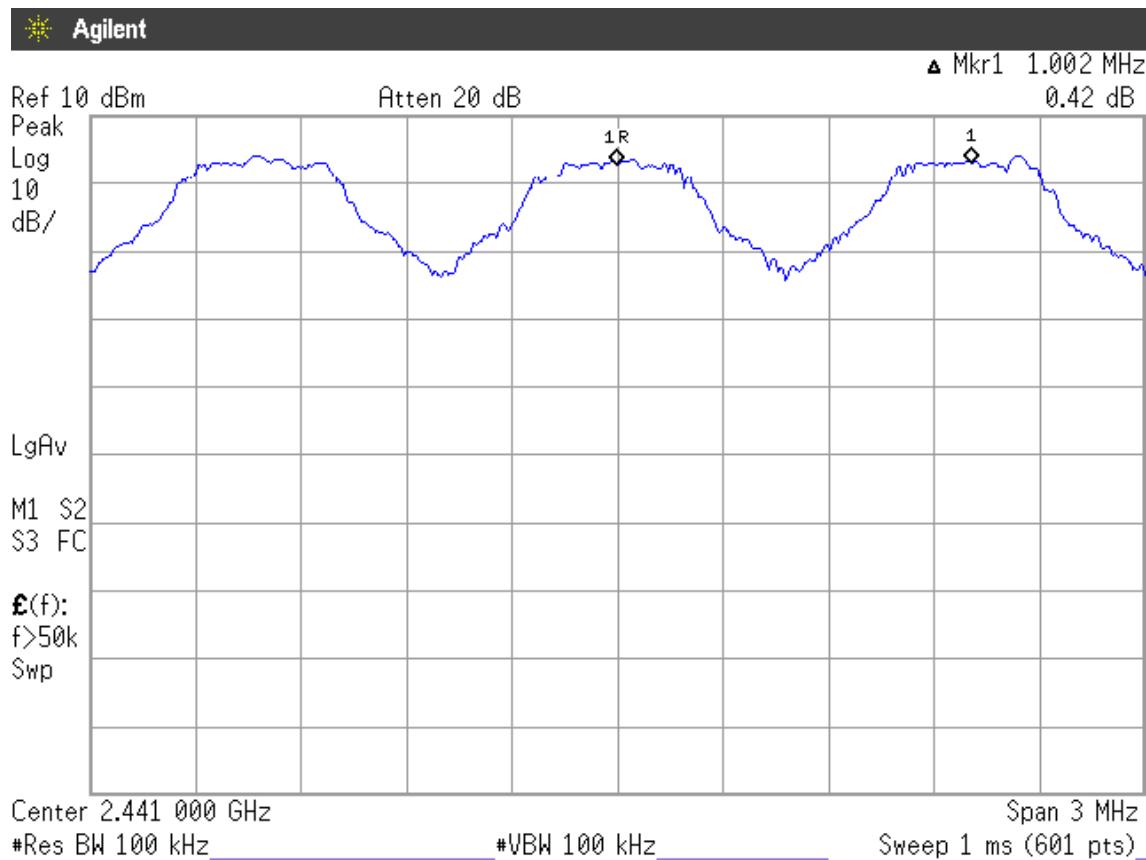
PASSED. All the test results are attached in next pages.

Test Date : Dec. 18, 2007 Temperature : 28 Humidity : 36%
Test Voltage: DC 12V

The minimum adjacent channel carrier frequency separation: 2.00MHz.

[Above values have met the requirement as specified in section 4.3: 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.]





6. TIME OF OCCUPANCY MEASUREMENT

6.1. Test Equipment

The following test equipment was used during the time of occupancy measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	E4446A	US44300366	Aug. 13, 07'	Aug. 12, 08'
2.	Bluetooth Test Set	Anritsu	MT8852B	6K00005697	Nov. 27, 07'	Nov. 26, 08'
3.	Power Divider	Anritsu	K240C	019728	May 15, 07'	May 14, 08'

6.2. Block Diagram of Test Setup

The same as section 4.2.

6.3. Specification Limits (§15.247(a)(1)(iii))

Frequency hopping systems in the 2400-2483.5MHz shall use at least 15 non-overlapping 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 number of hopping channels employed.

6.4. Operating Condition of EUT

Same as carrier frequency separation measurement which was listed in section 4.4.

6.5. Test Procedure

The transmitter output was connected to the spectrum analyzer. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 1MHz RBW and 1MHz VBW. $VBW \geq RBW$; Span=zero span.

Centered on a hopping channel sweep=as necessary to capture the entire dwell time per hopping channel; Detector function=peak; Trace=Max hold

The measurement guideline was according to FCC Public Notice DA 00-705.

6.6. Test Results

PASSED. All the test results are attached in next pages.

Test Date : Dec. 18, 2007 Temperature : 28 Humidity : 36%
Test Voltage: DC 12V

6.6.1. Test Frequency: 2402MHz (CH0)

Duty cycle: 79 channels*0.4 seconds = 31.6 seconds

DH1 : A The system makes worst case 1600 hops per second or 1 time slot has a length of 625us with 79 channels. A DH1 packet need 1 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 800 hops per second with 79 channels. So you have each channel 10.13 time per second and so for 31.6 seconds you have 320 time of appearance.

Each Tx-time per appearance is 400us.

$$10.13 \text{ time} * 31.6 \text{ seconds} * 0.4\text{ms} = 128.0432\text{ms} (<400\text{ms})$$

B. For each 5 seconds of 51 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

$$51 \text{ channels} * 31.6 \text{ seconds} / 5 * 0.4\text{ms} = 128.928\text{ms} (<400\text{ms})$$

DH3 : A The system makes worst case 1600 hops per second or 1 time slot has a length of 625us with 79 channels. A DH3 packet need 3 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 400 hops per second with 79 channels. So you have each channel 5.1 time per second and so for 31.6 seconds you have 161 time of appearance.

Each Tx-time per appearance is 1.658ms.

$$5.1 \text{ time} * 31.6 \text{ seconds} * 1.658\text{ms} = 267.2033\text{ms} (<400\text{ms})$$

B. For each 5 seconds of 25 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

$$25 \text{ channels} * 31.6 \text{ seconds} / 5 * 1.658\text{ms} = 261.964\text{ms} (<400\text{ms})$$

DH5 : A The system makes worst case 1600 hops per second or 1 time slot has a length of 625us with 79 channels. A DH5 packet need 5 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 266.7 hops per second with 79 channels. So you have each channel 3.37 time per second and so for 31.6 seconds you have 106 time of appearance.

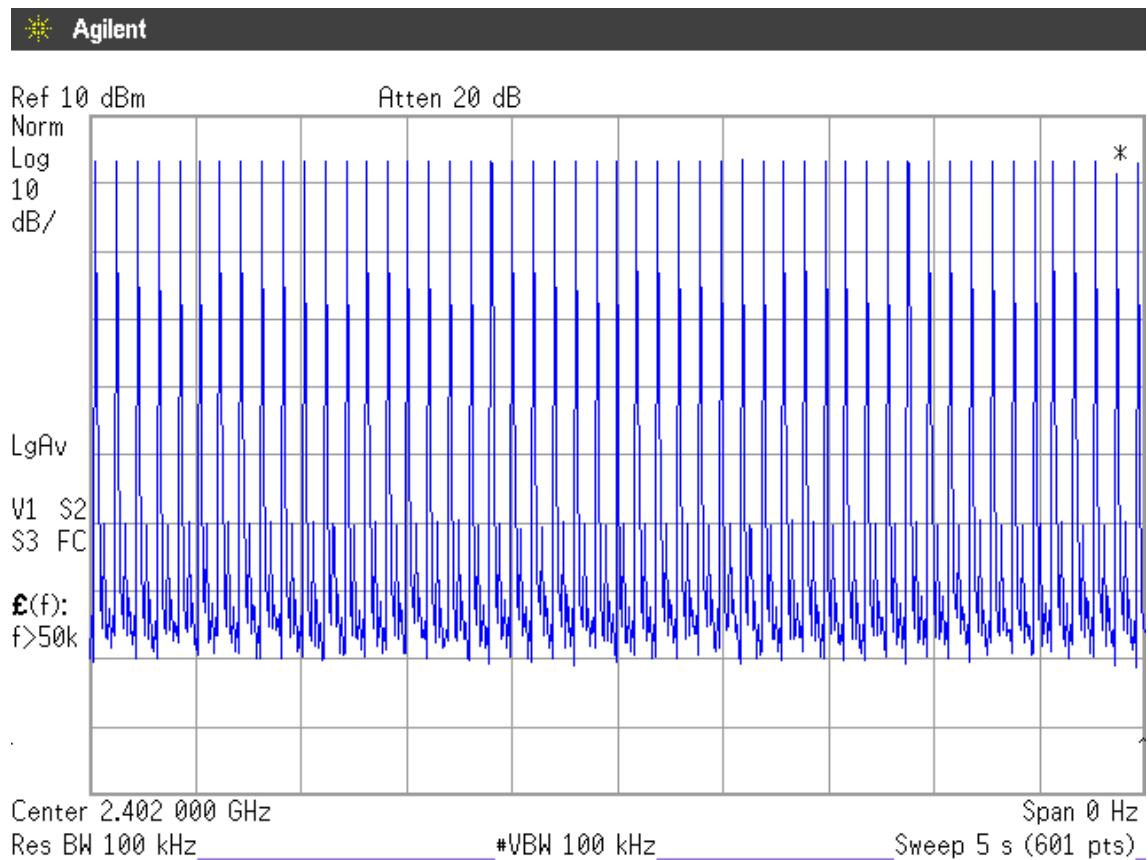
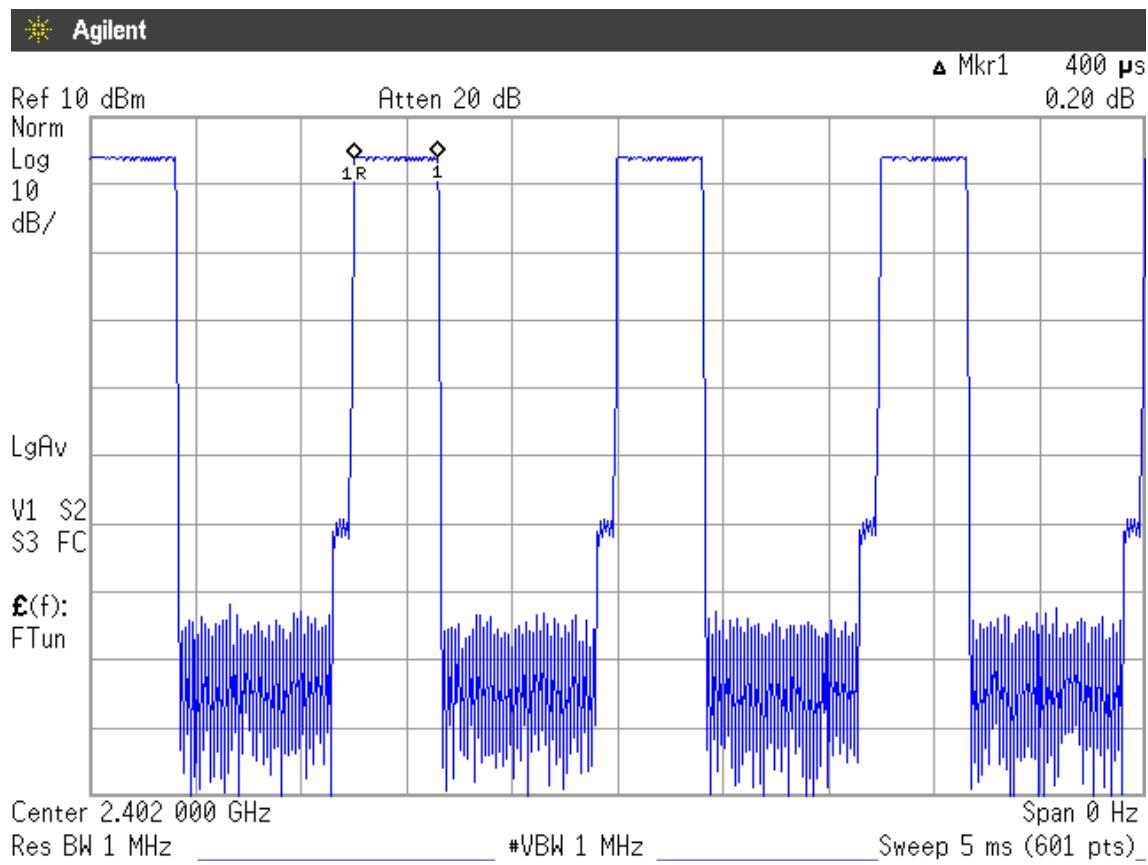
Each Tx-time per appearance is 2.883ms.

$$3.37 \text{ time} * 31.6 \text{ seconds} * 2.883\text{ms} = 307.0164\text{ms} (<400\text{ms})$$

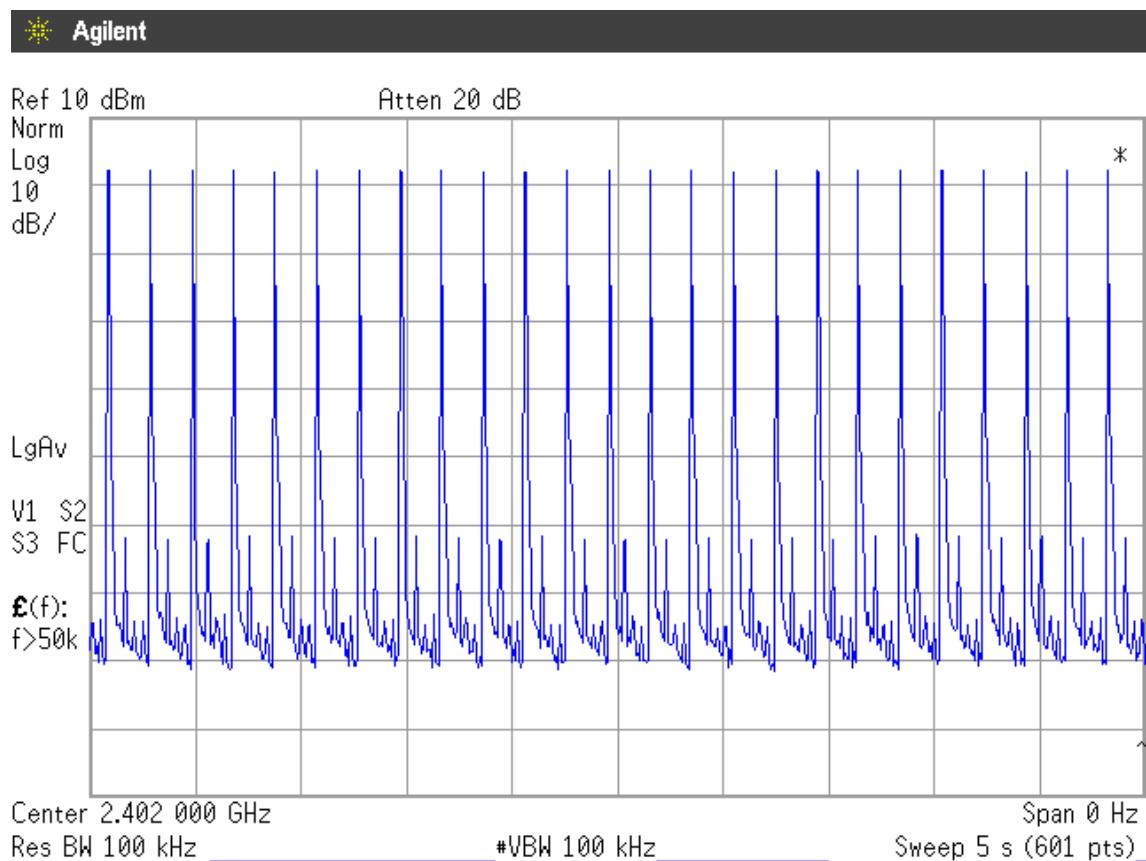
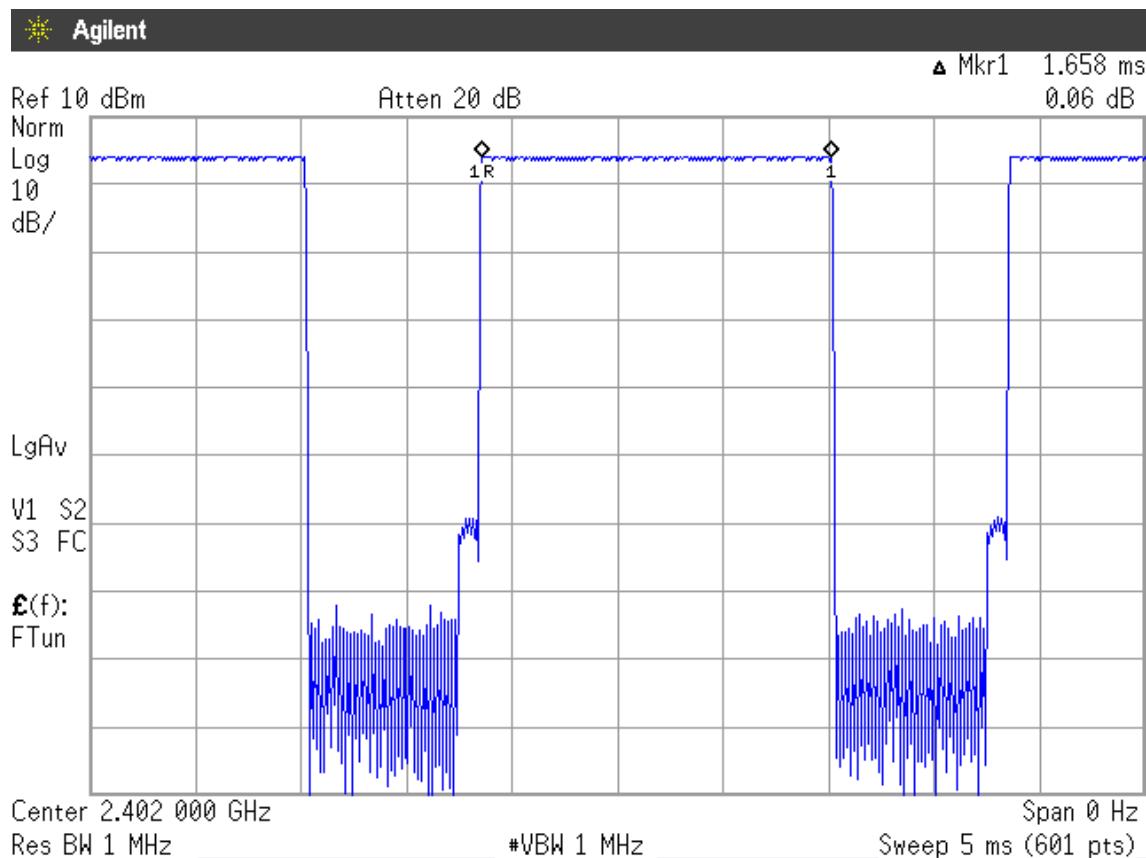
B. For each 5 seconds of 17 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

$$17 \text{ channels} * 31.6 \text{ seconds} / 5 * 2.883\text{ms} = 309.7495\text{ms} (<400\text{ms})$$

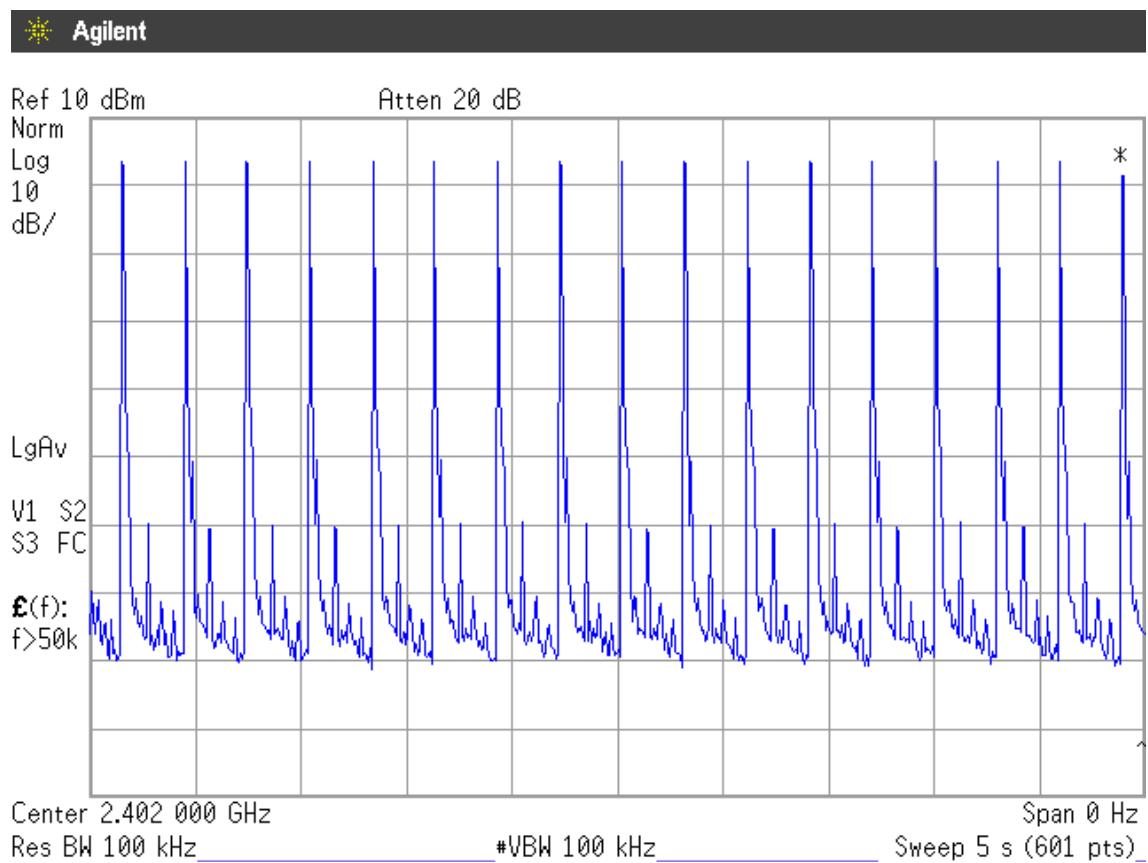
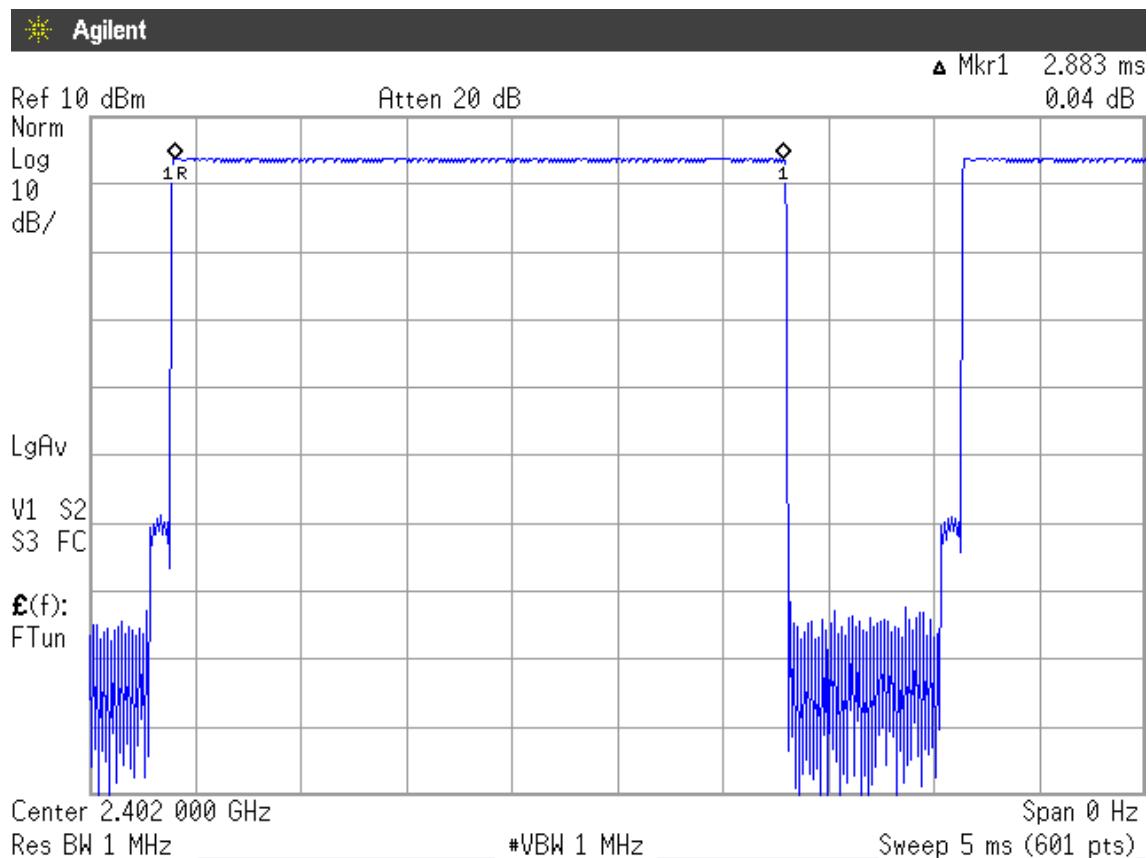
6.6.1.1. Test Frequency: 2402MHz (CH0), For DH1



6.6.1.2. Test Frequency: 2402MHz (CH0), For DH3



6.6.1.3. Test Frequency: 2402MHz (CH0), For DH5



6.6.2. Test Frequency: 2441MHz (CH39)

Duty cycle: 79 channels*0.4 seconds = 31.6 seconds

DH1 : A The system makes worst case 1600 hops per second or 1 time slot has a length of 625us with 79 channels. A DH1 packet need 1 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 800 hops per second with 79 channels. So you have each channel 10.13 time per second and so for 31.6 seconds you have 320 time of appearance.

Each Tx-time per appearance is 391.7us.

$$10.13 \text{ time} * 31.6 \text{ seconds} * 0.3917\text{ms} = 125.3863\text{ms} (<400\text{ms})$$

B. For each 5 seconds of 51 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

$$51 \text{ channels} * 31.6 \text{ seconds} / 5 * 0.3917\text{ms} = 126.2527\text{ms} (<400\text{ms})$$

DH3 : A The system makes worst case 1600 hops per second or 1 time slot has a length of 625us with 79 channels. A DH3 packet need 3 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 400 hops per second with 79 channels. So you have each channel 5.1 time per second and so for 31.6 seconds you have 161 time of appearance.

Each Tx-time per appearance is 1.65ms.

$$5.1 \text{ time} * 31.6 \text{ seconds} * 1.65\text{ms} = 265.914\text{ms} (<400\text{ms})$$

B. For each 5 seconds of 25 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

$$25 \text{ channels} * 31.6 \text{ seconds} / 5 * 1.65\text{ms} = 260.7\text{ms} (<400\text{ms})$$

DH5 : A The system makes worst case 1600 hops per second or 1 time slot has a length of 625us with 79 channels. A DH5 packet need 5 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 266.7 hops per second with 79 channels. So you have each channel 3.37 time per second and so for 31.6 seconds you have 106 time of appearance.

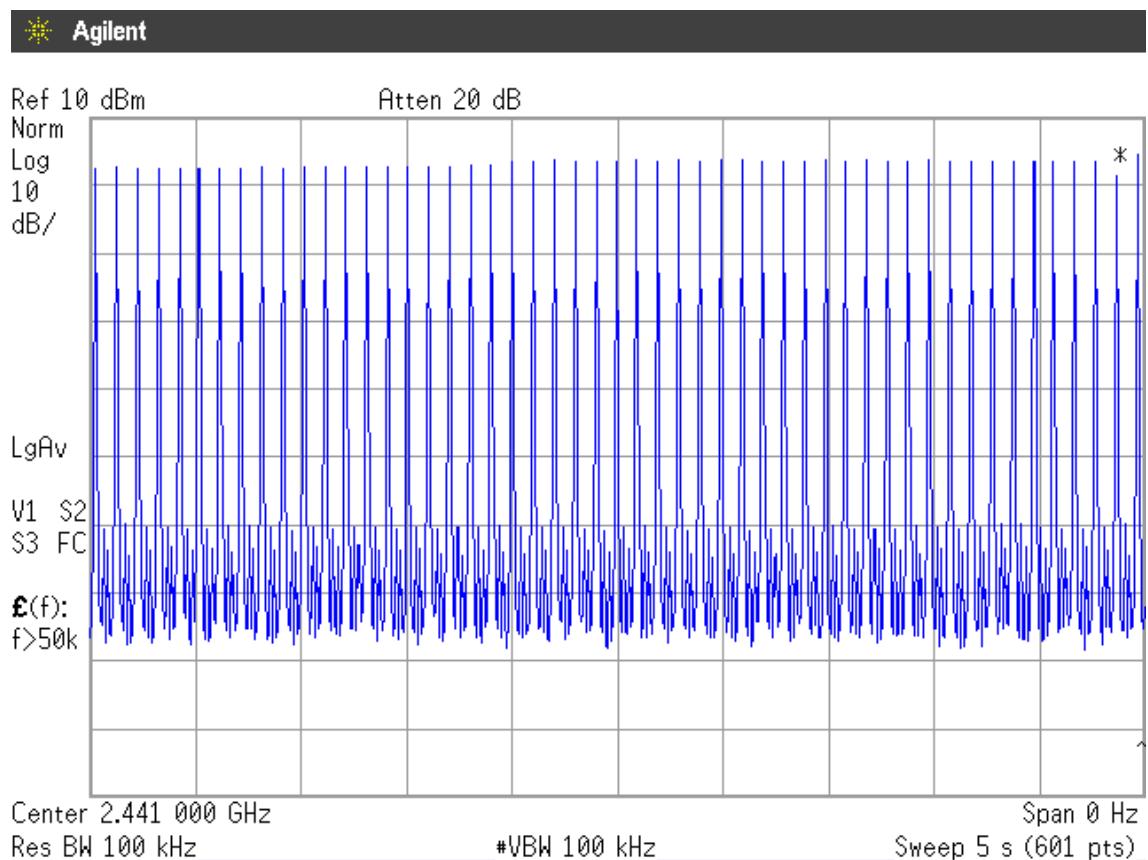
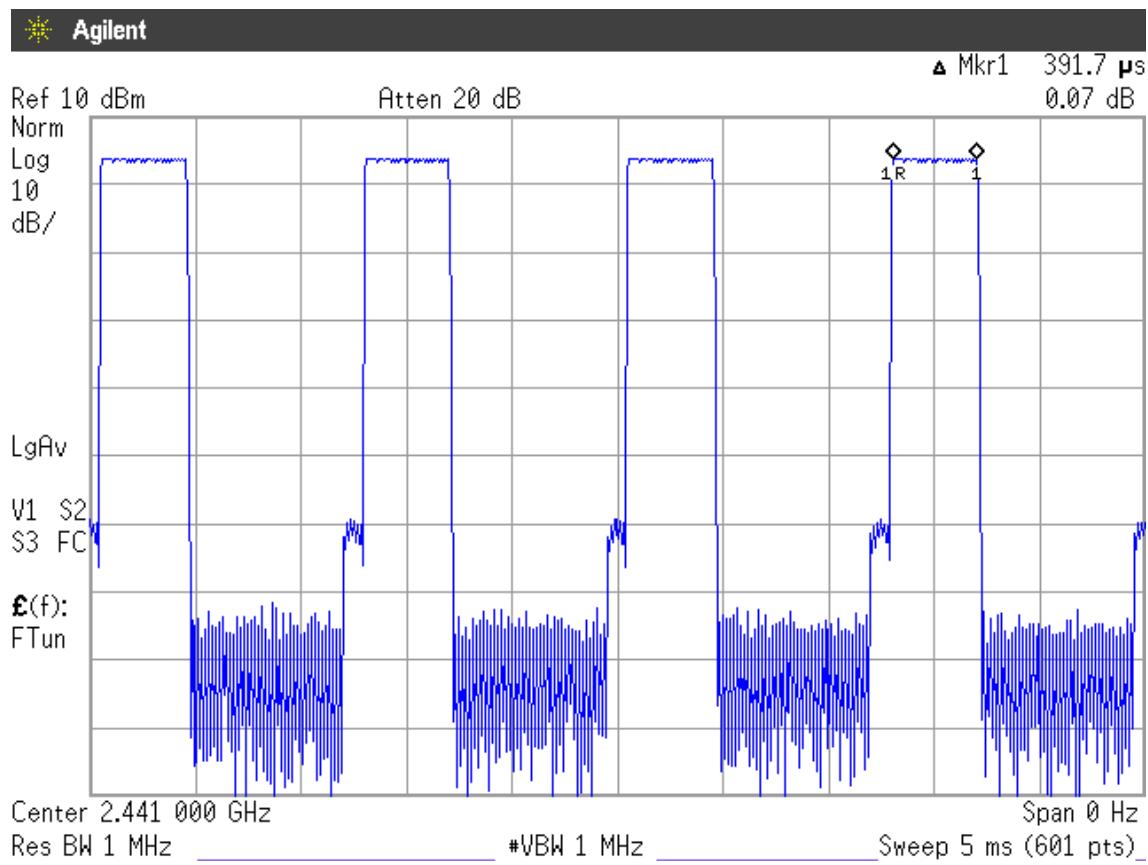
Each Tx-time per appearance is 2.908ms.

$$3.37 \text{ time} * 31.6 \text{ seconds} * 2.908\text{ms} = 309.6787\text{ms} (<400\text{ms})$$

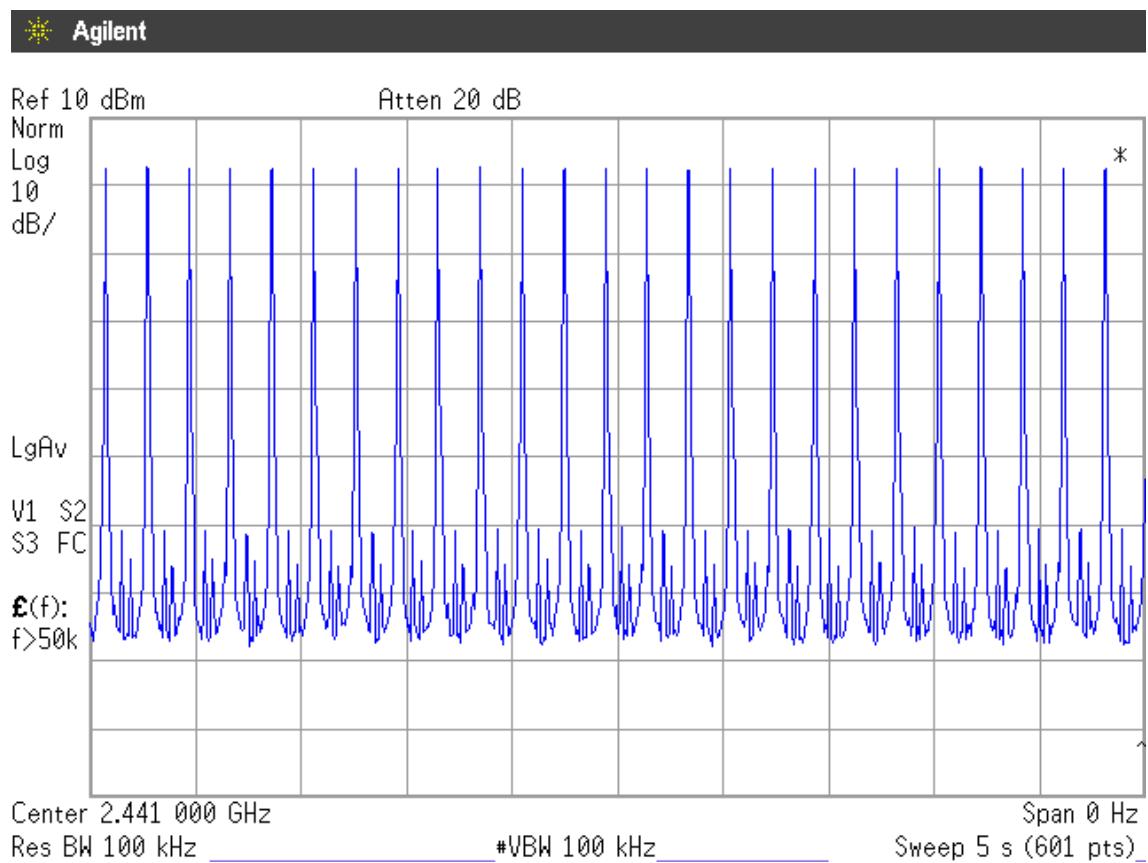
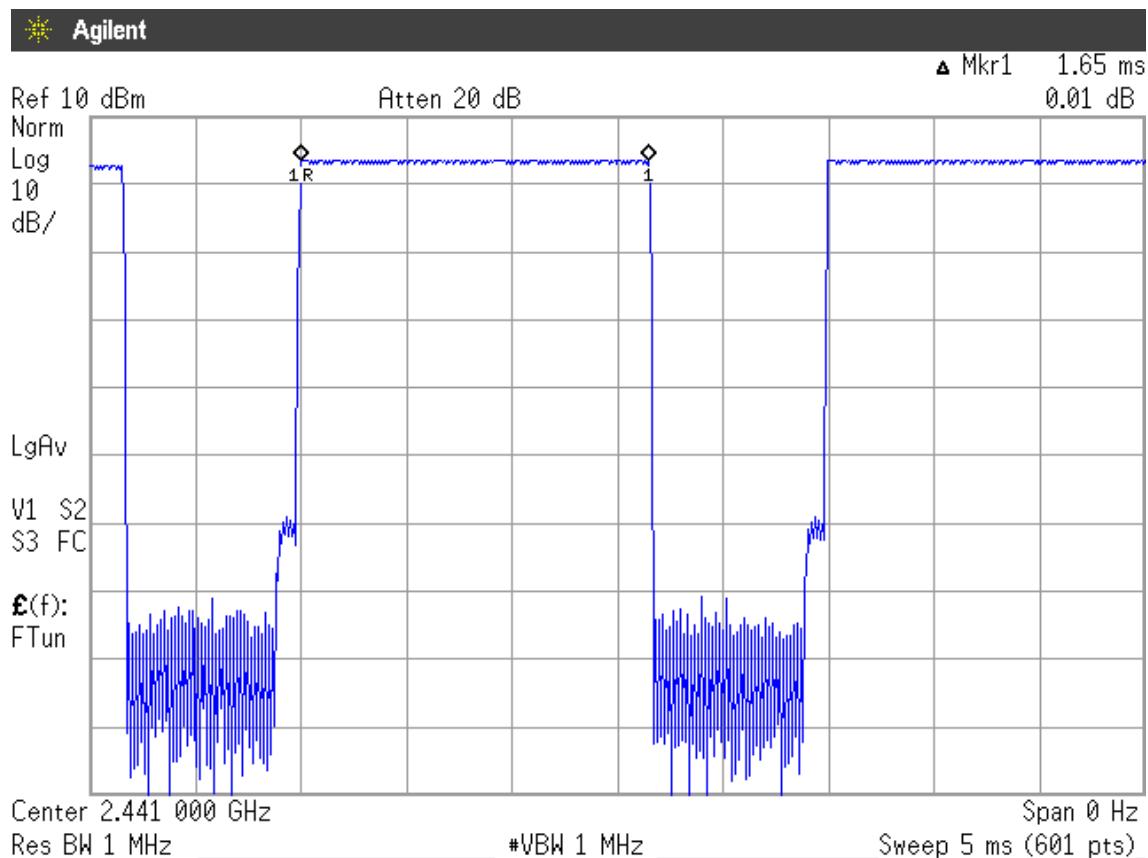
B. For each 5 seconds of 17 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

$$17 \text{ channels} * 31.6 \text{ seconds} / 5 * 2.908\text{ms} = 312.4355\text{ms} (<400\text{ms})$$

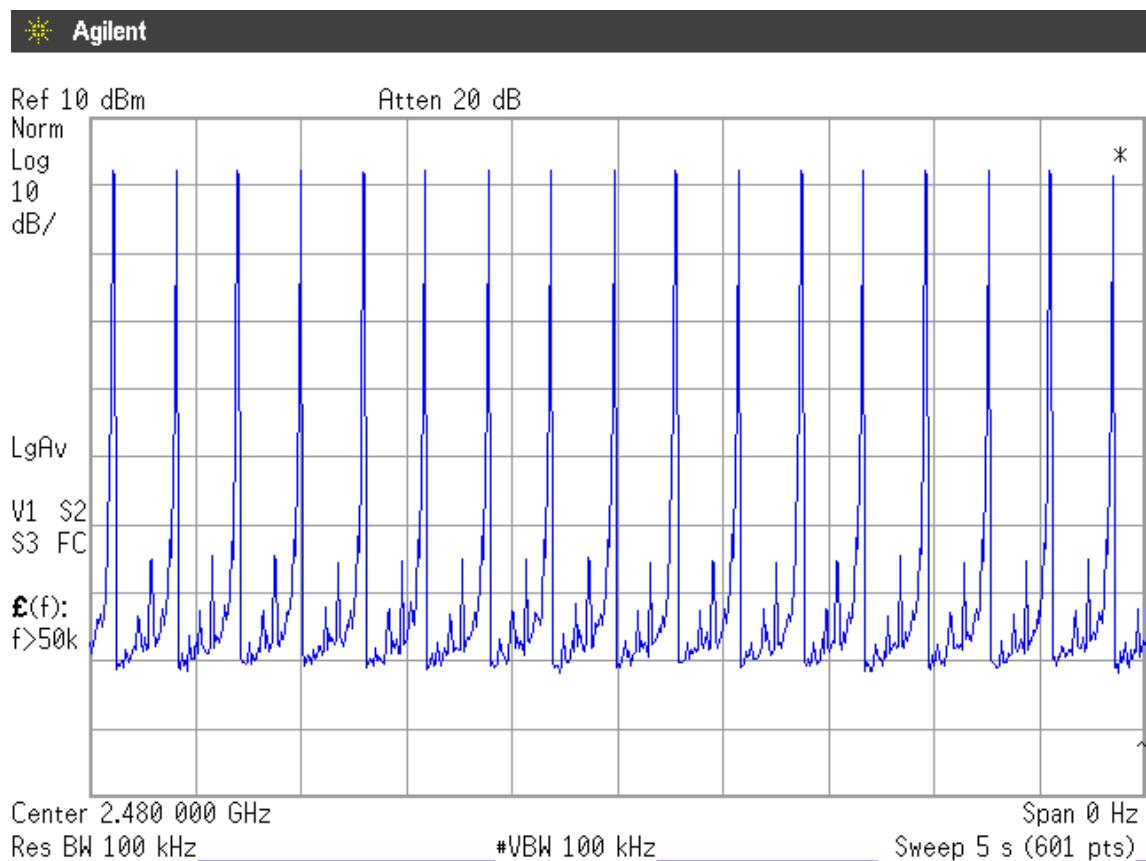
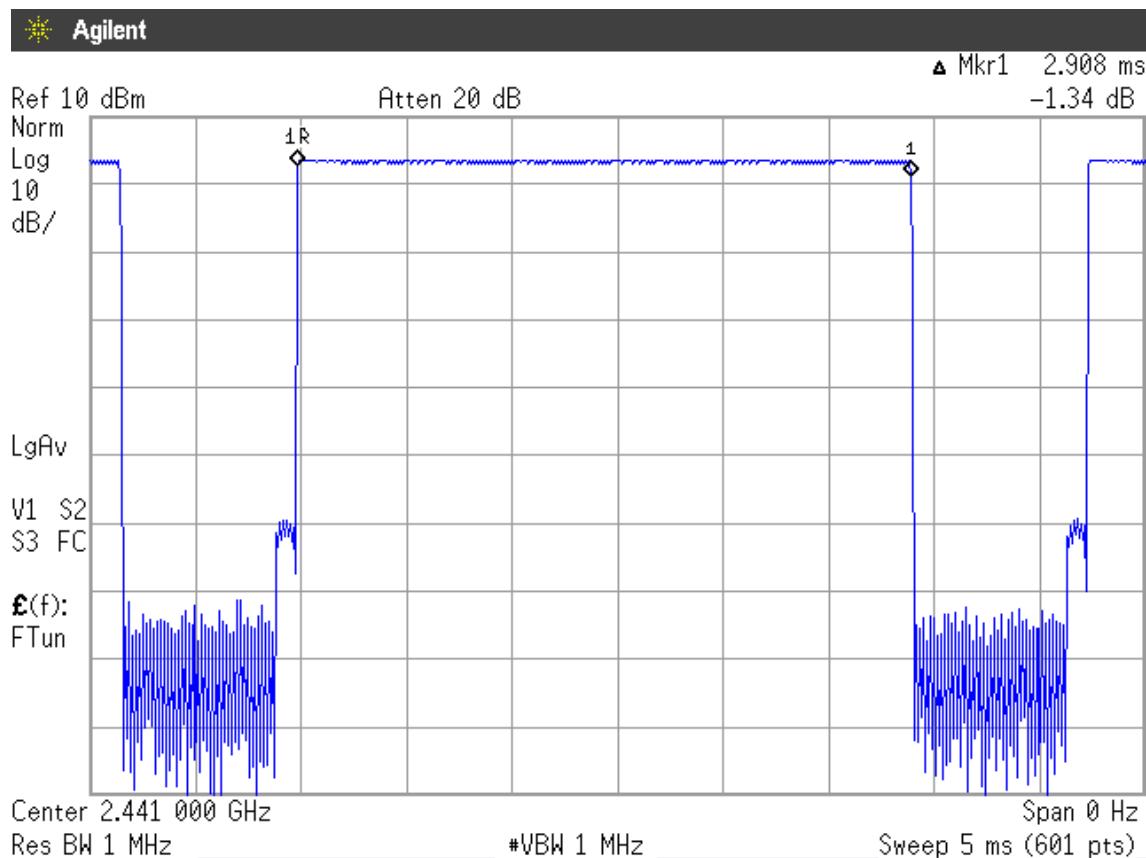
6.6.2.1. Test Frequency: 2441MHz (CH39), For DH1



6.6.2.2. Test Frequency: 2441MHz (CH39), For DH3



6.6.2.3. Test Frequency: 2441MHz (CH39), For DH5



6.6.3. Test Frequency: 2480MHz (CH78)

Duty cycle: 79 channels*0.4 seconds = 31.6 seconds

DH1 : A The system makes worst case 1600 hops per second or 1 time slot has a length of 625us with 79 channels. A DH1 packet need 1 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 800 hops per second with 79 channels. So you have each channel 10.13 time per second and so for 31.6 seconds you have 320 time of appearance.

Each Tx-time per appearance is 391.7us.

$$10.13 \text{ time} * 31.6 \text{ seconds} * 0.3917\text{ms} = 125.3863\text{ms} (<400\text{ms})$$

B. For each 5 seconds of 51 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

$$51 \text{ channels} * 31.6 \text{ seconds} / 5 * 0.3917\text{ms} = 126.2527\text{ms} (<400\text{ms})$$

DH3 : A The system makes worst case 1600 hops per second or 1 time slot has a length of 625us with 79 channels. A DH3 packet need 3 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 400 hops per second with 79 channels. So you have each channel 5.1 time per second and so for 31.6 seconds you have 161 time of appearance.

Each Tx-time per appearance is 1.658ms.

$$5.1 \text{ time} * 31.6 \text{ seconds} * 1.658\text{ms} = 267.2033\text{ms} (<400\text{ms})$$

B. For each 5 seconds of 25 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

$$25 \text{ channels} * 31.6 \text{ seconds} / 5 * 1.658\text{ms} = 261.964\text{ms} (<400\text{ms})$$

DH5 : A The system makes worst case 1600 hops per second or 1 time slot has a length of 625us with 79 channels. A DH5 packet need 5 time slot for transmitting and 1 time slot for receiving. Then the system makes worst case 266.7 hops per second with 79 channels. So you have each channel 3.37 time per second and so for 31.6 seconds you have 106 time of appearance.

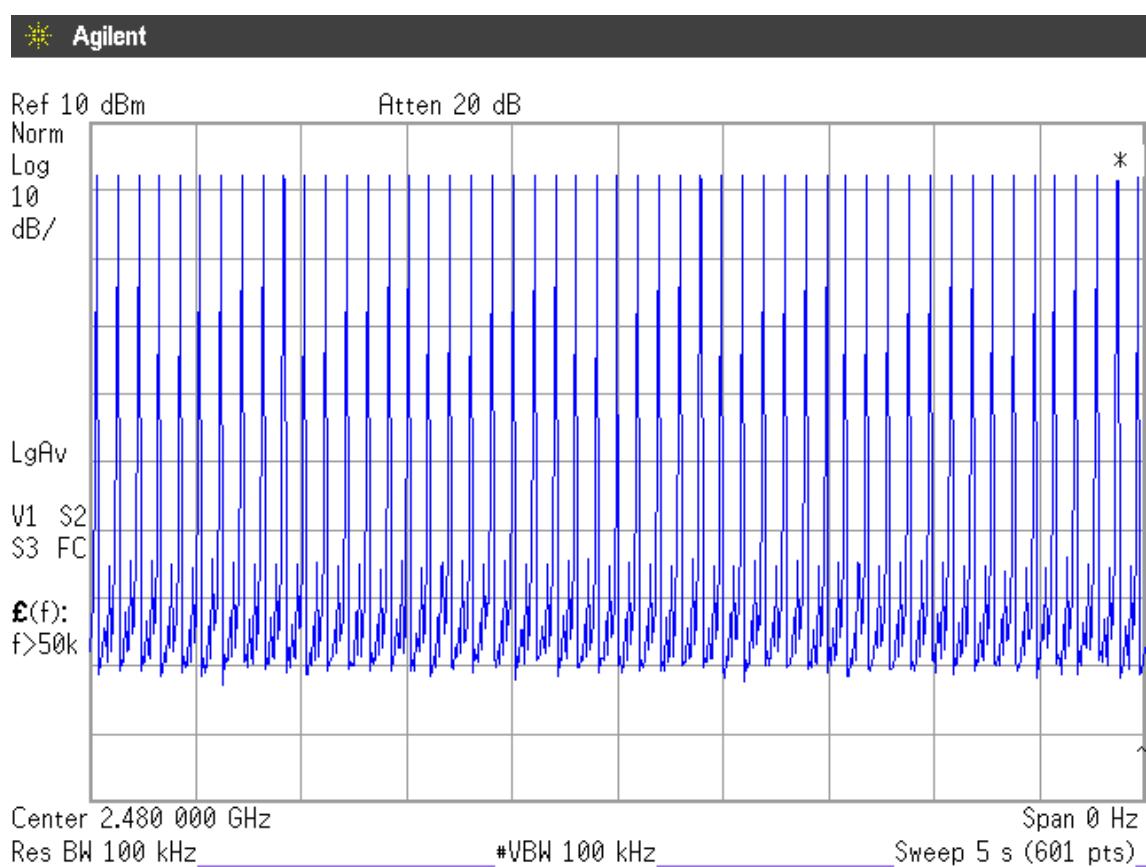
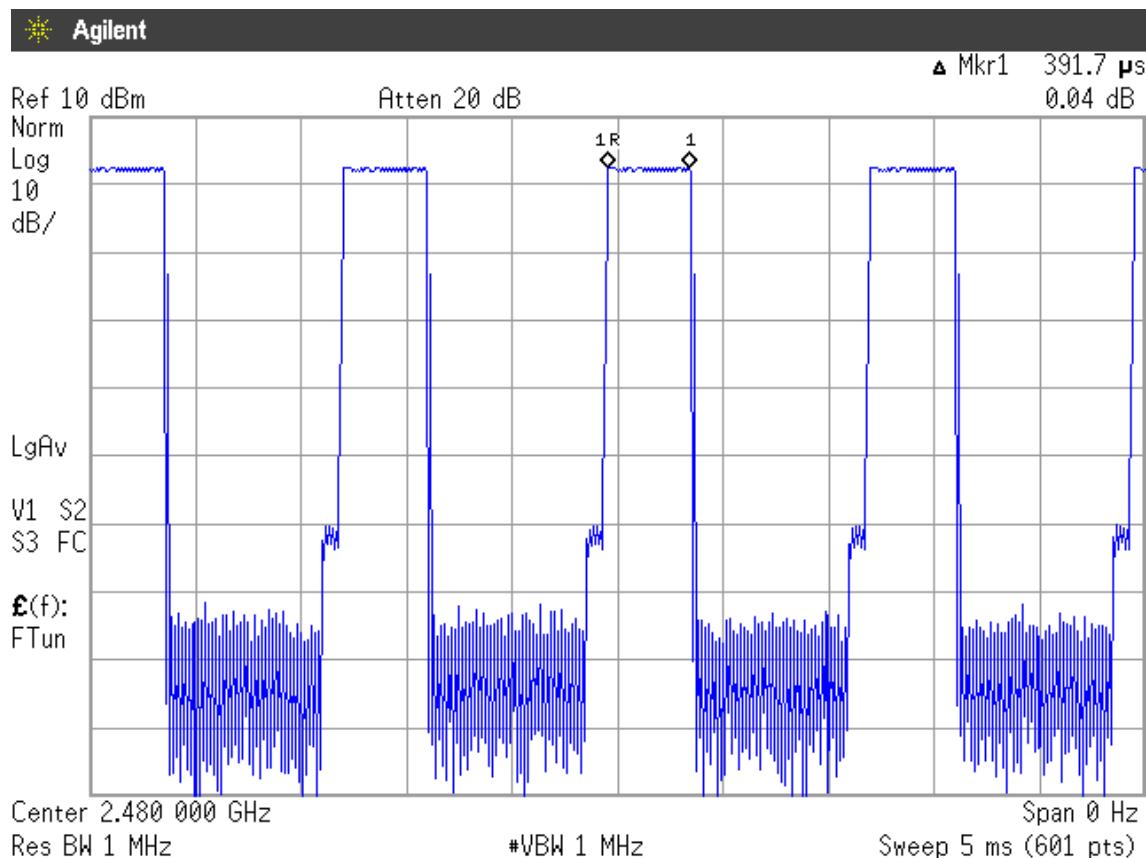
Each Tx-time per appearance is 2.892ms.

$$3.37 \text{ time} * 31.6 \text{ seconds} * 2.892\text{ms} = 307.9749\text{ms} (<400\text{ms})$$

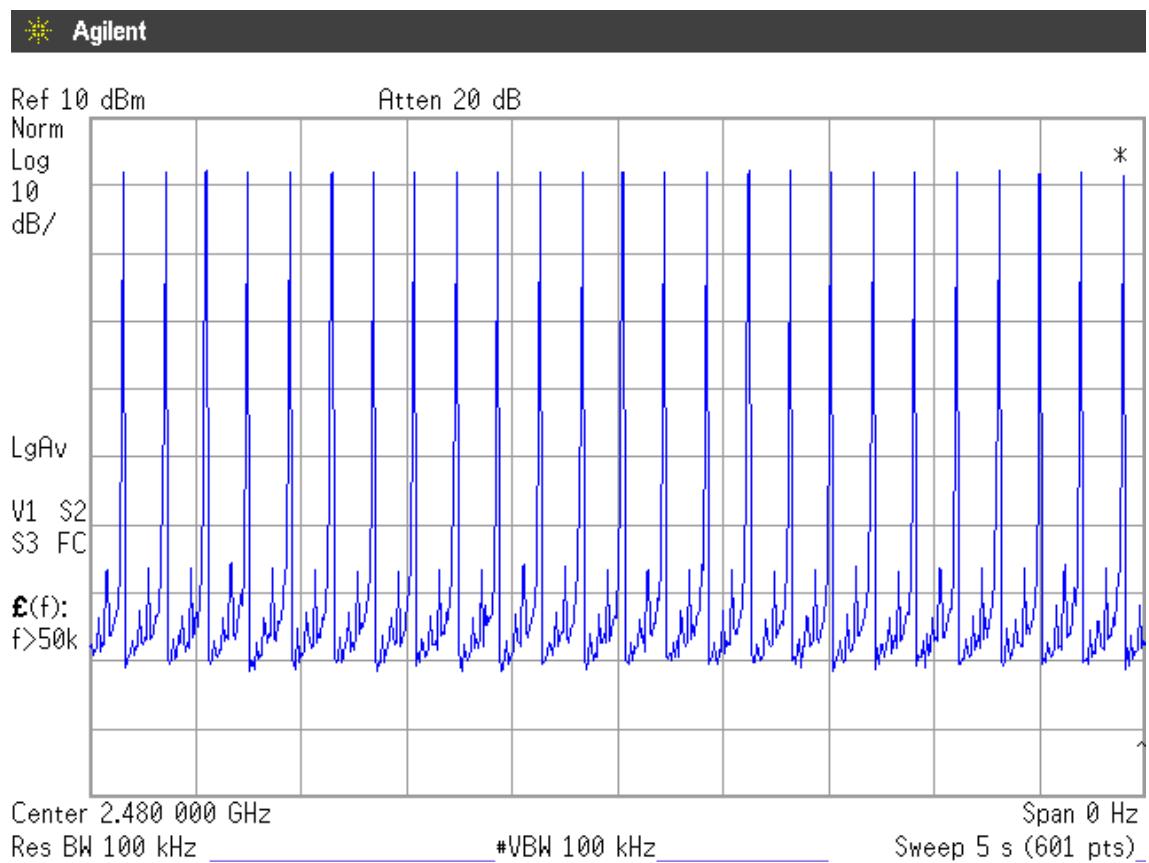
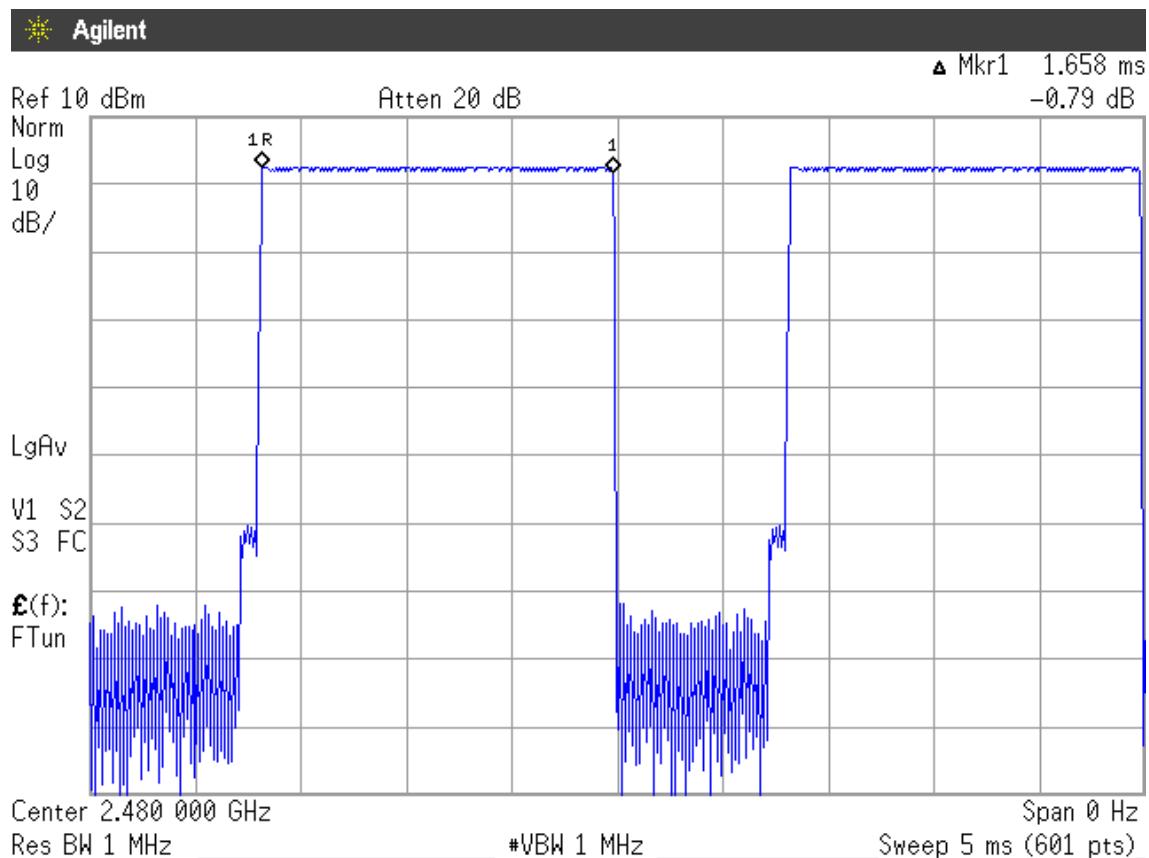
B. For each 5 seconds of 17 channels appearance, the longest time of occupancy for each of 31.6 seconds is:

$$17 \text{ channels} * 31.6 \text{ seconds} / 5 * 2.892\text{ms} = 310.7165\text{ms} (<400\text{ms})$$

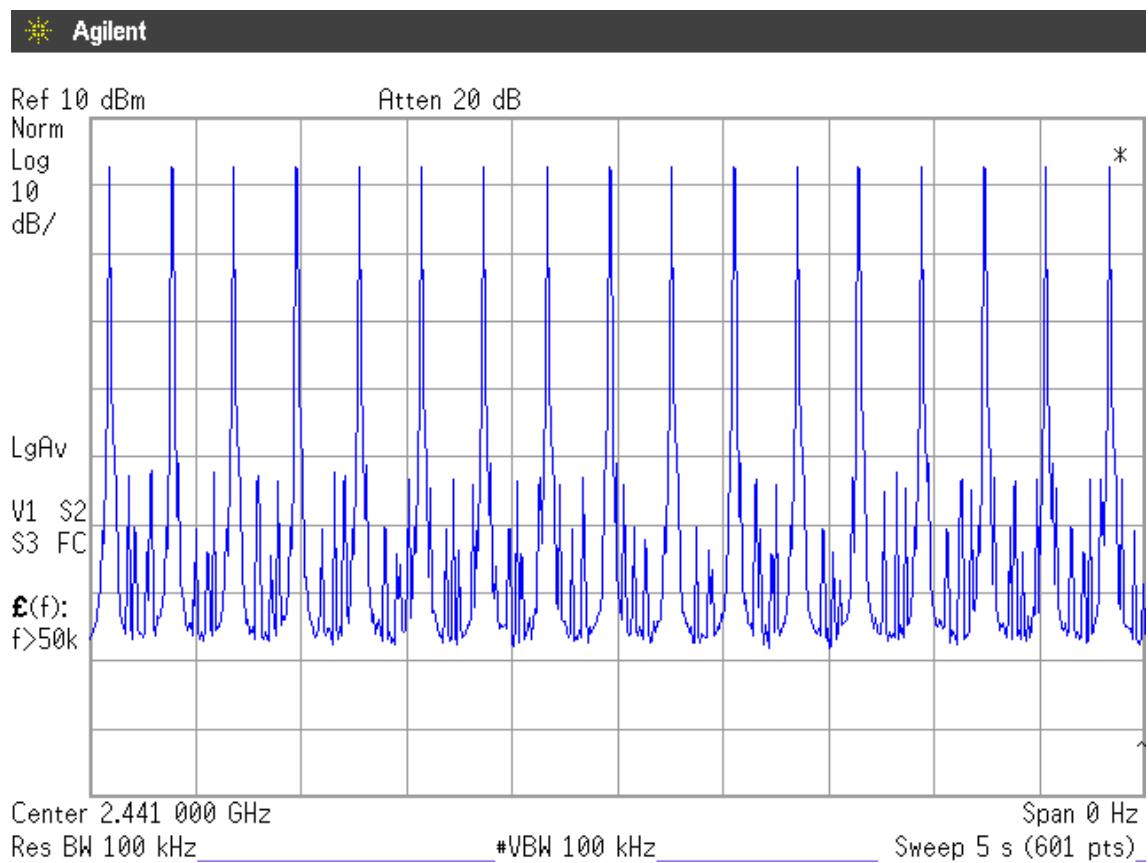
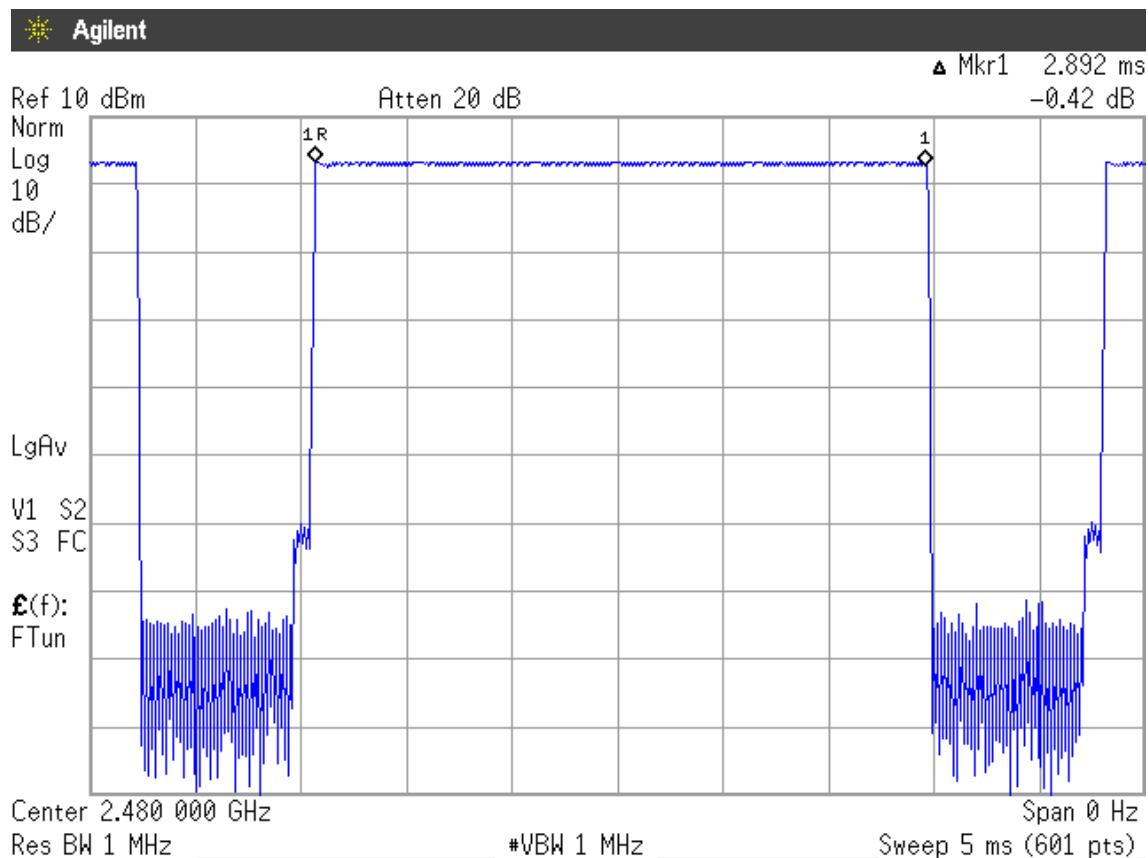
6.6.3.1. Test Frequency: 2480MHz (CH79), For DH1



6.6.3.2. Test Frequency: 2480MHz (CH79), For DH3



6.6.3.3. Test Frequency: 2480MHz (CH78), For DH5



7. NUMBER OF HOPPING CHANNELS MEASUREMENT

7.1. Test Equipment

The following test equipment was used during the number of hopping channels measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	E4446A	US44300366	Aug. 13, 07'	Aug. 12, 08'
2.	Bluetooth Test Set	Anritsu	MT8852B	6K00005697	Nov. 27, 07'	Nov. 26, 08'
3.	Power Divider	Anritsu	K240C	019728	May 15, 07'	May 14, 08'

7.2. Block Diagram of Test Setup

The same as section 4.2.

7.3. Specification Limits (§15.247(a)(1)(iii))

Frequency hopping systems which use fewer than 75 hopping frequencies may employ intelligent hopping techniques to avoid interference to other transmissions. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 non-overlapping channels.

7.4. Operating Condition of EUT

Same as carrier frequency separation measurement which was listed in section 4.4.

7.5. Test Procedure

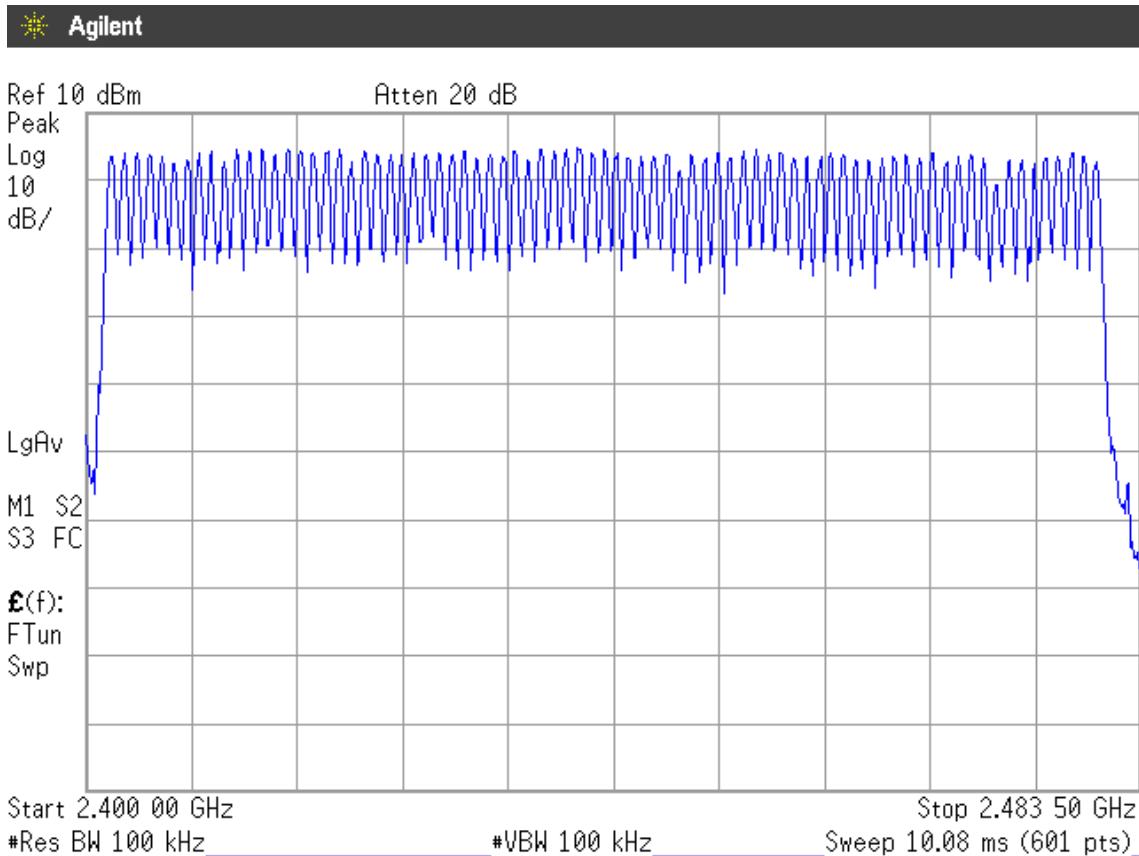
The transmitter output was connected to the spectrum analyzer. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100kHz RBW and 100kHz VBW. Sweep=Auto ; Detector function=peak ; Trace=Max hold. The measurement guideline was according to FCC Public Notice DA 00-705.

7.6. Test Results

PASSED. All the test results are attached in next page.

Test Date : Dec. 18, 2007 Temperature : 28 Humidity : 36%
Test Voltage: DC 12V

The number hopping channel is 79.



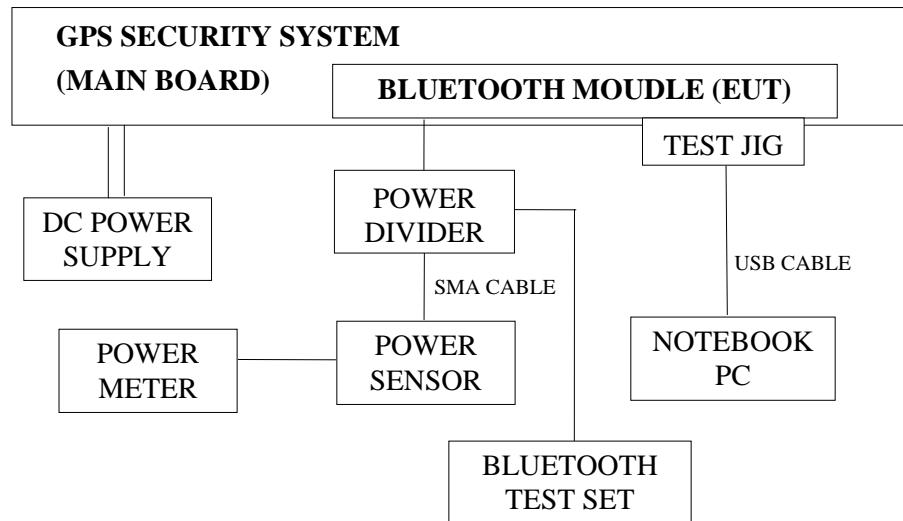
8. MAXIMUM PEAK OUTPUT POWER MEASUREMENT

8.1. Test Equipment

The following test equipment was used during the maximum peak output power measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Power Meter	Anritsu	ML2487A	6K00005406	Jan. 10, 07'	Jan. 09, 08'
2.	Power Sensor	Anritsu	MA2491A	030873	Jan. 10, 07'	Jan. 09, 08'
3.	Bluetooth Test Set	Anritsu	MT8852B	6K00005697	Nov. 27, 07'	Nov. 26, 08'
4.	Power Divider	Anritsu	K240C	019728	May 15, 07'	May 14, 08'

8.2. Block Diagram of Test Setup



8.3. Specification Limits (§15.247(b)-(1))

The Limits of maximum Peak Output Power for frequency hopping systems in 2400-2483.5MHz is: 1Watt. (30dBm)

8.4. Operating Condition of EUT

Same as carrier frequency separation measurement which was listed in 4.4 except the test set up replaced by section 8.2.

8.5. Test Procedure

The transmitter output was connected to the power sensor and record the reading of power meter.

The measurement guideline was according to FCC Public Notice DA 00-705.

8.6. Test Results

PASSED. All the test results are listed below.

Test Date : Dec. 13, 2007 Temperature : 26 Humidity : 71%
Test Voltage: DC 12V

No.	Channel	Test Frequency	Peak Output Power	Limit
1.	0	2402MHz	-0.8dBm	30dBm
2.	39	2441MHz	-1.2dBm	30dBm
3.	78	2480MHz	-1.6dBm	30dBm

9. EMISSION LIMITATIONS MEASUREMENT

9.1. Test Equipment

The following test equipment was used during the emission limitations measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	E4446A	US44300366	Aug. 13, 07'	Aug. 12, 08'
2.	Bluetooth Test Set	Anritsu	MT8852B	6K00005697	Nov. 27, 07'	Nov. 26, 08'
3.	Power Divider	Anritsu	K240C	019728	May 15, 07'	May 14, 08'

9.2. Block Diagram of Test Setup

The same as section 4.2.

9.3. Specification Limits (§15.247(c))

In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (See Section 15.205(c)).(This test result attaching to §3.6.3)

9.4. Operating Condition of EUT

Same as carrier frequency separation measurement which was listed in section 4.4.

9.5. Test Procedure

The transmitter output was connected to the spectrum analyzer. Set both RBW and VBW of spectrum analyzer to 100kHz with frequency range from 30MHz to 25GHz. The measurement guideline was according to FCC Public Notice DA 00-705.

9.6. Test Results

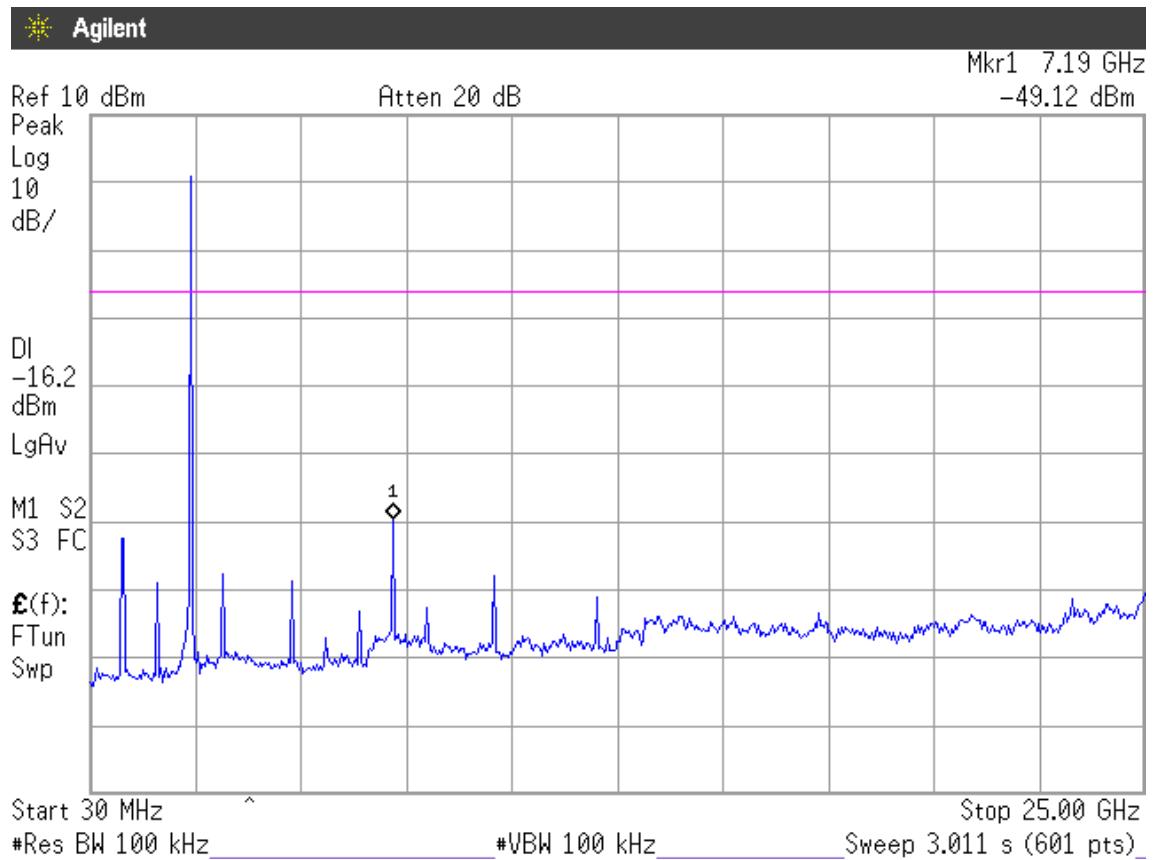
PASSED. All the test results are attached in next pages.

Test Date : Dec. 18, 2007 Temperature : 28 Humidity : 36%
Test Voltage: DC 12V

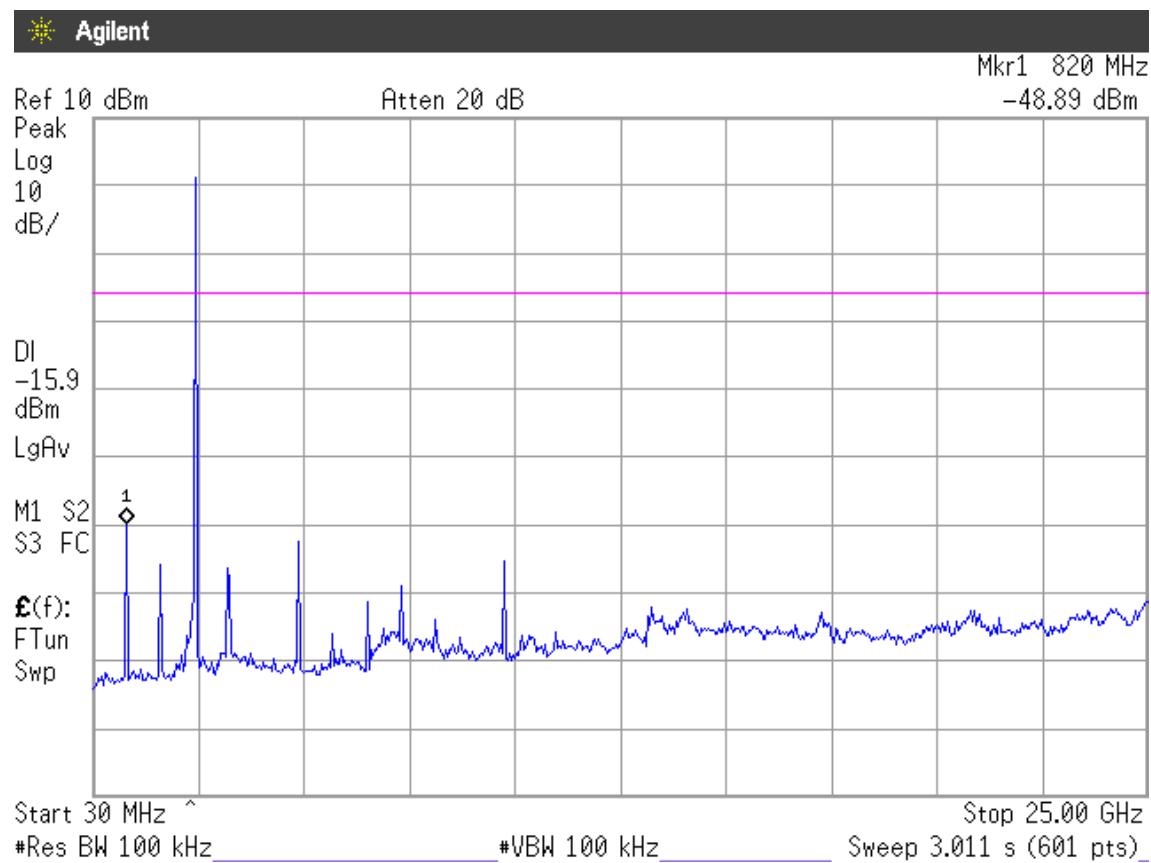
1. 2402MHz: During 30MHz~25GHz bandwidth. In the 2.4GHz, the -49.12dBm is max value that is lower than 20dB of primary channel.
2. 2441MHz: During 30MHz~25GHz bandwidth. In the 2.4GHz, the -48.89dBm is max value that is lower than 20dB of primary channel.
3. 2480MHz: During 30MHz~25GHz bandwidth. In the 2.4GHz, the -49.20dBm is max value that is lower than 20dB of primary channel.

Note: The peak above the limit line is the carrier frequency.

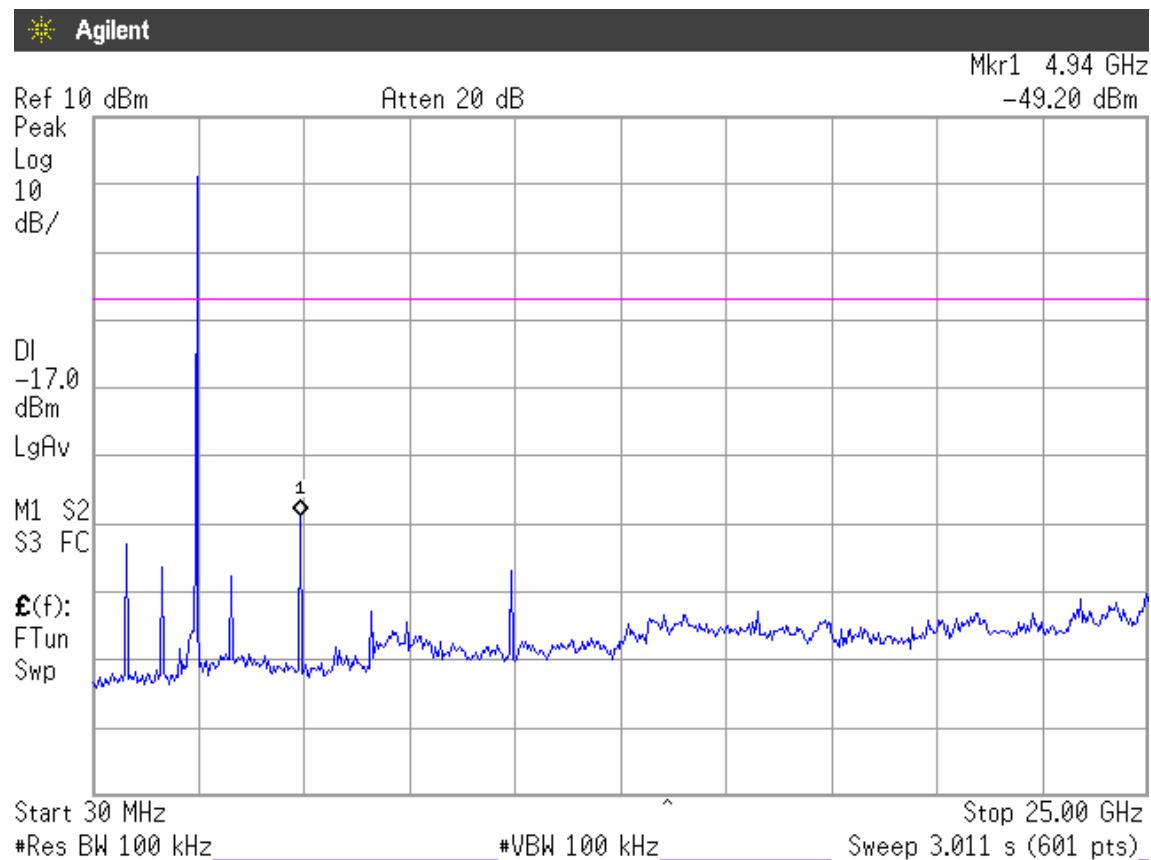
9.6.1. Channel 0, Frequency: 2402MHz



9.6.2. Channel 38, Frequency: 2441MHz



9.6.3. Channel 78, Frequency: 2480MHz



10. BAND EDGES MEASUREMENT

10.1. Test Equipment

The following test equipment was used during the band edges measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	E4446A	US44300366	Aug. 13, 07'	Aug. 12, 08'
2.	Bluetooth Test Set	Anritsu	MT8852B	6K00005697	Nov. 27, 07'	Nov. 26, 08'
3.	Power Divider	Anritsu	K240C	019728	May 15, 07'	May 14, 08'

10.2. Block Diagram of Test Setup

The same as section 4.2.

10.3. Specification Limits (§15.247(c))

In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (See Section 15.205(c)). (This test result attaching to §3.6.3)

10.4. Operating Condition of EUT

Same as carrier frequency separation measurement which was listed in section 4.4.

10.5. Test Procedure

The transmitter output was connected to the spectrum analyzer. Set both RBW and VBW of spectrum analyzer to 100kHz with suitable frequency span including 100kHz bandwidth from band edge.

The measurement guideline was according to FCC Public Notice DA 00-705.

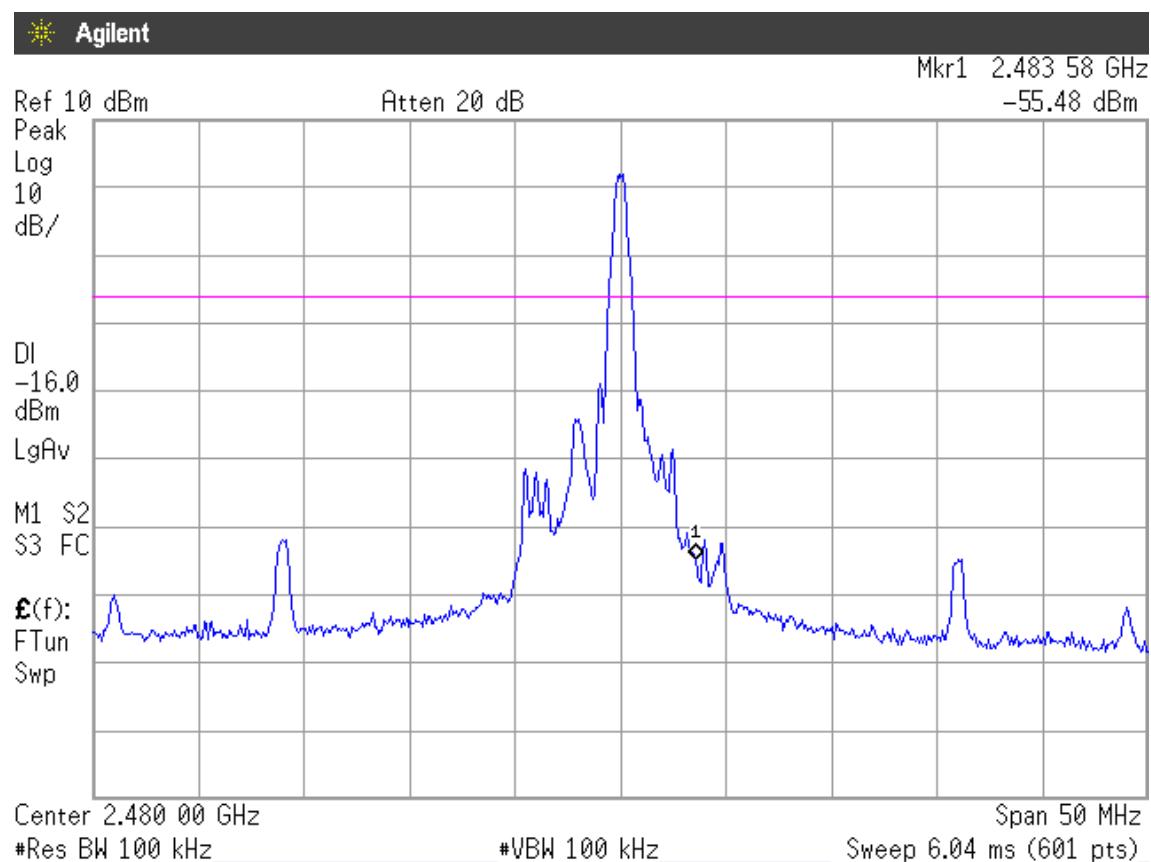
10.6. Test Results

PASSED. The testing data was attached in the next pages.

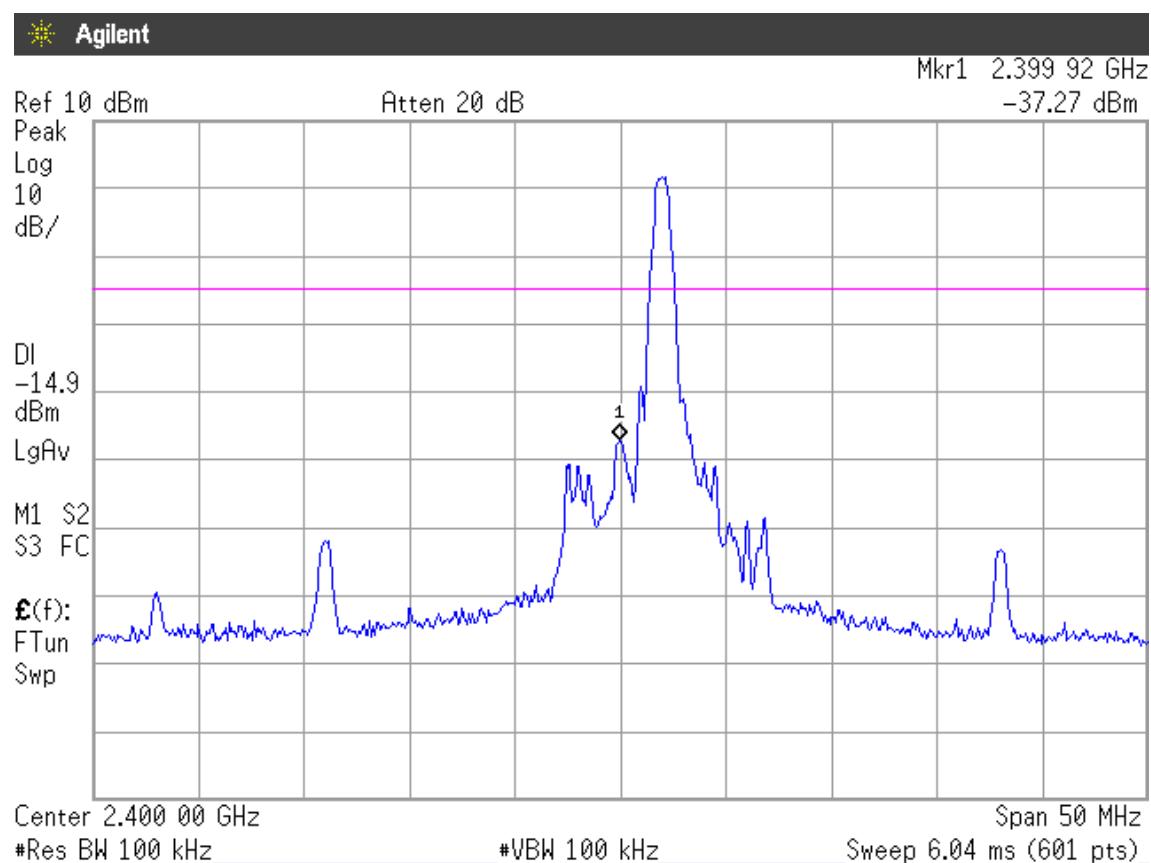
Test Date : Dec. 18, 2007 Temperature : 28 Humidity : 36%
Test Voltage: DC 12V

1. Upper Band edge : The highest emission level is – 55.48dBm on 2.48358Hz.
2. Below Band edge: The highest emission level is – 37.27dBm on 2.39992GHz.

10.6.1. Upper Band edge



10.6.2. Below Band edge



11. DEVIATION TO TEST SPECIFICATIONS

【NONE】