



Test Report

Product Name	GPS
Model No.	PND-K3
FCC ID.	PPQ-PND-K3

Applicant	LITE-ON Technology Corp.
Address	4F,90,Chien 1 Road, Chung-Ho, Taipei Hsien 235, Taiwan, R.O.C.

Date of Receipt	Apr. 15, 2008
Issued Date	May. 02, 2008
Report No.	084248R-RFUSP06V01
Version	V1.0

The Test Results relate only to the samples tested.

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This report must not be used to claim product endorsement by NVLAP any agency of the U.S. Government

Test Report Certification

Issued Date: May. 02, 2008

Report No.: 084248R-RFUSP06V01



Product Name	GPS	
Applicant	LITE-ON Technology Corp.	
Address	4F,90,Chien 1 Road, Chung-Ho, Taipei Hsien 235, Taiwan, R.O.C.	
Manufacturer	LITE-ON Technology Corp.	
Model No.	PND-K3	
FCC ID.	PPQ-PND-K3	
Rated Voltage	AC 120V/60Hz	
Working Voltage	DC 12V (Power by car charger)	
Trade Name	ALPINE	
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C: 2007 ANSI C63.4: 2003	 NVLAP Lab Code: 200533-0
Test Result	Complied	

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 (Engineer / Dino Chen)



Approved By : Vincent Lin
 (Deputy Manager / Vincent Lin)

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1. GENERAL INFORMATION

1.1. EUT Description

Product Name	GPS
Trade Name	ALPINE
FCC ID.	PPQ-PND-K3
Model No.	PND-K3
Frequency Range	2402 - 2480MHz
Channel Number	79
Type of Modulation	GFSK(1Mbps) / π / 4DQPSK(2Mbps) / 8DPSK(3Mbps)
Antenna type	Soldered on PCB
Channel Control	AUTO
Antenna Gain	Refer to the table "Antenna List"
Power Adapter (1)	MFR: Atech, M/N: TC-203-0510B11 Cable Out: Non-Shielded, 1.8m
Power Adapter (2)	MFR: ELEMENTECH, M/N: CU1100501a 01 Input: AC 12-24V, 1.4A Output: DC 5V, 2A Cable Out: Non-Shielded, 1.65m

Component	
Cradle	MFR: Pure, M/N: PND-K3-CR MFR: MSN, M.N: PND-K3msn-CR

Antenna List

No.	Manufacturer	Part No.	Peak Gain
1	CIROCOMM	03H40E4B000A120	1.41 dBi for 2.4 GHz

Frequency of Each Channel:

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

Note:

1. This device is a GPS with a built-in 2.4GHz Bluetooth 2.0+EDR (Enhanced Data Rate) transceiver.
2. These tests were conducted on a sample for the purpose of demonstrating compliance of Bluetooth transmitter with Part 15 Subpart C Paragraph 15.247 for Frequency hopping spread spectrum devices.
3. Regarding to the operation frequency, the lowest, middle and highest frequency channel are selected to be tested.

1.2. Operational Description

The EUT is a GPS with a built-in 2.4GHz Bluetooth 2.0+EDR (Enhanced Data Rate) transceiver. The number of the channels is 79 in 2402-2480MHz. The device adapts the frequency hopping spread spectrum modulation. The antenna is connector-type and provides diversity function to improve the receiving function.

This device provides wireless technology that revolutionizes personal connectivity. It is the solution for the seamless integration of Bluetooth technology into personal computer enabling short-range wireless connections between desktop/laptop computers, Bluetooth-enabled peripherals, and portable handheld devices.

Test Mode	Mode 1: Transmitter -1Mbps(GFSK)
	Mode 2: Transmitter -3Mbps(8DPSK)

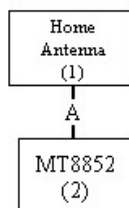
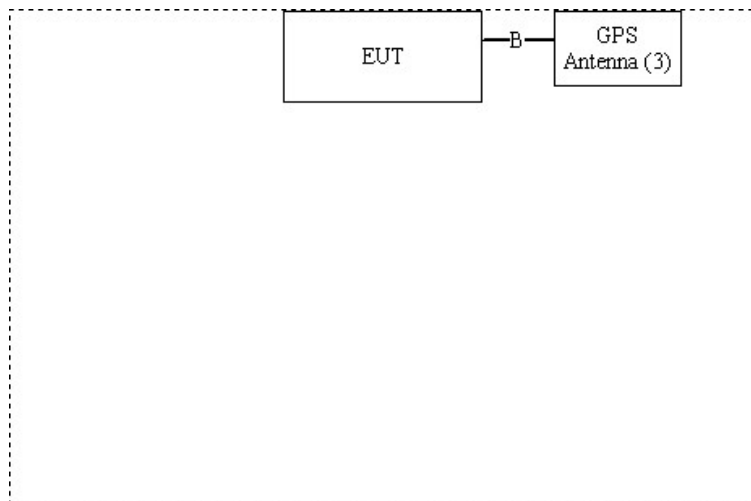
1.3. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

	Product	Manufacturer	Model No.	Serial No.	Power Cord
(1)	Home Antenna	ETS	3115	0005-6160	N/A
(2)	MT8852B	Anritsu	MT8852B	6K0000247	Non-Shielded, 1.8m
(3)	GPS Antenna	LITE-ON	N/A	N/A	N/A

	Signal Cable Type	Signal cable Description
A.	RF Cable	Shielded, 0.5m
B.	GPS Antenna Cable	Non-Shielded, 5m

1.4. Configuration of Tested System



1.5. EUT Exercise Software

- (1) Setup the EUT as shown in section 1.4
- (2) Execute the RF program (the continuous transmission program) on the EUT
- (3) Setup the test mode, the test channel, and the data rate.
- (4) Press OK to start the transmission.
- (5) Verify that the EUT works correctly.

1.6. Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	30-65
Barometric pressure (mbar)	860-1060	950-1000

Site Description: File on
 Federal Communications Commission
 FCC Engineering Laboratory
 7435 Oakland Mills Road
 Columbia, MD 21046
 Registration Number: 92195



Accreditation on NVLAP
 NVLAP Lab Code: 200533-0



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FCC Accreditation Number: TW1014



2. Conducted Emission

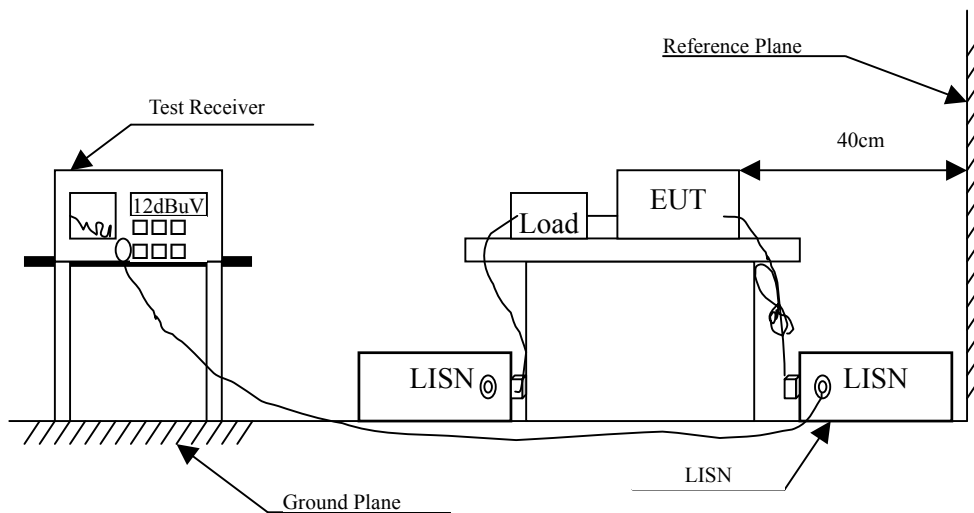
2.1. Test Equipment

The following test equipments are used during the conducted emission test:

Item	Instrument	Manufacturer	Type No./Serial No	Last Cal.	Remark
1	Test Receiver	R & S	ESCS 30/825442/17	May, 2008	
2	L.I.S.N.	R & S	ESH3-Z5/825016/6	May, 2008	EUT
3	L.I.S.N.	Kyoritsu	KNW-407/8-1420-3	May, 2008	Peripherals
4	Pulse Limiter	R & S	ESH3-Z2	May, 2008	
5	No.1 Shielded Room			N/A	

Note: 1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

2.2. Test Setup



2.3. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dBuV) Limit		
Frequency MHz	Limits	
	QP	AV
0.15 - 0.50	66-56	56-46
0.50-5.0	56	46
5.0 - 30	60	50

Remarks: In the above table, the tighter limit applies at the band edges.

2.4. Test Procedure

The EUT was setup according to ANSI C63.4, 2003 and tested according to FCC Public Notice DA 00-705.

The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs.)

Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.

The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.

Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

2.5. Uncertainty

± 2.26 Db

2.6. Test Result of Conducted Emission

Product : GPS
 Test Item : Conducted Emission Test
 Power Line : Line 1
 Test Mode : Mode 1: Transmitter -1Mbps(GFSK) (2441MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
LINE 1					
Quasi-Peak					
0.154	0.364	40.800	41.164	-24.722	65.886
0.193	0.698	32.280	32.978	-31.793	64.771
0.423	0.300	32.100	32.400	-25.800	58.200
0.572	0.300	32.890	33.190	-22.810	56.000
0.931	0.310	31.720	32.030	-23.970	56.000
10.310	0.610	27.320	27.930	-32.070	60.000
Average					
0.154	0.364	28.100	28.464	-27.422	55.886
0.193	0.698	19.160	19.858	-34.913	54.771
0.423	0.300	21.210	21.510	-26.690	48.200
0.572	0.300	13.340	13.640	-32.360	46.000
0.931	0.310	19.700	20.010	-25.990	46.000
10.310	0.610	17.710	18.320	-31.680	50.000

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. "■" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : GPS
 Test Item : Conducted Emission Test
 Power Line : Line 2
 Test Mode : Mode 1: Transmitter -1Mbps(GFSK) (2441MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
LINE 2					
Quasi-Peak					
0.158	0.300	40.260	40.560	-25.211	65.771
0.205	0.300	34.330	34.630	-29.799	64.429
0.427	0.310	31.450	31.760	-26.326	58.086
0.810	0.320	31.080	31.400	-24.600	56.000
1.087	0.320	27.980	28.300	-27.700	56.000
10.013	0.500	26.730	27.230	-32.770	60.000
Average					
0.158	0.300	31.850	32.150	-23.621	55.771
0.205	0.300	23.320	23.620	-30.809	54.429
0.427	0.310	16.030	16.340	-31.746	48.086
0.810	0.320	17.670	17.990	-28.010	46.000
1.087	0.320	10.680	11.000	-35.000	46.000
10.013	0.500	12.440	12.940	-37.060	50.000

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. "■" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : GPS
 Test Item : Conducted Emission Test
 Power Line : Line 1
 Test Mode : Mode 2: Transmitter -3Mbps(8DPSK) (2441MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
LINE 1					
Quasi-Peak					
0.287	0.300	20.260	20.560	-41.526	62.086
0.416	0.300	32.480	32.780	-25.620	58.400
0.642	0.305	32.080	32.385	-23.615	56.000
0.931	0.310	32.040	32.350	-23.650	56.000
10.115	0.600	28.550	29.150	-30.850	60.000
11.916	0.750	24.670	25.420	-34.580	60.000
Average					
0.287	0.300	8.150	8.450	-43.636	52.086
0.416	0.300	25.810	26.110	-22.290	48.400
0.642	0.305	19.970	20.275	-25.725	46.000
0.931	0.310	13.030	13.340	-32.660	46.000
10.115	0.600	15.270	15.870	-34.130	50.000
11.916	0.750	10.450	11.200	-38.800	50.000

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. "■" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

Product : GPS
 Test Item : Conducted Emission Test
 Power Line : Line 2
 Test Mode : Mode 2: Transmitter -3Mbps(8DPSK) (2441MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV	Margin dB	Limit dBuV
LINE 2					
Quasi-Peak					
0.162	0.300	37.610	37.910	-27.747	65.657
0.212	0.300	32.720	33.020	-31.209	64.229
0.252	0.300	32.750	33.050	-30.036	63.086
0.646	0.310	31.210	31.520	-24.480	56.000
0.798	0.320	31.350	31.670	-24.330	56.000
10.127	0.500	25.180	25.680	-34.320	60.000
Average					
0.162	0.300	25.780	26.080	-29.577	55.657
0.212	0.300	13.180	13.480	-40.749	54.229
0.252	0.300	20.370	20.670	-32.416	53.086
0.646	0.310	14.570	14.880	-31.120	46.000
0.798	0.320	18.390	18.710	-27.290	46.000
10.127	0.500	14.770	15.270	-34.730	50.000

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. "■" means the worst emission level.
3. Measurement Level = Reading Level + Correct Factor

3. Peak Power Output

3.1. Test Equipment

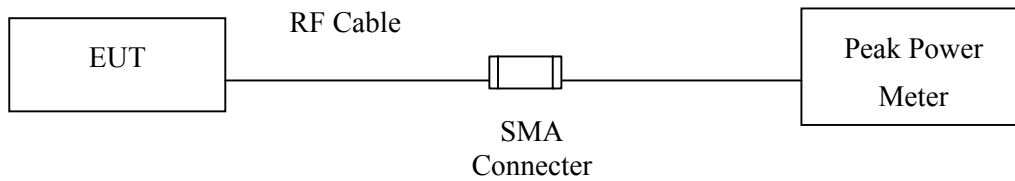
The following test equipments are used during the radiated emission tests:

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Power Meter	Anritsu	ML2495A/6K00003357	May, 2008
X	Power Sensor	Anritsu	MA2491A/034457	May, 2008

- Note:
1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
 2. The test instruments marked with “X” are used to measure the final test results.

3.2. Test Setup

Conducted Measurement



3.3. Test procedures

The EUT was setup according to ANSI C63.4, 2003 for compliance to FCC 47CFR 15.247 requirements

3.4. Limit

For frequency hopping systems in the 2400-2483.5 MHz band employing at least 75 hopping channels: 1Watt.

For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 Watt.

3.5. Uncertainty

± 1.27 dB

3.6. Test Result of Peak Power Output

Product : GPS
Test Item : Peak Power Output
Test Site : No.3 OATS
Test Mode : Mode 1: Transmitter -1Mbps(GFSK)

Channel No.	Frequency (MHz)	Cable loss (dB)	Peak Power Output (dBm)	Limit (dBm)	Result
Channel 00	2402.00	0.5	1.45	30	Pass
Channel 39	2441.00	0.5	1.50	30	Pass
Channel 78	2480.00	0.5	1.35	30	Pass

Note: Peak Power Output = Reading value on peak power meter + cable loss

Product : GPS
Test Item : Peak Power Output
Test Site : No.3 OATS
Test Mode : Mode 2: Transmitter -3Mbps(8DPSK)

Channel No.	Frequency (MHz)	Cable loss (dB)	Peak Power Output (dBm)	Limit (dBm)	Result
Channel 00	2402.00	0.5	1.63	30	Pass
Channel 39	2441.00	0.5	1.70	30	Pass
Channel 78	2480.00	0.5	1.32	30	Pass

Note: Peak Power Output =Reading value on peak power meter + cable loss

4. Radiated Emission

4.1. Test Equipment

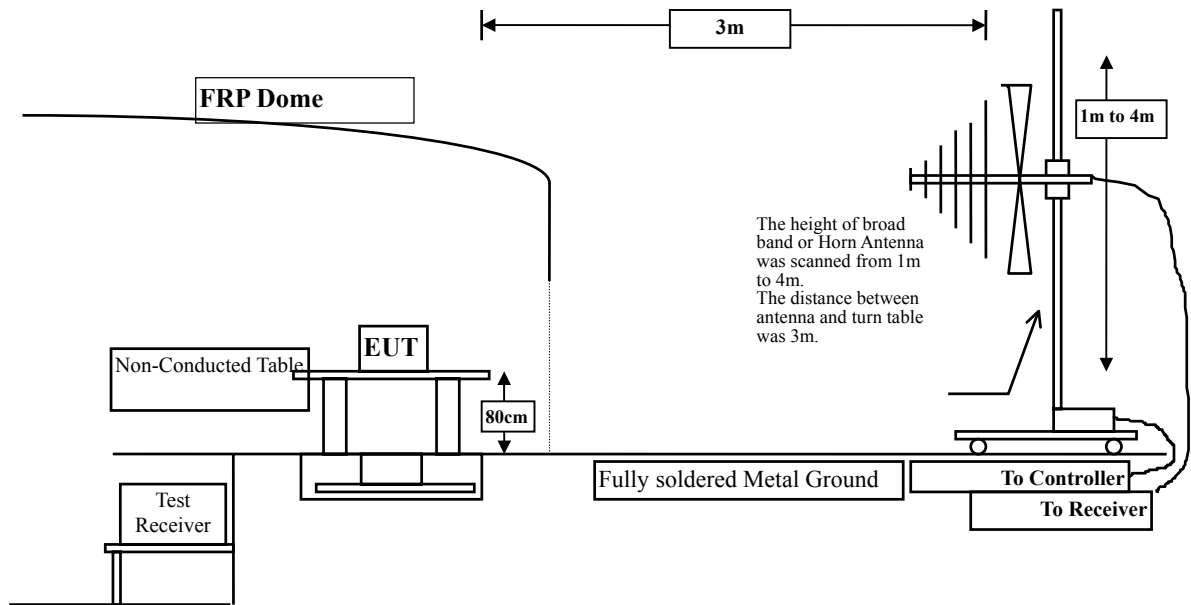
The following test equipments are used during the radiated emission test:

Test Site	Equipment	Manufacturer	Model No./Serial No.	LAST CAL.
<input type="checkbox"/> Site # 1	Test Receiver	R & S	ESVS 10 / 834468/003	May, 2008
	Spectrum Analyzer	Advantest	R3162/ 00803480	May, 2008
	Pre-Amplifier	Advantest	BB525C/ 3307A01812	May, 2008
	Bilog Antenna	SCHAFFNER	CBL6112B / 2697	Sep., 2007
<input type="checkbox"/> Site # 2	Test Receiver	R & S	ESCS 30 / 836858 / 022	May, 2008
	Spectrum Analyzer	Advantest	R3162 / 100803466	May, 2008
	Pre-Amplifier	Advantest	BB525C/3307A01814	May, 2008
	Bilog Antenna	SCHAFFNER	CBL6112B / 2705	May, 2008
	Horn Antenna	ETS	3115 / 0005-6160	Sep., 2007
	Pre-Amplifier	QTK	QTK-AMP-01/ 0001	May, 2008
<input checked="" type="checkbox"/> Site # 3	Test Receiver	R & S	ESI 26 / 838786 / 004	May, 2008
	Spectrum Analyzer	HP	E4407B / US39440758	May, 2008
	Bilog Antenna	SCHAFFNER	CBL6112B / 2697	May, 2008
	Horn Antenna	Schwarzbeck	BBHA9120D / 305, 306	July, 2007
	Horn Antenna	Schwarzbeck	BBHA9170 / 208, 209	July, 2007
	Pre-Amplifier	QTK	QTK-AMP-01 / 0001	July, 2007
	Pre-Amplifier	QTK	QTK-AMP-03 / 0003	May, 2008
	Pre-Amplifier	HP	8449B / 3008A01123	July, 2007

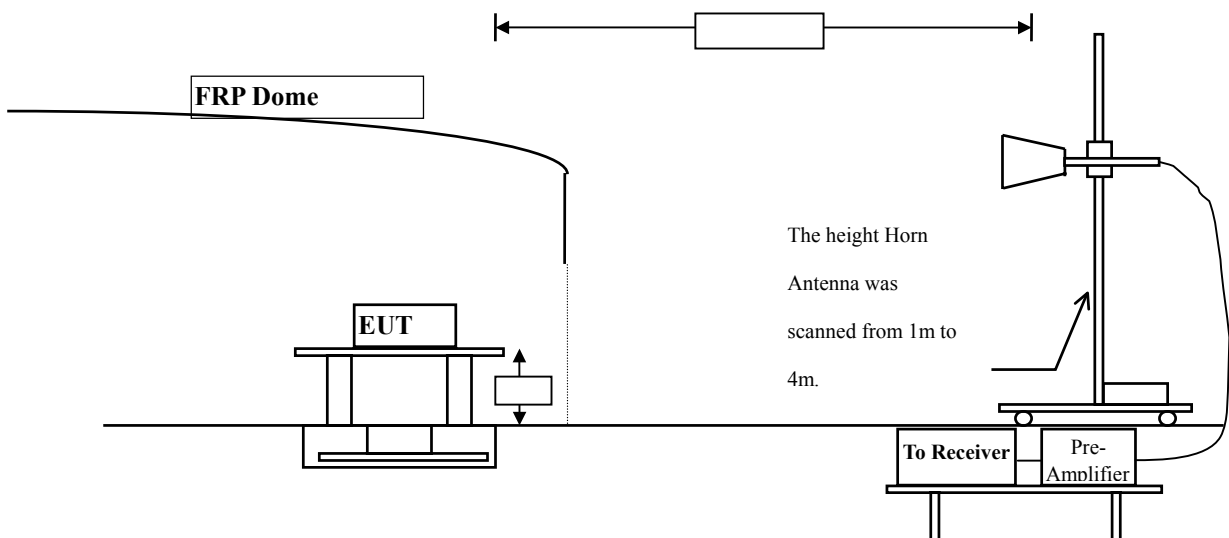
- Note:
1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
 2. The test instruments marked with "X" are used to measure the final test results.

4.2. Test Setup

Radiated Emission Below 1GHz



Radiated Emission Above 1GHz



4.3. Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart C Paragraph 15.209 Limits		
Frequency MHz	uV/m @3m	dBuV/m@3m
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Remarks: E field strength (dBuV/m) = 20 log E field strength (uV/m)

4.4. Test Procedure

The EUT was setup according to ANSI C63.4, 2003 and tested according to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4:2003 on radiated measurement.

The resolution bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz.

Radiated emission measurements below 1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB beamwidth of the antenna.

The worst radiated emission is measured on the Final Measurement.

The frequency range from 30MHz to 10th harmonics is checked.

4.5. Uncertainty

± 3.9 dB above 1GHz

± 3.8 dB below 1GHz

4.6. Test Result of Radiated Emission

Product : GPS
 Test Item : Harmonic Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter -1Mbps(GFSK)(2402MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4804.000	-0.205	42.640	42.435	-31.565	74.000
7206.000	3.294	42.010	45.304	-28.696	74.000
9608.000	5.696	42.340	48.036	-25.964	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4804.000	-0.205	42.950	42.745	-31.255	74.000
7206.000	3.294	41.940	45.234	-28.766	74.000
9608.000	5.696	43.360	49.056	-24.944	74.000
Average Detector:					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : GPS
 Test Item : Harmonic Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter -1Mbps(GFSK)(2441MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4882.000	-0.276	43.890	43.614	-30.386	74.000
7323.000	3.330	41.750	45.079	-28.921	74.000
9764.000	6.262	40.720	46.983	-27.017	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4882.000	-0.276	44.780	44.504	-29.496	74.000
7323.000	3.330	41.510	44.839	-29.161	74.000
9764.000	6.262	41.270	47.533	-26.467	74.000
Average Detector:					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : GPS
 Test Item : Harmonic Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter -1Mbps(GFSK)(2480MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4960.000	0.591	44.070	44.661	-29.339	74.000
7440.000	3.924	41.540	45.464	-28.536	74.000
9920.000	6.468	40.360	46.828	-27.172	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4960.000	0.591	43.260	43.851	-30.149	74.000
7440.000	3.924	40.790	44.714	-29.286	74.000
9920.000	6.468	40.460	46.928	-27.072	74.000
Average Detector:					
--					

Note:

- All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
- Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
- Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
- "*", means this data is the worst emission level.
- Measurement Level = Reading Level + Correct Factor.
- The average measurement was not performed when the peak measured data under the limit of average detection.

Product : GPS
 Test Item : Harmonic Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter -3Mbps(8DPSK) (2402MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4804.000	-0.205	43.450	43.245	-30.755	74.000
7206.000	3.294	42.110	45.404	-28.596	74.000
9608.000	5.696	41.960	47.656	-26.344	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4804.000	-0.205	42.590	42.385	-31.615	74.000
7206.000	3.294	41.690	44.984	-29.016	74.000
9608.000	5.696	42.770	48.466	-25.534	74.000
Average Detector:					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : GPS
 Test Item : Harmonic Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter -3Mbps(8DPSK) (2441MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4882.000	-0.276	43.220	42.944	-31.056	74.000
7323.000	3.330	41.520	44.849	-29.151	74.000
9764.000	6.262	41.160	47.423	-26.577	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4882.000	-0.276	42.990	42.714	-31.286	74.000
7323.000	3.330	41.300	44.629	-29.371	74.000
9764.000	6.262	41.570	47.833	-26.167	74.000
Average Detector:					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : GPS
 Test Item : Harmonic Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter -3Mbps(8DPSK) (2480MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
Peak Detector:					
4960.000	0.591	43.480	44.071	-29.929	74.000
7440.000	3.924	41.350	45.274	-28.726	74.000
9920.000	6.468	40.510	46.978	-27.022	74.000
Average Detector:					
--					
Vertical					
Peak Detector:					
4960.000	0.591	42.810	43.401	-30.599	74.000
7440.000	3.924	40.940	44.864	-29.136	74.000
9920.000	6.468	40.290	46.758	-27.242	74.000
Average Detector:					
--					

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : GPS
 Test Item : General Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter -1Mbps(GFSK)(2441MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
299.660	14.132	11.496	25.628	-20.372	46.000
400.540	16.687	8.435	25.122	-20.878	46.000
480.080	18.759	6.836	25.595	-20.405	46.000
544.100	19.945	6.284	26.229	-19.771	46.000
759.440	21.779	5.482	27.261	-18.739	46.000
961.200	22.909	12.416	35.325	-18.675	54.000
Vertical					
179.380	9.648	18.893	28.541	-14.959	43.500
299.660	13.749	12.024	25.773	-20.227	46.000
613.940	21.655	1.618	23.273	-22.727	46.000
749.740	23.178	1.446	24.624	-21.376	46.000
842.860	21.417	3.677	25.094	-20.906	46.000
961.200	23.009	7.715	30.724	-23.276	54.000

Note:

1. All Readings below 1GHz are Quasi-Peak Value
2. "█" means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Product : GPS
 Test Item : General Radiated Emission
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter -3Mbps(8DPSK) (2441MHz)

Frequency MHz	Correct Factor dB	Reading Level dBuV	Measurement Level dBuV/m	Margin dB	Limit dBuV/m
Horizontal					
196.840	9.510	21.482	30.992	-12.508	43.500
253.100	13.532	13.332	26.864	-19.136	46.000
299.660	14.132	11.277	25.409	-20.591	46.000
377.260	15.837	11.202	27.039	-18.961	46.000
472.320	18.759	9.300	28.059	-17.941	46.000
961.200	22.909	12.330	35.239	-18.761	54.000
Vertical					
179.380	9.648	18.056	27.704	-15.796	43.500
241.460	12.514	15.369	27.883	-18.117	46.000
299.660	13.749	12.848	26.597	-19.403	46.000
359.800	15.957	17.762	33.719	-12.281	46.000
396.660	17.644	8.861	26.505	-19.495	46.000
961.200	23.009	7.612	30.621	-23.379	54.000

Note:

- 1 All Readings below 1GHz are Quasi-Peak Value
2. "█" means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

5. Spurious RF Conducted Emissions

5.1. Test Equipment

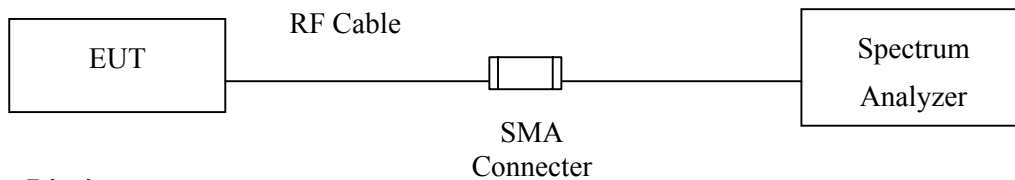
The following test equipments are used during the band edge tests:

Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X Spectrum Analyzer	R & S	FSP40 / 100170	Nov, 2007
Test Site	Site 3		

- Note: 1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
 2. The test instruments marked with “X” are used to measure the final test results.

5.2. Test Setup

Spurious RF Conducted Measurement



5.3. Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz 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 the 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)).

5.4. Test Procedure

The EUT was setup according to ANSI C63.4, 2003 and tested according to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

Set RBW=100KHz, VBW ≥ RBW, Sweep = auto, Detector function = peak

Trace = max hold

5.5. Uncertainty

± 3.9 dB above 1GHz

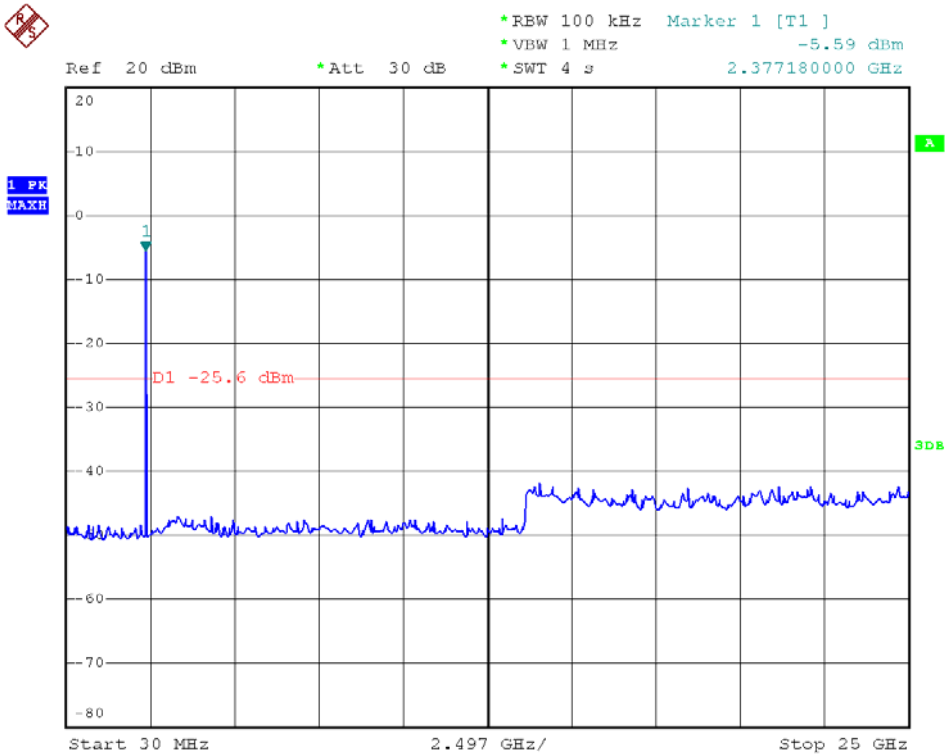
± 3.8 dB below 1GHz

5.6. Test Result of Spurious RF Conducted Emissions

Product : GPS
 Test Item : Spurious RF Conducted Emissions
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter -1Mbps(GFSK)

Spurious RF Conducted Measurement:

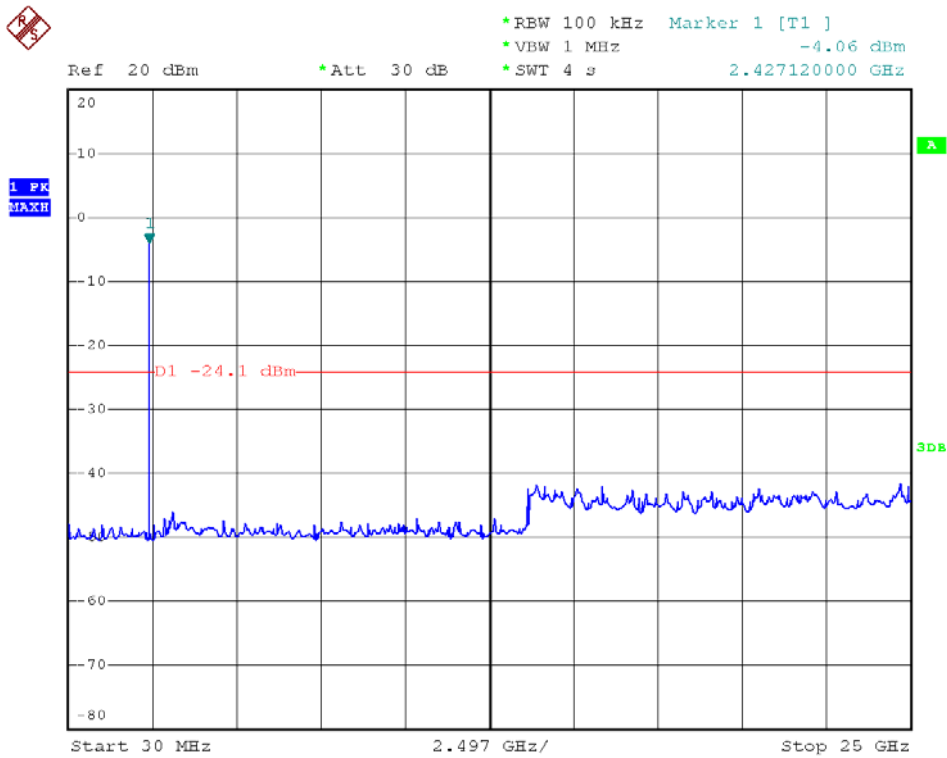
Channel No.	Frequency (MHz)	Required Limit (dBc)	Result
00	2402	>20dB	Pass



Product : GPS
 Test Item : Spurious RF Conducted Emissions
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter -1Mbps(GFSK)

Spurious RF Conducted Measurement:

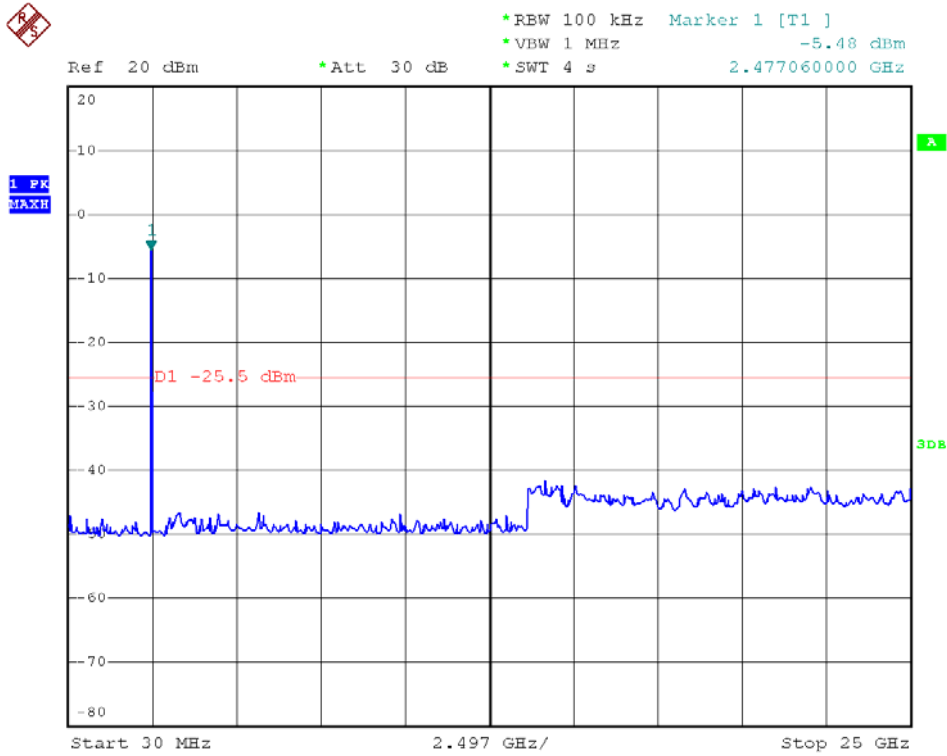
Channel No.	Frequency (MHz)	Required Limit (dBc)	Result
39	2441	>20dB	Pass



Product : GPS
 Test Item : Spurious RF Conducted Emissions
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter -1Mbps(GFSK)

Spurious RF Conducted Measurement:

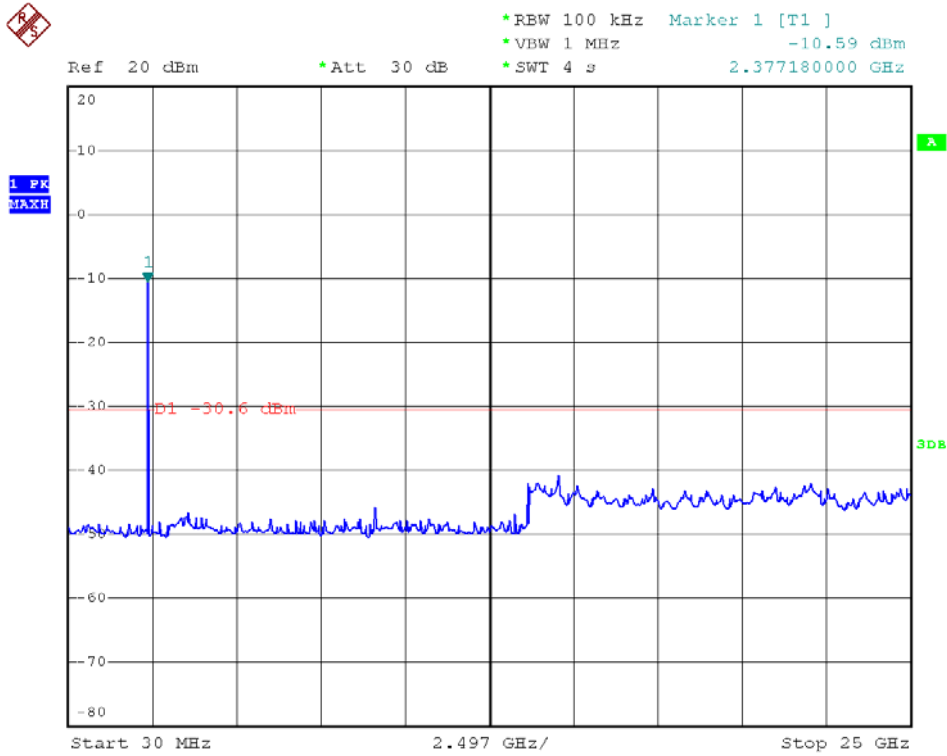
Channel No.	Frequency (MHz)	Required Limit (dBc)	Result
78	2480	>20dB	Pass



Product : GPS
 Test Item : Spurious RF Conducted Emissions
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter -3Mbps(8DPSK)

Spurious RF Conducted Measurement:

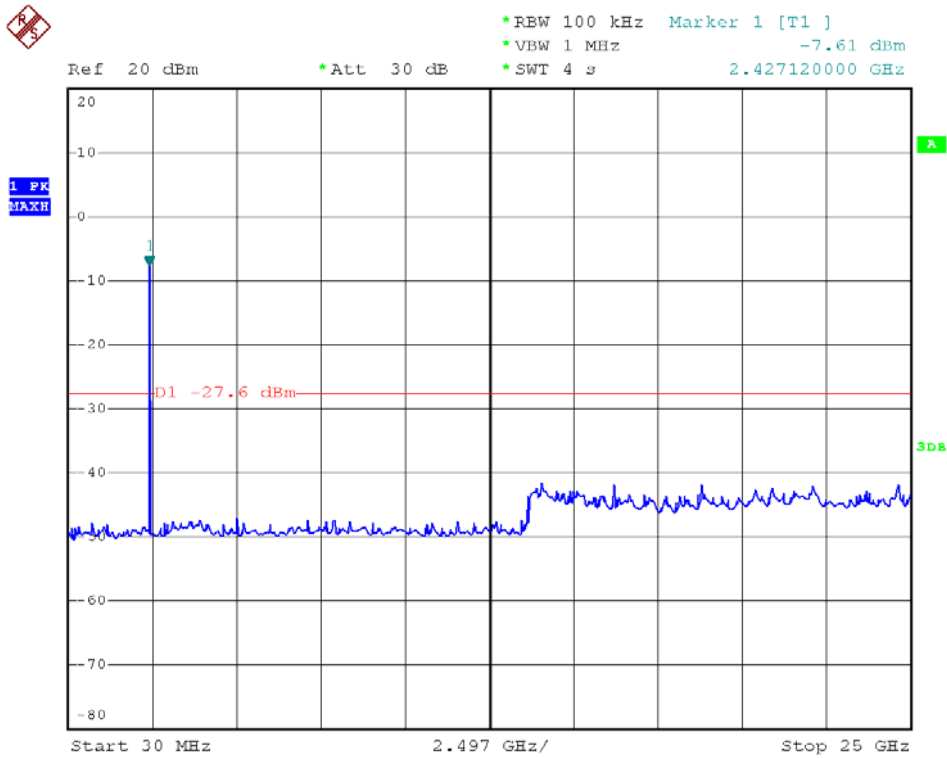
Channel No.	Frequency (MHz)	Required Limit (dBc)	Result
00	2402	>20dB	Pass



Product : GPS
 Test Item : Spurious RF Conducted Emissions
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter -3Mbps(8DPSK)

Spurious RF Conducted Measurement:

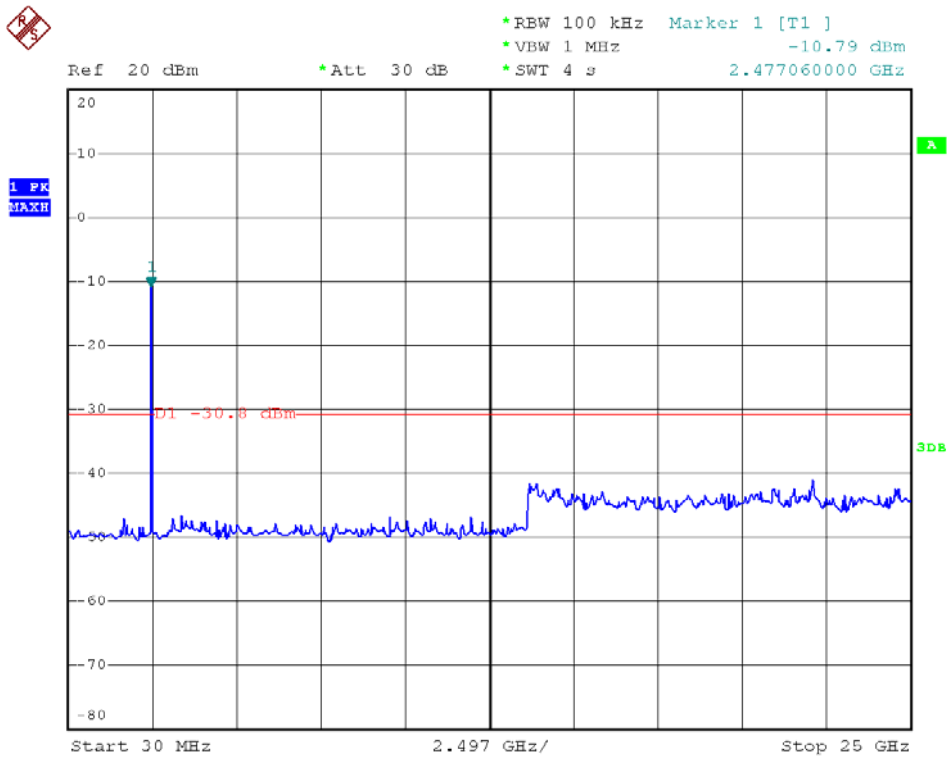
Channel No.	Frequency (MHz)	Required Limit (dBc)	Result
39	2441	>20dB	Pass



Product : GPS
 Test Item : Spurious RF Conducted Emissions
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter -3Mbps(8DPSK)

Spurious RF Conducted Measurement:

Channel No.	Frequency (MHz)	Required Limit (dBc)	Result
78	2480	>20dB	Pass



6. Radiated Emission Band Edge

6.1. Test Equipment

The following test equipments are used during the band edge tests:

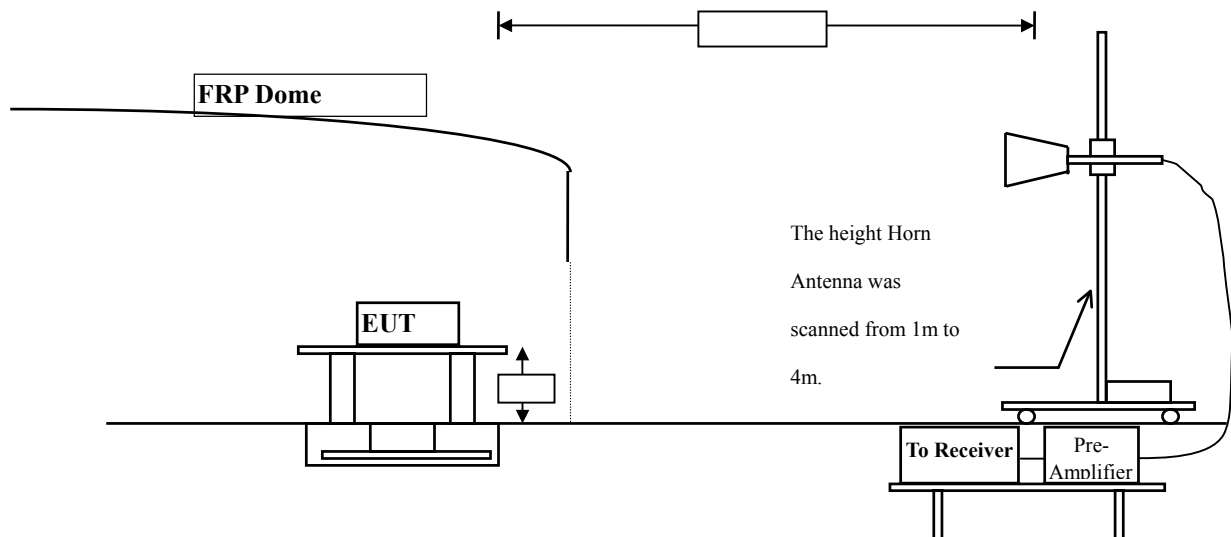
	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
X	Test Receiver	R & S	ESI 26 / 838786 / 004	May, 2008
X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2008
X	Bilog Antenna	SCHAFFNER	CBL6112B / 2697	May, 2008
X	Horn Antenna	Schwarzbeck	BBHA9120D / 305, 306	July, 2007
X	Horn Antenna	Schwarzbeck	BBHA9170 / 208, 209	July, 2007
X	Pre-Amplifier	QTK	QTK-AMP-01 / 0001	July, 2007
X	Pre-Amplifier	QTK	QTK-AMP-03 / 0003	May, 2008
X	Pre-Amplifier	Agilent	8449B / 3008A01123	July, 2007

Test Site Site 3

- Note:
1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
 2. The test instruments marked with “X” are used to measure the final test results.

6.2. Test Setup

RF Radiated Measurement:



6.3. Limit

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

6.4. Test Procedure

The EUT was setup according to ANSI C63.4, 2003 and tested according to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements.

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4:2003 on radiated measurement.

6.5. Uncertainty

± 3.9 dB above 1GHz

± 3.8 dB below 1GHz

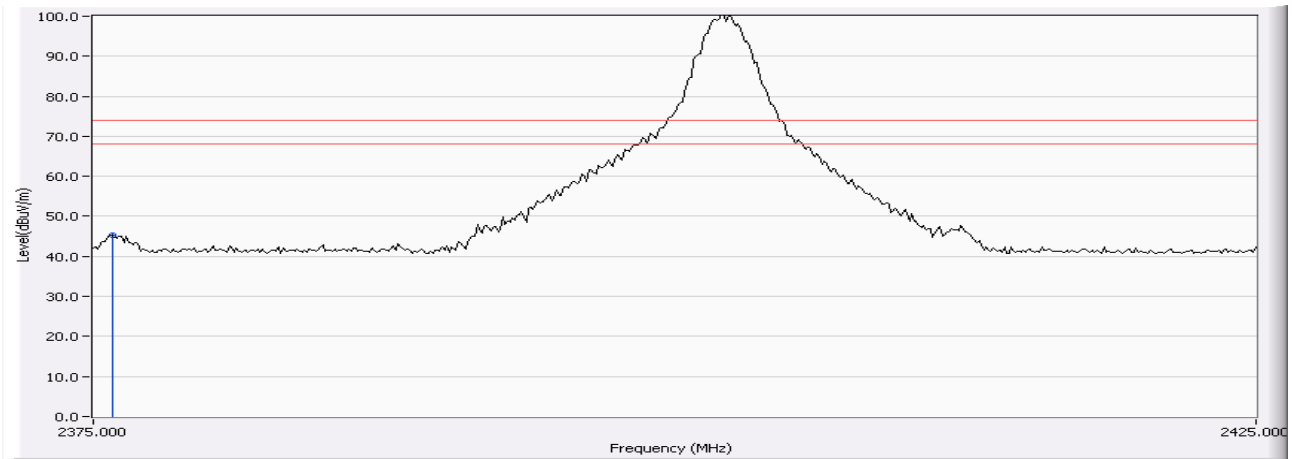
6.6. Test Result of Band Edge

Product : GPS
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter -1Mbps(GFSK)(2402MHz)

RF Radiated Measurement (Horizontal):

CHANNEL	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
00 (Peak)	2375.800	-2.467	47.731	45.264	74.00	54.00	Pass

Figure Channel 00: (Horizontal) (Peak)



Note:

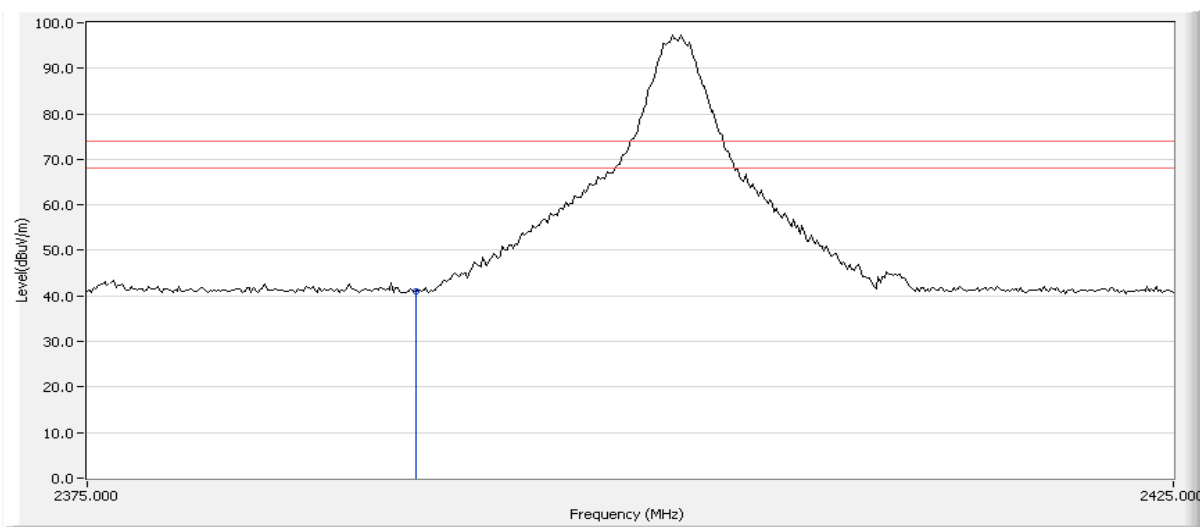
1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : GPS
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter -1Mbps(GFSK)(2402MHz)

RF Radiated Measurement (Vertical):

CHANNEL	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
00 (Peak)	2390.000	-2.405	43.367	40.963	74.00	54.00	Pass

Figure Channel 00: (Vertical) (Peak)



Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : GPS
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter -1Mbps(GFSK)(2480MHz)

RF Radiated Measurement (Horizontal):

CHANNEL	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
78(Peak)	2483.500	-1.987	67.374	65.387	74.00	54.00	Pass
78(Average)	2483.500	-1.987	33.327	31.340	74.00	54.00	Pass

Figure Channel 78: (Horizontal) (Peak)

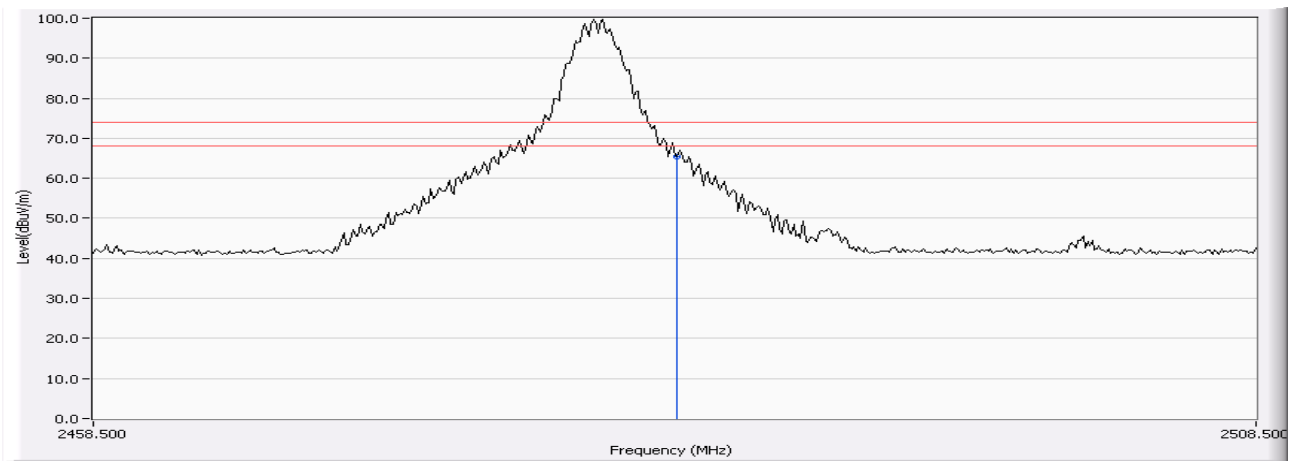
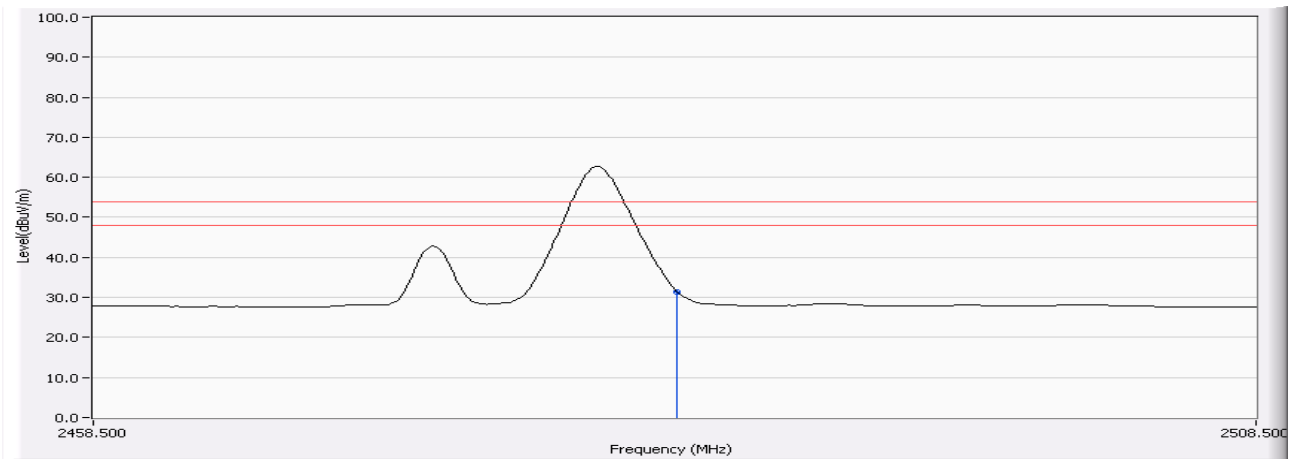


Figure Channel 78: (Horizontal) (Average)



Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : GPS
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter -1Mbps(GFSK)(2480MHz)

RF Radiated Measurement (Vertical):

CHANNEL	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	PEAK LIMIT (dBuV/m)	AVERAGE LIMIT (dBuV/m)	Result
78(Peak)	2483.500	-1.987	65.202	63.215	74.00	54.00	Pass
78(Average)	2483.500	-1.987	34.487	32.500	74.00	54.00	Pass

Figure Channel 78: (Vertical) (Peak)

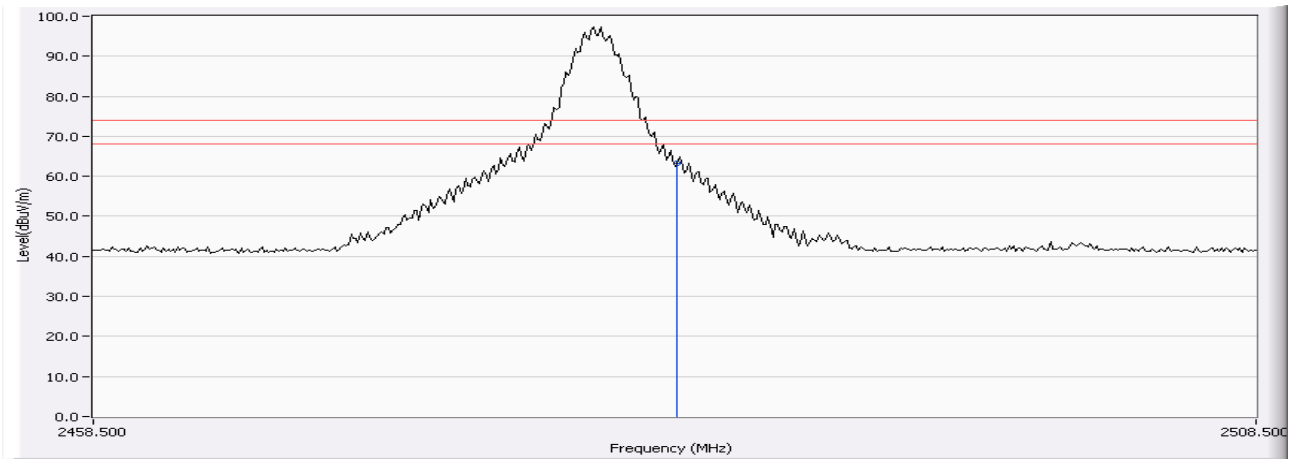
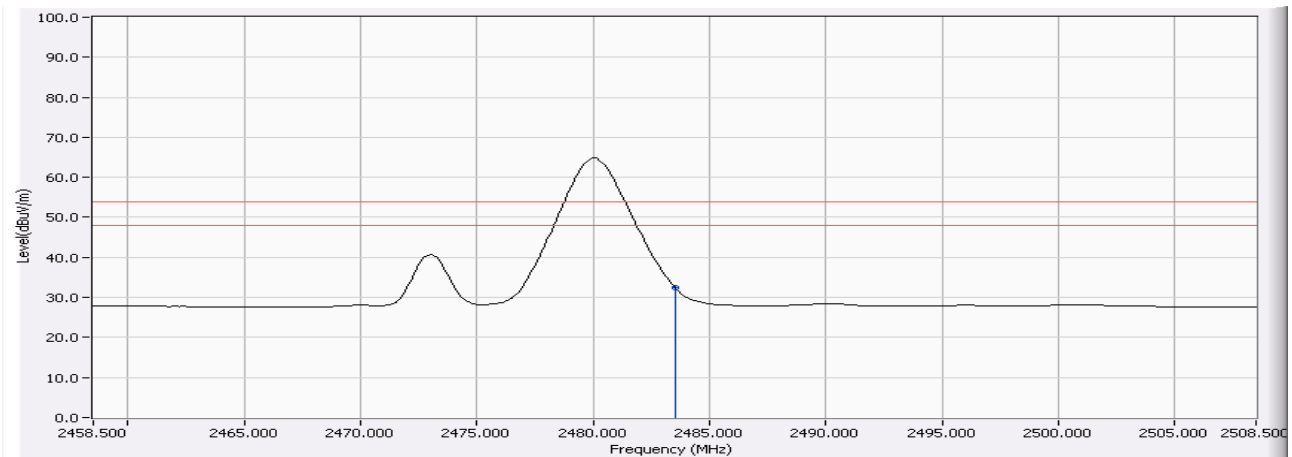


Figure Channel 78: (Vertical) (Average)



Note:

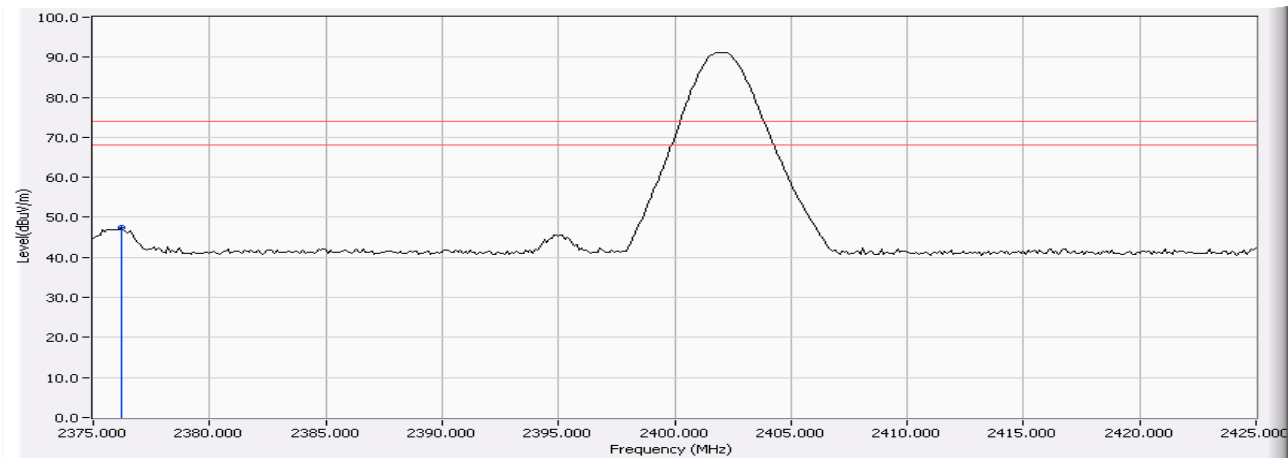
1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : GPS
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter -3Mbps(8DPSK)(2402MHz)

RF Radiated Measurement (Horizontal):

CHANNEL	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
00 (Peak)	2376.200	-2.466	49.889	47.423	74.00	54.00	Pass

Figure Channel 00: (Horizontal) (Peak)



Note:

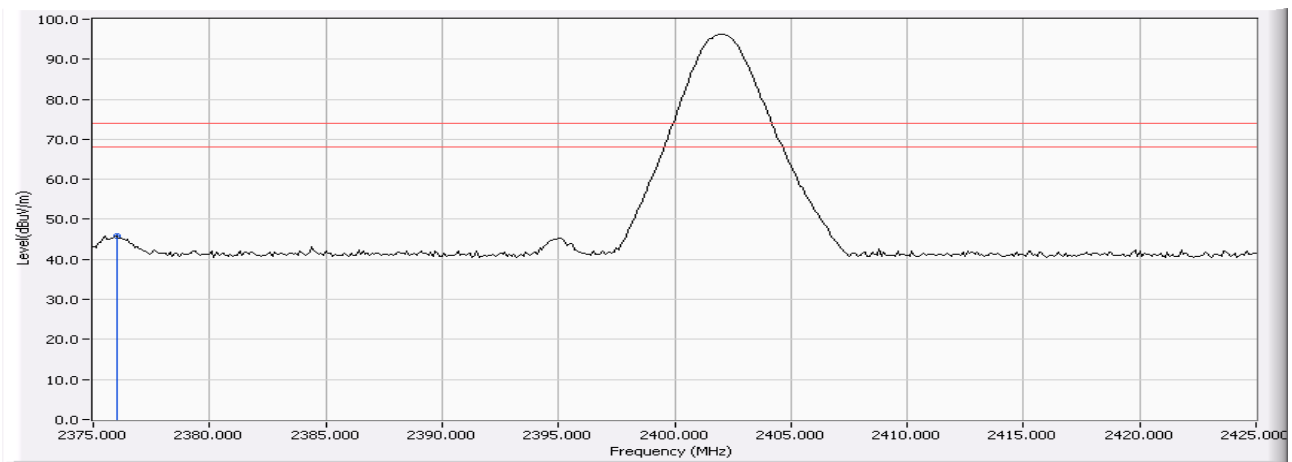
1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : GPS
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter -3Mbps(8DPSK)(2402MHz)

RF Radiated Measurement (Vertical):

CHANNEL	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
00 (Peak)	2376.000	-2.466	48.317	45.850	74.00	54.00	Pass

Figure Channel 00: (Vertical) (Peak)



Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : GPS
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter -3Mbps(8DPSK)(2480MHz)

RF Radiated Measurement (Horizontal):

CHANNEL	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Result
78(Peak)	2483.500	-1.987	56.585	54.598	74.00	54.00	Pass
78(Average)	2483.500	-1.987	42.380	40.393	74.00	54.00	Pass

Figure Channel 78: (Horizontal) (Peak)

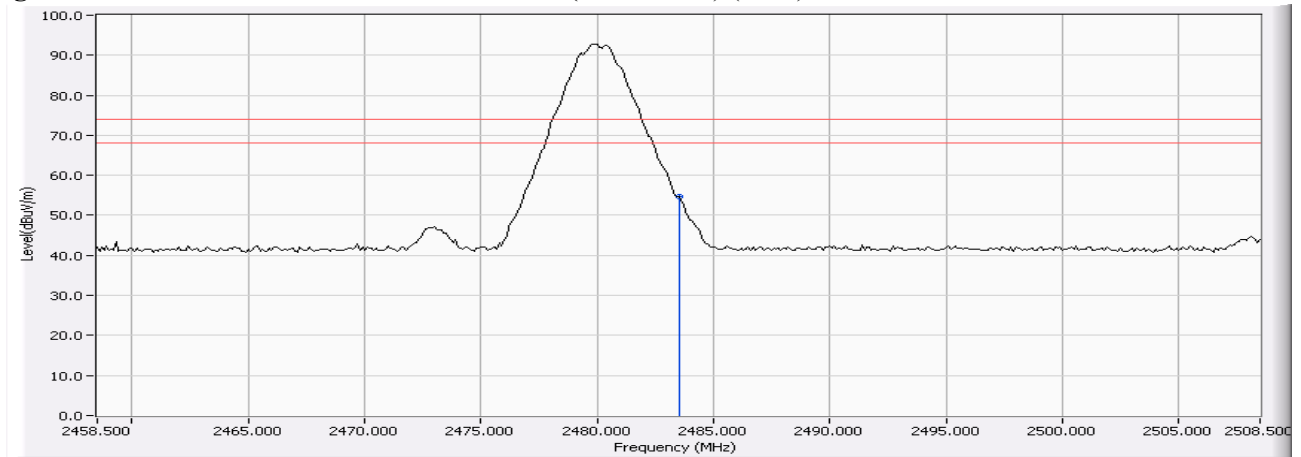
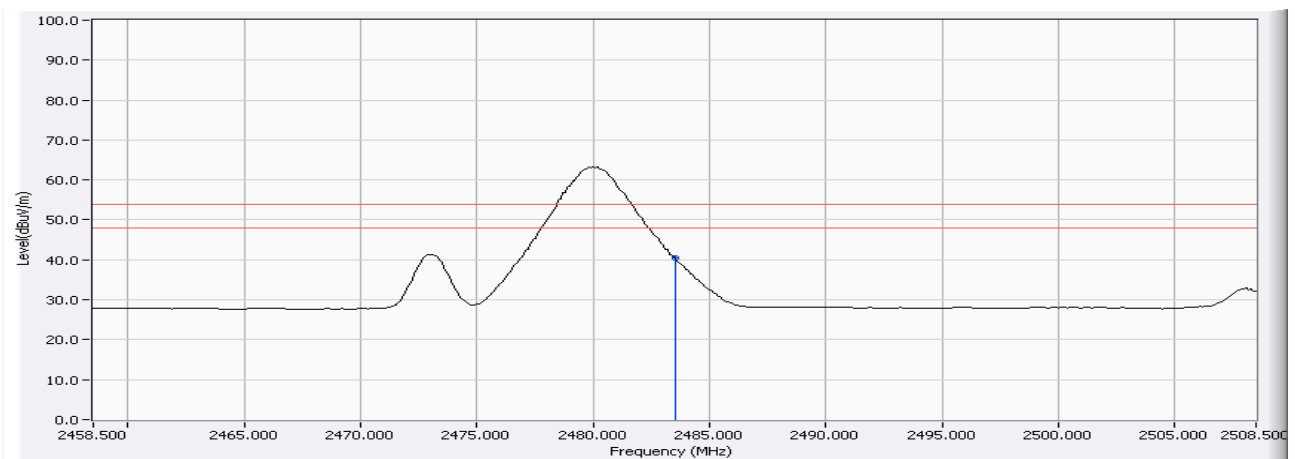


Figure Channel 78: (Horizontal) (Average)



Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : GPS
 Test Item : Band Edge
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter -3Mbps(8DPSK)(2480MHz)

RF Radiated Measurement (Vertical):

CHANNEL	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	PEAK LIMIT (dBuV/m)	AVERAGE LIMIT (dBuV/m)	Result
78(Peak)	2483.500	-1.987	60.915	58.928	74.00	54.00	Pass
78(Average)	2483.500	-1.987	44.993	43.006	74.00	54.00	Pass

Figure Channel 78: (Vertical) (Peak)

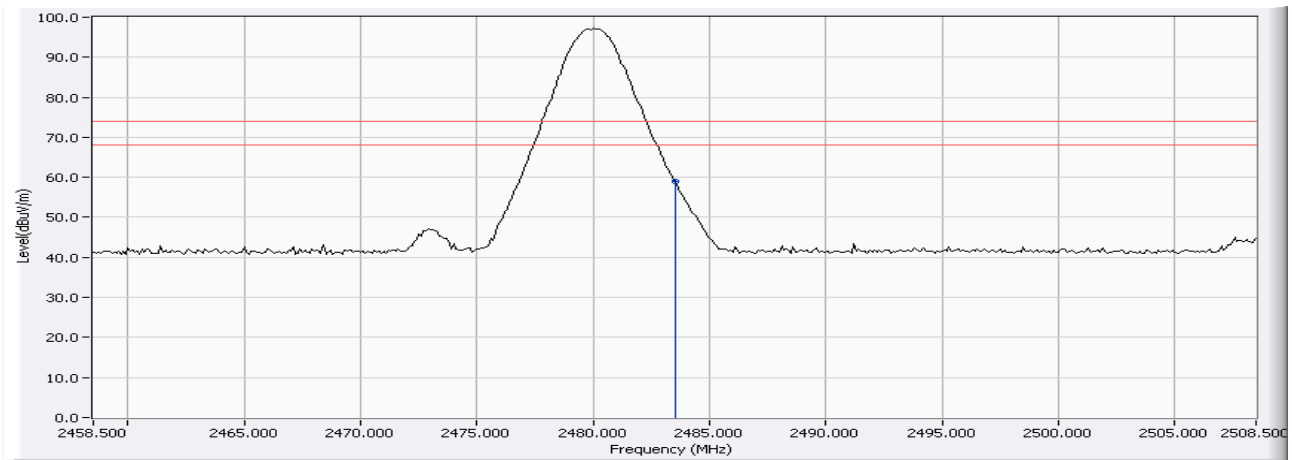
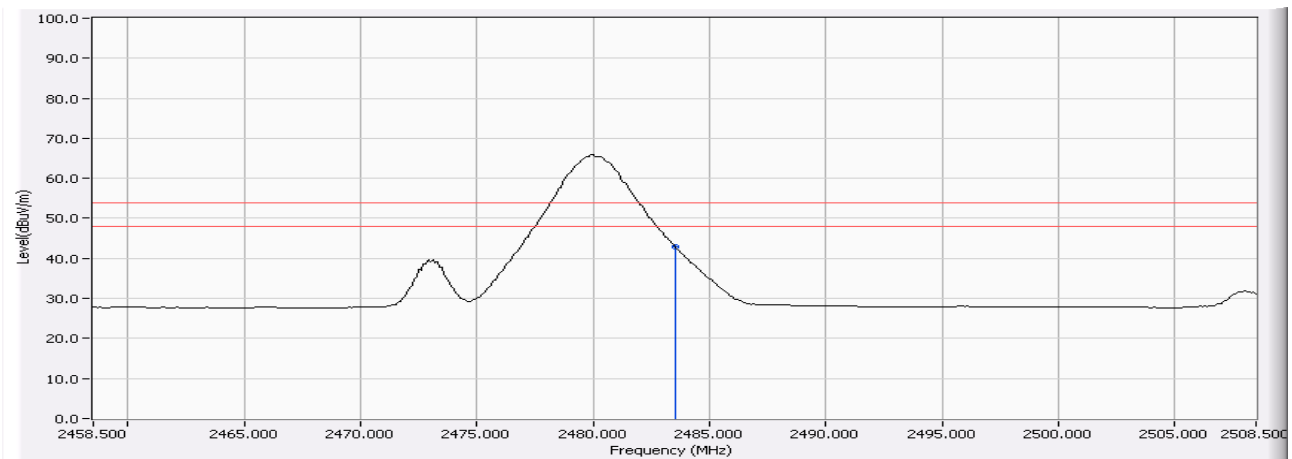


Figure Channel 78: (Vertical) (Average)



Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection..

7. Channel Number

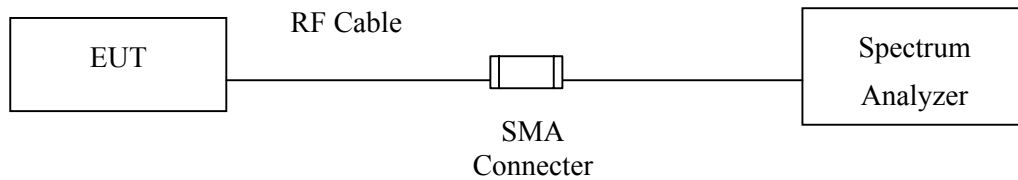
7.1. Test Equipment

The following test equipments are used during the radiated emission tests:

Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Spectrum Analyzer	R & S	FSP40 / 100170	Nov, 2007
X Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2008

- Note:
1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
 2. The test instruments marked with “X” are used to measure the final test results.

7.2. Test Setup



7.3. Limit

Number of hopping frequencies ≥ 75

7.4. Test Procedures

The EUT was setup according to ANSI C63.4, 2003 and tested according to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements

Span = the frequency band of operation

RBW $\geq 1\%$ of the span , VBW \geq RBW

Sweep = auto, Detector function = peak, Trace = max hold

7.5. Uncertainty

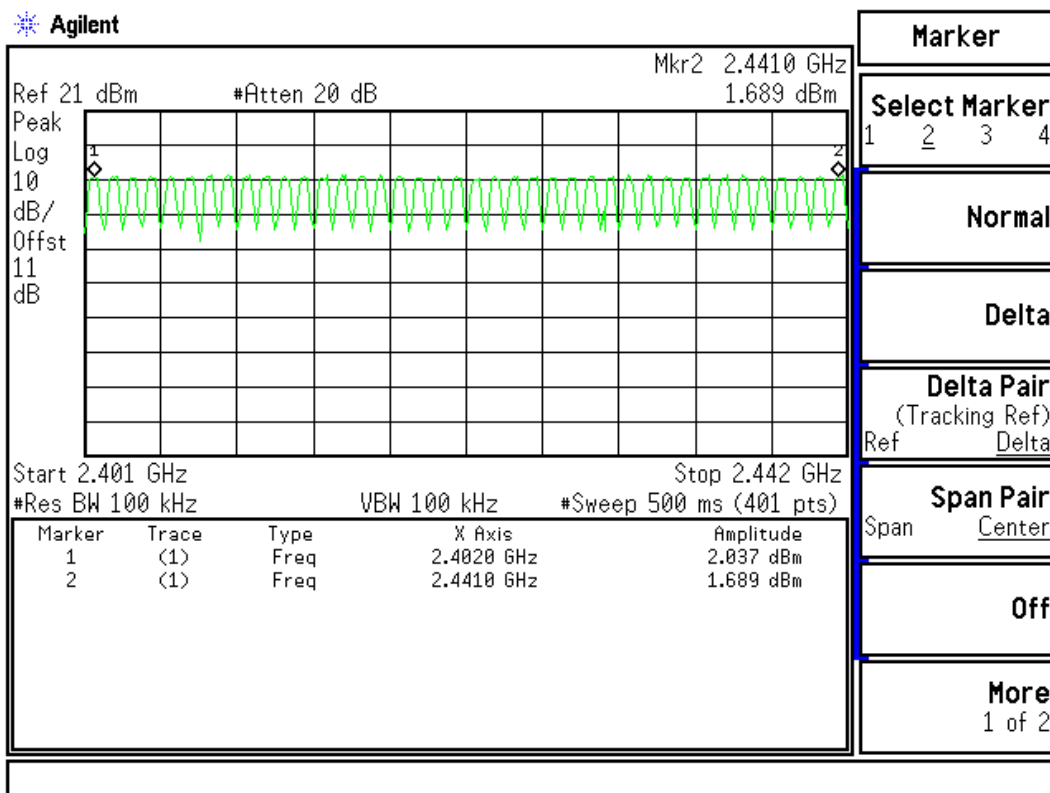
N/A

7.6. Test Result of Channel Number

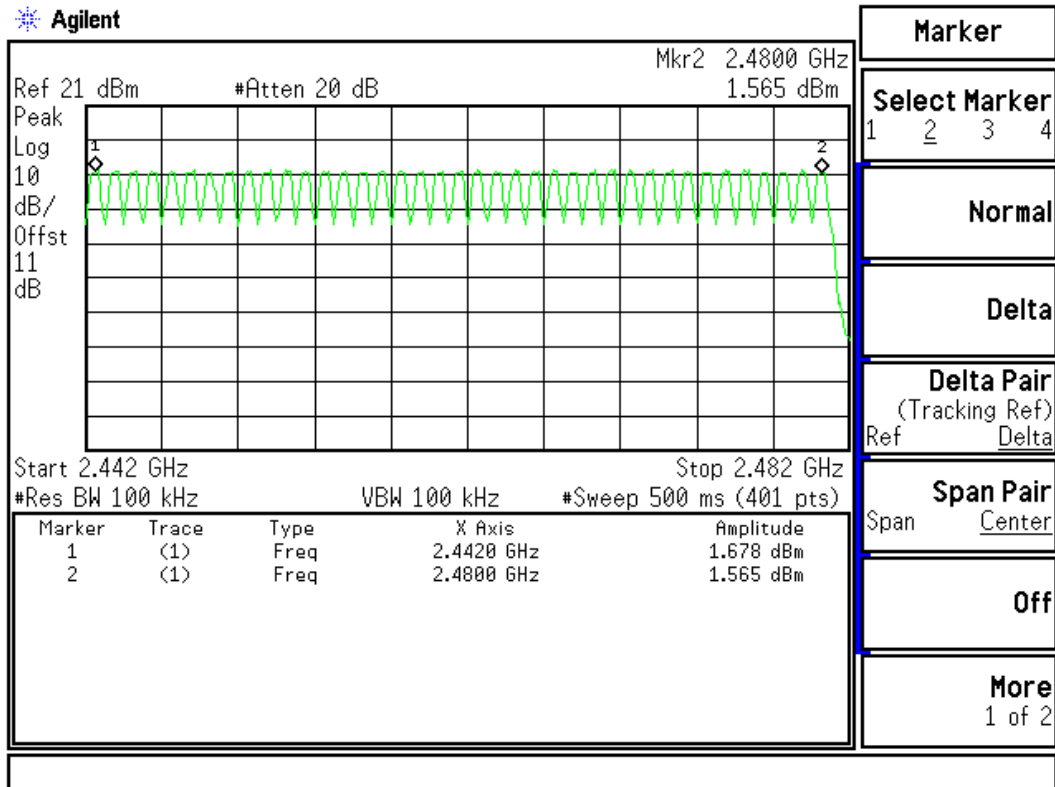
Product : GPS
 Test Item : Channel Number
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter -1Mbps(GFSK)

Frequency Range (MHz)	Measurement (Hopping Channel)	Required Limit (Hopping Channel)	Result
2402 ~ 2480	79	>75	Pass

2402-2441MHz



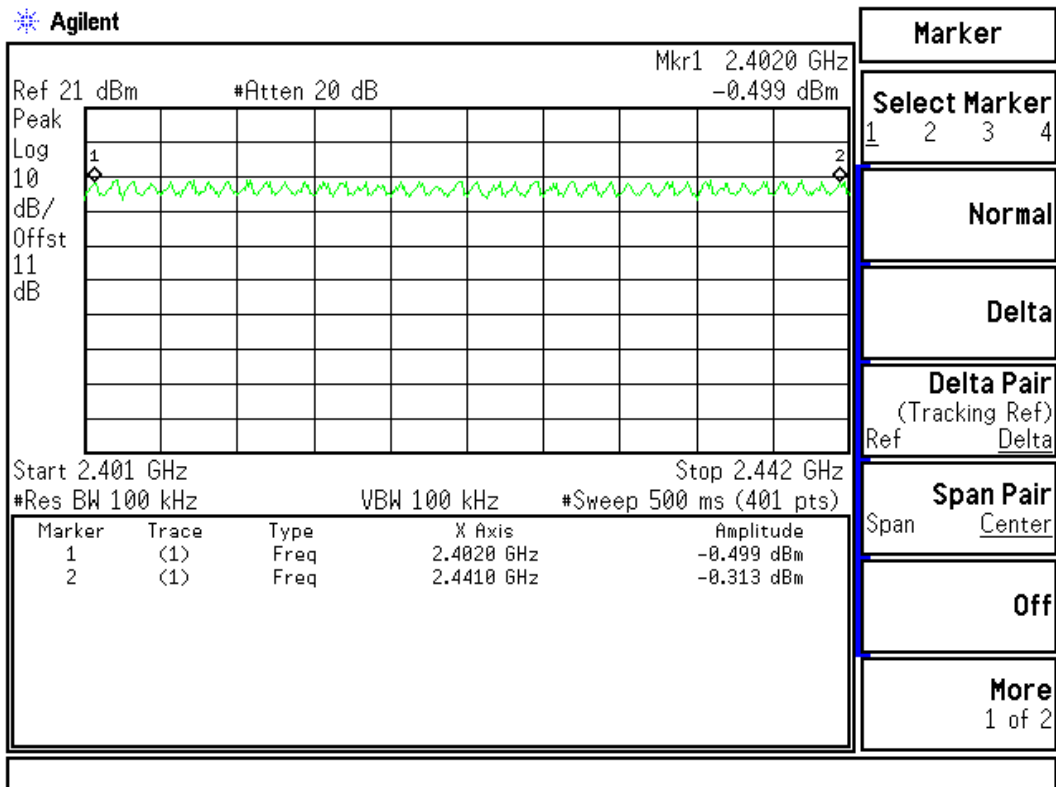
2422-2480MHz



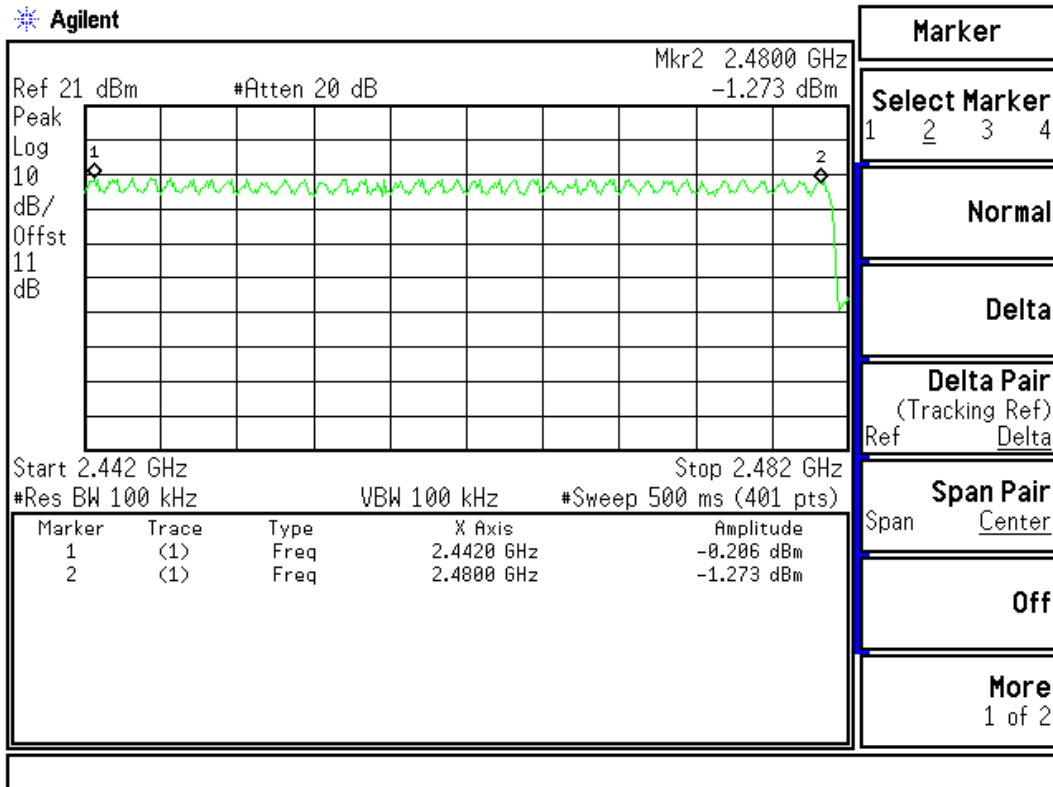
Product : GPS
 Test Item : Channel Number
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter -3Mbps(8DPSK)

Frequency Range (MHz)	Measurement (Hopping Channel)	Required Limit (Hopping Channel)	Result
2402 ~ 2480	79	>75	Pass

2402-2441MHz



2442-2480MHz



8. Channel Separation

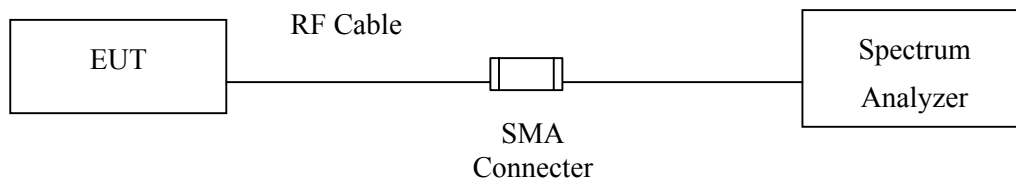
8.1. Test Equipment

The following test equipments are used during the radiated emission tests:

Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Spectrum Analyzer	R & S	FSP40 / 100170	Nov, 2007
X Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2008

- Note:
1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
 2. The test instruments marked with “X” are used to measure the final test results.

8.2. Test Setup



8.3. Limit

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

8.4. Test Procedures

The EUT was setup according to ANSI C63.4, 2003 and tested according to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements

Span = Capture the peaks of two adjacent channels

Resolution Bandwidth (RBW) \geq 1% of the span, VBW \geq RBW

Sweep = auto, Detector function = peak, Trace = max hold

8.5. Uncertainty

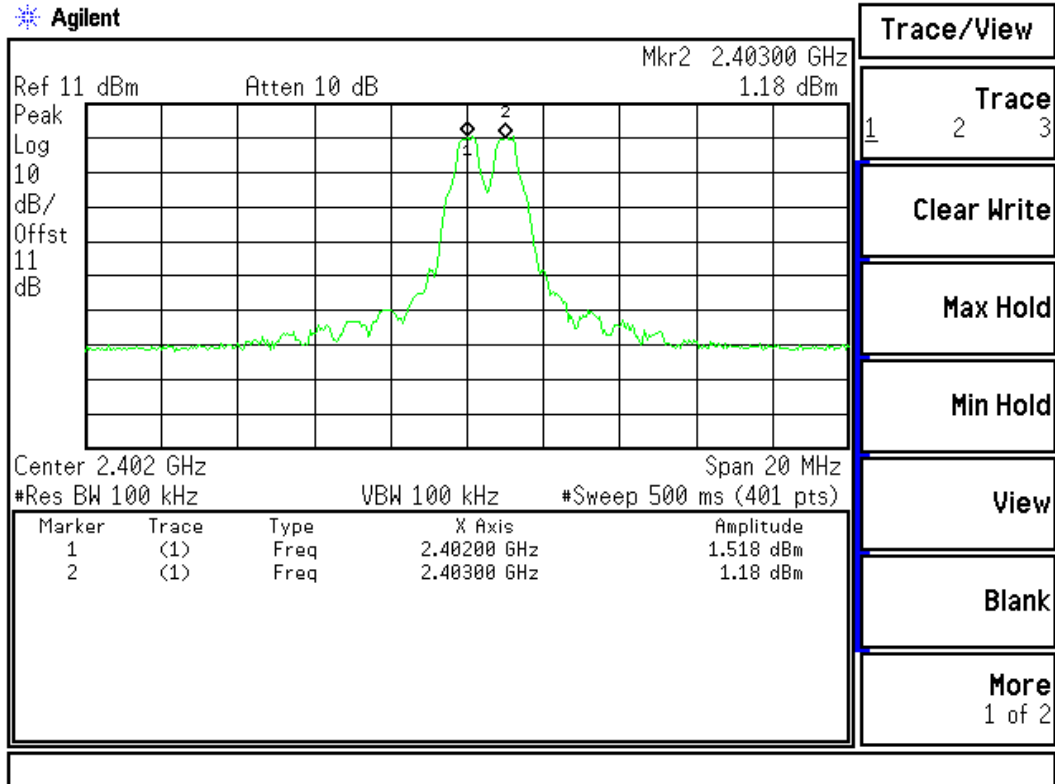
\pm 150Hz

8.6. Test Result of Channel Separation

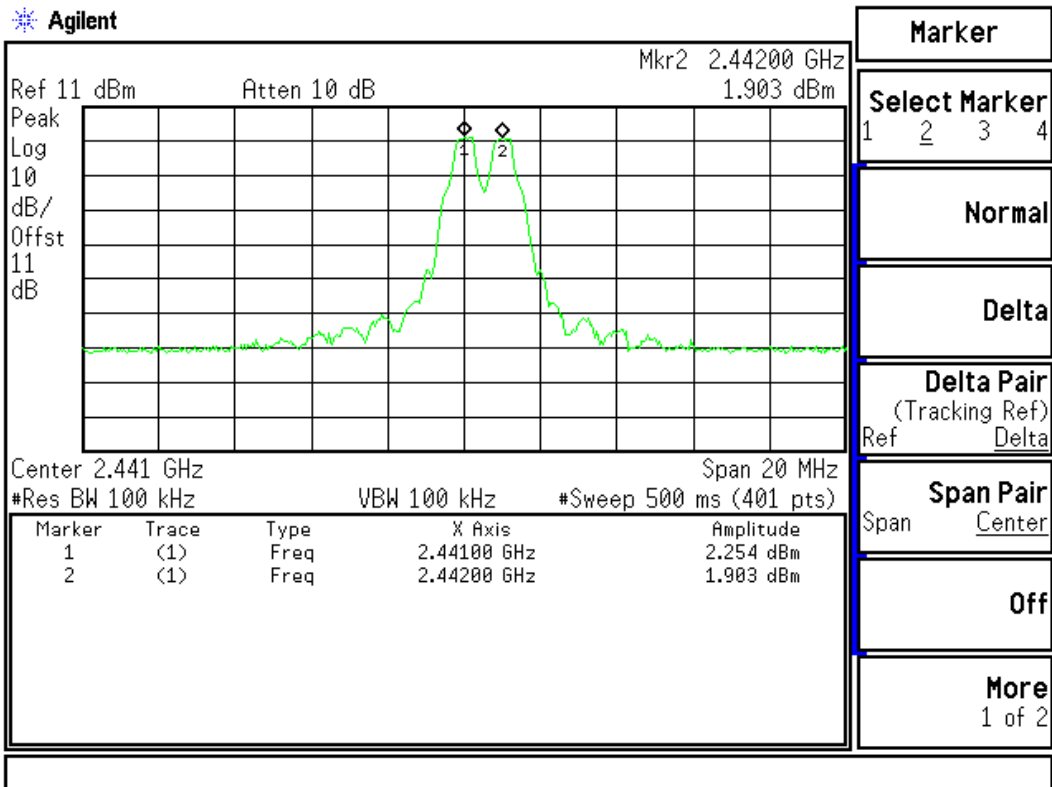
Product : GPS
 Test Item : Channel Separation
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter -1Mbps(GFSK)

Frequency Range (MHz)	Measured Result (MHz)	Required Limit	Result
2402	1.00	>25 kHz or 2/3 * 20 dB BW	Pass
2441	1.00	>25 kHz or 2/3 * 20 dB BW	Pass
2480	1.00	>25 kHz or 2/3 * 20 dB BW	Pass

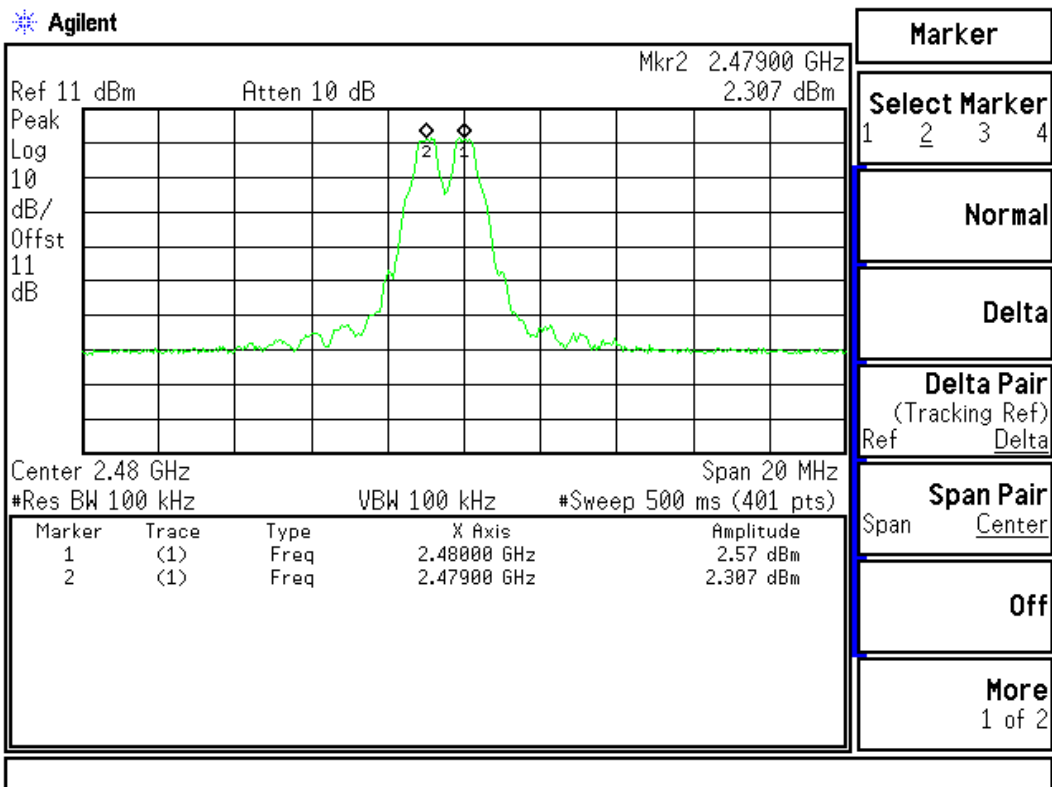
2402-2403MHz



2441-2442MHz



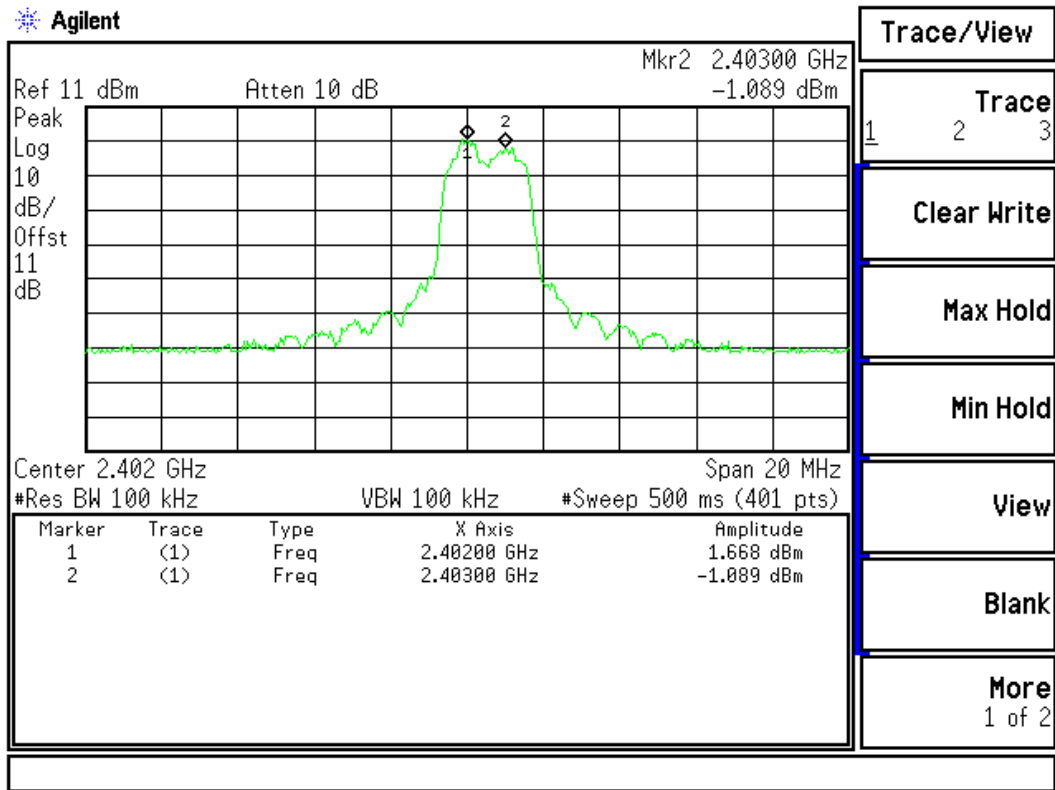
2479-2480MHz



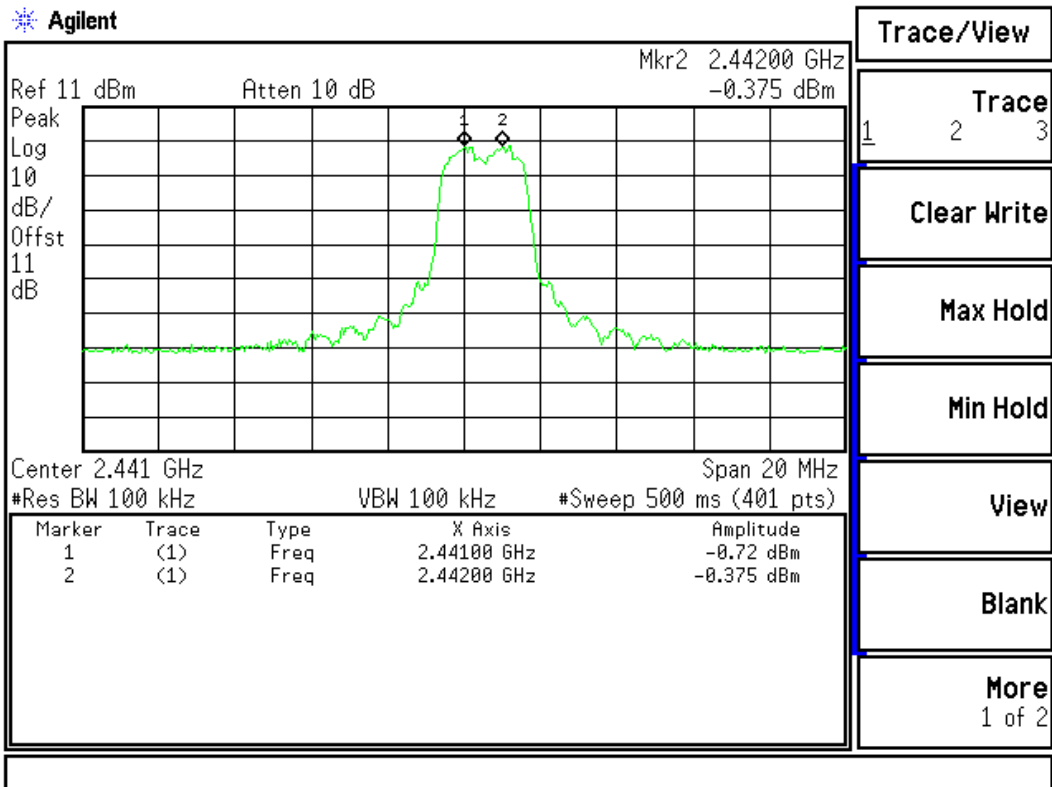
Product : GPS
 Test Item : Channel Separation
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter -3Mbps(8DPSK)

Frequency Range (MHz)	Measured Result (MHz)	Required Limit	Result
2402	1.00	>25 kHz or 2/3 * 20 dB BW	Pass
2441	1.00	>25 kHz or 2/3 * 20 dB BW	Pass
2480	1.00	>25 kHz or 2/3 * 20 dB BW	Pass

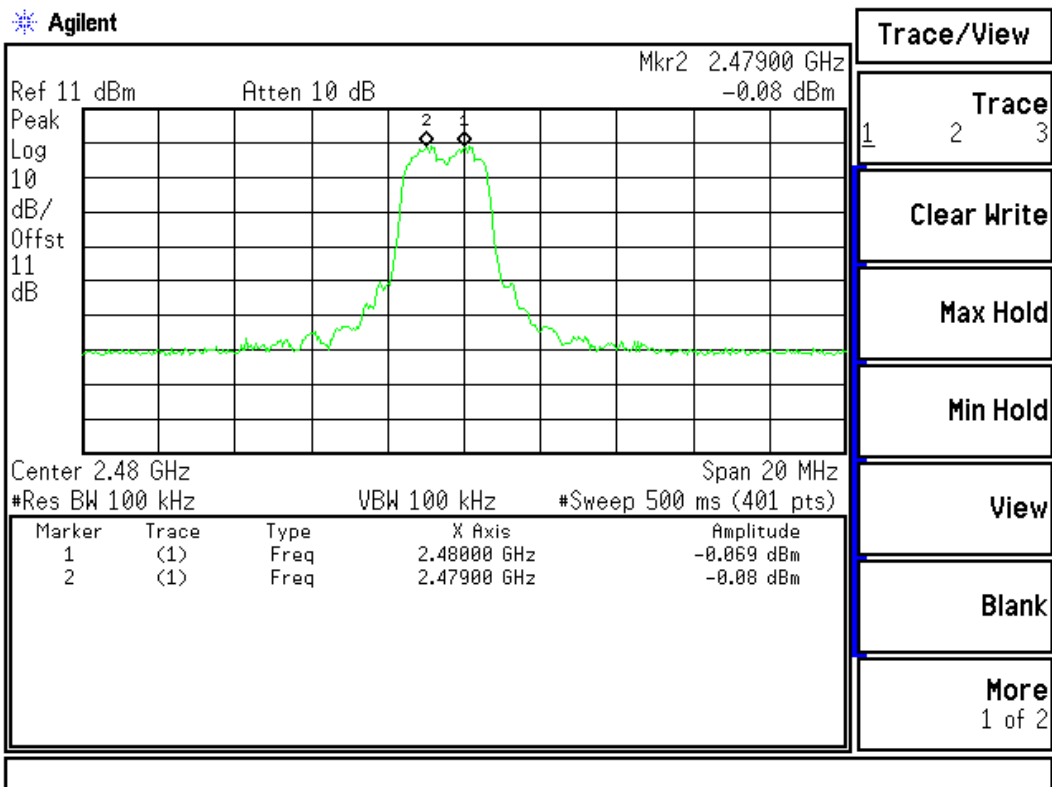
2402-2403MHz



2441-2442MHz



2479-2480MHz



9. Dwell Time

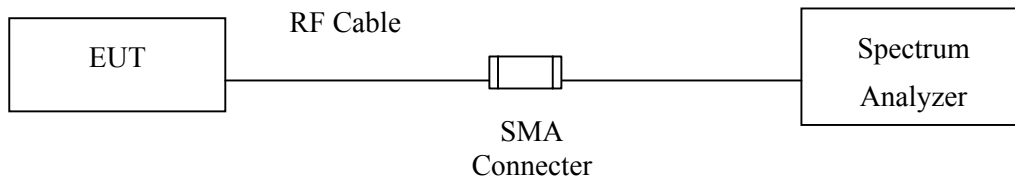
9.1. Test Equipment

The following test equipments are used during the radiated emission tests:

	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
	Spectrum Analyzer	R & S	FSP40 / 100170	Nov, 2007
X	Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2008

Note: 1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
 2. The test instruments marked with “X” are used to measure the final test results.

9.2. Test Setup



9.3. Limit

For frequency hopping systems operating in the 2400-2483.5 MHz bands. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

9.4. Test Procedures

The EUT was setup according to ANSI C63.4, 2003 and tested according to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements

The hopping function of the EUT is enabled.

Span = zero span, centered on a hopping channel

RBW = 1 MHz, VBW ≥ RBW

Sweep = Capture the entire dwell time per hopping channel

Detector function = peak, Trace = max hold

9.5. Uncertainty

± 25msec

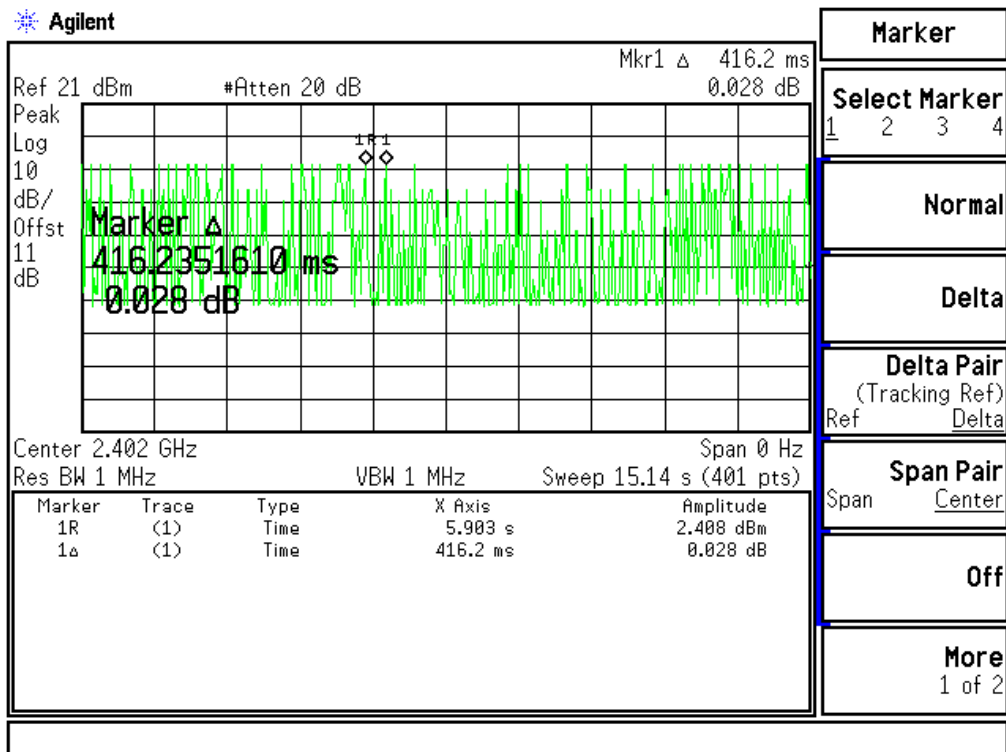
9.6. Test Result of Dwell Time

Product : GPS
 Test Item : Dwell Time
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter -1Mbps(GFSK)(DH5)

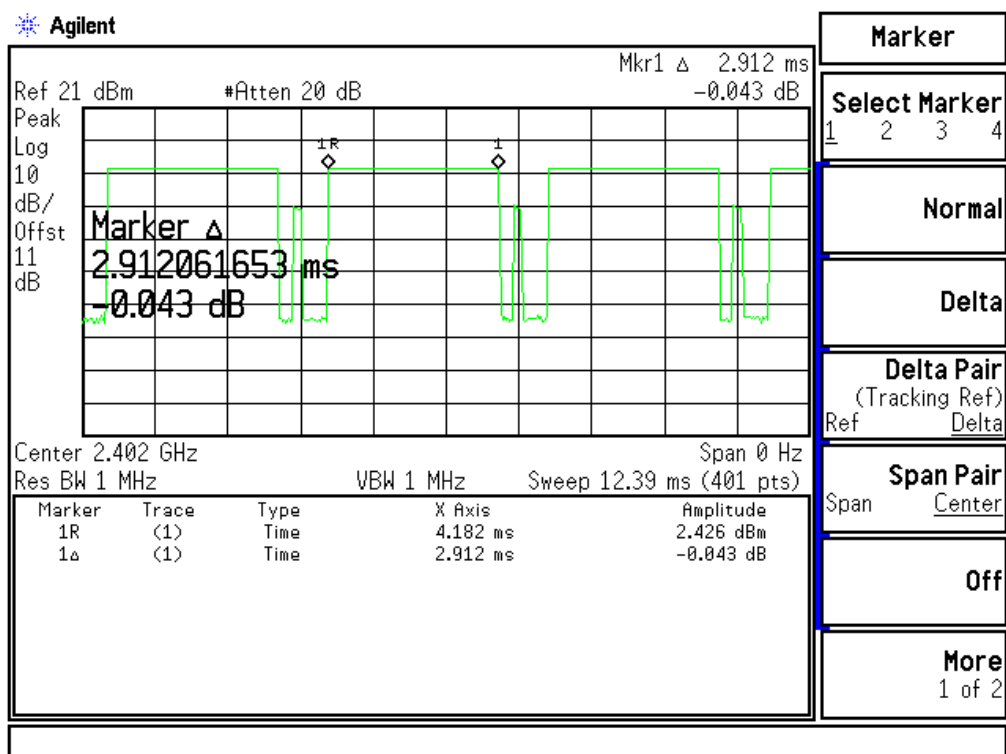
Channel No.	Frequency (MHz)	Time Interval between hops (ms)	Transmission Time (us)	Dwell Time (ms)	Limit (ms)	Result
00	2402	416.235	2912	221.0751138	400	Pass
39	2441	388.887	2912	236.6219493	400	Pass
78	2480	378.395	2912	243.1829173	400	Pass

Note: Dwell Time = $79 * 400 / \text{Time Interval Between Hops} * \text{Transmission Time} / 1000$

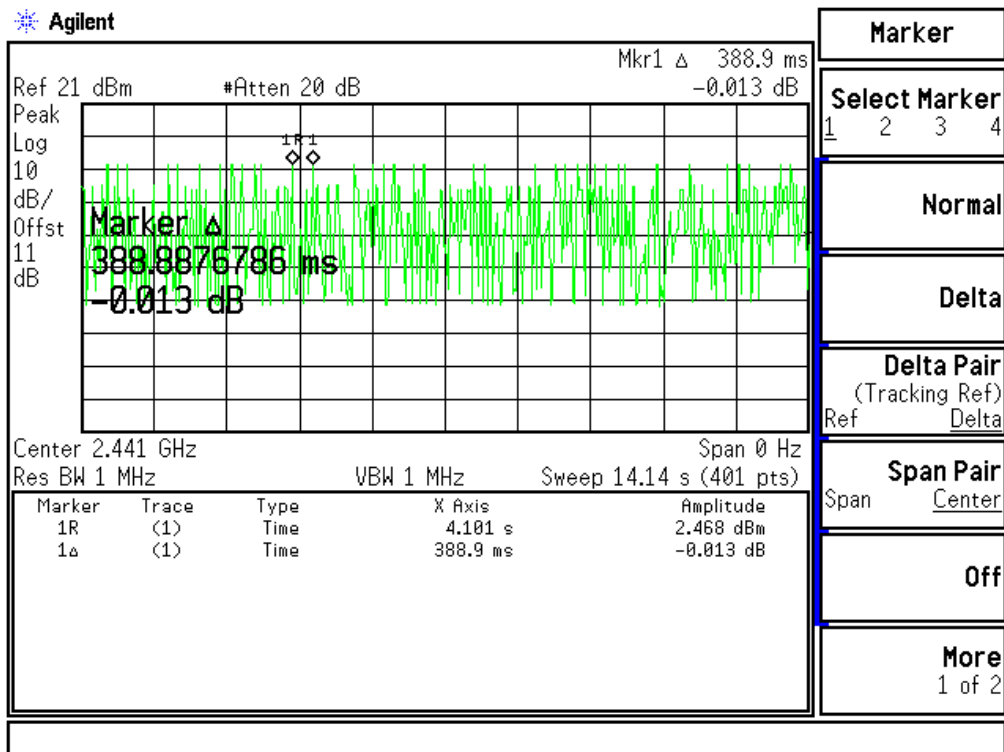
CH00 Time Interval between hops



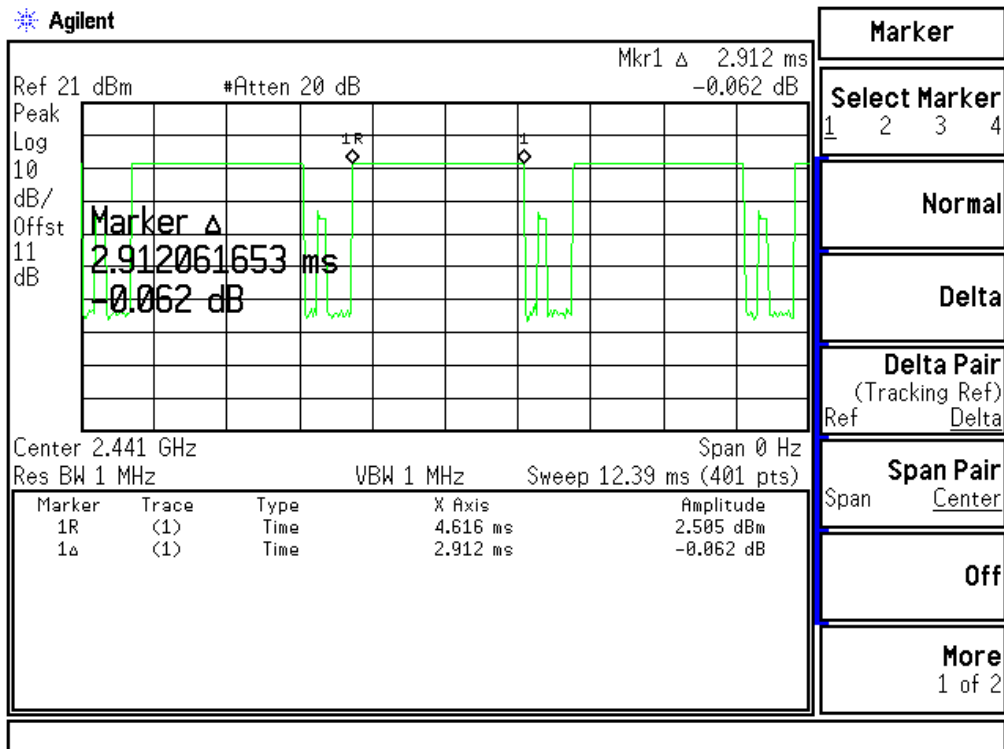
CH00 Transmission Time



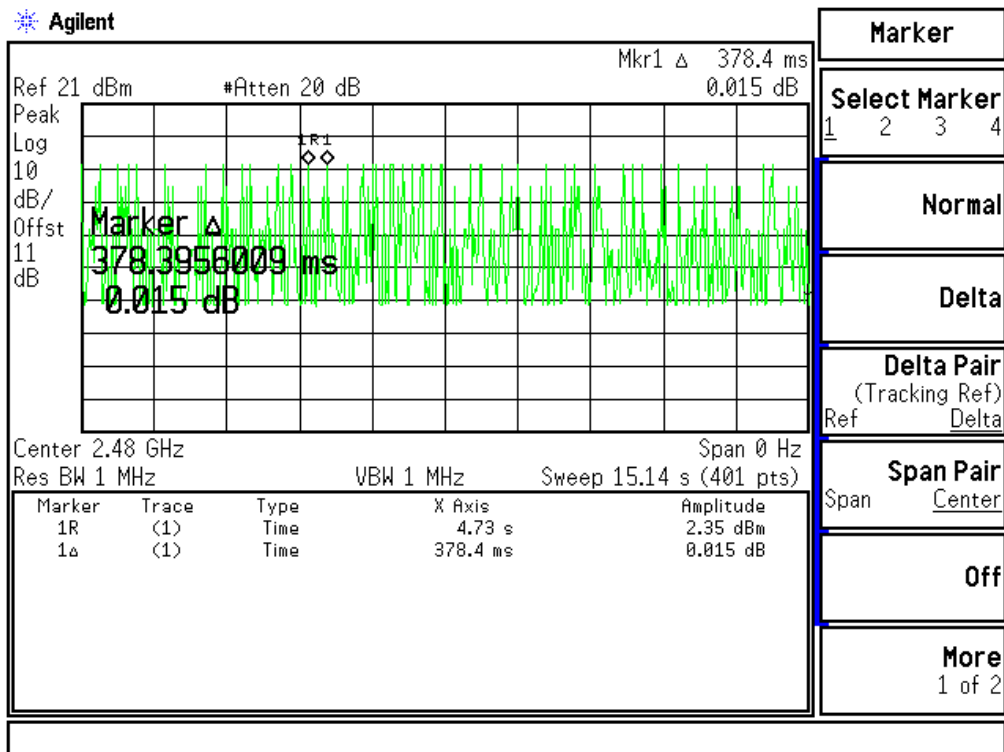
CH39 TIME INTERVAL BETWEEN HOPS



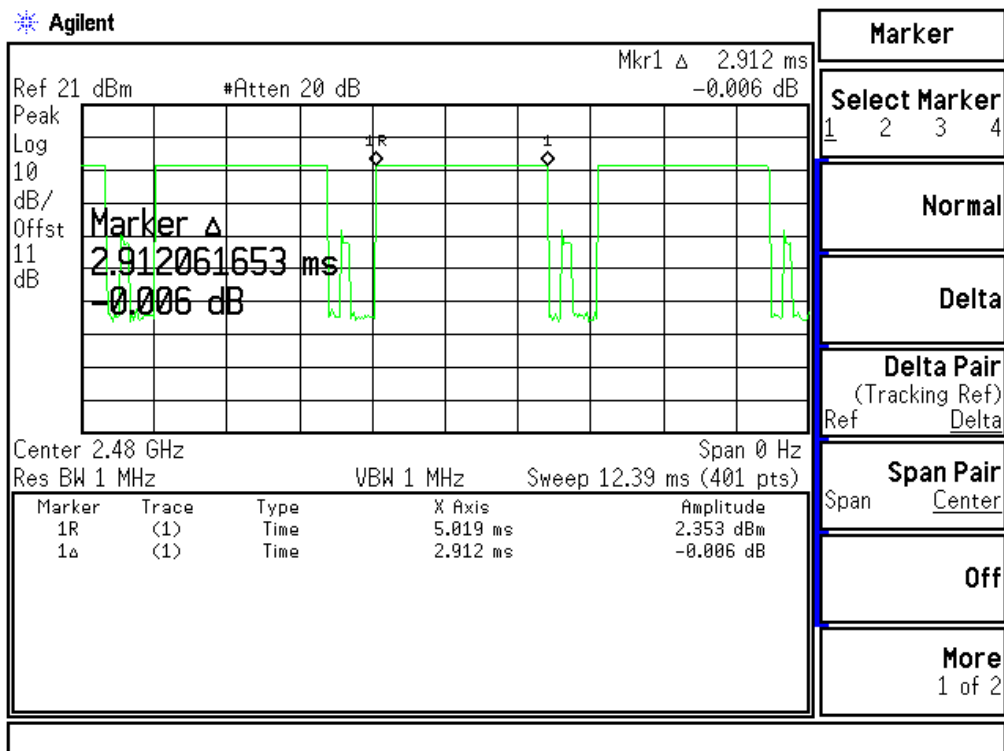
CH39 Transmission Time



CH78 Time Interval between hops



CH78 Transmission Time



NOTE:

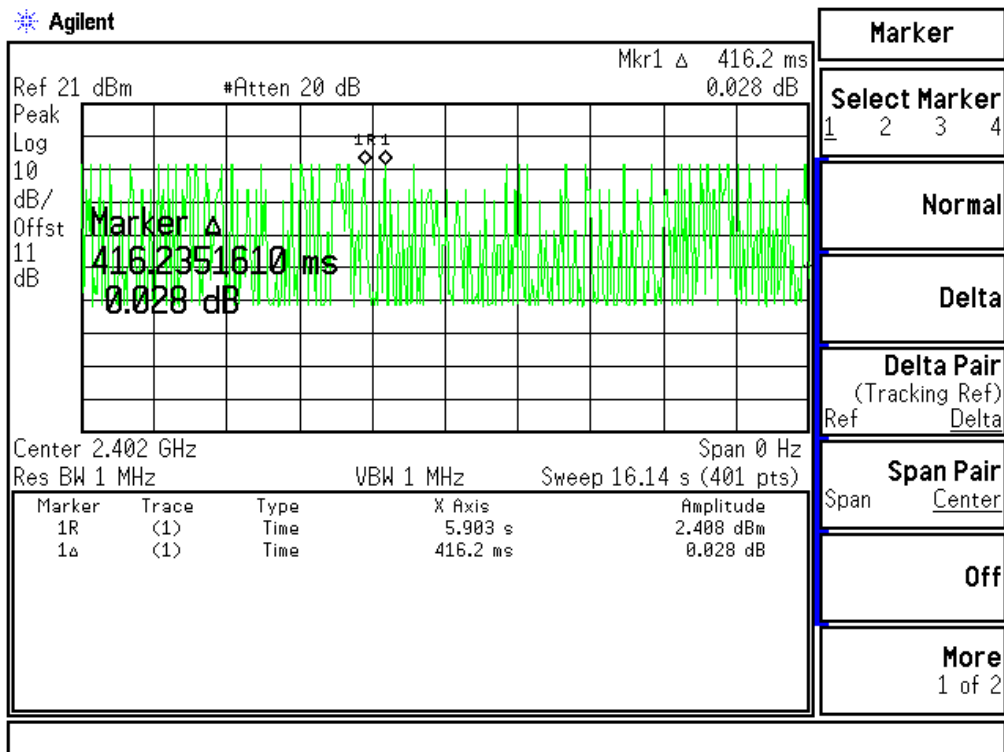
The dwell times of the packet type of DH1, DH3, and DH5 are tested. Only the worst case DH5 is shown on the report.

Product : GPS
 Test Item : Dwell Time
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter -3Mbps(8DPSK)(DH5)

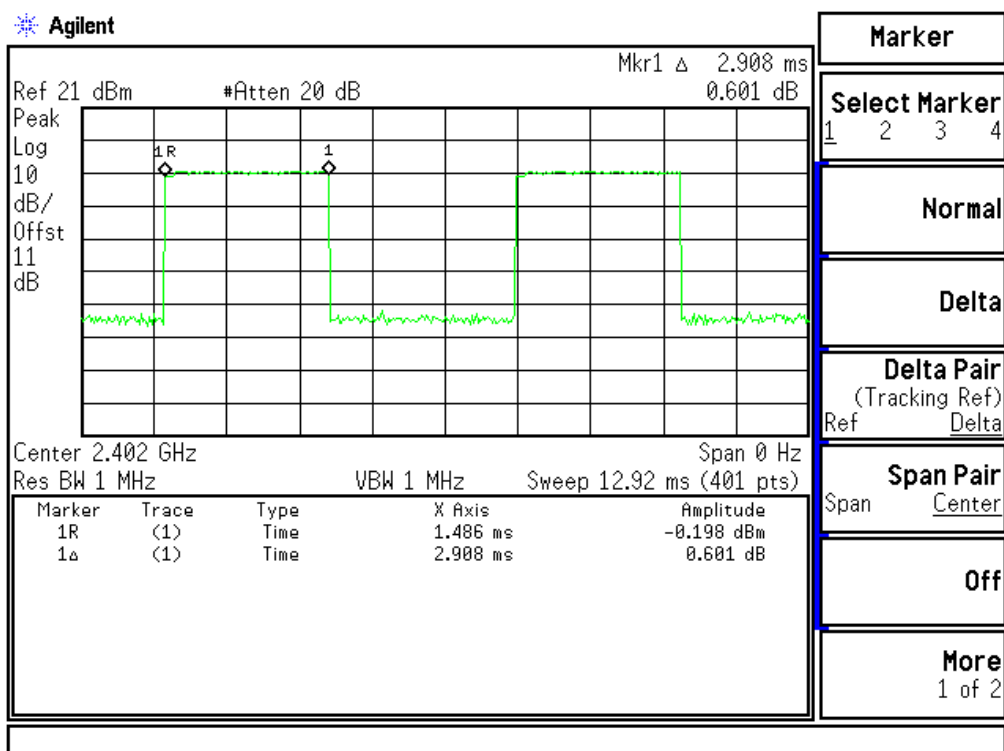
Channel No.	Frequency (MHz)	Time Interval between hops (ms)	Transmission Time (us)	Dwell Time (ms)	Limit (ms)	Result
00	2402	416.2	2908	220.7900048	400	Pass
39	2441	388.8	2908	236.3497942	400	Pass
78	2480	378.3	2908	242.9098599	400	Pass

Note: Dwell Time = $79 * 400 / \text{Time Interval Between Hops} * \text{Transmission Time} / 1000$

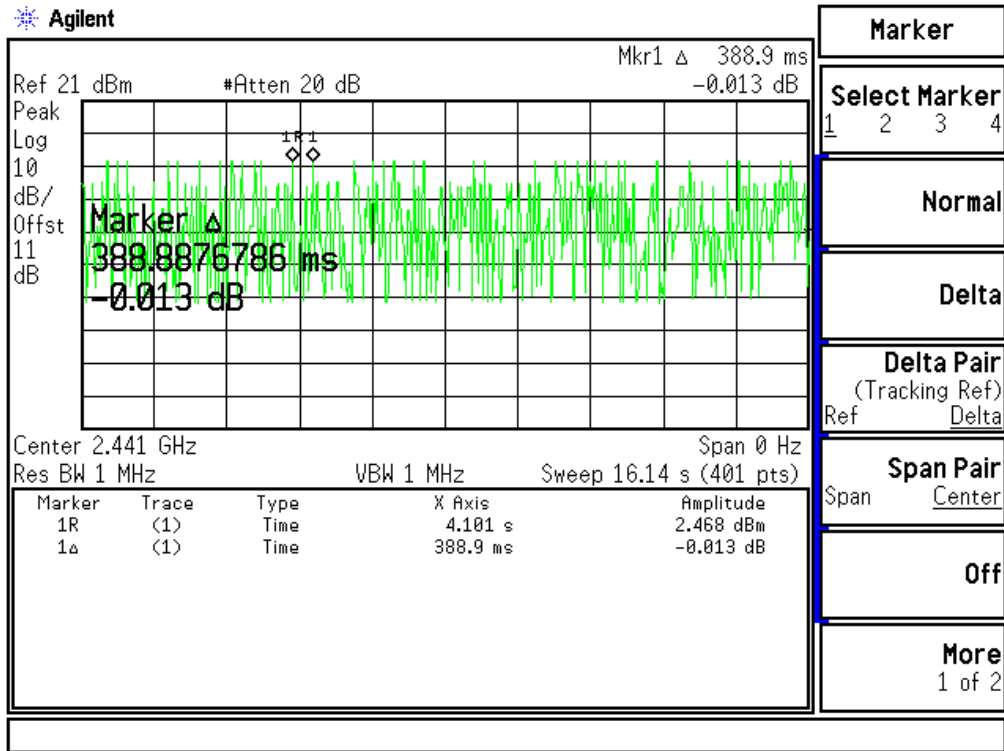
CH00 Time Interval between hops



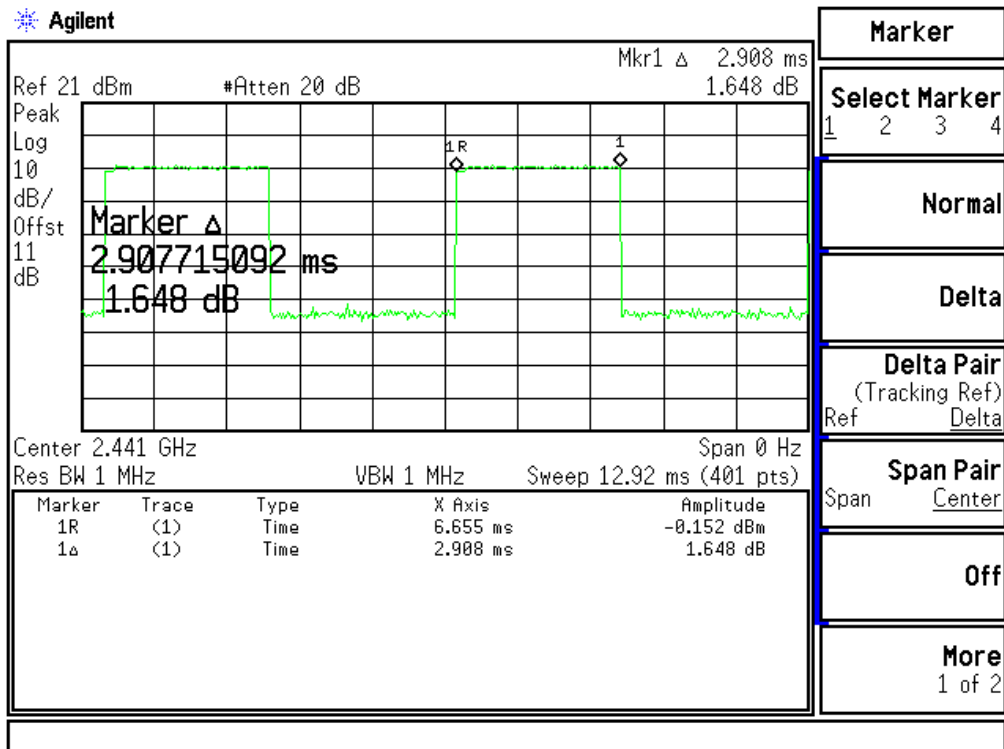
CH00 Transmission Time



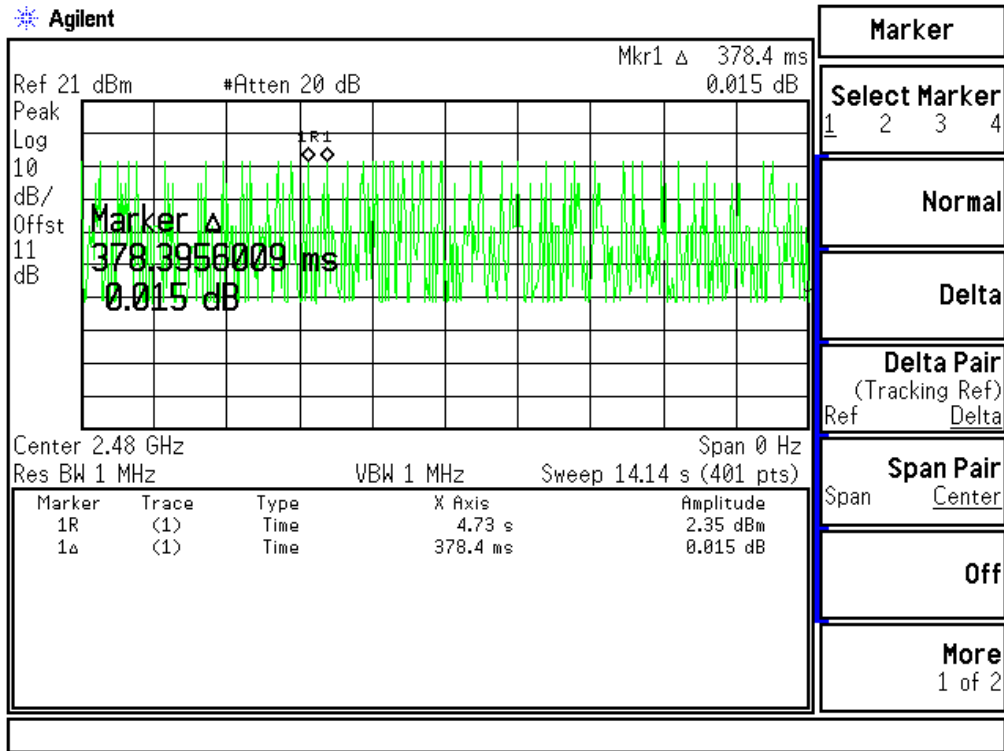
CH39 TIME INTERVAL BETWEEN HOPS



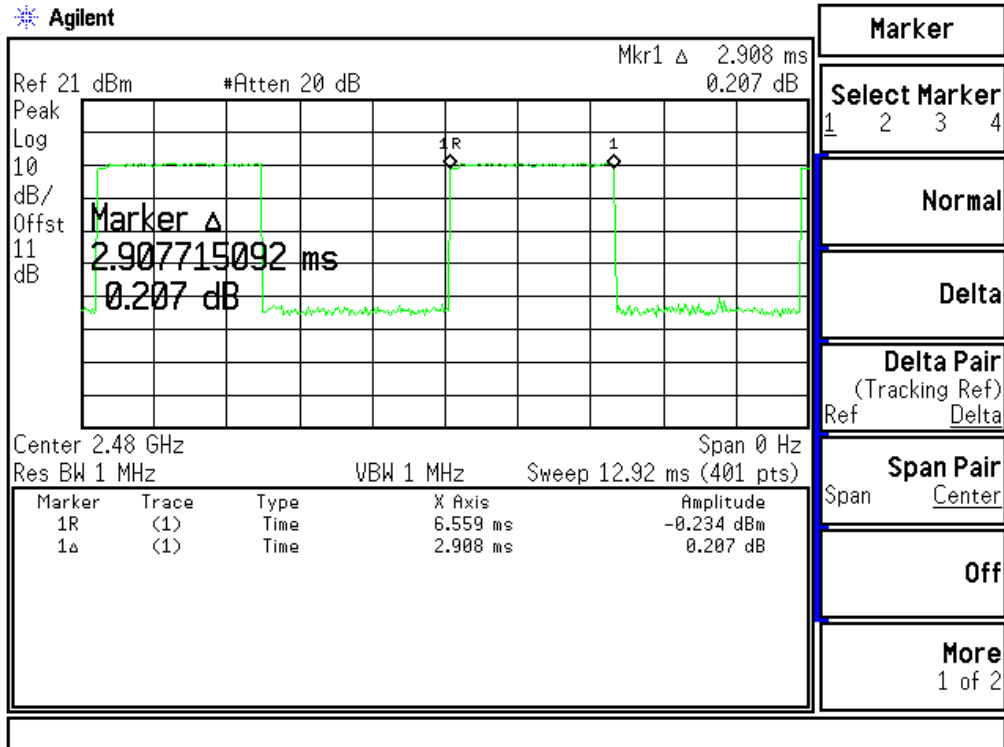
CH39 Transmission Time



CH78 TIME INTERVAL BETWEEN HOPS



CH78 Transmission Time



NOTE:

The dwell times of the packet type of DH1, DH3, and DH5 are tested. Only the worst case DH5 is shown on the report.

10. Occupied Bandwidth

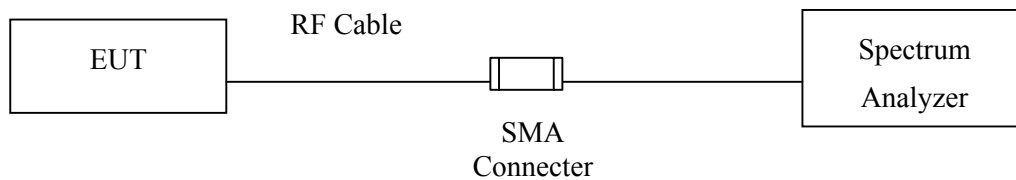
10.1. Test Equipment

The following test equipments are used during the radiated emission tests:

Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Spectrum Analyzer	R & S	FSP40 / 100170	Nov, 2007
X Spectrum Analyzer	Agilent	E4407B / US39440758	May, 2008

- Note:
1. All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
 2. The test instruments marked with “X” are used to measure the final test results.

10.2. Test Setup



10.3. Limits

N/A

10.4. Test Procedures

The EUT was setup according to ANSI C63.4, 2003 and tested according to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements

Use the following spectrum analyzer settings:

Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel

RBW \geq 1% of the 20 dB bandwidth, VBW \geq RBW

Sweep = auto, Detector function = peak, Trace = max hold

The EUT should be transmitting at its maximum data rate.

10.5. Uncertainty

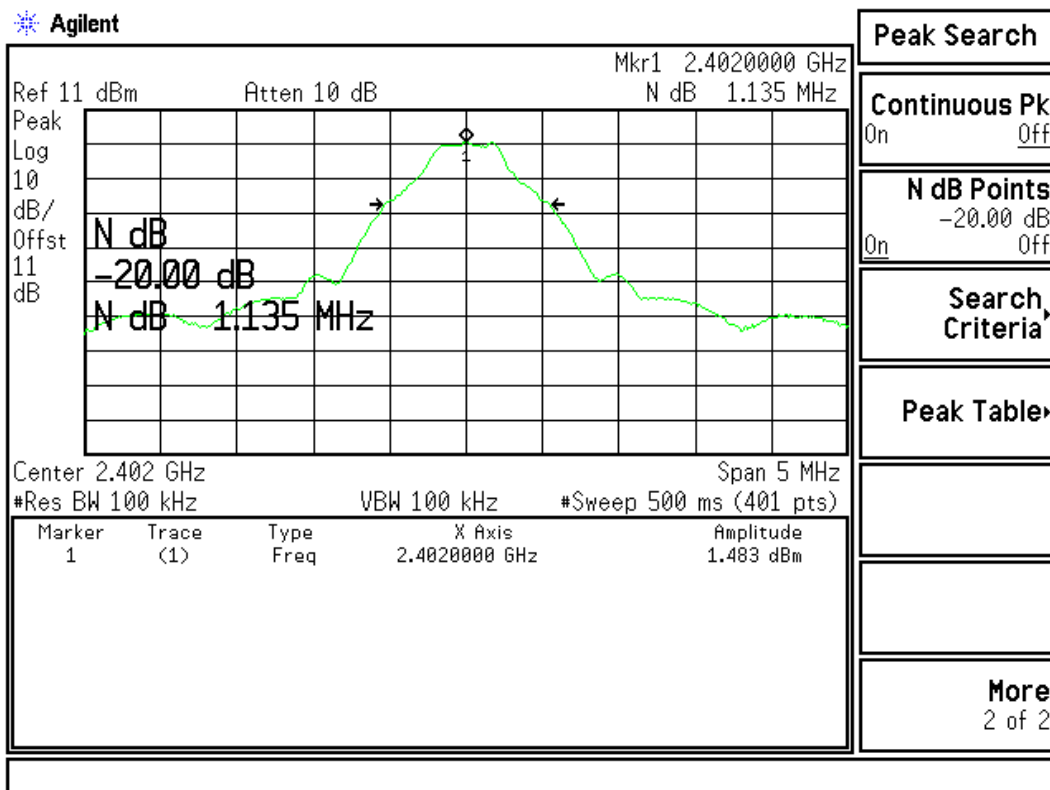
\pm 150Hz

10.6. Test Result of Occupied Bandwidth

Product : GPS
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter -1Mbps(GFSK)

Channel No.	Frequency (MHz)	20 dB bandwidth (kHz)	Required Limit (kHz)	Result
00	2402	1135	--	Pass

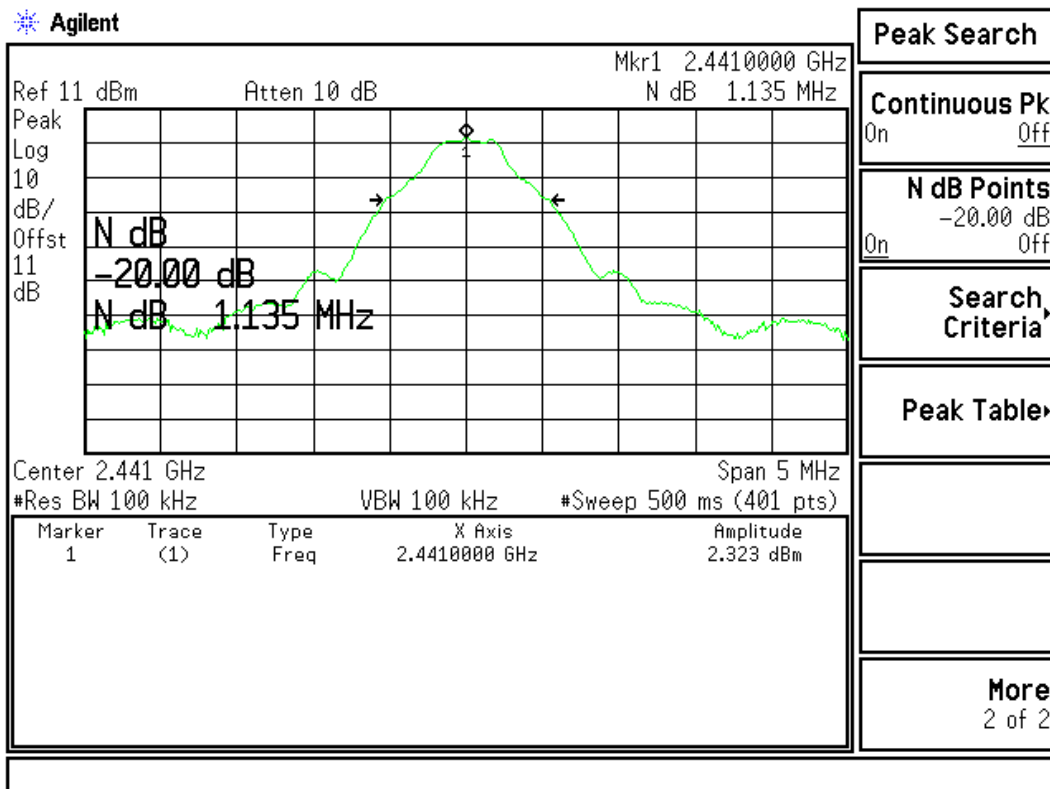
Figure Channel 00:



Product : GPS
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter -1Mbps(GFSK)

Channel No.	Frequency (MHz)	20dB bandwidth (kHz)	Required Limit (kHz)	Result
39	2441	1135	--	Pass

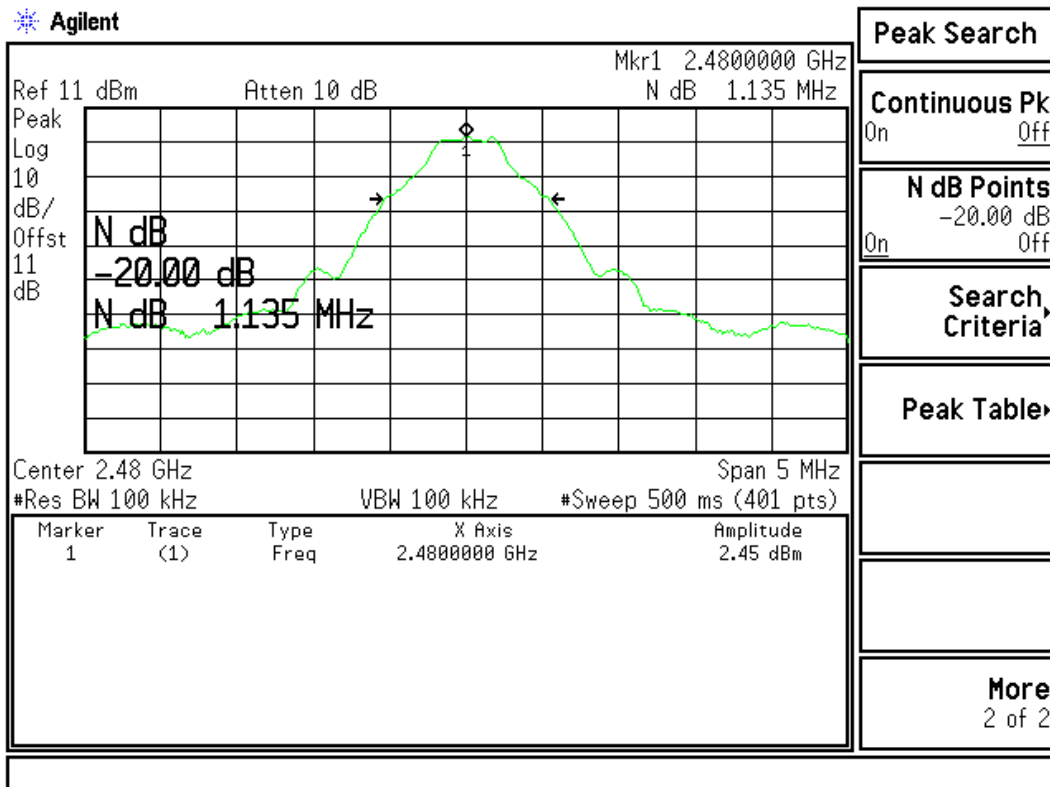
Figure Channel 39:



Product : GPS
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 1: Transmitter -1Mbps(GFSK)

Channel No.	Frequency (MHz)	20dB bandwidth (kHz)	Required Limit (kHz)	Result
78	2480	1135	--	Pass

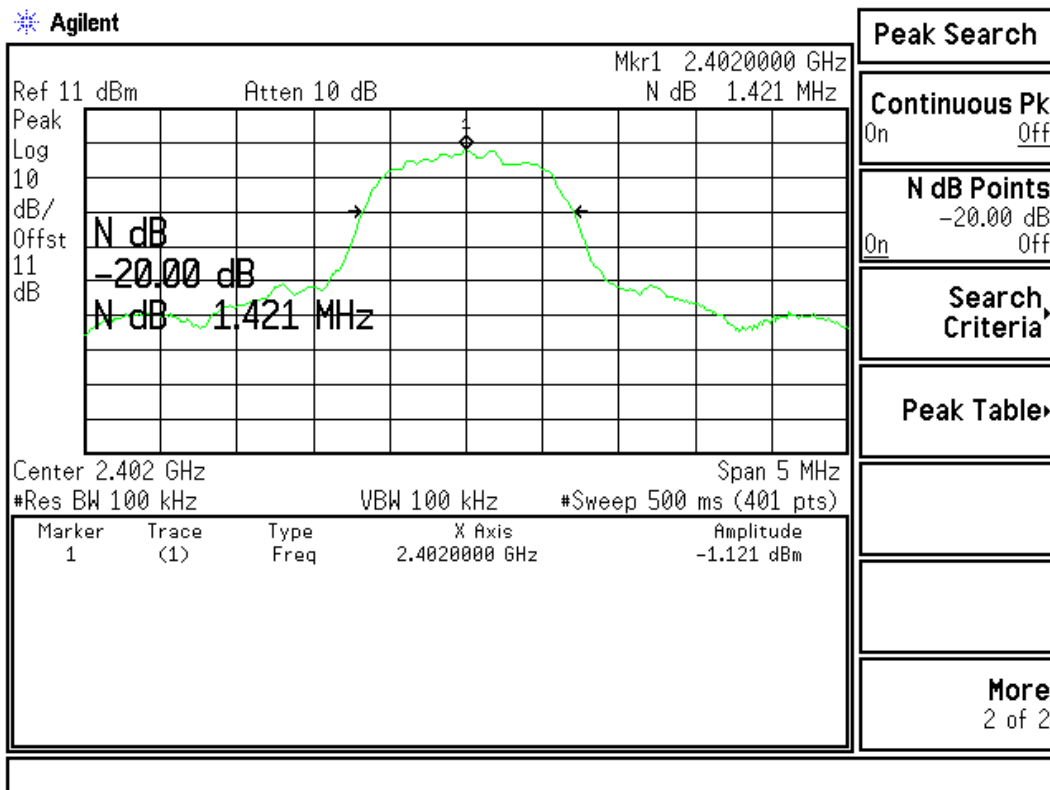
Figure Channel 78:



Product : GPS
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter -3Mbps(8DPSK)

Channel No.	Frequency (MHz)	20 dB bandwidth (kHz)	Required Limit (kHz)	Result
00	2402	1421	--	Pass

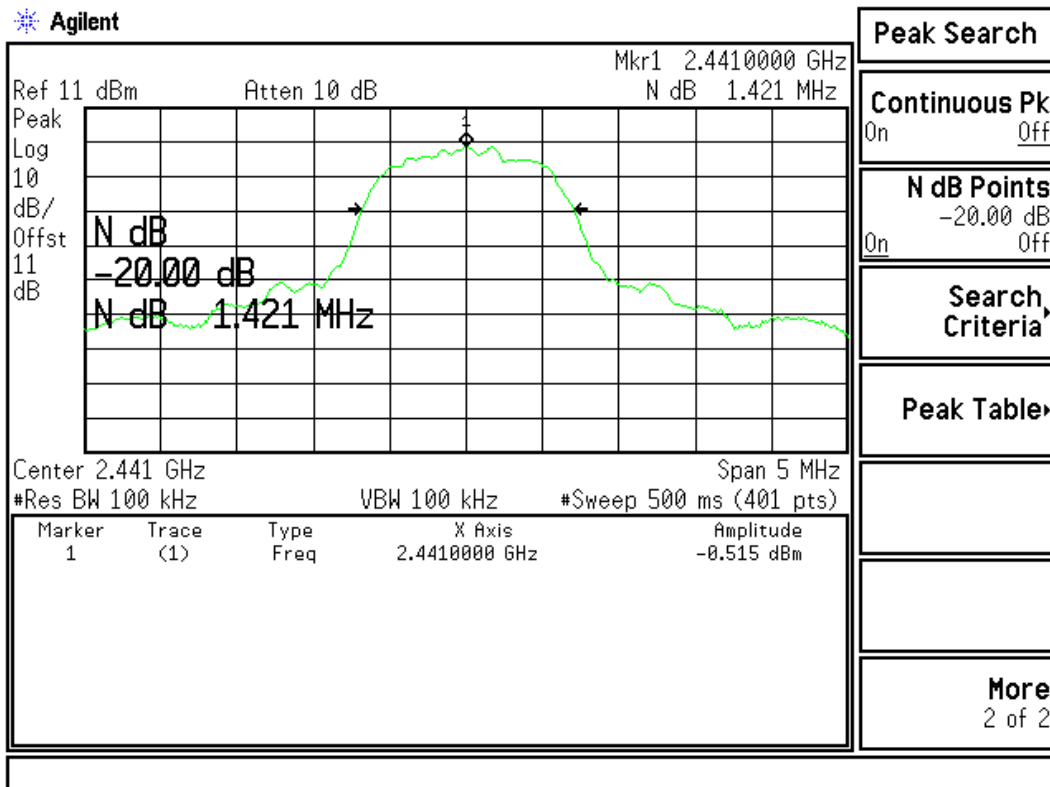
Figure Channel 00:



Product : GPS
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter -3Mbps(8DPSK)

Channel No.	Frequency (MHz)	20dB bandwidth (kHz)	Required Limit (kHz)	Result
39	2441	1421	--	Pass

Figure Channel 39:



Product : GPS
 Test Item : Occupied Bandwidth Data
 Test Site : No.3 OATS
 Test Mode : Mode 2: Transmitter -3Mbps(8DPSK)

Channel No.	Frequency (MHz)	20dB bandwidth (kHz)	Required Limit (kHz)	Result
78	2480	1421	--	Pass

Figure Channel 78:

