FCC Part 15
(Subpart C – Intentional Radiators)
Test Report

Prepared For:

Socket Communications
34700 Central Court
Newark, CA

Model:
BT-GPS Rev K

Prepared by:

EMCE Engineering, Inc.
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1 CUSTOMER INFORMATION

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FCC registration number	0007-1981-20
Customer:	Socket Communications 34700 Central Court Newark, CA Tel: 510-744-2723 Fax: 510-744-2727
Contact Person:	Bob Miller
Receipt of EUT:	12/20/04
Test plan reference:	FCC Part 2, 15 (15.247)
Date of testing:	12/20/04 – 1/21/05
Date of Report:	1/21/05

The tests listed in this report have been completed to demonstrate compliance to the CFR 47 Section 15.247.

Contents approved:

Name: Bob Cole Title: President

2 EUT AND ACCESSORY INFORMATION

2.1 EUT description

The EUT is a Socket Communications **BT-GPS Rev K Bluetooth GPS Link.**

2.2 EUT and accessories

The table below lists all EUTs and accessories used in the tests. Later in this report, only numbers in the last column are used to refer to the devices in each test.

2.3 Software

The computers were equipped with test software provided by the customer. The software was used to control the EUT in the tests.

	Name	Type	S/N	Number
EUT	**Bluetooth GPS Rev K**	**Bluetooth GPS Rev K**	N/A	E0001
Accessories	Laptop Computer	Fujitsu Lifebook M/N: CP15331	R3105476	S0001
Software	CSR Bluesuite	Bluetest, BlueChat	N/A	N/A

3 SUMMARY OF TEST RESULTS

Section in CFR 47	Description	Results
15.245 (b)(1)	Peak output power (Radiated Emissions)	***PASSED***
R&O 97-114	Power Density	***N/A***
15.247 (a)(1)	CF Separation	***PASSED***
15.247 (a)(1)(ii)	Number of Hopping Frequencies	***PASSED***
15.247 (a)(1)(ii)	Dwell Time	***PASSED***
15.247 (a)(1)(ii)	20 dB Bandwidth	***PASSED***
15.247, c	Band-edge compliance of RF Radiated emissions	***PASSED***
15.247, c	Restricted Band (Radiated Emissions)	***PASSED***
15.247,c	Spurious radiated emissions	***PASSED***

PASS The EUT passed that particular test.
FAIL The EUT failed that particular test.

4 STANDARDS AND MEASUREMENT METHODS

The tests were performed in guidance of CFR 47 section 15.247, FCC Public Notice DA 00-705 (March 30, 2000), FCC Report & Order 97-114 (April 10, 1997),and ANSI C63.4 (2003). Deviations, modifications or clarifications (if any) to above mentioned documents are written in each section under "Test method". For the test equipment, see device list in the end of this test.

4.1 Selection of operation mode for tests

Before tests, several operation modes, and modulation patterns were tried. The worst case was selected for each test and those results reported.

5 TEST SETUPS

To fulfill all requirements for the testing, total of two different test setups were used. One EUT was used, unmodified for radiated tests.

SMA connector added in place of internal antenna for conductive measurements.

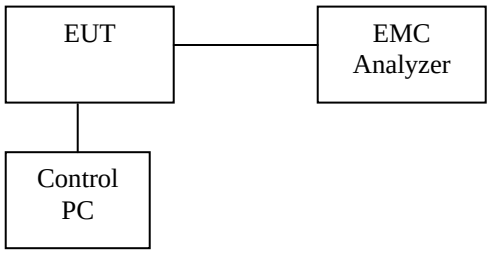
5.1 Setup A (conducted measurements, hopping enabled – Inquiry Mode)

5.1.1 Operational description

CONDUCTED EMISSIONS MEASUREMENTS

This setup was used in conducted measurements with EUT performing the INQUIRY function. The EUT was connected to the Laptop Computer through the serial port (COM1), the antenna bypassed and the SMA Cable connected to the Spectrum Analyzer. This setup was used for the ***TIME OF OCCUPANCY, PEAK POWER OUTPUT, CF SEPARATION, NUMBER OF HOPPPING FREQUENCIES, DWELL TIME, 20 dB BW, and RESTRICTED BAND*** measurements.

5.1.2 Block Diagram



The solid lines are coaxial cables and the dashed lines are either EUT insertion to the test board or control cables between test setup devices. The measurement results were adjusted with the attenuation of the coaxial cable.

5.2 Setup B (Radiated measurements, hopping enabled)

5.2.1 Operational description

RADIATED EMISSIONS MEASUREMENTS

This setup was used in conducted measurements with hopping enabled. The EUT (master) was connected to the laptop PC via the serial bus (COM1). THIS SETUP USED FOR ***RADIATED SPURIOUS EMISSIONS***

5.2.2 Block diagram

The solid lines are coaxial cables and the dashed lines are either EUT insertion to the test board or control cables between test setup devices.

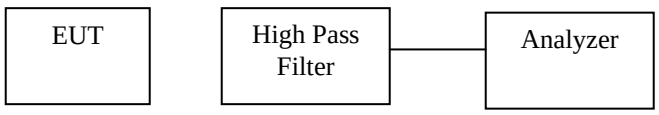
Setup C (Peak Power Measurements)

5.3.1 Operational description

PEAK POWER MEASUREMENTS

This setup was used in conducted measurements with hopping disabled. The EUT (master) was connected to the laptop PC via the serial bus (COM1). THIS SETUP USED FOR ***PEAK POWER EMISSIONS***

5.3.2 Block diagram



The solid lines are coaxial cables and the dashed lines are either EUT insertion to the test board or control cables between test setup devices.

6 TEST RESULTS

The measurement results were adjusted with the attenuation of the cable between the LISN and receiver.

6.1 Peak Output Power [CFR 47, 15.247(b)(1)]

EUT	**Bluetooth GPS Rev K**
Test setup	A (conducted – hopping DISABLED)
Temp, Humidity, Air Pressure	58º F, 30.28
Date of Measurement	1/21/05
Measured by	Bob Cole
Result	PASSED

6.1.1 EUT operation mode

EUT operation mode	Hopping Disabled
EUT channel	2, 41, 80
EUT TX power level	Maximum
Operation voltage	5 VDC

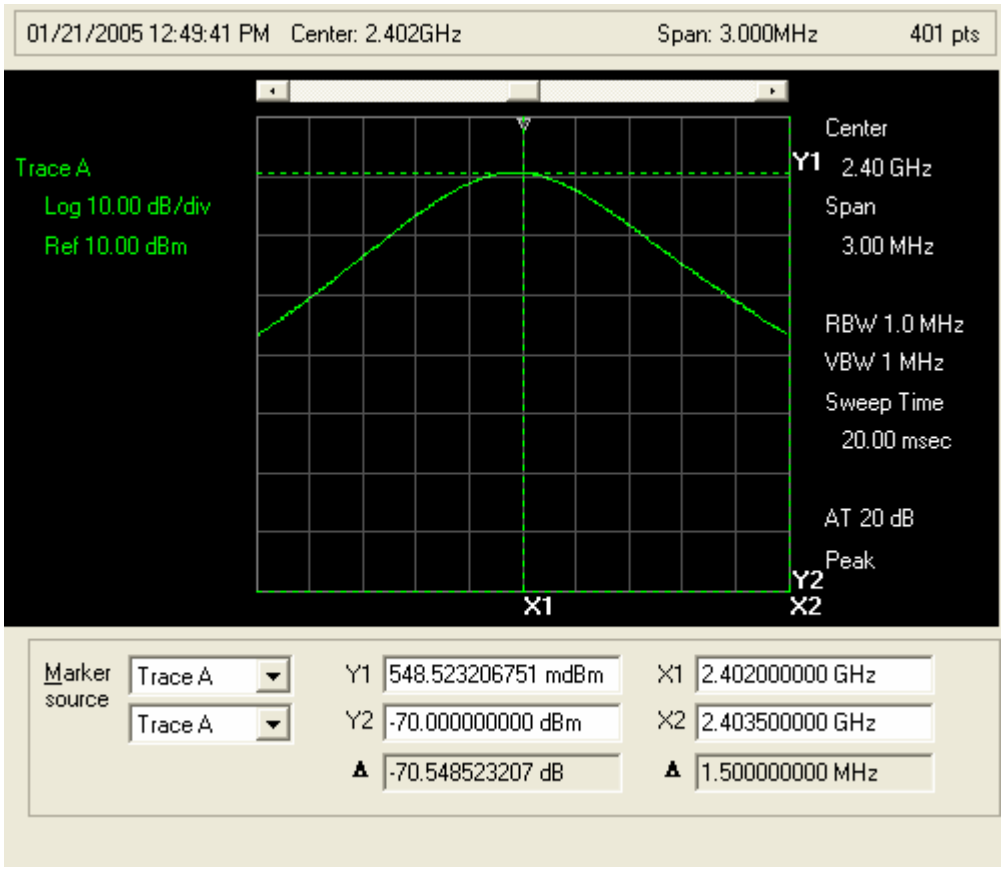
6.1.2 Limits and results

PEAK OUTPUT POWER

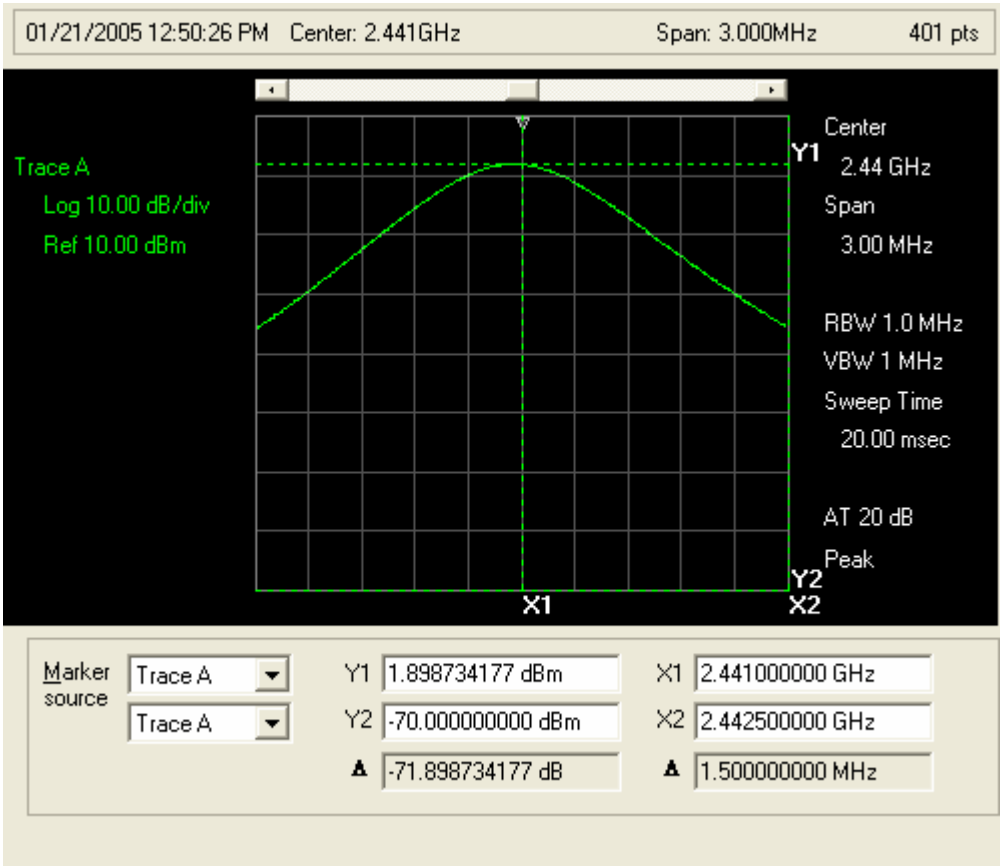
EUT Channel	Limit (dBm)	Test results (dBm)
2	30.0	0.548
40	30.0	1.899
80	30.0	0.211

6.1.3 Screen shots

Plot 1: Peak output power 2402 MHz



Plot 2: Peak output power 2441 MHz



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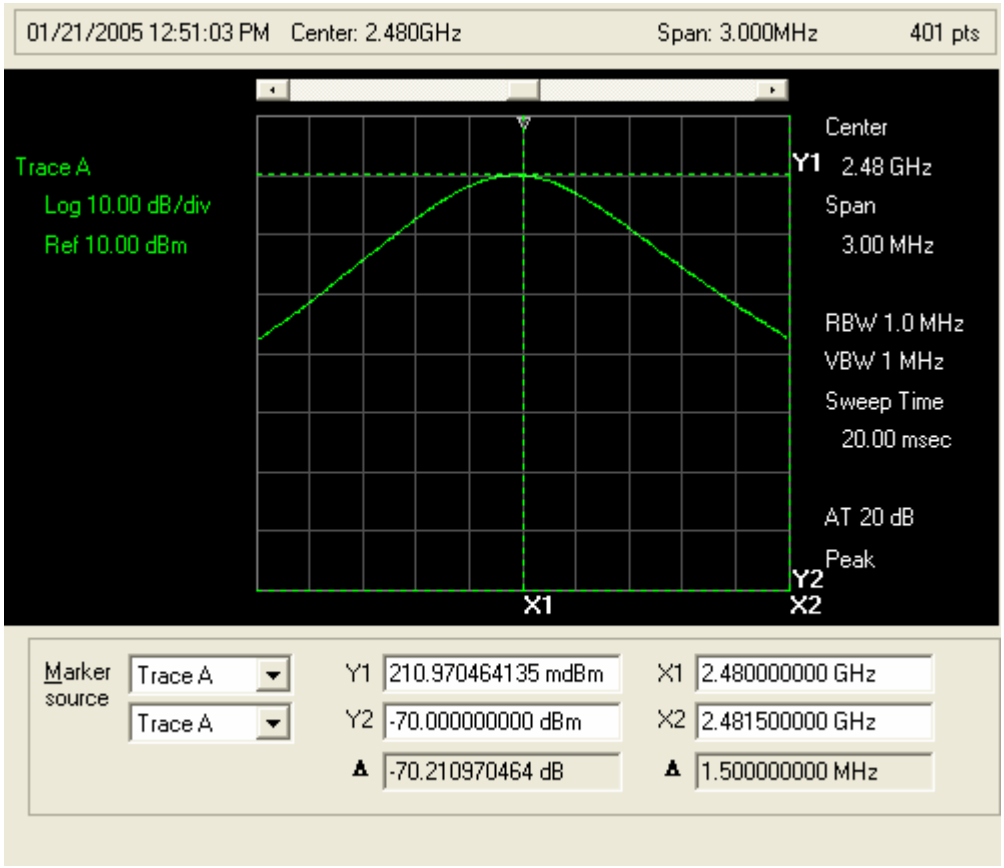
Plot 3: Peak output power 2480 MHz



6.2 CF Separation [CFR 47, 15.247 (a)(1)]

EUT	**Bluetooth GPS Rev K**
Test setup	A (conducted – hopping enabled)
Temp, Humidity, Air Pressure	58º F, 29.96
Date of Measurement	1/21/05
Measured by	Bob Cole
Result	PASSED

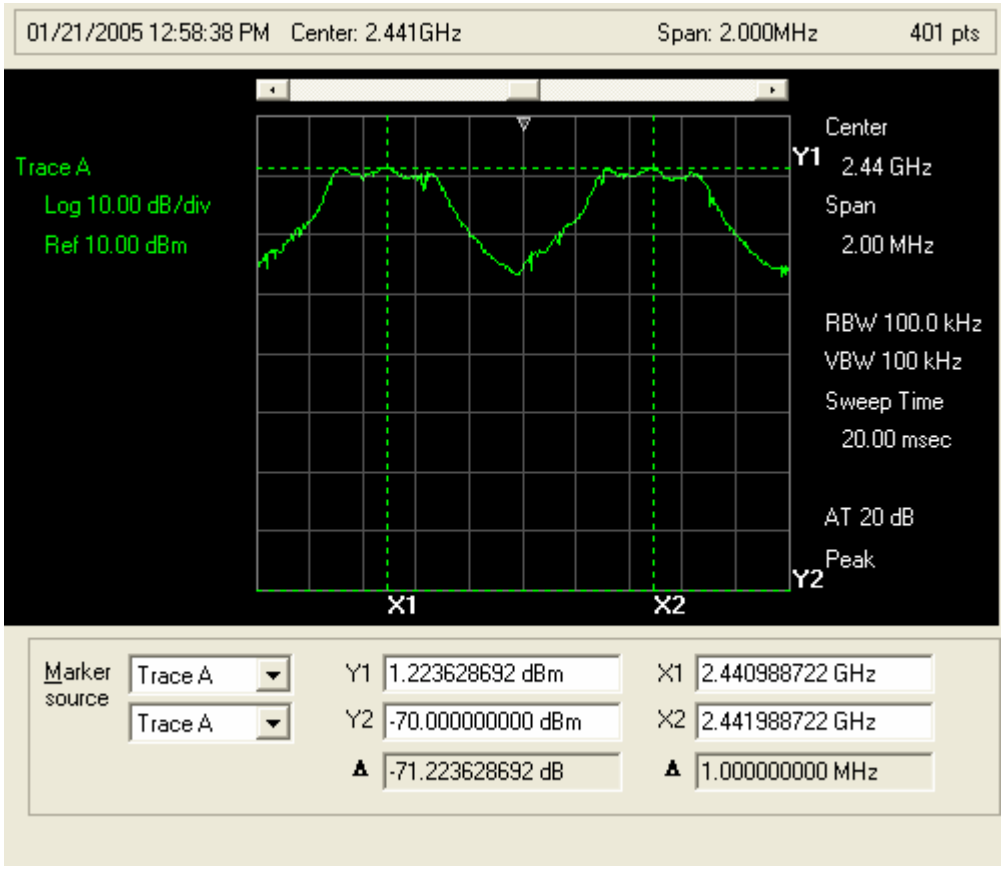
6.2.1 Limits and results

CF Separation

EUT Channel	Limit (MHz)	Test results (MHz)
41-42	</= 1.0	1.000

6.2.2 Screen Shot:

Plot 4: CF separation



6.3 Number of Hopping Frequencies [CFR 47, 15.247 (a)(1)(ii)]

EUT	**Bluetooth GPS Rev K**
Test setup	A (conducted – hopping enabled)
Temp, Humidity, Air Pressure	60º F, 29.92
Date of Measurement	4/20/04
Measured by	Bob Cole
Result	PASSED

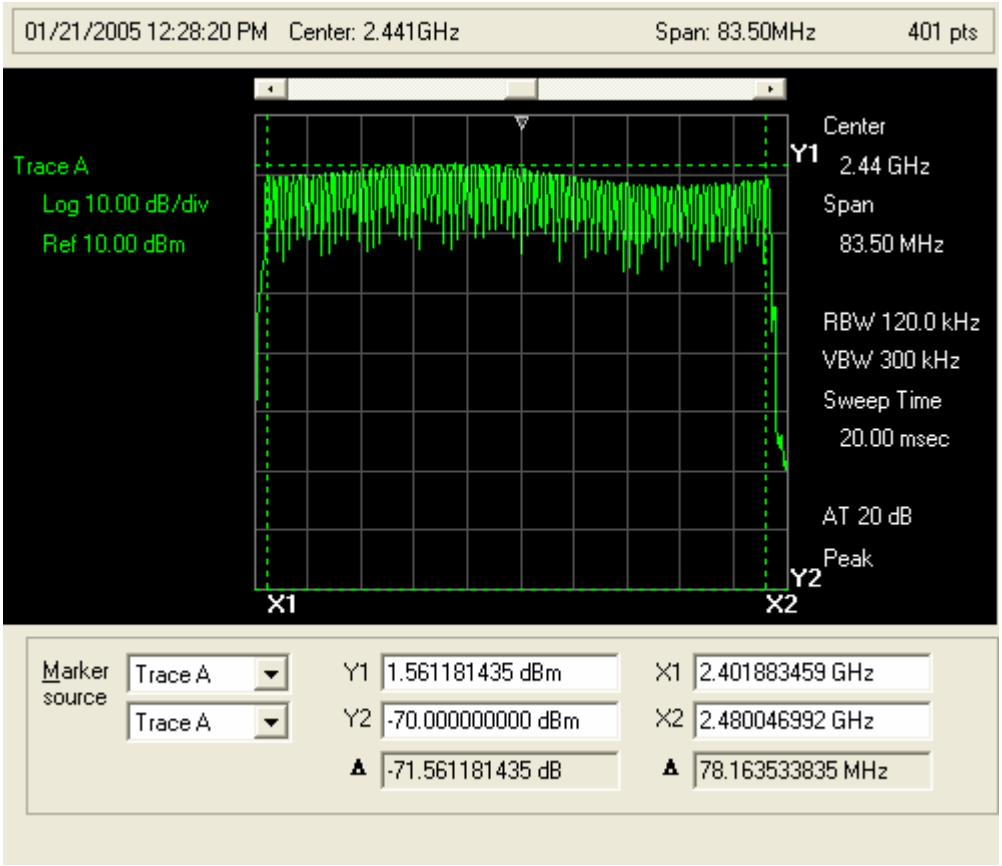
6.3.1 Limits and results

NUMBER OF HOPPING FREQUENCIES

EUT Channel	Limit (MHz)	Test results (MHz)
1-80	<= 75	79

6.3.2 Screen Shot:

Plot 5: Number of Hopping Frequencies



6.4 Dwell Time

EUT	**Bluetooth GPS Rev K**
Test setup	A (conducted – hopping enabled)
Temp, Humidity, Air Pressure	58º F, 30.87
Date of Measurement	1/21/05
Measured by	Bob Cole
Result	PASSED

6.4.1 Limits and results

DWELL TIME

EUT Channel	Limit	Test results
2	400 ms per 30 second of operation	PASSED *See description that follows*

There are five hopping sequences (section 11, Bluetooth Spec. 1.1):

1) A **page hopping sequence** with 32 unique wake-up frequencies distributed equally over the 79 MHz, with a period length of 32; The basic slot time can be 312.5 uS or 625 uS. Min. hop repeat rate = 32*.3125mS = 10mS.
2) A **page response sequence (page scan)** covering 32 unique response frequencies that all are in a one-to-one correspondence to the current page hopping sequence. The master and slave use different rules to obtain the same sequence. The basic slot time can be 312.5 uS or 625 uS and the period is 1.28s.
3) An **inquiry sequence** with 32 unique wake-up frequencies distributed equally over the 79 MHz, with a period length of 32; The basic slot time can be 312.5 uS or 625 uS. Min. hop repeat rate = 32*.3125mS = 10mS.
4) An **inquiry response sequence (inquiry scan)** covering 32 unique response frequencies that all are in a one-to-one correspondence to the current inquiry hopping sequence. The basic slot time can be 312.5 uS or 625 uS and the period is 1.28s.
5) A **channel hopping sequence** which has a very long period length, which does not show repetitive patterns over a short time interval, but which distributes the hop frequencies equally over the 79 MHz during a short time interval; The basic slot time is 625 uS.

Worst case dwell times (largest dwell value) would be found with #5, the Channel Hopping (or data) sequence. The other hopping sequences may short shorter time sequences; however they are not repeated as often and hence have a lower overall dwell or duty cycle.

In normal transactions one may see occasional short periods between a chosen frequency due to inquiry and page scans possibly be interleaved during data transactions. It's my understanding that this would not create a dwell cycle result worse than the Channel hopping or data sequence.

Channel Hopping Sequence (Data sequence) Dwell Calculation

Cycle time for complete hopping sequence of a 79 hop cycle (data transmission mode) =

(1.1) Time slot period * 79 slots = 625uS * 79 = 49.375 mS

See page below from Bluetooth spec. Rev 1.1, section 2, for a depiction of the hopping sequence versus packet size. Figure 2.1 shows a DH1 cycle. Figure 2.2 shows a DH1, DH3 and DH5 sequence (resp.).

Every time slot has a frequency assignment, and the frequency used for a packet remains the same as the slot it started in, if the packet is longer than one time slot.

For a DH1 packet this does not have an impact. The channel selector steps thru the entire list of 79 pseudo-random channels and then start over from the beginning.

For a DH5 (5 Slot packet), the starting frequency will be used for all 5 time slots (f(k) in this example), and 4 following frequencies will not be used during that hopping cycle. Therefore instead of stepping sequential thru the 79 frequency channel list, only every 5th channel is used. Each time the 79 frequency channel list is started, is it a new randomized list of 79 channels. The probability that it will use the same frequency channel in the next list is 1/5.

Therefore even though the DH5 is at one frequency for 5 times longer than a DH1 packet, it repeats itself 1/5 as often, with the effective dwell time (averaged over a long period over a long period of time – for instance the 30 sec FCC dwell test) being the same.

For the “duty cycle correction factor”, my “read” of the FCC doc says that one should take the “worst” 100mS period found, in contrast to the average 30 sec dwell time just mentioned. As a result the DH1 and DH5 numbers for the 100 mS dwell case will be different. For a worst case DH5 packet sequence, the same frequency channel could appear in two successive 79 channel sequences.

DH1 calculation: DH1 uses 1 time slot of 0.625 mS per hopping cycle.

Dwell time per 100mS – since one 79 hop sequence is approx 50mS, there will be approx. two hop sequences in 100 mS (more accurately 100/49.375).

(1.2) DH1 dwell time = 0.625 mS * (100ms/49.375mS) = 1.26 mS (per 100 mS)

DH5 calculation: DH5 uses 5 time slots of 0.625 mS per hopping cycle.

Dwell time per 100mS – since one 79 hop sequence is approx 50mS and there could be two appearances of a frequency channel in 100 mS (more accurately 100mms/49.375ms).

(1.3) DH5 dwell time =5* 0.625 mS * (100ms/49.375mS) = 6.3 mS (per 100 mS)

Using the FCC duty cycle correction factor:

(1.4) DH1 Dwell correction =
20 log (DH1 dwell time/100mS) = 20 log (0.0126) = -38 dB

(1.5) DH5 Dwell correction =
20 log (DH5 dwell time/100mS) = 20 log (0.0633) = -24 dB

Therefore the worst case duty cycle adjustment condition will be for the DH5 packet.

The calculation shows us that we can subtract 24 dB from our 2nd harmonic measurement to compensate for this duty cycle adjustment.

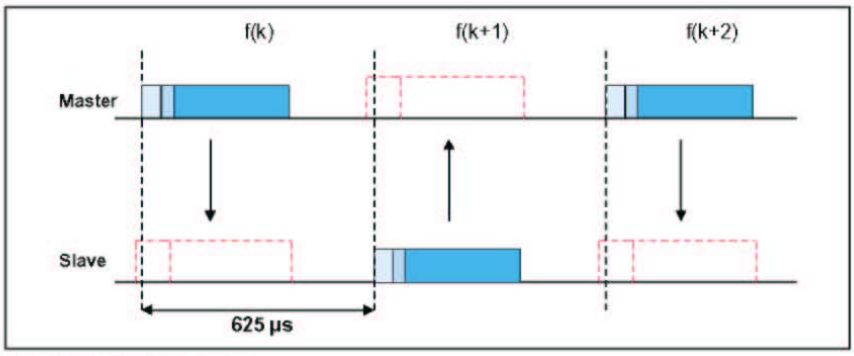


Figure 2.1: TDD and timing

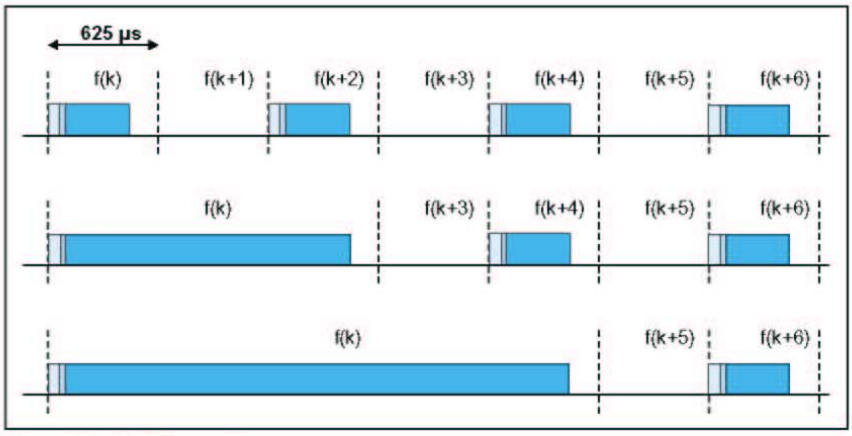


Figure 2.2: Multi-slot packets

6.5 20 dB Bandwidth

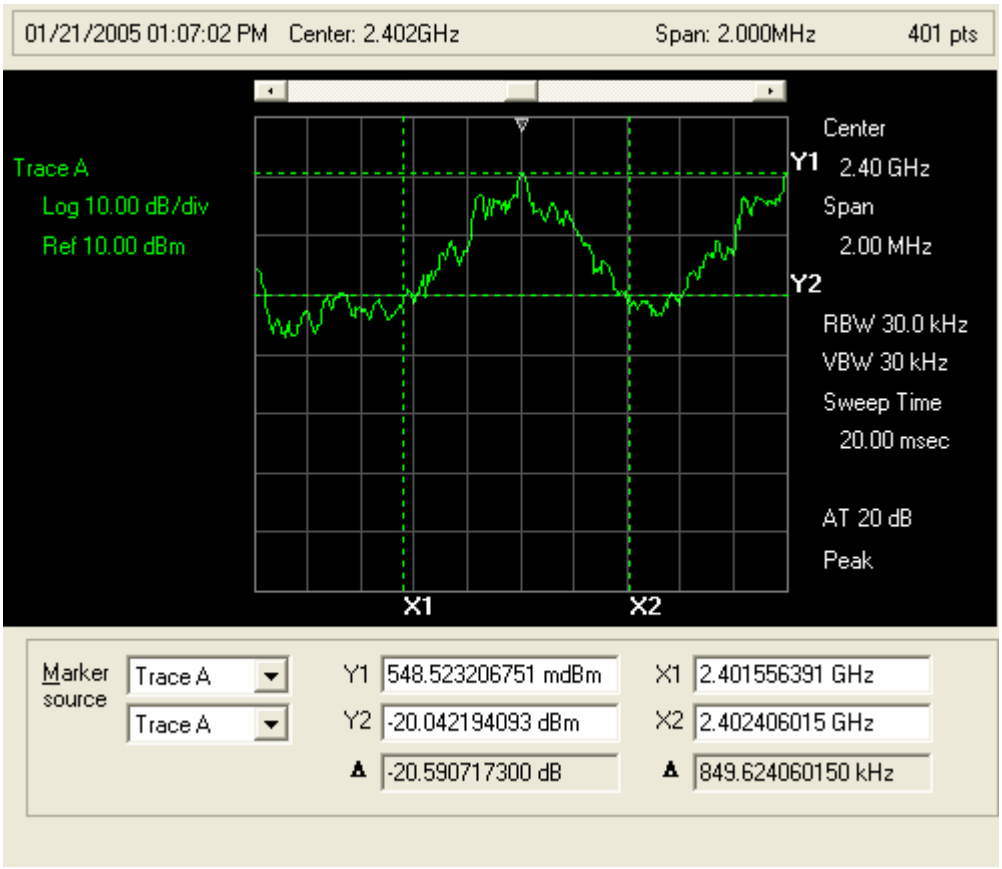
EUT	**Bluetooth GPS Rev K**
Test setup	A (conducted – hopping DISABLED)
Temp, Humidity, Air Pressure	58º F, 30.87
Date of Measurement	1/21/05
Measured by	Bob Cole
Result	PASSED

6.5.1 Limits and Results

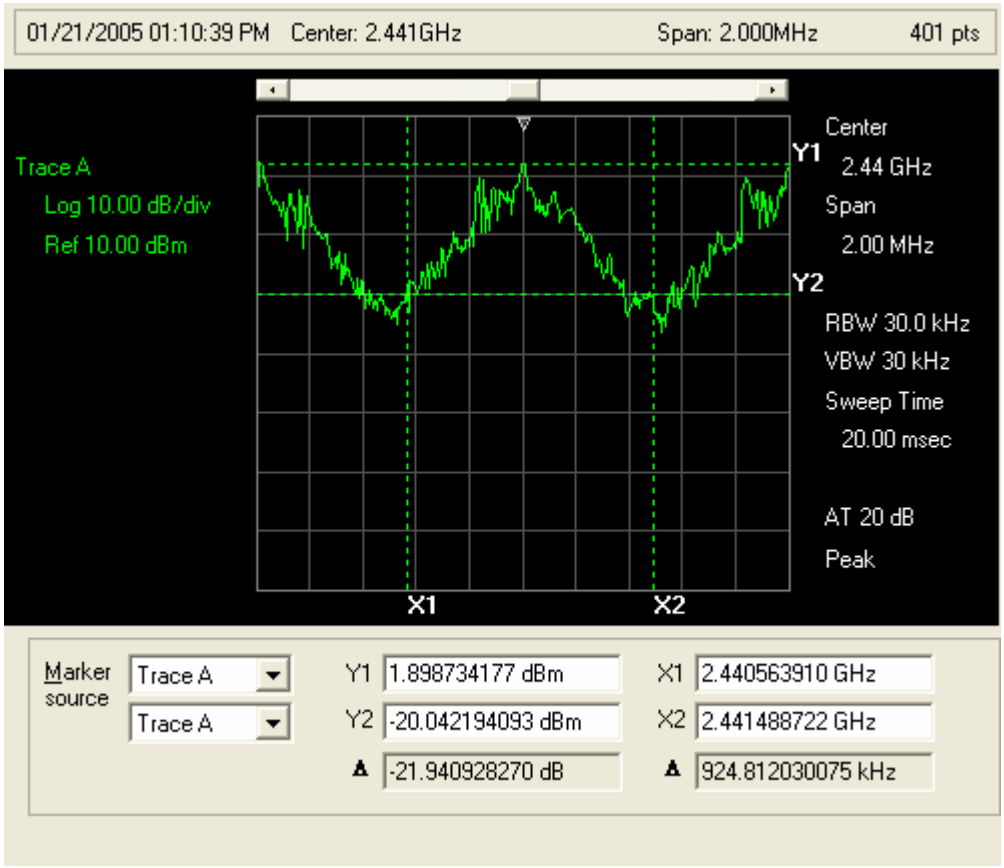
EUT Channel	Limit (MHz)	Test results (MHz)
2	</= 1.0	0.849
40	</= 1.0	0.924
80	</= 1.0	0.835

6.5.2 Screen Shots

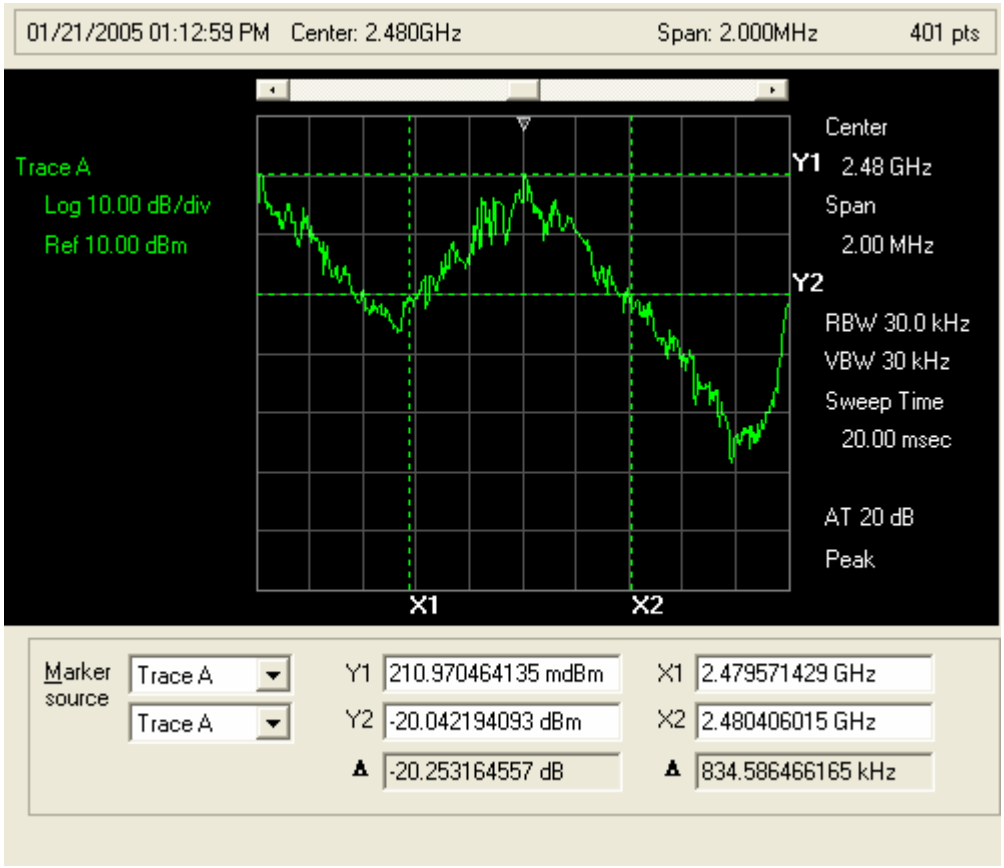
Plot 6: 20 dB BW 2402 MHz



Plot 7: 20 dB BW 2441 MHz



Plot 8: 20 dB BW 2480 MHz



6.6 Band-edge compliance of RF Radiated emissions [CFR 47, 15.247c(1)]

EUT	**Bluetooth GPS Rev K**
Test setup	A (conducted – hopping enabled & Disabled)
Temp, Humidity, Air Pressure	79º F, 30.72
Date of Measurement	1/21/05
Measured by	Bob Cole
Result	PASSED

6.6.1 EUT operation mode

EUT operation mode	Hopping Enabled / Disabled
EUT channel	2, 80
EUT TX power level	Maximum

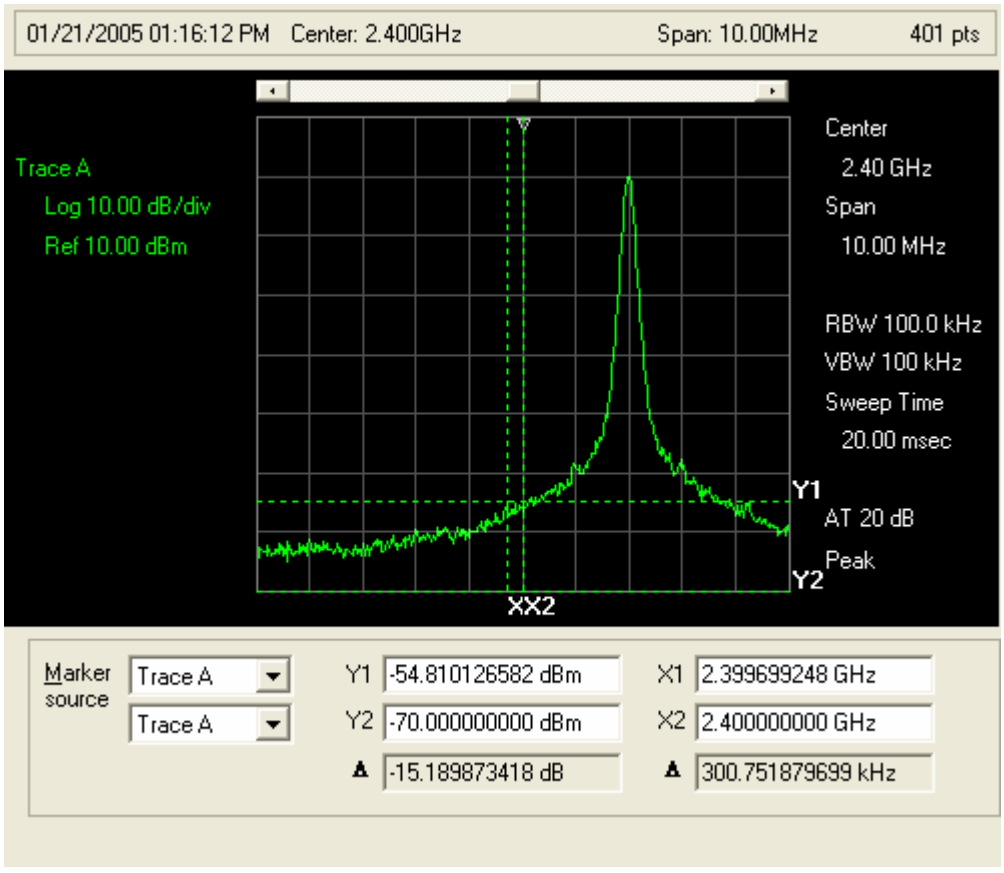
6.6.2 Limits and results

BAND-EDGE COMPLIANCE

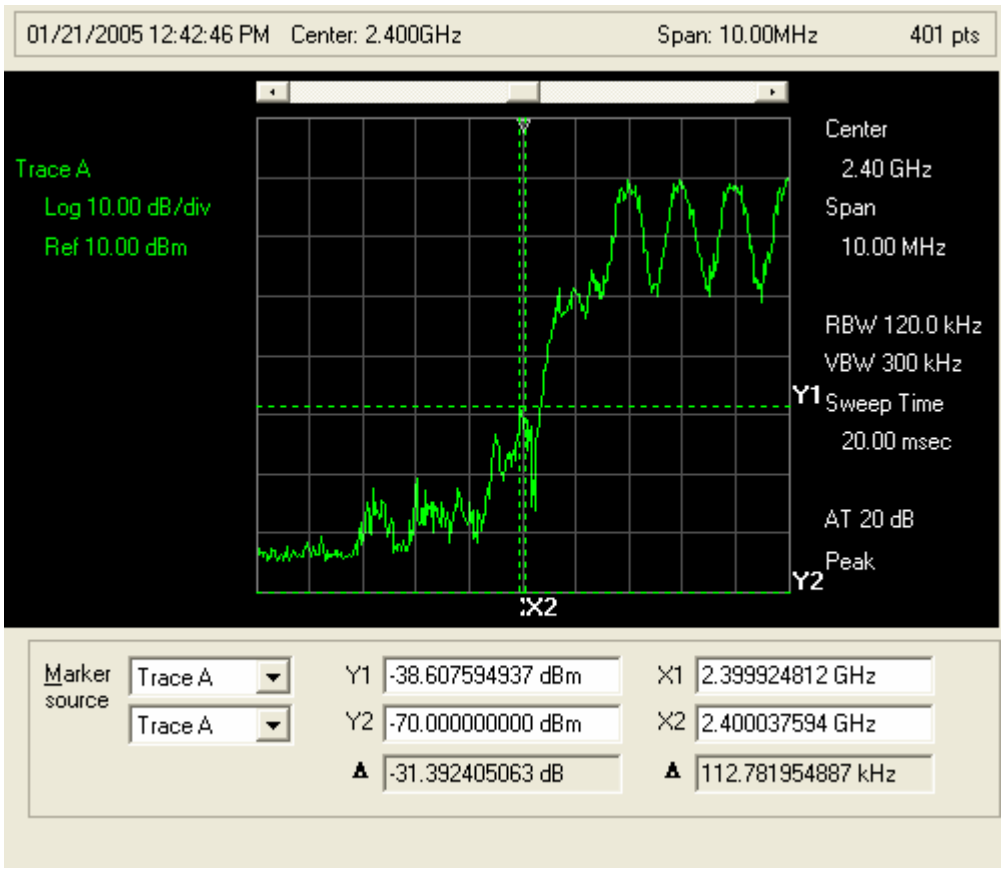
Channel	Limit (dBm)	Results (dBm)
2	-6.0	-38.61
80	-6.0	-47.05

6.6.3 Screen shots:

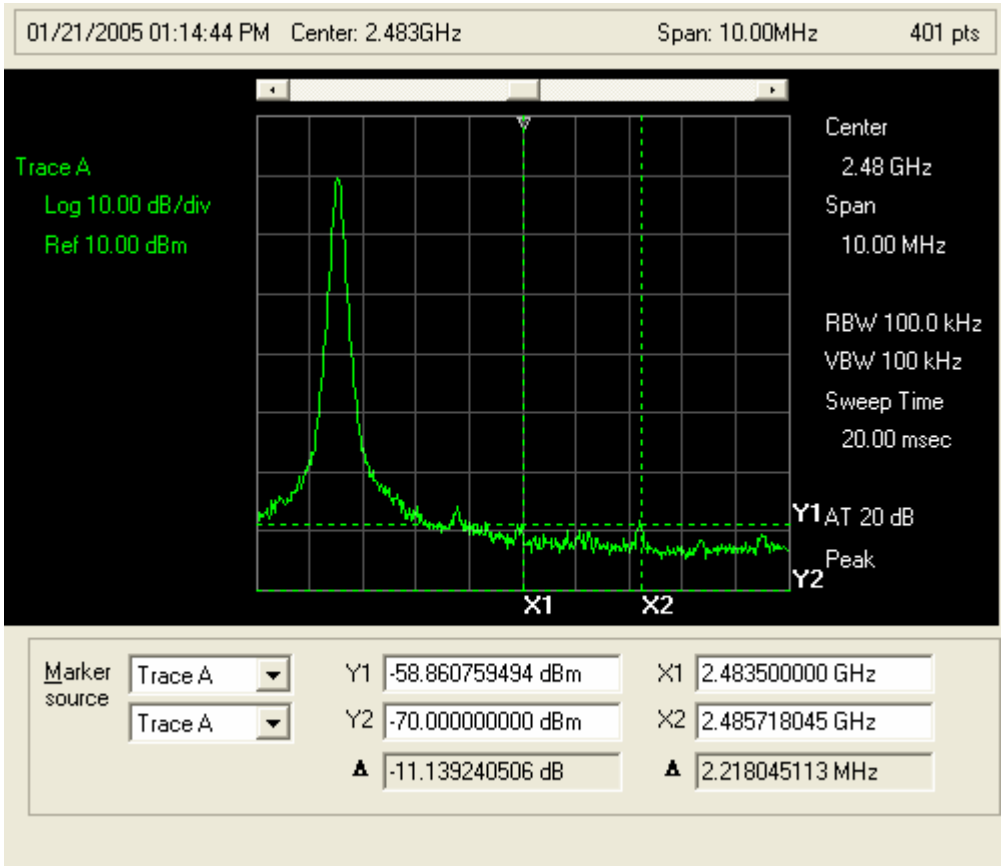
Plot 9: Band-edge Compliance, Lower Band-edge (Hopping Disabled)



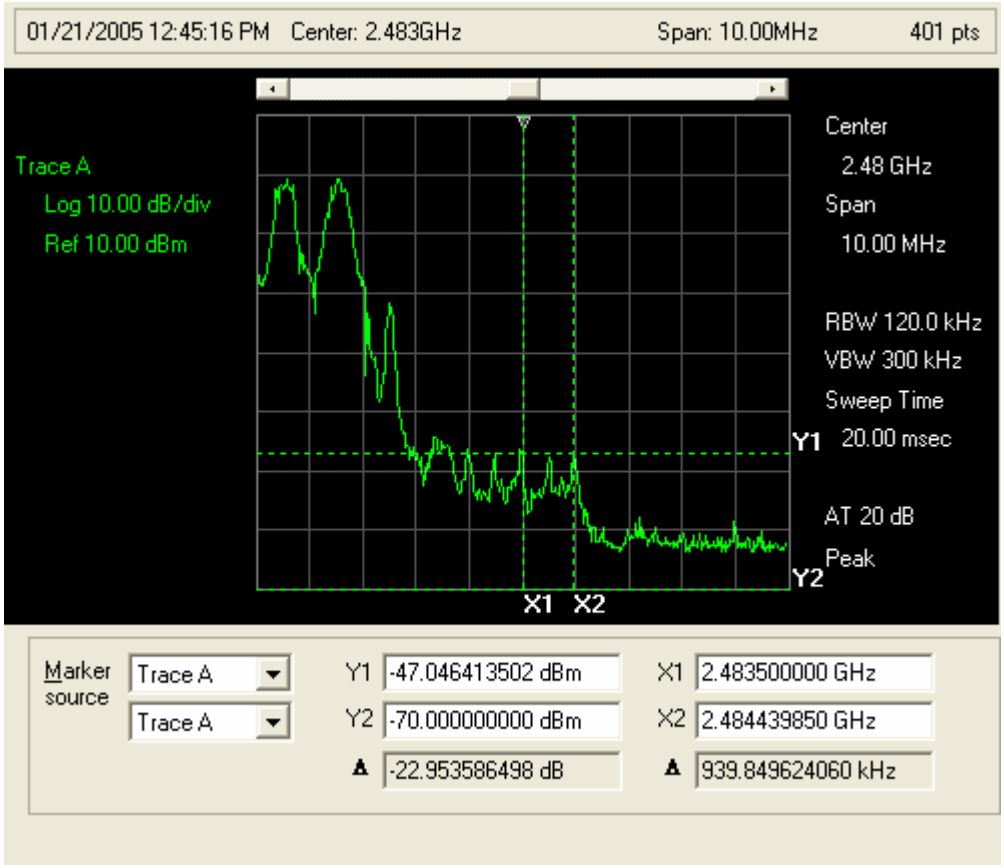
Plot 10: Band-edge Compliance, Lower Band-edge (Hopping Enabled)



Plot 11: Band-edge compliance, Upper Band-edge (Hopping Disabled)



Plot 12: Band-edge Compliance, Upper Band-edge (Hopping Enabled)



6.6.3.1 Test Method

The test is made according to ANSI C63.4 (2003)

6.7 Restricted Band Measurements

EUT	**Bluetooth GPS Rev K**
Test setup	B (Radiated – hopping enabled)
Temp, Humidity, Air Pressure	58º F, 30.02
Date of Measurement	1/21/05
Measured by	Bob Cole
Result	PASSED

6.7.1 EUT Operation Mode

EUT operation mode	Hopping Enabled
EUT channel	N/A
EUT TX power level	Maximum

6.7.2 Limits and results

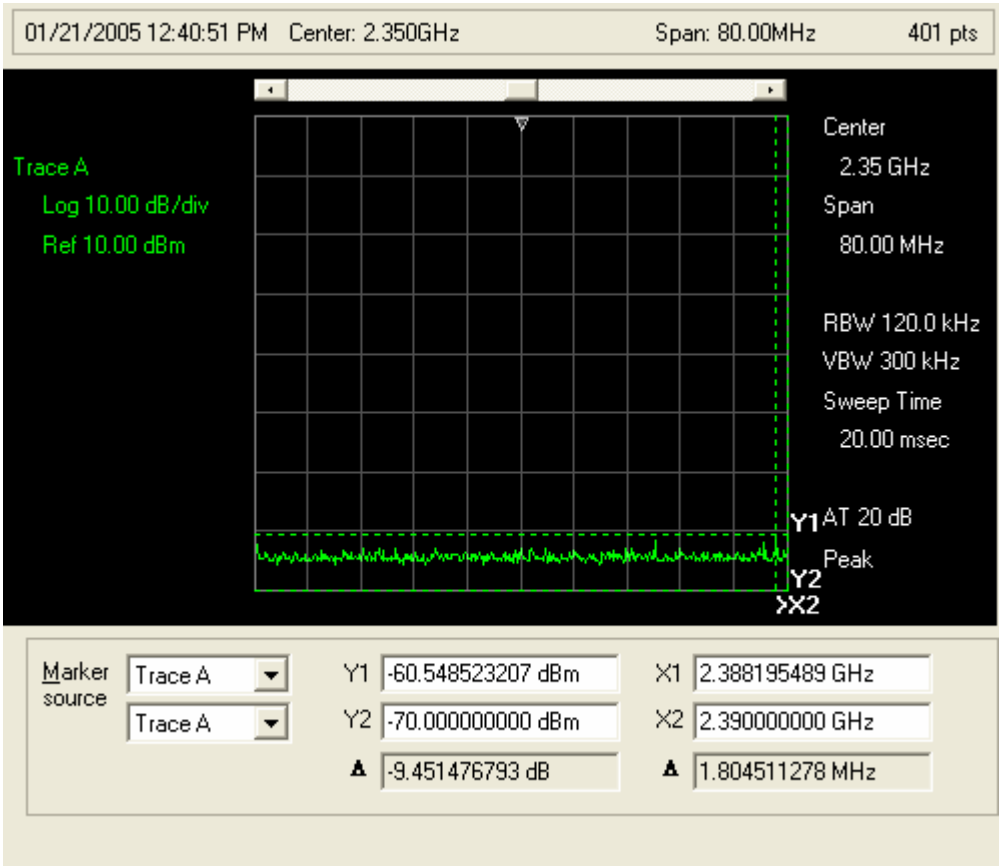
RESTRICTED BANDS

Frequency (MHz)	Limit (dBm)	Results (dBuV)
2310 - 2390	-6.0	-60.55
2483.5-2500	-6.0	-46.71

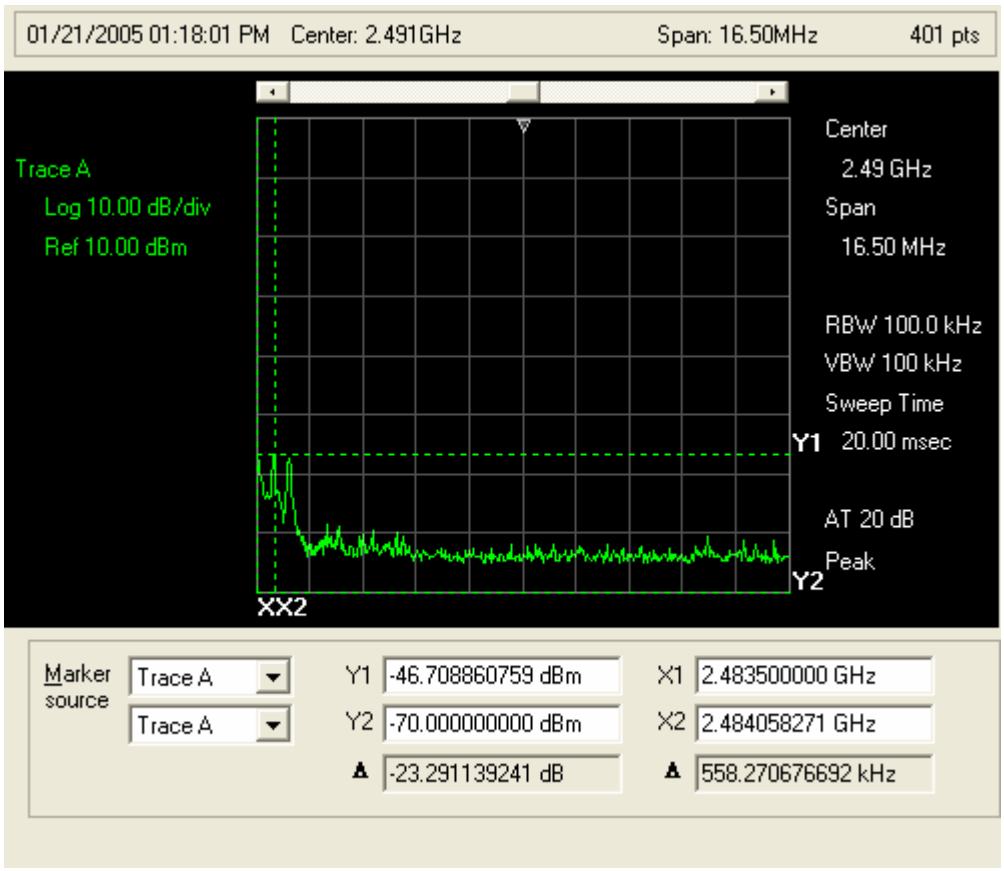
Note: All restricted Bands from 30 MHz to 25 GHz were examined. Below shows the worst case emissions from the EUT:

6.7.3 Screen Shots:

Plot 13: 2310-2400 MHz Restricted Band



Plot 14: 2483.5 - 2500 MHz Restricted Band



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6.8 Spurious RF Radiated Emissions [CFR 47, 15.247c1)

EUT	**Bluetooth GPS Rev K**
Test setup	B (Radiated – hopping enabled)
Temp, Humidity, Air Pressure	58º F, 30.27
Date of Measurement	1/21/05
Measured by	Bob Cole
Result	PASSED

6.8.1 Radiated Emissions Measurements Procedure, 30 MHz – 25GHz

RADIATED EMISSIONS TEST PROCEDURE

1. **Setup EUT on turntable per ANSI 63.4 Figure 11:** Be careful to maintain proper spacing between peripheral devices. Bundle excessive lengths of I/O cable to achieve 1 meter cable length, make sure I/O cables are at least 40 cm from ground plane. Power up the system and initialize any software necessary to exercise the EUT.

2. Place the biconical antenna in vertical polarization on antenna mast.

3. **INITIAL SCAN:** Record signals from 30 - 300 MHz, vary the size of the frequency span (and corresponding Center Frequency Step Size) displayed on the analyzer depending on the number of signals present. Decrease the span to 5 MHz or 1 MHz to clearly identify signals in crowded areas of the spectrum.

4. **IDENTIFICATION OF AMBIENT SIGNALS:** In order to identify ambient signals, turn off power to the turntable and recheck the spectrum from 30 - 300 MHz. Any signals still present are ambient signals. Remove these datapoints from the measurement spreadsheet.

5. **MAXIMIZATION OF SIGNAL STRENGTH:** With the ambient signals eliminated from consideration, it is time to maximize the emissions from the EUT to record the final measurements. Apply power to the EUT.

    a) **Identify worst case angle:** Center the spectrum analyzer display on the first recorded frequency. Set the frequency span to 1 MHz. With Trace A in **MAX HOLD**, rotate the turntable 360 degrees. Observe the display during turntable rotation. Trace A will record the maximum field strength, while Trace B (still in **Clear/Write** mode) will vary during the rotation. Return the turntable to the location where Trace B is at the same amplitude as Trace A. This is the worst case angle for this frequency.

    b) **Identify worst case antenna height:** Now vary the antenna height from 1 to 4 meters, again with Trace A on MAX HOLD and Trace B on Clear/Write. Return the antenna to the height where Trace B is the same amplitude as Trace A. This is the worst case height for this frequency.

    c) **Cable Manipulation:** It is essential to vary I/O cable and power cord positions to identify the maximum emission level from the EUT. With the turntable and mast still at the worst case positions, leave Trace A in MAX HOLD and vary the cable locations as much as they could reasonably be expected to vary in normal use of the EUT. For example, it is not necessary to lift any I/O cable or power cord to a position above the turntable height. Be careful to explore any possibilities for cable interactions which might increase emissions.

    d) **Quasi-Peak Measurements:** Certain signals will exhibit a lower amplitude when measured in quasi-peak mode. When the amplitude is lower is quasi-peak mode than in peak detection mode the quasi-peak measurement shall be recorded as the final measurement (note: quasi-peak detection is valid from 9 kHz to 1 GHz, above 1GHz average mode is required). Quasi-peak measurement procedure is as follows:

1) Center the signal being measured on the analyzer display.
2) Narrow the span to 100 Hz and re-center the signal.
3) Narrow the span to 10 Hz and re-center the signal.
4) Set the Frequency Span to 0 Hz.
5) Adjust the Reference Level until the trace is near the top of the display.
6) Put the analyzer in Linear Mode **<LIN>**
7) Re-adjust the Reference Level until the signal is near the top of the display.
8) Set the analyzer to single sweep mode **<Single>**
9) Set the sweep time to 5 seconds **<Sweep Time> <5> <Sec>**
10) Turn Trace B off **<Off>**
11) Set Trace A to max hold **<Max Hold>**
12) Turn the quasi-peak adapter on **<On>**
13) Hit **<Single>** to start measurement
14) Use marker **<Normal>** to find highest reading
15) Convert measurement to dB uV/m using the equation 20 Log (amplitude in microvolts)
16) Record measurement if lower than peak measurement.

6. **COMPLETE THE SCAN:**

a) Repeat steps 3 - 5 with the biconical antenna in the horizontal position. Perform the initial scan (step 3) with the antenna height at 2 meters.

b) Repeat steps 3 - 5 utilizing the log-periodic antenna in the vertical polarization to explore the frequency range from 300 MHz to 1 GHz.

c) Repeat steps 3 - 5 utilizing the log-periodic antenna in the horizontal polarization to explore the frequency range from 300 MHz to 1 GHz. Perform the initial scan with the log-periodic antenna positioned at 1 meter antenna height.

d) Repeat steps 3-5 with antennas in the Vertical Polarization

CLASS B LIMIT (10M MEASURING DISTANCE)

Frequency Band (MHz)	Limit (dBµV/m)	Detector
30-88	40	Q-Peak
88-230	43.5	Q-Peak
230-960	46	Q-Peak
960-1000	54	Q-Peak
1000-25000	54	Average

6.8.2 EUT operation mode

EUT operation mode	Hopping Enabled
EUT channel	Hopping
EUT TX power level	Maximum
EUT operation voltage	5 VDC

6.8.3 Emission measurement data, 30 MHz – 1GHz

The measurement results were obtained as described below.

$$E[uV/m]- URX + ACABLE + AF – GPREAMP$$

Where:

U_{RX}	receiver reading
A_{CABLE}	Attenuation of the cable
AF	Antenna Factor
G_{PREAMP}	Gain of the preamplifier

TABLE 1. RADIATED EMISSIONS, 30-1000 MHz (10 meter Measurement Distance)
EN 55022 Class B Limits

TEST RESULTS: PASSED by 10.60 dB

Antenna Polarity (H/V)	Antenna Height (Meters)	Turntable Angle (Degrees)	Frequency (MHz)	Raw Reading	Antenna Factor	Pre-Amp Gain(dB)	Corrected Reading	EN55022 B Limit	Margin (dB)
Vertical	1.80	32.00	60.42	32.50	10.80	25.00	18.30	30.00	-11.70
Horizontal	2.10	172.00	112.84	33.70	10.70	25.00	19.40	30.00	-10.60
Vertical	1.25	0.00	169.01	32.80	10.80	25.00	18.60	30.00	-11.40
Vertical	1.4	174.00	220.00	29.50	13.60	25.00	18.10	33.50	-15.40
Horizontal	1.10	9.00	312.29	28.90	13.80	25.00	17.70	33.50	-15.80
Horizontal	1.10	0.00	331.22	26.80	18.70	25.00	20.50	36.00	-15.50

6.8.4 Spurious Emissions 1 GHz - 26 GHz – Worst Case Emission

Frequency (MHz)	Limit (dBm)	Results (dBm)
2484.5	-33.00 (Peak)	-46.71 (Peak)

Note: Worst case radiated Spurious Emission is shown in Section 6.8.3, Plot 14, showing the 2483.5 – 2500 MHz Restricted Band.

6.8.5 AC Line Conducted Emissions Measurement Procedure 450 kHz – 30 MHz

EUT	**Bluetooth GPS Rev K**
Test setup	C (conducted – hopping enabled)
Temp, Humidity, Air Pressure	74º F, 30.69
Date of Measurement	4/22/04
Measured by	Bob Cole
Result	PASSED

LINE CONDUCTED EMISSIONS TEST PROCEDURE

1. **SET UP EUT ON TURNTABLE PER ANSI 63.4 FIGURE 11:** Be careful to maintain proper spacing between peripheral devices. Bundle excessive lengths of I/O cable to achieve 1 meter cable length, make sure I/O cables are at least 40 cm from ground plane. Power up the system and initialize any software necessary to exercise the EUT.

2. **SET UP SPECTRUM ANALYZER:** Per instrument settings in Appendix A of this document.

3. **BEGIN MEASUREMENT SEQUENCE:**

   a) **<Start Freq> <450> <kHz>, <Stop Freq> <5> <MHz>;** Start Sweep #1 as defined in Appendix A by starting a single sweep **<Single>** from 450 kHz to 5 MHz.

   b) **<Start Freq> <5> <MHz>, <Stop Freq> <15> <MHz>;** Start Sweep #2 as defined in Appendix A by starting a single sweep **<Single>** from 5 MHz to 15 MHz.

   c) **<Start Freq> <15> <MHz>, <Stop Freq> <30> <MHz>;** Start Sweep #3 as defined in Appendix A by starting a single sweep **<Single>** from 15 MHz to 30 MHz.

   d) For any emissions within 10 dB of the limit; reduce Frequency Span to 1 MHz **<Frequency Span> <1> <MHz>**, set sweep time to 200 **seconds <Sweep Time> <200> <Sec>**, a perform a single sweep **<Single>** to attain a final measurement. Record this measurement on the measurement spreadsheet.

4. CABLE MANIPULATION TO MAXIMIZE EMISSIONS: The effect of cable position on the line conducted emissions must be fully investigated. Experiment with various positions of the I/O cables and power cords to determine if there is any interaction between cables. Repeat step 3 to re-measure emissions after each cable manipulation.

CLASS B LIMIT

Frequency Band (MHz)	EN 55022 B Limit (dBµV/m)	Detector
0.15 – 0.5	66 to 56	QP
0.5 – 5.0	56	QP
5.0 – 30.0	60	QP

6.8.6 EUT operation mode

EUT operation mode	Hopping Enabled
EUT channel	Hopping
EUT TX power level	Maximum
EUT operation voltage	5 VDC

TABLE 2. LINE CONDUCTED EMISSIONS, .15 - 30 MHz
EN 55022 Class B Limits

TEST RESULTS: PASSED by 8.56 dB

Line / Detection Mode	Frequency (MHz)	Amplitude (uV)	Amplitude (dBuV)	Limiter Attenuation (dB)	Class B Limit	Margin (dBuV)
Hot/Average	0.258	9.711	19.75	10.00	56.00	-26.25
	0.577	19.586	25.84	10.00	46.00	-10.16
	2.471	7.849	17.90	10.00	46.00	-18.10
	6.880	20.754	26.34	10.00	50.00	-13.66
	15.350	8.543	18.63	10.00	50.00	-21.37
	22.680	9.285	19.36	10.00	50.00	-20.64
Neutral/Average	0.258	13.115	22.36	10.00	56.00	-23.64
	0.577	23.564	27.44	10.00	46.00	-8.56
	2.404	5.232	14.37	10.00	46.00	-21.63
	6.730	9.854	19.87	10.00	50.00	-20.13
	13.360	8.967	19.05	10.00	50.00	-20.95
	19.880	9.828	19.85	10.00	50.00	-20.15

7 TEST EQUIPMENT

Conducted Measurements:

Equipment	Type	Manufacturer	Device Number
EMI Analyzer	84125B	Hewlett-Packard	15921-12
Oscilloscope	TDS820	Tektronix	TDS7254
Coaxial cable	SMA Male – Reverse SMA Male (Length = 1 ft.)	Own	C1

Spurious RF radiated emissions:

Equipment	Type	Manufacturer	Device Number
EMI Analyzer System	84125B	Hewlett-Packard	15921-12
Pre-Amp	83051A	Hewlett-Packard	15921-12
Pre-Amp	83017A	Hewlett-Packard	15921-12
High Pass Filter	9701	CMT	15921-12
Horn Antenna	3115	EMCO	15921-12
Cable		Hewlett Packard	15921-12

Note: The HP 84125B EMC Analyzer System is calibrated as a system, including the analyzer, pre-amps, filters, and cable.

CFR47, 15.207 (AC powerline conducted emissions)

Equipment	Type	Manufacturer	Device number
EMI Analyzer System	84125B	Hewlett-Packard	15921-12
LISN	EMCO		ACL-001
Coaxial cable	SMA – BNC (5 Meters)	Own	C2