TEST REPORT

Class II Permissive Change

Report Number: 3059839
Project Number: 30598391
May 10, 2004

Testing performed on the

Mobile Computer
Model: MC9063
FCC ID: H9PMC9063A
IC ID: 1549D-MC9063A
to

FCC Parts: 15C, 22H & 24E

for
Symbol Technologies Inc.

A2LA Certificate Number: 1755-01

Test Performed by:	Test Authorized by:
Intertek Testing Services	Symbol Technologies Inc.
1365 Adams Court	One Symbol Plaza
Menlo Park, CA 94025	Holtsville, NY 11742-1300

Tested by: _____ Date: May 11, 2004
Bruce Gordon

Reviewed by: _____ Date: May 15, 2004
David Chernomordik

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1.0 Test Rationale

This is Class II Permissive Change report intended to show compliance of the certified device - **Mobile Computer**, model MC9063, FCC ID: H9PMC9063A to the requirements of FCC Specification Parts 15C, 22H, and 24E after modification.

The MC9063 integrates three certified radio modules listed below:
- RLAN module – Part 15 Spread Spectrum transmitter, FCC ID: H9P2164436
- Bluetooth module - Part 15 Spread Spectrum transmitter, FCC ID: H9P2164381
- CDMA module – Part 22/24 800/1900 MHz Dual Band CDMA Data Modem, FCC ID: N7N-EM3420P

As declared by the Applicant, the modules are identical (unmodified) to the original granted devices, except that the different antennas are used.

The model MC9063, FCC ID: H9PMC9063A was tested and certified with no simultaneous transmit of co-located transmitters. Simultaneous transmission was disabled by software.

The only modification made on the MC9063, FCC ID: H9PMC9063A is the modification of the software which in this Application enables simultaneous transmit of co-located transmitters.

Since the MC9063 utilizes unmodified approved modules, the following test results from the original reports are applicable to the MC9063:

TEST	REFERENCE	RESULTS
RLAN, FCC ID: H9P2164436		
6 dB Bandwidth	15.247(a)(2)	Complies
Power Density	15.247(d)	Complies
Out-of-band Antenna Conducted Emission	15.247(c)	Complies
Bluetooth, FCC ID: H9P2164381		
20 dB Bandwidth	15.247(a)(1)	Complies
Min. Channel Separation	15.247(a)(1)	Complies
Min. Hopping Channels	15.247(a)(1)	Complies
Average Channel Occupancy Time	15.47(a)(1)	Complies
Out-of-band Antenna Conducted Emission	15.247(c)	Complies
CDMA, FCC ID: N7N-EM3420P		
Out-of-band Antenna Conducted Emission including emission on the block-edge frequencies	2.1051, 22.901(d), 24.938(a)	Complies
Frequency stability vs temperature and voltage	2.1053	Complies
Occupied Bandwidth	2.1049	Complies

Further, the MC9063 tested for this Application is unmodified device tested for the Application FCC ID: H9PMC9063A. Therefore, the following test results from that Application are applicable:

TEST	REFERENCE	RESULTS
RLAN, FCC ID: H9P2164436		
Conducted output power	15.247(b)	Complies
Bluetooth, FCC ID: H9P2164381		
Conducted output power	15.247(b)	Complies
CDMA, FCC ID: N7N-EM3420P		
ERP/EIRP	22.913, 24.232	Complies
MC9063, FCC ID: H9PMC9063A		
Radiated emissions from digital part and receiver	15.109	Complies
AC line conducted emissions	15.107	Complies

The only required tests to be performed are:

for Part 22/24 CDMA and RLAN operating simultaneously - spurious radiated emissions

for Part 22/24 CDMA and BT operating simultaneously - spurious radiated emissions

for Part 15C BT and RLAN operating simultaneously - radiated emissions in the restricted bands

2.0 Summary of Tests

TEST	REFERENCE	RESULTS
CDMA (FCC ID: N7N-EM3420P) and RLAN (FCC ID: H9P2164436)		
Spurious radiated emissions	2.1053	Complies
CDMA (FCC ID: N7N-EM3420P) and Bluetooth (FCC ID: H9P2164381)		
Spurious radiated emissions	2.1053	Complies
RLAN (FCC ID: H9P2164436) and Bluetooth (FCC ID: H9P2164381)		
Radiated emissions in the restricted bands	15.247(c), 15.205, 15.209	Complies

A pre-production version of the EUT was received on March 10, 2004 in good operating condition. As declared by the Applicant, it is identical to the production units.

Date of Test: March 11, 2004 – April 22, 2004

3.0 General Description

3.1 Product Description

Equipment Under Test				
Description	Mobile Computer			
Manufacturer	Symbol Technologies Inc.			
Type	MC9063			
Part Number	MC9063-SKEJBAEA7WW			
Serial Number	ALP75427			
FCC ID	H9PMC9063A			
IC ID	1549D-MC9063A			
Radio Modules Integrated	RLAN (21-64436), Bluetooth (21-64381), CDMA (EM3420)			
Technical Description	Symbol MC9063 is Mobile Computer supporting a numeric keypad, which offers 2.4 GHz 802.11b Wireless LAN and Bluetooth connectivity, and includes Sierra EM3420 CDMA2000-1X dual band (800/1900) radio card.			
Battery/ Power Supply				
Description	Lithium Battery			
Manufacturer	Symbol Technologies Inc.			
Part Number	21-65587-01			
Voltage	7.2 V			
Radio Modules				
Description	RLAN radio	Bluetooth radio	CDMA dual band radio	
Manufacturer	Symbol Tech.	Symbol Tech.	Sierra Wireless	
Type	21-64436	21-64381	EM3420	
Power	7-16 V	3.3 V	3.4 – 4.5V	
Transmitter Operating Range, MHz	2412 –2462	2402 –2480	824.7-848.31	1851.25-1908.75
RF Output Power on file with FCC	68 mW (peak conducted)	96 mW (peak conducted)	93 mW (average ERP)	275 mW (average EIRP)
Receiver Operating Range, MHz	2412 –2462	2402 –2480	869.7 – 893.31	1930 - 1990
Intermediate Frequency	374 MHz	N/A	N/A	N/A
Emission Designator	11M0F1D	1M00F1D	1M25F9W	
Type of transmission	DSSS	FHSS	CDMA	
FCC ID	H9P2164436	H9P2164381	N7N-EM3420P	
IC ID	1549D-2164436	1549D-2164381	2417C-EM3420	
Ancillaries				
Description	Headset			
Manufacturer	VXI Corporation			
Type	VXI 61-SYB			
Part Number	50-11300-050			

3.2 Related Submittal(s) Grants

None.

3.3 Test Methodology

Radiated emissions measurements were performed according to the procedures in ANSI C63.4 (1992). Tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the **"Data Sheet"** of this Application.

For emission testing, the Equipment Under Test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). During testing, all cables were manipulated to produce worst-case emissions.

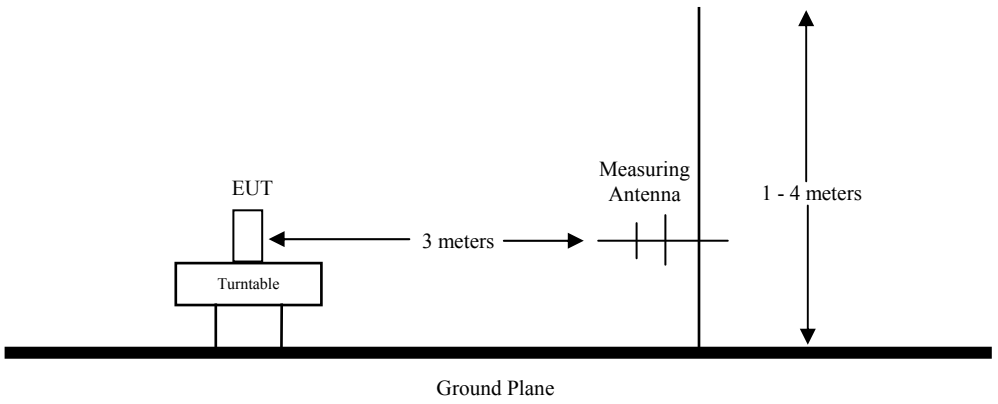
For radiated emission measurements, the EUT is attached to a cardboard box (if necessary) and placed on the wooden turntable. If the EUT attaches to peripherals, they are connected and operational (as typical as possible). The EUT is wired to transmit full power.

The signal is maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters.

Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance. All readings are extrapolated back to the equivalent three-meter reading using inverse scaling with distance.

Care was taken to ensure proper power supply voltages during testing.

Diagram of the test setup



Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF - AG
Where FS = Field Strength in dB(μV/m)
RA = Receiver Amplitude (including preamplifier) in dB(μV)
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB(1/m)
AG = Amplifier Gain in dB

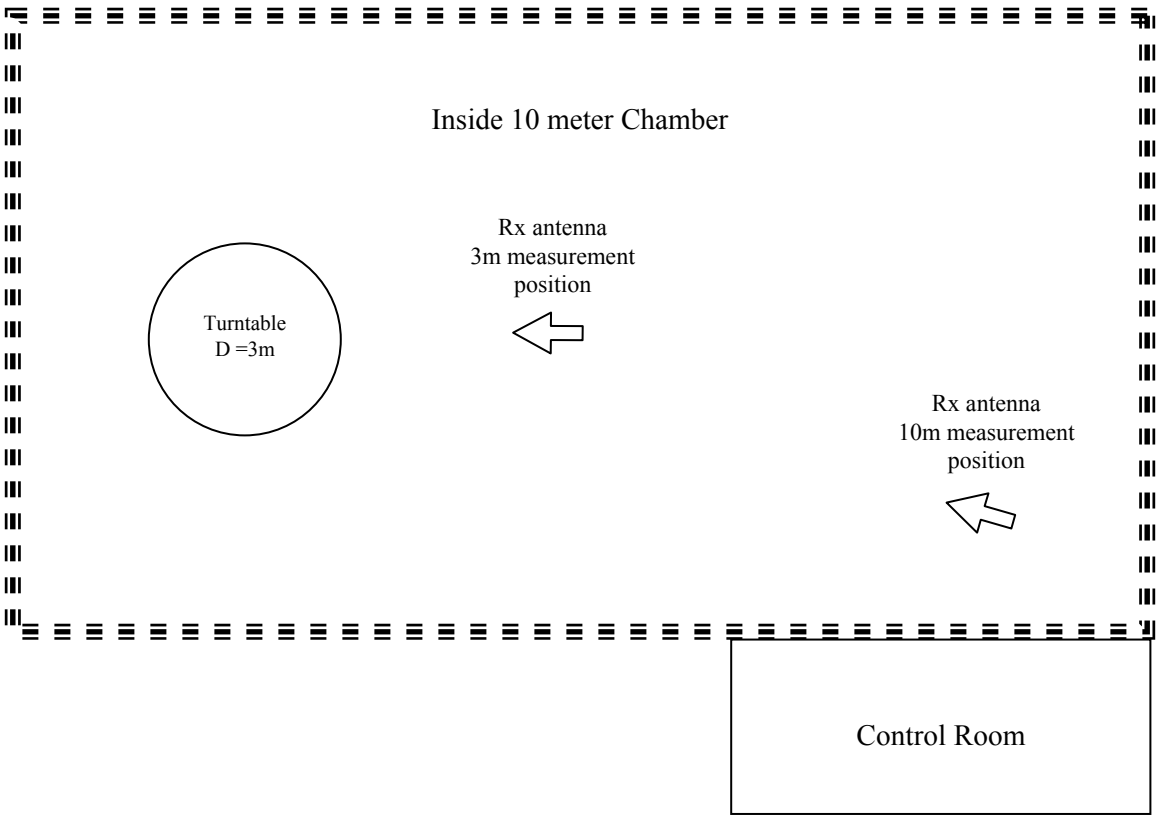
Assume a receiver reading of 52.0 dB(μV) is obtained. The antenna factor of 7.4 dB(1/m) and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving field strength of 32 dB(μV/m). This value in dB(μV/m) was converted to Intertek corresponding level in μV/m.
RA = 52.0 dB(μV); CF = 1.6 dB; AF = 7.4 dB(1/m); AG = 29.0 dB
FS = 52 + 7.4 + 1.6 - 29 = 32 dB(μV/m)
Level in μV/m = Common Antilogarithm [(32 dB(μV/m)/20] = 39.8 μV/m

3.4 Test Facility

The test facility is located at 1365 Adams Court, Menlo Park, California. Menlo Park is approximately 30 miles SE from San Francisco and 20 miles NW from San Jose. The geographic coordinates are 37° 28' 43" N Latitude and 122° 8' 40" W Longitude. Elevation is 60 feet above sea level.

Radiated emission measurements were performed in a 10 meter Semi-Anechoic Chamber, referred to as Site 1. Site 1 is a radio frequency semi-anechoic chamber / Alternate Test Site (ATS) intended to closely simulate the measurement environment as established for the Open Area test Site (OATS). The chamber is a shielded enclosure used to control and maintain a predictable EMI environment within the test region. A lining of RF absorbing material (Absorber) and other anechoic materials are installed over all interior wall and ceiling surfaces as to completely shroud exposed metallic components and disrupt reflective properties. The ground plane is an exposed RF reflective surface. The turntable is flush mounted, 3 meters in diameter, and remotely controlled. The antenna mast can be positioned at 3 or 10 meters away from the turntable. The antenna mast is remote controlled and can lower/raise an antenna between 1 – 4 meters. The antenna mast can also rotate between horizontal and vertical polarizations. The site meets the characteristics of ANSI C63.4 and is registered with the FCC.

Diagram of 10 meter Chamber for Radiated Emissions Testing

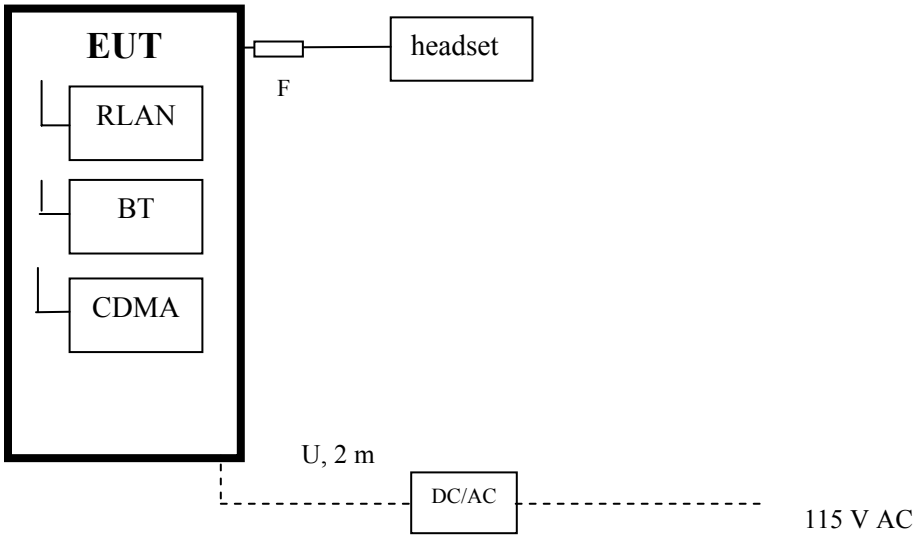


4.0 System Test Configuration

4.1 Support Equipment and description

Laptop computer: DELL, Latitude CPi, model PPX

4.2 Block Diagram of Test Setup



S = Shielded **U** = Unshielded	**F** = With Ferrite **m** = Meter

4.3 Justification

The MC9063 was previously tested in single transmission mode and the results were originally reported in Intertek report number 30567601. The ERP/EIRP of spurious emissions were measured in the CDMA mode, and the Field Strength of spurious emissions occurred in the restricted bands was measured in RLAN and BT modes.

The purpose of the tests described in this report is to measure emissions at intermodulation frequencies, which may occur during the simultaneous transmissions, as well, as emissions at some harmonic frequencies of each transmitter which may change the level because of simultaneous transmissions.
As the signals at spurious emission frequencies are low, particular attention was made on the second order (F1±F2) and third order (2∗F1±F2, 2∗F2±F1) intermodulation frequencies.

4.4 Software Exercise Program

The EUT exercise program used during testing was designed to exercise the various system components in a manner similar to a typical use. The transmitters were setup to transmit continuously to simplify the measurement methodology.

4.5 Mode of operation during test

Continuously transmitting signals on different channels.

4.6 Modifications required for Compliance

Intertek installed no modifications during compliance testing in order to bring the product into compliance.

4.7 Additions, deviations and exclusions from standards

No additions, deviations or exclusion have been made from standard.

5.0 CDMA RF Modem and RLAN. Simultaneous transmission test

FCC Rule: 2.1053, 22.901(d), 24.238(a)

5.1 Requirement

The mean power of emissions must be attenuated below the mean power of the unmodulated carrier (P) on any frequency outside the frequency band by at least (43 + 10 log P) dB.
Note: This requirement corresponds to ERP/EIRP Limit for spurious radiation as –13 dBm.

5.2 Procedure

The frequency range up to 25 GHz was investigated. The only combinations of the lowest CDMA channel with the highest RLAN channel and the highest CDMA channel with the lowest RLAN channel were investigated.

The EUT is powered from a fully charged battery. The preliminary scan was performed by placing a measuring antenna at a distance about 0.2m from the EUT to identify the spurious emission frequencies. Then the measuring antenna was placed at a distance of 3 meters from the EUT. During the tests, the EUT azimuth was varied and the antenna height is adjusted from 1m – 4m in the horizontal and vertical polarization in order to identify the maximum level of emissions from the EUT. The test was performed with the EUT positioned in three orthogonal axes. The worst-case emissions was reported.

For spurious emissions attenuation, the substitution method is used. The EUT is substituted by a reference antenna (half-wave dipole - below 1 GHz, or Horn antenna - above 1GHz) which is connected to a signal generator (SG). The signal generator output was adjusted to obtain the same reading from the measuring antenna as from EUT. The Power of the signal generator (V_g in dBm) on the end of the cable is recorded.

ERP (in dBm) is calculated as: ERP = V_g + G, where G is the transmitting antenna gain (in dBd).
EIRP (in dBm) is calculated as: EIRP = V_g + G, where G is the transmitting antenna gain (in dBi).

5.3 Test Result

1	2	3	4	5
Frequency	**SA Reading when measured the EUT**	**SG Power to get the same reading**	**ERP/EIRP * of spurious emissions**	**ERP/EIRP Limit**
MHz	**dB(µV)**	**dBm**	**dBm**	**dBm**
Cellular Band at 825.25 MHz and RLAN at 2462 MHz				
2484	17.5	-50.1	-44.6	-13.0
3301	19.1	-48.6	-43.3	-13.0
4924	16.4	-54.4	-47.8	-13.0
Cellular Band at 847.75 MHz and RLAN at 2412 MHz				
3391	16.7	-50.7	-45.4	-13.0
4824	16.0	-55.9	-49.3	-13.0
PCS Band at 1851.25 MHz and RLAN at 2462 MHz				
2484	17.9	-49.9	-44.2	-13.0
3702.5	25.5	-43.6	-34.8	-13.0
4924	16.9	-53.9	-47.3	-13.0
PCS Band at 1908.75 MHz and RLAN at 2412 MHz				
3817.5	24.1	-45.0	-36.2	-13.0
4824	16.2	-55.7	-49.1	-13.0

* Calculated as SG Power (in column 4) + substitution horn antenna gain (in dBd - for Cell band, or in dBi - for PCS band)
All other spurious emissions, not reported, are at least 20 dB below the limit.

The EUT complies by more than 20 dB.

CDMA RF Modem and Bluetooth. Simultaneous transmission test
FCC Rule: 2.1053, 22.901(d), 24.238(a)

6.1 Requirement

The mean power of emissions must be attenuated below the mean power of the unmodulated carrier (P) on any frequency outside the frequency band by at least (43 + 10 log P) dB.
Note: This requirement corresponds to ERP/EIRP Limit for spurious radiation as –13 dBm.

6.2 Procedure

The frequency range up to 25 GHz was investigated. The only combinations of the lowest CDMA channel with the highest Bluetooth channel and the highest CDMA channel with the lowest Bluetooth channel were investigated.

The EUT is powered from a fully charged battery. The preliminary scan was performed by placing a measuring antenna at a distance about 0.2m from the EUT to identify the spurious emission frequencies. Then the measuring antenna was placed at a distance of 3 meters from the EUT. During the tests, the EUT azimuth was varied and the antenna height is adjusted from 1m – 4m in the horizontal and vertical polarization in order to identify the maximum level of emissions from the EUT. The test was performed with the EUT positioned in three orthogonal axes. The worst-case emissions was reported.

For spurious emissions attenuation, the substitution method is used. The EUT is substituted by a reference antenna (half-wave dipole - below 1 GHz, or Horn antenna - above 1GHz) which is connected to a signal generator (SG). The signal generator output was adjusted to obtain the same reading from the measuring antenna as from EUT. The Power of the signal generator (V_g in dBm) on the end of the cable is recorded.

ERP (in dBm) is calculated as: ERP = V_g + G, where G is the transmitting antenna gain (in dBd).
EIRP (in dBm) is calculated as: EIRP = V_g + G, where G is the transmitting antenna gain (in dBi).

6.3 Test Result

1	2	3	4	5
Frequency	**SA Reading when measured the EUT**	**SG Power to get the same reading**	**ERP/EIRP * of spurious emissions**	**ERP/EIRP Limit**
MHz	**dB(µV)**	**dBm**	**dBm**	**dBm**
Cellular Band at 825.25 MHz and Bluetooth mode at 2480 MHz				
2483.5	14.2	-55.3	-50.2	-13.0
3301	19.1	-48.6	-43.3	-13.0
Cellular Band at 847.75 MHz and Bluetooth mode at 2402 MHz				
3391	16.7	-50.7	-45.4	-13.0
PCS Band at 1851.25 MHz and Bluetooth mode at 2480 MHz				
2483.5	14.2	-55.3	-48.0	-13.0
3702.5	25.5	-43.6	-34.8	-13.0
PCS Band at 1908.75 MHz and Bluetooth mode at 2402 MHz				
3817.5	24.1	-45.0	-36.2	-13.0

* Calculated as SG Power (in column 4) + substitution horn antenna gain (in dBd - for Cell band, or in dBi - for PCS band)
All other spurious emissions, not reported, are at least 20 dB below the limit.

The EUT complies by more than 20 dB.

6.0 RLAN and Bluetooth. Simultaneous transmission test

FCC Rule: 15.247(c)

7.1 Requirement

Radiated emissions which fall in the restricted bands, must comply with the radiated emission limits specified in 15.209.

7.2 Procedure

The frequency range up to 25 GHz was investigated. The only combinations of the lowest RLAN channel with the highest Bluetooth channel and the highest RLAN channel with the lowest Bluetooth channel were investigated.

The EUT was powered from a fully charged battery. The preliminary scan was performed by placing a measuring antenna at a distance about 0.2m from the EUT to identify the spurious emission frequencies. Then the measuring antenna was placed at a distance of 3 meters from the EUT. During the tests, the EUT azimuth was varied and the antenna height is adjusted from 1m – 4m in the horizontal and vertical polarization in order to identify the maximum level of emissions from the EUT. The test was performed with the EUT positioned in three orthogonal axes. The worst-case emissions is reported.

7.3 Test Result

The data listed on the following tables list the significant emission frequencies in the restricted bands, the limit and the margin of compliance.

The data listed on the following tables were the only emissions found in the investigation up to 25 GHz. No other emissions were found above the system noise floor, which is at least 6 dB below the regulatory limit.

All radiated spurious emissions in the restricted bands, including the emissions in the adjacent channels, are below the limits listed in FCC section 15.209.

The EUT complies by 3.2 dB.

Radiated emissions in the restricted bands									
Test dates: April 22-23, 2004, Test engineer: Bruce Gordon									
Freq	Field strength	Detector	Search antenna polarization	Limit	Margin	RA	CF	AG	AF
MHz	dB(uV/m)			dB(uV/m)	dB	dB(uV/)	dB	dB	dB(1/m)
Simultaneous Tx, Bluetooth @2480 MHz and RLAN @2412 MHz									
283.85	26.3	Peak	V	74.0	-47.7	40.3	5.5	32.2	12.7
283.85	25.1	Average	V	54.0	-28.9	39.1	5.5	32.2	12.7
2320.0	60.3	Peak	V	74.0	-13.7	30.7	0.5	-	29.1
2320.0	50.8	Average	V	54.0	-3.2	21.2	0.5	-	29.1
2483.5	65.6	Peak	V	74.0	-8.4	35.2	1.8	-	28.6
2483.5	39.1**	Average	V	54.0	-14.9	8.7**	1.8	-	28.6
4824.0	49.3	Peak	V	74.0	-24.7	48.7	2.7	35.9	33.8
4824.0	38.3	Average	V	54.0	-15.7	37.7	2.7	35.9	33.8
4960.0	52.4	Peak	V	74.0	-21.6	51.1	2.9	35.8	34.2
4960.0	23.4**	Average	V	54.0	-30.6	22.1**	2.9	35.8	34.2
7440.0	56.6	Peak	V	74.0	-17.4	51.9	3.5	35.4	36.6
7440.0	26.7**	Average	V	54.0	-27.3	22.0**	3.5	35.4	36.6
12060.0	46.1	Peak	V	74.0	-27.9	39.7*	4.0	37.2	39.6
12060.0	35.1	Average	V	54.0	-18.9	28.7*	4.0	37.2	39.6
12400.0	46.4	Peak	V	74.0	-27.6	40.0*	4.1	37.1	39.4
12400.0	36.4	Average	V	54.0	-17.6	30.0*	4.1	37.1	39.4
14472.0	49.8	Peak	V	74.0	-24.2	40.3*	4.8	36.4	41.1
14472.0	37.9	Average	V	54.0	-16.1	28.4*	4.8	36.4	41.1
19840.0	57.8	Peak	V	74.0	-16.2	34.0*	7.5	24.0	40.3
19840.0	47.8	Average	V	54.0	-6.2	24.0*	7.5	24.0	40.3
19296.0	57.5	Peak	V	74.0	-16.5	33.8*	7.4	24.0	40.3
19296.0	48.1	Average	V	54.0	-5.9	24.4*	7.4	24.0	40.3

Field strength = RA (spectrum analyzer reading) + AF (search antenna correction factor) + CF (cable factor) – AG (preamplifier gain)

* noise floor measurement

** includes a Duty Cycle CF = 24.7 dB. The Duty Cycle CF was used for selected measurements.

See Appendix A for Duty Cycle calculation.

Radiated emissions in the restricted bands									
Test dates: April 22-23, 2004, Test engineer: Bruce Gordon									
Freq	Field strength	Detector	Search antenna polarization	Limit	Margin	RA	CF	AG	AF
MHz	dB(uV/m)			dB(uV/m)	dB	dB(uV/)	dB	dB	dB(1/m)
Simultaneous Tx, Bluetooth @2402 MHz and RLAN @2462 MHz									
2338.0	60.4	Peak	V	74.0	-13.6	30.8	0.5	-	29.1
2338.0	50.1	Average	V	54.0	-3.9	20.5	0.5	-	29.1
2352.0	61.9	Peak	V	74.0	-12.1	32.2	0.5	-	29.2
2352.0	51.2	Average	V	54.0	-2.8	21.5	0.5	-	29.2
2484.0	54.3**	Peak	V	74.0	-19.7	29.6**	0.6	-	30.2
2484.0	49.7**	Average	V	54.0	-4.3	25.0**	0.6	-	30.2
4176.0	56.8	Peak	V	74.0	-17.2	57.6	2.8	36.3	32.7
4176.0	50.7	Average	V	54.0	-3.3	51.5	2.8	36.3	32.7
4804.0	56.3	Peak	V	74.0	-17.7	55.7	2.7	35.9	33.8
4804.0	29.7**	Average	V	54.0	-24.3	29.1**	2.7	35.9	33.8
4924.0	46.0	Peak	V	74.0	-28.0	44.7	2.9	35.8	34.2
4924.0	41.7	Average	V	54.0	-12.3	40.4	2.9	35.8	34.2
7386.0	52.3	Peak	V	74.0	-21.7	47.6	3.5	35.4	36.6
7386.0	42.3	Average	V	54.0	-11.7	37.6	3.5	35.4	36.6
12010.0	48.5	Peak	V	74.0	-25.5	42.1*	4.0	37.2	39.6
12010.0	34.4	Average	V	54.0	-19.6	28.0*	4.0	37.2	39.6
12310.0	47.4	Peak	V	74.0	-26.6	41.0*	4.1	37.1	39.4
12310.0	39.9	Average	V	54.0	-14.1	33.5*	4.1	37.1	39.4
14412.0	49.5	Peak	V	74.0	-24.5	40.0*	4.8	36.4	41.1
14412.0	37.6	Average	V	54.0	-16.4	28.1*	4.8	36.4	41.1
19216.0	57.7	Peak	V	74.0	-16.3	34.0*	7.4	24.0	40.3
19216.0	47.7	Average	V	54.0	-6.3	24.0*	7.4	24.0	40.3
19696.0	58.4	Peak	V	74.0	-15.6	34.6*	7.5	24.0	40.3
19696.0	48.0	Average	V	54.0	-6.0	24.2*	7.5	24.0	40.3
22158.0	59.3	Peak	V	74.0	-14.7	32.8*	10.2	24.0	40.3
22158.0	47.8	Average	V	54.0	-6.2	21.3*	10.2	24.0	40.3

Field strength = RA (spectrum analyzer reading) + AF (search antenna correction factor) + CF (cable factor) – AG (preamplifier gain)

Notes: * noise floor measurement

** includes a Duty Cycle CF = 24.7 dB. The Duty Cycle CF was used for selected measurements.

See Appendix A for Duty Cycle calculation.

8.0 List of Test Equipment

Measurement equipment used for emission compliance testing utilized the equipment on the following list:

EQUIPMENT	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. INTERVAL	CAL. DUE
Spectrum Analyzer w/85650 QP Adapter	Hewlett Packard	8566B	2416A00317 2043A00251	12	10/28/04
Spectrum Analyzer	R & S	FSP40	036612004	12	2/04/05
BI-Log Antenna	EMCO	3143	9509-1160	12	10/1/04
Dipole Antenna	CDI	Roberts	331	12	9/10/04
Horn Antenna	EMCO	3115	8812-3049	12	4/14/05
Horn Antenna	EMCO	3115	9170-3712	12	7/05/04
Horn Antenna	EMCO	3160-09	Not Labeled	#	#
Pre-Amplifier	Sonoma Inst.	310	185634	12	9/21/04
Pre-Amplifier	Miteq	AMF-4D-001180-24-10P	799159	12	9/06/04
Pre-Amplifier	CTT	ALO/400-8023	47526	12	3/25/05

No Calibration required

9.0 Document History

Revision/ Job Number	Writer Initials	Date	Change
1.0 / 3059839	DC	May 15, 2004	Original document

Appendix A – Duty Cycle Calculation for BT module

The test mode being used for BT emissions is the DH5 Packet on a fixed channel.

In accordance with FCC Public Notice DA 00-705, Released 30th March 2003, Section 15.247(c) Spurious Radiated Emissions, if the dwell time per channel of the hopping signal is less than 100ms, then the reading obtained with the 10Hz VBW may be further adjusted by a duty cycle correction factor, derived from 20log(dwell time/100ms).

In an effort to demonstrate compliance with the 15.209 limit, the following adjustment has been calculated for use with Average Measurements only:

Dwell Time = 5.81 ms this is derived from:

Total slot time per time slot for DH5 packet 625µs x 5 = 3.125 ms
Actual transmit time during this time slot is 2.905 ms and the reply time slot after each DH5 packet is 625 µs.
Total time slot length per channel 3.125 + 0.625 = 3.75 ms.

Multiply Total time slot length per channel by 32 channels per hop sequence 32 x 3.75 = 120 ms

It is therefore possible to have a maximum of two hop sequences in any given 100 ms period, a single channel could occur twice within any 100ms time window; 2 x 2.905 = 5.81 ms

Therefore; the Bluetooth Duty Cycle Correction Factor for the EUT is 20Log(5.81/100) = -24.7dB

This correction factor may be applied to all Average Measurements related to the FH signal.