Ecom Sertech Corp.
Rm. 258, Bldg. 17, NO.195, Sec. 4 Chung Hsing Rd.,ChuTung Chen, Hsinchu, Taiwan 310, R.O.C
TEL:886-3-5918012 FAX : 886-3-5825720

TEST REPORT

Product Name ：Bluetooth CE Bus Dongle
Model Number ：MBT-9107 ; SYN0895B ; DC600

Applicant ：Microlink Communications Inc.
Address ：6F, No. 30, Raykuang Rd., Neihu, Taipei 114, Taiwan R.O.C.

Received Date：May 03, 2004
Tested Date ：January 19 ~ February 08, 2004 ; May 03 ~ 12, 2004

Notes：
1. This report will be invalid if duplicated or photocopied in part.
2. This report refers only to the specimen(s) submitted to testing, and be invalid as seperately used.
3. This report is invalid without examination stamp and signature of this institute.
4. The tested specimen(s) will be preserved for thirty days from the data issued.
5. The report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.
6. **This report is modified from ER04-01-040.**

0240
ILAC MRA
NVLAP LAB CODE 200110-0

Test Report Certification

Product Name : Bluetooth CE Bus Dongle

Model Number : MBT-9107 ; SYN0895B ; DC600

Applicant : Microlink Communications Inc.

Measurement Standard :

FCC 47 C.F.R. Part 15, Subpart B and Subpart C (2003),
ANSI C63.4 (2001)

Tested By	: Stan Peng (Stan Peng)	Date :	May 12, 2004
Reviewed By	: Roger Sheng (Roger Sheng)	Date :	May 12, 2004
Approved By	: Chieh-De Tsai (Chieh-De Tsai ,Manager)	Date :	May 12, 2004

檢測報告專用章

WE HEREBY CERTIFY THAT: The measurements shown in the attachment were made in accordance with the procedures indicated, and the energy emitted by the equipment was found to be within the limits applicable. We assume full responsibility for the accuracy and completeness of these measurements and vouch for the qualifications of all persons taking them.

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1. GENERAL INFORMATION

1.1 Description of EUT & Power

MANUFACTURER	: Microlink Communications Inc.
SAMPLE NAME	: Bluetooth CE Bus Dongle
MODEL NO	: MBT-9107 ; SYN0895B ; DC600
EUT DESCRIPTION	: 2.4GHz Frequency Hopping Spread Spectrum Data Transceiver for Bluetooth CE Bus Dongle
FREQUENCY RANGE	: 2402 MHz to 2480MHz
CHANNEL NUMBER	: 79
CHANNEL Spacing	: 1MHz
AIR DATA RATE	: 723Kbps
TYPE OF MODULATION	: Frequency Hopping Spread Spectrum, G FSK
FEQUENCY SELECTION	: BY SOFTWARE
ANTENNA TYPE	: Meander Line (On Board), Antenna gain : 0dBi.
POWER SOURCE	: 3.7VDC (From Cell Phone)

1.2 Description of Peripherals

（1）Notebook PC

MANUFACTURER	：COMPAQ CORP.
MODEL NUMBER	：EV0N800
SERIAL NUMBER	：470052-787
F.C.C.	：DOC
POWER CORD	：Unshielded, Detachable, 1.8m

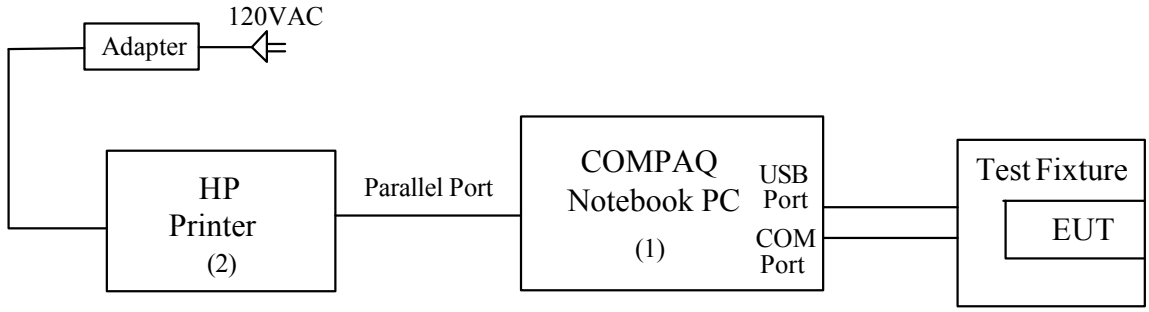
Adapter

MANUFACTURER	：COMPAQ CORP.
MODEL NUMBER	：PPP009H
SERIAL NUMBER	：--------

（2）Printer

MANUFACTURER	：HP CORP.
MODEL NUMBER	：C8952D
SERIAL NUMBER	：CN29B181H7
FCC ID	：DOC
POWER SOURCE	：100-240VAC, 50/60Hz, 0.7A
SIGNAL CABLE	：Shielded , Undetachable , 1.8m

1.3 EUT & Peripherals Setup Diagram



1.4 EUT Operating Procedure

1. Set up all computers like the setup diagram.
2. Run the test software " Blue test" in COMPAQ Notebook computer to control the EUT to transmit.
3. Remove the COM-port control cable.
4. The EUT continues transmitting after removing the cable
5. Start test.

1.5 Description of Test Site

SITE DESCRIPTION

FCC Certificate NO. : 90585
BSMI Certificate NO. : SL2-IN-E-0002
NVLAP Lab code : 200118-0
CNLA Certificate NO. : CNLA-ZL97018
VCCI Certificate NO. : R-1189, C-1250
TÜV Certificate NO. : 10008375

NAME OF SITE ：Ecom Sertech Corp. Hsin-Chu Lab.
(Spin-off from ITRI / ERSO on Apr. 01, 2003)

SITE LOCATION ：Rm.258, Bldg.17, NO.195 , Sec. 4, Chung Hsing Rd.,
Chu-Tung Chen. Hsin-Chu, Taiwan 310 R.O.C.

1.6 Summary of Test Results

The EUT has been tested according to the following specifications :

APPLIED STANDARD：FCC 47 C.F.R. Part 15, Subpart B and Subpart C			
Standard Section	Test Type and Limit	Result	REMARK
15.107 15.207	AC Power Conducted Emission Limit : Sec1.5.107	PASS	Meet the requirement of limit
15.109 15.205 15.209	Transmitter Radiated Emissions Limit : Table 15.209	PASS	Meet the requirement of limit
15.247(a) (1)(i)-(ii)	Transmitter 20dB Bandwidth Limit < 1MHz	PASS	Meet the requirement of limit
15.247(b)(1)	Maximum Peak Output Power Limit : max. 30dBm	PASS	Meet the requirement of limit
15.247(a)(1)	Carrier Frequency Separation	PASS	Meet the requirement of limit
15.247(a) (1)(ii)	Number of Hopping Frequency	PASS	Meet the requirement of limit
15.247(a) (1)(ii)	Time of Occupancy (dwell time)	PASS	Meet the requirement of limit
15.247(c)	Band Edge Compliens	PASS	Meet the requirement of limit
15.247(c)	Out of Band Measurements	PASS	Meet the requirement of limit

2. 20DB BANDWIDTH FOR HOPPING

Test Requirement: 15.247(a)(1)(ii)

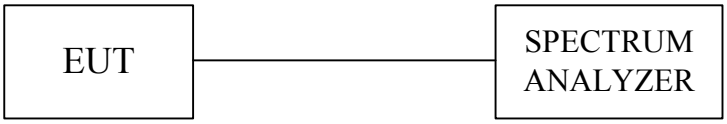
2.1 Test Equipments

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration
ROHDE & SCHWARZ SPECTRUM ANALYZER	FSEK30	835253/002	June 17, 2003

NOTE：

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2.2 Test Setup



2.3 Limits of 20db Bandwidth Measurement

Limit: 20dB band width < 1MHz

2.4 Test Procedure

The 20dB band width was measured with a spectrum analyzer connected to RF antenna connector(conducted measurement) while EUT was operating in transmit mode at the appropriate center frequency.
The analyzer center frequency was set to the EUT carrier frequency, using the analyzer. Display Line and Marker Delta functions, the 20dB band width of the emission was determined.

2.5 Uncertainty of Conducted Emission

The uncertainty of conducted emission is ± 10KHz.

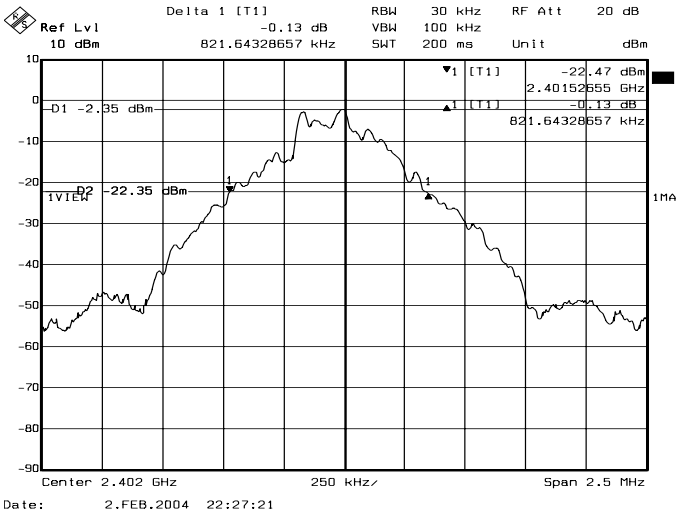
2.6 Test Results

Refer to attached spectrum analyzer data chart.

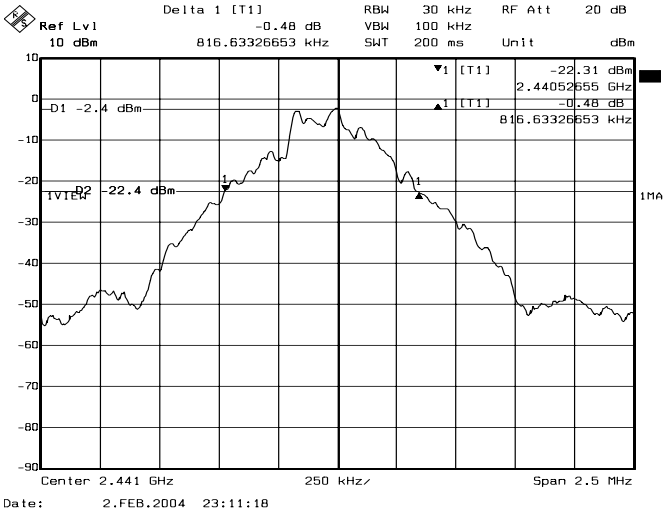
Input Power (System)	3.7VDC (From Cell Phone)	**Environmental Conditions**	14.6℃, 73%RH
Tested By	Stan Peng		

Channel	**Channel Frequency (MHz)**	**20dB Bandwidth (MHz)**	**Maximum Limit (MHz)**	**Pass / Fail**
01（Low）	2402	0.82164	＜1	PASS
40（Mid）	2441	0.81663	＜1	PASS
79（High）	2480	0.81162	＜1	PASS

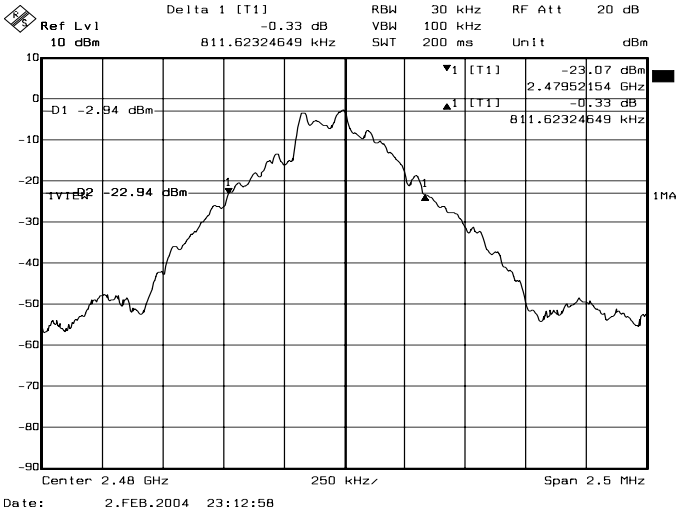
2.7 Photo of 20db Bandwidth Measurement



Channel 1



Channel 40



Channel 79

3. MAXIMUM PEAK OUTPUT POWER

Test Requirement: 15.247(b)(1)

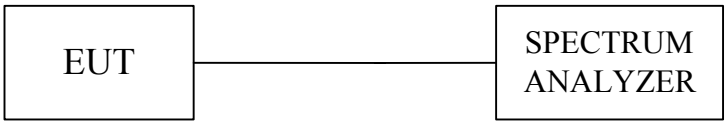
3.1 Test Equipments

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration
ROHDE & SCHWARZ SPECTRUM ANALYZER	FSEK30	835253/002	June 17, 2003

NOTE：

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

3.2 Test Setup



3.3 Limits of Maximum Peak Output Power

The Maximum Peak Output Power Measurement is 1W(30dBm) for frequency hopping systems operating in 2400~2483.5 MHz employing at least 75 hopping channels.

3.4 Test Procedure

The RF power output was measured with a Power meter connected to the RF Antenna connector (conducted measurement) while EUT was operating in transmit mode at the appropriate center frequency, A spectrum analyzer was used to record the shape of the transmit signal see 4.7 for the measurement set up.

3.5 Uncertainty of Conducted Emission

The uncertainty of conducted emission is ± 1.82dB.

3.6 Test Results

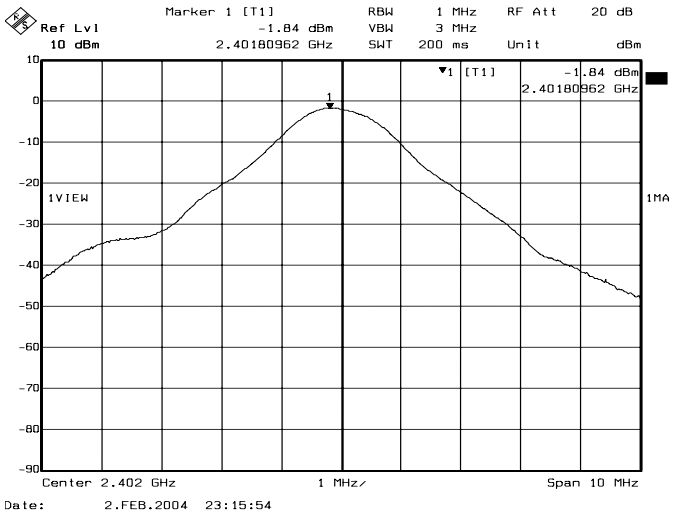
Input Power (System)	3.7VDC (From Cell Phone)	**Environmental Conditions**	14.6℃, 73%RH
Tested By	Stan Peng		

Cable loss = 1.5dB

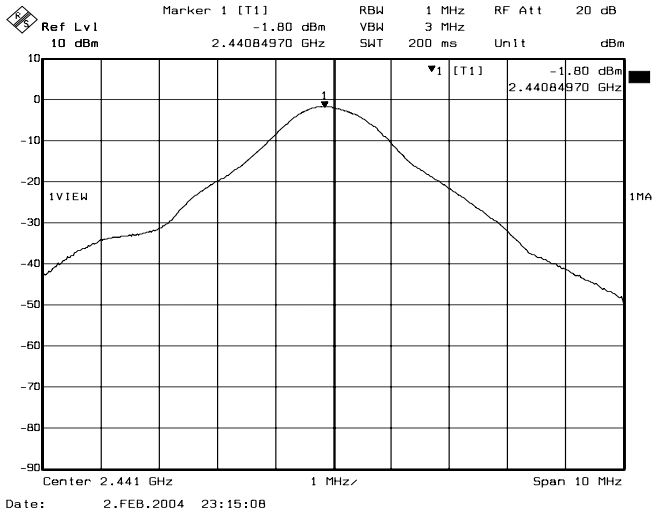
Channel	**Channel Frequency (MHz)**	**Peak Power Output (dBm)**	**Peak Power Limit (dBm)**	**Pass / Fail**
01（Low）	2402	-0.34	30	PASS
40（Mid）	2441	-0.30	30	PASS
79（High）	2480	-0.77	30	PASS

Note : The result was calculated as follow :
Peak Power Output = Peak Power Reading + Cable loss

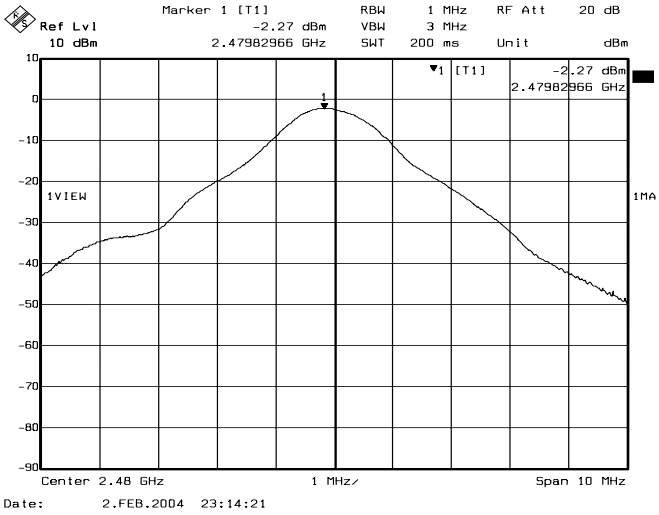
3.7 Photo of Maximum Peak Output Power



Channel Low



Channel Middle



Channel High

4. HOPPING CHANNEL SEPARATION

Test Requirement: 15.247(a)(1)

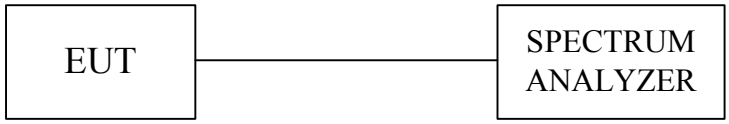
4.1 Test Equipments

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration
ROHDE & SCHWARZ SPECTRUM ANALYZER	FSEK30	835253/002	June 17, 2003

NOTE：

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.2 Test Setup



4.3 Limits of Hopping Channel Separation

According to 15.247(a)(1), frequency hopping system shall have, hopping channel carrier frequencies separated by a minimum of 25kHz or the 20dB bandwidth of the hopping channel, whichever is greater.

4.4 Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT as shown in test setup without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range.
3. Because of the property of test software and hardware, the TX signal can not be modulated while test.
4. By using the MaxHold function record the separation of adjacent channels.
5. Measure the frequency difference of these two adjacent channels by spectrum analyzer MARK function. And then plot the result on spectrum analyzer screen.

Repeat above procedures until all frequencies measured were complete.

4.5 Uncertainty of Conducted Emission

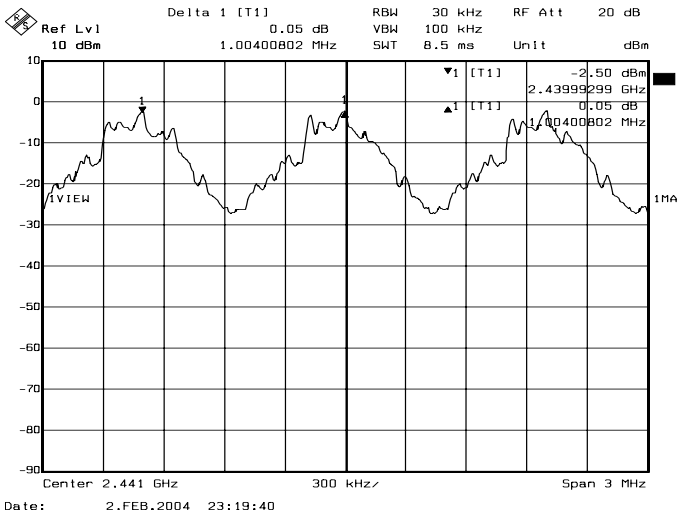
The uncertainty of conducted emission is ± 10KHz.

4.6 Test Results

Refer to section 3, 20dB bandwidth measurement, the measured channel separation should be greater than 20dB bandwidth or Minimum bandwidth.

Channel	Adjacent Hopping Channel Separation (kHz)	20dB bandwidth (kHz)	Minimum Bandwidth	Result
2441MHz (Mid)	1004 kHz	816.63 kHz	25 kHz	PASS

4.7 Photo of Hopping Channel Separation



Channel (Mid)

5. NUMBER OF HOPPING FREQUENCY USED

Test Requirement: 15.247(a)(1)(ii)

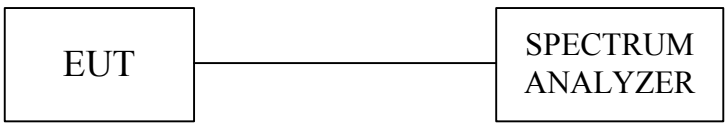
5.1 Test Equipments

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration
ROHDE & SCHWARZ SPECTRUM ANALYZER	FSEK30	835253/002	June 17, 2003

NOTE：

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

5.2 Test Setup



5.3 Limits of Number of Hopping Frequency Used

According to 15.247(a)(1)(ii), for frequency hopping system operating in the 2400-2483.5MHz and 5725-5850 MHz bands shall use at least 75 hopping frequencies

5.4 Test Procedure

1. Check the calibration of the measuring instrument (spectrum analyzer) using either an internal calibrator or a known signal from an external generator.
2. Position the EUT as shown in test setup without connection to measurement instrument.Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
3. Set the spectrum analyzer on MaxHold Mode, and then keep the EUT in hopping mode. Record all the signals from each channel until each one has been recorded.
4. Set the spectrum analyzer on View mode and then plot the result on spectrum analyzer screen.
5. Repeat above procedures until all frequencies measured were complete.

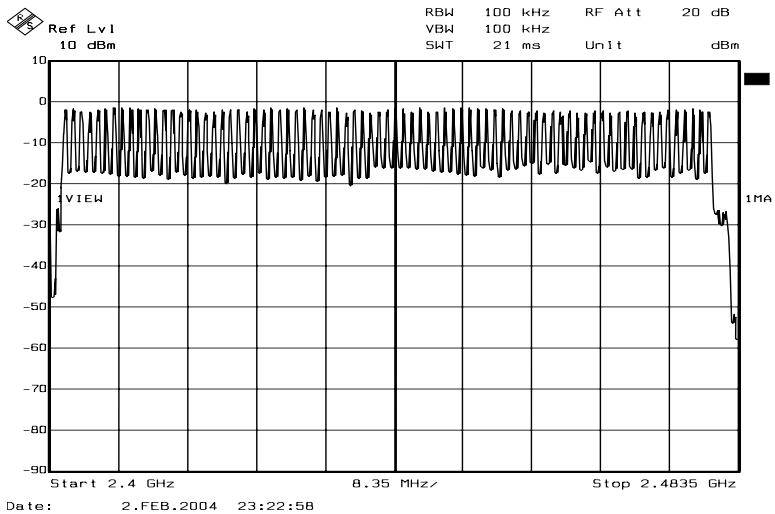
5.5 Uncertainty of Conducted Emission

The uncertainty is not applicable.

5.6 Test Results

Refer to the attached graph.
There are 79 hopping frequencies in a hopping sequence.

5.7 Photo of Number of Hopping Frequency Used



6. DWELL TIME ON EACH CHANNEL

Test Requirement: 15.247(a)(1)(ii)

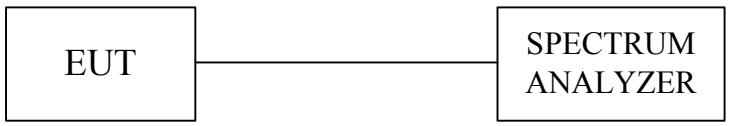
6.1 Test Equipments

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration
ROHDE & SCHWARZ SPECTRUM ANALYZER	FSEK30	835253/002	June 17, 2003

NOTE：

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

6.2 Test Setup



6.3 Limits of Dwell Time on Each Channel

According to 15.247(a)(1)(ii), for frequency hopping system operating in the 2400-2483.5MHz and 5725-5850 MHz band, the average time of occupancy on any frequency shall not be greater than **0.4** second within a 30 second period

6.4 Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT as shown in test setup without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
3. Adjust the center frequency of spectrum analyzer on any frequency be measured and set spectrum analyzer to zero span mode. And then, set RBW and VBW of spectrum analyzer to proper value.
4. Measure the time duration of one transmission on the measured frequency. And then plot the result with time difference of this time duration.
5. Repeat above procedures until all frequencies measured were complete.
6. The Bluetooth CE Bus Dongle has 3 type of payload, DH1. The hopping rate is 1600 per second. The longer the payload is, the slower the hopping rate is.

6.5 Uncertainty of Conducted Emission

The uncertainty of time is ± 5.25ms.

6.6 Test Results

Time of occupancy on the TX channel in 30sec = time domain slot length × (hop rate ÷ number of hop per channel) × 30

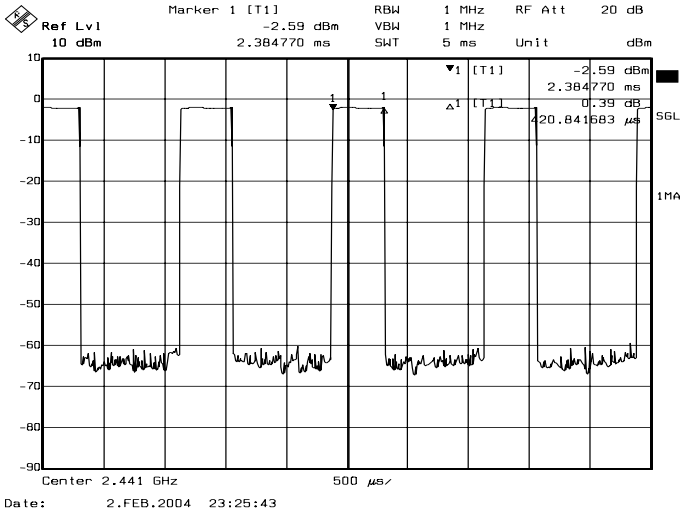
Refer to the attached graph.

The hopping rates of Bluetooth devices change with different types of payload. The longer the payload is, the slower the hopping rate. The hopping rate scenario is defined in Bluetooth core specification.

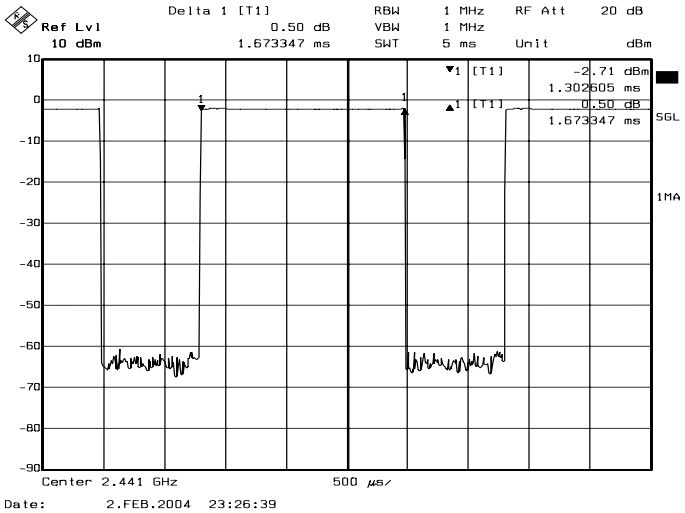
Transmitting Frequency	Packet type	Time domain slot length (ms)	Time of occupancy on the TX channel in 30sec (ms)	Limit for Time of occupancy on the TX channel in 30sec (ms)	Results
2441MHz	DH1	0.420	255.18	400	PASS
2441MHz	DH3	1.673	338.83	400	PASS
2441MHz	DH5	2.254	273.90	400	PASS

DH1 Dwell time = 0.420ms × 1600 ÷ 79 × 30 = 255.18 (ms)
DH3 Dwell time = 1.673ms × (1600 ÷ 3) ÷ 79 × 30 = 338.83 (ms)
DH5 Dwell time = 2.254ms × (1600 ÷ 5) ÷ 79 × 30 = 273.90 (ms)

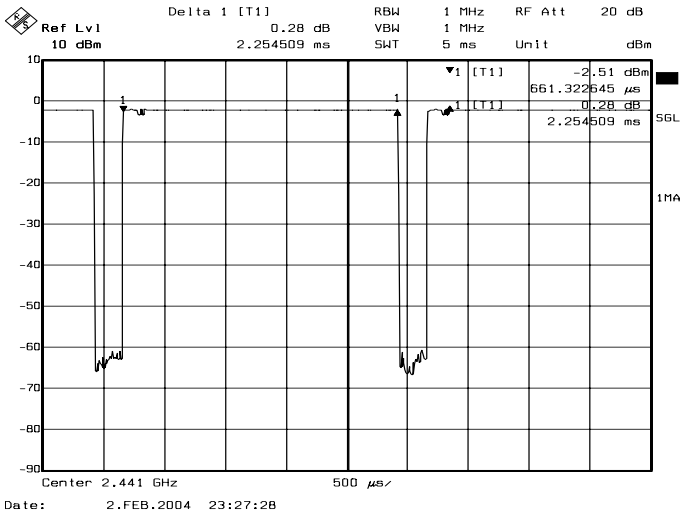
6.7 Photo of Dwell Time on Each Channel



DH1 2441MHz



DH3 2441MHz



DH5 2441MHz

7. BAND EDGE SPURIOUS EMISSIONS

Test Requirement: 15.247(c)

7.1 Test Equipments

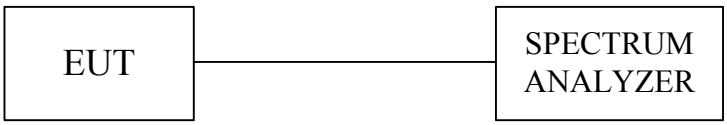
Description & Manufacturer	Model No.	Serial No.	Date Of Calibration
ROHDE & SCHWARZ SPECTRUM ANALYZER	FSEK30	835253/002	June 17, 2003

Note：

1. The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

7.2 Test Setup

.



7.3 Limits of Band edge Measurements

1. Below –20dB of the highest emission level of operating band (in 100KHz Resolution Bandwidth).
2. Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209.

7.4 Test Procedure

Section 15.247(c): Spurious emissions. The following tests are required:
Set the span wide enough to capture the peak level of the emission operating on the channel closest to the band edge. Set the RBW and VBW and maxhold the trace. Allow the trace to stabilize. Enable the marker-delta function, then use the marker-delta value function to move the marker to the peak of the in-band emission submit the plot.

7.5 Uncertainty of Conducted Emission

The uncertainty of Frequency : ± 100kHz.
The uncertainty of Amplitude : ± 2dB.

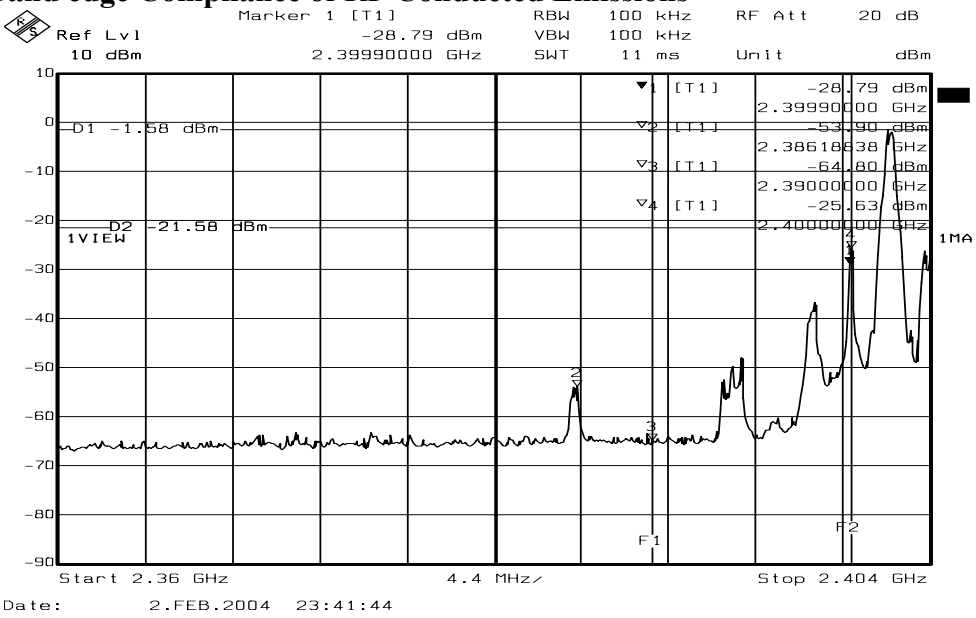
7.6 Test Results

Band edge		Measured radiated band edge field strength (dBuV/m)		Radiated band edge field strength limit (dBuV/m)		Test result
		Horizontal	Vertical	Horizontal	Vertical	
2399.90	PK	64.21	60.58	71.42	67.79	PASS
	AVG	62.94	59.23	70.15	66.44	
2483.50	PK	46.74	41.63	74.00	74.00	PASS
	AVG	45.97	39.50	54.00	54.00	

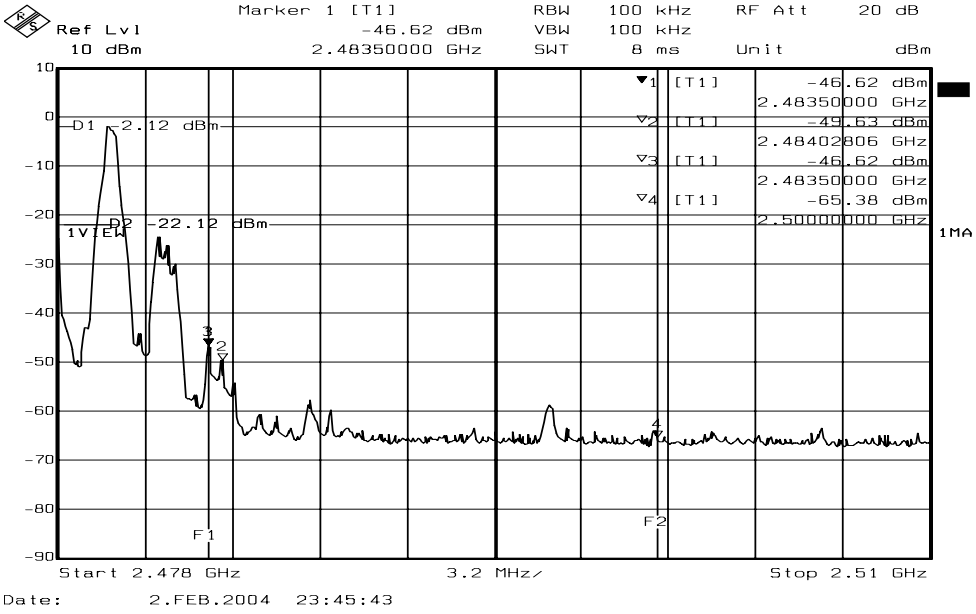
Note : Radiated band edge field strength is measured with FCC recommended mark-delta method.
Measured radiated band edge field strength Test Results = Radiated fundamental emission field strength - DELTA.
DELTA = Relative measurement between conducted measured peak level of fundamental emission and relevant band edge emission. Please refer to 7.7 photo of band edge Measurement.

7.7 Photo of Band edge Measurement

Band edge Compliance of RF Conducted Emissions

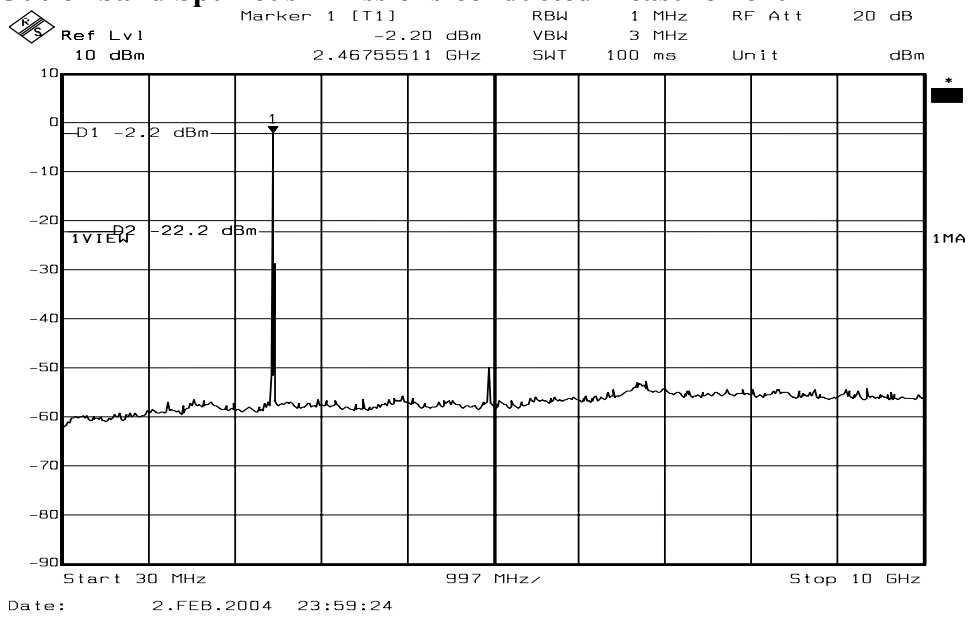


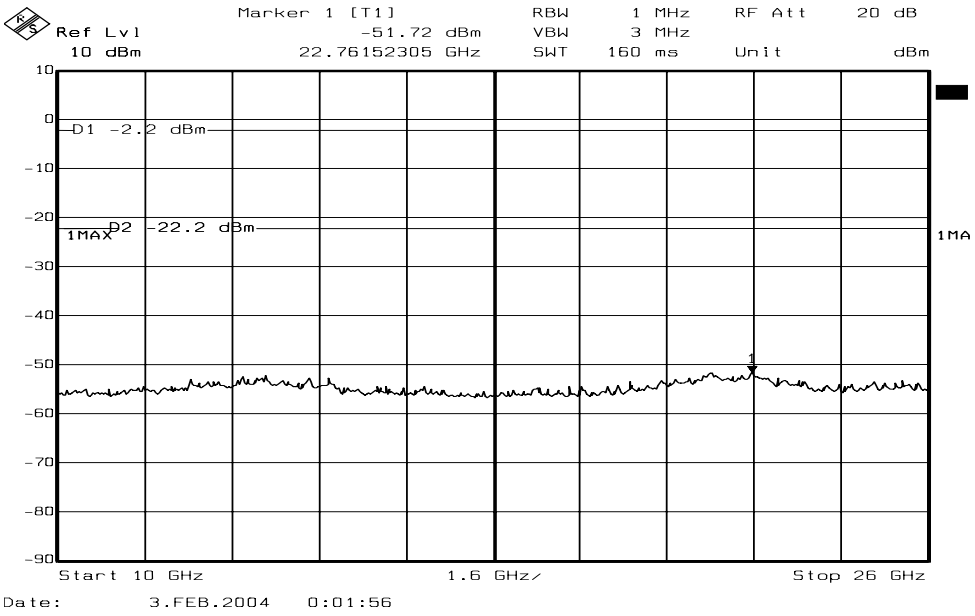
FRONT



REAR

Out-of-band Spurious Emissions-conducted measurement





8. OUT OF BAND SPURIOUS EMISSIONS -RADIATED MEASUREMENTS

Test Requirement: 15.247(c)

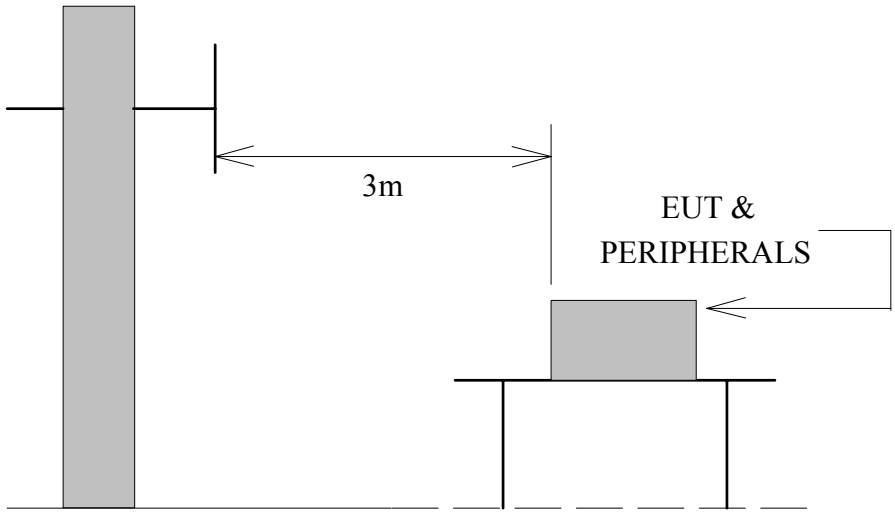
8.1 Test Equipments

The following test equipments are utilized in making the measurements contained in this report.

Manufacturer or Type	Model No	Serial No	Date of Calibration	Calibration Period	Remark
CHASE BI-LOG ANTENNA	CBL6112B	2421	May 07, 2004	1 Year	FINAL
R/S SPECTRUM ANALYZER	FSEK30	835253/002	June 17, 2003	1 Year	FINAL
OPEN SITE	----------	No.2	May 07, 2004	1 Year	FINAL
N TYPE COAXIAL CABLE	CHA9525	4	July 13, 2003	1 Year	FINAL
Horn Antenna	AH-118	10089	February 25, 2004	1 Year	FINAL
HP Pre-amplifier	8449B	3008A01471	October 11, 2003	1 Year	FINAL
HP High pass filter	84300/80038	011	CAL. ON USE	1 Year	FINAL
Horn Antenna	AH-840	03077	February 25, 2004	1 Year	FINAL

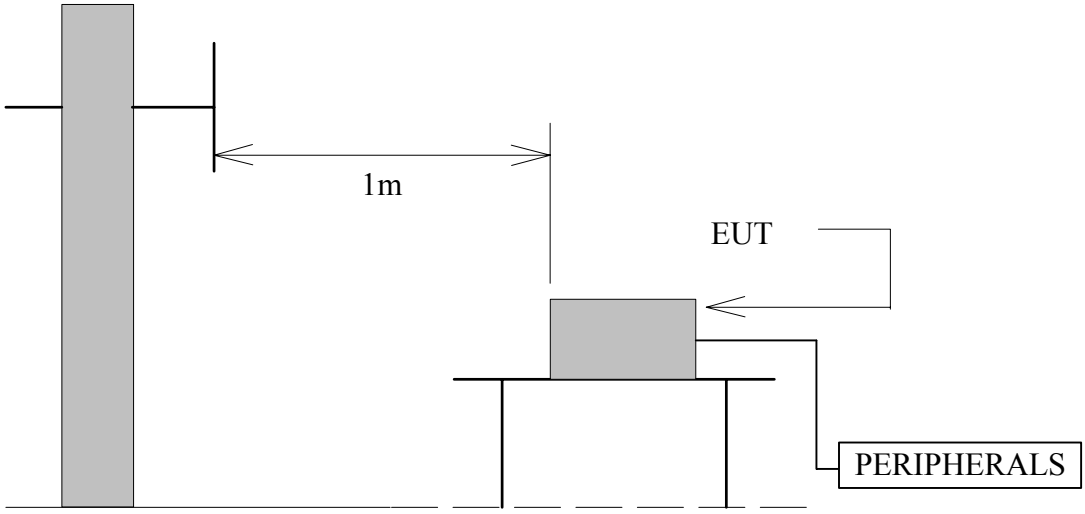
8.2 Test Setup

The diagram below shows the test setup that is utilized to make the measurements for emission from 30 to 1GHz.



Antenna Elevation Variable

The diagram below shows the test setup that is utilized to make the measurements for emission above 1GHz.



Antenna Elevation Variable

8.3 Radiation Limit

For unintentional device, according to § 15.109(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values：

Frequency (MHz)	Distance (METERS)	Field Strengths(dBμV/m)	
		CLASS A	CLASS B
30－230	10	40	30
230－1000	10	47	37
Above 1000	3	54	54

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the above table.

8.4 Test Procedures

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

NOTE：

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 KHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.

2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection and frequency above 1GHz.

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

8.5 Uncertainty of Radiated Emission

The uncertainty of radiated emission is ±2.72dB.

8.6 Radiated RF Noise Measurement

Test Requirement: 15.109, 15.209
The frequency spectrum from 30 MHz to 1000 MHz was investigated. All emissions not reported are much lower than the prescribed limits.
All readings are quasi-peak values.

Temperature：24.8 ℃ Humidity：66 % RH

Frequency (MHz)	Antenna Factor (dB)	Cable Loss (dB)	Meter Reading at 3m(dBμV/M)		Limits at 3m (dBμV/M)	Emission Level at 3m(dBμV/M)	
			Horizontal	Vertical		Horizontal	Vertical
30.00	21.39	0.90	*	*	40.00	*	*
199.99	10.39	2.80	10.20	11.90	43.50	23.39	25.09
239.99	12.55	3.12	19.90	13.80	46.00	35.57	29.47
279.98	13.34	3.44	8.20	7.90	46.00	24.98	24.68
359.99	15.74	3.96	11.50	8.10	46.00	31.20	27.80
399.98	17.24	4.20	10.20	8.90	46.00	31.64	30.34
439.99	17.67	4.48	8.90	7.50	46.00	31.05	29.65
479.99	18.10	4.76	14.80	10.50	46.00	37.66	33.36
1000.00	21.58	7.00	*	*	54.00	*	*

REMARKS：1. ＊Undetectable

2. Emission level (dB μ V/M) =Antenna Factor (dB/m) + Cable loss (dB) + Meter Reading (dB μ V).

Test Requirement: 15.205
The frequency spectrum above 1 GHz was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	Microlink Communications Inc.	Test Date :	2004/05/8
Product Name	Bluetooth CE Bus Dongle	Test By:	Stan Peng
Model Name	MBT-9107 ; SYN0895B ; DC600	Temp& Humidity :	19.5℃ , 78%

CH01 (2402 MHz) TX (Low)				Measurement Distance at 1m			Horizontal polarity				
Freq.	Reading	AF	Cable	Pre-amp	Dist	Filter	Level	Limit	Margin	Mark	Height
(MHz)	(dBμV)	(dBμV)	(dB)	(dB)	dB	dB	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)	(Meter)
* 2386.18	26.88	31.81	3.57	0.00	9.50	0.00	52.76	74	-21.24	P	1.00
* 2386.18	14.50	31.81	3.57	0.00	9.50	0.00	40.38	54	-13.62	A	1.00
2402.39	65.55	31.80	3.58	0.00	9.50	0.00	91.42	Fundamental Frequency		P	1.00
2402.39	64.28	31.80	3.58	0.00	9.50	0.00	90.15			A	1.00
* 4804.93	49.55	34.31	5.08	35.14	9.50	2.08	46.38	74	-27.62	P	1.00
* 4804.93	44.00	34.31	5.08	35.14	9.50	2.08	40.83	54	-13.17	A	1.00
7206.00	43.77	39.82	6.72	35.66	9.50	2.00	47.15	74	-26.85	P	1.00
7206.00	32.79	39.82	6.72	35.66	9.50	2.00	36.17	54	-17.83	A	1.00
9608.00	44.41	38.54	8.28	36.37	9.50	0.64	45.99	74	-28.01	P	1.00
9608.00	34.23	38.54	8.28	36.37	9.50	0.64	35.81	54	-18.19	A	1.00
* 12011.95	------	------	------	------	9.50	0.80	------	------	------	------	1.00
14414.34	------	------	------	------	0.00	0.60	------	------	------	------	1.00
16816.73	------	------	------	------	0.00	0.39	------	------	------	------	1.00
* 19219.12	------	------	------	------	0.00	1.86	------	------	------	------	1.00
21621.51	------	------	------	------	0.00	0.85	------	------	------	------	1.00
24023.90	------	------	------	------	0.00	3.06	------	------	------	------	1.00

Note :
1. The measurement was searched to 10th harmonic, Remark "---" means that the emissions level is too low to be measured.
2. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter : High Pass Filter Insertion Loss (3.5GHz)
3. Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
4. Remark "*" means that Restricted band.
5. Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
6. The result basic equation calculation is as follow:
   Level=Reading+AF+Closs-Preamp+Filter-Dist,Margin=Level-Limit
7. The other emission levels were very low against the limit
8. The test limit distance is 3M limit.

Test Requirement: 15.205
The frequency spectrum above 1 GHz was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	Microlink Communications Inc.	Test Date :	2004/05/8
Product Name	Bluetooth CE Bus Dongle	Test By:	Stan Peng
Model Name	MBT-9107 ; SYN0895B ; DC600	Temp& Humidity :	19.5℃ , 78%

CH01 (2402 MHz) TX (Low)				Measurement Distance at 1m			Vertical polarity				
Freq.	Reading	AF	Cable	Pre-amp	Dist	Filter	Level	Limit	Margin	Mark	Height
(MHz)	(dBμV)	(dBμV)	(dB)	(dB)	dB	dB	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)	(Meter)
* 2386.18	28.26	31.81	3.57	0.00	9.50	0.00	54.14	74	-19.86	P	1.00
* 2386.18	15.41	31.81	3.57	0.00	9.50	0.00	41.29	54	-12.71	A	1.00
2402.56	61.92	31.80	3.58	0.00	9.50	0.00	87.79	Fundamental Frequency		P	1.00
2402.56	60.57	31.80	3.58	0.00	9.50	0.00	86.44			A	1.00
* 4804.84	50.79	34.31	5.08	35.14	9.50	2.08	47.62	74	-26.38	P	1.00
* 4804.84	45.80	34.31	5.08	35.14	9.50	2.08	42.63	54	-11.37	A	1.00
7206.00	43.77	39.82	6.72	35.66	9.50	2.00	47.15	74	-26.85	P	1.00
7206.00	33.56	39.82	6.72	35.66	9.50	2.00	36.94	54	-17.06	A	1.00
9608.00	44.37	38.54	8.28	36.37	9.50	0.64	45.95	74	-28.05	P	1.00
9608.00	33.46	38.54	8.28	36.37	9.50	0.64	35.04	54	-18.96	A	1.00
* 12012.80	------	------	------	------	9.50	0.80	------	------	------	------	1.00
14415.36	------	------	------	------	0.00	0.60	------	------	------	------	1.00
16817.92	------	------	------	------	0.00	0.39	------	------	------	------	1.00
* 19220.48	------	------	------	------	0.00	1.86	------	------	------	------	1.00
21623.04	------	------	------	------	0.00	0.85	------	------	------	------	1.00
24025.60	------	------	------	------	0.00	3.06	------	------	------	------	1.00

Note :
1. The measurement was searched to 10th harmonic, Remark "---" means that the emissions level is too low to be measured.
2. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter : High Pass Filter Insertion Loss (3.5GHz)
3. Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
4. Remark "*" means that Restricted band.
5. Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
6. The result basic equation calculation is as follow:
   Level=Reading+AF+Closs-Preamp+Filter-Dist,Margin=Level-Limit
7. The other emission levels were very low against the limit
8. The test limit distance is 3M limit.

Test Requirement: 15.205
The frequency spectrum above 1 GHz was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	Microlink Communications Inc.	Test Date :	2004/05/8
Product Name	Bluetooth CE Bus Dongle	Test By:	Stan Peng
Model Name	MBT-9107 ; SYN0895B ; DC600	Temp& Humidity :	19.5℃ , 78%

CH40 (2441 MHz) TX (Mid)				Measurement Distance at 1m			Horizontal polarity				
Freq.	Reading	AF	Cable	Pre-amp	Dist	Filter	Level	Limit	Margin	Mark	Height
(MHz)	(dBμV)	(dBμV)	(dB)	(dB)	dB	dB	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)	(Meter)
2441.39	65.74	31.76	3.59	0.00	9.50	0.00	91.59	Fundamental Frequency		P	1.00
2441.39	65.37	31.76	3.59	0.00	9.50	0.00	91.22			A	1.00
* 4882.90	48.83	34.83	5.10	35.21	9.50	1.77	45.82	74	-28.18	P	1.00
* 4882.90	42.26	34.83	5.10	35.21	9.50	1.77	39.25	54	-14.75	A	1.00
* 7323.00	43.78	39.77	6.80	35.64	9.50	2.00	47.22	74	-26.78	P	1.00
* 7323.00	33.56	39.77	6.80	35.64	9.50	2.00	37.00	54	-17.00	A	1.00
9764.00	44.01	38.52	8.34	36.62	9.50	0.54	45.29	74	-28.71	P	1.00
9764.00	33.59	38.52	8.34	36.62	9.50	0.54	34.87	54	-19.13	A	1.00
* 12206.95	------	------	------	------	9.50	0.80	------	------	------	------	1.00
14648.34	------	------	------	------	0.00	0.58	------	------	------	------	1.00
17089.73	------	------	------	------	0.00	0.54	------	------	------	------	1.00
* 19531.12	------	------	------	------	0.00	2.23	------	------	------	------	1.00
21972.51	------	------	------	------	0.00	0.71	------	------	------	------	1.00
24413.90	------	------	------	------	0.00	2.44	------	------	------	------	1.00

Note :
1. The measurement was searched to 10th harmonic, Remark "---" means that the emissions level is too low to be measured.
2. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter : High Pass Filter Insertion Loss (3.5GHz)
3. Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
4. Remark "*" means that Restricted band.
5. Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
6. The result basic equation calculation is as follow:
   Level=Reading+AF+Closs-Preamp+Filter-Dist,Margin=Level-Limit
7. The other emission levels were very low against the limit
8. The test limit distance is 3M limit.

Test Requirement: 15.205
The frequency spectrum above 1 GHz was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	Microlink Communications Inc.	Test Date :	2004/05/8
Product Name	Bluetooth CE Bus Dongle	Test By:	Stan Peng
Model Name	MBT-9107 ; SYN0895B ; DC600	Temp& Humidity :	19.5℃ , 78%

CH40 (2441 MHz) TX (Mid)				Measurement Distance at 1m			Vertical polarity				
Freq.	Reading	AF	Cable	Pre-amp	Dist	Filter	Level	Limit	Margin	Mark	Height
(MHz)	(dBμV)	(dBμV)	(dB)	(dB)	dB	dB	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)	(Meter)
2441.50	59.98	31.76	3.59	0.00	9.50	0.00	85.83	Fundamental Frequency		P	1.00
2441.50	59.27	31.76	3.59	0.00	9.50	0.00	85.12			A	1.00
* 4882.84	53.43	34.83	5.10	35.21	9.50	1.77	50.42	74	-23.58	P	1.00
* 4882.84	49.74	34.83	5.10	35.21	9.50	1.77	46.73	54	-7.27	A	1.00
* 7323.00	43.95	39.77	6.80	35.64	9.50	2.00	47.39	74	-26.61	P	1.00
* 7323.00	33.05	39.77	6.80	35.64	9.50	2.00	36.49	54	-17.51	A	1.00
9764.00	45.07	38.52	8.34	36.62	9.50	0.54	46.35	74	-27.65	P	1.00
9764.00	34.10	38.52	8.34	36.62	9.50	0.54	35.38	54	-18.62	A	1.00
* 12207.50	------	------	------	------	9.50	0.80	------	------	------	------	1.00
14649.00	------	------	------	------	0.00	0.58	------	------	------	------	1.00
17090.50	------	------	------	------	0.00	0.54	------	------	------	------	1.00
* 19532.00	------	------	------	------	0.00	2.23	------	------	------	------	1.00
21973.50	------	------	------	------	0.00	0.71	------	------	------	------	1.00
24415.00	------	------	------	------	0.00	2.44	------	------	------	------	1.00

Note :
1. The measurement was searched to 10th harmonic, Remark "---" means that the emissions level is too low to be measured.
2. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter : High Pass Filter Insertion Loss (3.5GHz)
3. Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
4. Remark "*" means that Restricted band.
5. Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
6. The result basic equation calculation is as follow:
   Level=Reading+AF+Closs-Preamp+Filter-Dist,Margin=Level-Limit
7. The other emission levels were very low against the limit
8. The test limit distance is 3M limit.

Test Requirement: 15.205
The frequency spectrum above 1 GHz was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	Microlink Communications Inc.	Test Date :	2004/05/8
Product Name	Bluetooth CE Bus Dongle	Test By:	Stan Peng
Model Name	MBT-9107 ; SYN0895B ; DC600	Temp& Humidity :	19.5℃ , 78%

CH79 (2480 MHz) TX (High)				Measurement Distance at 1m			Horizontal polarity				
Freq.	Reading	AF	Cable	Pre-amp	Dist	Filter	Level	Limit	Margin	Mark	Height
(MHz)	(dBμV)	(dBμV)	(dB)	(dB)	dB	dB	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)	(Meter)
2480.37	65.41	31.72	3.61	0.00	9.50	0.00	91.24	Fundamental Frequency		P	1.00
2480.37	64.64	31.72	3.61	0.00	9.50	0.00	90.47			A	1.00
* 2484.02	27.04	31.72	3.61	0.00	9.50	0.00	52.87	74	-21.13	P	1.00
* 2484.02	17.26	31.72	3.61	0.00	9.50	0.00	43.09	54	-10.91	A	1.00
* 4961.02	47.15	35.34	5.13	35.27	9.50	1.46	44.31	74	-29.69	P	1.00
* 4961.02	39.03	35.34	5.13	35.27	9.50	1.46	36.19	54	-17.81	A	1.00
* 7440.02	43.83	39.72	6.88	35.61	9.50	2.00	47.32	74	-26.68	P	1.00
* 7440.02	34.11	39.72	6.88	35.61	9.50	2.00	37.60	54	-16.40	A	1.00
9920.00	46.04	38.51	8.39	36.87	9.50	0.45	47.02	74	-26.98	P	1.00
9920.00	34.57	38.51	8.39	36.87	9.50	0.45	35.55	54	-18.45	A	1.00
* 12401.85	------	------	------	------	9.50	0.80	------	------	------	------	1.00
14882.22	------	------	------	------	0.00	0.39	------	------	------	------	1.00
17362.59	------	------	------	------	0.00	0.65	------	------	------	------	1.00
* 19842.96	------	------	------	------	0.00	2.54	------	------	------	------	1.00
* 22323.33	------	------	------	------	0.00	0.70	------	------	------	------	1.00
24803.70	------	------	------	------	0.00	1.87	------	------	------	------	1.00

Note :
1. The measurement was searched to 10th harmonic, Remark "---" means that the emissions level is too low to be measured.
2. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter : High Pass Filter Insertion Loss (3.5GHz)
3. Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
4. Remark "*" means that Restricted band.
5. Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
6. The result basic equation calculation is as follow:
   Level=Reading+AF+Closs-Preamp+Filter-Dist,Margin=Level-Limit
7. The other emission levels were very low against the limit
8. The test limit distance is 3M limit.

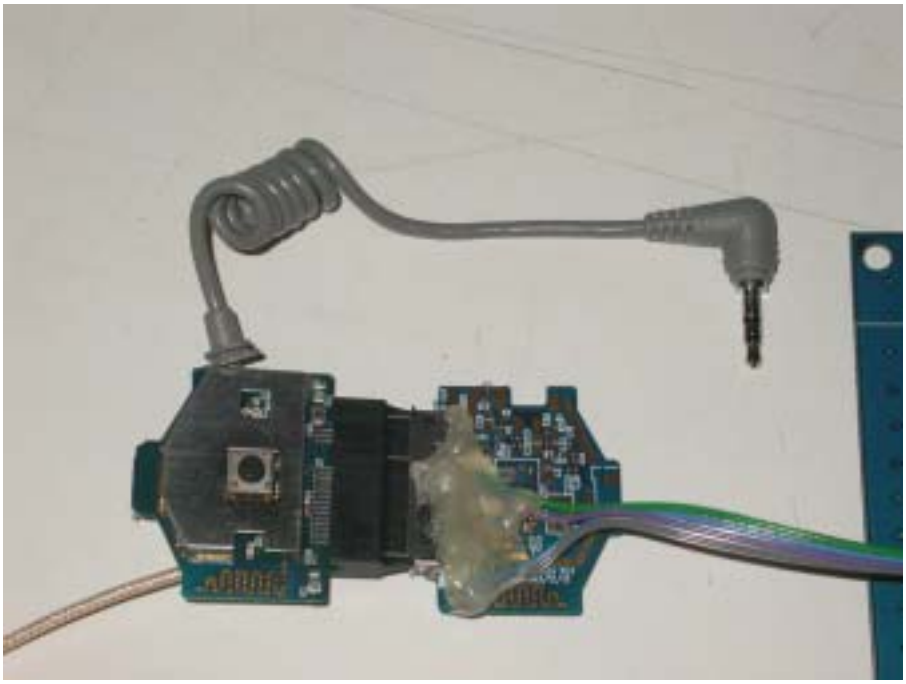
Test Requirement: 15.205
The frequency spectrum above 1 GHz was investigated. All emissions not reported are much lower than the prescribed limits. Readings are both peak and average values.

Company	Microlink Communications Inc.	Test Date :	2004/05/8
Product Name	Bluetooth CE Bus Dongle	Test By:	Stan Peng
Model Name	MBT-9107 ; SYN0895B ; DC600	Temp& Humidity :	19.5℃ , 78%

CH79 (2480 MHz) TX (High)				Measurement Distance at 1m			Vertical polarity				
Freq.	Reading	AF	Cable	Pre-amp	Dist	Filter	Level	Limit	Margin	Mark	Height
(MHz)	(dBμV)	(dBμV)	(dB)	(dB)	dB	dB	(dBμV/m)	(dBμV/m)	(dB)	(P/Q/A)	(Meter)
2480.38	60.30	31.72	3.61	0.00	9.50	0.00	86.13	Fundamental Frequency		P	1.00
2480.38	58.17	31.72	3.61	0.00	9.50	0.00	84.00			A	1.00
* 2484.02	27.09	31.72	3.61	0.00	9.50	0.00	52.92	74	-21.08	P	1.00
* 2484.02	15.52	31.72	3.61	0.00	9.50	0.00	41.35	54	-12.65	A	1.00
* 4961.00	52.74	35.34	5.13	35.27	9.50	1.46	49.90	74	-24.10	P	1.00
* 4961.00	49.50	35.34	5.13	35.27	9.50	1.46	46.66	54	-7.34	A	1.00
* 7440.12	43.21	39.72	6.88	35.61	9.50	2.00	46.70	74	-27.30	P	1.00
* 7440.12	33.25	39.72	6.88	35.61	9.50	2.00	36.74	54	-17.26	A	1.00
9920.00	44.99	38.51	8.39	36.87	9.50	0.45	45.97	74	-28.03	P	1.00
9920.00	34.62	38.51	8.39	36.87	9.50	0.45	35.60	54	-18.40	A	1.00
* 12401.90	------	------	------	------	9.50	0.80	------	------	------	------	1.00
14882.28	------	------	------	------	0.00	0.39	------	------	------	------	1.00
17362.66	------	------	------	------	0.00	0.65	------	------	------	------	1.00
* 19843.04	------	------	------	------	0.00	2.54	------	------	------	------	1.00
* 22323.42	------	------	------	------	0.00	0.70	------	------	------	------	1.00
24803.80	------	------	------	------	0.00	1.87	------	------	------	------	1.00

Note :
1. The measurement was searched to 10th harmonic, Remark "---" means that the emissions level is too low to be measured.
2. AF: Antenna Factor, Cable: Cable Loss, Pre-Amp: Preamplifier gain, Filter : High Pass Filter Insertion Loss (3.5GHz)
3. Analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz
4. Remark "*" means that Restricted band.
5. Dist : correction to extra plate reading to 3m specification distance 1m measurement distance = -9.5dB
6. The result basic equation calculation is as follow:
   Level=Reading+AF+Closs-Preamp+Filter-Dist,Margin=Level-Limit
7. The other emission levels were very low against the limit
8. The test limit distance is 3M limit.

8.7 Photos of Open Site



9. ANTENNA REQUIREMENT

9.1 Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

9.2 Antenna Connected Construction

The antenna used in this product is Meander Line (On Board) antenna. The maximum Gain of this antenna is only 0dBi.

10. CONDUDED EMISSION MEASUREMENT

10.1 Standard Applicable

This EUT is excused from investigation of conducted emission for it is powered by cell phone only. According to § 15.207 (C), measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines.

11. RF EXPOSURE EVALUATION

According to FCC 1.1310 : The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)
LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Average Time
(A) Limits for Occupational / Control Exposures				
300-1,500	--	--	F/300	6
1,500-100,000	--	--	5	6
(B) Limits for General Population / Uncontrol Exposures				
300-1,500	--	--	F/1500	6
1,500-100,000	--	--	1	30

11.1 Friis Formula

Friis transmission formula : Pd = (Pout*G)/(4*pi*r2)
Where
Pd = power density in mW/cm2
Pout = output power to antenna in mW
G = gain of antenna in linear scale
Pi = 3.1416
R = distance between observation point and center of the radiator in cm
Pd id the limit of MPE, 1 mW/cm2. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

11.2 EUT Operating Condition

A software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

11.3 Test Result of RF Exposure Evaluation

Test Item ： RF Exposure Evaluation Data
Test Mode：Normal Operation

11.3.1 Antenna Gain

Antenna Gain：The maximum Gain measured in fully anechoic chamber is 0dBi linear scale.

11.3.2 Output Power into Antenna & RF Exposure Evaluation Distance

Channel	Channel Frequency (MHz)	Output Power to Antenna (dBm)	Antenna Gain	Power Density at 20cm (mW/cm^2)	LIMITS (mW/cm^2)
CH01（Low）	2402.00	-0.34	0	0.000184	1
CH40（Mid）	2441.00	-0.30	0	0.000186	1
CH79（High）	2480.00	-0.77	0	0.000176	1

The power density Pd (4^{th} column) at a distance of 20cm calculated from the fries transmission formula is far below the limit of 1 mW/cm^2 . The EUT is classified as portable product and the output power is lower than the FCC low threshold. So, RF exposure limit warning or SAR test are not required.