



EMC TEST REPORT

Report No. : EME-030747

Model No. : MBT-1103

Issued Date : July 11, 2003

Applicant : Microlink Communications Inc.
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Test By : Intertek Testing Services Taiwan Ltd.
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Project Engineer

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Reviewed By

Elton Chen



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Intertek Testing Services
ETL SEMKO

FCC ID. : QVZ10010000

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Summary of Tests

Product Name: Bluetooth USB PC Adapter

Model: MBT-1103

FCC ID: QVZ10010000

Test	Reference	Results
Radiated Spurious Emission test	15.205, 15.209	Complies



1. General information

1.1 Identification of the EUT

Applicant	: Microlink Communications Inc.
Product	: Bluetooth USB PC Adapter
Model No.	: MBT-1103
FCC ID.	: QVZ10010000
Frequency Range	: 2402MHz to 2480MHz
Channel Number	: 79
Frequency of Each Channel	: 2402 + k (MHz), k: 0 ~78
Type of Modulation	: 2GFSK
Power Supply	: 5Vdc from Notebook
Power Cord	: N/A
Sample Received	: June 20, 2003
Test Date(s)	: July 8, 2003

A FCC DoC report has been generated for the client.

1.2 Additional information about the EUT

The Bluetooth USB Dongle is specifically designed to plug into an available USB port connecting to a desktop or laptop. It is the best solution for quick and easy connection and access to user's Ethernet Local Area Network (LAN) and other shared resources without cables or wires.

The model SYN0717A (for Motorola) is identical to MBT-1103, the different model no. for different brand serves as marketing purpose.

For more detail features, please refer to User's manual as file name "Installation guide.pdf"

Owing to the change of components/ PCB thickness, and after verifying the change of EUT, we conducted the Radiated Spurious Emission Test only.

Regarding to the relevant data of the test result, please refer to the FCC ID: QVZ10010000 Granted on Feb. 25, 2003 issued for model No. MBT-1101.



1.3 Antenna description

The EUT uses a permanently connected antenna.

Antenna Gain : 2.8dBi

Antenna Type : PCB Printed Antenna

Connector Type : N/A

1.4 Peripherals equipment

Peripherals	Manufacturer	Product No.	Serial No.	FCC ID
Notebook	HP	Brio BA410	SG11304267	FCC DoC Approved
Printer	HP	C2642A	TH86K1N2ZB	FCC DoC Approved
Modem	Dynalink	V1456VQE	00V230A00051494	FCC DoC Approved



2. Test specifications

2.1 Test standard

The EUT was performed according to the procedures in FCC Part 15 Subpart C Section §15.205 、§15.207 、§15.209 、§15.247 and ANSI C63.4/1992.

The test of radiated measurements according to FCC Part15 Section 15.33(a) had been conducted and the field strength of this frequency band were all meet limit requirement, thus we evaluate the EUT pass the specified test.

2.2 Operation mode

Settle the EUT into Notebook, and run the test program “Bluetest.exe” under Windows OS, which provided by manufacturer. The main function of the test program are (a) Mode transfer, (b) Channel control, (c) Output power control, (d) Hopping control.

The EUT was transmitted continuously during the test.



2.3 Test equipment

Equipment	Brand	Frequency range	Model No.	Series No.	Last Cal.Date
EMI Test Receiver	Rohde & Schwarz	9kHz~2.75GHz	ESCS 30	825788/014	Feb. 18, 2003
Spectrum Analyzer	Rohde & Schwarz	9kHz~30GHz	FSP 30	100137	July 10, 2002
Spectrum Analyzer	Rohde & Schwarz	20Hz~40GHz	FSEK 30	100186	Oct. 9, 2002
Horn Antenna	EMCO	1GHz~18GHz	3115	9906-5890	Sep. 19, 2002
Horn Antenna	SCHWARZBECK	14GHz~40GHz	BBHA 9170	159	June 21, 2003
Bilog Antenna	SCHWARZBECK	25MHz~1.7GHz	VULB 9160	3133	Feb. 21, 2003
Turn Table	HDGmbH	N/A	DS 420S	420/669/01	N/A
Antenna Tower	HDGmbH	N/A	MA 240	240/573	N/A
Microwave Amplifier	Agilent	2GHz~26.5GHz	8348A	3111A00567	Dec. 20, 2002
4GHz Source RF	HP	9KHz~4GHz	8648D	3847U00403	Sep. 7, 2002
RF Power Meter	Boonton	10kHz~100GHz	4231A	79401	Mar. 25, 2003
Power Sensor	Boonton	30MHz~8GHz	51011-EMC	32482	Mar. 25, 2003

Note:

1. The calibration interval of the above instruments is 12 months.



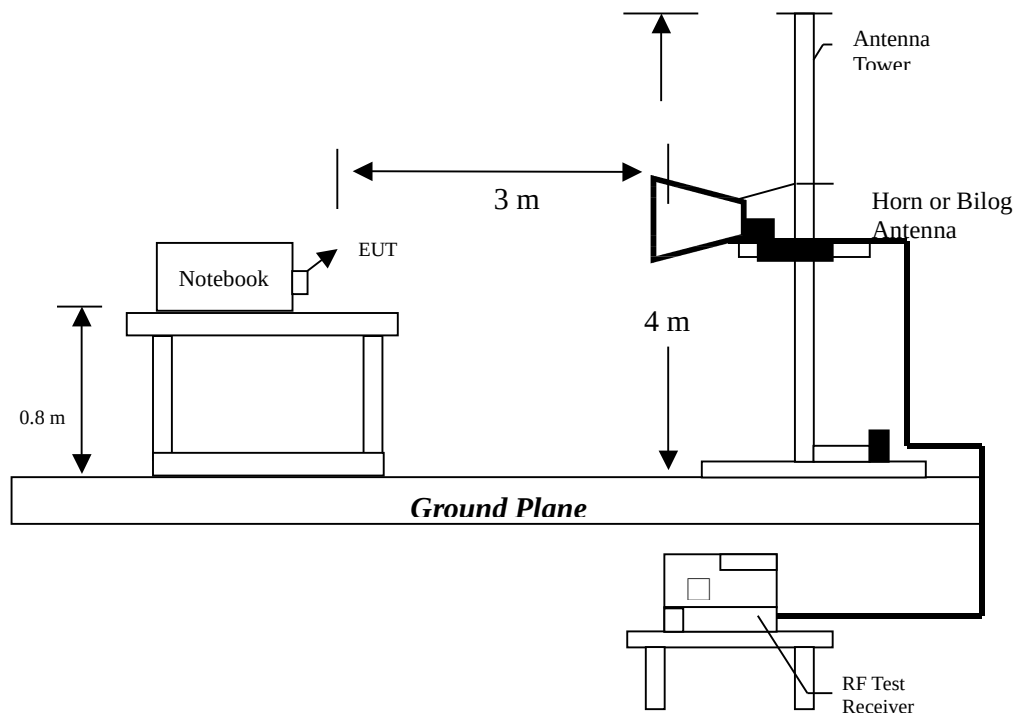
3. Radiated Emission test

3.1 Operating environment

Temperature:	25	°C	(10-40°C)
Relative Humidity:	55	%	(10-90%)
Atmospheric Pressure	1023	hPa	(860-1060hPa)

3.2 Test setup & procedure

The Diagram below shows the test setup, which is utilized to make these measurements.



Radiated emissions were investigated cover the frequency range from 30MHz to 1000MHz using a receiver RBW of 120kHz record QP reading, and the frequency over 1GHz using a spectrum analyzer RBW of 1MHz and 10Hz VBW record Average reading. (15.209 paragraph), the Peak reading (1MHz RBW/VBW) recorded also on the report. The EUT for testing is arranged on a wooden turntable. If some peripherals apply to the EUT, the peripherals will be connected to EUT and the whole system. During the test, all cables were arranged to produce worst-case emissions. The signal is maximized through rotation. The height of antenna and polarization is changing constantly for exploring for maximum signal level. The height of antenna can be up to 4 meters and down to 1 meter.



The measurement for radiated emission will be done at the distance of three meters unless the signal level is too low to measure at that distance. In the case of the reading under noise floor, a pre-amplifier is used and/or the test is conducted at a closer distance. And then all readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance.

The EUT configuration please refer to the “Spurious set-up photo.pdf”.

3.3 Emission limits

The spurious Emission shall test through the 10th harmonic. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

Frequency (MHz)	Limits (dB μ V/m@3m)
30-88	40
88-216	43.5
216-960	46
Above 960	54

Remark:

1. In the above table, the tighter limit applies at the band edges.
2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system

Uncertainty was calculated in accordance with NAMAS NIS 81.

Expanded uncertainty (k=2) of radiated emission measurement is ± 4.98 dB.



3.4 Radiated spurious emission test data

3.4.1 Measurement results: frequencies equal to or less than 1 GHz

EUT : MBT-1103

Test Mode : Transmitted mode (Hopping enable)

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit @ 3 m (dBuV)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
141.78100	QP	V	9.88	17.31	27.19	43.50	-16.31	110	141
200.87000	QP	V	12.91	12.79	25.70	43.50	-17.80	100	132
404.46100	QP	V	19.46	13.21	32.67	46.00	-13.33	113	318
572.45500	QP	V	23.19	14.77	37.95	46.00	-8.05	100	186
622.98000	QP	V	23.92	5.54	29.46	46.00	-16.54	107	240
664.34000	QP	V	23.88	10.40	34.28	46.00	-11.72	103	178
132.96000	QP	H	9.73	17.54	27.27	43.50	-16.23	145	246
374.69400	QP	H	19.53	7.58	27.11	46.00	-18.89	151	55
398.74400	QP	H	19.53	17.79	37.32	46.00	-8.68	100	303
664.42200	QP	H	23.88	12.44	36.32	46.00	-9.68	267	272
803.64000	QP	H	26.50	8.33	34.83	46.00	-11.17	170	119
930.96600	QP	H	28.42	7.78	36.20	46.00	-9.80	142	100

Remark:

1. Corrected Level = Reading Level + Correction Factor
2. Correction Factor = Antenna Factor + Cable Loss



3.4.2 Measurement results: frequency above 1GHz

EUT : MBT-1103
Test Condition : Tx at low channel

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
							@ 3 m (dBuV)			
4804	PK	V/H	32.496	35.47	-	-	74	-	-	-
4804	AV	V/H	32.496	35.47	-	-	54	-	-	-
7206	PK	V/H	34.32	38.42	-	-	74	-	-	-
7206	AV	V/H	34.32	38.42	-	-	54	-	-	-
9608	PK	V/H	35.808	41.35	-	-	74	-	-	-
9608	AV	V/H	35.808	41.35	-	-	54	-	-	-
12010	PK	V/H	35.4	43.38	-	-	74	-	-	-
12010	AV	V/H	35.4	43.38	-	-	54	-	-	-
14412	PK	V/H	34.754	44.99	-	-	74	-	-	-
14412	AV	V/H	34.754	44.99	-	-	54	-	-	-
16814	PK	V/H	35.346	42.8	-	-	74	-	-	-
16814	AV	V/H	35.346	42.8	-	-	54	-	-	-
19216	PK	V/H	34.488	34.488	-	-	74	-	-	-
19216	AV	V/H	34.488	34.488	-	-	54	-	-	-
21618	PK	V/H	34.588	34.588	-	-	74	-	-	-
21618	AV	V/H	34.588	34.588	-	-	54	-	-	-
24020	PK	V/H	35.52	35.52	-	-	74	-	-	-
24020	AV	V/H	35.52	35.52	-	-	54	-	-	-

Remark:

1. Corrected Level = Reading Level + Correction Factor – Preamp
2. Correction Factor = Antenna Factor + Cable Loss
3. “-“ means the emission is below the noise floor, and the noise floor listed below:

For PK:

1GHz-10GHz: 50dBuV

10GHz-26.5GHz: 60dBuV

For AV:

1GHz-10GHz: 40dBuV

10GHz-26.5GHz: 45dBuV



EUT : MBT-1103
Test Condition : Tx at middle channel

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
							@ 3 m (dBuV)			
4882	PK	V/H	32.496	35.47	-	-	74	-	-	-
4882	AV	V/H	32.496	35.47	-	-	54	-	-	-
7323	PK	V/H	34.32	38.42	-	-	74	-	-	-
7323	AV	V/H	34.32	38.42	-	-	54	-	-	-
9764	PK	V/H	35.808	41.35	-	-	74	-	-	-
9764	AV	V/H	35.808	41.35	-	-	54	-	-	-
12205	PK	V/H	35.315	43.75	-	-	74	-	-	-
12205	AV	V/H	35.315	43.75	-	-	54	-	-	-
14646	PK	V/H	34.856	45.75	-	-	74	-	-	-
14646	AV	V/H	34.856	45.75	-	-	54	-	-	-
17087	PK	V/H	35.29	44.41	-	-	74	-	-	-
17087	AV	V/H	35.29	44.41	-	-	54	-	-	-
19528	PK	V/H	34.401	34.488	-	-	74	-	-	-
19528	AV	V/H	34.401	34.488	-	-	54	-	-	-
21969	PK	V/H	34.644	34.588	-	-	74	-	-	-
21969	AV	V/H	34.644	34.588	-	-	54	-	-	-
24410	PK	V/H	35.752	35.52	-	-	74	-	-	-
24410	AV	V/H	35.752	35.52	-	-	54	-	-	-

Remark:

1. Corrected Level = Reading Level + Correction Factor – Preamp
2. Correction Factor = Antenna Factor + Cable Loss
3. “-“ means the emission is below the noise floor, and the noise floor listed below:

For PK:

1GHz-10GHz: 50dBuV
10GHz-26.5GHz: 60dBuV

For AV:

1GHz-10GHz: 40dBuV
10GHz-26.5GHz: 45dBuV



EUT : MBT-1103
Test Condition : Tx at high channel

Frequency (MHz)	Spectrum Analyzer Detector	Antenna Polariz. (H/V)	Preamp (dB)	Correction Factor (dB/m)	Reading (dBuV)	Corrected Level (dBuV)	Limit	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
							@ 3 m (dBuV)			
4960	PK	V/H	32.496	35.47	-	-	74	-	-	-
4960	AV	V/H	32.496	35.47	-	-	54	-	-	-
7440	PK	V/H	34.47	38.38	-	-	74	-	-	-
7440	AV	V/H	34.47	38.38	-	-	54	-	-	-
9920	PK	V/H	35.919	41.55	-	-	74	-	-	-
9920	AV	V/H	35.919	41.55	-	-	54	-	-	-
12400	PK	V/H	35.23	43.4	-	-	74	-	-	-
12400	AV	V/H	35.23	43.4	-	-	54	-	-	-
14880	PK	V/H	34.958	45.13	-	-	74	-	-	-
14880	AV	V/H	34.958	45.13	-	-	54	-	-	-
17360	PK	V/H	35.234	44.75	-	-	74	-	-	-
17360	AV	V/H	35.234	44.75	-	-	54	-	-	-
19840	PK	V/H	34.227	34.488	-	-	74	-	-	-
19840	AV	V/H	34.227	34.488	-	-	54	-	-	-
22320	PK	V/H	34.782	34.588	-	-	74	-	-	-
22320	AV	V/H	34.782	34.588	-	-	54	-	-	-
24800	PK	V/H	35.984	35.52	-	-	74	-	-	-
24800	AV	V/H	35.984	35.52	-	-	54	-	-	-

Remark:

1. Corrected Level = Reading Level + Correction Factor – Preamp
2. Correction Factor = Antenna Factor + Cable Loss
3. “-“ means the emission is below the noise floor, and the noise floor listed below:

For PK:

1GHz-10GHz: 50dBuV
10GHz-26.5GHz: 60dBuV

For AV:

1GHz-10GHz: 40dBuV
10GHz-26.5GHz: 45dBuV