EMI TEST REPORT

Test Report No. : 24KE0300-HO-4

Applicant	:	**FUJITSU LIMITED**
Type of Equipment	:	**Handheld Computer**
Model No.	:	**FHT401S3W**
Test standard	:	**FCC Part 15 Subpart C** **Section 15.207, Section 15.247: 2004**
FCC ID	:	**C9SDTA01TP400GS**
Test Result	:	**Complied**

1. This test report shall not be reproduced in full or partial, without the written approval of UL Apex Co., Ltd.
2. The results in this report apply only to the sample tested.
3. This equipment is in compliance with above regulation. We hereby certify that the data contain a true representation of the EMC profile.
4. The test results in this report are traceable to the national or international standards.

Date of test: August 2 to 16, 2004

Tested by:
Makoto Kosaka
EMC Service

Tested by :
Hiroka Umeyama
EMC Service

Approved by :
Naoki Sakamoto
Group Leader of
EMC Service

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SECTION 1: Client information

Company Name	:	FUJITSU LIMITED
Address	:	1-5-2, Higashishinbashi, Minato-ku, Tokyo, 105-7123 Japan
Telephone Number	:	+81-3-6252-2650
Facsimile Number	:	+81-3-6252-2920
Contact Person	:	Hisashi Hayasaka

SECTION 2: Equipment under test (E.U.T.)

2.1 Identification of E.U.T.

Type of Equipment	:	Handheld Computer
Model No.	:	FHT401S3BW / FHT401S3W
Serial No.	:	32 (for Radiated Spurious and AC Mains Conducted Emission tests) 47 00007 01A (for Other tests)
Rating	:	DC3.6V(Battery)
Country of Manufacture	:	Japan
Receipt Date of Sample	:	July 20, 2004
Condition of EUT	:	Production prototype (Not for Sale: This sample is equivalent to mass-produced items.)

2.2 Product Description

Model No: FHT401S3BW / FHT401S3W (referred to as the EUT in this report) is the Handheld Computer.
There are two models, FHT401S3BW and FHT401S3W for Handheld Computer.
FHT401S3BW has IEEE802.11b WLAN module and Bluetooth module (Class 2) inside.
FHT401S3W has IEEE802.11b WLAN module inside.
FCC grant is obtained for each model, FHT401S3BW (FCC ID:C9SDTA01TP400GSB) and FHT401S3W(FCC ID:C9SDTA01TP400GS).
The difference between two models is the existence of BT module only, and other EMC specifications of two models are identical.
Therefore, all the tests were performed with the superior model: FHT401S3BW.

System clock : CPU:3.6864MHz, UART:18.432MHz, AUDIO:24.768MHz

[W-LAN module:IEEE802.11b]

Equipment Type	:	Transceiver
Frequency of operation	:	2412-2462MHz
Transmission method	:	DSSS
Type of modulation	:	CCK(5.5/11Mbps), DQPSK(2Mbps), DBPSK(1Mbps)
Bandwidth & Channel spacing	:	15MHz & 5MHz
Channel number	:	11channels
Power control	:	No
Antenna Type	:	λ /4 wavelength printed line Antenna
Antenna Gain	:	-1.66dBi
Operating voltage (inner)	:	DC3.0-3.6V

FCC 15.31 (e)
This test was performed with the New Battery (DC 3.6V) and the constant voltage was supplied to this EUT during the tests. Therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement
It is impossible for end users to replace the antenna, because the antenna is mounted inside of the EUT. Therefore, the equipment complies with the antenna requirement of Section 15.203.

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification	:	FCC Part15 Subpart C : 2004
Title	:	FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators Section 15.207 Conducted limits : 2004 Section 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz : 2004

3.2 Procedures and results

[DSSS and other forms of modulation]

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	Conducted emission	ANSI C63.4:2003 7. AC powerline conducted emission measurements	Section 15.207	-	N/A	*See the worst margins in the data sheet in APPENDIX 3	Complied
2	6dB Bandwidth	ANSI C63.4:2003 13. Measurement of intentional radiators	Section 15.247(a)(2)	Conducted	N/A		Complied
3	Maximum Peak Output Power	ANSI C63.4:2003 13. Measurement of intentional radiators	Section 15.247(b)(3)	Conducted	N/A		Complied
4	Spurious Emission	ANSI C63.4:2003 13. Measurement of intentional radiators	Section 15.247 (c)	Conducted/ Radiated	N/A		Complied
5	Restricted Band Edges	ANSI C63.4:2003 13. Measurement of intentional radiators	Section 15.247 (c)	Conducted	N/A		Complied
6	Power Density	ANSI C63.4:2003 13. Measurement of intentional radiators	Section 15.247 (d)	Conducted	N/A		Complied

Note: UL Apex's EMI Work Procedures No.QPM05.

Uncertainty:

*In case of the margin below the EMC Head Office's uncertainty.

The data listed in this report meets the limits unless the uncertainty is taken into consideration.

Conducted Emission

The measurement uncertainty (with a 95% confidence level) for this test is ±1.3dB.

Spurious Emission (Radiated)

The measurement uncertainty (with a 95% confidence level) for this test using Biconical antenna is ±4.5dB(3m)/ ±4.7dB(10m).

The measurement uncertainty (with a 95% confidence level) for this test using Logperiodic antenna is ±5.2dB(3m)/ ±3.8dB(10m).

The measurement uncertainty (with a 95% confidence level) for this test using Horn antenna is ±6.6dB.

Other test except Conducted Emission and Spurious Emission (Radiated)

The measurement uncertainty (with a 95% confidence level) for this test is ±3.0dB.

*These tests were also referred to "Guidance on Measurement for Digital Transmission Systems Section15.247".

*These tests were performed without any deviations from test procedure except for additions or exclusions.

3.3 Addition to standards

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	99% Occupied Band Width	RSS210(issue 5): 2001 + Amendment:2002 + Amendment2:2003 + Amendment3:2004	RSS210(issue 5): 2001 + Amendment:2002 + Amendment2:2003 + Amendment3:2004	Conducted	N/A	N/A	Complied

3.4 Test Location

UL Apex Co., Ltd. Head Office EMC Lab. *NVLAP Lab. code: 200572-0
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone : +81 596 24 8116
Facsimile : +81 596 24 8124

	Listed date (for FCC)	FCC Registration Number	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms
No.1 semi-anechoic chamber	February 01, 2002	313583	IC4247	19.2 x 11.2 x 7.7m	7.0 x 6.0m	Preparation room
No.2 semi-anechoic chamber	June 05, 2002	846015	IC4247-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 shielded room	-	-	-	4.7 x 7.5 x 2.7m	4.7 x 7.5m	-
No.4 measurement room	-	-	-	3.1 x 5.0 x 2.7m	N/A	-

* Size of vertical conducting plane (for Conducted Emission test) : 2.0 x 2.0m for No.1 and No.2 semi-anechoic and No.3 shielded room.

3.5 Test set up, Test instruments and Data of EMI

Refer to APPENDIX 1 to 3.

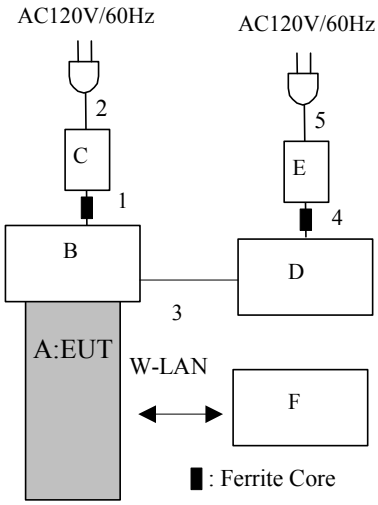
SECTION 4: Operation of E.U.T. during testing

4.1 Operating Modes

The mode is used : [DSSS and other forms of modulation:IEEE802.11b]
Transmitting mode(CCK 11Mbps, Packet Type : Maximum, Payload : PN9)
Low Channel :2412MHz(Ch1)
Mid Channel :2437MHz(Ch6)
High channel :2462MHz(Ch11)

4.2 Configuration and peripherals

for AC Mains Conducted Emission tests



for Other tests

* Cabling was taken into consideration and test data was taken under worse case conditions.

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	FCC ID
A	Handheld Computer	FHT401S3BW	32 (for Radiated Spurious and AC Mains Conducted Emissions) 47 00007 01A (for Other tests)	FUJITSU LIMITED	C9SDTA01TP400GSB
B	LAN Adapter	FHTUL411	-	FUJITSU LIMITED	-
C	AC Adapter	CA01007-0910	03111120C	FUJITSU LIMITED	-
D	Note PC	PC-MJ720M	1V24423	SHARP	-
E	AC Adapter	EA-RJ1V	NLD0107025900	SHARP	-
F	Handheld Computer	FHT401S3BW	47 00007 01A	FUJITSU LIMITED	W-LAN mode

List of cables used

No.	Name	Length (m)	Shield	Backshell Material
1	DC Power Cable	1.2	N	Polyvinyl chloride
2	AC Power Cable	2.0	N	Polyvinyl chloride
3	LAN Cable	5.0	N	Polyvinyl chloride
4	AC Power Cable	2.0	N	Polyvinyl chloride
5	DC Power Cable	1.5	N	Polyvinyl chloride

SECTION 5: AC Mains Conducted Emission

Test Procedure and conditions

EUT was placed on a platform of nominal size, 1m by 1.5m, raised 80cm above the conducting ground plane.
The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT, including peripherals aligned and flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80cm from a Line Impedance Stabilization Network (LISN)/ Artificial mains Network (AMN) and excess AC cable was bundled in center.

1) For the tests on EUT with other peripherals (as a whole system)
I/O cable and AC cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30cm to 40cm long and were hanged at a 40cm height to the ground plane.

2) For the tests on EUT itself (as a stand alone equipment)
Each EUT current-carrying power lead, except the ground (safety) lead, was individually connected through a LISN /(AMN) to the input power source. All unused 50ohm connectors of the LISN(AMN) were resistively terminated in 50ohm when not connected to the measuring equipment.

The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT in a Semi Anechoic Chamber or a Measurement Room.
The EUT was connected to a LISN (AMN).
An overview sweep with peak detection has been performed.

Detector : CISPR quasi-peak detector (IF BW 9 kHz)
Measurement range : 0.15-30MHz
Test data : APPENDIX 3
Test result : Pass

SECTION 6: Spurious Emission

[Conducted]

Test Procedure
The Out of Band Emission was measured with a spectrum analyzer connected to the antenna port.

Test data : APPENDIX 3
Test result : Pass

[Radiated]

Test Procedure
EUT was placed on a platform of nominal size, 0.5m by 0.5m, raised 80cm above the conducting ground plane.
The Radiated Electric Field Strength intensity has been measured in a Semi Anechoic Chamber with a ground plane and at a distance of 3m(Below 10GHz) and 1m(Upper 10GHz).
The height of the measuring varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.
The measurements were performed for both vertical and horizontal antenna polarization with the Test Receiver or the Spectrum Analyzer.
In any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator confirmed 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on a radiated measurement.

The result also satisfied with the general limits specified in section 15.209(a).

Frequency	Below 1GHz	Above 1GHz
Instrument used	Test Receiver	Spectrum Analyzer
Detector IF Bandwidth	QP: BW 120kHz	PK: RBW:1MHz/VBW: 1MHz AV: RBW:1MHz/VBW:10Hz

Test data : APPENDIX 3
Test result : Pass

- The carrier level (or, noise levels) was (or were) measured at each position of all three axes X, Y and Z, and the position that has the maximum noise was determined.
With the position, the noise levels of all the frequencies was measured.

SECTION 7: Bandwidth

Test Procedure

The bandwidth was measured with a spectrum analyzer connected to the antenna port.

Test data : APPENDIX 3
Test result : Pass

SECTION 8: Maximum Peak Output Power

Test Procedure

The Maximum Peak Output Power was measured with a spectrum analyzer connected to the antenna port.
The test was made with the spectrum analyzer that has a function of channel-power measurement.

Test data : APPENDIX 3
Test result : Pass

SECTION 9: Peak Power Density

[Conducted]
Test Procedure
The Peak Power Density was measured with a spectrum analyzer connected to the antenna port.

Test data : APPENDIX 3
Test result : Pass

APPENDIX 1: Photographs of test setup

AC Mains Conducted Emission

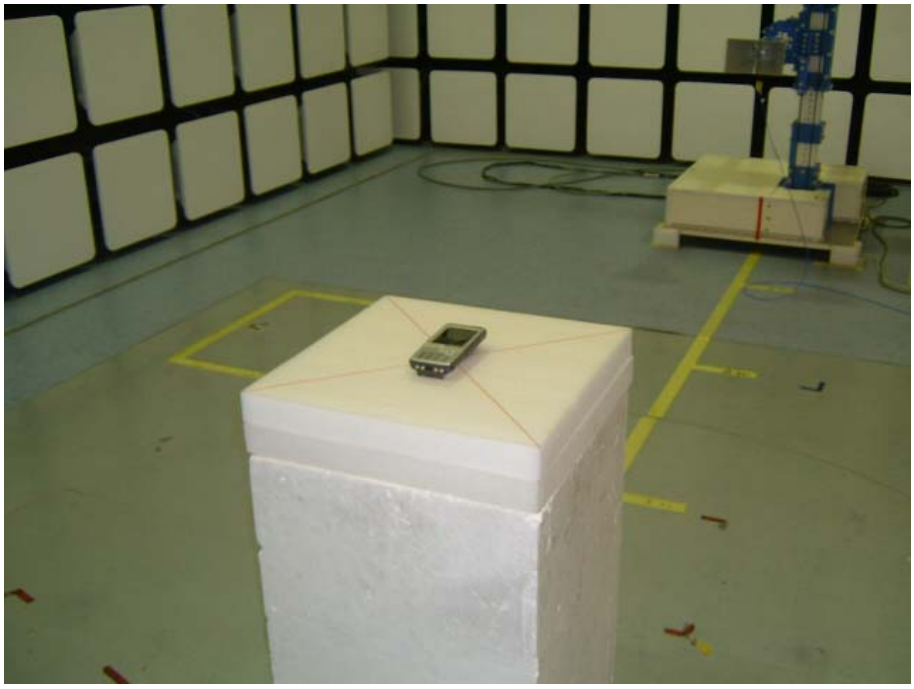
Front

Rear

Spurious Emission (Radiated)

Front

Rear



Worst Case Position (Z-axis:Horizontal / X-axis:Vertical)

X-axis

Y-axis

Z-axis

APPENDIX 2:Test instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Test Item	Calibration Date * Interval(month)
MBTR10	Spectrum Analyzer	Rohde & Schwarz	FSP30	AT	2003/11/12 * 12
MCC-26	Microwave Cable	Suhner	SUCOFLEX104	AT	2003/09/05 * 12
MAT-23	Attenuator (10dB)	Orient Microwave	BX10-0476-00	AT	2004/03/30 * 12
MAEC-02	Anechoic Chamber	TDK	Semi Anechoic Chamber 3m	RE/CE	2004/04/12 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	RE	2003/12/16 * 12
MBA-02	Biconical Antenna	Schwarzbeck	BBA9106	RE	2003/10/15 * 12
MLA-02	Logperiodic Antenna	Schwarzbeck	USLP9143	RE	2003/10/15 * 12
MCC-12	Coaxial Cable	Fujikura/Agilent	-	RE	2004/02/24 * 12
MPA-02	Pre Amplifier	Agilent	87405A	RE	2004/04/16 * 12
MTR-02	Test Receiver	Rohde & Schwarz	ESCS30	RE/CE	2004/02/03 * 12
MHA-05	Horn Antenna	Schwarzbeck	BBHA9120D	RE	2004/01/10 * 12
MHA-02	Horn Antenna	EMCO	3160-09	RE	2004/01/10 * 12
MCC-04	Microwave Cable	Storm	421-011	RE	2004/01/06 * 12
MCC-24	Microwave Cable	Storm	-	RE	2004/05/01 * 12
MPA-01	Pre Amplifier	Agilent	8449B	RE	2004/02/06 * 12
MRENT-09	Spectrum Analyzer	Advantest	R3273	RE/CE	2004/02/18 * 12
MAEC-01	Anechoic Chamber	TDK	Semi Anechoic Chamber 10m	RE	2003/12/27 * 12
MTR-01	Test Receiver	Rohde & Schwarz	ESI40	RE	2003/11/12 * 12
MHA-06	Horn Antenna	Schwarzbeck	BBHA9120D	RE	2004/01/10 * 12
MCC-05	Microwave Cable	Storm	421-011	RE	2004/01/06 * 12
MCC-23	Microwave Cable	Storm	-	RE	2004/05/01 * 12
MHF-02	High Pass Filter	Tokimec	TF323DCA	RE	2003/09/19 * 12
MHA-01	Horn Antenna	EMCO	3160-09	RE	2004/01/10 * 12
MCC-13	Coaxial Cable	Fujikura/Agilent	-	CE	2004/02/24 * 12
MLS-06	LISN(AMN)	Schwarzbeck	NSLK8127	CE(EUT)	2004/02/17 * 12
MLS-07	LISN(AMN)	Schwarzbeck	NSLK8127	CE	2004/02/17 * 12
MTA-04	Termination	MCL	NTRM-50	CE	2004/02/16 * 12

All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

Test Item:

CE: AC Mains Conducted emission,
RE: Spurious emission(Radiated).
AT: Other

APPENDIX 3: Data of EMI test

AC Mains Conducted Emission

DATA OF CONDUCTED EMISSION TEST

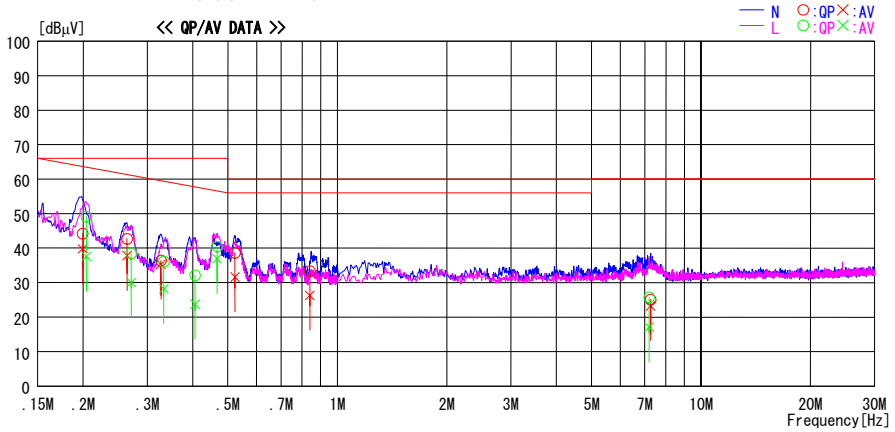
UL Apex Co., Ltd. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2004/08/07 15:43:08

Applicant : FUJITSU LIMITED
Kind of EUT : Handheld Computer
Model No. : FHT401S3BW
Serial No. : -

Report No. : 24KE0300-HO
Power : AC120V / 60Hz
Temp℃/Humi% : 25 / 59
Operator : Hiroka Umeyama

Mode / Remarks : Transmitting Wireless LAN Mode

LIMIT : FCC15C 15.207(QP) (0.15-30MHz)
FCC15C 15.207(AV) (0.15-30MHz)



NO	FREQ	READING QP	READING AV	C.F	RESULT QP	RESULT AV	LIMIT QP	LIMIT AV	MARGIN QP	MARGIN AV	PHASE
	[MHz]	[dBμV]	[dBμV]	[dB]	[dBμV]	[dBμV]	[dBμV]	[dBμV]	[dB]	[dB]	
1	0.1993	44.0	39.6	0.2	44.2	39.8	63.6	66.0	19.4	26.2	N
2	0.2640	42.5	37.6	0.2	42.7	37.8	61.3	66.0	18.6	28.2	N
3	0.3270	36.2	35.1	0.2	36.4	35.3	59.5	66.0	23.1	30.7	N
4	0.5230	38.4	31.4	0.2	38.6	31.6	56.0	60.0	17.4	28.4	N
5	0.8403	33.0	26.0	0.3	33.3	26.3	56.0	60.0	22.7	33.7	N
6	7.2640	24.0	22.1	1.1	25.1	23.2	60.0	60.0	34.9	36.8	N
7	0.2040	48.9	37.4	0.2	49.1	37.6	63.4	66.0	14.3	28.4	L
8	0.2710	38.3	29.8	0.2	38.5	30.0	61.1	66.0	22.6	36.0	L
9	0.3330	35.9	28.0	0.2	36.1	28.2	59.4	66.0	23.3	37.8	L
10	0.4060	31.9	23.5	0.2	32.1	23.7	57.7	66.0	25.6	42.3	L
11	0.4670	40.2	36.7	0.2	40.4	36.9	56.6	66.0	16.2	29.1	L
12	7.2010	24.6	16.0	1.1	25.7	17.1	60.0	60.0	34.3	42.9	L

CHART:WITHOUT FACTOR,Peak hold data.Data is uncorrected.
Except for the above table : adequate margin data below the limits.

[DSSS and other forms of modulation]

6dB Bandwidth(DSSS and other forms of modulation)

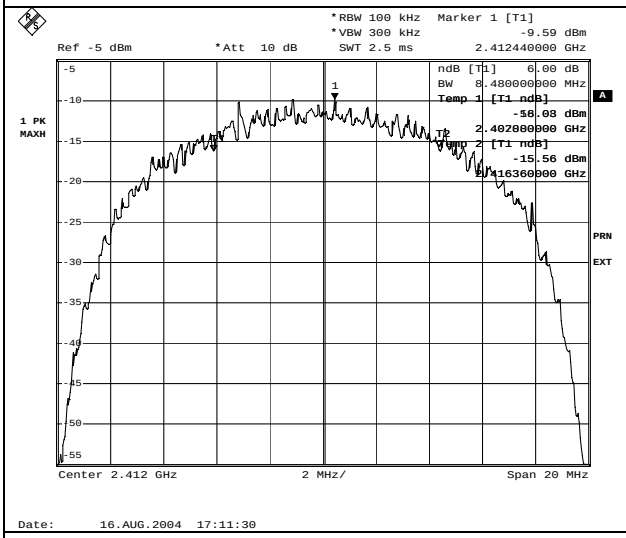
UL Apex Co., Ltd.
Head Office EMC Lab. No.3 Measurement Room

COMPANY	: FUJITSU LIMITED	REGULATION	: Fcc Part15 Subpart C 15.247(a)(2)
EQUIPMENT	: Handheld Computer	TEST DISTANCE	: -
MODEL	: FHT401S3BW	DATE	: 16/08/2004
S/ N	: -	TEMPERATURE	: 25deg.C
POWER	: DC3.6V	HUMIDITY	: 51%
MODE	: Tx (IEEE802.11b, 11Mbps)	ENGINEER	: Hiroka Umeyama

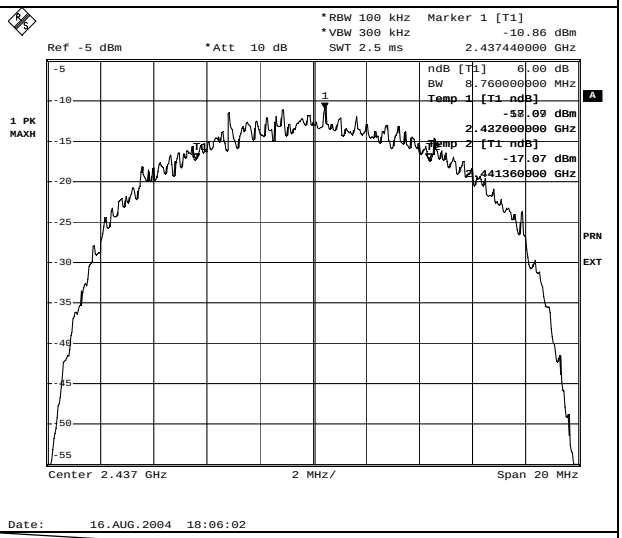
Ch	Freq. [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
Low	2412.0	8.480	500.0
Mid	2437.0	8.760	500.0
High	2462.0	8.440	500.0

6dB Bandwidth(DSSS and other forms of modulation)

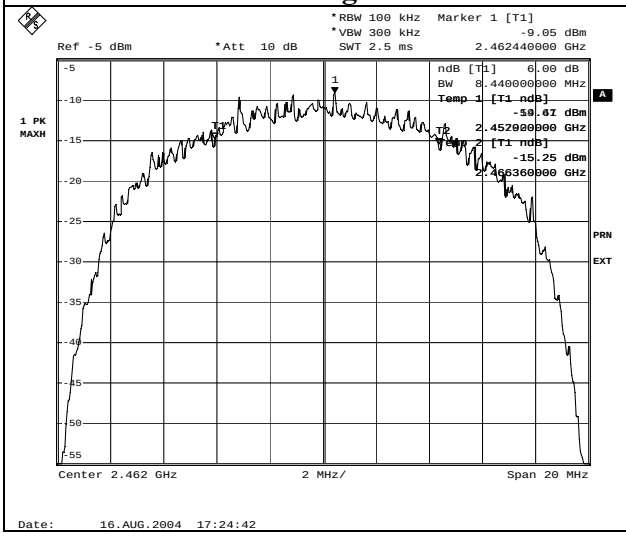
Ch:Low



Ch:Mid



Ch:High



Maximum Peak OutPut Power (DSSS and other forms of modulation)

UL Apex Co., Ltd.
Head Office EMC Lab. No.3 Measurement Room

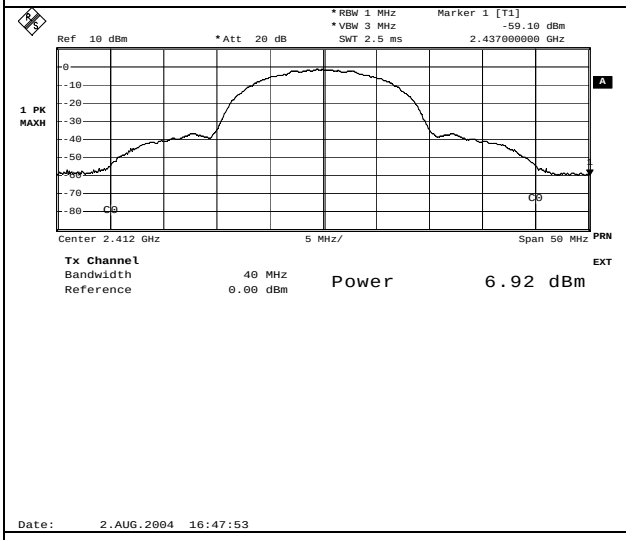
COMPANY	: FUJITSU LIMITED	REGULATION	: Fcc Part15 Subpart C 15.247(b)(3)
EQUIPMENT	: Handheld Computer	TEST DISTANCE	: -
MODEL	: FHT401S3BW	DATE	: 02/08/2004
S/ N	: -	TEMPERATURE	: 27deg.C
POWER	: DC3.6V	HUMIDITY	: 59%
MODE	: Tx (IEEE802.11b, 11Mbps)	ENGINEER	: Hiroka Umeyama

Ch	Freq. [MHz]	S/A Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit (1W) [dBm]	Margin [dB]
Low	2412.0	6.92	1.57	10.00	18.49	30.00	11.51
Mid	2437.0	5.49	1.63	10.00	17.12	30.00	12.88
High	2462.0	5.19	1.59	10.00	16.78	30.00	13.22

Sample Calculation:
Result = Reading + Cable Loss + Attenuator
* In the above table, factor 0.0dB represents no use of Atten. and/or Filter.

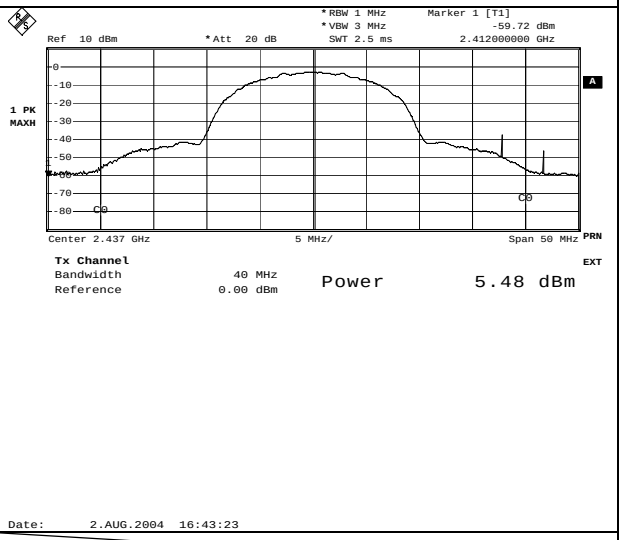
Maximum Peak OutPut Power (DSSS and other forms of modulation)

Ch:Low



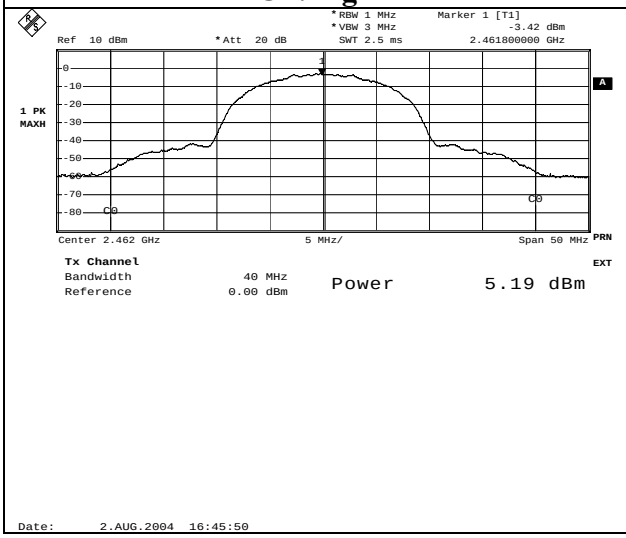
Date: 2.AUG.2004 16:47:53

Ch:Mid



Date: 2.AUG.2004 16:43:23

Ch:High



Date: 2.AUG.2004 16:45:50

Radiated Spurious Emission(DSSS and other forms of modulation)

DATA OF RADIATED EMISSION TEST

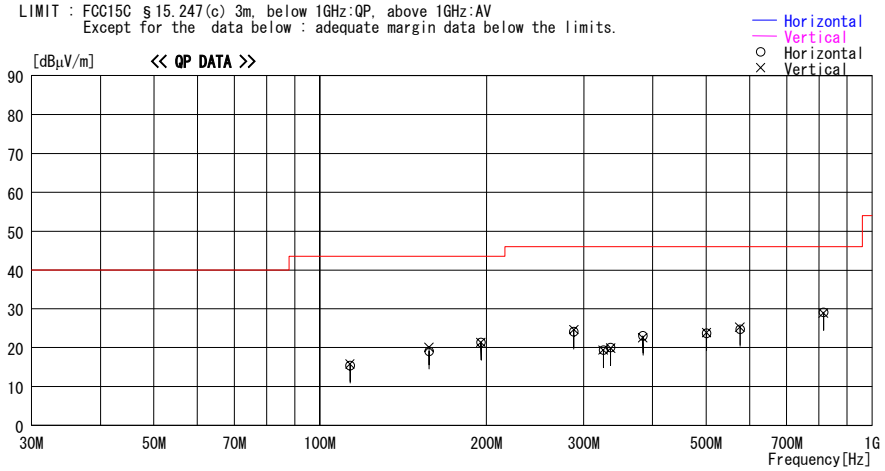
UL Apex Co., Ltd. Head Office EMC Lab. No.1 Semi Anechoic Chamber
Date : 2004/08/11 21:38:56

Applicant : FUJITSU LIMITED
Kind of EUT : Handheld Computer
Model No. : FHT401S3BW
Serial No. : -

Report No. : 24KE0300-HO
Power : DC3.6V
Temp℃/Humi% : 23 / 65
Operator : Hiroka Umeyama

Mode / Remarks : W-LAN Tx2412 Max-axis(Hori:Z / Ver:X)

LIMIT : FCC15C §15.247(c) 3m, below 1GHz:QP, above 1GHz:AV
Except for the data below : adequate margin data below the limits.



No.	FREQ [MHz]	READING QP [dBμV]	ANT FACTOR [dB/m]	LOSS [dB]	GAIN [dB]	RESULT [dBμV/m]	LIMIT [dBμV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	113.351	22.9	12.1	8.1	27.7	15.4	43.5	28.1	286	98
2	157.433	22.8	15.1	8.7	27.6	19.0	43.5	24.5	132	157
3	195.451	22.7	16.7	9.3	27.4	21.3	43.5	22.2	100	236
4	288.003	21.5	19.8	10.0	27.2	24.1	46.0	21.9	118	115
5	325.750	21.6	15.3	10.0	27.5	19.4	46.0	26.6	250	47
6	336.068	21.7	15.7	10.1	27.5	20.0	46.0	26.0	219	23
7	384.000	22.4	17.6	10.7	27.6	23.1	46.0	22.9	100	285
8	501.152	23.0	17.9	11.2	28.4	23.7	46.0	22.3	100	0
9	576.000	23.0	19.1	11.5	28.8	24.8	46.0	21.2	100	201
10	816.005	23.3	21.7	12.7	28.7	29.0	46.0	17.0	100	84
----- Vertical ------										
11	113.351	23.3	12.1	8.1	27.7	15.8	43.5	27.7	100	194
12	157.432	23.9	15.1	8.7	27.6	20.1	43.5	23.4	100	202
13	195.451	22.7	16.7	9.3	27.4	21.3	43.5	22.2	100	84
14	288.004	22.1	19.8	10.0	27.2	24.7	46.0	21.4	100	39
15	325.750	21.6	15.3	10.0	27.5	19.4	46.0	26.6	100	42
16	336.068	21.6	15.7	10.1	27.5	19.9	46.0	26.1	194	286
17	384.003	21.8	17.6	10.7	27.6	22.5	46.0	23.5	100	172
18	501.151	23.1	17.9	11.2	28.4	23.8	46.0	22.2	100	327
19	576.001	23.4	19.1	11.5	28.8	25.2	46.0	20.8	100	169
20	816.016	23.2	21.7	12.7	28.7	28.9	46.0	17.1	100	201

CHART:WITHOUT FACTOR ANT TYPE:-30MHz LOOP,30-300MHz BICONICAL,300MHz-1000MHz LOGPERIODIC,1000MHz- HORN
CALCULATION : READING + ANT FACTOR + LOSS(CABLE+ATTEN.) - AMP.GAIN Page:

Radiated Spurious Emission(DSSS and other forms of modulation)

DATA OF RADIATED EMISSION TEST

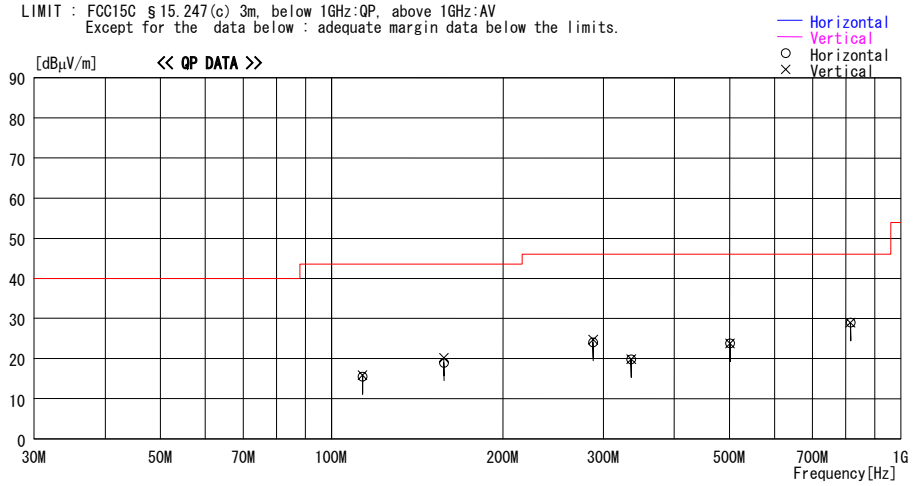
UL Apex Co., Ltd. Head Office EMC Lab. No.1 Semi Anechoic Chamber
Date : 2004/08/11 23:14:02

Applicant : FUJITSU LIMITED
Kind of EUT : Handheld Computer
Model No. : FHT401S3BW
Serial No. : -

Report No. : 24KE0300-HO
Power : DC3.6V
Temp℃/Humi% : 23 / 65
Operator : Hiroka Umeyama

Mode / Remarks : W-LAN Tx2437 Max-axis(Hori:Z / Ver:X)

LIMIT : FCC15C §15.247(c) 3m, below 1GHz:QP, above 1GHz:AV
Except for the data below : adequate margin data below the limits.



No.	FREQ [MHz]	READING QP [dBμV]	ANT FACTOR [dB/m]	LOSS [dB]	GAIN [dB]	RESULT [dBμV/m]	LIMIT [dBμV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	113.351	23.0	12.1	8.1	27.7	15.5	43.5	28.0	286	98
2	157.433	22.8	15.1	8.7	27.6	19.0	43.5	24.5	132	157
3	288.003	21.4	19.8	10.0	27.2	24.0	46.0	22.0	118	115
4	336.068	21.5	15.7	10.1	27.5	19.8	46.0	26.2	219	23
5	501.152	23.1	17.9	11.2	28.4	23.8	46.0	22.2	100	285
6	816.005	23.3	21.7	12.7	28.7	29.0	46.0	17.0	100	84
----- Vertical ------										
7	113.351	23.4	12.1	8.1	27.7	15.9	43.5	27.6	100	194
8	157.432	24.0	15.1	8.7	27.6	20.2	43.5	23.3	100	202
9	288.004	22.1	19.8	10.0	27.2	24.7	46.0	21.3	100	39
10	336.068	21.6	15.7	10.1	27.5	19.9	46.0	26.1	194	286
11	501.151	23.0	17.9	11.2	28.4	23.7	46.0	22.3	100	327
12	816.016	23.2	21.7	12.7	28.7	28.9	46.0	17.1	100	201

CHART:WITHOUT FACTOR ANT TYPE : -30MHz LOOP,30-300MHz BICONICAL,300MHz-1000MHz LOGPERIODIC,1000MHz- HORN
CALCULATION : READING + ANT FACTOR + LOSS(CABLE+ATTEN.) - AMP.GAIN Page:

Radiated Spurious Emission(DSSS and other forms of modulation)

DATA OF RADIATED EMISSION TEST

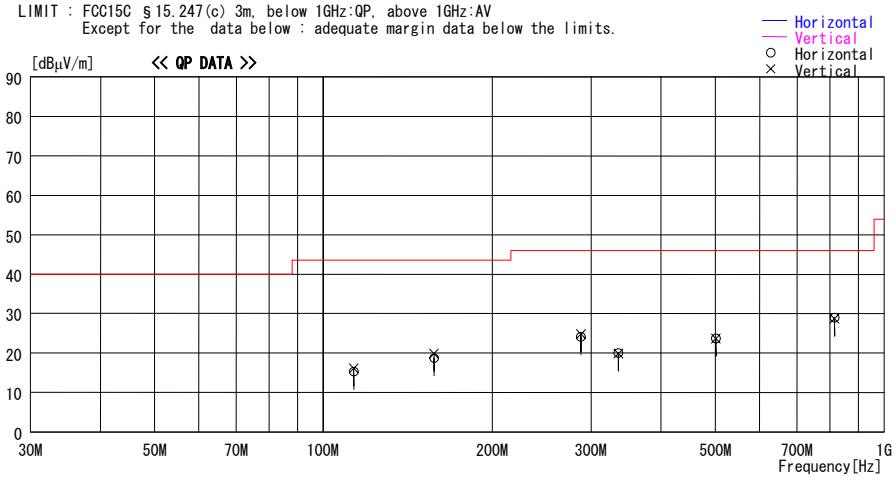
UL Apex Co., Ltd. Head Office EMC Lab. No.1 Semi Anechoic Chamber
Date : 2004/08/12 00:44:37

Applicant : FUJITSU LIMITED
Kind of EUT : Handheld Computer
Model No. : FHT401S3BW
Serial No. : -

Report No. : 24KE0300-HO
Power : DC3.6V
Temp℃/Humi% : 23 / 65
Operator : Hiroka Umeyama

Mode / Remarks : W-LAN Tx2462 Max-axis(Hori:Z / Ver:X)

LIMIT : FCC15C §15.247(c) 3m, below 1GHz:QP, above 1GHz:AV
Except for the data below : adequate margin data below the limits.



No.	FREQ [MHz]	READING QP [dBμV]	ANT FACTOR [dB/m]	LOSS [dB]	GAIN [dB]	RESULT [dBμV/m]	LIMIT [dBμV/m]	MARGIN [dB]	ANTENNA [cm]	TABLE [DEG]
----- Horizontal ------										
1	113.351	22.8	12.1	8.1	27.7	15.3	43.5	28.2	286	98
2	157.433	22.5	15.1	8.7	27.6	18.7	43.5	24.8	132	157
3	288.003	21.5	19.8	10.0	27.2	24.1	46.0	21.9	118	115
4	336.068	21.7	15.7	10.1	27.5	20.0	46.0	26.0	219	23
5	501.152	23.0	17.9	11.2	28.4	23.7	46.0	22.3	100	285
6	816.005	23.3	21.7	12.7	28.7	29.0	46.0	17.0	100	84
----- Vertical ------										
7	113.351	23.6	12.1	8.1	27.7	16.1	43.5	27.4	100	194
8	157.432	23.7	15.1	8.7	27.6	19.9	43.5	23.6	100	202
9	288.004	22.2	19.8	10.0	27.2	24.8	46.0	21.2	100	39
10	336.068	21.6	15.7	10.1	27.5	19.9	46.0	26.1	194	286
11	501.151	22.9	17.9	11.2	28.4	23.6	46.0	22.4	100	327
12	816.016	23.0	21.7	12.7	28.7	28.7	46.0	17.3	100	201

CHART:WITHOUT FACTOR ANT TYPE : -30MHz LOOP,30-300MHz BICONICAL,300MHz-1000MHz LOGPERIODIC,1000MHz- HORN
CALCULATION : READING + ANT FACTOR + LOSS(CABLE+ATTEN.) - AMP.GAIN Page:

Radiated Spurious Emission(DSSS and other forms of modulation)

COMPANY : FUJITSU LIMITED
EQUIPMENT : Handheld Computer
MODEL : FHT401S3BW
SAMPLE No. : -

POWER : DC 3.6V
Mode : Transmitting 2412MHz
EUT Position : Z-axis(Hor)/X-axis(Ver)

REPORT NO : 24KE0300-HO
REGULATION : FCC Part 15 Subpart C 15.247(c)
TEST DISTANCE : 3 and 1m
DATE : 2004/08/16
Temperature : 25deg.C
Humidity : 60%
ENGINEER : Hiroka Umeyama

PK DETECT(S/A : RBW 1MHz and VBW 1MHz)

No.	FREQ	S/A READING		ANT	AMP	CABLE	ATT	Hi-Pass	dwell	RESULT		Limit	MARGIN	
		HOR	VER	Factor	GAIN	LOSS		Filter	Factor	HOR	VER	PK	HOR	VER
	[GHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dB]	[dB]	[dB]	[dBuV/m]		[dBuV/m]	[dB]	
Test distance 3meters (RESULT=Reading + ANT Factor - Amp Gain + Cabele Loss)														
1	2.390000	46.0	45.1	30.7	36.3	5.6	-	-	-	46.0	45.1	74.0	28.0	28.9
2	2.400000	58.4	55.7	30.7	36.3	5.6	-	-	-	58.4	55.7	74.0	15.6	18.3
3	4.824000	43.2	42.8	35.2	36.1	8.2	-	1.0	-	51.5	51.1	74.0	22.5	22.9
4	7.236000	42.1	42.4	37.7	35.6	10.2	-	-	-	54.4	54.7	74.0	19.6	19.3
5	9.648000	43.5	43.1	37.1	36.3	11.9	-	-	-	56.2	55.8	74.0	17.8	18.2
Test distance 1meters (RESULT=Reading + ANT Factor - Amp Gain + Cabele Loss - Dfac)														
6	12.06000	43.4	42.7	40.8	35.7	13.5	-	-	-	52.5	51.8	74.0	21.5	22.2
7	14.47200	42.6	43.5	42.3	34.6	14.8	-	-	-	55.6	56.5	74.0	18.4	17.5
8	16.88400	41.9	41.9	46.4	35.5	16.6	-	-	-	59.9	59.9	74.0	14.1	14.1
9	19.29600	43.2	42.0	41.8	34.9	18.0	-	-	-	58.6	57.4	74.0	15.4	16.6
10	21.70800	43.9	44.2	40.9	35.3	19.7	-	-	-	59.7	60.0	74.0	14.3	14.0
11	24.12000	43.7	43.5	41.1	36.0	20.6	-	-	-	59.9	59.7	74.0	14.1	14.3

AV DETECT(S/A : RBW 1MHz and VBW 10Hz)

No.	FREQ	S/A READING		ANT	AMP	CABLE	ATT	Hi-Pass	dwell	RESULT		Limit	MARGIN	
		HOR	VER	Factor	GAIN	LOSS		Filter	Factor	HOR	VER	AV	HOR	VER
	[GHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dB]	[dB]	[dB]	[dBuV/m]		[dBuV/m]	[dB]	
Test distance 3meters (RESULT=Reading + ANT Factor - Amp Gain + Cabele Loss)														
1	2.390000	33.4	32.4	30.7	36.3	5.6	-	-	-	33.4	32.4	54.0	20.6	21.6
2	2.400000	48.3	45.2	30.7	36.3	5.6	-	-	-	48.3	45.2	54.0	5.7	8.8
3	4.824000	30.4	30.3	35.2	36.1	8.2	-	1.0	-	38.7	38.6	54.0	15.3	15.4
4	7.236000	30.0	30.0	37.7	35.6	10.2	-	-	-	42.3	42.3	54.0	11.7	11.7
5	9.648000	30.2	30.2	37.1	36.3	11.9	-	-	-	42.9	42.9	54.0	11.1	11.1
Test distance 1meters (RESULT=Reading + ANT Factor - Amp Gain + Cabele Loss - Dfac)														
6	12.06000	35.1	30.2	40.8	35.7	13.5	-	-	-	44.2	39.3	54.0	9.8	14.7
7	14.47200	29.7	29.7	42.3	34.6	14.8	-	-	-	42.7	42.7	54.0	11.3	11.3
8	16.88400	29.3	29.3	46.4	35.5	16.6	-	-	-	47.3	47.3	54.0	6.7	6.7
9	19.29600	30.5	29.0	41.8	34.9	18.0	-	-	-	45.9	44.4	54.0	8.1	9.6
10	21.70800	30.9	30.7	40.9	35.3	19.7	-	-	-	46.7	46.5	54.0	7.3	7.5
11	24.12000	30.6	30.6	41.1	36.0	20.6	-	-	-	46.8	46.8	54.0	7.2	7.2

*Except for the above table : All other spurious emissions were less than 20dB for the limit.
Test Distance 1.0m : Distance Factor(Dfac) = 20log(3/1.0) = 9.5 dB
Used Equipment: MHA-05, MHA-02, MCC-04+24, MPA-01, MRENT-09
* - not used or none

Radiated Spurious Emission(DSSS and other forms of modulation)

UL Apex Co., Ltd.
Head Office EMC Lab. No.1 Semi Anechoic Chamber

COMPANY : FUJITSU LIMITED
EQUIPMENT : Handheld Computer
MODEL : FHT401S3BW
SAMPLE No. : -

POWER : DC 3.6V
Mode : Transmitting 2437MHz
EUT Position : Z-axis(Hor)/X-axis(Ver)

REPORT NO : 24KE0300-HO
REGULATION : FCC Part 15 Subpart C 15.247(c)
TEST DISTANCE : 3 and 1m
DATE : 2004/08/16
Temperature : 25deg.C
Humidity : 60%
ENGINEER : Hiroka Umeyama

PK DETECT(S/A : RBW 1MHz and VBW 1MHz)

No.	FREQ	S/A READING HOR	S/A READING VER	ANT Factor	AMP GAIN	CABLE LOSS	ATT	Hi-Pass Filter	dwell Factor	RESULT HOR	RESULT VER	Limit PK	MARGIN HOR	MARGIN VER
	[GHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dB]	[dB]	[dB]	[dBuV/m]		[dBuV/m]	[dB]	
Test distance 3meters (RESULT=Reading + ANT Factor - Amp Gain + Cabele Loss)														
1	4.874000	43.4	42.5	35.4	36.1	8.2	-	1.0	-	51.9	51.0	74.0	22.1	23.0
2	7.311000	42.9	43.2	37.9	35.7	10.3	-	-	-	55.4	55.7	74.0	18.6	18.3
3	9.748000	43.2	42.6	37.0	36.3	12.0	-	-	-	55.9	55.3	74.0	18.1	18.7
Test distance 1meters (RESULT=Reading + ANT Factor - Amp Gain + Cabele Loss - Dfac)														
4	12.18500	42.9	43.6	41.4	35.6	13.6	-	-	-	52.8	53.5	74.0	21.2	20.5
5	14.62200	43.0	42.4	42.6	34.8	15.0	-	-	-	56.3	55.7	74.0	17.7	18.3
6	17.05900	41.8	41.9	46.6	35.4	16.6	-	-	-	60.1	60.2	74.0	13.9	13.8
7	19.49600	42.3	42.4	41.2	34.9	18.1	-	-	-	57.2	57.3	74.0	16.8	16.7
8	21.93300	45.3	45.1	41.0	35.0	19.9	-	-	-	61.7	61.5	74.0	12.3	12.5
9	24.37000	43.2	43.3	41.2	36.6	20.7	-	-	-	59.0	59.1	74.0	15.0	14.9

AV DETECT(S/A : RBW 1MHz and VBW 10Hz)

No.	FREQ	S/A READING HOR	S/A READING VER	ANT Factor	AMP GAIN	CABLE LOSS	ATT	Hi-Pass Filter	dwell Factor	RESULT HOR	RESULT VER	Limit AV	MARGIN HOR	MARGIN VER
	[GHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dB]	[dB]	[dB]	[dBuV/m]		[dBuV/m]	[dB]	
Test distance 3meters (RESULT=Reading + ANT Factor - Amp Gain + Cabele Loss)														
1	4.874000	30.1	30.2	35.4	36.1	8.2	-	1.0	-	38.6	38.7	54.0	15.4	15.3
2	7.311000	30.1	30.3	37.9	35.7	10.3	-	-	-	42.6	42.8	54.0	11.4	11.2
3	9.748000	30.2	29.9	37.0	36.3	12.0	-	-	-	42.9	42.6	54.0	11.1	11.4
Test distance 1meters (RESULT=Reading + ANT Factor - Amp Gain + Cabele Loss - Dfac)														
4	12.18500	30.1	30.2	41.4	35.6	13.6	-	-	-	40.0	40.1	54.0	14.0	13.9
5	14.62200	30.0	1.0	42.6	34.8	15.0	-	-	-	43.3	14.3	54.0	10.7	39.7
6	17.05900	28.9	33.4	46.6	35.4	16.6	-	-	-	47.2	51.7	54.0	6.8	2.3
7	19.49600	29.1	29.1	41.2	34.9	18.1	-	-	-	44.0	44.0	54.0	10.0	10.0
8	21.93300	32.1	32.5	41.0	35.0	19.9	-	-	-	48.5	48.9	54.0	5.5	5.1
9	24.37000	33.4	30.1	41.2	36.6	20.7	-	-	-	49.2	45.9	54.0	4.8	8.1

*Except for the above table : All other spurious emissions were less than 20dB for the limit.
Test Distance 1.0m : Distance Factor(Dfac) = 20log(3/1.0) = 9.5 dB
Used Equipment: MHA-05, MHA-02, MCC-04+24, MPA-01, MRENT-09
* - not used or none

Radiated Spurious Emission(DSSS and other forms of modulation)

UL Apex Co., Ltd.
Head Office EMC Lab. No.1 Semi Anechoic Chamber

COMPANY : FUJITSU LIMITED
EQUIPMENT : Handheld Computer
MODEL : FHT401S3BW
SAMPLE No. : -

POWER : DC 3.6V
Mode : Transmitting 2462MHz
EUT Position : Z-axis(Hor)/X-axis(Ver)

REPORT NO : 24KE0300-HO
REGULATION : FCC Part 15 Subpart C 15.247(c)
TEST DISTANCE : 3 and 1m
DATE : 2004/08/16
Temperature : 25deg.C
Humidity : 60%
ENGINEER : Hiroka Umeyama

PK DETECT(S/A : RBW 1MHz and VBW 1MHz)

No.	FREQ	S/A READING		ANT	AMP	CABLE	ATT	Hi-Pass	dwell	RESULT		Limit	MARGIN	
		HOR	VER	Factor	GAIN	LOSS		Filter	Factor	HOR	VER	PK	HOR	VER
	[GHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dB]	[dB]	[dB]	[dBuV/m]		[dBuV/m]	[dB]	
Test distance 3meters (RESULT=Reading + ANT Factor - Amp Gain + Cabele Loss)														
1	2.483500	47.2	45.5	30.8	36.2	5.6	-	-	-	47.4	45.7	74.0	26.6	28.3
2	4.924000	42.5	42.8	35.7	36.1	8.2	-	1.0	-	51.3	51.6	74.0	22.7	22.4
3	7.386000	43.1	42.9	38.1	35.7	10.3	-	-	-	55.8	55.6	74.0	18.2	18.4
4	9.848000	43.1	42.9	37.0	36.3	12.0	-	-	-	55.8	55.6	74.0	18.2	18.4
Test distance 1meters (RESULT=Reading + ANT Factor - Amp Gain + Cabele Loss - Dfac)														
5	12.31000	43.5	43.5	41.9	35.6	13.6	-	-	-	53.9	53.9	74.0	20.1	20.1
6	14.77200	43.2	42.9	42.8	34.9	15.1	-	-	-	56.7	56.4	74.0	17.3	17.6
7	17.23400	42.0	42.0	45.9	35.3	16.6	-	-	-	59.7	59.7	74.0	14.3	14.3
6	19.69600	42.3	42.8	41.2	35.2	18.2	-	-	-	57.0	57.5	74.0	17.0	16.5
7	22.15800	44.0	43.6	41.3	35.0	20.0	-	-	-	60.8	60.4	74.0	13.2	13.6
10	24.62000	43.5	44.6	41.3	36.8	20.8	-	-	-	59.3	60.4	74.0	14.7	13.6

AV DETECT(S/A : RBW 1MHz and VBW 10Hz)

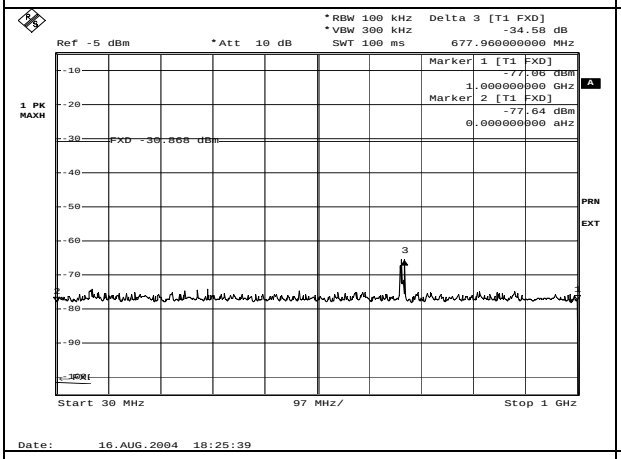
No.	FREQ	S/A READING		ANT	AMP	CABLE	ATT	Hi-Pass	dwell	RESULT		Limit	MARGIN	
		HOR	VER	Factor	GAIN	LOSS		Filter	Factor	HOR	VER	AV	HOR	VER
	[GHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dB]	[dB]	[dB]	[dBuV/m]		[dBuV/m]	[dB]	
Test distance 3meters (RESULT=Reading + ANT Factor - Amp Gain + Cabele Loss)														
1	2.483500	33.9	32.2	30.8	36.2	5.6	-	-	-	34.1	32.4	54.0	19.9	21.6
2	4.924000	29.4	29.4	35.7	36.1	8.2	-	1.0	-	38.2	38.2	54.0	15.8	15.8
3	7.386000	30.1	33.7	38.1	35.7	10.3	-	-	-	42.8	46.4	54.0	11.2	7.6
4	9.848000	29.9	29.9	37.0	36.3	12.0	-	-	-	42.6	42.6	54.0	11.4	11.4
Test distance 1meters (RESULT=Reading + ANT Factor - Amp Gain + Cabele Loss - Dfac)														
5	12.31000	30.0	30.1	41.9	35.6	13.6	-	-	-	40.4	40.5	54.0	13.6	13.5
6	14.77200	29.7	29.6	42.8	34.9	15.1	-	-	-	43.2	43.1	54.0	10.8	10.9
7	17.23400	28.9	28.8	45.9	35.3	16.6	-	-	-	46.6	46.5	54.0	7.4	7.5
6	19.69600	29.3	29.4	41.2	35.2	18.2	-	-	-	44.0	44.1	54.0	10.0	9.9
7	22.15800	30.7	30.7	41.3	35.0	20.0	-	-	-	47.5	47.5	54.0	6.5	6.5
10	24.62000	31.0	31.0	41.3	36.8	20.8	-	-	-	46.8	46.8	54.0	7.2	7.2

*Except for the above table : All other spurious emissions were less than 20dB for the limit.
Test Distance 1.0m : Distance Factor(Dfac) = 20log(3/1.0) = 9.5 dB
Used Equipment: MHA-05, MHA-02, MCC-04+24, MPA-01, MRENT-09
* - not used or none

Conducted Spurious Emission(DSSS and other forms of modulation)

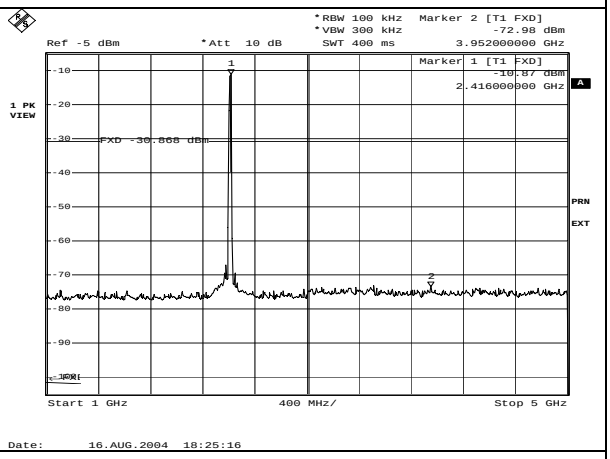
Ch : Low

30MHz-1GHz



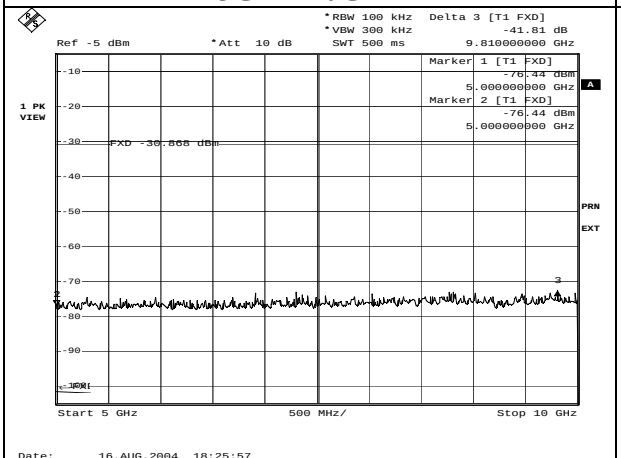
Date: 16.AUG.2004 18:25:39

1GHz-5GHz



Date: 16.AUG.2004 18:25:16

5GHz-10GHz



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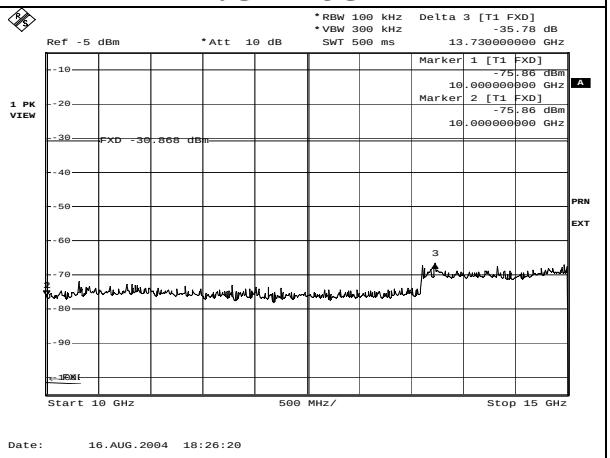
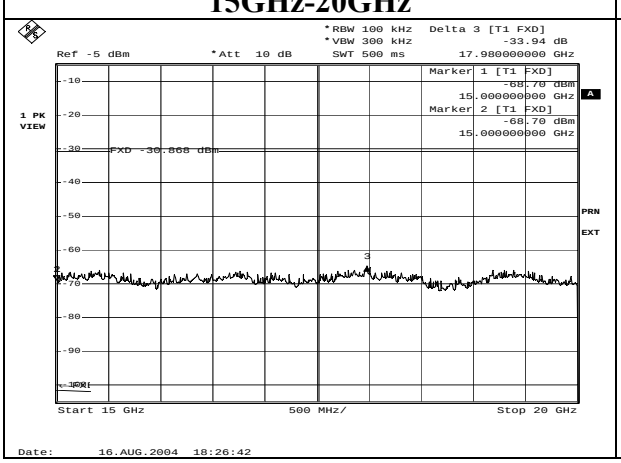
10GHz-15GHz



Date: 16.AUG.2004 18:26:20

15GHz-20GHz



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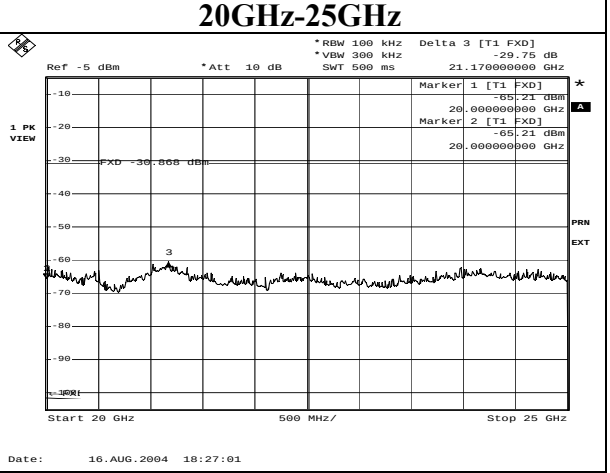
20GHz-25GHz

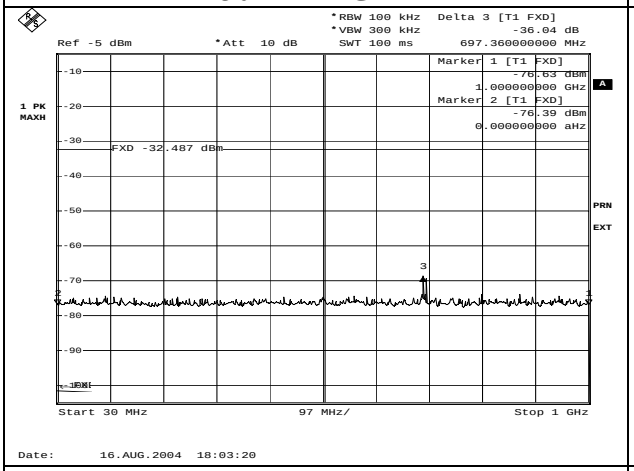


Date: 16.AUG.2004 18:27:01

Conducted Spurious Emission(DSSS and other forms of modulation)

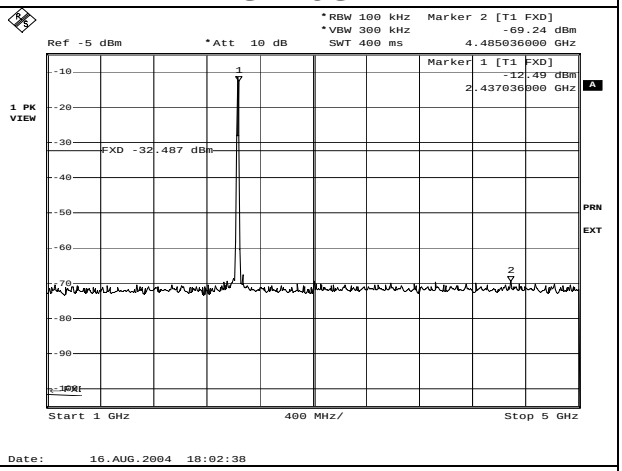
Ch : Mid

30MHz-1GHz



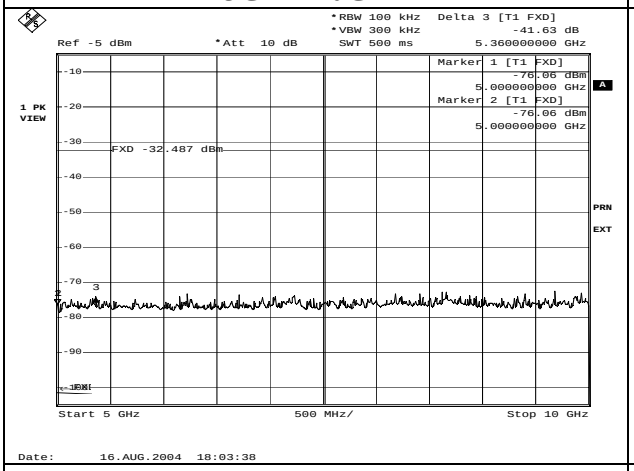
Date: 16.AUG.2004 18:03:20

1GHz-5GHz



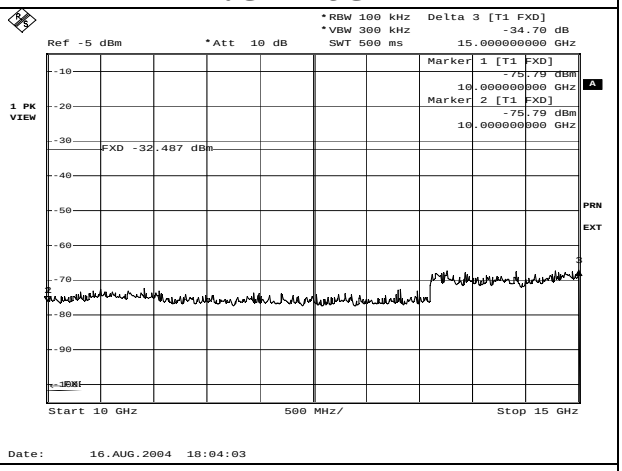
Date: 16.AUG.2004 18:02:38

5GHz-10GHz



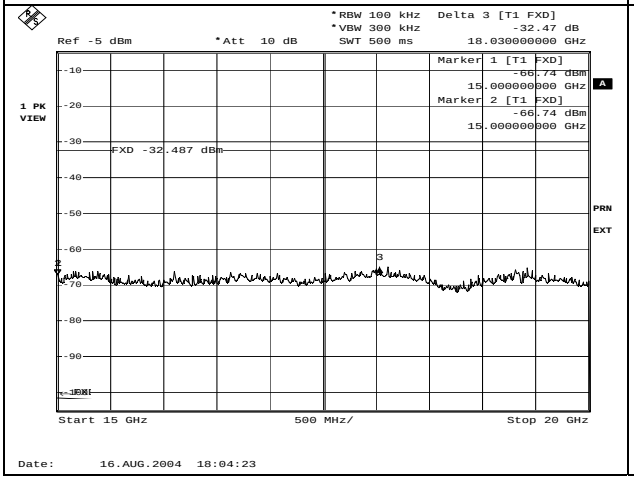
Date: 16.AUG.2004 18:03:38

10GHz-15GHz



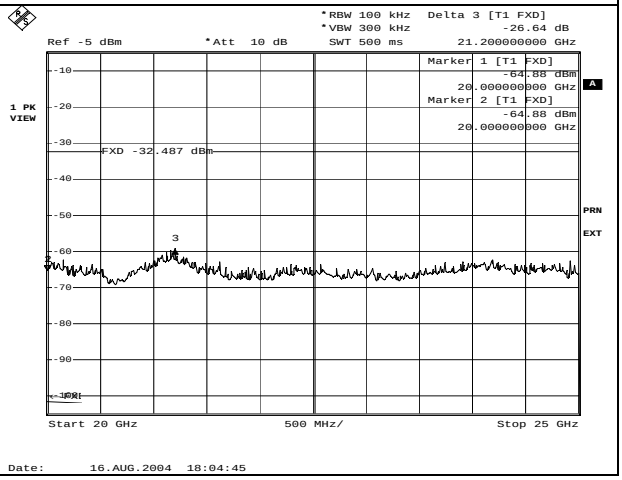
Date: 16.AUG.2004 18:04:03

15GHz-20GHz



Date: 16.AUG.2004 18:04:23

20GHz-25GHz



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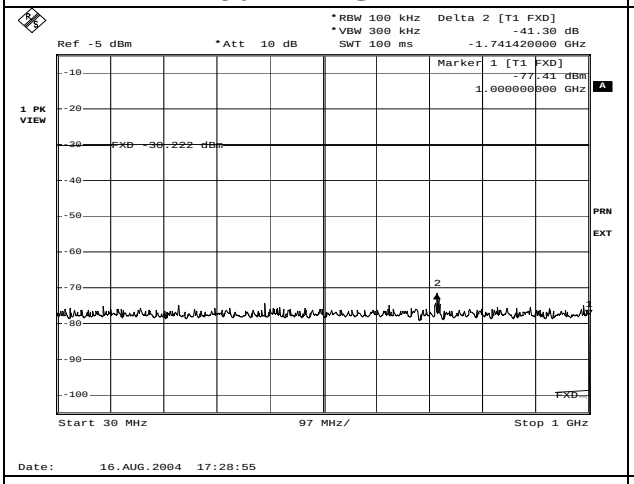
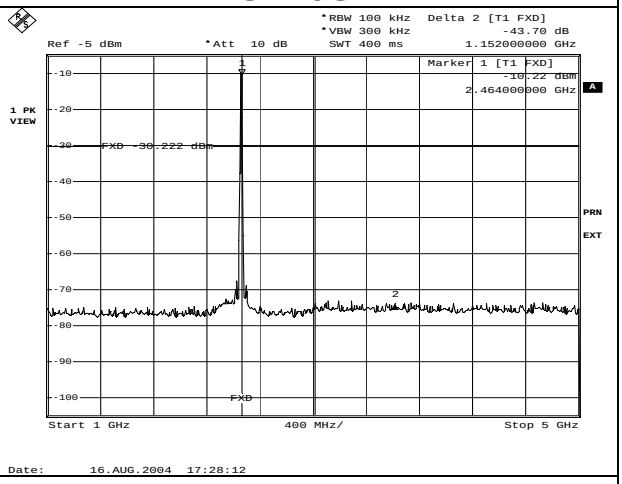
Conducted Spurious Emission(DSSS and other forms of modulation)

Ch : High

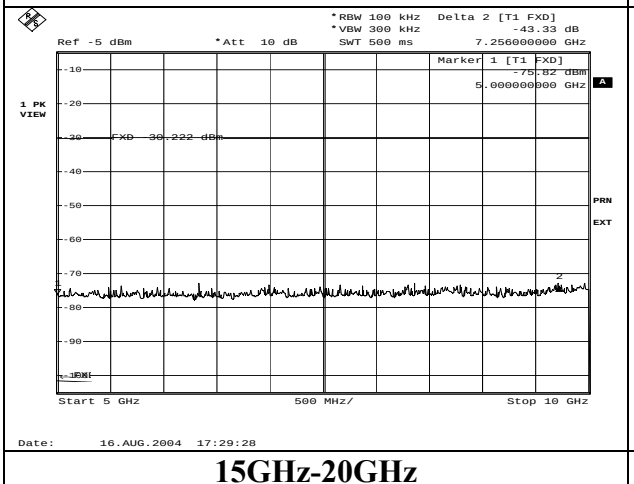
30MHz-1GHz



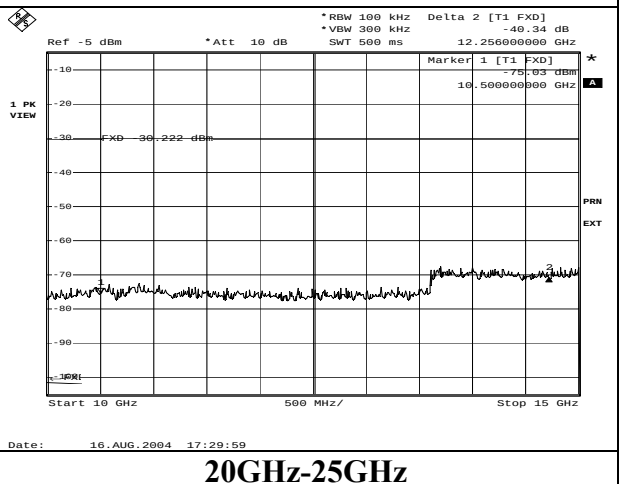
1GHz-5GHz



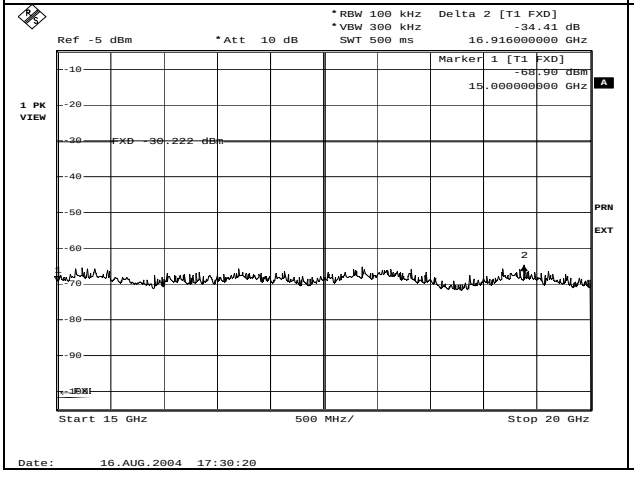
5GHz-10GHz



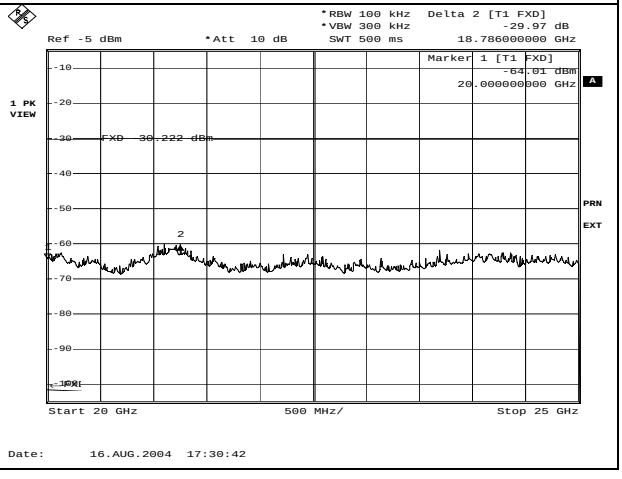
10GHz-15GHz



15GHz-20GHz



20GHz-25GHz



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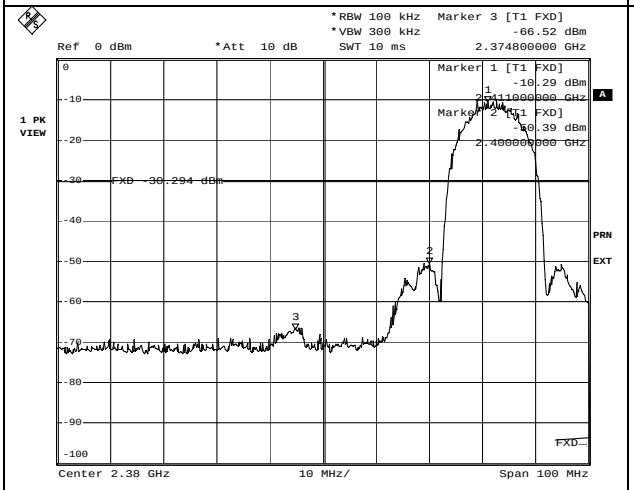
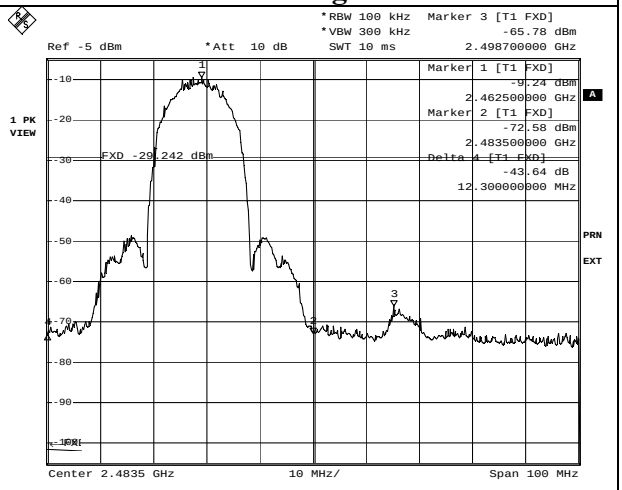
Telephone : +81 596 24 8116
Facsimile : +81 596 24 8124

Conducted emission Band Edge compliance (DSSS and other forms of modulation)

Ch:Low



Ch:High



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Power Density (DSSS and other forms of modulation)

UL Apex Co., Ltd.
Head Office EMC Lab. No.3 Measurement Room

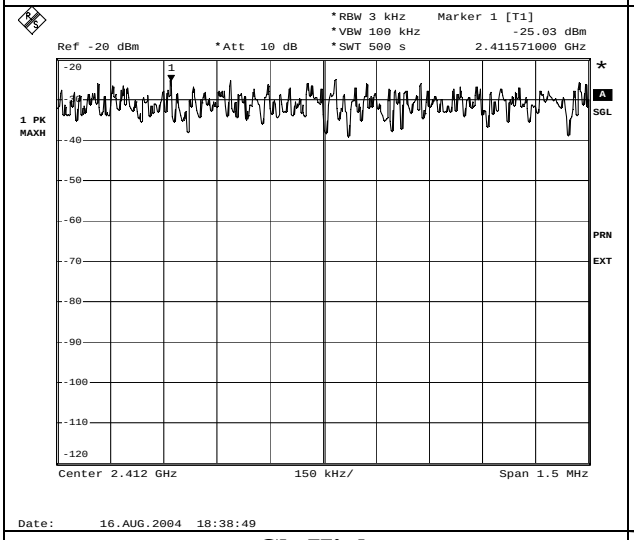
COMPANY	: FUJITSU LIMITED	REGULATION	: Fcc Part15 Subpart C 15.247(d)
EQUIPMENT	: Handheld Computer	TEST DISTANCE	: -
MODEL	: FHT401S3BW	DATE	: 16/08/2004
S/ N	: -	TEMPERATURE	: 25deg.C
POWER	: DC3.6V	HUMIDITY	: 51%
MODE	: Tx (IEEE802.11b, 11Mbps)	ENGINEER	: Hiroka Umeyama

Ch	Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
Low	2412.0	-25.23	1.20	10.00	-14.0	8.0	22.0
Mid	2437.0	-26.28	1.23	10.00	-15.1	8.0	23.1
High	2462.0	-24.56	1.19	10.00	-13.4	8.0	21.4

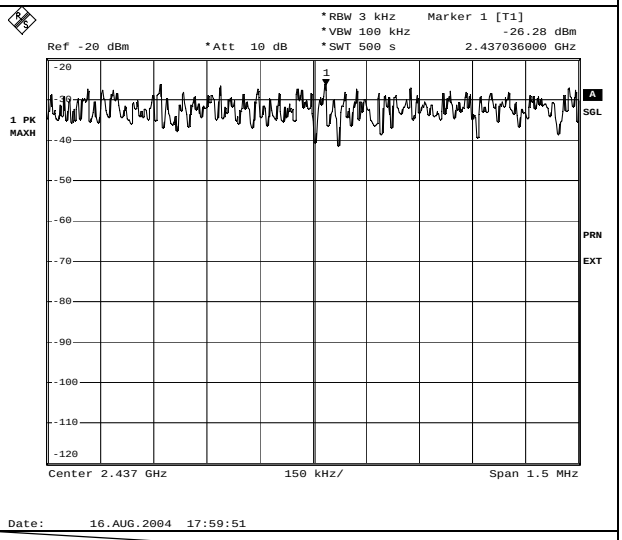
Sample Calculation:
Result = Reading + Cable Loss + Attenuator
* Atten. was not used for factor 0.0dB of the above table.

Power Density(DSSS and other forms of modulation)

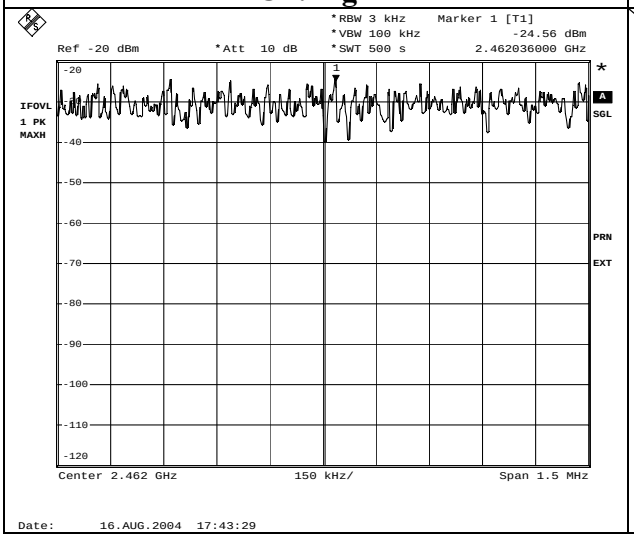
Ch:Low



Ch:Mid

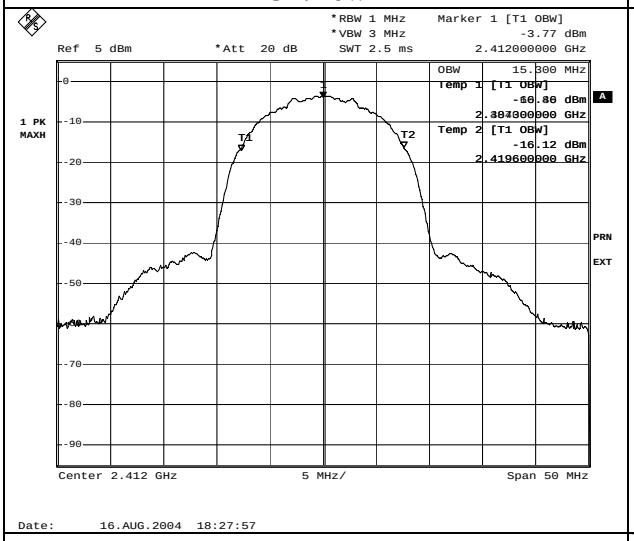


Ch:High

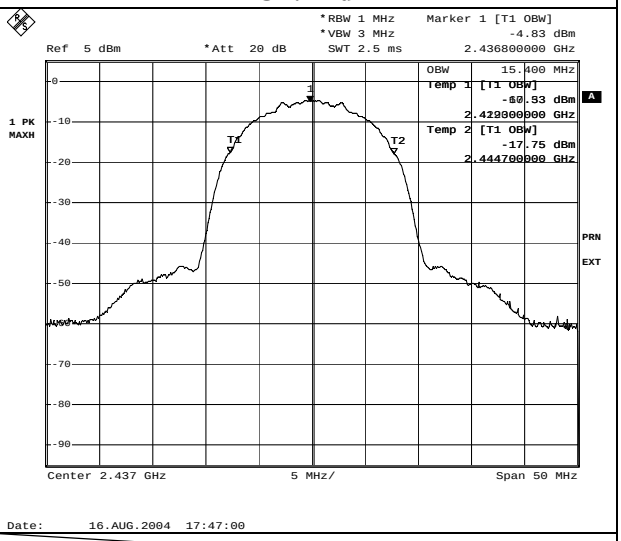


99%Occupied Bandwidth(DSSS and other forms of modulation)

Ch:Low



Ch:Mid



Ch:High