
EMI TEST REPORT

Test Report No. : 23HE0018-HO-1

Applicant : DENSO CORPORATION

Type of Equipment : Bluetooth ASSY

Model No. : BTA-01A

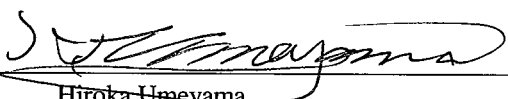
Test standard : FCC Part 15 Subpart C Section 15.247

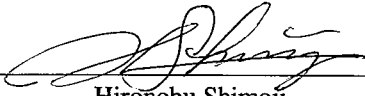
FCC ID : HYQBTA01A

Test Result : Complied

1. This test report shall not be reproduced in full or partial, without the written approval of A-Pex International 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.
5. This test report does not constitute an endorsement by NIST/NVLAP or U.S. Government.

Date of test : March 5,6,7 and 8, 2003

Tested by : 
Hiroka Umeyama
EMC Head Office Division

Approved by : 
Hironobu Shimoji
Group Leader of EMC Head Office Division

A-Pex International Co., Ltd.

EMC Head Office Division.

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MF060b(23.04.02)

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SECTION 1: Client information

Company Name : DENSO CORPORATION

Brand Name : DENSO

Address : 1-1 Showa-cho, Kariya-shi, Aichi-ken, 448-8661 Japan

Telephone Number : +81-566-61-3711

Facsimile Number : +81-566-25-4941

Contact Person : Hiroshi Miyazaki

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

2.1 Identification of E.U.T.

Type of Equipment : Bluetooth ASSY

Model No. : BTA-01A

Serial No. : 23, 40

Rating : DC3.3V DC5V

Country of Manufacture : Japan

Receipt Date of Sample : March 5, 2003

Condition of EUT : Production prototype

2.2 Product Description

Model: BTA-01A which was referred to as the EUT in this report is a Bluetooth ASSY.

This product is installed in Display in a Navigation system. And this product is used for a Hands free system. Instead of having connected using the cable, a Navigation system is connected with a cellular phone on radio by using this product.

The specification is as following;

Equipment Type	: Transceiver
Clock frequency used in EUT	: 13MHz
Frequency characteristics	: from 2402MHz to 2480MHz
Type of modulation	: GFSK
Bandwidth & Channel spacing	: 78MHz, 1MHz
Emission Designation (ITU Code)	: F1D
Antenna Type	: $\lambda/4$ Uni-pole
Antenna Connector type	: MM8430-2600B
Antenna gain	: 1.0dBi (Max)
Method of Frequency Generation	: ☒ Crystal ☒ Synthesizer ☐ Other (Resonator)
Power Supply	: DC3.3V
Operating voltage	: DC3.1-3.5V
Duty cycle	: 0.78
Operating temperature	: -30deg.C. to+85deg.C.
Power & Signal Cable Length	: ☐ > 3m ☒ $\leq$ 3m

*FCC Part 15.31(e) Verification of Input Power:

The host device BTA-01A provide the stable power-supply (DC 3.3V); and the Bluetooth ASSY complies power supply regulation.

*FCC Part 15.203 Antenna requirement

The antenna built in the BTA-01A is a chip antenna and is permanently mounted by soldering on a printed electronic circuit board in BTA-01A. It is impossible for end users to replace it, because a special tool is necessary for removal of the antenna.

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SECTION 3: Test specification, procedures and results**3.1 Test Specification**

Test Specification : FCC Part 15 Subpart C and Section15.247
 Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
 Section 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz,
 5725-5850MHz

3.2 Procedures and results

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	Conducted Emission	ANSI C63.4:2001	Section 15.207	N/A	Excluded *	N/A	Complied
2	Carrier Frequency Separation	ANSI C63.4:2001	Section15.247(a)(1)	Conducted	N/A	N/A	Complied
3	20dB Bandwidth	ANSI C63.4:2001	Section15.247(a)(1)	Conducted	N/A	N/A	Complied
4	Number of Hopping Frequency	ANSI C63.4:2001	Section15.247(a)(1)(iii)	Conducted	N/A	N/A	Complied
5	Dwell time	ANSI C63.4:2001	Section15.247(a)(1)(iii)	Conducted	N/A	N/A	Complied
6	Maximum Peak Output Power	ANSI C63.4:2001	Section15.247(b)(1)	Conducted	N/A	N/A	Complied
7	Band Edge Compliance	ANSI C63.4:2001	Section15.247(c)	Conducted	N/A	N/A	Complied
8	Spurious Emission	ANSI C63.4:2001	Section15.247(c)	Conducted/ Radiated	N/A	5.8dB 223.20MHz Horizontal/ Vertical	Complied

* The test is not applicable since the EUT does not have possibility to be connected with the AC Power.

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

3.3 Confirmation

A-Pex International Co., Ltd. hereby confirms that E.U.T. , in the configuration tested, complies with the specifications FCC Part15 Subpart C Section 15.247.

3.4 UncertaintySpurious Emission(Radiated)

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

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

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

The data listed in this test report may exceed the test limit because it does not have enough margin.

Other test except Conducted Emission and Spurious Emission(Radiated)

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

The data listed in this test report has enough margin.

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3.5 Test Location

A-Pex International Co., Ltd. EMC Head Office Division.

No.2 semi anechoic chamber, 7.5 x 5.8 x 5.2m.

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This site has been fully described in a report submitted to FCC office, and listed on June 05, 2002 (Registration number: 846015).

*NVLAP Lab. code: 200572-0

Industry Canada: IC4247-2

3.6 Test setup, Data of EMI and Test instruments

Refer to APPENDIX 1 to 3.

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

4.1 Operating Modes

The EUT exercise program used during radiated testing was designed to exercise the various system components in a manner similar to typical use.

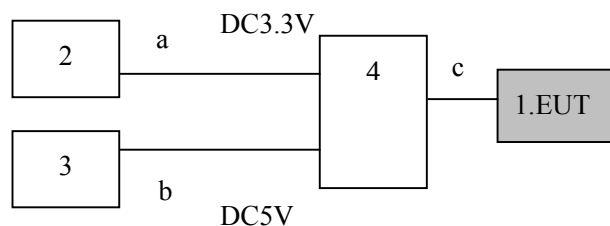
The operating mode/system was as follows:

Operation mode : Transmitting

1. Transmitting mode(2402 MHz)
 2. Transmitting mode(2441 MHz)
 3. Transmitting mode(2480MHz)
 4. Transmitting mode(Hopping on)
- *This system does not have Inquiry mode
*This system uses only DH5 type (packet)

Justification: The system was configured in typical fashion (as a customer would normally use it) for testing.

4.2 Configuration and peripherals



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

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remark
1	Bluetooth ASSY	BTA-01A	23, 40	DENSO CORPORATION	EUT
2	DC Power Supply	MY40000510	6654A	Agilent	-
3	DC Power Supply	PCM35-2A	13D90501	KIKUSUI	-
4	JIGU	N/A	N/A	DENSO CORPORATION	-

List of cables used

No.	Name	Length (m)	Shield	Backshell Material
a	DC Power Cable	2.0	N	Polyvinyl chloride
b	DC Power Cable	1.0	N	Polyvinyl chloride
c	DC Power Cable	0.2	N	Polyvinyl chloride

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SECTION 5: Carrier Frequency Separation , Section 15.247(a)(1)

Test Procedure

The carrier frequency separation was measured with a spectrum analyzer connected to the antenna port.

Test data : APPENDIX 2
Test result : Pass
Test instruments : MTR-01, MCC-05

SECTION 6: 20dB Bandwidth , Section 15.247(a)(1)

Test Procedure

The 20dB bandwidth was measured with a spectrum analyzer connected to the antenna port.

Test data : APPENDIX 2
Test result : Pass
Test instruments : MTR-01, MCC-05

SECTION 7: Number of Hopping Frequency, Section 15.247(a)(1)(iii)

Test Procedure

The Number of Hopping Frequency was measured with a spectrum analyzer connected to the antenna port.

Test data : APPENDIX 2
Test result : Pass
Test instruments : MTR-01, MCC-05

SECTION 8: Dwell time, Section 15.247(a)(1)(iii)

Test Procedure

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

Test data : APPENDIX 2
Test result : Pass
Test instruments : MTR-01, MCC-05

SECTION 9: Maximum Peak Output Power, Section 15.247(b)(1)

Test Procedure

The Maximum Peak Output Power was measured with a spectrum analyzer connected to the antenna port.

Test data : APPENDIX 2
Test result : Pass
Test instruments : MTR-01, MCC-05, MAT-21

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SECTION 10: Band Edge Compliance, Section 15.247(c)

Test Procedure

The Band Edge Compliance was measured with a spectrum analyzer connected to the antenna port.

Test data : APPENDIX 2
Test result : Pass
Test instruments : MTR-01, MCC-05

SECTION 11: Spurious Emission , Section 15.247(c)

[Conducted]

Test Procedure

The Spurious Emission (Conducted) was measured with a spectrum analyzer connected to the antenna port.

Test data : APPENDIX 2
Test result : Pass
Test instruments : MTR-01, MCC-05

[Radiated]

Test Procedure

EUT was placed on a platform of nominal size, 1m by 1.5m, raised 80cm above the conducting ground plane.

Test was made with the antenna positioned in both the horizontal and vertical planes of polarization.

The Radiated Electric Field Strength intensity has been measured in No.2 semi anechoic chamber (7.5x5.8x5.2m) with a ground plane and at a distance of 3m.

The measuring antenna height was varied between 1 to 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.

Test data : APPENDIX 2
Test result : Pass
Test instruments : MTR-01, MCC-12, MCC-05, MCC-06, MHA-05, MPA-01
MBA-03, MLA-03, MPA-04, MAT-07, MCC-11
MBF-01, MHA-01, MSA-02, MTR-02

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APPENDIX 1: Photographs of test setup

Page 11 : Spurious Emission (Radiated)

Page 12 : Other tests except Conducted emission and Spurious Emission (Radiated)

APPENDIX 2: Test instruments

Page 13 : Test instruments

APPENDIX 3: Data of EMI test

Page 14-16 : Carrier Frequency Separation

Page 17-19 : 20dB Bandwidth

Page 20-22 : Number of Hopping Frequency

Page 23-29 : Dwell time

Page 30-32 : Maximum Peak Output Power

Page 33-35 : Band Edge Compliance

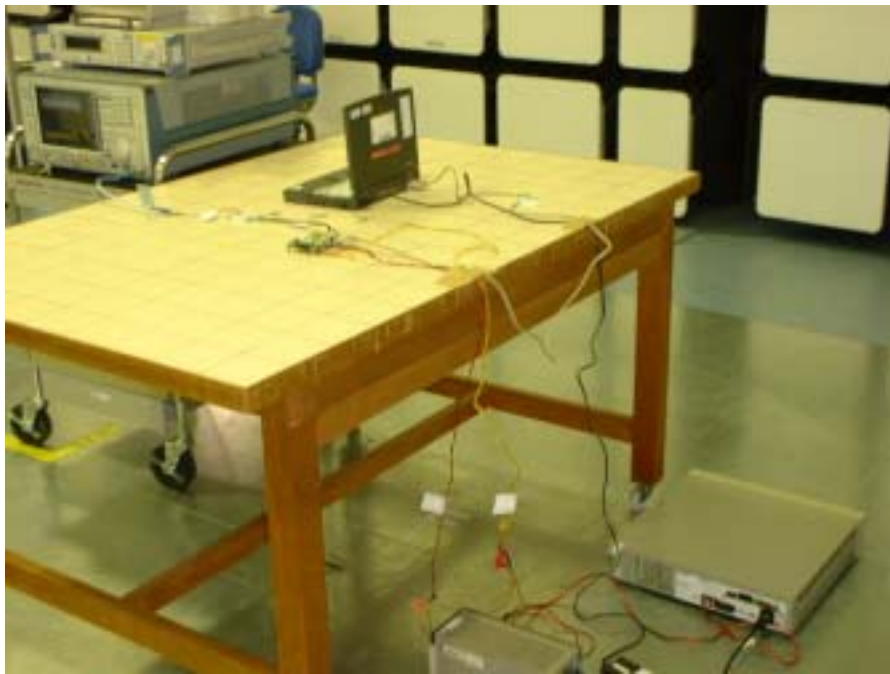
Page 36-47 : Spurious Emission

APPENDIX 1: Photographs of test setup

Spurious Emission (Radiated)



Other tests except Conducted emission and Spurious Emission (Radiated)



Test Report No :23HE0018-HO- 1

APPENDIX 2

Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Test Item	Calibration Date * Interval(month)
MTR-01	Test Receiver	Rohde & Schwarz	ES140	RE	2002/11/01 * 12
MAEC-02	Anechoic Chamber	TDK	Semi Anechoic Chamber 3m	RE	2002/04/12 * 12
MCC-11	Microwave coaxial cable	Suhner	SUCOFLEX 104	RE	2002/03/27 * 12
MBF-01	SHF Bandpass Filter	M-City	5GHz BPF	RE	2002/04/30 * 12
MAT-21	Attenuator	HIROSE ELECTRIC CO.,LTD.	AT-120	RE	2003/02/03 * 12
MCC-12	Coaxial Cable	Fujikura/Agilent	-	RE	2002/05/09 * 12
MHA-05	Horn Antenna	Schwarzbeck	BBHA9120D	RE	2003/01/11 * 12
MPA-01	Pre Amplifier	Agilent	8449B	RE	2003/02/08 * 12
MCC-05	Microwave Cable	Storm	421-011	RE	2003/01/14 * 12
MCC-06	Microwave Cable	Storm	421-011	RE	2003/01/14 * 12
MBA-03	Biconical Antenna	Schwarzbeck	BBA9106	RE	2002/05/02 * 12
MLA-03	Logperiodic Antenna	Schwarzbeck	USLP9143	RE	2002/05/02 * 12
MPA-04	Pre Amplifier	Agilent	8447D	RE	2002/03/13 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	RE	2002/12/24 * 12
MHA-01	Horn Antenna	EMCO	3160-09	RE	2003/01/11 * 12
MSA-02	Spectrum Analyzer	Advantest	R3265A	RE	2002/09/20 * 12
MTR-02	Test Receiver	Rohde & Schwarz	ESCS30	RE	2003/01/31 * 12

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

Test Item:

RE: Radiated emission

DATA OF CARRIER FREQUENCY SEPARATION

A-Pex International Co., Ltd.

EMC HEAD OFFICE DIVISION No.2 SEMI ANECHOIC CHAMBER

COMPANY	: DENSO CORPORATION	REPORT NO	: 23HE0018-HO- 1
EQUIPMENT	: Bluetooth ASSY	REGULATION	: Fcc Part15 Subpart C 15.247(a)(1)
MODEL	: BTA-01A	TEST DISTANCE	: -
S/ N	: 40	DATE	: 03/05/2003
FCC ID	: HYQBTA01A	TEMPERATURE	: 24°C
IC Number	: 1551A-BTA01A	HUMIDITY	: 34%
POWER	: DC3.3V		
MODE	: Tx (Hopping on)		

Engineer:

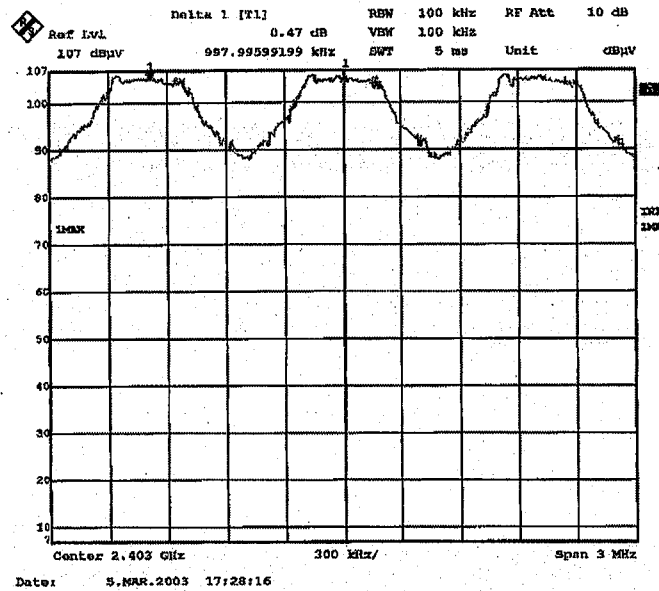

Hiroka Umeyama

PK DETECT(S/A :span 3MHz, RBW 100kHz,VBW 100kHz, sweep time AUTO)

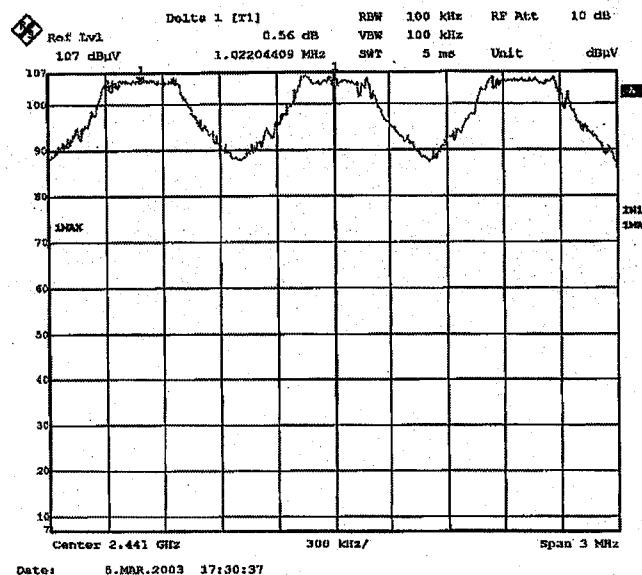
CH	FREQ	Channel separation	Limit
	[MHz]	[MHz]	
Low	2402.0	0.998	>20dB Bandwidth and 25[kHz]
Mid	2441.0	1.022	>20dB Bandwidth and 25[kHz]
High	2480.0	1.028	>20dB Bandwidth and 25[kHz]

Test Report No. : 23HE0018-HO-1
FCC ID : HYQBTA01A
IC No. : 1551A-BTA01A

Carrier Frequency Separation:TX(Hopping on)2402MHz

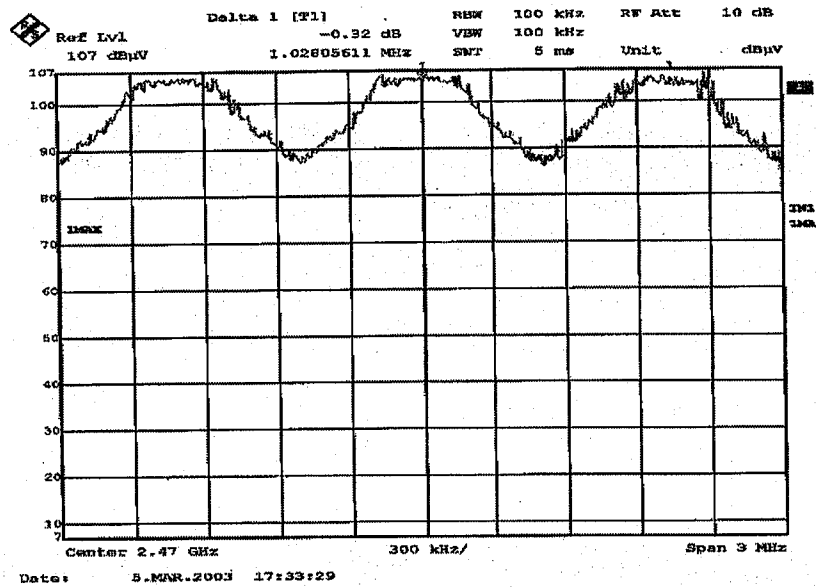


Carrier Frequency Separation:TX(Hopping on)2441MHz



Test Report No. : 23HE0018-HO-1
FCC ID : HYQBTA01A
IC No. : 1551A-BTA01A

Carrier Frequency Separation:TX(Hopping on)2480MHz



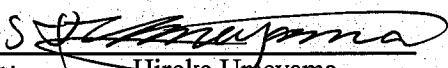
DATA OF 20dB BANDWIDTH

A-Pex International Co., Ltd.

EMC HEAD OFFICE DIVISION No.2 SEMI ANECHOIC CHAMBER

COMPANY	: DENSO CORPORATION	REPORT NO	: 23HE0018-HO- 1
EQUIPMENT	: Bluetooth ASSY	REGULATION	: Fcc Part15 Subpart C 15.247(a)(1)
MODEL	: BTA-01A	TEST DISTANCE	: -
S/N	: 40	DATE	: 03/05/2003
FCC ID	: HYQBTA01A	TEMPERATURE	: 24°C
IC Number	: 1551A-BTA01A	HUMIDITY	: 34%
POWER	: DC3.3V		
MODE	: Tx (Hopping off)		

Engineer:

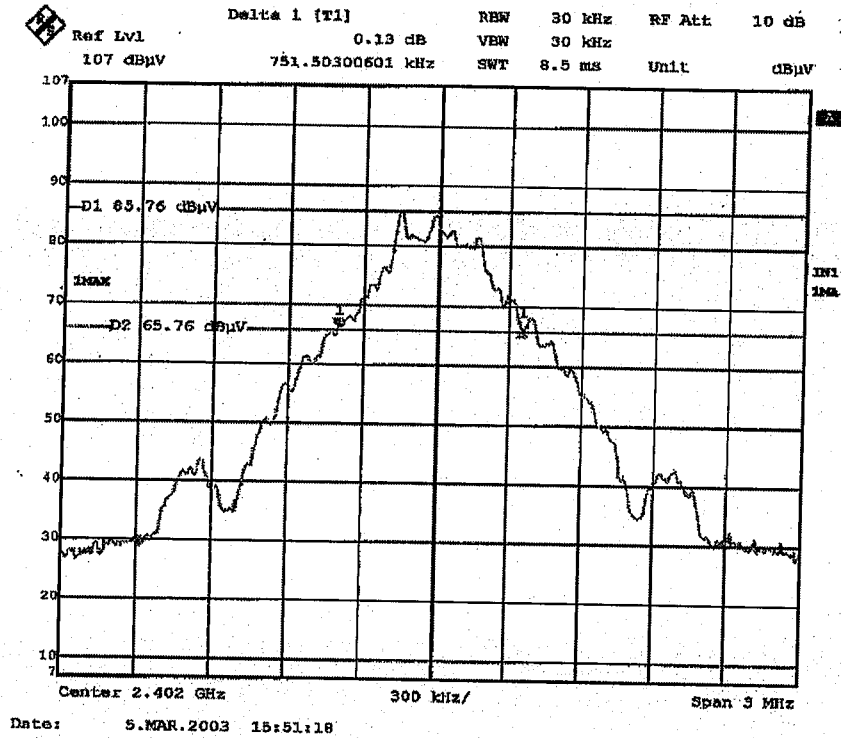

Hiroka Uneyama

PK DETECT(S/A: span 3MHz, RBW 30kHz, VBW 30kHz, sweep time AUTO)

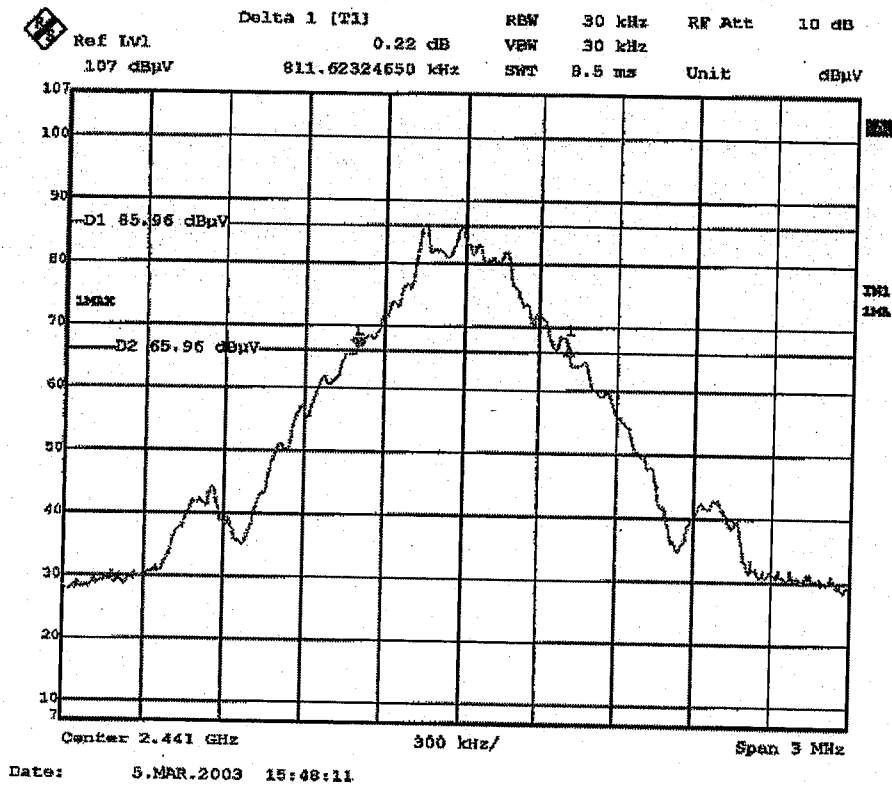
CH	FREQ	20dB Bandwidth	Limit
	[MHz]	[MHz]	[MHz]
Low	2402.0	0.751	1.0
Mid	2441.0	0.812	1.0
High	2480.0	0.745	1.0

Test Report No. : 23HE0018-HO-1
FCC ID : HYQBTA01A
IC No. : 1551A-BTA01A

20dB Bandwidth:TX(Hopping off)2402MHz

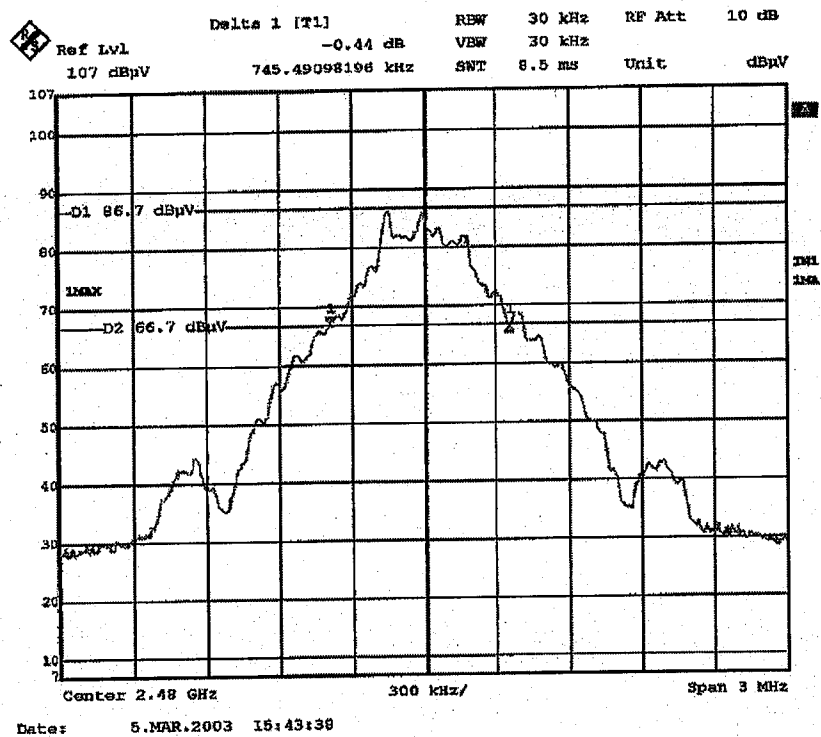


20dB Bandwidth:TX(Hopping off)2441MHz



Test Report No. :23HE0018-HO- 1
FCC ID :HYQBTA01A
IC No. :1551A-BTA01A

20dB Bandwidth:TX(Hopping off)2480MHz



DATA OF NUMBER OF HOPPING FREQUENCY

A-Pex International Co., Ltd.
EMC HEAD OFFICE DIVISION No.2 SEMI ANECHOIC CHAMBER

COMPANY : DENSO CORPORATION
EQUIPMENT : Bluetooth ASSY
MODEL : BTA-01A
S/ N : 40
FCC ID : HYQBTA01A
IC Number : 1551A-BTA01A
POWER : DC3.3V
MODE : Tx (Hopping on)

REPORT NO : 23HE0018-HO- **1**
REGULATION : Fcc Part15 Subpart C 15.247(a)(1)(iii)
TEST DISTANCE : -
DATE : 03/05/2003
TEMPERATURE : 24°C
HUMIDITY : 34%

Engineer :

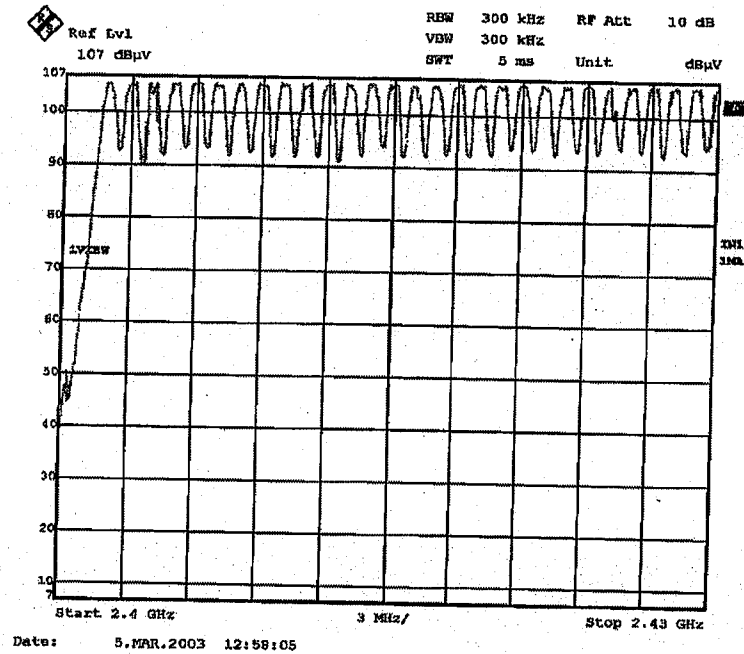

Hiroka Umeyama

PK DETECT(S/A : RBW 300kHz, VBW 300kHz, sweep time AUTO)

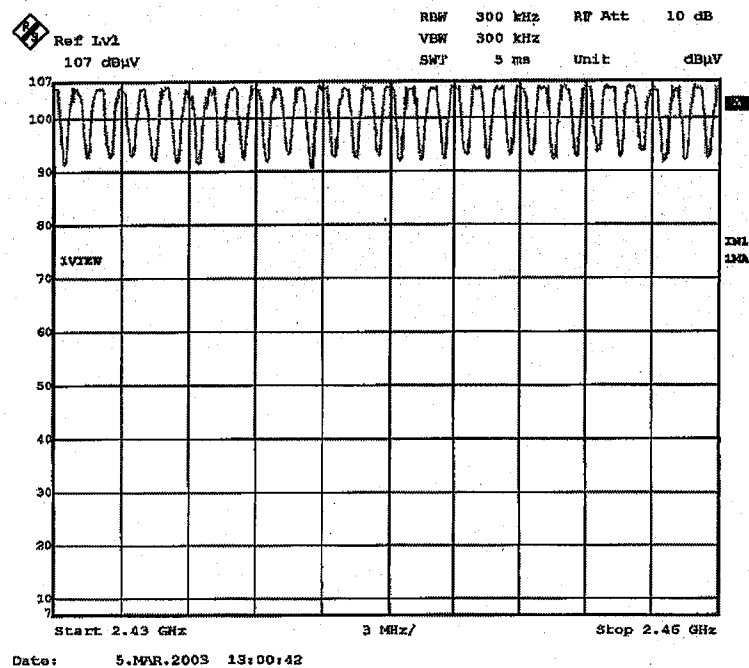
Mode	Number of channel	Limit
	[time]	[time]
Tx(Hoppng on)	79	≥ 15

Test Report No. : 23HE0018-HO-1
FCC ID : HYQBTA01A
IC No. : 1551A-BTA01A

Number of Hopping Frequency:TX(Hopping on)2400-2430MHz

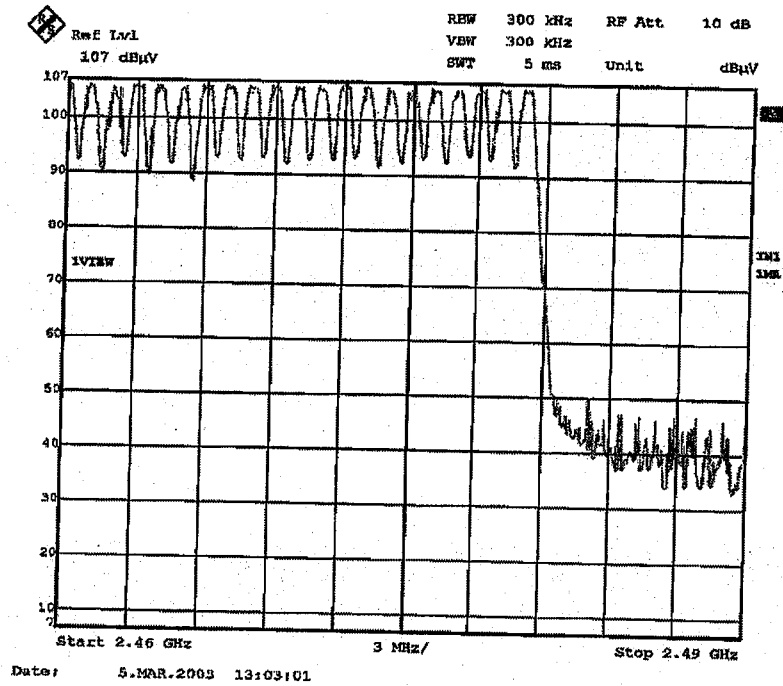


Number of Hopping Frequency:TX(Hopping on)2430-2460MHz



Test Report No. : 23HE0018-HO-1
FCC ID : HYQBTA01A
IC No. : 1551A-BTA01A

Number of Hopping Frequency: TX(Hopping on)2460-2490MHz



DATA OF DWELL TIME

A-Pex International Co., Ltd.

EMC HEAD OFFICE DIVISION No.2 SEMI ANECHOIC CHAMBER

COMPANY : DENSO CORPORATION
EQUIPMENT : Bluetooth ASSY
MODEL : BTA-01A
S/ N : 40
FCC ID : HYQBTA01A
IC Number : 1551A-BTA01A
POWER : DC3.3V
MODE : Tx (Hopping off)

REPORT NO : 23HE0018-HO- **1**
REGULATION : Fcc Part15 Subpart C 15.247(a)(1)(iii)
TEST DISTANCE : -
DATE : 03/05/2003
TEMPERATURE : 24°C
HUMIDITY : 34%

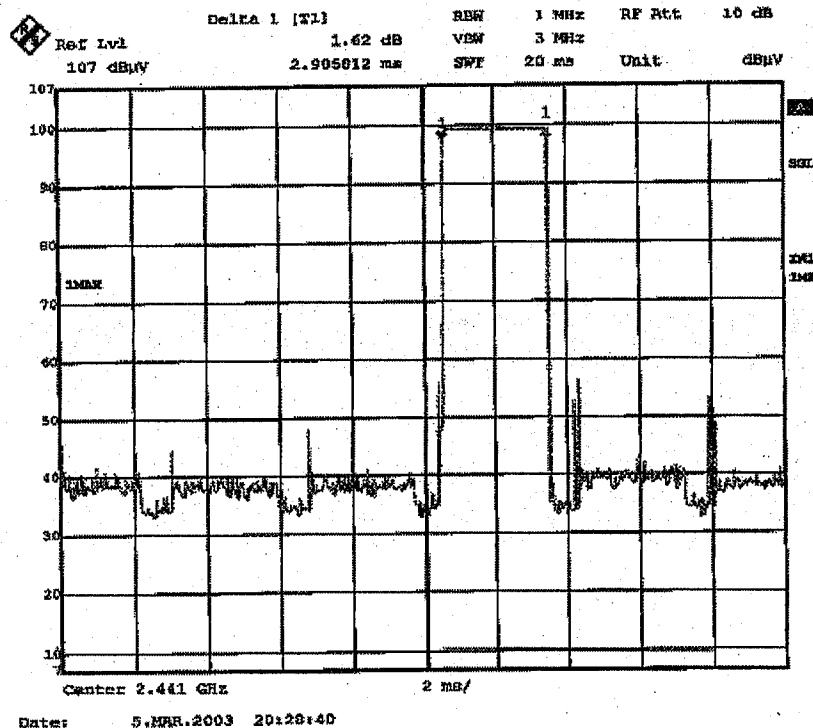
Engineer : 
Hiroka Uneyama

PK DETECT(S/A :span ZERO, RBW 1MHz,VBW 3MHz, sweep time 20ms)

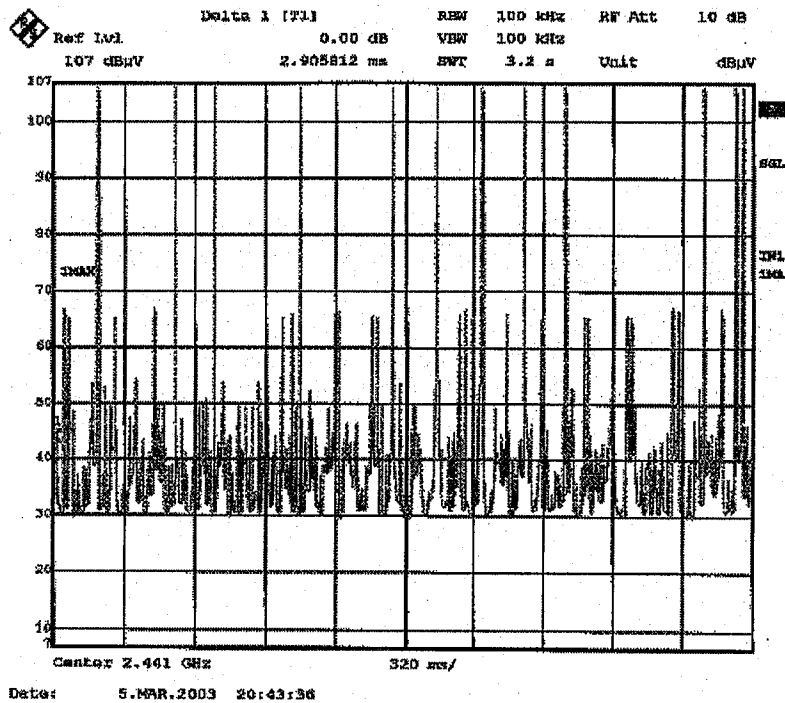
Mode	Number of transmission in a 31.6(79 Hopping x 0.4) second period	Length of transmission time [msec]	Result [msec]	Limit [msec]
DH5	116 times	2.906	337	400

Test Report No. : 23HE0018-HO-1
 FCC ID : HYQBTA01A
 IC No. : 1551A-BTA01A

Dwell time:TX(Hopping on)DH5(1)

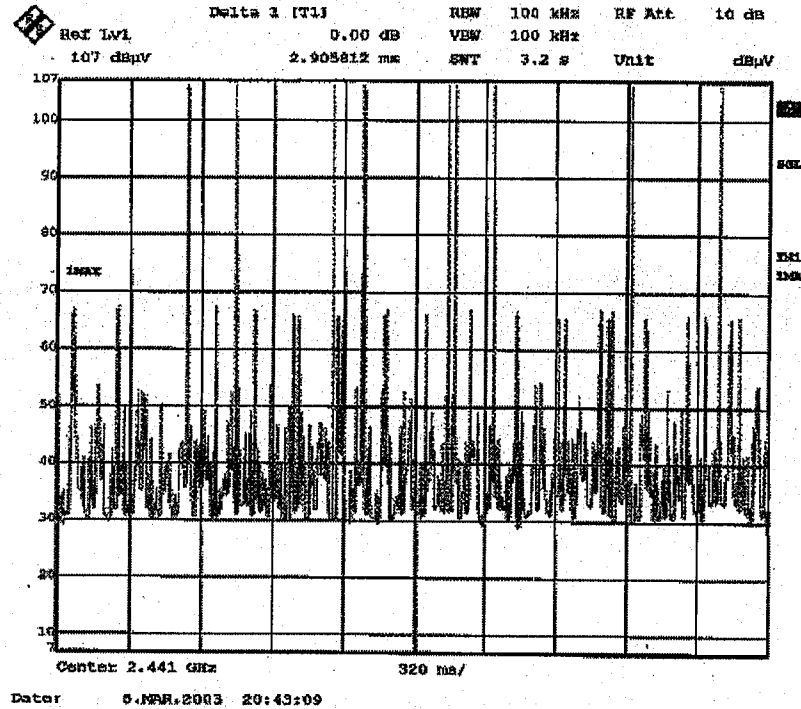


Dwell time:TX(Hopping on)DH5(2)

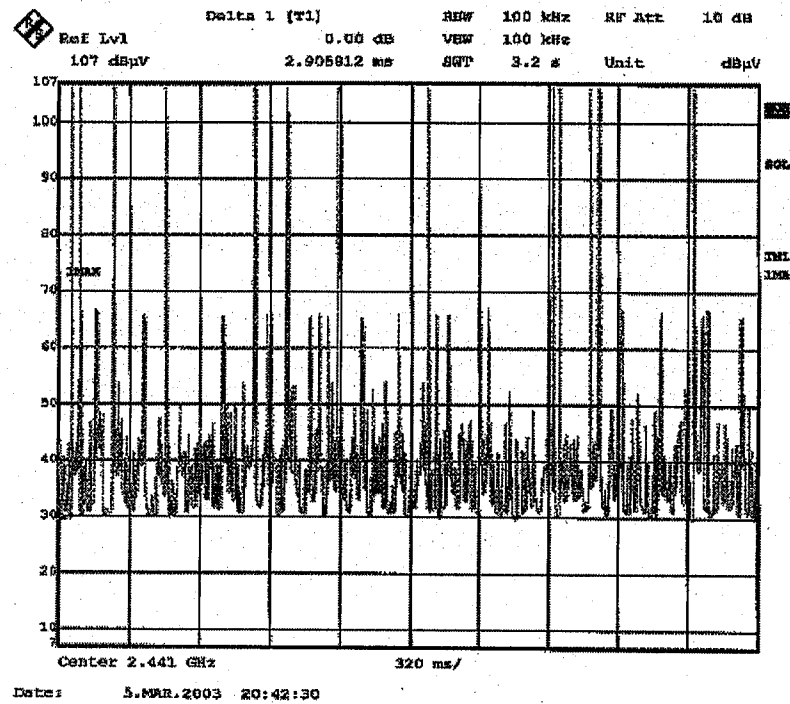


Test Report No. : 23HE0018-HO-1
FCC ID : HYQBTA01A
IC No. : 1551A-BTA01A

Dwell time:TX(Hopping on)DH5(3)

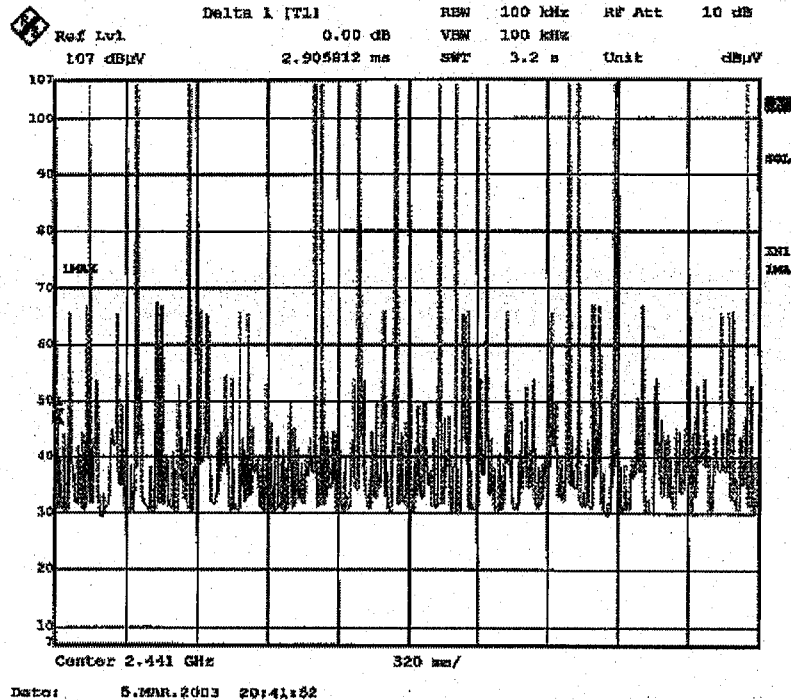


Dwell time:TX(Hopping on)DH5(4)

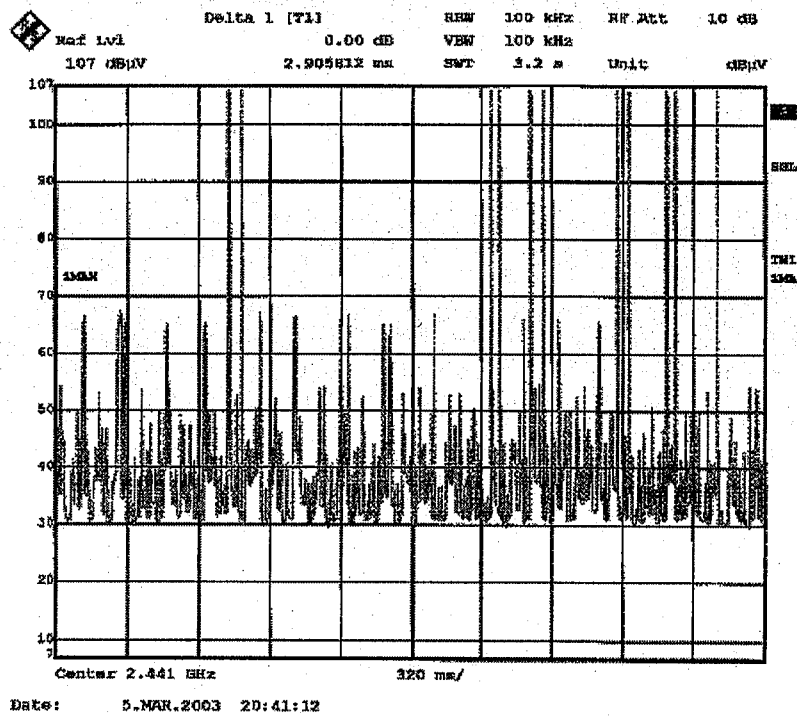


Test Report No. : 23HE0018-HO- 1
FCC ID : HYQBTA01A
IC No. : 1551A-BTA01A

Dwell time:TX(Hopping on)DH5(5)

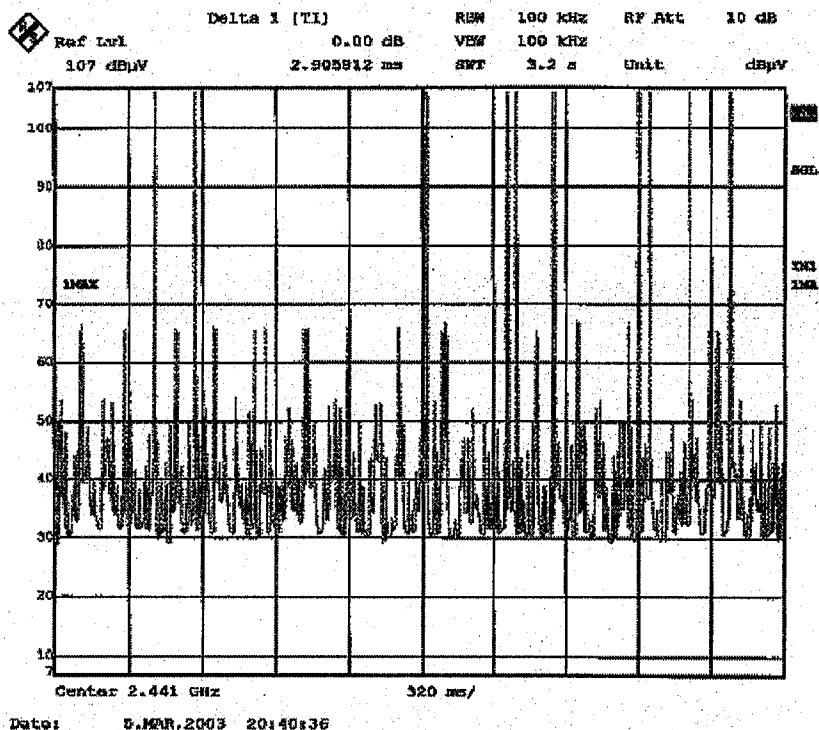


Dwell time:TX(Hopping on)DH5(6)

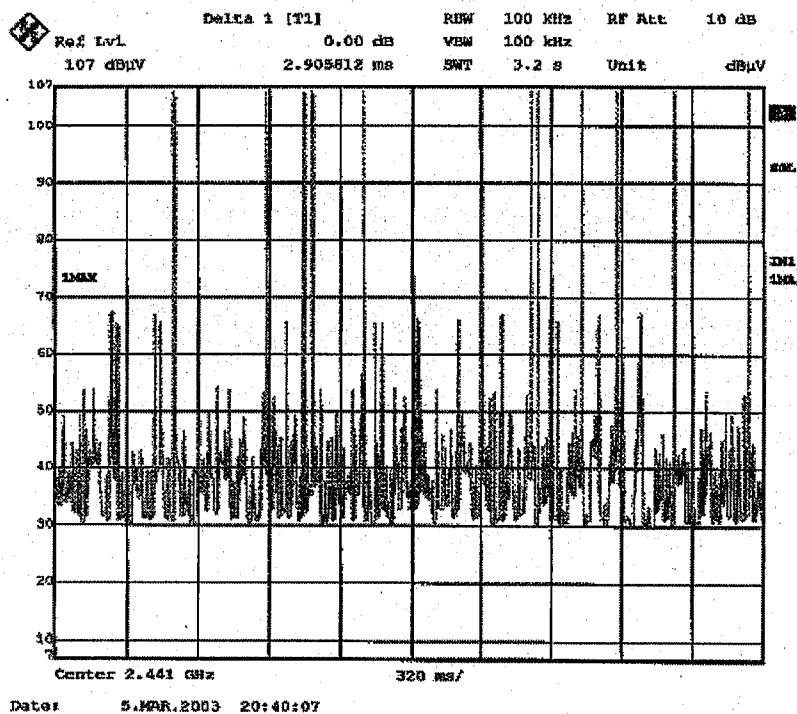


Test Report No. : 23HE0018-HO-1
 FCC ID : HYQBTA01A
 IC No. : 1551A-BTA01A

Dwell time:TX(Hopping on)DH5(7)

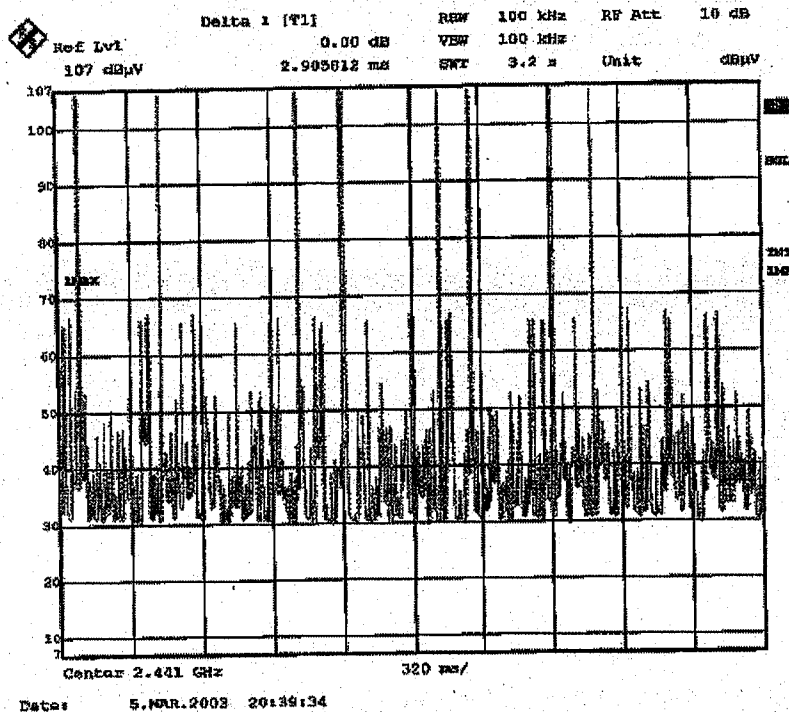


Dwell time:TX(Hopping on)DH5(8)

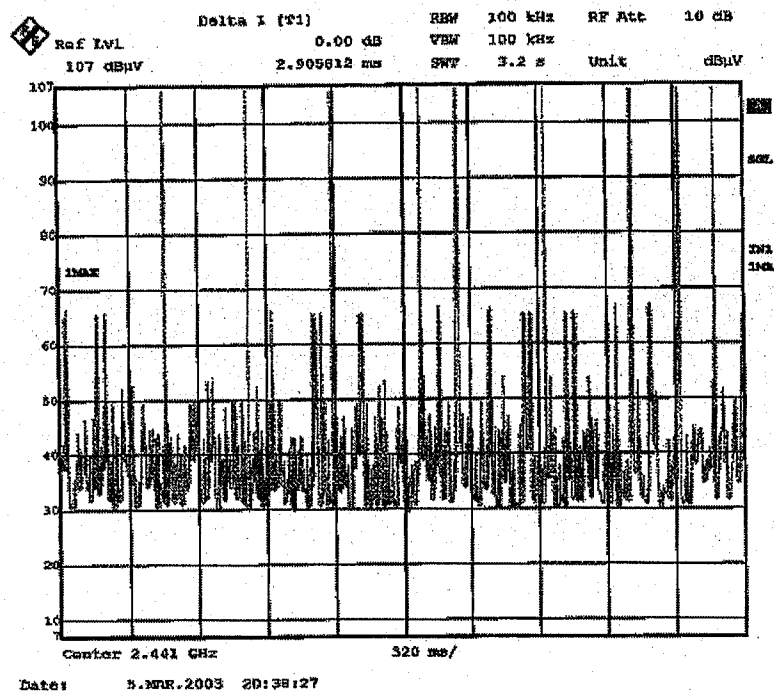


Test Report No. : 23HE0018-HO-1
FCC ID : HYQBTA01A
IC No. : 1551A-BTA01A

Dwell time:TX(Hopping on)DH5(9)

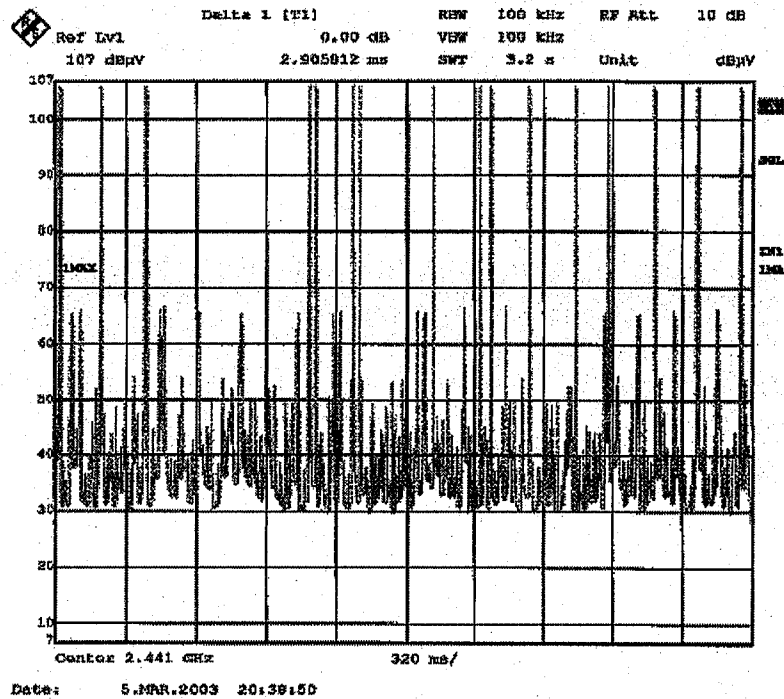


Dwell time:TX(Hopping on)DH5(10)



Test Report No. : 23HE0018-HO- 1
FCC ID : HYQBTA01A
IC No. : 1551A-BTA01A

Dwell time:TX(Hopping on)DH5(11)

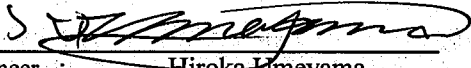


DATA OF PEAK OUTPUT POWER(CONDUCTED)

A-Pex International Co., Ltd.

EMC HEAD OFFICE DIVISION No.2 SEMI ANECHOIC CHAMBER

COMPANY	: DENSO CORPORATION	REPORT NO	: 23HE0018-HO- 1
EQUIPMENT	: Bluetooth ASSY	REGULATION	: Fcc Part15 Subpart C 15.247(b)(1)
MODEL	: BTA-01A	TEST DISTANCE	: -
S/ N	: 40	DATE	: 03/05/2003
FCC ID	: HYQBTA01A	TEMPERATURE	: 24°C
IC Number	: 1551A-BTA01A	HUMIDITY	: 34%
POWER	: DC3.3V		
MODE	: Tx (Hopping off)		

Engineer :  Hiroka Umeyama

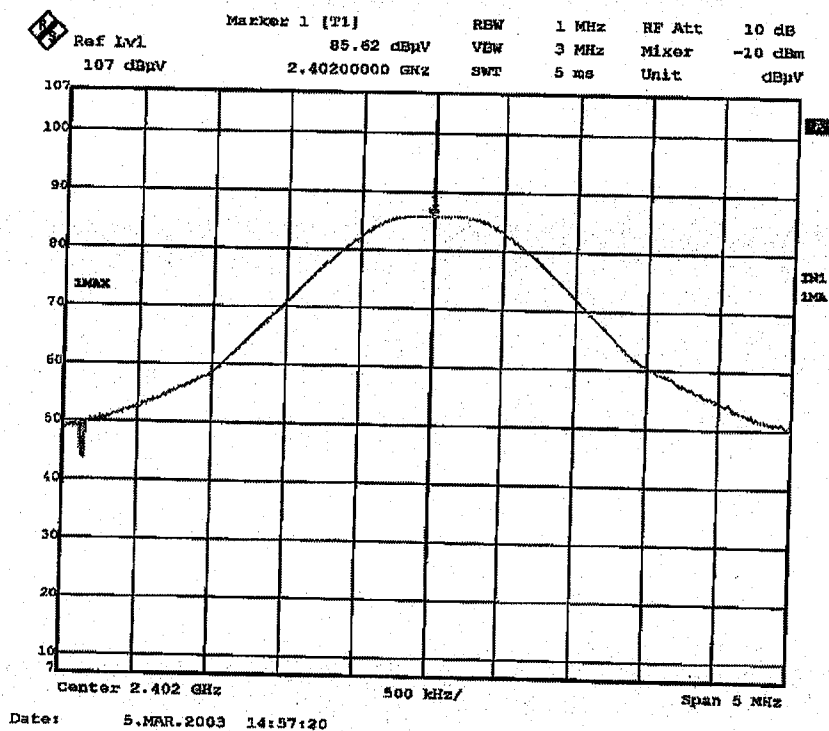
CH	FREQ [MHz]	T/R Reading [dBuV]	Cable Loss [dB]	Result [dBuV]	Result [dBm]	Limit (1W) [dBm]
Low	2402.0	86.0	19.6	105.6	-1.40	30.0
Mid	2441.0	86.5	19.6	106.1	-0.90	30.0
High	2480.0	86.6	19.6	106.2	-0.80	30.0

Sample Calculation :

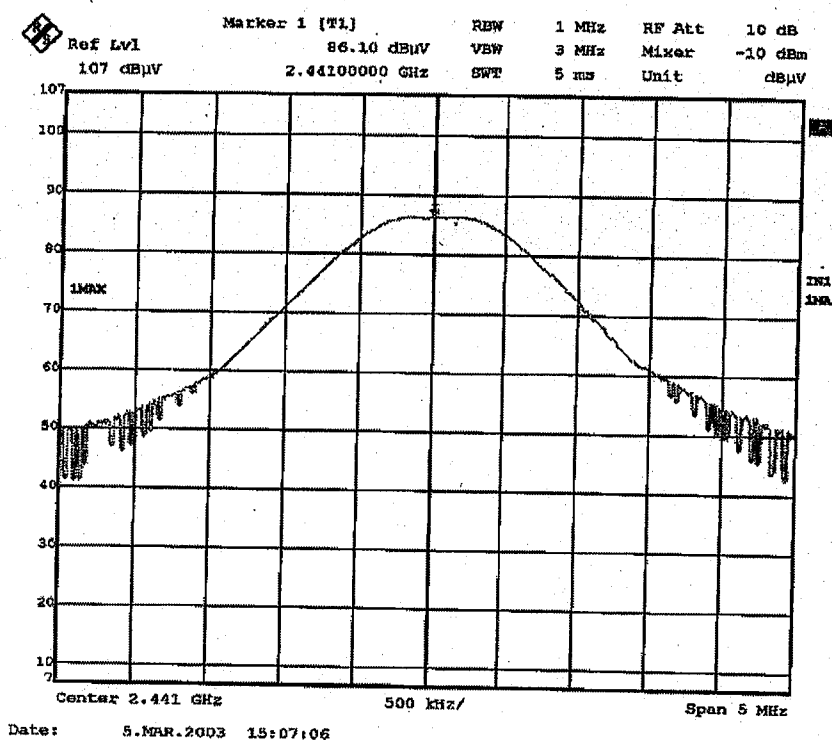
Result = T/R Reading + Cable Loss(include attenuator)

Test Report No. : 23HE0018-HO- 1
 FCC ID : HYQBTA01A
 IC No. : 1551A-BTA01A

Peak Output Power(Conducted):Tx(2402MHz)

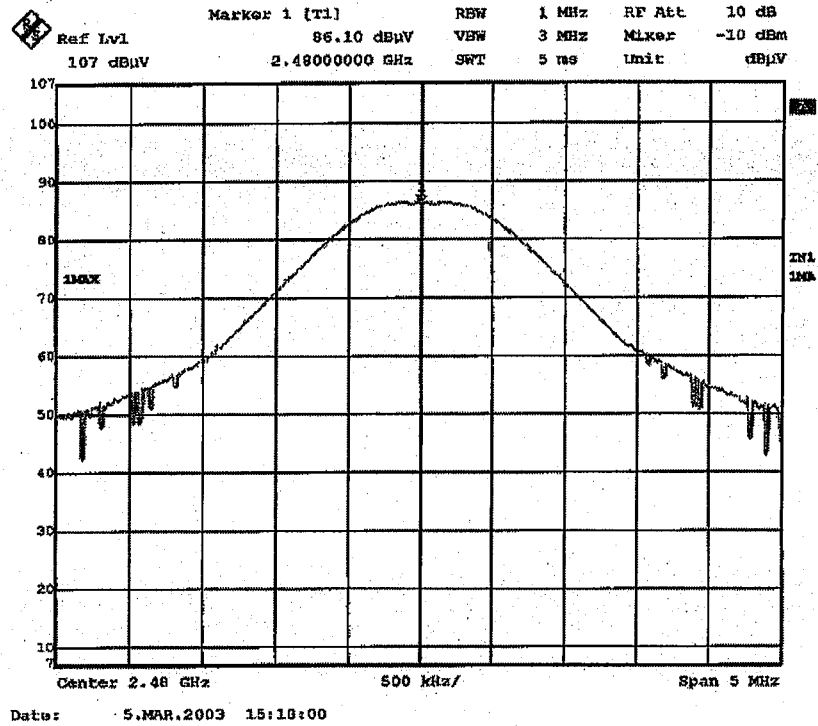


Peak Output Power(Conducted):Tx(2441MHz)



Test Report No. : 23HE0018-HO-1
FCC ID : HYQBTA01A
IC No. : 1551A-BTA01A

Peak Output Power(Conducted):Tx(2480MHz)



DATA OF BAND EDGE COMPLIANCE

A-Pex International Co., Ltd.

EMC HEAD OFFICE DIVISION No.2 SEMI ANECHOIC CHAMBER

COMPANY : DENSO CORPORATION

EQUIPMEN : Bluetooth ASSY

MODEL : BTA-01A

S/ N : 40

FCC ID : HYQBTA01A

IC Number : 1551A-BTA01A

POWER : DC3.3V

MODE : TX(Hopping on)

TX(Hopping off 2402/2480MHz)

REPORT NO : 23HE0018-HO- **1**

REGULATION : Fcc Part15 Subpart C 15.247(c)

TEST DISTANCE : -

DATE : 03/05/2003

TEMPERATURE : 24°C

HUMIDITY : 34%


 Engineer : Hiroka Umeyama

PK DETECT(S/A :Span 30MHz, RBW 300kHz/1MHz, VBW 300kHz, sweep time AUTO)

[Hopping on] Conducted

Frequency [MHz]	Reading [dBuV]	Cable Loss [dB]	E [dBuV]	P [nW]	Difference of level [dB]	Field Strength [dBuV/m]	Limit
2390.0	45.1	0.1	45.2	0.66	-	34.4	<74[dBuV/m]
2399.8	57.0	0.1	57.1	-	48.6*	-	>20[dB]
2483.7	50.3	0.1	50.4	2.19	-	39.6	<74[dBuV/m]

* Reference : Reading (105.6[dBuV]) + Cable Loss (0.1[dB]) = E (105.7[dBuV]) at 2402MHz.

[Hopping off Tx (2402/2480MHz)] Conducted

Frequency [MHz]	Reading [dBuV]	Cable Loss [dB]	E [dBuV]	P [nW]	Difference of level [dB]	Field Strength [dBuV/m]	Limit
2389.6	48.0	0.1	48.1	1.29	-	37.3	<74[dBuV/m]
2400.0	62.0	0.1	62.1	-	43.6*	-	>20[dB]
2483.6	56.8	0.1	56.9	9.77	-	46.1	<74[dBuV/m]

* Reference : Reading (105.6[dBuV]) + Cable Loss (0.1[dB]) = E (105.7[dBuV]) at 2402MHz.

Sample Calculation:

Field Strength = $(\sqrt{30 \cdot P \cdot 10^{-9} \cdot G}) / d$

E : Reading + Cable Loss

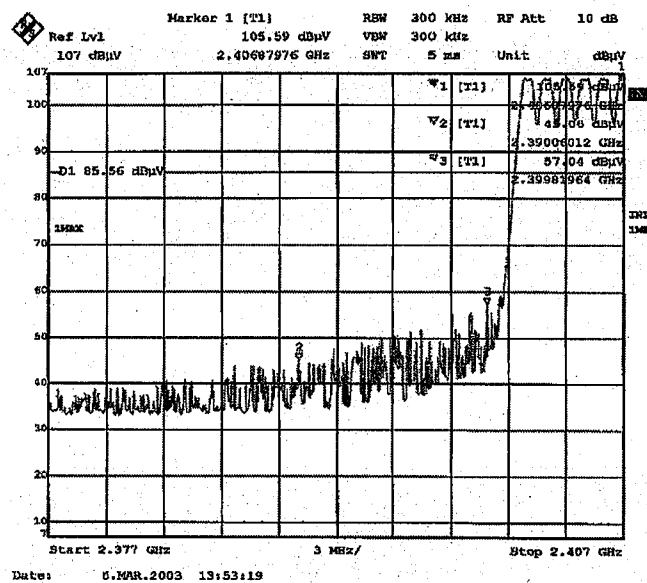
P : Converted to nW

d : Test distance(3.0m)

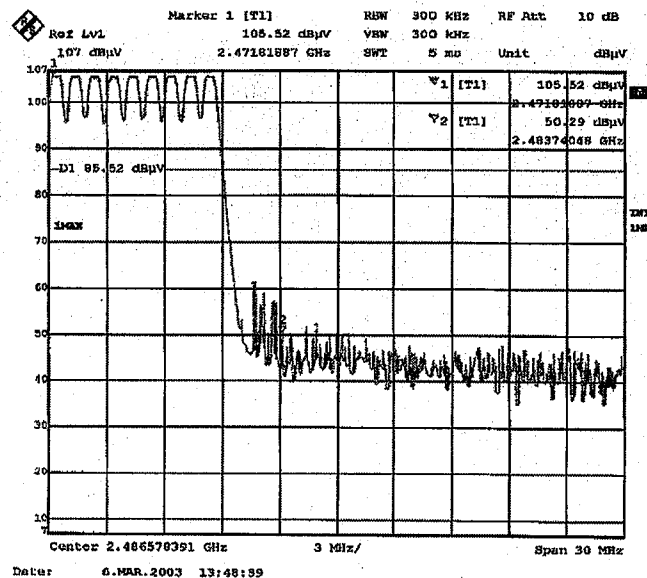
G : Numeric Antenna Gain 1.26

Test Report No. : 23HE0018-HO- 1
 FCC ID : HYQBTA01A
 IC No. : 1551A-BTA01A

Band Edge:TX(Hopping on)2402MHz

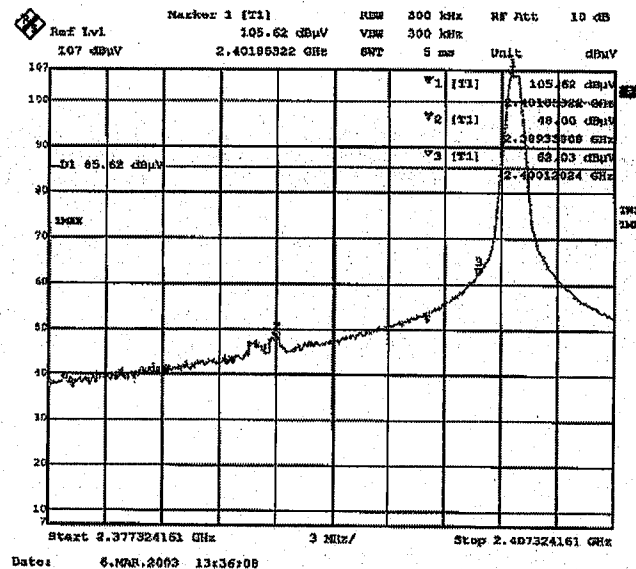


Band Edge:TX(Hopping on)2480MHz

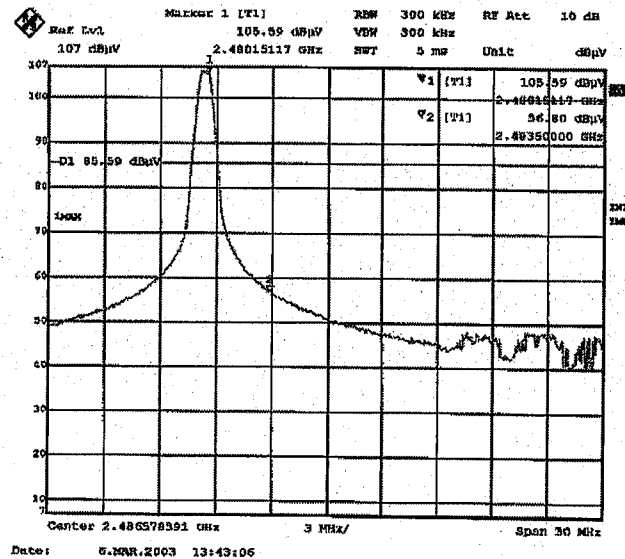


Test Report No. : 23HE0018-HO-1
FCC ID : HYQBTA01A
IC No. : 1551A-BTA01A

Band Edge:TX(Hopping off)2402MHz



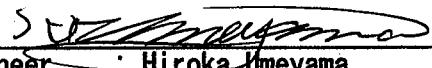
Band Edge:TX(Hopping off)2480MHz



DATA OF RADIATION TEST

A-Pex International Co., Ltd.
No.2 SEMI ANECHOIC CHAMBER
Report No. : 23HE0018-H0- 1

Applicant : Denso Corporation
Kind of Equipment : Bluetooth ASSY
Model No. : BTA-01A
Serial No. : 23
Power : DC 3.3V
Mode : TX (2402MHz)
Remarks : DETECTOR:QP FCC ID:HYQBTA01A IC NUMBER:1551A-BTA01A
Date : 3/8/2003
Test Distance : 3 m
Temperature : 24 °C
Humidity : 34 %
Regulation : FCC § 15.247(C)

Engineer :  Hiroka Umeyama

No.	FREQ. [MHz]	ANT TYPE	READING		ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS [dB μV/m]	MARGIN	
			HOR [dB μV]	VER [dB μV]					HOR [dB μV/m]	VER [dB μV/m]		HOR [dB]	VER [dB]
1.	90.00	BB	31.0	33.1	8.3	27.0	1.1	6.1	19.5	21.6	43.5	24.0	21.9
2.	126.04	BB	18.4	22.9	13.4	26.7	1.2	6.0	12.3	16.8	43.5	31.2	26.7
3.	500.37	BB	24.9	35.3	18.5	27.6	2.6	6.2	24.6	35.0	46.0	21.4	11.0
4.	600.50	BB	25.6	31.7	19.1	27.7	3.1	6.1	26.2	32.3	46.0	19.8	13.7
5.	630.46	BB	29.7	35.8	19.1	27.7	3.4	6.1	30.6	36.7	46.0	15.4	9.3
6.	800.58	BB	29.7	26.8	22.0	27.1	3.5	6.1	34.2	31.3	46.0	11.8	14.7

CALCULATION: $\text{READING}[\text{dB } \mu\text{V}] + \text{ANT. FACTOR}[\text{dB/m}] + \text{CABLE LOSS}[\text{dB}] - \text{AMP. GAIN}[\text{dB}] + \text{ATTEN}[\text{dB}]$.

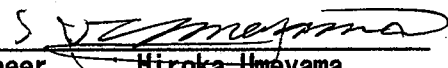
All other spurious emissions were less than 20dB for the limit.

ANT. TYPE : 30-300MHz Biconical, 300-1000MHz Logperiodic, 1000MHz- Horn

DATA OF RADIATION TEST

A-Pex International Co., Ltd.
No.2 SEMI ANECHOIC CHAMBER
Report No. : 23HE0018-H0- 1

Applicant : Denso Corporation
Kind of Equipment : Bluetooth ASSY
Model No. : BTA-01A
Serial No. : 23
Power : DC 3.3V
Mode : TX (2441MHz)
Remarks : DETECTOR:QP FCC ID:HYQBTA01A IC NUMBER:1551A-BTA01A
Date : 3/8/2003
Test Distance : 3 m
Temperature : 24 °C
Humidity : 34 %
Regulation : FCC § 15.247(C)

Engineer :  Hiroka Umeyama

No.	FREQ. [MHz]	ANT TYPE	READING		ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS [dB μ V/m]	MARGIN	
			HOR [dB μ V]	VER [dB μ V]					HOR [dB μ V/m]	VER [dB μ V/m]		HOR [dB]	VER [dB]
1.	90.00	BB	29.7	35.6	8.3	27.0	1.1	6.1	18.2	24.1	43.5	25.3	19.4
2.	126.04	BB	25.5	24.2	13.4	26.7	1.2	6.0	19.4	18.1	43.5	24.1	25.4
3.	500.37	BB	26.6	34.9	18.5	27.6	2.6	6.2	26.3	34.6	46.0	19.7	11.4
4.	600.50	BB	23.4	31.7	19.1	27.7	3.1	6.1	24.0	32.3	46.0	22.0	13.7
5.	630.46	BB	30.4	36.3	19.1	27.7	3.4	6.1	31.3	37.2	46.0	14.7	8.8
6.	800.58	BB	26.4	26.4	22.0	27.1	3.5	6.1	30.9	30.9	46.0	15.1	15.1

CALCULATION: READING[dB μ V] + ANT. FACTOR[dB/m] + CABLE LOSS[dB] - AMP. GAIN[dB] + ATTEN[dB].

All other spurious emissions were less than 20dB for the limit.

ANT. TYPE : 30-300MHz Biconical, 300-1000MHz Logperiodic, 1000MHz- Horn

DATA OF RADIATION TEST

A-Pex International Co., Ltd.
No.2 SEMI ANECHOIC CHAMBER
Report No. : 23HE0018-H0- 1

Applicant : Denso Corporation
Kind of Equipment : Bluetooth ASSY
Model No. : BTA-01A
Serial No. : 23
Power : DC 3.3V
Mode : TX (2480MHz)
Remarks : DETECTOR:QP FCC ID:HYQBT01A IC NUMBER:1551A-BTA01A
Date : 3/8/2003
Test Distance : 3 m
Temperature : 24 °C
Humidity : 34 %
Regulation : FCC § 15.247(C)

Engineer : Hiroka Umeyama

No.	FREQ. [MHz]	ANT TYPE	READING		ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS [dB μV/m]	MARGIN	
			HOR [dB μV]	VER [dB μV]					HOR [dB μV/m]	VER [dB μV/m]		HOR [dB]	VER [dB]
1.	90.00	BB	27.2	35.5	8.3	27.0	1.1	6.1	15.7	24.0	43.5	27.8	19.5
2.	126.04	BB	22.1	36.4	13.4	26.7	1.2	6.0	16.0	30.3	43.5	27.5	13.2
3.	500.37	BB	22.6	35.7	18.5	27.6	2.6	6.2	22.3	35.4	46.0	23.7	10.6
4.	600.50	BB	26.5	35.2	19.1	27.7	3.1	6.1	27.1	35.8	46.0	18.9	10.2
5.	630.46	BB	31.2	28.3	19.1	27.7	3.4	6.1	32.1	29.2	46.0	13.9	16.8
6.	800.58	BB	23.6	22.3	22.0	27.1	3.5	6.1	28.1	26.8	46.0	17.9	19.2

CALCULATION: READING[dB μV] + ANT.FACTOR[dB/m] + CABLE LOSS[dB] - AMP.GAIN[dB] + ATTEN[dB].

All other spurious emissions were less than 20dB for the limit.

ANT.TYPE : 30-300MHz Biconical, 300-1000MHz Logperiodic, 1000MHz- Horn

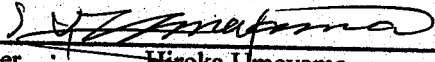
DATA OF SPURIOUS EMISSIONS(1GHz to 25GHz)

A-Pex International Co., Ltd.

EMC HEAD OFFICE DIVISION No.2 SEMI ANECHOIC CHAMBER

COMPANY : DENSO CORPORATION
EQUIPMENT : Bluetooth ASSY
MODEL : BTA-01A
S/N : 23
FCC ID : HYQBTA01A
IC Number : 1551A-BTA01A
POWER : DC3.3V
MODE : Tx 2402MHz (Hopping off)

REPORT NO : 23HE0018-HO- 1
REGULATION : Fcc Part15 Subpart C 15.247(c)
TEST DISTANCE : 3 and 1 m
DATE : 03/06/2003
TEMPERATURE : 22°C
HUMIDITY : 49%

Engineer : 
Hiroka Umeyama

PK DETECT

No.	FREQ [MHz]	T/R READING		ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	Band-Pass Filter [dB]	RESULT		Limit PK [dBuV/m]	MARGIN	
		HOR	VER					HOR	VER		HOR	VER
		[dBuV/m]	[dBuV/m]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]
Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + CABLE LOSS + Band Pass.												
0	1200.0	49.6	47.8	23.3	37.6	4.7	0.0	40.0	38.2	74.0	34.0	35.8
1	2390.0	43.1	43.0	30.7	36.9	6.3	0.0	43.2	43.1	74.0	30.8	30.9
2	4803.7	49.2	50.6	35.1	36.8	11.6	0.3	59.4	60.8	74.0	14.6	13.2
3	7206.0	43.0	43.0	37.5	36.5	10.7	0.0	54.7	54.7	74.0	19.3	19.3
4	9608.0	43.0	43.0	37.4	37.2	12.7	0.0	55.9	55.9	74.0	18.1	18.1
Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + CABLE LOSS + Band Pass - Dfac												
5	12010.0	44.0	44.0	40.5	36.8	14.2	0.0	52.4	52.4	74.0	21.6	21.6
6	14412.0	43.0	43.0	42.8	35.3	15.8	0.0	56.8	56.8	74.0	17.2	17.2
7	16814.0	43.0	43.0	45.2	36.5	17.6	0.0	59.8	59.8	74.0	14.2	14.2
8	19216.0	43.0	43.0	41.0	35.8	18.9	0.0	57.6	57.6	74.0	16.4	16.4
9	21618.0	44.0	44.0	40.9	36.8	19.5	0.0	58.1	58.1	74.0	15.9	15.9
10	24020.0	44.0	44.0	40.3	36.4	20.8	0.0	59.2	59.2	74.0	14.8	14.8

AV DETECT

No.	FREQ [MHz]	T/R READING		ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	Band-Pass Filter [dB]	RESULT		Limit AV [dBuV/m]	MARGIN	
		HOR	VER					HOR	VER		HOR	VER
		[dBuV/m]	[dBuV/m]	[dB/m]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dBuV/m]	[dB]	[dB]
Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + CABLE LOSS + Band Pass.												
0	1200.0	35.9	33.5	23.3	37.6	4.7	0.0	26.3	23.9	54.0	27.7	30.1
1	2390.0	31.0	30.9	30.7	36.9	6.3	0.0	31.1	31.0	54.0	22.9	23.0
2	4803.9	32.9	33.3	35.1	36.8	11.6	0.3	43.1	43.5	54.0	10.9	10.5
3	7206.0	30.3	30.3	37.5	36.5	10.7	0.0	42.0	42.0	54.0	12.0	12.0
4	9608.0	30.7	30.7	37.4	37.2	12.7	0.0	43.6	43.6	54.0	10.4	10.4
Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + CABLE LOSS + Band Pass - Dfac												
5	12010.0	30.9	31.3	40.5	36.8	14.2	0.0	39.3	39.7	54.0	14.7	14.3
6	14412.0	30.0	30.1	42.8	35.3	15.8	0.0	43.8	43.9	54.0	10.2	10.1
7	16814.0	30.5	30.5	45.2	36.5	17.6	0.0	47.3	47.3	54.0	6.7	6.7
8	19216.0	30.5	30.5	41.0	35.8	18.9	0.0	45.1	45.1	54.0	8.9	8.9
9	21618.0	31.0	31.5	40.9	36.8	19.5	0.0	45.1	45.6	54.0	8.9	8.4
10	24020.0	31.5	31.5	40.3	36.4	20.8	0.0	46.7	46.7	54.0	7.3	7.3

Test Distance 1.0m : Distance Factor(Dfac) = $20\log(3/1.0) =$

9.5 dB

*Except for the above table : All other spurious emissions were less than 20dB for the limit.

DATA OF SPURIOUS EMISSIONS(1GHz to 25GHz)

A-Pex International Co., Ltd.

EMC HEAD OFFICE DIVISON No.2 SEMI ANECHOIC CHAMBER

COMPANY : DENSO CORPORATION
EQUIPMENT : Bluetooth ASSY
MODEL : BTA-01A
S/N : 23
FCC ID : HYQBTA01A
IC Number : 1551A-BTA01A
POWER : DC3.3V
MODE : Tx 2441MHz (Hopping off)

REPORT NO : 23HE0018-HO- 1
REGULATION : Fcc Part15 Subpart C 15.247(c)
TEST DISTANCE : 3 and 1 m
DATE : 03/06/2003
TEMPERATURE : 22°C
HUMIDITY : 49%

Engineer : Hiroka Umeyama

PK DETECT

No.	FREQ	T/R READING		ANT	AMP	CABLE	Band-Pass	RESULT		Limit	MARGIN	
	HOR	VER	Factor	GAIN	LOSS	Filter	HOR	VER	PK	HOR	VER	
	[MHz]	[dBuV/m]	[dB/m]	[dB]	[dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[dB]	
Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + CABLE LOSS + Band Pass.												
0	1220.0	49.3	47.8	23.3	37.6	4.7	0.0	39.7	38.2	74.0	34.3	35.8
1	4881.6	50.2	48.6	35.5	36.8	11.7	0.4	61.0	59.4	74.0	13.0	14.6
2	7323.0	43.0	43.0	37.8	36.6	10.8	0.0	55.0	55.0	74.0	19.0	19.0
3	9764.0	43.0	43.0	37.0	37.2	12.8	0.0	55.6	55.6	74.0	18.4	18.4
Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + CABLE LOSS + Band Pass - Dfac												
4	12205.0	43.0	43.0	41.2	36.7	14.4	0.0	52.4	52.4	74.0	21.6	21.6
5	14646.0	43.0	43.0	43.1	35.5	16.0	0.0	57.1	57.1	74.0	16.9	16.9
6	17087.0	43.2	42.0	45.5	36.2	17.8	0.0	60.8	59.6	74.0	13.2	14.4
7	19528.0	43.0	42.8	40.6	36.0	19.0	0.0	57.1	56.9	74.0	16.9	17.1
8	21969.0	45.3	45.6	40.9	36.0	19.6	0.0	60.3	60.6	74.0	13.7	13.4
9	24410.0	44.0	44.0	40.5	36.9	21.0	0.0	59.1	59.1	74.0	14.9	14.9

AV DETECT

No.	FREQ [MHz]	T/R READING		ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	Band-Pass Filter [dB]	RESULT		Limit AV [dBuV/m]	MARGIN	
		HOR	VER					HOR	VER		HOR	VER
Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + CABLE LOSS + Band Pass.												
0	1220.0	35.5	35.5	23.3	37.6	4.7	0.0	25.9	25.9	54.0	28.1	28.1
1	4881.6	33.3	32.6	35.5	36.8	11.7	0.4	44.1	43.4	54.0	9.9	10.6
2	7323.0	30.3	30.3	37.8	36.6	10.8	0.0	42.3	42.3	54.0	11.7	11.7
3	9764.0	30.7	30.7	37.0	37.2	12.8	0.0	43.3	43.3	54.0	10.7	10.7
Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + CABLE LOSS + Band Pass - Dfac												
4	12205.0	30.6	31.0	41.2	36.7	14.4	0.0	40.0	40.4	54.0	14.0	13.6
5	14646.0	30.5	30.5	43.1	35.5	16.0	0.0	44.6	44.6	54.0	9.4	9.4
6	17087.0	29.6	29.6	45.5	36.2	17.8	0.0	47.2	47.2	54.0	6.8	6.8
7	19528.0	30.3	30.2	40.6	36.0	19.0	0.0	44.4	44.3	54.0	9.6	9.7
8	21969.0	32.5	32.6	40.9	36.0	19.6	0.0	47.5	47.6	54.0	6.5	6.4
9	24410.0	31.6	31.7	40.5	36.9	21.0	0.0	46.7	46.8	54.0	7.3	7.2

Test Distance 1.0m : Distance Factor(Dfac) = $20\log(3/1.0) =$

9.5 dB

*Except for the above table : All other spurious emissions were less than 20dB for the limit.

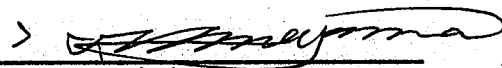
DATA OF SPURIOUS EMISSIONS(1GHz to 25GHz)

A-Pex International Co., Ltd.

EMC HEAD OFFICE DIVISON No.2 SEMI ANECHOIC CHAMBER

COMPANY : DENSO CORPORATION
EQUIPMENT : Bluetooth ASSY
MODEL : BTA-01A
S/N : 23
FCC ID : HYQBTA01A
IC Number : 1551A-BTA01A
POWER : DC3.3V
MODE : Tx 2480MHz (Hopping off)

REPORT NO : 23HE0018-HO-1
REGULATION : Fcc Part15 Subpart C 15.247(c)
TEST DISTANCE : 3 and 1 m
DATE : 03/06/2003
TEMPERATURE : 22°C
HUMIDITY : 49%

Engineer : 
Hiroka Umeyama

PK DETECT

No.	FREQ [MHz]	T/R READING		ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	Band-Pass Filter [dB]	RESULT		Limit PK [dBuV/m]	MARGIN	
		HOR	VER					HOR	VER		HOR	VER
		[dBuV/m]	[dBuV/m]					[dBuV/m]	[dBuV/m]		[dB]	[dB]
Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + CABLE LOSS + Band Pass.												
0	1240.0	48.3	46.5	23.4	37.6	4.8	0.0	38.9	37.1	74.0	35.1	36.9
1	2483.5	43.0	42.7	30.7	36.9	6.3	0.0	43.1	42.8	74.0	30.9	31.2
2	4960.0	49.6	49.5	36.0	36.8	11.8	0.5	61.1	60.5	74.0	12.9	13.5
3	7440.0	43.6	43.6	38.1	36.7	10.9	0.0	55.9	55.9	74.0	18.1	18.1
4	9920.0	43.0	43.0	36.5	37.3	13.0	0.0	55.2	55.2	74.0	18.8	18.8
Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + CABLE LOSS + Band Pass - Dfac												
5	12400.0	43.0	43.0	41.8	36.6	14.5	0.0	53.2	53.2	74.0	20.8	20.8
6	14880.0	43.0	43.0	43.3	35.7	16.1	0.0	57.2	57.2	74.0	16.8	16.8
7	17360.0	43.0	43.0	45.4	36.2	18.0	0.0	60.7	60.7	74.0	13.3	13.3
8	19840.0	43.0	43.0	41.0	36.1	19.1	0.0	57.5	57.5	74.0	16.5	16.5
9	22320.0	45.0	45.7	40.8	35.5	19.8	0.0	60.6	61.3	74.0	13.4	12.7
10	24800.0	44.0	44.0	40.6	36.7	21.1	0.0	59.5	59.5	74.0	14.5	14.5

AV DETECT

No.	FREQ [MHz]	T/R READING		ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	Band-Pass Filter [dB]	RESULT		Limit AV [dBuV/m]	MARGIN	
		HOR	VER					HOR	VER		HOR	VER
		[dBuV/m]	[dBuV/m]					[dBuV/m]	[dBuV/m]		[dB]	[dB]
Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + CABLE LOSS + Band Pass.												
0	1240.0	34.0	32.7	23.4	37.6	4.8	0.0	24.6	23.3	54.0	29.4	30.7
1	2483.5	30.8	30.8	30.7	36.9	6.3	0.0	30.9	30.9	54.0	23.1	23.1
2	4960.0	33.0	32.8	36.0	36.8	11.8	0.5	44.5	44.3	54.0	9.5	9.7
3	7440.0	30.7	30.7	38.1	36.7	10.9	0.0	43.0	43.0	54.0	11.0	11.0
4	9920.0	30.6	30.6	36.5	37.3	13.0	0.0	42.8	42.8	54.0	11.2	11.2
Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + CABLE LOSS + Band Pass - Dfac												
5	12400.0	31.1	31.1	41.8	36.6	14.5	0.0	41.3	41.3	54.0	12.7	12.7
6	14880.0	30.5	30.5	43.3	35.7	16.1	0.0	44.7	44.7	54.0	9.3	9.3
7	17360.0	29.9	29.9	45.4	36.2	18.0	0.0	47.6	47.6	54.0	6.4	6.4
8	19840.0	30.3	30.3	41.0	36.1	19.1	0.0	44.8	44.8	54.0	9.2	9.2
9	22320.0	32.6	32.6	40.8	35.5	19.8	0.0	48.2	48.2	54.0	5.8	5.8
10	24800.0	31.9	31.9	40.6	36.7	21.1	0.0	47.4	47.4	54.0	6.6	6.6

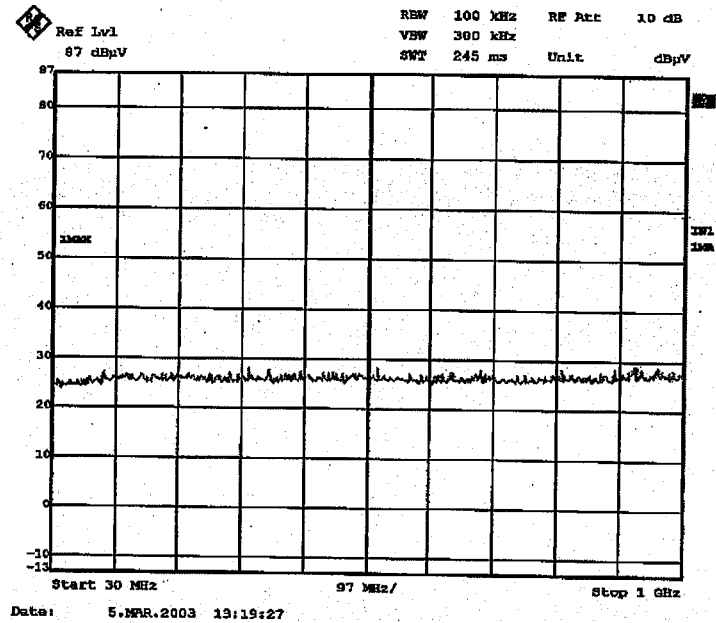
Test Distance 1.0m : Distance Factor(Dfac) = $20\log(3/1.0) =$

9.5 dB

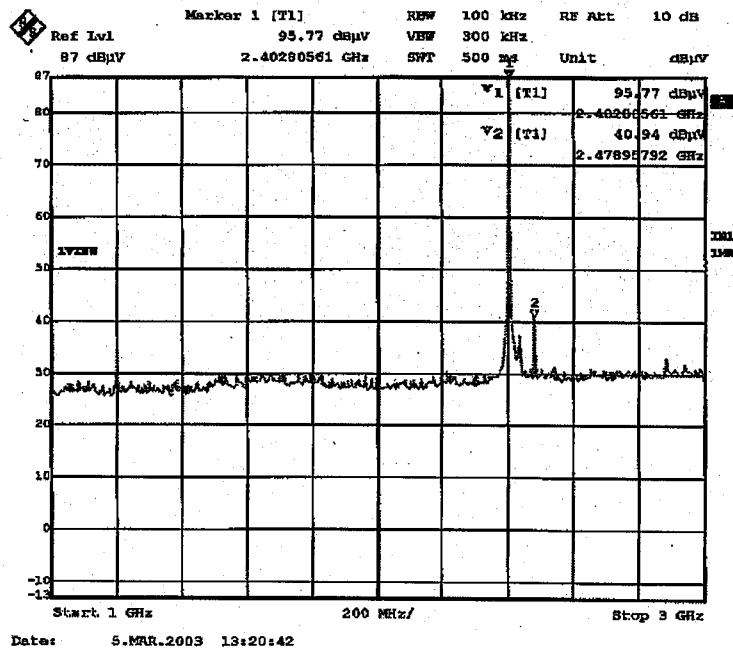
*Except for the above table : All other spurious emissions were less than 20dB for the limit.

Test Report No. : 23HE0018-HO-1
 FCC ID : HYQBTA01A
 IC No. : 1551A-BTA01A

Spurious Emission(Conducted):Tx(2402MHz)

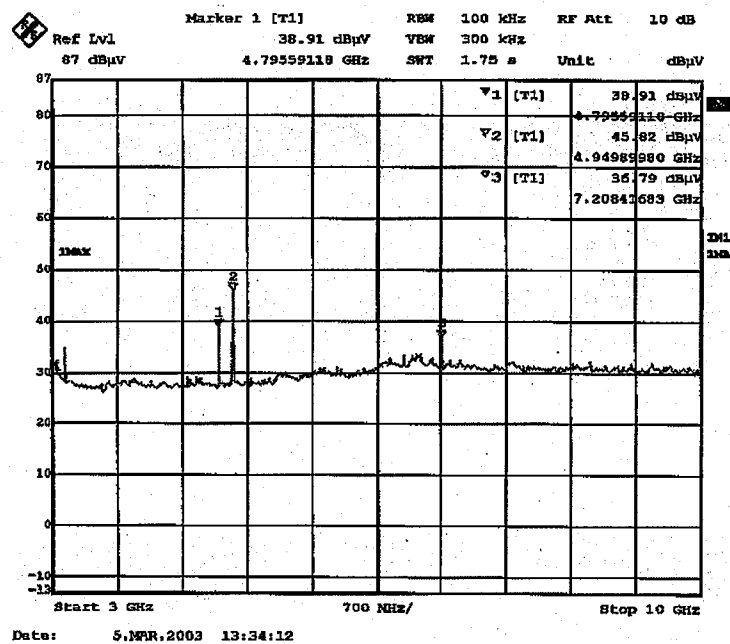


Spurious Emission(Conducted):Tx(2402MHz)

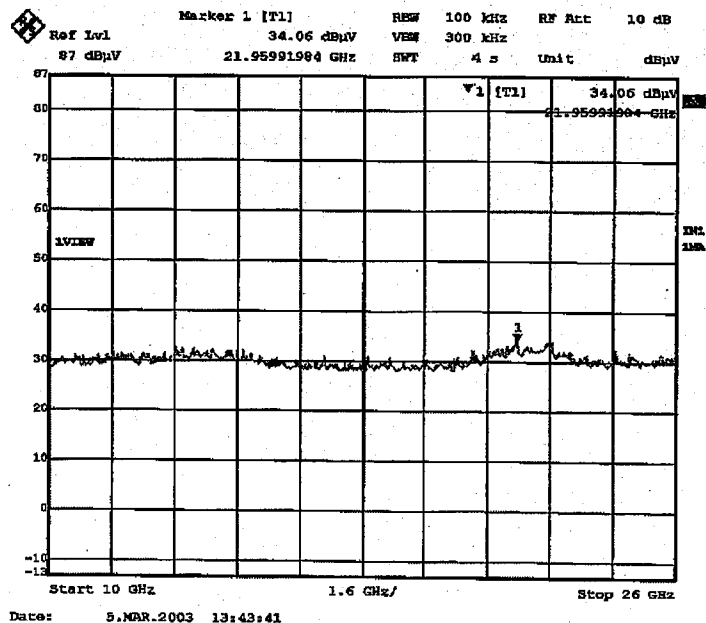


Test Report No. : 23HE0018-HO-1
 FCC ID : HYQBTA01A
 IC No. : 1551A-BTA01A

Spurious Emission(Conducted):Tx(2402MHz)

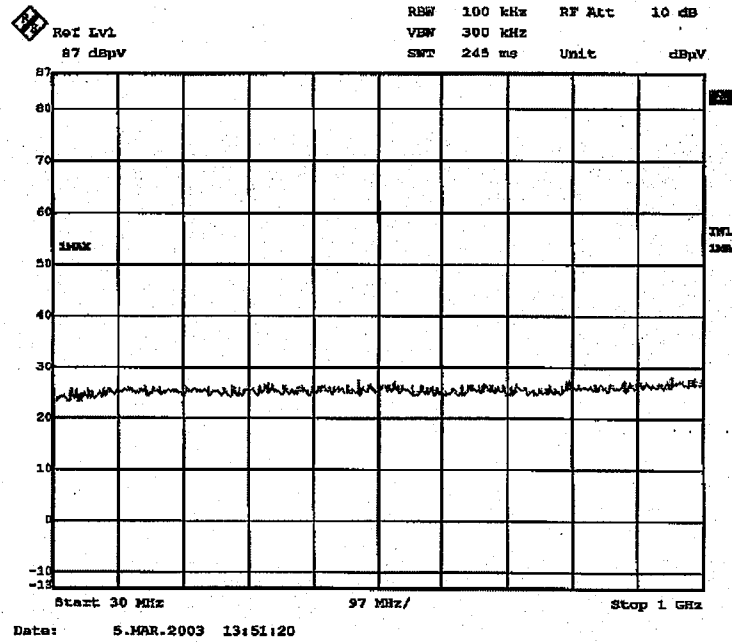


Spurious Emission(Conducted):Tx(2402MHz)

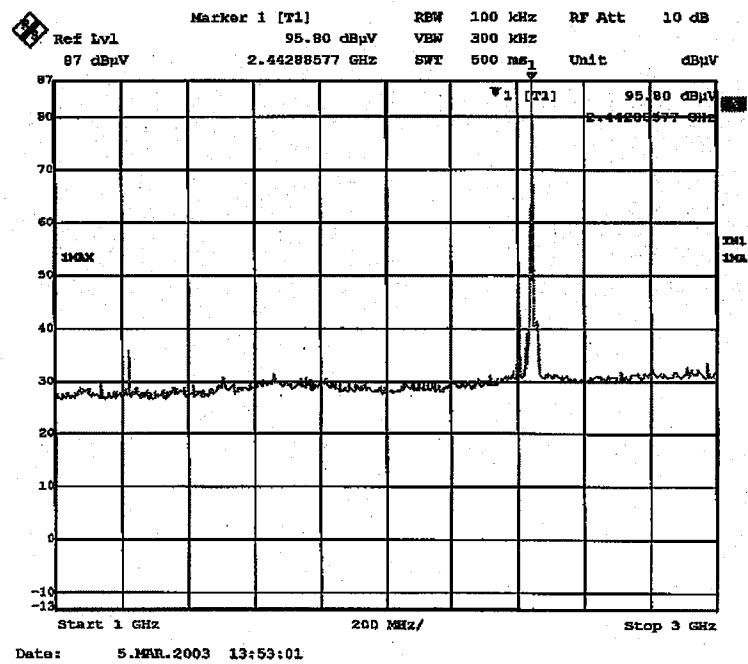


Test Report No. : 23HE0018-HO-1
 FCC ID : HYQBTA01A
 IC No. : 1551A-BTA01A

Spurious Emission(Conducted):Tx(2441MHz)

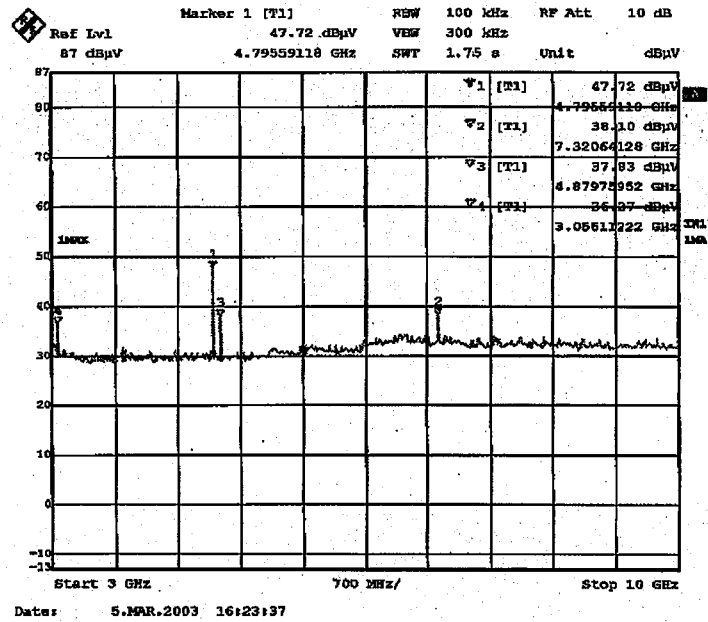


Spurious Emission(Conducted):Tx(2441MHz)

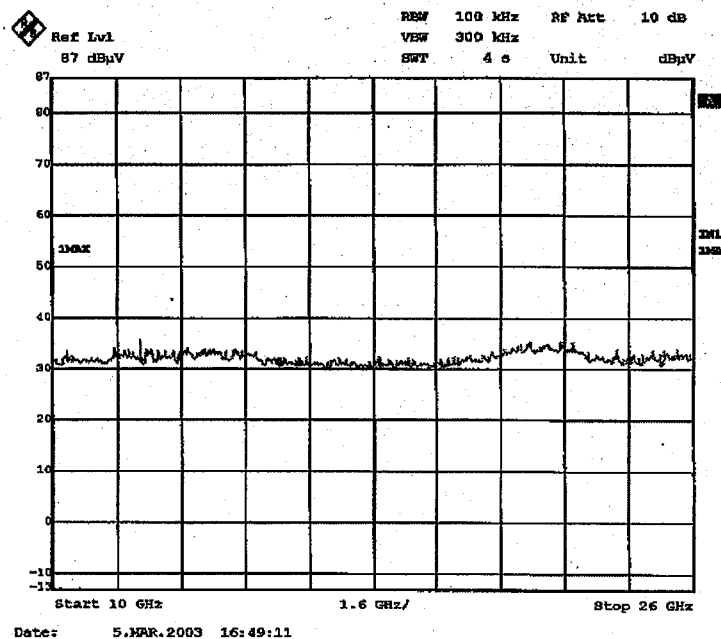


Test Report No. : 23HE0018-HO-1
 FCC ID : HYQBTA01A
 IC No. : 1551A-BTA01A

Spurious Emission(Conducted):Tx(2441MHz)

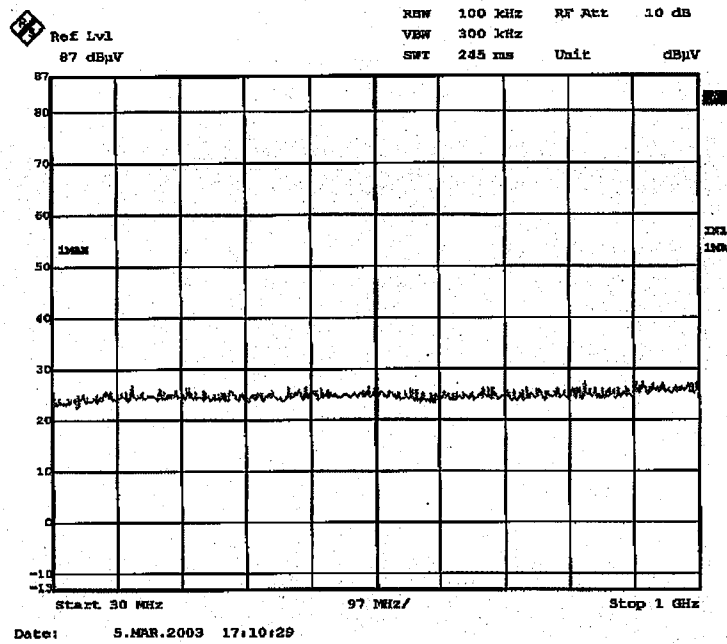


Spurious Emission(Conducted):Tx(2441MHz)

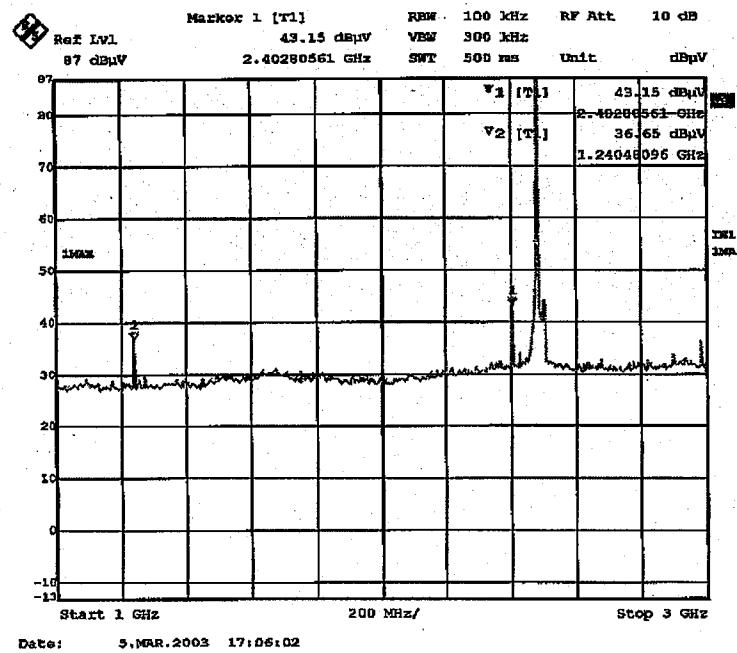


Test Report No. : 23HE0018-HO-1
 FCC ID : HYQBTA01A
 IC No. : 1551A-BTA01A

Spurious Emission(Conducted):Tx(2480MHz)

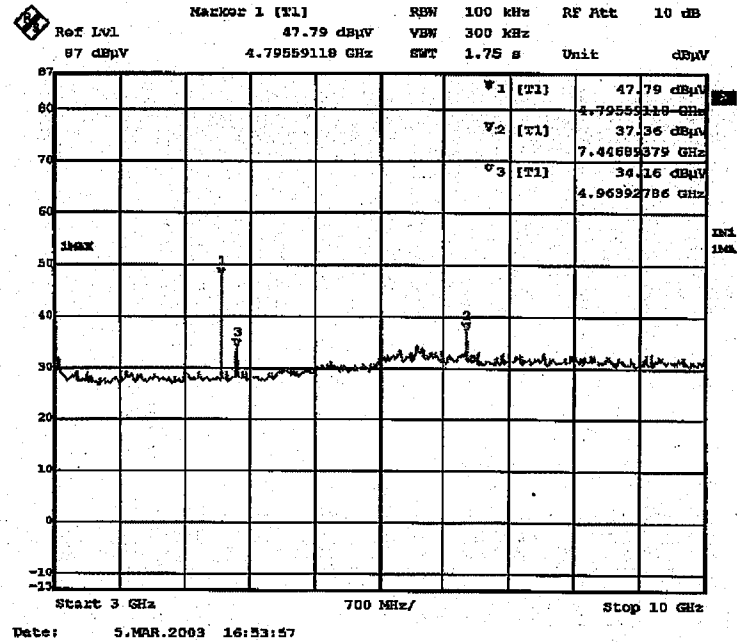


Spurious Emission(Conducted):Tx(2480MHz)



Test Report No. : 23HE0018-HO-1
FCC ID : HYQBTA01A
IC No. : 1551A-BTA01A

Spurious Emission(Conducted):Tx(2480MHz)



Spurious Emission(Conducted):Tx(2480MHz)

