

EMI TEST REPORT

Test Report No. : 22CE0007-YW-2

Applicant: SHARP CORPORATION

Type of Equipment: Bluetooth CF Card

Model No.: DC2C1BZ001

FCC ID: APYSJY0007

Test standard: FCC Part15 Subpart C, Section 15.247

Test Result: Complied

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The results in this report apply only to the sample tested.

Date of test: December 5 and 6, 2001 **Issued date:** January 18, 2002

Tested by: 

Naoki Sakamoto
Group Leader of EMC section

Approved by: 

Kazutoyo Nakanishi
Site Operation Manager of EMC section

A-pex International Co., Ltd.

YOKOWA LAB.

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1 GENERAL INFORMATION

APPLICANT : SHARP CORPORATION

ADDRESS : 22-22, Nagaike-cho, Abeno-ku, Osaka, 545-8522 Japan
TEL : 81-6-6624-3857
FAX : 81-6-6622-9289

REGULATION(S) : FCC Part15 Subpart C, Section 15.247

MODEL NUMBER : DC2C1BZ001

SERIAL NUMBER : 011203521

KIND OF EQUIPMENT : Bluetooth CF Card

TESTED DATE : December 5 and 6, 2001

RECEIPT DATE OF SAMPLE : December 5, 2001

REPORT FILE NUMBER : 22CE0007-YW-2

TEST SITE : A-PEX Yokowa No.3 Open Test Sites

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Test report
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1.1 Tested Methodology

The measurement was performed according to the procedures in ANSI C63.4(1992).

1.2 Test Facility

The open area site measurement facilities used to collect the radiated data are located at 108, Yokowa-cho, Ise-shi, Mie-ken, 516-1106 Japan.

These sites have been fully described in reports submitted to the FCC office.

No.1 and No.3 test site has filed to the FCC on September 12, 2000 as number: 90412 and is accepted by Industry Canada on May 01, 2001 as number IC2973-3.

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2 PRODUCT DESCRIPTION

SHARP CORPORATION, Model DC2C1BZ001 (referred to as the EUT in this report) is a Bluetooth CF Card.
The EUT is based on the Bluetooth SPEC. V1.1 and CF Card Rev. 1.4.

The specification is as following :

Frequency characteristics	: 2402MHz through 2480MHz
No. of channels / channel spacing	: 79 channels / 1MHz channel spacing
Modulation	: GFSK (Low power Frequency Hopping Spread Spectrum(FHSS))
Antenna type	: Integral
Antenna Gain	: -2.4dBi
Operating Voltage	: DC3.3V

***FccPart15.203 Antenna requirement**

Since the antenna of Bluetooth CF card is incorporated in a equipment and it is impossible to be modified by user, therefore this requirement is satisfied.

Also however there is a antenna connector for maintenance at external of equipment, specific connector is used as showed in attachment "A26" then it can not be used by general user.

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2.1 Test System Details

Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	Remark (FCC ID)
A	Bluetooth CF Card	DC2C1BZ001	011203521	SHARP	APYSJY007 (EUT)
B	Notebook PC	PC-PJ100S	09047864	SHARP	A00-0198JP
C	AC Adaptor	EA-J03V	LTD0015016173	SHARP	-
D*	Floppy Disk Drive	CE-FD04	-	SHARP	-
E*	Microphone	-	-	FUJITSU	-
F*	Mouse	M-UB 48	830318-0000	SHARP	DZL211137
G*	Speaker	000M3A2-0	-	-	-
H*	CRT Monitor	D5258A	TH02905902	Hewlett Packard	-
I*	Modem	C202A	010303	EPSON	BKM552C202A
J*	AC Adaptor	H00CAA	017321	EPSON	-

* Only Conducted Emission :AC Line

List of cables used

No.	Name	Length (m)	Shield	Backshell material	Remark
1	DC Power Cable	1.2	N	Polyvinyl chloride	-
2	AC Power Cable	1.8	N	Polyvinyl chloride	-
3*	Floppy Disk Drive Cable	0.3	Y	Polyvinyl chloride	-
4*	Microphone Cable	1.6	N	Polyvinyl chloride	-
5*	Mouse Cable	0.7	Y	Polyvinyl chloride	-
6*	Speaker Cable	1.6	N	Polyvinyl chloride	-
7*	RGB Cable	1.3	Y	Polyvinyl chloride	-
8*	AC Power Cable	1.8	N	Polyvinyl chloride	-
9*	RS232C Cable	1.5	Y	Polyvinyl chloride	-
10*	AC Power Cable	1.8	N	Polyvinyl chloride	-

* Only Conducted Emission :AC Line

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3 SYSTEM TEST CONFIGURATION

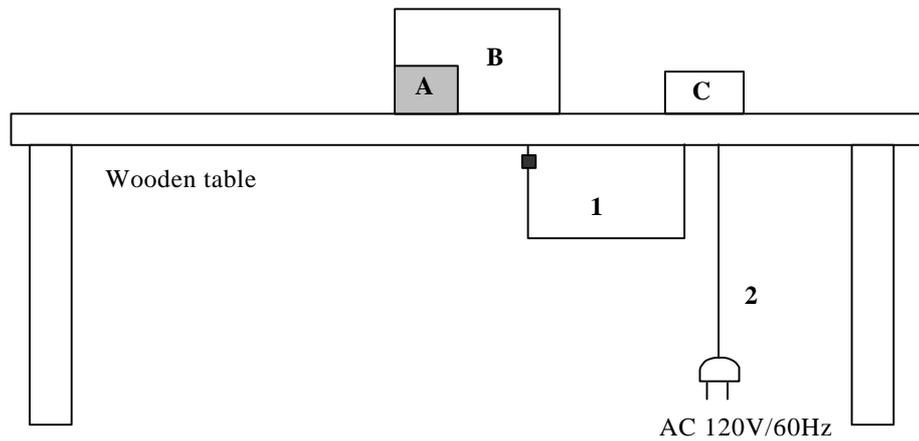
3.1 Justification

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

Test mode : Transmitting mode
 Performed the test about channels 2(low:2402MHz), 41(mid:2441MHz)
 and 80(high:2480MHz) among 79 channels of all Carrier frequencies.
 Receiving mode

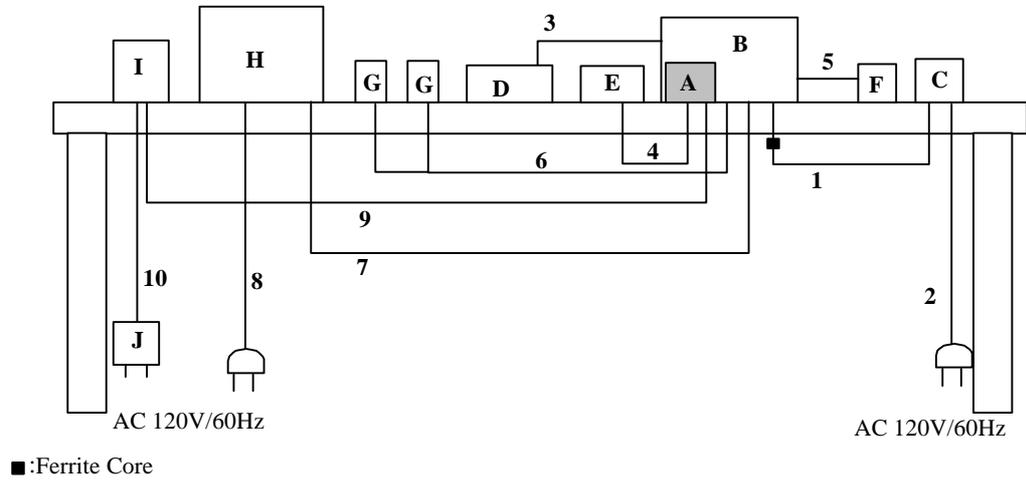
3.2 Configuration of Tested System

Figure 3.2.1 Configuration of Tested System



■ : Ferrite Core

Figure 3.2.2 Configuration of Tested System (Only Conducted emission: AC Lines)



4 Measurement Uncertainty

Conducted Emission Test

The measurement uncertainty (with a 95% confidence level) for this test was ± 2.0 dB.

The data listed in this test report has enough margin, more than 2.0dB.

Radiated Emission Test

The measurement uncertainty (with a 95% confidence level) for this test using Biconical antenna is ± 4.4 dB.

The measurement uncertainty (with a 95% confidence level) for this test using Logperiodic antenna is ± 4.8 dB.

The measurement uncertainty (with a 95% confidence level) for this test using Horn antenna is ± 5.8 dB.

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

Test report

FCC ID : APYSJY0007
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5 TEST EQUIPMENT USED

<u>Name</u>	<u>Manufacturer</u>	<u>Model</u>	<u>Control No.</u>	<u>Calibrated Until</u>
Pre Amplifier	Hewlett Packard	8447D	AF-01	March 30, 2002
Pre Amplifier	Hewlett Packard	8449B	AF-04	November 3, 2002
Biconical Antenna	Schwarzbeck	BBA9106	BA-03	April 30, 2002
Logperiodic Antenna	Schwarzbeck	UKLP9140-A	LA-06	April 30, 2002
LISN	Schwarzbeck	NSLK8127	LS-03	November 5, 2002
LISN	Rohde & Schwarz	ESH3-Z5	LS-04 (EUT)	November 5, 2002
Horn Antenna	AH System, Inc	SAS-200/571	HA-01	May 19, 2002
High Pass Filter	Tokimec	TF323DCA	HF-04	October 14, 2002
Spectrum Analyzer	Hewlett packard	8567A	SA-04	March 30, 2002
Spectrum Analyzer	Advantest	R3271	SA-05	January 31, 2002
Spectrum Analyzer	Advantest	R3273	SA-06	November 19, 2002
Test Receiver	Rohde & Schwarz	ESCS30	TR-07	October 1, 2002
Power Sensor	Hewlett packard	ECP-E18A	PS-01	May 28, 2002
Power Meter	Hewlett packard	EPM-442A	PM-01	May 28, 2002

All measurement equipment is traceable to national standards.

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6 SUMMARY OF TESTS

6.1 §15.207 Conducted Emissions

Test Procedure

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 flush with rear of tabletop. All other surfaces of tabletop was at least 80cm from any other grounded conducting surface. I/O cables 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. Each EUT current-carrying power lead, except the ground (safety) lead, were individually connected through a LISN to the input power source. All unused 50ohm connectors of the LISN 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 on a shielded room. The EUT was connected to a Line Impedance Stabilization Network (LISN).

An overview sweep with peak detection has been performed.

The measurements have been performed with a CISPR quasi-peak detector (IF BW 10kHz) .
(Measurement range : 450kHz to 30MHz)

Test data : APPENDIX A1 to A3
Photographs of test setup : Page 14
Test result : Pass
Test instruments : LS-03, LS-04, SA-04, TR-07

6.2 §15.247(a)(1) Frequency Hopping Systems

Bluetooth Module uses 79 channels, each 1MHz wide.
On average, each channel is used equally.

6.3 §15.247(a)(1)(ii) Channel Utilization

The total number of channels is 79.

Test data : APPENDIX A4
Photographs of test setup : Page15
Test result : Pass
Test instruments : AF-04, HA-01, SA-06

20dB band width

1. 2402MHz(Low) : 0.1184MHz < 1MHz
2. 2441MHz(Mid) : 0.1150MHz < 1MHz
3. 2480MHz(High) : 0.1160MHz < 1MHz

Test data : APPENDIX A5
Photographs of test setup : Page15
Test result : Pass
Test instruments : AF-04, HA-01, SA-06

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Dwell time

Spectrum analyzer was set as center frequency 2402MHz, zero span and dwell time 30sec.

As a result of observation with Bluetooth module was on hopping condition, 95 times hopping were appeared per 1 channel.

Maximum transmit ON time per appeared hopping is 2.89ms(DH5).

Therefore accumulated maximum transmit ON time per channel for 30sec is as follows:

$$2.89\text{ms} \times 95 = 274.55\text{ms} < 400\text{ms}$$

Test data : APPENDIX A6
Test result : Pass
Test instruments : SA-06

6.4 § 15.247(b) Maximum Peak Out Put Power(Radiated)

Test Procedure

EUT was placed on a platform of nominal size, 1m by 1.5m, raised 80cm above the conducting ground plane. I/O 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 40cm height to the ground plane. Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna was varied in height above the conducting ground plane to obtain the maximum signal strength.

The Radiated Electric Field Strength intensity has been measured on an open test site 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.

For the EUT, turn table was rotated against to three orthogonal axes then receive antenna was move up and down in order to find maximum emission point.

The point which is indicated in attached photograph(Page 15) was found as maximum emission point.

Test data : APPENDIX A7 to A10
Photographs of test setup : Page15
Test result : Pass
Test instruments : SA-06, HA-01, AF-04

6.5 § 15.247(b) Maximum Peak Out Put Power(Conducted)

Test Procedure

The Maximum Peak Output power was measured with a power meter connected to the antenna port.

According to FCC 15.31(e), frequency change, same as power level when power supply voltage of host PC was changed 85%(AC102V)~115%(AC138V), was confirmed by spectrum analyzer.

Both of power level and frequency were not changed at all.

* Antenna Gain dose not exceed 6dBi.

Test data : APPENDIX A11
Test result : Pass
Test instruments : PS-01, PM-01, SA-06

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6.6 § 15.247(c) Out of Band Emissions(Radiated)

Test Procedure

EUT was placed on a platform of nominal size, 1m by 1.5m, raised 80cm above the conducting ground plane. I/O 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 40cm height to the ground plane. Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna was varied in height above the conducting ground plane to obtain the maximum signal strength.

The Radiated Electric Field Strength intensity has been measured on an open test site with a ground plane and at a distance of 1m and 3m.

*Test distance 3m : 30MHz to 10GHz / 1m : 10GHz to 26GHz

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.

For the EUT, turn table was rotated against to three orthogonal axes then receive antenna was move up and down in order to find maximum emission point.

The point which is indicated in attached photograph(Page 15) was found as maximum emission point.

Radiated Spurious emissions

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 was also satisfied the general limits specified in Sec.15.209(a).

Measurement range : 30MHz to 1000MHz CISPR QP Detector, IF BW 120kHz

: 1GHz to 26GHz PK(RBW 1MHz, VBW 1MHz) and AV(RBW 1MHz, VBW 10Hz) Detector

Test data : APPENDIX A12 to A15: 30 –1000MHz
: APPENDIX A16 to A19: 1 – 26GHz
Photographs of test setup : Page15
Test result : Pass
Test instruments : AF-01, AF-04, BA-03, LA-06, HA-01, HF-04, SA-04, SA-06, TR-07

6.7 § 15.247(c) Out of Band Emissions(Conducted)

Test Procedure

The Out of Band Emissions(Conducted) was measured with a spectrum analyzer connected to the antenna port.

Test data : APPENDIX A20 to A25
Test result : Pass
Test instruments : SA-06

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Test report
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Photographs of test setup(1)



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Photographs of test setup(2)



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APPENDIX

Test Data

1	§15.207 Conducted Emissions	<u>A 1 to A 3</u>
2	§15.247(a)(1)(ii) Channel Utilization	<u>A 4 to A 6</u>
3	§15.247(b) Maximum Peak Out Put Power(Radiated)	<u>A 7 to A10</u>
4	§15.247(b) Maximum Peak Out Put Power(Conducted)	<u>A11</u>
5	§15.247(c) Out of Band Emissions(Radiated)	<u>A12 to A19</u>
6	§15.247(c) Out of Band Emissions(Conducted)	<u>A20 to A25</u>
7	§15.203 Antenna requirement	<u>A26</u>

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DATA OF CONDUCTION TEST

A-PEX INTERNATIONAL CO., LTD.
YOKOWA No.3 OPEN TEST SITE
Report No. : 22CE0007-YW-2

Applicant : SHARP CORPORATION
Kind of Equipment : Bluetooth CF Card
Model No. : DC2C1BZ001
Serial No. :
Power : AC120V/60Hz
Mode : Transmitting
Remarks : FCCID : APYSJY0007
Date : 12/5/2001
Phase : Single Phase
Temperature : 25 °C
Humidity : 34 %
Regulation : FCC Part15.207


Engineer : Naoki Sakamoto

No.	FREQ. [MHz]	READING (N)		READING (L1)		LISN FACTOR [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS		MARGIN	
		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]				QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
1.	0.4817	33.8	-	32.2	-	0.1	0.1	0.0	34.0	-	48.0	0.0	14.0	-
2.	0.8956	31.4	-	28.0	-	0.1	0.1	0.0	31.6	-	48.0	0.0	16.4	-
3.	1.1003	32.1	-	29.8	-	0.1	0.1	0.0	32.3	-	48.0	0.0	15.7	-
4.	2.7564	28.4	-	26.7	-	0.2	0.2	0.0	28.8	-	48.0	0.0	19.2	-
5.	4.7566	31.1	-	30.0	-	0.2	0.2	0.0	31.5	-	48.0	0.0	16.5	-
6.	16.4640	22.9	-	20.8	-	0.7	0.4	0.0	24.0	-	48.0	0.0	24.0	-
7.	24.5773	31.7	-	31.6	-	0.9	0.4	0.0	33.0	-	48.0	0.0	15.0	-

CALCULATION: READING + LISN FACTOR + CABLE LOSS + ATTEN.

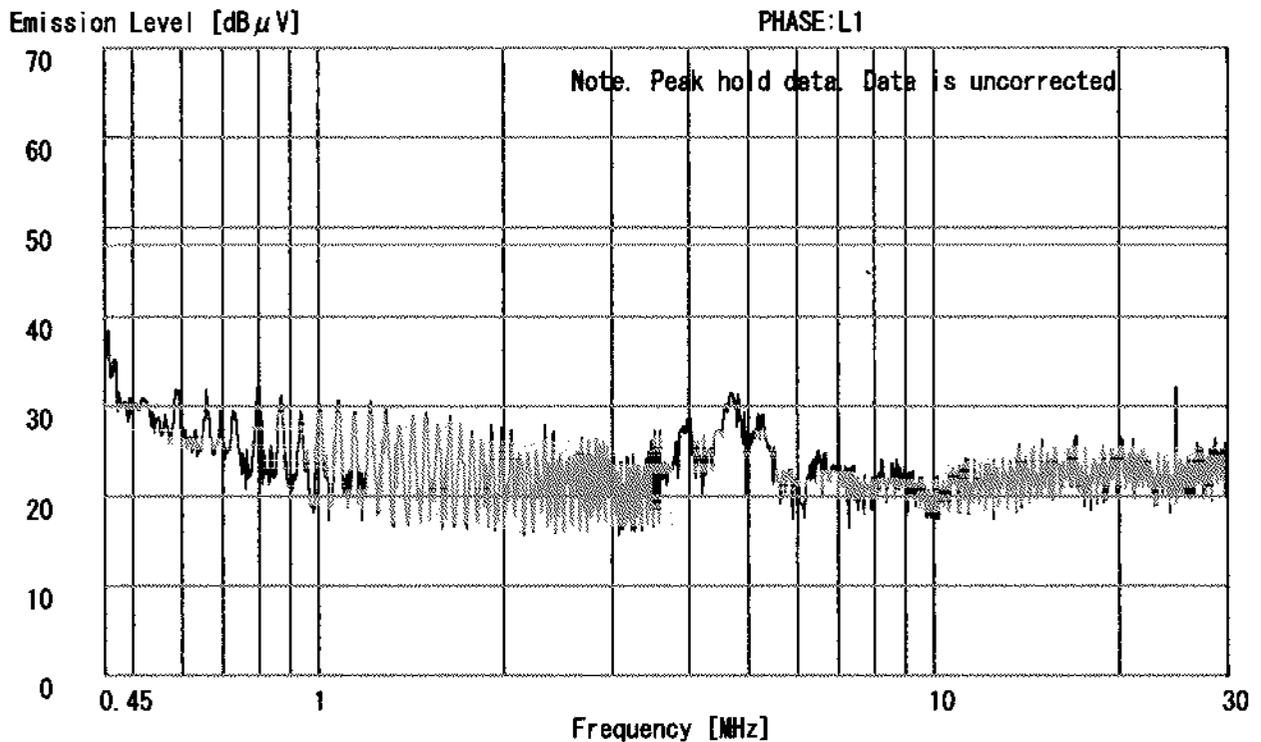
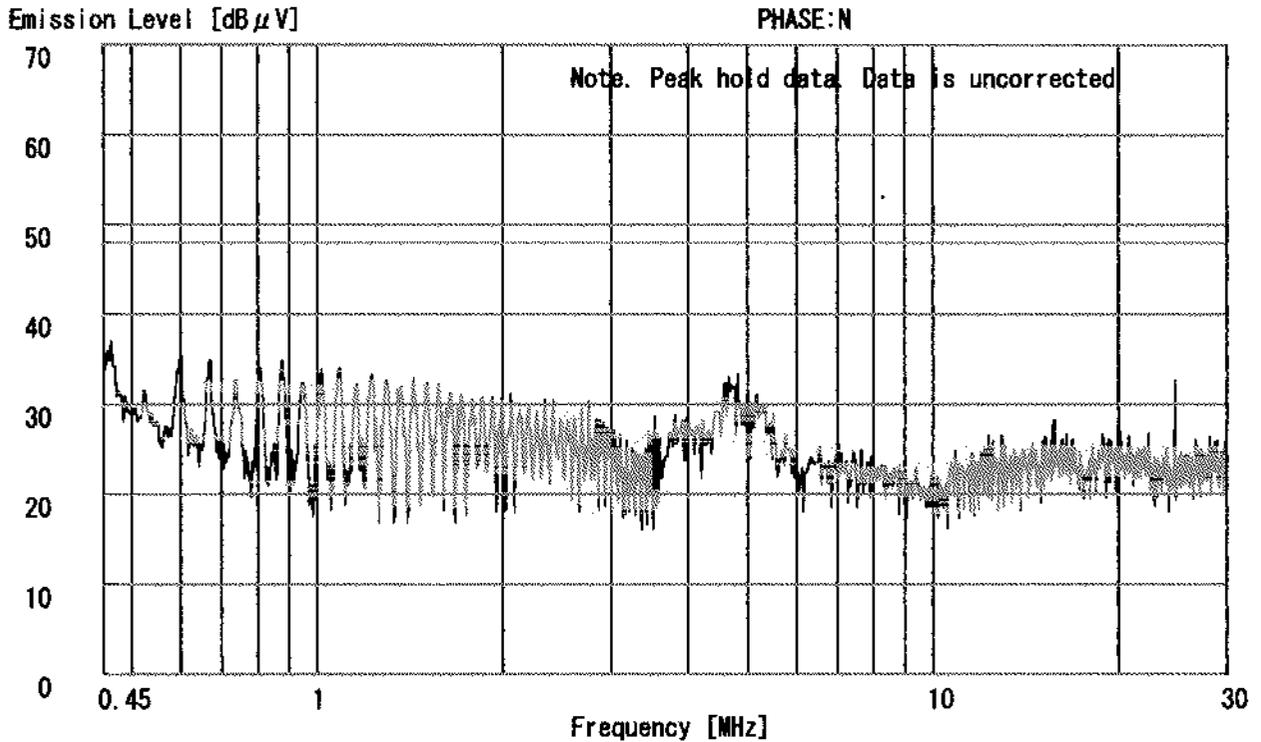
All other spurious emissions are more than 20dB below the limits.

DATA OF CONDUCTION TEST CHART

A-PEX INTERNATIONAL CO., LTD.
YOKOWA No.3 OPEN TEST SITE
Report No. : 22CE0007-YW-2

Applicant : SHARP CORPORATION
Kind of Equipment : Bluetooth CF Card
Model No. : DC2C1BZ001
Serial No. :
Power : AC120V/60Hz
Mode : Transmitting
Remarks : FCCID : APYSJY0007
Date : 12/5/2001
Phase : Single Phase
Temperature : 25 °C
Humidity : 34 %
Regulation 1 : FCC Part15.207
Regulation 2 : None


Engineer : Naoki Sakamoto

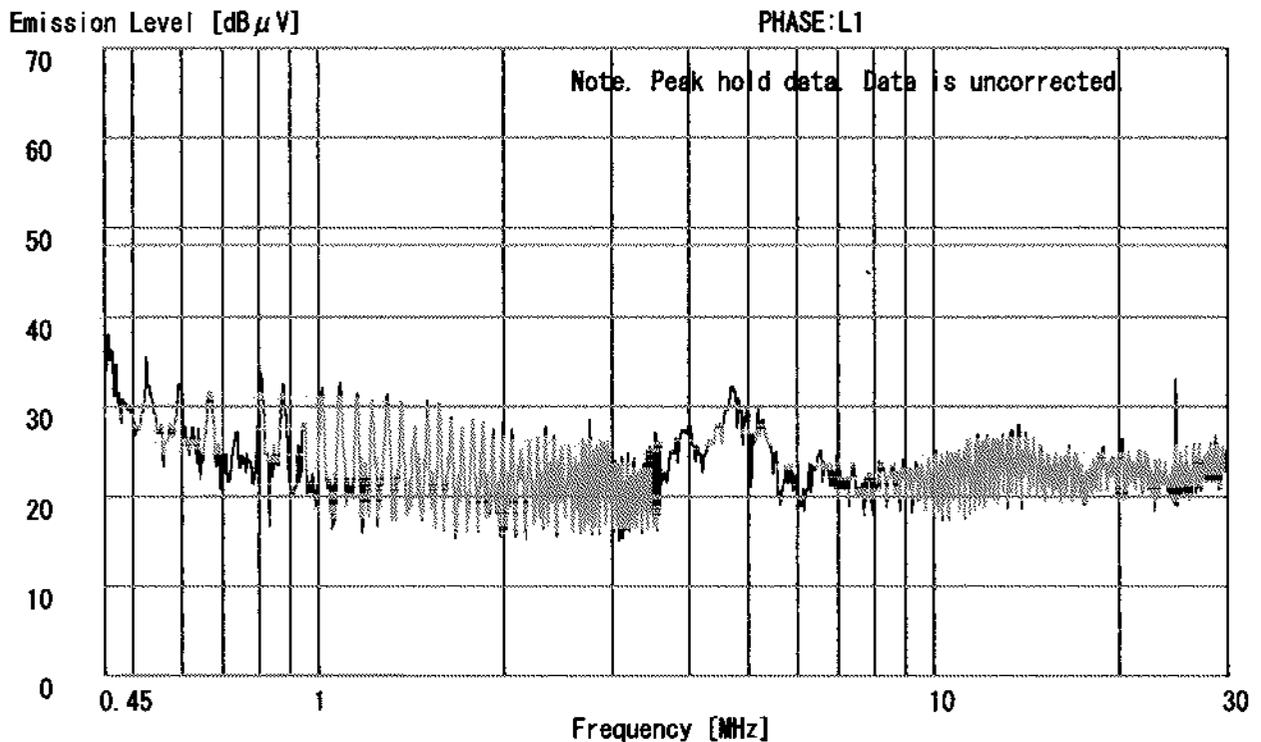
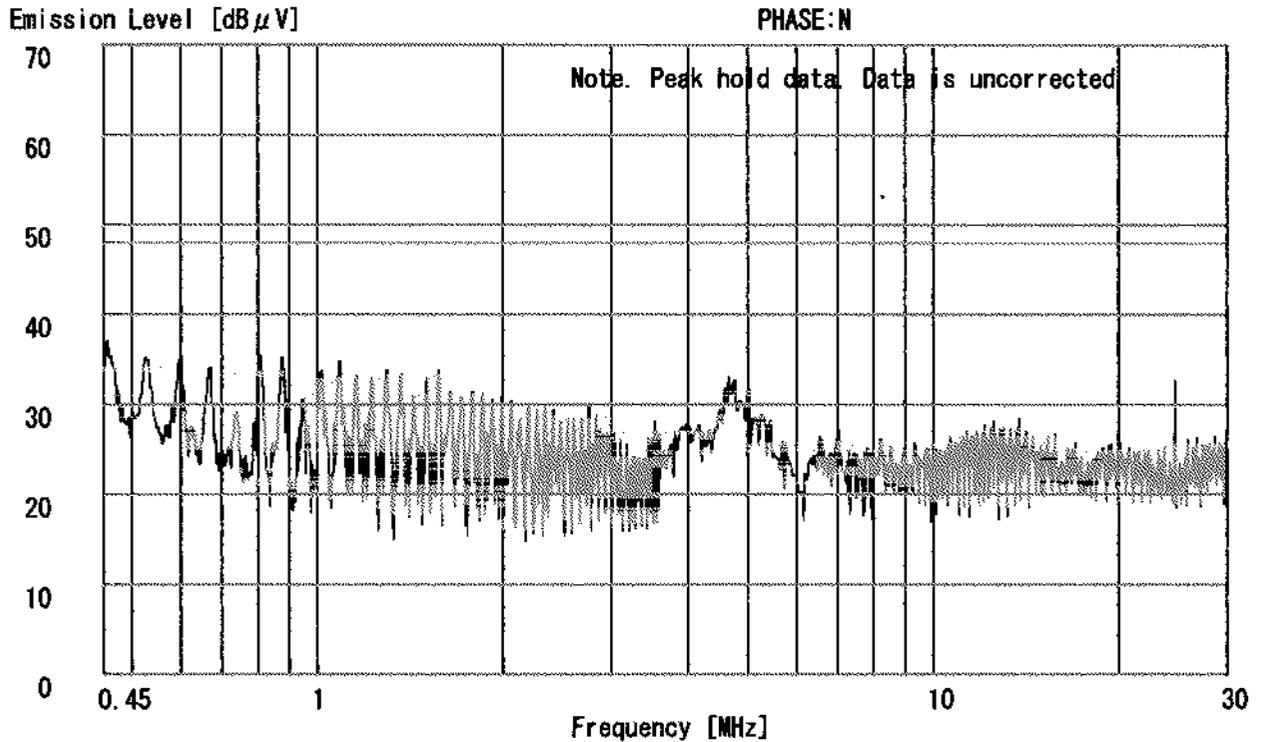


DATA OF CONDUCTION TEST CHART

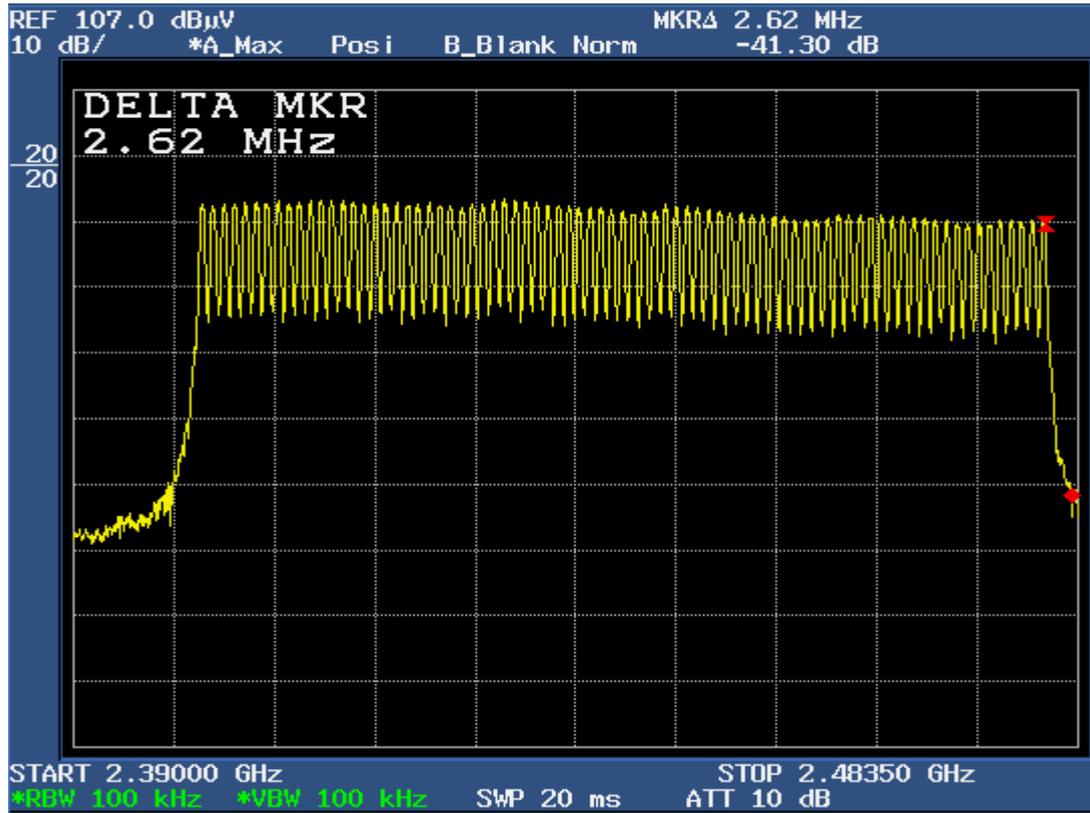
A-PEX INTERNATIONAL CO., LTD.
YOKOWA No.3 OPEN TEST SITE
Report No. : 22CE0007-YW-2

Applicant : SHARP CORPORATION
Kind of Equipment : Bluetooth CF Card
Model No. : DC2C1BZ001
Serial No. :
Power : AC120V/60Hz
Mode : Standby
Remarks : FCC ID : APYSJY0007
Date : 12/5/2001
Phase : Single Phase
Temperature : 25 °C
Humidity : 34 %
Regulation 1 : FCC Part15.207
Regulation 2 : None

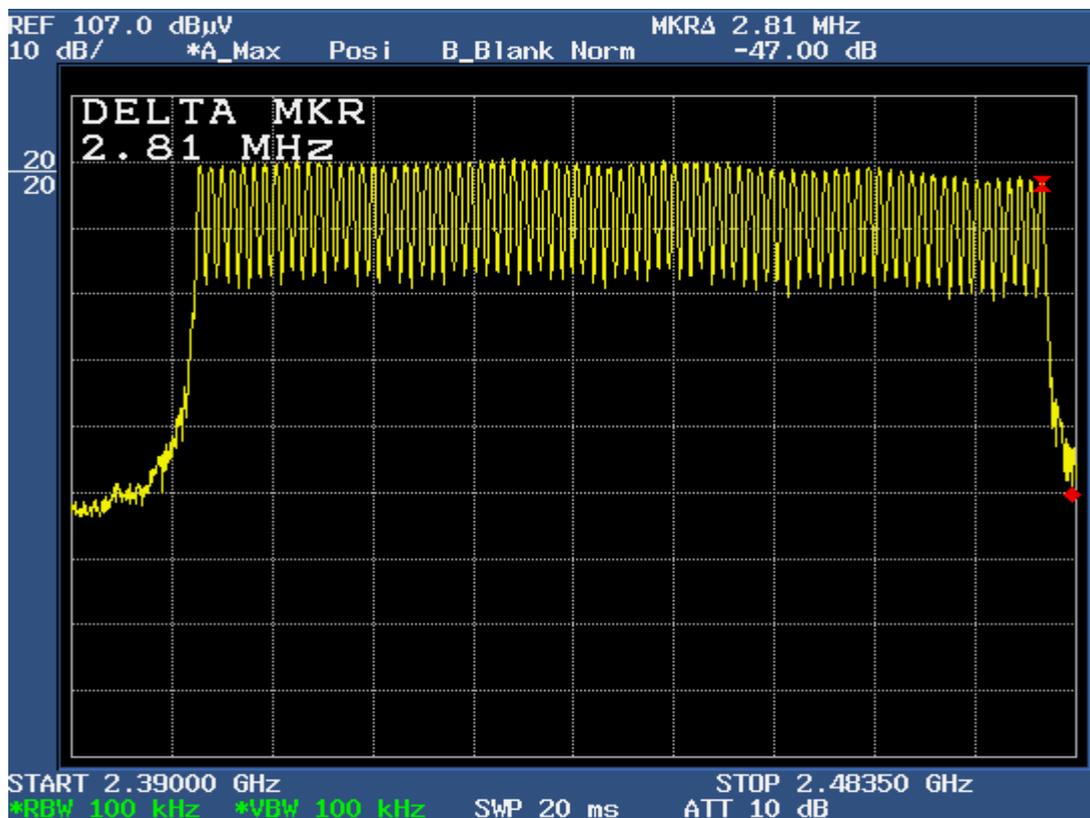
Engineer : Naoki Sakamoto

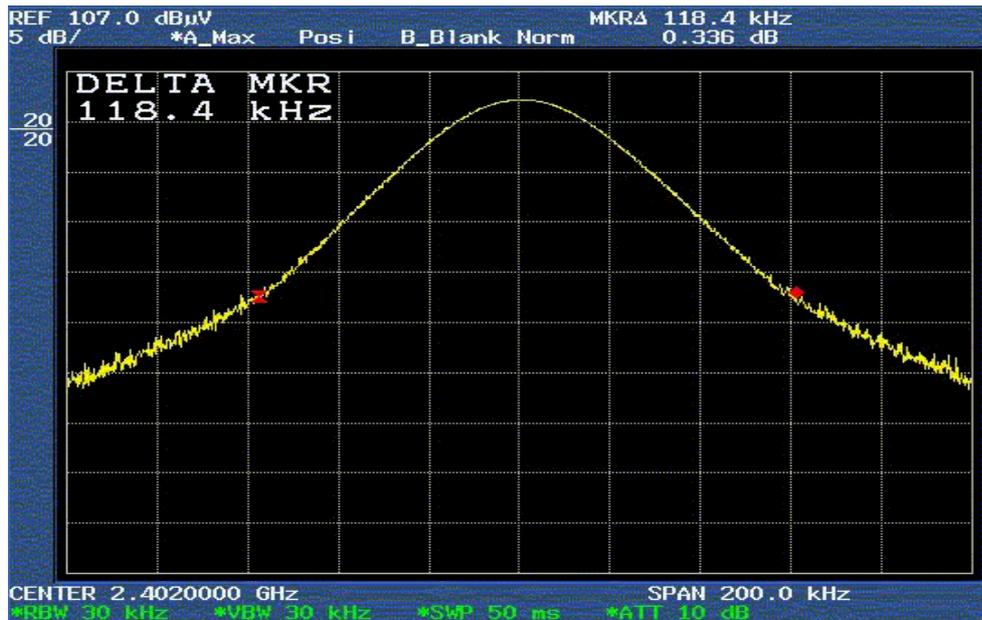


1. Horizontal

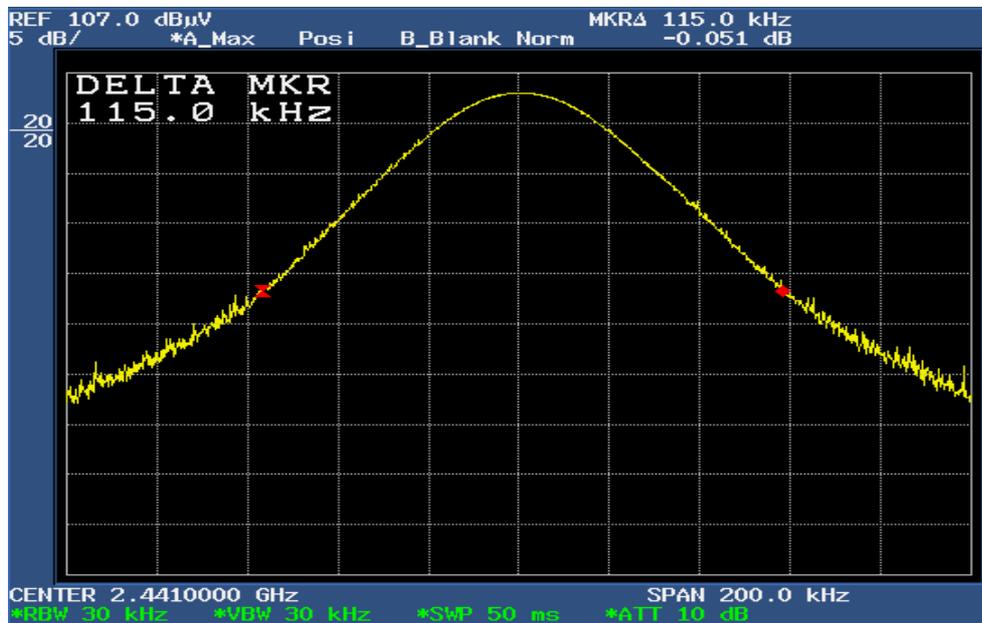


2. Vertical

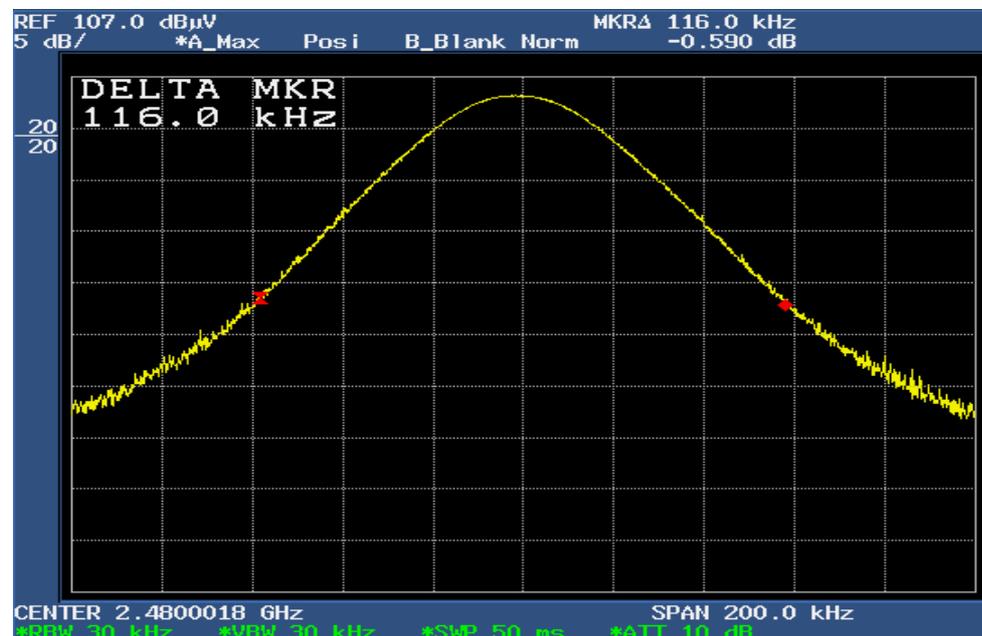




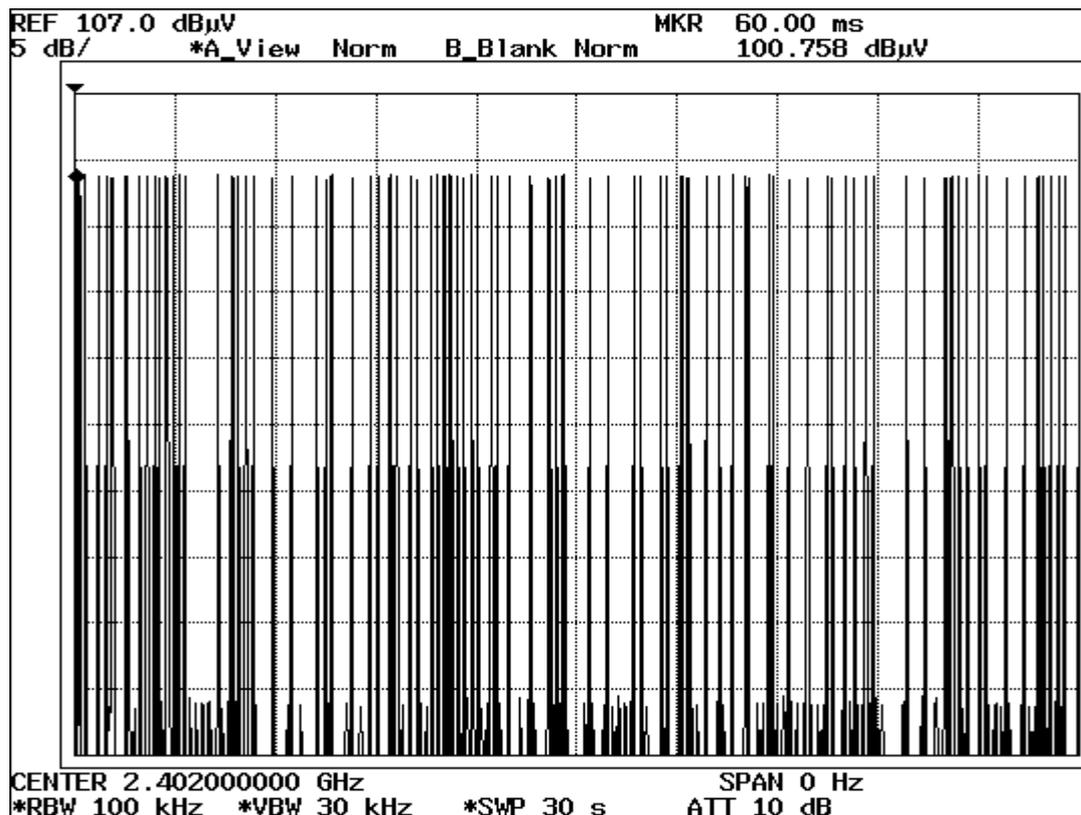
2. 2441MHz(Mid)



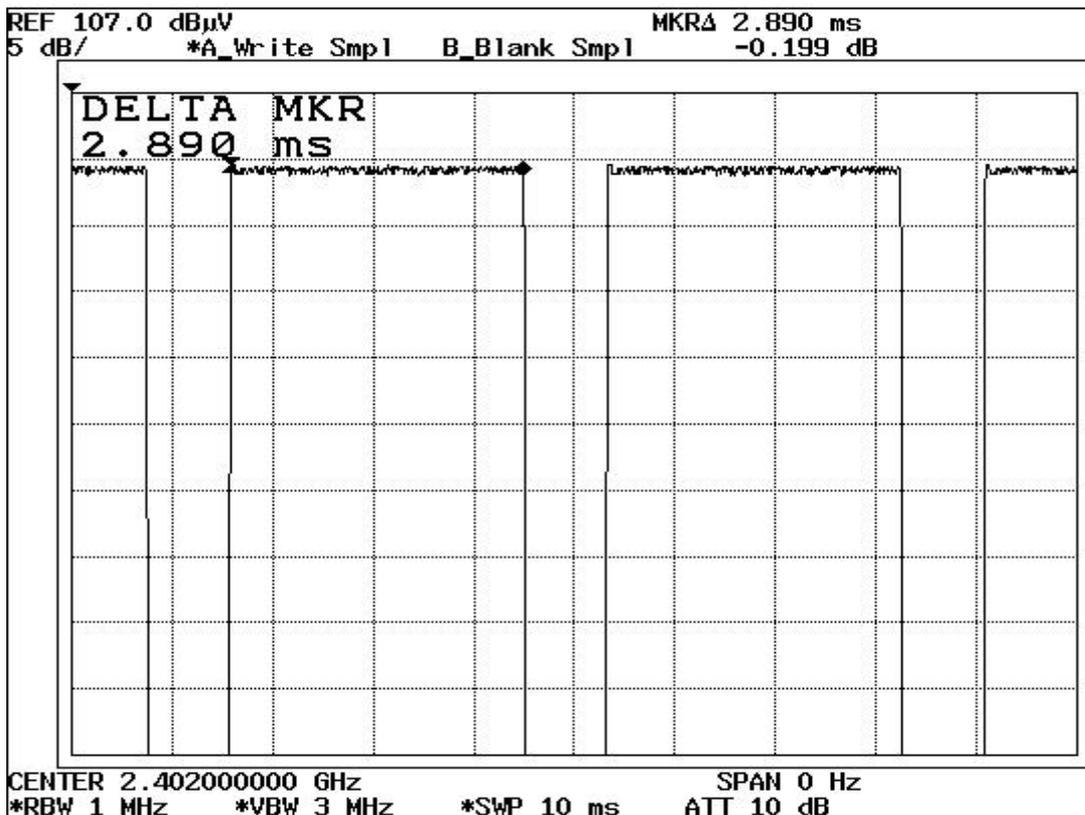
3. 2480MHz(Hi)



Dwell time

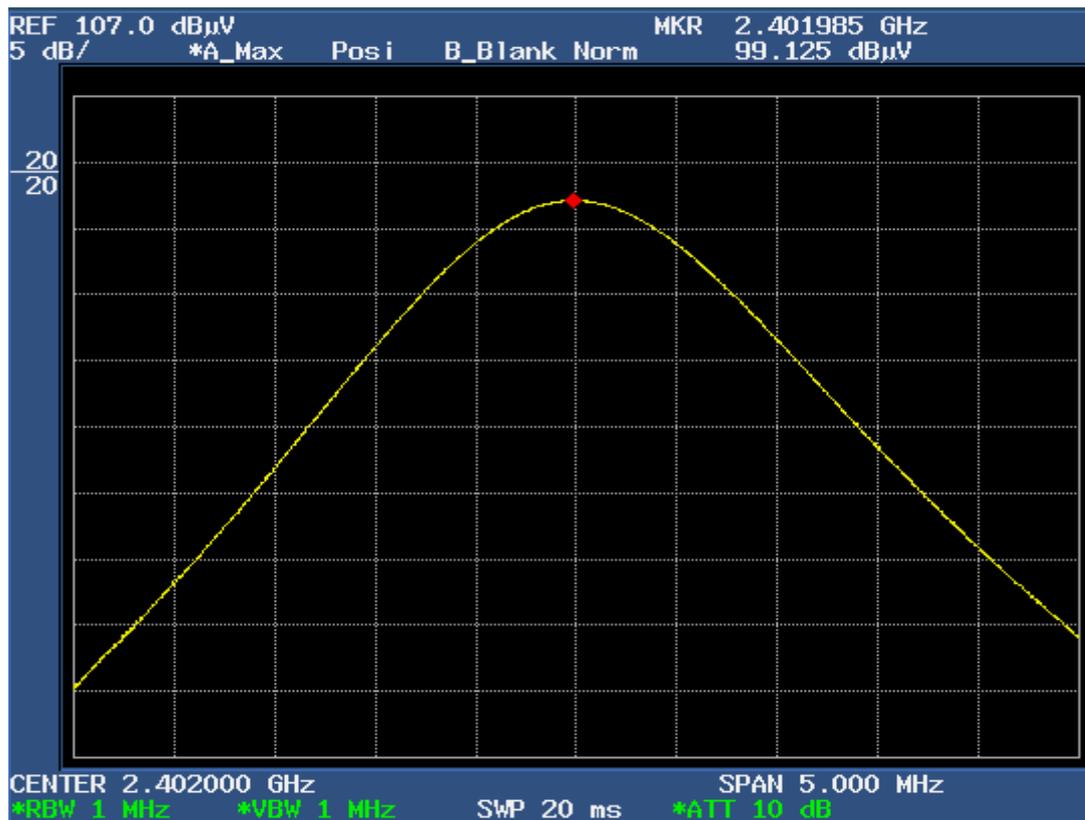


Duty cycle

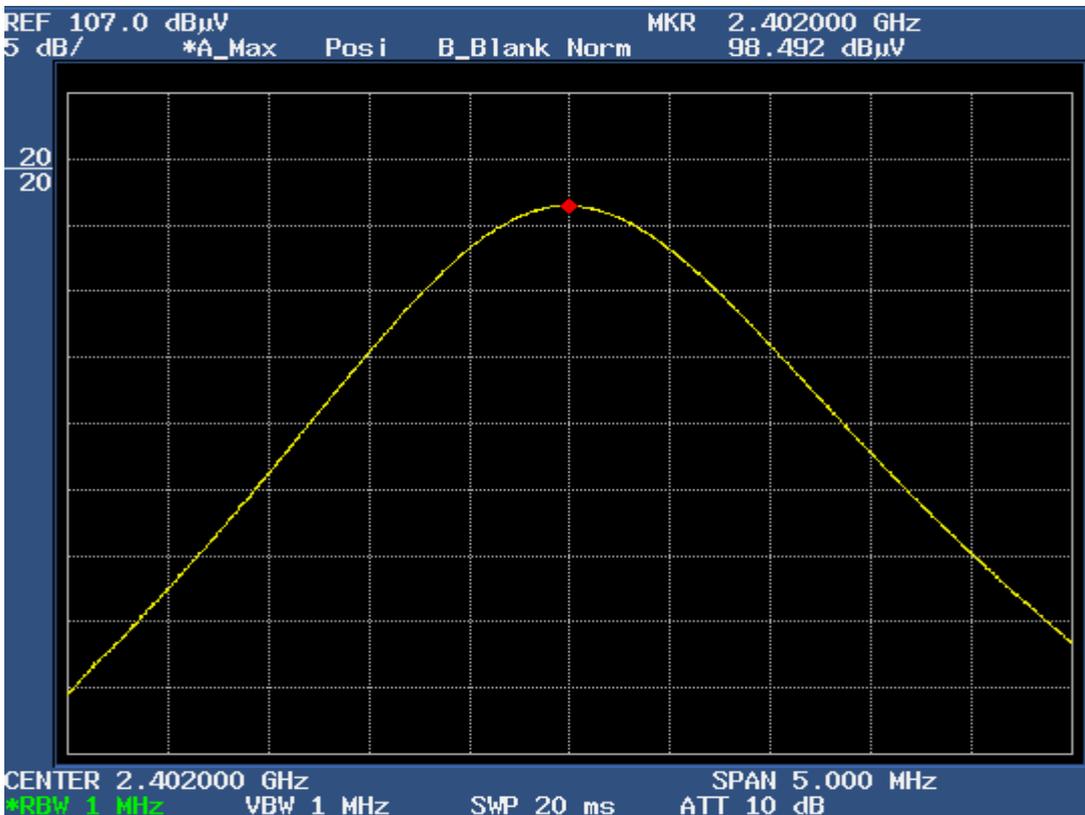


2402MHz(Low)

1. Horizontal

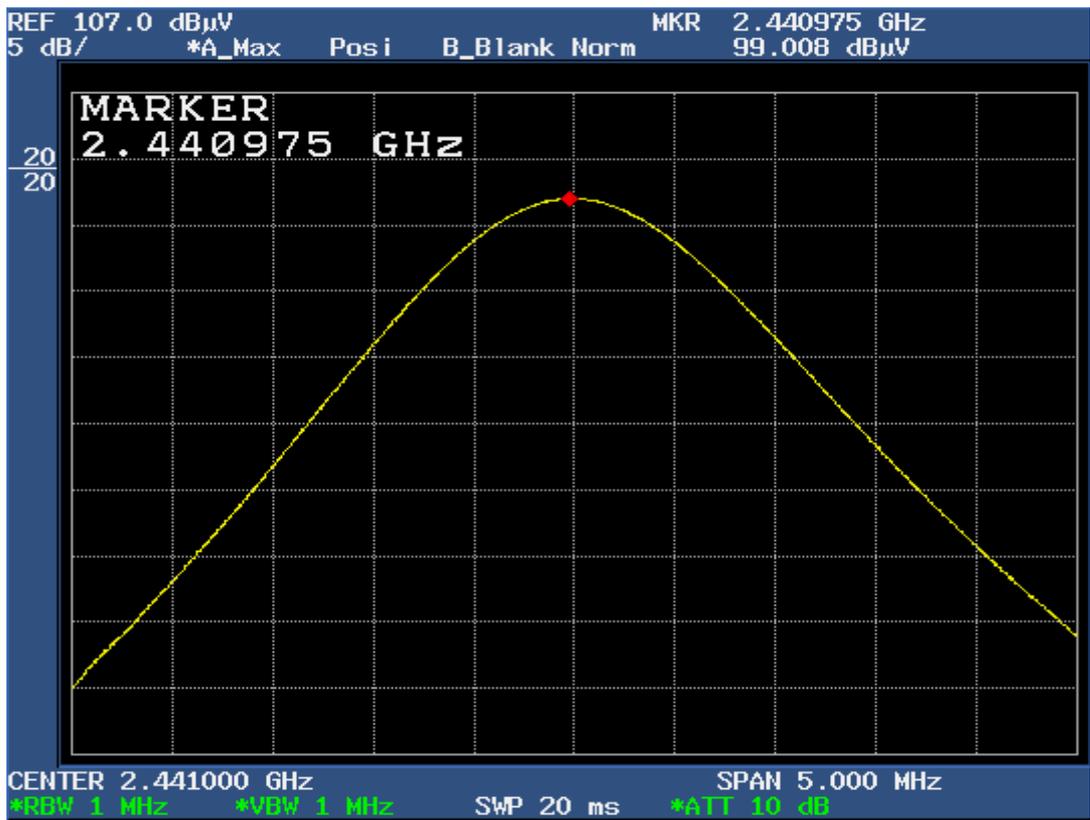


2. Vertical

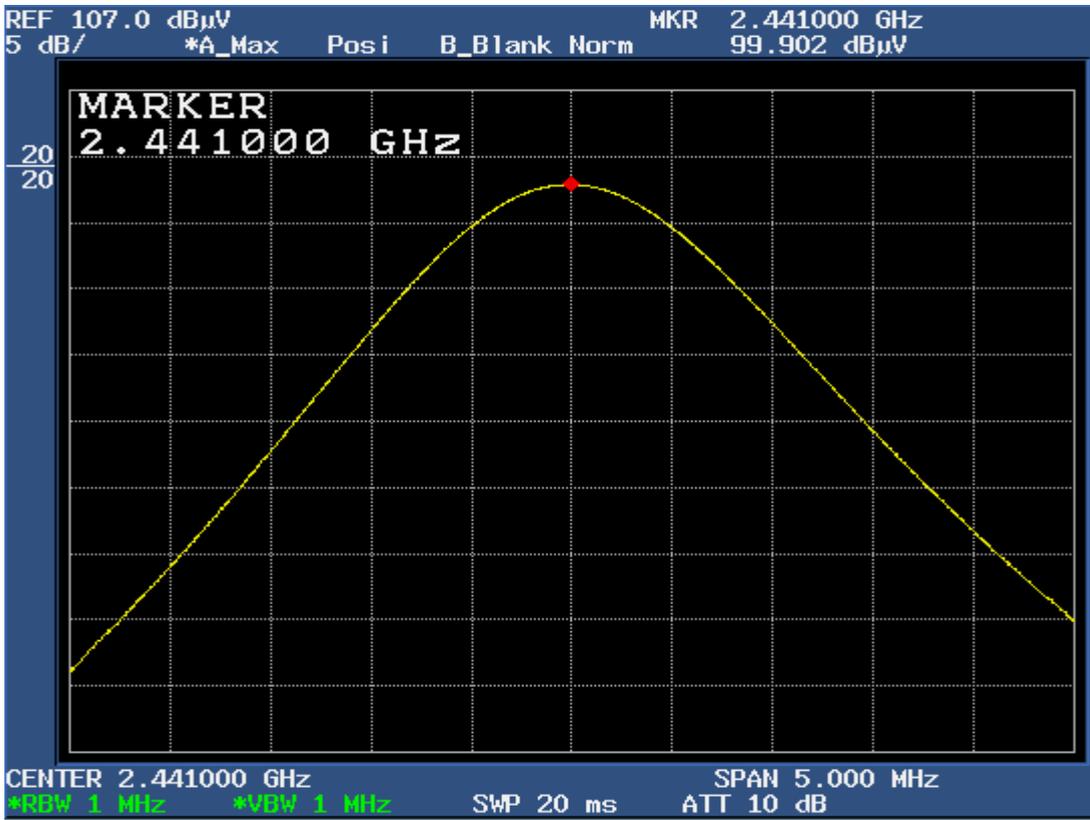


2441MHz(Mid)

1. Horizontal

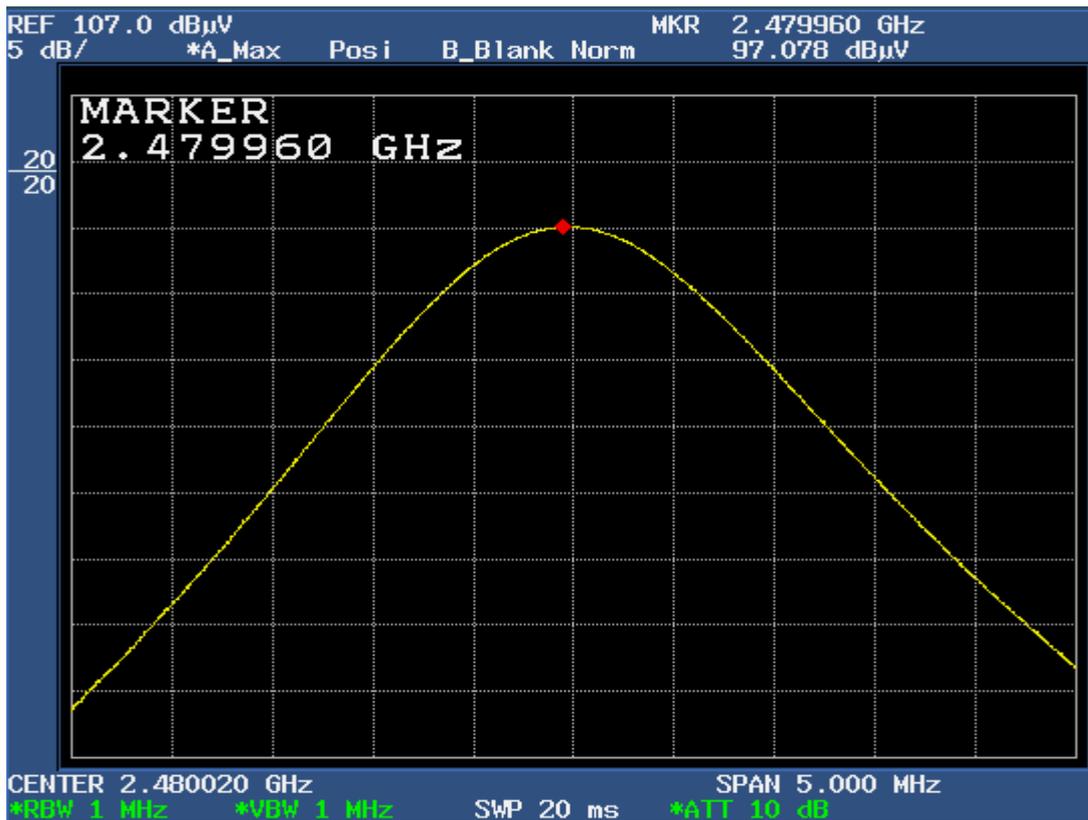


2. Vertical

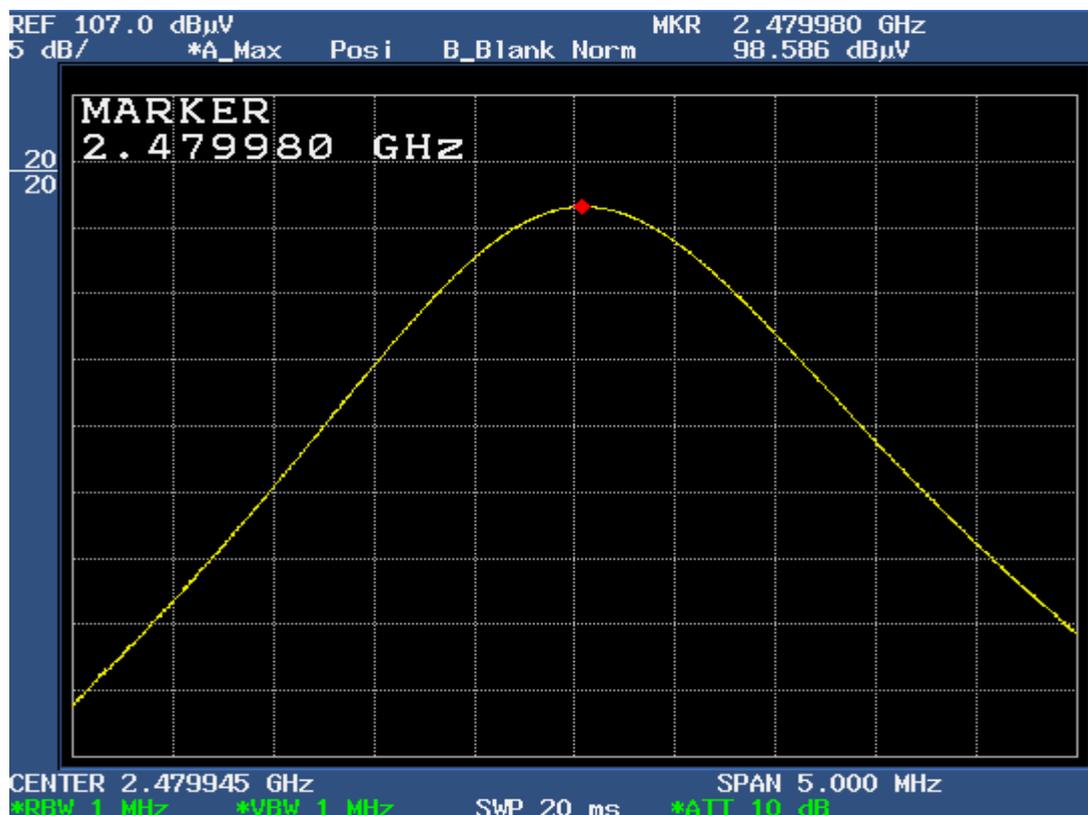


2480MHz(High)

1. Horizontal



2. Vertical



DATA OF PEAK OUT PUT POWER(Radiated)

A-PEX INTERNATIONAL CO., LTD.
YOKOWA NO.3 OPEN SITE

COMPANY : SHARP CORPORATION
EQUIPMENT : Bluetooth CF Card
MODEL : DC2C1BZ0001
FCC ID : APYSJY0007
POWER : AC120V/60Hz
Mode : Transmitting

REPORT NO : 22CE0007-YW-2
REGULATION : Fcc Part15SubpartC 247(b)(1)
TEST DISTANCE : 3m
DATE : 2001 / 12 / 6
Temp. / Humi. : 20deg.C / 43%


ENGINEER : Naoki Sakamoto

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

Ch	FREQ [GHz]	S/A READING		All Factor [dB]	E1		E		Limit (1W) [mW]	Result	
		HOR	VER		HOR	VER	HOR	VER		HOR	VER
		[dBuV]			[dBuV/m]		[V/m]			[mW]	
Low	2.4020	99.1	98.5	3.1	102.2	101.6	0.1292	0.1201	1000.0	5.0	4.3
Mid	2.4410	99.0	99.9	3.2	102.2	103.1	0.1289	0.1429	1000.0	5.0	6.1
High	2.4800	97.1	98.6	3.4	100.5	102.0	0.1057	0.1257	1000.0	3.3	4.7

Sample Calculation :

All Factor = S/A Reading + ANT Factor - Amp Gain + CABLE LOSS + ATTEN

RESULT = (E*d)(E*d)/(30G)

E : Converted to V/m

E1: S/A Reading + All Factor

d : Test distance(3.0m)

G : Antenna Gaine(1.0)

DATA OF PEAK OUT PUT POWER(Conducted)

A-PEX INTERNATIONAL CO., LTD.
YOKOWA NO.3 OPEN SITE

COMPANY : SHARP CORPORATION
EQUIPMENT : Bluetooth CF Card
MODEL : DC2C1BZ0001
FCC ID : APYSJY0007
POWER : AC120V/60Hz
Mode : Transmitting

REPORT NO : 22CE0007-YW-2
REGULATION : Fcc Part15SubpartC 247(b)(1)

DATE : 2001 / 12 / 6
Temp. / Humi. : 20deg.C / 43%



ENGINEER : Naoki Sakamoto

CH	FREQ [GHz]	PM Reading [dBm]	Limit (1W) [dBm]	MARGIN [dB]
Low	2.40200	-3.0	30.0	33.0
Mid	2.44100	-2.4	30.0	32.4
High	2.48000	-2.3	30.0	32.3

DATA OF RADIATION TEST

A-PEX INTERNATIONAL CO., LTD.
YOKOWA No.3 OPEN TEST SITE
Report No. : 22CE0007-YW-2

Applicant : SHARP CORPORATION
Kind of Equipment : Bluetooth GF Card
Model No. : DC2C1BZ001
Serial No. :
Power : AC120V/60Hz
Mode : Transmitting(2402MHz)
Remarks : FCC ID : APYSJY0007
Date : 12/5/2001
Test Distance : 3 m
Temperature : 21 °C
Humidity : 58 %
Regulation : Fcc 15C § 15. 209 (a)


Engineer : Naoki Sakamoto

No.	FREQ. [MHz]	ANT TYPE	READING		ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS		MARGIN	
			HOR [dB μ V]	VER					HOR [dB μ V/m]	VER	HOR [dB]	VER		
1.	90.34	BB	28.2	32.0	7.9	27.9	2.1	5.9	16.2	20.0	43.5	27.3	23.5	
2.	208.90	BB	36.6	35.3	16.4	27.8	3.3	5.9	34.4	33.1	43.5	9.1	10.4	
3.	221.19	BB	37.8	35.1	16.5	27.8	3.4	5.9	35.8	33.1	46.0	10.2	12.9	
4.	233.47	BB	38.6	36.0	16.5	27.7	3.5	5.9	36.8	34.2	46.0	9.2	11.8	
5.	270.35	BB	37.1	35.1	17.7	27.6	3.8	5.8	36.8	34.8	46.0	9.2	11.2	
6.	300.79	BB	37.6	36.2	14.2	27.6	4.0	5.8	34.0	32.6	46.0	12.0	13.4	
7.	307.44	BB	40.9	39.9	14.3	27.6	4.1	5.8	37.5	36.5	46.0	8.5	9.5	
8.	320.82	BB	40.6	41.1	14.4	27.6	4.2	5.8	37.4	37.9	46.0	8.6	8.1	
9.	373.39	BB	40.0	40.7	15.1	27.6	4.6	5.8	37.9	38.6	46.0	8.1	7.4	
10.	498.68	BB	30.2	38.1	18.1	27.5	5.1	5.9	31.8	39.7	46.0	14.2	6.3	
11.	516.10	BB	29.7	30.0	18.2	27.5	5.2	5.9	31.5	31.8	46.0	14.5	14.2	

CALCULATION: READING + ANT. FACTOR + CABLE LOSS - AMP. GAIN + ATTEN.

All other spurious emissions are more than 20dB below the limits.
ANT. TYPE: 30-300MHz Biconical, 300-1000MHz Logperiodic

DATA OF RADIATION TEST

A-PEX INTERNATIONAL CO., LTD.
YOKOWA No.3 OPEN TEST SITE
Report No. : 22CE0007-YW-2

Applicant : SHARP CORPORATION
Kind of Equipment : Bluetooth CF Card
Model No. : DC2C1BZ001
Serial No. :
Power : AC120V/60Hz
Mode : Transmitting (2441MHz)
Remarks : FCC ID : APYSJY0007
Date : 12/5/2001
Test Distance : 3 m
Temperature : 21 °C
Humidity : 58 %
Regulation : Fcc 15C § 15. 209 (a)


Engineer : Naoki Sakamoto

No.	FREQ. [MHz]	ANT TYPE	READING		ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS		MARGIN	
			HOR [dB μ V]	VER					HOR [dB μ V/m]	VER	HOR [dB]	VER		
1.	208.90	BB	36.3	34.0	16.4	27.8	3.3	5.9	34.1	31.8	43.5	9.4	11.7	
2.	221.19	BB	36.2	31.5	16.5	27.8	3.4	5.9	34.2	29.5	46.0	11.8	16.5	
3.	233.47	BB	37.5	32.8	16.5	27.7	3.5	5.9	35.7	31.0	46.0	10.3	15.0	
4.	270.35	BB	26.8	35.0	17.7	27.6	3.8	5.8	26.5	34.7	46.0	19.5	11.3	
5.	300.79	BB	37.1	34.4	14.2	27.6	4.0	5.8	33.5	30.8	46.0	12.5	15.2	
6.	307.44	BB	41.3	39.6	14.3	27.6	4.1	5.8	37.9	36.2	46.0	8.1	9.8	
7.	320.82	BB	43.1	41.5	14.4	27.6	4.2	5.8	39.9	38.3	46.0	6.1	7.7	
8.	373.39	BB	41.6	41.3	15.1	27.6	4.6	5.8	39.5	39.2	46.0	6.5	6.8	
9.	498.68	BB	30.5	35.8	18.1	27.5	5.1	5.9	32.1	37.4	46.0	13.9	8.6	
10.	516.10	BB	30.5	30.3	18.2	27.5	5.2	5.9	32.3	32.1	46.0	13.7	13.9	

CALCULATION: READING + ANT. FACTOR + CABLE LOSS - AMP. GAIN + ATTEN.

All other spurious emissions are more than 20dB below the limits.
ANT. TYPE: 30-300MHz Biconical, 300-1000MHz Logperiodic

DATA OF RADIATION TEST

A-PEX INTERNATIONAL CO., LTD.
YOKOWA No.3 OPEN TEST SITE
Report No. : 22CE0007-YW-2

Applicant : SHARP CORPORATION
Kind of Equipment : Bluetooth CF Card
Model No. : DC2C1BZ001
Serial No. :
Power : AC120V/60Hz
Mode : Transmitting (2480MHz)
Remarks : FCC ID : APYSJY0007
Date : 12/5/2001
Test Distance : 3 m
Temperature : 21 °C
Humidity : 58 %
Regulation : Fcc 15C § 15. 209 (a)



Engineer : Naoki Sakamoto

No.	FREQ. [MHz]	ANT TYPE	READING		ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS		MARGIN	
			HOR [dB μ V]	VER					HOR [dB μ V/m]	VER	HOR [dB]	VER		
1.	208.90	BB	35.8	32.5	16.4	27.8	3.3	5.9	33.6	30.3	43.5	9.9	13.2	
2.	221.19	BB	34.8	30.8	16.5	27.8	3.4	5.9	32.8	28.8	46.0	13.2	17.2	
3.	233.47	BB	38.3	34.1	16.5	27.7	3.5	5.9	36.5	32.3	46.0	9.5	13.7	
4.	270.35	BB	33.1	30.1	17.7	27.6	3.8	5.8	32.8	29.8	46.0	13.2	16.2	
5.	300.79	BB	37.4	37.2	14.2	27.6	4.0	5.8	33.8	33.6	46.0	12.2	12.4	
6.	307.44	BB	41.8	42.3	14.3	27.6	4.1	5.8	38.4	38.9	46.0	7.6	7.1	
7.	320.82	BB	43.5	43.7	14.4	27.6	4.2	5.8	40.3	40.5	46.0	5.7	5.5	
8.	373.39	BB	41.7	40.9	15.1	27.6	4.6	5.8	39.6	38.8	46.0	6.4	7.2	
9.	498.68	BB	28.2	34.9	18.1	27.5	5.1	5.9	29.8	36.5	46.0	16.2	9.5	
10.	516.10	BB	31.0	31.7	18.2	27.5	5.2	5.9	32.8	33.5	46.0	13.2	12.5	

CALCULATION: READING + ANT. FACTOR + CABLE LOSS - AMP. GAIN + ATTEN.

All other spurious emissions are more than 20dB below the limits.
ANT. TYPE: 30-300MHz Biconical, 300-1000MHz Logperiodic

DATA OF RADIATION TEST

A-PEX INTERNATIONAL CO., LTD.
YOKOWA No.3 OPEN TEST SITE
Report No. : 22CE0007-YW-2

Applicant : SHARP CORPORATION
Kind of Equipment : Bluetooth CF Card
Model No. : DC2C1BZ001
Serial No. :
Power : AC120V/60Hz
Mode : Receiving
Remarks : FCC ID : APYSJY0007
Date : 12/5/2001
Test Distance : 3 m
Temperature : 21 °C
Humidity : 58 %
Regulation : Fcc 15C § 15. 209 (a)


Engineer : Naoki Sakamoto

No.	FREQ. [MHz]	ANT TYPE	READING		ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS		MARGIN	
			HOR [dB μ V]	VER					HOR [dB μ V/m]	VER	HOR [dB]	VER		
1.	208.90	BB	35.6	32.7	16.4	27.8	3.3	5.9	33.4	30.5	43.5	10.1	13.0	
2.	221.19	BB	35.2	31.2	16.5	27.8	3.4	5.9	33.2	29.2	46.0	12.8	16.8	
3.	233.47	BB	38.0	34.3	16.5	27.7	3.5	5.9	36.2	32.5	46.0	9.8	13.5	
4.	270.35	BB	33.1	29.6	17.7	27.6	3.8	5.8	32.8	29.3	46.0	13.2	16.7	
5.	300.79	BB	40.0	38.9	14.2	27.6	4.0	5.8	36.4	35.3	46.0	9.6	10.7	
6.	307.44	BB	42.6	43.6	14.3	27.6	4.1	5.8	39.2	40.2	46.0	6.8	5.8	
7.	320.82	BB	43.5	44.5	14.4	27.6	4.2	5.8	40.3	41.3	46.0	5.7	4.7	
8.	373.39	BB	41.9	42.0	15.1	27.6	4.6	5.8	39.8	39.9	46.0	6.2	6.1	
9.	498.68	BB	27.6	35.5	18.1	27.5	5.1	5.9	29.2	37.1	46.0	16.8	8.9	
10.	516.10	BB	31.9	30.6	18.2	27.5	5.2	5.9	33.7	32.4	46.0	12.3	13.6	

CALCULATION: READING + ANT. FACTOR + CABLE LOSS - AMP. GAIN + ATTEN.

All other spurious emissions are more than 20dB below the limits.
ANT. TYPE: 30-300MHz Biconical, 300-1000MHz Logperiodic

DATA OF SUPURIOUS EMISSIONS(1GHz to 26GHz)

A-PEX INTERNATIONAL CO., LTD.
YOKOWA NO.3 OPEN SITE

COMPANY : SHARP CORPORATION
EQUIPMENT : Bluetooth CF Card
MODEL : DC2C1BZ0001
FCC ID : APYSJY0007
POWER : AC120V/60Hz
Mode : Transmitting(ch02:2402MHz)

REPORT NO : 22CE0007-YW-2
REGULATION : Fcc Part15SubpartC 247/209
TEST DISTANCE : 3m(1 to 10GHz)/1m(10 to 26GHz)
DATE : 2001 / 12 / 6
Temp. / Humi. : 20deg.C / 43%

ENGINEER : Naoki Sakamoto

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

No.	FREQ [GHz]	S/A READING		ANT Factor [dB]	AMP GAIN [dB]	CABLE LOSS [dB]	H.P.Filter [dB]	RESULT		Limit PK [dBuV/m]	MARGIN	
		HOR [dBuV]	VER [dBuV]					HOR [dBuV/m]	VER [dBuV/m]		HOR [dB]	VER [dB]
#1	1.30143	47.3	51.9	26.3	35.0	2.6	0.0	41.2	45.8	74.0	24.7	24.2
#2	1.90464	41.8	47.9	29.7	34.5	3.3	0.0	40.3	46.4	74.0	33.8	27.6
#3	2.39000	40.6	41.0	31.3	38.1	3.6	0.0	37.4	37.8	74.0	36.6	36.2
4	4.80400	42.0	41.6	35.4	34.5	8.0	1.1	52.0	51.6	74.0	22.0	22.4
5	7.20606	41.9	44.6	39.1	34.8	9.4	0.5	56.1	58.8	74.0	17.9	15.2
6	9.60799	43.3	43.0	39.2	35.0	11.0	0.5	59.0	58.7	74.0	15.1	15.3
*7	12.01000	42.2	43.6	43.5	34.4	12.1	0.5	63.9	65.3	83.5	19.6	18.3
*8	14.41200	42.9	43.2	42.2	33.1	13.5	0.6	66.1	66.4	83.5	17.4	17.1
*9	16.81400	43.6	43.9	43.8	33.4	14.8	0.6	69.4	69.7	83.5	14.1	13.8
*10	19.21600	44.4	43.3	38.0	33.4	15.8	1.0	65.8	64.7	83.5	17.7	18.8
*11	21.61800	44.1	43.5	37.8	33.0	16.5	0.6	66.1	65.5	83.5	17.5	18.1
*12	24.02000	44.9	44.2	39.6	33.2	15.8	0.7	67.8	67.1	83.5	15.7	16.4

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

No.	FREQ [GHz]	S/A READING		ANT Factor [dB]	AMP GAIN [dB]	CABLE LOSS [dB]	H.P.Filter [dB]	RESULT		Limit AV [dBuV/m]	MARGIN	
		HOR [dBuV]	VER [dBuV]					HOR [dBuV/m]	VER [dBuV/m]		HOR [dB]	VER [dB]
#1	1.30143	36.7	35.6	26.3	35.0	2.6	0.0	30.6	29.5	54.0	23.4	24.5
#2	1.90464	30.4	31.7	29.7	34.5	3.3	0.0	28.9	30.2	54.0	25.1	23.8
#3	2.39000	30.2	30.3	31.3	38.1	3.6	0.0	27.0	27.1	54.0	27.0	26.9
4	4.80400	31.5	30.7	35.4	34.5	8.0	1.1	41.5	40.7	54.0	12.5	13.3
5	7.20606	32.1	35.4	39.1	34.8	9.4	0.5	46.3	49.6	54.0	7.7	4.4
6	9.60799	32.6	32.9	39.2	35.0	11.0	0.5	48.3	48.6	54.0	5.7	5.4
*7	12.01000	31.9	32.1	43.5	34.4	12.1	0.5	53.6	53.8	63.5	10.0	9.8
*8	14.41200	31.6	31.7	42.2	33.1	13.5	0.6	54.8	54.9	63.5	8.8	8.7
*9	16.81400	33.2	33.4	43.8	33.4	14.8	0.6	59.0	59.2	63.5	4.5	4.3
*10	19.21600	32.2	32.1	38.0	33.4	15.8	1.0	53.6	53.5	63.5	10.0	10.1
*11	21.61800	33.0	32.9	37.8	33.0	16.5	0.6	54.9	54.9	63.5	8.7	8.7
*12	24.02000	33.3	33.4	39.6	33.2	15.8	0.7	56.2	56.3	63.5	7.4	7.3

Sample Calculation :

RESULT=Reading + ANT Factor - Amp Gain + CABLE LOSS + High Pass Filter

Except for the above table : All other spurious emissions are more than 20dB below the limit.

* Test Distance 1m, 1m Limit=3m Limit(54dB)+20log(3/1)

The point don't use high pass filter.

DATA OF SUPURIOUS EMISSIONS(1GHz to 26GHz)

A-PEX INTERNATIONAL CO., LTD.
YOKOWA NO.3 OPEN SITE

COMPANY : SHARP CORPORATION
EQUIPMENT : Bluetooth CF Card
MODEL : DC2C1BZ0001
FCC ID : APYSJY0007
POWER : AC120V/60Hz
Mode : Transmitting(ch41:2441MHz)

REPORT NO : 22CE0007-YW-2
REGULATION : Fcc Part15SubpartC 247/209
TEST DISTANCE : 3m(1 to 10GHz)/1m(10 to 26GHz)
DATE : 2001 / 12 / 6
Temp. / Humi. : 20deg.C / 43%

ENGINEER : Naoki Sakamoto

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

No.	FREQ [GHz]	S/A READING		ANT Factor [dB]	AMP GAIN [dB]	CABLE LOSS [dB]	H.P.Filter [dB]	RESULT		Limit PK [dBuV/m]	MARGIN	
		HOR [dBuV]	VER [dBuV]					HOR [dBuV/m]	VER [dBuV/m]		HOR [dB]	VER [dB]
#1	1.29651	41.2	52.8	26.3	35.0	2.6	0.0	35.1	46.7	74.0	38.9	27.4
#2	1.89907	44.6	49.6	29.7	34.5	3.3	0.0	43.1	48.1	74.0	30.9	25.9
3	4.88200	39.0	41.2	35.6	34.5	7.8	1.1	49.0	51.2	74.0	25.0	22.8
4	7.32299	41.2	45.0	39.2	34.9	9.4	0.5	55.4	59.2	74.0	18.6	14.8
5	9.76399	43.1	43.4	39.2	35.0	11.0	0.5	58.8	59.1	74.0	15.2	14.9
*6	12.20500	42.3	43.7	43.4	34.3	12.3	0.5	64.2	65.6	83.5	19.3	17.9
*7	14.64600	42.5	42.9	42.6	33.1	13.6	0.5	66.1	66.5	83.5	17.4	17.0
*8	17.08700	43.4	43.2	43.8	33.2	14.8	0.6	69.4	69.2	83.5	14.1	14.3
*9	19.52800	44.2	44.6	38.0	33.4	15.9	1.3	66.0	66.4	83.5	17.5	17.1
*10	21.96900	43.7	45.0	37.8	33.0	16.5	0.2	65.2	66.5	83.5	18.3	17.0
*11	24.41000	44.4	44.9	39.5	33.2	15.7	0.9	67.2	67.8	83.5	16.3	15.7

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

No.	FREQ [GHz]	S/A READING		ANT Factor [dB]	AMP GAIN [dB]	CABLE LOSS [dB]	H.P.Filter [dB]	RESULT		Limit AV [dBuV/m]	MARGIN	
		HOR [dBuV]	VER [dBuV]					HOR [dBuV/m]	VER [dBuV/m]		HOR [dB]	VER [dB]
#1	1.29651	30.0	37.0	26.3	35.0	2.6	0.0	23.9	30.9	54.0	30.1	23.1
#2	1.89907	31.5	32.6	29.7	34.5	3.3	0.0	30.0	31.1	54.0	24.0	22.9
3	4.88200	29.2	30.9	35.6	34.5	7.8	1.1	39.2	40.9	54.0	14.8	13.1
4	7.32299	32.9	37.4	39.2	34.9	9.4	0.5	47.1	51.6	54.0	6.9	2.4
5	9.76399	32.8	33.0	39.2	35.0	11.0	0.5	48.5	48.7	63.5	15.0	14.9
*6	12.20500	31.7	32.9	43.4	34.3	12.3	0.5	53.6	54.8	63.5	9.9	8.7
*7	14.64600	31.8	32.0	42.6	33.1	13.6	0.5	55.4	55.6	63.5	8.2	8.0
*8	17.08700	32.9	32.8	43.8	33.2	14.8	0.6	58.9	58.8	63.5	4.7	4.7
*9	19.52800	32.3	32.5	38.0	33.4	15.9	1.3	54.1	54.3	63.5	9.4	9.2
*10	21.96900	32.7	32.8	37.8	33.0	16.5	0.2	54.2	54.3	63.5	9.3	9.2
*11	24.41000	33.0	33.0	39.5	33.2	15.7	0.9	55.9	55.9	63.5	7.6	7.6

Sample Calculation :

RESULT=Reading + ANT Factor - Amp Gain + CABLE LOSS

Except for the above table : All other spurious emissions are more than 20dB below the limit.

* Test Distance 1m, 1m Limit=3m Limit(54dB)+20log(3/1)

The point don't use high pass filter.

DATA OF SUPURIOUS EMISSIONS(1GHz to 26GHz)

A-PEX INTERNATIONAL CO., LTD.
YOKOWA NO.3 OPEN SITE

COMPANY : SHARP CORPORATION
EQUIPMENT : Bluetooth CF Card
MODEL : DC2C1BZ0001
FCC ID : APYSJY0007
POWER : AC120V/60Hz
Mode : Transmitting(ch80:2480MHz)

REPORT NO : 22CE0007-YW-2
REGULATION : Fcc Part15SubpartC 247/209
TEST DISTANCE : 3m(1 to 10GHz)/1m(10 to 26GHz)
DATE : 2001 / 12 / 6
Temp. / Humi. : 20deg.C / 43%


ENGINEER : Naoki Sakamoto

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

No.	FREQ [GHz]	S/A READING		ANT Factor [dB]	AMP GAIN [dB]	CABLE LOSS [dB]	H.P.Filter [dB]	RESULT		Limit PK [dBuV/m]	MARGIN	
		HOR [dBuV]	VER [dBuV]					HOR dBuV/m	VER dBuV/m		HOR [dB]	VER [dB]
#1	1.29736	44.9	53.1	26.3	35.0	2.6	0.0	38.8	47.0	74.0	35.2	27.0
#2	1.89636	42.5	48.3	29.7	34.5	3.3	0.0	41.0	46.8	74.0	33.0	27.2
#3	2.48350	49.2	51.3	31.6	38.1	3.7	0.0	46.4	48.5	74.0	27.6	25.5
4	4.96000	39.2	38.6	35.8	34.5	7.9	1.1	49.5	48.9	74.0	24.5	25.1
5	7.44000	41.6	38.4	39.2	34.9	9.5	0.5	55.9	52.7	74.0	18.1	21.3
6	9.92000	40.1	39.2	39.2	34.9	11.0	0.5	55.9	55.0	74.0	18.1	19.0
*7	12.39999	43.1	42.5	43.3	34.2	12.3	0.5	65.0	64.4	83.5	18.5	19.1
*8	14.87999	45.3	42.2	42.9	33.0	13.7	0.5	69.4	66.3	83.5	14.1	17.2
*9	17.35999	43.3	44.4	43.9	33.1	14.8	0.6	69.5	70.6	83.5	14.0	12.9
*10	19.84000	44.3	43.5	38.0	33.4	16.0	1.6	66.5	65.7	83.5	17.0	17.8
*11	22.32000	42.8	43.3	38.3	33.0	16.5	0.3	64.9	65.4	83.5	18.6	18.1
*12	24.80000	44.7	45.1	39.4	33.2	15.4	1.0	67.3	67.7	83.5	16.2	15.8

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

No.	FREQ [GHz]	S/A READING		ANT Factor [dB]	AMP GAIN [dB]	CABLE LOSS [dB]	H.P.Filter [dB]	RESULT		Limit AV [dBuV/m]	MARGIN	
		HOR [dBuV]	VER [dBuV]					HOR dBuV/m	VER dBuV/m		HOR [dB]	VER [dB]
#1	1.29736	32.3	36.6	26.3	35.0	2.6	0.0	26.2	30.5	54.0	27.9	23.5
#2	1.89636	30.0	32.2	29.7	34.5	3.3	0.0	28.5	30.7	54.0	25.5	23.3
#3	2.48350	48.0	50.1	31.6	38.1	3.7	0.0	45.2	47.3	54.0	8.8	6.7
4	4.96000	28.8	27.9	35.8	34.5	7.9	1.1	39.1	38.2	54.0	15.0	15.8
5	7.44000	30.4	27.9	39.2	34.9	9.5	0.5	44.7	42.2	54.0	9.3	11.8
6	9.92000	28.3	28.4	39.2	34.9	11.0	0.5	44.1	44.2	54.0	10.0	9.8
*7	12.39999	31.2	31.0	43.3	34.2	12.3	0.5	53.1	52.9	63.5	10.5	10.7
*8	14.87999	31.9	31.7	42.9	33.0	13.7	0.5	56.0	55.8	63.5	7.6	7.8
*9	17.35999	32.6	32.6	43.9	33.1	14.8	0.6	58.8	58.8	63.5	4.7	4.7
*10	19.84000	33.0	32.9	38.0	33.4	16.0	1.6	55.2	55.1	63.5	8.4	8.5
*11	22.32000	32.2	32.3	38.3	33.0	16.5	0.3	54.2	54.4	63.5	9.3	9.2
*12	24.80000	34.2	34.1	39.4	33.2	15.4	1.0	56.8	56.7	63.5	6.8	6.9

Sample Calculation :

RESULT=Reading + ANT Factor - Amp Gain + CABLE LOSS

Except for the above table : All other spurious emissions are more than 20dB below the limit.

* Test Distance 1m, 1m Limit=3m Limit(54dB)+20log(3/1)

The point don't use high pass filter.

DATA OF SUPURIOUS EMISSIONS(1GHz to 26GHz)

A-PEX INTERNATIONAL CO., LTD.
YOKOWA NO.3 OPEN SITE

COMPANY : SHARP CORPORATION
EQUIPMENT : Bluetooth CF Card
MODEL : DC2C1BZ0001
FCC ID : APYSJY0007
POWER : AC120V/60Hz
Mode : Receiving

REPORT NO : 22CE0007-YW-2
REGULATION : Fcc Part15SubpartC 247/209
TEST DISTANCE : 3m
DATE : 2001 / 12 / 6
Temp. / Humi. : 20deg.C / 43%


ENGINEER : Naoki Sakamoto

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

No.	FREQ [GHz]	S/A READING		ANT Factor [dB]	AMP GAIN [dB]	CABLE LOSS [dB]	RESULT		Limit PK [dBuV/m]	MARGIN	
		HOR [dBuV]	VER [dBuV]				HOR [dBuV/m]	VER [dBuV/m]		HOR [dB]	VER [dB]
1	1.29736	49.3	56.7	26.3	35.0	2.6	43.2	50.6	74.0	30.8	23.4
2	1.89636	48.2	50.3	29.7	34.5	3.3	46.7	48.8	74.0	27.3	25.2

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

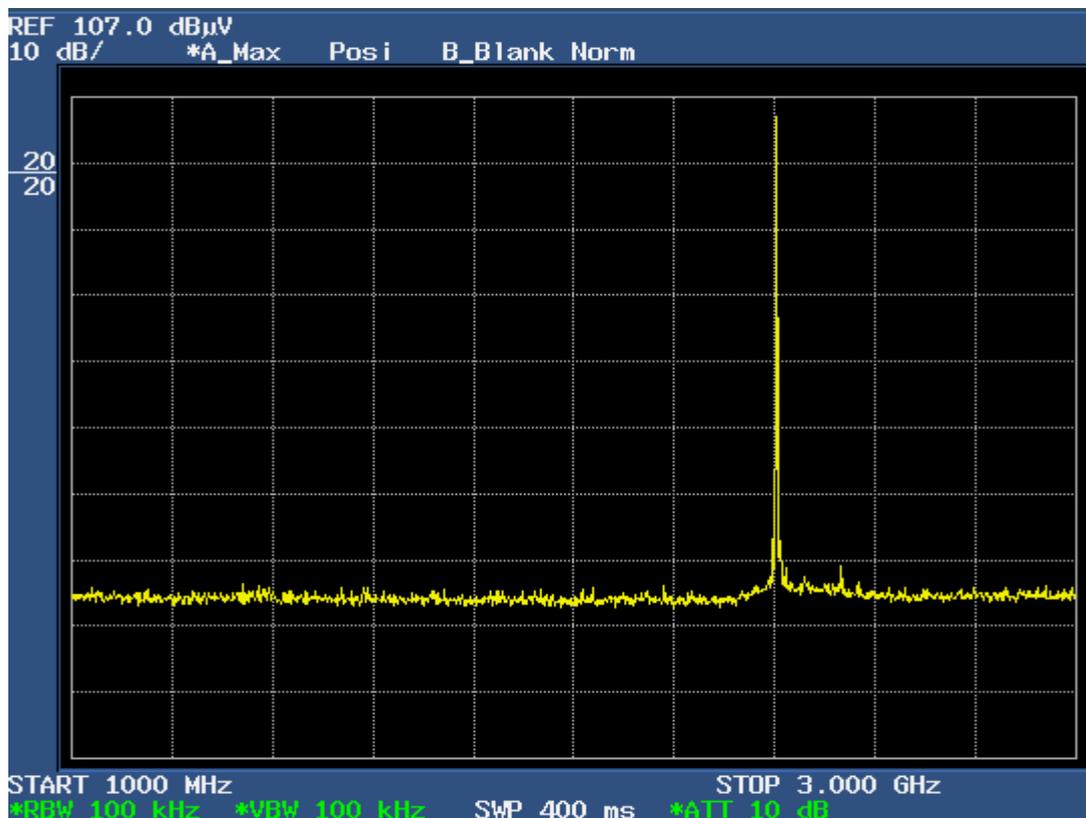
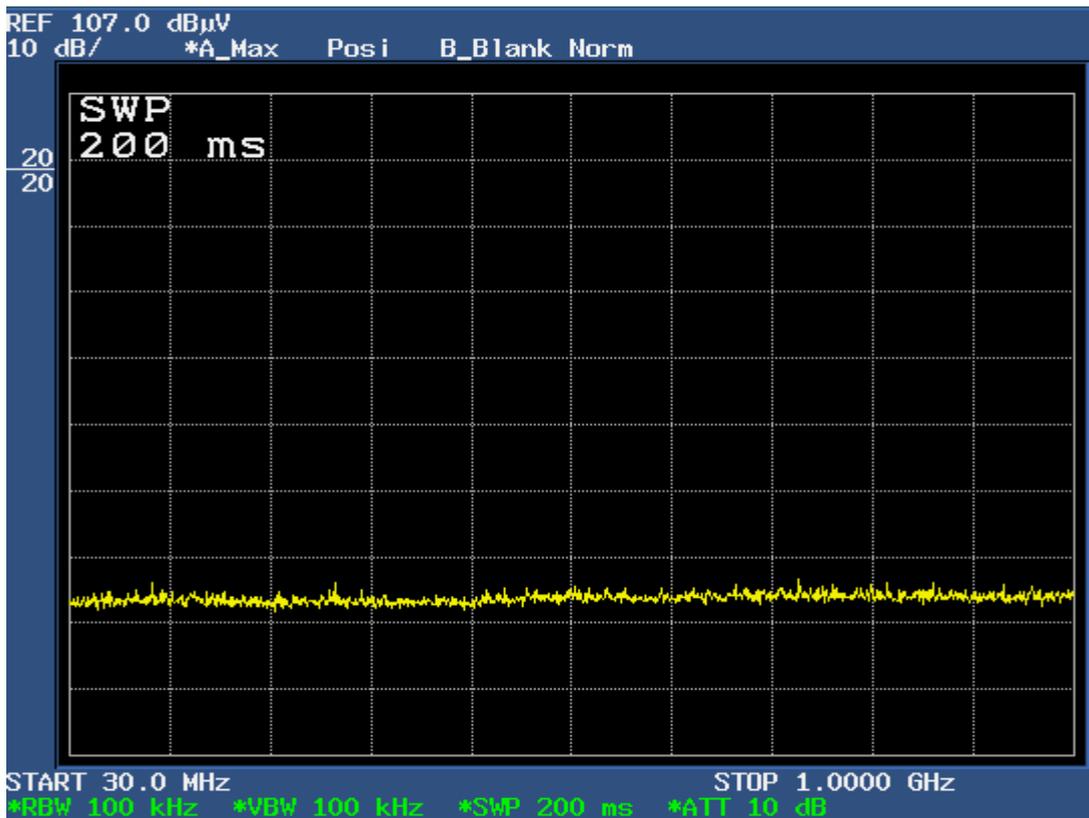
No.	FREQ [GHz]	S/A READING		ANT Factor [dB]	AMP GAIN [dB]	CABLE LOSS [dB]	RESULT		Limit AV [dBuV/m]	MARGIN	
		HOR [dBuV]	VER [dBuV]				HOR [dBuV/m]	VER [dBuV/m]		HOR [dB]	VER [dB]
1	1.29736	35.4	37.7	26.3	35.0	2.6	29.3	31.6	54.0	24.7	22.4
2	1.89636	33.8	34.1	29.7	34.5	3.3	32.3	32.6	54.0	21.7	21.4

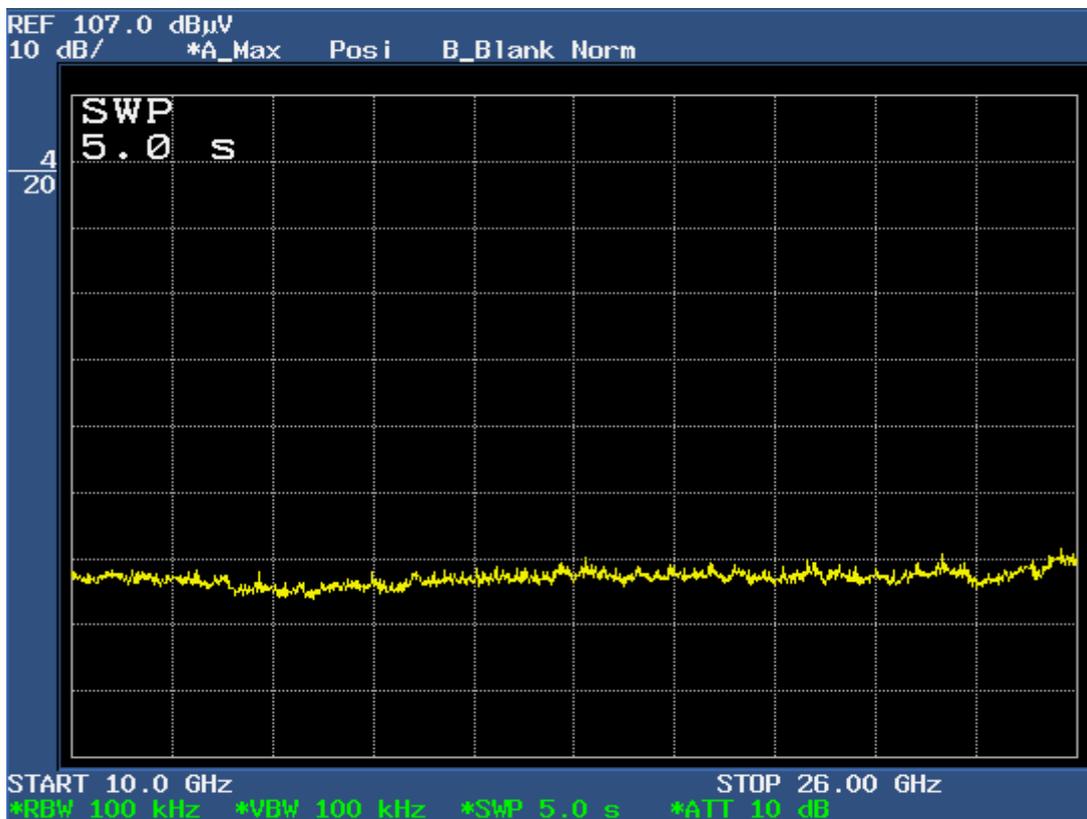
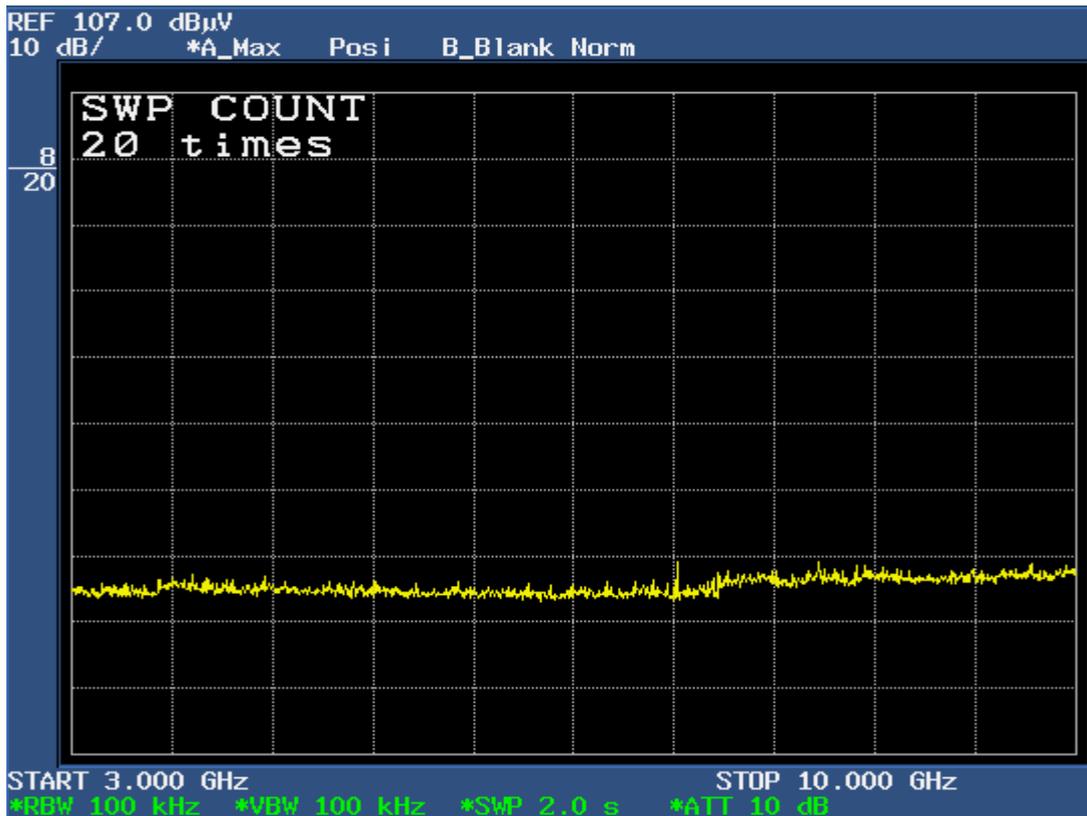
Sample Calculation :

RESULT=Reading + ANT Factor - Amp Gain + CABLE LOSS.

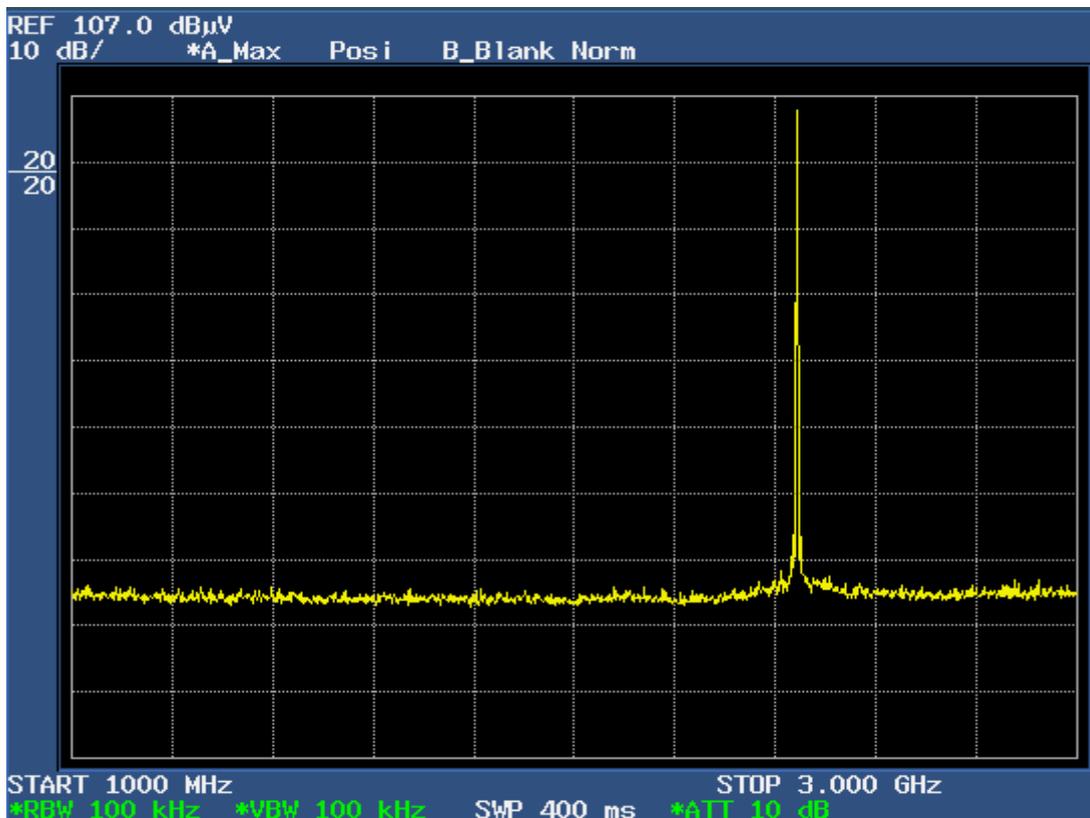
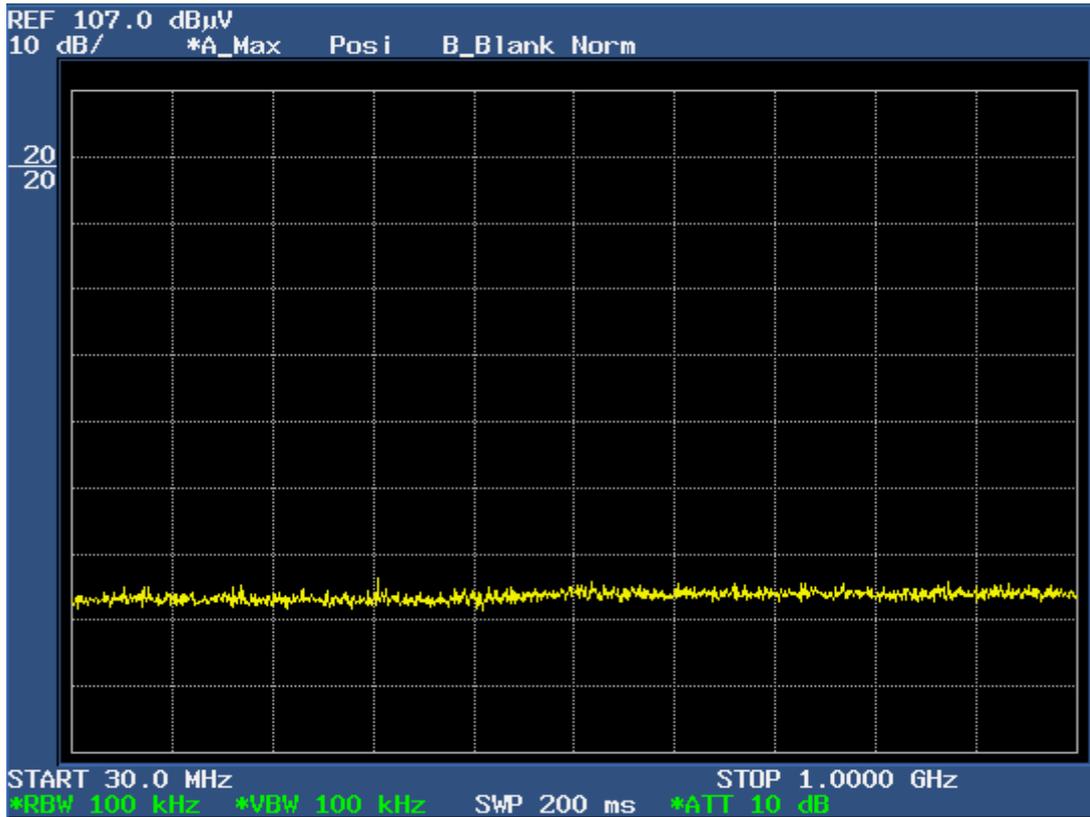
Except for the above table : All other spurious emissions are more than 20dB below the limit.

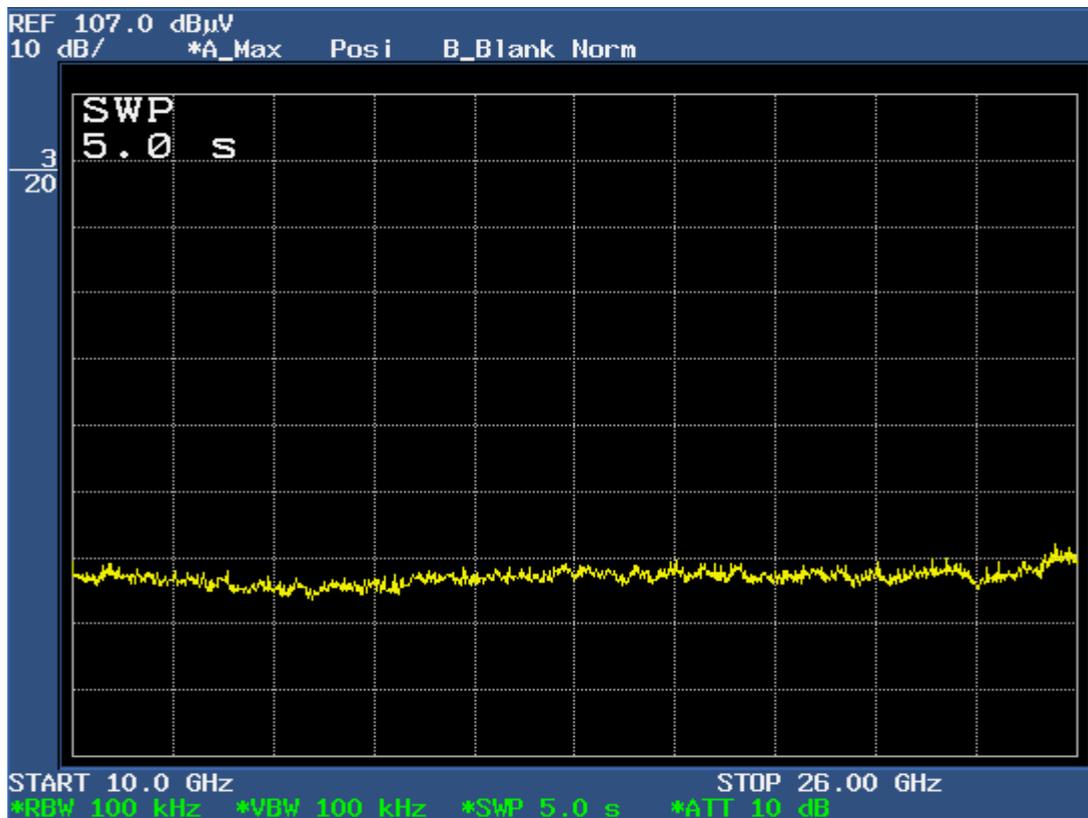
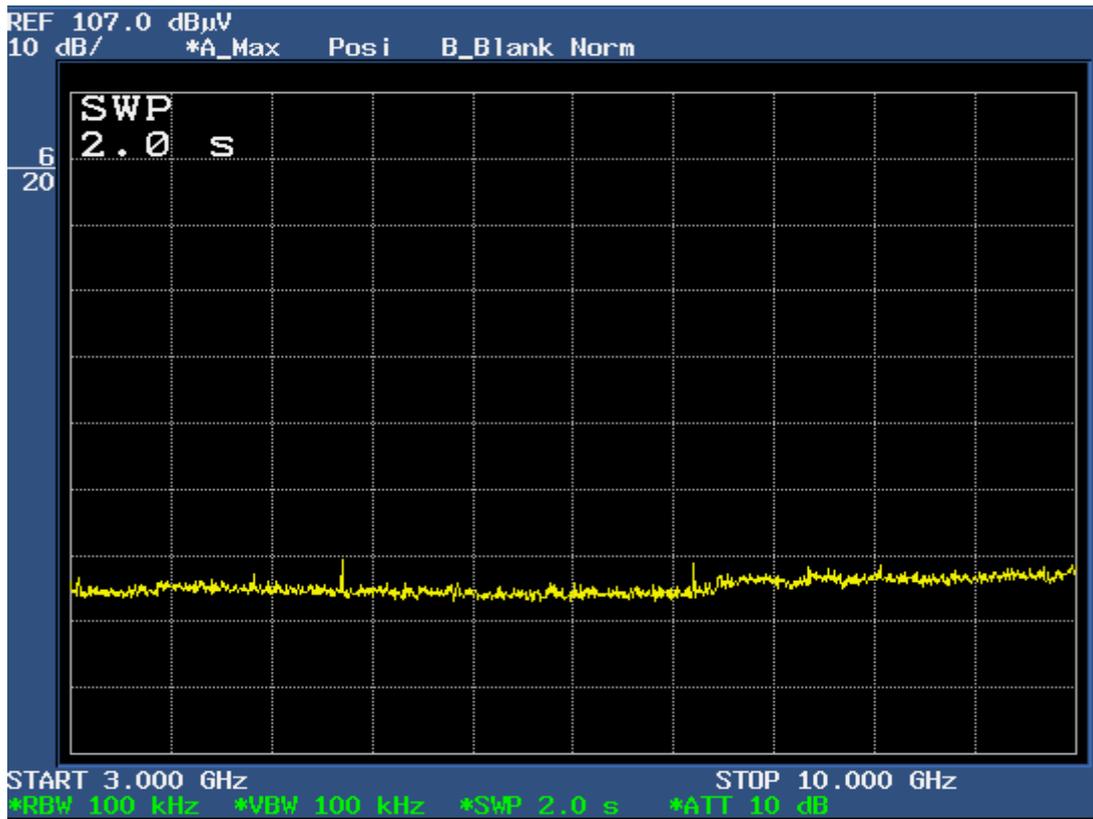
2402MHz(Low)





2441MHz(Mid)





2480MHz(High)

