



TEST REPORT

REPORT NUMBER : ANKK-102062

APPLICANT : Hitachi Ltd.,
Digital Media Products Division

MODEL NUMBER : SH-P300

FCC ID : ABLSP20

REGULATION : FCC Part15B Class B
Canada ICES-003 Class B

Conducted Emission Test
Radiated Emission Test



NVLAP accreditation is valid for FCC Part15 (Digital Devices), CISPR22 and AS/NZS 3548.

NVLAP accreditation does not cover ICES-003.

Akzo Nobel K. K.
EMC Division
Kashima Site

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ABBREVIATIONS

LISN = Line Impedance Stabilization Network

AMN = Artificial Mains Network

ISN = Impedance Stabilization Network

CDN = Coupling Decoupling Network

ANT = Antenna

BBA = Broadband Antenna

DIP = Dipole Antenna

AMP = Amplifier

ATT = Attenuator

EUT = Equipment Under Test

AE = Associated Equipment

Q-P = Quasi-peak

AVG = Average

SECTION 1. TEST CERTIFICATION

APPLICANT INFORMATION

Company	:	Hitachi Ltd., Digital Media Products Division
Address	:	1410 Inada, Hitachinaka-shi, Ibaraki-ken, 312-8505 Japan
Telephone number	:	+81 29 276 8745
Fax number	:	+81 29 276 0549

DESCRIPTION OF TEST ITEM

Kind of equipment	:	Handy Phone
Condition of equipment	:	Pre production
Type	:	Tabletop (Handheld type)
Trademark	:	HITACHI
FCC ID	:	ABLSP20
Model number	:	SH-P300
Serial number	:	None

TEST PERFORMED

Location	:	Kashima No. 1 Test Site (FCC File No. : 31040/SIT)
EUT received	:	March 22, 2002
Test started	:	March 22, 2002
Test completed	:	March 25, 2002
Purpose of test	:	FCC Docket 87-389 and Canadian Interference Causing Equipment Regulations
Regulation	:	FCC Part15B Class B and Canada ICES-003 Class B Unintentional Radiators
Test setup	:	ANSI C63.4-1992

Report number : ANKK-102062

Report issue date : April 9, 2002

Test engineer : Kazuhiro Ando



Report approved by : Junichi Okada
[Site Manager]



SECTION 2. CONCLUSION

This test report clearly shows that the EUT is in compliance with the FCC Part 15B Class B and Canada ICES-003 Class B specification.

Traceability to national standards of test result is achieved by means of calibration traceability to national standards.

The minimum margins to the limits are as follows:

Conducted Voltages on Mains Port			
RX mode (Channel High)	2.5 dB	at	1.7860 MHz
Radiated Electric Field			
RX mode (Channel High)	2.9 dB	at	6494.45 MHz

Note : See Section 9 for details.

SECTION 3. EQUIPMENT UNDER TEST

The equipment under test (EUT) consisted of the following equipment.
Indication in the following left side column corresponds to Section 6.

Symbol	Item	Model No.	Serial No.	FCC ID / DoC	Manufacturer	Remarks
A)	Handy Phone	SH-P300	None	ABLSP20	Hitachi Ltd.	
B)	Desktop Charger	SH-P300DTC	None	N.A.	Hitachi Ltd.	Option
C)	Traveler Charger	SH-P300ACT	None	N.A.	Hitachi Ltd.	Accessory

Power ratings of EUT : [Handy Phone] DC 3.7V (1000mAH battery)
[Traveler Charger] AC 120V, 60 Hz, 0.12 A

DoC : Device for Declaration of Conformity

3.1 Port(s)/Connector(s) :

Port name	Connector type	Connector pin	Remarks
Receptacle Head set jack	Hitachi-original Earphone Mic Jack	18 pin 1 pin	

3.2 Oscillator(s)/Crystal(s) :

Oscillator	Operating frequency	Board name	Remarks
19.2 MHz	19.2 MHz 2113.6 – 2173.6 MHz	Main Board Main Board	CPU PLL VCO, Highest frequency
	1391.82 MHz	Main Board	GPS Low
	527.2 MHz	Main Board	TX IF
	367.2 MHz	Main Board	IF VCO
48 MHz	48 MHz	Main Board	USB Clock
32.768 kHz	32.768 kHz	Main Board	RTC

SECTION 4. SUPPORT EQUIPMENT USED

The EUT was supported by the following equipment during the test.
Indication in the following left side column corresponds to Section 6.

Symbol	Item	Model No.	Serial No.	FCC ID / DoC	Manufacturer	Remarks
D)	Computer	Type 2628	97-4149B	DoC	IBM Corporation	
E)	Printer	C3941A	JPCD204480	B94C3941A	HP	
F)	PC Head Set/Mic	None	None	N.A.	Microtronics	
G)	AC Adapter	AA21131	1Z0ZA992GZA	DoC	IBM Corporation	

DoC : Device was tested and authorized under a Declaration of Conformity to the applicable FCC rules.

SECTION 5. CABLE (S) USED

The following cable(s) was used for the test.

Indication number in the following left side column corresponds to Section 6.

Number	Name	Length	Shield	Connector	Core
1)	Head Set/Mic cable (Curl cord)	0.60 m	None	Metal	
2)	USB cable	0.50 m	Yes	Metal	
3)	Centronics cable	1.80 m	Yes	Metal	
4)	Power cable for AC Adapter (C)	1.40 m	None		
5)	Power cable for Computer	1.80 m	None		Fixed × 1
6)	Power cable for AC Adapter (G)	1.00 m	None		
7)	Power cable for Printer	1.80 m	None		

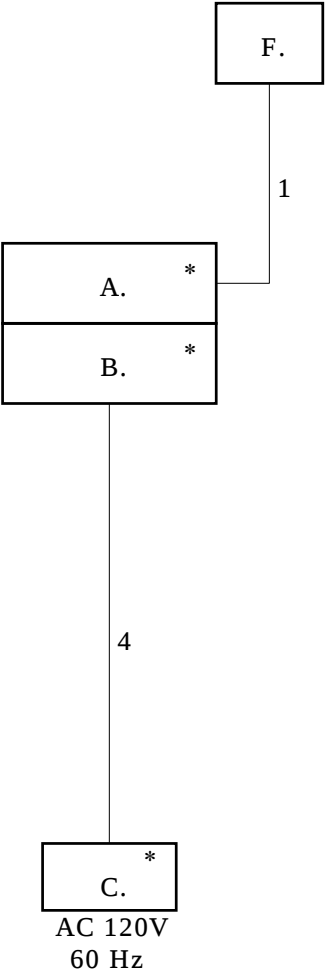
SECTION 6. CONSTRUCTION OF EQUIPMENT

The construction of EUT during the test was as follows.

6.1 Rx mode

System configuration

* : EUT
■ : Ferrite core

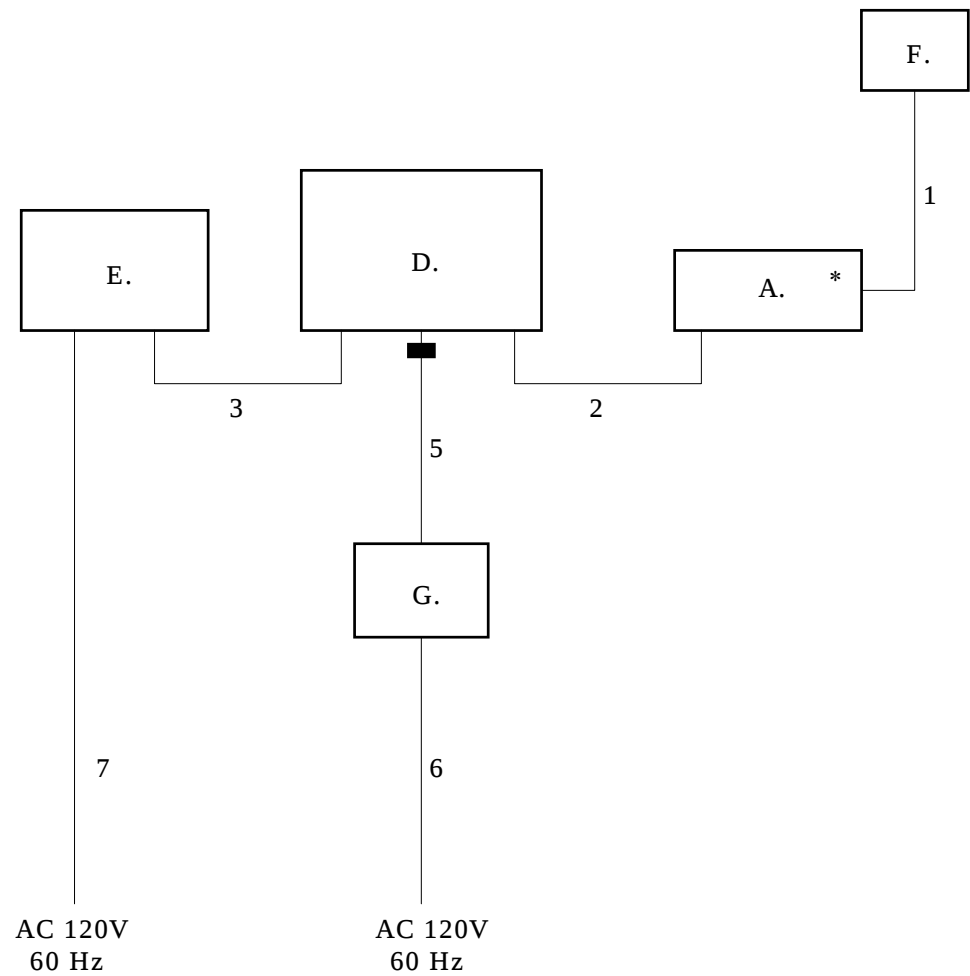


Symbols or numbers assigned to equipment or cables on this diagram are corresponded to the symbols or numbers assigned to equipment or cables on tables in Sections 3 to 5.

6.2 Data communications (USB) mode

System configuration

* : EUT
■ : Ferrite core



Symbols or numbers assigned to equipment or cables on this diagram are corresponded to the symbols or numbers assigned to equipment or cables on tables in Sections 3 to 5.

SECTION 7. OPERATING CONDITIONS

The EUT was operated under the following conditions during the test.

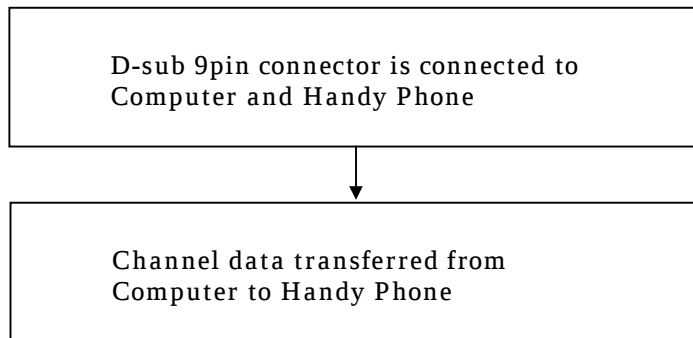
7.1 Operating condition

The test was carried out under Rx mode and Data communications (USB) mode. EUT was examined in the operating conditions that had maximum emissions.

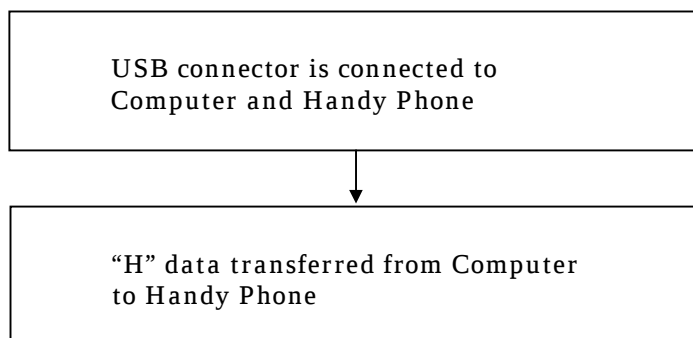
7.2 Operating flow

Following operations were performed continuously.

7.2.1 Rx mode



7.2.2 Data communications (USB) mode

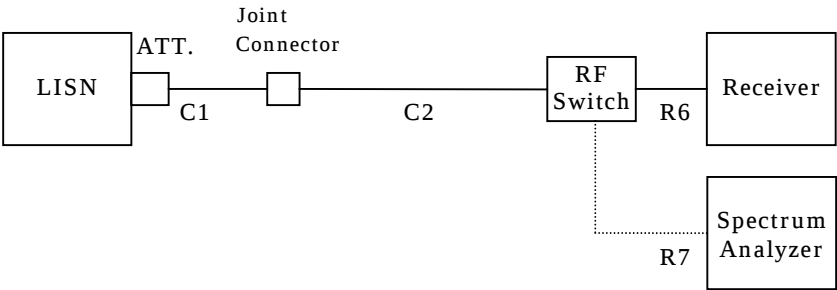


SECTION 8. TEST PROCEDURE(S)

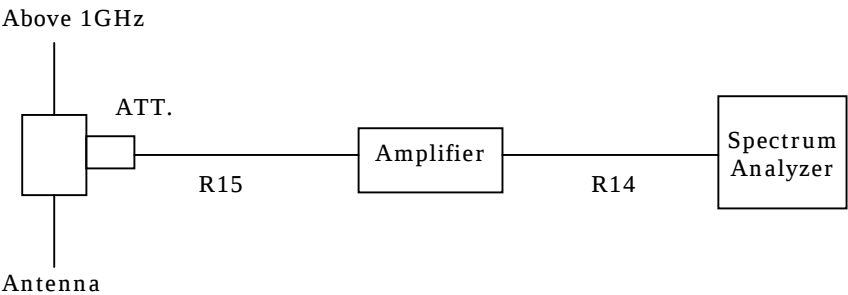
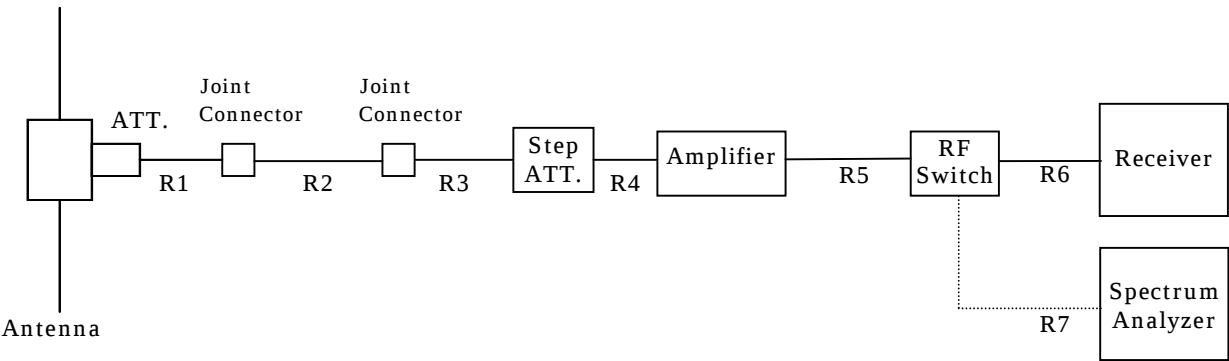
Test was carried out under the following conditions.
Test was carried out with no deviations from standards and test methods.

Subject	Test procedure	Scanned frequency
Conducted Voltages on Mains Port	Akzo Nobel Document number : 03-10-004	0.45 – 30 MHz
Radiated Electric Field	Akzo Nobel Document number : 03-10-003	30 – 11000 MHz

Schema for the conducted voltages on mains port measurement



Schema for the radiated electric field measurement



Summary ;

8.1 Conducted Voltages on Mains Port

8.1.1 Equipment Setup

System configuration and Equipment setup are shown on Section 6 and Section 10.

8.1.1.1 Tabletop Equipment

EUT is placed on the wooden table, the top of which is 0.8meter above the metal ground plane.

8.1.1.2 Interconnecting Cables

Excess part of the interconnecting cables longer than 1 meter are bundled in the center. Cables that hang closer than 40 cm to the ground plane is folded back and forth forming bundle 30 to 40 cm long, hanging approx, in the middle between ground plane and table.

8.1.1.3 AC Power Cable

AC power cable for EUT is connected to one LISN which is placed on the ground plane. The LISN is placed in 80 cm from the nearest part of EUT chassis.
The excess power cable is bundled in the center, or shortened to appropriate length.
AC cables except from the EUT are connected second LISN.

8.1.2 Measuring Instruments

Measuring instruments list and their calibration schedule are shown on Section 11.
The brief description are as follows;

8.1.2.1 Spectrum Analyzer

The Spectrum analyzer is used for preliminary measurement.

8.1.2.2 EMI Test Receiver

The Quasi-peak detector (IF bandwidth : 10 kHz) and average detector (IF bandwidth : 10 kHz) built in test receiver is used for final measurement.
The test receiver is complied with the specification of the CISPR publication 16.

8.1.2.3 LISN

Two 50 μ H//50 Ω LISN are used. The chassis of the LISN is bonded to the ground plane by the copper blade.
One LISN is connected to the EUT. Other LISN (2nd LISN) is connected to the support equipment. The signal output of the 2nd LISN is terminated with a 50 Ω termination.

8.1.3 Test Procedure

8.1.3.1 Preliminary Measurement

EUT is tested on all operating conditions.

The spectrum analyzer is controlled by the computer program to sweep the frequency range to be measured, then spectrum chart are plotted out to find the worst emission conditions in operating mode and/or configuration decision for the final test.

All leads other than safety ground are tested.

8.1.3.2 Final Measurement

The EUT is operated in the worst emission condition found by the preliminary test. The equipment and cables are arranged or manipulated within the range of the test standard in the above condition.

At least six highest spectrum are measured in quasi-peak using the test receiver. When the value in the quasi-peak mode is higher than the limit in the standard, the measurement in the average mode is done to compare to the value in the quasi-peak mode. If the value in the quasi-peak mode exceeds the value in the average mode by more than 6 dB, the value reducing 13 dB from the value in the quasi-peak mode is used to compare to the limit.

8.2 Radiated Electric Field

8.2.1 Equipment Setup

System configuration and Equipment setup are shown on Section 6 and Section 10.

8.2.1.1 Tabletop Equipment

EUT is placed on the wooden table, the top of which is 0.8meter above the metal ground plane (turntable).

8.2.1.2 Interconnecting Cables

Excess part of the interconnecting cables longer than 1 meter are bundled in the center. Cables that hang closer than 40 cm to the ground plane is folded back and forth forming bundle 30 to 40 cm long, hanging approx, in the middle between ground plane and table.

8.2.2 Measuring Instruments

Measuring instruments list and calibration schedule are shown on Section 11.
The brief description are as follows;

8.2.2.1 Antennas

The broadband Tri-Log antenna is used for measurement on the frequency range 30 – 1000 MHz.

The Double ridged guide antenna is used for frequency higher than 1000 MHz.

If uncertain result was obtained, the broadband antenna is replaced by the half wave length dipole, then measurement is carried out over again.

8.2.2.2 Pre-amplifier

The broadband pre-amplifier is used for Radiated Electric Field measurement.

The signal to noise ratio is improved by using pre-amplifier.

8.2.2.3 Spectrum Analyzer

The spectrum analyzer is used for preliminary measurement of frequency range 30 – 1000 MHz, and also used for final measurement of higher than 1000 MHz (Resolution bandwidth : 1 MHz).

8.2.2.4 EMI Test Receiver

The Quasi-peak detector (IF bandwidth : 120 kHz) built in test receiver is used for final measurement of the frequency 30 – 1000 MHz.

The test receiver is complied with the specification of the CISPR publication 16.

8.2.2.5 Turntable

The turntable is capable for EUT weight and rotatable 0 to 360 degree horizontally by remote control in the test room.

8.2.2.6 Antenna Mast

The antenna mast is attachable to all antennas described on clause 8.2.2.1 and antenna height is adjustable 1 to 4 meters continuously by remote control at the test room, and antenna polarization is also changed by the remote control.

8.2.3 Test Procedure

8.2.3.1 Preliminary Measurement

EUT is tested on all operating conditions.

The spectrum analyzer is set max-hold mode and swept during turntable was rotated 0 to 360 degree. Then spectrum chart are plotted out to find the worst emission conditions in configuration, operating mode, or ambient noise notation.

8.2.3.2 Final Measurement

The EUT operated in the worst emission condition found by the preliminary test.

The turntable azimuth (EUT direction) and antenna height are adjusted the position so that maximum field strength is obtained for each frequency spectrum to be measured. The equipment and cables are arranged or manipulated within the range of the test standard in the above condition.

When the uncertain result was obtained, the measurement is retried by using the half wave dipole antenna instead of the broadband antenna.

SECTION 9. EVALUATION OF TEST RESULTS

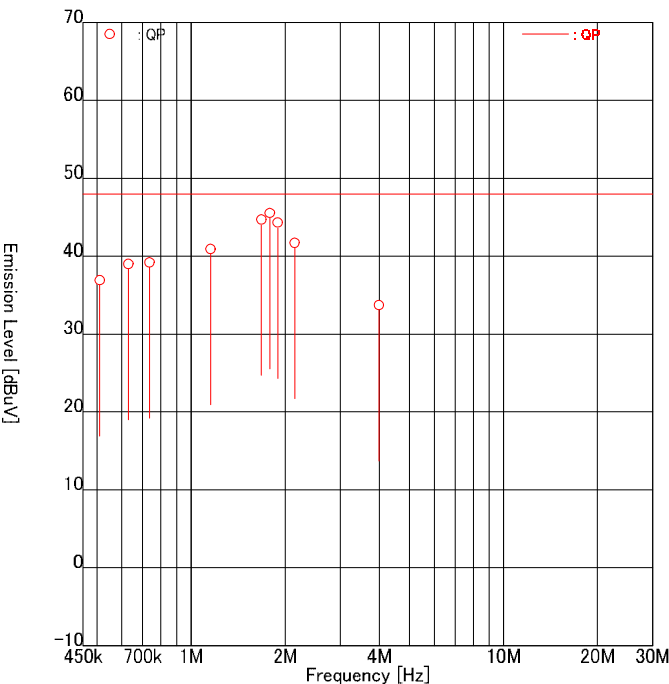
9.1 Conducted Voltages on Mains Port

9.1.1 Rx mode (Channel High)

Akzo Nobel K. K.
Kashima Kashima No.1 Test Site
Conducted Voltages on Mains Port

APPLICANT : Hiatchi Ltd. Digital Media
Products Division
EUT NAME : Handy Phone
MODEL NO. : SH-P300
SERIAL NO. : None
TEST MODE : Rx (Channel High)
POWER SOURCE : AC120V60Hz
DATE TESTED : Mar 25 2002
FILE NO. : ANKK-102062
REGULATION : FCC Part15B Class B
TEST METHOD : ANSI C63.4-1992
TEMPERATURE : 21.0 [degC]
HUMIDITY : 35.0 [%]

ENGINEER : Kazuhiro Ando



FREQUENCY No	[MHz]	READING [dBuV]		FACTOR [dB]		EMISSION [dBuV]		LIMIT [dBuV]	MARGIN [dB]	
		Line1	Line2	Line1	Line2	Line1	Line2		Line1	Line2
1	0.5099	31.0	28.2	5.9	5.9	36.9	34.1	48.0	11.1	13.9
2	0.6298	33.1	30.2	5.9	5.9	39.0	36.1	48.0	9.0	11.9
3	0.7366	33.2	28.5	6.0	5.9	39.2	34.4	48.0	8.8	13.6
4	1.1553	34.9	32.3	6.0	6.0	40.9	38.3	48.0	7.1	9.7
5	1.6797	38.6	37.8	6.1	6.1	44.7	43.9	48.0	3.3	4.1
6	1.7860	39.4	38.2	6.1	6.1	45.5	44.3	48.0	2.5	3.7
7	1.8933	38.2	36.6	6.1	6.1	44.3	42.7	48.0	3.7	5.3
8	2.1454	35.6	34.9	6.1	6.1	41.7	41.0	48.0	6.3	7.0
9	3.9981	27.5	25.1	6.2	6.2	33.7	31.3	48.0	14.3	16.7

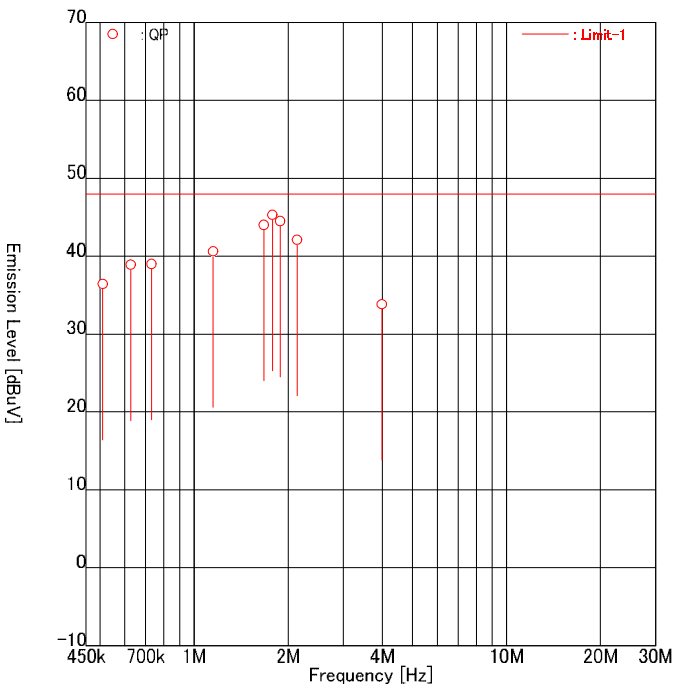
Other frequencies : Below the FCC Part15B Class B limit
Emission Level = Read + Factor(LISN,Pad,Cable)

9.1.2 Rx mode (Channel Low)

Akzo Nobel K. K.
Kashima Kashima No.1 Test Site
Conducted Voltages on Mains Port

APPLICANT : Hiatchi Ltd. Digital Media
Products Division
EUT NAME : Handy Phone
MODEL NO. : SH-P300
SERIAL NO. : None
TEST MODE : Rx (Channel Low)
POWER SOURCE : AC120V60Hz
DATE TESTED : Mar 25 2002
FILE NO. : ANKK-102062
REGULATION : FCC Part15B Class B
TEST METHOD : ANSI C63.4-1992
TEMPERATURE : 21.0 [degC]
HUMIDITY : 35.0 [%]

ENGINEER : Kazuhiro Ando



FREQUENCY No	[MHz]	READING [dBuV]		FACTOR [dB]		EMISSION [dBuV]		LIMIT [dBuV]	MARGIN [dB]	
		Line1	Line2	Line1	Line2	Line1	Line2		Line1	Line2
1	0.5102	30.5	28.4	5.9	5.9	36.4	34.3	48.0	11.6	13.7
2	0.6279	33.0	30.4	5.9	5.9	38.9	36.3	48.0	9.1	11.7
3	0.7314	33.0	28.5	6.0	5.9	39.0	34.4	48.0	9.0	13.6
4	1.1500	34.6	32.3	6.0	6.0	40.6	38.3	48.0	7.4	9.7
5	1.6723	37.9	37.5	6.1	6.1	44.0	43.6	48.0	4.0	4.4
6	1.7808	39.2	38.2	6.1	6.1	45.3	44.3	48.0	2.7	3.7
7	1.8882	38.4	36.9	6.1	6.1	44.5	43.0	48.0	3.5	5.0
8	2.1384	36.0	35.0	6.1	6.1	42.1	41.1	48.0	5.9	6.9
9	3.9887	27.6	24.8	6.2	6.2	33.8	31.0	48.0	14.2	17.0

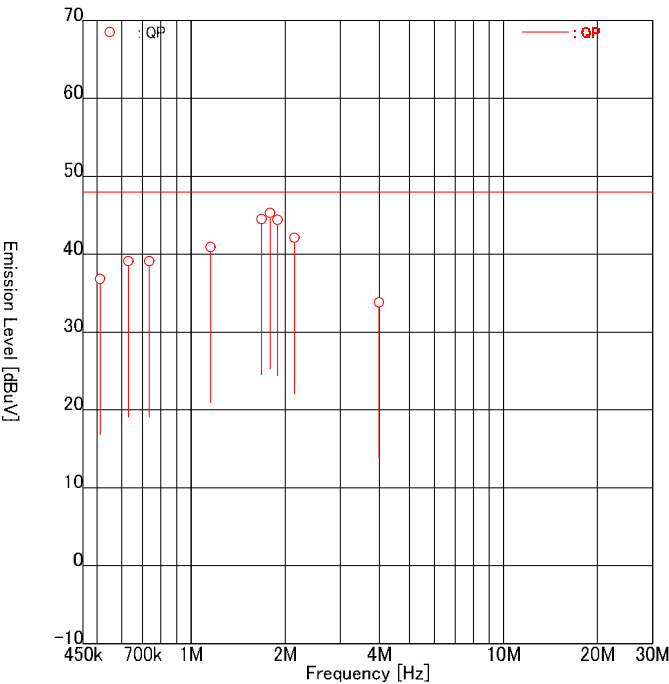
Other frequencies : Below the FCC Part15B Class B limit
Emission Level = Read + Factor(LISN,Pad,Cable)

9.1.3 Rx mode (Channel Middle)

Akzo Nobel K. K.
Kashima Kashima No.1 Test Site
Conducted Voltages on Mains Port

APPLICANT : Hiatchi Ltd. Digital Media
Products Division
EUT NAME : Handy Phone
MODEL NO. : SH-P300
SERIAL NO. : None
TEST MODE : Rx (Channel Middle)
POWER SOURCE : AC120V60Hz
DATE TESTED : Mar 25 2002
FILE NO. : ANKK-102062
REGULATION : FCC Part15B Class B
TEST METHOD : ANSI C63.4-1992
TEMPERATURE : 21.0 [degC]
HUMIDITY : 35.0 [%]

ENGINEER : Kazuhiro Ando



FREQUENCY No	[MHz]	READING [dBuV]		FACTOR [dB]		EMISSION [dBuV]		LIMIT [dBuV]	MARGIN [dB]	
		Line1	Line2	Line1	Line2	Line1	Line2		Line1	Line2
1	0.5117	30.9	28.3	5.9	5.9	36.8	34.2	48.0	11.2	13.8
2	0.6301	33.2	30.2	5.9	5.9	39.1	36.1	48.0	8.9	11.9
3	0.7351	33.1	28.4	6.0	5.9	39.1	34.3	48.0	8.9	13.7
4	1.1551	34.9	32.3	6.0	6.0	40.9	38.3	48.0	7.1	9.7
5	1.6819	38.4	37.7	6.1	6.1	44.5	43.8	48.0	3.5	4.2
6	1.7885	39.2	38.2	6.1	6.1	45.3	44.3	48.0	2.7	3.7
7	1.8920	38.3	36.8	6.1	6.1	44.4	42.9	48.0	3.6	5.1
8	2.1428	36.0	34.8	6.1	6.1	42.1	40.9	48.0	5.9	7.1
9	3.9956	27.6	24.9	6.2	6.2	33.8	31.1	48.0	14.2	16.9

Other frequencies : Below the FCC Part15B Class B limit
Emission Level = Read + Factor(LISN,Pad,Cable)

9.2 Radiated Electric Field

9.2.1 Rx mode (Channel High) [30 MHz - 1000 MHz]

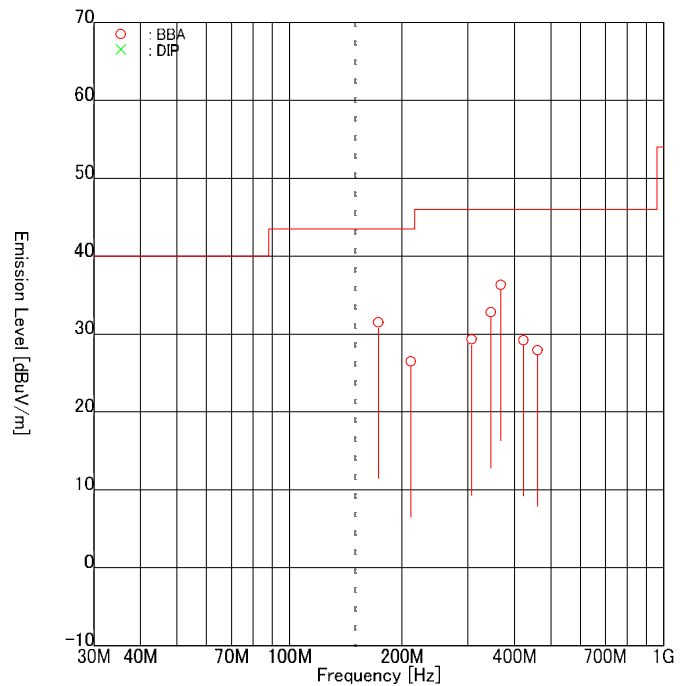
Akzo Nobel K. K.

Kashima Kashima No.1 Test Site

Radiated Electric Field

APPLICANT : Hiatchi Ltd. Digital Media
 Products Division
 EUT NAME : Handy Phone
 MODEL NO. : SH-P300
 SERIAL NO. : None
 TEST MODE : Rx (Channel High)
 POWER SOURCE : AC120V60Hz
 DATE TESTED : Mar 25 2002
 FILE NO. : ANKK-102062
 REGULATION : FCC Part15B Class B
 TEST METHOD : ANSI C63.4-1992
 DISTANCE : 3.0 [m]
 TEMPERATURE : 21.0 [degC]
 HUMIDITY : 35.0 [%]

ENGINEER : Kazuhiro Ando



FREQUENCY No	[MHz]	ANT.	READING [dBuV]		FACTOR [dB/m]		EMISSION [dBuV/m]		LIMIT [dBuV/m]	MARGIN [dB]	
			Hori	Vert	Hori	Vert	Hori	Vert		Hori	Vert
1	172.80	BBA	40.4	34.4	-8.9	-8.9	31.5	25.5	43.5	12.0	18.0
2	211.20	BBA	34.4	-	-7.9	-7.9	26.5	-	43.5	17.0	-
3	307.20	BBA	33.9	-	-4.6	-4.6	29.3	-	46.0	16.7	-
4	345.60	BBA	36.8	-	-4.0	-4.0	32.8	-	46.0	13.2	-
5	367.20	BBA	38.9	36.5	-2.6	-2.6	36.3	33.9	46.0	9.7	12.1
6	422.41	BBA	30.8	-	-1.6	-1.6	29.2	-	46.0	16.8	-
7	460.80	BBA	28.2	-	-0.3	-0.3	27.9	-	46.0	18.1	-

Other frequencies : Below the FCC Part15B Class B limit

Emission Level = Read + Factor(Antenna,Antenna Pad,Cable,Preamp)

ANT. : Used antenna(BBA = Broadband antenna, DIP = Dipole antenna)

9.2.2 Rx mode (Channel High) [1000 MHz ~ 11000 MHz]

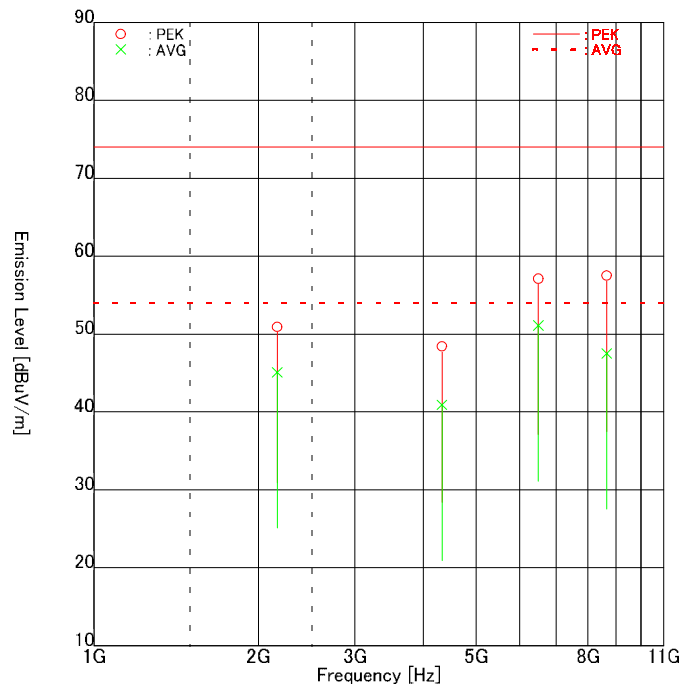
Akzo Nobel K. K.

Kashima Kashima No.1 Test Site

Radiated Electric Field

APPLICANT : Hiatchi Ltd. Digital Media
 Products Division
 EUT NAME : Handy Phone
 MODEL NO. : SH-P300
 SERIAL NO. : None
 TEST MODE : Rx (Channel High)
 POWER SOURCE : AC120V60Hz
 DATE TESTED : Mar 22 2002
 FILE NO. : ANKK-102062
 REGULATION : FCC Part15B Class B
 TEST METHOD : ANSI C63.4:1992
 DISTANCE : 3.0 [m]
 TEMPERATURE : 19.0 [degC]
 HUMIDITY : 40.0 [%]

ENGINEER : Kazuhiro Ando



FREQUENCY MODE			READING		FACTOR		EMISSION		LIMIT	MARGIN	
No	[MHz]		[dBuV]		[dB/m]		[dBuV/m]		[dBuV/m]	[dB]	
			Hori	Vert	Hori	Vert	Hori	Vert		Hori	Vert
1	2164.77	PEK	44.1	45.9	5.0	5.0	49.1	50.9	74.0	24.9	23.1
2	2164.77	AVG	37.6	40.1	5.0	5.0	42.6	45.1	54.0	11.4	8.9
3	4329.59	PEK	35.3	35.8	12.6	12.6	47.9	48.4	74.0	26.1	25.6
4	4329.59	AVG	26.5	28.3	12.6	12.6	39.1	40.9	54.0	14.9	13.1
5	6494.45	PEK	38.3	35.3	18.8	18.8	57.1	54.1	74.0	16.9	19.9
6	6494.45	AVG	32.3	25.5	18.8	18.8	51.1	44.3	54.0	2.9	9.7
7	8659.23	PEK	34.3	32.8	23.2	23.2	57.5	56.0	74.0	16.5	18.0
8	8659.23	AVG	24.3	21.0	23.2	23.2	47.5	44.2	54.0	6.5	9.8

Other frequencies : Below the FCC Part15B Class B limit

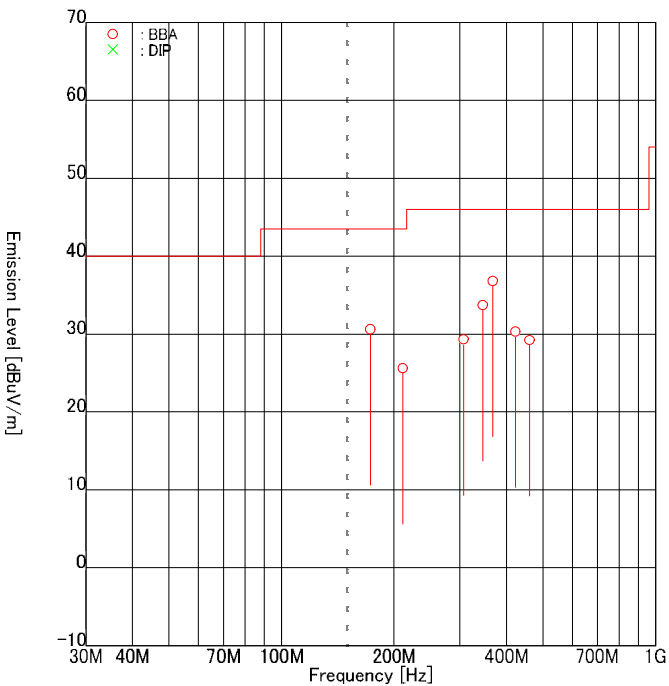
Emission Level = Read + Factor(Antenna,Antenna Pad,Cable,Preamp)

9.2.3 Rx mode (Channel Low) [30 MHz - 1000 MHz]

Akzo Nobel K. K.
Kashima Kashima No.1 Test Site
Radiated Electric Field

APPLICANT : Hiatchi Ltd. Digital Media
Products Division
EUT NAME : Handy Phone
MODEL NO. : SH-P300
SERIAL NO. : None
TEST MODE : Rx (Channel Low)
POWER SOURCE : AC120V60Hz
DATE TESTED : Mar 25 2002
FILE NO. : ANKK-102062
REGULATION : FCC Part15B Class B
TEST METHOD : ANSI C63.4-1992
DISTANCE : 3.0 [m]
TEMPERATURE : 21.0 [degC]
HUMIDITY : 35.0 [%]

ENGINEER : Kazuhiro Ando



FREQUENCY No	[MHz]	ANT.	READING [dBuV]		FACTOR [dB/m]		EMISSION [dBuV/m]		LIMIT [dBuV/m]	MARGIN [dB]	
			Hori	Vert	Hori	Vert	Hori	Vert		Hori	Vert
1	172.80	BBA	39.5	33.7	-8.9	-8.9	30.6	24.8	43.5	12.9	18.7
2	211.20	BBA	33.5	-	-7.9	-7.9	25.6	-	43.5	17.9	-
3	307.20	BBA	33.9	-	-4.6	-4.6	29.3	-	46.0	16.7	-
4	345.60	BBA	37.7	-	-4.0	-4.0	33.7	-	46.0	12.3	-
5	367.20	BBA	39.4	36.6	-2.6	-2.6	36.8	34.0	46.0	9.2	12.0
6	422.41	BBA	31.9	-	-1.6	-1.6	30.3	-	46.0	15.7	-
7	460.80	BBA	29.5	-	-0.3	-0.3	29.2	-	46.0	16.8	-

Other frequencies : Below the FCC Part15B Class B limit

Emission Level = Read + Factor(Antenna,Antenna Pad,Cable,Preamp)

ANT. : Used antenna(BBA = Broadband antenna, DIP = Dipole antenna)

9.2.4 Rx mode (Channel Low) [1000 MHz ~ 11000 MHz]

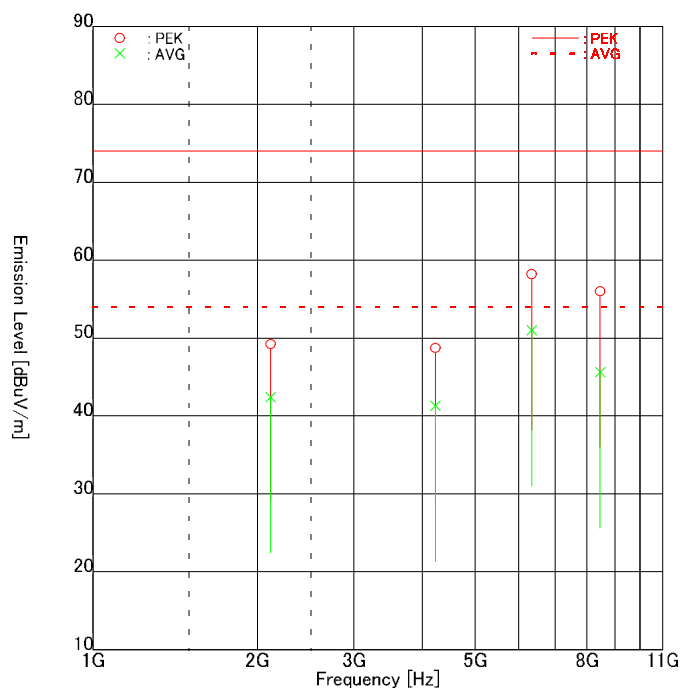
Akzo Nobel K. K.

Kashima Kashima No.1 Test Site

Radiated Electric Field

APPLICANT : Hiatchi Ltd. Digital Media
 Products Division
 EUT NAME : Handy Phone
 MODEL NO. : SH-P300
 SERIAL NO. : None
 TEST MODE : Rx (Channel Low)
 POWER SOURCE : AC120V60Hz
 DATE TESTED : Mar 22 2002
 FILE NO. : ANKK-102062
 REGULATION : FCC Part15B Class B
 TEST METHOD : ANSI C63.4:1992
 DISTANCE : 3.0 [m]
 TEMPERATURE : 19.0 [degC]
 HUMIDITY : 40.0 [%]

ENGINEER : Kazuhiro Ando



FREQUENCY No	MODE [MHz]		READING [dBuV]		FACTOR [dB/m]		EMISSION [dBuV/m]		LIMIT [dBuV/m]	MARGIN [dB]	
			Hori	Vert	Hori	Vert	Hori	Vert		Hori	Vert
1	2114.80	PEK	42.6	44.4	4.8	4.8	47.4	49.2	74.0	26.6	24.8
2	2114.80	AVG	35.0	37.6	4.8	4.8	39.8	42.4	54.0	14.2	11.6
3	4229.66	PEK	36.2	36.1	12.5	12.5	48.7	48.6	74.0	25.3	25.4
4	4229.66	AVG	28.8	28.0	12.5	12.5	41.3	40.5	54.0	12.7	13.5
5	6344.51	PEK	39.6	36.1	18.6	18.6	58.2	54.7	74.0	15.8	19.3
6	6344.51	AVG	32.4	27.8	18.6	18.6	51.0	46.4	54.0	3.0	7.6
7	8459.34	PEK	33.4	33.2	22.6	22.6	56.0	55.8	74.0	18.0	18.2
8	8459.34	AVG	23.0	21.0	22.6	22.6	45.6	43.6	54.0	8.4	10.4

Other frequencies : Below the FCC Part15B Class B limit

Emission Level = Read + Factor(Antenna,Antenna Pad,Cable,Preamp)

9.2.5 Rx mode (Channel Middle) [30 MHz - 1000 MHz]

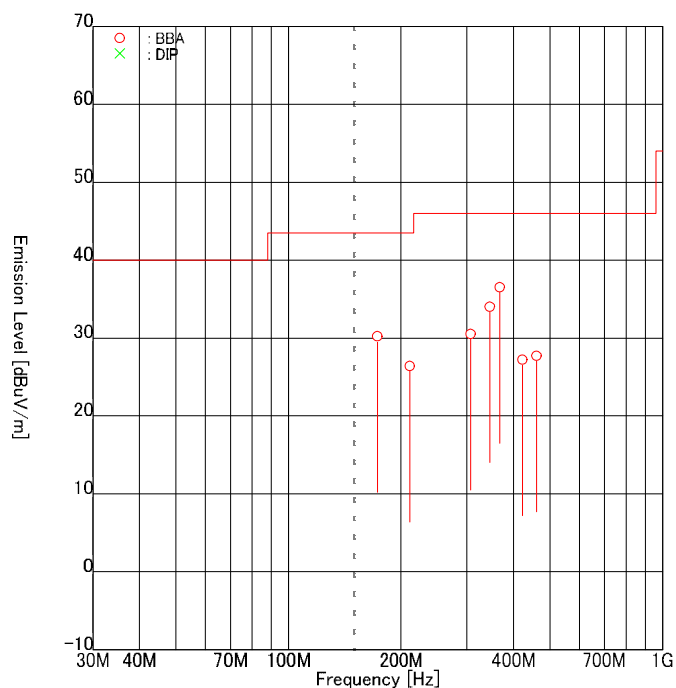
Akzo Nobel K. K.

Kashima Kashima No.1 Test Site

Radiated Electric Field

APPLICANT : Hiatchi Ltd. Digital Media
 Products Division
 EUT NAME : Handy Phone
 MODEL NO. : SH-P300
 SERIAL NO. : None
 TEST MODE : Rx (Channel Middle)
 POWER SOURCE : AC120V60Hz
 DATE TESTED : Mar 25 2002
 FILE NO. : ANKK-102062
 REGULATION : FCC Part15B Class B
 TEST METHOD : ANSI C63.4-1992
 DISTANCE : 3.0 [m]
 TEMPERATURE : 21.0 [degC]
 HUMIDITY : 35.0 [%]

ENGINEER : Kazuhiro Ando



FREQUENCY No	[MHz]	ANT.	READING [dBuV]		FACTOR [dB/m]		EMISSION [dBuV/m]		LIMIT [dBuV/m]	MARGIN [dB]	
			Hori	Vert	Hori	Vert	Hori	Vert		Hori	Vert
1	172.80	BBA	39.1	35.3	-8.9	-8.9	30.2	26.4	43.5	13.3	17.1
2	211.20	BBA	34.3	-	-7.9	-7.9	26.4	-	43.5	17.1	-
3	307.20	BBA	35.1	-	-4.6	-4.6	30.5	-	46.0	15.5	-
4	345.60	BBA	38.0	-	-4.0	-4.0	34.0	-	46.0	12.0	-
5	367.20	BBA	39.1	35.5	-2.6	-2.6	36.5	32.9	46.0	9.5	13.1
6	422.41	BBA	28.8	-	-1.6	-1.6	27.2	-	46.0	18.8	-
7	460.80	BBA	28.0	-	-0.3	-0.3	27.7	-	46.0	18.3	-

Other frequencies : Below the FCC Part15B Class B limit

Emission Level = Read + Factor(Antenna,Antenna Pad,Cable,Preamp)

ANT. : Used antenna(BBA = Broadband antenna, DIP = Dipole antenna)

9.2.6 Rx mode (Channel Middle) [1000 MHz ~ 11000 MHz]

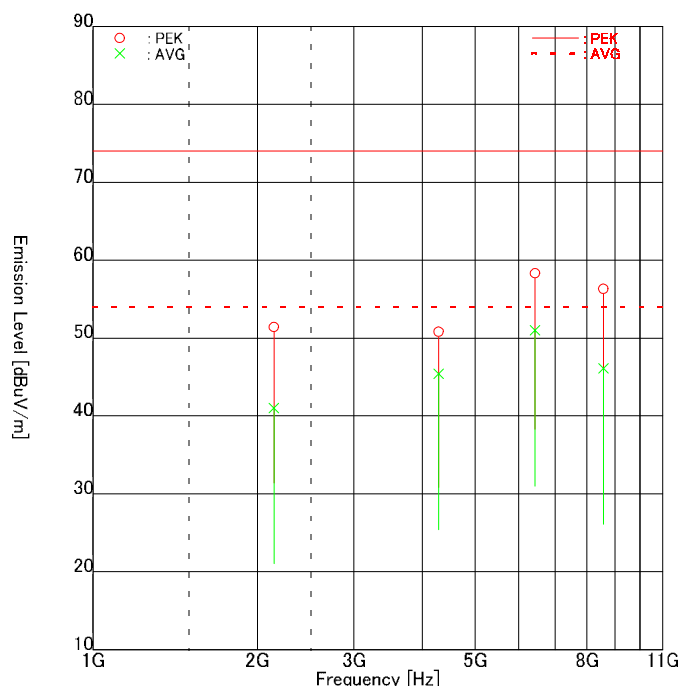
Akzo Nobel K. K.

Kashima Kashima No.1 Test Site

Radiated Electric Field

APPLICANT : Hiatchi Ltd. Digital Media
 Products Division
 EUT NAME : Handy Phone
 MODEL NO. : SH-P300
 SERIAL NO. : None
 TEST MODE : Rx (Channel Middle)
 POWER SOURCE : AC120V60Hz
 DATE TESTED : Mar 22 2002
 FILE NO. : ANKK-102062
 REGULATION : FCC Part15B Class B
 TEST METHOD : ANSI C63.4:1992
 DISTANCE : 3.0 [m]
 TEMPERATURE : 19.0 [degC]
 HUMIDITY : 40.0 [%]

ENGINEER : Kazuhiro Ando



FREQUENCY No	MODE [MHz]		READING [dBuV]		FACTOR [dB/m]		EMISSION [dBuV/m]		LIMIT [dBuV/m]	MARGIN [dB]	
			Hori	Vert	Hori	Vert	Hori	Vert		Hori	Vert
1	2143.63	PEK	43.4	46.5	4.9	4.9	48.3	51.4	74.0	25.7	22.6
2	2143.63	AVG	35.0	36.1	4.9	4.9	39.9	41.0	54.0	14.1	13.0
3	4287.18	PEK	35.8	38.2	12.6	12.6	48.4	50.8	74.0	25.6	23.2
4	4287.18	AVG	26.4	32.8	12.6	12.6	39.0	45.4	54.0	15.0	8.6
5	6430.84	PEK	39.5	36.7	18.8	18.8	58.3	55.5	74.0	15.7	18.5
6	6430.84	AVG	32.2	28.2	18.8	18.8	51.0	47.0	54.0	3.0	7.0
7	8574.42	PEK	33.3	33.4	22.9	22.9	56.2	56.3	74.0	17.8	17.7
8	8574.42	AVG	23.2	22.6	22.9	22.9	46.1	45.5	54.0	7.9	8.5

Other frequencies : Below the FCC Part15B Class B limit

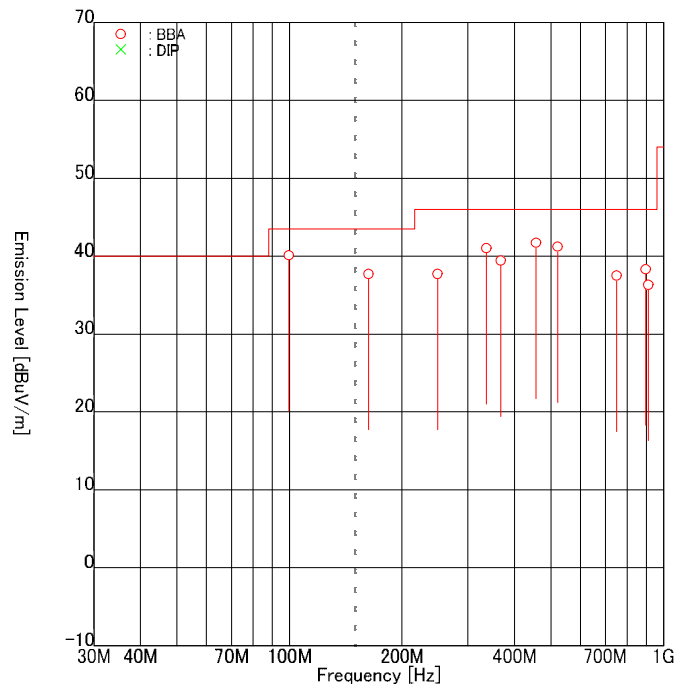
Emission Level = Read + Factor(Antenna,Antenna Pad,Cable,Preamp)

9.2.7 Data communications(USB) mode [30 MHz ~ 1000 MHz]

Akzo Nobel K. K.
Kashima Kashima No.1 Test Site
Radiated Electric Field

APPLICANT : Hiatchi Ltd. Digital Media
 Products Division
 EUT NAME : Handy Phone
 MODEL NO. : SH-P300
 SERIAL NO. : None
 TEST MODE : Data Communications (USB)
 POWER SOURCE : AC120V60Hz
 DATE TESTED : Mar 22 2002
 FILE NO. : ANKK-102062
 REGULATION : FCC Part15B Class B
 TEST METHOD : ANSI C63.4-1992
 DISTANCE : 3.0 [m]
 TEMPERATURE : 19.0 [degC]
 HUMIDITY : 40.0 [%]

ENGINEER : Kazuhiro Ando



FREQUENCY No	[MHz]	ANT.	READING [dBuV]		FACTOR [dB/m]		EMISSION [dBuV/m]		LIMIT [dBuV/m]	MARGIN [dB]	
			Hori	Vert	Hori	Vert	Hori	Vert		Hori	Vert
1	99.73	BBA	49.3	46.8	-9.2	-9.2	40.1	37.6	43.5	3.4	5.9
2	162.87	BBA	48.2	44.0	-10.5	-10.5	37.7	33.5	43.5	5.8	10.0
3	248.91	BBA	43.9	-	-6.2	-6.2	37.7	-	46.0	8.3	-
4	336.05	BBA	45.1	-	-4.1	-4.1	41.0	-	46.0	5.0	-
5	367.20	BBA	42.0	-	-2.6	-2.6	39.4	-	46.0	6.6	-
6	456.02	BBA	37.0	42.1	-0.4	-0.4	36.6	41.7	46.0	9.4	4.3
7	521.17	BBA	-	39.8	1.4	1.4	-	41.2	46.0	-	4.8
8	749.18	BBA	-	32.2	5.3	5.3	-	37.5	46.0	-	8.5
9	897.01	BBA	-	31.0	7.3	7.3	-	38.3	46.0	-	7.7
10	912.06	BBA	-	28.6	7.7	7.7	-	36.3	46.0	-	9.7

Other frequencies : Below the FCC Part15B Class B limit

Emission Level = Read + Factor(Antenna,Antenna Pad,Cable,Preamp)

ANT. : Used antenna(BBA = Broadband antenna, DIP = Dipole antenna)

9.2.8 Data communications(USB) mode [1000 MHz ~ 11000 MHz]

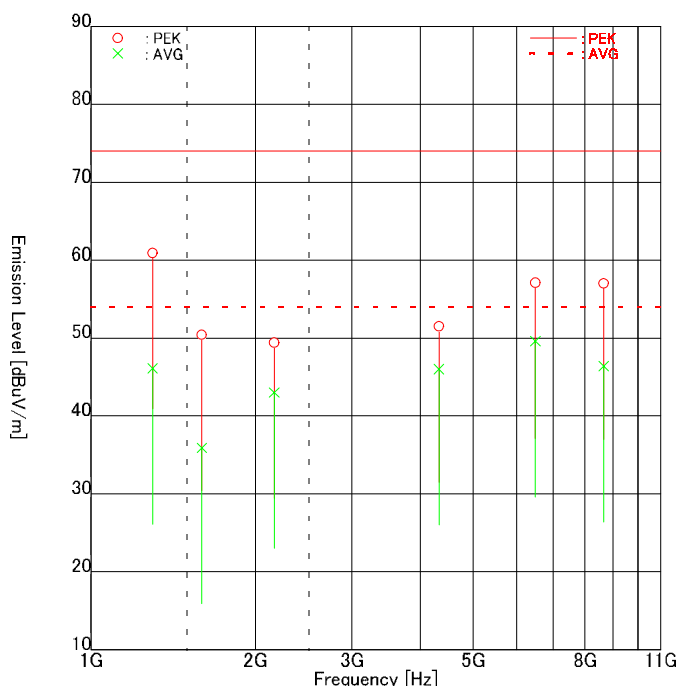
Akzo Nobel K. K.

Kashima Kashima No.1 Test Site

Radiated Electric Field

APPLICANT : Hiatchi Ltd. Digital Media
 Products Division
 EUT NAME : Handy Phone
 MODEL NO. : SH-P300
 SERIAL NO. : None
 TEST MODE : Data Communications (USB)
 POWER SOURCE : AC120V60Hz
 DATE TESTED : Mar 22 2002
 FILE NO. : ANKK-102062
 REGULATION : FCC Part15B Class B
 TEST METHOD : ANSI C63.4:1992
 DISTANCE : 3.0 [m]
 TEMPERATURE : 19.0 [degC]
 HUMIDITY : 40.0 [%]

ENGINEER : Kazuhiro Ando



FREQUENCY No	MODE [MHz]		READING [dBuV]		FACTOR [dB/m]		EMISSION [dBuV/m]		LIMIT [dBuV/m]	MARGIN [dB]	
			Hori	Vert	Hori	Vert	Hori	Vert		Hori	Vert
1	1296.70	PEK	53.0	60.0	0.9	0.9	53.9	60.9	74.0	20.1	13.1
2	1296.70	AVG	39.0	45.2	0.9	0.9	39.9	46.1	54.0	14.1	7.9
3	1595.93	PEK	44.1	48.4	2.0	2.0	46.1	50.4	74.0	27.9	23.6
4	1595.93	AVG	32.9	33.9	2.0	2.0	34.9	35.9	54.0	19.1	18.1
5	2164.85	PEK	44.4	41.6	5.0	5.0	49.4	46.6	74.0	24.6	27.4
6	2164.85	AVG	38.0	31.9	5.0	5.0	43.0	36.9	54.0	11.0	17.1
7	4329.61	PEK	37.1	38.9	12.6	12.6	49.7	51.5	74.0	24.3	22.5
8	4329.61	AVG	29.6	33.4	12.6	12.6	42.2	46.0	54.0	11.8	8.0
9	6494.45	PEK	35.5	38.3	18.8	18.8	54.3	57.1	74.0	19.7	16.9
10	6494.45	AVG	24.6	30.8	18.8	18.8	43.4	49.6	54.0	10.6	4.4
11	8659.23	PEK	32.8	33.8	23.2	23.2	56.0	57.0	74.0	18.0	17.0
12	8659.23	AVG	20.8	23.2	23.2	23.2	44.0	46.4	54.0	10.0	7.6

Other frequencies : Below the FCC Part15B Class B limit

Emission Level = Read + Factor(Antenna,Antenna Pad,Cable,Preamp)

9.3 Sample Calculations

9.3.1 Conducted Voltages on Mains Port

Example @ 1.7860 MHz

Emission Level	=	Meter Reading		39.4	dBuV
	+	Factor		6.1	dB
			=	45.5	dBuV
Margin	=	Limit		48.0	dBuV
	-	Emission Level		45.5	dBuV
			=	2.5	dB

Factor = LISN Factor + Cable Loss + Pad Loss

9.3.2 Radiated Electric Field

Example @ 6494.45 MHz

Emission Level	=	Meter Reading		32.3	dBuV
	+	Factor		18.8	dB/m
			=	51.1	dBuV/m
Margin	=	Limit		54.0	dBuV/m
	-	Emission Level		51.1	dBuV/m
			=	2.9	dB

Factor = Antenna Factor + Cable Loss – Amplifier Gain + Pad Loss

SECTION 10. PHOTOGRAPHS OF MAXIMUM EMISSION SET-UP

10.1 Conducted Voltages on Mains Port

Test setup in accordance with ANSI C63.4-1992



Front view

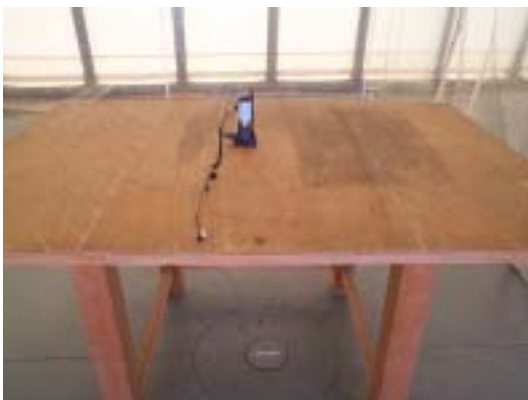


Side view

10.2 Radiated Electric Field

10.2.1 Rx mode

Test setup in accordance with ANSI C63.4-1992



Front view



Rear view

10.2.1 Data communications (USB) mode

Test setup in accordance with ANSI C63.4-1992



Front view



Rear view

Note : Maintaining 10cm spacing between all the equipment cabinets.

SECTION 11. INSTRUMENTS USED FOR FINAL TEST

Instrument	Model No.	Serial No.	Manufacturer	Last cal. date	Period
LISN (EUT)	ESH2-Z5	881492/014	ROHDE & SCHWARZ	Oct. 3, 01	1 Year
6dB Attenuator	CFA-01	None	TME	Oct. 4, 01	1 Year
LISN (Peripheral)	KNW-242	8-851-21	KYORITSU	Feb. 25, 02	1 Year
50Ω Termination	CT-01	A010CON50	TME	Feb. 25, 02	1 Year
Coaxial cable	5D-2W(7.0 m)	C1	AKZO	Oct. 4, 01	1 Year
	5D-2W(2.0 m)	C2	AKZO	Oct. 4, 01	1 Year
	5D-2W(1.0 m)	R6	AKZO	Oct. 4, 01	1 Year
	5D-2W(1.0 m)	R7	AKZO	Oct. 4, 01	1 Year
Broad Band antenna	LPB-2513/A	1103	A.R.A.	May 17, 01	1 Year
Double Ridged antenna	3115	5044	EMCO	Jul. 16, 01	1 Year
6dB Attenuator	MP721B	M57593	ANRITSU	Oct. 4, 01	1 Year
	6806.17.B	None	SUHNER	Mar. 18, 02	1 Year
Step Attenuator	8494B	2726A14513	HEWLETT PACKARD	Oct. 4, 01	1 Year
Spectrum Analyzer	8564E	3643A00665	HEWLETT PACKARD	Jul. 19, 01	1 Year
Amplifier	8447D	1937A03130	HEWLETT PACKARD	Oct. 4, 01	1 Year
	83051A	3332A00329	HEWLETT PACKARD	Aug. 21, 01	1 Year
Coaxial cable	5D-2W(9.0 m)	R1	AKZO	Oct. 4, 01	1 Year
	10D-2W(5.5 m)	R2	AKZO	Oct. 4, 01	1 Year
	5D-2W(2.0 m)	R3	AKZO	Oct. 4, 01	1 Year
	5D-2W(0.2 m)	R4	AKZO	Oct. 4, 01	1 Year
	5D-2W(1.0 m)	R5	AKZO	Oct. 4, 01	1 Year
	5D-2W(1.0 m)	R6	AKZO	Oct. 4, 01	1 Year
	5D-2W(1.0 m)	R7	AKZO	Oct. 4, 01	1 Year
	SUCOFLEX 102(1.0 m)	R14 712/2	SUHNER	Mar. 18, 02	1 Year
Test receiver	SUCOFLEX 102(5.0 m)	R15 713/2	SUHNER	Mar. 18, 02	1 Year
	ESS	844861/004	ROHDE & SCHWARZ	Apr. 11, 01	1 Year
RF Switch	ACX-150	None	AKZO	Oct. 4, 01	1 Year
Site Attenuation				May 28, 01	1 Year

Note : Test instruments are calibrated according to Quality Manual and Calibration Rules of EMC division.

SECTION 12. MEASUREMENT UNCERTAINTY

The uncertainty of the measurements performed for this report lies:

Radiated Electric Field at 3m

30 MHz – 1000 MHz +/- 3.6 dB

Above 1 GHz +/- 3.9 dB

Conducted Voltages on Mains Port

9 kHz – 30 MHz +/- 1.8 dB

Note on Radiated Electric Field measurement uncertainty

The following items are not included in the calculations in spite of their own uncertainty components because it is impracticable to find the value.

It is our problem awaiting solution in future.

(1) Repeatability of measurement

It is not possible to calculate repeatability since the measurement was carried out only one time.

(2) Antenna factor variation

The definition of measured (radiated electric field strength) is not completed on the referred standard(s).

(3) Loss of EUT radiation propagation

It is certainly one of the uncertainty components, however is not able to calculate.

Please note that these uncertainties are not reflected to the compliance judgement of the test results in this report.

SECTION 13. VALIDITY OF TEST REPORT

- 13.1 The test result of this report is effective for equipment under test itself and under the test configuration described on the report.
- 13.2 This test report does not assure that whether the test result taken in other testing laboratory is compatible or reproducible to the test result on this report or not.
- 13.3 This test report shall not be reproduced except in full, without issuer's permission.

SECTION 14. DESCRIPTION OF TEST LABORATORY

14.1 Outline of Akzo Nobel K. K. (formerly Akzo Kashima Limited), EMC Division

Akzo Nobel K. K., the country organization in Japan for Akzo Nobel NV, was established in 1968. The shares are owned by Akzo Nobel NV (100%). Akzo Nobel NV, headquartered in the Netherlands, is one of the world's leading companies in selected areas of chemicals, coatings, healthcare products and fibers with work force of approximately 70,000 people in over 50 countries.

In 1984, in order to respond to the growing testing demand, in particular, for FCC filing, Akzo Nobel K. K. started EMI testing business, installing the first open air test site in Kashima, Ibaraki prefecture. Further the business has been expanded by installing additional testing facilities not only in Ibaraki but also in other areas such as Shizuoka, Nagano, Kanagawa and Tochigi. As results, Akzo Nobel K. K. has now 16 open air test sites and 4 anechoic chambers for EMI/EMC testing. As the largest EMC testing laboratory in number of testing facilities and staffs, EMC Division has been organized separately in the company and independently operated in conformity with the requirements of ISO Guide 25 (EN 45000) for its competency as a testing laboratory.

Akzo Nobel K. K. EMC Division is the first foreign private laboratory accredited by NVLAP, National Voluntary Laboratory Accreditation Program-NIST, USA. The division has been certified, authorized and/or filed as a competent testing laboratory by various testing organizations/authorities as described below.

14.2 Filing, certification, authorization and accreditation list

<u>EMI/EMC testing</u>		<u>Telecommunications terminal testing</u>	
FCC	(USA)	FCC	(USA)
NVLAP	(USA)	NVLAP	(USA)
NEMKO	(Norway)	NATA	(Australia)
VCCI	(Japan)	IC	(Canada)
ETL SEMKO Japan	(Sweden)		
TÜV PRODUCT SERVICE	(Germany)		

Note 1 : NVLAP accreditation does not constitute any product endorsement by NVLAP or any agent of the U.S. Government.