

APPENDIX 2: Test instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Test Item	Calibration Date * Interval(month)
MSA-04	Spectrum Analyzer	Agilent	E4448A	FT	2006/02/11 * 12
MCH-01	Temperature and Humidity Chamber	Tabai Espec	PL-2KP	FT	2005/12/19 * 12
MOS-04	Digital Humidity Indicator	N.T	NT-1800	FT	2004/11/25 * 24
MCC-26	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX104	FT	2005/08/30 * 12
MCC-30	coaxial cable	ULApex	-	FT	2005/06/02 * 12
MCC-08	coaxial cable	-	-	FT	2005/09/07 * 12
MAEC-04	Anechoic Chamber	TDK	Semi Anechoic Chamber 3m	RE / CE	2006/03/06 * 12
MCC-50	Coaxial cable	UL Apex	-	RE / CE	2006/03/09 * 12
MPA-14	Pre Amplifier	SONOA INSTRUMENT	310	RE	2006/03/25 * 12
MLPA-02	Loop Antenna	Rohde & Schwarz	HFH2-Z2	RE	2005/12/06 * 12
MSA-03	Spectrum Analyzer	Agilent	E4448A	RE / CE	2005/09/16 * 12
MTR-02	Test Receiver	Rohde & Schwarz	ESCS30	RE / CE	2006/02/02 * 12
MAT-31	Attenuator(6dB)	TME	UFA-01	RE	2006/03/11 * 12
MBA-05	Biconical Antenna	Schwarzbeck	BBA9106	RE	2006/01/29 * 12
MLA-08	Logperiodic Antenna	Schwarzbeck	UKLP9140-A	RE	2006/01/29 * 12
MLS-07	LISN(AMN)	Schwarzbeck	NSLK8127	CE (EUT)	2006/02/06 * 12
MLS-06	LISN(AMN)	Schwarzbeck	NSLK8127	CE (AE)	2006/02/06 * 12
MOS-15	Thermo-Hygrometer	Custom	CTH-180	RE / CE	2006/01/19 * 24
MTA-05	Terminator	MCL	NTRM-50	CE	2006/02/06 * 12
MSTW-14	EMI measurement program	TSJ	TEPTO-DV	RE / CE	-

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

Test Item:

CE: Conducted emission,
RE: Radiated emission,
FT: Frequency Tolerance

UL Apex Co., Ltd.

Head Office EMC Lab.

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MF060b(19.04.06)

APPENDIX 3: Data of EMI test

Conducted emission

DATA OF CONDUCTED EMISSION TEST

UL Apex Co., Ltd. Head Office EMC Lab. No. 4 Semi Anechoic Chamber
Date : 2006/04/28 04:05:12

Applicant : Ishino Seisakusho Co., Ltd.
Kind of EUT : RFID Reader/Writer
Model No. : C63
Serial No. : 1

Report No. : 26HE0252-HO
Power : AC 120V / 60Hz
Temp./Humi. : 24deg. C / 36%
Operator : Mitsuru Fujimura

Mode / Remarks : Transmitting Mode , With Tag

LIMIT : FCC15C §15.207 (QP)
FCC15C §15.207 (AV)

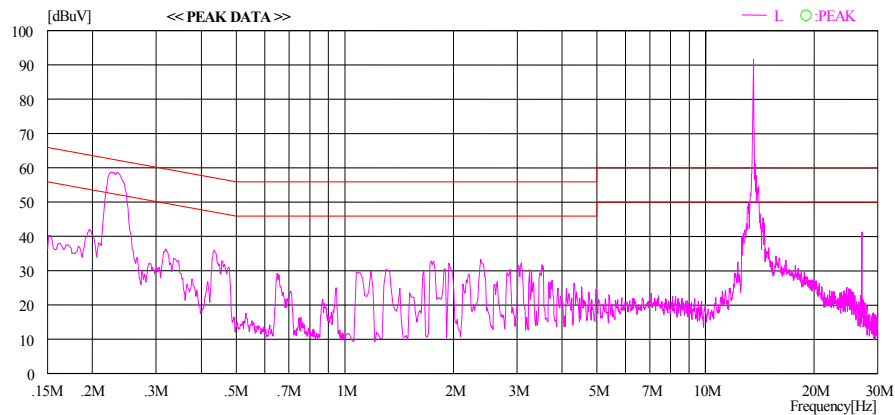
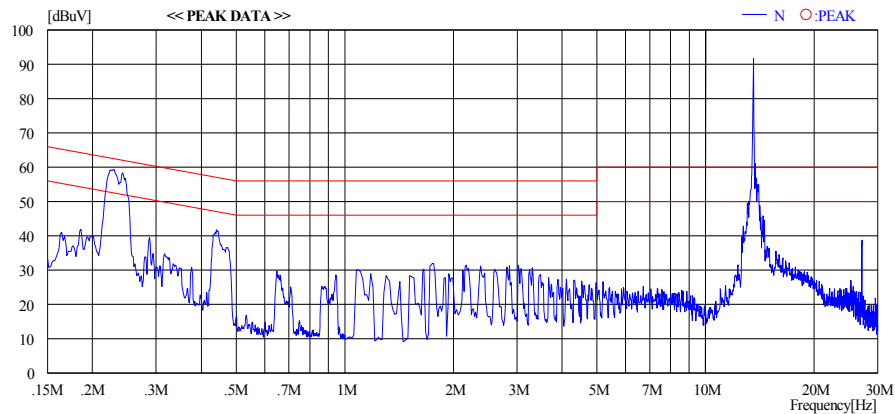


CHART: WITH FACTOR, Peak hold data. Data is uncorrected. CALCULATION: RESULT=READING+C.F (LISN LOSS+CABLE LOSS)
Except for the above table : adequate margin data below the limits.

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Revised date : June 20, 2006
FCC ID : T6ZC63

Conducted emission

DATA OF CONDUCTED EMISSION TEST

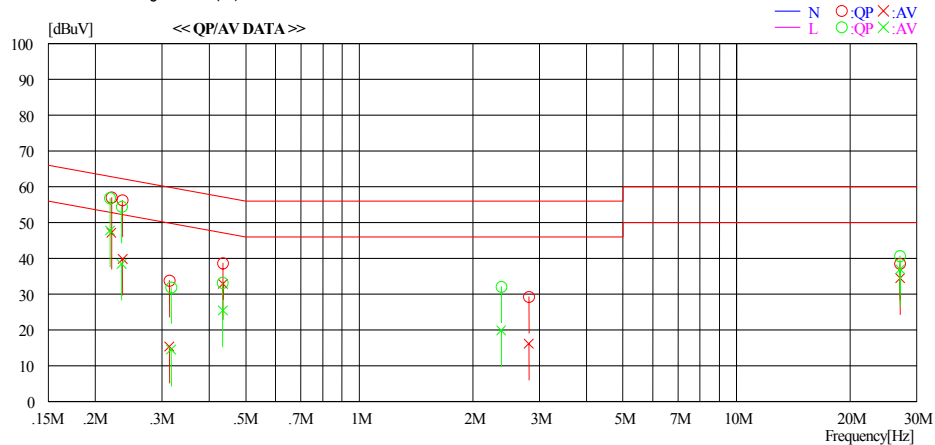
UL Apex Co., Ltd. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2006/04/28 04:05:12

Applicant : Ishino Seisakusho Co.,Ltd.
Kind of EUT : RFID Reader/Writer
Model No. : C63
Serial No. : 1

Report No. : 26HE0252-H0
Power : AC 120V / 60Hz
Temp./Humi. : 24deg. C / 36%
Operator : Mitsuru Fujimura

Mode / Remarks : Transmitting Mode , With Tag

LIMIT : FCC15C §15.207 (QP)
FCC15C §15.207 (AV)



Frequency	Reading Level		Corr. Factor	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.21851	56.6	47.5	0.2	56.8	47.7	62.9	52.9	6.1	5.2	L	
0.22061	56.8	46.9	0.2	57.0	47.1	62.8	52.8	5.8	5.7	N	
0.23470	54.2	38.2	0.2	54.4	38.4	62.3	52.3	7.9	13.9	L	
0.23586	56.0	39.6	0.2	56.2	39.8	62.2	52.2	6.0	12.4	N	
0.31384	33.5	15.1	0.2	33.7	15.3	59.9	49.9	26.2	34.6	N	
0.31750	31.6	14.3	0.2	31.8	14.5	59.8	49.8	28.0	35.3	L	
0.43457	32.9	25.2	0.2	33.1	25.4	57.2	47.2	24.1	21.8	L	
0.43508	38.4	32.7	0.2	38.6	32.9	57.2	47.2	18.6	14.3	N	
2.38070	31.6	19.5	0.4	32.0	19.9	56.0	46.0	24.0	26.1	L	
2.81470	28.8	15.7	0.4	29.2	16.1	56.0	46.0	26.8	29.9	N	
27.11858	38.6	34.9	2.0	40.6	36.9	60.0	50.0	19.4	13.1	L	
27.11983	36.5	32.4	2.0	38.5	34.4	60.0	50.0	21.5	15.6	N	

CHART:WITH FACTOR, Peak hold data. Data is uncorrected. CALCULATION: RESULT=READING+C.F (L:LSN LOSS+CABLE LOSS)
Except for the above table : adequate margin data below the limits.

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FCC ID : T6ZC63

Conducted emission

DATA OF CONDUCTED EMISSION TEST

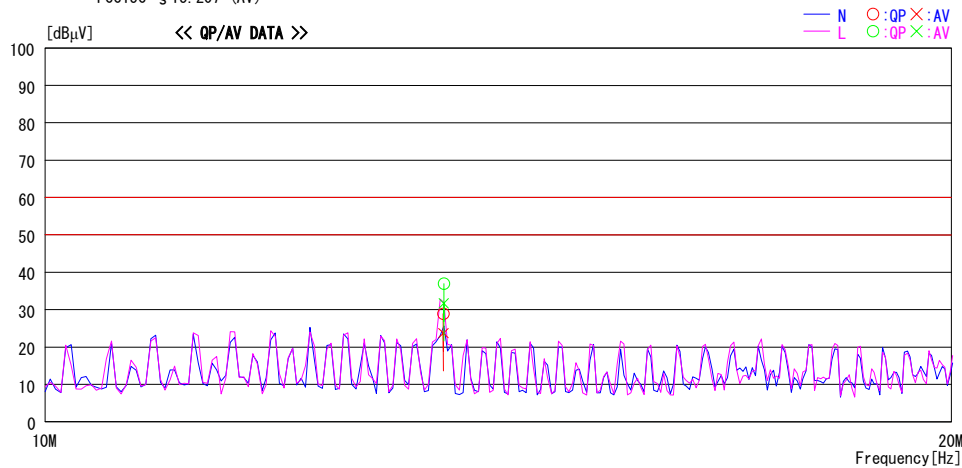
UL Apex Co., Ltd. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2006/06/20 13:49:22

Applicant : Ishino Seisakusho Co., Ltd.
Kind of EUT : FRESHNESS MANAGER
Model No. : C63
Serial No. : 1

Report No. : 26HE0252-H0
Power : AC 120V / 60Hz
Temp./Humi. : 25deg. C / 64%
Operator : Mitsuru Fujimura

Mode / Remarks : Transmitting Mode (Putting a dummy load (50 ohm) instead of the antenna)

LIMIT : FCC15C §15.207 (QP)
FCC15C §15.207 (AV)



Frequency	Reading Level		Corr. Factor	Results		Limit		Margin		Phase
	QP	AV		QP	AV	QP	AV	QP	AV	
[MHz]	[dBμV]	[dBμV]	[dB]	[dBμV]	[dBμV]	[dBμV]	[dBμV]	[dB]	[dB]	
13.56000	27.1	21.9	1.8	28.9	23.7	60.0	50.0	31.1	26.3	N
13.56713	35.2	29.9	1.8	37.0	31.7	60.0	50.0	23.0	18.3	L

CHART: WITH FACTOR, Peak hold data. Data is uncorrected. CALCURATION: RESULT=READING+C. F (L ISN LOSS+CABLE LOSS)
Except for the above table : adequate margin data below the limits.

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Radiated emission(Fundamental emission and Spectrum Mask)

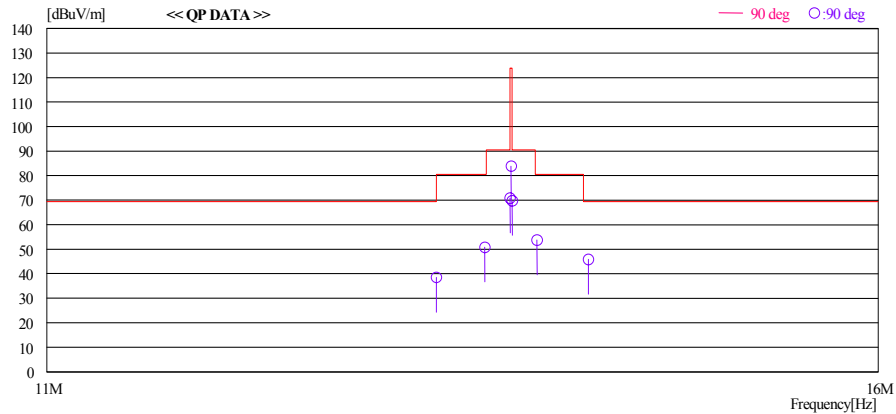
DATA OF MAGNETIC RADIATED EMISSION TEST

UL Apex Co.,LTD. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2006/04/27 22:30:49

Applicant : Ishino Seisakusho Co.,Ltd. Report No. : 26HE0252-HO
Kind of EUT : RFID Reader/Writer Power : AC120V/60Hz
Model No. : C63 Temp./Humi. : 24deg. C / 36%
Serial No. : 1 Operator : Mitsuru Fujimura

Mode / Remarks : Transmitting Mode (EUT_Axis : Freshness Manager:X / Antenna:Z) , With Tag

LIMIT : FCC15C §15.225, 3m
All other spurious emissions were less than 20dB for the limit.



Freq.	Reading	DET	Ant.Fac	Loss	Gain	Result	Limit	Margin	Antenna	Table	Comment
[MHz]	[dBuV]		[dBm]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[deg]		
13.11000	49.3	QP	20.4	0.8	32.0	38.5	69.5	31.0	90deg	269	
13.40110	61.6	QP	20.4	0.8	32.0	50.8	80.5	29.7	90deg	269	
13.55300	81.5	QP	20.5	0.8	32.0	70.8	90.4	19.6	90deg	269	
13.56000	94.6	QP	20.5	0.8	32.0	83.9	123.9	40.0	90deg	269	
13.56700	80.5	QP	20.5	0.8	32.0	69.8	90.4	20.6	90deg	269	
13.71891	64.4	QP	20.5	0.8	32.0	53.7	80.5	26.8	90deg	269	
14.03999	56.5	QP	20.5	0.8	32.0	45.8	69.5	23.7	90deg	269	

CHART : WITH FACTOR ANT TYPE : LOOP
CALCULATION : READING + ANT FACTOR + LOSS(CABLE + ATTEN. -AMP.)

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FCC ID : T6ZC63

Radiated emission(Fundamental emission and Spectrum Mask)

DATA OF MAGNETIC RADIATED EMISSION TEST

UL Apex Co.,LTD. Head Office EMC Lab. No. 4 Semi Anechoic Chamber
Date : 2006/04/27 22:30:49

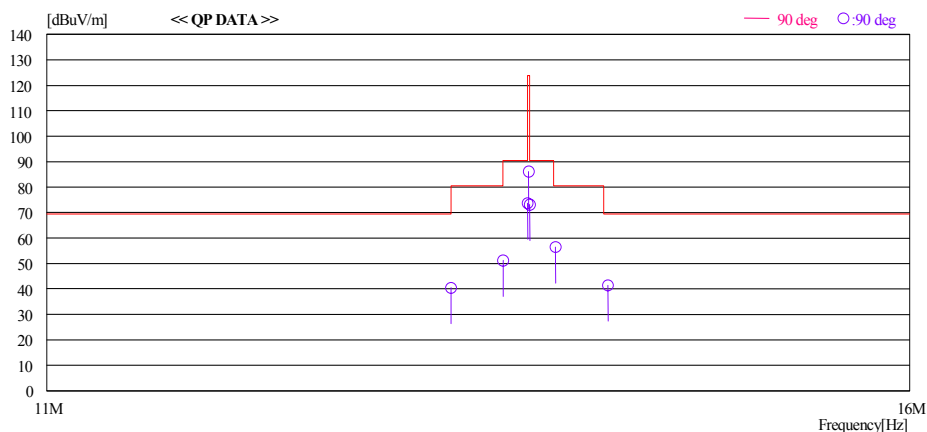
Applicant : Ishino Seisakusho Co.,Ltd.
Kind of EUT : RFID Reader/Writer
Model No. : C63
Serial No. : 1

Report No. : 26HE0252-HO
Power : AC120V/60Hz
Temp./Humi. : 24deg. C / 36%
Operator : Mitsuru Fujimura

Mode / Remarks : Transmitting Mode (EUT_Axis : Freshness Manager:X / Antenna:Z) , Without Tag

LIMIT : FCC15C §15.225, 3m

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



Freq.	Reading	DET	Ant.Fac	Loss	Gain	Result	Limit	Margin	Antenna	Table	Comment
[MHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]		[deg]	
13.11000	51.2	QP	20.4	0.8	32.0	40.4	69.5	29.1	90deg	269	
13.41000	62.0	QP	20.4	0.8	32.0	51.2	80.5	29.3	90deg	269	
13.55300	84.4	QP	20.5	0.8	32.0	73.7	90.4	16.7	90deg	269	
13.56000	96.8	QP	20.5	0.8	32.0	86.1	123.9	37.8	90deg	269	
13.56700	83.8	QP	20.5	0.8	32.0	73.1	90.4	17.3	90deg	269	
13.71941	67.2	QP	20.5	0.8	32.0	56.5	80.5	24.0	90deg	269	
14.03668	52.1	QP	20.5	0.8	32.0	41.4	69.5	28.1	90deg	269	

CHART : WITH FACTOR ANT TYPE : LOOP
CALCULATION : READING + ANT FACTOR + LOSS (CABLE + ATTEN. -AMP.)

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Radiated emission (Spurious emission: below 30MHz)

DATA OF MAGNETIC RADIATED EMISSION TEST

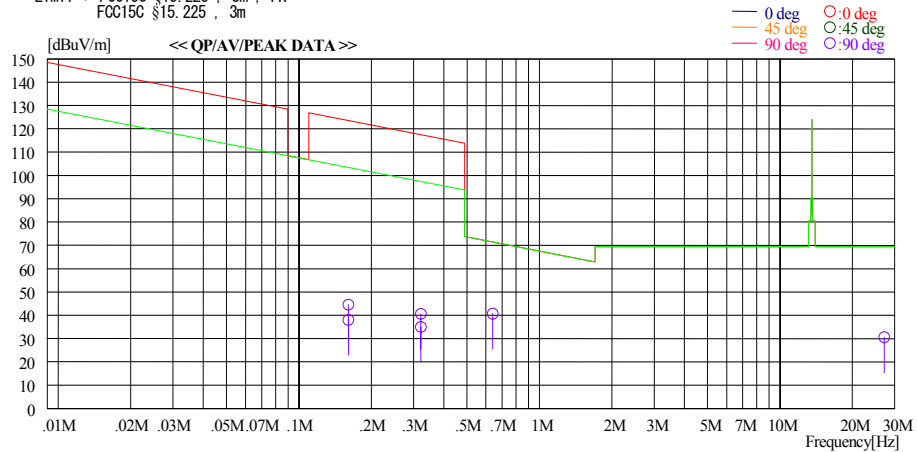
UL Apex Co., Ltd. Head Office EMC Lab. No. 4 Semi Anechoic Chamber
Date : 2006/04/28 00:01:18

Applicant : Ishino Seisakusho Co., Ltd.
Kind of EUT : RFID Reader/Writer
Model No. : C63
Serial No. : 1

Report No. : 26HE0252-HO
Power : AC120V/60Hz
Temp./Humi. : 24deg. C / 36%
Operator : Mitsuru Fujimura

Mode / Remarks : Transmitting Mode (EUT_Axis : Freshness Manager:X / Antenna:Z) , With Tag

LIMIT : FCC15C §15.225 , 3m , PK
FCC15C §15.225 , 3m



Freq.	Reading	DET	Ant.Fac	Loss	Gain	Result	Limit	Margin	Antenna	Table	Comment
[MHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]		[deg]	
0.16060	57.0	PEAK	19.5	0.1	32.0	44.6	123.5	78.9	90deg	0	
0.16060	50.4	AV	19.5	0.1	32.0	38.0	103.5	65.5	90deg	0	
0.32040	53.0	PEAK	19.5	0.1	32.0	40.6	117.5	76.9	90deg	312	
0.32040	47.4	AV	19.5	0.1	32.0	35.0	97.5	62.5	90deg	312	
0.63999	53.1	QP	19.5	0.2	32.0	40.8	71.5	30.7	90deg	257	
27.11928	40.2	QP	21.3	1.1	32.0	30.6	69.5	38.9	90deg	278	

CHART : WITH FACTOR ANT TYPE : LOOP
CALCULATION : READING + ANT FACTOR + LOSS(CABLE + ATTEN. -AMP.)

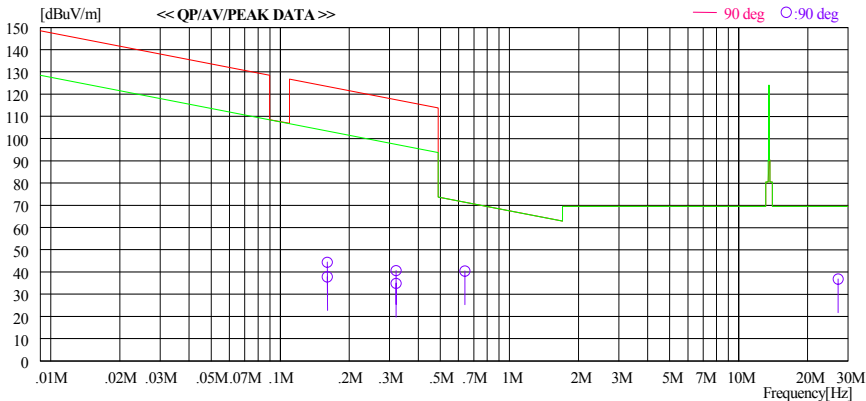
Page:

Radiated emission (Spurious emission : below 30MHz)

DATA OF MAGNETIC RADIATED EMISSION TEST

UL Apex Co., Ltd. Head Office EMC Lab. No. 4 Semi Anechoic Chamber
Date : 2006/04/27 22:30:49

Applicant : Ishino Seisakusho Co., Ltd. Report No. : 26HE0252-HO
Kind of EUT : RFID Reader/Writer Power : AC120V/60Hz
Model No. : C63 Temp./Humi. : 24deg. C / 36%
Serial No. : 1 Operator : Mitsuru Fujimura
Mode / Remarks : Transmitting Mode (EUT_Axis : Freshness Manager:X / Antenna:Z) , Without Tag
LIMIT : FCC15C §15.225 , 3m , PK
FCC15C §15.225 , 3m



Freq.	Reading	DET	Ant.Fac	Loss	Gain	Result	Limit	Margin	Antenna	Table	Comment
[MHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]		[deg]	
0.16060	56.8	PEAK	19.5	0.1	32.0	44.4	123.5	79.1	90deg	0	
0.16060	50.3	AV	19.5	0.1	32.0	37.9	103.5	65.6	90deg	0	
0.31957	53.0	PEAK	19.5	0.1	32.0	40.6	117.5	76.9	90deg	329	
0.31957	47.2	AV	19.5	0.1	32.0	34.8	97.5	62.7	90deg	329	
0.63999	52.8	QP	19.5	0.2	32.0	40.5	71.5	31.0	90deg	240	
27.11922	46.5	QP	21.3	1.1	32.0	36.9	69.5	32.6	90deg	250	

CHART : WITH FACTOR ANT TYPE : LOOP
CALCULATION : READING + ANT FACTOR + LOSS (CABLE + ATTEN. -AMP.)

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Radiated emission (Spurious emission: above 30MHz)

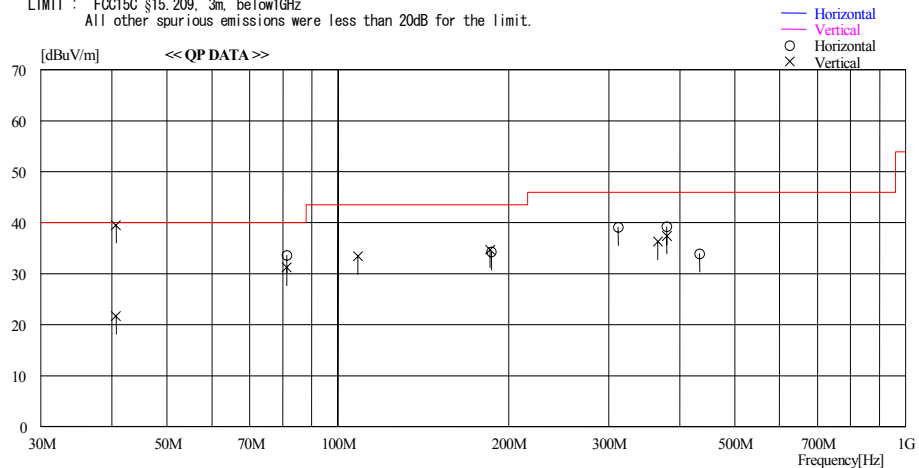
DATA OF RADIATED EMISSION TEST

UL Apex Co., Ltd. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2006/04/28 01:33:38

Company : Ishino Seisakusho Co., Ltd. Report No. : 26HE0252-HO
Kind of EUT : RFID Reader/Writer Power : AC120V/60Hz
Model No. : C63 Temp./Humi. : 24deg. C. / 36%
Serial No. : 1 Operator : Mitsuru Fujimura

Mode / Remarks : Transmitting Mode (EUT_Axis : Freshness Manager:X / Antenna:Z) , With Tag

LIMIT : FCC15C §15.209, 3m, below1GHz
All other spurious emissions were less than 20dB for the limit.



Frequency	Reading	DET	Antenna	Loss&	Level	Angle	Height	Polar.	Limit	Margin	Comment
			Factor	Gain							
[MHz]	[dBuV]		[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]	
40.690	50.1	QP	14.1	-24.7	39.5	88	100	Vert.	40.0	0.5	
40.690	32.3	QP	14.1	-24.7	21.7	88	100	Vert.	40.0	18.3	
81.311	50.0	QP	7.5	-23.9	33.6	268	205	Hori.	40.0	6.4	
81.317	47.6	QP	7.5	-23.9	31.2	245	100	Vert.	40.0	8.8	
108.484	44.9	QP	12.1	-23.6	33.4	280	100	Vert.	43.5	10.1	
185.450	40.6	QP	16.8	-22.7	34.7	200	100	Vert.	43.5	8.8	
186.500	40.1	QP	16.8	-22.7	34.2	156	193	Hori.	43.5	9.3	
311.877	44.1	QP	16.9	-21.9	39.1	179	100	Hori.	46.0	6.9	
366.115	40.2	QP	17.6	-21.5	36.3	87	100	Vert.	46.0	9.7	
379.677	41.0	QP	17.8	-21.4	37.4	66	100	Vert.	46.0	8.6	
379.677	42.8	QP	17.8	-21.4	39.2	42	120	Hori.	46.0	6.8	
433.913	36.2	QP	18.7	-21.0	33.9	38	100	Hori.	46.0	12.1	

CHART:WITH FACTOR ANT TYPE : -30MHz LOOP, 30-300MHz BICONICAL, 300MHz-1000MHz LOGPERIODIC, 1000MHz- HORN
CALCULATION: RESULT = READING + ANT FACTOR + LOSS (CABLE+ATTEN.) - GAIN (AMP)

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MF060b(19.04.06)

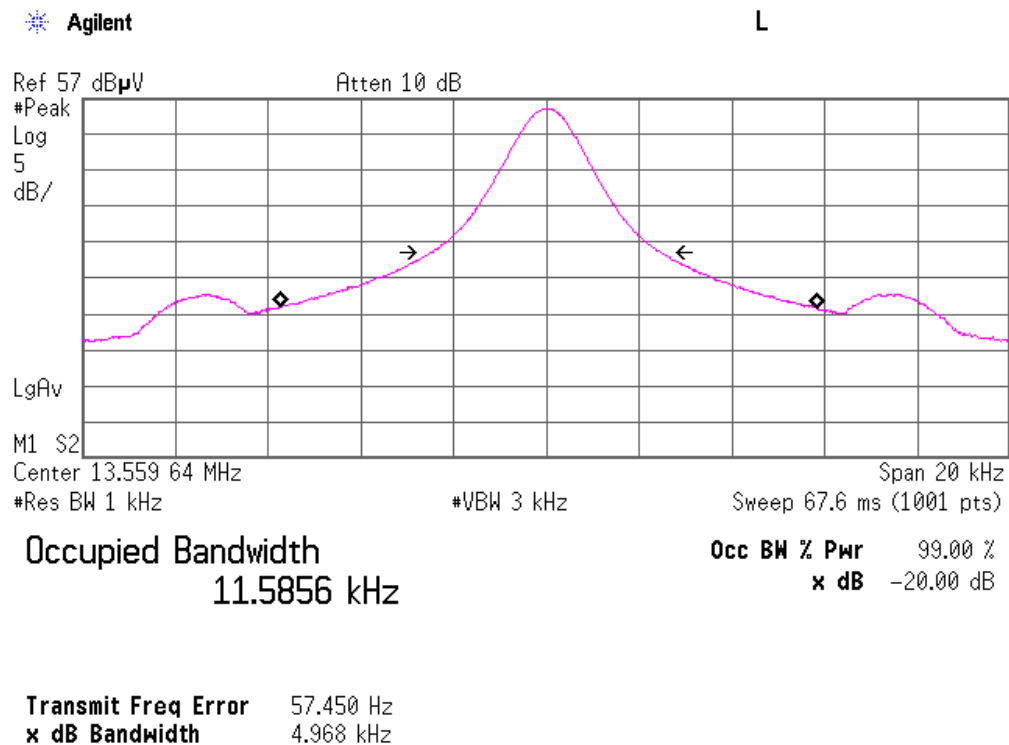
-20dB Bandwidth

UL Apex Co., Ltd.
No.7 Shielded room

COMPANY : Ishino Seisakusho Co.,Ltd
EQUIPMENT : RFID Reader/Writer
MODEL : C63
S/ N : 1
POWER : AC120V/60Hz
MODE : Tx 13.56MHz

REPORT NO : 26HE0252-HO
REGULATION : FCC 15.225
TEST DISTANCE : -
DATE : 04/26/2006
TEMPERATURE : 25 deg. C
HUMIDITY : 30%
ENGINEER : Norihisa Hashimoto

FREQ [MHz]	-20dB Bandwidth [kHz]
13.56	4.97



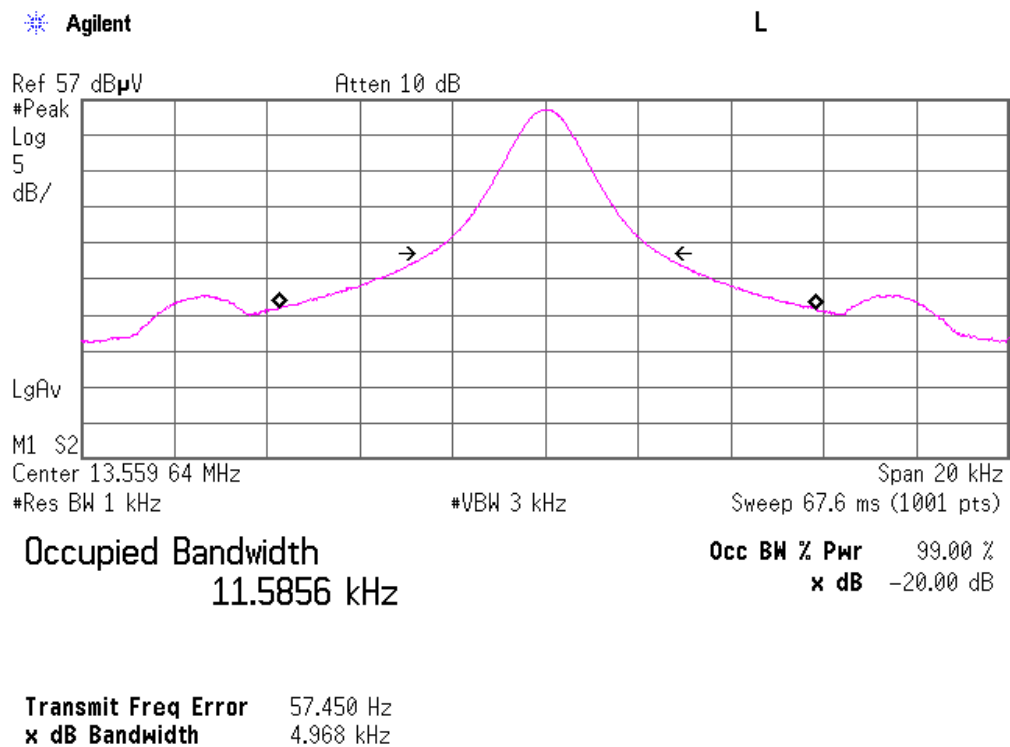
99% Occpied Bandwidth

UL Apex Co., Ltd.
No.7 Shielded room

COMPANY : Ishino Seisakusho Co.,Ltd
EQUIPMENT : RFID Reader/Writer
MODEL : C63
S/N : 1
POWER : AC120V/60Hz
MODE : Tx 13.56MHz

REPORT NO : 26HE0252-HO
REGULATION : RSS-Gen 4.4.1
TEST DISTANCE : -
DATE : 04/26/2006
TEMPERATURE : 25 deg. C
HUMIDITY : 30%
ENGINEER : Norihisa Hashimoto

FREQ [MHz]	99% Occpied Bandwidth [kHz]
13.56	11.59



Frequency Tolerance

UL Apex Co., Ltd.
No.7 Shielded room

COMPANY : Ishino Seisakusho Co.,Ltd
EQUIPMENT : RFID Reader/Writer
MODEL : C63
S/ N : 1
POWER : AC120V/60Hz
MODE : Tx 13.56MHz

REPORT NO : 26HE0252-HO
REGULATION : FCC 15.225 (e)
TEST DISTANCE : -
DATE : 04/26/2006
TEMPERATURE : 25 deg. C
HUMIDITY : 30%
ENGINEER : Norihisa Hashimoto

Test Condition	Test Timing	Measured freq [MHz]	Freq error [MHz]	Result [ppm]	Limit (+/- 0.01%) [+/- ppm]	Margin [ppm]
T nom 20deg.C Vmax AC138V (115%)	Power on	13.55967113	-0.00032887	-24.25	100.00	75.75
	on 2min.	13.55966239	-0.00033761	-24.90	100.00	75.10
	on 5min.	13.55965816	-0.00034184	-25.21	100.00	74.79
	on 10min.	13.55965557	-0.00034443	-25.40	100.00	74.60
T nom 20deg.C Vnom AC120V (100%)	Power on	13.55965330	-0.00034670	-25.57	100.00	74.43
	on 2min.	13.55965326	-0.00034674	-25.57	100.00	74.43
	on 5min.	13.55965323	-0.00034677	-25.57	100.00	74.43
	on 10min.	13.55965335	-0.00034665	-25.56	100.00	74.44
T nom 20deg.C Vmin AC102V (85%)	Power on	13.55969394	-0.00030606	-22.57	100.00	77.43
	on 2min.	13.55968439	-0.00031561	-23.27	100.00	76.73
	on 5min.	13.55966978	-0.00033023	-24.35	100.00	75.65
	on 10min.	13.55966470	-0.00033531	-24.73	100.00	75.27
T max 50°C Vnom AC120V (100%)	Power on	13.55962253	-0.00037747	-27.84	100.00	72.16
	on 2min.	13.55961901	-0.00038099	-28.10	100.00	71.90
	on 5min.	13.55961501	-0.00038499	-28.39	100.00	71.61
	on 10min.	13.55961550	-0.00038450	-28.36	100.00	71.64
T min -20deg.C Vnom AC120V (100%) (IC only)	Power on	13.55969390	-0.00030610	-22.57	100.00	77.43
	on 2min.	13.55969098	-0.00030902	-22.79	100.00	77.21
	on 5min.	13.55968459	-0.00031541	-23.26	100.00	76.74
	on 10min.	13.55968021	-0.00031979	-23.58	100.00	76.42
T min -30deg.C Vnom AC120V (100%) *(IC only)	Power on	13.55966705	-0.00033295	-24.55	100.00	75.45
	on 2min.	13.55965699	-0.00034301	-25.30	100.00	74.70
	on 5min.	13.55964836	-0.00035164	-25.93	100.00	74.07
	on 10min.	13.55963507	-0.00036493	-26.91	100.00	73.09

Limit : 13.56 MHz +/-0.01 % (+/- 100ppm)
+/- 0.001356 MHz

* For IC application (RSS-Gen 4.5 requirement)