

**APPENDIX 2: Data of EMI test**

**Conducted emission**  
 (Reference chart, V680-CH1D)  
**DATA OF CONDUCTED EMISSION TEST**

UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber  
 Date : 2007/09/18

Company	: OMRON Corporation	Report No.	: 28AE0160-HO
Kind of EUT	: RFID READER/WRITER	Power	: DC 5.0V (AC adapter:AC120V/60Hz)
Model No.	: V680-CH1D	Temp./Humi.	: 26deg.C / 54%
Serial No.	: RF-DS-07011	Operator	: Kenichi Adachi

Mode / Remarks : Transmitting (without Tag) (with Antenna)

LIMIT : FCC15.207 QP  
 FCC15.207 AV

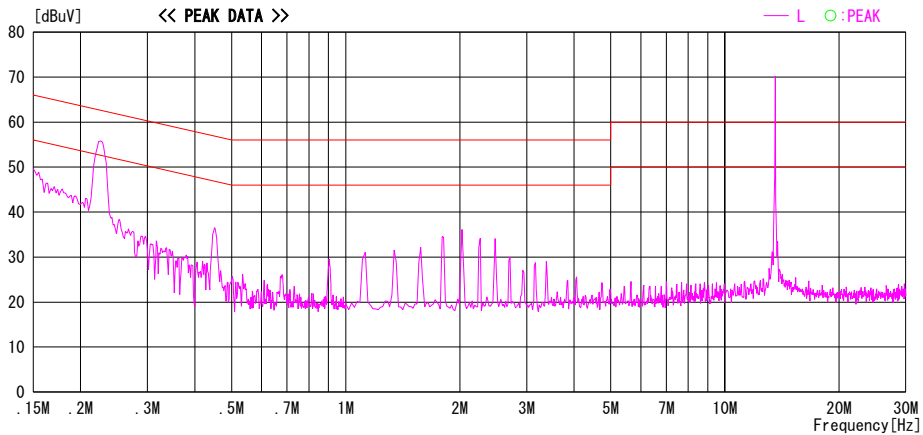
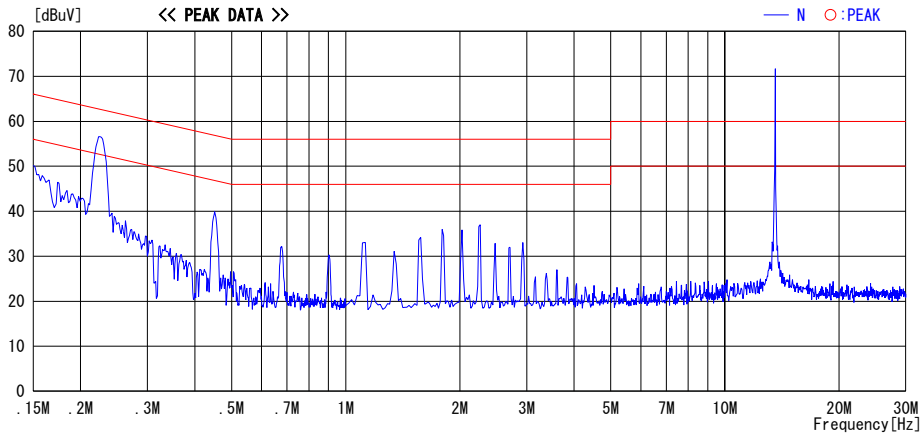


CHART: WITH FACTOR, Peak hold data. CALCURATION: RESULT[dBuV]=READING[dBuV]+C. F[dB] (LISN LOSS+CABLE LOSS)  
 Except for the above table : adequate margin data below the limits.

**UL Japan, Inc.**  
**Head Office EMC Lab.**  
 4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN  
 Telephone : +81 596 24 8116  
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**Conducted emission**  
**(V680-CH1D)**  
**DATA OF CONDUCTED EMISSION TEST**

UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber  
 Date : 2007/09/18

Company	: OMRON Corporation	Report No.	: 28AE0160-HO
Kind of EUT	: RFID READER/WRITER	Power	: DC 5.0V (AC adapter:AC120V/60Hz)
Model No.	: V680-CH1D	Temp./Humi.	: 26deg.C / 54%
Serial No.	: RF-DS-07011	Operator	: Kenichi Adachi

Mode / Remarks : Transmitting (with Tag) (with Antenna)

LIMIT : FCC15.207 QP  
FCC15.207 AV

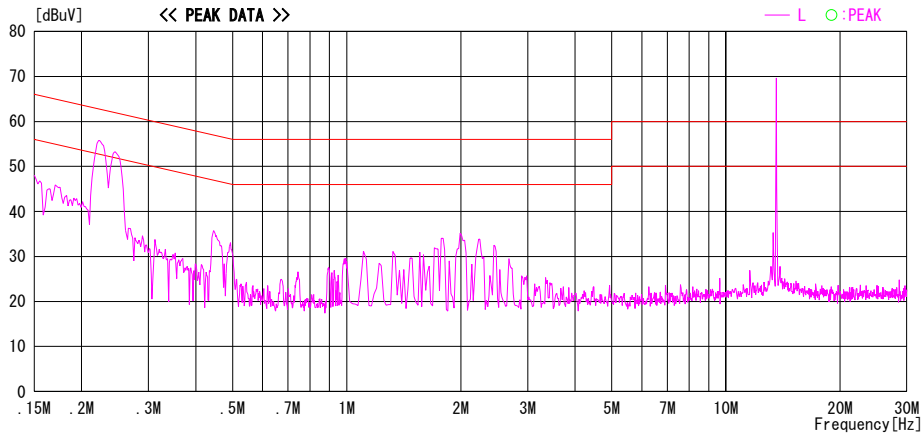
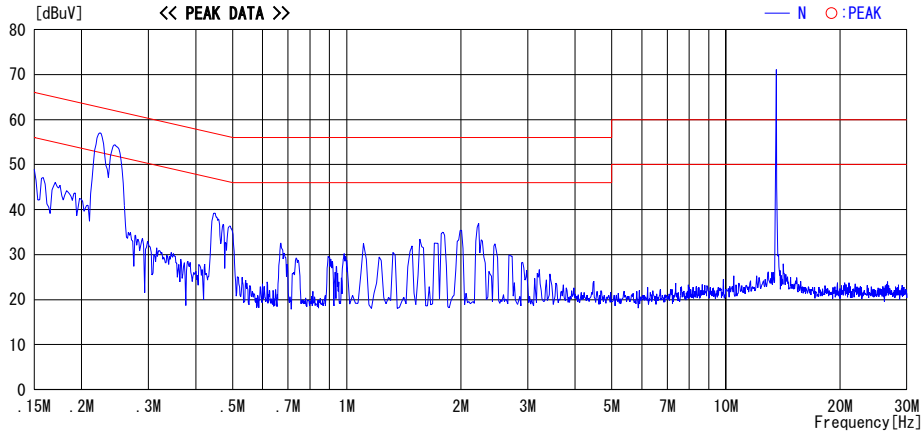


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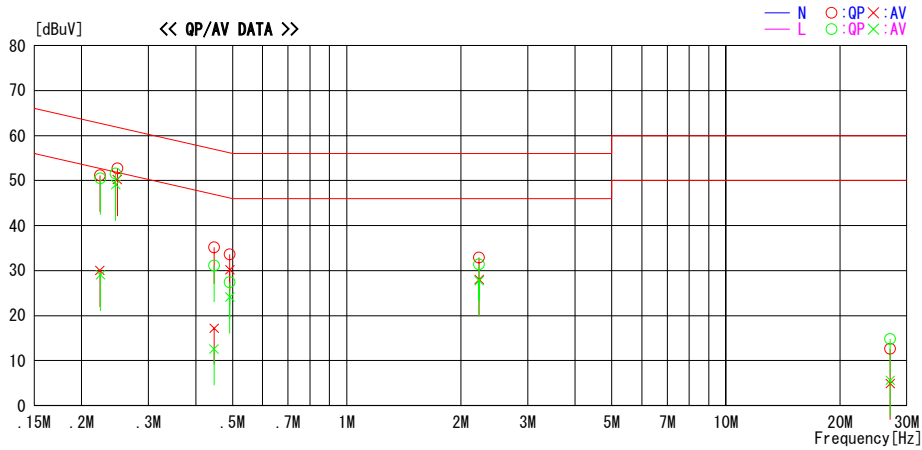
**Conducted emission**  
**(V680-CH1D)**  
**DATA OF CONDUCTED EMISSION TEST**

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 Temp./Humi. : 26deg. C / 54%  
 Operator : Kenichi Adachi

Mode / Remarks : Transmitting (with Tag) (with Antenna)

LIMIT : FCC15.207 QP  
 FCC15.207 AV



Frequency [MHz]	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]		
0.22340	50.8	29.6	0.4	51.2	30.0	62.7	52.7	11.5	22.7	N	
0.22408	50.1	28.7	0.4	50.5	29.1	62.7	52.7	12.2	23.6	L	
0.24836	52.3	49.8	0.4	52.7	50.2	61.8	51.8	9.1	1.6	N	
0.24593	51.2	48.7	0.4	51.6	49.1	61.9	51.9	10.3	2.8	L	
0.44728	34.8	16.8	0.4	35.2	17.2	56.9	46.9	21.7	29.7	N	
0.44672	30.7	12.2	0.4	31.1	12.6	56.9	46.9	25.8	34.3	L	
0.49172	33.2	29.8	0.4	33.6	30.2	56.1	46.1	22.5	15.9	N	
0.49172	27.0	23.7	0.4	27.4	24.1	56.1	46.1	28.7	22.0	L	
2.23494	32.1	27.2	0.8	32.9	28.0	56.0	46.0	23.1	18.0	N	
2.23444	30.5	27.0	0.8	31.3	27.8	56.0	46.0	24.7	18.2	L	
27.12000	6.1	-1.6	6.5	12.6	4.9	60.0	50.0	47.4	45.1	N	
27.12000	8.3	-0.9	6.5	14.8	5.6	60.0	50.0	45.2	44.4	L	

CHART: WITH FACTOR, Peak hold data. CALCULATION: RESULT[dBuV]=READING[dBuV]+C.F[dB] (LISN LOSS+CABLE LOSS)  
 Except for the above table : adequate margin data below the limits.  
 \*The test result is round off to one or two decimal places, so some differences might be observed.

**Conducted emission**  
**(V680-CH1D)**  
**DATA OF CONDUCTED EMISSION TEST**

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Model No.	: V680-CH1D	Temp./Humi.	: 26deg.C / 54%
Serial No.	: RF-DS-07011	Operator	: Kenichi Adachi

Mode / Remarks : Transmitting (with Tag) (Antenna: 50 ohm terminated)

LIMIT : FCC15.207 QP  
 FCC15.207 AV

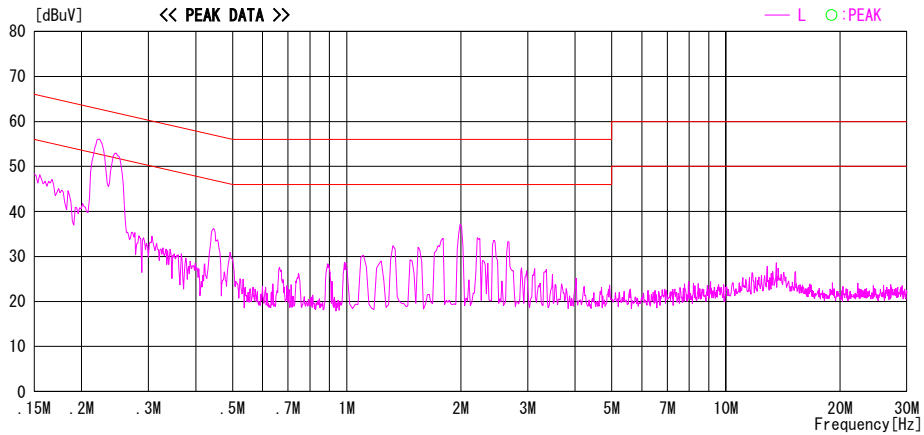
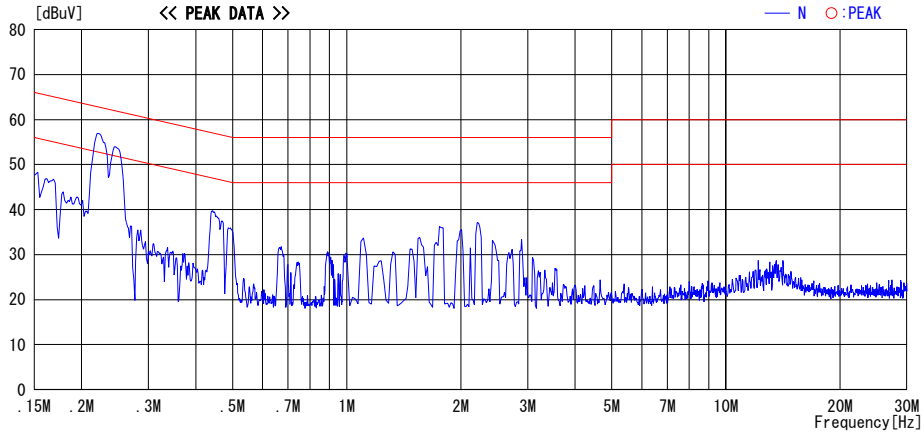


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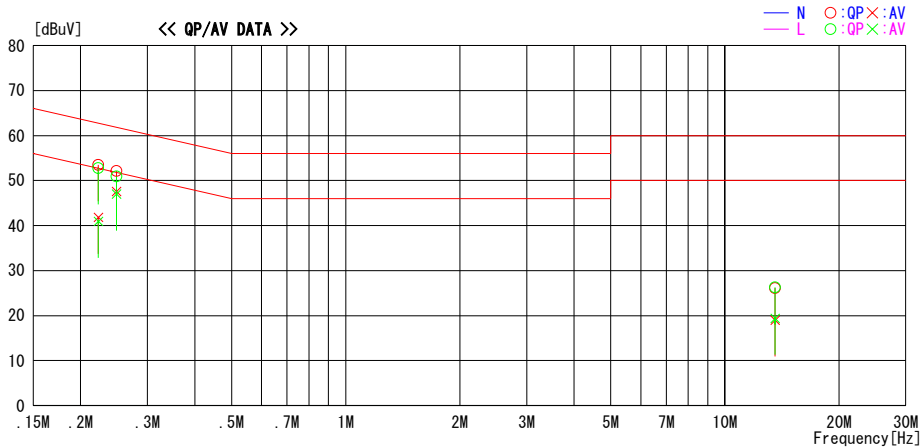
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 Operator : Kenichi Adachi

Mode / Remarks : Transmitting (with Tag) (Antenna: 50 ohm terminated)

LIMIT : FCC15.207 QP  
 FCC15.207 AV



Frequency [MHz]	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]		
0.22264	53.1	41.4	0.4	53.5	41.8	62.7	52.7	9.2	10.9	N	
0.22264	52.4	40.5	0.4	52.8	40.9	62.7	52.7	9.9	11.8	L	
0.24872	51.7	47.2	0.4	52.1	47.6	61.8	51.8	9.7	4.2	N	
0.24872	50.5	46.6	0.4	50.9	47.0	61.8	51.8	10.9	4.8	L	
13.55974	22.9	15.8	3.2	26.1	19.0	60.0	50.0	33.9	31.0	N	
13.55974	23.1	16.2	3.2	26.3	19.4	60.0	50.0	33.7	30.6	L	

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**Conducted emission**  
 (Reference chart, V680-CHUD)  
**DATA OF CONDUCTED EMISSION TEST**

UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber  
 Date : 2007/09/18

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Model No.	: V680-CHUD	Temp./Humi.	: 26deg. C / 54%
Serial No.	: RF-DS-07014	Operator	: Kenichi Adachi

Mode / Remarks : Transmitting (without Tag) (with Antenna)

LIMIT : FCC15.207 QP  
FCC15.207 AV

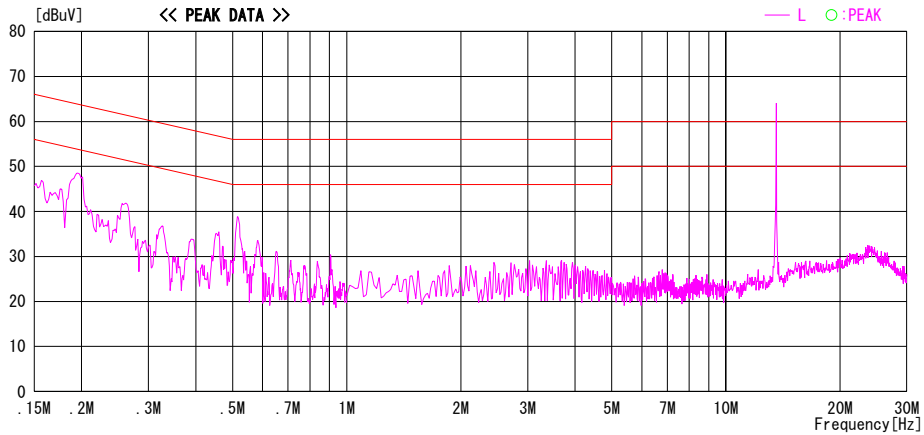
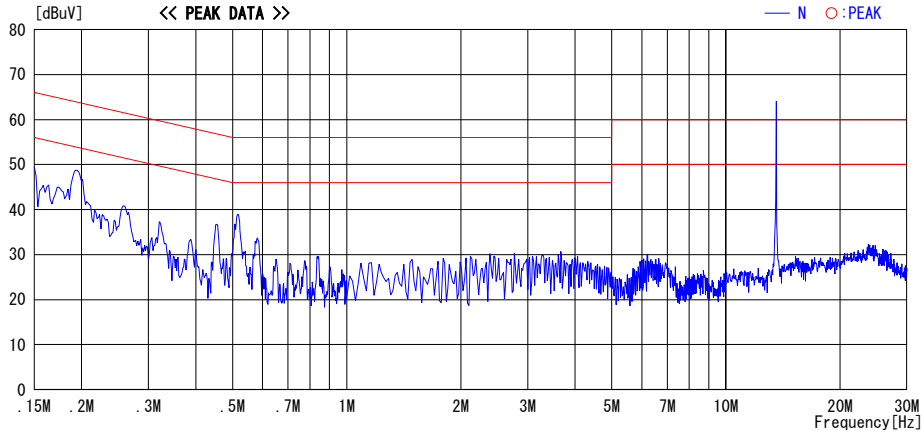


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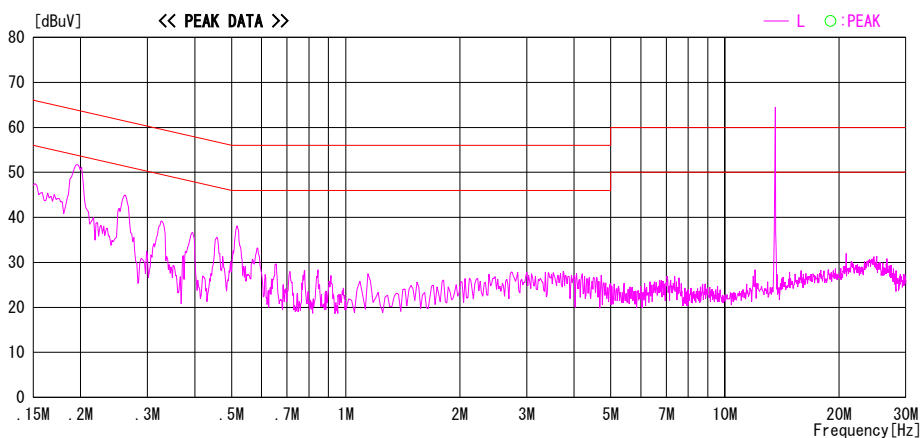
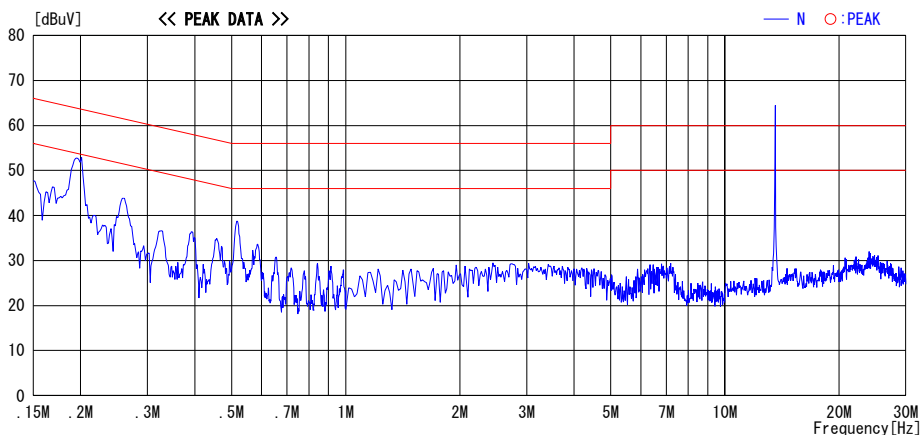


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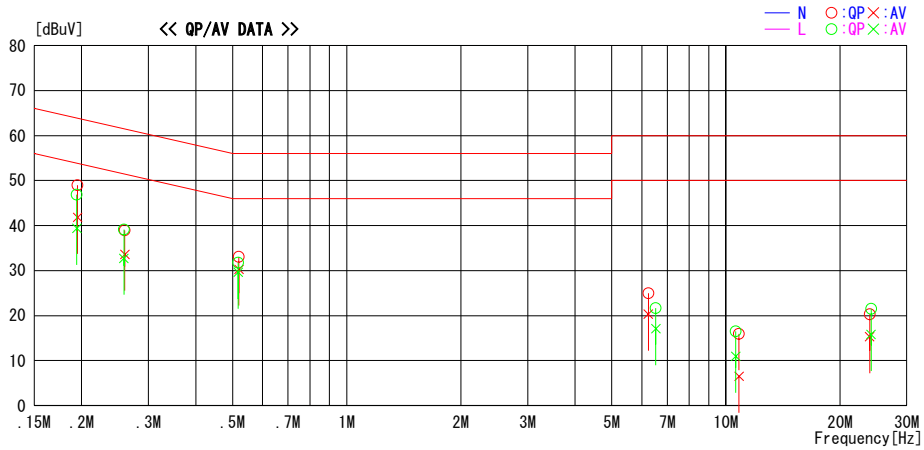
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 FCC15.207 AV



Frequency	Reading Level		Corr. Factor	Results		Limit		Margin		Phase	Comment
	QP	AV		QP	AV	QP	AV	QP	AV		
[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
0.19509	48.7	41.5	0.3	49.0	41.8	63.8	53.8	14.8	12.0	N	
0.19428	46.6	39.1	0.3	46.9	39.4	63.9	53.9	17.0	14.5	L	
0.25989	38.7	33.3	0.3	39.0	33.6	61.4	51.4	22.4	17.8	N	
0.25844	38.8	32.4	0.3	39.1	32.7	61.5	51.5	22.4	18.8	L	
0.51970	32.8	30.0	0.3	33.1	30.3	56.0	46.0	22.9	15.7	N	
0.51740	31.5	29.3	0.3	31.8	29.6	56.0	46.0	24.2	16.4	L	
6.24280	23.9	19.2	1.1	25.0	20.3	60.0	50.0	35.0	29.7	N	
6.53365	20.5	16.0	1.1	21.6	17.1	60.0	50.0	38.4	32.9	L	
10.82400	14.4	5.0	1.5	15.9	6.5	60.0	50.0	44.1	43.5	N	
10.61400	15.1	9.5	1.4	16.5	10.9	60.0	50.0	43.5	39.1	L	
23.93518	18.0	13.0	2.3	20.3	15.3	60.0	50.0	39.7	34.7	N	
24.15718	19.2	13.5	2.3	21.5	15.8	60.0	50.0	38.5	34.2	L	

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Serial No.	: RF-DS-07014	Operator	: Kenichi Adachi

Mode / Remarks : Transmitting (with Tag) (Antenna: 50 ohm terminated)

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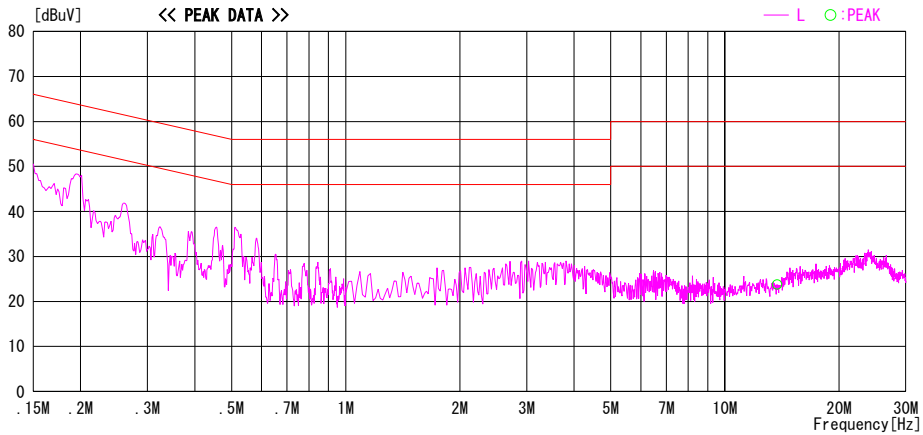
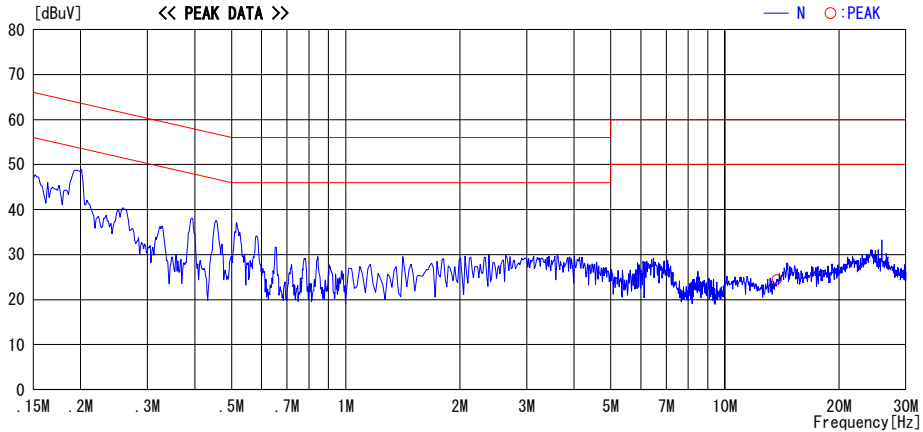


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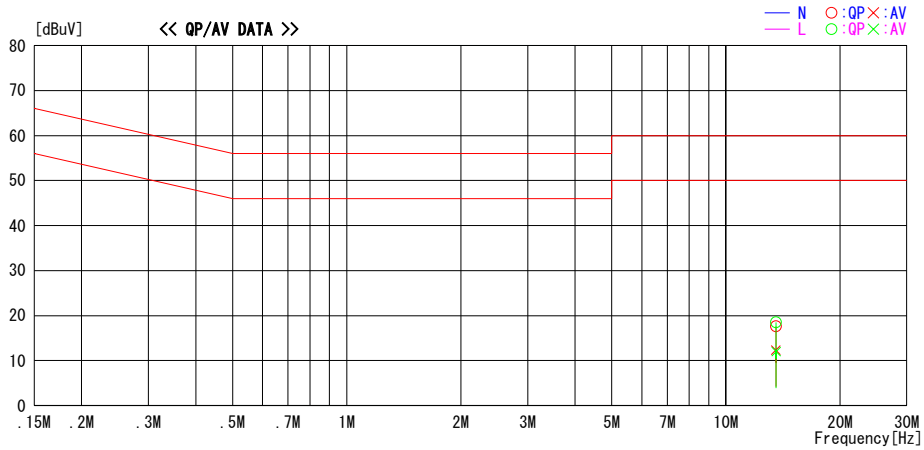
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LIMIT : FCC15.207 QP  
 FCC15.207 AV



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]		
13.55075	15.9	10.6	1.7	17.6	12.3	60.0	50.0	42.4	37.7	N	
13.55542	16.8	10.3	1.7	18.5	12.0	60.0	50.0	41.5	38.0	L	

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 Date : 2007/09/18

Company	: OMRON Corporation	Report No.	: 28AE0160-HO
Kind of EUT	: RFID READER/WRITER	Power	: DC 5.0V (DC power supply: AC120V/60Hz)
Model No.	: V680-CH1D-PSI	Temp./Humi.	: 26deg. C / 54%
Serial No.	: RF-DS-07012	Operator	: Kenichi Adachi

Mode / Remarks : Transmitting (without Tag) (with antenna)

LIMIT : FCC15.207 QP  
 FCC15.207 AV

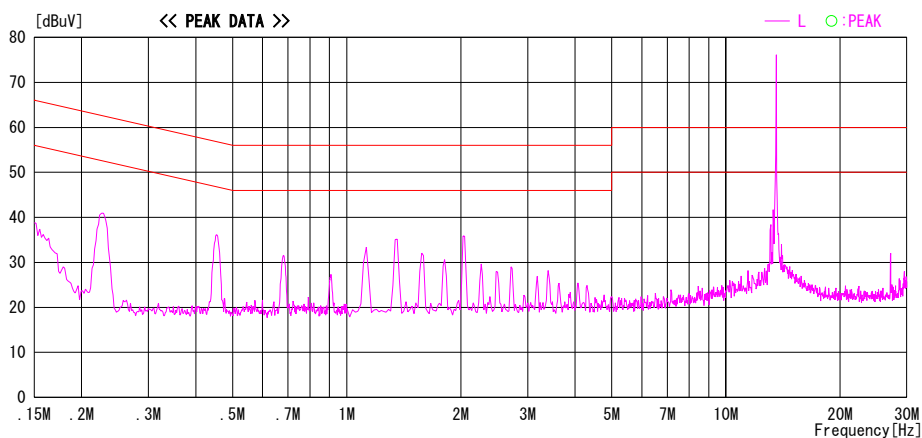
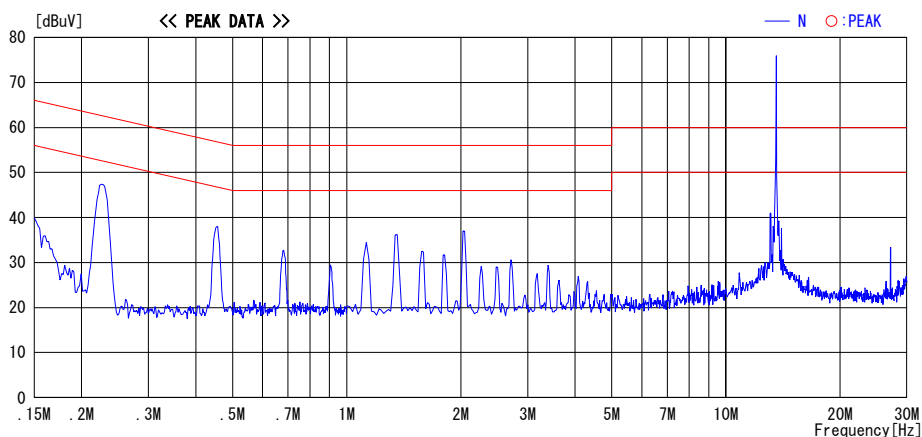


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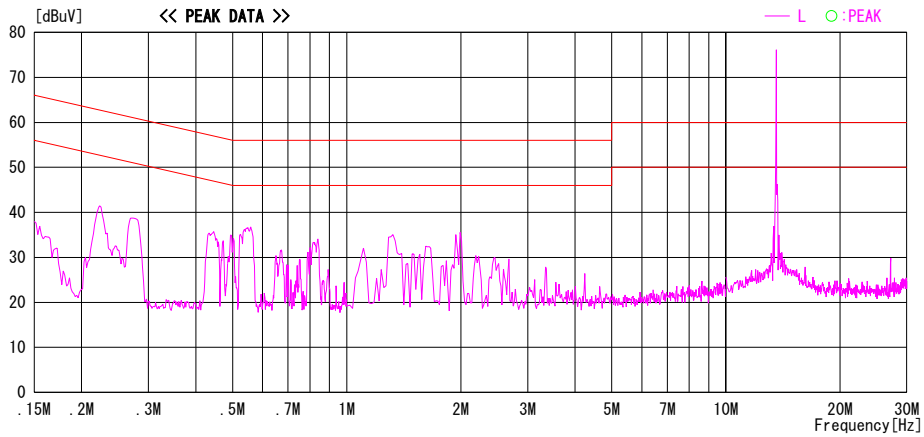
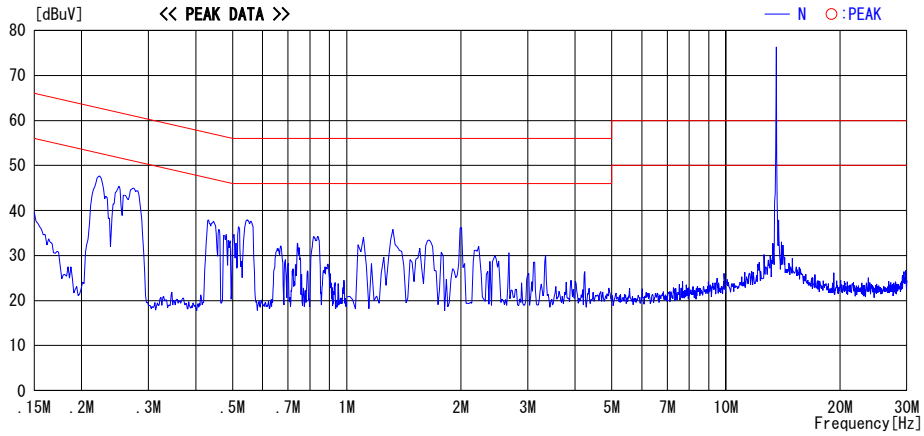


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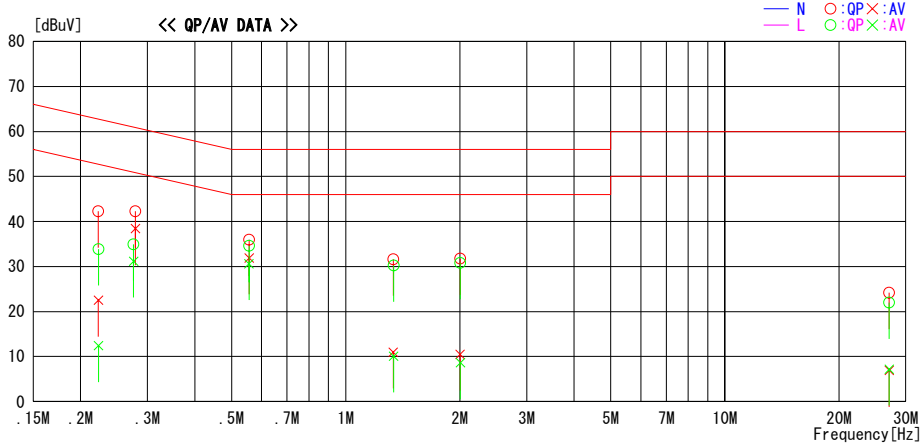
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Frequency [MHz]	Reading Level		Corr. Factor [dB]	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.22265	42.0	22.2	0.3	42.3	22.5	62.7	52.7	20.4	30.2	N	
0.22306	33.6	12.1	0.3	33.9	12.4	62.7	52.7	28.8	40.3	L	
0.27900	42.0	38.1	0.3	42.3	38.4	60.8	50.8	18.5	12.4	N	
0.27591	34.6	30.9	0.3	34.9	31.2	60.9	50.9	26.0	19.7	L	
0.55640	35.7	31.6	0.3	36.0	31.9	56.0	46.0	20.0	14.1	N	
0.55621	34.3	30.3	0.3	34.6	30.6	56.0	46.0	21.4	15.4	L	
1.33440	31.1	10.5	0.5	31.6	11.0	56.0	46.0	24.4	35.0	N	
1.33720	29.7	9.6	0.5	30.2	10.1	56.0	46.0	25.8	35.9	L	
2.00280	31.3	10.0	0.5	31.8	10.5	56.0	46.0	24.2	35.5	N	
2.00503	30.3	8.1	0.5	30.8	8.6	56.0	46.0	25.2	37.4	L	
27.12000	21.8	4.5	2.4	24.2	6.9	60.0	50.0	35.8	43.1	N	
27.12001	19.6	4.8	2.4	22.0	7.2	60.0	50.0	38.0	42.8	L	

CHART: WITH FACTOR, Peak hold data. CALCULATION: RESULT [dBuV] = READING [dBuV] + C.F [dB] (LISN LOSS + CABLE LOSS)  
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 (V680-CH1D-PSI)  
**DATA OF CONDUCTED EMISSION TEST**

UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber  
 Date : 2007/09/18

Company	: OMRON Corporation	Report No.	: 28AE0160-HO
Kind of EUT	: RFID READER/WRITER	Power	: DC 5.0V (DC power supply: AC120V/60Hz)
Model No.	: V680-CH1D-PSI	Temp./Humi.	: 26deg. C / 54%
Serial No.	: RF-DS-07012	Operator	: Kenichi Adachi

Mode / Remarks : Transmitting (with Tag) (Antenna: 50 ohm terminated)

LIMIT : FCC15.207 QP  
 FCC15.207 AV

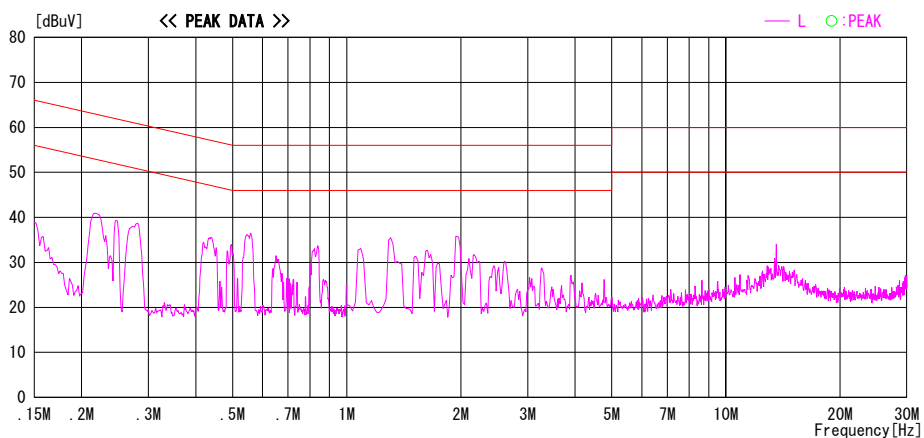
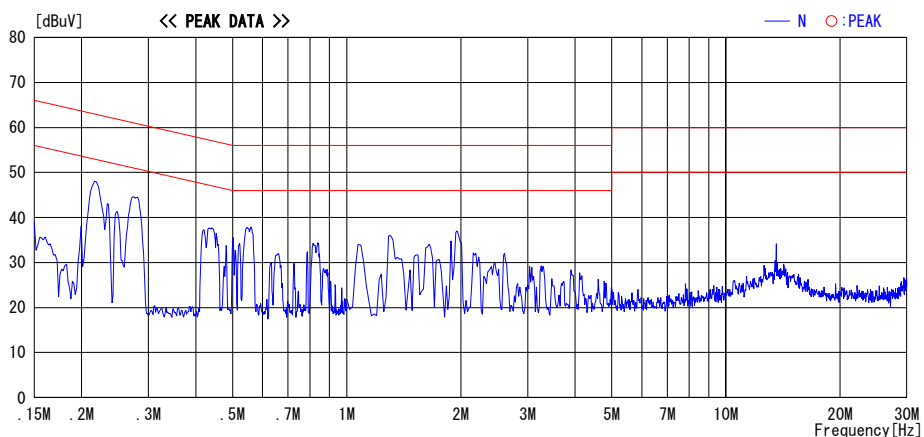


CHART: WITH FACTOR, Peak hold data. CALCULATION: RESULT [dBuV] = READING [dBuV] + C. F [dB] (LISN LOSS + CABLE LOSS)  
 Except for the above table : adequate margin data below the limits.

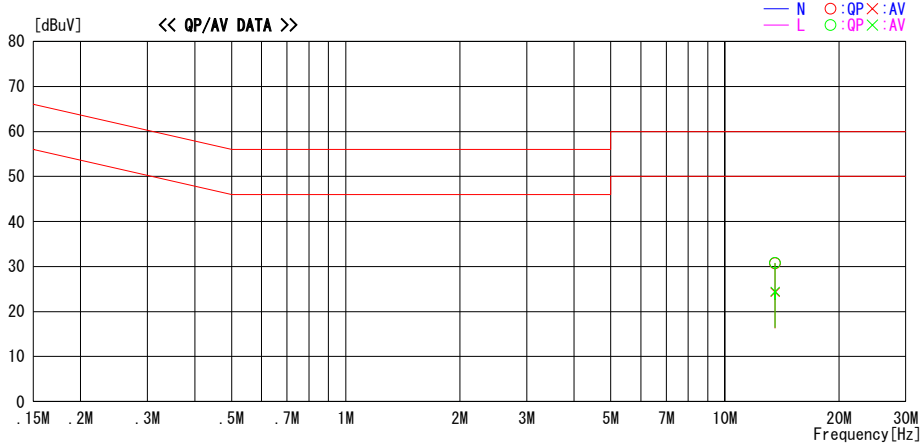
**Conducted emission**  
 (V680-CH1D-PSI)  
**DATA OF CONDUCTED EMISSION TEST**

UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber  
 Date : 2007/09/18

Company : OMRON Corporation  
 Kind of EUT : RFID READER/WRITER  
 Model No. : V680-CH1D-PSI  
 Serial No. : RF-DS-07012  
 Report No. : 28AE0160-HO  
 Power : DC 5.0V (DC power supply: AC120V/60Hz)  
 Temp./Humi. : 26deg. C / 54%  
 Operator : Kenichi Adachi

Mode / Remarks : Transmitting (with Tag) (Antenna: 50 ohm terminated)

LIMIT : FCC15.207 QP  
 FCC15.207 AV



Frequency [MHz]	Reading Level		Corr. Factor [dB]	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
13.56045	29.0	22.6	-1.7	30.7	24.3	60.0	50.0	29.3	25.7	N	
13.56045	29.1	22.8	1.7	30.8	24.5	60.0	50.0	29.2	25.5	L	

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

\*The test result is round off to one or two decimal places, so some differences might be observed.

**Radiated emission(Fundamental emission and Spectrum Mask)**  
(Reference data)(V680-CH1D, with Tag)

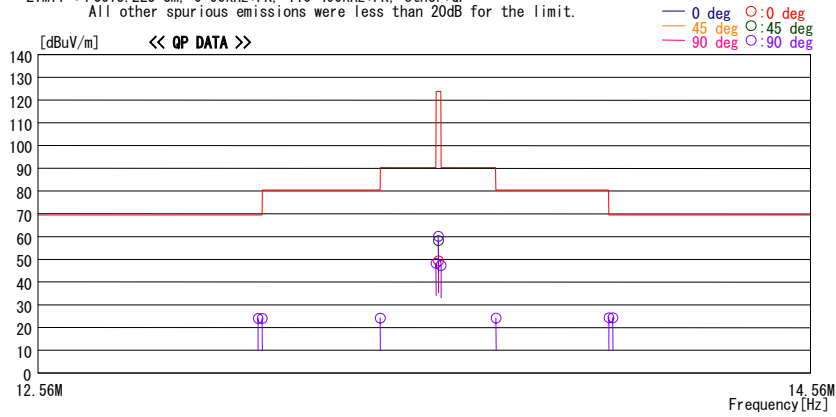
**DATA OF RADIATED EMISSION TEST**

UL Japan, Inc. Head Office EMC Lab. No.1 Semi Anechoic Chamber  
Date : 2007/09/12

Company : OMRON Corporation Report No. : 28AE0160-HO  
Kind of EUT : RFID READER/WRITER Power : DC 5.0V  
Model No. : V680-CH1D Temp./ Humi. : 25 deg.C. / 57 %  
Serial No. : RF-DS-07011 Operator : Kenichi Adachi

Mode / Remarks : Transmitting with Tag. Worst-axis:Y. Worst-angle:90deg.

LIMIT : FCC15.225 3m, 9-90kHz:PK, 110-490kHz:PK, other:QP  
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]	[deg]	
13.10000	42.0	QP	20.1	1.2	39.3	24.0	69.5	45.5	90deg	118	
13.11000	42.0	QP	20.1	1.2	39.3	24.0	69.5	45.5	90deg	118	
13.41000	42.2	QP	20.1	1.2	39.3	24.2	80.5	56.3	90deg	118	
13.55300	66.2	QP	20.1	1.2	39.3	48.2	90.4	42.2	90deg	118	
13.55992	78.1	QP	20.1	1.2	39.3	60.1	123.9	63.8	90deg	118	Worst-angle
13.55992	67.4	QP	20.1	1.2	39.3	49.4	123.9	74.5	0deg	359	
13.55992	76.3	QP	20.1	1.2	39.3	58.3	123.9	65.6	45deg	185	
13.56700	65.3	QP	20.1	1.2	39.3	47.3	90.4	43.1	90deg	118	
13.71000	42.2	QP	20.1	1.2	39.3	24.2	80.5	56.3	90deg	118	
14.01000	42.3	QP	20.1	1.2	39.2	24.4	69.5	45.1	90deg	118	
14.02000	42.3	QP	20.1	1.2	39.2	24.4	69.5	45.1	90deg	118	

CHART : WITH FACTOR , ANT TYPE : LOOP (below 30MHz).  
CALCULATION : READING + ANT FACTOR + LOSS ( CABLE + ATTEN. -AMP. )

\*The test result is round off to one or two decimal places, so some differences might be observed.



**Radiated emission(Fundamental emission and Spectrum Mask)**  
 (V680-CH1D, without Tag)

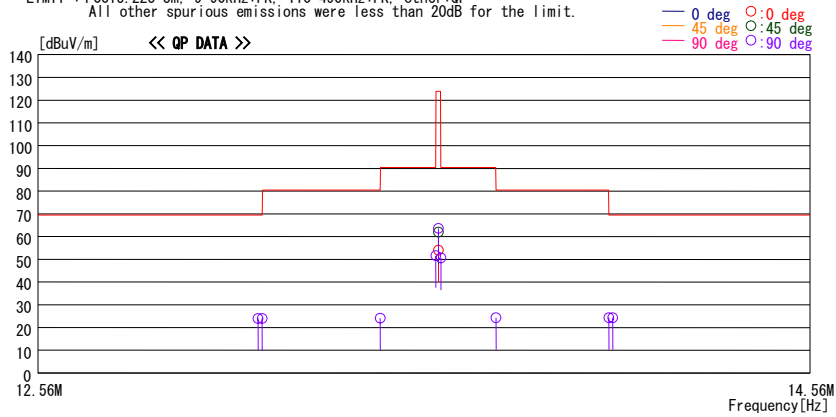
**DATA OF RADIATED EMISSION TEST**

UL Japan, Inc. Head Office EMC Lab. No.1 Semi Anechoic Chamber  
 Date : 2007/09/12

Company : OMRON Corporation Report No. : 28AE0160-HO  
 Kind of EUT : RFID READER/WRITER Power : DC 5.0V  
 Model No. : V680-CH1D Temp./ Humi. : 25 deg. C. / 57 %  
 Serial No. : RF-DS-07011 Operator : Kenichi Adachi

Mode / Remarks : Transmitting without Tag. Worst-axis:Y. Worst-angle:90deg.

LIMIT : FCC15.225 3m, 9-90kHz:PK, 110-490kHz:PK, other:QP  
 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]	
13.10000	42.0	QP	20.1	1.2	39.3	24.0	69.5	45.5	90deg	145	
13.11000	42.0	QP	20.1	1.2	39.3	24.0	69.5	45.5	90deg	145	
13.41000	42.2	QP	20.1	1.2	39.3	24.2	80.5	56.3	90deg	145	
13.55300	69.7	QP	20.1	1.2	39.3	51.7	90.4	38.7	90deg	145	
13.55992	81.7	QP	20.1	1.2	39.3	63.7	123.9	60.2	90deg	145	Worst-angle
13.55992	72.0	QP	20.1	1.2	39.3	54.0	123.9	69.9	0deg	37	
13.55992	80.0	QP	20.1	1.2	39.3	62.0	123.9	61.9	45deg	174	
13.56700	68.6	QP	20.1	1.2	39.3	50.6	90.4	39.8	90deg	145	
13.71000	42.3	QP	20.1	1.2	39.3	24.3	80.5	56.2	90deg	145	
14.01000	42.3	QP	20.1	1.2	39.2	24.4	69.5	45.1	90deg	145	
14.02000	42.3	QP	20.1	1.2	39.2	24.4	69.5	45.1	90deg	145	

CHART : WITH FACTOR , ANT TYPE : LOOP (below 30MHz) ,  
 CALCULATION : READING + ANT FACTOR + LOSS ( CABLE + ATTEN. -AMP. )

\*The test result is round off to one or two decimal places, so some differences might be observed.

**Radiated emission(Fundamental emission and Spectrum Mask)**  
(Reference data)(V680-CHUD, with Tag)

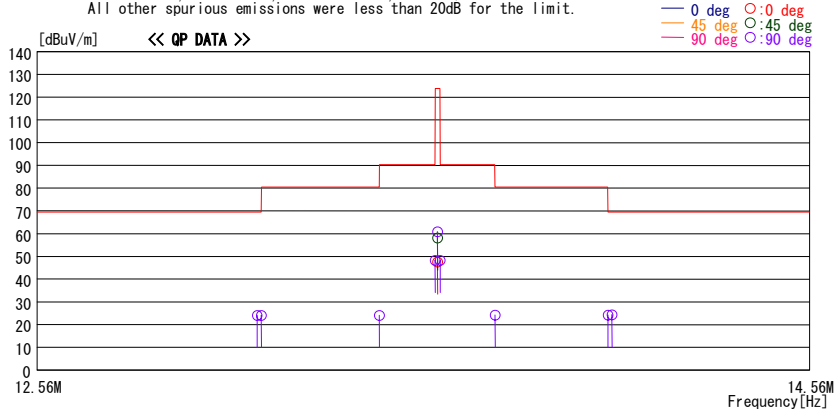
**DATA OF RADIATED EMISSION TEST**

UL Japan, Inc. Head Office EMC Lab. No.1 Semi Anechoic Chamber  
Date : 2007/09/11

Company : OMRON Corporation Report No. : 28AE0160-HO  
Kind of EUT : RFID READER/WRIITER Power : DC 5.0V  
Model No. : V680-CHUD Temp./ Humi. : 25 deg. C. / 57 %  
Serial No. : RF-DS-07014 Operator : Kenichi Adachi

Mode / Remarks : Transmitting with Tag, Worst-axis:Y, Worst-angle:90deg.

LIMIT : FCC15.225 3m, 9-90kHz:PK, 110-490kHz:PK, other:QP  
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]	[deg]	
13.10000	42.0	QP	20.1	1.2	39.3	24.0	69.5	45.5	90deg	109	
13.11000	42.0	QP	20.1	1.2	39.3	24.0	69.5	45.5	90deg	109	
13.41000	42.1	QP	20.1	1.2	39.3	24.1	80.5	56.4	90deg	109	
13.55300	66.2	QP	20.1	1.2	39.3	48.2	90.4	42.2	90deg	109	
13.56026	78.8	QP	20.1	1.2	39.3	60.8	123.9	63.1	90deg	109	Worst-angle
13.56026	65.5	QP	20.1	1.2	39.3	47.5	123.9	76.4	0deg	359	
13.56026	76.2	QP	20.1	1.2	39.3	58.2	123.9	65.7	45deg	175	
13.56700	66.2	QP	20.1	1.2	39.3	48.2	90.4	42.2	90deg	109	
13.71000	42.2	QP	20.1	1.2	39.3	24.2	80.5	56.3	90deg	109	
14.01000	42.1	QP	20.1	1.2	39.2	24.2	69.5	45.3	90deg	109	
14.02000	42.2	QP	20.1	1.2	39.2	24.3	69.5	45.2	90deg	109	

CHART : WITH FACTOR , ANT TYPE : LOOP (below 30MHz) ,  
CALCULATION : READING + ANT FACTOR + LOSS ( CABLE + ATTEN. -AMP. )

\*The test result is round off to one or two decimal places, so some differences might be observed.

**Radiated emission(Fundamental emission and Spectrum Mask)**  
(V680-CHUD, without Tag)

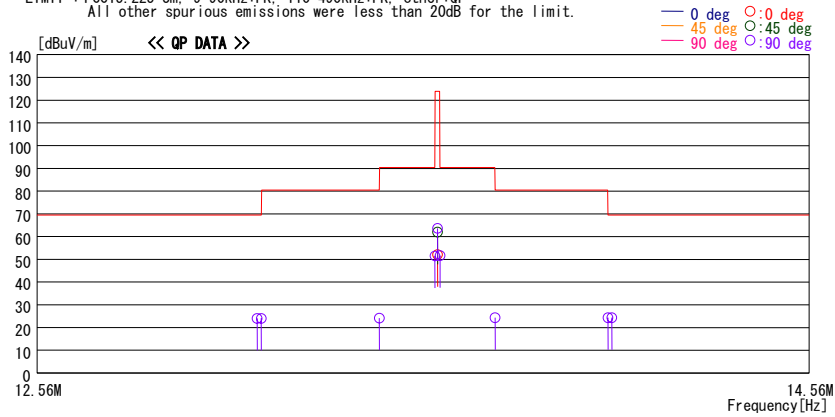
**DATA OF RADIATED EMISSION TEST**

UL Japan, Inc. Head Office EMC Lab. No.1 Semi Anechoic Chamber  
Date : 2007/09/11

Company : OMRON Corporation Report No. : 28AE0160-HO  
Kind of EUT : RFID READER/WRITER Power : DC 5.0V  
Model No. : V680-CHUD Temp./ Humi. : 25 deg. C. / 57 %  
Serial No. : RF-DS-07014 Operator : Kenichi Adachi

Mode / Remarks : Transmitting without Tag, Worst-axis:Y, Worst-angle:90deg.

LIMIT : FCC15.225 3m, 9-90kHz:PK, 110-490kHz:PK, other:QP  
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]	[deg]	
13.10000	42.1	QP	20.1	1.2	39.3	24.1	69.5	45.4	90deg	140	
13.11000	42.1	QP	20.1	1.2	39.3	24.1	69.5	45.4	90deg	140	
13.41000	42.2	QP	20.1	1.2	39.3	24.2	80.5	56.3	90deg	140	
13.55300	69.5	QP	20.1	1.2	39.3	51.5	90.4	38.9	90deg	140	
13.56026	81.6	QP	20.1	1.2	39.3	63.6	123.9	60.3	90deg	140	Worst-angle
13.56026	70.1	QP	20.1	1.2	39.3	52.1	123.9	71.8	0deg	22	
13.56026	79.9	QP	20.1	1.2	39.3	61.9	123.9	62.0	45deg	181	
13.56700	69.6	QP	20.1	1.2	39.3	51.6	90.4	38.8	90deg	140	
13.71000	42.4	QP	20.1	1.2	39.3	24.4	80.5	56.1	90deg	140	
14.01000	42.3	QP	20.1	1.2	39.2	24.4	69.5	45.1	90deg	140	
14.02000	42.3	QP	20.1	1.2	39.2	24.4	69.5	45.1	90deg	140	

CHART : WITH FACTOR , ANT TYPE : LOOP (below 30MHz) ,  
CALCULATION : READING + ANT FACTOR + LOSS ( CABLE + ATTEN. -AMP. )

\*The test result is round off to one or two decimal places, so some differences might be observed.

**Radiated emission(Fundamental emission and Spectrum Mask)**  
(Reference data)(V680-CH1D-PSI, with Tag)

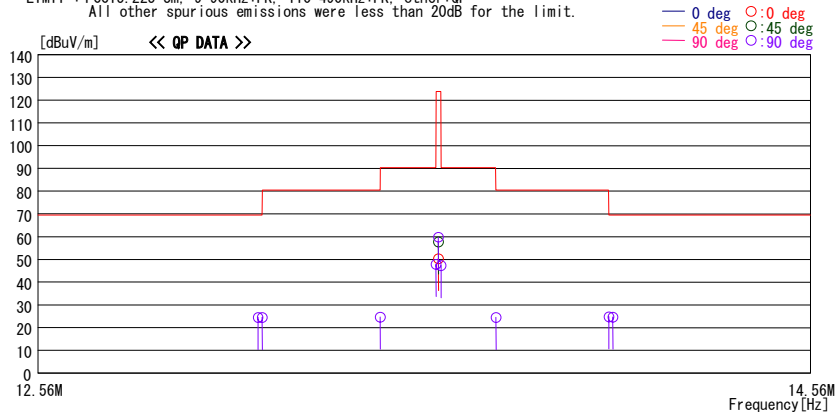
**DATA OF RADIATED EMISSION TEST**

UL Japan, Inc. Head Office EMC Lab. No.1 Semi Anechoic Chamber  
Date : 2007/09/12

Company : OMRON Corporation Report No. : 28AE0160-HO  
Kind of EUT : RFID READER/WRITER Power : DC 5.0V  
Model No. : V680-CH1D-PS1 Temp./ Humi. : 25 deg. C. / 57 %  
Serial No. : RF-DS-07012 Operator : Kenichi Adachi

Mode / Remarks : Transmitting with Tag, Worst-axis:Y, Worst-angle:90deg.

LIMIT : FCC15.225 3m, 9-90kHz:PK, 110-490kHz:PK, other:QP  
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]	
13.10000	42.5	QP	20.1	1.2	39.3	24.5	69.5	45.0	90deg	115	
13.11000	42.5	QP	20.1	1.2	39.3	24.5	69.5	45.0	90deg	115	
13.41000	42.6	QP	20.1	1.2	39.3	24.6	80.5	55.9	90deg	115	
13.55300	65.8	QP	20.1	1.2	39.3	47.8	90.4	42.6	90deg	115	
13.56019	77.9	QP	20.1	1.2	39.3	59.9	123.9	64.0	90deg	115	Worst-angle
13.56019	68.3	QP	20.1	1.2	39.3	50.3	123.9	73.6	0deg	46	
13.56019	75.7	QP	20.1	1.2	39.3	57.7	123.9	66.2	45deg	177	
13.56700	65.3	QP	20.1	1.2	39.3	47.3	90.4	43.1	90deg	115	
13.71000	42.5	QP	20.1	1.2	39.3	24.5	80.5	56.0	90deg	115	
14.01000	42.6	QP	20.1	1.2	39.2	24.7	69.5	44.8	90deg	115	
14.02000	42.5	QP	20.1	1.2	39.2	24.6	69.5	44.9	90deg	115	

CHART : WITH FACTOR , ANT TYPE : LOOP (below 30MHz) ,  
CALCULATION : READING + ANT FACTOR + LOSS ( CABLE + ATTN. -AMP. )

\*The test result is round off to one or two decimal places, so some differences might be observed.

**Radiated emission(Fundamental emission and Spectrum Mask)**  
 (V680-CH1D-PSI, without Tag)

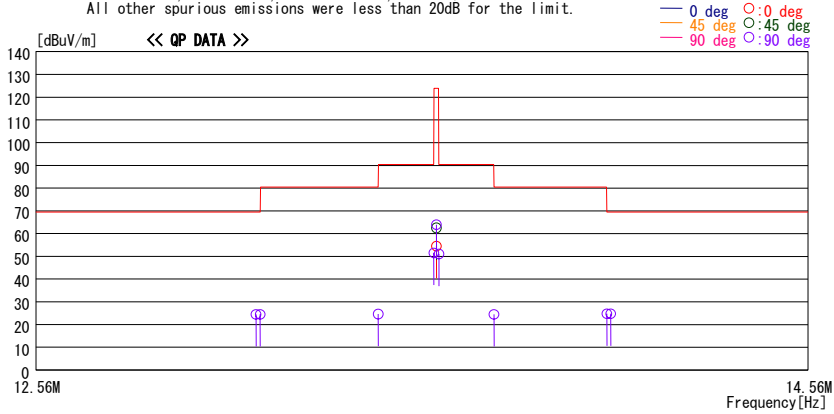
**DATA OF RADIATED EMISSION TEST**

UL Japan, Inc. Head Office EMC Lab. No.1 Semi Anechoic Chamber  
 Date : 2007/09/12

Company : OMRON Corporation Report No. : 28AE0160-HO  
 Kind of EUT : RFID READER/WRITER Power : DC 5.0V  
 Model No. : V680-CH1D-PSI Temp./ Humi. : 25 deg. C. / 57 %  
 Serial No. : RF-DS-07012 Operator : Kenichi Adachi

Mode / Remarks : Transmitting without Tag. Worst-axis:Y. Worst-angle:90deg.

LIMIT : FCC15.225 3m, 9-90kHz:PK, 110-490kHz:PK, other:QP  
 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]	
13.10000	42.5	QP	20.1	1.2	39.3	24.5	69.5	45.0	90deg	126	
13.11000	42.5	QP	20.1	1.2	39.3	24.5	69.5	45.0	90deg	126	
13.41000	42.6	QP	20.1	1.2	39.3	24.6	80.5	55.9	90deg	126	
13.55300	69.5	QP	20.1	1.2	39.3	51.5	90.4	38.9	90deg	126	
13.56019	81.9	QP	20.1	1.2	39.3	63.9	123.9	60.0	90deg	126	Worst-angle
13.56019	72.4	QP	20.1	1.2	39.3	54.4	123.9	69.5	0deg	25	
13.56019	80.5	QP	20.1	1.2	39.3	62.5	123.9	61.4	45deg	183	
13.56700	69.0	QP	20.1	1.2	39.3	51.0	90.4	39.4	90deg	126	
13.71000	42.5	QP	20.1	1.2	39.3	24.5	80.5	56.0	90deg	126	
14.01000	42.6	QP	20.1	1.2	39.2	24.7	69.5	44.8	90deg	126	
14.02000	42.6	QP	20.1	1.2	39.2	24.7	69.5	44.8	90deg	126	

CHART : WITH FACTOR , ANT TYPE : LOOP (below 30MHz) ,  
 CALCULATION : READING + ANT FACTOR + LOSS ( CABLE + ATTEN. -AMP. )

\*The test result is round off to one or two decimal places, so some differences might be observed.

**Radiated emission (Spurious emission: below 30MHz)**  
**(V680-CH1D)**

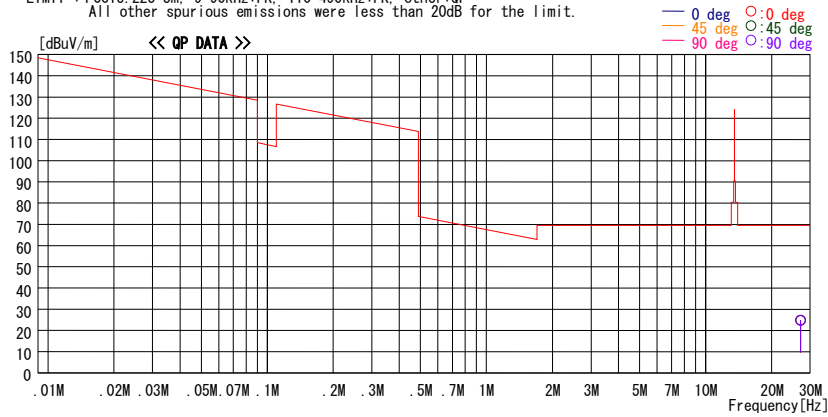
**DATA OF RADIATED EMISSION TEST**

UL Japan, Inc. Head Office EMC Lab. No.1 Semi Anechoic Chamber  
 Date : 2007/09/12

Company : OMRON Corporation  
 Kind of EUT : RFID READER/WRITER  
 Model No. : V680-CH1D  
 Serial No. : RF-DS-07011  
 Report No. : 28AE0160-HO  
 Power : DC 5.0V  
 Temp./ Humi. : 25 deg. C. / 57 %  
 Operator : Kenichi Adachi

Mode / Remarks : Transmitting without Tag, Worst-axis:Y, Worst-angle:90deg.

LIMIT : FCC15.225 3m, 9-90kHz:PK, 110-490kHz:PK, other:QP  
 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]	[deg]	
27.12000	41.6	QP	20.5	1.8	39.2	24.7	69.5	44.8	0deg	151	
27.12000	41.7	QP	20.5	1.8	39.2	24.8	69.5	44.7	45deg	187	
27.12000	41.8	QP	20.5	1.8	39.2	24.9	69.5	44.6	90deg	98	

CHART : WITH FACTOR , ANT TYPE : LOOP (below 30MHz) , Except for the data below : adequate margin data below the limits.  
 CALCULATION : READING + ANT FACTOR + LOSS ( CABLE + ATTEN. -AMP. )

\*The test result is round off to one or two decimal places, so some differences might be observed.

**Radiated emission (Spurious emission: below 30MHz)**  
**(V680-CHUD)**

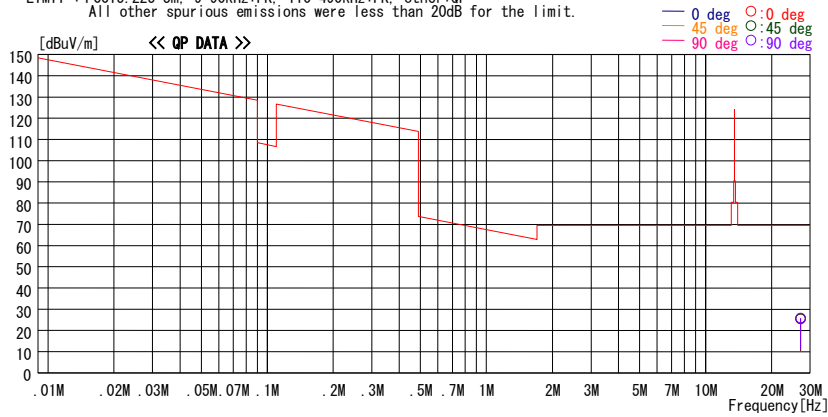
**DATA OF RADIATED EMISSION TEST**

UL Japan, Inc. Head Office EMC Lab. No.1 Semi Anechoic Chamber  
 Date : 2007/09/11

Company : OMRON Corporation  
 Kind of EUT : RFID READER/WRITER  
 Model No. : V680-CHUD  
 Serial No. : RF-DS-07014  
 Report No. : 28AE0160-HO  
 Power : DC 5.0V  
 Temp./ Humi. : 25 deg. C. / 57 %  
 Operator : Kenichi Adachi

Mode / Remarks : Transmitting without Tag, Worst-axis:Y, Worst-angle:90deg.

LIMIT : FCC15.225 3m, 9-90kHz:PK, 110-490kHz:PK, other:QP  
 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]	[deg]	
27.12000	42.4	QP	20.5	1.8	39.2	25.5	69.5	44.0	0deg	222	
27.12000	42.5	QP	20.5	1.8	39.2	25.6	69.5	43.9	45deg	140	
27.12000	42.8	QP	20.5	1.8	39.2	25.9	69.5	43.6	90deg	130	

CHART : WITH FACTOR , ANT TYPE : LOOP (below 30MHz) , Except for the data below : adequate margin data below the limits.  
 CALCULATION : READING + ANT FACTOR + LOSS ( CABLE + ATTEN. -AMP. )

\*The test result is round off to one or two decimal places, so some differences might be observed.

**Radiated emission (Spurious emission: below 30MHz)**  
**(V680-CH1D-PSI)**

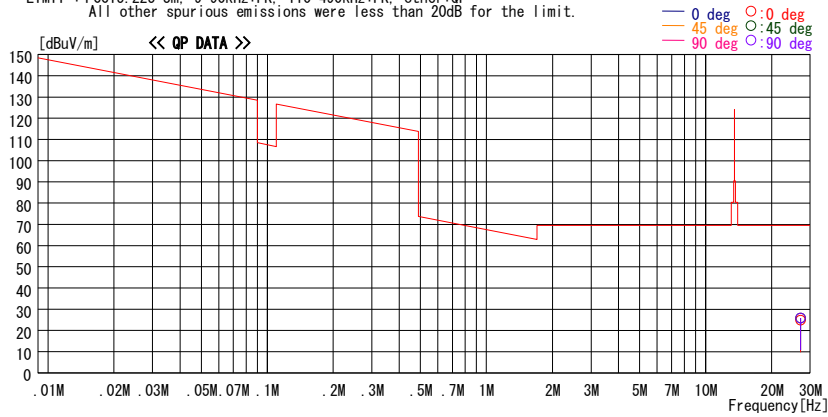
**DATA OF RADIATED EMISSION TEST**

UL Japan, Inc. Head Office EMC Lab. No.1 Semi Anechoic Chamber  
 Date : 2007/09/12

Company : OMRON Corporation  
 Kind of EUT : RFID READER/WRITER  
 Model No. : V680-CH1D-PSI  
 Serial No. : RF-DS-07012  
 Report No. : 28AE0160-HO  
 Power : DC 5.0V  
 Temp./ Humi. : 25 deg. C. / 57 %  
 Operator : Kenichi Adachi

Mode / Remarks : Transmitting without Tag, Worst-axis:Y, Worst-angle:90deg.

LIMIT : FCC15.225 3m, 9-90kHz:PK, 110-490kHz:PK, other:QP  
 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]	
27.12000	41.7	QP	20.5	1.8	39.2	24.8	69.5	44.7	0deg	273	
27.12000	42.8	QP	20.5	1.8	39.2	25.9	69.5	43.6	45deg	221	
27.12000	42.9	QP	20.5	1.8	39.2	26.0	69.5	43.5	90deg	333	

CHART : WITH FACTOR , ANT TYPE : LOOP (below 30MHz) , Except for the data below : adequate margin data below the limits.  
 CALCULATION : READING + ANT FACTOR + LOSS (CABLE + ATTEN. -AMP. )

\*The test result is round off to one or two decimal places, so some differences might be observed.



**Radiated emission (Spurious emission: above 30MHz)**  
**(V680-CH1D)**

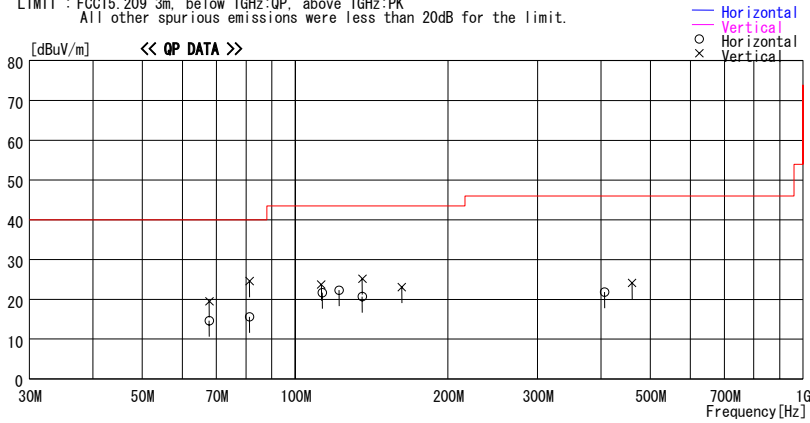
**DATA OF RADIATED EMISSION TEST**

UL Japan, Inc. Head Office EMC Lab. No.1 Semi Anechoic Chamber  
 Date : 2007/09/12

Company : OMRON Corporation Report No. : 28AE0160-HO  
 Kind of EUT : RFID READER/WRITER Power : DC 5.0V  
 Model No. : V680-CH1D Temp./Humi. : 25 deg. C. / 57%  
 Serial No : RF-DS-07011 Operator : Kenichi Adachi

Mode / Remarks : Transmitting without Tag, Worst-axis:Y

LIMIT : FCC15.209 3m, below 1GHz:QP, above 1GHz:PK  
 All other spurious emissions were less than 20dB for the limit.



Frequency [MHz]	Reading [dBuV]	DET	Antenna	Loss	Level	Angle	Height	Polar.	Limit	Margin	Comment
			Factor	Gain							
			[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]	
67.802	38.9	QP	7.1	-31.4	14.6	201	269	Hori.	40.0	25.4	
67.805	43.8	QP	7.1	-31.4	19.5	83	100	Vert.	40.0	20.5	
81.369	39.8	QP	6.8	-31.0	15.6	178	216	Hori.	40.0	24.4	
81.369	48.8	QP	6.8	-31.0	24.6	110	100	Vert.	40.0	15.4	
112.571	42.5	QP	11.9	-30.7	23.7	245	100	Vert.	43.5	19.8	
113.066	40.4	QP	12.0	-30.7	21.7	359	265	Hori.	43.5	21.8	
122.038	39.9	QP	13.0	-30.6	22.3	359	252	Hori.	43.5	21.2	
135.607	37.2	QP	13.9	-30.4	20.7	37	254	Hori.	43.5	22.8	
135.609	41.7	QP	13.9	-30.4	25.2	332	100	Vert.	43.5	18.3	
162.192	37.9	QP	15.4	-30.2	23.1	325	100	Vert.	43.5	20.4	
406.802	33.5	QP	16.2	-27.9	21.8	177	100	Hori.	46.0	24.2	
461.047	34.1	QP	17.5	-27.5	24.1	323	100	Vert.	46.0	21.9	

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)

\*The test result is round off to one or two decimal places, so some differences might be observed.

**Radiated emission (Spurious emission: above 30MHz)**  
**(V680-CHUD)**

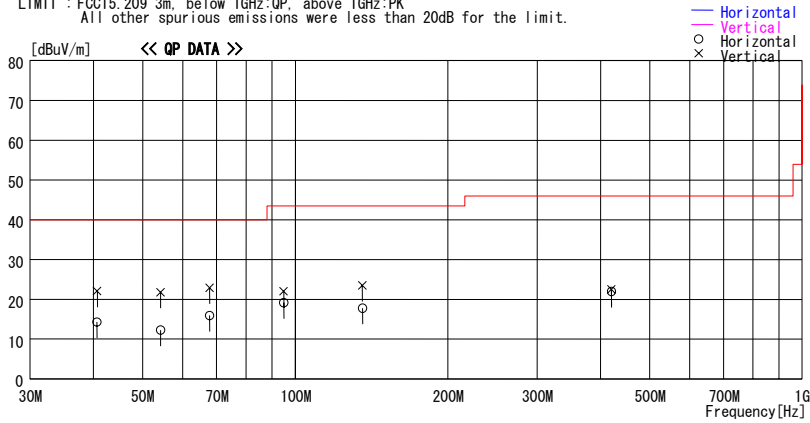
**DATA OF RADIATED EMISSION TEST**

UL Japan, Inc. Head Office EMC Lab. No.1 Semi Anechoic Chamber  
Date : 2007/09/12

Company : OMRON Corporation Report No. : 28AE0160-HO  
Kind of EUT : RFID READER/WRITER Power : DC 5.0V  
Model No. : V680-CHUD Temp./Humi. : 25 deg. C. / 57%  
Serial No : RF-DS-07014 Operator : Kenichi Adachi

Mode / Remarks : Transmitting without Tag, Worst-axis:Y

LIMIT : FCC15.209 3m, below 1GHz:QP, above 1GHz:PK  
All other spurious emissions were less than 20dB for the limit.



Frequency [MHz]	Reading [dBuV]	DET	Antenna	Loss	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
			Factor [dB/m]	Gain [dB]							
40.671	32.7	QP	13.5	-31.9	14.3	93	273	Hori.	40.0	25.7	
40.685	40.5	QP	13.5	-31.9	22.1	337	100	Vert.	40.0	17.9	
54.242	44.0	QP	9.4	-31.6	21.8	6	100	Vert.	40.0	18.2	
54.256	34.5	QP	9.4	-31.6	12.3	239	349	Hori.	40.0	27.7	
67.800	47.2	QP	7.1	-31.4	22.9	122	100	Vert.	40.0	17.1	
67.804	40.2	QP	7.1	-31.4	15.9	12	311	Hori.	40.0	24.1	
94.916	41.4	QP	8.8	-31.0	19.2	32	271	Hori.	43.5	24.3	
94.923	44.2	QP	8.8	-31.0	22.0	90	100	Vert.	43.5	21.5	
135.602	40.0	QP	13.9	-30.4	23.5	280	100	Vert.	43.5	20.0	
135.696	34.3	QP	13.9	-30.4	17.8	83	243	Hori.	43.5	25.7	
420.364	33.7	QP	16.6	-27.8	22.5	344	100	Vert.	46.0	23.5	
420.368	33.2	QP	16.6	-27.8	22.0	200	100	Hori.	46.0	24.0	

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)

\*The test result is round off to one or two decimal places, so some differences might be observed.

**Radiated emission (Spurious emission: above 30MHz)**  
**(V680-CH1D-PSI)**

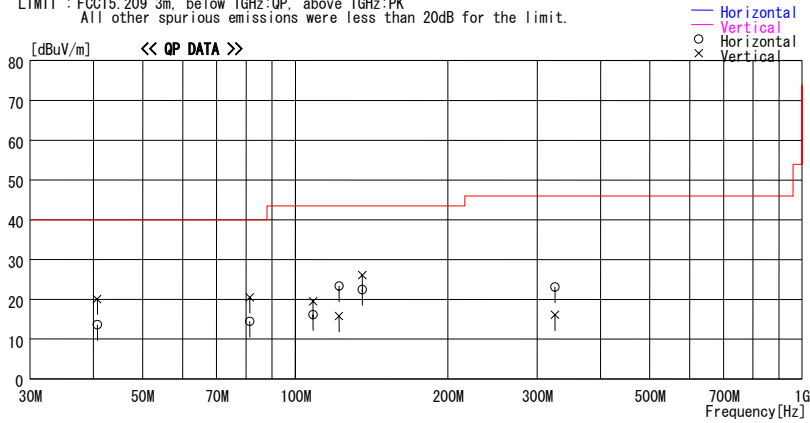
**DATA OF RADIATED EMISSION TEST**

UL Japan, Inc. Head Office EMC Lab. No.1 Semi Anechoic Chamber  
 Date : 2007/09/12

Company : OMRON Corporation  
 Kind of EUT : RFID READER/WRITER  
 Model No. : V680-CH1D-PS1  
 Serial No : RF-DS-07012  
 Report No. : 28AE0160-HO  
 Power : DC 5.0V  
 Temp./Humi. : 25 deg. C. / 57%  
 Operator : Kenichi Adachi

Mode / Remarks : Transmitting without Tag, Worst-axis:Y

LIMIT : FCC15.209 3m, below 1GHz:QP, above 1GHz:PK  
 All other spurious emissions were less than 20dB for the limit.



Frequency [MHz]	Reading [dBuV]	DET	Antenna	Loss	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
			Factor [dB/m]	Gain [dB]							
40.679	38.5	QP	13.5	-31.9	20.1	0	100	Vert.	40.0	19.9	
40.682	32.1	QP	13.5	-31.9	13.7	234	192	Hori.	40.0	26.3	
81.358	38.7	QP	6.8	-31.0	14.5	217	305	Hori.	40.0	25.5	
81.364	44.7	QP	6.8	-31.0	20.5	276	100	Vert.	40.0	19.5	
108.457	39.0	QP	11.3	-30.8	19.5	267	100	Vert.	43.5	24.0	
108.475	35.7	QP	11.3	-30.8	16.2	0	146	Hori.	43.5	27.3	
122.043	33.4	QP	13.0	-30.6	15.8	11	100	Vert.	43.5	27.7	
122.049	41.0	QP	13.0	-30.6	23.4	24	256	Hori.	43.5	20.1	
135.599	42.6	QP	13.9	-30.4	26.1	292	100	Vert.	43.5	17.4	
135.610	39.0	QP	13.9	-30.4	22.5	229	231	Hori.	43.5	21.0	
325.411	30.1	QP	14.7	-28.7	16.1	359	100	Vert.	46.0	29.9	
325.441	37.1	QP	14.7	-28.7	23.1	12	100	Hori.	46.0	22.9	

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)

\*The test result is round off to one or two decimal places, so some differences might be observed.

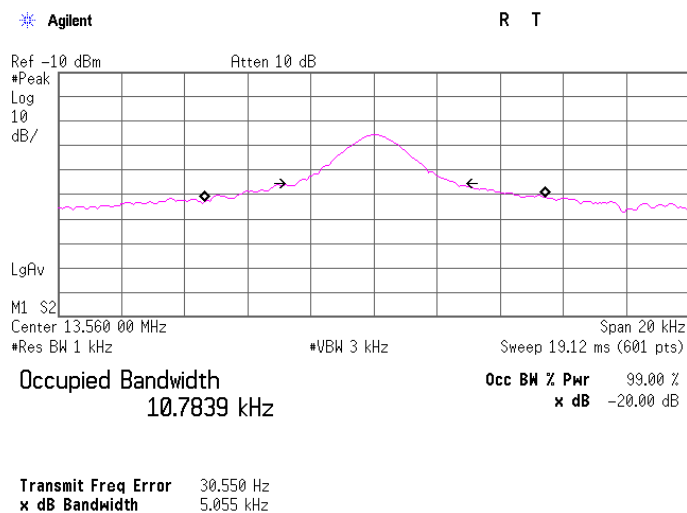
## 20dB Bandwidth

UL Japan, Inc.  
 Head Office EMC Lab. No.1 Anechoic chamber

COMPANY : OMRON Corporation  
 EQUIPMENT : RFID READER/WRITER  
 MODEL : V680-CH1D-PSI  
 S/ N : RF-DS-07012  
 POWER : DC 5.0V  
 MODE : Transmitting  
           with Tag (Worst)

REPORT NO : 28AE0160-HO  
 REGULATION : FCC 15.225  
 TEST DISTANCE : -  
 DATE : 09/11/2007  
 TEMPERATURE : 25 deg.C.  
 HUMIDITY : 57 %  
 ENGINEER : Kenichi Adachi

FREQ [MHz]	20dB Bandwidth [kHz]
13.56	5.06



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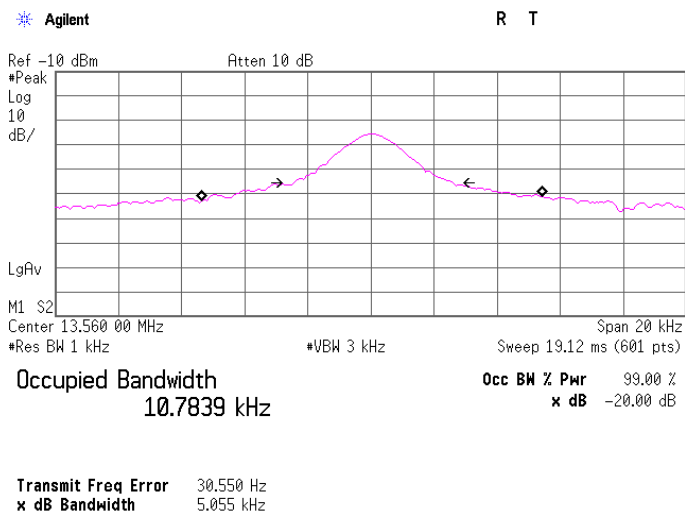
### 99% Occupied Bandwidth

UL Japan, Inc.  
 Head Office EMC Lab. No.1 Anechoic chamber

COMPANY : OMRON Corporation  
 EQUIPMENT : RFID READER/WRITER  
 MODEL : V680-CH1D-PSI  
 S/ N : RF-DS-07012  
 POWER : DC 5.0V  
 MODE : Transmitting  
           with Tag (Worst)

REPORT NO : 28AE0160-HO  
 REGULATION : RSS-Gen 4.6.1  
 TEST DISTANCE : -  
 DATE : 09/11/2007  
 TEMPERATURE : 25 deg.C.  
 HUMIDITY : 57 %  
 ENGINEER : Kenichi Adachi

FREQ [MHz]	99% Occupied Bandwidth [kHz]
13.56	10.78



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## Frequency Tolerance

Company OMRON Corporation  
Equipment RFID READER/WRITER  
Model V680-CH1D-PSI  
S/N RF-DS-07012  
Power DC 5.0V (DC power supply: AC120V / 60Hz)  
Mode Transmitting (None Modulation)

UL Japan, Inc.  
Head Office EMC Lab. No.6 Shielded Room  
Regulation FCC15.225 (e) / RSS-210 A2.6  
Test Distance -  
Date 09/18/2007  
Temperature 25 deg.C.  
Humidity 56 %  
Engineer Kenichi Adachi

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	13.56006390	0.00006390	4.71	100.00	95.29
	on 2min.	13.56006295	0.00006295	4.64	100.00	95.36
	on 5min.	13.56006202	0.00006202	4.57	100.00	95.43
	on 10min.	13.56006178	0.00006178	4.56	100.00	95.44
T nom 20deg.C Vnom AC120V (100%)	Power on	13.56006031	0.00006031	4.45	100.00	95.55
	on 2min.	13.56006083	0.00006083	4.49	100.00	95.51
	on 5min.	13.56006228	0.00006228	4.59	100.00	95.41
	on 10min.	13.56006281	0.00006281	4.63	100.00	95.37
T nom 20deg.C Vmin AC102V (85%)	Power on	13.56006268	0.00006268	4.62	100.00	95.38
	on 2min.	13.56006235	0.00006235	4.60	100.00	95.40
	on 5min.	13.56006224	0.00006224	4.59	100.00	95.41
	on 10min.	13.56006200	0.00006200	4.57	100.00	95.43
T max 50deg.C. Vnom AC120V (100%)	Power on	13.56005901	0.00005901	4.35	100.00	95.65
	on 2min.	13.56006125	0.00006125	4.52	100.00	95.48
	on 5min.	13.56006296	0.00006296	4.64	100.00	95.36
	on 10min.	13.56006675	0.00006675	4.92	100.00	95.08
40deg.C. Vnom AC120V (100%)	Power on	13.56005622	0.00005622	4.15	100.00	95.85
	on 2min.	13.56005442	0.00005442	4.01	100.00	95.99
	on 5min.	13.56005426	0.00005426	4.00	100.00	96.00
	on 10min.	13.56005435	0.00005435	4.01	100.00	95.99
30deg.C. Vnom AC120V (100%)	Power on	13.56006270	0.00006270	4.62	100.00	95.38
	on 2min.	13.56005991	0.00005991	4.42	100.00	95.58
	on 5min.	13.56005794	0.00005794	4.27	100.00	95.73
	on 10min.	13.56005630	0.00005630	4.15	100.00	95.85
20deg.C. Vnom AC120V (100%)	Power on	13.56006031	0.00006031	4.45	100.00	95.55
	on 2min.	13.56006083	0.00006083	4.49	100.00	95.51
	on 5min.	13.56006228	0.00006228	4.59	100.00	95.41
	on 10min.	13.56006281	0.00006281	4.63	100.00	95.37
10deg.C. Vnom AC120V (100%)	Power on	13.56006356	0.00006356	4.69	100.00	95.31
	on 2min.	13.56006531	0.00006531	4.82	100.00	95.18
	on 5min.	13.56006662	0.00006662	4.91	100.00	95.09
	on 10min.	13.56006767	0.00006767	4.99	100.00	95.01
0deg.C. Vnom AC120V (100%)	Power on	13.56006629	0.00006629	4.89	100.00	95.11
	on 2min.	13.56006634	0.00006634	4.89	100.00	95.11
	on 5min.	13.56006531	0.00006531	4.82	100.00	95.18
	on 10min.	13.56006359	0.00006359	4.69	100.00	95.31
-10deg.C. Vnom AC120V (100%)	Power on	13.56003945	0.00003945	2.91	100.00	97.09
	on 2min.	13.56004263	0.00004263	3.14	100.00	96.86
	on 5min.	13.56004266	0.00004266	3.15	100.00	96.85
	on 10min.	13.56004217	0.00004217	3.11	100.00	96.89
-20deg.C Vnom AC120V (100%)	Power on	13.56000057	0.00000057	0.04	100.00	99.96
	on 2min.	13.56000397	0.00000397	0.29	100.00	99.71
	on 5min.	13.56000013	0.00000013	0.01	100.00	99.99
	on 10min.	13.55999483	-0.00000517	-0.38	100.00	99.62
T min -30deg.C Vnom AC120V (100%)	Power on	13.55998999	-0.00001001	-0.74	100.00	99.26
	on 2min.	13.55991387	-0.00008613	-6.35	100.00	93.65
	on 5min.	13.55991827	-0.00008173	-6.03	100.00	93.97
	on 10min.	13.55991884	-0.00008116	-5.99	100.00	94.01

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

\* Temperature -30deg.C.: Reference data

### APPENDIX 3: Test instruments

#### EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Test Item	Calibration Date * Interval(month)
MAEC-01	Anechoic Chamber	TDK	Semi Anechoic Chamber 10m	ME/RE/BW	2006/11/01 * 12
MLPA-02	Loop Antenna	Rohde & Schwarz	HFH2-Z2	ME/BW	2006/12/19 * 12
MCC-30	Coaxial cable	UL Japan	-	ME/BW	2007/06/04 * 12
MCC-03	Coaxial Cable	Fujikura/Suhner/Agilent/TSJ	-	ME/BW	2006/12/28 * 12
MPA-19	Pre Amplifier	MITEQ	MLA-10K01-B01-35	ME/RE/BW	2007/02/08 * 12
MSTW-14	EMI measurement program	TSJ	TEPTO-DV	ME/RE	-
MJM-01	Measure	KDS	ES19-55	ME/RE	-
MOS-01	Digital Humidity Indicator	N.T	NT-1800	ME/RE/BW	2006/11/27 * 12
MTR-01	Test Receiver	Rohde & Schwarz	ESI40	ME/RE	2006/10/14 * 12
MSA-10	Spectrum Analyzer	Agilent	E4448A	BW	2007/07/04 * 12
MBA-01	Biconical Antenna	Schwarzbeck	BBA9106	RE	2006/10/07 * 12
MLA-09	Logperiodic Antenna	Schwarzbeck	USLP9143B	RE	2007/01/19 * 12
MAT-06	Attenuator(6dB)	Weinschel Corp	2	RE	2006/12/27 * 12
MCC-01	Coaxial Cable 0.1-3000MHz	Suhner/storm/Agilent/TSJ	-	RE	2007/02/27 * 12
MCH-04	Temperature and Humidity Chamber	Espec	PL-2KP	FT	2007/08/30 * 12
MUC-01	Universal Counter	Agilent	53132A	FT	2007/05/23 * 12
MMM-11	Digital HiTESTER	Hioki	3805	FT	2007/04/18 * 12
MOS-14	Thermo-Hygrometer	Custom	CTH-180	FT	2006/01/19 * 24
MAEC-02	Anechoic Chamber	TDK	Semi Anechoic Chamber 3m	CE	2007/04/02 * 12
MTR-03	Test Receiver	Rohde & Schwarz	ESCI	CE	2007/03/01 * 12
MCC-13	Coaxial Cable	Fujikura/Agilent	-	CE	2007/02/27 * 12
MLS-07	LISN(AMN)	Schwarzbeck	NSLK8127	CE (EUT)	2007/02/22 * 12
MLS-06	LISN(AMN)	Schwarzbeck	NSLK8127	CE (AE)	2007/02/22 * 12
MTA-07	Terminator	MCL	BTRM-50	CE	2007/02/01 * 12

The expiration date of the calibration is the end of the expired month.

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

#### Test Item:

CE: Conducted emission

ME: Radiated emission (below 30MHz)

RE: Radiated emission (above 30MHz)

BW: 20dB Bandwidth and 99% Occupied Bandwidth

FT: Frequency Tolerance

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