

APPENDIX 2:Test instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Test Item	Calibration Date * Interval(month)
MAEC-04	Anechoic Chamber	TDK	Semi Anechoic Chamber 3m	RE	2006/03/06 * 12
MSA-05	Spectrum Analyzer	Advantest	R3273	RE	2006/05/20 * 12
MCC-50	Coaxial cable	UL Apex	-	RE	2006/03/09 * 12
MAT-31	Attenuator(6dB)	TME	UFA-01	RE	2006/03/11 * 12
MPA-14	Pre Amplifier	SONOA INSTRUMENT	310	RE	2006/03/25 * 12
MBA-05	Biconical Antenna	Schwarzbeck	BBA9106	RE	2006/01/29 * 12
MLA-08	Logperiodic Antenna	Schwarzbeck	UKLP9140-A	RE	2006/01/29 * 12
MOS-14	Thermo-Hygrometer	Custom	CTH-180	RE	2006/01/19 * 24
MSTW-14	EMI measurement program	TSJ	TEPTO-DV	RE	-
MAEC-03	Anechoic Chamber	TDK	Semi Anechoic Chamber 3m	RE	2006/03/03 * 12
MRENT-39	Spectrum Analyzer	Advantest	R3273	RE	2006/07/25 * 12
TR-07	Test Receiver	Rohde & Schwarz	ESCS30	RE	2006/09/12 * 12
MCC-51	Coaxial cable	UL Apex	-	RE	2006/03/11 * 12
MPA-13	Pre Amplifier	SONOA INSTRUMENT	310	RE	2006/03/25 * 12
MAT-30	Attenuator(6dB)	TME	UFA-01	RE	2006/03/11 * 12
MBA-03	Biconical Antenna	Schwarzbeck	BBA9106	RE	2006/01/29 * 12
MLA-03	Logperiodic Antenna	Schwarzbeck	USLP9143	RE	2006/01/29 * 12
MOS-12	Thermo-Hygrometer	Custom	CTH-180	RE	2006/01/19 * 24

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MF060b(19.04.06)

MAEC-02	Anechoic Chamber	TDK	Semi Anechoic Chamber 3m	RE	2006/04/10 * 12
MSA-03	Spectrum Analyzer	Agilent	E4448A	RE	2006/09/13 * 12
MCC-12	Coaxial Cable	Fujikura/Agilent	-	RE	2006/02/23 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	RE	2006/12/27 * 12
MLA-02	Logperiodic Antenna	Schwarzbeck	USLP9143	RE	2006/10/07 * 12
MOS-02	Digital Humidity Indicator	N.T	NT-1800	RE	2006/11/27 * 12

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

Test Item :

RE: Radiated emission

APPENDIX 3: Data of EMI test

200kHz Bandwidth

UL Apex Co., Ltd.
Head Office EMC Lab. No.2 Semi Anechoic Chamber

COMPANY : THine Electronics, inc.
EQUIPMENT : THG4649 demonstration set
MODEL : FMT-MB02 rev3
S/ N : 170
POWER : DC 3.0V
MODE : Transmitting (88.1/98.0/107.9MHz)
: audio signal of a typical audio file

REGULATION : Fcc Part15 Subpart C Section 15.239(a)
PROCEDURE : Fcc Part2 Section 2.1049
TEST DISTANCE : 3 m
DATE : 01/23/2007
TEMPERATURE : 24deg.C
HUMIDITY : 31 %
ENGINEER : Shinya Watanabe

No.	FREQ [MHz]	RESULT		LIMIT [kHz]	MARGIN	
		HOR [kHz]	VER [kHz]		HOR [kHz]	VER [kHz]
1	88.1	114.9	103.8	200.0	85.1	96.2
2	98.0	115.1	115.6	200.0	84.9	84.4
3	107.9	134.8	128.0	200.0	65.2	72.0

20dB Bandwidth

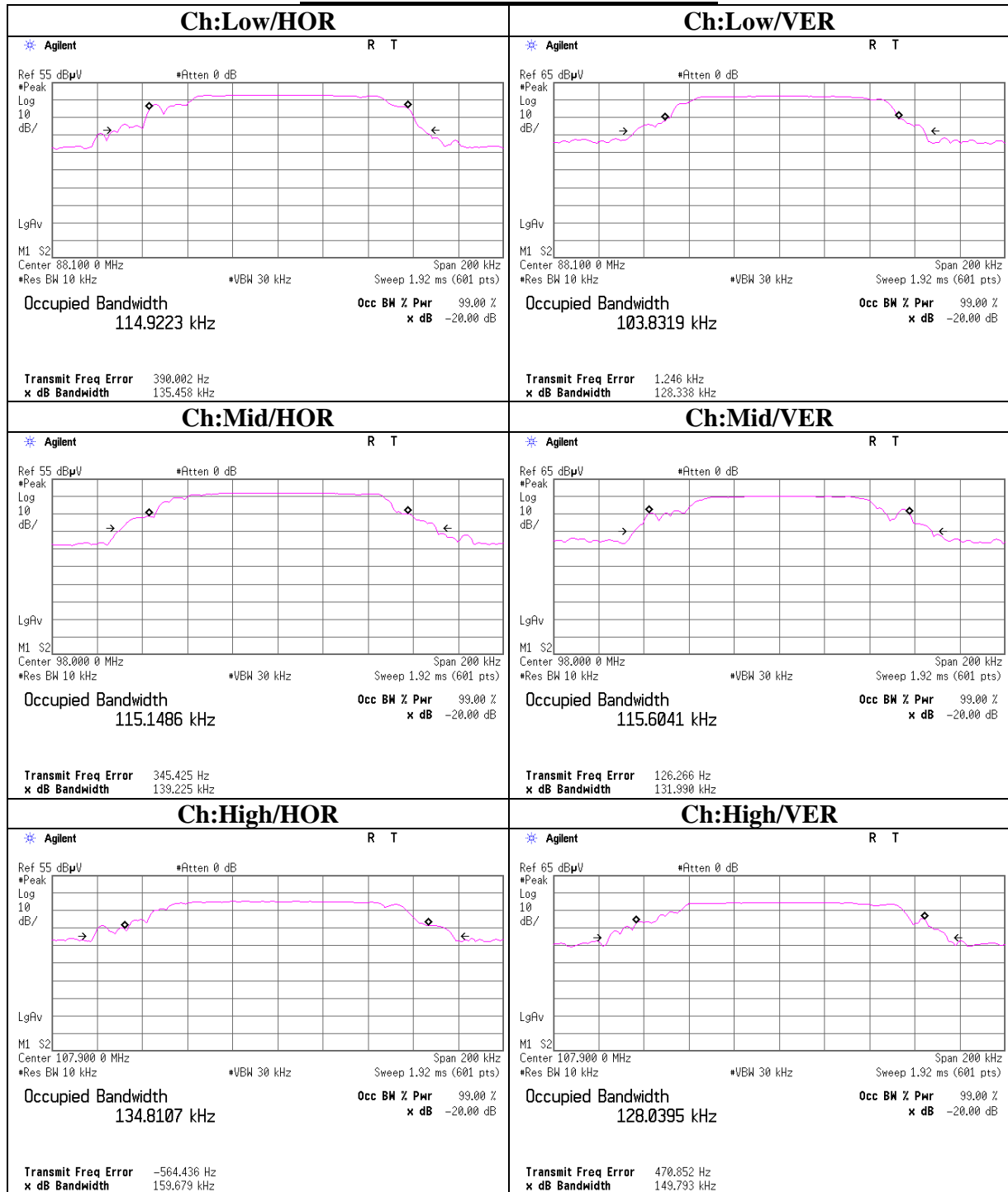
UL Apex Co., Ltd.
Head Office EMC Lab. No.2 Semi Anechoic Chamber

COMPANY : THine Electronics, inc.
EQUIPMENT : THG4649 demonstration set
MODEL : FMT-MB02 rev3
S/ N : 170
POWER : DC 3.0V
MODE : Transmitting (88.1/98.0/107.9MHz)
: audio signal of a typical audio file

REGULATION : Fcc Part15 Subpart C
TEST DISTANCE : 3 m
DATE : 01/23/2007
TEMPERATURE : 24 deg.C
HUMIDITY : 31 %
ENGINEER : Shinya Watanabe

No.	FREQ [MHz]	RESULT		LIMIT [kHz]	MARGIN	
		HOR [kHz]	VER [kHz]		HOR [kHz]	VER [kHz]
1	88.1	135.5	128.3	-	-	-
2	98.0	139.2	132.0	-	-	-
3	107.9	159.7	149.8	-	-	-

200kHz Bandwidth / 20dB Bandwidth



Emissions from the Intentional radiators

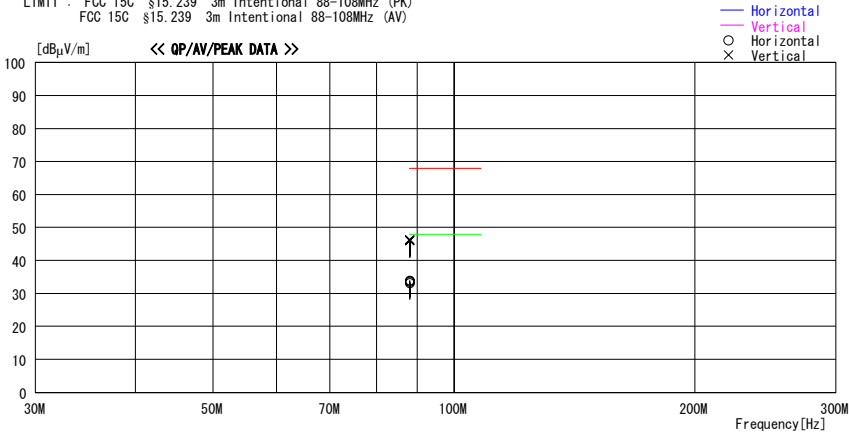
DATA OF RADIATED EMISSION TEST

UL Apex Co., Ltd. Head Office EMC Lab. No.3 Semi Anechoic Chamber
Date : 2006/12/13 23:10:54

Company : THine Electronics, inc. Report No. : 26IE0294-HO
Kind of EUT : THG4649 demonstration set Power : DC 3.0V
Model No. : FMT-MB02 rev3 Temp./Humi. : 24degC / 36%
Serial No. : 170 Operator : Shinya Watanabe

Mode / Remarks : TX 88.1MHz MAX_Axis

LIMIT : FCC 15C §15.239 3m Intentional 88-108MHz (PK)
FCC 15C §15.239 3m Intentional 88-108MHz (AV)



Frequency	Reading	DET	Antenna	Loss&	Level	Polar.	Limit	Margin
			Factor	Gain				
[MHz]	[dBμV]		[dB/m]	[dB]	[dBμV/m]		[dBμV/m]	[dB]
88.100	49.6	PK	8.6	-24.2	34.0	Hori.	67.9	33.9
88.100	49.1	QP	8.6	-24.2	33.5	Hori.	67.9	34.4
88.100	48.7	AV	8.6	-24.2	33.1	Hori.	47.9	14.8
88.100	61.9	PK	8.6	-24.2	46.3	Vert.	67.9	21.6
88.100	61.7	QP	8.6	-24.2	46.1	Vert.	67.9	21.8
88.100	61.5	AV	8.6	-24.2	45.9	Vert.	47.9	2.0

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)

Test report No. : 26IE0294-HO-B-2
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Revised date : January 25, 2007
FCC ID : USTFMTMB02R3

Emissions from the Intentional radiators

DATA OF RADIATED EMISSION TEST

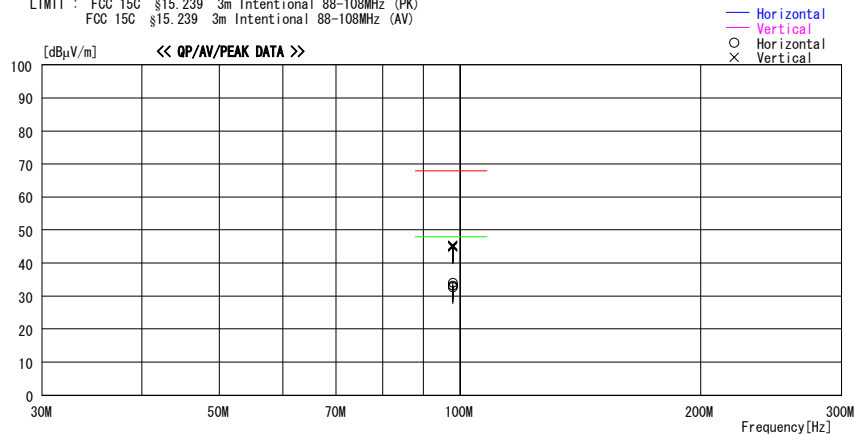
UL Apex Co., Ltd. Head Office EMC Lab. No.3 Semi Anechoic Chamber
Date : 2006/12/13 23:10:54

Company : Thine Electronics, inc.
Kind of EUT : THG4649 demonstration set
Model No. : FMT-MB02 rev3
Serial No. : 170

Report No. : 26IE0294-HO
Power : DC 3.0V
Temp./Humi. : 24degC / 36%
Operator : Shinya Watanabe

Mode / Remarks : TX 98.0MHz MAX_Axis

LIMIT : FCC 15C §15.239 3m Intentional 88-108MHz (PK)
FCC 15C §15.239 3m Intentional 88-108MHz (AV)



Frequency	Reading	DET	Antenna	Loss&	Level	Polar.	Limit	Margin
			Factor	Gain				
[MHz]	[dBμV]		[dB/m]	[dB]	[dBμV/m]		[dBμV/m]	[dB]
98.000	47.4	PK	10.6	-23.9	34.1	Hori.	67.9	33.8
98.000	46.5	QP	10.6	-23.9	33.2	Hori.	67.9	34.7
98.000	46.0	AV	10.6	-23.9	32.7	Hori.	47.9	15.2
98.000	58.7	PK	10.6	-23.9	45.4	Vert.	67.9	22.5
98.000	58.4	QP	10.6	-23.9	45.1	Vert.	67.9	22.8
98.000	58.1	AV	10.6	-23.9	44.8	Vert.	47.9	3.1

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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Emissions from the Intentional radiators

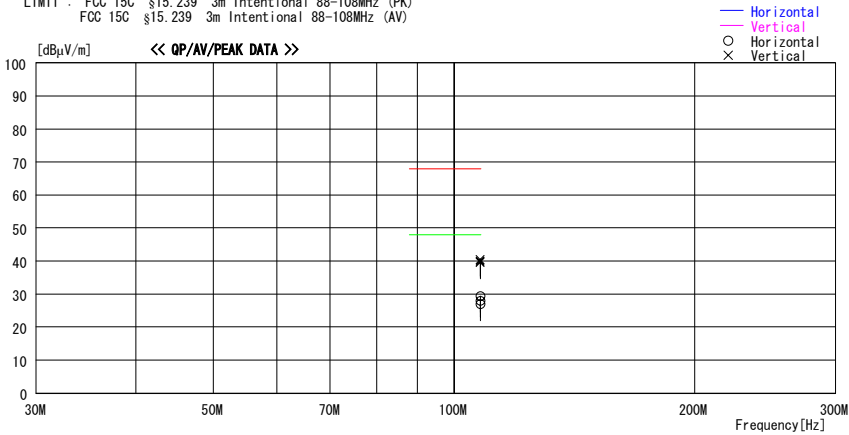
DATA OF RADIATED EMISSION TEST

UL Apex Co., Ltd. Head Office EMC Lab. No.3 Semi Anechoic Chamber
Date : 2006/12/13 23:10:54

Company : Thine Electronics, inc. Report No. : 26IE0294-H0
Kind of EUT : THG4649 demonstration set Power : DC 3.0V
Model No. : FMT-MB02 rev3 Temp./Humi. : 24degC / 36%
Serial No. : 170 Operator : Shinya Watanabe

Mode / Remarks : TX 107.9MHz MAX_Axis

LIMIT : FCC 15C §15.239 3m Intentional 88-108MHz (PK)
FCC 15C §15.239 3m Intentional 88-108MHz (AV)



Frequency	Reading	DET	Antenna	Loss&	Level	Polar.	Limit	Margin
			Factor	Gain				
[MHz]	[dBμV]		[dB/m]	[dB]	[dBμV/m]		[dBμV/m]	[dB]
107.900	41.2	PK	12.0	-23.8	29.4	Hori.	67.9	38.5
107.900	39.8	QP	12.0	-23.8	28.0	Hori.	67.9	39.9
107.900	38.8	AV	12.0	-23.8	27.0	Hori.	47.9	20.9
107.900	52.3	PK	12.0	-23.8	40.5	Vert.	67.9	27.4
107.900	51.8	QP	12.0	-23.8	40.0	Vert.	67.9	27.9
107.900	51.4	AV	12.0	-23.8	39.6	Vert.	47.9	8.3

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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Spurious Emissions

DATA OF RADIATED EMISSION TEST

UL Apex Co., Ltd. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2006/06/06 13:35:56

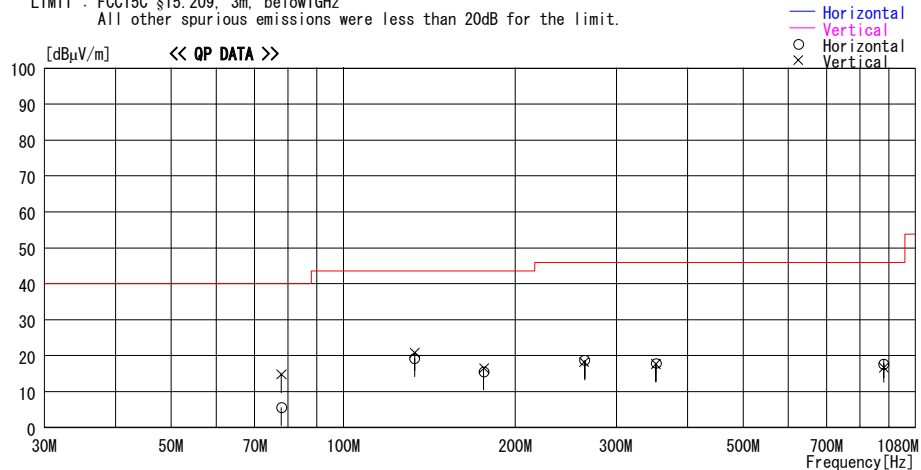
Company : THine Electronics, inc.
Kind of EUT : THG4649 demonstration set
Model No. : FMT-MB02 rev3
Serial No. : 170

Report No. : 26IE0294-HO
Power : DC 3.0V
Temp./Humi. : 25degC / 56%
Operator : Takumi Shimada

Mode / Remarks : TX 88.1MHz Max_Axis

LIMIT : FCC15C §15.209, 3m, below1GHz

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



Frequency	Reading	DET	Antenna	Loss&	Level	Polar.	Limit	Margin
			Factor	Gain				
[MHz]	[dBuV]		[dB/m]	[dB]	[dBuV/m]		[dBuV/m]	[dB]
78.000	22.4	QP	7.3	-24.1	5.6	Hori.	40.0	34.4
78.000	31.6	QP	7.3	-24.1	14.8	Vert.	40.0	25.2
133.300	27.8	QP	14.6	-23.2	19.2	Hori.	43.5	24.3
133.300	29.4	QP	14.6	-23.2	20.8	Vert.	43.5	22.7
176.200	21.8	QP	16.5	-22.8	15.5	Hori.	43.5	28.0
176.200	22.7	QP	16.5	-22.8	16.4	Vert.	43.5	27.1
264.300	22.2	QP	18.6	-22.1	18.7	Hori.	46.0	27.3
264.300	21.7	QP	18.6	-22.1	18.2	Vert.	46.0	27.8
352.400	22.1	QP	17.4	-21.6	17.9	Hori.	46.0	28.1
352.400	21.8	QP	17.4	-21.6	17.6	Vert.	46.0	28.4
881.000	21.8	QP	23.3	-27.7	17.4	Hori.	46.0	---
881.000	21.7	QP	23.3	-27.7	17.3	Vert.	46.0	---

*Test Distance 1.0m : Distance Factor (Dfac) = $20\log(3/1.0) = 9.5\text{dB}$ / No signal was detected.

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) - Dfac*

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Test report No. : 26IE0294-HO-B-2
Page : 20 of 22
Issued date : July 10, 2006
Revised date : January 25, 2007
FCC ID : USTFMTMB02R3

Spurious Emissions

DATA OF RADIATED EMISSION TEST

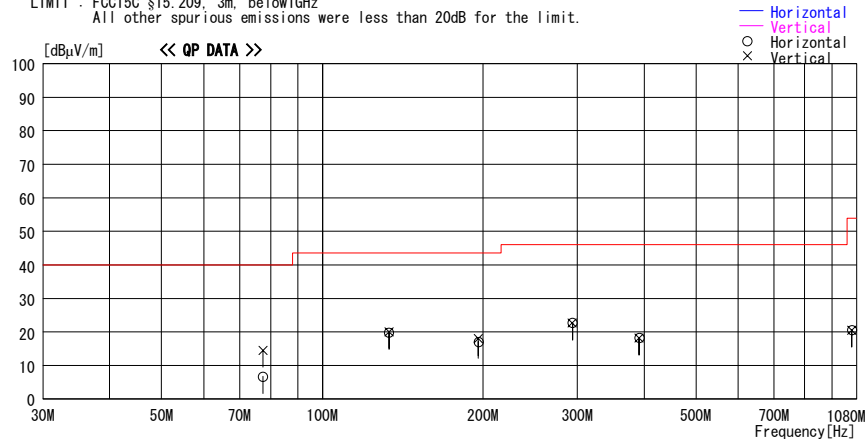
UL Apex Co., Ltd. Head Office EMC Lab. No. 4 Semi Anechoic Chamber
Date : 2006/06/06 14:31:20

Company : THine Electronics, inc.
Kind of EUT : THG4649 demonstration set
Model No. : FMT-MB02 rev3
Serial No. : 170

Report No. : 26IE0294-H0
Power : DC 3.0V
Temp./Humi. : 25degC / 56%
Operator : Takumi Shimada

Mode / Remarks : TX 98.0MHz Max_Axis

LIMIT : FCC15C §15.209, 3m, below 1GHz
All other spurious emissions were less than 20dB for the limit.



Frequency [MHz]	Reading [dBuV]	DET	Antenna		Level [dBuV/m]	Polar.	Limit [dBuV/m]	Margin [dB]
			Factor [dB/m]	Gain [dB]				
77.400	23.5	QP	7.3	-24.1	6.7	Hori.	40.0	33.3
77.400	31.3	QP	7.3	-24.1	14.5	Vert.	40.0	25.5
133.300	28.4	QP	14.6	-23.2	19.8	Hori.	43.5	23.7
133.300	28.7	QP	14.6	-23.2	20.1	Vert.	43.5	23.4
196.000	22.9	QP	16.9	-22.7	17.1	Hori.	43.5	26.4
196.000	23.7	QP	16.9	-22.7	17.9	Vert.	43.5	25.6
294.000	24.8	QP	19.9	-22.0	22.7	Hori.	46.0	23.3
294.000	24.7	QP	19.9	-22.0	22.6	Vert.	46.0	23.4
392.000	21.7	QP	17.9	-21.3	18.3	Hori.	46.0	27.7
392.000	21.5	QP	17.9	-21.3	18.1	Vert.	46.0	27.9
980.000	20.6	QP	26.6	-26.9	20.3	Hori.	53.9	---
980.000	20.6	QP	26.6	-26.9	20.3	Vert.	53.9	---

*Test Distance 1.0m : Distance Factor (Dfac) = $20 \log(3/1.0) = 9.5 \text{ dB}$ / No signal was detected.

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) - Dfac*

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Test report No. : 26IE0294-HO-B-2
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Issued date : July 10, 2006
Revised date : January 25, 2007
FCC ID : USTFMTMB02R3

Spurious Emissions

DATA OF RADIATED EMISSION TEST

UL Apex Co., Ltd. Head Office EMC Lab. No. 4 Semi Anechoic Chamber
Date : 2006/06/06 15:17:24

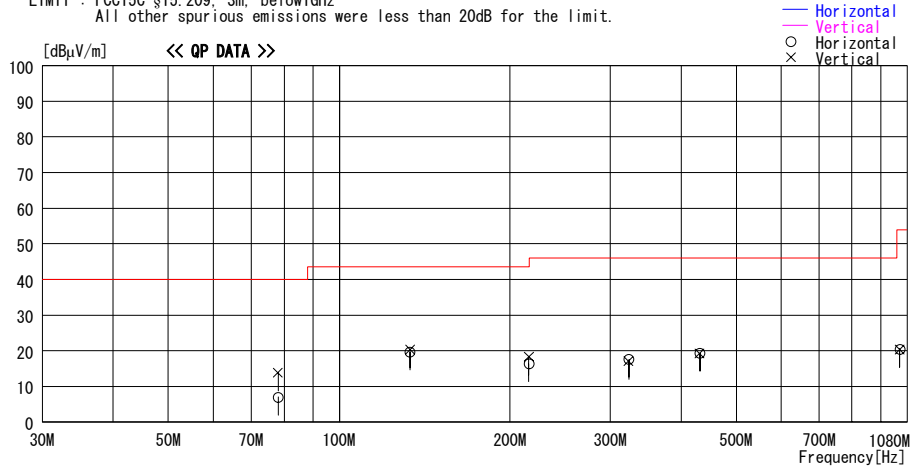
Company : THine Electronics, inc.
Kind of EUT : THG4649 demonstration set
Model No. : FMT-MB02 rev3
Serial No. : 170

Report No. : 26IE0294-HO
Power : DC 3.0V
Temp./Humi. : 25degC / 56%
Operator : Takumi Shimada

Mode / Remarks : TX 107.9MHz Max_Axis

LIMIT : FCC15C §15.209, 3m, below1GHz

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



Frequency	Reading	DET	Antenna Factor	Loss & Gain	Level	Polar.	Limit	Margin
[MHz]	[dBuV]		[dB/m]	[dB]	[dBuV/m]		[dBuV/m]	[dB]
78.060	23.8	QP	7.3	-24.1	7.0	Hori.	40.0	33.0
78.060	30.6	QP	7.3	-24.1	13.8	Vert.	40.0	26.2
133.300	28.2	QP	14.6	-23.2	19.6	Hori.	43.5	23.9
133.300	28.9	QP	14.6	-23.2	20.3	Vert.	43.5	23.2
215.800	21.6	QP	17.3	-22.5	16.4	Hori.	43.5	27.1
215.800	23.5	QP	17.3	-22.5	18.3	Vert.	43.5	25.2
323.700	22.4	QP	17.0	-21.8	17.6	Hori.	46.0	28.4
323.700	21.8	QP	17.0	-21.8	17.0	Vert.	46.0	29.0
431.600	21.8	QP	18.6	-21.1	19.3	Hori.	46.0	26.7
431.600	21.8	QP	18.6	-21.1	19.3	Vert.	46.0	26.7
971.100	20.6	QP	26.3	-26.9	20.0	Hori.	53.9	---
971.100	20.8	QP	26.3	-26.9	20.2	Vert.	53.9	---

*Test Distance 1.0m : Distance Factor (Dfac) = $20 \log(3/1.0) = 9.5 \text{ dB}$ / No signal was detected.

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) - Dfac*

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MF060b(19.04.06)

Spurious Emissions (Band Edge)

DATA OF RADIATED EMISSION TEST

UL Apex Co., Ltd. Head Office EMC Lab. No.3 Semi Anechoic Chamber
Date : 2006/12/13 23:10:54

Company

Kind of EUT

Model No.

Serial No.

: Thine Electronics, inc.

: THG4649 demonstration set

: FMT-MB02 rev3

: 170

Report No.

Power

Temp./Humi.

Operator

: 26IE0294-H0

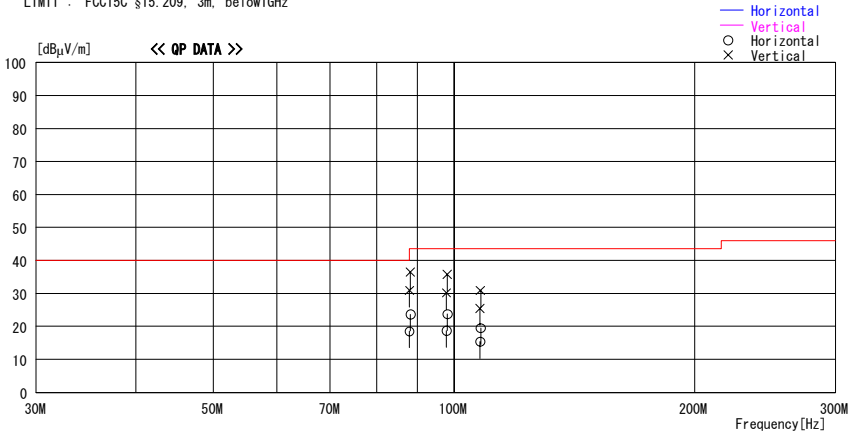
: DC 3.0V

: 24degC / 36%

: Shinya Watanabe

Mode / Remarks : TX 88.1MHz / 98.0MHz / 107.9MHz Band Edge

LIMIT : FCC15C §15.209, 3m, below1GHz



Frequency	Reading	DET	Antenna Factor	Loss& Gain	Level	Polar.	Limit	Margin	Comment
[MHz]	[dBμV]		[dB/m]	[dB]	[dBμV/m]		[dBμV/m]	[dB]	
88.000	34.2	QP	8.5	-24.2	18.5	Hori.	40.0	21.5	TX 88.1MHz
88.000	46.6	QP	8.5	-24.2	30.9	Vert.	40.0	9.1	TX 88.1MHz
88.200	39.2	QP	8.6	-24.2	23.6	Hori.	43.5	19.9	TX 88.1MHz
88.200	52.0	QP	8.6	-24.2	36.4	Vert.	43.5	7.1	TX 88.1MHz
97.900	32.0	QP	10.6	-23.9	18.7	Hori.	43.5	24.8	TX 98.0MHz
97.900	43.5	QP	10.6	-23.9	30.2	Vert.	43.5	13.3	TX 98.0MHz
98.100	37.0	QP	10.6	-23.9	23.7	Hori.	43.5	19.8	TX 98.0MHz
98.100	49.0	QP	10.6	-23.9	35.7	Vert.	43.5	7.8	TX 98.0MHz
107.800	27.2	QP	12.0	-23.8	15.4	Hori.	43.5	28.1	TX 107.9MHz
107.800	37.2	QP	12.0	-23.8	25.4	Vert.	43.5	18.1	TX 107.9MHz
108.000	31.2	QP	12.1	-23.8	19.5	Hori.	43.5	24.0	TX 107.9MHz
108.000	42.6	QP	12.1	-23.8	30.9	Vert.	43.5	12.6	TX 107.9MHz

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)