

TEST DATA

2.1 AC Power Line Conducted Emission Measurement(0.45 MHz - 30 MHz)

Note : This test was not applicable.

2.2 Radiated Emissions Measurement(9 kHz - 30 MHz)

2.2.1 Immobilizer Antenna:X1T25271(X1L-043-11)

Transponder :X1T20271(X1L-043-21)

Date : July 7, 2000

Temp.: 29 °C Humi.: 58 %

Operating Frequency : 126.0 kHz

Distance of Measurement : 30 meters

Frequency (MHz)	Meter Reading (dBμV/m)	Field Strength (dBμV/m)
Fundamental		
0.1260	< 30.0	< 30.0
Harmonic Frequency		
0.2520	< 33.2	< 33.2
0.2780	< 31.4	< 31.4
0.5040	< 30.1	< 30.1
0.6300	< 29.0	< 29.0
0.7560	< 28.1	< 28.1
0.8820	< 27.3	< 27.3
1.0080	< 27.0	< 27.0
1.1340	< 27.0	< 27.0
1.2600	< 27.0	< 27.0

Note : The fundamental field strength was found undetectable weak of the field strength meter.

Tested by : Y. Nakajima
Yoichi Nakajima
Testing Engineer

The distance of measurements was reduced to 10 meters.

Date : July 7, 2000Temp.: 20 °C Humi.: 41 %

Operating Frequency : 126.0 kHz
Distance of Measurement : 10 meters

Frequency (MHz)	Meter Reading (dBμV/m)	Field Strength (dBμV/m)
Fundamental		
0.1260	41.5	41.5
Harmonic Frequency		
0.2520	< 33.2	< 33.2
0.2780	< 31.4	< 31.4
0.5040	< 30.1	< 30.1
0.6300	< 29.0	< 29.0
0.7560	< 28.1	< 28.1
0.8820	< 27.3	< 27.3
1.0080	< 27.0	< 27.0
1.1340	< 27.0	< 27.0
1.2600	< 27.0	< 27.0

- Note: 1. Meter reading value shows field strength, because the value includes antenna factor.
2. The symbol of "<" means "or less".
3. Measuring Instrument Setting:

Frequency Range : 110 kHz to 490 kHz
Detector Function : Average
IF Band width : 10 kHz

Frequency Range : 536.8 kHz to 1345 kHz
Detector Function : CISPR Quasi-peak Peak
IF Band width : 9 kHz

For fundamental, the measured field strength was extrapolated to distance 300 meters, using the formula that field strength varies as the inverse distance square(40 dB per decade of distance).

Calculation :

$$\begin{aligned} 41.5 \text{ dB}\mu\text{V/m} - 20\log_{10}((300/10)^2) &= 41.5 - 59.1 \\ &= -17.6 \text{ dB}\mu\text{V/m at 300 meters} \end{aligned}$$

$$\text{Limits for fundamental}(\$15.209(a)) = 20\log_{10}(2400/134.0) = 25.1 \text{ dB } \mu\text{V/m}$$

Tested by : Y. Nakajima
Yoichi Nakajima
Testing Engineer

2.2.2 Immobilizer Antenna : X1T25671(X1L-057-11)
Transponder : X1T20271(X1L-057-21)

Date : July 7, 2000Temp.: 29 °C Humi.: 58 %

Operating Frequency : 123.7 kHz
Distance of Measurement : 30 meters

Frequency (MHz)	Meter Reading (dBμV/m)	Field Strength (dBμV/m)
Fundamental		
0.1237	< 30.0	< 30.0
Harmonic Frequency		
0.2474	< 33.2	< 33.2
0.3711	< 31.4	< 31.4
0.4948	< 30.1	< 30.1
0.6185	< 29.0	< 29.0
0.7422	< 28.1	< 28.1
0.8659	< 27.3	< 27.3
0.9896	< 27.0	< 27.0
1.1113	< 27.0	< 27.0
1.2370	< 27.0	< 27.0

Note : The fundamental field strength was found undetectable weak of the field strength meter.

Tested by :



Yoichi Nakajima

Testing Engineer

The distance of measurements was reduced to 10 meters.

Date : July 7, 2000

Temp.: 20 °C Humi.: 41 %

Operating Frequency : 123.7 kHz
Distance of Measurement : 10 meters

Frequency (MHz)	Meter Reading (dBμV/m)	Field Strength (dBμV/m)
Fundamental		
0.1237	56.0	56.0
Harmonic Frequency		
0.2474	< 33.2	< 33.2
0.3711	< 31.4	< 31.4
0.4948	< 30.1	< 30.1
0.6185	< 29.0	< 29.0
0.7422	< 28.1	< 28.1
0.8659	< 27.3	< 27.3
0.9896	< 27.0	< 27.0
1.1113	< 27.0	< 27.0
1.2370	< 27.0	< 27.0

- Note:
1. Meter reading value shows field strength, because the value includes antenna factor.
 2. The symbol of "<" means "or less".
 3. Measuring Instrument Setting:

Frequency Range : 110 kHz to 490 kHz
Detector Function : Average
IF Band width : 10 kHz

Frequency Range : 536.8 kHz to 1345 kHz
Detector Function : CISPR Quasi-peak Peak
IF Band width : 9 kHz

For fundamental, the measured field strength was extrapolated to distance 300 meters, using the formula that field strength varies as the inverse distance square(40 dB per decade of distance).

Calculation :

$$56.0 \text{ dB}\mu\text{V/m} - 20\log_{10}((300/10)^2) = 56.0 - 59.1 \\ = -3.1 \text{ dB}\mu\text{V/m at 300 meters}$$

$$\text{Limits for fundamental}(\$15.209(a)) = 20\log_{10}(2400/134.0) = 25.1 \text{ dB } \mu\text{V/m}$$

Tested by : Y. Nakajima
Yoichi Nakajima
Testing Engineer

2.3. Radiated Spurious Emissions [§15.209]

2.3.1. Immobilizer Antenna:X1T25271(X1L-043-11)

Transponder :X1T20271(X1L-043-21)

Date : July 12, 2000

Temp. : 19° C Humi.: 38%

Frequency (MHz)	Antenna Factor (dB/m)	Meter Reading (dBuV)		Limits (dBuV/m)	Emission Level (dBuV/m)		Margin (dB)		Comment
		Horiz.	Ver.		Horiz.	Ver.	Horiz.	Ver.	
30.0	19.6	< -2.0	< -2.0	40.0	< 17.6	< 17.6	> 22.4	> 22.4	
40.0	15.9	< -2.0	< -2.0	40.0	< 13.9	< 13.9	> 26.1	> 26.1	
50.0	12.8	< -2.0	< -2.0	40.0	< 10.8	< 10.8	> 29.2	> 29.2	
70.0	7.9	< -2.0	< -2.0	40.0	< 5.9	< 5.9	> 34.1	> 34.1	
90.0	9.5	< -2.0	< -2.0	43.5	< 7.5	< 7.5	> 36.0	> 36.0	
110.0	12.8	< -2.0	< -2.0	43.5	< 10.8	< 10.8	> 32.7	> 32.7	
130.0	14.8	< -2.0	< -2.0	43.5	< 12.8	< 12.8	> 30.7	> 30.7	
150.0	16.4	< -2.0	< -2.0	43.5	< 14.4	< 14.4	> 29.1	> 29.1	
180.0	18.4	< -2.0	< -2.0	43.5	< 16.4	< 16.4	> 27.1	> 27.1	
210.0	18.3	< -2.0	< -2.0	43.5	< 16.3	< 16.3	> 27.2	> 27.2	
250.0	19.1	< -2.0	< -2.0	46.0	< 17.1	< 17.1	> 28.9	> 28.9	
300.0	21.3	< -2.0	< -2.0	46.0	< 19.3	< 19.3	> 26.7	> 26.7	
400.0	19.9	< -2.0	< -2.0	46.0	< 17.9	< 17.9	> 28.1	> 28.1	
500.0	22.1	< -2.0	< -2.0	46.0	< 20.1	< 20.1	> 25.9	> 25.9	
600.0	24.3	< -2.0	< -2.0	46.0	< 22.3	< 22.3	> 23.7	> 23.7	
800.0	27.2	< -2.0	< -2.0	46.0	< 25.2	< 25.2	> 20.8	> 20.8	
1000.0	30.1	< -2.0	< -2.0	54.0	< 28.1	< 28.1	> 25.9	> 25.9	

- Notes:
- 1) Test Location : Anechoic Chamber
 - 2) Test Distance : 3 m
 - 3) Test spectram was checked from 30 MHz to 1000 MHz.
 - 4) Antenna factor includes the cable loss for 33 meter.
 - 5) The symbol of "<" means "or less".
 - 6) The symbol of ">" means "more than".
 - 7) A sample calculation was made at 30.0 MHz

$$Af + Mr = 19.6 + -2.0 = 17.6 \text{ dBuV/m}$$

Af : Antenna Factor Mr : Meter Reading
 - 8) Setting of measuring instrument :

Detector Function : CISPR Quasi-Peak
IF Bandwidth : 120 kHz

Tested by :


Yuichi Fukumoto

Radiated Emissions Measurements (30 MHz - 1000 MHz)

Immobilizer Antenna :X1T25271(X1L-043-11)

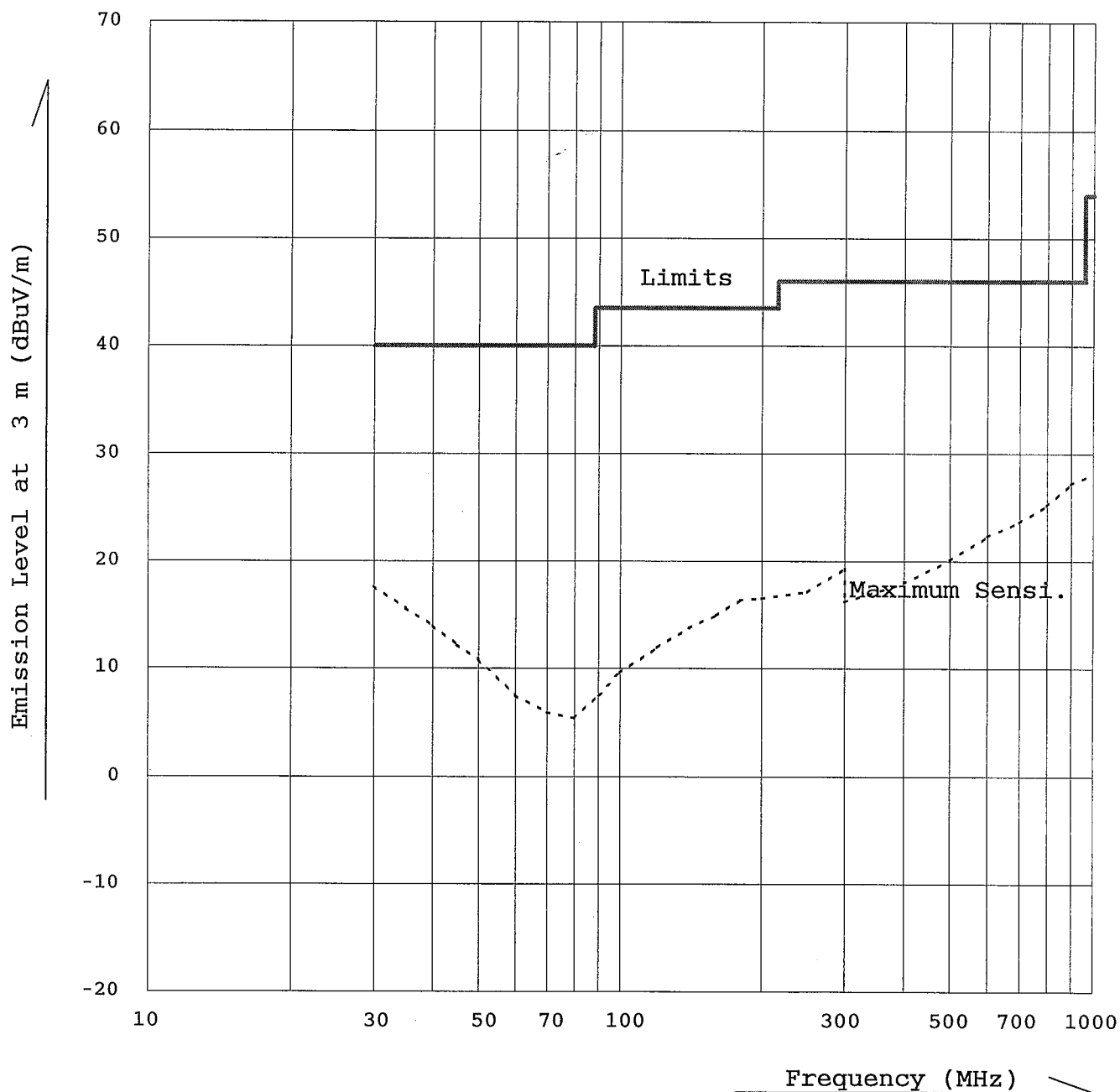
Transponder :X1T20271(X1L-043-21)

Measuring Distance : 3 m

⊙ Horizontal

Classifications : B

× Vertical



**2.3.2. Immobilizer Antenna:X1T25671(X1L-057-11)
Transponder :X1T20271(X1L-057-21)**

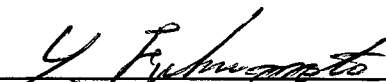
Date : July 12, 2000

Temp. : 19°C Humi.: 38%

Frequency (MHz)	Antenna Factor (dB/m)	Meter Reading (dBuV)		Limits (dBuV/m)	Emission Level (dBuV/m)		Margin (dB)		Comment
		Horiz.	Ver.		Horiz.	Ver.	Horiz.	Ver.	
30.0	19.6	< -2.0	< -2.0	40.0	< 17.6	< 17.6	> 22.4	> 22.4	
40.0	15.9	< -2.0	< -2.0	40.0	< 13.9	< 13.9	> 26.1	> 26.1	
47.0	13.6	< -2.0	-1.6	40.0	< 11.6	12.0	> 28.4	28.0	
55.0	11.1	< -2.0	< -2.0	40.0	< 9.1	< 9.1	> 31.0	> 31.0	
70.0	7.9	< -2.0	< -2.0	40.0	< 5.9	< 5.9	> 34.1	> 34.1	
90.0	9.5	< -2.0	< -2.0	43.5	< 7.5	< 7.5	> 36.0	> 36.0	
110.0	12.8	< -2.0	< -2.0	43.5	< 10.8	< 10.8	> 32.7	> 32.7	
130.0	14.8	< -2.0	< -2.0	43.5	< 12.8	< 12.8	> 30.7	> 30.7	
150.0	16.4	< -2.0	< -2.0	43.5	< 14.4	< 14.4	> 29.1	> 29.1	
180.0	18.4	< -2.0	< -2.0	43.5	< 16.4	< 16.4	> 27.1	> 27.1	
210.0	18.3	< -2.0	< -2.0	43.5	< 16.3	< 16.3	> 27.2	> 27.2	
250.0	19.1	< -2.0	< -2.0	46.0	< 17.1	< 17.1	> 28.9	> 28.9	
300.0	21.3	< -2.0	< -2.0	46.0	< 19.3	< 19.3	> 26.7	> 26.7	
400.0	19.9	< -2.0	< -2.0	46.0	< 17.9	< 17.9	> 28.1	> 28.1	
500.0	22.1	< -2.0	< -2.0	46.0	< 20.1	< 20.1	> 25.9	> 25.9	
600.0	24.3	< -2.0	< -2.0	46.0	< 22.3	< 22.3	> 23.7	> 23.7	
800.0	27.2	< -2.0	< -2.0	46.0	< 25.2	< 25.2	> 20.8	> 20.8	
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- Notes: 1) Test Location : Anechoic Chamber
2) Test Distance : 3 m
3) Test spectram was checked from 30 MHz to 1000 MHz.
4) Antenna factor includes the cable loss for 33 meter.
5) The symbol of "<" means "or less".
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7) A sample calculation was made at 30.0 MHz
 $Af + Mr = 19.6 + -2.0 = 17.6 \text{ dBuV/m}$
Af : Antenna Factor Mr : Meter Reading
8) Setting of measuring instrument :
Detector Function : CISPR Quasi-Peak
IF Bandwidth : 120 kHz

Tested by :


Yuichi Fukumoto

Radiated Emissions Measurements (30 MHz - 1000 MHz)

Immobilizer Antenna :X1T25671(X1L-057-11)

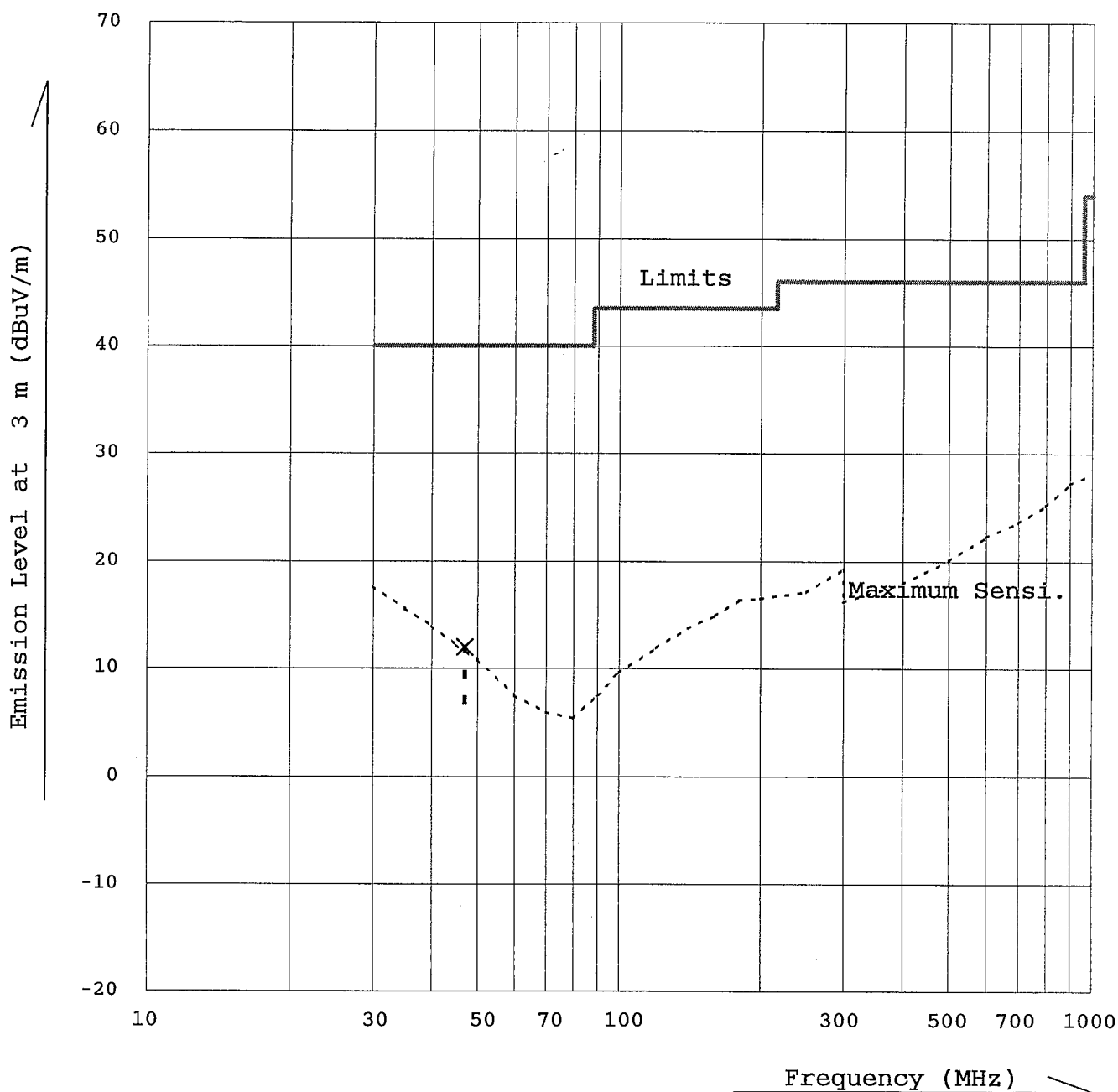
Transponder :X1T20271(X1L-057-21)

Measuring Distance : 3 m

○ Horizontal

Classifications : B

× Vertical



2.4 Radiated Emissions Measurement(Above 1 GHz)

Note : This test was not applicable.

2.5 Frequency Stability Measurement

Note : This test was not applicable.

2.6 Occupied Bandwidth Measurement

Note : This test was not applicable.