



Electrical (EMC)

DATE: 06 August 2003

I.T.L. (PRODUCT TESTING) LTD.
EMC Test
for
RACAM - TECH LTD.*

* See customer's statement on page 5.

Equipment under test:

Terminal Unit

TU

Approved by: I. Raz
I. Raz, EMC Laboratory Manager

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This report relates only to items tested.

Spurious Radiated Emission

E.U.T Description Terminal Unit
 Type TU
 Serial Number: 00378

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Horizontal
 Test Distance: 3 meters

Frequency range: 30 MHz to 1.0 GHz
 Detector: Peak

Frequency (MHz)	Peak Amp (1) (dB μ V/m)	D.C.F. (2) (dB)	Correction (3) (dB)	Final Result (4) (dB μ V/m)	Specification (dB μ V/m)	Margin (dB μ V/m)
73.60	18.2	-14.0	10.3	+4.2	40.0	-35.8
114.43	19.5	-14.0	13.3	+5.5	43.5	-38.0
156.75	21.4	-14.0	15.2	+7.4	43.5	-36.1
170.30	21.7	-14.0	15.5	+7.7	43.5	-35.8
248.19	27.3	-14.0	20.4	+13.3	46.0	-32.7
274.31	27.9	-14.0	21.7	+13.9	46.0	-32.1
325.34	23.6	-14.0	15.7	+9.6	46.0	-36.4
609.18	30.6	-14.0	22.4	+16.6	46.0	-29.4
968.03	36.3	-14.0	28.3	+22.3	54.0	-31.7

**Figure 1. Spurious Radiated Emission. Antenna Polarization: HORIZONTAL.
 Detector: Peak**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

- (1) "Peak Amp." (dB μ V/m) includes the "correction" numbers.
- (2) "Duty Cycle Factor (D.C.F.)= $20 \log \frac{20(m \text{ sec})}{100(m \text{ sec})} = -14dB$ (See Section 4.2 of this report).
- (3) "Correction" (dB) = Test Antenna Correction Factor(dB) + Coax Cable.
- (4) "Final Result" (dB μ V/m)=Peak Amp. (dB μ V/m)+D.C.F. (dB).

Spurious Radiated Emission

E.U.T Description Terminal Unit
 Type TU
 Serial Number: 00378

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Vertical
 Test Distance: 3 meters

Frequency range: 30 MHz to 1.0 GHz
 Detector: Peak

Frequency (MHz)	Peak Amp (dB μ V/m)	D.C.F. (2)	Correction (3) (dB)	Final Result (4) (dB μ V/m)	Specification (dB μ V/m)	Margin (dB μ V/m)
74.40	23.6	-14.0	10.3	+9.6	40.0	-30.4
130.63	19.5	-14.0	13.9	+5.5	60.3 (5)	-54.8
143.71	20.1	-14.0	14.6	+6.1	60.3 (5)	-54.2
158.75	21.1	-14.0	15.2	+7.1	43.5	-36.4
248.30	27.0	-14.0	20.4	+13.0	46.0	-33.0
274.34	28.0	-14.0	21.7	+14.0	46.0	-32.0
325.34	21.9	-14.0	15.7	+7.9	46.0	-38.1
609.18	29.4	-14.0	22.4	+15.4	46.0	-30.6
968.03	35.6	-14.0	28.3	+21.6	54.0	-32.4

**Figure 2. Spurious Radiated Emission. Antenna Polarization: VERTICAL.
 Detector: Peak**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

- (1) "Peak Amp." (dB μ V/m) includes the "correction" numbers.
- (2) "Duty Cycle Factor (D.C.F.)= $20 \log \frac{20(m \text{ sec})}{100(m \text{ sec})} = -14dB$ (See Section 4.2 of this report).
- (3) "Correction" (dB) = Test Antenna Correction Factor(dB) + Coax Cable.
- (4) "Final Result" (dB μ V/m)=Peak Amp. (dB μ V/m)+D.C.F. (dB).
- (5) Out of restricted band signal: Limit = fundamental limit (80.3dB)-20dB

Spurious Radiated Emission Above 1 GHz

E.U.T Description Terminal Unit
 Type TU
 Serial Number: 00378

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Horizontal Frequency range: 1 GHz to 2.9 GHz
 Test Distance: 3 meters Detector: Average

Frequency (MHz)	Peak Amp (dB μ V/m)	D.C.F. (dB)	Correction (dB)	Final Result (dB μ V/m)	Avg. Specification (dB μ V/m)	Margin (dB μ V/m)
1253.92	49.6	-14.0	34.1	+35.6	60.3 (5)	-24.7
1306.20	45.6	-14.0	34.5	+31.6	54.0	-16.6
1436.72	45.5	-14.0	35.8	+31.5	54.0	-22.5
1671.90	49.2	-14.0	37.7	+35.2	54.0	-18.8
1698.04	47.8	-14.0	37.9	+33.8	54.0	-20.2
2246.57	52.2	-14.0	41.6	+38.2	54.0	-15.8

**Figure 10. Radiated Emission. Antenna Polarization: HORIZONTAL.
Detector: Average**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

- (1) "Peak Amp." (dB μ V/m) includes the "correction" numbers.
- (2) "Duty Cycle Factor (D.C.F.)= $20 \log \frac{20(m \text{ sec})}{100(m \text{ sec})} = -14 \text{ dB}$ (See Section 4.2 of this report).
- (3) "Correction" (dB) = Test Antenna Correction Factor(dB) + Coax Cable.
- (4) "Final Result" (dB μ V/m)=Peak Amp. (dB μ V/m)+D.C.F. (dB).
- (5) Out of restricted band signal: Limit = fundamental limit (80.3dB)-20dB



Spurious Radiated Emission Above 1 GHz

E.U.T Description Terminal Unit
Type TU
Serial Number: 00378

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Horizontal Frequency range: 1 GHz to 2.9 GHz
Test Distance: 3 meters Detector: Peak

Frequency	Peak Amp	Correction	Specification	Margin
(MHz)	(dB μ V/m)	(dB)	(dB μ V/m)	(dB μ V/m)
1253.92	49.6	34.1	80.3 (Note*)	-30.7
1306.20	45.6	34.5	74.0	-28.4
1436.72	45.5	35.8	74.0	-28.5
1671.90	49.2	37.7	74.0	-24.8
1698.04	47.8	37.9	74.0	-26.2
2246.57	52.2	41.6	74.0	-21.8

**Figure 3. Radiated Emission. Antenna Polarization: HORIZONTAL.
Detector: Peak**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Note* Out of restricted band signal: Limit = Average limit + 20dB

Spurious Radiated Emission Above 1 GHz

E.U.T Description Terminal Unit
 Type TU
 Serial Number: 00378

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Horizontal Frequency range: 2.9 GHz to 4.2 GHz
 Test Distance: 3 meters Detector: Peak

Freq. (MHz)	Peak Amp (dB μ V)	Correction Factors			Peak. Specification (dB μ V/m)	Peak Final Result FR (P)* (dB μ V/m) See Note *	Peak. Margin (dB)
		Antenna AF (dB)	Cable CF (dB)	Low Noise Amp (dB)			
2925.80	45.0	32.6	1.8	30.5	80.3 (Note **)	48.9	-31.4
3343.80	48.2	33.4	2.0	30.5	80.3 (Note **)	53.1	-27.2
3761.80	40.6	34.0	2.4	30.5	74.0	46.5	-23.5

**Figure 4. Radiated Emission. Antenna Polarization: HORIZONTAL.
Detector: Peak**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Note *: In the frequency range above 2.9 GHz, the field strength was manually calculated by using the following equation:

$$FR(P) = Peak + AF + CF - PF$$

Where: FR (P) is final peak detector result.

Peak is peak detector measurement.

AF is antenna factor.

CF is cable factor.

PF is preamplifier factor.

Note** Out of restricted band signal: Limit = Average limit + 20dB

Spurious Radiated Emission Above 1 GHz

E.U.T Description Terminal Unit
 Type TU
 Serial Number: 00378

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Horizontal Frequency range: 2.9 GHz to 4.2 GHz
 Test Distance: 3 meters Detector: Average

Freq. (MHz)	Peak Amp (dB μ V)	D.C.F. (See Note**)	Correction Factors			AVG Specification (dB μ V/m)	AVG Final Result FR (A) (dB See Note *)	AVG Margin (dB)
			Antenna AF (dB)	Cable CF (dB)	Low Noise Amp (dB)			
2925.80	45.0	-14.0	32.6	1.8	30.5	60.3 (Note***)	31.3	-29.0
3343.80	48.2	-14.0	33.4	2.0	30.5	60.3 (Note***)	39.1	-21.2
3761.80	40.6	-14.0	34.0	2.4	30.5	54.0	32.5	-21.5

**Figure 13. Radiated Emission. Antenna Polarization: HORIZONTAL.
Detector: Average**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Note*: In the frequency range above 2.9 GHz, the field strength was manually calculated by using the following equation:

$$FR(A) = Peak + D.C.F. + AF+CF-LN$$

Where: FR(A) is final average detector result.

Peak is Peak detector measurement.

AF is antenna factor.

CF is cable factor.

LN is low noise amplifier factor.

Note**: "Duty Cycle Factor" (D.C.F.) = $20 \log \frac{20(m \text{ sec})}{100(m \text{ sec})} = -14dB$ (See Section 4.2 of this report).

Note***: Out of restricted band signal:

Limit = fundamental limit (80.3dB)-20dB

Spurious Radiated Emission Above 1 GHz

E.U.T Description Terminal Unit
 Type TU
 Serial Number: 00378

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Vertical
 Test Distance: 3 meters

Frequency range: 1 GHz to 2.9 GHz
 Detector: Average

Frequency (MHz)	Peak Amp (1) (dB μ V/m)	D.C.F. (2) (dB)	Correction (3) (dB)	Final Result (4) (dB μ V/m)	Avg. Specification (dB μ V/m)	Margin (dB μ V/m)
1253.92	49.6	-14.0	34.1	+35.6	60.3 (5)	-24.7
1306.20	44.5	-14.0	34.5	+30.5	54.0	-23.5
1436.72	45.5	-14.0	35.8	+31.5	54.0	-22.5
1671.90	49.7	-14.0	37.7	+35.7	54.0	-18.3
1698.04	48.4	-14.0	37.9	+34.4	54.0	-19.6
2246.57	53.6	-14.0	41.6	+39.6	54.0	-14.4

**Figure 14. Radiated Emission. Antenna Polarization: VERTICAL.
Detector: Average**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

- (1) "Peak Amp." (dB μ V/m) includes the "correction" numbers.
- (2) "Duty Cycle Factor" (D.C.F.) = $20 \log \frac{20(m \text{ sec})}{100(m \text{ sec})} = -14 \text{ dB}$ (See Section 4.2 of this report).
- (3) "Correction" (dB) = Test Antenna Correction Factor(dB) + Coax Cable.
- (4) "Final Result" (dB μ V/m)=Peak Amp. (dB μ V/m)+D.C.F. (dB).
- (5) Out of restricted band signal: Limit = fundamental limit (80.3dB)-20dB



Spurious Radiated Emission Above 1 GHz

E.U.T Description Terminal Unit
Type TU
Serial Number: 00378

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Vertical Frequency range: 1 GHz to 2.9 GHz
Test Distance: 3 meters Detector: Peak

Frequency	Peak Amp	Correction	Specification	Margin
(MHz)	(dB μ V/m)	(dB)	(dB μ V/m)	(dB μ V/m)
1253.93	49.6	34.1	80.3 (Note *)	-30.7
1306.20	44.5	34.5	74.0	-29.5
1436.72	45.5	35.8	74.0	-28.5
1671.89	49.7	37.7	74.0	-24.3
1698.04	48.4	37.9	74.0	-25.6
2246.57	53.6	41.6	74.0	-20.4

**Figure 5. Radiated Emission. Antenna Polarization: VERTICAL.
Detector: Peak**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Note* Out of restricted band signal: Limit = Average limit + 20dB

Spurious Radiated Emission Above 1 GHz

E.U.T Description Terminal Unit
 Type TU
 Serial Number: 00378

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Vertical
 Test Distance: 3 meters

Frequency range: 2.9 GHz to 4.2 GHz
 Detector: Peak

Freq. (MHz)	Peak Amp (dB μ V/m)	Correction Factors Antenna AF (dB)	Cable CF (dB)	Low Noise Amp (dB)	Peak. Specification (dB μ V/m)	Peak Final Result FR (P) (dB μ V/m) See Note *	Peak. Margin (dB)
2925.80	43.7	32.6	1.8	30.5	80.3**	47.6	-32.4
3343.80	47.4	33.4	2.0	30.5	80.3**	52.3	-28.0
3761.80	38.9	34.0	34.0	30.5	74.0	44.8	-29.2

**Figure 6. Radiated Emission. Antenna Polarization: VERTICAL.
 Detector: Peak**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Note*: In the frequency range above 2.9 GHz, the field strength was manually calculated by using the following equation:

$$FR(P) = Peak + AF + CF - PF$$

Where: FR (P) is final peak detector result,

Peak is peak detector measurement,

AF is antenna factor,

CF is cable factor,

PF is preamplifier factor.

Note** Out of restricted band signal: Limit = Average limit + 20dB

Spurious Radiated Emission Above 1 GHz

E.U.T Description Terminal Unit
 Type TU
 Serial Number: 00378

Specification: F.C.C., Part 15, Subpart C

Antenna Polarization: Vertical
 Test Distance: 3 meters

Frequency range: 2.9 GHz to 4.2 GHz
 Detector: Average

Freq. (MHz)	Peak Amp (dB μ V)	D.C.F. (See Note**)	Correction Factors			AVG Specification (dB μ V/m See Note *)	Final Result FR (A) (dB)	AVG Margin (dB)			
			Antenna AF (dB)	Cable CF (dB)	Low Noise Amp (dB)						
2925.80	43.7	-14.0	32.6	1.8	30.5	60.3 (Note***)	33.6	-26.7			
3343.80	47.4	-14.0	33.4	2.0	30.5	60.3 (Note***)	38.3	-22.0			
3761.80	38.9	-14.0	34.0	2.4	30.5	54.0	30.8	-23.2			

**Figure 17. Radiated Emission. Antenna Polarization: VERTICAL
 Detector: Average**

Note: Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Note*: In the frequency range above 2.9 GHz, the field strength was manually calculated by using the following equation:

$$FR(A) = Peak - DCF + AF + CF - LN$$

Where: FR(A) is average detector result,

Peak is Peak detector measurement,

AF is antenna factor,

CF is cable factor,

LN is low noise amplifier factor.

Note**: "Duty Cycle Factor" (D.C.F.) = $20 \log \frac{20(m\ sec)}{100(m\ sec)} = -14dB$ (See Section 4.2 of this report).

Note***: Out of restricted band signal:

Limit = fundamental limit (80.3dB)-20dB