

KTL Test Report: 8R00471

Applicant: Agilis Communications Tech. Pte Ltd.
Singapore Technologies Building
100 Jurong East Street 21, Level 4
Singapore 609602

Equipment Under Test: BB100 Automatic Door Activator
(E.U.T.)

FCC ID: M2EBB100

In Accordance With: **FCC Part 15, Subpart C**
For Operation Within The Bands 902-928 MHz,
2435-2465 MHz, 5785-5815 MHz, 10500-10550 MHz,
24075-24175 MHz Intentional Radiators Used As
Field Disturbance Sensors Excluding Perimeter
Protection Systems

Tested By: KTL Ottawa Inc.
3325 River Road, R.R. 5
Ottawa, Ontario K1V 1H2

Authorized By: Russell Grant, Senior Technologist

Date:

Total Number of Pages:

Table of Contents

Section 1. Summary of Test Results

- General
- Summary of Test Data

Section 2. Equipment Under Test

- General Equipment Information
- Description of E.U.T.
- Modifications Incorporated in E.U.T.
- Theory of Operation
- Exercise Program

Section 3. Equipment Configuration

- Equipment Configuration List
- Inter-Connection Cables
- Configuration of E.U.T.

Section 4. Radiated Emissions

- Test Conditions
- Test Results
- Test Data - Radiated Emissions
- Radiated Photographs

Section 5. Powerline Conducted Emissions

- Test Conditions
- Test Results
- Test Data

Section 6. Block Diagrams

- Conducted Emissions
- Radiated Prescan
- Outdoor Test Site for Radiated Emissions
- Indoor Measurement Setup for Emissions Above 10 GHz

Section 7. Test Equipment List

Annex A - Restricted Bands

Annex B - Radiated Emission Limits

EQUIPMENT: BB100 Automatic Door Activator
FCC ID: M2EBB100

Section 1. Summary of Test Results

Manufacturer: Agilis Communications Tech. PTE Ltd.

Model No.: BB100

Serial No.: None

General: **All measurements are traceable to national standards.**

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15, Subpart C, Paragraph 15.245. All tests were conducted using measurement procedure ANSI C63.4-1992. Radiated emissions are made on an open area test site. A description of the test facility is on file with the FCC.



New Submission



Production Unit



Class II Permissive Change



Pre-Production Unit



Equipment Code

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE.

See "Summary of Test Data".



NVLAP LAB CODE: 100351-0

TESTED BY: _____ DATE: _____
Tom Tidwell

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FCC PART 15, SUBPART C
INTENTIONAL RADIATORS USED AS
FIELD DISTURBANCE SENSORS
PROJECT NO.: 8R00471

*EQUIPMENT: BB100 Automatic Door Activator
FCC ID: M2EBB100*

Summary Of Test Data

Name of Test	Paragraph Number	Results
Radiated Emissions	15.231(b)	Complies
Powerline Conducted Emissions	15.207	Complies

Footnotes For N/A's:

Test Conditions:

Indoor Temperature: 20 °C
 Humidity: 30 %

Outdoor Temperature: Not Applicable
 Humidity: Not Applicable

EQUIPMENT: BB100 Automatic Door Activator
FCC ID: M2EBB100

Section 2. Equipment Under Test (E.U.T.)

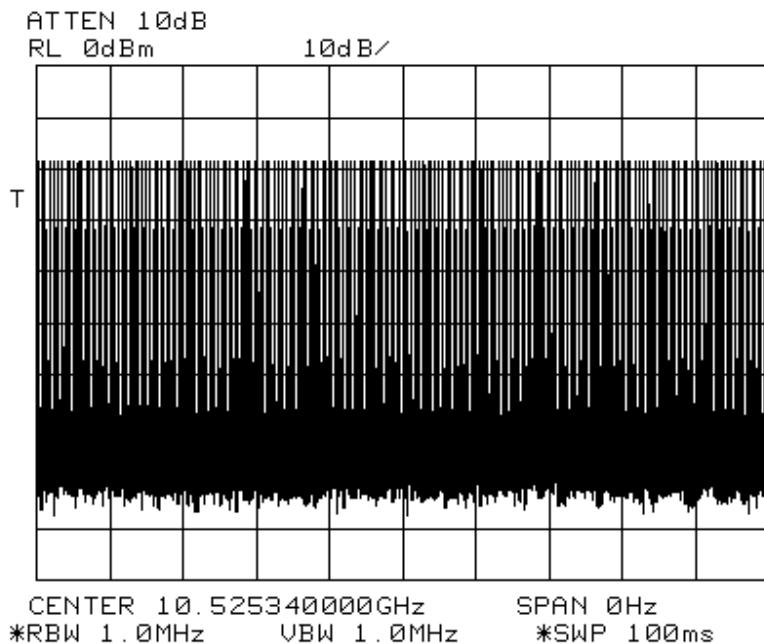
General Equipment Information

Frequency Range: 10.525 GHz
Operating Frequency(ies) of Sample: 10.525 GHz
Type of Emission: Pulsed Carrier
Emission Designator: PON
Supply Power Requirement: 12-24 VAC / Vdc
Duty Cycle Calculation: $20 \log (43.4 / 546) = -22.0 \text{ dB}$
 See attached graphs.

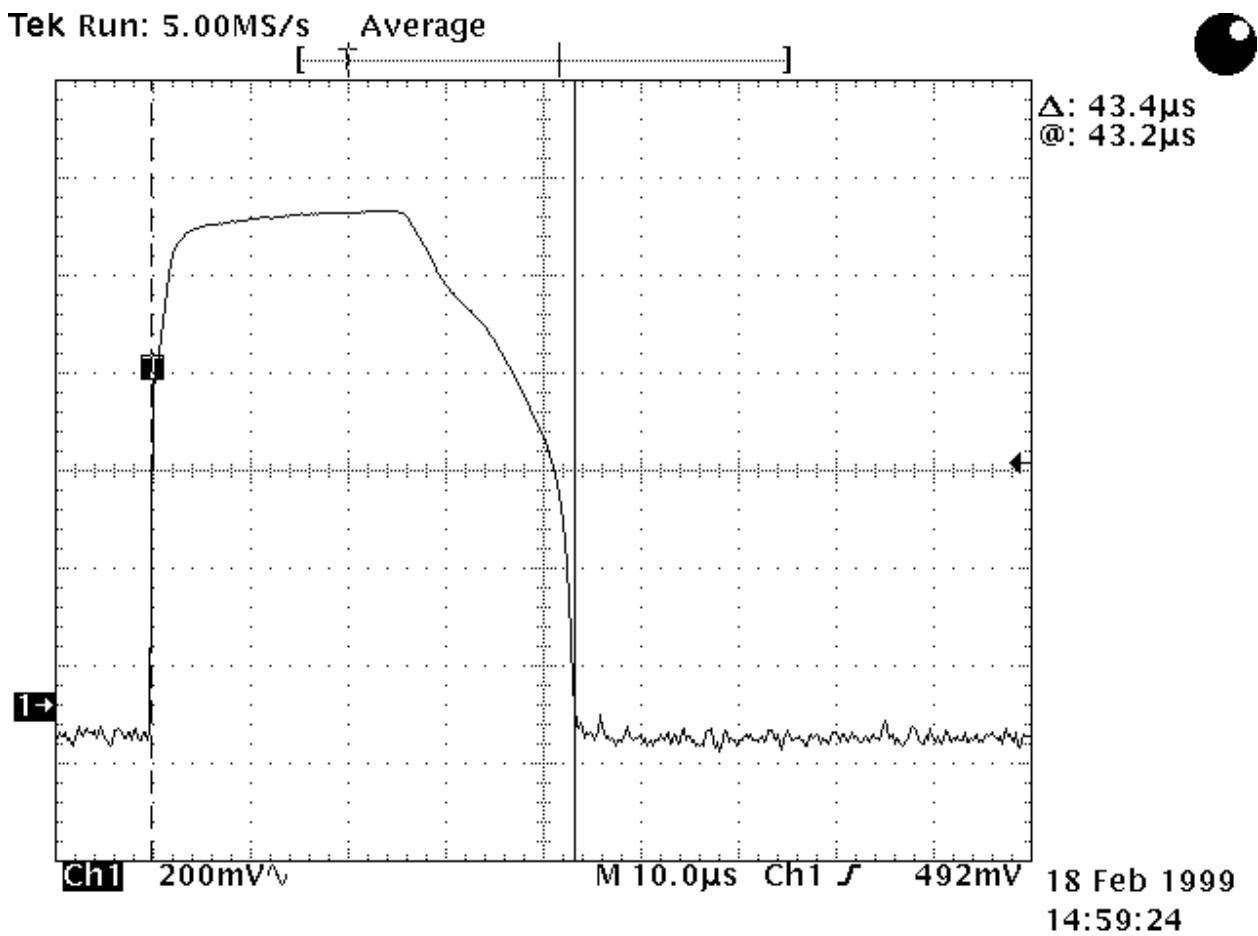
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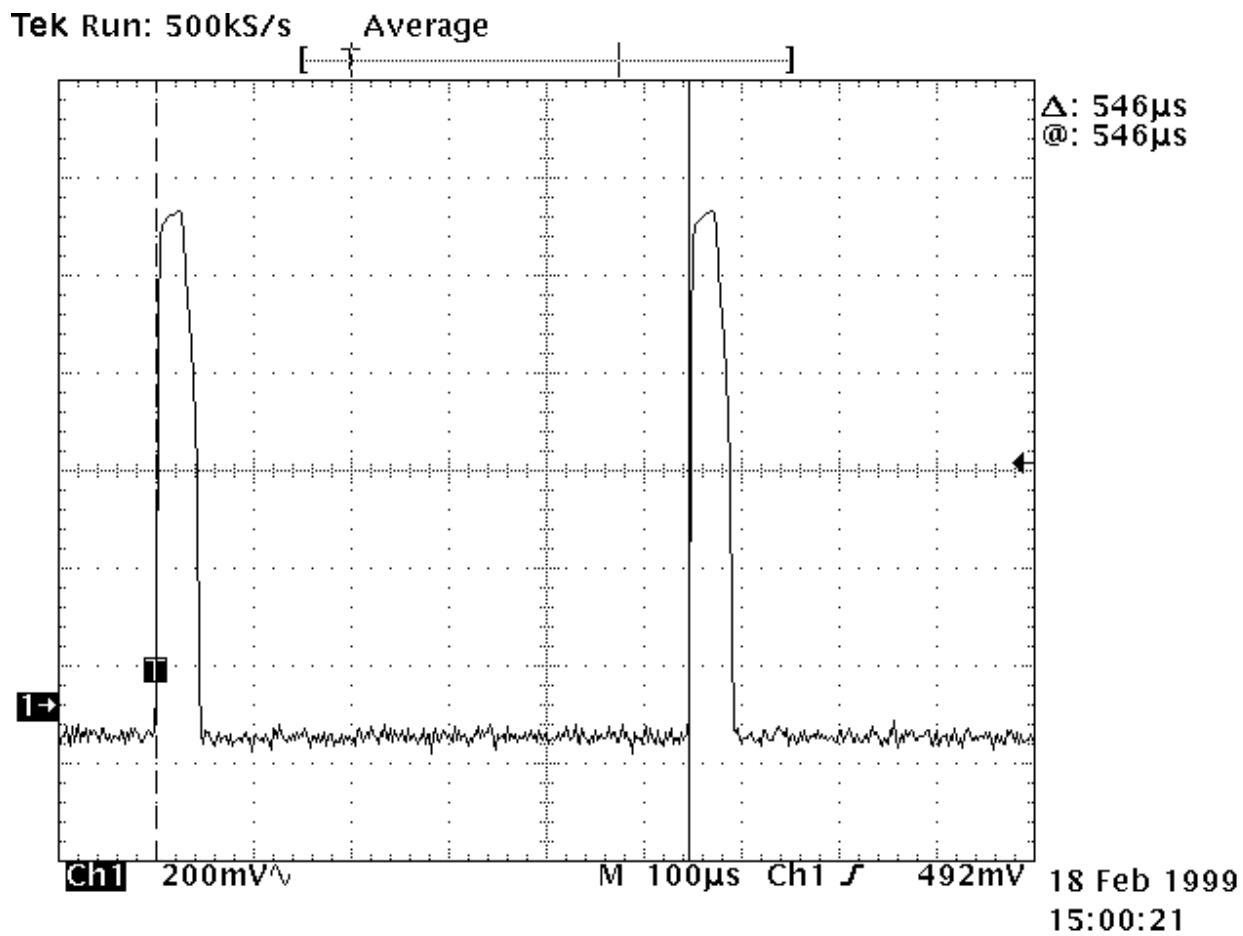
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Description of E.U.T.

The E.U.T. is a 10.525 GHz motion detector used for opening doors.

Modifications Incorporated in E.U.T.

The EUT has not been modified from what is described by the brand name and unique type identification stated above.

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FCC PART 15, SUBPART C
INTENTIONAL RADIATORS USED AS
FIELD DISTURBANCE SENSORS
PROJECT NO.: 8R00471

EQUIPMENT: BB100 Automatic Door Activator
FCC ID: M2EBB100

Theory of Operation

NOT APPLICABLE

EQUIPMENT: BB100 Automatic Door Activator
FCC ID: M2EBB100

Justification

The E.U.T. was configured for testing as per typical installation.

The following combinations were investigated to establish worst case configuration:

- (1) Three axis.

Exercise Program

The E.U.T. exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to typical use.

Exercise Mode:

- (1) Tx

EQUIPMENT: BB100 Automatic Door Activator
FCC ID: M2EBB100

Section 3. Equipment Configuration

Equipment Configuration List:

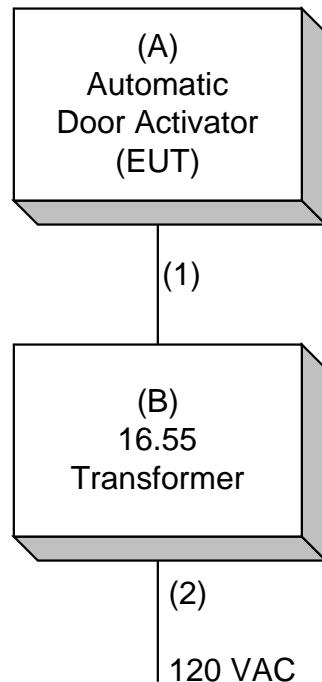
Item	Description	Model No.	Serial.	Rev.
(A)	Automatic Door Activator (EUT)	BB100	None	
(B)	Transformer	None	None	

Inter-connection Cables:

Item	Description	Length (m)
(1)	2 Conductor Power Cord	2.0
(2)	2 Conductor Power Cord	1.0

EQUIPMENT: BB100 Automatic Door Activator
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Configuration of the Equipment Under Test (E.U.T)



EQUIPMENT: BB100 Automatic Door Activator
FCC ID: M2EBB100

Section 4. Radiated Emissions

NAME OF TEST: Radiated Emissions	PARA. NO.: 15.245
TESTED BY: Tom Tidwell	DATE: March 11, 1999

Minimum Standard: See Annex B

Test Results: Complies. The worst-case emission level is 69.6 dB μ V/m @ 3m at 31575 MHz. This is 18.4 dB below the specification limit.

Test Data: See attached table.

Above 1 GHz a spectrum analyzer and low noise amplifier are used to measure emission levels. The spectrum analyzer resolution bandwidth was set to 1 MHz and video bandwidth was 3 MHz.

In the case of handheld equipment, the E.U.T. is rotated in three planes to obtain worst-case results.

EQUIPMENT: BB100 Automatic Door Activator
FCC ID: M2EBB100

Test Data - Radiated Emissions

Test Distance (meters) : 1		Range:		Receiver: 8564E		RBW(kHz): 1 MHz		Detector: Peak			
Freq. (MHz)	Ant. *	Pol. (V/H)	Ant. HGT. (m)	Table (deg.)	RCVD Signal (dB μ V/m)	Ant. Factor (dB)**	Duty Cycle (dB)***	Dist. Corr. (dB)	Field Strength (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)
10525	H	V			80.2	40.6	-20.0	-9.5	91.3	128	36.7 (1)
10525	H	H			80.5	40.6	-20.0	-9.5	91.6	128	36.4 (1)
21050	H	V			38.5	44.2	-20.0	-15.6	47.1	88	40.9 (2)
21050	H	H			38.4	44.2	-20.0	-15.6	47.0	88	41.0 (2)
31575	H	V			50.0	49.1	-20.0	-9.5	69.6	88	18.4 (1)
31575	H	H			46.7	49.1	-20.0	-9.5	66.3	88	21.7 (1)
42100	H	V			47.1	49.6	-20.0	-15.6	61.1	88	26.9 (2)
42100	H	H			47.0	49.6	-20.0	-15.6	61.0	88	27.0 (2)
52625	H	V			43.3	41.1	-20.0	-21.6	42.8	88	45.2 (3)
52625	H	H			43.6	41.1	-20.0	-21.6	43.1	88	44.9 (3)

Notes:

B/C = Biconical, B/L = Biconilog, L/P = Log-Periodic, H = Horn, D/P = Dipole

* Re-measured using dipole antenna.

** Includes cable loss when amplifier is not used.

*** Includes cable loss.

() Denotes failing emission level.

(1) Measured @ 1 m

(2) Measured @ 0.5m

(3) Measured @ 0.25m

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FCC PART 15, SUBPART C
INTENTIONAL RADIATORS USED AS
FIELD DISTURBANCE SENSORS
PROJECT NO.: 8R00471

EQUIPMENT: BB100 Automatic Door Activator
FCC ID: M2EBB100

Radiated Photographs (Worst Case Configuration)

Front View



EQUIPMENT: BB100 Automatic Door Activator
FCC ID: M2EBB100

Section 5. Powerline Conducted Emissions

NAME OF TEST: Powerline Conducted Emissions	PARA. NO.: 15.207
TESTED BY: Tom Tidwell	DATE: March 11, 1999

Minimum Standard:

Frequency(MHz)	Maximum Powerline Conducted RF Voltage	
	µV	dBµV
0.45 - 30.0	250	48

Test Results: Complies. See attached graphs and table.

Test Data: See attached table and graphs.

Method Of Measurement: (Procedure ANSI C63.4-1992)

Measurements were made using a spectrum analyzer with 10 kHz RBW, Peak detector. Any emissions that are close to the limit are measured using a test receiver with 10 kHz bandwidth, CISPR Quasi-Peak detector.

Broadband emissions are identified by switching the receiver detector function from Quasi-Peak to Average. If the amplitude of the emission drops by 6 dB or more then the emission is classified as broadband and the Quasi-Peak level is reduced by a factor of 13 dB.

All emissions within 10 dB of limit have been recorded.

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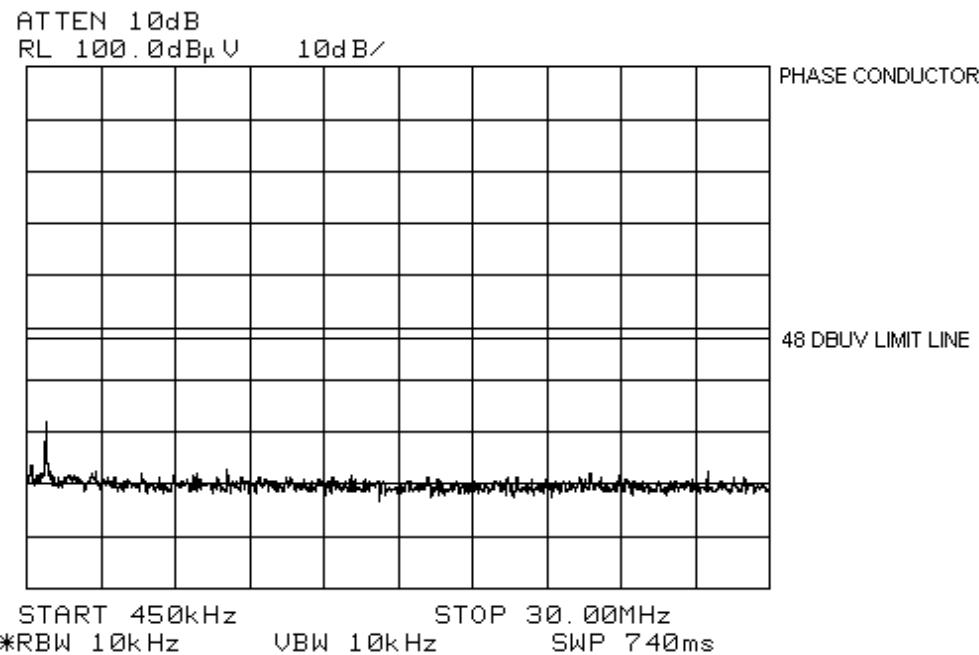
*EQUIPMENT: BB100 Automatic Door Activator
FCC ID: M2EBB100*

Measurement Data:

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FCC PART 15, SUBPART C
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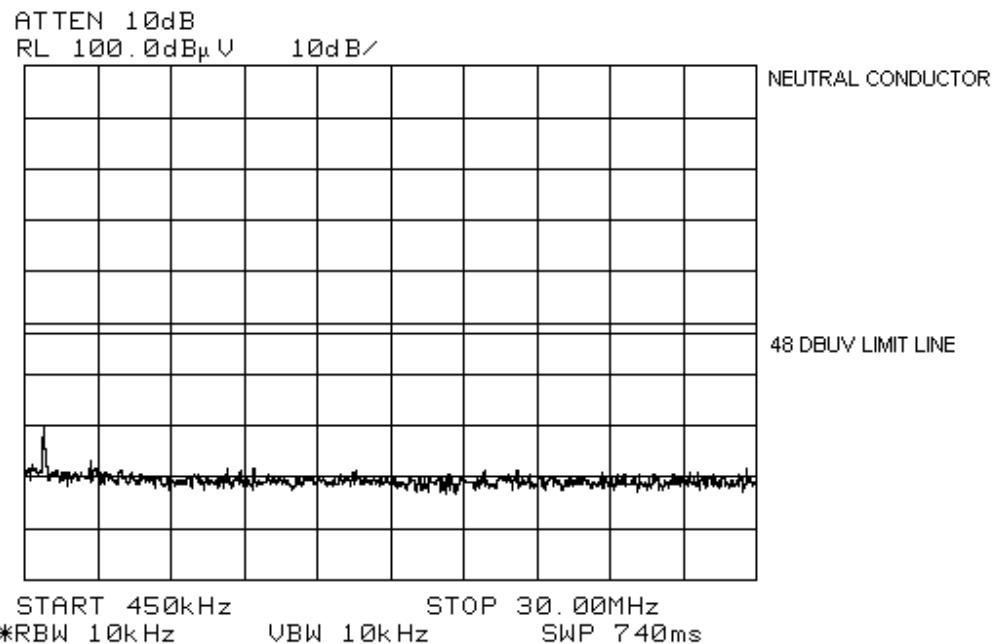
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Conducted Photographs (Worst Case Configuration)

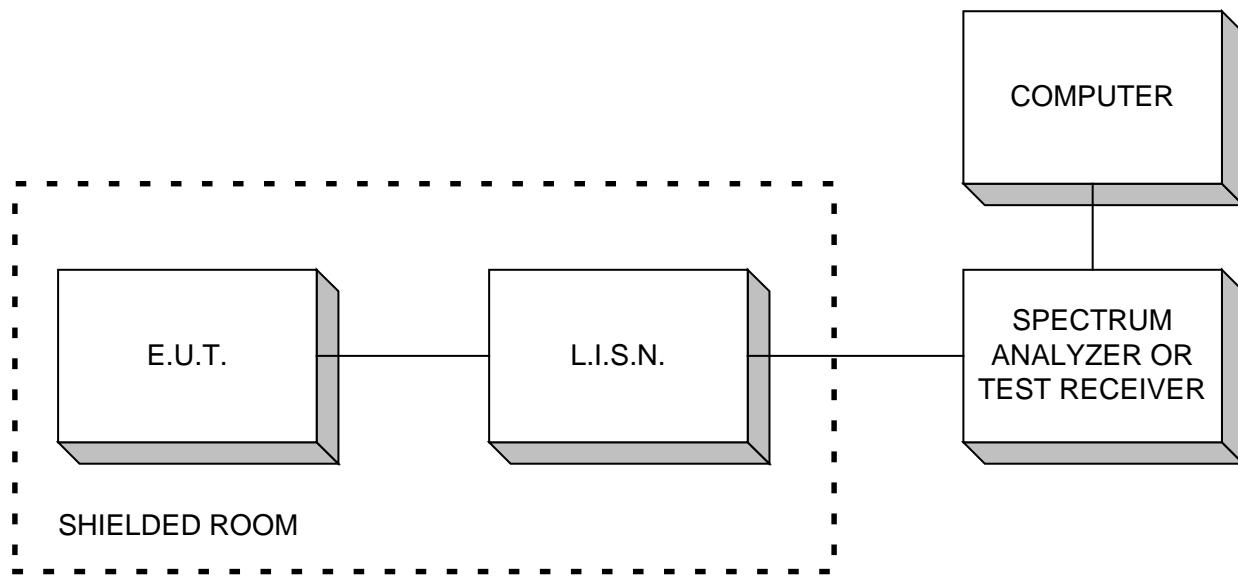
Front View



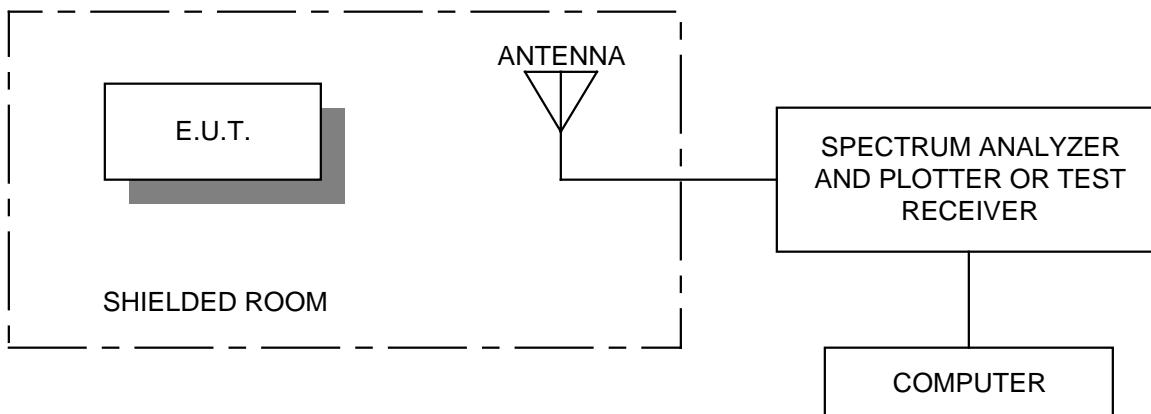
EQUIPMENT: BB100 Automatic Door Activator
FCC ID: M2EBB100

Section 6. Block Diagrams

Conducted Emissions

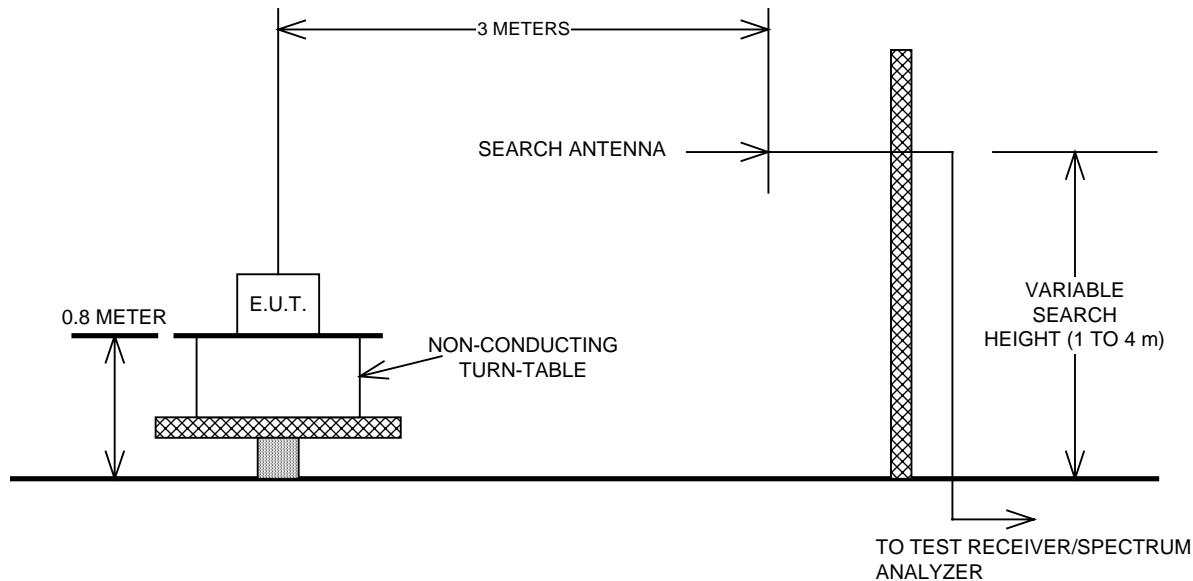


Radiated Prescan

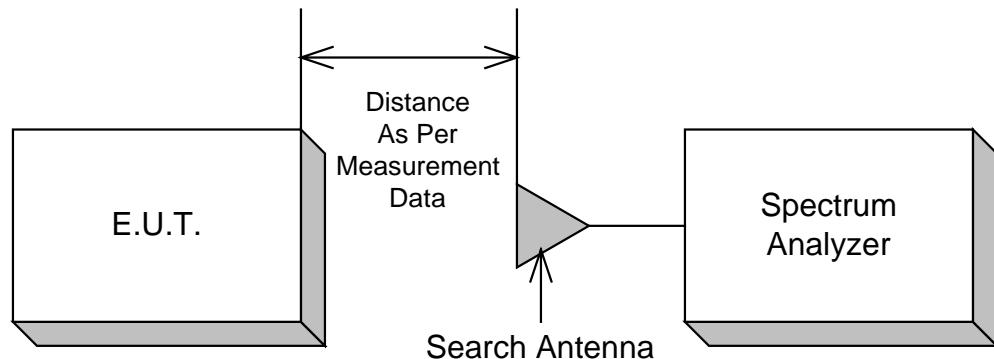


*EQUIPMENT: BB100 Automatic Door Activator
FCC ID: M2EBB100*

Outdoor Test Site For Radiated Emissions



Indoor Measurement Setup for Emissions Above 10 GHz



EQUIPMENT: BB100 Automatic Door Activator
FCC ID: M2EBB100

Section 7. Test Equipment List

CAL CYCLE	EQUIPMENT	MANUFACTURER	MODEL	SERIAL	LAST CAL.	NEXT CAL.	
1 Year	Spectrum Analyzer	Hewlett Packard	8565E	FA000981	May 20/98	May 20/99	
3 Year	Standard Gain Horn	Electro-Metrics	SH-50/60-1	FA000479	July 29/97	July 29/00	
3 Year	Standard Gain Horn	Electro-Metrics	SH-50/60-2	FA000485	July 29/97	July 29/00	
3 Year	Standard Gain Horn	Millitech	SGH-19-RP000	021	Apr. 25/97	Apr. 25/00	
3 Year	Standard Gain Horn	Millitech	SGH-12-RP000	031	Apr. 25/97	Apr. 25/00	
3 Year	Millimeter Wave Mixer	Hewlett Packard	11970V	2521A01150	Feb. 25./97	Feb. 25./00	

NA: Not Applicable

NCR: No Cal Required

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FCC PART 15, SUBPART C
INTENTIONAL RADIATORS USED AS
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ANNEX A

EQUIPMENT: BB100 Automatic Door Activator
FCC ID: M2EBB100

ANNEX A

RESTRICTED BANDS

EQUIPMENT: BB100 Automatic Door Activator
FCC ID: M2EBB100

Section A Restricted Bands of Operation

(a) Except as shown in paragraph (d) of this section , only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42-16.423	399.9-410	4.5-5.15
0.49 - 0.51	16.69475-16.69525	608-614	5.35-5.46
2.1735 - 2.1905	16.80425-16.80475	960-1240	7.25-7.75
3.020 - 3.026	25.5-25.67	1300-1427	8.025-8.5
4.125 - 4.128	37.5-38.25	1435-1626.6	9.0-9.2
4.17725 - 4.17775	73-74.6	1645.5-1646.5	9.3-9.5
4.20725 - 4.20775	74.8-75.2	1660-1710	10.6-12.7
6.215 - 6.218	108-121.94	1718.8-1722.2	13.25-13.4
6.31175 - 6.31225	123-138	2220-2300	14.47-14.5
8.291 - 8.294	149.9-150.05	2310-2390	15.35-16.2
8.362 - 8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625 - 8.38675	156.7-156.9	2655-2900	22.01-23.12
8.41425 - 8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29 - 12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975 - 12.52025	240-285	3345.8-3358	36.43-36.5
12.57675 - 12.57725	322-335.4	3600-4400	Above 38.6
13.36 - 13.41			

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FCC PART 15, SUBPART C
INTENTIONAL RADIATORS USED AS
FIELD DISTURBANCE SENSORS
PROJECT NO.: 8R00471
ANNEX B

EQUIPMENT: BB100 Automatic Door Activator
FCC ID: M2EBB100

ANNEX B

RADIATED EMISSION LIMITS

EQUIPMENT: BB100 Automatic Door Activator
FCC ID: M2EBB100

Radiated Emission Limits

§15.245 Operation within the bands 902-928 MHz, 2435-2465 MHz, 5785-5815 MHz, 10500-10550 MHz and 24075-24175 MHz.

- (a) Operation under the provision of this section is limited to intentional radiators used as field disturbance sensors, excluding perimeter protection systems.
- (b) The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental Frequency (MHz)	Field Strength Of Fundamental (millivolts/meter)	Field Strength of Harmonics (millivolts/meter)
902-928	500	1.6
2435-2465	500	1.6
5785-5815	500	1.6
10500-10550	2500	25.0
24075-24175	2500	25.0

- (1) Regardless of the limits shown in the above table, harmonic emissions in the restricted bands below 17.7 GHz, as specified in §15.205, shall not exceed the field strength limits shown in §15.209. Harmonic emissions in the restricted bands at and above 17.7 GHz shall not exceed the following field strength limits:
 - (i) For field disturbance sensors designed for use only within a building or to open building doors, 25 mV/m.
 - (ii) For all other field disturbance sensors, 7.5 mV/m.
 - (iii) Field disturbance sensors designed to be used in motor vehicles or aircraft must include features to prevent continuous operation unless their emissions in the restricted bands fully comply with the limits given in §15.209. Continuous operation of field disturbance sensors designed to be used in farm equipment; vehicles such as fork-lifts that are intended primarily for use indoors or for very specialized operations. Or railroad locomotives, railroad cars and other equipment which travel on fixed tracks is permitted. A field disturbance sensor will be considered not to be operating in a continuous mode if its operation is limited to specific activities of limited duration (e.g. putting a vehicle in reverse gear, activating a turn signal, etc.).

EQUIPMENT: BB100 Automatic Door Activator
FCC ID: M2EBB100

§15.245, continued

- (2) Field strength limits are specified at a distance of 3 meters.
- (3) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.
- (4) The emission limits shown above are based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply.

§15.209 Radiated Emission Limits, General Requirements

- (a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (millivolts/meter)	Measurement Distance (meters)
0.009-0.490	2400/F (kHz)	300
0.490-1.705	2400/F (kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3