TEST RESULT SUMMARY

FCC PART 15 Subpart C
Section 15.231

MANUFACTURER'S NAME	BEA Inc.
TYPE OF EQUIPMENT	RF 433MHz Transmitter
MODEL NUMBERS	**10TD433, 10TD433PB, & 10TD433PB9V**
MANUFACTURER'S ADDRESS	100 Enterprise Drive RIDC Park West Pittsburgh, PA 15275
TEST REPORT NUMBER	NC303343.1
TEST DATE	15 & 20,22 October 2003

According to testing performed at TÜV Product Service Inc, the above-mentioned unit is in compliance with the electromagnetic compatibility requirements defined in FCC Part 15 Subpart C Section 15.231.

It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical characteristics. Any modifications necessary for compliance made during testing on the above mentioned date(s) must be implemented in all production units for compliance to be maintained.

TÜV Product Service Inc, as an independent testing laboratory, declares that the equipment tested as specified above conforms to the requirements of FCC Part 15 Subpart C Section 15.231.

Date: 11 November 2003

Location: Taylors Falls MN USA	G. S. Jakubowski Tested By	J. T. Schneider Reviewed By

Not Transferable

EMC EMISSION - T E S T R E P O R T

Test Report File No.	:	**NC303343.1**	Date of issue:	11 November 2003

Model Nos.	:	**10TD433, 10TD433PB, & 10TD433PB9V**
Product Type	:	433MHz Transmitter for Automatic Doors
Applicant	:	BEA Inc.
Address	:	100 Enterprise Drive
	:	RIDC Park West
		Pittsburgh, PA 15275
Manufacturer	:	BEA Inc.
Address	:	100 Enterprise Drive
	:	RIDC Park West
		Pittsburgh, PA 15275
Test Result	:	■ **Positive** ☐ **Negative**
Test Project Number Reference(s)	:	**NC303343.1**
Total pages including Appendices		35

TÜV Product Service Inc is a subcontractor to TÜV Product Service, GmbH according to the principles outlined in ISO/IEC Guide 25 and EN 45001.

TÜV Product Service Inc reports apply only to the specific samples tested under stated test conditions. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. TÜV Product Service Inc shall have no liability for any deductions, inferences or generalizations drawn by the client or others from TÜV Product Service Inc issued reports.

This report is the confidential property of the client. As a mutual protection to our clients, the public and ourselves, extracts from the test report shall not be reproduced except in full without our written approval. This report shall not be used by the client to claim product endorsement by NVLAP or any agency of the US government.

TÜV Product Service Inc and its professional staff hold government and professional organization certifications and are members of AAMI, ACIL, AEA, ANSI, IEEE, NVLAP, and VCCI

TÜV PRODUCT SERVICE INC 19333 Wild Mountain Road Taylors Falls MN 55084-1758 Tel: 651 638 0297 Fax: 651 638 0298 Rev.No 1.0

DIRECTORY - EMISSIONS

TÜV PRODUCT SERVICE INC 19333 Wild Mountain Road Taylors Falls MN 55084-1758 Tel: 651 638 0297 Fax: 651 638 0298 Rev.No 1.0

EMISSIONS TEST REGULATIONS :

The emissions tests were performed according to following regulations:

☐ - EN 50081-1 / 1991

☐ - EN 55011 / 1991 ☐ - Group 1 ☐ - Group 2
☐ - Class A ☐ - Class B

☐ - EN 55013 / 1990

☐ - EN 55014 / 1987 ☐ - Household appliances and similar
☐ - Portable tools
☐ - Semiconductor devices

☐ - EN 55014 / A2:1990

☐ - EN 55014 / 1993 ☐ - Household appliances and similar
☐ - Portable tools
☐ - Semiconductor devices

☐ - EN 55015 / 1987

☐ - EN 55015 / A1:1990

☐ - EN 55015 / 1993

☐ - EN 55022 / 1987 ☐ - Class A ☐ - Class B

☐ - EN 55022 / 1994 ☐ - Class A ☐ - Class B

☐ - BS

☐ - VCCI ☐ - Class A ☐ - Class B

■ - FCC Part 15 Subpart C Section 15.231

☐ - AS 3548 (1992) ☐ - Class A ☐ - Class B

☐ - CISPR 11 (1990) ☐ - Group 1 ☐ - Group 2
☐ - Class A ☐ - Class B

☐ - CISPR 22 (1993) ☐ - Class A ☐ - Class B

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Environmental conditions in the lab:

	Actual
Temperature	: 21 °C
Relative Humidity	: 32 %
Atmospheric pressure	: 98.0 kPa
Power supply system	: 9 and 12 VDC Battery

Sign Explanations:

☐ - not applicable
■ - applicable

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Emissions Test Conditions: CONDUCTED EMISSIONS (Interference Voltage)

The *CONDUCTED EMISSIONS (INTERFERENCE VOLTAGE)* measurements were performed at the following test location:

■ - Test not applicable

☐ - Wild River Lab Large Test Site (Open Area Test Site)
☐ - Wild River Lab Small Test Site (Open Area Test Site)
☐ - Oakwood Lab (Open Area Test Site)
☐ - Wild River Lab Screen Room
☐ - New Brighton Lab Shielded Room

Emissions Test Conditions: RADIATED EMISSIONS (Magnetic Field)

The *RADIATED EMISSIONS (MAGNETIC FIELD)* measurements were performed at the following test location:

■ - Test not applicable

☐ - Wild River Lab Large Test Site (Open Area Test Site)
☐ - Wild River Lab Small Test Site (Open Area Test Site)
☐ - Oakwood Lab (Open Area Test Site)

Emissions Test Conditions: INTERFERENCE POWER

The *INTERFERENCE POWER* measurements were performed by using the absorbing clamp on the mains and interface cables in the frequency range 30 MHz - 300 MHz at the following test location:

■ - Test not applicable

☐ - Wild River Lab Large Test Site (Open Area Test Site)
☐ - Wild River Lab Small Test Site (Open Area Test Site)
☐ - Oakwood Lab (Open Area Test Site)
☐ - Wild River Lab Screen Room
☐ - New Brighton Lab Shielded Room

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Emissions Test Conditions: RADIATED EMISSIONS (Electric Field)

The *RADIATED EMISSIONS (ELECTRIC FIELD)* measurements, in the frequency range of 30 MHz-4400 MHz, were tested in a horizontal and vertical polarization at the following test location:

☐ - Test not applicable

■ - Wild River Lab Large Test Site (Open Area Test Site) – NSA measurements made 2-03, due 2-04.
■ - Wild River Lab Small Test Site (Open Area Test Site) – NSA measurements made 2-03, due 2-04.
☐ - Oakwood Lab (Open Area Test Site)

at a test distance of :

■ - 3 meters
☐ - 10 meters
☐ - 30 meters

Test equipment used :

	TUV ID	Model Number	Manufacturer	Description	Serial Number	Cal Due
■-	2670	8447D	Hewlett-Packard	Preamplifier 10-1300 MHz	2443A03954	10-08-04
■-	2668	8447D	Hewlett-Packard	Preamplifier 30 -1000 MHz	1937A02209	02-28-04
■ -	3203	EM-6917B	Electro-Metrics	Biconicalog Periodic 3-20 MHz	106	03-18-04
■ -	3204	EM-6917B	Electro-Metrics	Biconicalog Periodic 30 MHz-2GHz	102	10-24-04
■-	2690	8566B	Hewlett-Packard	Spectrum Analyzer (Unit F)	2430A00930	12-02-03
■ -	2678	85662A	Hewlett-Packard	Analyzer Display (Unit F)	2403A08134	12-02-03
■ -	2684	85650A	Hewlett-Packard	Quasi-Peak Adapter (Unit F)	2521A01006	11-26-03
■ -	2125	JCA018-504	JCA Technology	Preamp .4 - 18 GHz	101A	08-15-04
■ -	2075	3115	Electro-Mechanics (EMCO)	Ridge Guide Ant. 2-18 GHz	9001-3275	11-13-03
■ -	3894	MC NHP-600	Mini-Circuits	Band Pass Filter 600 - 5000 MHz	2	10-13-04

All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST) and is calibrated annually.

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Equipment Under Test (EUT) Test Operation Mode - Emission tests :

The device under test was operated under the following conditions during emissions testing:

☐ - Standby

☐ - Test program (H - Pattern)

☐ - Test program (color bar)

☐ - Test program (customer specific)

☐ - Practice operation

☐ - Normal Operating Mode

■ - Constant transmit.

Configuration of the device under test:

☐ - See Constructional Data Form in Appendix B - Page B2

■ - See Product Information Form in Appendix B - beginning on Page B2

The following peripheral devices and interface cables were connected during the measurement:

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - unshielded power cable

☐ - unshielded cables

☐ - shielded cables MPS.No.: _____

☐ - customer specific cables

☐ - _____

☐ - _____

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Emission Test Results:

FCC 15.207 - Conducted emissions 10/150 kHz - 30 MHz

The requirements are ☐ - MET ☐ - NOT MET ■ - N/A

Minimum margin of compliance _____ dB at _____ kHz

Maximum margin of non-compliance _____ dB at _____ MHz

Remarks: Battery operated.

FCC 15.231 - Radiated emissions (electric field) 30 MHz - 4400 MHz

The requirements are ■ - MET ☐ - NOT MET

Minimum margin of compliance for fundamental 15.2 dB at 433.8 MHz [15.231(c)]

Minimum margin of compliance for spurious 3.1 dB at 1302 MHz [15.209]

Remarks: The fundamental was measured to be 65.6 dBuV/m, or 1905 uV/m, average mode compared to a limit of 80.7 dBuV/m (10958 uV/m) worst case with the key fob, 12 V battery, external lead configuration. The peak reading was 82.2 dBuv/m, <20 dB above the average. The 1302 MHz signal was measured to be 50.9 dBuV/m or 350 uV/m in average mode compared to a limit of 54 dBuV/m (500 uV/m) worst case with the key fob, 12 V battery configuration. The peak reading was 57 dBuV/m, <20 dB above the average.

FCC 15.231 (c) - Emission Bandwidth

The requirements are ■ - MET ☐ - NOT MET

Remarks: The bandwidth of the fundamental must be less than 0.25% of the center frequency, or 1.082 MHz. Page A3 shows the bandwidth to be 405 kHz.

FCC 15.35 (c) – Duty Cycle

The requirements are ■ - MET ☐ - NOT MET

Remarks: The duty cycle correction factor is calculated by 20 log (24/100) or –12.4 dB, this is for information only and is NOT added into the final measurement levels. See page A4.

FCC 15.231 (a) – Signal Deactivation

The requirements are ■ - MET ☐ - NOT MET

Remarks: The transmitter stops when the button is released.

DEVIATIONS FROM STANDARD:

None.

GENERAL REMARKS:

SUMMARY:

The requirements according to the technical regulations are

■ - met

☐ - **not** met.

The device under test does

■ - fulfill the general approval requirements mentioned on page 3.

☐ - **not** fulfill the general approval requirements mentioned on page 3.

Testing Start Date: 15 October 2003

Testing End Date: 22 October 2003

- TÜV PRODUCT SERVICE INC -

Joel T. Schneider
J. T. Schneider
Reviewed By

G. S. Jakubowski
Tested By:
G. S. Jakubowski

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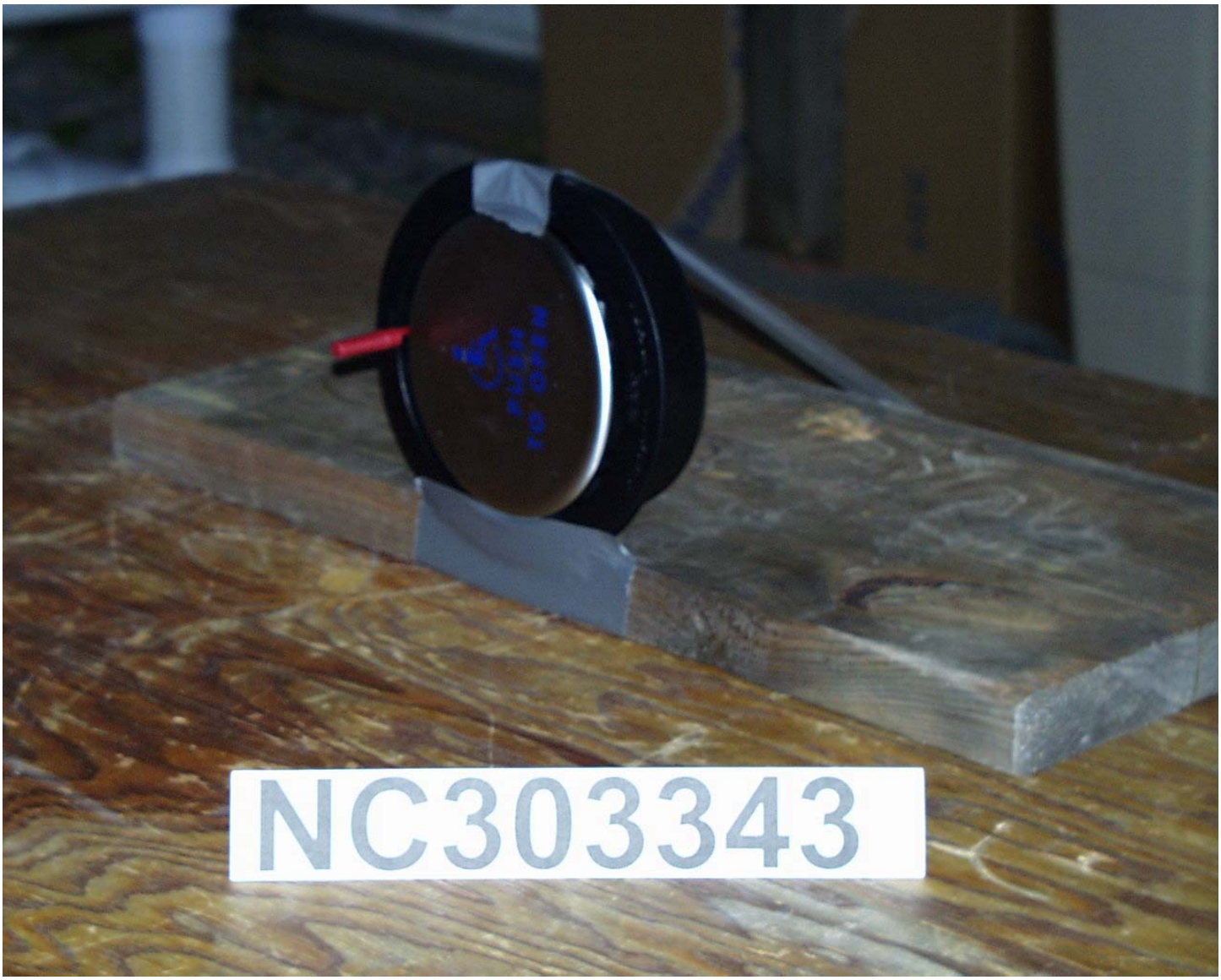
Test-setup photo(s):
Radiated emission 30 MHz – 4.4 GHz - Transmitter



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Test-setup photo(s):
Radiated emission 30 MHz – 4.4 GHz - Transmitter

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Appendix A

Test Data Sheets

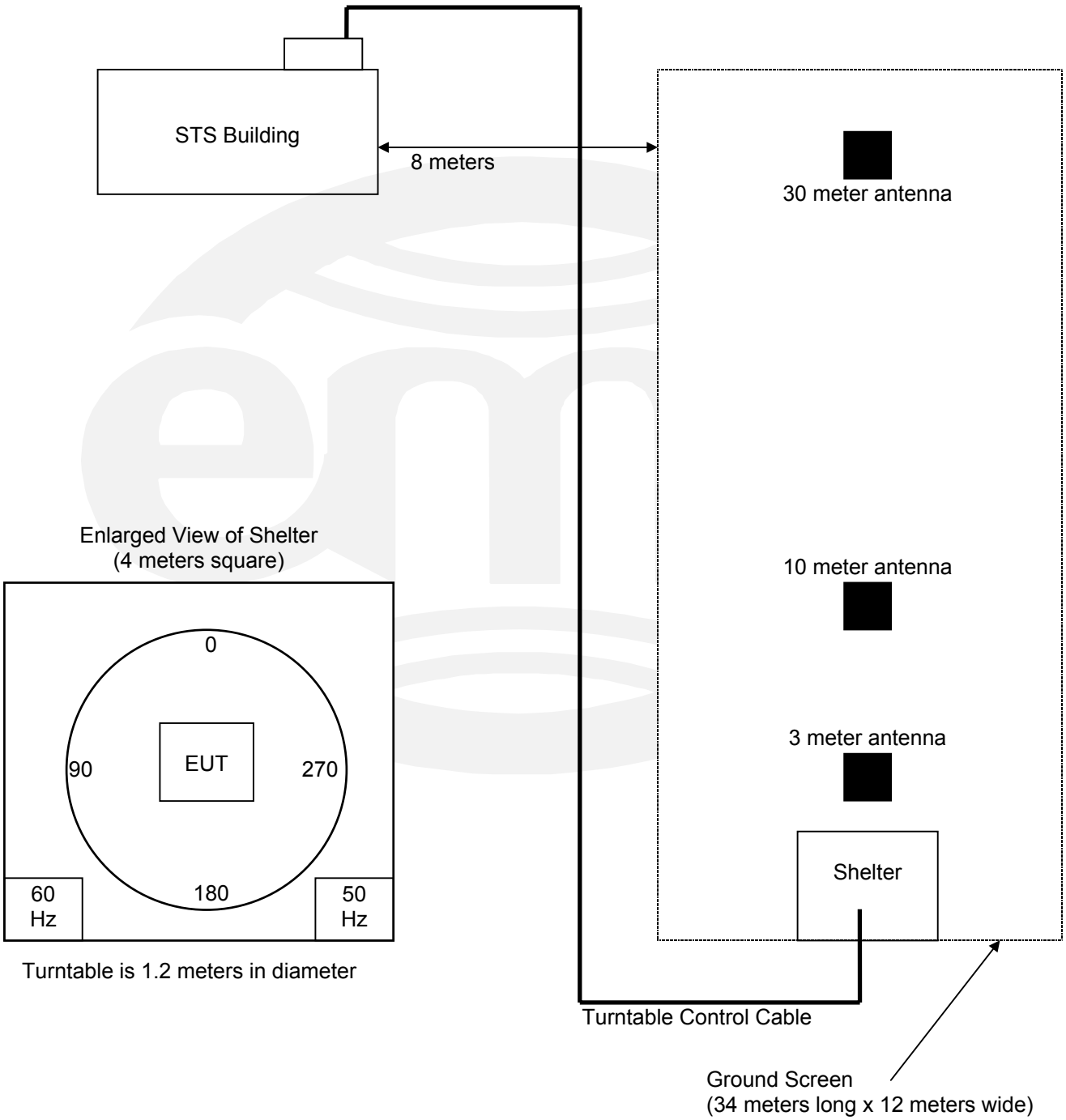
and

Test Setup Drawing(s)

TÜV PRODUCT SERVICE INC 19333 Wild Mountain Road Taylors Falls MN 55084-1758 Tel: 651 638 0297 Fax: 651 638 0298 Rev.No 1.0

TEST SETUP FOR EMISSIONS TESTING

WILD RIVER LAB
Small Test Site (STS)



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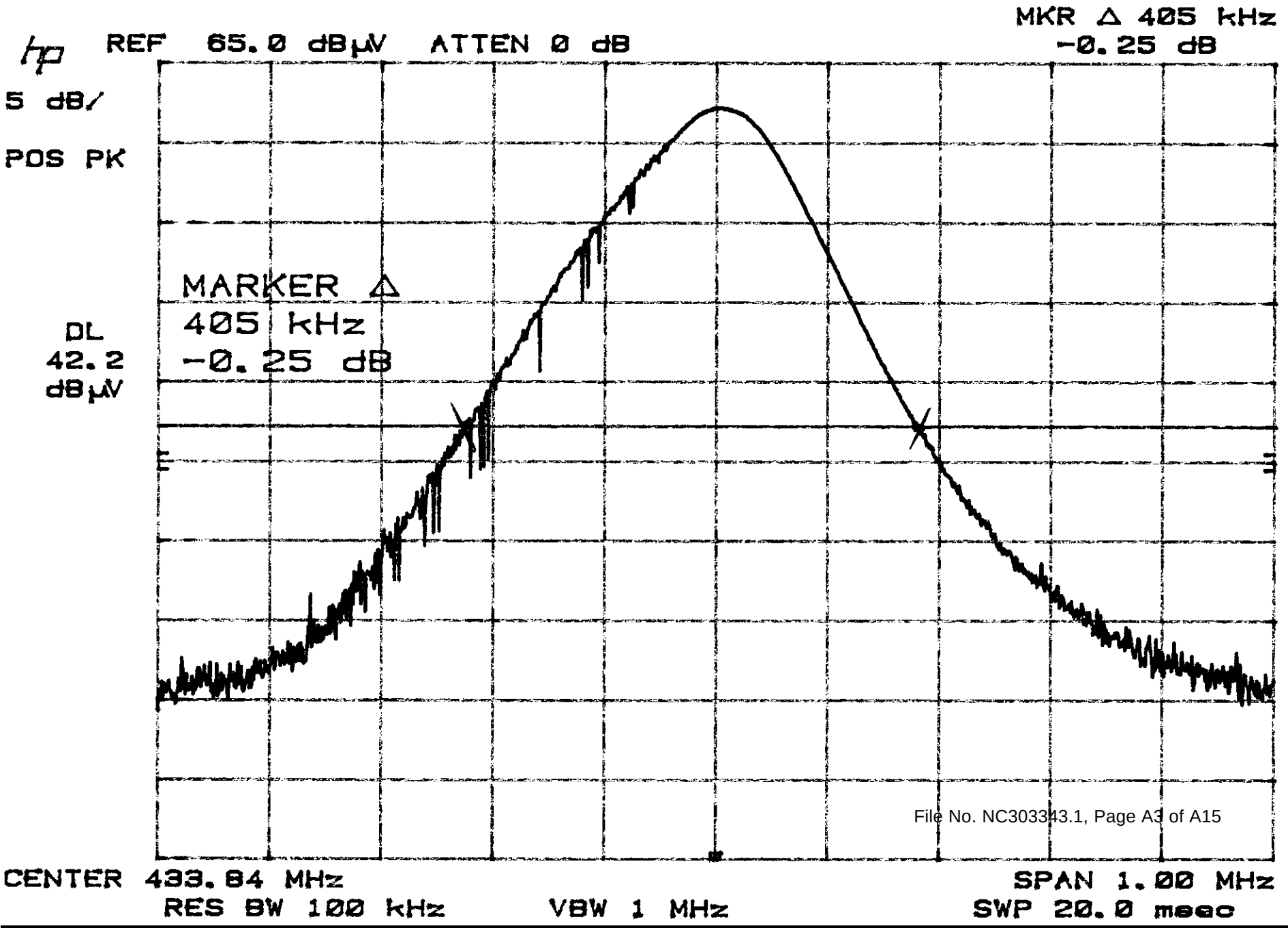
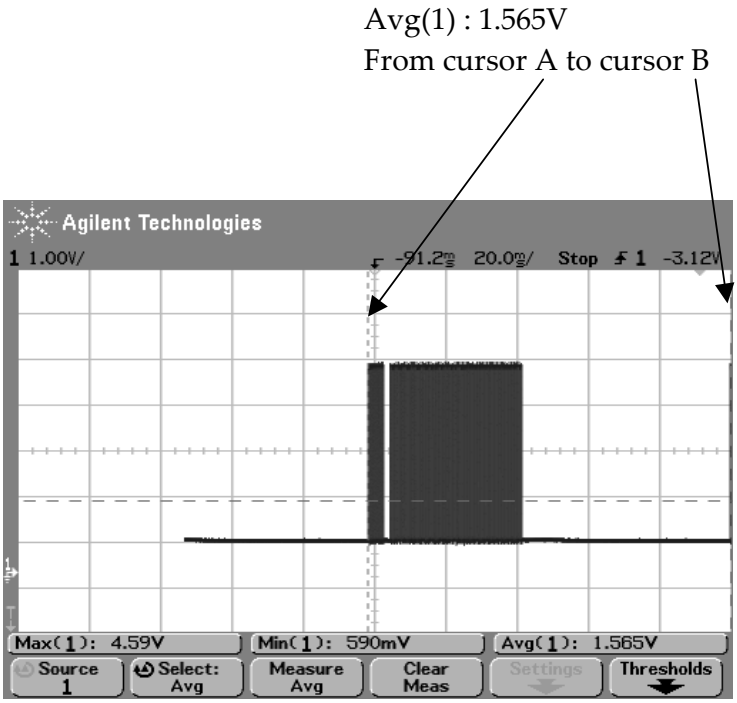
20dB Band Width

BEA - NC303343 - 10/15/03 - mn:10TD433PB - Option 1, Internal 12V battery only





200µs – "On time" calculation.

"On time" calculation :

Taking into account that all the measurements values given by the scope are influenced by the DC offset voltage, we may calculate the ratio between 'ON' and 'OFF' time for transmission using the following formula :

$$(V_{avg}-V_{min}) \ / \ (V_{max}-V_{min}) \ = \ (1.565-0.590) \ / \ (4.59-0.590) \ = 24\ \%$$

Samples provided on October 6, 2003 :

BEA-US-8 : 12V – 2 wires
BEA-US-9 : 9V – 4 wires
BEA-US-10 : 12V – No wires

RADIATED EMISSIONS

Test Report #:	NC303343 Run 1	Test Area:	STS		
EUT Model #:	10TD433PB	Date:	10/15/03		
EUT Serial #:	400000323124	EUT Power:	Internal 12VDC	Temperature:	21.0 °C
Test Method:	FCC 15.231			Air Pressure:	98.0 kPa
Customer:	BEA			Rel. Humidity:	32.0 %
EUT Description:	433MHz Transmitter for automatic doors				
Notes:	Option 1 - Internal 12V battery only				
Data File Name:	3343-2.dat			Page:	1 of 3

List of measurements for run #: 1

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1	DELTA2
All measurements maximized unless noted otherwise						
Upright						
433.836 MHz	58.0 Pk	3.04 / 16.5 / 0.0 / 0.0	77.54	V / 1.18 / 114	n/a	n/a
433.836 MHz	42.7 Av	3.04 / 16.5 / 0.0 / 0.0	62.24	V / 1.20 / 114	n/a	n/a
On its side						
433.836 MHz	57.75 Pk	3.04 / 16.5 / 0.0 / 0.0	77.29	V / 1.24 / 291	n/a	n/a
433.836 MHz	43.1 Av	3.04 / 16.5 / 0.0 / 0.0	62.64	V / 1.24 / 291	n/a	n/a
On its back						
433.836 MHz	54.1 Pk	3.04 / 16.5 / 0.0 / 0.0	73.64	H / 1.00 / 134	n/a	n/a
433.84 MHz	40.0 Av	3.04 / 16.5 / 0.0 / 0.0	59.54	H / 1.00 / 134	n/a	n/a
Upright						
867.69 MHz	50.6 Pk	4.41 / 22.0 / 27.1 / 0.3	50.21	V / 1.19 / 86	n/a	n/a
867.69 MHz	33.7 Av	4.41 / 22.0 / 27.1 / 0.3	33.31	V / 1.19 / 86	n/a	n/a
1.302 GHz	53.8 Pk	5.45 / 25.36 / 28.1 / 0.5	57.01	V / 1.20 / 76	n/a	n/a
1.302 GHz	47.75 Av	5.45 / 25.36 / 28.1 / 0.5	50.96	V / 1.20 / 76	n/a	n/a

Tested by: G. S. Jakubowski

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Reviewed by: J. T. Schneider

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RADIATED EMISSIONS

Test Report #:	NC303343 Run 1	Test Area:	STS		
EUT Model #:	10TD433PB	Date:	10/15/03		
EUT Serial #:	400000323124	EUT Power:	Internal 12VDC	Temperature:	21.0 °C
Test Method:	FCC 15.231			Air Pressure:	98.0 kPa
Customer:	BEA			Rel. Humidity:	32.0 %
EUT Description:	433MHz Transmitter for automatic doors				
Notes:	Option 1 - Internal 12V battery only				
Data File Name:	3343-2.dat			Page:	2 of 3

List of measurements for run #: 1

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1	DELTA2
1.735 GHz	40.82 Pk	6.35 / 27.77 / 29.77 / 0.44	45.62	V / 1.20 / 95	n/a	n/a
No significant harmonic emissions detected above 1.735GHz						
No significant spurious emissions detected						
End scan 30MHz to 4.4GHz						

Graph:

Tested by: G. S. Jakubowski

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Reviewed by: J. T. Schneider

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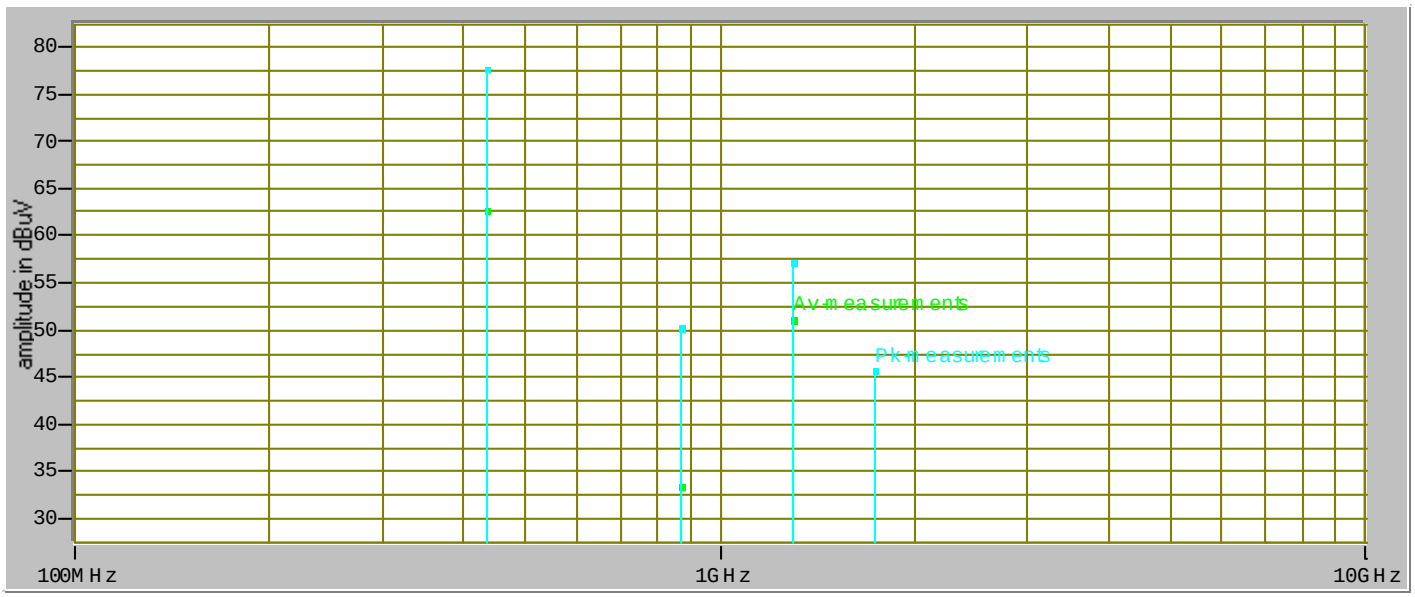
RADIATED EMISSIONS

Test Report #:	NC303343 Run 1	Test Area:	STS		
EUT Model #:	10TD433PB	Date:	10/15/03		
EUT Serial #:	400000323124	EUT Power:	Internal 12VDC	Temperature:	21.0 °C
Test Method:	FCC 15.231			Air Pressure:	98.0 kPa
Customer:	BEA			Rel. Humidity:	32.0 %
EUT Description:	433MHz Transmitter for automatic doors				
Notes:	Option 1 - Internal 12V battery only				
Data File Name:	3343-2.dat			Page:	3 of 3



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Reviewed by: J. T. Schneider

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RADIATED EMISSIONS

Test Report #:	NC303343 Run 2	Test Area:	LTS		
EUT Model #:	10TD433PB	Date:	10/20/03		
EUT Serial #:	400000323124	EUT Power:	Internal 12VDC	Temperature:	23.0 °C
Test Method:	FCC 15.231			Air Pressure:	98.0 kPa
Customer:	BEA			Rel. Humidity:	40.0 %
EUT Description:	433MHz Transmitter for automatic doors				
Notes:	Option 2 - Internal 12V battery and external leads				
Data File Name:	3343-2.dat			Page:	1 of 2

List of measurements for run #: 2

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1	DELTA2
All measurements maximized unless noted otherwise						
Upright						
433.792 MHz	59.7 Pk	1.84 / 17.18 / 0.0 / 0.0	78.72	V / 1.14 / 86	n/a	n/a
433.792 MHz	43.3 Av	1.84 / 17.18 / 0.0 / 0.0	62.32	V / 1.14 / 86	n/a	n/a
On its side						
433.792 MHz	60.1 Pk	1.84 / 17.18 / 0.0 / 0.0	79.12	V / 1.22 / 225	n/a	n/a
433.792 MHz	44.1 Av	1.84 / 17.18 / 0.0 / 0.0	63.12	V / 1.22 / 225	n/a	n/a
On its back						
433.792 MHz	63.2 Pk	1.84 / 17.18 / 0.0 / 0.0	82.22	H / 1.82 / 167	n/a	n/a
433.792 MHz	46.6 Av	1.84 / 17.18 / 0.0 / 0.0	65.62	H / 1.82 / 167	n/a	n/a
On its back						
867.606 MHz	53.4 Pk	2.74 / 22.9 / 24.42 / 0.0	54.61	H / 1.00 / 0	n/a	n/a
867.606 MHz	34.2 Av	2.74 / 22.9 / 24.42 / 0.0	35.41	H / 1.00 / 0	n/a	n/a
1.301 GHz	31.02 Pk	3.27 / 26.58 / 29.8 / 0.0	31.07	H / 1.05 / 185	n/a	n/a
No other significant emissions detcted						
End scan 30MHz to 4.4GHz						

Tested by: G. S. Jakubowski

Printed Signature

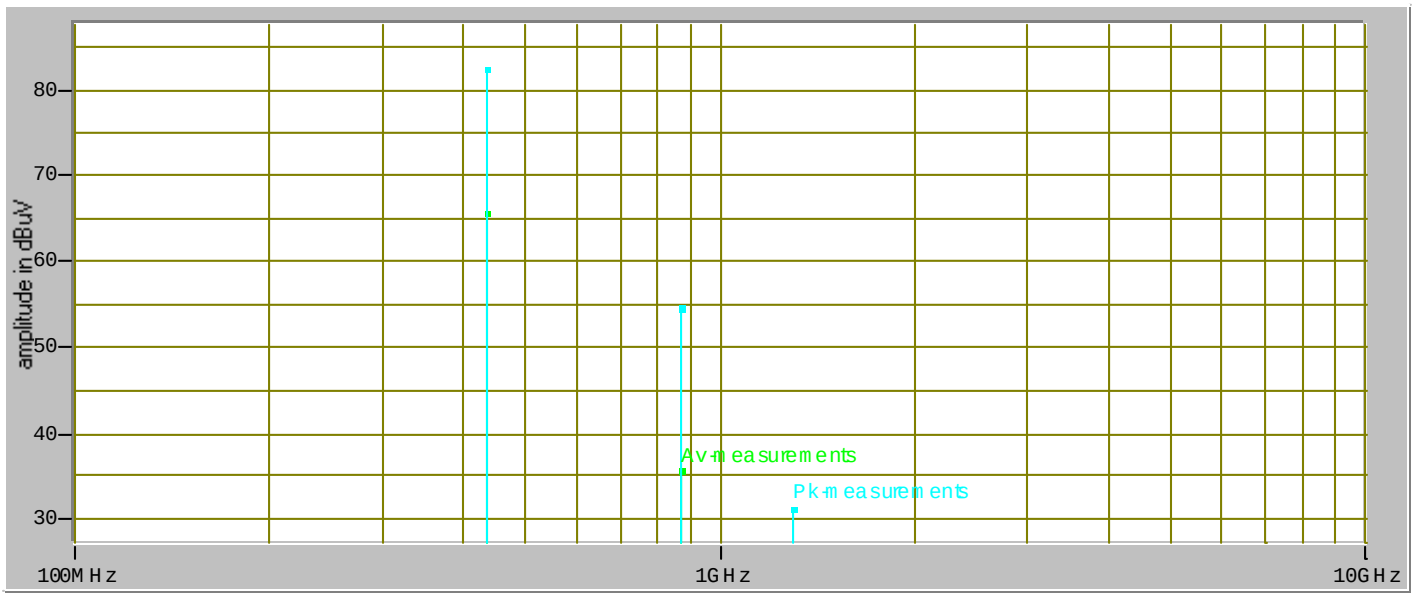
Reviewed by: J. T. Schneider

Printed Signature

RADIATED EMISSIONS

Test Report #:	NC303343 Run 2	Test Area:	LTS		
EUT Model #:	10TD433PB	Date:	10/20/03		
EUT Serial #:	400000323124	EUT Power:	Internal 12VDC	Temperature:	23.0 °C
Test Method:	FCC 15.231			Air Pressure:	98.0 kPa
Customer:	BEA			Rel. Humidity:	40.0 %
EUT Description:	433MHz Transmitter for automatic doors				
Notes:	Option 2 - Internal 12V battery and external leads				
Data File Name:	3343-2.dat			Page:	2 of 2

Graph:



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Reviewed by: J. T. Schneider

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RADIATED EMISSIONS

Test Report #:	NC303343 Run 3	Test Area:	LTS		
EUT Model #:	10TD433PB	Date:	10/20/03		
EUT Serial #:	400000323124	EUT Power:	Internal 12VDC	Temperature:	23.0 °C
Test Method:	FCC 15.231			Air Pressure:	98.0 kPa
Customer:	BEA			Rel. Humidity:	40.0 %
EUT Description:	433MHz Transmitter for automatic doors				
Notes:	Option 2 - Internal 12V battery and external leads. Mounted inside a push plate.				
Data File Name:	3343-2.dat			Page:	1 of 2

List of measurements for run #: 3

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1	DELTA2
All measurements maximized						
Upright						
433.8 MHz	53.8 Pk	1.84 / 17.18 / 0.0 / 0.0	72.82	V / 1.38 / 152	n/a	n/a
433.8 MHz	21.33 Av	1.84 / 17.18 / 0.0 / 0.0	40.35	H / 1.69 / 63	n/a	n/a
867.6 MHz	51.5 Pk	2.74 / 22.9 / 24.42 / 0.0	52.71	V / 1.14 / 341	n/a	n/a
867.6 MHz	31.2 Av	2.74 / 22.9 / 24.42 / 0.0	32.41	V / 1.14 / 341	n/a	n/a
1.301 GHz	36.0 Pk	3.27 / 26.58 / 29.8 / 0.0	36.05	H / 1.00 / 0	n/a	n/a
No other significant emissions detected						
End scan 30MHz to 4.4GHz						

Tested by: G. S. Jakubowski

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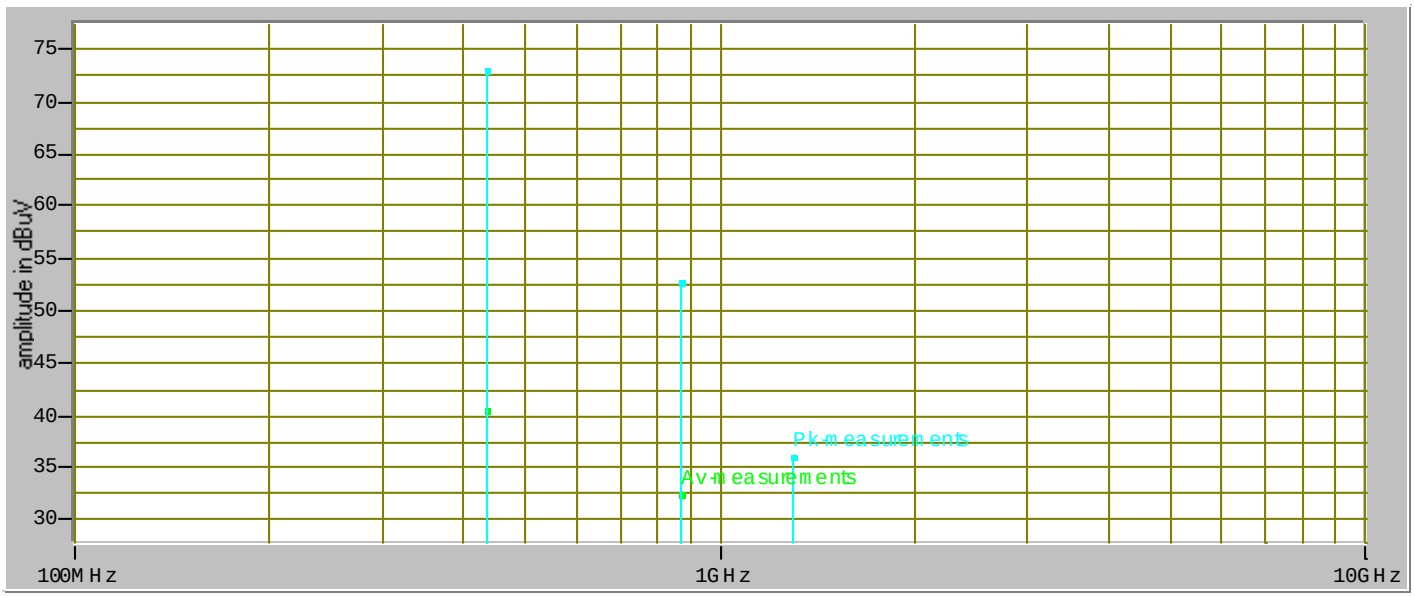
Reviewed by: J. T. Schneider

Printed | Signature

RADIATED EMISSIONS

Test Report #:	NC303343 Run 3	Test Area:	LTS		
EUT Model #:	10TD433PB	Date:	10/20/03		
EUT Serial #:	400000323124	EUT Power:	Internal 12VDC	Temperature:	23.0 °C
Test Method:	FCC 15.231			Air Pressure:	98.0 kPa
Customer:	BEA			Rel. Humidity:	40.0 %
EUT Description:	433MHz Transmitter for automatic doors				
Notes:	Option 2 - Internal 12V battery and external leads. Mounted inside a push plate.				
Data File Name:	3343-2.dat			Page:	2 of 2

Graph:



Tested by: G. S. Jakubowski

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Reviewed by: J. T. Schneider

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RADIATED EMISSIONS

Test Report #:	NC303343 Run 4	Test Area:	LTS		
EUT Model #:	10TD433PB9V	Date:	10/22/03		
EUT Serial #:	400000323124	EUT Power:	External 9vdc	Temperature:	21.0 °C
Test Method:	FCC 15.231			Air Pressure:	98.0 kPa
Customer:	BEA			Rel. Humidity:	45.0 %
EUT Description:	433MHz Transmitter for automatic doors				
Notes:	Option 4 - External 9V battery and external leads.				
Data File Name:	3343-2.dat			Page:	1 of 2

List of measurements for run #: 4

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1	DELTA2
All measurements maximized						
Upright						
433.779 MHz	60.25 Pk	1.84 / 17.19 / 0.0 / 0.0	79.27	H / 1.00 / 182	n/a	n/a
433.779 MHz	41.8 Av	1.84 / 17.19 / 0.0 / 0.0	60.82	H / 1.00 / 182	n/a	n/a
On its side						
433.785 MHz	59.2 Pk	1.84 / 17.18 / 0.0 / 0.0	78.22	V / 1.17 / 53	n/a	n/a
433.785 MHz	39.8 Av	1.84 / 17.18 / 0.0 / 0.0	58.82	V / 1.17 / 53	n/a	n/a
On its back						
433.785 MHz	58.1 Pk	1.84 / 17.18 / 0.0 / 0.0	77.12	H / 1.00 / 0	n/a	n/a
433.785 MHz	39.1 Av	1.84 / 17.18 / 0.0 / 0.0	58.12	H / 1.00 / 0	n/a	n/a
Upright						
867.573 MHz	58.5 Pk	2.74 / 22.9 / 29.92 / 0.0	54.22	H / 1.00 / 145	n/a	n/a
867.573 MHz	36.6 Av	2.74 / 22.9 / 29.92 / 0.0	32.32	H / 1.00 / 145	n/a	n/a
No other significant emissions detected						
End scan 30MHz to 4.4GHz						

Tested by: G. S. Jakubowski

Printed Signature

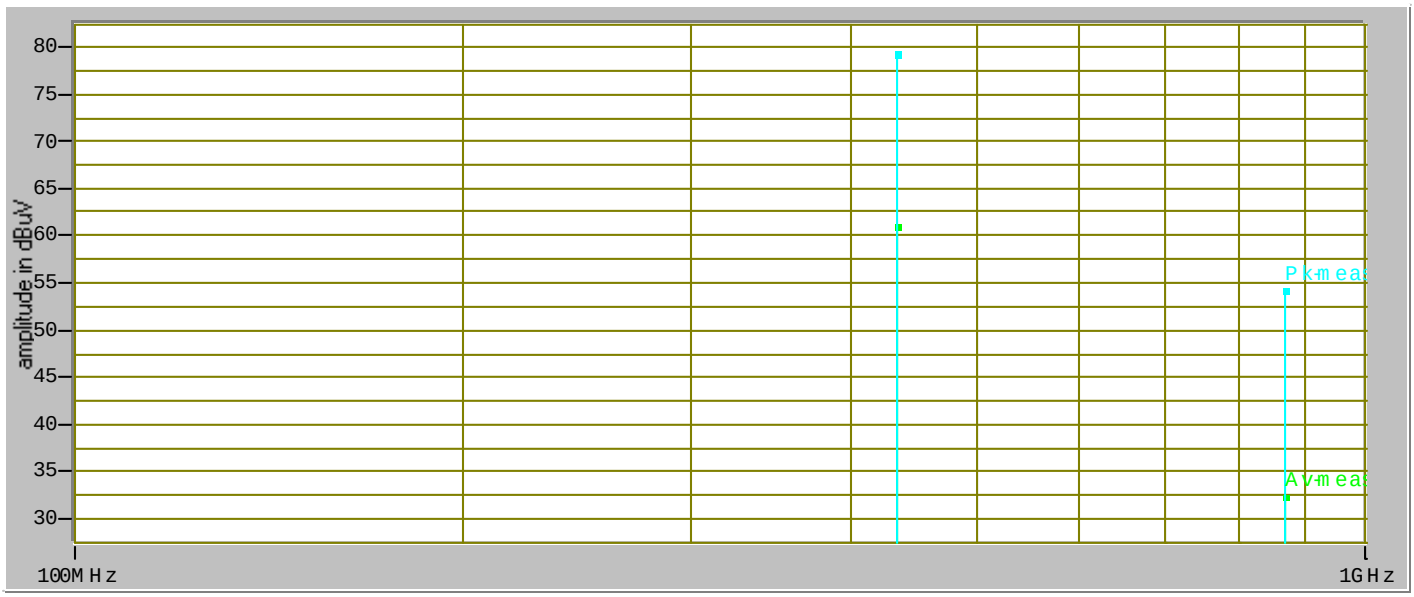
Reviewed by: J. T. Schneider

Printed Signature

RADIATED EMISSIONS

Test Report #:	NC303343 Run 4	Test Area:	LTS		
EUT Model #:	10TD433PB9V	Date:	10/22/03		
EUT Serial #:	400000323124	EUT Power:	External 9vdc	Temperature:	21.0 °C
Test Method:	FCC 15.231			Air Pressure:	98.0 kPa
Customer:	BEA			Rel. Humidity:	45.0 %
EUT Description:	433MHz Transmitter for automatic doors				
Notes:	Option 4 - External 9V battery and external leads.				
Data File Name:	3343-2.dat			Page:	2 of 2

Graph:



Tested by: G. S. Jakubowski

Printed | Signature

Reviewed by: J. T. Schneider

Printed | Signature

RADIATED EMISSIONS

Test Report #:	NC303343 Run 5	Test Area:	LTS		
EUT Model #:	10TD433PB9V	Date:	10/22/03		
EUT Serial #:	400000323124	EUT Power:	External 9vdc	Temperature:	21.0 °C
Test Method:	FCC 15.231			Air Pressure:	98.0 kPa
Customer:	BEA			Rel. Humidity:	45.0 %
EUT Description:	433MHz Transmitter for automatic doors				
Notes:	Option 5 - External 9V battery and external leads. Mounted inside a push plate				
Data File Name:	3343-2.dat			Page:	1 of 2

List of measurements for run #: 5

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1	DELTA2
All measurements maximized						
Upright						
433.791 MHz	55.95 Pk	1.84 / 17.18 / 0.0 / 0.0	74.97	V / 1.10 / 228	n/a	n/a
433.791 MHz	31.5 Av	1.84 / 17.18 / 0.0 / 0.0	50.52	V / 1.10 / 228	n/a	n/a
867.573 MHz	42.5 Pk	2.74 / 22.9 / 29.92 / 0.0	38.22	V / 1.25 / 185	n/a	n/a
No other significant emissions detected						
End scan 30MHz to 4.4GHz						

Tested by: G. S. Jakubowski

Printed | Signature

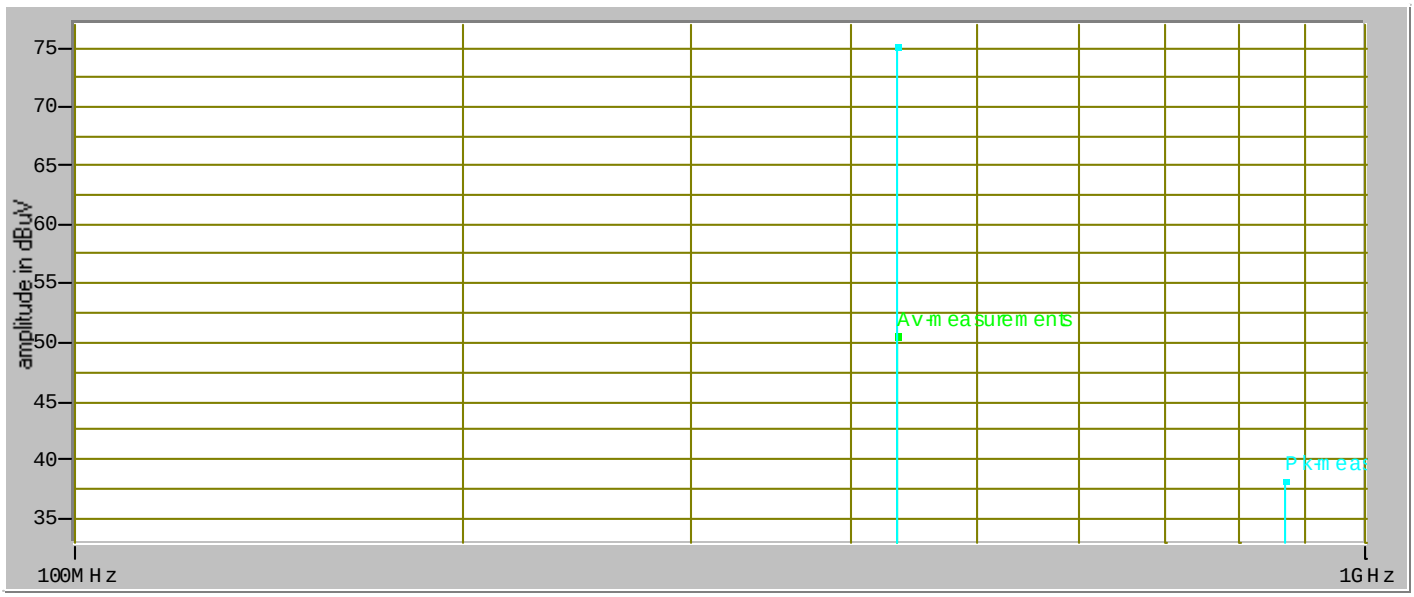
Reviewed by: J. T. Schneider

Printed | Signature

RADIATED EMISSIONS

Test Report #:	NC303343 Run 5	Test Area:	LTS		
EUT Model #:	10TD433PB9V	Date:	10/22/03		
EUT Serial #:	400000323124	EUT Power:	External 9vdc	Temperature:	21.0 °C
Test Method:	FCC 15.231			Air Pressure:	98.0 kPa
Customer:	BEA			Rel. Humidity:	45.0 %
EUT Description:	433MHz Transmitter for automatic doors				
Notes:	Option 5 - External 9V battery and external leads. Mounted inside a push plate				
Data File Name:	3343-2.dat			Page:	2 of 2

Graph:



Tested by: G. S. Jakubowski

Printed | Signature

Reviewed by: J. T. Schneider

Printed | Signature

Appendix B

Constructional Data Form

And/or

Product Information Form

TÜV PRODUCT SERVICE INC 19333 Wild Mountain Road Taylors Falls MN 55084-1758 Tel: 651 638 0297 Fax: 651 638 0298 Rev.No 1.0

Form

EMC Test Plan and Constructional Data Form

TÜV AMERICA

PLEASE COMPLETE THIS DOCUMENT IN FULL, ENTERING N/A IF THE FIELD IS NOT APPLICABLE.

Applicant -- ***NOTE: This information will be input into your test report as shown below.***
Press the F1 key at any time to get HELP for the current field selected.

Company:	BEA Inc.		
Address:	100 Enterprise Drive		
	RIDC Park West		
	Pittsburgh, PA 15275		
Contact:	Thomas Schluep	Position:	Vice President Engineering
Phone:	412 249 4100	Fax:	412 249 4101
E-mail Address:	tpschluep@beainc.com		

General Equipment Description -- ***NOTE: This information will be input into your test report as shown below.***

EUT Description	RF433MHz Transmitter and Receiver		
EUT Name	Digital Transmitter & Digital Receiver		
Model No.:	10RD433 10TD433 10TD433PB 10TD433PB9v	Serial No.:	N/A
Product Options:	N/A		
Configurations to be tested:	10RD433 10TD433 10TD433PB 10TD433PB9v		

Test Objective

- ☐ EMC Directive 89/336/EEC (EMC) Std: _____
- ☐ Machinery Directive 89/392/EEC (EMC Std: _____
- ☐ Medical Device Directive 93/42/EEC (EMC) Std: _____
- ☐ Vehicle Directive 72/245/EEC (EMC) Std: _____
- ☐ FDA Reviewers Guidance for Premarket Notification Submissions (EMC)

- ☐ FCC: Class ☐ A ☒ B Part _____
- ☐ VCCI: Class ☐ A ☐ B
- ☐ BSMI: Class ☐ A ☐ B
- ☐ Canada: Class ☐ A ☒ B
- ☐ Australia: Class ☐ A ☐ B
- ☐ Other: _____

EMC Test Plan and Constructional Data Form

TÜV AMERICA

TÜV Product Service Certification Requested

☐ Attestation of Conformity (AoC) ☐ EMC Certification (used with Octagon Mark)
☐ Certificate of Conformity (CoC) ☐ Compliance Document

Protection Class (N/A for vehicles) ☐ Class I ☐ Class II ☐ Class III

(Press **F1** when field is selected to show additional information on Protection Class.)

Attendance

Test will be: ☐ Attended by the customer ☒ Unattended by the customer

Failure - *Complete this section if testing will not be attended by the customer.*

If a failure occurs, TUV Product Service should:
☐ Call contact listed above, if not available then stop testing. (After hrs phone): _____
☒ Continue testing to complete test series.
☒ Continue testing to define corrective action.
☐ Stop testing.

EUT Specifications and Requirements

Length	Width:	Height:	Weight:
77mm : 57mm	52mm 35mm	28mm 14mm	60g 20g

Power Requirements

Regulations require testing to be performed at typical power ratings in the countries of intended use. (i.e., European power is typically 230 VAC 50 Hz or 400 VAC 50 Hz, single and three phase, respectively)

Voltage: 9VDC Battery (If battery powered, make sure battery life is sufficient to complete testing.)
12VDC Battery

# of Phases: _____

Current (Amps/phase(max)): _____ Current (Amps/phase(nominal)): _____

Other _____

Other Special Requirements

Typical Installation and/or Operating Environment

(ie. Hospital, Small Business, Industrial/Factory, etc.)
In conjunction with push plates for low energy-, swing-, sliding-, bifolding-, or revolving automatic doors. Commericial or residential applications.

EUT Power Cable

☐ Permanent OR ☐ Removable Length (in meters): _____
☐ Shielded OR ☐ Unshielded
☒ Not Applicable

EMC Test Plan and Constructional Data Form

EUT Interface Ports and Cables

Type	Analog	Digital	Active (During Test)	Passive (During Test)	Qty	Shielding: Yes	Shielding: No	Shielding: Type	Termination	Connector Type	Port Termination	Length tested (in meters)	Removable	Permanent
EXAMPLE: *RS232*	☐	☒	☒	☐	*2*	☒	☐	*Foil over braid*	*Coaxial*	*Metallized 9-pin D-Sub*	*Characteristic Impedance*	*6*	☒	☐
9V Battery adapter	☒	☐	☒	☐		☐	☒		N/A	9V Battery Connector	N/A	0	☐	☒
Push Plate Leads	☐	☒	☒	☒		☐	☒		N/A	Flag Style Connectors	N/A	.15	☐	☒
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
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	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐
	☐	☐	☐	☐		☐	☐						☐	☐

EMC Test Plan and Constructional Data Form

TÜV AMERICA

EUT Software.

Revision Level:

Description:

Equipment Under Test (EUT) Operating Modes to be Tested -- list the operating modes to be used during test. It is recommended the equipment be tested while operating in a typical operation mode. FCC testing of personal computers and/or peripherals requires that a simple program generate a complete line of upper case H's. Provide a general description of all software, firmware, and PLD algorithms used in the equipment. List all code modules as described above, with the revision level used during testing. Consult with your TÜV Product Service Representative if additional assistance is required.

1. As stand alone 10TD433

2. In conjunction with a push plate, models 10TD433PB and 10TD433PB9V.

3. As stand alone 10RD433

Equipment Under Test (EUT) System Components -- List and describe all components which are part of the EUT. For FCC & Taiwan testing a minimum configuration is required. (ie. Mouse, Printer, Monitor, External Disk Drive, Motherboard, etc)

Description	Model #	Serial #	FCC ID #

EMC Test Plan and Constructional Data Form

AMERICA

Support Equipment -- List and describe all support equipment which is not part of the EUT. (i.e. peripherals, simulators, etc) This information is required for FCC & Taiwan testing.

Description	*Model #*	*Serial #*	*FCC ID #*
Push Plate			

Oscillator Frequencies

Frequency	*Derived Frequency*	*Component # / Location*	*Description of Use*
433.92			

Power Supply

Manufacturer	*Model #*	*Serial #*	*Type*
			☐ Switched-mode: (Frequency) _____ ☐ Linear ☐ Other: _____
			☐ Switched-mode: (Frequency) _____ ☐ Linear ☐ Other: _____

Power Line Filters

Manufacturer	*Model #*	*Location in EUT*

EMC Test Plan and Constructional Data Form

AMERICA

Critical EMI Components (Capacitors, ferrites, etc.)				
Description	***Manufacturer***	***Part # or Value***	***Qty***	***Component # / Location***

EMC Critical Detail -- Describe other EMC Design details used to reduce high frequency noise.

(PLEASE INSERT "**ELECTRONIC SIGNATURE**" BELOW IF POSSIBLE)

Authorization Signatures

Thomas P. Schluep	11/10/2003
Customer authorization to perform tests according to this test plan.	Date
Jolene Murphy	11/10/2003
Test Plan/CDF Prepared By (please print)	Date

Appendix C

MEASUREMENT PROTOCOL

GENERAL INFORMATION

Measurement Uncertainty

The test system for conducted emissions is defined as the LISN, tuned receiver or spectrum analyzer, and coaxial cable. The test system for radiated emissions is defined as the antenna, the pre-amplifier, the spectrum analyzer and the coaxial cable. These test systems have a measurement uncertainty of ±4.5 dB. The equipment comprising the test systems are calibrated on an annual basis.

Justification

The Equipment Under Test (EUT) is configured in a typical user arrangement in accordance with the manufacturer's instructions. A cable is connected to each available port and either terminated with a peripheral into it's characteristic impedance or left unterminated. When appropriate, the cables are manually manipulated with respect to each other to obtain maximum emissions from the unit.

CONDUCTED EMISSIONS

The final level, expressed in dBμV, is arrived at by taking the reading directly from the EMI receiver. This level is compared directly to the FCC limit.

To convert between dBμV and μV, the following conversions apply:

dBμV = 20(log μV)

μV = Inverse log(dBμV/20)

RADIATED EMISSIONS

The final level, expressed in dBμV/m, is arrived at by taking the reading from the spectrum analyzer (Level dBμV), adding the antenna correction factor and cable loss factor (Factor dB) to it, then subtracting the preamp gain. This result then has the FCC limit subtracted from it to provide the Delta which gives the tabular data as shown in the data sheets in Attachment A.

Example:

FREQ (MHz)	LEVEL (dBuV)		CABLE (dB)		ANT (dB/m)		PREAMP (dB)		FINAL (dBuV/m)	POL	HGT (m)	AZ (deg)		DELTA1 LIMIT
60.80	42.5Qp	+	1.2	+	10.9	-	25.5	=	29.1	V	1.0	0.0	-	-10.9

TÜV PRODUCT SERVICE INC 19333 Wild Mountain Road Taylors Falls MN 55084-1758 Tel: 651 638 0297 Fax: 651 638 0298 Rev.No 1.0

DETAILS OF TEST PROCEDURES

General Standard Information

The test methods used comply with ANSI C63.4-1992 - "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz."

Conducted Emissions

Conducted emissions on the 60 Hz power interface of the EUT are measured in the frequency range of 150 kHz to 30 MHz. The measurements are performed using a receiver, which has CISPR characteristic bandwidth and quasi-peak detection, and a Line Impedance Stabilization Network (LISN), with 50 Ω/50 μH (CISPR 16) characteristics. Table top equipment is placed on a non-conducting table 80 centimeters above the floor and is positioned 40 centimeters from the vertical ground plane (wall) of the screen room. In some cases, a pre-scan using a spectrum analyzer is initially performed on the units comprising the system under test to locate the highest emissions. If the minimum passing margin appears to be less than 20 dB with a peak mode measurement, the emissions are re-measured using a tuned receiver or spectrum analyzer with quasi-peak and average detection and recorded on the data sheets.

Radiated Emissions

Radiated emissions from the EUT are measured in the frequency range of 30 to 1000 MHz using a receiver, and in the frequency range of 1000-4400 MHz using a spectrum analyzer, and appropriate broadband linearly polarized antennas. Measurements between 30 MHz and 1000 MHz are made with 120 kHz/6 dB bandwidth and average and peak detection and measurements above 1000 MHz are made with a 1 MHz/6 dB bandwidth and average and peak detection. Table top equipment is placed on a 1.0 X 1.5 meter non-conducting table 80 centimeters above the ground plane. Floor standing equipment is placed directly on the turntable/ground plane. Interface cables that are closer than 40 centimeters to the ground plane are bundled in the center in a serpentine fashion so they are at least 40 centimeters from the ground plane. Cables to simulators/testers (if used in this test) are routed through the center of the table and to a screen room located outside the test area. The antenna is positioned 3 meters horizontally from the EUT. To locate maximum emissions from the test sample the antenna is varied in height from 1 to 4 meters, measurement scans are made with both horizontal and vertical antenna polarizations and the EUT are rotated 360 degrees. Intentional radiators are rotated through three orthogonal axes to determine the attitude that maximizes the emissions.

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