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Report No.: 25021716136RFC-1



TEST REPORT

Product Name:	Wireless Doorbell
Trade Mark:	AVANTEK
Model No.:	CB-21, WA-11
HVIN:	XJ-DB-C3-Send-V1.0
Add. Model No.:	CW-21, CB-12, CW-12, CR-1, CR-2, CB-11, CW-11, BA-11, BA-12, DB-21
Report Number:	25021716136RFC-1
Test Standards:	FCC 47 CFR Part 15 Subpart C RSS-210 Issue 11 RSS-Gen Issue 5
FCC ID:	2AU4DDCP
IC:	32919-AAJ
Test Result:	PASS
Date of Issue:	March 7, 2025

Prepared for:

X-Sense Innovations Co., Ltd. Room 1703, Building 7A, International Innovation Valley, Dashi 1st Road, Shenzhen, 518055, CHINA

Prepared by:

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Version

Version No.	Date	Description
V1.0	March 7, 2025	Original



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1. GENERAL INFORMATION

1.1 CLIENT INFORMATION

Applicant:	X-Sense Innovations Co., Ltd.
Address of Applicant:	Room 1703, Building 7A, International Innovation Valley, Dashi 1st Road, Shenzhen, 518055, CHINA
Manufacturer:	X-Sense Electronics Co., Ltd.
Address of Manufacturer:	Room 402, Building 4, No. 9, Jinshagang 1st Road, Shixia Village, Dalang Town, Dongguan City, 523750 Guangdong, P.R. CHINA
Factory:	X-Sense Electronics Co., Ltd.
Address of Factory:	Room 402, Building 4, No. 9, Jinshagang 1st Road, Shixia Village, Dalang Town, Dongguan City, 523750 Guangdong, P.R. CHINA

1.2 EUT INFORMATION

1.2.1 General Description of EUT

Product Name:	Wireless Doorbell		
Model No.:	CB-21, WA-11		
Add. Model No.:	CW-21, CB-12, CW-12, CR-1, CR-2, CB-11, CW-11, BA-11, BA-12, DB-21 Note 1		
Trade Mark:	AVANTEK		
DUT Stage:	Identical Prototype		
EUT Supports Function:	433.92 MHz (Transmitter)		
Software Version	Battery powered receiver: V2.9.4		
(Provided by the customer)	AC powered receiver: V10.3		
(Frovided by the customer)	Transmitter: V1.2		
Hardware Version	Battery powered receiver: DB-Mini2-Get-BAT-V1.0		
(Provided by the customer)	AC powered receiver: DB-Mini2-Get-V1.1		
(Flovided by the customer)	Transmitter: XJ-DB-C3-Send-V1.0		
Sample Received Date:	January 17, 2025		
Sample Tested Date:	February 17, 2025 to February 24, 2025		
Note 1: The above models have the receivers are divided into battery power supply and AC input power supply. The other differences are only in color, number of combinations and commercial model names.			

1.2.2 Description of Accessories

None

1.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

Nominal Operating Frequency:	433.92 MHz
Type of Modulation:	ООК
Number of Channels:	1
Antenna Type:	Spring Antenna
Antenna Gain:	1 dBi
Maximum Field Strength:	84.08 dBµV/m at 3m
Normal Test Voltage:	3.0 Vdc *1 Button battery

1.4 OTHER INFORMATION

None

1.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested independently

1.6 TEST LOCATION

Shenzhen UnionTrust Quality and Technology Co., Ltd.

Address: 16/F, Block A, Building 6th, Baoneng Science and Technology Park, Longhua Street, Longhua District, Shenzhen, China Telephone: +86 (0) 755 2823 0888 Fax: +86 (0) 755 2823 0886

1.7 TEST FACILITY

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L9069

The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable under the ISO/IEC 17025 to international or national standards. Equipment has been calibrated by accredited calibration laboratories.

A2LA-Lab Certificate No.: 4312.01

Shenzhen UnionTrust Quality and Technology Co., Ltd. has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

ISED Wireless Device Testing Laboratories

CAB identifier: CN0032

FCC Accredited Lab.

Designation Number: CN1194 Test Firm Registration Number: 259480

1.8 DEVIATION FROM STANDARDS

None.

1.9 ABNORMALITIES FROM STANDARD CONDITIONS

None.

1.10 OTHER INFORMATION REQUESTED BY THE CUSTOMER

None.

1.11 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

No.	Item	Measurement Uncertainty
1	Conducted emission 9KHz-150KHz	±3.2 dB
2	Conducted emission 150KHz-30MHz	±2.7 dB
3	Radiated emission 9KHz-30MHz	±4.7 dB
4	Radiated emission 30MHz-1GHz	±4.6 dB
5	Radiated emission 1GHz-18GHz	±4.4 dB
6	Radiated emission 18GHz-26GHz	±4.6 dB
7	Radiated emission 26GHz-40GHz	±5.2 dB
8	Radio Frequency	±7.0x10 ⁻⁸
9	Transmission Time	±0.19%
10	Occupied Bandwidth	±1.86%

2. TEST SUMMARY

FCC 47 CFR Part 15 Subpart C Test Cases							
Test Item	Test Requirement	Test Method	Result				
Antenna Requirement	FCC 47 CFR Part 15 Subpart C Section 15.203 RSS-Gen Issue 5, Section 6.8	ANSI C63.10-2013	PASS				
Conducted Emission	FCC 47 CFR Part 15 Subpart C Section 15.207 RSS-Gen Issue 5, Section 8.8	7 CFR Part 15 Subpart C Section 15.207 ANSI C63.10-2013 N SS-Gen Issue 5, Section 8.8					
Radiated Emissions	FCC 47 CFR Part 15 Subpart C Section 15.231(b)/15.209/15.205 RSS-210 Issue 11, Annex A.1.2 RSS-Gen Issue 5, Section 8.9	ANSI C63.10-2013	PASS				
20DB Bandwidth & Occupied bandwidth	20DB Bandwidth & Occupied bandwidthFCC 47 CFR Part 15 Subpart C Section 15.231 (c) RSS-210 Issue 11, Annex A.1.3		PASS				
Transmit Time	FCC 47 CFR Part 15 Subpart C Section 15.231 (a) RSS-210 Issue 11, Annex A.1.1(a)	ANSI C63.10-2013	PASS				
Duty cycle	None, for reporting purposes only.	ANSI C63.10-2013 Clause 11.6	N/A				
Note: 1) N/A: In this whole report not applicable.							

2) This EUT is powered by the 3.0 Vdc *1 Button battery.

3. EQUIPMENT LIST

Radiated Emission Test Equipment List							
Used	Equipment	Manufacturer	Model No.	Serial Cal. date		Cal. Due date	
Ŋ	3m SAC	ETS-LINDGREN	3M	Euroshiedpn- CT001270- 1317	11-Nov-2023	10-Nov-2026	
$\mathbf{\nabla}$	Receiver	R&S	ESIB26	100114	25-Oct-2024	24-Oct-2025	
N	Loop Antenna	ETS-LINDGREN	6502	00202525	28-Oct-2024	27-Oct-2025	
Ŋ	Broadband Antenna	ETS-LINDGREN	3142E	00201566	29-Oct-2024	28-Oct-2025	
Ŋ	6dB Attenuator	Talent	RA6A5-N- 18	18103001	29-Oct-2024	28-Oct-2025	
Ŋ	Preamplifier	HP	8447F	2805A02960	25-Oct-2024	24-Oct-2025	
Ŋ	Double-Ridged Waveguide Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3117-PA	00201541	01-Apr-2024	31-Mar-2025	
N	Pre-amplifier	ETS-LINDGREN	00118385	00201874	01-Apr-2024	31-Mar-2025	
	Double-Ridged Waveguide Horn Antenna (Pre-amplifier)	ETS-LINDGREN	3116C-PA	00202652	28-Oct-2024	27-Oct-2025	
	Pre-amplifier	ETS-LINDGREN	00118384	00202652	28-Oct-2024	27-Oct-2025	
	Multi device Controller	ETS-LINDGREN	7006-001	00160105	N/A	N/A	
Ø	Test Software	Audix	e3	Software Version: 9.160323			

	Conducted RF test Equipment List						
Used Equipment Manufacturer Model No. Serial Cal. date Cal.						Cal. Due date	
Ø	EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY51440197	29-Mar-2024	28-Mar-2025	

4. TEST CONFIGURATION 4.1 ENVIRONMENTAL CONDITIONS FOR TESTING

4.1.1 Normal or Extreme Test Conditions

Environment Parameter	Selected Values During Tests					
Test Condition	Ambient					
Test Condition	Temperature (°C)	Temperature (°C) Voltage				
NT/NV	+15 to +35 3VDC 20 to 75					
Remark:						

4.1.2 Record of Normal Environment and Test Sample

Test Item	Temp. (°C)	Relative Humidity (%)	Pressure (kPa)	Sample No.	Tested by
Conducted Emission	N/A	N/A	N/A	N/A	N/A
Radiated Emissions	22.0	55.8	100.9	S202502135212- ZJB02/3	Fire Huo
20DB Bandwidth & Occupied bandwidth	20.9	49	100.8	S202502135212- ZJB03/3	Allen Zhou
Transmit Time	20.9	49	100.8	S202502135212- ZJA01/2	Allen Zhou

4.2 TEST CHANNELS

Frequency	Test RF Channel
433.92 MHz	Channel 1
	433.92 MHz

4.3 EUT TEST STATUS

Frequency	Tx Function	Description		
433.92 MHz	1Tx	1. Keep the EUT in continuously transmitting with modulation test single.		

4.4 TEST SETUP

4.4.1 For Radiated Emissions test setup

Figure 1. Below 30MHz

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4.4.2 For Conducted RF test setup



4.5 SYSTEM TEST CONFIGURATION

For emissions testing, the equipment under test (EUT) setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, radiated emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario. It was powered by a 3Vdc battery. Only the worst case data were recorded in this test report.

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 100 kHz or greater for frequencies below 1000 MHz. The resolution is 1 MHz or greater for frequencies above 1000 MHz. The spurious emissions more than 20 dB below the permissible value are not reported.

Radiated emission measurement were performed from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.



5. RADIO TECHNICAL REQUIREMENTS SPECIFICATION 5.1 REFERENCE DOCUMENTS FOR TESTING

No.	Identity	Document Title		
1	FCC 47 CFR Part 15	Radio Frequency Devices		
2	ANSI C63.10-2013	American National Standard for Testing Unlicesed Wireless Devices		
3	RSS-210 Issue 11	Licence-Exempt Radio Apparatus: Category I Equipment		
4	RSS-Gen Issue 5	General Requirements for Compliance of Radio Apparatus		

5.2 ANTENNA REQUIREMENT

Standard Requirement

15.203 requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

RSS-Gen Issue 5, Section 6.8 requirement:

According to RSS-Gen Issue 5, Section 6.8, a transmitter can only be sold or operated with antennas with which it was certified. A transmitter may be certified with multiple antenna types. An antenna type comprises antennas having similar in-band and out-of-band radiation patterns.

EUT Antenna:

This product has a permanent antenna, fulfill the requirement of this section.

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5.320DB BANDWIDTH & OCCUPIED BANDWIDTH

Test Requirement: Test Method: Limit:	 FCC 47 CFR Part 15 Subpart C Section 15.231 (c) RSS-210 Issue 11, Annex A.1.3 ANSI C63.10 RSS-210 Issue 11, Annex A.1.3 The occupied bandwidth of momentarily operated devices shall be less than or equal to 0.25% of the centre frequency for devices operating between 70 MHz and 900 MHz. For devices operating above 900 MHz, the occupied bandwidth shall be less than or equal to 0.5% of the centre frequency. FCC 47 CFR Part 15 Subpart C Section 15.231 (c) The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.
Test Procedure:	 Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer. Use the following spectrum analyzer settings: a) Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel b) RBW ≥ 1% of the 20 dB bandwidth c) VBW ≥ RBW d) Sweep = auto; e) Detector function = peak f) Trace = max hold g) All the trace to stabilize, use the marker-to-peak function to set the marker to the peak of the emission, use the marker-delta function to measure and record the 20dB down bandwidth of the emission.
Test Setup: Instruments Used: Test Mode: Test Results:	amplitude offset. Refer to section 4.4.2 for details. Refer to section 3 for details Transmitter mode Pass

Frequency	Occupied bandwidth	20 dB Bandwidth	Limit	Pass / Fail
433.92 MHz	10.239kHz	6.486 kHz	433.92 MHz * 0.25% = 1.0848 MHz	Pass

Test plot as follows:



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5.4 TRANSMIT TIME

Test item	Test Value	Limit	Pass / Fail			
Test Data:						
Test Results:	Pass					
Test Mode:	Transmitter mode					
Instruments Used:	Refer to section 3 for details					
Test Setup:	Refer to section 4.4.2 for details.					
	FCC 47 CFR Part 15 Subpart C A manually operated transmitter the transmitter within not more th	Section 15.231 (a) shall employ a switch that will au nan 5 seconds of being released	utomatically deactivate			
Test Method: Limit:	ANSI C63.10 RSS-210 Issue 11, Annex A.1.1 A manually operated transmitter be under manual control at all tim shall cease transmission within r	NSI C63.10 SS-210 Issue 11, Annex A.1.1 (a) Manually operated transmitter shall be equipped with a push-to-operate switch and the under manual control at all times during transmission. When released, the transmitte hall cease transmission within no more than 5 seconds of being released.				
Test Requirement:	FCC 47 CFR Part 15 Subpart C RSS-210 Issue 11, Annex A.1.1(Section 15.231 (a) a)				

Test item	Test Value	Limit	Pass / Fail
Transmitting time	2.147 s	not be greater than 5 second	Pass

The test plot as follows:

LXI RL RF 50 Ω DC	SENSE:PULSE SOU	RCE OFF	05:14:02 PM Feb 24, 2025	Fraguanay
Center Freq 433.920000	NHZ PNO: Wide ↔ Trig: Free Run IFGain:Low #Atten: 30 dB	Avg Type: RMS	TRACE 1 2 3 4 5 6 TYPE WWWWWWW DET A N N N N N	Frequency
10 dB/div Ref 20.00 dBm			ΔMkr1 2.147 s 5.87 dB	Auto Tune
				Center Freq
0.00	142			433.920000 MHz
-20.0				Start Freq
-30.0				433.920000 MHz
-50.0				Stop Fred
-70.0		and processing of the part of the second	gene Milaingel Kilyan Bayann An ann fer sa reithean an sa bhair.	433.920000 MHz
Center 433.920000 MHz	#\/B\// 300 kHz*	Swoon 1	Span 0 Hz	CF Step
MKR MODE TRC SCL X	Y FUN	CTION FUNCTION WIDTH	FUNCTION VALUE	Auto Man
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	2.147 s (∆) 5.87 dB 2.150 s -20.77 dBm			Erea Offect
				0 Hz
6 7 8				
9				
			×	
MSG				

5.5 RADIATED EMISSIONS

Test Requirement:

FCC 47 CFR Part 15 Subpart C Section 15.231(b)/15.209/15.205 RSS-210 Issue 11, Annex A.1.3 RSS-Gen Issue 5, Section 8.9 ANSI C63.10-2013 Section 6.6.4.3

Test Method: Receiver Setup:

Frequency	RBW
0.009 MHz-0.150 MHz	200/300 kHz
0.150 MHz -30 MHz	9/10 kHz
30 MHz-1 GHz	100/120 kHz
Above 1 GHz	1 MHz

Limits:

For FCC 47 CFR Part 15 Subpart C 15.231(a)

Frequency (MHz)	Field strength of fundamental (microvolts/meter)	Field strength of fundamental (dBµV/m)	Field strength of spurious emission (microvolts/meter)	Field strength of spurious emission (dBµV/m)
40.66-40.70	2250	67.04	225	47.04
70-130	1250	61.94	125	41.94
130-174	¹ 1250 to 3750	61.94 to 71.48	¹ 125 to 375	41.94 to 51.48
174-260	3750	71.48	375	51.48
260-470	¹ 3750 to 12500	71.48 to 81.94	¹ 375 to 1250 ¹	51.48 to 61.94
Above 470	12500	81.94	1250	61.94
¹ Linear interpolations.				

FCC 47 CFR Part 15 Subpart C 15.209

Frequency	Field strength (microvolt/meter)	Limit (dBµV/m)	Remark	Measurement distance (m)
0.009 MHz-0.490 MHz	2400/F(kHz)			300
0.490 MHz-1.705 MHz	24000/F(kHz)	-		30
1.705 MHz-30 MHz	30			30
30 MHz-88 MHz	100	40.0	Quasi-peak	3
88 MHz-216 MHz	150	43.5	Quasi-peak	3
216 MHz-960 MHz	200	46.0	Quasi-peak	3
960MHz-1GHz	500	54.0	Quasi-peak	3
Above 1 GHz	500	54.0	Average	3

Remark:

- 1. The lower limit shall apply at the transition frequencies.
- 2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
- 3. For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

Test Setup:

Refer to section 4.4.1 for details.

Test Procedures:

- 1) The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
- 2) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- 3) The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

- 4) For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rota table table was turned from 0 degrees to 360 degrees to find the maximum reading.
- 5) The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- 6) If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- The radiation measurements are performed in X, Y, Z axis positioning. And found the Y axis positioning which it is worse case, only the test worst case mode is recorded in the report. (for portable and mobile devices)

Remark: Test Procedure: For testing performed with the loop antenna, testing was performed in accordance to ANSI C63.10: 2013. The center of the loop was positioned 1 m above the ground and positioned with its plane vertical at the specified distance from the EUT. During testing the loop was rotated about its vertical axis for maximum response at each azimuth and also investigated with the loop positioned in the horizontal plane. **Equipment Used:** Refer to section 3 for details.

Test Result: Pass

Duty cycle test data and plot as follows:

Type of Pulse	Width of Pulse (ms)	Quantity of Pulse	Transmission Time (ms)	Total Time (T _{on}) (ms)
Pulse 1	2.005	1	2.005	
Pulse 2	0.988	30	29.64	39.4482
Pulse 3	0.4877	16	7.8032	

Test Period (T _P)	Total Time (Ton)	Duty Cycle		
(ms)	(ms)	(%)		
70.21	39.4482			



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Field strength of fundamental:									
Fundamental frequency	Polari-zation	Detector	Result at 3m (dBµV/m)	Limit at 3m (dBµV/m)	Margin (dB)				
	V	Peak	84.08	100.83	-16.75				
433.92 MHz	V	Average	79.07 Note 1,2	80.83	-1.76				
	Н	Peak	77.17	100.83	-23.66				
	Н	Average	72.16 Note 1,2	80.83	-8.67				
Note:									

1) Average value = Peak value + Average factor;

Average factor =20*log₁₀ (Duty cycle) = 20*log₁₀(0.56186) = -5.00744 dB; 2)

Radiated Emission Test Data (9 KHz ~ 30 MHz):

The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.



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Radiated Emission Test Data (Above 1GHz):									
Horizontal									
No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector		
1	3037.440	50.19	-6.00	44.19	74.00	-29.81	Peak		
2	3037.440			39.18 Note 1,2	54.00	-14.82	Average		
3	3471.360	49.76	-5.27	44.49	74.00	-29.51	Peak		
4	3471.360		I	39.48 Note 1,2	54.00	-14.52	Average		
Vertica	Vertical								
No.	Frequency (MHz)	Reading (dBuV)	Correction factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector		
No.	Frequency (MHz) 3037.440	Reading (dBuV) 55.46	Correction factor (dB) -6.00	Result (dBuV/m) 49.46	Limit (dBuV/m) 74.00	Margin (dB) -24.54	Detector Peak		
No.	Frequency (MHz) 3037.440 3037.440	Reading (dBuV) 55.46	Correction factor (dB) -6.00	Result (dBuV/m) 49.46 44.45 ^{Note 1,2}	Limit (dBuV/m) 74.00 54.00	Margin (dB) -24.54 -9.55	Detector Peak Average		
No.	Frequency (MHz) 3037.440 3037.440 3471.360	Reading (dBuV) 55.46 53.48	Correction factor (dB) -6.00 -5.27	Result (dBuV/m) 49.46 44.45 Note 1,2 48.21	Limit (dBuV/m) 74.00 54.00 74.00	Margin (dB) -24.54 -9.55 -25.79	Detector Peak Average Peak		

Note:

1) Average value = Peak value + Average factor;

2) Average factor = 20^{10} (Duty cycle) = 20^{10} (0.56186) = -5.00744 dB;



APPENDIX 1 PHOTOS OF TEST SETUP

See test photos attached in Appendix 1 for the actual connections between Product and support equipment.

APPENDIX 2 PHOTOS OF EUT CONSTRUCTIONAL DETAILS

Refer to Appendix 2 for EUT external and internal photos.

*** End of Report ***

The test report is effective only with both signature and specialized stamp. The result(s) shown in this report refer only to the sample(s) tested. Without written approval of UnionTrust, this report can't be reproduced except in full.

