

FCC TEST REPORT

for

3.5G MIMO - NES Storage Server with BT

Model No.: NR620M

of

Applicant: E-Top Network Technology Inc.

Address: No.82, Gongye 2nd Rd., Tainan City 70095, Taiwan, R.O.C.

**Tested and Prepared
by**



ETS Product Service (Taiwan) Co., Ltd.

FCC Registration No.: 930600

Industry Canada filed test laboratory Reg. No. IC 5679

A2LA Accredited No.: 1983.02

PTCRB Accredited Type Certification Test House

FCC ID: U6ANR620M

Report No.: W6M20709-8524-C-1

Registration number: W6M20709-8524-C-1

FCC ID: U6ANR620M

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1 General Information

1.1 Notes

The purpose of conformity testing is to increase the probability of adherence to the essential requirements or conformity specifications, as appropriate.

The complexity of the technical specifications, however, means that full and thorough testing is impractical for both technical and economic reasons.

Furthermore, there is no guarantee that a test sample which has Passed all the relevant tests conforms to a specification.

Neither is there any guarantee that such a test sample will interwork with other genuinely open systems.

The existence of the tests nevertheless provides the confidence that the test sample possesses the qualities as maintained and that its performance generally conforms to representative cases of communications equipment.

The test results of this test report relate exclusively to the item tested as specified in 1.5.

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Reproduction or publication of extracts from the report requires the prior written approval of the ETS Product Service (Taiwan) Co., Ltd.

Specific Conditions:

Usage of the hereunder tested device in combination with other integrated or external antennas requires at least additional output power measurements, spurious emission measurements, conducted emission measurements (AC supply lines) and radio frequency exposure evaluations for each individual configuration performed, for certification by FCC.

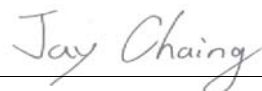
The test sample is able to work according IEEE 802.11 b/g.

This report is related to FCC Part 15 C (DSSS and OFDM device).

Tester:

October 25, 2007

Jay Chaing



Date

ETS-Lab.

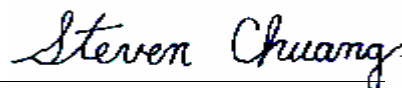
Name

Signature

Technical responsibility for area of testing:

October 25, 2007

Steven Chuang



Date

ETS

Name

Signature

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1.2 Testing laboratory

1.2.1 Location

OATS

No.5-1, Shuang Sing Village,
LiShuei Rd., Wanli Township,
Taipei County 207, Taiwan (R.O.C.)

Company

ETS Product Service (Taiwan) Co., Ltd.
6F, NO. 58, LANE 188, RUEY-KUANG RD.
NEIHU, TAIPEI 114, TAIWAN R.O.C.

Tel : 886-2-66068877

Fax : 886-2-66068879

1.2.2 Details of accreditation status

Accredited testing laboratory

A2LA accredited number: 1983.02

FCC filed test laboratory Reg. No. 930600

Industry Canada filed test laboratory Reg. No. IC 5679

PTCRB Accredited Type Certification Test House

1.3 Details of approval holder

Name	: E-Top Network Technology Inc.
Street	: No.82, Gongye 2nd Rd.,
City	: Tainan City 70095,
Country	: Taiwan, R.O.C.
Telephone	: ./.
Fax	: ./.
Teletex	: ./.

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1.4 Application details

Date of receipt of test item : September 11, 2007
Date of test : from September 12, 2007 to October 23, 2007

1.5 General information of Test item

Type of test item : 3.5G MIMO - NES Storage Server with BT
Model Number : NR620M
Brand Name : E-TOP
Hardware : V10
Software : QA2561
Multi-listing model number :

Model number	Brand name	Model number	Brand name	Model number	Brand name
3R621M	E-TOP	GR-1521	Sapido	MR622m	Amigo
MR622M	E-TOP	WE-1511	Sapido	DR620m	Amigo
DR620M	E-TOP	WE-1521	Sapido	NR620m	Amigo
NR621M	E-TOP	WE-1531	Sapido	NR621m	Amigo
		GR-1531	Sapido	3R621m	Amigo

Photos : See Appendix

Technical data

Frequency band : 2.4 GHz – 2.4835 GHz
Frequency (ch 1 or A) : 2.412 GHz
Frequency (ch 6 or B) : 2.437 GHz
Frequency (ch 11 or C) : 2.462 GHz
Number of Channels : 11
Operation modes : duplex
Modulation Type : DSSS / OFDM

Fixed point-to-point operation: ☐ Yes / ☒ No
Type of Antenna : Dipole Antenna
Antenna gain : 2 dBi

Power supply : I/P: AC 100-240 V / 50-60 Hz / 1.0 A,
O/P: 12 Vdc / 3.0 A

Emission designator : DSSS: 16M2G1D
OFDM: 16M5W7D

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Host device: none

Classification :

Fixed Device	<input checked="" type="checkbox"/>
Mobile Device (Human Body distance > 20cm)	<input type="checkbox"/>
Portable Device (Human Body distance < 20cm)	<input type="checkbox"/>

Transmitter

Unom

Mode A (DSSS)

Power (ch 1 or A) : Conducted: 18.16 dBm
Power (ch 6 or B) : Conducted: 17.95 dBm
Power (ch 11 or C) : Conducted: 18.15 dBm

Mode B (OFDM)

Power (ch 1 or A) : Conducted: 14.36 dBm
Power (ch 6 or B) : Conducted: 14.21 dBm
Power (ch 11 or C) : Conducted: 14.38 dBm

Manufacturer:

(if applicable)

Name : ./.
Street : ./.
Town : ./.
Country : ./.

Additional information: The sample is using WLAN technology according IEEE 802.11 b/g.
There are two testing modes in the test report.
Mode A: IEEE 802.11b
Mode B: IEEE 802.11g
The scheme for frequency generation, spectrum spreading,
receiver parameters, synchronization procedure, and other parameters
are determined by the mentioned standard above.

1.6 Test standards

Technical standard : FCC RULES PART 15 SUBPART B / SUBPART C § 15.247 (2007-09)

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2 Technical test

2.1 Summary of test results

No deviations from the technical specification(s) were ascertained in the course of the tests performed.



or

The deviations as specified in 2.5 were ascertained in the course of the tests performed.



2.2 Test environment

Temperature : 23 °C

Relative humidity content : 20 ... 75 %

Air pressure : 86 ... 103 kPa

Power supply : I/P: AC 100-240 V / 50-60 Hz / 1.0 A,
O/P: 12 Vdc / 3.0 A

Extreme conditions parameters : --

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2.3 Test Equipment List

No.	Test equipment	Type	Serial No.	Manufacturer	Cal. Date	Next Cal. Date
ETSTW-CE 001	EMI TEST RECEIVER	ESHS10	842121/013	R&S	2007/10/15	2008/10/14
ETSTW-CE 002	PREREULATOR MODE DC POWER SUPPLY	None	None		Function Test	
ETSTW-CE 003	AC POWER SOURCE	APS-9102	D161137	GW	Function Test	
ETSTW-CE 004	ZWEILEITER-V-NETZNACHBILDUNG TWO-LINE V-NETWORK	ESH3-Z5	840731/011	R&S	2007/10/15	2008/10/14
ETSTW-CE 005	Line-Impedance Stabilisation Network	NNBM 8126D	137	Schwarzbeck	2007/10/15	2008/10/14
ETSTW-CE 006	IMPULSBEGRENZER PULSE LIMITER	ESH3-Z2	100226	R&S	In House Certificate	
ETSTW-CE 008	ABSORBING CLAMP	MDS 21	3469	Schwarzbeck	2007/10/23	2009/10/22
ETSTW-CE 009	TEMP.&HUMIDITY CHAMBER	GTH-225-40-1P-U	MAA0305-009	GIANT FORCE	2007/8/2	2008/8/1
ETSTW-CE 013	CISPR 22 TWO BALANCED TELECOM PAIRS IMPEDANCE STABILIZATION NETWORK	FCC-TLISN-T4-02	20242	FCC	2005/12/8	2007/12/7
ETSTW-CE 014	CISPR 22 TWO BALANCED TELECOM PAIRS IMPEDANCE STABILIZATION NETWORK	FCC-TLISN-T2-02	20241	FCC	2005/12/7	2007/12/6
ETSTW-CE 015	CISPR 22 TWO BALANCED TELECOM PAIRS IMPEDANCE STABILIZATION NETWORK	FCC-TLISN-T8-02	20307	FCC	2006/11/7	2008/11/6
ETSTW-CE 016	TWO-LINE V-NETWORK	ENV216	100050	R&S	2006/11/21	2007/11/20
ETSTW-RE 002	Function Generator	33220A	MY43004982	Agilent	2007/10/13	2009/10/12
ETSTW-RE 003	EMI TEST RECEIVER	ESI 26	831438/001	R&S	2007/10/19	2008/10/18
ETSTW-RE 004	EMI TEST RECEIVER	ESI 40	832427/004	R&S	2006/10/30	2007/10/29
ETSTW-RE 005	EMI TEST RECEIVER	ESVS10	843207/020	R&S	2007/10/11	2008/10/12
ETSTW-RE 010	PROGRAMMABLE LINEAR POWER SUPPLY	LPS-305	30503070181	MOTECH	Function Test	
ETSTW-RE 011	PROGRAMMABLE LINEAR POWER SUPPLY	LPS-305	30503070165	MOTECH	Function Test	
ETSTW-RE 017	Log-Periodic Antenna	HL025	352886/001	R&S	2006/5/4	2008/5/3
ETSTW-RE 018	MICROWAVE HORN ANTENNA	AT4560	27212	AR	2004/11/8	2007/11/7
ETSTW-RE 020	MICROWAVE HORN ANTENNA	AT4002A	306915	AR	Function Test	
ETSTW-RE 021	SWEEP GENERATOR	SWM05	835130/010	R&S	2007/10/9	2008/10/8
ETSTW-RE 027	Passive Loop Antenna	6512	00034563	EMCO	In House Certificate	
ETSTW-RE 028	Log-Periodic DipoleArray Antenna	3148	34429	EMCO	2006/5/26	2008/5/25
ETSTW-RE 029	Biconical Antenna	3109	33524	EMCO	2006/5/26	2008/5/25
ETSTW-RE 030	Double-Ridged Guide Horn Antenna	3117	00035224	EMCO	2006/5/3	2008/5/2
ETSTW-RE 032	Millivoltmeter	URV 55	849086/013	R&S	2007/10/9	2008/10/8
ETSTW-RE 033	WaveRunner 6000A Serise Oscilloscope	WAVERUNNER 6100A	LCRY0604P14508	LeCroy	2007/7/9	2008/7/8
ETSTW-RE 034	Power Sensor	URV5-Z4	839313/006	R&S	2007/10/16	2008/10/15
ETSTW-RE 042	Biconical Antenna	HK116	100172	R&S	2007/1/11	2009/1/10
ETSTW-RE 043	Log-Periodic Dipole Antenna	HL223	100166	R&S	2006/5/8	2008/5/7
ETSTW-RE 044	Log-Periodic Antenna	HL050	100094	R&S	2006/5/29	2008/5/28

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ETSTW-RE 048	Triple Loop Antenna	HXYZ 9170	HXYZ 9170-134	Schwarzbeck	2005/3/22	2008/3/21
ETSTW-RE 049	TRILOG Super Broadband test Antenna	VULB 9160	9160-3185	Schwarzbeck	2007/5/2	2009/5/1
ETSTW-RE 055	SPECTRUM ANALYZER	FSU-26	200074	R&S	2007/7/16	2008/7/15
ETSTW-RE 064	Bluetooth Test Set	MT8852B-042	6K00005709	Anritsu	Function Test	
ETSTW-RE 072	CELL SITE TEST SET	8921A	3339A00375	HP	2007/7/2	2009/7/1

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2.4 General Test Procedure

POWER LINE CONDUCTED INTERFERENCE: The procedure used was ANSI STANDARD C63.4-2003 using a 50 μ H LISN (if necessary). Both lines were observed. The bandwidth of the spectrum analyzer was 10 kHz with an appropriate sweep speed.

RADIATION INTERFERENCE: The test procedure used was according to ANSI STANDARD C63.4-2003 employing a spectrum analyzer. For investigated frequency is equal to or below 1GHz, the RBW and VBW of the spectrum analyzer was 100 kHz and 100kHz respectively with an appropriate sweep speed. For investigated frequency is above 1GHz, both of RBW and VBW of the spectrum analyzer were 1 MHz with an appropriate sweep speed. The analyzer was calibrated in dB above a microvolt at the output of the antenna.

FORMULA OF CONVERSION FACTORS: The Field Strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dB μ V) to the antenna correction factor supplied by the antenna manufacturer. The antenna correction factors are stated in terms of dB.

Example:

Freq (MHz)	METER READING + ACF + CABLE LOSS (to the receiver) = FS
33	20 dB μ V + 10.36 dB + 6 dB = 36.36 dB μ V/m @3m

The UUT was placed on a table 80 cm high and with dimensions of 1m by 1.5m (non metallic table) and arranged according to ANSI C63.4-2000 Section 13.1.2. The table used for radiated measurements is capable of continuous rotation. The spectrum was scanned from 30 MHz to the frequency specified as follows:

- (1) If the intentional radiator operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.
- (2) If the intentional radiator operates at or above 10 GHz and below 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 100 GHz, whichever is lower.
- (3) If the intentional radiator operates at or above 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 200 GHz, whichever is lower, unless specified otherwise elsewhere in the rules.
- (4) If the intentional radiator contains a digital device, regardless of whether this digital device controls the functions of the intentional radiator or the digital device is used for additional control or function purposes other than to enable the operation of the intentional radiator, the frequency range shall be investigated up to the range specified in paragraphs (a)(1)-(a)(3) of this section or the range applicable to the digital device, as shown in paragraph (b)(1) of this Section, whichever is the higher frequency range of investigation.

For hand-held devices, a exploratory test was performed with three (3) orthogonal planes to determine the highest emissions.

Measurements were made by ETS Product Service (Taiwan) Co., Ltd. at the registered open field test site located at No.5-1, Shuang Sing Village, LiShuei Rd., Wanli Township, Taipei County 207, Taiwan (R.O.C.) The Registration Number: 930600.

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When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. The antenna was placed in both the horizontal and vertical planes.

When the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value.

The formula is as follows:

Average = Peak + Duty Factor

Duty Factor = $20 \log (\text{dwell time}/T)$

T = 100ms when the pulse train period is over 100 ms or the period of the pulse train.

Modified Limits for peak according to 15.35 (b) = Max Permitted average Limits + 20dB

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3 Test results (enclosure)

TEST CASE	Para. Number	Required	Test passed	Test failed
Peak Output Power	15.247(b)(3)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Equivalent radiated Power	15.247(b)(3)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Spurious Emissions radiated – Transmitter operating	15.247(c)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Band Edge Measurement	15.247(c)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Minimum 6 dB Bandwidth	15.247(a)(2)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Peak Power Spectral Density	15.247(d)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Radiated Emission from Digital Part	15.109	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Power Line Conducted Emission	15.207	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

The follows is intended to leave blank.

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3.1 Peak Output Power (transmitter)

FCC Rule: 15.247(b)(3)

This measurement applies to equipment with an integral antenna and to equipment with an antenna connector and equipped with an antenna as declared by the applicant.

The power was measured with modulation (declared by the applicant).

Mode A

Test condition		Conducted Power		
		Channel A	Channel B	Channel C
$T_{nom} = 23^{\circ}\text{C}$	$V_{nom} = 120 \text{ V}$	[dBm]	[dBm]	[dBm]
		18.16	17.95	18.15

Mode B

Test condition		Conducted Power		
		Channel A	Channel B	Channel C
$T_{nom} = 23^{\circ}\text{C}$	$V_{nom} = 120 \text{ V}$	[dBm]	[dBm]	[dBm]
		14.36	14.21	14.38

Mode A

Test condition $T_{nom} = 23^{\circ}\text{C}, V_{nom} = 120 \text{ V}$	Signal Field strength TX highest power mode $\text{dB } \mu\text{V/m}$
Frequency [MHz]	--
--	

Mode B

Test condition $T_{nom} = 23^{\circ}\text{C}, V_{nom} = 120 \text{ V}$	Signal Field strength TX highest power mode $\text{dB } \mu\text{V/m}$
Frequency [MHz]	--
--	

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Limits:

Frequency MHz	Power dBm
902 - 928	30
2400 – 2483.5	30
5725 – 5850	30

In case of employing transmitter antennas having antenna gain > 6 dBi and using fixed point-to-point operation consider §15.247 (b)(4)

Test equipment used: ETSTW-RE 003 ETSTW-RE 004 ETSTW-RE 055

Explanation: The diagrams for the peak output power measurements are included in Appendix.

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3.2 Equivalent isotropic radiated power

FCC Rule: 15.247(b)(3)

EIRP = max. conducted output power + antenna gain

EIRP = 18.16 dBm + 2dBi

= 20.16 dBm

Limit: EIRP = +36 dBm for Antenna gain <6dBi

Test equipment used: ETSTW-RE 003 ETSTW-RE 004 ETSTW-RE 017 ETSTW-RE 021
ETSTW-RE 028 ETSTW-RE 030 ETSTW-RE 043 ETSTW-RE 044

3.3 RF Exposure Compliance Requirements

FCC OET Bulletin 65 Edition 97.01 determines the equations for predicting RF fields and applicable limits.

The prediction for power density in the far-field but will over-predict power density in the near field, where it could be used for walking a “worst case” or conservative prediction.

$$S = \frac{PG}{4\pi R^2}$$

S – Power Density

P – Output power ERP

R – Distance

D – Cable Loss

AG – Antenna Gain G = AG-D

Item	Unit	Value	Remarks
P	mW	65.4636	Peak value
D	dB		
AG	dBi	2	
G		1.6	Calculated Value
R	cm	20	Assumed value
S	mW/cm ²	0.02083	Calculated value

Limits:

Limit for General Population / Uncontrolled Exposure	
Frequency (MHz)	Power Density (mW/cm ²)
1500 – 100.000	1,0

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3.4 Transmitter Radiated Emissions in Restricted Bands

FCC Rules: 15.247 (c), 15.205, 15.209, 15.35

Radiated emission measurements were performed from 30 MHz to 26500 MHz.

For radiated emission tests, the analyzer setting was as followings:

Frequency \leq 1 GHz, RBW:100 kHz, VBW: 100 kHz (Peak measurements)

Frequency $>$ 1 GHz, RBW: 1 MHz, VBW: 1 MHz (Peak measurements)

Frequency $>$ 1 GHz , RBW:1 MHz , VBW: 10 Hz (Average measurements)

Limits.

For frequencies below 1GHz:

Frequency of Emission (MHz)	Field strength (microvolts/meter)	Field Strength (dB microvolts/meter)
30 - 88	100	40.0
88 - 216	150	43.5
216 - 960	200	46.0
Above	500	54.0

For frequencies above 1GHz (Average measurements).

Guidance on Measurement of Digit Transmission Systems:

“If the emission is pulsed, modify the unit for continuous operation, use the setting shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation.”

The correction factor, based on the total channel dwell time in a 100 ms period, may be mathematically applied to a measurement made with an average detector, to further reduce the value.

Duty cycle correction = $20 \log (\text{dwell time} / 100\text{ms})$

Note: No duty cycle correction was added to the reading of this EUT.

Explanation: See attached diagrams in Appendix.

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3.5 Spurious Emissions (tx)

Spurious emission was measured with modulation (declared by manufacturer).

In any 100 kHz bandwidth outside the frequency band in which the intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in § 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c))

FCC Rule: 15.247(c), 15.35

For out of band emissions that are close to or that exceed the 20 dB attenuation requirement described in the specification, radiated measurements were performed at a 3 m separation distance to determine whether these emissions complied with the general radiated emission requirement.

Limits:

Max. reading – 20 dB

Guidance on Measurement of Digit Transmission Systems:

“If the emission is pulsed, modify the unit for continuous operation, use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation.”

The correction factor, based on the total channel dwell time in a 100 ms period, may be mathematically applied to a measurement made with an average detector, to further reduce the value.

Duty Cycle correction = $20 \log (\text{dwell time}/100\text{ms})$

For frequencies above 1GHz (Peak measurements).

Modified Limit for peak according to 15.35 (b) = Max Permitted average Limits + 20dB

For frequencies above 1GHz (Average measurements).

Max. reading – 20dB

Note: No duty cycle correction was added to the reading of EUT.

Test equipment used: ETSTW-RE 003 ETSTW-RE 004 ETSTW-RE 017 ETSTW-RE 028
ETSTW-RE 029 ETSTW-RE 030 ETSTW-RE 042 ETSTW-RE 043
ETSTW-RE 044

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SAMPLE CALCULATION OF LIMIT. All results will be updated by an automatic measuring system in accordance with point 2.3.

Calculation of test results:

Such factors like antenna correction, cable loss, external attenuation etc. are already included in the provided measurement results. This is done by using validated test software and calibrated test system according the accreditation requirements.

The peak and average spurious emission plots was measured with the average limits.

In the Table being listed the critical peak and average value and exhibit the compliance with the above calculated Limits.

If in the column's correction factor states a value then the max. Field strength in the same row is corrected by a value gained from the "Duty-Cycle Correction Factor".

Summary table with radiated data of the test plots

Model: NR620M 11B TX LOW
Mode: CHANNEL
Polarization: Horizontal

Date: 2007/10/22
Temperature: 26 °C
Humidity: 60 %

Engineer: Michael

Frequency (MHz)	Reading (dBuV)		Factor (dB) Corr.	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
	Peak	Ave.		Peak	Ave.	Peak	Ave.			
3250.000	46.45	---	-1.95	44.50	---	74.00	54.00	-29.50	290	150
4825.920	54.95	53.31	-1.30	53.65	52.01	74.00	54.00	-0.35	295	150
6433.333	49.95	---	4.03	53.98	---	74.00	54.00	-20.02	290	150
7236.000	42.09	---	1.86	43.95	---	74.00	54.00	-30.05	295	150
9648.000	20.24	---	25.06	39.30	---	74.00	54.00	-34.70	305	150
12060.000	19.83	---	29.44	37.27	---	74.00	54.00	-36.73	305	150

Polarization: Vertical

Frequency (MHz)	Reading (dBuV)		Factor (dB) Corr.	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
	Peak	Ave.		Peak	Ave.	Peak	Ave.			
3216.667	47.36	---	-2.18	45.18	---	74.00	54.00	-28.82	295	150
4826.667	44.57	---	-1.30	43.27	---	74.00	54.00	-30.73	290	150
6433.333	54.90	---	4.03	58.93	---	74.00	54.00	-15.07	290	150
7236.000	41.53	---	1.86	43.39	---	74.00	54.00	-30.61	300	150
9648.000	18.98	---	25.06	38.04	---	74.00	54.00	-35.96	295	150
12060.000	19.53	---	29.44	36.97	---	74.00	54.00	-37.03	295	150

Registration number: W6M20709-8524-C-1
FCC ID: U6ANR620M

11B TX MIDDLE

Mode: CHANNEL Temperature: 26 °C Engineer: Michael
Polarization: Horizontal Humidity: 60 %

Frequency (MHz)	Reading (dBuV)		Factor (dB) Corr.	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
	Peak	Ave.		Peak	Ave.	Peak	Ave.			
4873.333	46.27	---	-1.30	44.97	---	74.00	54.00	-29.03	290	150
6500.000	48.29	---	4.50	52.79	---	74.00	54.00	-21.21	300	150
7311.000	41.53	---	1.82	43.35	---	74.00	54.00	-30.65	300	150
9748.000	19.40	---	24.94	38.34	---	74.00	54.00	-35.66	300	150
12185.000	19.92	---	29.74	37.66	---	74.00	54.00	-36.34	295	150
14622.000	24.43	---	32.14	44.57	---	74.00	54.00	-29.43	295	150

Polarization: Vertical

Frequency (MHz)	Reading (dBuV)		Factor (dB) Corr.	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
	Peak	Ave.		Peak	Ave.	Peak	Ave.			
4873.333	45.30	---	-1.30	44.00	---	74.00	54.00	-30.00	290	150
6500.000	53.48	---	4.50	57.98	---	74.00	54.00	-16.02	295	150
7311.000	42.38	---	1.82	44.20	---	74.00	54.00	-29.80	295	150
9748.000	23.43	---	24.94	42.37	---	74.00	54.00	-31.63	300	150
12185.000	21.93	---	29.74	39.67	---	74.00	54.00	-34.33	295	150
14622.000	24.71	---	32.14	44.85	---	74.00	54.00	-29.15	295	150

11B TX HIGH

Mode: CHANNEL Temperature: 26 °C Engineer: Michael
Polarization: Horizontal Humidity: 60 %

Frequency (MHz)	Reading (dBuV)		Factor (dB) Corr.	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
	Peak	Ave.		Peak	Ave.	Peak	Ave.			
4926.667	48.68	---	-1.19	47.49	---	74.00	54.00	-26.51	290	150
6566.667	45.70	---	4.70	50.40	---	74.00	54.00	-23.60	295	150
7386.000	42.73	---	1.97	44.70	---	74.00	54.00	-29.30	295	150
9848.000	21.61	---	25.49	41.10	---	74.00	54.00	-32.90	300	150
12310.000	23.14	---	30.04	41.18	---	74.00	54.00	-32.82	295	150
14772.000	24.64	---	32.56	45.20	---	74.00	54.00	-28.80	305	150

Registration number: W6M20709-8524-C-1
 FCC ID: U6ANR620M

Polarization: Vertical

Frequency (MHz)	Reading (dBuV)		Factor (dB) Corr.	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
	Peak	Ave.		Peak	Ave.	Peak	Ave.			
4926.667	49.47	---	-1.19	48.28	---	74.00	54.00	-25.72	290	150
6566.667	49.56	---	4.70	54.26	---	74.00	54.00	-19.74	290	150
7386.000	42.73	---	1.97	44.70	---	74.00	54.00	-29.30	290	150
9848.000	21.85	---	25.49	41.34	---	74.00	54.00	-32.66	300	150
12310.000	23.90	---	30.04	41.94	---	74.00	54.00	-32.06	295	150
14772.000	25.48	---	32.56	46.04	---	74.00	54.00	-27.96	300	150

11G TX LOW

Mode: CHANNEL Temperature: 26 °C Engineer: Michael
 Polarization: Horizontal Humidity: 60 %

Frequency (MHz)	Reading (dBuV)		Factor (dB) Corr.	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
	Peak	Ave.		Peak	Ave.	Peak	Ave.			
4826.667	49.94	---	-1.30	48.64	---	74.00	54.00	-25.36	295	150
6433.333	49.73	---	4.03	53.76	---	74.00	54.00	-20.24	295	150
7236.000	41.31	---	1.86	43.17	---	74.00	54.00	-30.83	295	150
9648.000	20.17	---	25.06	39.23	---	74.00	54.00	-34.77	290	150
12060.000	20.36	---	29.44	37.80	---	74.00	54.00	-36.20	290	150
14472.000	25.40	---	31.65	45.05	---	74.00	54.00	-28.95	290	150

Polarization: Vertical

Frequency (MHz)	Reading (dBuV)		Factor (dB) Corr.	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
	Peak	Ave.		Peak	Ave.	Peak	Ave.			
4826.667	49.01	---	-1.30	47.71	---	74.00	54.00	-26.29	290	150
6433.333	56.84	---	4.03	60.87	---	74.00	54.00	-13.13	290	150
7236.000	41.24	---	1.86	43.10	---	74.00	54.00	-30.90	295	150
9648.000	22.13	---	25.06	41.19	---	74.00	54.00	-32.81	300	150
12060.000	22.33	---	29.44	39.77	---	74.00	54.00	-34.23	300	150
14472.000	25.01	---	31.65	44.66	---	74.00	54.00	-29.34	295	150

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FCC ID: U6ANR620M

11G TX MIDDLE

Mode: CHANNEL Temperature: 26 °C Engineer: Michael
Polarization: Horizontal Humidity: 60 %

Frequency (MHz)	Reading (dBuV)		Factor (dB) Corr.	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
	Peak	Ave.		Peak	Ave.	Peak	Ave.			
4873.333	42.29	---	-1.30	40.99	---	74.00	54.00	-33.01	300	150
6500.000	48.13	---	4.50	52.63	---	74.00	54.00	-21.37	300	150
7311.000	41.88	---	1.82	43.70	---	74.00	54.00	-30.30	300	150
9748.000	20.17	---	24.94	39.11	---	74.00	54.00	-34.89	295	150
12185.000	20.92	---	29.74	38.66	---	74.00	54.00	-35.34	295	150
14622.000	25.14	---	32.14	45.28	---	74.00	54.00	-28.72	295	150

Polarization: Vertical

Frequency (MHz)	Reading (dBuV)		Factor (dB) Corr.	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
	Peak	Ave.		Peak	Ave.	Peak	Ave.			
4874.000	41.60	---	-1.30	40.30	---	74.00	54.00	-33.70	295	150
6500.000	48.44	---	4.50	52.94	---	74.00	54.00	-21.06	295	150
7311.000	42.10	---	1.82	43.92	---	74.00	54.00	-30.08	295	150
9748.000	22.26	---	24.94	41.20	---	74.00	54.00	-32.80	295	150
12185.000	22.44	---	29.74	40.18	---	74.00	54.00	-33.82	295	150
14622.000	24.22	---	32.14	44.36	---	74.00	54.00	-29.64	295	150

11G TX HIGH

Mode: CHANNEL Temperature: 26 °C Engineer: Michael
Polarization: Horizontal Humidity: 60 %

Frequency (MHz)	Reading (dBuV)		Factor (dB) Corr.	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
	Peak	Ave.		Peak	Ave.	Peak	Ave.			
4926.667	45.18	---	-1.19	43.99	---	74.00	54.00	-30.01	290	150
6566.667	44.08	---	4.70	48.78	---	74.00	54.00	-25.22	290	150
7386.000	42.65	---	1.97	44.62	---	74.00	54.00	-29.38	290	150
9848.000	22.14	---	25.49	41.63	---	74.00	54.00	-32.37	290	150
12310.000	23.55	---	30.04	41.59	---	74.00	54.00	-32.41	290	150
14772.000	25.44	---	32.56	46.00	---	74.00	54.00	-28.00	295	150

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FCC ID: U6ANR620M

Polarization: Vertical

Frequency (MHz)	Reading (dBuV)		Factor (dB) Corr.	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
	Peak	Ave.		Peak	Ave.	Peak	Ave.			
4920.000	43.51	---	-1.22	42.29	---	74.00	54.00	-31.71	295	150
6566.667	49.47	---	4.70	54.17	---	74.00	54.00	-19.83	295	150
7386.000	42.92	---	1.97	44.89	---	74.00	54.00	-29.11	295	150
9848.000	21.71	---	25.49	41.20	---	74.00	54.00	-32.80	290	150
12310.000	23.04	---	30.04	41.08	---	74.00	54.00	-32.92	295	150
14772.000	25.16	---	32.56	45.72	---	74.00	54.00	-28.28	295	150

- Note**
1. Correction Factor = Antenna factor + Cable loss - Preamplifier
 2. The formula of measured value as: Test Result = Reading + Correction Factor
 3. All not in the table noted test results are more than 20 dB below the relevant limits.
 4. See attached diagrams as appendix.

TEST RESULT (Transmitter): The unit DOES meet the FCC requirements.

Test equipment used: ETSTW-RE003 ETSTW-RE 004 ETSTW-RE 017 ETSTW-RE 028
ETSTW-RE029 ETSTW-RE 030 ETSTW-RE 042 ETSTW-RE 043
ETSTW-RE 044

Registration number: W6M20709-8524-C-1

FCC ID: U6ANR620M

3.6 Radiated Emission on the band edge

According to FCC rules part 15 subpart C §15.247(c) in any 100 kHz bandwidth outside the frequency band in which the intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in § 15.209(a) is not required.

In addition radiated emission which fall in the restricted bands, as defined in section 15.205(a), must also with the radiated emission limits.

Mode A

Test conditions		Attenuation at or outside band-edges	
		Lower Band-edge	Upper Band-edge
$T_{nom} = 23^{\circ}\text{C}$	$V_{nom} = 120 \text{ V}$	36.89 dB	46.64 dB

Mode B

Test conditions		Attenuation at or outside band-edges	
		Lower Band-edge	Upper Band-edge
$T_{nom} = 23^{\circ}\text{C}$	$V_{nom} = 120 \text{ V}$	37.64 dB	42.44 dB

Limit:

Frequency Range / MHz	Limit
902 – 928	- 20 dB
2400 – 2483.5	
5725 - 5850	

Test equipment used: ETSTW-RE 003 ETSTW-RE 004 ETSTW-RE 017 ETSTW-RE 028
ETSTW-RE 030 ETSTW-RE 043 ETSTW-RE 044

Explanation: Please see attached diagram as appendix.

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FCC ID: U6ANR620M

3.7 Minimum 6 dB Bandwidth

The analyzer ResBW was set to 100 kHz. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. A PEAK reading was taken, two markers were set 6 dB below the maximum level on the right and the left side of the emission.

The 6 dB bandwidth is the frequency difference between the two markers.

Mode A

Test conditions		6 dB Bandwidth		
		Channel 1	Channel 6	Channel 11
$T_{nom} = 23^{\circ}\text{C}$	$V_{nom} = 120 \text{ V}$	10.512820513 MHz	10.512820513 MHz	10.512820513 MHz

Mode B

Test conditions		6 dB Bandwidth		
		Channel 1	Channel 6	Channel 11
$T_{nom} = 23^{\circ}\text{C}$	$V_{nom} = 120 \text{ V}$	16.570512821 MHz	16.602564103 MHz	16.602564103 MHz

Limits:

Frequency Range MHz	Limits
902-928	min 500 kHz
2400-2483.5	min 500 kHz
5725-5850	min 500 kHz

Test equipment used: ETSTW-RE 003 ETSTW-RE 004 ETSTW-RE 055

Explanation: See attached diagrams in Appendix.

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FCC ID: U6ANR620M

3.8 Peak Power Spectral Density

Peak Power Spectral density is a measured at low, middle and high channel.

The peak output power is measured with a measurement bandwidth of 10 MHz and displayed on diagram together with Peak Power Spectral Density result which was measured with a bandwidth of 3 kHz, appreciate frequency span and sweep time.

Mode A

Test conditions		Peak Power Spectral Density (3 kHz)		
		Channel 1 [dBm]	Channel 6 [dBm]	Channel 11 [dBm]
$T_{nom} = 23^{\circ}\text{C}$	$V_{nom} = 120 \text{ V}$	-11.57	-11.82	-11.67

Mode B

Test conditions		Peak Power Spectral Density (3 kHz)		
		Channel 1 [dBm]	Channel 6 [dBm]	Channel 11 [dBm]
$T_{nom} = 23^{\circ}\text{C}$	$V_{nom} = 120 \text{ V}$	-15.07	-15.28	-15.06

Limits:

Frequency Range MHz	dBm
902-928	8
2400-2483,5	8
5725-5850	8

Test equipment used: ETSTW-RE 003 ETSTW-RE 004 ETSTW-RE 055

Explanation: See attached diagrams in Appendix.

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FCC ID: U6ANR620M

3.9 Radiated Emission from Digital Part

According to FCC part 15.109 (g), digital devices may be shown to comply with the standards contained in Third Edition of the International Special Committee on Radio Interference (CISPR), Pub. 22, "Information Technology Equipment - Radio Disturbance Characteristics - Limits and Methods of Measurement".

Model: NR620M Date: 2007/9/20
Mode: Temperature: 26 °C Engineer: Michael
Polarization: Horizontal Humidity: 60 %

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
34.870	13.25	peak	13.25	26.5	30	-3.5	310	330
165.014	13.45	QP	15.21	28.66	30	-1.34	320	320
200.018	16.14	QP	12.14	28.28	30	-1.72	306	325
499.198	10.89	peak	19.80	30.69	37	-6.31	295	230
660.521	10.15	peak	22.85	33.00	37	-4.00	290	175
900.052	9.24	QP	26.22	35.46	37	-1.54	300	120

Polarization: Vertical

Frequency (MHz)	Reading (dBuV)	Detector	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (cm)
88.875	14.16	QP	10.42	24.58	30	-5.42	160	160
165.009	12.80	QP	15.21	28.01	30	-1.99	80	110
175.010	12.36	peak	14.49	26.85	30	-3.15	150	120
625.451	8.69	peak	22.30	30.99	37	-6.01	285	330
660.521	9.50	peak	22.85	32.35	37	-4.65	280	345
899.748	9.26	QP	26.22	35.48	37	-1.52	290	370

- Note**
1. Correction Factor = Antenna factor + Cable loss - Preamplifier
 2. The formula of measured value as: Test Result = Reading + Correction Factor
 3. Detector function in the form : PK = Peak, QP = Quasi Peak, AV = Average
 4. All not in the table noted test results are more than 20 dB below the relevant limits.
 5. See attached diagrams as appendix.

Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency of Emission (MHz)	Field Strength (microvolts/meter)	Field Strength (dBmicrovolts/meter)
30 – 88	100	40.0
88 – 216	150	43.5
216 – 960	200	46.0
Above 960	500	54.0

Test equipment used: ETSTW-RE 003 ETSTW-RE 004 ETSTW-RE 017 ETSTW-RE 028
ETSTW-RE 029 ETSTW-RE 030 ETSTW-RE 042 ETSTW-RE 043
ETSTW-RE 044

Registration number: W6M20709-8524-C-1

FCC ID: U6ANR620M

3.10 Power Line Conducted Emission

For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the table bellows with this provision shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminals.

This measurement was transact first with instrumentation using an average and peak detector and a 10 kHz bandwidth. If the peak detector achieves a calculated level, the measurement is repeated by an instrumentation using a quasi-peak detector.

Frequency	Level (dBμV)	
	quasi-peak	average
150 kHz	lower limit line	Lower limit line

Model: NR620M Date: 2007/9/28
 Mode: Temperature: 26 °C Engineer: Michael
 Polarization: N Humidity: 60 %

Frequency (MHz)	Reading (dBμV)		Factor (dB) Corr.	Result (dBμV)		Limit (dBμV)		Margin (dB)
	QP	Ave.		QP	Ave.	QP	Ave.	
0.3071	37.16	--	10.10	47.26	--	60.05	--	-12.79
0.4498	31.6	--	10.10	41.7	--	56.88	--	-15.18
0.9550	27.16	--	10.10	37.26	--	56	--	-18.74
1.5850	26.67	--	10.10	36.77	--	56	--	-19.23
2.8600	34.39	--	10.10	44.49	--	56	--	-11.51
19.7222	34.9	--	10.10	45	--	60	--	-15

Polarization: L1

Frequency (MHz)	Reading (dBμV)		Factor (dB) Corr.	Result (dBμV)		Limit (dBμV)		Margin (dB)
	QP	Ave.		QP	Ave.	QP	Ave.	
0.1850	47.5	0.20	10.10	57.6	10.3	64.26	54.26	-6.66
0.4277	48.18	0.55	10.10	58.28	10.65	57.30	47.3	0.98
0.7900	39.19	0.30	10.10	49.29	10.40	56	46	-6.71
1.6300	27.43	--	10.10	37.53	--	56	--	-18.47
2.8600	34.27	--	10.10	44.37	--	56	--	-11.63
19.9444	34.17	--	10.10	44.27	--	60	--	-15.73

Registration number: W6M20709-8524-C-1

FCC ID: U6ANR620M

- Note:**
1. The formula of measured value as: **Test Result = Reading + Correction Factor**
 2. The **Correction Factor = Cable Loss + LISN Insertion Loss + Pulse Limit Loss**
 3. Detector function in the form : **PK = Peak, QP = Quasi Peak, AVG = Average**
 4. All not in the table noted test results are more than 20 dB below the relevant limits.

Limits:

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi Peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50

Test equipment used: ETSTW-CE 001 ETSTW-CE 003 ETSTW-CE 004 ETSTW-CE 006
ETSTW-CE 011

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FCC ID: U6ANR620M

Appendix

Measurement diagrams

1. **Peak Output Power**

2. **Spurious Emissions**

(The measurement diagrams plots attached below are preliminary wideband scan with a peak detector for reference only. The final test results are listed on section 3.5)

3. **Band Edge Measurement**

4. **Minimum 6dB Bandwidth**

5. **Peak Power Spectral Density**

6. **Radiated Emission from Digital Part**

(The measurement diagrams plots attached below are preliminary wideband scan with a peak detector for reference only. The final test results are listed on section 3.9)

7. **Power Line Conducted Emission**

(The measurement diagrams plots attached below are preliminary wideband scan with a peak and average detector for reference only. The final test results are listed on section 3.10)