FCC TEST REPORT

for

Remote Control

Model No.: TRX970HAU

of

Applicant: Advance Security Inc.
Address: 3F, 48 Ta-An Street, Hsi-Chih Taipei Hsien, 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.: 2300.01

PTCRB Accredited Type Certification Test House

FCC ID : H5OTR23

Report No.: W6M20705-8132-P-15

6F, NO. 58, LANE 188, RUEY-KUANG RD., NEIHU TAIPEI 114, TAIWAN, R.O.C.
TEL: 886-2-66068877 FAX: 886-2-66068879 E-mail: ets@ets-bzt.com.tw

Registration number: W6M20705-8132-P-15
FCC ID : H5OTR23

TABLE OF CONTENTS

Registration number: W6M20705-8132-P-15
FCC ID : H5OTR23

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 is 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.
The test report may only be reproduced or published in full.
Reproduction or publication of extracts from the report requires the prior written approval of the ETS Product Service (Taiwan) Co., Ltd.

Tester:

July 05, 2007		Jay Chaing	Jay Chaing
Date	ETS-Lab.	Name	Signature

Technical responsibility for area of testing:

July 05, 2007		Steven Chuang	Steven Chuang
Date	ETS	Name	Signature

Registration number: W6M20705-8132-P-15
FCC ID : H5OTR23

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: 2300.01

FCC filed test laboratory Reg. No. 930600

Industry Canada filed test laboratory Reg. No. IC 5679

PCTRB Accredited Type Certification Test House

1.3 Details of approval holder

Name	: Advance Security Inc.
Street	: 3F, 48 Ta-An Street, Hsi-Chih
Town	: Taipei Hsien,
Country	: Taiwan R.O.C.
Telephone	: +886-2-86481688
Fax	: +886-2-86481689

Registration number: W6M20705-8132-P-15
FCC ID : H5OTR23

1.4 Application details

Date of receipt of test item : May 25, 2007
Date of test : from May 26, 2007 to July 04, 2007

1.5 General information of Test item

Type of test item : Remote Control
Model Number : TRX970HAU
Multi-listing model number : without
Photos : see Appendix

Technical data

Frequency band : 909 - 921.778 MHz
Frequency (ch A) : 909.000 MHz
Frequency (ch B) : 915.500 MHz
Frequency (ch C) : 921.778 MHz

Transmitter **Unom**

Power (ch A or ch 1) : Conducted: 22.25 dBm
Power (ch B or ch 13) : Conducted: 22.29 dBm
Power (ch C or ch 25) : Conducted: 22.27 dBm

Power supply adaptor
Input : 100-240 VAC, 50/60 Hz, 0.15 A
Output : 5 VDC, 1.0 A

Power supply battery : 4.2 VDC (battery)

Operation modes : duplex

Modulation Type : FSK

Antenna Type : Helical antenna

Antenna gain : <6 dBi

Registration number: W6M20705-8132-P-15
FCC ID : H5OTR23

Host device : none

Classification :

Fixed Device	☐
Mobile Device (Human Body distance ＞ 20cm)	☐
Portable Device (Human Body distance ＜ 20cm)	☒

Manufacturer:
(if applicable)

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

Additional information : The test sample is designed as TRX970HAU device. Its pseudorandom hopping scheme, authentication, receiver parameters, synchronization procedure and other parameters are determined by TRX970HAU Specification.

1.6 Test standards

Technical standard : FCC RULES PART 15 Subpart B / SUBPART C § 15.247 (2007-05)

Registration number: W6M20705-8132-P-15
FCC ID : H5OTR23

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 3 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

Details of power supply
Adapter: Input 100-240 VAC, 50/60 Hz, 0.15 A Output: 5 VDC, 1.0 A
Battery: 4.2 VDC
:

Extreme conditions parameters : test voltage : -- extreme
min :-- V
max :-- V

Registration number: W6M20705-8132-P-15
FCC ID : H5OTR23

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	2006/10/16	2007/10/15
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	2006/10/16	2007/10/15
ETSTW-CE 005	Line-Impedance Stabilisation Network	NNBM 8126D	137	Schwarzbeck	2006/10/16	2007/10/15
ETSTW-CE 006	IMPULSBEGRENZER PULSE LIMITER	ESH3-Z2	100226	R&S	In House Certificate	
ETSTW-CE 008	ABSORBING CLAMP	MDS 21	3469	Schwarzbeck	2005/10/24	2007/10/23
ETSTW-CE 009	TEMP.&HUMIDITY CHAMBER	GTH-225-40-1P-U	MAA0305-009	GIANT FORCE	2006/8/17	2007/8/16
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	2005/10/14	2007/10/13
ETSTW-RE 003	EMI TEST RECEIVER	ESI 26	831438/001	R&S	2006/10/20	2007/10/19
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	2006/10/12	2007/10/11
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	2006/10/11	2007/10/10
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	2006/10/11	2007/10/10
ETSTW-RE 033	WaveRunner 6000A Serise Oscilloscope	WAVERUNNER 6100A	LCRY0604P14508	LeCroy	2006/7/27	2007/7/26
ETSTW-RE 034	Power Sensor	URV5-Z4	839313/006	R&S	2005/10/17	2007/10/16
ETSTW-RE 042	Biconical Antenna	HK116	100172	R&S	2007/1/11	2009/1/10

Registration number: W6M20705-8132-P-15
FCC ID : H5OTR23

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
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	2007/5/02	2009/5/01
ETSTW-RE 055	SPECTRUM ANALYZER	FSU-26	200074	R&S	2006/7/28	2007/7/27
ETSTW-RE 064	Bluetooth Test Set	MT8852B-042	6K00005709	Anritsu	Function Test	

Registration number: W6M20705-8132-P-15
FCC ID : H5OTR23

2.4 General Test Procedure

POWER LINE CONDUCTED INTERFERENCE: The procedure used was ANSI STANDARD C63.4-2003 using a 50μH 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 dBμV) 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 dBμV + 10.36 dB + 6 dB = 36.36 dBμV/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 C63.4-2003 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 No.5-1, Shuang Sing Village, LiShuei Rd., Wanli Township, Taipei County 207, Taiwan (R.O.C.). The Registration Number: **930600**.

Registration number: W6M20705-8132-P-15
FCC ID : H5OTR23

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 (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

3 Test results (enclosure)

TEST CASE	Para. Number	Required	Test passed	Test failed
Peak Output Power	15.247(b)	☒	☒	☐
Equivalent radiated Power	15.247(b)	☒	☒	☐
Spurious Emissions radiated – Transmitter operating	15.247(c)	☒	☒	☐
Spurious Emissions conducted – Transmitter operating	15.247	☐	☐	☐
Carrier Frequency Separation	15.247(a) (1)	☒	☒	☐
Number of Hopping Frequencies	15.247(a) (1)(i)	☒	☒	☐
Time of Occupancy (Dwell Time)	15.247(a) (1)(i)	☒	☒	☐
20 dB Bandwidth	15.247(a) (1)(i)	☒	☒	☐
Band-edge Compliance of RF Emission	15.247(c)	☒	☒	☐
Radiated Emission from Digital Part	15.109	☐	☐	☐
Power Line Conducted Emission	15.207(a)	☒	☒	☐

The follows is intended to leave blank.

3.1 Peak Output Power (transmitter)

FCC Rule: 15.247

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).

Test conditions		Conducted Power		
		Channel A [dBm]	**Channel B** [dBm]	**Channel C** [dBm]
T_{nom}= 23°C	V_{nom} = 4.2 V	22.25	22.29	22.27

Test conditions		Radiated Power		
		Channel A [dBm]	**Channel B** [dBm]	**Channel C** [dBm]
T_{nom}= --°C	V_{nom} = -- V	--	--	--

Test conditions T_{nom}= --°C, V_{nom}= -- V Frequency[MHz]	Signal Field strength TX highest power mode dBµV/m
--	--
Measurement uncertainty	< 3 dB

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

Maximum Peak Output Power

Limits:

Frequency MHz	Number of hopping channels			
	≥ 75	≥ 50	49 ≥ 25	74 ≥ 15
902-928		30 dBm	24 dBm	
2400-2483.5 MHz	30 dBm	-		21 dbm
5725-5850 MHz	30 dBm	-		

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

Test equipment used: ETSTW-RE 003 ETSTW-RE 004 ETSTW-RE 055 ETSTW-RE 064

Registration number: W6M20705-8132-P-15
FCC ID : H5OTR23

3.2 Equivalent isotropic radiated power

FCC Rule: 15.239(b), 15.35

Because using an internal antenna there are no deviations from the radiated test results according 3.1.

3.3 RF Exposure Compliance Requirements

According to Supplement C, Edition 01-01 to OET Bulletin 65, Edition 97-01 this spread spectrum transmitter is categorically excluded from routine environmental evaluation because of the low power level, where there is a high likelihood of compliance with RF exposure standards.

3.4 Out of Band Radiated Emissions

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:
For frequencies below 1GHz :
Max. reading – 20 dB

Guidance on Measurement of FHSS 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." Here the correction was added to the limit instead subtracted from the reading.

Duty Cycle correction = 20 log (dwell time/100ms)
For frequencies above 1GHz (Peak measurements).
Limit = max. aver. reading-20dB +20dB(because Peak detector is used)

For frequencies above 1GHz (Average measurements).
Max. reading – 20 dB - duty cycle correction:

No duty cycle correction was added to the reading

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 ETSTW-RE 064

Registration number: W6M20705-8132-P-15
FCC ID : H5OTR23

3.5 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 26000 MHz.
For radiated emission tests, the analyzer setting was as followings:
RES BW VID BW
Frequency <1 GHz 100 kHz 100 kHz (Peak measurements)
Frequency >1 GHz 1 MHz 1 MHz (Peak measurements)
1 MHz 1 MHz (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 960	500	54.0

For frequencies above 1GHz (Average measurements).
Guidance on Measurement of FHSS Systems:
"If the emission is pulsed, modify the unit for continues operation , use the settings shown above, then correct the reading by subtracting the peak-average correction factor, derived from the appropriate duty cycle calculation." Here the correction was added to the limit instead subtracted from the reading.

Duty cycle correction = 20 log (dwell time/100ms)

For frequencies above 1GHz (Average measurements).

Limit – duty cycle correction

No duty cycle correction was added to the reading.

54.0dBμV/m

For frequencies above 1GHz (Peak measurements).

Limit + 20dB

54.0dBμV/m + 20 dB= 74 dBμV/m

Comments: See attached diagrams as 3.6.

Test equipment used: ETSTW-RE 003 ETSTW-RE 004 ETSTW-RE 017ETSTW-RE 028
ETSTW-RE 029 ETSTW-RE 030 ETSTW-RE 042 ETSTW-RE 043
ETSTW-RE 044 ETSTW-RE 064

Registration number: W6M20705-8132-P-15
FCC ID : H5OTR23

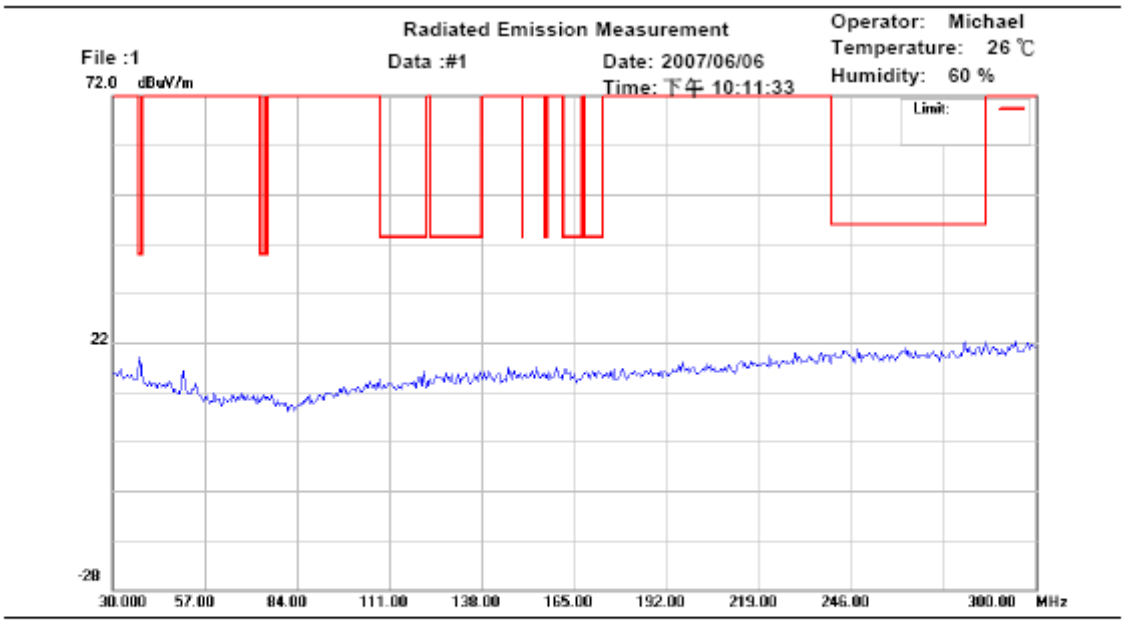
3.6 Spurious emissions (tx)

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))

SAMPLE CALCULATION OF LIMIT. All results will be updated by an automatic measuring system in accordance to 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 an exhibit the compliance with the above calculated Limits.

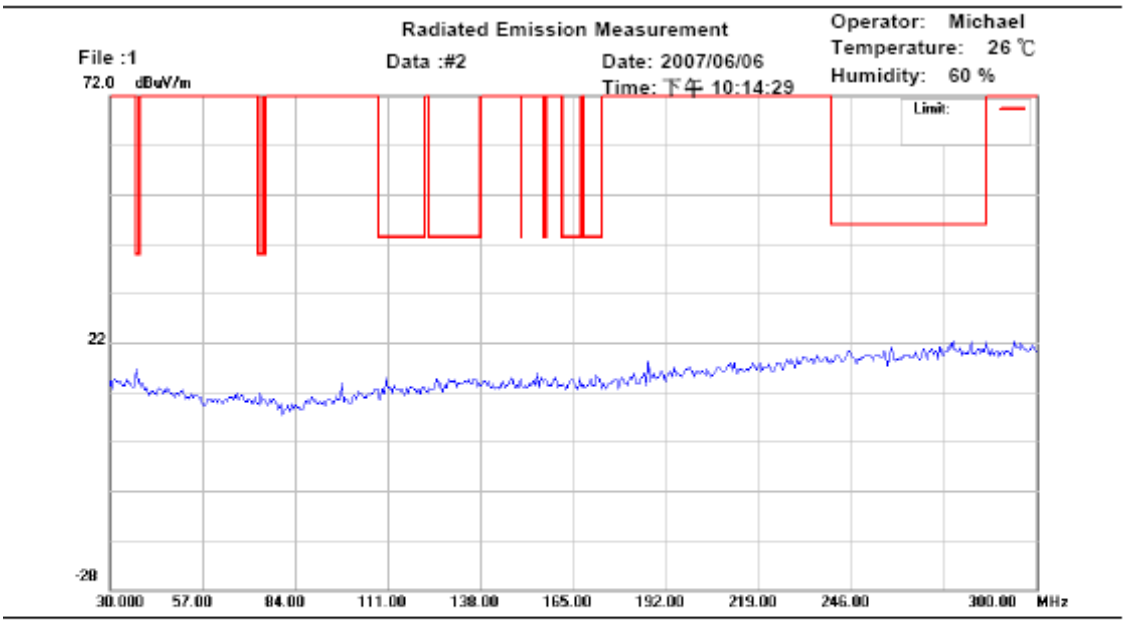
If in the column‘s correction factor states a value then the max. Field strength in the same row is corrected by a value gained from the “Marker-Delta-Method“ or the „Duty-Cycle Correction Factor“.



Site : site #1
Condition : FCC 15.247
Company : W6M20705-8132
EUT Model: TRX970HAU
Execute Program : low channel
Note :

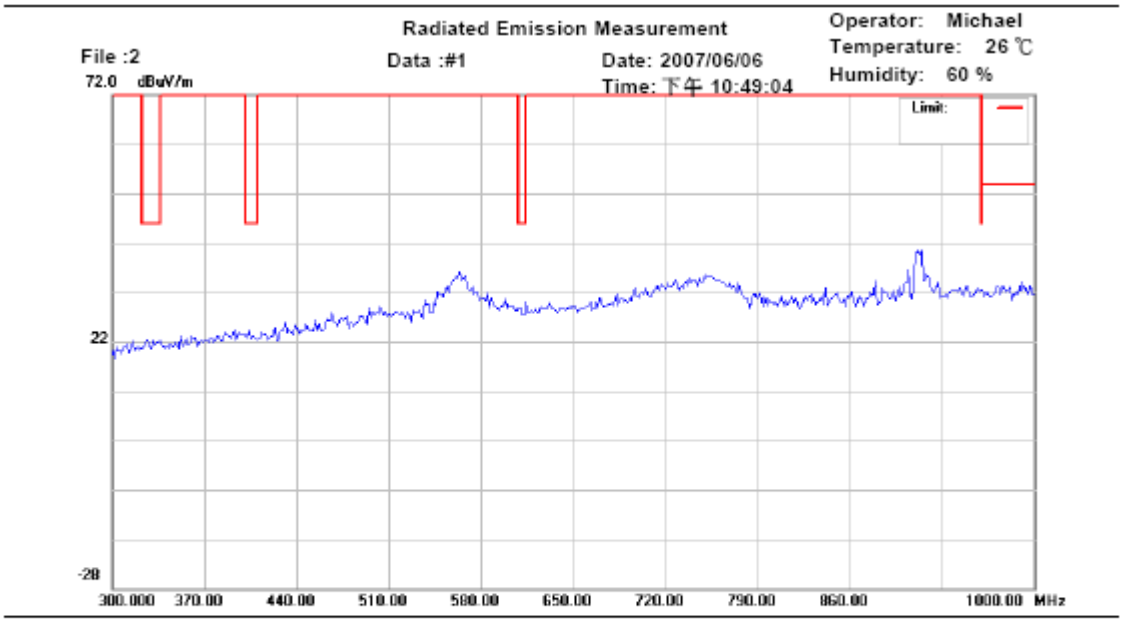
Polarization: Horizontal
Power : 4.2 VDC
Distance: 3m

Registration number: W6M20705-8132-P-15
FCC ID : H5OTR23



Site : site #1
Condition : FCC 15.247
Company : W6M20705-8132
EUT Model: TRX970HAU
Execute Program : low channel
Note :

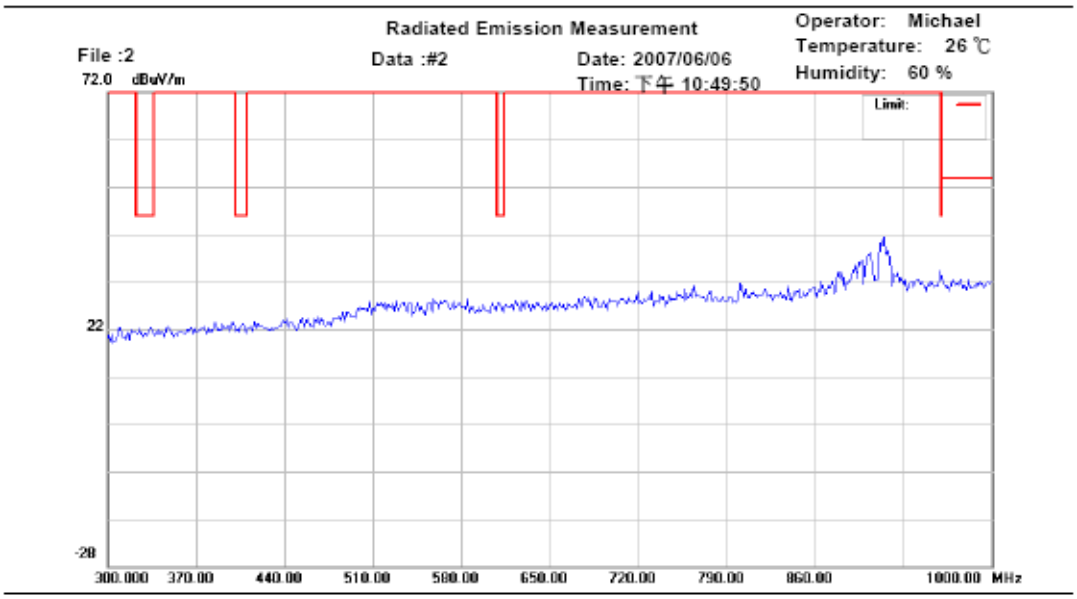
Polarization: *Vertical*
Power : 4.2 VDC
Distance: 3m



Site : site #1
Condition : FCC 15.247
Company : W6M20705-8132
EUT Model: TRX970HAU
Execute Program : low channel
Note :

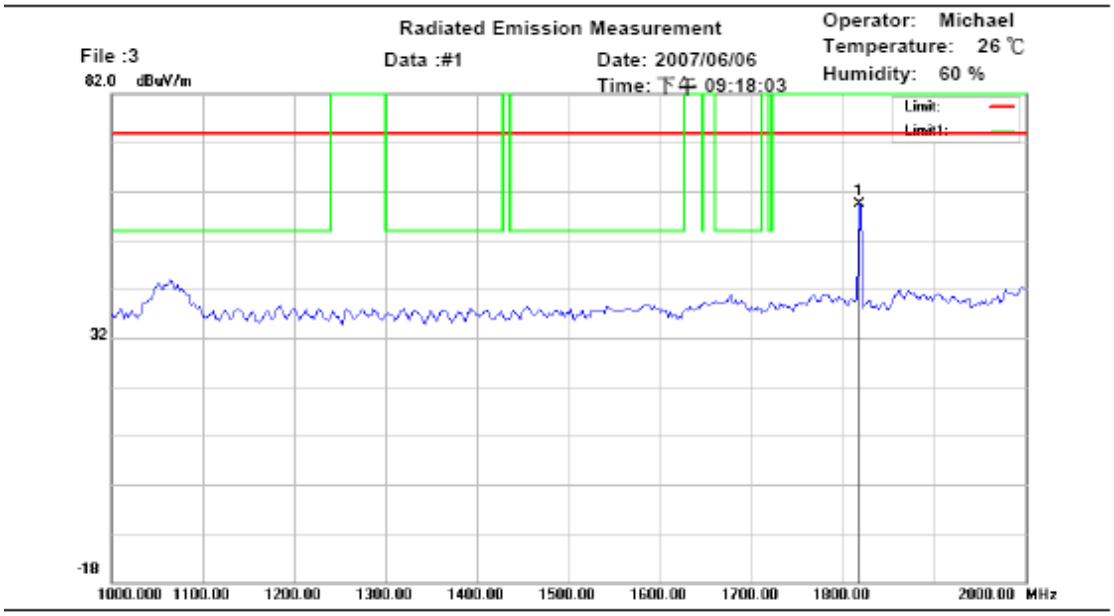
Polarization: *Horizontal*
Power : 4.2 VDC
Distance: 3m

Registration number: W6M20705-8132-P-15
FCC ID : H5OTR23



Site : site #1
Condition : FCC 15.247
Company : W6M20705-8132
EUT Model: TRX970HAU
Execute Program : low channel
Note :

Polarization: *Vertical*
Power : 4.2 VDC
Distance: 3m

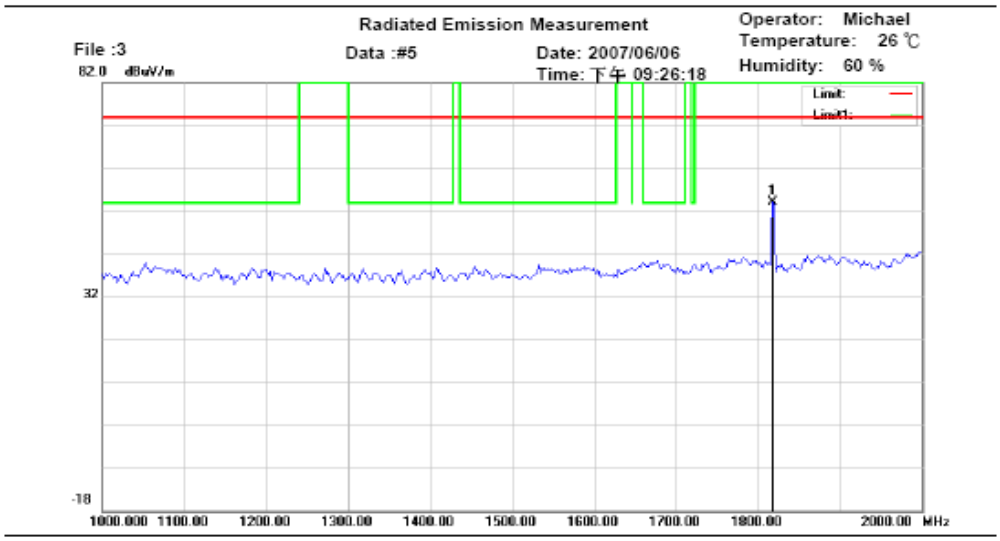


Site : site #1
Condition : FCC 15.247
Company : W6M20705-8132
EUT Model: TRX970HAU
Execute Program : low channel
Note :

Polarization: *Horizontal*
Power : 4.2 VDC
Distance: 3m

Mk.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	1817.635	69.18	peak	-9.74	59.44	74.00	155	185	-14.56	

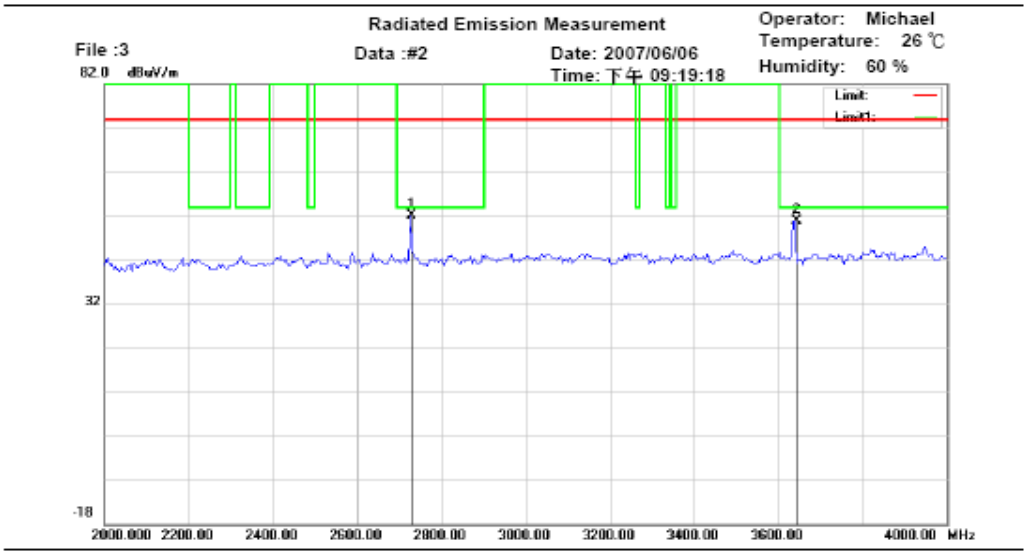
Registration number: W6M20705-8132-P-15
FCC ID : H5OTR23



Site : site #1
Condition : FCC 15.247
Company : W6M20705-8132
EUT Model: TRX970HAU
Execute Program : low channel
Note :

Polarization: *Vertical*
Power : 4.2 VDC
Distance: 3m

Mk.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	1817.635	63.96	peak	-9.74	54.22	74.00	155	180	-19.78	

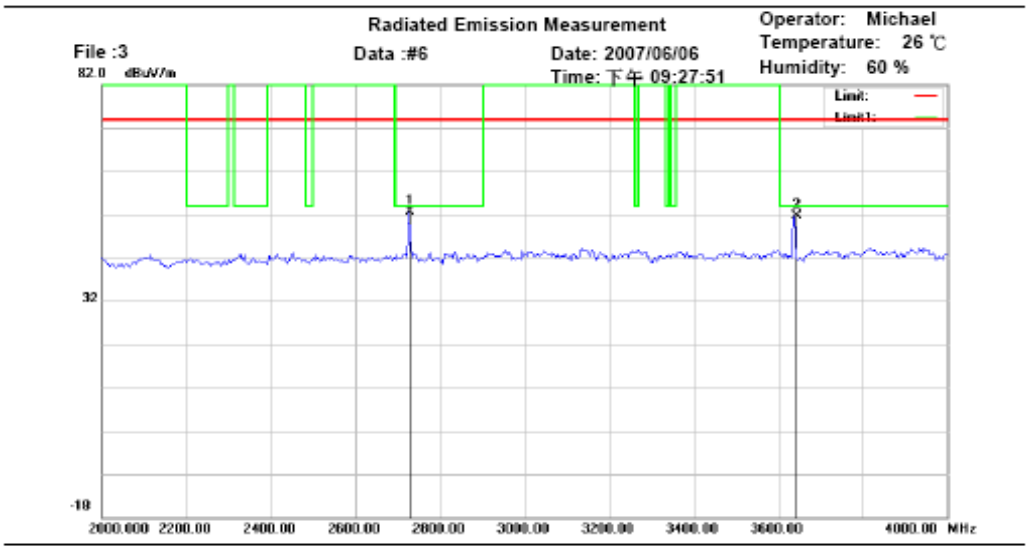


Site : site #1
Condition : FCC 15.247
Company : W6M20705-8132
EUT Model: TRX970HAU
Execute Program : low channel
Note :

Polarization: *Horizontal*
Power : 4.2 VDC
Distance: 3m

Mk.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	2725.451	58.82	peak	-6.76	52.06	74.00	155	185	-21.94	
	3639.279	55.98	peak	-5.05	50.93	74.00	155	185	-23.07	

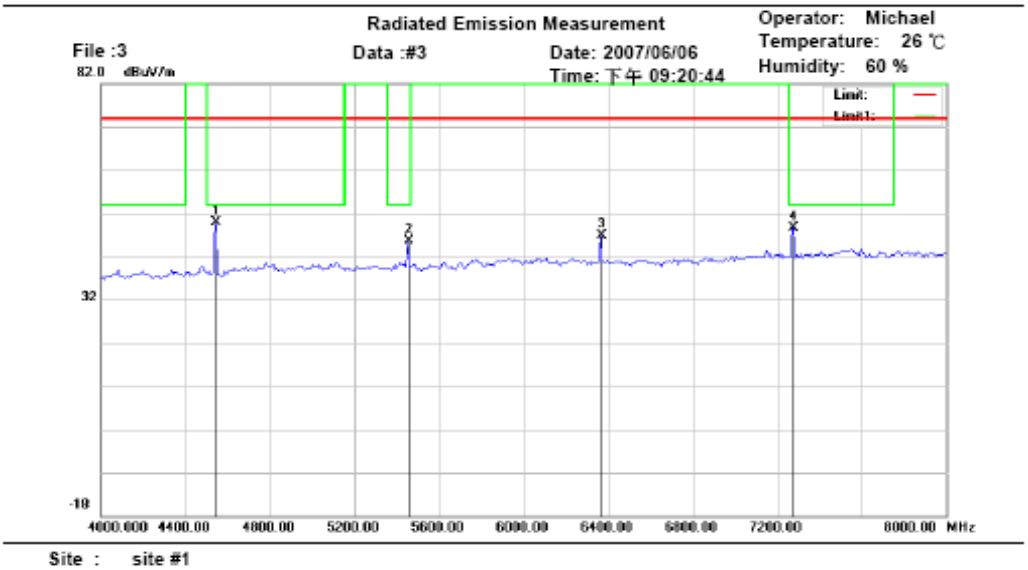
Registration number: W6M20705-8132-P-15
FCC ID : H5OTR23



Site : site #1
Condition : FCC 15.247
Company : W6M20705-8132
EUT Model: TRX970HAU
Execute Program : low channel
Note :

Polarization: *Vertical*
Power : 4.2 VDC
Distance: 3m

Mk.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	2725.451	59.46	peak	-6.76	52.70	74.00	155	190	-21.30	
	3639.279	56.56	peak	-5.05	51.51	74.00	155	190	-22.49	

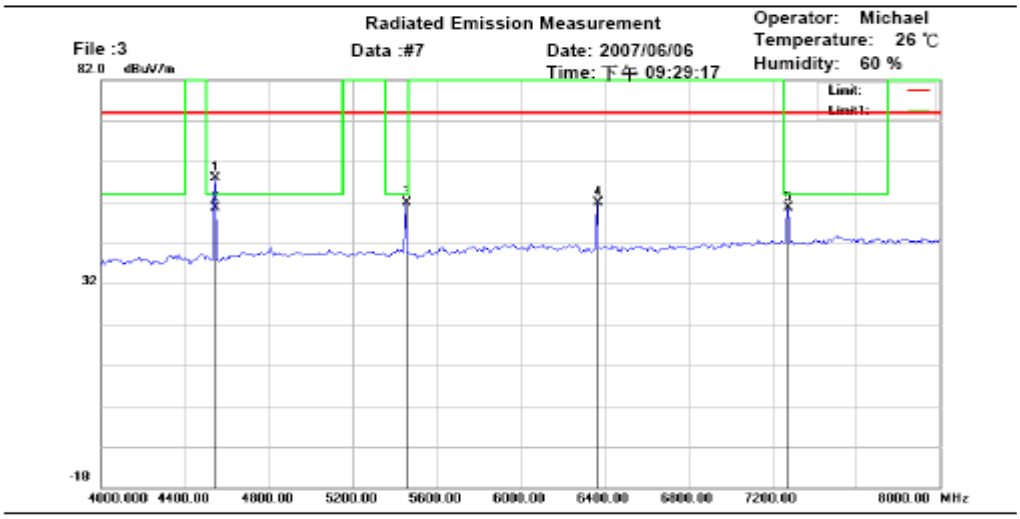


Site : site #1
Condition : FCC 15.247
Company : W6M20705-8132
EUT Model: TRX970HAU
Execute Program : low channel
Note :

Polarization: *Horizontal*
Power : 4.2 VDC
Distance: 3m

Mk.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	4545.090	53.57	peak	-3.69	49.88	74.00	160	180	-24.12	
	5450.902	46.76	peak	-1.15	45.61	74.00	160	180	-28.39	
	6364.730	46.75	peak	0.13	46.88	74.00	160	180	-27.12	
	7278.557	46.45	peak	2.17	48.62	74.00	160	180	-25.38	

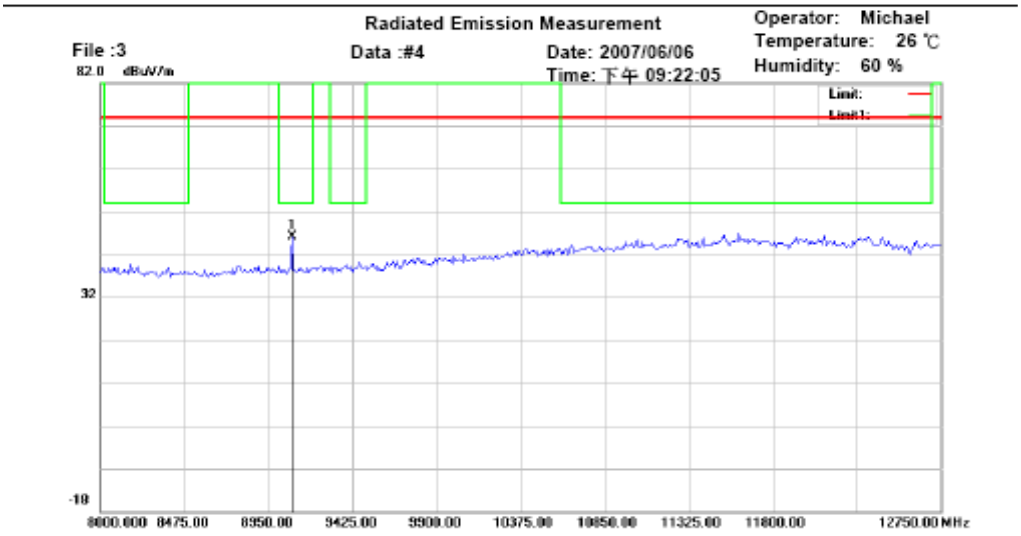
Registration number: W6M20705-8132-P-15
FCC ID : H5OTR23



Site : site #1
Condition : FCC 15.247
Company : W6M20705-8132
EUT Model: TRX970HAU
Execute Program : low channel
Note :

Polarization: *Vertical*
Power : 4.2 VDC
Distance: 3m

Mk.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	4545.004	61.53	peak	-3.69	57.84	74.00	150	263	-16.16	
*	4545.004	54.29	AVG	-3.69	50.60	54.00	150	263	-3.40	
	5450.902	52.97	peak	-1.15	51.82	74.00	150	200	-22.18	
	6364.730	51.63	peak	0.13	51.76	74.00	150	200	-22.24	
	7278.557	48.43	peak	2.17	50.60	74.00			-23.40	

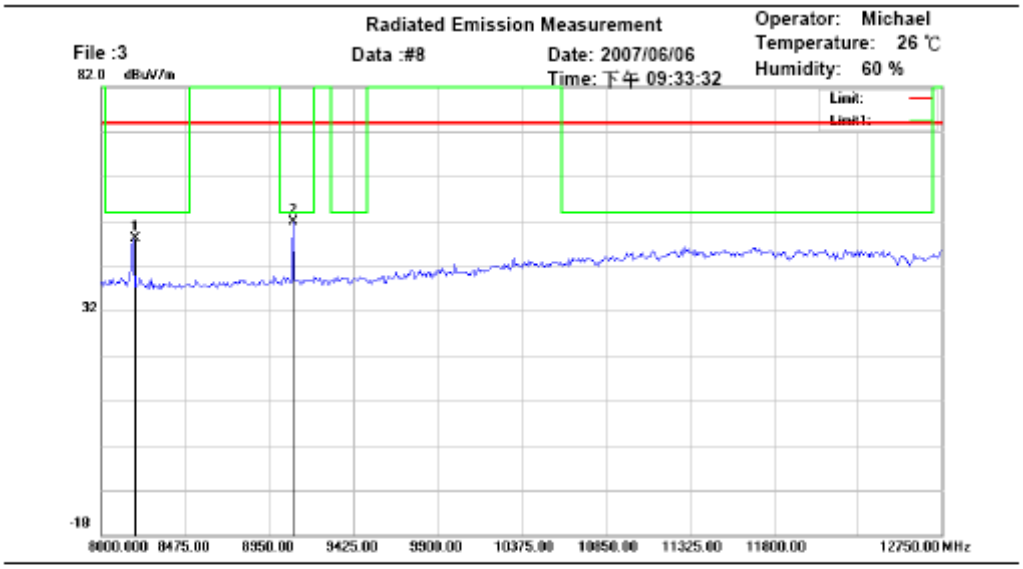


Site : site #1
Condition : FCC 15.247
Company : W6M20705-8132
EUT Model: TRX970HAU
Execute Program : low channel
Note :

Polarization: *Horizontal*
Power : 4.2 VDC
Distance: 3m

Mk.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	9085.170	42.65	peak	3.49	46.14	74.00	150	185	-27.86	

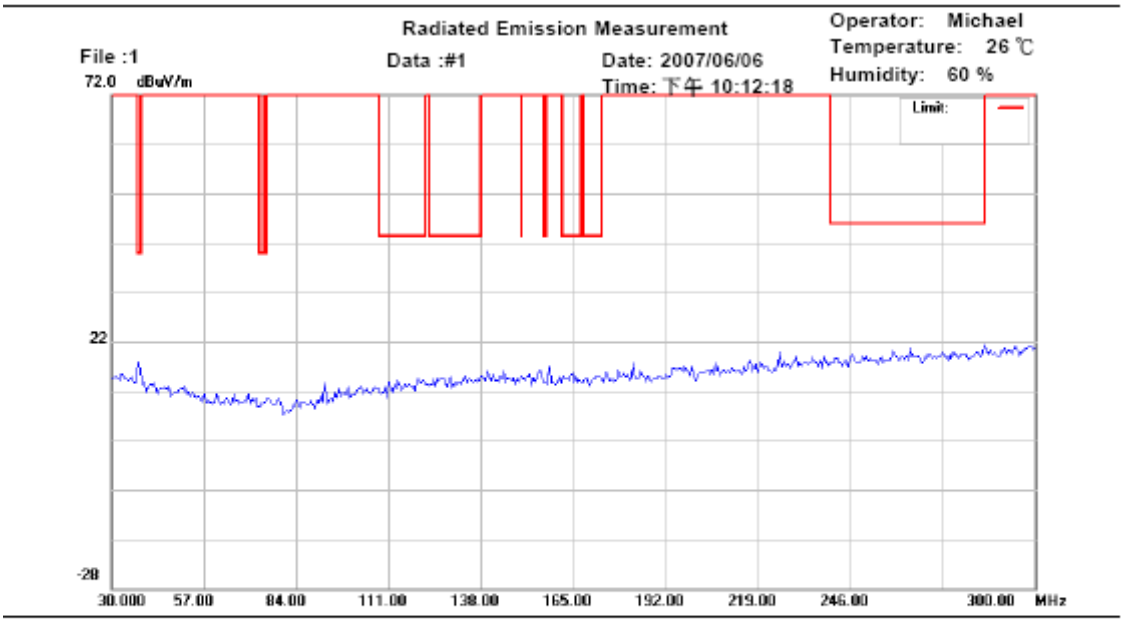
Registration number: W6M20705-8132-P-15
FCC ID : H5OTR23



Site : site #1
Condition : FCC 15.247
Company : W6M20705-8132
EUT Model: TRX970HAU
Execute Program : low channel
Note :

Polarization: *Vertical*
Power : 4.2 VDC
Distance: 3m

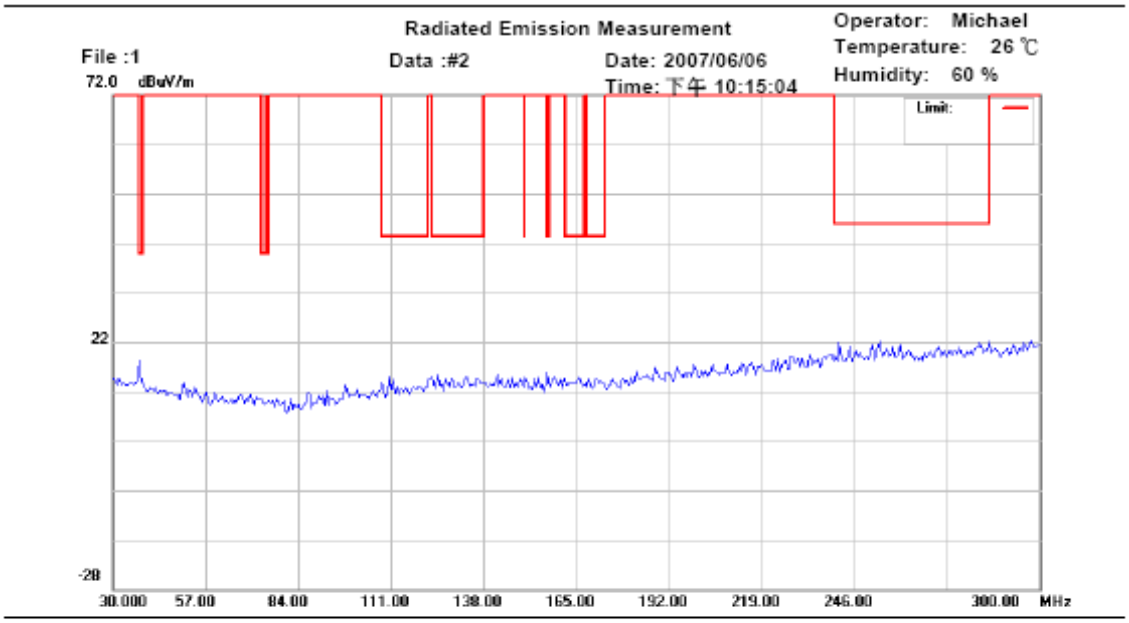
Mk.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	8180.862	45.38	peak	2.63	48.01	74.00	155	180	-25.99	
*	9085.170	48.28	peak	3.49	51.77	74.00	155	180	-22.23	



Site : site #1
Condition : FCC 15.247
Company : W6M20705-8132
EUT Model: TRX970HAU
Execute Program : middle channel
Note :

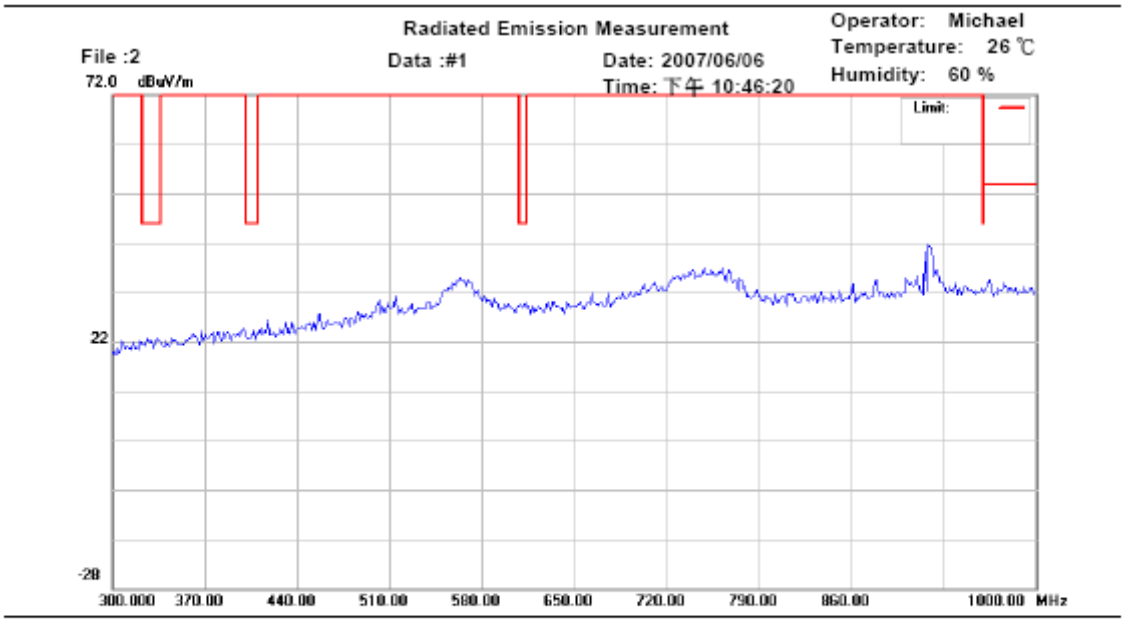
Polarization: *Horizontal*
Power : 4.2 VDC
Distance: 3m

Registration number: W6M20705-8132-P-15
FCC ID : H5OTR23



Site : site #1
Condition : FCC 15.247
Company : W6M20705-8132
EUT Model: TRX970HAU
Execute Program : middle channel
Note :

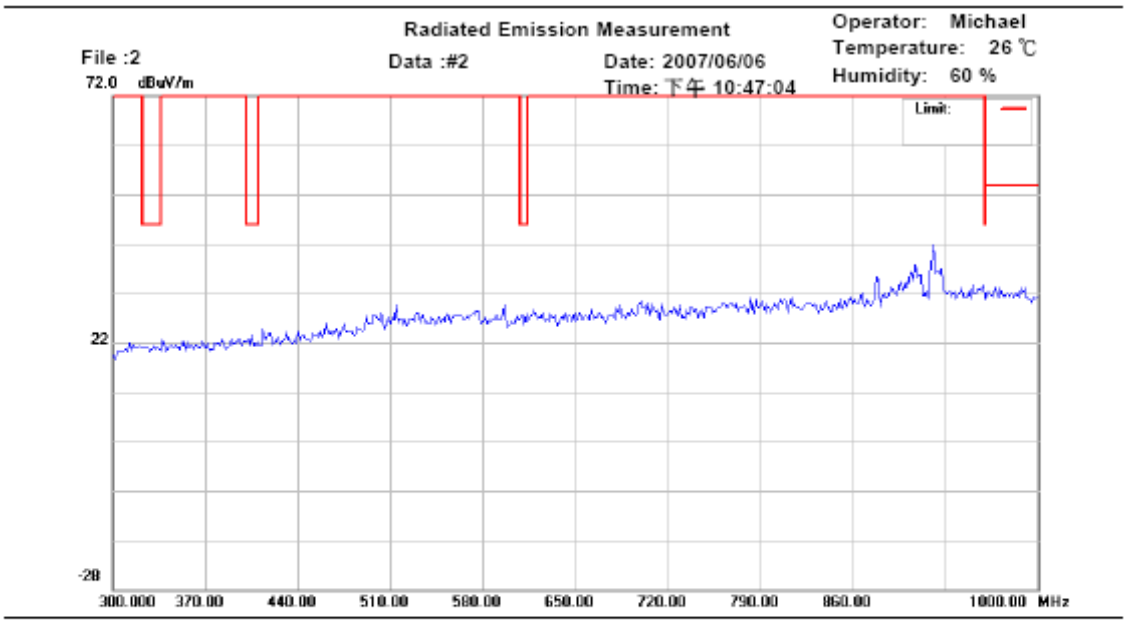
Polarization: *Vertical*
Power : 4.2 VDC
Distance: 3m



Site : site #1
Condition : FCC 15.247
Company : W6M20705-8132
EUT Model: TRX970HAU
Execute Program : middle channel
Note :

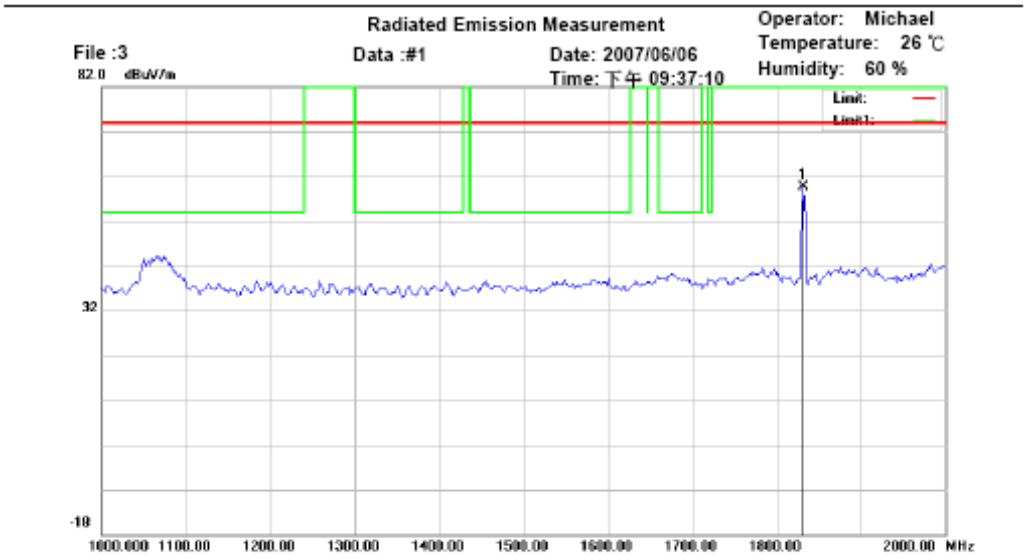
Polarization: *Horizontal*
Power : 4.2 VDC
Distance: 3m

Registration number: W6M20705-8132-P-15
FCC ID : H5OTR23



Site : site #1
Condition : FCC 15.247
Company : W6M20705-8132
EUT Model: TRX970HAU
Execute Program : middle channel
Note :

Polarization: *Vertical*
Power : 4.2 VDC
Distance: 3m

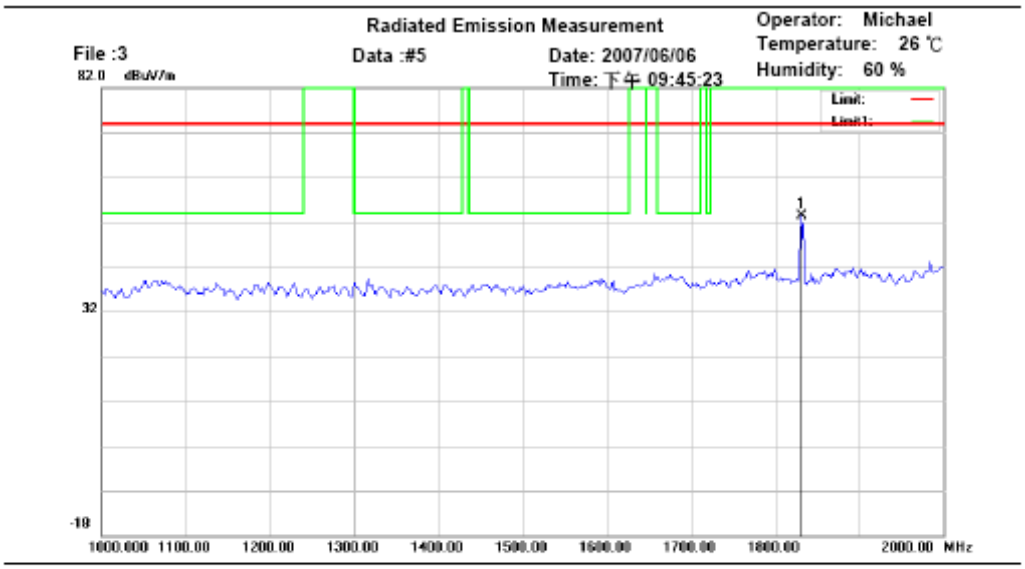


Site : site #1
Condition : FCC 15.247
Company : W6M20705-8132
EUT Model: TRX970HAU
Execute Program : middle channel
Note :

Polarization: *Horizontal*
Power : 4.2 VDC
Distance: 3m

Mk.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	1831.663	69.20	peak	-9.64	59.56	74.00	155	210	-14.44	

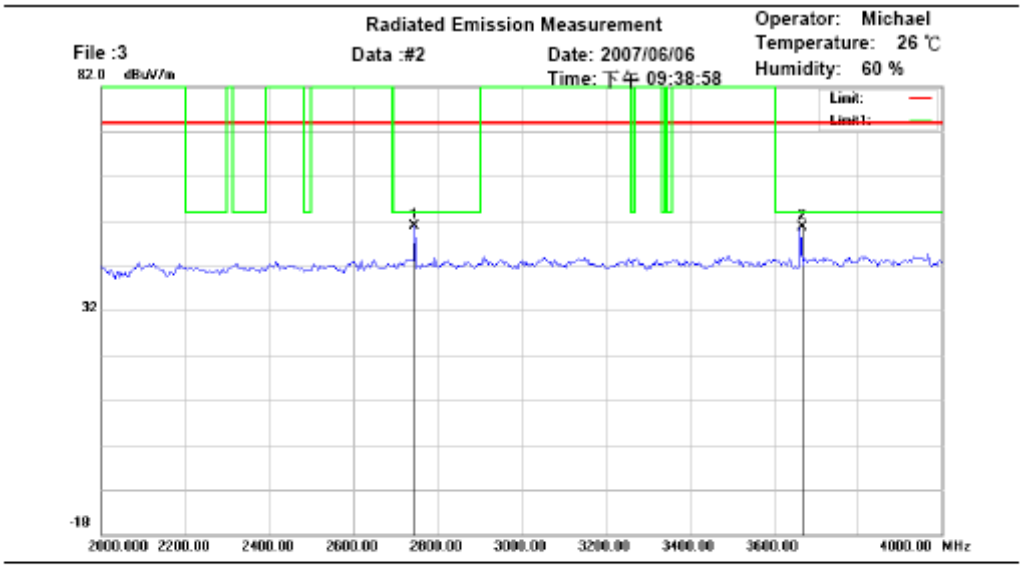
Registration number: W6M20705-8132-P-15
FCC ID : H5OTR23



Site : site #1
Condition : FCC 15.247
Company : W6M20705-8132
EUT Model: TRX970HAU
Execute Program : middle channel
Note :

Polarization: *Vertical*
Power : 4.2 VDC
Distance: 3m

Mk.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	1831.663	63.06	peak	-9.64	53.42	74.00	155	200	-20.58	

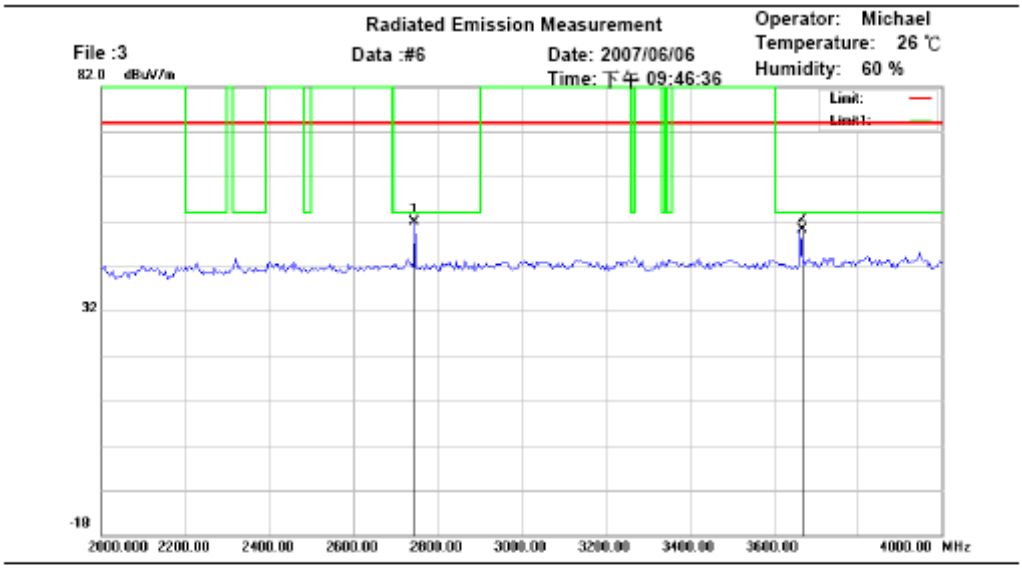


Site : site #1
Condition : FCC 15.247
Company : W6M20705-8132
EUT Model: TRX970HAU
Execute Program : middle channel
Note :

Polarization: *Horizontal*
Power : 4.2 VDC
Distance: 3m

Mk.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	2745.491	57.61	peak	-6.71	50.90	74.00	160	205	-23.10	
	3663.327	55.64	peak	-5.01	50.63	74.00	160	205	-23.37	

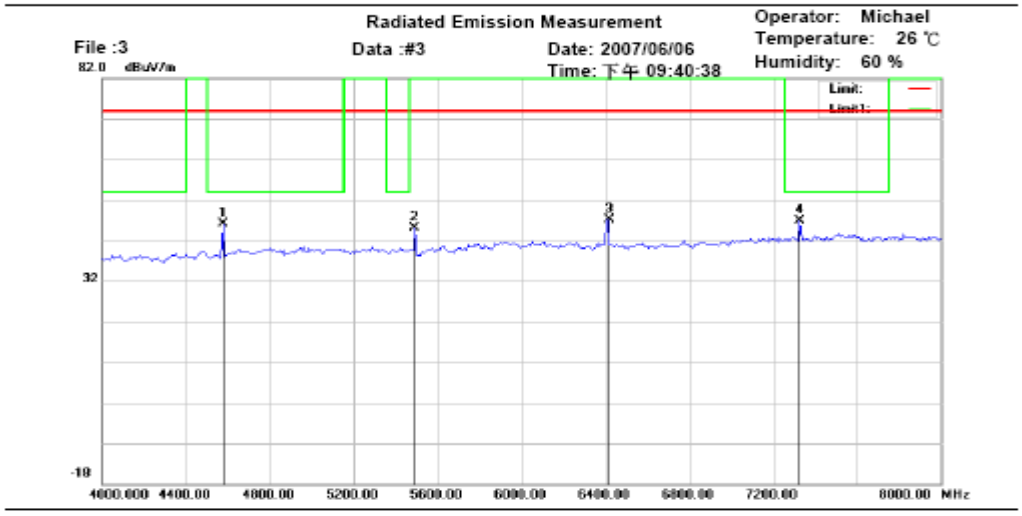
Registration number: W6M20705-8132-P-15
FCC ID : H5OTR23



Site : site #1
Condition : FCC 15.247
Company : W6M20705-8132
EUT Model: TRX970HAU
Execute Program : middle channel
Note :

Polarization: *Vertical*
Power : 4.2 VDC
Distance: 3m

Mk.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	2745.491	58.56	peak	-6.71	51.85	74.00	155	190	-22.15	
	3663.327	55.02	peak	-5.01	50.01	74.00	155	190	-23.99	

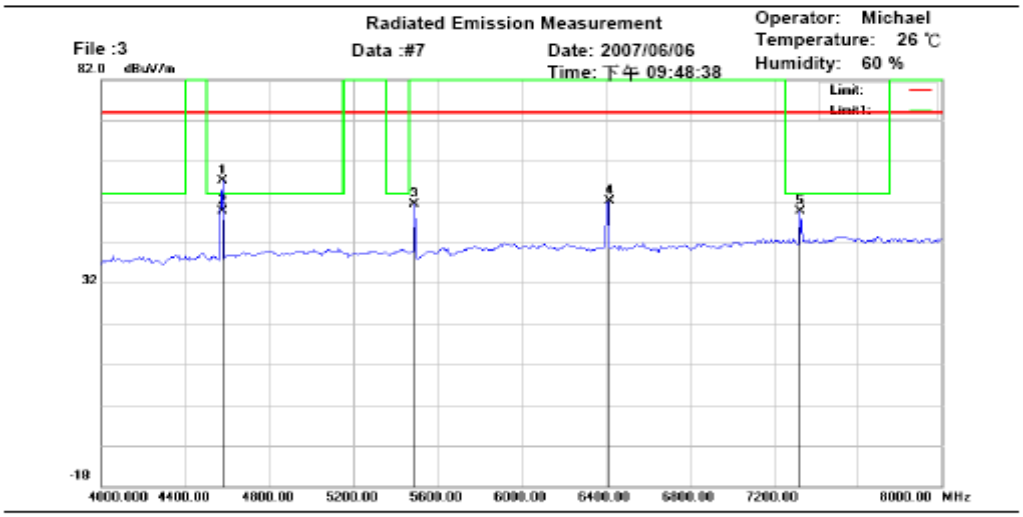


Site : site #1
Condition : FCC 15.247
Company : W6M20705-8132
EUT Model: TRX970HAU
Execute Program : middle channel
Note :

Polarization: *Horizontal*
Power : 4.2 VDC
Distance: 3m

Mk.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	4577.154	49.69	peak	-3.55	46.14	74.00	155	195	-27.86	
	5490.982	46.16	peak	-1.11	45.05	74.00	155	195	-28.95	
*	6412.826	47.01	peak	0.12	47.13	74.00	155	195	-26.87	
	7326.653	44.58	peak	2.28	46.86	74.00	155	195	-27.14	

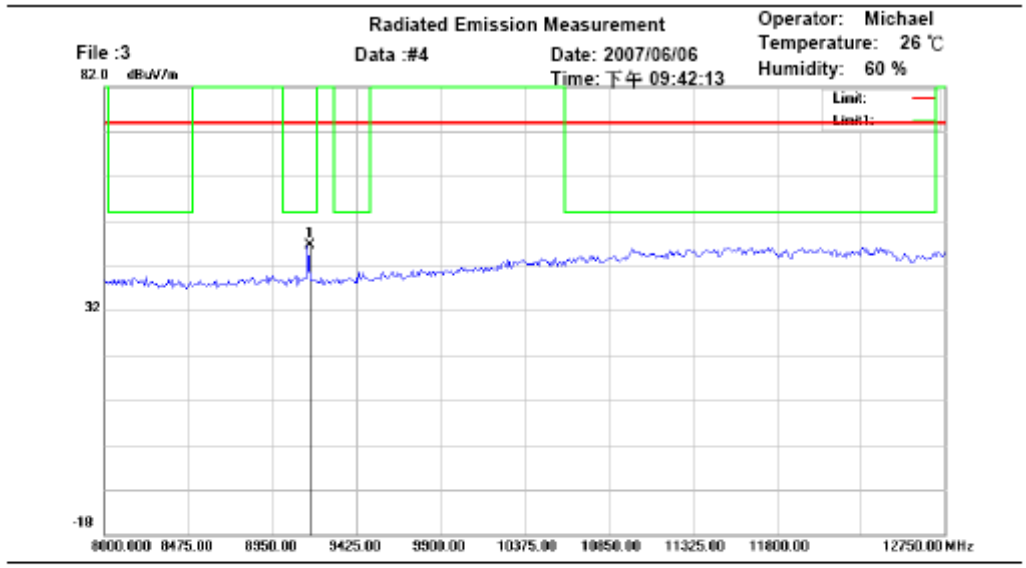
Registration number: W6M20705-8132-P-15
FCC ID : H5OTR23



Site : site #1
Condition : FCC 15.247
Company : W6M20705-8132
EUT Model: TRX970HAU
Execute Program : middle channel
Note :

Polarization: *Vertical*
Power : 4.2 VDC
Distance: 3m

Mk.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	4577.154	60.62	peak	-3.55	57.07	74.00	150	267	-16.93	
*	4577.154	53.23	AVG	-3.55	49.68	54.00	150	267	-4.32	
	5490.982	52.43	peak	-1.11	51.32	74.00	150	210	-22.68	
	6412.826	51.96	peak	0.12	52.08	74.00	150	210	-21.92	
	7326.653	47.43	peak	2.28	49.71	74.00	150	210	-24.29	

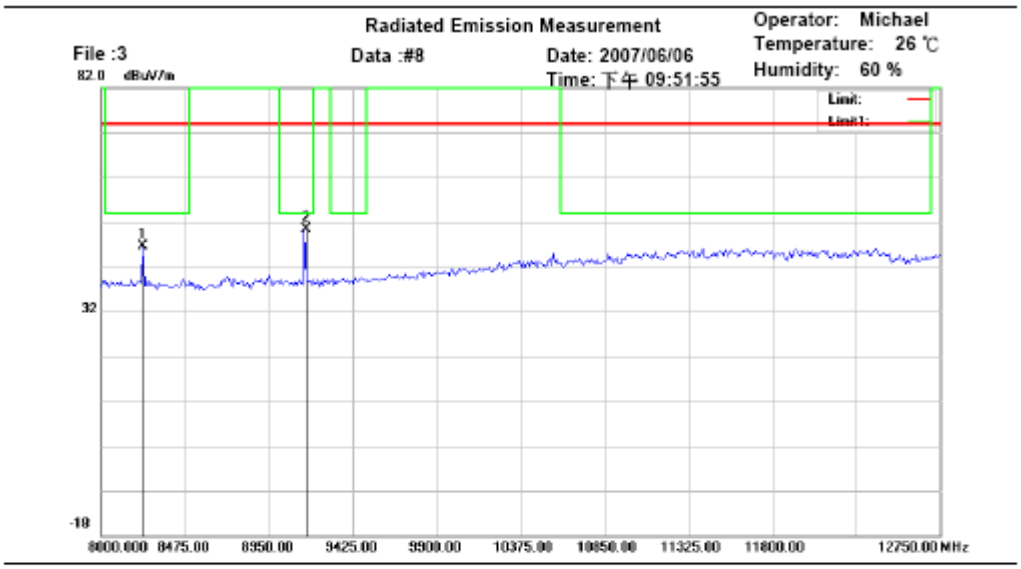


Site : site #1
Condition : FCC 15.247
Company : W6M20705-8132
EUT Model: TRX970HAU
Execute Program : middle channel
Note :

Polarization: *Horizontal*
Power : 4.2 VDC
Distance: 3m

Mk.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	9151.804	43.07	peak	3.63	46.70	74.00	155	205	-27.30	

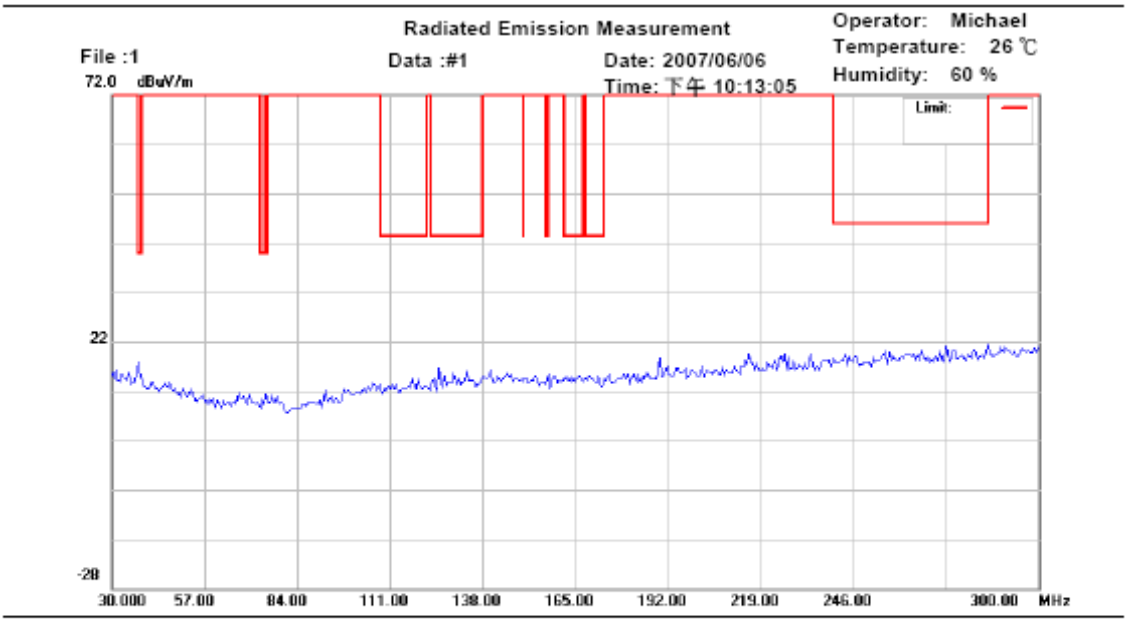
Registration number: W6M20705-8132-P-15
FCC ID : H5OTR23



Site : site #1
Condition : FCC 15.247
Company : W6M20705-8132
EUT Model: TRX970HAU
Execute Program : middle channel
Note :

Polarization: *Vertical*
Power : 4.2 VDC
Distance: 3m

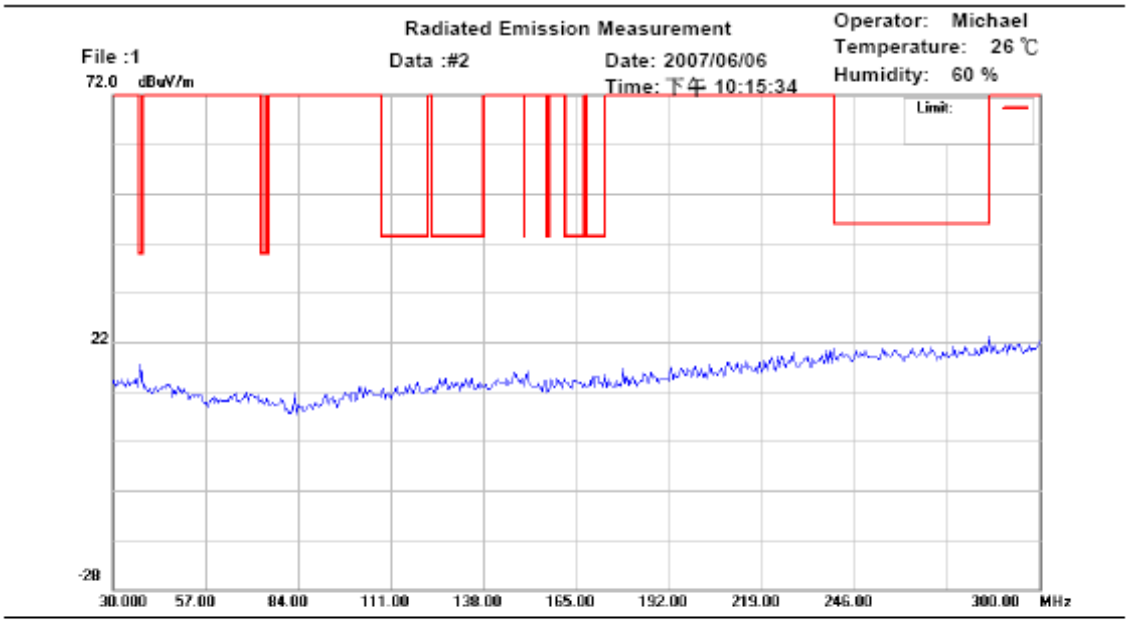
Mk.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	8237.976	44.09	peak	2.60	46.69	74.00	155	190	-27.31	
*	9151.804	46.74	peak	3.63	50.37	74.00	155	190	-23.63	



Site : site #1
Condition : FCC 15.247
Company : W6M20705-8132
EUT Model: TRX970HAU
Execute Program : high channel
Note :

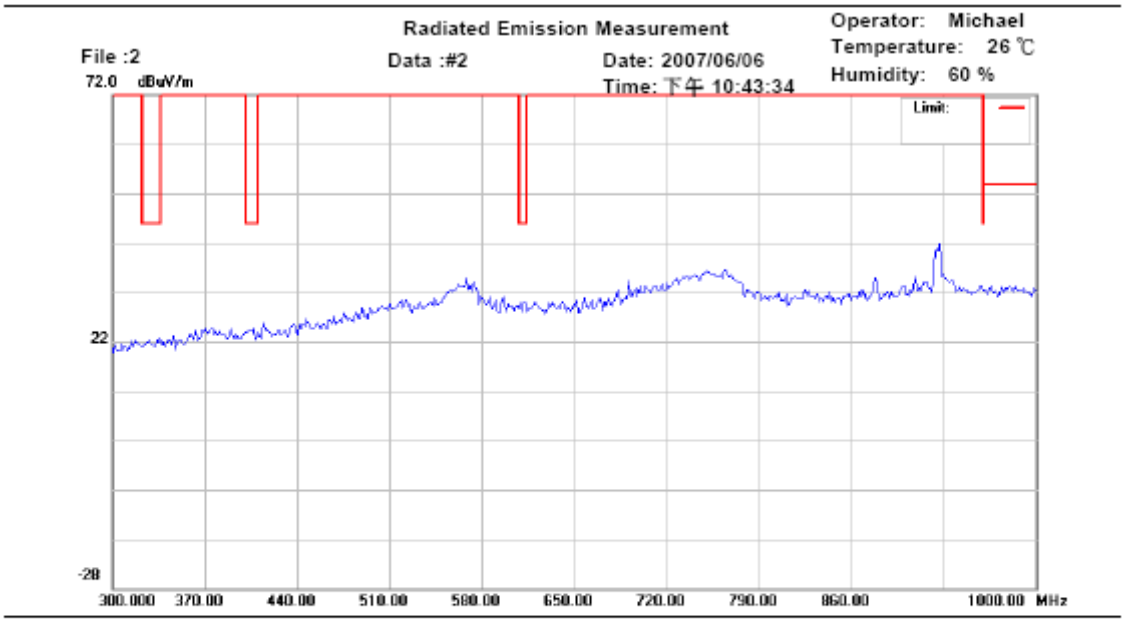
Polarization: *Horizontal*
Power : 4.2 VDC
Distance: 3m

Registration number: W6M20705-8132-P-15
FCC ID : H5OTR23



Site : site #1
Condition : FCC 15.247
Company : W6M20705-8132
EUT Model: TRX970HAU
Execute Program : high channel
Note :

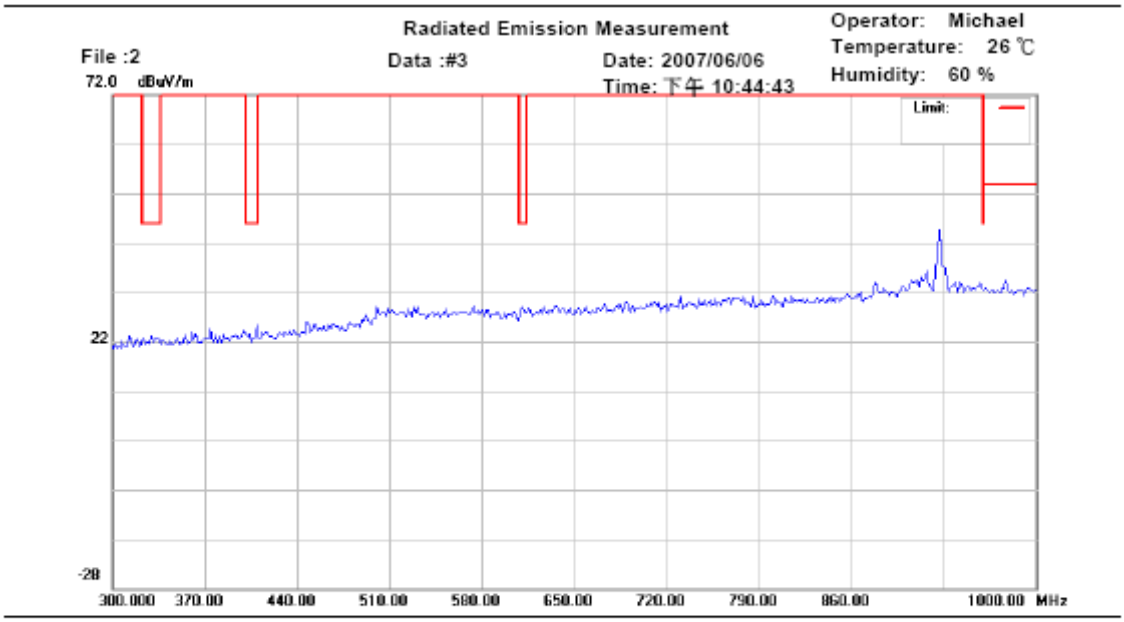
Polarization: *Vertical*
Power : 4.2 VDC
Distance: 3m



Site : site #1
Condition : FCC 15.247
Company : W6M20705-8132
EUT Model: TRX970HAU
Execute Program : high channel
Note :

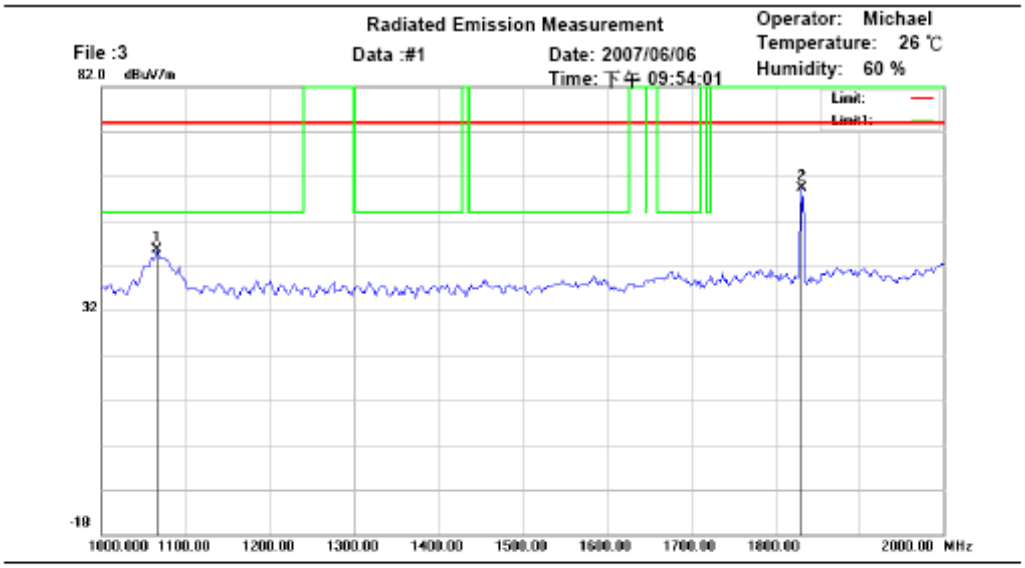
Polarization: *Horizontal*
Power : 4.2 VDC
Distance: 3m

Registration number: W6M20705-8132-P-15
FCC ID : H5OTR23



Site : site #1
Condition : FCC 15.247
Company : W6M20705-8132
EUT Model: TRX970HAU
Execute Program : high channel
Note :

Polarization: *Vertical*
Power : 4.2 VDC
Distance: 3m

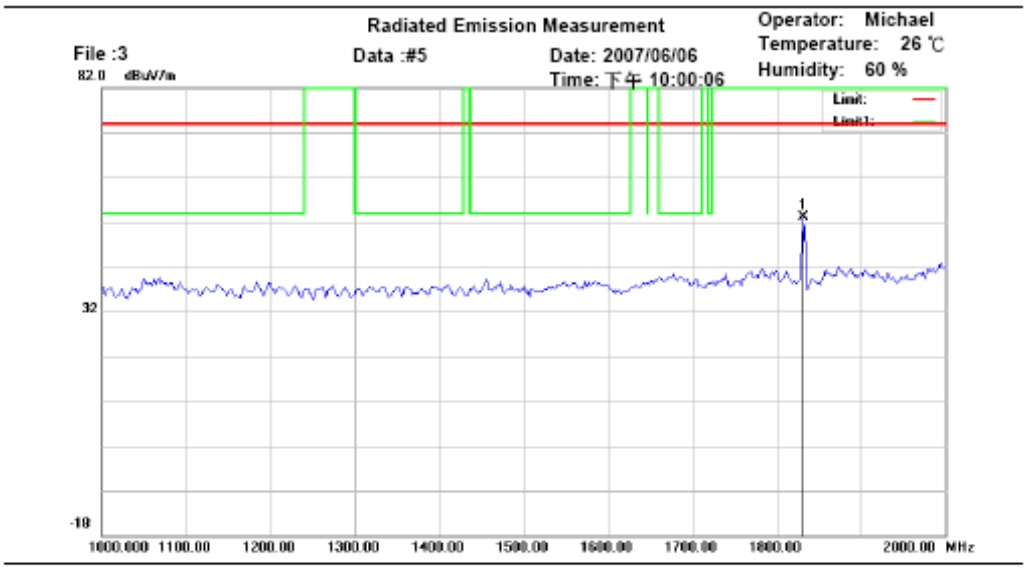


Site : site #1
Condition : FCC 15.247
Company : W6M20705-8132
EUT Model: TRX970HAU
Execute Program : high channel
Note :

Polarization: *Horizontal*
Power : 4.2 VDC
Distance: 3m

Mk.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	1066.132	57.38	peak	-11.81	45.57	74.00	155	150	-28.43	
*	1831.663	69.03	peak	-9.64	59.39	74.00	155	150	-14.61	

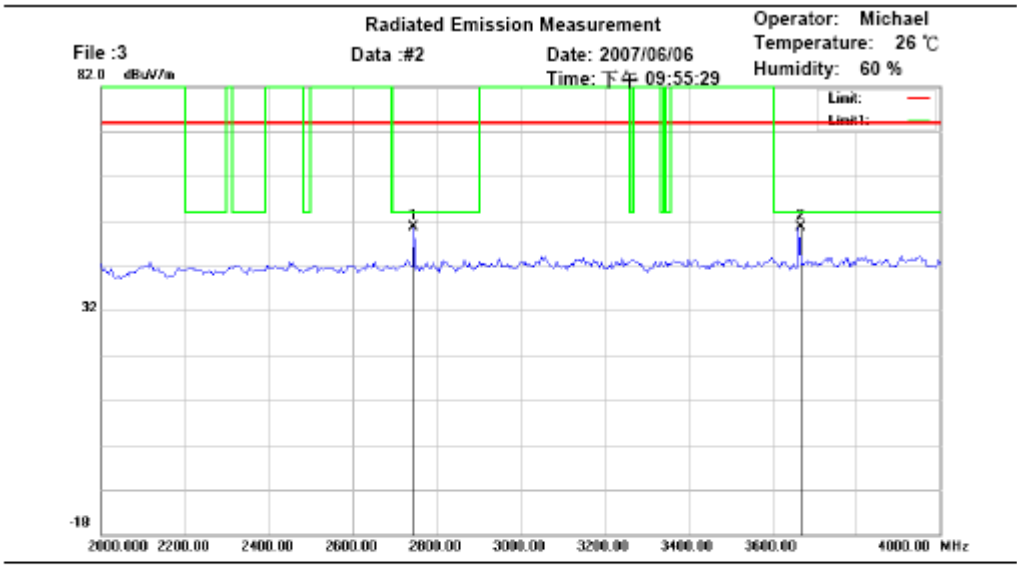
Registration number: W6M20705-8132-P-15
FCC ID : H5OTR23



Site : site #1
Condition : FCC 15.247
Company : W6M20705-8132
EUT Model: TRX970HAU
Execute Program : high channel
Note :

Polarization: *Vertical*
Power : 4.2 VDC
Distance: 3m

Mk.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	1831.663	62.65	peak	-9.64	53.01	74.00	155	165	-20.99	

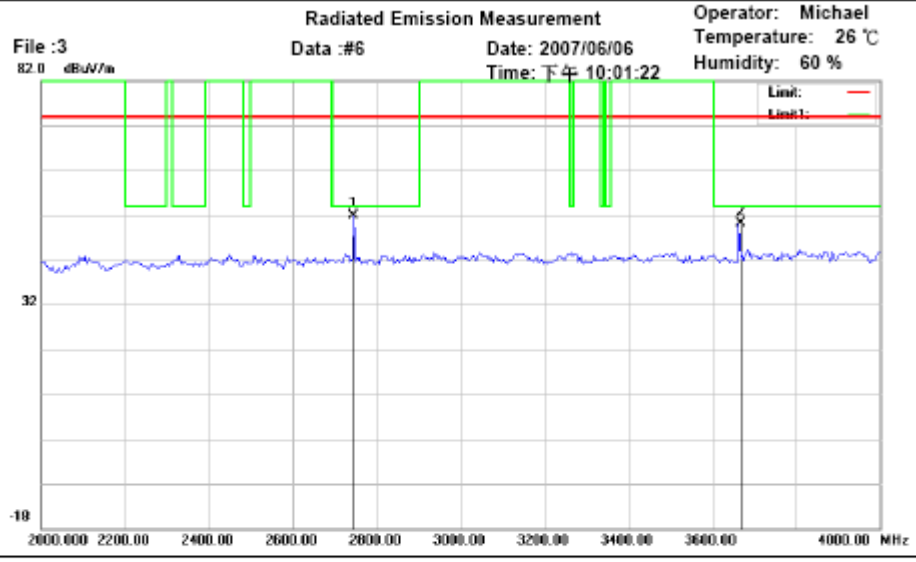


Site : site #1
Condition : FCC 15.247
Company : W6M20705-8132
EUT Model: TRX970HAU
Execute Program : high channel
Note :

Polarization: *Horizontal*
Power : 4.2 VDC
Distance: 3m

Mk.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	2745.491	57.33	peak	-6.71	50.62	74.00	150	155	-23.38	
	3663.327	55.59	peak	-5.01	50.58	74.00	150	155	-23.42	

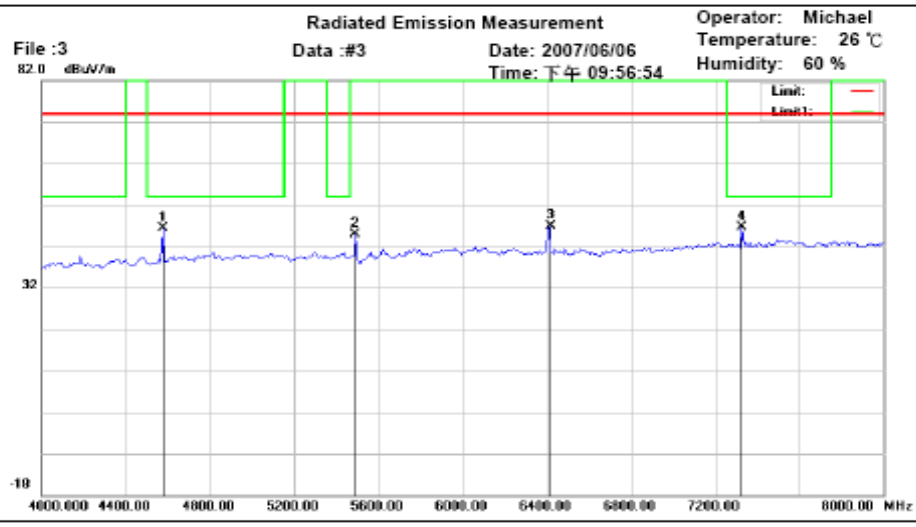
Registration number: W6M20705-8132-P-15
FCC ID : H5OTR23



Site : site #1
Condition : FCC 15.247
Company : W6M20705-8132
EUT Model: TRX970HAU
Execute Program : high channel
Note :

Polarization: *Vertical*
Power : 4.2 VDC
Distance: 3m

Mk.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	2745.491	58.53	peak	-6.71	51.82	74.00	145	160	-22.18	
	3663.327	55.02	peak	-5.01	50.01	74.00	145	160	-23.99	

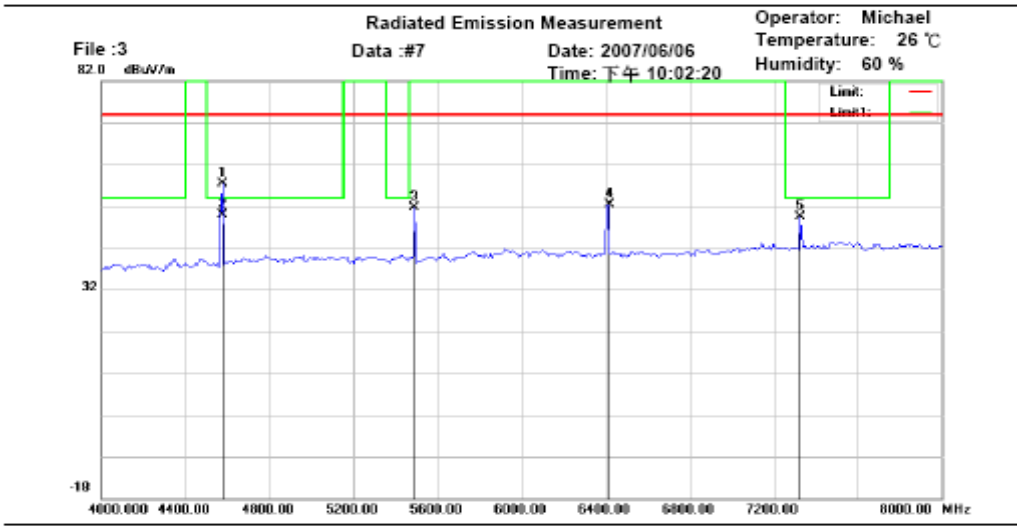


Site : site #1
Condition : FCC 15.247
Company : W6M20705-8132
EUT Model: TRX970HAU
Execute Program : high channel
Note :

Polarization: *Horizontal*
Power : 4.2 VDC
Distance: 3m

Mk.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	4577.154	50.00	peak	-3.55	46.45	74.00	150	165	-27.55	
	5490.982	46.02	peak	-1.11	44.91	74.00	150	165	-29.09	
*	6412.826	46.84	peak	0.12	46.96	74.00	150	165	-27.04	
	7326.653	44.45	peak	2.28	46.73	74.00	150	165	-27.27	

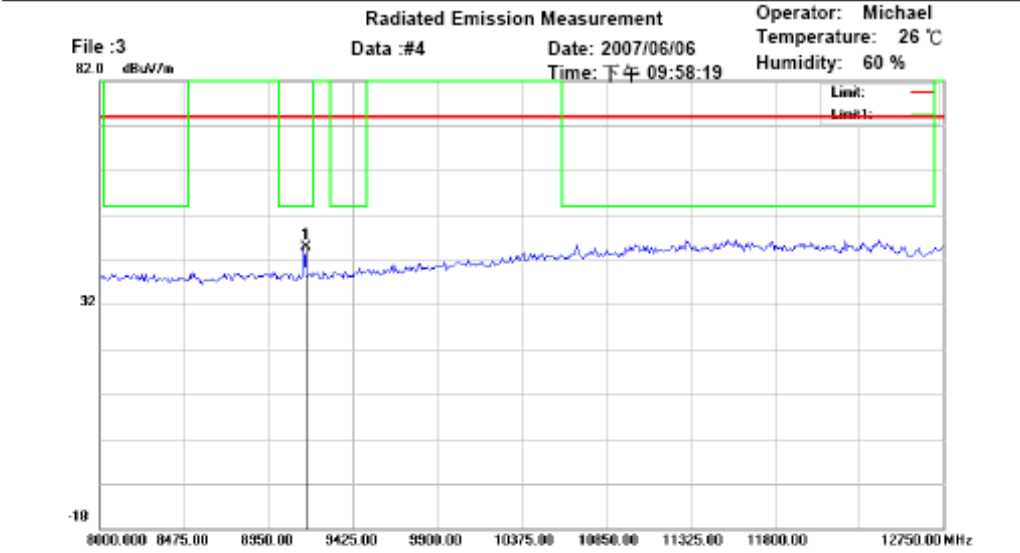
Registration number: W6M20705-8132-P-15
FCC ID : H5OTR23



Site : site #1
Condition : FCC 15.247
Company : W6M20705-8132
EUT Model: TRX970HAU
Execute Program : high channel
Note :

Polarization: *Vertical*
Power : 4.2 VDC
Distance: 3m

Mk.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	4577.154	61.03	peak	-3.55	57.48	74.00	150	271	-16.52	
*	4577.154	53.40	AVG	-3.55	49.85	54.00	150	271	-4.15	
	5490.982	52.85	peak	-1.11	51.74	74.00	150	175	-22.26	
	6412.826	52.29	peak	0.12	52.41	74.00	150	175	-21.59	
	7326.653	47.01	peak	2.28	49.29	74.00			-24.71	

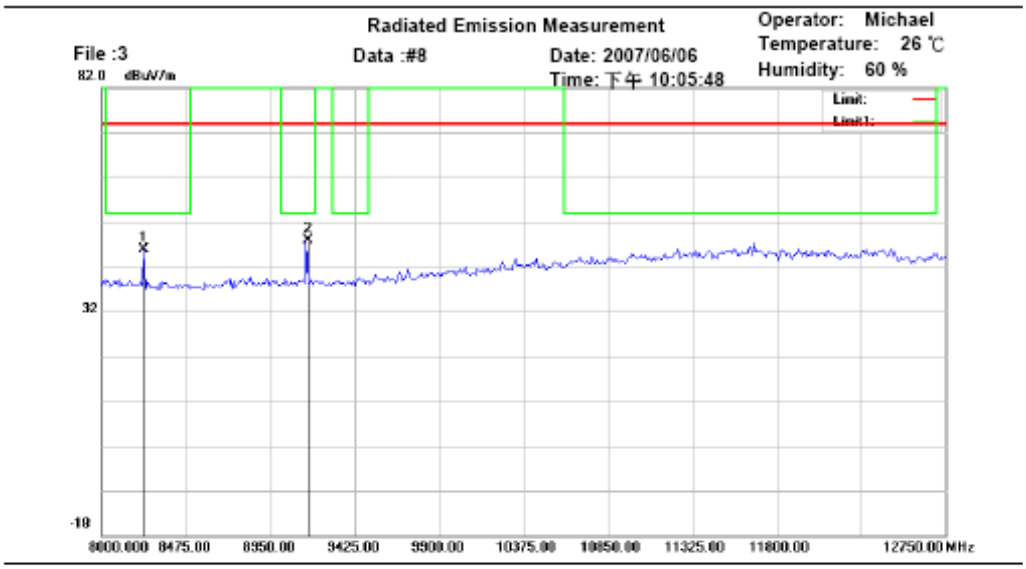


Site : site #1
Condition : FCC 15.247
Company : W6M20705-8132
EUT Model: TRX970HAU
Execute Program : high channel
Note :

Polarization: *Horizontal*
Power : 4.2 VDC
Distance: 3m

Mk.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
*	9151.804	41.26	peak	3.63	44.89	74.00	150	165	-29.11	

Registration number: W6M20705-8132-P-15
FCC ID : H5OTR23



Site : site #1
Condition : FCC 15.247
Company : W6M20705-8132
EUT Model: TRX970HAU
Execute Program : high channel
Note :

Polarization: *Vertical*
Power : 4.2 VDC
Distance: 3m

Mk.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Ant.Pos (cm)	Tab.Pos (deg.)	Margin (dB)	Comment
	8237.976	43.21	peak	2.60	45.81	74.00	155	185	-28.19	
*	9151.804	44.29	peak	3.63	47.92	74.00	155	185	-26.08	

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.**

All other not noted test plots do not contain significant test results in relation to the limits.

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

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 ETSTW-RE 064

3.7 Carrier Frequency Separation

Carrier Frequency Separation was measured with modulation (declared by manufacturer).

According to FCC rules part 15 subpart C §15.247 frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or 20 dB bandwidth of the hopping channel, whichever is greater.

Test conditions		**Channel Separation**	
		Channel 0	**Channel 0+1**
T_{nom}= 23°C	V_{nom} = 4.2 V	499.856230000 kHz	

Test conditions		**Channel Separation**	
		Channel 12	**Channel 12+1**
T_{nom}= 23°C	V_{nom} = 4.2 V	499.421530000 kHz	

Test conditions		**Channel Separation**	
		Channel 24	**Channel 24+1**
T_{nom}= 23°C	V_{nom} = 4.2 V	498.569889653 kHz	

Limits:

Frequency Range MHz	Limits	
	20 dB bandwidth < 25 kHz	20 dB bandwidth > 25 kHz
902-928	25 kHz	20 dB bandwidth
2400-2483.5 5725-5850.0	25 kHz	20 dB bandwidth

Test equipment used: ETSTW-RE 003 ETSTW-RE 004 ETSTW-RE 055 ETSTW-RE 064

Comment: See attached diagram as appendix.

Registration number: W6M20705-8132-P-15
FCC ID : H5OTR23

3.8 Number of Hopping Frequencies

According to FCC rules part 15 subpart C §15.247 frequency hopping systems operating in the 2400-2483.5 MHz band shall use at least 15 hopping frequencies. Frequency hopping systems in 5725-5850 MHz bands shall use least 75 hopping frequencies.

For frequency hopping systems operating in the 902-928 MHz band: if the 20dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies; if the 20dB bandwidth of the hopping channel 250 kHz or greater, the system shall use at least 25 hopping frequencies.

Test conditions		Operating Mode	Number of Channels
T_{nom}= 23°C	V_{nom}= 12 V	normal transmitting	25
T_{nom}= 23°C	V_{nom}= 12 V	Inquiry mode	--

Limits:

Frequency Range MHz	Limit			
	20dB Bandwidth		20dB Bandwidth < 250 kHz	20dB Bandwidth ≥ 250 kHz
	≤ 1MHz			
902-928 MHz			≥ 50	≥ 25
2400-2483.5	≥ 15	≥ 15		
5725-5850.0 MHz	≥ 75			

Test equipment used: ETSTW-RE 003 ETSTW-RE 004 ETSTW-RE 055 ETSTW-RE 064

Comment: See attached diagrams as appendix.

3.8.1 Pseudorandom Frequency Hopping Sequence

This FHSS transmitter is controlled by a microchip to generate the Pseudorandom Frequency Hopping Sequence. There are three hopping sequences listed below:

Sequence A : 915.5, 914, 912.47, 910.5, 913.45, 911.5, 910, 909, 909.5, 911, 912.96, 914.5, 916.51, 916, 915, 917.6, 919.6, 921.77, 920.29, 918.11, 919.11, 921.29, 920.8, 918.62, 917.05

Sequence B : 921.29, 919.11, 917.6, 919.6, 918.11, 916, 914.5, 912.96, 910.5, 909, 911, 909.5, 911.5, 910, 912.47, 914, 913.45, 915, 917.05, 915.5, 916.51, 918.62, 920.8, 921.77, 920.29

Sequence C : 913.45, 915.5, 918.11, 920.29, 920.8, 918.62, 916.51, 915, 912.96, 911, 910, 911.5, 909.5, 909, 910.5, 912.47, 914, 916, 917.6, 919.6, 921.77, 921.29, 919.11, 917.05, 914.5

3.8.2 Coordination of hopping sequences to other transmitters

This transmitter does not have the ability of being coordinated with other FHSS system for as soon as the transmitter is in operation, the hopping frequency will follow the selected hopping sequence to transmit independently and no coordination is possible. Especially, this transmitter is used as a duplex car alarm system, so no coordination of hopping frequency is required.

3.8.3 System Receiver Hopping Capability

There are two steps to make the receiver to shift the frequencies in synchronization with the transmitted signals:
First, the Transmitter will emit a preamble signal of 50 ms and the receiver will scan this signal by 2ms sweeping until the preamble signal is caught. Second, the preamble signal is coded with the information of hopping sequence and the next transmitting frequency, so the receiver will be able to shift the receiving frequencies in synchronization with the transmitted signals.

3.8.4 Equal Hopping Frequency Use

Due to each hopping frequency will be transmitted in accordance to the frequency tables described above, there is no any frequency will be able to hop more times than others. Therefore each frequency will be used equally.

3.9 Time of Occupancy (Dwell Time)

Frequency hopping systems operating in the 5725-5850 MHz band shall use an average time of occupancy on any frequency not greater than 0.4 seconds within a 30 second period.

In 2400-2483,5 MHz band the average time of occupancy on any channel shall not be greater than 0,4 seconds multiplied by the number of hopping channels employed.

For frequency hopping systems operating in the 902-928 MHz band: if the 20dB bandwidth of the hopping channel is less than 250 kHz, the average time of occupancy on any frequency shall not greater than 0.4 seconds within a 20 second period; if the 20dB bandwidth of the hopping channel is 250 kHz or greater, the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period.

Test conditions	**Operating mode**	**Measurement periode**	**Time of Occupancy**
T_{nom}= 23°C V_{nom} = 4.2 V Channel 1	normal transmitting		388.143 ms

Test conditions	**Operating mode**	**Measurement periode**	**Time of Occupancy**
T_{nom}= 23°C V_{nom} = 4.2 V Channel 13	normal transmitting		388.143 ms

Test conditions	**Operating mode**	**Measurement periode**	**Time of Occupancy**
T_{nom}= 23°C V_{nom} = 4.2 V Channel 25	normal transmitting		388.143 ms

Limits and measurement periods:

Frequency MHz	Number of channels	Measurement Periode	Limit
902 – 928	≥50	20 s	0,4 s
	49 ≥ 25	10 s	0,4 s
2400 – 2483,5	≥ 15	0,4 s * number of used channels	0,4 s
5725- 5850	≥ 75	30 s	0,4s

Registration number: W6M20705-8132-P-15
FCC ID : H5OTR23

Test equipment used: ETSTW-RE 003 ETSTW-RE 004 ETSTW-RE 055 ETSTW-RE 064

Comment: See attached diagrams as appendix, which show the On-time and the number of counted events during the measurement period

3.10 20dB Bandwidth

Frequency hopping systems operating in the 5725-5850 MHz bands shall use a maximum 20dB bandwidth of 1 MHz.
The 20dB bandwidth is measured on the lowest, middle and highest hopping channel.

For frequency hopping systems operating in the 902-928 MHz band the maximum 20dB bandwidth of the hopping channel is 500 kHz.

Test conditions		20 dB Bandwidth		
		Channel A	Channel B	Channel C
T_{nom}= 23°C	V_{nom} = 4.2 V	384.80 kHz	394.40 kHz	369.60 kHz

Limits:

Frequency Range / MHz	Number of channels	Limit
902-928	< 50	< 250 kHz
	49 ≥ 25	500 kHz ≥ 250 kHz
2400-2483.5	≥ 15	not determined
5725-5850	75	≤ 1 MHz

Test equipment used: ETSTW-RE 003 ETSTW-RE 004 ETSTW-RE 055 ETSTW-RE 064

Comment: See attached diagram as appendix.

3.10.1 System Receiver Input Bandwidth

The receiver's bandwidth is 420kHz and transmitter's signal is about 380kHz, so the receiver's bandwidth can match the bandwidth of the transmitter.

3.11 Band-edge Compliance of RF Emissions

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.

Test conditions		Attenuation at or outside band-edges **Single Frequency**	
		Lower Band-edge	Upper Band-edge
T_{nom}= 23°C	V_{nom} = 4.2 V	59.01 dB	59.76 dB

Test conditions		Attenuation at or outside band-edges **Hopping Fequency**	
		Lower Band-edge	Upper Band-edge
T_{nom}= 23°C	V_{nom} = 4.2 V	54.95 dB	55.27 dB

Limits:

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

Test equipment used: ETSTW-RE 003 ETSTW-RE 004 ETSTW-RE 017ETSTW-RE 028
ETSTW-RE 030 ETSTW-RE 043 ETSTW-RE 044 ETSTW-RE 064

Comment: See attached diagrams as appendix.

Registration number: W6M20705-8132-P-15
FCC ID : H5OTR23

3.12 Radiated Emissions from Digital Part

FCC Rule: 15.109

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 ETSTW-RE 064

Comment: This test is not required because the frequency is above 960MHz.

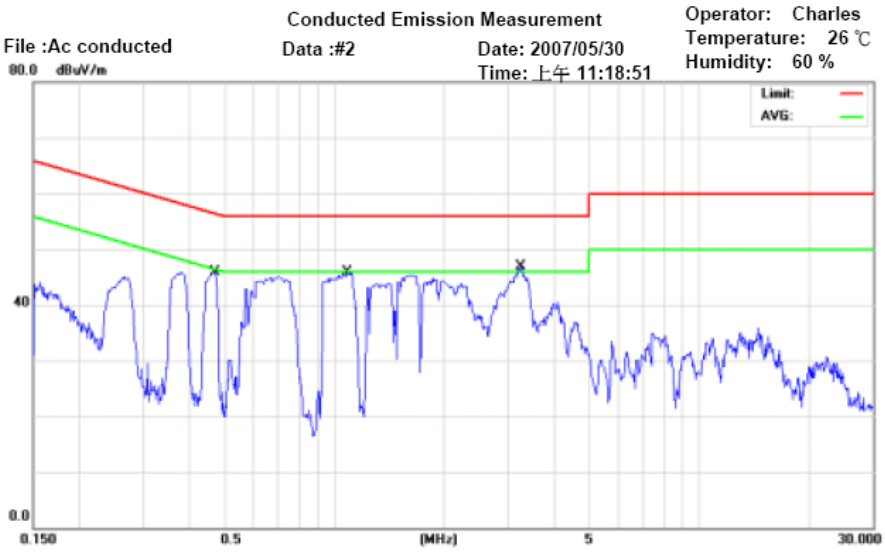
Registration number: W6M20705-8132-P-15
FCC ID : H5OTR23

3.13 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

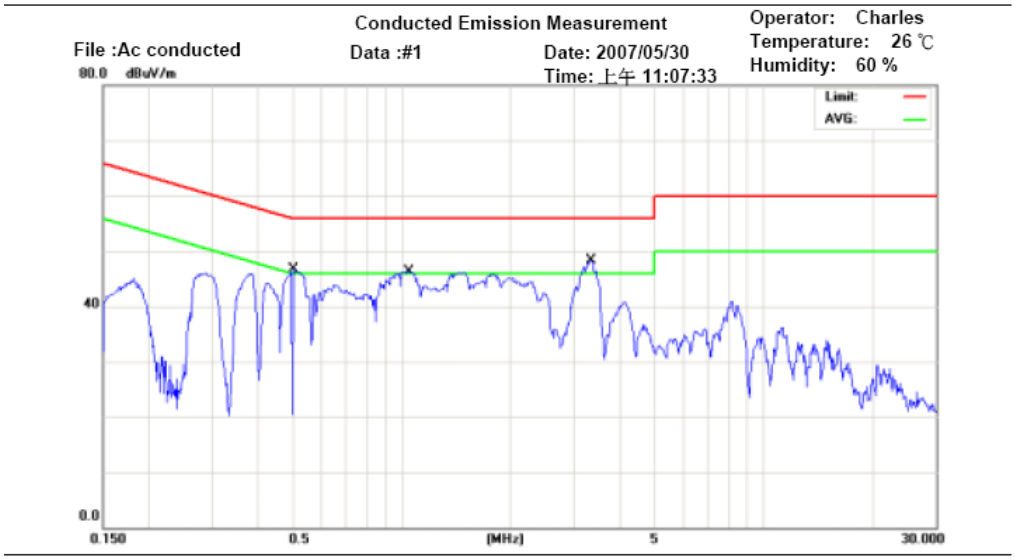


Site : site #1
Condition : FCC Class B Conduction(QP)
Company : W6M20705-8132
EUT Model: TRX970HAU
Execute Program :
Note :

Phase: N
Power : AC 110V/60Hz

Mk.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Comment
*	0.4728	35.17	QP	10.10	45.27	56.46	-11.19	
	0.4728	19.46	AVG	10.10	29.56	46.46	-16.90	
	1.0850	30.97	QP	10.10	41.07	56.00	-14.93	
	1.0850	12.24	AVG	10.10	22.34	46.00	-23.66	
	3.2449	23.74	QP	10.10	33.84	56.00	-22.16	
	3.2449	5.44	AVG	10.10	15.54	46.00	-30.46	

Registration number: W6M20705-8132-P-15
FCC ID : H5OTR23



Site : site #1
Condition : FCC Class B Conduction(QP)
Company : W6M20705-8132
EUT Model: TRX970HAU
Execute Program :
Note :

Phase: L1
Power : AC 110V/60Hz

Mk.	Frequency (MHz)	Reading (dBuV/m)	Detector	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Comment
*	0.5020	35.98	QP	10.10	46.08	56.00	-9.92	
	0.5020	22.05	AVG	10.10	32.15	46.00	-13.85	
	1.0565	33.88	QP	10.10	43.98	56.00	-12.02	
	1.0565	14.70	AVG	10.10	24.80	46.00	-21.20	
	3.3400	28.38	QP	10.10	38.48	56.00	-17.52	
	3.3400	10.38	AVG	10.10	20.48	46.00	-25.52	

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

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, AV = Average
4. All not in the table noted test results are more than 20 dB below the relevant limits.

Test equipment used: ETSTW-CE 001 ETSTW-CE 003 ETSTW-CE 004 ETSTW-CE 006 ETSTW-RE 064

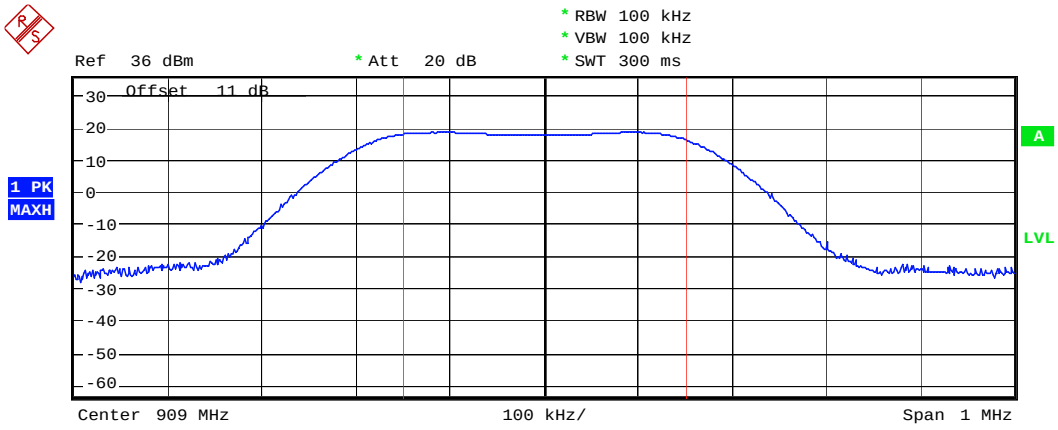
Appendix

A Measurement diagrams

1. Peak Output Power
2. Carrier Frequency Separation
3. Number of Hopping Frequencies
4. Time of Occupancy (Dwell Time)
5. 20dB Bandwidth
6. Band-edge Compliance of RF Conducted Emissions

B Photos

1. External Photos
2. Internal Photos
3. Set Up Photo of Radiated Emission
4. Set Up Photo of Conducted Emission



Tx Channel

Bandwidth	300 kHz	Power	22.25 dBm

Adjacent Channel

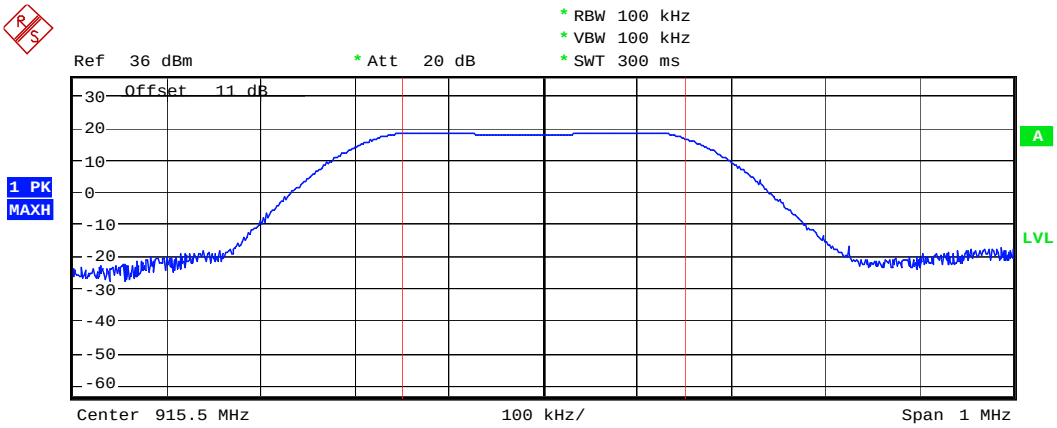
Bandwidth	500 kHz	Lower	-----
Spacing	16.5 MHz	Upper	-----

Alternate Channel

Bandwidth	500 kHz	Lower	-----
Spacing	27.5 MHz	Upper	-----

Max output power low channel

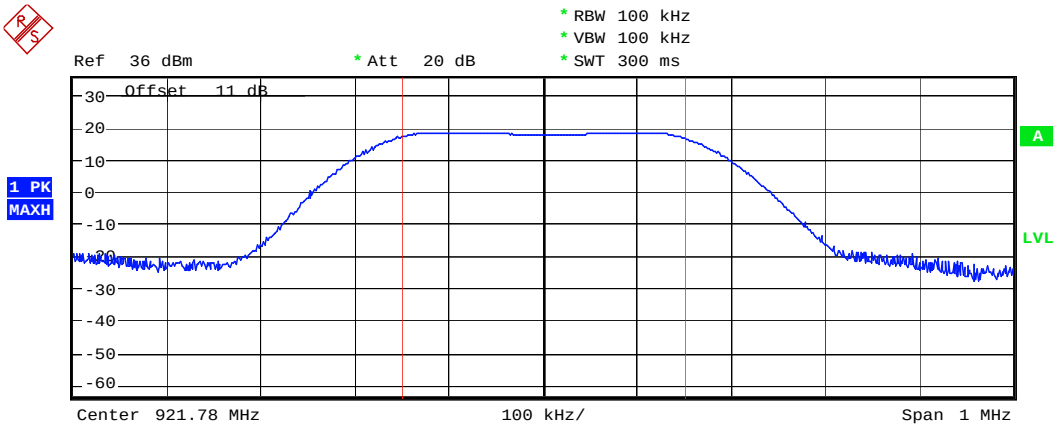
Date: 7.JUN.2007 18:34:59



Tx Channel			
Bandwidth	300 kHz	Power	22.29 dBm
Adjacent Channel			
Bandwidth	500 kHz	Lower	-----
Spacing	16.5 MHz	Upper	-----
Alternate Channel			
Bandwidth	500 kHz	Lower	-----
Spacing	27.5 MHz	Upper	-----

Max output power middle channel

Date: 7.JUN.2007 18:35:50



Tx Channel
Bandwidth 300 kHz

Power 22.27 dBm

Adjacent Channel
Bandwidth 500 kHz
Spacing 16.5 MHz

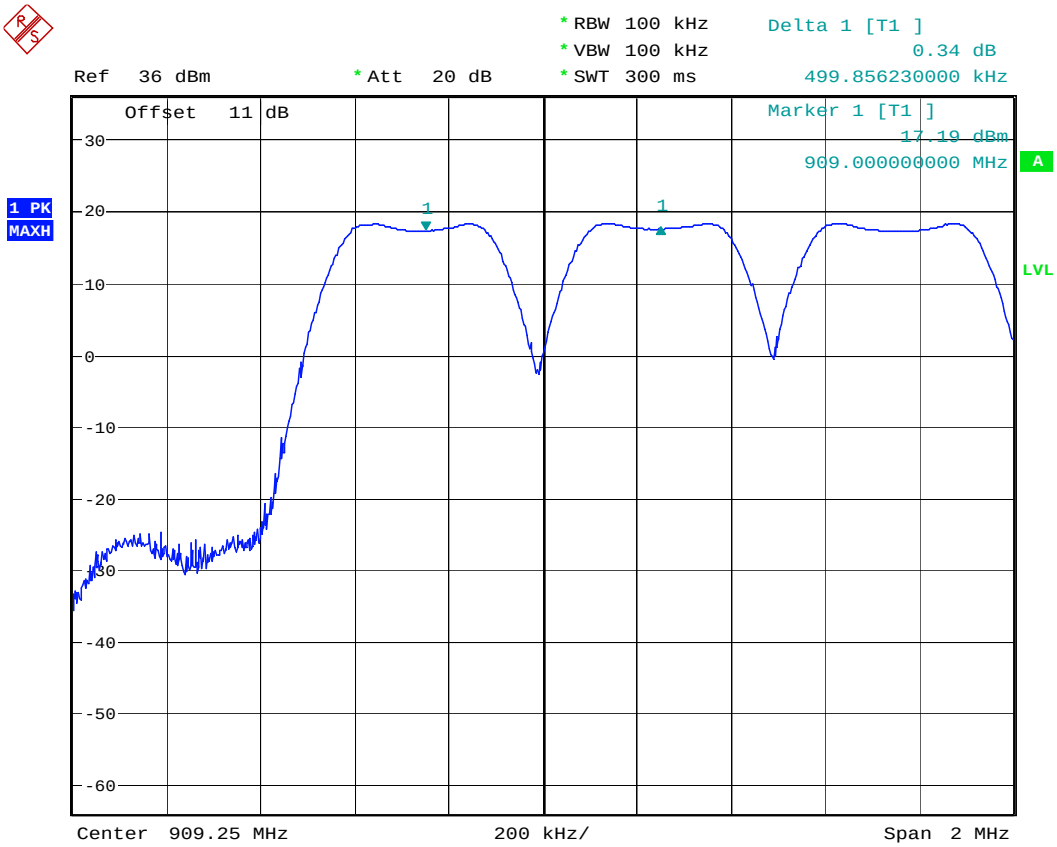
Lower -----
Upper -----

Alternate Channel
Bandwidth 500 kHz
Spacing 27.5 MHz

Lower -----
Upper -----

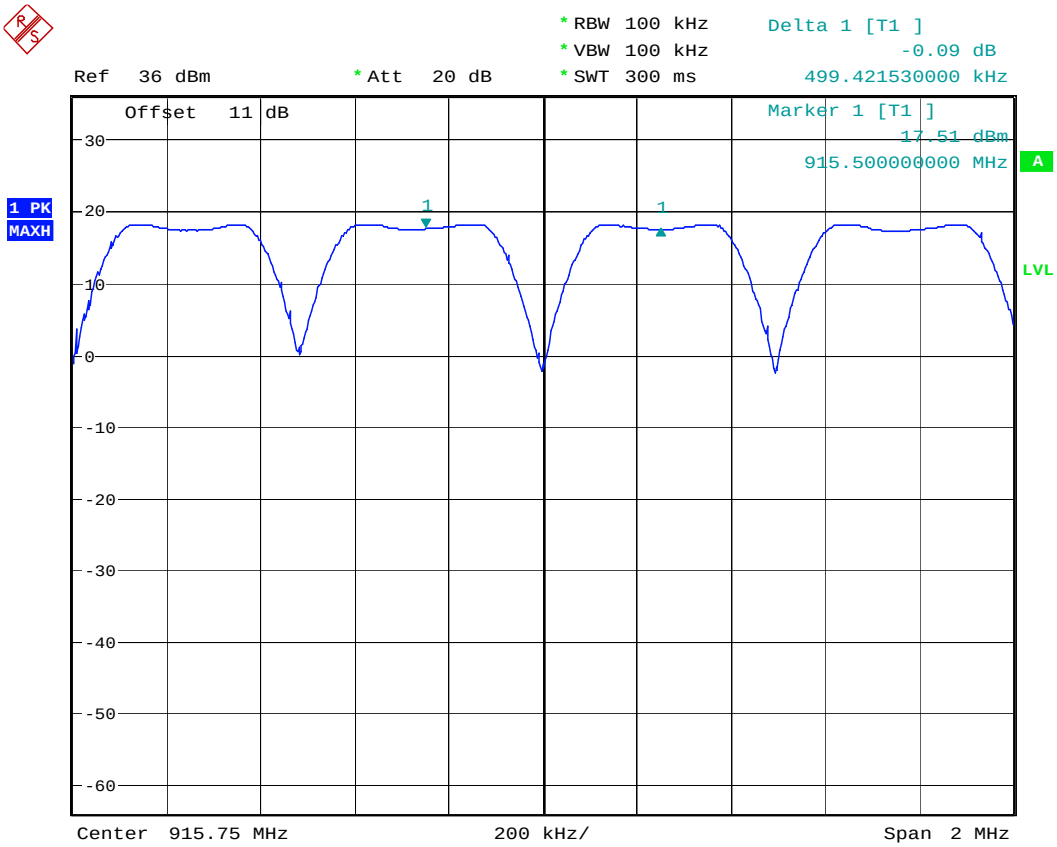
Max output power high channel

Date: 7.JUN.2007 18:36:44



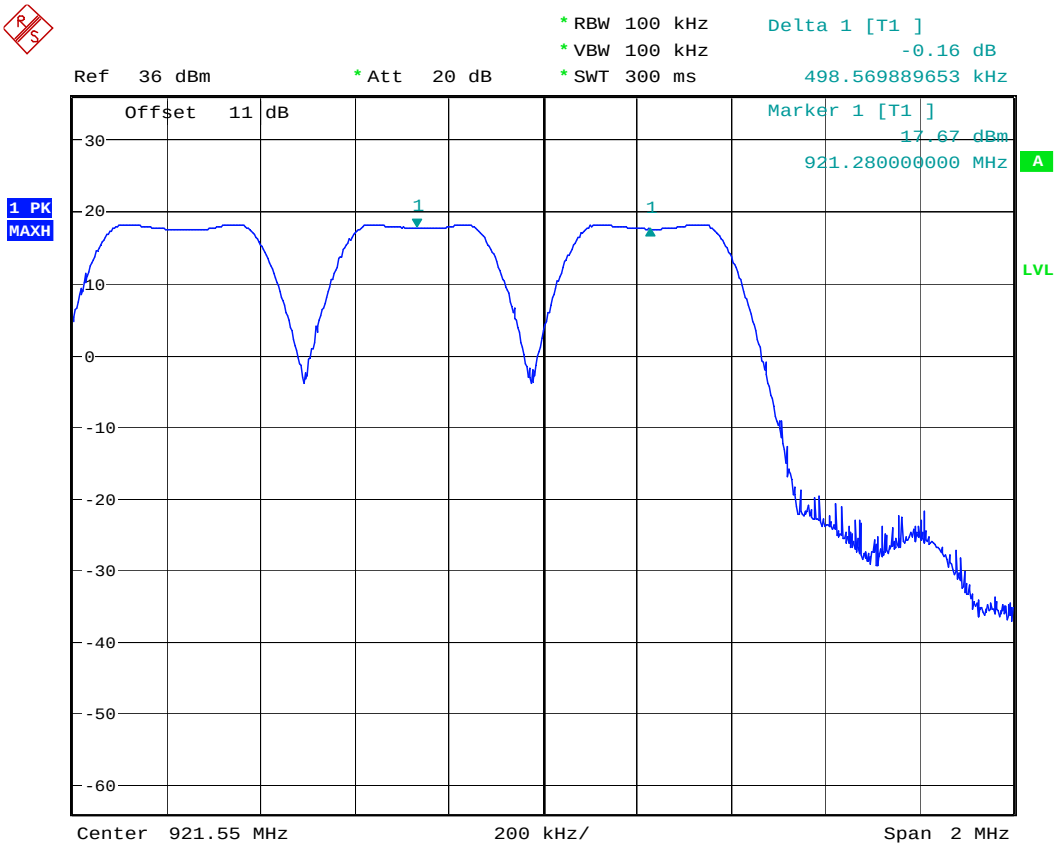
Frequency separation low channel

Date: 7.JUN.2007 18:57:51



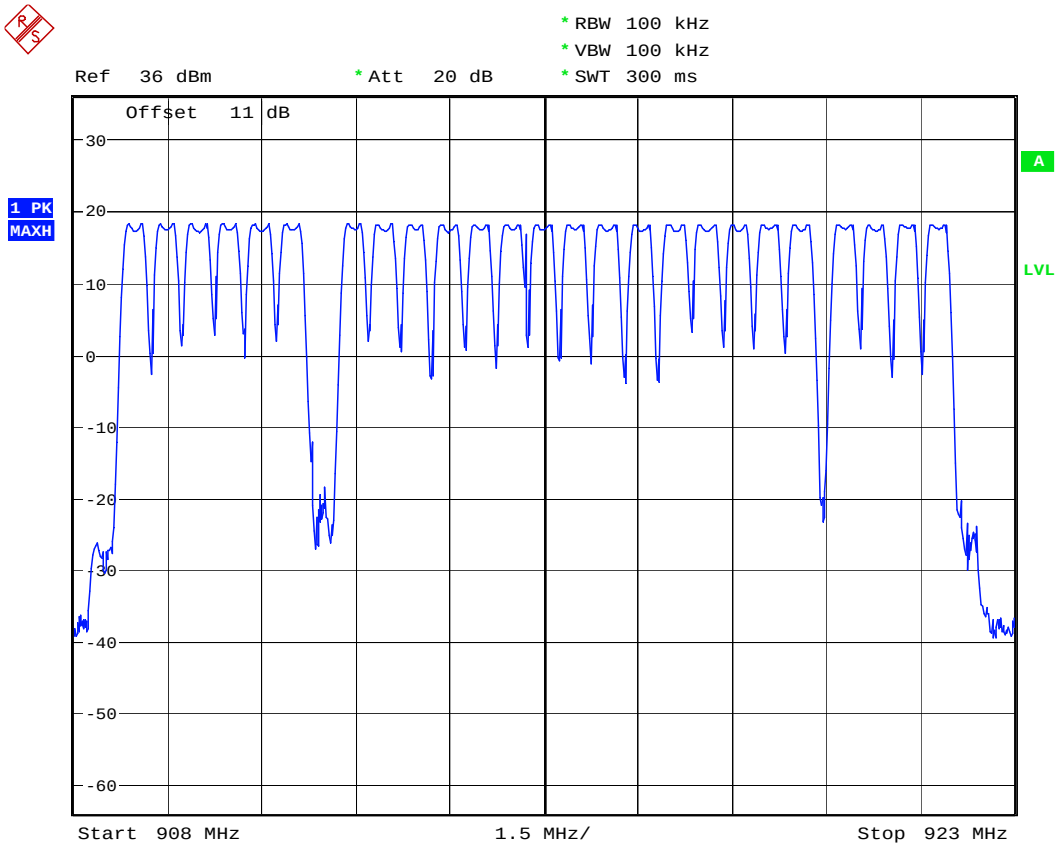
Frequency separation middle channel

Date: 7.JUN.2007 19:01:37



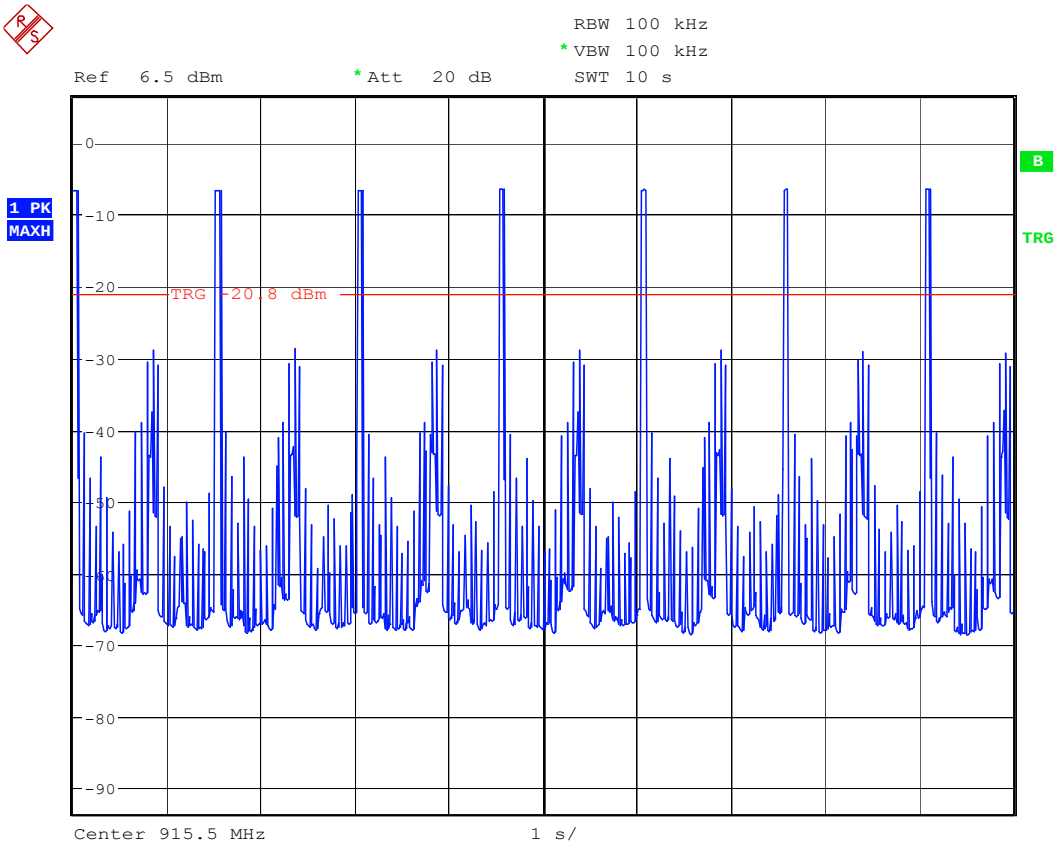
Frequency separation high channel

Date: 7.JUN.2007 19:05:05



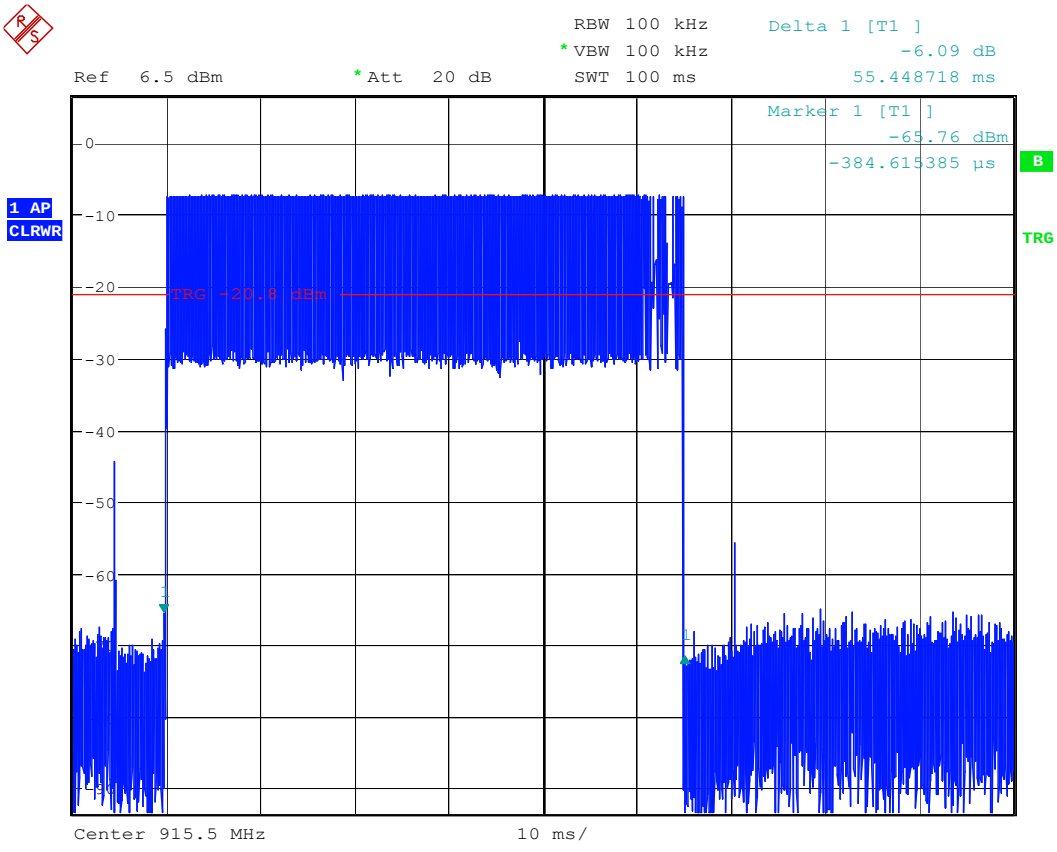
Number of hopping

Date: 7.JUN.2007 19:10:46



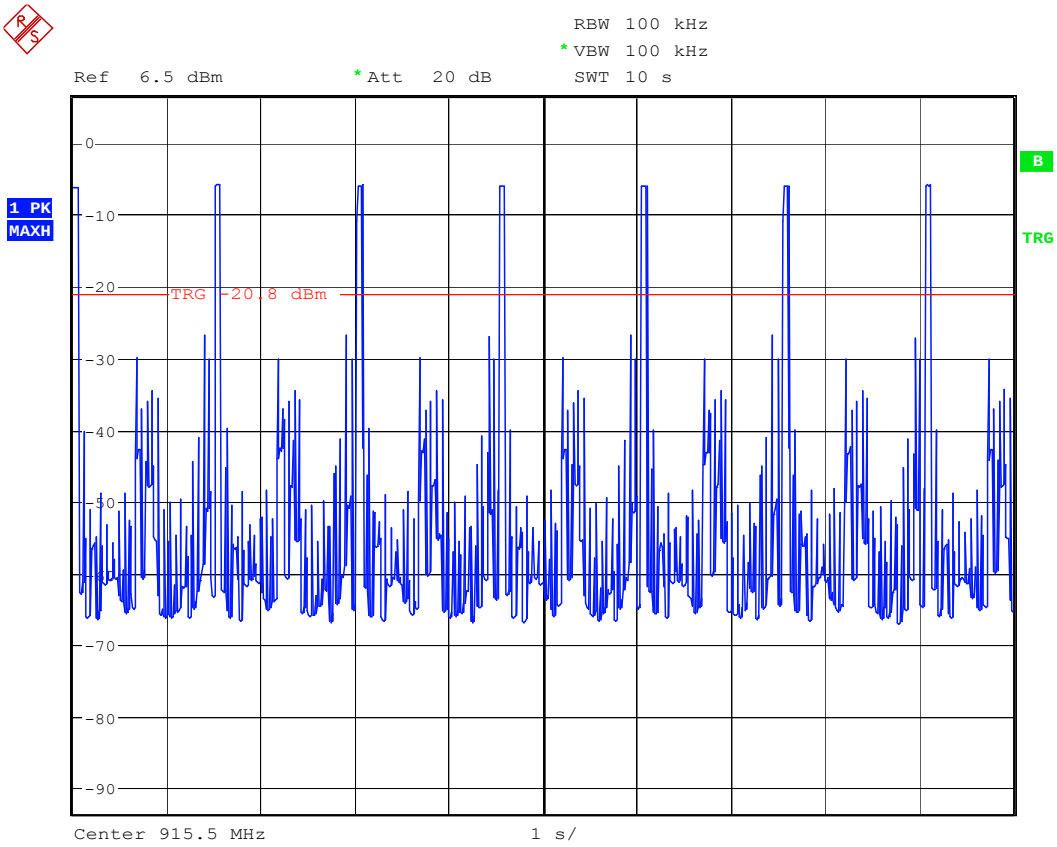
Dwell time 909MHz =55.449 ms*7=388.143ms

Date: 29.JUN.2007 18:06:41



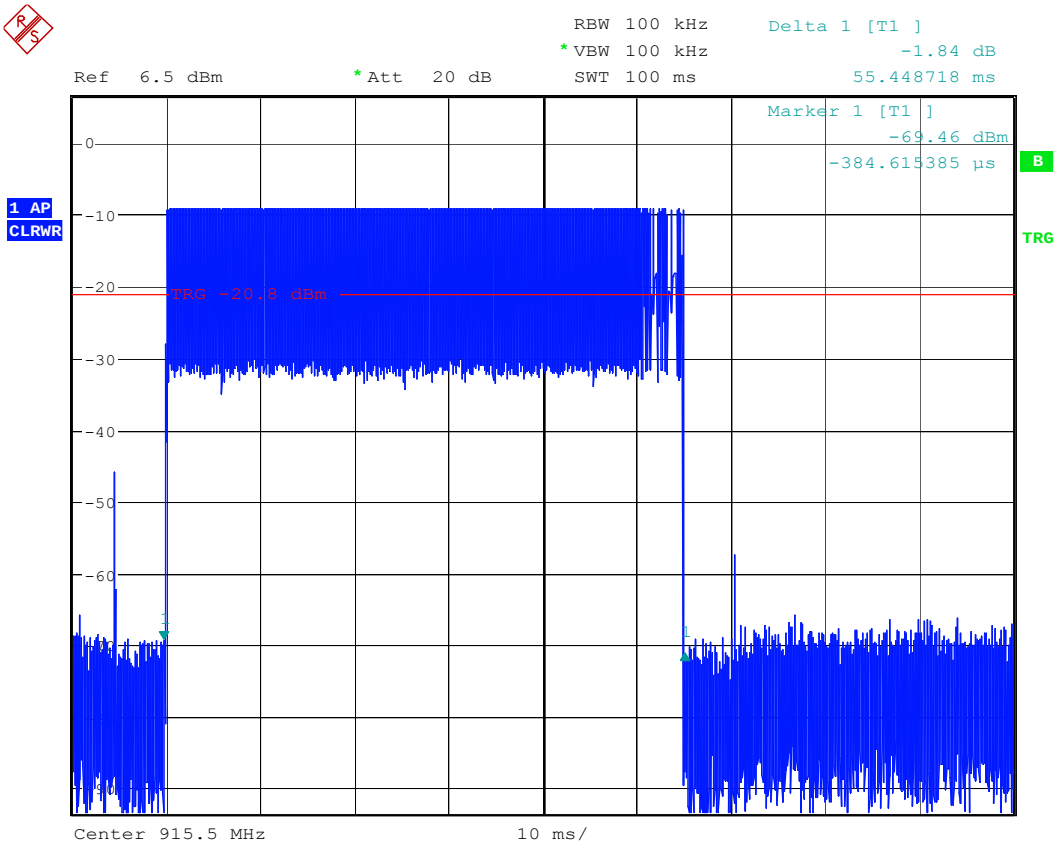
Dwell time 909MHz =55.449 ms*7=388.143ms

Date: 29.JUN.2007 18:06:13



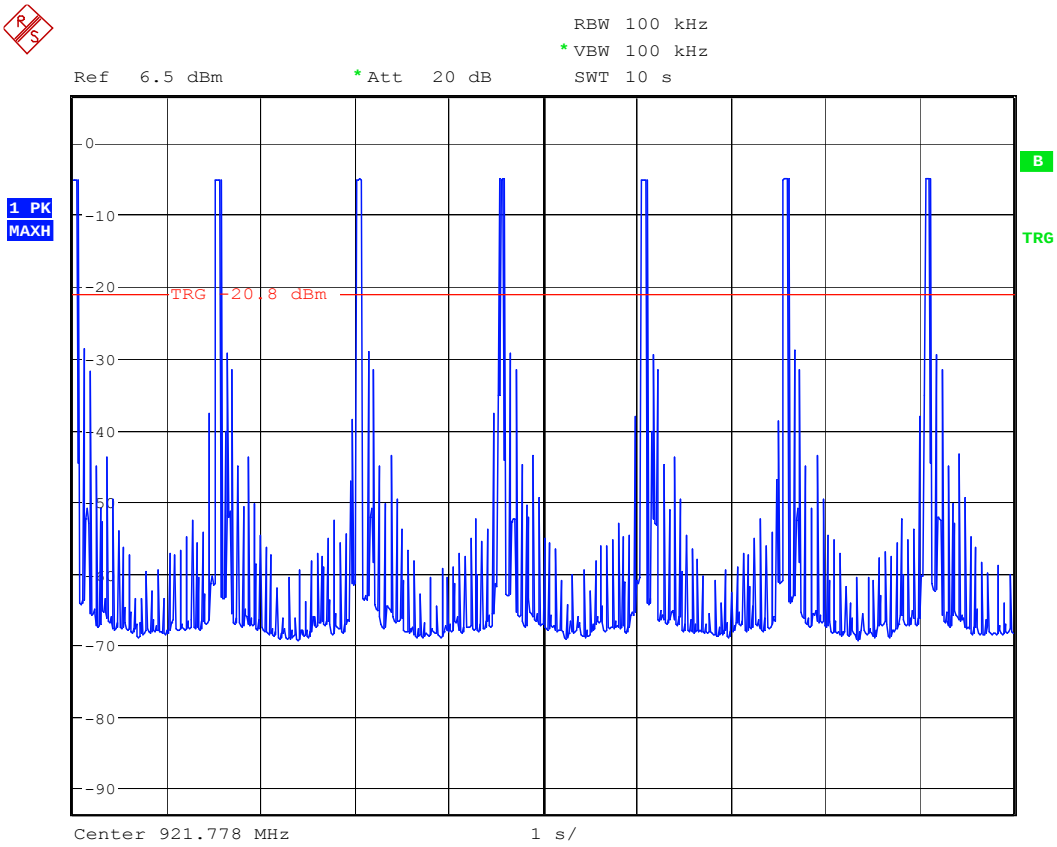
Dwell time 915.5MHz =55.449 ms*7=388.143ms

Date: 29.JUN.2007 18:05:06



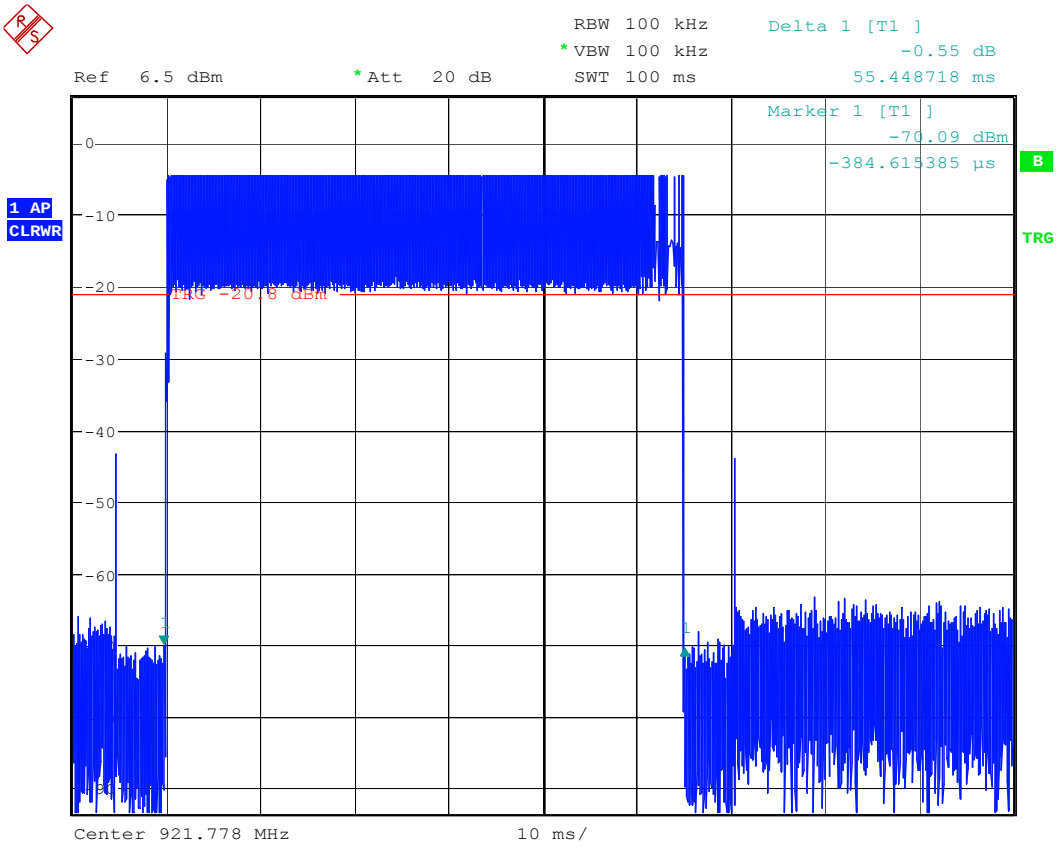
Dwell time 915.5MHz =55.449 ms*7=388.143ms

Date: 29.JUN.2007 18:05:32



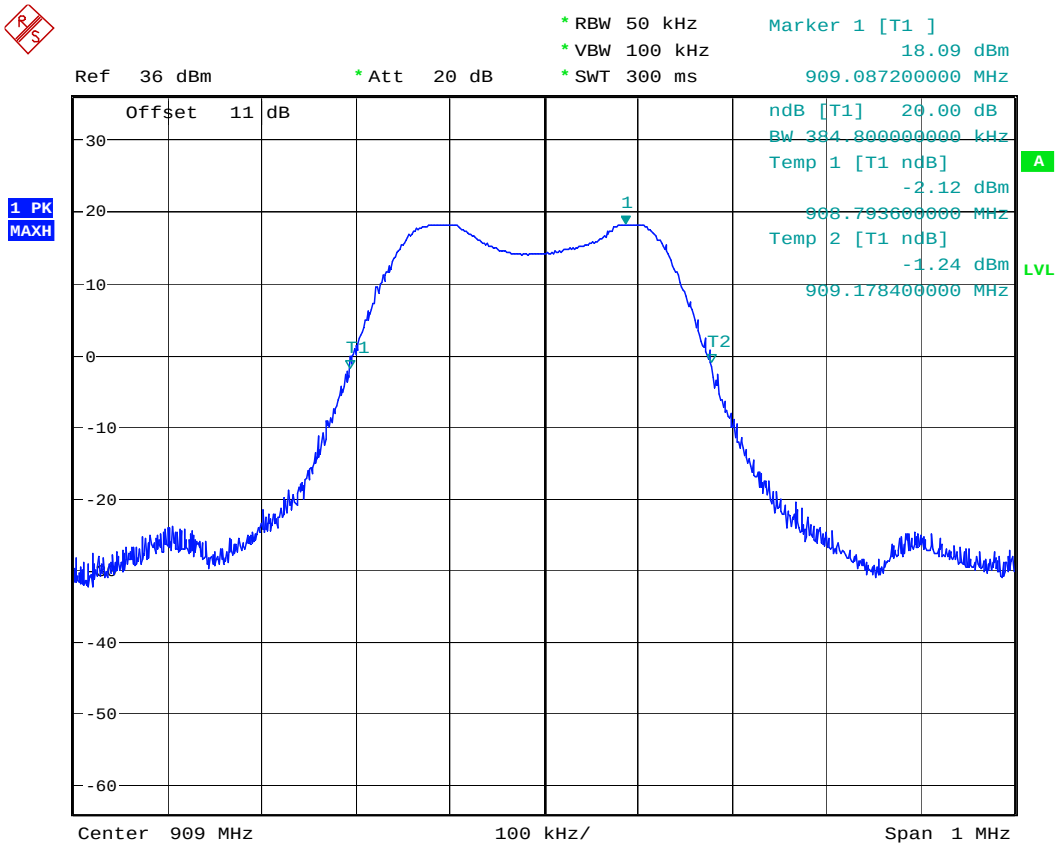
Dwell time 921.778MHz =55.449 ms*7=388.143ms

Date: 29.JUN.2007 18:07:11



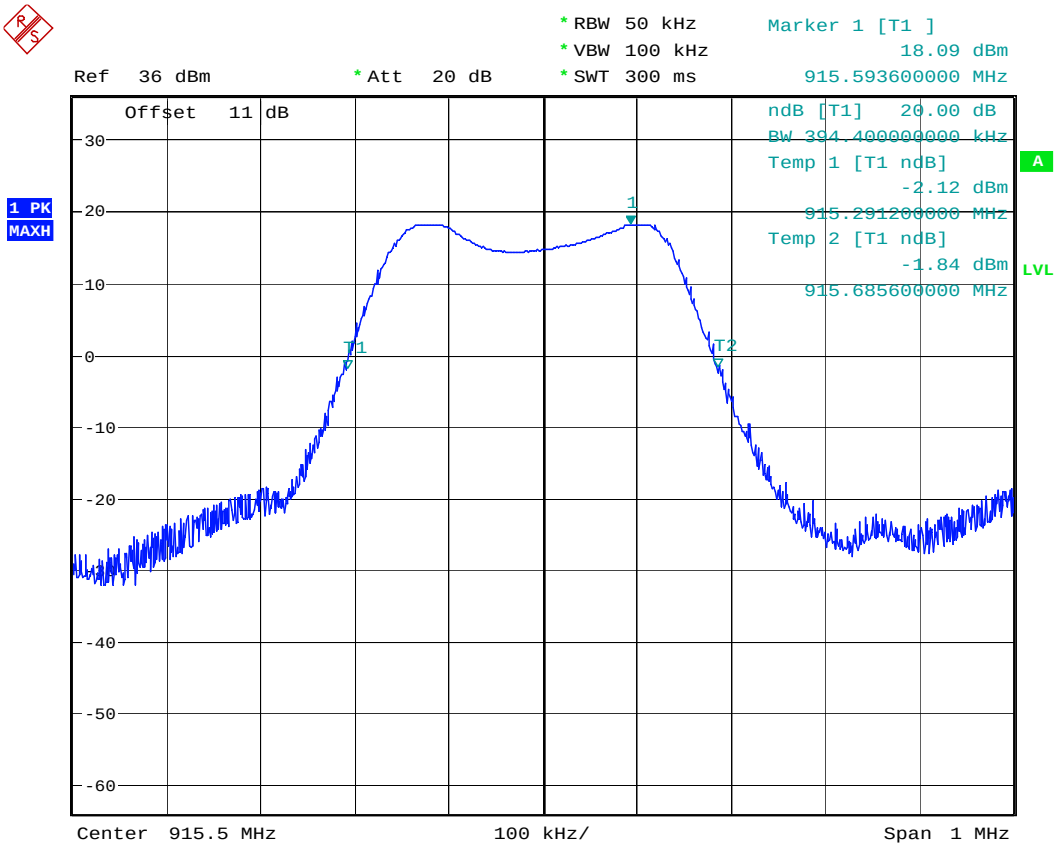
Dwell time 921.778MHz =55.449 ms*7=388.143ms

Date: 29.JUN.2007 18:07:44



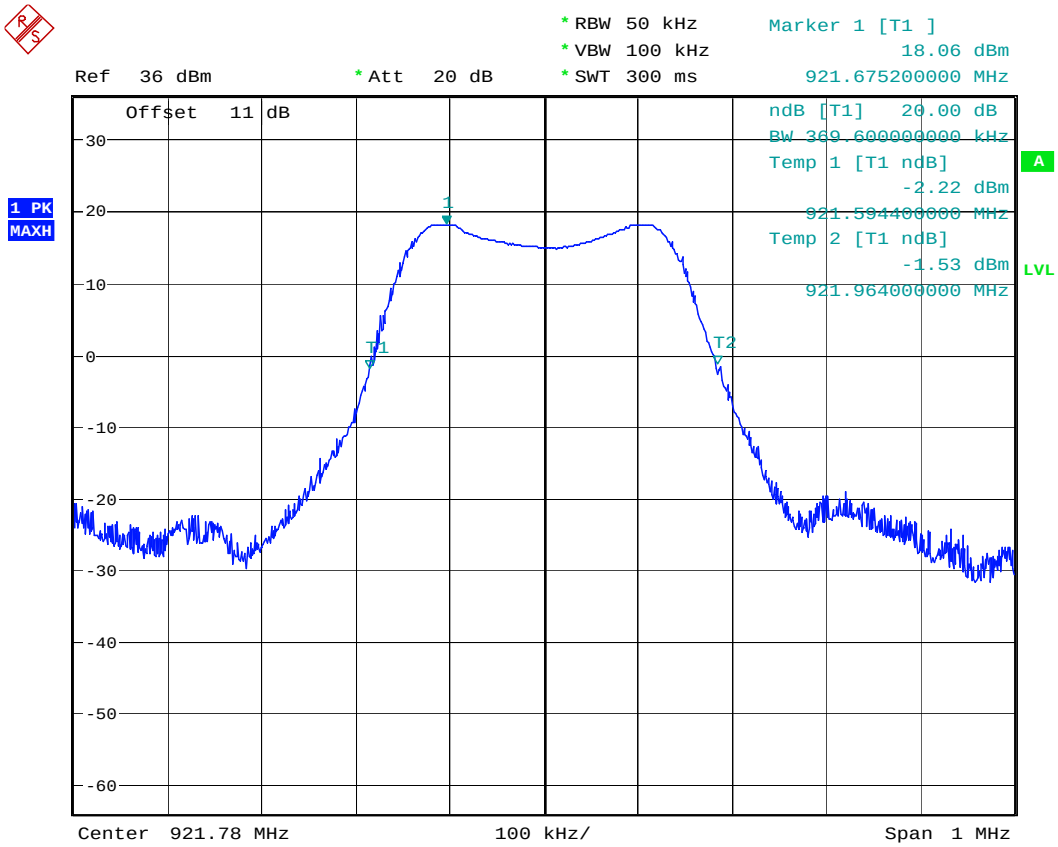
20dB bandwidth low channel

Date: 7.JUN.2007 18:47:39



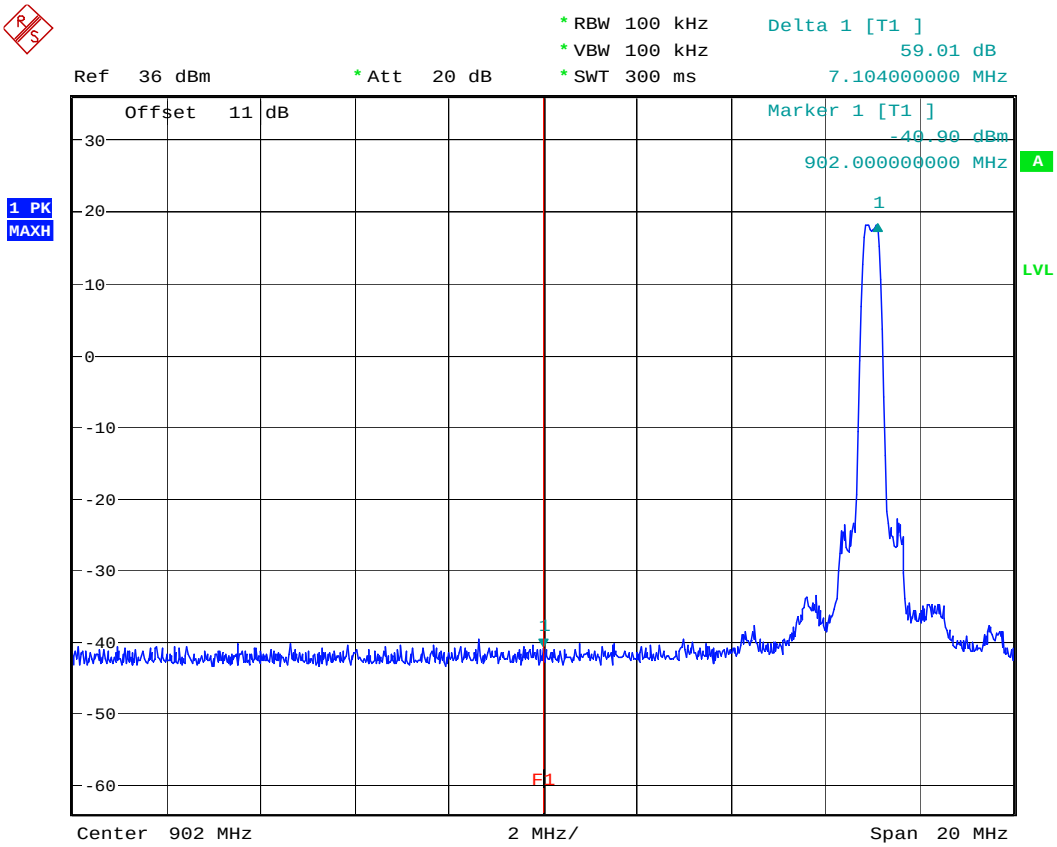
20dB bandwidth middle channel

Date: 7.JUN.2007 18:47:19



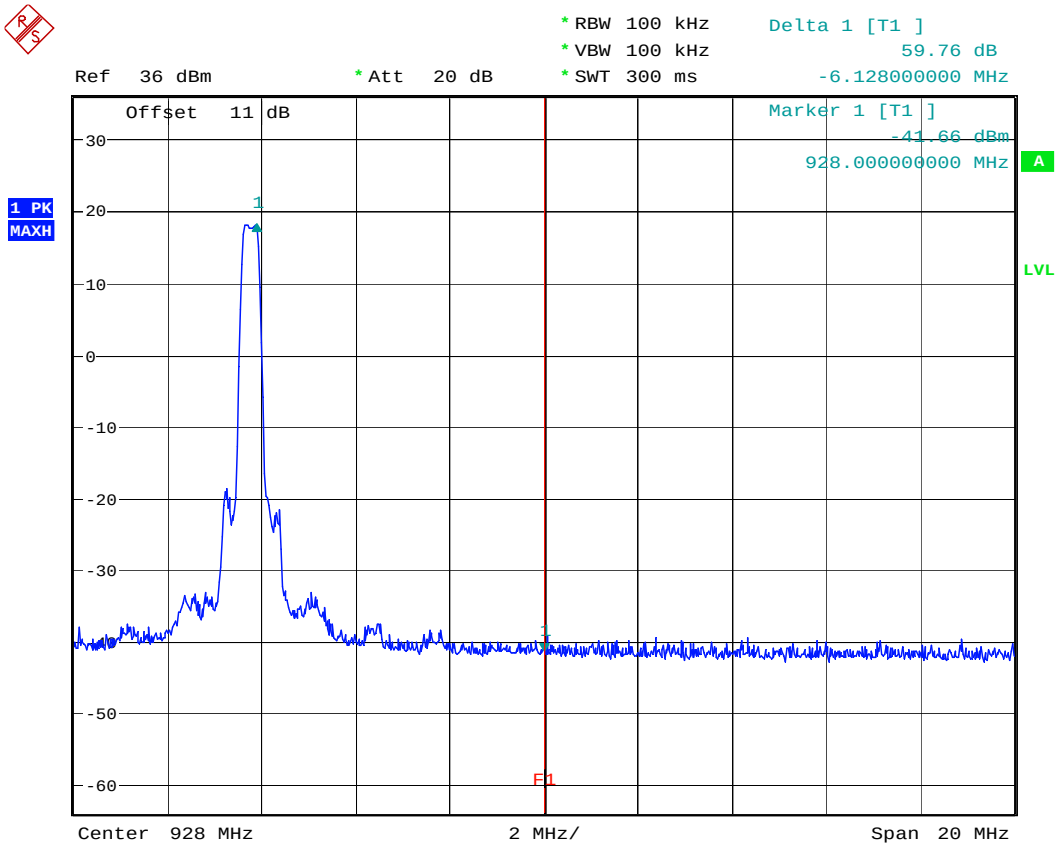
20dB bandwidth high channel

Date: 7.JUN.2007 18:44:39



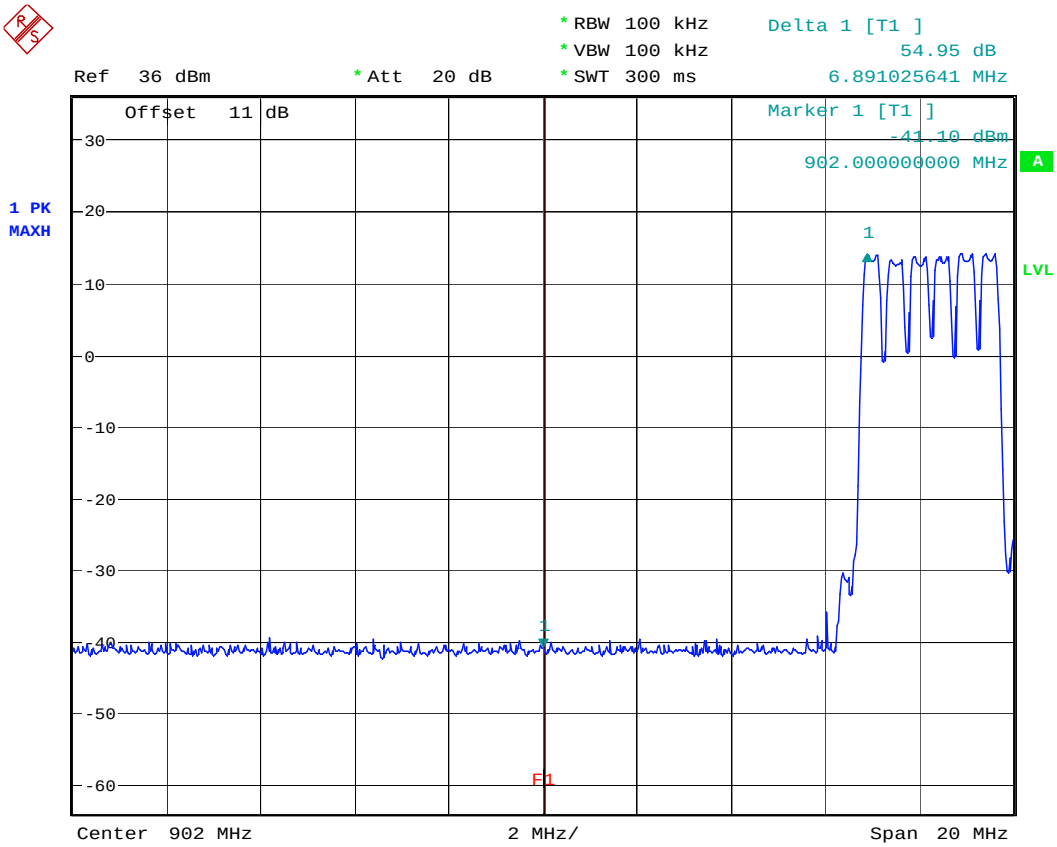
Bandedge low channel

Date: 7.JUN.2007 18:40:43



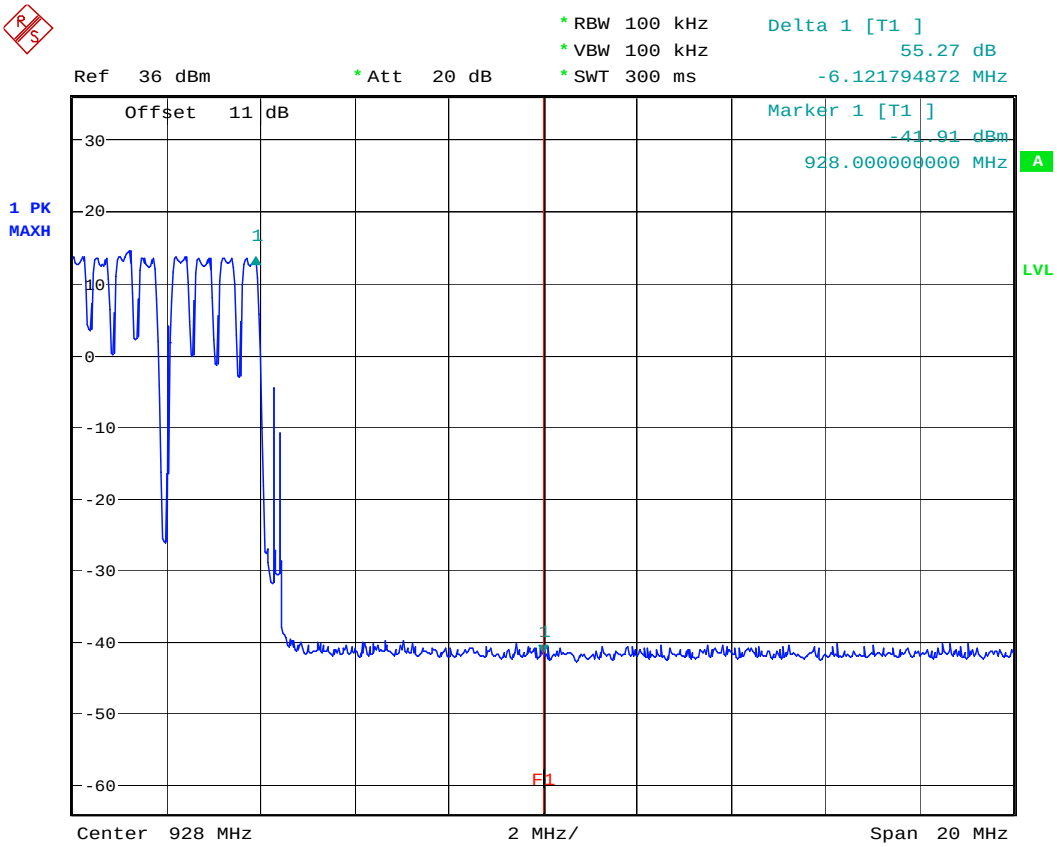
Bandedge high channel

Date: 7.JUN.2007 18:40:05



Bandedge low channel hopping mode

Date: 4.JUL.2007 17:39:34



Bandedge high channel hopping mode

Date: 4.JUL.2007 17:40:58