

FCC Part 15

Subpart D Test Report

of

E.U.T. : 1.9GHz DECT Cordless Handset
Speakerphone/Answering System
(Base Station FP)

MODEL : 28111XX1-A, 28111XX2-A, 28111XX3-A,
28110XX1-A, 28112XX1-A, 28112XX2-A,
28112XX3-A
(XXX represents any number or letter for marketing purposes)

FCC ID. : G9H2-8111A

for

APPLICANT : Thomson Inc.

ADDRESS : 10330 North Meridian Street Indianapolis, IN
46290

Test Performed by

ELECTRONICS TESTING CENTER, TAIWAN
NO. 34, LIN 5, DING FU TSUN, LINKOU HSIANG,
TAIPEI HSIEN, TAIWAN, R.O.C.
TEL : (02)26023052 FAX: (02)26010910

http : // www.etc.org.tw ; e-mail : r00@etc.org.tw

Report Number : 06-06-RBF-081-02

TEST REPORT CERTIFICATION

Applicant : Thomson Inc.
10330 North Meridian Street Indianapolis, IN 46290

Manufacturer : Huiyang CCT Telecommunications Products Co., Ltd.
CCT Techonology Park, San He Economic Development Zone,
Huiyang District, Huizhou City, Guangdong Province, PRC

Description of EUT

a) Type of EUT : 1.9GHz DECT Cordless Handset Speakerphone/Answering System
(Base Station FP)

b) Trade Name : GE

c) Model No. : 28111XX1-A, 28111XX2-A, 28111XX3-A, 28110XX1-A,
28112XX1-A, 28112XX2-A, 28112XX3-A
(XXX represents any number or letter for marketing purposes)

d) Power Supply : Adaptor: I/P: 120Vac, 60Hz, 5.5W; O/P: 7.5Vdc, 350mA
(For model 28111XX1-A, 28111XX2-A, 28111XX3-A, 28110XX1-A)
Adaptor: I/P: 120Vac, 60Hz, 7.5W; O/P: 7.5Vdc, 500mA
(For model 28112XX1-A, 28112XX2-A, 28112XX3-A)

e) Frequency Range : 1921.536~1928.448MHz

Regulation Applied : FCC Rules and Regulations Part 15 Subpart D (2006)

I HEREBY CERTIFY THAT: The data shown in this report were made in accordance with the procedures given in ANSI C63.17-2006/ ANSI C63.4-2003, and the energy emitted by the device was founded to be within the limits applicable. I assume full responsibility for accuracy and completeness of these data.

Note: 1. The result of the testing report relate only to the item tested.

2. The testing report shall not be reproduced expect in full, without the written approval of ETC.

Issued Date : Jul. 25, 2006

Test Engineer : 
(Falcon Shi)

Approve & Authorized Signer : 
Will Yauo, Manager
EMC Dept. II of ELECTRONICS
TESTING CENTER, TAIWAN

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1 GENERAL INFORMATION

1.1 Testing Laboratory

Name : Electronics Testing Center, Taiwan
Address : No. 34, Lin 5, Dingfu Tsuen, Linkou Shiang, Taipei County,
Taiwan, 24442, R.O.C.
Telephone : 886-2-26023052
Fax : 886-2-26010910
NVLAP lab registration# : 200133-0
IC OATS registration# : IC 2949-2

1.2 Client Information

Name : Thomson Inc.
Address : 10330 North Meridian Street Indianapolis, IN 46290
Telephone : 317-587-3095
Contact person : Roger Hunt

1.3 Manufacturer

Name : Huiyang CCT Telecommunications Products Co. Ltd.
Address : CCT Technology Park, San He Economic Developmental Zone,
Huiyang District, Huizhou City, Guangdong Province, PRC

2 TEST INFORMATION

2.1 Descriptino of Tested Device(s)

The tested equipment is a DECT base station which complies with ETSI EN 300175. The frequencies have been reprogrammed to comply with the FCC requirements to an Isochronous UPCS device after FCC Part 15D.

The EUT is a responding device as described in ANSI C63.17 and is designed to operate togerter with a DECT handset, which is then the initiating device.

Frequency Channel	Frequency	Test Frequency
CH4	1928.448 MHz	F _L
CH3	1926.720 MHz	-
CH2	1924.992 MHz	-
CH1	1923.264 MHz	-
CH0	1921.536 MHz	F _H

2.2 Model Different Description

Model 28111XXX-A is similar to 28112XXX-A, the main difference is the additional answering machine in 28112XXX-A. Model 28110XXX-A is only combine with one handset and one charger. The “XXX” suffix directly following the model can be 0-9, or any alphanumeric character or blank.

Multiple Model List:

28112XX1-A: (1 base + 1 handset)+(FP Answering Machine Function)

28112XX2-A: (1 base + 2 handsets + 1 charger)+(FP Answering Machine Function)

28112XX3-A: (1 base + 3 handsets + 2 chargers)+(FP Answering Machine Function)

28111XX1-A (1 base + 1 handset)

28111XX1-A: (1 base + 1 handset)

28111XX2-A: (1 base + 2 handsets + 1 charger)

28111XX3-A: (1 base + 3 handsets + 2 chargers)

28110XX1-A: (extra handset + charger)

2.3 Test Environment

Normal test condition

Temperature:	20 – 25 °C
Relative humidity:	55 – 75%

Extreme test condition (declared by manufacture)

Please see the manufacturer declaration form.

3 TEST REPORT SUMMARY

3.1 Test Summary

Requirement	FCC Paragraph #	Required	Customer Declaration	Test Pass
Coordination with fixed microwave	15.307(b)	■	■	☐
Cross Reference	15.309(b)	☐	☐	☐
Labeling requirements	15.311 , 15.19(a)(3)	■	■	☐
Power line Conducted Emission	15.315 , 15.207	■	☐	■
Antenna Requirement	15.315, 15.203	■	■	☐
Digital Modulation Techniques	15.319(b)	■	■	☐
Peak transmit Power	15.319(c)	■	☐	■
Power spectral Density	15.319(d)	■	☐	■
Antenna gain	15.319(e)	■	■	☐
Automatic discontinuation of transmission	15.319(f)	■	■	☐
Safety exposure levels	15.319(i)	■	☐	■
Emission Bandwidth	15.323(a)	■	☐	■
Emissions inside and outside the subband	15.323(d)	■	☐	■
Frame period and jitter	15.323(e)	■	☐	■
Carrier frequency stability	15.323(f)	■	☐	■

3.2 Devices for Tested System

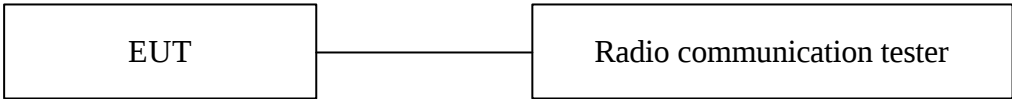
All measurements are traceable to national standards.

The tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC CFR47 Part 15, Paragraph 15.232 for Isochronous UPCS Devices and Industry Canada RSS-213 Issue 2.

The conducted test methods have been in accordance with ANSI C63.17-2006 Draft where applicable. Radiated tests were conducted in accordance with ANSI C63.4-2003.

4 TEST SETUP

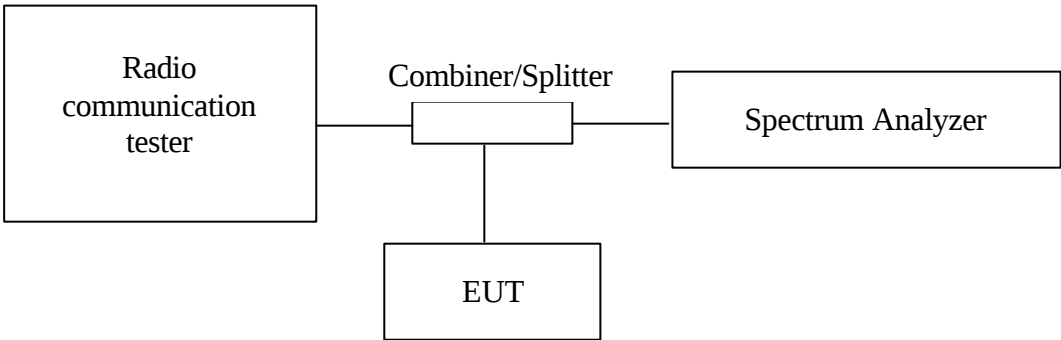
4.1 Frequency and Timing Measurements



Test Set-up 1

This setup is used for measuring Frame stability, Jitter, Carrier frequency stability at normal and extremet temperatures.

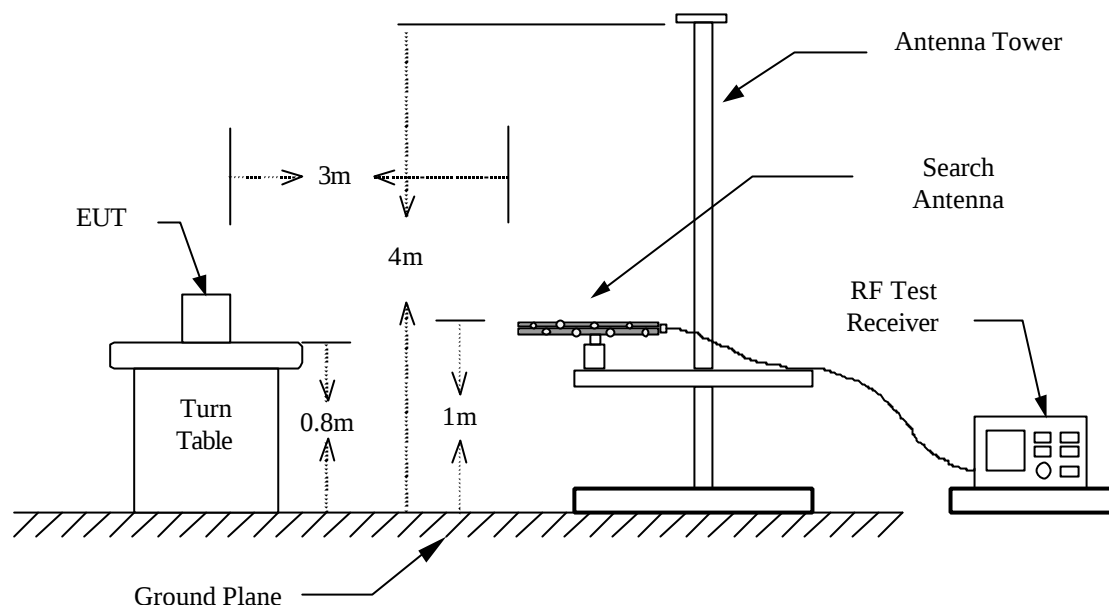
4.2 Conducted Emission Tests



Test Set-up 2

This setup is used for all conducted emission tests.

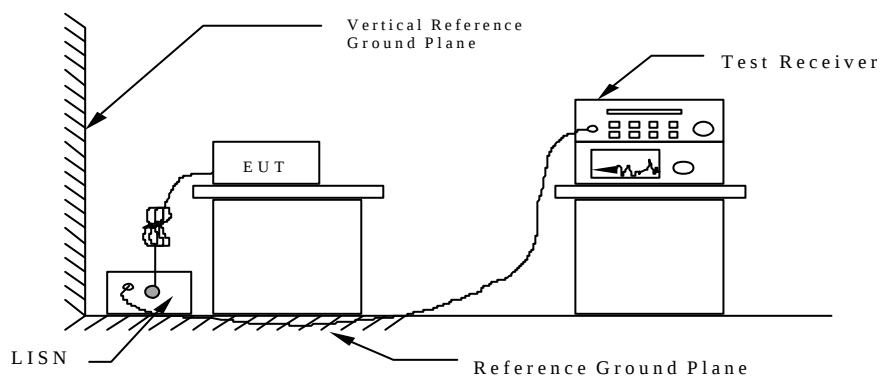
4.3 Radiated Emission Tests



Test Set-up 3

This test setup is used for all radiated emissions tests. For frequencies below 30 MHz the measuring distance is 10 m, for all toher frequencies it is 3m. Emissions above 1 GHz were measured with the Spectrum Analyzer, Horn Antenna and the preamplifier after the antenna.

4.4 Power Line Conducted Tests



Test Set-up 4

5 TEST EQUIPMENT LIST

To facilitate inclusion on each page of the test equipment used for related test, each item of test equipment and ancillaries are identified (numbered) by the Test Laboratory.

Equipment	Manufacturer	Model No.	Next Cal. Due
Test Receiver	Rohde & Schwarz	ESCS 30	12/22/2006
Amplifier	HP	8447D	10/17/2006
Spectrum	Advantest	R3361C	08/14/2006
Bi-Log Antenna	Schaffner	CBL 6111C	03/15/2007
Log-periodic Antenna	EMCO	3146	10/05/2006
Biconical Antenna	EMCO	3110B	10/05/2006
Double Ridged Antenna	EMCO	3115	08/18/2006
Amplifier	HP	8449B	09/13/2006
Amplifier	HP	83051A	04/18/2007
Spectrum	Rohde & Schwarz	FSP40	07/05/2007
Spectrum	HP	8564E	08/08/2006
Radio commun. Tester	Rohde & Schwarz	CTS60	07/13/2007
EMI Test Receiver	Rohde and Schwarz	ESCI	11/28/2006
Line Impedance Stabilization network	EMCO	3825/2	07/03/2007
Line Impedance Stabilization network	Rohde & Schwarz	ESH2-Z5	09/11/2006
Monitor	IBM	E54	N.C.R.
Printer	HP	LaserJet 1000	N.C.R.
Shielded Room	Riken	----	N.C.R.
Computer	Acer	Veriton	N.C.R.

6 TEST RESULT

6.1 Corrdination with fixed microwave

6.1.1 Standard Applicable: FCC 15.307 (b)

Each application for certification of equipment operating under the provisions of this Subpart must be accompanied by an affidavit from UTAM, Inc. certifying that the applicant is a participating member of UTAM, Inc. In the event a grantee fails to fulfill the obligations attendant to participation in UTAM, Inc., the Commission may invoke administrative sanctions as necessary to preclude continued marketing and installation of devices covered by the grant of certification, including but not limited to revoking certification.

Result

The affidavit from UTAM, Inc. is included in the documentation supplied by the applicant:

☒ **Yes**

☐ **No**

6.2 Cross Reference

6.2.1 Standard Applicable

15.309(b)

The requirements of Subpart D apply only to the radio transmitter contained in the PCS device. Other aspects of the operation of a PCS device may be subject to requirements contained elsewhere in this Chapter. In particular, a PCS device that includes digital circuitry not directly associated with the radio transmitter also is subject to the requirements for unintentional radiators in Subpart B.

15.109(a)

For unintentional device, according to FCC §15.109(a), the field strength of radiated emissions from unintentional except for class A digital device radiators at a distance of 3 meters shall not exceed the following values:

Frequency MHz	Distance Meters	Radiated μ V/m	Radiated dB μ V/m
30 - 88	3	100	40.0
88 - 216	3	150	43.5
216 - 960	3	200	46.0
Above 960	3	500	54.0

6.2.2 Test Results

This requirement is not applicable because test sample does not include digital circuitry which is not directly associated with the radio transmitter	■
For test results according to FCC 15 subpart B, see the EMC report as attached	☐
For test results according to FCC 15 subpart B, see the measurement data as follow	☐
This requirement is covered by results of power line conducted emission test according to FCC 15.315	☐

6.3 Labeling Requirements

6.3.1 Standard Applicable: FCC 15.19

The FCC Identifier shall be displayed on the label, and the device(s) shall bear the following statement in a conspicuous location on the device or in the user manual if the device is too small:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The label itself shall be of a permanent type, not a paper label, and shall last the lifetime of the equipments.

6.3.2 Result

See separate documents showing the label design and the placement of the label on the EUT.

6.4 Power Line Conducted Emissions

6.4.1 Standard Applicable

15.315

An unlicensed PCS device that is designed to connected to the public utility (AC) power line must meet the limites specified in Section 15.207.

15.207(a)

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150kHz to 30MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal.

The lower limit applies at the boundary between the frequency ranges.

Frequency MHz	Quasi Peak dB μ V	Average dB μ V
0.15 - 0.5	66-56*	56-46*
0.5 - 5.0	56	46
5.0 - 30.0	60	50

* Decreases with the logarithm of the frequency

6.4.2 Measurement procedure

ANSI C63.4-2003 using 50 μ H/50 ohms LISN.

6.4.3 Test Results: Complies

Measurement Data: See attached graph, (Peak detector)

Highest measured value (L1 and L2):

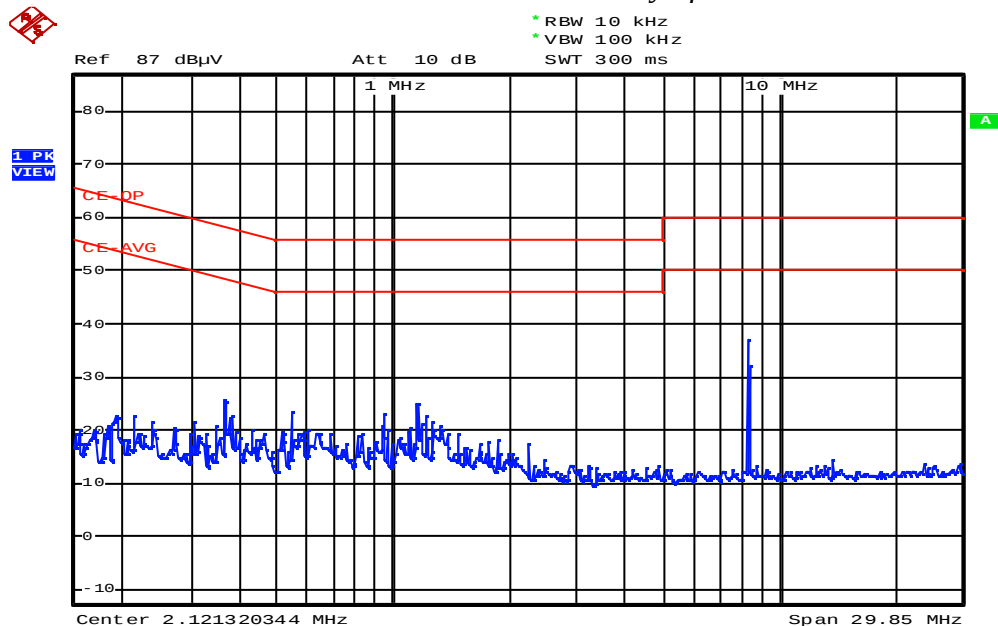
All emissions were below the QP and Average limits when measured with Peak detector.

Model : 28111XX1-A, 28111XX2-A, 28111XX3-AOperation Mode : Base On LineNTest Date : Jul. 11, 2006Temperature : 23 °CHumidity : 56 %

Frequency (MHz)	Meter Reading (dBμV)		Factor (dB)	Result (dBμV)		Limit (dBμV)		Margin (dBμV)	
	Q.P	AVG		Q.P	AVG	Q.P	AVG	Q.P	AVG
0.195	22.2	----	0.2	22.4	----	63.8	53.8	-41.4	----
0.369	25.7	----	0.3	26.0	----	58.5	48.5	-32.5	----
0.552	23.6	----	0.3	23.9	----	56.0	46.0	-32.1	----
0.948	23.2	----	0.3	23.5	----	56.0	46.0	-32.5	----
1.171	25.0	----	0.3	25.3	----	56.0	46.0	-30.7	----
8.322	36.9	----	0.7	37.6	----	60.0	50.0	-22.4	----

Note :

1. “***” means the value was too low to be measured.
2. If the data table appeared symbol of “----“ means the Q.P. value is under the limit of AVG. so, the AVG. value doesn't need to be measured.
3. The estimated measurement uncertainty of the result measurement is ± 2.5 dB.



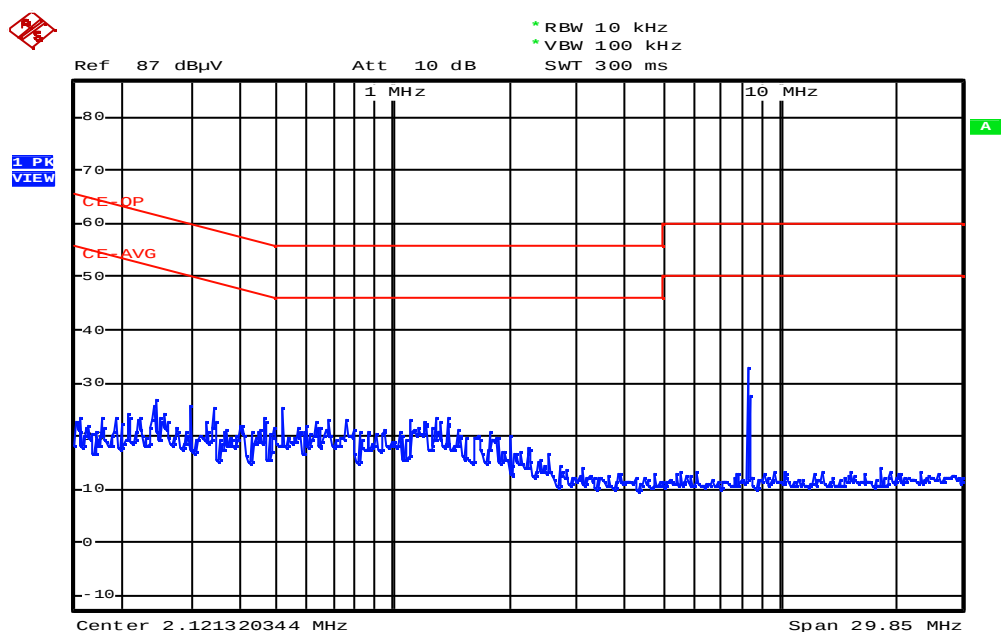
Date: 11.JUL.2006 16:01:43

Operation Mode : Base On LineL1Test Date : Jul. 11, 2006Temperature : 23 °CHumidity : 56 %

Frequency (MHz)	Meter Reading (dBμV)		Factor (dB)	Result (dBμV)		Limit (dBμV)		Margin (dBμV)	
	Q.P	AVG		Q.P	AVG	Q.P	AVG	Q.P	AVG
0.244	----	27.0	0.2	----	27.2	62.0	52.0	----	-24.8
0.298	----	25.7	0.2	----	25.9	60.3	50.3	----	-24.4
0.346	----	25.1	0.3	----	25.4	59.1	49.1	----	-23.7
0.518	----	25.2	0.3	----	25.5	56.0	46.0	----	-20.5
1.388	----	23.5	0.4	----	23.9	56.0	46.0	----	-22.1
8.322	----	33.0	0.7	----	33.7	60.0	50.0	----	-16.3

Note :

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2. If the data table appeared symbol of “----” means the Q.P. value is under the limit of AVG. so, the AVG. value doesn't need to be measured.
3. The estimated measurement uncertainty of the result measurement is ± 2.5 dB.



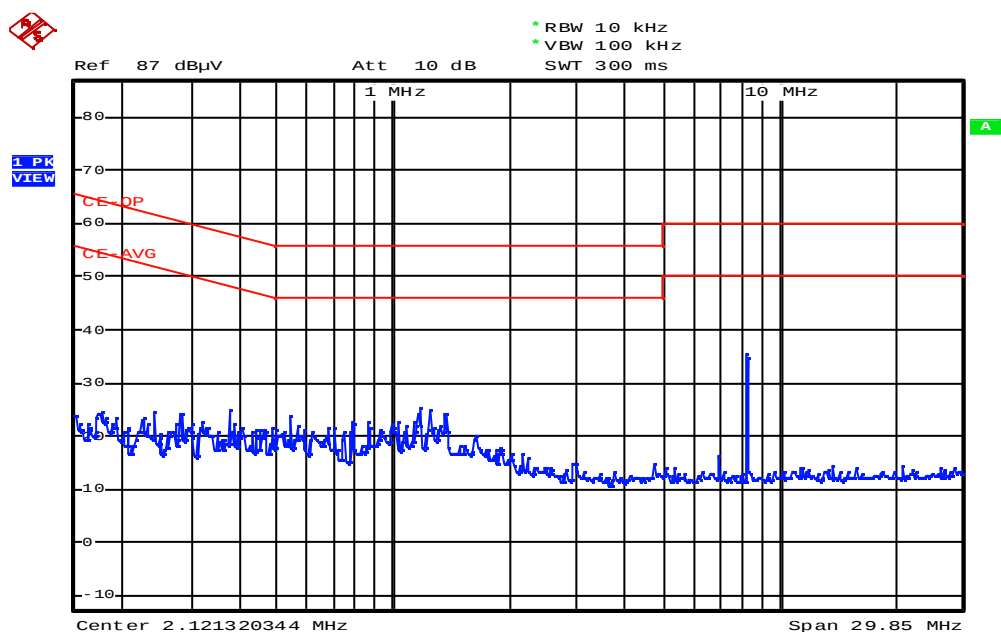
Date: 11.JUL.2006 15:59:55

Operation Mode : Charging and Stand by NTest Date : Jul. 11, 2006 Temperature : 23 °C Humidity : 56 %

Frequency (MHz)	Meter Reading (dBμV)		Factor (dB)	Result (dBμV)		Limit (dBμV)		Margin (dBμV)	
	Q.P	AVG		Q.P	AVG	Q.P	AVG	Q.P	AVG
0.177	24.7	----	0.2	24.9	----	64.6	54.6	-39.7	----
0.241	24.8	----	0.2	25.0	----	62.1	52.1	-37.1	----
0.283	24.5	----	0.2	24.7	----	60.7	50.7	-36.0	----
0.381	25.0	----	0.3	25.3	----	58.3	48.3	-33.0	----
1.184	25.3	----	0.3	25.6	----	56.0	46.0	-30.4	----
8.235	35.4	----	0.7	36.1	----	60.0	50.0	-23.9	----

Note :

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3. The estimated measurement uncertainty of the result measurement is ± 2.5 dB.



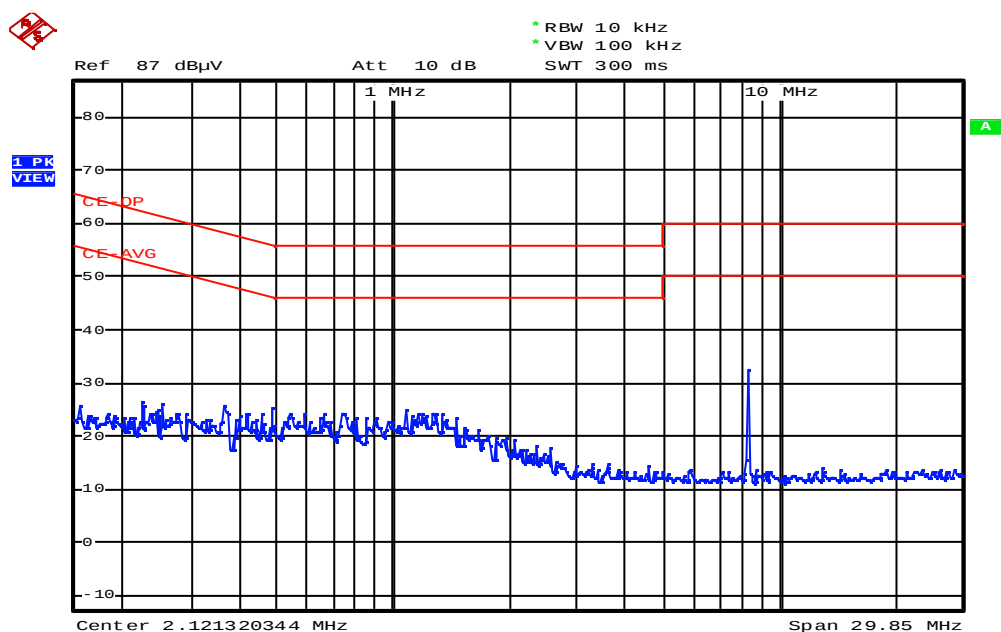
Date: 11.JUL.2006 15:43:59

Operation Mode : Charging and Stand by L1Test Date : Jul. 11, 2006 Temperature : 23 °C Humidity : 56 %

Frequency (MHz)	Meter Reading (dBμV)		Factor (dB)	Result (dBμV)		Limit (dBμV)		Margin (dBμV)	
	Q.P	AVG		Q.P	AVG	Q.P	AVG	Q.P	AVG
0.224	----	26.5	0.2	----	26.7	62.7	52.7	----	-26.0
0.254	----	26.2	0.2	----	26.4	61.6	51.6	----	-25.2
0.365	----	25.8	0.2	----	26.0	58.6	48.6	----	-22.6
0.491	----	25.3	0.3	----	25.6	56.2	46.2	----	-20.6
1.088	----	24.8	0.3	----	25.1	56.0	46.0	----	-20.9
8.322	----	32.5	0.7	----	33.2	60.0	50.0	----	-16.8

Note :

1. “***” means the value was too low to be measured.
2. If the data table appeared symbol of “----“ means the Q.P. value is under the limit of AVG. so, the AVG. value doesn't need to be measured.
3. The estimated measurement uncertainty of the result measurement is ± 2.5 dB.



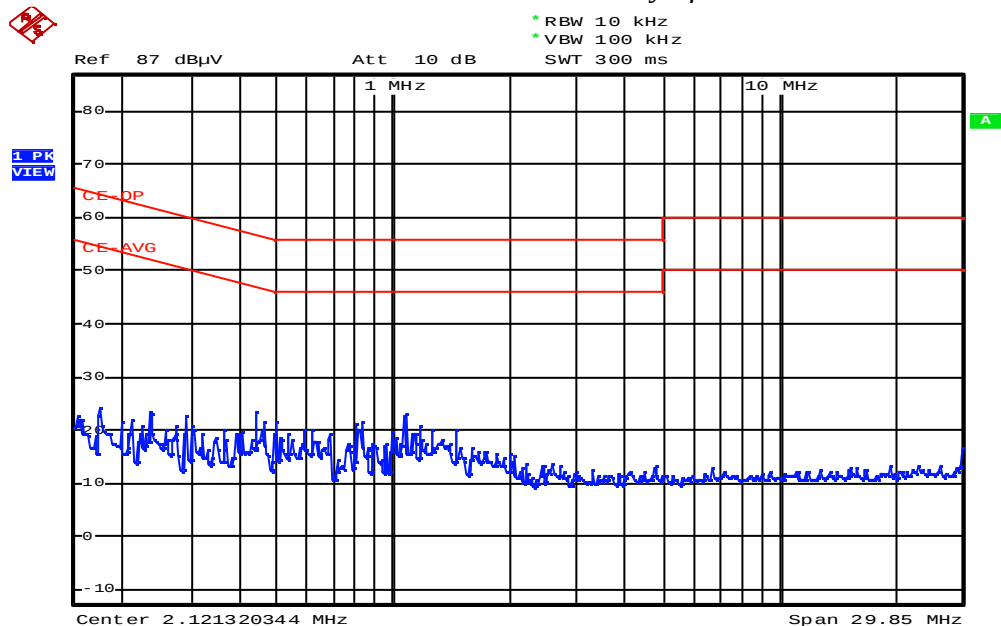
Date: 11.JUL.2006 15:47:20

Model : 28112XX1-A, 28112XX2-A, 28112XX3-AOperation Mode : Base On LineNTest Date : Jul. 11, 2006Temperature : 23 °CHumidity : 56 %

Frequency (MHz)	Meter Reading (dBμV)		Factor (dB)	Result (dBμV)		Limit (dBμV)		Margin (dBμV)	
	Q.P	AVG		Q.P	AVG	Q.P	AVG	Q.P	AVG
0.175	24.4	----	0.2	24.6	----	64.7	54.7	-40.1	----
0.236	23.6	----	0.2	23.8	----	62.2	52.2	-38.4	----
0.292	22.7	----	0.2	22.9	----	60.5	50.5	-37.6	----
0.446	23.2	----	0.3	23.5	----	56.9	46.9	-33.4	----
0.834	21.6	----	0.3	21.9	----	56.0	46.0	-34.1	----
1.088	23.2	----	0.3	23.5	----	56.0	46.0	-32.5	----

Note :

1. “***” means the value was too low to be measured.
2. If the data table appeared symbol of “----“ means the Q.P. value is under the limit of AVG. so, the AVG. value doesn't need to be measured.
3. The estimated measurement uncertainty of the result measurement is ± 2.5 dB.



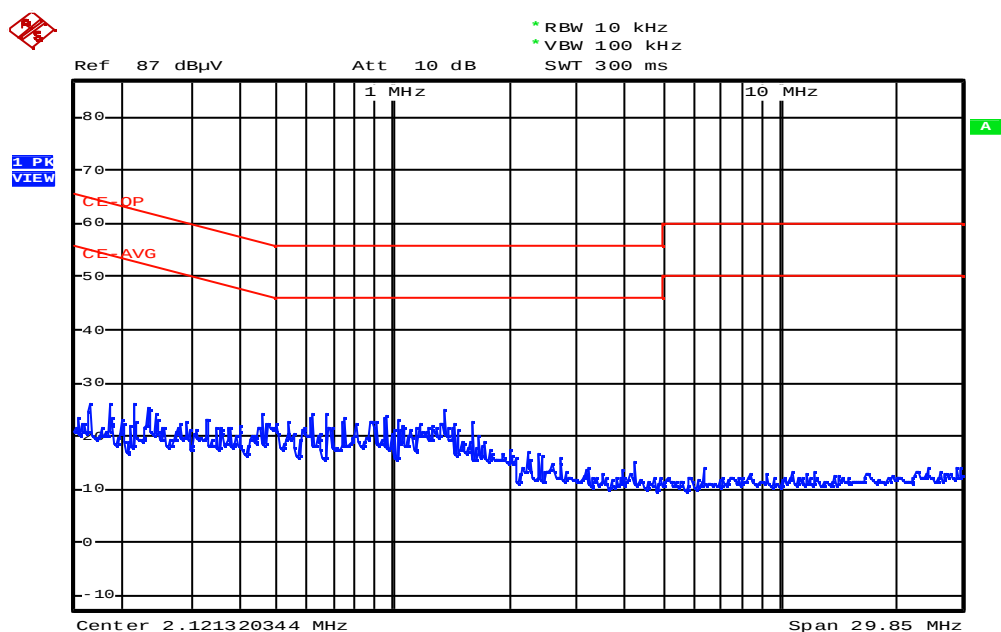
Date: 11.JUL.2006 16:37:53

Operation Mode : Base On LineL1Test Date : Jul. 11, 2006Temperature : 23 °CHumidity : 56 %

Frequency (MHz)	Meter Reading (dBμV)		Factor (dB)	Result (dBμV)		Limit (dBμV)		Margin (dBμV)	
	Q.P	AVG		Q.P	AVG	Q.P	AVG	Q.P	AVG
0.185	----	26.2	0.2	----	26.4	64.3	54.3	----	-27.9
0.215	----	26.0	0.2	----	26.2	63.0	53.0	----	-26.8
0.234	----	25.4	0.2	----	25.6	62.3	52.3	----	-26.7
0.675	----	24.0	0.3	----	24.3	56.0	46.0	----	-21.7
0.968	----	23.8	0.3	----	24.1	56.0	46.0	----	-21.9
1.359	----	24.9	0.4	----	25.3	56.0	46.0	----	-20.7

Note :

1. “***” means the value was too low to be measured.
2. If the data table appeared symbol of “----” means the Q.P. value is under the limit of AVG. so, the AVG. value doesn't need to be measured.
3. The estimated measurement uncertainty of the result measurement is ± 2.5 dB.



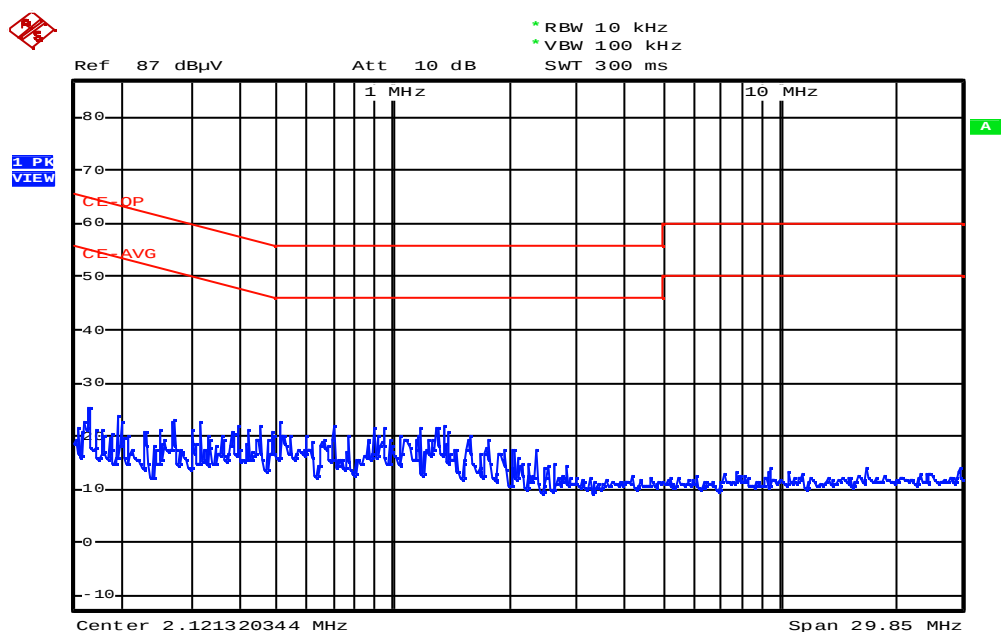
Date: 11.JUL.2006 16:45:02

Operation Mode : Charging and Stand by NTest Date : Jul. 11, 2006 Temperature : 23 °C Humidity : 56 %

Frequency (MHz)	Meter Reading (dBμV)		Factor (dB)	Result (dBμV)		Limit (dBμV)		Margin (dBμV)	
	Q.P	AVG		Q.P	AVG	Q.P	AVG	Q.P	AVG
0.163	25.4	----	0.2	25.6	----	65.3	55.3	-39.7	----
0.195	23.8	----	0.2	24.0	----	63.8	53.8	-39.8	----
0.271	23.2	----	0.2	23.4	----	61.1	51.1	-37.7	----
0.318	22.8	----	0.3	23.1	----	59.8	49.8	-36.7	----
0.512	22.7	----	0.3	23.0	----	56.0	46.0	-33.0	----
1.359	21.9	----	0.4	22.3	----	56.0	46.0	-33.7	----

Note :

1. “***” means the value was too low to be measured.
2. If the data table appeared symbol of “----” means the Q.P. value is under the limit of AVG. so, the AVG. value doesn't need to be measured.
3. The estimated measurement uncertainty of the result measurement is ± 2.5 dB.



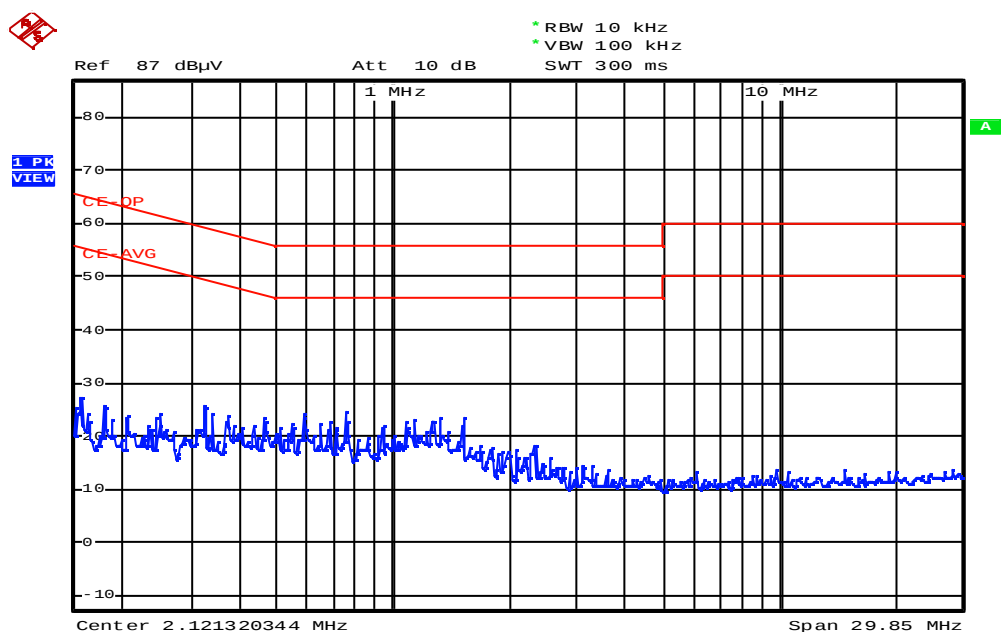
Date: 11.JUL.2006 16:50:11

Operation Mode : Charging and Stand by L1Test Date : Jul. 11, 2006 Temperature : 23 °C Humidity : 56 %

Frequency (MHz)	Meter Reading (dBμV)		Factor (dB)	Result (dBμV)		Limit (dBμV)		Margin (dBμV)	
	Q.P	AVG		Q.P	AVG	Q.P	AVG	Q.P	AVG
0.156	----	27.4	0.2	----	27.6	65.7	55.7	----	-28.1
0.179	----	25.6	0.2	----	25.8	64.5	54.5	----	-28.7
0.325	----	25.6	0.3	----	25.9	59.6	49.6	----	-23.7
0.588	----	24.3	0.3	----	24.6	56.0	46.0	----	-21.4
0.758	----	24.6	0.3	----	24.9	56.0	46.0	----	-21.1
1.330	----	23.3	0.4	----	23.7	56.0	46.0	----	-22.3

Note :

1. “***” means the value was too low to be measured.
2. If the data table appeared symbol of “----“ means the Q.P. value is under the limit of AVG. so, the AVG. value doesn't need to be measured.
3. The estimated measurement uncertainty of the result measurement is ± 2.5 dB.



Date: 11.JUL.2006 16:47:41

6.4.4 Photos of Conduction Measuring Setup

Model 28111XX1-A, 28111XX2-A, 28111XX3-A



Model 28111XX1-A, 28111XX2-A, 28111XX3-A





6.5 Antenna Requirement

6.5.1 Standard Applicable: FCC 15.317, 15.203

Does the EUT have detachable antenna?

☐ Yes

☒ No

If detachable, is the antenna connector non-standard?

☐ Yes

☐ No

The tested equipment has only integral antennas. The conducted tests were performed on a sample with a temporary antenna connects.

6.6 digital Modulation Techniques

6.6.1 Standard Applicable: FCC 15.319(b)

All transmissions must use only digital modulation techniques.

6.6.2 Result: Meets the requirement

Please see the declaration provided by applicant

6.7 Peak Power Output

6.7.1 Standard Applicable: FCC 15.319(c)(f)

Peak transmit power shall not exceed 100 microwatts multiplie by the square root of the emission bandwidth in Hz.

The peak transmit power shall be reduced by the amount in decibels that the maximum directional gain of the antenna exceeds 3 dBi.

6.7.2 Measurement procedure

Measurement method according to ANSI C63.17 2006 paragraph 6.1.2

6.7.3 Test Results: Complies

Measurement Data:

Model: 28111XX1-A, 28111XX2-A, 28111XX3-A, 28110XX1-A

Channel	Frequency (MHz)	Maximum Peak Output Power (dBm)	FCC Limit (dBm)
F _L	1921.536	20.63	20.91
F _H	1928.448	20.73	20.88

Model: 28112XX1-A, 28112XX2-A, 28112XX3-A

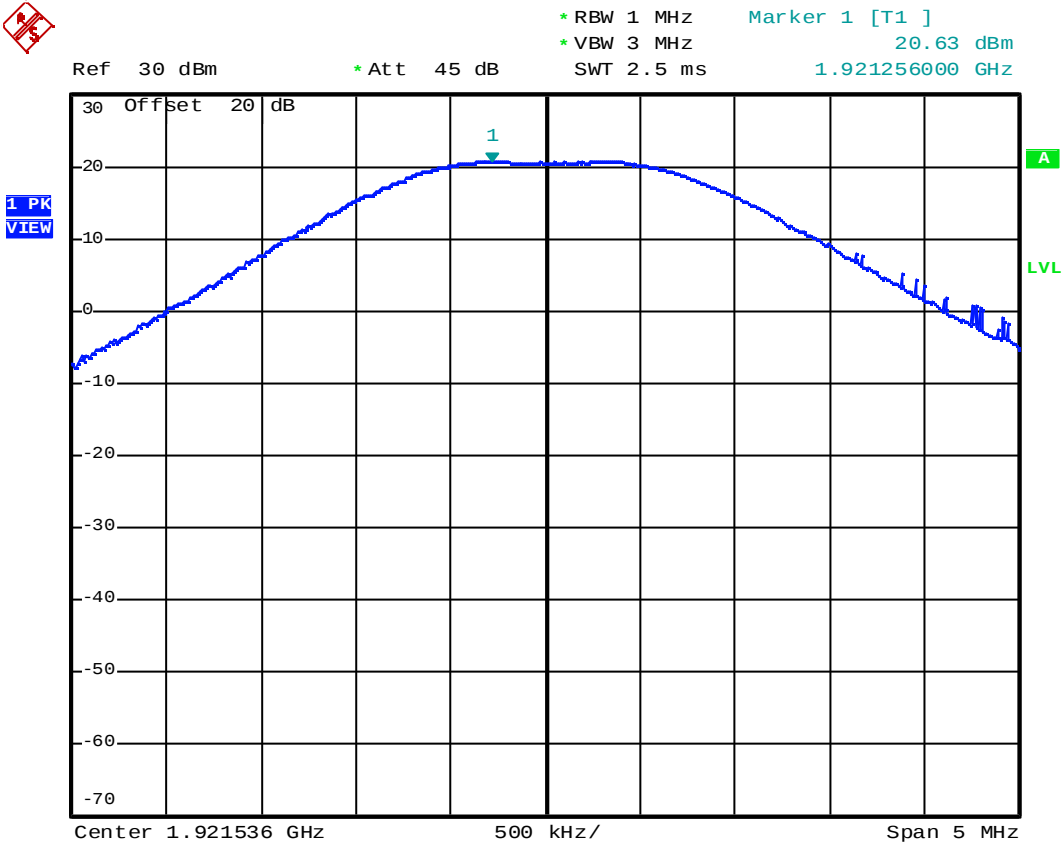
Channel	Frequency (MHz)	Maximum Peak Output Power (dBm)	FCC Limit (dBm)
F _L	1921.536	20.63	20.88
F _H	1928.448	20.73	20.91

Limit:

Peak Transmit Power = 100 uW x $\sqrt{BW}$

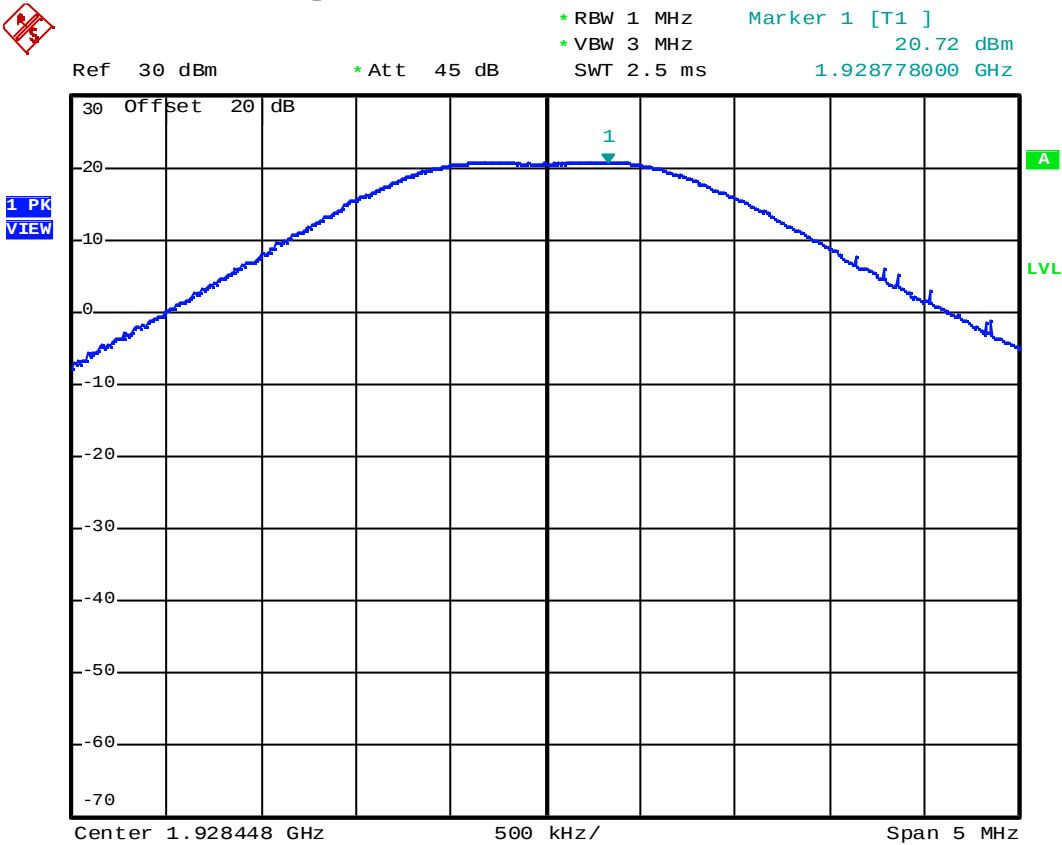
BW = Emission Bandwidth in Hz.

Maximum Peak Output Power: CH F_L
(Model: 28111XX1-A, 28111XX2-A, 28111XX3-A)



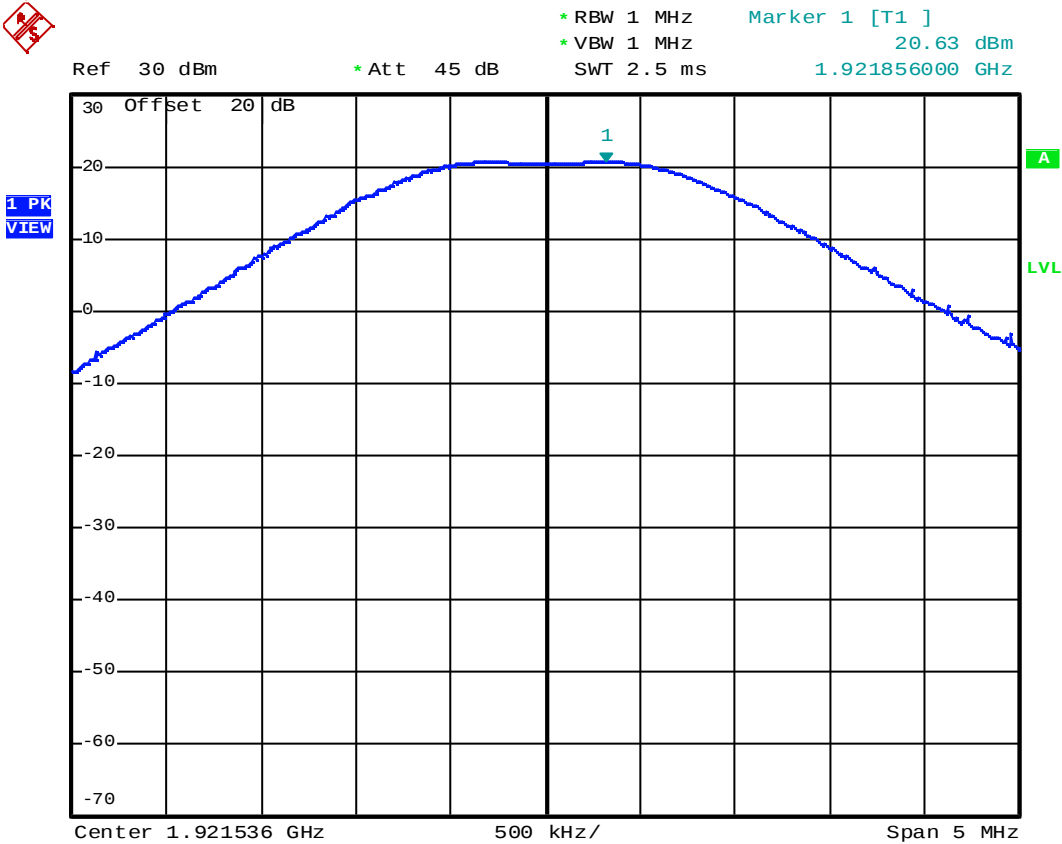
Date: 11.JUL.2006 10:26:27

Maximum Peak Output Power: CH F_H



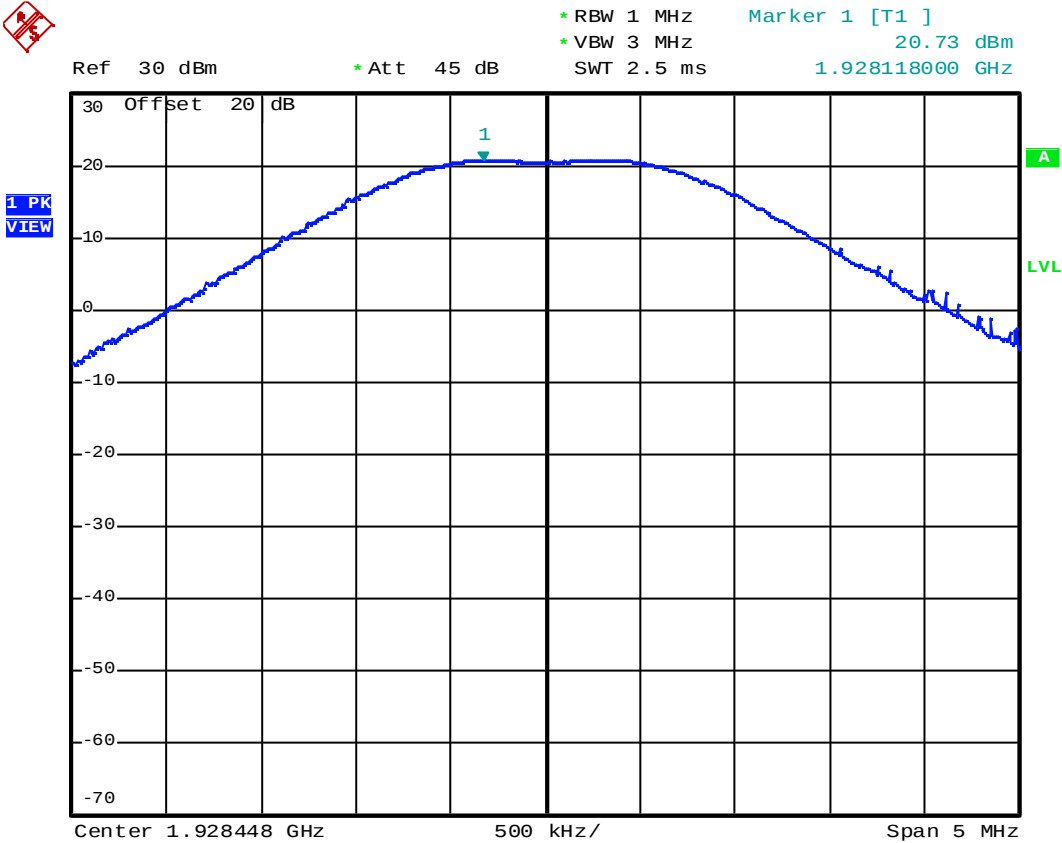
Date: 11.JUL.2006 10:28:12

Maximum Peak Output Power: CH F_L
(Model: 28112XX1-A, 28112XX2-A, 28112XX3-A)



Date: 11.JUL.2006 10:15:45

Maximum Peak Output Power: CH F_H



Date: 11.JUL.2006 10:27:50

6.8 Power Spectral Density

6.8.1 Standard Applicable: FCC 15.319(d)

Power spectral density shall not exceed 3 milliwatts in any 3 kHz bandwidth as measured with a spectrum analyzer having a resolution bandwidth of 3 kHz.

6.8.2 Measurement procedure

Measurement method according to ANSI C63.17 2006 paragraph 6.1.5

6.7.3 Test Results: Complies

Measurement Data:

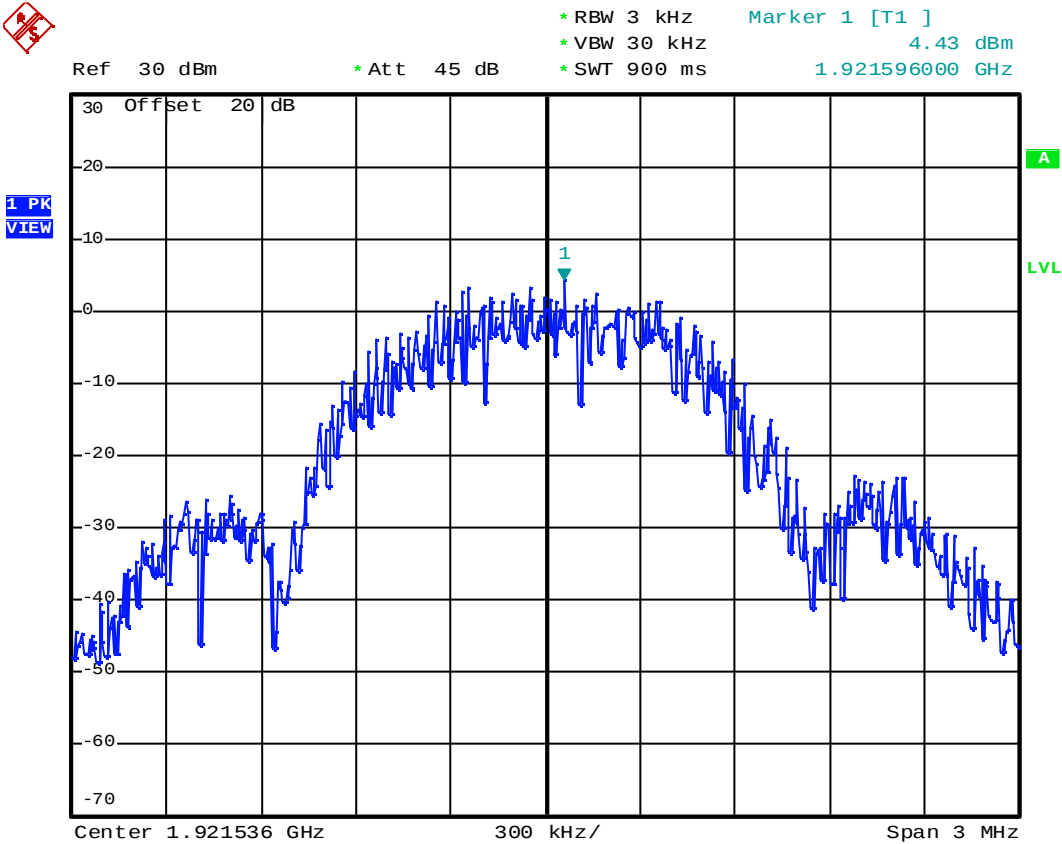
Model: 28111XX1-A, 28111XX2-A, 28111XX3-A

Channel	Frequency (MHz)	Power spectral Density (dBm)	FCC Limit (dBm)
F _L	1921.536	4.43	4.77
F _H	1928.448	4.43	4.77

Model: 28112XX1-A, 28112XX2-A, 28112XX3-A

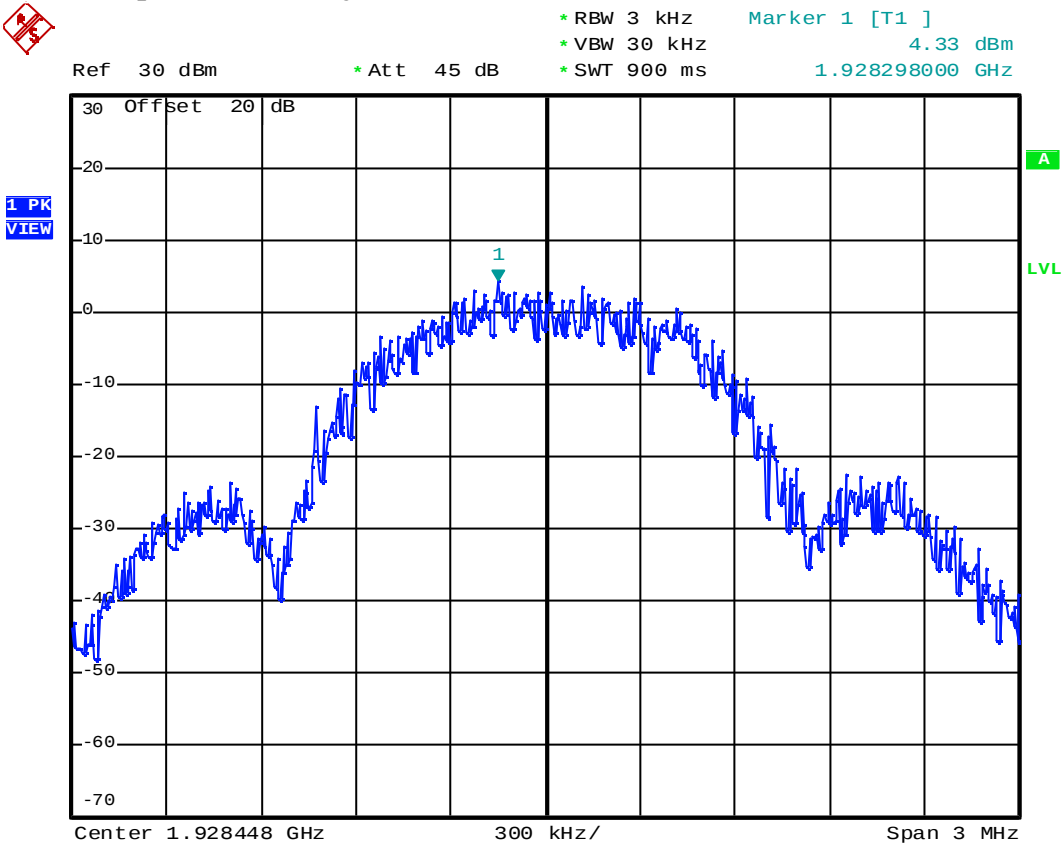
Channel	Frequency (MHz)	Power spectral Density (dBm)	FCC Limit (dBm)
F _L	1921.536	4.45	4.77
F _H	1928.448	4.54	4.77

Power Spectral Density: CH F_L
(Model: 28111XX1-A, 28111XX2-A, 28111XX3-A)



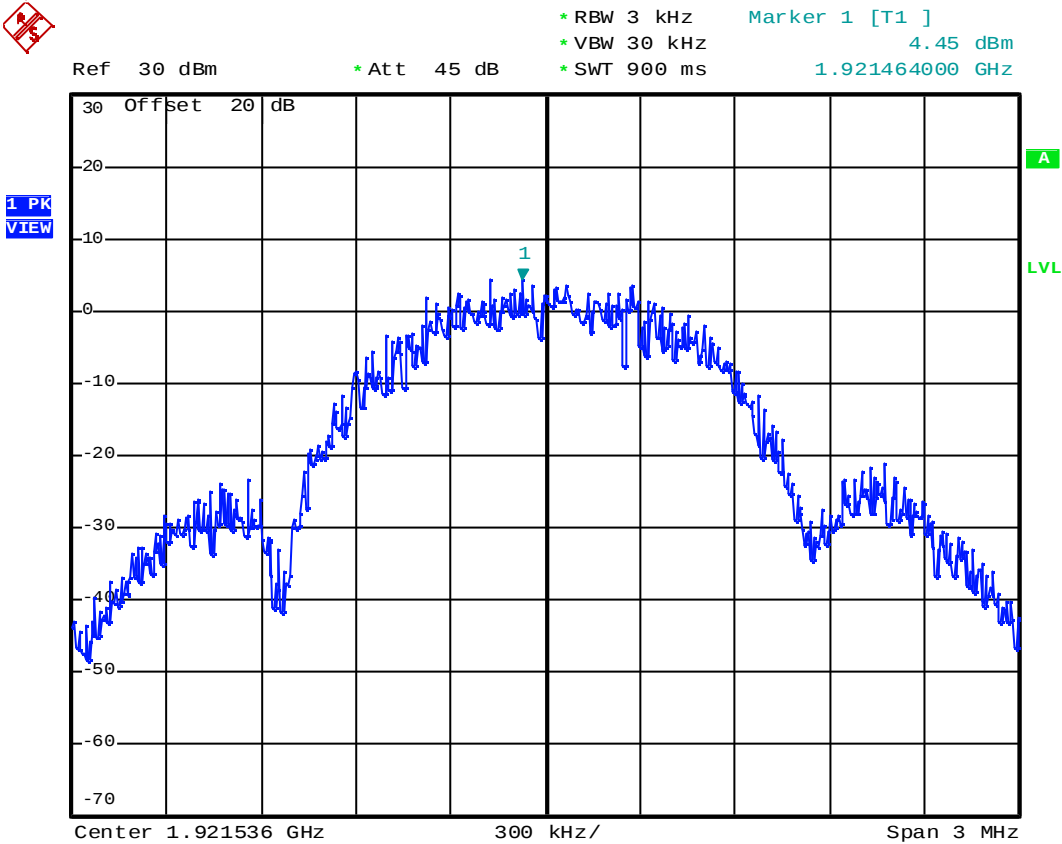
Date: 11.JUL.2006 10:24:00

Power Spectral Density: CH F_H



Date: 11.JUL.2006 10:36:35

Power Spectral Density: CH F_L
(Model: 28112XX1-A, 28112XX2-A, 28112XX3-A)

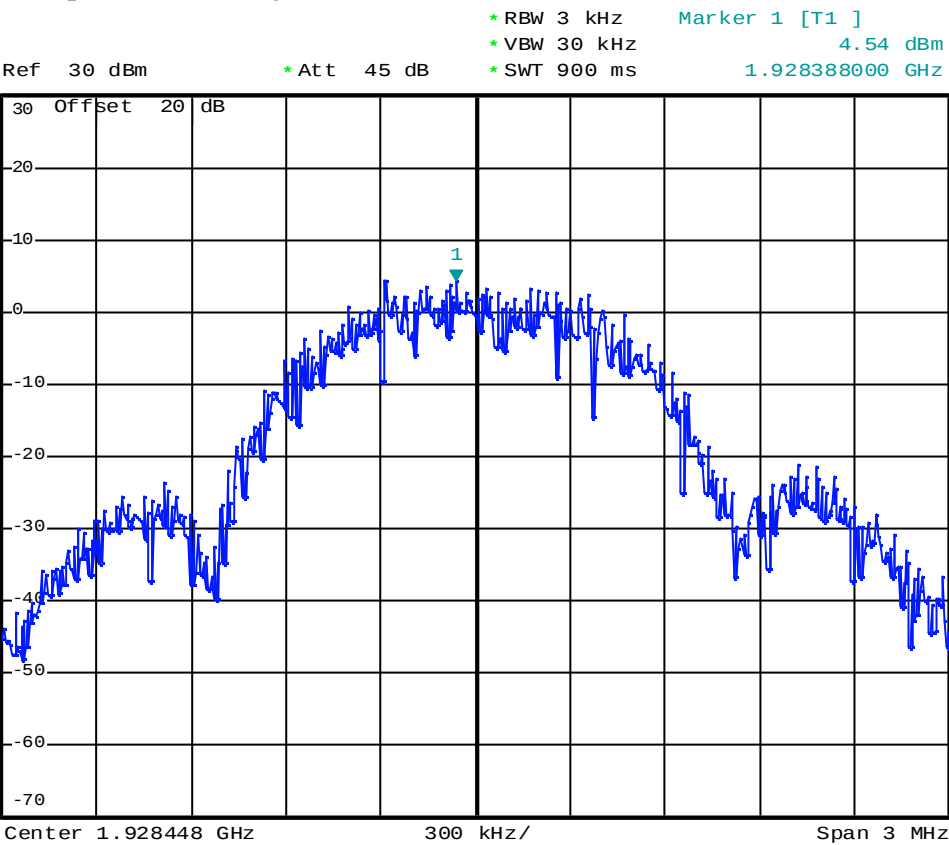


Date: 11.JUL.2006 10:18:16

Power Spectral Density: CH F_H



1 PK
VIEW



Date: 11.JUL.2006 10:35:43

6.9 Antenna Gain

6.9.1 Standard Applicable: FCC 15.323(e)

The peak transmit power shall be reduced by the amount in decibels that the maximum directional gain of the antenna exceeds 3 dBi.

6.9.2 Results: Meets the requirement

The antenna gain value provided by manufacturer is 0 dBi.

6.10 Automatic discontinuation of transmission

6.10.1 Standard Applicable: FCC 15.319(f)

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude transmission of control and signaling information or use of repetitive codes used by certain digital technologies to complete frame or burst intervals.

6.10.2 Procedure

Please see the declaration provided by applicant.

6.10.3 Results: Meets the requirement

6.11 Safety exposure levels

6.11.1 Standard Applicable: FCC 15.319(i)

UPCS devices are subject to the radio frequency radiation exposure requirements specified in FCC parts 1.1307 (b), 2.1091 and 2.1093, as appropriate. All equipment shall be considered to operate in a “general population / uncontrolled environment. For portable devices tests according to IEEE 1528 are requested, applicable.

6.11.2 Measurement procedure

Consideration of radio frequency radiation exposure for EUT is done as

SAR test according IEEE 1528 (for PP)	☐
MPE calculation as below (for FP, Repeater)	☒

SAR test results: not applicable

MPE calculation:

The EUT is considered as a mobile device according to OET Bulletin 65, Edition –97-01. Therefore distance to human body of min. 20 cm is determined.

The limit of Power density for General Population / Uncontrolled Exposure is 1.0 mW/cm².

Formula:

$$S = EIRP/4_{TT}R^2$$

Calculation:

Model: 28111XX1-A, 28111XX2-A, 28111XX3-A

EIRP	Radiated Power (dBm)	20.72
EIRP	Radiated Power (mW)	118.03
R	Disance (cm)	20
S	Power Density (mW/cm ²)	0.023

Model: 28112XX1-A, 28112XX2-A, 28112XX3-A

EIRP	Radiated Power (dBm)	20.73
EIRP	Radiated Power (mW)	118.30
R	Disance (cm)	20
S	Power Density (mW/cm ²)	0.023

6.11.3 Results: Complies

6.12 Emission Bandwidth B

6.12.1 Standard Applicable: FCC 15.323(a)

The 26 dB Bandwidth B shall be larger than 50 kHz and less than 2.5 MHz.

6.12.2 Measurement procedure

Measurement method according to ANSI C63.17 2006 paragraph 6.1.3

6.12.3 Test Results: Complies

Measurement Data:

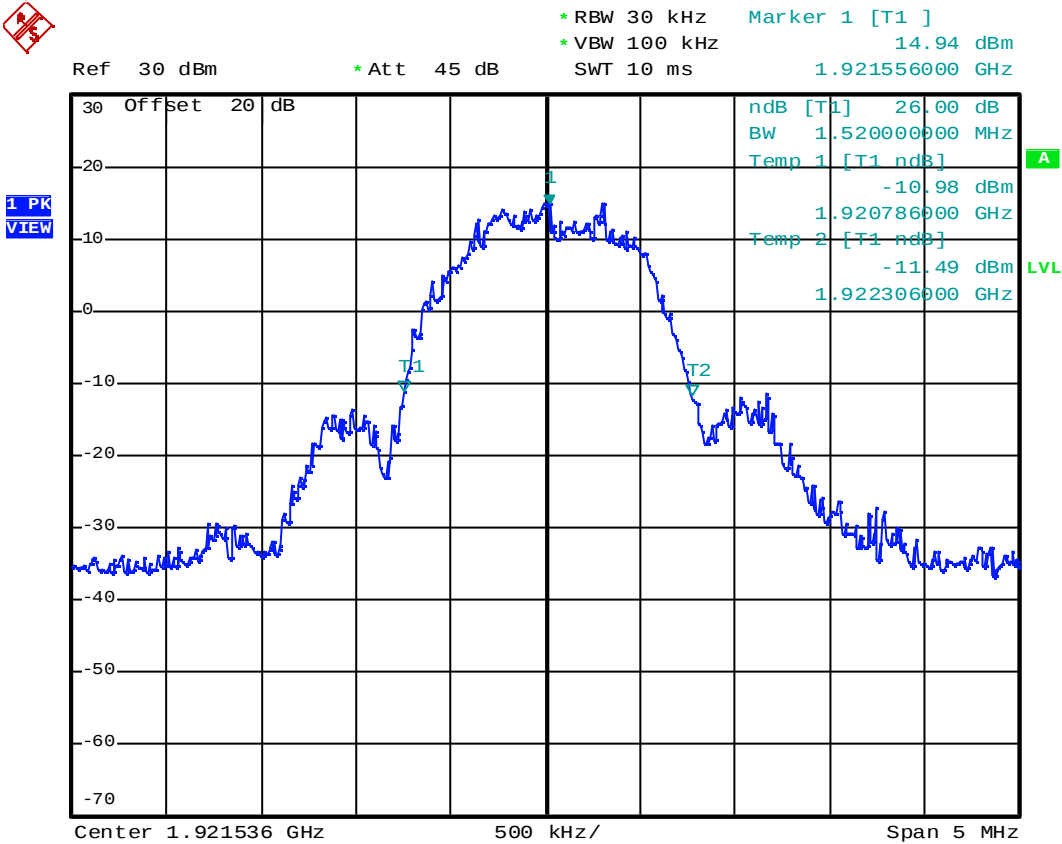
Model: 28111XX1-A, 28111XX2-A, 28111XX3-A

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
F _L	1921.536	1.52
F _H	1928.448	1.50

Model: 28112XX1-A, 28112XX2-A, 28112XX3-A

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
F _L	1921.536	1.50
F _H	1928.448	1.52

26 dB Bandwidth B: CH F_L
(Model: 28111XX1-A, 28111XX2-A, 28111XX3-A)

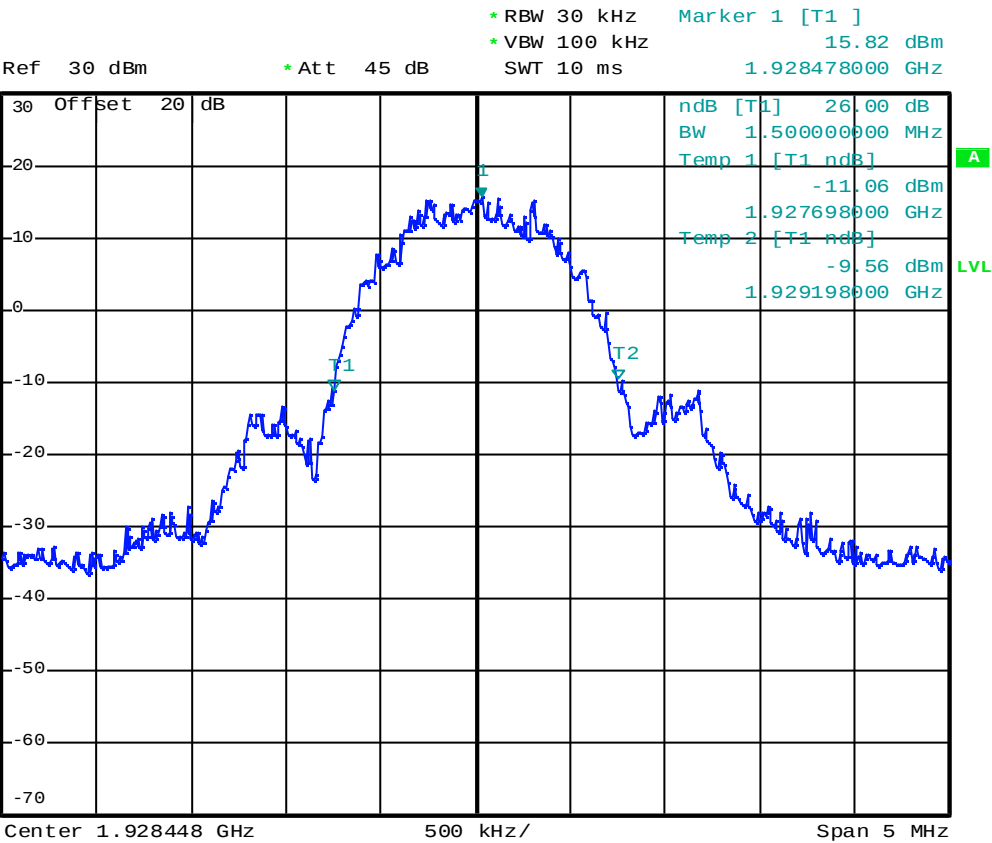


Date: 11.JUL.2006 10:26:02

26 dB Bandwidth B: CH F_H

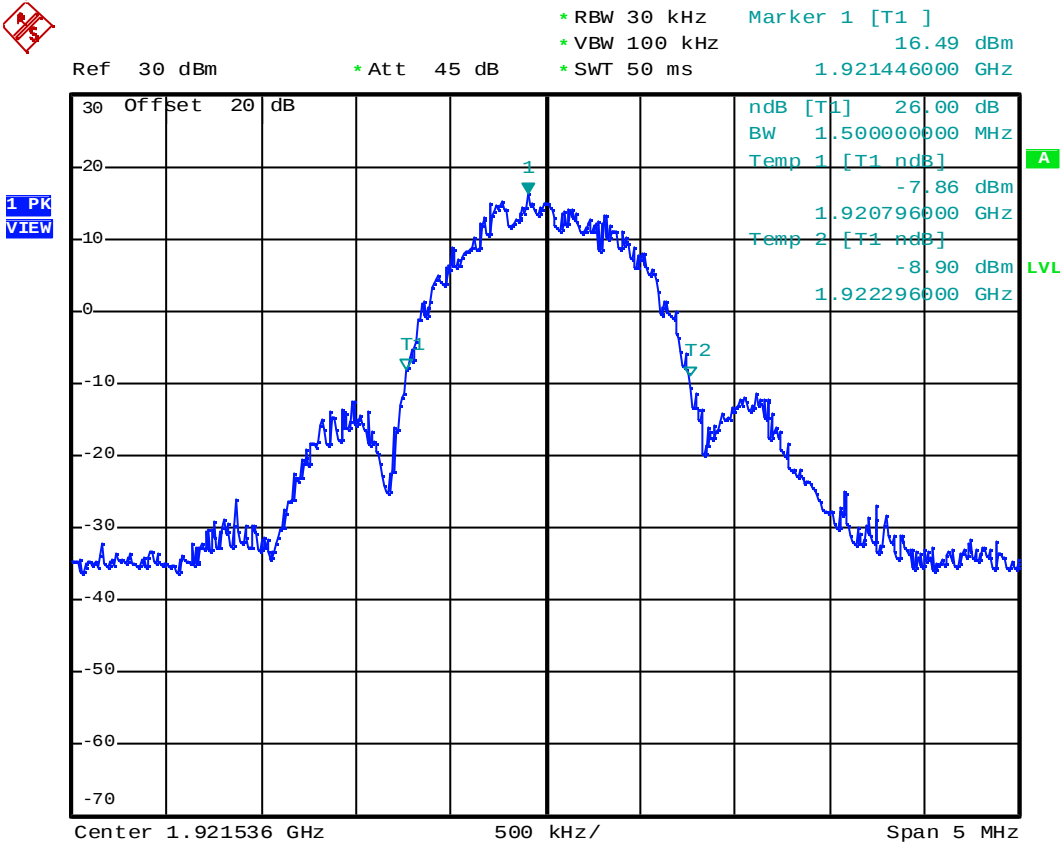


1 PK
VIEW



Date: 11.JUL.2006 10:30:37

26 dB Bandwidth B: CH F_L
(Model: 28112XX1-A, 28112XX2-A, 28112XX3-A)

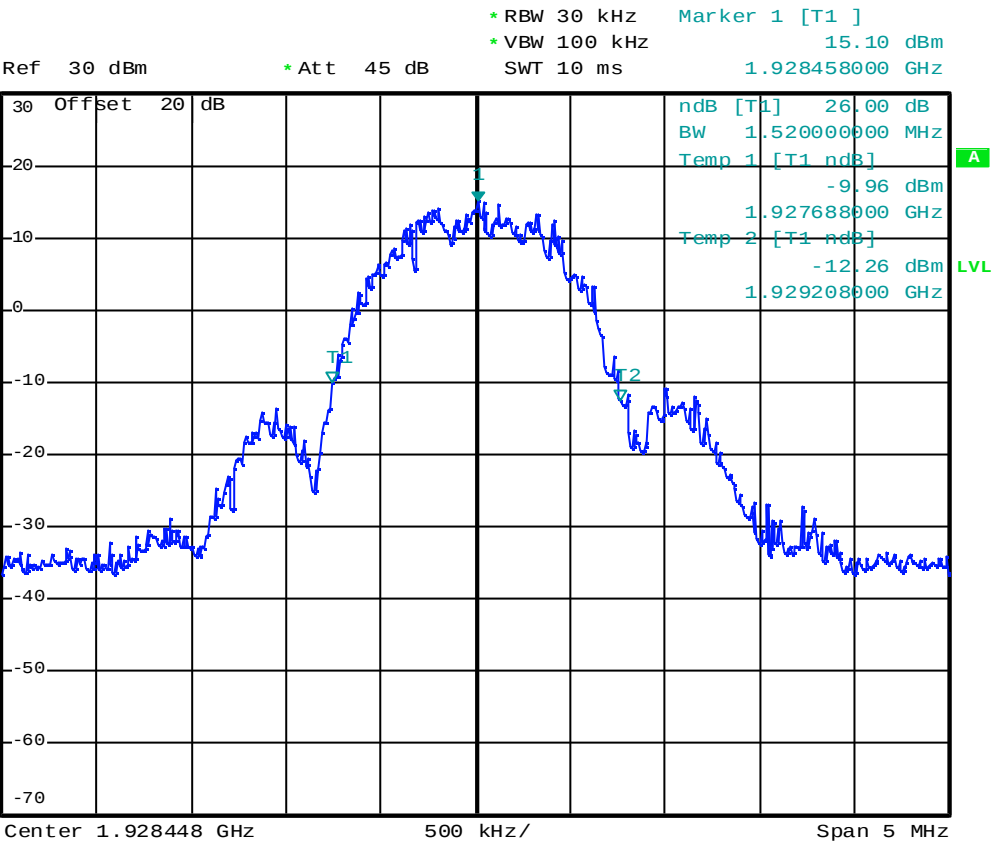


Date: 11.JUL.2006 10:16:56

26 dB Bandwidth B: CH F_H



1 PK
VIEW



Date: 11.JUL.2006 10:29:55

6.25 Emissions inside and outside the subband

6.25.1 Standard Applicable: FCC 15.323(d)

Emissions inside the subband

$B < f$ 2B: less than or equal to 30dB below max. permitted peak power level

$2B < f$ 3B: less than or equal to 50 dB below max. permitted peak power level

$3B < f$ UPCS Band Edge: less than or equal to 60 dB below max. permitted peak power level

Emissions outside the subband

f 1.25MHz outside UPCS band: -9.5dBm

1.25MHz f 2.5MHz outside UPCS band: -29.5dBm

f 2.5MHz outside UPCS band: The EUT shall pass the test either a) or b) as follow:

a) In the region at 2.5 MHz or greater below and above the lower and upper band edges respectively, the measured emission level shall not exceed -39.5 dBm	☐
b) In the region at 2.5MHz or greater below and above the lower and upper band edges respectively, the measured emission level shall not exceed the limits of 47CFR15.209. Measurement shall be made as a radiated test.	☒

6.25.2 Measurement procedure

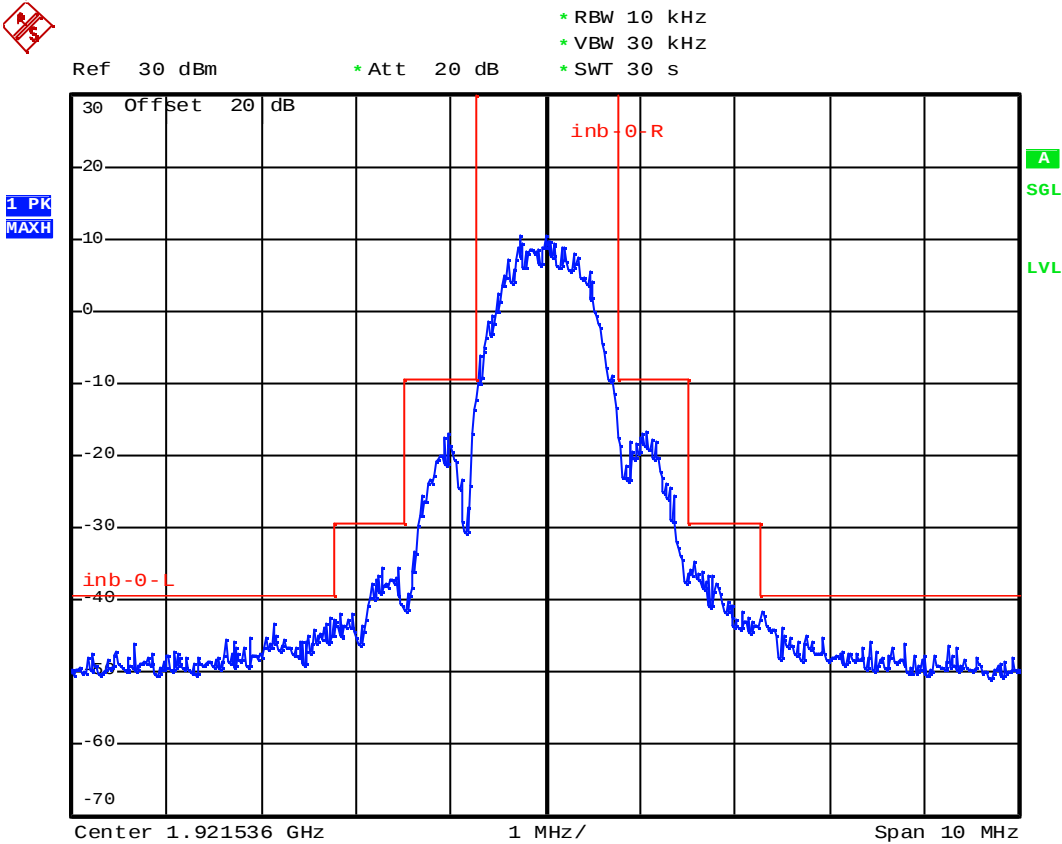
Measurement method according to ANSI C63.17 2006 paragraph 6.1.6

6.25.3 Results: Complies

Measurement Data:

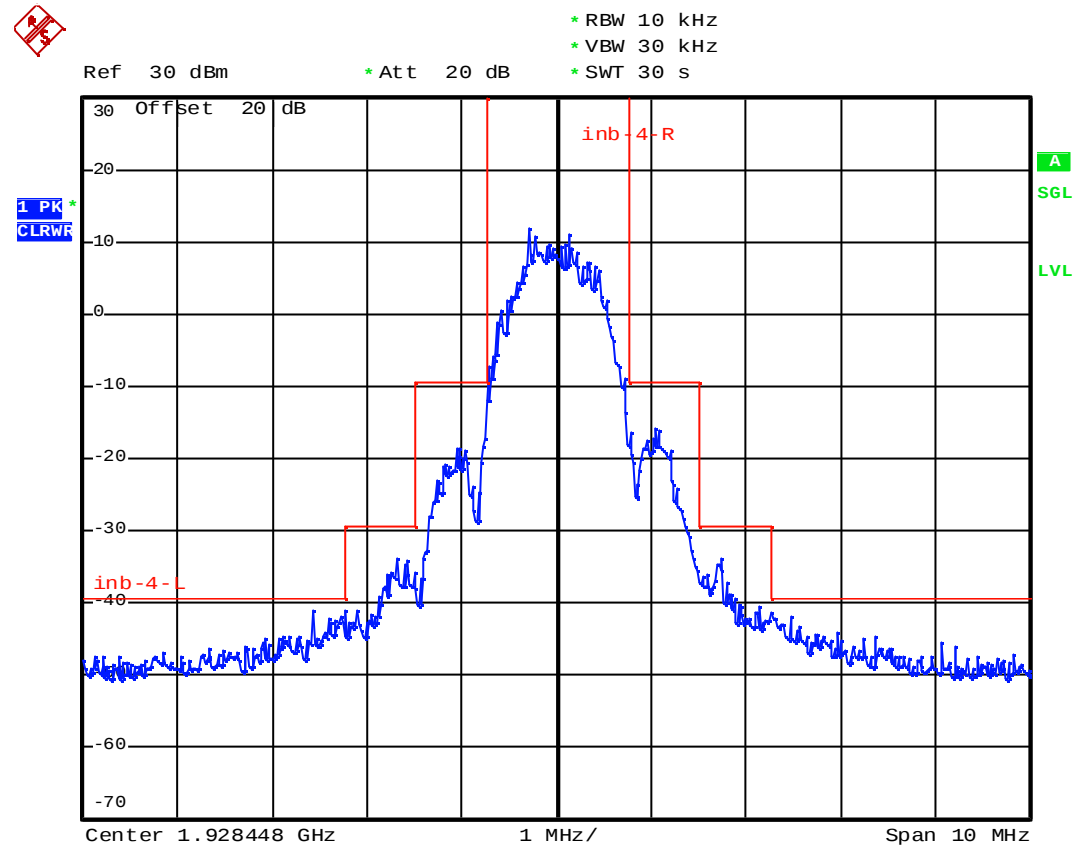
See plots.

In-band Unwanted Emission: CH F_L
(Model: 28111XX1-A, 28111XX2-A, 28111XX3-A)



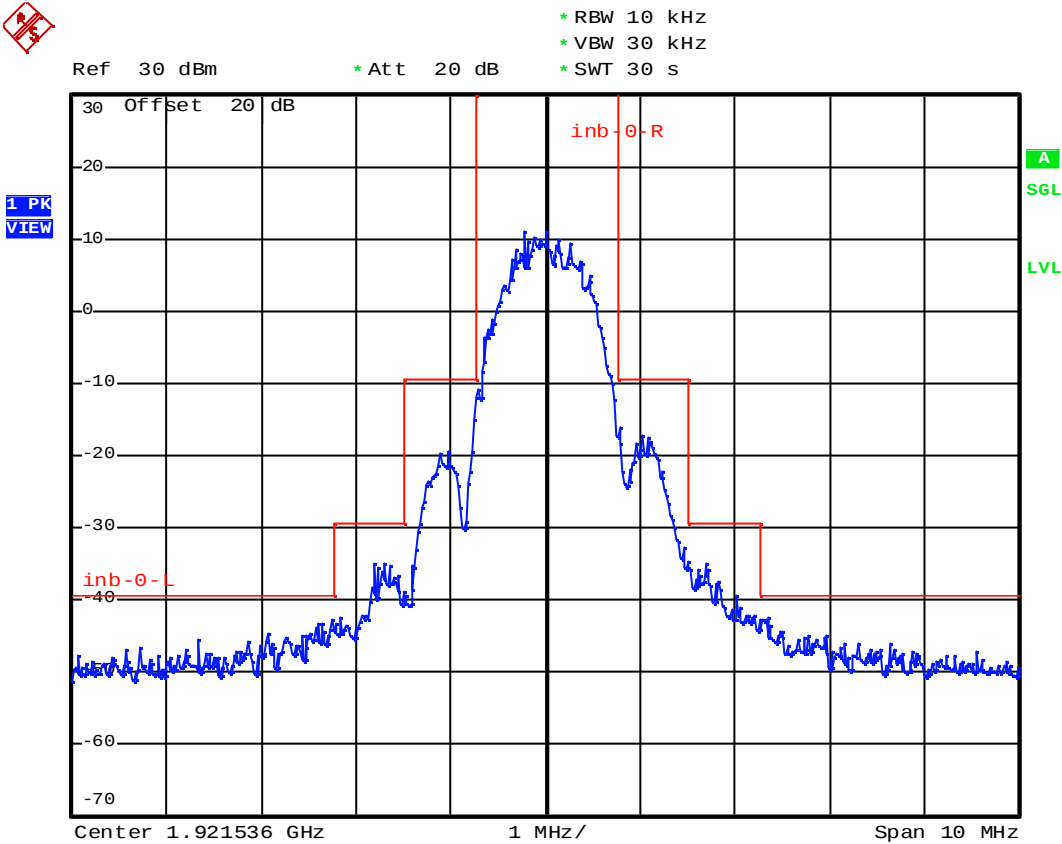
Date: 23.JUL.2006 15:26:21

In-band Unwanted Emission: CH F_H



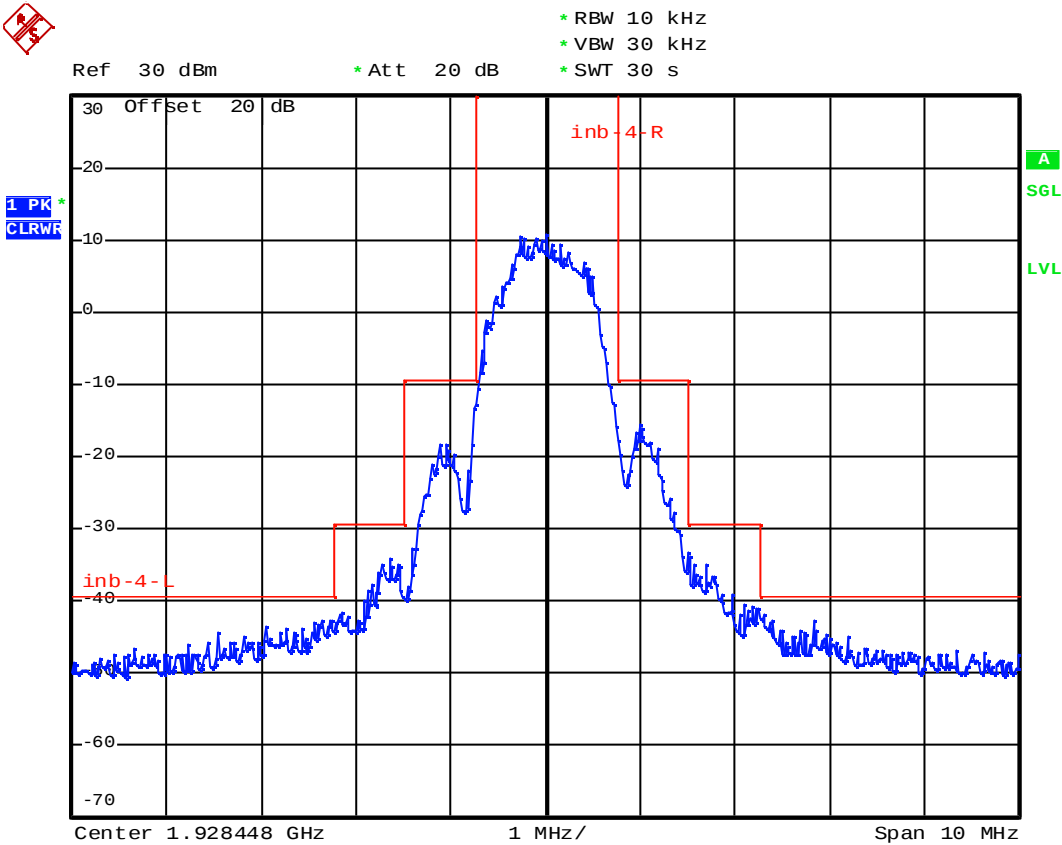
Date: 23.JUL.2006 15:37:45

In-band Unwanted Emission: CH F_L
(Model: 28112XX1-A, 28112XX2-A, 28112XX3-A)



Date: 23.JUL.2006 15:22:51

In-band Unwanted Emission: CH F_H



Date: 23.JUL.2006 15:36:41

Out-of -band Unwanted Emission:

Out-of -band Unwanted Emission (below 1GHz)

Model 28111XX1-A, 28111XX2-A, 28111XX3-A

a)

Operation Mode : Base On LineTest Date : Jul. 24, 2006Temperature : 23 °CHumidity : 56 %

Frequency (MHz)	Ant-Pol H/V	Meter Reading (dBuV)	Corrected Factor (dB)	Result @3m (dBuV/m)	Limit @3m (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (m)
89.940	V	13.0	11.5	24.5	43.5	-19.0	82	1.2
147.180	H	9.6	17.8	27.4	43.5	-16.1	282	1.8
164.730	H	8.4	18.7	27.1	43.5	-16.4	26	1.5
170.940	H	8.3	19.1	27.4	43.5	-16.1	78	1.7
179.580	H	6.7	20.3	27.0	43.5	-16.5	183	1.1
366.500	V	9.4	20.2	29.6	46.0	-16.4	36	1.0

b)

Operation Mode : Base Charging and Stand byTest Date : Jul. 24, 2006Temperature : 23 °CHumidity : 56 %

Frequency (MHz)	Ant-Pol H/V	Meter Reading (dBuV)	Corrected Factor (dB)	Result @3m (dBuV/m)	Limit @3m (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (m)
102.090	H	11.4	13.9	25.3	43.5	-18.2	63	1.5
186.330	H	7.0	20.5	27.5	43.5	-16.0	83	1.4
226.290	H	4.9	22.0	26.9	46.0	-19.1	37	1.5
264.910	V	4.8	24.5	29.3	46.0	-16.7	28	1.2
285.690	H	4.5	25.9	30.4	46.0	-15.6	37	1.4
519.800	H	5.1	24.2	29.3	46.0	-16.7	244	1.5

Note :

1. Remark “---” means that the emissions level is too low to be measured.
2. The expanded uncertainty of the radiated emission tests is 3.53 dB.

Model 28112XX1-A, 28112XX2-A, 28112XX3-A

a)

Operation Mode : Base On LineTest Date : Jul. 24, 2006 Temperature : 23 °C Humidity : 56 %

Frequency (MHz)	Ant-Pol H/V	Meter Reading (dBuV)	Corrected Factor (dB)	Result @3m (dBuV/m)	Limit @3m (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (m)
43.770	V	2.6	16.4	19.0	40.0	-21.0	111	1.4
99.930	H	17.6	13.6	31.2	43.5	-12.3	119	1.4
107.220	V	12.5	14.6	27.1	43.5	-16.4	67	1.8
186.060	V	10.5	20.5	31.0	43.5	-12.5	49	1.6
286.510	V	7.7	26.0	33.7	46.0	-12.3	29	1.7
422.500	H	13.0	21.5	34.5	46.0	-11.5	21	1.6

b)

Operation Mode : Base Charging and Stand byTest Date : Jul. 24, 2006 Temperature : 23 °C Humidity : 56

Frequency (MHz)	Ant-Pol H/V	Meter Reading (dBuV)	Corrected Factor (dB)	Result @3m (dBuV/m)	Limit @3m (dBuV/m)	Margin (dB)	Table Degree (Deg.)	Ant. High (m)
96.690	V	12.4	12.9	25.3	43.5	-18.2	77	1.2
159.060	V	9.8	18.3	28.1	43.5	-15.4	138	1.3
173.100	H	8.3	19.4	27.7	43.5	-15.8	59	1.6
365.800	V	13.9	20.2	34.1	46.0	-11.9	63	1.4
377.740	V	14.2	20.5	34.7	46.0	-11.3	43	1.8
419.720	V	14.1	21.5	35.6	46.0	-10.4	146	1.5

Note :

1. Remark “---” means that the emissions level is too low to be measured.
2. The expanded uncertainty of the radiated emission tests is 3.53 dB.

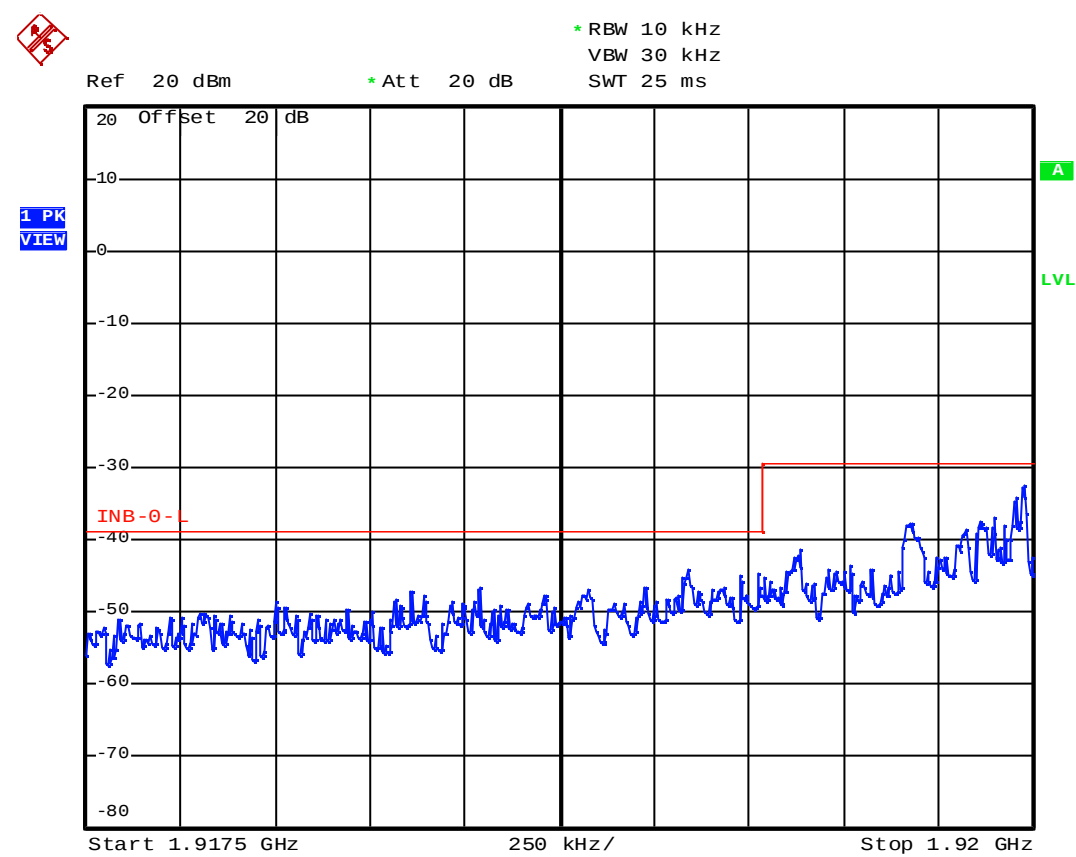
a) CH F_LOut-of -band Unwanted Emission (above 1GHz): CH F_LModel : 28111XX1-A, 28111XX2-A, 28111XX3-AOperation Mode : TransmittingFundamental Frequency : 1921.536MHz (Local Frequency : 3842.750MHz)Test Date : Jul. 11, 2006Temperature : 23 °CHumidity : 56 %

Frequency (MHz)	Reading (dBuV)				Factor (dB) Corr.	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin (dB)	Table Deg. (Deg.)	Ant. High (m)
	Peak	Ave	Peak	Ave		Peak	Ave	Peak	Ave			
3842.750	38.8	---	41.6	---	-2.7	38.9	---	74.0	54.0	-15.1	106	1.9
5763.670	40.2	---	43.3	---	0.7	44.0	---	74.0	54.0	-10.0	141	1.5
7686.320	46.3	---	49.8	---	3.3	53.1	---	74.0	54.0	-0.9	108	1.5
9606.100	44.8	---	44.8	---	4.1	48.9	---	74.0	54.0	-5.1	129	1.4
11531.550	49.1	31.3	51.0	31.3	7.1	58.1	38.4	74.0	54.0	-15.6	116	1.6

Note :

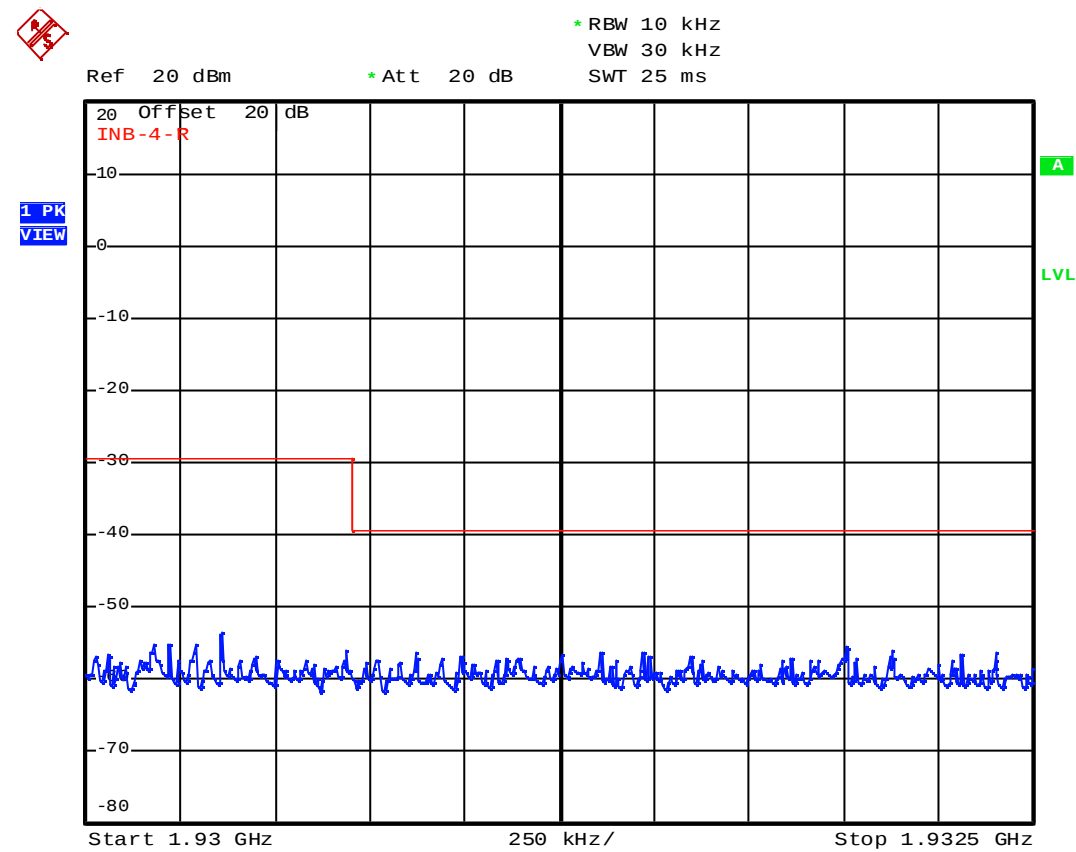
1. Item of margin shown in above table refer to average limit.
2. It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark "***" means that Peak result is meet average limit.
3. Remark "---" means that the emissions level is too low to be measured.
4. Item "Margin" referred to Average limit while there is only peak result.
5. The expanded uncertainty of the radiated emission tests is 3.53 dB.

Out-of -band Unwanted Emission: CH F_L



Date: 24.JUL.2006 10:48:11

Out-of -band Unwanted Emission: CH F_L



Date: 24.JUL.2006 10:45:49

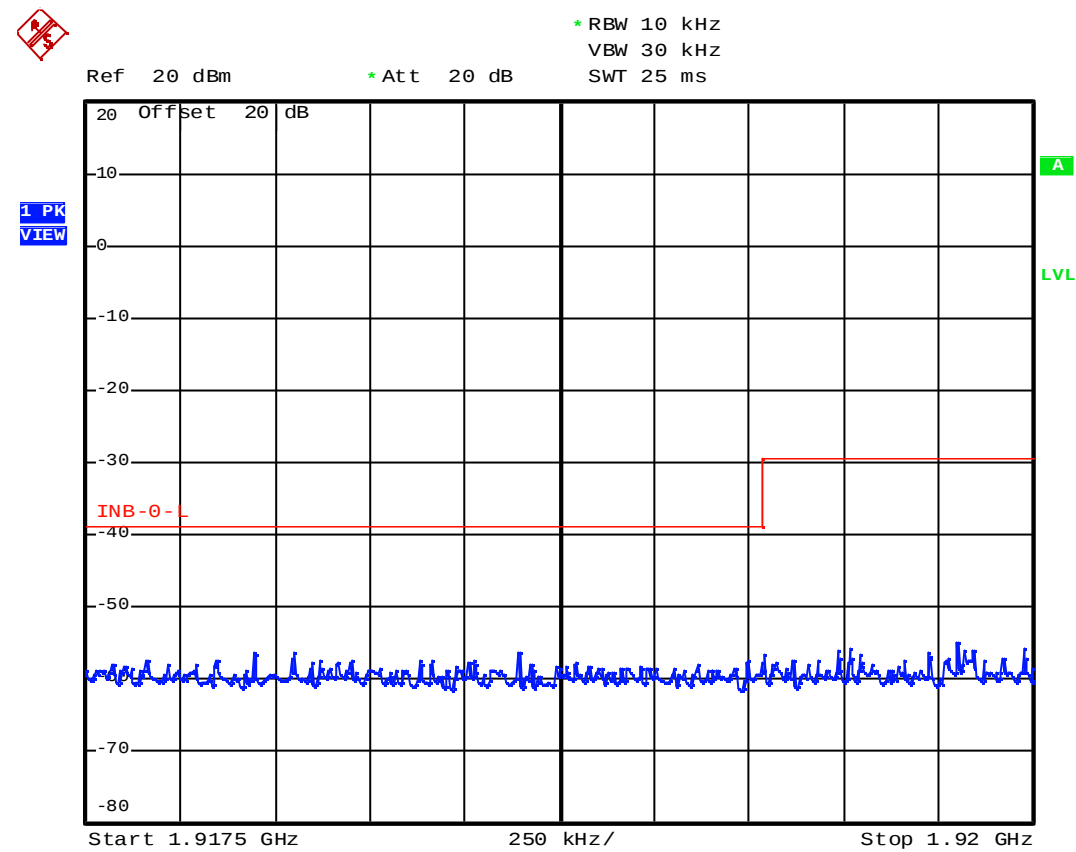
b) CH F_HOut-of -band Unwanted Emission (above 1GHz): CH F_HModel : 28111XX1-A, 28111XX2-A, 28111XX3-AOperation Mode : TransmittingFundamental Frequency : 1928.448MHz (Local Frequency : 3857.850MHz)Test Date : Jul. 11, 2006Temperature : 23 °CHumidity : 56 %

Frequency (MHz)	Reading (dBuV)				Factor (dB) Corr.	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin (dB)	Table Deg. (Deg.)	Ant. High (m)
	Peak	Ave	Peak	Ave		Peak	Ave	Peak	Ave			
3857.850	39.0	---	41.0	---	-2.6	38.4	---	74.0	54.0	-15.6	119	1.3
5784.330	39.5	---	42.8	---	0.7	43.5	---	74.0	54.0	-10.5	131	1.6
7714.020	46.5	---	48.6	---	3.4	52.0	---	74.0	54.0	-2.0	106	1.6
9640.020	47.0	---	46.0	---	4.1	51.1	---	74.0	54.0	-2.9	138	1.9
11567.780	48.8	32.2	52.5	32.3	7.1	59.6	39.4	74.0	54.0	-14.4	141	1.6

Note :

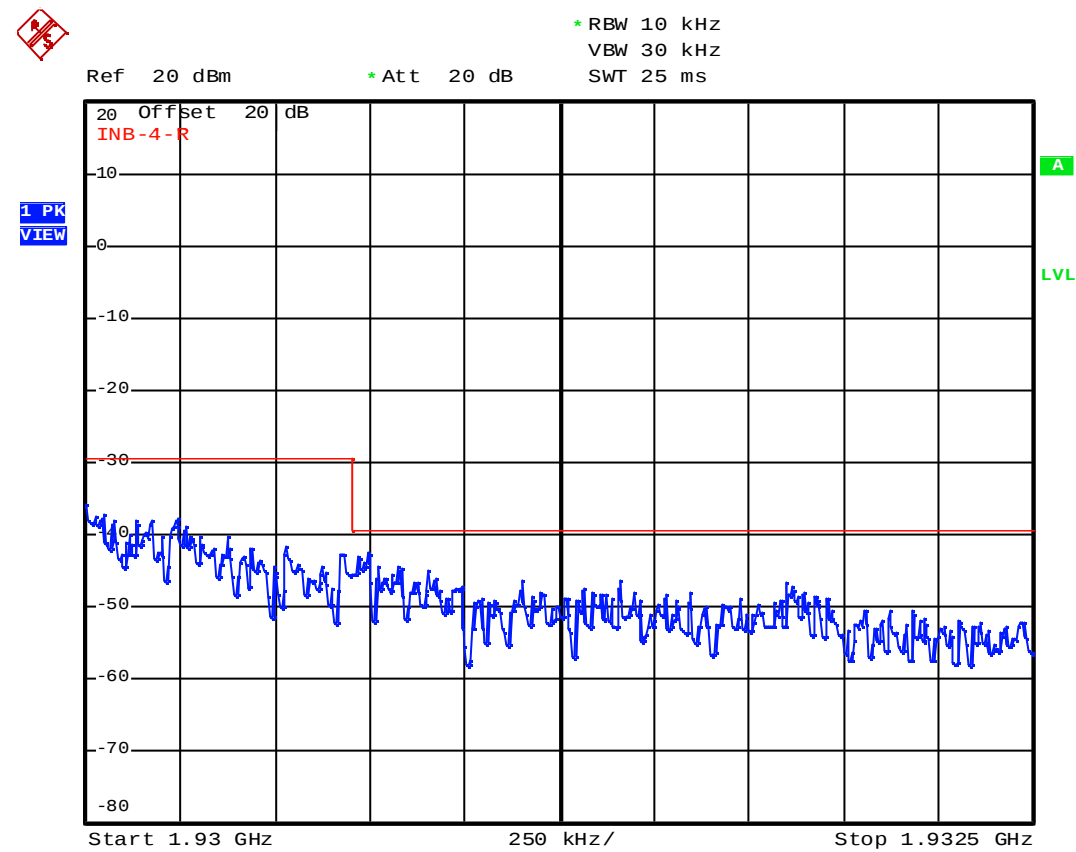
1. Item of margin shown in above table refer to average limit.
2. It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark "***" means that Peak result is meet average limit.
3. Remark "---" means that the emissions level is too low to be measured.
4. Item "Margin" referred to Average limit while there is only peak result.
5. The expanded uncertainty of the radiated emission tests is 3.53 dB.

Out-of -band Unwanted Emission: CH F_H



Date: 24.JUL.2006 10:39:25

Out-of -band Unwanted Emission: CH F_H



Date: 24.JUL.2006 10:38:07

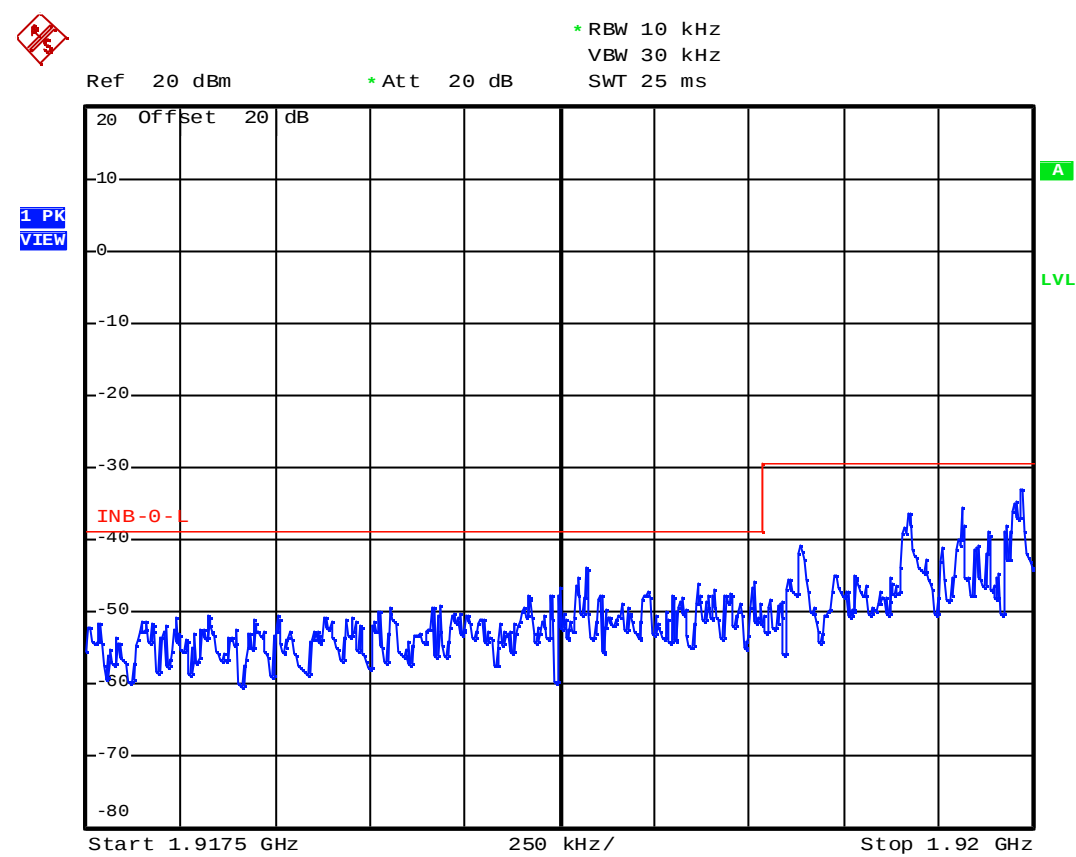
a) CH F_LOut-of -band Unwanted Emission (above 1GHz): CH F_LModel : 28111XX2-A, 28112XX2-A, 28112XX3-AOperation Mode : TransmittingFundamental Frequency : 1921.536MHz (Local Frequency : 3843.18 0MHz)Test Date : Jul. 11, 2006Temperature : 23 °CHumidity : 56 %

Frequency (MHz)	Reading (dBuV)				Factor (dB) Corr.	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin (dB)	Table Deg. (Deg.)	Ant. High (m)
	Peak	Ave	Peak	Ave		Peak	Ave	Peak	Ave			
3843.180	38.4	---	42.0	---	-2.6	39.4	---	74.0	54.0	-14.6	112	1.9
5763.620	40.6	---	43.1	---	0.7	43.8	---	74.0	54.0	-10.2	106	1.5
7686.150	46.1	---	48.7	---	3.3	52.0	---	74.0	54.0	-2.0	98	1.5
9607.720	45.1	---	43.2	---	4.1	49.2	---	74.0	54.0	-4.8	143	1.4
11529.500	49.1	31.4	50.3	31.2	7.1	57.4	38.5	74.0	54.0	-15.5	128	1.6

Note :

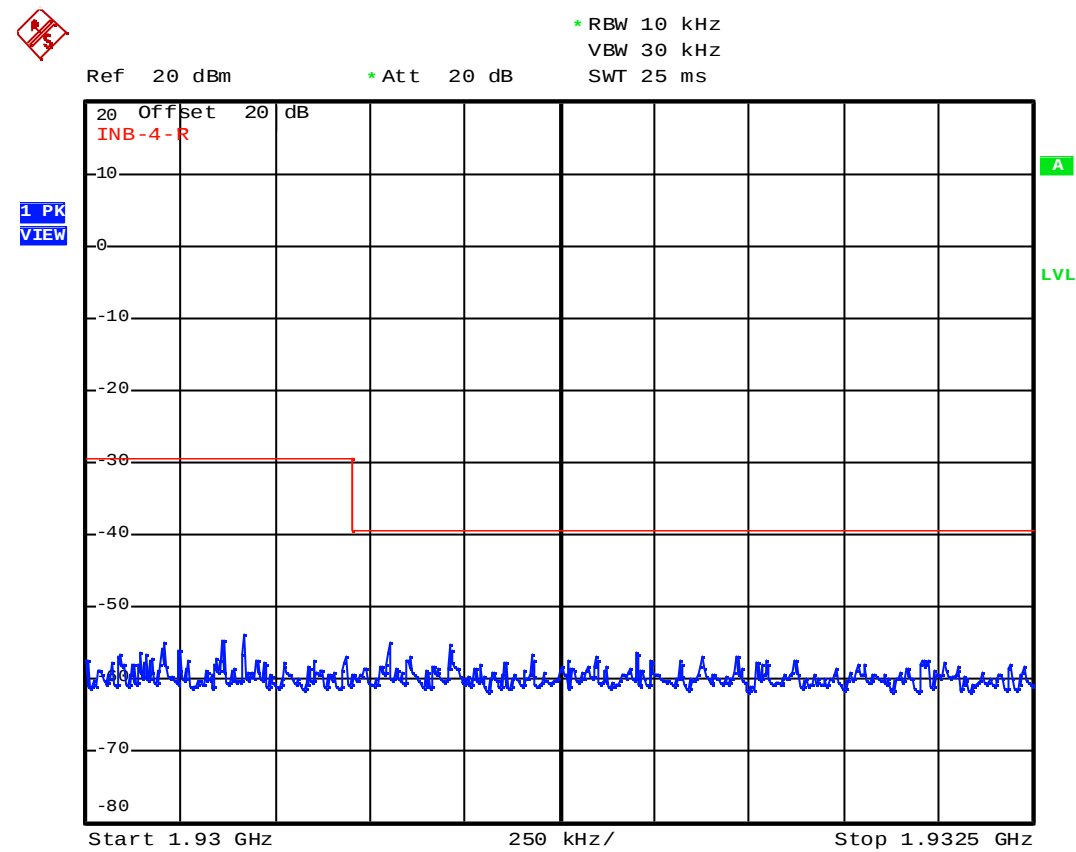
1. Item of margin shown in above table refer to average limit.
2. It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark "***" means that Peak result is meet average limit.
3. Remark "---" means that the emissions level is too low to be measured.
4. Item "Margin" referred to Average limit while there is only peak result.
5. The expanded uncertainty of the radiated emission tests is 3.53 dB.

Out-of -band Unwanted Emission: CH F_L



Date: 24.JUL.2006 10:48:26

Out-of -band Unwanted Emission: CH F_L



Date: 24.JUL.2006 10:46:05

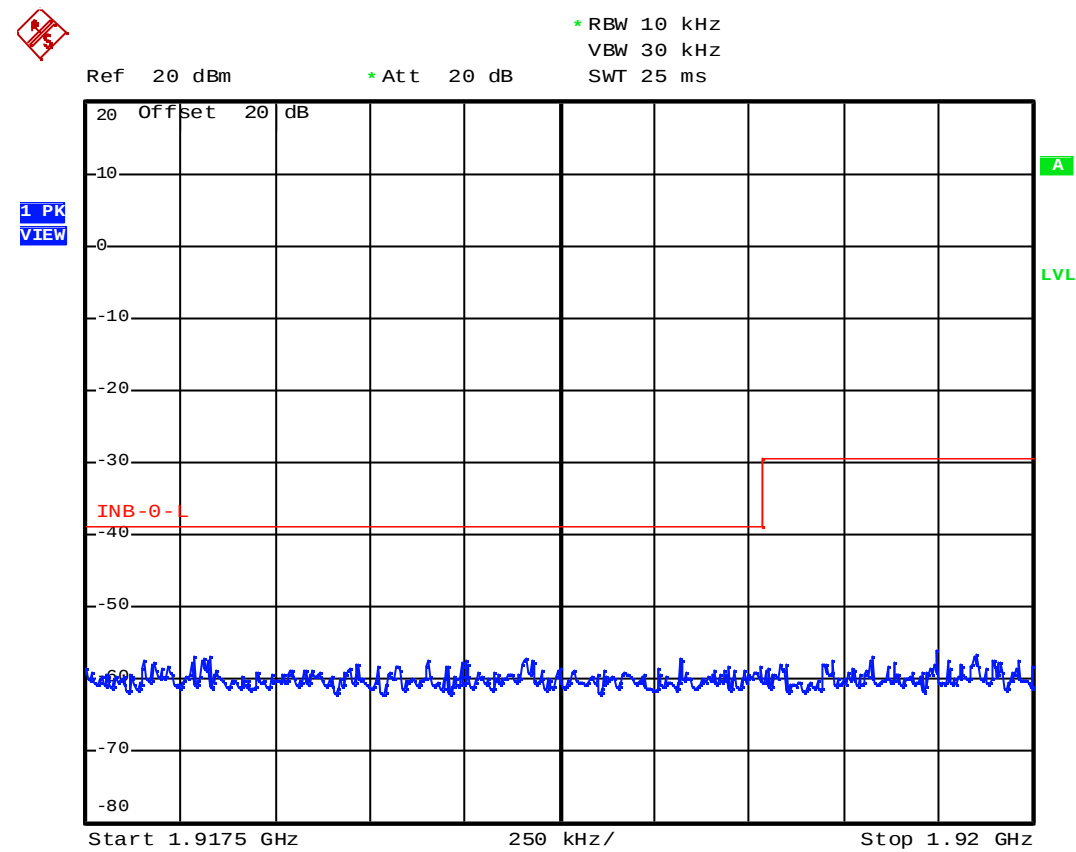
b) CH F_HOut-of -band Unwanted Emission (above 1GHz): CH F_HModel : 28112XX1-A, 28112XX2-A, 28112XX3-AOperation Mode : TransmittingFundamental Frequency : 1928.448MHz (Local Frequency : 3856.970MHz)Test Date : Jul. 11, 2006 Temperature : 23 °C Humidity : 56 %

Frequency (MHz)	Reading (dBuV)				Factor (dB) Corr.	Result @3m (dBuV/m)		Limit @3m (dBuV/m)		Margin (dB)	Table Deg. (Deg.)	Ant. High (m)
	Peak	Ave	Peak	Ave		Peak	Ave	Peak	Ave			
3856.970	38.2	---	40.3	---	-2.6	37.7	---	74.0	54.0	-16.3	101	1.4
5785.020	39.3	---	42.1	---	0.7	42.8	---	74.0	54.0	-11.2	118	1.8
7712.530	45.8	---	47.9	---	3.4	51.3	---	74.0	54.0	-2.7	114	1.7
9640.520	47.2	---	45.3	---	4.1	51.3	---	74.0	54.0	-2.7	127	1.8
11570.320	48.2	32.1	51.9	32.2	7.1	59.0	39.3	74.0	54.0	-14.7	136	1.7

Note :

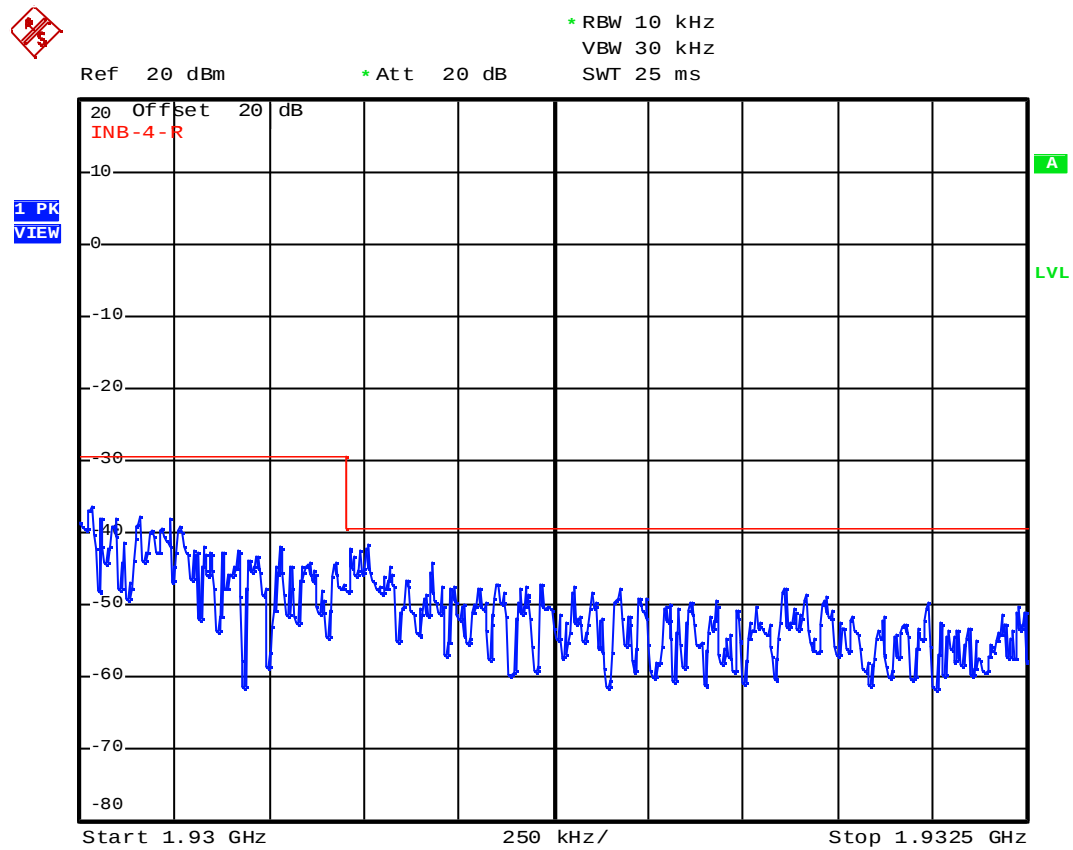
1. Item of margin shown in above table refer to average limit.
2. It is considered that the results of average comply with average limit when measuring data with a peak function detector meet the average limit. Mark "****" means that Peak result is meet average limit.
3. Remark "---" means that the emissions level is too low to be measured.
4. Item "Margin" referred to Average limit while there is only peak result.
5. The expanded uncertainty of the radiated emission tests is 3.53 dB.

Out-of -band Unwanted Emission: CH F_H



Date: 24.JUL.2006 10:39:41

Out-of -band Unwanted Emission: CH F_H



Date: 24.JUL.2006 10:38:46

6.25.4 Photos of Radiation Measuring Setup

Model 28111XX1-A, 28111XX2-A, 28111XX3-A



Model 28112XX1-A, 28112XX2-A, 28112XX3-A





6.26 Frame period and jitter

6.26.1 Standard Applicable: FCC 15.323(e)

The frame period (a set of consecutive time slots in which the position of each time slot can be identified by reference to a synchronizing source) of an intentional radiator operating in these subbands shall be 20 milliseconds/X where X is a positive whole number. Each device that implements time division for the purposes of maintaining a duplex connection on a given frequency carrier shall maintain a frame repetition rate with a frequency stability of at least 50 parts per million (ppm). Each device which further divides access in time in order to support multiple communication links on a given frequency carrier shall maintain a frame repetition rate with a frequency stability of at least 10 ppm. The jitter (time-related, abrupt, spurious variations in the duration of the frame interval) introduced at the two ends of such a communication link shall not exceed 25 microseconds for any two consecutive transmissions. Transmissions shall be continuous in every time and spectrum window during the frame period defined for the device.

6.26.2 Measurement procedure

- Frame frequency stability 50 ppm
- TDMA frame frequency stability 10 ppm (That translates to frequency drift of 19.2 kHz/slot for 1920 MHz carrier)
- Frame jitter 25 μ s

6.26.3 Test Results: Complies**Measurement Data**Model: 28111XX1-A, 28111XX2-A, 28111XX3-A

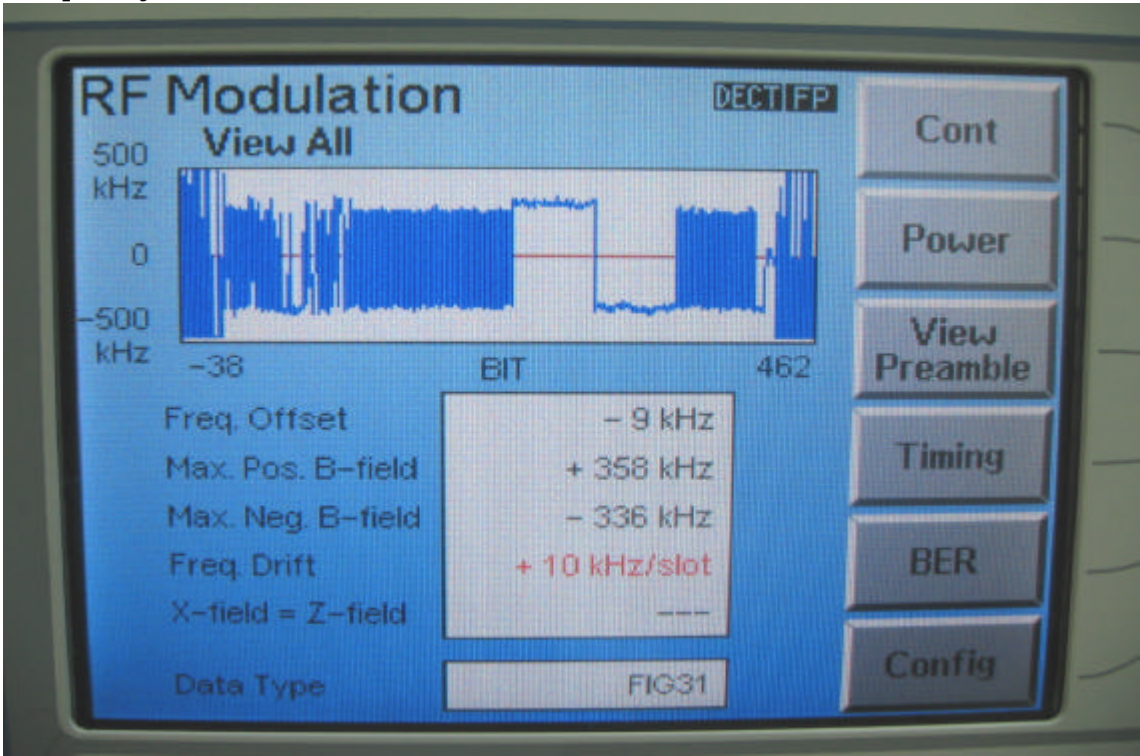
Channel No.	Frequency (KHz/slot)		Jitter (us)	
	Drift	Limit	Result	Limit
F _L	9	19.2	0.06	25
F _H	9	19.2	0.06	25

Model: 28112XX1-A, 28112XX2-A, 28112XX3-A

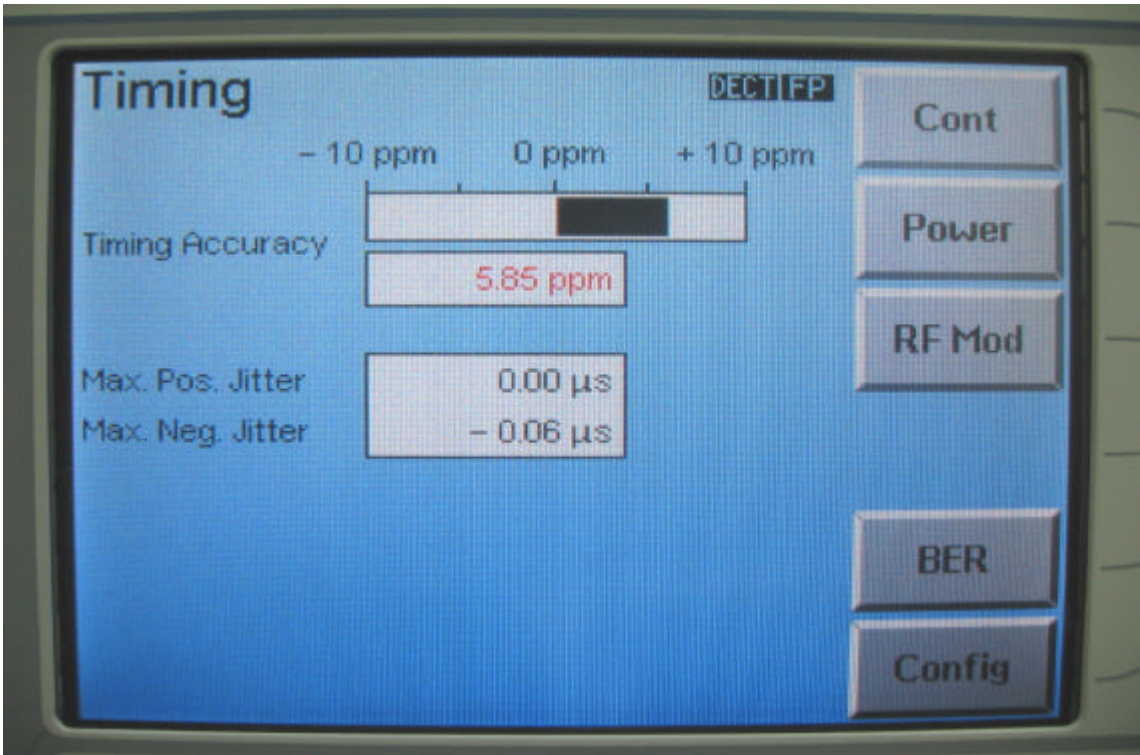
Channel No.	Frequency (KHz/slot)		Jitter (us)	
	Drift	Limit	Result	Limit
F _L	14	19.2	0.06	25
F _H	13	19.2	0.06	25

Photos of worst-case disply follow:

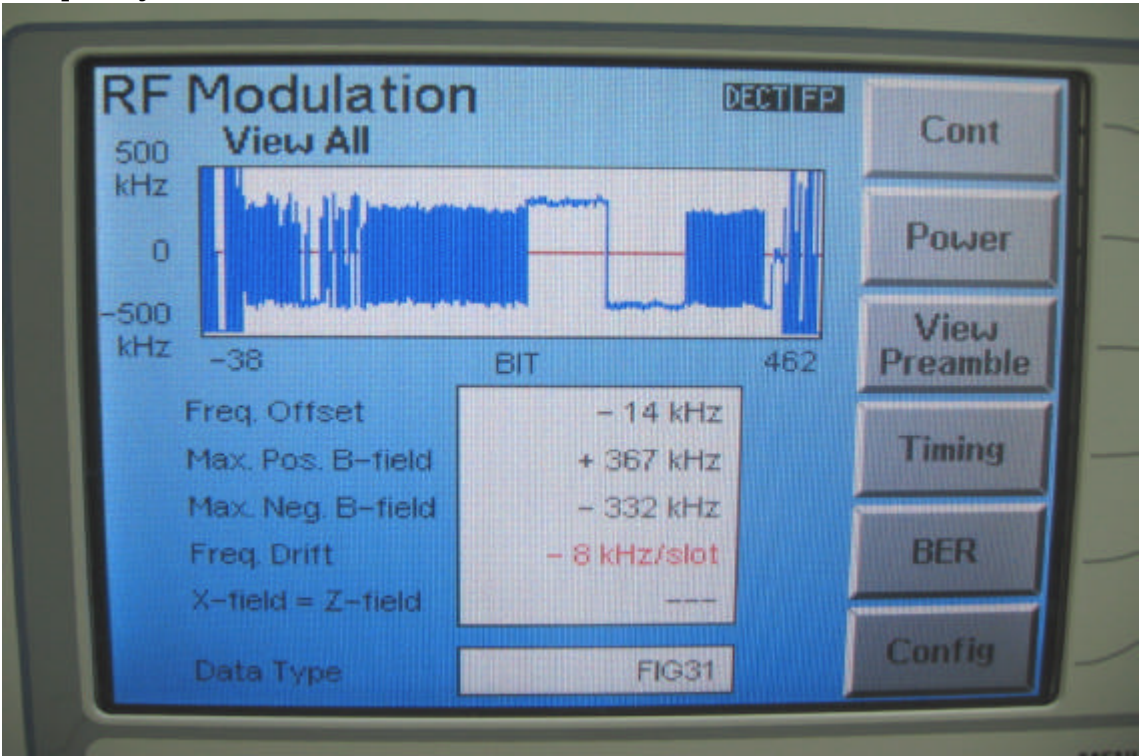
Model: 28111XX1-A, 28111XX2-A, 28111XX3-A
Frequency Drift



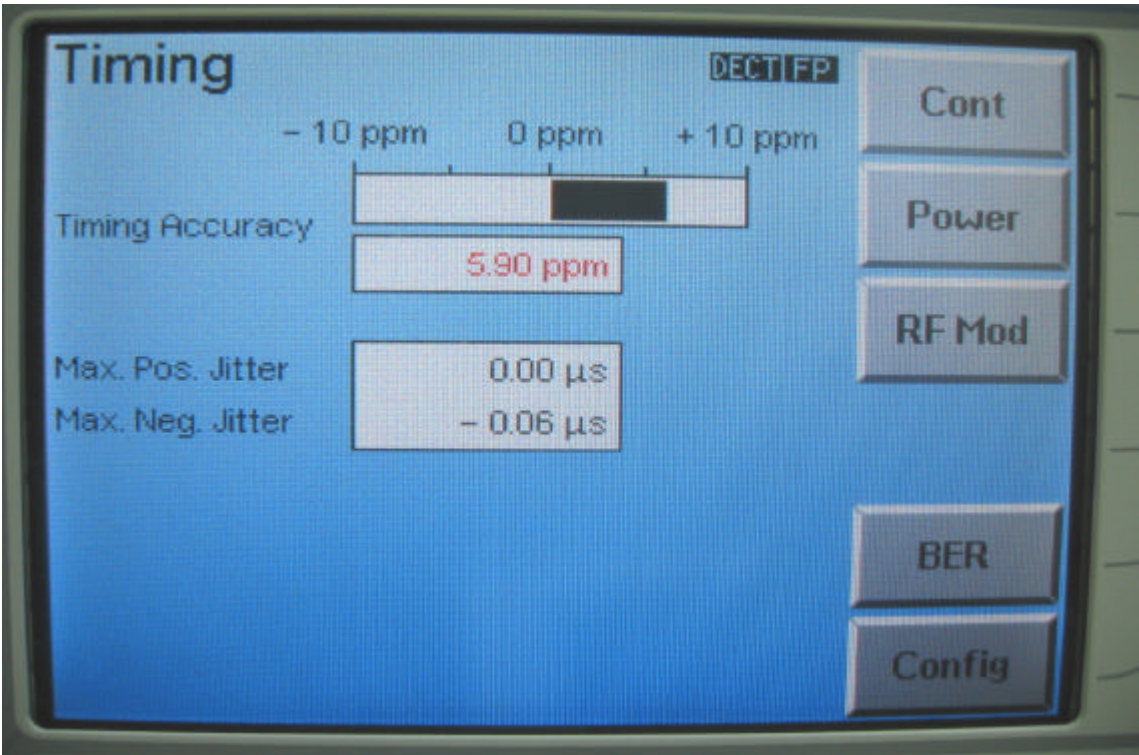
TDMA Frame Jitter



Model: 28112XX1-A, 28112XX2-A, 28112XX3-A
Frequency Drift



TDMA Frame Jitter



6.27 Carrier frequency stability

6.27.1 Standard Applicable: FCC 15.323(f)

The frequency stability of the carrier frequency of the intentional radiator shall be maintained within ± 10 ppm over 1 hour or the interval between channel access monitoring, whichever is shorter. The frequency stability shall be maintained over a temperature variation of -20°C to $+50^{\circ}\text{C}$ degrees C at normal supply voltage, and over a variation in the primary supply voltage of 85 percent to 115 percent of the rated supply voltage at a temperature of 20°C . For equipment that is capable only of operating from a battery, the frequency stability tests shall be performed using a new battery without any further requirement to vary supply voltage.

6.27.2 Measurement Requirement

- Carrier frequency stability 10 ppm over 1 hour or interval between channel access monitoring, whichever is shorter (That translates to frequency drift of 19.2 kHz for 1920 MHz carrier)
- Carrier frequency stability over -20°C to $+50^{\circ}\text{C}$ at normal supply voltage, and over 85% to 115% of rated supply voltage (voltage variation not required for battery operated device)

6.27.3 Test Results: Complies**Measurement Data**Model: 28111XX1-A, 28111XX2-A, 28111XX3-A**a) Carrier Frequency Stability with Supply Voltage**

Channel No.	Frequency Offset (KHz)			Limit (KHz)
	5.53V (85%)	6.5V (Normal)	7.48V (115%)	
F _L	10	9	7	±9.2
F _H	10	8	7	±9.2

b) Carrier Frequency Stability with Temperature and Time

Channel No.	Frequency Offset (KHz)			Limit (KHz)
	0 °C	20 °C	45 °C	
F _L	9	8	6	±9.2
F _H	9	8	7	±9.2

Model: 28112XX1-A, 28112XX2-A, 28112XX3-A**a) Carrier Frequency Stability with Supply Voltage**

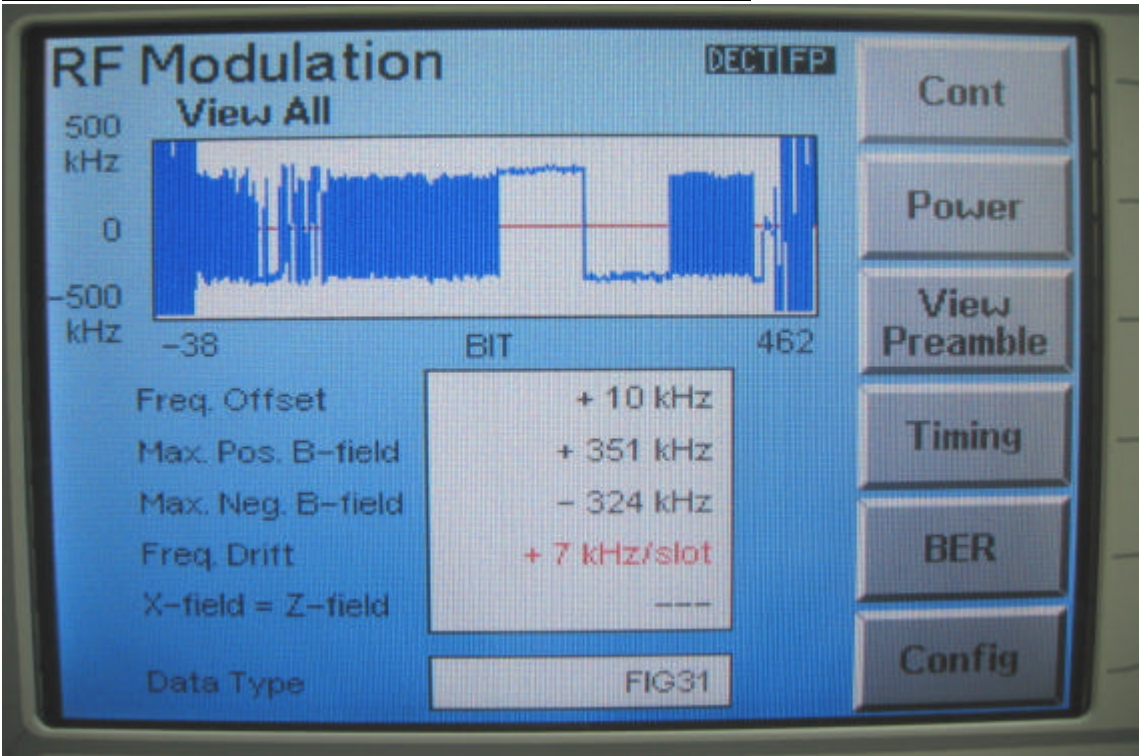
Channel No.	Frequency Offset (KHz)			Limit (KHz)
	5.53V (85%)	6.5V (Normal)	7.48V (115%)	
F _L	11	9	10	±9.2
F _H	11	8	9	±9.2

b) Carrier Frequency Stability with Temperature and Time

Channel No.	Frequency Offset (KHz)			Limit (KHz)
	0 °C	20 °C	45 °C	
F _L	14	12	11	±9.2
F _H	14	13	11	±9.2

Test was conducted for duration longer than 1 hour. Photo of worst-case display follows:

Model: 28111XX1-A, 28111XX2-A, 28111XX3-A



Model: 28112XX1-A, 28112XX2-A, 28112XX3-A

