FCC PART 24 TYPE APPROVAL

EMI MEASUREMENT AND TEST REPORT

For

ZTE Corporation

ZTE Plaza, Hi-tech Park, Nanshan District, Shenzhen, Guangdong, China

FCC ID: Q78-ZXCBTS192T

April 29, 2005

This Report Concerns:	**Equipment Type:**
☒ Original Report	CDMA Micro Base Transceiver Station

Test Engineer:	Sam Lin
Report No.:	RSZ05032302
Test Date:	March 28-April 1, 2005
Reviewed By:	Chris Zeng
Prepared By:	Bay Area Compliance Lab Corp. (ShenZhen) 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone, ShenZhen, Guangdong 518038, P.R.China Tel: +86-755-33320018 Fax: +86-755-33320008

TABLE OF CONTENTS

GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The *ZTE Corporation*'s product, model number: ZXCBTS M192T; ZXCBTS R192T or the "EUT" as referred to in this report is a CDMA Micro Base Transceiver Station. The EUT is measured approximately 63.0 cm L x 40.0cmW x 28.5cmH, rated input voltage: AC 120V/60Hz.

The following charts describe the modules what ZXCBTS M192Tand ZXCBTS R192T have used.

ZXCBTS M192T			
NO.	MODULE NAME		
1	RFS	MPA192	
2		MLNA1900	
3		MTRX（1900M）	RFCM
			FS1900
			RX1900
			TX1900
			IQ_BORAD
4		RFE (RF Filter)	MDUP1900
			MDIV1900
5	MPD (Power supply)		
6	TFS	GPSTM	
7	BDS	BDM1900	

ZXCBTS R192T			
NO.	MODULE NAME		
1	RFS	MPA192	
2		MLNA1900	
3		MTRX（1900M）	RFCM
			FS1900
			RX1900
			TX1900
			IQ_BORAD
4		RFE (RF Filter)	MDUP1900
			MDIV1900
5	MPD (Power supply)		
6	TFS	N/A	
7	Remote Fiber Module (RFM)		

Note:

RFS: Provides an air interface, completes the modulation transmitting and demodulation receiving of CDMA signals and implements related detection, monitor, configuration and control functions.
MPD: Power supply.
TFS: Provides time and frequency signals necessary for the BDS and RFS.
BDS: Completes the baseband modulation/demodulation of CDMA signals and also provides functions such as resources management, signaling processing and operation & maintenance. In addition, the BDS provides an Abis interface with the base station controller.
RFM: Remote Fiber Module, used to transmit CDMA baseband signals and system signaling.

** The test data gathered are from production sample, serial number which were provided by the manufacturer:*

ZXCBTS M192T:0510065050300002;
ZXCBTS R192T: 0510065050300001.

Objective

This Type approval report is prepared on behalf of ZTE Corporation in accordance with Part 2, Subpart J, and Part 24 Subpart E of the Federal Communication Commissions rules.

The objective is to determine compliance with FCC rules for output power, modulation characteristic, occupied bandwidth, spurious emission at antenna terminal, field strength of spurious radiation, frequency stability, and conducted and radiated margin.

Related Submittal(s)/Grant(s)

No related submittal(s).

Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of federal Regulations Title 47 Part 2,Sub-part J as well as the following parts:

Part 24 Subpart E - PCS

Applicable Standards: TIA EIA 137-A, TIA EIA 97-D, TIA/EIA 603-B, Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.

Test Facility

The Test site used by Bay Area Compliance Lab Corp. (ShenZhen) to collect radiated and conducted emission measurement data is located in the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone, ShenZhen, Guangdong 518038, P.R.China.

Test site at Bay Area Compliance Lab Corp. (ShenZhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on November 04, 2004. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

External I/O Cable

Cable Description	Length (M)	From/Port	To
Unshielded Undetachable AC Power Cable	3.0	EUT	AC Power

SYSTEM TEST CONFIGURATION

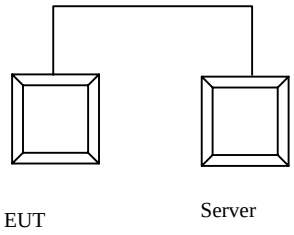
Description of Test Configuration

The system was configured for testing in a typical fashion (as normally used by a typical user).

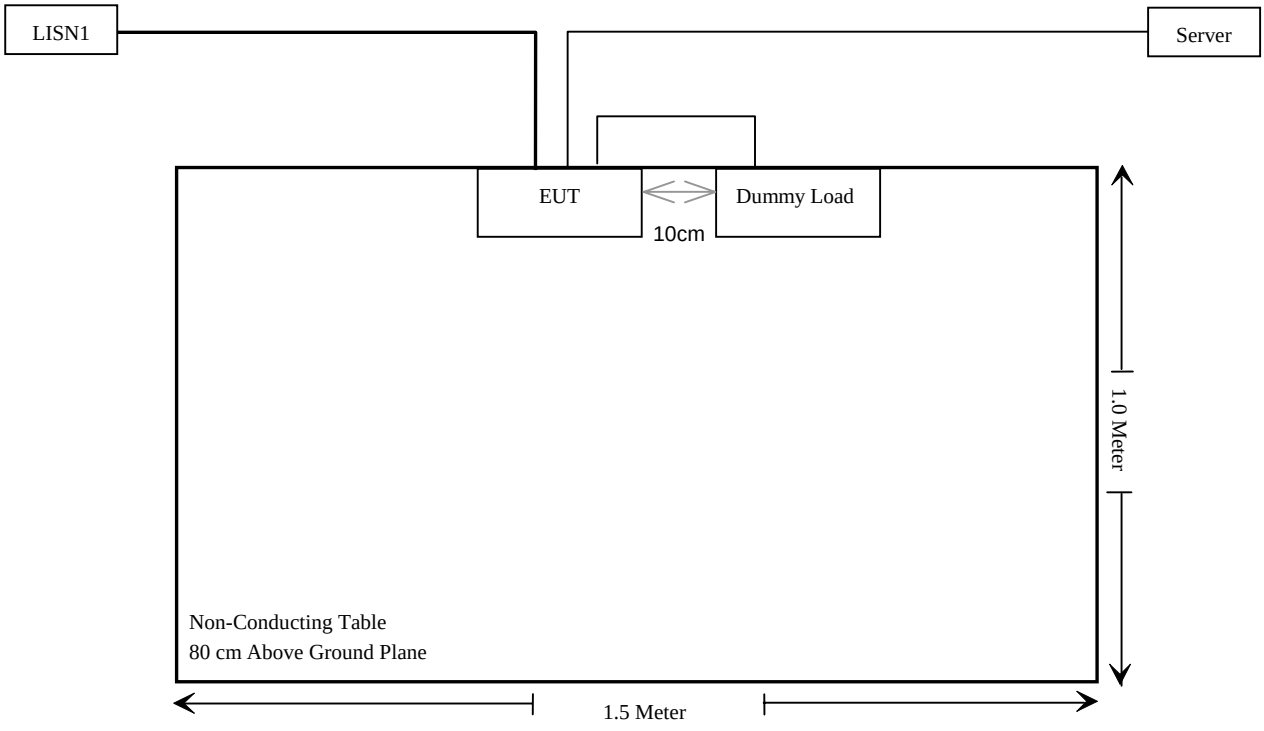
Equipment Modifications

BACL has not done any modification on the EUT.

Configuration of Test Setup



Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

ZXCBTS M192T

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.107 (a)	Conduction Emission	Compliant
§2.1046, §24.232	Conducted Output Power	Compliant
§ 2.1091	RF Exposure	Compliant
§2.1047	Modulation characteristic	Compliant
§15.109(a)	Radiation Emission	Compliant
§2.1053	Spurious Radiated Emissions	Compliant
§2.1051, §24.238(a)	Spurious Emissions AT Antenna Terminals	Compliant
§2.1049, §24.238	Occupied Bandwidth	Compliant
§24.238	Band Edge	Compliant
§ 2.1055 (a) § 2.1055 (d) § 24.235	Frequency stability	Compliant

ZXCBTS R192T

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.107 (a)	Conduction Emission	Compliant
§15.109(a)	Radiation Emission	Compliant

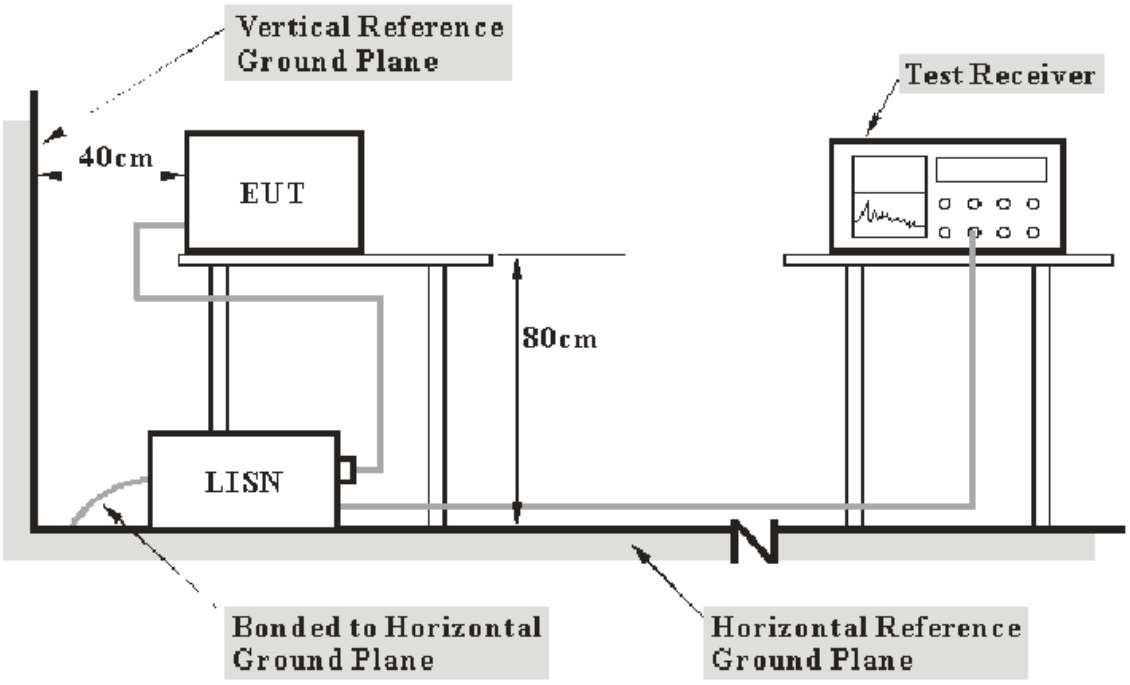
§15.107 (a)- CONDUCTED EMISSION

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at BACL is ±2.4 dB.

EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per TIA/EIA 603-B measurement procedure. The specification used was with the FCC Part 15.107 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

The EUT was connected to a 120 VAC/60 Hz power source.

Test Receiver Setup

The test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the test receiver was set with the following configurations:

Frequency Range	***IFBW***
150 kHz – 30 MHz	9 kHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCS30	100068	2004-9-24	2005-9-23
R&S	LISN	ESH2-Z5	100027	2004-9-24	2005-9-23
SCHWARZBECK	LISN	NNLK8129	8129-151	2004-9-24	2005-9-23
R&S	ISN	ENY22	100046	2004-9-24	2005-9-23
R&S	ISN	ENY41	100057	2004-9-24	2005-9-23
R&S	Pulse Limiter	ESH3-Z2	100063	2004-9-24	2005-9-23
HP	Current Probe	HP11967A	555	2004-10-22	2007-10-19
R&S	Software	ES-K1	N/A	N/A	N/A
R&S	Cable	CE Cable	N/A	2004-9-24	2005-9-23

***** Com-Power's LISN were used as the supporting equipment.
*** Statement of Tractability: BACL** attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

During the conducted emission test, the EUT power cord was connected the LISN.

Maximizing procedure was performed on the six (6) highest were emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

Test Data

Environmental Conditions

Temperature:	18 °C
Relative Humidity:	53 %
ATM Pressure:	1015 mbar

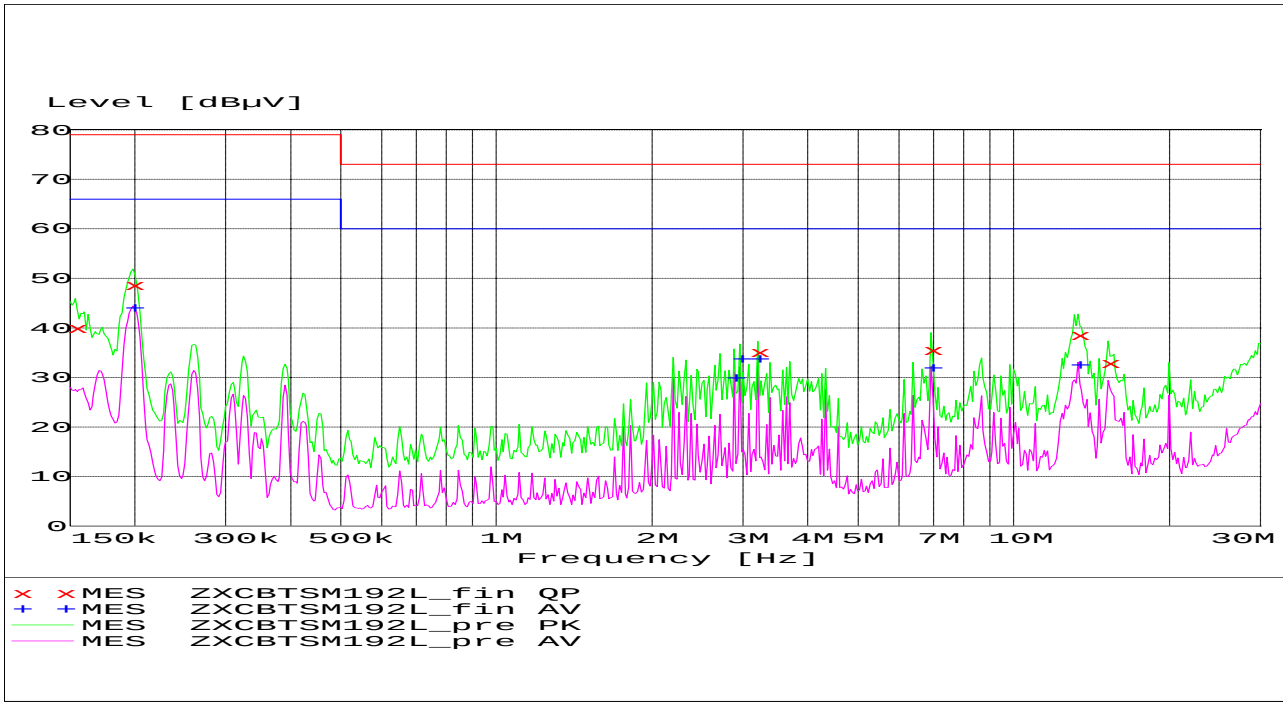
The testing was performed by Sam Lin on 2005-3-28

Test result: Pass

Plot(s) of Test Data is presented hereinafter as reference.

Conducted Emission

EUT: ZXCBTS M192T
Manufacturer: ZTE
Operating Condition: Running
Test Site: ZTE
Operator:
Test Specification: FCC PART 15 Class A
Comment: L Line
Start of Test: 2005-3-28 / 11:19:22



MEASUREMENT RESULT: "ZXCBTSM192T L_fin QP"

2005-3-28 11:22

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.153629	39.90	9.9	79	39.1	L1	GND
0.198248	48.70	9.9	79	30.3	L1	GND
3.198421	35.10	9.9	73	37.9	L1	GND
6.927989	35.40	10.0	73	37.6	L1	GND
13.315910	38.50	10.1	73	34.5	L1	GND
15.247544	32.90	10.1	73	40.1	L1	GND

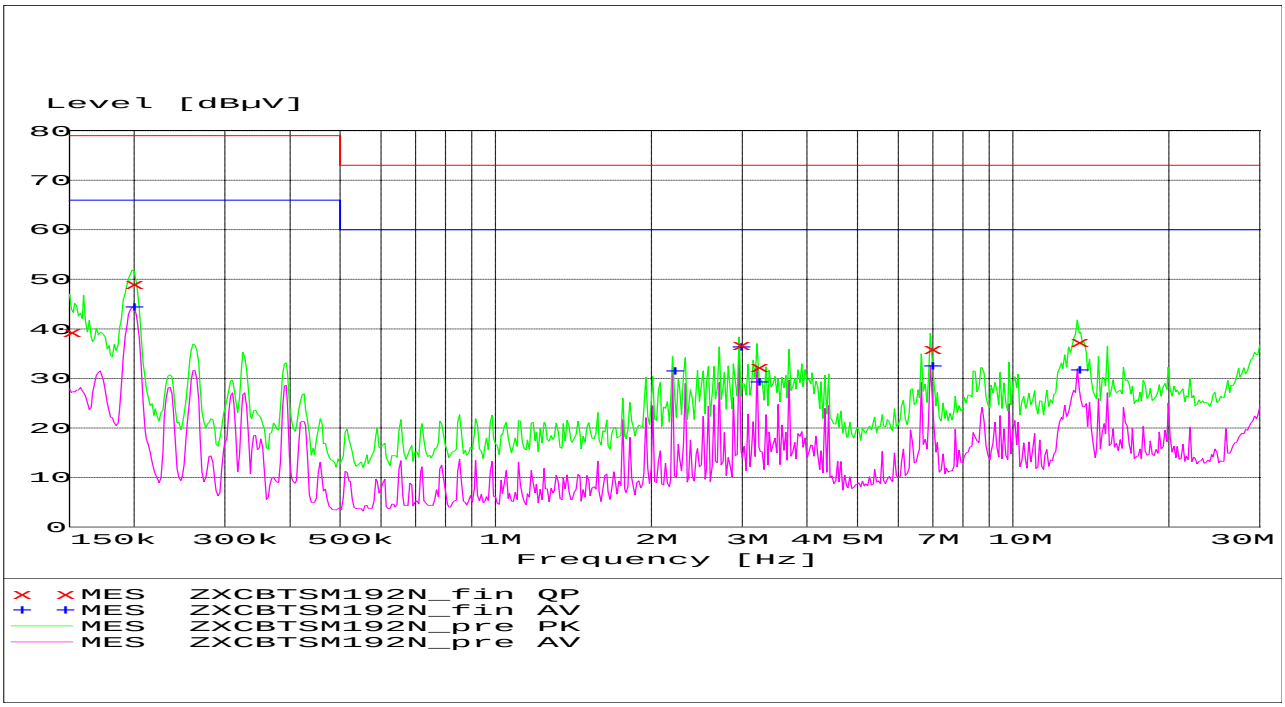
MEASUREMENT RESULT: "ZXCBTSM192T L_fin AV"

2005-3-28 11:22

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.198248	44.00	9.9	66	22.0	L1	GND
2.883691	29.90	10.0	60	30.1	L1	GND
2.953454	33.70	10.0	60	26.3	L1	GND
3.198421	33.60	9.9	60	26.4	L1	GND
6.927989	31.90	10.0	60	28.1	L1	GND
13.315910	32.50	10.1	60	27.5	L1	GND

Conducted Emission

EUT: ZXCBTS M192T
Manufacturer: ZTE
Operating Condition: Running
Test Site: ZTE
Operator:
Test Specification: FCC PART 15 Class A
Comment: Neutral
Start of Test: 2005-3-28 / 11:30:26



MEASUREMENT RESULT: "ZXCBTSM192T N_fin QP"

2005-3-28 11:34

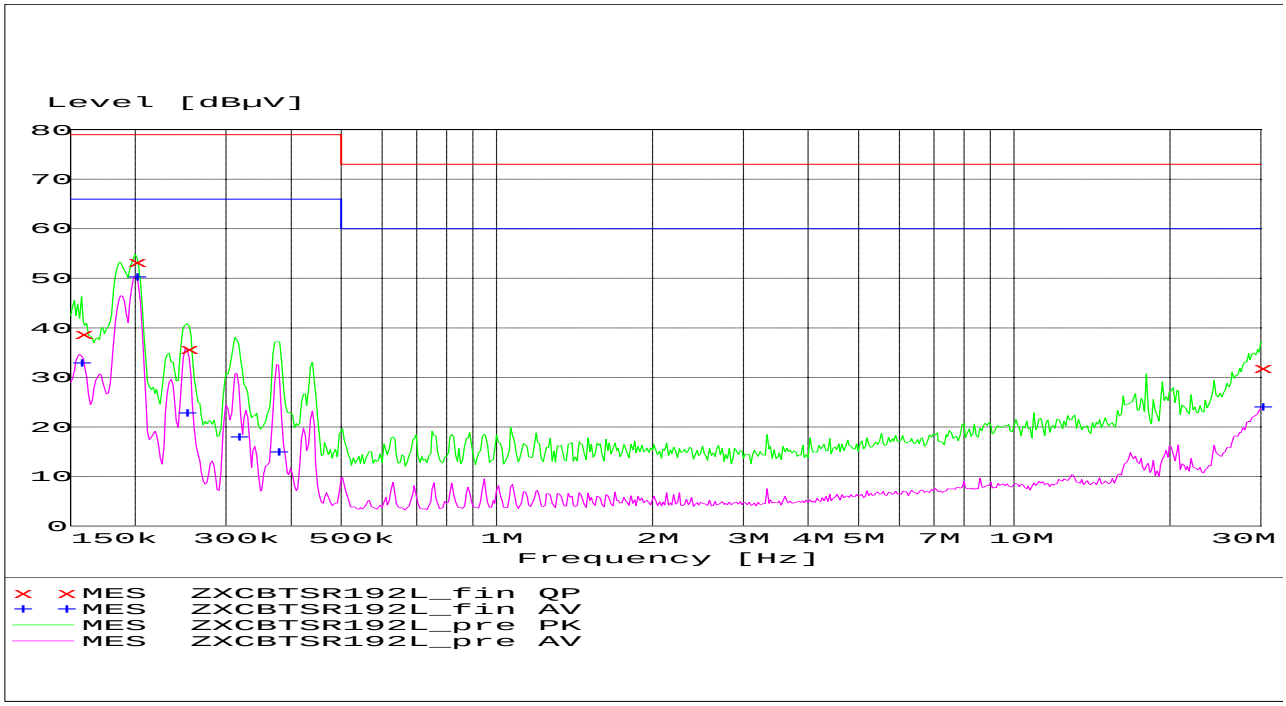
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.150000	39.30	9.9	79	39.7	N	GND
0.198248	49.00	9.9	79	30.0	N	GND
2.953454	36.70	10.0	73	36.3	N	GND
3.198421	32.30	9.9	73	40.7	N	GND
6.927989	35.80	10.0	73	37.2	N	GND
13.315910	37.20	10.1	73	35.8	N	GND

MEASUREMENT RESULT: "ZXCBTSM192T N_fin AV"

2005-3-28 11:34

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.198248	44.30	9.9	66	21.7	N	GND
2.199331	31.40	9.9	60	28.6	N	GND
2.953454	36.20	10.0	60	23.8	N	GND
3.198421	29.20	9.9	60	30.8	N	GND
6.927989	32.50	10.0	60	27.5	N	GND
13.315910	31.60	10.1	60	28.4	N	GND

EUT: ZXCBTS R192T
Manufacturer: ZTE
Operating Condition: Running
Test Site: ZTE
Operator:
Test Specification: FCC PART 15 Class A
Comment: Line
Start of Test: 2005-3-28 / 14:35:24



MEASUREMENT RESULT: "ZXCBTSR192T L_fin QP"

2005-3-28 14:38

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.157346	38.60	9.9	79	40.4	L1	GND
0.199834	53.30	9.9	79	25.7	L1	GND
0.251783	35.70	9.9	79	43.3	L1	GND
30.000000	31.80	10.3	73	41.2	L1	GND
0.312224	17.20	9.9	79	61.8	L1	GND
0.375028	16.90	9.9	79	62.1	L1	GND

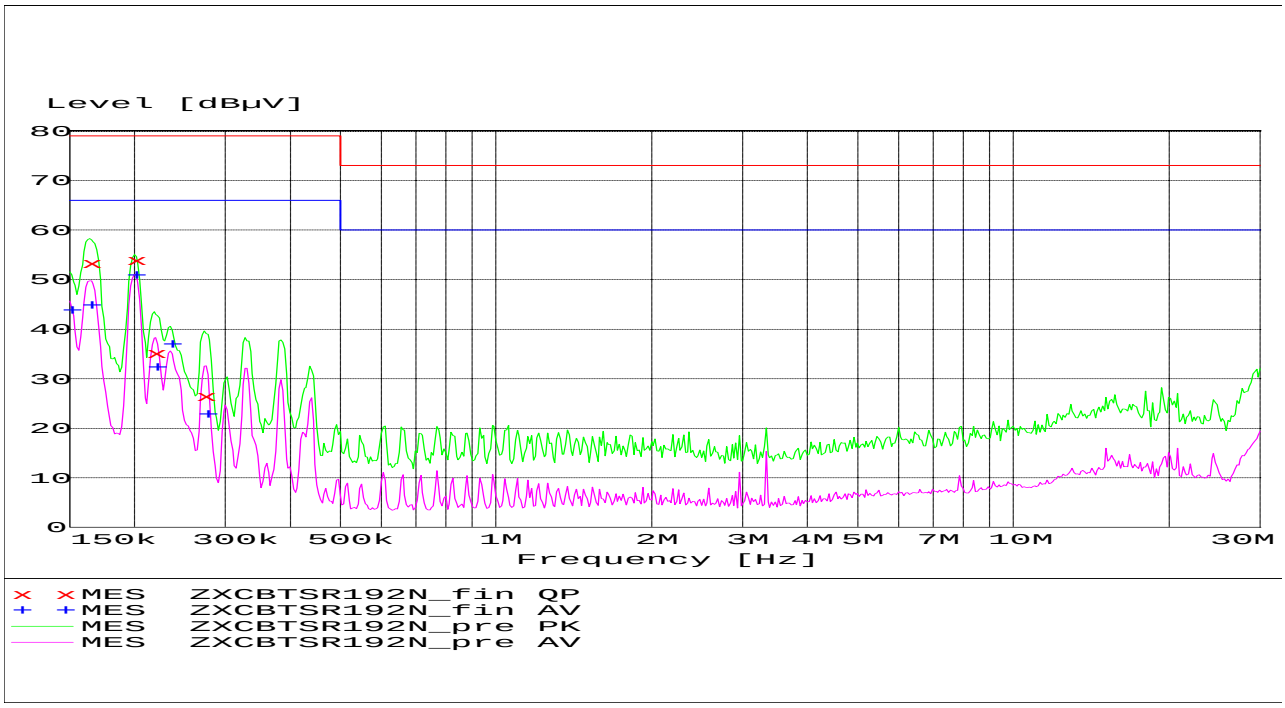
MEASUREMENT RESULT: "ZXCBTSR192T L_fin AV"

2005-3-28 14:38

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.156097	32.90	9.9	66	33.1	L1	GND
0.199834	50.30	9.9	66	15.7	L1	GND
0.249784	22.80	9.9	66	43.2	L1	GND
0.314717	17.90	9.9	66	48.1	L1	GND
0.375018	14.90	9.9	66	51.1	L1	GND
30.000000	23.90	10.3	60	36.1	L1	GND

Conducted Emission

EUT: ZXCBTS R192T
Manufacturer: ZTE
Operating Condition: Running
Test Site: ZTE
Operator:
Test Specification: FCC PART 15 Class A
Comment: Neutral
Start of Test: 2005-3-28 / 14:24:30



MEASUREMENT RESULT: "ZXCBTSR192T N_fin QP"

2005-3-28 14:27

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.163741	53.30	9.9	79	25.7	N	GND
0.199834	53.90	9.9	79	25.1	N	GND
0.218140	35.20	9.9	79	43.8	N	GND
0.272666	26.50	9.9	79	52.5	N	GND
0.234359	40.20	9.9	79	38.8	N	GND
0.327519	24.70	9.9	79	54.3	N	GND

MEASUREMENT RESULT: "ZXCBTSR192T N_fin AV"

2005-3-28 14:27

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.150000	43.70	9.9	66	22.3	N	GND
0.163741	44.80	9.9	66	21.2	N	GND
0.199834	50.90	9.9	66	15.1	N	GND
0.219886	32.40	9.9	66	33.6	N	GND
0.234359	37.00	9.9	66	29.0	N	GND
0.274847	22.90	9.9	66	43.1	N	GND

§2.1046, §24.232- CONDUCTED OUTPUT POWER

Standard Applicable

According to FCC §2.1046 and §24.232(a), in no case may the peak output power of a base station transmitter exceed 100 watt.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	PSA Spectrum Analyzer	E4445A	MY44300451	2004-11-5	2005-11-4

*** Statement of Tractability:** BACL attests that all calibrations have been performed per the NVLAP requirements, traceable to NIST.

Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

Environmental Conditions

Temperature:	18 °C
Relative Humidity:	53 %
ATM Pressure:	1015 mbar

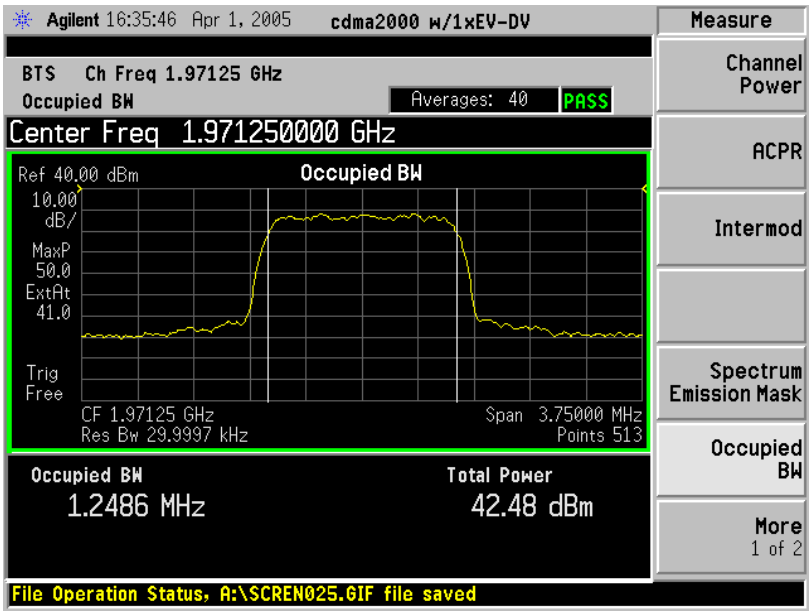
The testing was performed by Sam Lin on 2005-4-1

Model: ZXCBTS M192T

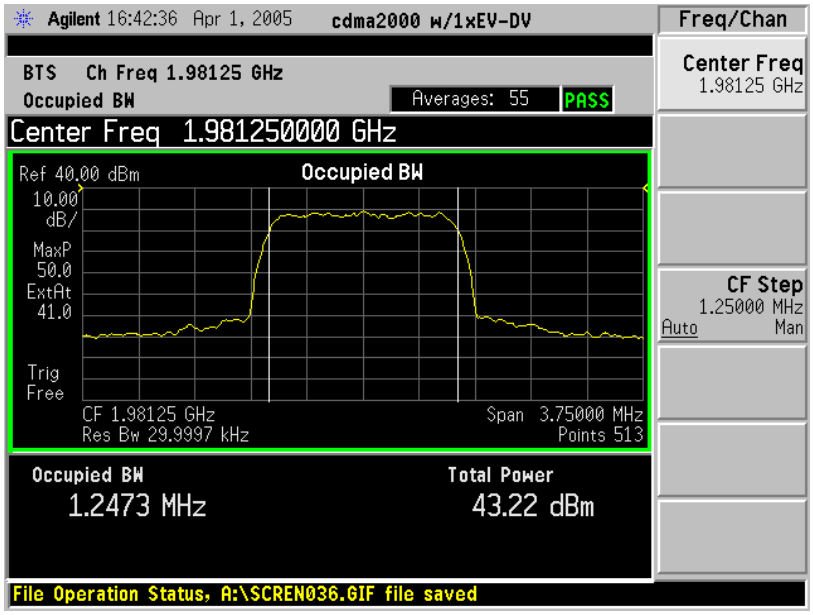
The result has been complied with the §2.1046, §24.232, see the following plot:

Channel	Frequency (MHz)	Output Power in dBm	Output Power in W	Limit in W
Channel 825	1971.25	42.48	17.70	100
Channel 1025	1981.25	43.22	20.99	100
Channel 1175	1988.75	43.22	20.99	100

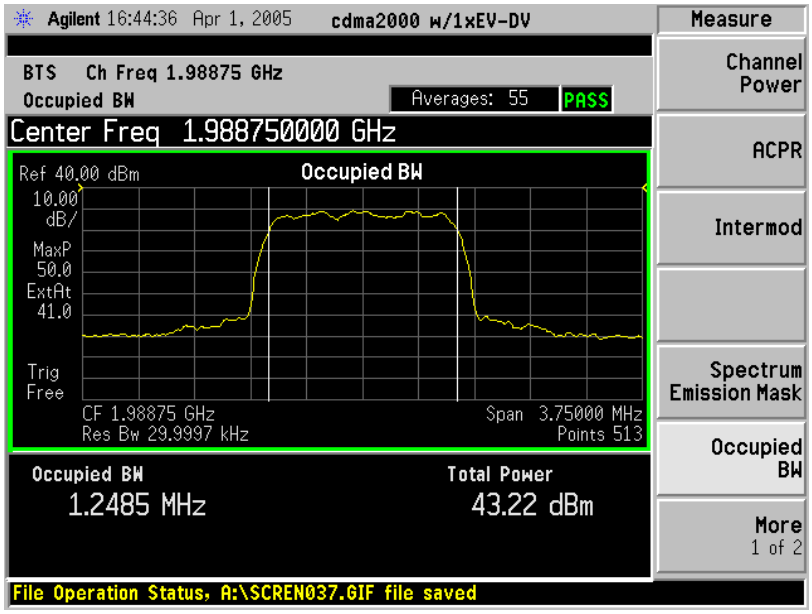
Channel 825



Channel 1025



Channel 1175



§2.1047- MODULATION CHARACTERISTIC

Standard Applicable

Requirement: §2.1047.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	PSA Spectrum Analyzer	E4445A	MY44300451	2004-11-5	2005-11-4

*** Statement of Traceability:** BACL attests that all calibrations have been performed per the NVLAP requirements, traceable to NIST.

Test Procedure

CDMA digital mode is used by EUT.

Test Data

Environmental Conditions

Temperature:	18 °C
Relative Humidity:	53 %
ATM Pressure:	1015 mbar

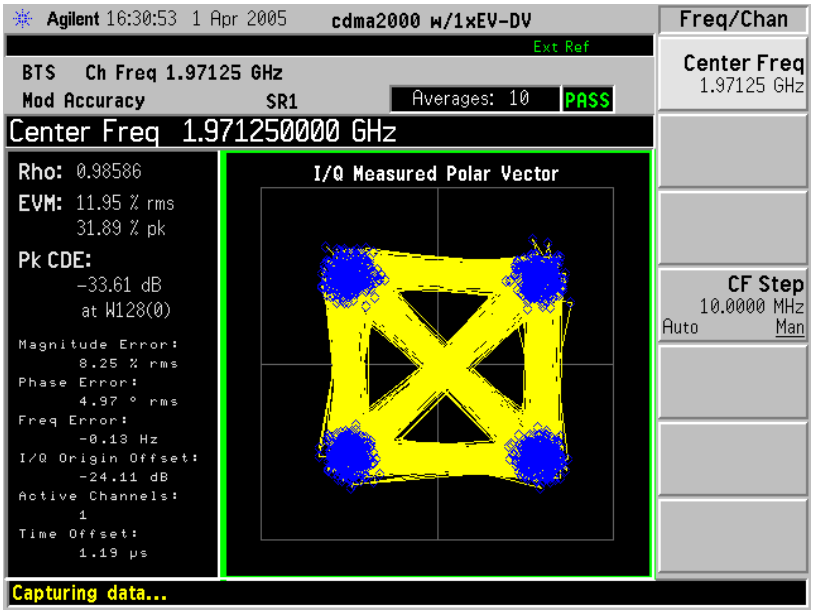
The testing was performed by Sam Lin on 2005-4-11

Model: ZXCBTS M192T

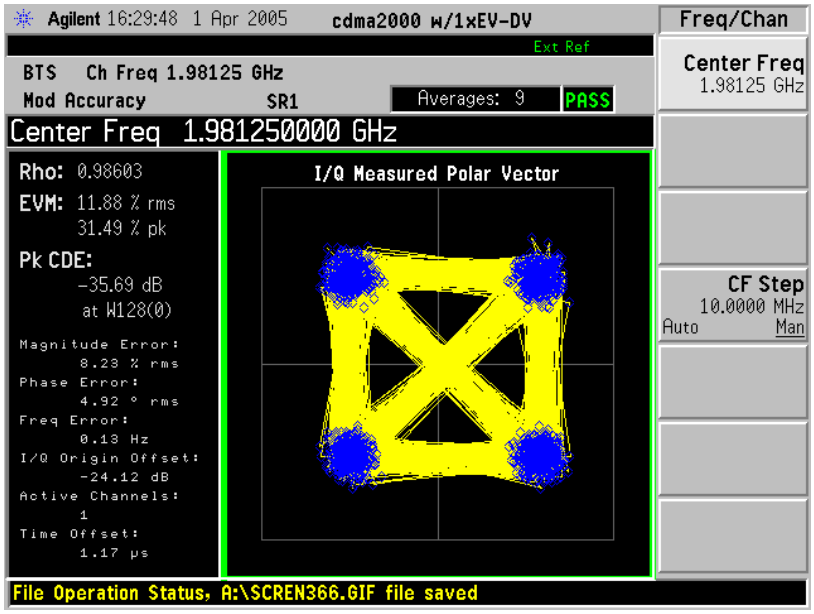
The result has been complied with the §2.1047, see the following plot:

Channel	Frequency (MHz)	Rho
Channel 825	1971.25	0.98586
Channel 1025	1981.25	0.98603
Channel 1175	1988.75	0.98606

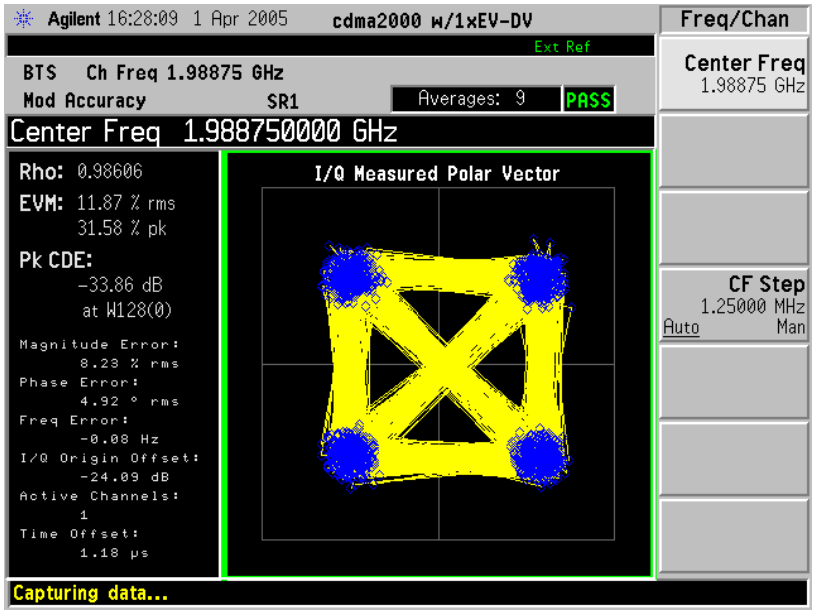
Channel 825



Channel 1025



Channel 1175



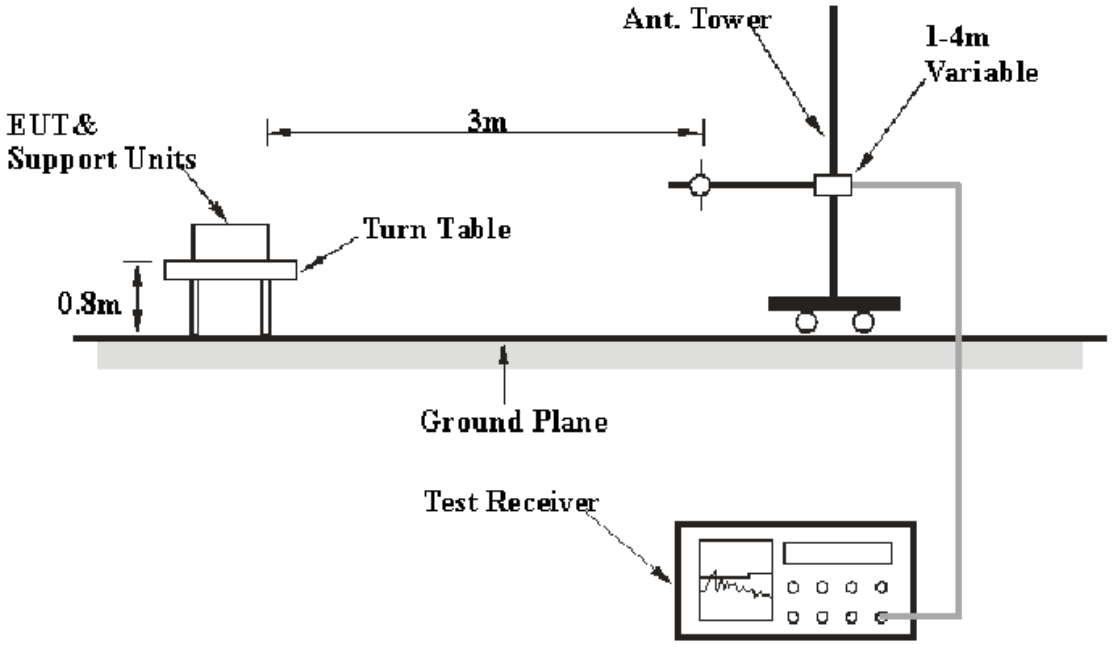
§15.109(a)- RADIATED EMISSION

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at BACL is ±4.0 dB.

EUT Setup



The radiated emission tests were performed in the 3-meter Chamber, using the setup accordance with the TIA/EIA 603-B. The specification used was the FCC 15.109 limits.

Test Receiver Setup

The system was investigated from 30 MHz to 1000 MHz.

During the radiated emission test, the Test Receiver was set with the following configurations:

Frequency Range	***RBW***	***Video B/W***
30 – 1000 MHz	100 kHz	100 kHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESI26	100058	2004-9-24	2005-9-23
R&S	Ultra Broadband Antenna	HL562	100022	2003-3-7	2006-34
R&S	Double-Ridged Waveguide Horn Antenna	HF906	100032	2004-10-10	2007-10-7
Albatross	Anechoic Chamber	3m Site	N/A	2002-6-8	2005-6-5
R&S	Cable Set	RE Cable	N/A	2004-9-24	2005-9-23
R&S	Software	ES-K1	N/A	N/A	N/A

*** Statement of Traceability: BACL** attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All data was recorded in the PK detection mode.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corr. Ampl. =Meter Reading + Antenna Loss+ Cable Loss - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the maximum limit for Class B. The equation for margin calculation is as follows:

Margin = Corr. Ampl. –Limit

Test Data

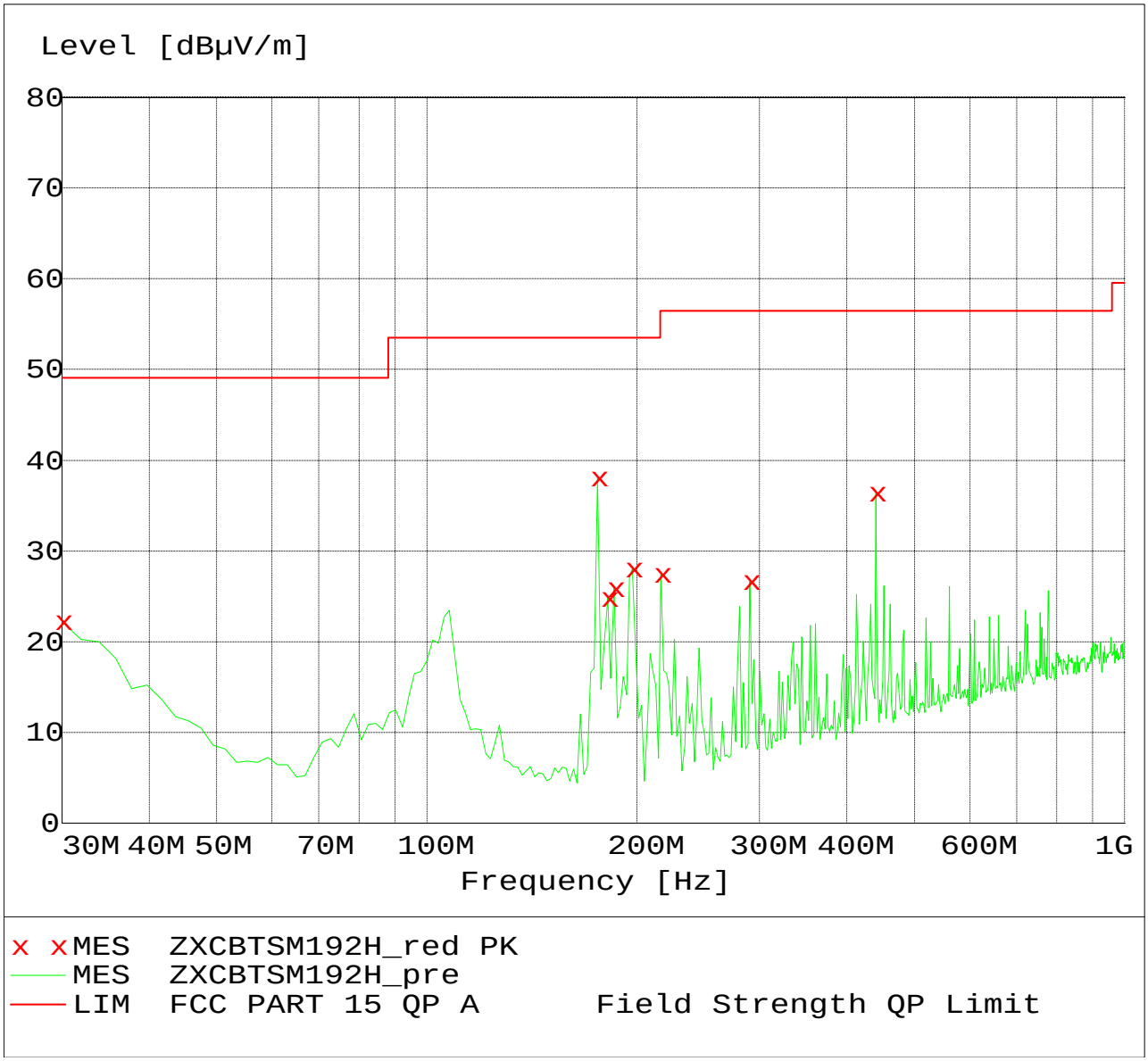
Environmental Conditions

Temperature:	18 °C
Relative Humidity:	53 %
ATM Pressure:	1015 mbar

The testing was performed by Sam Lin on 2005-4-11, and the data were only for unintentional radiator and be subjected to verification

ZTE Corporation

EUT: ZXCBTSM 192T
Manufacturer: ZTE
Operating Condition: Running
Test Site: Anechoic Chamber
Operator:
Test Specification: FCC PART15 Class A
Comment: Hor
Start of Test: 2005-3-29 / 19:40:33

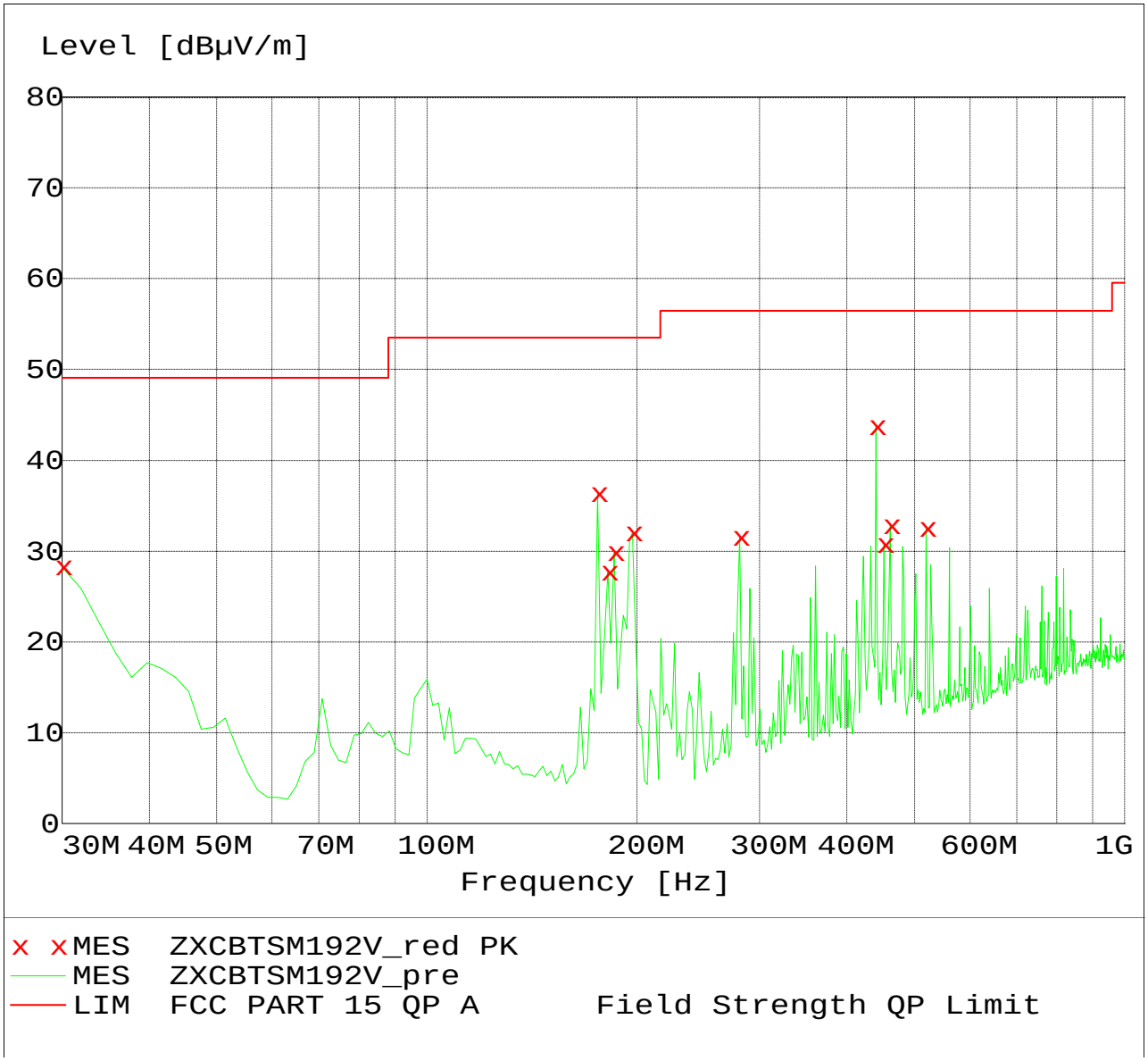


MEASUREMENT RESULT: "ZXCBTSM192T H_red PK"

2005-3-29 19:46

Frequency MHz	Level dBµV/m	Height cm	Azimuth deg	Polarisation	Transd dB	Limit dBµV/m	Margin dB
30.000000	22.18	200.0	90.00	HORIZONTAL	-16.9	49.1	26.9
175.791583	38.01	200.0	270.00	HORIZONTAL	-26.5	53.5	15.5
181.623246	24.84	100.0	270.00	HORIZONTAL	-26.5	53.5	28.7
185.511022	25.87	100.0	270.00	HORIZONTAL	-27.0	53.5	27.6
197.174349	28.05	100.0	0.00	HORIZONTAL	-27.2	53.5	25.5
216.613226	27.40	100.0	270.00	HORIZONTAL	-26.4	56.4	29.0
290.480962	26.64	100.0	90.00	HORIZONTAL	-22.8	56.4	29.8
440.160321	36.37	200.0	0.00	HORIZONTAL	-18.6	56.4	20.1

EUT: ZXCBTS M192T
Manufacturer: ZTE
Operating Condition: Running
Test Site: Anechoic Chamber
Operator:
Test Specification: FCC PART15 Class A
Comment: Ver
Start of Test: 2005-3-29 / 19:56:26



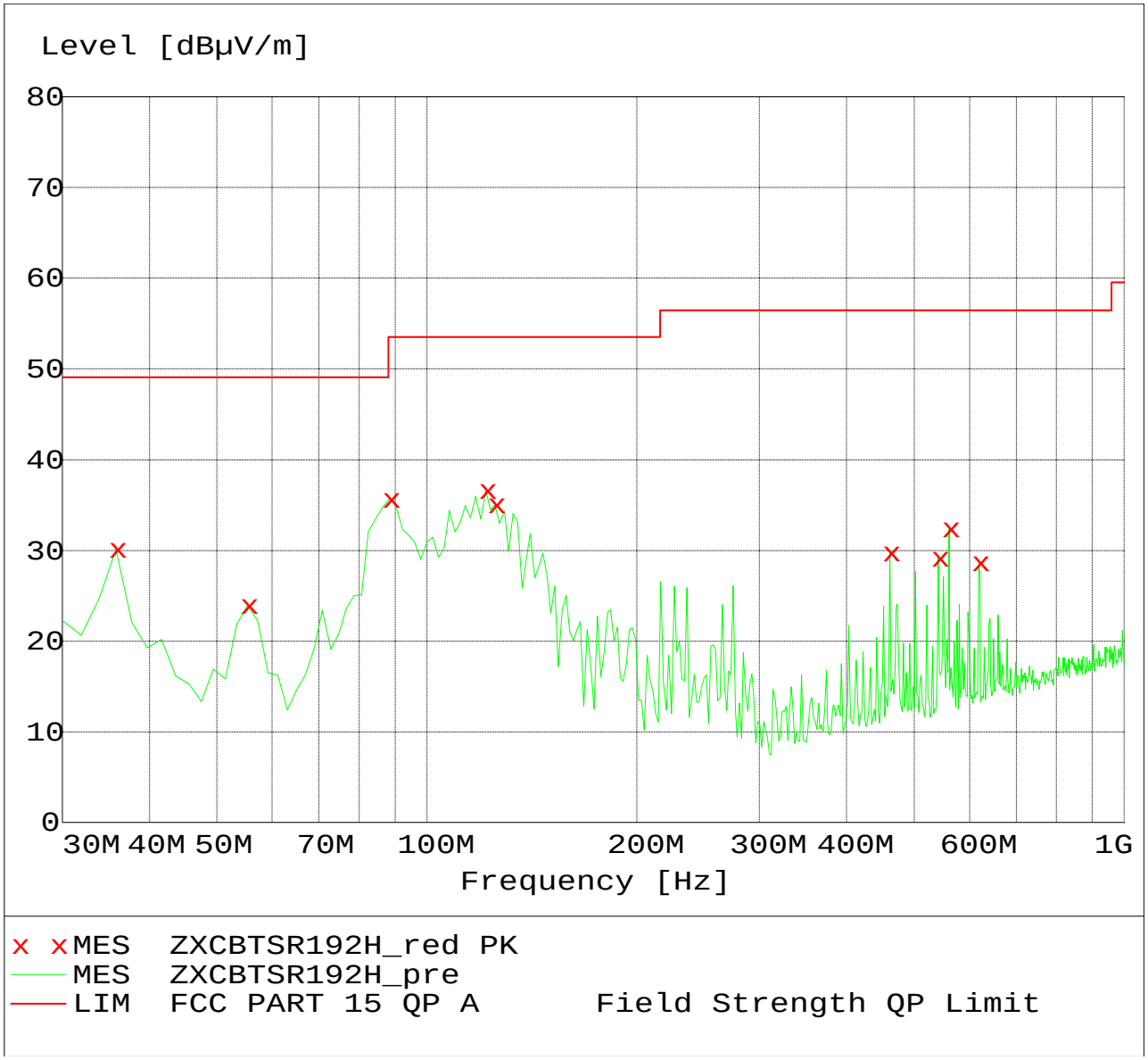
MEASUREMENT RESULT: "ZXCBTSM192T V_red PK"

2005-3-29 20:03

Frequency MHz	Level dBµV/m	Height cm	Azimuth deg	Polarisation	Transd dB	Limit dBµV/m	Margin dB
30.000000	28.21	100.0	90.00	VERTICAL	-16.9	49.1	20.9
175.791583	36.33	100.0	270.00	VERTICAL	-26.5	53.5	17.2
181.623246	27.72	100.0	270.00	VERTICAL	-26.5	53.5	25.8
185.511022	29.86	100.0	0.00	VERTICAL	-27.0	53.5	23.7
197.174349	32.08	300.0	0.00	VERTICAL	-27.2	53.5	21.4
280.761523	31.50	100.0	270.00	VERTICAL	-23.3	56.4	24.9
440.160321	43.75	100.0	270.00	VERTICAL	-18.6	56.4	12.7
451.823647	30.77	100.0	90.00	VERTICAL	-18.3	56.4	25.7
461.543086	32.78	100.0	0.00	VERTICAL	-18.0	56.4	23.7
519.859719	32.53	100.0	0.00	VERTICAL	-16.6	56.4	23.9

ZTE Corporation

EUT: ZXCBTS R192T
Manufacturer: ZTE
Operating Condition: Running
Test Site: Anechoic Chamber
Operator:
Test Specification: FCC PART15 Class A
Comment: Hor
Start of Test: 2005-3-29 / 16:04:13

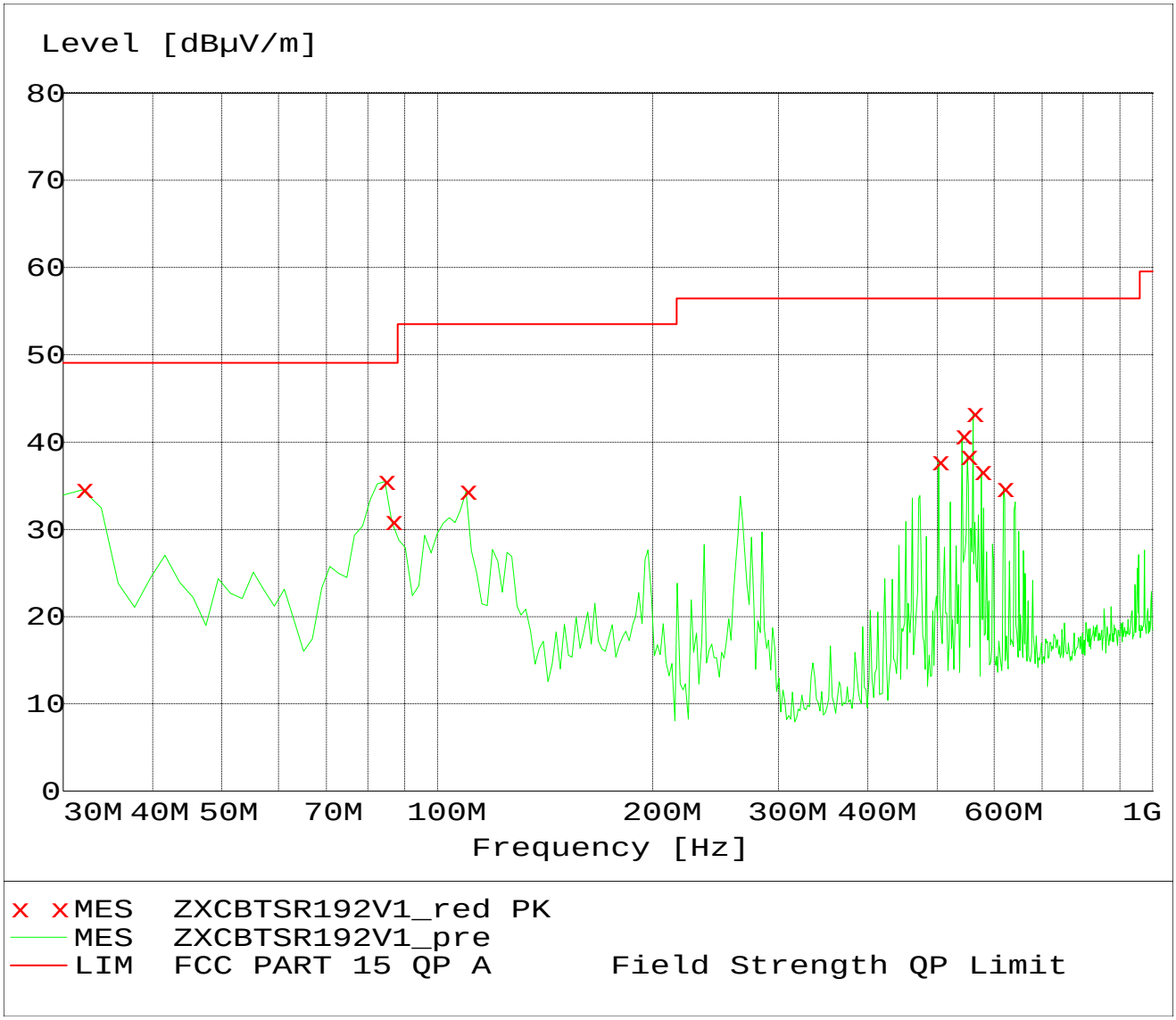


MEASUREMENT RESULT: "ZXCBTSR192T H_red PK"

2005-3-29 16:13

Frequency MHz	Level dBµV/m	Height cm	Azimuth deg	Polarisation	Transd dB	Limit dBµV/m	Margin dB
35.831663	30.13	200.0	270.00	HORIZONTAL	-19.9	49.1	19.0
55.270541	23.95	300.0	270.00	HORIZONTAL	-31.5	49.1	25.1
88.316633	35.66	300.0	180.00	HORIZONTAL	-25.6	53.5	17.8
121.362725	36.63	300.0	180.00	HORIZONTAL	-25.6	53.5	16.9
125.250501	35.03	100.0	180.00	HORIZONTAL	-26.0	53.5	18.5
461.543086	29.72	200.0	0.00	HORIZONTAL	-18.0	56.4	26.7
541.242485	29.14	200.0	180.00	HORIZONTAL	-16.4	56.4	27.3
560.681363	32.42	200.0	180.00	HORIZONTAL	-15.8	56.4	24.0
618.997996	28.60	200.0	180.00	HORIZONTAL	-14.9	56.4	27.8

```
EUT:                    ZXCBTS R192T
 Manufacturer:           ZTE
 Operating Condition:   Running
 Test Site:              Anechoic Chamber
 Operator:
 Test Specification:    FCC PART15 Class A
 Comment:                Ver
 Start of Test:         2005-3-29 / 16:14:28
```



MEASUREMENT RESULT: "ZXCBTSR192T V1_red PK"

2005-3-29 16:22

Frequency MHz	Level dBµV/m	Height cm	Azimuth deg	Polarisation	Transd dB	Limit dBµV/m	Margin dB
31.943888	34.52	100.0	0.00	VERTICAL	-17.9	49.1	14.6
84.428858	35.48	100.0	180.00	VERTICAL	-26.9	49.1	13.6
86.372745	30.81	100.0	180.00	VERTICAL	-26.8	49.1	18.3
109.699399	34.33	100.0	180.00	VERTICAL	-26.0	53.5	19.2
502.364729	37.68	100.0	90.00	VERTICAL	-17.1	56.4	18.8
541.242485	40.63	100.0	90.00	VERTICAL	-16.4	56.4	15.8
550.961924	38.28	100.0	90.00	VERTICAL	-16.1	56.4	18.2
560.681363	43.26	100.0	90.00	VERTICAL	-15.8	56.4	13.2
576.232465	36.57	100.0	90.00	VERTICAL	-15.5	56.4	19.9
618.997996	34.60	100.0	90.00	VERTICAL	-14.9	56.4	21.8

§2.1053- SPURIOUS RADIATED EMISSIONS

Applicable Standard

Requirements: CFR 47, §2.1053

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESI26	100058	2004-9-24	2005-9-23
R&S	Ultra Broadband	HL562	100022	2003-3-7	2006-3-4
R&S	Double-Ridged Waveguide Horn Antenna	HF906	100032	2004-10-10	2007-10-7
Albatross	Anechoic Chamber	3m Site	N/A	2002-6-8	2005-6-5
R&S	Cable Set	RE Cable	N/A	2004-9-24	2005-9-23
R&S	Software	ES-K1	N/A	N/A	N/A
R&S	Double-Ridged Waveguide Horn Antenna	HF906	100013	2004-1-31	2007-1-28
SCHWARZBECK	VHF-UHF Broad band Antenna	VUBA 9117	SB3174	2003-3-31	2006-3-28
R&S	Signal Generator	SMR20	100098	2004-9-24	2005-9-23

*** Statement of Traceability: BACL** attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load, which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT .The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to teeth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB =10 1g (TXpwr in Watts/0.001)-the absolute level

Spurious attenuation limit in dB =43+10 Log_{10} (power out in Watts)

Test Data

Environmental Conditions

Temperature:	18 °C
Relative Humidity:	53 %
ATM Pressure:	1015 mbar

The testing was performed by Sam Lin on 2005-4-11

Model: ZXCBTS M192T

Indicated		Table	Test Antenna		Substituted			Antenna	Cable	Absolute	Limit	Margin
Frequency MHz	Ampl. dBuV/m	Angle Degree	Height Meter	Polar H/V	Frequency MHz	Level dBm	Polar H/V	Gain Correction	Loss dB	Level dBm	dBm	dB
CHANNEL 825 F=1971.25MHZ												
9474.95	61.82	270	1.0	H	9474.95	-39.0	H	12.2	8.5	-35.3	-13	-22.3
9527.05	56.23	180	1.5	V	9527.05	-47.0	V	12.2	8.6	-43.4	-13	-30.4
5917.83	46.87	180	1.5	H	5917.83	-55.0	H	11.3	6.6	-50.3	-13	-37.3
5977.96	46.38	180	1.0	V	5977.96	-57.5	V	11.3	6.7	-52.9	-13	-39.9
3933.86	42.64	270	1.0	V	3933.86	-58.6	V	10.0	5.3	-53.9	-13	-40.9
1276.55	39.83	270	1.0	H	1276.55	-58.5	H	7.4	3.0	-54.1	-13	-41.1
1072.14	43.32	0	1.0	V	1072.14	-58.9	V	7.4	2.7	-54.2	-13	-41.2
5917.0	45.00	180	1.0	V	5917.00	-59.5	V	11.3	6.6	-54.8	-13	-41.8
3969.94	41.90	270	1.5	H	3969.94	-61.5	H	10.0	5.3	-56.8	-13	-43.8
1108.22	42.68	0	1.0	V	1108.22	-62.0	V	7.4	2.9	-57.5	-13	-44.5
1970.94	99.23	0	1.0	H	1970.94	36.9	H	9.2	3.8	42.3		
1970.94	112.73	0	1.2	V	1970.94	46.9	V	9.2	3.8	52.3		
CHANNEL 1025 F=1981.25MHZ												
9474.95	60.49	270	1.0	H	9474.95	-40.0	H	12.2	8.6	-36.4	-13	-23.4
9527.05	55.52	180	1.5	V	9527.05	-48.0	V	12.2	8.6	-44.4	-13	-31.4
5941.88	45.15	270	1.0	H	5941.88	-55.1	H	11.3	6.7	-50.5	-13	-37.5
1228.46	39.06	270	1.0	H	1228.46	-57.0	H	7.4	2.9	-52.5	-13	-39.5
3969.94	41.59	270	1.0	V	3969.94	-58.0	V	10.0	5.3	-53.3	-13	-40.3
5941.88	46.00	270	1.5	V	5941.88	-58.0	V	11.3	6.7	-53.4	-13	-40.4
3969.94	42.12	180	1.0	H	3969.94	-61.0	H	10.0	5.3	-56.3	-13	-43.3
1981.25	98.98	0	1.0	H	1981.25	36.2	H	9.2	3.7	41.7		
1981.25	111.83	0	1.2	V	1981.25	46.7	V	9.2	3.7	52.2		
Channel 1175 f=1988.75MHz												
9474.95	60.30	270	1.0	H	9474.95	-40.0	H	12.2	8.6	-36.4	-13	-23.4
9527.05	56.24	180	1.5	V	9527.05	-47.0	V	12.2	8.6	-43.4	-13	-30.4
5965.93	47.29	90	1.5	H	5965.93	-53.0	H	11.3	6.7	-48.4	-13	-35.4
3969.94	42.47	180	1.5	V	3969.94	-57.0	V	10.0	5.3	-52.3	-13	-39.3
5965.93	46.03	90	1.0	V	5965.93	-58.0	V	11.3	6.7	-53.4	-13	-40.4
3969.94	41.74	180	1.5	H	3969.94	-62.0	H	10.0	5.3	-57.3	-13	-44.3
1988.75	110.10	0	1.0	V	1988.75	44.4	V	9.2	3.7	49.9		
1988.75	98.17	0	1.2	H	1988.75	36.7	H	9.2	3.7	42.2		

§2.1051, §24.238(a)- SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Applicable Standard

Requirements: CFR 47§ 2.1051 & §24.238(a)

The spectrum was to be investigated to the tenth harmonics of the highest fundamental frequency as specified in §2.1057

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2004-11-10	2005-11-9

*** Statement of Traceability: BACL** attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 100 kHz. Sufficient scans were taken to show any out of band emissions up to 10^{th} harmonic.

Test Data

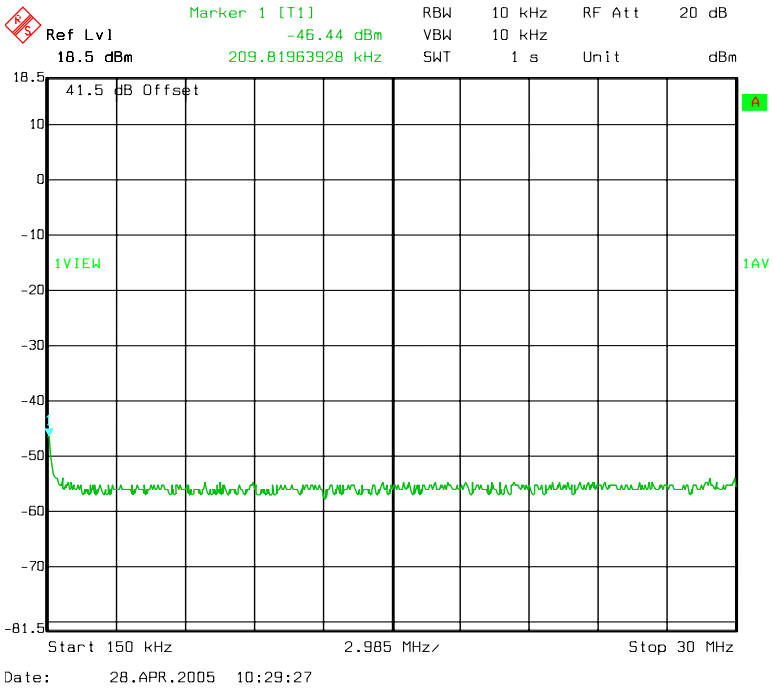
Environmental Conditions

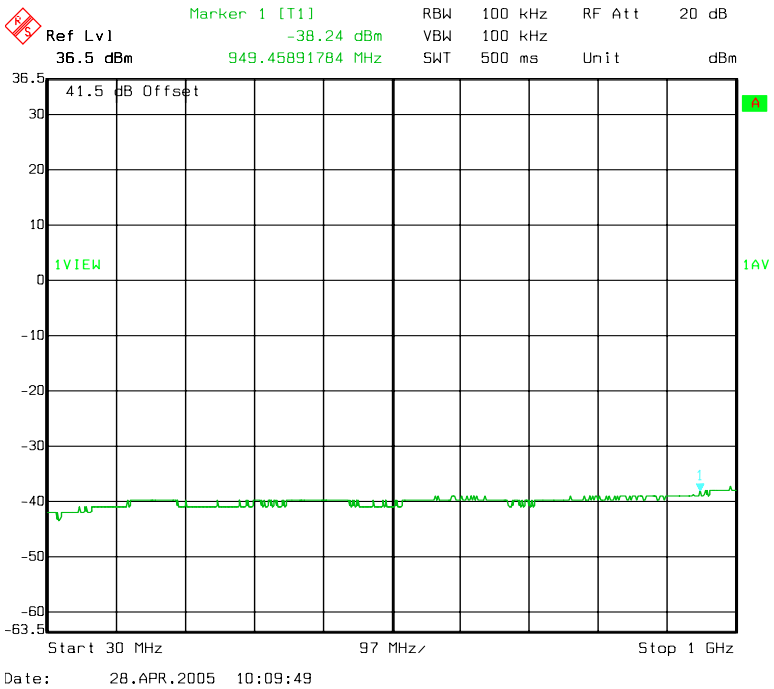
Temperature:	18 °C
Relative Humidity:	53 %
ATM Pressure:	1015 mbar

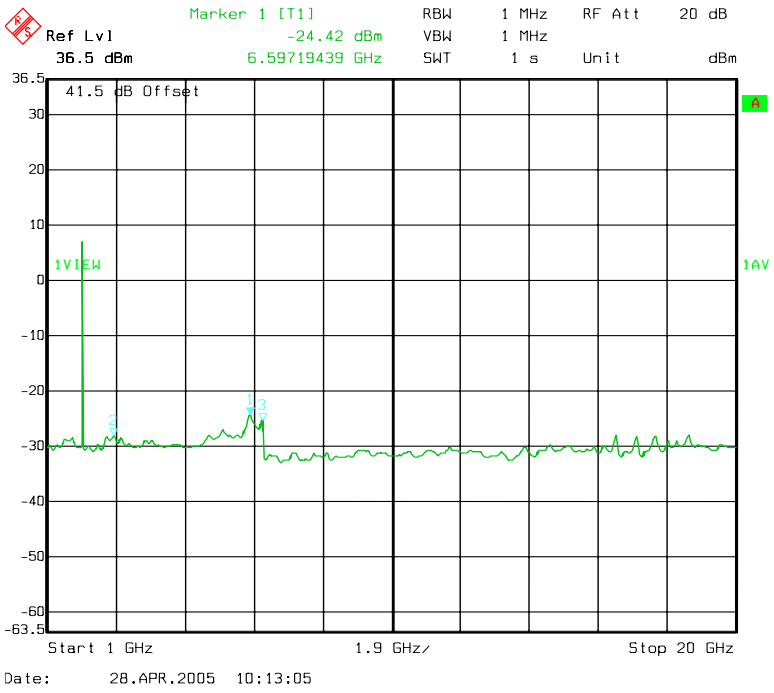
The testing was performed by Sam Lin on 2005-4-1

Model: ZXCBTS M192T

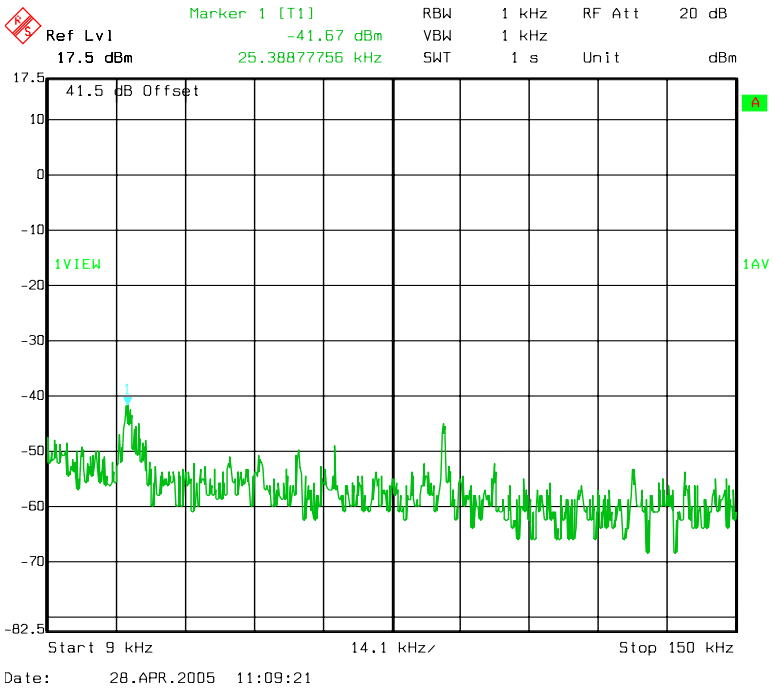
Channel 825

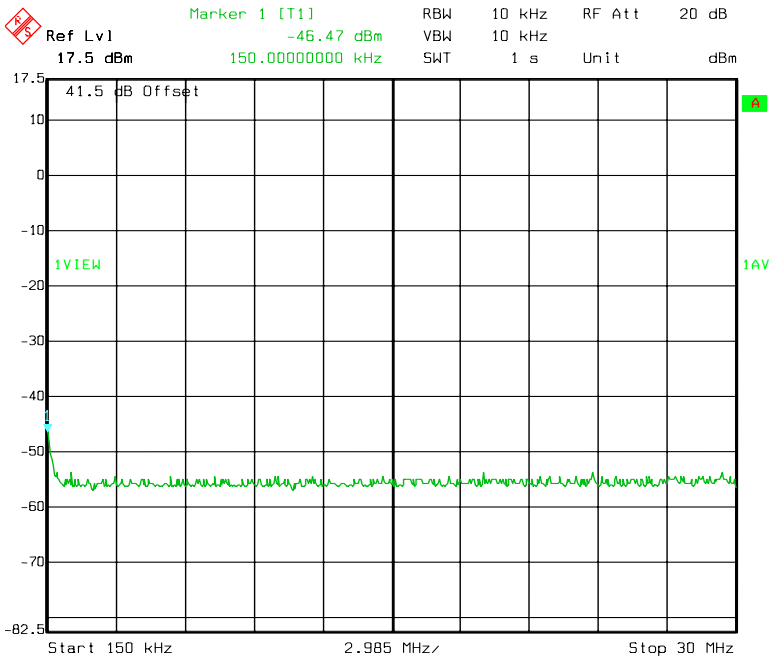


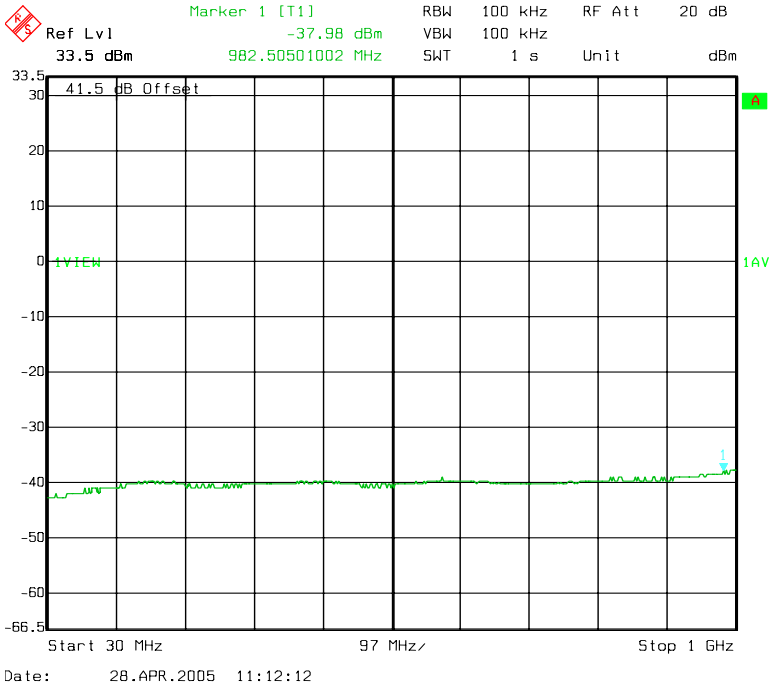


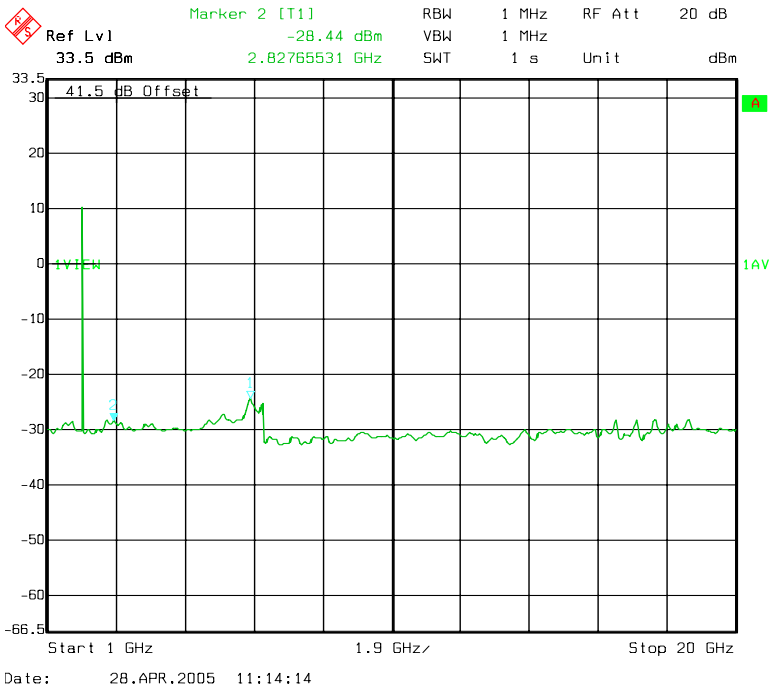


Channel 1025

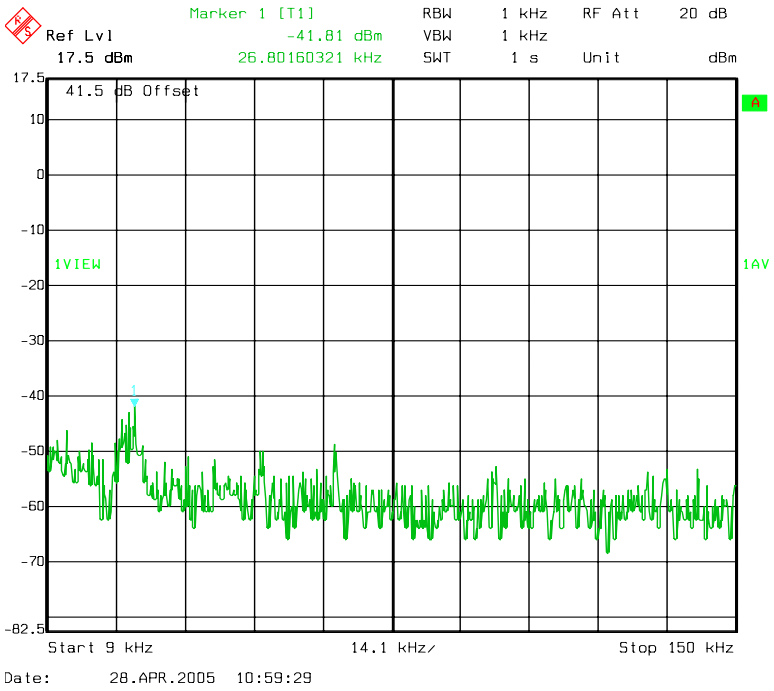


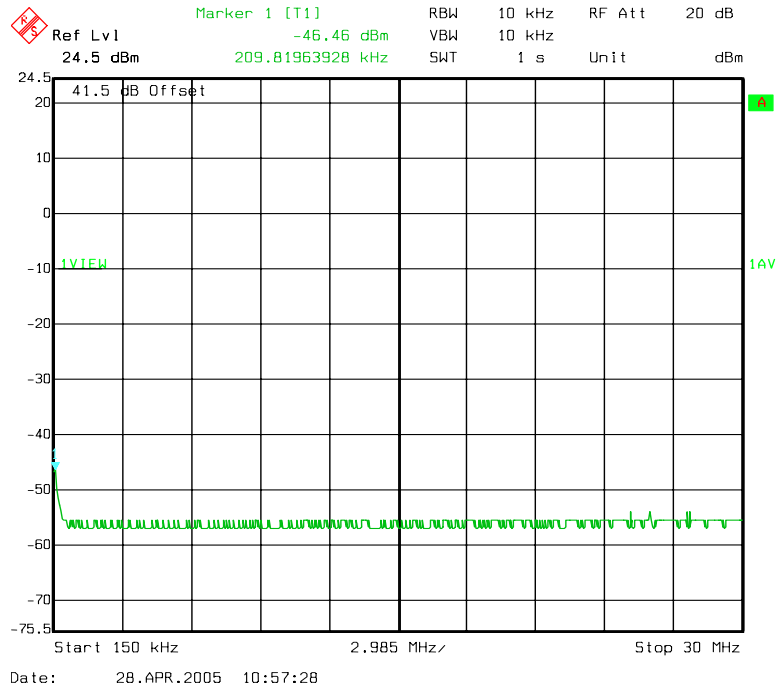

Marker 1 [T1]
RBW 10 kHz
RF Att 20 dB
Ref Lvl
-46.47 dBm
VBW 10 kHz
17.5 dBm
150.00000000 kHz
SWT 1 s
Unit dBm
41.5 dB Offset
1VIEW
1AV
Start 150 kHz
2.985 MHz/
Stop 30 MHz
Date: 28.APR.2005 11:10:42

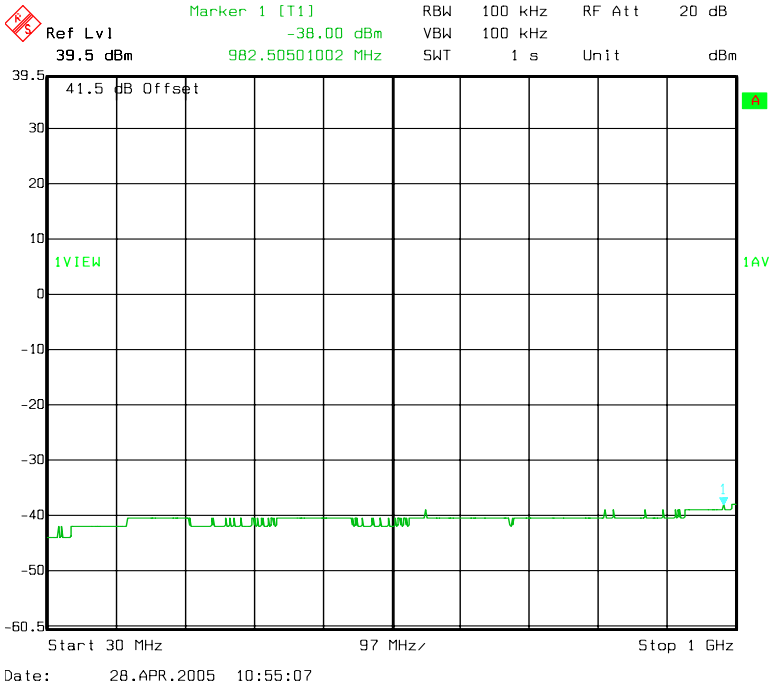

Marker 1 [T1]
RBW 100 kHz
RF Att 20 dB
Ref Lvl
-37.98 dBm
VBW 100 kHz
33.5 dBm
982.50501002 MHz
SWT 1 s
Unit dBm
41.5 dB Offset
1VIEW
1AV
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 28.APR.2005 11:12:12

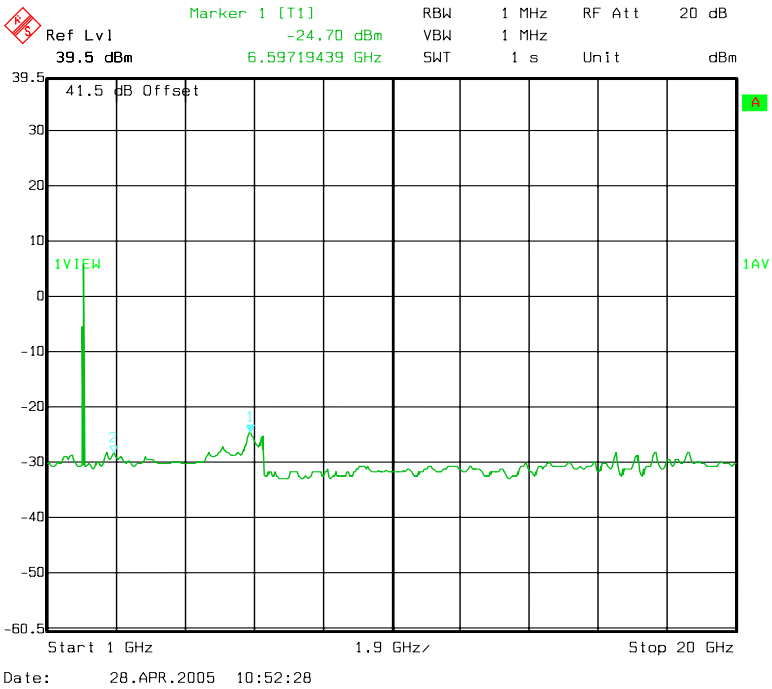


Channel 1175




Marker 1 [T1]
RBW 10 kHz
RF Att 20 dB
Ref Lvl
-46.46 dBm
VBW 10 kHz
24.5 dBm
209.81963928 kHz
SWT 1 s
Unit dBm
41.5 dB Offset
1VIEW
1AV
Start 150 kHz
2.985 MHz/
Stop 30 MHz
Date: 28.APR.2005 10:57:28


Marker 1 [T1]
RBW 100 kHz
RF Att 20 dB
Ref Lvl
-38.00 dBm
VBW 100 kHz
39.5 dBm
982.50501002 MHz
SWT 1 s
Unit dBm
41.5 dB Offset
1VIEW
1AV
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 28.APR.2005 10:55:07


Marker 1 [T1]
RBW 1 MHz
RF Att 20 dB
Ref Lvl
-24.70 dBm
VBW 1 MHz
39.5 dBm
6.59719439 GHz
SWT 1 s
Unit dBm
41.5 dB Offset
1VIEW
1AV
Start 1 GHz
1.9 GHz/
Stop 20 GHz
Date: 28.APR.2005 10:52:28

§2.1049& §24.238-OCCUPIED BANDWIDTH

Standard Applicable

Requirements: CFR 47, Section 2.1049 and Section 24.238.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	PSA Spectrum Analyzer	E4445A	MY44300451	2004-11-5	2005-11-4

*** Statement of Traceability: BACL** attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

The RF out of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

The resolution bandwidth of the spectrum analyzer was set at 30 kHz and the 26 dB and 99%Power bandwidth was recorded.

Test Data

Environmental Conditions

Temperature:	25 ° C
Relative Humidity:	50%
ATM Pressure:	1032mbar

The testing was performed by Sam Lin on 2005-4-12

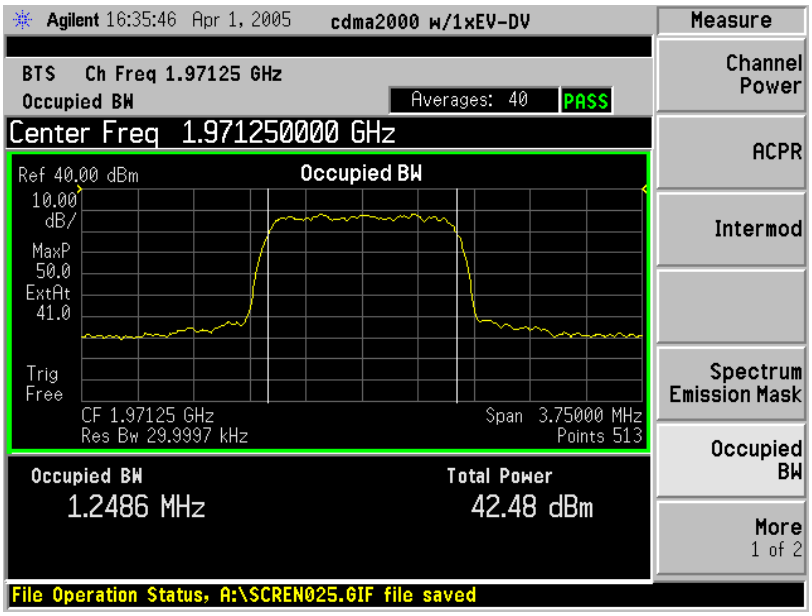
Test Result: Pass

Model: ZXCBTS M192T

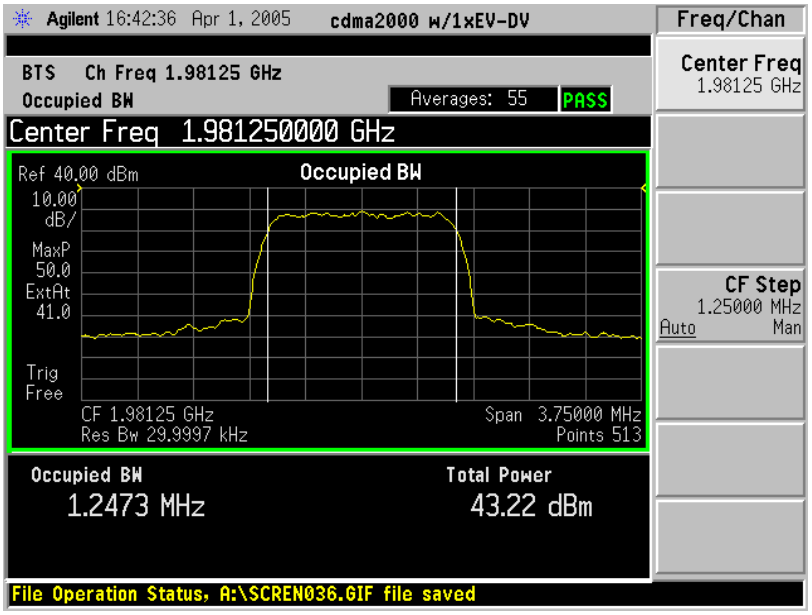
The result has been complied with the §2.1049 & §24.238, see the following plot:

Channel	Channel frequency (MHz)	99% Power Bandwidth (MHz)
Channel 825	1971.25	1.2431
Channel 1025	1981.25	1.2434
Channel 1175	1988.75	1.2465

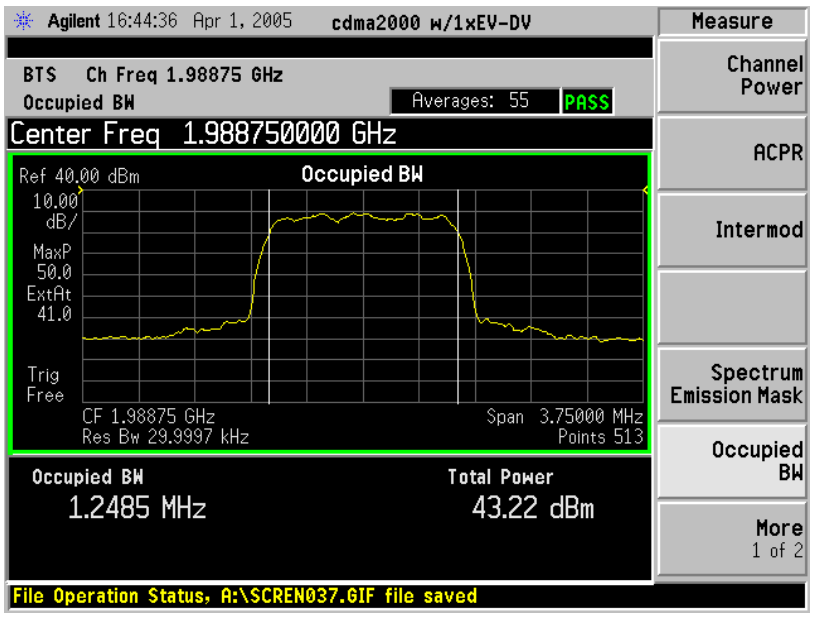
Channel 825



Channel 1025



Channel 1175



§24.238- BAND EDGES

Standard Applicable

According to §24.238, the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (p) by a factor of at least 43+10 log (p) dB.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2004-11-10	2005-11-9

*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

The center of the spectrum analyzer was set to block edge frequency, RBW set to 30 kHz.

Environmental Conditions

Temperature:	24 °C
Relative Humidity:	59%
ATM Pressure:	1178mbar

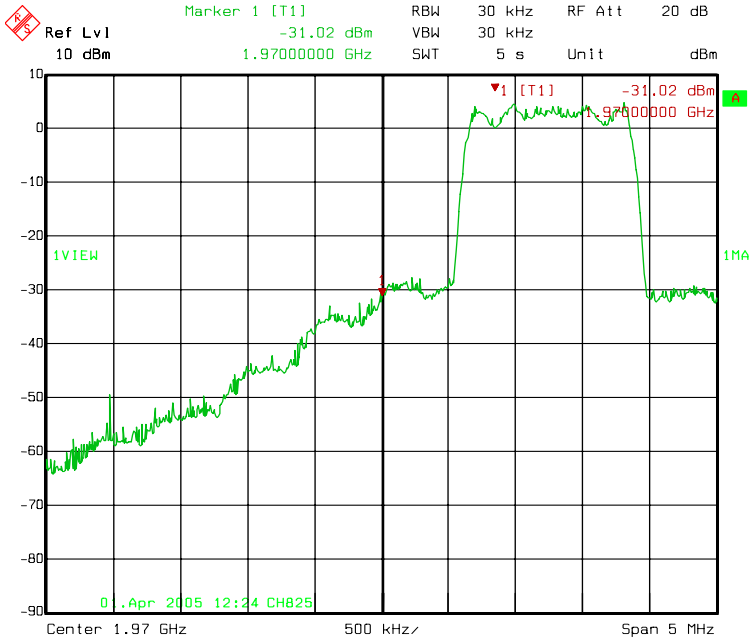
The testing was performed by Sam Lin on 2005-4-1

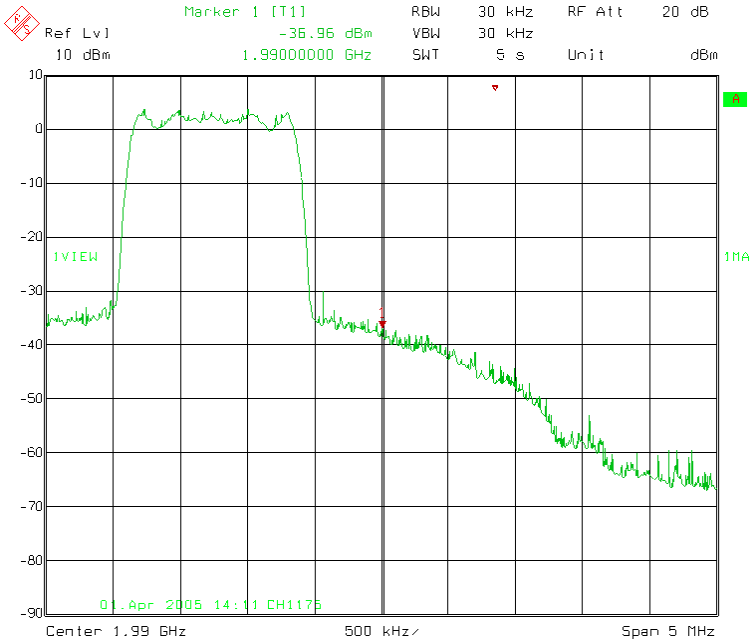
Test Result: Pass

Model: ZXCBTS M192T

The result has been complied with the §24.238, see the following plot:

Frequency MHz	Emission dBm	Limit dBm
1970.00	-31.02	-13
1990.00	-36.96	-13





§2.1055 (a), §2.1055 (d) & §24.235 - FREQUENCY STABILITY

Applicable Standard

Requirements: FCC § 2.1055 (a), § 2.1055 (d) & following:

According to §24.235, The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Agilent	PSA Spectrum Analyzer	E4445A	MY44300451	2004-11-5	2005-11-4
GZ-ESPEC	Temperature Chamber	EL-10AGP	0105105	2004-6-1	2005-5-31

*** Statement of Traceability: BACL Corp.** certifies that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external AC power supply and the RF output was connected to a f Spectrum Analyzer via feed-through attenuators. The EUT was placed inside the temperature chamber. The AC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the counter.

Frequency Stability vs. Voltage: An external variable AC power supply Source. The voltage was set to 115% of the nominal value and was then decreased until the transmitter light no longer illuminated; i.e., the end point. The output frequency was recorded for each voltage.

Test Data

Environmental Conditions

Temperature:	20° C
Relative Humidity:	49%
ATM Pressure:	1011 mbar

The testing was performed by Sam Lin on 2004-4-1.

Model: ZXCBTS M192T

Frequency Stability Versus Temperature

Frequency Stability vs. Temperature				
Temperature ℃	Power Supplied Vac	Frequency Measure Error Hz	Error ppm	Results
CH825 f=1971.25MHz				
-30	120	2.42	0.00123	Pass
-20	120	3.05	0.00155	Pass
-10	120	3.96	0.00201	Pass
0	120	3.64	0.00185	Pass
10	120	3.97	0.00201	Pass
20	120	3.64	0.00185	Pass
30	120	1.81	0.00092	Pass
40	120	2.01	0.00102	Pass
55	120	2.17	0.0011	Pass
CH1025 f=1981.25MHz				
-30	120	2.59	0.00131	Pass
-20	120	3.16	0.00159	Pass
-10	120	3.61	0.00182	Pass
0	120	3.46	0.00175	Pass
10	120	3.64	0.00184	Pass
20	120	4.23	0.00214	Pass
30	120	2.48	0.00125	Pass
40	120	2.10	0.00106	Pass
55	120	1.89	0.00095	Pass
CH1175 f=1988.75MHz				
-30	120	3.57	0.0018	Pass
-20	120	3.06	0.00154	Pass
-10	120	3.57	0.0018	Pass
0	120	3.36	0.00169	Pass
10	120	3.48	0.00175	Pass
20	120	4.17	0.0021	Pass
30	120	1.44	0.00072	Pass
40	120	1.67	0.00084	Pass
55	120	2.79	0.0014	Pass

Frequency Stability Versus Voltage

Frequency Stability vs. Voltage				
Voltage Vac	Temperature ℃	Frequency Measure Error Hz	Error ppm	Results
CH825 f=1971.25MHz				
85	20	1.12	0.00057	Pass
120	20	0.49	0.00025	Pass
135	20	1.17	0.00059	Pass
CH1025 f=1981.25MHz				
85	20	1.88	0.00095	Pass
120	20	1.92	0.00097	Pass
135	20	0.82	0.00041	Pass
CH1175 f=1988.75MHz				
85	20	4.13	0.00208	Pass
120	20	5.15	0.00259	Pass
135	20	4.04	0.00203	Pass