

MATCHING TEST REPORT

Customer

FOXCONN

Customer Model

T99X171T00

Report Number

FT99X171T00-019-001

TXC AE Dept.

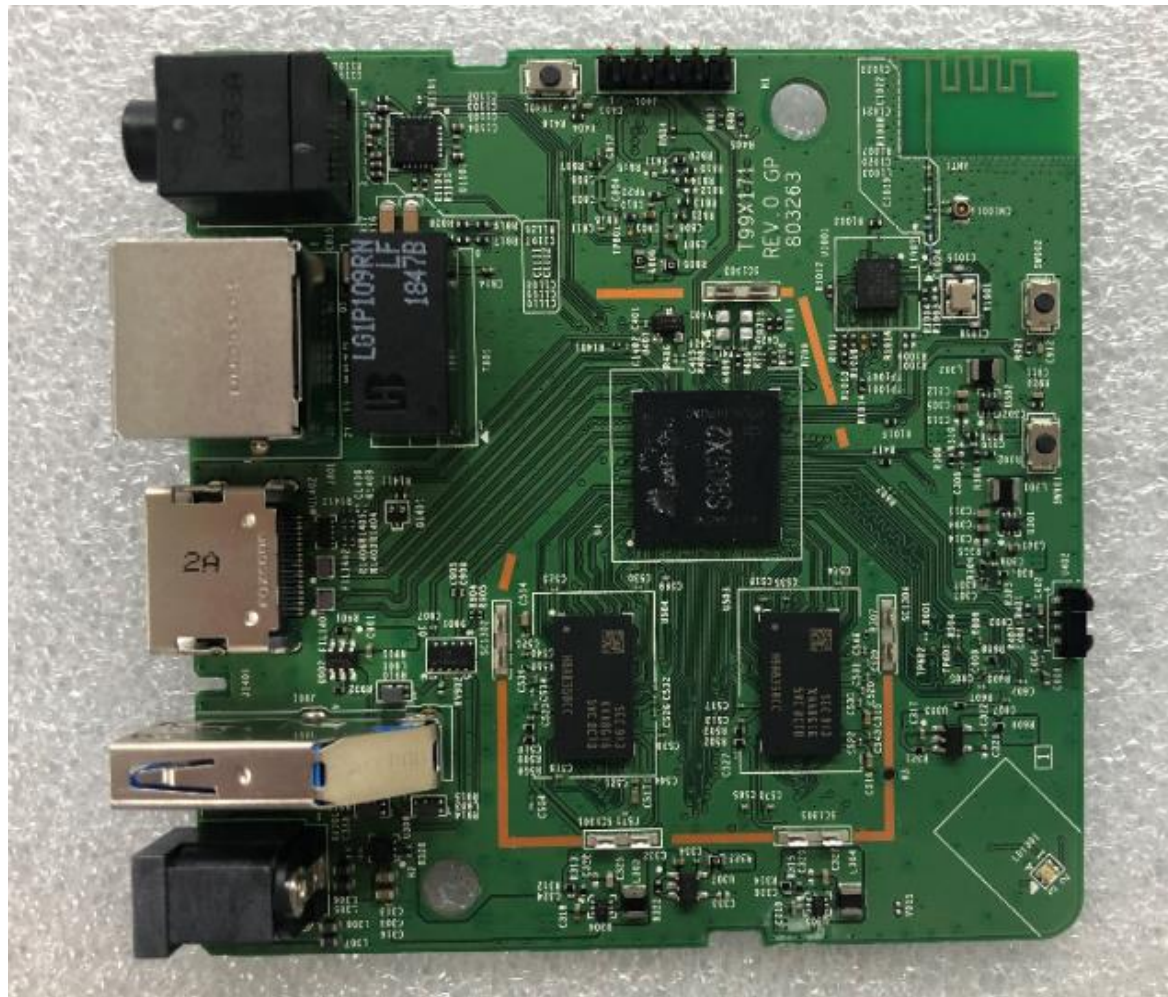
Approved by :

Edward Kuo

Tested by :

Yuna Yu

Circuit Board



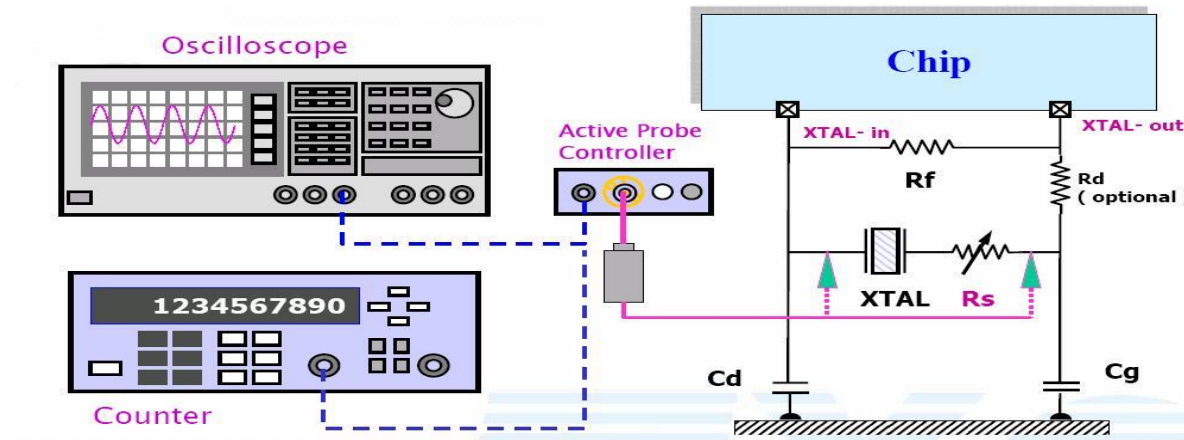
1). Test Material:

- 1. Crystal Test system : S&A 250B , PRA1140**
- 2. Oscilloscope: Tektronix TDS 3052**
- 3. AC/DC Current Measurement System : Tektronix TCPA300**
- 4. Probe Power Supply : Tektronix 1103**
- 5. Active Probe - Tektronix P6243 (< 1pF)**
- 6. Counter: HP 53131A**

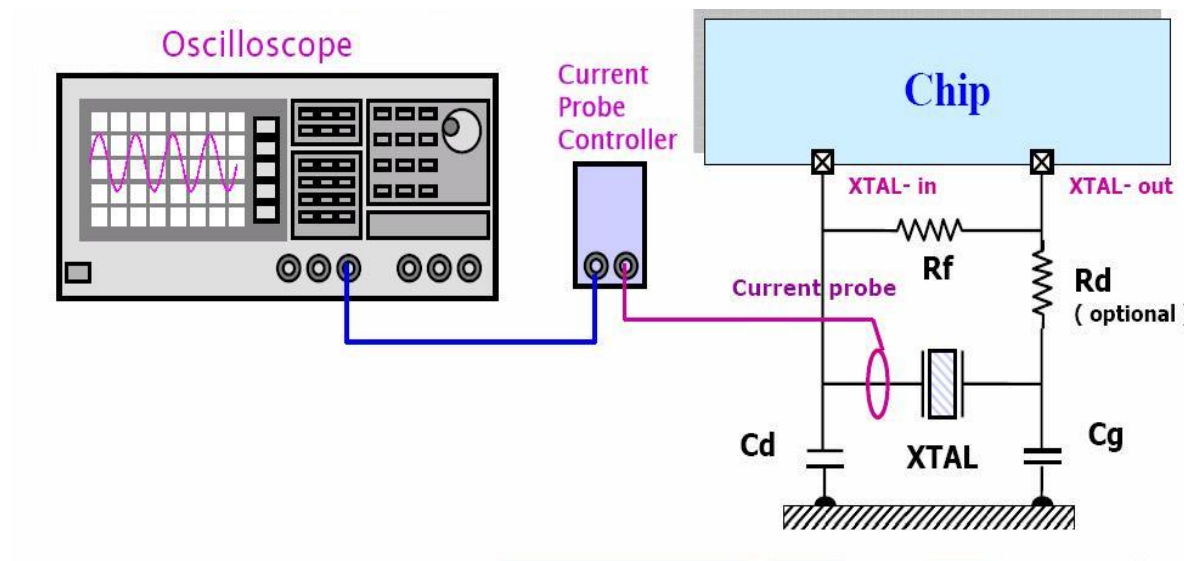
2). Process of Crystal & Oscillation Circuit "Matching" Test

- 2-1. Crystal room temperature characteristic test.**
- 2-2. Crystal on board test: Verify frequency tolerance & waveform.**
- 2-3. Measure the negative resistance (-R) value of chip set.**
- 2-4. Measure the drive level of crystal on PCB board.**
- 2-5. Modify the circuit capacitance (Cd & Cg) to obtain an accurate frequency and a correct waveform amplitude.**
- 2-6. Suggest the crystal specifications and the load capacitance of external circuit base on the tests above.**

Measure the negative resistance ($-R$) value of chip set.



Measure the drive level of crystal on PCB board.



Location: Y401

TXC P/N: 7M24000055

Customer P/N: N/A

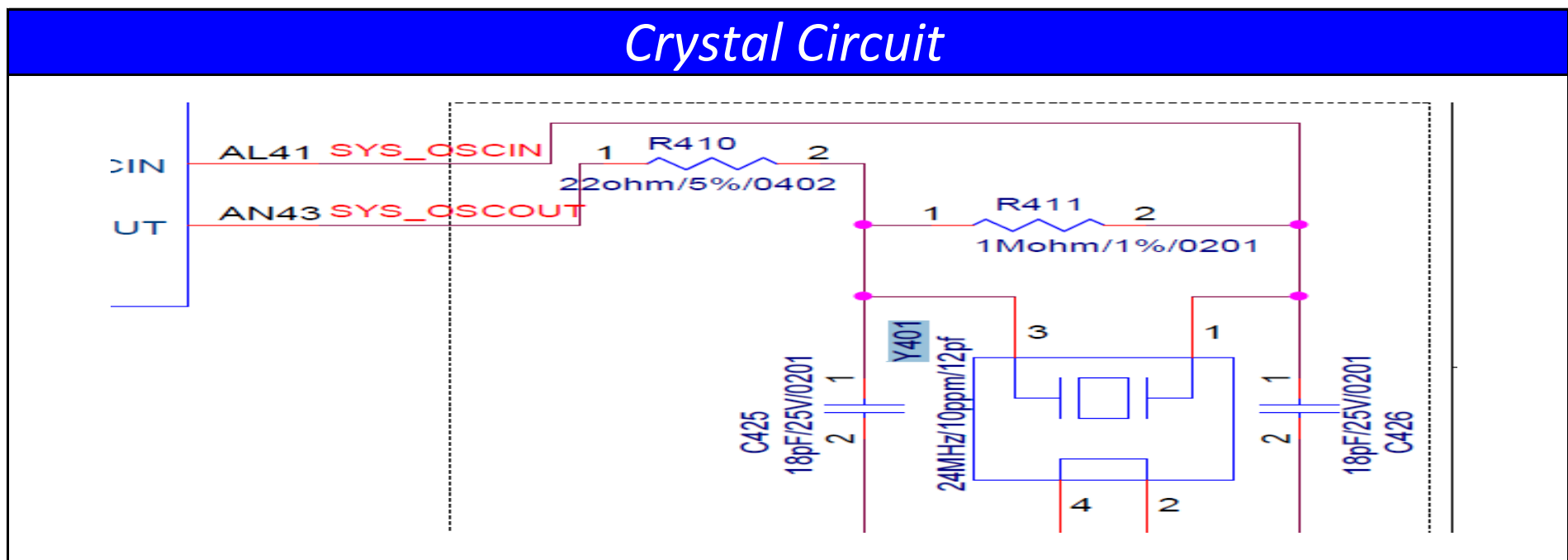
1.) Crystal Spec:

SIZE Seam 3.2*2.5 / Normial_Freq 24 MHZ / Frequency Tolerance (25°C) ±10 PPM

Load Capacitance 12 pF / Effective Resistance 30 Ω / Stability ±20 PPM

Operating_Temp -40 ~ 105 °C

2.) Circuit Information:



3.) Test Result:

1. Crystal room temperature(25°C) characteristic test.

Vendor	FL(PPM)	Rr(Ω)	C0(pF)	C1(fF)	TS(ppm/pF)
TXC	2.04	9.06	0.87	2.80	8.40

2. Crystal on board test.

C425,C426=18pF,R410=22ohm

Vendor	Osc Frequency (Hz)	ΔF (ppm)	Ix (mA)	DL (μ W)	$-R$ (Ω)	*Correlation (ppm)	Amplitude (V)
TXC	24000061	2.54	2.40	52.19	559	0.50	1.85

* Correlation = Output Freq. - Crystal FL

4.) Conclusion:

Location: Y401

TXC P/N: 7M24000055

Customer P/N: N/A

Circuit	CL	ΔF (ppm)	*DL (uW)	** $ -R $ (Ω)
Current	C425,C426=18pF,R410=22ohm	2.54	52.19	559

▲ TXC recommend to use Current circuit for better frequency deviation result and enough negative resistance.†

*DL(Driver Level)<=>power consumption of Crystal

** $|-R|$ (Ω) should follow the rule of $|-R| > 3*ESR_{max}(>90ohm)$ for stable oscillation.

Location: Y1001

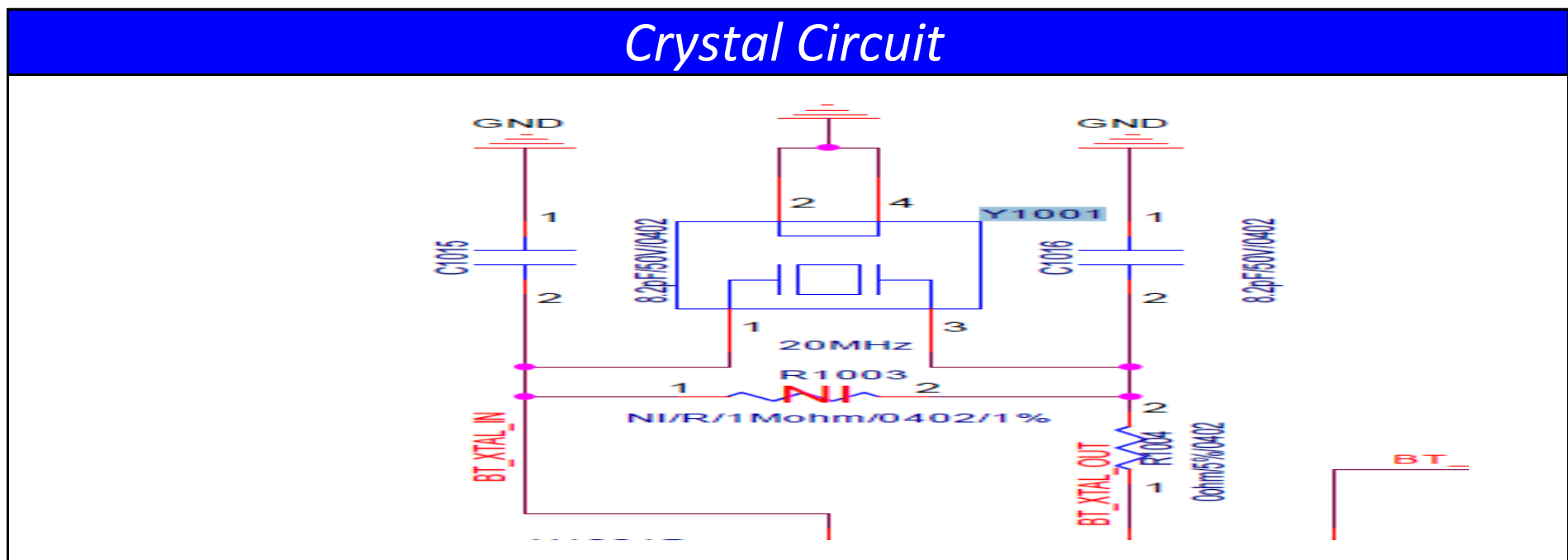
TXC P/N: 8Z20072001

Customer P/N: N/A

1.) Crystal Spec:

SIZE	<u>Seam 2.5*2.0</u>	/	Normal_Freq	<u>20</u>	MHZ	/	Frequency Tolerance (25°C)	<u>±20</u>	PPM	
Load Capacitance	<u>8</u>	pF	/	Effective Resistance	<u>50</u>	Ω	/	Stability	<u>±20</u>	PPM
Operating_Temp	<u>-30</u>	~	<u>105</u>	°C						

2.) Circuit Information:



3.) Test Result:

1. Crystal room temperature(25°C) characteristic test.

Vendor	FL(PPM)	Rr(Ω)	C0(pF)	C1(fF)	TS(ppm/pF)
TXC	5.37	26.39	0.67	2.01	13.40

2. Crystal on board test.

C1015,C1016=8.2pF

Vendor	Osc Frequency (Hz)	ΔF (ppm)	Ix (mA)	DL (μW)	$-R$ (Ω)	*Correlation (ppm)	Amplitude (V)
TXC	20000188	9.40	0.70	12.93	622	4.03	1.11

* Correlation = Output Freq. - Crystal FL

4.) Conclusion:

Location: Y1001

TXC P/N: 8Z20072001

Customer P/N: N/A

Circuit	CL	ΔF (ppm)	*DL (uW)	** $ -R $ (Ω)
Current	C1015,C1016=8.2pF	9.40	12.93	622

▲ TXC recommend to use Current circuit for better frequency deviation result and enough negative resistance.†

*DL(Driver Level)<=>power consumption of Crystal

** $|-R|$ (Ω) should follow the rule of $|-R| > 3*ESR_{max}(>150\text{ohm})$ for stable oscillation.