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CERTIFICATION OF COMPLIANCE

Telian Corporation

4th Fl, Nam Jeun B/D 53-3 Haan-Dong, Kwang Myung-Si, Kyung Gi-Do, KOREA 423-606

Dates of Tests: Nov. 24 ~ 25, 2004

Test Report S/N:DR50110411O

Test Site : DIGITAL EMC CO., LTD.

FCC ID

NPQRFM1000

APPLICANT

Telian Corporation

FCC Classification	:	Part 15 Low Power Communication Device Transmitter
Device name	:	900MHz Transmitter
Manufacturer	:	Telian Corporation
FCC ID	:	NPQRFM1000
Model name	:	FTD-8900
Test Device Serial number	:	Identical prototype
FCC Rule Part(s)	:	FCC Part 15.249; ANSI C-63.4-2001
Frequency Range	:	920.528 ~ 927.594MHz
Max. Output power	:	-13dBm
Data of issue	:	November 26, 2004

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.



NVLAP LAB CODE 200559-0

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1. General information's

This report contains the result of tests performed by:

DIGITAL EMC CO., LTD.

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Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the "General requirements for the competents of calibration and testing laboratory".

This laboratory is accredited by NVLAP for NVLAP Lab. Code : 200559-0.

Test operator: engineer

November 26, 2004

Won-Jong LEE



Data

Name

Signature

Report Reviewed By: manager

November 26, 2004

Dong-Min JUNG



Data

Name

Signature

Ordering party:

Company name : TELIAN CORPORATION

Address : 4th Fl, Nam Jeun B/D 53-3 Haan-Dong, Kwang Myung-Si

Zip code : 423-606

City/town : Kyung Gi-Do

Country : KOREA

Date of order : November 04, 2004

2. Information's about test item

NPQRFM1000

2.1 Equipment information

Equipment model name	FTD-8900
Type of equipment	900MHz Transmitter
Frequency band	920.528 ~ 927.594MHz TX
Type of Modulation	FSK
Channel Spacing	307.2 kHz
Output Impedance	50 ohms
Type of antenna	Helical Antenna
Operating Voltage	DC input : 5.0Vdc $\pm$ 5% 1A
	Regulator Voltage : 3.0V
AC/DC Adaptor	Input: 120VAC, 60Hz, 0.15A
	Output: 6Vdc, 500mA

2.2 Tested frequency

Frequency	TX
Low frequency	920.528 MHz
High frequency	927.594 MHz

2.3 Tested environment

Temperature	15 ~ 35 (°C)
Relative humidity content	20 ~ 75 %
Air pressure	86 ~ 103 kPa
Details of power supply	120 VAC, 60Hz

2.4 Ancillary Equipment

Equipment	Model No.	Serial No.	Manufacturer
1. AC/DC Adaptor	RGD41060500	N/A	Telian Corp.
2. AC/DC Adaptor	3A- 41WU05A	N/A	ENG
TDMA Phone	FTD-8900	N/A	Telian Corp.

2.5 EMI Suppression Device(s)/Modifications

EMI suppression device(s) added and/or modifications made during testing -> none

3. Test Report

3.1 Summary of tests

FCC Part Section(s)	Parameter	Limit	Test Condition	Status (note 1)
I. Transmit mode(Tx)				
15.249 (a)	Field Strength Limits	Refer to the FCC 15.249(a)	Radiated	C
15.215 (c)	BAND - EDGE (at 20 dB blow)	902 < f < 928 MHz	Radiated	C
15.205 / 15.209	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	< FCC 15.209 limits	Radiated	C
15.207	AC Conducted Emissions	< FCC 15.207 limits	Line Conducted	C
Note 1: C=Complies NC=Not Complies NT=Not Tested NA=Not Applicable				

The sample was tested according to the following specification:

FCC Parts 15.249; ANSI C-63.4-2001

3.2 Transmitter requirements

3.2.1 AC Conducted Emissions

Procedure:

The conducted emissions are measured in the shielded room with a spectrum analyzer in peak hold. While the measurement, EUT had its hopping function disabled at the middle channels in line with Section 15.31(m). Emissions closest to the limit are measured in the quasi-peak mode (QP) with the tuned receiver using a bandwidth of 9 kHz. The emissions are maximized further by cable manipulation and Exerciser operation. The highest emissions relative to the limit are listed.

Measurement Data: **Complies**

- No other emissions were detected at a level greater than 10dB below limit.
- Refer to the next page.

Minimum Standard: FCC Part 15.207(a)/EN 55022

Frequency Range (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

* Decreases with the logarithm of the frequency

Measurement Setup

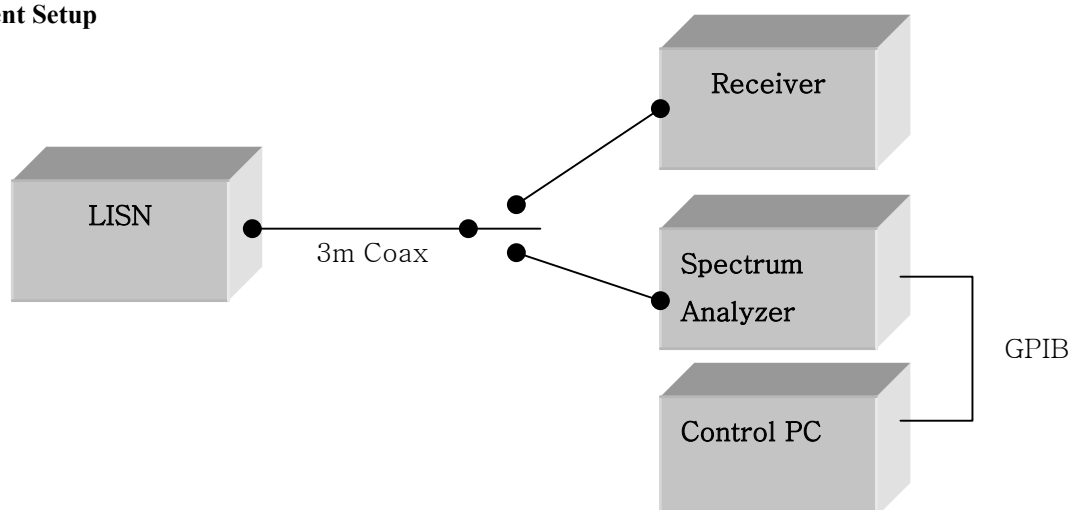
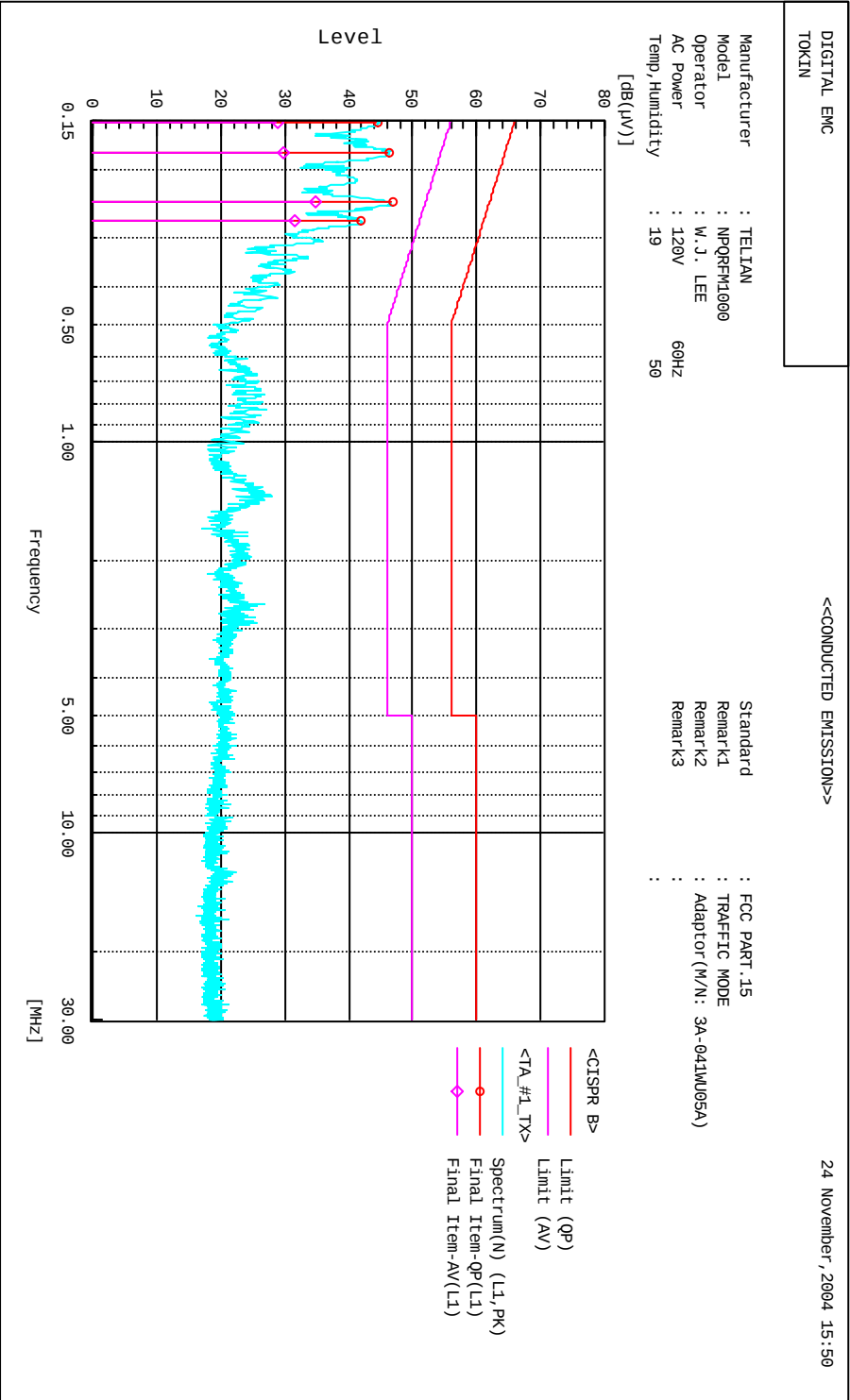
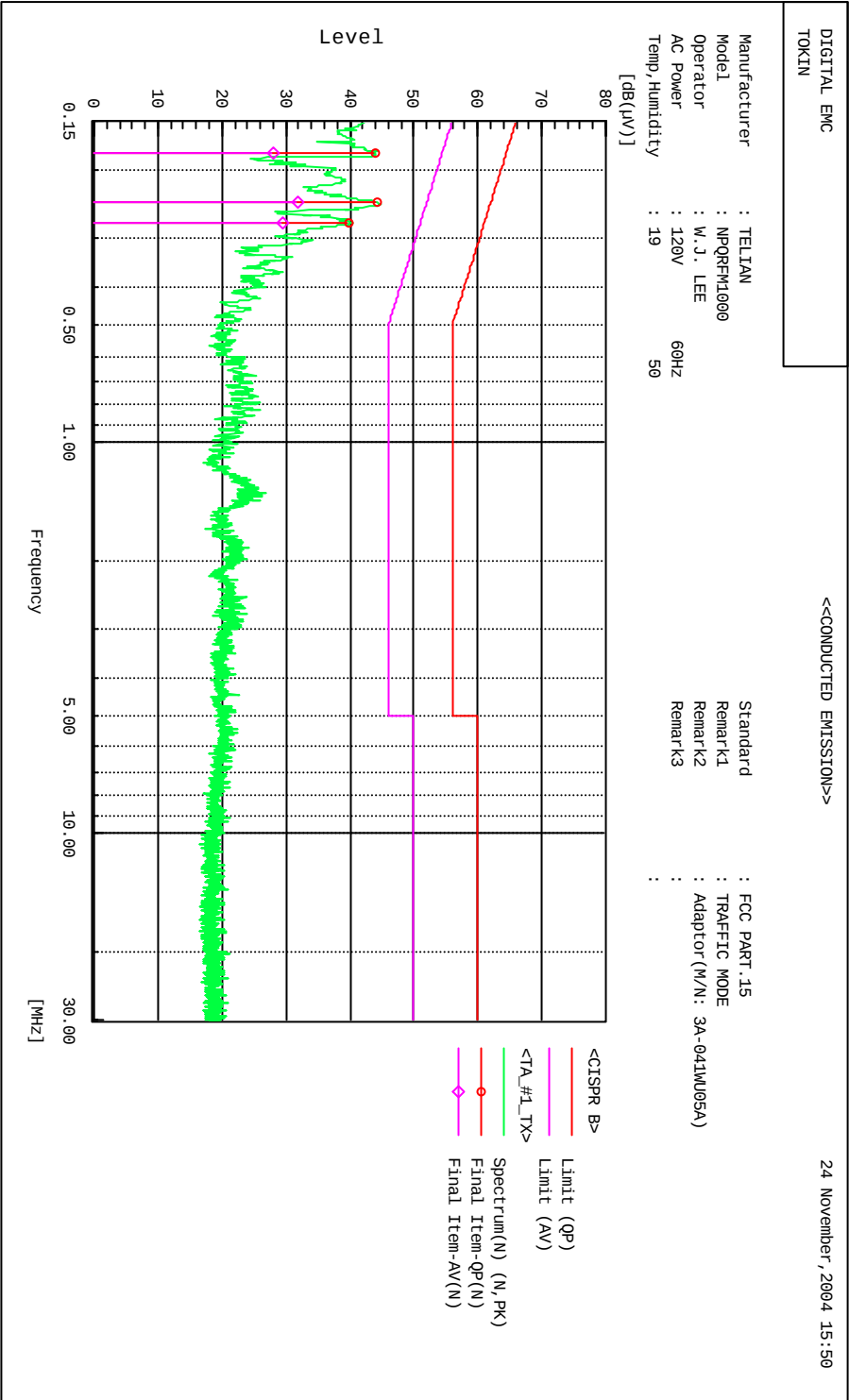


Figure 2: Measurement setup for AC Conducted Emission

NPQRFM1000/ 3A- 41WU05A adaptor/ Line



NPQRFM1000/ 3A- 41WU05A adaptor / Neutral



NPQRFM1000/ 3A- 41WU05A adaptor / Data

Standard : FCC PART.15
 Manufacturer : TELIAN
 Model : NPQRFM1000
 Operator : W.J. LEE
 AC Power : 120V 60Hz
 Temp, Humidity : 19 50
 Remark1 : TRAFFIC MODE
 Remark2 : Adaptor(M/N: 3A-041WU05A)
 Remark3 :

***** DIGITAL EMC *****
 <<CONDUCTED EMISSION>>
 24 November, 2004 15:50

 Final Result

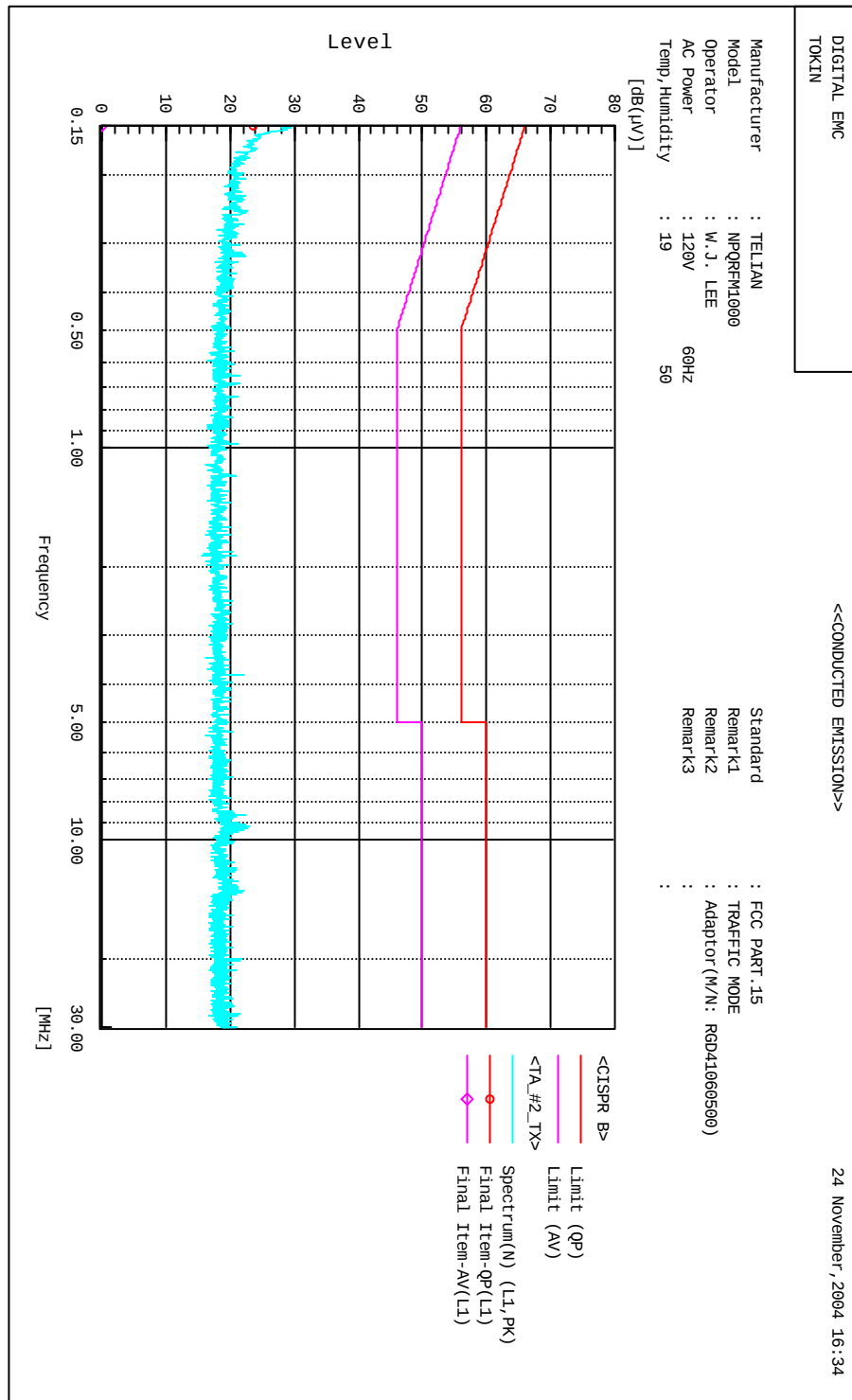
--- N Phase ---
 No. Frequency Reading QP AV c.f Result QP AV Limit QP AV Margin QP AV Remark

1	0.182	42.8	42.8	26.6	1.3	44.1	27.9	64.4	54.4	20.3	26.5	
2	0.242	43.4	31.0	0.9	44.3	31.9	62.0	52.0	17.7	20.1		
3	0.273	39.0	28.7	0.9	39.9	29.6	61.0	51.0	21.1	21.4		

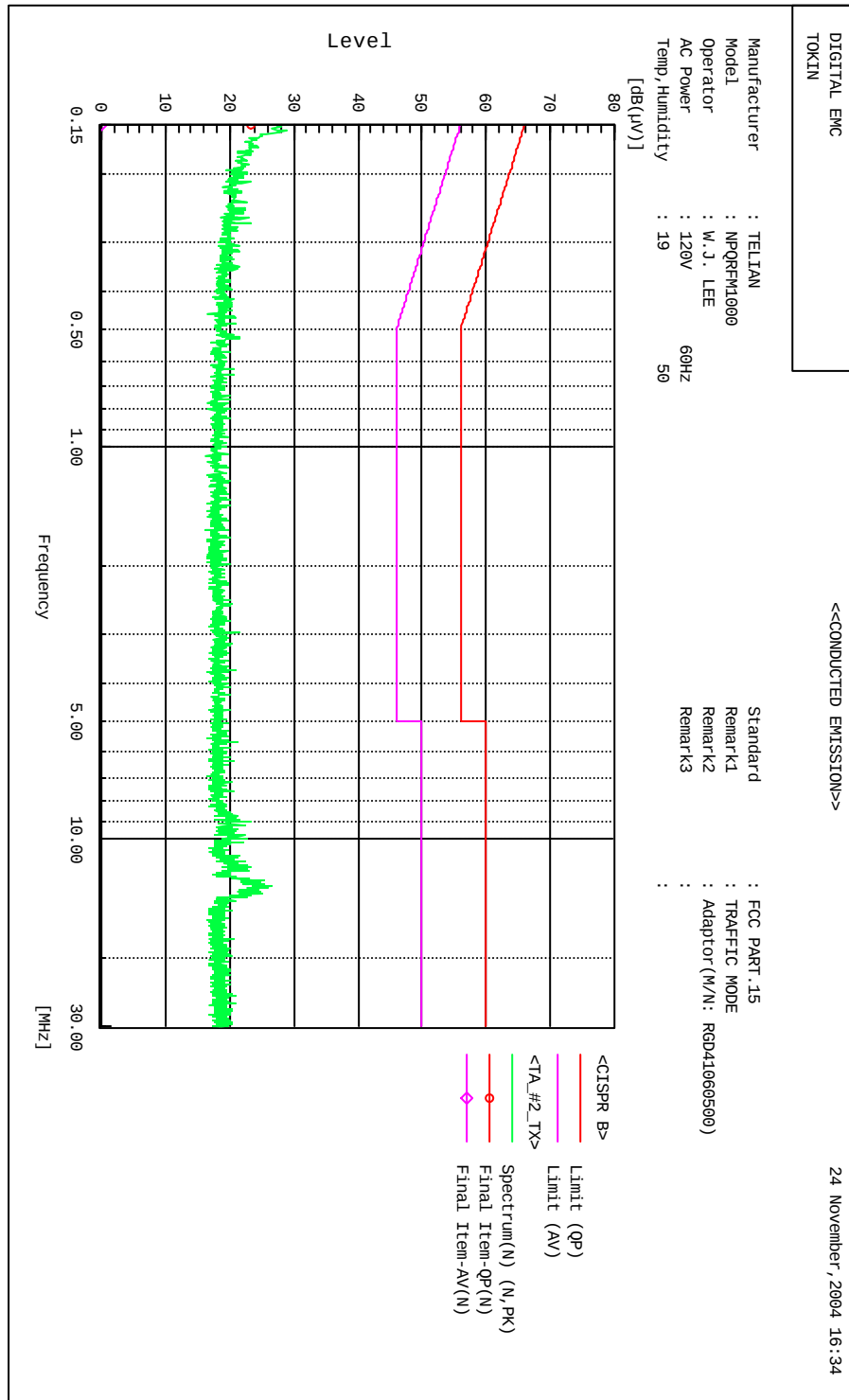
--- L1 Phase ---
 No. Frequency Reading QP AV c.f Result QP AV Limit QP AV Margin QP AV Remark

1	0.242	45.8	33.8	1.0	46.8	34.8	62.0	52.0	15.2	17.2	
2	0.182	45.1	28.7	1.2	46.3	29.9	64.4	54.4	18.1	24.5	
3	0.272	40.9	30.6	0.9	41.8	31.5	61.1	51.1	19.3	19.6	
4	0.151	42.8	27.0	1.8	44.6	28.8	65.9	55.9	21.3	27.1	

NPQRFM1000/ RGD41060500 adaptor/ Line



NPQRFM1000/ RGD41060500 adaptor/ Neutral



NPQRFM1000/ RGD41060500 adaptor/ Data

 <<CONDUCTED EMISSION>>

24 November, 2004 16:34

Standard : FCC PART.15
 Manufacturer : TELIAN
 Model : NPQRFM1000
 Operator : W. J. LEE
 AC Power : 120V 60Hz
 Temp, Humidity : 19 50
 Remark1 : TRAFFIC MODE
 Remark2 : Adaptor (M/N: RGD41060500)
 Remark3 :

 Final Result

--- N Phase ---											
No.	Frequency	Reading	Reading	c.f	Result	Result	Limit	Limit	Margin	Margin	Remark
		QP	AV		QP	AV	QP	AV	QP	AV	
	[MHz]	[dB(µV)]	[dB(µV)]	[dB]	[dB(µV)]	[dB(µV)]	[dB(µV)]	[dB(µV)]	[dB]	[dB]	
1	0.150	21.4	0.0	1.8	23.2	0.0	66.0	56.0	42.8	0.0	
--- L1 Phase ---											
No.	Frequency	Reading	Reading	c.f	Result	Result	Limit	Limit	Margin	Margin	Remark
		QP	AV		QP	AV	QP	AV	QP	AV	
	[MHz]	[dB(µV)]	[dB(µV)]	[dB]	[dB(µV)]	[dB(µV)]	[dB(µV)]	[dB(µV)]	[dB]	[dB]	
1	0.150	21.8	0.0	1.8	23.6	0.0	66.0	56.0	42.4	0.0	

3.2.2 Radiated Emission

Procedure:

The EUT was placed on a 0.8m high wooden table inside a shielded enclosure. An antenna was placed near the EUT and measurements of frequencies and amplitudes of field strengths were recorded for reference during final measurements. For final radiated testing, measurements were performed in OATS. Measurements were performed with the EUT oriented in 3 orthogonal axis and rotated 360 degrees to determine worst-case orientation for maximum emissions.

The spectrum analyzer is set to:

Center frequency = the worst channel

Frequency Range = 30 MHz ~ 10th harmonic.

RBW = 120 kHz (30MHz ~ 1 GHz)

VBW ≥ RBW

= 1 MHz (1 GHz ~ 10th harmonic)

Distance = 3m

Detector function = peak

Trace = max hold

Sweep = auto

Measurement Data: **Complies**

- No other emissions were detected at a level greater than 10dB below limit.
- Refer to the next page.

Fundamental / Harmonics emission: FCC Part 15.249(a)

Frequency (MHz)	Limit @ 3m	
	Fundamental (mV/m)	Harmonics (uV/m)
902 - 928	50	500

General Standard: FCC Part 15.209(a)

Frequency (MHz)	Limit (uV/m) @ 3m
30 ~ 88	100 **
88 ~ 216	150 **
216 ~ 960	200 **
Above 960	500

** Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88MHz, 174-216MHz or 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.

Fundamental Measurement Data:

Frequency (MHz)	Pol	QP Reading (dBuV)	C.F (dBuV/m)	QP Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
920.528	H	90.5	-0.9	89.6	94.0	4.4
920.528	V	88.0	-0.9	87.1	94.0	6.9
927.594	H	88.5	-0.9	87.6	94.0	6.4
927.594	V	89.5	-0.9	88.6	94.0	5.4

Harmonic and other emission Measurement Data: Fundamental Frequency = 920.528MHz

Frequency (MHz)	Pol	Reading (dBuV)	C.F (dBuV/m)	Result PK (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1841.056	H	46.9	1.3	48.2	54.0	5.8
2761.584	V	46.0	4.6	50.6	54.0	3.4
3682.112	H	34.5	11.1	45.6	54.0	8.4
4602.64	H	21.6	16.9	38.5	54.0	15.5
5523.168	H	12.7	24.2	36.9	54.0	17.1
-	-	-	-	-	-	-

Harmonic and other emission Measurement Data: Fundamental Frequency = 927.594MHz

Frequency (MHz)	Pol	Reading (dBuV)	T.F (dBuV/m)	Result QP (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1855.188	H	46.5	1.4	47.9	54.0	6.1
2782.782	H	43.2	4.8	48.0	54.0	6.0
3710.376	H	31.5	11.3	42.8	54.0	11.2
4637.97	H	22.6	17.0	39.6	54.0	14.4
5565.564	H	14.2	24.4	38.6	54.0	15.4
-	-	-	-	-	-	-

Note.

1. No other emissions were detected at a level greater than 10dB below limit.
2. Sample Calculation.

$$\text{Margin} = \text{Limit} - \text{Result} \quad / \quad \text{Result} = \text{Reading} + \text{T.F} \quad / \quad \text{T.F} = \text{AF} + \text{CL} - \text{AG}$$

Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain

3.2.3 BAND - EDGE (at 20 dB blow)

Procedure:

After the trace being stable, Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 20dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 20 dB bandwidth of the emission.

The spectrum analyzer is set to:

Center frequency = the worst channel

Frequency : 920.528MHz / 927.594MHz

RBW = 120 kHz

VBW $\geq$ RBW

Distance = 3m

Detector function = peak

Trace = max hold

Sweep = auto

Measurement Data: **Complies**

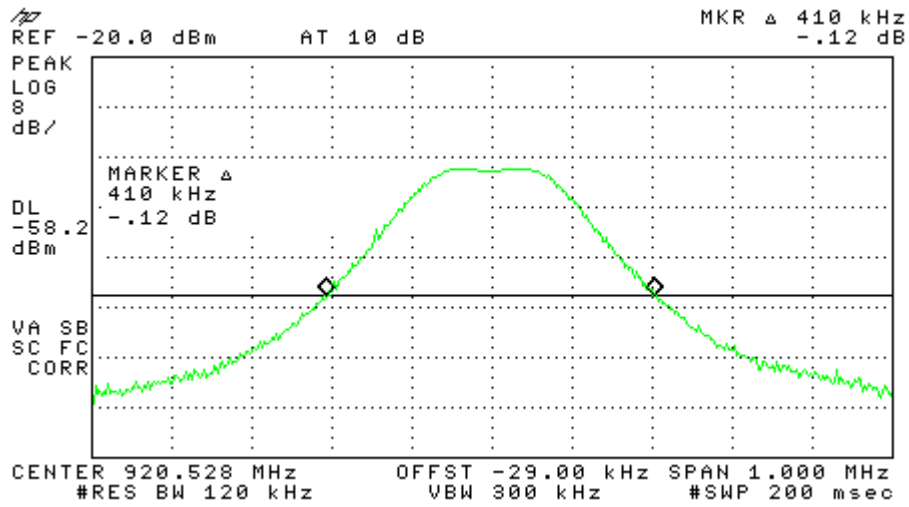
- Refer to the next page.

Frequency (MHz)	Channel No.	BAND - EDGE (at 20 dB blow)		
		Lowest Frequency	Highest Frequency	Measured Bandwidth (KHz)
920.528	1	920.320	920.730	410
927.594	16	927.376	927.806	430

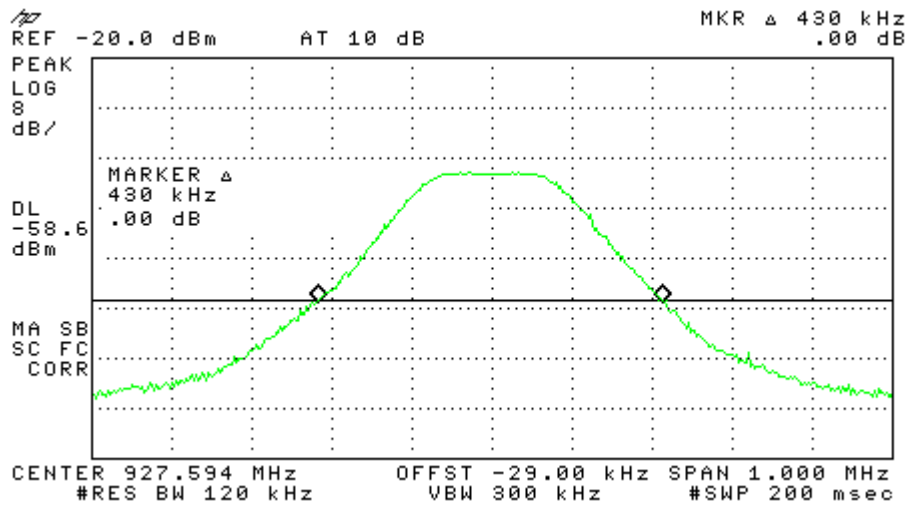
Minimum Standard: FCC Part 15.215(c)

The requirement to contain the 20 dB bandwidth of the emission within the specified frequency band (902 ~ 928MHz) includes the effects from frequency sweeping,

20 dB Bandwidth



RL



RT

APPENDIX

TEST EQUIPMENT USED FOR TESTS

	Type	Manufacturer	Model	Cal.Due.Date (dd/mm/yy)	S/N
01	Spectrum Analyzer	H.P	8563E	25/09/05	3551A04634
02	Power Meter	H.P	EPM-442A	15/07/05	GB37170413
03	Power Sensor	H.P	8481A	15/07/05	3318A96332
04	Frequency Counter	H.P	5342A	07/10/05	2119A04450
05	Multifunction Synthesizer	H.P	8904A	07/10/05	3633A08404
06	Signal Generator	H.P	8673D	26/09/05	2844A00753
07	Signal Generator	H.P	E4421A	15/07/05	US37230529
08	Signal Generator	H.P	8657A	26/05/05	3430U02049
09	Audio Analyzer	H.P	8903B	21/07/05	3011A0944B
10	Modulation Analyzer	H.P	8901B	15/07/05	3028A03029
11	Sensor Module	H.P	11722A	15/07/05	3111A04665
12	Oscilloscope	LeCroy	9314A	10/10/05	93144390
13	CDMA Mobile Station Test Set	H.P	8924C	07/10/05	US35360688
14	Power Splitter	WEINSCHTEL	1593	07/10/05	332
15	BAND Reject Filter	Microwave circuits INC.	NO308372	07/10/05	3125-01DC0312
16	BAND Reject Filter	Wainwright	WRCG1750	07/10/05	SN2
17	AC Power supply	DAEKWANG	5KVA	03/04/05	N/A
18	DC Power Supply	H.P	6622A	24/03/05	465487
19	Attenuator (30dB)	H.P	8498A	07/10/05	50101
20	Attenuator (10dB)	WEINSCHTEL	23-10-34	07/10/05	BP4387
21	HORN ANT	EMCO	3115	04/04/05	6419
22	HORN ANT	EMCO	3115	10/01/05	21097
23	Dipole Antenna	Schwarzbeck	VHA9103	29/10/05	2116
24	Dipole Antenna	Schwarzbeck	VHA9103	29/10/05	2117
25	Dipole Antenna	Schwarzbeck	UHA9105	29/10/05	2261
26	Dipole Antenna	Schwarzbeck	UHA9105	29/10/05	2262

	Type	Manufacturer	Model	Cal.Due.Date (dd/mm/yy)	S/N
27	RFI/FIELD Intensity Meter	Kyorits	KNM-504D	25/07/05	SN-161-4
28	Frequency Converter	Kyorits	KCV-604C	25/07/05	4-230-3
29	TEMP & HUMIDITY Chamber	JISCO	J-RHC2	14/09/05	021031
30	Log Periodic Antenna	Schwarzbeck	UHALP9108A1	29/10/05	1098
31	Biconical Antenna	Schwarzbeck	VHA9103	29/10/05	VHA91031946
32	Digital Multimeter	H.P	34401A	07/04/05	3146A13475
33	Attenuator (10dB)	WEINSCHEL	23-10-34	07/10/05	BP4386
34	High-Pass Filter	ANRITSU	MP526	12/05/05	M27756
35	Attenuator (3dB)	Agilent	8491B	15/09/05	58177
36	Amplifier (25dB)	Agilent	8447D	08/10/05	2944A10144
37	Amplifier (30dB)	Agilent	8449B	22/08/05	3008A01590
38	Position Controller	TOKIN	5901T	N/A	14173
39	Driver	TOKIN	5902T2	N/A	14174
40	Spectrum Analyzer	H.P	8591E	23/05/05	3649A05889
41	RFI/FIELD Intensity Meter	Kyorits	KNW-2402	07/07/05	4N-170-3
42	LISN	Kyorits	KNW-407	16/08/05	8-317-8
43	LISN	Kyorits	KNW-242	16/08/05	8-654-15
44	CVCF	NF Electronic	4400	N/A	344536 4420064
45	Software	ToYo EMI	EP5/RE	N/A	Ver 2.0.800
46	Software	ToYo EMI	EP5/CE	N/A	Ver 2.0.801
47	Software	AUDIX	e3	N/A	Ver 3.0
48	Software	Agilent	Benchlink	N/A	A.01.09 021211