FCC TEST REPORT

Product Name	PCS Repeater Repote Monitor system
Model Name	RSN-GATE-MLT
Applicant	R-tron Inc.
FCC ID	STESNGATEMLT

ESTECH CO., LTD

Rm. 1015 World Venture Center, 426-5 Gasan-dong, Geumcheon-gu,
Seoul, 153-803, Korea. Tel:82-2-867-3201, Fax:82-2-867-3204

FCC Test Report

Report Number	ESTR0803-001			
Applicant	Company Name	R-tron Inc.		
	Address	Jisan IT Venture Center 3F, 1004-9 Doksna-Dong, Gumcheon-Gu, Seoul, Korea		
Product	Product Name	PCS Repeater Repote Monitor system		
	Model No.	RSN-GATE-MLT	Manufacturer	R-tron Inc.
	Additional Model(s)			
	Serial No.	NONE	Country of origin	KOREA
Other	Issued Date	2008-03-04	Tested Date	2008-01-21 ~ 2008-03-04
Test Result	**Pass**			
Standard	**FCC PART 24 Subpart E**			
Tested by	K.I. Hong/ Engineer (Signature)			
Approved by	Eun-young Son/ Engineering Manager (Signature)			

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Contents

1. General Information

1.1 EUT Description

FCC ID	**STESNGATEMLT**
Product Name	**PCS Repeater Repote Monitor system**
Model Name	**RSN-GATE-MLT**
Frequency	**Tx :1851.25 ~ 1908.75MHz(PCS1900)**
	Rx :1931.25 ~ 1988.75MHz(PCS1900)
Channel	**PCS1900(25/600/1175)**
Modulation Type	**CDMA**
Power Rating	**12.0(10.2~13.8)VDC**

2. Laboratory Information

2.1 Laboratory Name	Estech Co., Ltd.
2.2 Location	
Head Office	Rm. 1015, World Venture Center II, 426-5 Gasan-dong Geumcheon-gu, Seoul, 153-803. Korea.
EMC Lab(Ichon)	58-1, Osan-Ri, GaNam-Myon, YeoJoo-Gun, KyungKi-Do, Korea
EMC Lab(Yanggi)	97-1, Hoiuk-Ri Majang-Myon, Icheon-city, KyungKi-Do, Korea
2.3 Quality System	Accredited by KOLAS(ISO/IEC 17025)
2.4 Major Accredited Mark	

3. Summary of Test Results

Test Item	Standard	Result
RF Output Power	Part 24	PASS
Occupied Bandwidth		PASS
Spurious and Harmonic Emission at Antenna Terminal		PASS
Field Strength of Spurious Radiation		PASS
Frequency stability		PASS

4. RF Output Power

4.1 Test Procedure

The EUT was placed on a wooden turn table 3 meters from the receive antenna. The receive antenna height and turn table rotation was adjusted for the highest reading on the receive spectrum analyzer. For CDMA signals, a peak detector is used, with RBW = VBW = 3MHz. For AMPS, GSM, and NADC TDMA signals, a peak detector is used, with RBW = VBW = 1MHz, A Horn antenna was substituted in place of the EUT. This Horn antenna was driven by a signal generator and the level of the signal generator was adjusted to obtain the same receive spectrum analyzer reading. This spurious level is recorded. For reading 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration. Basic Standard 47CFR § 2.1033

4.2 Test Equipments

The following test equipments are used during tests

Equipment	Manufacturer	Model	Cal. Due Date
Receiver	Rohde & Schwarz	ESPI7	2008-08-26
Signal Generator	HP	83620B	2008-09-11
Power Meter	HP	EPM-442A	2009-03-02
Wireless Communications Test Set	Agilent	E5515C	2009-02-12
Pre Amplifier	HP	8449B	2009-03-06
Horn Antenna	SCHWARZBECK	BBHA 9120 D	2009-06-05

4.3. Test Results

4.3.1 PCS1900

(CDMA)

Ch No.	Freq (MHz)	Peak Power Meter(dBm)	Peak Power EIRP(dBm)
25	1851.25	22.23	28.20
600	1880.00	21.55	27.53
1175	1908.75	23.00	26.74

FREQ (MHz)	Receiver Reading (dBuV)	Correction Factor (dB)		SG Reading (dBm)	EIRP (dBm)	Limit (dBm)	POL (H/V)
		Antenna gain(dBi)	Cable Loss (dB)				
1850.20	89.15	10.40	12.50	30.30	28.20	33	H
1880.00	88.83	10.43	12.60	29.70	27.53	33	H
1909.80	87.62	10.44	12.70	29.00	26.74	33	H

5. Occupied Bandwidth

5.1 Test Procedure

The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% of the Emission bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled.

5.2 Test Equipments

The following test equipments are used during tests

Equipment	Manufacturer	Model	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	2009-03-02
Dual Directional Coupler	HP	778D	2009-03-02
Wireless Communications Test Set	Agilent	E5515C	2009-02-12

5.3 Test Results

5.3.1 PCS1900

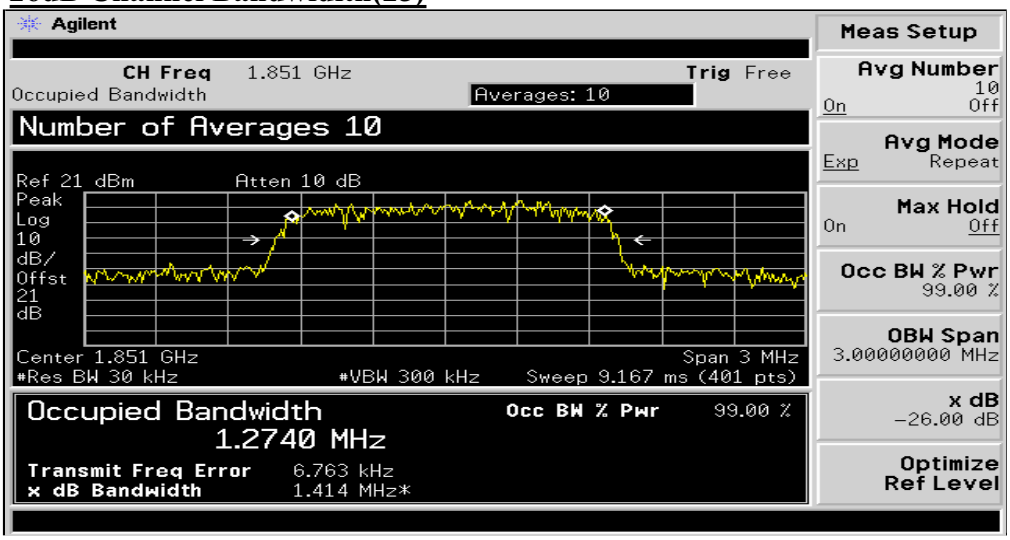
(CDMA)

Channel	Frequency(MHz)	26dB Bandwidth(MHz)
25	1851.25	1.414
600	1880.00	1.407
1175	1908.75	1.420

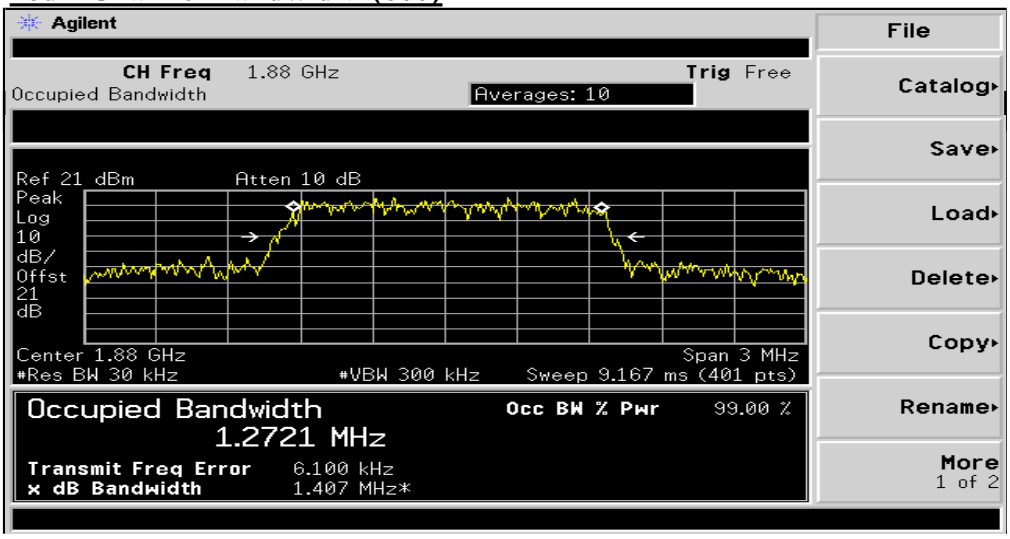
5.4 Test Plot

PCS1900 CDMA

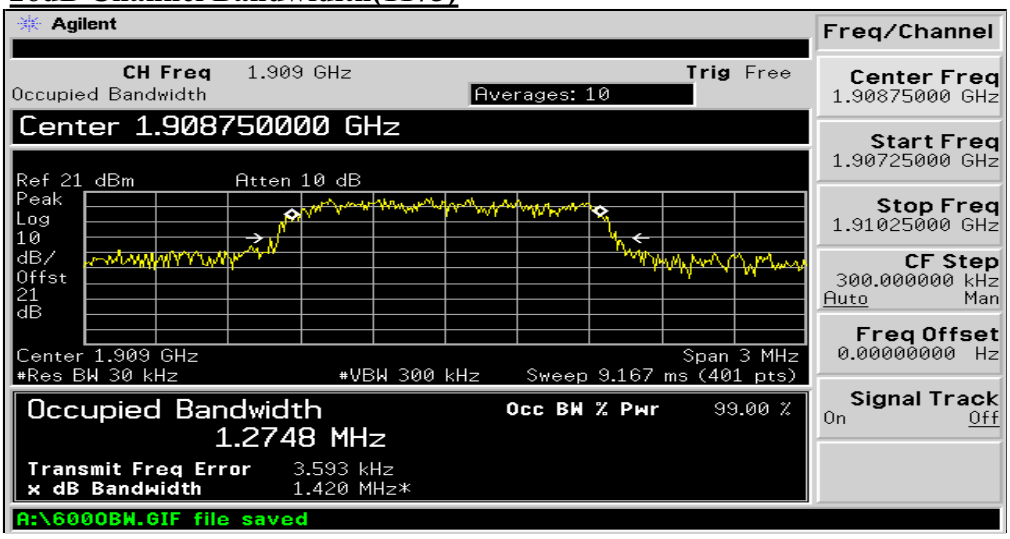
26dB Channel Bandwidith(25)



26dB Channel Bandwidith(600)



26dB Channel Bandwidith(1175)



6. Spurious and Harmonic Emission at Antenna Terminal

6.1 Test Procedure

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to 10GHz. Set the RES BW to 1% of the emission bandwidth to show compliance with the -13dBm, limit, in the 1MHz bands immediately outside and adjacent to the top and bottom edges of the frequency block.

For the Out-of-Band measurements a 1MHz RBW was used to scan from 10MHz to 10xfo of the fundamental carrier for all frequency block. A display line was placed at -13dBm to show compliance for spurious, and harmonics.

22.917(f): Mobile emission in base frequency range. The mean power of any emissions appearing in the base station frequency range from cellular mobile transmitter operated must be attenuated to a level not to exceed -80dBm at the transmit antenna connector.

6.2 Test Equipments

The following test equipments are used during tests

Equipment	Manufacturer	Model	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	2009-03-02
Dual Directional Coupler	HP	778D	2009-03-02
Wireless Communications Test Set	Agilent	E5515C	2009-02-12

6.3 Test Results

6.3.1 PCS1900

CDMA(Spurious Emission: Band Edge)

Channel	Frequency	Result	Limit	Margin
25	1851.25	-25.43	-13.00	12.43
1175	1908.75	-18.70	-13.00	5.70

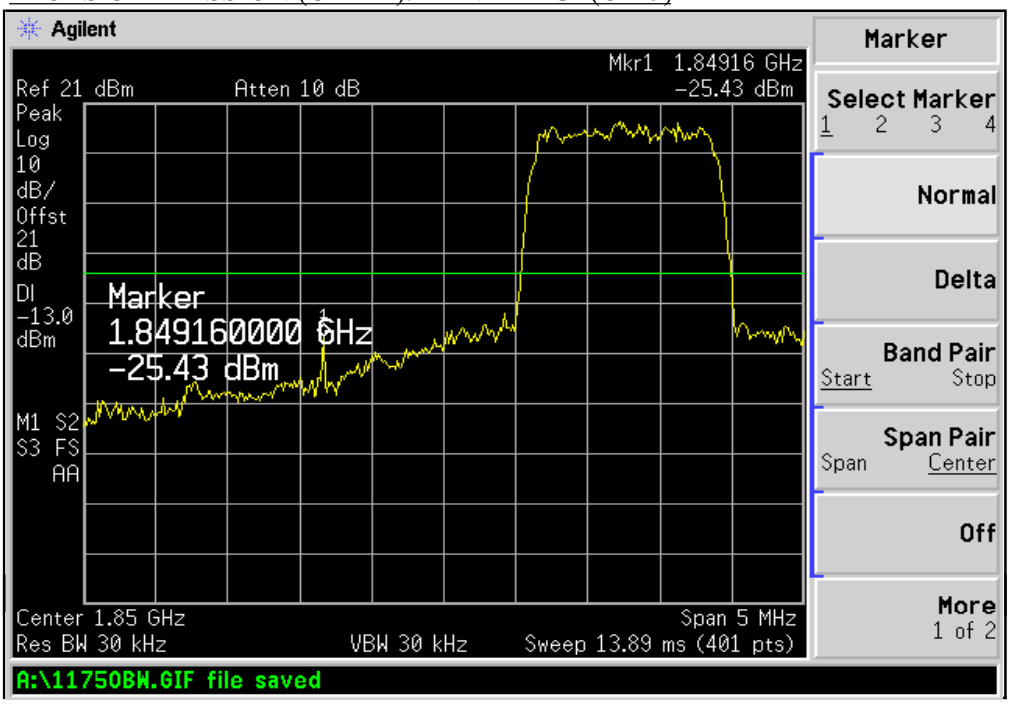
CDMA (Spurious Emission: Out of Band)

Channel	Frequency	Result	Limit	Margin
25	1851.25	-35.13	-13.00	22.13
600	1880.00	-36.25	-13.00	23.25
1175	1908.75	-35.22	-13.00	22.22

6.5 Test Plot

PCS1900

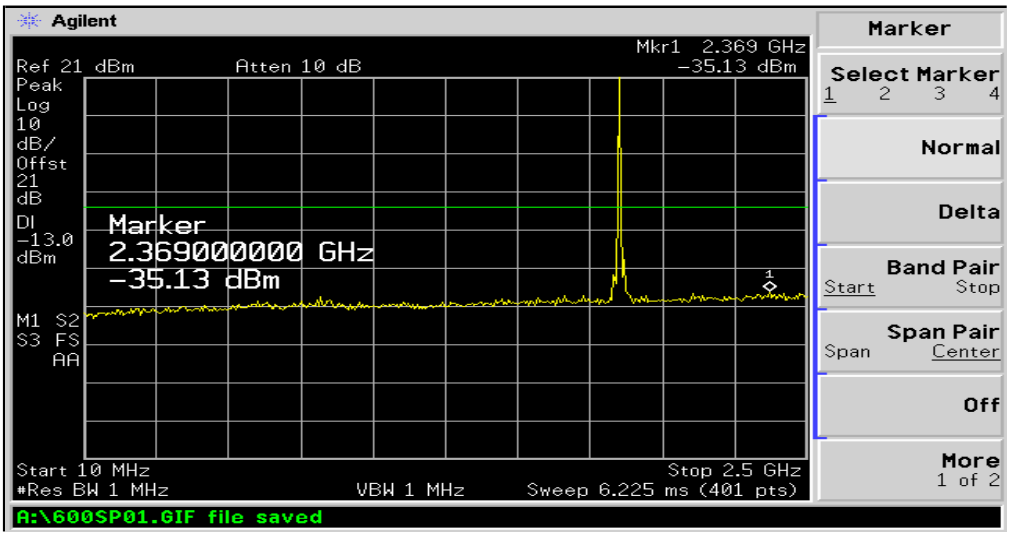
PLOTS OF EMISSION (CDMA): BAND EDGE(Ch25)

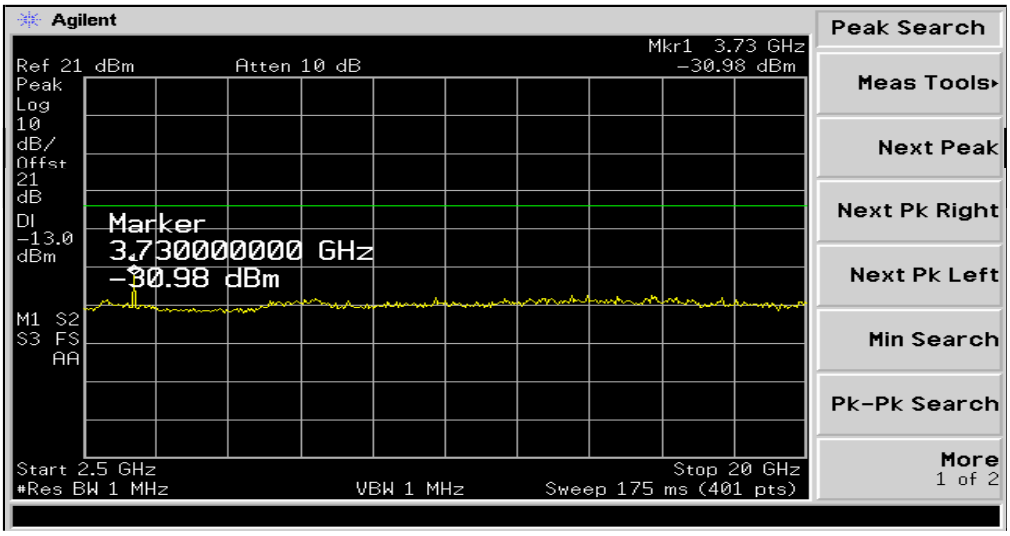


PLOTS OF EMISSION (CDMA): BAND EDGE(Ch1175)

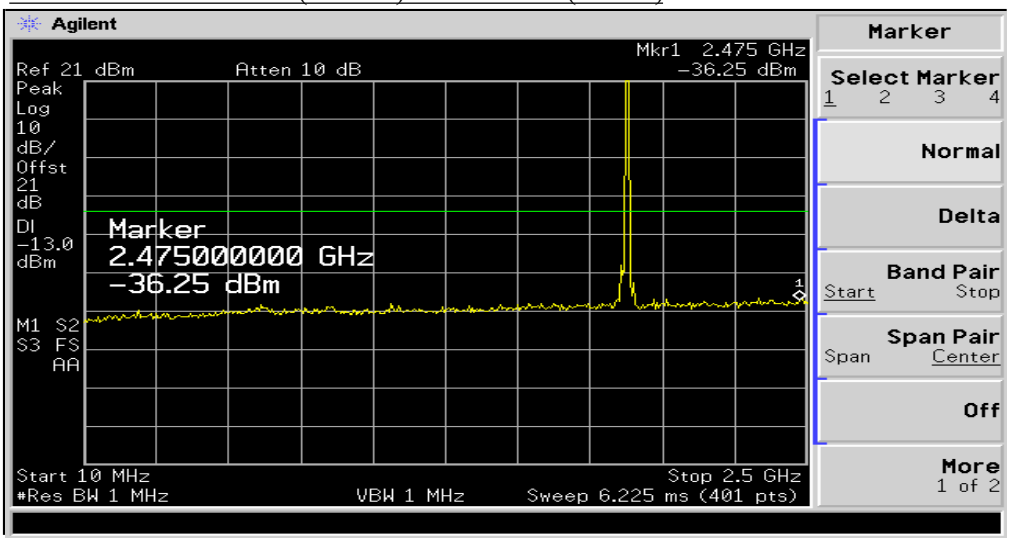
PCS1900

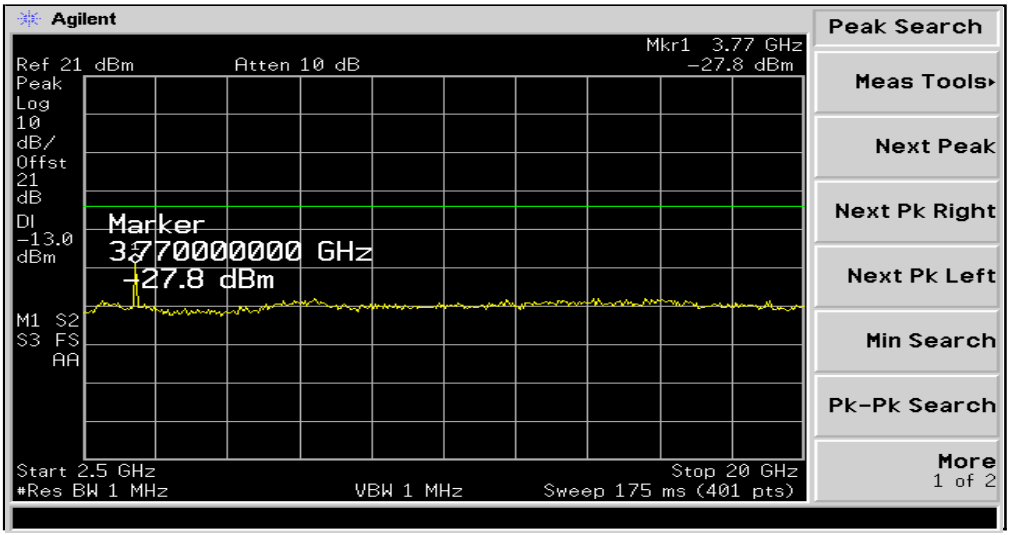
PLOTS OF EMISSION (CDMA): Out of Band(Ch25)



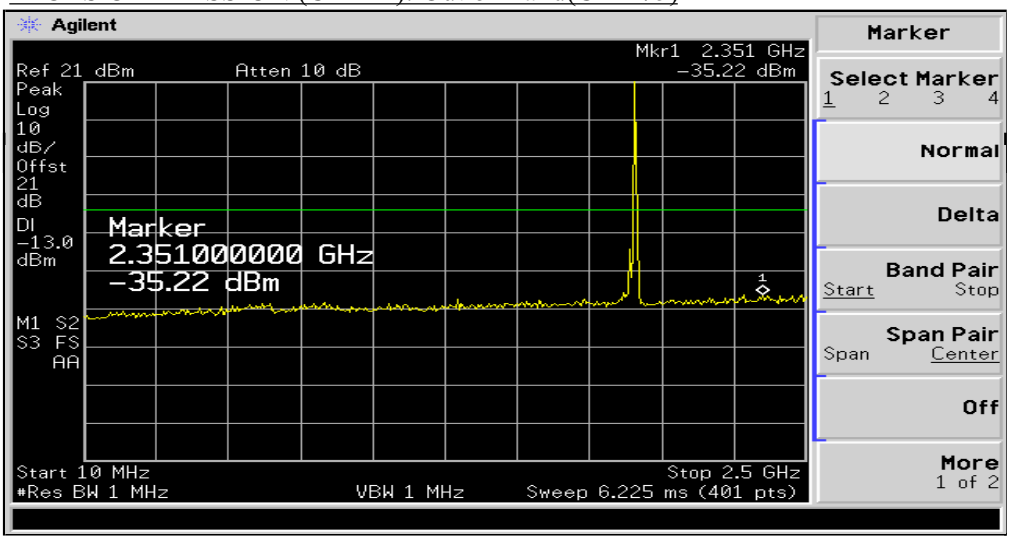


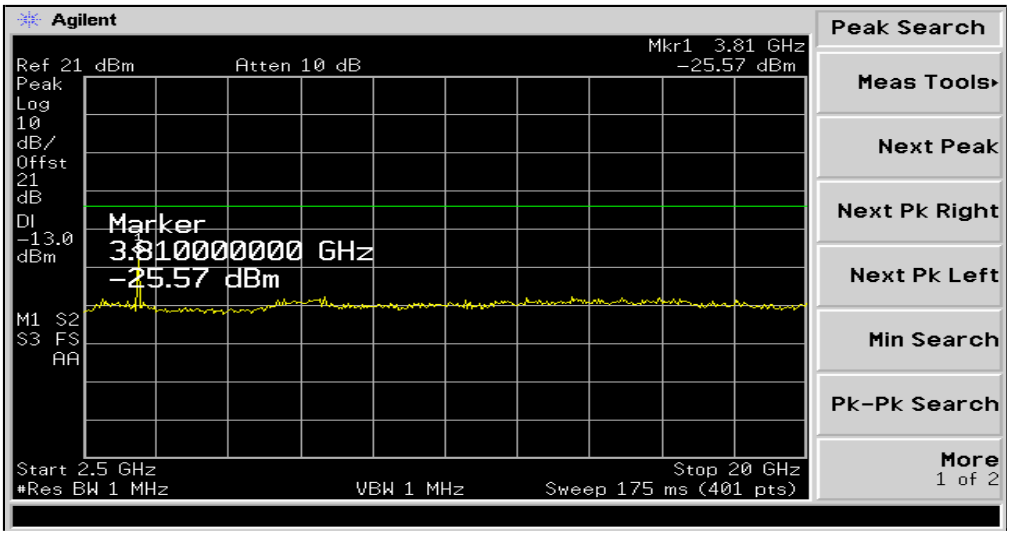
PLOTS OF EMISSION (CDMA): Out of Band(Ch600)





PLOTS OF EMISSION (CDMA): Out of Band(Ch1175)





7. Field Strength of Spurious Radiation

7.1 Test Procedure

Radiation and harmonic emission are measured outdoors at our 3 meters test range. The equipment under test is placed on a wooden turntable 3 meters from the receive antenna. The receive antenna height and turntable rotations were adjusted for the highest reading on the receive spectrum analyzer (or receiver). A half wave dipole was substituted in place of the EUT. This dipole antenna was driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer reading. This level is recorded. For readings above 1GHz, the above procedure is repeated using horn antennas and the difference between the gain of the horn and an isotropic or dipole antenna are taken into consideration.

7.2 Test Equipments

The following test equipments are used during tests

Equipment	Manufacturer	Model	Cal. Due Date
Receiver	Rohde & Schwarz	ESPI7	2008-08-26
Signal Generator	HP	83620B	2007-09-07
Wireless Communications Test Set	Agilent	E5515C	2009-02-11
Pre Amplifier	HP	8449B	2009-03-06
Horn Antenna	SCHWARZBECK	BBHA 9120 D	2009-06-05

* The TX signal isn't detected from 3rd harmonics.

7.3 Test Results

PCS1900

CDMA(Ch 25)

Mesured output power: 28.20dBm = 0.660W, Limit: 43+10log$_{10}$(W)= 41.20dBc

Frequency (MHz)	Receiver Reading(dBuV	Correction Factor(dB)		EIRP(dBm)		dBc	Polarity
		AG(dBi)	CL(dB)	SG Reading	Result		
3702.50	57.14	12.69	19.10	-20.80	-27.21	55.41	V
5553.75	43.71	13.15	25.30	-16.80	-28.95	57.15	V

CDMA(Ch 600)

Mesured output power: 27.53dBm = 0.566W, Limit: 43+10log$_{10}$(W)= 40.53dBc

Frequency (MHz)	Receiver Reading(dBuV	Correction Factor(dB)		EIRP(dBm)		dBc	Polarity
		AG(dBi)	CL(dB)	SG Reading	Result		
3760.00	59.98	12.73	19.50	-17.20	-23.97	51.50	V
5640.00	43.98	13.14	25.70	-16.00	-28.56	56.09	V

CDMA(Ch 1175)

Mesured output power: 26.74dBm = 0.472W, Limit: 43+10log$_{10}$(W)= 39.74dBc

Frequency (MHz)	Receiver Reading(dBuV	Correction Factor(dB)		EIRP(dBm)		dBc	Polarity
		AG(dBi)	CL(dB)	SG Reading	Result		
3817.50	59.57	12.73	19.50	-17.50	-24.27	51.01	V
5726.25	44.06	13.11	26.00	-16.10	-28.99	55.73	V

8. Frequency stability

8.1 Test Procedure

The frequency stability of the transmitter is measured by:

a) Temperature: The temperature is varied from -30℃ to +60℃ using an environmental chamber.

b) Primary Supply Voltage: The primary supply voltage is varied from 85% to 115% of the voltage normally at the input to the device or at the power supply terminals if cables are not normally supplied.

※ The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within ±2.5ppm of the center frequency.

8.2 Test Equipments

The following test equipments are used during tests

Equipment	Manufacturer	Model	Cal. Due Date
Communications Test	Agilent	E5515C	2009-02-11
DC Power Supply	INTERACT	AK-3010	2009-03-02
Tem/Hum Chamber	Myung Technology	SM-150-2	2009-03-03

8.3 Test Results

PCS1900

Operting Frequency :	1,880,000,000
Channel :	600
Reference Voltage :	3.20
Deviatin Limit :	0.00025

Voltage (%)	Power (VDC)	Temperature (℃)	Frequency (Hz)	Deviation
100	3.70	+20℃(Ref)	1,880,000,002	0.000000
100		-30	1,879,999,973	0.000002
100		-20	1,879,999,974	0.000001
100		-10	1,879,999,979	0.000001
100		**0**	1,879,999,975	0.000001
100		10	1,879,999,981	0.000001
100		20	1,880,000,002	0.000000
100		25	1,879,999,973	0.000002
100		30	1,879,999,977	0.000001
100		40	1,879,999,982	0.000001
100		50	1,879,999,978	0.000001
100		60	1,879,999,972	0.000002
85	3.15	20	1,879,999,971	0.000002
115	4.26	20	1,879,999,976	0.000001
EndPoint	3.10	20	1,879,999,973	0.000002