

FCC TEST REPORT

for

47 CFR Part 24E

Equipment : GSM Phone with GPRS
Trade Name : NEC Corporation
Model No. : e121
: N343i
FCC ID : HFS-KMP6J1BH1
IC ID : 1787B-KMP6J1BH
Tx Frequency Range : PCS 1900: 1850.2~1909.8MHz
Max. RF Output Power : e121: PCS 1900: 0.40W
: N343i: PCS 1900: 0.48W
Emission Designator : 300 KGXW
Applicant : Quanta Computer Inc.
No. 188, Wen Hwa 2nd Road, Kuei Shan Hsiang,
Tao Yuan Shien, Taiwan

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- The data shown in this test report were carried out on May 27, 2004 at Sporton International Inc. LAB.

Daniel Lee 6/8/2005

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History of this test report

Report Issue Date: Jun. 07, 2005

Original Report Issue Date	Description



1. General Information

1.1. Applicant

Quanta Computer Inc.

No. 188, Wen Hwa 2nd Road, Kuei Shan Hsiang, Tao Yuan Shien, Taiwan

1.2 Manufacturer

Quanta Computer Inc.

No. 188, Wen Hwa 2nd Road, Kuei Shan Hsiang, Tao Yuan Shien, Taiwan

1.3 Basic Description of Equipment under Test

Equipment : GSM Phone with GPRS
Trade Name : NEC Corporation
Model No. : e121
 N343i
FCC ID : HFS-KMP6J1BH1
IC ID : 1787B-KMP6J1BH
Power Supply Type : Switching, DC 3.7V
AC Power Cord : AC 120V, Non-shielded, Wall-mount, 1.8 meter, 2 pin
Headset : MAY-DH0014-A001

Remark:

N343i is the serial model of e121, they have the same antenna, RF solution, main board etc. The difference is out looking, digital chips and SW version.

**1.4 Feature of Equipment under Test**

e121_Product Feature & Specification	
DUT Type :	GSM Phone with GPRS
Trade Name :	NEC Corporation
Model Name :	e121 N343i
FCC ID :	HFS-KMP6J1BH1
IC ID :	1787B-KMP6J1BH
Tx Frequency :	PCS 1900: 1850.2~1910MHz
Rx Frequency :	PCS 1900: 1930~1990MHz
Antenna Type :	Fixed Internal
Maximum Output Power to Antenna :	e121: PCS 1900: 29.55 dBm N343i: PCS 1900: 29.72 dBm
Maximum EIRP :	e121: PCS 1900: 0.40 W (25.980 dBm) N343i: PCS 1900: 0.48 W (26.820 dBm)
IMEI :	350421030000600
HW Version :	e121: C2B N343i: C2B
SW Version :	e121: e121-050428n-08.00SI2.KEN-0.17DTCW N343i: N343i-050428n-08.00SI3.KEN-0.10DDTCW-iDF8
Digital Modulation Emission :	PCS: GMSK
Type of Emission :	300 KGXW
DUT Stage :	Production Unit
Power Rating (DC/AC, Voltage) :	DC 3.7V

1.5 Report Date

EUT Received : May 24, 2005

Report Date : Jun. 07, 2005



2 Test Configuration of Equipment under Test

2.1 Test Manner

- a. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range.
- b. During all testings, EUT is in link mode with base station emulator at maximum power level. (PCL=0 for PCS 1900)
- c. Frequency range investigated: radiated emission 30MHz to 9000 MHz for PCS 1900.

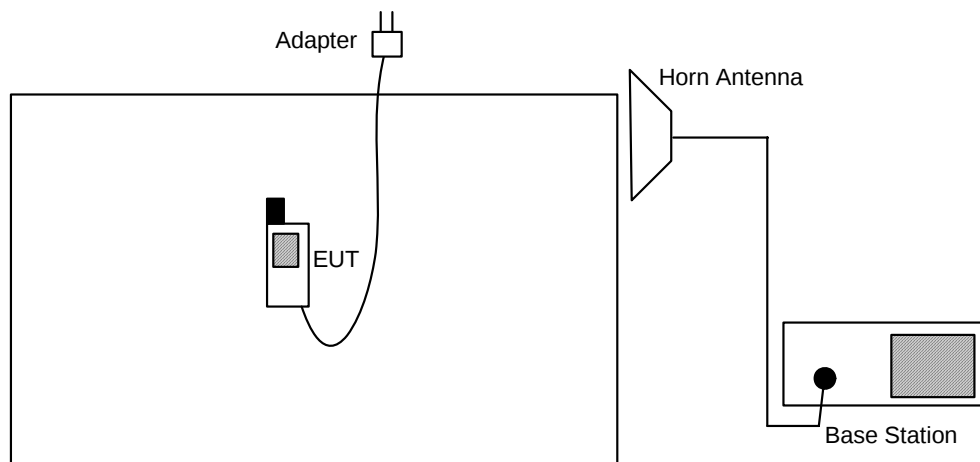
2.2 Test Mode

Application	PCS 1900
Radiated Emission	☒ Mode 1: CH 661
Conducted Measurement	☒ Mode 1: CH 661

Remark:

The testings above are mainly on N343i.

2.3 Connection Diagram of Test System



2.4 Ancillary Equipment List

Item	Asset	Trade Name	Model Name	Power Cord
1.	Base Station	R & S	CMU200	N/A



3. General Information of Test Site

Test Site Location : No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park,
Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.
TEL : 886-3-327-3456
FAX : 886-3-318-0055

Test Site No : 03CH06-HY

The chamber meets the characteristics of ANSI C63.4-2003. This site is on file with the FCC. The Industry Canada file number for this site is IC 4088.

3.1 Test Voltage

120V/ 60Hz

3.2 Test in Compliance with

47 CFR Part 24E and Part 2.

3.3 Frequency Range Investigated

a. Radiation: from 30 MHz to 19000 MHz for PCS 1900.

3.4 Test Distance

The test distance of radiated emission from antenna to EUT is 3 m.



4. Test Data and Test Result

4.1 List of Measurements and Examinations

FCC Rule	IC RULE	DESCRIPTION OF TEST	Result	Section
§2.1046	RSS-133 § 6.2	RF Output Power	Passed	4.2
§24.232	RSS-133 § 6.2	ERP / EIRP	Passed	4.3
§2.1049, § 24.238(b)	RSS-133 § 6.3	Occupied Bandwidth & Band Edge Measurement	Passed	4.4
§2.1051	RSS-133 § 6.3	Conducted Emission	Passed	4.5
§2.1053	RSS-133 § 6.3	Field Strength of Spurious Radiation	Passed	4.6
§2.1055, §24.235	RSS-133 § 7	Frequency Stability vs. Temperature	Passed	4.7
§2.1055, §24.235	RSS-133 § 7	Frequency Stability vs. Voltage	Passed	4.8

4.2 RF Output Power

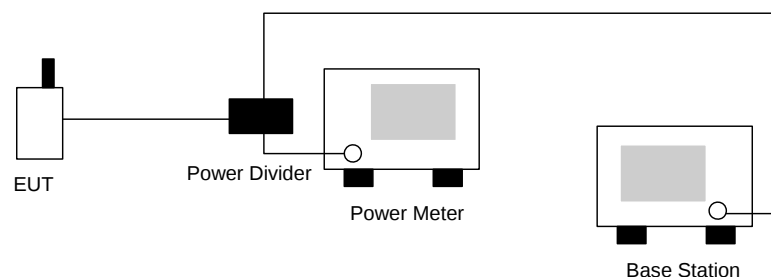
4.2.1 Measurement Instruments :

As described in chapter 5 of this test report.

4.2.2 Test Procedure :

1. The transmitter output was connected to power meter and base station through power divider.
2. Set EUT at PCL=0 for PCS 1900 through base station.
3. Select lowest, middle, and highest channels for each band.

4.2.3 Test Setup Layout :



4.2.4 Test Result :

Model	Bands	Channel	Frequency (MHz)	Conducted Power (dBm)	Conducted Power (Watts)
e121	PCS 1900	512	1850.2 (Low)	29.55	0.902
		661	1880.0 (Mid)	29.20	0.832
		810	1909.8 (High)	29.45	0.881
N343i	PCS 1900	512	1850.2 (Low)	29.72	0.938
		661	1880.0 (Mid)	29.36	0.863
		810	1909.8 (High)	28.35	0.684

4.3 ERP / EIRP Measurement

Equivalent isotropic radiated power measurements by substitution method according to ANSI/TIA/EIA-603-A.

4.3.1 Measurement Instruments

As described in chapter 5 of this test report.

4.3.2 Test Procedure

1. The EUT was placed on a rotatable table with 1.5 meter height.
2. The EUT was set 3 meters from the receiving antenna which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiated power.
4. The height of the receiving antenna is also kept at 1.5m height.
5. Taking the record of maximum ERP/EIRP.
6. A Horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. The conducted power at the terminal of the Horn antenna is measured.
8. Repeat step 3 to step 5 to get the maximum ERP/EIRP of the substitution antenna.
9. $ERP/EIRP = P_s + E_t - E_s + G_s = P_s + R_t - R_s + G_s$

P_s (dBm): Input power to substitution antenna.

G_s (dBi or dBd): Substitution antenna Gain.

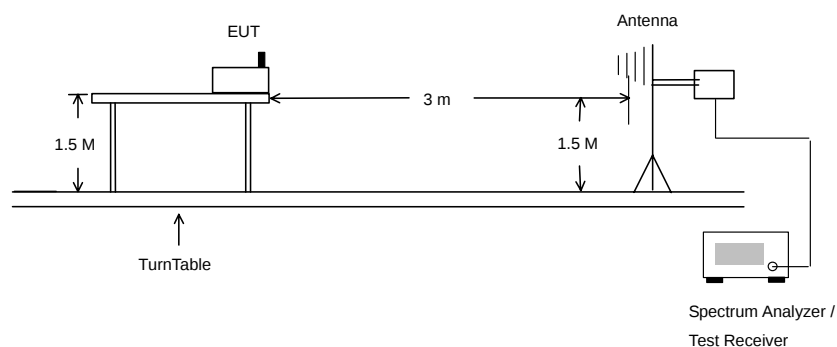
$E_t = R_t + AF$

$E_s + R_s + AF$

AF (dB/m): Receive antenna factor

10. R_t : the highest received signal in Spectrum Analyzer for EUT.

4.3.3 Test Setup Layout of ERP/EIRP



4.3.4 Test Result

e121_PCS1900 Radiated Power EIRP					
H Polarization			V Polarization		
Frequency (MHz)	EIRP (dBm)	EIRP (Watts)	Frequency (MHz)	EIRP (dBm)	EIRP (Watts)
1850.170	21.350	0.14	1850.140	25.980	0.40
1880.040	20.110	0.10	1879.940	21.440	0.14
1909.690	18.150	0.07	1909.840	18.960	0.08

N343i_PCS1900 Radiated Power EIRP					
H Polarization			V Polarization		
Frequency (MHz)	EIRP (dBm)	EIRP (Watts)	Frequency (MHz)	EIRP (dBm)	EIRP (Watts)
1850.140	21.040	0.13	1850.270	26.820	0.48
1880.040	19.430	0.09	1879.940	25.080	0.32
1909.890	17.240	0.05	1909.720	22.760	0.19

4.4 Occupied Bandwidth and Band Edge Measurement

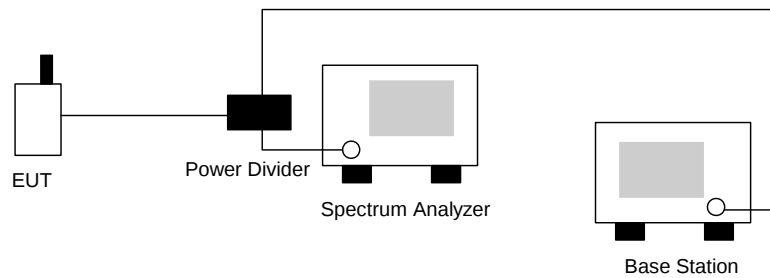
4.4.1 Measurement Instruments

As described in chapter 5 of this test report.

4.4.2 Test Procedure

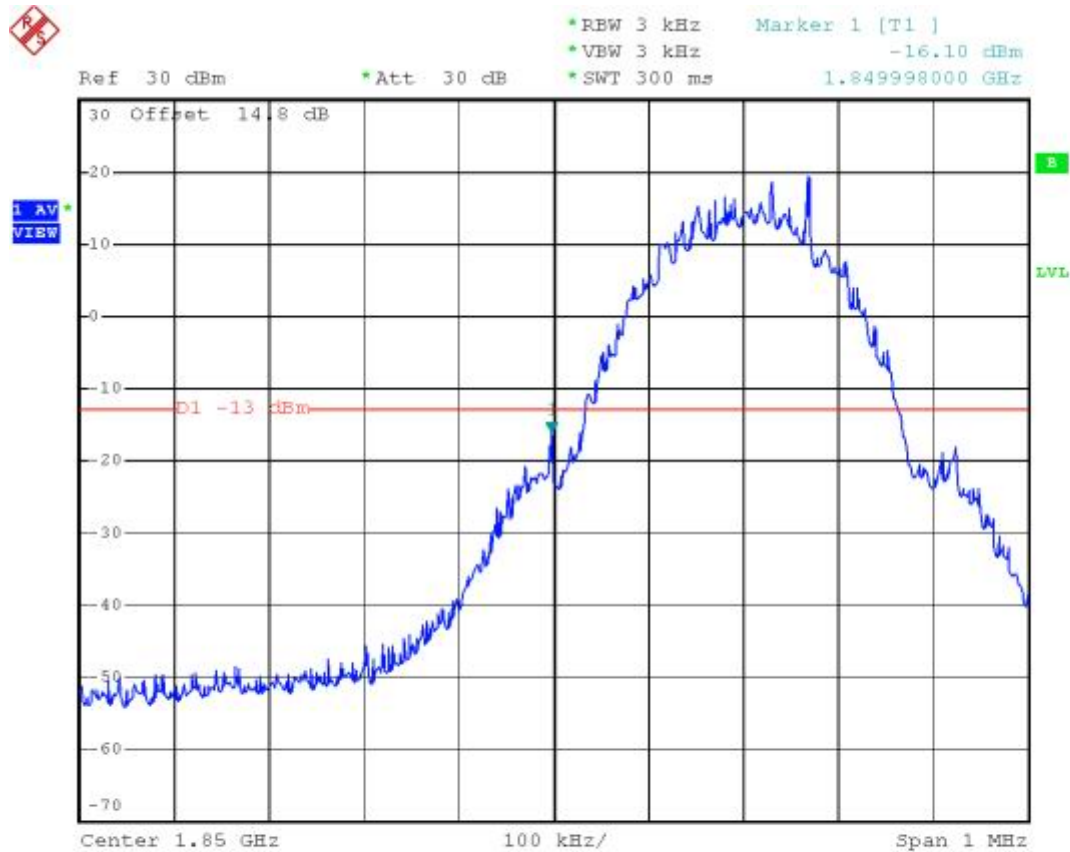
1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The occupied bandwidth of middle channel for the highest and lowest RF powers were measured.
3. The bandedge of low and high channels for the highest RF powers within the transmitting frequency band were measured. Setting RBW as roughly $BW/10$.

4.4.3 Test Setup Layout



4.4.4 Test Result

- Test Mode : PCS 1900 CH512 Lower Band Edge
- Power State : High



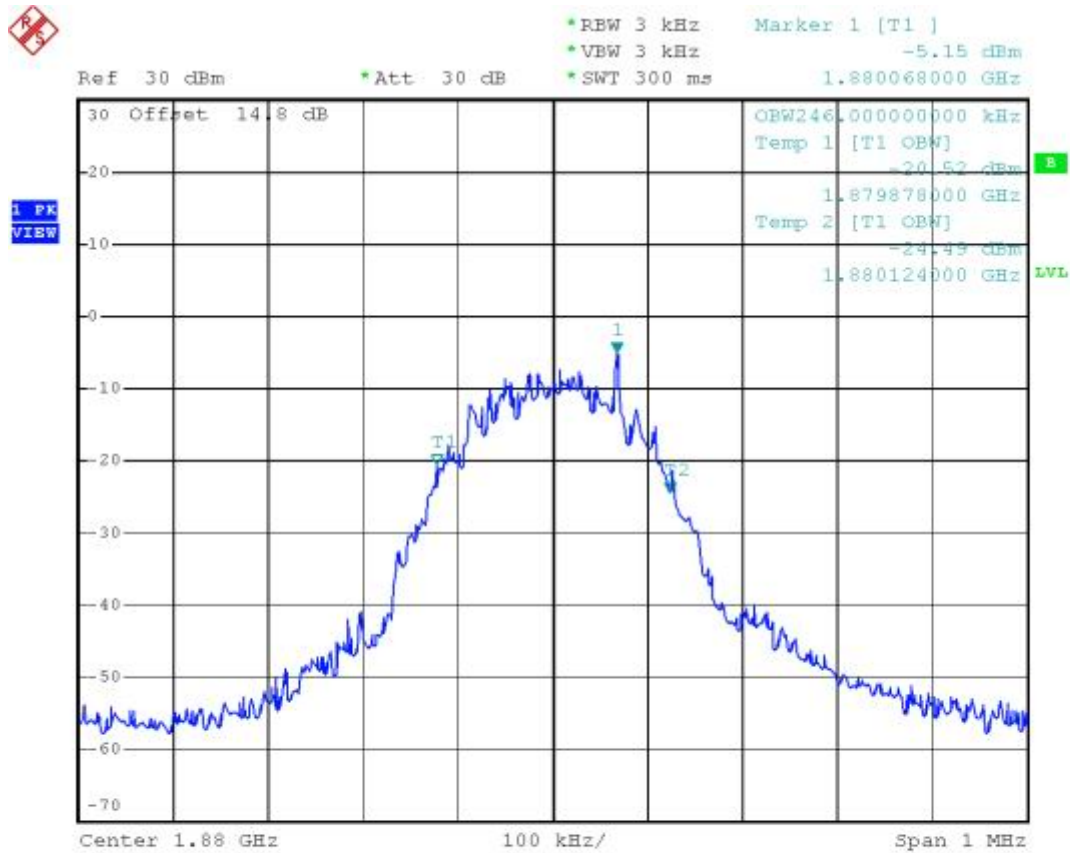
Date: 27.MAY.2005 01:21:49



FCC TEST REPORT

Report No. : FG552401

- Test Mode : PCS 1900 CH661 99% Occupied Bandwidth
- Power State : Low



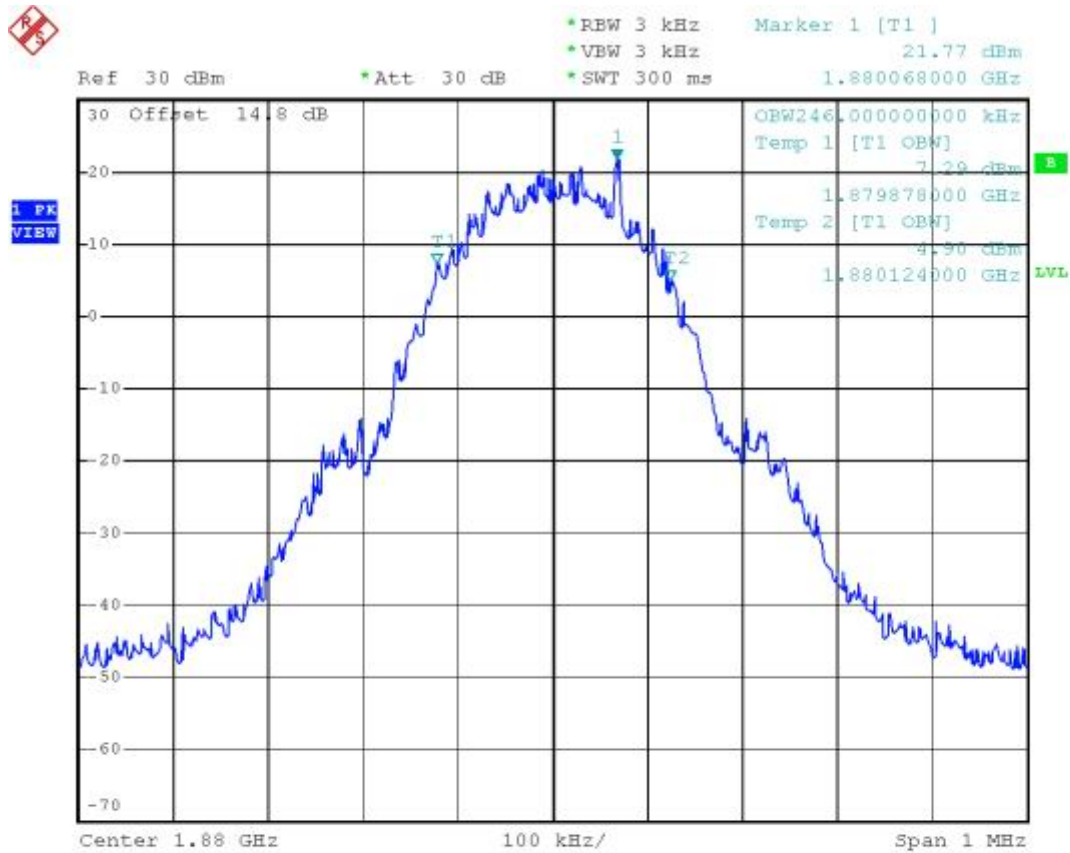
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FCC TEST REPORT

Report No. : FG552401

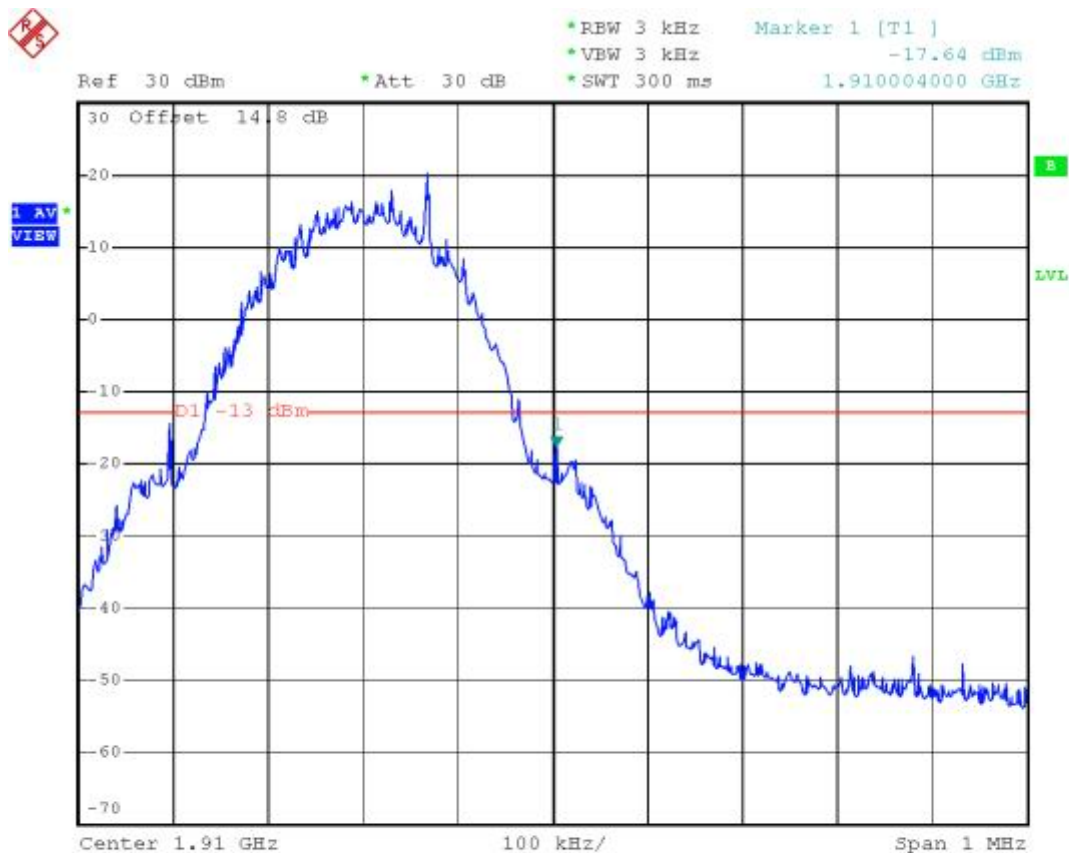
- Test Mode : PCS 1900 CH661 99% Occupied Bandwidth
- Power State : High



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- Test Mode : PCS 1900 CH810 Higher Band Edge
- Power State : High



Date: 27.MAY.2005 01:24:50

4.5 Conducted Emission

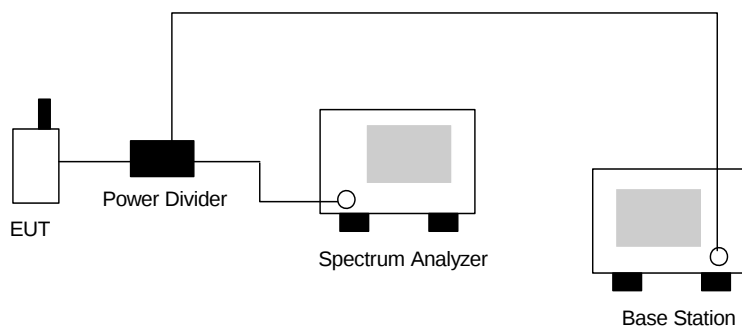
4.5.1 Measurement Instruments

As described in chapter 5 of this test report.

4.5.2 Test Procedure

1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The middle channel for the highest RF power within the transmitting frequency was measured.
3. The conducted spurious emission for the whole frequency range was taken.

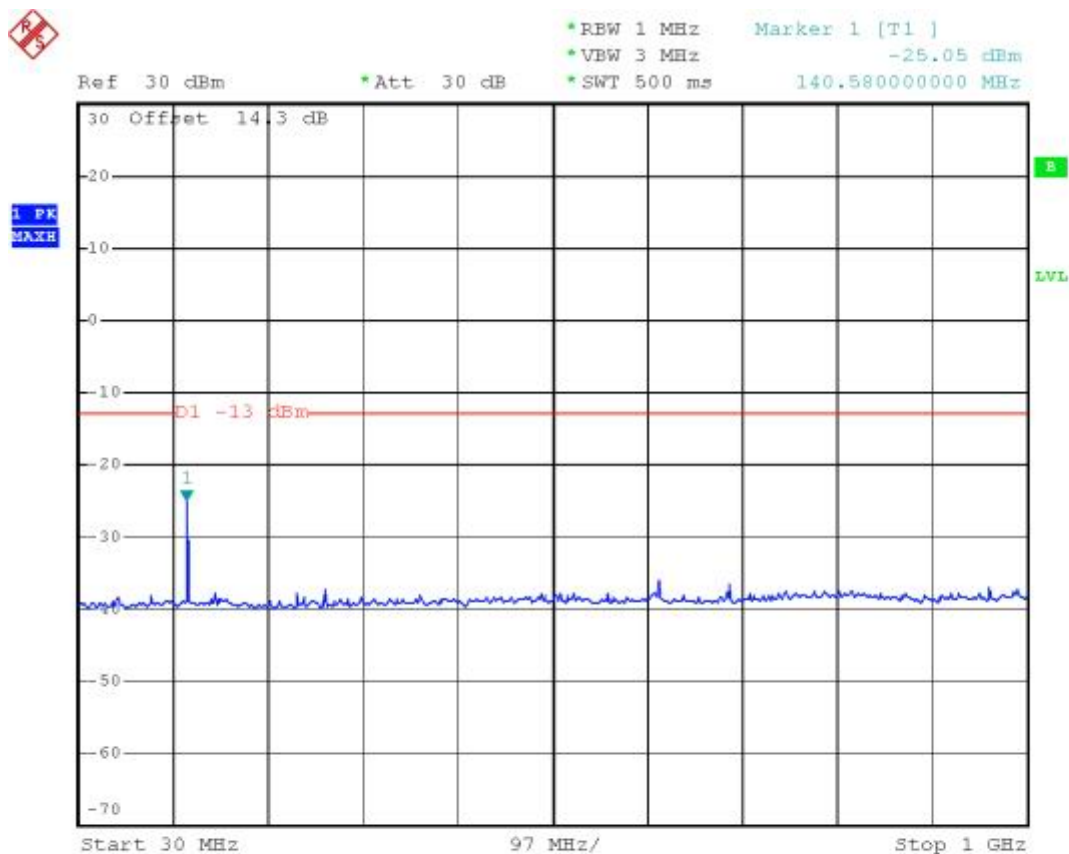
4.5.3 Test Setup Layout





4.5.4 Test Result

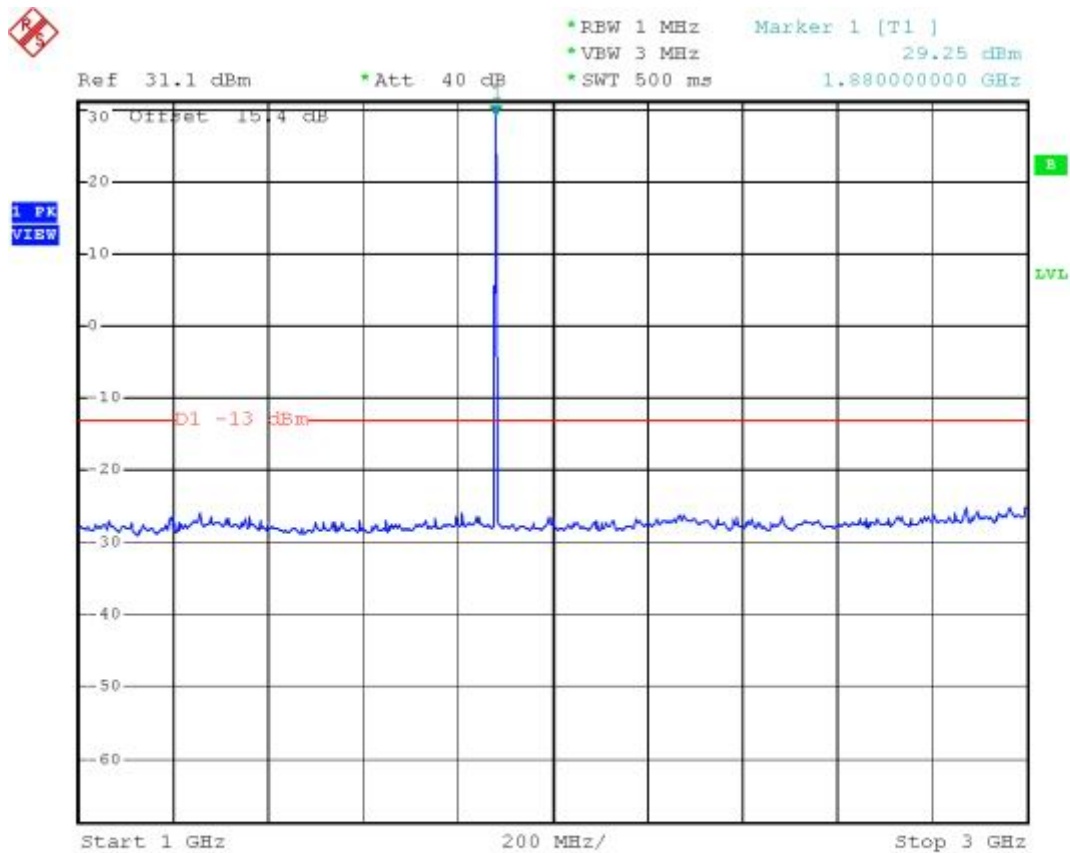
- Test Mode : PCS 1900 CH661
- Frequency Range : 0.3G-1G



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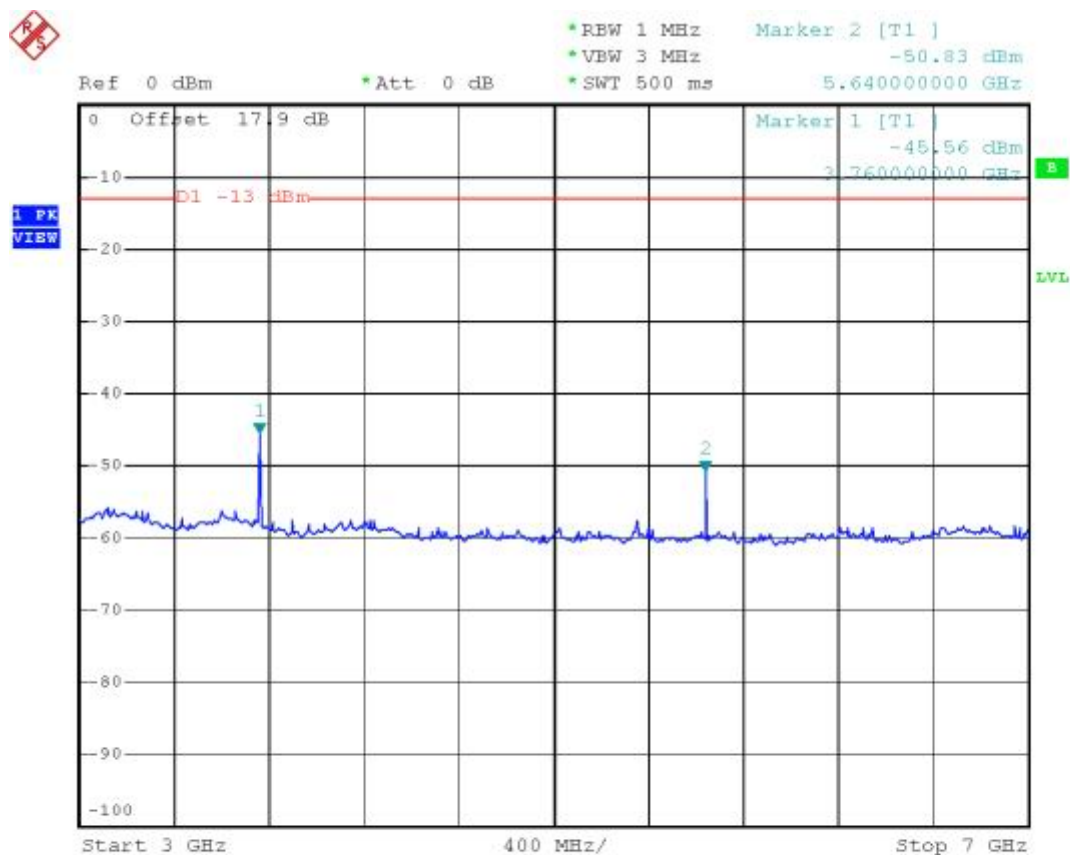


- Test Mode : PCS 1900 CH661
- Frequency Range : 1G-3G



Date: 27.MAY.2005 01:33:14

- Test Mode : PCS 1900 CH661
- Frequency Range : 3G-7G



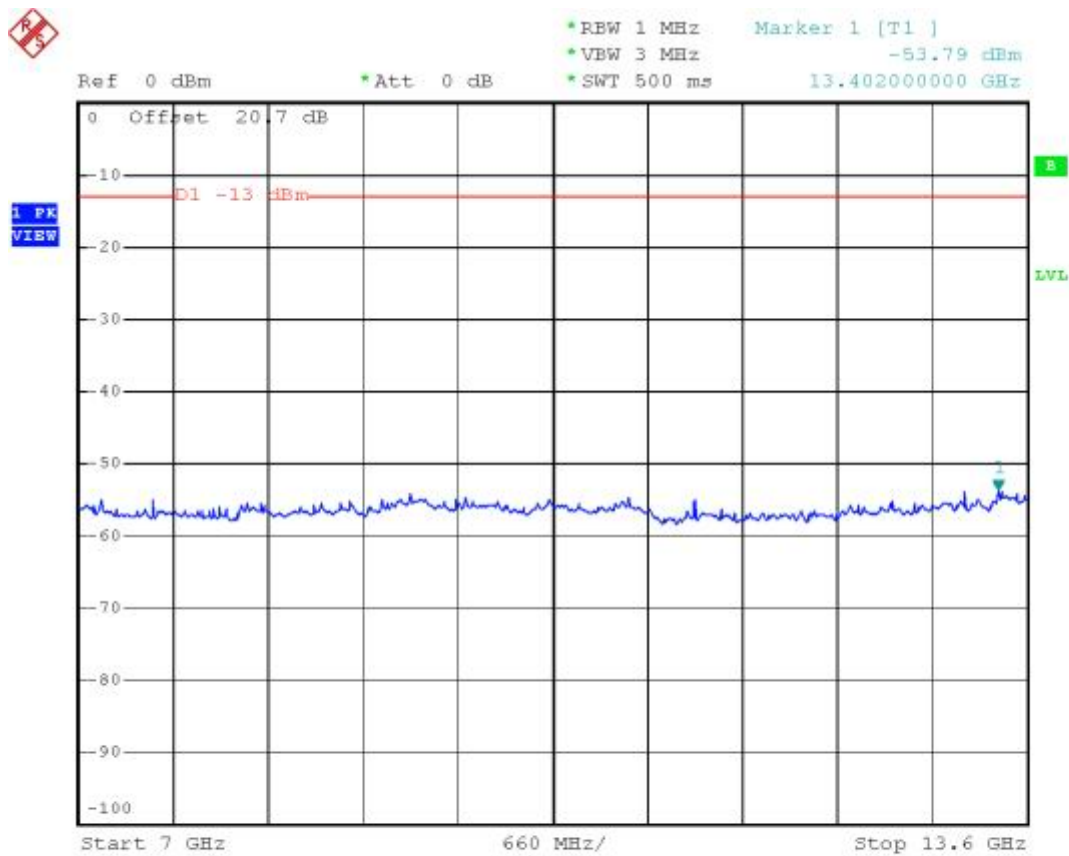
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FCC TEST REPORT

Report No. : FG552401

- Test Mode : PCS 1900 CH661
- Frequency Range : 7G-13.6G



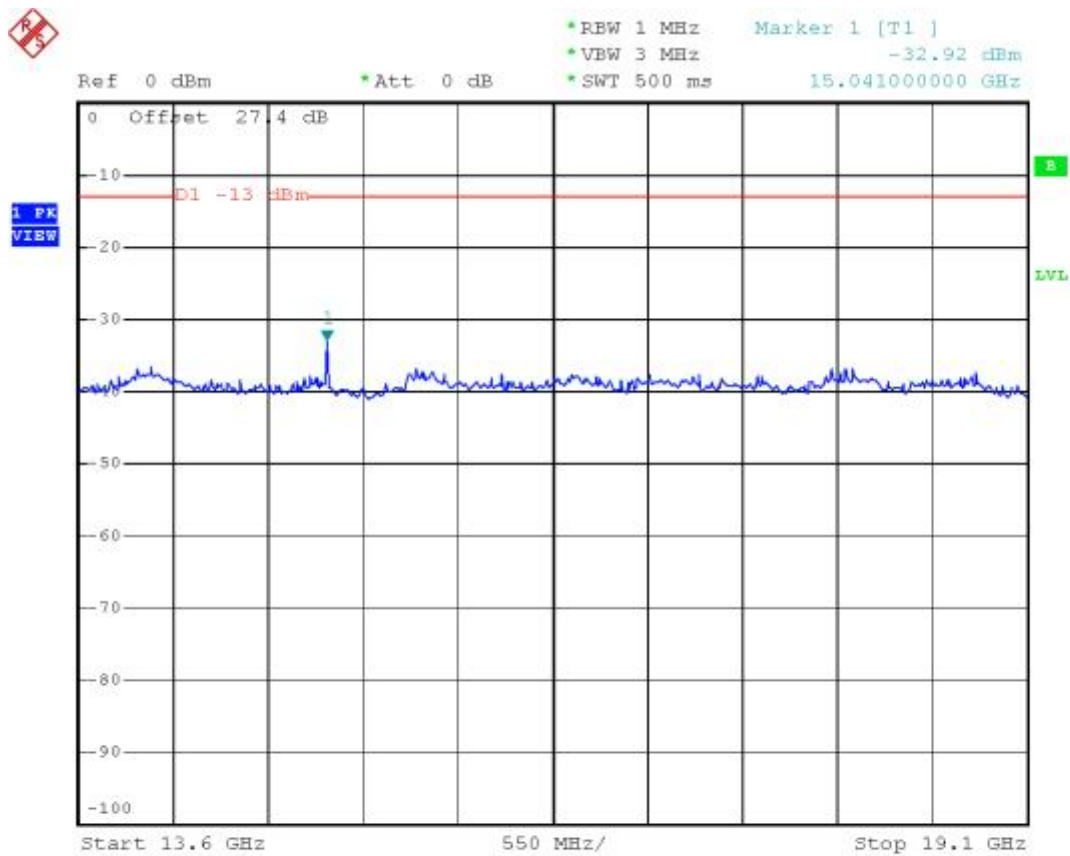
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FCC TEST REPORT

Report No. : FG552401

- Test Mode : PCS 1900 CH661
- Frequency Range : 13.6G-19.1G



Date: 27.MAY.2005 01:39:37



4.6 Field Strength of Spurious Radiation

Equivalent isotropic radiated Power Measurements by substitution method according to ANSI/TIA/EIA-603-A.

4.6.1 Measurement Instruments

As described in chapter 5 of this test report.

4.6.2 Test Procedure

1. The EUT was placed on a rotatable wooden table with 0.8 meter about ground.
2. The EUT was set 3 meters from the receiving antenna which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to reach the maximum spurious emission for both horizontal and vertical polarizations.
5. Taking the record of maximum spurious emission.
6. A Horn antenna was substituted in place of the EUT and was driven by a signal generator.
7. Tune the output power of signal generator to the same emission level with EUT maximum spurious emission.
8. Taking the record of output power at antenna port.
9. Repeat step 7 to step 8 for another polarization.
10. Emission level (dBm) = output power + substitution Gain.

4.6.3 Test Setup Layout

As the setup in section 4.3.3.

4.6.4 Test Result

- Test Mode : Mode 1

PCS1900 Radiated Spurious EIRP							
H Polarization				V Polarization			
Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Margin (dB)
31.080	-70.110	-13	-57.11	71.580	-70.260	-13	-57.26
983.900	-72.830	-13	-59.83	962.900	-71.110	-13	-58.11
1134.000	-51.830	-13	-38.83	3758.000	-43.210	-13	-30.21
3758.000	-43.330	-13	-30.33	5638.000	-46.110	-13	-33.11
5638.000	-43.970	-13	-30.97				
7518.000	-40.260	-13	-27.26				



4.6.5 Test Data

4.6.5.1 Mode 1

Horizontal Polarization

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBm	dB	dBm	dBm	dB	dB	dB	cm	deg	
1 @	31.08	-70.11	-57.11	-13.00	-69.86	-0.25	0.00	0.00	---	---	Peak

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBm	dB	dBm	dBm	dB	dB	dB	cm	deg	
1 @	983.90	-72.83	-59.83	-13.00	-72.91	0.08	0.00	0.00	---	---	Peak

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBm	dB	dBm	dBm	dB	dB	dB	cm	deg	
1 @	1134.00	-51.83	-38.83	-13.00	-53.41	1.58	0.00	0.00	---	---	Peak
2 @	1878.00	-44.86			-44.35	-0.51	0.00	0.00	---	---	Peak
3 @	1958.00	-36.20			-35.09	-1.11	0.00	0.00	---	---	Peak

Remark: #2 MS TCH Signal

#3 BS TCH Signal

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBm	dB	dBm	dBm	dB	dB	dB	cm	deg	
1 @	3758.00	-43.33	-30.33	-13.00	-51.26	7.92	0.00	0.00	---	---	Peak

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBm	dB	dBm	dBm	dB	dB	dB	cm	deg	
1 @	5638.00	-43.97	-30.97	-13.00	-53.94	9.97	0.00	0.00	---	---	Peak

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBm	dB	dBm	dBm	dB	dB	dB	cm	deg	
1 @	7518.00	-40.26	-27.26	-13.00	-56.06	15.80	0.00	0.00	---	---	Peak



Vertical Polarization

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBm	dB	dBm	dBm	dB	dB	dB	cm	deg	
1 @	71.58	-70.26	-57.26	-13.00	-58.51	-11.74	0.00	0.00	---	---	Peak

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBm	dB	dBm	dBm	dB	dB	dB	cm	deg	
1 @	962.90	-71.11	-58.11	-13.00	-73.47	2.37	0.00	0.00	---	---	Peak

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBm	dB	dBm	dBm	dB	dB	dB	cm	deg	
1 @	1878.00	-42.81			-42.40	-0.40	0.00	0.00	---	---	Peak
2 @	1958.00	-29.86			-29.27	-0.60	0.00	0.00	---	---	Peak

Remark: #1 MS TCH Signal

#2 BS TCH Signal

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBm	dB	dBm	dBm	dB	dB	dB	cm	deg	
1 @	3758.00	-43.21	-30.21	-13.00	-49.85	6.64	0.00	0.00	---	---	Peak

	Freq	Level	Over Limit	Limit Line	ReadAntenna Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBm	dB	dBm	dBm	dB	dB	dB	cm	deg	
1 @	5638.00	-46.11	-33.11	-13.00	-54.76	8.65	0.00	0.00	---	---	Peak

4.7 Frequency Stability (Temperature Variation)

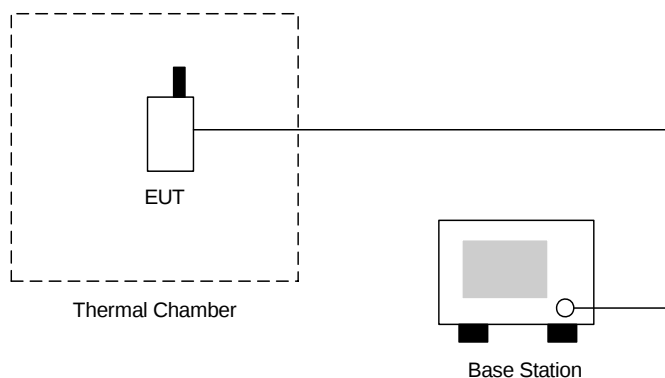
4.7.1 Measurement Instrument

As described in chapter 5 of this test report.

4.7.2 Test Procedure

1. The EUT and test equipment were set up as shown on the following section.
2. With all power removed, the temperature was decreased to -30°C and permitted to stabilize for three hours. Power was applied and the maximum change in frequency was noted within one minute.
3. With power OFF, the temperature was raised in 10°C steps. The sample was permitted to stabilize at each step for at least one-half hour. Power was applied and the maximum frequency change was noted within one minute.
4. The temperature tests were performed for the worst case.
5. Test data was recorded.

4.7.3 Test Setup Layout



4.7.4 Test Result

- Test Mode : PCS 1900 CH661

Temperature(°C)	Change (Hz)	Change (ppm)	Limit (ppm)	Result
-30	52	0.03	2.5	Passed
-20	50	0.03		
-10	47	0.02		
0	-59	-0.03		
10	-74	-0.04		
20	-31	-0.02		
30	-89	-0.05		
40	-127	-0.07		
50	-70	-0.04		

4.8 Frequency Stability (Voltage Variation)

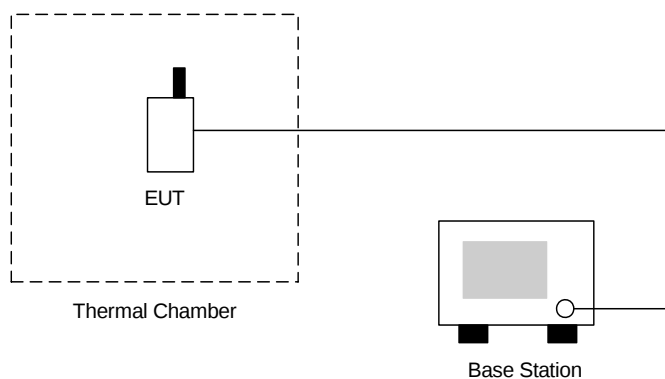
4.8.1 Measurement Instrument

As described in chapter 5 of this test report.

4.8.2 Test Procedure

1. The EUT was placed in a temperature chamber at $25 \pm 5^{\circ}\text{C}$ and connected as the following section.
2. The power supply voltage to the EUT was varied from BEP to 115% of the nominal value measured at the input to the EUT.
3. The variation in frequency was measured for the worst case.

4.8.3 Test Setup Layout



4.8.4 Test Result

- Test Mode : PCS 1900 CH661

Voltage(Volt)	Change (Hz)	Change (ppm)	Limit (ppm)	Result
3.7	-31	-0.02	2.5	Passed
BEP	-44	-0.02		
4.3	-68	-0.04		

Remark:

1. Normal Voltage=3.7V
2. Battery End Point (BEP)=3.1 V

5 List of Measurement Equipments

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
Antenna Mast	INN-CO	MM3000	114/8000604/L	1m~4m	NCR	N/A	Radiation (03CH06-HY)
Bilog Antenna	Schaffner	CBL6112B	2885	30MHz~2GHz	Nov. 21, 2004	Nov. 20, 2005	Radiation (03CH06-HY)
Controller	INN-CO	CO2000	114/8000604/L	N/A	NCR	N/A	Radiation (03CH06-HY)
Digital Radio Communication Tester	R&S	CMD55	832796/0061	RF Link	Feb. 18, 2004	Feb. 17, 2006	Radiation (03CH06-HY)
Double Ridge Horn Antenna	Com-Power	AH118	071025	1G~18G	Feb. 01, 2005	Jan. 31, 2006	Radiation (03CH06-HY)
EMI Test Receiver	R&S	ESCS30	100356	9KHz~2.75GHz	Jul. 09, 2004	Jul. 08, 2005	Radiation (03CH06-HY)
PreAmplifier	Agilent	8449B	3008A01917	1~26.5GHz	Mar. 29, 2005	Mar. 28, 2006	Radiation (03CH06-HY)
PreAmplifier	Com-Power	PA-103	161055	1MHz~1000MHz	Mar. 29, 2005	Mar. 28, 2006	Radiation (03CH06-HY)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	9170-249	14G~40G	Jul. 21, 2004	Jul. 20, 2005	Radiation (03CH06-HY)
Spectrum Analyzer	Agilent	E4408B	MY44211030	9KHz~26.5GHz	Jul. 27, 2004	Jul. 26, 2005	Radiation (03CH06-HY)
Turn Table	INN-CO	DS2000	420/650/00	0~360 Degree	NCR	N/A	Radiation (03CH06-HY)

6 Uncertainty Evaluation

Uncertainty of Radiated Emission Measurement (30MHz ~ 1000MHz)

Contribution			$u(x_i)$
	dB	Probability	
Receiver reading	0.41	Normal(k=2)	0.21
Antenna factor calibration	0.83	Normal(k=2)	0.42
Cable loss calibration	0.25	Normal(k=2)	0.13
Pre Amplifier Gain calibration	0.27	Normal(k=2)	0.14
RCV/SPA specification	2.50	Rectangular	0.72
Antenna Factor Interpolation for Frequency	1.00	Rectangular	0.29
Site imperfection	1.43	Rectangular	0.83
Mismatch	+0.39/-0.41	U-shaped	0.28
combined standard uncertainty Uc(y)	1.27		
Measuring uncertainty for a level of confidence	2.54		

Uncertainty of Radiated Emission Measurement (1GHz ~ 40GHz)

Contribution	Uncertainty of x_i		$u(x_i)$	C_i	$C_i * u(x_i)$
	dB	Probability Distribution			
Receiver reading	±0.10	Normal(k=1)	0.10	1	0.10
Antenna factor calibration	±1.70	Normal(k=2)	0.85	1	0.85
Cable loss calibration	±0.50	Normal(k=2)	0.25	1	0.25
Receiver Correction	±2.00	Rectangular	1.15	1	1.15
Antenna Factor Directional	±1.50	Rectangular	0.87	1	0.87
Site imperfection	±2.80	Triangular	1.14	1	1.14
Mismatch Receiver VSWR $\Gamma_1 = 0.197$ Antenna VSWR $\Gamma_2 = 0.194$ Uncertainty = $20 \log(1 - \Gamma_1 * \Gamma_2 * \Gamma_3)$	+0.34/-0.35	U-shaped	0.244	1	0.244
Combined standard uncertainty Uc(y)	2.36				
Measuring uncertainty for a level of confidence of 95% U=2Ue(y)	4.72				

END OF TEST REPORT