TECHNICAL REPORT

Report No: IC 1906212-01
File reference No: 2019-06-27

Applicant: Pointer Telocation

Product: MiniTrack 2G

Model No: CM900100-000

Marketing name: MiniTrack 2G

Test Standards: FCC 47 CFR Part 2, 22(H), 24(E)
RSS-132 Issue 3, January 2013
RSS-133 Issue 6, January 2013
RSS-Gen Issue 5, April 2018

Test result: In the configuration tested, the EUT complied with the standards specified above.

Approved By
Jack Chung
Manager

Dated: June 27, 2019

Results appearing herein relate only to the sample tested
The technical reports is issued errors and omissions exempt and is subject to withdrawal at

SHENZHEN TIMEWAY TESTING LABORATORIES

Zone C, 1st Floor, Block B, Jun Xiang Da Building, Zhongshan Park Road West, Tong Le Village, Nanshan District, Shenzhen, China

Tel (755) 83448688, Fax (755) 83442996, E-Mail:info@timeway-lab.com

Special Statement:

The testing quality ability of our laboratory meet with “Quality Law of People’s Republic of China” Clause 19.

The testing quality system of our laboratory meet with ISO/IEC-17025 requirements, which is approved by CNAL. This approval result is accepted by MRA of APLAC.

Our test facility is recognized, certified, or accredited by the following organizations:

CNAL-LAB Code: L2292

The EMC Laboratory has been assessed and in compliance with CNAL/AC01:2002 accreditation criteria for testing Laboratories (identical to ISO/IEC 17025:1999 General Requirements) for the Competence of testing Laboratories.

FCC-Registration No.: 744189

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 744189.

Industry Canada (IC) —Registration No.:5205A-2

The EMC Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 5205A-2.

Test Report Conclusion

Content

1.0 General Details

1.1 Test Lab Details

Name : SHENZHEN TIMEWAY TESTING LABORATORIES.
Address: Zone C, 1st Floor, Block B, Jun Xiang Da Building, Zhongshan Park Road West, Tong Le Village, Nanshan District, Shenzhen, China
Telephone: (755) 83448688
Fax: (755) 83442996

Site on File with the Federal Communications Commission – United Sates

Registration Number: 744189

For 3m Chamber

Site Listed with Industry Canada of Ottawa, Canada

Registration Number: IC: 5205A-02

For 3m Chamber

1.2 Applicant Details

Applicant: Pointer Telocation
Address: FCC:14 Hamelacha, Rohash Haain, 11473, Israel
IC: 14 Hamelacha St. Rosh Ha'ayin, 11473, Israel
Telephone: --
Fax: --

1.3 Description of EUT

Product:	MiniTrack 2G
Manufacturer:	Asiatelco Technologies Co
Address:	#289 Bisheng Road, Building-8, 3F, Zhangjiang Hi-Tech Park, Pudong, Shanghai 201204, China
Marketing name:	MiniTrack 2G
Model Number:	CM900100-000
Hardware Version:	P2
Software Version:	MM12_V1.0.9
Tx Frequency	GSM850 : 824.2 MHz ~ 848.8 MHz PCS1900 : 1850.2 MHz ~ 1909.8 MHz
Rx Frequency	GSM850 : 869.2 MHz ~ 893.8 MHz PCS1900 : 1930.2 MHz ~ 1989.8 MHz
Support Networks:	GPRS
Antenna Type	Integral Antenna
Antenna Peak Gain	GSM850 Band : -5.67dBi PCS1900 Band : -2.56Bi
Type of Modulation	GMSK
IC:	9975A-MINI2G
FCC ID:	2AG69MINI2G
Input Voltage:	DC12V

1.4 Submitted Sample: 2 Samples

1.5 Test Duration
2019-03-01 to 2019-03-14

1.6 Test Uncertainty

Conducted Emissions Uncertainty =3.6dB
Radiated Emissions below 1GHz Uncertainty =4.7dB
Radiated Emissions above 1GHz Uncertainty =6.0dB
Conducted Power Uncertainty =6.0dB
Occupied Channel Bandwidth Uncertainty =5%
Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.

1.7 Test Engineer

The sample tested by _____

Print Name: Terry Tang

1.8 Operation Frequency List:

GSM 850		PCS1900	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
128	824.20	512	1850.20
129	824.40	513	1850.40
⋮	⋮	⋮	⋮
189	836.40	660	1879.80
190	836.60	661	1880.00
191	836.80	662	1880.20
⋮	⋮	⋮	⋮
250	848.60	809	1909.60
251	848.80	810	1909.80

Regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Final test channel:

GSM 850		PCS1900	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
128	824.20	512	1850.20
190	836.60	661	1880.00
251	848.80	810	1909.80

Summary of test result

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	§2.1046	Conducted Output Power	N/A	PASS	-
3.2	§22.913(a)(2)	Effective Radiated Power	< 7 Watts	PASS	-
3.2	§24.232(c)	Equivalent Isotropic Radiated Power	< 2 Watts	PASS	-
3.3	§2.1049 §22.917(a) §24.238(a)	Occupied Bandwidth	N/A	PASS	-
3.4	§2.1051 §22.917(a) §24.238(a)	Band Edge Measurement	< 43+10log10(P[Watts])	PASS	-
3.5	§2.1051 §22.917(a) §24.238(a)	Conducted Emission	< 43+10log10(P[Watts])	PASS	-
3.6	§2.1053 §22.917(a) §24.238(a)	Field Strength of Spurious Radiation	< 43+10log10(P[Watts])	PASS	-
3.7	§2.1055 §22.355 §24.235	Frequency Stability for Temperature & Voltage	< 2.5 ppm	PASS	-
3.8	§24.232(d)	Peak-to-Average Ratio	< 13 dB	PASS	-

Test Item	Section in RSS	Result
RF Exposure (SAR)	RSS-102	Pass* (Please refer to MPE Report)
Frequency Plan	RSS-132 Clause 5.1 RSS-133 Clause 6.1	Pass
Types of Modulation	RSS-132 Clause 5.2 RSS-133 Clause 6.2	Pass
Occupied Bandwidth	RSS-Gen Clause 6.6	Pass
Frequency Stability	RSS-132 Clause 5.3 RSS-133 Clause 6.3	Pass
Transmitter Output Power and Equivalent Isotropically Radiated Power	RSS-132 Clause 5.4 RSS-133 Clause 6.4	Pass
Peak-to-Average Power Ratio	RSS-132 Clause 5.4 RSS-133 Clause 6.4	Pass
Transmitter Unwanted Emissions	RSS-132 Clause 5.5 RSS-133 Clause 6.5	Pass
Field strength of spurious radiation measurement	RSS-Gen Clause 6.13	Pass

Pass: The EUT complies with the essential requirements in the standard.

2 Test Configuration of Equipment Under Test

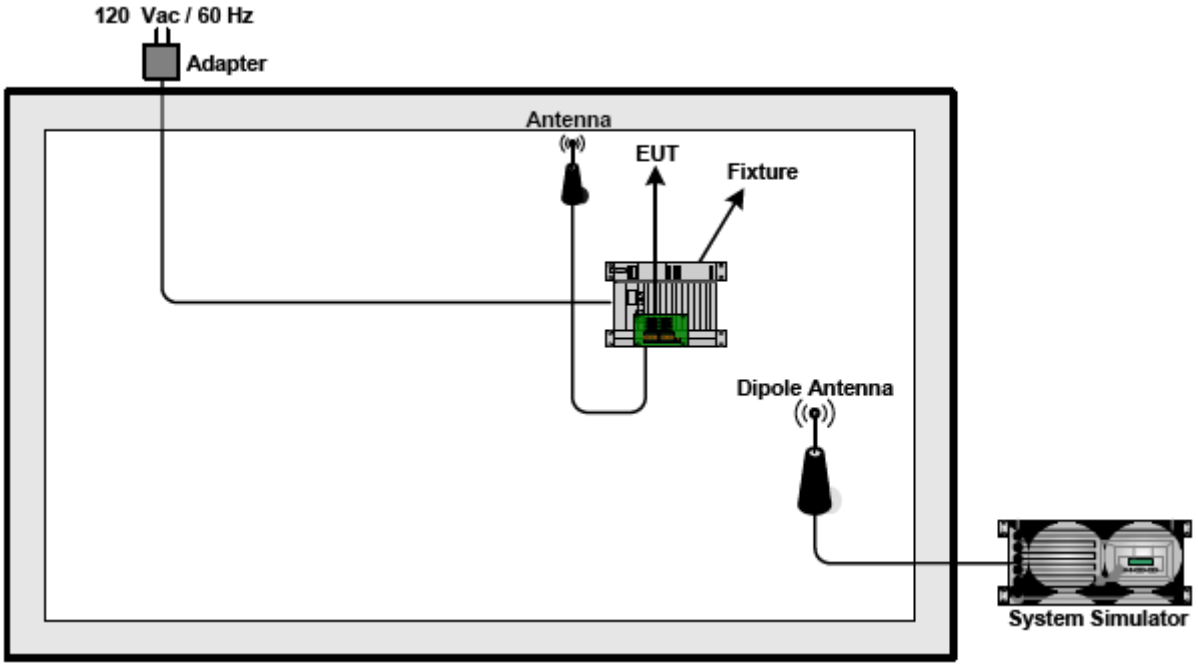
2.1 Test Mode

During all testing, EUT is in link mode with base station emulator at maximum power level. The spurious emission measurements were carried out in semi-anechoic chamber with 3-meter test range. Frequency range investigated for radiated emission is as follows:

1. 30 MHz to 9000 MHz for GSM850
2. 30 MHz to 19000 MHz for PCS1900

Test Modes		
Band	**Radiated TCs**	**Conducted TCs**
GSM 850	■ GPRS 1 Link	■ GPRS 1 Link
PCS 1900	■ GPRS 1 Link	■ GPRS 1 Link

2.2 Connection Diagram of Test System



2.3 Frequency Plan

Frequency Plan for band 824MHz ~ 849MHz				
Frequency Plan (MHz)	**824-835**	**835-845**	**845-846.5**	**846.5-849**
Product Supported plan (Yes or No)	Y	Y	Y	Y

Frequency Plan for band 1850MHz ~ 1915MHz			
Block	**Total Spectrum**	**Lower Sub-band**	**Product Supported plan (Yes or No)**
Block A	30 MHz	1850-1865 MHz	Y
Block D*	10 MHz	1865-1870 MHz	Y
Block B1	10 MHz	1870-1875 MHz	Y
Block B2*	10 MHz	1875-1880 MHz	Y
Block B3*	10 MHz	1880-1885 MHz	Y
Block E*	10 MHz	1885-1890 MHz	Y
Block F	10 MHz	1890-1895 MHz	Y
Block C1*	10 MHz	1895-1900 MHz	Y
Block C2*	10 MHz	1900-1905 MHz	Y

Block C3*	10 MHz	1905-1910 MHz	Y
Block G	10 MHz	1910-1915 MHz	N
Note: * The usage of these blocks in certain geographic areas is under policies listed in SRSP-510 sections 3.1.3, 3.1.4, 3.1.5 and 3.1.15.			

3 Test Result

3.1 Conducted Output Power Measurement

3.1.1 Description of the Conducted Output Power Measurement

A base station simulator was used to establish communication with the EUT. Its parameters were set to transmit the maximum power on the EUT. The measured power in the radio frequency on the transmitter output terminals shall be reported.

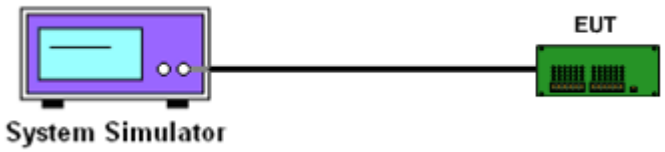
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedures

1. The transmitter output port was connected to base station.
2. Set EUT at maximum power through base station.
3. Select lowest, middle, and highest channels for each band and different modulation.

3.1.4 Test Setup



3.1.5 Test Result of Conducted Output Power

Conducted Power (dBm)						
Band	GSM850			PCS1900		
Channel	128	190	251	512	661	810
Frequency	824.20	836.60	848.80	1850.20	1880.00	1909.80
GPRS (GMSK, 1 TX slot)	33.19	33.20	33.11	29.46	29.16	28.86
GPRS (GMSK, 2 TX slot)	31.43	31.50	31.44	28.10	27.98	27.82
GPRS (GMSK, 3 TX slot)	28.84	28.93	28.87	25.75	25.65	25.59
GPRS (GMSK, 4 TX slot)	28.40	28.44	28.40	24.95	24.93	25.01

3.2 Effective Radiated Power and Effective Isotropic Radiated Power Measurement

3.2.1 Description of the ERP/EIRP Measurement

The substitution method, in ANSI / TIA / EIA-603-C-2004, was used for ERP/EIRP measurement, and the spectrum analyzer configuration follows KDB 971168 D01 Power Meas. License Digital Systems v02r01. The ERP of mobile transmitters must not exceed 7 Watts and the EIRP of mobile transmitters are limited to 2 Watts.

3.2.2 Measuring Instruments

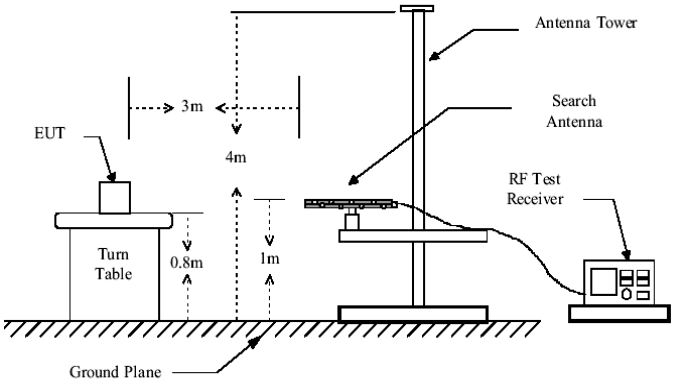
See list of measuring instruments of this test report.

3.2.3 Test Procedures

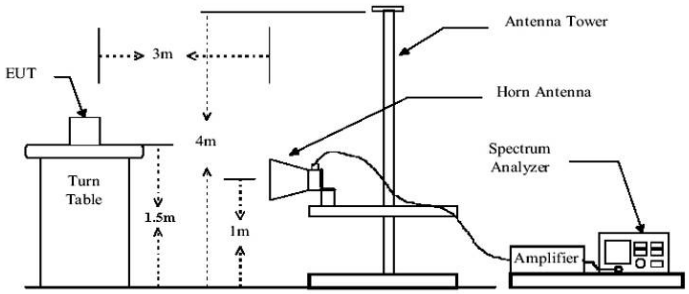
1. The EUT was placed on a turntable with 1.5 meter height in a fully anechoic chamber.
2. The EUT was set at 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. GSM operating modes: Set RBW= 1MHz, VBW= 3MHz, RMS detector over burst;
   UMTS operating modes: Set RBW= 100 kHz, VBW= 300 kHz, RMS detector over frame, and use channel power option with bandwidth=5MHz, per KDB 971168 D01.
4. The table was rotated 360 degrees to determine the position of the highest radiated power.
5. The height of the receiving antenna is adjusted to look for the maximum ERP/EIRP.
6. Taking the record of maximum ERP/EIRP.
7. A dipole antenna was substituted in place of the EUT and was driven by a signal generator.
8. The conducted power at the terminal of the dipole antenna is measured.
9. Repeat step 3 to step 5 to get the maximum ERP/EIRP of the substitution antenna.
10. ERP/EIRP = Ps + Et – Es + Gs = Ps + Rt – Rs + Gs
    Ps (dBm)：Input power to substitution antenna.
    Gs (dBi or dBd)：Substitution antenna Gain.
    Et = Rt + AF
    Es = Rs + AF
    AF (dB/m)：Receive antenna factor
    Rt：The highest received signal in spectrum analyzer for EUT.
    Rs：The highest received signal in spectrum analyzer for substitution antenna.

3.2.4 Test Setup

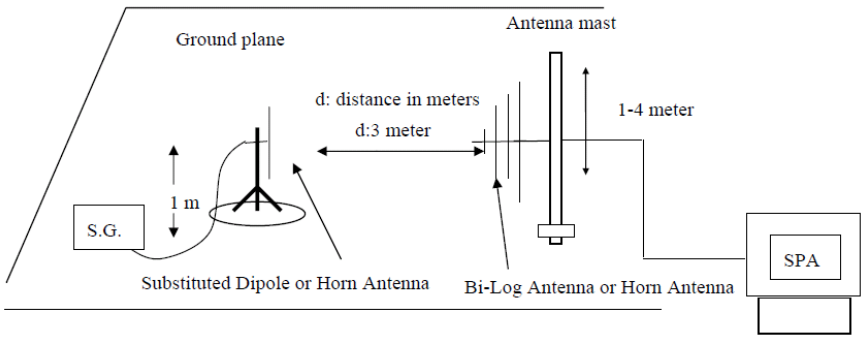
Below1GHz



Above 1GHz



Substituted method:



3.2.5 Test Result of ERP

The maximum value has been record and the tighter limits apply:

EUT mode	Channel	Modulation	Polarization	SGP [dBm]	Substitution Gain[dBi]	Cable loss[dB]	ERP (dBm)	Limit (dBm)	Result
GSM 850	Lowest	QPSK	H	22.07	-2.08	1.55	21.54	38.45	Pass
	Middle	QPSK	H	22.54	-2.08	1.6	22.06	38.45	Pass
	Highest	QPSK	H	22.39	-2.08	1.65	21.96	38.45	Pass

3.2.6 Test Result of EIRP

The maximum value has been record and the tighter limits apply:

EUT mode	Channel	Modulation	Polarization	SGP [dBm]	Substitution Gain[dBi]	Cable loss[dB]	EIRP (dBm)	Limit (dBm)	Result
PCS 1900	Lowest	QPSK	H	22.47	-1.93	1.13	21.67	33.00	Pass
	Middle	QPSK	H	22.39	-1.93	1.22	21.68	33.00	Pass
	Highest	QPSK	H	22.44	-1.93	1.34	21.85	33.00	Pass

3.3 Occupied Bandwidth Measurement

3.3.1 Description of Occupied Bandwidth Measurement

The 99% occupied bandwidth is the width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5% of the total mean transmitted power.

The emission bandwidth is defined as the width of the signal between two points, located at the 2 sides of the carrier frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

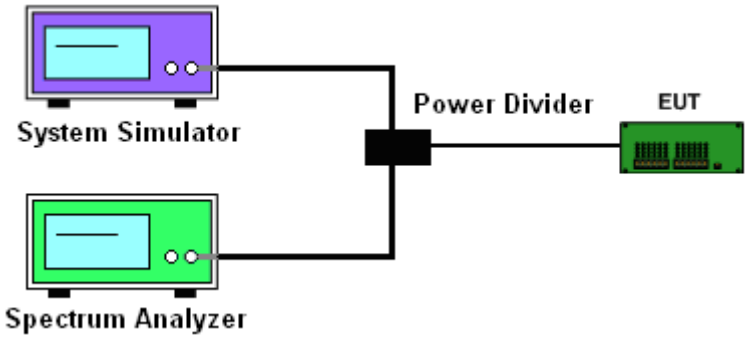
3.3.2 Measuring Instruments

See list of measuring instruments of this test report.

3.3.3 Test Procedures

1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. The 99% occupied bandwidth were measured, set RBW= 1% of span, VBW= 10*RBW, Peak detector, trace maximum hold.
4. The 26dB bandwidth were measured, set RBW= 1% of EBW, VBW= 3*RBW, peak detector, trace maximum hold.

3.3.4 Test Setup



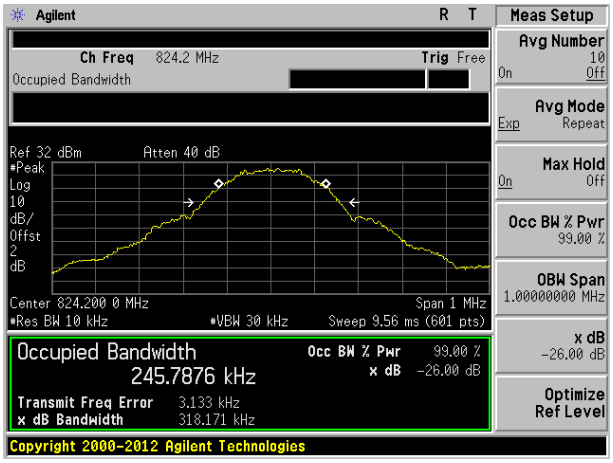
3.4.5 Test Result of Occupied Bandwidth and 26dB Bandwidth

Cellular Band			
Modes	**GSM850 (GPRS 1 link)**		
Channel	**128 (Low)**	**190 (Mid)**	**251 (High)**
Frequency (MHz)	**824.2**	**836.6**	**848.8**
99% OBW (kHz)	245.79	246.38	251.69
26dB BW (kHz)	318.17	316.17	324.97

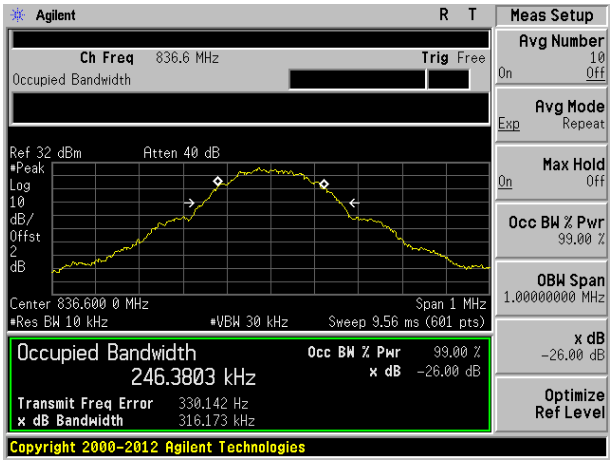
PCS Band			
Modes	**PCS1900 (GPRS 1 link)**		
Channel	**512 (Low)**	**661 (Mid)**	**810 (High)**
Frequency (MHz)	**1850.2**	**1880**	**1909.8**
99% OBW (kHz)	246.97	243.36	242.22
26dB BW (kHz)	319.40	327.09	321.38

3.4.6 T e s t Result (Plots) of Occupied Bandwidth and 26dB Bandwidth

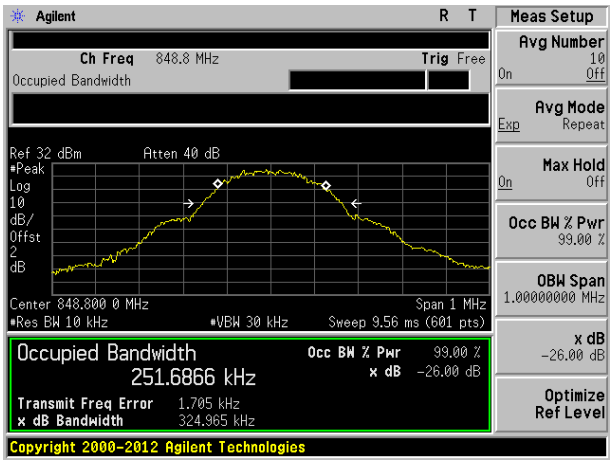
GSM 850MHz Channel = 128



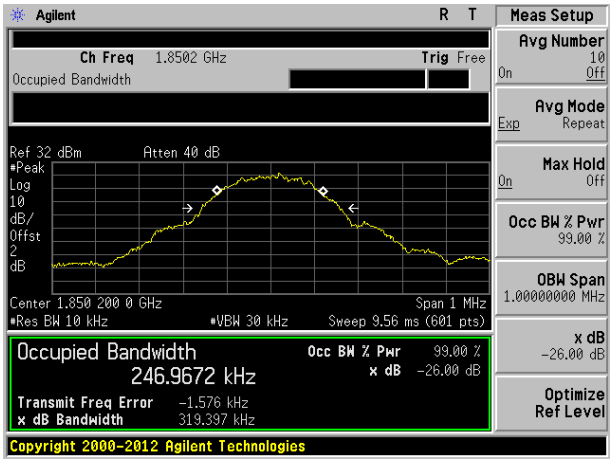
GSM 850MHz Channel = 190



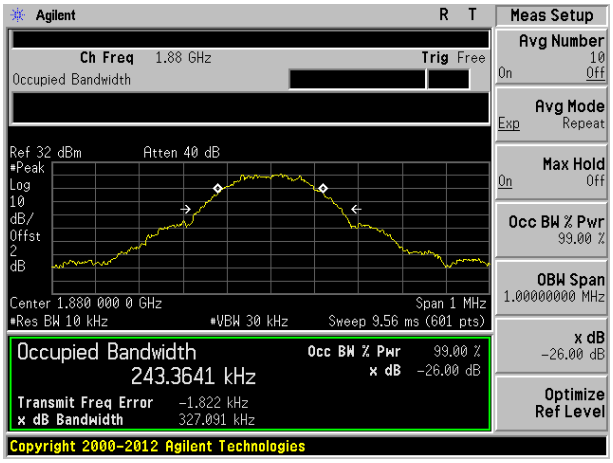
GSM 850MHz Channel = 251



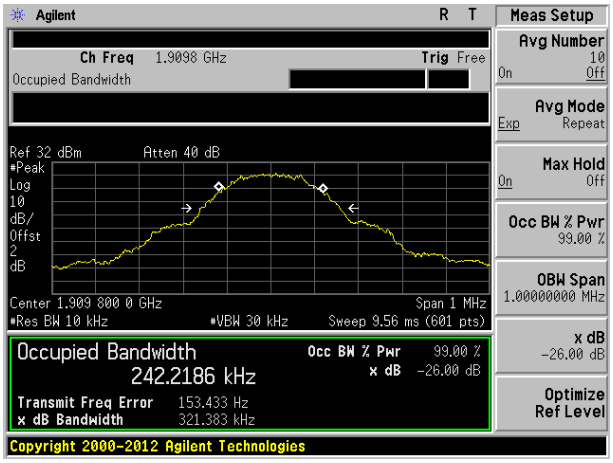
GSM 1900MHz Channel = 512



GSM 1900MHz Channel = 661



GSM 1900MHz Channel = 810



3.4 Band Edge Measurement

3.4.1 Description of Band Edge Measurement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.

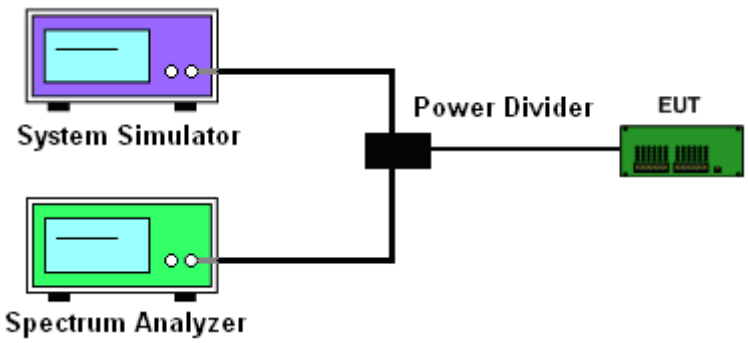
3.4.2 Measuring Instruments

See list of measuring instruments of this test report.

3.4.3 Test Procedures

1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. The band edges of low and high channels for the highest RF powers were measured. Setting RBW as roughly BW/100.
4. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
5. The limit line is derived from 43 + 10log (P) dB below the transmitter power P(Watts)
   = P(W) - [43 + 10log(P)] (dB)
   = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
   = -13dBm.

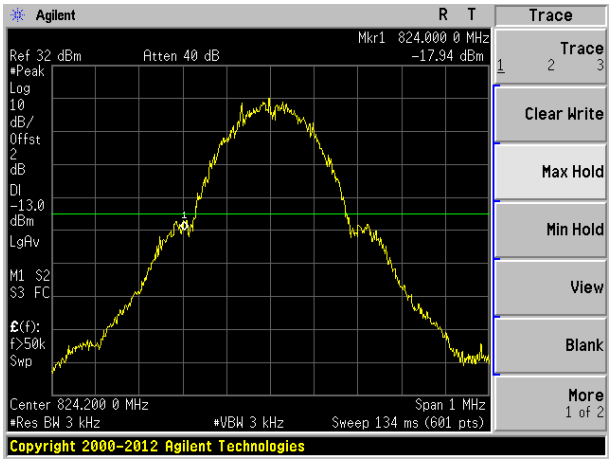
3.4.4 Test Setup



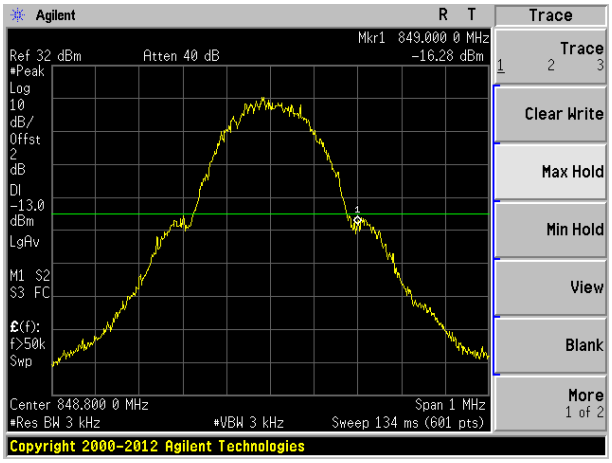
3.4.5 Test Result (Plots) of Conducted Band Edge

Band :	GSM850	Power Stage :	High
Test Mode :	GPRS 1 Link		

Lower Band Edge Plot on Channel 128

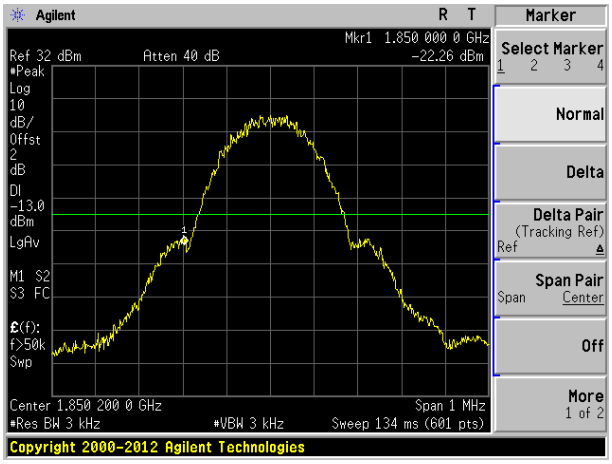


Higher Band Edge Plot on Channel 251

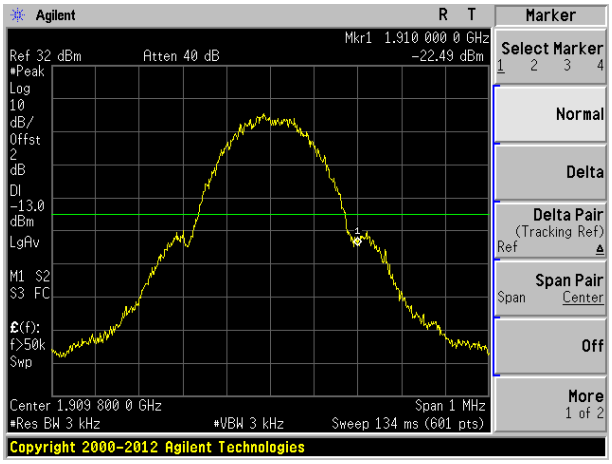


Band :	PCS1900	**Power Stage :**	High
Test Mode :	GPRS 1 Link		

Lower Band Edge Plot on Channel 512



Higher Band Edge Plot on Channel 810



3.5 Conducted Emission Measurement

3.5.1 Description of Conducted Emission Measurement

The power of any emission outside of the authorized operating frequency ranges must be lower than the transmitter power (P) by a factor of at least 43 + 10 log (P) dB.

It is measured by means of a calibrated spectrum analyzer and scanned from 30 MHz up to a frequency including its 10^{th} harmonic.

3.5.2 Measuring Instruments

See list of measuring instruments of this test report.

3.5.3 Test Procedures

1. The EUT was connected to spectrum analyzer and base station via power divider.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.

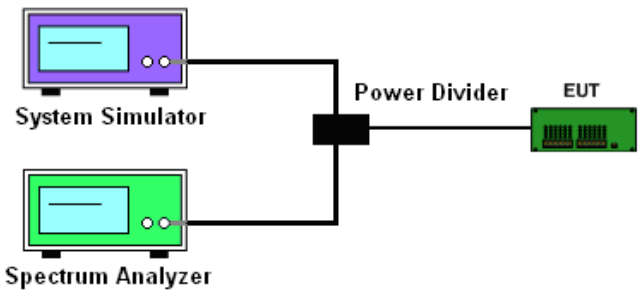
   The path loss was compensated to the results for each measurement.
3. The middle channel for the highest RF power within the transmitting frequency was measured.
4. The conducted spurious emission for the whole frequency range was taken.
5. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
6. The limit line is derived from 43 + 10log(P) dB below the transmitter power P(Watts)

   = P(W) - [43 + 10log(P)] (dB)

   = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)

   = -13dBm

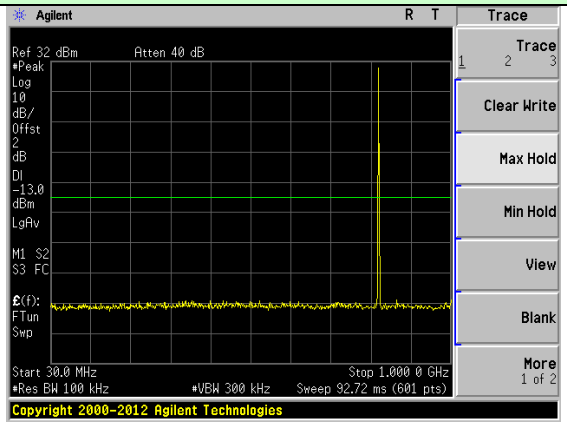
3.5.4 Test Setup

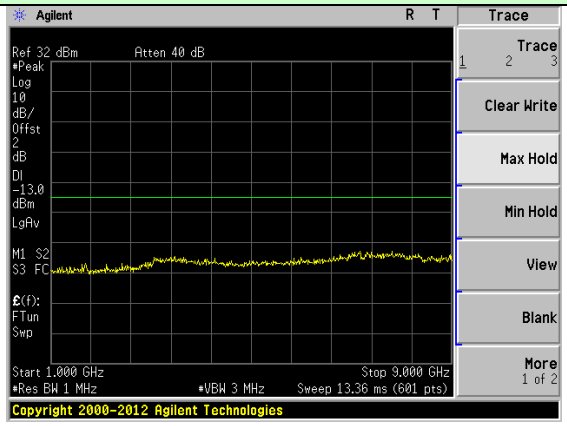


3.5.5 Test Result (Plots) of Conducted Emission

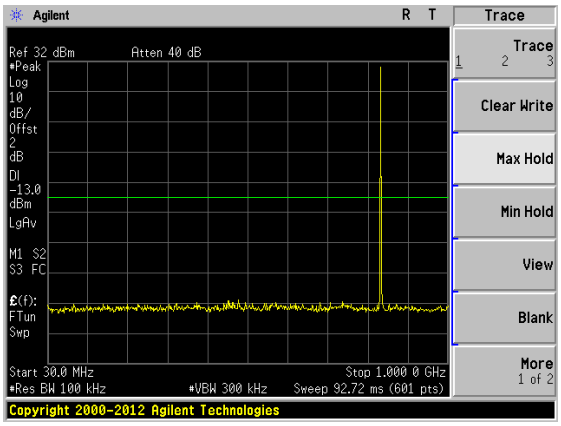
Test plot as follows:

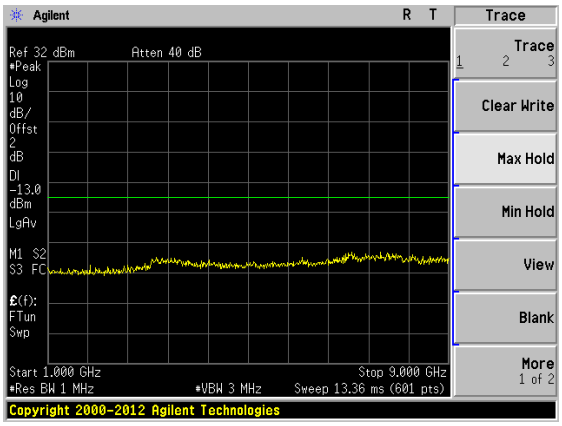
Test Mode: Traffic mode	GSM 850 (GPRS 1 link)



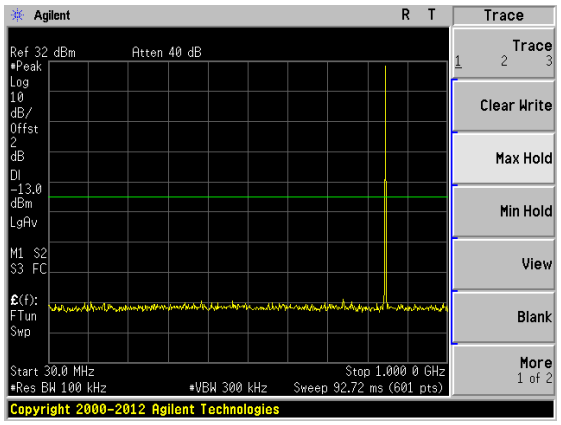


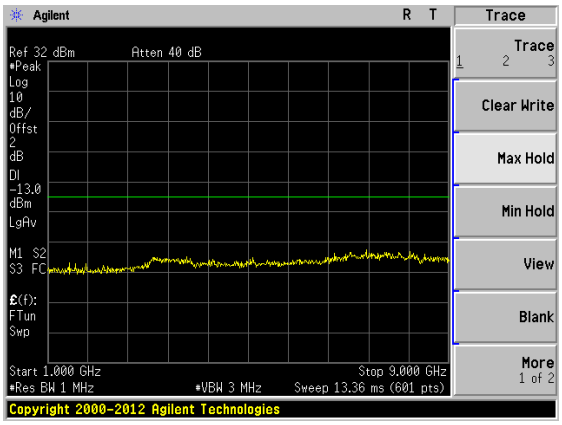
Lowest channel





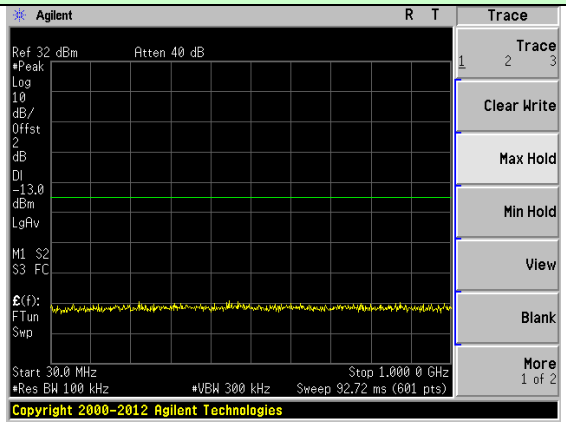
Middle channel

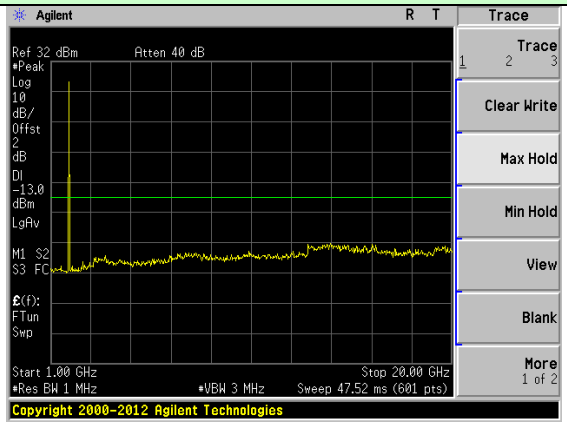




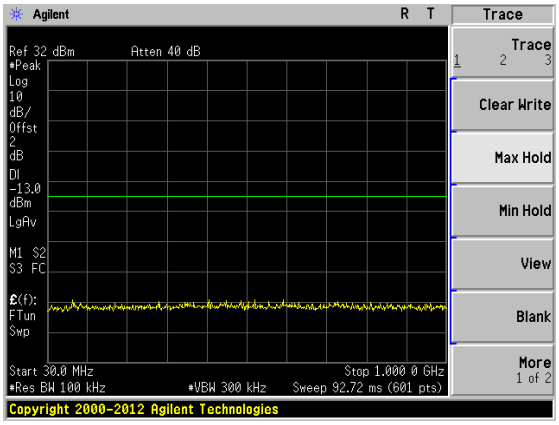
Highest channel

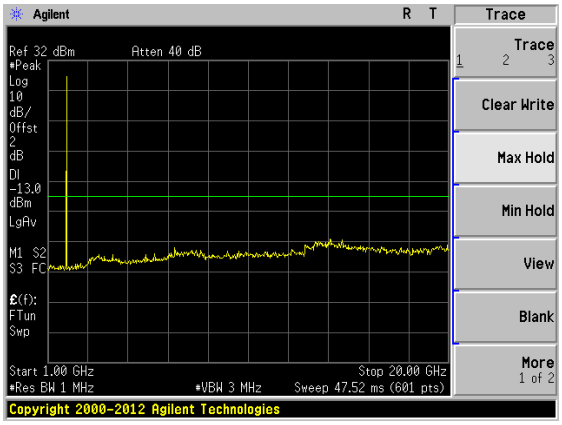
Test Mode: Traffic mode	PCS 1900 (GPRS 1 link)



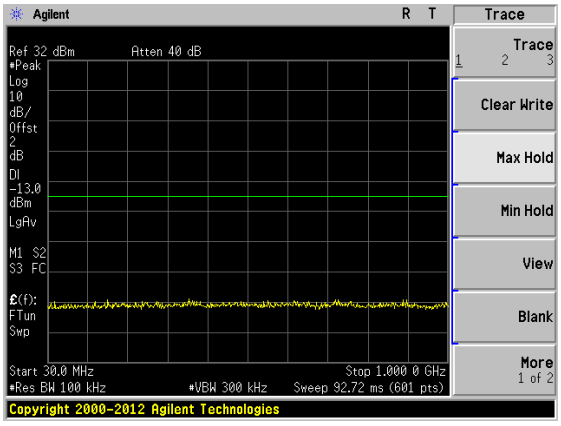


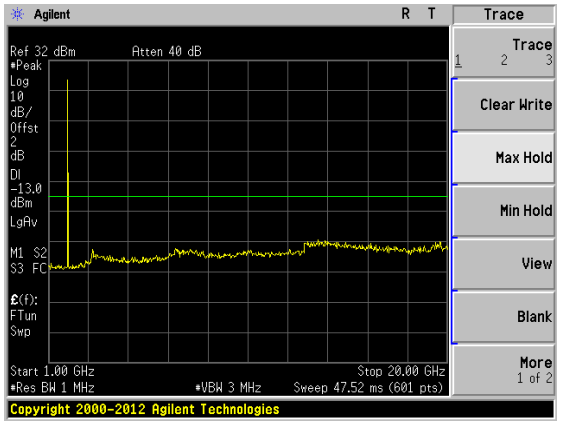
Lowest channel





Middle channel





Highest channel

3.6 Field Strength of Spurious Radiation Measurement

3.6.1 Description of Field Strength of Spurious Radiated Measurement

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitter power (P) by a factor of at least 43 + 10 log (P) dB. The spectrum is scanned from 30 MHz up to a frequency including its 10th harmonic.

3.6.2 Measuring Instruments

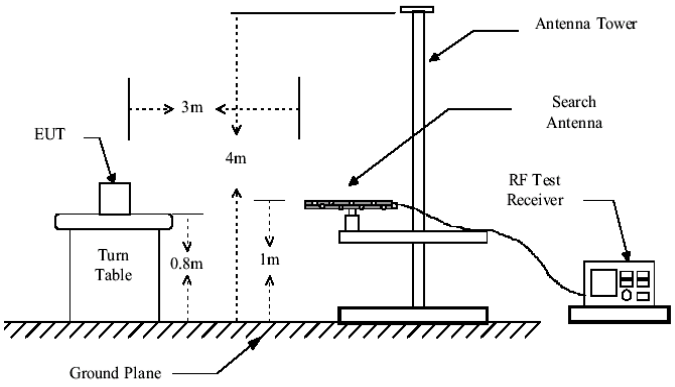
See list of measuring instruments of this test report.

3.6.3 Test Procedures

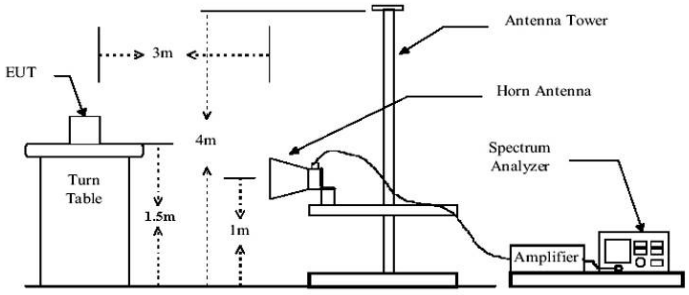
1. The EUT was placed on a rotatable wooden table with 0.8 meter above ground.
2. The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest spurious emission.
4. The height of the receiving antenna is varied between one meter and four meters to search the maximum spurious emission for both horizontal and vertical polarizations.
5. Make the measurement with the spectrum analyzer's RBW = 1MHz, VBW = 3MHz, 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. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
11. The limit line is derived from 43 + 10log(P) dB below the transmitter power P(Watts)
    = P(W) - [43 + 10log(P)] (dB)
    = [30 + 10log(P)] (dBm) - [43 + 10log(P)] (dB)
    = -13dBm.
12. EIRP (dBm) = S.G. Power – Tx Cable Loss + Tx Antenna Gain
13. ERP (dBm) = EIRP - 2.15

3.6.4 Test Setup

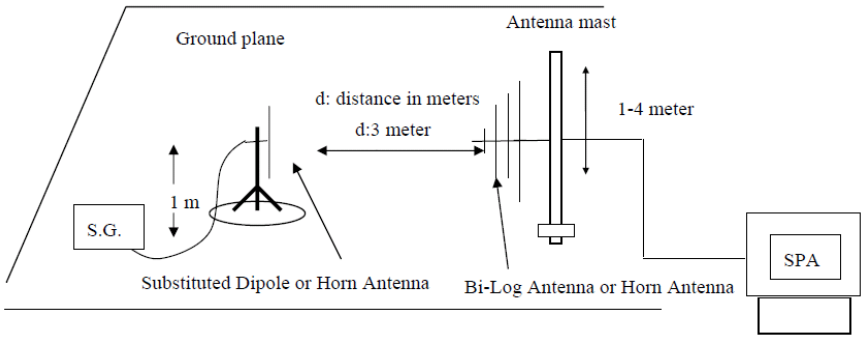
Below 1GHz



Above 1GHz



Substituted method:



3.6.5 Test Result of Field Strength of Spurious Radiated

Test mode:	GSM850		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1648.40	Vertical	-51.90	-13.00	Pass
2472.60	V	-53.64		
3296.80	V	-51.90		
4121.00	V	-54.06		
4945.20	V	-51.81		
1648.40	Horizontal	-53.14	-13.00	Pass
2472.60	H	-54.01		
3296.80	H	-53.32		
4121.00	H	-52.07		
4945.20	H	-52.19		
Test mode:	**GSM850**		**Test channel:**	**Middle**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1673.20	Vertical	-54.27	-13.00	Pass
2509.80	V	-53.55		
3346.40	V	-54.45		
4183.00	V	-53.25		
5019.60	V	-52.06		
1673.20	Horizontal	-52.65	-13.00	Pass
2509.80	H	-52.87		
3346.40	H	-53.19		
4183.00	H	-52.47		
5019.60	H	-53.16		
Test mode:	**GSM850**		**Test channel:**	**Highest**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
1697.60	Vertical	-57.52	-13.00	Pass
2546.40	V	-53.55		
3395.20	V	-51.22		
4244.00	V	-52.83		
5092.80	V	-53.75		
1697.60	Horizontal	-51.41	-13.00	Pass
2546.40	H	-54.28		
3395.20	H	-55.44		
4244.00	H	-57.47		
5092.80	H	-53.34		

Remark：

1. The emission behaviour belongs to narrowband spurious emission.
2. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

Test mode:	PCS1900		Test channel:	Lowest
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3700.40	Vertical	-56.97	-13.00	Pass
5550.60	V	-59.36		
7400.80	V	-51.33		
9251.00	V	-53.23		
11101.20	V	-52.83		
3700.40	Horizontal	-51.55	-13.00	Pass
5550.60	H	-54.93		
7400.80	H	-56.29		
9251.00	H	-58.66		
11101.20	H	-54.63		
Test mode:	**PCS1900**		**Test channel:**	**Middle**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3760.00	Vertical	-54.66	-13.00	Pass
5640.00	V	-57.12		
7520.00	V	-59.16		
9400.00	V	-51.13		
11280.00	V	-53.06		
3760.00	Horizontal	-49.40	-13.00	Pass
5640.00	H	-52.89		
7520.00	H	-54.30		
9400.00	H	-56.76		
11280.00	H	-53.51		
Test mode:	**PCS1900**		**Test channel:**	**Highest**
Frequency (MHz)	Spurious Emission		Limit (dBm)	Result
	Polarization	Level (dBm)		
3819.60	Vertical	-55.85	-13.00	Pass
5729.40	V	-58.24		
7639.20	V	-50.22		
9549.00	V	-52.12		
11458.80	V	-52.79		
3819.60	Horizontal	-50.44	-13.00	Pass
5729.40	H	-53.83		
7639.20	H	-55.19		
9549.00	H	-57.57		
11458.80	H	-53.56		

Remark：

1. The emission behaviour belongs to narrowband spurious emission.
2. The emission levels of below 1 GHz are very lower than the limit and not show in test report.

3.7 Frequency Stability Measurement

3.7.1 Description of Frequency Stability Measurement

The frequency stability shall be measured by variation of ambient temperature and variation of primary supply voltage to ensure that the fundamental emission stays within the authorized frequency block. The frequency stability of the transmitter shall be maintained within ±0.00025% (±2.5ppm) of the center frequency.

3.7.2 Measuring Instruments

See list of measuring instruments of this test report.

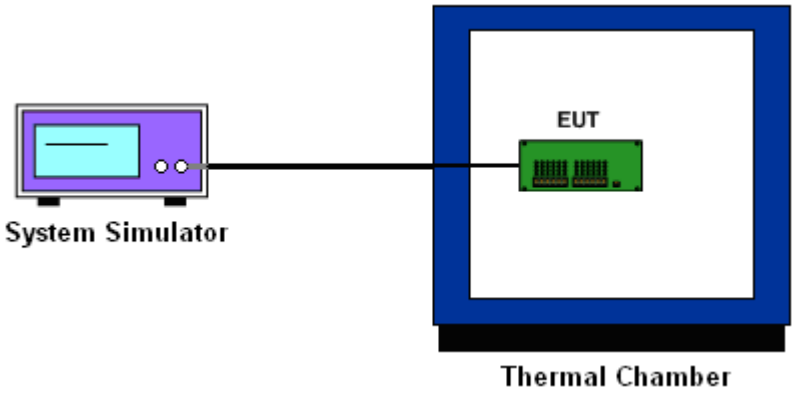
3.7.3 Test Procedures for Temperature Variation

1. The EUT was set up in the thermal chamber and connected with the base station.
2. With power OFF, the temperature was decreased to -30℃ and the EUT was stabilized for three hours. Power was applied and the maximum change in frequency was recorded within one minute.
3. With power OFF, the temperature was raised in 10℃ step up to 50℃. The EUT was stabilized at each step for at least half an hour. Power was applied and the maximum frequency change was recorded within one minute.
4. If the EUT can not be turned on at -30℃, the testing lowest temperature will be raised in 10℃ step until the EUT can be turned on.

3.7.4 Test Procedures for Voltage Variation

1. The EUT was placed in a temperature chamber at 25±5° C and connected with the base station.
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.

3.7.5 Test Setup



3.7.6 Test Result of Temperature and Voltage Variation

Reference Frequency: GSM850 (GPRS 1 link) Middle channel=190 channel=836.6MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
12.0	-30	98	0.1166	2.5	Pass
	-20	110	0.1320		
	-10	93	0.1114		
	0	76	0.0908		
	10	89	0.1063		
	20	76	0.0908		
	30	128	0.1526		
	40	115	0.1372		
	50	110	0.1320		
Reference Frequency: PCS1900 (GPRS 1 link) Middle channel=661 channel=1880MHz					
Power supplied (Vdc)	Temperature (°C)	Frequency error			Result
		Hz	ppm		
12.0	-30	68	0.0817	2.5	Pass
	-20	76	0.0905		
	-10	65	0.0774		
	0	57	0.0686		
	10	61	0.0730		
	20	54	0.0642		
	30	94	0.1124		
	40	79	0.0949		
	50	76	0.0905		

Reference Frequency: GSM850 (GPRS 1 link) Middle channel=190 channel=836.6MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	36.0	33	0.0392	2.5	Pass
	12.0	38	0.0451		
	5.0	43	0.0509		
Reference Frequency: PCS1900 (GPRS 1 link) Middle channel=661 channel=1880MHz					
Temperature (°C)	Power supplied (Vdc)	Frequency error		Limit (ppm)	Result
		Hz	ppm		
25	36.0	46	0.0547	2.5	Pass
	12.0	34	0.0408		
	5.0	38	0.0454		

Note: The extreme voltage was declared by the manufacturer.

3.8 Peak-to-Average Ratio

3.8.1 Description of the PAR Measurement

The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

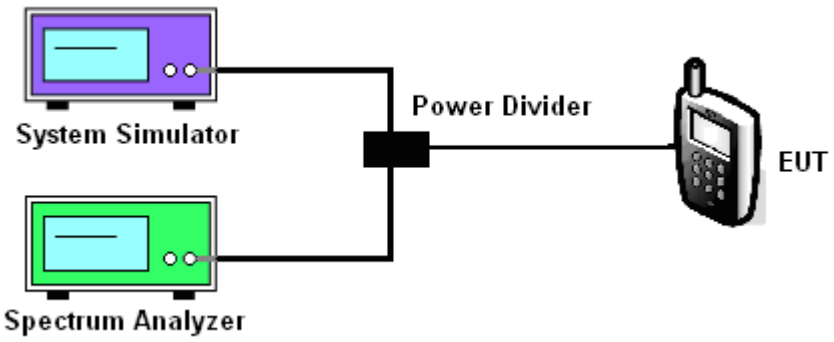
3.8.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.8.3 Test Procedures

1. The EUT was connected to Spectrum Analyzer and System Simulator via power divider.
2. For GSM/EGPRS operating modes:
   a. Set EUT in maximum power output.
   b. Set the RBW = 1MHz, VBW = 3MHz, Peak detector in spectrum analyzer for first trace.
   c. Set the RBW = 1MHz, VBW = 3MHz, RMS detector in spectrum analyzer for second trace.
   d. The wanted burst signal is triggered by spectrum analyzer, and measured respectively the peak level and Mean level without burst-off time, after system simulator synchronized with the spectrum analyzer.
3. For UMTS operating modes:
   a. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
   b. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.
4. Record the deviation as Peak to Average Ratio.

3.8.4 Test Setup



3.8.5 Test Result of Peak-to-Average Ratio

Modes	GSM850			PCS1900		
Channel	128 (Low)	190 (Mid)	251 (High)	512 (Low)	661 (Mid)	810 (High)
Frequency (MHz)	824.2	836.6	848.8	1850.2	1880	1909.8
Peak-to-Average Ratio (dB)	7.77	7.74	7.74	7.83	8.03	7.76

4.0 Test Equipment					
Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date
ESPI Test Receiver	R&S	ESPI 3	100379	2018-06-22	2019-06-21
TWO Line-V-NETW	R&S	EZH3-Z5	100294	2018-06-22	2019-06-21
TWO Line-V-NETW	R&S	EZH3-Z5	100253	2018-06-22	2019-06-21
Ultra Broadband ANT	R&S	HL562	100157	2018-06-18	2019-06-17
Impuls-Begrenzer	R&S	ESH3-Z2	100281	2018-06-22	2019-06-21
Loop Antenna	EMCO	6507	00078608	2018-06-25	2019-06-24
Spectrum	R&S	FSIQ26	100292	2018-06-22	2019-06-21
Horn Antenna	A-INFO	LB-180400-KF	J211060660	2018-06-25	2019-06-24
Horn Antenna	R&S	BBHA 9120D	9120D-631	2018-08-24	2019-08-23
Power meter	Anritsu	ML2487A	6K00003613	2018-08-22	2019-08-21
Power sensor	Anritsu	MA2491A	32263	2018-08-22	2019-08-21
Bilog Antenna	Schwarebeck	VULB9163	9163/340	2018-07-04	2019-07-03
9*6*6 Anechoic	--	--	N/A	2018-02-07	2021-02-06
EMI Test Receiver	RS	ESVB	826156/011	2018-06-22	2019-06-21
EMI Test Receiver	RS	ESH3	860904/006	2018-06-22	2019-06-21
Spectrum	HP/Agilent	ESA-L1500A	US37451154	2018-06-22	2019-06-21
Spectrum	HP/Agilent	E4407B	MY50441392	2018-03-27	2019-03-26
Spectrum	RS	FSP	1164.4391.38	2019-01-20	2020-01-19
RF Cable	Zhengdi	ZT26-NJ-NJ-8 M/FA	--	2018-05-24	2019-05-23
RF Cable	Zhengdi	7m	--	2018-03-17	2019-03-16
RF Switch	EM	EMSW18	060391	2018-06-22	2019-06-21
Pre-Amplifier	Schwarebeck	BBV9743	#218	2018-06-22	2019-06-21
Pre-Amplifier	HP/Agilent	8449B	3008A00160	2018-08-05	2019-08-04
LISN	SCHAFFNER	NNB42	00012	2019-01-08	2020-01-07
Universal Radio Communication Test	RS	CMU200	1100.008.02	2018-06-22	2019-06-21

5.0 Photographs

Reference to the **appendix I** for details.

Photographs – EUT

Reference to the **appendix II** for details.

End of the report