







ISO/IEC17025Accredited Lab.

Report No: FCC 1408087-03 File reference No: 2014-09-03

Applicant: OBO Electronics Group Limited

Product: TABLET PC

Model No: TouchSmart SDS, OB701, OB702, OB801, OB802, OB901,

OB902, OB1001, OB1002, OB7801, OB7802, GK8821, GK8831, GK710, GK736, GK738, GK756I, GK810, GK10181,

GK10141

Trademark: OBO

Test Standards: FCC 47 CFR Part 2, 22(H), 24(E)

Test result: It is herewith confirmed and found to comply with the

requirements set up by ANSI C63.4, ,FCC Part 22H and 24E

for the evaluation of electromagnetic compatibility

Approved By

Jack Chung

Jack Chung

Manager

Dated: Sep 03, 2014

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 TECHNOLOGY CONSULTING CO., LTD

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Date: 2014-09-03



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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.: 899988

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.: 899988.

IC- Registration No.: IC5205A-02

The EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada. The acceptance letter from the IC is maintained in our files. Registration IC No.: 5205A-02.



Date: 2014-09-03



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1.0 General Details

1.1 Test Lab Details

Name: SHENZHEN TIMEWAY TECHNOLOGY CONSULTING CO., LTD

Address: 5/F, Block 4, Anhua Industrial Zone., No.8 TaiRan Rd.CheGongMiao, FuTian District,

Shenzhen, CHINA.

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Site on File with the Federal Communications Commission – United Sates

Registration Number: 899988

For 3m & 10 m OATS

Site Listed with Industry Canada of Ottawa, Canada

Registration Number: IC: 5205A-02

For 3m & 10 m OATS

1.2 Applicant Details

Applicant: OBO Electronics Group Limited

Address: Unit 705, GuanEr Yongtai Building, Congyun Road, Baiyun District, Guangzhou, China

Telephone: 020-81429308(Ext: 604)

Fax: 020-36257622

1.3 Description of EUT

Product: TABLET PC

Manufacturer: OBO Electronics Group Limited

Address: Unit 705, GuanEr Yongtai Building, Congyun Road, Baiyun

District, Guangzhou, China

Brand Name: OBO

Model Number: TouchSmart SDS

Additional Model Number: OB701, OB702, OB801, OB802, OB901, OB902, OB1001, OB1002, OB7801, OB7802, GK8821, GK8831, GK710, GK736, GK738, GK756I, GK810, GK10181, GK10141

Tx Frequency GSM850 : 824.2 MHz ~ 848.8 MHz

GSM1900 : 1850.2 MHz ~ 1909.8 MHz WCDMA Band V : 826.4 MHz ~ 846.6 MHz WCDMA Band II : 1852.4 MHz ~ 1907.6 MHz

Rx Frequency GSM850 : 869.2 MHz ~ 893.8 MHz

GSM1900 : 1930.2 MHz ~ 1989.8 MHz WCDMA Band V : 871.4 MHz ~ 891.6 MHz WCDMA Band II : 1932.4 MHz ~ 1987.6 MHz

Maximum Output Power to GSM850: 20.59 dBm

Antenna GSM1900 : 18.19 dBm

WCDMA Band V: 17.01 dBm WCDMA Band II: 16.73 dBm

Antenna Type Integral Antenna

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Antenna Peak Gain 824 ~ 849 MHz : -0.8 dBi

1850~1910 MHz: -0.8 dBi

Type of Modulation GSM / GPRS : GMSK

EDGE : GMSK/8PSK WCDMA : QPSK

HSDPA: QPSK / 16QAM

HSUPA: QPSK

EMISSION DESIGNATOR GSM: 253KGXW

EGPRS: 250KG7W WCDMA: 4M15F9W

1.4 Submitted Sample: 2 Samples

1.5 Test Duration

2014-08-20 to 2014-09-02

1.6 Test Uncertainty

Conducted Emissions Uncertainty =3.6dB Radiated Emissions Uncertainty =4.7dB

1.7 Test Engineer

The sample tested by __

Print Name: Terry Tang

Date: 2014-09-03



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	-
3.9	Part 15B	Main Conducted Emissions	See part 15.107 and 207	PASS	-

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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 and WCDMA Band V.
- 30 MHz to 19000 MHz for GSM1900 and WCDMA Band II.

	Test Modes					
Band	Radiated TCs	Conducted TCs				
CCM 950	■ GSM Link	■ GSM Link				
GSM 850	■ EDGE 8 Link	■ EDGE 8 Link				
0011 4000	■ GSM Link	■ GSM Link				
GSM 1900	■ EDGE 8 Link	■ EDGE 8 Link				
WCDMA Band V	RMC 12.2Kbps Link	■ RMC 12.2Kbps Link				
WCDMA Band II	■ RMC 12.2Kbps Link	■ RMC 12.2Kbps Link				

Note: The maximum power levels are GSM mode for GMSK link, EDGE multi-slot class 8 mode for 8PSK link, RMC 12.2Kbps mode for WCDMA band V, and RMC 12.2Kbps mode for WCDMA band II, only these modes were used for all tests.

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The conducted power tables are as follows:

Conducted Power (*Unit: dBm)							
Band		GSM850	GSM850		GSM1900		
Channel	128	190	251	512	661	810	
Frequency	824.2	836.6	848.8	1850.2	1880.0	1909.8	
GSM	20.59	20.41	20.27	17.89	17.86	18.19	
GPRS Class 8	20.58	20.38	20.25	17.87	17.84	18.17	
GPRS Class 10	20.47	20.32	20.14	17.82	17.83	18.05	
GPRS Class 11	20.28	20.13	20.02	17.79	17.65	18.09	
GPRS Class 12	20.26	20.17	20.01	17.46	17.59	17.86	
EGPRS Class 8	12.95	12.89	12.74	13.95	14.05	14.22	
EGPRS Class 10	12.78	12.73	12.64	13.80	13.92	14.04	
EGPRS Class 11	12.64	12.61	12.59	13.81	13.89	13.99	
EGPRS Class 12	12.57	12.55	12.51	13.77	13.83	13.89	

Conducted Power (*Unit: dBm)							
Band	ind WCDMA Band V WCDMA Band II			II			
Channel	4132	4183	4233	9262	9400	9538	
Frequency	826.4	836.6	846.6	1852.4	1880.0	1907.6	
RMC 12.2K	16.72	17.01	16.68	16.73	16.43	16.30	
HSDPA	16.37	16.65	16.45	16.58	16.35	16.11	
HSDPA Subtest-1	16.38	16.68	16.45	16.59	16.33	16.12	
HSDPA Subtest-2	16.39	16.60	16.44	16.58	16.35	16.11	
HSDPA Subtest-3	16.33	16.59	16.46	16.62	16.29	16.13	
HSDPA Subtest-4	16.36	16.73	16.49	16.61	16.31	16.15	
HSUPA	16.51	16.69	16.41	16.76	16.37	16.23	
HSUPA Subtest-1	16.52	16.72	16.45	16.74	16.36	16.23	
HSUPA Subtest-2	16.55	16.67	16.39	16.71	16.37	16.24	
HSUPA Subtest-3	16.53	16.74	16.39	16.69	16.33	16.22	
HSUPA Subtest-4	16.55	16.71	16.41	16.68	16.39	16.19	
HSUPA Subtest-5	16.59	16.73	16.42	16.70	16.41	16.18	

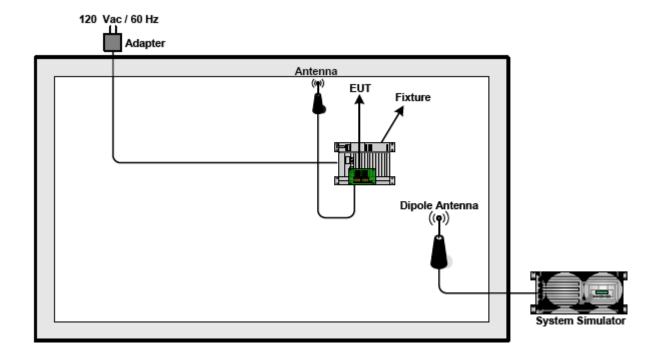
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2.2 Connection Diagram of Test System



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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.

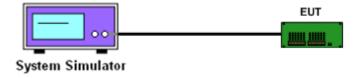
3.1.2 Measuring Instruments

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



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3.1.5 Test Result of Conducted Output Power

	Cellular Band						
Modes	Channel	Frequency (MHz)	Conducted Power (dBm)	Conducted Power (Watts)			
GSM850	128 (Low)	824.2	20.59	0.1146			
(GSM)	190 (Mid)	836.6	20.41	0.1099			
	251 (High)	848.8	20.27	0.1064			
GSM850	128 (Low)	824.2	12.95	0.01972			
(EDGE Class 8)	190 (Mid)	836.4	12.89	0.01945			
	251 (High)	848.8	12.74	0.01879			
	4132 (Low)	826.4	16.72	0.04699			
WCDMA Band V (RMC 12.2Kbps)	4183 (Mid)	836.6	17.01	0.05023			
	4233 (High)	846.6	16.68	0.04656			

PCS Band						
Modes	Channel	Frequency (MHz)	Conducted Power (dBm)	Conducted Power (Watts)		
	512 (Low)	1850.2	17.89	0.06152		
GSM1900	661 (Mid)	1880.0	17.86	0.06109		
(GSM)	810 (High)	1909.8	18.19	0.06592		
	512 (Low)	1850.2	13.95	0.02483		
GSM1900	661 (Mid)	1880.0	14.05	0.02541		
(EDGE Class 8)	810 (High)	1909.8	14.22	0.02642		
	9262 (Low)	1852.4	16.73	0.04710		
WCDMA Band II (RMC 12.2Kbps)	9400 (Mid)	1880.0	16.43	0.04395		
	9538 (High)	1907.6	16.30	0.04266		

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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.
- 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.

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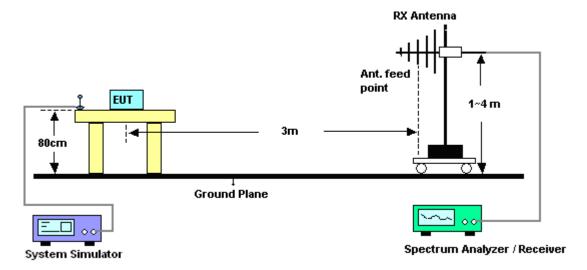
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3.2.4 Test Setup



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3.3.5 Test Result of ERP

GSM850 (GSM) Radiated Power ERP						
Frequency (MHz)	ERP (dBm)	ERP (W)	Polarization Of Max. ERP	Result		
824.20	17.26	0.0532	Horizontal	Pass		
836.60	17.09	0.0512	Horizontal	Pass		
848.80	17.02	0.0504	Horizontal	Pass		

GSM850 (EDGE class 8) Radiated Power ERP						
Frequency (MHz)	ERP (dBm)	ERP (W)	Polarization Of Max. ERP	Result		
824.20	9.85	0.00966	Horizontal	Pass		
836.60	9.76	0.00946	Horizontal	Pass		
848.80	9.63	0.00918	Horizontal	Pass		

WCDMA Band V (RMC 12.2Kbps) Radiated Power ERP						
Frequency (MHz)	ERP (dBm)	ERP (W)	Polarization Of Max. ERP	Result		
826.40	13.21	0.0209	Horizontal	Pass		
836.60	13.35	0.0216	Horizontal	Pass		
846.60	13.23	0.0210	Horizontal	Pass		

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3.3.6 Test Result of EIRP

GSM1900 (GSM) Radiated Power EIRP						
Frequency (MHz)	EIRP (dBm)	EIRP (W)	Polarization Of Max. EIRP	Result		
1850.20	14.37	0.0274	Horizontal	Pass		
1880.00	14.29	0.0269	Horizontal	Pass		
1909.80	14.52	0.0283	Horizontal	Pass		

GSM1900 (EDGE class 8) Radiated Power EIRP						
Frequency (MHz)	EIRP (dBm)	EIRP (W)	Polarization Of Max. EIRP	Result		
1850.20	10.52	0.0113	Horizontal	Pass		
1880.00	10.64	0.0116	Horizontal	Pass		
1909.80	10.79	0.0120	Horizontal	Pass		

WCDMA Band II (RMC 12.2Kbps) Radiated Power EIRP						
Frequency (MHz)	EIRP (dBm)	EIRP (W)	Polarization Of Max. EIRP	Result		
1852.40	13.18	0.0208	Horizontal	Pass		
1880.00	12.93	0.0196	Horizontal	Pass		
1907.60	12.85	0.0192	Horizontal	Pass		

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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.

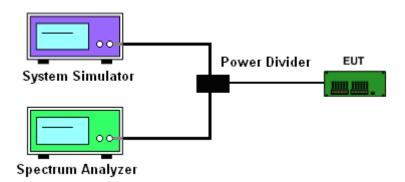
3.3.2 Measuring Instruments

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.
- 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.
- The 26dB bandwidth were measured, set RBW= 1% of EBW, VBW= 3*RBW, peak detector, trace maximum hold.

3.3.4 Test Setup



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3.4.5 Test Result of Occupied Bandwidth and 26dB Bandwidth

Cellular Band						
Modes	GSM850 (GSM)			GSM850 (EDGE class 8)		
Channel	128	190	251	128	190	251
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency (MHz)	824.2	836.6	848.8	824.2	836.6	848.8
99% OBW (kHz)	248.65	247.54	250.93	239.75	247.98	249.50
26dB BW (kHz)	314.79	317.47	317.64	316.52	314.58	314.33

PCS Band						
Modes	GSM1900 (GSM)		GSM1900 (EDGE class 8)			
Channel	512	661	810	512	661	810
	(Low)	(Mid)	(High)	(Low)	(Mid)	(High)
Frequency (MHz)	1850.2	1880	1909.8	1850.2	1880	1909.8
99% OBW (kHz)	247.31	252.98	247.66	245.80	248.52	245.00
26dB BW (kHz)	321.37	325.02	321.99	318.15	305.71	315.42

Cellular Band					
Modes	WCDMA Band V (RMC 12.2Kbps)				
Channel	4132 (Low)	4183 (Mid)	4233 (High)		
Frequency (MHz)	826.4	836.6	846.6		
99% OBW (MHz)	9% OBW (MHz) 4.11		4.13		
26dB BW (MHz)	4.72	4.76	4.72		

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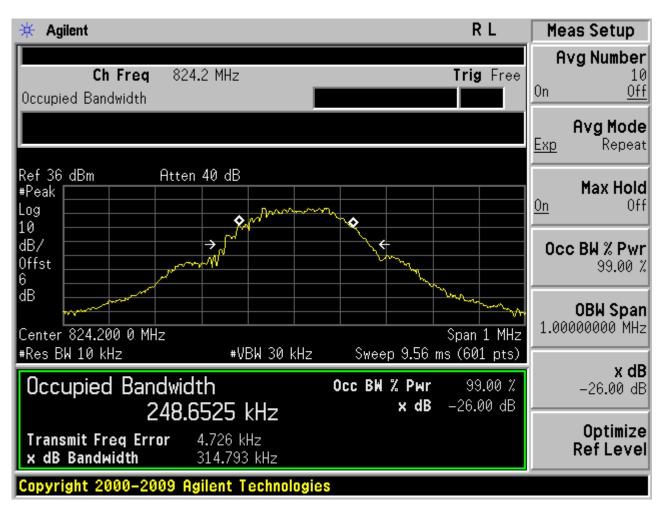
Date: 2014-09-03



PCS Band					
Modes	WCDMA Band II (RMC 12.2Kbps)				
Channel	9262 (Low)	9400 (Mid)	9538 (High)		
Frequency (MHz)	1852.4	1880	1907.6		
99% OBW (MHz)	4.15	4.14	4.12		
26dB BW (MHz)	4.78	4.73	4.76		

3.4.6 Test Result (Plots) of Occupied Bandwidth and 26dB Bandwidth

GSM 850MHz Channel = 128

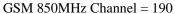


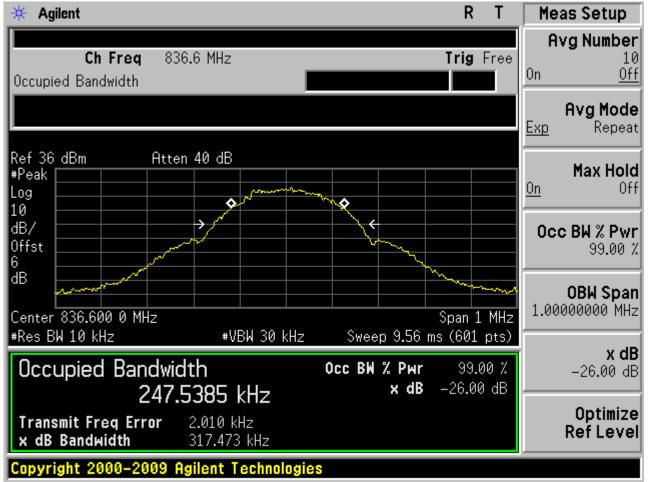
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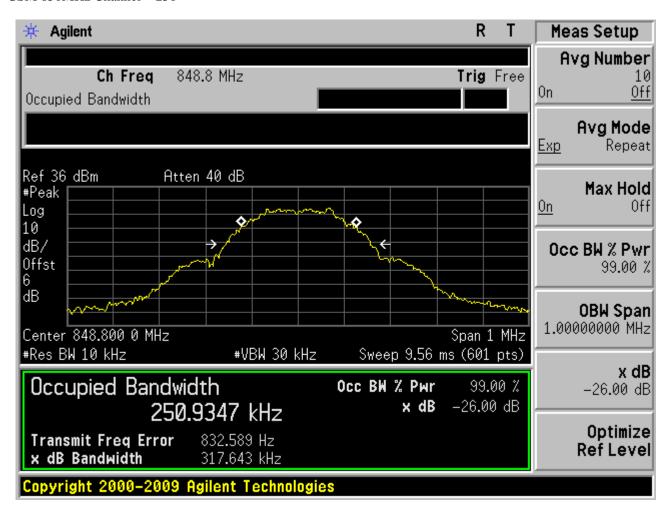
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GSM 850MHz Channel = 251

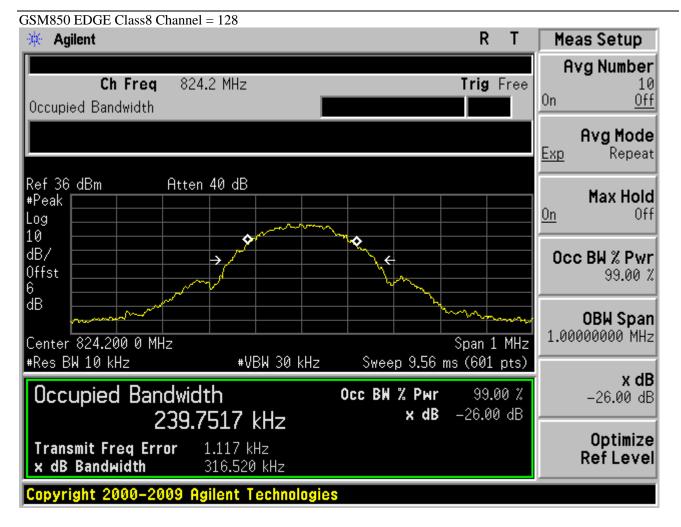


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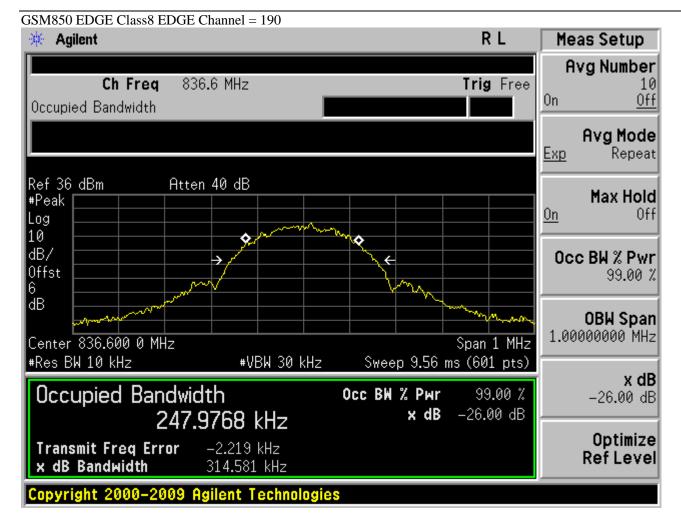


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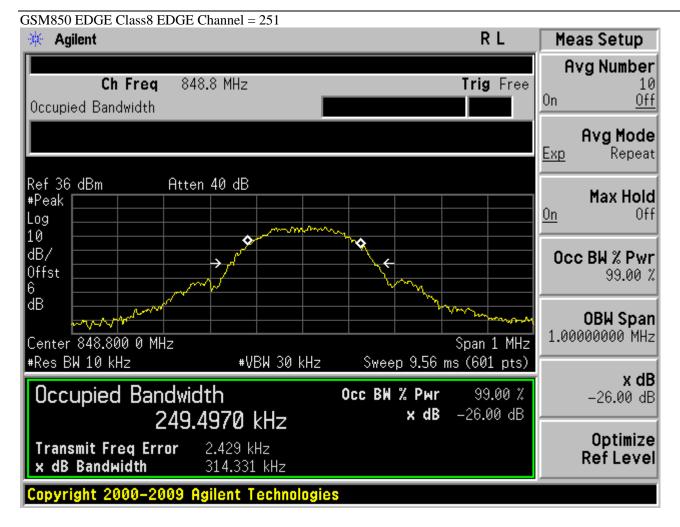


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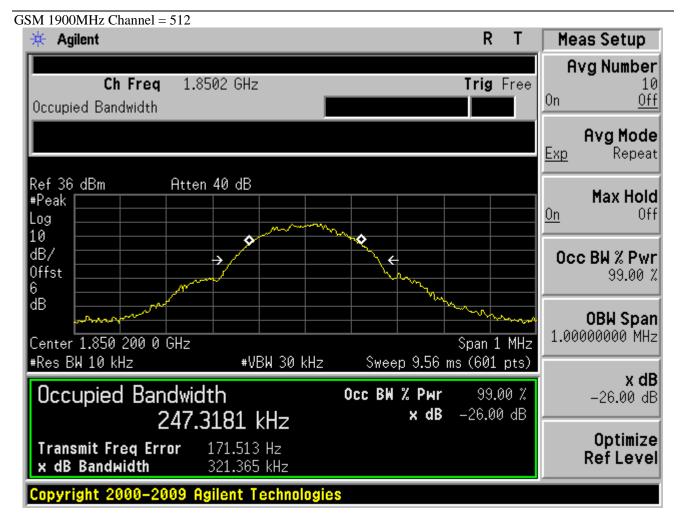


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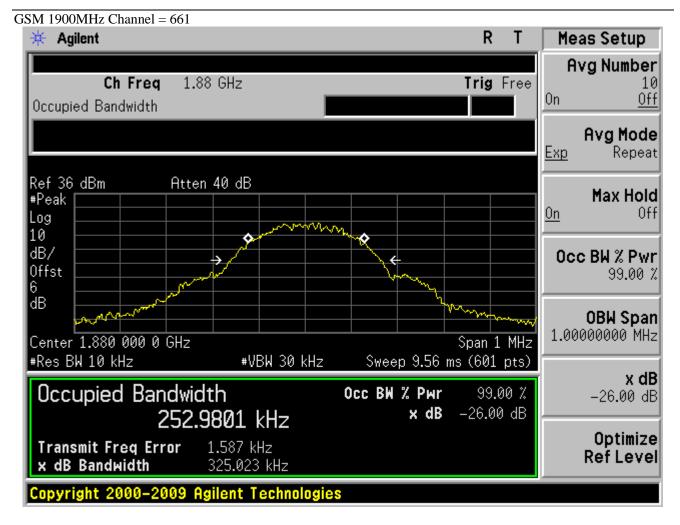


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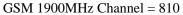


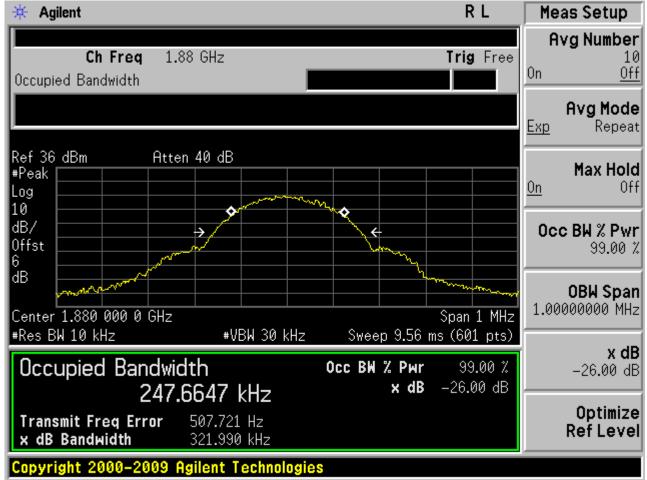
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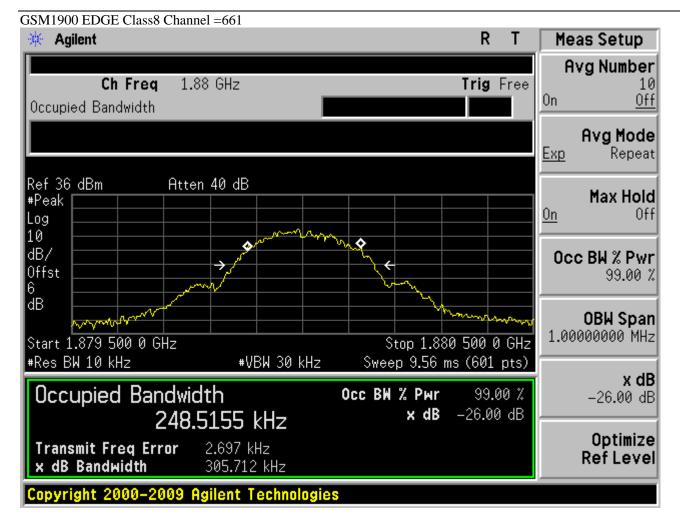


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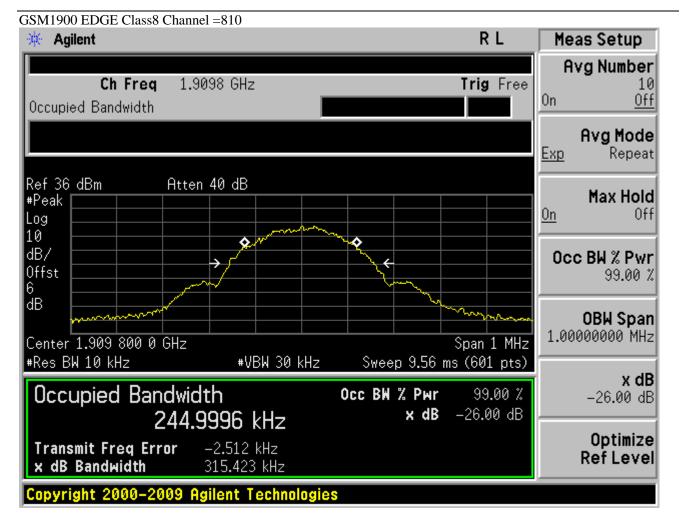


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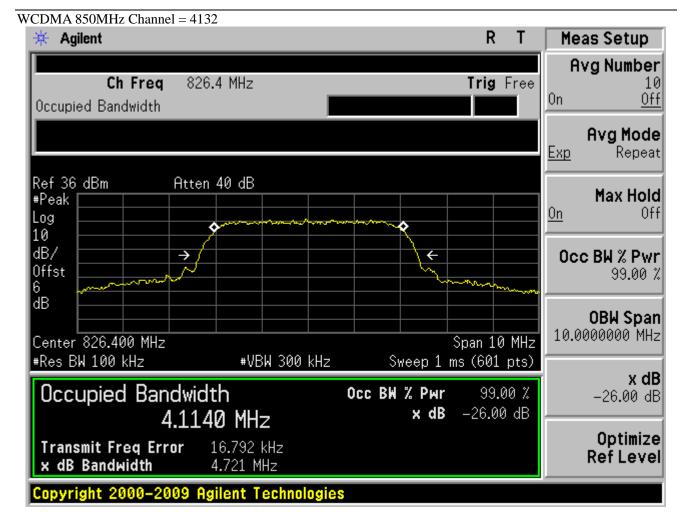


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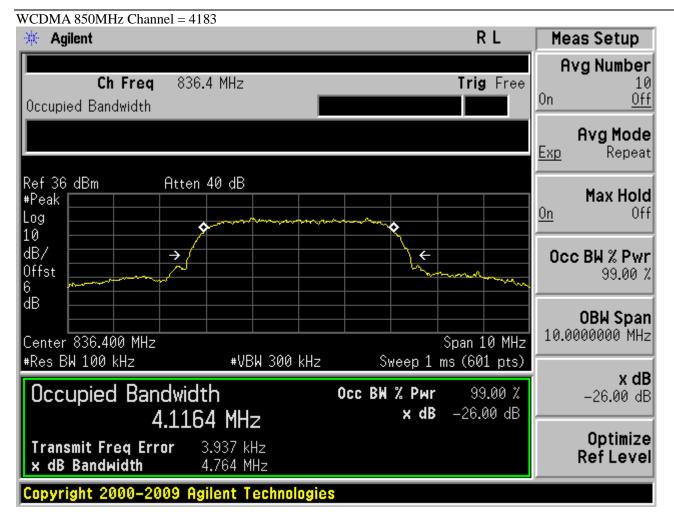


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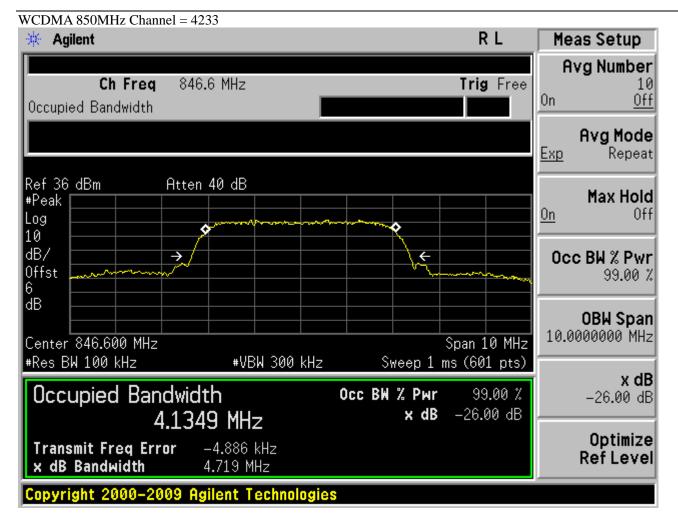


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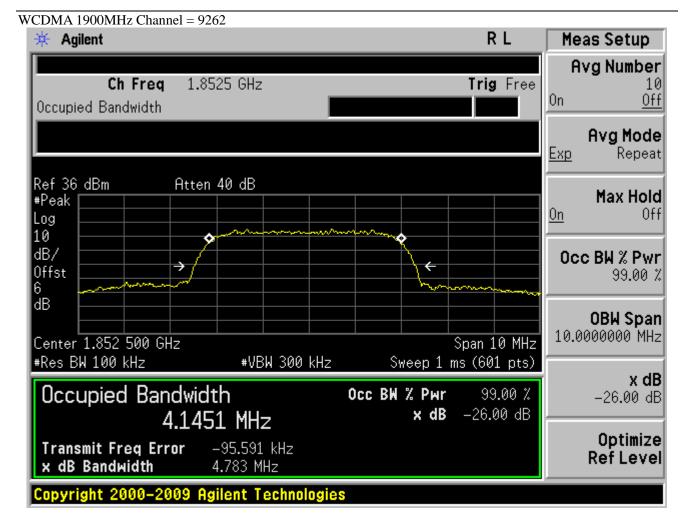


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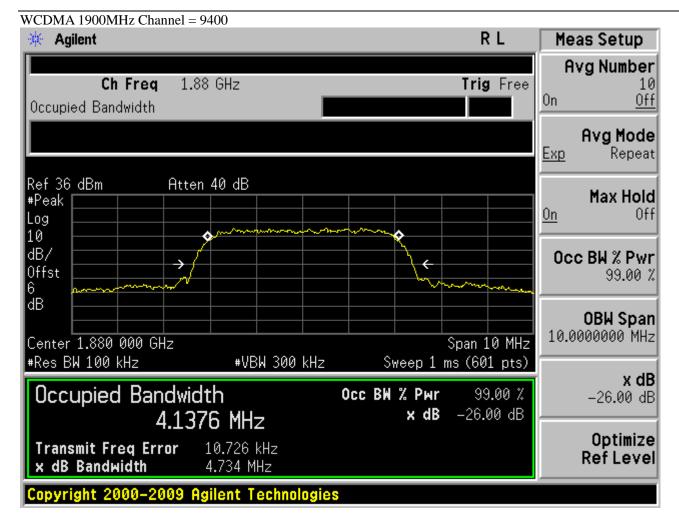


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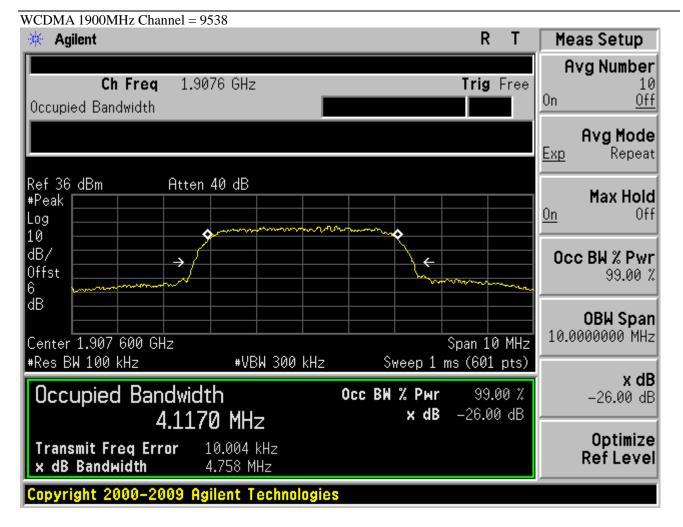


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3.4 Band Edge Measurement

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.

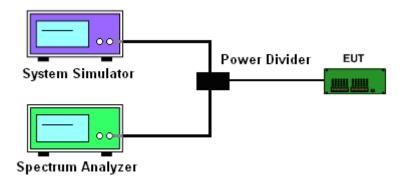
3.4.2 Measuring Instruments

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.
- 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.
- 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



The report refers only to the sample tested and does not apply to the bulk.

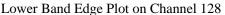
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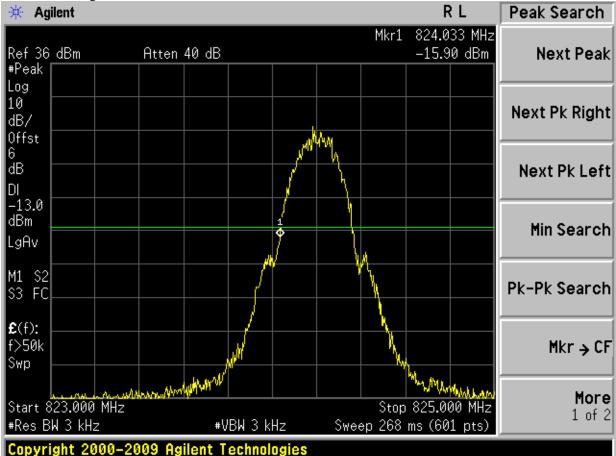
Date: 2014-09-03



3.4.5 Test Result (Plots) of Conducted Band Edge

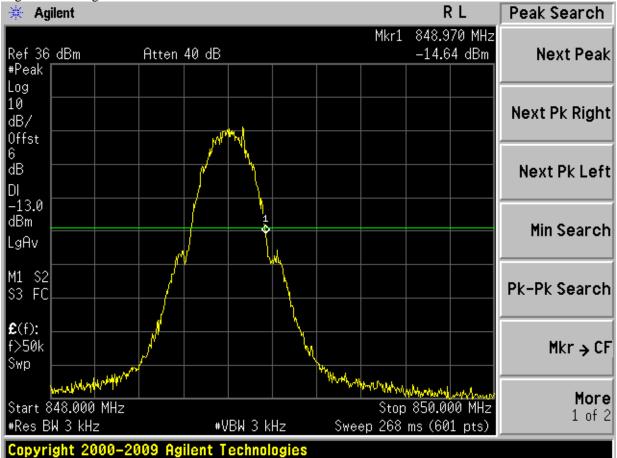
Band:	GSM850	Power Stage :	High
Test Mode :	GSM		









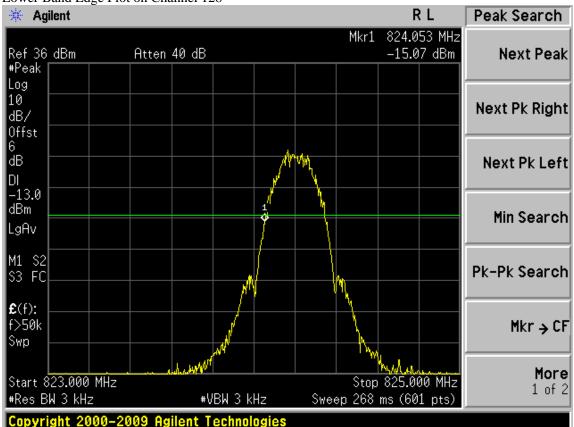


Date: 2014-09-03



Band:	GSM850	Power Stage:	High
Test Mode:	EDGE Class 8 Link		

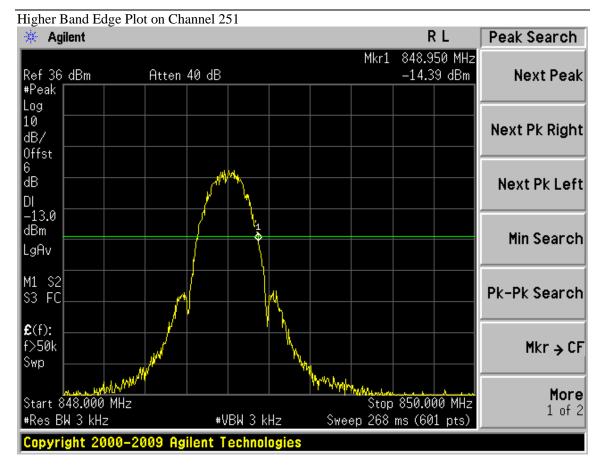
Lower Band Edge Plot on Channel 128



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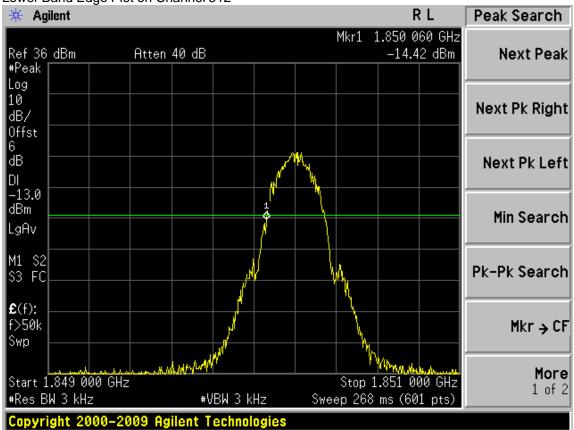
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Band:	GSM1900	Power Stage :	High
Test Mode :	GSM		

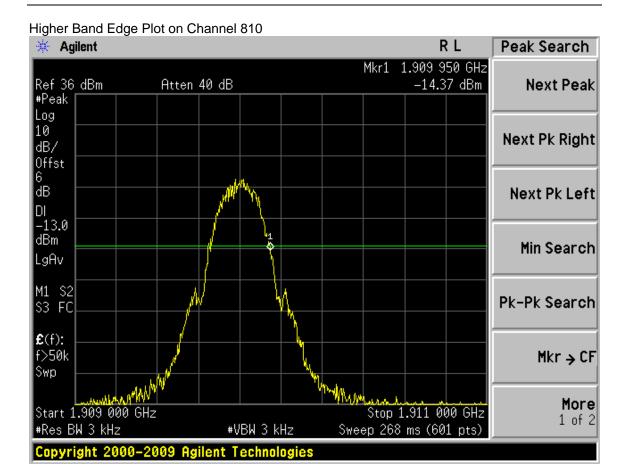




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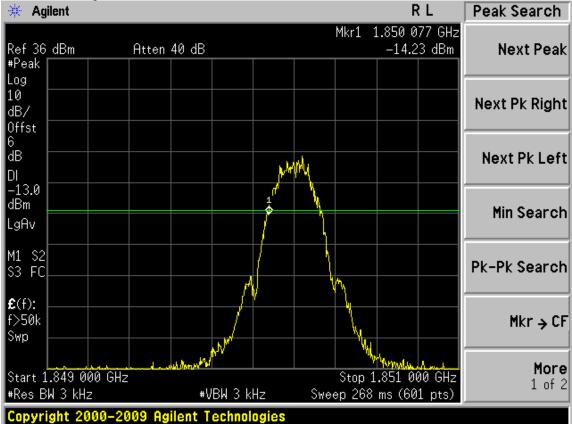


Date: 2014-09-03



Band:	GSM1900	Power Stage :	High
Test Mode:	EDGE Class 8 Link		

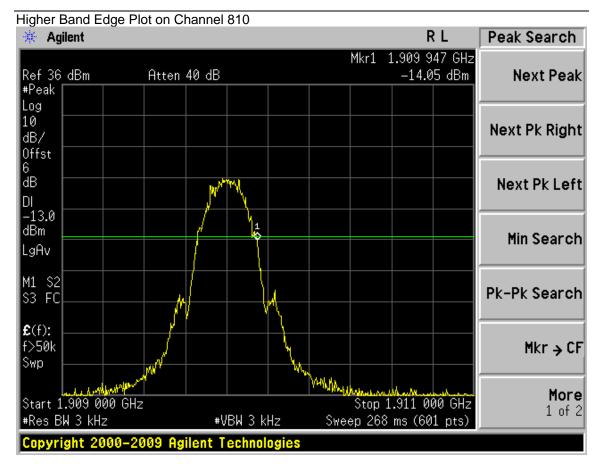




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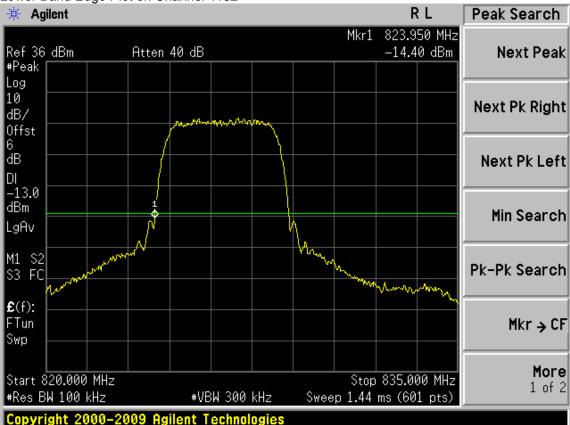
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Date: 2014-09-03



Band:	WCDMA Band V	Power Stage:	High
Test Mode:	RMC 12.2Kbps Link		

Lower Band Edge Plot on Channel 4132



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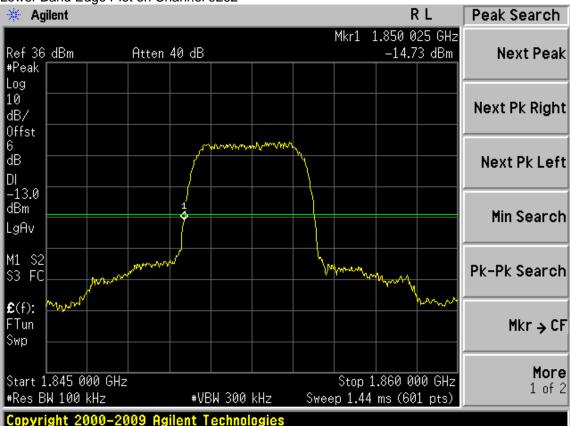


Date: 2014-09-03



Band:	WCDMA Band II	Power Stage:	High
Test Mode:	RMC 12.2Kbps Link		

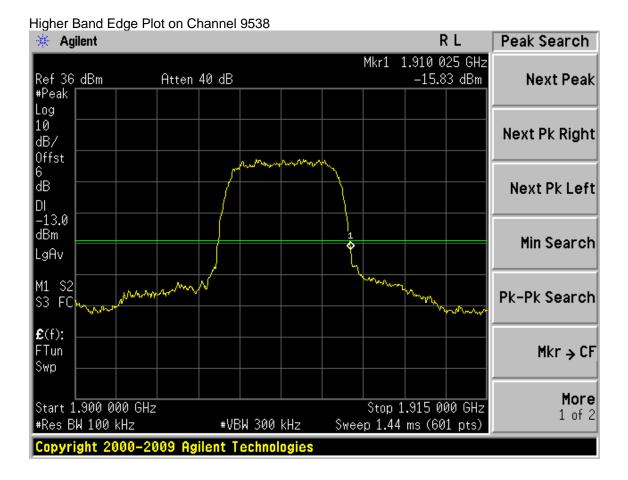




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Date: 2014-09-03



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 10th harmonic.

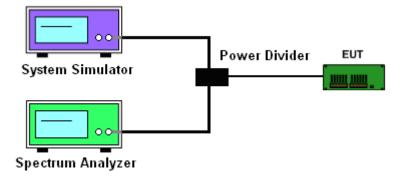
3.5.2 Measuring Instruments

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.
- 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



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Mkr → CF

Stop 1.000 0 GHz

Sweep 92.72 ms (601 pts)

More

1 of 2

Report No: FCC1408087-03

Date: 2014-09-03

£(f): FTun

Swp

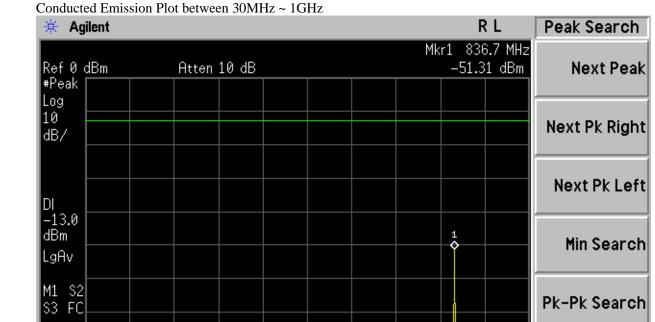
Start 30.0 MHz

#Res BW 100 kHz



3.5.5 Test Result (Plots) of Conducted Emission

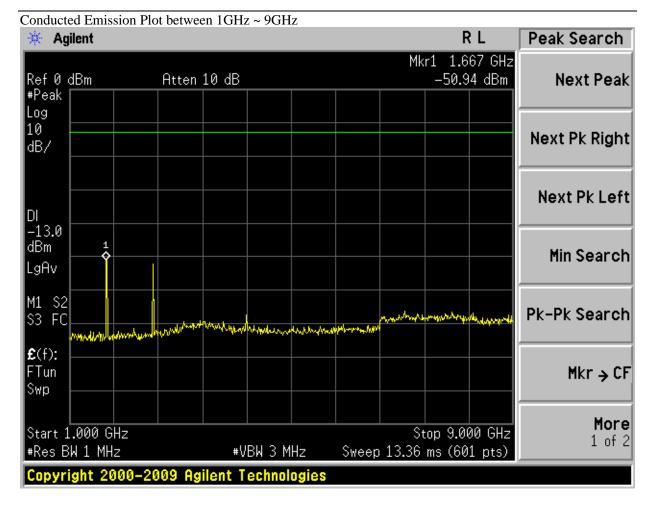
Band:	GSM850	Channel:	CH190
Test Mode:	GPRS 8 Link		



#VBW 300 kHz

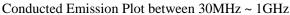
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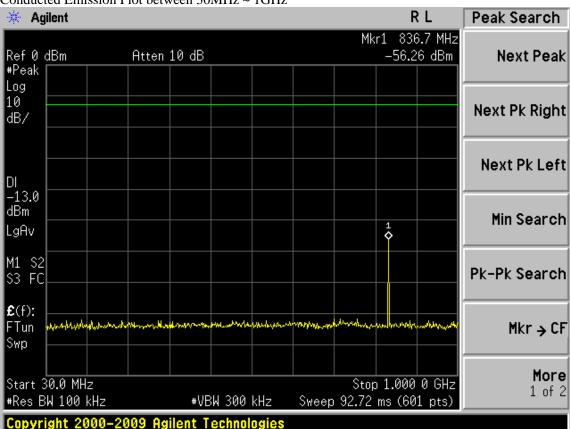




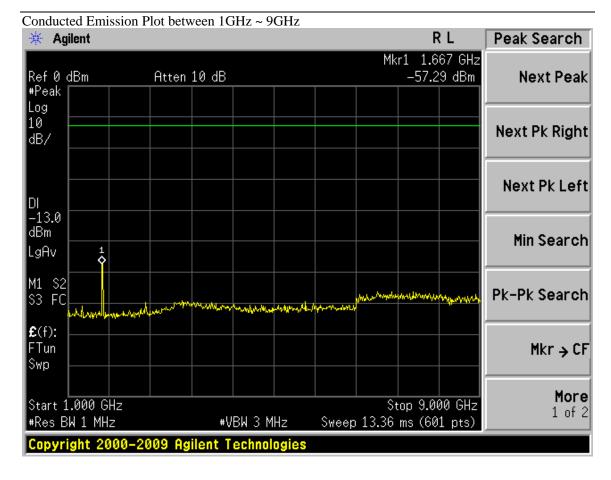


Band:	GSM850	Channel:	CH190
Test Mode:	EDGE Class 8 Link		



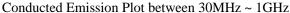


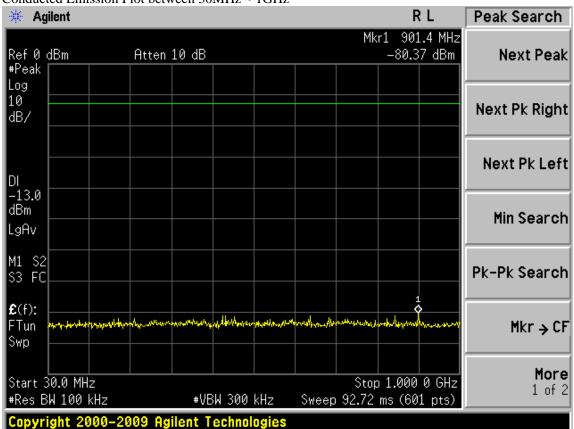




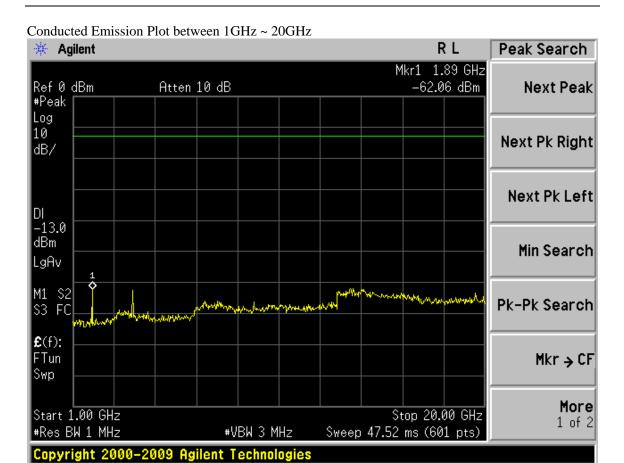


Band:	GSM1900	Channel:	CH661
Test Mode:	GPRS 8 Link		





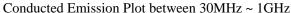


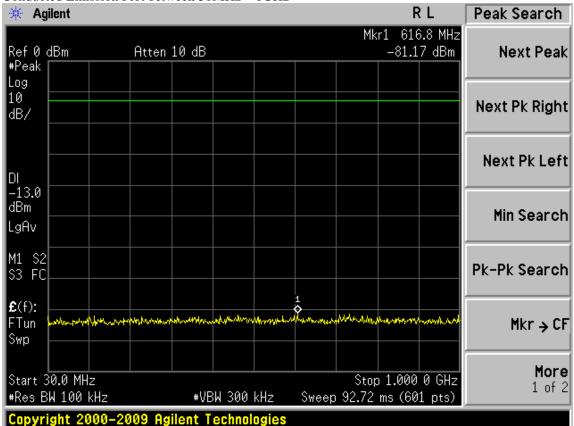


Date: 2014-09-03



Band:	GSM1900	Channel:	CH661
Test Mode:	EDGE Class 8 Link		



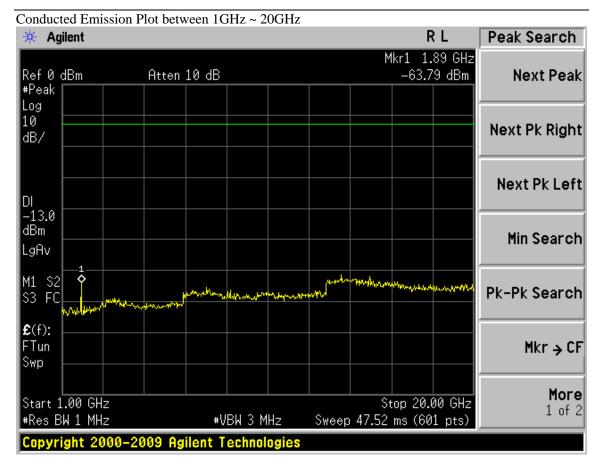


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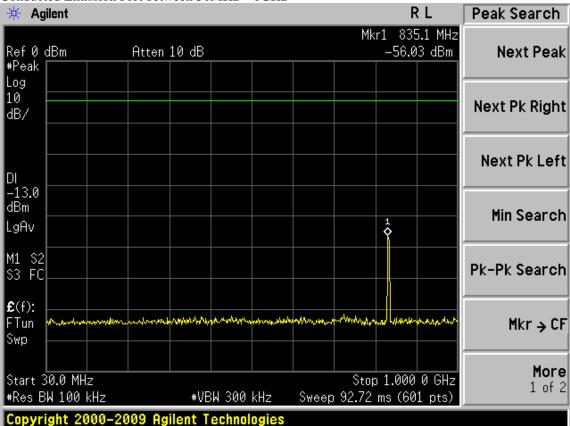
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Band:	WCDMA Band V	Channel:	CH4183
Test Mode:	RMC 12.2Kbps Link		

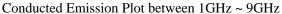


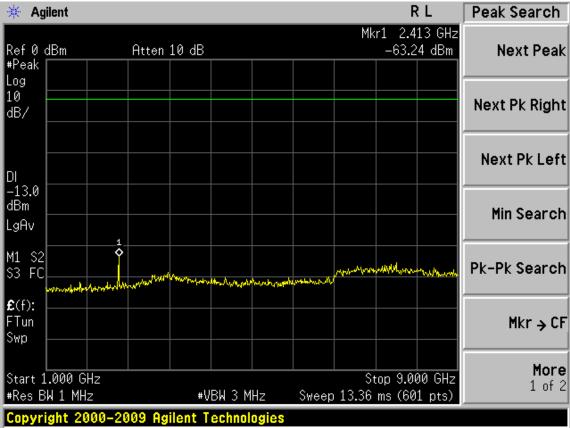


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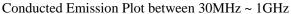


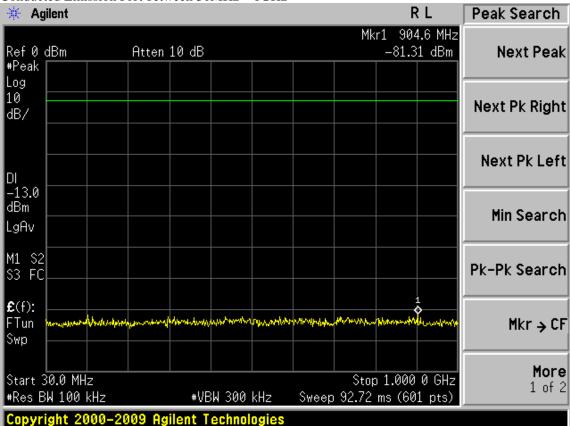


Date: 2014-09-03



Band:	WCDMA Band II	Channel:	CH9400
Test Mode:	RMC 12.2Kbps Link		





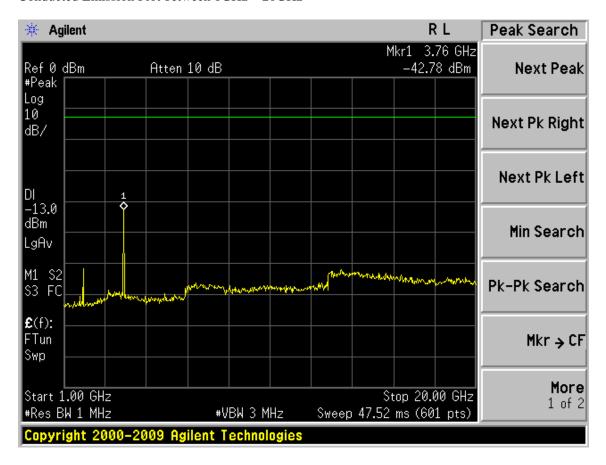
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Conducted Emission Plot between 1GHz ~ 20GHz



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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.
- The EUT was set 3 meters from the receiving antenna, which was mounted on the antenna tower.
- The table was rotated 360 degrees to determine the position of the highest spurious emission.
- 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.
- 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.
- Taking the record of output power at antenna port.
- 9. Repeat step 7 to step 8 for another polarization.
- 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

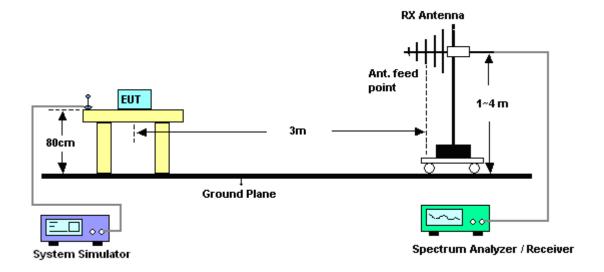
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3.6.4 Test Setup



In the event of the improper use of the report. The Shenzhen Timeway Technology Consulting co.,Ltd reserves the rights to withdraw it and to adopt any other remedies which may be appropriate.

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3.6.5 Test Result of Field Strength of Spurious Radiated

Test Mode	GSM850 GSM		Test Channel	Low
Frequency (MHz)	Spurious Emissions		Limit (dDm)	Dooult
	Polarization	Level(dBm)	Limit (dBm)	Result
1648.40	Vertical	-47.20	-13	Pass
2472.60	Vertical	-44.18	-13	Pass
1648.40	Horizontal	-50.07	-13	Pass
2472.60	Horizontal	-46.12	-13	Pass

Test Mode	GSM850 GSM		Test Channel	Middle
Frequency (MHz)	Spurious Emissions		Limit (dDm)	Dooult
	Polarization	Level(dBm)	Limit (dBm)	Result
1673.20	Vertical	-46.25	-13	Pass
2509.80	Vertical	-50.38	-13	Pass
1673.20	Horizontal	-43.91	-13	Pass
2509.80	Horizontal	-48.04	-13	Pass

Test Mode	GSM850 GSM		Test Channel	High
Frequency (MHz)	Spurious Emissions		Limit (dPm)	Result
	Polarization	Level(dBm)	Limit (dBm)	Result
1697.60	Vertical	-46.13	-13	Pass
2546.41	Vertical	-51.25	-13	Pass
1697.60	Horizontal	-44.35	-13	Pass
2546.41	Horizontal	-47.08	-13	Pass

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Test Mode	GSM1900 GSM		Test Channel	Low
Frequency (MHz)	Spurious Emissions		Limit (dDm)	Dooult
	Polarization	Level(dBm)	Limit (dBm)	Result
3700.40	Vertical	-46.92	-13	Pass
5550.60	Vertical	-46.66	-13	Pass
3700.40	Horizontal	-45.02	-13	Pass
5550.60	Horizontal	-47.83	-13	Pass

Test Mode	GSM1900 GSM		Test Channel	Middle
Frequency (MHz)	Spurious Emissions		Limit (dPm)	Result
	Polarization	Level(dBm)	Limit (dBm)	Result
3760.00	Vertical	-47.62	-13	Pass
5640.00	Vertical	-50.82	-13	Pass
3760.00	Horizontal	-43.19	-13	Pass
5640.00	Horizontal	-52.08	-13	Pass

Test Mode	GSM1900 GSM		Test Channel	High
Frequency (MHz)	Spurious Emissions		Limit (dDm)	Dooult
	Polarization	Level(dBm)	Limit (dBm)	Result
3819.60	Vertical	-47.28	-13	Pass
5729.40	Vertical	-51.39	-13	Pass
3819.60	Horizontal	-42.16	-13	Pass
5729.40	Horizontal	-47.33	-13	Pass

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Test Mode	WCDMA Band V RMC 12.2Kbps		Test Channel	Low
Frequency (MHz)	Spurious Emissions		Lineit (ADne)	Dazult
	Polarization	Level(dBm)	Limit (dBm)	Result
1652.80	Vertical	-54.29	-13	Pass
2479.20	Vertical	-58.12	-13	Pass
1652.80	Horizontal	-51.67	-13	Pass
2479.20	Horizontal	-52.88	-13	Pass

Test Mode	WCDMA Band V RMC 12.2Kbps		Test Channel	Middle
Frequency (MHz)	Spurious Emissions		Lineit (dDire)	Daguit
	Polarization	Level(dBm)	Limit (dBm)	Result
1673.20	Vertical	-56.12	-13	Pass
2509.80	Vertical	-60.32	-13	Pass
1673.20	Horizontal	-54.03	-13	Pass
2509.80	Horizontal	-55.36	-13	Pass

Test Mode	WCDMA Band V RMC 12.2Kbps		Test Channel	High
Frequency (MHz)	Spurious Emissions		Limit (dDm)	Dogult
	Polarization	Level(dBm)	Limit (dBm)	Result
1693.20	Vertical	-55.67	-13	Pass
2539.80	Vertical	-61.29	-13	Pass
1693.20	Horizontal	-51.76	-13	Pass
2539.80	Horizontal	-54.37	-13	Pass

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Test Mode	WCDMA Band II RMC 12.2Kbps		Test Channel	Low
Frequency (MHz)	Spurious Emissions		Limit (dDm)	Decult
	Polarization	Level(dBm)	Limit (dBm)	Result
3704.80	Vertical	-57.22	-13	Pass
5557.20	Vertical	-60.39	-13	Pass
3704.80	Horizontal	-52.72	-13	Pass
5557.20	Horizontal	-55.29	-13	Pass

Test Mode	WCDMA Band V RMC 12.2Kbps		Test Channel	Middle
Frequency (MHz)	Spurious Emissions		Lineit (dDne)	Daguit
	Polarization	Level(dBm)	Limit (dBm)	Result
3760	Vertical	-57.25	-13	Pass
5640	Vertical	-60.22	-13	Pass
3760	Horizontal	-53.37	-13	Pass
5640	Horizontal	-55.80	-13	Pass

Test Mode	WCDMA Band V RMC 12.2Kbps		Test Channel	High
Frequency (MHz)	Spurious E	missions	Limit (dDm)	Dogult
	Polarization	Level(dBm)	Limit (dBm)	Result
3815.20	Vertical	-58.26	-13	Pass
5722.80	Vertical	-61.38	-13	Pass
3815.20	Horizontal	-52.86	-13	Pass
5722.80	Horizontal	-56.79	-13	Pass

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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°C, the testing lowest temperature will be raised in 10°C step until the EUT can be turned on.

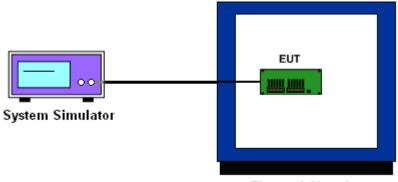
3.7.4 Test Procedures for Voltage Variation

- 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.

Date: 2014-09-03



3.7.5 Test Setup



Thermal Chamber

Date: 2014-09-03



3.7.6 Test Result of Temperature and Voltage Variation

GSM850, Middle Channel

Middle Channel Middle channel, fo =836.6MHz						
Temperature (°C)	Power Supplied (V)	Frequency Error (Hz)	Error (ppm)	Limit (ppm)		
-30	3.1	-35	0.04	2.5		
	3.7	-45	0.05	2.5		
	4.3	-23	0.03	2.5		
	3.1	-26	0.04	2.5		
-20	3.7	-23	0.03	2.5		
	4.3	-22	0.03	2.5		
-10	3.1	-41	0.05	2.5		
	3.7	-39	0.05	2.5		
	4.3	-27	0.03	2.5		
	3.1	-35	0.04	2.5		
0	3.7	-26	0.03	2.5		
	4.3	-31	0.04	2.5		
	3.1	-37	0.04	2.5		
10	3.7	-35	0.04	2.5		
	4.3	-29	0.03	2.5		
20	3.1	-45	0.05	2.5		
	3.7	-23	0.03	2.5		
	4.3	-35	0.04	2.5		
30	3.1	-55	0.07	2.5		
	3.7	-26	0.03	2.5		
	4.3	-43	0.05	2.5		
40	3.1	-36	0.04	2.5		
	3.7	-30	0.04	2.5		
	4.3	-25	0.03	2.5		
50	3.1	-43	0.05	2.5		
	3.7	-35	0.04	2.5		
	4.3	-51	0.06	2.5		

Note: The extreme voltage was declared by the manufacturer.

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EDGE Class 8, Middle Channel

Middle channel, fo =836.6MHz						
Temperature (°C)	Power Supplied (V)	Frequency Error (Hz)	Error (ppm)	Limit (ppm)		
-30	3.1	-53	0.06	2.5		
	3.7	-35	0.04	2.5		
	4.3	-45	0.05	2.5		
-20	3.1	-36	0.04	2.5		
	3.7	-31	0.04	2.5		
	4.3	-28	0.03	2.5		
	3.1	-45	0.05	2.5		
-10	3.7	-33	0.04	2.5		
	4.3	-35	0.04	2.5		
	3.1	-45	0.05	2.5		
0	3.7	-40	0.05	2.5		
	4.3	-32	0.04	2.5		
	3.1	-33	0.04	2.5		
10	3.7	-28	0.03	2.5		
	4.3	-30	0.04	2.5		
20	3.1	-39	0.05	2.5		
	3.7	-45	0.05	2.5		
	4.3	-35	0.04	2.5		
30	3.1	-49	0.06	2.5		
	3.7	-52	0.06	2.5		
	4.3	-37	0.04	2.5		
40	3.1	-32	0.04	2.5		
	3.7	-33	0.04	2.5		
	4.3	-50	0.06	2.5		
50	3.1	-52	0.06	2.5		
	3.7	-46	0.05	2.5		
	4.3	-53	0.06	2.5		

Note: The extreme voltage was declared by the manufacturer.

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GSM1900 Middle Channel:

Middle channel, fo =1880.0MHz						
Temperature	Power Supplied	Frequency Error	Error	Limit		
(℃)	(V)	(Hz)	(ppm)	(ppm)		
-30	3.1	-68	0.04	2.5		
	3.7	-70	0.04	2.5		
	4.3	-66	0.04	2.5		
-20	3.1	-53	0.03	2.5		
	3.7	-62	0.03	2.5		
	4.3	-63	0.03	2.5		
-10	3.1	-59	0.03	2.5		
	3.7	-68	0.04	2.5		
	4.3	-63	0.03	2.5		
	3.1	-56	0.03	2.5		
0	3.7	-58	0.03	2.5		
	4.3	-60	0.03	2.5		
	3.1	-72	0.04	2.5		
10	3.7	-73	0.04	2.5		
	4.3	-68	0.04	2.5		
20	3.1	-68	0.04	2.5		
	3.7	-66	0.04	2.5		
	4.3	-65	0.03	2.5		
30	3.1	-63	0.03	2.5		
	3.7	-69	0.04	2.5		
	4.3	-62	0.03	2.5		
40	3.1	-65	0.03	2.5		
	3.7	-63	0.03	2.5		
	4.3	-61	0.03	2.5		
50	3.1	-70	0.04	2.5		
	3.7	-68	0.04	2.5		
	4.3	-69	0.04	2.5		

Note: The extreme voltage was declared by the manufacturer.

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EDGE Class 8 Middle Channel:

Middle channel, fo =1880.0MHz								
Temperature (°C)	Power Supplied (V)	Frequency Error (Hz)	Error (ppm)	Limit (ppm)				
	3.1	-82	0.04	2.5				
-30	3.7	-85	0.05	2.5				
	4.3	-78	0.04	2.5				
	3.1	-59	0.03	2.5				
-20	3.7	-63	0.03	2.5				
	4.3	-55	0.03	2.5				
	3.1	-67	0.04	2.5				
-10	3.7	-53	0.03	2.5				
	4.3	-58	0.03	2.5				
	3.1	-67	0.04	2.5				
0	3.7	-53	0.03	2.5				
	4.3	-56	0.03	2.5				
	3.1	-66	0.04	2.5				
10	3.7	-55	0.03	2.5				
	4.3	-56	0.03	2.5				
	3.1	-57	0.03	2.5				
20	3.7	-58	0.03	2.5				
	4.3	-62	0.03	2.5				
	3.1	-46	0.02	2.5				
30	3.7	-65	0.03	2.5				
	4.3	-59	0.03	2.5				
	3.1	-42	0.02	2.5				
40	3.7	-53	0.03	2.5				
	4.3	-69	0.04	2.5				
	3.1	-72	0.04	2.5				
50	3.7	-69	0.04	2.5				
	4.3	-75	0.04	2.5				

Note: The extreme voltage was declared by the manufacturer.

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WCDMA Band V

Middle channel, fo =836.6MHz								
Temperature (°C)	Power Supplied (V)	Frequency Error (Hz)	Error (ppm)	Limit (ppm)				
	3.1	-39	0.05	2.5				
-30	3.7	-42	0.05	2.5				
	4.3	-42	0.05	2.5				
	3.1	-63	0.08	2.5				
-20	3.7	-45	0.05	2.5				
	4.3	-48	0.06	2.5				
	3.1	-50	0.06	2.5				
-10	3.7	-39	0.05	2.5				
	4.3	-43	0.05	2.5				
	3.1	-47	0.06	2.5				
0	3.7	-46	0.05	2.5				
	4.3	-45	0.05	2.5				
	3.1	-37	0.04	2.5				
10	3.7	-36	0.04	2.5				
	4.3	-45	0.05	2.5				
	3.1	-46	0.05	2.5				
20	3.7	-52	0.06	2.5				
	4.3	-39	0.05	2.5				
	3.1	-62	0.07	2.5				
30	3.7	-48	0.06	2.5				
	4.3	-49	0.06	2.5				
	3.1	-44	0.05	2.5				
40	3.7	-39	0.05	2.5				
	4.3	-46	0.05	2.5				
	3.1	-58	0.07	2.5				
50	3.7	-46	0.05	2.5				
	4.3	-42	0.05	2.5				

Note: The extreme voltage was declared by the manufacturer.

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WCDMA Band II

Middle channel, fo =1880.0MHz								
Temperature (°C)	Power Supplied (V)	Frequency Error (Hz)	Error (ppm)	Limit (ppm)				
	3.1	-58	0.03	2.5				
-30	3.7	-65	0.03	2.5				
	4.3	-73	0.04	2.5				
	3.1	-66	0.04	2.5				
-20	3.7	-69	0.04	2.5				
	4.3	-48	0.03	2.5				
	3.1	-45	0.02	2.5				
-10	3.7	-63	0.03	2.5				
	4.3	-65	0.03	2.5				
	3.1	-69	0.04	2.5				
0	3.7	-42	0.02	2.5				
	4.3	-50	0.03	2.5				
	3.1	-56	0.03	2.5				
10	3.7	-69	0.04	2.5				
	4.3	-45	0.02	2.5				
	3.1	-45	0.02	2.5				
20	3.7	-44	0.02	2.5				
	4.3	-62	0.03	2.5				
	3.1	-39	0.02	2.5				
30	3.7	-61	0.03	2.5				
	4.3	-42	0.02	2.5				
	3.1	-46	0.02	2.5				
40	3.7	-53	0.03	2.5				
	4.3	-56	0.03	2.5				
	3.1	-54	0.03	2.5				
50	3.7	-65	0.03	2.5				
	4.3	-59	0.03	2.5				

Note: The extreme voltage was declared by the manufacturer.

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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.

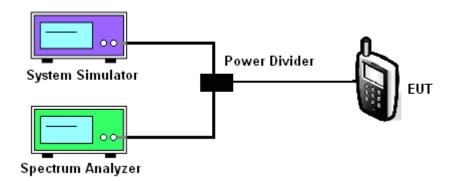
3.8.2 Measuring Instruments

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

3.8.3 Test Procedures

- The EUT was connected to Spectrum Analyzer and System Simulator via power divider.
- 2. For GSM/EGPRS operating modes:
 - 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



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3.8.5 Test Result of Peak-to-Average Ratio

PCS Band										
Modes	GSM1900 (GSM)			GSM1900 (EDGE class 8)			WCDMA Band II (RMC 12.2Kbps)			
Channel	512 (Low)	661 (Mid)	810 (High)	512 (Low)	661 (Mid)	810 (High)	9262 9400 9538 (Low) (Mid) (High			
Frequency (MHz)	1850.2	1880	1909.8	1850.2	1880	1909.8	1852.4	1880	1907.6	
Peak-to-Average Ratio (dB)	0.36	0.24	0.32	2.58	2.53	2.58	2.67	2.72	2.73	

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3.9 Mains Conducted Emissions

3.9.1 Measurement Method

The measurement procedure specified in ANSI C63.4-2003 was used for testing. Conducted Emission was measured with travel charger.

3.9.2 Provisions Applicable

Frequency of Emission (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.						
*The lower limit shall apply at the transition frequency.						

Note: The GSM850 mode is the worst condition and the test result as following:

any other remedies which may be appropriate.

Date: 2014-09-03



Conducted Emission on Live Terminal (150kHz to 30MHz) A:

EUT Operating Environment

Temperature: 26°C Humidity: 65%RH Atmospheric Pressure: 101 KPa

EUT set Condition: Charging and Communication by GSM850

Equipment Level: Class B

Results: PASS

Please refer to following diagram for individual

80.0 dBuV Qp: AVG: \Ajjko~oon.wojikaapoodoopoodoopoodoopoodoopoodoo 0.0 0.150 0.5 (MHz) 5 30.000 Reading Correct Measure-Limit Over No. Mk. Freq. Level Factor ment MHz dBuV dΒ dBuV dBuV dB Detector Comment 0.4612 30.60 11.33 41.93 56.67 -14.74 QΡ 1 2 0.4612 8.30 11.33 19.63 46.67 -27.04 AVG 0.5185 56.00 -14.81 QΡ 3 29.80 11.39 41.19 4 0.5185 7.50 11.39 18.89 46.00 -27.11 AVG QΡ 5 1.1500 25.90 11.96 37.86 56.00 -18.14 6 1.1500 -2.2011.96 9.76 46.00 -36.24 AVG 7 1.8951 12.26 56.00 -19.34 QΡ 24.40 36.66 -3.7046.00 -37.44 8 1.8951 12.26 8.56 AVG 9 2.9094 23.00 12.66 35.66 56.00 -20.34 QΡ 2.9094 -1.1012.66 11.56 46.00 -34.44 AVG 10

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B: Conducted Emission on Neutral Terminal (150kHz to 30MHz)

EUT Operating Environment

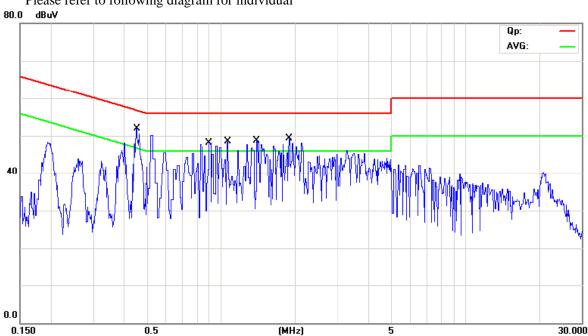
Temperature: 26°C Humidity: 65%RH Atmospheric Pressure: 101 KPa

EUT set Condition: Charging and Communication by GSM850

Equipment Level: Class B

Results: PASS

Please refer to following diagram for individual



No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
	MHz	dBu∀	dB	dBuV	dBuV	dB	Detector	Comment
1 *	0.4500	31.00	11.32	42.32	56.88	-14.56	QP	
2	0.4500	5.90	11.32	17.22	46.88	-29.66	AVG	
3	0.9017	25.80	11.80	37.60	56.00	-18.40	QP	
4	0.9017	-2.60	11.80	9.20	46.00	-36.80	AVG	
5	1.0580	24.00	11.92	35.92	56.00	-20.08	QP	
6	1.0580	-5.10	11.92	6.82	46.00	-39.18	AVG	
7	1.3945	25.80	12.06	37.86	56.00	-18.14	QP	
8	1.3945	-3.00	12.06	9.06	46.00	-36.94	AVG	
9	1.8998	24.30	12.26	36.56	56.00	-19.44	QP	
10	1.8998	-4.70	12.26	7.56	46.00	-38.44	AVG	

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4 **List of Measuring Equipment**

Test Equipments								
Instrument Type	Manufacturer	Model	Serial No.	Date of Cal.	Due Date			
ESPI Test Receiver	R&S	ESPI 3	100379	2014-08-21	2015-08-20			
TWO Line-V-NETW	R&S	EZH3-Z5	100294	2014-08-22	2015-08-21			
TWO Line-V-NETW	R&S	EZH3-Z5	100253	2014-08-22	2015-08-21			
Ultra Broadband ANT	R&S	HL562	100157	2014-08-23	2015-08-22			
ESDV Test Receiver	R&S	ESDV	100008	2014-08-22	2015-08-21			
Impuls-Begrenzer	R&S	ESH3-Z2	100281	2014-08-21	2015-08-20			
System Controller	CT	SC100	-					
Printer	EPSON	PHOTO EX3	CFNH234850					
Computer	IBM	8434	1S8434KCE99BLXLO*	-	-			
Loop Antenna	EMCO	6502	00042960	2014-08-22	2015-08-21			
ESPI Test Receiver	R&S	ESI26	838786/013	2014-08-22	2015-08-21			
3m OATS			N/A	2014-08-21	2015-08-20			
Horn Antenna	R&S	BBHA 9170	BBHA9170265	2014-08-23	2015-08-22			
Horn Antenna	R&S	BBHA 9120D	9120D-631	2014-08-23	2015-08-22			
Power meter	Anritsu	ML2487A	6K00003613	2014-08-22	2015-08-21			
Power sensor	Anritsu	MA2491A	32263	2014-08-22	2015-08-21			
Bilog Antenna	Schwarebeck	VULB9163	9163/340	2014-08-23	2015-08-22			
LISN	AFJ	LS16C	10010947251	2014-08-21	2015-08-20			
LISN (Three Phase)	Schwarebeck	NSLK 8126	8126453	2014-08-22	2015-08-21			
9*6*6 Anechoic			N/A	2014-08-21	2015-08-20			
EMI Test Receiver	RS	ESCS30	100139	2014-08-22	2015-08-21			
Universal Radio Communication Tester	RS	CMU200	1100.0008.02	2013-11-28	2014-11-27			
Spectrum Analyzer	Agilent	E4440A	US44300286	2014-03-23	2015-03-22			

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Date: 2014-05-26



5.0 Photographs

Conducted Emission Test Setup:



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Radiated Emission Test Setup:





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Photographs - EUT







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Outside view



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Inside view





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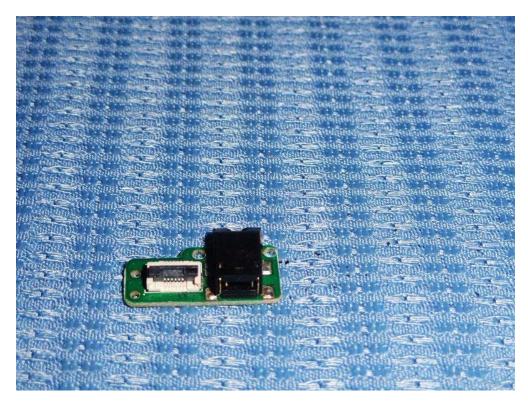
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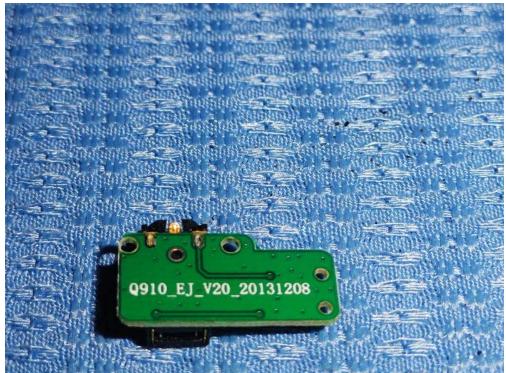
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