



Test Report

Product Name : MMLink-G
Model No : GWA-G10
FCC ID : AURMMLINK-G

Applicant : YASKAWA INFORMATION SYSTEMS Corporation
Address : 5-15, HIGASHI-OJI-MACHI, YAHATANISHI-KU,
KITAKYUSHU 806-0037, JAPAN

Date of Receipt : 2011/11/21
Issued Date : 2012/04/02
Report No. : 1211000R-HPUSP07V01
Report Version : V 1.0



The test results relate only to the samples tested.
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This report must not be used to claim product endorsement by NVLAP any agency of the U.S. Government

Test Report Certification

Issued Date : 2012/04/02

Report No.: 1211000R-HPUSP07V01



Accredited by NIST (NVLAP)

NVLAP Lab Code: 200533-0

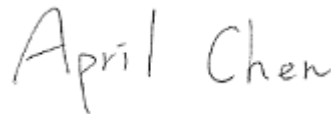
Product Name : MMLink-G
Applicant : YASKAWA INFORMATION SYSTEMS Corporation
Address : 5-15, HIGASHI-OJI-MACHI, YAHATANISHI-KU, KITAKYUSHU
806-0037, JAPAN
Manufacturer : YASKAWA CONTROLS CO., LTD.
Trade Name : YASKAWA
Model No. : GWA-G10
EUT Rated Voltage : AC 120V~240V
EUT Test Voltage : AC 120V
Measurement Standard : FCC CFR Title 47 Part 2 22 24
Measurement : TIA/EIA 603-C
Reference
Test Result : Complied

Test results relate only to the samples tested.

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Documented By :



(Adm. Assistant / April Chen)

Tested By :



(Engineer / Wen Lee)

Approved By :



(Manager / Vincent Lin)

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1. GENERAL INFORMATION

1.1. EUT Description

Product Name	MMLink-G
Model No.	GWA-G10
Trade Name	YASKAWA
WWAN Modular	MFR: CINTERION, M/N: MC55i
IMEI No.	356497-xx-xxxxxx-x
FCC ID	AURMMLINK-G
Antenna Type	External
Antenna Kit	Refer Antenna list
TX Frequency	824MHz~849MHz(GSM 850) 1850MHz ~ 1910MHz(PCS 1900)
Rx Frequency	869MHz~894MHz(GSM 850) 1930MHz ~ 1990MHz(PCS 1900)
Function	GPRS

Antenna List

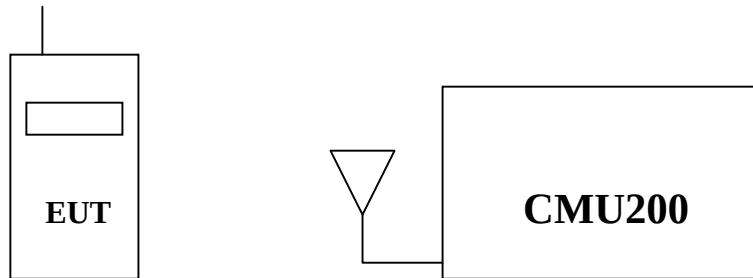
No.	Manufacturer	Part No.	Peak Gain
1	Nippon Antenna	DP-BRO-AD	0 dBi(815-2170MHz)
2	Nippon Antenna	DP-BRO	-0.1dBi (824-925MHz)
			1.6dBi (1850-1920MHz)
3	SMARTEQ	1140.26SMA	-1.35dBi (824-960MHz)
			-1.35dBi (1710-2170MHz)

*Note : Only the higher gain antenna was tested and recorded in this report.

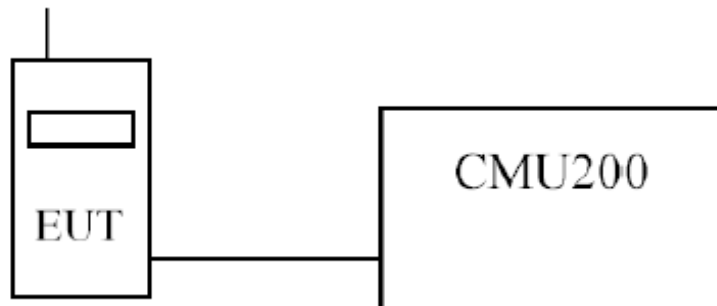
(GSM 850 are used DP-BRO-AD antenna ; GSM 1900 are used DP-BRO antenna)

1.3. Configuration of tested System

(a) Configuration of Radiated measurement



(b) Configuration of Conducted measurement



1.4. EUT Setup Procedures

- (1) Setup the EUT and simulators as shown on 1.3
- (2) Turn on the power of all equipments.
- (3) The EUT was set to communicate with CMU200.
- (4) Repeat the above procedure (3).

1.5. Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	21
Humidity (%RH)	25-75	53
Barometric pressure (mbar)	860-1060	982

Site Description: File on
Federal Communications Commission
FCC Engineering Laboratory
7435 Oakland Mills Road
Columbia, MD 21046
FCC Registration Number :92195

July 03, 2001 Accreditation on NVLAP
NVLAP Lab Code: 200533-0

Site Name: Quie Tek Corporation

Linkou Testing Laboratory:

No. 5-22, Rueishu Keng, Linkou Dist.,
New Taipei City 24451,
Taiwan. R.O.C.
TEL : 886-2-8601-3788 / FAX : 886-2-8601-3789
E-Mail : service@quietek.com

FCC Accreditation Number: TW1014

1.6. Type of Emission

GSM/GPRS: 300KGXW

1.7. voltages and DC currents

GPRS 850/1900	
EUT Transmitting (in maximum power) :	DC voltage : 5V , DC current : 1.5 A
EUT Standby	: DC voltage : 5V , DC current : 1 A

2. Peak Power Output

2.1. Test Equipment

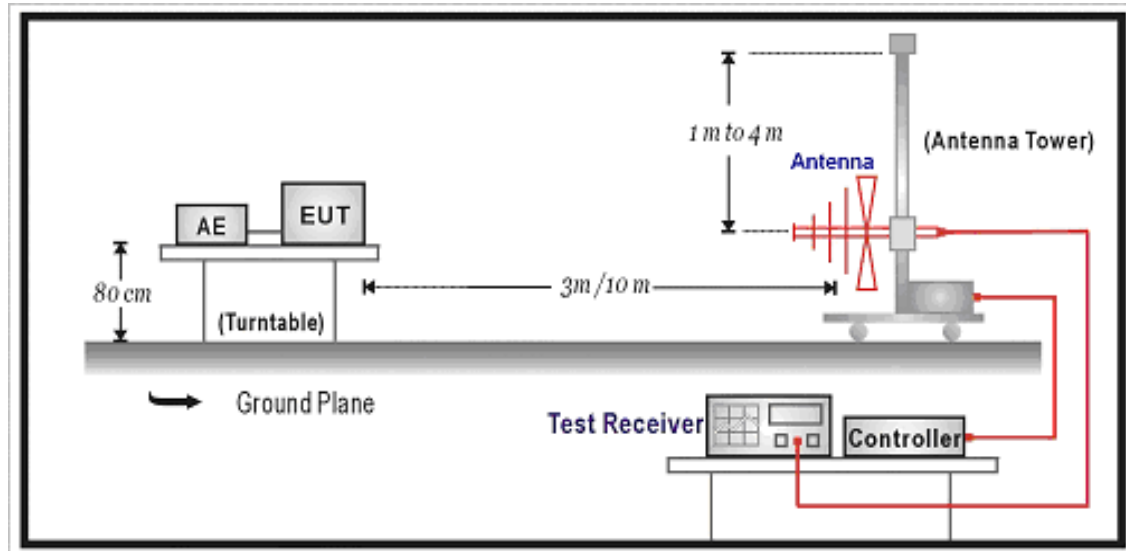
The following test equipments are used during the radiated emission test:

Test Site	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
☑CTR	Spectrum Analyzer	Agilent	N9020A / MY48010570	2011/05/19
	Dual Directional couple	Agilent	778D / 50550	2011/09/16
	Directional coupler	Agilent	87300C / 3239A01864	2011/09/16
☑Site#3	Test Receiver	R & S	ESCS 30/ 100367	2011/09/23
	Universal Radio Communication Tester	R&S	CMU200/104846	2011/05/20
	Spectrum Analyzer	Agilent	N9000A/ MY50510070	2012/03/12
	Bilog Antenna	Schaffner Chase	CBL6112B/ 2704	2011/07/22
	Horn Antenna	Schwarzbeck	9120D / 556	2011/11/04
	Pre-Amplifier	QTK	QTK-LK-E-I-AMP4/ CHM-0201003	2011/07/04

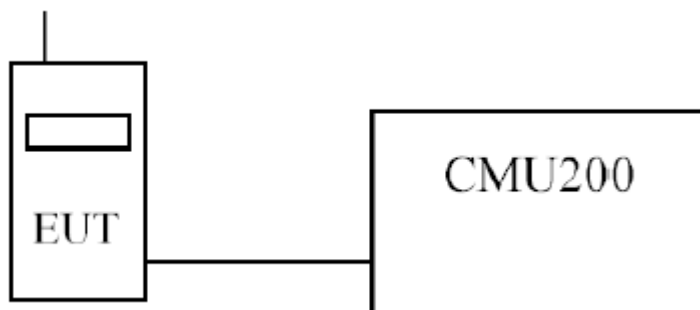
Note: All equipments that need to be calibrated are with calibration period of 1 year.

2.2. Test Setup

Radiated Power Measurement



Conducted Power Measurement



2.3. Limits

Cellular Band 850	<7W
PCS Band 1900	<2W or +33dBm

2.4. Test Procedure

➤RF Out Power (Radiated)

The Spectrum Analyzer was tuned to the test frequency. The EUT was tested in three The device was put into Transmit mode then rotated through 360 degrees until the highest power level was observed in both horizontal and vertical polarization. The device was then replaced with a substitution antenna, which input signal was adjusted until the received level matched that of the previously detected emission.

- (1) The EUT is tested with maximum rated TX power via the Base Station simulator.
- (2) The EUT is tested in three orthogonal planes , The worst case test configuration was found in the horizontal position.

➤RF Out Power (Conducted)

The EUT is tested with maximum rated TX power via the Base Station simulator, and the output power was measured at the antenna terminals of the EUT.

2.5. Test Specification

According to Part 2.1046, 22.913, 24.232.

2.6. Test Result of Peak Power Output

Product	MMLink-G			
Test Mode	RF Output Power (Conducted)			
Date of Test	2012/01/03	Test Site	CTR	

GPRS 850 (↑)				
Frequency (MHz)	Output Power (dBm)	Path Loss (dB)	Result (dBm)	Result (W)
824.2	31.59	1.48	33.07	2.03
836.4	31.67	1.48	33.15	2.07
848.8	31.71	1.48	33.19	2.08
GPRS 1900 (↑)				
Frequency (MHz)	Output Power (dBm)	Path Loss (dB)	Result (dBm)	Result (W)
1850.2	28.51	2.43	30.94	1.24
1880	28.20	2.43	30.63	1.16
1909.8	28.10	2.43	30.53	1.13
Note: The output power are measurement in external connector of device's case.				

GPRS 850 (↑ ↑)				
Frequency (MHz)	Output Power (dBm)	Path Loss (dB)	Result (dBm)	Result (W)
824.2	31.59	1.48	33.07	2.03
836.4	31.67	1.48	33.15	2.07
848.8	31.69	1.48	33.17	2.07
GPRS 1900 (↑ ↑)				
Frequency (MHz)	Output Power (dBm)	Path Loss (dB)	Result (dBm)	Result (W)
1850.2	28.49	2.43	30.92	1.24
1880	28.07	2.43	30.50	1.12
1909.8	28.07	2.43	30.50	1.12
Note: The output power are measurement in external connector of device's case.				

Product	MMLink-G		
Test Mode	RF Output Power (Radiated)		
Date of Test	2012/03/26	Test Site	Site3
Test Condition	GSM 850 GPRS		

Maximum Power-GSM 850 GPRS

Frequency (MHz)	Reading Level (dBm)	Substitution Level (dBm)	Substitution Antenna Gain (dBd)	Cable Loss (dB)	Result ERP (dBm)	Result ERP (W)
824.2	22.73	29.18	1.75	0.6	30.33	1.08
836.4	22.68	29.14	1.75	0.6	30.29	1.07
848.8	22.25	28.72	1.75	0.6	29.87	0.97

Note:

1. The EUT meets the requirements of FCC CFR 47: Part 22, Section 22.913(a) for Effective Radiated Power.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:1MHz
3. Result ERP = Substitution Level + Substitution Antenna Gain - Cable Loss

Product	MMLink-G		
Test Mode	RF Output Power (Radiated)		
Date of Test	2012/03/26	Test Site	Site3
Test Condition	PCS 1900 GPRS		

Maximum Power-PCS 1900 GPRS

Frequency (MHz)	Reading Level (dBm)	Substitution Level (dBm)	Substitution Antenna Gain (dBi)	Cable Loss (dB)	Result EIRP (dBm)	Result EIRP (W)
1850.2	-10.42	21.767	10.4	1.02	31.147	1.30
1880.0	-11.75	20.652	10.4	1.02	30.032	1.01
1909.8	-12.58	19.861	10.4	1.02	29.241	0.84

Note:

1. The EUT meets the requirements of FCC CFR 47: Part 24, Section 24.232(b) for Effective Isotropically Radiated Power.
2. Receiver setting (Peak Detector) : RBW:1MHz; VBW:1MHz
3. Result EIRP = Substitution Level + Substitution Antenna Gain - Cable Loss

3. Occupied Bandwidth

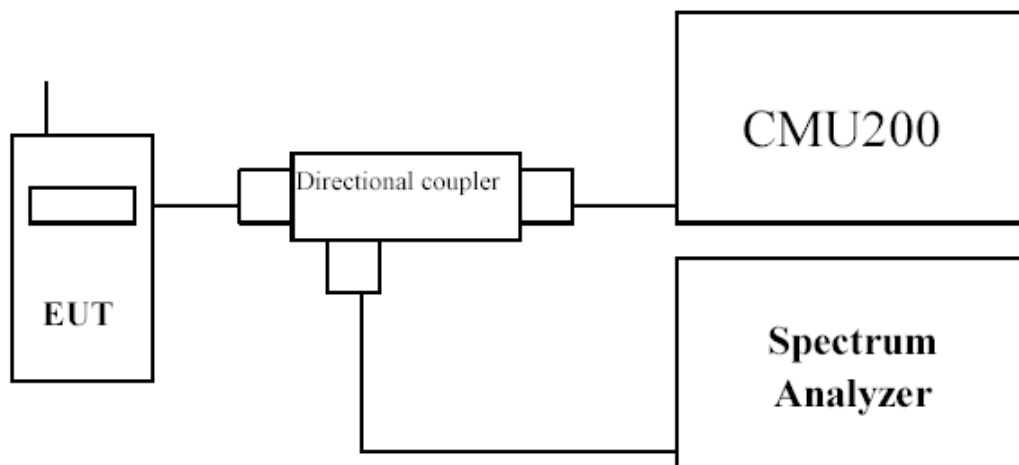
3.1. Test Equipment

The following test equipments are used during the occupied bandwidth tests:

Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Spectrum Analyzer	Agilent	N9020A / MY48010570	2011/05/19
Universal Radio Communication Tester	R & S	CMU200 / 104846	2011/05/20
Directional coupler	Agilent	87300C / 3239A01864	2011/09/16
Directional coupler	Agilent	778D / 50550	2011/09/16

Note: All equipments upon which need to be calibrated are with calibration period of 1 year.

3.2. Test Setup



3.3. Test Procedure

The EUT is tested with maximum rated TX power via the Base Station simulator, and the occupied bandwidth was measured at the antenna terminals of the EUT.

The Resolution BW of the analyzer is set to 1 % of the emission bandwidth. The EUT's occupied bandwidth is measured as the width of the signal between two points, one below the carrier center frequency and one above the carrier frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

The plots below show the resultant display from the Spectrum Analyzer.

3.4. Test Specification

According to Part 2.1049, 22.917(b), 24.238(b).

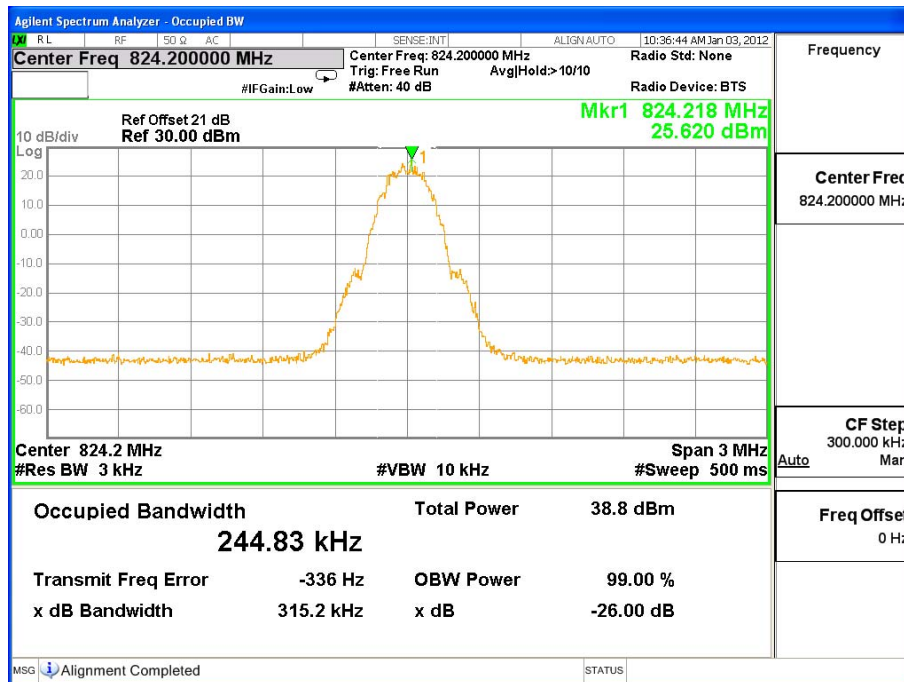
3.5. Test Result of Occupied Bandwidth

Product	MMLink-G
Test Mode	Occupied Bandwidth
Test Site	CTR

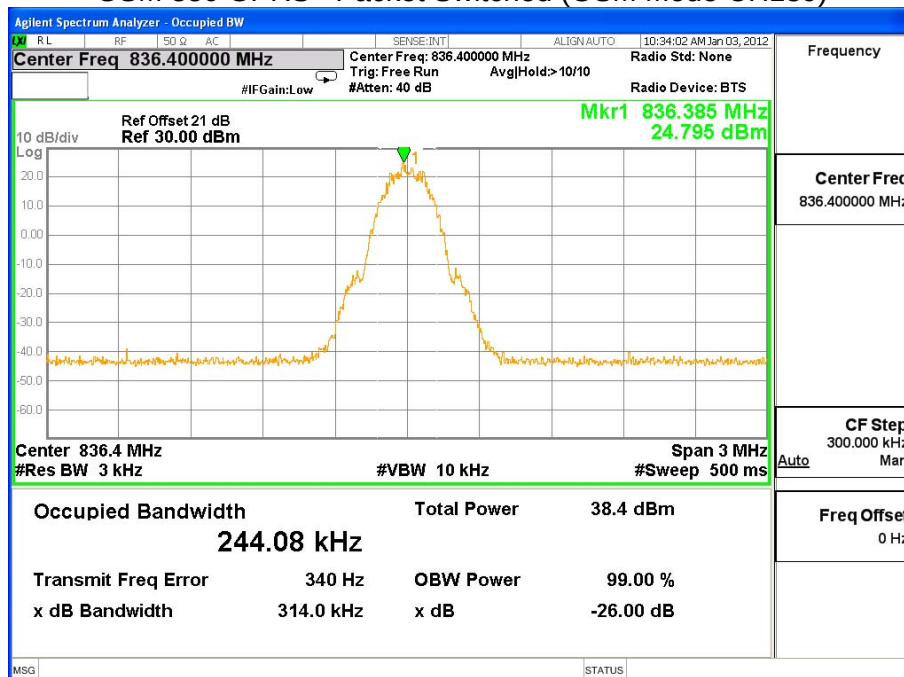
Test Mode	Channel & TX Frequency (MHz)	99% Occupied Bandwidth (KHz)	26 dB bandwidth (KHz)	Required Limit (MHz)	Result
GSM 850 GPRS	128(824.2)	244.83	315.2	N/A	Pass
	189(836.4)	244.08	314.0	N/A	Pass
	251(848.8)	239.05	314.7	N/A	Pass
PCS 1900 GPRS	512(1850.2)	248.56	314.0	N/A	Pass
	661(1880)	245.40	317.5	N/A	Pass
	810(1909.8)	242.94	313.5	N/A	Pass

Product	MMLink-G		
Test Mode	Occupied Bandwidth		
Date of Test	2012/01/03	Test Site	CTR
Test Condition	GSM 850 GPRS		

GSM 850 GPRS - Packet Switched (GSM Mode CH 128)

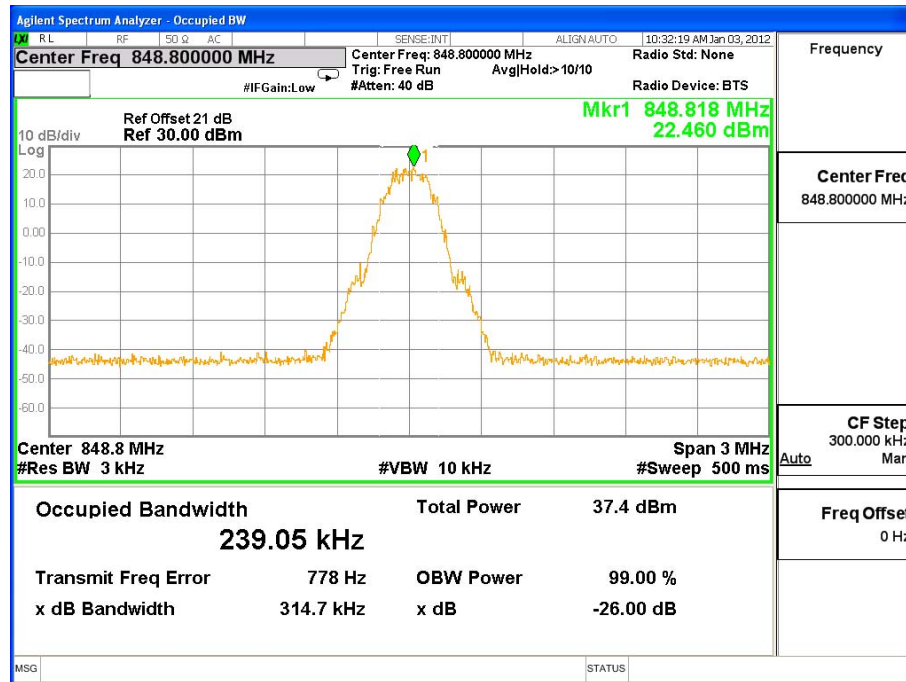


GSM 850 GPRS - Packet Switched (GSM Mode CH189)



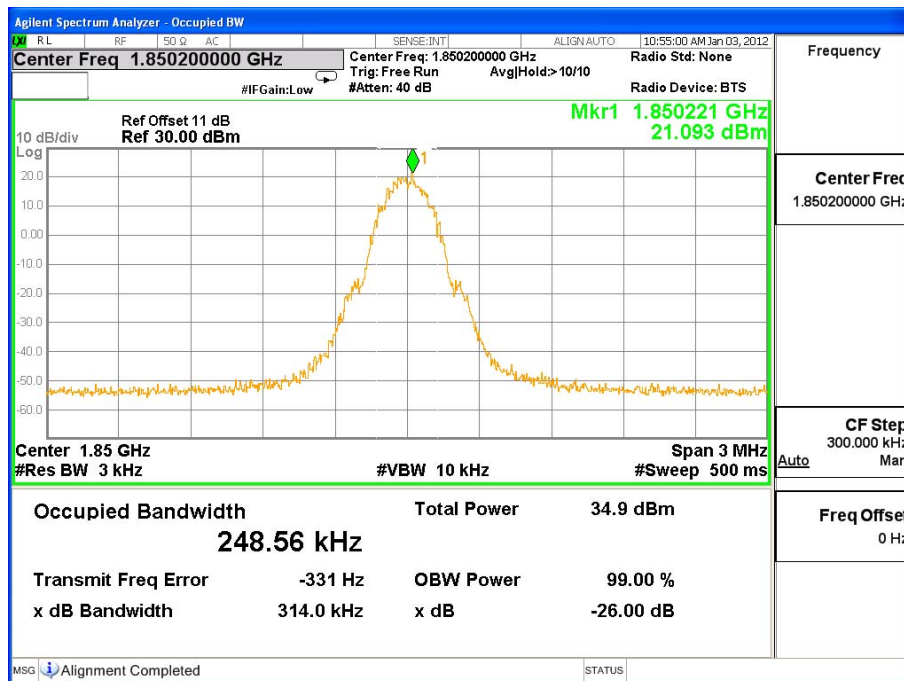
Product	MMLink-G		
Test Mode	Occupied Bandwidth		
Date of Test	2012/01/03	Test Site	CTR
Test Condition	GSM 850 GPRS		

GSM 850 GPRS - Packet Switched (GSM Mode CH 251)

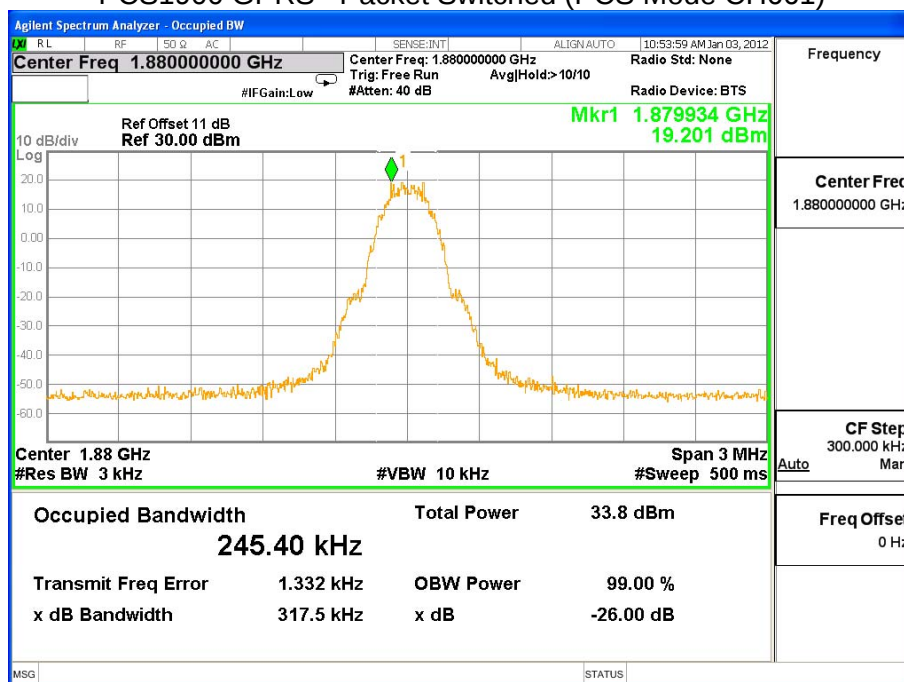


Product	MMLink-G		
Test Mode	Occupied Bandwidth		
Date of Test	2012/01/03	Test Site	CTR
Test Condition	PCS1900 GPRS		

PCS1900 GPRS - Packet Switched (PCS Mode CH 512)

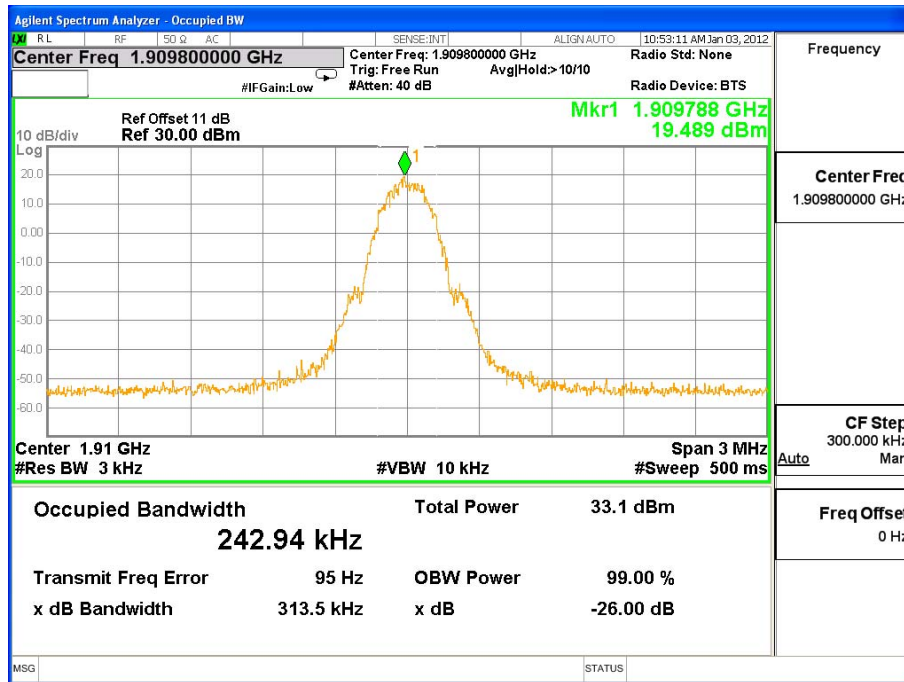


PCS1900 GPRS - Packet Switched (PCS Mode CH661)



Product	MMLink-G		
Test Mode	Occupied Bandwidth		
Date of Test	2012/01/03	Test Site	CTR
Test Condition	PCS1900 GPRS		

PCS1900 GPRS - Packet Switched (PCS Mode CH 810)



4. Spurious Emission At Antenna Terminals (+/-1MHz)

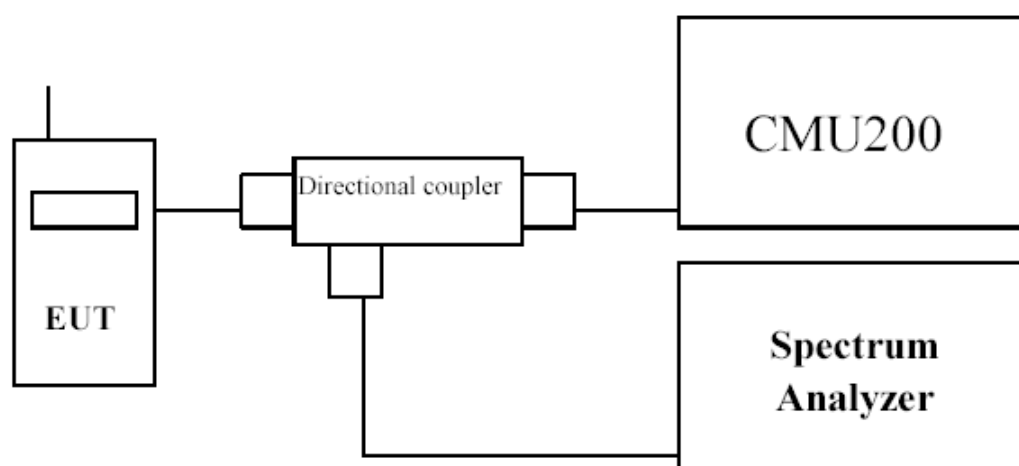
4.1. Test Equipment

The following test equipments are used during the spurious emission test

Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Spectrum Analyzer	Agilent	N9020A / MY48010570	2011/05/19
Universal Radio Communication Tester	R & S	CMU200 / 104846	2011/05/20
Directional coupler	Agilent	87300C / 3239A01864	2011/09/16
Directional coupler	Agilent	778D / 50550	2011/09/16

Note: All equipments upon which need to be calibrated are with calibration period of 1 year.

4.2. Setup



4.3. Limits

Cellular Band Transmitter limits for narrowband spurious emission

Lower Block Edge Test Frequencies	Upper Block Edge Test Frequencies
Block A Channel : 128 Frequency : 824.2 MHz	Block B Channel : 251 Frequency : 848.8 MHz

PCS Band Transmitter limits for narrowband spurious emission

Lower Block Edge Test Channels/Frequencies	Upper Block Edge Test Channels/Frequencies
Block A Channel : 512 Frequency : 1850.2 MHz	Block C Channel : 810 Frequency : 1909.8 MHz

4.4. Test Procedure

In accordance with Part 22.917 and 24.238, at least 1% of the emission bandwidth was used for the resolution and video bandwidths up to 1MHz away from the Block Edge. At greater than 1MHz, the resolution and video bandwidth were increased to 1MHz.

The reference power and path losses of all channels used for testing in each frequency block were measured.

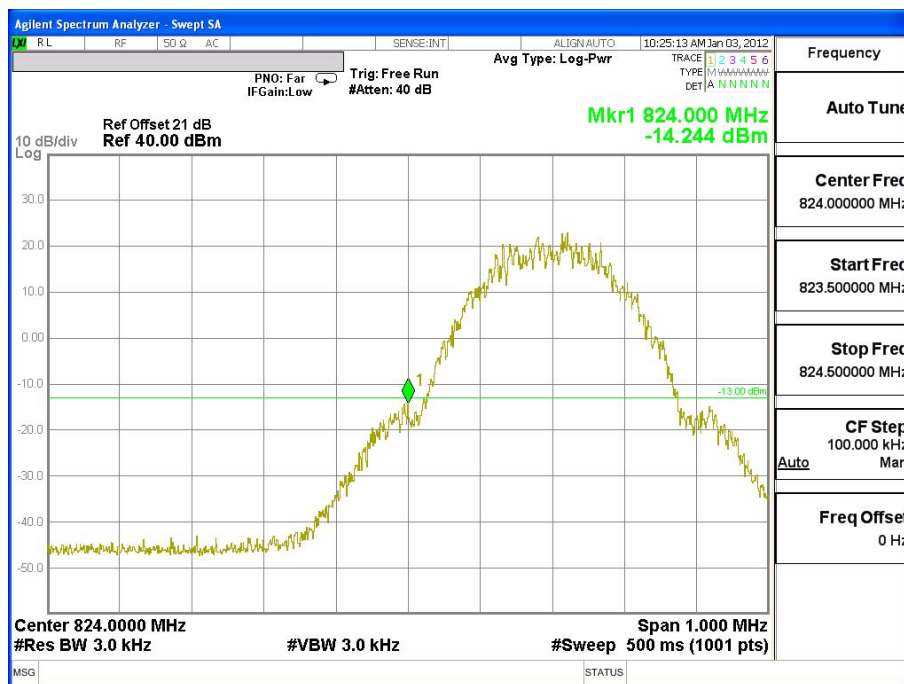
4.5. Test Specification

According to Part 2.1049, 22.917,24.238.

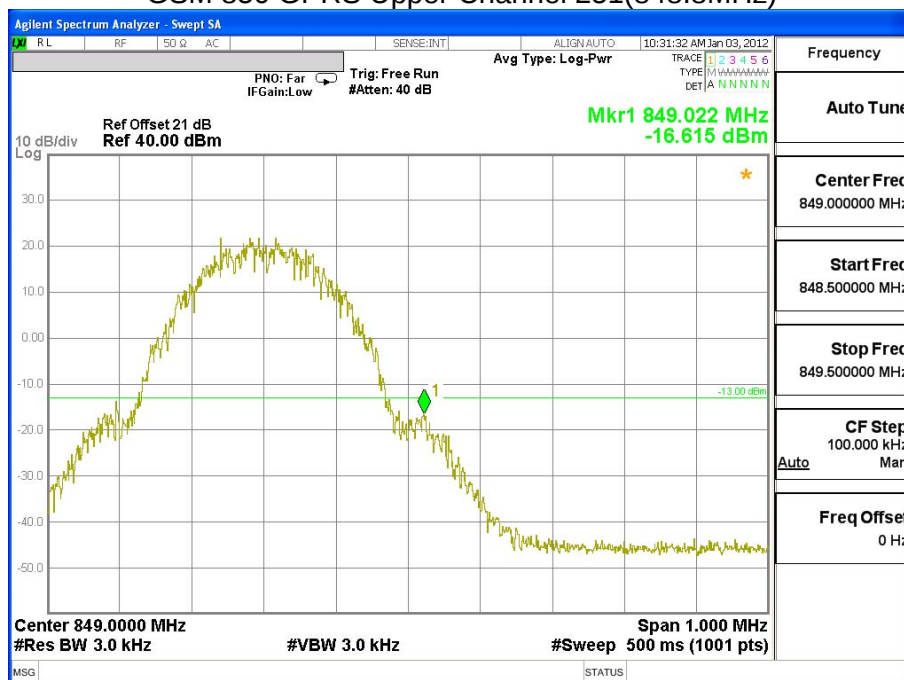
4.6. Test Result of Spurious Emission At Antenna Terminals (+/-1MHz)

Product	MMLink-G		
Test Mode	Spurious Emission At Antenna Terminals (+/-1MHz)		
Date of Test	2012/01/03	Test Site	CTR
Test Condition	Block Edge Test (GSM 850 GPRS)		

GSM 850 GPRS Lower Channel 128 (824.2MHz)

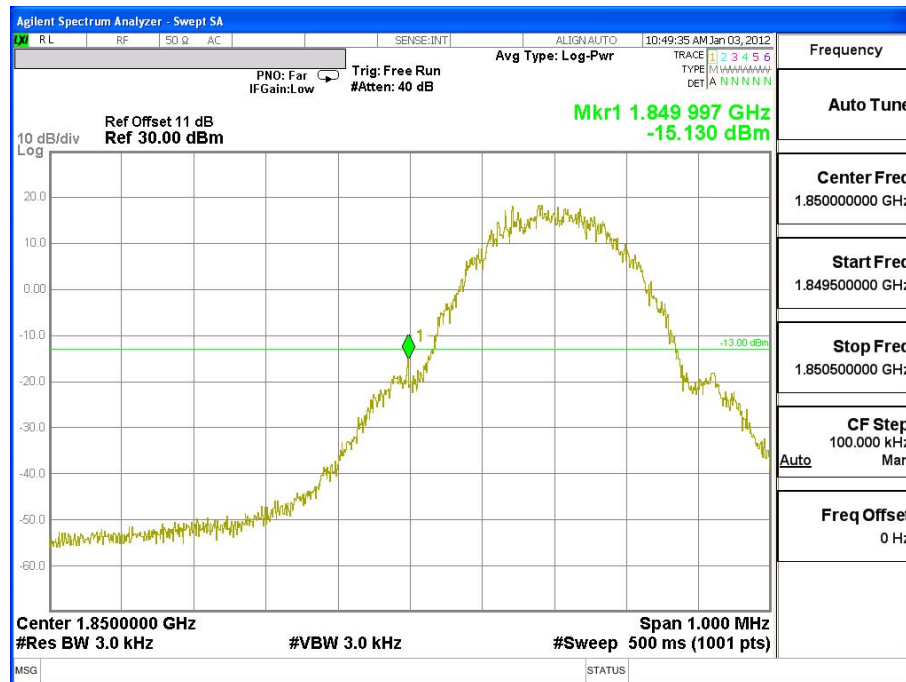


GSM 850 GPRS Upper Channel 251(848.8MHz)

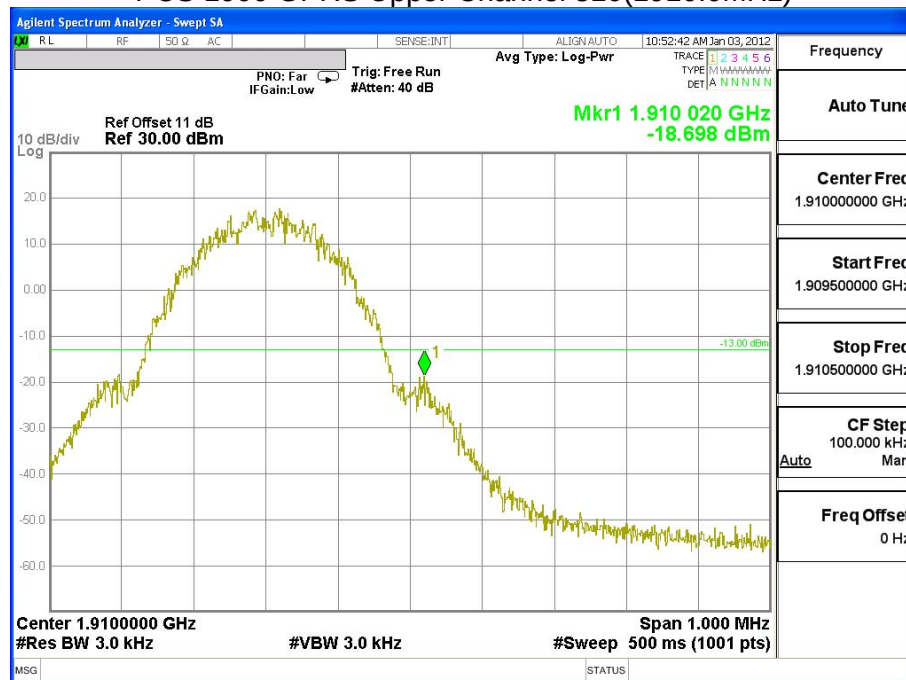


Product	MMLink-G		
Test Mode	Spurious Emission At Antenna Terminals (+/-1MHz)		
Date of Test	2012/01/03	Test Site	CTR
Test Condition	Block Edge Test (PCS 1900 GPRS)		

PCS 1900 GPRS Lower Channel 512 (1850.2MHz)



PCS 1900 GPRS Upper Channel 810(1910.0MHz)



5. Spurious Emission

5.1. Test Equipment

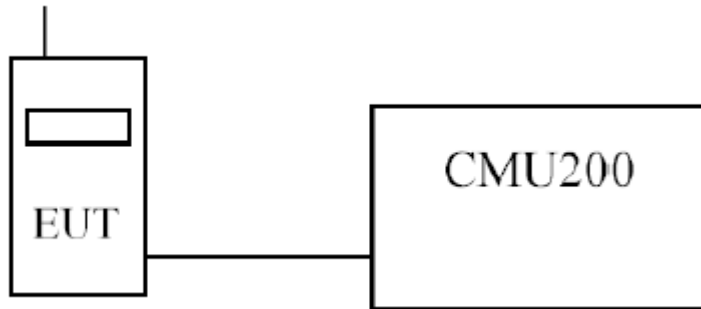
The following test equipments are used during the radiated emission test:

Test Site	Equipment	Manufacturer	Model No./Serial No.	Last Cal.
☑CTR	Spectrum Analyzer	Agilent	N9020A / MY48010570	2011/05/19
	Dual Directional couple	Agilent	778D / 50550	2011/09/16
	Directional coupler	Agilent	87300C / 3239A01864	2011/09/16
☑Site#3	Test Receiver	R & S	ESCS 30/ 100367	2011/09/23
	Universal Radio Communication Tester	R&S	CMU200/104846	2011/05/20
	Spectrum Analyzer	Agilent	N9000A/ MY50510070	2012/03/12
	Bilog Antenna	Schaffner Chase	CBL6112B/ 2704	2011/07/22
	Horn Antenna	Schwarzbeck	9120D / 556	2011/11/04
	Pre-Amplifier	QTK	QTK-LK-E-I-AMP4/ CHM-0201003	2011/07/04

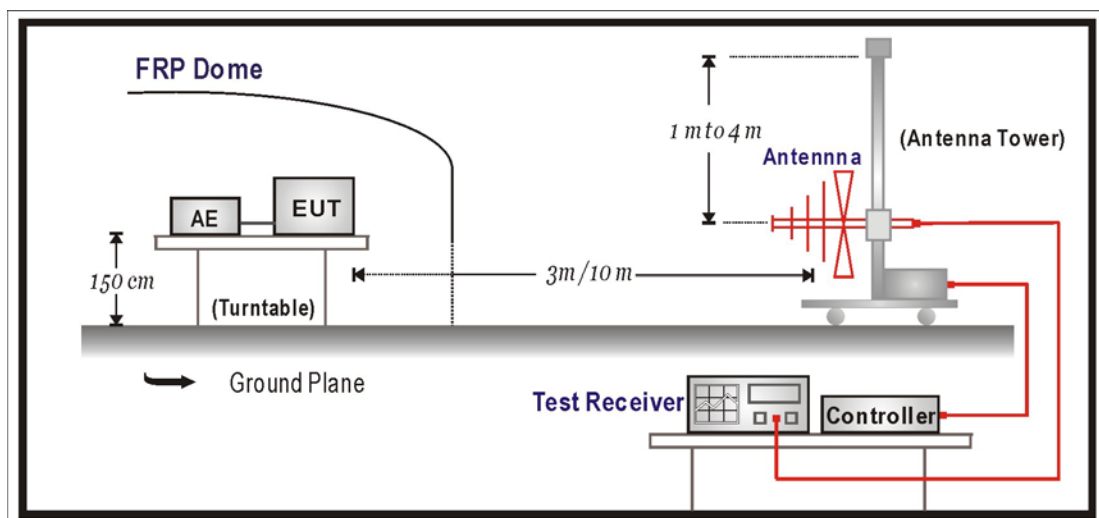
Note: All equipments that need to be calibrated are with calibration period of 1 year.

5.2. Test Setup

5.2.1.1 Spurious emissions at antenna terminals.



5.2.1.2 Field strength of spurious radiation.



5.3. Limits

Limit	<-13dBm
-------	---------

$43 + 10\log(P)$ down on the carrier where P is the power in Watts.

5.4. Test Procedure

In accordance with Part 2.1051, the spurious emissions from the antenna terminal were measured. The transmitter output power was attenuated using a combination of filters and attenuators and the frequency spectrum investigated from 30MHz to 20GHz. The EUT was set to transmit on full power. The EUT was tested on Low, middle and High channels for both power levels. The resolution and video bandwidth was set to 3MHz in accordance with Part 22.917&24.238. The spectrum analyzer detector was set to Max Hold. In addition, measurements were made up to the 10th harmonic of the fundamental. The device was then replaced with a substitution antenna, which input signal was adjusted until the received level matched that of the previously detected emission.

- (1) The EUT is tested with maximum rated TX power via the Base Station simulator.
- (2) The EUT is tested in three orthogonal planes, The worst case test configuration was found in the horizontal position.

The EUT is placed on a turn table which is 1.5 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to TIA/EIA 603-C on radiated measurement.

5.5. Test Specification

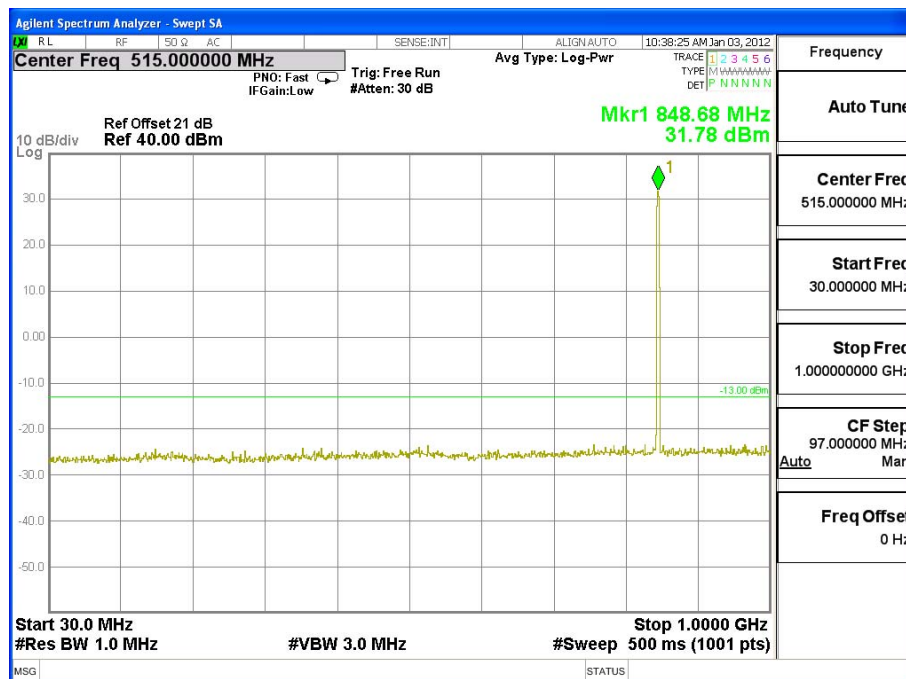
According to Part 2.1051, 2.1053, 22.917(a), 24.238(b).

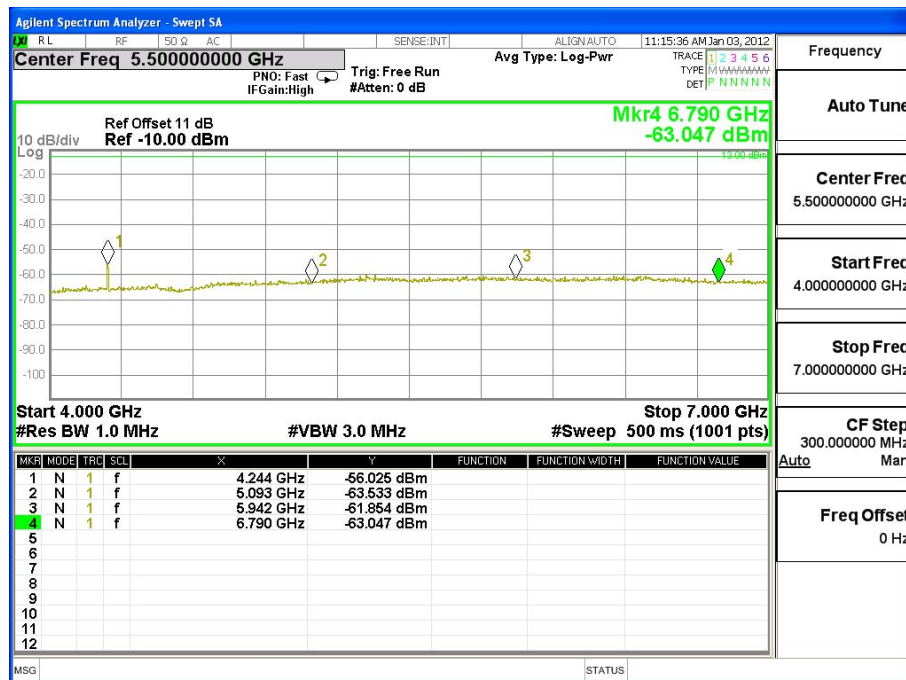
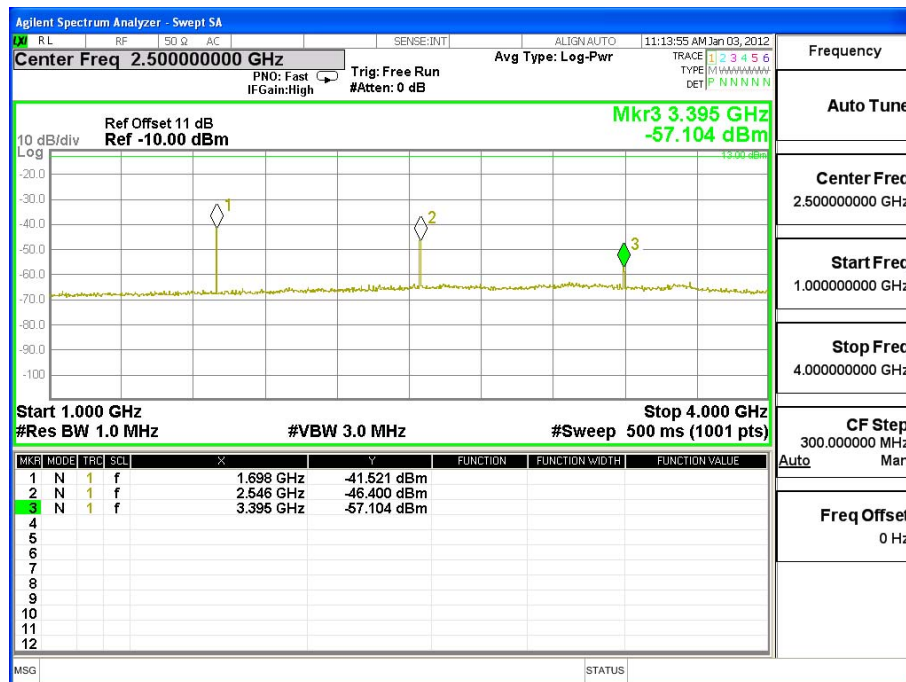
5.6. Test Result of Spurious Emission

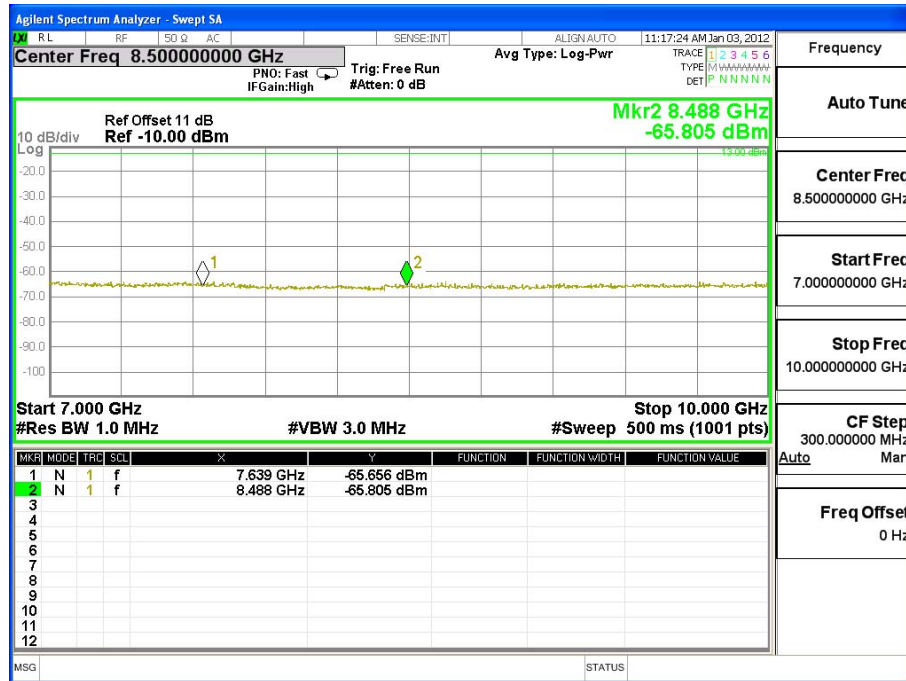
Product	MMLink-G		
Test Mode	Spurious Emission (Conducted)		
Date of Test	2012/01/09	Test Site	CTR
Test Condition	GSM 850 GPRS	Test Range	30MHz~10GHz

GSM 850 GPRS Mid-Channel 251

Frequency (MHz)	Reading Level (dBm)	Path Loss (dB)	Emission Level (dBm)	Limit (dBm)
1697.6	-41.521	0.58	-40.941	-13
2546.4	-46.400	0.7	-45.700	-13
3395.2	-57.104	1.01	-56.094	-13
4244	-56.025	1.18	-54.845	-13
5092.8	-63.533	1.23	-62.303	-13
5941.6	-61.854	1.45	-60.404	-13
6790.4	-63.047	1.56	-61.487	-13
7639.2	-65.656	1.59	-64.066	-13
8488	-65.805	1.82	-63.985	-13



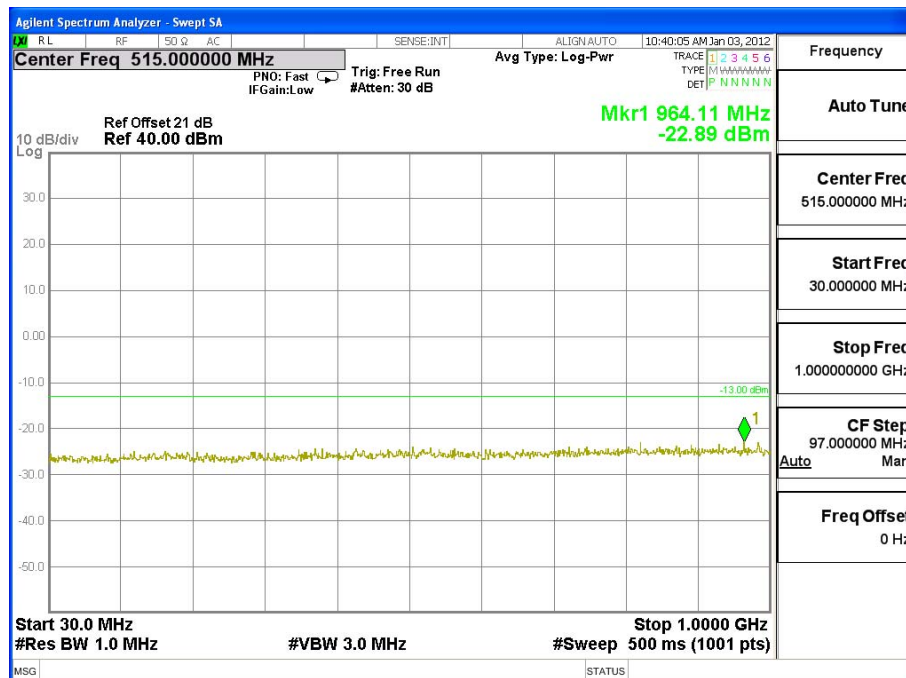


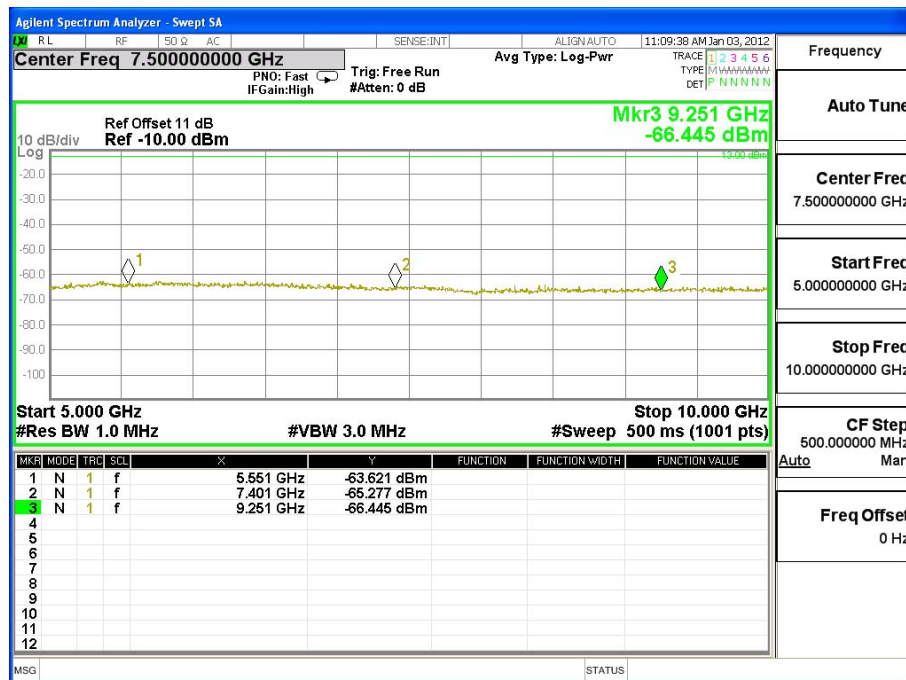
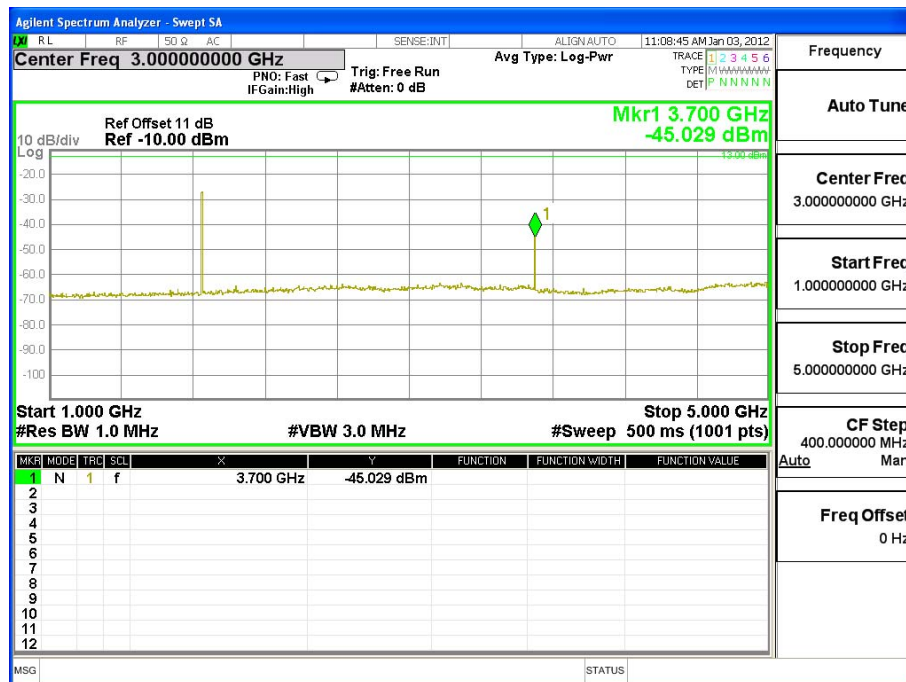


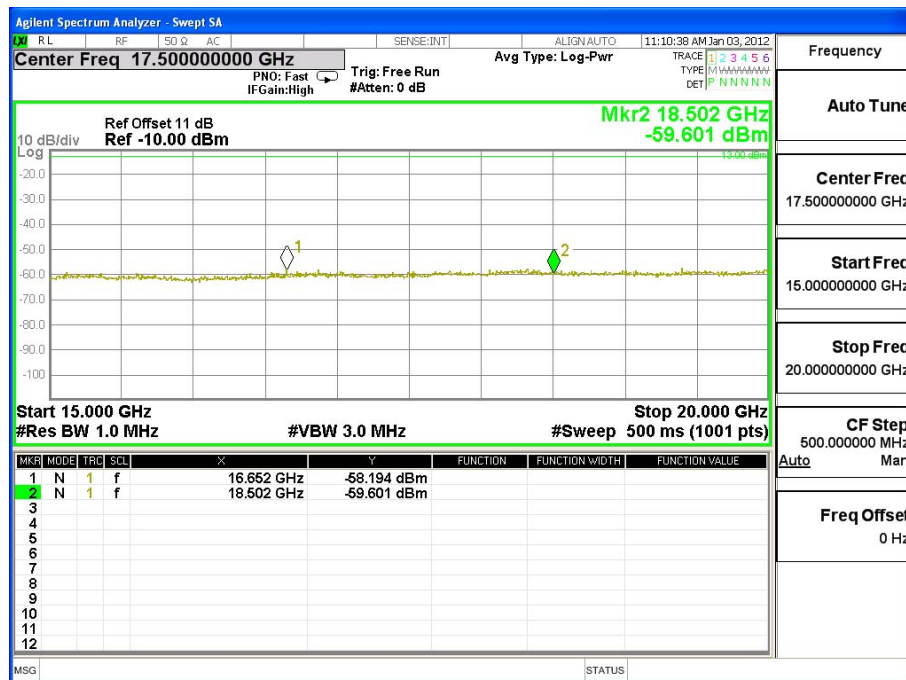
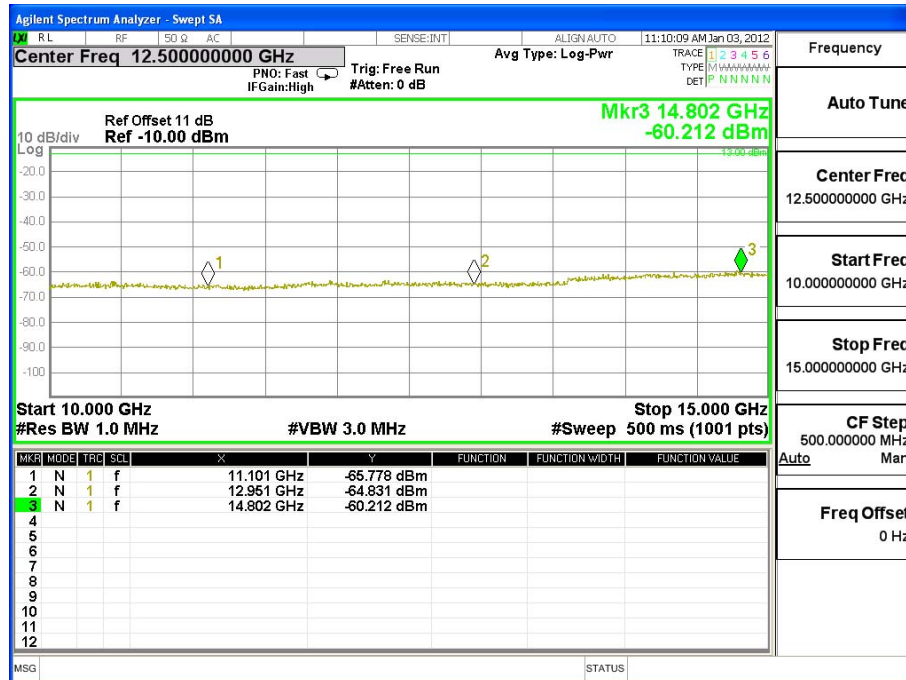
Product	MMLink-G		
Test Mode	Spurious Emission (Conducted)		
Date of Test	2012/01/03	Test Site	CTR
Test Condition	PCS 1900 GPRS	Test Range	30MHz~20GHz

PCS 1900 GPRS Low-Channel 512

Frequency (MHz)	Reading Level (dBm)	Path Loss (dB)	Emission Level (dBm)	Limit (dBm)
3700.4	-45.029	1.1	-43.929	-13
5550.6	-63.621	1.23	-62.391	-13
7400.8	-65.277	1.59	-63.687	-13
9251	-66.445	1.89	-64.555	-13
11101.2	-65.778	2.07	-63.708	-13
12951.4	-64.831	2.26	-62.571	-13
14801.6	-60.212	2.64	-57.572	-13
16651.8	-58.194	3.5	-54.694	-13
18502	-59.601	3.7	-55.901	-13







Product	MMLink-G		
Test Mode	Spurious Emission (Radiated)		
Date of Test	2012/03/26	Test Site	Site3
Test Condition	Channel 128 (GSM 850 GPRS)	Test Range	9KHz ~10GHz

Frequency	Reading Level	Signal Generator Level	Cable Loss	Antenna Gain	ERP Value	Limit
(GHz)	(dBm)	(dBm)	(dB)	(dBd)	(dBm)	(dBm)

Horizontal Emissions

1648.400	-45.63	-49.019	1.630	9.800	-40.849	-13
2472.600	-50.99	-51.346	2.100	10.600	-42.846	-13
3296.800	-57.10	-58.782	2.350	12.300	-48.832	-13
4121.000	-57.12	-56.114	2.700	12.600	-46.214	-13
4945.200	-60.39	-56.293	2.830	12.700	-46.423	-13
5769.400	-59.12	-57.064	3.200	13.000	-47.264	-13

Vertical Emissions

1648.400	-53.14	-56.220	1.630	9.800	-48.050	-13
2478.600	-57.34	-57.420	2.100	10.600	-48.920	-13
3296.800	-57.58	-58.208	2.350	12.300	-48.258	-13
4121.000	-58.17	-55.465	2.700	12.600	-45.565	-13
4945.200	-60.25	-55.610	2.830	12.700	-45.740	-13
5769.400	-59.36	-57.144	3.200	13.000	-47.344	-13

Note:

1. Receiver setting (Peak Detector) : RBW:3MHz; VBW:3MHz
2. ERP Value = Signal Generator Level + Antenna Gain - Cable Loss
3. Spurious emissions past 6 GHz are not shown, due to the magnitude of spurious emissions attenuated more than 20 dB below the limit.

Product	MMLink-G		
Test Mode	Spurious Emission (Radiated)		
Date of Test	2012/03/26	Test Site	Site3
Test Condition	Channel 885 (PCS1900 GPRS)	Test Range	9KHz ~20GHz

Frequency	Reading Level	Signal Generator Level	Cable Loss	Antenna Gain	EIRP Value	Limit
(GHz)	(dBm)	(dBm)	(dB)	(dBi)	(dBm)	(dBm)

Horizontal Emissions

3700.4	-51.760	-52.388	2.530	12.600	-42.318	-13
5550.6	-55.330	-51.951	3.050	13.100	-41.901	-13
7400.8	-59.490	-44.810	3.650	11.500	-36.960	-13
9251	-58.840	-44.005	3.850	12.000	-35.855	-13
11101.2	-60.460	-42.918	4.580	12.000	-35.498	-13

Vertical Emissions

3700.4	-52.390	-50.767	2.530	12.600	-40.697	-13
5550.6	-55.080	-51.098	3.050	13.100	-41.048	-13
7400.8	-59.990	-44.909	3.650	11.500	-37.059	-13
9251	-59.340	-43.915	3.850	12.000	-35.765	-13
11101.2	-61.370	-43.630	4.580	12.000	-36.210	-13

Note:

1. Receiver setting (Peak Detector) : RBW:3MHz; VBW:3MHz
2. EIRP Value = Signal Generator Level + Antenna Gain - Cable Loss
3. Spurious emissions past 12GHz are not shown, due to the magnitude of spurious emissions attenuated more than 20 dB below the limit.

6. Frequency Stability Under Temperature & Voltage Variations

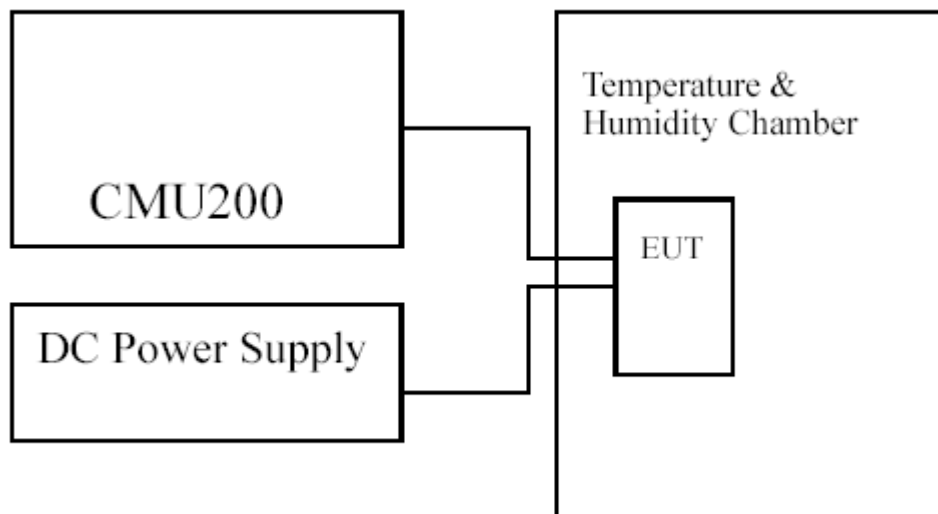
6.1. Test Equipment

The following test equipments are used during the frequency stability test:

Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Universal Radio Communication Tester	R & S	CMU200 / 104846	2011/05/20
Standard Temperature & Humidity Chamber	WIT	TH-1S-B / 108210	2011/09/16

Note: All equipments upon which need to be calibrated are with calibration period of 1 year

6.2. Test Setup



6.3. Limits

Limit	$\leq \pm 2.5\text{ppm}$
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6.4. Test Procedure

The frequency stability of transmitter is measured by:

- (a) Temperature: The temperature is varied from -30 °C to 50 °C in 10 °C increment using a standard temperature & Humidity chamber.
- (b) Primary Supply Voltage: The primary supply voltage is varied 85% to 115% of the nominal value for non hand-carried equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating endpoint which shall be specified by the manufacturer.

The EUT was connected via the base station simulator. Universal Radio Communication Tester, (CMU200), was used to measure The Frequency Error. The maximum result of measurements was recorded.

6.5. Test Specification

According to Part 2.1055, 22.355, 24.235

6.6. Test Result of Frequency Stability Under Temperature Variations

Product	MMLink-G		
Test Mode	Frequency Stability Under Temperature Variations & Voltage Variations		
Date of Test	2011/11/24	Test Site	CTR
Test Condition	GSM 850 GPRS / Channel 189	Test Range	-20°C ~+50°C

Frequency Stability Under Temperature Variations

Temperature Interval(°C)	Test Frequency (GHz)	Deviation (Hz)	Limit (KHz)
-20	0.836	25	±2.0913
-10	0.836	-9	±2.0913
0	0.836	-12	±2.0913
10	0.836	15	±2.0913
20	0.836	26	±2.0913
30	0.836	22	±2.0913
40	0.836	18	±2.0913
50	0.836	-10	±2.0913

Voltage Variations

AC Voltage (V)	Test Frequency (GHz)	Deviation (Hz)	Limit (KHz)
102	0.836	28	±2.0913
120	0.836	22	±2.0913
138	0.836	18	±2.0913

Product	MMLink-G		
Test Mode	Frequency Stability Under Temperature Variations & Voltage Variations		
Date of Test	2011/11/24	Test Site	CTR
Test Condition	PCS 1900 GPRS / Channel 661	Test Range	-30°C ~+50°C

Frequency Stability Under Temperature Variations

Temperature Interval(°C)	Test Frequency (GHz)	Deviation (Hz)	Limit (KHz)
-20	1.88	26	±4.7
-10	1.88	37	±4.7
0	1.88	43	±4.7
10	1.88	41	±4.7
20	1.88	40	±4.7
30	1.88	35	±4.7
40	1.88	-29	±4.7
50	1.88	33	±4.7

Voltage Variations

AC Voltage (V)	Test Frequency (GHz)	Deviation (Hz)	Limit (KHz)
102	1.88	32	±4.7
120	1.88	40	±4.7
138	1.88	34	±4.7

7. EMI Reduction Method During Compliance Testing

No modification was made during testing.

Attachment 1: EUT Test Photographs

Attachment 2: EUT Detailed Photographs