JQA File No. : KL80070036
Issue Date : May 18, 2007

TEST REPORT

APPLICANT	:	Sharp Corporation, Communication Systems Group
ADDRESS	:	2-13-1, Iida Hachihonmatsu, Higashihiroshima-city, Hiroshima 739-0192, JAPAN
PRODUCTS	:	WCDMA & Tri-band GSM Dual mode Mobile Phone / Bluetooth Enable
MODEL NO.	:	815SH
SERIAL NO.	:	004401/11/063202/9
FCC ID	:	APYHRO00057
TEST STANDARD	:	CFR 47 FCC Rules and Regulations Part 24
TESTING LOCATION	:	Japan Quality Assurance Organization KITA-KANSAI Testing Center 1-7-7, Ishimaru, Minoh-shi, Osaka 562-0027, Japan
TEST RESULTS	:	**Passed**
DATE OF TEST	:	May 1, 2007 - May 8, 2007

This report must not used by the client to claim product endorsement by NVLAP or NIST or any agency of the U.S. Government.

NVLAP LAB CODE 200191-0

Y. Fukumoto

Yuichi Fukumoto
Manager
Japan Quality Assurance Organization
KITA-KANSAI Testing Center
Testing Dept. EMC Division
1-7-7, Ishimaru, Minoh-shi, Osaka 562-0027, Japan

- The measurement values stated in Test Report was made with traceable to National Institute of Advanced Industrial Science and Technology (AIST) of Japan and National Institute of Information and Communications Technology (NICT) of Japan.
- The applicable standard, testing condition and testing method which were used for the tests are based on the request of the applicant.
- The test results presented in this report relate only to the offered test sample.
- The contents of this test report cannot be used for the purposes, such as advertisement for consumers.
- This test report shall not be reproduced except in full without the written approval of JQA.

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DEFINITIONS FOR ABBREVIATION AND SYMBOLS USED IN THIS TEST REPORT

"EUT" means Equipment Under the Test.
"N/A" means that Not Applicable.
"N/T" means that Not Tested.

☒ - indicates that the listed condition, standard or equipment is applicable for this report.
☐ - indicates that the listed condition, standard or equipment is not applicable for this report.

Documentation

1 Test Regulation

Applied Standard	:	CFR 47 FCC Rules and Regulations Part 24 Subpart E - Broadband PCS
Test Requirements	:	CFR 47 FCC Rules and Regulations Part 2 §2.1046, §2.1047, §2.1049, §2.1051, §2.1053, §2.1055 and §2.1057
Test Procedure	:	ANSI C63.4–2003, TIA/EIA–603

2 Test Location

KITA-KANSAI Testing Center
1-7-7, Ishimaru, Minoh-shi, Osaka 562-0027, Japan
KAMEOKA EMC Branch
9-1, Ozaki, Inukanno, Nishibetsuin-cho, Kameoka-shi, Kyoto 621-0126, Japan

3 Recognition of Test Laboratory

JQA KITA-KANSAI Testing Center Testing Department EMC Division is accredited under ISO/IEC 17025 by following accreditation bodies and the test facility of Testing Division is registered by the following bodies.

VLAC Code	:	VLAC-001-2 (Effective through : April 3, 2008)
NVLAP Lab Code	:	200191-0 (Effective through : June 30, 2007)
BSMI Recognition No.	:	SL2-IS-E-6006, SL2-IN-E-6006, SL2-AI-E-6006 (Effective through : September 14, 2007)
VCCI Registration No.	:	R-006, R-008, R-1117, C-006, C-007, C-1674, C-2143 (Effective through : April 3, 2008)
FCC Registration No.	:	683630 (Effective through : June 30, 2007)
IC Registration No.	:	IC 4125-1, IC 6217-1, IC 6217-2 (Effective through : November 16, 2008)

Accredited as conformity assessment body for Japan electrical appliances and material law by METI.
(Effective through : February 22, 2010)

4 Description of the Equipment Under Test

4.1 General Information

1.	Manufacturer	:	Sharp Corporation, Communication Systems Group 2-13-1, Iida Hachihonmatsu, Hiagashihiroshima-city, Hiroshima 739-0192, JAPAN
2.	Products	:	WCDMA & Tri-band GSM Dual mode Mobile Phone / Bluetooth Enable
3.	Model No.	:	815SH
4.	Serial No.	:	004401/11/063202/9
5.	Product Type	:	Pre-production
6.	Date of Manufacture	:	April, 2007
7.	Transmitting Frequency	:	1850.2 MHz(512CH) – 1909.8MHz(810CH)
8.	Receiving Frequency	:	1930.2 MHz(512CH) – 1989.8MHz(810CH)
9.	Emission Designations	:	249KGXW
10.	Max. RF Output Power	:	1.202W (EIRP)
11.	Power Rating	:	4.0VDC (Lithium-ion Battery Pack SHBBB1 800mAh)
12.	EUT Grounding	:	None
13.	Category	:	Broadband PCS
14.	EUT Authorization	:	Certification
15.	Receive Date of EUT	:	May 1, 2007

4.2 Channel Plan

The carrier spacing is 200 kHz.
The carrier frequency is designated by the absolute frequency channel number (ARFCN).
The carrier frequency is expressed in the equation shown as follows:

Transmitting Frequency (in MHz) = $1850.2 + 0.2 \times (n - 512)$
Receiving Frequency (in MHz) = $1930.2 + 0.2 \times (n - 512)$
where, n : channel number ($512 \leq n \leq 810$)

5 Test Condition

5.1 RF Power Output (§2.1046)

5.1.1 Conducted RF Power Output

The requirements are ☒ - Applicable [☒ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

Test site : KITA-KANSAI ☐ - Shielded room ☒ - 2nd Shielded room
KAMEOKA ☐ - Shielded room ☐ - Conducted emission facility

Test instruments : Refer to Appendix B.

5.1.2 ERP / EIRP RF Power Output

The requirements are ☒ - Applicable [☒ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

Test site : ☐ - KITA-KANSAI 1st open site (3 m)
☒ - KAMEOKA 1st open site ☒ - 3 m ☐ - 10 m ☐ - 30 m
☐ - KAMEOKA 2nd open site ☐ - 3 m ☐ - 10 m

Test instruments : Refer to Appendix B.

5.2 Modulation Characteristics (§2.1047)

The requirements are ☐ - Applicable [☐ - Tested. ☐ - Not tested by applicant request.]
☒ - Not Applicable

Test site : KITA-KANSAI ☐ - Shielded room ☐ - Anechoic chamber
KAMEOKA ☐ - Shielded room

Test instruments : Refer to Appendix B.

5.3 Occupied Bandwidth (§2.1049)

The requirements are ☒ - Applicable [☒ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

Test site : KITA-KANSAI ☒ - Shielded room ☐ - 2nd Shielded room
KAMEOKA ☐ - Shielded room ☐ - Conducted emission facility

Test instruments : Refer to Appendix B.

5.4 Spurious Emissions at Antenna Terminals (§2.1051)

The requirements are ☒ - Applicable [☒ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

Test site : KITA-KANSAI ☒ - Shielded room ☐ - 2nd Shielded room
KAMEOKA ☐ - Shielded room ☐ - Conducted emission facility

Test instruments : Refer to Appendix B.

5.5 Band-Edge Emission (§2.1051)

The requirements are ☒ - Applicable [☒ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

Test site : KITA-KANSAI ☒ - Shielded room ☐ - 2nd Shielded room
KAMEOKA ☐ - Shielded room ☐ - Conducted emission facility

Test instruments : Refer to Appendix B.

5.6 Field Strength of Spurious Radiation (§2.1053)

The requirements are ☒ - Applicable [☒ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

Test site : ☒ - KITA-KANSAI 1st open site (3 m)
☐ - KAMEOKA 1st open site ☐ - 3 m ☐ - 10 m ☐ - 30 m
☐ - KAMEOKA 2nd open site ☐ - 3 m ☐ - 10 m

Test instruments : Refer to Appendix B.

5.7 Frequency Stability (§2.1055)

The requirements are ☒ - Applicable [☒ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

Test site : KITA-KANSAI Environment Testing Room

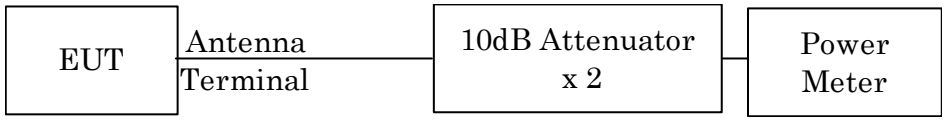
Test instruments : Refer to Appendix B.

6 Preliminary Test and Test Setup

6.1 RF Power Output (§2.1046)

6.1.1 Conducted RF Power Output

The Conducted RF Power Output was measured with a power meter, two 10dB attenuator and a short, low loss cable.



6.1.2 ERP / EIRP RF Power Output

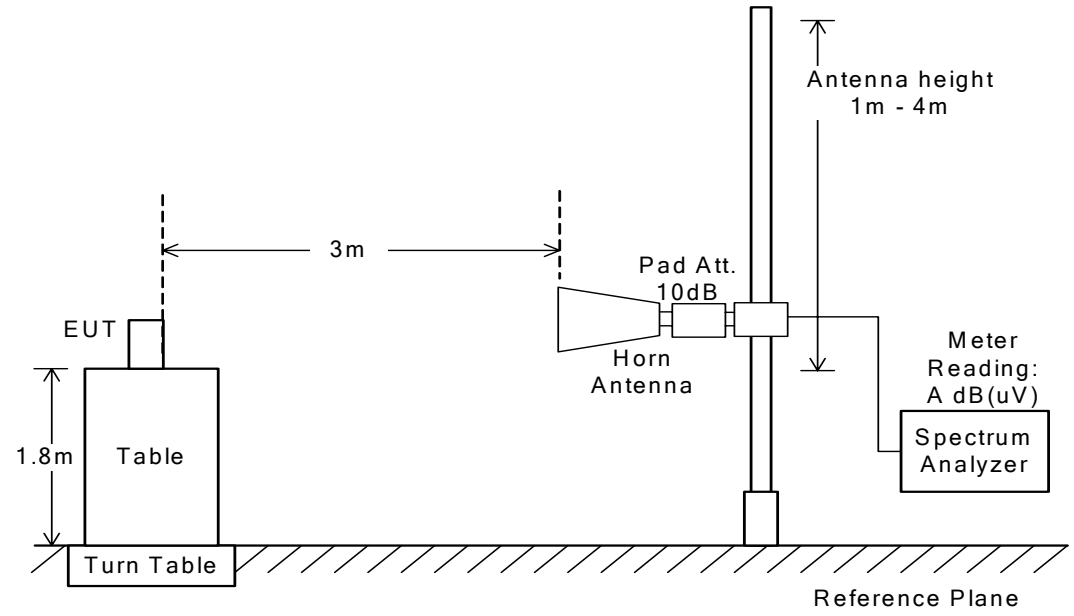
Step 1:
In order to obtain the maximum emission, the EUT was placed at the height 1.8 m on the non-conducted support and was varying at three orthogonal axes (Refer to clause 15), at the distance 3 m from the receiving antenna and rotated around 360 degrees.
The receiving antenna height was varied from 1 m to 4 m.
The EUT on the table was placed to be maximum emission against at the receiving antenna polarized (vertical and horizontal).
Then the meter reading of the spectrum analyzer at the maximum emission was A dB(μV).

Step 2:
The EUT was replaced to substitution antenna at the same polarized under the same condition as step 1.
The RF power was fed to the transmitting antenna through the RF amplifier from the signal generator.
In order to obtain the maximum emission level, the height of the receiving antenna was varied from 1 m to 4 m.
The level of maximum emission was A dB(μV), same as the recorded level in the step 1.
Then the RF power into the substitution horn antenna was P (dBm).

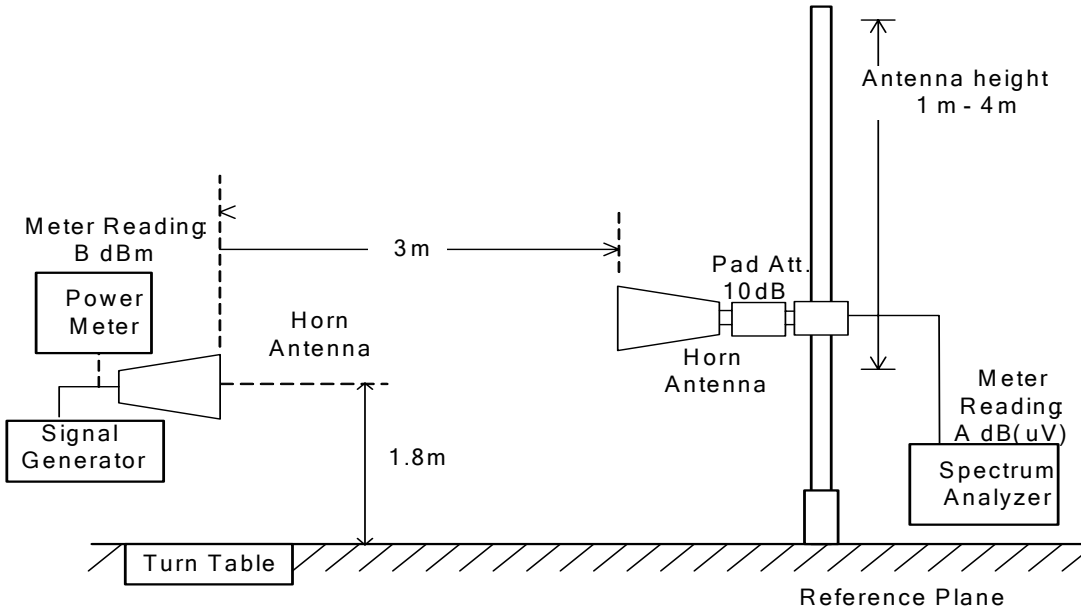
The ERP/EIRP output power was calculated in the following equation.

ERP (dBm) = P (dBm) – Balun loss of the half-wave dipole antenna (dB) + Cable loss (dB)
EIRP (dBm) = P (dBm) + Gh (dBi)
where, Gh (dBi) : Gain of the substitution horn antenna.

– Side View –



(a)EUT



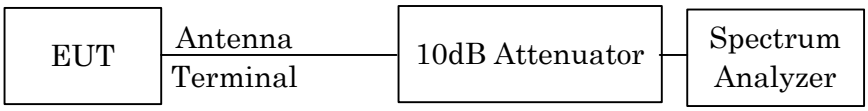
(b) Substitution Horn Antenna

6.2 Modulation Characteristics (§2.1047)

Not Applicable

6.3 Occupied Bandwidth (§2.1049)

The test system is shown as follows:



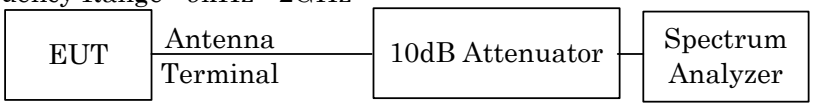
The setting of the spectrum analyzer are shown as follows:

Res. Bandwidth	10 kHz
Video Bandwidth	30 kHz
Span	1 MHz
Sweep Time	AUTO
Trace	Maxhold

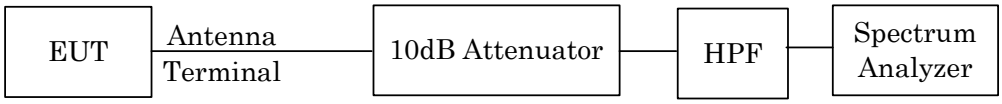
6.4 Spurious Emissions at Antenna Terminals (§2.1051)

The Antenna Conducted Emission was with a spectrum analyzer. The test system is shown as follows:

a) Frequency Range : 9kHz - 2GHz



b) Frequency Range : 2GHz - 20GHz

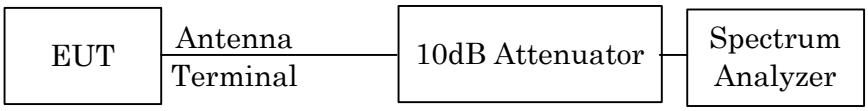


The setting of the spectrum analyzer are shown as follows:

Frequency Range	9 kHz - 150 kHz	150 kHz - 30 MHz	30 MHz - 20 GHz
Res. Bandwidth	200 Hz	10 kHz	1 MHz
Video Bandwidth	1 kHz	30 kHz	3 MHz
Sweep Time	AUTO	AUTO	AUTO
Trace	Maxhold	Maxhold	Maxhold

6.5 Band-Edge Emission (§2.1051)

The test system is shown as follows:



The setting of the spectrum analyzer are shown as follows:

TX Frequency	1850.20 MHz / 1909.80 MHz
Band-Edge Frequency	1850.00 MHz / 1910.00 MHz
Res. Bandwidth	3 kHz
Video Bandwidth	10 kHz
Span	2 MHz
Sweep Time	AUTO
Trace	Maxhold

6.6 Field Strength of Spurious Radiation (§2.1053)

Step 1) The spurious radiation for transmitter were measured at the distance 3 m away from the EUT which was placed on a non-conducted support 1.0 m in height and was varying at three orthogonal axes (Refer to clause 15). The receiving antenna was oriented for vertical polarization and varied from 1 m to 4 m until the maximum emission level was detected on the measuring instrument. The EUT was rotated 360 degrees until the maximum emission was received. The measurement was also repeated with the receiving antenna in the horizontal polarization.
This test was carried out using the half-wave dipole antenna for up to 1GHz and using the horn antenna for above 1 GHz.

Step 2) The ERP measurement was carried out with according to Step 2 in page 8. Then the RF power in the substitution antenna half-wave dipole antenna for up to 1 GHz and the substitution horn antenna for above 1 GHz.

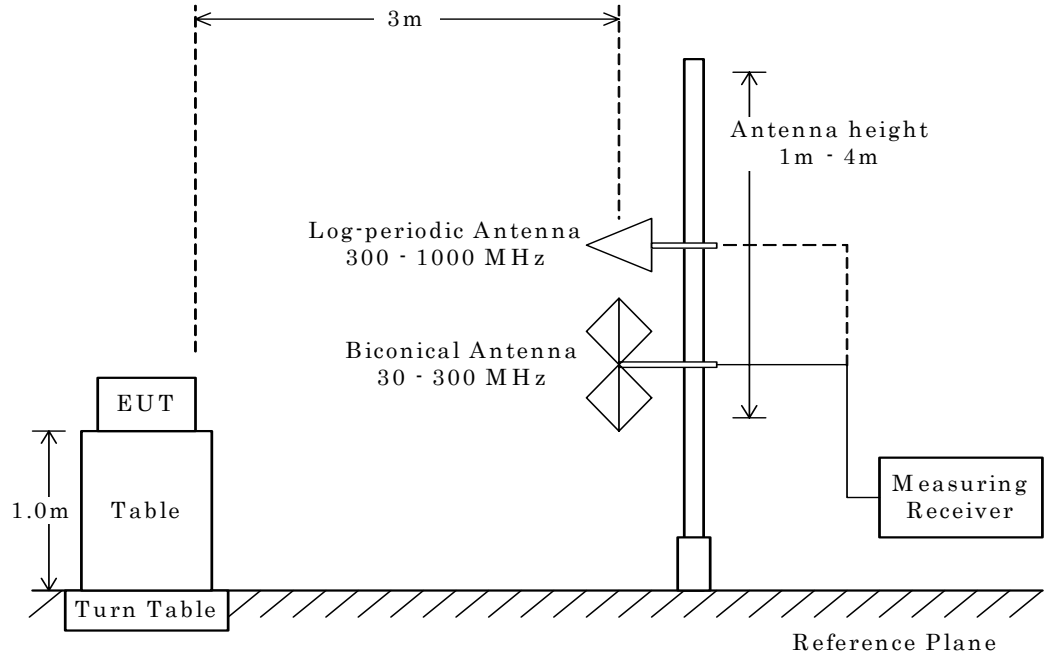
The ERP is calculated in the following equation.

A) Up to 1 GHz
ERP (dBm) = P (dBm) - (Balun Loss of the half-wave dipole Ant. (dB)) + Cable Loss (dB)

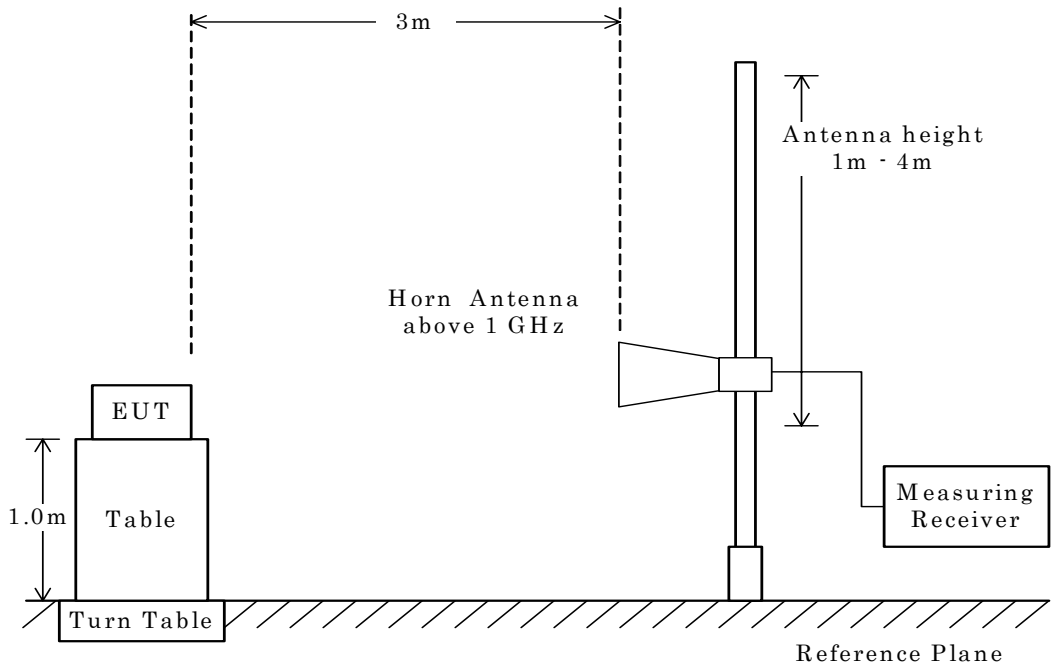
B) Above 1 GHz
ERP (dBm) = P (dBm) + Gh (dBi) - Gd (dBi)
Where, Gh (dBi) : Gain of the substitution horn antenna
Gd (dBi) : Gain of the substitution half-wave dipole antenna

The respective calculated ERP of the spurious and harmonics were compared with the ERP of fundamental frequency by specified attenuation limits, $43+10\log_{10}$ (TP in watt)[dB]. Where, TP = Transmitter power at the ANT OUT under test configuration as the hands free unit used.

Radiated Emission 30 MHz to 1000 MHz

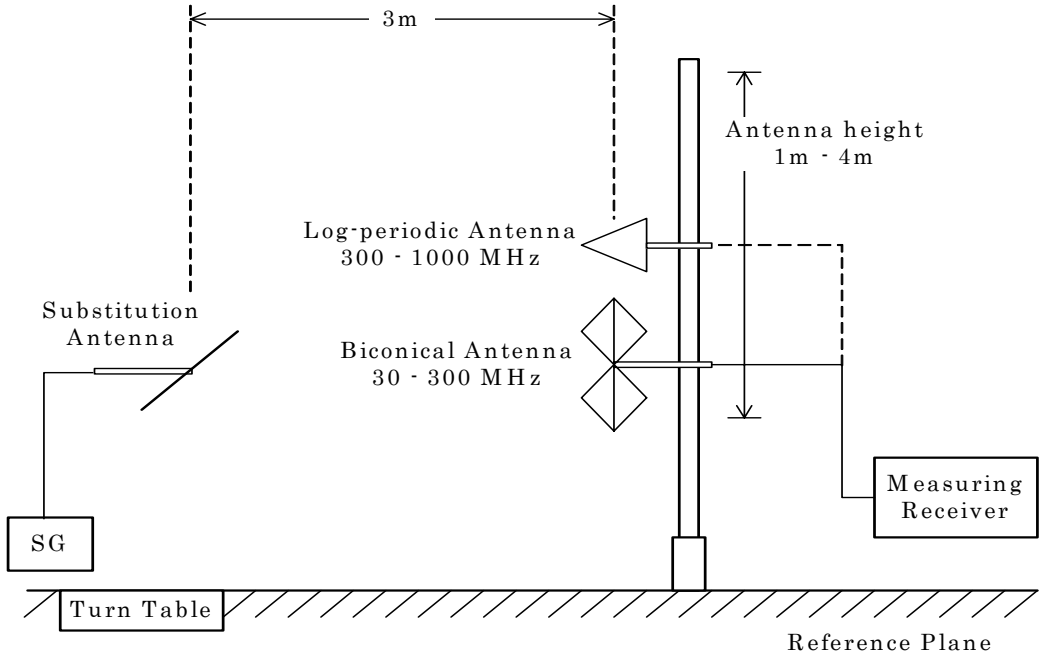


Radiated Emission above 1 GHz

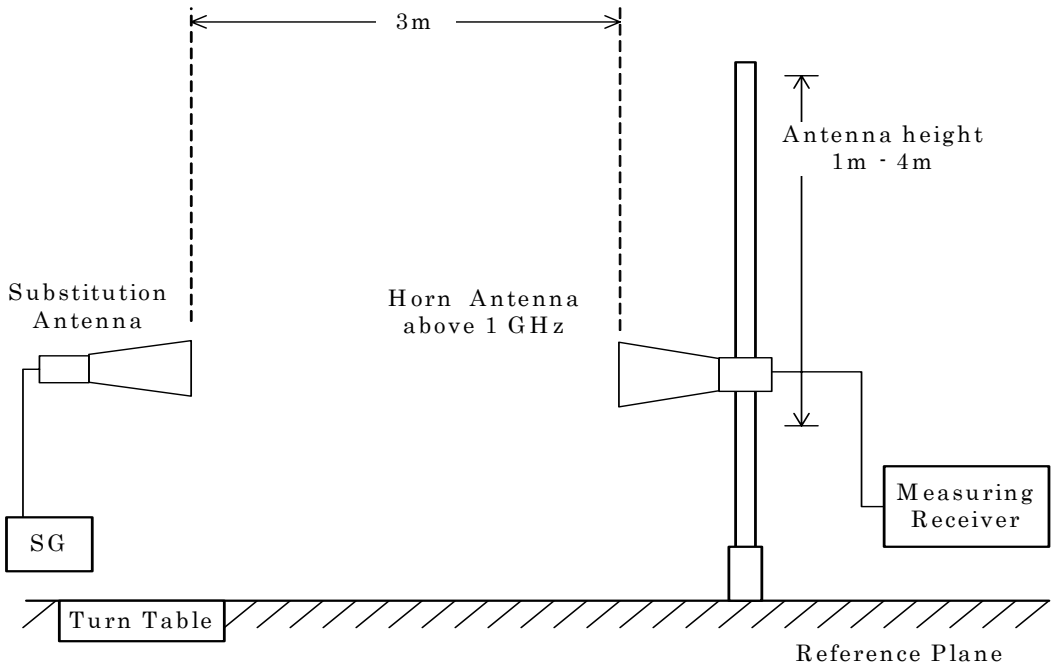


NOTE
The antenna height is scanned depending on the EUT's size and mounting height.

Radiated Emission 30 to 1000 MHz – Substitution Method



Radiated Emission above 1 GHz – Substitution Method



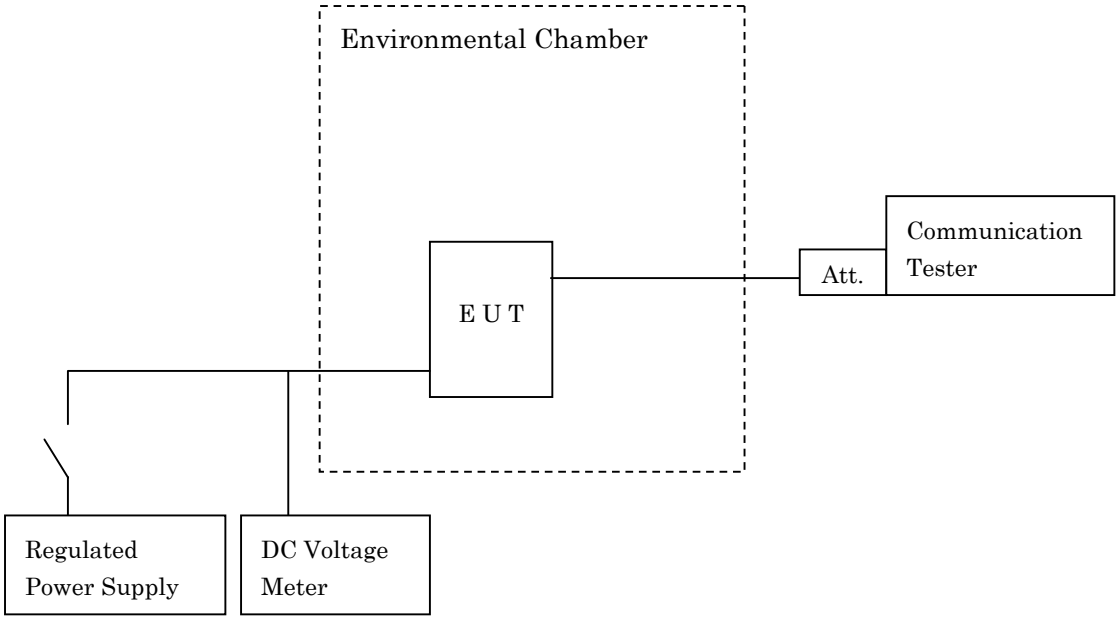
6.7 Frequency Stability (§2.1055)

Frequency Stability versus Temperature

The EUT was placed in an environmental chamber and was tested in the range from –30 to +50 degrees Celsius. The EUT was stabilized at each temperature. The power (4.0VDC) supplied was applied to the transmitter and allowed to stabilize for 10 minutes. The transmitting frequency was measured at startup and 2 minutes, 5 minutes and 10 minutes after startup. This procedure was repeated from –30 to +50 degrees Celsius at the interval of 10 degrees.

Frequency Stability versus Power Supply Voltage

The EUT was placed in an environmental chamber and was tested at the temperature of +20 degrees Celsius. The EUT was stabilized at the temperature. The power (4.0VDC) and the power (3.7VDC, the ending voltage) was applied to the EUT allowed to stabilize for 10 minutes. The transmitting frequency was measured at startup and 2 minutes, 5 minutes and 10 minutes after startup.



7 Equipment Under Test Modification

☒ - No modifications were conducted by JQA to achieve compliance to the limitations.
☐ - To achieve compliance to the limitations, the following changes were made by JQA during the compliance test.

The modifications will be implemented in all production models of this equipment.

Applicant : Not Applicable
Date : Not Applicable
Typed Name : Not Applicable
Position : Not Applicable Signatory : _____

8 Responsible Party

Responsible Party of Test Item (Product)

Responsible Party :

Contact Person :

_____
Signatory

9 Deviation from Standard

☒ - No deviations from the standard described in clause 1.
☐ - The following deviations were employed from the standard described in clause 1.

_____

1

10 Test Results

10.1 RF Power Output (§2.1046)

10.1.1 Conducted RF Power Output

The requirements are ☒ - Applicable [☒ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

Transmitter Power is 812.8 mW at 1909.800 MHz

Uncertainty of Measurement Results at Amplitude +/-0.19 dB(2σ)

Remarks : _____

10.1.2 ERP / EIRP RF Output Power

The requirements are ☒ - Applicable [☒ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

☒ - Passed ☐ - Failed ☐ - Not judged

Min. Limit Margin 2.2 dB at 1880.00 MHz

Max. Limit Exceeding _____ dB at _____ MHz

Uncertainty of Measurement Results at Amplitude +/-1.3 dB(2σ)

Remarks : The maximum EIRP is 1.202 W at 1880.00 MHz.

10.2 Modulation Characteristics (§2.1047)

The requirements are ☐ - Applicable [☐ - Tested. ☐ - Not tested by applicant request.]
☒ - Not Applicable

☐ - Passed ☐ - Failed ☐ - Not judged

Remarks : _____

10.3 Occupied Bandwidth (§2.1049)

The requirements are ☒ - Applicable [☐ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

☒ - **Passed** ☐ - **Failed** ☐ - **Not judged**

The 26dB Bandwidth is	319.2	kHz	at 1880.000	MHz
The 99% Bandwidth is	248.7	kHz	at 1880.000	MHz

Uncertainty of Measurement Results at Frequency	+/-1.7	kHz(2σ)
Uncertainty of Measurement Results at Amplitude	+/-0.24	dB(2σ)

Remarks : _____

10.4 Antenna Conducted Spurious Emission (§2.1051)

The requirements are ☒ - Applicable [☒ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

☒ - **Passed** ☐ - **Failed** ☐ - **Not judged**

Min. Limit Margin	23.6	dB	at 5550.600	MHz
Max. Limit Exceeding	_____	dB	at _____	MHz

Uncertainty of Measurement Results at Amplitude	+/-0.24	dB(2σ)

Remarks : _____

10.5 Band-Edge Emission (§2.1051)

The requirements are ☒ - Applicable [☒ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

☒ - **Passed** ☐ - **Failed** ☐ - **Not judged**

The Band-Edge level is	-38.7	dBc	at 1910.000	MHz

Uncertainty of Measurement Results at Frequency	+/-1.7	kHz(2σ)
Uncertainty of Measurement Results at Amplitude	+/-0.24	dB(2σ)

Remarks : _____

10.6 Field Strength of Spurious Radiation (§2.1053)

The requirements are ☒ - Applicable [☒ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

☒ - **Passed** ☐ - **Failed** ☐ - **Not judged**

Min. Limit Margin	>14.4	dB	at	13368.600 MHz
Max. Limit Exceeding		dB	at	MHz
Uncertainty of Measurement Results	30 MHz – 1000 MHz		+1.3/-1.3	dB(2σ)
	above 1 GHz		+1.3/-1.3	dB(2σ)

Remarks :

10.7 Frequency Stability(§2.1055)

The requirements are ☒ - Applicable [☒ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

The Frequency Stability level is	+0.06	ppm	at	1880.000 MHz
Uncertainty of Measurement Results			+/-10	Hz(2σ)

Remarks :

11 Summary

General Remarks :

The EUT was tested according to the requirements of the following standard.
CFR 47 FCC Rules and Regulations Part 24
The test configuration is shown in clause 12 to 14.
The conclusion for the test items of which are required by the applied regulation is indicated under the test results.

Test Results :

The "as received" sample;

☒ - fulfill the test requirements of the regulation mentioned on clause 1.
☐ - doesn't fulfill the test requirements of the regulation mentioned on clause 1.

Reviewed by:

Shigeru Kinoshita
Deputy Manager
Testing Dept. EMC Div.
JQA KITA-KANSAI Testing Center

Tested by:

Akio Hosoda
Manager
Testing Dept. EMC Div.
JQA KITA-KANSAI Testing Center

12 Operating Condition

The test were carried under one modulation type shown as follows:
Modulation Burst Signal : DATA TSC 5 in accordance with GSM 05.02.

The Radiated Emission test were carried under 3 test configurations shown in clause 14.
In all tests, the fully charged battery is used for the EUT.

Detailed Transmitter portion:
Transmitter frequency : 1850.2 MHz(512CH) – 1909.8 MHz(810CH)
Local frequency : 1850.2 MHz(512CH) – 1909.8 MHz(810CH)

Detailed Transmitter portion:
Receiver frequency : 1930.2 MHz(512CH) – 1989.8 MHz(810CH)
Local frequency : 3860.4 MHz(512CH) – 3979.6 MHz(810CH)

Other Clock Frequency
RTC : 32.768 kHz
Reference : 26.0 MHz

13 Test Configuration

The equipment under test (EUT) consists of :

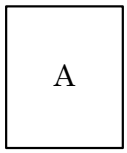
	Item	Manufacturer	Model No.	Serial No.	FCC ID
A	WCDMA & Tri-band GSM Dual mode Mobile Phone / Bluetooth Enable	Sharp	815SH	004401/11/ 063202/9	APYHRO00057
B	Lithium-ion Battery	Sharp	SHBBB1	--	N/A
C	AC Charger	Sharp	SHCAA1	--	N/A
D	Stereo Headset	Sharp	SHLAX1	--	N/A

The auxiliary equipment used for testing :
None
Type of Cable:

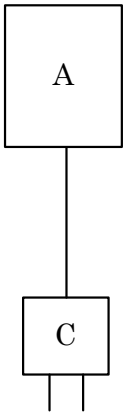
No.	Description	Identification (Manu. etc.)	Connector Shielded	Cable Shielded	Ferrite Core	Length (m)
1	DC Power Cord	--	NO	--	NO	1.5
2	Stereo Headset Cable	--	NO	--	NO	1.9

14 Equipment Under Test Arrangement (Drawings)

a) Single Unit

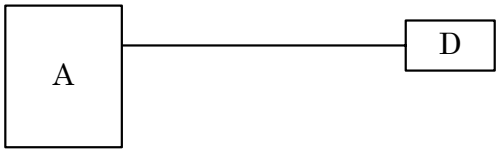


b) AC Charger used



120VAC 60Hz

c) Stereo Headset used



15 Equipment Under Test Arrangement (Photographs)

15.1 Radiated Emission

This page is CONFIDENTIAL.

15.2 Radiated Emission at three orthogonal axis

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Appendix A: Test Data

A.1 RF Power Output (§2.1046)

A.1.1 Conducted RF Power Output

Test Date: May 7, 2007
Temp.: 22 °C, Humi: 60 %

Transmitting Frequency		Correction Factor	Meter Reading (Peak)	Results (Peak)	
CH	[MHz]	[dB]	[dBm]	[dBm]	[mW]
512	1850.200	20.40	8.66	29.06	805.4
661	1880.000	20.40	8.65	29.05	803.5
810	1909.800	20.40	8.70	29.10	812.8

Calculated result at 1909.800 MHz, as the maximum level point shown on underline:

	Correction Factor	=	20.40	dBm
+)	Meter Reading	=	8.70	dB
	Result	=	29.10	dBm = 812.8 mW

NOTE : The correction factor shows the attenuation pad loss including the short, low loss cable or adapter.

A.1.2 ERP /EIRP Power Output

Test Date: May 1, 2007
Temp.: 23 °C, Humi: 59 %

1. Measurement Results

Transmitting Frequency		Emission Measurement [dB(μV)]		Substitution Measurement [dB(μV)]		Supplied Power to Substitution Antenna	Gain of Substitution Antenna
CH	[MHz]	Hori. (Mh)	Vert. (Mv)	Hori. (Msh)	Vert. (Msv)	[dBm]	[dB]
512	1850.200	93.8	93.5	74.0	74.2	- 3.2	14.2
661	1880.000	94.1	94.0	74.3	74.5	- 3.2	14.2
810	1909.800	94.2	94.2	74.5	74.5	- 3.2	14.3

2. Calculation Results

Transmitting Frequency		Peak EIRP [dBm]		Maximum Peak EIRP	Limits	Margin
CH	[MHz]	(EIRPh)	Vert. (EIRPv)	[W]	[dBm]	[dB]
512	1850.200	30.8	30.3	1.202	33.0	+ 2.2
661	1880.000	30.8	30.5	1.202	33.0	+ 2.2
810	1909.800	30.8	30.8	1.202	33.0	+ 2.2

Calculated result at 1909.800 MHz, as the worst point shown on underline:

	Emission Measurment (Mh)	=	94.2 dB(uV)
	Substitution Measurement (Msh)	=	-74.5 dB(uV)
	Supplied Power to Substitution Antenna	=	-3.2 dBm
+)	Gain of Substitution Antenna	=	14.3 dB
	Result (ERPh)	=	30.8 dBm = 1.202 W

Minimum Margin: 33.0 - 30.8 = 2.2 (dB)

NOTE : Setting of measuring instrument(s) :

Detector Function	Resolution B.W.	V.B.W.	Sweep Time
Peak	1 MHz	1 MHz	20 msec.

A.2 Modulation Characteristics (§2.1047)

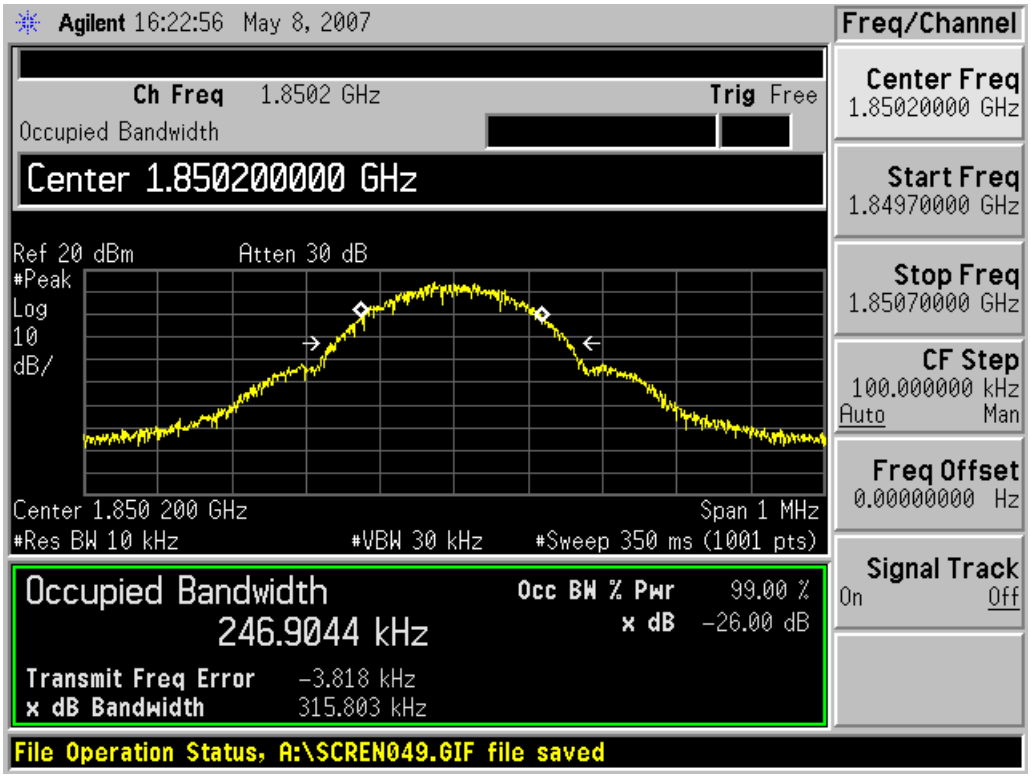
Not Applicable

A.3 Occupied Bandwidth (§2.1049)

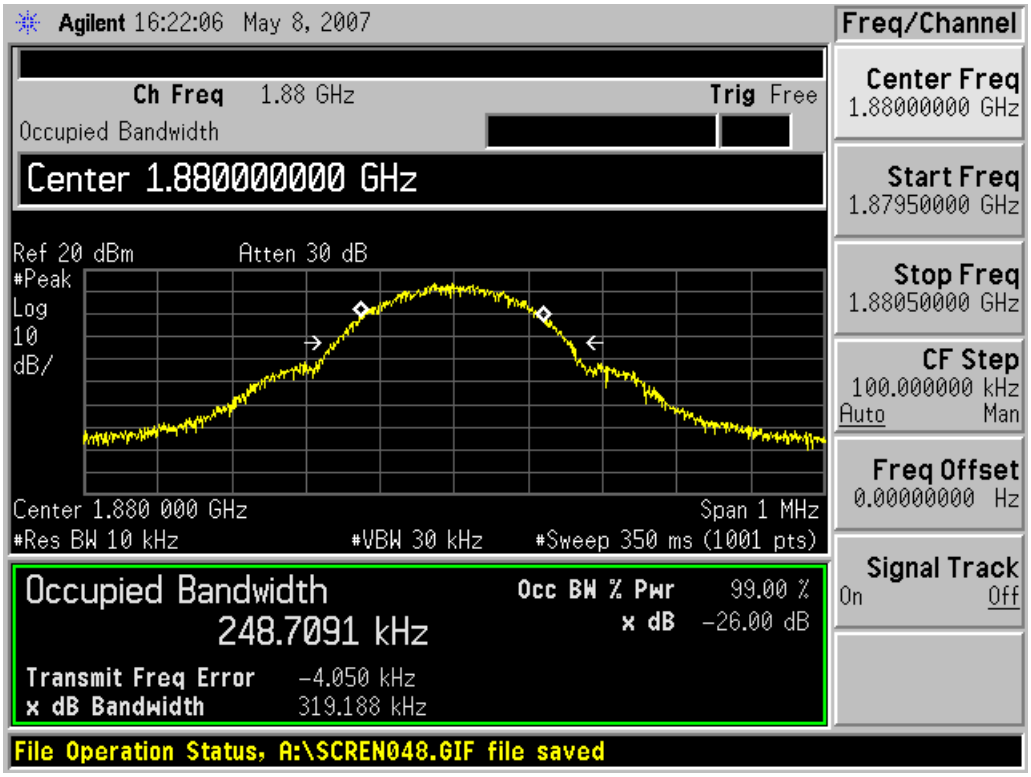
The resolution bandwidth was set to about 1% of emission bandwidth, -26dBc display line was placed on the screen (or 99% bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.

Channel	Frequency (MHz)	99% Bandwidth (kHz)	-26dBc Bandwidth (kHz)
512	1850.20	315.8	246.9
661	1880.00	319.2	248.7
810	1909.80	319.0	245.6

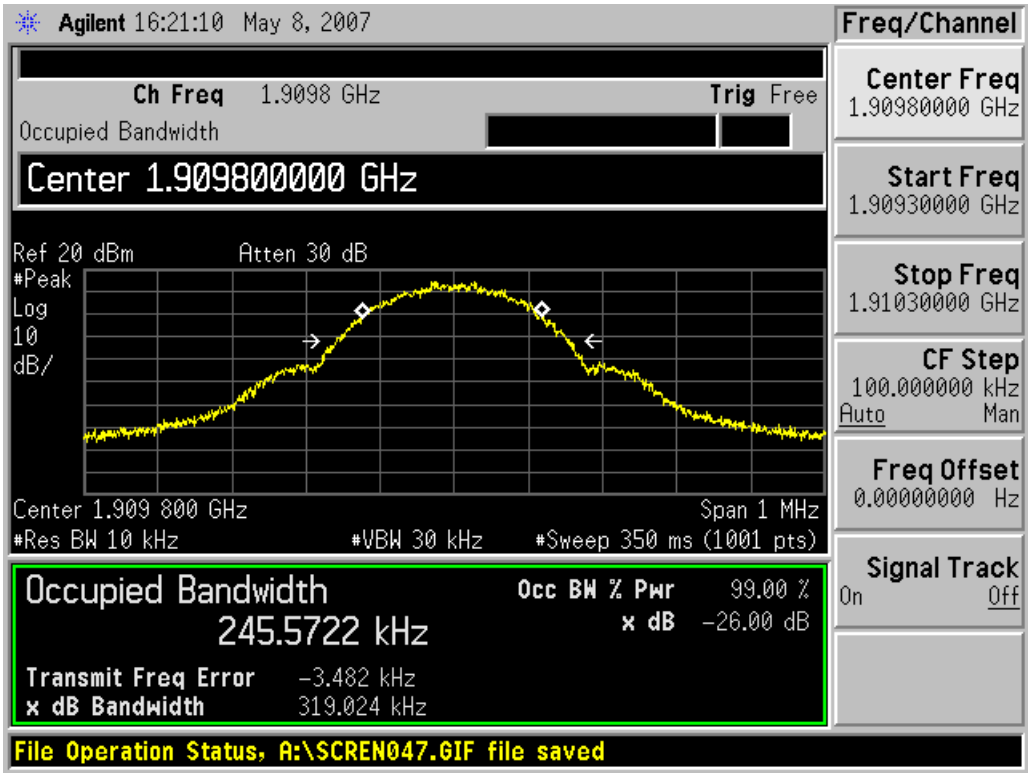
Low Channel



Middle Channel



High Channel



A.4 Spurious Emissions at Antenna Terminals (§2.1051)

Test Date: May 8, 2007
Temp.: 22 °C, Humi: 55 %

CH	Transmitting Frequency [MHz]	Measured Frequency [MHz]	Corr. Factor [dB]	Meter Readings [dBm]	Limits [dBm]	Results [dBm]	Margin [dB]	Remarks
512	1850.200	3700.400	11.3	-59.5	-13.0	-48.2	+35.2	C
		5550.600	11.3	-47.9	-13.0	-36.6	+23.6	C
		7400.800	11.1	< -60.0	-13.0	< -48.9	> +35.9	C
		9251.000	11.1	< -60.0	-13.0	< -48.9	> +35.9	C
		11101.200	11.4	< -60.0	-13.0	< -48.6	> +35.6	C
		12951.400	11.6	< -60.0	-13.0	< -48.4	> +35.4	C
		14801.600	11.8	< -60.0	-13.0	< -48.2	> +35.2	C
		16651.800	11.9	< -60.0	-13.0	< -48.1	> +35.1	C
		18502.000	12.1	< -60.0	-13.0	< -47.9	> +34.9	C
661	1880.000	3760.000	11.3	-57.9	-13.0	-46.6	+33.6	C
		5640.000	11.3	-51.1	-13.0	-39.8	+26.8	C
		7520.000	11.1	< -60.0	-13.0	< -48.9	> +35.9	C
		9400.000	11.1	< -60.0	-13.0	< -48.9	> +35.9	C
		11280.000	11.4	< -60.0	-13.0	< -48.6	> +35.6	C
		13160.000	11.6	< -60.0	-13.0	< -48.4	> +35.4	C
		15040.000	11.8	< -60.0	-13.0	< -48.2	> +35.2	C
		16920.000	11.9	< -60.0	-13.0	< -48.1	> +35.1	C
		18800.000	12.1	< -60.0	-13.0	< -47.9	> +34.9	C
810	1909.800	3819.600	11.3	-58.2	-13.0	-46.9	+33.9	C
		5729.400	11.2	-55.3	-13.0	-44.1	+31.1	C
		7639.200	11.1	< -60.0	-13.0	< -48.9	> +35.9	C
		9549.000	11.2	< -60.0	-13.0	< -48.8	> +35.8	C
		11458.800	11.4	< -60.0	-13.0	< -48.6	> +35.6	C
		13368.600	11.6	< -60.0	-13.0	< -48.4	> +35.4	C
		15278.400	11.8	< -60.0	-13.0	< -48.2	> +35.2	C
		17188.200	12.0	< -60.0	-13.0	< -48.0	> +35.0	C
		19098.000	12.1	< -60.0	-13.0	< -47.9	> +34.9	C

Calculated result at 5550.6 MHz, as the worst point shown on underline:

	Corr. Factor	=	11.3 dB
+)	Meter Reading	=	-47.9 dBm
	Result	=	-36.6 dBm

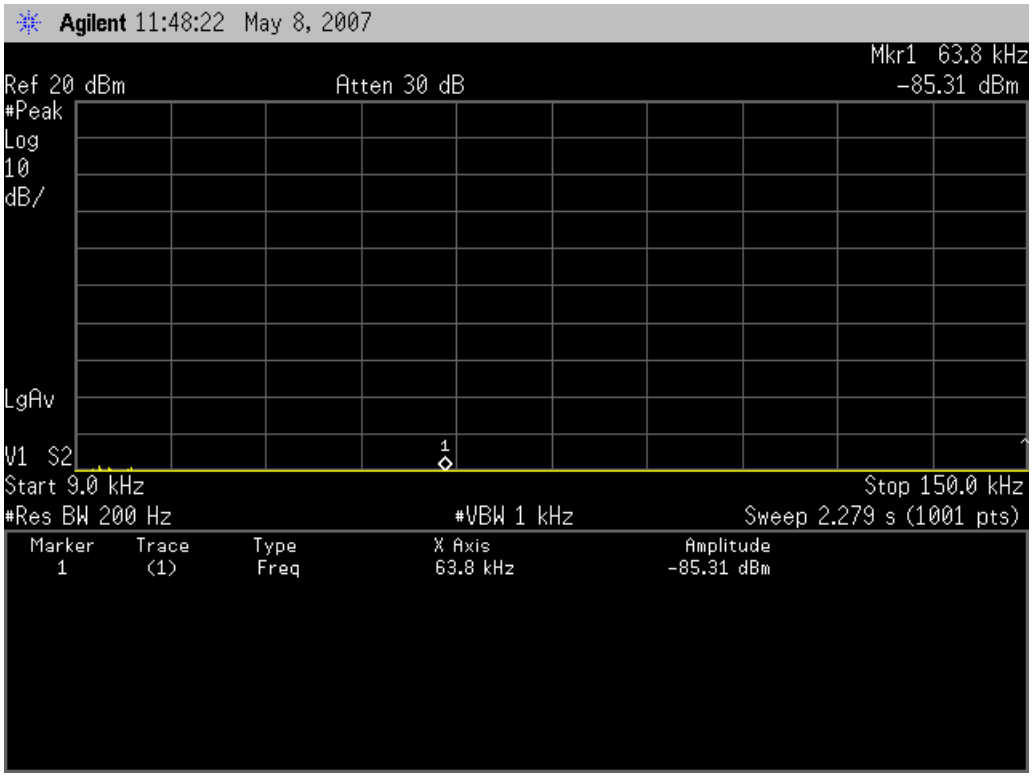
Minimum Margin: -13.0 - (-36.6) = 23.6 (dB)

NOTES

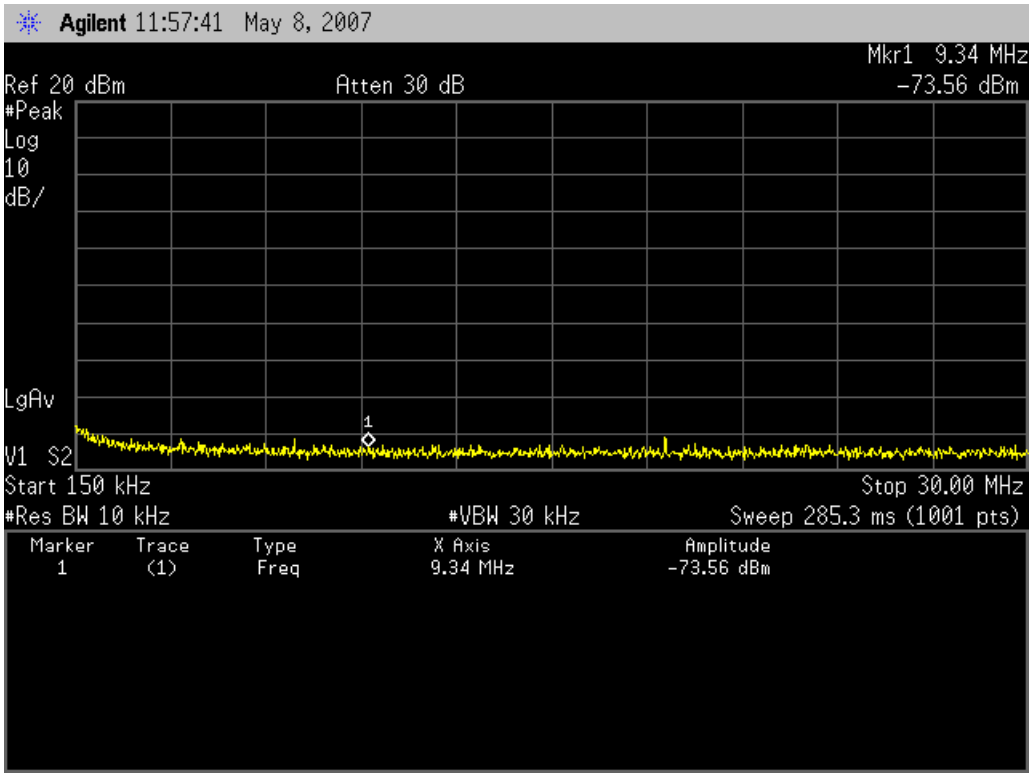
1. The spectrum was checked from 9 kHz to 20 GHz.
2. The spectrum analyzer displays were printed out in attachment B.
3. Applied limits : -13.0 [dBm] = 10log(TP[mW]) - (43 + 10log(tp[W])) = 10log(TP[mW]) - (43 + (10 log(TP[mW]) - 30))
   where, tp[W] = TP[mW] / 1000 : Transmitter power at anttena terminal
4. The correction factor is shown as follows:
   Corr. Factor [dB] = Cable Loss + 10dB Pad Att. [dB] (9 kHz - 2 GHz)
   Corr. Factor [dB] = Cable Loss + 10dB Pad Att. + High Pass Filter Loss (D-96) [dB] (over 2 GHz)
5. The symbol of "<" means "or less".
6. The symbol of ">" means "more than".
7. Setting of measuring instrument(s) :

	Detector Function	RES B.W.	V.B.W.
A	Peak	10 kHz	30 kHz
B	Peak	100 kHz	300 kHz
C	Peak	1 MHz	3 MHz

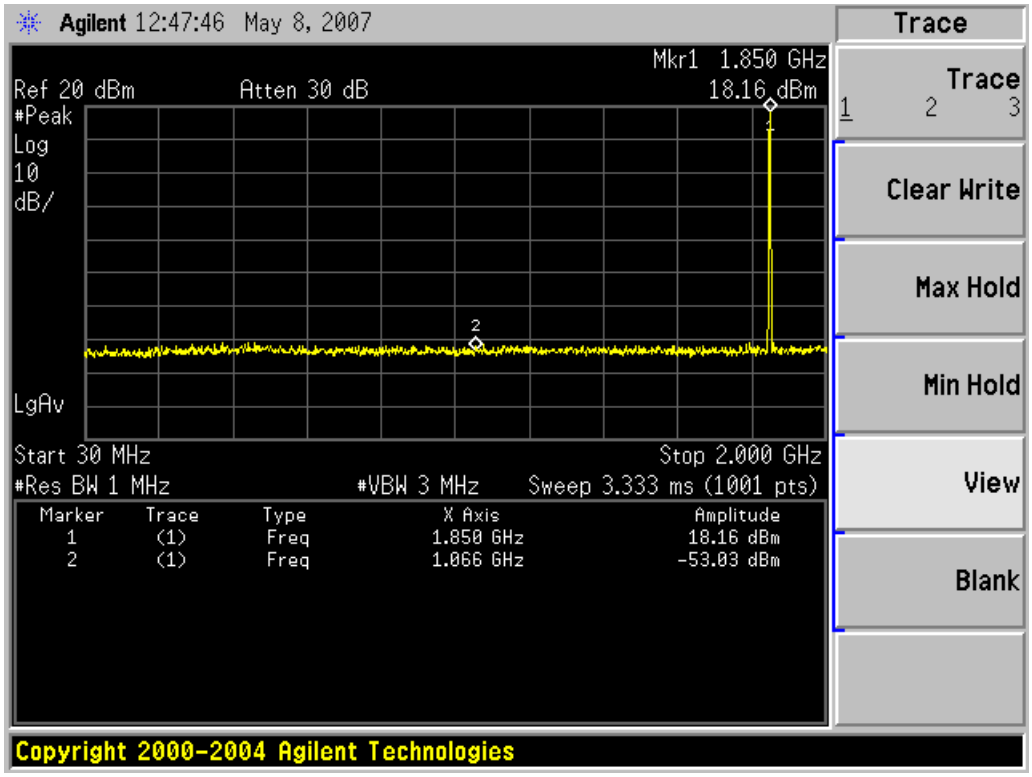
Low Channel, Out-Of-Band Emissions (9 kHz – 150 kHz)



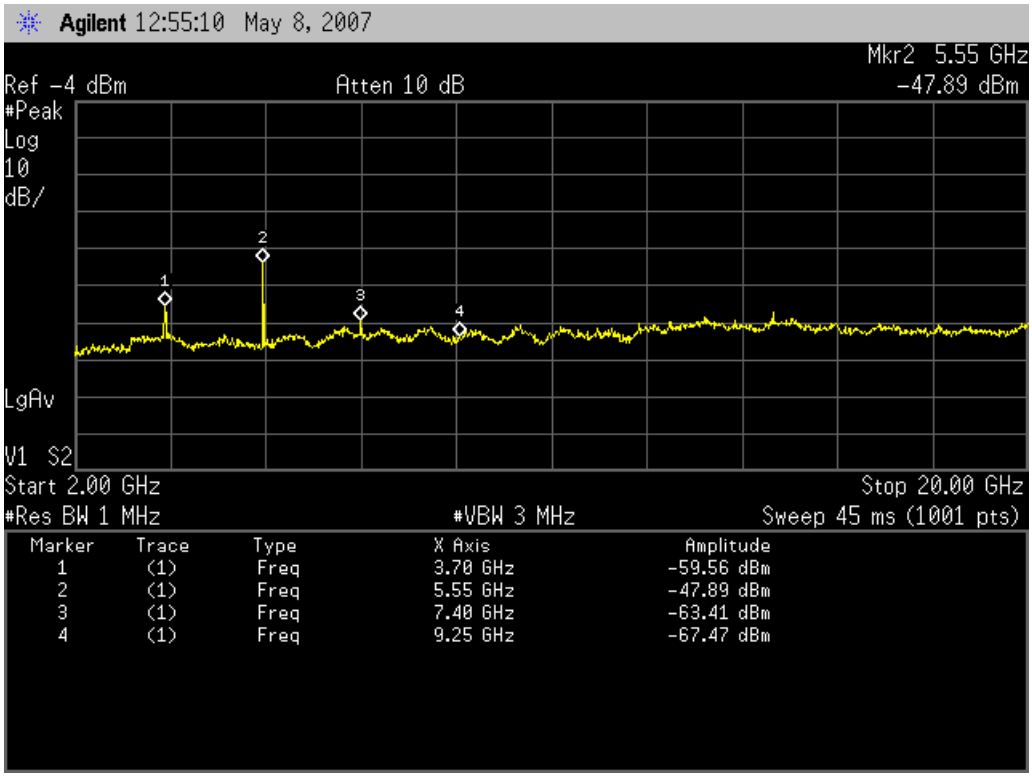
Low Channel, Out-Of-Band Emissions (150 kHz – 30 MHz)



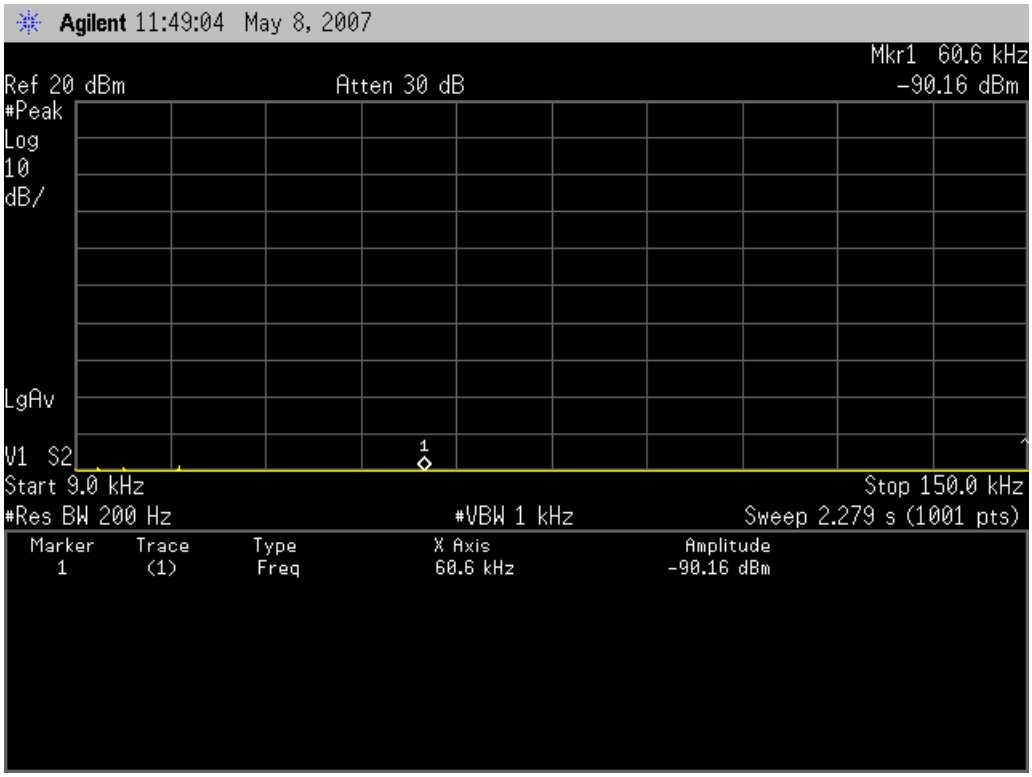
Low Channel, Out-Of-Band Emissions (30 MHz – 2 GHz)



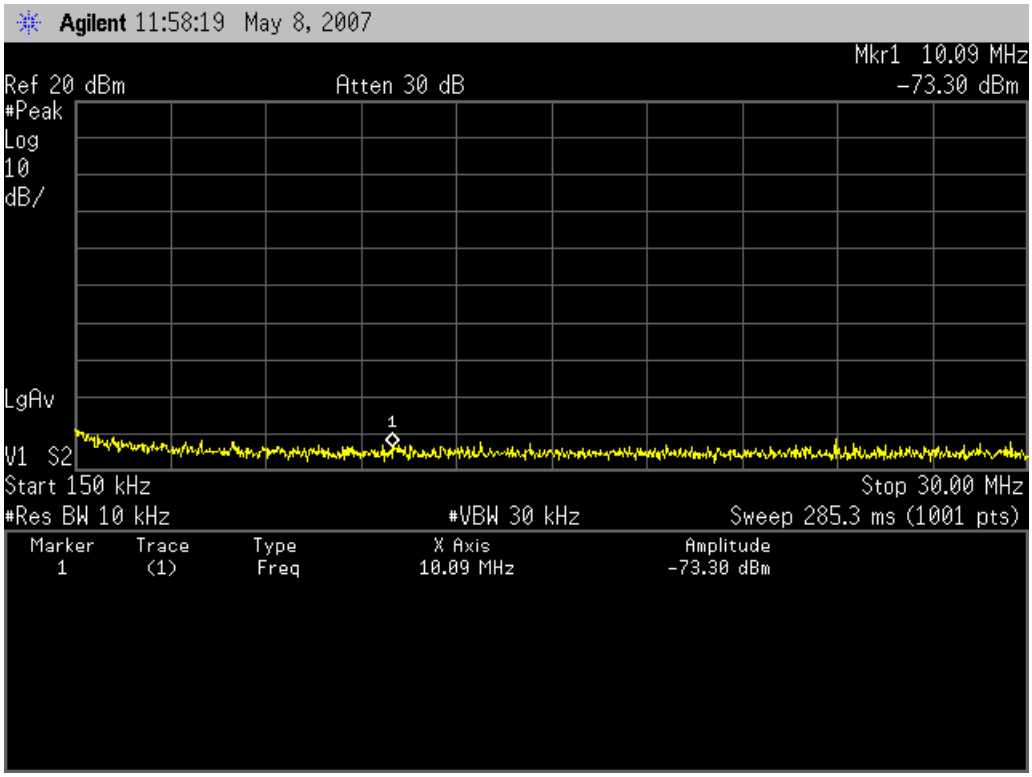
Low Channel, Out-Of-Band Emissions (2 GHz – 20 GHz)



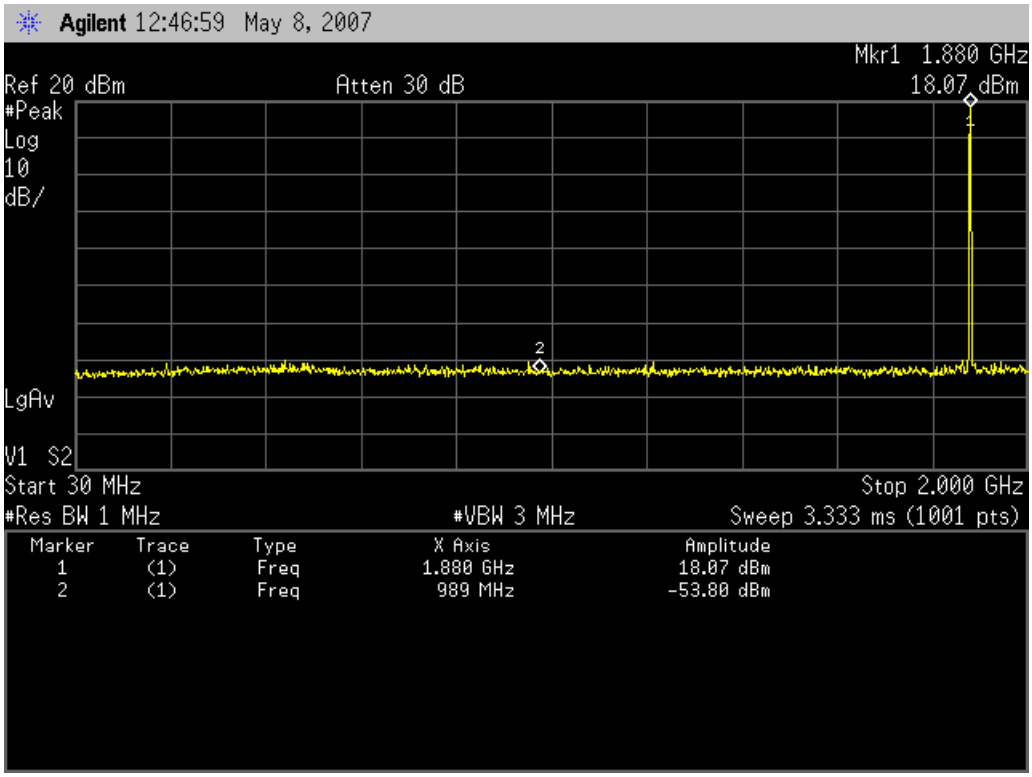
Middle Channel, Out-Of-Band Emissions (9 kHz – 150 kHz)



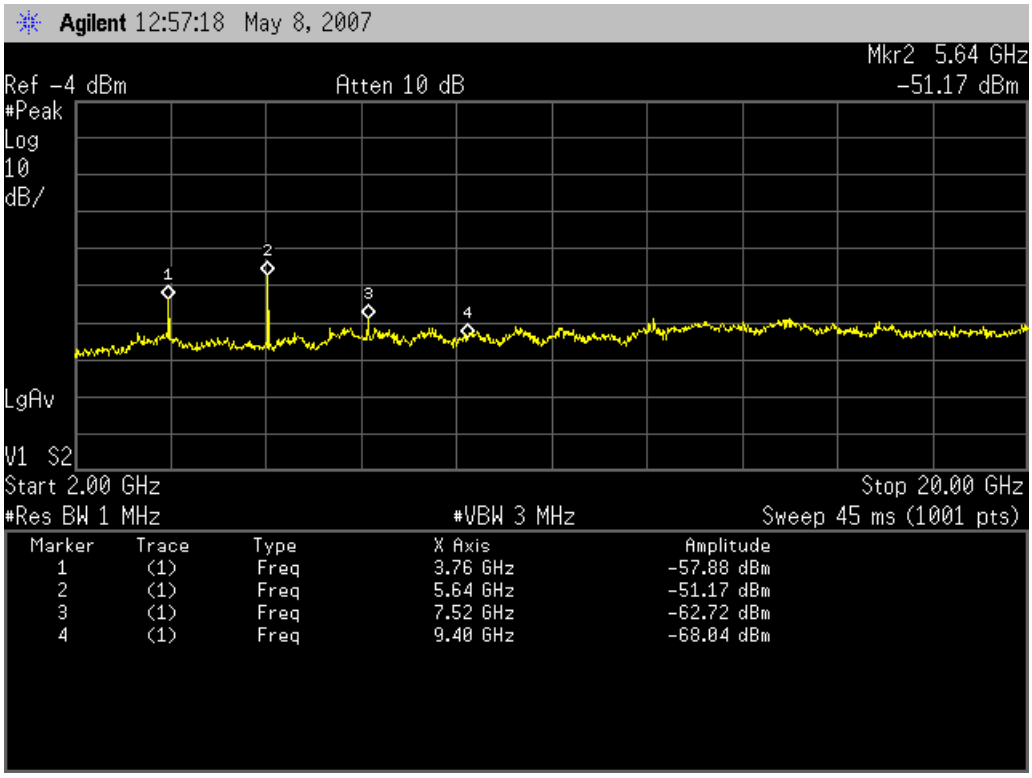
Middle Channel, Out-Of-Band Emissions (150 kHz – 30 MHz)



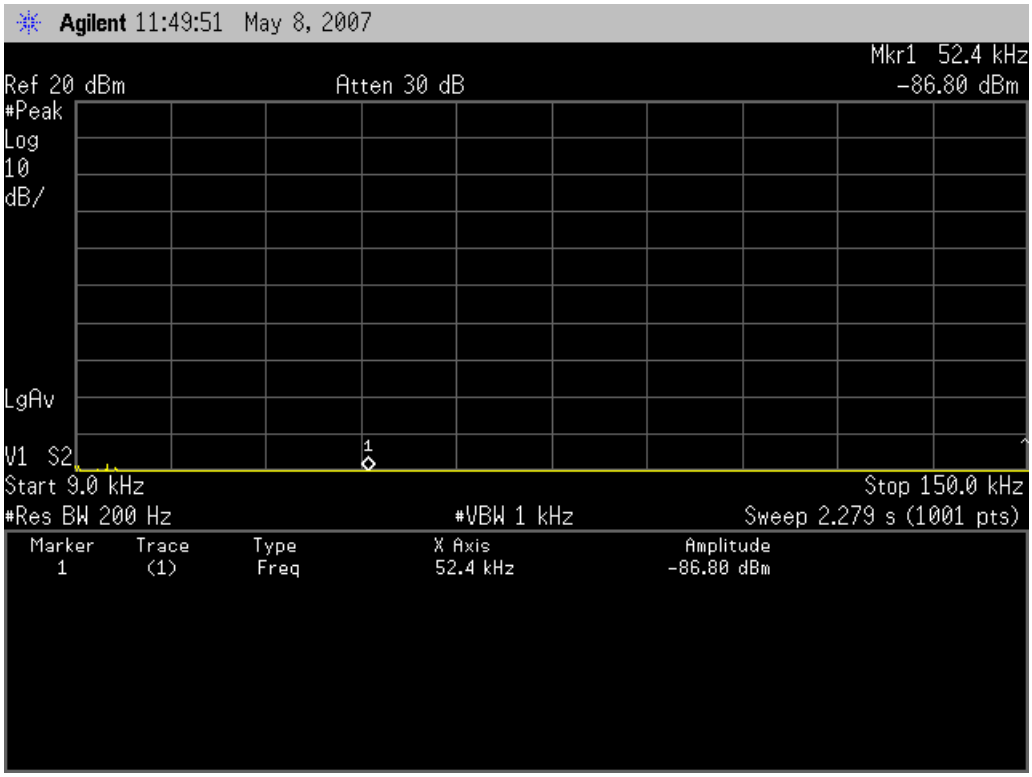
Middle Channel, Out-Of-Band Emissions (30 MHz – 2 GHz)



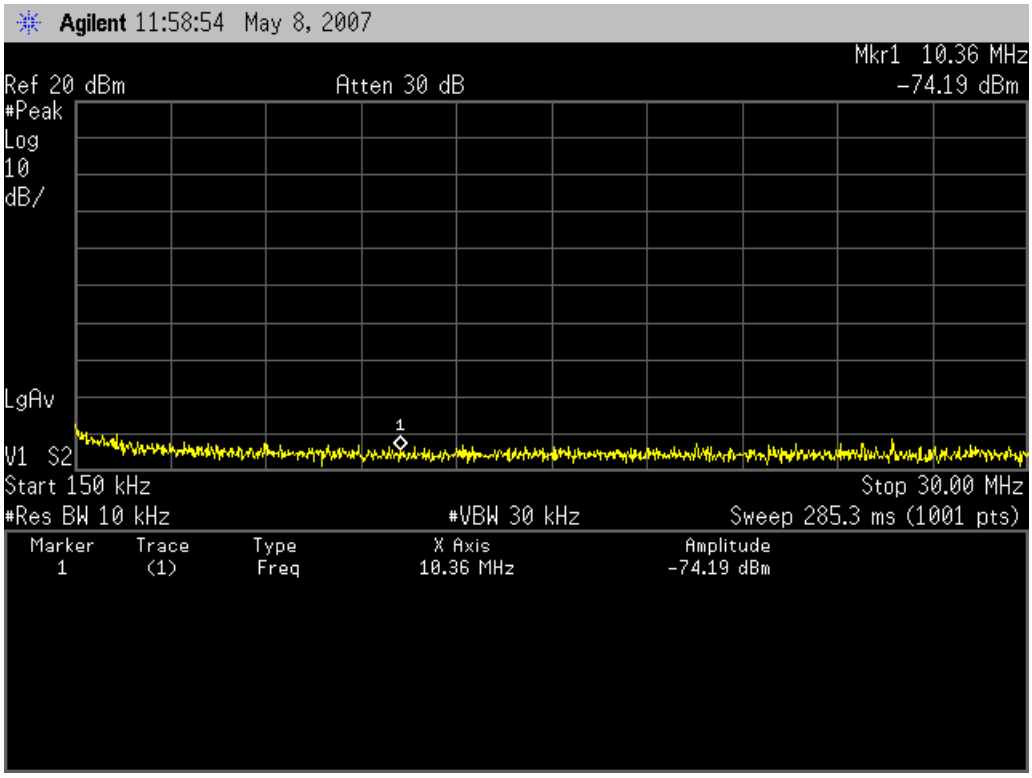
Middle Channel, Out-Of-Band Emissions (2 GHz – 20 GHz)



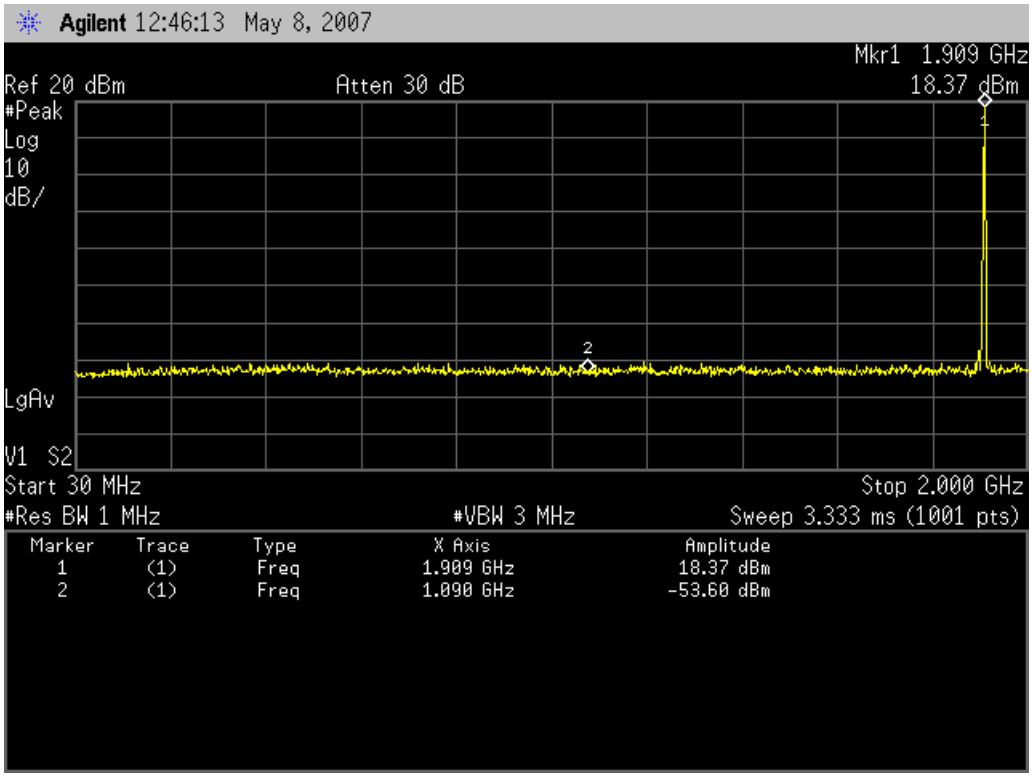
High Channel, Out-Of-Band Emissions (9 kHz – 150 kHz)



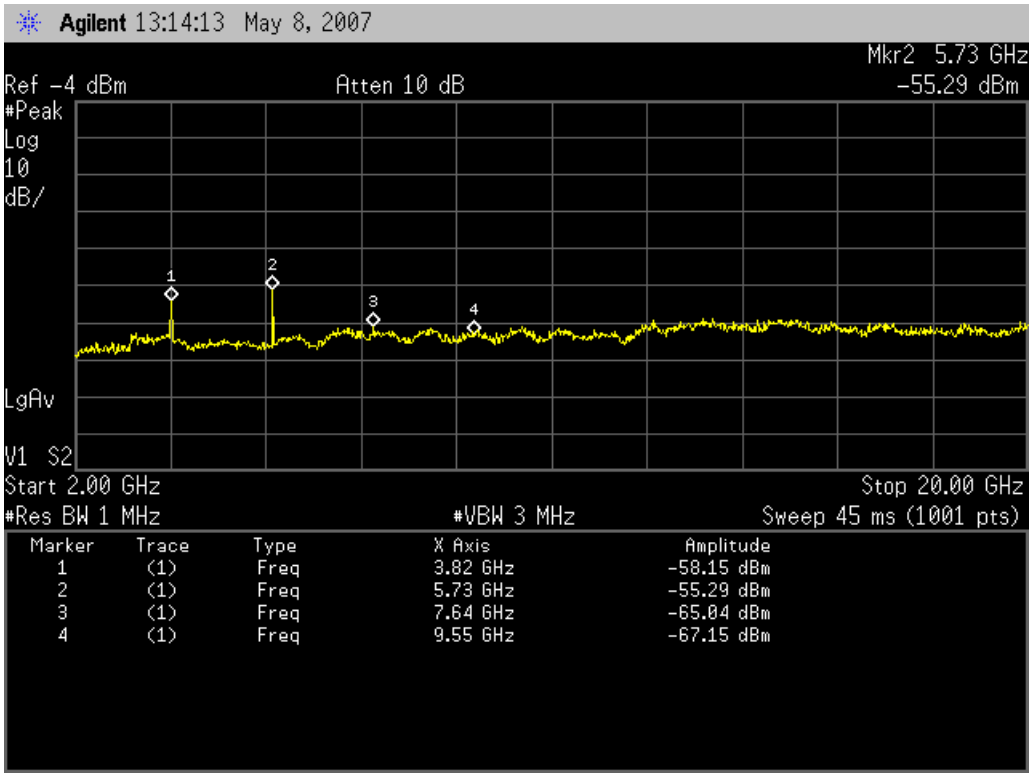
High Channel, Out-Of-Band Emissions (150 kHz – 30 MHz)



High Channel, Out-Of-Band Emissions (30 MHz – 2 GHz)



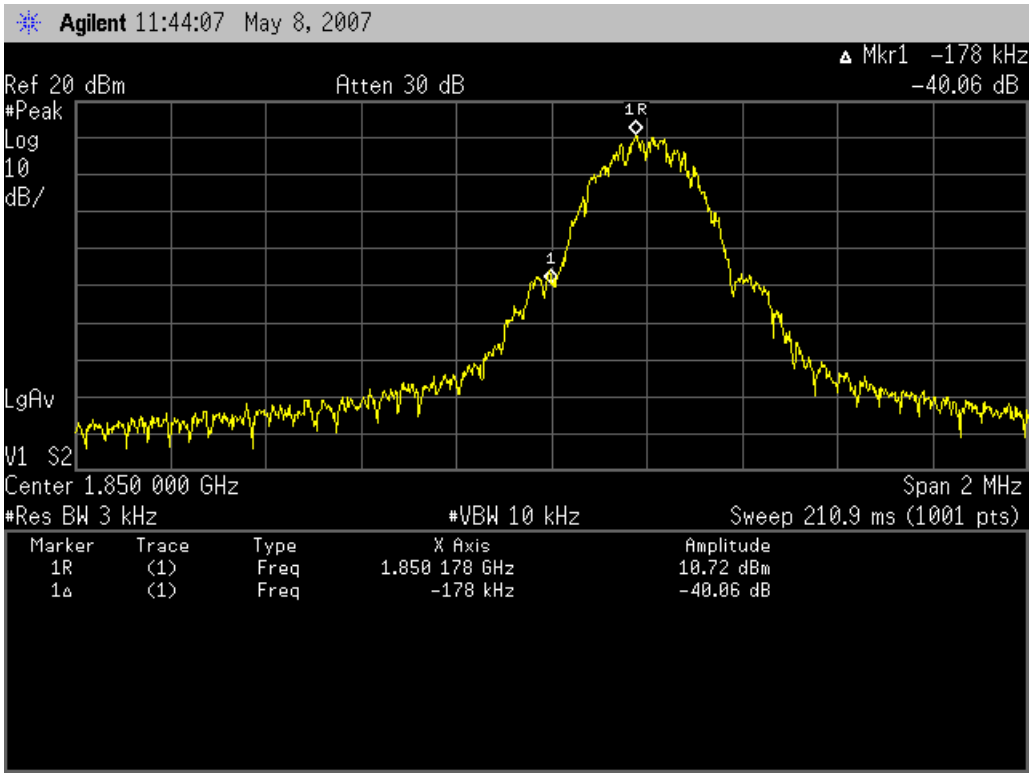
High Channel, Out-Of-Band Emissions (2 GHz – 20 GHz)



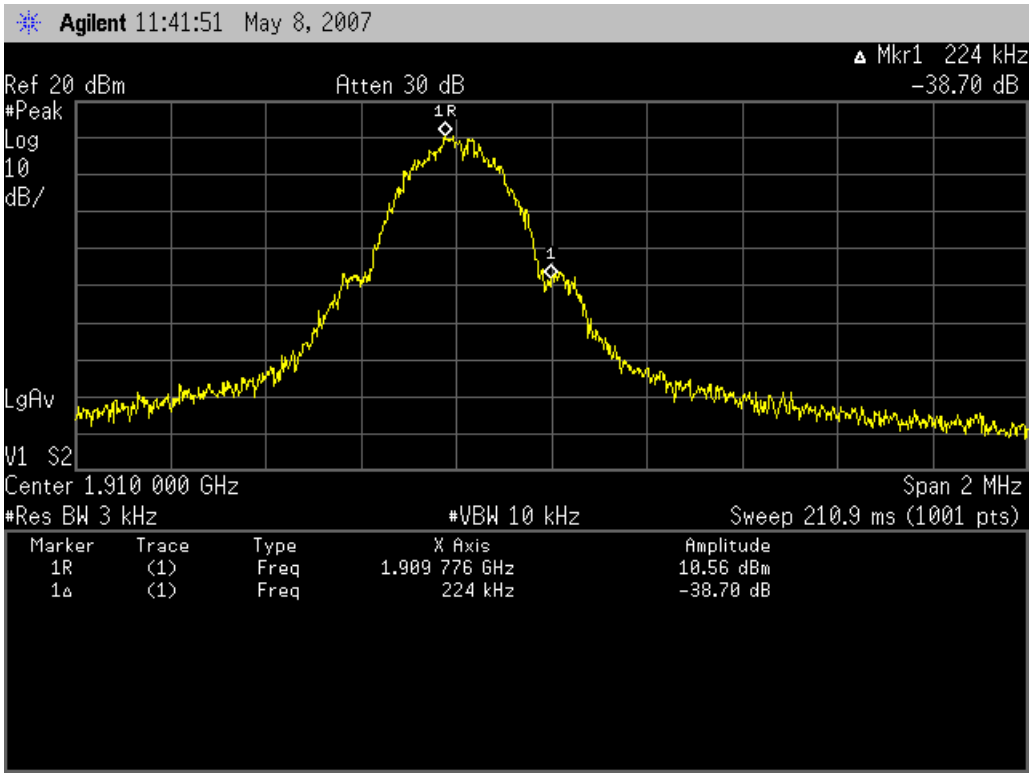
A.5 Band-Edge Emission(§2.1051)

Channel	Frequency (MHz)	Band-Edge Frequency (MHz)	Band-Edge Level (dBc)
512	1850.20	1850.00	-40.1
810	1909.80	1910.00	-38.7

Low Channel, Band-Edge Emission



High Channel, Band-Edge Emission



A.6 Field Strength of Spurious Radiation (§2.1053)

Test Date: May 1, 2007
Temp.: 23 °C, Humi: 59 %

Test Configuration : Single Unit

CH	Transmitting Frequency [MHz]	Measured Frequency [MHz]	ERP [dBm] Hori.	ERP [dBm] Vert.	Limits [dBm]	Margin [dB]	Remarks
512	1850.200	3700.400	< -32.9	< -32.9	-13.0	> +19.9	C
		5550.600	< -30.7	< -30.7	-13.0	> +17.7	C
		7400.800	< -29.3	< -29.3	-13.0	> +16.3	C
		9251.000	< -33.6	< -33.6	-13.0	> +20.6	C
		11101.200	< -33.3	-33.1	-13.0	+20.1	C
		12951.400	< -27.8	< -27.8	-13.0	> +14.8	C
		14801.600	< -27.7	< -27.7	-13.0	> +14.7	C
		16651.800	< -28.9	< -28.9	-13.0	> +15.9	C
		18502.000	< -31.6	< -31.6	-13.0	> +18.6	C
661	1880.000	3760.000	< -33.2	< -33.2	-13.0	> +20.2	C
		5640.000	< -30.3	< -30.3	-13.0	> +17.3	C
		7520.000	< -28.5	< -28.5	-13.0	> +15.5	C
		9400.000	< -33.9	< -33.9	-13.0	> +20.9	C
		11280.000	-32.6	-33.0	-13.0	+19.6	C
		13160.000	< -27.6	< -27.6	-13.0	> +14.6	C
		15040.000	< -28.1	< -28.1	-13.0	> +15.1	C
		16920.000	< -29.1	< -29.1	-13.0	> +16.1	C
		18800.000	< -31.6	< -31.6	-13.0	> +18.6	C
810	1909.800	3819.600	< -33.3	< -33.3	-13.0	> +20.3	C
		5729.400	< -30.3	< -30.3	-13.0	> +17.3	C
		7639.200	< -33.7	< -33.7	-13.0	> +20.7	C
		9549.000	< -34.1	< -34.1	-13.0	> +21.1	C
		11458.800	< -33.2	< -33.2	-13.0	> +20.2	C
		13368.600	< -27.4	< -27.4	-13.0	> +14.4	C
		15278.400	< -28.4	< -28.4	-13.0	> +15.4	C
		17188.200	< -28.9	< -28.9	-13.0	> +15.9	C
		19098.000	< -31.6	< -31.6	-13.0	> +18.6	C

Calculated result at 13368.6 MHz, as the worst point shown on underline:
Minimum Margin: -13.0 - (<-27.4) = >14.4 (dB)

NOTES
1. Test Distance : 3 m
2. The spectrum was checked from 30 MHz to 20 GHz.
3. All emissions not reported were more than 20 dB below the applied limits.
4. Applied limits : -13.0 [dBm] = 10log(TP[mW]) - (43 + 10log(tp[W])) = 10log(TP[mW]) - (43 + (10 log(TP[mW]) - 30))
   where, tp[W] = TP[mW] / 1000 : Transmitter power at anttena terminal
5. The symbol of "<" means "or less".
6. The symbol of ">" means "more than".
7. Setting of measuring instrument(s) :

	Detector Function	RES B.W.	V.B.W.	Sweep Time
A	Peak	10 kHz	30 kHz	20 msec.
B	Peak	100 kHz	300 kHz	20 msec.
C	Peak	1 MHz	3 MHz	20 msec.

A.7 Frequency Stability (§2.1055)

Test Date: May 9, 2007

1. Frequency Stability Measurement versus Temperature

Transmitting Frequency : 1880.000 MHz (661 ch)
DC Supply Voltage : 4.0 VDC

Ambient Temperature [°C]	Deviation [ppm] Startup	2 minutes	5 minutes	10 minutes	Limits [ppm]	Margin [ppm]
-30	**+ 0.06**	+ 0.04	+ 0.03	+ 0.03	N/A	N/A
-20	+ 0.05	+ 0.03	+ 0.03	- 0.02	N/A	N/A
-10	+ 0.04	- 0.03	- 0.02	- 0.01	N/A	N/A
0	- 0.04	- 0.03	- 0.03	+ 0.03	N/A	N/A
10	- 0.05	- 0.04	- 0.03	- 0.02	N/A	N/A
20	- 0.05	- 0.03	- 0.03	- 0.01	N/A	N/A
30	- 0.05	- 0.04	- 0.04	- 0.03	N/A	N/A
40	- 0.05	- 0.04	- 0.04	- 0.03	N/A	N/A
50	- 0.04	- 0.04	- 0.03	- 0.01	N/A	N/A

2. Frequency Stability Measurement versus Power Supply Voltage

Transmitting Frequency : 1880.000 MHz (661 ch)
DC Supply Voltage : 20 °C

Ambient Temperature [°C]	Deviation [ppm] Startup	2 minutes	5 minutes	10 minutes	Limits [ppm]	Margin [ppm]
4.0	- 0.05	- 0.03	- 0.03	- 0.01	N/A	N/A
3.7(Ending)	- 0.05	- 0.03	- 0.03	- 0.03	N/A	N/A

Test condition example as the maximum deviation point shown on underline:
Ambient Temperature : -30 °C / Startup
DC Supply Voltage : 4 VDC

NOTE : The measurement were made after all of components of the oscillator sufficiently stabilized at each temperature.

Appendix B: Test Instruments

B.1 RF Power Output

B.1.1 Conducted RF Power Output

Type	Model	Manufacturer	ID No.	Last Cal.	Interval
Power Meter	E4417A	Agilent	B-51	2006/6	1 Year
Power Sensor	E9321A	Agilent	B-52	2006/6	1 Year
Attenuator	54-10	Weinschel	D-82	2006/5	1 Year
Attenuator	54-10	Weinschel	D-83	2006/5	1 Year

B.1.2 ERP /EIRP Power Output

Type	Model	Manufacturer	ID No.	Last Cal.	Interval
Spectrum Analyzer	E4446A	Agilent	A-39	2006/11	1 Year
Signal Generator	E8257D	Agilent	B-39	2005/5	2 Years
Power Meter	N1911A	Agilent	B-63	2006/6	1 Year
Power Sensor	N1921A	Agilent	B-64	2006/6	1 Year
Attenuator(RX)	2-10	Weinschel	D-79	2006/9	1 Year
Attenuator(TX)	2-10	Weinschel	D-80	2006/9	1 Year
RF Cable(RX)	SUCOFLEX104	SUHNER	C-40-11	2006/11	1 Year
RF Cable(TX)	SUCOFLEX 102/E	SUHNER	C-70	2007/3	1 Year
Horn Antenna(RX)	91889-2	EATON	C-40-2	2006/6	1 Year
Horn Antenna(TX)	91889-2	EATON	C-41-2	2006/6	1 Year

B.2 Modulation Characteristics

Not Applicable

B.3 Occupied Bandwidth

Type	Model	Manufacturer	ID No.	Last Cal.	Interval
Spectrum Analyzer	E4446A	Agilent	A-39	2006/11	1 Year
Attenuator	54-10	Weinschel	D-83	2006/5	1 Year
RF Cable	SUCOFLEX102	SUHNER	C-51	2006/5	1 Year

B.4 Spurious Emissions at Antenna Terminals

Type	Model	Manufacturer	ID No.	Last Cal.	Interval
Spectrum Analyzer	E4446A	Agilent	A-39	2006/11	1 Year
Attenuator	54-10	Weinschel	D-83	2006/5	1 Year
HPF	HPM13899	MICRO-TRONICS	D-96	2007/2	1 Year
RF Cable	SUCOFLEX102	SUHNER	C-51	2006/5	1 Year

B.5 Band-Edge Emission

Type	Model	Manufacturer	ID No.	Last Cal.	Interval
Spectrum Analyzer	E4446A	Agilent	A-39	2006/11	1 Year
Attenuator	54-10	Weinschel	D-83	2006/5	1 Year
RF Cable	SUCOFLEX102	SUHNER	C-51	2006/5	1 Year

B.6 Field Strength of Spurious Radiation

Type	Model	Manufacturer	ID No.	Last Cal.	Interval
Test Receiver	ESCS 30	Rohde & Schwarz	A-1	2006/8	1 Year
Biconical Antenna	VHA9103/BBA9106	Schwarzbeck	C-30	2006/8	1 Year
Log-periodic Antenna	UHALP 9108A1	Schwarzbeck	C-31	2006/8	1 Year
RF Cable	--	----	H-5	2006/8	1 Year
Site Attenuation	--	----	H-17	2006/10	1 Year
0Spectrum Analyzer	E4446A	Agilent	A-39	2006/11	1 Year
Signal Generator	E8257D	Agilent	B-39	2005/5	2 Years
Power Meter	N1911A	Agilent	B-63	2006/6	1 Year
Power Sensor	N1921A	Agilent	B-64	2006/6	1 Year
Attenuator	2-10	Weinschel	D-79	2006/9	1 Year
Attenuator	2-10	Weinschel	D-80	2006/9	1 Year
Attenuator	54-10	Weinschel	D-82	2006/11	1 Year
Attenuator	54-10	Weinschel	D-83	2006/11	1 Year
Pre-Amplifier	WJ-6611-513	Watkins Johnson	A-23	2006/11	1 Year
Pre-Amplifier	WJ-6882-824	Watkins Johnson	A-21	2006/11	1 Year
Pre-Amplifier	DBL-0618N515	DBS Microwave	A-33	2006/11	1 Year
RF Cable	SUCOFLEX104	SUHNER	C-40-11	2006/11	1 Year
RF Cable	SUCOFLEX104	SUHNER	C-40-14	2006/11	1 Year
RF Cable	SUCOFLEX 102/E	SUHNER	C-70	2007/3	1 Year
RF Cable	SUCOFLEX102	SUHNER	C-54	2007/3	1 Year
RF Cable	102EA-40 11K-252 x2 2m	SUHNER	C-69	2007/3	1 Year
Horn Antenna	91888-2	EATON	C-40-1	2006/6	1 Year
Horn Antenna	91888-2	EATON	C-41-1	2006/6	1 Year
Horn Antenna	91889-2	EATON	C-40-2	2006/6	1 Year
Horn Antenna	91889-2	EATON	C-41-2	2006/6	1 Year
Horn Antenna	94613-1	EATON	C-40-3	2006/6	1 Year
Horn Antenna	94613-1	EATON	C-41-3	2006/6	1 Year
Horn Antenna	91891-2	EATON	C-40-4	2006/6	1 Year
Horn Antenna	91891-2	EATON	C-41-4	2006/6	1 Year
Horn Antenna	94614-1	EATON	C-40-5	2006/6	1 Year
Horn Antenna	CL-107-43	ARNELLAB	C-41-5	2006/6	1 Year
Horn Antenna	3160-09	EMCO	C-48	2006/6	1 Year

B.7 Frequency Stability

Type	Model	Manufacturer	ID No.	Last Cal.	Interval
Universal Telecommunication Tester	CMU200	Rohde&Schwarz	B-21	2007/4	1 Year
DC Voltage Meter	2011-39	YEW	B-33	2007/4	1 Year
Environmental Chamber	PL-4KPH (S/N:14007470)	TABAI ESPEC	--	N/A	N/A
Temperature Recorder	SRF106AS00000M11 (S/N:1400909)	TABAI ESPEC	--	2006/10	1 Year
DC Power Supply	NL035-10	TAKASAGO	F-4	N/A	N/A