JQA File No. : KL80090292
Issue Date : October 5, 2009

TEST REPORT

APPLICANT	:	Sharp Corporation, Communication Systems Group
ADDRESS	:	2-13-1, Iida Hachihonmatsu, Higashi-Hiroshima City, Hiroshima, 739-0192, JAPAN
PRODUCTS	:	Cellular Phone
MODEL NO.	:	SH-02B
SERIAL NO.	:	004401112155193
FCC ID	:	APYHRO00110
TEST STANDARD	:	CFR 47 FCC Rules and Regulations Part 22
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	:	September 23, 2009 - September 30, 2009

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

Junichi Wakamatsu
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.

TABLE OF CONTENTS

DEFINITIONS FOR ABBREVIATION AND SYMBOLS USED IN THIS TEST REPORT

EUT : Equipment Under Test
AE : Associated Equipment
N/A : Not Applicable
N/T : Not Tested
EMC : Electromagnetic Compatibility
EMI : Electromagnetic Interference
EMS : Electromagnetic Susceptibility

☒ - 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 22
Subpart H – Cellular Radiotelephone Service

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-C-2004

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, 2010)
NVLAP Lab Code : 200191-0 (Effective through : June 30, 2010)
BSMI Recognition No. : SL2-IS-E-6006, SL2-IN-E-6006, SL2-AI-E-6006
(Effective through : September 14, 2010)

VCCI Registration No. : R-008, R-1117, C-006, C-007, C-1674, C-2143, T-1418, T-1419
(Effective through : April 3, 2010)
IC Registration No. : 2079E-1, 2079E-2 (Effective through : January 6, 2011)

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, Higashi-Hiroshima City, Hiroshima, 739-0192, JAPAN
2.	Products	:	Cellular Phone
3.	Model No.	:	SH-02B
4.	Serial No.	:	004401112155193
5.	Product Type	:	Pre-production
6.	Date of Manufacture	:	September, 2009
7.	Transmitting Frequency	:	826.4 MHz(4132CH) – 846.6MHz(4233CH)
8.	Receiving Frequency	:	871.4 MHz(4357CH) – 891.6MHz(4458CH)
9.	Emission Designations	:	4M15F9W
10.	Max. RF Output Power	:	0.132W (ERP)
11.	Power Rating	:	4.0VDC (Lithium-ion Battery Pack SH21 770mAh)
12.	EUT Grounding	:	None
13.	Category	:	WCDMA850
14.	EUT Authorization	:	Certification
15.	Receive Date of EUT	:	September 12, 2009

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) $= 826.4 + 0.2 \times (n - 4132)$
where, n : channel number $(4132 \leq n \leq 4233)$

Receiving Frequency (in MHz) $= 871.4 + 0.2 \times (n - 4357)$
where, n : channel number $(4357 \leq n \leq 4458)$

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 C.

5.1.2 ERP / EIRP RF Power Output

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

Test site : ☒ - KAMEOKA 1st open site ☒ - 3 m ☐ - 10 m
☐ - KAMEOKA 2nd open site ☐ - 3 m ☐ - 10 m

Test instruments : Refer to Appendix C.

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 C.

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 C.

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 C.

5.6 Field Strength of Spurious Radiation (§2.1053)

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

Test site : ☒ - KAMEOKA 1st open site ☒ - 3 m ☐ - 10 m
☐ - KAMEOKA 2nd open site ☐ - 3 m ☐ - 10 m

Test instruments : Refer to Appendix C.

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

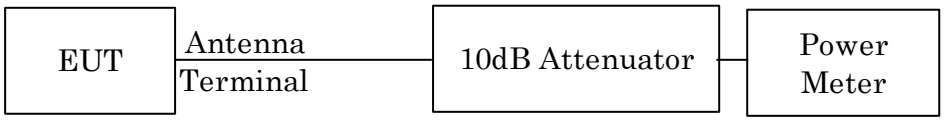
Test instruments : Refer to Appendix C.

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, one 10dB attenuator and a short, low loss cable.



6.1.2 ERP / EIRP RF Power Output

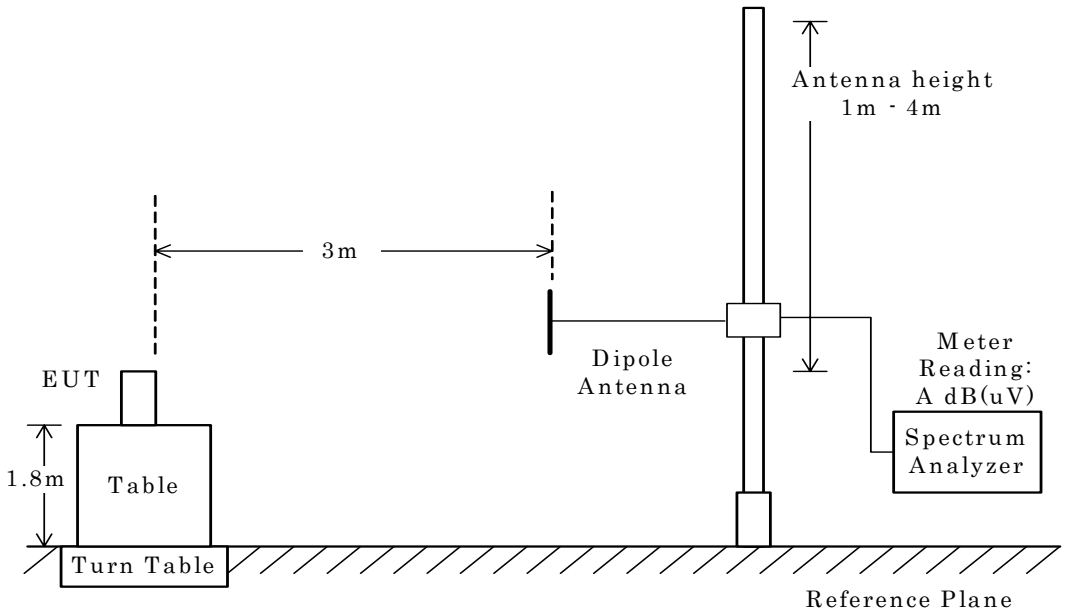
Step 1:
In order to obtain the maximum emission, the EUT was placed at the height 1.8 m on the non-conducted support and was varying at three orthogonal axes (Refer to clause 15), at the distance 3 m from the receiving antenna and rotated around 360 degrees.
The receiving antenna height was varied from 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).

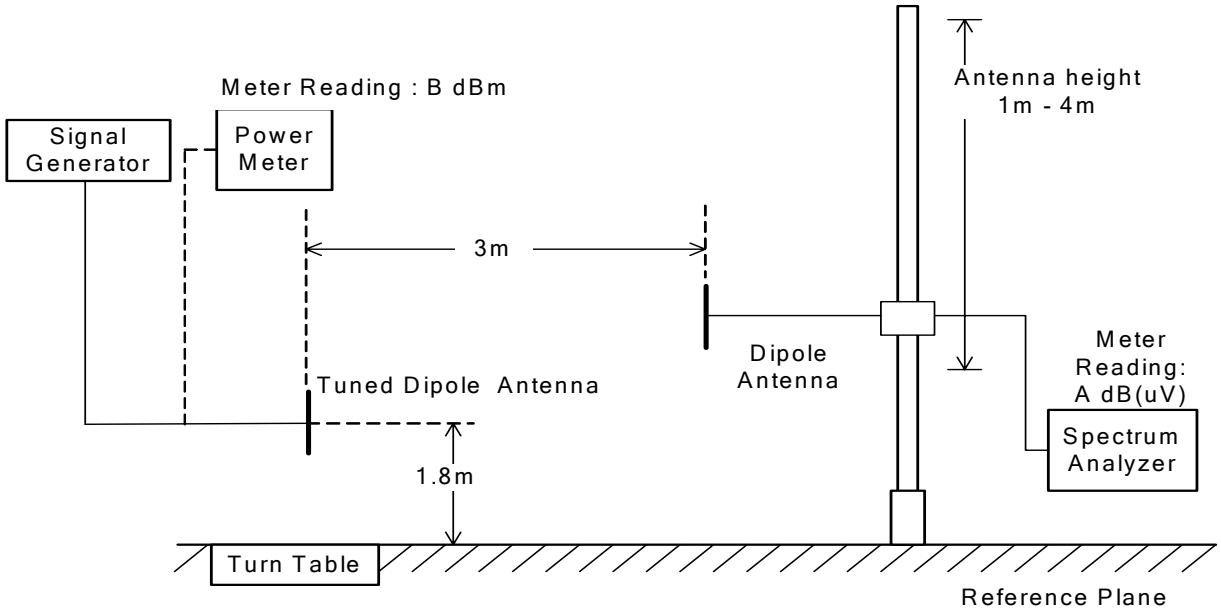
The ERP/EIRP output power was calculated in the following equation.

ERP (dBm) = P (dBm) – Balun loss of the tuned 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



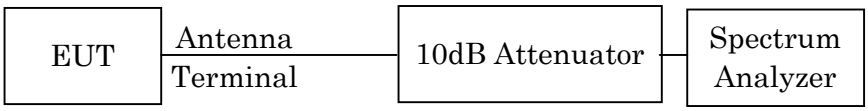
(b) Substitution Half-wave Dipole Antenna

6.2 Modulation Characteristics (§2.1047)

Not Applicable

6.3 Occupied Bandwidth (§2.1049)

The test system is shown as follows:



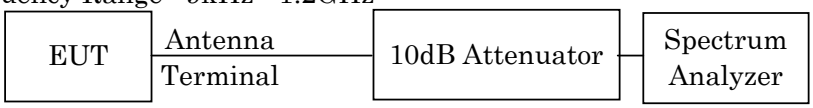
The setting of the spectrum analyzer are shown as follows:

Res. Bandwidth	30 kHz
Video Bandwidth	30 kHz
Span	3 MHz
Sweep Time	AUTO
Trace	Maxhold

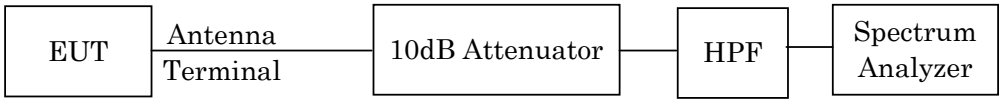
6.4 Spurious Emissions at Antenna Terminals (§2.1051)

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

a) Frequency Range : 9kHz - 1.2GHz



b) Frequency Range : 1.2GHz - 10GHz

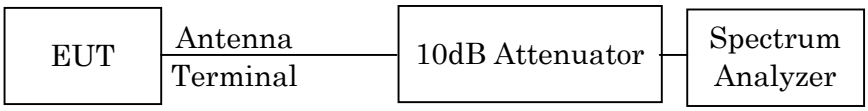


The setting of the spectrum analyzer are shown as follows:

Frequency Range	9 kHz - 150 kHz	150 kHz - 30 MHz	30 MHz - 10 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	826.40 MHz / 846.60 MHz
Band-Edge Frequency	824.00 MHz / 849.00 MHz
Res. Bandwidth	51 kHz
Video Bandwidth	51 kHz
Span	5 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.

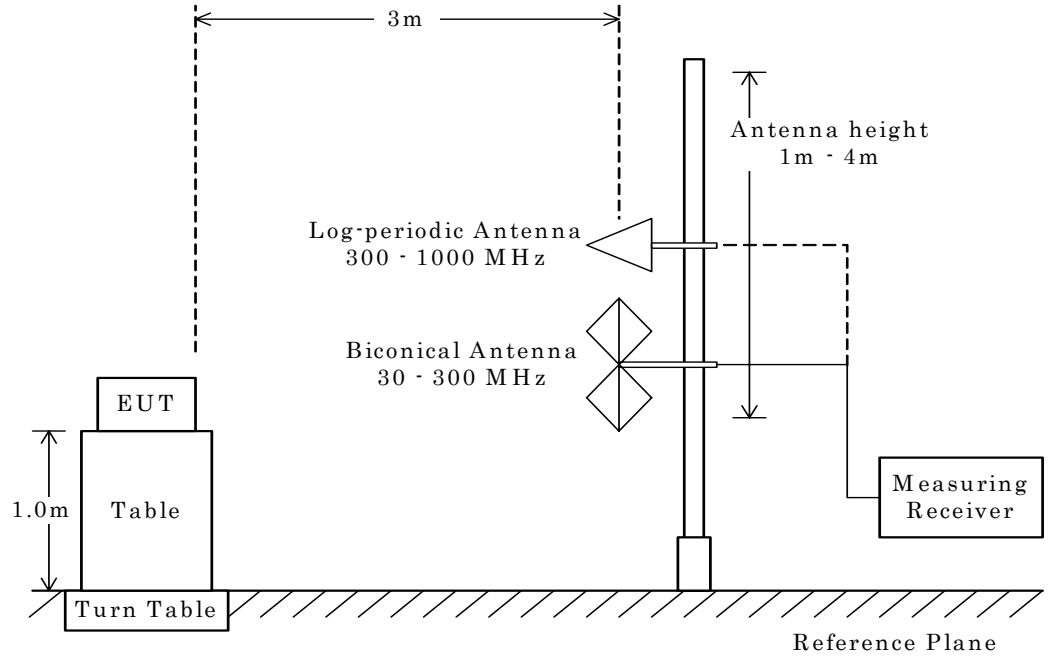
The ERP is calculated in the following equation.

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

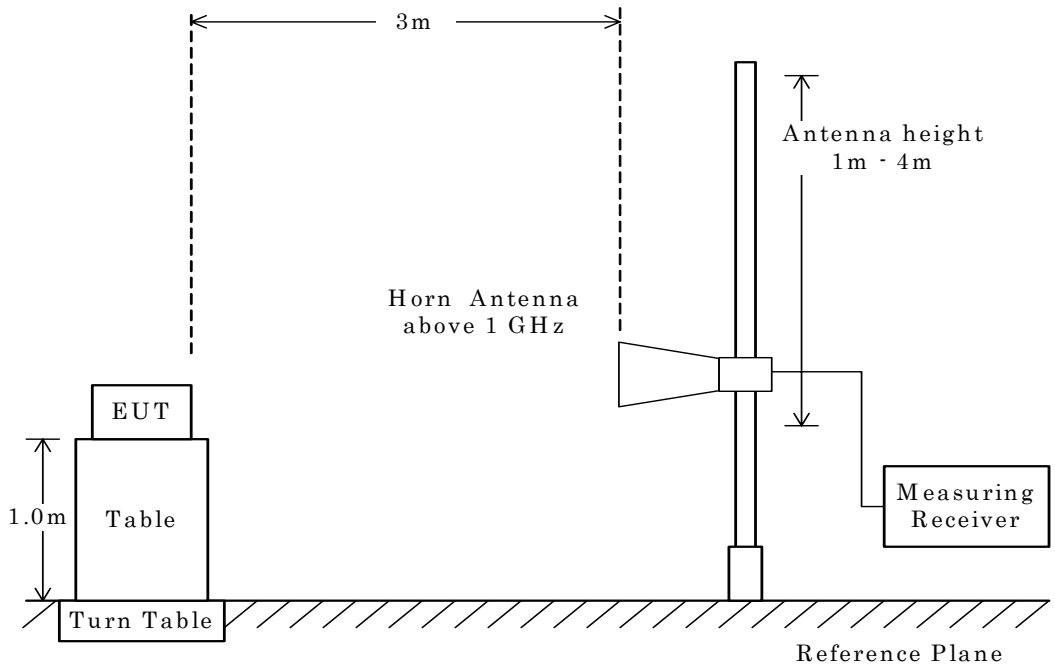
B) Above 1 GHz
ERP (dBm) = P (dBm) + Gh (dBi) - Gd (dBi)
Where, Gh (dBi) : Gain of the substitution horn antenna
Gd (dBi) : Gain of the substitution half-wave dipole antenna

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

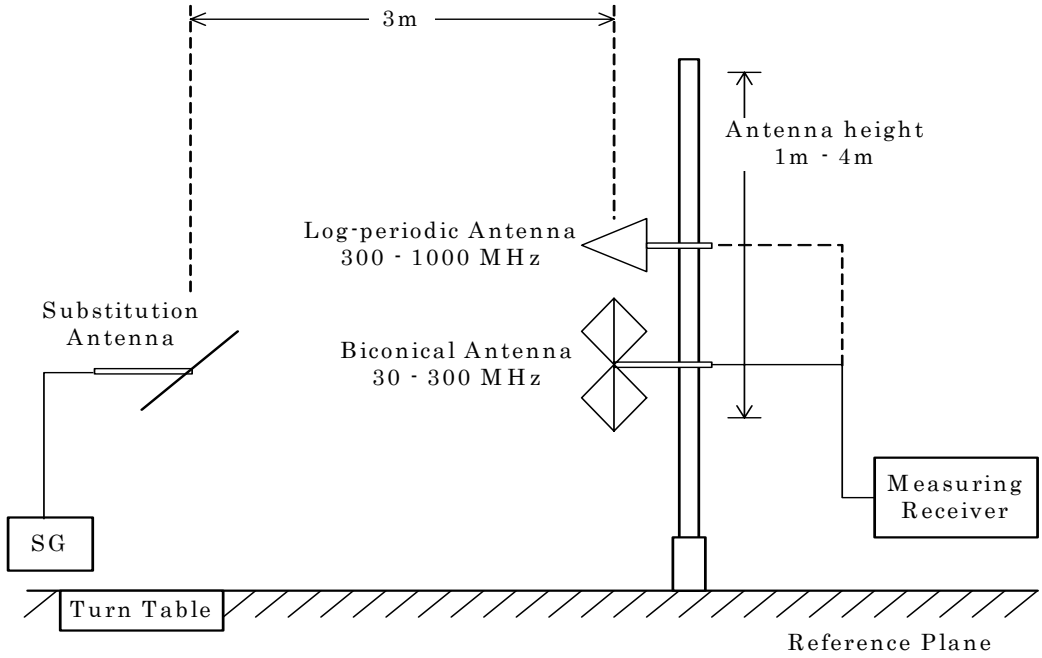


Radiated Emission above 1 GHz

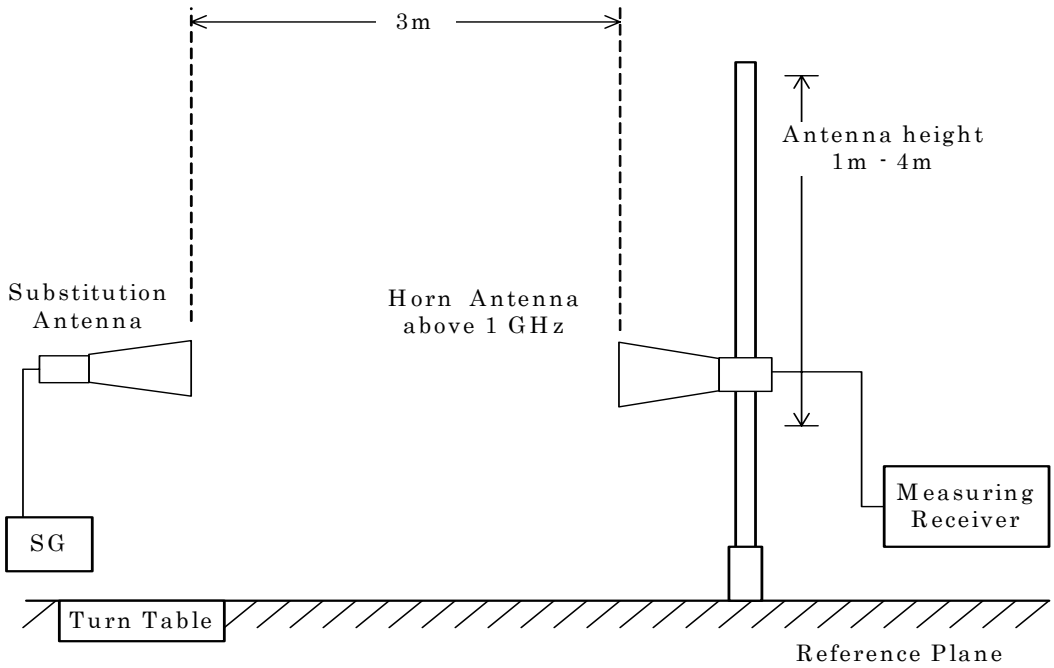


NOTE
The antenna height is scanned depending on the EUT's size and mounting height.

Radiated Emission 30 to 1000 MHz – Substitution Method



Radiated Emission above 1 GHz – Substitution Method



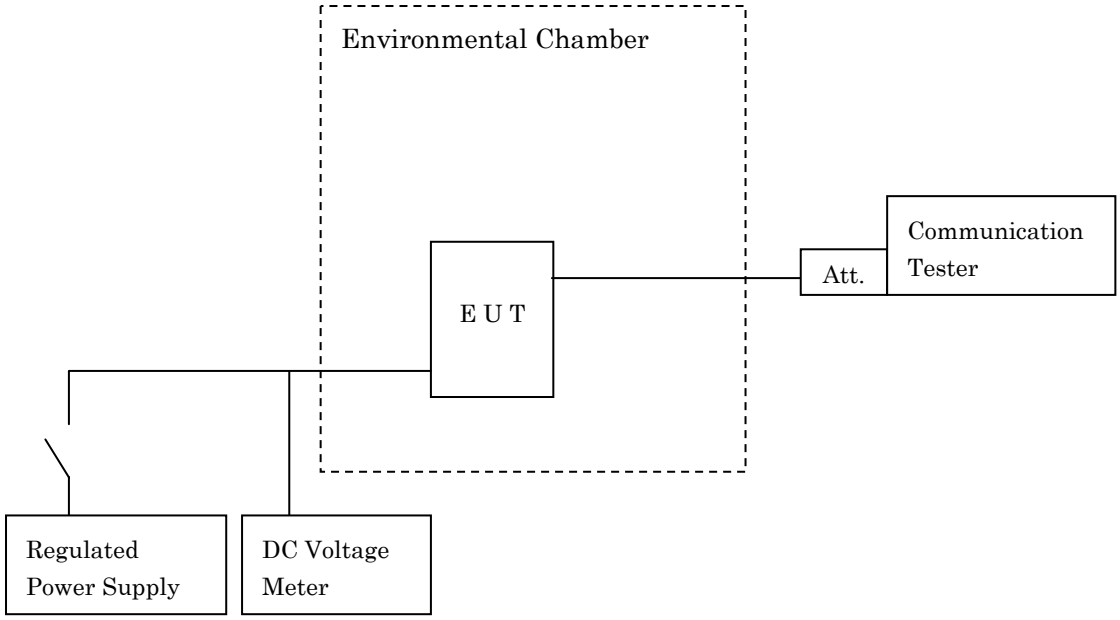
6.7 Frequency Stability (§2.1055)

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 : Not Applicable

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.

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 468.8 mW at 826.400 MHz(Peak)
208.4 mW at 826.400 MHz(Average)

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

Remarks :

10.1.2 ERP / EIRP RF Power Output

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

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

Min. Limit Margin 17.3 dB at 826.400 MHz

Max. Limit Exceeding _____ dB at _____ MHz

Uncertainty of Measurement Results at Amplitude +1.4/-1.3 dB(2σ)

Remarks : The maximum ERP is 0.132 W at 836.400 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 99% Bandwidth is	4.15	MHz	at	846.600 MHz
The 26dB Bandwidth is	4.64	MHz	at	826.400 MHz

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

Remarks :

10.4 Spurious Emissions at Antenna Terminals (§2.1051)

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

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

Min. Limit Margin	>29.8	dB	at	8466.000 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 -37.5 dBc at 849.000 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 >19.4 dB at 7527.600 MHz

Max. Limit Exceeding _____ dB at _____ MHz

Uncertainty of Measurement Results 30 MHz – 1000 MHz +1.4/-1.3 dB(2σ)
above 1 GHz +/-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 +0.07 ppm at 836.400 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 22
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.
Determining compliance with the limits in this report was based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

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:

S. Kino

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

Tested by:

A. Hosoda

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 Data : BPSK Spreading : HPSK

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 : 826.4 MHz(4132CH) – 846.6 MHz(4233CH)
Local frequency : 3305.6 MHz(4132CH) – 3386.4 MHz(4233CH)

Detailed Receiver portion:
Receiver frequency : 871.4 MHz(4357CH) – 891.6 MHz(4458CH)
Local frequency : 3485.6 MHz(4357CH) – 3566.4 MHz(4458CH)

Other Clock Frequency
13 MHz, 13.56 MHz, 26 MHz, 27.456 MHz, 32.768 kHz, 40 MHz, 48 MHz

13 Test Configuration

The equipment under test (EUT) consists of :

	Item	Manufacturer	Model No.	Serial No.	FCC ID
A	Cellular Phone	Sharp	SH-02B	004401112 155193	APYHRO00110
B	Lithium-ion Battery	Sharp	Battery Pack SH21	--	N/A
C	AC Adapter for Global use	NTT DoCoMo	MAS-BH0008 -A 001	--	N/A
D	Flat-plug Stereo Earphone Set	NTT DoCoMo	P01	--	N/A
E	Arib Connector Adaptor	SMK	--	--	N/A

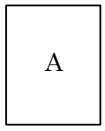
The auxiliary equipment used for testing :
None

Type of Cable:

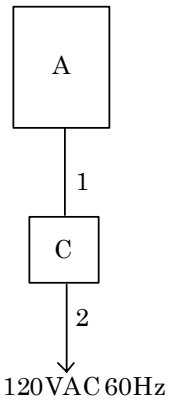
No.	Description	Identification (Manu. etc.)	Connector Shielded	Cable Shielded	Ferrite Core	Length (m)
1	DC Power Cord	--	--	NO	NO	1.5
2	AC Power Cord	--	--	NO	NO	0.8
3	Stereo Earphone Cable	--	--	NO	NO	1.5
4	Arib Connector Cable	--	--	NO	NO	0.1

14 Equipment Under Test Arrangement (Drawings)

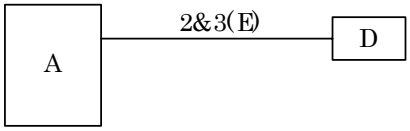
a) Single Unit



b) AC Adapter used



c) Stereo Earphone used



Appendix A: Test Data

A.1 RF Power Output (§2.1046)

A.1.1 Conducted RF Power Output

Transmitter Power (TP) Measurement
(WCDMA850)

Test Date: September 30, 2009
Temp.: 24 °C, Humi: 71 %

Transmitting Frequency CH	[MHz]	Correction Factor [dB]	Meter Reading (Peak) [dBm]	Results (Peak) [dBm]	[mW]
4132	826.400	11.01	15.70	26.71	468.8
4182	836.400	11.01	15.44	26.45	441.6
4233	846.600	11.01	15.58	26.59	456.0

Transmitting Frequency CH	[MHz]	Correction Factor [dB]	Meter Reading (Average) [dBm]	Results (Average) [dBm]	[mW]
4132	826.400	11.01	12.18	23.19	208.4
4182	836.400	11.01	11.94	22.95	197.2
4233	846.600	11.01	12.09	23.10	204.2

Sample of calculated result at 826.400 MHz, as the Maximum Level point:

	Correction Factor	=	11.01 dBm
+)	Meter Reading	=	15.70 dB
	Result	=	26.71 dBm = 468.8 mW

The point shown on "_____" is the Maximum Level Point.

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

A.1.2 ERP /EIRP Power Output

(WCDMA850)

Test Date: September 23, 2009
Temp.: 26 °C, Humi: 51 %

1. Measurement Results

CH	Transmitting Frequency [MHz]	Emission Measurement [dB(uV)] Hori. (Mh)	Emission Measurement [dB(uV)] Vert. (Mv)	Substitution Measurement [dB(uV)] Hori. (Msh)	Substitution Measurement [dB(uV)] Vert. (Msv)	Supplied Power to Substitution Antenna [dBm]	Balun Loss of Substitution Antenna [dB]
4132	826.400	87.2	86.3	65.4	63.5	- 0.6	1.4
4182	836.400	86.4	86.0	65.3	62.8	- 0.6	1.4
4233	846.600	87.2	85.4	64.8	63.1	- 0.6	1.4

2. Calculation Results

CH	Transmitting Frequency [MHz]	Peak ERP [dBm] Hori. (ERPh)	Peak ERP [dBm] Vert. (ERPv)	Maximum Peak ERP [W]	Limits [dBm]	Margin [dB]
4132	826.400	19.8	20.8	0.120	38.5	+17.7
4182	836.400	19.1	21.2	0.132	38.5	+17.3
4233	846.600	20.4	20.3	0.110	38.5	+18.1

Sample of calculated result at 836.400 MHz, as the Minimum Margin point:

	Emission Measurment Mv	=	86.0 dB(V)
	Substitution Measurement Msv	=	-62.8 dB(V)
	Supplied Power to Substitution Antenna	=	-0.6 dBm
+)	Balun Loss of Substitution Antenna	=	-1.4 dB
	Result	=	21.2 dBm = 0.132 W

ERPh = Mh - Msh + Ps + Gs
ERPv = Mv - Msv + Ps + Gs

Minimum Margin: 38.5 - 21.2 = 17.3 (dB)
The point shown on "_____" is the Minimum Margin Point.

Remarks:

Detector Function	Resolution B.W.	V.B.W.	Sweep Time
Peak	5 MHz	5 MHz	AUTO

A.2 Modulation Characteristics (§2.1047)

Not Applicable

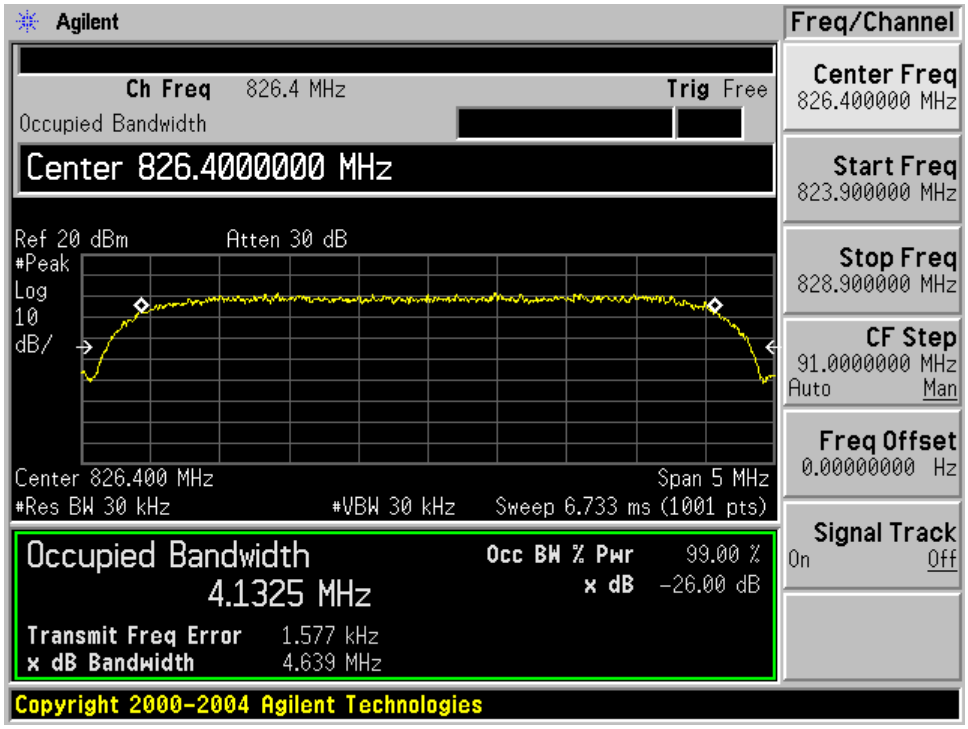
A.3 Occupied Bandwidth (§2.1049)

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.

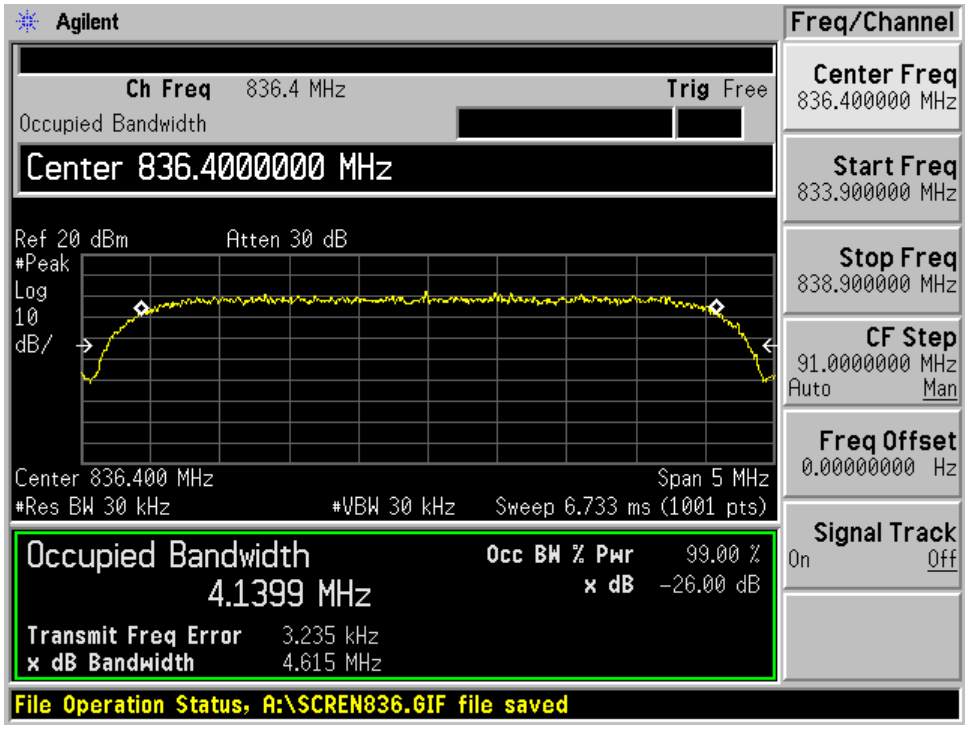
Test Date : September 30, 2009
Temp.:24°C, Humi:71%

Channel	Frequency (MHz)	99% Bandwidth (MHz)	-26dBc Bandwidth (MHz)
4132	826.40	4.13	4.64
4182	836.40	4.14	4.62
4233	846.60	4.15	4.63

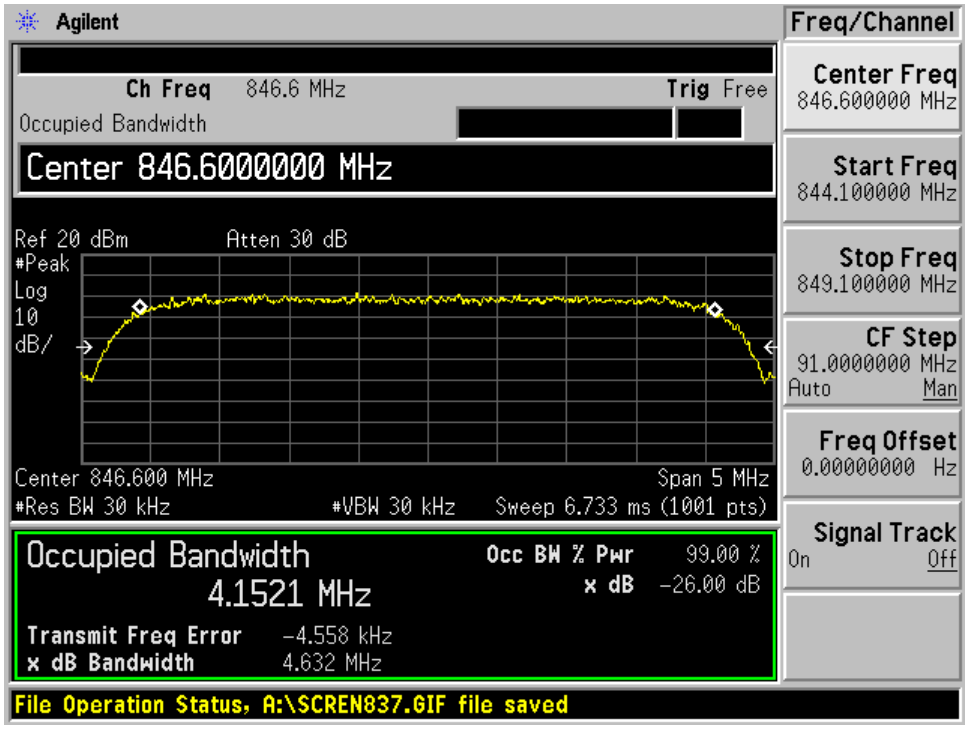
Low Channel



Middle Channel



High Channel



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

(WCDMA850)

Test Date: September 30, 2009
Temp.: 24 °C, Humi: 71 %

CH	Transmitting Frequency [MHz]	Measured Frequency [MHz]	Corr. Factor [dB]	Meter Readings [dBm]	Limits [dBm]	Results [dBm]	Margin [dB]	Remarks
4132	826.400	1652.800	13.3	-56.8	-13.0	-43.5	+30.5	C
		2479.200	14.4	< -63.0	-13.0	< -48.6	> +35.6	C
		3305.600	15.7	< -63.0	-13.0	< -47.3	> +34.3	C
		4132.000	16.0	< -63.0	-13.0	< -47.0	> +34.0	C
		4958.400	16.5	< -63.0	-13.0	< -46.5	> +33.5	C
		5784.800	17.2	< -63.0	-13.0	< -45.8	> +32.8	C
		6611.200	18.2	< -63.0	-13.0	< -44.8	> +31.8	C
		7437.600	19.0	< -63.0	-13.0	< -44.0	> +31.0	C
		8264.000	20.0	< -63.0	-13.0	< -43.0	> +30.0	C
4182	836.400	1672.800	13.3	-59.9	-13.0	-46.6	+33.6	C
		2509.200	14.5	< -63.0	-13.0	< -48.5	> +35.5	C
		3345.600	15.7	< -63.0	-13.0	< -47.3	> +34.3	C
		4182.000	16.0	< -63.0	-13.0	< -47.0	> +34.0	C
		5018.400	16.5	< -63.0	-13.0	< -46.5	> +33.5	C
		5854.800	17.4	< -63.0	-13.0	< -45.6	> +32.6	C
		6691.200	18.3	< -63.0	-13.0	< -44.7	> +31.7	C
		7527.600	19.1	< -63.0	-13.0	< -43.9	> +30.9	C
		8364.000	20.1	< -63.0	-13.0	< -42.9	> +29.9	C
4233	846.600	1693.200	13.3	-59.8	-13.0	-46.5	+33.5	C
		2539.800	14.6	< -63.0	-13.0	< -48.4	> +35.4	C
		3386.400	15.7	< -63.0	-13.0	< -47.3	> +34.3	C
		4233.000	16.2	< -63.0	-13.0	< -46.8	> +33.8	C
		5079.600	16.6	< -63.0	-13.0	< -46.4	> +33.4	C
		5926.200	17.5	< -63.0	-13.0	< -45.5	> +32.5	C
		6772.800	18.4	< -63.0	-13.0	< -44.6	> +31.6	C
		7619.400	19.2	< -63.0	-13.0	< -43.8	> +30.8	C
		8466.000	20.2	< -63.0	-13.0	< -42.8	> +29.8	C

Sample of calculated result at 8466.0 MHz, as the Minimum Margin point:

	Corr. Factor	=	20.2 dB
+)	Meter Reading	=	<-63.0 dB(μV)
	Result	=	<-42.8 dB(μV)

Minimum Margin: -13.0 - (<-42.8) = >29.8 (dB)
The point shown on " ____ " is the Minimum Margin Point.

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
10log(tp[W]) = 10log(TP[mW]) - 30

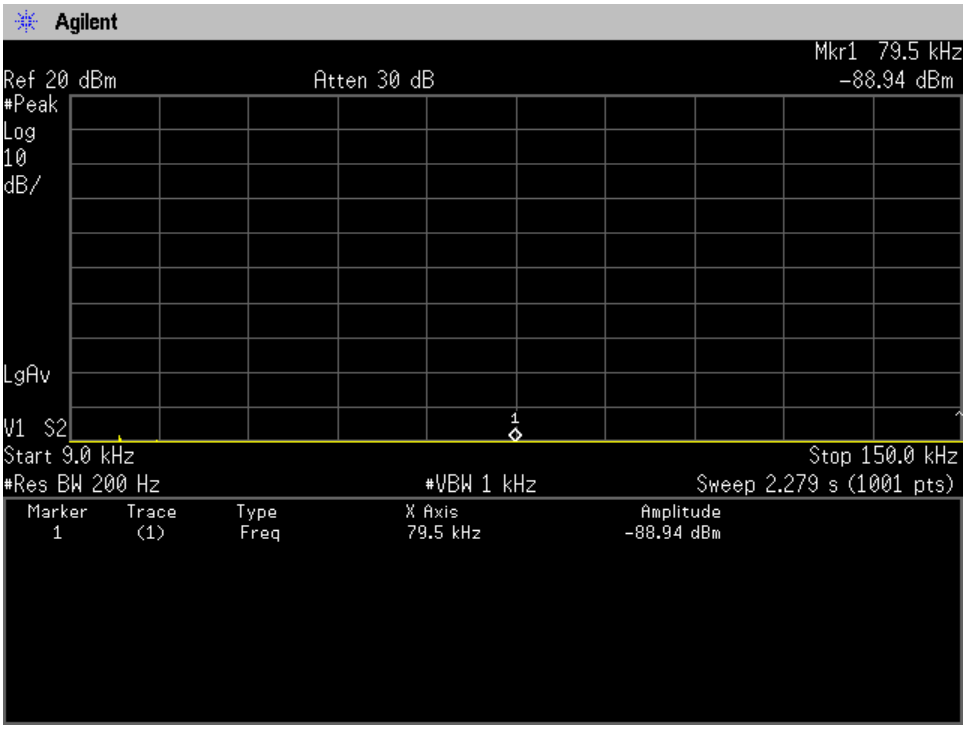
Correction factor details:
Cable Loss + 10dB Pad Att. [dB] (9 kHz - 1.2 GHz)
Cable Loss + 10dB Pad Att. + High Pass Filter Loss (D-94) [dB] (1.2 GHz - 10 GHz)

Note: 1) The spectrum was scanned 9 kHz to 10 GHz and all emissions not reported were more than 20 dB below the applied limits.

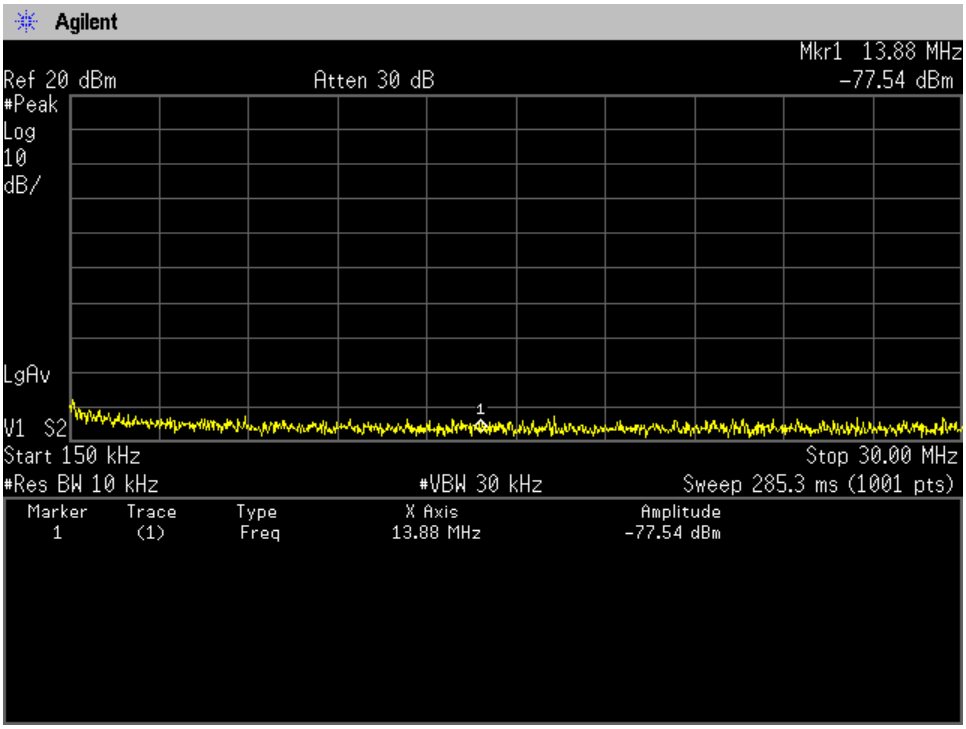
Remarks:

	Detector Function	RES B.W.	V.B.W.	Sweep Time
A	Peak	200 Hz	1 kHz	AUTO
B	Peak	10 kHz	30 kHz	AUTO
C	Peak	1 MHz	3 MHz	AUTO

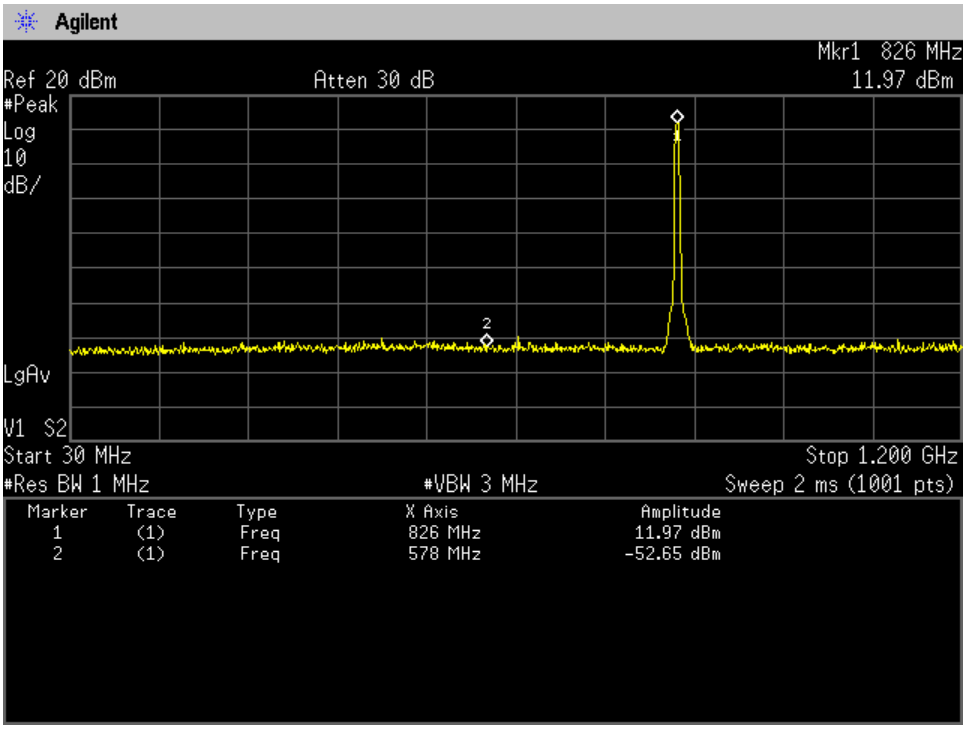
Low Channel, Out-Of-Band Emissions (9 kHz – 150 kHz)



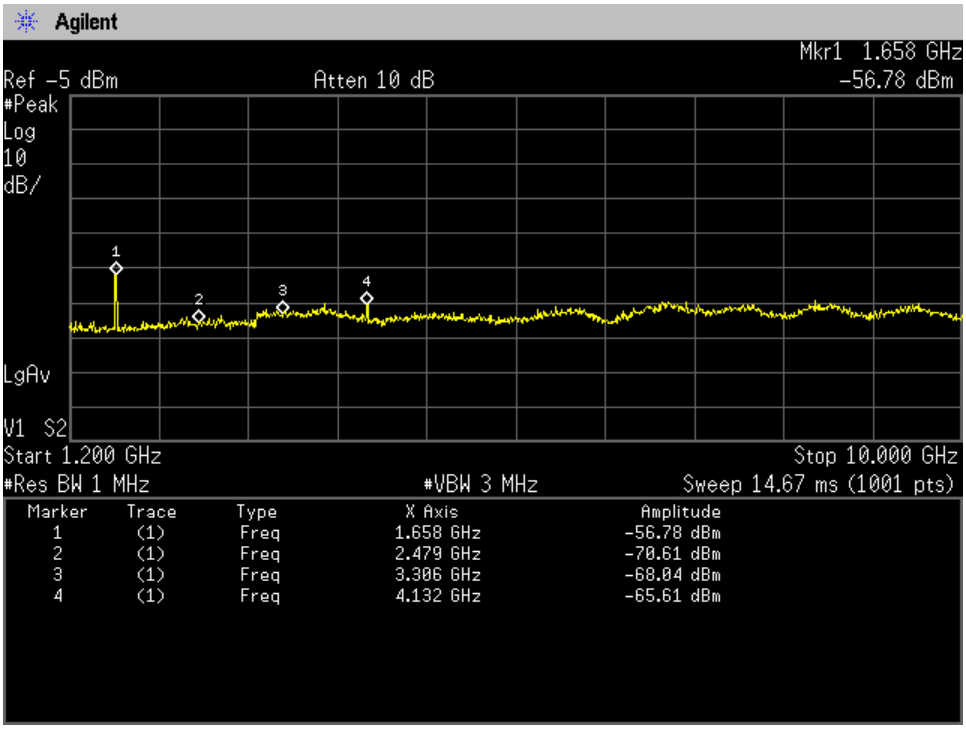
Low Channel, Out-Of-Band Emissions (150 kHz – 30 MHz)



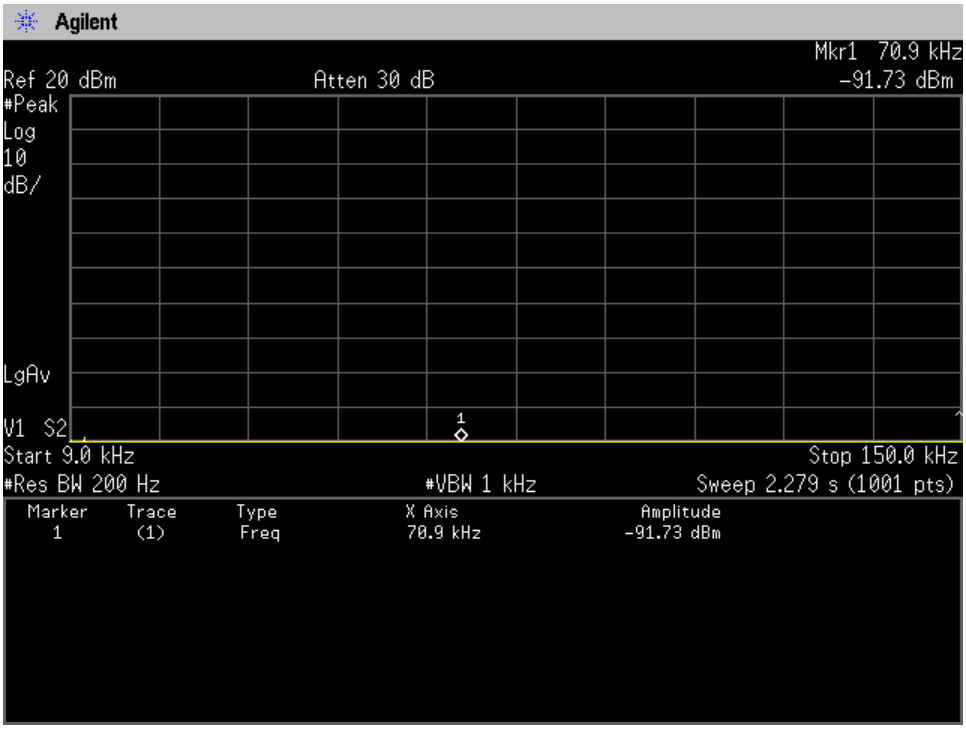
Low Channel, Out-Of-Band Emissions (30 MHz – 1.2 GHz)



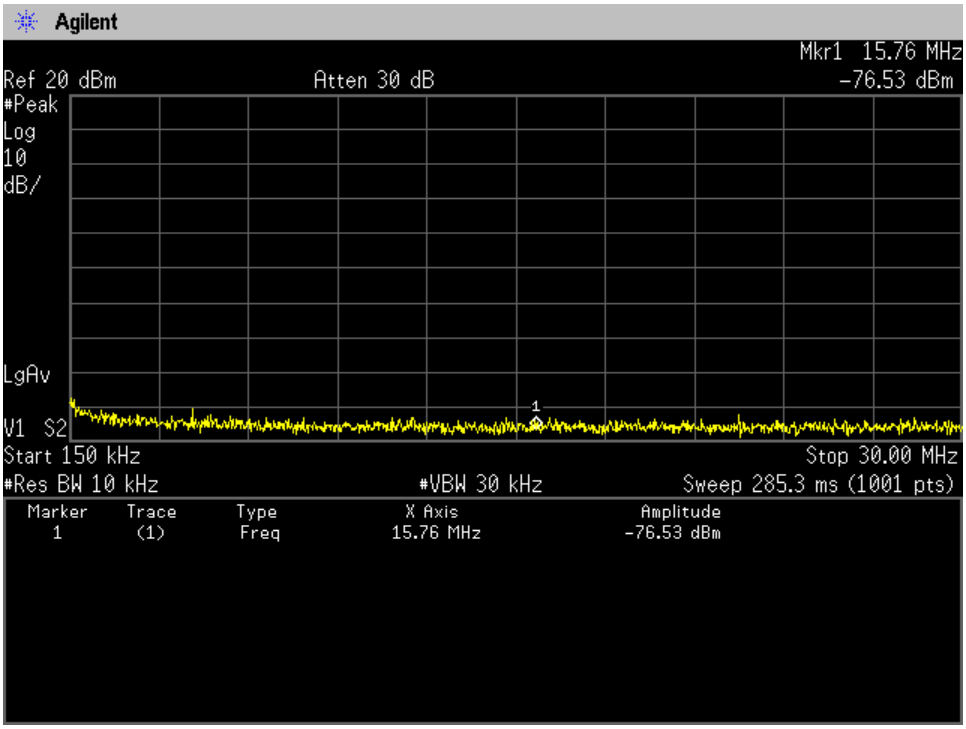
Low Channel, Out-Of-Band Emissions (1.2 GHz – 10 GHz)



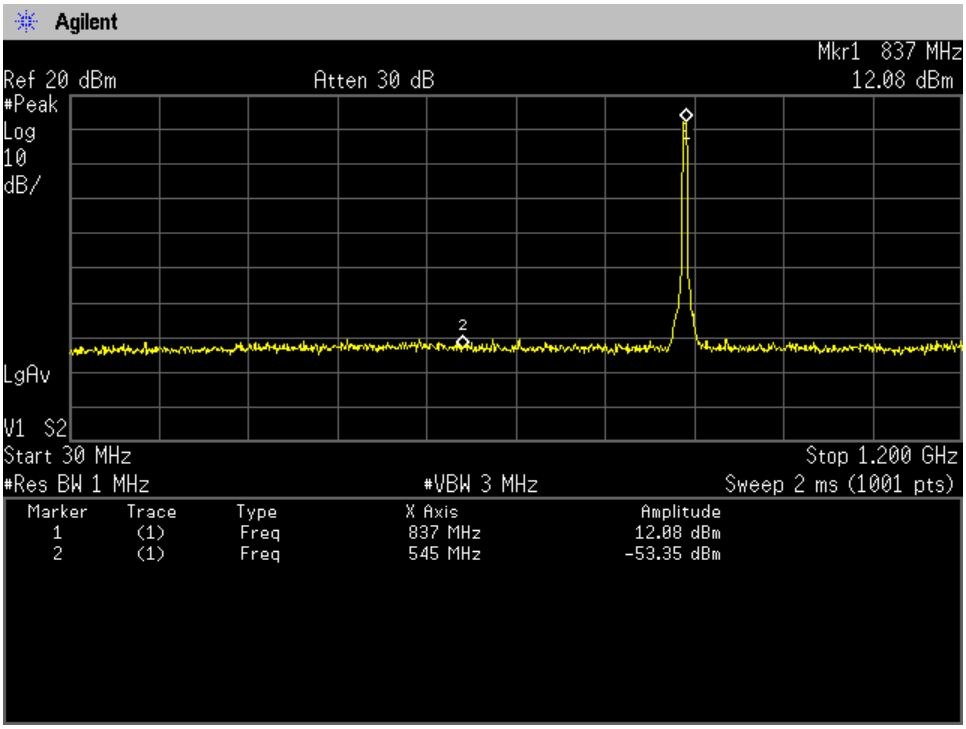
Middle Channel, Out-Of-Band Emissions (9 kHz – 150 kHz)



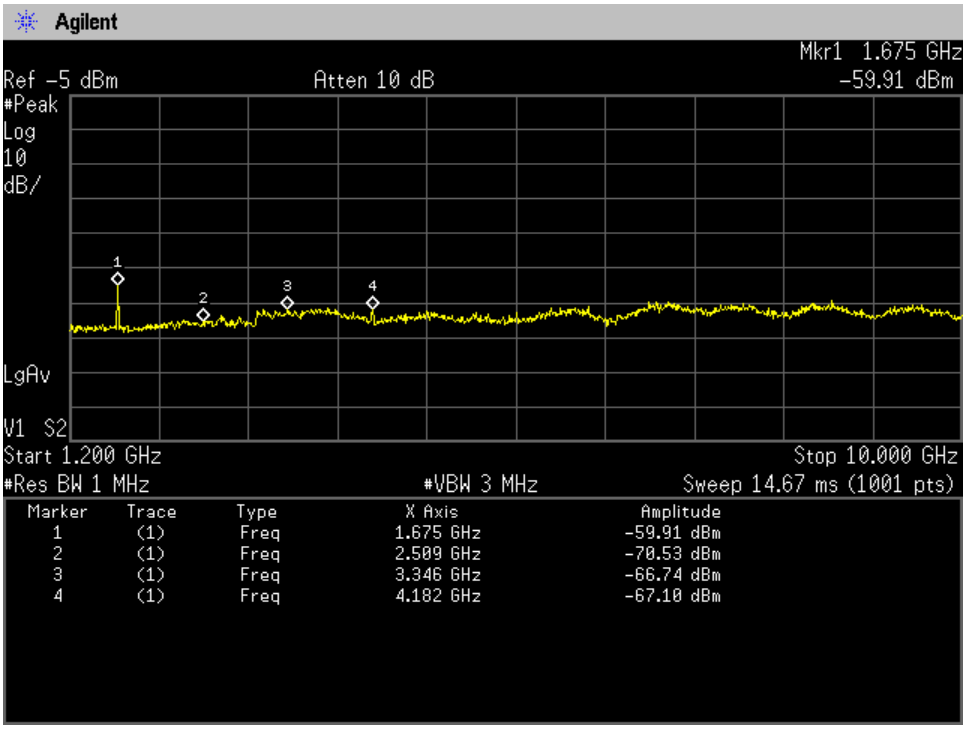
Middle Channel, Out-Of-Band Emissions (150 kHz – 30 MHz)



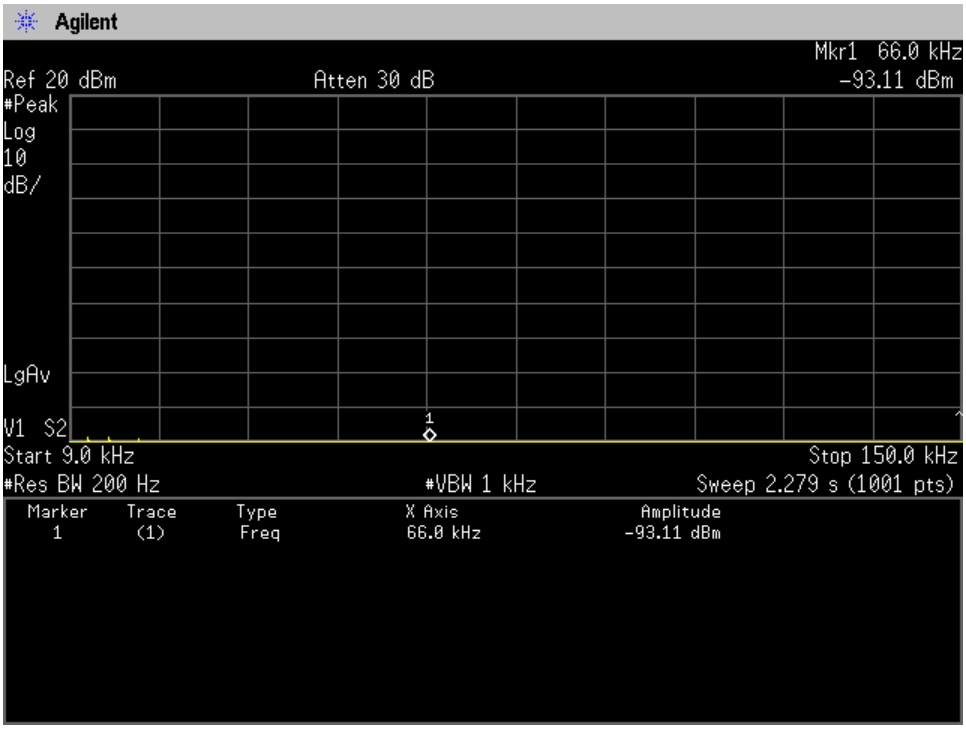
Middle Channel, Out-Of-Band Emissions (30 MHz – 1.2 GHz)



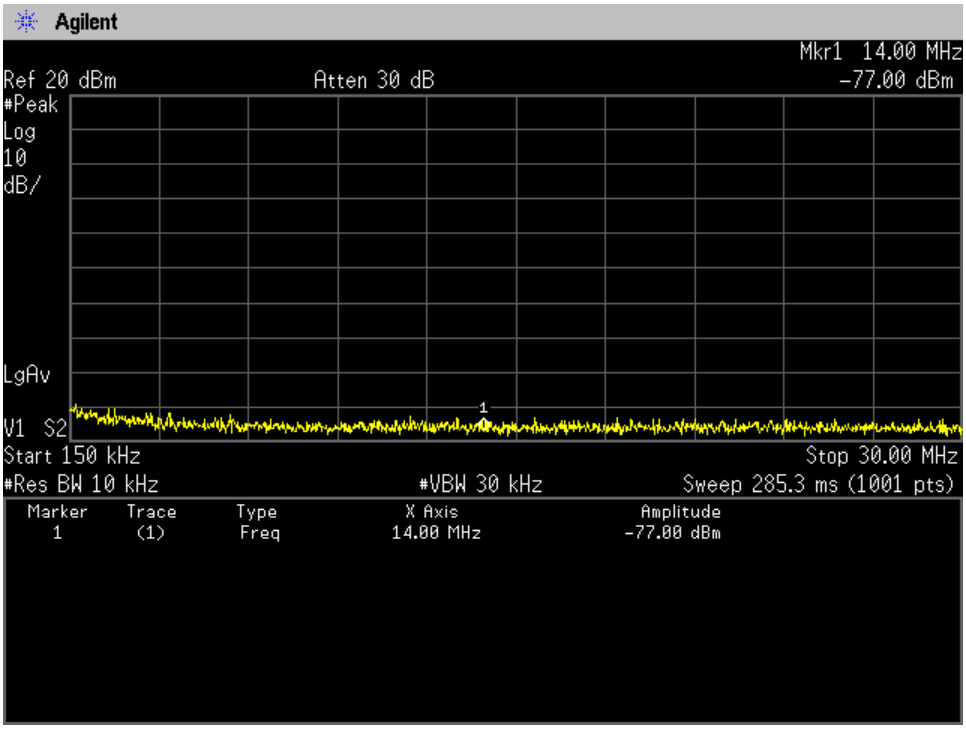
Middle Channel, Out-Of-Band Emissions (1.2 GHz – 10 GHz)



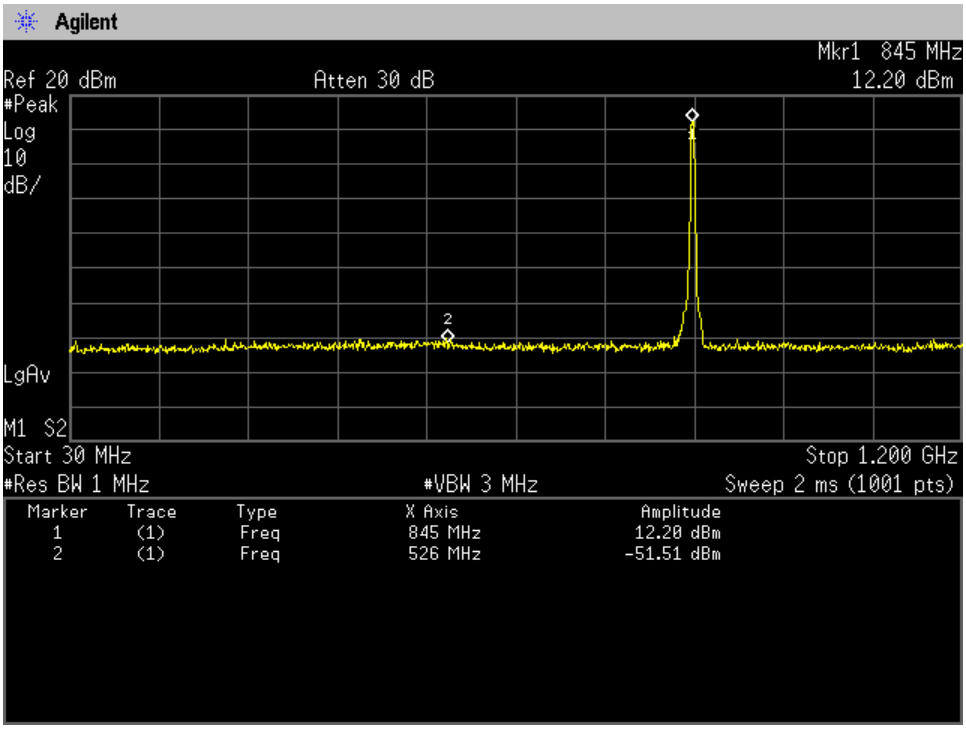
High Channel, Out-Of-Band Emissions (9 kHz – 150 kHz)



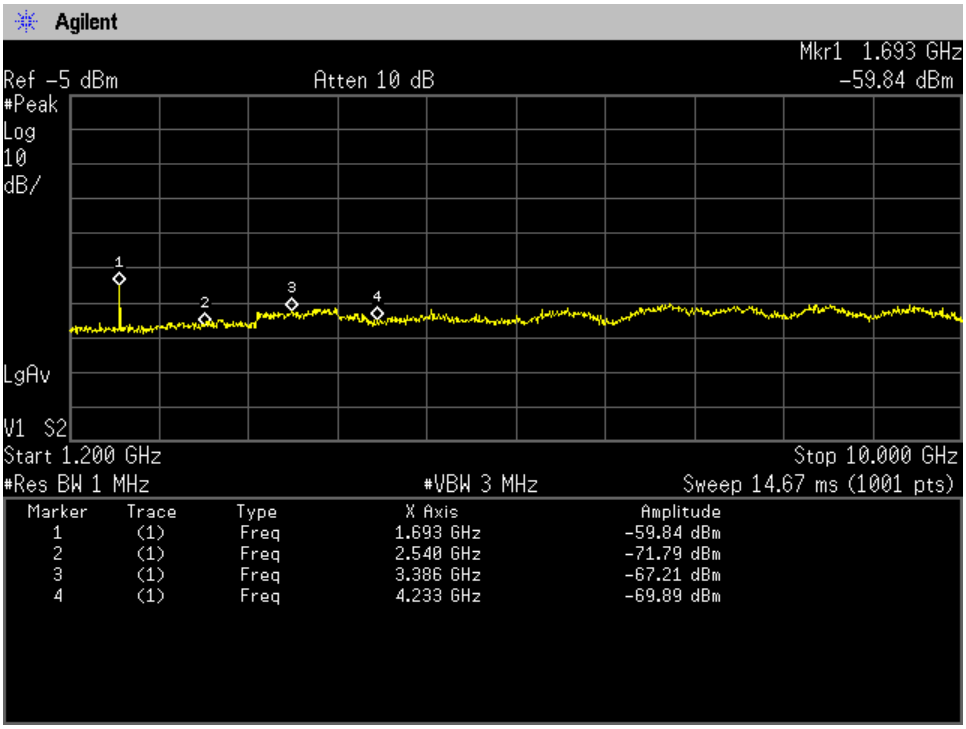
High Channel, Out-Of-Band Emissions (150 kHz – 30 MHz)



High Channel, Out-Of-Band Emissions (30 MHz – 1.2 GHz)



High Channel, Out-Of-Band Emissions (1.2 GHz – 10 GHz)

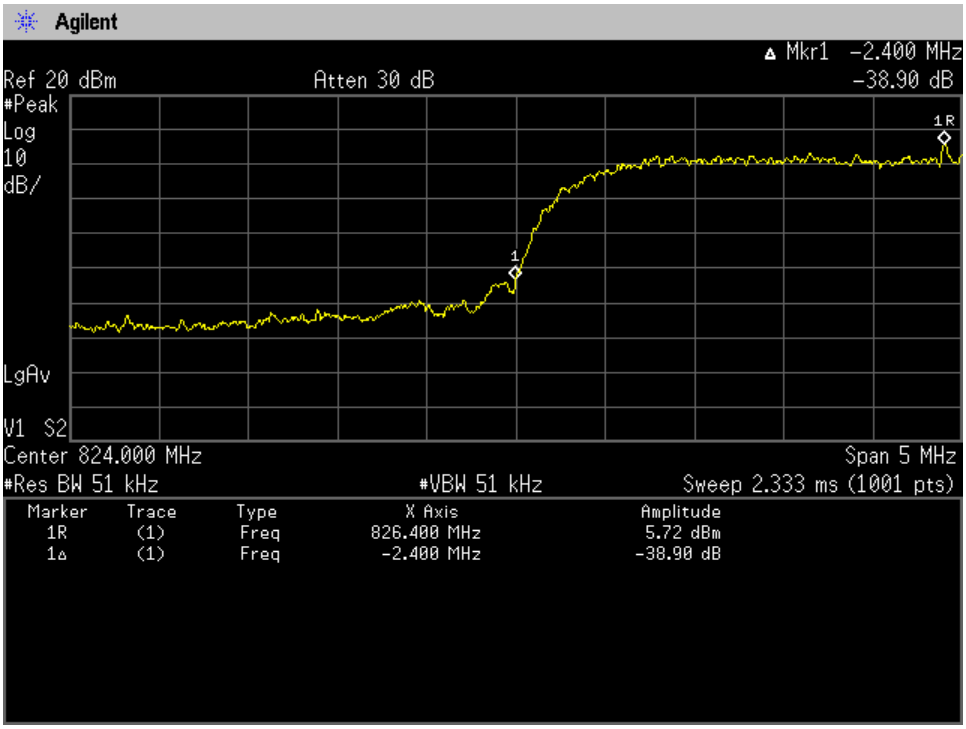


A.5 Band-Edge Emission(§2.1051)

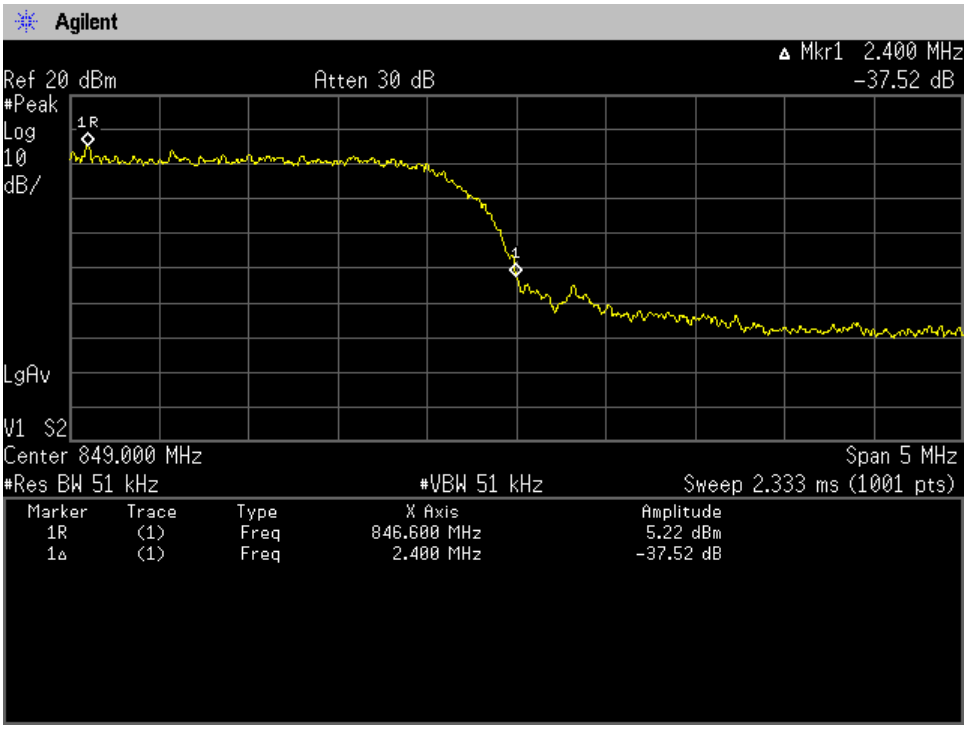
Test Date : September 30, 2009
Temp.:24°C, Humi:71%

Channel	Frequency (MHz)	Band-Edge Frequency (MHz)	Band-Edge Level (dBc)
4132	826.4	824.0	-38.9
4233	846.6	849.0	-37.5

Low Channel, Band-Edge Emission



High Channel, Band-Edge Emission



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

(WCDMA850)

Test Date: September 23, 2009
Temp.: 26 °C, Humi: 51 %

Test Configuration : Single Unit

Transmitting Frequency CH	Transmitting Frequency [MHz]	Measured Frequency [MHz]	ERP [dBm] Hori.	ERP [dBm] Vert.	Limits [dBm]	Margin [dB]	Remarks
4132	826.400	1652.800	-49.9	-49.1	-13.0	+36.1	C
		2479.200	< -51.2	< -51.2	-13.0	> +38.2	C
		3305.600	< -49.8	< -49.8	-13.0	> +36.8	C
		4132.000	< -35.9	< -35.9	-13.0	> +22.9	C
		4958.400	< -34.8	< -34.8	-13.0	> +21.8	C
		5784.800	< -33.7	< -33.7	-13.0	> +20.7	C
		6611.200	< -33.8	< -33.8	-13.0	> +20.8	C
		7437.600	< -33.0	< -33.0	-13.0	> +20.0	C
		8264.000	< -36.5	< -36.5	-13.0	> +23.5	C
4182	836.400	1672.800	-50.9	-51.2	-13.0	+37.9	C
		2509.200	< -51.3	< -51.3	-13.0	> +38.3	C
		3345.600	< -49.7	< -49.7	-13.0	> +36.7	C
		4182.000	< -35.4	< -35.4	-13.0	> +22.4	C
		5018.400	< -34.9	< -34.9	-13.0	> +21.9	C
		5854.800	< -33.8	< -33.8	-13.0	> +20.8	C
		6691.200	< -33.9	< -33.9	-13.0	> +20.9	C
		7527.600	< -32.4	< -32.4	-13.0	> +19.4	C
		8364.000	< -36.5	< -36.5	-13.0	> +23.5	C
4233	846.600	1693.200	-50.8	-50.9	-13.0	+37.8	C
		2539.800	< -51.4	< -51.4	-13.0	> +38.4	C
		3386.400	< -49.6	< -49.6	-13.0	> +36.6	C
		4233.000	< -35.3	< -35.3	-13.0	> +22.3	C
		5079.600	< -34.8	< -34.8	-13.0	> +21.8	C
		5926.200	< -33.2	< -33.2	-13.0	> +20.2	C
		6772.800	< -34.1	< -34.1	-13.0	> +21.1	C
		7619.400	< -36.6	< -36.6	-13.0	> +23.6	C
		8466.000	< -36.4	< -36.4	-13.0	> +23.4	C

Sample of calculated result at 7527.6 MHz, as the Minimum Margin point:
Minimum Margin: -13.0 - (<-32.4) = >19.4 (dB)
The point shown on " ____ " is the Minimum Margin Point.

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
10log(tp[W]) = 10log(TP[mW]) - 30

Test system connection setup:
Cable (9 kHz - 1 GHz)
Cable + 20dB Pad Att. + High Pass Filter (D-94) - Pre-Amplifier (1.0 GHz - 3.6 GHz)
Cable + 10dB Pad Att. + High Pass Filter (D-94) - Pre-Amplifier (7.6 GHz - 10 GHz)

Note: The spectrum was scanned 9 kHz to 10 GHz and all emissions not reported were more than 20 dB below the applied limits.

Remarks:

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

A.7 Frequency Stability (§2.1055)

(WCDMA850)

Test Date: September 16, 2009
- September 17, 2009

1. Frequency Stability Measurement versus Temperature

Transmitting Frequency : 836.400 MHz (4182 ch)
DC Supply Voltage : 4.0 VDC

Ambient Temperature [℃]	Deviation [ppm] Startup	2 minutes	5 minutes	10 minutes	Limits [ppm]	Margin [ppm]
-30	+ 0.02	+ 0.01	+ 0.00	+ 0.00	2.50	+ 2.48
-20	**+ 0.07**	+ 0.00	- 0.01	- 0.01	2.50	+ 2.43
-10	+ 0.06	+ 0.00	+ 0.00	- 0.01	2.50	+ 2.44
0	+ 0.00	+ 0.00	- 0.01	- 0.01	2.50	+ 2.49
10	+ 0.02	+ 0.00	- 0.01	+ 0.00	2.50	+ 2.48
20	+ 0.00	+ 0.00	+ 0.00	- 0.01	2.50	+ 2.49
30	+ 0.00	- 0.01	- 0.01	- 0.01	2.50	+ 2.49
40	+ 0.02	- 0.01	- 0.01	- 0.01	2.50	+ 2.48
50	- 0.06	- 0.01	+ 0.00	- 0.01	2.50	+ 2.44

2. Frequency Stability Measurement versus Power Supply Voltage

Transmitting Frequency : 836.400 MHz (4182 ch)
Ambient Temperature : 20 ℃

DC Supply Voltage [V]	Deviation [ppm] Startup	2 minutes	5 minutes	10 minutes	Limits [ppm]	Margin [ppm]
4.0	+ 0.00	+ 0.00	+ 0.00	- 0.01	2.50	+ 2.49
3.7(Ending)	+ 0.03	+ 0.00	- 0.01	+ 0.00	2.50	+ 2.47

Sample of calculated result at 836.400 MHz, as the Minimum Margin point:
Ambient Temperature : -20 °C / Startup
DC Supply Voltage : 4 VDC

Minimum Margin: 2.50 - 0.07 = 2.43 (ppm)
The point shown on " ____ " is the Minimum Margin Point. The Maximum Deviation Point is shown on a thick letter.

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

Appendix B: Test Arrangement (Photographs)

Radiated Emission

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Appendix C: Test Instruments

C.1 RF Power Output

C.1.1 Conducted RF Power Output

Type	Model	Manufacturer	ID No.	Last Cal.	Interval
Power Meter	N1911A	Agilent	B-63	2009/6	1 Year
Power Sensor	N1921A	Agilent	B-64	2009/6	1 Year
Attenuator	54-10	Weinschel	D-82	2009/6	1 Year

C.1.2 ERP /EIRP Power Output

Type	Model	Manufacturer	ID No.	Last Cal.	Interval
Spectrum Analyzer	E4446A	Agilent	A-39	2008/12	1 Year
Signal Generator	E8257D	Agilent	B-39	2009/8	1 Year
Power Meter	N1911A	Agilent	B-63	2009/6	1 Year
Power Sensor	N1921A	Agilent	B-64	2009/6	1 Year
Attenuator(TX)	2-10	Weinschel	D-79	2009/9	1 Year
Dipole Antenna(RX)	KBA-611	Kyoritsu	C-20	2009/8	2 Years
Dipole Antenna(TX)	KBA-611	Kyoritsu	C-19	2009/8	2 Years

C.2 Modulation Characteristics

Not Applicable

C.3 Occupied Bandwidth

Type	Model	Manufacturer	ID No.	Last Cal.	Interval
Spectrum Analyzer	E4446A	Agilent	A-39	2008/12	1 Year
Attenuator	54-10	Weinschel	D-82	2009/6	1 Year
RF Cable	SUCOFLEX102	SUHNER	C-52	2009/6	1 Year

C.4 Spurious Emissions at Antenna Terminals

Type	Model	Manufacturer	ID No.	Last Cal.	Interval
Spectrum Analyzer	E4446A	Agilent	A-39	2008/12	1 Year
Attenuator	54-10	Weinschel	D-82	2009/6	1 Year
HPF	HPM5010S	MICRO-TRONICS	D-94	2009/2	1 Year
RF Cable	SUCOFLEX102	SUHNER	C-52	2009/6	1 Year

C.5 Band-Edge Emission

Type	Model	Manufacturer	ID No.	Last Cal.	Interval
Spectrum Analyzer	E4446A	Agilent	A-39	2008/12	1 Year
Attenuator	54-10	Weinschel	D-82	2009/6	1 Year
RF Cable	SUCOFLEX102	SUHNER	C-52	2009/6	1 Year

C.6 Field Strength of Spurious Radiation

Type	Model	Manufacturer	ID No.	Last Cal.	Interval
Spectrum Analyzer	E4446A	Agilent	A-39	2008/12	1 Year
Signal Generator	E8257D	Agilent	B-39	2009/8	1 Year
Power Meter	ML2437A	Anritsu	B-10	2008/2	1 Year
Power Sensor	ML2444A	Anritsu	B-11	2008/2	1 Year
Attenuator	54-10	Weinschel	D-82	2008/12	1 Year
Attenuator	2-10	Weinschel	D-40	2008/12	1 Year
Pre-Amplifier	WJ-6611-513	Watkins Johnson	A-23	2008/12	1 Year
Pre-Amplifier	WJ-6882-824	Watkins Johnson	A-21	2008/12	1 Year
Pre-Amplifier	DBL-0618N515	DBS Microwave	A-33	2008/12	1 Year
RF Cable	SUCOFLEX102/E	SUHNER	C-70	2008/3	1 Year
RF Cable	SUCOFLEX104	SUHNER	C-40-11	2008/12	1 Year
RF Cable	SUCOFLEX104	SUHNER	C-40-14	2008/12	1 Year
Horn Antenna	91888-2	EATON	C-40-1	2009/6	1 Year
Horn Antenna	91888-2	EATON	C-41-1	2009/6	1 Year
Horn Antenna	91889-2	EATON	C-40-2	2009/6	1 Year
Horn Antenna	91889-2	EATON	C-41-2	2009/6	1 Year
Horn Antenna	94613-1	EATON	C-40-3	2009/6	1 Year
Horn Antenna	94613-1	EATON	C-41-3	2009/6	1 Year
Horn Antenna	91891-2	EATON	C-40-4	2009/6	1 Year
Horn Antenna	91891-2	EATON	C-41-4	2009/6	1 Year

C.7 Frequency Stability

Type	Model	Manufacturer	ID No.	Last Cal.	Interval
Radio Communication Analyzer	MTB8815B	Anritsu	B-69	2008/9	1 Year
DC Voltage Meter	2011-39	YEW	B-33	2009/4	1 Year
Environmental Chamber	PL-4KPH (S/N:14007470)	TABAI ESPEC	--	N/A	N/A
Temperature Recorder	SRF106AS00000M11 (S/N:01400909)	TABAI ESPEC	--	2009/8	1 Year
DC Power Supply	NL035-10	TAKASAGO	F-4	N/A	N/A