RADIO TEST REPORT

Test Report No.: 31HE0196-HO-E

Applicant	:	**NEC CASIO Mobile Communications, Ltd.**
Type of Equipment	:	**Digital Portable Cellular Telephone**
Model No.	:	**KMP7N4Y1-1A**
Test regulation	:	**FCC Part 22 Subpart H: 2006**
FCC ID	:	**A98-PUL1905**
Test Result	:	**Complied**

1. This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with above regulation.
4. The test results in this report are traceable to the national or international standards.
5. This FCC ID: A98-PUL1905 is electrically identical to the previously certified FCC ID: A98-TBP4266.
6. This test report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

Date of test: January 23 to April 2, 2011

Representative test engineer:

Katsunori Okai
Engineer of WiSE Japan,
UL Verification Service

Approved by:

Takahiro Hatakeda
Leader of WiSE Japan,
UL Verification Service

NVLAP LAB CODE: 200572-0

This laboratory is accredited by the NVLAP LAB CODE 200572-0, U.S.A. The tests reported herein have been performed in accordance with its terms of accreditation.
*As for the range of Accreditation in NVLAP, you may refer to the WEB address, http://www.ul.com/japan/jpn/pages/services/emc/about/mark1/index.jsp#nvlap

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SECTION 1: Customer information

Company Name	:	NEC CASIO Mobile Communications, Ltd.
Address	:	1753 Shimonumabe, Nakahara-ku, Kawasaki, Kanagawa 211-8666 Japan
Telephone Number	:	+81-44-455-8045
Facsimile Number	:	+81-44-455-8025
Contact Person	:	Kazuhiro Kurihara

SECTION 2: Equipment under test (E.U.T.)

2.1 Identification of E.U.T.

Type of Equipment	:	Digital Portable Cellular Telephone
Model No.	:	KMP7N4Y1-1A
Serial No.	:	Refer to Section 4, Clause 4.2
Rating	:	DC 3.8V
Receipt Date of Sample	:	January 22, 2011
Country of Mass-production	:	Japan
Condition of EUT	:	Production prototype
Modification of EUT	:	No Modification by the test lab

2.2 Product description

Model No: KMP7N4Y1-1A, (referred to as the EUT in this report), is the Digital Portable Cellular Telephone.

Radio Specification

Bluetooth (Ver.2.1 + EDR)

Equipment Type	Transceiver
Frequency of Operation	2402-2480MHz
Other Clock Frequency	19.2MHz
Type of Modulation	FHSS
Bandwidth & Channel spacing	1MHz & 1MHz
Antenna Connector Type	Integrated antenna

WLAN (IEEE802.11b/g/n (SISO/HT20))

Equipment Type	Transceiver
Frequency of Operation	2412-2462MHz
Other Clock Frequency	19.2MHz
Type of Modulation	DSSS, OFDM
Antenna Connector Type	Integrated antenna

GSM

Equipment Type	Transceiver
Frequency of Operation	[Up Link] GSM850: 824 – 849MHz PCS: 1850 – 1910MHz [Down Link] GSM850: 869 – 894MHz PCS: 1930 – 1990MHz
Other Clock Frequency	19.2MHz
Type of Modulation	GMSK
Channel spacing	200kHz
Antenna Connector Type	Integrated antenna

W-CDMA

Equipment Type	Transceiver
Frequency of Operation	[Up Link] Band V: 824 – 849MHz [Down Link] Band V: 869 – 894MHz
Other Clock Frequency	19.2MHz
Type of Modulation	HPSK
Channel spacing	5MHz
Antenna Connector Type	Integrated antenna

GPS

Equipment Type	Receiver
Receiver Type	Direct Downconversion
Frequency of Operation	1575.42MHz
Other Clock Frequency	19.2MHz
Antenna Connector Type	Integrated antenna

RFID

Equipment Type	Transceiver
Frequency of Operation	13.56MHz
Type of Modulation	ASK
Antenna Connector Type	Integrated antenna

*This test report applies for GSM(GSM850) and W-CDMA.

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 22 Subpart H: 2006, final revised on November 29, 2006
Title : FCC 47CFR Part 22 Subpart H
Cellular Radiotelephone Service

3.2 Procedures and results

Item	Test Specification & Procedure	Remarks	Deviation	Worst margin	Results
RF Output Power(Conducted/ Radiated) (Conducted Output Power / Effective radiated power(ERP))	FCC 2.1046 FCC 22.913(a)(2)	Conducted/ Radiated	N/A	-	Complied
Emission Bandwidth, 99% Occupied Bandwidth	FCC 2.1049 FCC 22.917(b)	Conducted	N/A	-	Complied
Band-Edge	FCC 2.1051 FCC 22.917	Conducted/ Radiated	N/A	**GSM** [Conducted] 1.89dB 849.015MHz [Radiated] 0.6dB 849.01MHz, Horizontal **W-CDMA** [Conducted] 6.07dB 823.967MHz [Radiated] 9.9dB 849.03MHz, Horizontal	Complied
Spurious Emission(Conducted)	FCC 2.1051 FCC 22.917	Conducted	N/A	-	Complied
Spurious Emission(Radiated)	FCC 2.1053 FCC 22.917	Radiated	N/A	**GSM** 22.1dB 1697.60MHz, Vertical **W-CDMA** 36.6dB 2539.80MHz, Horizontal	Complied
Frequency Stability (Temperature Variation)	FCC 2.1055(a)(1)(b) FCC 22.355	Conducted	N/A	-	Complied
Frequency Stability (Voltage Variation)	FCC 2.1055(d)(1)(2) FCC 22.355	Conducted	N/A	-	Complied
Note: UL Japan's EMI Work Procedures No. 13-EM-W0420					

*These tests were also referred to ANSI/TIA 603-C-2004 " Land Mobile FM or PM Communications Equipment Measurement and Performance Standards."
*These tests were performed without any deviations from test procedure except for additions or exclusions.

3.3 Uncertainty

EMI
The following uncertainties have been calculated to provide a confidence level of 95% using a coverage factor k=2.

Radiated Emission (EUT height: 0.8m) (±dB)	
Measurement Distance 3m	
25MHz-300MHz	5.4dB
300MHz-1000MHz	4.0dB
1GHz-12.75GHz	4.4dB

Power meter (±dB)	
Below 1GHz	Above 1GHz
1.0dB	1.0dB

Antenna terminal conducted emission and Power density (±dB)			**Antenna terminal conducted emission (±dB)**		**Channel power (±dB)**
Below 1GHz	1GHz-3GHz	3GHz-18GHz	18GHz-26.5GHz	26.5GHz-40GHz	
1.0dB	1.1dB	2.7dB	3.2dB	3.3dB	1.5dB

Conducted emission test
The data listed in this test report has enough margin, more than the site margin.

Radiated emission test(3m)
The data listed in this report meets the limits unless the uncertainty is taken into consideration.

3.4 Test Location

UL Japan, Inc. Head Office EMC Lab. *NVLAP Lab. code: 200572-0
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone : +81 596 24 8116 Facsimile : +81 596 24 8124

	FCC Registration Number	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms
No.1 semi-anechoic chamber	313583	2973C-1	19.2 x 11.2 x 7.7m	7.0 x 6.0m	No.1 Power source room
No.2 semi-anechoic chamber	655103	2973C-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 semi-anechoic chamber	148738	2973C-3	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.3 Preparation room
No.3 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.4 semi-anechoic chamber	134570	2973C-4	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.4 Preparation room
No.4 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.5 semi-anechoic chamber	-	-	6.0 x 6.0 x 3.9m	6.0 x 6.0m	-
No.6 shielded room	-	-	4.0 x 4.5 x 2.7m	4.75 x 5.4 m	-
No.6 measurement room	-	-	4.75 x 5.4 x 3.0m	4.75 x 4.15 m	-
No.7 shielded room	-	-	4.7 x 7.5 x 2.7m	4.7 x 7.5m	-
No.8 measurement room	-	-	3.1 x 5.0 x 2.7m	N/A	-
No.9 measurement room	-	-	8.0 x 4.5 x 2.8m	2.0 x 2.0m	-
No.10 measurement room	-	-	2.6 x 2.8 x 2.5m	2.4 x 2.4m	-
No.11 measurement room	-	-	3.1 x 3.4 x 3.0m	2.4 x 3.4m	-

* Size of vertical conducting plane (for Conducted Emission test): 2.0 x 2.0m for No.1, No.2, No.3, and No.4 semi-anechoic chambers and No.3 and No.4 shielded rooms.

3.5 Test set up, Test instruments and Data of EMI

Refer to APPENDIX.

SECTION 4: Operation of E.U.T. during testing

4.1 Operating Modes

<GSM850>

Test	Operating mode	Power control	Tested frequency	Channel
RF output Power(Conducted)	Transmitting (Tx) (GSM, GMSK) Transmitting (Tx) (GPRS, GMSK),	Max	824.2MHz 836.6MHz 848.8MHz	128 190 251
RF output Power (Radiated), Emission Bandwidth, 99% Occupied bandwidth, Spurious Emission	Transmitting (Tx) (GSM, GMSK)	Max	824.2MHz 836.6MHz 848.8MHz	128 190 251
Band Edge	Transmitting (Tx) (GSM, GMSK),	Max	824.2MHz 848.8MHz	128 251
Frequency Stability (Temperature/Voltage Variation)	Transmitting (Tx) (GSM, GMSK)	Max	836.6MHz	190

<W-CDMA>

Test	Operating mode	Tested frequency	Channel
RF output Power(Conducted)	Transmitting (Tx) W-CDMA (RMC12.2kbps), Transmitting (Tx) W-CDMA (AMR), Transmitting (Tx) W-CDMA (HSDPA Subtest 1-4), Transmitting (Tx) W-CDMA (HSUPA Subtest 1-5)	826.4MHz 836.6MHz 846.6MHz	4132 4183 4233
RF output Power (Radiated), Emission Bandwidth, 99% Occupied bandwidth, Spurious Emission	Transmitting (Tx) W-CDMA (RMC12.2kbps)	826.4MHz 836.6MHz 846.6MHz	4132 4183 4233
Band Edge	Transmitting (Tx) W-CDMA (RMC12.2kbps)	826.4MHz 846.6MHz	4132 4233
Frequency Stability (Temperature/Voltage Variation)	Transmitting (Tx) W-CDMA (RMC12.2kbps)	836.6MHz	4183

4.1.1 Explanation of theRel-99 WCDMA and Rel-6 HSPA measurement mode

3GPP defines UE Test Modes and Channel Configurations for Regulatory Testing.

- **UE Test Modes:**
  Test Mode 1(Data Loopback Test)
- **Channel Configurations:**
  R99 – 12.2kpbs Reference Measurement Channel (RMC) channel
  HSDPA – Fixed Reference Channel (FRC)
  HSUPA – New HSUPA channel configuration (HSDPA data from DL is looped back onto UL)
- **Procedure to configure UE to transmit maximum power:**
  Rel99: 3GPP TS 34.121 section 5.2
  HSDPA Rel5: 3GPP TS 34.121 section 5.2A
  HSDPA Rel6: 3GPP TS 34.121 section 5.2AA
  HSUPA Rel6: 3GPP TS 34.121 section 5.2B

  * About Rel-99 and HSDPA testing, test equipment send “all up bits” forcing UE max power

4.1.2 Explanation for HSDPA/HSPA Subtests

3GPP TS 34.121 defines test requirements and procedures for testing all variations of WCDMA. 3GPP TS 34.121 defines 4 HSDPA test configurations and 5 HSPA test configurations (“Subtests”) for various RF Conformance tests. And also FCC KDB941225 D01 is referencing 3GPP Subtest configurations for FCC Type Approval Testing. The Following table shows Release 5 HSDPA and Release 6 HSPA Subtest Configurations per 3GPP TS 34.121.

[HSDPA]

Table C.10.1.4: β values for transmitter characteristics tests with HS-DPCCH

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS} (Note1, Note 2)	CM (dB) (Note 3)	MPR (dB) (Note 3)
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15 (Note 4)	15/15 (Note 4)	64	12/15 (Note 4)	24/15	1.0	0.0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with β_{hs} = 30/15 * β_c.

Note 2: For the HS-DPCCH power mask requirement test in clause 5.2C, 5.7A, and the Error Vector Magnitude (EVM) with HS-DPCCH test in clause 5.13.1A, and HSDPA EVM with phase discontinuity in clause 5.13.1AA, Δ_{ACK} and Δ_{NACK} = 30/15 with β_{hs} = 30/15 * β_c, and Δ_{CQI} = 24/15 with β_{hs} = 24/15 * β_c.

Note 3: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15. For all other combinations of DPDCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.

Note 4: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to β_c = 11/15 and β_d = 15/15.

[HSUPA]

Table C.11.1.3: β values for transmitter characteristics tests with HS-DPCCH and E-DCH

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS} (Note1)	β_{ec}	β_{ed} (Note 5) (Note 6)	β_{ed} (SF)	β_{ed} (Codes)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 6)	E-TFCI
1	11/15 (Note 3)	15/15 (Note 3)	64	11/15 (Note 3)	22/15	209/225	1309/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	β_{ed}1: 47/15 β_{ed}2: 47/15	4 4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15 (Note 4)	15/15 (Note 4)	64	15/15 (Note 4)	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with β_{hs} = 30/15 * β_c.

Note 2: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15. For all other combinations of DPDCH, DPCCH, HS- DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.

Note 3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to β_c = 10/15 and β_d = 15/15.

Note 4: For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to β_c = 14/15 and β_d = 15/15.

Note 5: In case of testing by UE using E-DPDCH Physical Layer category 1, Sub-test 3 is omitted according to TS25.306 Table 5.1g.

Note 6: β_{ed} can not be set directly, it is set by Absolute Grant Value.

4.1.3 Maximum Output Power Verification

[HSDPA]

Maximum output power was verified on High, Middle and Low channels according to the Release 5 procedures described in section 5.2 of 3GPP TS 34.121, using an FRC with H-set 1 and 12.2kbps RMC with TPC (transmit power control) set to all "1's". Output power was measured according requirements for HS-DPCCH Sub-test 1-4.

[HSUPA]

Maximum output power was verified on the High, Middle and Low channels according to Release 6 procedures in section 5.2 of 3GPP TS 34.121, using the appropriate RMC, FRC and E-DCH configurations. When E-DCH was active, inner loop power control with power control algorithm 2 was used to maintain E-TFCI requirements. Output power for the applicable HSPA modes was measured for E-DCH Sub-test 1-5.

4.1.4 Test Equipment Setting Summary Table

The following table is the key parameters that was configured in test equipment.

Subtest	Mode	Loopback Mode	Rel99 RMC	HSDPA FRC	HSUPA Test	Common Setting		βc/βd	MPR	Power Class 3 limit
						βc	βd			
	Rel99	Test Mode 1	12.2kbps RMC	-	-	-	-	8/15	-	24(+1.7/ -3.7dB)
1	Rel6 HSDPA	Test Mode 1	12.2kbps RMC	H-Set 1 (QPSK)	-	2/15	15/15	2/15	0	24(+1.7/ -3.7dB)
2	Rel6 HSDPA	Test Mode 1	12.2kbps RMC	H-Set 1 (QPSK)	-	12/15	15/15	12/15	0	24(+1.7/ -3.7dB)
3	Rel6 HSDPA	Test Mode 1	12.2kbps RMC	H-Set 1 (QPSK)	-	15/15	8/15	15/8	0.5	23.5(+2.2/ -3.7dB)
4	Rel6 HSDPA	Test Mode 1	12.2kbps RMC	H-Set 1 (QPSK)	-	15/15	4/15	15/4	0.5	23.5(+2.2/ -3.7dB)
1	Rel6 HSUPA	Test Mode 1	12.2kbps RMC	H-Set 1 (QPSK)	HSUPA Loopback	11/15	15/15	11/15	0	24(+1.7/ -3.7dB)
2	Rel6 HSUPA	Test Mode 1	12.2kbps RMC	H-Set 1 (QPSK)	HSUPA Loopback	6/15	15/15	6/15	2	22(+3.7/ -3.7dB)
3	Rel6 HSUPA	Test Mode 1	12.2kbps RMC	H-Set 1 (QPSK)	HSUPA Loopback	15/15	9/15	15/9	1	23(+2.7/ -3.7dB)
4	Rel6 HSUPA	Test Mode 1	12.2kbps RMC	H-Set 1 (QPSK)	HSUPA Loopback	2/15	15/15	2/15	2	22(+3.7/ -3.7dB)
5	Rel6 HSUPA	Test Mode 1	12.2kbps RMC	H-Set 1 (QPSK)	HSUPA Loopback	15/15	15/15	15/15	0	24(+1.7/ -3.7dB)

Subtest	HSDPA Specific Settings						
	ΔACK	ΔNACK	ΔCQI	Ack-Nack repetition factor	CQI Feedback	CQI Repetition Factor	Ahs=βhs/βc
Rel 6 HSDPA							
1	8	8	8	3	4ms	2	30/15
2	8	8	8	3	4ms	2	30/15
3	8	8	8	3	4ms	2	30/15
4	8	8	8	3	4ms	2	30/15

Subtest	HSDPA Specific Settings							HSUPA Specific Settings			HSUPA Additional Info	
	ΔACK	ΔNACK	ΔCQI	Ack-Nack repetition factor	CQI Feedback	CQI Repetition Factor	Ahs=βhs/βc	ΔE-DPCCH	ΔHARQ	AG Index	ETFCI (form TS34.121 Table C.11.1.3)	Associated Max UL Data Rate kbps
Rel 6 HSPA												
1	8	8	8	3	4ms	2	30/15	6	0	20	75	242.1
2	8	8	8	3	4ms	2	30/15	8	0	12	67	174.9
3	8	8	8	3	4ms	2	30/15	8	0	15	92	482.8
4	8	8	8	3	4ms	2	30/15	5	0	17	71	205.8
5	8	8	8	3	4ms	2	30/15	7	0	21	81	308.9

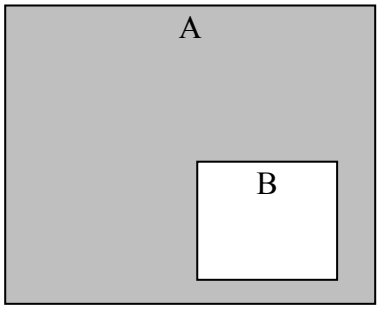
HSUPA Reference E-TFCI Parameters
[Subtest 1,2,4,5]

Information Element	Value/Remark
E-DCH info	Uplink DPCH info
- E-DPDCH info	
- Reference E-TFCIs	5 E-TFCIs
- Reference E-TFCI	11
- Reference E-TFCI PO	4
- Reference E-TFCI	67
- Reference E-TFCI PO	18
- Reference E-TFCI	71
- Reference E-TFCI PO	23
- Reference E-TFCI	75
- Reference E-TFCI PO	26
- Reference E-TFCI	81
- Reference E-TFCI PO	27

[Subtest 3]

Information Element	Value/Remark
E-DCH info	Uplink DPCH info
- E-DPDCH info	
- Reference E-TFCIs	2 E-TFCIs
- Reference E-TFCI	11
- Reference E-TFCI PO	4
- Reference E-TFCI	92
- Reference E-TFCI PO	18

4.2 Configuration and peripherals



* Setup was taken into consideration and test data was taken under worse case conditions.

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remark
A	Digital Portable Cellular Telephone	KMP7N4Y1-1A	004401200680128 *1) 004401200680136 *2) 004401200620132 *3)	NEC CASIO Mobile Communications, Ltd.	EUT
B	micro SD	1GB	SR9FB014582	Panasonic	-

*1) Used for RF Output Power (Conducted) test.
*2) Used for Band-Edge(Radiated), Spurious Emission(Radiated) and RF Output Power (Radiated) tests.
*3) Used for all tests except for RF Output Power (Conducted/Radiated), Band-Edge(Radiated) and Spurious Emission(Radiated) tests.

SECTION 5: RF Output Power (Conducted/Radiated)

[Conducted : Conducted Output Power]

Test Procedure

The RF output power (conducted) was measured with a power meter and Wireless Communication Test Set and an attenuator at the antenna port.

[Radiated : Effective radiated power(ERP)]

Test Procedure

1) EUT was placed on a platform of nominal size, 1.0 m by 0.5m, raised 80cm above the conducting ground plane. Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The Radiated Electric Field Strength intensity has been measured in a semi anechoic chamber with a ground plane and at a distance of 3m.
The measuring antenna height varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.

2) Exchanged the EUT to the Substitution Antenna, the antenna was set for the same height as EUT on the table. The frequency below 1GHz of the Substitution Antenna was used as the Half wave dipole Antenna, which is harmonized with the measured frequency in 1).
The Substitution Antenna was connected with the Signal Generator, and the polarized electromagnetic radiation of the Substitution Antenna was matched with the one of the measuring Antenna, which was set with the Signal Generator to the measured frequency in 1). Then, we set with the Output power (CW) of the Signal Generator where the measuring electromagnetic field is equal to the measured value in 1).
The measuring antenna height varied between 1 and 4m to obtain the maximum receiving level.
Its Output power of Signal Generator was recorded.

3) Effective radiated power(ERP) was calculated by subtracting the cable loss and the attenuator loss connected between the Signal Generator and the Substitution Antenna from the Output power of the Signal Generator recorded in 2).

- The carrier level and noise levels were confirmed at each position of X, Y and Z axis of EUT to see the position of maximum noise, and the test was made at the position that has the maximum noise.

Test data : APPENDIX 2
Test result : Pass

SECTION 6: Bandwidth (Conducted)

Test Procedure
The Emission Bandwidth and 99% Occupied Bandwidth was measured with a spectrum analyzer and attenuator connected to the antenna port.

Test data : APPENDIX 2
Test result : Pass

SECTION 7: Spurious Emission and Band-Edge (Conducted/Radiated)

[Conducted]
Test Procedure
The Spurious Emission and Band-Edge was measured with a spectrum analyzer and attenuator connected to the antenna port.

Test data : APPENDIX 2
Test result : Pass

[Radiated]
Test Procedure

1) EUT was placed on a platform of nominal size, 1.0m by 0.5m, raised 80cm above the conducting ground plane. Test was made with the antenna positioned in both the horizontal and vertical planes of polarization.
The Radiated Electric Field Strength intensity has been measured in a semi anechoic chamber with a ground plane and at a distance of 3m.
The measuring antenna height varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.

2) Exchanged the EUT to the Substitution Antenna, the antenna was set for the same height as EUT on the table.
The frequency below 1GHz of the Substitution antenna was used as the Half wave dipole antenna and Shorted dipole antenna calibrated with the Half wave dipole antenna, which is harmonized with the measured frequency in 1).
The frequency above 1GHz of the Substitution antenna was used with Horn antenna calibrated with the Half wave dipole antenna.
The Substitution antenna was connected with the Signal Generator, and the polarized electromagnetic radiation of the Substitution antenna was matched with the one of the measuring antenna, which was set with the Signal Generator to the measured frequency in 1). Then, we set with the Output power (CW) of the Signal Generator where the measuring electromagnetic field is equal to the measured value in 1).
The measuring antenna height varied between 1 and 4m to obtain the maximum receiving level.
Its Output power of Signal Generator was recorded.

3) Effective radiated power was calculated by subtracting the cable loss and the attenuator loss connected between the Signal Generator and the Substitution Antenna from the Output power of the Signal Generator recorded in 2).
For the usage of the antenna (Shorted dipole and Horn antenna) except for the Half wave dipole antenna (2.15dBi) for the Substitution antenna, the Effective radiated power was calculated by compensating the finite difference in the antenna gain of the Half wave dipole antenna, and Substitution antenna.

- The carrier level and noise levels were confirmed at each position of X, Y and Z axis of EUT to see the position of maximum noise, and the test was made at the position that has the maximum noise.

Test data : APPENDIX 2
Test result : Pass

SECTION 8: Frequency Stability(Temperature/Voltage Variation)

Test Procedure
The Frequency Stability was measured with a Wireless Communication Test Set and attenuator connected to the antenna port.
The Frequency Drift was measured with the 10 deg. C. steps from –30 deg. C. to 50 deg. C., and it is presented as the ppm unit. The Frequency Drift was measured with the normal temperature (20 deg. C.) and Voltage tolerance (DC3.4V to DC4.37V), and it is presented as the ppm unit.

Temperature : –30deg.C to +50deg.C (10 deg. C. step)
Voltage : Vnom:DC3.8V, Vmin:DC3.4V, Vmax:DC4.37V

In case of the voltage supply below DC 3.4V, the EUT stops operation by low battery detection function.
Therefore, Frequency Stability test was performed under the above condition.

Test data : APPENDIX 2
Test result : Pass

APPENDIX 1: Photographs of test setup

APPENDIX 2: Data of EMI test

RF Output Power (Conducted)

Conducted Output Power
GSM Mode

Test place	Head Office EMC Lab. No.11 Measurement Room
Report No.	31HE0196-HO
Date	04/01/2011
Temperature/ Humidity	27 deg.C./ 38%RH
Engineer	Katsunori Okai
Mode	Tx

Mode	Ch	Frequency [MHz]	P/M (PK) Reading [dBm]	Atten. [dB]	Cable Loss [dB]	Result [dBm]
GSM (GMSK)	Low	824.2	14.18	15.80	3.82	33.80
	Mid	836.6	14.07	15.82	3.83	33.72
	High	848.8	14.10	15.82	3.83	33.75
GPRS (GMSK)	Low	824.2	14.15	15.80	3.82	33.77
	Mid	836.6	14.04	15.82	3.83	33.69
	High	848.8	14.08	15.82	3.83	33.73

Results = P/M Reading + Atten.Loss + Cable Loss

RF Output Power (Conducted)

Conducted Output Power
W-CDMA Mode

Test place	Head Office EMC Lab. No.11 Measurement Room
Report No.	31HE0196-HO
Date	04/01/2011
Temperature/ Humidity	27 deg.C./ 38%RH
Engineer	Katsunori Okai
Mode	Tx

Mode	Ch	Frequency [MHz]	Result [dBm]
RMC 12.2kbps	Low	826.4	23.94
	Mid	836.6	23.96
	High	846.6	23.85
AMR 12.2kbps with 3.4kbps SRB	Low	826.4	23.93
	Mid	836.6	23.93
	High	846.6	23.84
HSDPA Subtest 1	Low	826.4	23.76
	Mid	836.6	23.93
	High	846.6	23.74
HSDPA Subtest 2	Low	826.4	23.84
	Mid	836.6	23.95
	High	846.6	23.85
HSDPA Subtest 3	Low	826.4	23.31
	Mid	836.6	23.44
	High	846.6	23.31
HSDPA Subtest 4	Low	826.4	23.41
	Mid	836.6	23.35
	High	846.6	23.33
HSUPA Subtest 1	Low	826.4	23.06
	Mid	836.6	23.40
	High	846.6	23.44
HSUPA Subtest 2	Low	826.4	22.37
	Mid	836.6	21.90
	High	846.6	21.89
HSUPA Subtest 3	Low	826.4	22.55
	Mid	836.6	22.44
	High	846.6	22.48
HSUPA Subtest 4	Low	826.4	22.34
	Mid	836.6	22.65
	High	846.6	22.67
HSUPA Subtest 5	Low	826.4	23.02
	Mid	836.6	23.42
	High	846.6	23.42

MPR Explanation

The product implements an Enhanced MPR (E-MPR) software algorithm that also considers power compression (Scaling), a requirement per 3GPP 25.214 section 5.1.2.6, to generate a more accurate Cubic Metric (CM) value that is used to determine the magnitude of power reduction for HSPA signals. The Enhanced MPR solution can introduce a deviation of the actual observed power reduction from the MPR target values configured for a device.

In the power scaling process defined by 3GPP TS 25.214, the channel beta values are modified as the transmitted signal approaches maximum power to ensure that the transmit power does not exceed the maximum rated transmit power and is also compliant with emissions requirements. The power scaling process considers the software-defined MPR target values based on the CM for the signal to be transmitted to determine the required power reduction for a given signal. The actual CM value of the signal transmitted after power scaling, however, is often different from the estimated CM value used in the power reduction algorithm.

An accurate CM value is desirable as the goal of power reduction is to maintain compliance with emissions limits. By using a more accurate CM value, the E-MPR process minimizes the magnitudes of power reduction required to maintain emissions compliance whereas the legacy MPR software may incorporate a magnitude of power reduction that is higher than is required for emissions compliance.

The enhanced power reduction may result in around 1dB of variance from the MPR target values depending on HSPA channel configuration (e.g. 34.121 subtest) and characteristics of hardware RF design.

RF Output Power (Radiated)

Effective radiated power(ERP)
GSM Mode

Test place	Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No.	31HE0196-HO
Date	04/02/2011
Temperature / Humidity	25 deg. C. / 23 %RH
Engineer	Takayuki Shimada
Mode	Tx

Frequency	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss	Tx Ant. Gain	Tx Ant. Atten. Loss	Result (ERP) [dBm]		Limit (ERP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks
													Rx Ant. Height	Turn Table	Rx Ant. Height	Turn Table	
[MHz]	HOR	VER	HOR	VER	[dB]	[dBi]	[dB]	HOR	VER		HOR	VER	[cm]	[deg.]	[cm]	[deg.]	
824.20	96.6	91.2	42.4	41.5	5.52	2.15	10.03	26.9	26.0	38.5	11.7	12.6	100	95	135	0	
836.60	97.7	94.0	43.4	43.7	5.56	2.15	10.04	27.8	28.1	38.5	10.7	10.4	100	96	133	46	
848.80	97.9	95.3	44.6	44.4	5.61	2.15	10.05	28.9	28.7	38.5	9.6	9.8	100	95	127	83	

Calculation Result = SG Reading - Tx Cable Loss + Tx Antenna Gain - Tx Antenna Attenuator Loss -2.15
Rx-ANTENNA : Biconical Antenna(30M-300MHz), Logperiodic Antenna(300M-1000MHz), Horn Antenna(1G-12.75GHz)
Tx-ANTENNA : 120MHz tuned Dipole Antenna(30M-120MHz), Dipole Antenna(120M-1000MHz), Horn Antenna(1G-12.75GHz)
Detector : S/A PK (RBW: 3MHz , VBW: 8MHz)

RF Output Power (Radiated)

Effective radiated power(ERP)
W-CDMA (RMC12.2kbps) Mode

Test place	Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No.	31HE0196-HO
Date	04/02/2011
Temperature / Humidity	25 deg. C. / 23 %RH
Engineer	Takayuki Shimada
Mode	Tx

Frequency	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss	Tx Ant. Gain	Tx Ant. Atten. Loss	Result (ERP) [dBm]		Limit (ERP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks
													Rx Ant. Height	Turn Table	Rx Ant. Height	Turn Table	
[MHz]	HOR	VER	HOR	VER	[dB]	[dBi]	[dB]	HOR	VER		HOR	VER	[cm]	[deg.]	[cm]	[deg.]	
826.40	89.9	85.3	35.4	35.3	5.52	2.15	10.03	19.9	19.8	38.5	18.7	18.8	100	97	135	0	
836.60	90.9	87.0	36.4	36.4	5.56	2.15	10.04	20.8	20.8	38.5	17.7	17.7	100	97	133	45	
846.60	91.1	88.5	37.6	37.3	5.60	2.15	10.05	22.0	21.7	38.5	16.6	16.9	100	96	132	96	

Calculation Result = SG Reading - Tx Cable Loss + Tx Antenna Gain - Tx Antenna Attenuator Loss -2.15
Rx-ANTENNA : Biconical Antenna(30M-300MHz), Logperiodic Antenna(300M-1000MHz), Horn Antenna(1G-12.75GHz)
Tx-ANTENNA : 120MHz tuned Dipole Antenna(30M-120MHz), Dipole Antenna(120M-1000MHz), Horn Antenna(1G-12.75GHz)
Detector : S/A PK (RBW: 5MHz , VBW: 50MHz)

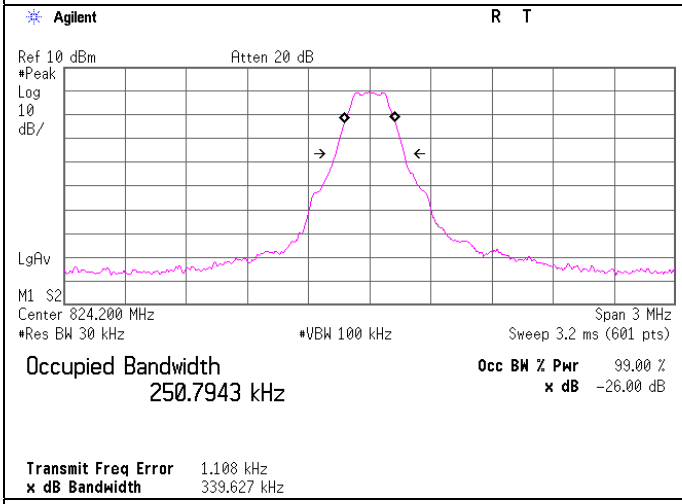
Bandwidth(Conducted)

GSM Mode

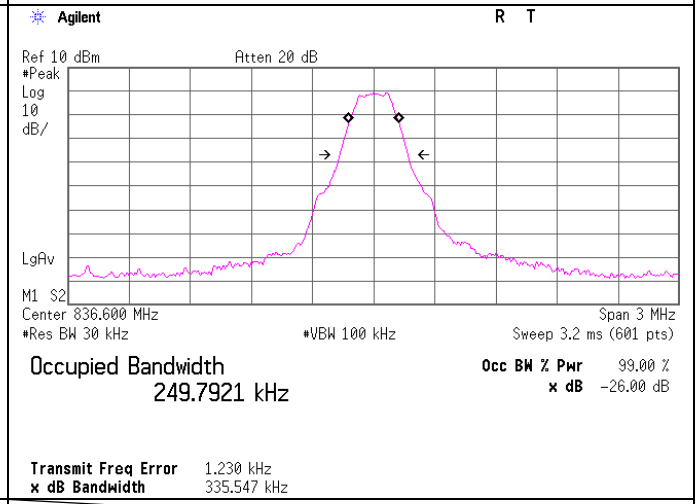
Test place	Head Office EMC Lab. No.6 Measurement Room
Report No.	31HE0196-HO
Date	01/23/2011
Temperature/ Humidity	20 deg.C./ 56%RH
Engineer	Katsunori Okai
Mode	Tx

CH	FREQ [MHz]	26dB Bandwidth [kHz]	99% OBW [kHz]	Limit [kHz]
Low	824.2	339.627	250.7943	-
Mid	836.6	335.547	249.7921	-
High	848.8	334.026	251.8475	-

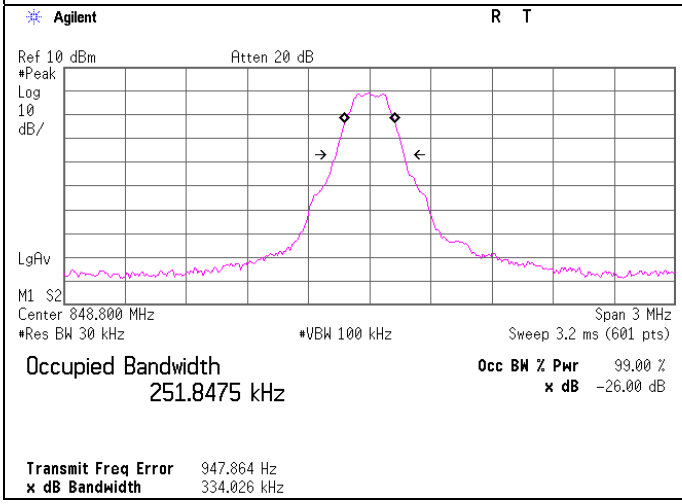
Tx:824.2MHz



Tx:836.6MHz



Tx:848.8MHz



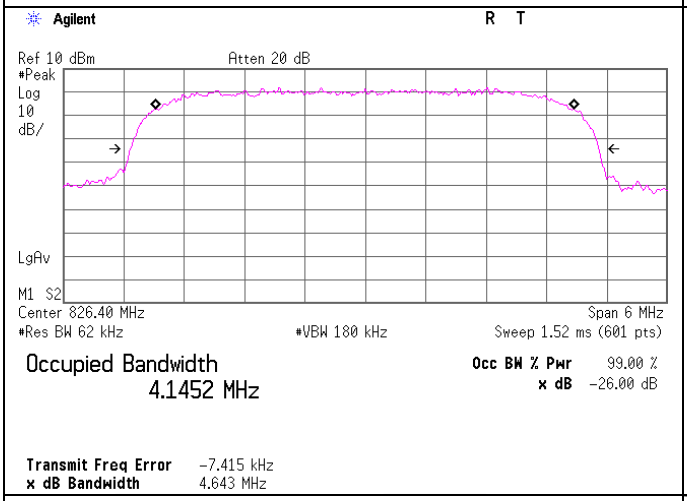
Bandwidth(Conducted)

W-CDMA (RMC12.2kbps) Mode

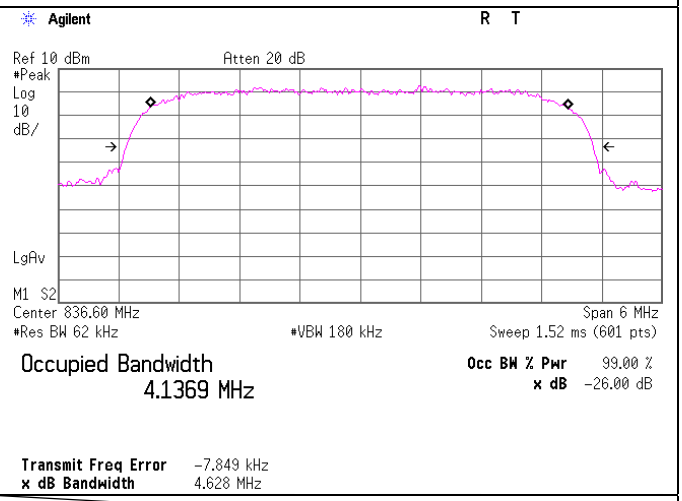
Test place	Head Office EMC Lab. No.6 Measurement Room
Report No.	31HE0196-HO
Date	01/23/2011
Temperature/ Humidity	20 deg.C./ 56%RH
Engineer	Katsunori Okai
Mode	Tx

CH	FREQ [MHz]	26dB Bandwidth [MHz]	99% OBW [MHz]	Limit [MHz]
Low	826.4	4.643	4.1452	-
Mid	836.6	4.628	4.1369	-
High	846.6	4.646	4.1413	-

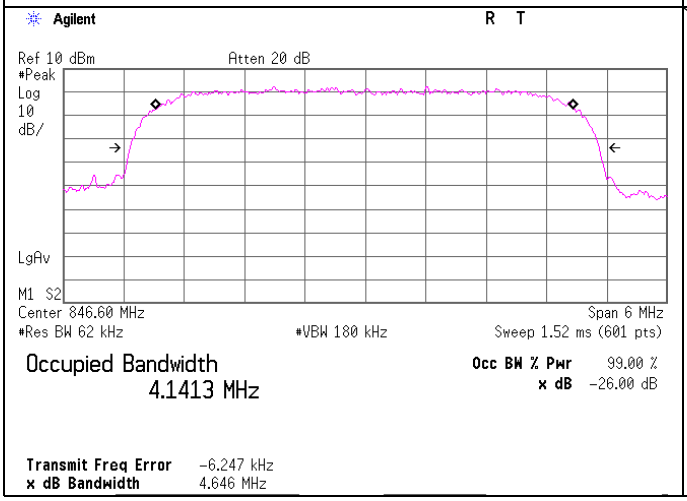
Tx: 826.4MHz



Tx: 836.6MHz



Tx: 846.6MHz



Band Edge (Conducted)

GSM Mode

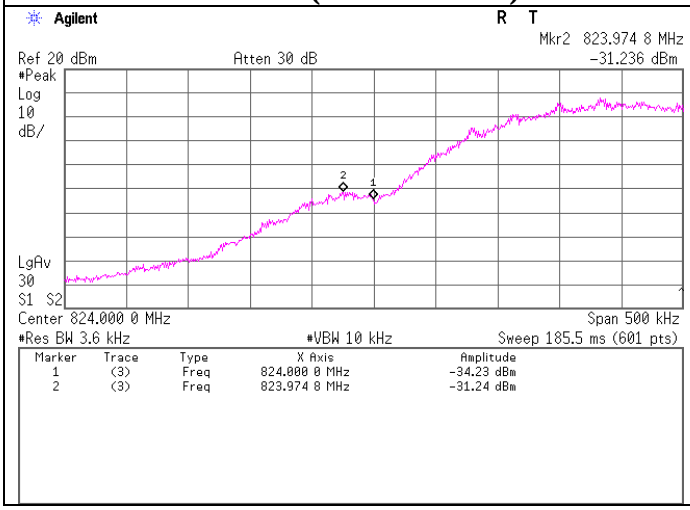
Test place	Head Office EMC Lab. No.6 Measurement Room
Report No.	31HE0196-HO
Date	01/23/2011
Temperature/ Humidity	20 deg.C./ 56%RH
Engineer	Katsunori Okai
Mode	Tx

Frequency [MHz]	Reading [dBm]	Atten. [dB]	Cable Loss [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
823.975	-31.24	9.90	4.11	-17.23	-13.0	4.23
824.000	-34.23	9.90	4.11	-20.22	-13.0	7.22
849.000	-32.95	9.91	4.14	-18.90	-13.0	5.90
849.015	-28.94	9.91	4.14	-14.89	-13.0	1.89

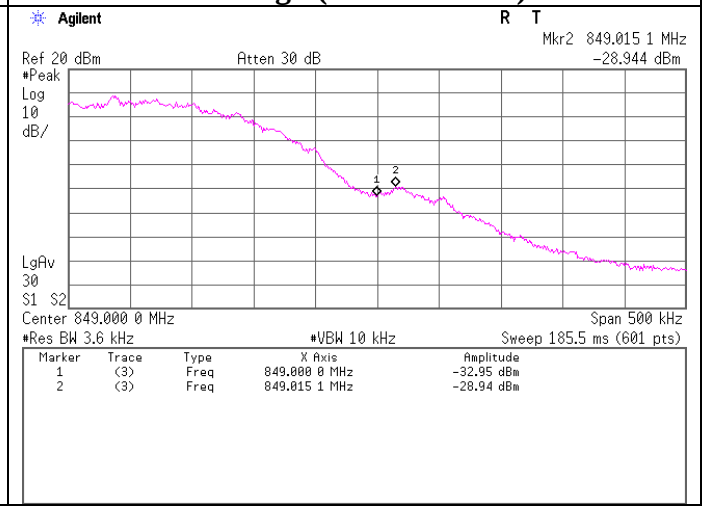
VIDEO AV 30 times

Sample Calculation : Result = Reading + Atten. + Cable Loss

Ch: Low (Tx:824.2MHz)



Ch: High (Tx:848.8MHz)



Band Edge (Conducted)

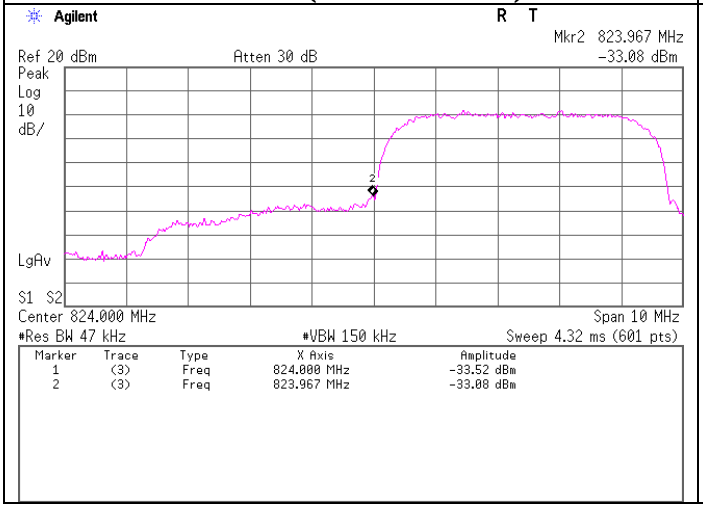
W-CDMA (RMC12.2kbps) Mode

Test place	Head Office EMC Lab. No.6 Measurement Room
Report No.	31HE0196-HO
Date	01/23/2011
Temperature/ Humidity	20 deg.C./ 56%RH
Engineer	Katsunori Okai
Mode	Tx

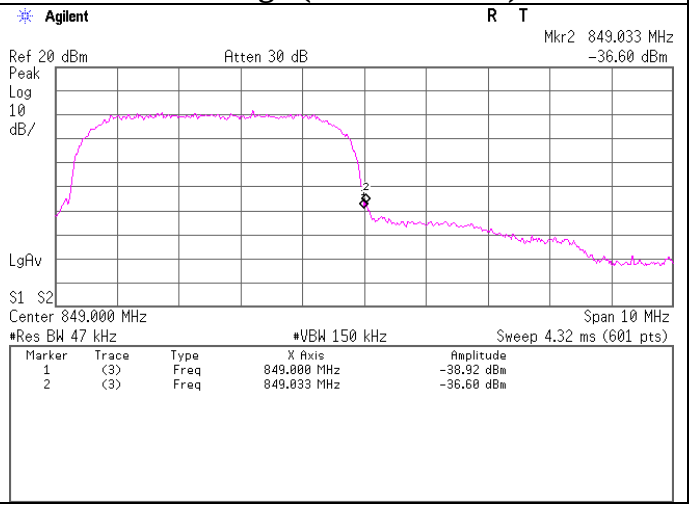
Frequency [MHz]	Reading [dBm]	Atten. [dB]	Cable Loss [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
823.967	-33.08	9.90	4.11	-19.07	-13.0	6.07
824.000	-33.52	9.90	4.11	-19.51	-13.0	6.51
849.000	-38.92	9.91	4.14	-24.87	-13.0	11.87
849.033	-36.60	9.91	4.14	-22.55	-13.0	9.55

Result = Reading + Atten. + Cable Loss

Ch: Low (Tx: 826.4MHz)



Ch: High (Tx: 846.6MHz)



Band Edge (Radiated)

GSM Mode

Test place	Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No.	31HE0196-HO
Date	04/02/2011
Temperature / Humidity	25 deg. C. / 23 %RH
Engineer	Takayuki Shimada
Mode	Tx

Frequency	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss	Tx Ant. Gain	Tx Ant. Atten. Loss	Result (ERP) [dBm]		Limit (ERP)	Margin [dB]		Horizontal		Vertical		Remarks
													Rx Ant. Height	Turn Table	Rx Ant. Height	Turn Table	
[MHz]	HOR	VER	HOR	VER	[dB]	[dBi]	[dB]	HOR	VER	[dBm]	HOR	VER	[cm]	[deg.]	[cm]	[deg.]	
823.99	53.8	47.8	-0.2	-1.6	5.5	2.2	10.0	-15.8	-17.2	-13.0	2.8	4.2	100	95	135	0	
824.00	52.8	46.6	-1.2	-2.8	5.5	2.2	10.0	-16.8	-18.4	-13.0	3.8	5.4	100	95	135	0	
849.00	54.7	51.5	1.1	0.8	5.6	2.2	10.1	-14.6	-14.9	-13.0	1.6	1.9	100	95	127	83	
849.01	56.2	53.3	2.1	1.6	5.6	2.2	10.1	-13.6	-14.1	-13.0	0.6	1.1	100	95	127	83	

Calculation Result = SG Reading - Tx Cable Loss + Tx Antenna Gain - Tx Antenna Attenuator Loss -2.15
Rx-ANTENNA : Biconical Antenna(30M-300MHz), Logperiodic Antenna(300M-1000MHz), Horn Antenna(1G-12.75GHz)
Tx-ANTENNA : 120MHz tuned Dipole Antenna(30M-120MHz), Dipole Antenna(120M-1000MHz), Horn Antenna(1G-12.75GHz)
Detector : S/A PK (RBW: 3.6kHz , VBW: 10kHz)

Band Edge (Radiated)

W-CDMA (RMC12.2kbps) Mode

Test place	Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No.	31HE0196-HO
Date	04/02/2011
Temperature / Humidity	25 deg. C. / 23 %RH
Engineer	Takayuki Shimada
Mode	Tx

Frequency	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss	Tx Ant. Gain	Tx Ant. Atten. Loss	Result (ERP) [dBm]		Limit (ERP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks
													Rx Ant. Height	Turn Table	Rx Ant. Height	Turn Table	
[MHz]	HOR	VER	HOR	VER	[dB]	[dBi]	[dB]	HOR	VER		HOR	VER	[cm]	[deg.]	[cm]	[deg.]	
823.98	44.4	39.8	-9.9	-10.2	5.5	2.2	10.0	-25.5	-25.8	-13.0	12.5	12.8	100	97	135	0	
824.00	43.5	39.0	-10.8	-11.2	5.5	2.2	10.0	-26.4	-26.8	-13.0	13.4	13.8	100	97	135	0	
849.00	45.0	41.9	-8.4	-9.3	5.6	2.2	10.1	-24.1	-25.0	-13.0	11.1	12.0	100	96	132	90	
849.03	46.1	43.1	-7.2	-8.0	5.6	2.2	10.1	-22.9	-23.7	-13.0	9.9	10.7	100	96	132	90	

Calculation Result = SG Reading - Tx Cable Loss + Tx Antenna Gain - Tx Antenna Attenuator Loss -2.15
Rx-ANTENNA : Biconical Antenna(30M-300MHz), Logperiodic Antenna(300M-1000MHz), Horn Antenna(1G-12.75GHz)
Tx-ANTENNA : 120MHz tuned Dipole Antenna(30M-120MHz), Dipole Antenna(120M-1000MHz), Horn Antenna(1G-12.75GHz)
Detector : S/A PK (RBW: 47kHz , VBW: 150kHz)

Spurious Emission (Conducted)

GSM Mode

Test place	Head Office EMC Lab. No.6 Measurement Room
Report No.	31HE0196-HO
Date	01/23/2011
Temperature/ Humidity	20 deg.C./ 56%RH
Engineer	Katsunori Okai
Mode	Tx

Limit Line

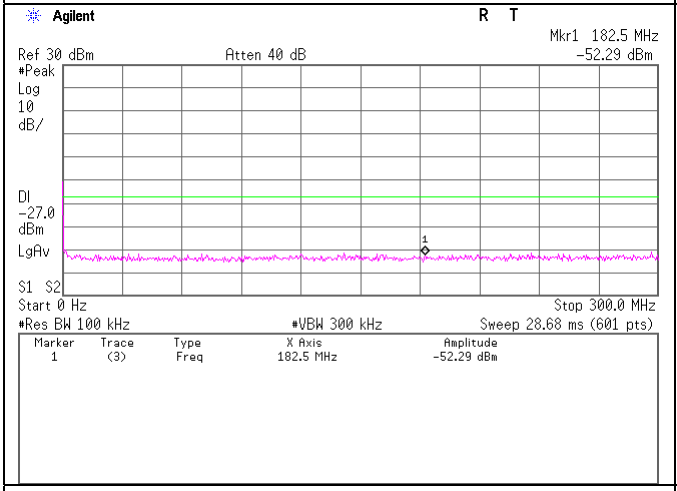
Tx Frequency [MHz]	Limit [dBm]	Atten. [dB]	Cable Loss [dB]	Limit Line [dBm]
824.2	-13.0	9.90	4.11	-27.0
836.6	-13.0	9.91	4.13	-27.0
848.8	-13.0	9.91	4.14	-27.1

Sample Calculation : Limit Line = Limit - Atten. - Cable Loss
*All the spurious noises were below the above limit line.

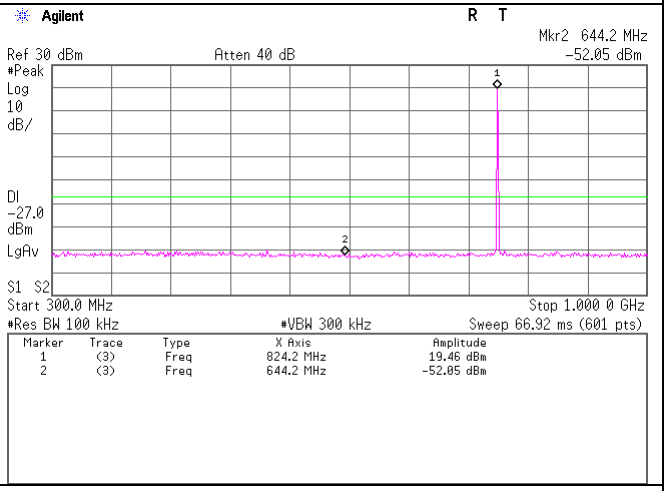
Spurious Emission (Conducted)

GSM Mode / Tx:824.2MHz

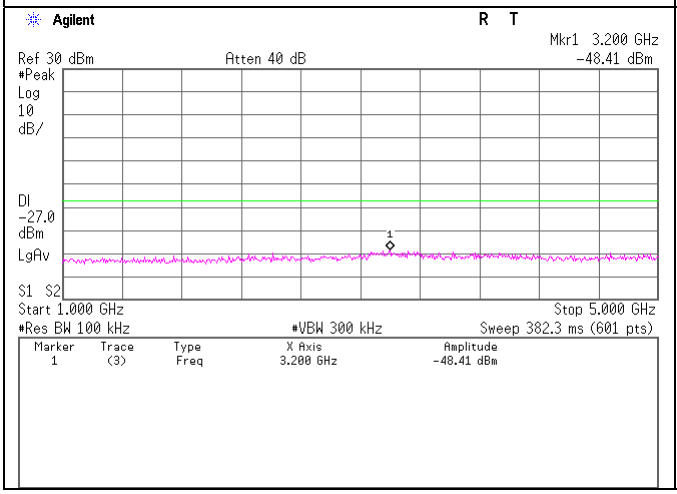
0Hz-300MHz



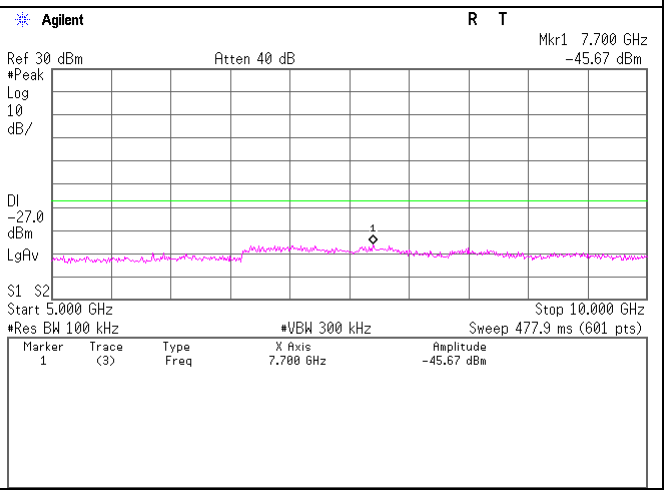
300MHz-1GHz



1GHz-5GHz



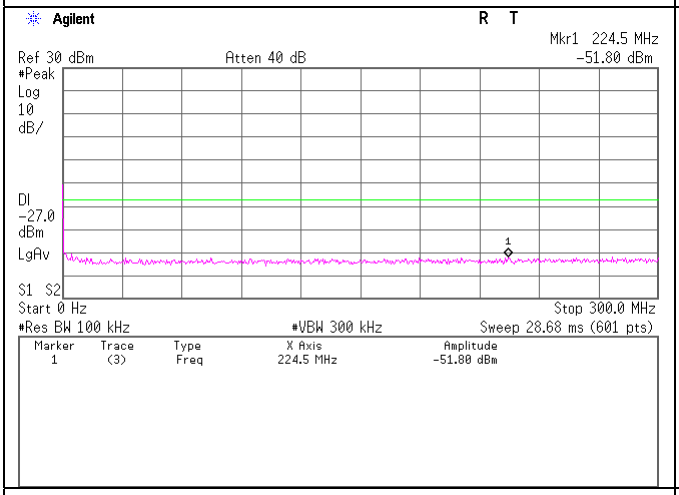
5GHz-10GHz



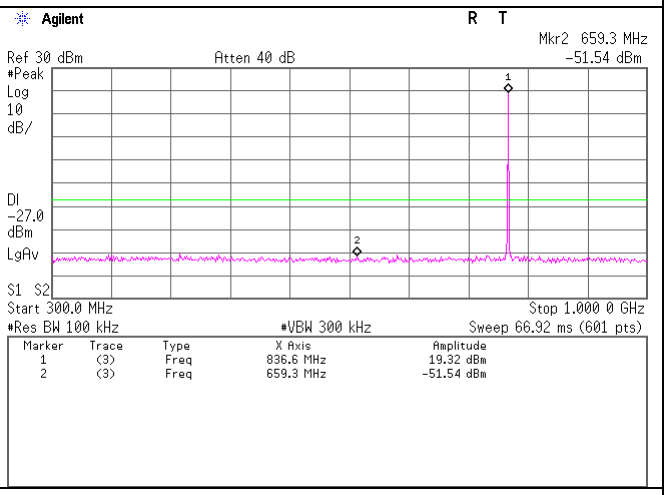
Spurious Emission (Conducted)

GSM Mode / Tx:836.6MHz

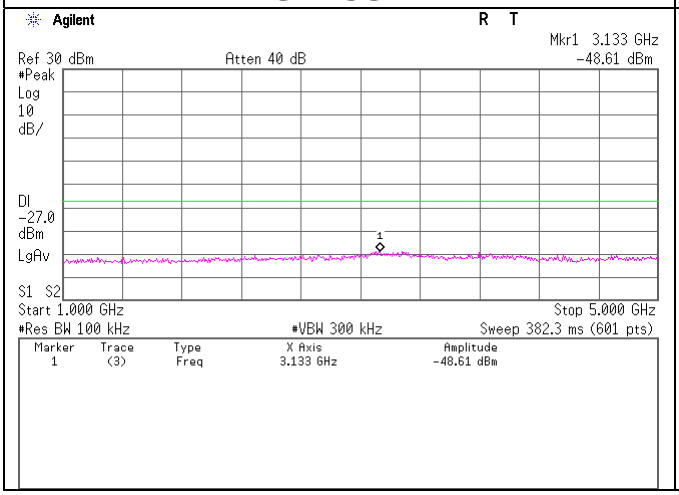
0Hz-300MHz



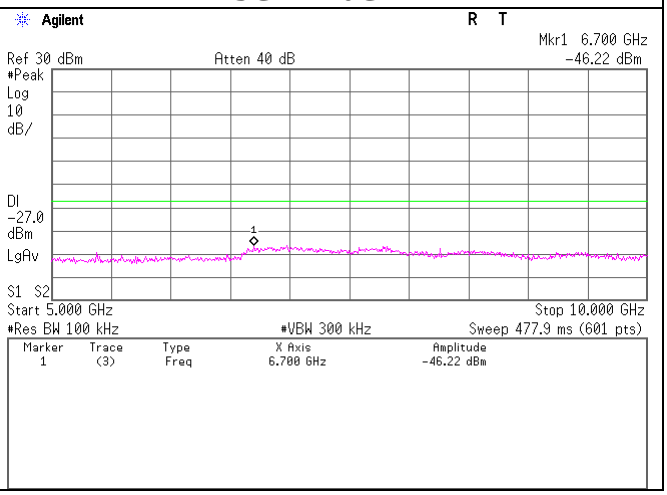
300MHz-1GHz



1GHz-5GHz



5GHz-10GHz



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Telephone : +81 596 24 8116
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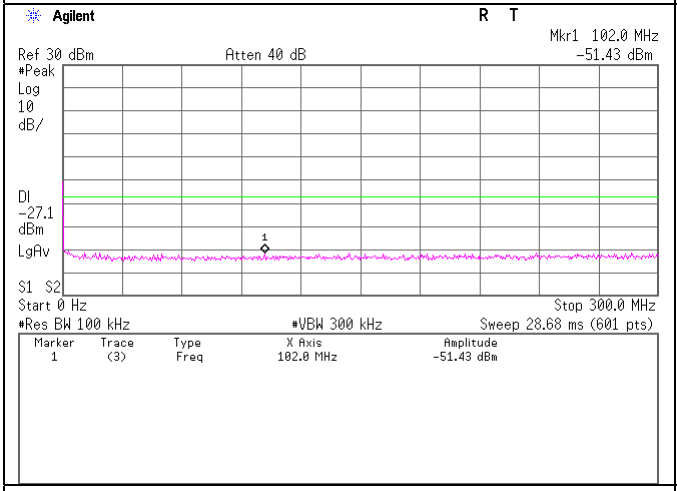
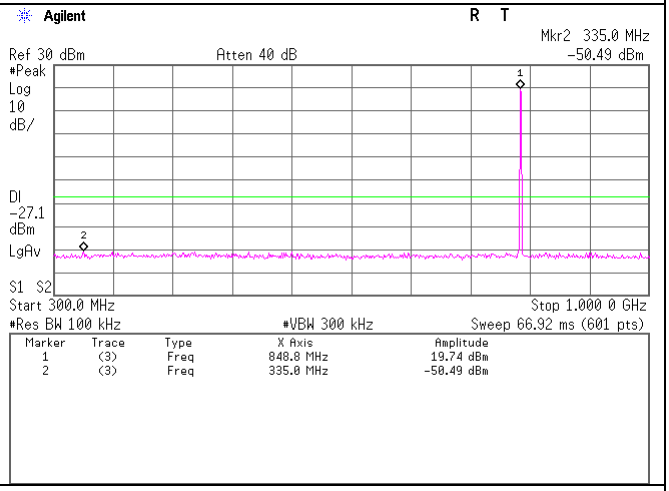
Spurious Emission (Conducted)

GSM Mode / Tx:848.8MHz

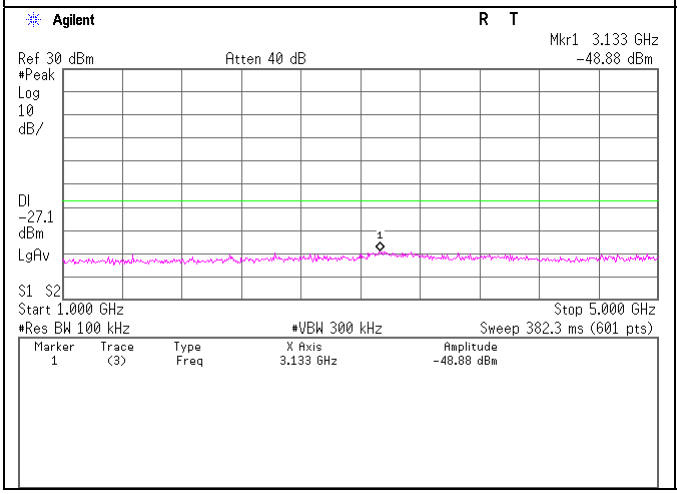
0Hz-300MHz



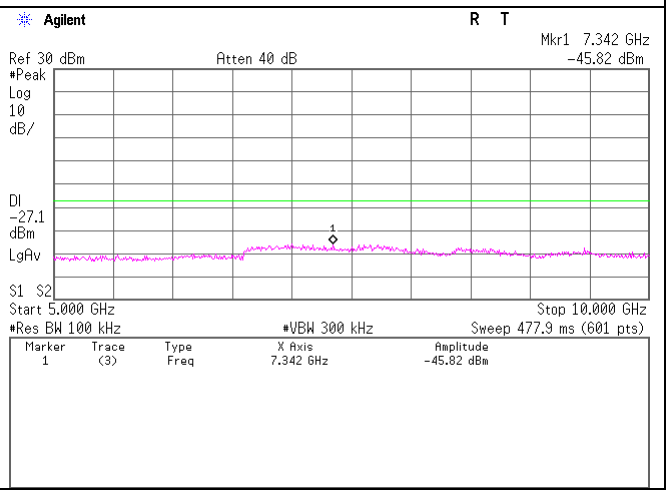
300MHz-1GHz



1GHz-5GHz



5GHz-10GHz



Spurious Emission (Conducted)

W-CDMA (RMC12.2kbps) Mode

Test place	Head Office EMC Lab. No.6 Measurement Room
Report No.	31HE0196-HO
Date	01/23/2011
Temperature/ Humidity	20 deg.C./ 56%RH
Engineer	Katsunori Okai
Mode	Tx

Limit Line

Tx Frequency [MHz]	Limit [dBm]	Atten. [dB]	Cable Loss [dB]	Limit Line [dBm]
826.4	-13.0	9.90	4.12	-27.0
836.6	-13.0	9.91	4.13	-27.0
846.6	-13.0	9.91	4.13	-27.0

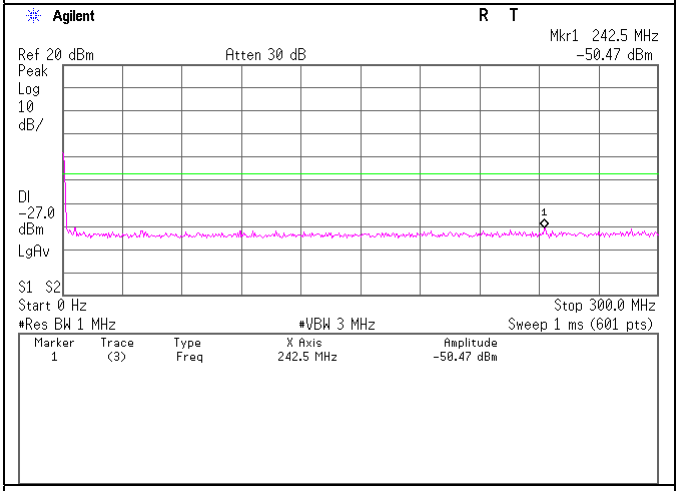
Sample Calculation : Limit Line = Limit - Atten. - Cable Loss

*All the spurious noises were below the above limit line.

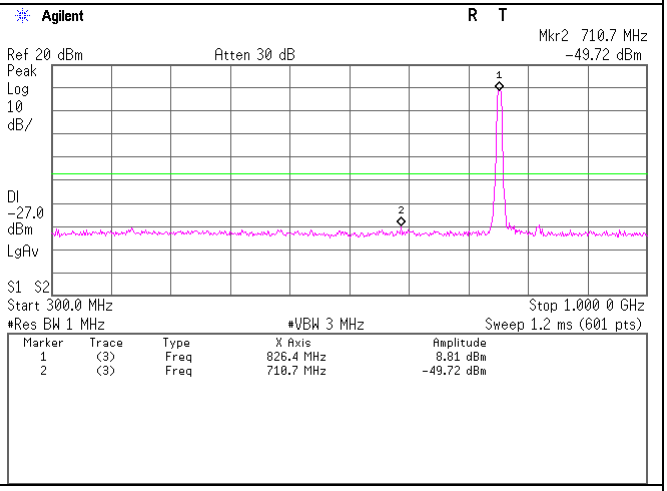
Spurious Emission (Conducted)

W-CDMA(RMC12.2kbps) Mode / Tx: 826.4MHz

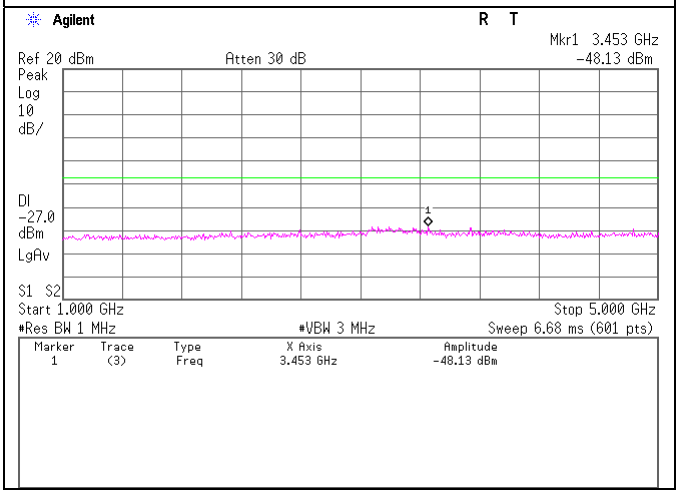
0Hz-300MHz



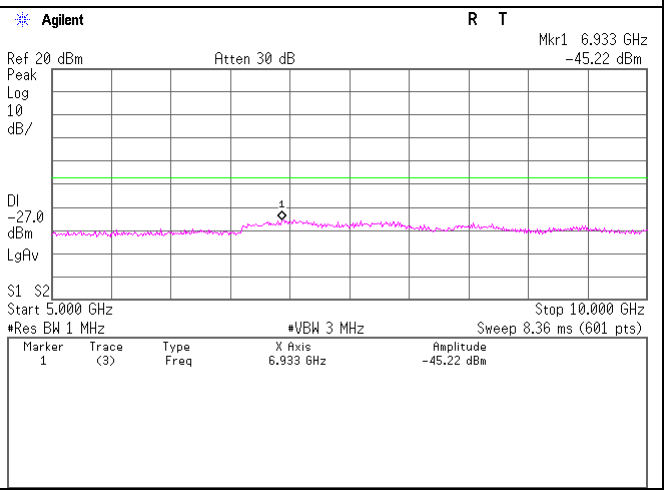
300MHz-1GHz



1GHz-5GHz



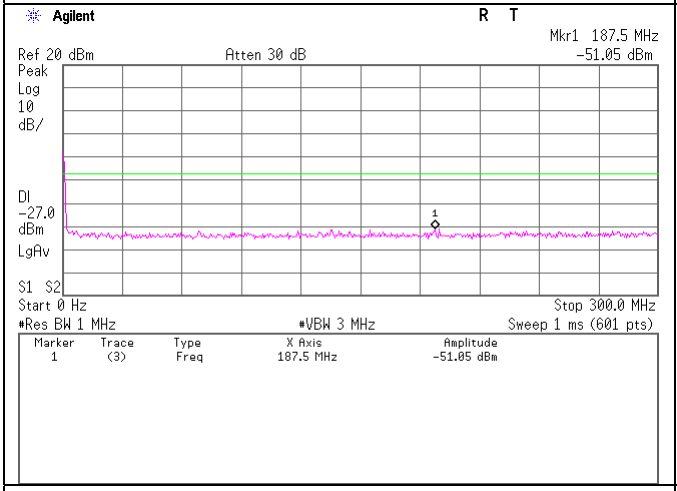
5GHz-10GHz



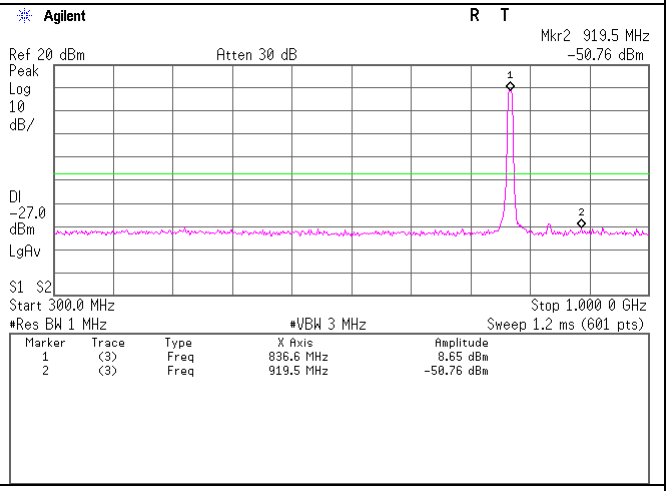
Spurious Emission (Conducted)

W-CDMA(RMC12.2kbps) Mode / Tx: 836.6MHz

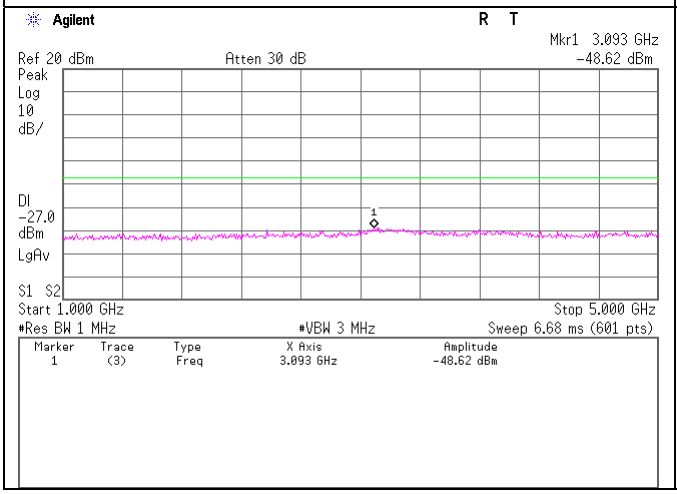
0Hz-300MHz



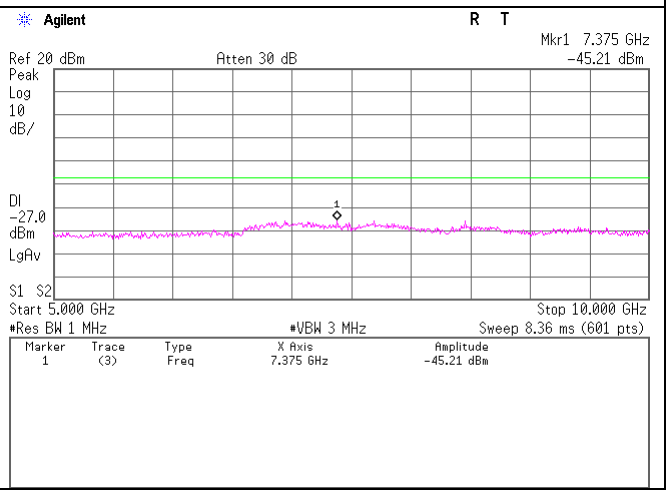
300MHz-1GHz



1GHz-5GHz



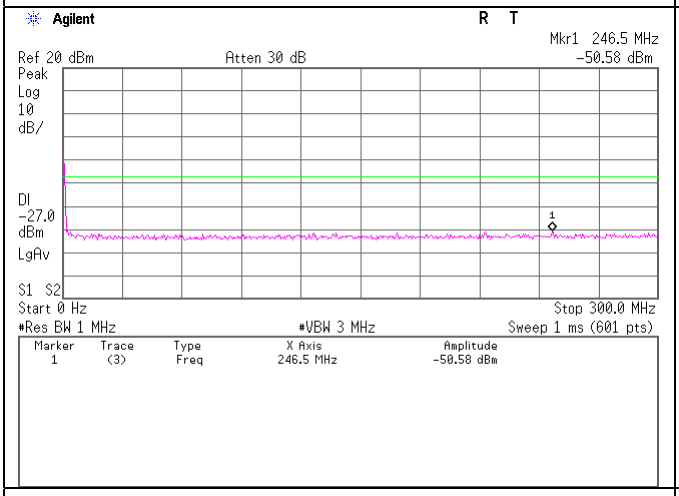
5GHz-10GHz



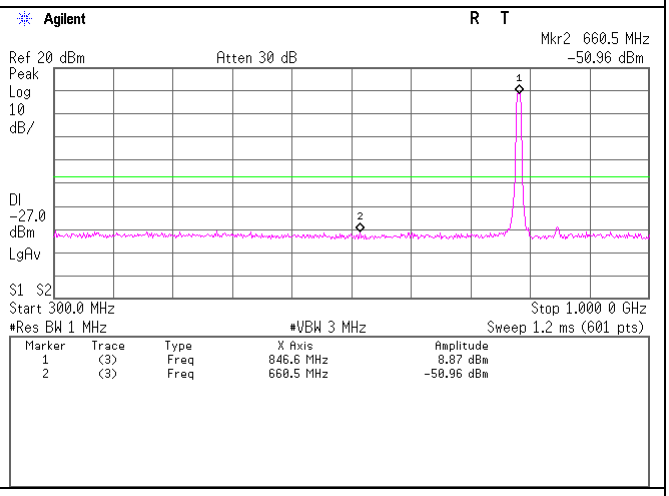
Spurious Emission (Conducted)

W-CDMA(RMC12.2kbps) Mode / Tx: 846.6MHz

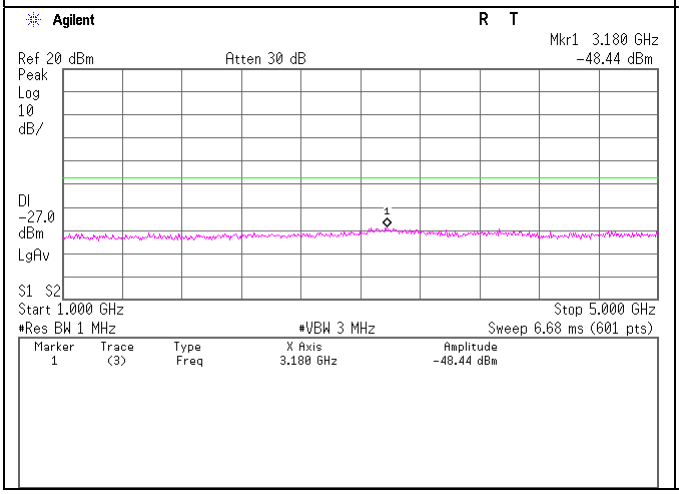
0Hz-300MHz



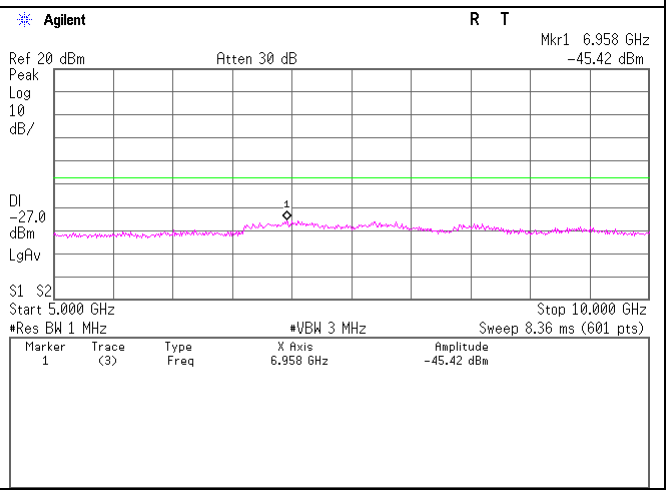
300MHz-1GHz



1GHz-5GHz



5GHz-10GHz



Spurious Emission (Radiated)

GSM Mode / Tx:824.2MHz

Test place	Head Office EMC Lab. No.2 Semi Anechoic Chamber	
Report No.	31HE0196-HO	
Date	04/01/2011	04/02/2011
Temperature / Humidity	25 deg. C. / 23 %RH	25 deg. C. / 23 %RH
Engineer	Satofumi Matsuyama (Above 1GHz)	Takayuki Shimada (Below 1GHz)
Mode	Tx	

Frequency	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss	Tx Ant. Gain	Tx Ant. Atten. Loss	Result (ERP) [dBm]		Limit (ERP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks
													Rx Ant. Height	Turn Table	Rx Ant. Height	Turn Table	
[MHz]	HOR	VER	HOR	VER	[dB]	[dBi]	[dB]	HOR	VER		HOR	VER	[cm]	[deg.]	[cm]	[deg.]	
1648.40	64.6	69.7	-44.8	-40.4	3.1	9.2	0.0	-40.8	-36.4	-13.0	27.8	23.4	171	279	100	283	
2472.60	59.7	61.4	-47.4	-44.9	3.8	10.3	0.0	-43.1	-40.6	-13.0	30.1	27.6	166	47	144	190	
3296.80	43.9	42.0	-69.0	-72.9	4.4	11.7	0.0	-63.8	-67.7	-13.0	50.8	54.7	100	161	100	192	

Calculation Result = SG Reading - Tx Cable Loss + Tx Antenna Gain - Tx Antenna Attenuator Loss -2.15
Rx-ANTENNA : Biconical Antenna(30M-300MHz), Logperiodic Antenna(300M-1000MHz), Horn Antenna(1G-40GHz)
Tx-ANTENNA : 120MHz tuned Dipole Antenna(30M-120MHz), Dipole Antenna(120M-1000MHz), Horn Antenna(1G-40GHz)
Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).
Detector : S/A PK(RBW:1MHz/VBW:3MHz)

Spurious Emission (Radiated)

GSM Mode / Tx:836.6MHz

Test place	Head Office EMC Lab. No.2 Semi Anechoic Chamber	
Report No.	31HE0196-HO	
Date	04/01/2011	04/02/2011
Temperature / Humidity	25 deg. C. / 23 %RH	25 deg. C. / 23 %RH
Engineer	Satofumi Matsuyama (Above 1GHz)	Takayuki Shimada (Below 1GHz)
Mode	Tx	

Frequency	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss	Tx Ant. Gain	Tx Ant. Atten. Loss	Result (ERP) [dBm]		Limit (ERP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks
													Rx Ant. Height	Turn Table	Rx Ant. Height	Turn Table	
[MHz]	HOR	VER	HOR	VER	[dB]	[dBi]	[dB]	HOR	VER		HOR	VER	[cm]	[deg.]	[cm]	[deg.]	
1673.20	58.0	68.9	-51.7	-41.6	3.1	9.4	0.0	-47.6	-37.5	-13.0	34.6	24.5	161	289	100	258	
2509.80	63.2	60.4	-43.5	-45.9	3.8	10.3	0.0	-39.2	-41.6	-13.0	26.2	28.6	100	292	140	190	
3346.40	44.9	45.9	-68.0	-65.0	4.5	11.9	0.0	-62.8	-59.8	-13.0	49.8	46.8	100	163	100	184	

Calculation Result = SG Reading - Tx Cable Loss + Tx Antenna Gain - Tx Antenna Attenuator Loss -2.15
Rx-ANTENNA : Biconical Antenna(30M-300MHz), Logperiodic Antenna(300M-1000MHz), Horn Antenna(1G-40GHz)
Tx-ANTENNA : 120MHz tuned Dipole Antenna(30M-120MHz), Dipole Antenna(120M-1000MHz), Horn Antenna(1G-40GHz)
Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).
Detector : S/A PK(RBW:1MHz/VBW:3MHz)

Spurious Emission (Radiated)

GSM Mode / Tx:848.8MHz

Test place	Head Office EMC Lab. No.2 Semi Anechoic Chamber	
Report No.	31HE0196-HO	
Date	04/01/2011	04/02/2011
Temperature / Humidity	25 deg. C. / 23 %RH	25 deg. C. / 23 %RH
Engineer	Satofumi Matsuyama	Takayuki Shimada
	(Above 1GHz)	(Below 1GHz)
Mode	Tx	

Frequency	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss	Tx Ant. Gain	Tx Ant. Atten. Loss	Result (ERP) [dBm]		Limit (ERP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks
													Rx Ant. Height	Turn Table	Rx Ant. Height	Turn Table	
[MHz]	HOR	VER	HOR	VER	[dB]	[dBi]	[dB]	HOR	VER		HOR	VER	[cm]	[deg.]	[cm]	[deg.]	
1697.60	60.4	71.2	-49.1	-39.3	3.2	9.5	0.0	-44.9	-35.1	-13.0	31.9	22.1	159	283	100	258	
2546.40	56.5	58.0	-51.8	-48.3	3.9	10.3	0.0	-47.5	-44.0	-13.0	34.5	31.0	153	280	139	197	
3395.20	43.0	43.9	-71.9	-68.8	4.5	12.0	0.0	-66.6	-63.5	-13.0	53.6	50.5	100	49	100	187	

Calculation Result = SG Reading - Tx Cable Loss + Tx Antenna Gain - Tx Antenna Attenuator Loss -2.15
Rx-ANTENNA : Biconical Antenna(30M-300MHz), Logperiodic Antenna(300M-1000MHz), Horn Antenna(1G-40GHz)
Tx-ANTENNA : 120MHz tuned Dipole Antenna(30M-120MHz), Dipole Antenna(120M-1000MHz), Horn Antenna(1G-40GHz)
Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).
Detector : S/A PK(RBW:1MHz/VBW:3MHz)

Spurious Emission (Radiated)

W-CDMA(RMC12.2kbps) Mode / Tx: 826.4MHz

Test place	Head Office EMC Lab. No.2 Semi Anechoic Chamber	
Report No.	31HE0196-HO	
Date	04/01/2011	04/02/2011
Temperature / Humidity	25 deg. C. / 23 %RH	25 deg. C. / 23 %RH
Engineer	Satofumi Matsuyama (Above 1GHz)	Takayuki Shimada (Below 1GHz)
Mode	Tx	

Frequency	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss	Tx Ant. Gain	Tx Ant. Atten. Loss	Result (ERP) [dBm]		Limit (ERP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks
													Rx Ant. Height	Turn Table	Rx Ant. Height	Turn Table	
[MHz]	HOR	VER	HOR	VER	[dB]	[dBi]	[dB]	HOR	VER		HOR	VER	[cm]	[deg.]	[cm]	[deg.]	
1652.80	54.2	53.8	-56.9	-58.1	3.1	9.3	0.0	-52.9	-54.1	-13.0	39.9	41.1	173	287	100	11	
2479.20	51.7	46.0	-57.3	-66.4	3.8	10.3	0.0	-53.0	-62.1	-13.0	40.0	49.1	196	321	137	43	

Calculation Result = SG Reading - Tx Cable Loss + Tx Antenna Gain - Tx Antenna Attenuator Loss -2.15
Rx-ANTENNA : Biconical Antenna(30M-300MHz), Logperiodic Antenna(300M-1000MHz), Horn Antenna(1G-40GHz)
Tx-ANTENNA : 120MHz tuned Dipole Antenna(30M-120MHz), Dipole Antenna(120M-1000MHz), Horn Antenna(1G-40GHz)
Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).
Detector : S/A PK(RBW:1MHz/VBW:3MHz)

Spurious Emission (Radiated)

W-CDMA(RMC12.2kbps) Mode / Tx: 836.6MHz

Test place	Head Office EMC Lab. No.2 Semi Anechoic Chamber	
Report No.	31HE0196-HO	
Date	04/01/2011	04/02/2011
Temperature / Humidity	25 deg. C. / 23 %RH	25 deg. C. / 23 %RH
Engineer	Satofumi Matsuyama (Above 1GHz)	Takayuki Shimada (Below 1GHz)
Mode	Tx	

Frequency	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss	Tx Ant. Gain	Tx Ant. Atten. Loss	Result (ERP) [dBm]		Limit (ERP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks
													Rx Ant. Height	Turn Table	Rx Ant. Height	Turn Table	
[MHz]	HOR	VER	HOR	VER	[dB]	[dBi]	[dB]	HOR	VER		HOR	VER	[cm]	[deg.]	[cm]	[deg.]	
1673.20	52.2	50.9	-59.1	-62.7	3.1	9.4	0.0	-55.0	-58.6	-13.0	42.0	45.6	159	272	100	12	
2509.80	51.9	50.5	-57.0	-58.3	3.8	10.3	0.0	-52.7	-54.0	-13.0	39.7	41.0	130	320	105	43	

Calculation Result = SG Reading - Tx Cable Loss + Tx Antenna Gain - Tx Antenna Attenuator Loss -2.15
Rx-ANTENNA : Biconical Antenna(30M-300MHz), Logperiodic Antenna(300M-1000MHz), Horn Antenna(1G-40GHz)
Tx-ANTENNA : 120MHz tuned Dipole Antenna(30M-120MHz), Dipole Antenna(120M-1000MHz), Horn Antenna(1G-40GHz)
Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).
Detector : S/A PK(RBW:1MHz/VBW:3MHz)

Spurious Emission (Radiated)

W-CDMA(RMC12.2kbps) Mode / Tx: 846.6MHz

Test place	Head Office EMC Lab. No.2 Semi Anechoic Chamber	
Report No.	31HE0196-HO	
Date	04/01/2011	04/02/2011
Temperature / Humidity	25 deg. C. / 23 %RH	25 deg. C. / 23 %RH
Engineer	Satofumi Matsuyama (Above 1GHz)	Takayuki Shimada (Below 1GHz)
Mode	Tx	

Frequency	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss	Tx Ant. Gain	Tx Ant. Atten. Loss	Result (ERP) [dBm]		Limit (ERP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks
													Rx Ant. Height	Turn Table	Rx Ant. Height	Turn Table	
[MHz]	HOR	VER	HOR	VER	[dB]	[dBi]	[dB]	HOR	VER		HOR	VER	[cm]	[deg.]	[cm]	[deg.]	
1693.20	49.0	52.8	-64.2	-60.1	3.2	9.5	0.0	-60.1	-56.0	-13.0	47.1	43.0	102	43	100	13	
2539.80	54.7	51.3	-53.9	-56.5	3.8	10.3	0.0	-49.6	-52.2	-13.0	36.6	39.2	161	322	130	49	

Calculation Result = SG Reading - Tx Cable Loss + Tx Antenna Gain - Tx Antenna Attenuator Loss -2.15
Rx-ANTENNA : Biconical Antenna(30M-300MHz), Logperiodic Antenna(300M-1000MHz), Horn Antenna(1G-40GHz)
Tx-ANTENNA : 120MHz tuned Dipole Antenna(30M-120MHz), Dipole Antenna(120M-1000MHz), Horn Antenna(1G-40GHz)
Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).
Detector : S/A PK(RBW:1MHz/VBW:3MHz)

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Frequency Stability(Temperature/Voltage Variation)

GSM Mode / Tx:836.6MHz

Test place	Head Office EMC Lab. No.6 Measurement Room
Report No.	31HE0196-HO
Date	01/24/2010
Temperature/ Humidity	20 deg.C./ 32%RH
Engineer	Hironobu Ohnishi
Mode	Tx

Temp. [deg.C]	Volt. [V]	Frequency Error [Hz]	Frequency Error [ppm]	Limit [ppm]	Remark
-30	3.80	-19.27	-0.023	2.5	-
-20	3.80	-10.12	-0.012	2.5	-
-10	3.80	-24.22	-0.029	2.5	-
0	3.80	-15.36	-0.018	2.5	-
10	3.80	-34.28	-0.041	2.5	-
20	3.80	-23.46	-0.028	2.5	-
30	3.80	-32.28	-0.039	2.5	-
40	3.80	-26.52	-0.032	2.5	-
50	3.80	-24.37	-0.029	2.5	-

Temp. [deg.C]	Volt. [V]	Frequency Error [Hz]	Frequency Error [ppm]	Limit [ppm]	Remark
20	4.37	-26.83	-0.032	2.5	-
20	3.80	-23.46	-0.028	2.5	-
20	3.40	-22.56	-0.027	2.5	Battery End Point

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Frequency Stability(Temperature/Voltage Variation)

W-CDMA(RMC12.2kbps) Mode / Tx: 836.6MHz

Test place	Head Office EMC Lab. No.6 Measurement Room
Report No.	31HE0196-HO
Date	01/24/2011
Temperature/ Humidity	20 deg.C./ 32%RH
Engineer	Hironobu Ohnishi
Mode	Tx

Temp. [deg.C]	Volt. [V]	Frequency Error [Hz]	Frequency Error [ppm]	Limit [ppm]	Remark
-30.0	3.80	-8.08	-0.010	2.5	-
-20.0	3.80	-11.34	-0.014	2.5	-
-10.0	3.80	-5.14	-0.006	2.5	-
0.0	3.80	-11.65	-0.014	2.5	-
10.0	3.80	-14.45	-0.017	2.5	-
20.0	3.80	-11.48	-0.014	2.5	-
30.0	3.80	-7.58	-0.009	2.5	-
40.0	3.80	-10.49	-0.013	2.5	-
50.0	3.80	-16.90	-0.020	2.5	-

Temp. [deg.C]	Volt. [V]	Frequency Error [Hz]	Frequency Error [ppm]	Limit [ppm]	Remark
20.0	4.37	-10.61	-0.013	2.5	-
20.0	3.80	-11.48	-0.014	2.5	-
20.0	3.40	-11.48	-0.014	2.5	Battery End Point

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APPENDIX 3: Test instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MOS-14	Thermo-Hygrometer	Custom	CTH-201	-	AT	2010/05/19 * 12
MCC-64	Coaxial Cable	UL Japan	-	-	AT	2010/03/04 * 12 *1)
MAT-10	Attenuator(10dB)	Weinschel Corp	2	BL1173	AT	2010/11/05 * 12
MURC-03	Radio Communication Analyzer	Anritsu	MT8815B	6200711471	RE/AT	Pre Check
MCH-04	Temperature and Humidity Chamber	Tabai Espec	PL-2KP	14015723	AT	2010/08/03 * 12
MAT-17	Attenuator(20dB)_DC-1GHz_N	Weinschel Corp	MODEL 1	BG0143	AT	2011/01/11 * 12
MAEC-02	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	RE	2010/09/01 * 12
MOS-22	Thermo-Hygrometer	Custom	CTH-201	0003	RE	2011/02/23 * 12
MJM-05	Measure	PROMART	SEN1955	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MSA-10	Spectrum Analyzer	Agilent	E4448A	MY46180655	RE/AT	2011/02/15 * 12
MHA-06	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	254	RE	2011/01/16 * 12
MPA-10	Pre Amplifier	Agilent	8449B	3008A02142	RE	2010/09/30 * 12
MCC-56	Microwave Cable	Suhner	SUCOFLEX104	270875/4(1m) / 284655(5m)	RE	2011/03/02 * 12
MHF-18	High Pass Filter 3.5-18.0GHz	TOKIMEC	TF323DCA	7002	RE	2010/09/21 * 12
MCC-77	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX104	278942/4	RE	2010/12/02 * 12
MHF-04	High Pass Filter 1.22-4.60GHz	Mini-Circuit	VHF-1200	10435	RE	2010/08/17 * 12
KSG-05	Signal Generator	Rohde & Schwarz	SMR40	100137	RE	2010/08/20 * 12
MCC-129	Microwave Cable(1-33GHz)	HUBER+SUHNER	SF103/11PC3.5-31	54307/3	RE	2011/01/06 * 12
MHA-21	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	9120D-557	RE	2010/08/08 * 12
MBA-02	Biconical Antenna	Schwarzbeck	BBA9106	VHA91032008	RE	2010/10/11 * 12
MLA-02	Logperiodic Antenna	Schwarzbeck	USLP9143	201	RE	2010/10/11 * 12
MCC-12	Coaxial Cable	Fujikura/Agilent	-	-	RE	2011/02/18 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	BK7970	RE	2010/11/05 * 12
MPA-09	Pre Amplifier	Agilent	8447D	2944A10845	RE	2010/09/09 * 12
MSG-09	Signal Generator	Wiltron	68247B	674005	RE	2011/02/05 * 12
MCC-125	Corexial Cable	UL Japan	-	-	RE	2010/07/27 * 12
MDA-04	Dipole Antenna	Schwarzbeck	UHAP	992	RE	2010/10/16 * 12
MOS-19	Thermo-Hygrometer	Custom	CTH-201	0001	AT	2010/12/13 * 12
MURC-02	Wireless Communication Test Set	Agilent	E5515C	GB47050683	RE/AT	2009/10/20 * 36
MPM-08	Power Meter	Anritsu	ML2495A	6K00003338	AT	2010/09/10 * 12
MPSE-11	Power sensor	Anritsu	MA2411B	011737	AT	2010/09/10 * 12
MAT-09	Attenuator(6dB)	Weinschel Corp	2	BK7973	AT	2010/11/05 * 12
MAT-10	Attenuator(10dB)	Weinschel Corp	2	BL1173	AT	2010/11/05 * 12
MPSC-01	Power splitters/Combiners	Mini-Circuit	ZFSC-2-2500	0124	AT	2010/09/17 * 12

***1) This test equipment was used for the tests before the expiration date of the calibration.**

The expiration date of the calibration is the end of the expired month.
All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards. As for some calibrations performed after the tested dates, those test equipment have been controlled by means of an unbroken chains of calibrations.
Test Item:

RE: Radiated Emission
AT: Antenna Terminal Conducted

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