TEST REPORT

For

Mobile phone incorporated with Felica (RFID)

In conformity with

FCC CFR 47 Part15 / RSS-210, RSS-Gen

Model: F905i

FCC ID/ IC Certification No.: EJE-FOMA-905I / 337J-F905I

Test Item: Mobile phone incorporated with Felica (RFID)

Report No: RY707Y18R3

Issue Date: July 18, 2007

Prepared for

Fujitsu Limited.
1-1, Kamikodanaka 4-chome, Nakahara-ku, Kawasaki 211-8588, Japan

Prepared by

RF Technologies Ltd.
472, Nippa-cho, Kohoku-ku, Yokohama, 223-0057, Japan
Telephone: +81+(0)45- 534-0645
FAX: +81+(0)45- 534-0646

Table of contents

1 General information

1.1 Product description

Test item	: Mobile phone incorporated with Felica (RFID)
Manufacturer	: Fujitsu Limited
Address	: 1-1, Kamikodanaka 4-chome, Nakahara-ku, Kawasaki 211-8588, Japan
Model	: F905i
FCC ID	: EJE-FOMA-905I
IC Certification No.	: 337J-F905I
Classification	: Certification
Serial numbers	: 355280010006848
Transmitting Frequency	: 13.56 MHz (RFID)
Type of Modulation	: ASK
Receipt date of EUT	: July 9, 2007
Nominal power souse voltages	: Lithium-ion Battery Pack(CA54310-0006) and DC 5.4V (from AC Adaptor, Model:MAS-BH0008-A001 by NEC)

1.2 Test(s) performed/ Summary of test result

Test specification(s)	: FCC CFR 47. Part 15 / RSS-210 Issue 7, RSS-Gen Issue 2
Test method(s)	: ANSI C63.4: 2003
Test(s) started	: July 9, 2007
Test(s) completed	: July 15, 2007
Purpose of test(s)	: Grant for Certification of FCC / IC
Summary of test result	: Complied

Note: The above judgment is only based on the measurement data and it does not include the measurement uncertainty. Accordingly, the statement below is applied to the test result.
The EUT complies with the limit required in the standard in case that the margin is not less than the measurement uncertainty in the Laboratory.
Compliance of the EUT is more probable than non-compliance is case that the margin is less than the measurement uncertainty in the Laboratory.

Test engineer : Y. Nakajima
Y. Nakajima

Reviewer : T. Ikegami
T. Ikegami

1.3 Test facility

The Federal Communications Commission has reviewed the technical characteristics of the test facilities at RF Technologies Ltd., located in 472, Nippa-cho, Kohoku-ku, Yokohama, 223-0057, Japan, and has found these test facilities to be in compliance with the requirements of 47 CFR Part 15, section 2.948, per October 23, 2000.
The description of the test facilities has been filed under registration number 879401 at the Office of the Federal Communications Commission. The facility has been added to the list of laboratories performing these test services for the public on a fee basis.
The list of all public test facilities is available on the Internet at http://www.fcc.gov.

Registered by Voluntary Control Council for Interference by Information Technology Equipment (VCCI).
Each registered facility number is as follows;
Test site (Anechoic chamber 3m) R-2393
Test site (Shielded room) C-2617

Registered by Industry Canada (IC). The registered facility number is as follows;
Test site No. 1(Anechoic chamber 3m) : 6974A

1.4 Measurement uncertainty

The treatment of uncertainty is based on the general matters on the definition of uncertainty in “Guide to the expression of uncertainty in measurement (GUM)” published by ISO. The Lab’s uncertainty is determined by referring UKAS Publication LAB34: 2002 “The Expression of Uncertainty in EMC Testing” and CISPR16-4-2: 2003 “Uncertainty in EMC Measurements”.
The uncertainty of the measurement result in the level of confidence of approximately 95% (k=2) is as follows;

Conducted emission: ± 3.5 dB (10 kHz – 150 kHz), ± 3.6 dB (150 kHz – 30 MHz)
Radiated emission (9 kHz - 30MHz): ± 3.2 dB
Radiated emission (30MHz - 1000MHz): ± 4.6 dB
Radiated emission (above 1000MHz): ± 4.6 dB

1.5 Summary of test results

Requirement of;	Section in FCC15	Section in RSS210/ RSS-Gen	Result	Section in this report
1.5.1 Occupied bandwidth (20 dB and 99%)	-	RSS-Gen 4.6.1	Complied	2.1
1.5.2 Transmitter AC power line conducted emissions	15.207	RSS-Gen 7.2.2	Complied	2.2
1.5.3 Transmitter radiated emissions between 9kHz to 30 MHz	15.225(a),(b),(c) and (d)	A2.6(a), (b),(c) and(d)	Complied	2.3
1.5.4 Transmitter radiated emissions between 30MHz to 1000 MHz	15.225 (d)	A2.6 (d)	Complied	2.4
1.5.5 Carrier frequency stability	15.225 (e)	A2.6 (d)	Complied	2.5
1.5.6 Receiver AC power line conducted emissions	15.107	RSS-Gen 7.2.2	Complied	2.6
1.5.7 Receiver radiated emissions above 30 MHz	15.109	RSS-Gen 6	Complied	2.7

The field strength of spurious emission was measured in three orthogonal EUT positions (X-Plane, Y- Plane and Z- Plane). The axis defined in the photographs in clause 3.1 in this report.

1.6 Setup of equipment under test (EUT)

1.6.1 Test configuration of EUT

Equipment(s) under test:

	Item	Manufacturer	Model No.	Serial No.	FCC ID/ IC Certification No.
A	Mobile phone incorporated with Felica (RFID)	Fujitsu Limited	F905i	355280010006848	EJE-FOMA-905I / 337J-F905I
B	Li-ion Battery Pack	Fujitsu Limited	CA54310-0006	None	N/A

Support Equipment(s):

	Item	Manufacturer	Model No.	Serial No.	FCC ID
C	AC Adaptor	NEC Corp.	MAS-BH0008-A001	None	N/A
D	Ear Phone	NTT DoCoMo	P02	-	N/A

Connected cable(s):

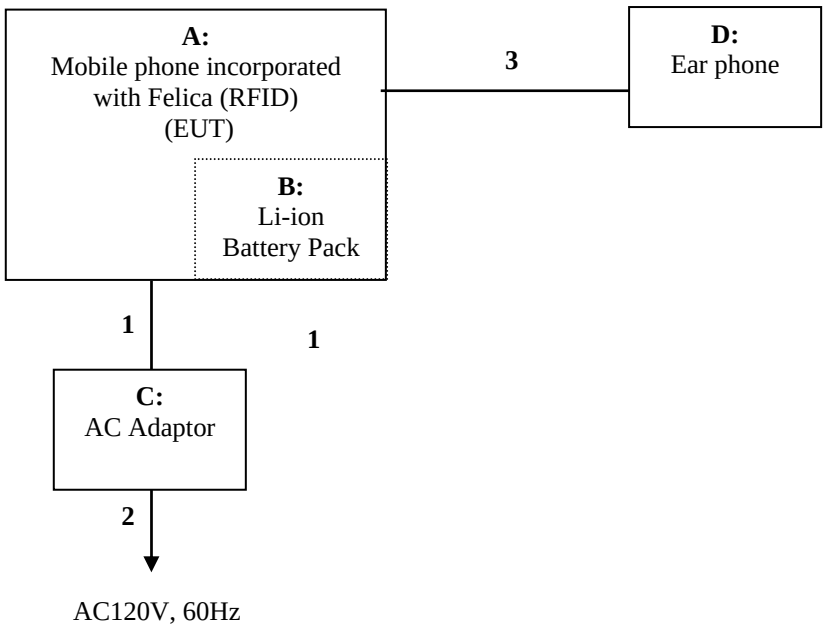
No.	Item	Identification (Manu.e.t.c)	Shielded YES / NO	Ferrite Core YES / NO	Connector Type Shielded YES / NO	Length (m)
1	DC power cable	-	No	No	No	1.5
2	AC power cable	HEWTECH	No	No	No	0.6
3	Ear phone cable	-	No	No	No	1.4

1.6.2 Operating condition:

Operating mode:

Continuous transmission under the test mode.

1.6.3 Setup diagram of tested system:



1.7 Equipment modifications

No modifications have been made to the equipment in order to achieve compliance with the applicable standards described in clause 1.2.

1.8 Deviation from the standard

No deviations from the standards described in clause 1.2.

2 Test procedure and test data

2.1 Occupied bandwidth (20dB/ 99%)

Test setup
Test setup was implemented according to the method of ANSI C63.4: 2003 13.1.7 “Occupied bandwidth measurements” and Annex H.6 “Occupied bandwidth measurements”.

Test procedure
Measurement procedures were implemented according to the method of ANSI C63.4: 2003 13.1.7 “Occupied bandwidth measurements” and Annex H.6 “Occupied bandwidth measurements”.
The spectrum analyzer RBW was set as follows and VBW the video bandwidth shall be set to a value at least three times greater than the RBW.
The marker-to-peak function and the marker-delta function of the spectrum analyzer were used to measure to measure the emission 20dB below the peak level.

Fundamental frequency being measured	Minimum instrument bandwidth
9 kHz to 30 MHz	1 kHz
30 MHz to 1000 MHz	10 kHz
1000 MHz to 40 GHz	100 kHz

Limitation
There are no limitations. The measurement value is used to calculation of the limitation of the channel separation and the emission designator.

Test equipment used (refer to List of utilized test equipment)

SA06	LP51				

Test results – Reporting purpose.

Frequency (MHz)	20dB Bandwidth (kHz)	99% Bandwidth (kHz)
13.56	2.59	2.20

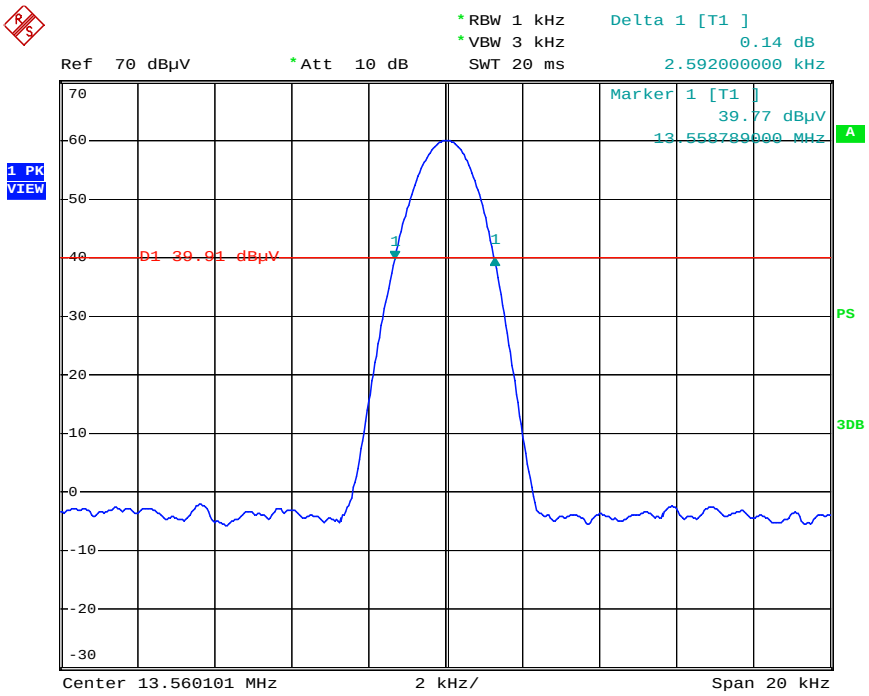
Test Data

Tested Date: July 14, 2007

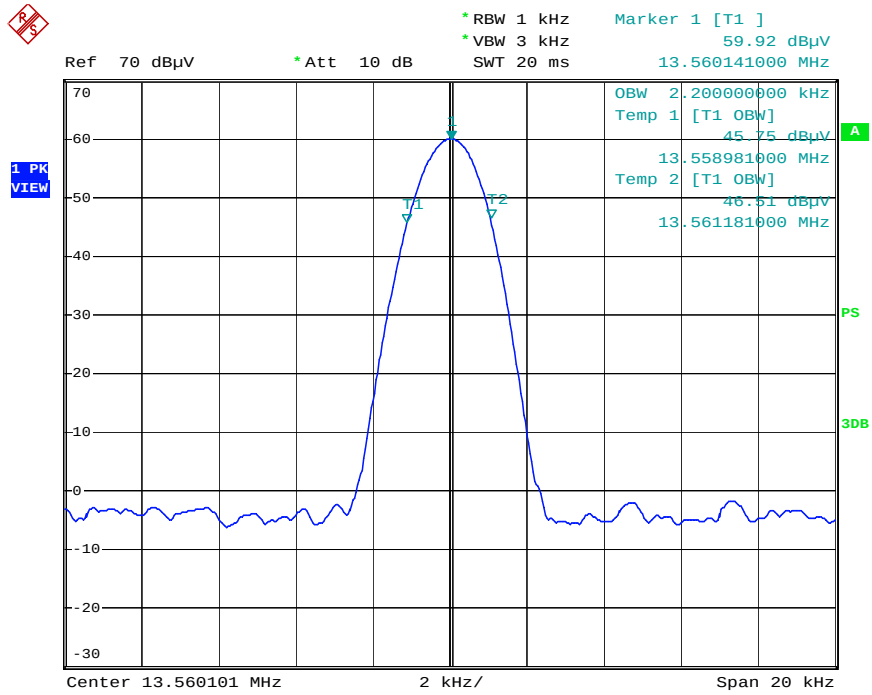
Temperature: 24 ˚C
Humidity: 66 %
Atmos. Press: 1002 hPa

Operating mode: Continuous transmission with modulation

(1) 20 dB Bandwidth



(2) 99 % Bandwidth



2.2 Transmitter AC power line conducted emissions

Test setup
Test setup was implemented according to the method of ANSI C63.4: 2003 clause 6 “General requirements for EUT equipment arrangements and operation” and Annex H.1 “AC power line conducted emission measurements setup”.

Test procedure
Measurement procedures were implemented according to the method of ANSI C63.4: 2003 clauses 7, clause 13.1.3 and Annex H.2 “AC power line conducted emission measurements”.
Exploratory measurements were used the spectrum analyzer to identify the frequency of the emission that has the highest amplitude relative to the limit by operating the EUT in a range of typical modes of operation, cable positions, and with a typical system equipment configuration and arrangement.
Final ac power line conducted emission measurements were performed based on the exploratory tests.
The EUT cable configuration and arrangement and mode of operation that produced the emission with the highest amplitude relative to the limit are selected for the final measurement.
When the measurement value is grater than average limitation the average detection measurements were performed.

Applicable rule and limitation

§15.207 (a) AC power line conducted limits

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.
The lower limit applies at the band edges.

Test equipment used (refer to List of utilized test equipment)

TR04	PL01	LN06	CL11

Test results - Complied with requirement.

Test Data

Tested Date: July 9, 2007

Temperature: 23 ˚C
Humidity: 66 %
Atmos. Press: 1008 hPa

Operating Mode: Continuous Transmission (Worst case configuration)

No.	Frequency [MHz]	Reading		C.F. [dB]	Result		Limit		Margin		PHASE
		QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	
1	1.210	44.1	26.5	0.2	44.3	26.7	56.0	46.0	11.7	19.3	L
2	1.837	54.4	38.6	0.2	54.6	38.8	56.0	46.0	1.4	7.2	L
3	2.124	48.5	35.0	0.3	48.8	35.3	56.0	46.0	7.2	10.7	L
4	2.323	44.8	30.5	0.3	45.1	30.8	56.0	46.0	10.9	15.2	L
5	3.334	45.3	28.9	0.3	45.6	29.2	56.0	46.0	10.4	16.8	L
6	**13.557**	**51.6**	**48.4**	**0.8**	**52.4**	**49.2**	**60.0**	**50.0**	**7.6**	**0.8**	**L**
7	1.347	46.2	31.6	0.2	46.4	31.8	56.0	46.0	9.6	14.2	N
8	1.762	54.3	40.5	0.2	54.5	40.7	56.0	46.0	1.5	5.3	N
9	1.870	54.2	39.6	0.2	54.4	39.8	56.0	46.0	1.6	6.2	N
10	2.028	49.8	36.8	0.3	50.1	37.1	56.0	46.0	5.9	8.9	N
11	3.580	44.2	31.5	0.3	44.5	31.8	56.0	46.0	11.5	14.2	N
12	13.559	51.3	48.1	0.8	52.1	48.9	60.0	50.0	7.9	1.1	N

The power line conducted emission voltage is calculated by adding the LISN factor and Cable loss attenuation from the measured reading. The calculation is as follows:

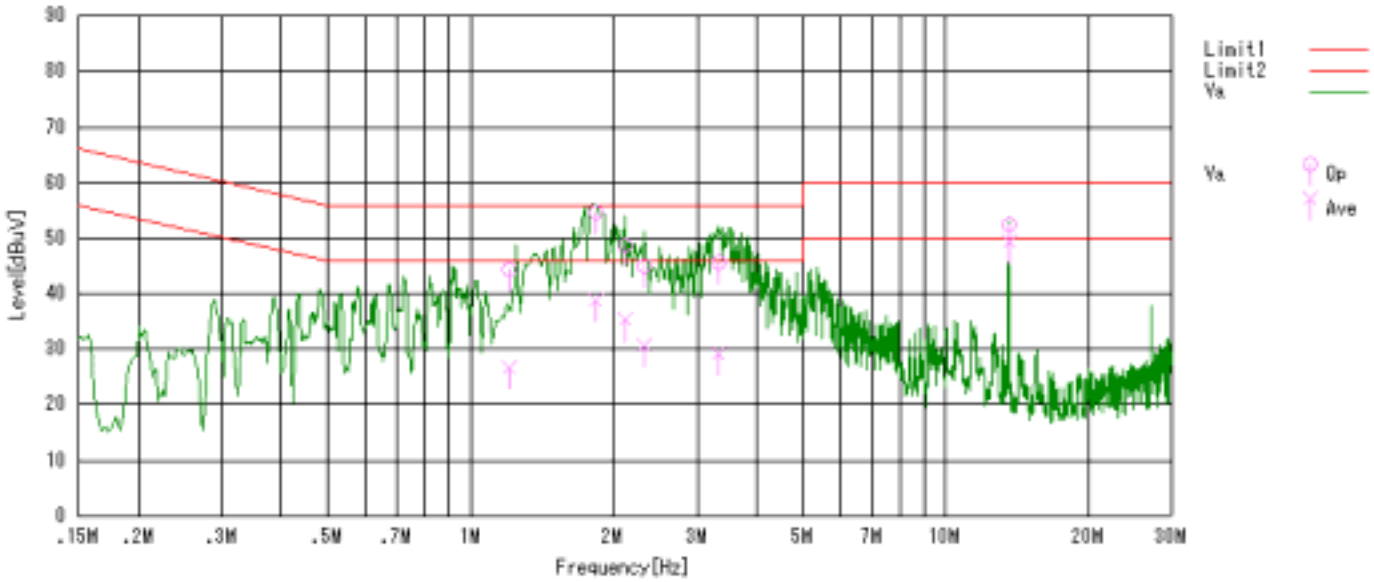
Result = Reading + C. F
where C.F = LISN Factor + Cable Loss [dB]

Sample calculation at 13.557 MHz Ave. result as follow:

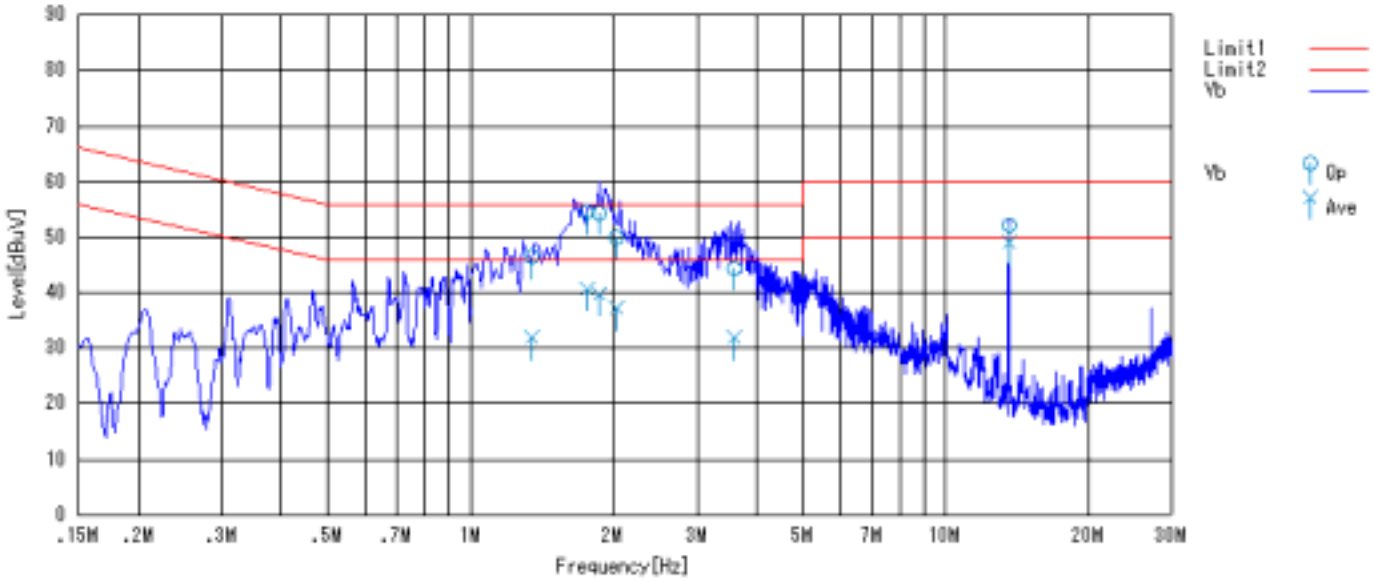
Result (dBuV) = Reading + C.F = 48.4 + 0.8 = 49.2 (dBuV)
Margin = Limit – Result = 50.0 – 49.2 = 0.8 (dBuV)

Graphical express of test result (0.15 MHz-30MHz)

AC Power line conducted emission. (Phase N)



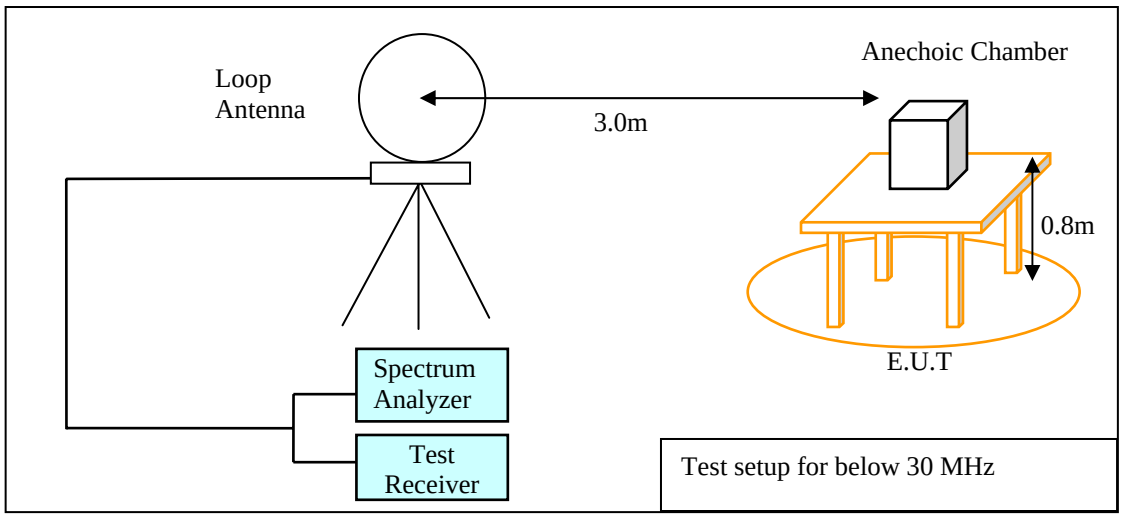
AC Power line conducted emission. (Phase L)



2.3 Transmitter radiated spurious emissions between 9kHz to 30MHz

Test setup

Test setup was implemented according to the method of ANSI C63.4: 2003 clause 6 "General requirements for EUT equipment arrangements and operation", clause 8.2 and Annex H.3 "Radiated emission measurements setup".



Test procedure

Measurement procedures were implemented according to the method of ANSI C63.4: 2003 clauses 8.2.
The EUT is place on a non-conducted table which is 0.8m height from a ground plane and the measurement antenna to EUT distance is 3 meters. The turn table is rotated for 360 degrees to determine the maximum emission level.
In the frequency range of 9 kHz to 30 MHz, a calibrated loop antenna was positioned with its plane vertical at the distance 3m from the EUT with an extrapolation of corrected distance factor and rotated about its vertical axis for maximum response at each azimuth about the EUT. For certain applications, the loop antenna also needs to be positioned horizontally. The center of the loop shall be 1 m above the ground.
EUT is placed at three different orientations (X, Y and Z axis) in order to find the worst orientation.
The spectrum analyzer and receiver is set to the followings;
Below 30 MHz: RBW=10 kHz, VBW= 30 kHz, final measurement is carried out receiver RBW=9 kHz QP

Applicable rule and limitation

§15.205 restricted bands of operation
Except as shown in paragraph 15.205 (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
0.490 - 0.510	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(1)

15.205(b) except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

§15.209 general requirements
Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 - 0.490	2400/F (kHz)	300
0.490 - 1.705	24000/F (kHz)	30
1.705 - 30.0	30	30

In the emission table above, the tighter limit applies at the band edges.
The level of any unwanted emissions from an intentional radiator operating under these general provisions shall not exceed the level of the fundamental emission.
The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz.
Radiated emission limits in the above bands are based on measurements employing an average detector.

§15.225 Operation within the band 13.110 – 14.010 MHz

Frequency (MHz)	Field strength @30m (uV/m)	Field strength @30m (dBuV/m)	Field strength @3m (dBuV/m)
13.110 - 13.410	106	40.5	80.5
13.410 - 13.553	334	50.5	90.5
13.553 - 13.567	15,848	84.0	124.0
13.567 - 13.710	334	50.5	90.5
13.710 - 14.010	106	40.5	80.5

dBuV/m = 20 x log (uV/m), Corrected distance factor = 40dB / decade (15.31(f))
The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the above radiated emission limits in § 15.209.

Test equipment used (refer to List of utilized test equipment)

AC01	LP01	CL11	TR04

Test results - Complied with requirement.

Test Data

Tested Date: July 9, 2007

Temperature: 23 ˚C
Humidity: 66 %
Atmos. Press: 1008 hPa

Operating Mode: Continuous Transmission (Worst case configuration)

Maximum configuration: EUT – Y-Plane

§15.225(a)/ (b)/ (c) Fundamental emission

Freq. (MHz)	Reading at 3m (dBuV)	Detector (QP/Ave)	Corr. Factor (dB)	Result (dBuV/m)	Limit at 3m (dBuV/m)	Margin (dB)
13.56	40.4	QP	10.8	51.2	124.0	72.8

Correction Factor (dB) = Antenna Factor (dB/m) + Cable Loss (dB)

§15.225(d) Harmonics and spurious emission between 9kHz to 30MHz(refer 15.209 and 15.205)

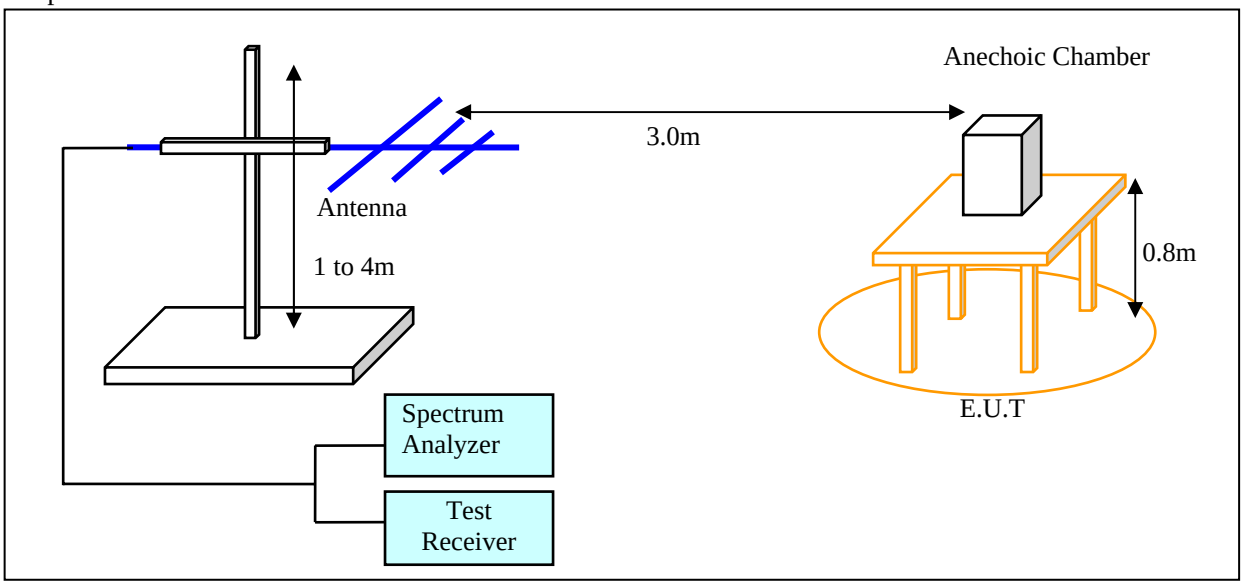
Freq. (MHz)	Reading at 3m (dBuV)	Detector (QP/Ave)	Corr. Factor (dB)	Result (dBuV/m)	Limit at 3m (dBuV/m)	Margin (dB)
27.12	< 30.0	QP	9.8	< 39.8	69.5	> 29.7

Correction Factor (dB) = Antenna Factor (dB/m) + Cable Loss (dB)
There were no emissions more than 20 dB below the applicable limit or greater than noise floor.

2.4 Transmitter radiated spurious emissions between 30MHz to 1000MHz

Test setup

Test setup was implemented according to the method of ANSI C63.4: 2003 clause 6 "General requirements for EUT equipment arrangements and operation", clause 8.2.3 and Annex H.4 "Radiated emission measurements setup".



Test procedure

Measurement procedures were implemented according to the method of ANSI C63.4: 2003 clauses 8.2.3.
Exploratory radiated measurements were performed at the measurement distance of 3 meters using broadband antennas and a spectrum analyzer. The EUT was set up in its typical configuration and arrangement, and operated in its various modes.
For each mode of operation required to be tested, the frequency spectrum were monitored. Variations in antenna height between 1 and 4 m, antenna polarization, EUT azimuth, and cable or wire placement (each variable within bounds specified elsewhere) were explored to produce the emission that has the highest amplitude relative to the limit.
Based on the exploratory measurement results, the one EUT, cable and wire arrangement, and mode of operation that produces the emission that has the highest amplitude relative to the limit is selected for the final measurement
This investigation was performed with the EUT rotated 360 ° , the antenna height scanned between 1m and 4m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. EUT was placed at three different orientations (X, Y and Z axis) in order to find the worst orientation.

Applicable rule and limitation

§15.209 general requirements

Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Measurement Distance (m)	Field Strength (uV/m)	Field Strength (dBuV/m)
30 – 88	3	100	40.0
88 –216	3	150	43.5
216 – 960	3	200	46.0
Above 960	3	500	54.0

In the emission table above, the tighter limit applies at the band edges.
The level of any unwanted emissions from an intentional radiator operating under these general provisions shall not exceed the level of the fundamental emission.
The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector.

Test equipment used (refer to List of utilized test equipment)

AC01	BA03	CL11	PR03	SA06	TR04

Test results - Complied with requirement.

Test Data

Tested Date: July 9, 2007

Temperature: 23 ˚C
Humidity: 66 %
Atmos. Press: 1008 hPa

Operating Mode: Continuous Transmission (Worst case configuration)

Maximum configuration: EUT – X-Plane

§15.225(d) Harmonics and spurious emission between 30MHz to 1000MHz(refer 15.209)

No.	Frequency [MHz]	Reading [dBuV]	Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Antenna Plariozation
1	30.00	33.2	18.5	3.9	29.9	25.7	40.0	14.3	Vert.
2	67.78	51.4	6.2	4.3	29.8	32.1	40.0	7.9	Hori.
3	67.79	52.8	6.2	4.3	29.8	33.5	40.0	6.5	Vert.
4	**81.34**	**57.8**	**7.2**	**4.5**	**29.8**	**39.7**	**40.0**	**0.3**	**Hori.**
5	81.34	53.9	7.2	4.5	29.8	35.8	40.0	4.2	Vert.
6	94.90	58.2	9.2	4.7	29.8	42.3	43.5	1.2	Hori.
7	94.96	45.9	9.2	4.7	29.8	30.0	43.5	13.5	Vert.
8	108.46	46.8	11.1	4.8	29.8	32.9	43.5	10.6	Vert.
9	122.01	43.0	12.2	4.9	29.8	30.3	43.5	13.2	Vert.

Calculation method

The Correction Factors and RESULT are calculated as followings.

Correction Factor = FACTOR + LOSS – GAIN
(dB) (dB/m) (dB) (dB)

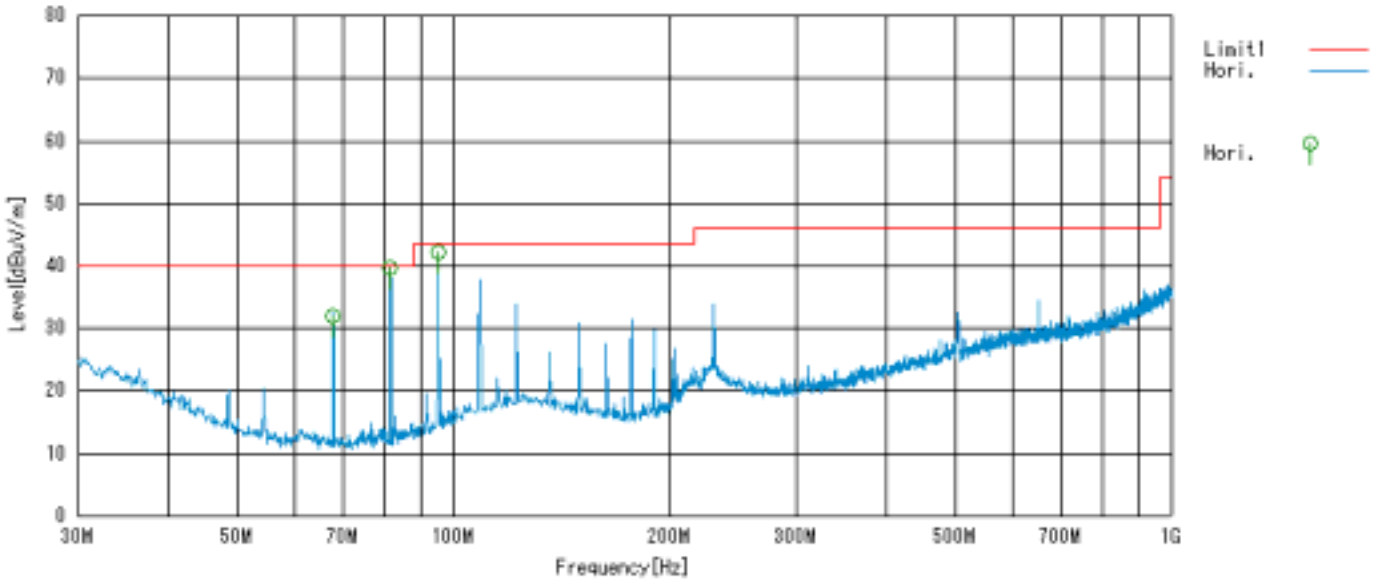
RESULT =READING+ Correction Factor
(dBµV/m) (dBµV) (dB/m)

Sample calculation at 81.34 MHz Horizontal result as follow:

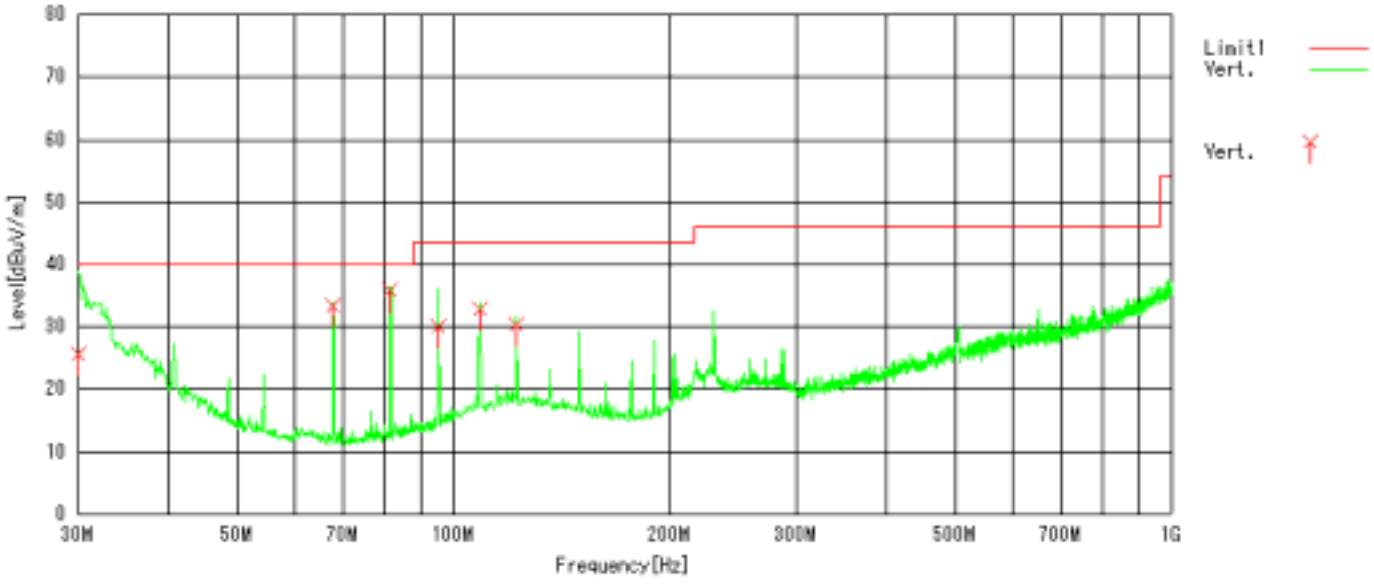
Result (dBuV/m) = Reading + C.F = 57.8 + 7.2 + 4.5 - 29.8 = 39.7
Margin = Limit – Result = 40.0 – 39.7 = 0.3 (dBuV/m)

Graphical express of test result (30MHz-1000MHz)

Antenna polarization: Horizontal



Antenna polarization: Vertical



2.5 Frequency stability

Test setup
Test setup was implemented according to the method of ANSI C63.4: 2003 clauses 13.1.6.1 "Frequency stability measurements", and Annex H.5 "Frequency measurements".

Test procedure
Measurement procedures were implemented according to the test method of ANSI C63.4: 2003 Annex H5.
Place the de-energized EUT in the temperature test chamber. Supply the EUT with nominal ac voltage, or install a new or fully charged battery in the EUT. An antenna was connected to the antenna output connector of the EUT if possible.
The frequency counter was connected to the measurement antenna with a suitable length of coaxial cable.
The environmental chamber set to the highest temperature specified in applicable regulation.
Allow sufficient time (approximately 30 minutes) for the temperature of the chamber to stabilize.
Turn the EUT on and measure the EUT operating frequency at startup, and two, five, and ten minutes after startup.
The measurements were performed that the temperature chamber set to reduce the lowest temperature specified in applicable regulation.

Applicable rule and limitation

§15.225(e) Frequency tolerance

Test items	Variation ranges	Limit
Temperature variations	-20 to +50 degrees	+/-0.01%

Test equipment used (refer to List of utilized test equipment)

LP51	TC01	SA06	

Test results - Complied with requirement.

Test Data

Tested Date: July 14, 2007

Temperature: 27 ˚C
Humidity: 76 %
Atmos. Press: 1001 hPa

Operating Mode: Continuous Transmission (Worst case configuration)
Power supply: Full charged Li-ion battery

Temp. (Degrees)	Voltages (V)	Measured Frequency (MHz)				Worst Deviation (%)	Limit (%)
		Start-up	2 min.	5 min.	10 min.		
Ambient Temperatures Variation							
50	DC3.7V	13.560072	13.560063	13.560055	13.560051	0.00053	+/-0.01
20	DC3.7V	13.560112	13.560111	13.560109	13.560109	0.00083	+/-0.01
0	DC3.7V	13.560138	13.560143	13.560143	13.560145	0.00107	+/-0.01
-20	DC3.7V	13.560091	13.560086	13.560082	13.560079	0.00067	+/-0.01

2.6 Receiver AC power line conducted emissions

Test setup - Same as clause 2.2

Test procedure - Same as clause 2.2

Applicable rule and limitation

§15.107 (a) AC power line conducted limits

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.
The lower limit applies at the band edges.

Test equipment used (refer to List of utilized test equipment)

TR04	PL01	LN06	CL11

Test results - Complied with requirement.

This transceiver could not achieved receiving mode only therefore the measurement was carried out under receiving ready condition of the EUT. This condition is same as standby.

Test Data

Tested Date: July 14, 2007

Temperature: 22 ˚C
Humidity: 67 %
Atmos. Press: 1002 hPa

Operating Mode: Ready to reception (same as standby)

No.	Frequency [MHz]	Reading		C.F. [dB]	Result		Limit		Margin		PHASE
		QP [dBuV]	AV [dBuV]		QP [dBuV]	QP [dBuV]	QP [dBuV]	QP [dBuV]	QP [dBuV]	QP [dBuV]	
1	1.383	43.8	24.8	0.2	44.0	25.0	56.0	46.0	12.0	21.0	N
2	1.596	43.8	27.8	0.2	44.0	28.0	56.0	46.0	12.0	18.0	N
3	1.859	48.2	30.0	0.2	48.4	30.2	56.0	46.0	7.6	15.8	N
4	2.199	40.2	23.5	0.3	40.5	23.8	56.0	46.0	15.5	22.2	N
5	3.260	38.8	20.0	0.3	39.1	20.3	56.0	46.0	16.9	25.7	N
6	3.585	41.3	21.5	0.3	41.6	21.8	56.0	46.0	14.4	24.2	N
7	0.932	42.4	25.5	0.2	42.6	25.7	56.0	46.0	13.4	20.3	L
8	1.144	41.7	24.3	0.2	41.9	24.5	56.0	46.0	14.1	21.5	L
9	1.271	46.1	27.8	0.2	46.3	28.0	56.0	46.0	9.7	18.0	L
10	**1.696**	**48.4**	**30.3**	**0.2**	**48.6**	**30.5**	**56.0**	**46.0**	**7.4**	**15.5**	**L**
11	1.870	46.7	32.0	0.2	46.9	32.2	56.0	46.0	9.1	13.8	L
12	3.488	33.8	18.1	0.3	34.1	18.4	56.0	46.0	21.9	27.6	L

The power line conducted emission voltage is calculated by adding the LISN factor and Cable loss attenuation from the measured reading. The calculation is as follows:

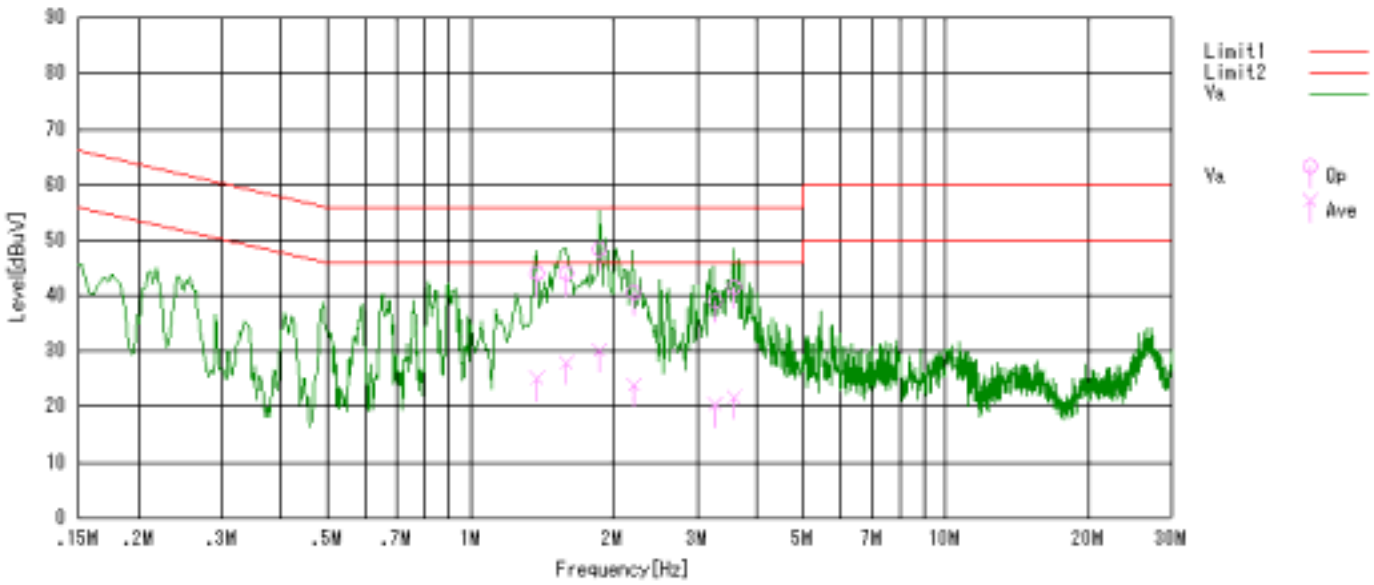
Result = Reading + C. F
where C.F = LISN Factor + Cable Loss [dB]

Sample calculation at 1.696 MHz Q.P. result as follow:

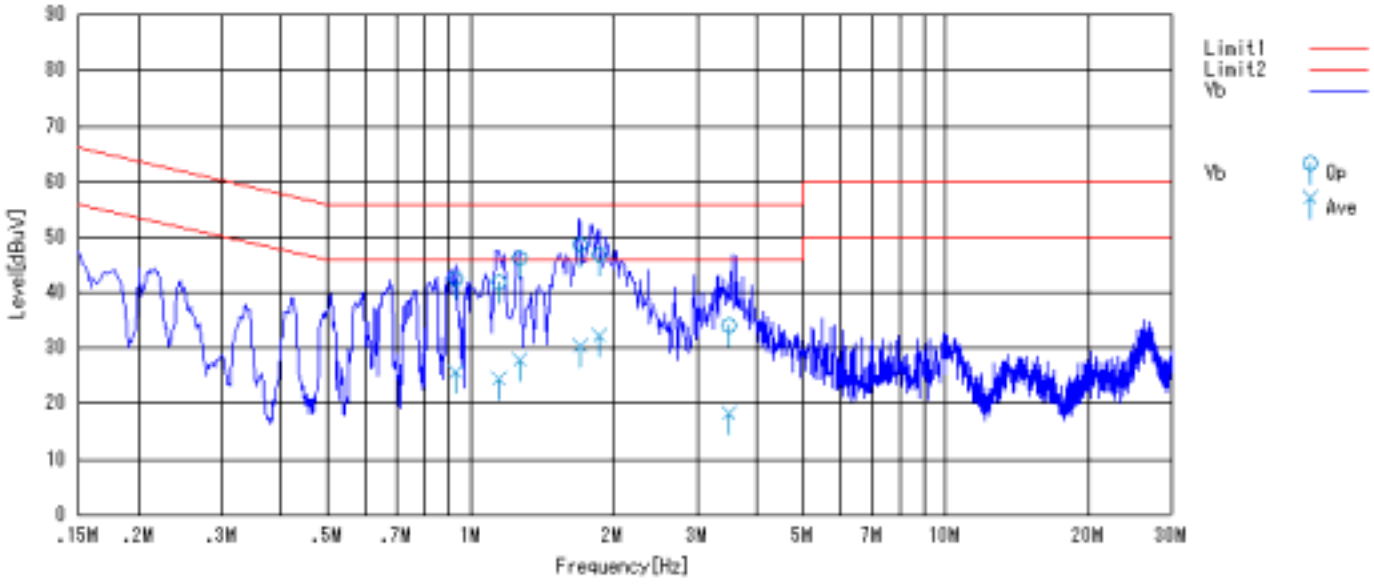
Result (dBuV) = Reading + C.F = 48.4 + 0.2 = 48.6 (dBuV)
Margin = Limit – Result = 56.0 – 48.6 = 7.4 (dBuV)

Graphical express of test result (0.15 MHz-30MHz)

AC Power line conducted emission. (Phase N)



AC Power line conducted emission. (Phase L)



2.7 Receiver Radiated spurious emissions

Test setup - Same as clause 2.4

Test procedure - Same as clause 2.4

Applicable rule and limitation at 3m
§15.109 radiated emission limitation

Frequency (MHz)	Measurement Distance (m)	Field Strength (uV/m)	Field Strength (dBuV/m)
30 – 88	3	100	40.0
88 –216	3	150	43.5
216 – 960	3	200	46.0
Above 960	3	500	54.0

In the emission table above, the tighter limit applies at the band edges.
The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector.

Test results - Complied with requirement.

This transceiver could not achieved receiving mode only therefore the measurement was carried out under receiving ready condition of the EUT. This condition is same as standby.

Test equipment used (refer to List of utilized test equipment)

AC01	BA03	CL11	PR03	SA06	TR04

Test Data

Tested Date: July 15 2007

Temperature: 22 ˚C
Humidity: 55 %
Atmos. Press: 996 hPa

Operating Mode: Ready to reception (same as standby)

No.	Frequency [MHz]	Reading [dBuV]	Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Antenna Plariozation
1	64.83	26.5	6.2	4.3	29.8	7.2	40.0	32.8	Vert.
2	66.67	32.2	6.2	4.3	29.8	12.9	40.0	27.1	Vert.
3	66.82	31.0	6.2	4.3	29.8	11.7	40.0	28.3	Hori.

Calculation method

The Correction Factors and RESULT are calculated as followings.

Correction Factor = FACTOR + LOSS – GAIN
(dB/m) (dB/m) (dB) (dB)

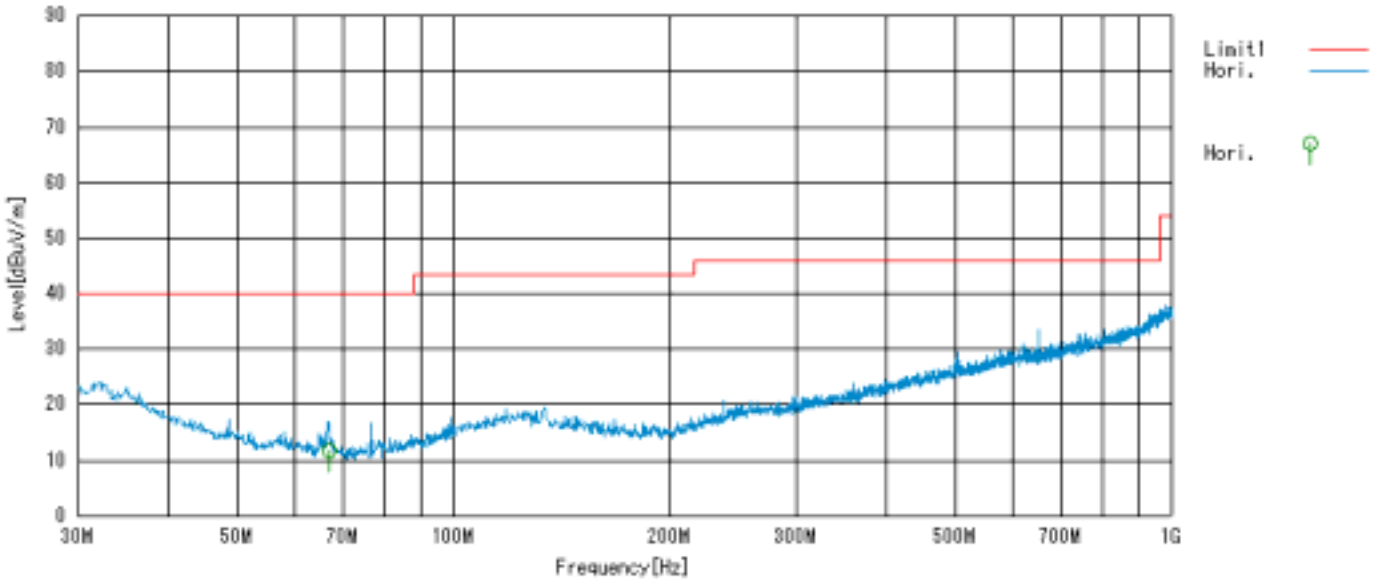
RESULT =READING+ Correction Factor
(dBµV/m) (dBµV) (dB/m)

Sample calculation at 66.67 MHz vertical result as follow:

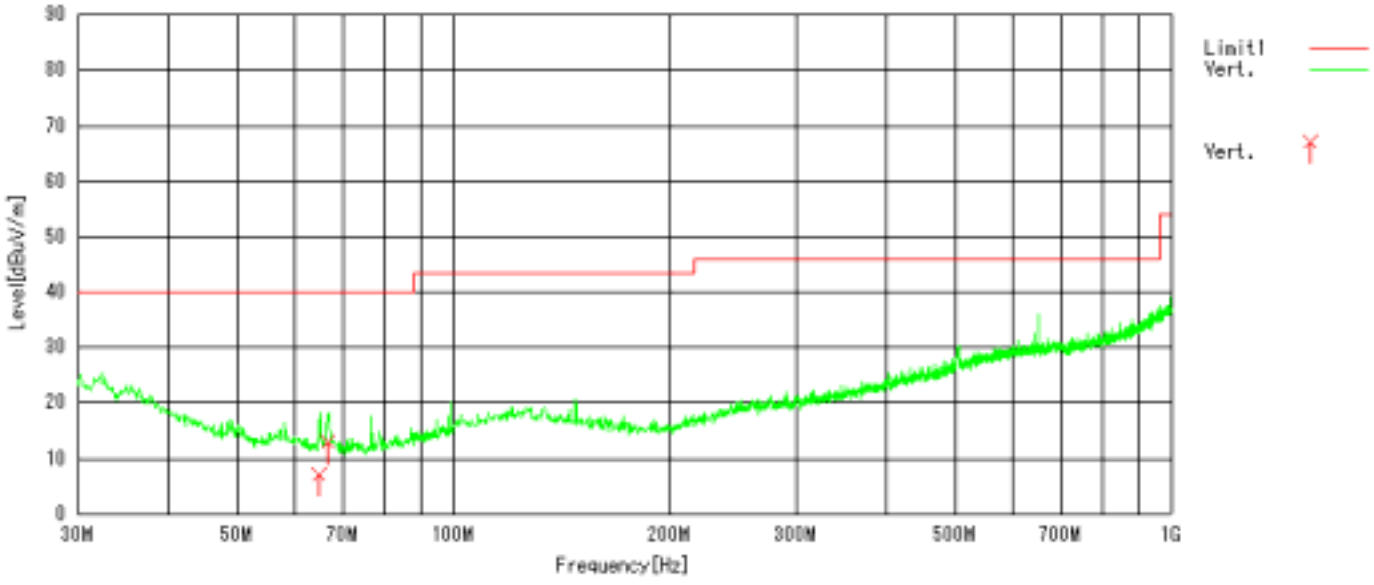
Result (dBuV/m) = Reading + C.F = 32.2 + 6.2 + 4.3 – 29.8 = 12.9
Margin = Limit – Result = 40.0 – 12.9 = 27.1 (dBuV/m)

Graphical express of test result (30MHz-1000MHz)

Antenna polarization: Horizontal



Antenna polarization: Vertical



4 List of utilized test equipment/ calibration

RFT ID No.	Kind of Equipment and Precision	Manufacturer	Model No.	Serial Number	Calibration Date	Calibrated until
AC01	Anechoic Chamber	Japan Shiled Closure	203397C		2007/5/8	2008/5/6
BA03	Bilogical Antenna	CAHSE	CBL6111	1309	2007/5/14	2008/5/12
BI01	Biconical Antenna	SCHWARZBECK	VHA9103	2359	2007/5/21	2008/5/19
BRF1	Band Reject Filter (WCDMA2000)		BRF2000-06	VT0001	2007/4/24	2008/4/22
BRF2	Band Reject Filter (Bluetooth)	MICRO TRONICS	BRM50701	024	2007/4/26	2008/4/24
CL11	Antenna Cable	RFT	-	-	2007/6/12	2008/6/10
CL21	RF Cable 0.5m	SUCOFLEX	SF104PE	48772/4PE	2007/5/25	2008/5/23
CL22	RF Cable 2.0m	SUCOFLEX	SF104	274755/4	2007/5/25	2008/5/23
CL23	RF Cable 0.5m	SUCOFLEX	SF104PE	48773/4PE	2007/6/8	2008/6/6
CL24	RF Cable 5.0m	SUCOFLEX	SF104PE	48775/4PE	2007/6/8	2008/6/6
DC01	Directional Coupler	KRYTAR	1850	77202	2007/4/24	2008/4/22
HC01	Harmonic Current Analysis system	NF	ES4153	9075640	2007/3/1	2008/2/28
HPF1	High Pass Filter (3500MHz)	TOKIMEC	TF323DCA	603	2007/6/8	2008/6/6
HPF2	High Pass Filter (900MHz)	M-City	HPF0900-01	RF0003-01	2007/6/1	2008/5/30
LA01	Logperiodic Antenna	SCHWARZBECK	USLP 9143	338	2007/5/21	2008/5/19
LN02	LISN (3ph 32A)	SCHWARZBECK	NSLK8128	8128-212	2007/2/2	2008/2/1
LN05	LISN	Kyoritsu	KNW-407	8-1773-2	2007/5/14	2008/5/12
LN06	LISN	Kyoritsu	KNW-407	8-1773-3	2007/5/14	2008/5/12
LN08	LISN (5uF)	SCHWARZBECK	NNBM8125	8126A-9262	2006/9/4	2007/9/3
LP01	Loop Antenna	EMCO	6502	3436	2007/6/8	2008/6/6
MA01	Active Monopole Antenna	SCHWARZBECK	VAMP9243	9438	2007/2/8	2008/2/7
PL01	Pulse Limiter	PMM	PL-01	0000J10109	2007/1/30	2008/1/29
PR03	Pre. Amplifier	Anritsu	HM648A	M41984	2007/5/14	2008/5/12
PR04	Pre. Amplifier (1-26G)	RFT	LNP126	060208-01	2007/6/8	2008/6/6
PR08	Pre. Amplifier	Sonoma Instrument	315	263504	2007/2/23	2008/2/22
SA06	Spectrum Analyzer (F/W: 3.60 SP1)	Rohde & Schwarz	FSP40	100071	2006/11/13	2007/11/12
SH01	Standard Horn Antenna (18-26G)	A.H. Systems	SAS-572	208	2006/5/3	2008/5/1
SH02	Standard Horn Antenna (18-26G)	A.H. Systems	SAS-572	209	2006/5/3	2008/5/1
SH03	Standard Horn Antenna (26-40G)	A.H. Systems	SAS-573	150	2006/5/3	2008/5/1
SH04	Standard Horn Antenna (26-40G)	A.H. Systems	SAS-573	151	2006/5/3	2008/5/1
TL01	Transient Limiter	Agilent Technologies	11947A	3107A04000	2006/11/6	2007/11/5
TR04	Test Receiver (F/W : 3.82 SP1)	Rohde & Schwarz	ESCI	100447	2006/9/27	2007/9/26

RFT ID No.	Kind of Equipment and Precision	Manufacturer	Model No.	Serial Number	Calibration Date	Calibrated until
AT05	Attenuator 3dB 50W	Weinschel	45-3-33	LC530	2007/2/5	2008/2/4
AT12	Attenuator 6dB 30W	FUJISOKU	FAT-530A	63454	2007/2/5	2008/2/4
AT14	Attenuator	JFW	50HF-003N	—	2007/4/25	2008/4/23
AT15	Attenuator	JFW	50HF-006N	—	2007/4/25	2008/4/23
AT20	Attenuator	JFW	50HF-010N	—	2007/3/16	2008/3/14
AT21	Attenuator 6dB 5W 18GHz	Weinschel	WA2-6-34	A1020	2007/3/9	2008/3/7
AT22	Attenuator 6dB 5W 18GHz	Weinschel	WA2-6-34	A1021	2007/3/9	2008/3/7
AT23	Attenuator 6dB 5W 18GHz	Weinschel	WA2-6-34	A1022	2007/3/9	2008/3/7
AT24	Attenuator 6dB 5W 18GHz	Weinschel	WA2-6-34	A1023	2007/3/9	2008/3/7
AT25	Attenuator 6dB 5W 18GHz	Weinschel	WA2-6-34	A1024	2007/3/9	2008/3/7
AT26	Attenuator 6dB 5W 18GHz	Weinschel	WA2-6-34	A1025	2007/3/9	2008/3/7
AT27	Attenuator 10dB 5W 18GHz	Weinschel	WA2-10-34	A1026	2007/3/9	2008/3/7
AT29	Attenuator 10dB 5W 18GHz	Weinschel	WA2-10-34	A1028	2007/3/9	2008/3/7
AT30	Attenuator 20dB 5W 18GHz	Weinschel	WA2-20-34	A1029	2007/3/9	2008/3/7
AT31	Attenuator 20dB 5W 18GHz	Weinschel	WA2-20-34	A1030	2007/3/9	2008/3/7
AT32	Attenuator 20dB 5W 18GHz	Weinschel	WA2-20-34	A1031	2007/3/9	2008/3/7
AT33	Attenuator 10dB 26GHz	INMET	26A-10	FT2075	2007/6/1	2008/5/30
DH01	DRG Horn Antenna	A.H. Systems	SAS-571	785	2006/2/6	2008/2/5
DH02	DRG Horn Antenna	A.H. Systems	SAS-200/571	239	2007/4/20	2008/4/18
PM01	Power Meter	Rohde & Schwarz	NRVS	100055	2007/1/29	2008/1/28
PU01	Power Meter Insertion Unit	Rohde & Schwarz	URV5-Z4	100055	2007/1/29	2008/1/28
RC02	Radio communication tester (F/W : V4.10)	Rohde & Schwarz	CMU200	105097	2006/9/14	2007/9/13
RC03	Radio communication tester (F/W : 10.20 #005)	Anritsu	MT8820B	6200636657	2007/5/24	2008/5/22
SG01	Signal Generator	Rohde & Schwarz	SML03	100325	2007/2/2	2008/2/1
SG05	Signal Generator	Rohde & Schwarz	SMR20	100905	2007/6/12	2008/6/10
SG07	Signal Generator	Agilent Technologies	N5181A	MY47070251	2007/5/11	2008/5/9
TA02	Dummy Load	Mini-Circuits	DL-30N	-	2007/2/23	2008/2/22
TA03	Dummy Load	Mini-Circuits	DL-30N	-	2007/2/23	2008/2/22
TA04	Dummy Load (4GHz, 50W)	Weinschel	WA1423-4	A462	2007/3/9	2008/3/7
TA05	Dummy Load (4GHz, 50W)	Weinschel	WA1423-4	A463	2007/3/9	2008/3/7
PM02	Power Meter	Anritsu	ML2487A	6K00004724	2007/7/11	2008/7/10
PU02	Dummy Load (4GHz, 50W)	Weinschel	WA1423-4	A463	2007/7/11	2008/7/10
TC01	Temperature Chamber	ESPEC	SH-641	92000964	2007/4/23	2008/4/21

RFT ID No.	Kind of Equipment and Precision	Manufacturer	Model No.	Serial Number	Calibration Date	Calibrated until
AC51	AC power supply	TAKASAGO	AA2000D	506960030014	not applicable	not applicable
AC52	AC power supply	KIKUSUI	PCR6000W		not applicable	not applicable
AF51	Active Filter	NF corp.	DV-04	434339	not applicable	not applicable
BC51	Burst Clamp	SCHAFFNER	CDN8015	21369	not applicable	not applicable
CG51	Comb Generator	tsj	TG-C2	TGC2-0009	not applicable	not applicable
CG52	Comb Generator	tsj	TG-R2	TGR2-0009	not applicable	not applicable
CJ51	CDN Calibration JIG 1	RFT	-	-	not applicable	not applicable
CJ52	CDN Calibration JIG 2	RFT	-	-	not applicable	not applicable
CJ53	EM clamp Calibration JIG 1	RFT	-	-	not applicable	not applicable
CJ54	EM clamp Calibration JIG 2	RFT	-	-	not applicable	not applicable
DC51	DC power supply	KIKUSUI	PMC18-3A	DF002941	not applicable	not applicable
DC52	DC power supply	KIKUSUI			not applicable	not applicable
LP51	Test Loop Antenna	Panasonic	VQ-085C	0O2861A122	not applicable	not applicable
MP51	Microphone	G.R.A.S	26AK + 12AK	50941 + 58712	not applicable	not applicable
MS51	Mouth Simulator	G.R.A.S	44AA	52222	not applicable	not applicable
TS51	TEMSEL	KYORITSU	KTC-5055	8S-688-6	not applicable	not applicable

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.