TEST REPORT

For

Cellular phone

In conformity with

FCC CFR 47 Part15C (Bluetooth)

Model: CDMA TSI04

FCC ID: YUW-TSI04

Test Item: Cellular phone

Report No: RY1101Z24R1

Issue Date: 24 January, 2011

Prepared for

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Prepared by

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History

Report No.	Date	Revisions	Issued By
RY1101Z24R1	24 January, 2011	Initial Issue	K. Ohnishi

1 General information

1.1 Product description

Test item	: Cellular phone
Manufacturer	: Fujitsu Toshiba Mobile Communications Limited
Address	: 1-1, Kamikodanaka 4, Nakahara, Kawasaki, 211-8588, Japan
Model	: CDMA TSI04
FCC ID	: YUW-TSI04
Serial numbers	: STSGX000780 02 (For radiated test)
	: STSGX000787 59 (For conducted test)
	: No. 1015 (For conducted test)
Frequency range	: Tx/Rx Freq. (2402 - 2480MHz)
Oscillator frequencies	: 32 KHz, 19.2 MHz
Type of Modulation	: Basic Rate: GFSK, EDR: π/4DQPSK, 8DPSK
RF Output Power	: 7.04dBm (measured at the antenna terminal)
Antenna Gain	: 1.15 dBi (Internal, Chip Antenna)
Receipt date of EUT	: 21 January, 2011
Nominal power source voltages	: DC 3.7V (Battery)

1.2 Test(s) performed/ Summary of test result

Test specification(s)	: FCC CFR 47. Part 15 (October 1, 2009)
Test method(s)	: ANSI C63.4: 2003
Test(s) started	: 22 January, 2011
Test(s) completed	: 24 January, 2011
Purpose of test(s)	: Grant for Certification of FCC
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 : K.Ohnishi
K.Ohnishi
EMC testing Department

Reviewer : T. Ikegami
T. Ikegami
Manager
EMC testing Department

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 1, 2009.
The description of the test facilities has been filed under registration number 319924 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 (Semi-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 (Semi-Anechoic chamber 3m): 6974A-1

Accredited by **National Voluntary Laboratory Accreditation Program** (NVLAP) for the emission tests stated in the scope of the certificate under Certificate Number 200780-0

This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

NVLAP LAB CODE 200780-0

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;

RF Conducted level: +/- 0.88dB
Conducted emission: +/- 1.87dB (10 kHz – 30 MHz)
Radiated emission (9 kHz - 30 MHz): +/- 2.79dB
Radiated emission (30 MHz - 300 MHz): +/- 5.69dB
Radiated emission (300 MHz - 1000 MHz): +/- 5.52dB
Radiated emission (1GHz - 18GHz): +/- 5.77dB
Radiated emission (18GHz - 26GHz): +/- 5.89dB

1.5 Summary of test results

1.5.1 Table of test summary

Requirement of;	Section in FCC15	Result	Sample	Section in this report
1.5.1 Peak Output Power	15.247(a)(1)/(b)(1)	Complied	A2, A3	2.1
1.5.2 Transmitter Radiated Spurious Emissions	15.205(b)/15.209	Complied	A1	2.2

1.6 Setup of equipment under test (EUT)

1.6.1 Test configuration of EUT

Equipment(s) under test:

	Item	Brand	Model No.	Serial No.	Remarks
A1	Cellular phone	FTML	CDMA TSI04	STSGX000780 02	For radiated test
A2	Cellular phone	FTML	CDMA TSI04	STSGX000787 59	For conducted test
A3	Cellular phone	FTML	CDMA TSI04	No. 1015	For conducted test
B	Li-ion Battery Pack	FTML	TSI04UAA	-	3.7V, 1300mAh

Support Equipment(s):

	Item	Manufacturer	Model No.	Serial No.
C	AC Adapter	KYUSYU MITSUMI	HS-ZGA	-

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	KYUSYU MITSUMI	No	No	No	1.5

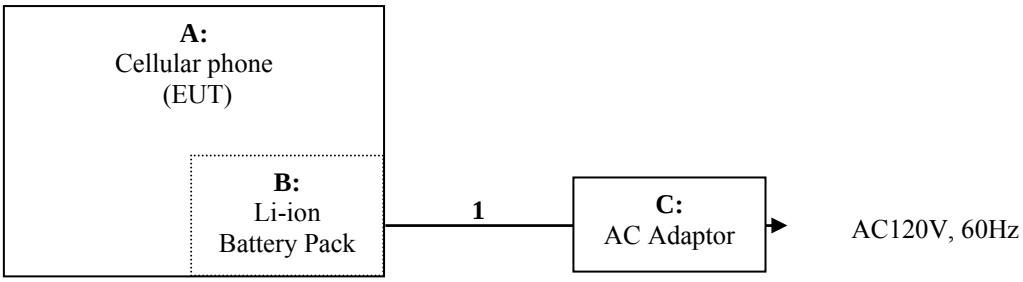
1.6.2 Operating condition:

Operating mode:

The EUT was tested under the following test mode prepared by the applicant:

(1-1) GFSK modulation, Continuous transmission with DH5 PACKET at hopping off (2402MHz)
(1-2) GFSK modulation, Continuous transmission with DH5 PACKET at hopping off (2441MHz)
(1-3) GFSK modulation, Continuous transmission with DH5 PACKET at hopping off (2480MHz)
(1-4) π/4DQPSK modulation, Continuous transmission with DH5 PACKET at hopping off (2402MHz)
(1-5) π/4DQPSK modulation, Continuous transmission with DH5 PACKET at hopping off (2441MHz)
(1-6) π/4DQPSK modulation, Continuous transmission with DH5 PACKET at hopping off (2480MHz)
(1-7) 8DPSK modulation, Continuous transmission with DH5 PACKET at hopping off (2402MHz)
(1-8) 8DPSK modulation, Continuous transmission with DH5 PACKET at hopping off (2441MHz)
(1-9) 8DPSK modulation, Continuous transmission with DH5 PACKET at hopping off (2480MHz)

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.

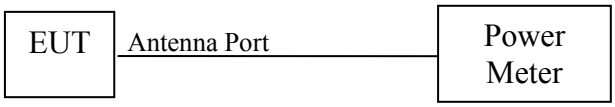
1.8 Deviation from the standard

No deviations from the standards described in clause 1.2.

2 Test procedure and test data

2.1 Peak Output Power

Test setup
Test setup is the following drawing. The antenna port of EUT was connected to the spectrum analyzer.



Test procedure
The EUT antenna port connected to the spectrum analyzer. The RBW is set to the greater than 20dB bandwidth. The VBW is set to three times of RBW. The sweep time is coupled appropriate. The span is set to cover the carrier output spectrum. The analyzer is set to MAX HOLD. The EUT is set measured transmission channel under hopping off mode.

Limitation
15.247(a) (1) Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW(21dBm).

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

PM05	PU05				

Test results – comply with the limitation.

Test Data

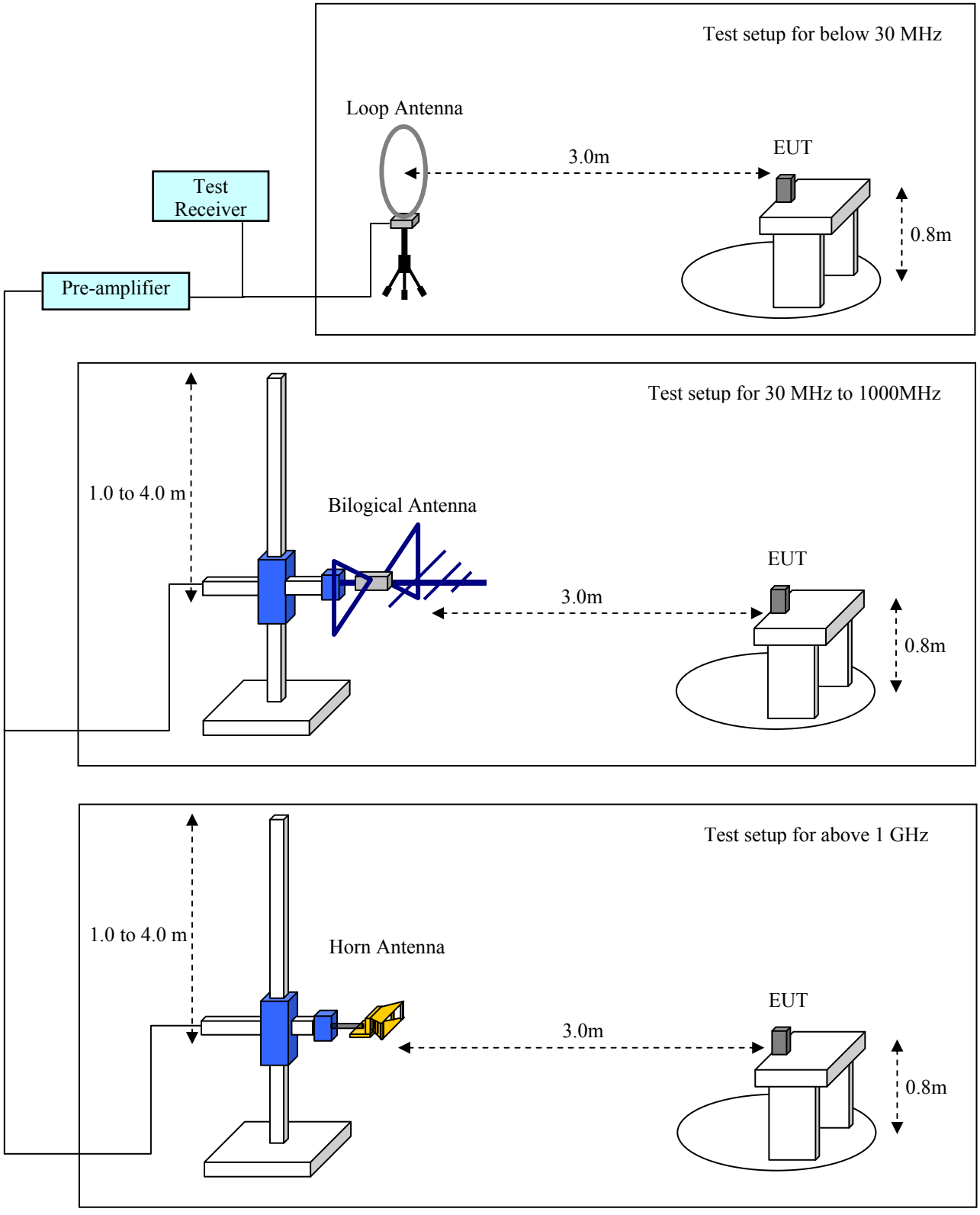
Tested Date: 24 January, 2011

Temperature: 18 ˚C
Humidity: 34 %
Atmos. Press: 1014 hPa

Operating Mode	Transmission Channel (Frequency: MHz)	Output power (Sample: A3) [Before change] (dBm)	Output power (Sample: A2) [After change] (dBm)	Deviation (dB)
GFSK	Low (2402)	7.14	6.98	0.16
	Middle (2441)	7.05	**7.04**	0.01
	High (2480)	6.99	6.63	0.36
π/4DQPSK	Low (2402)	6.81	6.49	0.32
	Middle (2441)	6.82	6.43	0.39
	High (2480)	6.40	6.01	0.39
8DPSK	Low (2402)	6.48	6.19	0.29
	Middle (2441)	6.53	6.27	0.26
	High (2480)	6.14	5.89	0.25

2.2 Transmitter Radiated spurious 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”, 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.
In the frequency above 30 MHz, 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 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 with a receiver RBW of 9 kHz (QP)
Between 30 - 1000 MHz:	RBW=100 kHz, VBW= 300 kHz Final measurement is carried out with a receiver RBW of 120 kHz (QP)
Above 1000 MHz:	Peak measurement- RBW=1 MHz, VBW= 1 MHz Average measurement – RBW=1 MHz, VBW=10 Hz

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(a) 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
30 – 88	100	3
88 –216	150	3
216 – 960	200	3
Above 960	500	3

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.

Test results - Complied with requirement.

Test Data

2.2.1 Below 30 MHz

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

LP01	CL11	TR06	

Tested Date: 23 January, 2011

Temperature: 16 ˚C
Humidity: 25 %
Atmos. Press: 1020 hPa

Result

There is no spurious emission with levels of more than 20 dB below the applicable limit

2.2.2 Between 30 – 1000 MHz

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

BI01	LA01	CL11	BRF2	CL23	PR08	TR06

Tested Date: 23 January, 2011

Temperature: 16 ˚C
Humidity: 25 %
Atmos. Press: 1020 hPa

Operating mode: Continuous Communication (GFSK, 2402MHz: Worst configuration)
EUT position: X-plane (Maximum position)
Measurement distance: 3 m

No.	Frequency [MHz]	Reading [dBuV]	Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Antenna Polarization
1	**41.304**	**49.8**	**14.6**	**7.0**	**49.9**	**21.5**	**40.0**	**18.5**	**Vert.**
2	44.779	47.9	13.3	7.0	49.9	18.3	40.0	21.7	Vert.

Calculation method

The Correction Factors and RESULT are calculated as followings.

Correction Factor [dB/m] = FACTOR [dB/m] + LOSS [dB] – GAIN [dB]

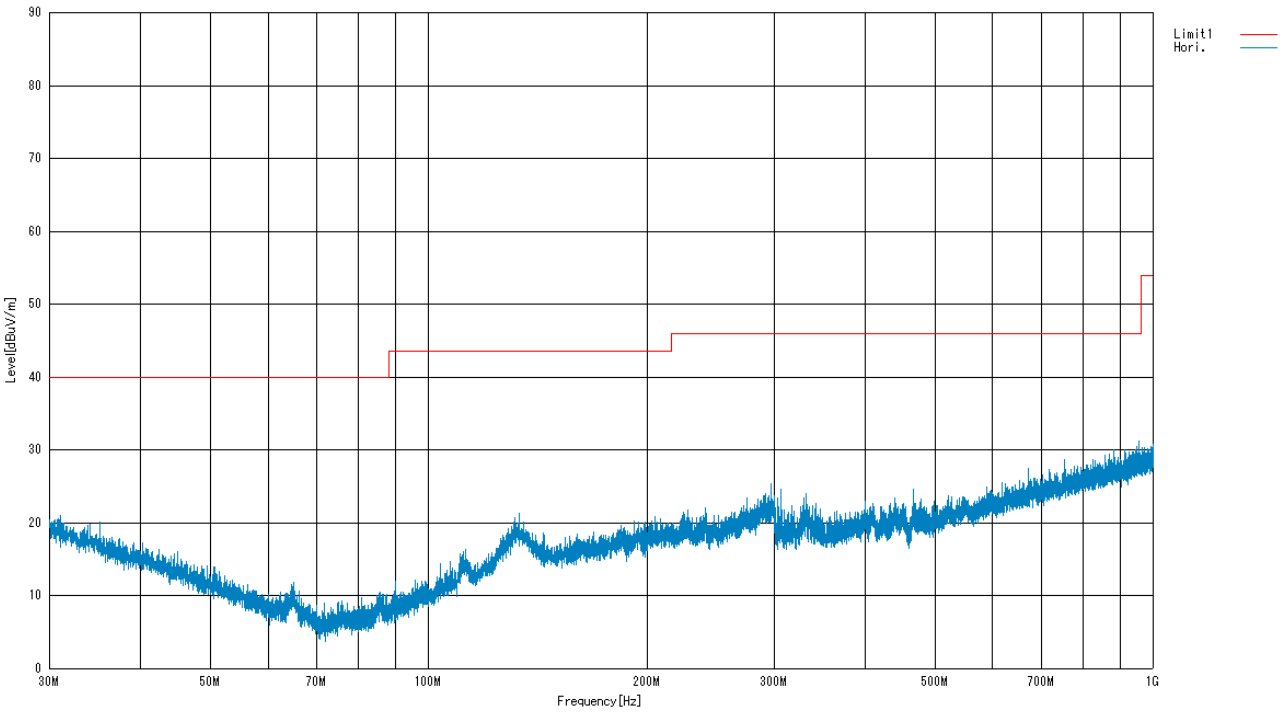
RESULT [dBuV/m] =READING [dBuV] + Correction Factor [dB/m]

Sample calculation at 41.304 MHz vertical result as follow:

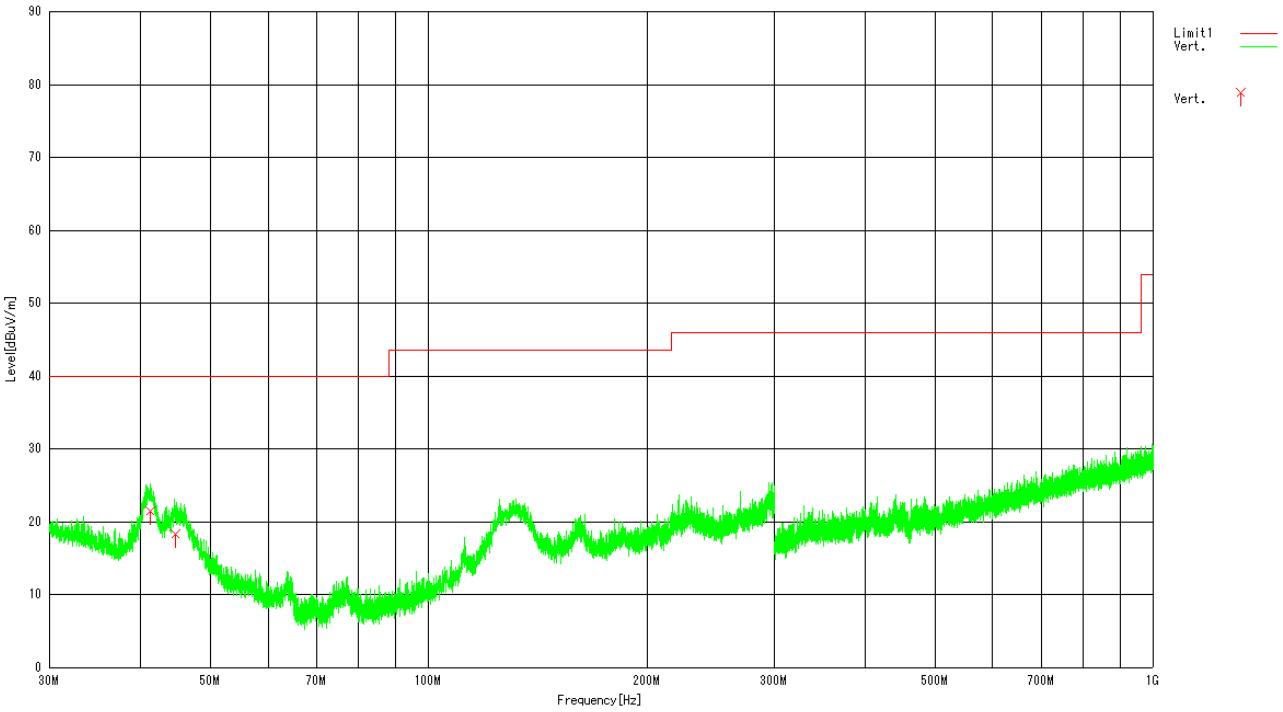
Result [dBuV/m] = Reading + C.F = 49.8 + 14.6 + 7.0 - 49.9 = 21.5
Margin = Limit – Result = 40.0 – 21.5 = 18.5 [dB]

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

Antenna polarization: Horizontal



Antenna polarization: Vertical



2.2.3 Above 1000 MHz

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

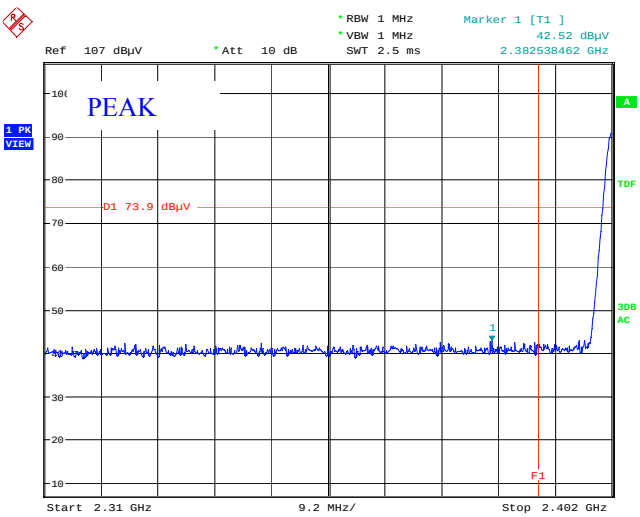
PR11	SH01	TR06	CL23	CL24	HPF1	DH01	AC01

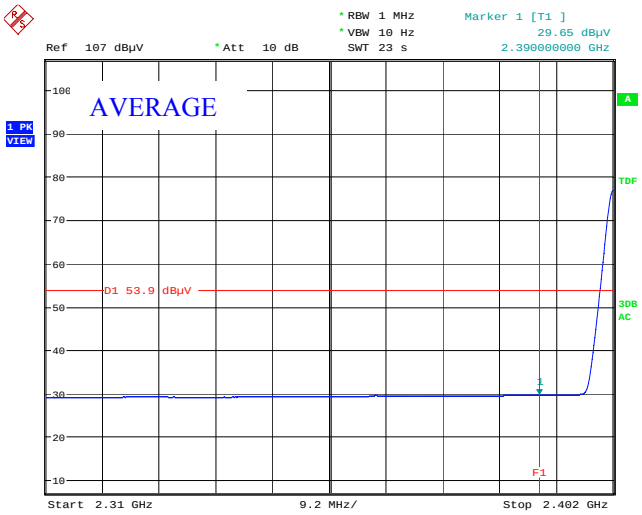
Tested Date: 22 January, 2011

Temperature: 15 ˚C
Humidity: 26 %
Atmos. Press: 1016 hPa

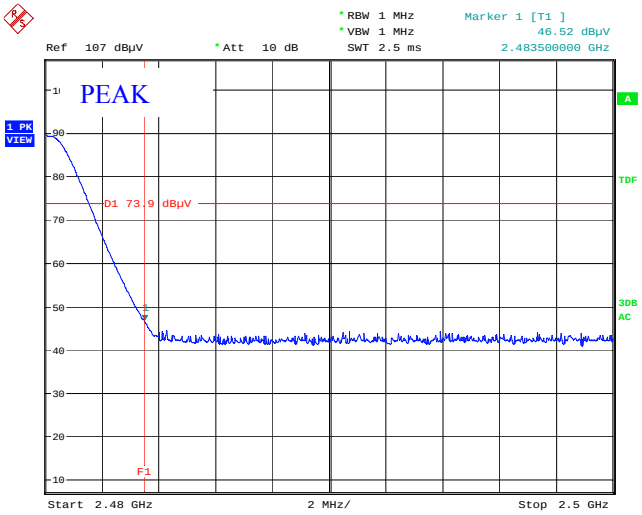
Restricted Band Edge (Worst Configuration)

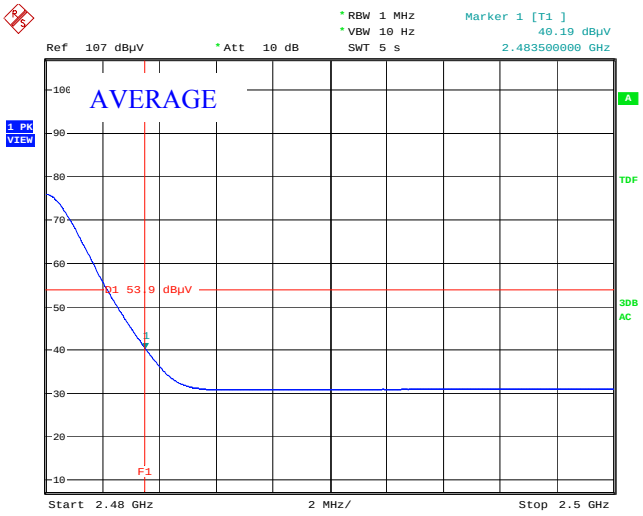
Low channel (GFSK, X-plane, Horizontal)





High channel (GFSK, X-plane, Horizontal)





Harmonics and Spurious Emission above 1000 MHz (Worst configuration)

Tested Date: 23 January, 2011

Temperature: 16 ˚C
Humidity: 25 %
Atmos. Press: 1020 hPa

Operating mode: Continuous Communication (GFSK, 2480MHz: Worst configuration)
EUT position: Y-plane (Maximum position)
Measurement distance: 3 m

There are no spurious emissions other than listed below;

No.	Frequency [MHz]	Reading		C.F. [dB]	Result		Limit		Margin		Polarization
		Peak [dBuV]	Ave [dBuV]		Peak [dBuV]	Ave [dBuV]	Peak [dBuV]	Ave [dBuV]	Peak [dB]	Ave [dB]	
1	4960.000	46.6	37.8	4.3	50.9	42.1	73.9	53.9	23.0	11.8	Hori.
2	**4960.000**	49.0	**40.9**	**4.3**	53.3	**45.2**	73.9	**53.9**	20.6	**8.7**	**Vert.**

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(EM)	Anechoic Chamber (1st test room)	JSE	203397C	-	2010/04/10	2011/04/30
AC01(EG)	Anechoic Chamber (1st test room)	JSE	203397C	-	2010/11/13	2011/11/30
AT33	Attenuator 10dB 26GHz	INMET	26A-10	FT2075	2010/07/14	2011/07/31
BI01	Biconical Antenna	SCHWARZBECK	VHA9103 & BBA9106	2359	2010/07/21	2011/07/31
BRF2	Band Reject Filter (Bluetooth)	MICRO TRONICS	BRM50701	024	2010/04/22	2011/04/30
CL11	Antenna Cable for RE	RFT	-	-	2010/05/24	2011/05/31
CL23	RF Cable 0.5m	SUCOFLEX	SF104PE	48773/4PE	2010/06/15	2011/06/30
CL24	RF Cable 5.0m	SUCOFLEX	SF104PE	48775/4PE	2010/06/15	2011/06/30
DH01	DRG Horn Antenna	A.H. Systems	SAS-571	785	2010/01/20	2012/01/31
HPF1	High Pass Filter (3500MHz)	TOKIMEC	TF323DCA	603	2010/06/15	2011/06/30
LA01	Logperiodic Antenna	SCHWARZBECK	USLP 9143	338	2010/07/21	2011/07/31
PM05	Power Meter	Anritsu	ML2487A	6K00004724	2010/09/13	2011/09/30
PR08	Pre. Amplifier	Sonoma Instrument	315	263504	2010/01/25	2011/01/31
PR11	Pre. Amplifier (0.1-25G)	RFT	AFS42-00102650	1413028	2010/01/21	2011/01/31
PU05	Power Sensor (Peak/Ave)	Anritsu	MA2475D	011720	2010/09/13	2011/09/30
SH01	Standard Horn Antenna (18-26G)	A.H. Systems	SAS-572	208	2010/07/13	2012/07/31
TR06	Test Receiver (F/W : 3.93 SP2)	Rohde & Schwarz	ESU26	100002	2010/09/02	2011/09/30

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.