

TEST REPORT

For

Digital Portable Cellular Telephone (RFID)

In conformity with

FCC CFR 47 Part15 Subpart C

Model : KMP7R4H1-4A

FCC ID : A98-EKO8545

Test Item : RFID

Report No. : RY1212P20R2

Issue Date : 20 Dec. 2012

Prepared for

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History

Report No.	Date	Revisions	Issued By
RY1212P06R1	06 Dec. 2012	Initial Issue	T.Kato
RY1212P10R2	10 Dec. 2012	Correct the client name and address (Top page) Correct the manufacturer name and address (Sec. 1.1)	T.Kato
RY1212P20R2	20 Dec. 2012	Correct the comment for RFID operation in connecting to AC charger (Sec. 1.5)	T.Kato

1 General information

1.1 Product description

Test item	: Digital Portable Cellular Telephone
Manufacturer	: NEC CASIO Mobile Communications, Ltd.
Address	: 1753, Shimonumabe, Nakahara-Ku, Kawasaki, Kanagawa 211-8666, Japan
Model	: KMP7R4H1-4A
FCC ID	: A98-EKO8545
Serial number	: 004401201080195
Software version	: A0000700
Hardware version	: BA-1
Transmitting Frequency	: 13.56 MHz
Type of Modulation	: ASK
Operating temperature range	: -10 to +55 degC (Manufacturer declaration)
Receipt date of EUT	: 19 Nov. 2012
Nominal power source voltages	: 3.8 Vdc (Li-ion Battery)
Antenna Type	: Integral

1.2 Test(s) performed/ Summary of test result


Test specification(s)	: FCC CFR 47. Part 15 (01 Oct. 2010)
Test method(s)	: ANSI C63.4: 2003
Test(s) started	: 22 Nov. 2012
Test(s) completed	: 03 Dec. 2012
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

: 
T. Kato
EMC testing Department

Reviewer

: 
K. Ohnishi
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, 2010.

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 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: 2011 “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: ± 3.4 dB (10 kHz - 30 MHz)

Radiated emission (9 kHz - 30 MHz): ± 2.9 dB

Radiated emission (30 MHz - 200 MHz): ± 5.0 dB

Radiated emission (200 MHz - 1000 MHz): ± 6.2 dB

1.5 Summary of test results

Requirement	Section in FCC15	Result	Section in this report
1.5.1 Occupied bandwidth	-	-	2.1
1.5.2 Transmitter radiated emissions (9 kHz to 30 MHz)	15.225 (a),(b),(c),(d)	Complied	2.2.1
1.5.3 Transmitter radiated emissions (30 to 1000 MHz)	15.209	Complied	2.2.2
1.5.4 Carrier frequency stability	15.225 (e)	Complied	2.3
1.5.5 Transmitter AC power line conducted emissions	15.207	N/A (*)	2.4

The field strength of spurious emission was measured in three orthogonal EUT positions(X, Y and Z - plane).

- (*) RFID function of the device is disabled when the AC Charger is connected and charging the device. AC Line conducted tests are therefore not needed for this mode as it is not operational and AC Line Conducted is covered by other testing.

1.6 Setup of equipment under test (EUT)

1.6.1 Test configuration of EUT

Equipment(s) under test

	Item	Manufacture	Model No.	Serial No.
A	Digital Portable Cellular Telephone	NEC CASIO Mobile Communications, Ltd.	KMP7R4H1-4A	IMEI 004401201080195
B	Battery Pack	NEC CASIO Mobile Communications, Ltd.	N36	-

Support Equipment(s)

	Item	Manufacture	Model No.	Serial No.	Remark
-	-	-	-	-	-
-	-	-	-	-	-

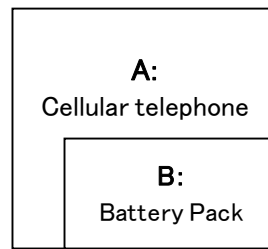
Connected cable(s)

No.	Item	Identification (Manu.e.t.c)	Cable Shielded	Ferrite Core	Connector Shielded	Length [m]
-	-	-	-	-	-	-
-	-	-	-	-	-	-

1.6.2 Operating condition:

Operating mode: Continuous transmission

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

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.

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 is no limitation. The measurement value is used to calculate the emission designator.

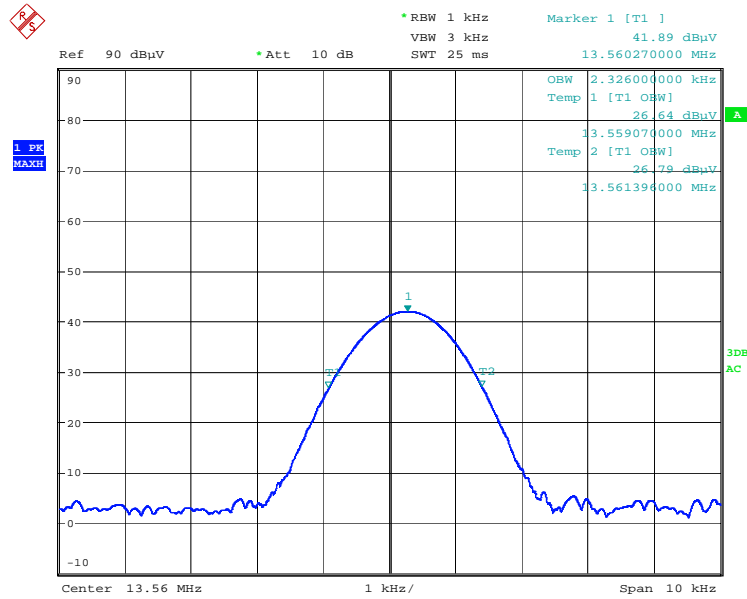
Test equipment used (refer to List of utilized test equipment)

TR06	LP04	CL11	
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Test results – Reporting purpose.

Frequency [MHz]	Occupied Bandwidth [kHz]
13.560270	2.326

Test Data



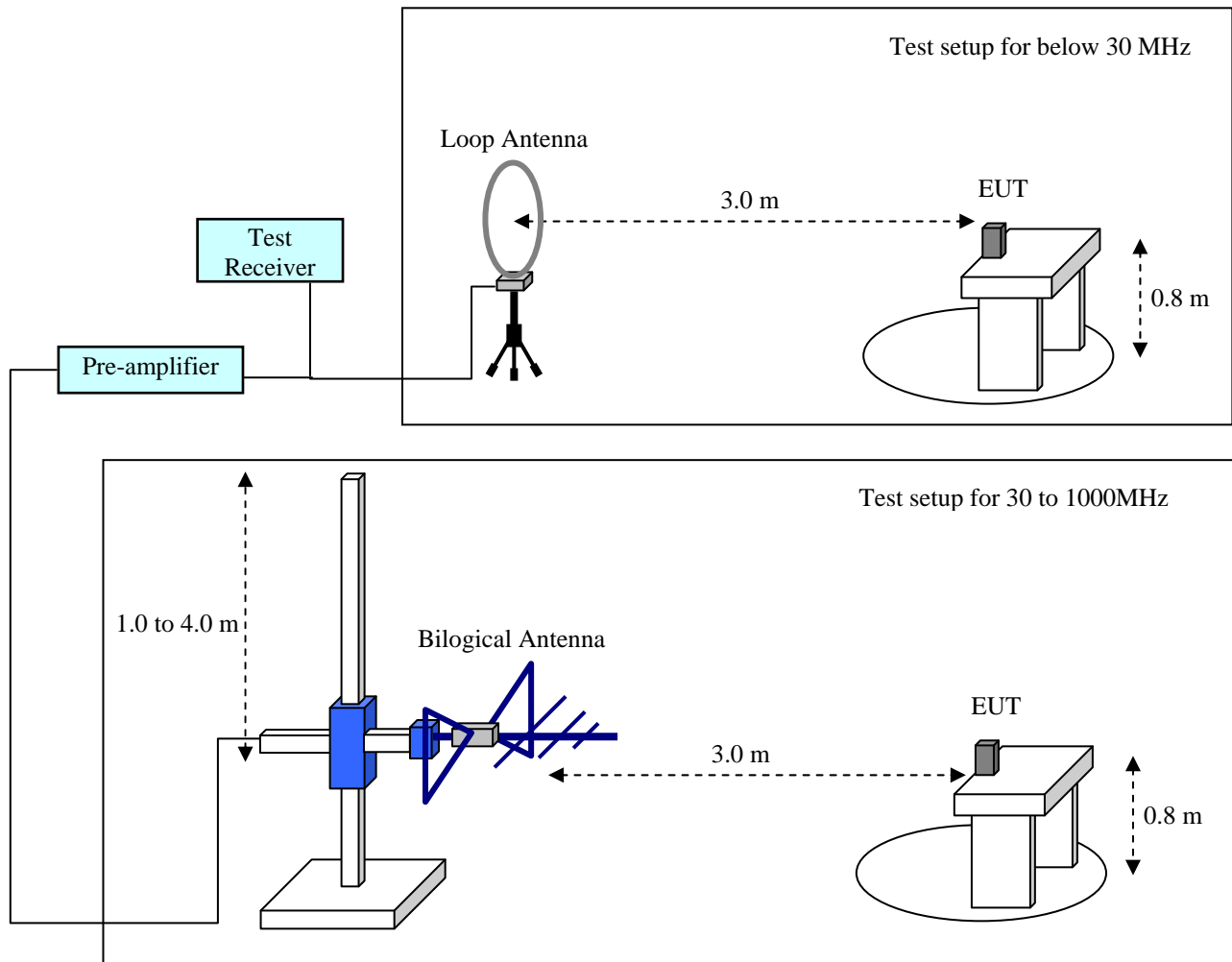
Tested Date: 22 Nov. 2012
Humidity: 35 %

Temperature: 18 degC
Atmos. Press: 1018 hPa

2.2 Transmitter Radiated 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 placed 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 are 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)

Applicable rule and limitation

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 [μ V/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.

§15.225 Operation within the band 13.110 – 14.010 MHz

Frequency [MHz]	Field strength @30m [μ V/m]	Field strength @30m [dB μ V/m]	Field strength @3m [dB μ V/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

dB μ V/m = 20 x log (μ V/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 results - Complied with requirement.

2.2.1 Below 30 MHz

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

AC01	LP04	CL11	TR06
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Test Data

Tested Date: 22 Nov. 2012 Temperature: 18 degC
Humidity: 35% Atmos. Press: 1018 hPa

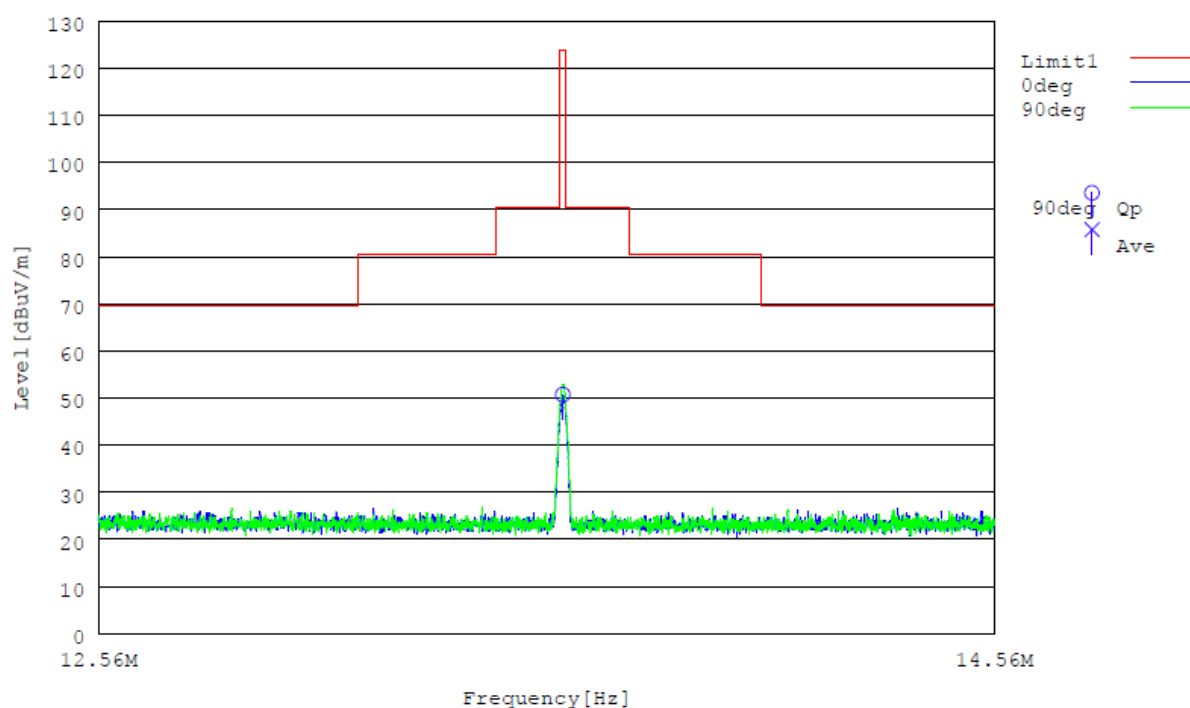
Operating mode: Continuous transmission
Measurement distance: 3 m

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

Freq. [MHz]	Reading @3m [dBμV]	Corr. Factor [dB]	Result [dBμV/m]	Limit @3m [dBμV/m]	Margin [dB]	Axis
13.56	39.6	11.1	50.7	124.0	73.3	Y

Correction Factor [dB] = Antenna Factor [dB/m] + Cable Loss [dB]

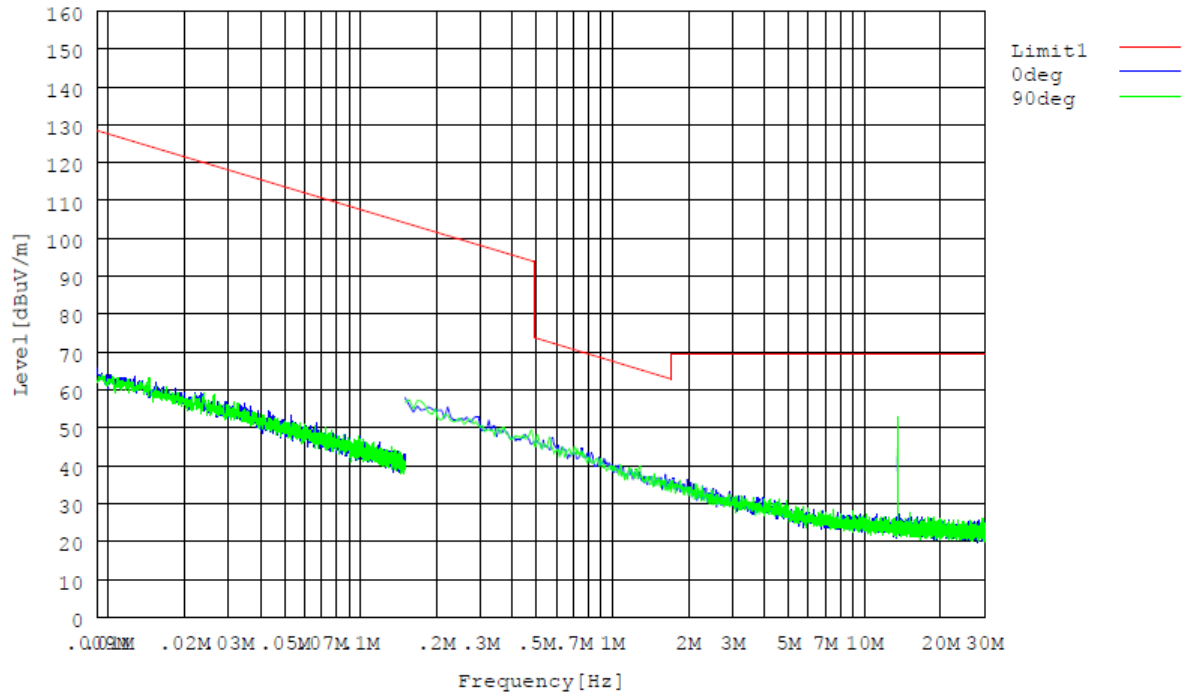
[Chart result : Y-plane (Worst)]



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

There was no spurious emission greater than noise floor or 20 dB below the limit.

[Chart result : Y-plane (Worst)]



Note : 13.56 MHz is a Tx carrier. This is not spurious emission from EUT.

2.2.2 Between 30 – 1000 MHz

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

AC01	BI01	LA05	CL11	PR15	Tr06	
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Test Data

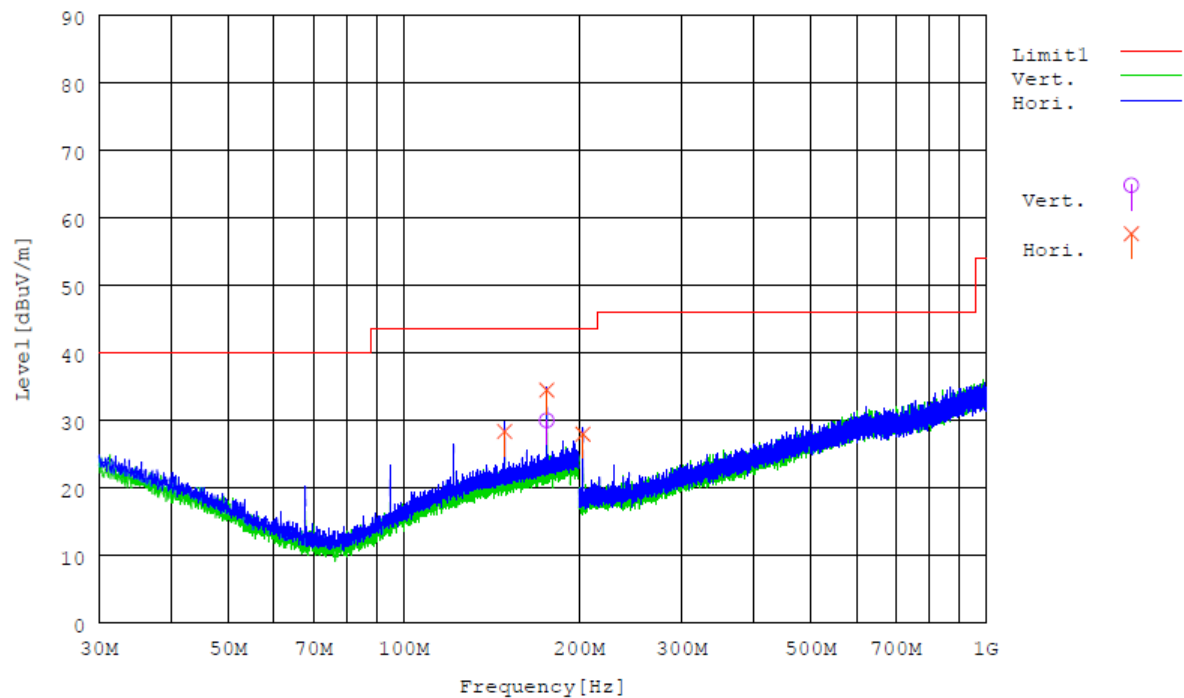
Tested Date: 22 Nov. 2012 Temperature: 18 degC
Humidity: 35% Atmos. Press: 1018 hPa

Operating mode: Continuous transmission
Measurement distance: 3 m

Spurious level (worst data in each spurious frequency)

Frequency [MHz]	Reading [dBμV]	Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Ant Polar.	Axis
40.680	33.9	14.8	7.1	30.3	25.5	40.0	14.5	Vert.	Z
149.160	35.2	14.6	8.5	30.0	28.3	43.5	15.2	Hori.	X
176.280	39.6	16.0	8.8	30.0	34.4	43.5	9.1	Hori.	X
203.400	37.6	11.3	9.0	30.0	27.9	43.5	15.6	Hori.	X

[Chart result : X-plane (Worst)]



2.3 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 variation	-20 to +50 degC	± 0.01 %
Voltage variation	120 Vac ± 15 %	± 0.01 %

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

TR09	TC01	LP51	
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Test results - Complied with requirement.

Test Data

Tested Date: 03 Dec. 2012

Temperature: - degC

Humidity: - %

Atmos. Press: 1021 hPa

Operating Mode: Continuous transmission

Temp. [degC]	Volt. [V]	Measured Frequency [MHz]				Worst Deviation [%]	Limit [%]
		Start-up	2 min.	5 min.	10 min.		
50	-	13.560231	13.560229	13.560230	13.560231	+0.0017	+/-0.01
40	-	13.560249	13.560239	13.560236	13.560232	+0.0018	+/-0.01
30	-	13.560277	13.560263	13.560256	13.560251	+0.0020	+/-0.01
20	-	-	-	-	-	-	+/-0.01
	-	13.560307	13.560295	13.560288	13.560280	+0.0023	+/-0.01
10	-	13.560330	13.560325	13.560322	13.560315	+0.0024	+/-0.01
0	-	13.560340	13.560338	13.560336	13.560332	+0.0025	+/-0.01
-10	-	13.560328	13.560332	13.560335	13.560338	+0.0025	+/-0.01
-20 (*)	-	-	-	-	-	-	+/-0.01

Note : Voltage condition is not changed for this test (full charged battery is used) since the EUT is battery operated equipment.

(*) : Test is not applied under -20 degC condition since operating temperature range of the EUT is -10 to +55 degC.

2.4 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 greater 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 [dBμV]	
	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)

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Test results - *This item was not tested.*

Test Data

Tested Date: - Temperature: - degC
Humidity: - % Atmos. Press: - hPa

Operating Mode: -

No.	Frequency [MHz]	Reading		C.F. [dB]	Result		Limit		Phase
		QP [dBμV]	AV [dBμV]		QP [dBμV]	AV [dBμV]	QP [dBμV]	AV [dBμV]	
-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-

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	-	2012/4/21	2013/4/30
BI01	Biconical Antenna	SCHWARZBECK	VHA9103 & BBA9106	2359	2012/3/12	2013/3/31
CL11	Antenna Cable for RE	RFT	-	-	2012/10/1	2013/10/31
LA05	Logperiodic Antenna	SCHWARZBECK	VUSLP9111B	070	2012/3/12	2013/3/31
LP04	Loop Antenna	EMCO	6502	00058682	2012/10/23	2013/10/31
PR15	Pre. Amplifier	Anritsu	MH648A	6201156141	2012/6/27	2013/6/30
TR06	Test Receiver (F/W : 3.93 SP2)	Rohde & Schwarz	ESU26	100002	2012/9/27	2013/9/30
TR09	Test Receiver (F/W : 4.43 SP3)	Rohde & Schwarz	ESU8	100386	2012/1/10	2013/1/31
TC01	Temperature Chamber	ESPEC	SH-641	92000964	2012/11/19	2013/11/30
LP51	Test Loop Antenna	Panasonic	VQ-085C	0Q2861A122	2012/10/31	2013/10/31

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.