



RADIO TEST REPORT

Test Report No. : 4786001719H-E

Applicant : NEC Corporation of America
Type of Equipment : Digital Portable Cellular Telephone
Model No. : KMP7R4H1-6A
FCC ID : A98-FQM6833
Test regulation : FCC Part 15 Subpart C: 2012
Test Result : Complied

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the above regulation.
4. The test results in this report are traceable to the national or international standards.
5. 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: December 11 to 18, 2012

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.
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<http://www.ul.com/japan/jpn/pages/services/emc/about/mark1/index.jsp#nvlap>

REVISION HISTORY

Original Test Report No.: 4786001719H-E

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SECTION 1: Customer information

Company Name : NEC Corporation of America
Address : Radio Communications Systems Division 6535N. State Highway 161,
Irving, TX 75039-2402 USA
Telephone Number : +1 214 262 4241
Facsimile Number : +1 214 262 4225
Contact Person : Sanjay Wadhwa

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

2.1 Identification of E.U.T.

Type of Equipment : Digital Portable Cellular Telephone
Model No. : KMP7R4H1-6A
Serial No. : Refer to Section 4, Clause 4.2
Rating : DC 3.8V (DC 3.4 - 4.2V)
Receipt Date of Sample : December 10, 2012
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: KMP7R4H1-6A, (referred to as the EUT in this report), is the Digital Portable Cellular Telephone.

Radio Specification [1/2]

Bluetooth (Ver.2.1 + EDR)

Equipment Type	Transceiver
Frequency of Operation	2402-2480MHz
Type of Modulation	FHSS
Bandwidth & Channel spacing	1MHz & 1MHz
Antenna Connector Type	Integrated antenna
Antenna Type	Pattern Antenna
Antenna Gain	-3.0 dBi

Low Energy (Ver.4.0)

Equipment Type	Transceiver
Frequency of Operation	2402-2480MHz
Bandwidth & Channel spacing	1MHz & 2MHz
Antenna Connector Type	Integrated antenna
Antenna Type	Pattern antenna
Antenna Gain	-3.0 dBi

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

Equipment Type	Transceiver
Frequency of Operation	2412-2462MHz
Type of Modulation	DSSS, OFDM
Antenna Connector Type	Integrated antenna
Antenna Type	Pattern antenna
Antenna Gain	-3.0 dBi

GSM

Equipment Type	Transceiver
Frequency of Operation	[Up Link] GSM850: 824 – 849MHz PCS: 1850 – 1910MHz [Down Link] GSM850: 869 – 894MHz PCS: 1930 – 1990MHz
Type of Modulation	GMSK
Emission Designator	GSM850: 254KGXW, PCS: 259KGXW
Channel spacing	200kHz
Antenna Connector Type	Integrated antenna
Antenna Type	Pattern antenna
Antenna Gain	+2.5dBi (PCS), 0.0dBi (GSM850)

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Radio Specification [2/2]

WCDMA

Equipment Type	Transceiver
Frequency of Operation	[Up Link] Band V: 824 – 849MHz [Down Link] Band V: 869 – 894MHz
Type of Modulation	HPSK
Emission Designator	4M16F9W
Channel spacing	5MHz
Antenna Connector Type	Integrated antenna
Antenna Type	Pattern antenna
Antenna Gain	0 dBi

GPS

Equipment Type	Receiver
Receiver Type	Direct Downconversion
Frequency of Operation	1575.42MHz
Antenna Connector Type	Integrated antenna
Antenna Type	Pattern antenna
Antenna Gain	-3.0dBi

*This test report applies for Low Energy (Ver.4.0).

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C: 2012, final revised on August 13, 2012 and effective September 12, 2012

Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
Section 15.207 Conducted limits
Section 15.247 Operation within the bands 902-928MHz,
2400-2483.5MHz, and 5725-5850MHz

3.2 Procedures and results

Item	Test Procedure	Specification	Worst margin	Results	Remarks
Conducted Emission	FCC: ANSI C63.4:2003 7. AC powerline Conducted Emission measurements ----- IC: RSS-Gen 7.2.4	FCC: Section 15.207 ----- IC: RSS-Gen 7.2.4	QP 9.0dB, 1.84525MHz, N AV 11.0dB, 1.84525MHz, N	Complied	-
6dB Bandwidth	FCC: "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247(issued on October 4, 2012)" ----- IC: RSS-Gen 4.6.2	FCC: Section 15.247(a)(2) ----- IC: RSS-210 A8.2(a)	See data.	Complied	Conducted
Maximum Peak Output Power	FCC: "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247(issued on October 4, 2012)" ----- IC: RSS-Gen 4.8	FCC: Section 15.247(b)(3) ----- IC: RSS-210 A8.4(4)		Complied	Conducted
Power Density	FCC: "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247(issued on October 4, 2012)" ----- IC: -	FCC: Section 15.247 (e) ----- IC: RSS-210 A8.2(b)		Complied	Conducted
Spurious Emission Restricted Band Edges	FCC: "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247(issued on October 4, 2012)" ----- IC: RSS-Gen 4.9	FCC: Section15.247(d) ----- IC: RSS-210 A8.5 RSS-Gen 7.2.3	6.1dB 204.799MHz, QP, Vertical	Complied	Conducted/ Radiated

Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422.

* In case any questions arise about test procedure, ANSI C63.4: 2003 is also referred.

FCC 15.31 (e)

This EUT provides stable voltage (DC1.3, 1.8, 3.0V) constantly to RF Part regardless of input voltage. Therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement

It is impossible for end users to replace the antenna, because the antenna is mounted inside of the EUT. Therefore, the equipment complies with the antenna requirement of Section 15.203.

3.3 Addition to standard

Item	Test Procedure	Specification	Worst margin	Results	Remarks
99% Occupied Bandwidth	IC: RSS-Gen 4.6.1	IC: RSS-Gen 4.6.1	N/A	-	Conducted

Other than above, no addition, exclusion nor deviation has been made from the standard.

3.4 Uncertainty

EMI

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

Test room (semi-anechoic chamber)	Conducted emission (+dB)
	150kHz-30MHz
No.1	3.5dB
No.2	3.6dB
No.3	3.6dB
No.4	3.6dB

Test room (semi-anechoic chamber)	Radiated emission						
	(3m*)(+dB)				(1m*)(+dB)		(0.5m*)(+dB)
	9kHz -30MHz	30MHz -300MHz	300MHz -1GHz	1GHz -10GHz	10GHz -18GHz	18GHz -26.5GHz	26.5GHz -40GHz
No.1	4.3dB	5.0dB	5.1dB	4.9dB	5.8dB	4.4dB	4.3dB
No.2	4.3dB	5.2dB	5.1dB	5.0dB	5.7dB	4.3dB	4.2dB
No.3	4.6dB	5.0dB	5.1dB	5.0dB	5.7dB	4.5dB	4.2dB
No.4	4.8dB	5.2dB	5.0dB	5.0dB	5.7dB	5.2dB	4.2dB

*3m/1m/0.5m = Measurement distance

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 test report has enough margin, more than the site margin.

3.5 Test Location

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	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.

3.6 Data of EMI, Test instruments, and Test set up

Refer to APPENDIX.

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

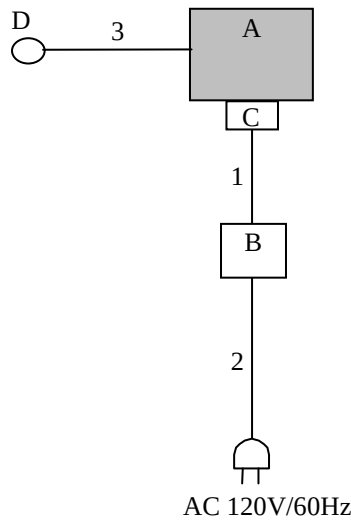
4.1 Operating Mode(s)

Bluetooth(BT) LE(Low Energy): Transmitting (Tx)

Details of Operating Mode(s)

Test Item	Operating Mode	Tested Frequency
Conducted Emission Spurious Emission 6dB Bandwidth Maximum Peak Output Power Power Density 99% Occupied Bandwidth	Tx BT LE	2402MHz 2440MHz 2480MHz
Power of the EUT was set by the software as follows: -Hardware Version: BA1 -Software Version: ESP_A0000420_N0000400 *This setting of software is the worst case. Any conditions under the normal use do not exceed the condition of setting. In addition, end users cannot change the settings of the output power of the product.		

4.2 Configuration and peripherals



* Cabling and setup(s) were 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	KMP7R4H1-6A	004401201130123 *1) 004401201130149 *2) 004401201130156 *3)	NEC Corporation of America	EUT
B	AC Adaptor	MAS-BH0008-A002	-	MITSUMI	-
C	Micro USB	FOMA charging microUSB adapter N01	-	NEC Corporation of America	-
D	Earphone	-	-	NEC Corporation of America	-

*1) Used for Antenna Terminal Conducted test

*2) Used for Radiated Emission tests(Above 1GHz)

*3) Used for Conducted Emission and Radiated Emission tests(Below 1GHz)

List of cables used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	DC Cable	1.6	Shielded	Shielded	-
2	AC Cable	0.6	Unshielded	Unshielded	-
3	Earphone Cable	0.7	Unshielded	Unshielded	-

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SECTION 5: Conducted Emission

Test Procedure and conditions

EUT was placed on a urethane platform of nominal size, 1.0m by 1.5m, raised 0.8m above the conducting ground plane.

The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT, including peripherals aligned and flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80cm from a Line Impedance Stabilization Network (LISN)/ Artificial mains Network (AMN) and excess AC cable was bundled in center.

For the tests on EUT with other peripherals (as a whole system)

I/O cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30cm to 40cm long and were hanged at a 40cm height to the ground plane. All unused 50ohm connectors of the LISN(AMN) were resistivity terminated in 50ohm when not connected to the measuring equipment.

The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT in a Semi Anechoic Chamber.

The EUT was connected to a LISN (AMN).

An overview sweep with peak detection has been performed.

The test results and limit are rounded off to one decimal place, so some differences might be observed.

Detector	: QP and AV
Measurement range	: 0.15-30MHz
Test data	: APPENDIX
Test result	: Pass

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SECTION 6: Radiated Spurious Emission

Test Procedure

It was measured based on "10.0 MAXIMUM UNWANTED EMISSION LEVELS" of "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under § 15.247 (Issued on October 4, 2012)".

EUT was placed on a urethane platform of nominal size, 0.5m by 1.0m, raised 0.8m above the conducting ground plane.

The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

The height of the measuring antenna varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field strength.

The measurements were performed for both vertical and horizontal antenna polarization with the Test Receiver, or the Spectrum Analyzer.

The measurements were made with the following detector function of the test receiver and the Spectrum analyzer (in linear mode).

The test was made with the detector (RBW/VBW) in the following table.

When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

Test Antennas are used as below;

Frequency	30MHz to 300MHz	300MHz to 1GHz	Above 1GHz
Antenna Type	Biconical	Logperiodic	Horn

In any 100kHz bandwidth outside the restricted band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator confirmed 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on a radiated measurement.

20dBc was applied to the frequency over the limit of FCC 15.209 / Table 5 of RSS-Gen 7.2.5(IC) and outside the restricted band of FCC15.205 / Table 3 of RSS-Gen 7.2.2 (IC).

Frequency	Below 1GHz	Above 1GHz		20dBc
Instrument used	Test Receiver	Spectrum Analyzer		Spectrum Analyzer
Detector	QP	PK	AV	PK
IF Bandwidth	BW 120kHz(T/R)	RBW: 1MHz VBW: 3MHz	Average Power Method: Alternative Method1 RBW: 1MHz VBW: 3MHz Trace: Free Run Detector: Power Averaging (RMS) Duty factor was added to the results.	RBW: 100kHz VBW: 300kHz (S/A)
Test Distance	3m	3m (below 10GHz), 1m*1) (above 10GHz)		3m (below 10GHz), 1m*2) (above 10GHz)

*1) Distance Factor: $20 \times \log(3.0\text{m}/1.0\text{m}) = 9.5\text{dB}$

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

The test results and limit are rounded off to one decimal place, so some differences might be observed.

Measurement range	: 30M-26.5GHz
Test data	: APPENDIX
Test result	: Pass

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SECTION 7: Antenna Terminal Conducted Tests

Test Procedure

The tests were made with below setting connected to the antenna port.

Test	Span	RBW	VBW	Sweep time	Detector	Trace	Instrument used
6dB Bandwidth	3MHz	30kHz	100kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99% Occupied Bandwidth	Enough width to display 20dB Bandwidth	1 to 3% of Span	Three times of RBW	Auto	Peak	Max Hold *1)	Spectrum Analyzer
Maximum Peak Output Power	-	-	-	Auto	Peak	-	Peak Power Meter (Sensor: 50MHz BW) Option 3
Peak Power Density	1.5 times the DTS Channel Bandwidth	3kHz	10kHz	Auto	Peak	Max Hold	Spectrum Analyzer *2)
Conducted Spurious Emission	9kHz to 150kHz	200Hz	620Hz	Auto	Peak	Max Hold	Spectrum Analyzer
	150kHz to 30MHz	9.1kHz	27kHz				

*1) The measurement was performed with Max Hold since the duty cycle was not 100%.
*2) PSD Option 1 of "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under §15.247 (Issued on October 4, 2012)".

The test results and limit are rounded off to two decimals place, so some differences might be observed.

Test data : APPENDIX
Test result : Pass

APPENDIX 1: Data of EMI test

Conducted Emission

DATA OF CONDUCTED EMISSION TEST

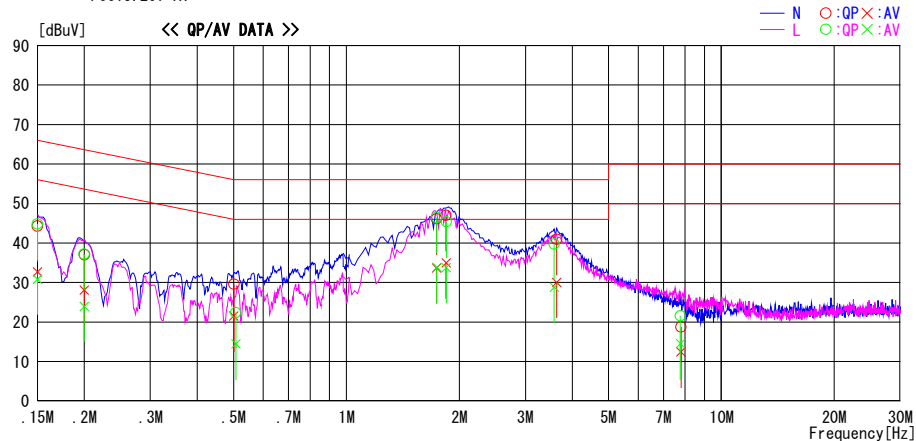
UL Japan, Inc. Head Office EMC Lab. No. 2 Semi Anechoic Chamber
Date : 2012/12/18

Report No. : 4786001719H

Temp./Humi. : 23deg. C / 31% RH
Engineer : Katsunori Okai

Mode / Remarks : Tx LE 2440MHz

LIMIT : FCC15.207 QP
FCC15.207 AV



Frequency [MHz]	Reading Level		Corr. Factor	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.15000	31.1	19.5	13.2	44.3	32.7	66.0	56.0	21.7	23.3	N	
0.20009	23.8	14.9	13.2	37.0	28.1	63.6	53.6	26.6	25.5	N	
0.50089	16.4	8.3	13.2	29.6	21.5	56.0	46.0	26.4	24.5	N	
1.74022	32.7	20.3	13.4	46.1	33.7	56.0	46.0	9.9	12.3	N	
1.84525	33.6	21.6	13.4	47.0	35.0	56.0	46.0	9.0	11.0	N	
3.63637	27.2	16.4	13.7	40.9	30.1	56.0	46.0	15.1	15.9	N	
7.80046	4.5	-1.8	14.2	18.7	12.4	60.0	50.0	41.3	37.6	N	
0.15000	31.6	17.7	13.2	44.8	30.9	66.0	56.0	21.2	25.1	L	
0.19994	24.0	10.8	13.2	37.2	24.0	63.6	53.6	26.4	29.6	L	
0.50729	9.2	1.2	13.2	22.4	14.4	56.0	46.0	33.6	31.6	L	
1.74183	33.1	20.5	13.4	46.5	33.9	56.0	46.0	9.5	12.1	L	
1.84634	32.0	20.4	13.4	45.4	33.8	56.0	46.0	10.6	12.2	L	
3.58462	26.1	15.2	13.6	39.7	28.8	56.0	46.0	16.3	17.2	L	
7.77756	7.4	0.3	14.2	21.6	14.5	60.0	50.0	38.4	35.5	L	

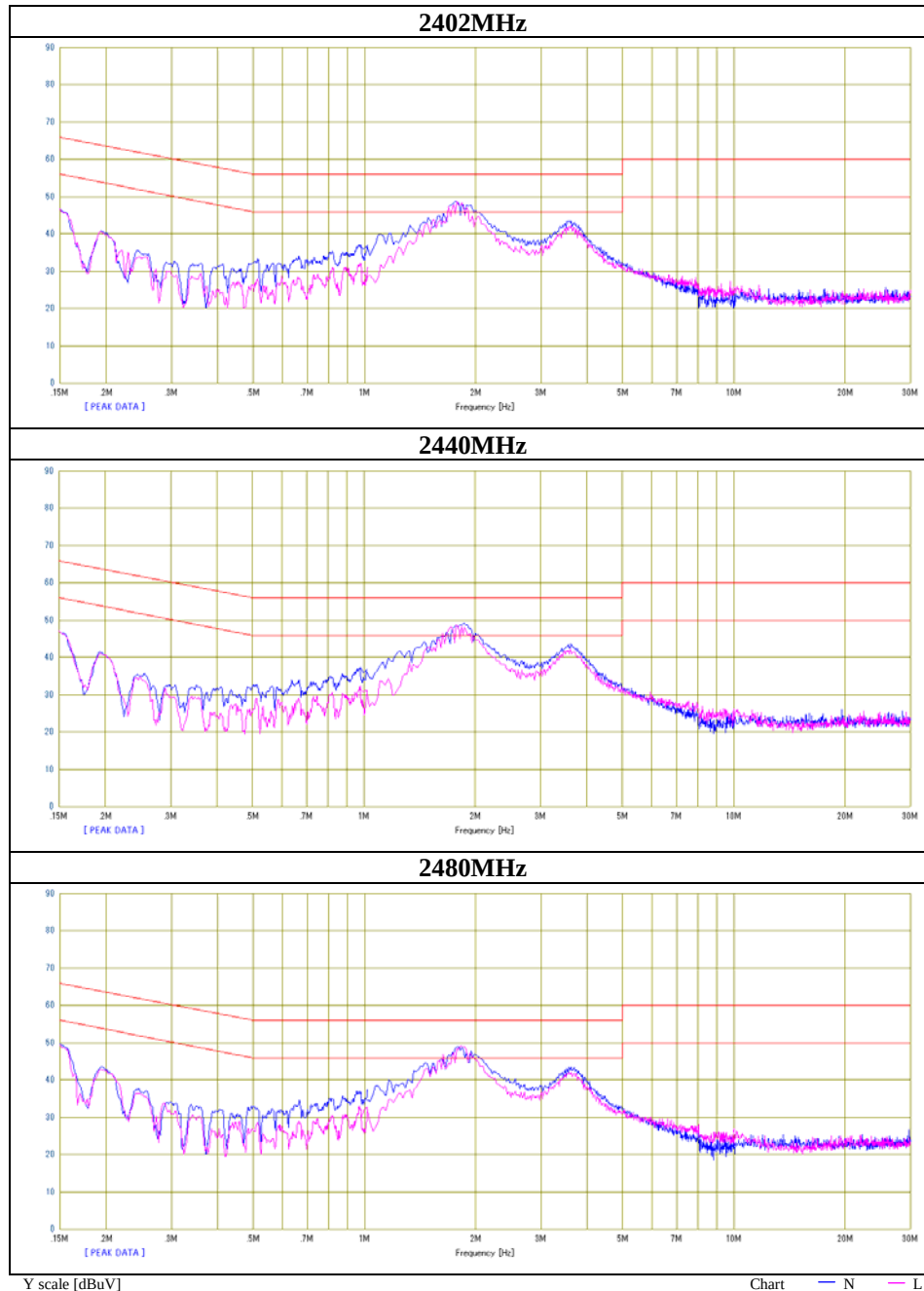
CHART:WITH FACTOR,Peak hold data. CALCULATION:RESULT=READING+C.F(LISN LOSS + ATTN LOSS + CABLE LOSS)
Except for the above table : adequate margin data below the limits.

*The limit is rounded down to one decimal place.

*The test result is rounded off to one or two decimal places, so some differences might be observed.

Conducted Emission

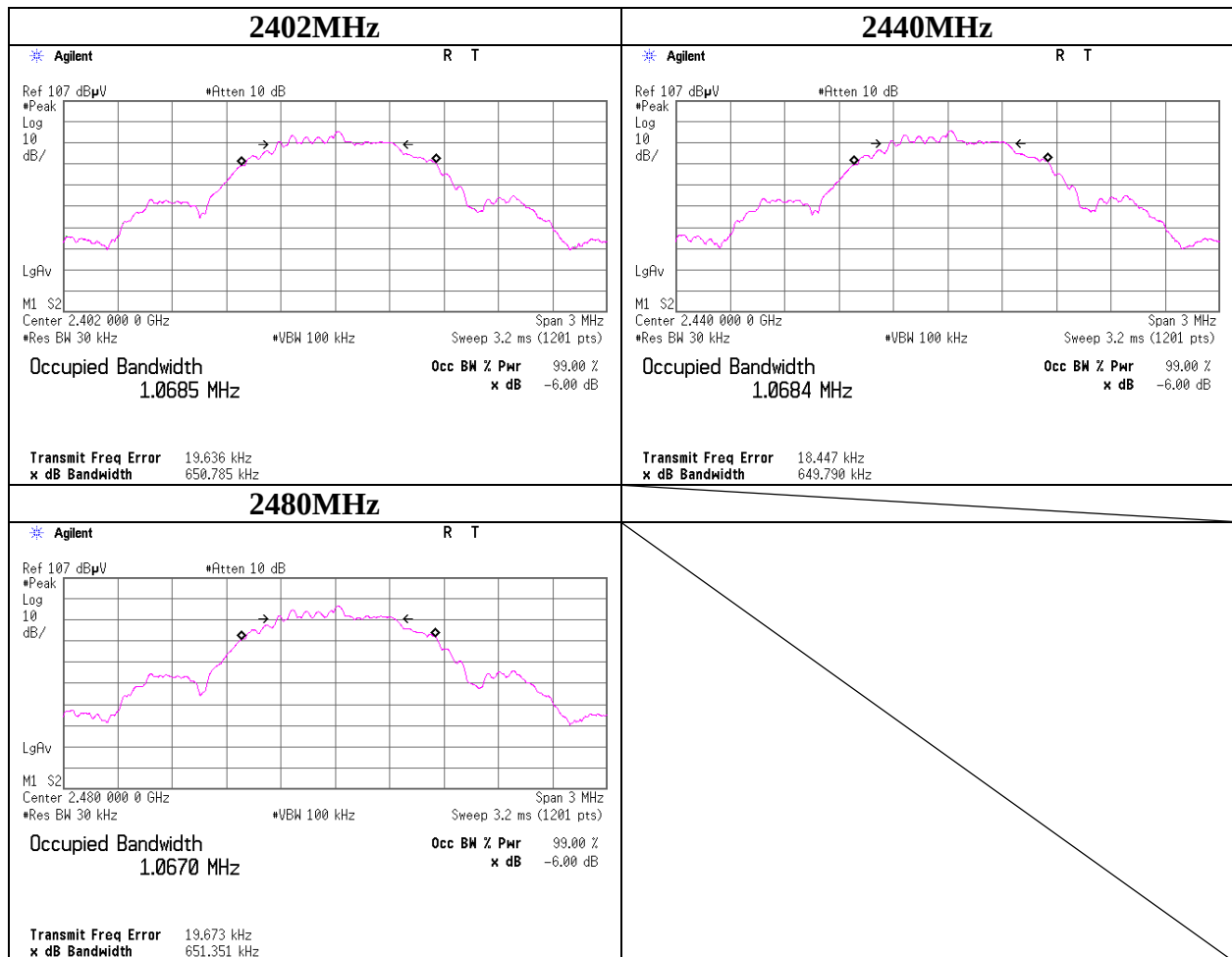
Test place	Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No.	4786001719H
Date	12/18/2012
Temperature/ Humidity	23 deg. C / 31% RH
Engineer	Katsunori Okai
Mode	Tx LE



6dB Bandwidth

Test place	Head Office EMC Lab. No.6 Measurement Room
Report No.	4786001719H
Date	12/12/2012
Temperature/ Humidity	22deg. C / 31% RH
Engineer	Takayuki Shimada
Mode	Tx LE

Frequency [MHz]	6dB Bandwidth [MHz]	Limit [kHz]
2402	0.651	>500
2440	0.650	>500
2480	0.651	>500



Maximum Peak Output Power

Test place Head Office EMC Lab. No.6 Measurement Room
Project No. 4786001719H
Date 12/17/2012
Temperature/ Humidity 23deg. C / 47% RH
Engineer Keisuke Kawamura
Mode Tx LE

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
				[dBm]	[mW]	[dBm]	[mW]	
2402	-9.44	0.64	10.03	1.23	1.33	30.00	1000	28.77
2440	-9.96	0.65	10.03	0.72	1.18	30.00	1000	29.28
2480	-9.85	0.65	10.03	0.83	1.21	30.00	1000	29.17

Sample Calculation:

Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator

Radiated Spurious Emission

Test place	Head Office EMC Lab. No.2 Semi Anechoic Chamber		
Report No.	4786001719H		
Date	12/11/2012	12/12/2012	12/17/2012
Temperature/ Humidity	23 deg. C / 31% RH	21 deg. C / 33% RH	22deg. C / 35% RH
Engineer	Keisuke Kawamura (1-10GHz)	Keisuke Kawamura (10-26.5GHz)	Katsunori Okai (Below 1GHz)
Mode	Tx LE 2402MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	44.803	QP	28.6	12.5	6.9	28.6	-	19.4	40.0	20.6	
Hori	108.801	QP	39.1	11.4	7.6	28.3	-	29.8	43.5	13.7	
Hori	131.201	QP	37.7	13.8	7.7	28.2	-	31.0	43.5	12.5	
Hori	140.799	QP	38.1	14.6	7.8	28.2	-	32.3	43.5	11.2	
Hori	182.398	QP	32.9	16.2	8.1	27.9	-	29.3	43.5	14.2	
Hori	310.398	QP	29.5	14.4	8.9	27.7	-	25.1	46.0	20.9	
Hori	2390.000	PK	45.6	27.4	2.4	34.8	-	40.6	73.9	33.3	
Hori	4804.000	PK	44.8	31.2	4.2	34.0	-	46.2	73.9	27.7	
Hori	7206.000	PK	43.0	35.9	4.9	34.2	-	49.6	73.9	24.3	
Hori	9608.000	PK	42.5	38.8	5.7	34.7	-	52.3	73.9	21.6	
Hori	2390.000	AV	35.5	27.4	2.4	34.8	-	30.5	53.9	23.4	
Hori	4804.000	AV	36.5	31.2	4.2	34.0	1.8	39.7	53.9	14.2	
Hori	7206.000	AV	35.0	35.9	4.9	34.2	1.8	43.4	53.9	10.5	
Hori	9608.000	AV	34.2	38.8	5.7	34.7	1.8	45.8	53.9	8.1	
Vert	44.802	QP	42.2	12.5	6.9	28.6	-	33.0	40.0	7.0	
Vert	108.801	QP	40.8	11.4	7.6	28.3	-	31.5	43.5	12.0	
Vert	163.199	QP	36.0	15.4	7.9	28.1	-	31.2	43.5	12.3	
Vert	201.599	QP	38.7	16.6	8.2	27.8	-	35.7	43.5	7.8	
Vert	204.799	QP	40.3	16.7	8.2	27.8	-	37.4	43.5	6.1	
Vert	310.399	QP	25.5	14.4	8.9	27.7	-	21.1	46.0	24.9	
Vert	2390.000	PK	44.4	27.4	2.4	34.8	-	39.4	73.9	34.5	
Vert	4804.000	PK	44.2	31.2	4.2	34.0	-	45.6	73.9	28.3	
Vert	7206.000	PK	41.9	35.9	4.9	34.2	-	48.5	73.9	25.4	
Vert	9608.000	PK	43.1	38.8	5.7	34.7	-	52.9	73.9	21.0	
Vert	2390.000	AV	35.6	27.4	2.4	34.8	-	30.6	53.9	23.3	
Vert	4804.000	AV	34.8	31.2	4.2	34.0	1.8	38.0	53.9	15.9	
Vert	7206.000	AV	34.2	35.9	4.9	34.2	1.8	42.6	53.9	11.3	
Vert	9608.000	AV	34.2	38.8	5.7	34.7	1.8	45.8	53.9	8.1	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier) + Duty Factor

* Spurious emissions listed with duty factor value in the above table have the synchronized duty cycle with carrier.

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB

Radiated Spurious Emission

Test place Head Office EMC Lab. No.2 Semi Anechoic Chamber
Report No. 4786001719H
Date 12/11/2012
Temperature/ Humidity 23 deg. C / 31% RH
Engineer Keisuke Kawamura
(1-10GHz)
Mode Tx LE 2402MHz

20dBc Data Sheet

Polarity	Frequency	Detector	Reading	Ant Factor	Loss	Gain	Result	Limit	Margin	Remark
	[MHz]		[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
Hori	2402.000	PK	96.6	27.5	2.4	34.8	91.7	-	-	Carrier
Hori	2400.000	PK	42.6	27.5	2.4	34.8	37.7	71.7	34.0	
Vert	2402.000	PK	93.4	27.5	2.4	34.8	88.5	-	-	Carrier
Vert	2400.000	PK	40.3	27.5	2.4	34.8	35.4	68.5	33.1	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)

Radiated Spurious Emission

Test place	Head Office EMC Lab. No.2 Semi Anechoic Chamber		
Report No.	4786001719H		
Date	12/11/2012	12/12/2012	12/17/2012
Temperature/ Humidity	23 deg. C / 31% RH	21 deg. C / 33% RH	22deg. C / 35% RH
Engineer	Keisuke Kawamura (1-10GHz)	Keisuke Kawamura (10-26.5GHz)	Katsunori Okai (Below 1GHz)
Mode	Tx LE 2440MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	44.801	QP	28.6	12.5	6.9	28.6	-	19.4	40.0	20.6	
Hori	108.799	QP	38.6	11.4	7.6	28.3	-	29.3	43.5	14.2	
Hori	147.199	QP	35.9	14.8	7.8	28.2	-	30.3	43.5	13.2	
Hori	179.199	QP	33.2	16.1	8.0	28.0	-	29.3	43.5	14.2	
Hori	191.999	QP	33.5	16.4	8.1	27.9	-	30.1	43.5	13.4	
Hori	367.999	QP	30.7	16.4	9.2	28.2	-	28.1	46.0	17.9	
Hori	4880.000	PK	43.2	31.4	4.2	34.0	-	44.8	73.9	29.1	
Hori	7320.000	PK	43.9	36.0	4.9	34.2	-	50.6	73.9	23.3	
Hori	9760.000	PK	42.5	38.9	5.7	34.7	-	52.4	73.9	21.5	
Hori	4880.000	AV	35.1	31.4	4.2	34.0	1.8	38.5	53.9	15.4	
Hori	7320.000	AV	34.7	36.0	4.9	34.2	1.8	43.2	53.9	10.7	
Hori	9760.000	AV	34.2	38.9	5.7	34.7	1.8	45.9	53.9	8.0	
Vert	33.227	QP	31.9	16.7	6.8	28.6	-	26.8	40.0	13.2	
Vert	44.802	QP	42.0	12.5	6.9	28.6	-	32.8	40.0	7.2	
Vert	108.799	QP	40.4	11.4	7.6	28.3	-	31.1	43.5	12.4	
Vert	163.201	QP	38.3	15.4	7.9	28.1	-	33.5	43.5	10.0	
Vert	204.799	QP	40.1	16.7	8.2	27.8	-	37.2	43.5	6.3	
Vert	207.998	QP	39.6	16.7	8.2	27.8	-	36.7	43.5	6.8	
Vert	383.999	QP	29.0	16.9	9.3	28.3	-	26.9	46.0	19.1	
Vert	4880.000	PK	43.6	31.4	4.2	34.0	-	45.2	73.9	28.7	
Vert	7320.000	PK	41.9	36.0	4.9	34.2	-	48.6	73.9	25.3	
Vert	9760.000	PK	43.1	38.9	5.7	34.7	-	53.0	73.9	20.9	
Vert	4880.000	AV	34.7	31.4	4.2	34.0	1.8	38.1	53.9	15.8	
Vert	7320.000	AV	34.2	36.0	4.9	34.2	1.8	42.7	53.9	11.2	
Vert	9760.000	AV	34.2	38.9	5.7	34.7	1.8	45.9	53.9	8.0	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier) + Duty Factor

* Spurious emissions listed with duty factor value in the above table have the synchronized duty cycle with carrier.

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB

Radiated Spurious Emission

Test place	Head Office EMC Lab. No.2 Semi Anechoic Chamber		
Report No.	4786001719H		
Date	12/11/2012	12/12/2012	12/17/2012
Temperature/ Humidity	23 deg. C / 31% RH	21 deg. C / 33% RH	22deg. C / 35% RH
Engineer	Keisuke Kawamura (1-10GHz)	Keisuke Kawamura (10-26.5GHz)	Katsunori Okai (Below 1GHz)
Mode	Tx LE 2480MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	108.799	QP	32.8	11.4	7.6	28.3	-	23.5	43.5	20.0	
Hori	124.799	QP	41.8	13.3	7.7	28.2	-	34.6	43.5	8.9	
Hori	150.399	QP	36.3	14.9	7.9	28.2	-	30.9	43.5	12.6	
Hori	204.799	QP	32.6	16.7	8.2	27.8	-	29.7	43.5	13.8	
Hori	239.999	QP	31.2	17.1	8.5	27.6	-	29.2	46.0	16.8	
Hori	345.599	QP	32.1	15.7	9.1	28.0	-	28.9	46.0	17.1	
Hori	2483.500	PK	49.4	27.5	2.4	34.8	-	44.5	73.9	29.4	
Hori	4960.000	PK	43.6	31.6	4.2	34.0	-	45.4	73.9	28.5	
Hori	7440.000	PK	43.5	36.2	5.0	34.3	-	50.4	73.9	23.5	
Hori	9920.000	PK	42.5	39.1	5.8	34.7	-	52.7	73.9	21.2	
Hori	2483.500	AV	38.4	27.5	2.4	34.8	-	33.5	53.9	20.4	
Hori	4960.000	AV	34.9	31.6	4.2	34.0	1.8	38.5	53.9	15.4	
Hori	7440.000	AV	34.3	36.2	5.0	34.3	1.8	43.0	53.9	10.9	
Hori	9920.000	AV	34.2	39.1	5.8	34.7	1.8	46.2	53.9	7.7	
Vert	44.801	QP	43.0	12.5	6.9	28.6	-	33.8	40.0	6.2	
Vert	102.399	QP	36.7	10.4	7.5	28.3	-	26.3	43.5	17.2	
Vert	163.199	QP	39.0	15.4	7.9	28.1	-	34.2	43.5	9.3	
Vert	204.800	QP	39.6	16.7	8.2	27.8	-	36.7	43.5	6.8	
Vert	207.999	QP	39.3	16.7	8.2	27.8	-	36.4	43.5	7.1	
Vert	355.199	QP	27.6	16.0	9.2	28.1	-	24.7	46.0	21.3	
Vert	2483.500	PK	46.5	27.5	2.4	34.8	-	41.6	73.9	32.3	
Vert	4960.000	PK	44.5	31.6	4.2	34.0	-	46.3	73.9	27.6	
Vert	7440.000	PK	41.9	36.2	5.0	34.3	-	48.8	73.9	25.1	
Vert	9920.000	PK	43.1	39.1	5.8	34.7	-	53.3	73.9	20.6	
Vert	2483.500	AV	36.4	27.5	2.4	34.8	-	31.5	53.9	22.4	
Vert	4960.000	AV	34.9	31.6	4.2	34.0	1.8	38.5	53.9	15.4	
Vert	7440.000	AV	34.2	36.2	5.0	34.3	1.8	42.9	53.9	11.0	
Vert	9920.000	AV	34.2	39.1	5.8	34.7	1.8	46.2	53.9	7.7	

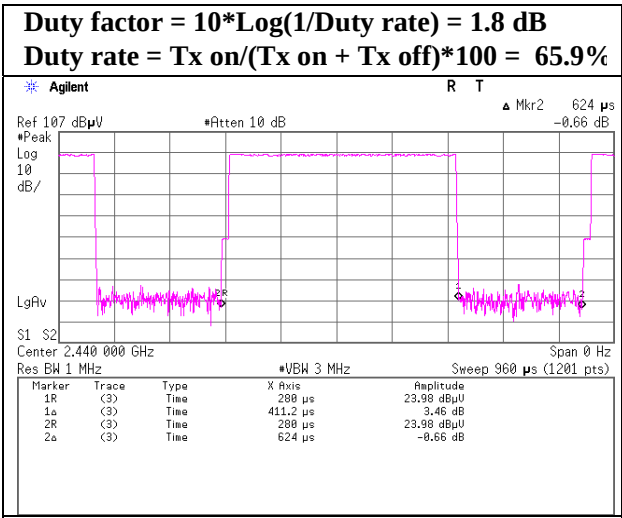
Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier) + Duty Factor

* Spurious emissions listed with duty factor value in the above table have the synchronized duty cycle with carrier.

*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

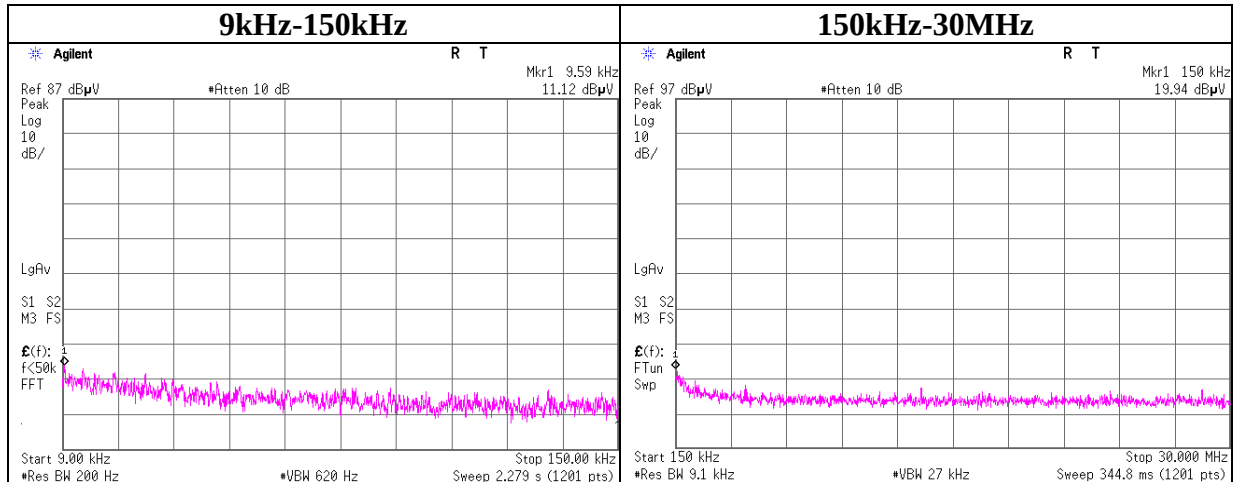
Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB

Duty rate confirmation



Conducted Spurious Emission

Tx 2402MHz

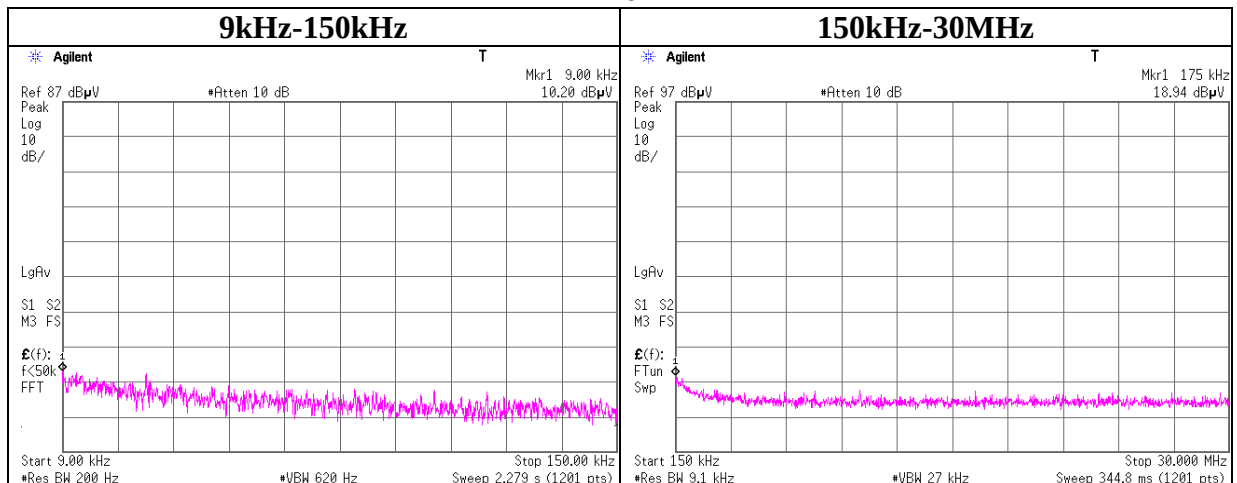


Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator [dB]	Antenna Gain [dBi]	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]
9.590	-95.9	0.3	9.9	2.0	-83.7	300.0	6.0	-22.4	48.0
150.000	-87.1	0.3	9.8	2.0	-74.9	300.0	6.0	-13.7	24.1

$E = EIRP - 20 \log(D) + 104.8 [dBuV/m] + \text{Ground bounce}$

$EIRP = \text{Reading} + \text{Cable Loss} + \text{Attenuator} + \text{Antenna Gain}$

Tx 2440MHz



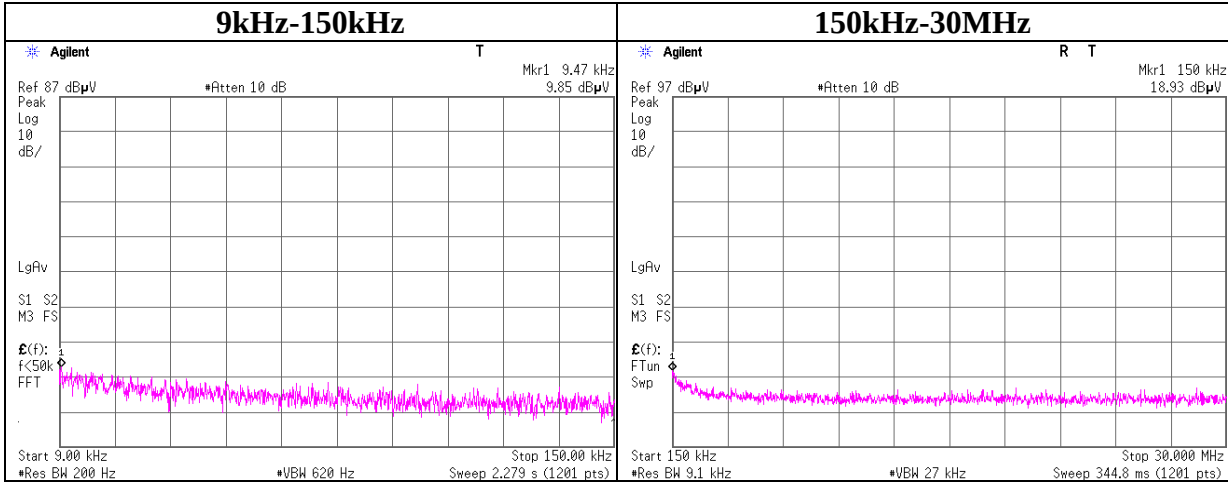
Frequency [kHz]	Reading [dBm]	Cable Loss [dB]	Attenuator [dB]	Antenna Gain [dBi]	EIRP [dBm]	Distance [m]	Ground bounce [dB]	E (field strength) [dBuV/m]	Limit [dBuV/m]
9.000	-96.8	0.3	9.9	2.0	-84.6	300.0	6.0	-23.4	48.5
175.000	-88.1	0.3	9.8	2.0	-75.9	300.0	6.0	-14.7	22.7

$E = EIRP - 20 \log(D) + 104.8 [dBuV/m] + \text{Ground bounce}$

$EIRP = \text{Reading} + \text{Cable Loss} + \text{Attenuator} + \text{Antenna Gain}$

Conducted Spurious Emission

Tx 2480MHz



Frequency	Reading	Cable Loss	Attenuator	Antenna Gain	EIRP	Distance	Ground bounce	E (field strength)	Limit
[kHz]	[dBm]	[dB]	[dB]	[dBi]	[dBm]	[m]	[dB]	[dBuV/m]	[dBuV/m]
9.470	-97.2	0.3	9.9	2.0	-85.0	300.0	6.0	-23.7	48.1
150.000	-88.1	0.3	9.8	2.0	-75.9	300.0	6.0	-14.7	24.1

E=EIRP-20log(D)+104.8[dBuV/m]+Ground bounce

EIRP=Reading+Cable Loss+Attenuator+Antenna Gain

Power Density

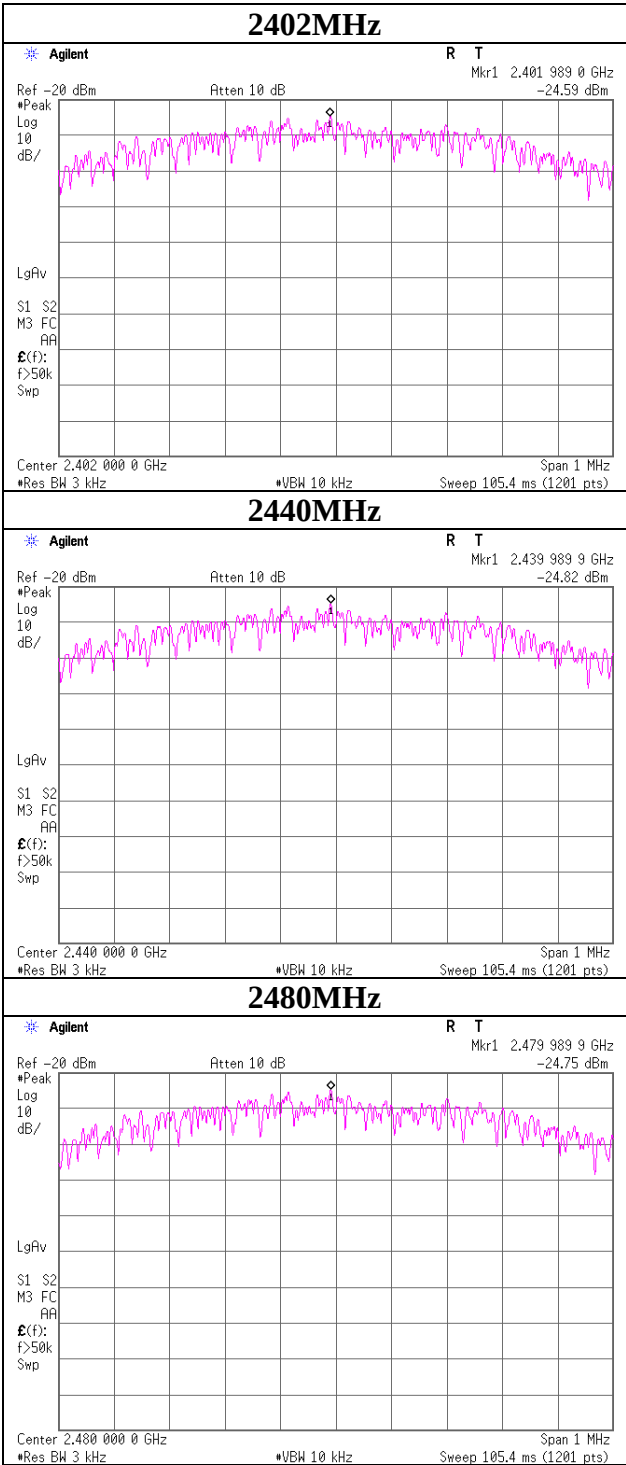
Test place Head Office EMC Lab. No.6 Measurement Room
Report No. 4786001719H
Date 12/17/2012
Temperature/ Humidity 23deg. C / 47% RH
Engineer Keisuke Kawamura
Mode Tx LE

Freq. [MHz]	Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
2402.00	-24.59	0.64	10.03	-13.92	8.00	21.92
2440.00	-24.82	0.65	10.03	-14.14	8.00	22.14
2480.00	-24.75	0.65	10.03	-14.07	8.00	22.07

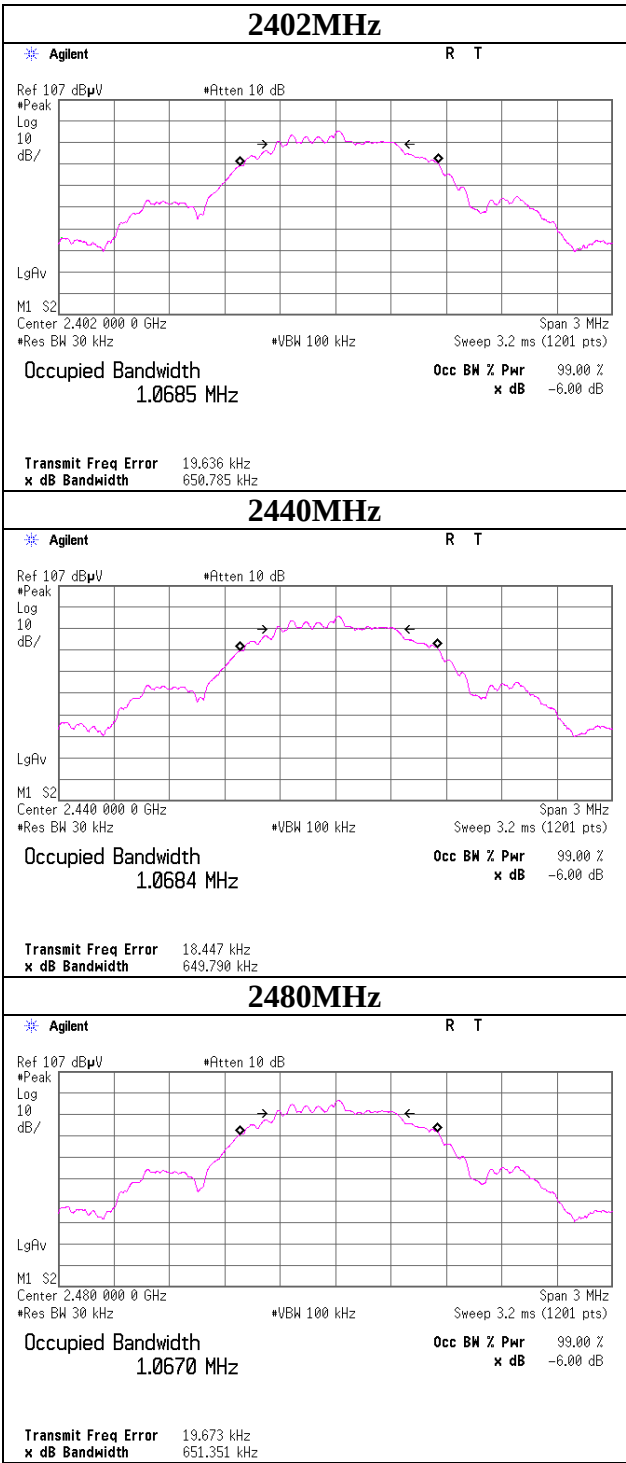
Sample Calculation:

Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator

Power Density



99%Occupied Bandwidth



APPENDIX 2: Test instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date	Expiration date of the calibration
MOS-14	Thermo-Hygrometer	Custom	CTH-201	-	AT	2012/02/06	2013/02/28
MPM-12	Power Meter	Anritsu	ML2495A	0825002	AT	2012/06/01	2013/06/30
MPSE-17	Power sensor	Anritsu	MA2411B	0738285	AT	2012/06/01	2013/06/30
MAT-25	Attenuator(10dB) (above1GHz)	Agilent	8493C	71642	AT	2012/06/27	2013/06/30
MCC-35	Microwave Cable	Hirose Electric	U.FL-2LP-066-A-(200)	-	AT	2012/09/05	2013/09/30
MAEC-02	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	RE/CE	2012/06/29	2013/06/30
MOS-22	Thermo-Hygrometer	Custom	CTH-201	0003	RE/CE	2012/02/06	2013/02/28
MJM-14	Measure	KOMELON	KMC-36	-	RE/CE	-	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE/CE	-	-
MSA-03	Spectrum Analyzer	Agilent	E4448A	MY44020357	RE/CE	2012/11/20	2013/11/30
MHA-06	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	254	RE	2012/02/22	2013/02/28
MPA-10	Pre Amplifier	Agilent	8449B	3008A02142	RE	2012/01/25	2013/01/31
MCC-132	Microwave Cable	HUBER+SUHNER	SUCOFLEX104	336161/4(1m) / 340639(5m)	RE	2012/09/05	2013/09/30
MHF-06	High Pass Filter 3.5-24GHz	TOKIMEC	TF323DCA	601	RE	2012/05/30	2013/05/31
MCC-98	Microwave Cable 1G-40GHz	Schner	SUCOFLEX102	30819/2	AT	2012/05/09	2013/05/31
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	AT	2012/04/06	2013/04/30
MHA-02	Horn Antenna 18-26.5GHz	EMCO	3160-09	1265	RE	2012/02/22	2013/02/28
MCC-64	Coaxial Cable	UL Japan	-	-	AT	2012/03/22	2013/03/31
MAT-10	Attenuator(10dB)	Weinschel Corp	2	BL1173	AT	2012/11/06	2013/11/30
MTR-03	Test Receiver	Rohde & Schwarz	ESCI	100300	RE/CE	2012/04/03	2013/04/30
MBA-02	Biconical Antenna	Schwarzbeck	BBA9106	VHA91032008	RE	2012/10/08	2013/10/31
MLA-02	Logperiodic Antenna	Schwarzbeck	USLP9143	201	RE	2012/10/08	2013/10/31
MCC-12	Coaxial Cable	Fujikura/Agilent	-	-	RE	2012/02/16	2013/02/28
MAT-07	Attenuator(6dB)	Weinschel Corp	2	BK7970	RE	2012/11/06	2013/11/30
MPA-09	Pre Amplifier	Agilent	8447D	2944A10845	RE	2012/09/11	2013/09/30
MLS-07	LISN(AMN)	Schwarzbeck	NSLK8127	8127364	CE	2012/02/09	2013/02/28
MCC-13	Coaxial Cable	Fujikura	3D-2W(12m)/ 5D-2W(5m)/ 5D-2W(0.8m)/ 5D-2W(1m)	-	CE	2012/02/16	2013/02/28
MAT-65	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2012/01/28	2013/01/31

The expiration date of the calibration is the end of the expired month.

All equipment is calibrated with valid calibrations. Each measurement data 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: CE: Conducted Emission

RE: Radiated Emission

AT: Antenna Terminal Conducted test

UL Japan, Inc.

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