RADIO TEST REPORT

Test Report No. : 10866733S-A

Applicant	:	**Circuit Design Inc.**
Type of Equipment	:	**UHF Narrow Band Multi Channel Transceiver**
Model No.	:	**LMD-400-R**
Test regulation	:	**FCC part 90 subpart I: 2015**
FCC ID	:	**V9X-LMD400RC**
Test Result	:	**Complied**

1. This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the limits of the above standard.
4. The test results in this test 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 any agency of the Federal Government.
6. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.

Date of test: February 17 to 21, 2014

Representative test engineer:

Kenichi Adachi
Engineer
Consumer Technology Division

Approved by :

Toyokazu Imamura
Leader
Consumer Technology Division

UL Japan, Inc.
Shonan EMC Lab.
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REVISION HISTORY

Original Test Report No.: 10866733S-A

Revision	Test report No.	Date	Page revised	Contents
- (Original)	10866733S-A	July 13, 2015	-	-
1	10866733S-A	July 21, 2015	p.1, p.2	Revised report.
			p.5, 8, 9,10,11	Changed "TIA-603-C" to "TIA-603-D". Corrected the error in the table of section 3.2.
			p.11	Added comments in section 9.
			p.32 - p.37	Corrected the limit (+/-2.5 to +/-1.5).
2	10866733S-A	July 28, 2015	p.1, p.2	Revised report.
			p.14	Changed "TIA-603-C" to "TIA-603-D".
3	10866733S-A	August 6, 2015	p.1, p.2	Revised report.
			p.5, p.13	Added section 90.205, 90.267.
			p.15	Added comment in Emission masks data.

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SECTION 1: Customer information

Company Name	:	Circuit Design Inc.
Address	:	7557-1, Hotaka Azumino-city, Nagano 399-8303, Japan
Telephone Number	:	+81-263-82-1011
Facsimile Number	:	+81-263-82-1012
Contact Person	:	Maiko Yasunaga

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

2.1 Identification of E.U.T.

Type of Equipment	:	UHF Narrow Band Multi Channel Transceiver
Model Number	:	LMD-400-R
Serial Number	:	Refer to Section 4.2
Rating	:	DC 3.0 V to 5.5 V
Country of Mass-production	:	Japan
Condition of EUT	:	Production model
Receipt Date of Sample	:	February 7, 2014
Modification of EUT	:	The test lab did not make the modification to the EUT supplied from the customer to have it pass the tests.

2.2 Product Description

Model: LMD-400-R (referred to as the EUT in this report) is a UHF Narrow Band Multi Channel Transceiver.

General Specification

Clock frequency(ies) in the system	:	21.25 MHz

Radio Specification

Radio Type	:	Transceiver
Frequency of Operation	:	458.0000 MHz to 462.5000 MHz
Modulation	:	GFSK
Intermediate frequency	:	1st IF: 21.7 MHz, 2nd IF: 450 kHz
Bandwidth	:	8.5 kHz
Channel spacing	:	12.5 kHz
Power Supply (RF port input)	:	DC 3.0 V to 5.5 V
Antenna type	:	Whip antenna
Antenna Gain	:	1.83 dBi
Antenna Connector Type	:	Plug connector (Shintake SP060022)
Operating Temperature	:	-20 deg.C to +60 deg.C

SECTION 3: Test specification, procedures and results

3.1 Test Specification

Test specification : FCC Part 90 Subpart I: 2015, final revised on May 5, 2015

Title : FCC 47CFR Part90 PRIVATE LAND MOBILE RADIO SERVICES

* The revision on May 5, 2015 does not affect the test specification applied to the EUT.

3.2 Procedures and results

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	RF Output Power	TIA-603-D 2.2.1	FCC section 90.205, 90.217, 90.267	-	N/A	-	Complied
2	Modulation Characteristics	TIA-603-D 2.2.3, 2.2.6	FCC section 2.1033, RSS-119 section 5.2	-	N/A	-	Complied *3)
3	Emission Bandwidth	TIA-603-D 2.2.11, 1.3.4.4	FCC section 90.209, 90.217	-	N/A	-	(Complied) *4)
4	Emission masks	TIA-603-D 2.2.11, 1.3.4.4	FCC section 90.210, 90.217	-	N/A	-	(Complied) *4)
5	Spurious Emission at Antenna Terminals	TIA-603-D 2.2.13	FCC section 90.210, 90.215, 90.217	-	N/A	-	Complied
6	Field Strength of Spurious Emission	TIA-603-D 2.2.12	FCC section 90.210, 90.215, 90.217	Radiated	N/A	5.2 dB, (924.996 MHz, Horizontal, Peak, Tx 462.5 MHz)	Complied
7	Frequency Stability	TIA-603-D 2.2.2	FCC section 90.213, 90.217	-	N/A	-	(Complied) *4)
8	Transient Frequency Behavior	TIA-603-D 2.2.19	FCC section 90.214, 90.217	-	N/A	-	N/A *2)
9	Receiver spurious emissions	TIA-603-D 2.1.1	FCC 15.109, RSS-Gen 7	Radiated	N/A	29.5 dB, (484.200 MHz, Horizontal, QP, Rx 462.5 MHz)	(Complied) *4)
10	99% Occupied Bandwidth	RSS-Gen 4.6.1	RSS-Gen 4.6.1	-	N/A	N/A	N/A

Note: UL Japan, Inc.'s EMI Work Test Procedure 13-EM-W0420.
*1) These tests were also referred to "Land Mobile FM or PM Communications Equipment Measurement and Performance Standards" (TIA-603-D: 2010)
*2) The test is not applicable since the power level of EUT is less than 120 mW.
*3) The test is not applicable since this device is set to 2.4 kHz deviation as default value. To tuned up can not be made by end user. The procedure to tune up was attached when this application was submitted. Also, the modulation description as FCC section 2.1033(c)(13) requested was attached.
*4) The test is not applicable since the power level of EUT is less than 120 mW, The test is reference.

3.3 Addition to standard

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

3.4 Confirmation

UL Japan, Inc. hereby confirms that E.U.T., in the configuration tested, complies with the specifications FCC part 90.

3.5 Uncertainty

EMI

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

(EMI measurement)

Item	Frequency range	No.1 SAC*1 (±)	No.2 SAC(±)	No.3 SAC (±)
Radiated emission (Measurement distance: 3 m)	9 kHz-30 MHz	3.7 dB	3.7 dB	3.6 dB
	30 MHz-300 MHz	4.8 dB	5.0 dB	4.8 dB
	300 MHz-1 GHz	5.0 dB	5.0 dB	4.8 dB
	1 GHz-18 GHz	4.9 dB	4.9 dB	4.9 dB

(Substitution measurement)

Item	Frequency range	No.1 SAC*1 (±)	No.2 SAC(±)	No.3 SAC (±)
Radiated emission (Substitution measurement: 3 m) (EUT height 0.8 m)	30 MHz-300 MHz	4.7 dB	4.7 dB	4.7 dB
	300 MHz-1 GHz	3.7 dB	3.7 dB	3.7 dB
	1 GHz-18 GHz	5.3 dB	5.3 dB	5.3 dB

*1: SAC=Semi-Anechoic Chamber

Radiated Emission Test

The data listed in this report meets the limits unless the uncertainty is taken into consideration.

Power Measurement uncertainty above 1 GHz for this test was: (±) 1.5 dB
Conducted emissions Measurement (below 1 GHz) uncertainty for this test was: (±) 1.6 dB
Conducted emissions, Power Density Measurement (1 GHz-3 GHz) uncertainty for this test was: (±) 1.4 dB
Conducted emissions Measurement (3 GHz-18 GHz) uncertainty for this test was: (±) 2.8 dB
Frequency Measurement uncertainty for this test was: (±) 5.3 x 10^-6
Bandwidth Measurement uncertainty for this test was: (±) 5.4 %

3.6 Test Location

UL Japan, Inc. Shonan EMC Lab.
1-22-3, Megumigaoka, Hiratsuka-shi, Kanagawa-ken 259-1220 JAPAN
Telephone number : +81 463 50 6400
Facsimile number : +81 463 50 6401
JAB Accreditation No. : RTL02610

Test room	Width x Depth x Height (m)	Test room	Width x Depth x Height (m)
No.1 Semi-Anechoic Chamber	20.6 x 11.3 x 7.65 Maximum measurement distance: 10m	No.1 Shielded room	6.8 x 4.1 x 2.7
No.2 Semi-Anechoic Chamber	20.6 x 11.3 x 7.65 Maximum measurement distance: 10m	No.2 Shielded room	6.8 x 4.1 x 2.7
No.3 Semi-Anechoic Chamber	12.7 x 7.7 x 5.35 Maximum measurement distance: 5m	No.3 Shielded room	6.3 x 4.7 x 2.7
No.4 Semi-Anechoic Chamber	8.1 x 5.1 x 3.55	No.4 Shielded room	4.4 x 4.7 x 2.7
		No.5 Shielded room	7.8 x 6.4 x 2.7
		No.6 Shielded room	7.8 x 6.4 x 2.7
		No.1 Measurement room	2.55 x 4.1 x 2.5

3.7 Data of EMI, Test instruments, Test set up

Refer to APPENDIX.

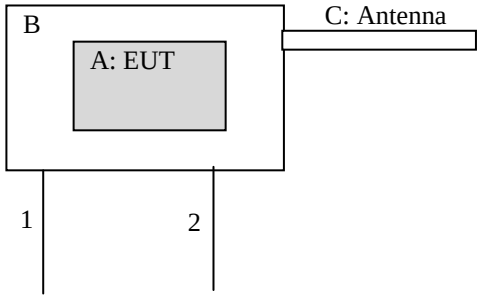
SECTION 4: Operation of E.U.T. during testing

4.1 Operating Modes

Mode *1)	Tested frequency
Continuous Transmitting (Tx) None-modulated (CW)	458.0000 MHz, 462.5000 MHz
Continuous Transmitting (Tx) modulated	458.0000 MHz, 462.5000 MHz
Continuous Receiving (Rx)	458.0000 MHz, 462.5000 MHz

Justification : The system was configured in typical fashion (as a customer would normally use it) for testing.

4.2. Configuration and peripherals



DC 5.0 V *2)

Open or input digital signal PN9, 4.8 kHz (from MP1201C (S/N: M14160, Anritsu))

*1) Cabling and setup were taken into consideration and test data was taken under worst case conditions.
*2) DC power supply (Model No.: PAN35-10A) was used for DC 5.0 V input.

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remark
A	UHF Narrow Band Multi Channel Transceiver	LMD-400-R	S0000019, *3) S0000020 *4)	Circuit Design Inc.	EUT
B	Test board	TB-STD-302/LMD-400-R	-	Circuit Design Inc.	-
C	Whip antenna	ANT-LEA-01-R	1	Circuit Design Inc.	-

*3) Used for Radiated emission tests.
*4) Used for Antenna terminal conducted tests.

List of cables used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	DC cable	1.3	Unshielded	Unshielded	-
2	Digital input	0.3	Shielded	Shielded	-

SECTION 5: RF Output power

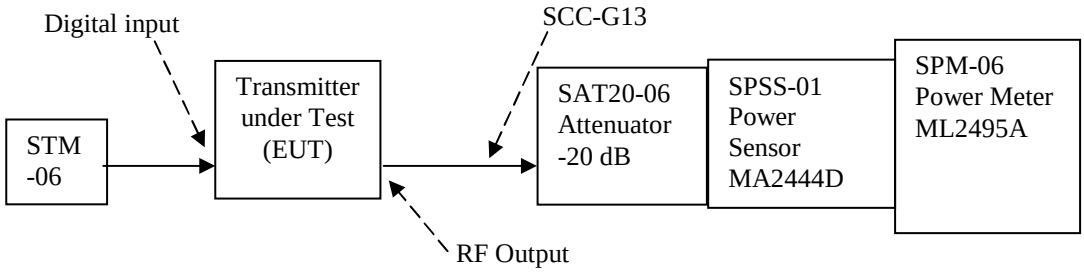
5.1 Test Procedure : TIA-603-D section 2.2.1

5.2 Test data : APPENDIX 1

5.3 Test result : Pass

5.4 Test instruments : SPM-06, SPSS-01, SAT20-06, SCC-G13, STM-06, KDC-01

5.5 Measurement Block Diagram of RF power output



RF Power Measurement (TIA-603-D section 2.2.1)

SECTION 6: Emission Bandwidth and Emission masks

6.1 Test Procedure : TIA-603-D section 2.2.11

1) Set the reference level the spectrum analyzer to the unmodulation carrier level on the EUT

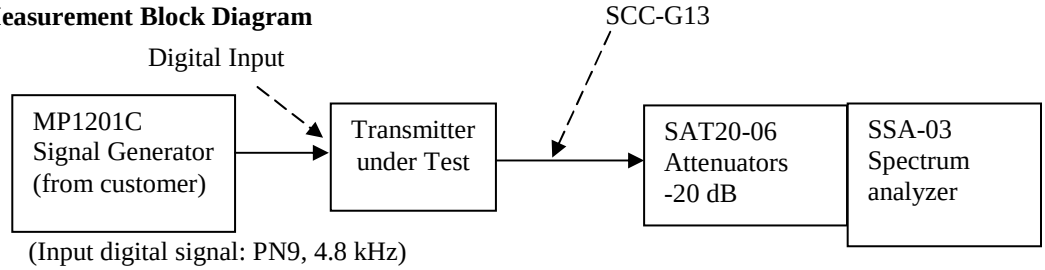
2) The Carrier is modulated by the PN9 digital signal (4.8 kHz) (worst mode).
The input signal shall be established at the frequency of maximum response of the modulation.
(*Emission mask D (406.1 MHz - 430 MHz and 450 MHz - 470 MHz, channel spacing: 12.5 kHz))

6.2 Test Data : APPENDIX 1

6.3 Test Result : Pass

6.4 Test Instrument : SSA-03, SCC-G13, SAT20-06, KDC-01, MP1201C

6.5 Measurement Block Diagram



(Input digital signal: PN9, 4.8 kHz)

Emission Bandwidth (TIA-603-D section 2.2.11)

SECTION 7: Spurious emission at Antenna Terminals

7.1 Test Procedure : TIA-603-D section 2.2.13

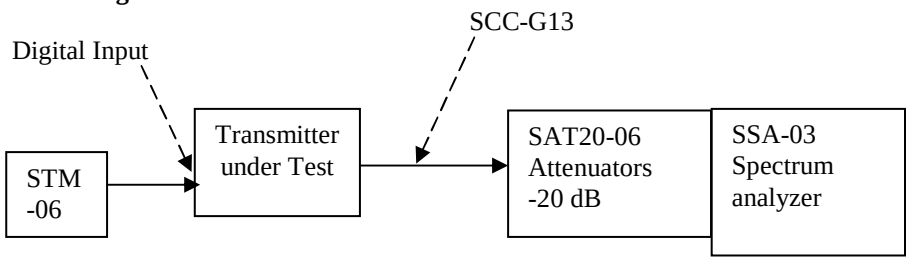
1) The EUT was aligned for transmitter operation at full rated power.
2) Set the reference level the spectrum analyzer to the unmodulation carrier level on the EUT.
   (Since spurious level was no difference between modulation mode and none-modulation mode)
3) Output of EUT was connected with spectrum analyzer through dummy load attenuator 20 dB.

7.2 Test Data : APPENDIX 1

7.3 Test result : Pass

7.4 Test Instrument : SSA-03, SCC-G13, SAT20-06, KDC-01

7.5 Measurement Block Diagram



Spurious Emission at Antenna Terminals (TIA-603-D section 2.2.13)

SECTION 8: Field Strength of Spurious Emission

8.1 Test Procedure : TIA-603-D section 2.2.12

1) The EUT was aligned for transmitter operation at full rated power.
2) Set the reference level the spectrum analyzer to the unmodulation carrier level on the EUT. (Since spurious level was no difference between modulation mode and none-modulation mode)
3) Tune-up the transmitter (EUT)
4) For each spurious measurement the receiving antenna is adjusted to the correct length for the frequency involved. These measurements are made from the lowest radio frequency generated in the EUT or 30 MHz to the tenth harmonics of the carrier.
5) EUT was placed on a urethane plate form of nominal size, 0.5 m by 0.5 m raised 0.8 m above the conducting ground plane.
The Radiated Electric Field Strength intensity has been measured in semi anechoic chamber on a ground plane (above 1 GHz only) and at a distance of 3 m.
The measuring antenna height was varied between 1 m to 4 m and the turn table 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.
6) Exchanged the EUT to the Substitution Antenna, the measurement was set for the same height 1.5 m as the EUT. The frequency below 1GHz of the Substitution Antenna was used the Half wave dipole Antenna, which was tuned the measured frequency in 1).
The frequency above 1GHz of the Substitution Antenna was used Horn Antenna.
The Substitution Antenna was connected to the Signal Generator, and the polarized electromagnetic radiation of the Substitution Antenna was matched with the one of the measuring Antenna, which was set with the Signal Generator to the measured frequency in 1). Then, we set with the Output power (CW) of the Signal Generator where the measuring electromagnetic field strength is equal to the measured value in 1) by means of varying the measuring antenna height between 1 m to 4 m to obtain maximum receiving level.
Its Output power of Signal Generator was recorded.
7) Below 1 GHz:
Effective radiated power was calculated by subtracting the cable loss and the attenuator loss connected between the Signal Generator and the Substitution Antenna from the Output power of the Signal Generator recorded in 2).
For the usage of the Antenna (Horn Antenna) except for the Half wave dipole Antenna (2.15 dBi) for the Substitution Antenna, the Effective radiated power was calculated by compensating the finite difference in the Antenna gain of the Half wave dipole Antenna, and Substitution Antenna.
Above 1 GHz:
Equivalent isotropic radiated power was calculated by subtracting the cable loss and the attenuator loss connected between the signal generator and the substitution antenna from the output power of the signal generator recorded in 2).
For the usage of the antenna (horn antenna) for the substitution antenna, the equivalent isotropic radiated power was calculated by compensating the finite substitution antenna.

Frequency	Below 1 GHz	Above 1 GHz
Instrument used	Spectrum Analyzer	Spectrum Analyzer
IF Bandwidth	PK: RBW: 10 kHz/VBW: 300 kHz	PK: RBW: 1 MHz/VBW: 3 MHz

Transmitter Spurious Limit : Carrier Level [dBm] – 30 dB

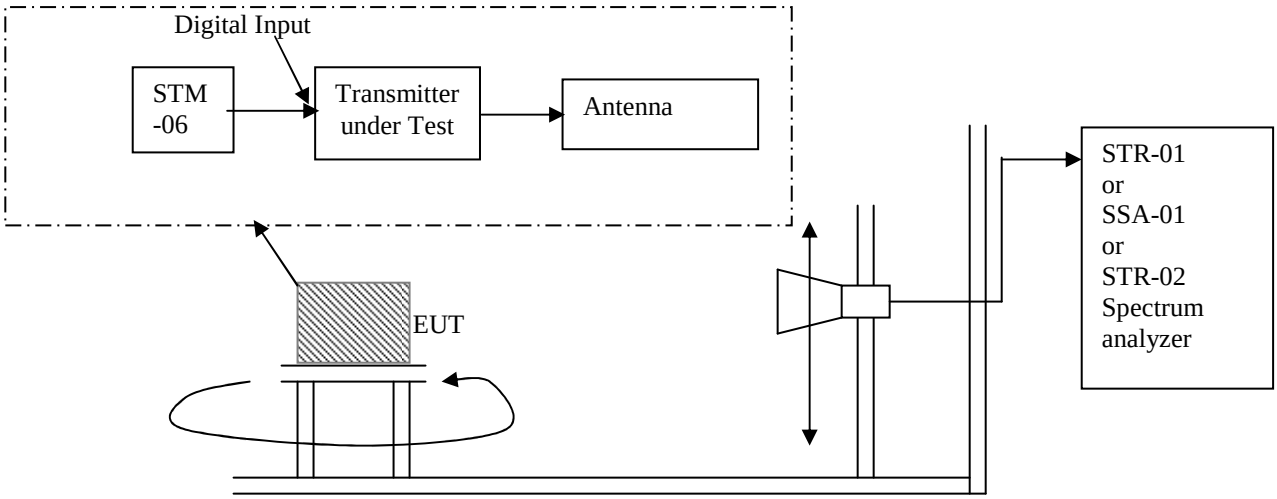
8.2 Test Data : APPENDIX 1

8.3 Test Result : Pass

8.4 Test Instrument :

[9k-30MHz]: SAEC-02, STR-02, SAF-02, SCC-B2/B4/B6/B7/B8/B13/SRSE-02, SAT6-07, SLP-02,
[30M-1GHz]: SAEC-01, STR-01, SAF-01, SCC-A1/A3/A5/A7/A8/A13/SRSE-01, KAT6-04, SBA-01, SAT10-01, SCC-A2/A4/A6/A7/A8/A13/SRSE-01, KAT3-09, SLA-01, SSG-02, SCC-04, SCC-05, SDA-08
[1G-5GHz]: SAEC-02, SSA-01, SCC-G22, KAF-04, SCC-G02, SHA-02, SSG-02, SCC-G16, SHA-RS01

8.5 Measurement Block Diagram



Field Strength of Spurious Emission (TIA-603-D section 2.2.12)

SECTION 9: Frequency Stability

9.1 Test Procedure : TIA-603-D section 2.2.2

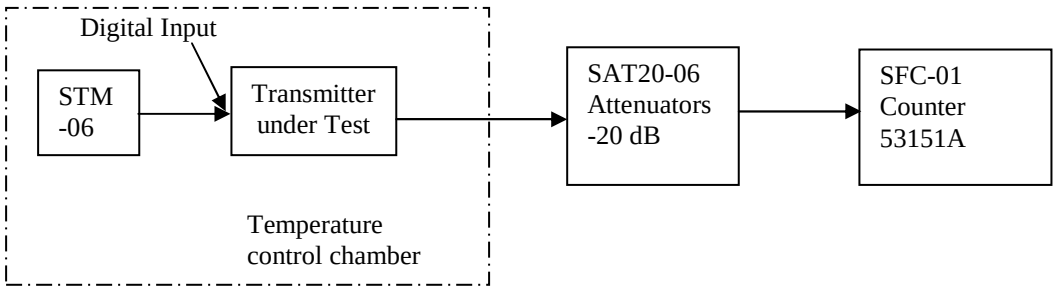
* The limit value applied +/-1.5 ppm of severest "Fixed", because the tested equipment cannot specify either of Fixed or Mobile.
*It is originally necessary to measure -30 deg.C to +50 deg.C, but -30 deg.C was not measured, because this test may be not applied since the RF output power of this equipment is less than 120 mW.

9.2 Test Data : APPENDIX 1

9.3 Test Result : Pass

9.4 Test Instrument : SCH-01, SFC-01, SAT20-06, SCC-G13, KDC-01, MP1201C

9.5 Measurement Block Diagram



Frequency Stability (TIA-603-D section 2.2.2)

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Test instruments

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Radiated emission

Antenna terminal conducted tests

Revised date : August 6, 2015

APPENDIX 1: Data of Radio tests

RF output power

UL Japan, Inc.
Shonan EMC Lab. No.5 Shielded Room

Company	Circuit Design Inc.		
Equipment	UHF Narrow Band Multi Channel Transceiver	Regulation	FCC section 90.217
Model	LMD-400-R		FCC section 90.205, 90.267
Serial No.	S0000020		RSS-119, section 5.10
Power	DC 5 V	Date	February 20, 2014
Mode	Transmitting	Temperature	24 deg.C
		Humidity	52 %RH
		ENGINEER	Kenichi Adachi

(* P/M: Power Meter with power sensor, PK: Peak, AV: Average)

Freq.	P/M (PK) Reading	Cable Loss	Atten. Loss	Result		Limit		Margin
[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]
458.0000	-11.12	1.59	19.89	10.36	10.86	20.79	120.00	10.43
462.5000	-11.74	1.59	19.89	9.74	9.42	20.79	120.00	11.05

* Reference limit: 6 W e.r.p. (for fixed or mobile), 2 W e.r.p. (for portable) (section 90.267(e)(2), 90.267(g)(2))

(Reference)
Maximum permissible exposure (MPE)
For the calculation of the MPE, a reference antenna with a gain of 1.83 dBi (= 1.52) has been assumed.

Freq.	Max power	Antenna Gain	Power density at 20 cm	Power density at 20 cm	Limit1	Limit2
[MHz]	[mW]	[ ]	[mW/cm^2]	[W/m^2]	[mW/cm^2]	[W/m^2]
458.0000	10.86	1.52	0.003	0.033	0.305	1.724
462.5000	9.42	1.52	0.003	0.028	0.308	1.736

Calculation:
Power density at 20 cm [mW/cm^2] = (Max power [mW] x Antenna gain [ ]) / (4 x pi x (r = 20 [cm])^2)
Power density at 20 cm [W/m^2] = Power density at 20 cm [mW/cm^2] x 10
* Limit1 for maximum permissible exposure (MPE) according to FCC 1.1310 table1(b) (= f [MHz] /1500)
* Limit2 for maximum permissible exposure (MPE) according to RSS-102 section 4 and Safety Code 6 section 2.2 table 6 (= 0.02619 x f [MHz] ^ (0.6834))

Revised date : July 28, 2015

Emission Bandwidth

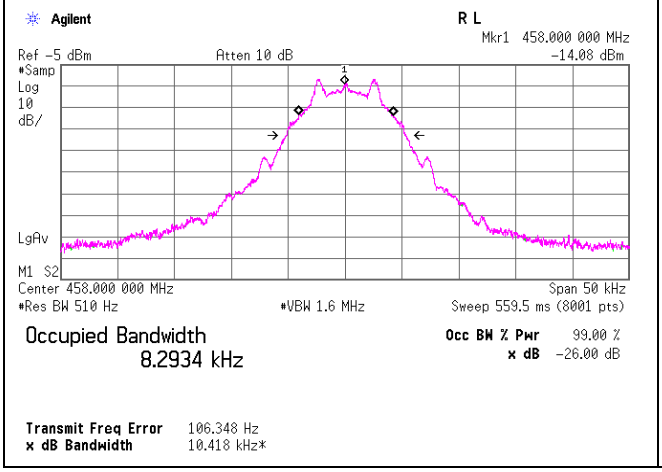
UL Japan, Inc.
Shonan EMC Lab. No.5 Shielded Room

Company	Circuit Design Inc.		
Equipment	UHF Narrow Band Multi Channel Transceiver	Regulation	FCC part 90, section 90.209
Model	LMD-400-R		RSS-119, section 5.5, table 3
Serial No.	S0000020	Date	February 20, 2014
Power	DC 5 V	Temperature	24 deg.C
Mode	Transmitting	Humidity	52 %RH
	input signal: PN9, 4.8 kHz (worst data (Digital signal))	ENGINEER	Kenichi Adachi

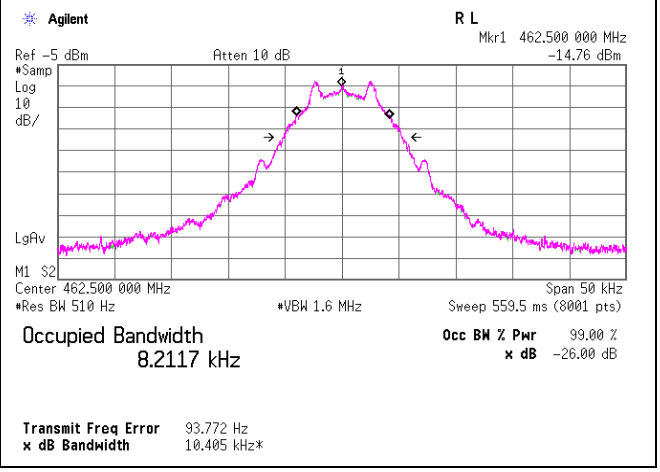
Freq. [MHz]	(Reference) 26 dB bandwidth [kHz]	99 % Occupied bandwidth [kHz]
458.0000	9.2430	8.2934
462.5000	9.2120	8.2117

(method RSS-Gen)

Tx 458 MHz

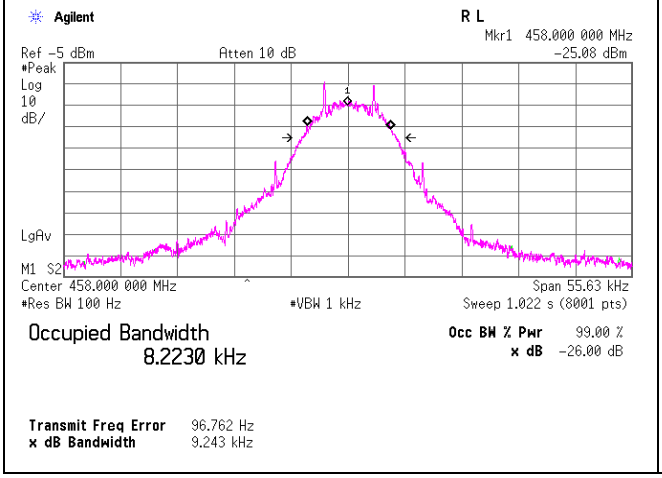


Tx 462.5 MHz

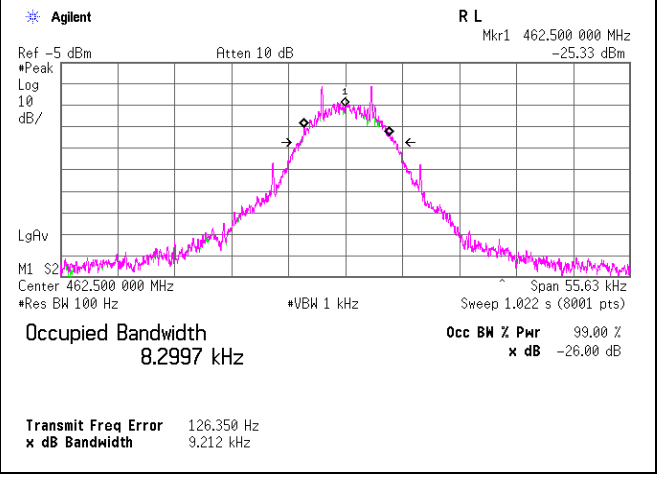


(method TIA-603-D)

Tx 458 MHz



Tx 462.5 MHz



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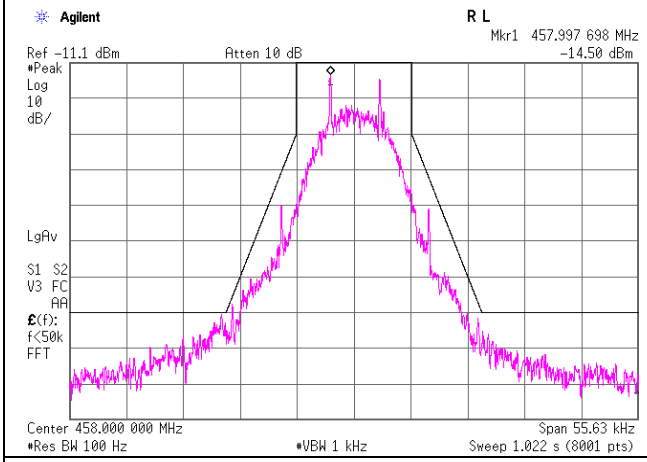
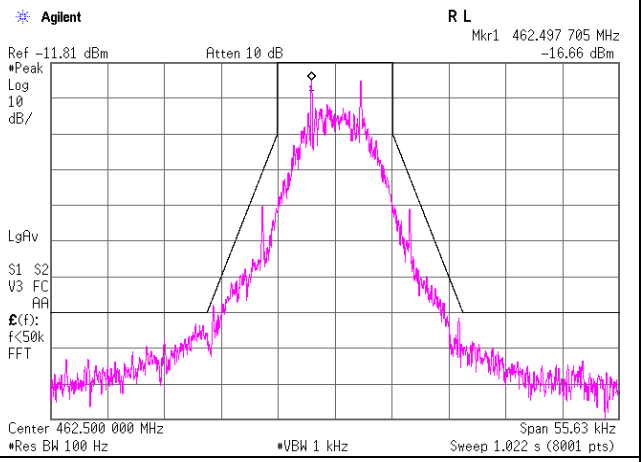
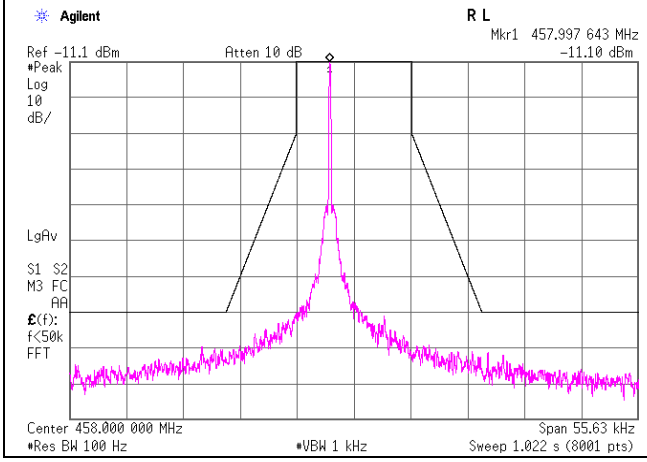
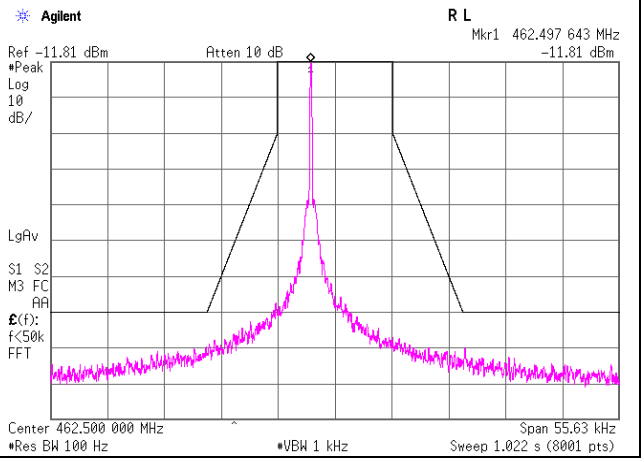
Facsimile : +81 463 50 6401

Revised date : August 6, 2015

Emission masks

UL Japan, Inc.
Shonan EMC Lab. No.5 Shielded Room

Company	Circuit Design Inc.		
Equipment	UHF Narrow Band Multi Channel Transceiver	Regulation	FCC part 90, section 90.210
Model	LMD-400-R		RSS-119, section 5.8.3
Serial No.	S0000020	Date	February 20, 2014
Power	DC 5 V	Temperature	24deg.C
Mode	Transmitting	Humidity	52%RH
	input signal: PN9, 4.8kHz (worst data (Digital signal))	ENGINEER	Kenichi Adachi

Tx 458 MHz	Tx 462.5 MHz
Emission mask D	**Emission mask D**
	
(Reference none-modulation chart)	**(Reference none-modulation chart)**
	

* Limit line is
  center frequency to +/-5.625 kHz (= width 11.25 kHz) is -0 [dB], +/-5.625 kHz to +/-12.5 kHz is - (7.27 * (fd - 2.88)) [dB] and +/-12.5 kHz outside is -70 [dB].
* Although Span was set narrower than real measurement value(56.25 kHz) by equipment setting, these limits was severer than real limits line.
* It was originally only that was the limit of -30 dB of 90.217, however, the severe of limit of RSS-119 / FCC 90.210 was used.

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Shonan EMC Lab.
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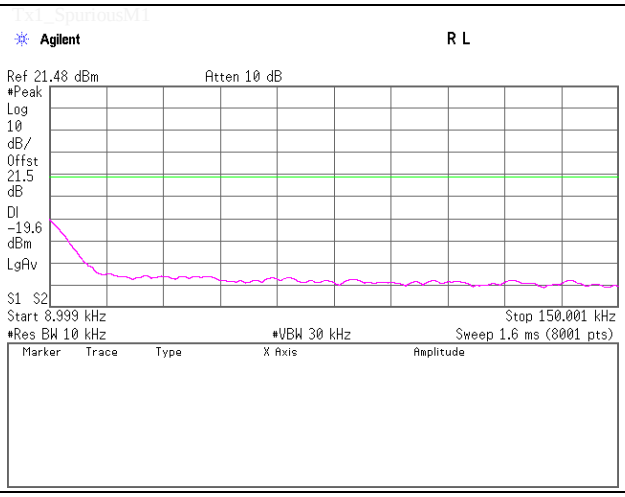
Telephone : +81 463 50 6400
Facsimile : +81 463 50 6401

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	February 20, 2014	(Serial No. S0000020)
Temperature / Humidity	24deg.C , 52%RH	
Engineer	Kenichi Adachi	

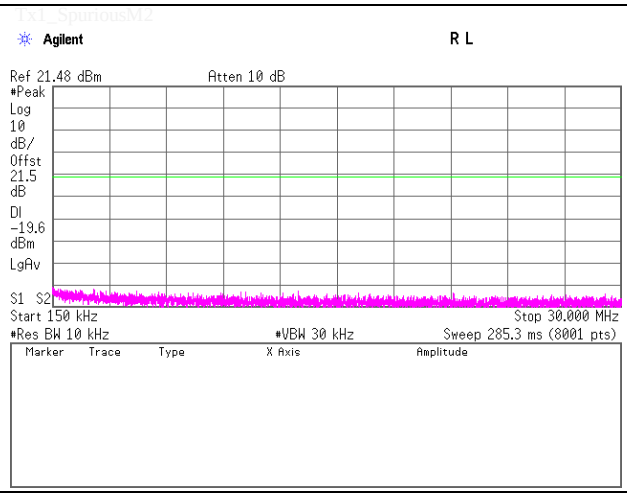
Spurious emission at antenna terminal

Tx 458MHz

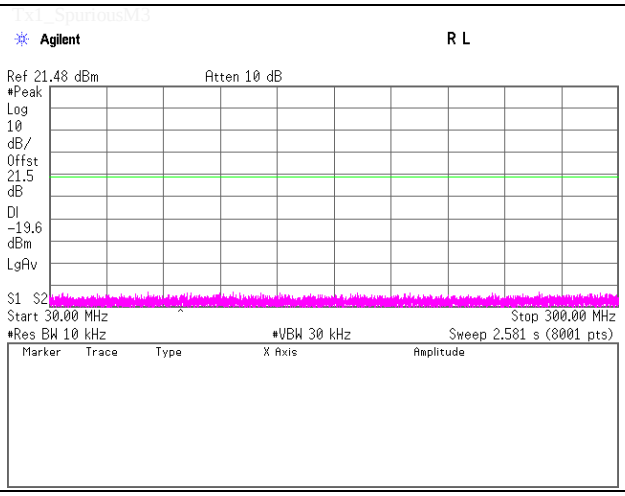
9kHz - 150kHz



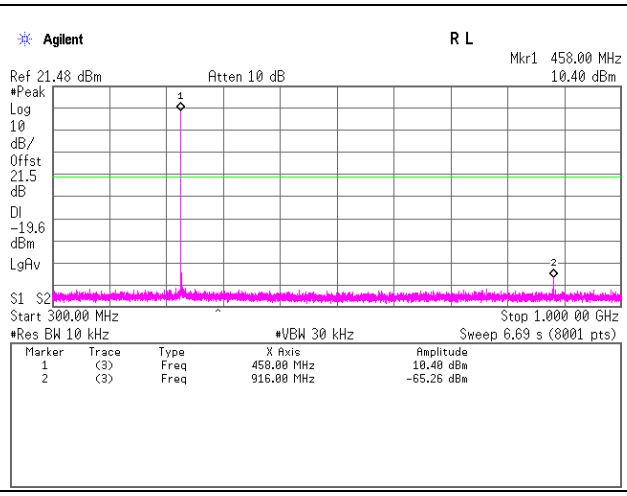
150kHz - 30MHz



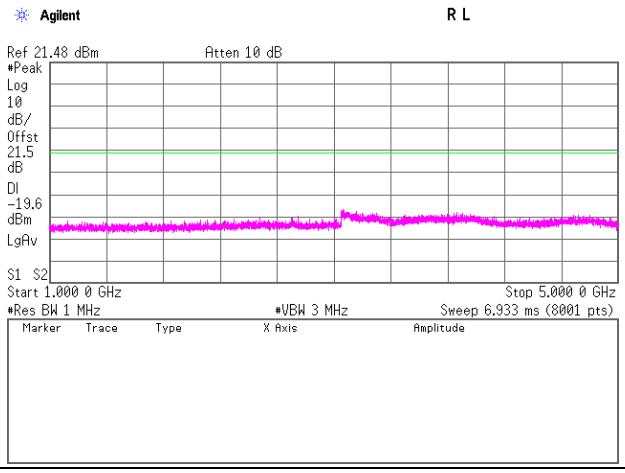
30MHz - 300MHz



300MHz - 1GHz



1GHz - 5GHz



offset calculation

Cable Loss [dB]	Atten. Loss [dB]	Total loss [dB]
1.59	19.89	21.48

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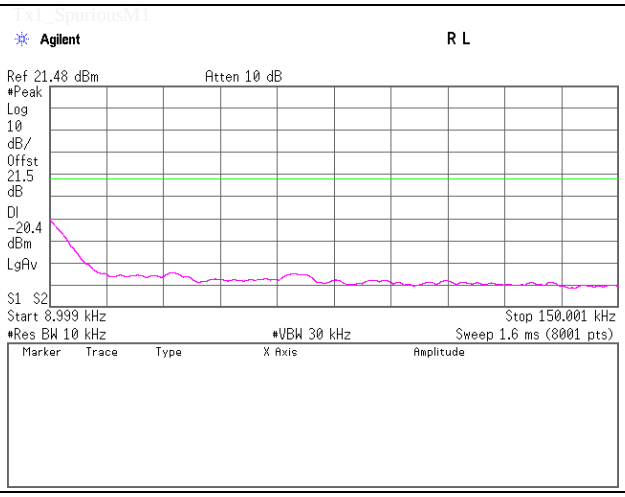
Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room
Date	February 20, 2014	(Serial No. S0000020)
Temperature / Humidity	24deg.C , 52%RH	
Engineer	Kenichi Adachi	

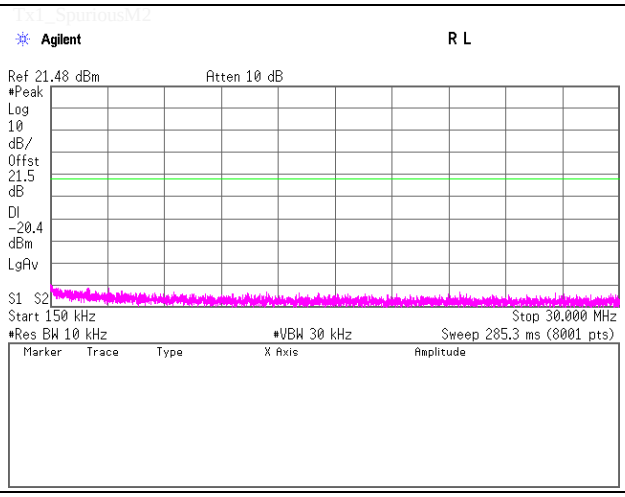
Spurious emission at antenna terminal

Tx 462.5MHz

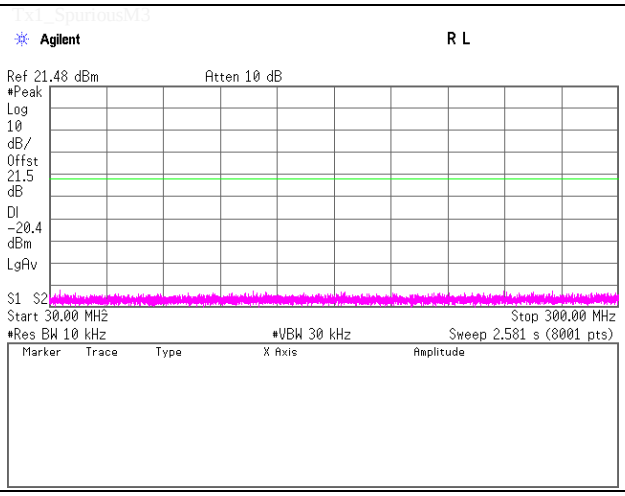
9kHz - 150kHz



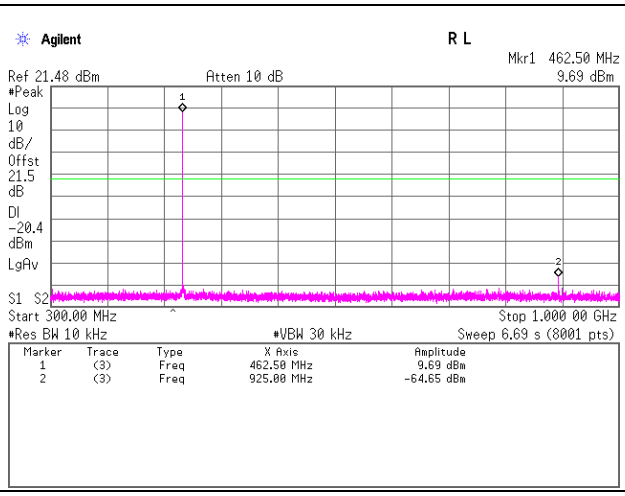
150kHz - 30MHz



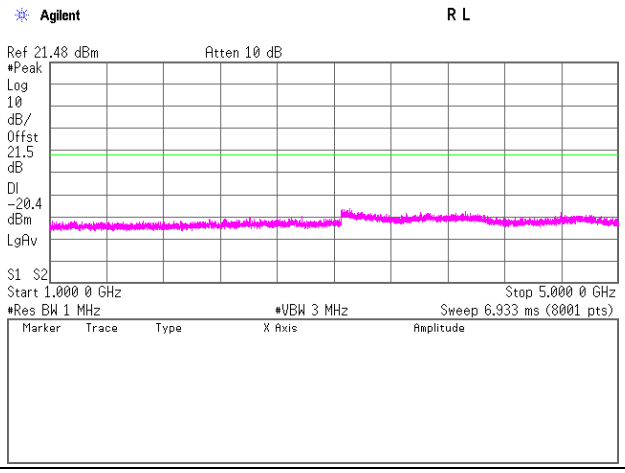
30MHz - 300MHz



300MHz - 1GHz



1GHz - 5GHz



offset calculation

Cable Loss [dB]	Atten. Loss [dB]	Total loss [dB]
1.59	19.89	21.48

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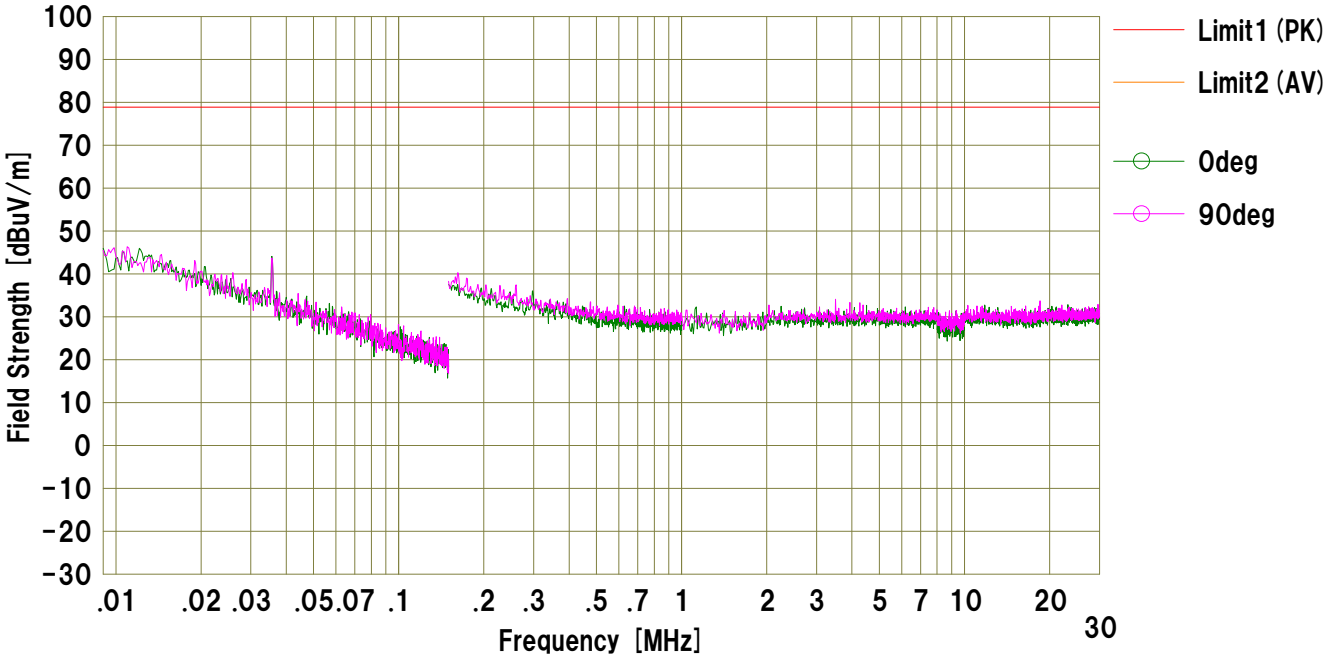
DATA OF RADIATED EMISSION (below 30MHz) TEST

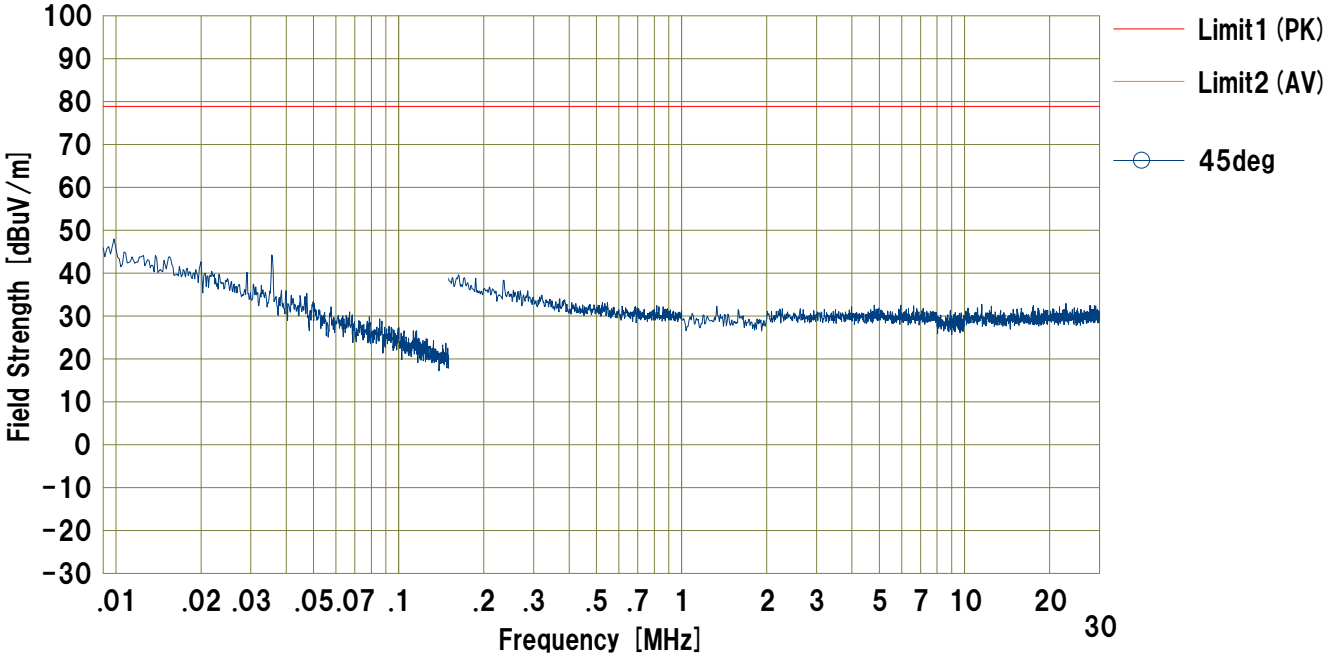
UL Japan,Inc. Shonan EMC Lab. No.2 Semi-Anechoic Chamber
Date : 2014/02/20

Company	: Circuit Design, Inc.	Mode	: Transmitting 458.0000MHz
Kind of EUT	: UHF Narrow band multi channel transceiver	Order No.	: 10214948S
Model No.	: LMD-400-R	Power	: DC 5V
Serial No.	: S0000019	Temp./Humi.	: 24deg.C / 21%RH
Remarks	: EUT & antenna worst-axis: Y No detect signal from EUT		

Limit1 : FCC part 90, carrier level=108.9dBuV/m, Spurious, PK

Engineer : Kenichi Adachi





Calculation:Result [dBuA] =Reading [dBuV] +Ant.Fac [dB] +Loss (Cable+ATT) [dB] -Gain (AMP) [dB]
Ant.Type=LOOP:Loop Antenna

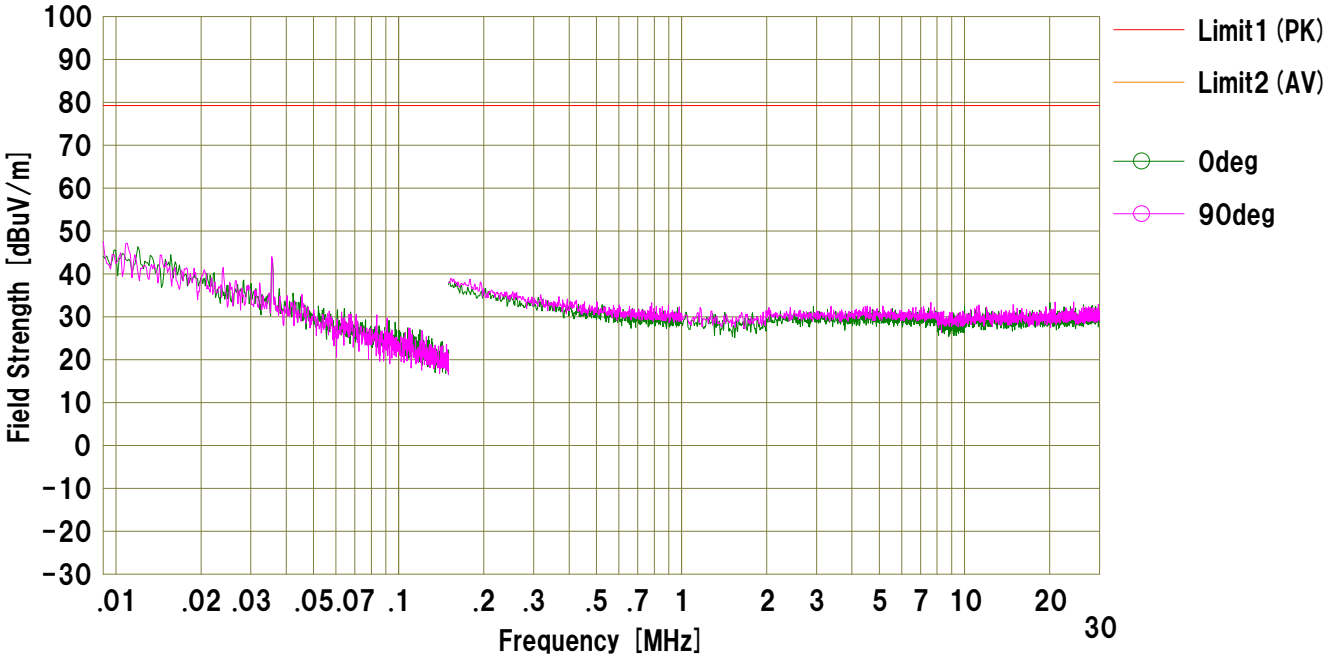
DATA OF RADIATED EMISSION (below 30MHz) TEST

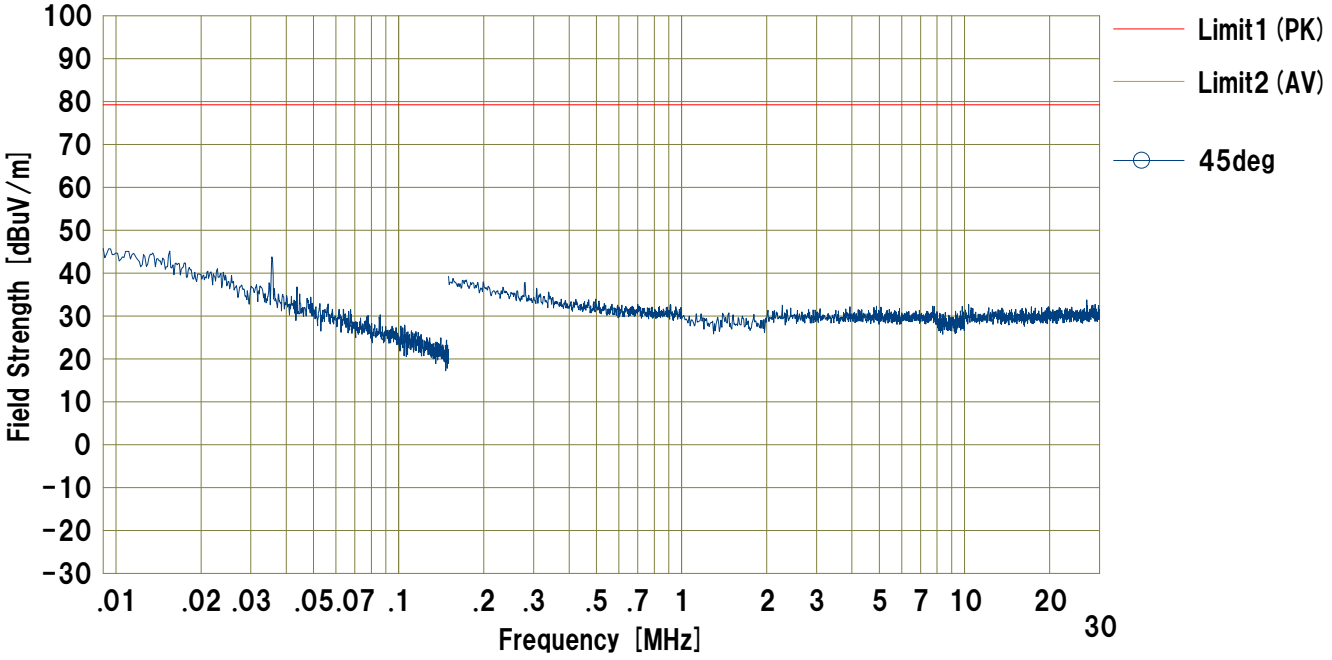
UL Japan,Inc. Shonan EMC Lab. No.2 Semi-Anechoic Chamber
Date : 2014/02/20

Company	: Circuit Design, Inc.	Mode	: Transmitting 462.5000MHz
Kind of EUT	: UHF Narrow band multi channel transceiver	Order No.	: 10214948S
Model No.	: LMD-400-R	Power	: DC 5V
Serial No.	: S0000019	Temp./Humi.	: 24deg.C / 21%RH
Remarks	: EUT & antenna worst-axis: Y No detect signal from EUT		

Limit1 : FCC part 90, carrier level=109.2dBuV/m, Spurious, PK

Engineer : Kenichi Adachi





Calculation:Result [dBuA] =Reading [dBuV] +Ant.Fac [dB] +Loss (Cable+ATT) [dB] -Gain (AMP) [dB]
Ant.Type=LOOP:Loop Antenna

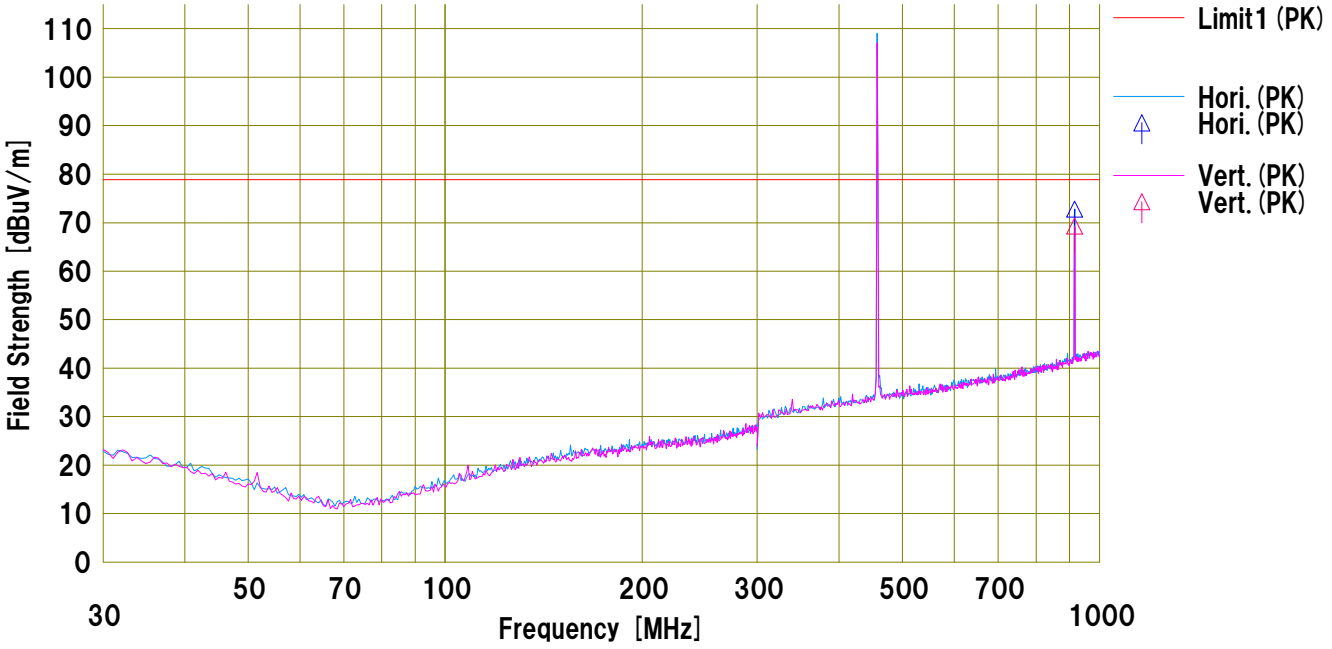
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.1 Semi-Anechoic Chamber
Date : 2014/02/18

Company	: Circuit Design, Inc.		Mode	: Transmitting 458.0000MHz
Kind of EUT	: UHF Narrow band multi channel transceiver		Order No.	: 10214948S
Model No.	: LMD-400-R		Power	: DC 5V
Serial No.	: S0000019		Temp./Humi.	: 21deg.C / 22%RH
Remarks	: EUT & antenna worst-axis: H: Z, V: X			

Limit1 : FCC part 90, carrier level=108.9dBuV/m, Spurious, PK

Engineer : Kenichi Adachi



No.	Freq.	Reading <PK>	Ant.Fac	Loss	Gain	Result <PK>	Limit <PK>	Margin <PK>	Pola.	Height	Angle	Ant. Type	Comment
	[MHz]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[H/V]	[cm]	[deg]		
1	915.996	62.6	21.5	20.0	31.3	72.8	78.9	6.1	Hori.	100	115	LP	
2	915.996	59.1	21.5	20.0	31.3	69.3	78.9	9.6	Vert.	100	0	LP	

Calculation:Result [dBuV/m] =Reading [dBuV] +Ant.Fac [dB/m] +Loss (Cable+ATT) [dB] -Gain (AMP) [dB]
Ant.Type=BC:Biconical Antenna, LP:Logperiodic Antenna, SHA**:Horn Antenna

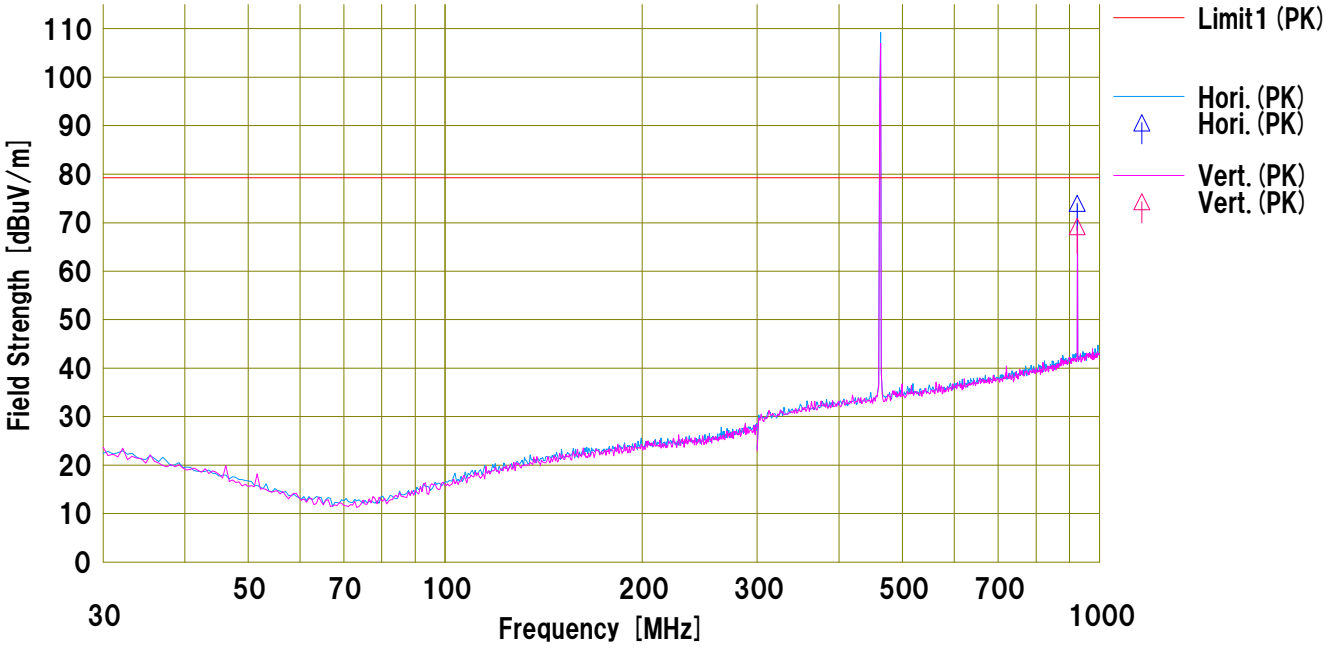
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.1 Semi-Anechoic Chamber
Date : 2014/02/18

Company	: Circuit Design, Inc.		Mode	: Transmitting 462.5000MHz	
Kind of EUT	: UHF Narrow band multi channel transceiver		Order No.	: 10214948S	
Model No.	: LMD-400-R		Power	: DC 5V	
Serial No.	: S0000019		Temp./Humi.	: 21deg.C / 22%RH	
Remarks	: EUT & antenna worst-axis: H: Z, V: X				

Limit1 : FCC part 90, carrier level=109.2dBuV/m, Spurious, PK

Engineer : Kenichi Adachi



No.	Freq.	Reading <PK>	Ant.Fac	Loss	Gain	Result <PK>	Limit <PK>	Margin <PK>	Pola.	Height	Angle	Ant. Type	Comment
	[MHz]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[H/V]	[cm]	[deg]		
1	924.996	63.7	21.5	20.0	31.2	74.0	79.2	5.2	Hori.	100	116	LP	
2	924.996	58.9	21.5	20.0	31.2	69.2	79.2	10.0	Vert.	100	0	LP	

Calculation:Result [dBuV/m] =Reading [dBuV] +Ant.Fac [dB/m] +Loss (Cable+ATT) [dB] -Gain (AMP) [dB]
Ant.Type=BC:Biconical Antenna, LP:Logperiodic Antenna, SHA**:Horn Antenna

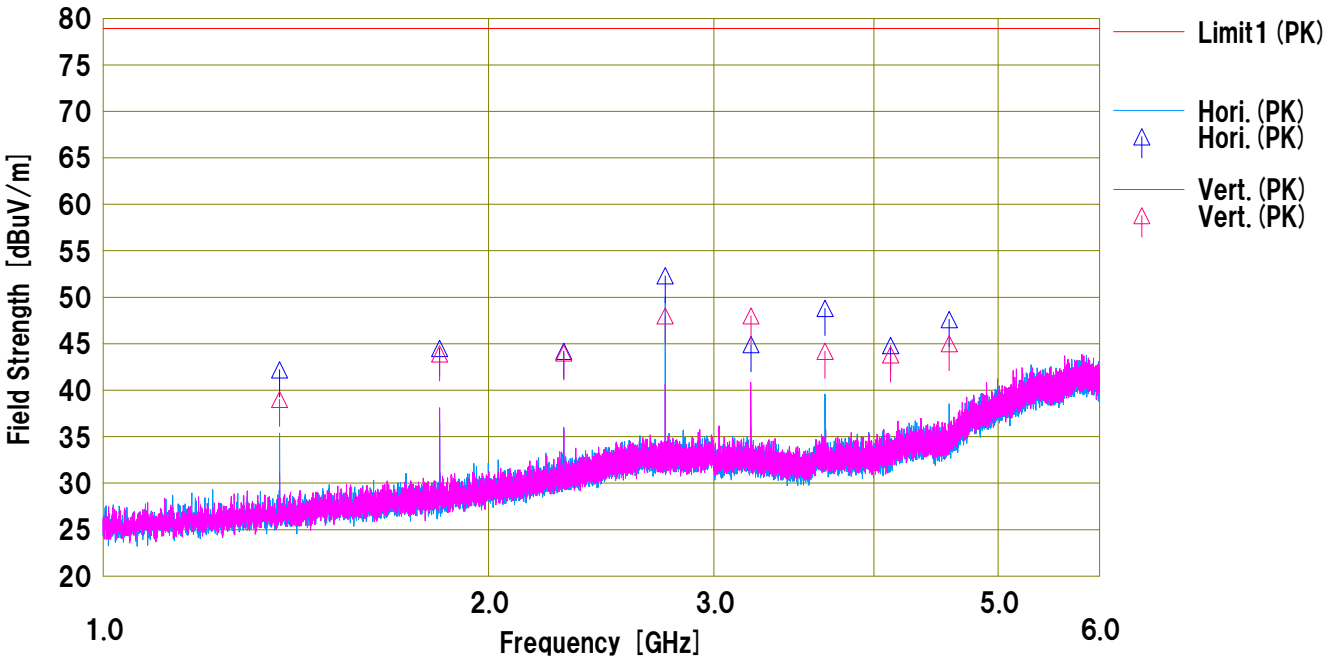
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.2 Semi-Anechoic Chamber
Date : 2014/02/19

Company	: Circuit Design, Inc.		Mode	: Transmitting 458.0000MHz	
Kind of EUT	: UHF Narrow band multi channel transceiver		Order No.	: 10214948S	
Model No.	: LMD-400-R		Power	: DC 5V	
Serial No.	: S0000019		Temp./Humi.	: 24deg.C / 21%RH	
Remarks	: EUT & antenna worst-axis: H: Y, V: Z				

Limit1 : FCC part 90, carrier level=108.9dBuV/m, Spurious, PK

Engineer : Kenichi Adachi



No.	Freq.	Reading <PK>	Ant.Fac	Loss	Gain	Result <PK>	Limit <PK>	Margin <PK>	Pola.	Height	Angle	Ant. Type	Comment
	[MHz]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[H/V]	[cm]	[deg]		
1	1373.993	50.2	24.9	3.1	36.0	42.2	78.9	36.7	Hori.	103	101	SHA02	
2	1831.992	50.5	25.7	3.7	35.4	44.5	78.9	34.4	Hori.	117	104	SHA02	
3	2289.988	48.0	27.1	4.2	35.1	44.2	78.9	34.7	Hori.	122	62	SHA02	
4	2747.987	54.6	28.2	4.6	35.1	52.3	78.9	26.6	Hori.	100	66	SHA02	
5	3205.984	46.5	28.4	5.1	35.1	44.9	78.9	34.0	Hori.	103	61	SHA02	
6	3663.981	50.0	28.4	5.5	35.1	48.8	78.9	30.1	Hori.	108	66	SHA02	
7	4121.979	45.0	28.9	5.7	34.8	44.8	78.9	34.1	Hori.	100	65	SHA02	
8	4579.977	46.4	29.6	6.2	34.6	47.6	78.9	31.3	Hori.	100	301	SHA02	
9	1373.993	47.0	24.9	3.1	36.0	39.0	78.9	39.9	Vert.	152	289	SHA02	
10	1831.992	49.9	25.7	3.7	35.4	43.9	78.9	35.0	Vert.	151	231	SHA02	
11	2289.988	47.8	27.1	4.2	35.1	44.0	78.9	34.9	Vert.	110	59	SHA02	
12	2747.987	50.3	28.2	4.6	35.1	48.0	78.9	30.9	Vert.	106	177	SHA02	
13	3205.984	49.6	28.4	5.1	35.1	48.0	78.9	30.9	Vert.	127	51	SHA02	
14	3663.981	45.4	28.4	5.5	35.1	44.2	78.9	34.7	Vert.	131	34	SHA02	
15	4121.979	44.0	28.9	5.7	34.8	43.8	78.9	35.1	Vert.	132	44	SHA02	
16	4579.977	43.8	29.6	6.2	34.6	45.0	78.9	33.9	Vert.	131	0	SHA02	

Calculation:Result [dBuV/m] =Reading [dBuV] +Ant.Fac [dB/m] +Loss (Cable) [dB] -Gain (AMP) [dB]
Ant.Type=BC:Biconical Antenna, LP:Logperiodic Antenna, SHA**:Horn Antenna

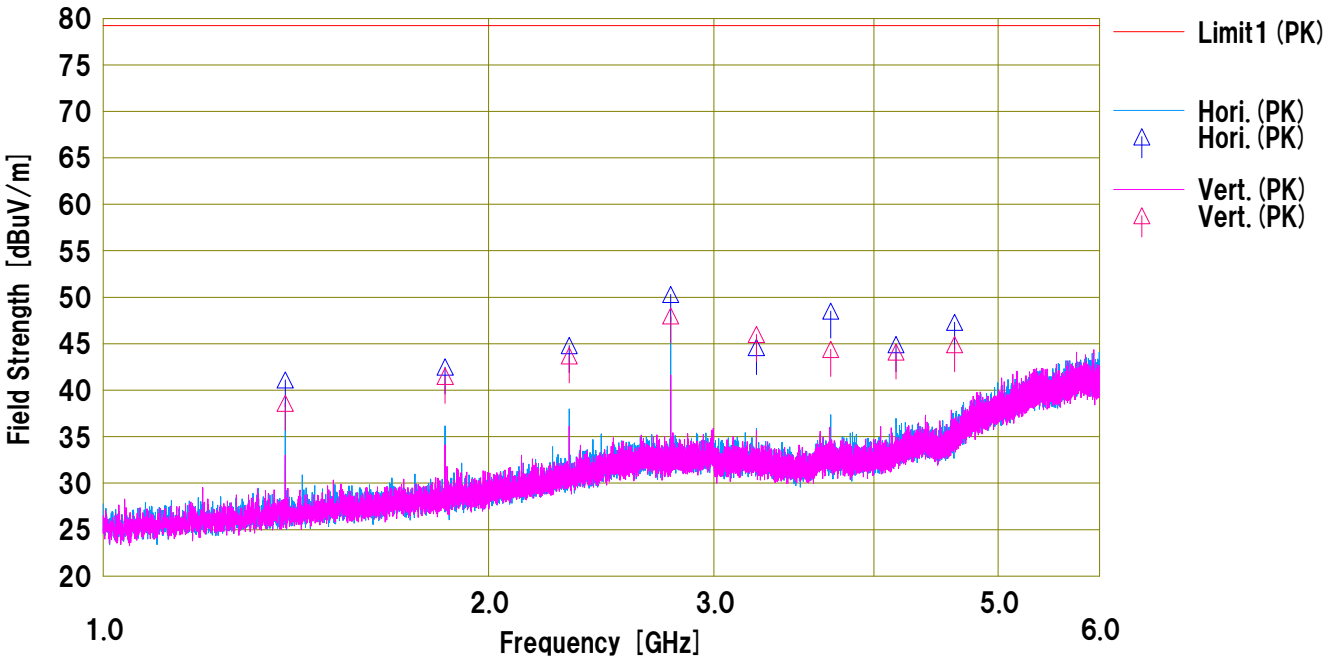
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.2 Semi-Anechoic Chamber
Date : 2014/02/19

Company	: Circuit Design, Inc.		Mode	: Transmitting 462.5000MHz
Kind of EUT	: UHF Narrow band multi channel transceiver		Order No.	: 10214948S
Model No.	: LMD-400-R		Power	: DC 5V
Serial No.	: S0000019		Temp./Humi.	: 24deg.C / 21%RH
Remarks	: EUT & antenna worst-axis: H: Y, V: Z			

Limit1 : FCC part 90, carrier level=109.2dBuV/m, Spurious, PK

Engineer : Kenichi Adachi



No.	Freq.	Reading <PK>	Ant.Fac	Loss	Gain	Result <PK>	Limit <PK>	Margin <PK>	Pola.	Height	Angle	Ant. Type	Comment
	[MHz]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[H/V]	[cm]	[deg]		
1	1387.493	48.9	24.9	3.2	35.9	41.1	79.2	38.1	Hori.	104	100	SHA02	
2	1849.991	48.4	25.7	3.8	35.4	42.5	79.2	36.7	Hori.	115	106	SHA02	
3	2312.488	48.5	27.2	4.2	35.1	44.8	79.2	34.4	Hori.	121	60	SHA02	
4	2774.986	52.5	28.3	4.6	35.1	50.3	79.2	28.9	Hori.	100	65	SHA02	
5	3237.484	46.2	28.4	5.2	35.2	44.6	79.2	34.6	Hori.	102	62	SHA02	
6	3699.981	49.7	28.4	5.5	35.1	48.5	79.2	30.7	Hori.	107	64	SHA02	
7	4162.479	44.9	29.0	5.8	34.8	44.9	79.2	34.3	Hori.	100	62	SHA02	
8	4624.977	45.8	29.9	6.2	34.6	47.3	79.2	31.9	Hori.	100	299	SHA02	
9	1387.493	46.4	24.9	3.2	35.9	38.6	79.2	40.6	Vert.	149	293	SHA02	
10	1849.991	47.4	25.7	3.8	35.4	41.5	79.2	37.7	Vert.	149	239	SHA02	
11	2312.488	47.4	27.2	4.2	35.1	43.7	79.2	35.5	Vert.	109	62	SHA02	
12	2774.986	50.2	28.3	4.6	35.1	48.0	79.2	31.2	Vert.	104	175	SHA02	
13	3237.484	47.6	28.4	5.2	35.2	46.0	79.2	33.2	Vert.	147	64	SHA02	
14	3699.981	45.6	28.4	5.5	35.1	44.4	79.2	34.8	Vert.	129	36	SHA02	
15	4162.479	44.1	29.0	5.8	34.8	44.1	79.2	35.1	Vert.	133	47	SHA02	
16	4624.977	43.4	29.9	6.2	34.6	44.9	79.2	34.3	Vert.	130	0	SHA02	

Calculation:Result [dBuV/m] =Reading [dBuV] +Ant.Fac [dB/m] +Loss (Cable) [dB] -Gain (AMP) [dB]
Ant.Type=BC:Biconical Antenna, LP:Logperiodic Antenna, SHA**:Horn Antenna

DATA OF RADIATED EMISSION (SUBSTITUTION) TEST

UL Japan, Inc. Shonan EMC Lab. No.1 Semi-Anechoic Chamber
Date : 2014/02/18

Company	: Circuit Design, Inc.	Mode	: Transmitting 458.0000MHz
Kind of EUT	: UHF Narrow band multi channel transceiver	Order No.	: 10214948S
Model No.	: LMD-400-R	Power	: DC 5V
Serial No.	: S0000019	Temp./Humi.	: 21deg.C / 22%RH
Remarks	: EUT & antenna worst-axis: H: Z, V: X		

Limit : FCC part 90,Substitution -13dBm,Spurious,PK

Engineer : Kenichi Adachi

<< ERP DATA >>

No.	Freq.	Reading <PK>	SG Level	TX Ant.Gain	TX Loss	ERP Result	ERP Limit	Margin	Pola.	Height	Angle	TX Ant.Type	Comment
	[MHz]	[dBuV]	[dBm]	[dBi]	[dB]	[dBm]	[dBm]	[dB]		[cm]	[deg]		
1	915.996	62.6	-8.6	2.2	20.8	-29.4	-13.0	16.4	Hori.	100	115	Dipol	
2	915.996	59.1	-8.9	2.2	20.8	-29.7	-13.0	16.7	Vert.	100	0	Dipol	

Calculation:Result [dBm] =SG level [dB] +Tx Ant Gain [dBi] -Tx Loss (Cable+ATT) [dB] -2.15 [dB]
Tx Ant: 120MHz turned Dipole (30M-120M), Dipole (120M-1G) / Rx-Ant: Biconical (25M-300M), Logperiodic (300M-1G)

DATA OF RADIATED EMISSION (SUBSTITUTION) TEST

UL Japan, Inc. Shonan EMC Lab. No.1 Semi-Anechoic Chamber
Date : 2014/02/18

Company	: Circuit Design, Inc.	Mode	: Transmitting 462.5000MHz
Kind of EUT	: UHF Narrow band multi channel transceiver	Order No.	: 10214948S
Model No.	: LMD-400-R	Power	: DC 5V
Serial No.	: S0000019	Temp./Humi.	: 21deg.C / 22%RH
Remarks	: EUT & antenna worst-axis: H: Z, V: X		

Limit : FCC part 90,Substitution -13dBm,Spurious,PK

Engineer : Kenichi Adachi

<< ERP DATA >>

No.	Freq.	Reading <PK>	SG Level	TX Ant.Gain	TX Loss	ERP Result	ERP Limit	Margin	Pola.	Height	Angle	TX Ant.Type	Comment
	[MHz]	[dBuV]	[dBm]	[dBi]	[dB]	[dBm]	[dBm]	[dB]		[cm]	[deg]		
1	924.996	63.7	-7.6	2.2	21.0	-28.6	-13.0	15.6	Hori.	100	116	Dipol	
2	924.996	58.9	-9.2	2.2	21.0	-30.2	-13.0	17.2	Vert.	100	0	Dipol	

Calculation:Result [dBm] =SG level [dB] +Tx Ant Gain [dBi] -Tx Loss (Cable+ATT) [dB] -2.15 [dB]
Tx Ant: 120MHz turned Dipole (30M-120M), Dipole (120M-1G) / Rx-Ant: Biconical (25M-300M), Logperiodic (300M-1G)

DATA OF RADIATED EMISSION (SUBSTITUTION) TEST

UL Japan, Inc. Shonan EMC Lab. No.2 Semi-Anechoic Chamber
Date : 2014/02/19

Company : Circuit Design, Inc.
Kind of EUT : UHF Narrow band multi channel transceiver
Model No. : LMD-400-R
Serial No. : S0000019
Remarks : EUT & antenna worst-axis: H: Y, V: Z

Mode : Transmitting 458.0000MHz
Order No. : 10214948S
Power : DC 5V
Temp./Humi. : 24deg.C / 21%RH

Limit : FCC part 90,Substitution -13dBm,Spurious,PK

Engineer : Kenichi Adachi

<< EIRP DATA >>

No.	Freq.	Reading <PK>	SG Level	TX Ant.Gain	TX Loss	EIRP Result	EIRP Limit	Margin	Pola.	Height	Angle	TX Ant.Type	Comment
	[MHz]	[dBuV]	[dBm]	[dBi]	[dB]	[dBm]	[dBm]	[dB]		[cm]	[deg]		
1	1373.993	50.2	-63.0	7.2	4.7	-60.5	-13.0	47.5	Hori.	103	101	Horn	
2	1831.992	50.5	-61.6	9.4	5.5	-57.7	-13.0	44.7	Hori.	117	104	Horn	
3	2289.988	48.0	-63.6	9.6	6.2	-60.2	-13.0	47.2	Hori.	122	62	Horn	
4	2747.987	54.6	-51.3	9.9	6.8	-48.2	-13.0	35.2	Hori.	100	66	Horn	
5	3205.984	46.5	-64.4	11.3	7.3	-60.4	-13.0	47.4	Hori.	103	61	Horn	
6	3663.981	50.0	-57.4	12.3	7.8	-52.9	-13.0	39.9	Hori.	108	66	Horn	
7	4121.979	45.0	-65.4	12.3	8.3	-61.4	-13.0	48.4	Hori.	100	65	Horn	
8	4579.977	46.4	-61.0	12.2	8.8	-57.6	-13.0	44.6	Hori.	100	301	Horn	
9	1373.993	47.0	-70.5	7.2	4.7	-68.0	-13.0	55.0	Vert.	152	289	Horn	
10	1831.992	49.9	-64.9	9.4	5.5	-61.0	-13.0	48.0	Vert.	151	231	Horn	
11	2289.988	47.8	-62.1	9.6	6.2	-58.7	-13.0	45.7	Vert.	110	59	Horn	
12	2747.987	50.3	-55.4	9.9	6.8	-52.3	-13.0	39.3	Vert.	106	177	Horn	
13	3205.984	49.6	-58.3	11.3	7.3	-54.3	-13.0	41.3	Vert.	127	51	Horn	
14	3663.981	45.4	-67.3	12.3	7.8	-62.8	-13.0	49.8	Vert.	131	34	Horn	
15	4121.979	44.0	-69.8	12.3	8.3	-65.8	-13.0	52.8	Vert.	132	44	Horn	
16	4579.977	43.8	-70.0	12.2	8.8	-66.6	-13.0	53.6	Vert.	131	0	Horn	

Calculation:Result [dBm] =SG level [dB] +Tx Ant Gain [dBi] -Tx Loss (Cable+ATT) [dB]
Tx Antenna: Horn (1G-40G) / Rx-Antenna: Horn (1G-40G)

DATA OF RADIATED EMISSION (SUBSTITUTION) TEST

UL Japan, Inc. Shonan EMC Lab. No.2 Semi-Anechoic Chamber
Date : 2014/02/19

Company : Circuit Design, Inc.
Kind of EUT : UHF Narrow band multi channel transceiver
Model No. : LMD-400-R
Serial No. : S0000019
Remarks : EUT & antenna worst-axis: H: Y, V: Z

Mode : Transmitting 462.5000MHz
Order No. : 10214948S
Power : DC 5V
Temp./Humi. : 24deg.C / 21%RH

Limit : FCC part 90,Substitution -13dBm,Spurious,PK

Engineer : Kenichi Adachi

<< EIRP DATA >>

No.	Freq.	Reading <PK>	SG Level	TX Ant.Gain	TX Loss	EIRP Result	EIRP Limit	Margin	Pola.	Height	Angle	TX Ant.Type	Comment
	[MHz]	[dBuV]	[dBm]	[dBi]	[dB]	[dBm]	[dBm]	[dB]		[cm]	[deg]		
1	1387.493	48.9	-64.3	7.3	4.8	-61.8	-13.0	48.8	Hori.	104	100	Horn	
2	1849.991	48.4	-63.7	9.5	5.5	-59.7	-13.0	46.7	Hori.	115	106	Horn	
3	2312.488	48.5	-63.1	9.6	6.2	-59.7	-13.0	46.7	Hori.	121	60	Horn	
4	2774.986	52.5	-52.4	10.0	6.8	-49.2	-13.0	36.2	Hori.	100	65	Horn	
5	3237.484	46.2	-64.7	11.4	7.4	-60.7	-13.0	47.7	Hori.	102	62	Horn	
6	3699.981	49.7	-57.7	12.3	7.9	-53.3	-13.0	40.3	Hori.	107	64	Horn	
7	4162.479	44.9	-65.5	12.3	8.4	-61.6	-13.0	48.6	Hori.	100	62	Horn	
8	4624.977	45.8	-61.6	12.2	8.9	-58.3	-13.0	45.3	Hori.	100	299	Horn	
9	1387.493	46.4	-71.1	7.3	4.8	-68.6	-13.0	55.6	Vert.	149	293	Horn	
10	1849.991	47.4	-66.4	9.5	5.5	-62.4	-13.0	49.4	Vert.	149	239	Horn	
11	2312.488	47.4	-62.5	9.6	6.2	-59.1	-13.0	46.1	Vert.	109	62	Horn	
12	2774.986	50.2	-55.5	10.0	6.8	-52.3	-13.0	39.3	Vert.	104	175	Horn	
13	3237.484	47.6	-60.3	11.4	7.4	-56.3	-13.0	43.3	Vert.	147	64	Horn	
14	3699.981	45.6	-67.5	12.3	7.9	-63.1	-13.0	50.1	Vert.	129	36	Horn	
15	4162.479	44.1	-69.9	12.3	8.4	-66.0	-13.0	53.0	Vert.	133	47	Horn	
16	4624.977	43.4	-70.4	12.2	8.9	-67.1	-13.0	54.1	Vert.	130	0	Horn	

Calculation:Result [dBm] =SG level [dB] +Tx Ant Gain [dBi] -Tx Loss (Cable+ATT) [dB]
Tx Antenna: Horn (1G-40G) / Rx-Antenna: Horn (1G-40G)

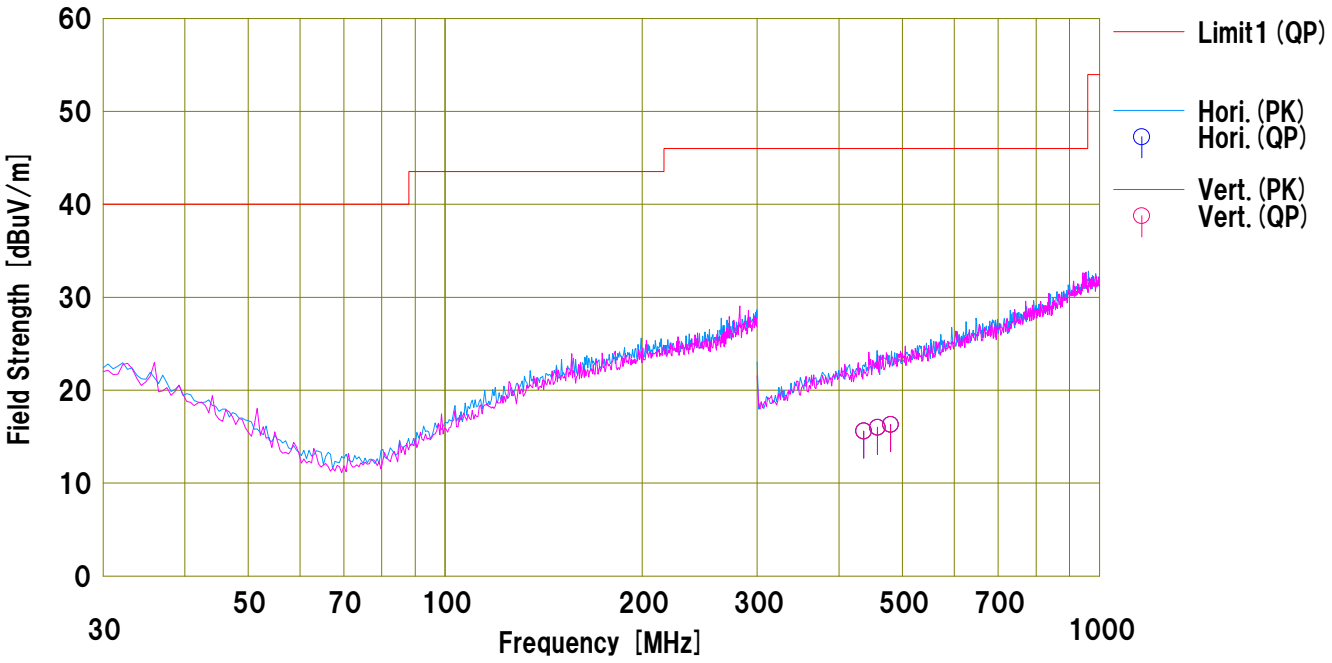
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.1 Semi-Anechoic Chamber
Date : 2014/02/18

Company	: Circuit Design, Inc.		Mode	: Receiving 458.0000MHz	
Kind of EUT	: UHF Narrow band multi channel transceiver		Order No.	: 10214948S	
Model No.	: LMD-400-R		Power	: DC 5V	
Serial No.	: S0000019		Temp./Humi.	: 21deg.C / 22%RH	
Remarks	: EUT & antenna worst-axis: H: Z, V: X				

Limit1 : FCC 15B Class B (3m)

Engineer : Kenichi Adachi



No.	Freq.	Reading <QP>	Ant.Fac	Loss	Gain	Result <QP>	Limit <QP>	Margin <QP>	Pola.	Height	Angle	Ant. Type	Comment
	[MHz]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[H/V]	[cm]	[deg]		
1	436.300	23.1	16.6	7.8	31.9	15.6	46.0	30.4	Hori.	100	0	LP	
2	457.998	23.2	16.8	7.9	31.9	16.0	46.0	30.0	Hori.	100	0	LP	
3	479.700	23.2	17.0	8.0	31.9	16.3	46.0	29.7	Hori.	100	0	LP	
4	436.300	23.1	16.6	7.8	31.9	15.6	46.0	30.4	Vert.	100	0	LP	
5	457.998	23.2	16.8	7.9	31.9	16.0	46.0	30.0	Vert.	100	0	LP	
6	479.700	23.2	17.0	8.0	31.9	16.3	46.0	29.7	Vert.	100	0	LP	

Calculation:Result [dBuV/m] =Reading [dBuV] +Ant.Fac [dB/m] +Loss (Cable+ATT+⊿AF) [dB] -Gain (AMP) [dB]
Ant.Type=BC:Biconical Antenna LP:Logperiodic Antenna SHA01: Horn

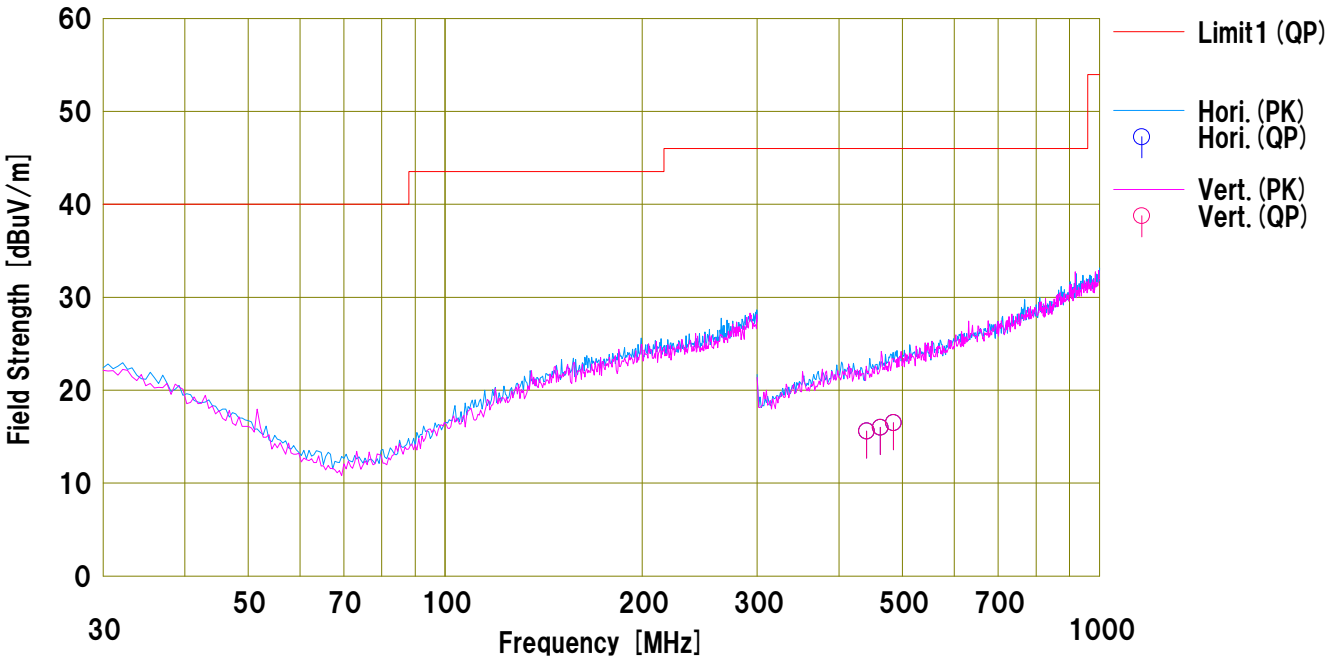
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.1 Semi-Anechoic Chamber
Date : 2014/02/18

Company	: Circuit Design, Inc.		Mode	: Receiving 462.5000MHz	
Kind of EUT	: UHF Narrow band multi channel transceiver		Order No.	: 10214948S	
Model No.	: LMD-400-R		Power	: DC 5V	
Serial No.	: S0000019		Temp./Humi.	: 21deg.C / 22%RH	
Remarks	: EUT & antenna worst-axis: H: Z, V: X				

Limit1 : FCC 15B Class B (3m)

Engineer : Kenichi Adachi



No.	Freq.	Reading <QP>	Ant.Fac	Loss	Gain	Result <QP>	Limit <QP>	Margin <QP>	Pola.	Height	Angle	Ant. Type	Comment
	[MHz]	[dBuV]	[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[H/V]	[cm]	[deg]		
1	440.800	23.1	16.6	7.8	31.9	15.6	46.0	30.4	Hori.	100	0	LP	
2	462.498	23.1	16.9	7.9	31.9	16.0	46.0	30.0	Hori.	100	0	LP	
3	484.200	23.2	17.1	8.1	31.9	16.5	46.0	29.5	Hori.	100	0	LP	
4	440.800	23.1	16.6	7.8	31.9	15.6	46.0	30.4	Vert.	100	0	LP	
5	462.498	23.1	16.9	7.9	31.9	16.0	46.0	30.0	Vert.	100	0	LP	
6	484.200	23.2	17.1	8.1	31.9	16.5	46.0	29.5	Vert.	100	0	LP	

Calculation:Result [dBuV/m] =Reading [dBuV] +Ant.Fac [dB/m] +Loss (Cable+ATT+⊿AF) [dB] -Gain (AMP) [dB]
Ant.Type=BC:Biconical Antenna LP:Logperiodic Antenna SHA01: Horn

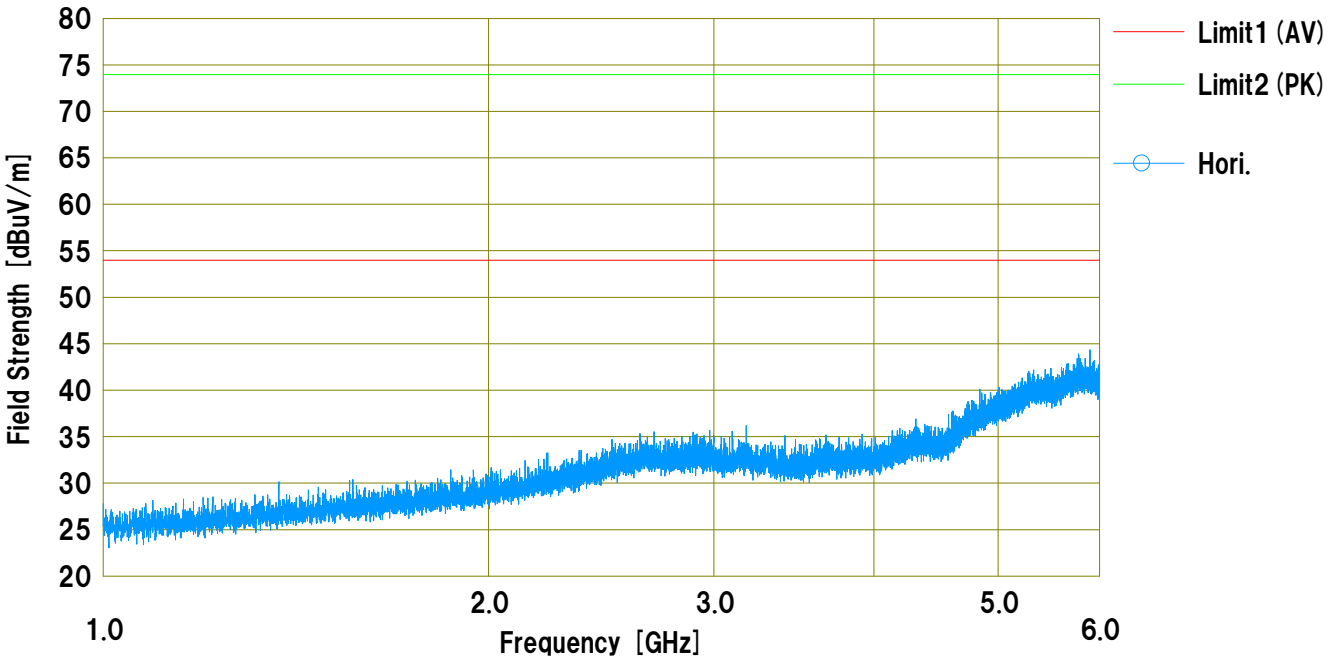
DATA OF RADIATED EMISSION TEST

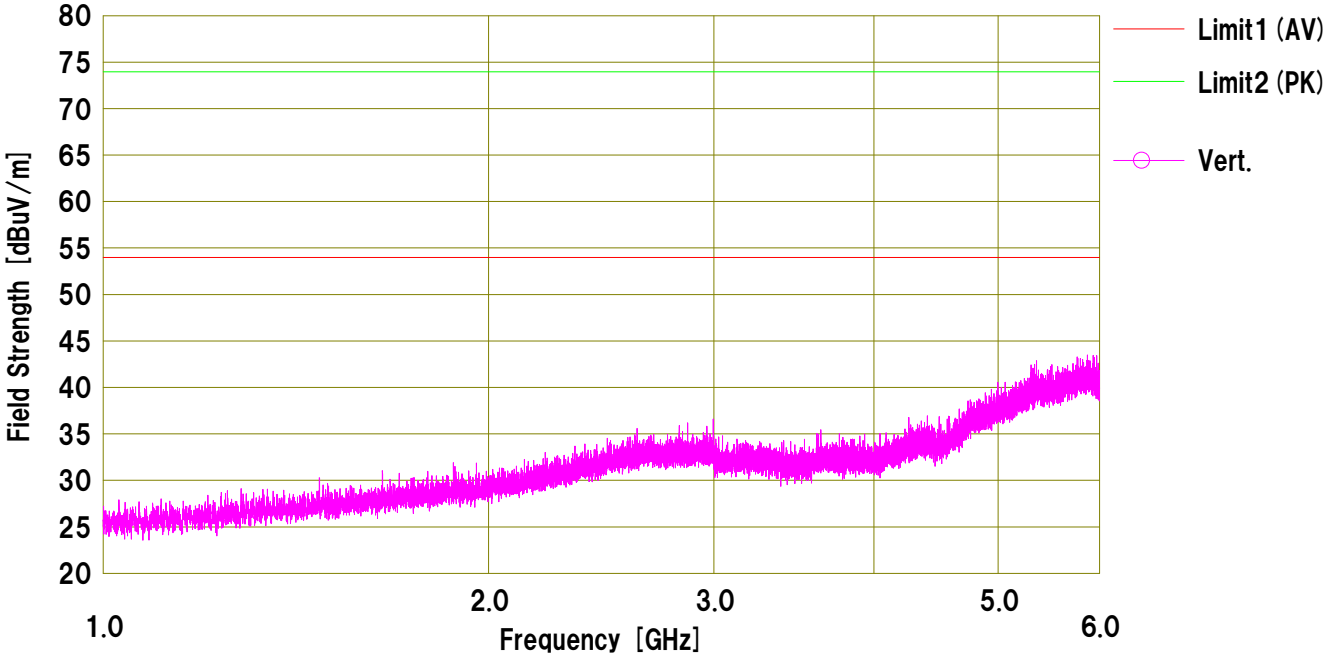
UL Japan, Inc. Shonan EMC Lab. No.2 Semi-Anechoic Chamber
Date : 2014/02/20

Company	:	Circuit Design, Inc.	Mode	:	Receiving 458.0000MHz
Kind of EUT	:	UHF Narrow band multi channel transceiver	Order No.	:	10214948S
Model No.	:	LMD-400-R	Power	:	DC 5V
Serial No.	:	S0000019	Temp./Humi.	:	24deg.C / 21%RH
Remarks	:	EUT & antenna worst-axis: H: Y, V: Z No detect signal from EUT			

Limit1 : FCC 15B Class B (3m) AV
Limit2 : FCC 15B Class B (3m) Peak

Engineer : Kenichi Adachi





Calculation:Result [dBuV/m] =Reading [dBuV] +Ant.Fac [dB/m] +Loss (Cable) [dB] -Gain (AMP) [dB]
Ant.Type=BC:Biconical Antenna, LP:Logperiodic Antenna, SHA**:Horn Antenna

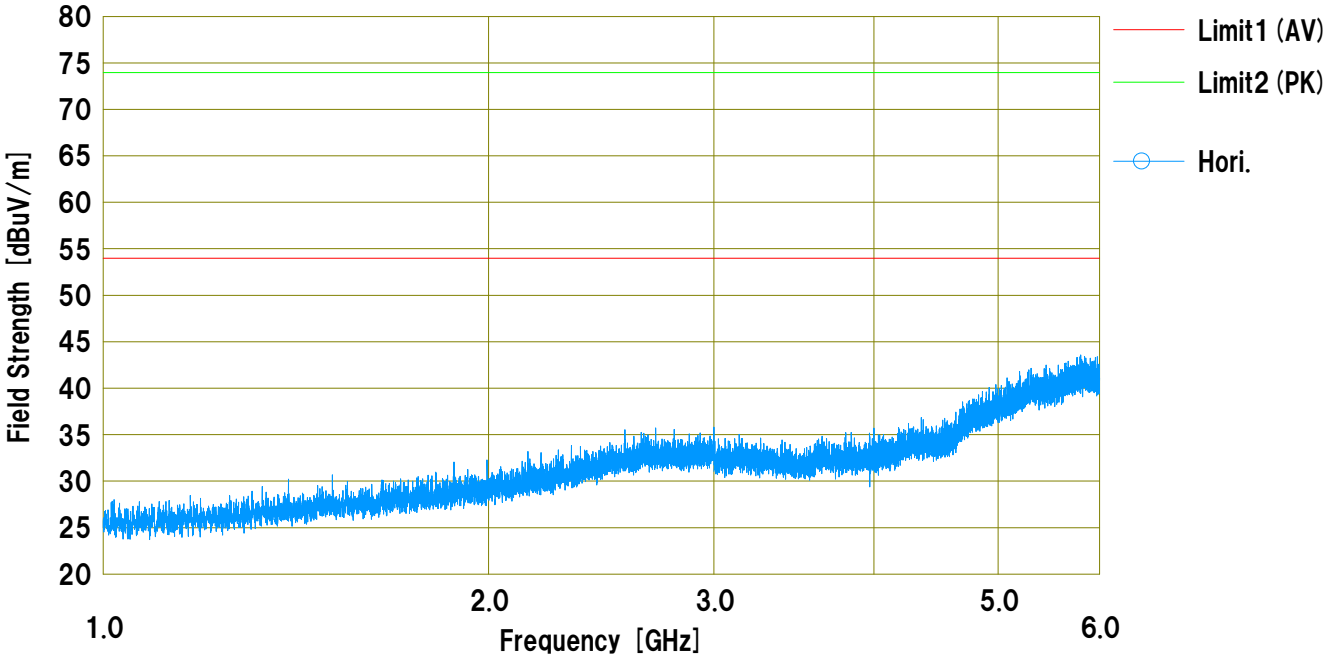
DATA OF RADIATED EMISSION TEST

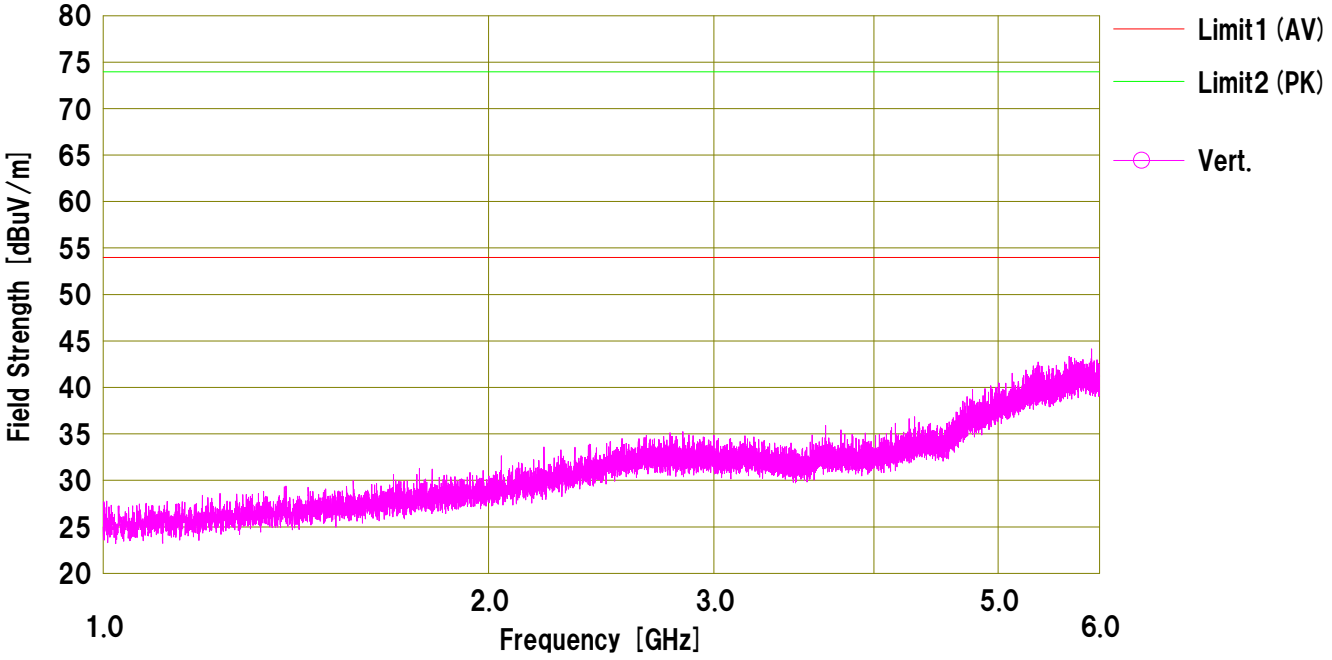
UL Japan, Inc. Shonan EMC Lab. No.2 Semi-Anechoic Chamber
Date : 2014/02/19

Company	:	Circuit Design, Inc.	Mode	:	Receiving 462.5000MHz
Kind of EUT	:	UHF Narrow band multi channel transceiver	Order No.	:	10214948S
Model No.	:	LMD-400-R	Power	:	DC 5V
Serial No.	:	S0000019	Temp./Humi.	:	24deg.C / 21%RH
Remarks	:	EUT & antenna worst-axis: H: Y, V: Z No detect signal from EUT			

Limit1 : FCC 15B Class B (3m) AV
Limit2 : FCC 15B Class B (3m) Peak

Engineer : Kenichi Adachi





Calculation:Result [dBuV/m] =Reading [dBuV] +Ant.Fac [dB/m] +Loss (Cable) [dB] -Gain (AMP) [dB]
Ant.Type=BC:Biconical Antenna, LP:Logperiodic Antenna, SHA**:Horn Antenna

Revised date : July 21, 2015

Frequency Stability

UL Japan, Inc.
Shonan EMC Lab. No.5 Shielded room

Company	Circuit Design Inc.	Regulation	FCC part 90 subpart I, 90.213
Equipment	UHF Narrow Band Multi Channel Transceiver		RSS-119 section 5.3
Model	LMD-400-R	Date	February 21, 2014
Serial No.	S0000020	Temperature	25 deg.C
Power	DC 5 V	Humidity	28 %RH
Mode	Transmitting 458 MHz	ENGINEER	Kenichi Adachi

Temperature Variation: -20deg.C

* This limit is severer limit value is applied.

Test Conditions	Original Frequency (MHz)	Measure Low frequency (MHz)	Measure High frequency (MHz)	Measure frequency (MHz)	Frequency Error (MHz)	Frequency torerance (ppm)	Limit (ppm)
startup	458.0000	457.996263	458.003950	458.000107	0.000107	0.23253	1.500
after 2minutes	458.0000	457.996200	458.004056	458.000128	0.000128	0.27948	1.500
after 5minutes	458.0000	457.996475	458.003619	458.000047	0.000047	0.10262	1.500
after 10minutes	458.0000	457.996481	458.003881	458.000181	0.000181	0.39520	1.500

Temperature Variation: -10deg.C

Test Conditions	Original Frequency (MHz)	Measure Low frequency (MHz)	Measure High frequency (MHz)	Measure frequency (MHz)	Frequency Error (MHz)	Frequency torerance (ppm)	Limit (ppm)
startup	458.0000	457.996288	458.004100	458.000194	0.000194	0.42358	1.500
after 2minutes	458.0000	457.996518	458.003956	458.000237	0.000237	0.51747	1.500
after 5minutes	458.0000	457.996406	458.003981	458.000194	0.000194	0.42249	1.500
after 10minutes	458.0000	457.996488	458.003788	458.000138	0.000138	0.30131	1.500

Temperature Variation: 0deg.C

Test Conditions	Original Frequency (MHz)	Measure Low frequency (MHz)	Measure High frequency (MHz)	Measure frequency (MHz)	Frequency Error (MHz)	Frequency torerance (ppm)	Limit (ppm)
startup	458.0000	457.996300	458.004075	458.000188	0.000188	0.40939	1.500
after 2minutes	458.0000	457.996175	458.004106	458.000141	0.000140	0.30677	1.500
after 5minutes	458.0000	457.995944	458.004100	458.000022	0.000022	0.04803	1.500
after 10minutes	458.0000	457.996568	458.003844	458.000206	0.000206	0.44978	1.500

Temperature Variation: 10deg.C

Test Conditions	Original Frequency (MHz)	Measure Low frequency (MHz)	Measure High frequency (MHz)	Measure frequency (MHz)	Frequency Error (MHz)	Frequency torerance (ppm)	Limit (ppm)
startup	458.0000	457.996400	458.004082	458.000241	0.000241	0.52620	1.500
after 2minutes	458.0000	457.995956	458.004119	458.000038	0.000037	0.08188	1.500
after 5minutes	458.0000	457.996431	458.003888	458.000160	0.000159	0.34825	1.500
after 10minutes	458.0000	457.996488	458.004088	458.000288	0.000288	0.62882	1.500

Temperature Variation: 20deg.C

Test Conditions	Original Frequency (MHz)	Measure Low frequency (MHz)	Measure High frequency (MHz)	Measure frequency (MHz)	Frequency Error (MHz)	Frequency torerance (ppm)	Limit (ppm)
startup	458.0000	457.996219	458.004050	458.000135	0.000135	0.29367	1.500
after 2minutes	458.0000	457.996294	458.004056	458.000175	0.000175	0.38210	1.500
after 5minutes	458.0000	457.996544	458.003794	458.000169	0.000169	0.36900	1.500
after 10minutes	458.0000	457.995912	458.004075	457.999994	-0.000007	-0.01419	1.500

* calculation: Measure frequency = (Measure Low frequency + Measure High frequency) / 2

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Revised date : July 21, 2015

Frequency Stability

Temperature Variation: 30deg.C

* This limit is severer limit value is applied.

Test Conditions	Original Frequency (MHz)	Measure Low frequency (MHz)	Measure High frequency (MHz)	Measure frequency (MHz)	Frequency Error (MHz)	Frequency torerance (ppm)	Limit (ppm)
startup	458.0000	457.996232	458.004100	458.000166	0.000166	0.36245	1.500
after 2minutes	458.0000	457.996212	458.004050	458.000131	0.000131	0.28603	1.500
after 5minutes	458.0000	457.996325	458.003894	458.000110	0.000110	0.23908	1.500
after 10minutes	458.0000	457.995900	458.004088	457.999994	-0.000006	-0.01310	1.500

Temperature Variation: 40deg.C

Test Conditions	Original Frequency (MHz)	Measure Low frequency (MHz)	Measure High frequency (MHz)	Measure frequency (MHz)	Frequency Error (MHz)	Frequency torerance (ppm)	Limit (ppm)
startup	458.0000	457.996162	458.003668	457.999915	-0.000085	-0.18559	1.500
after 2minutes	458.0000	457.996144	458.003926	458.000035	0.000035	0.07642	1.500
after 5minutes	458.0000	457.996206	458.003925	458.000066	0.000066	0.14301	1.500
after 10minutes	458.0000	457.995787	458.003931	457.999859	-0.000141	-0.30786	1.500

Temperature Variation: 50deg.C

Test Conditions	Original Frequency (MHz)	Measure Low frequency (MHz)	Measure High frequency (MHz)	Measure frequency (MHz)	Frequency Error (MHz)	Frequency torerance (ppm)	Limit (ppm)
startup	458.0000	457.996132	458.003850	457.999991	-0.000009	-0.01965	1.500
after 2minutes	458.0000	457.996263	458.003732	457.999998	-0.000002	-0.00546	1.500
after 5minutes	458.0000	457.996132	458.003863	457.999998	-0.000002	-0.00546	1.500
after 10minutes	458.0000	457.996088	458.003863	457.999976	-0.000024	-0.05349	1.500

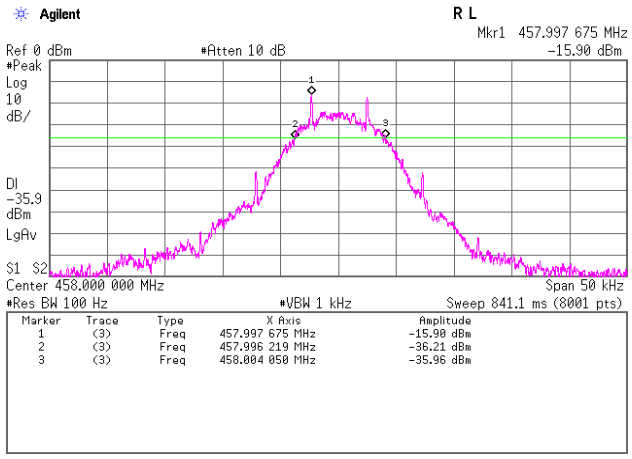
Temperature Variation: 60deg.C

Test Conditions	Original Frequency (MHz)	Measure Low frequency (MHz)	Measure High frequency (MHz)	Measure frequency (MHz)	Frequency Error (MHz)	Frequency torerance (ppm)	Limit (ppm)
startup	458.0000	457.995688	458.003838	457.999763	-0.000237	-0.51747	1.500
after 2minutes	458.0000	457.995694	458.003950	457.999822	-0.000178	-0.38865	1.500
after 5minutes	458.0000	457.996044	458.003856	457.999950	-0.000050	-0.10917	1.500
after 10minutes	458.0000	457.995712	458.003975	457.999844	-0.000157	-0.34170	1.500

* calculation: Measure frequency = (Measure Low frequency + Measure High frequency) / 2

* -30 deg.C was not measured, because this test may be not applied since the RF output power of this equipment is less than 120 mW.

(measured chart example)



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Revised date : July 21, 2015

Frequency Stability

UL Japan, Inc.
Shonan EMC Lab. No.5 Shielded room

Company	Circuit Design Inc.	Regulation	FCC part 90 subpart I, 90.213
Equipment	UHF Narrow Band Multi Channel Transceiver		RSS-119 section 5.3
Model	LMD-400-R	Date	February 21, 2014
Serial No.	S0000020	Temperature	25 deg.C
Power	DC 5 V	Humidity	28 %RH
Mode	Transmitting 462.5 MHz	ENGINEER	Kenichi Adachi

Temperature Variation: -20deg.C

* This limit is severer limit value is applied.

Test Conditions	Original Frequency (MHz)	Measure Low frequency (MHz)	Measure High frequency (MHz)	Measure frequency (MHz)	Frequency Error (MHz)	Frequency torerance (ppm)	Limit (ppm)
startup	462.5000	462.496200	462.504144	462.500172	0.000172	0.37189	1.500
after 2minutes	462.5000	462.496462	462.503581	462.500022	0.000022	0.04649	1.500
after 5minutes	462.5000	462.496500	462.503881	462.500191	0.000191	0.41189	1.500
after 10minutes	462.5000	462.496256	462.503732	462.499994	-0.000006	-0.01297	1.500

Temperature Variation: -10deg.C

Test Conditions	Original Frequency (MHz)	Measure Low frequency (MHz)	Measure High frequency (MHz)	Measure frequency (MHz)	Frequency Error (MHz)	Frequency torerance (ppm)	Limit (ppm)
startup	462.5000	462.495844	462.504106	462.499975	-0.000025	-0.05405	1.500
after 2minutes	462.5000	462.496406	462.503625	462.500016	0.000016	0.03351	1.500
after 5minutes	462.5000	462.496400	462.503937	462.500169	0.000168	0.36432	1.500
after 10minutes	462.5000	462.496532	462.503732	462.500132	0.000132	0.28541	1.500

Temperature Variation: 0deg.C

Test Conditions	Original Frequency (MHz)	Measure Low frequency (MHz)	Measure High frequency (MHz)	Measure frequency (MHz)	Frequency Error (MHz)	Frequency torerance (ppm)	Limit (ppm)
startup	462.5000	462.496162	462.504212	462.500187	0.000187	0.40432	1.500
after 2minutes	462.5000	462.496406	462.504050	462.500228	0.000228	0.49297	1.500
after 5minutes	462.5000	462.496393	462.504024	462.500209	0.000208	0.45081	1.500
after 10minutes	462.5000	462.496331	462.504224	462.500278	0.000278	0.60000	1.500

Temperature Variation: 10deg.C

Test Conditions	Original Frequency (MHz)	Measure Low frequency (MHz)	Measure High frequency (MHz)	Measure frequency (MHz)	Frequency Error (MHz)	Frequency torerance (ppm)	Limit (ppm)
startup	462.5000	462.495957	462.504244	462.500101	0.000101	0.21730	1.500
after 2minutes	462.5000	462.496269	462.504200	462.500235	0.000235	0.50703	1.500
after 5minutes	462.5000	462.496375	462.504119	462.500247	0.000247	0.53405	1.500
after 10minutes	462.5000	462.496431	462.504044	462.500238	0.000238	0.51351	1.500

Temperature Variation: 20deg.C

Test Conditions	Original Frequency (MHz)	Measure Low frequency (MHz)	Measure High frequency (MHz)	Measure frequency (MHz)	Frequency Error (MHz)	Frequency torerance (ppm)	Limit (ppm)
startup	462.5000	462.495919	462.503862	462.499891	-0.000110	-0.23676	1.500
after 2minutes	462.5000	462.495919	462.504157	462.500038	0.000038	0.08216	1.500
after 5minutes	462.5000	462.496300	462.503900	462.500100	0.000100	0.21622	1.500
after 10minutes	462.5000	462.495912	462.504069	462.499991	-0.000010	-0.02054	1.500

* calculation: Measure frequency = (Measure Low frequency + Measure High frequency) / 2

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Revised date : July 21, 2015

Frequency Stability

Temperature Variation: 30deg.C

* This limit is severer limit value is applied.

Test Conditions	Original Frequency (MHz)	Measure Low frequency (MHz)	Measure High frequency (MHz)	Measure frequency (MHz)	Frequency Error (MHz)	Frequency torerance (ppm)	Limit (ppm)
startup	462.5000	462.496294	462.503781	462.500038	0.000037	0.08108	1.500
after 2minutes	462.5000	462.496368	462.504012	462.500190	0.000190	0.41081	1.500
after 5minutes	462.5000	462.495887	462.504025	462.499956	-0.000044	-0.09514	1.500
after 10minutes	462.5000	462.496431	462.503787	462.500109	0.000109	0.23568	1.500

Temperature Variation: 40deg.C

Test Conditions	Original Frequency (MHz)	Measure Low frequency (MHz)	Measure High frequency (MHz)	Measure frequency (MHz)	Frequency Error (MHz)	Frequency torerance (ppm)	Limit (ppm)
startup	462.5000	462.496144	462.503663	462.499904	-0.000096	-0.20865	1.500
after 2minutes	462.5000	462.495788	462.504057	462.499923	-0.000077	-0.16757	1.500
after 5minutes	462.5000	462.495782	462.504063	462.499923	-0.000077	-0.16757	1.500
after 10minutes	462.5000	462.496182	462.503782	462.499982	-0.000018	-0.03892	1.500

Temperature Variation: 50deg.C

Test Conditions	Original Frequency (MHz)	Measure Low frequency (MHz)	Measure High frequency (MHz)	Measure frequency (MHz)	Frequency Error (MHz)	Frequency torerance (ppm)	Limit (ppm)
startup	462.5000	462.495719	462.503906	462.499813	-0.000188	-0.40541	1.500
after 2minutes	462.5000	462.496106	462.503693	462.499900	-0.000101	-0.21730	1.500
after 5minutes	462.5000	462.495688	462.503888	462.499788	-0.000212	-0.45838	1.500
after 10minutes	462.5000	462.495706	462.503982	462.499844	-0.000156	-0.33730	1.500

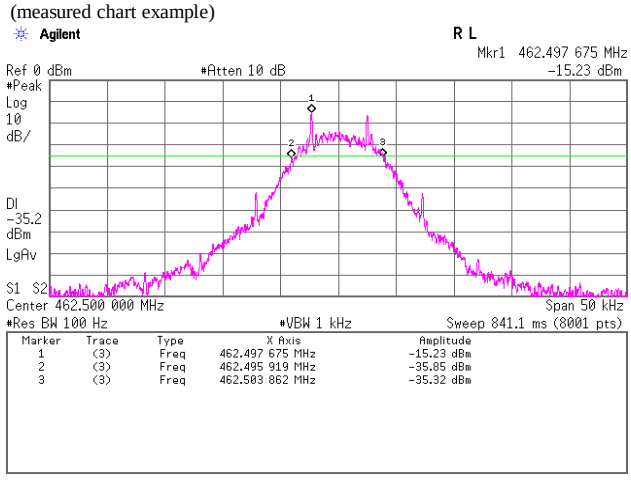
Temperature Variation: 60deg.C

Test Conditions	Original Frequency (MHz)	Measure Low frequency (MHz)	Measure High frequency (MHz)	Measure frequency (MHz)	Frequency Error (MHz)	Frequency torerance (ppm)	Limit (ppm)
startup	462.5000	462.495675	462.503900	462.499788	-0.000212	-0.45946	1.500
after 2minutes	462.5000	462.495994	462.503994	462.499994	-0.000006	-0.01297	1.500
after 5minutes	462.5000	462.495706	462.503825	462.499766	-0.000235	-0.50703	1.500
after 10minutes	462.5000	462.496044	462.503625	462.499835	-0.000165	-0.35784	1.500

* calculation: Measure frequency = (Measure Low frequency + Measure High frequency) / 2

* -30 deg.C was not measured, because this test may be not applied since the RF output power of this equipment is less than 120 mW.

(measured chart example)



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Frequency Stability

UL Japan, Inc.
Shonan EMC Lab. No.5 Shielded room

Company	Circuit Design Inc.	Regulation	FCC part 90 subpart I, 90.213
Equipment	UHF Narrow Band Multi Channel Transceiver		RSS-119 section 5.3
Model	LMD-400-R	Date	February 21, 2014
Serial No.	S0000020	Temperature	25 deg.C
Power	DC 5 V	Humidity	28 %RH
Mode	Transmitting 458 MHz	ENGINEER	Kenichi Adachi

Voltage Variation: DC 3 V
Temperature Variation: 20deg.C

* This limit is severer limit value is applied.

Test Conditions	Original Frequency (MHz)	Measure Low frequency (MHz)	Measure High frequency (MHz)	Measure frequency (MHz)	Frequency Error (MHz)	Frequency torerance (ppm)	Limit (ppm)
startup	458.0000	457.996344	458.003694	458.000019	0.000019	0.04148	1.500
after 2minutes	458.0000	457.996225	458.004069	458.000147	0.000147	0.32096	1.500
after 5minutes	458.0000	457.996400	458.003894	458.000147	0.000147	0.32096	1.500
after 10minutes	458.0000	457.996250	458.004176	458.000213	0.000213	0.46507	1.500

Voltage Variation: DC 5 V
Temperature Variation: 20deg.C

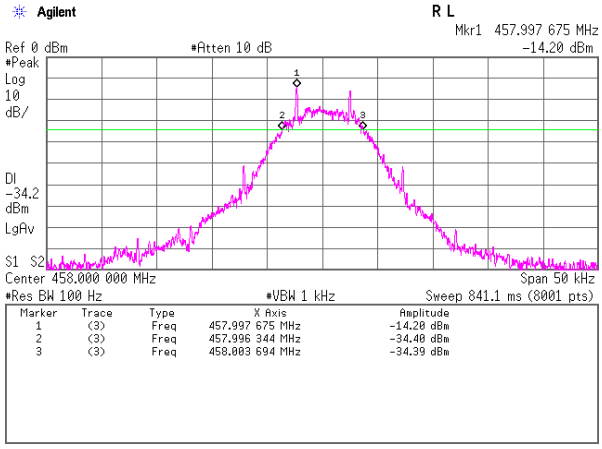
Test Conditions	Original Frequency (MHz)	Measure Low frequency (MHz)	Measure High frequency (MHz)	Measure frequency (MHz)	Frequency Error (MHz)	Frequency torerance (ppm)	Limit (ppm)
startup	458.0000	457.996219	458.004050	458.000135	0.000135	0.29367	1.500
after 2minutes	458.0000	457.996294	458.004056	458.000175	0.000175	0.38210	1.500
after 5minutes	458.0000	457.996544	458.003794	458.000169	0.000169	0.36900	1.500
after 10minutes	458.0000	457.995912	458.004075	457.999994	-0.000007	-0.01419	1.500

Voltage Variation: DC 5.5 V
Temperature Variation: 20deg.C

Test Conditions	Original Frequency (MHz)	Measure Low frequency (MHz)	Measure High frequency (MHz)	Measure frequency (MHz)	Frequency Error (MHz)	Frequency torerance (ppm)	Limit (ppm)
startup	458.0000	457.996388	458.004025	458.000207	0.000206	0.45087	1.500
after 2minutes	458.0000	457.996318	458.004044	458.000181	0.000181	0.39520	1.500
after 5minutes	458.0000	457.996400	458.004044	458.000222	0.000222	0.48472	1.500
after 10minutes	458.0000	457.996388	458.004050	458.000219	0.000219	0.47817	1.500

* calculation: Measure frequency = (Measure Low frequency + Measure High frequency) / 2

(measured chart example)



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Revised date : July 21, 2015

Frequency Stability

UL Japan, Inc.
Shonan EMC Lab. No.5 Shielded room

Company	Circuit Design Inc.	Regulation	FCC part 90 subpart I, 90.213
Equipment	UHF Narrow Band Multi Channel Transceiver		RSS-119 section 5.3
Model	LMD-400-R	Date	February 21, 2014
Serial No.	S0000020	Temperature	25 deg.C
Power	DC 5 V	Humidity	28 %RH
Mode	Transmitting 462.5 MHz	ENGINEER	Kenichi Adachi

Voltage Variation: DC 3 V
Temperature Variation: 20deg.C

* This limit is severer limit value is applied.

Test Conditions	Original Frequency (MHz)	Measure Low frequency (MHz)	Measure High frequency (MHz)	Measure frequency (MHz)	Frequency Error (MHz)	Frequency torerance (ppm)	Limit (ppm)
startup	462.5000	462.496300	462.504025	462.500163	0.000162	0.35135	1.500
after 2minutes	462.5000	462.495912	462.504106	462.500009	0.000009	0.01946	1.500
after 5minutes	462.5000	462.496475	462.503881	462.500178	0.000178	0.38486	1.500
after 10minutes	462.5000	462.496362	462.503725	462.500044	0.000043	0.09405	1.500

Voltage Variation: DC 5 V
Temperature Variation: 20deg.C

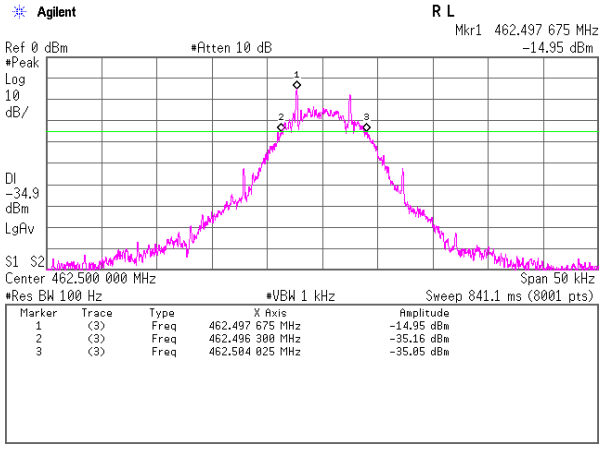
Test Conditions	Original Frequency (MHz)	Measure Low frequency (MHz)	Measure High frequency (MHz)	Measure frequency (MHz)	Frequency Error (MHz)	Frequency torerance (ppm)	Limit (ppm)
startup	462.5000	462.495919	462.503862	462.499891	-0.000110	-0.23676	1.500
after 2minutes	462.5000	462.495919	462.504157	462.500038	0.000038	0.08216	1.500
after 5minutes	462.5000	462.496300	462.503900	462.500100	0.000100	0.21622	1.500
after 10minutes	462.5000	462.495912	462.504069	462.499991	-0.000010	-0.02054	1.500

Voltage Variation: DC 5.5 V
Temperature Variation: 20deg.C

Test Conditions	Original Frequency (MHz)	Measure Low frequency (MHz)	Measure High frequency (MHz)	Measure frequency (MHz)	Frequency Error (MHz)	Frequency torerance (ppm)	Limit (ppm)
startup	462.5000	462.496312	462.504056	462.500184	0.000184	0.39784	1.500
after 2minutes	462.5000	462.496244	462.504168	462.500206	0.000206	0.44541	1.500
after 5minutes	462.5000	462.496288	462.503894	462.500091	0.000091	0.19676	1.500
after 10minutes	462.5000	462.495919	462.504112	462.500016	0.000016	0.03351	1.500

* calculation: Measure frequency = (Measure Low frequency + Measure High frequency) / 2

(measured chart example)



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APPENDIX 2
Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SBA-01	Biconical Antenna	Schwarzbeck	BBA9106	91032664	RE	2013/10/13 * 12
KAT6-04	Attenuator	INMET	18N-6dB	-	RE	2013/12/26 * 12
SCC-A1/A3/A5/A7/A8/A13/SRSE-01	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-269(RF Selector)	RE	2013/04/04 * 12
SLA-01	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A 0888	RE	2013/10/26 * 12
KAT3-09	Attenuator	JFW IND. INC.	50HF-003N	-	RE	2013/08/23 * 12
SCC-A2/A4/A6/A7/A8/A13/SRSE-01	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-269(RF Selector)	RE	2013/04/04 * 12
SAT10-01	Attenuator	JFW	50HF-010N	-	RE	2014/02/17 * 12
SAF-01	Pre Amplifier	SONOMA	310N	290211	RE	2014/02/17 * 12
STR-01	Test Receiver	Rohde & Schwarz	ESU40	100093	RE	2013/11/20 * 12
SOS-02	Humidity Indicator	A&D	AD-5681	4063343	RE	2013/03/07 * 12
SJM-08	Measure	PROMART	SEN1935	-	RE	-
SAEC-01(NSA)	Semi-Anechoic Chamber	TDK	SAEC-01(NSA)	1	RE	2013/07/03 * 12
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE,RFI,MF)	-	RE	-
STM-06	Terminator	TME	CT-01 BP	-	RE	2013/12/26 * 12
SSG-02	Signal Generator	Agilent	E8257D-540	MY48051404	RE	2013/03/29 * 12
SCC-04	Coaxial Cable	Fujikura	5D2W	-	RE	2013/09/03 * 12
SCC-05	Coaxial Cable	Fujikura	5D2W	-	RE	2013/04/03 * 12
SDA-08	Dipole Antenna	Schwarzbeck	UHAP	1158	RE	2013/03/29 * 12
SHA-01	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-725	RE	2013/08/12 * 12
SCC-G01	Coaxial Cable	Suhner	SUCOFLEX 104A	46497/4A	RE	2013/04/09 * 12
SAF-04	Pre Amplifier	TOYO Corporation	TPA0118-36	1440489	RE	2013/03/19 * 12
SCC-G21	Coaxial Cable	Suhner	SUCOFLEX 104	296169/4	RE	2013/05/22 * 12
SHA-02	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-726	RE	2013/08/12 * 12
SCC-G02	Coaxial Cable	Suhner	SUCOFLEX 104A	46498/4A	RE	2013/04/09 * 12
KAF-04	Pre Amplifier	Agilent	8449B	3008A01600	RE	2013/04/03 * 12
SCC-G22	Coaxial Cable	Suhner	SUCOFLEX 104	296199/4	RE	2013/05/22 * 12
SSA-01	Spectrum Analyzer	Agilent	N9010A-526	MY48031482	RE	2013/04/09 * 12
SOS-04	Humidity Indicator	A&D	AD-5681	4061512	RE	2013/03/07 * 12
SJM-02	Measure	KOMELON	KMC-36	-	RE	-
SAEC-02(NSA)	Semi-Anechoic Chamber	TDK	SAEC-02(NSA)	2	RE	2013/07/06 * 12
SCC-G16	Coaxial Cable	Suhner	SUCOFLEX 102	32704/2	RE	2013/03/16 * 12
SHA-RS01	Horn Antenna	Schwarzbeck	BBHA9120D	770	RE	2013/08/19 * 12
SLP-02	Loop Antenna	Rohde & Schwarz	HFH2-Z2	100218	RE	2013/11/08 * 12
SAT6-07	Attenuator	JFW	50HF-006N	-	RE	2014/02/17 * 12
SCC-B2/B4/B6/B7/B8/B13/SRSE-02	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-270(RF Selector)	RE	2013/04/03 * 12
SAF-02	Pre Amplifier	SONOMA	310N	290212	RE	2014/02/17 * 12
STR-02	Test Receiver	Rohde & Schwarz	ESCI	100575	RE	2013/09/24 * 12

The expiration date of the calibration is the end of the expired month .
As for some calibrations performed after the tested dates , those test equipment have been controlled by means of an unbroken chains of calibrations .

All equipment is calibrated with valid calibrations . Each measurement data is traceable to the national or international standards .
Test Item : RE: Radiated emission, AT: Antenna terminal conducted tests ,

APPENDIX 2
Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SPM-06	Power Meter	Anritsu	ML2495A	0850009	AT	2013/04/09 * 12
SPSS-01	Power Sensor	Anritsu	MA2444D	0738366	AT	2013/04/09 * 12
SFC-01	Microwave Counter	Agilent	53151A	US40511493	AT	2013/03/26 * 12
SSA-03	Spectrum Analyzer	Agilent	E4448A	MY48250152	AT	2014/02/03 * 12
SAT20-06	Attenuator	Weinschel Corp.	54A-20	31506	AT	2013/04/09 * 12
SCC-G13	Coaxial Cable	Suhner	SUCOFLEX 102	31599/2	AT	2013/03/16 * 12
SOS-09	Humidity Indicator	A&D	AD-5681	4061484	AT	2013/03/07 * 12
STS-05	Digital Hitester	Hioki	3805-50	080997828	AT	2013/03/25 * 12
SCH-01	Temperature and Humidity Chamber	Espec	PL-1KT	14020837	AT	2013/04/17 * 12

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