



# RADIO TEST REPORT

Test Report No.: 10939078S

**Applicant** : Fukuda Denshi Co., Ltd.  
**Type of Equipment** : ECG & Respiration Transmitter  
**Model No.** : LX-7120(G)  
**FCC ID** : DV8LX7120G  
**Test regulation** : FCC Part 95 Subpart H: 2015  
FCC Part 2 Subpart J: 2015  
**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 regulation.
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. This test report covers Radio technical requirements.  
It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)

**Date of test:** September 17 to 25, 2015

**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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13-EM-F0429



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## **SECTION 1: Customer information**

Company Name : Fukuda Denshi Co., Ltd.  
Address : 35-8, Hongo 2-chome, Bunkyo-ku, Tokyo 113-8420, Japan  
Telephone Number : +81-3-5684-1480  
Facsimile Number : +81-3-5684-1449  
Contact Person : Yoshi Muraki

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

### **2.1 Identification of E.U.T.**

Type of equipment : ECG & Respiration Transmitter  
Model No. : LX-7120(G)  
Serial No. : Refer to Clause 4.2  
Rating : DC 1.5 V (Battery)  
Country of Mass-production : Japan  
Condition of EUT : Engineering prototype  
(Not for Sale: This sample is equivalent to mass-produced items.)  
Modification of EUT : No modification by the test lab.  
Receipt Date of Sample : September 7, 2015

### **2.2 Product description**

Model: LX-7120(G) (referred to as the EUT in this report) is ECG & Respiration Transmitter.

Clock frequency(ies) in the system : 8 MHz, 84 kHz (Not Radio part), 13.0 MHz (Radio part, TCXO)

Radio specification:

Radio Type : Transmitter  
Frequency of Operation : 1395.0375 MHz to 1399.9625 MHz, 1427.0375 MHz to 1431.4625 MHz  
Modulation : DFSK  
RF Output Power : 5 mW  $\pm$ 2 dB \*1)  
RF Output Power Limit : 740 mV/m at 3m (= 117.3 dBuV/m at 3 m)  
Antenna type : Dielectric antenna  
Antenna gain : -13 dBi  
Operating Temperature : +10 deg. C. to +40 deg. C.  
Frequency stability :  $\pm$ 2.5 ppm  
ITU code (Emission designator) : F1D

\*1) RF Output Power is fixed as shown in "08 (Confidential) Theory of Operation.pdf" and this product is shipped.  
(\* maximum measurement value was 0.26 mW. refer to APPENDIX 1 (p.20 to p.26).)

Supplied voltage:

The EUT is a battery-operated device and test was performed with the new battery. Therefore, the EUT complies with power supply regulation.

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## **SECTION 3: Test specification, procedures & results**

### **3.1 Test specification**

Test specification : FCC Part 95 Subpart H: 2015, final revised on September 8, 2015  
Title : FCC 47CFR Part 95 Personal Radio Services  
Subpart H Wireless Medical Telemetry Service (WMTS)

Test specification : FCC Part 2 Subpart J: 2015, final revised on September 8, 2015  
Title : FCC 47CFR Part 2 Frequency Allocations and Radio Treaty Matters; General Rules and Regulations  
Subpart J Equipment Authorization Procedures

The EUT is used for the purpose of being related with medical treatment. Therefore this device applies to §15.103(e), exempted from FCC Part 15 Subpart B.

### **3.2 Procedures & Results**

<b>Item</b>	<b>Test Procedure</b>	<b>Specification</b>	<b>Remarks</b>	<b>Deviation</b>	<b>Worst margin</b>	<b>Results</b>
Field strength of fundamental emission	FCC 2.1046, ANSI/TIA-603-D: 2010	FCC 95.1115 (a)	Radiated	N/A	28.0 dB 1431.4625 MHz Horizontal, AV Tx 1431.4625 MHz	Complied
Field strength of spurious emissions	FCC 2.1053, ANSI/TIA-603-D: 2010	FCC 95.1115 (b)	Radiated	N/A	0.4 dB 2790.075 MHz Horizontal, AV Tx 1395.0375 MHz	Complied
Frequency stability	FCC 2.1055, ANSI/TIA-603-D: 2010	FCC 95.1115 (e)	Radiated	N/A	-	Complied
Bandwidth	FCC 2.1049, ANSI/TIA-603-D: 2010	Applicant specification	Radiated	N/A	-	Complied
Spurious emission at antenna terminals	FCC 2.1051, ANSI/TIA-603-D: 2010	-	Conducted	N/A *1)	-	-

Note: UL Japan, Inc.'s EMI Work Test Procedure 13-EM-W0420.

\*1) The test is not applicable since the EUT has no antenna terminals.

### **3.3 Addition to standard**

No addition, exclusion nor deviation has been made from the standard.

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### 3.4 Uncertainty

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

Item	Frequency range	No.1 SAC <sup>*1</sup> /SR <sup>*2</sup> (±)	No.2 SAC/SR (±)	No.3 SAC/SR (±)
<b>Radiated emission</b> (Measurement distance: 3 m)	9 kHz-30 MHz	3.7 dB	3.5 dB	3.5 dB
	30 MHz-300 MHz	4.9 dB	4.9 dB	4.7 dB
	300 MHz-1 GHz	5.0 dB	5.0 dB	4.8 dB
	1 GHz-15 GHz	4.9 dB	4.9 dB	4.9 dB

\*1: SAC=Semi-Anechoic Chamber

\*2: SR= Shielded Room is applied besides radiated emission

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

### Other test

Frequency Measurement uncertainty for this test was: (±)  $5.3 \times 10^{-6}$ .

Bandwidth Measurement uncertainty for this test was: (±) 0.66 %

### 3.5 Test location

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	IC Registration No.	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
<input type="checkbox"/> No.1 semi-anechoic chamber	2973D-1	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
<input type="checkbox"/> No.2 semi-anechoic chamber	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
<input checked="" type="checkbox"/> No.3 semi-anechoic chamber	2973D-3	12.7 x 7.7 x 5.35	12.7 x 7.7	5m
<input type="checkbox"/> No.4 semi-anechoic chamber	-	8.1 x 5.1 x 3.55	8.1 x 5.1	-
<input type="checkbox"/> No.1 shielded room	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
<input type="checkbox"/> No.2 shielded room	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
<input type="checkbox"/> No.3 shielded room	-	6.3 x 4.7 x 2.7	6.3 x 4.7	-
<input type="checkbox"/> No.4 shielded room	-	4.4 x 4.7 x 2.7	4.4 x 4.7	-
<input checked="" type="checkbox"/> No.5 shielded room	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
<input type="checkbox"/> No.6 shielded room	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
<input type="checkbox"/> No.1 measurement room	-	2.55 x 4.1 x 2.5	-	-

### 3.6 Test setup, Test data & Test instruments

Refer to APPENDIX 1 to 3.

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

### **4.1 Operating mode**

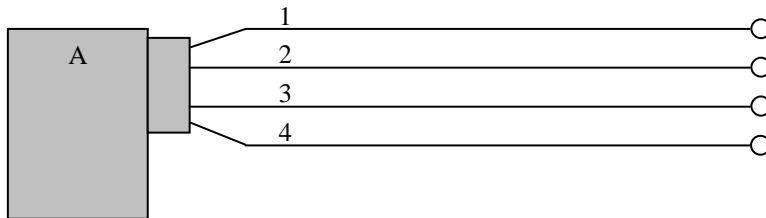
The EUT exercise program used during testing was designed to exercise the various system components in a manner similar to typical use.

Test item	Operating mode	Tested frequency
All items	Transmitting (Modulated)	1395.0375 MHz, 1397.5125 MHz, 1399.9625 MHz, 1427.0375 MHz, 1429.2625 MHz, 1431.4625 MHz

Software: None (Firmware of the EUT)

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

### **4.2 Configuration and peripherals**



\* Test data was taken under worse case conditions.

### **Description of EUT and support equipment**

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	ECG & Respiration Transmitter	LX-7120(G)	3-2	FUKUDA DENSHI	EUT

### **List of cables used**

No.	Name	Length (m)	Shield (Cable)	Shield (Connector)	Remarks
1	Patient	0.7	Shielded	Unshielded	-
2	Patient	0.7	Shielded	Unshielded	-
3	Patient	0.7	Shielded	Unshielded	-
4	Patient	0.7	Shielded	Unshielded	-

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## **SECTION 5: Bandwidth & Occupied bandwidth (99%)**

### **Test procedure**

The bandwidth was measured with a spectrum analyzer.

Summary of the test results: Pass  
Refer to APPENDIX 1

## **SECTION 6: Frequency stability**

### **Test procedure**

The frequency stability was measured with a spectrum analyzer.  
The temperature test was started after the temperature stabilization time of 30 minutes.

\* Tested temperature was -20 to +50deg.C, because EUT cannot transmit under the temperature of -30deg.C.  
(EUT's specification: +10 to +40 deg.C.)

Summary of the test results: Pass  
Refer to APPENDIX 1

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## **SECTION 7: Field strength of fundamental emission and spurious emissions**

### **7.1 Operating environment**

Test place : See test data (APPENDIX 1)  
Temperature : See test data (APPENDIX 1)  
Humidity : See test data (APPENDIX 1)

### **7.2 Test configuration**

EUT was placed on a polystyrene platform of nominal size, 0.5 m by 0.5 m, raised 0.8 m above the conducting ground plane. Photographs of the set up are shown in APPENDIX 3.

### **7.3 Test conditions**

Frequency range : 30 MHz to 15 GHz  
EUT position : Table top

### **7.4 Test procedure**

The Radiated Electric Field Strength intensity has been measured with a ground plane and at a distance of 3 m. The measuring antenna height was varied between 1 and 4 m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.

The measurements were performed for both vertical and horizontal antenna polarization.

Measurements were performed with QP and AV detector.

The radiated emission measurements were made with the following detector function.

Frequency	Below 1 GHz	Above 1 GHz
Instrument used	Test Receiver	Spectrum Analyzer *1)
Detector IF Bandwidth	QP: BW 120 kHz	AV RBW: 1 MHz VBW: 10 Hz (No pulse emission detected)
Measuring antenna	Biconical (30 MHz - 300 MHz) Logperiodic (300 MHz - 1 GHz)	Horn

\*1) When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

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.

Antenna polarization	Carrier (Band edge)	Spurious (Below 1 GHz)	Spurious (1 GHz - 15 GHz)
Horizontal	Y	Y	Y
Vertical	Z	Z	Z

\* The definition of each position is shown in a 'Pre-check of the worst position' in APPENDIX 3.

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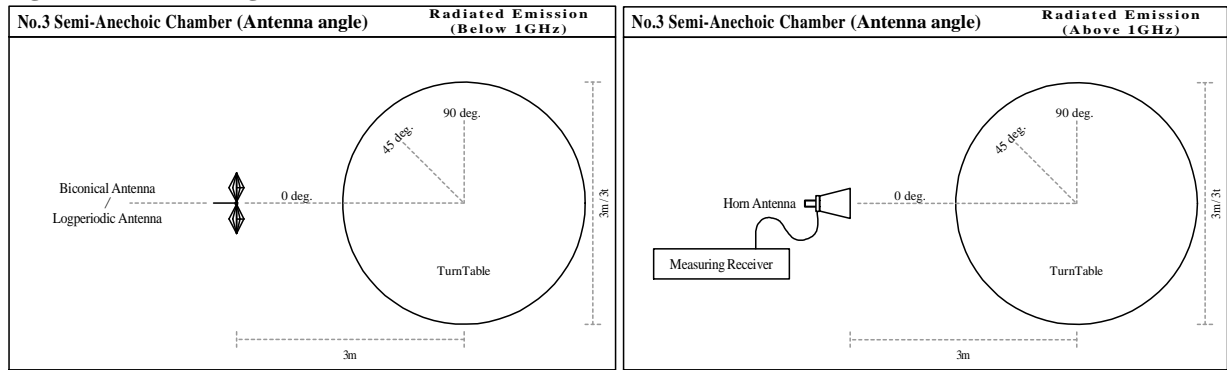
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**Figure 1. Antenna angle**



**7.5 Band edge**

To determine the level of band-edge spurious, we use the following procedure:

Set the resolution bandwidth to 1 kHz in the peak detector mode.

Because we don't want to include in-band emission at Band edge measurement if center frequencies are "1395.0375 MHz" or "1399.9625 MHz" and Band edges are "1395 MHz" or "1400 MHz", "1427.0375 MHz" or "1431.4625 MHz" and Band edges are "1427 MHz" or "1432 MHz",

(The supplementation: There are some granted test report that were measured by 3 kHz RBW for the equipment that has 350 kHz for 26 dB bandwidth in similar case. )

\*As we started at section 7.5, we used RBW = 1 kHz (greater than 1 % bandwidth) to prevent to detect in-band emission. Refer to KDB 662683.

Measure the maximum level of the in-band channel closest to the band edge and the maximum level of the out-of-band emissions close to the same band edge.

Determine the ratio of the in-band signal to the out-of-band emissions. Then, measure the level of the in-band channel in Average mode (= VBW 10 Hz) with 1MHz bandwidth. Using the ratio obtained, we calculate the equivalent level of the out-of-band emissions to determine compliance with the limits.

The emission tests, except for the band edge, were performed with the average mode of the spectrum analyzer. (Bandwidth: 1 MHz)

**7.6 Results**

Summary of the test results : Pass

\* No noise from radio part was detected in 9 kHz to 30 MHz.

Refer to APPENDIX 1

## **Contents of APPENDIXES**

### **APPENDIX 1: Data of Radio tests**

Frequency stability  
26 dB bandwidth  
Field strength of fundamental emission and spurious emissions  
Occupied bandwidth

### **APPENDIX 2: Test instruments**

Test instruments

### **APPENDIX 3: Photographs of test setup**

Field strength of fundamental emission and spurious emissions  
Pre-check of the worst position

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Revised date : October 19, 2015

## APPENDIX 2: Data of Radio tests

### Frequency Stability

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room	
Date	September 24, 2015	September 25, 2015	October 19, 2015
Temperature / Humidity	23 deg.C / 43 %RH	27 deg.C / 46 %RH	25 deg.C / 54 %RH
Engineer	Yosuke Ishikawa	Yosuke Ishikawa	Kenichi Adachi
Mode	Transmitting		

Test Condition deg.C	Test Timing	Measured freq [MHz]	Freq error [MHz]	Result [ppm]	Limit [+/- ppm]	Margin [ppm]		
20 deg.C	DC 0.9 V (Vmin)	Power on	1395.038011	0.000511	0.37	2.50	2.13	
		on 2 min.	1395.038173	0.000673	0.48	2.50	2.02	
		on 5 min.	1395.037966	0.000466	0.33	2.50	2.17	
		on 10 min.	1395.038448	0.000948	0.68	2.50	1.82	
	DC 1.5 V (Vnom)	Power on	1395.037924	0.000424	0.30	2.50	2.20	
		on 2 min.	1395.038042	0.000542	0.39	2.50	2.11	
		on 5 min.	1395.037522	0.000022	0.02	2.50	2.48	
		on 10 min.	1395.038041	0.000541	0.39	2.50	2.11	
	50 deg.C.	DC 1.5 V	Power on	1395.037638	0.000138	0.10	2.50	2.40
			on 2 min.	1395.037909	0.000409	0.29	2.50	2.21
			on 5 min.	1395.038105	0.000605	0.43	2.50	2.07
			on 10 min.	1395.038148	0.000648	0.46	2.50	2.04
40 deg.C.		Power on	1395.038074	0.000574	0.41	2.50	2.09	
		on 2 min.	1395.038112	0.000612	0.44	2.50	2.06	
		on 5 min.	1395.037824	0.000324	0.23	2.50	2.27	
		on 10 min.	1395.037768	0.000268	0.19	2.50	2.31	
30 deg.C.		Power on	1395.037886	0.000386	0.28	2.50	2.22	
		on 2 min.	1395.038168	0.000667	0.48	2.50	2.02	
		on 5 min.	1395.037416	-0.000084	-0.06	2.50	2.44	
		on 10 min.	1395.037523	0.000023	0.02	2.50	2.48	
20 deg.C.	Power on	1395.037924	0.000424	0.30	2.50	2.20		
	on 2 min.	1395.038042	0.000542	0.39	2.50	2.11		
	on 5 min.	1395.037522	0.000022	0.02	2.50	2.48		
	on 10 min.	1395.038041	0.000541	0.39	2.50	2.11		
10 deg.C.	Power on	1395.037977	0.000477	0.34	2.50	2.16		
	on 2 min.	1395.037939	0.000439	0.31	2.50	2.19		
	on 5 min.	1395.037614	0.000114	0.08	2.50	2.42		
	on 10 min.	1395.037445	-0.000055	-0.04	2.50	2.46		
0 deg.C.	Power on	1395.037677	0.000177	0.13	2.50	2.37		
	on 2 min.	1395.037652	0.000152	0.11	2.50	2.39		
	on 5 min.	1395.037514	0.000014	0.01	2.50	2.49		
	on 10 min.	1395.037464	-0.000037	-0.03	2.50	2.47		
-10 deg.C.	Power on	1395.037851	0.000351	0.25	2.50	2.25		
	on 2 min.	1395.037938	0.000438	0.31	2.50	2.19		
	on 5 min.	1395.037506	0.000006	0.00	2.50	2.50		
	on 10 min.	1395.037495	-0.000006	0.00	2.50	2.50		
-20 deg.C	Power on	1395.037802	0.000302	0.22	2.50	2.28		
	on 2 min.	1395.037727	0.000227	0.16	2.50	2.34		
	on 5 min.	1395.037564	0.000064	0.05	2.50	2.45		
	on 10 min.	1395.037301	-0.000199	-0.14	2.50	2.36		
-30deg.C	Power on	1395.037553	0.000053	0.04	2.50	2.46		
	on 2 min.	1395.037891	0.000391	0.28	2.50	2.22		
	on 5 min.	1395.039380	0.001880	1.35	2.50	1.15		
	on 10 min.	transmit stop	-	-	2.50	-		

Limit : 1395.038 MHz +/-0.00025 % (+/- 2.5 ppm) = +/- 0.003488 MHz

\*The test on -30 deg.C. was not apply, since EUT cannot transmit on -30 deg.C.

(The transmit of EUT stopped about 5 min. later.)

(The specification of operating temperature of EUT was 10 deg.C to 40 deg.C.)

Revised date : October 19, 2015

## Frequency Stability

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room	
Date	September 24, 2015	September 25, 2015	October 19, 2015
Temperature / Humidity	23 deg.C / 43 %RH	27 deg.C / 46 %RH	25 deg.C / 54 %RH
Engineer	Yosuke Ishikawa	Yosuke Ishikawa	Kenichi Adachi
Mode	Transmitting		

Test Condition deg.C	Test Timing	Measured freq [MHz]	Freq error [MHz]	Result [ppm]	Limit [+/- ppm]	Margin [ppm]		
20 deg.C	DC 0.9 V (Vmin)	Power on	1397.512986	0.000485	0.35	2.50	2.15	
		on 2 min.	1397.513054	0.000554	0.40	2.50	2.10	
		on 5 min.	1397.512479	-0.000022	-0.02	2.50	2.48	
		on 10 min.	1397.512341	-0.000159	-0.11	2.50	2.39	
	DC 1.5 V (Vnom)	Power on	1397.512472	-0.000028	-0.02	2.50	2.48	
		on 2 min.	1397.512692	0.000192	0.14	2.50	2.36	
		on 5 min.	1397.512503	0.000003	0.00	2.50	2.50	
		on 10 min.	1397.512517	0.000016	0.01	2.50	2.49	
	50 deg.C. 40 deg.C. 30 deg.C. 20 deg.C. 10 deg.C. 0 deg.C. -10 deg.C. -20 deg.C. -30deg.C	DC 1.5 V	Power on	1397.513080	0.000580	0.42	2.50	2.08
			on 2 min.	1397.513030	0.000530	0.38	2.50	2.12
			on 5 min.	1397.512868	0.000368	0.26	2.50	2.24
			on 10 min.	1397.512579	0.000079	0.06	2.50	2.44
Power on			1397.512960	0.000460	0.33	2.50	2.17	
on 2 min.			1397.513073	0.000572	0.41	2.50	2.09	
on 5 min.			1397.512917	0.000416	0.30	2.50	2.20	
on 10 min.			1397.512779	0.000278	0.20	2.50	2.30	
Power on			1397.512704	0.000203	0.15	2.50	2.35	
on 2 min.			1397.512816	0.000315	0.23	2.50	2.27	
on 5 min.			1397.512322	-0.000179	-0.13	2.50	2.37	
on 10 min.			1397.512554	0.000054	0.04	2.50	2.46	
Power on			1397.512472	-0.000028	-0.02	2.50	2.48	
on 2 min.			1397.512692	0.000192	0.14	2.50	2.36	
on 5 min.			1397.512503	0.000003	0.00	2.50	2.50	
on 10 min.			1397.512517	0.000016	0.01	2.50	2.49	
Power on			1397.512876	0.000376	0.27	2.50	2.23	
on 2 min.			1397.512770	0.000270	0.19	2.50	2.31	
on 5 min.			1397.512538	0.000037	0.03	2.50	2.47	
on 10 min.			1397.512476	-0.000024	-0.02	2.50	2.48	
Power on			1397.512989	0.000489	0.35	2.50	2.15	
on 2 min.			1397.512638	0.000138	0.10	2.50	2.40	
on 5 min.			1397.512269	-0.000231	-0.17	2.50	2.33	
on 10 min.			1397.512344	-0.000156	-0.11	2.50	2.39	
Power on	1397.512989	0.000489	0.35	2.50	2.15			
on 2 min.	1397.512845	0.000345	0.25	2.50	2.25			
on 5 min.	1397.512194	-0.000307	-0.22	2.50	2.28			
on 10 min.	1397.512353	-0.000148	-0.11	2.50	2.39			
Power on	1397.513101	0.000601	0.43	2.50	2.07			
on 2 min.	1397.511869	-0.000631	-0.45	2.50	2.05			
on 5 min.	1397.512438	-0.000062	-0.04	2.50	2.46			
on 10 min.	1397.512413	-0.000087	-0.06	2.50	2.44			
Power on	transmit stop	-	-	-	2.50	-		
on 2 min.	transmit stop	-	-	-	2.50	-		
on 5 min.	transmit stop	-	-	-	2.50	-		
on 10 min.	transmit stop	-	-	-	2.50	-		

Limit : 1397.513 MHz +/-0.00025 % (+/- 2.5 ppm) = +/- 0.003494 MHz

\*The test on -30 deg.C. was not apply, since EUT cannot transmit on -30 deg.C.

(The specification of operating temperature of EUT was 10 deg.C to 40 deg.C.)

Revised date : October 19, 2015

## Frequency Stability

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room	
Date	September 24, 2015	September 25, 2015	October 19, 2015
Temperature / Humidity	23 deg.C / 43 %RH	27 deg.C / 46 %RH	25 deg.C / 54 %RH
Engineer	Yosuke Ishikawa	Yosuke Ishikawa	Kenichi Adachi
Mode	Transmitting		

Test Condition deg.C	Test Timing	Measured freq [MHz]	Freq error [MHz]	Result [ppm]	Limit [+/- ppm]	Margin [ppm]		
20 deg.C	DC 0.9 V (Vmin)	Power on	1399.963230	0.000730	0.52	2.50	1.98	
		on 2 min.	1399.963080	0.000579	0.41	2.50	2.09	
		on 5 min.	1399.963080	0.000579	0.41	2.50	2.09	
		on 10 min.	1399.962705	0.000205	0.15	2.50	2.35	
	DC 1.5 V (Vnom)	Power on	1399.962578	0.000078	0.06	2.50	2.44	
		on 2 min.	1399.962634	0.000134	0.10	2.50	2.40	
		on 5 min.	1399.962528	0.000028	0.02	2.50	2.48	
		on 10 min.	1399.962547	0.000046	0.03	2.50	2.47	
	50 deg.C. 40 deg.C. 30 deg.C. 20 deg.C. 10 deg.C. 0 deg.C. -10 deg.C. -20 deg.C -30deg.C	DC 1.5 V	Power on	1399.963291	0.000791	0.57	2.50	1.93
			on 2 min.	1399.963141	0.000641	0.46	2.50	2.04
			on 5 min.	1399.963003	0.000503	0.36	2.50	2.14
			on 10 min.	1399.963222	0.000722	0.52	2.50	1.98
Power on			1399.963510	0.001009	0.72	2.50	1.78	
on 2 min.			1399.962885	0.000385	0.27	2.50	2.23	
on 5 min.			1399.962772	0.000272	0.19	2.50	2.31	
on 10 min.			1399.962716	0.000215	0.15	2.50	2.35	
Power on			1399.962678	0.000178	0.13	2.50	2.37	
on 2 min.			1399.963054	0.000554	0.40	2.50	2.10	
on 5 min.			1399.962710	0.000209	0.15	2.50	2.35	
on 10 min.			1399.962766	0.000266	0.19	2.50	2.31	
Power on			1399.962578	0.000078	0.06	2.50	2.44	
on 2 min.			1399.962634	0.000134	0.10	2.50	2.40	
on 5 min.			1399.962528	0.000028	0.02	2.50	2.48	
on 10 min.			1399.962547	0.000046	0.03	2.50	2.47	
Power on			1399.962563	0.000062	0.04	2.50	2.46	
on 2 min.			1399.962957	0.000457	0.33	2.50	2.17	
on 5 min.			1399.962472	-0.000028	-0.02	2.50	2.48	
on 10 min.			1399.962531	0.000031	0.02	2.50	2.48	
Power on			1399.962669	0.000169	0.12	2.50	2.38	
on 2 min.			1399.962400	-0.000100	-0.07	2.50	2.43	
on 5 min.			1399.962556	0.000056	0.04	2.50	2.46	
on 10 min.			1399.962243	-0.000257	-0.18	2.50	2.32	
Power on	1399.962895	0.000394	0.28	2.50	2.22			
on 2 min.	1399.962807	0.000306	0.22	2.50	2.28			
on 5 min.	1399.962513	0.000012	0.01	2.50	2.49			
on 10 min.	1399.962450	-0.000050	-0.04	2.50	2.46			
Power on	1399.963439	0.000939	0.67	2.50	1.83			
on 2 min.	1399.962944	0.000444	0.32	2.50	2.18			
on 5 min.	1399.962144	-0.000357	-0.25	2.50	2.25			
on 10 min.	1399.962306	-0.000195	-0.14	2.50	2.36			
Power on	transmit stop	-	-	-	2.50	-		
on 2 min.	transmit stop	-	-	-	2.50	-		
on 5 min.	transmit stop	-	-	-	2.50	-		
on 10 min.	transmit stop	-	-	-	2.50	-		

Limit : 1399.963 MHz +/-0.00025 % (+/- 2.5 ppm) = +/- 0.003500 MHz

\*The test on -30 deg.C. was not apply, since EUT cannot transmit on -30 deg.C.

(The specification of operating temperature of EUT was 10 deg.C to 40 deg.C.)

Revised date : October 19, 2015

## Frequency Stability

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room	
Date	September 24, 2015	September 25, 2015	October 19, 2015
Temperature / Humidity	23 deg.C / 43 %RH	27 deg.C / 46 %RH	25 deg.C / 54 %RH
Engineer	Yosuke Ishikawa	Yosuke Ishikawa	Kenichi Adachi
Mode	Transmitting		

Test Condition deg.C	Test Condition Volts	Test Timing	Measured freq [MHz]	Freq error [MHz]	Result [ppm]	Limit [+/- ppm]	Margin [ppm]	
20 deg.C	DC 0.9 V (Vmin)	Power on	1427.038257	0.000757	0.53	2.50	1.97	
		on 2 min.	1427.038057	0.000557	0.39	2.50	2.11	
		on 5 min.	1427.038314	0.000814	0.57	2.50	1.93	
		on 10 min.	1427.037726	0.000225	0.16	2.50	2.34	
	DC 1.5 V (Vnom)	Power on	1427.037979	0.000479	0.34	2.50	2.16	
		on 2 min.	1427.038055	0.000555	0.39	2.50	2.11	
		on 5 min.	1427.037655	0.000155	0.11	2.50	2.39	
		on 10 min.	1427.037435	-0.000065	-0.05	2.50	2.45	
	-	-	-	-	-	-	-	-
	50 deg.C.	DC 1.5 V	Power on	1427.038271	0.000771	0.54	2.50	1.96
			on 2 min.	1427.038190	0.000690	0.48	2.50	2.02
			on 5 min.	1427.038090	0.000589	0.41	2.50	2.09
on 10 min.			1427.038002	0.000502	0.35	2.50	2.15	
40 deg.C.	DC 1.5 V	Power on	1427.038228	0.000728	0.51	2.50	1.99	
		on 2 min.	1427.038128	0.000628	0.44	2.50	2.06	
		on 5 min.	1427.037584	0.000084	0.06	2.50	2.44	
		on 10 min.	1427.038066	0.000565	0.40	2.50	2.10	
30 deg.C.	DC 1.5 V	Power on	1427.038016	0.000516	0.36	2.50	2.14	
		on 2 min.	1427.037879	0.000379	0.27	2.50	2.23	
		on 5 min.	1427.037891	0.000391	0.27	2.50	2.23	
		on 10 min.	1427.037998	0.000498	0.35	2.50	2.15	
20 deg.C.	DC 1.5 V	Power on	1427.037979	0.000479	0.34	2.50	2.16	
		on 2 min.	1427.038055	0.000555	0.39	2.50	2.11	
		on 5 min.	1427.037655	0.000155	0.11	2.50	2.39	
		on 10 min.	1427.037435	-0.000065	-0.05	2.50	2.45	
10 deg.C.	DC 1.5 V	Power on	1427.037864	0.000364	0.25	2.50	2.25	
		on 2 min.	1427.037970	0.000470	0.33	2.50	2.17	
		on 5 min.	1427.037707	0.000207	0.15	2.50	2.35	
		on 10 min.	1427.037745	0.000245	0.17	2.50	2.33	
0 deg.C.	DC 1.5 V	Power on	1427.037619	0.000119	0.08	2.50	2.42	
		on 2 min.	1427.037663	0.000163	0.11	2.50	2.39	
		on 5 min.	1427.037526	0.000025	0.02	2.50	2.48	
		on 10 min.	1427.037676	0.000176	0.12	2.50	2.38	
-10 deg.C.	DC 1.5 V	Power on	1427.037889	0.000389	0.27	2.50	2.23	
		on 2 min.	1427.037658	0.000158	0.11	2.50	2.39	
		on 5 min.	1427.037451	-0.000049	-0.03	2.50	2.47	
		on 10 min.	1427.037796	0.000295	0.21	2.50	2.29	
-20 deg.C	DC 1.5 V	Power on	1427.037938	0.000438	0.31	2.50	2.19	
		on 2 min.	1427.037832	0.000331	0.23	2.50	2.27	
		on 5 min.	1427.037395	-0.000105	-0.07	2.50	2.43	
		on 10 min.	1427.037738	0.000238	0.17	2.50	2.33	
-30deg.C	DC 1.5 V	Power on	1427.037209	-0.000292	-0.20	2.50	2.30	
		on 2min.	1427.037153	-0.000347	-0.24	2.50	2.26	
		on 5min.	1427.037052	-0.000448	-0.31	2.50	2.19	
		on 10min.	transmit stop	-	-	2.50	-	

Limit : 1427.038 MHz +/-0.00025 % (+/- 2.5ppm) = +/- 0.003568 MHz

\*The test on -30 deg.C. was not apply, since EUT cannot transmit on -30 deg.C.

(The transmit of EUT stopped about 5 min. later.)

(The specification of operating temperature of EUT was 10 deg.C to 40 deg.C.)

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Revised date : October 19, 2015

**Frequency Stability**

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room	
Date	September 24, 2015	September 25, 2015	October 19, 2015
Temperature / Humidity	23 deg.C / 43 %RH	27 deg.C / 46 %RH	25 deg.C / 54 %RH
Engineer	Yosuke Ishikawa	Yosuke Ishikawa	Kenichi Adachi
Mode	Transmitting		

Test Condition deg.C	Test Condition Volts	Test Timing	Measured freq [MHz]	Freq error [MHz]	Result [ppm]	Limit [+/- ppm]	Margin [ppm]	
20 deg.C	DC 0.9 V (Vmin)	Power on	1429.263225	0.000725	0.51	2.50	1.99	
		on 2 min.	1429.262956	0.000456	0.32	2.50	2.18	
		on 5 min.	1429.263363	0.000863	0.60	2.50	1.90	
		on 10 min.	1429.262919	0.000419	0.29	2.50	2.21	
	DC 1.5 V (Vnom)	Power on	1429.262872	0.000372	0.26	2.50	2.24	
		on 2 min.	1429.262722	0.000222	0.16	2.50	2.34	
		on 5 min.	1429.262741	0.000241	0.17	2.50	2.33	
		on 10 min.	1429.262247	-0.000254	-0.18	2.50	2.32	
	-	-	-	-	-	-	-	-
	50 deg.C.	DC 1.5 V	Power on	1429.263059	0.000559	0.39	2.50	2.11
			on 2 min.	1429.263065	0.000564	0.39	2.50	2.11
			on 5 min.	1429.262777	0.000276	0.19	2.50	2.31
on 10 min.			1429.263008	0.000508	0.36	2.50	2.14	
40 deg.C.	DC 1.5 V	Power on	1429.262840	0.000340	0.24	2.50	2.26	
		on 2 min.	1429.262941	0.000441	0.31	2.50	2.19	
		on 5 min.	1429.262722	0.000222	0.16	2.50	2.34	
		on 10 min.	1429.263047	0.000547	0.38	2.50	2.12	
30 deg.C.	DC 1.5 V	Power on	1429.263179	0.000678	0.47	2.50	2.03	
		on 2 min.	1429.262828	0.000328	0.23	2.50	2.27	
		on 5 min.	1429.262797	0.000297	0.21	2.50	2.29	
		on 10 min.	1429.262491	-0.000009	-0.01	2.50	2.49	
20 deg.C.	DC 1.5 V	Power on	1429.262872	0.000372	0.26	2.50	2.24	
		on 2 min.	1429.262722	0.000222	0.16	2.50	2.34	
		on 5 min.	1429.262741	0.000241	0.17	2.50	2.33	
		on 10 min.	1429.262247	-0.000254	-0.18	2.50	2.32	
10 deg.C.	DC 1.5 V	Power on	1429.262600	0.000100	0.07	2.50	2.43	
		on 2 min.	1429.262707	0.000206	0.14	2.50	2.36	
		on 5 min.	1429.262444	-0.000056	-0.04	2.50	2.46	
		on 10 min.	1429.262369	-0.000131	-0.09	2.50	2.41	
0 deg.C.	DC 1.5 V	Power on	1429.262675	0.000175	0.12	2.50	2.38	
		on 2 min.	1429.262644	0.000144	0.10	2.50	2.40	
		on 5 min.	1429.262469	-0.000031	-0.02	2.50	2.48	
		on 10 min.	1429.262213	-0.000288	-0.20	2.50	2.30	
-10 deg.C.	DC 1.5 V	Power on	1429.263014	0.000514	0.36	2.50	2.14	
		on 2 min.	1429.262976	0.000476	0.33	2.50	2.17	
		on 5 min.	1429.262482	-0.000018	-0.01	2.50	2.49	
		on 10 min.	1429.262614	0.000113	0.08	2.50	2.42	
-20 deg.C	DC 1.5 V	Power on	1429.263119	0.000619	0.43	2.50	2.07	
		on 2 min.	1429.263026	0.000526	0.37	2.50	2.13	
		on 5 min.	1429.262512	0.000012	0.01	2.50	2.49	
		on 10 min.	1429.262342	-0.000158	-0.11	2.50	2.39	
-30deg.C	DC 1.5 V	Power on	transmit stop	-	-	2.50	-	
		on 2min.	transmit stop	-	-	2.50	-	
		on 5min.	transmit stop	-	-	2.50	-	
		on 10min.	transmit stop	-	-	2.50	-	

Limit : 1429.263 MHz +/-0.00025 % (+/- 2.5ppm) = +/- 0.003573 MHz

\*The test on -30 deg.C. was not apply, since EUT cannot transmit on -30 deg.C.

(The specification of operating temperature of EUT was 10 deg.C to 40 deg.C.)

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Revised date : October 19, 2015

## Frequency Stability

Test place	UL Japan, Inc. Shonan EMC Lab.	No.5 Shielded Room	
Date	September 24, 2015	September 25, 2015	October 19, 2015
Temperature / Humidity	23 deg.C / 43 %RH	27 deg.C / 46 %RH	25 deg.C / 54 %RH
Engineer	Yosuke Ishikawa	Yosuke Ishikawa	Kenichi Adachi
Mode	Transmitting		

Test Condition deg.C	Test Condition Volts	Test Timing	Measured freq [MHz]	Freq error [MHz]	Result [ppm]	Limit [+/- ppm]	Margin [ppm]	
20 deg.C	DC 0.9 V (Vmin)	Power on	1431.463248	0.000748	0.52	2.50	1.98	
		on 2 min.	1431.462929	0.000429	0.30	2.50	2.20	
		on 5 min.	1431.463035	0.000535	0.37	2.50	2.13	
		on 10 min.	1431.462873	0.000372	0.26	2.50	2.24	
	DC 1.5 V (Vnom)	Power on	1431.462247	-0.000253	-0.18	2.50	2.32	
		on 2 min.	1431.462485	-0.000016	-0.01	2.50	2.49	
		on 5 min.	1431.462392	-0.000109	-0.08	2.50	2.42	
		on 10 min.	1431.462672	0.000171	0.12	2.50	2.38	
	50 deg.C.	-	Power on	1431.463425	0.000924	0.65	2.50	1.85
			on 2 min.	1431.463125	0.000625	0.44	2.50	2.06
			on 5 min.	1431.463131	0.000630	0.44	2.50	2.06
			on 10 min.	1431.462956	0.000456	0.32	2.50	2.18
40 deg.C.	-	Power on	1431.463374	0.000874	0.61	2.50	1.89	
		on 2 min.	1431.463250	0.000749	0.52	2.50	1.98	
		on 5 min.	1431.462936	0.000436	0.30	2.50	2.20	
		on 10 min.	1431.462943	0.000442	0.31	2.50	2.19	
30 deg.C.	-	Power on	1431.462905	0.000405	0.28	2.50	2.22	
		on 2 min.	1431.462574	0.000073	0.05	2.50	2.45	
		on 5 min.	1431.462724	0.000223	0.16	2.50	2.34	
		on 10 min.	1431.462624	0.000123	0.09	2.50	2.41	
20 deg.C.	-	Power on	1431.462247	-0.000253	-0.18	2.50	2.32	
		on 2 min.	1431.462485	-0.000016	-0.01	2.50	2.49	
		on 5 min.	1431.462392	-0.000109	-0.08	2.50	2.42	
		on 10 min.	1431.462672	0.000171	0.12	2.50	2.38	
10 deg.C.	DC 1.5 V	Power on	1431.462645	0.000144	0.10	2.50	2.40	
		on 2 min.	1431.462545	0.000045	0.03	2.50	2.47	
		on 5 min.	1431.462608	0.000108	0.08	2.50	2.42	
		on 10 min.	1431.462639	0.000139	0.10	2.50	2.40	
0 deg.C.	-	Power on	1431.462757	0.000256	0.18	2.50	2.32	
		on 2 min.	1431.462663	0.000162	0.11	2.50	2.39	
		on 5 min.	1431.462482	-0.000019	-0.01	2.50	2.49	
		on 10 min.	1431.461993	-0.000507	-0.35	2.50	2.15	
-10 deg.C.	-	Power on	1431.462795	0.000294	0.21	2.50	2.29	
		on 2 min.	1431.462301	-0.000200	-0.14	2.50	2.36	
		on 5 min.	1431.462839	0.000338	0.24	2.50	2.26	
		on 10 min.	1431.462137	-0.000363	-0.25	2.50	2.25	
-20 deg.C	-	Power on	1431.463013	0.000512	0.36	2.50	2.14	
		on 2 min.	1431.462154	-0.000346	-0.24	2.50	2.26	
		on 5 min.	1431.462698	0.000198	0.14	2.50	2.36	
		on 10 min.	1431.462082	-0.000418	-0.29	2.50	2.21	
-30deg.C	-	Power on	transmit stop	-	-	2.50	-	
		on 2min.	transmit stop	-	-	2.50	-	
		on 5min.	transmit stop	-	-	2.50	-	
		on 10min.	transmit stop	-	-	2.50	-	

Limit : 1431.463 MHz +/-0.00025 % (+/- 2.5ppm) = +/- 0.003579 MHz

\*The test on -30 deg.C. was not apply, since EUT cannot transmit on -30 deg.C.

(The specification of operating temperature of EUT was 10 deg.C to 40 deg.C.)

**UL Japan, Inc.**

**Shonan EMC Lab.**

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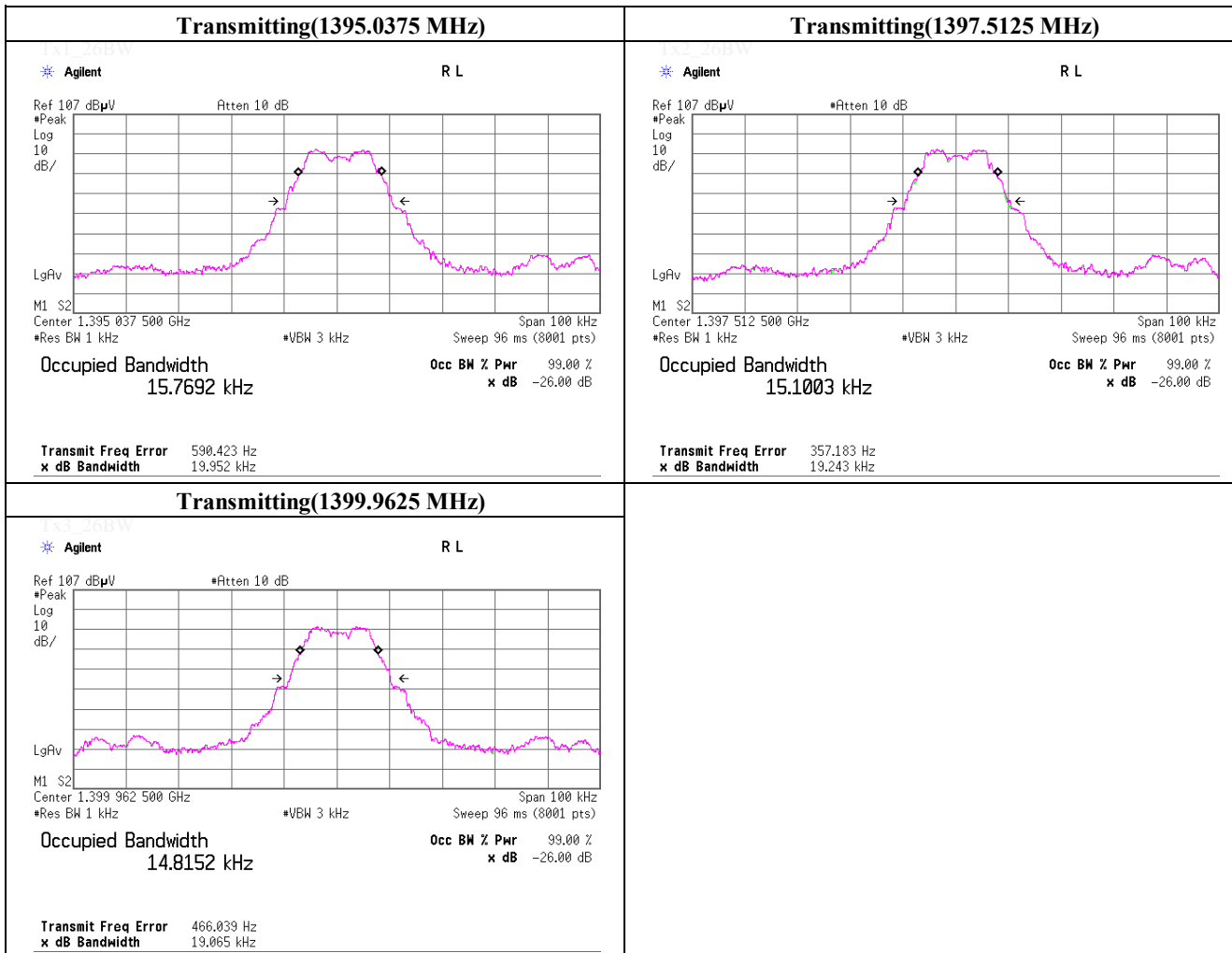
Facsimile : +81 463 50 6401

**-26dB Bandwidth**

Test place	UL Japan, Inc. Shonan EMC Lab.	No.3 Semi-Anechoic Chamber
Date	September 17, 2015	
Temperature / Humidity	23 deg.C / 58 %RH	
Engineer	Kenichi Adachi	
Mode	Transmitting	

Freq. [MHz]	-26dB Bandwidth [kHz]
1395.0375	19.952
1397.5125	19.243
1399.9625	19.065

No limit applies to -26dB Bandwidth.



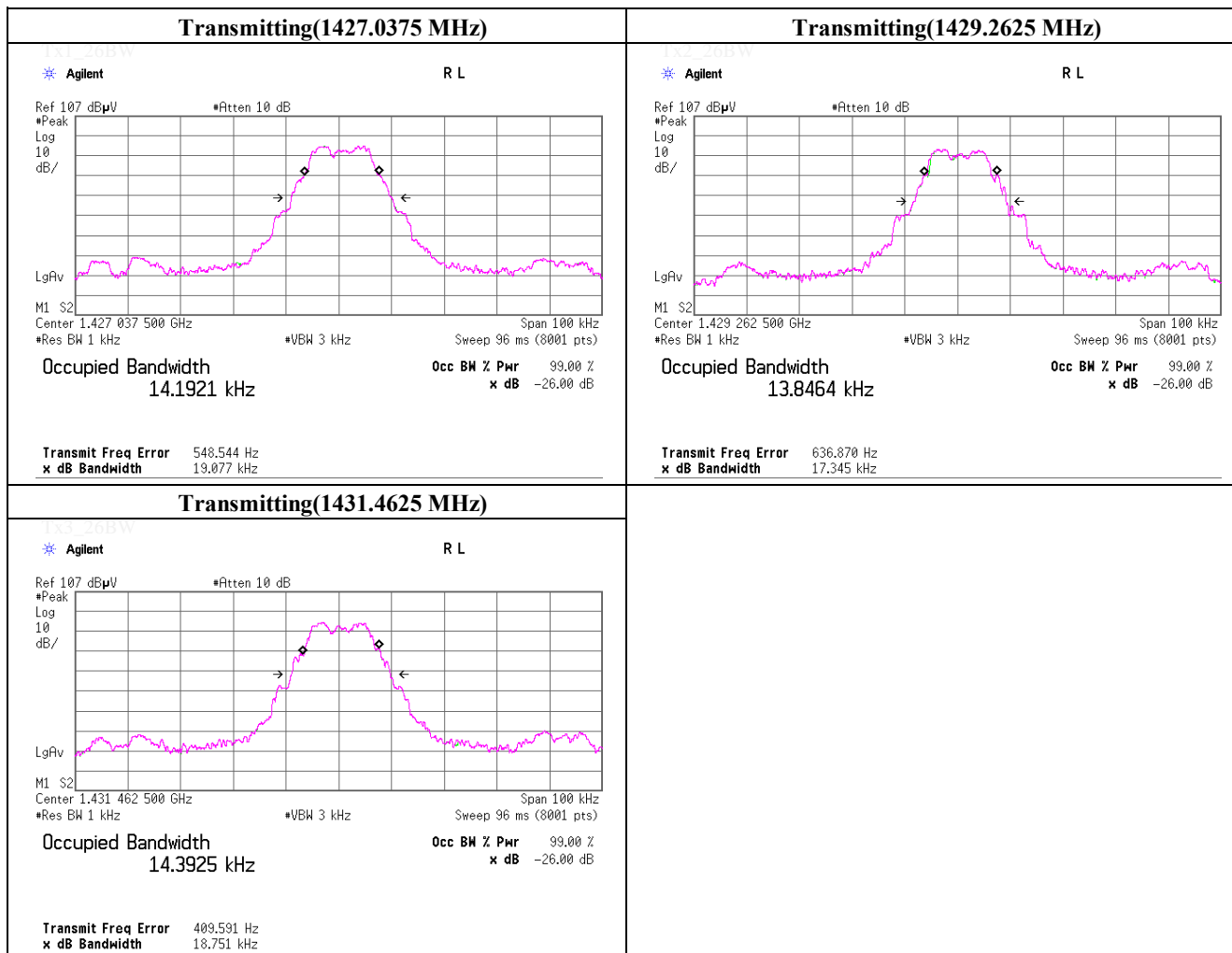
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## -26dB Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.3 Semi-Anechoic Chamber
Date	September 17, 2015	
Temperature / Humidity	23 deg.C / 58 %RH	
Engineer	Kenichi Adachi	
Mode	Transmitting	

Freq. [MHz]	-26dB Bandwidth [kHz]
1427.0375	19.077
1429.2625	17.345
1431.4625	18.751

No limit applies to -26dB Bandwidth.



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**Field Strength(Electric Field Strength of Fundamental Emission ,  
Spurious Emission and Band Edge Compliance)**

Test place                   UL Japan, Inc. Shonan EMC Lab.                   No.3 Semi Anechoic Chamber  
 Date                         September 18, 2015  
 Temperature / Humidity   23 deg.C / 58 %RH  
 Engineer                   Kenichi Adachi  
 Mode                        Tx,                   1395.0375 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	130.000	QP	21.6	13.6	7.7	32.1	10.8	46.0	35.2	100	0	
Hori.	260.000	QP	21.5	17.4	8.4	32.0	15.3	46.0	30.7	100	0	
Hori.	390.000	QP	21.5	16.2	9.1	31.9	14.9	46.0	31.1	100	0	
Hori.	910.000	QP	20.8	22.6	11.0	30.9	23.5	46.0	22.5	100	0	
Hori.	1395.0375	AV	90.1	24.7	12.8	40.7	86.9	117.3	30.4	106	23	Carrier, VBW 10 Hz,
Hori.	2790.075	AV	52.2	28.1	14.0	40.8	53.5	53.9	0.4	117	176	VBW 10 Hz,
Hori.	4185.113	AV	46.8	29.6	5.4	40.2	41.6	53.9	12.3	104	276	VBW 10 Hz,
Hori.	5580.150	AV	34.4	32.4	6.1	38.8	34.1	53.9	19.8	118	343	VBW 10 Hz,
Hori.	6975.188	AV	40.4	36.7	6.7	39.8	44.0	53.9	9.9	142	129	VBW 10 Hz,
Hori.	8370.225	AV	37.5	37.5	7.4	40.7	41.7	53.9	12.2	144	346	VBW 10 Hz,
Hori.	9765.263	AV	38.7	38.5	8.2	39.5	45.9	53.9	8.0	139	59	VBW 10 Hz,
Hori.	11160.300	AV	37.3	40.2	8.5	39.0	47.0	53.9	6.9	138	306	VBW 10 Hz,
Hori.	12555.340	AV	32.6	39.5	9.2	39.7	41.6	53.9	12.3	110	350	VBW 10 Hz,
Hori.	13950.380	AV	31.1	41.2	9.9	40.0	42.2	53.9	11.7	100	0	VBW 10 Hz,
Vert.	130.000	QP	21.6	13.6	7.7	32.1	10.8	46.0	35.2	100	0	
Vert.	260.000	QP	21.5	17.4	8.4	32.0	15.3	46.0	30.7	100	0	
Vert.	390.000	QP	21.5	16.2	9.1	31.9	14.9	46.0	31.1	100	0	
Vert.	910.000	QP	20.8	22.6	11.0	30.9	23.5	46.0	22.5	100	0	
Vert.	1395.0375	AV	90.1	24.7	12.8	40.7	86.9	137.3	50.4	126	349	Carrier, VBW 10 Hz,
Vert.	2790.0750	AV	50.6	28.1	14.0	40.8	51.9	53.9	2.0	103	312	VBW 10 Hz,
Vert.	4185.1130	AV	48.3	29.6	5.4	40.2	43.1	53.9	10.8	100	124	VBW 10 Hz,
Vert.	5580.1500	AV	35.2	32.4	6.1	38.8	34.9	53.9	19.0	146	31	VBW 10 Hz,
Vert.	6975.1880	AV	41.6	36.7	6.7	39.8	45.2	53.9	8.7	181	338	VBW 10 Hz,
Vert.	8370.2250	AV	37.2	37.5	7.4	40.7	41.4	53.9	12.5	144	23	VBW 10 Hz,
Vert.	9765.263	AV	35.6	38.5	8.2	39.5	42.8	53.9	11.1	141	184	VBW 10 Hz,
Vert.	11160.300	AV	35.9	40.2	8.5	39.0	45.6	53.9	8.3	145	322	VBW 10 Hz,
Vert.	12555.340	AV	35.0	39.5	9.2	39.7	44.0	53.9	9.9	173	4	VBW 10 Hz,
Vert.	13950.380	AV	31.0	41.2	9.9	40.0	42.1	53.9	11.8	100	0	VBW 10 Hz,

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amplifier)  
 \*Other frequency noises omitted in this report were not seen or have enough margin (more than 20 dB).  
 \*The 10th harmonic was not seen so the result was its base noise level.

(for RF Exposure sheet)

[ RF Output Power ]

	Result [dBuV/m]	Result 1 [mW]	Result 2 [mW]
carrier Level	86.9	0.15	0.23

Calculation:

$$\text{Result 1 [mW]} = ((10 \wedge (\text{Result [dBuV/m]} / 20)) \times (10 \wedge (-6)) \times (\text{distance} \Rightarrow 3 \text{ [m]}) \wedge 2) / 30 \times (\text{gain} \Rightarrow 1) \times 10 \wedge 3$$

(Fundamental emission with power tolerance = Result 2)

$$\text{Result 2 [mW]} = 10 \wedge ((10 \times \log (\text{Result 1 [mW]}) + 2 \text{ dB}) / 10)$$

\* tolerance specification is +/-2 dB

**Marker Delta Method(Test distance 3 m)**

		Polarity	AV			
			Hor.		Ver.	
			[dBuV]	[dBuV/m]	[dBuV]	[dBuV/m]
Step1	Fundamental(1395.0375 MHz)	RBW	90.1	86.9	90.1	86.9
Step2	Fundamental(1395.0375 MHz)	1 kHz/3 kHz	88.7	85.5	89.7	86.5
	Band-edge(1395 MHz)	1 kHz/3 kHz	30.3	27.1	31.6	28.4
Step3	Amplitude delta	-	58.4	58.4	58.1	58.1
	Field strength of band-edge	-	-	28.5	-	28.8
	Limit	-	-	53.9	-	53.9
	Margin	-	-	25.5	-	25.1

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amplifier)  
 \*1 Amplitude delta = Fundamental(RBW:1 kHz,VBW:3kHz) - Band-edge(RBW:1 kHz,VBW:3 kHz)  
 \*2 Field strength of band-edge = Fundamental(AV) - Amplitude delta

\*As we started at section 7.5, we used RBW = 1 kHz (greater than 1 % bandwidth) to prevent to detect in-band emission. Refer to KDB 662683.

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## Field Strength(Electric Field Strength of Fundamental Emission , Spurious Emission)

Test place                   UL Japan, Inc. Shonan EMC Lab.                   No.3 Semi Anechoic Chamber  
Date                           September 18, 2015  
Temperature / Humidity    23 deg.C / 58 %RH  
Engineer                    Kenichi Adachi  
Mode                         Tx,                    1397.5125 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	130.000	QP	21.6	13.6	7.7	32.1	10.8	46.0	35.2	100	0	
Hori.	260.000	QP	21.5	17.4	8.4	32.0	15.3	46.0	30.7	100	0	
Hori.	390.000	QP	21.5	16.2	9.1	31.9	14.9	46.0	31.1	100	0	
Hori.	910.000	QP	20.8	22.6	11.0	30.9	23.5	46.0	22.5	100	0	
Hori.	1397.5125	AV	89.7	24.7	12.8	40.7	86.5	117.3	30.8	105	21	Carrier, VBW 10 Hz,
Hori.	2795.025	AV	50.9	28.1	14.0	40.8	52.2	53.9	1.7	118	181	VBW 10 Hz,
Hori.	4192.538	AV	46.9	29.6	5.4	40.2	41.7	53.9	12.2	105	286	VBW 10 Hz,
Hori.	5590.050	AV	34.5	32.4	6.1	38.8	34.2	53.9	19.7	144	349	VBW 10 Hz,
Hori.	6987.563	AV	39.1	36.8	6.7	39.8	42.8	53.9	11.1	148	142	VBW 10 Hz,
Hori.	8385.075	AV	38.8	37.5	7.4	40.7	43.0	53.9	10.9	137	353	VBW 10 Hz,
Hori.	9782.588	AV	39.7	38.5	8.2	39.5	46.9	53.9	7.0	142	55	VBW 10 Hz,
Hori.	11180.100	AV	37.9	40.2	8.5	39.0	47.6	53.9	6.3	136	311	VBW 10 Hz,
Hori.	12577.610	AV	35.1	39.5	9.2	39.7	44.1	53.9	9.8	108	345	VBW 10 Hz,
Hori.	13975.130	AV	31.0	41.3	9.9	40.0	42.2	53.9	11.7	100	0	VBW 10 Hz,
Vert.	130.000	QP	21.6	13.6	7.7	32.1	10.8	46.0	35.2	100	0	
Vert.	260.000	QP	21.5	17.4	8.4	32.0	15.3	46.0	30.7	100	0	
Vert.	390.000	QP	21.5	16.2	9.1	31.9	14.9	46.0	31.1	100	0	
Vert.	910.000	QP	20.8	22.6	11.0	30.9	23.5	46.0	22.5	100	0	
Vert.	1397.5125	AV	90.4	24.7	12.8	40.7	87.2	117.3	30.1	124	351	Carrier, VBW 10 Hz,
Vert.	2795.025	AV	50.2	28.1	14.0	40.8	51.5	53.9	2.4	104	313	VBW 10 Hz,
Vert.	4192.538	AV	47.9	29.6	5.4	40.2	42.7	53.9	11.2	100	131	VBW 10 Hz,
Vert.	5590.050	AV	34.8	32.4	6.1	38.8	34.5	53.9	19.4	144	31	VBW 10 Hz,
Vert.	6987.563	AV	40.7	36.8	6.7	39.8	44.4	53.9	9.5	173	334	VBW 10 Hz,
Vert.	8385.075	AV	36.1	37.5	7.4	40.7	40.3	53.9	13.6	142	22	VBW 10 Hz,
Vert.	9782.588	AV	36.3	38.5	8.2	39.5	43.5	53.9	10.4	140	183	VBW 10 Hz,
Vert.	11180.100	AV	36.2	40.2	8.5	39.0	45.9	53.9	8.0	141	325	VBW 10 Hz,
Vert.	12577.610	AV	35.3	39.5	9.2	39.7	44.3	53.9	9.6	178	0	VBW 10 Hz,
Vert.	13975.130	AV	30.9	41.3	9.9	40.0	42.1	53.9	11.8	100	0	VBW 10 Hz,

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amplifier)

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

\*The 10th harmonic was not seen so the result was its base noise level.

(for RF Exposure sheet)

[ RF Output Power ]

	Result [dBuV/m]	Result 1 [mW]	Result 2 [mW]
carrier Level	87.2	0.16	0.25

Calculation:

$$\text{Result 1 [mW]} = \left( \left( 10^{\left( \text{Result [dBuV/m]} / 20 \right)} \times 10^{(-6)} \right) \times (\text{distance} = 3 \text{ [m]})^2 \right) / 30 \times (\text{gain} = 1) \times 10^3$$

(Fundamental emission with power tolerance = Result 2)

$$\text{Result 2 [mW]} = 10^{\left( \left( 10 \times \log(\text{Result 1 [mW]}) + 2 \text{ dB} \right) \right) / 10}$$

\* tolerance specification is +/-2 dB

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**Field Strength(Electric Field Strength of Fundamental Emission ,  
Spurious Emission and Band Edge Compliance)**

Test place                   UL Japan, Inc. Shonan EMC Lab.                   No.3 Semi Anechoic Chamber  
 Date                         September 18, 2015  
 Temperature / Humidity   23 deg.C / 58 %RH  
 Engineer                  Kenichi Adachi  
 Mode                        Tx,                   1399.9625 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	130.000	QP	21.6	13.6	7.7	32.1	10.8	46.0	35.2	100	0	
Hori.	260.000	QP	21.5	17.4	8.4	32.0	15.3	46.0	30.7	100	0	
Hori.	390.000	QP	21.5	16.2	9.1	31.9	14.9	46.0	31.1	100	0	
Hori.	910.000	QP	20.8	22.6	11.0	30.9	23.5	46.0	22.5	100	0	
Hori.	1399.9625	AV	89.7	24.7	12.8	40.7	86.5	117.3	30.8	104	20	Carrier, VBW 10 Hz,
Hori.	2799.925	AV	51.3	28.1	14.0	40.8	52.6	53.9	1.3	118	181	VBW 10 Hz,
Hori.	4199.888	AV	46.6	29.6	5.4	40.2	41.4	53.9	12.5	106	285	VBW 10 Hz,
Hori.	5599.850	AV	34.2	32.4	6.1	38.8	33.9	53.9	20.0	145	351	VBW 10 Hz,
Hori.	6999.813	AV	39.0	36.8	6.7	39.8	42.7	53.9	11.2	147	140	VBW 10 Hz,
Hori.	8399.775	AV	38.6	37.5	7.4	40.7	42.8	53.9	11.1	135	351	VBW 10 Hz,
Hori.	9799.738	AV	39.5	38.5	8.2	39.5	46.7	53.9	7.2	141	54	VBW 10 Hz,
Hori.	11199.700	AV	35.5	40.2	8.5	39.0	45.2	53.9	8.7	135	310	VBW 10 Hz,
Hori.	12599.660	AV	34.8	39.5	9.2	39.7	43.8	53.9	10.1	109	344	VBW 10 Hz,
Hori.	13999.630	AV	28.9	41.3	9.9	40.0	40.1	53.9	13.8	100	0	VBW 10 Hz,
Vert.	130.000	QP	21.6	13.6	7.7	32.1	10.8	46.0	35.2	100	0	
Vert.	260.000	QP	21.5	17.4	8.4	32.0	15.3	46.0	30.7	100	0	
Vert.	390.000	QP	21.5	16.2	9.1	31.9	14.9	46.0	31.1	100	0	
Vert.	910.000	QP	20.8	22.6	11.0	30.9	23.5	46.0	22.5	100	0	
Vert.	1399.9625	AV	89.7	24.7	12.8	40.7	86.5	117.3	30.8	127	354	Carrier, VBW 10 Hz,
Vert.	2799.925	AV	50.2	28.1	14.0	40.8	51.5	53.9	2.4	103	314	VBW 10 Hz,
Vert.	4199.888	AV	46.9	29.6	5.4	40.2	41.7	53.9	12.2	100	129	VBW 10 Hz,
Vert.	5599.850	AV	34.6	32.4	6.1	38.8	34.3	53.9	19.6	145	29	VBW 10 Hz,
Vert.	6999.813	AV	40.1	36.8	6.7	39.8	43.8	53.9	10.1	171	333	VBW 10 Hz,
Vert.	8399.775	AV	36.0	37.5	7.4	40.7	40.2	53.9	13.7	143	21	VBW 10 Hz,
Vert.	9799.738	AV	36.1	38.5	8.2	39.5	43.3	53.9	10.6	139	182	VBW 10 Hz,
Vert.	11199.700	AV	35.9	40.2	8.5	39.0	45.6	53.9	8.3	141	323	VBW 10 Hz,
Vert.	12599.660	AV	35.1	39.5	9.2	39.7	44.1	53.9	9.8	181	0	VBW 10 Hz,
Vert.	13999.630	AV	29.0	41.3	9.9	40.0	40.2	53.9	13.7	100	0	VBW 10 Hz,

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amplifier)  
 \*Other frequency noises omitted in this report were not seen or have enough margin (more than 20 dB).  
 \*The 10th harmonic was not seen so the result was its base noise level.

(for RF Exposure sheet)

**[ RF Output Power ]**

	Result [dBuV/m]	Result 1 [mW]	Result 2 [mW]
carrier Level	86.5	0.13	0.21

Calculation:

$$\text{Result 1 [mW]} = ((10^{(\text{Result [dBuV/m]} / 20)} \times 10^{(-6)}) \times (\text{distance} \Rightarrow 3 \text{ [m]})^2) / 30 \times (\text{gain} \Rightarrow 1) \times 10^3$$

(Fundamental emission with power tolerance = Result 2)

$$\text{Result 2 [mW]} = 10^{((10 \times \log(\text{Result 1 [mW]}) + 2 \text{ dB}^*) / 10)}$$

\* tolerance specification is +/-2 dB

**Marker Delta Method(Test distance 3 m)**

	Polarity	AV			
		Hor.		Ver.	
		[dBuV]	[dBuV/m]	[dBuV]	[dBuV/m]
Step1	Fundamental(1399.9625 MHz)	89.7	91.0	89.7	91.0
Step2	Fundamental(1399.9625 MHz)	88.9	90.2	89.7	91.0
	Band-edge(1400 MHz)	33.1	29.9	33.3	30.1
	Amplitude delta	-	55.8	56.4	60.9
Step3	Field strength of band-edge	-	-	30.7	30.1
	Limit	-	-	53.9	53.9
	Margin	-	-	23.2	23.8

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amplifier)  
 \*1 Amplitude delta = Fundamental(RBW:1 kHz,VBW:3 kHz) - Band-edge(RBW:1 kHz,VBW:3 kHz)  
 \*2 Field strength of band-edge = Fundamental(AV) - Amplitude delta

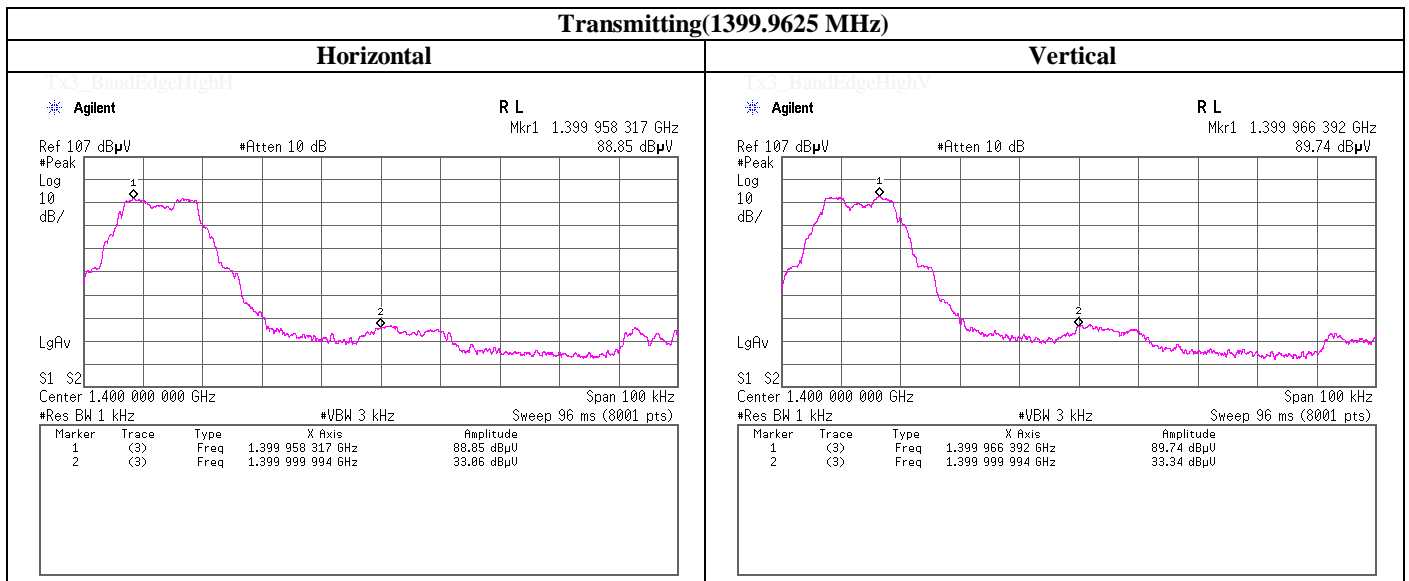
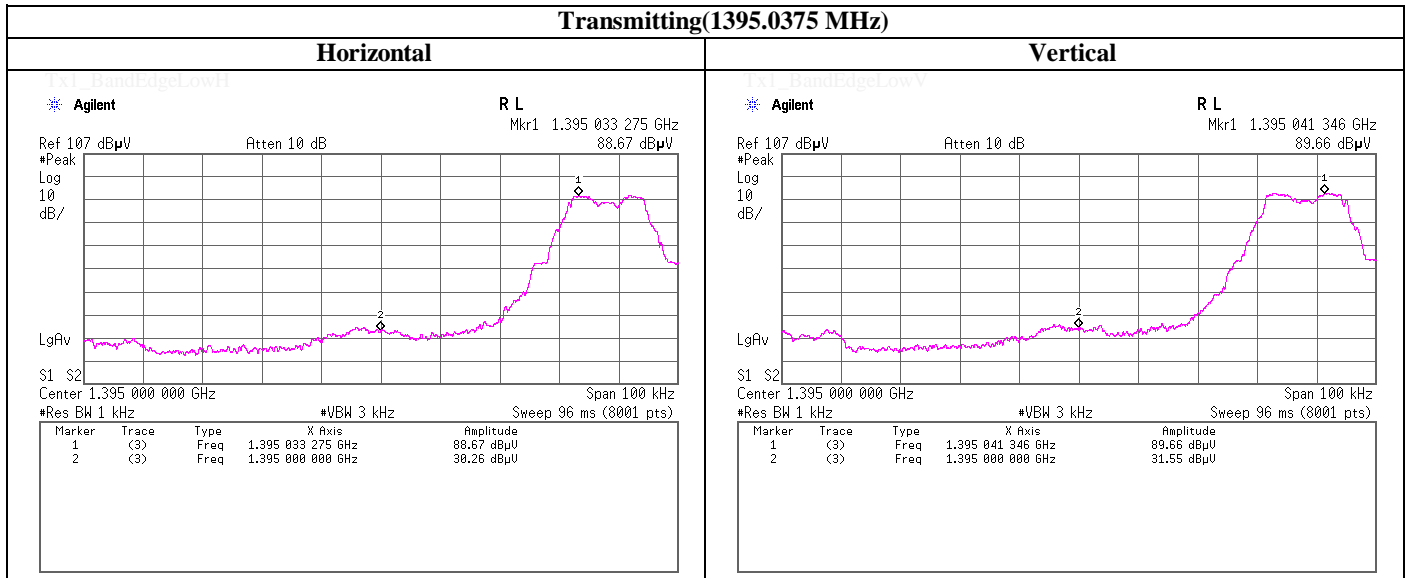
\*As we started at section 7.5, we used RBW = 1 kHz (greater than 1 % bandwidth) to prevent to detect in-band emission. Refer to KDB 662683.

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Test place                   UL Japan, Inc. Shonan EMC Lab.     No.3 Semi-Anechoic Chamber  
 Date                         September 17, 2015  
 Temperature / Humidity   23 deg.C     / 58 %RH  
 Engineer                    Kenichi Adachi

**Field Strength(Electric Field Strength of Fundamental Emission ,  
 Spurious Emission and Band Edge Compliance)**

Band Edge compliance(for Marker Delta Method)



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**Field Strength(Electric Field Strength of Fundamental Emission ,  
Spurious Emission and Band Edge Compliance)**

Test place                   UL Japan, Inc. Shonan EMC Lab.                   No.3 Semi Anechoic Chamber  
 Date                         September 18, 2015  
 Temperature / Humidity   23 deg.C / 58 %RH  
 Engineer                   Kenichi Adachi  
 Mode                        Tx,                   1427.0375 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	130.000	QP	21.6	13.6	7.7	32.1	10.8	46.0	35.2	100	0	
Hori.	260.000	QP	21.5	17.4	8.4	32.0	15.3	46.0	30.7	100	0	
Hori.	390.000	QP	21.5	16.2	9.1	31.9	14.9	46.0	31.1	100	0	
Hori.	910.000	QP	20.8	22.6	11.0	30.9	23.5	46.0	22.5	100	0	
Hori.	1427.0375	AV	92.3	24.8	12.8	40.7	89.2	117.3	28.1	104	354	Carrier, VBW 10Hz,
Hori.	2854.075	AV	58.6	28.1	5.8	40.8	51.7	53.9	2.2	115	180	VBW 10Hz,
Hori.	4281.113	AV	48.3	29.8	5.4	40.2	43.3	53.9	10.6	110	104	VBW 10Hz,
Hori.	5708.150	AV	34.2	32.6	6.1	38.8	34.1	53.9	19.8	142	347	VBW 10Hz,
Hori.	7135.188	AV	39.0	36.9	6.8	40.0	42.7	53.9	11.2	151	141	VBW 10Hz,
Hori.	8562.225	AV	38.4	37.4	7.5	40.7	42.6	53.9	11.3	136	354	VBW 10Hz,
Hori.	9989.263	AV	39.6	38.4	8.2	39.3	46.9	53.9	7.0	143	54	VBW 10Hz,
Hori.	11416.300	AV	37.7	40.0	8.7	38.9	47.5	53.9	6.4	134	308	VBW 10Hz,
Hori.	12843.340	AV	35.1	39.4	9.5	39.7	44.3	53.9	9.6	109	341	VBW 10Hz,
Hori.	14270.380	AV	33.1	41.2	10.0	40.3	44.0	53.9	9.9	100	0	VBW 10Hz,
Vert.	130.000	QP	21.6	13.6	7.7	32.1	10.8	46.0	35.2	100	0	
Vert.	260.000	QP	21.5	17.4	8.4	32.0	15.3	46.0	30.7	100	0	
Vert.	390.000	QP	21.5	16.2	9.1	31.9	14.9	46.0	31.1	100	0	
Vert.	910.000	QP	20.8	22.6	11.0	30.9	23.5	46.0	22.5	100	0	
Vert.	1427.0375	AV	91.0	24.8	12.8	40.7	87.9	117.3	29.4	126	353	Carrier, VBW 10Hz,
Vert.	2854.075	AV	56.1	28.1	5.8	40.8	49.2	53.9	4.7	102	218	VBW 10Hz,
Vert.	4281.113	AV	45.4	29.8	5.4	40.2	40.4	53.9	13.5	126	10	VBW 10Hz,
Vert.	5708.150	AV	41.3	32.6	6.1	38.8	41.2	53.9	12.7	116	36	VBW 10Hz,
Vert.	7135.188	AV	42.9	36.9	6.8	40.0	46.6	53.9	7.3	170	325	VBW 10Hz,
Vert.	8562.225	AV	40.0	37.4	7.5	40.7	44.2	53.9	9.7	151	0	VBW 10Hz,
Vert.	9989.263	AV	37.2	38.4	8.2	39.3	44.5	53.9	9.4	145	182	VBW 10Hz,
Vert.	11416.300	AV	36.1	40.0	8.7	38.9	45.9	53.9	8.0	144	317	VBW 10Hz,
Vert.	12843.340	AV	35.2	39.4	9.5	39.7	44.4	53.9	9.5	176	0	VBW 10Hz,
Vert.	14270.380	AV	33.0	41.2	10.0	40.3	43.9	53.9	10.0	100	0	VBW 10Hz,

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amplifier)  
 \*Other frequency noises omitted in this report were not seen or have enough margin (more than 20 dB).  
 \*The 10th harmonic was not seen so the result was its base noise level.

(for RF Exposure sheet)

[ RF Output Power ]

	Result [dBuV/m]	Result 1 [mW]	Result 2 [mW]
carrier Level	89.2	0.25	0.40

Calculation:

$$\text{Result 1 [mW]} = (( (10 \wedge (\text{Result [dBuV/m]} / 20) \times (10\wedge(-6)) \times (\text{distance} \Rightarrow 3 \text{ [m]}) \wedge 2) / 30 \times (\text{gain} \Rightarrow 1) ) \times 10\wedge 3$$

(Fundamental emission with power tolerance = Result 2)

$$\text{Result 2 [mW]} = 10 \wedge (( 10 \times \log ( \text{Result 1 [mW]} ) + 2 \text{ dB } *) / 10 )$$

\* tolerance specification is +/-2 dB

**Marker Delta Method(Test distance 3 m)**

	Polarity	AV			
		Hor.		Ver.	
		[dBuV]	[dBuV/m]	[dBuV]	[dBuV/m]
Step1	Fundamental(1427.0375 MHz)	92.3	89.2	91.0	87.9
Step2	Fundamental(1427.0375 MHz)	91.6	88.5	90.9	87.8
	Band-edge(1427 MHz)	36.2	33.1	34.2	31.1
Step3	Amplitude delta	-	55.4	56.7	56.7
	Field strength of band-edge	-	33.8	-	31.2
	Limit	-	53.9	-	53.9
	Margin	-	20.1	-	22.7

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amplifier)  
 \*1 Amplitude delta = Fundamental(RBW:1 kHz,VBW:3 kHz) - Band-edge(RBW:1 kHz,VBW:3 kHz)  
 \*2 Field strength of band-edge = Fundamental(AV) - Amplitude delta

\*As we started at section 7.5, we used RBW = 1 kHz (greater than 1 % bandwidth) to prevent to detect in-band emission. Refer to KDB 662683.

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## Field Strength(Electric Field Strength of Fundamental Emission , Spurious Emission)

Test place                   UL Japan, Inc. Shonan EMC Lab.                   No.3 Semi Anechoic Chamber  
Date                         September 18, 2015  
Temperature / Humidity    23 deg.C / 58 %RH  
Engineer                  Kenichi Adachi  
Mode                        Tx,                    1429.2625 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	130.000	QP	21.6	13.6	7.7	32.1	10.8	46.0	35.2	100	0	
Hori.	260.000	QP	21.5	17.4	8.4	32.0	15.3	46.0	30.7	100	0	
Hori.	390.000	QP	21.5	16.2	9.1	31.9	14.9	46.0	31.1	100	0	
Hori.	910.000	QP	20.8	22.6	11.0	30.9	23.5	46.0	22.5	100	0	
Hori.	1429.2625	AV	91.5	24.8	12.8	40.7	88.4	117.3	28.9	103	353	Carrier, VBW 10Hz
Hori.	2858.525	AV	58.4	28.1	5.8	40.8	51.5	53.9	2.4	115	180	VBW 10Hz,
Hori.	4287.788	AV	48.1	29.8	5.4	40.1	43.2	53.9	10.7	108	102	VBW 10Hz,
Hori.	5717.050	AV	34.0	32.6	6.1	38.8	33.9	53.9	20.0	140	344	VBW 10Hz,
Hori.	7146.313	AV	38.9	36.9	6.8	40.0	42.6	53.9	11.3	148	142	VBW 10Hz,
Hori.	8575.575	AV	38.1	37.5	7.5	40.6	42.5	53.9	11.4	134	351	VBW 10Hz,
Hori.	10004.840	AV	39.3	38.5	8.2	39.3	46.7	53.9	7.2	145	52	VBW 10Hz,
Hori.	11434.100	AV	37.4	40.0	8.7	38.9	47.2	53.9	6.7	132	311	VBW 10Hz,
Hori.	12863.360	AV	35.1	39.4	9.5	39.7	44.3	53.9	9.6	109	342	VBW 10Hz,
Hori.	14292.630	AV	33.6	41.2	10.0	40.3	44.5	53.9	9.4	100	0	VBW 10Hz,
Vert.	130.000	QP	21.6	13.6	7.7	32.1	10.8	46.0	35.2	100	0	
Vert.	260.000	QP	21.5	17.4	8.4	32.0	15.3	46.0	30.7	100	0	
Vert.	390.000	QP	21.5	16.2	9.1	31.9	14.9	46.0	31.1	100	0	
Vert.	910.000	QP	20.8	22.6	11.0	30.9	23.5	46.0	22.5	100	0	
Vert.	1429.2625	AV	90.5	24.8	12.8	40.7	87.4	117.3	29.9	128	352	Carrier, VBW 10Hz
Vert.	2858.525	AV	55.8	28.1	5.8	40.8	48.9	53.9	5.0	100	221	VBW 10Hz,
Vert.	4287.788	AV	45.2	29.8	5.4	40.1	40.3	53.9	13.6	124	12	VBW 10Hz,
Vert.	5717.050	AV	41.6	32.6	6.1	38.8	41.5	53.9	12.4	114	34	VBW 10Hz,
Vert.	7146.313	AV	42.4	36.9	6.8	40.0	46.1	53.9	7.8	173	324	VBW 10Hz,
Vert.	8575.575	AV	39.7	37.5	7.5	40.6	44.1	53.9	9.8	148	356	VBW 10Hz,
Vert.	10004.840	AV	37.1	38.5	8.2	39.3	44.5	53.9	9.4	144	183	VBW 10Hz,
Vert.	11434.100	AV	36.0	40.0	8.7	38.9	45.8	53.9	8.1	142	319	VBW 10Hz,
Vert.	12863.360	AV	35.1	39.4	9.5	39.7	44.3	53.9	9.6	179	0	VBW 10Hz,
Vert.	14292.630	AV	33.5	41.2	10.0	40.3	44.4	53.9	9.5	100	0	VBW 10Hz,

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amplifier)

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

\*The 10th harmonic was not seen so the result was its base noise level.

(for RF Exposure sheet)

[ RF Output Power ]

	Result [dBuV/m]	Result 1 [mW]	Result 2 [mW]
carrier Level	88.4	0.21	0.33

Calculation:

$$\text{Result 1 [mW]} = \left( \left( 10^{\left( \text{Result [dBuV/m]} / 20 \right)} \times 10^{(-6)} \right) \times (\text{distance} = 3 \text{ [m]})^2 / 30 \times (\text{gain} = 1) \right) \times 10^3$$

(Fundamental emission with power tolerance = Result 2)

$$\text{Result 2 [mW]} = 10^{\left( \left( 10 \times \log(\text{Result 1 [mW]}) + 2 \text{ dB} \right) / 10 \right)}$$

\* tolerance specification is +/-2 dB

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**Field Strength(Electric Field Strength of Fundamental Emission ,  
Spurious Emission and Band Edge Compliance)**

Test place                   UL Japan, Inc. Shonan EMC Lab.                   No.3 Semi Anechoic Chamber  
 Date                         September 18, 2015  
 Temperature / Humidity   23 deg.C / 58 %RH  
 Engineer                  Kenichi Adachi  
 Mode                        Tx,                   1431.4625 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	130.000	QP	21.6	13.6	7.7	32.1	10.8	46.0	35.2	100	0	
Hori.	260.000	QP	21.5	17.4	8.4	32.0	15.3	46.0	30.7	100	0	
Hori.	390.000	QP	21.5	16.2	9.1	31.9	14.9	46.0	31.1	100	0	
Hori.	910.000	QP	20.8	22.6	11.0	30.9	23.5	46.0	22.5	100	0	
Hori.	1431.4625	AV	92.4	24.8	12.8	40.7	89.3	117.3	28.0	103	337	Carrier, VBW 10Hz
Hori.	2862.925	AV	58.6	28.1	5.7	40.8	51.6	53.9	2.3	115	179	VBW 10Hz,
Hori.	4294.388	AV	46.2	29.8	5.4	40.1	41.3	53.9	12.6	113	101	VBW 10Hz,
Hori.	5725.850	AV	37.9	32.6	6.1	38.8	37.8	53.9	16.1	143	346	VBW 10Hz,
Hori.	7157.313	AV	42.9	36.9	6.8	40.0	46.6	53.9	7.3	149	138	VBW 10Hz,
Hori.	8588.775	AV	37.9	37.5	7.5	40.6	42.3	53.9	11.6	143	353	VBW 10Hz,
Hori.	10020.240	AV	37.1	38.5	8.3	39.3	44.6	53.9	9.3	141	54	VBW 10Hz,
Hori.	11451.700	AV	36.9	40.0	8.8	38.9	46.8	53.9	7.1	133	311	VBW 10Hz,
Hori.	12883.160	AV	35.0	39.4	9.5	39.7	44.2	53.9	9.7	107	351	VBW 10Hz,
Hori.	14314.630	AV	33.7	41.2	10.0	40.3	44.6	53.9	9.3	100	0	VBW 10Hz,
Vert.	130.000	QP	21.6	13.6	7.7	32.1	10.8	46.0	35.2	100	0	
Vert.	260.000	QP	21.5	17.4	8.4	32.0	15.3	46.0	30.7	100	0	
Vert.	390.000	QP	21.5	16.2	9.1	31.9	14.9	46.0	31.1	100	0	
Vert.	910.000	QP	20.8	22.6	11.0	30.9	23.5	46.0	22.5	100	0	
Vert.	1431.4625	AV	90.7	24.8	12.8	40.7	87.6	117.3	29.7	122	342	Carrier, VBW 10Hz
Vert.	2862.925	AV	56.5	28.1	5.7	40.8	49.5	53.9	4.4	100	224	VBW 10Hz,
Vert.	4294.388	AV	45.6	29.8	5.4	40.1	40.7	53.9	13.2	126	14	VBW 10Hz,
Vert.	5725.850	AV	41.1	32.6	6.1	38.8	41.0	53.9	12.9	113	33	VBW 10Hz,
Vert.	7157.313	AV	42.7	36.9	6.8	40.0	46.4	53.9	7.5	172	322	VBW 10Hz,
Vert.	8588.775	AV	40.0	37.5	7.5	40.6	44.4	53.9	9.5	147	0	VBW 10Hz,
Vert.	10020.240	AV	37.0	38.5	8.3	39.3	44.5	53.9	9.4	142	181	VBW 10Hz,
Vert.	11451.700	AV	36.0	40.0	8.8	38.9	45.9	53.9	8.0	141	321	VBW 10Hz,
Vert.	12883.160	AV	34.9	39.4	9.5	39.7	44.1	53.9	9.8	177	0	VBW 10Hz,
Vert.	14314.630	AV	33.6	41.2	10.0	40.3	44.5	53.9	9.4	100	0	VBW 10Hz,

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amplifier)  
 \*Other frequency noises omitted in this report were not seen or have enough margin (more than 20 dB).  
 \*The 10th harmonic was not seen so the result was its base noise level.

(for RF Exposure sheet)

[ RF Output Power ]

	Result [dBuV/m]	Result 1 [mW]	Result 2 [mW]
carrier Level	89.3	0.26	0.40

Calculation:

$$\text{Result 1 [mW]} = (( (10 \wedge (\text{Result [dBuV/m]} / 20) \times (10 \wedge (-6)) \times (\text{distance} \Rightarrow 3 \text{ [m]}) \wedge 2) / 30 \times (\text{gain} \Rightarrow 1) ) \times 10 \wedge 3$$

(Fundamental emission with power tolerance = Result 2)

$$\text{Result 2 [mW]} = 10 \wedge (( 10 \times \log ( \text{Result 1 [mW]} ) + 2 \text{ dB } *) / 10)$$

\* tolerance specification is +/-2 dB

**Marker Delta Method(Test distance 3 m)**

		AV			
		Hor.		Ver.	
		[dBuV]	[dBuV/m]	[dBuV]	[dBuV/m]
Step	Test Item	Reading	Result	Reading	Result
Step1	Fundamental(1431.4625 MHz)	92.4	85.4	90.7	83.7
Step2	Fundamental(1431.4625 MHz)	92.2	85.2	90.6	83.6
	Band-edge(1432 MHz)	15.9	12.8	16.9	13.8
	Amplitude delta	-	76.3	73.7	69.8
Step3	Field strength of band-edge	-	-	13.0	13.9
	Limit	-	-	53.9	53.9
	Margin	-	-	40.9	40.0

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amplifier)  
 \*1 Amplitude delta = Fundamental(RBW:1 kHz,VBW:3 kHz) - Band-edge(RBW:1 kHz,VBW:3 kHz)  
 \*2 Field strength of band-edge = Fundamental(AV) - Amplitude delta

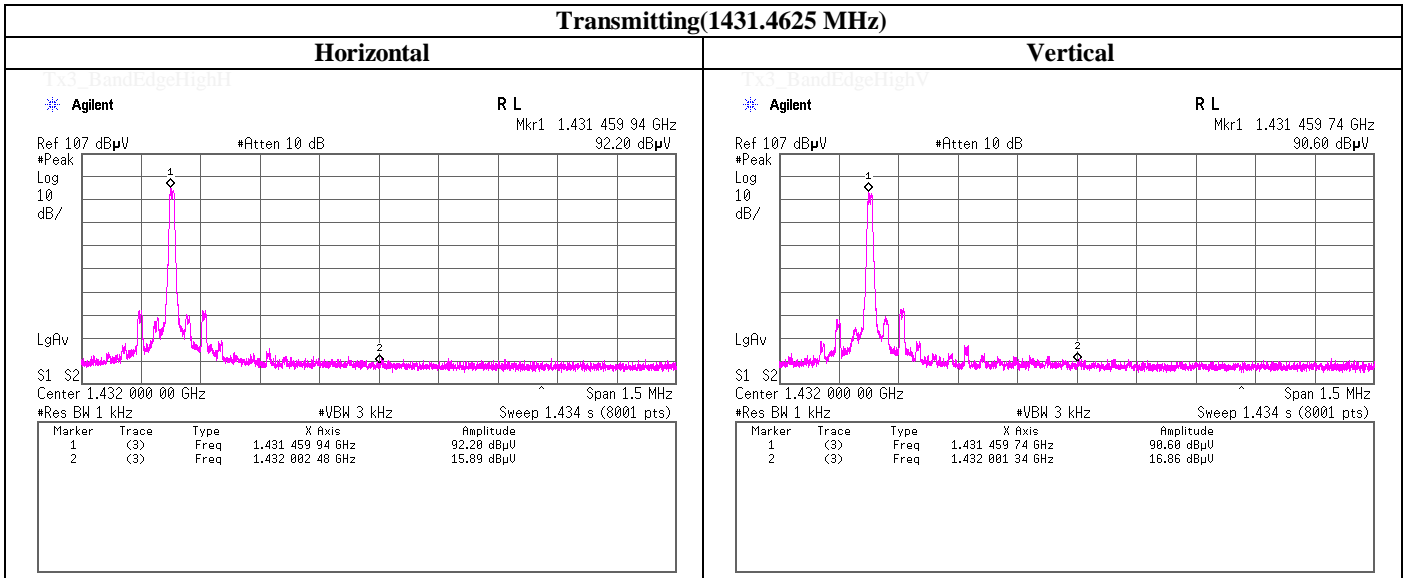
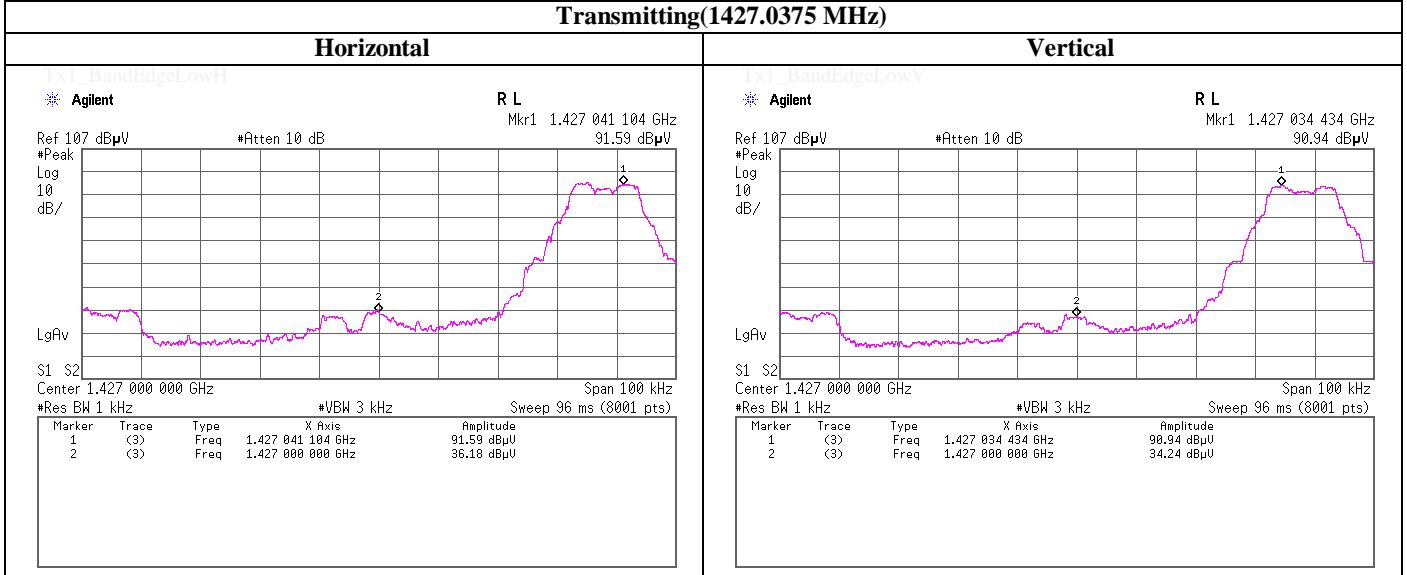
\*As we started at section 7.5, we used RBW = 1 kHz (greater than 1 % bandwidth) to prevent to detect in-band emission. Refer to KDB 662683.

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Test place UL Japan, Inc. Shonan EMC Lab. No.3 Semi-Anechoic Chamber  
 Date September 17, 2015  
 Temperature / Humidity 23 deg.C / 58 %RH  
 Engineer Kenichi Adachi

**Field Strength(Electric Field Strength of Fundamental Emission ,  
 Spurious Emission and Band Edge Compliance)**

Band Edge compliance(for Marker Delta Method)



**UL Japan, Inc.**

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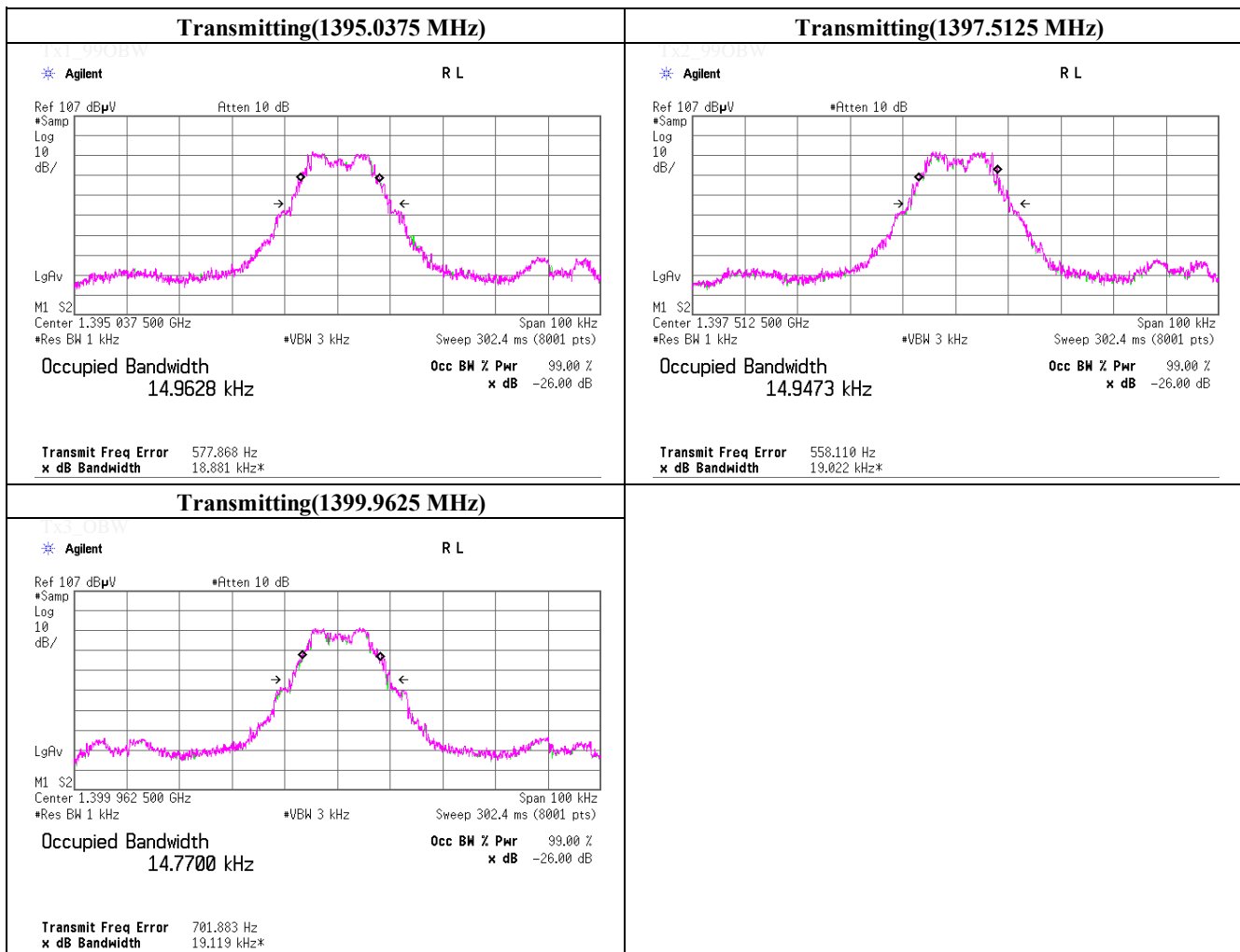
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### 99% Occupied Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.3 Semi-Anechoic Chamber
Date	September 17, 2015	
Temperature / Humidity	23 deg.C / 58 %RH	
Engineer	Kenichi Adachi	
Mode	Transmitting	

Freq. [MHz]	99% Occupied Bandwidth [kHz]
1395.0375	14.963
1397.5125	14.947
1399.9625	14.770

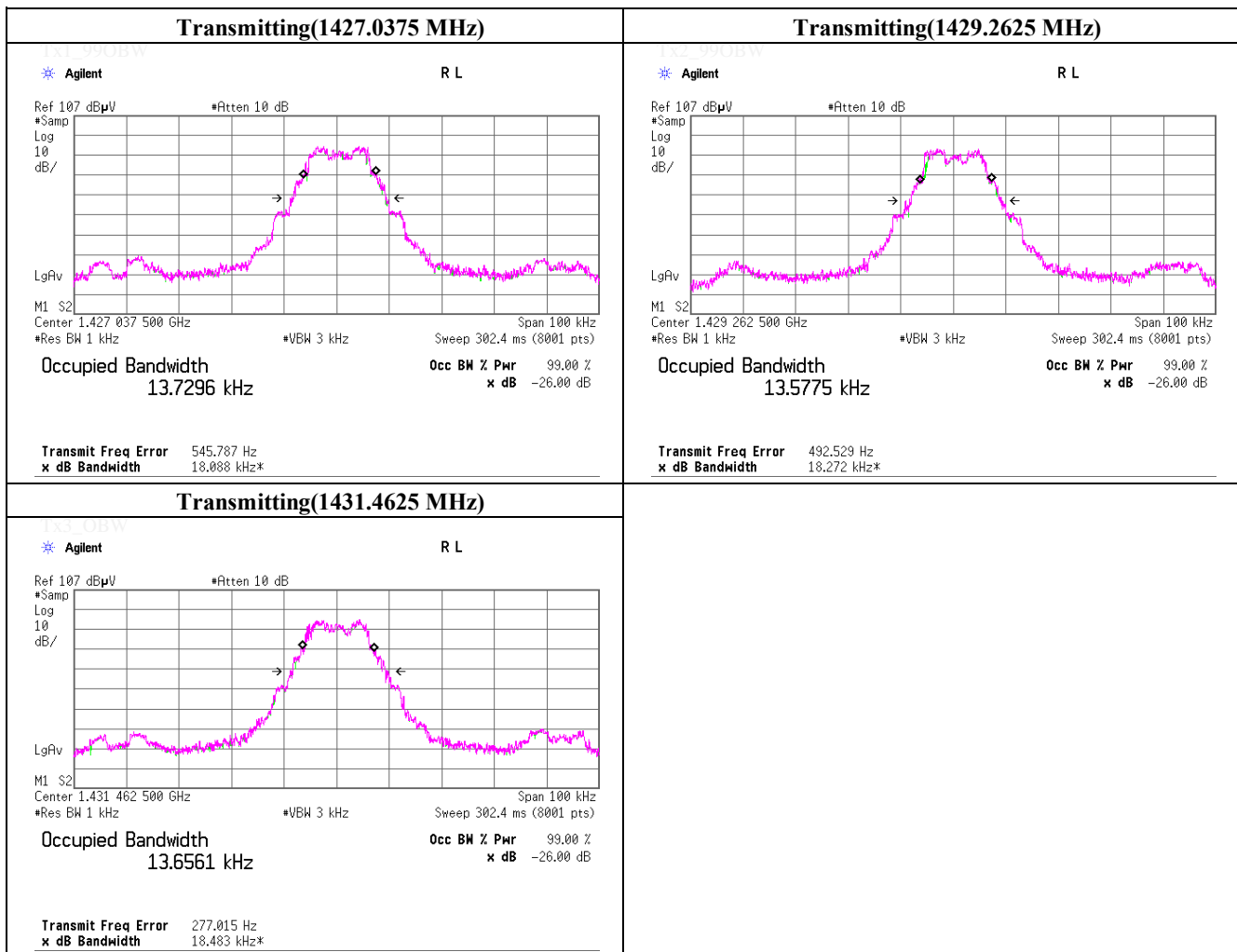


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### 99% Occupied Bandwidth

Test place	UL Japan, Inc. Shonan EMC Lab.	No.3 Semi-Anechoic Chamber
Date	September 17, 2015	
Temperature / Humidity	23 deg.C / 58 %RH	
Engineer	Kenichi Adachi	
Mode	Transmitting	

Freq. [MHz]	99% Occupied Bandwidth [kHz]
1427.0375	13.730
1429.2625	13.578
1431.4625	13.656



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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)
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	2015/07/16 * 12
SAF-06	Pre Amplifier	TOYO Corporation	TPA0118-36	1440491	RE	2015/05/27 * 12
SCC-G04	Coaxial Cable	Junkosha	J12J102207-00	JUN-12-14-018	RE	2015/06/08 * 12
SCC-G23	Coaxial Cable	Suhner	SUCOFLEX 104	297342/4	RE	2015/05/19 * 12
SHA-03	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	RE	2015/08/11 * 12
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2014/10/30 * 12
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	RE, TF	2015/03/26 * 12
SJM-15	Measure	ASKUL	-	-	RE	-
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE, RF,LMF)	-	RE	-
SAT10-05	Attenuator(above1GHz)	Agilent	8493C-010	74864	RE	2014/11/21 * 12
SFL-18	Highpass Filter	MICRO-TRONICS	HPM50111	119	RE	2015/04/09 * 12
SBA-03	Biconical Antenna	Schwarzbeck	BBA9106	91032666	RE	2014/10/18 * 12
SLA-03	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A 0901	RE	2014/10/18 * 12
SAT6-08	Attenuator	HIROSE ELECTRIC CO.,LTD.	AT-406(40)	-	RE	2015/08/31 * 12
SCC-C1/C2/C3/C4/C5/C10/SRSE-03	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/ Suhner/Suhner/Suhner/ TOYO	8D2W/12DSFA/14 1PE/141PE/141PE /141PE/NS4906	-/0901-271(RF Selector)	RE	2015/04/17 * 12
SAF-03	Pre Amplifier	SONOMA	310N	290213	RE	2015/02/18 * 12
STR-06	Test Receiver	Rohde & Schwarz	ESCI	101259	RE	2015/03/24 * 12
SCH-01	Temperature and Humidity Chamber	Espec	PL-1KT	14020837	TF	2015/04/22 * 12
SOS-09	Humidity Indicator	A&D	AD-5681	4061484	TF	2014/12/24 * 12
STS-05	Digital Hitester	Hioki	3805-50	080997828	TF	2014/11/11 * 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 (other tests),

TF: Test Fixture tests (Frequency tolerance test)