RADIO TEST REPORT

Test Report No. : 32GE0069-HO-01-A-R1

Applicant	:	**FUJITSU TEN LIMITED**
Type of Equipment	:	**Radio Detection and Ranging Device for Vehicle**
Model No.	:	**FT0019A**
FCC ID	:	**BABFT0019A**
Test regulation	:	**FCC Part 15 Subpart C: 2012**
Test Result	:	**Complied**

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the above regulation.
4. The test results in this report are traceable to the national or international standards.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.
6. This report is a revised version of 32GE0069-HO-01-A. 32GE0069-HO-01-A is replaced with this report.

Date of test: February 23 to March 1, 2012

Representative test engineer:

Hironobu Ohnishi
Engineer of WiSE Japan,
UL Verification Service

Approved by:

Masanori Nishiyama
Leader of WiSE Japan,
UL Verification Service

NVLAP LAB CODE: 200572-0

This laboratory is accredited by the NVLAP LAB CODE 200572-0, U.S.A. The tests reported herein have been performed in accordance with its terms of accreditation.
*As for the range of Accreditation in NVLAP, you may refer to the WEB address,
http://www.ul.com/japan/jpn/pages/services/emc/about/mark1/index.jsp#nvlap

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SECTION 1: Customer information

Company Name	:	FUJITSU TEN LIMITED
Address	:	2-28, Gosho-dori 1-Chome, Hyogo-ku, Kobe 652-8510, Japan
Telephone Number	:	+81-78-682-2159
Facsimile Number	:	+81-78-671-7160
Contact Person	:	Shotatsu Yo

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

2.1 Identification of E.U.T.

Type of Equipment	:	Radio Detection and Ranging Device for Vehicle
Model No.	:	FT0019A
Serial No.	:	Refer to Section 4, Clause 4.2
Receipt Date of Sample	:	February 21, 2012
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

2.2 Product Description

Model No: FT0019A (referred to as the EUT in this report) is the Radio Detection and Ranging Device for Vehicle.

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification	:	FCC Part 15 Subpart C: 2012, final revised on February 1, 2012
Title	:	FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators Section 15.253 Operation within the bands 46.7-46.9GHz and 76.0-77.0GHz.

3.2 Procedures and results

Item	Test Procedure	Specification	Worst margin	Results	Remarks
Conducted Emission	**FCC:** ANSI C63.4:2003 7. AC power line Conducted Emission measurements **IC:** RSS-Gen 7.2.4	**FCC:** Section 15.207 **IC:** RSS-Gen 7.2.4	N/A	N/A	*1)
26dB Bandwidth	**FCC:** "MILLIMETER WAVE TEST PROCEDURES" **IC:** -	**FCC:** Section 15.253(e) **IC:** RSS-210 A13.1.5	See data.	Complied	Radiated
Power Density	**FCC:** "MILLIMETER WAVE TEST PROCEDURES" **IC:** -	**FCC:** Section 15.253(b), (d) **IC:** RSS-210 A13.1.2(1)		Complied	Radiated
Spurious Emissions	**FCC:** ANSI C63.4:2003, "MILLIMETER WAVE TEST PROCEDURES" **IC:** RSS-Gen 4.9	**FCC:** Section 15.253(c) , (d) **IC:** RSS-210 A13.1.2(2), A13.1.4, RSS-Gen 7.2.3	2.2dB 9563.165MHz, AV, Vertical	Complied	Radiated
Frequency Stability	**FCC:** "MILLIMETER WAVE TEST PROCEDURES" **IC:** RSS-Gen 4.7, 7.2.4	**FCC:** Section 15.253(e) **IC:** RSS-210 A13.1.5	See data.	Complied	Radiated
*1) The test is not applicable since the EUT is not the device that is designed to be connected to the public utility (AC) power line Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422. Millimeter wave measurement was performed accordance with FCC KDB 200443 (MILLIMETER WAVE TEST PROCEDURES).					

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

FCC Part 15.203 Antenna requirement

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

3.3 Addition to standard

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

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

3.4 Uncertainty

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

Test room (semi-anechoic chamber)	**Radiated emission**						
	(3m*)(±dB)				**(1m*)(±dB)**		**(0.5m*)(±dB)**
	9kHz -30MHz	30MHz -300MHz	300MHz -1GHz	1GHz -10GHz	10GHz -18GHz	18GHz -26.5GHz	26.5GHz -40GHz
No.1	4.2dB	5.0dB	5.1dB	4.7dB	5.7dB	4.4dB	4.3dB
No.2	4.1dB	5.2dB	5.1dB	4.8dB	5.6dB	4.3dB	4.2dB
No.3	4.5dB	5.0dB	5.2dB	4.8dB	5.6dB	4.5dB	4.2dB
No.4	4.7dB	5.2dB	5.2dB	4.8dB	5.6dB	5.1dB	4.2dB

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

Radiated emission (±dB)	
40GHz-50GHz	3.9dB
50GHz-75GHz	5.1dB
75GHz-110GHz	5.4dB
110GHz-170GHz	5.2dB
170GHz-260GHz	5.2dB

Radiated emission test(3m)
The data listed in this report meets the limits unless the uncertainty is taken into consideration.

Power Density
The data listed in this test report has enough margin, more than the site margin.

3.5 Test Location

UL Japan, Inc. Head Office EMC Lab. *NVLAP Lab. code: 200572-0
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone : +81 596 24 8116 Facsimile : +81 596 24 8124

	FCC Registration Number	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms
No.1 semi-anechoic chamber	313583	2973C-1	19.2 x 11.2 x 7.7m	7.0 x 6.0m	No.1 Power source room
No.2 semi-anechoic chamber	655103	2973C-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 semi-anechoic chamber	148738	2973C-3	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.3 Preparation room
No.3 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.4 semi-anechoic chamber	134570	2973C-4	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.4 Preparation room
No.4 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.5 semi-anechoic chamber	-	-	6.0 x 6.0 x 3.9m	6.0 x 6.0m	-
No.6 shielded room	-	-	4.0 x 4.5 x 2.7m	4.75 x 5.4 m	-
No.6 measurement room	-	-	4.75 x 5.4 x 3.0m	4.75 x 4.15 m	-
No.7 shielded room	-	-	4.7 x 7.5 x 2.7m	4.7 x 7.5m	-
No.8 measurement room	-	-	3.1 x 5.0 x 2.7m	N/A	-
No.9 measurement room	-	-	8.0 x 4.5 x 2.8m	2.0 x 2.0m	-
No.10 measurement room	-	-	2.6 x 2.8 x 2.5m	2.4 x 2.4m	-
No.11 measurement room	-	-	3.1 x 3.4 x 3.0m	2.4 x 3.4m	-

* Size of vertical conducting plane (for Conducted Emission test) : 2.0 x 2.0m for No.1, No.2, No.3, and No.4 semi-anechoic chambers and No.3 and No.4 shielded rooms.

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

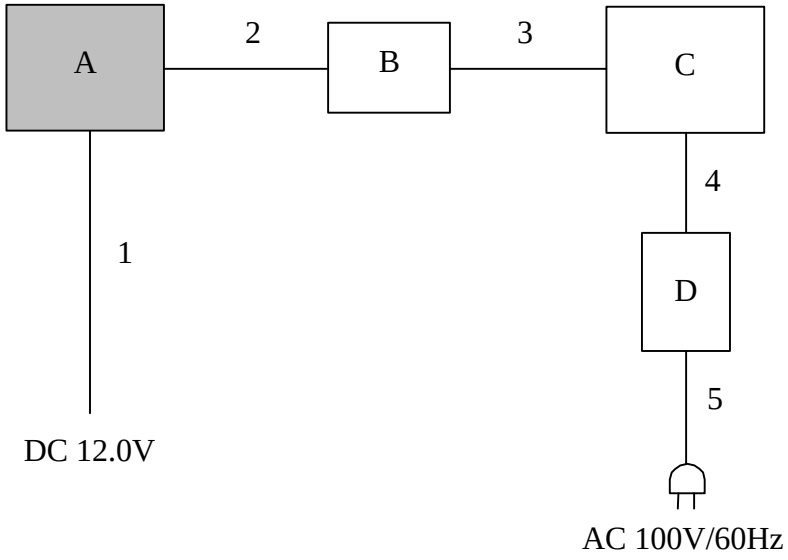
Refer to APPENDIX.

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

4.1 Operating Mode(s)

Mode	Test Item
Operating mode (In motion) *1)	26dB Bandwidth Power Density Spurious Emission Frequency Stability
End users cannot change the settings of the output power of the product. *1) All test items were performed on "In motion" mode, since the EUT is controlled by vehicle's computer to radiate only when the vehicle is moving.	

4.2 Configuration and peripherals



* Cabling and setup(s) were taken into consideration and test data was taken under worse case conditions.

Description of EUT

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Radio Detection and Ranging Device for Vehicle	FT0019A	10102	FUJITSU TEN LIMITED	EUT
B	CANcab	251	-	vector	-
C	Laptop PC	FMVNAL3HCA	R5306361	FUJITSU LIMITED	-
D	AC Adaptor	FMV-AC312	052510895B	FUJITSU LIMITED	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC Cable	2.0	Unshielded	Unshielded	-
2	CAN Cable	2.3	Unshielded	Unshielded	-
3	Signal Cable	0.3	Unshielded	Unshielded	-
4	DC Cable	1.8	Unshielded	Unshielded	-
5	AC Cable	1.9	Unshielded	Unshielded	-

SECTION 5: Radiated Emission (Spurious Emission, Power Density)

Test Procedure
[Up to 40GHz]
EUT was placed on a urethane platform of nominal size, 0.5m by 1.0m(9kHz – 10GHz), 0.5m by 0.5m(10GHz – 40GHz) , raised 0.8m(9kHz – 10GHz), 1.0m(10GHz – 40GHz) above the conducting ground plane. The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane. The height of the measuring antenna varied between 1 and 4m (frequency 9kHz – 30MHz: loop antenna was fixed height at 1.0m) and EUT was rotated a full revolution in order to obtain the maximum value of the electric field strength. The measurements were performed for both vertical and horizontal antenna polarization with the Test Receiver, or the Spectrum Analyzer. The measurements were made with the following detector function of the test receiver and the Spectrum analyzer (in linear mode).

The test was made with the detector (RBW/VBW) in the following table. When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

Test Antennas are used as below;

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

Frequency	9kHz-150kHz	150kHz–30MHz	30MHz-1GHz	1GHz-231GHz	
Instrument used	Test Receiver	Test Receiver	Test Receiver	Spectrum Analyzer	
Detector	QP, AV	QP, AV	QP	PK	AV
IF Bandwidth	BW 200Hz	BW 9kHz	BW 120kHz	RBW: 1MHz VBW: 3MHz	RBW: 1MHz VBW: 10Hz *1)
Test Distance	3m	3m	3m	3m (below 10GHz), 1m*2) (above 10GHz), 0.5m*3) (26.5 - 40GHz) Above 40GHz: For more details, refer to next page.	

*1) The test was performed with VBW 10Hz since the harmonics of oscillation (9.6GHz VCO) had continuously oscillated, except for carrier frequency.
*2) Distance Factor: 20 x log (3.0m/1.0m) = 9.5dB
*3) Distance Factor: 20 x log (3.0m/0.5m) = 15.6dB

[Above 40GHz]
The test was performed based on "MILLIMETER WAVE TEST PROCEDURES".
The EUT was placed on a urethane platform, raised 1.0m above the conducting ground plane.
The measurements were performed on handheld method.

Set spectrum analyzer RBW, VBW, span, etc., to the proper values. Note these values. Enable two traces—one set to "clear write," and the other set to "max hold."
Begin hand-held measurements with the test antenna (horn) at a distance of 1 m from the EUT in a horizontally polarized position. Slowly adjust its position, entirely covering the plane 1 m from the EUT.
Observation of the two active traces on the spectrum analyzer will allow refined horn positioning at the point(s) of maximum field intensity. Repeat with the horn in a vertically polarized position. If the emission cannot be detected at 1 m, reduce the RBW to increase system sensitivity. Note the value. If the emission still cannot be detected, move the horn closer to the EUT, noting the distance at which a measurement is made.

Note the maximum level indicated on the spectrum analyzer. Adjust this level, if necessary, by the antenna gain, conversion loss of the external mixer and gain of LNA used, at the frequency under investigation. Calculate the field strength of the emission at the measurement distance from the Friis' transmission equation.

[About carrier measurement]
The carrier levels were confirmed at maximum direction of transmission. The maximum direction was searched under carefully since beam-widths are extremely narrow.

The carrier levels were measured in the far field. The distance of the far field was calculated from follow equation.

$$r = \frac{2D^2}{\lambda}$$

where

r is the distance from the radiating element of the EUT to the edge of the far field, in m
D is the largest dimension of both the radiating element and the test antenna (horn), in m
Lambda is the wavelength of the emission under investigation [300/f (MHz)], in m

Frequency	Lambda	Maximum Dimention			Far Field
		H	V	Diagonal	Boundary
[GHz]	[mm]	[mm]	[mm]	D [m]	r [m]
77.0	3.9	91.4	61.5	0.110	6.3

The test was made on EUT at the normal use position since the installation position was decided based on "Theory of operation".

For the carrier measurement, the measuring antenna was angularly-tilted, since the EUT has angularly-tilted linear polarized antenna.

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

Measurement range : 9k-231GHz
Test data : APPENDIX
Test result : Pass

SECTION 6: Frequency Stability

Test Procedure
The external mixer was placed in side of the temperature chamber drain hole.

The power supply set to 100 % nominal setting, raise EUT operating temperature to 50 deg. C.
Record the frequency excursion of the EUT emission mask.
Repeat measurements at each 10 deg. C increment down to –20 deg. C.

Varied EUT power supply between 85 % and 115 % of nominal and record the frequency excursion of the EUT emission mask when temperature is 20 deg. C.

Emission mask was measured 26dB bandwidth.

Test data : APPENDIX
Test result : Pass

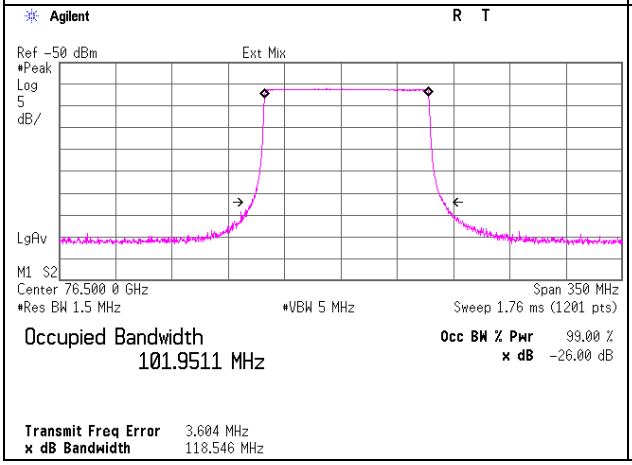
APPENDIX 1: Data of EMI test

26dB and 99% Bandwidth

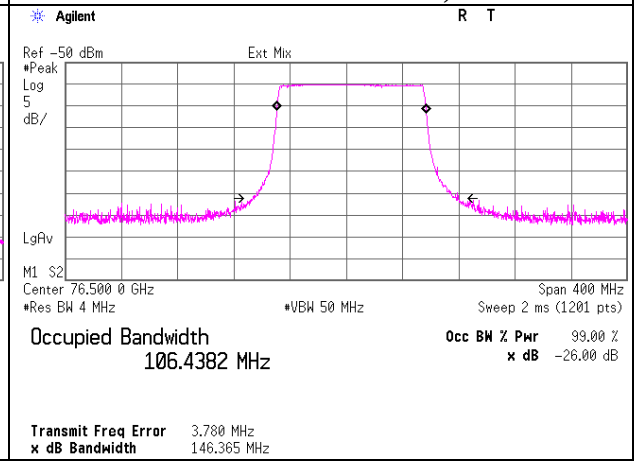
Test place	Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No.	32GE0069-HO-01
Date	02/28/2012
Temperature/ Humidity	23 deg. C / 32% RH
Engineer	Hironobu Ohnishi
Mode	Operating mode

Frequency [GHz]	26dB Bandwidth [MHz]	99% Occupied Bandwidth [MHz]
76.500	118.546	106.438

26dB bandwidth



99% bandwidth *1)



*1) The measurement was performed with Peak detector, Max Hold since the duty cycle was not 100%.

Power Density

Test place	Head Office EMC Lab. No.3 Semi Anechoic Chamber
Report No.	32GE0069-HO-01
Date	02/28/2012
Temperature/ Humidity	23 deg. C / 32% RH
Engineer	Hironobu Ohnishi
Mode	Operating mode

Mode	Frequency [GHz]	Measurement Distance [m]	Measured Power [dBm]	Rx Antenna Gain [dBi]	System Loss [dB]	LNA Gain [dB]	Free field Attenuation [dB]
Operating mode	76.47083	6.5	-67.33	22.32	41.96	0.00	86.37

Mode	Peak EIRP		Specification Distance [m]	Power Density Pk [uW/cm2]	Limit Pk [uW/cm2]	Margin Pk [dB]
	[dBm]	[mW]				
Operating mode	38.68	7376.6	3.0	6.522	6000	29.64

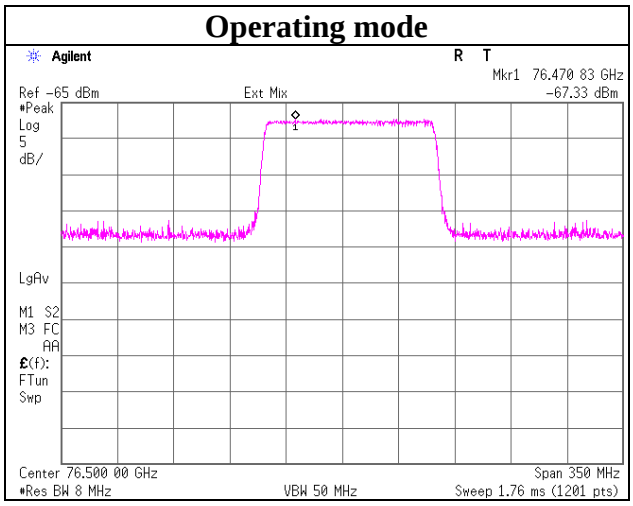
Mode	Duty Factor * [dB]	Average EIRP (Peak with Duty Factor)		Specification Distance [m]	Power Density Av [uW/cm2]	Limit Av [uW/cm2]	Margin Av [dB]
		[dBm]	[mW]				
Operating mode	-3.01	35.67	3688.3	3.0	3.261	60	12.65

* 10log(0.5): Since duty is 50%, Refer to exhibit "Theory of operation"

Calculating formula:

Free Field Attenuation = 10 * log((4 * pi * Measurement Distance / lambda) ^ 2)
Peak EIRP = Measured Power - Rx Antenna Gain + System Loss - LNA Gain + Free Field Attenuation
Average EIRP = Peak EIRP + Duty Factor
Power Density = EIRP / (4 * pi * Specification Distance ^ 2)

Operating mode



* The peak power density complies with both peak and average limits.
* As for the limit, 60uW/cm^2 of §15.253 (b) (2) was applied to the EUT based on “Theory of operation”.

Spurious Emission

Report No.	32GE0069-HO-01	
Test place	Head Office EMC Lab.	
Semi Anechoic Chamber	No.4	No.3
Date	02/25/2012	02/28/2012
Temperature/ Humidity	22 deg. C / 30% RH	23 deg. C / 32% RH
Engineer	Hironobu Ohnishi (9kHz-18GHz)	Hironobu Ohnishi (18GHz-40GHz)
Mode	Operating mode	

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori	89.599	QP	26.4	8.2	7.9	32.2	10.3	43.5	33.2	
Hori	447.998	QP	29.9	18.3	10.8	32.1	26.9	46.0	19.1	
Hori	9563.165	PK	47.0	38.3	4.8	33.2	56.9	73.9	17.0	
Hori	19125.340	PK	52.0	37.9	-2.5	32.2	55.2	73.9	18.7	
Hori	28688.220	PK	40.8	40.0	-10.1	24.8	45.9	73.9	28.0	
Hori	38251.330	PK	43.7	42.0	-9.0	24.0	52.7	73.9	21.2	
Hori	9563.165	AV	41.1	38.3	4.8	33.2	51.0	53.9	2.9	VBW=10Hz
Hori	19125.340	AV	48.0	37.9	-2.5	32.2	51.2	53.9	2.7	VBW=10Hz
Hori	28688.220	AV	34.5	40.0	-10.1	24.8	39.6	53.9	14.3	VBW=10Hz
Hori	38251.330	AV	33.3	42.0	-9.0	24.0	42.3	53.9	11.6	VBW=10Hz
Vert	89.599	QP	32.5	8.2	7.9	32.2	16.4	43.5	27.1	
Vert	447.998	QP	27.0	18.3	10.8	32.1	24.0	46.0	22.0	
Vert	9563.165	PK	47.6	38.3	4.8	33.2	57.5	73.9	16.4	
Vert	19125.340	PK	49.2	37.9	-2.5	32.2	52.4	73.9	21.5	
Vert	28688.220	PK	42.7	40.0	-10.1	24.8	47.8	73.9	26.1	
Vert	38251.330	PK	44.0	42.0	-9.0	24.0	53.0	73.9	20.9	
Vert	9563.165	AV	41.8	38.3	4.8	33.2	51.7	53.9	2.2	VBW=10Hz
Vert	19125.340	AV	46.0	37.9	-2.5	32.2	49.2	53.9	4.7	VBW=10Hz
Vert	28688.220	AV	37.2	40.0	-10.1	24.8	42.3	53.9	11.6	VBW=10Hz
Vert	38251.330	AV	34.6	42.0	-9.0	24.0	43.6	53.9	10.3	VBW=10Hz

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter-Distance factor(above 10GHz)) - Gain(Amplifier)
*Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).

Distance factor: 10GHz-26.5GHz 20log(3.0m/1.0m)= 9.5dB
26.5GHz-40GHz 20log(3.0m/0.5m)=15.6dB

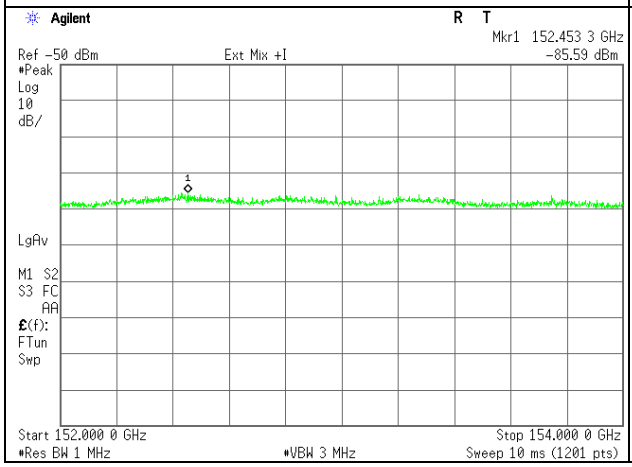
The average measurement was performed with VBW 10Hz since the harmonics of oscillation (9.6GHz VCO) had continuously oscillated.

Spurious Emission (above 40GHz)

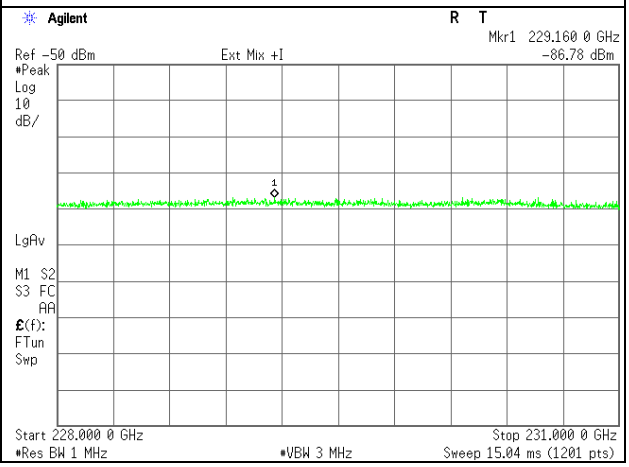
Test place	Head Office EMC Lab. No.4 Semi Anechoic Chamber	
Report No.	32GE0069-HO-01	
Date	02/28/2012	03/01/2012
Temperature/ Humidity	23 deg. C / 32% RH	22 deg. C / 30% RH
Engineer	Hironobu Ohnishi (40-50GHz)	Hironobu Ohnishi (50-231GHz)
Mode	Operating mode	

* The peak density is less than the average limit.
There is no spurious emission from 40GHz to 231GHz except for operating band.
The following shows the measurement results of the harmonics.

2nd harmonics



3rd harmonics



Frequency Stability

Test place	Head Office EMC Lab. No.6 Shielded room
Report No.	32GE0069-HO-01
Date	02/23/2012
Temperature/ Humidity	23 deg. C / 35% RH
Engineer	Hironobu Ohnishi
Mode	Operating mode

Test Condition		Center	Frequency	26dB	Lower	Upper
Temperature [deg. C]	Power Supply [V]	Frequency [GHz]	Error [MHz]	Bandwitdh [MHz]	Frequency [GHz]	Frequency [GHz]
50	12.0	76.500	-16.854	123.292	76.422	76.545
40	12.0	76.500	-8.748	121.705	76.430	76.552
30	12.0	76.500	1.822	121.377	76.441	76.563
20	12.0	76.500	10.363	124.475	76.448	76.573
10	12.0	76.500	21.159	120.493	76.461	76.581
0	12.0	76.500	30.276	121.061	76.470	76.591
-10	12.0	76.500	40.715	123.459	76.479	76.602
-20	12.0	76.500	51.225	120.731	76.491	76.612
20	10.2	76.500	10.511	122.037	76.449	76.572
20	13.8	76.500	10.717	121.152	76.450	76.571
20	9.0	76.500	9.760	123.439	76.448	76.571
20	16.0	76.500	10.249	121.814	76.449	76.571

Calculating formula:

Lower Frequency = Center Frequency + Frequency Error - 26dB Bandwidth / 2
Upper Frequency = Center Frequency + Frequency Error + 26dB Bandwidth / 2

APPENDIX 2: Test instruments

EMI test equipment (1/2)

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MOS-14	Thermo-Hygrometer	Custom	CTH-201	-	RE	2012/02/06 * 12
MCH-04	Temperature and Humidity Chamber	Tabai Espec	PL-2KP	14015723	RE	2011/08/22 * 12
MHA-11	Horn Antenna	WiseWave	ARH1023-02	10766-01	RE	2011/10/31 * 12
MPA-18	Pre Amplifier	AmTechs Corporation	LNA-7511025	9601	RE	2011/08/27 * 12
MMX-01	Preselected Millimeter Mixer	Agilent	11974V-E01	3001A00412	RE	2011/06/13 * 12
MCC-66	Microwave Cable 1G-40GHz	Suhner	SUCOFLEX102	28636/2	RE	2011/04/22 * 12
MCC-67	Microwave Cable 1G-40GHz	Suhner	SUCOFLEX102	28635/2	RE	2011/04/22 * 12
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	RE	2011/04/08 * 12
MAEC-04	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2011/03/01 * 12
MOS-15	Thermo-Hygrometer	Custom	CTH-180	-	RE	2012/02/06 * 12
MJM-07	Measure	PROMART	SEN1955	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MSA-03	Spectrum Analyzer	Agilent	E4448A	MY44020357	RE	2011/11/23 * 12
MTR-07	Test Receiver	Rohde & Schwarz	ESCI	100635	RE	2011/10/19 * 12
MLPA-01	Loop Antenna	Rohde & Schwarz	HFH2-Z2	100017	RE	2011/10/19 * 12
MCC-113	Coaxial cable	Fujikura/Suhner/TSJ	5D-2W(10m)/ SFM141(5m)/ 421-010(1m)/ sucoform141-PE(1m)/ RFM-E121(Switcher)	-/04178	RE	2011/07/04 * 12
MCC-31	Coaxial cable	UL Japan	-	-	RE	2011/07/28 * 12
MPA-14	Pre Amplifier	SONOMA INSTRUMENT	310	260833	RE	2011/03/04 * 12
MAT-09	Attenuator(6dB)	Weinschel Corp	2	BK7973	RE	2011/11/02 * 12
MBA-05	Biconical Antenna	Schwarzbeck	BBA9106	1302	RE	2011/11/16 * 12
MLA-08	Logperiodic Antenna	Schwarzbeck	UKLP9140-A	N/A	RE	2011/11/16 * 12
MCC-50	Coaxial Cable	UL Japan	-	-	RE	2011/03/25 * 12
MHA-21	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	9120D-557	RE	2011/08/11 * 12
MCC-133	Microwave Cable	HUBER+SUHNER	SUCOFLEX104	336164/4(1m) / 340640(5m)	RE	2011/09/07 * 12
MPA-12	MicroWave System Amplifier	Agilent	83017A	MY39500780	RE	2011/03/10 * 12
MAEC-03	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2011/02/22 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	-	RE	2012/02/06 * 12
MJM-06	Measure	PROMART	SEN1955	-	RE	-
MHA-16	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170306	RE	2011/05/23 * 12
MPA-11	MicroWave System Amplifier	Agilent	83017A	MY39500779	RE	2011/03/10 * 12
MCC-140	Microwave Cable	Junkosha	J12J101596-00	JAN-31-12-001	RE	2012/02/24 * 12

EMI test equipment (2/2)

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MPA-03	Microwave System Power Amplifier	Agilent	83050A	3950M00205	RE	2011/06/15 * 12
MHA-07	Horn Antenna	Custom	HO22R	10766-01	RE	2011/10/31 * 12
MMX-02	Harmonic Mixer	Agilent	11970W	2521 A01909	RE	2011/06/14 * 12
MHA-09	Horn Antenna	WiseWave	ARH1523-02	10766-01	RE	2011/10/31 * 12
MPA-08	Pre Amplifier	WiseWave	ALN-61226028-51	11576-01-071	RE	2011/08/27 * 12
MHA-24	Horn Antenna	Custom Microwave Inc.	HO6R	-	RE	2011/09/19 * 12
MMX-03	Harmonic Mixer	OML Inc.	M06HWD	D100709-1	RE	2011/09/30 * 12
MHA-27	Horn Antenna	Custom Microwave Inc.	HO4R	-	RE	2011/09/19 * 12
MMX-04	Harmonic Mixer	OML Inc.	M04HWD	Y100709-1	RE	2011/09/30 * 12
MDPLX-01	Diplexer	OML Inc.	DPL26	-	RE	2011/09/19 * 12
MCC-135	Microwave Cable	HUBER+SUHNER	SUCOFLEX102	37511/2	RE	2011/08/31 * 12

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

[Below 40GHz]
All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or international standards.

[Above 40GHz]
Acceptance criteria for untraceable equipment was formulated according to ISO/IEC 17025 5.6.2.2.2, and the regular inspection was performed based on it annually.
For 40-110GHz, power sensor is calibrated by manufacturer, and the measured calibration data is used as in-house reference. The calibration data by manufacturer is checked for acceptance by a calorie meter except for some frequency bands.
For above 110GHz, output level of millimeter wave source module is used as the reference, and inspection by the calorie meter is performed.
Electric power is checked with the calorie meter by measuring resistance and voltage of reference resistor.

As for some calibrations performed after the tested dates, those test equipment have been controlled by means of an unbroken chains of calibrations.

Test Item:
RE: Radiated Emission