



# RADIO TEST REPORT

**Test Report No. : 12902060H-B**

**Applicant** : DENSO TEN Limited  
**Type of Equipment** : Car Audio  
**Model No.** : FT0106B  
**FCC ID** : BABFT0106B  
**Test regulation** : FCC Part 15 Subpart C: 2019  
For Permissive Change  
\*Bluetooth part  
(Radiated Spurious Emission test only)  
**Test Result** : Complied (Refer to SECTION 3.2)

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 above regulation.
4. The test results in this report are traceable to the national or international standards.
5. This test report covers Radio technical requirements. It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)
6. The all test items in this test report are conducted by UL Japan, Inc. Ise EMC Lab.
7. 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.
8. The information provided from the customer for this report is identified in SECTION 1.

**Date of test:** June 10 to 13, 2019

**Representative test engineer:**

Junki Nagatomi  
Engineer  
Consumer Technology Division

**Approved by:**

Tsubasa Takayama  
Leader  
Consumer Technology Division



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://japan.ul.com/resources/emc\\_accredited/](http://japan.ul.com/resources/emc_accredited/)

- The testing in which "Non-accreditation" is displayed is outside the accreditation scopes in UL Japan.  
 There is no testing item of "Non-accreditation".

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# REVISION HISTORY

**Original Test Report No.: 12902060H-B**

Revision	Test report No.	Date	Page revised	Contents
- (Original)	12902060H-B	July 25, 2019	-	-

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## **SECTION 1: Customer information**

Company Name : DENSO TEN Limited  
Address : 2-28, Goshō-dori 1-Chome, Hyogo-ku, Kobe, 652-8510 JAPAN  
Telephone Number : +81-78-682-2159  
Facsimile Number : +81-78-671-7160  
Contact Person : DAISUKE FUKII

The information provided from the customer is as follows;

- Applicant, Type of Equipment, Model No., FCC ID on the cover and other relevant pages
  - Operating/Test Mode(s) (Mode(s)) on all the relevant pages
  - SECTION 1: Customer information
  - SECTION 2: Equipment under test (E.U.T.)
  - SECTION 4: Operation of E.U.T. during testing
- \* The laboratory is exempted from liability of any test results affected from the above information in SECTION 2 and 4.

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

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

Type of Equipment : Car Audio  
Model No. : FT0106B  
Serial No. : Refer to SECTION 4.2  
Rating : DC 12 V  
Receipt Date of Sample : June 3, 2019  
(Information from test lab.)  
Country of Mass-production : Mexico  
Condition of EUT : Production 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: FT0106B (referred to as the EUT in this report) is a Car Audio.

### General Specification

Clock frequency(ies) : 48 MHz (Crystal)  
Operating Temperature : -20 deg. C- +65 deg. C

### Radio Specification

#### **WLAN (IEEE802.11b/g/n-20)**

Radio Type : Transceiver  
Frequency of Operation : 2412 MHz - 2462 MHz  
Modulation : DSSS/OFDM  
Antenna type : Inverted F Antenna  
Antenna Gain : 0.98 dBi

#### **Bluetooth (Ver.4.2 + EDR)**

Equipment Type : Transceiver  
Frequency of Operation : 2402 MHz - 2480 MHz  
Type of Modulation : FHSS, GFSK,  $\pi/4$  DQPSK, 8 DPSK  
Antenna Type : Inverted F Antenna  
Antenna Gain : 0.98 dBi

#### **GPS Receiver**

Type of Receiver : GPS Receiver  
Frequency of Operation : 1575.42 MHz  
Modulation : DSSS  
Antenna type : GPS Antenna  
Antenna Gain : 29 dBi

#### **AM / FM**

Type of Receiver : Receiver  
Frequency of Operation : AM: 530 kHz to 1710 kHz  
FM: 87.75 MHz to 107.9 MHz  
Channel spacing : AM: 10 kHz  
FM: 200 kHz  
Antenna connector type : AM / FM: HFC II

\*This test report applies to Bluetooth Ver.4.2 with EDR function.

\*Wireless LAN and Bluetooth do not transmit simultaneously.

<Contents of the change from original model>

Antenna of the EUT was modified and antenna gain is larger than original model.  
The radio specification is identical to the original.

Therefore only Radiated Spurious Emission test were performed in this report.

Additionally, only the information of modified antenna is described in this report.

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

### **3.1 Test Specification**

Test Specification : FCC Part 15 Subpart C  
FCC Part 15 final revised on July 19, 2019 and effective August 19, 2019 except 15.258

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

\* The revisions made after testing date do not affect the test specification applied to the EUT.

### **3.2 Procedures and results**

Item	Test Procedure	Specification	Worst Margin	Results	Remarks
Spurious Emission & Band Edge Compliance	FCC: KDB 558074 D01 15.247 Meas Guidance v05r02 ISED: RSS-Gen 6.13	FCC: Section15.247(d) ----- ISED: RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10	9.4 dB 4804.000 MHz, AV, Vert.	Complied a)	Radiated (above 30 MHz) *1)
Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422. *1) Radiated test was selected over 30 MHz based on section 15.247(d).					
a) Refer to APPENDIX 1 (data of Radiated Spurious Emission)					
Symbols:					
Complied                    The data of this test item has enough margin, more than the measurement uncertainty.					
Complied#                 The data of this test item meets the limits unless the measurement uncertainty is taken into consideration.					

\* In case any questions arise about test procedure, ANSI C63.10: 2013 is also referred.

#### **FCC Part 15.31 (e)**

This EUT provides stable voltage constantly to RF Module regardless of input voltage. Therefore, this EUT complies with the requirement.

#### **FCC Part 15.203 Antenna requirement**

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

### **3.3 Addition to standard**

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

### 3.4 Uncertainty

#### EMI

There is no applicable rule of uncertainty in this applied standard. Therefore, the results are derived depending on whether or not laboratory uncertainty is applied.

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

#### Radiated emission

Measurement distance	Frequency range	Uncertainty (+/-)
3 m	9 kHz to 30 MHz	3.3 dB
10 m		3.2 dB
<hr/>		
3 m	30 MHz to 200 MHz (Horizontal)	4.8 dB
	(Vertical)	5.0 dB
	200 MHz to 1000 MHz (Horizontal)	5.2 dB
	(Vertical)	6.3 dB
10 m	30 MHz to 200 MHz (Horizontal)	4.8 dB
	(Vertical)	4.9 dB
	200 MHz to 1000 MHz (Horizontal)	5.0 dB
	(Vertical)	5.0 dB
<hr/>		
3 m	1 GHz to 6 GHz	5.0 dB
	6 GHz to 18 GHz	5.3 dB
1 m	10 GHz to 26.5 GHz	5.8 dB
	26.5 GHz to 40 GHz	5.8 dB
10 m	1 GHz to 18 GHz	5.2 dB

### 3.5 Test Location

UL Japan, Inc. Ise EMC Lab.

\*NVLAP Lab. code: 200572-0 / FCC Test Firm Registration Number: 199967 / ISED Lab Company Number: 2973C

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Test site	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms	Maximum measurement distance
No.1 semi-anechoic chamber	19.2 x 11.2 x 7.7	7.0 x 6.0	No.1 Power source room	10 m
No.2 semi-anechoic chamber	7.5 x 5.8 x 5.2	4.0 x 4.0	-	3 m
No.3 semi-anechoic chamber	12.0 x 8.5 x 5.9	6.8 x 5.75	No.3 Preparation room	3 m
No.3 shielded room	4.0 x 6.0 x 2.7	N/A	-	-
No.4 semi-anechoic chamber	12.0 x 8.5 x 5.9	6.8 x 5.75	No.4 Preparation room	3 m
No.4 shielded room	4.0 x 6.0 x 2.7	N/A	-	-
No.5 semi-anechoic chamber	6.0 x 6.0 x 3.9	6.0 x 6.0	-	-
No.5 measurement room	6.4 x 6.4 x 3.0	6.4 x 6.4	-	-
No.6 shielded room	4.0 x 4.5 x 2.7	4.0 x 4.5	-	-
No.6 measurement room	4.75 x 5.4 x 3.0	4.75 x 4.15	-	-
No.7 shielded room	4.7 x 7.5 x 2.7	4.7 x 7.5	-	-
No.8 measurement room	3.1 x 5.0 x 2.7	3.1 x 5.0	-	-
No.9 measurement room	8.8 x 4.6 x 2.8	2.4 x 2.4	-	-
No.11 measurement room	6.2 x 4.7 x 3.0	4.8 x 4.6	-	-

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

### 3.6 Test data, Test instruments, and Test set up

Refer to APPENDIX.

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

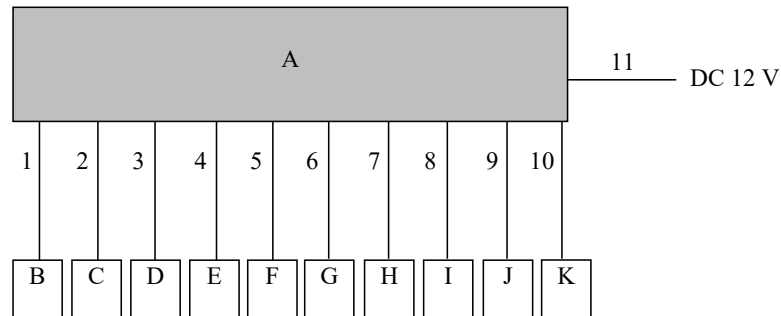
### **4.1 Operating Mode(s)**

Bluetooth (BT): Transmitting (Tx), Payload: PRBS9

#### Details of Operating Mode(s)

<b>Test Item</b>	<b>Mode</b>	<b>Tested frequency</b>
Spurious Emission (Radiated),	Tx (Hopping Off) DH5, 3DH5	2402 MHz 2441 MHz 2480 MHz
<p>*As a result of preliminary test, the formal test was performed with the above modes, which had the maximum payload length (except Dwell time test) *2DH mode (2Mb/s EDR: pi/4DQPSK) was excluded for other tests than power measurement by using 3DH mode (3 Mb/s EDR: 8DPSK) as a representative. * It is considered that the non-tested packet type (e.g. inquiry) can be omitted as it is complied with above all the test items based on Bluetooth Core specification.</p> <p>*EUT has the power settings by the software as follows (setting value might be different from product specification value); - Power settings: 0 dBm - Software: BSDT Ver. 2.0.0.12 *This setting of software is the worst case. Any conditions under the normal use do not exceed the condition of setting. In addition, end users cannot change the settings of the output power of the product.</p>		

## 4.2 Configuration and peripherals



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

### Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Car Audio	FT0106B	MR200045	DENSO TEN Limited	EUT
B	USB Memory	USM4GR B	17116 DGGNN	SONY	-
C	AM Dummy	828-00064-D1	No.6	-	-
D	FM Dummy	828-00064-D5	Z312515070049	-	-
E	XM Radio Antenna	1149	No.2	-	-
F	GPS Antenna	2354031090A15000	No.7	-	-
G	Speaker Dummy	-	-	-	-
H	Microphone	-	46	-	-
I	Smart Camera	867B0-76010	No.3	Panasonic	-
J	Back Camera	317616008-012	No.12	Panasonic	-
K	Steering switch	84250-53201	No.2	-	-

### List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	USB Cable	2.0	Shielded	Shielded	-
2	AM Antenna Cable	0.2	Shielded	Shielded	-
3	FM Antenna Cable	0.2	Shielded	Shielded	-
4	Signal Cable	7.2	Shielded	Shielded	-
5	Signal Cable	4.4	Shielded	Shielded	-
6	Signal Cable	3.5	Unshielded	Unshielded	-
7	Signal Cable	3.6	Unshielded	Unshielded	-
8	Signal Cable	3.75	Unshielded	Unshielded	-
9	Signal Cable	3.75	Unshielded	Unshielded	-
10	Signal Cable	3.5	Unshielded	Unshielded	-
11	DC Cable	4.5	Unshielded	Unshielded	-

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## **SECTION 5: Radiated Spurious Emission**

### **Test Procedure**

[For below 1 GHz]

EUT was placed on a urethane platform of nominal size, 1.0 m by 1.5 m, raised 0.8 m above the conducting ground plane. The Radiated Electric Field Strength has been measured in a Semi Anechoic Chamber with a ground plane.

[For above 1 GHz]

EUT was placed on a urethane platform of nominal size, 0.5 m by 0.5 m, raised 1.5 m above the conducting ground plane.

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

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

Test antenna was aimed at the EUT for receiving the maximum signal and always kept within the illumination area of the 3 dB beamwidth of the antenna.

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	30 MHz to 200 MHz	200 MHz to 1 GHz	Above 1 GHz
Antenna Type	Biconical	Logperiodic	Horn

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

### **20 dBc was applied to the frequency over the limit of FCC 15.209 / Table 4 of RSS-Gen 8.9 (ISED) and outside the restricted band of FCC15.205 / Table 6 of RSS-Gen 8.10 (ISED).**

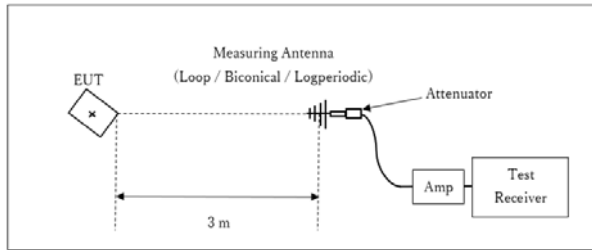
Frequency	Below 1 GHz	Above 1 GHz		20 dBc
Instrument used	Test Receiver	Spectrum Analyzer *a)		Spectrum Analyzer
Detector	QP	PK	AV *1)	PK
IF Bandwidth	BW 120 kHz	RBW: 1 MHz VBW: 3 MHz	RBW: 1 MHz VBW: 3 MHz Detector: Power Averaging (RMS) Trace: 100 traces Duty factor was added to the results.	RBW: 100 kHz VBW: 300 kHz

\*1) Average Power Measurement was performed based on KDB 558074 D01 15.247 Meas Guidance v05r02.

\*a) The Spectrum Analyzer was used in 3 dB resolution bandwidth.

**Figure 2: Test Setup**

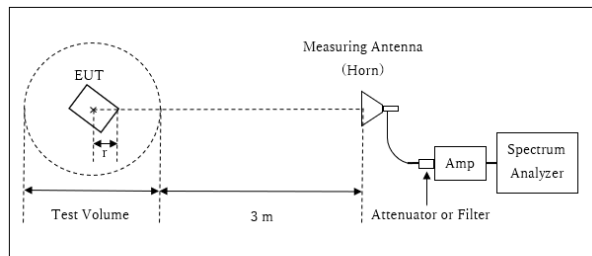
Below 1 GHz



× : Center of turn table

Test Distance: 3 m

1 GHz - 10 GHz



r : Radius of an outer periphery of EUT

× : Center of turn table

Distance Factor:  $20 \times \log(3.55 \text{ m} / 3.0 \text{ m}) = 1.47 \text{ dB}$

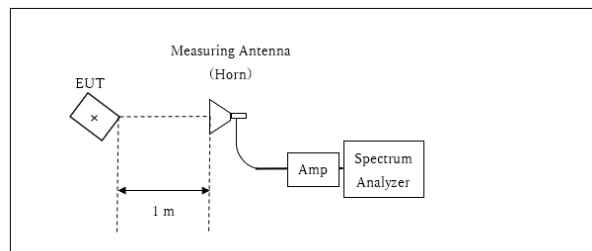
\* Test Distance:  $(3 + \text{Test Volume} / 2) - r = 3.55 \text{ m}$

Test Volume : 1.5m

(Test Volume has been calibrated based on CISPR 16-1-4.)

r = 0.2 m

10 GHz - 26.5 GHz



× : Center of turn table

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

\*Test Distance: 1 m

The test was made on EUT at the normal use position.

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

**Measurement range : 30 MHz - 26.5 GHz**

**Test data : APPENDIX**

**Test result : Pass**

## APPENDIX 1: Test data

### Radiated Spurious Emission

Report No. 12902060H  
Test place Ise EMC Lab.  
Semi Anechoic Chamber No.2 No.2  
Date June 10, 2019 June 12, 2019  
Temperature / Humidity 24 deg. C / 58 % RH 21 deg. C / 42 % RH  
Engineer Junki Nagatomi Junki Nagatomi  
(1 GHz -10 GHz) (Above 10 GHz)  
(Below 1GHz)  
Mode Tx, Hopping Off, DH5 2402 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	516.088	QP	34.9	17.6	9.8	29.9	-	32.4	46.0	13.6	
Hori.	633.747	QP	30.3	19.5	10.3	29.5	-	30.5	46.0	15.5	
Hori.	663.546	QP	28.1	19.4	10.4	29.4	-	28.5	46.0	17.5	
Hori.	877.495	QP	29.7	22.0	11.2	28.2	-	34.7	46.0	11.3	
Hori.	926.242	QP	29.4	22.1	11.4	27.9	-	35.0	46.0	11.0	
Hori.	992.274	QP	29.2	22.4	11.6	27.5	-	35.7	53.9	18.2	
Hori.	2379.068	PK	46.4	27.5	4.7	34.3	-	44.4	73.9	29.6	
Hori.	2390.000	PK	44.9	27.3	4.7	34.3	-	42.6	73.9	31.3	
Hori.	4804.000	PK	45.6	31.6	6.8	33.5	-	50.5	73.9	23.4	
Hori.	7206.000	PK	44.0	36.4	8.1	33.4	-	55.1	73.9	18.8	Floor noise
Hori.	9608.000	PK	45.6	38.5	8.7	33.8	-	59.0	73.9	14.9	Floor noise
Hori.	2379.068	AV	38.2	27.5	4.7	34.3	1.1	37.3	53.9	16.6	
Hori.	2390.000	AV	36.1	27.3	4.7	34.3	1.1	34.9	53.9	19.0	*1)
Hori.	4804.000	AV	36.3	31.6	6.8	33.5	1.1	42.3	53.9	11.6	
Hori.	7206.000	AV	33.2	36.4	8.1	33.4	-	44.3	53.9	9.6	Floor noise
Hori.	9608.000	AV	34.5	38.5	8.7	33.8	-	47.8	53.9	6.1	Floor noise
Vert.	516.088	QP	31.6	17.6	9.8	29.9	-	29.1	46.0	16.9	
Vert.	633.747	QP	35.7	19.5	10.3	29.5	-	35.9	46.0	10.1	
Vert.	663.546	QP	30.7	19.4	10.4	29.4	-	31.1	46.0	14.9	
Vert.	877.495	QP	29.0	22.0	11.2	28.2	-	34.0	46.0	12.0	
Vert.	926.242	QP	27.8	22.1	11.4	27.9	-	33.4	46.0	12.6	
Vert.	991.263	QP	30.2	22.4	11.6	27.5	-	36.7	53.9	17.2	
Vert.	2379.068	PK	47.1	27.5	4.7	34.3	-	45.0	73.9	28.9	
Vert.	2390.000	PK	45.7	27.3	4.7	34.3	-	43.4	73.9	30.5	
Vert.	4804.000	PK	45.6	31.6	6.8	33.5	-	50.5	73.9	23.4	
Vert.	7206.000	PK	44.0	36.4	8.1	33.4	-	55.1	73.9	18.8	Floor noise
Vert.	9608.000	PK	45.6	38.5	8.7	33.8	-	59.0	73.9	14.9	Floor noise
Vert.	2379.068	AV	38.5	27.5	4.7	34.3	1.1	37.6	53.9	16.4	
Vert.	2390.000	AV	33.6	27.3	4.7	34.3	1.1	32.4	53.9	21.5	*1)
Vert.	4804.000	AV	37.1	31.6	6.8	33.5	1.1	43.1	53.9	10.8	
Vert.	7206.000	AV	33.2	36.4	8.1	33.4	-	44.3	53.9	9.6	Floor noise
Vert.	9608.000	AV	34.5	38.5	8.7	33.8	-	47.8	53.9	6.1	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor

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

Distance factor: 1 GHz - 10 GHz 20log(3.55 m / 3.0 m) = 1.47 dB

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

\*1) Not Out of Band emission(Leakage Power)

#### 20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	94.9	27.0	4.7	34.3	92.3	-	-	Carrier
Hori.	2400.000	PK	39.5	27.0	4.7	34.3	37.0	72.3	35.4	
Vert.	2402.000	PK	93.1	27.0	4.7	34.3	90.6	-	-	Carrier
Vert.	2400.000	PK	39.6	27.0	4.7	34.3	37.0	70.6	33.6	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

**UL Japan, Inc.**

**Ise EMC Lab.**

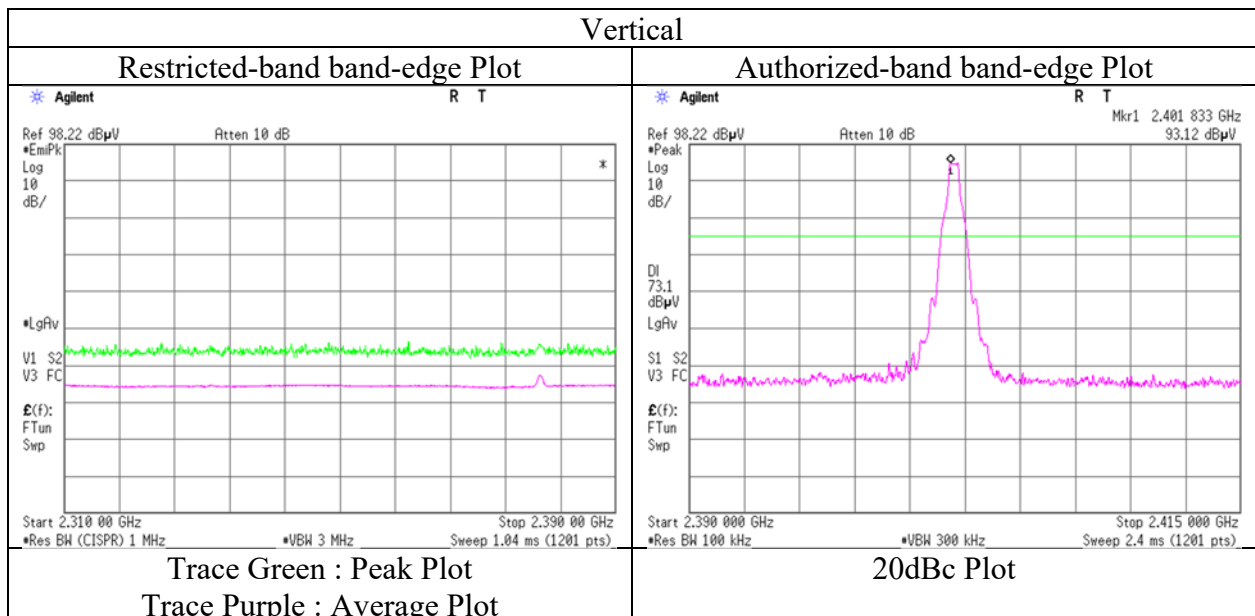
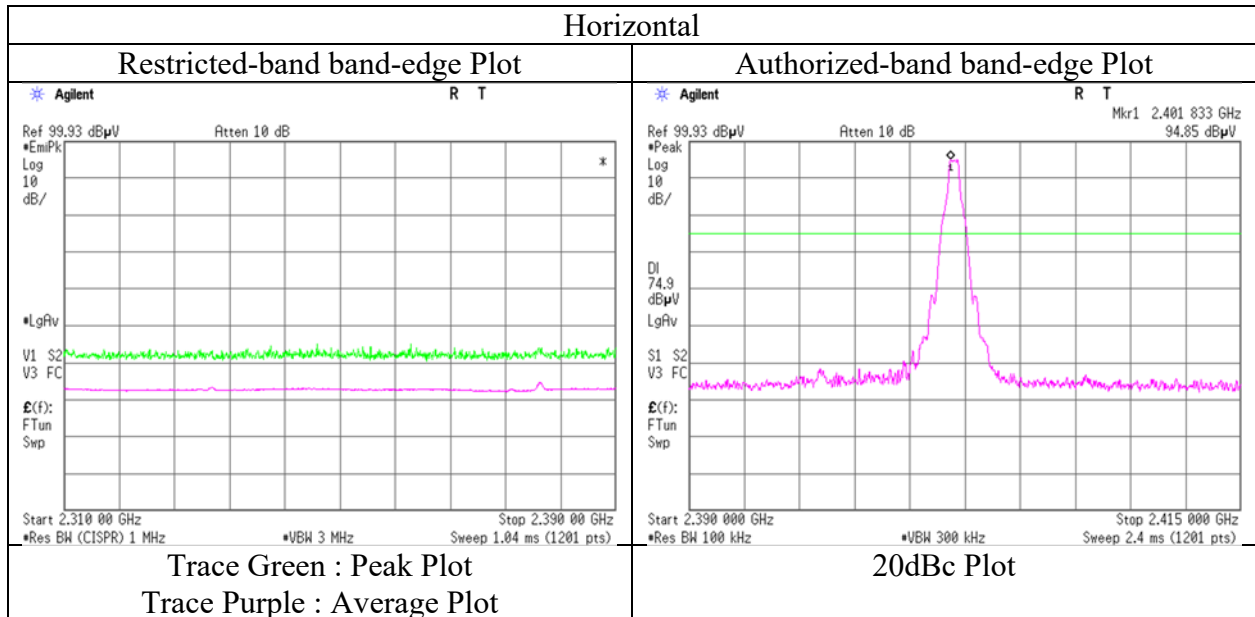
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**Radiated Spurious Emission**  
**(Reference Plot for band-edge)**

Report No. 12902060H  
Test place Ise EMC Lab.  
Semi Anechoic Chamber No.2  
Date June 10, 2019  
Temperature / Humidity 24 deg. C / 58 % RH  
Engineer Junki Nagatomi  
(1 GHz -10 GHz)  
Mode Tx, Hopping Off, DH5 2402 MHz



\* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.

Final result of restricted band edge was shown in tabular data.

**UL Japan, Inc.**

**Ise EMC Lab.**

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## Radiated Spurious Emission

Report No. 12902060H  
Test place Ise EMC Lab.  
Semi Anechoic Chamber No.2 No.2  
Date June 10, 2019 June 12, 2019  
Temperature / Humidity 24 deg. C / 58 % RH 21 deg. C / 42 % RH  
Engineer Junki Nagatomi Junki Nagatomi  
(1 GHz -10 GHz) (Above 10 GHz)  
(Below 1GHz)  
Mode Tx, Hopping Off, DH5 2441 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	333.059	QP	37.6	14.6	9.1	29.4	-	32.0	46.0	14.0	
Hori.	516.089	QP	35.1	17.6	9.8	29.9	-	32.6	46.0	13.4	
Hori.	633.744	QP	30.3	19.5	10.3	29.5	-	30.5	46.0	15.5	
Hori.	877.495	QP	29.4	22.0	11.2	28.2	-	34.4	46.0	11.6	
Hori.	926.559	QP	29.2	22.1	11.4	27.9	-	34.8	46.0	11.2	
Hori.	991.258	QP	29.3	22.4	11.6	27.5	-	35.8	53.9	18.1	
Hori.	4882.000	PK	43.8	31.7	6.8	33.5	-	48.9	73.9	25.0	
Hori.	7323.000	PK	43.3	36.0	8.1	33.5	-	54.0	73.9	19.9	Floor noise
Hori.	9764.000	PK	44.6	38.8	8.7	33.8	-	58.2	73.9	15.7	Floor noise
Hori.	4882.000	AV	34.8	31.7	6.8	33.5	1.1	40.9	53.9	13.0	
Hori.	7323.000	AV	34.8	36.0	8.1	33.5	-	45.5	53.9	8.4	Floor noise
Hori.	9764.000	AV	34.2	38.8	8.7	33.8	-	47.8	53.9	6.1	Floor noise
Vert.	333.059	QP	31.8	14.6	9.1	29.4	-	26.2	46.0	19.8	
Vert.	516.089	QP	31.7	17.6	9.8	29.9	-	29.2	46.0	16.8	
Vert.	633.744	QP	35.7	19.5	10.3	29.5	-	35.9	46.0	10.1	
Vert.	877.495	QP	29.1	22.0	11.2	28.2	-	34.1	46.0	11.9	
Vert.	926.559	QP	27.4	22.1	11.4	27.9	-	33.0	46.0	13.0	
Vert.	991.258	QP	30.4	22.4	11.6	27.5	-	36.9	53.9	17.0	
Vert.	4882.000	PK	43.9	31.7	6.8	33.5	-	48.9	73.9	25.0	
Vert.	7323.000	PK	43.3	36.0	8.1	33.5	-	54.0	73.9	19.9	Floor noise
Vert.	9764.000	PK	44.6	38.8	8.7	33.8	-	58.2	73.9	15.7	Floor noise
Vert.	4882.000	AV	35.5	31.7	6.8	33.5	1.1	41.7	53.9	12.2	
Vert.	7323.000	AV	34.8	36.0	8.1	33.5	-	45.5	53.9	8.4	Floor noise
Vert.	9764.000	AV	34.2	38.8	8.7	33.8	-	47.8	53.9	6.1	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor

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

Distance factor: 1 GHz - 10 GHz 20log (3.55 m / 3.0 m) = 1.47 dB  
10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

## Radiated Spurious Emission

Report No. 12902060H  
Test place Ise EMC Lab.  
Semi Anechoic Chamber No.2  
Date June 10, 2019 No.2  
Temperature / Humidity 24 deg. C / 58 % RH 21 deg. C / 42 % RH  
Engineer Junki Nagatomi Junki Nagatomi  
(1 GHz -10 GHz) (Above 10 GHz)  
(Below 1GHz)  
Mode Tx, Hopping Off, DH5 2480 MHz

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	333.059	QP	37.5	14.6	9.1	29.4	-	31.9	46.0	14.1	
Hori.	516.756	QP	34.9	17.6	9.8	29.9	-	32.4	46.0	13.6	
Hori.	633.744	QP	30.5	19.5	10.3	29.5	-	30.7	46.0	15.3	
Hori.	682.499	QP	32.7	19.7	10.5	29.3	-	33.6	46.0	12.4	
Hori.	877.171	QP	28.8	22.0	11.2	28.2	-	33.8	46.0	12.2	
Hori.	926.243	QP	29.1	22.1	11.4	27.9	-	34.7	46.0	11.3	
Hori.	2483.500	PK	45.1	28.1	4.7	34.2	-	43.7	73.9	30.3	
Hori.	4960.000	PK	44.9	31.9	6.1	33.5	-	49.4	73.9	24.5	
Hori.	7440.000	PK	43.2	36.3	7.5	33.5	-	53.5	73.9	20.5	Floor noise
Hori.	9920.000	PK	44.8	38.7	8.3	33.8	-	58.1	73.9	15.8	Floor noise
Hori.	2483.500	AV	34.0	28.1	4.7	34.2	1.1	33.8	53.9	20.2	*1)
Hori.	4960.000	AV	35.5	31.9	6.1	33.5	1.1	41.1	53.9	12.8	
Hori.	7440.000	AV	32.6	36.3	7.5	33.5	-	42.8	53.9	11.1	Floor noise
Hori.	9920.000	AV	34.6	38.7	8.3	33.8	-	47.8	53.9	6.1	Floor noise
Vert.	333.059	QP	31.5	14.6	9.1	29.4	-	25.9	46.0	20.1	
Vert.	516.756	QP	31.7	17.6	9.8	29.9	-	29.2	46.0	16.8	
Vert.	633.744	QP	35.8	19.5	10.3	29.5	-	36.0	46.0	10.0	
Vert.	682.499	QP	32.6	19.7	10.5	29.3	-	33.5	46.0	12.5	
Vert.	877.171	QP	29.2	22.0	11.2	28.2	-	34.2	46.0	11.8	
Vert.	926.243	QP	27.8	22.1	11.4	27.9	-	33.4	46.0	12.6	
Vert.	2483.500	PK	44.6	28.1	4.7	34.2	-	43.2	73.9	30.7	
Vert.	4960.000	PK	45.7	31.9	6.1	33.5	-	50.2	73.9	23.7	
Vert.	7440.000	PK	43.2	36.3	7.5	33.5	-	53.5	73.9	20.5	Floor noise
Vert.	9920.000	PK	44.8	38.7	8.3	33.8	-	58.1	73.9	15.8	Floor noise
Vert.	2483.500	AV	35.9	28.1	4.7	34.2	1.1	35.6	53.9	18.3	*1)
Vert.	4960.000	AV	37.2	31.9	6.1	33.5	1.1	42.8	53.9	11.1	
Vert.	7440.000	AV	32.6	36.3	7.5	33.5	-	42.8	53.9	11.1	Floor noise
Vert.	9920.000	AV	34.6	38.7	8.3	33.8	-	47.8	53.9	6.1	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor

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

Distance factor: 1 GHz - 10 GHz  $20\log(3.55\text{ m} / 3.0\text{ m}) = 1.47\text{ dB}$

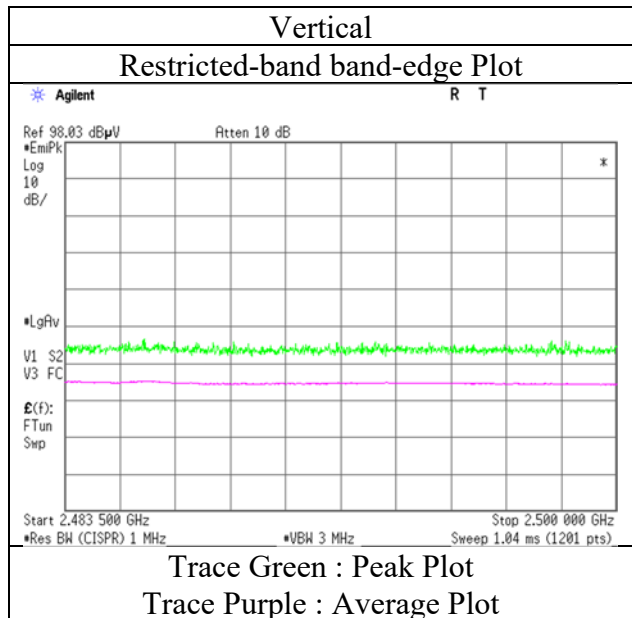
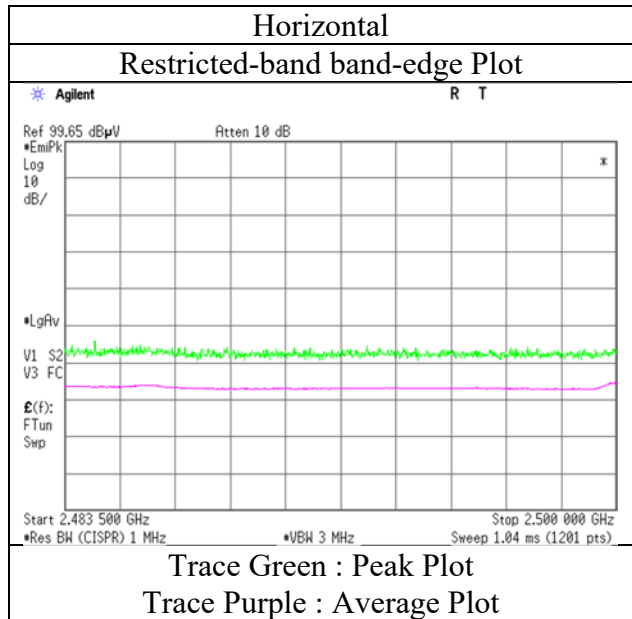
10 GHz - 26.5 GHz  $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

\*1) Not Out of Band emission(Leakage Power)



**Radiated Spurious Emission**  
**(Reference Plot for band-edge)**

Report No. 12902060H  
Test place Ise EMC Lab.  
Semi Anechoic Chamber No.2  
Date June 10, 2019  
Temperature / Humidity 24 deg. C / 58 % RH  
Engineer Junki Nagatomi  
(1 GHz -10 GHz)  
Mode Tx, Hopping Off, DH5 2480 MHz



\* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.  
Final result of restricted band edge was shown in tabular data.

## Radiated Spurious Emission

Report No.	12902060H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.2	No.2	No.2
Date	June 10, 2019	June 12, 2019	June 13, 2019
Temperature / Humidity	24 deg. C / 58 % RH	21 deg. C / 42 % RH	24 deg. C / 56 % RH
Engineer	Junki Nagatomi	Junki Nagatomi	Junki Nagatomi
	(1 GHz - 10 GHz)	(Above 10 GHz)	(Below 1GHz)
Mode	Tx, Hopping Off, 3DH5 2402 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	516.119	QP	33.1	17.6	9.8	29.9	-	30.6	46.0	15.4	
Hori.	552.960	QP	33.1	17.9	10.0	29.8	-	31.2	46.0	14.9	
Hori.	731.995	QP	29.4	20.1	10.7	29.0	-	31.1	46.0	14.9	
Hori.	877.053	QP	28.7	22.0	11.2	28.2	-	33.7	46.0	12.3	
Hori.	921.589	QP	25.5	22.1	11.3	27.9	-	31.1	46.0	14.9	
Hori.	992.460	QP	22.6	22.4	11.6	27.5	-	29.1	53.9	24.8	
Hori.	2378.961	PK	46.4	27.5	4.7	34.3	-	44.3	73.9	29.6	
Hori.	2390.000	PK	44.2	27.3	4.7	34.3	-	41.8	73.9	32.1	
Hori.	4804.000	PK	46.3	31.6	6.8	33.5	-	51.2	73.9	22.7	
Hori.	7206.000	PK	43.2	36.4	8.1	33.4	-	54.3	73.9	19.6	Floor noise
Hori.	9608.000	PK	45.2	38.5	8.7	33.8	-	58.5	73.9	15.4	Floor noise
Hori.	2378.961	AV	38.3	27.5	4.7	34.3	-	36.2	53.9	17.7	
Hori.	2390.000	AV	33.8	27.3	4.7	34.3	1.1	32.6	53.9	21.3	*1)
Hori.	4804.000	AV	36.6	31.6	6.8	33.5	1.1	42.6	53.9	11.3	
Hori.	7206.000	AV	33.0	36.4	8.1	33.4	-	44.1	53.9	9.8	Floor noise
Hori.	9608.000	AV	34.5	38.5	8.7	33.8	-	47.9	53.9	6.0	Floor noise
Vert.	516.119	QP	31.2	17.6	9.8	29.9	-	28.7	46.0	17.3	
Vert.	552.960	QP	29.0	17.9	10.0	29.8	-	27.1	46.0	19.0	
Vert.	731.995	QP	26.7	20.1	10.7	29.0	-	28.4	46.0	17.6	
Vert.	877.053	QP	29.9	22.0	11.2	28.2	-	34.9	46.0	11.1	
Vert.	921.589	QP	28.5	22.1	11.3	27.9	-	34.1	46.0	11.9	
Vert.	992.460	QP	22.1	22.4	11.6	27.5	-	28.6	53.9	25.3	
Vert.	2378.961	PK	46.5	27.5	4.7	34.3	-	44.4	73.9	29.5	
Vert.	2390.000	PK	44.6	27.3	4.7	34.3	-	42.2	73.9	31.7	
Vert.	4804.000	PK	45.6	31.6	6.8	33.5	-	50.6	73.9	23.4	
Vert.	7206.000	PK	43.2	36.4	8.1	33.4	-	54.3	73.9	19.6	Floor noise
Vert.	9608.000	PK	45.2	38.5	8.7	33.8	-	58.5	73.9	15.4	Floor noise
Vert.	2378.961	AV	37.3	27.5	4.7	34.3	-	35.2	53.9	18.7	
Vert.	2390.000	AV	36.1	27.3	4.7	34.3	1.1	34.9	53.9	19.0	*1)
Vert.	4804.000	AV	38.5	31.6	6.8	33.5	1.1	44.5	53.9	9.4	
Vert.	7206.000	AV	33.0	36.4	8.1	33.4	-	44.1	53.9	9.8	Floor noise
Vert.	9608.000	AV	34.5	38.5	8.7	33.8	-	47.9	53.9	6.0	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor  
\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz 20log(3.55 m / 3.0 m) = 1.47 dB  
10 GHz - 26.5 GHz 20log(1.0 m / 3.0 m) = -9.5 dB

\*1) Not Out of Band emission(Leakage Power)

### 20dBc Data Sheet

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	94.5	27.0	4.7	34.3	92.0	-	-	Carrier
Hori.	2400.000	PK	39.6	27.0	4.7	34.3	37.0	72.0	34.9	
Vert.	2402.000	PK	93.6	27.0	4.7	34.3	91.1	-	-	Carrier
Vert.	2400.000	PK	40.3	27.0	4.7	34.3	37.7	71.1	33.4	

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

**UL Japan, Inc.**

**Ise EMC Lab.**

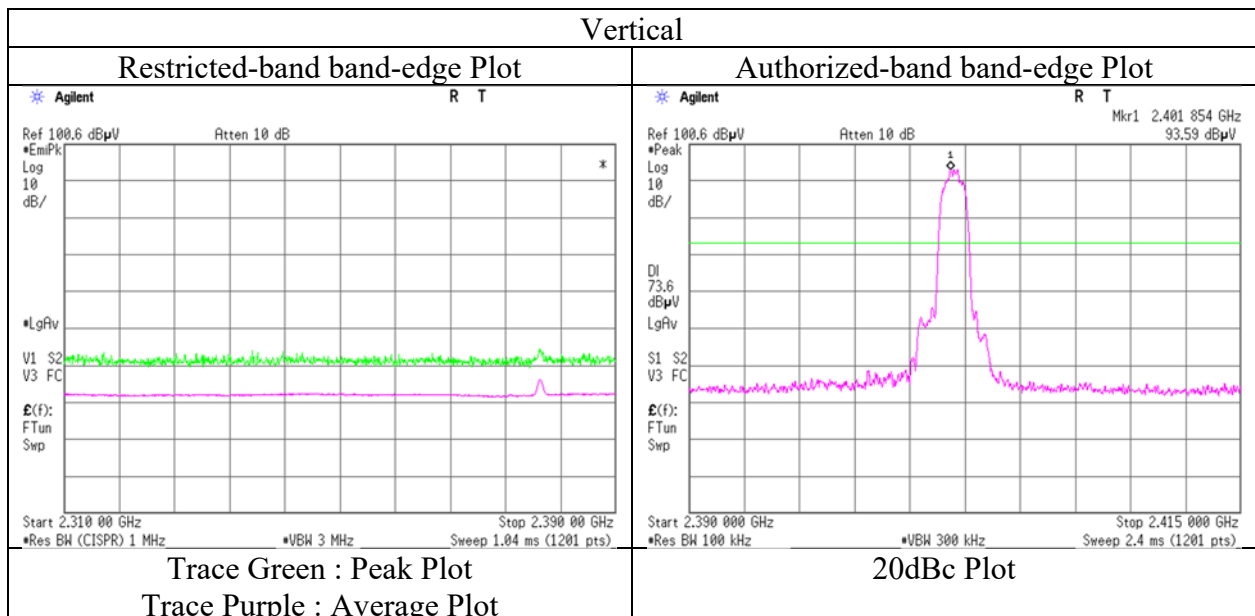
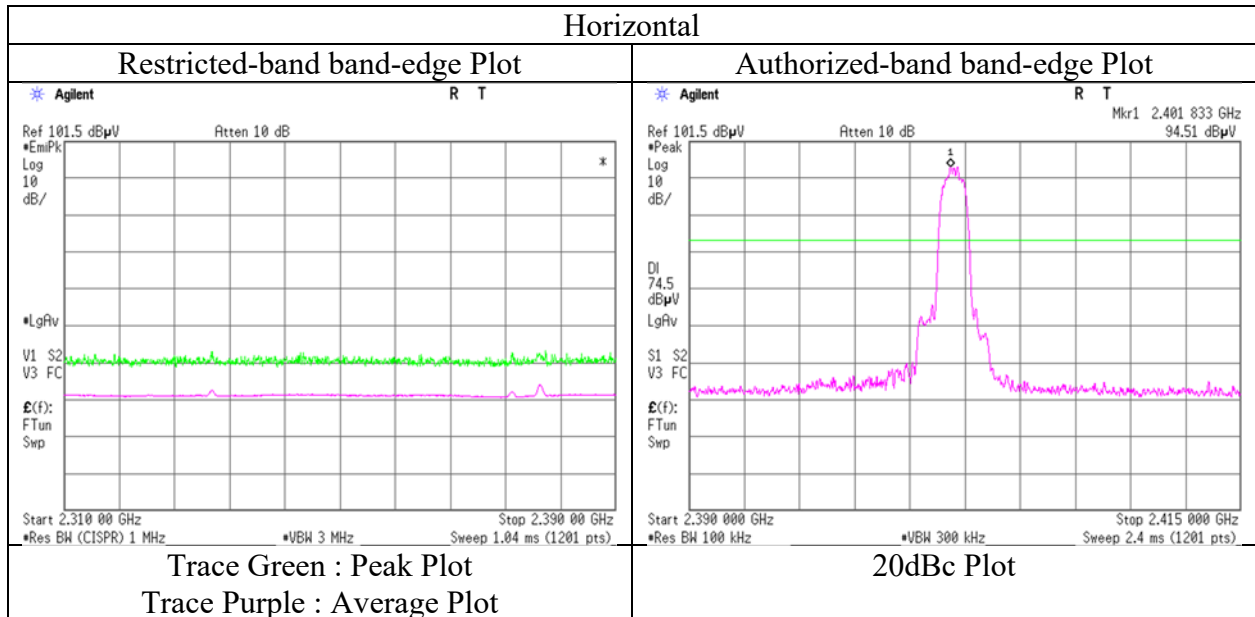
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**Radiated Spurious Emission**  
**(Reference Plot for band-edge)**

Report No.	12902060H
Test place	Ise EMC Lab.
Semi Anechoic Chamber	No.2
Date	June 10, 2019
Temperature / Humidity	24 deg. C / 58 % RH
Engineer	Junki Nagatomi (1 GHz -10 GHz)
Mode	Tx, Hopping Off, 3DH5 2402 MHz



\* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.

Final result of restricted band edge was shown in tabular data.

**UL Japan, Inc.**

**Ise EMC Lab.**

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

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## Radiated Spurious Emission

Report No.	12902060H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.2	No.2	No.2
Date	June 10, 2019	June 12, 2019	June 13, 2019
Temperature / Humidity	24 deg. C / 58 % RH	21 deg. C / 42 % RH	24 deg. C / 56 % RH
Engineer	Junki Nagatomi	Junki Nagatomi	Junki Nagatomi
	(1 GHz -10 GHz)	(Above 10 GHz)	(Below 1GHz)
Mode	Tx, Hopping Off, 3DH5 2441 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	516.088	QP	34.1	17.6	9.8	29.9	-	31.6	46.0	14.4	
Hori.	552.957	QP	28.4	17.9	10.0	29.8	-	26.5	46.0	19.6	
Hori.	731.248	QP	31.0	20.1	10.7	29.0	-	32.7	46.0	13.3	
Hori.	877.499	QP	28.1	22.0	11.2	28.2	-	33.1	46.0	12.9	
Hori.	926.249	QP	28.6	22.1	11.4	27.9	-	34.2	46.0	11.8	
Hori.	991.254	QP	29.0	22.4	11.6	27.5	-	35.5	53.9	18.4	
Hori.	4882.000	PK	43.6	31.7	6.8	33.5	-	48.7	73.9	25.3	Floor noise
Hori.	7323.000	PK	43.3	36.0	8.1	33.5	-	54.0	73.9	19.9	Floor noise
Hori.	9764.000	PK	44.5	38.8	8.7	33.8	-	58.1	73.9	15.8	Floor noise
Hori.	4882.000	AV	34.6	31.7	6.8	33.5	-	39.7	53.9	14.3	Floor noise
Hori.	7323.000	AV	36.6	36.0	8.1	33.5	-	47.3	53.9	6.6	Floor noise
Hori.	9764.000	AV	34.2	38.8	8.7	33.8	-	47.8	53.9	6.1	Floor noise
Vert.	516.088	QP	31.2	17.6	9.8	29.9	-	28.7	46.0	17.3	
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Vert.	731.248	QP	25.9	20.1	10.7	29.0	-	27.6	46.0	18.4	
Vert.	877.499	QP	29.8	22.0	11.2	28.2	-	34.8	46.0	11.2	
Vert.	926.249	QP	27.0	22.1	11.4	27.9	-	32.6	46.0	13.4	
Vert.	991.254	QP	30.7	22.4	11.6	27.5	-	37.2	53.9	16.7	
Vert.	4882.000	PK	43.6	31.7	6.8	33.5	-	48.7	73.9	25.3	Floor noise
Vert.	7323.000	PK	43.3	36.0	8.1	33.5	-	54.0	73.9	19.9	Floor noise
Vert.	9764.000	PK	44.5	38.8	8.7	33.8	-	58.1	73.9	15.8	Floor noise
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Vert.	7323.000	AV	36.6	36.0	8.1	33.5	-	47.3	53.9	6.6	Floor noise
Vert.	9764.000	AV	34.2	38.8	8.7	33.8	-	47.8	53.9	6.1	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier)

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

Distance factor:     1 GHz - 10 GHz     20log (3.55 m / 3.0 m) = 1.47 dB  
                          10 GHz - 26.5 GHz 20log (1.0 m / 3.0 m) = -9.5 dB

## Radiated Spurious Emission

Report No.	12902060H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.2	No.2	No.2
Date	June 10, 2019	June 12, 2019	June 13, 2019
Temperature / Humidity	24 deg. C / 58 % RH	21 deg. C / 42 % RH	24 deg. C / 56 % RH
Engineer	Junki Nagatomi	Junki Nagatomi	Junki Nagatomi
	(1 GHz -10 GHz)	(Above 10 GHz)	(Below 1GHz)
Mode	Tx, Hopping Off, 3DH5 2480 MHz		

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	516.954	QP	34.4	17.6	9.8	29.9	-	31.9	46.0	14.1	
Hori.	552.995	QP	33.4	17.9	10.0	29.8	-	31.5	46.0	14.6	
Hori.	731.255	QP	31.6	20.1	10.7	29.0	-	33.3	46.0	12.7	
Hori.	779.997	QP	28.4	20.7	10.8	28.8	-	31.2	46.0	14.8	
Hori.	877.502	QP	28.4	22.0	11.2	28.2	-	33.4	46.0	12.6	
Hori.	992.504	QP	22.3	22.4	11.6	27.5	-	28.8	53.9	25.1	
Hori.	2483.500	PK	45.6	28.1	4.7	34.2	-	44.2	73.9	29.7	
Hori.	4960.000	PK	44.6	31.9	6.8	33.5	-	49.9	73.9	24.0	
Hori.	7440.000	PK	43.4	36.3	8.1	33.5	-	54.4	73.9	19.5	Floor noise
Hori.	9920.000	PK	45.1	38.7	8.7	33.8	-	58.7	73.9	15.2	Floor noise
Hori.	2483.500	AV	36.3	28.1	4.7	34.2	1.1	36.0	53.9	17.9	*1)
Hori.	4960.000	AV	34.4	31.9	6.8	33.5	1.1	40.7	53.9	13.2	
Hori.	7440.000	AV	34.6	36.3	8.1	33.5	-	45.5	53.9	8.4	Floor noise
Hori.	9920.000	AV	34.2	38.7	8.7	33.8	-	47.8	53.9	6.1	Floor noise
Vert.	552.995	QP	29.1	17.9	10.0	29.8	-	27.2	46.0	18.9	
Vert.	553.562	QP	29.1	17.9	10.0	29.8	-	27.2	46.0	18.8	
Vert.	731.255	QP	26.1	20.1	10.7	29.0	-	27.8	46.0	18.2	
Vert.	779.997	QP	28.8	20.7	10.8	28.8	-	31.6	46.0	14.4	
Vert.	877.502	QP	30.0	22.0	11.2	28.2	-	35.0	46.0	11.0	
Vert.	992.504	QP	21.9	22.4	11.6	27.5	-	28.4	53.9	25.5	
Vert.	2483.500	PK	45.6	28.1	4.7	34.2	-	44.2	73.9	29.8	
Vert.	4960.000	PK	46.0	31.9	6.8	33.5	-	51.3	73.9	22.6	
Vert.	7440.000	PK	43.4	36.3	8.1	33.5	-	54.4	73.9	19.5	Floor noise
Vert.	9920.000	PK	45.1	38.7	8.7	33.8	-	58.7	73.9	15.2	Floor noise
Vert.	2483.500	AV	36.2	28.1	4.7	34.2	1.1	35.8	53.9	18.1	*1)
Vert.	4960.000	AV	38.1	31.9	6.8	33.5	1.1	44.4	53.9	9.5	
Vert.	7440.000	AV	34.6	36.3	8.1	33.5	-	45.5	53.9	8.4	Floor noise
Vert.	9920.000	AV	34.2	38.7	8.7	33.8	-	47.8	53.9	6.1	Floor noise

Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+Distance factor(above 1 GHz)) - Gain(Amplifier) + Duty factor

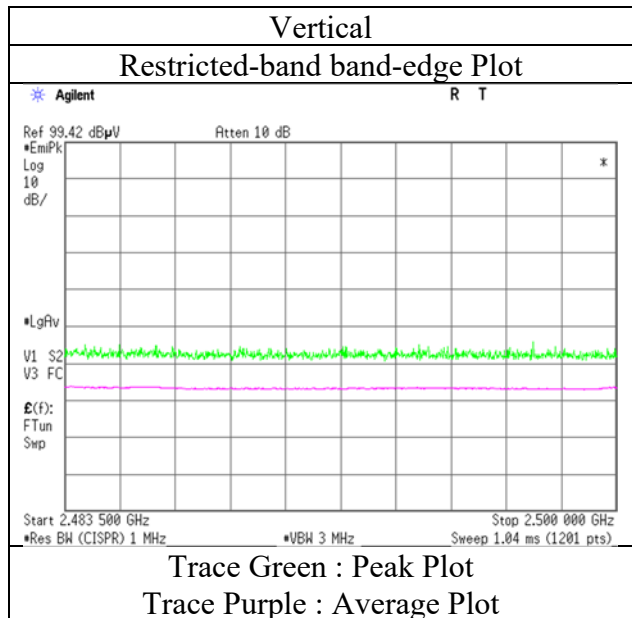
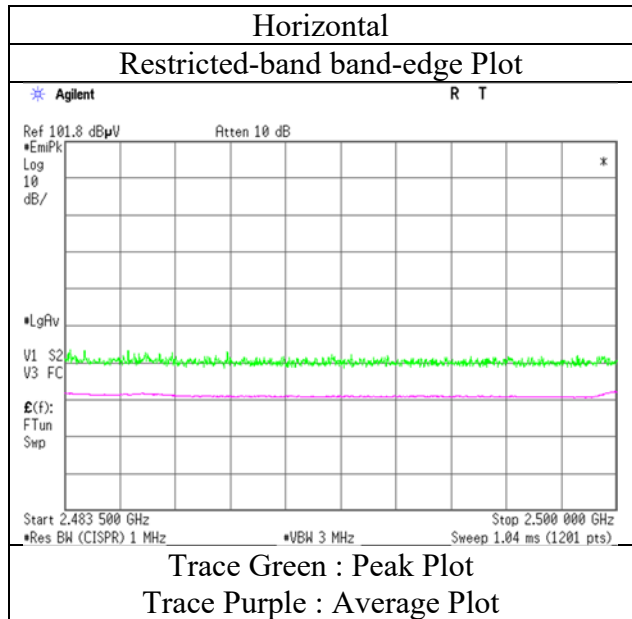
\*Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).

Distance factor: 1 GHz - 10 GHz  $20\log(3.55\text{ m} / 3.0\text{ m}) = 1.47\text{ dB}$   
10 GHz - 26.5 GHz  $20\log(1.0\text{ m} / 3.0\text{ m}) = -9.5\text{ dB}$

\*1) Not Out of Band emission(Leakage Power)

**Radiated Spurious Emission**  
**(Reference Plot for band-edge)**

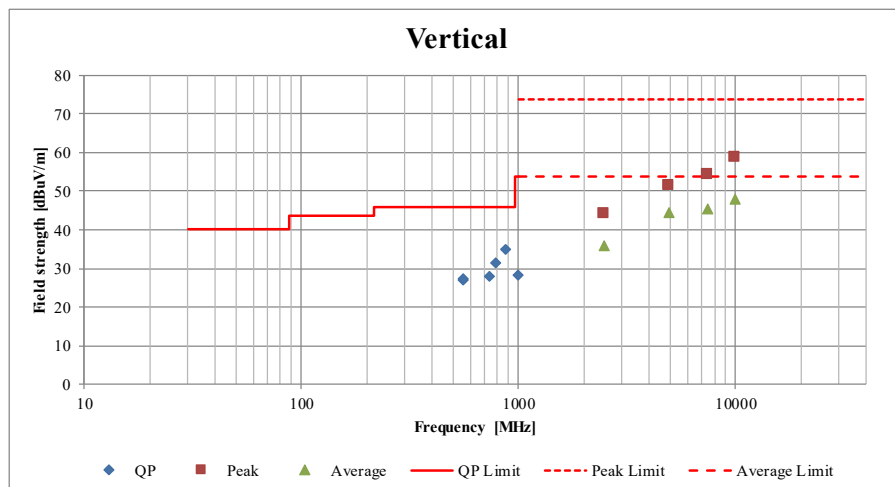
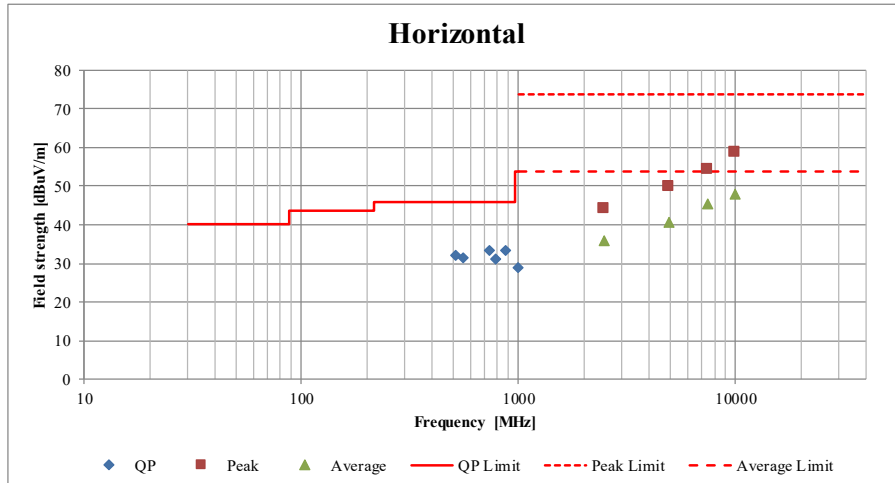
Report No. 12902060H  
Test place Ise EMC Lab.  
Semi Anechoic Chamber No.2  
Date June 10, 2019  
Temperature / Humidity 24 deg. C / 58 % RH  
Engineer Junki Nagatomi  
(1 GHz -10 GHz)  
Mode Tx, Hopping Off, 3DH5 2480 MHz



\* The measurement was conducted for a sufficiently long enough time to detect any possible spurious emissions.  
Final result of restricted band edge was shown in tabular data.

**Radiated Spurious Emission**  
**(Plot data, Worst case)**

Report No.	12902060H		
Test place	Ise EMC Lab.		
Semi Anechoic Chamber	No.2	No.2	No.2
Date	June 10, 2019	June 13, 2019	June 13, 2019
Temperature / Humidity	24 deg. C / 58 % RH	21 deg. C / 42 % RH	24 deg. C / 56 % RH
Engineer	Junki Nagatomi	Junki Nagatomi	Junki Nagatomi
	(1 GHz -10 GHz)	(Above 10 GHz)	(Below 1GHz)
Mode	Tx, Hopping Off, 3DH5 2480 MHz		



\*These plots data contains sufficient number to show the trend of characteristic features for EUT.

## **APPENDIX 2: Test instruments**

### **Test Instruments**

Test Item	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Calibration Due Date	Cal Int
RE	142006	AC2_Semi Anechoic Chamber(SVSWR)	TDK	Semi Anechoic Chamber 3m	DA-06902	04/01/2019	04/30/2020	12
RE	141542	Digital Tester	Fluke Corporation	FLUKE 26-3	78030611	08/21/2018	08/31/2019	12
RE	141152	EMI measurement program	TSJ	TEPTO-DV	-	-	-	-
RE	141512	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	254	05/09/2019	05/31/2020	12
RE	141232	High Pass Filter 3.5-18.0GHz	UL Japan	HPF SELECTOR	001	09/19/2018	09/30/2019	12
RE	141392	Microwave Cable	Junkosha	MWX221	1604S253(1 m) / 1608S087(5 m)	08/08/2018	08/31/2019	12
RE	141579	Pre Amplifier	AGILENT	8449B	3008A02142	01/21/2019	01/31/2020	12
RE	141556	Thermo-Hygrometer	CUSTOM	CTH-201	0003	12/05/2018	12/31/2019	12
RE	141885	Spectrum Analyzer	AGILENT	E4448A	US44300523	11/07/2018	11/30/2019	12
RE	142228	Measure	KOMELON	KMC-36	-	-	-	-
RE	141427	Biconical Antenna	Schwarzbeck	VHA9103B	8031	04/12/2019	04/30/2020	12
RE	141942	Test Receiver	Rohde & Schwarz	ESCI	100300	08/08/2018	08/31/2019	12
RE	141513	Horn Antenna 15-40GHz	Schwarzbeck	BBHA9170	BBHA9170306	05/10/2019	05/31/2020	12
RE	141296	High Pass Filter 3.5-18.0GHz	UL Japan	HPF SELECTOR	002	09/19/2018	09/30/2019	12
RE	141317	Coaxial Cable	Fujikura/Agilent	-	-	02/25/2019	02/29/2020	12
RE	141203	Attenuator(6dB)	Weinschel Corp	2	BK7970	11/05/2018	11/30/2019	12
RE	141265	Logperiodic Antenna (200-1000MHz)	Schwarzbeck	VUSLP9111B	911B-190	03/25/2019	03/31/2020	12
RE	142004	AC2_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	06/29/2018	06/30/2020	24

**\*Hyphens for Last Calibration Date, Calibration Due Date and Cal Intare instruments that Calibration is not required (e.g. software), or instruments checked in advance before use.**

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

**All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or international standards.**

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

**Test item: RE: Radiated Spurious Emission test**

**UL Japan, Inc.**

**Ise EMC Lab.**

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