RADIO TEST REPORT

Test Report No. : 12596522S-A-R1

Applicant	:	**Panasonic Automotive Systems Asia Pacific Co., Ltd.**
Type of Equipment	:	**Display Audio**
Model No.	:	**AH1802**
FCC ID	:	**ACJ932AH1802**
Test regulation	:	**FCC Part 15 Subpart C: 2018**
Test Result	:	**Complied (Refer to Section 3.2)**

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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 limits of the above regulation.
4. The test results in this test report are traceable to the national or international standards.
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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)
7. The all test items in this test report are conducted by UL Japan, Inc. Shonan EMC Lab.
8. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.
9. The information provided from the customer for this report is identified in SECTION 1 .
10. This report is a revised version of 12596522S-A. 12596522S-A is replaced with this report.

Date of test: December 3, 2018 to January 14, 2019

Representative test engineer:

Shiro Kobayashi
Engineer
Consumer Technology Division

Approved by:

Shinichi Takano
Engineer
Consumer Technology Division

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

RTL02610

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REVISION HISTORY

Original Test Report No.: 12596522S-A

Revision	Test report No.	Date	Page revised	Contents
- (Original)	12596522S-A	February 1, 2019	-	-
1	12596522S-A-R1	April 24, 2019	5	Addition of Comment "*3) Although KDB 558074…"
			9	Addition of Configuration "DC Power supply" Addition of Item "No. L1, L2, 11 " Addition of Comment "*3), *4)"
			25, 27, 28, 30, 32, 33, 35	Correction of Frequency "(18 MHz -26.5 MHz) ->(18 GHz -26.5 GHz)"
			46	Correction of Photo "Rear (Above 1 GHz)"

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SECTION 1: Customer information

Company Name	:	Panasonic Automotive Systems Asia Pacific Co., Ltd.
Address	:	101 Moo2 Teparak Road T.Bangsaothong A.Bangsaothong Samutprakarn 10570 Thailand
Telephone Number	:	+66-2723-3000
Contact Person	:	Pattarawan Jaihong

The information provided from the customer is as follows;
- Applicant, Type of Equipment, Model No. on the cover and other 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 information in SECTION 2 and 4.

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

2.1 Identification of E.U.T.

Type of Equipment	:	Display Audio
Model No.	:	AH1802
Serial No.	:	Refer to Section 4, Clause 4.2
Rating	:	System : DC 13.2 V Bluetooth block : DC 3.3 V
Receipt Date of Sample (Information from test lab.)	:	November 29, 2018
Country of Mass-production	:	Thailand
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: AH1802 (referred to as the EUT in this report) is a Display Audio.

Radio Specification

<Bluetooth Radio part>

Radio Type	:	Transceiver
Frequency of Operation	:	2402 MHz - 2480 MHz
Modulation	:	FHSS
Antenna type	:	Pattern Antenna
Antenna Gain	:	1.9 dBi
Clock frequency (Maximum)		26 MHz

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification	:	FCC Part 15 Subpart C FCC Part 15 final revised on March 12, 2018 and effective April 11, 2018
Title	:	FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators Section 15.207 Conducted limits Section 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz

3.2 Procedures and results

Item	Procedure	Specification	Worst Margin	Results	Remarks
Conducted Emission	**FCC:** ANSI C63.10-2013 6. Standard test methods **IC:** RSS-Gen 8.8	**FCC:** Section 15.207 **IC:** RSS-Gen 8.8	**N/A**	N/A *1)	-
Carrier Frequency Separation	**FCC:** FCC Public Notice DA 00-705 *3) **IC:** -	**FCC:** Section15.247(a)(1) **IC:** RSS-247 5.1 (b)	See data.	Complied a)	Conducted
20dB Bandwidth	**FCC:** FCC Public Notice DA 00-705 *3) **IC:** -	**FCC:** Section15.247(a)(1) **IC:** RSS-247 5.1 (a)		Complied a)	Conducted
Number of Hopping Frequency	**FCC:** FCC Public Notice DA 00-705 *3) **IC:** -	**FCC:** Section15.247(a)(1)(iii) **IC:** RSS-247 5.1 (d)		Complied b)	Conducted
Dwell time	FCC: FCC Public Notice DA 00-705 *3) **IC:** -	**FCC:** Section15.247(a)(1)(iii) **IC:** RSS-247 5.1 (d)		Complied c)	Conducted
Maximum Peak Output Power	**FCC:** FCC Public Notice DA 00-705 *3) **IC:** RSS-Gen 6.12	**FCC:** Section15.247(a)(b)(1) **IC:** RSS-247 5.4 (b)		Complied d)	Conducted
Spurious Emission & Band Edge Compliance	**FCC:** FCC Public Notice DA 00-705 *3) **IC:** RSS-Gen 6.13	**FCC:** Section15.247(d) **IC:** RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10	8.0 dB 9608.00 MHz, AV, Hori., Vert. Tx, Hopping Off, 3DH5 2402 MHz	Complied e)/f)	Conducted/ Radiated (above 30 MHz) *2)

Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422.
*1) The test is not applicable since the EUT has no AC mains.
*2) Radiated test was selected over 30 MHz based on section 15.247(d).
*3) Although KDB 558074 v05 was issued, we referred to DA 00-705 which had been accepted provisionally.
a) Refer to APPENDIX 1 (data of 20dB Bandwidth, 99%Occupied Bandwidth and Carrier Frequency Separation)
b) Refer to APPENDIX 1 (data of Number of Hopping Frequency)
c) Refer to APPENDIX 1 (data of Dwell time)
d) Refer to APPENDIX 1 (data of Maximum Peak Output Power)
e) Refer to APPENDIX 1 (data of Conducted Spurious Emission)
f) 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)
The equipment provides the wireless transmitter with stable power supply.
Instead of a new battery, DC power supply was used for the test. That does not affect the test result, therefore the EUT complies with the requirement.

FCC Part 15.203 Antenna requirement
The equipment and its antenna comply with the requirement since the antenna is built in the equipment and it cannot be replaced by end users. Therefore, the equipment complies with the antenna requirement.

3.3 Addition to standard

Item	Test Procedure	Specification	Worst margin	Results	Remarks
99% Occupied Bandwidth	RSS-Gen 6.7	**IC:** -	N/A	Complied a)	Conducted
Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422. a) Refer to APPENDIX 1 (data of 20dB Bandwidth, 99%Occupied Bandwidth and Carrier Frequency Separation)					

Other than above, 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 following 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.

Shonan EMC Lab.

Item	Frequency range	Uncertainty (+/-)		
		No. 1 SAC / SR	No. 2 SAC / SR	No. 3 SAC / SR
Radiated emission (Measurement distance: 3 m)	9 kHz-30 MHz	3.0 dB	3.0 dB	3.1 dB
	30 MHz-200 MHz	4.6 dB	4.6 dB	4.7 dB
	200 MHz-1 GHz	6.0 dB	6.0 dB	6.1 dB
	1 GHz-6 GHz	4.8 dB	4.8 dB	4.8 dB
	6 GHz-18 GHz	5.4 dB	5.4 dB	5.4 dB
Radiated emission (Measurement distance: 1 m)	1 GHz-18 GHz	5.7 dB	5.7 dB	5.7 dB
	18 GHz-40 GHz	5.9 dB	5.9 dB	5.9 dB

SAC=Semi-Anechoic Chamber

SR= Shielded Room is applied besides radiated emission

Antenna terminal test	Uncertainty (+/-)
Power Measurement above 1 GHz (Average Detector)_SPM-06	0.48 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-06	0.66 dB
Power Measurement above 1 GHz (Average Detector)_SPM-07	0.47 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-07	0.64 dB
Power Measurement above 1 GHz (Average Detector)_SPM-13	0.90 dB
Power Measurement above 1 GHz (Peak Detector)_SPM-13	1.04 dB
Spurious emission (Conducted) below 1GHz	1.8 dB
Spurious emission (Conducted) 1 GHz-3 GHz	1.7 dB
Spurious emission (Conducted) 3 GHz-18 GHz	2.5 dB
Spurious emission (Conducted) 18 GHz-26.5 GHz	2.5 dB
Spurious emission (Conducted) 26.5 GHz-40 GHz	2.7 dB
Bandwidth Measurement	1.01 %
Duty cycle and Time Measurement	0.012 %

3.5 Test Location

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Telephone: +81 463 50 6400, Facsimile: +81 463 50 6401
JAB Accreditation No. RTL02610
FCC Test Firm Registration Number: 839876

Test site	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
No.1 Semi-anechoic chamber	2973D-1	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
No.2 Semi-anechoic chamber	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10 m
No.3 Semi-anechoic chamber	2973D-3	12.7 x 7.7 x 5.35	12.7 x 7.7	5 m
No.4 Semi-anechoic chamber	-	8.1 x 5.1 x 3.55	8.1 x 5.1	-
No.1 Shielded room	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
No.2 Shielded room	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
No.3 Shielded room	-	6.3 x 4.7 x 2.7	6.3 x 4.7	-
No.4 Shielded room	-	4.4 x 4.7 x 2.7	4.4 x 4.7	-
No.5 Shielded room	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
No.6 Shielded room	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
No.8 shielded room	-	3.45 x 5.5 x 2.4	3.45 x 5.5	-
No.1 Measurement room	-	2.55 x 4.1 x 2.5	-	-

3.6 Test data, Test instruments, and Test set up

Refer to APPENDIX.

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

4.1 Operating Mode(s)

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

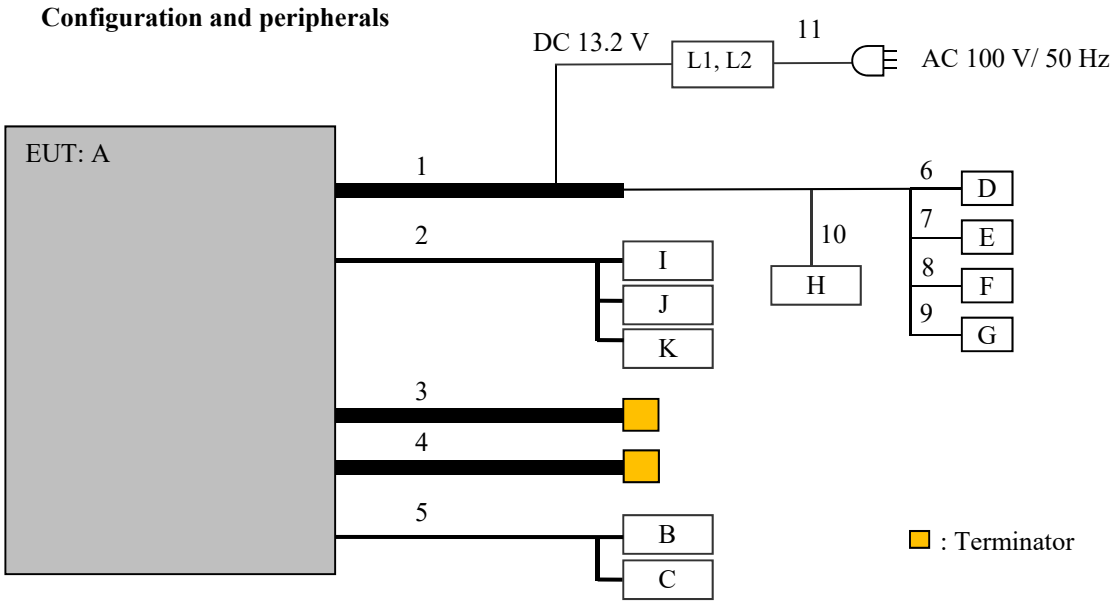
Details of Operating Mode(s)

Test Item	Mode	Tested frequency
Conducted Emission, Spurious Emission (Conducted/Radiated)	Tx (Hopping Off) DH5, 3DH5	2402 MHz 2441 MHz 2480 MHz
Carrier Frequency Separation	Tx (Hopping On) DH5, 3DH5	2402 MHz 2441 MHz 2480 MHz
20dB Bandwidth	Tx (Hopping Off) DH5, 3DH5	2402 MHz 2441 MHz 2480 MHz
Number of Hopping Frequency	Tx (Hopping On) DH5, 3DH5	-
Dwell time	Tx (Hopping On), -DH1, DH3, DH5 -3DH1, 3DH3, 3DH5	-
Maximum Peak Output Power	Tx (Hopping Off) DH5, 2DH5, 3DH5	2402 MHz 2441 MHz 2480 MHz
Band Edge Compliance (Conducted)	Tx DH5, 3DH5 -Hopping On -Hopping Off	2402 MHz 2480 MHz
99% Occupied Bandwidth	Tx DH5, 3DH5 -Hopping On -Hopping Off	2402 MHz 2441 MHz 2480 MHz

*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 (2 Mb/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 test items based on Bluetooth Core specification.
*EUT has the power settings by the software as follows;
Power settings: Fixed
Software: 09012300

*This setting of software is the worst case.
Any conditions under the normal use do not exceed the condition of setting.
In addition, end users cannot change the settings of the output power of the product.

4.2 Configuration and peripherals



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

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Display Audio	AH1802	15500159 *1) 15500155 *2)	Panasonic	EUT
B	USB Memory	USM4G	-	Sony	-
C	USB Memory	USM4G	-	Sony	-
D	Speaker	TS-F1030	-	Pioneer	-
E	Speaker	TS-F1030	-	Pioneer	-
F	Speaker	TS-F1030	-	Pioneer	-
G	Speaker	TS-F1030	-	Pioneer	-
H	Remote controller	-	-	Panasonic	
I	Mic	W01B-5012-D210	87033232C2	Panasonic	
J	Camera	GP-DKE7A8SC	88C03764	Panasonic	
K	T-Switch	-	-	Panasonic	
L1	DC Power supply	PAN55-20A	DD000084	Kikusui	*3)
L2	DC Power supply	PAN35-10A	ML002085	Kikusui	*4)

*1) Used for Antenna Terminal conducted test
*2) Used for Radiated Emission test
*3) Used for Radiated Emission test (30 MHz-1000 MHz, 18 GHz-26.5 GHz)
*4) Used for tests other than listed on *3).

List of cables used

No.	Item	Length (m)	Shield	Remarks
1	24 Pin connector (Main)	2.0	Unshielded	-
2	24 Pin connector	1.9	Unshielded	-
3	DAB Antenna	0.5+2.0	Shielded	-
4	FM/AM Antenna	0.2 + 2.0	Shielded	-
5	USB	1.95	Shielded	-
6	Speaker	1.0	Unshielded	-
7	Speaker	1.0	Unshielded	-
8	Speaker	1.0	Unshielded	-
9	Speaker	1.0	Unshielded	-
10	Remote controller	0.15	Unshielded	-
11	AC	2.0	Unshielded	-

SECTION 5: Radiated Spurious Emission

Test Procedure

[For below 1 GHz]
EUT was placed on a urethane platform of nominal size, 2.0 m by 1.0 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.
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.

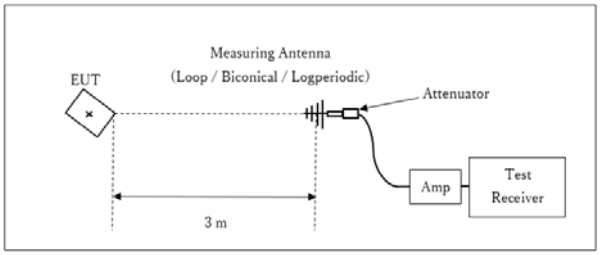
20 dBc was applied to the frequency over the limit of FCC 15.209 / Table 4 of RSS-Gen 8.9 (IC) and outside the restricted band of FCC15.205 / Table 6 of RSS-Gen 8.10 (IC).

Frequency	Below 1 GHz	Above 1 GHz		20 dBc
Instrument used	Test Receiver	Spectrum Analyzer		Spectrum Analyzer
Detector	QP	PK	AV	PK
IF Bandwidth	BW 120 kHz	RBW: 1 MHz VBW: 3 MHz	RBW: 1 MHz VBW: 10 Hz *1)	RBW: 100 kHz VBW: 300 kHz

*1) Although DA 00-705 accepts VBW = 10 Hz for AV measurements, it was confirmed that superfluous smoothing was not performed.

Figure 2: Test Setup

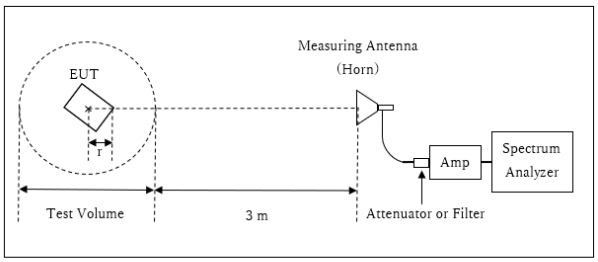
Below 1 GHz



× : Center of turn table

Test Distance: 3 m

1 GHz - 13 GHz

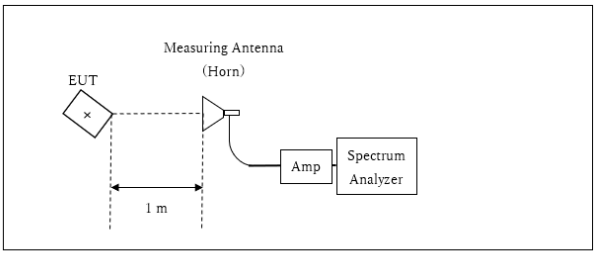


r : Radius of an outer periphery of EUT
× : Center of turn table

Distance Factor: 20 x log (3.86 m / 3.0 m) = 2.19 dB
* Test Distance: (3 + Test Volume /2) - r = 3.86 m

Test Volume : 2.0 m
(Test Volume has been calibrated based on CISPR 16-1-4.)
r = 0.14 m

13 GHz – 26.5 GHz



× : Center of turn table

Distance Factor: 20 x log (1.0 m / 3.0 m) = -9.54 dB
*Test Distance: 1 m

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

SECTION 6: Antenna Terminal Conducted Tests

Test Procedure

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

Test	Span	RBW	VBW	Sweep time	Detector	Trace	Instrument used
20dB Bandwidth	3 MHz	30 kHz	100 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
99% Occupied Bandwidth *1)	Enough width to display emission skirts	1 to 5 % of OBW	Three times of RBW	Auto	Peak	Max Hold	Spectrum Analyzer
Maximum Peak Output Power	-	-	-	Auto	Peak Average *2)	-	Power Meter (Sensor: 50 MHz BW)
Carrier Frequency Separation	3 MHz	100 kHz	300 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
Number of Hopping Frequency	30 MHz	300 kHz	1 MHz	Auto	Peak	Max Hold	Spectrum Analyzer
Dwell Time	Zero Span	100 kHz, 1 MHz	300 kHz, 3 MHz	As necessary capture the entire dwell time per hopping channel	Peak	Clear Write	Spectrum Analyzer
Conducted Spurious Emission *3)	9 kHz to 150 kHz	200 Hz	620 Hz	Auto	Peak	Max Hold	Spectrum Analyzer
	150 kHz to 30 MHz	10 kHz	30 kHz				
	30 MHz to 25 GHz	100 kHz	300 kHz				
Conducted Spurious Emission Band Edge compliance	10 MHz	100 kHz	300 kHz	Auto	Peak	Max Hold	Spectrum Analyzer

*1) The measurement was performed with Max Hold since the duty cycle was not 100 %. Peak hold was applied as Worst-case measurement.
*2) Reference data
*3) In the frequency range below 30 MHz, RBW was narrowed to separate the noise contents.
Then, wide-band noise near the limit was checked separately, however the noise was not detected as shown in the chart.
(9 kHz -150 kHz: RBW = 200 Hz, 150 kHz - 30 MHz: RBW = 10 kHz)

The test results and limit are rounded off to two decimals place, so some differences might be observed.
The equipment and cables were not used for factor 0 dB of the data sheets.

Test data : **APPENDIX**
Test result : **Pass**

APPENDIX 1: Test data

20dB Bandwidth, 99%Occupied Bandwidth and Carrier Frequency Separation

Report No.	12596522S-A-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	December 3, 2018
Temperature / Humidity	20 deg. C / 44 % RH
Engineer	Kazuya Noda
Mode	Tx, Hopping Off, Tx, Hopping On

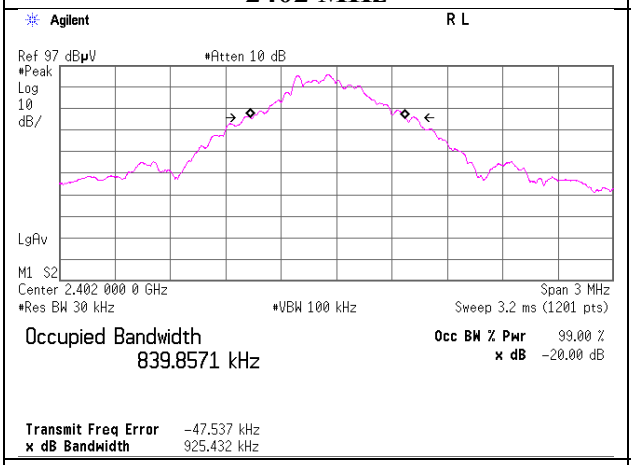
Mode	Freq. [MHz]	20dB Bandwidth [MHz]	99% Occupied Bandwidth [kHz]	Carrier Frequency Separation [MHz]	Limit for Carrier Frequency separation [MHz]
DH5	2402.0	0.925	839.857	1000.000	>= 0.617
DH5	2441.0	0.927	839.194	1000.000	>= 0.618
DH5	2480.0	0.926	838.004	1000.000	>= 0.618
DH5	Hopping On	-	78569.8	-	-
3DH5	2402.0	1.260	1160.9	1000.000	>= 0.840
3DH5	2441.0	1.263	1160.9	1000.000	>= 0.842
3DH5	2480.0	1.260	1166.9	1000.000	>= 0.840
3DH5	Hopping On	-	78702.3	-	-

Limit: Two-thirds of 20dB Bandwidth or 25kHz (whichever is greater).
No limit applies to 20dB Bandwidth.

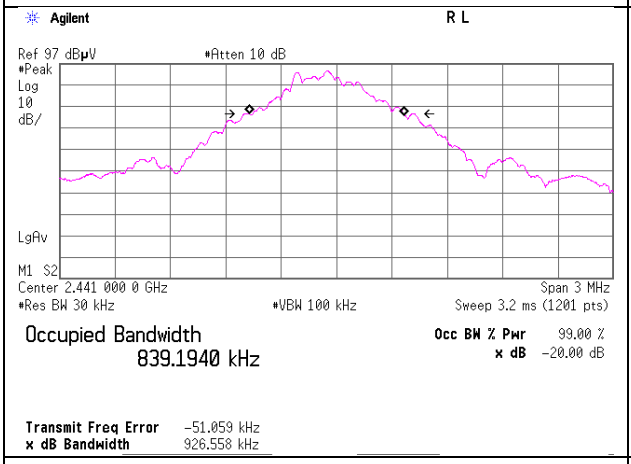
20dB Bandwidth and 99% Occupied Bandwidth

DH5

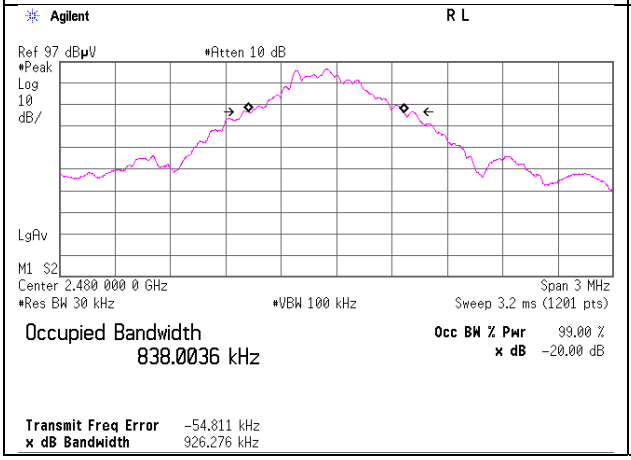
2402 MHz



2441 MHz

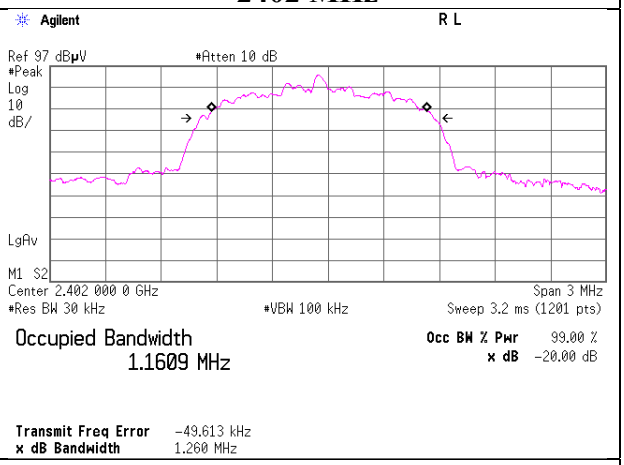


2480 MHz

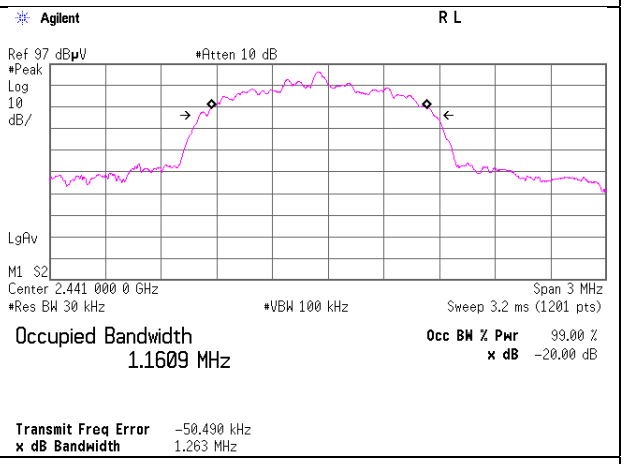


3DH5

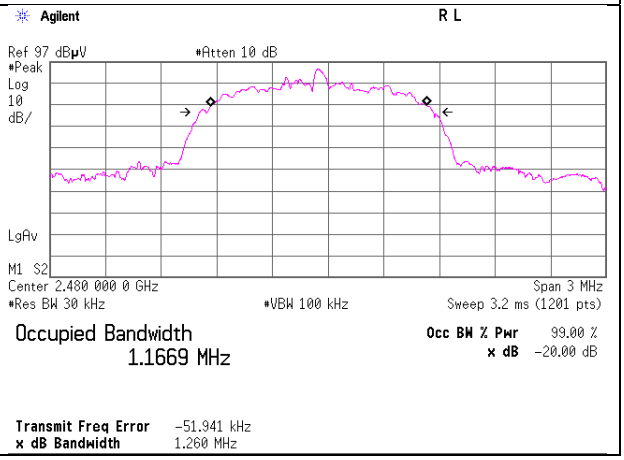
2402 MHz



2441 MHz

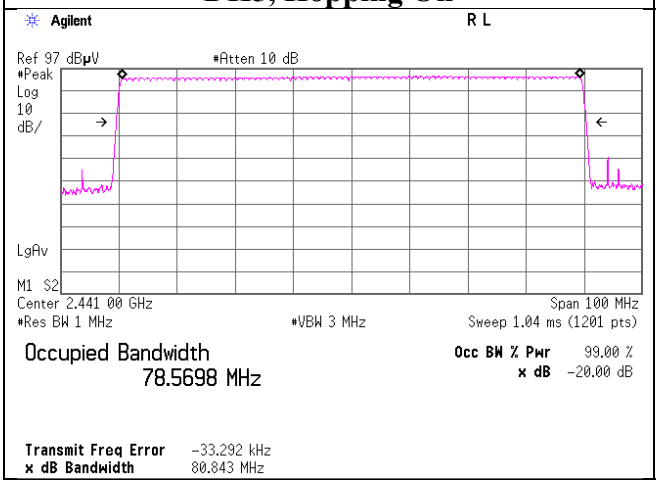


2480 MHz

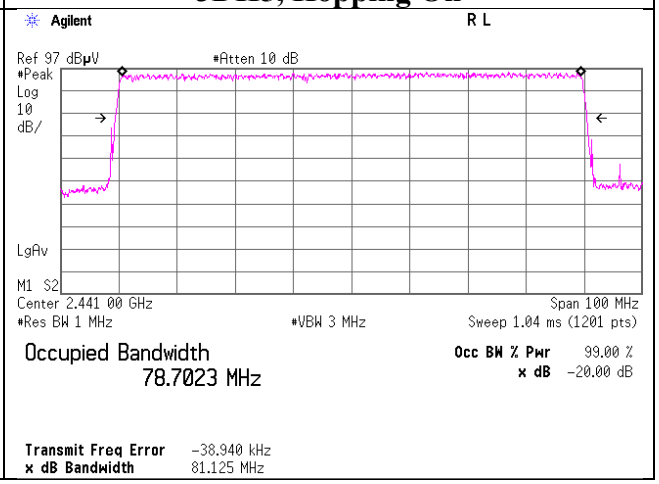


20dB Bandwidth and 99% Occupied Bandwidth

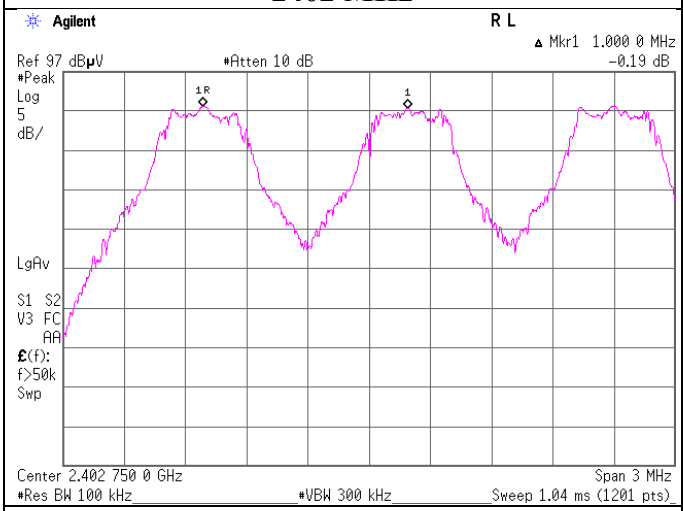
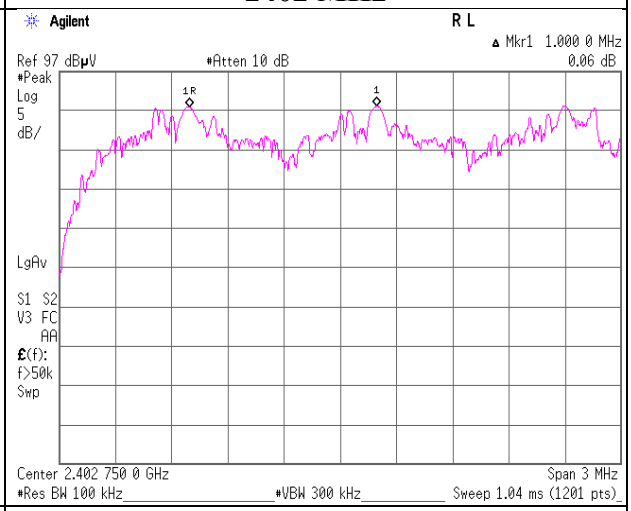
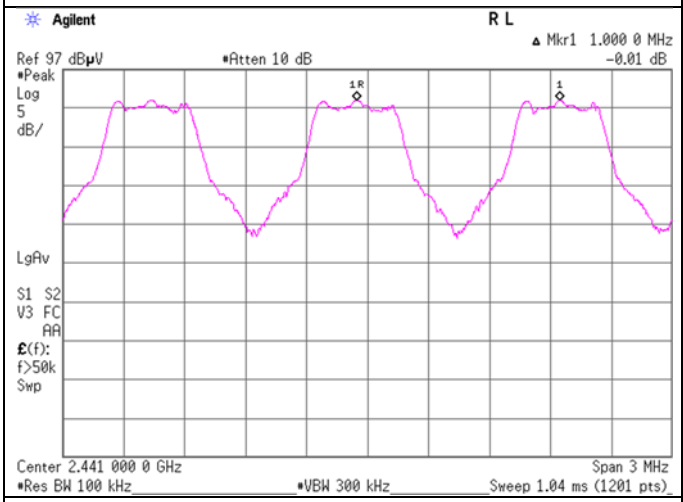
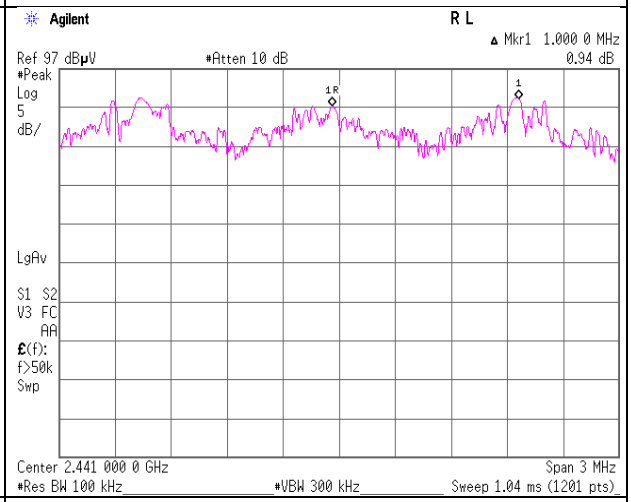
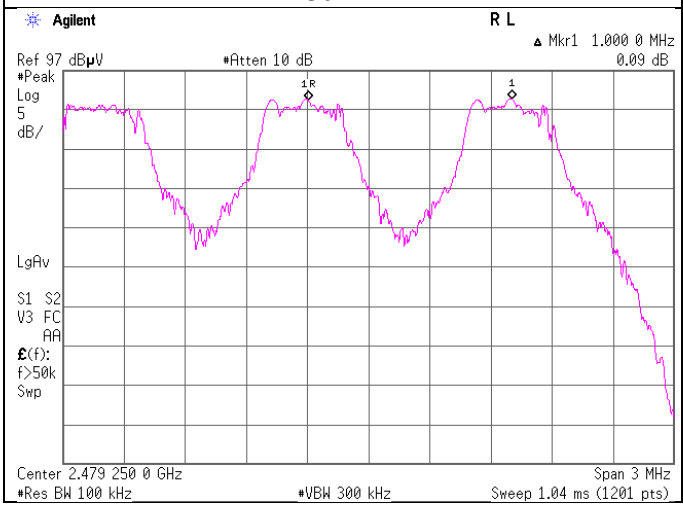
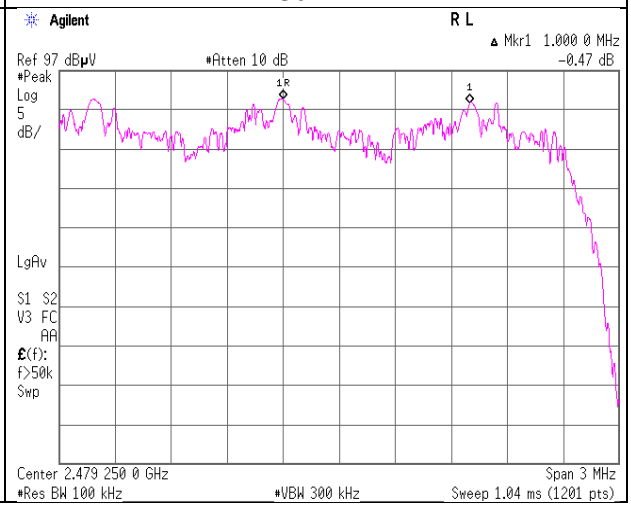
DH5, Hopping On



3DH5, Hopping On



Carrier Frequency Separation

DH5	3DH5
2402 MHz	**2402 MHz**
	
2441 MHz	**2441 MHz**
	
2480 MHz	**2480 MHz**
	

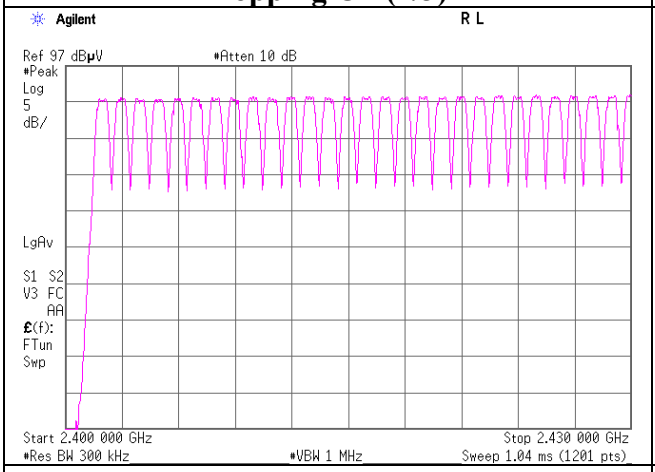
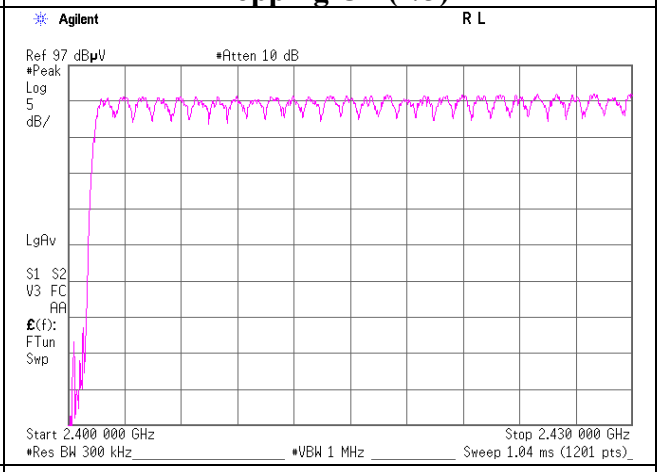
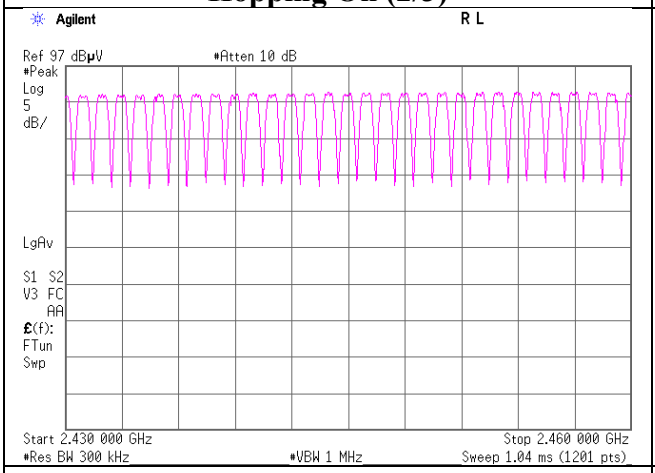
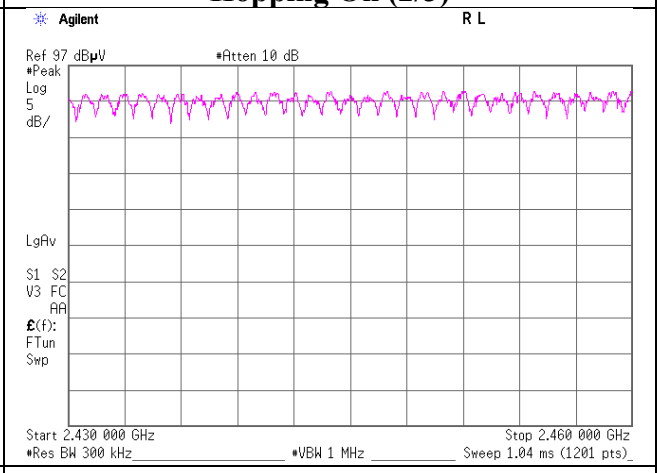
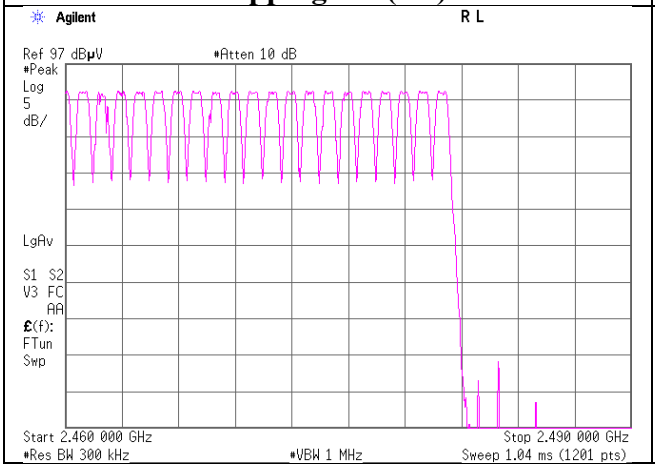
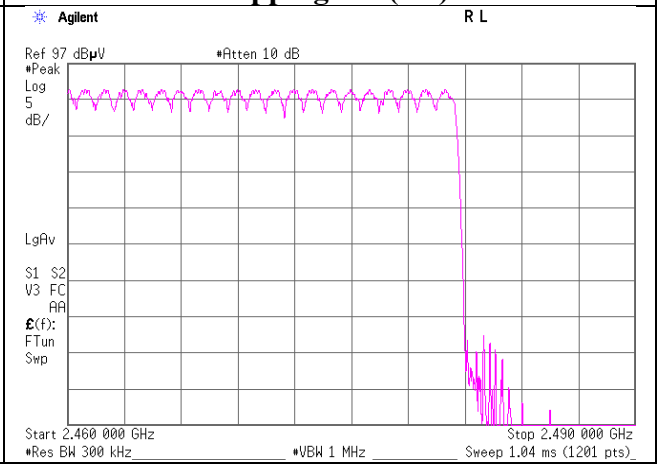
Number of Hopping Frequency

Report No.	12596522S-A-R1
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	December 3, 2018
Temperature / Humidity	20 deg. C / 44 % RH
Engineer	Kazuya Noda
Mode	Tx, Hopping On

Mode	Number of channel [channels]	Limit [channels]
DH5	79	>= 15
3DH5	79	>= 15

Test was not performed at AFH mode whose number of hopping channel is 20 channels because this Bluetooth radio is in compliance of Bluetooth Specification.

Number of Hopping Frequency

DH5	3DH5
Hopping On (1/3)	**Hopping On (1/3)**
	
Hopping On (2/3)	**Hopping On (2/3)**
	
Hopping On (3/3)	**Hopping On (3/3)**
	

Dwell time

Report No.	12596522S-A-R1
Test place	Shonan EMC Lab. No5 Shielded Room
Date	December 3, 2018
Temperature / Humidity	20 deg. C / 44 % RH
Engineer	Kazuya Noda
Mode	Tx, Hopping On

Mode	Number of transmission in a 31.6(79 Hopping x 0.4) / 12.8 (32 Hopping x 0.4) second period	Length of transmission [msec]	Result [msec]	Limit [msec]
DH1	50.4 times / 5 sec. x 31.6 sec. = 319 times	0.458	146	400
DH3	27.8 times / 5 sec. x 31.6 sec. = 176 times	1.719	303	400
DH5	20.0 times / 5 sec. x 31.6 sec. = 127 times	2.991	380	400
3DH1	47.2 times / 5 sec. x 31.6 sec. = 299 times	0.456	136	400
3DH3	25.0 times / 5 sec. x 31.6 sec. = 158 times	1.715	271	400
3DH5	19.8 times / 5 sec. x 31.6 sec. = 126 times	2.970	374	400

Sample Calculation
Result = Number of transmission x Length of transmission

*Average data of 5 tests.(except Inquiry)

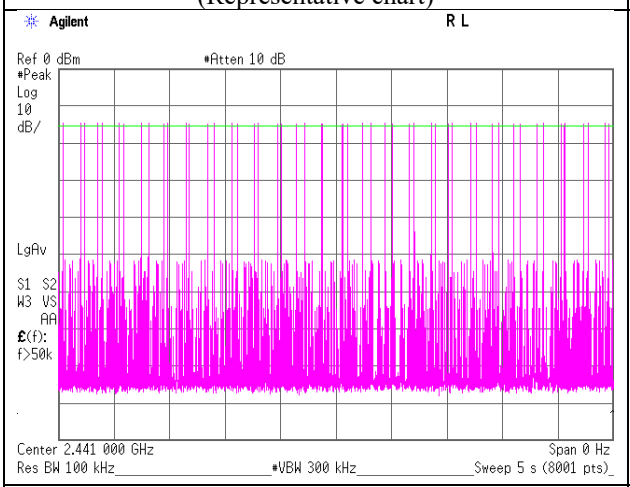
Mode	Sampling [times] 1	2	3	4	5	Average [times]
DH1	50	52	46	55	49	50.4
DH3	29	30	27	25	28	27.8
DH5	21	20	19	22	18	20
3DH1	47	44	49	46	50	47.2
3DH3	22	26	24	26	27	25
3DH5	23	16	18	22	20	19.8

Sample Calculation
Average = Summation (Sampling 1 to 5) / 5

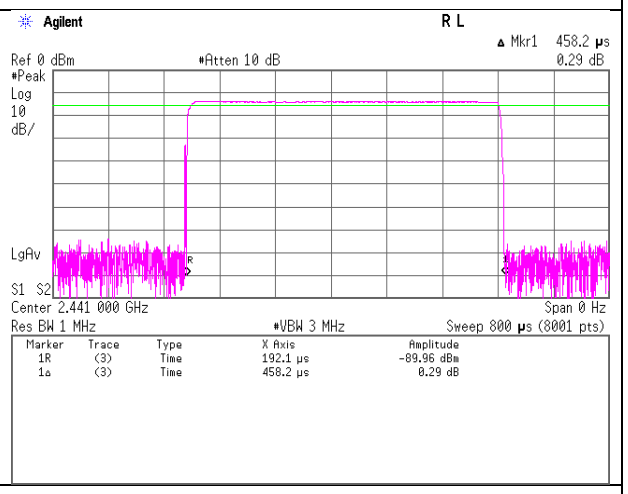
This device complies with the Bluetooth protocol for FHSS operation, employing a pseudo random channel selection and hopping rate to ensure that the occupancy time in N x 0.4s, where N is the number of channels being used in the hopping sequence ($20 \leq N \leq 79$), is always less than 0.4s regardless of packet size. This is confirmed in the test report for N = 79.

Dwell time

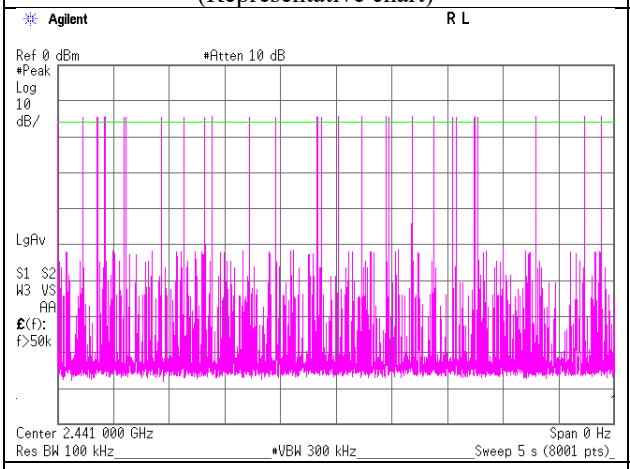
DH1 (1/2)
(Representative chart)



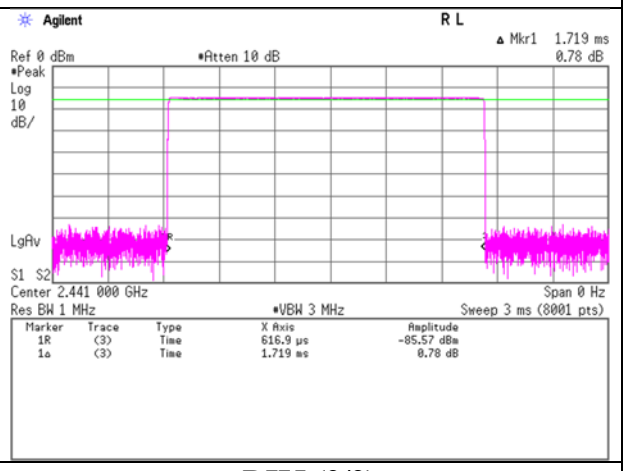
DH1 (2/2)



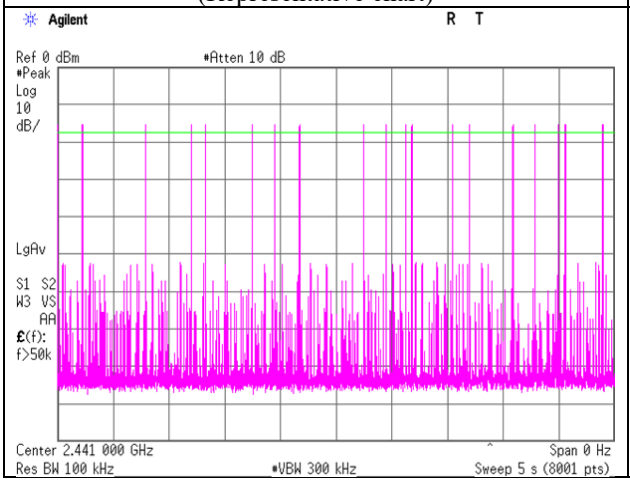
DH3 (1/2)
(Representative chart)



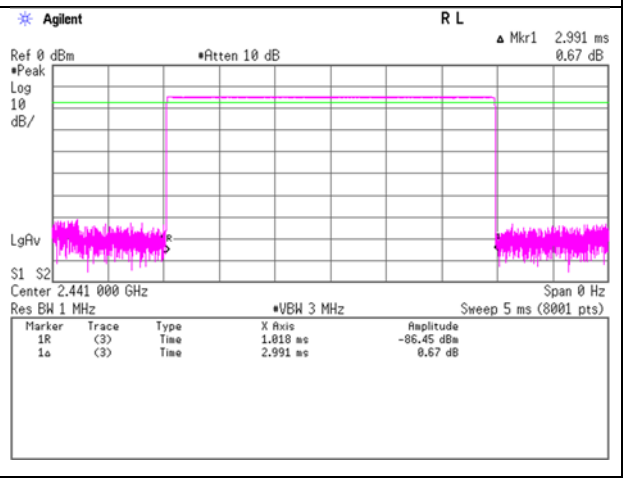
DH3 (2/2)



DH5 (1/2)
(Representative chart)

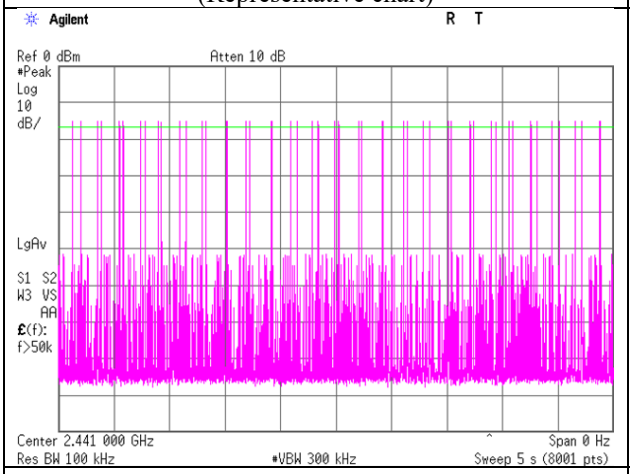


DH5 (2/2)

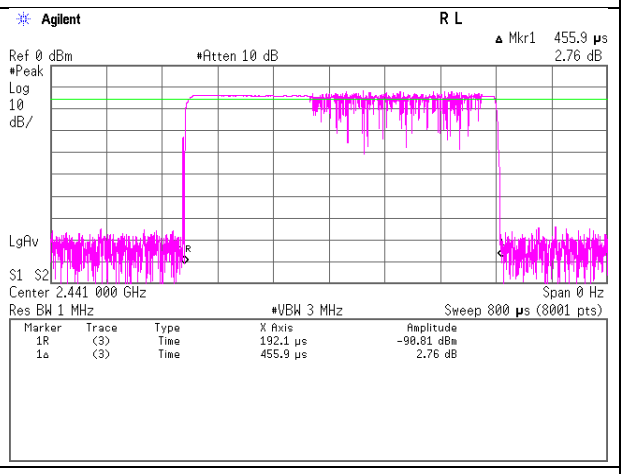


Dwell time

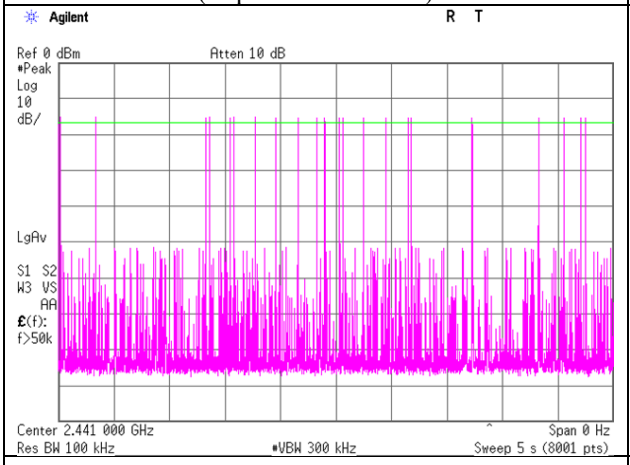
3DH1 (1/2)
(Representative chart)



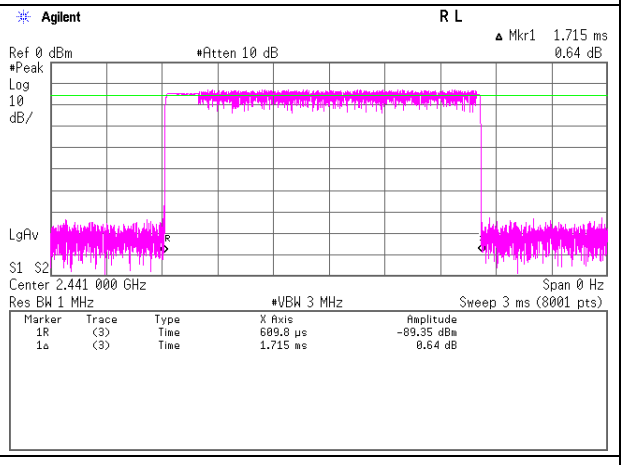
3DH1 (2/2)



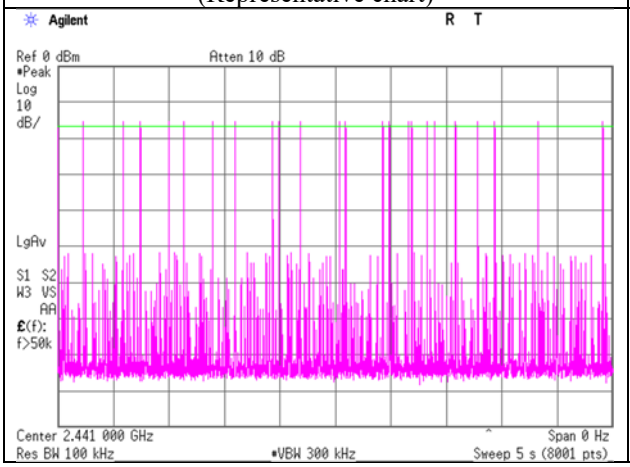
3DH3 (1/2)
(Representative chart)



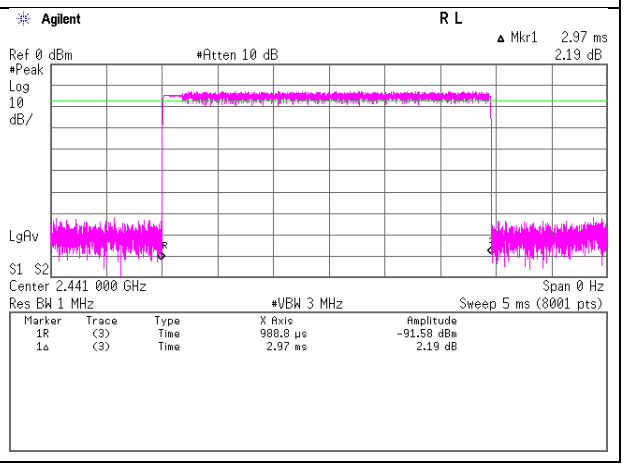
3DH3 (2/2)



3DH5 (1/2)
(Representative chart)



3DH5 (2/2)



Maximum Peak Output Power

Report No.	12596522S-A-R1
Test place	Shonan EMC Lab. No5 Shielded Room
Date	December 3, 2018
Temperature / Humidity	20 deg. C / 44 % RH
Engineer	Kazuya Noda
Mode	Tx, Hopping Off

					Conducted Power					e.i.r.p. for RSS-247					
Mode	Freq.	Reading	Cable Loss	Atten. Loss	Result		Limit		Margin	Antenna Gain	Result		Limit		Margin
	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]	[dBi]	[dBm]	[mW]	[dBm]	[mW]	[dB]
DH5	2402.0	-14.00	2.56	9.69	-1.75	0.67	20.96	125	22.71	1.90	0.15	1.04	36.02	4000	35.87
DH5	2441.0	-13.40	2.58	9.69	-1.13	0.77	20.96	125	22.09	1.90	0.77	1.19	36.02	4000	35.25
DH5	2480.0	-13.33	2.59	9.70	-1.04	0.79	20.96	125	22.00	1.90	0.86	1.22	36.02	4000	35.16
2DH5	2402.0	-12.54	2.56	9.69	-0.29	0.94	20.96	125	21.25	1.90	1.61	1.45	36.02	4000	34.41
2DH5	2441.0	-11.87	2.58	9.69	0.40	1.10	20.96	125	20.56	1.90	2.30	1.70	36.02	4000	33.72
2DH5	2480.0	-11.83	2.59	9.70	0.46	1.11	20.96	125	20.50	1.90	2.36	1.72	36.02	4000	33.66
3DH5	2402.0	-12.00	2.56	9.69	0.25	1.06	20.96	125	20.71	1.90	2.15	1.64	36.02	4000	33.87
3DH5	2441.0	-11.44	2.58	9.69	0.83	1.21	20.96	125	20.13	1.90	2.73	1.87	36.02	4000	33.29
3DH5	2480.0	-11.26	2.59	9.70	1.03	1.27	20.96	125	19.93	1.90	2.93	1.96	36.02	4000	33.09

Sample Calculation:
Result = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss
e.i.r.p. Result = Conducted Power Result + Antenna Gain

Test was not performed at AFH mode, because the decrease of number of channel (min: 20ch) at AFH mode does not influence on the output power and bandwidth of the EUT.
As this device had AFH mode and frequency separation could not meet the requirement of over 20dB BW without 2/3 relaxation, 125mW power limit was applied to it.

Average Output Power
(Reference data for RF Exposure)

Report No.	12596522S-A-R1
Test place	Shonan EMC Lab. No5 Shielded Room
Date	December 3, 2018
Temperature / Humidity	20 deg. C / 44 % RH
Engineer	Kazuya Noda
Mode	Tx, Hopping Off

Mode	Freq.	Reading	Cable Loss	Atten. Loss	Result (Time average)		Duty factor	Result (Burst power average)	
	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dB]	[dBm]	[mW]
DH5	2402.0	-15.94	2.56	9.69	-3.69	0.43	0.99	-2.70	0.54
DH5	2441.0	-15.22	2.58	9.69	-2.95	0.51	0.99	-1.96	0.64
DH5	2480.0	-15.11	2.59	9.70	-2.82	0.52	0.99	-1.83	0.66
2DH5	2402.0	-16.46	2.56	9.69	-4.21	0.38	1.00	-3.21	0.48
2DH5	2441.0	-15.75	2.58	9.69	-3.48	0.45	1.00	-2.48	0.56
2DH5	2480.0	-15.65	2.59	9.70	-3.36	0.46	1.00	-2.36	0.58
3DH5	2402.0	-16.47	2.56	9.69	-4.22	0.38	1.03	-3.19	0.48
3DH5	2441.0	-15.76	2.58	9.69	-3.49	0.45	1.03	-2.46	0.57
3DH5	2480.0	-15.65	2.59	9.70	-3.36	0.46	1.03	-2.33	0.58

Sample Calculation:
Result (Time average) = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss
Result (Burst power average) = Time average + Duty factor

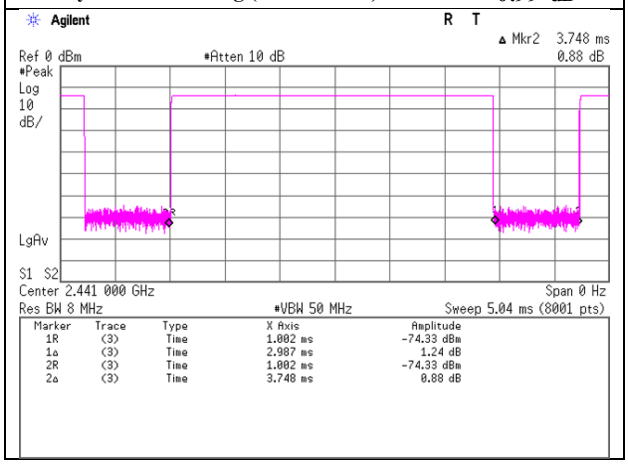
*The equipment and cables were not used for factor 0 dB of the data sheets.

Burst Rate Confirmation

Report No.	12596522S-A-R1
Test place	Shonan EMC Lab. No5 Shielded Room
Date	December 3, 2018
Temperature / Humidity	20 deg. C / 44 % RH
Engineer	Kazuya Noda
Mode	Tx, Hopping Off

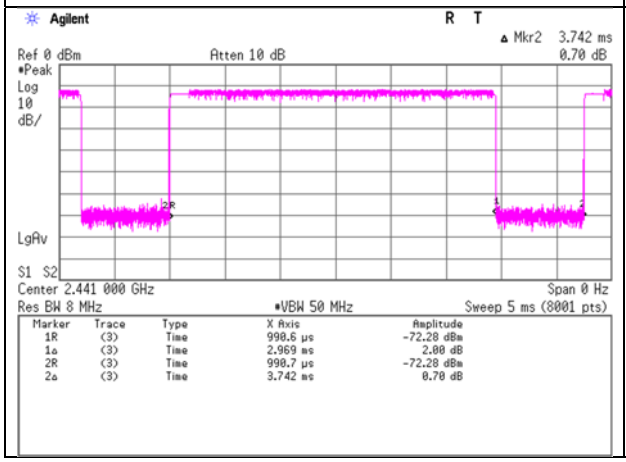
DH5

Tx on / (Tx on + Tx off) =	**0.797**
Tx on / (Tx on + Tx off) * 100 =	**79.7 %**
Duty factor = 10 * log (3.748 / 2.987) =	**0.99 dB**



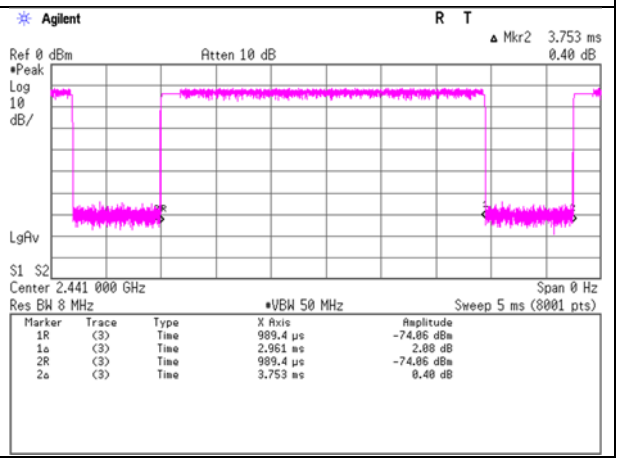
2DH5

Tx on / (Tx on + Tx off) =	**0.793**
Tx on / (Tx on + Tx off) * 100 =	**79.3 %**
Duty factor = 10 * log (3.742 / 2.969) =	**1.00 dB**



3DH5

Tx on / (Tx on + Tx off) =	**0.789**
Tx on / (Tx on + Tx off) * 100 =	**78.9 %**
Duty factor = 10 * log (3.753 / 2.961) =	**1.03 dB**



Radiated Spurious Emission

Report No.	12596522S-A-R1			
Test place	Shonan EMC Lab.			
Semi Anechoic Chamber	No.3	No.1	No.3	No.3
Date	December 5, 2018	January 14, 2019	December 4, 2018	December 5, 2018
Temperature / Humidity	23 deg. C / 31 % RH	21 deg. C / 34 % RH	25 deg. C / 48 % RH	23 deg. C / 31 % RH
Engineer	Shiro Kobayashi	Kazuya Noda	Shiro Kobayashi	Shiro Kobayashi
	(30 MHz -1000 MHz)	(1 GHz -2.8 GHz)	(2.8 GHz -18 GHz)	(18 GHz -26.5 GHz)
Mode	Tx, Hopping Off, DH5 2402 MHz			

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	73.733	QP	35.90	6.37	7.08	32.18	0.00	17.17	40.00	22.8	265	301	
Hori.	405.512	QP	43.50	15.97	9.27	31.98	0.00	36.76	46.00	9.2	107	76	
Hori.	427.039	QP	29.30	16.29	9.36	31.97	0.00	22.98	46.00	23.0	100	185	
Hori.	433.374	QP	32.80	16.39	9.38	31.97	0.00	26.60	46.00	19.4	100	274	
Hori.	436.809	QP	40.40	16.47	9.40	31.97	0.00	34.30	46.00	11.7	100	203	
Hori.	442.375	QP	40.60	16.62	9.42	31.97	0.00	34.67	46.00	11.3	100	163	
Hori.	479.243	QP	41.00	17.26	9.55	31.97	0.00	35.84	46.00	10.1	100	46	
Hori.	959.994	QP	34.00	22.22	11.27	30.57	0.00	36.92	46.00	9.0	100	124	
Hori.	2003.920	PK	49.99	25.88	13.71	39.47	2.19	52.30	73.90	21.6	253	323	
Hori.	2376.020	PK	48.99	27.88	14.01	39.46	2.19	53.61	73.90	20.3	114	348	
Hori.	2390.000	PK	46.26	27.89	14.02	39.46	2.19	50.90	73.90	23.0	108	347	
Hori.	3989.963	PK	48.25	29.70	6.77	39.38	2.19	47.53	73.90	26.3	129	298	
Hori.	4804.000	PK	44.57	31.43	7.17	39.50	2.19	45.86	73.90	28.0	150	0	
Hori.	7206.000	PK	44.85	36.79	9.03	39.29	2.19	53.57	73.90	20.3	161	135	
Hori.	9608.000	PK	45.49	38.51	10.52	39.52	2.19	57.19	73.90	16.7	150	0	
Hori.	2003.920	AV	42.81	25.88	13.71	39.47	2.19	45.12	53.90	8.8	253	323	
Hori.	2376.020	AV	36.32	27.88	14.01	39.46	2.19	40.94	53.90	13.0	114	348	
Hori.	2390.000	AV	33.39	27.89	14.02	39.46	2.19	38.03	53.90	15.9	108	347	
Hori.	3989.963	AV	40.04	29.70	6.77	39.38	2.19	39.32	53.90	14.5	129	298	
Hori.	4804.000	AV	32.77	31.43	7.17	39.50	2.19	34.06	53.90	19.8	150	0	
Hori.	7206.000	AV	33.47	36.79	9.03	39.29	2.19	42.19	53.90	11.7	161	135	
Hori.	9608.000	AV	34.02	38.51	10.52	39.52	2.19	45.72	53.90	**8.1**	150	0	
Vert.	73.730	QP	37.40	6.37	7.08	32.18	0.00	18.67	40.00	21.3	100	255	
Vert.	589.836	QP	40.00	18.89	9.96	31.96	0.00	36.89	46.00	9.1	110	197	
Vert.	663.563	QP	36.00	19.40	10.24	31.95	0.00	33.69	46.00	12.3	100	196	
Vert.	959.999	QP	32.90	22.22	11.27	30.57	0.00	35.82	46.00	10.1	100	356	
Vert.	2003.458	PK	48.71	25.88	13.71	39.47	2.19	51.02	73.90	22.9	166	196	
Vert.	2375.975	PK	47.11	27.88	14.01	39.46	2.19	51.73	73.90	22.2	197	295	
Vert.	2390.000	PK	46.71	27.89	14.02	39.46	2.19	51.35	73.90	22.6	150	289	
Vert.	3989.963	PK	48.16	29.70	6.77	39.38	2.19	47.44	73.90	26.4	144	195	
Vert.	4804.000	PK	44.48	31.43	7.17	39.50	2.19	45.77	73.90	28.1	150	0	
Vert.	7206.000	PK	45.99	36.79	9.03	39.29	2.19	54.71	73.90	19.1	130	331	
Vert.	9608.000	PK	45.46	38.51	10.52	39.52	2.19	57.16	73.90	16.7	150	0	
Vert.	2003.458	AV	42.53	25.88	13.71	39.47	2.19	44.84	53.90	9.1	166	196	
Vert.	2375.975	AV	34.58	27.88	14.01	39.46	2.19	39.20	53.90	14.7	197	295	
Vert.	2390.000	AV	33.28	27.89	14.02	39.46	2.19	37.92	53.90	16.0	150	289	
Vert.	3989.963	AV	40.77	29.70	6.77	39.38	2.19	40.05	53.90	13.8	144	195	
Vert.	4804.000	AV	32.64	31.43	7.17	39.50	2.19	33.93	53.90	19.9	150	0	
Vert.	7206.000	AV	34.00	36.79	9.03	39.29	2.19	42.72	53.90	11.1	130	331	
Vert.	9608.000	AV	33.86	38.51	10.52	39.52	2.19	45.56	53.90	8.3	150	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.86 m / 3.0 m) = 2.19 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
* These results have sufficient margin without taking account Dwell time factor.

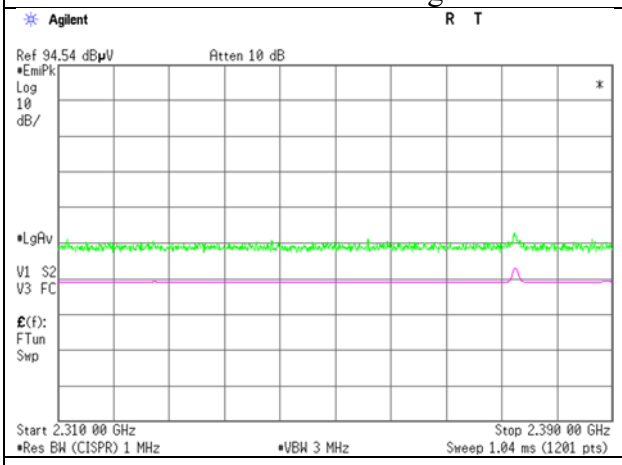
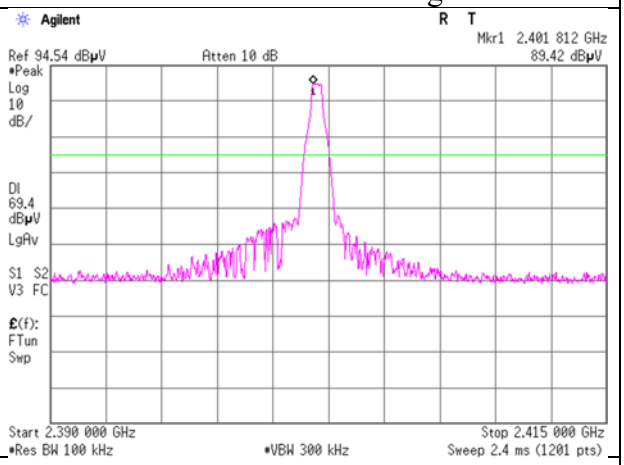
20 dBc Data Sheet **(RBW 100 kHz, VBW 300 kHz)**

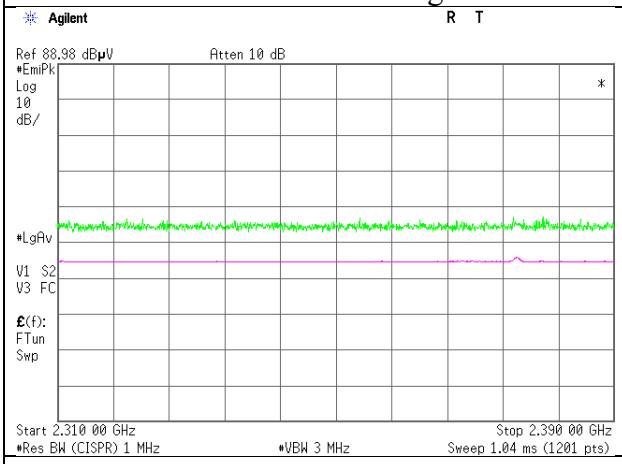
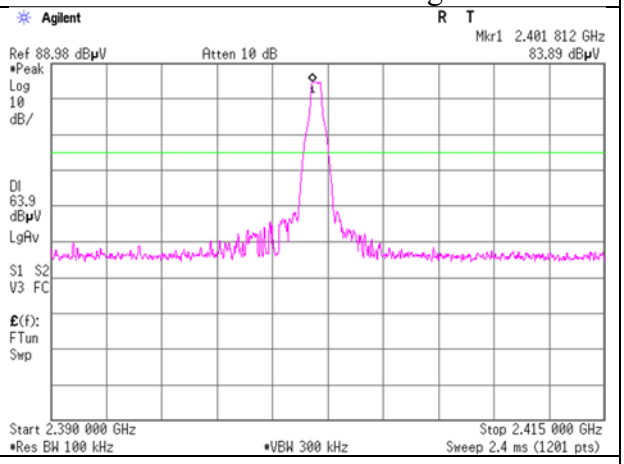
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	89.67	27.88	14.03	39.46	2.19	94.31	-	-	Carrier
Hori.	2400.000	PK	49.49	27.89	14.03	39.46	2.19	54.14	74.31	20.2	
Vert.	2402.000	PK	83.84	27.88	14.03	39.46	2.19	88.48	-	-	Carrier
Vert.	2400.000	PK	44.82	27.89	14.03	39.46	2.19	49.47	68.48	19.0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.86 m / 3.0 m) = 2.19 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	12596522S-A-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.1
Date	January 14, 2019
Temperature / Humidity	21 deg. C / 34 % RH
Engineer	Kazuya Noda (1 GHz -2.8 GHz)
Mode	Tx, Hopping Off, DH5 2402 MHz

Horizontal	
Restricted-band band-edge Plot	Authorized-band band-edge Plot
	
Trace Green : Peak Plot Trace Purple : Average Plot	20dBc Plot

Vertical	
Restricted-band band-edge Plot	Authorized-band band-edge Plot
	
Trace Green : Peak Plot Trace Purple : Average Plot	20dBc Plot

* 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.	12596522S-A-R1			
Test place	Shonan EMC Lab.			
Semi Anechoic Chamber	No.3	No.1	No.3	No.3
Date	December 5, 2018	January 14, 2019	December 4, 2018	December 5, 2018
Temperature / Humidity	23 deg. C / 31 % RH	21 deg. C / 34 % RH	25 deg. C / 48 % RH	23 deg. C / 31 % RH
Engineer	Shiro Kobayashi	Kazuya Noda	Shiro Kobayashi	Shiro Kobayashi
	(30 MHz -1000 MHz)	(1 GHz -2.8 GHz)	(2.8 GHz -18 GHz)	(18 GHz -26.5 GHz)
Mode	Tx, Hopping Off, DH5 2441 MHz			

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	73.732	QP	36.00	6.38	7.06	32.18	0.00	17.26	40.00	22.7	261	295	
Hori.	203.220	QP	45.20	11.49	8.06	32.07	0.00	32.68	43.50	10.8	170	301	
Hori.	405.513	QP	42.20	15.97	9.27	31.98	0.00	35.46	46.00	10.5	105	76	
Hori.	427.034	QP	28.40	16.30	9.36	31.97	0.00	22.09	46.00	23.9	100	242	
Hori.	436.809	QP	40.10	16.47	9.40	31.97	0.00	34.00	46.00	12.0	100	147	
Hori.	442.378	QP	40.60	16.62	9.42	31.97	0.00	34.67	46.00	11.3	100	159	
Hori.	479.242	QP	41.40	17.26	9.55	31.97	0.00	36.24	46.00	9.7	100	44	
Hori.	959.999	QP	34.10	22.22	11.27	30.57	0.00	37.02	46.00	8.9	100	125	
Hori.	2003.000	PK	49.29	25.87	13.71	39.47	2.19	51.59	73.90	22.3	273	198	
Hori.	3989.958	PK	48.22	29.70	6.77	39.38	2.19	47.50	73.90	26.4	125	298	
Hori.	4882.000	PK	44.76	31.37	7.23	39.50	2.19	46.05	73.90	27.8	150	0	
Hori.	7323.000	PK	45.43	37.01	9.08	39.35	2.19	54.36	73.90	19.5	160	131	
Hori.	9764.000	PK	44.28	38.92	10.44	39.41	2.19	56.42	73.90	17.4	150	0	
Hori.	2003.000	AV	42.78	25.87	13.71	39.47	2.19	45.08	53.90	**8.8**	273	198	
Hori.	3989.958	AV	39.18	29.70	6.77	39.38	2.19	38.46	53.90	15.4	125	298	
Hori.	4882.000	AV	31.36	31.37	7.23	39.50	2.19	32.65	53.90	21.2	150	0	
Hori.	7323.000	AV	32.77	37.01	9.08	39.35	2.19	41.70	53.90	12.2	160	131	
Hori.	9764.000	AV	31.22	38.92	10.44	39.41	2.19	43.36	53.90	10.5	150	0	
Vert.	73.730	QP	37.60	6.38	7.06	32.18	0.00	18.86	40.00	21.1	105	264	
Vert.	589.835	QP	39.90	18.89	9.96	31.96	0.00	36.79	46.00	9.2	114	194	
Vert.	663.564	QP	36.00	19.40	10.24	31.95	0.00	33.69	46.00	12.3	100	194	
Vert.	959.997	QP	32.60	22.22	11.27	30.57	0.00	35.52	46.00	10.4	104	351	
Vert.	2003.000	PK	49.12	25.87	13.71	39.47	2.19	51.42	73.90	22.5	165	196	
Vert.	3989.958	PK	48.82	29.70	6.77	39.38	2.19	48.10	73.90	25.8	143	194	
Vert.	4882.000	PK	44.22	31.37	7.23	39.50	2.19	45.51	73.90	28.3	150	0	
Vert.	7323.000	PK	45.29	37.01	9.08	39.35	2.19	54.22	73.90	19.6	141	331	
Vert.	9764.000	PK	44.55	38.92	10.44	39.41	2.19	56.69	73.90	17.2	150	0	
Vert.	2003.000	AV	42.70	25.87	13.71	39.47	2.19	45.00	53.90	8.9	165	196	
Vert.	3989.958	AV	40.06	29.70	6.77	39.38	2.19	39.34	53.90	14.5	143	194	
Vert.	4882.000	AV	31.19	31.37	7.23	39.50	2.19	32.48	53.90	21.4	150	0	
Vert.	7323.000	AV	32.16	37.01	9.08	39.35	2.19	41.09	53.90	12.8	141	331	
Vert.	9764.000	AV	31.23	38.92	10.44	39.41	2.19	43.37	53.90	10.5	150	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.86 m / 3.0 m) = 2.19 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
* These results have sufficient margin without taking account Dwell time factor.

Radiated Spurious Emission

Report No.	12596522S-A-R1			
Test place	Shonan EMC Lab.			
Semi Anechoic Chamber	No.3	No.1	No.3	No.3
Date	December 5, 2018	January 14, 2019	December 4, 2018	December 5, 2018
Temperature / Humidity	23 deg. C / 31 % RH	21 deg. C / 34 % RH	25 deg. C / 48 % RH	23 deg. C / 31 % RH
Engineer	Shiro Kobayashi	Kazuya Noda	Shiro Kobayashi	Shiro Kobayashi
	(30 MHz -1000 MHz)	(1 GHz -2.8 GHz)	(2.8 GHz -18 GHz)	(18 GHz -26.5 GHz)
Mode	Tx, Hopping Off, DH5 2480 MHz			

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	73.734	QP	35.90	6.37	7.09	32.18	0.00	17.18	40.00	22.8	256	289	
Hori.	405.512	QP	41.00	15.97	9.27	31.98	0.00	34.26	46.00	11.7	100	79	
Hori.	431.374	QP	34.40	16.35	9.38	31.97	0.00	28.16	46.00	17.8	100	174	
Hori.	432.942	QP	31.70	16.38	9.38	31.97	0.00	25.49	46.00	20.5	144	245	
Hori.	436.809	QP	42.20	16.47	9.40	31.97	0.00	36.10	46.00	9.9	100	132	
Hori.	442.377	QP	40.40	16.62	9.42	31.97	0.00	34.47	46.00	11.5	100	162	
Hori.	479.242	QP	41.30	17.26	9.55	31.97	0.00	36.14	46.00	9.8	100	48	
Hori.	709.707	QP	29.30	19.99	10.42	31.86	0.00	27.85	46.00	18.1	153	238	
Hori.	959.998	QP	33.70	22.22	11.27	30.57	0.00	36.62	46.00	9.3	100	114	
Hori.	2003.950	PK	49.40	25.88	13.71	39.47	2.19	51.71	73.90	22.2	145	201	
Hori.	2483.500	PK	57.43	27.64	14.09	39.46	2.19	61.89	73.90	12.0	127	17	
Hori.	3989.969	PK	48.14	29.70	6.77	39.38	2.19	47.42	73.90	26.4	128	299	
Hori.	4960.000	PK	44.89	31.54	7.28	39.50	2.19	46.40	73.90	27.5	150	0	
Hori.	7440.000	PK	44.60	37.10	9.15	39.42	2.19	53.62	73.90	20.2	147	120	
Hori.	9920.000	PK	43.47	38.97	10.36	39.30	2.19	55.69	73.90	18.2	150	0	
Hori.	2003.950	AV	42.92	25.88	13.71	39.47	2.19	45.23	53.90	8.7	145	201	
Hori.	2483.500	AV	34.26	27.64	14.09	39.46	2.19	38.72	53.90	15.2	127	17	
Hori.	3989.969	AV	40.05	29.70	6.77	39.38	2.19	39.33	53.90	14.5	128	299	
Hori.	4960.000	AV	32.74	31.54	7.28	39.50	2.19	34.25	53.90	19.6	150	0	
Hori.	7440.000	AV	32.84	37.10	9.15	39.42	2.19	41.86	53.90	12.0	147	120	
Hori.	9920.000	AV	31.81	38.97	10.36	39.30	2.19	44.03	53.90	9.8	150	0	
Vert.	73.732	QP	37.30	6.37	7.09	32.18	0.00	18.58	40.00	21.4	100	269	
Vert.	589.834	QP	39.60	18.89	9.96	31.96	0.00	36.49	46.00	9.5	117	201	
Vert.	959.999	QP	32.90	22.22	11.27	30.57	0.00	35.82	46.00	10.1	111	351	
Vert.	2003.969	PK	49.43	25.88	13.71	39.47	2.19	51.74	73.90	22.2	230	120	
Vert.	2483.500	PK	54.18	27.64	14.09	39.46	2.19	58.64	73.90	15.3	205	282	
Vert.	3989.969	PK	48.87	29.70	6.77	39.38	2.19	48.15	73.90	25.7	146	195	
Vert.	4960.000	PK	44.48	31.54	7.28	39.50	2.19	45.99	73.90	27.9	150	0	
Vert.	7440.000	PK	44.64	37.10	9.15	39.42	2.19	53.66	73.90	20.2	134	326	
Vert.	9920.000	PK	43.71	38.97	10.36	39.30	2.19	55.93	73.90	17.9	150	0	
Vert.	2003.969	AV	43.24	25.88	13.71	39.47	2.19	45.55	53.90	**8.3**	230	120	
Vert.	2483.500	AV	33.74	27.64	14.09	39.46	2.19	38.20	53.90	15.7	205	282	
Vert.	3989.969	AV	41.26	29.70	6.77	39.38	2.19	40.54	53.90	13.3	146	195	
Vert.	4960.000	AV	32.67	31.54	7.28	39.50	2.19	34.18	53.90	19.7	150	0	
Vert.	7440.000	AV	32.89	37.10	9.15	39.42	2.19	41.91	53.90	11.9	134	326	
Vert.	9920.000	AV	31.80	38.97	10.36	39.30	2.19	44.02	53.90	9.8	150	0	

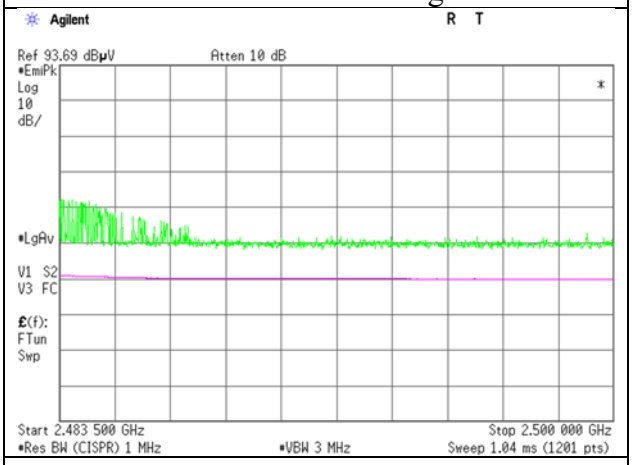
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.86 m / 3.0 m) = 2.19 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
* These results have sufficient margin without taking account Dwell time factor.

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	12596522S-A-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.1
Date	January 14, 2019
Temperature / Humidity	21 deg. C / 34 % RH
Engineer	Kazuya Noda (1 GHz -2.8 GHz)
Mode	Tx, Hopping Off, DH5 2480 MHz

Horizontal

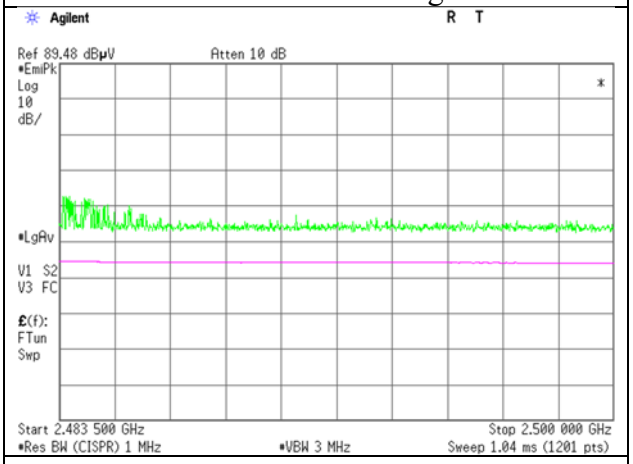
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

* 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.	12596522S-A-R1			
Test place	Shonan EMC Lab.			
Semi Anechoic Chamber	No.3	No.1	No.3	No.3
Date	December 5, 2018	January 14, 2019	December 4, 2018	December 5, 2018
Temperature / Humidity	23 deg. C / 31 % RH	21 deg. C / 34 % RH	25 deg. C / 48 % RH	23 deg. C / 31 % RH
Engineer	Shiro Kobayashi	Kazuya Noda	Shiro Kobayashi	Shiro Kobayashi
	(30 MHz -1000 MHz)	(1 GHz -2.8 GHz)	(2.8 GHz -18 GHz)	(18 GHz -26.5 GHz)
Mode	Tx, Hopping Off, 3DH5 2402 MHz			

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	73.733	QP	35.70	6.38	7.07	32.18	0.00	16.97	40.00	23.0	258	301	
Hori.	405.510	QP	41.40	15.97	9.27	31.98	0.00	34.66	46.00	11.3	105	77	
Hori.	427.707	QP	34.60	16.30	9.36	31.97	0.00	28.29	46.00	17.7	100	144	
Hori.	436.811	QP	42.10	16.47	9.40	31.97	0.00	36.00	46.00	10.0	100	141	
Hori.	442.379	QP	40.40	16.62	9.42	31.97	0.00	34.47	46.00	11.5	100	158	
Hori.	479.244	QP	41.20	17.26	9.55	31.97	0.00	36.04	46.00	9.9	100	42	
Hori.	758.312	QP	26.70	20.32	10.61	31.77	0.00	25.86	46.00	20.1	100	167	
Hori.	959.999	QP	33.40	22.22	11.27	30.57	0.00	36.32	46.00	9.6	100	124	
Hori.	2002.972	PK	49.34	25.87	13.71	39.47	2.19	51.64	73.90	22.3	144	200	
Hori.	2376.067	PK	49.02	27.88	14.01	39.46	2.19	53.64	73.90	20.3	153	23	
Hori.	2390.000	PK	46.09	27.89	14.02	39.46	2.19	50.73	73.90	23.2	151	22	
Hori.	3989.967	PK	48.44	29.70	6.77	39.38	2.19	47.72	73.90	26.1	125	298	
Hori.	4804.000	PK	44.90	31.43	7.17	39.50	2.19	46.19	73.90	27.7	150	0	
Hori.	7206.000	PK	45.99	36.79	9.03	39.29	2.19	54.71	73.90	19.1	164	134	
Hori.	9608.000	PK	46.20	38.51	10.52	39.52	2.19	57.90	73.90	16.0	150	0	
Hori.	2002.972	AV	42.90	25.87	13.71	39.47	2.19	45.20	53.90	8.7	144	200	
Hori.	2376.067	AV	36.41	27.88	14.01	39.46	2.19	41.03	53.90	12.9	153	23	
Hori.	2390.000	AV	33.39	27.89	14.02	39.46	2.19	38.03	53.90	15.9	151	22	
Hori.	3989.967	AV	40.12	29.70	6.77	39.38	2.19	39.40	53.90	14.5	125	298	
Hori.	4804.000	AV	32.81	31.43	7.17	39.50	2.19	34.10	53.90	19.8	150	0	
Hori.	7206.000	AV	33.32	36.79	9.03	39.29	2.19	42.04	53.90	11.8	164	134	
Hori.	9608.000	AV	34.17	38.51	10.52	39.52	2.19	45.87	53.90	**8.0**	150	0	
Vert.	73.731	QP	37.30	6.37	7.09	32.18	0.00	18.58	40.00	21.4	106	277	
Vert.	589.835	QP	39.60	18.89	9.96	31.96	0.00	36.49	46.00	9.5	118	196	
Vert.	663.565	QP	36.20	19.40	10.24	31.95	0.00	33.89	46.00	12.1	100	195	
Vert.	959.999	QP	33.30	22.22	11.27	30.57	0.00	36.22	46.00	9.7	102	347	
Vert.	2002.874	PK	46.06	25.87	13.71	39.47	2.19	48.36	73.90	25.5	148	284	
Vert.	2390.000	PK	45.72	27.89	14.02	39.46	2.19	50.36	73.90	23.5	150	293	
Vert.	3989.967	PK	48.99	29.70	6.77	39.38	2.19	48.27	73.90	25.6	141	197	
Vert.	4804.000	PK	44.38	31.43	7.17	39.50	2.19	45.67	73.90	28.2	150	0	
Vert.	7206.000	PK	46.07	36.79	9.03	39.29	2.19	54.79	73.90	19.1	131	329	
Vert.	9608.000	PK	46.08	38.51	10.52	39.52	2.19	57.78	73.90	16.1	150	0	
Vert.	2002.874	AV	33.46	25.87	13.71	39.47	2.19	35.76	53.90	18.1	148	284	
Vert.	2390.000	AV	33.28	27.89	14.02	39.46	2.19	37.92	53.90	16.0	150	293	
Vert.	3989.967	AV	41.62	29.70	6.77	39.38	2.19	40.90	53.90	13.0	141	197	
Vert.	4804.000	AV	32.76	31.43	7.17	39.50	2.19	34.05	53.90	19.8	150	0	
Vert.	7206.000	AV	33.68	36.79	9.03	39.29	2.19	42.40	53.90	11.5	131	329	
Vert.	9608.000	AV	34.18	38.51	10.52	39.52	2.19	45.88	53.90	**8.0**	150	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.86 m / 3.0 m) = 2.19 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
* These results have sufficient margin without taking account Dwell time factor.

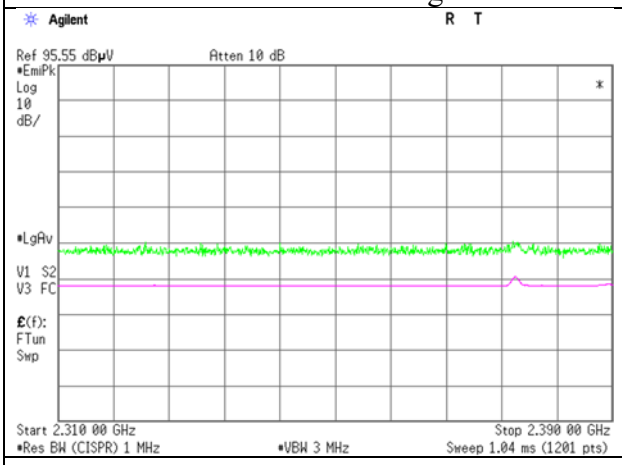
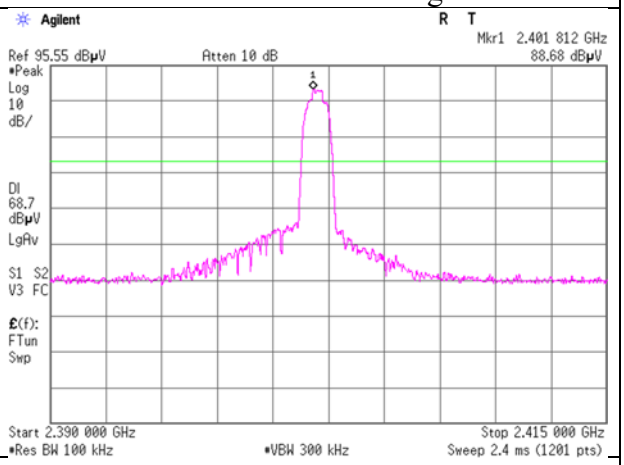
20 dBc Data Sheet (RBW 100 kHz, VBW 300 kHz)

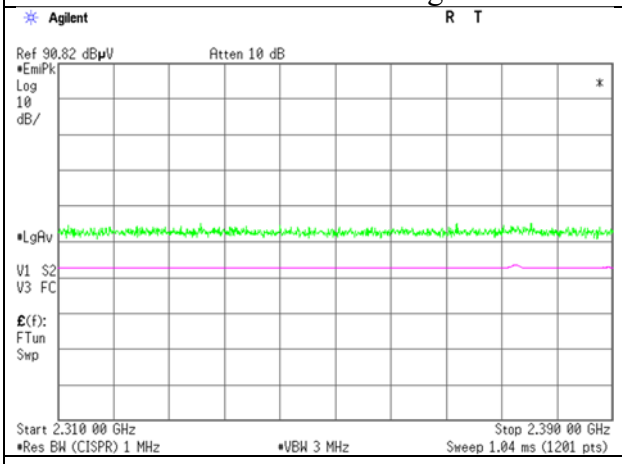
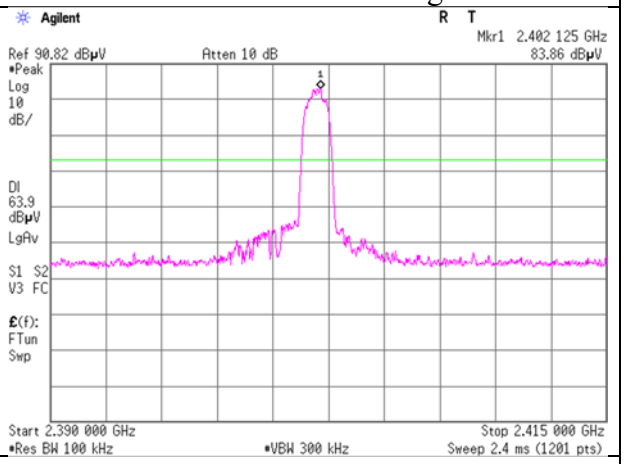
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	88.58	27.88	14.03	39.46	2.19	93.22	-	-	Carrier
Hori.	2400.000	PK	48.61	27.89	14.03	39.46	2.19	53.26	73.22	20.0	
Vert.	2402.000	PK	83.78	27.88	14.03	39.46	2.19	88.42	-	-	Carrier
Vert.	2400.000	PK	44.45	27.89	14.03	39.46	2.19	49.10	68.42	19.3	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.86 m / 3.0 m) = 2.19 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	12596522S-A-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.1
Date	January 14, 2019
Temperature / Humidity	21 deg. C / 34 % RH
Engineer	Kazuya Noda (1 GHz -2.8 GHz)
Mode	Tx, Hopping Off, 3DH5 2402 MHz

Horizontal	
Restricted-band band-edge Plot	Authorized-band band-edge Plot
	
Trace Green : Peak Plot Trace Purple : Average Plot	20dBc Plot

Vertical	
Restricted-band band-edge Plot	Authorized-band band-edge Plot
	
Trace Green : Peak Plot Trace Purple : Average Plot	20dBc Plot

* 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.	12596522S-A-R1			
Test place	Shonan EMC Lab.			
Semi Anechoic Chamber	No.3	No.1	No.3	No.3
Date	December 5, 2018	January 14, 2019	December 4, 2018	December 5, 2018
Temperature / Humidity	23 deg. C / 31 % RH	21 deg. C / 34 % RH	25 deg. C / 48 % RH	23 deg. C / 31 % RH
Engineer	Shiro Kobayashi (30 MHz -1000 MHz)	Kazuya Noda (1 GHz -2.8 GHz)	Shiro Kobayashi (2.8 GHz -18 GHz)	Shiro Kobayashi (18 GHz -26.5 GHz)
Mode	Tx, Hopping Off, 3DH5 2441 MHz			

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	73.733	QP	35.10	6.37	7.09	32.18	0.00	16.38	40.00	23.6	263	293	
Hori.	203.219	QP	46.60	11.49	8.06	32.07	0.00	34.08	43.50	9.4	216	317	
Hori.	426.073	QP	30.50	16.28	9.35	31.97	0.00	24.16	46.00	21.8	100	168	
Hori.	479.240	QP	41.30	17.26	9.55	31.97	0.00	36.14	46.00	9.8	100	42	
Hori.	516.105	QP	37.90	17.79	9.68	31.98	0.00	33.39	46.00	12.6	100	284	
Hori.	839.147	QP	26.60	21.35	10.90	31.43	0.00	27.42	46.00	18.5	100	334	
Hori.	959.999	QP	32.40	22.22	11.27	30.57	0.00	35.32	46.00	10.6	100	137	
Hori.	2002.816	PK	49.52	25.87	13.71	39.47	2.19	51.82	73.90	22.1	149	200	
Hori.	3989.988	PK	48.20	29.70	6.77	39.38	2.19	47.48	73.90	26.4	125	299	
Hori.	4882.000	PK	45.08	31.37	7.23	39.50	2.19	46.37	73.90	27.5	150	0	
Hori.	7323.000	PK	45.17	37.01	9.08	39.35	2.19	54.10	73.90	19.8	145	153	
Hori.	9764.000	PK	44.95	38.92	10.44	39.41	2.19	57.09	73.90	16.8	150	0	
Hori.	2002.816	AV	42.96	25.87	13.71	39.47	2.19	45.26	53.90	**8.6**	149	200	
Hori.	3989.988	AV	40.25	29.70	6.77	39.38	2.19	39.53	53.90	14.3	125	299	
Hori.	4882.000	AV	32.53	31.37	7.23	39.50	2.19	33.82	53.90	20.0	150	0	
Hori.	7323.000	AV	32.90	37.01	9.08	39.35	2.19	41.83	53.90	12.0	145	153	
Hori.	9764.000	AV	32.65	38.92	10.44	39.41	2.19	44.79	53.90	9.1	150	0	
Vert.	73.733	QP	36.90	6.37	7.09	32.18	0.00	18.18	40.00	21.8	111	280	
Vert.	203.216	QP	41.20	11.49	8.06	32.07	0.00	28.68	43.50	14.8	100	356	
Vert.	589.834	QP	39.80	18.89	9.96	31.96	0.00	36.69	46.00	9.3	119	195	
Vert.	746.289	QP	32.10	20.25	10.56	31.81	0.00	31.10	46.00	14.9	100	155	
Vert.	959.998	QP	30.50	22.22	11.27	30.57	0.00	33.42	46.00	12.5	102	349	
Vert.	2002.809	PK	49.51	25.87	13.71	39.47	2.19	51.81	73.90	22.1	195	165	
Vert.	3989.988	PK	48.18	29.70	6.77	39.38	2.19	47.46	73.90	26.4	140	197	
Vert.	4882.000	PK	44.59	31.37	7.23	39.50	2.19	45.88	73.90	28.0	150	0	
Vert.	7323.000	PK	45.76	37.01	9.08	39.35	2.19	54.69	73.90	19.2	136	332	
Vert.	9764.000	PK	44.99	38.92	10.44	39.41	2.19	57.13	73.90	16.7	150	0	
Vert.	2002.809	AV	42.17	25.87	13.71	39.47	2.19	44.47	53.90	9.4	195	165	
Vert.	3989.988	AV	41.16	29.70	6.77	39.38	2.19	40.44	53.90	13.4	140	197	
Vert.	4882.000	AV	32.52	31.37	7.23	39.50	2.19	33.81	53.90	20.0	150	0	
Vert.	7323.000	AV	33.30	37.01	9.08	39.35	2.19	42.23	53.90	11.6	136	332	
Vert.	9764.000	AV	32.73	38.92	10.44	39.41	2.19	44.87	53.90	9.0	150	0	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor

Distance factor : 1 GHz - 13 GHz : 20log (3.86 m / 3.0 m) = 2.19 dB

13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

* These results have sufficient margin without taking account Dwell time factor.

Radiated Spurious Emission

Report No.	12596522S-A-R1			
Test place	Shonan EMC Lab.			
Semi Anechoic Chamber	No.3	No.1	No.3	No.3
Date	December 5, 2018	January 14, 2019	December 4, 2018	December 5, 2018
Temperature / Humidity	23 deg. C / 31 % RH	21 deg. C / 34 % RH	25 deg. C / 48 % RH	23 deg. C / 31 % RH
Engineer	Shiro Kobayashi (30 MHz -1000 MHz)	Kazuya Noda (1 GHz -2.8 GHz)	Shiro Kobayashi (2.8 GHz -18 GHz)	Shiro Kobayashi (18 GHz -26.5 GHz)
Mode	Tx, Hopping Off, 3DH5 2480 MHz			

(* PK: Peak, AV: Average, QP: Quasi-Peak)

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg]	Remark
Hori.	73.733	QP	35.10	6.37	7.09	32.18	0.00	16.38	40.00	23.6	251	301	
Hori.	203.220	QP	46.60	11.49	8.06	32.07	0.00	34.08	43.50	9.4	201	317	
Hori.	405.510	QP	40.20	15.97	9.27	31.98	0.00	33.46	46.00	12.5	100	81	
Hori.	427.932	QP	33.30	16.30	9.36	31.97	0.00	26.99	46.00	19.0	100	166	
Hori.	436.812	QP	41.80	16.47	9.40	31.97	0.00	35.70	46.00	10.3	100	135	
Hori.	442.377	QP	39.70	16.62	9.42	31.97	0.00	33.77	46.00	12.2	100	158	
Hori.	479.240	QP	41.30	17.26	9.55	31.97	0.00	36.14	46.00	9.8	100	43	
Hori.	705.088	QP	28.80	19.89	10.41	31.86	0.00	27.24	46.00	18.7	100	327	
Hori.	959.999	QP	32.40	22.22	11.27	30.57	0.00	35.32	46.00	10.6	100	136	
Hori.	2002.885	PK	48.97	25.87	13.71	39.47	2.19	51.27	73.90	22.6	144	203	
Hori.	2483.500	PK	57.80	27.64	14.09	39.46	2.19	62.26	73.90	11.6	111	15	
Hori.	3989.957	PK	48.31	29.70	6.77	39.38	2.19	47.59	73.90	26.3	100	0	
Hori.	4960.000	PK	44.87	31.54	7.28	39.50	2.19	46.38	73.90	27.5	150	0	
Hori.	7440.000	PK	45.07	37.10	9.15	39.42	2.19	54.09	73.90	19.8	150	0	
Hori.	9920.000	PK	43.71	38.97	10.36	39.30	2.19	55.93	73.90	17.9	150	0	
Hori.	2002.885	AV	43.01	25.87	13.71	39.47	2.19	45.31	53.90	**8.6**	144	203	
Hori.	2483.500	AV	34.30	27.64	14.09	39.46	2.19	38.76	53.90	15.1	111	15	
Hori.	3989.957	AV	40.24	29.70	6.77	39.38	2.19	39.52	53.90	14.3	100	0	
Hori.	4960.000	AV	32.53	31.54	7.28	39.50	2.19	34.04	53.90	19.8	150	0	
Hori.	7440.000	AV	32.77	37.10	9.15	39.42	2.19	41.79	53.90	12.1	150	0	
Hori.	9920.000	AV	31.93	38.97	10.36	39.30	2.19	44.15	53.90	9.7	150	0	
Vert.	73.731	QP	36.80	6.37	7.09	32.18	0.00	18.08	40.00	21.9	106	282	
Vert.	203.219	QP	41.40	11.49	8.06	32.07	0.00	28.88	43.50	14.6	100	351	
Vert.	589.836	QP	39.90	18.89	9.96	31.96	0.00	36.79	46.00	9.2	115	197	
Vert.	959.998	QP	30.30	22.22	11.27	30.57	0.00	33.22	46.00	12.7	103	350	
Vert.	2003.083	PK	49.48	25.87	13.71	39.47	2.19	51.78	73.90	22.1	233	129	
Vert.	2483.500	PK	54.63	27.64	14.09	39.46	2.19	59.09	73.90	14.8	178	290	
Vert.	3989.957	PK	49.67	29.70	6.77	39.38	2.19	48.95	73.90	24.9	140	196	
Vert.	4960.000	PK	44.48	31.54	7.28	39.50	2.19	45.99	73.90	27.9	150	0	
Vert.	7440.000	PK	45.26	37.10	9.15	39.42	2.19	54.28	73.90	19.6	111	346	
Vert.	9920.000	PK	43.77	38.97	10.36	39.30	2.19	55.99	73.90	17.9	150	0	
Vert.	2003.083	AV	42.65	25.87	13.71	39.47	2.19	44.95	53.90	9.0	233	129	
Vert.	2483.500	AV	33.83	27.64	14.09	39.46	2.19	38.29	53.90	15.6	178	290	
Vert.	3989.957	AV	41.52	29.70	6.77	39.38	2.19	40.80	53.90	13.1	140	196	
Vert.	4960.000	AV	32.58	31.54	7.28	39.50	2.19	34.09	53.90	19.8	150	0	
Vert.	7440.000	AV	32.92	37.10	9.15	39.42	2.19	41.94	53.90	11.9	111	346	
Vert.	9920.000	AV	31.95	38.97	10.36	39.30	2.19	44.17	53.90	9.7	150	0	

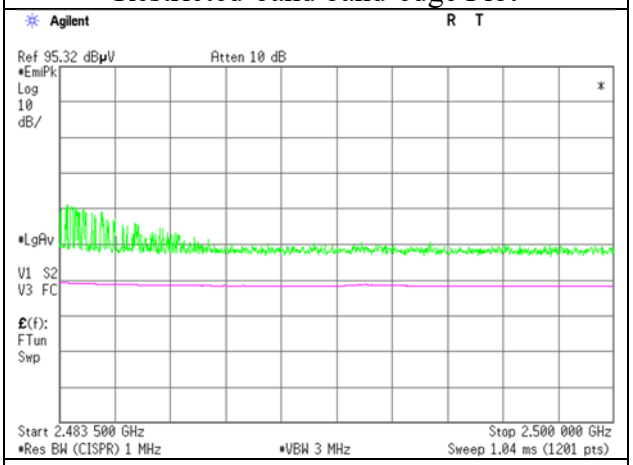
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.86 m / 3.0 m) = 2.19 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
* These results have sufficient margin without taking account Dwell time factor.

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	12596522S-A-R1
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.1
Date	January 14, 2019
Temperature / Humidity	21 deg. C / 34 % RH
Engineer	Kazuya Noda (1 GHz -2.8 GHz)
Mode	Tx, Hopping Off, 3DH5 2480 MHz

Horizontal

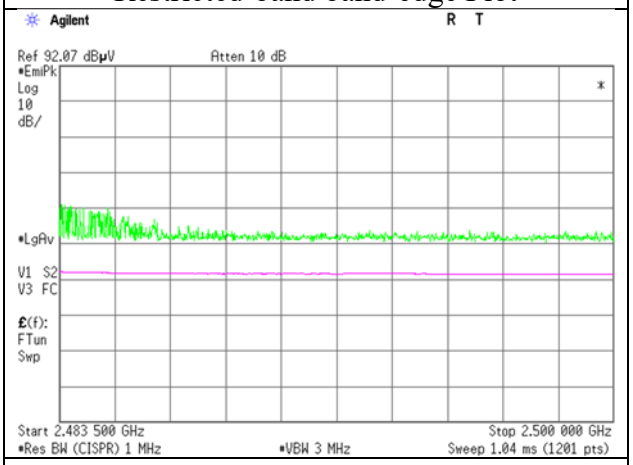
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot

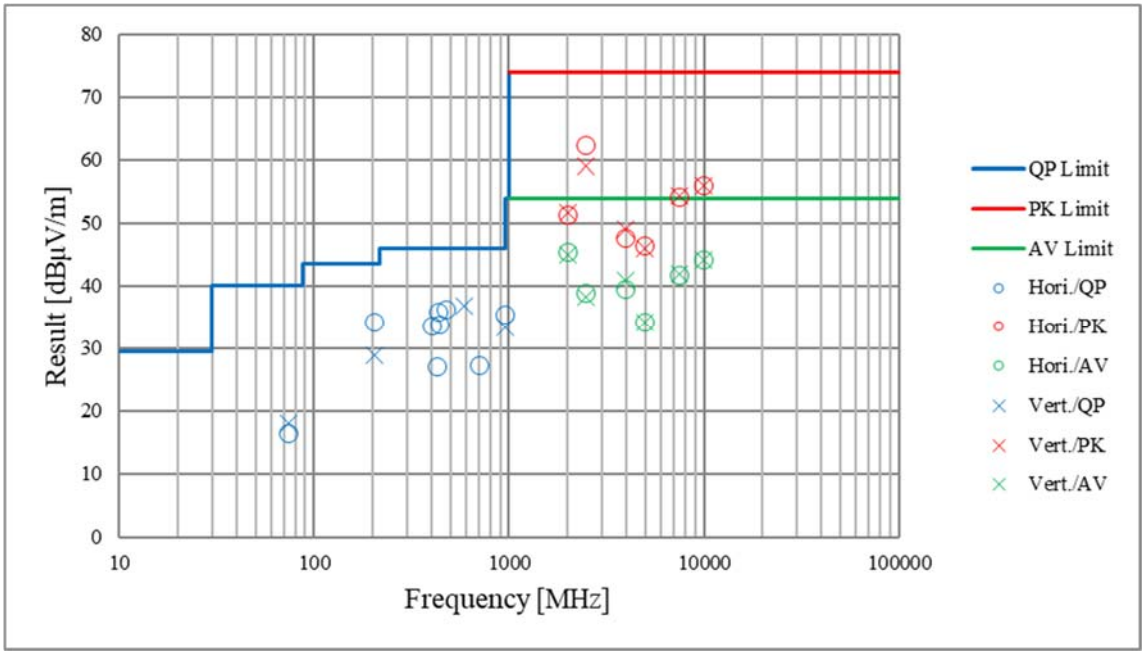


Trace Green : Peak Plot
Trace Purple : Average Plot

* 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.	12596522S-A-R1			
Test place	Shonan EMC Lab.			
Semi Anechoic Chamber	No.3	No.1	No.3	No.3
Date	December 5, 2018	January 14, 2019	December 4, 2018	December 5, 2018
Temperature / Humidity	23 deg. C / 31 % RH	21 deg. C / 34 % RH	25 deg. C / 48 % RH	23 deg. C / 31 % RH
Engineer	Shiro Kobayashi (30 MHz -1000 MHz)	Kazuya Noda (1 GHz -2.8 GHz)	Shiro Kobayashi (2.8 GHz -18 GHz)	Shiro Kobayashi (18 GHz -26.5 GHz)
Mode	Tx, Hopping Off, 3DH5 2480 MHz			



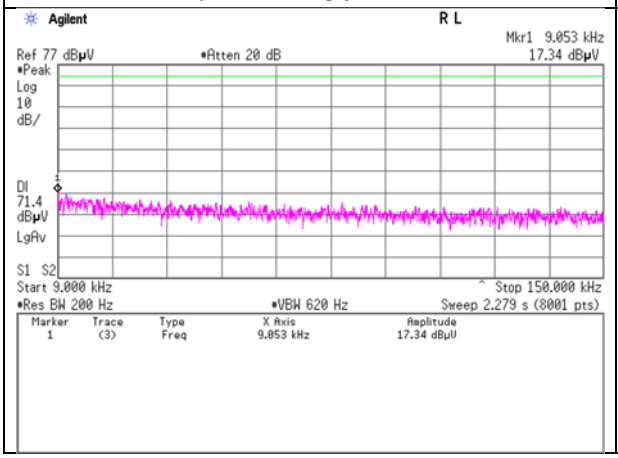
*These plots data contains sufficient number to show the trend of characteristic features for EUT.

Conducted Spurious Emission

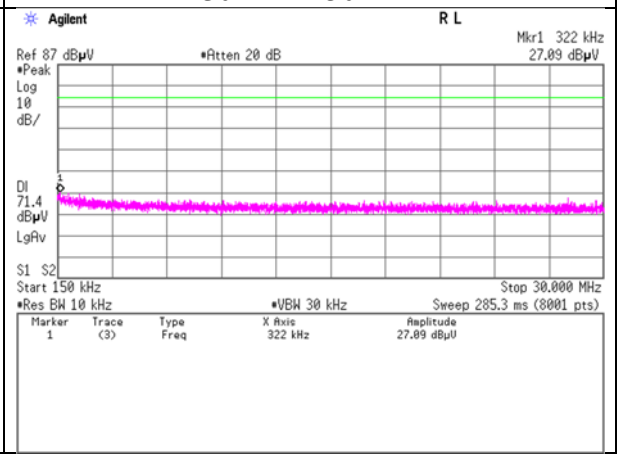
Report No.	12596522S-A-R1
Test place	Shonan EMC Lab. No5 Shielded Room
Date	December 3, 2018
Temperature / Humidity	20 deg. C / 44 % RH
Engineer	Kazuya Noda
Mode	Tx, Hopping Off, DH5

2402 MHz

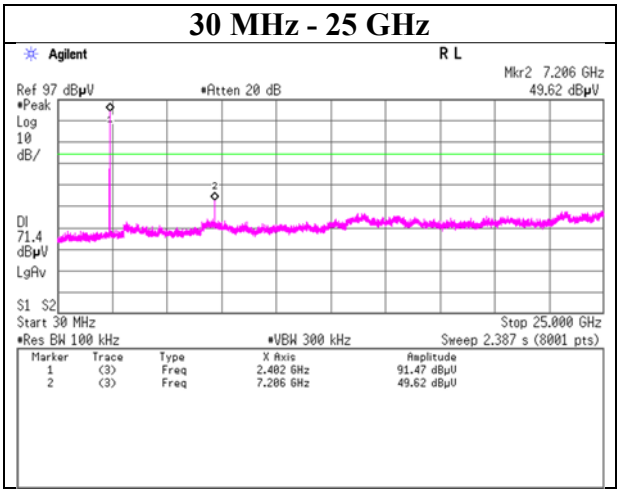
9 kHz - 150 kHz



150 kHz - 30 MHz



30 MHz - 25 GHz

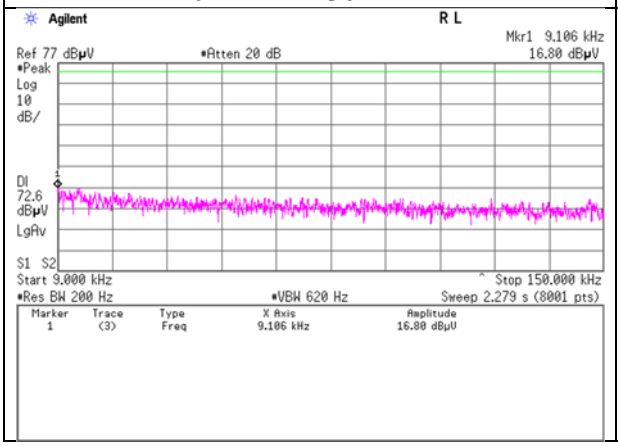


Conducted Spurious Emission

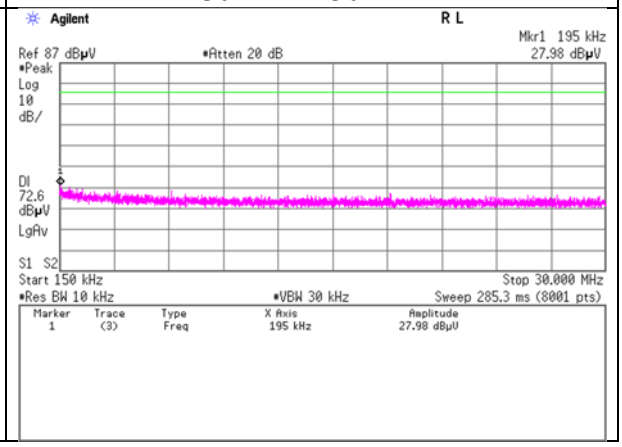
Report No.	12596522S-A-R1
Test place	Shonan EMC Lab. No5 Shielded Room
Date	December 3, 2018
Temperature / Humidity	20 deg. C / 44 % RH
Engineer	Kazuya Noda
Mode	Tx, Hopping Off, DH5

2441 MHz

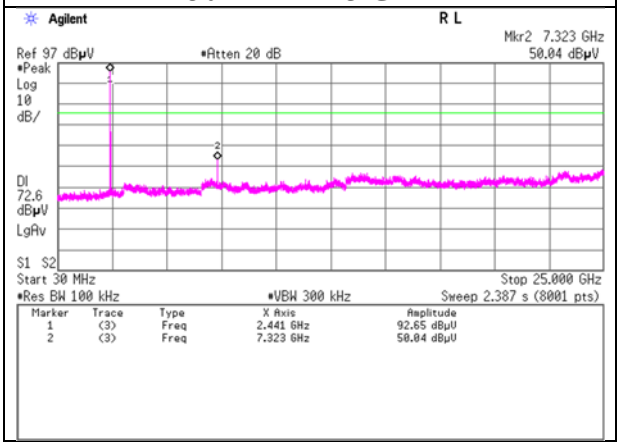
9 kHz – 150 kHz



150 kHz – 30 MHz



30 MHz – 25 GHz

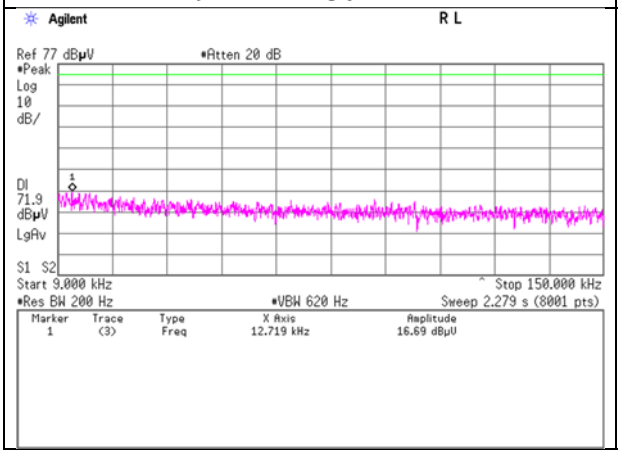


Conducted Spurious Emission

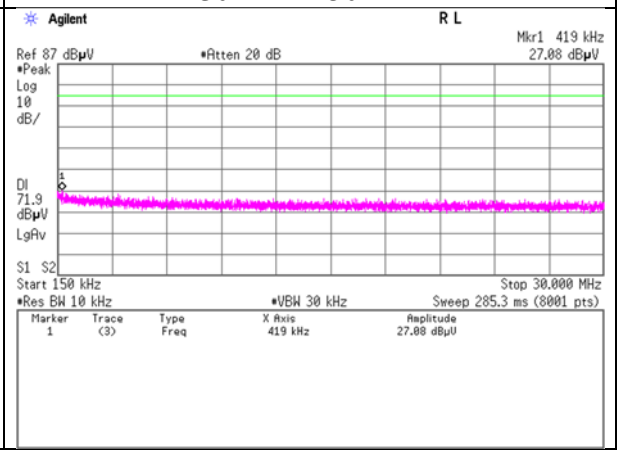
Report No.	12596522S-A-R1
Test place	Shonan EMC Lab. No5 Shielded Room
Date	December 3, 2018
Temperature / Humidity	20 deg. C / 44 % RH
Engineer	Kazuya Noda
Mode	Tx, Hopping Off, DH5

2480 MHz

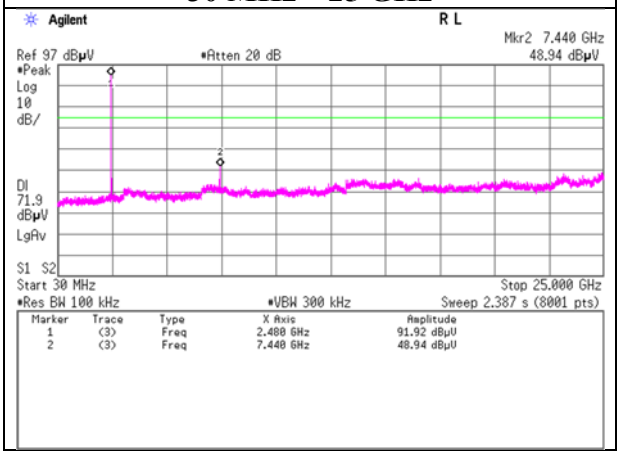
9 kHz – 150 kHz



150 kHz – 30 MHz



30 MHz – 25 GHz

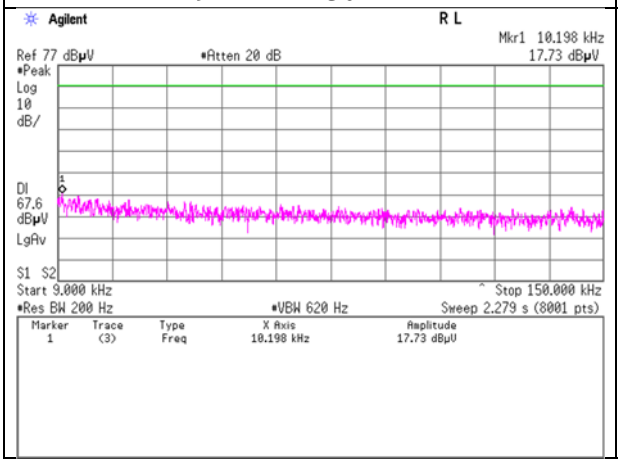


Conducted Spurious Emission

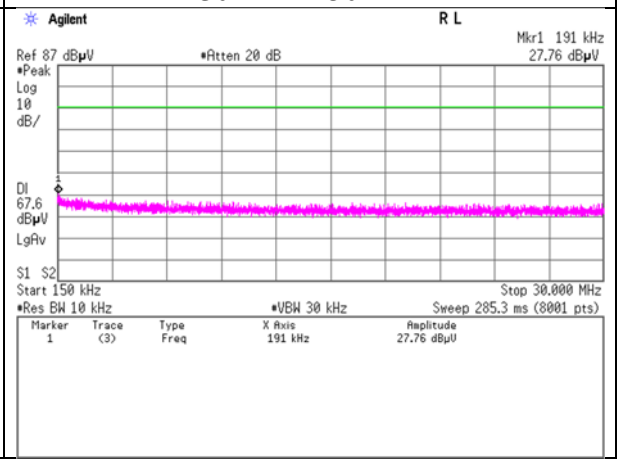
Report No.	12596522S-A-R1
Test place	Shonan EMC Lab. No5 Shielded Room
Date	December 3, 2018
Temperature / Humidity	20 deg. C / 44 % RH
Engineer	Kazuya Noda
Mode	Tx, Hopping Off, 3DH5

2402 MHz

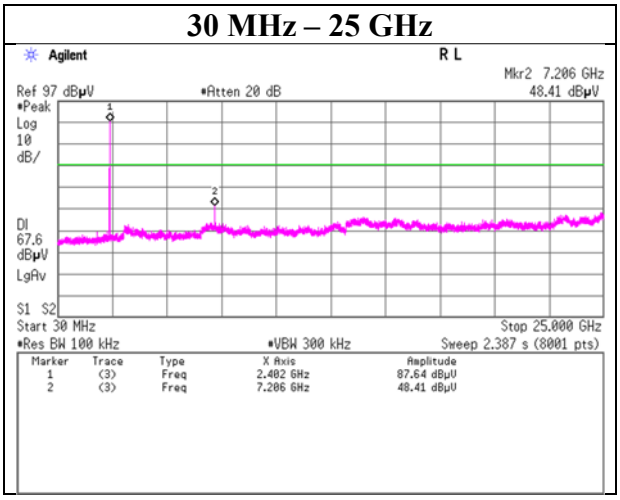
9 kHz – 150 kHz



150 kHz – 30 MHz



30 MHz – 25 GHz

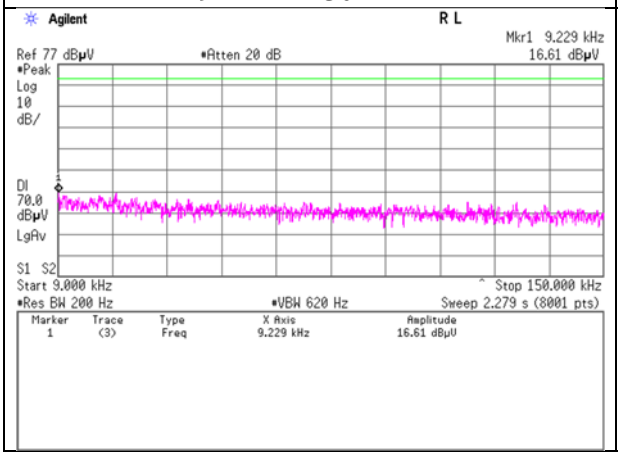


Conducted Spurious Emission

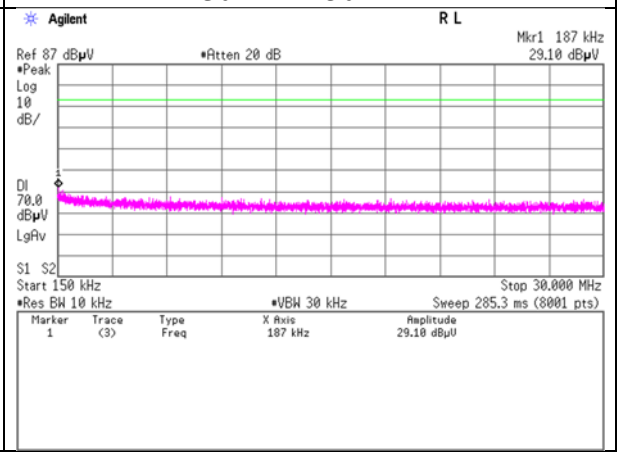
Report No.	12596522S-A-R1
Test place	Shonan EMC Lab. No5 Shielded Room
Date	December 3, 2018
Temperature / Humidity	20 deg. C / 44 % RH
Engineer	Kazuya Noda
Mode	Tx, Hopping Off, 3DH5

2441 MHz

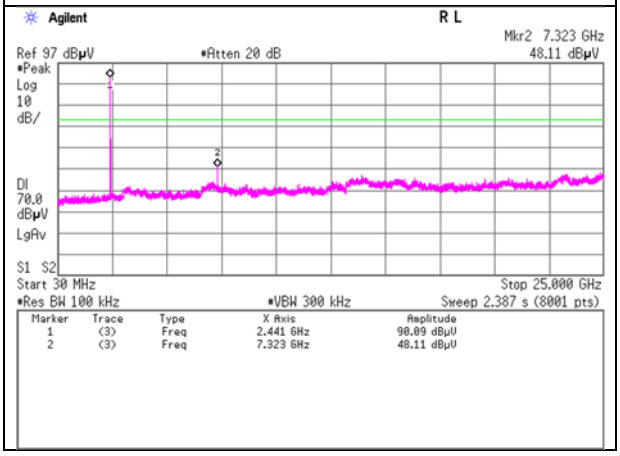
9 kHz - 150 kHz



150 kHz - 30 MHz



30 MHz - 25 GHz

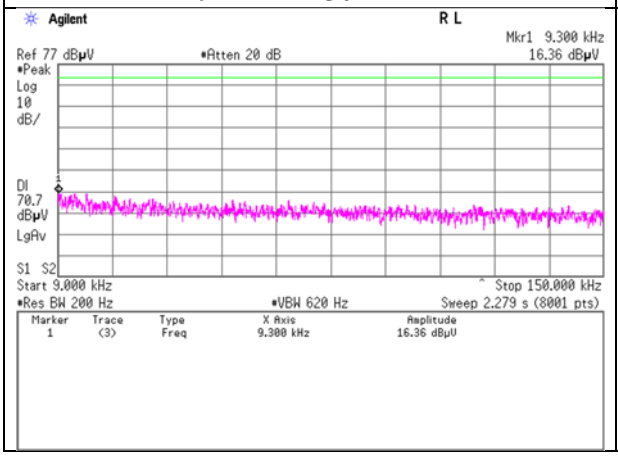


Conducted Spurious Emission

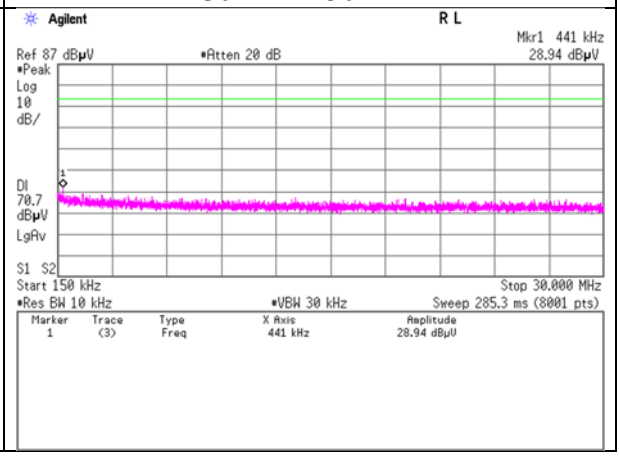
Report No.	12596522S-A-R1
Test place	Shonan EMC Lab. No5 Shielded Room
Date	December 3, 2018
Temperature / Humidity	20 deg. C / 44 % RH
Engineer	Kazuya Noda
Mode	Tx, Hopping Off, 3DH5

2480 MHz

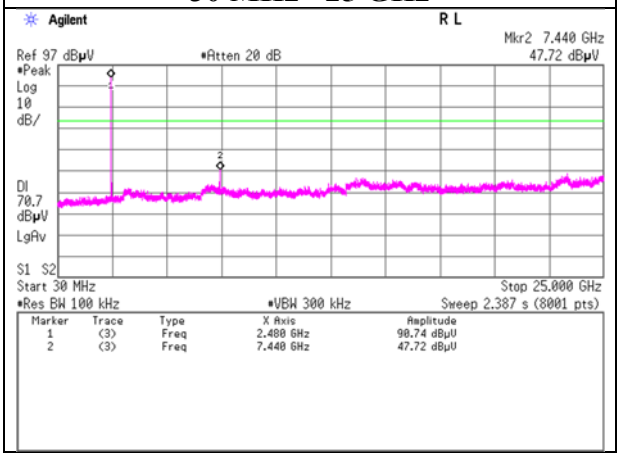
9 kHz - 150 kHz



150 kHz - 30 MHz



30 MHz - 25 GHz

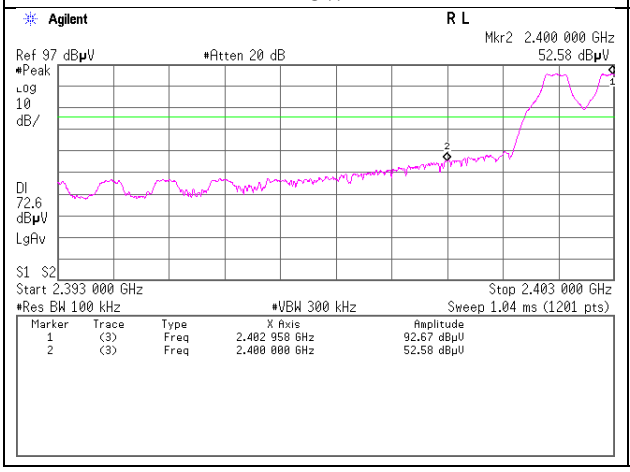


Conducted Emission Band Edge compliance

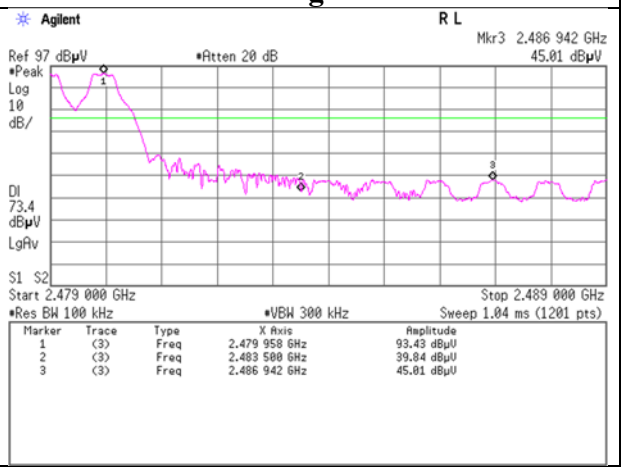
Report No.	12596522S-A-R1
Test place	Shonan EMC Lab. No5 Shielded Room
Date	December 3, 2018
Temperature / Humidity	20 deg. C / 44 % RH
Engineer	Kazuya Noda
Mode	Tx DH5

Hopping On

Low

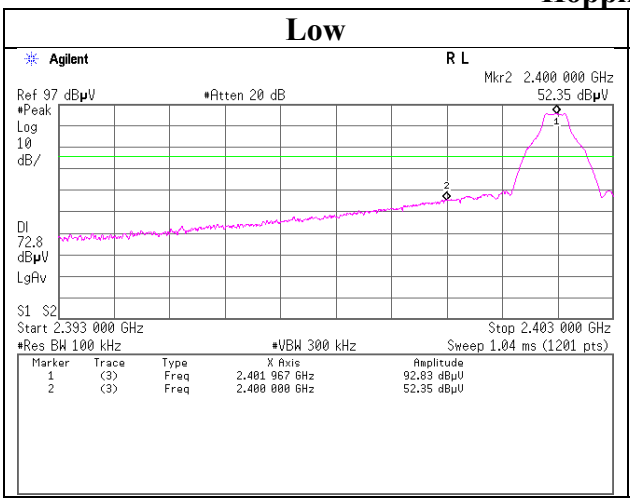


High

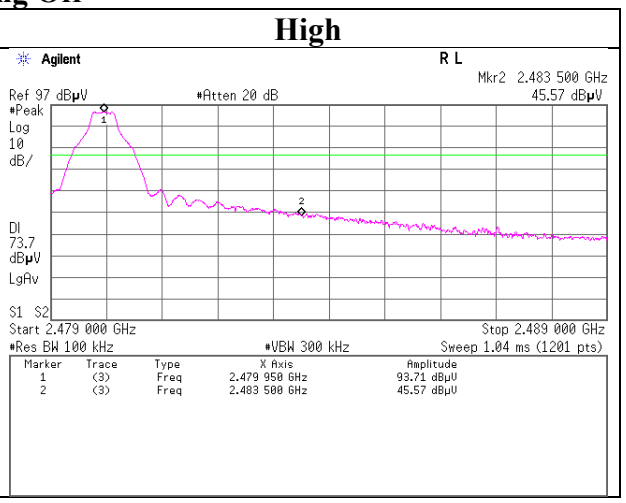


Hopping Off

Low



High

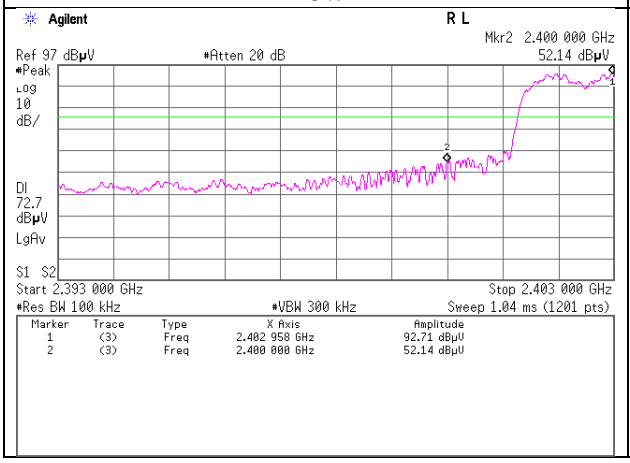


Conducted Emission Band Edge compliance

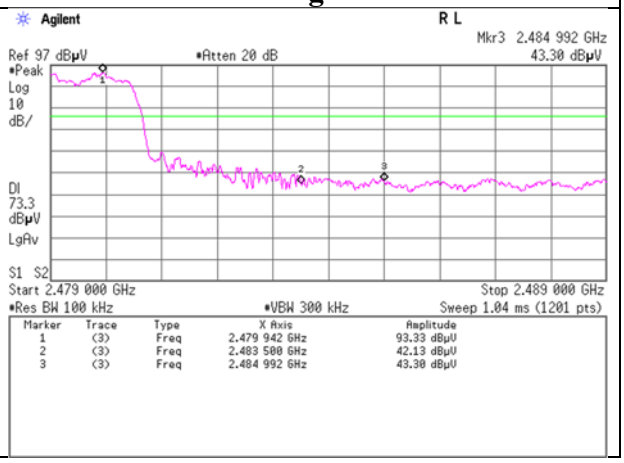
Report No.	12596522S-A-R1
Test place	Shonan EMC Lab. No5 Shielded Room
Date	December 3, 2018
Temperature / Humidity	20 deg. C / 44 % RH
Engineer	Kazuya Noda
Mode	Tx 3DH5

Hopping On

Low

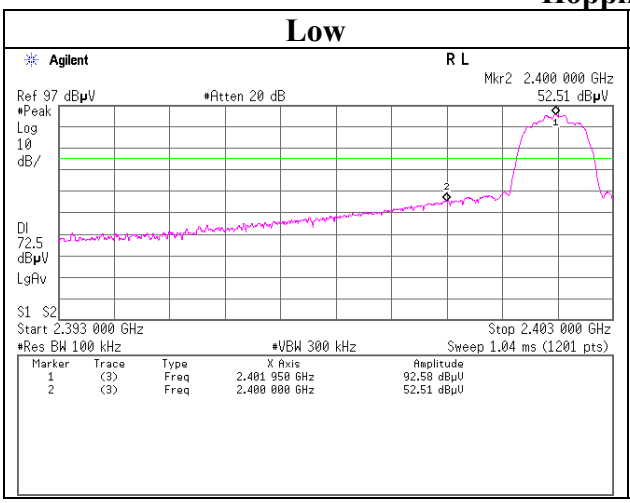


High

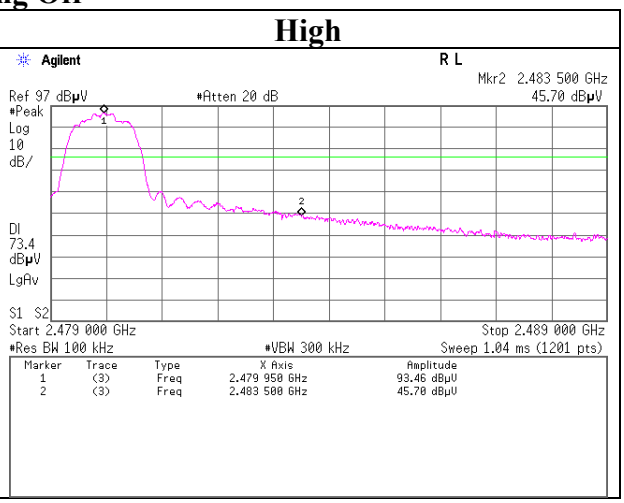


Hopping Off

Low



High



APPENDIX 2: Test instruments

Test Instruments

Local ID	Test Name	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Calibration Due Date	Calibration Interval (Month)
KTS-08	AT	145095	Digital Tester	SANWA	PC500	7019224	2018/3/5	2019/3/31	12
SAT10-09	AT	145132	Attenuator	Weinschel Corp.	54A-10	W5692	2018/11/25	2019/11/30	12
SCC-G32	AT	145183	Coaxial Cable	Junkosha	MWX241-02000KMSKMS	OCT-09-13-005	2018/11/25	2019/11/30	12
SOS-09	AT	146318	Humidity Indicator	A&D	AD-5681	4061484	2018/12/5	2019/12/31	12
SPM-07	AT	146247	Power Meter	AGILENT	8990B	MY5100272	2018/7/13	2019/7/31	12
SPSS-04	AT	146310	Power sensor	AGILENT	N1923A	MY5326009	2018/7/13	2019/7/31	12
SRENT-15	AT	160899	Spectrum Analyzer	AGILENT (KEYSIGHT)	E4440A	MY46185516	2017/12/26	2018/12/31 *1)	12
COTS-SEMI-5	RE	170932	EMI Software	TSJ	TEPTO-DV3(RE,CE,ME,PE)		-	-	-
KJM-02	RE	146432	Measure	TAJIMA	GL19-55	-	-	-	-
KJM-09	RE	145929	Measure	KOMELON	KMC-36	-	-	-	-
SAEC-01(SVSWR)	RE	145561	Semi-Anechoic Chamber	TDK	SAEC-01(SVSWR)	1	2018/7/19	2019/7/31	12
SAEC-03(NSA)	RE	145565	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	2018/6/2	2019/6/30	12
SAEC-03(SVSWR)	RE	145566	Semi-Anechoic Chamber	TDK	SAEC-03(SVSWR)	3	2018/7/17	2019/7/31	12
SAF-03	RE	145126	Pre Amplifier	SONOMA	310N	290213	2018/2/16	2019/2/28	12
SAF-04	RE	145127	Pre Amplifier	Toyo Corporation	TPA0118-36	2072554	2018/6/26	2019/6/30	12
SAF-08	RE	145007	Pre Amplifier	Toyo Corporation	HAP18-26W	19	2018/3/27	2019/3/31	12
SAT10-06	RE	145137	Attenuator	AGILENT	8493C-010	74865	2018/11/25	2019/11/30	12
SAT6-13	RE	167094	Attenuator	JFW	50HF-006N		2018/2/9	2019/2/28	12
SBA-03	RE	145023	Biconical Antenna	Schwarzbeck	BBA9106	91032666	2018/6/17	2019/6/30	12
SCC-C1/C2/C3/C4/C5/C10/SRSE-03	RE	145171	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141P	-/0901-271(RF Selector)	2018/4/9	2019/4/30	12
SCC-G05	RE	145039	Coaxial Cable	Junkosha	J12J102207-00	APR-30-15-037	2018/1/29	2019/1/31	12
SCC-G22	RE	145180	Coaxial Cable	Suhner	SUCOFLEX 104	296199/4	2018/5/11	2019/5/31	12
SCC-G33	RE	145184	Coaxial Cable	Junkosha	MWX241-01000KMSKMS	-	2018/4/20	2019/4/30	12
SCC-G40	RE	166491	Coaxial Cable	Junkosha	MWX221-01000NFSNMS/B	1612S005	2018/1/29	2019/1/31	12
SCC-G41	RE	151617	Coaxial Cable	Junkosha	MWX221-01000NFSNMS/B	1612S006	2018/1/29	2019/1/31	12
SCC-G43	RE	156380	Coaxial Cable	HUBER+SUNER	SUCOFLEX_104_E	SN MY 13406/4E	2018/7/10	2019/7/31	12
SCC-G44	RE	168300	Coaxial Cable	HUBER+SUNER	SUCOFLEX 104	800070/4A	2018/3/28	2019/3/31	12
SCC-G45	RE	168301	Coaxial Cable	HUBER+SUNER	SUCOFLEX 102 E	800137/2EA	2018/3/28	2019/3/31	12
SFL-02	RE	145301	Highpass Filter	MICRO-TRONICS	HPM50111	51	2018/11/16	2019/11/30	12
SHA-01	RE	145383	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-725	2018/7/23	2019/7/31	12
SHA-03	RE	145501	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	2018/7/23	2019/7/31	12

Local ID	Test Name	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Calibration Due Date	Calibration Interval (Month)
SHA-04	RE	145512	Horn Antenna	ETS LINDGREN	Sep-60	LM3640	2018/7/23	2019/7/31	12
SLA-07	RE	145529	Logperiodic Antenna	Schwarzbeck	VUSLP9111B	196	2018/6/17	2019/6/30	12
SOS-01	RE	146316	Humidity Indicator	A&D	AD-5681	4062555	2018/10/25	2019/10/31	12
SOS-05	RE	146293	Humidity Indicator	A&D	AD-5681	4062518	2018/10/25	2019/10/31	12
SSA-02	RE	145800	Spectrum Analyzer	AGILENT	E4448A	MY48250106	2018/3/5	2019/3/31	12
STR-07	RE	146209	Test Receiver	Rohde & Schwarz	ESU26	100484	2018/9/26	2019/9/30	12
STR-08	RE	150463	Test Receiver	Rohde & Schwarz	ESW44	101581	2018/11/28	2019/11/30	12
STS-01	RE	145792	Digital Hitester	HIOKI	3805-50	80997812	2018/10/16	2019/10/31	12
STS-03	RE	146210	Digital Hitester	HIOKI	3805-50	80997823	2018/10/16	2019/10/31	12

***1) This test equipment was used for the tests before the expiration date of the calibration.**
***Hyphens for Last Calibration Date, Calibration Due Date and Cal Int (month) are 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 Emission test**
AT: Antenna Terminal Conducted test