RADIO TEST REPORT

Test Report No. : 12261916S-R2

Applicant	:	**TAIYO YUDEN CO., LTD.**
Type of Equipment	:	**Wi-SUN FAN Transceiver / ANT Module**
Model No.	:	**SYSFCSAXY-WX** **SYSFESAXY-WX**
FCC ID	:	**RYYSYSF**
Test regulation	:	**FCC Part 15 Subpart C: 2018**
Test Result	:	**Complied**

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the 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 EMC technical requirements.
   It does not cover administrative issues such as Manual or non-EMC 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. This report is a revised version of 12261916S-R1. 12261916S-R1 is replaced with this report.

Date of test: May 15 to 26, 2018

Representative test engineer:
Shiro Kobayashi
Engineer
Consumer Technology Division

Approved by:
Akio Hayashi
Leader
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.: 12261916S

Revision	Test report No.	Date	Page revised	Contents
- (Original)	12261916S	June 11, 2018	-	-
1	12261916S-R1	June 25, 2018	1-52	Change of FCC ID
			4	Addition of similar model description to 2.2 Correction of Frequency of Operation from “902 MHz - 928 MHz” to “902.4 MHz - 927.6 MHz”
			9	Correction of Configuration and peripherals (Jig board has been added.)
			19	Addition of 20 dB Bandwidth Deletion of comment
			23-24	Addition of comment
2	12261916S-R2	July 25, 2018	6	Change of comment for FCC Part 15.31 (e) from “The stable voltage was provided to the EUT during the tests.” to “The host device provides stable voltage constantly to RF Module regardless of input voltage.”

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SECTION 1: Customer information

Company Name	:	TAIYO YUDEN CO., LTD.
Address	:	8-1, Sakae-cho, Takasaki-shi, Gunma, 370-8522 Japan
Telephone Number	:	+81-27-324-2313
Facsimile Number	:	+81-27-324-2314
Contact Person	:	Tomohiro Igarashi

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

2.1 Identification of E.U.T.

Type of Equipment	:	Wi-SUN FAN Transceiver / ANT Module
Model No.	:	SYSFCSAXY-WX SYSFESAXY-WX
Serial No.	:	Refer to Section 4, Clause 4.2
Rating	:	DC 3.0 V – DC 3.6 V
Receipt Date of Sample	:	April 25, 2018
Country of Mass-production	:	Japan
Condition of EUT	:	Engineering prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT	:	No Modification by the test lab.

2.2 Product Description

Model: SYSFCSAXY-WX , SYSFESAXY-WX (referred to as the EUT in this report) is Wi-SUN FAN Transceiver / ANT Module.

Differences between SYSFCSAXY-WX and SYSFESAXY-WX are as follows.
- SYSFCSAXY-WX: Build-in (PCB) Antenna type
- SYSFESAXY-WX: External (Dipole) Antenna type

In addition, there are the following similar models.
- SYSFCSAXZ-WX: Build-in (PCB) Antenna type
- SYSFESAXZ-WX: External (Dipole) Antenna type

Difference is the Capacity of Flash Memory and it does not affect the radio specification. Therefore, SYSFCSAXY-WX and SYSFESAXY-WX has been tested as representatives.

Clock frequency	:	30 MHz (RF Transceiver), 32 MHz (MCU), 32.768 kHz (MCU)

Radio Specification

Radio Type	:	Transceiver
Frequency of Operation	:	902.4 MHz - 927.6 MHz
Modulation	:	FSK
Antenna type & Antenna Gain	:	PCB antenna, -0.8 dBi Dipole antenna, 2 dBi

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	20.0 dB 0.39609 MHz, N, QP Tx 902.4 MHz SYSFCSAXY-WX, 0.42264 MHz, N, QP 0.42270 MHz, L1, QP Tx 902.4 MHz SYSFESAXY-WX	Complied	-
Carrier Frequency Separation	**FCC:** FCC Public Notice DA 00-705 **IC:** -	**FCC:** Section15.247(a)(1) **IC:** RSS-247 5.1 (b)	See data.	Complied	Conducted
20dB Bandwidth	**FCC:** FCC Public Notice DA 00-705 **IC:** -	**FCC:** Section15.247(a)(1) **IC:** RSS-247 5.1 (a)		Complied	Conducted
Number of Hopping Frequency	**FCC:** FCC Public Notice DA 00-705 **IC:** -	**FCC:** Section15.247(a)(1)(iii) **IC:** RSS-247 5.1 (d)		Complied	Conducted
Dwell time	**FCC:** FCC Public Notice DA 00-705 **IC:** -	**FCC:** Section15.247(a)(1)(iii) **IC:** RSS-247 5.1 (d)		Complied	Conducted
Maximum Peak Output Power	**FCC:** FCC Public Notice DA 00-705 **IC:** RSS-Gen 6.12	**FCC:** Section15.247(a)(b)(1) **IC:** RSS-247 5.4 (b)		Complied	Conducted
Spurious Emission & Band Edge Compliance	**FCC:** FCC Public Notice DA 00-705 **IC:** RSS-Gen 6.13	**FCC:** Section15.247(d) **IC:** RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10	1.3 dB 8236.800 MHz, AV, Horizontal Tx 915.2 MHz SYSFCSAXY-WX, 7420.800 MHz, AV Horizontal Tx 927.6 MHz SYSFESAXY-WX	Complied#	Conducted/ 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).

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

FCC Part 15.203 Antenna requirement

The pattern antenna is not removable from the EUT.
The EUT has a unique coupling/antenna connector (U.FL) for Dipole antenna.
Therefore the equipment complies with the requirement.

3.3 Addition to standard

Item	Test Procedure	Specification	Worst margin	Results	Remarks
99% Occupied Bandwidth	**IC:** RSS-Gen 6.6	**IC:** -	N/A	Complied	Conducted

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

3.4 Uncertainty

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	No. 4 SAC / SR	No. 5,6,8 SR
Conducted emission (AC Mains) LISN	150 kHz-30 MHz	2.5 dB	2.5 dB	2.5 dB	2.6 dB	2.6 dB
Radiated emission (Measurement distance: 3 m)	9 kHz-30 MHz	3.2 dB	3.2 dB	3.3 dB	-	-
	30 MHz-200 MHz	4.9 dB	4.8 dB	4.9 dB	-	-
	200 MHz-1 GHz	6.1 dB	6.1 dB	6.1 dB	-	-
	1 GHz-6 GHz	4.7 dB	4.7 dB	4.7 dB	-	-
	6 GHz-18 GHz	5.3 dB	5.3 dB	5.3 dB	-	-
	18 GHz-40 GHz	5.6 dB	5.6 dB	5.6 dB	-	-
Radiated emission (Measurement distance: 1 m)	1 GHz-18 GHz	5.6 dB	5.6 dB	5.6 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
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

UL Japan, Inc. Shonan EMC Lab.
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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)

Transmitting (Tx), Payload: PN9

Details of Operating Mode(s)

Test Item	Mode	Tested frequency
Conducted Emission, Spurious Emission (Conducted/Radiated)	Tx (Hopping Off) 200 kbps *1)	902.4 MHz 915.2 MHz 927.6 MHz
Carrier Frequency Separation	Tx (Hopping On) 150 kbps, 200 kbps	902.4 MHz 915.2 MHz 927.6 MHz
20dB Bandwidth	Tx (Hopping Off) 150 kbps, 200 kbps	902.4 MHz 915.2 MHz 927.6 MHz
Number of Hopping Frequency	Tx (Hopping On) 150 kbps, 200 kbps	-
Dwell time	Tx (Hopping On) 150 kbps, 200 kbps	-
Maximum Peak Output Power	Tx (Hopping Off) 150 kbps, 200 kbps	902.4 MHz 915.2 MHz 927.6 MHz
Band Edge Compliance (Conducted)	150 kbps, 200 kbps -Hopping On -Hopping Off	902.4 MHz 927.6 MHz
99% Occupied Bandwidth	Tx (Hopping On) 150 kbps, 200 kbps Tx (Hopping Off) 150 kbps, 200 kbps	902.4 MHz 915.2 MHz 927.6 MHz

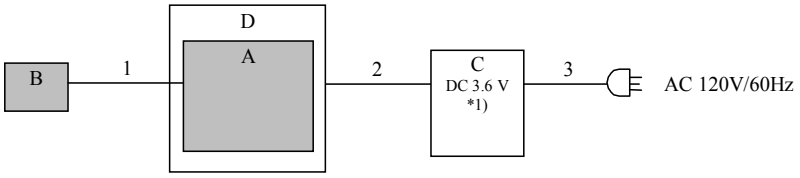
*1) Spurious measurement was performed at 200 kbps. Because 200 kbps is the worst mode of power.

*EUT has the power settings by the software as follows;
Power settings: 6e
Software: RF.caribrator.exe, Ver. 1.0.0.0

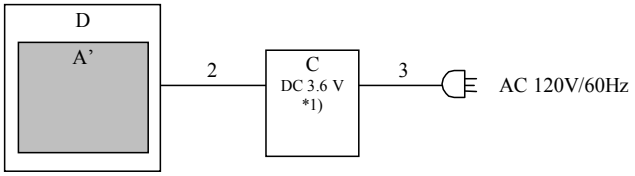
*This setting of software is the worst case.
Any conditions under the normal use do not exceed the condition of setting.
In addition, end users cannot change the settings of the output power of the product.

4.2 Configuration and peripherals

Dipole antenna



PCB antenna



* Cabling and setup(s) were taken into consideration and test data was taken under worse case conditions.
*1) The test was carried out in the worst case DC 3.6 V.

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Wi-SUN FAN Transceiver / ANT Module	SYSFESAXY-WX	F9-15-C3-05-12-EA-00-01 *2)	TAIYO YUDEN CO.,LTD.	EUT
A'	Wi-SUN FAN Transceiver / ANT Module	SYSFCSAXY-WX	F9-15-C3-05-12-BA-00-01 *3)	TAIYO YUDEN CO.,LTD.	EUT
B	Dipole Antenna	MEGHS-1551ULAX-920H015	-	TAIYO YUDEN CO.,LTD.	EUT
C	DC power supply	PAN35-10A	NA000955	Kikusui Corp	-
D	Jig board	-	-	-	*4)

*2) Used for Antenna Terminal conducted test, Conducted Emission test and Radiated Emission test
*3) Used for Conducted Emission test and Radiated Emission test
*4) Using this item does not affect the test result.

List of cables used

No.	Cable Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	Antenna Cable	0.15	Shielded	Shielded	-
2	DC	2.5	Unshielded	Unshielded	-
3	AC	1.5	Unshielded	Unshielded	-

SECTION 5: Conducted Emission

Test Procedure and conditions

EUT was placed on a platform of nominal size, 1.0 m by 1.5 m, raised 0.8 m above the conducting ground plane. The table is made of Styrofoam and covered with polyvinyl chloride. That has very low permittivity.

The rear of tabletop was located 40 cm to the vertical conducting plane. The rear of EUT, including peripherals aligned and flushed with rear of tabletop. All other surfaces of tabletop were at least 80 cm from any other grounded conducting surface. EUT was located 80 cm from a Line Impedance Stabilization Network (LISN) / Artificial mains Network (AMN) and excess AC cable was bundled in center.

I/O cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30 cm to 40 cm long and were hanged at a 40 cm height to the ground plane.

The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT in a shielded room.
The EUT was connected to a LISN (AMN) via DC power supply.
An overview sweep with peak detection has been performed.

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

Detector : QP and CISPR AV
Measurement range : 0.15 MHz - 30 MHz
Test data : APPENDIX
Test result : Pass

SECTION 6: Radiated Spurious Emission

Test Procedure

[For below 1 GHz]
EUT was placed on a platform of nominal size, 1.0 m by 1.5 m, raised 0.8 m above the conducting ground plane.
The table is made of expanded polystyrol and expanded polypropylene and the table top is covered with polycarbonate. That has very low permittivity. 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 m 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
Test Distance	3 m	3.95 m *2) (1 GHz – 10 GHz)		3.95 m *2) (1 GHz – 10 GHz)

*1) Although DA 00-705 accepts VBW = 10 Hz for AV measurements, it was confirmed that superfluous smoothing was not performed.
*2) Distance Factor: 20 x log (3.95 m/3.0 m) = 2.39 dB

The carrier level and noise levels were confirmed at each position of X, Y and Z axes of EUT to see the position of maximum noise, and the test was made at the position that has the maximum noise.

	Carrier (Band edge)	Spurious	
		30 MHz-1 GHz	1 GHz -10 GHz
SYSFCSAXY-WX			
Horizontal	X	X	Z
Vertical	Z	Z	Z
SYSFESAXY-WX			
Module			
Horizontal	Z	Z	Z
Vertical	Z	Z	Z
Antenna			
Horizontal	X	X	Y
Vertical	Y	Y	X

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

Measurement range : 30 MHz - 10 GHz
Test data : APPENDIX
Test result : Pass

SECTION 7: 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	500 kHz (150kbps) 700 kHz (200k bps)	2 kHz (150 kbps) 3 kHz (200kbps)	6.2 kHz (150 kbps) 9.1 kHz (200 kbps)	Auto	Peak	Max Hold	Spectrum Analyzer
99% Occupied Bandwidth *1)	Enough width to displa emission skirts	1 to 5 % of OBW	Three times of RBW	Auto	Peak	Max Hold *1)	Spectrum Analyzer
Maximum Peak Output Power	-	-	-	Auto	Peak Average *2)	-	Power Meter (Sensor: 50MHz BW)
Carrier Frequency Separation	1.2 MHz	12 kHz	36 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
Number of Hopping Frequency	30 MHz	300 kHz	910 kHz	Auto	Peak	Max Hold	Spectrum Analyzer
Dwell Time *3)	Zero Span	390 kHz	1.2 MHz	As necessary capture the entire dwell time per hopping channel	Peak	Clear Write	Spectrum Analyzer
Conducted Spurious Emission *4)	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 10 GHz	100 kHz	300 kHz				
Conducted Spurious Emission Band Edge compliance	5 MHz	100 kHz	300 kHz	Auto	Peak	Max Hold	Spectrum Analyzer

*1) Peak hold was applied as Worst-case measurement.
*2) Reference data
*3) The test was not performed at RBW:1 MHz because the setting value with RBW:1 MHz detects adjacent channel hopping.
*4) In the frequency range below 30MHz, 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.

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

Test data : APPENDIX
Test result : Pass

APPENDIX 1: Test data

Conducted Emission

DATA OF CONDUCTED EMISSION TEST

UL Japan,Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2018/05/26

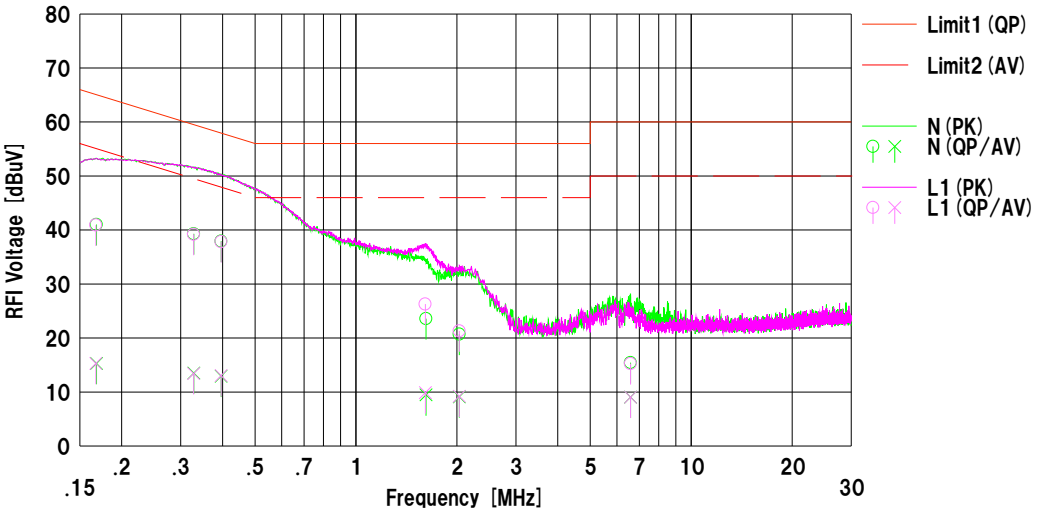
Mode : Tx 902.400 MHz

Model No. : SYSFCSAXY-WX
Serial No. : Refer to Section 4.2
Remarks : -

Power : DC 3.6 V
Temp./Humi. : 25 deg.C / 51 %RH

Limit1 : FCC 15C (15.207) QP
Limit2 : FCC 15C (15.207) AV

Engineer : Yosuke Ishikawa



No.	Freq.	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		<QP>	<AV>		<QP>	<AV>	<QP>	<AV>	<QP>	<AV>		
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.16825	28.60	2.90	12.40	41.00	15.30	65.05	55.05	24.0	39.7	N	
2	0.32827	26.90	1.10	12.41	39.31	13.51	59.49	49.49	20.1	35.9	N	
3	0.39609	25.50	0.50	12.43	37.93	12.93	57.93	47.93	20.0	35.0	N	
4	1.61874	11.10	-3.00	12.48	23.58	9.48	56.00	46.00	32.4	36.5	N	
5	2.03534	8.20	-3.40	12.51	20.71	9.11	56.00	46.00	35.2	36.8	N	
6	6.59232	2.70	-3.70	12.75	15.45	9.05	60.00	50.00	44.5	40.9	N	
7	0.16756	28.50	2.90	12.40	40.90	15.30	65.08	55.08	24.1	39.7	L1	
8	0.32798	26.80	1.00	12.41	39.21	13.41	59.50	49.50	20.2	36.0	L1	
9	0.39609	25.40	0.60	12.43	37.83	13.03	57.93	47.93	20.1	34.9	L1	
10	1.60988	13.80	-2.60	12.48	26.28	9.88	56.00	46.00	29.7	36.1	L1	
11	2.03532	8.80	-3.30	12.51	21.31	9.21	56.00	46.00	34.6	36.7	L1	
12	6.59232	2.50	-3.70	12.75	15.25	9.05	60.00	50.00	44.7	40.9	L1	

Calculation:Result [dBuV] =Reading [dBuV] +C.Fac (LISN (AMN) +Cable+ATT) [dB]
LISN (AMN) : SLS-05

Conducted Emission

DATA OF CONDUCTED EMISSION TEST

UL Japan,Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2018/05/26

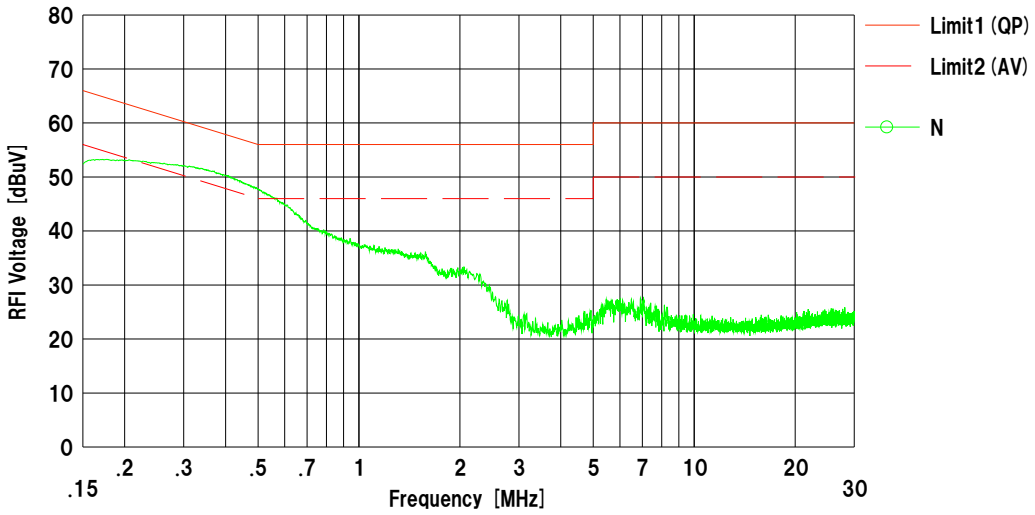
Mode : Tx 915.200 MHz

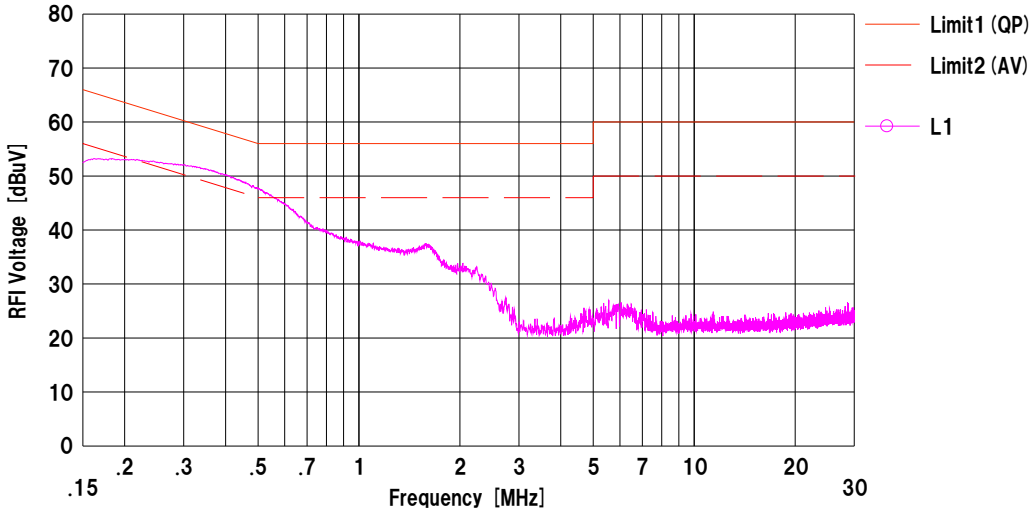
Model No. : SYSFCSAXY-WX
Serial No. : Refer to Section 4.2
Remarks : -

Power : DC 3.6 V
Temp./Humi. : 25 deg.C / 51 %RH

Limit1 : FCC 15C (15.207) QP
Limit2 : FCC 15C (15.207) AV

Engineer : Yosuke Ishikawa





Calculation:Result [dBuV] =Reading [dBuV] +C.Fac (LISN (AMN) +Cable+ATT) [dB]
LISN (AMN) : SLS-05

Conducted Emission

DATA OF CONDUCTED EMISSION TEST

UL Japan,Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2018/05/26

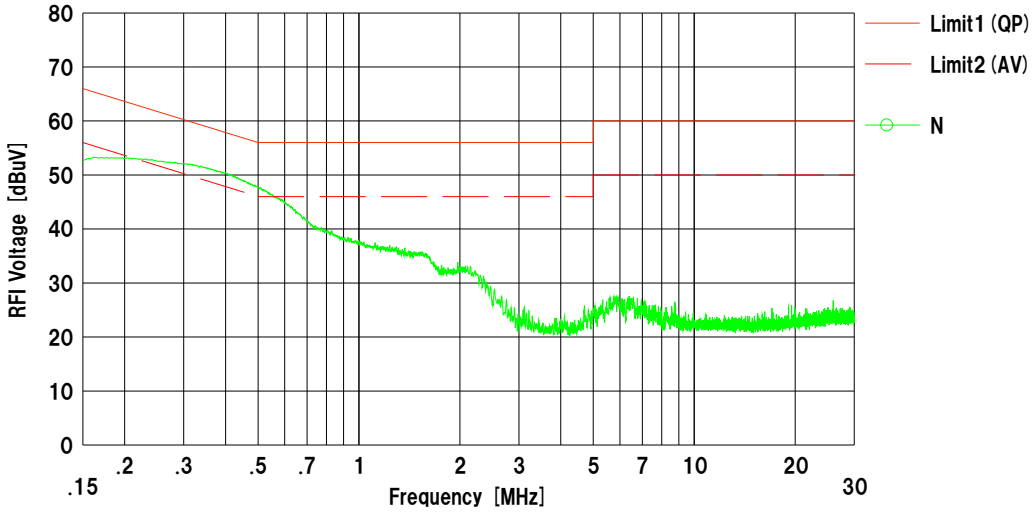
Mode : Tx 927.600 MHz

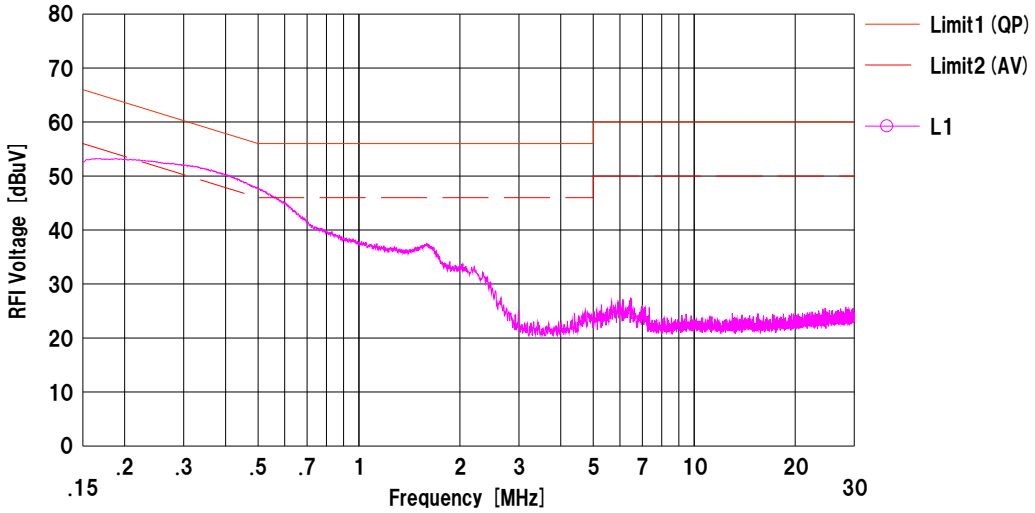
Model No. : SYSFCSAXY-WX
Serial No. : Refer to Section 4.2
Remarks : -

Power : DC 3.6 V
Temp./Humi. : 25 deg.C / 51 %RH

Limit1 : FCC 15C (15.207) QP
Limit2 : FCC 15C (15.207) AV

Engineer : Yosuke Ishikawa





Calculation:Result [dBuV] =Reading [dBuV] +C.Fac (LISN (AMN) +Cable+ATT) [dB]
LISN (AMN) : SLS-05

Conducted Emission

DATA OF CONDUCTED EMISSION TEST

UL Japan,Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2018/05/26

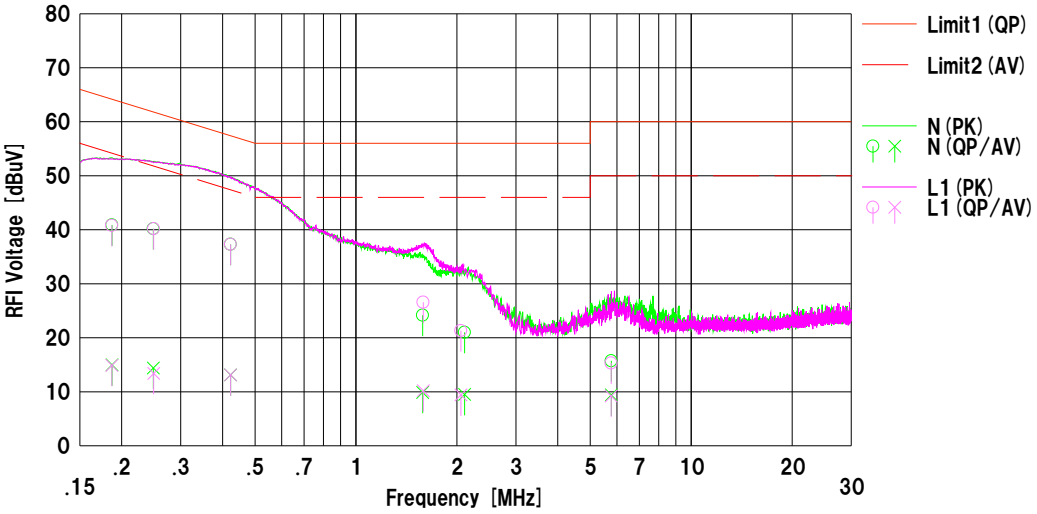
Mode : Tx 902.400 MHz

Model No. : SYSFESAXY-WX
Serial No. : Refer to Section 4.2
Remarks : -

Power : DC 3.6 V
Temp./Humi. : 25 deg.C / 51 %RH

Limit1 : FCC 15C (15.207) QP
Limit2 : FCC 15C (15.207) AV

Engineer : Yosuke Ishikawa



No.	Freq.	Reading		C.Fac	Results		Limit		Margin		Phase	Comment
		<QP>	<AV>		<QP>	<AV>	<QP>	<AV>	<QP>	<AV>		
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.18724	28.50	2.60	12.39	40.89	14.99	64.16	54.16	23.2	39.1	N	
2	0.24853	27.80	2.00	12.40	40.20	14.40	61.81	51.81	21.6	37.4	N	
3	0.42264	24.90	0.70	12.42	37.32	13.12	57.40	47.40	20.0	34.2	N	
4	1.58154	11.70	-2.60	12.48	24.18	9.88	56.00	46.00	31.8	36.1	N	
5	2.10846	8.50	-3.00	12.51	21.01	9.51	56.00	46.00	34.9	36.4	N	
6	5.77450	3.00	-3.30	12.71	15.71	9.41	60.00	50.00	44.2	40.5	N	
7	0.18700	28.40	2.50	12.39	40.79	14.89	64.17	54.17	23.3	39.2	L1	
8	0.24928	27.80	1.00	12.40	40.20	13.40	61.78	51.78	21.5	38.3	L1	
9	0.42270	24.90	0.70	12.42	37.32	13.12	57.39	47.39	20.0	34.2	L1	
10	1.58718	14.10	-2.30	12.48	26.58	10.18	56.00	46.00	29.4	35.8	L1	
11	2.05629	8.80	-3.10	12.51	21.31	9.41	56.00	46.00	34.6	36.5	L1	
12	5.77214	2.60	-3.50	12.71	15.31	9.21	60.00	50.00	44.6	40.7	L1	

Calculation:Result [dBuV] =Reading [dBuV] +C.Fac (LISN (AMN) +Cable+ATT) [dB]
LISN (AMN) : SLS-05

Conducted Emission

DATA OF CONDUCTED EMISSION TEST

UL Japan,Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2018/05/26

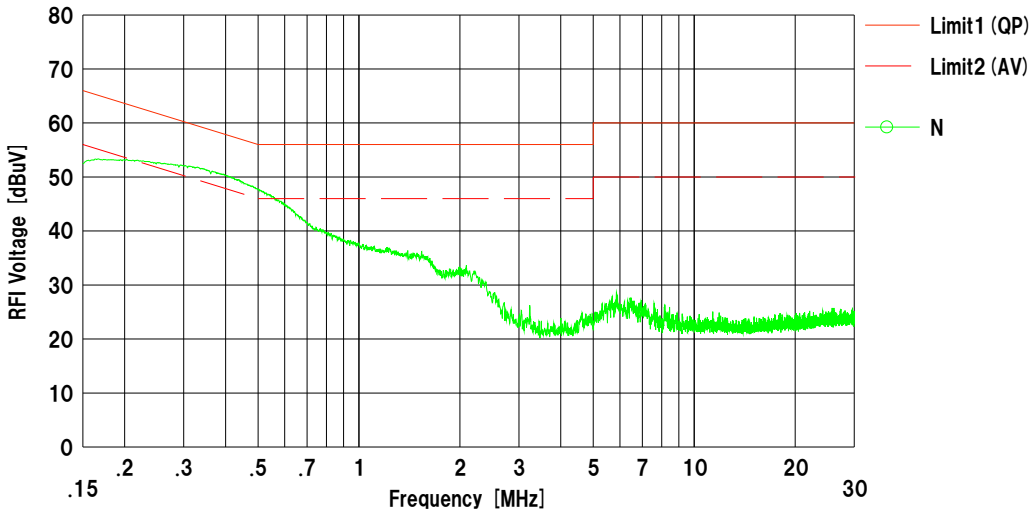
Mode : Tx 915.200 MHz

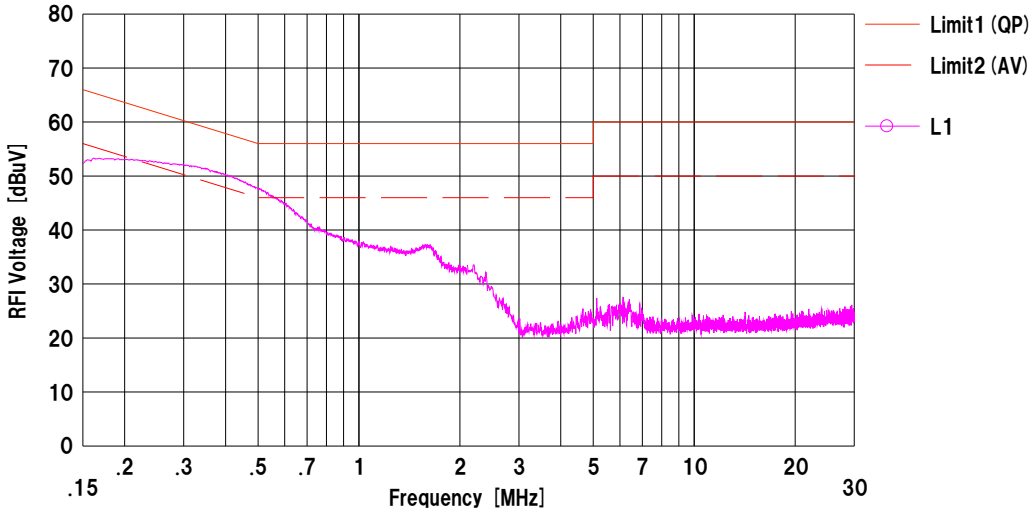
Model No. : SYSFESAXY-WX
Serial No. : Refer to Section 4.2
Remarks : -

Power : DC 3.6 V
Temp./Humi. : 25 deg.C / 51 %RH

Limit1 : FCC 15C (15.207) QP
Limit2 : FCC 15C (15.207) AV

Engineer : Yosuke Ishikawa





Calculation:Result [dBuV] =Reading [dBuV] +C.Fac (LISN (AMN) +Cable+ATT) [dB]
LISN (AMN) : SLS-05

Conducted Emission

DATA OF CONDUCTED EMISSION TEST

UL Japan,Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2018/05/26

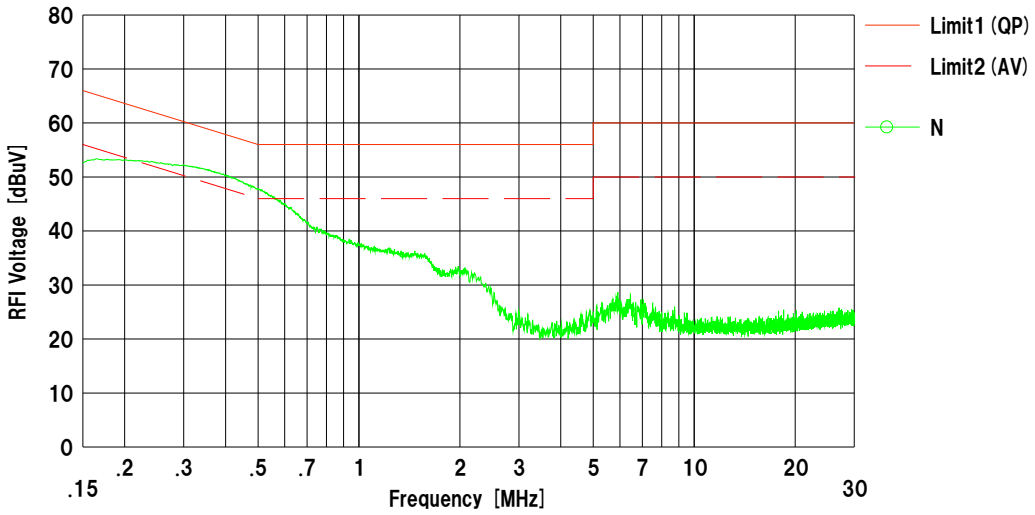
Mode : Tx 927.600 MHz

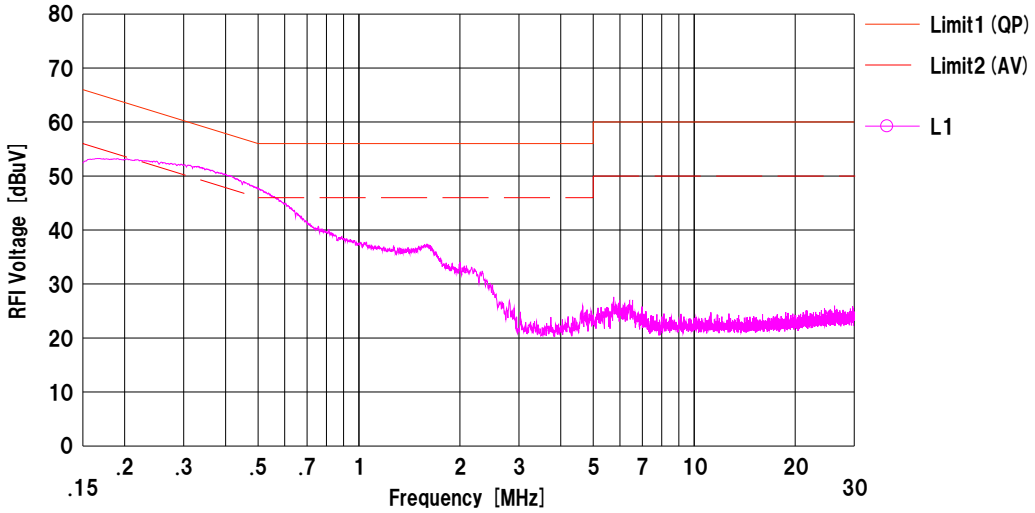
Model No. : SYSFESAXY-WX
Serial No. : Refer to Section 4.2
Remarks : -

Power : DC 3.6 V
Temp./Humi. : 25 deg.C / 51 %RH

Limit1 : FCC 15C (15.207) QP
Limit2 : FCC 15C (15.207) AV

Engineer : Yosuke Ishikawa





Calculation:Result [dBuV] =Reading [dBuV] +C.Fac (LISN (AMN) +Cable+ATT) [dB]
LISN (AMN) : SLS-05

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

Report No.	12261916S-R2
Test place	Shonan EMC Lab. No.1 Measurement Room
Date	May 15, 2018
Temperature / Humidity	24 deg. C / 40 % RH
Engineer	Yosuke Ishikawa
Mode	Tx, Hopping Off, Tx, Hopping On

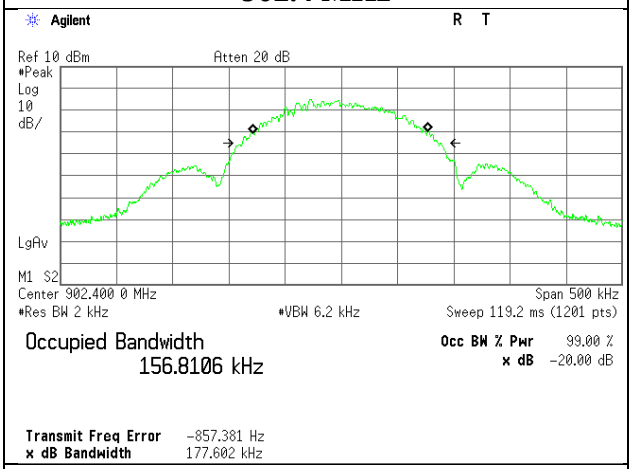
Mode	Freq. [MHz]	20dB Bandwidth [kHz]	Limit for 20dB Bandwidth [kHz]	99% Occupied Bandwidth [kHz]	Carrier Frequency Separation [kHz]	Limit for Carrier Frequency separation [kHz]
150 kbps	902.4	177.602	500.000	156.8106	400.000	>= 177.602
150 kbps	915.2	177.510	500.000	156.6931	400.000	>= 177.510
150 kbps	927.6	177.269	500.000	156.4809	400.000	>= 177.269
150 kbps	Hopping On	-	-	25679.5	-	-
200 kbps	902.4	231.106	500.000	208.1831	400.000	>= 231.106
200 kbps	915.2	232.870	500.000	208.1952	400.000	>= 232.870
200 kbps	927.6	233.037	500.000	207.9209	400.000	>= 233.037
200 kbps	Hopping On	-	-	25681.8	-	-

Separation Limit: 20dB Bandwidth or 25kHz (whichever is greater).

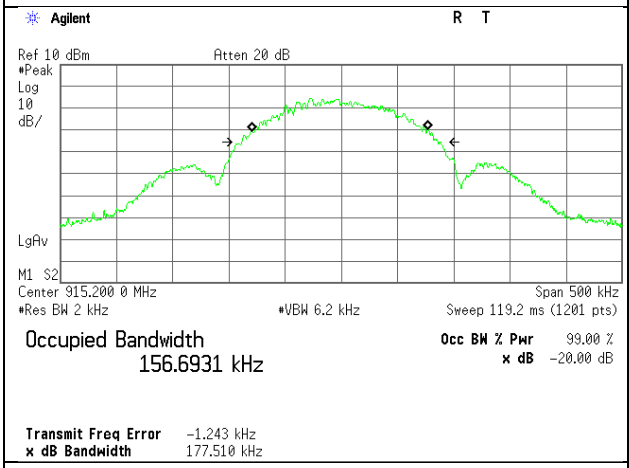
20dB Bandwidth and 99% Occupied Bandwidth

150 kbps

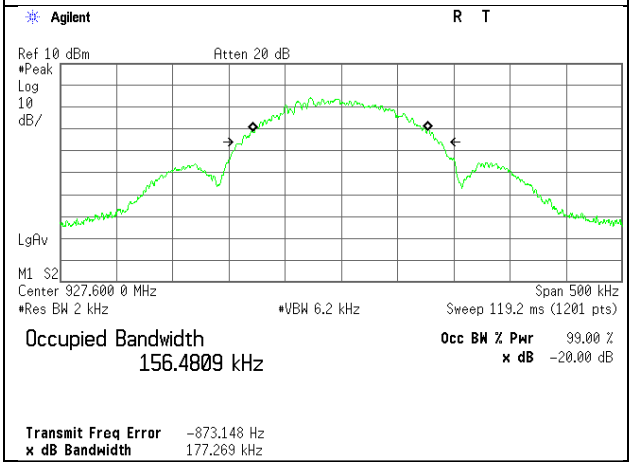
902.4 MHz



915.2 MHz

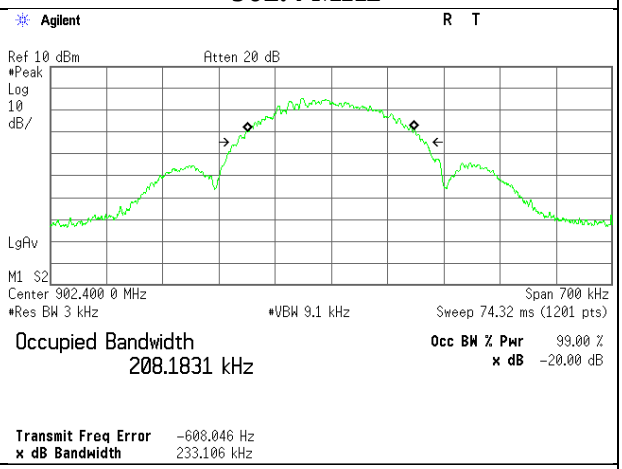


927.6 MHz

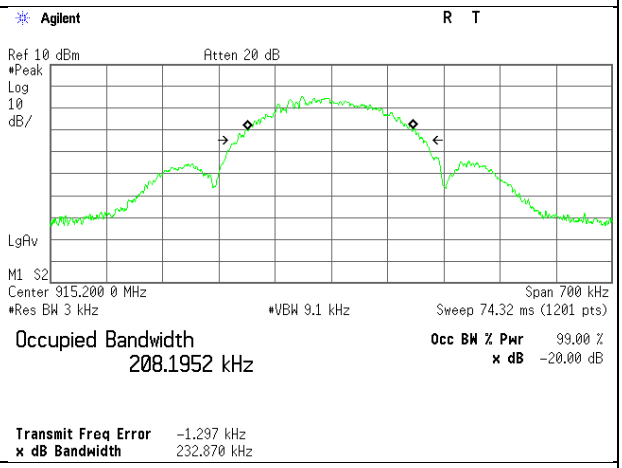


200 kbps

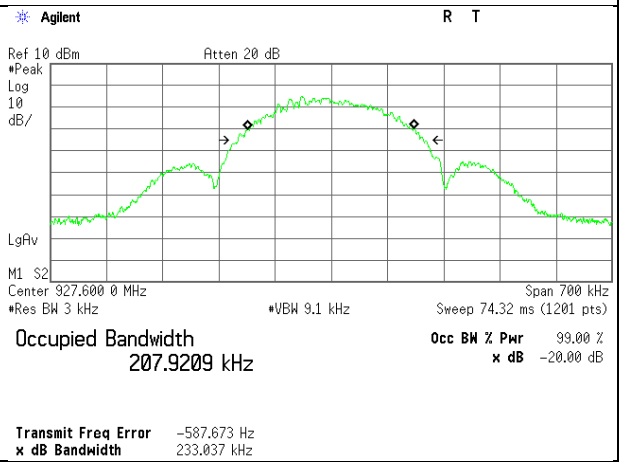
902.4 MHz



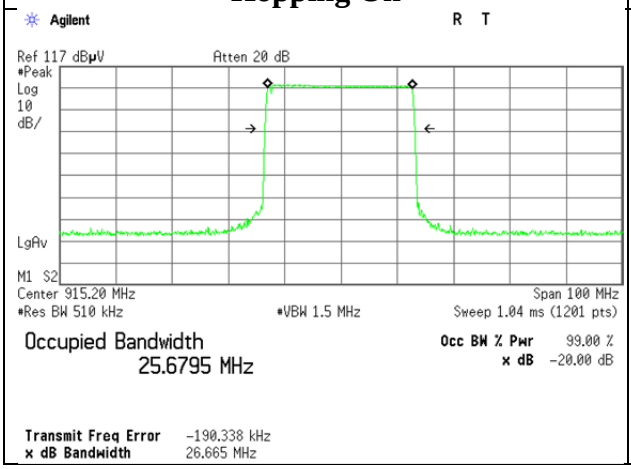
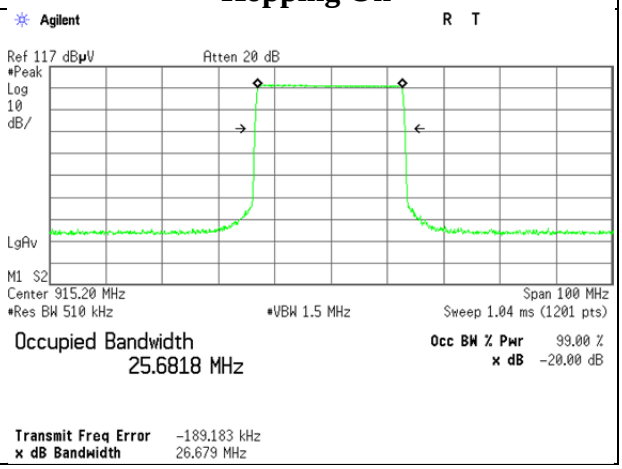
915.2 MHz



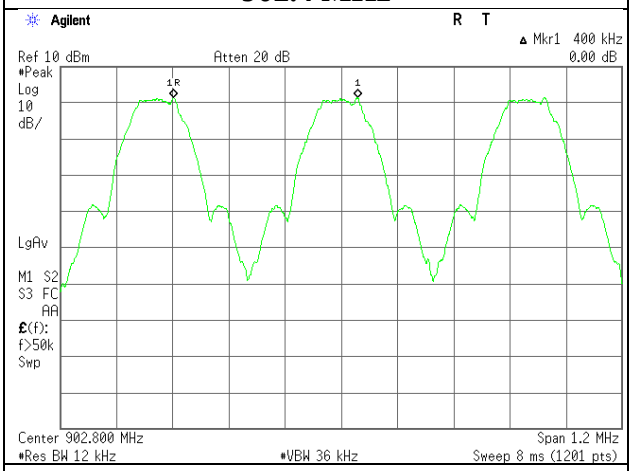
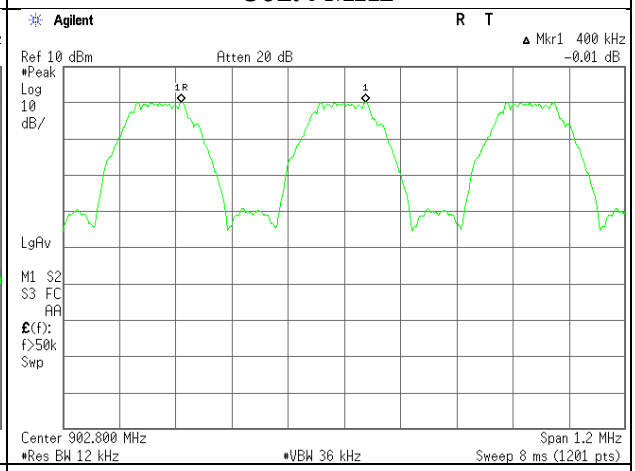
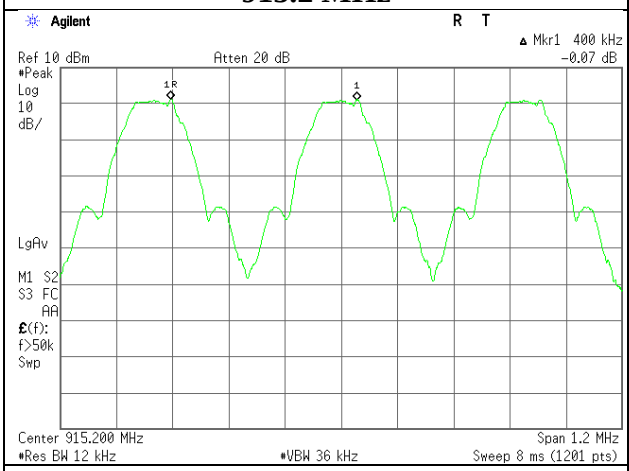
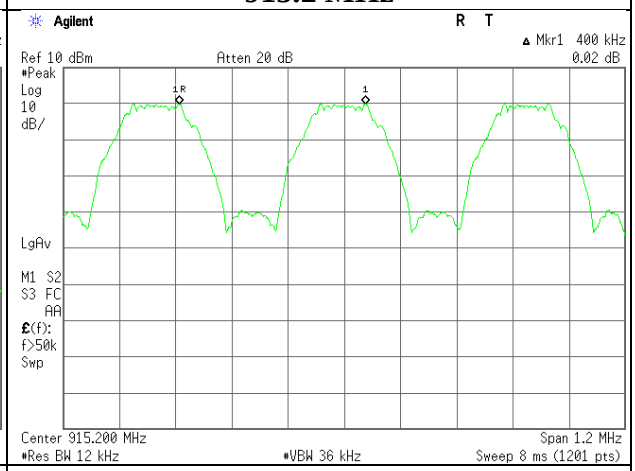
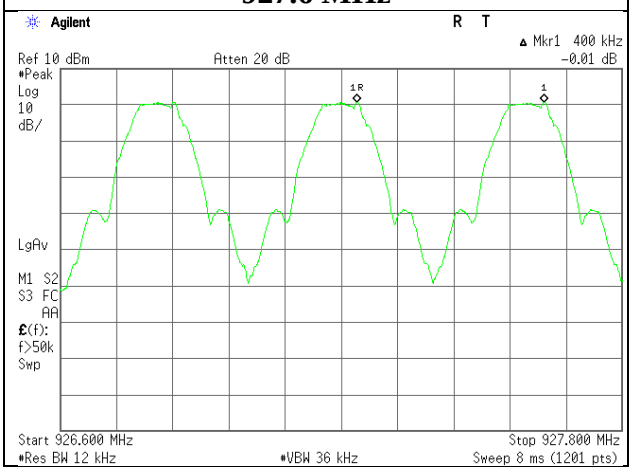
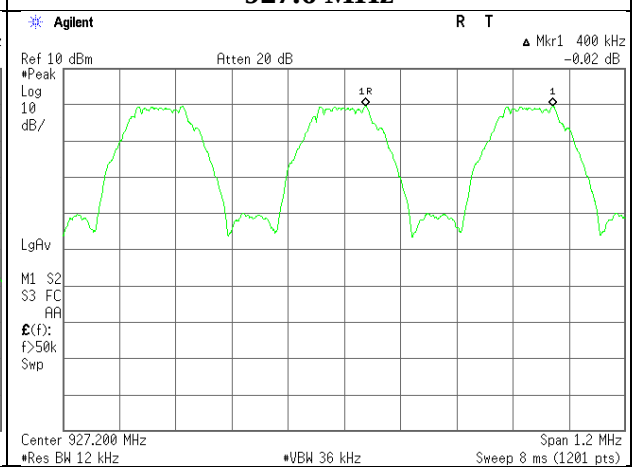
927.6 MHz



99% Occupied Bandwidth

150 kbps	200 kbps
Hopping On	**Hopping On**
	

Carrier Frequency Separation

150 kbps	200 kbps
902.4 MHz	**902.4 MHz**
	
915.2 MHz	**915.2 MHz**
	
927.6 MHz	**927.6 MHz**
	

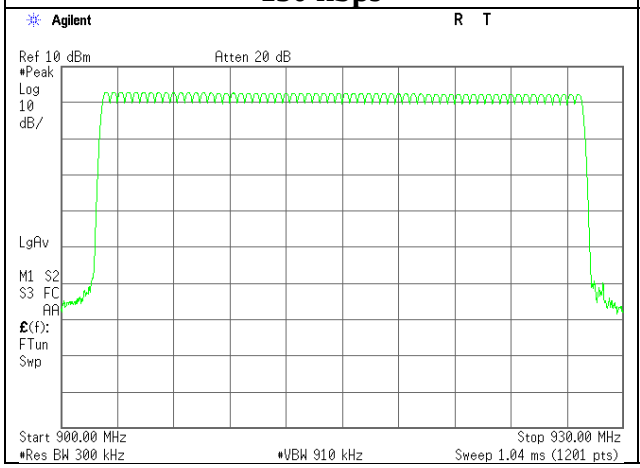
Number of Hopping Frequency

Report No.	12261916S-R2
Test place	Shonan EMC Lab. No.1 Measurement Room
Date	May 15, 2018
Temperature / Humidity	24 deg. C / 40 % RH
Engineer	Yosuke Ishikawa
Mode	Tx, Hopping On

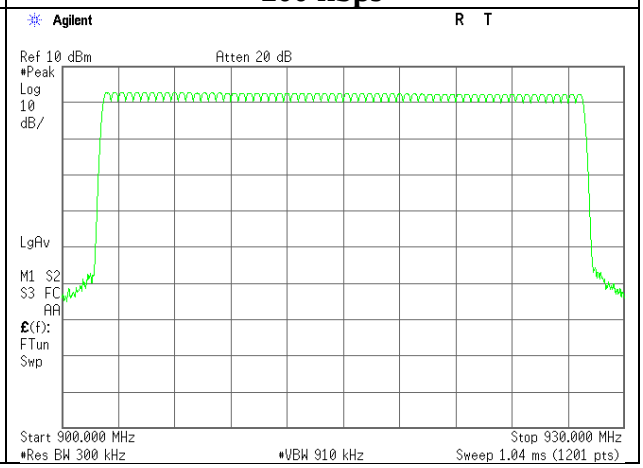
Mode	Number of channel [channels]	Limit [channels]
150 kbps	64	>= 50
200 kbps	64	>= 50

Limit for 20 dB bandwidth which is less than 250 kHz

150 kbps



200 kbps



Dwell time

Report No.	12261916S-R2
Test place	Shonan EMC Lab. No.1 Measurement Room
Date	May 15, 2018
Temperature / Humidity	24 deg. C / 40 % RH
Engineer	Yosuke Ishikawa
Mode	Tx, Hopping On

Mode	Number of transmission	Length of transmission [msec]	Result [msec]	Limit [msec]
150 kbps	1.2 times / 100 sec. x 20.0 sec. = 1 times	254.4	254.4	400
200 kbps	1.6 times / 100 sec. x 20.0 sec. = 1 times	254.4	254.4	400

Sample Calculation
Result = Number of transmission x Length of transmission
Limit for 20 dB bandwidth which is less than 250 kHz

*Average data of 5 tests.(except Inquiry)

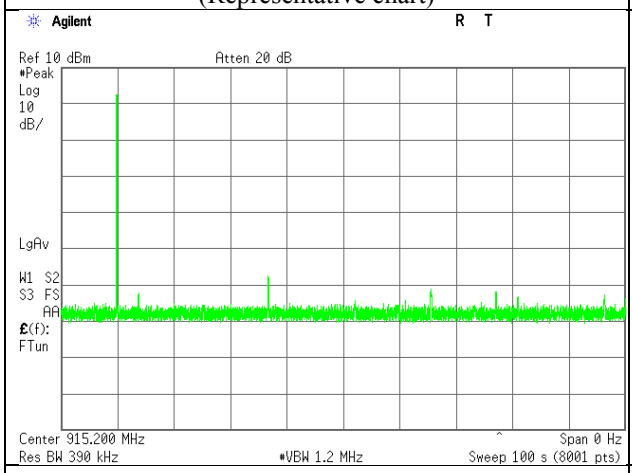
Mode	Sampling [times]					Average [times]
	1	2	3	4	5	
150 kbps	1	1	1	1	2	1.2
200 kbps	1	3	1	2	1	1.6

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

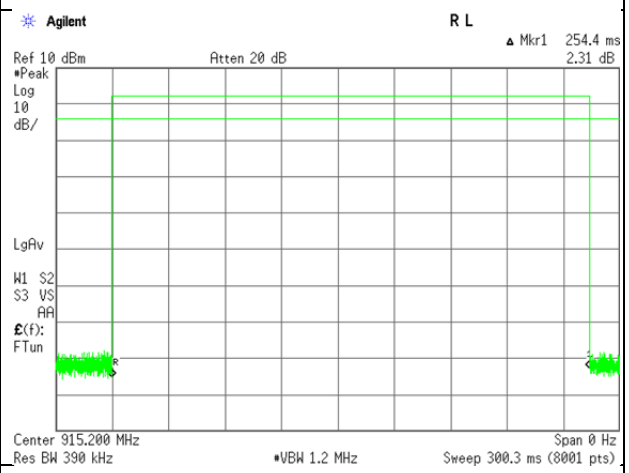
Dwell time

150 kbps (1/2)

(Representative chart)

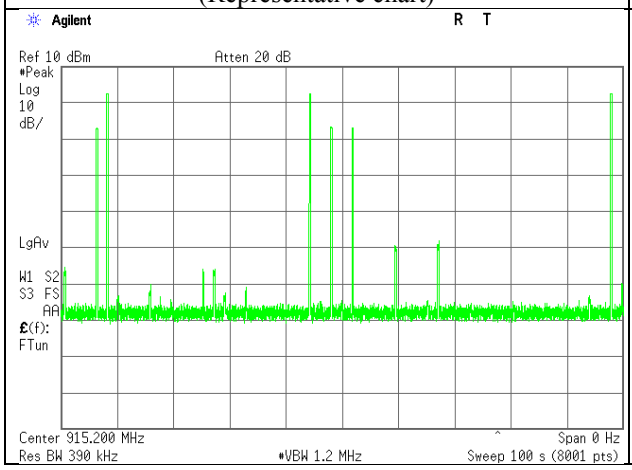


150 kbps (2/2)

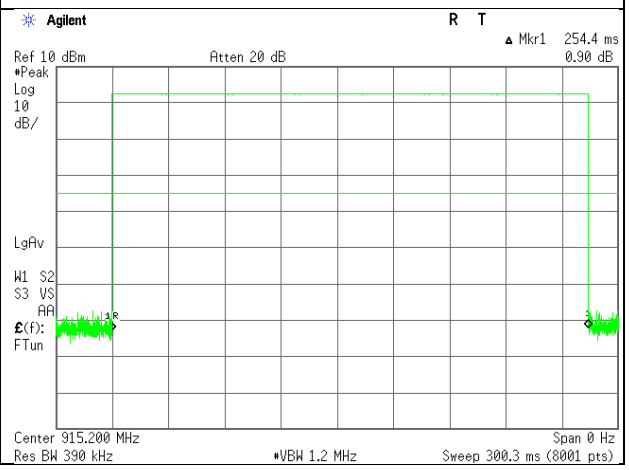


200 kbps (1/2)

(Representative chart)



200 kbps (2/2)



Maximum Peak Output Power

Report No.	12261916S-R2
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	May 25, 2018
Temperature / Humidity	25 deg. C / 55 % RH
Engineer	Makoto Hosaka
Mode	Tx, Hopping Off

Dipole antenna gain: 2.00 dBi

Mode	Freq.	Reading	Cable Loss	Atten. Loss	Conducted Power Result		Conducted Power Limit		Conducted Power Margin	e.i.r.p. Antenna Gain	e.i.r.p. Result		e.i.r.p. Limit		e.i.r.p. Margin
	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]	[dBi]	[dBm]	[mW]	[dBm]	[mW]	[dB]
150 kbps	902.4	1.21	0.68	10.15	12.04	16.00	30.00	1000	17.96	2.00	14.04	25.35	36.02	4000	21.98
150 kbps	915.2	1.07	0.70	10.15	11.92	15.56	30.00	1000	18.08	2.00	13.92	24.66	36.02	4000	22.10
150 kbps	927.6	0.86	0.70	10.15	11.71	14.83	30.00	1000	18.29	2.00	13.71	23.50	36.02	4000	22.31
200 kbps	902.4	1.21	0.68	10.15	12.04	16.00	30.00	1000	17.96	2.00	14.04	25.35	36.02	4000	21.98
200 kbps	915.2	1.08	0.70	10.15	11.93	15.60	30.00	1000	18.07	2.00	13.93	24.72	36.02	4000	22.09
200 kbps	927.6	0.87	0.70	10.15	11.72	14.86	30.00	1000	18.28	2.00	13.72	23.55	36.02	4000	22.30

Sample Calculation:
Result = Reading + Cable Loss + Attenuator Loss
e.i.r.p. Result = Conducted Power Result + Antenna Gain

PCB antenna gain: -0.80 dBi

Mode	Freq.	Reading	Cable Loss	Atten. Loss	Conducted Power Result		Conducted Power Limit		Conducted Power Margin	e.i.r.p. Antenna Gain	e.i.r.p. Result		e.i.r.p. Limit		e.i.r.p. Margin
	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dBm]	[mW]	[dB]	[dBi]	[dBm]	[mW]	[dBm]	[mW]	[dB]
150 kbps	902.4	1.21	0.68	10.15	12.04	16.00	30.00	1000	17.96	-0.80	11.24	13.30	36.02	4000	24.78
150 kbps	915.2	1.07	0.70	10.15	11.92	15.56	30.00	1000	18.08	-0.80	11.12	12.94	36.02	4000	24.90
150 kbps	927.6	0.86	0.70	10.15	11.71	14.83	30.00	1000	18.29	-0.80	10.91	12.33	36.02	4000	25.11
200 kbps	902.4	1.21	0.68	10.15	12.04	16.00	30.00	1000	17.96	-0.80	11.24	13.30	36.02	4000	24.78
200 kbps	915.2	1.08	0.70	10.15	11.93	15.60	30.00	1000	18.07	-0.80	11.13	12.97	36.02	4000	24.89
200 kbps	927.6	0.87	0.70	10.15	11.72	14.86	30.00	1000	18.28	-0.80	10.92	12.36	36.02	4000	25.10

Sample Calculation:
Result = Reading + Cable Loss + Attenuator Loss
e.i.r.p. Result = Conducted Power Result + Antenna Gain

Average Output Power
(Reference data for RF Exposure)

Report No.	12261916S-R2
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	May 25, 2018
Temperature / Humidity	25 deg. C / 55 % RH
Engineer	Makoto Hosaka
Mode	Tx, Hopping Off

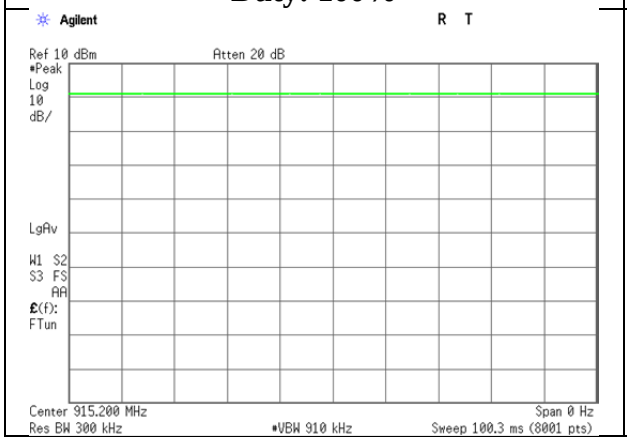
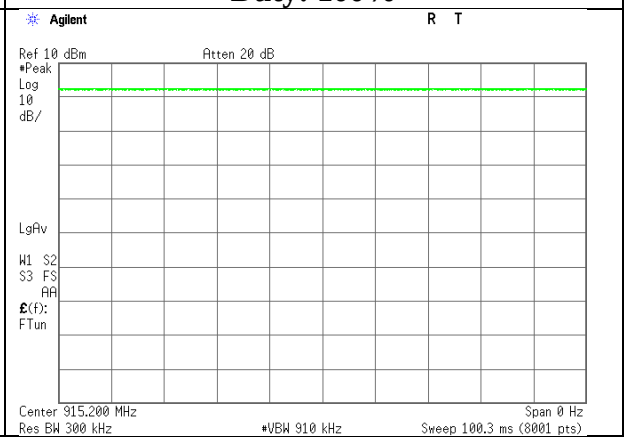
Mode	Freq.	Reading	Cable Loss	Atten. Loss	Result (Time average)		Duty factor	Result (Burst power average)	
	[MHz]	[dBm]	[dB]	[dB]	[dBm]	[mW]	[dB]	[dBm]	[mW]
150 kbps	902.4	1.15	0.68	10.15	11.98	15.78	0.00	11.98	15.78
150 kbps	915.2	1.01	0.70	10.15	11.86	15.35	0.00	11.86	15.35
150 kbps	927.6	0.80	0.70	10.15	11.65	14.62	0.00	11.65	14.62
200 kbps	902.4	1.15	0.68	10.15	11.98	15.78	0.00	11.98	15.78
200 kbps	915.2	1.02	0.70	10.15	11.87	15.38	0.00	11.87	15.38
200 kbps	927.6	0.80	0.70	10.15	11.65	14.62	0.00	11.65	14.62

Sample Calculation:
Result (Time average) = Reading + Cable Loss + 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.	12261916S-R2
Test place	Shonan EMC Lab. No.1 Measurement Room
Date	May 15, 2018
Temperature / Humidity	24 deg. C / 40 % RH
Engineer	Yosuke Ishikawa
Mode	Tx, Hopping Off

150 kbps	200 kbps
Duty: 100%	Duty: 100%
	

Radiated Spurious Emission

Report No.	12261916S-R2	
Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	No.3	No.3
Date	May 24, 2018	May 24, 2018
Temperature / Humidity	24 deg. C / 57 % RH	25 deg. C / 50 % RH
Engineer	Shiro Kobayashi	Kazuya Noda
	(1 GHz -10 GHz)	(30 MHz - 1000 MHz)
Mode	Tx, Hopping Off, 902.4 MHz (Model No. SYSFCSAXY-WX)	

(* 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.	192.000	QP	21.50	16.16	8.03	32.08	0.00	13.61	43.50	29.8	100	0	
Hori.	225.600	QP	21.64	11.55	8.39	32.04	0.00	9.54	46.00	36.4	100	0	
Hori.	451.200	QP	21.66	16.45	9.65	31.97	0.00	15.79	46.00	30.2	100	0	
Hori.	614.000	QP	20.79	19.09	10.26	31.96	0.00	18.18	46.00	27.8	100	0	
Hori.	960.000	QP	21.42	22.10	11.49	30.57	0.00	24.44	46.00	21.5	100	6	
Hori.	1804.800	PK	48.15	25.63	4.51	43.94	2.39	36.74	73.90	37.1	150	0	
Hori.	2707.200	PK	48.40	28.07	5.04	44.14	2.39	39.76	73.90	34.1	150	0	
Hori.	3609.600	PK	49.23	29.02	5.62	44.51	2.39	41.75	73.90	32.1	219	2	
Hori.	4512.000	PK	48.94	30.60	6.28	44.34	2.39	43.87	73.90	30.0	150	0	
Hori.	5414.400	PK	49.49	32.12	6.98	44.83	2.39	46.15	73.90	27.7	231	312	
Hori.	6316.800	PK	50.44	34.20	7.59	44.71	2.39	49.91	73.90	23.9	224	350	
Hori.	7219.200	PK	49.25	36.59	8.12	43.99	2.39	52.36	73.90	21.5	218	44	
Hori.	8121.600	PK	53.78	37.76	8.41	44.02	2.39	58.32	73.90	15.5	231	38	
Hori.	9024.000	PK	48.91	38.03	9.02	43.72	2.39	54.63	73.90	19.2	192	45	
Hori.	1804.800	AV	36.43	25.63	4.51	43.94	2.39	25.02	53.90	28.8	150	0	
Hori.	2707.200	AV	36.66	28.07	5.04	44.14	2.39	28.02	53.90	25.8	150	0	
Hori.	3609.600	AV	37.63	29.02	5.62	44.51	2.39	30.15	53.90	23.7	219	2	
Hori.	4512.000	AV	37.17	30.60	6.28	44.34	2.39	32.10	53.90	21.8	150	0	
Hori.	5414.400	AV	39.63	32.12	6.98	44.83	2.39	36.29	53.90	17.6	231	312	
Hori.	6316.800	AV	38.34	34.20	7.59	44.71	2.39	37.81	53.90	16.0	224	350	
Hori.	7219.200	AV	38.33	36.59	8.12	43.99	2.39	41.44	53.90	12.4	218	44	
Hori.	8121.600	AV	45.47	37.76	8.41	44.02	2.39	50.01	53.90	**3.8**	231	38	
Hori.	9024.000	AV	37.64	38.03	9.02	43.72	2.39	43.36	53.90	10.5	192	45	
Vert.	192.000	QP	21.66	16.16	8.03	32.08	0.00	13.77	43.50	29.7	100	0	
Vert.	225.600	QP	21.63	11.55	8.39	32.04	0.00	9.53	46.00	36.4	100	0	
Vert.	451.200	QP	21.61	16.45	9.65	31.97	0.00	15.74	46.00	30.2	100	0	
Vert.	614.000	QP	20.78	19.09	10.26	31.96	0.00	18.17	46.00	27.8	100	0	
Vert.	960.000	QP	21.51	22.10	11.49	30.57	0.00	24.53	46.00	21.4	114	189	
Vert.	1804.800	PK	48.33	25.63	4.51	43.94	2.39	36.92	73.90	36.9	150	0	
Vert.	2707.200	PK	48.71	28.07	5.04	44.14	2.39	40.07	73.90	33.8	150	0	
Vert.	3609.600	PK	49.44	29.02	5.62	44.51	2.39	41.96	73.90	31.9	150	0	
Vert.	4512.000	PK	49.28	30.60	6.28	44.34	2.39	44.21	73.90	29.6	150	0	
Vert.	5414.400	PK	49.89	32.12	6.98	44.83	2.39	46.55	73.90	27.3	243	0	
Vert.	6316.800	PK	49.88	34.20	7.59	44.71	2.39	49.35	73.90	24.5	150	0	
Vert.	7219.200	PK	50.01	36.59	8.12	43.99	2.39	53.12	73.90	20.7	306	3	
Vert.	8121.600	PK	52.74	37.76	8.41	44.02	2.39	57.28	73.90	16.6	310	3	
Vert.	9024.000	PK	48.80	38.03	9.02	43.72	2.39	54.52	73.90	19.3	160	285	
Vert.	1804.800	AV	36.83	25.63	4.51	43.94	2.39	25.42	53.90	28.4	150	0	
Vert.	2707.200	AV	36.54	28.07	5.04	44.14	2.39	27.90	53.90	26.0	150	0	
Vert.	3609.600	AV	37.04	29.02	5.62	44.51	2.39	29.56	53.90	24.3	150	0	
Vert.	4512.000	AV	37.04	30.60	6.28	44.34	2.39	31.97	53.90	21.9	150	0	
Vert.	5414.400	AV	39.97	32.12	6.98	44.83	2.39	36.63	53.90	17.2	243	0	
Vert.	6316.800	AV	37.89	34.20	7.59	44.71	2.39	37.36	53.90	16.5	150	0	
Vert.	7219.200	AV	37.96	36.59	8.12	43.99	2.39	41.07	53.90	12.8	306	3	
Vert.	8121.600	AV	44.24	37.76	8.41	44.02	2.39	48.78	53.90	5.1	310	3	
Vert.	9024.000	AV	36.42	38.03	9.02	43.72	2.39	42.14	53.90	11.7	160	285	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.95 m / 3.0 m) = 2.39 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

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.	902.400	QP	107.64	21.78	11.29	31.07	0.00	109.64	-	-	Carrier
Hori.	902.000	QP	61.65	21.78	11.29	31.07	0.00	63.65	89.64	26.0	
Vert.	902.400	QP	104.57	21.78	11.29	31.07	0.00	106.57	-	-	Carrier
Vert.	902.000	QP	58.85	21.78	11.29	31.07	0.00	60.85	86.57	25.7	

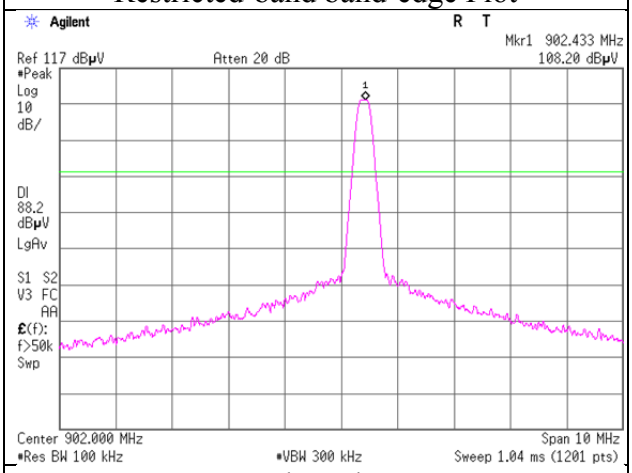
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.95 m / 3.0 m) = 2.39 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	12261916S-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	May 24, 2018
Temperature / Humidity	25 deg. C / 50 % RH
Engineer	Kazuya Noda
	(30 MHz - 1000 MHz)
Mode	Tx, Hopping Off, 902.4 MHz (Model No. SYSFCSAXY-WX)

Horizontal

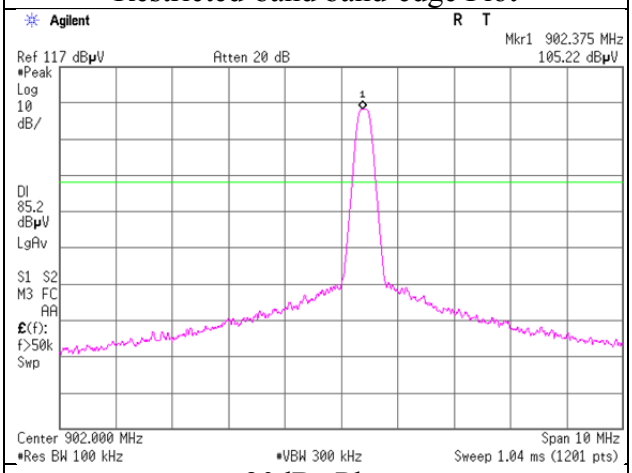
Restricted-band band-edge Plot



20dBc Plot

Vertical

Restricted-band band-edge Plot



20dBc Plot

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

Radiated Spurious Emission

Report No.	12261916S-R2	
Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	No.3	No.3
Date	May 24, 2018	May 24, 2018
Temperature / Humidity	24 deg. C / 57 % RH	25 deg. C / 50 % RH
Engineer	Shiro Kobayashi	Kazuya Noda
	(1 GHz -10 GHz)	(30 MHz - 1000 MHz)
Mode	Tx, Hopping Off, 915.2 MHz (Model No. SYSFCSAXY-WX)	

(* 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.	192.000	QP	21.87	16.16	8.03	32.08	0.00	13.98	43.50	29.5	100	0	
Hori.	228.800	QP	21.41	11.55	8.42	32.04	0.00	9.34	46.00	36.6	100	0	
Hori.	457.600	QP	21.37	16.59	9.68	31.97	0.00	15.67	46.00	30.3	100	0	
Hori.	960.000	QP	21.67	22.10	11.49	30.57	0.00	24.69	46.00	21.3	100	2	
Hori.	1830.400	PK	48.50	25.69	4.50	43.96	2.39	37.12	73.90	36.7	150	0	
Hori.	2745.600	PK	48.30	28.16	5.07	44.14	2.39	39.78	73.90	34.1	150	0	
Hori.	3660.800	PK	49.30	29.12	5.68	44.47	2.39	42.02	73.90	31.8	226	11	
Hori.	4576.000	PK	48.89	30.78	6.36	44.37	2.39	44.05	73.90	29.8	150	0	
Hori.	5491.200	PK	50.66	32.16	7.01	44.89	2.39	47.33	73.90	26.5	185	331	
Hori.	6406.400	PK	49.91	34.54	7.64	44.68	2.39	49.80	73.90	24.1	260	341	
Hori.	7321.600	PK	47.78	36.77	8.20	44.03	2.39	51.11	73.90	22.7	226	317	
Hori.	8236.800	PK	55.81	37.80	8.53	44.14	2.39	60.39	73.90	13.5	234	43	
Hori.	9152.000	PK	47.38	38.15	9.13	43.75	2.39	53.30	73.90	20.6	182	42	
Hori.	1830.400	AV	36.07	25.69	4.50	43.96	2.39	24.69	53.90	29.2	150	0	
Hori.	2745.600	AV	36.37	28.16	5.07	44.14	2.39	27.85	53.90	26.0	150	0	
Hori.	3660.800	AV	37.07	29.12	5.68	44.47	2.39	29.79	53.90	24.1	226	11	
Hori.	4576.000	AV	36.99	30.78	6.36	44.37	2.39	32.15	53.90	21.7	150	0	
Hori.	5491.200	AV	40.84	32.16	7.01	44.89	2.39	37.51	53.90	16.3	185	331	
Hori.	6406.400	AV	38.50	34.54	7.64	44.68	2.39	38.39	53.90	15.5	260	341	
Hori.	7321.600	AV	36.95	36.77	8.20	44.03	2.39	40.28	53.90	13.6	226	317	
Hori.	8236.800	AV	47.98	37.80	8.53	44.14	2.39	52.56	53.90	**1.3**	234	43	
Hori.	9152.000	AV	35.99	38.15	9.13	43.75	2.39	41.91	53.90	11.9	182	42	
Vert.	192.000	QP	21.91	16.16	8.03	32.08	0.00	14.02	43.50	29.4	100	0	
Vert.	228.800	QP	21.53	11.55	8.42	32.04	0.00	9.46	46.00	36.5	100	0	
Vert.	457.600	QP	21.42	16.59	9.68	31.97	0.00	15.72	46.00	30.2	100	0	
Vert.	960.000	QP	21.35	22.10	11.49	30.57	0.00	24.37	46.00	21.6	116	241	
Vert.	1830.400	PK	48.67	25.69	4.50	43.96	2.39	37.29	73.90	36.6	150	0	
Vert.	2745.600	PK	48.66	28.16	5.07	44.14	2.39	40.14	73.90	33.7	150	0	
Vert.	3660.800	PK	48.64	29.12	5.68	44.47	2.39	41.36	73.90	32.5	150	0	
Vert.	4576.000	PK	47.99	30.78	6.36	44.37	2.39	43.15	73.90	30.7	235	347	
Vert.	5491.200	PK	50.43	32.16	7.01	44.89	2.39	47.10	73.90	26.8	222	359	
Vert.	6406.400	PK	48.89	34.54	7.64	44.68	2.39	48.78	73.90	25.1	226	343	
Vert.	7321.600	PK	47.98	36.77	8.20	44.03	2.39	51.31	73.90	22.5	207	3	
Vert.	8236.800	PK	53.31	37.80	8.53	44.14	2.39	57.89	73.90	16.0	322	4	
Vert.	9152.000	PK	47.53	38.15	9.13	43.75	2.39	53.45	73.90	20.4	150	0	
Vert.	1830.400	AV	36.18	25.69	4.50	43.96	2.39	24.80	53.90	29.1	150	0	
Vert.	2745.600	AV	36.26	28.16	5.07	44.14	2.39	27.74	53.90	26.1	150	0	
Vert.	3660.800	AV	36.71	29.12	5.68	44.47	2.39	29.43	53.90	24.4	150	0	
Vert.	4576.000	AV	36.99	30.78	6.36	44.37	2.39	32.15	53.90	21.7	235	347	
Vert.	5491.200	AV	42.61	32.16	7.01	44.89	2.39	39.28	53.90	14.6	222	359	
Vert.	6406.400	AV	38.83	34.54	7.64	44.68	2.39	38.72	53.90	15.1	226	343	
Vert.	7321.600	AV	36.46	36.77	8.20	44.03	2.39	39.79	53.90	14.1	207	3	
Vert.	8236.800	AV	45.45	37.80	8.53	44.14	2.39	50.03	53.90	3.8	322	4	
Vert.	9152.000	AV	35.55	38.15	9.13	43.75	2.39	41.47	53.90	12.4	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 (3.95 m / 3.0 m) = 2.39 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission

Report No.	12261916S-R2	
Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	No.3	No.3
Date	May 24, 2018	May 24, 2018
Temperature / Humidity	24 deg. C / 57 % RH	25 deg. C / 50 % RH
Engineer	Shiro Kobayashi	Kazuya Noda
	(1 GHz -10 GHz)	(30 MHz - 1000 MHz)
Mode	Tx, Hopping Off, 927.6 MHz (Model No. SYSFCSAXY-WX)	

(* 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.	192.000	QP	21.53	16.16	8.03	32.08	0.00	13.64	43.50	29.8	100	0	
Hori.	231.900	QP	21.58	11.55	8.44	32.04	0.00	9.53	46.00	36.4	100	0	
Hori.	463.800	QP	21.43	16.71	9.70	31.97	0.00	15.87	46.00	30.1	100	0	
Hori.	960.000	QP	21.83	22.10	11.49	30.57	0.00	24.85	46.00	21.1	100	2	
Hori.	1855.200	PK	48.14	25.74	4.51	43.97	2.39	36.81	73.90	37.0	150	0	
Hori.	2782.800	PK	48.53	28.24	5.09	44.13	2.39	40.12	73.90	33.7	150	0	
Hori.	3710.400	PK	48.69	29.21	5.75	44.42	2.39	41.62	73.90	32.2	230	10	
Hori.	4638.000	PK	47.97	30.95	6.42	44.39	2.39	43.34	73.90	30.5	230	293	
Hori.	5565.600	PK	50.48	32.27	7.07	44.89	2.39	47.32	73.90	26.5	220	328	
Hori.	6493.200	PK	48.25	34.87	7.70	44.64	2.39	48.57	73.90	25.3	245	334	
Hori.	7420.800	PK	51.11	36.94	8.25	44.07	2.39	54.62	73.90	19.2	110	38	
Hori.	8348.400	PK	54.96	37.84	8.64	44.25	2.39	59.58	73.90	14.3	227	41	
Hori.	9276.000	PK	47.02	38.27	9.20	43.77	2.39	53.11	73.90	20.7	185	40	
Hori.	1855.200	AV	36.02	25.74	4.51	43.97	2.39	24.69	53.90	29.2	150	0	
Hori.	2782.800	AV	36.80	28.24	5.09	44.13	2.39	28.39	53.90	25.5	150	0	
Hori.	3710.400	AV	36.77	29.21	5.75	44.42	2.39	29.70	53.90	24.2	230	10	
Hori.	4638.000	AV	37.30	30.95	6.42	44.39	2.39	32.67	53.90	21.2	230	293	
Hori.	5565.600	AV	41.46	32.27	7.07	44.89	2.39	38.30	53.90	15.6	220	328	
Hori.	6493.200	AV	37.17	34.87	7.70	44.64	2.39	37.49	53.90	16.4	245	334	
Hori.	7420.800	AV	41.85	36.94	8.25	44.07	2.39	45.36	53.90	8.5	110	38	
Hori.	8348.400	AV	47.68	37.84	8.64	44.25	2.39	52.30	53.90	**1.6**	227	41	
Hori.	9276.000	AV	35.77	38.27	9.20	43.77	2.39	41.86	53.90	12.0	185	40	
Vert.	192.000	QP	21.65	16.16	8.03	32.08	0.00	13.76	43.50	29.7	100	0	
Vert.	231.900	QP	21.65	11.55	8.44	32.04	0.00	9.60	46.00	36.4	100	0	
Vert.	463.800	QP	21.41	16.71	9.70	31.97	0.00	15.85	46.00	30.1	100	0	
Vert.	960.000	QP	21.65	22.10	11.49	30.57	0.00	24.67	46.00	21.3	115	185	
Vert.	1855.200	PK	48.47	25.74	4.51	43.97	2.39	37.14	73.90	36.7	150	0	
Vert.	2782.800	PK	48.09	28.24	5.09	44.13	2.39	39.68	73.90	34.2	150	0	
Vert.	3710.400	PK	48.24	29.21	5.75	44.42	2.39	41.17	73.90	32.7	150	0	
Vert.	4638.000	PK	48.59	30.95	6.42	44.39	2.39	43.96	73.90	29.9	248	351	
Vert.	5565.600	PK	51.62	32.27	7.07	44.89	2.39	48.46	73.90	25.4	216	358	
Vert.	6493.200	PK	48.45	34.87	7.70	44.64	2.39	48.77	73.90	25.1	239	344	
Vert.	7420.800	PK	49.91	36.94	8.25	44.07	2.39	53.42	73.90	20.4	303	346	
Vert.	8348.400	PK	52.38	37.84	8.64	44.25	2.39	57.00	73.90	16.9	315	1	
Vert.	9276.000	PK	47.35	38.27	9.20	43.77	2.39	53.44	73.90	20.4	183	278	
Vert.	1855.200	AV	36.31	25.74	4.51	43.97	2.39	24.98	53.90	28.9	150	0	
Vert.	2782.800	AV	36.56	28.24	5.09	44.13	2.39	28.15	53.90	25.7	150	0	
Vert.	3710.400	AV	36.65	29.21	5.75	44.42	2.39	29.58	53.90	24.3	150	0	
Vert.	4638.000	AV	37.38	30.95	6.42	44.39	2.39	32.75	53.90	21.1	248	351	
Vert.	5565.600	AV	44.37	32.27	7.07	44.89	2.39	41.21	53.90	12.6	216	358	
Vert.	6493.200	AV	37.31	34.87	7.70	44.64	2.39	37.63	53.90	16.2	239	344	
Vert.	7420.800	AV	41.35	36.94	8.25	44.07	2.39	44.86	53.90	9.0	303	346	
Vert.	8348.400	AV	44.49	37.84	8.64	44.25	2.39	49.11	53.90	4.7	315	1	
Vert.	9276.000	AV	35.72	38.27	9.20	43.77	2.39	41.81	53.90	12.0	183	278	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.95 m / 3.0 m) = 2.39 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

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.	927.600	QP	105.12	21.92	11.38	30.85	0.00	107.57	-	-	Carrier
Hori.	928.000	QP	59.36	21.92	11.39	30.84	0.00	61.83	87.57	25.7	
Vert.	927.600	QP	104.09	21.92	11.38	30.85	0.00	106.54	-	-	Carrier
Vert.	928.000	QP	54.76	21.92	11.39	30.84	0.00	57.23	86.54	29.3	

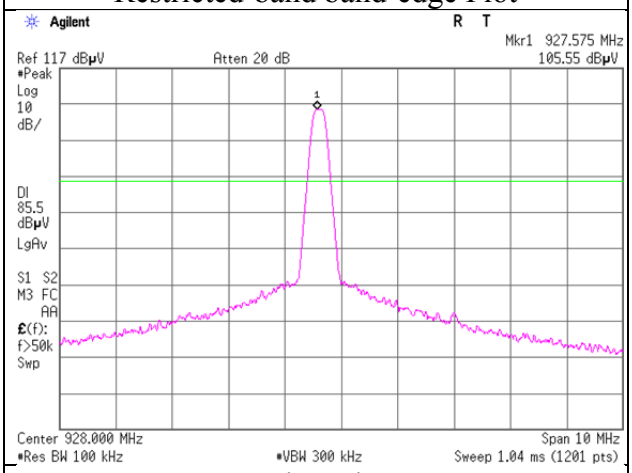
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.95 m / 3.0 m) = 2.39 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	12261916S-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	May 24, 2018
Temperature / Humidity	25 deg. C / 50 % RH
Engineer	Kazuya Noda
	(30 MHz - 1000 MHz)
Mode	Tx, Hopping Off, 927.6 MHz (Model No. SYSFCSAXY-WX)

Horizontal

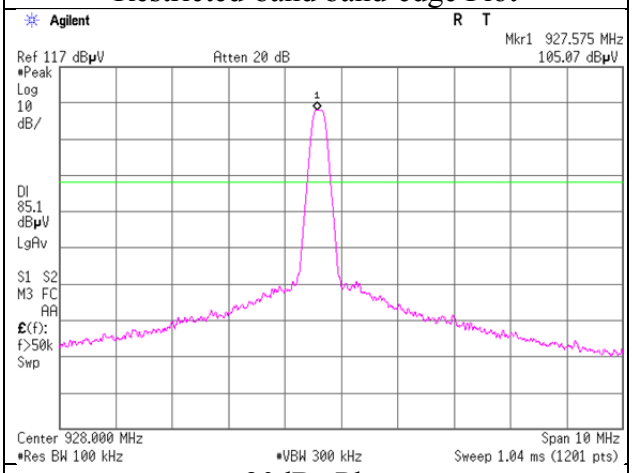
Restricted-band band-edge Plot



20dBc Plot

Vertical

Restricted-band band-edge Plot

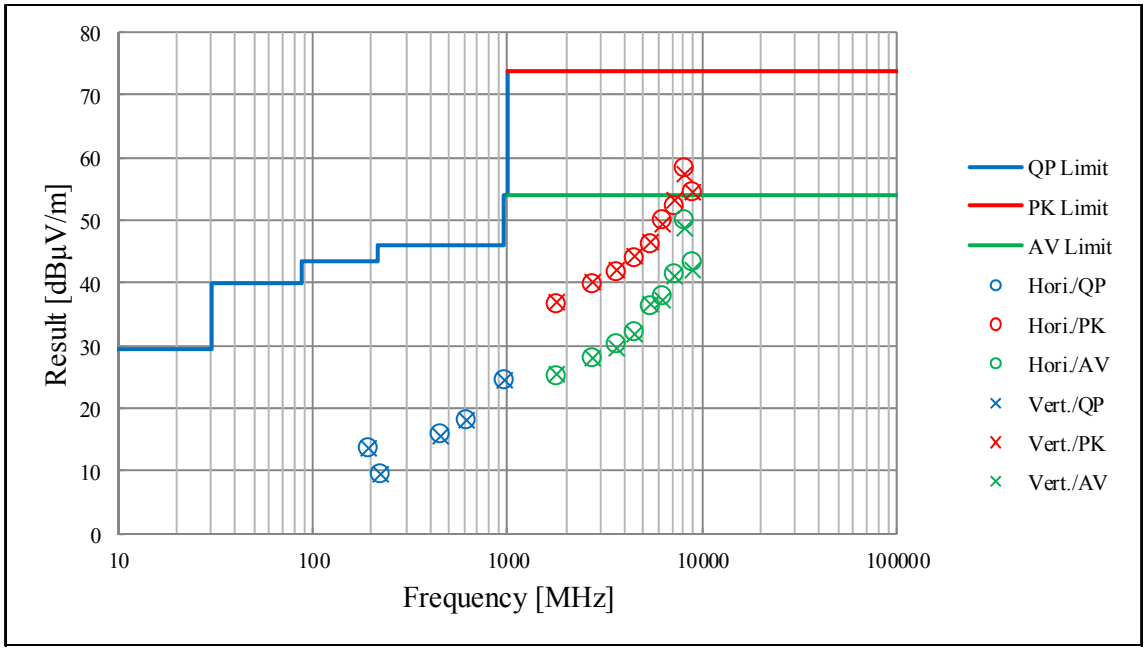


20dBc Plot

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

Radiated Spurious Emission
(Plot data, Worst case)

Report No.	12261916S-R2	
Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	No.3	No.3
Date	May 24, 2018	May 24, 2018
Temperature / Humidity	24 deg. C / 57 % RH	25 deg. C / 50 % RH
Engineer	Shiro Kobayashi	Kazuya Noda
	(1 GHz -10 GHz)	(30 MHz - 1000 MHz)
Mode	Tx, Hopping Off, 902.4 MHz (Model No. SYSFCSAXY-WX)	



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

Radiated Spurious Emission

Report No.	12261916S-R2	
Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	No.3	No.3
Date	May 24, 2018	May 24, 2018
Temperature / Humidity	24 deg. C / 57 % RH	25 deg. C / 50 % RH
Engineer	Shiro Kobayashi	Kazuya Noda
	(1 GHz -10 GHz)	(30 MHz - 1000 MHz)
Mode	Tx, Hopping Off, 902.4 MHz (Model No. SYSFESAXY-WX)	

(* 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.	192.000	QP	21.53	16.16	8.03	32.08	0.00	13.64	43.50	29.8	100	0	
Hori.	247.879	QP	26.18	11.58	8.55	32.02	0.00	14.29	46.00	31.7	133	316	
Hori.	451.200	QP	21.54	16.45	9.65	31.97	0.00	15.67	46.00	30.3	100	0	
Hori.	614.000	QP	20.76	19.09	10.26	31.96	0.00	18.15	46.00	27.8	100	0	
Hori.	960.000	QP	21.56	22.10	11.49	30.57	0.00	24.58	46.00	21.4	174	288	
Hori.	1804.800	PK	48.03	25.63	4.51	43.94	2.24	36.47	73.90	37.4	150	0	
Hori.	2707.200	PK	48.48	28.07	5.04	44.14	2.24	39.69	73.90	34.2	150	0	
Hori.	3609.600	PK	49.56	29.02	5.62	44.51	2.24	41.93	73.90	31.9	193	338	
Hori.	4512.000	PK	50.36	30.60	6.28	44.34	2.24	45.14	73.90	28.7	209	3	
Hori.	5414.400	PK	51.10	32.12	6.98	44.83	2.24	47.61	73.90	26.2	272	315	
Hori.	6316.800	PK	50.19	34.20	7.59	44.71	2.24	49.51	73.90	24.3	337	317	
Hori.	7219.200	PK	51.21	36.59	8.12	43.99	2.24	54.17	73.90	19.7	336	311	
Hori.	8121.600	PK	52.26	37.76	8.41	44.02	2.24	56.65	73.90	17.2	278	315	
Hori.	9024.000	PK	48.84	38.03	9.02	43.72	2.24	54.41	73.90	19.4	263	336	
Hori.	1804.800	AV	36.51	25.63	4.51	43.94	2.24	24.95	53.90	28.9	150	0	
Hori.	2707.200	AV	37.44	28.07	5.04	44.14	2.24	28.65	53.90	25.2	150	0	
Hori.	3609.600	AV	40.20	29.02	5.62	44.51	2.24	32.57	53.90	21.3	193	338	
Hori.	4512.000	AV	40.18	30.60	6.28	44.34	2.24	34.96	53.90	18.9	209	3	
Hori.	5414.400	AV	40.45	32.12	6.98	44.83	2.24	36.96	53.90	16.9	272	315	
Hori.	6316.800	AV	40.65	34.20	7.59	44.71	2.24	39.97	53.90	13.9	337	317	
Hori.	7219.200	AV	40.50	36.59	8.12	43.99	2.24	43.46	53.90	10.4	336	311	
Hori.	8121.600	AV	44.55	37.76	8.41	44.02	2.24	48.94	53.90	**4.9**	278	315	
Hori.	9024.000	AV	36.50	38.03	9.02	43.72	2.24	42.07	53.90	11.8	263	336	
Vert.	192.000	QP	21.54	16.16	8.03	32.08	0.00	13.65	43.50	29.8	100	0	
Vert.	247.651	QP	24.04	11.58	8.54	32.02	0.00	12.14	46.00	33.8	100	41	
Vert.	451.200	QP	21.61	16.45	9.65	31.97	0.00	15.74	46.00	30.2	100	0	
Vert.	614.000	QP	20.92	19.09	10.26	31.96	0.00	18.31	46.00	27.6	100	0	
Vert.	960.000	QP	21.61	22.10	11.49	30.57	0.00	24.63	46.00	21.3	103	74	
Vert.	1804.800	PK	48.40	25.63	4.51	43.94	2.24	36.84	73.90	37.0	150	0	
Vert.	2707.200	PK	49.42	28.07	5.04	44.14	2.24	40.63	73.90	33.2	150	0	
Vert.	3609.600	PK	48.85	29.02	5.62	44.51	2.24	41.22	73.90	32.6	150	0	
Vert.	4512.000	PK	50.15	30.60	6.28	44.34	2.24	44.93	73.90	28.9	135	3	
Vert.	5414.400	PK	51.25	32.12	6.98	44.83	2.24	47.76	73.90	26.1	136	358	
Vert.	6316.800	PK	49.49	34.20	7.59	44.71	2.24	48.81	73.90	25.0	142	14	
Vert.	7219.200	PK	51.29	36.59	8.12	43.99	2.24	54.25	73.90	19.6	104	8	
Vert.	8121.600	PK	51.06	37.76	8.41	44.02	2.24	55.45	73.90	18.4	102	359	
Vert.	9024.000	PK	48.94	38.03	9.02	43.72	2.24	54.51	73.90	19.3	109	10	
Vert.	1804.800	AV	36.37	25.63	4.51	43.94	2.24	24.81	53.90	29.0	150	0	
Vert.	2707.200	AV	36.85	28.07	5.04	44.14	2.24	28.06	53.90	25.8	150	0	
Vert.	3609.600	AV	36.93	29.02	5.62	44.51	2.24	29.30	53.90	24.6	150	0	
Vert.	4512.000	AV	37.59	30.60	6.28	44.34	2.24	32.37	53.90	21.5	135	3	
Vert.	5414.400	AV	42.13	32.12	6.98	44.83	2.24	38.64	53.90	15.2	136	358	
Vert.	6316.800	AV	38.07	34.20	7.59	44.71	2.24	37.39	53.90	16.5	142	14	
Vert.	7219.200	AV	40.53	36.59	8.12	43.99	2.24	43.49	53.90	10.4	104	8	
Vert.	8121.600	AV	41.73	37.76	8.41	44.02	2.24	46.12	53.90	7.7	102	359	
Vert.	9024.000	AV	36.40	38.03	9.02	43.72	2.24	41.97	53.90	11.9	109	10	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.88 m / 3.0 m) = 2.24 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

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.	902.400	QP	110.25	21.78	11.29	31.07	0.00	112.25	-	-	Carrier
Hori.	902.000	QP	62.82	21.78	11.29	31.07	0.00	64.82	92.25	27.4	
Vert.	902.400	QP	109.46	21.78	11.29	31.07	0.00	111.46	-	-	Carrier
Vert.	902.000	QP	62.38	21.78	11.29	31.07	0.00	64.38	91.46	27.1	

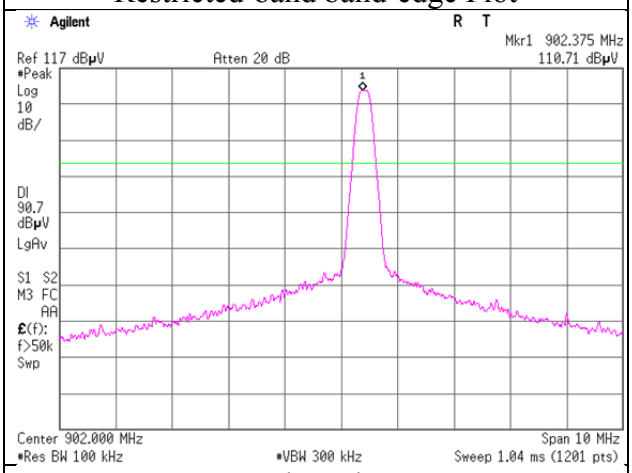
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.88 m / 3.0 m) = 2.24 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	12261916S-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	May 24, 2018
Temperature / Humidity	25 deg. C / 50 % RH
Engineer	Kazuya Noda
	(30 MHz - 1000 MHz)
Mode	Tx, Hopping Off, 902.4 MHz (Model No. SYSFESAXY-WX)

Horizontal

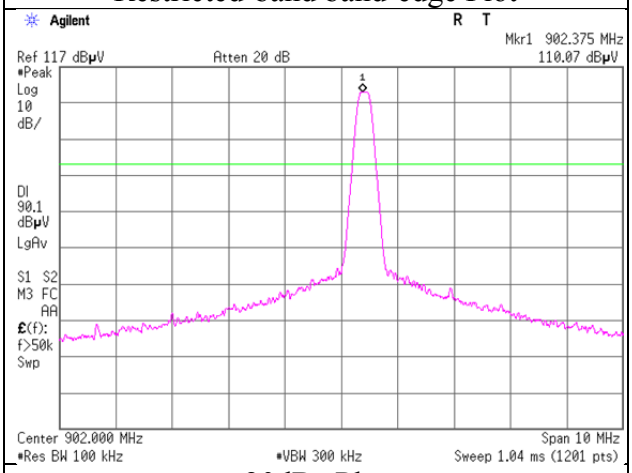
Restricted-band band-edge Plot



20dBc Plot

Vertical

Restricted-band band-edge Plot



20dBc Plot

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

Radiated Spurious Emission

Report No.	12261916S-R2	
Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	No.3	No.3
Date	May 24, 2018	May 24, 2018
Temperature / Humidity	24 deg. C / 57 % RH	25 deg. C / 50 % RH
Engineer	Shiro Kobayashi	Kazuya Noda
	(1 GHz -10 GHz)	(30 MHz - 1000 MHz)
Mode	Tx, Hopping Off, 915.2 MHz (Model No. SYSFESAXY-WX)	

(* 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.	192.000	QP	21.55	16.16	8.03	32.08	0.00	13.66	43.50	29.8	100	0	
Hori.	247.901	QP	26.15	11.58	8.55	32.02	0.00	14.26	46.00	31.7	129	335	
Hori.	457.600	QP	21.45	16.59	9.68	31.97	0.00	15.75	46.00	30.2	100	0	
Hori.	960.000	QP	21.81	22.10	11.49	30.57	0.00	24.83	46.00	21.1	166	256	
Hori.	1830.400	PK	48.27	25.69	4.50	43.96	2.24	36.74	73.90	37.1	150	0	
Hori.	2745.600	PK	48.68	28.16	5.07	44.14	2.24	40.01	73.90	33.8	150	0	
Hori.	3660.800	PK	48.92	29.12	5.68	44.47	2.24	41.49	73.90	32.4	185	351	
Hori.	4576.000	PK	50.20	30.78	6.36	44.37	2.24	45.21	73.90	28.6	218	15	
Hori.	5491.200	PK	48.67	32.16	7.01	44.89	2.24	45.19	73.90	28.7	315	292	
Hori.	6406.400	PK	48.72	34.54	7.64	44.68	2.24	48.46	73.90	25.4	311	250	
Hori.	7321.600	PK	51.93	36.77	8.20	44.03	2.24	55.11	73.90	18.7	337	319	
Hori.	8236.800	PK	50.74	37.80	8.53	44.14	2.24	55.17	73.90	18.7	283	319	
Hori.	9152.000	PK	47.86	38.15	9.13	43.75	2.24	53.63	73.90	20.2	297	328	
Hori.	1830.400	AV	36.49	25.69	4.50	43.96	2.24	24.96	53.90	28.9	150	0	
Hori.	2745.600	AV	37.07	28.16	5.07	44.14	2.24	28.40	53.90	25.5	150	0	
Hori.	3660.800	AV	37.48	29.12	5.68	44.47	2.24	30.05	53.90	23.8	185	351	
Hori.	4576.000	AV	38.50	30.78	6.36	44.37	2.24	33.51	53.90	20.3	218	15	
Hori.	5491.200	AV	38.70	32.16	7.01	44.89	2.24	35.22	53.90	18.6	315	292	
Hori.	6406.400	AV	36.84	34.54	7.64	44.68	2.24	36.58	53.90	17.3	311	250	
Hori.	7321.600	AV	45.12	36.77	8.20	44.03	2.24	48.30	53.90	**5.6**	337	319	
Hori.	8236.800	AV	41.15	37.80	8.53	44.14	2.24	45.58	53.90	8.3	283	319	
Hori.	9152.000	AV	36.62	38.15	9.13	43.75	2.24	42.39	53.90	11.5	297	328	
Vert.	192.000	QP	21.59	16.16	8.03	32.08	0.00	13.70	43.50	29.8	100	0	
Vert.	247.540	QP	24.73	11.58	8.54	32.02	0.00	12.83	46.00	33.1	100	41	
Vert.	457.600	QP	21.41	16.59	9.68	31.97	0.00	15.71	46.00	30.2	100	0	
Vert.	960.000	QP	21.63	22.10	11.49	30.57	0.00	24.65	46.00	21.3	106	78	
Vert.	1830.400	PK	47.95	25.69	4.50	43.96	2.24	36.42	73.90	37.4	150	0	
Vert.	2745.600	PK	48.83	28.16	5.07	44.14	2.24	40.16	73.90	33.7	150	0	
Vert.	3660.800	PK	48.53	29.12	5.68	44.47	2.24	41.10	73.90	32.8	150	0	
Vert.	4576.000	PK	49.16	30.78	6.36	44.37	2.24	44.17	73.90	29.7	147	9	
Vert.	5491.200	PK	51.82	32.16	7.01	44.89	2.24	48.34	73.90	25.5	164	14	
Vert.	6406.400	PK	48.78	34.54	7.64	44.68	2.24	48.52	73.90	25.3	150	0	
Vert.	7321.600	PK	50.80	36.77	8.20	44.03	2.24	53.98	73.90	19.9	111	4	
Vert.	8236.800	PK	48.91	37.80	8.53	44.14	2.24	53.34	73.90	20.5	119	0	
Vert.	9152.000	PK	48.16	38.15	9.13	43.75	2.24	53.93	73.90	19.9	113	4	
Vert.	1830.400	AV	36.00	25.69	4.50	43.96	2.24	24.47	53.90	29.4	150	0	
Vert.	2745.600	AV	36.37	28.16	5.07	44.14	2.24	27.70	53.90	26.2	150	0	
Vert.	3660.800	AV	36.70	29.12	5.68	44.47	2.24	29.27	53.90	24.6	150	0	
Vert.	4576.000	AV	37.74	30.78	6.36	44.37	2.24	32.75	53.90	21.1	147	9	
Vert.	5491.200	AV	43.45	32.16	7.01	44.89	2.24	39.97	53.90	13.9	164	14	
Vert.	6406.400	AV	36.87	34.54	7.64	44.68	2.24	36.61	53.90	17.2	150	0	
Vert.	7321.600	AV	43.05	36.77	8.20	44.03	2.24	46.23	53.90	7.6	111	4	
Vert.	8236.800	AV	38.97	37.80	8.53	44.14	2.24	43.40	53.90	10.5	119	0	
Vert.	9152.000	AV	36.01	38.15	9.13	43.75	2.24	41.78	53.90	12.1	113	4	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.88 m / 3.0 m) = 2.24 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission

Report No.	12261916S-R2	
Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	No.3	No.3
Date	May 24, 2018	May 24, 2018
Temperature / Humidity	24 deg. C / 57 % RH	25 deg. C / 50 % RH
Engineer	Shiro Kobayashi	Kazuya Noda
	(1 GHz -10 GHz)	(30 MHz - 1000 MHz)
Mode	Tx, Hopping Off, 927.6 MHz (Model No. SYSFESAXY-WX)	

(* 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.	192.000	QP	21.49	16.16	8.03	32.08	0.00	13.60	43.50	29.9	100	0	
Hori.	248.594	QP	26.22	11.58	8.55	32.02	0.00	14.33	46.00	31.6	141	326	
Hori.	463.800	QP	21.46	16.71	9.70	31.97	0.00	15.90	46.00	30.1	100	0	
Hori.	960.000	QP	22.17	22.10	11.49	30.57	0.00	25.19	46.00	20.8	170	267	
Hori.	1855.200	PK	48.23	25.74	4.51	43.97	2.24	36.75	73.90	37.1	150	0	
Hori.	2782.800	PK	48.36	28.24	5.09	44.13	2.24	39.80	73.90	34.1	150	0	
Hori.	3710.400	PK	48.45	29.21	5.75	44.42	2.24	41.23	73.90	32.6	194	356	
Hori.	4638.000	PK	48.62	30.95	6.42	44.39	2.24	43.84	73.90	30.0	227	22	
Hori.	5565.600	PK	49.70	32.27	7.07	44.89	2.24	46.39	73.90	27.5	309	208	
Hori.	6493.200	PK	51.19	34.87	7.70	44.64	2.24	51.36	73.90	22.5	367	321	
Hori.	7420.800	PK	54.21	36.94	8.25	44.07	2.24	57.57	73.90	16.3	335	324	
Hori.	8348.400	PK	50.02	37.84	8.64	44.25	2.24	54.49	73.90	19.4	328	332	
Hori.	9276.000	PK	48.05	38.27	9.20	43.77	2.24	53.99	73.90	19.9	312	330	
Hori.	1855.200	AV	36.17	25.74	4.51	43.97	2.24	24.69	53.90	29.2	150	0	
Hori.	2782.800	AV	37.57	28.24	5.09	44.13	2.24	29.01	53.90	24.8	150	0	
Hori.	3710.400	AV	37.64	29.21	5.75	44.42	2.24	30.42	53.90	23.4	194	356	
Hori.	4638.000	AV	37.08	30.95	6.42	44.39	2.24	32.30	53.90	21.6	227	22	
Hori.	5565.600	AV	38.25	32.27	7.07	44.89	2.24	34.94	53.90	18.9	309	208	
Hori.	6493.200	AV	41.87	34.87	7.70	44.64	2.24	42.04	53.90	11.8	367	321	
Hori.	7420.800	AV	49.20	36.94	8.25	44.07	2.24	52.56	53.90	**1.3**	335	324	
Hori.	8348.400	AV	39.74	37.84	8.64	44.25	2.24	44.21	53.90	9.6	328	332	
Hori.	9276.000	AV	37.06	38.27	9.20	43.77	2.24	43.00	53.90	10.9	312	330	
Vert.	192.000	QP	21.65	16.16	8.03	32.08	0.00	13.76	43.50	29.7	100	0	
Vert.	247.794	QP	24.44	11.58	8.54	32.02	0.00	12.54	46.00	33.4	100	45	
Vert.	463.800	QP	21.56	16.71	9.70	31.97	0.00	16.00	46.00	30.0	100	0	
Vert.	960.000	QP	21.64	22.10	11.49	30.57	0.00	24.66	46.00	21.3	106	76	
Vert.	1855.200	PK	48.61	25.74	4.51	43.97	2.24	37.13	73.90	36.7	150	0	
Vert.	2782.800	PK	48.99	28.24	5.09	44.13	2.24	40.43	73.90	33.4	150	0	
Vert.	3710.400	PK	48.44	29.21	5.75	44.42	2.24	41.22	73.90	32.6	150	0	
Vert.	4638.000	PK	49.38	30.95	6.42	44.39	2.24	44.60	73.90	29.3	143	10	
Vert.	5565.600	PK	51.05	32.27	7.07	44.89	2.24	47.74	73.90	26.1	135	359	
Vert.	6493.200	PK	50.34	34.87	7.70	44.64	2.24	50.51	73.90	23.3	105	13	
Vert.	7420.800	PK	53.51	36.94	8.25	44.07	2.24	56.87	73.90	17.0	102	3	
Vert.	8348.400	PK	49.44	37.84	8.64	44.25	2.24	53.91	73.90	19.9	105	356	
Vert.	9276.000	PK	47.17	38.27	9.20	43.77	2.24	53.11	73.90	20.7	109	4	
Vert.	1855.200	AV	36.03	25.74	4.51	43.97	2.24	24.55	53.90	29.3	150	0	
Vert.	2782.800	AV	36.77	28.24	5.09	44.13	2.24	28.21	53.90	25.6	150	0	
Vert.	3710.400	AV	36.86	29.21	5.75	44.42	2.24	29.64	53.90	24.2	150	0	
Vert.	4638.000	AV	37.94	30.95	6.42	44.39	2.24	33.16	53.90	20.7	143	10	
Vert.	5565.600	AV	41.65	32.27	7.07	44.89	2.24	38.34	53.90	15.5	135	359	
Vert.	6493.200	AV	41.21	34.87	7.70	44.64	2.24	41.38	53.90	12.5	105	13	
Vert.	7420.800	AV	47.29	36.94	8.25	44.07	2.24	50.65	53.90	3.2	102	3	
Vert.	8348.400	AV	37.85	37.84	8.64	44.25	2.24	42.32	53.90	11.5	105	356	
Vert.	9276.000	AV	36.30	38.27	9.20	43.77	2.24	42.24	53.90	11.6	109	4	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.88 m / 3.0 m) = 2.24 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

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.	927.600	QP	109.85	21.92	11.38	30.85	0.00	112.30	-	-	Carrier
Hori.	928.000	QP	62.19	21.92	11.39	30.84	0.00	64.66	92.30	27.6	
Vert.	927.600	QP	108.44	21.92	11.38	30.85	0.00	110.89	-	-	Carrier
Vert.	928.000	QP	61.45	21.92	11.39	30.84	0.00	63.92	90.89	27.0	

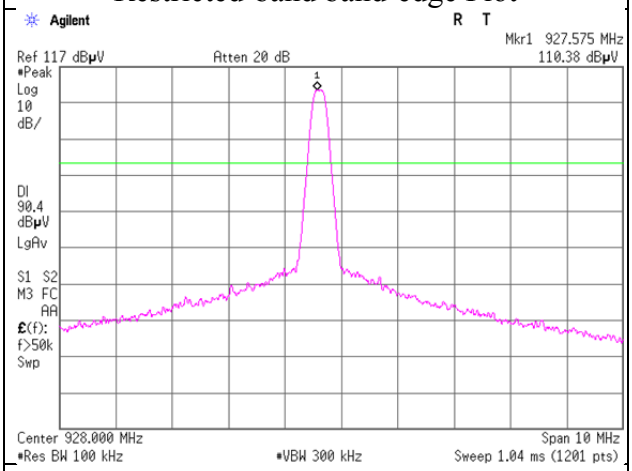
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.88 m / 3.0 m) = 2.24 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	12261916S-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.3
Date	May 24, 2018
Temperature / Humidity	25 deg. C / 50 % RH
Engineer	Kazuya Noda (30 MHz - 1000 MHz)
Mode	Tx, Hopping Off, 927.6 MHz (Model No. SYSFESAXY-WX)

Horizontal

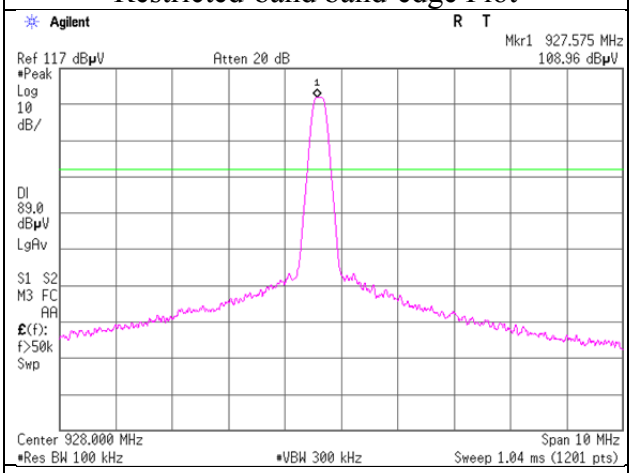
Restricted-band band-edge Plot



20dBc Plot

Vertical

Restricted-band band-edge Plot

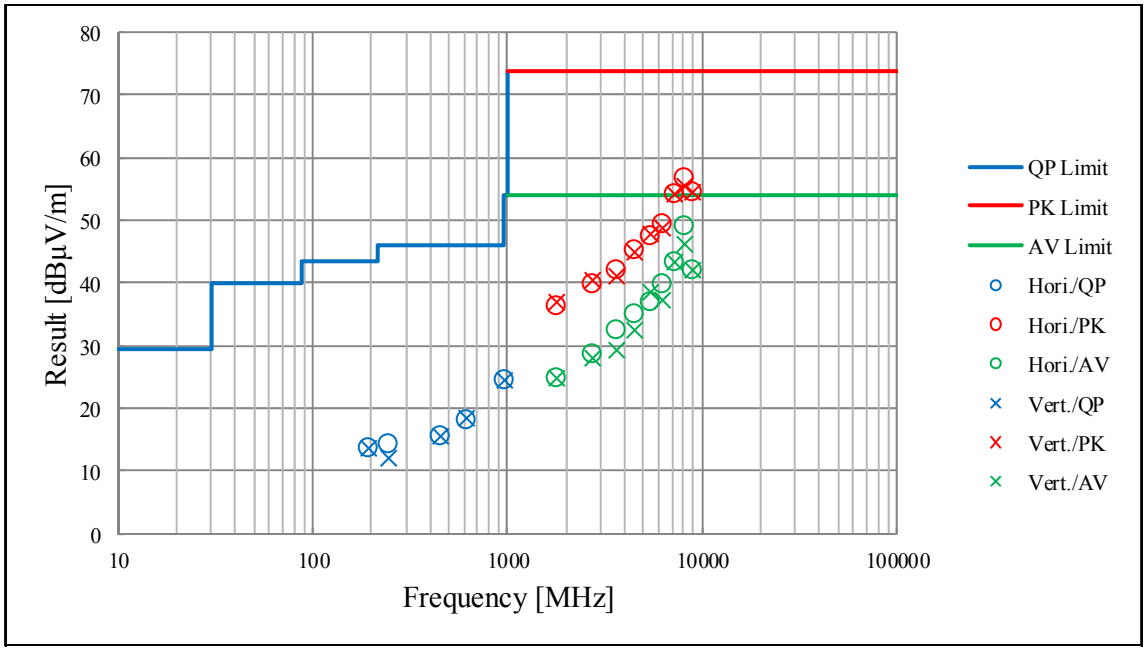


20dBc Plot

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

Radiated Spurious Emission
(Plot data, Worst case)

Report No.	12261916S-R2	
Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	No.3	No.3
Date	May 24, 2018	May 24, 2018
Temperature / Humidity	24 deg. C / 57 % RH	25 deg. C / 50 % RH
Engineer	Shiro Kobayashi (1 GHz -10 GHz)	Kazuya Noda (30 MHz - 1000 MHz)
Mode	Tx, Hopping Off, 902.4 MHz (Model No. SYSFESAXY-WX)	



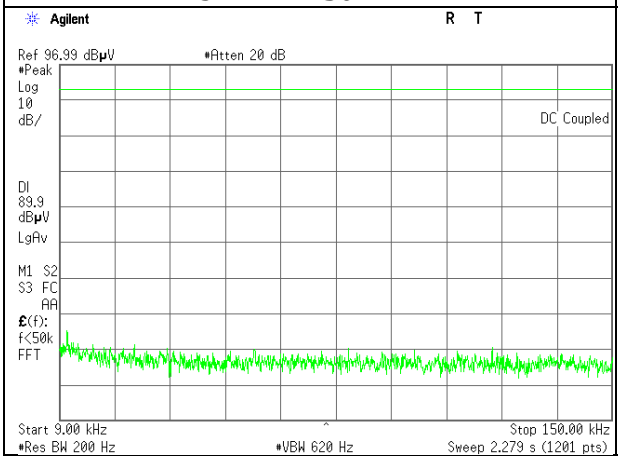
*These plots data contains sufficient number to show the trend of characteristic features for EUT.

Conducted Spurious Emission

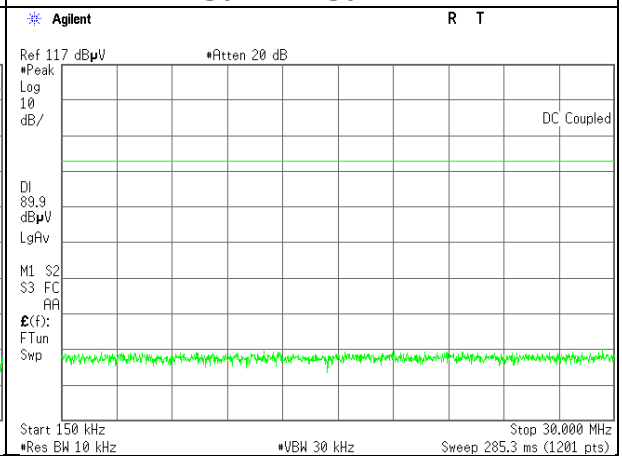
Report No.	12261916S-R2
Test place	Shonan EMC Lab. No.1 Measurement Room
Date	May 15, 2018
Temperature / Humidity	24 deg. C / 40 % RH
Engineer	Yosuke Ishikawa
Mode	Tx, Hopping Off

200 kbps, Tx 902.4 MHz

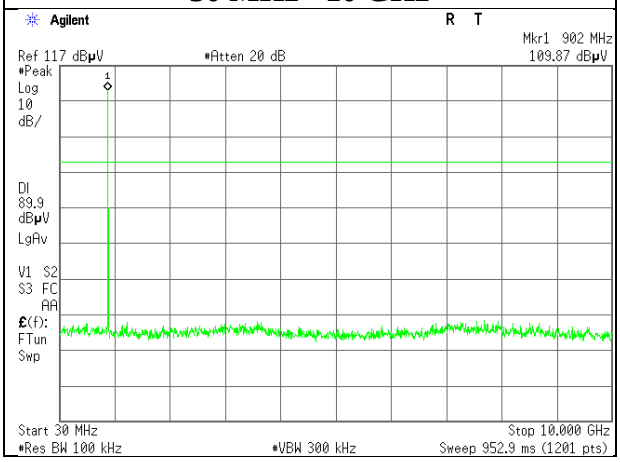
9 kHz - 150 kHz



150 kHz - 30 MHz



30 MHz - 10 GHz

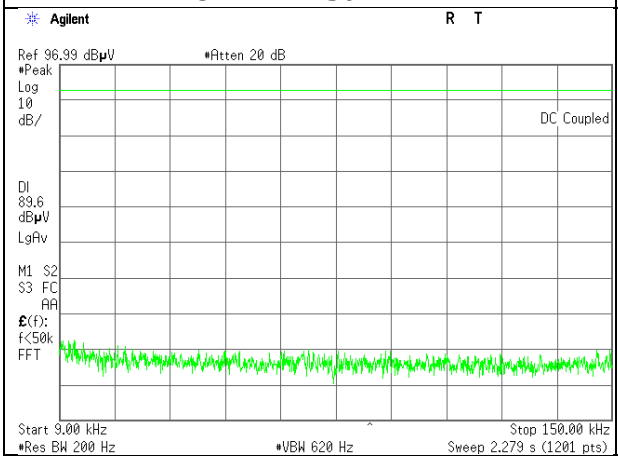


Conducted Spurious Emission

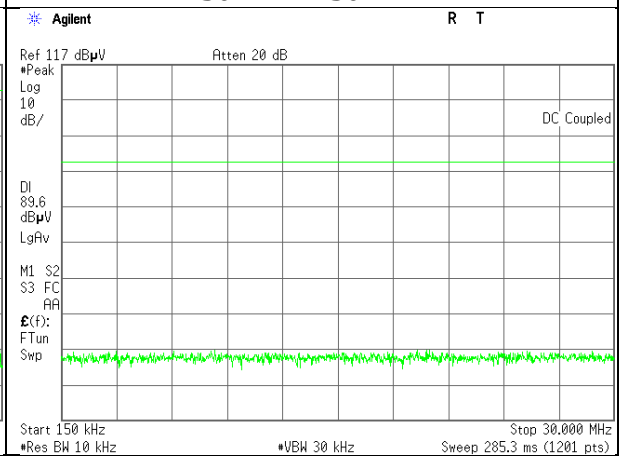
Report No.	12261916S-R2
Test place	Shonan EMC Lab. No.1 Measurement Room
Date	May 15, 2018
Temperature / Humidity	24 deg. C / 40 % RH
Engineer	Yosuke Ishikawa
Mode	Tx, Hopping Off

200 kbps, Tx 915.2 MHz

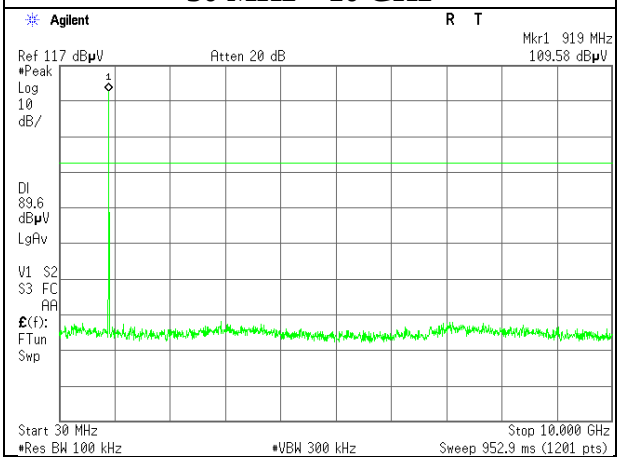
9 kHz – 150 kHz



150 kHz – 30 MHz



30 MHz – 10 GHz

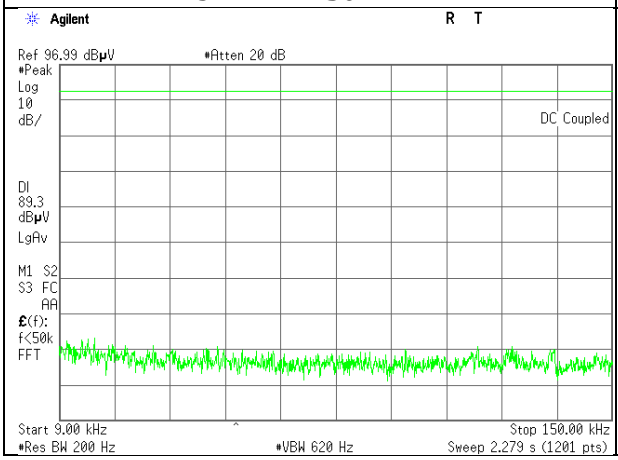


Conducted Spurious Emission

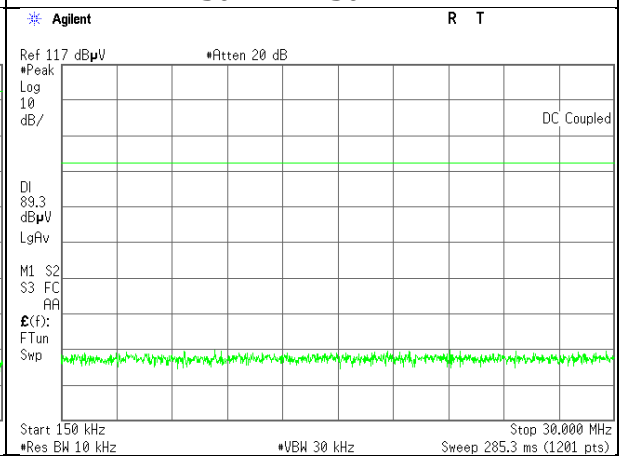
Report No.	12261916S-R2
Test place	Shonan EMC Lab. No.1 Measurement Room
Date	May 15, 2018
Temperature / Humidity	24 deg. C / 40 % RH
Engineer	Yosuke Ishikawa
Mode	Tx, Hopping Off

200 kbps, Tx 927.6 MHz

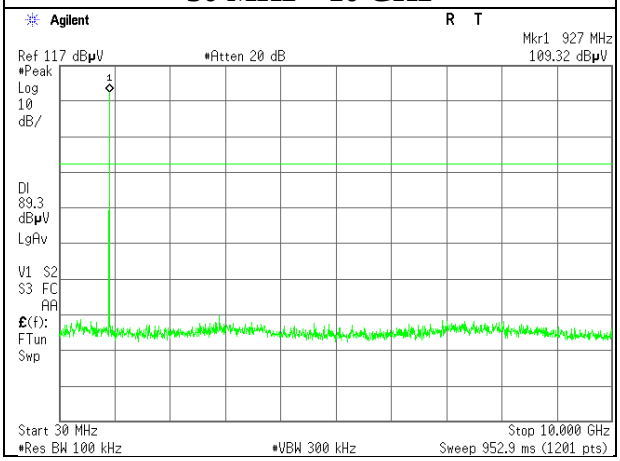
9 kHz – 150 kHz



150 kHz – 30 MHz



30 MHz – 10 GHz

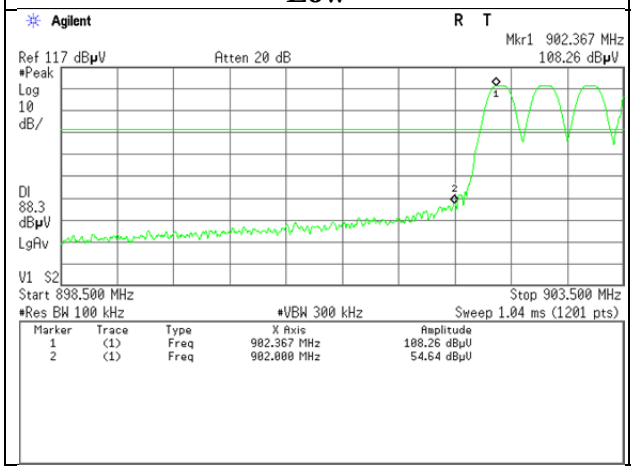


Conducted Emission Band Edge compliance

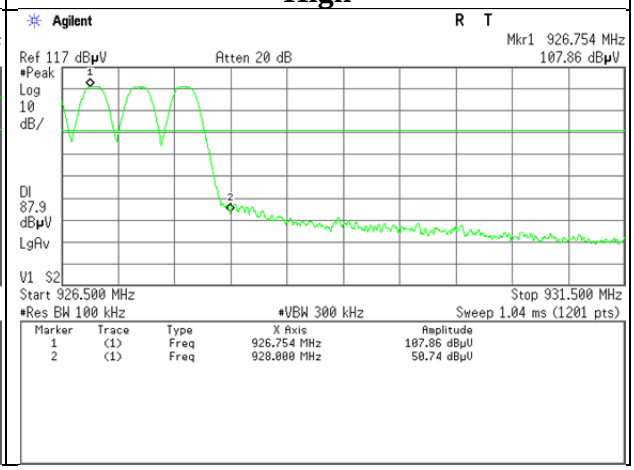
Report No.	12261916S-R2
Test place	Shonan EMC Lab. No.5 Shielded Room
Date	May 25, 2018
Temperature / Humidity	25 deg. C / 55 % RH
Engineer	Makoto Hosaka
Mode	Tx

150 kbps, Hopping On

Low

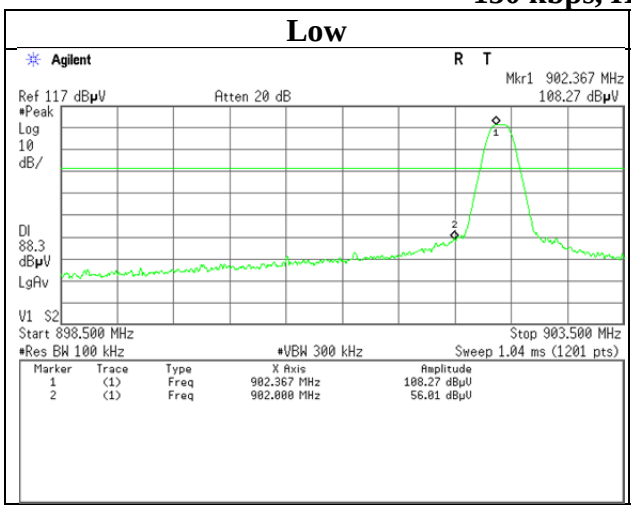


High

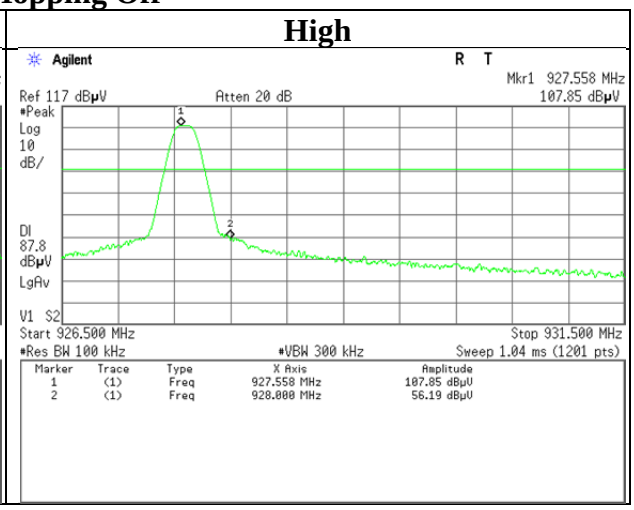


150 kbps, Hopping Off

Low



High

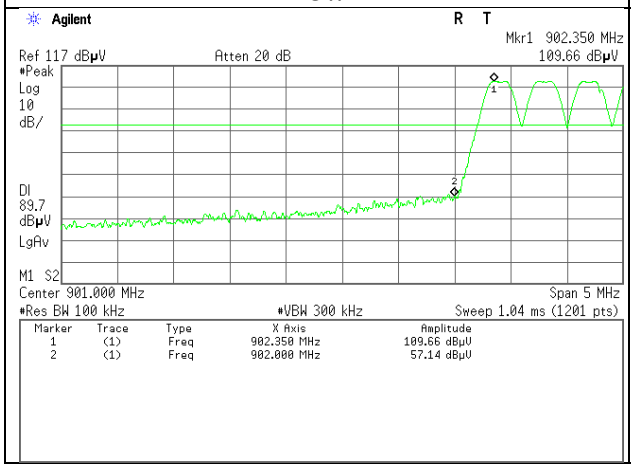


Conducted Emission Band Edge compliance

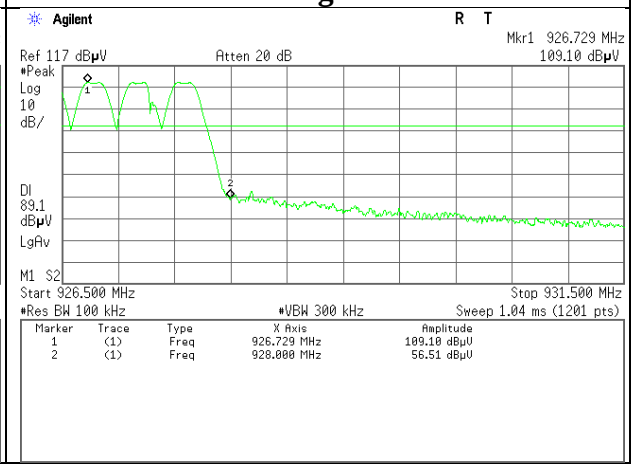
Report No.	12261916S-R2
Test place	Shonan EMC Lab. No.1 Measurement Room
Date	May 25, 2018
Temperature / Humidity	25 deg. C / 55 % RH
Engineer	Makoto Hosaka
Mode	Tx

200 kbps, Hopping On

Low

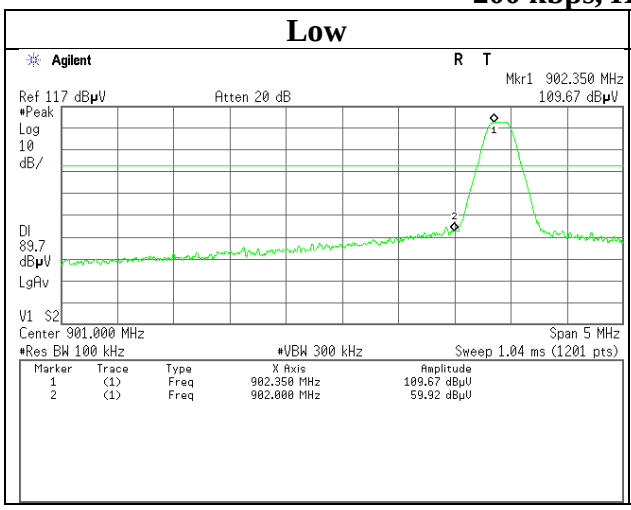


High

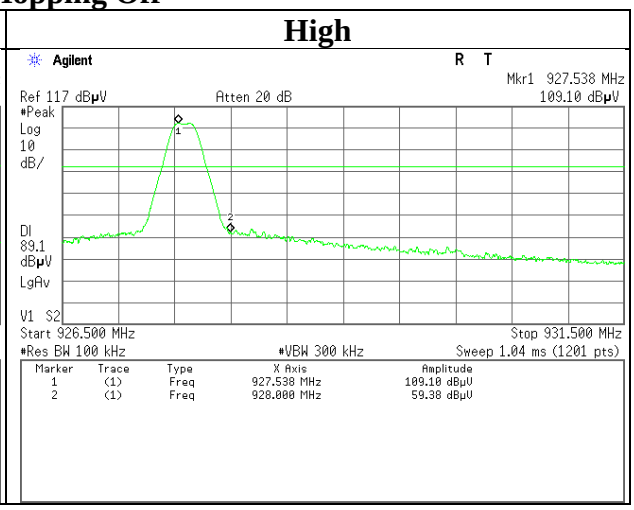


200 kbps, Hopping Off

Low



High



APPENDIX 2: Test instruments

Test Instruments

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SPM-06	Power Meter	Anritsu	ML2495A	0850009	AT	2018/05/10 * 12
SPSS-03	Power sensor	Anritsu	MA2411B	0917063	AT	2018/05/10 * 12
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	AT	2018/03/05 * 12
SAT10-15	Attenuator	Weinschel Corp.	54A-10	83406	AT	2017/12/08 * 12
SCC-G12	Coaxial Cable	Suhner	SUCOFLEX 102	30790/2	AT	2018/03/19 * 12
SCC-H14	Microwave cable	RS Pro	R-132G7210 100CO	-	AT	2018/04/04 * 12
SOS-09	Humidity Indicator	A&D	AD-5681	4061484	AT	2017/12/21 * 12
STS-05	Digital Hitester	Hioki	3805-50	080997828	AT	2017/10/16 * 12
SRENT-09	Spectrum Analyzer	Agilent	E4440A	MY46186392	AT	2017/11/08 * 12
SOS-13	Humidity Indicator	Custom	CTH-202	Q.C.17	AT	2017/12/21 * 12
KTS-08	Digital Tester	SANWA	PC500	7019224	AT	2018/03/05 * 12
SAF-06	Pre Amplifier	TOYO Corporation	TPA0118-36	2046104	RE	2017/09/22 * 12
SCC-G06	Coaxial Cable	Junkosha	J12J102207-00	MAY-23-16-09 1	RE	2017/06/13 * 12
SCC-G23	Coaxial Cable	Suhner	SUCOFLEX 104	297342/4	RE	2018/05/11 * 12
SCC-G40	Coaxial Cable	Junkosha	MWX221-01000NF SNMS/B	1612S005	RE	2018/01/29 * 12
SHA-03	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-739	RE	2017/08/23 * 12
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2017/10/30 * 12
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	RE	2018/03/05 * 12
SJM-02	Measure	KOMELON	KMC-36	-	RE, CE	-
SAEC-03(SVS WR)	Semi-Anechoic Chamber	TDK	SAEC-03(SVSWR)	3	RE	2017/07/17 * 12
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE, RFI,MF)	-	RE, CE	-
STS-03	Digital Hitester	Hioki	3805-50	080997823	RE	2017/10/16 * 12
SAT10-06	Attenuator	Agilent	8493C-010	74865	RE	2017/11/22 * 12
SFL-22	Highpass Filter	MICRO-TRONICS	HPM50114	G035	RE	2018/04/10 * 12
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	2017/06/11 * 12
SBA-03	Biconical Antenna	Schwarzbeck	BBA9106	91032666	RE	2017/10/02 * 12
SLA-07	Logperiodic Antenna	Schwarzbeck	VUSLP9111B	196	RE	2018/01/30 * 12
SAT6-08	Attenuator	HIROSE ELECTRIC CO.,LTD.	AT-406(40)	-	RE	2017/08/24 * 12
SCC-C1/C2/C3/ C4/C5/C10/SRS E-03	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhne r/Suhner/Suhner/Suhner/ TOYO	8D2W/12DSFA/141 PE/141PE/141PE/14 1PE/NS4906	-/0901-271(RF Selector)	RE	2018/04/09 * 12
SAF-03	Pre Amplifier	SONOMA	310N	290213	RE	2018/02/16 * 12
STR-08	Test Receiver	Rohde & Schwarz	ESW44	101581	RE, CE	2017/11/24 * 12
SCC-C9/C10/S RSE-03	Coaxial Cable&RF Selector	Suhner/Suhner/TOYO	RG223U/141PE/NS 4906	-/0901-271(RF Selector)	CE	2018/04/09 * 12
SLS-05	LISN	Rohde & Schwarz	ENV216	100516	CE	2018/02/26 * 12
SAT3-07	Attenuator	JFW	50HF-003N	-	CE	2017/09/08 * 12
SOS-06	Humidity Indicator	A&D	AD-5681	4062118	CE	2017/12/21 * 12

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: **CE: Conducted Emission test**
RE: Radiated Emission test
AT: Antenna Terminal Conducted test