RADIO TEST REPORT

Test Report No. : 12442164S-C-R2

Applicant	:	**Sony Corporation**
Type of Equipment	:	**Digital Music Player**
Model No.	:	**DMP-Z1**
FCC ID	:	**AK8DMPZ1**
Test regulation	:	**FCC Part 15 Subpart C: 2018** *** Bluetooth part**
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 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. This report is a revised version of 12442164S-C-R1. 12442164S-C-R1 is replaced with this report.

Date of test: August 1 to September 15, 2018

Representative test engineer:
Shiro Kobayashi
Engineer
Consumer Technology Division

Approved by:
Toyokazu Imamura
Leader
Consumer Technology Division

RTL02610

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

UL Japan, Inc.
Shonan EMC Lab.
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN
Telephone : +81 463 50 6400
Facsimile : +81 463 50 6401

REVISION HISTORY

Original Test Report No.: 12442164S-C

Revision	Test report No.	Date	Page revised	Contents
- (Original)	12442164S-C	September 7, 2018	-	-
1	12442164S-C-R1	September 26, 2018	1, 17-20, 22-26, 28-31, 37-42, 46-48, 50-52	Update due to Additional test
			4	Correction of Rating: from "AC 100 V - 240 V, 50 Hz / 60 Hz" to "DC 19.5 V" Correction of Radio specification from "Bluetooth BDR" to "Bluetooth BDR/EDR" Correction of modulation from "GFSK, FHSS" to "GFSK, π/4-DQPSK, 8DPSK, FHSS"
			8	Correction of operation mode (3DH5 has been added.)
			10, 12	Addition of Connection and configuration of test equipment
			11	Deletion of *2) and *3) (Contents has been moved to page 12)
2	12442164S-C-R2	September 27, 2018	17, 18	Correction of Model No.: from Temporary No. to Official No.
			19	Correction of Model No.: from Temporary No. to Official No. Correction of Mode: from "Tx_BT_EDR 2402MHz" to "Tx_BT_EDR 2480MHz"
			20	Correction of Number of digits of 99 % Occupied Bandwidth data: from "78610.500" to "78610.5" "1200.848" to "1200.8" "1196.526" to "1196.5" "1193.421" to "1193.4" "78762.600" to "78762.6"

UL Japan, Inc.
Shonan EMC Lab.
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN
Telephone : +81 463 50 6400
Facsimile : +81 463 50 6401

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SECTION 1: Customer information

Company Name	:	Sony Corporation
Brand Name	:	SONY
Address	:	1-7-1 Konan, Minato-ku, Tokyo 108-0075, Japan

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

2.1 Identification of E.U.T.

Type of Equipment	:	Digital Music Player
Model No.	:	DMP-Z1
Serial No.	:	Refer to Clause 4.2
Rating	:	DC 19.5 V
Receipt Date of Sample	:	July 24, 2018
Country of Mass-production	:	Malaysia
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: DMP-Z1 (referred to as the EUT in this report) is a Digital Music Player.

Radio Specification

Bluetooth BDR/EDR

Radio Type	:	Transceiver
Frequency of Operation	:	2402 MHz - 2480 MHz
Modulation	:	GFSK, π/4-DQPSK, 8DPSK, FHSS
Antenna type	:	Inverted F
Antenna Gain	:	1.9 dBi
Clock frequency (Maximum)	:	26 MHz

NFC

Radio Type	:	Transceiver
Frequency of Operation	:	13.56 MHz
Modulation	:	ASK
Antenna type	:	Loop
Clock frequency (Maximum)	:	27.12 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

* Also the EUT complies with FCC Part 15 Subpart B.

3.2 Procedures and results

Item	Procedure	Specification	Worst Margin	Results	Remarks
Conducted Emission	**FCC:** ANSI C63.10-2013 6. Standard test methods	**FCC:** Section 15.207	16.8 dB, 0.48647 MHz, L1 QP, Tx 2441 MHz	Complied	-
	IC: RSS-Gen 8.8	**IC:** RSS-Gen 8.8			
Carrier Frequency Separation	**FCC:** FCC Public Notice DA 00-705	**FCC:** Section15.247(a)(1)	See data.	Complied	Conducted
	IC: -	**IC:** RSS-247 5.1 (b)			
20dB Bandwidth	**FCC:** FCC Public Notice DA 00-705	**FCC:** Section15.247(a)(1)		Complied	Conducted
	IC: -	**IC:** RSS-247 5.1 (a)			
Number of Hopping Frequency	**FCC:** FCC Public Notice DA 00-705	**FCC:** Section15.247(a)(1)(iii)		Complied	Conducted
	IC: -	**IC:** RSS-247 5.1 (d)			
Dwell time	**FCC:** FCC Public Notice DA 00-705	**FCC:** Section15.247(a)(1)(iii)		Complied	Conducted
	IC: -	**IC:** RSS-247 5.1 (d)			
Maximum Peak Output Power	**FCC:** FCC Public Notice DA 00-705	**FCC:** Section15.247(a)(b)(1)		Complied	Conducted
	IC: RSS-Gen 6.12	**IC:** RSS-247 5.4 (b)			
Spurious Emission & Band Edge Compliance	**FCC:** FCC Public Notice DA 00-705	**FCC:** Section15.247(d)	9.8 dB 9608.00 MHz, AV, Vertical Tx 2402 MHz	Complied	Conducted/ Radiated (above 30 MHz) *1)
	IC: RSS-Gen 6.13	**IC:** RSS-247 5.5 RSS-Gen 8.9 RSS-Gen 8.10			
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)
This EUT provides stable voltage constantly to RF transmitter regardless of input voltage. Therefore, this EUT complies with the requirement.

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

3.3 Addition to standard

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
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

UL Japan, Inc. Shonan EMC Lab.
1-22-3, Megumigaoka, Hiratsuka-shi, Kanagawa-ken 259-1220 JAPAN
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)

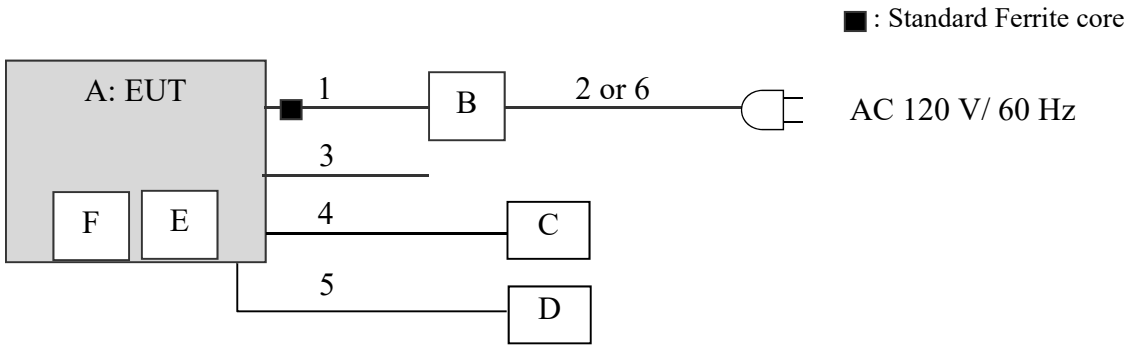
Test Item	Mode	Tested frequency
Conducted Emission, Spurious Emission (Conducted/Radiated)	Tx (Hopping Off) DH5, 3DH5	2402 MHz 2441 MHz 2480 MHz
Carrier Frequency Separation	Tx (Hopping On) DH5, 3DH5	2402 MHz 2441 MHz 2480 MHz
20dB Bandwidth	Tx (Hopping Off) DH5, 3DH5	2402 MHz 2441 MHz 2480 MHz
Number 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)
* 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
- EUT firmware: Diagnosis ver. 3.04.02 (TEST MODE)

*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	Digital Music Player	DMP-Z1	1000689 *1) 1000690 *2)	Sony Corporation	EUT
B	AC Adapter	ACDP-045L01	1805000181	Sony Corporation	-
C	Headphones	MDR-1AM2	-	Sony Corporation	-
D	Headphones	MDR-1AM2	-	Sony Corporation	-
E	micro SDHC card	SR-8C4	TVLN003068885	Sony Corporation	-
F	micro SDHC card	SR-16C4	TPSN002554976	Sony Corporation	-

*1) Used for Antenna Terminal conducted test
*2) Used for Conducted Emission test and Radiated Emission test

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	DC	1.4	Unshielded	Unshielded	-
2	AC	0.5	Unshielded	Unshielded	*3)
3	USB	1.0	Shielded	Shielded	-
4	Audio	1.2	Unshielded	Unshielded	-
5	Audio	1.2	Unshielded	Unshielded	-
6	AC	1.8	Unshielded	Unshielded	*4)

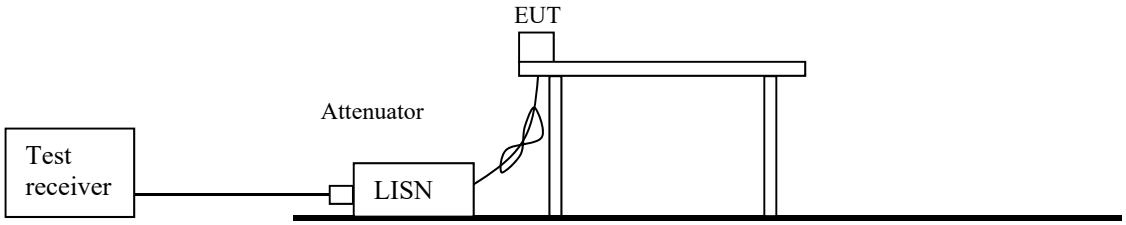
*3) Used for Antenna Terminal conducted test and Radiated Emission test
*4) Used for Conducted Emission test

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 expanded polystyrol and expanded polypropylene and the table top is covered with polycarbonate. 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).
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

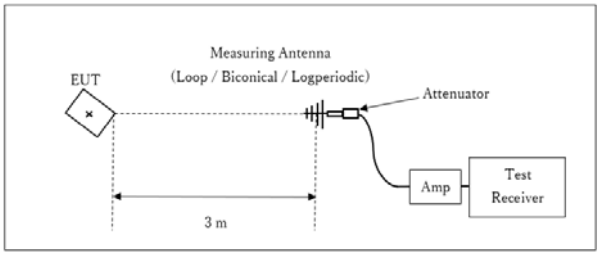
*1) Although DA 00-705 accepts VBW = 10 Hz for AV measurements, it was confirmed that superfluous smoothing was not performed.

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

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

Measurement range : 30 MHz – 26.5 GHz
Test data : APPENDIX
Test result : Pass

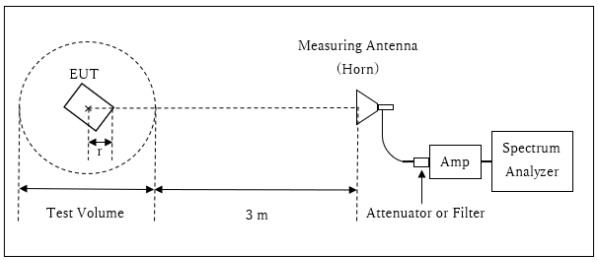
Below 1 GHz



× : Center of turn table

Test Distance: 3 m

1 GHz - 13 GHz

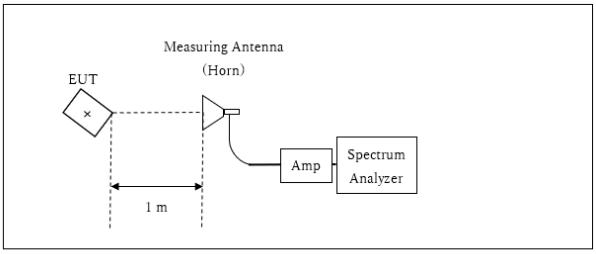


r : Radius of an outer periphery of EUT
× : Center of turn table

Distance Factor: 20 x log (3.85 m*/3.0 m) = 2.17 dB
* Test Distance: (3 + Test Volume /2) - r = 3.85 m

Test Volume : 2 m
(Test Volume has been calibrated based on CISPR 16-1-4.)
r = 0.15 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

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	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 *1)	Spectrum Analyzer
Maximum Peak Output Power	-	-	-	Auto	Peak Average *2)	-	Power Meter (Sensor: 160 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 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.
(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.

Test data : APPENDIX
Test result : Pass

APPENDIX 1: Test data

Conducted Emission

DATA OF CONDUCTED EMISSION TEST

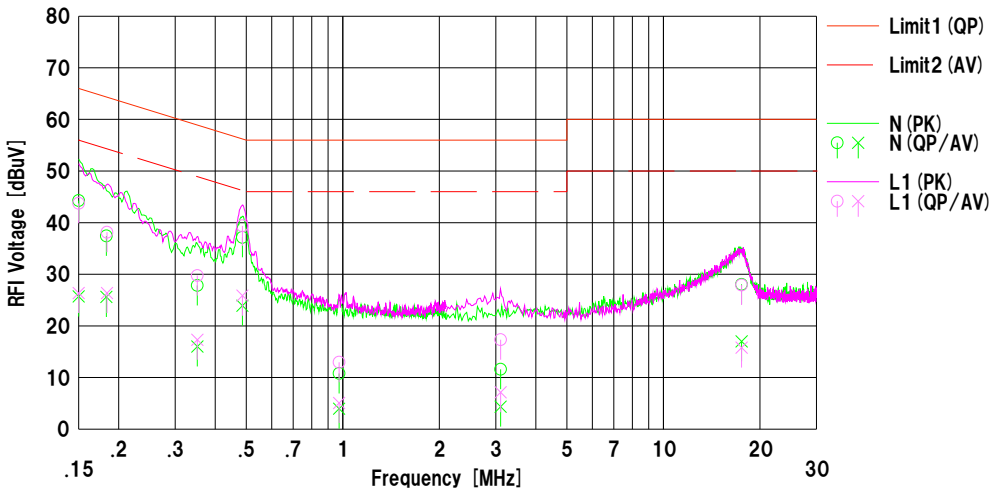
UL Japan,Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2018/08/08

Company : Sony Corporation
Kind of EUT : Digital Music Player
Model No. : DMP-Z1
Serial No. : 1000690
Remarks : -

Mode : Tx_BT 2441 MHz
Order No. : 12442164S
Power : AC 120 V / 60 Hz
Temp./Humi. : 25 deg.C / 40 %RH

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

Engineer : Makoto Hosaka



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	0.15000	31.90	13.32	12.38	44.28	25.70	66.00	56.00	21.7	30.3	N	
2	0.18311	25.03	13.22	12.39	37.42	25.61	64.34	54.34	26.9	28.7	N	
3	0.35174	15.42	3.60	12.41	27.83	16.01	58.92	48.92	31.0	32.9	N	
4	0.48647	24.74	11.52	12.41	37.15	23.93	56.23	46.23	19.0	22.3	N	
5	0.97415	-1.68	-8.51	12.46	10.78	3.95	56.00	46.00	45.2	42.0	N	
6	3.10469	-0.97	-8.22	12.56	11.59	4.34	56.00	46.00	44.4	41.6	N	
7	17.52580	14.84	3.79	13.21	28.05	17.00	60.00	50.00	31.9	33.0	N	
8	0.15000	31.37	13.98	12.38	43.75	26.36	66.00	56.00	22.2	29.6	L1	
9	0.18393	25.75	13.97	12.39	38.14	26.36	64.31	54.31	26.1	27.9	L1	
10	0.35174	17.33	4.89	12.41	29.74	17.30	58.92	48.92	29.1	31.6	L1	
11	0.48647	26.97	13.45	12.41	39.38	25.86	56.23	46.23	16.8	20.3	L1	
12	0.97415	0.49	-7.40	12.46	12.95	5.06	56.00	46.00	43.0	40.9	L1	
13	3.10469	4.76	-5.42	12.56	17.32	7.14	56.00	46.00	38.6	38.8	L1	
14	17.52580	14.69	2.58	13.21	27.90	15.79	60.00	50.00	32.1	34.2	L1	

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

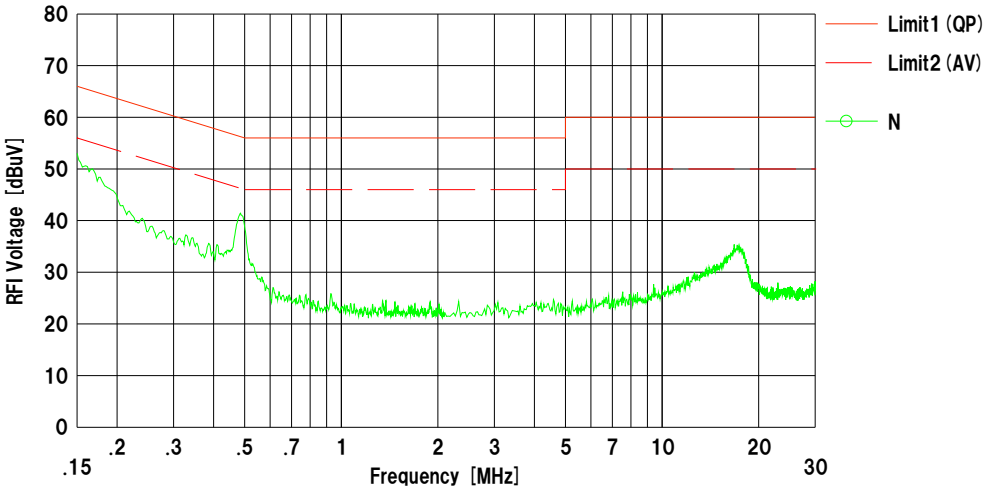
DATA OF CONDUCTED EMISSION TEST

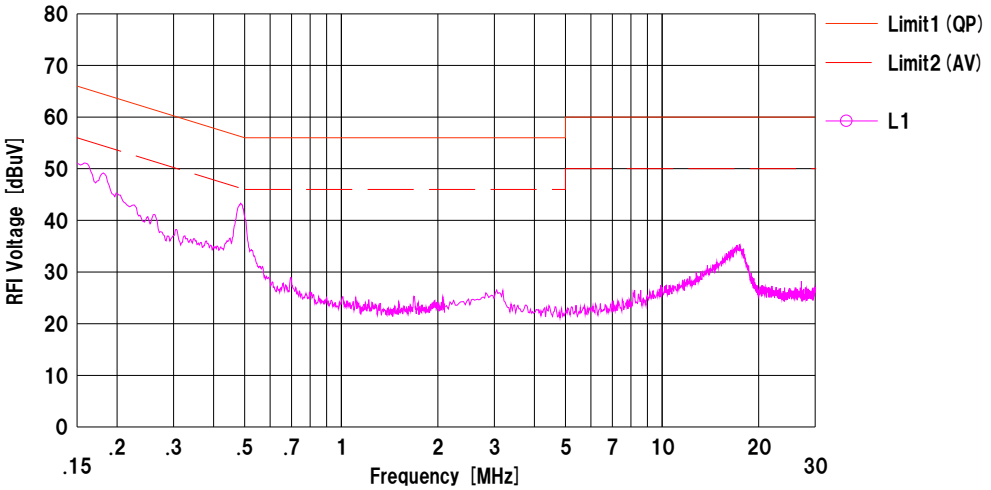
UL Japan,Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2018/08/08

Company	: Sony Corporation	Mode	: Tx_BT 2402 MHz
Kind of EUT	: Digital Music Player	Order No.	: 12442164S
Model No.	: DMP-Z1	Power	: AC 120 V / 60 Hz
Serial No.	: 1000690	Temp./Humi.	: 25 deg.C / 40 %RH
Remarks	: -		

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

Engineer : Makoto Hosaka





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

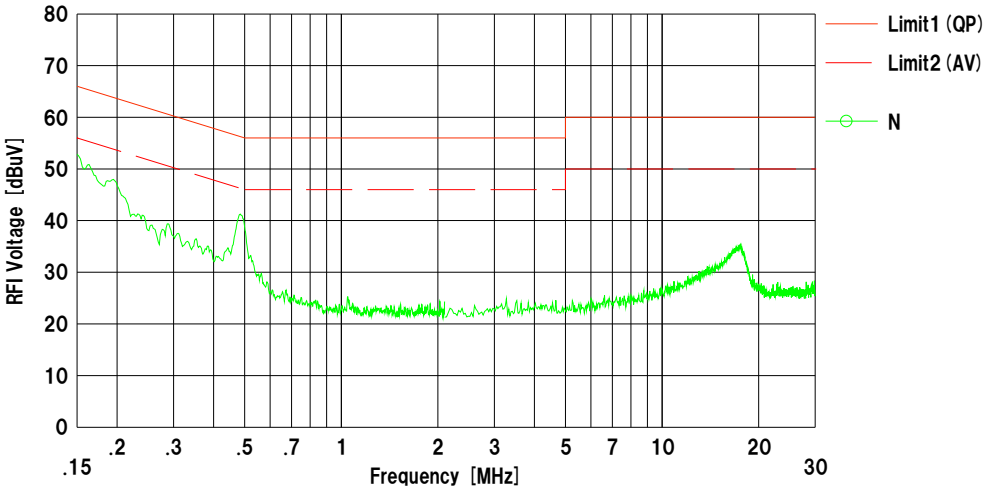
DATA OF CONDUCTED EMISSION TEST

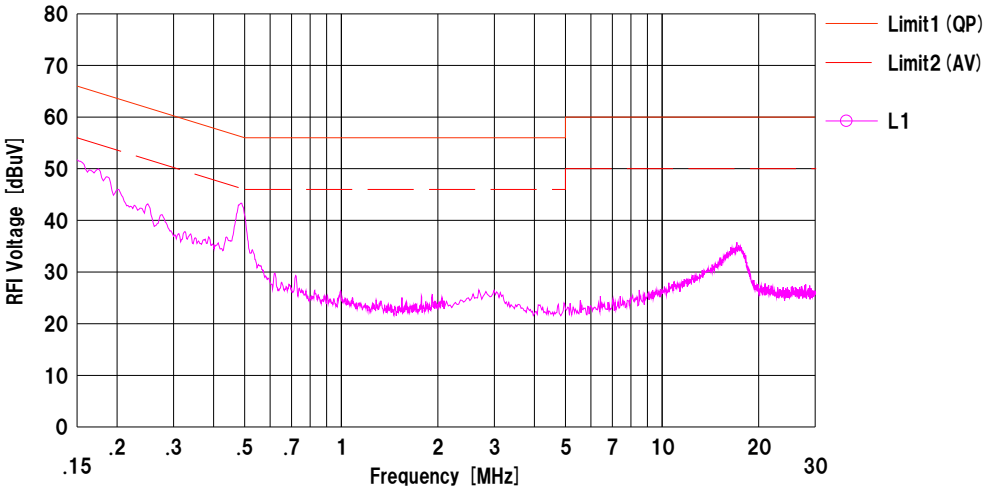
UL Japan,Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2018/08/08

Company	: Sony Corporation	Mode	: Tx_BT 2480 MHz
Kind of EUT	: Digital Music Player	Order No.	: 12442164S
Model No.	: DMP-Z1	Power	: AC 120 V / 60 Hz
Serial No.	: 1000690	Temp./Humi.	: 25 deg.C / 40 %RH
Remarks	: -		

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

Engineer : Makoto Hosaka





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

DATA OF CONDUCTED EMISSION TEST

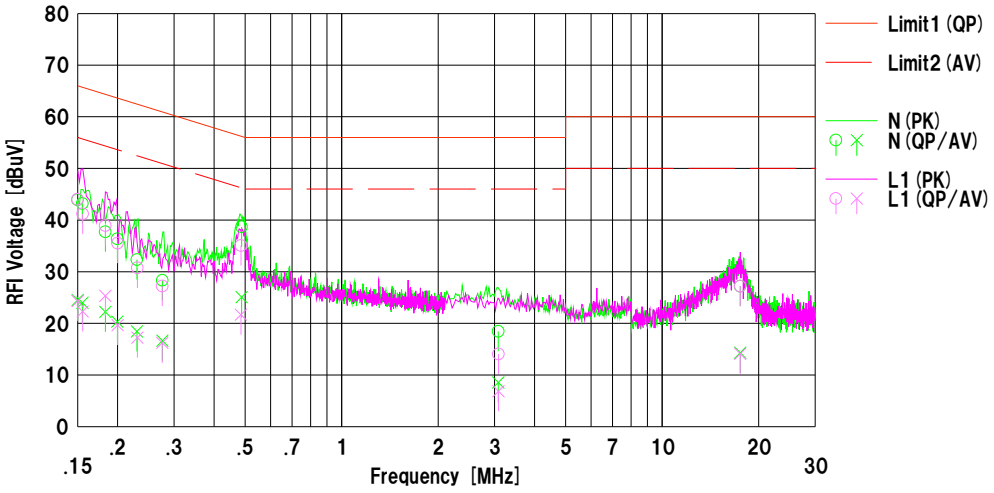
UL Japan,Inc. Shonan EMC Lab. No.1 Semi-Anechoic Chamber
Date : 2018/09/15

Company : Sony Corporation
Kind of EUT : Digital Music Player
Model No. : DMP-Z1
Serial No. : 1000690
Remarks : -

Mode : Tx_BT_EDR 2441MHz
Order No. : 12442164S
Power : AC 120 V / 60 Hz
Temp./Humi. : 24 deg.C / 65 %RH

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

Engineer : Yasumasa Owaki



No.	Freq.	Reading <QP>	Reading <AV>	C.Fac	Results <QP>	Results <AV>	Limit <QP>	Limit <AV>	Margin <QP>	Margin <AV>	Phase	Comment
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.15000	31.50	12.10	12.40	43.90	24.50	66.00	56.00	22.1	31.5	N	
2	0.15531	30.80	11.60	12.40	43.20	24.00	65.71	55.71	22.5	31.7	N	
3	0.18314	25.30	9.80	12.42	37.72	22.22	64.34	54.34	26.6	32.1	N	
4	0.19964	23.90	7.90	12.44	36.34	20.34	63.63	53.63	27.2	33.2	N	
5	0.22970	19.90	6.00	12.43	32.33	18.43	62.46	52.46	30.1	34.0	N	
6	0.27579	15.90	4.20	12.42	28.32	16.62	60.94	50.94	32.6	34.3	N	
7	0.48736	26.20	12.60	12.47	38.67	25.07	56.21	46.21	17.5	21.1	N	
8	3.08187	5.80	-4.10	12.65	18.45	8.55	56.00	46.00	37.5	37.4	N	
9	17.52557	13.80	0.90	13.40	27.20	14.30	60.00	50.00	32.8	35.7	N	
10	0.15000	31.60	11.90	12.40	44.00	24.30	66.00	56.00	22.0	31.7	L1	
11	0.15559	28.80	9.90	12.40	41.20	22.30	65.70	55.70	24.5	33.4	L1	
12	0.18310	26.50	12.90	12.42	38.92	25.32	64.34	54.34	25.4	29.0	L1	
13	0.19997	23.10	7.20	12.44	35.54	19.64	63.61	53.61	28.0	33.9	L1	
14	0.23043	18.30	4.80	12.43	30.73	17.23	62.43	52.43	31.7	35.2	L1	
15	0.27575	14.80	3.80	12.42	27.22	16.22	60.94	50.94	33.7	34.7	L1	
16	0.48492	22.60	9.20	12.47	35.07	21.67	56.25	46.25	21.1	24.5	L1	
17	3.08507	1.40	-5.80	12.65	14.05	6.85	56.00	46.00	41.9	39.1	L1	
18	17.52740	13.80	0.70	13.40	27.20	14.10	60.00	50.00	32.8	35.9	L1	

Calculation:Result [dBuV] =Reading [dBuV] +C.Fac (LISN (AMN) +Cable+ATT) [dB]
LISN: SLS-03

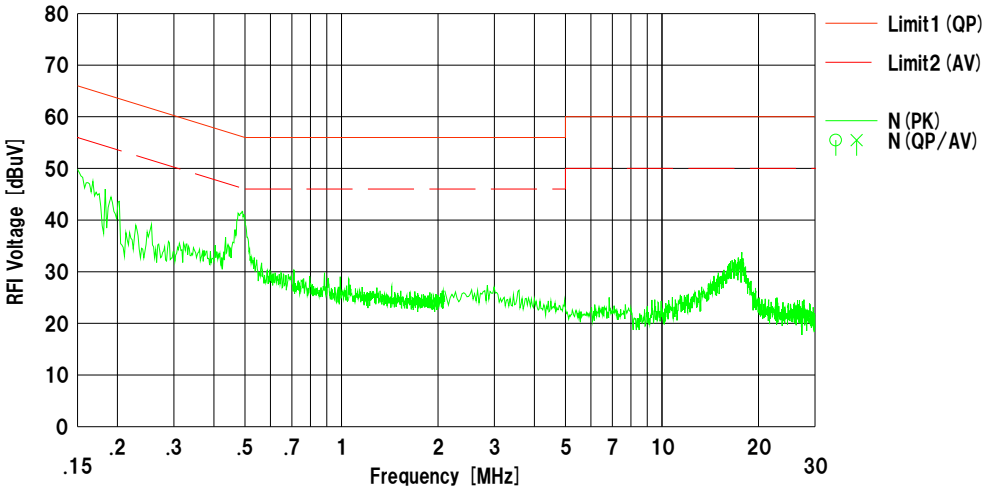
DATA OF CONDUCTED EMISSION TEST

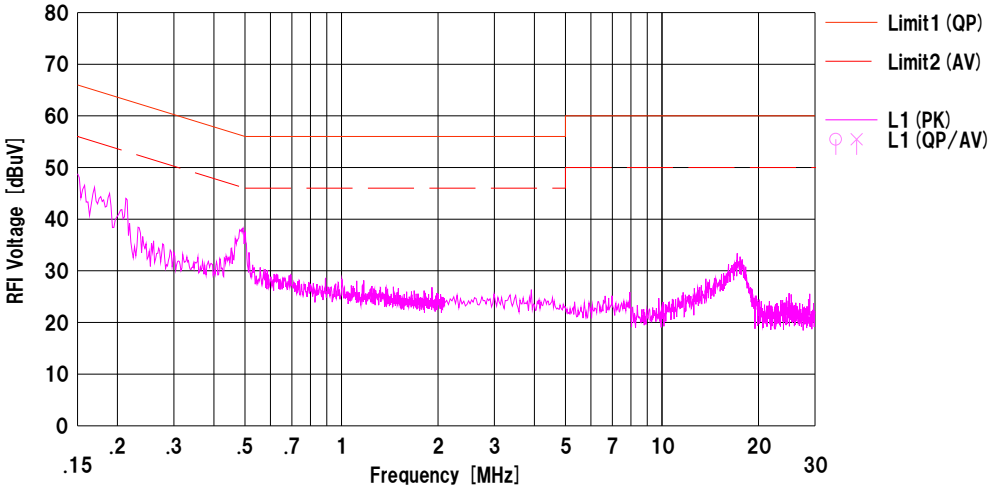
UL Japan,Inc. Shonan EMC Lab. No.1 Semi-Anechoic Chamber
Date : 2018/09/15

Company	: Sony Corporation	Mode	: Tx_BT_EDR 2402MHz
Kind of EUT	: Digital Music Player	Order No.	: 12442164S
Model No.	: DMP-Z1	Power	: AC 120 V / 60 Hz
Serial No.	: 1000690	Temp./Humi.	: 24 deg.C / 65 %RH
Remarks	: -		

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

Engineer : Yasumasa Owaki





Calculation:Result [dBuV] =Reading [dBuV] +C.Fac (LISN (AMN) +Cable+ATT) [dB]
LISN: SLS-03

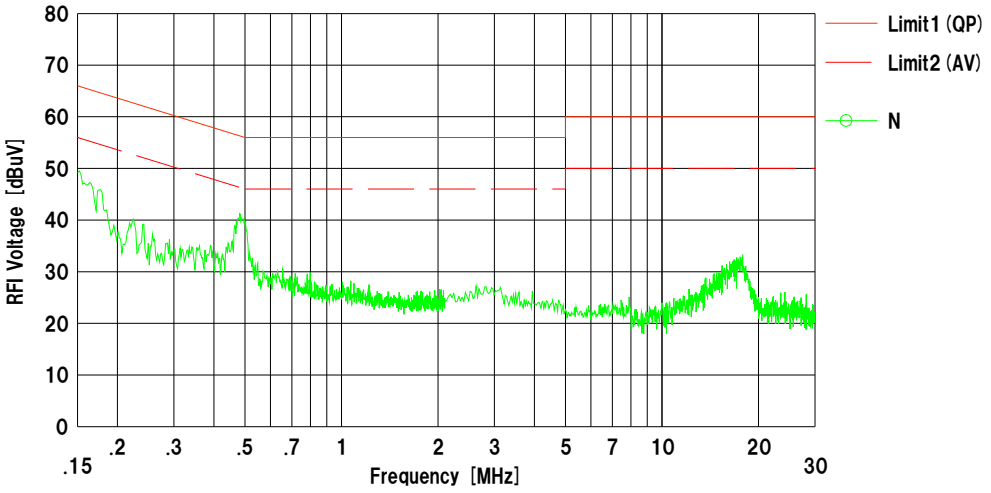
DATA OF CONDUCTED EMISSION TEST

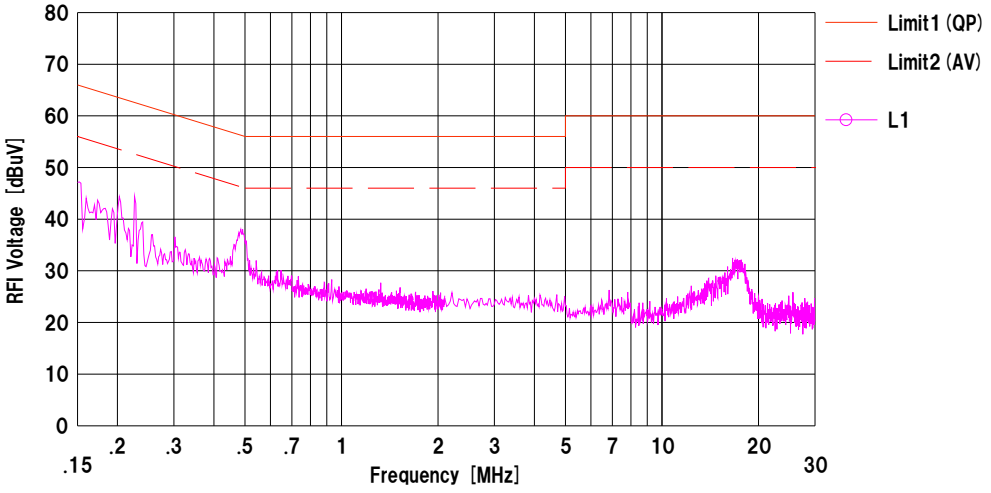
UL Japan,Inc. Shonan EMC Lab. No.1 Semi-Anechoic Chamber
Date : 2018/09/15

Company	: Sony Corporation	Mode	: Tx_BT_EDR 2480MHz
Kind of EUT	: Digital Music Player	Order No.	: 12442164S
Model No.	: DMP-Z1	Power	: AC 120 V / 60 Hz
Serial No.	: 1000690	Temp./Humi.	: 24 deg.C / 65 %RH
Remarks	: -		

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

Engineer : Yasumasa Owaki





Calculation:Result [dBuV] =Reading [dBuV] +C.Fac (LISN (AMN) +Cable+ATT) [dB]
LISN: SLS-03

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

Report No.	12442164S-C-R2	
Test place	Shonan EMC Lab. No.1 Measurement Room /No.6 Shielded Room	
Date	August 2, 2018	September 12, 2018
Temperature / Humidity	25 deg. C / 50 % RH	23 deg. C / 57 % RH
Engineer	Yosuke Ishikawa	Yosuke Ishikawa
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	0.970	887.332	1.003	>= 0.647
DH5	2441.0	1.028	885.708	1.005	>= 0.685
DH5	2480.0	1.030	890.989	1.005	>= 0.687
DH5	Hopping On	-	78610.5	-	-
3DH5	2402.0	1.314	1200.8	1.010	>= 0.876
3DH5	2441.0	1.312	1196.5	1.010	>= 0.874
3DH5	2480.0	1.312	1193.4	1.005	>= 0.875
3DH5	Hopping On	-	78762.6	-	-

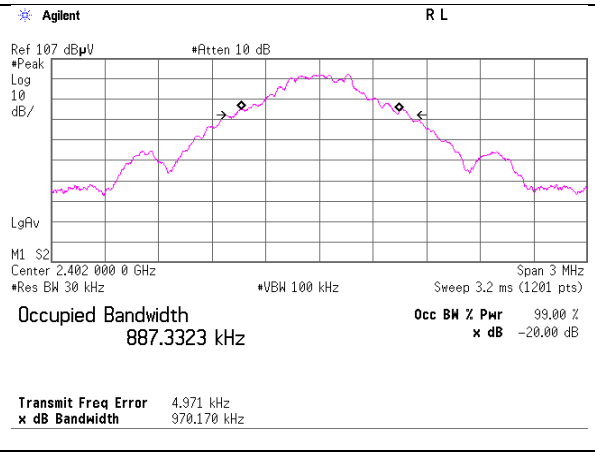
Limit: Two-thirds of 20dB Bandwidth or 25kHz (whichever is greater).
No limit applies to 20dB Bandwidth.

20 dB Bandwidth and Carrier Frequency Separation

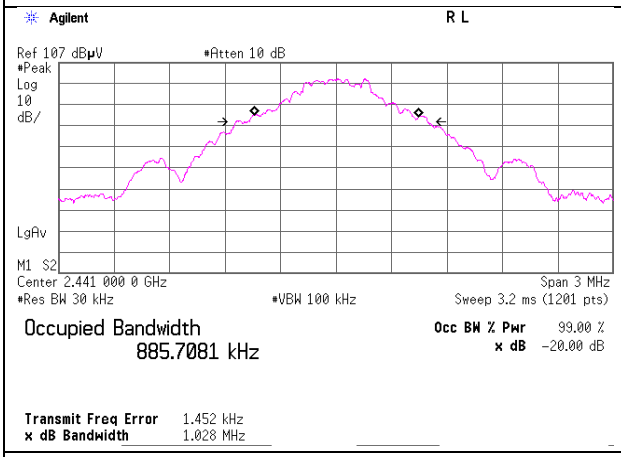
DH5

20 dB Bandwidth

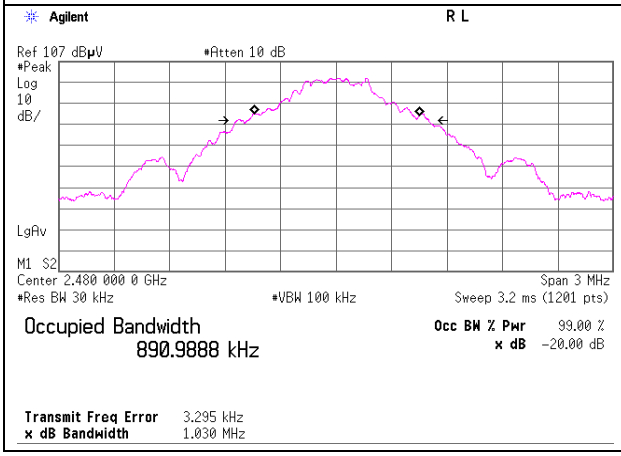
2402 MHz



2441 MHz

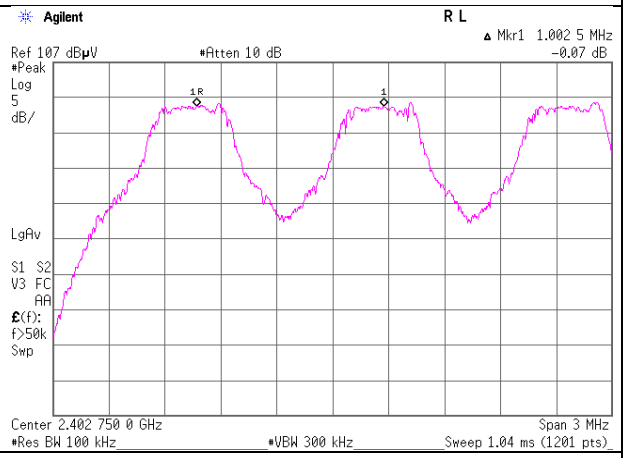


2480 MHz

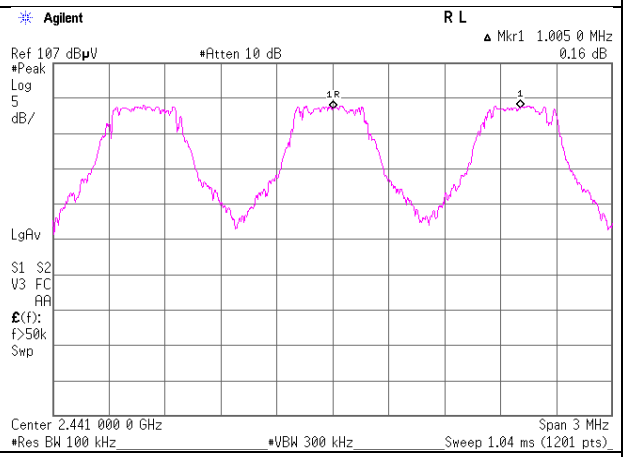


Carrier Frequency Separation

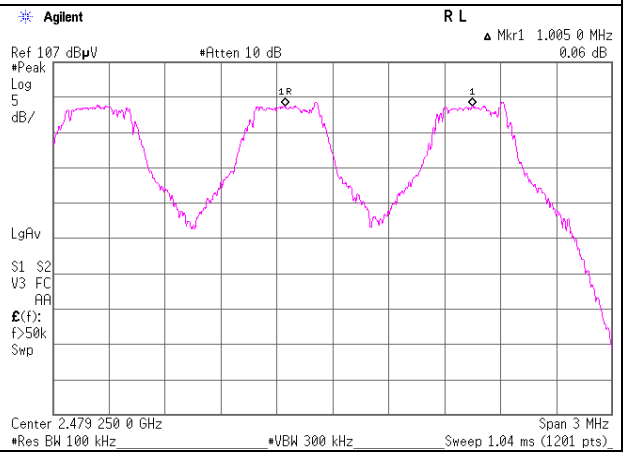
2402 MHz



2441 MHz



2480 MHz

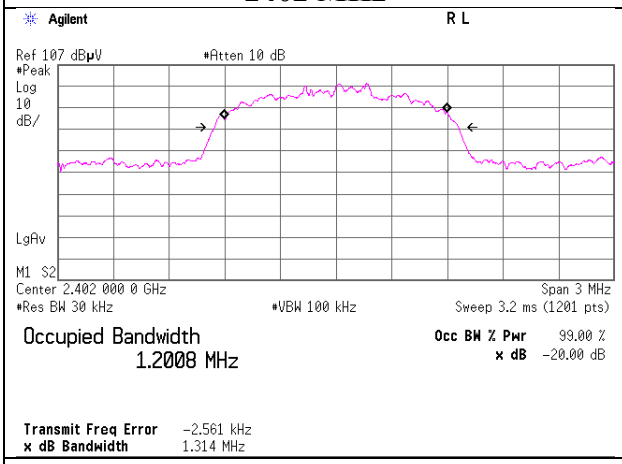


20 dB Bandwidth and Carrier Frequency Separation

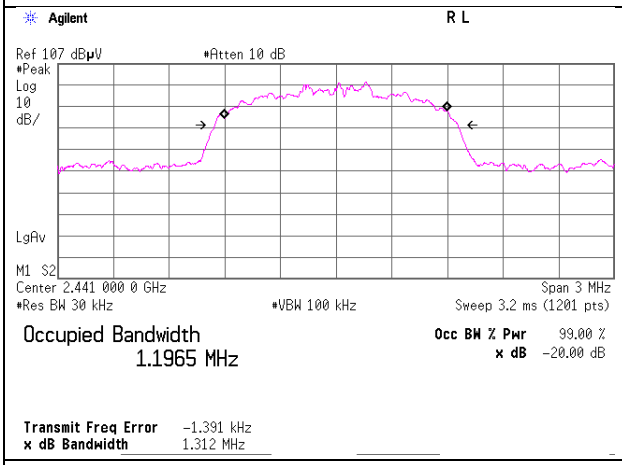
3DH5

20 dB Bandwidth

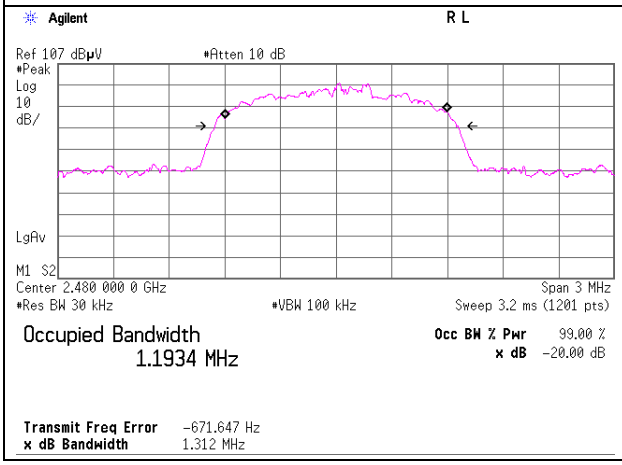
2402 MHz



2441 MHz

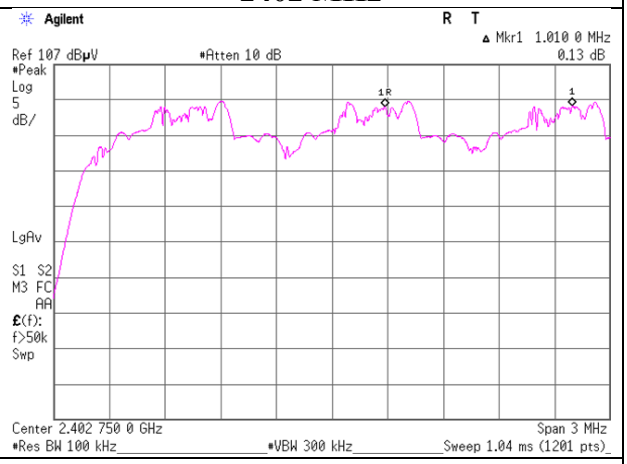


2480 MHz

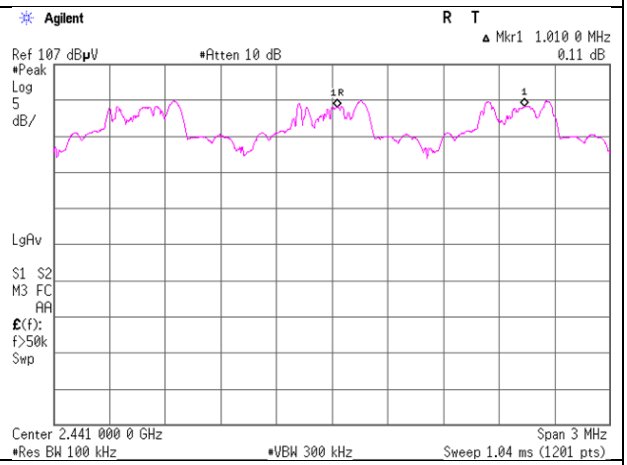


Carrier Frequency Separation

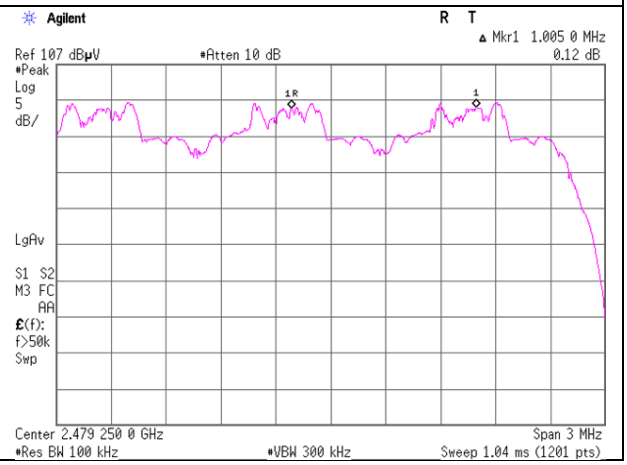
2402 MHz



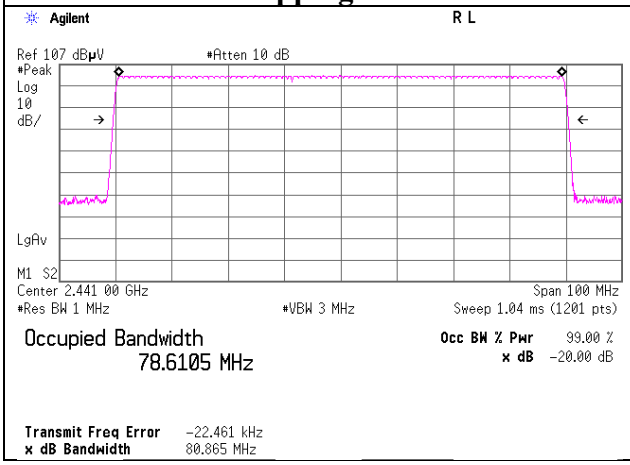
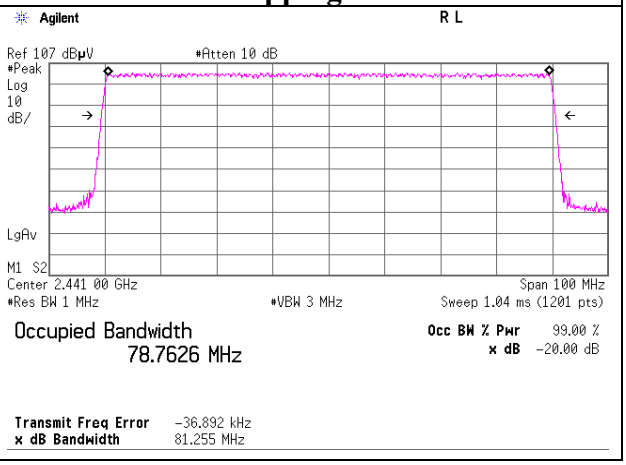
2441 MHz



2480 MHz



99 % Occupied Bandwidth

DH5	3DH5
Hopping On	Hopping On
	

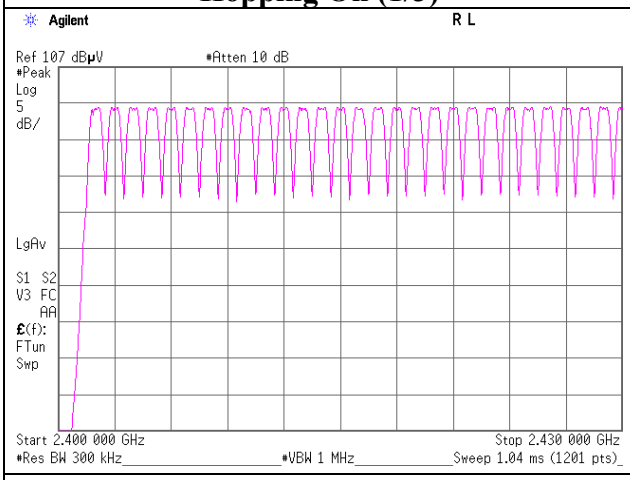
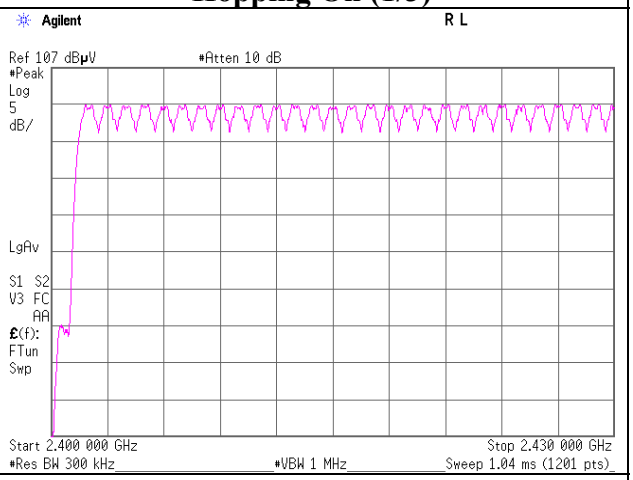
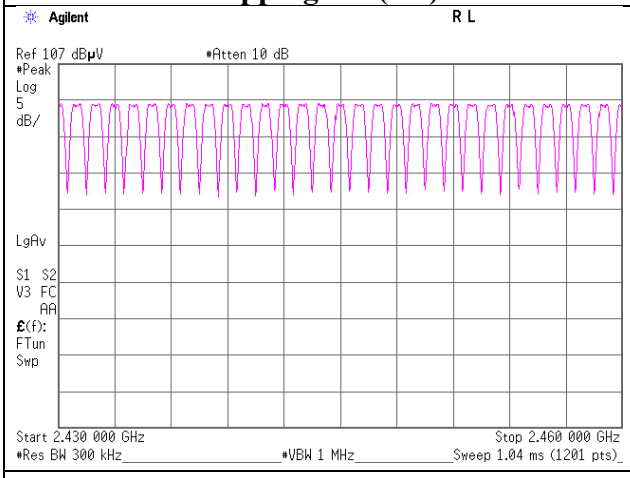
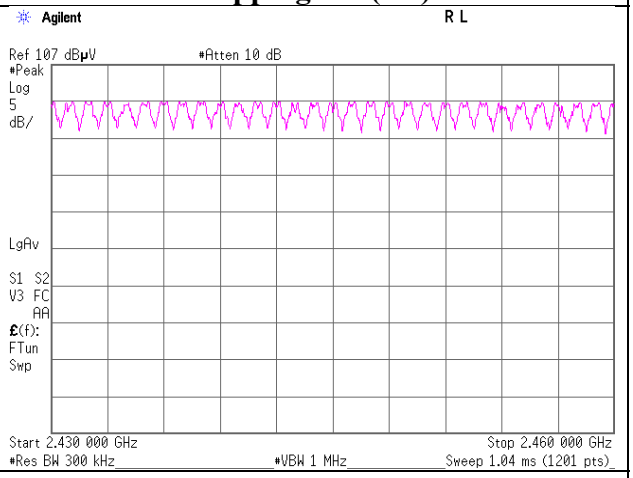
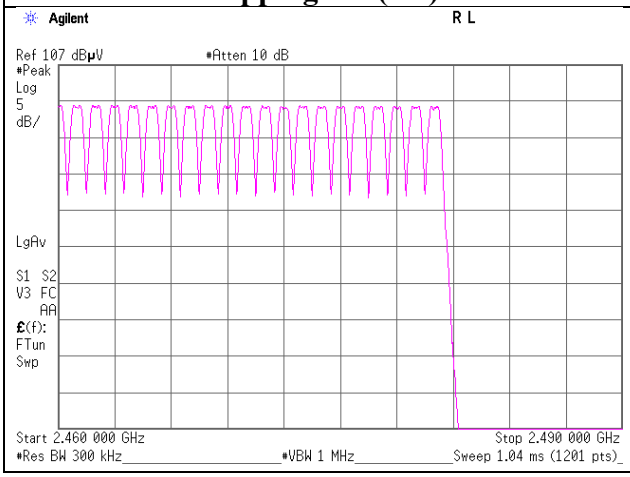
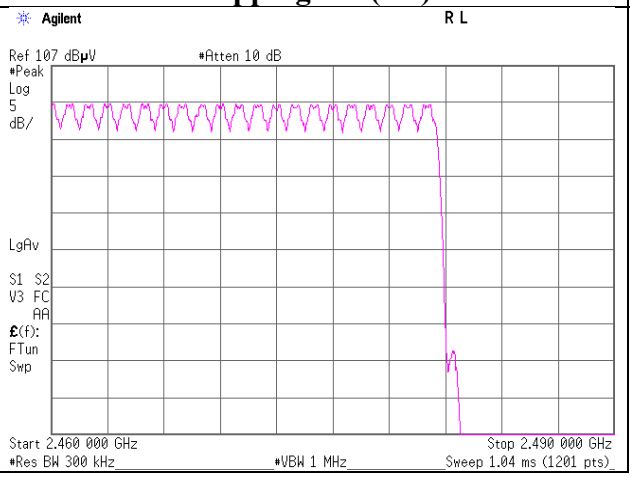
Number of Hopping Frequency

Report No.	12442164S-C-R2	
Test place	Shonan EMC Lab. No.1 Measurement Room /No.6 Shielded Room	
Date	August 2, 2018	September 12, 2018
Temperature / Humidity	25 deg. C / 50 % RH	23 deg. C / 57 % RH
Engineer	Yosuke Ishikawa	Yosuke Ishikawa
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.	12442164S-C-R2	
Test place	Shonan EMC Lab. No.1 Measurement Room / No.6 Shielded Room	
Date	August 2, 2018	September 12, 2018
Temperature / Humidity	25 deg. C / 50 % RH	23 deg. C / 57 % RH
Engineer	Yosuke Ishikawa	Yosuke Ishikawa
Mode	Tx, Hopping On	

Mode	Number of transmission in a 31.6(79 Hopping x 0.4)				Length of transmission [msec]	Result [msec]	Limit [msec]
DH1	48.2 times /	5 sec. x	31.6 sec. =	305 times	0.386	118	400
DH3	26.0 times /	5 sec. x	31.6 sec. =	165 times	1.641	271	400
DH5	16.8 times /	5 sec. x	31.6 sec. =	107 times	2.894	310	400
3DH1	47.6 times /	5 sec. x	31.6 sec. =	301 times	0.391	118	400
3DH3	24.8 times /	5 sec. x	31.6 sec. =	157 times	1.641	258	400
3DH5	16.4 times /	5 sec. x	31.6 sec. =	104 times	2.894	301	400

Sample Calculation
Result = Number of transmission x Length of transmission

*Average data of 5 tests.(except Inquiry)

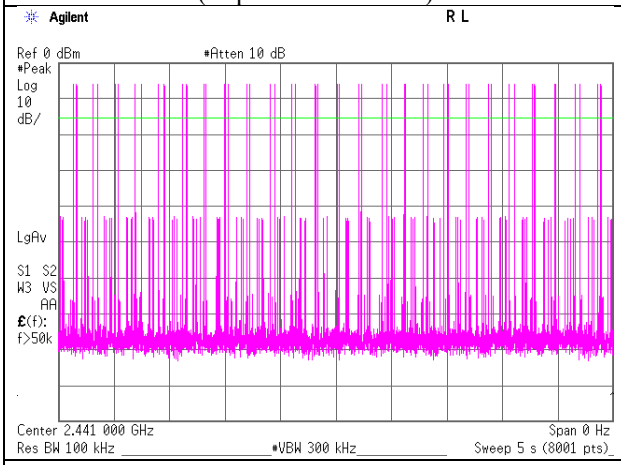
Mode	Sampling [times]					Average [times]
	1	2	3	4	5	
DH1	48	51	44	48	50	48.2
DH3	28	24	28	23	27	26.0
DH5	25	24	13	14	8	16.8
3DH1	45	48	46	49	50	47.6
3DH3	24	24	26	24	26	24.8
3DH5	18	16	16	13	19	16.4

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

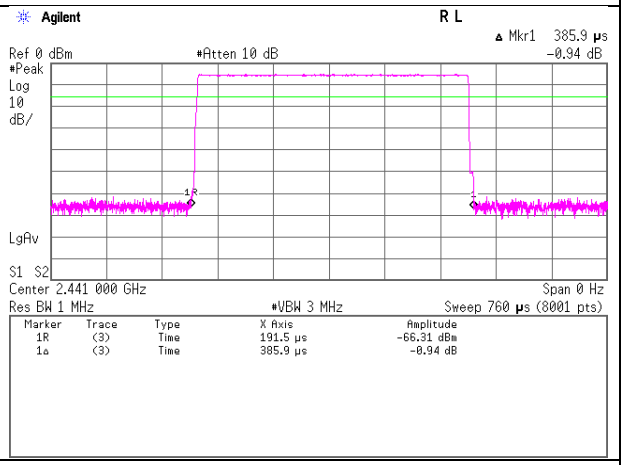
This device complies with the Bluetooth protocol for FHSS operation, employing a pseudo random channel selection and hopping rate to ensure that the occupancy time in N x 0.4s, where N is the number of channels being used in the hopping sequence ($20 \leq N \leq 79$), is always less than 0.4s regardless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

Dwell time

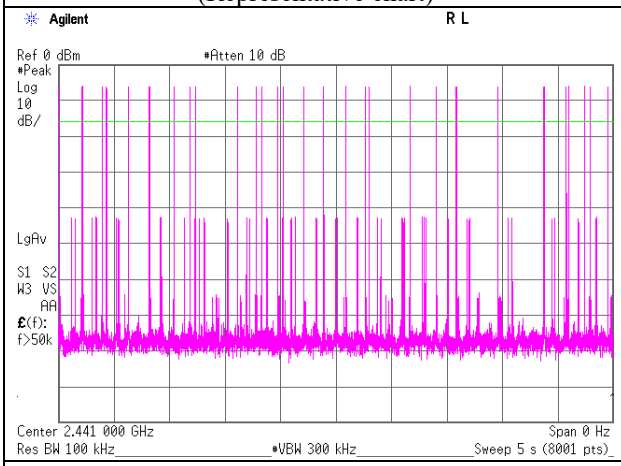
DH1 (1/2)
(Representative chart)



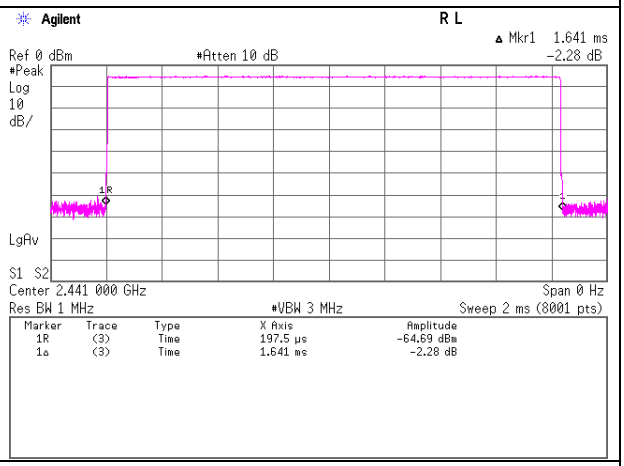
DH1 (2/2)



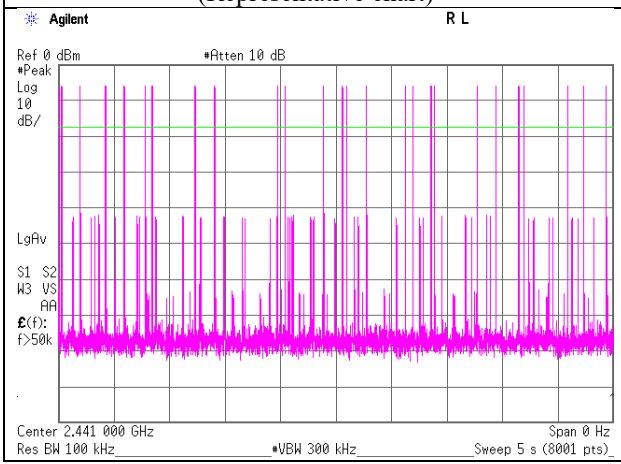
DH3 (1/2)
(Representative chart)



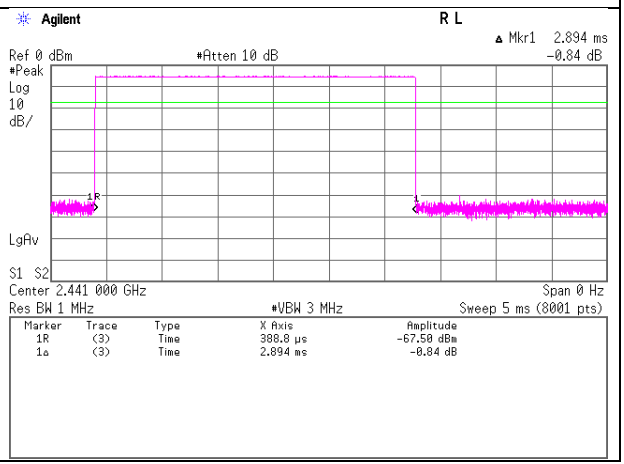
DH3 (2/2)



DH5 (1/2)
(Representative chart)

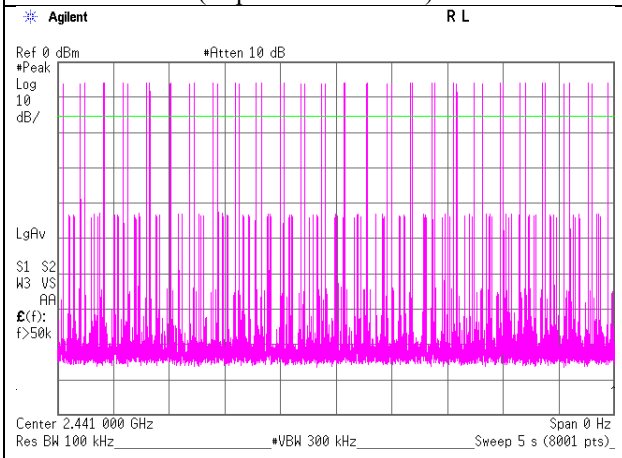


DH5 (2/2)

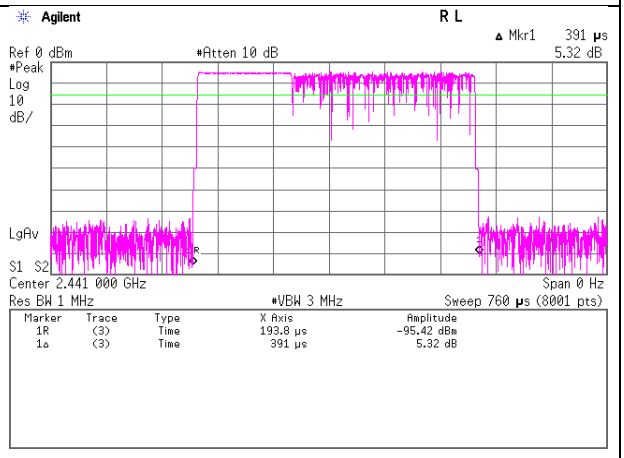


Dwell time

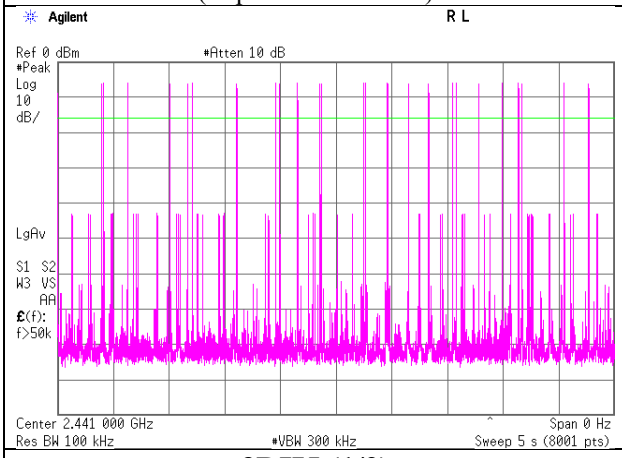
3DH1 (1/2)
(Representative chart)



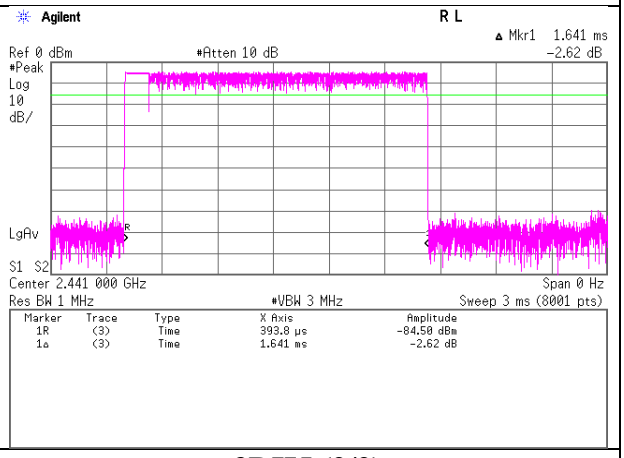
3DH1 (2/2)



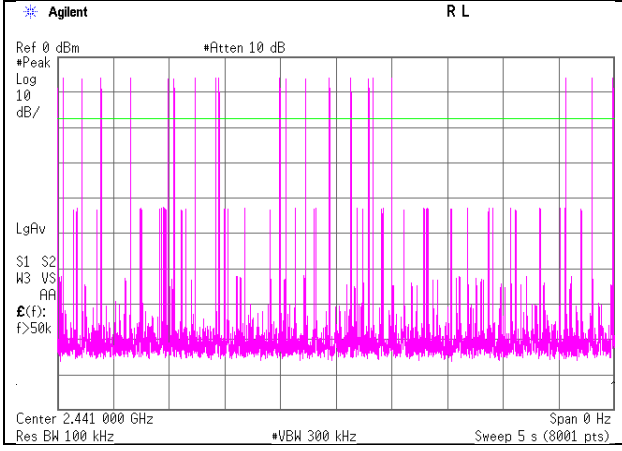
3DH3 (1/2)
(Representative chart)



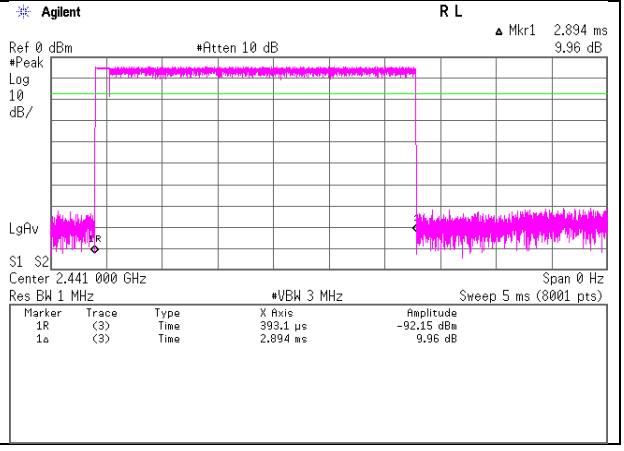
3DH3 (2/2)



3DH5 (1/2)
(Representative chart)



3DH5 (2/2)



Maximum Peak Output Power

Report No.	12442164S-C-R2
Test place	Shonan EMC Lab. No.6 Shielded Room
Date	September 12, 2018
Temperature / Humidity	23 deg. C / 57 % RH
Engineer	Yosuke Ishikawa
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	-4.91	1.62	9.85	6.56	4.53	20.96	125	14.40	1.90	8.46	7.01	36.02	4000	27.56
DH5	2441.0	-4.79	1.62	9.84	6.67	4.65	20.96	125	14.29	1.90	8.57	7.19	36.02	4000	27.45
DH5	2480.0	-5.02	1.63	9.84	6.45	4.42	20.96	125	14.51	1.90	8.35	6.84	36.02	4000	27.67
2DH5	2402.0	-4.70	1.62	9.85	6.77	4.75	20.96	125	14.19	1.90	8.67	7.36	36.02	4000	27.35
2DH5	2441.0	-4.55	1.62	9.84	6.91	4.91	20.96	125	14.05	1.90	8.81	7.60	36.02	4000	27.21
2DH5	2480.0	-4.72	1.63	9.84	6.75	4.73	20.96	125	14.21	1.90	8.65	7.33	36.02	4000	27.37
3DH5	2402.0	-4.57	1.62	9.85	6.90	4.90	20.96	125	14.06	1.90	8.80	7.59	36.02	4000	27.22
3DH5	2441.0	-4.36	1.62	9.84	7.10	5.13	20.96	125	13.86	1.90	9.00	7.94	36.02	4000	27.02
3DH5	2480.0	-4.57	1.63	9.84	6.90	4.90	20.96	125	14.06	1.90	8.80	7.59	36.02	4000	27.22

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.
However, the limit level 125mW of AFH mode was used for the test.

Average Output Power
(Reference data for RF Exposure)

Report No.	12442164S-C-R2
Test place	Shonan EMC Lab. No.6 Shielded Room
Date	September 12, 2018
Temperature / Humidity	23 deg. C / 57 % RH
Engineer	Yosuke Ishikawa
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	-6.41	1.62	9.85	5.06	3.21	1.13	6.19	4.16
DH5	2441.0	-6.29	1.62	9.84	5.17	3.29	1.13	6.30	4.27
DH5	2480.0	-6.52	1.63	9.84	4.95	3.13	1.13	6.08	4.06
2DH5	2402.0	-7.99	1.62	9.85	3.48	2.23	1.12	4.60	2.88
2DH5	2441.0	-7.93	1.62	9.84	3.53	2.25	1.12	4.65	2.92
2DH5	2480.0	-8.25	1.63	9.84	3.22	2.10	1.12	4.34	2.72
3DH5	2402.0	-7.99	1.62	9.85	3.48	2.23	1.12	4.60	2.88
3DH5	2441.0	-7.93	1.62	9.84	3.53	2.25	1.12	4.65	2.92
3DH5	2480.0	-8.24	1.63	9.84	3.23	2.10	1.12	4.35	2.72

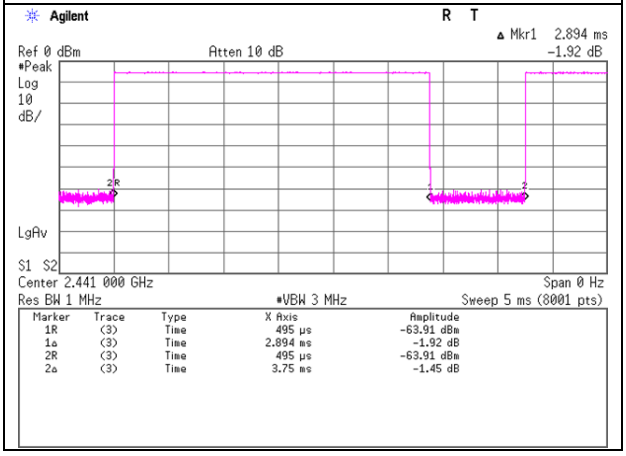
Sample Calculation:
Result (Time average) = Reading + Cable Loss (including the cable(s) customer supplied) + Attenuator Loss
Result (Burst power average) = Time average + Duty factor

Burst Rate Confirmation

Report No.	12442164S-C-R2
Test place	Shonan EMC Lab. No.1 Measurement Room
Date	August 2, 2018
Temperature / Humidity	25 deg. C / 50 % RH
Engineer	Yosuke Ishikawa
Mode	Tx, Hopping Off

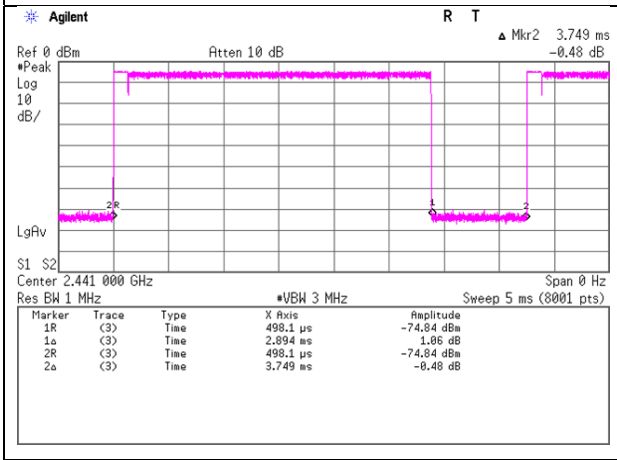
DH5

Tx on / (Tx on + Tx off) =	**0.772**
Tx on / (Tx on + Tx off) * 100 =	**77.2 %**
Duty factor = 10 * log (3.75 / 2.894) =	**1.13 dB**



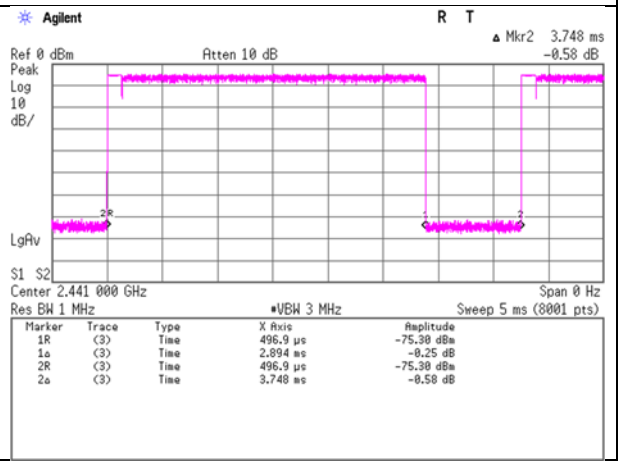
2DH5

Tx on / (Tx on + Tx off) =	**0.772**
Tx on / (Tx on + Tx off) * 100 =	**77.2 %**
Duty factor = 10 * log (3.749 / 2.894) =	**1.12 dB**



3DH5

Tx on / (Tx on + Tx off) =	**0.772**
Tx on / (Tx on + Tx off) * 100 =	**77.2 %**
Duty factor = 10 * log (3.748 / 2.894) =	**1.12 dB**



Radiated Spurious Emission

Report No.	12442164S-C-R2	
Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	No.2	No.3
Date	August 1, 2018	August 7, 2018
Temperature / Humidity	24 deg. C / 61 % RH	20 deg. C / 54 % RH
Engineer	Shiro Kobayashi (1 GHz -18 GHz)	Makoto Hosaka (30 MHz -1 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.	34.873	QP	22.06	16.81	6.55	32.20	0.00	13.22	40.00	26.7	200	219	
Hori.	60.059	QP	28.11	8.18	6.54	32.18	0.00	10.65	40.00	29.3	375	287	
Hori.	66.420	QP	29.91	7.06	6.56	32.18	0.00	11.35	40.00	28.6	322	278	
Hori.	234.273	QP	25.42	11.56	8.27	32.03	0.00	13.22	46.00	32.7	131	241	
Hori.	552.398	QP	25.12	17.89	9.83	32.01	0.00	20.83	46.00	25.1	153	251	
Hori.	2390.000	PK	43.29	27.91	13.89	36.58	2.17	50.68	73.90	23.2	370	22	
Hori.	4804.000	PK	44.35	31.31	6.51	36.88	2.17	47.46	73.90	26.4	150	0	
Hori.	7206.000	PK	45.13	36.77	7.66	37.26	2.17	54.47	73.90	19.4	100	0	
Hori.	9608.000	PK	45.38	38.11	8.64	38.47	2.17	55.83	73.90	18.0	100	0	
Hori.	2390.000	AV	31.42	27.91	13.89	36.58	2.17	38.81	53.90	15.0	370	22	
Hori.	4804.000	AV	31.04	31.31	6.51	36.88	2.17	34.15	53.90	19.7	150	0	
Hori.	7206.000	AV	32.55	36.77	7.66	37.26	2.17	41.89	53.90	12.0	100	0	
Hori.	9608.000	AV	33.23	38.11	8.64	38.47	2.17	43.68	53.90	10.2	100	0	
Vert.	72.075	QP	27.47	6.43	6.95	32.18	0.00	8.67	40.00	31.3	160	46	
Vert.	76.446	QP	30.98	6.35	7.31	32.17	0.00	12.47	40.00	27.5	100	251	
Vert.	180.829	QP	22.41	16.02	7.84	32.09	0.00	14.18	43.50	29.3	100	4	
Vert.	237.006	QP	25.77	11.61	8.29	32.03	0.00	13.64	46.00	32.3	100	140	
Vert.	680.926	QP	26.79	19.66	10.31	31.91	0.00	24.85	46.00	21.1	100	194	
Vert.	2390.000	PK	43.99	27.91	13.89	36.58	2.17	51.38	73.90	22.5	170	60	
Vert.	4804.000	PK	44.75	31.31	6.51	36.88	2.17	47.86	73.90	26.0	219	214	
Vert.	7206.000	PK	45.13	36.77	7.66	37.26	2.17	54.47	73.90	19.4	150	0	
Vert.	9608.000	PK	46.44	38.11	8.64	38.47	2.17	56.89	73.90	17.0	150	0	
Vert.	2390.000	AV	31.40	27.91	13.89	36.58	2.17	38.79	53.90	15.1	170	60	
Vert.	4804.000	AV	31.52	31.31	6.51	36.88	2.17	34.63	53.90	19.2	219	214	
Vert.	7206.000	AV	32.97	36.77	7.66	37.26	2.17	42.31	53.90	11.5	150	0	
Vert.	9608.000	AV	33.58	38.11	8.64	38.47	2.17	44.03	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 (3.85 m / 3.0 m) = 2.17 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

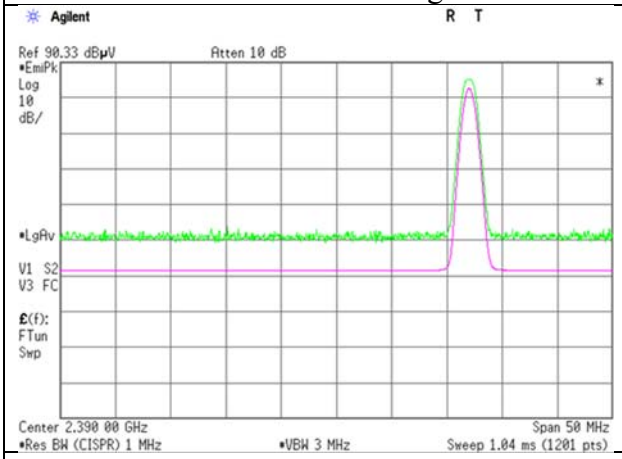
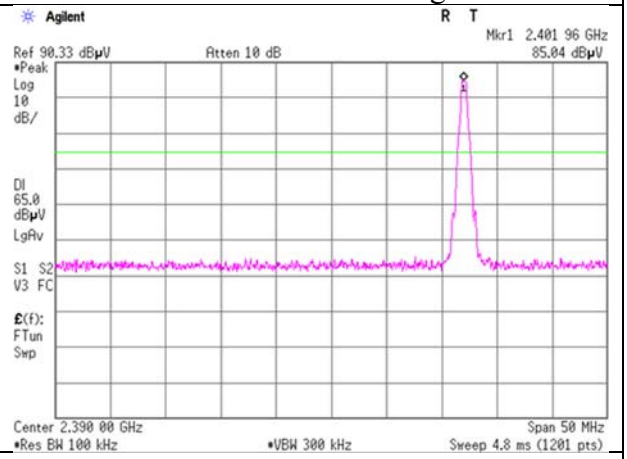
20 dBc Data Sheet **(RBW 100 kHz, VBW 300 kHz)**

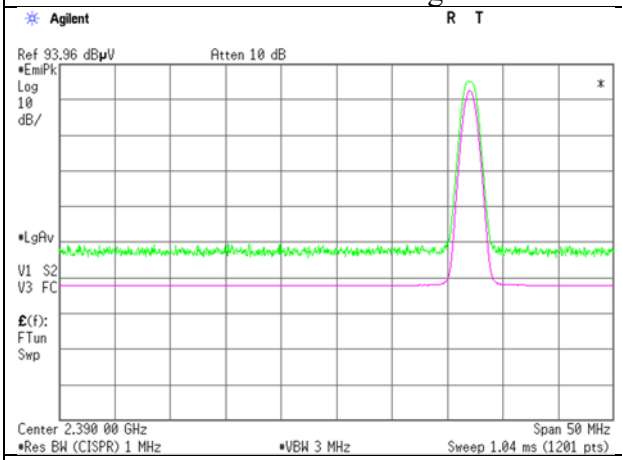
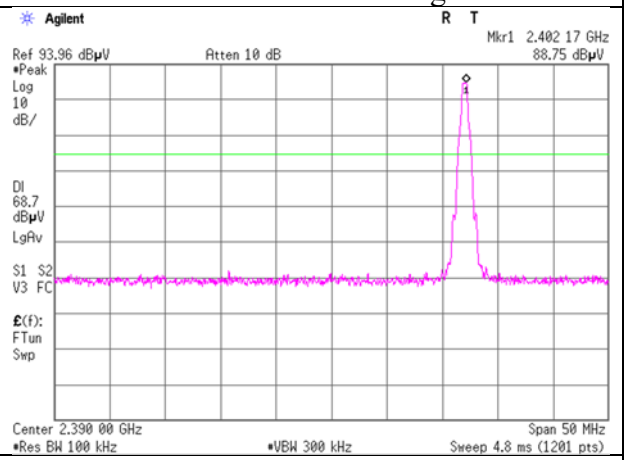
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	85.09	27.90	13.90	36.57	2.17	92.49	-	-	Carrier
Hori.	2400.000	PK	34.88	27.91	13.90	36.58	2.17	42.28	72.49	30.2	
Vert.	2402.000	PK	88.75	27.90	13.90	36.57	2.17	96.15	-	-	Carrier
Vert.	2400.000	PK	36.60	27.91	13.90	36.58	2.17	44.00	76.15	32.2	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.85 m / 3.0 m) = 2.17 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.	12442164S-C-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.2
Date	August 1, 2018
Temperature / Humidity	24 deg. C / 61 % RH
Engineer	Shiro Kobayashi (1 GHz -18 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

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

Radiated Spurious Emission

Report No.	12442164S-C-R2	
Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	No.2	No.3
Date	August 1, 2018	August 7, 2018
Temperature / Humidity	24 deg. C / 61 % RH	20 deg. C / 54 % RH
Engineer	Shiro Kobayashi (1 GHz -18 GHz)	Makoto Hosaka (30 MHz -1 GHz, 18 GHz – 26.5 GHz)
Mode	Tx, Hopping Off, DH5 2441 MHz	

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.	35.813	QP	22.38	16.46	6.56	32.20	0.00	13.20	40.00	26.8	200	1	
Hori.	60.052	QP	28.02	8.18	6.54	32.18	0.00	10.56	40.00	29.4	373	288	
Hori.	67.459	QP	29.24	6.90	6.62	32.18	0.00	10.58	40.00	29.4	267	296	
Hori.	234.213	QP	25.11	11.55	8.27	32.03	0.00	12.90	46.00	33.1	138	241	
Hori.	720.700	QP	28.31	20.18	10.46	31.84	0.00	27.11	46.00	18.8	128	45	
Hori.	4882.000	PK	43.29	31.14	6.53	36.91	2.17	46.22	73.90	27.6	150	0	
Hori.	7323.000	PK	44.06	36.84	7.73	37.44	2.17	53.36	73.90	20.5	150	0	
Hori.	9764.000	PK	44.76	38.59	8.81	38.66	2.17	55.67	73.90	18.2	150	0	
Hori.	4882.000	AV	31.17	31.14	6.53	36.91	2.17	34.10	53.90	19.8	150	0	
Hori.	7323.000	AV	32.26	36.84	7.73	37.44	2.17	41.56	53.90	12.3	150	0	
Hori.	9764.000	AV	32.43	38.59	8.81	38.66	2.17	43.34	53.90	10.5	150	0	
Vert.	72.066	QP	27.29	6.43	6.95	32.18	0.00	8.49	40.00	31.5	135	62	
Vert.	75.386	QP	30.10	6.33	7.23	32.17	0.00	11.49	40.00	28.5	100	125	
Vert.	190.173	QP	22.06	16.33	7.84	32.08	0.00	14.15	43.50	29.3	100	299	
Vert.	338.306	QP	24.31	14.89	8.96	31.96	0.00	16.20	46.00	29.8	100	165	
Vert.	658.700	QP	26.66	19.35	10.22	31.96	0.00	24.27	46.00	21.7	100	8	
Vert.	4882.000	PK	43.10	31.14	6.53	36.91	2.17	46.03	73.90	27.8	150	0	
Vert.	7323.000	PK	44.04	36.84	7.73	37.44	2.17	53.34	73.90	20.5	150	0	
Vert.	9764.000	PK	44.25	38.59	8.81	38.66	2.17	55.16	73.90	18.7	150	0	
Vert.	4882.000	AV	31.18	31.14	6.53	36.91	2.17	34.11	53.90	19.7	150	0	
Vert.	7323.000	AV	31.93	36.84	7.73	37.44	2.17	41.23	53.90	12.6	150	0	
Vert.	9764.000	AV	32.95	38.59	8.81	38.66	2.17	43.86	53.90	**10.0**	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 (3.85 m / 3.0 m) = 2.17 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission

Report No.	12442164S-C-R2	
Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	No.2	No.3
Date	August 1, 2018	August 7, 2018
Temperature / Humidity	24 deg. C / 61 % RH	20 deg. C / 54 % RH
Engineer	Shiro Kobayashi (1 GHz -18 GHz)	Makoto Hosaka (30 MHz -1 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.	36.788	QP	22.66	16.08	6.58	32.20	0.00	13.12	40.00	26.8	200	126	
Hori.	60.064	QP	28.12	8.18	6.54	32.18	0.00	10.66	40.00	29.3	376	275	
Hori.	65.056	QP	29.75	7.24	6.48	32.18	0.00	11.29	40.00	28.7	305	280	
Hori.	308.151	QP	25.33	13.85	8.76	32.00	0.00	15.94	46.00	30.0	100	38	
Hori.	716.619	QP	27.45	20.12	10.45	31.85	0.00	26.17	46.00	19.8	134	44	
Hori.	2483.500	PK	43.59	27.67	13.96	36.52	2.17	50.87	73.90	23.0	330	86	
Hori.	4960.000	PK	43.98	31.33	6.56	36.93	2.17	47.11	73.90	26.7	150	0	
Hori.	7440.000	PK	43.15	36.97	7.81	37.63	2.17	52.47	73.90	21.4	150	0	
Hori.	9920.000	PK	43.10	38.80	9.00	38.84	2.17	54.23	73.90	19.6	150	0	
Hori.	2483.500	AV	31.43	27.67	13.96	36.52	2.17	38.71	53.90	15.1	330	86	
Hori.	4960.000	AV	31.30	31.33	6.56	36.93	2.17	34.43	53.90	19.4	150	0	
Hori.	7440.000	AV	31.25	36.97	7.81	37.63	2.17	40.57	53.90	13.3	150	0	
Hori.	9920.000	AV	31.55	38.80	9.00	38.84	2.17	42.68	53.90	**11.2**	150	0	
Vert.	76.124	QP	29.50	6.34	7.29	32.17	0.00	10.96	40.00	29.0	100	241	
Vert.	80.077	QP	28.18	6.45	7.56	32.17	0.00	10.02	40.00	29.9	100	125	
Vert.	176.149	QP	24.45	15.88	7.85	32.10	0.00	16.08	43.50	27.4	100	211	
Vert.	288.277	QP	23.25	13.53	8.63	32.01	0.00	13.40	46.00	32.6	100	155	
Vert.	664.680	QP	26.35	19.42	10.25	31.95	0.00	24.07	46.00	21.9	100	3	
Vert.	2483.500	PK	44.10	27.67	13.96	36.52	2.17	51.38	73.90	22.5	400	351	
Vert.	4960.000	PK	43.25	31.33	6.56	36.93	2.17	46.38	73.90	27.5	150	0	
Vert.	7440.000	PK	42.79	36.97	7.81	37.63	2.17	52.11	73.90	21.7	150	0	
Vert.	9920.000	PK	43.41	38.80	9.00	38.84	2.17	54.54	73.90	19.3	100	0	
Vert.	2483.500	AV	31.63	27.67	13.96	36.52	2.17	38.91	53.90	14.9	400	351	
Vert.	4960.000	AV	31.34	31.33	6.56	36.93	2.17	34.47	53.90	19.4	150	0	
Vert.	7440.000	AV	31.24	36.97	7.81	37.63	2.17	40.56	53.90	13.3	150	0	
Vert.	9920.000	AV	31.54	38.80	9.00	38.84	2.17	42.67	53.90	**11.2**	100	0	

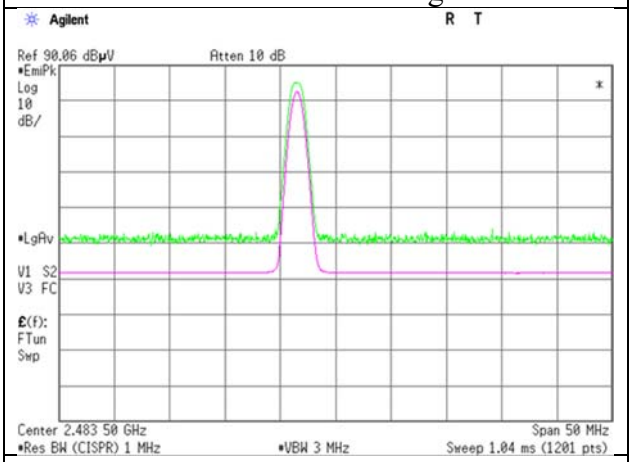
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.85 m / 3.0 m) = 2.17 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	12442164S-C-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.2
Date	August 1, 2018
Temperature / Humidity	24 deg. C / 61 % RH
Engineer	Shiro Kobayashi (1 GHz -18 GHz)
Mode	Tx, Hopping Off, DH5 2480 MHz

Horizontal

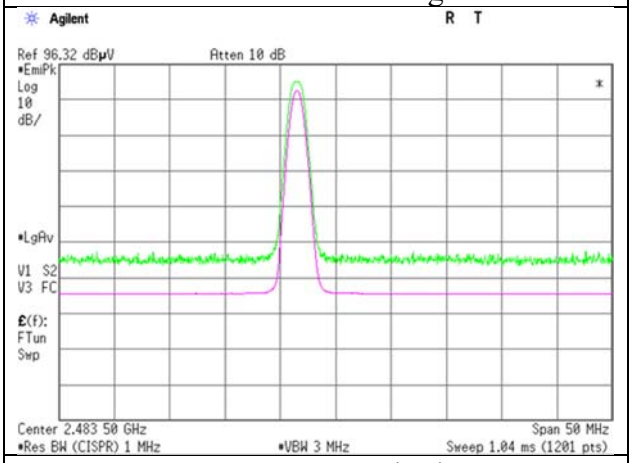
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

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

Radiated Spurious Emission

Report No.	12442164S-C-R2	
Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	No.1	No.1
Date	September 15, 2018	September 14, 2018
Temperature / Humidity	24 deg. C / 65 % RH	24 deg. C / 58 % RH
Engineer	Yasumasa Owaki	Shiro Kobayashi
	(30 MHz -1 GHz)	(1 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.	30.808	QP	21.61	18.27	7.03	31.84	0.00	15.07	40.00	24.9	252	358	
Hori.	63.976	QP	29.08	7.41	7.20	31.82	0.00	11.87	40.00	28.1	313	325	
Hori.	340.302	QP	29.66	14.84	7.19	31.77	0.00	19.92	46.00	26.0	100	141	
Hori.	356.779	QP	28.00	15.10	7.28	31.78	0.00	18.60	46.00	27.4	100	166	
Hori.	668.895	QP	23.68	19.43	8.66	32.06	0.00	19.71	46.00	26.2	130	170	
Hori.	2390.000	PK	45.28	27.89	13.93	39.46	0.00	47.64	73.90	26.2	212	191	
Hori.	2400.000	PK	53.35	27.89	13.94	39.46	0.00	55.72	73.90	18.1	212	191	
Hori.	4804.000	PK	45.21	31.35	6.39	39.50	0.00	43.45	73.90	30.4	150	0	
Hori.	7206.000	PK	46.11	36.78	7.83	39.29	0.00	51.43	73.90	22.4	150	0	
Hori.	9608.000	PK	45.68	38.10	9.27	39.52	0.00	53.53	73.90	20.3	150	0	
Hori.	2390.000	AV	33.07	27.89	13.93	39.46	0.00	35.43	53.90	18.4	212	191	
Hori.	2400.000	AV	37.86	27.89	13.94	39.46	0.00	40.23	53.90	**13.6**	212	191	
Hori.	4804.000	AV	33.08	31.35	6.39	39.50	0.00	31.32	53.90	22.5	150	0	
Hori.	7206.000	AV	31.78	36.78	7.83	39.29	0.00	37.10	53.90	16.8	150	0	
Hori.	9608.000	AV	31.97	38.10	9.27	39.52	0.00	39.82	53.90	14.0	150	0	
Vert.	30.372	QP	24.68	18.45	7.02	31.84	0.00	18.31	40.00	21.6	100	188	
Vert.	188.930	QP	21.93	16.58	8.99	31.77	0.00	15.73	43.50	27.7	100	130	
Vert.	596.444	QP	22.95	19.22	8.32	32.01	0.00	18.48	46.00	27.5	100	259	
Vert.	694.736	QP	28.37	19.75	8.81	32.04	0.00	24.89	46.00	21.1	100	321	
Vert.	734.801	QP	24.34	20.02	8.96	31.97	0.00	21.35	46.00	24.6	100	324	
Vert.	2390.000	PK	45.42	27.89	13.93	39.46	0.00	47.78	73.90	26.1	311	359	
Vert.	4804.000	PK	45.38	31.35	6.39	39.50	0.00	43.62	73.90	30.2	150	0	
Vert.	7206.000	PK	45.12	36.78	7.83	39.29	0.00	50.44	73.90	23.4	150	0	
Vert.	9608.000	PK	45.44	38.10	9.27	39.52	0.00	53.29	73.90	20.6	150	0	
Vert.	2390.000	AV	33.09	27.89	13.93	39.46	0.00	35.45	53.90	18.4	311	359	
Vert.	4804.000	AV	33.41	31.35	6.39	39.50	0.00	31.65	53.90	22.2	150	0	
Vert.	7206.000	AV	31.66	36.78	7.83	39.29	0.00	36.98	53.90	16.9	150	0	
Vert.	9608.000	AV	31.98	38.10	9.27	39.52	0.00	39.83	53.90	14.0	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 (3.85 m / 3.0 m) = 2.17 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.

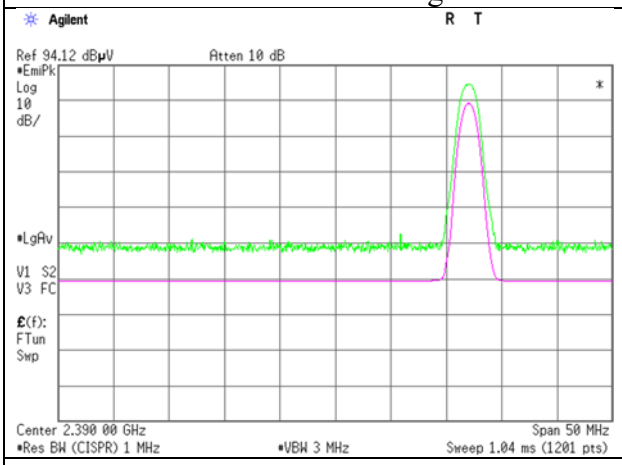
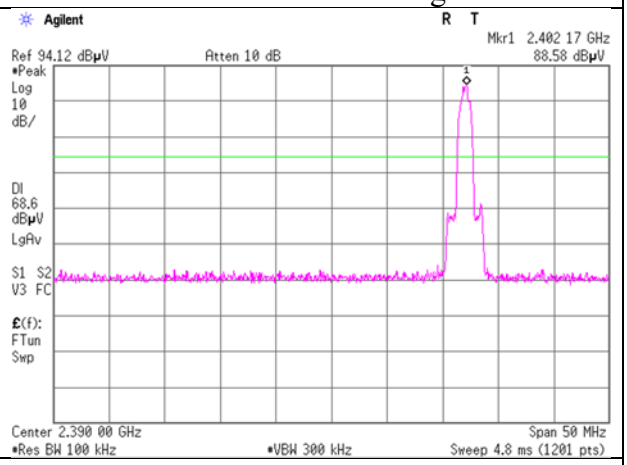
20 dBc Data Sheet **(RBW 100 kHz, VBW 300 kHz)**

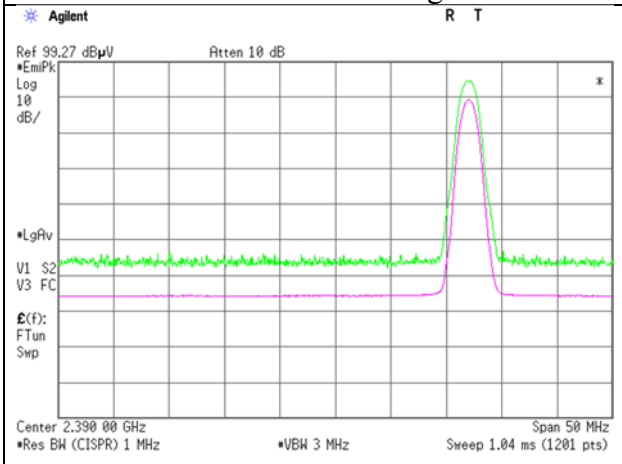
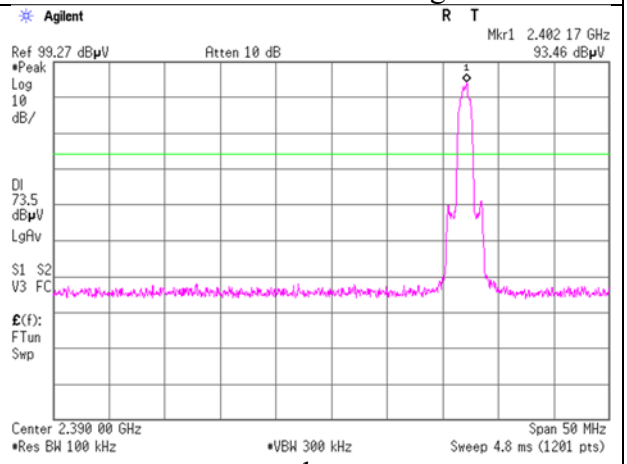
Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Distance Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Remark
Hori.	2402.000	PK	88.91	27.88	13.94	39.46	0.00	91.27	-	-	Carrier
Hori.	2400.000	PK	37.43	27.89	13.94	39.46	0.00	39.80	71.27	31.5	
Vert.	2402.000	PK	93.73	27.88	13.94	39.46	0.00	96.09	-	-	Carrier
Vert.	2400.000	PK	38.19	27.89	13.94	39.46	0.00	40.56	76.09	35.5	

Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.85 m / 3.0 m) = 2.17 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.	12442164S-C-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.1
Date	September 14, 2018
Temperature / Humidity	24 deg. C / 58 % RH
Engineer	Shiro Kobayashi
	(1 GHz - 26.5 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

b

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

Radiated Spurious Emission

Report No.	12442164S-C-R2	
Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	No.1	No.1
Date	September 15, 2018	September 14, 2018
Temperature / Humidity	24 deg. C / 65 % RH	24 deg. C / 58 % RH
Engineer	Yasumasa Owaki	Shiro Kobayashi
	(30 MHz -1 GHz)	(1 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.	35.813	QP	22.38	16.46	6.56	32.20	0.00	13.20	40.00	26.8	200	1	
Hori.	60.052	QP	28.02	8.18	6.54	32.18	0.00	10.56	40.00	29.4	373	288	
Hori.	67.459	QP	29.24	6.90	6.62	32.18	0.00	10.58	40.00	29.4	267	296	
Hori.	234.213	QP	25.11	11.55	8.27	32.03	0.00	12.90	46.00	33.1	138	241	
Hori.	720.700	QP	28.31	20.18	10.46	31.84	0.00	27.11	46.00	18.8	128	45	
Hori.	4882.000	PK	45.44	31.19	6.48	39.50	0.00	43.61	73.90	30.2	150	0	
Hori.	7323.000	PK	44.26	36.71	7.95	39.35	0.00	49.57	73.90	24.3	150	0	
Hori.	9764.000	PK	43.52	38.61	9.26	39.41	0.00	51.98	73.90	21.9	150	0	
Hori.	4882.000	AV	32.83	31.19	6.48	39.50	0.00	31.00	53.90	22.9	150	0	
Hori.	7323.000	AV	32.62	36.71	7.95	39.35	0.00	37.93	53.90	15.9	150	0	
Hori.	9764.000	AV	31.81	38.61	9.26	39.41	0.00	40.27	53.90	**13.6**	150	0	
Vert.	72.066	QP	27.29	6.43	6.95	32.18	0.00	8.49	40.00	31.5	135	62	
Vert.	75.386	QP	30.10	6.33	7.23	32.17	0.00	11.49	40.00	28.5	100	125	
Vert.	190.173	QP	22.06	16.33	7.84	32.08	0.00	14.15	43.50	29.3	100	299	
Vert.	338.306	QP	24.31	14.89	8.96	31.96	0.00	16.20	46.00	29.8	100	165	
Vert.	658.700	QP	26.66	19.35	10.22	31.96	0.00	24.27	46.00	21.7	100	8	
Vert.	4882.000	PK	44.18	31.19	6.48	39.50	0.00	42.35	73.90	31.5	150	0	
Vert.	7323.000	PK	44.61	36.71	7.95	39.35	0.00	49.92	73.90	23.9	150	0	
Vert.	9764.000	PK	43.84	38.61	9.26	39.41	0.00	52.30	73.90	21.6	150	0	
Vert.	4882.000	AV	32.73	31.19	6.48	39.50	0.00	30.90	53.90	23.0	150	0	
Vert.	7323.000	AV	32.32	36.71	7.95	39.35	0.00	37.63	53.90	16.2	150	0	
Vert.	9764.000	AV	31.83	38.61	9.26	39.41	0.00	40.29	53.90	**13.6**	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 (3.85 m / 3.0 m) = 2.17 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.	12442164S-C-R2	
Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	No.1	No.1
Date	September 15, 2018	September 14, 2018
Temperature / Humidity	24 deg. C / 65 % RH	24 deg. C / 58 % RH
Engineer	Yasumasa Owaki	Shiro Kobayashi
	(30 MHz -1 GHz)	(1 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.	32.995	QP	22.25	17.53	7.08	31.84	0.00	15.02	40.00	24.9	189	349	
Hori.	63.142	QP	28.77	7.57	7.21	31.82	0.00	11.73	40.00	28.2	337	310	
Hori.	338.293	QP	30.22	14.79	7.17	31.77	0.00	20.41	46.00	25.5	100	139	
Hori.	640.623	QP	27.11	19.28	8.51	32.05	0.00	22.85	46.00	23.1	172	229	
Hori.	694.665	QP	29.03	19.75	8.81	32.04	0.00	25.55	46.00	20.4	158	7	
Hori.	2483.500	PK	44.86	27.64	14.02	39.46	0.00	47.06	73.90	26.8	241	25	
Hori.	4960.000	PK	44.71	31.40	6.58	39.50	0.00	43.19	73.90	30.7	150	0	
Hori.	7440.000	PK	43.53	36.84	8.08	39.42	0.00	49.03	73.90	24.8	150	0	
Hori.	9920.000	PK	42.12	38.77	9.24	39.30	0.00	50.83	73.90	23.0	150	0	
Hori.	2483.500	AV	33.13	27.64	14.02	39.46	0.00	35.33	53.90	18.5	241	25	
Hori.	4960.000	AV	32.78	31.40	6.58	39.50	0.00	31.26	53.90	22.6	150	0	
Hori.	7440.000	AV	32.14	36.84	8.08	39.42	0.00	37.64	53.90	16.2	150	0	
Hori.	9920.000	AV	30.51	38.77	9.24	39.30	0.00	39.22	53.90	**14.6**	150	0	
Vert.	30.514	QP	24.72	18.39	7.02	31.84	0.00	18.29	40.00	21.7	100	208	
Vert.	190.073	QP	21.66	16.51	8.99	31.77	0.00	15.39	43.50	28.1	100	132	
Vert.	644.697	QP	27.81	19.24	8.53	32.06	0.00	23.52	46.00	22.4	100	315	
Vert.	690.870	QP	27.96	19.69	8.79	32.04	0.00	24.40	46.00	21.6	100	318	
Vert.	889.501	QP	21.08	21.96	9.63	31.41	0.00	21.26	46.00	24.7	100	358	
Vert.	2483.500	PK	45.72	27.64	14.02	39.46	0.00	47.92	73.90	25.9	161	253	
Vert.	4960.000	PK	45.12	31.40	6.58	39.50	0.00	43.60	73.90	30.3	150	0	
Vert.	7440.000	PK	43.97	36.84	8.08	39.42	0.00	49.47	73.90	24.4	150	0	
Vert.	9920.000	PK	42.54	38.77	9.24	39.30	0.00	51.25	73.90	22.6	150	0	
Vert.	2483.500	AV	33.93	27.64	14.02	39.46	0.00	36.13	53.90	17.7	161	253	
Vert.	4960.000	AV	32.78	31.40	6.58	39.50	0.00	31.26	53.90	22.6	150	0	
Vert.	7440.000	AV	32.15	36.84	8.08	39.42	0.00	37.65	53.90	16.2	150	0	
Vert.	9920.000	AV	30.53	38.77	9.24	39.30	0.00	39.24	53.90	**14.6**	150	0	

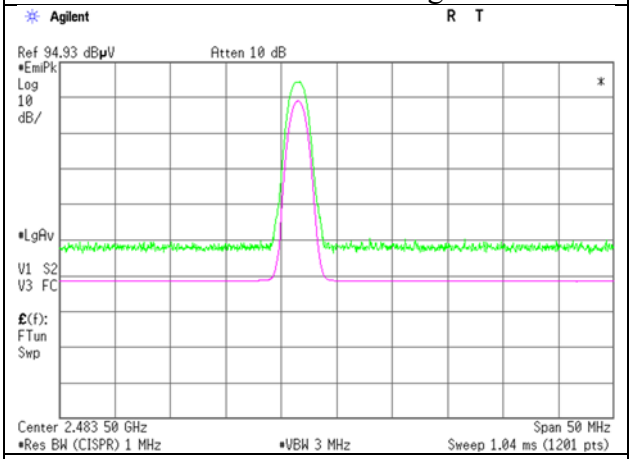
Result = Reading + Ant.Fac. + Loss (Cable+(Attenuator or Filter)(below 18 GHz)) - Gain(Amprifier) + Distance factor
Distance factor : 1 GHz - 13 GHz : 20log (3.85 m / 3.0 m) = 2.17 dB
13 GHz - 40 GHz : 20log (1.0 m / 3.0 m) = -9.54 dB
* These results have sufficient margin without taking account Dwell time factor.

Radiated Spurious Emission
(Reference Plot for band-edge)

Report No.	12442164S-C-R2
Test place	Shonan EMC Lab.
Semi Anechoic Chamber	No.1
Date	September 14, 2018
Temperature / Humidity	24 deg. C / 58 % RH
Engineer	Shiro Kobayashi (1 GHz - 26.5 GHz)
Mode	Tx, Hopping Off, 3DH5 2480 MHz

Horizontal

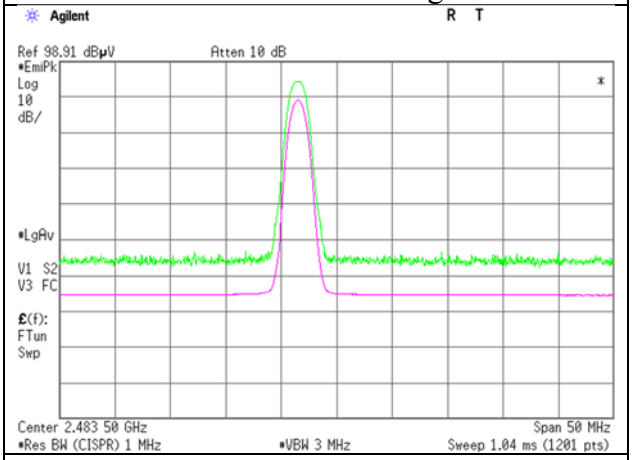
Restricted-band band-edge Plot



Trace Green : Peak Plot
Trace Purple : Average Plot

Vertical

Restricted-band band-edge Plot

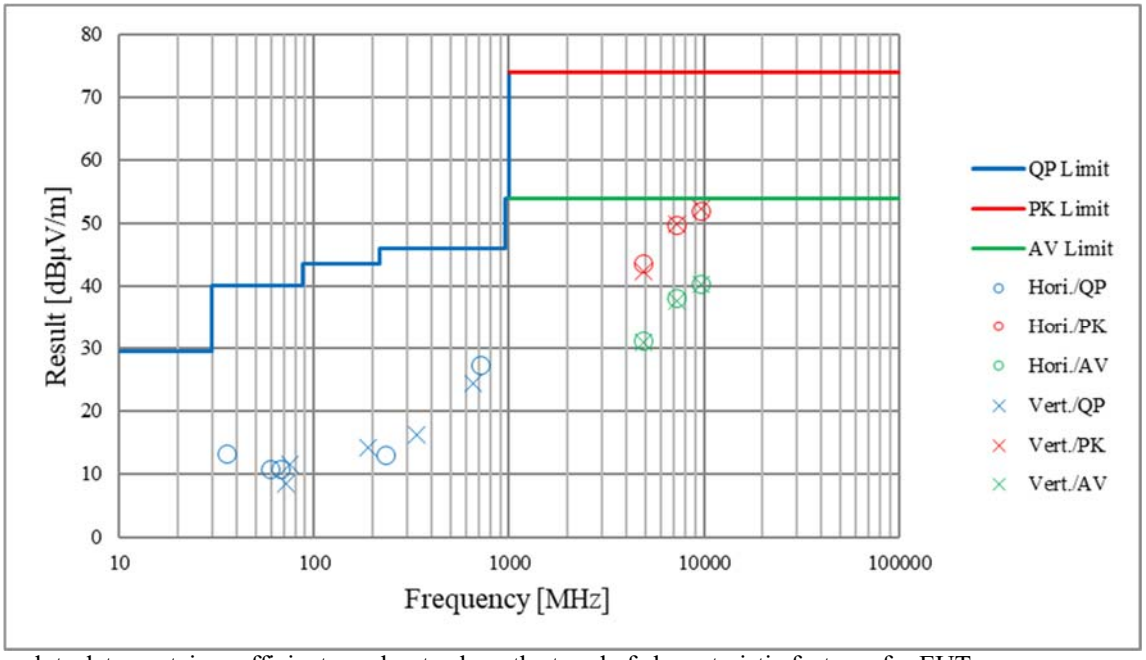


Trace Green : Peak Plot
Trace Purple : Average Plot

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

Radiated Spurious Emission
(Plot data, Worst case)

Report No.	12442164S-C-R2	
Test place	Shonan EMC Lab.	
Semi Anechoic Chamber	No.1	No.1
Date	September 15, 2018	September 14, 2018
Temperature / Humidity	24 deg. C / 65 % RH	24 deg. C / 58 % RH
Engineer	Yasumasa Owaki	Shiro Kobayashi
	(30 MHz -1 GHz)	(1 GHz - 26.5 GHz)
Mode	Tx, Hopping Off, 3DH5 2441 MHz	



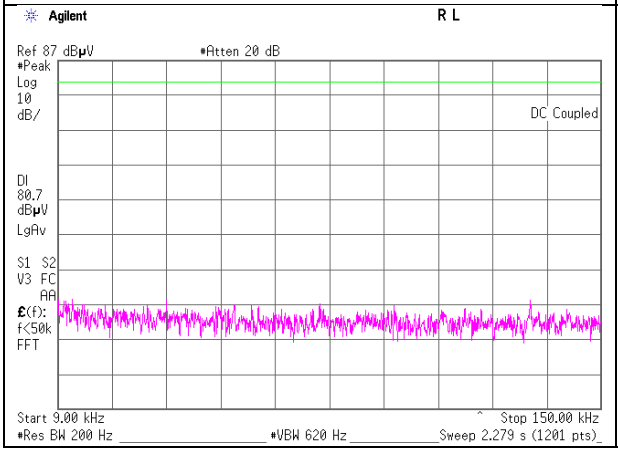
*These plots data contains sufficient number to show the trend of characteristic features for EUT.

Conducted Spurious Emission

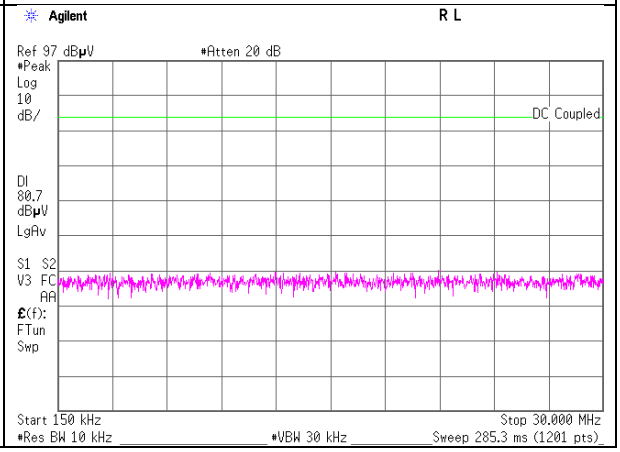
Report No.	12442164S-C-R2
Test place	Shonan EMC Lab. No.1 Measurement Room
Date	August 2, 2018
Temperature / Humidity	25 deg. C / 50 % RH
Engineer	Yosuke Ishikawa
Mode	Tx, Hopping Off, DH5

2402 MHz

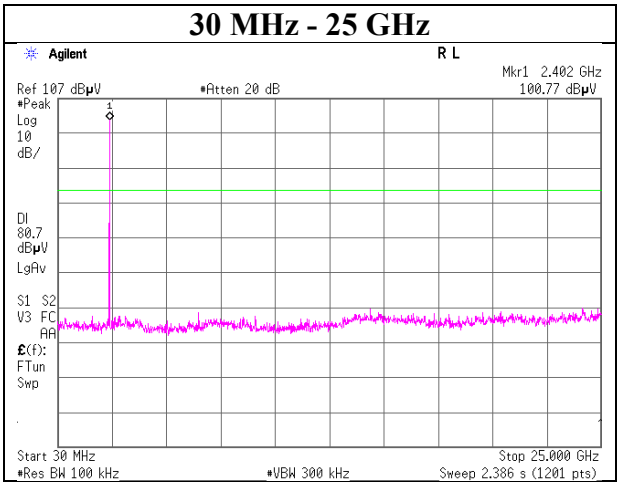
9 kHz - 150 kHz



150 kHz - 30 MHz



30 MHz - 25 GHz



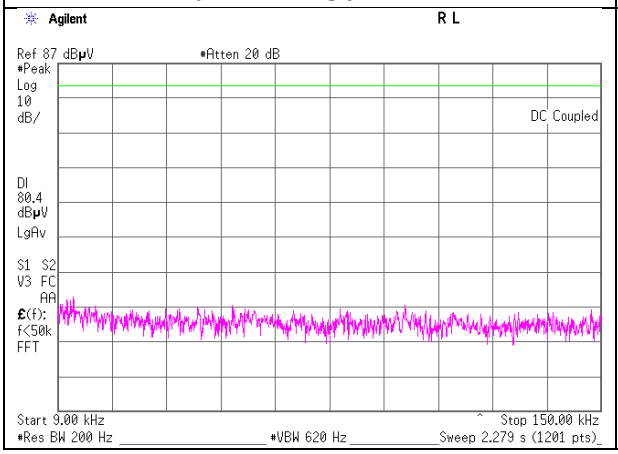
UL Japan, Inc.
Shonan EMC Lab.
1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN
Telephone : +81 463 50 6400
Facsimile : +81 463 50 6401

Conducted Spurious Emission

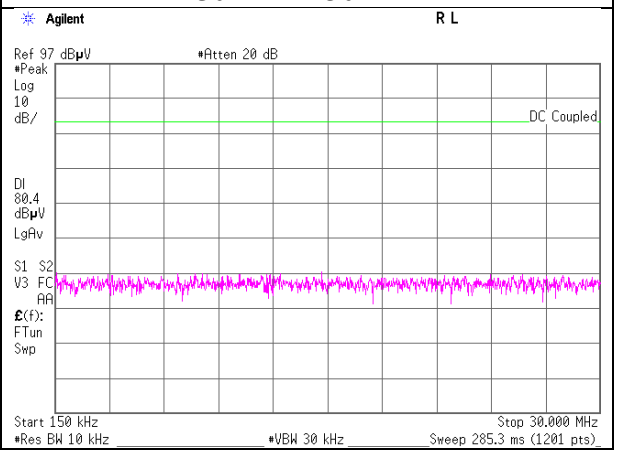
Report No.	12442164S-C-R2
Test place	Shonan EMC Lab. No.1 Measurement Room
Date	August 2, 2018
Temperature / Humidity	25 deg. C / 50 % RH
Engineer	Yosuke Ishikawa
Mode	Tx, Hopping Off, DH5

2441 MHz

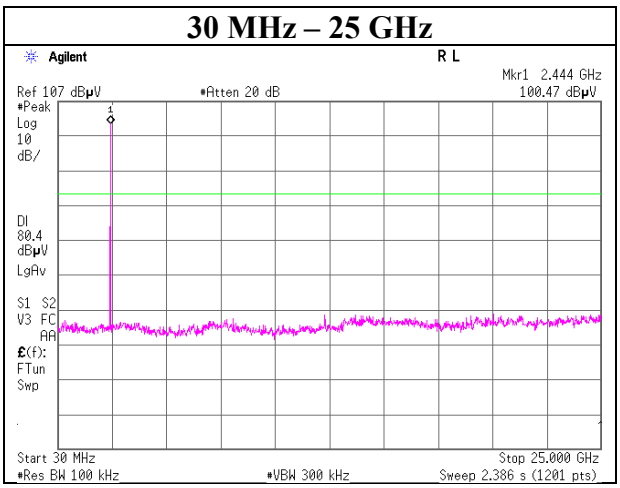
9 kHz – 150 kHz



150 kHz – 30 MHz



30 MHz – 25 GHz

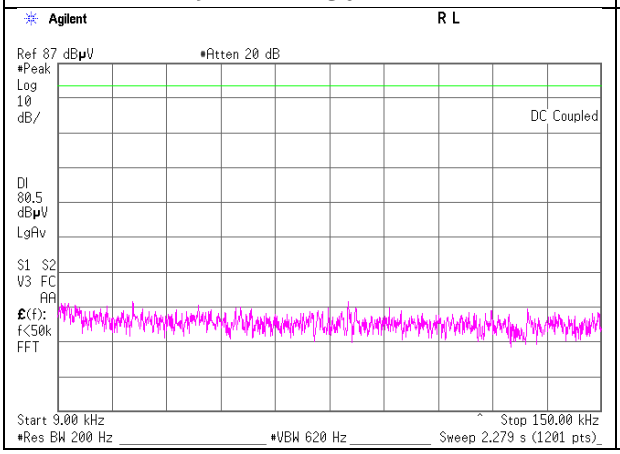


Conducted Spurious Emission

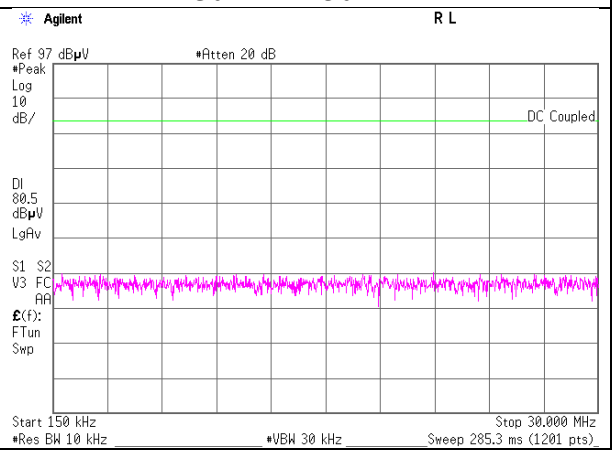
Report No.	12442164S-C-R2
Test place	Shonan EMC Lab. No.1 Measurement Room
Date	August 2, 2018
Temperature / Humidity	25 deg. C / 50 % RH
Engineer	Yosuke Ishikawa
Mode	Tx, Hopping Off, DH5

2480 MHz

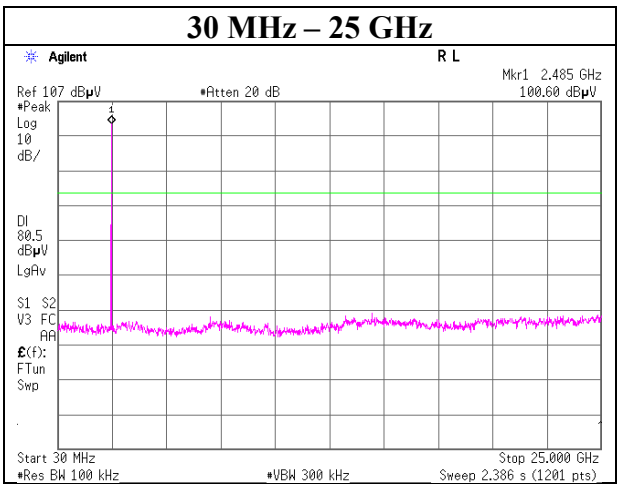
9 kHz – 150 kHz



150 kHz – 30 MHz



30 MHz – 25 GHz

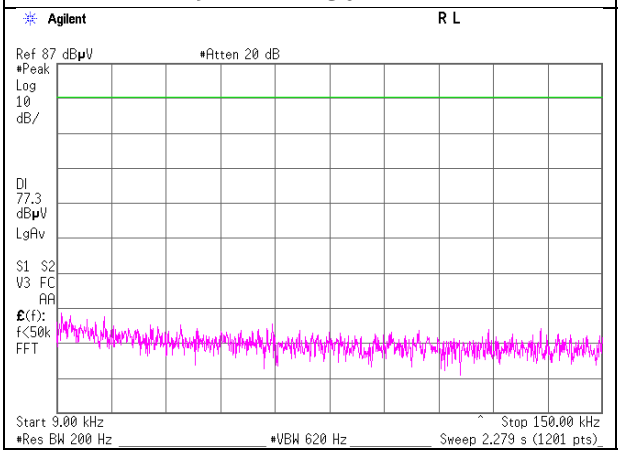


Conducted Spurious Emission

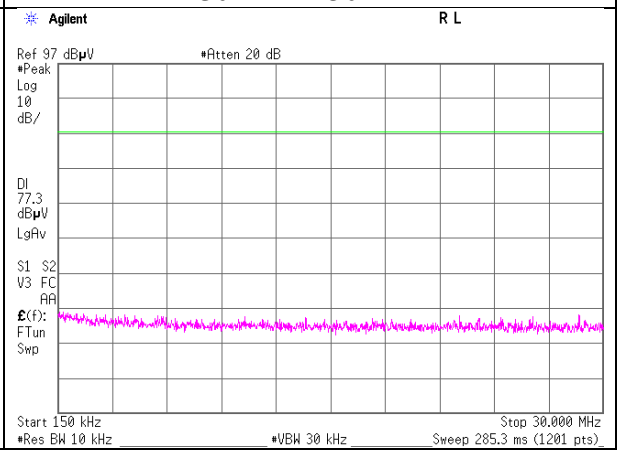
Report No.	12442164S-C-R2
Test place	Shonan EMC Lab. No.6 Shielded Room
Date	September 12, 2018
Temperature / Humidity	23 deg. C / 57 % RH
Engineer	Yosuke Ishikawa
Mode	Tx, Hopping Off, 3DH5

2402 MHz

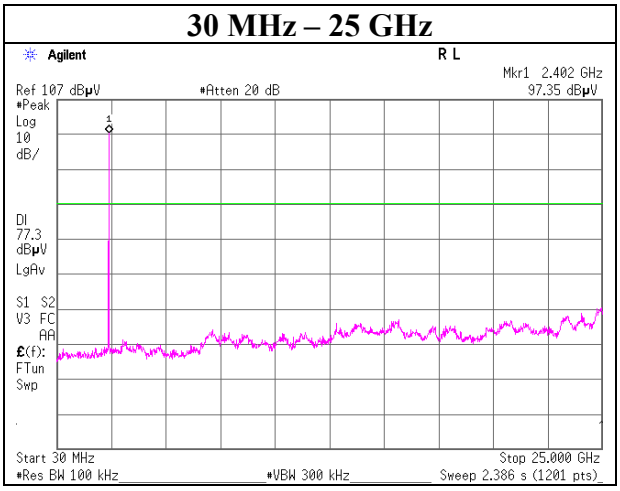
9 kHz – 150 kHz



150 kHz – 30 MHz



30 MHz – 25 GHz



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1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken, 259-1220 JAPAN
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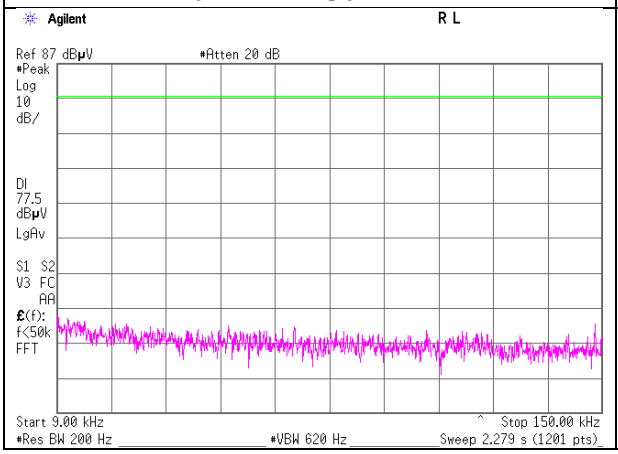
Conducted Spurious Emission

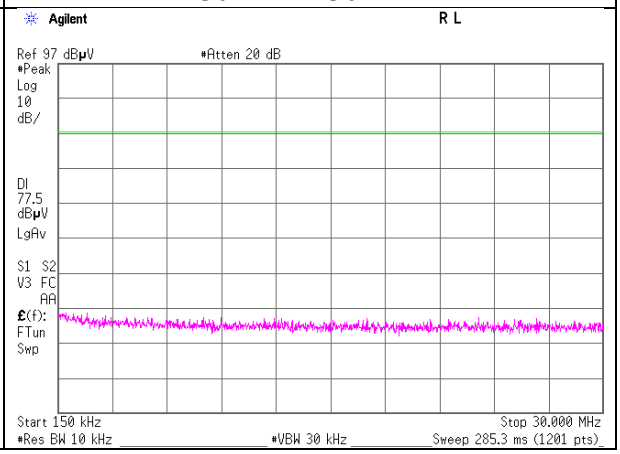
Report No.	12442164S-C-R2
Test place	Shonan EMC Lab. No.6 Shielded Room
Date	September 12, 2018
Temperature / Humidity	23 deg. C / 57 % RH
Engineer	Yosuke Ishikawa
Mode	Tx, Hopping Off, 3DH5

2441 MHz

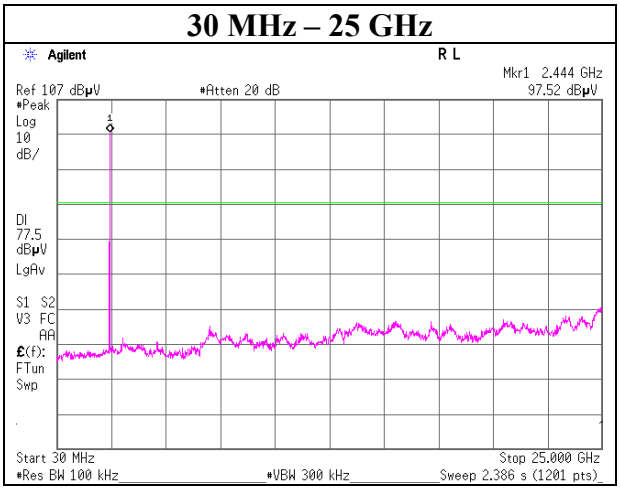
9 kHz – 150 kHz



150 kHz – 30 MHz



30 MHz – 25 GHz

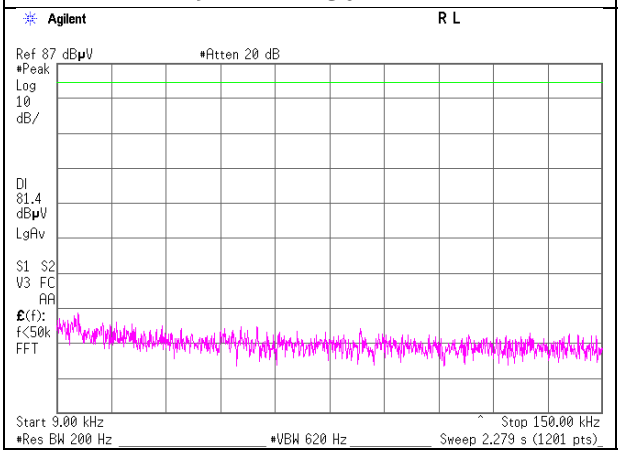


Conducted Spurious Emission

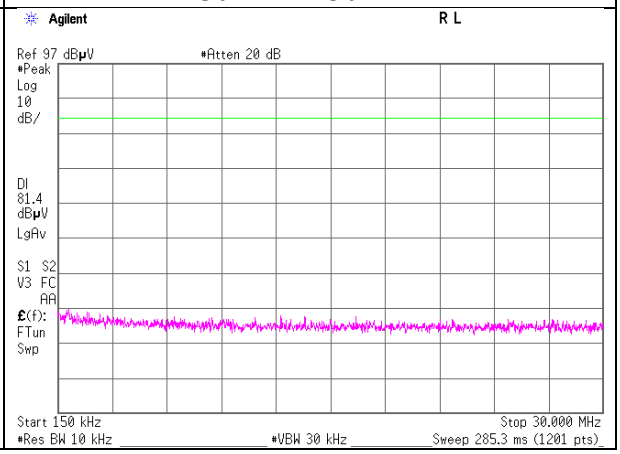
Report No.	12442164S-C-R2
Test place	Shonan EMC Lab. No.6 Shielded Room
Date	September 12, 2018
Temperature / Humidity	23 deg. C / 57 % RH
Engineer	Yosuke Ishikawa
Mode	Tx, Hopping Off, 3DH5

2480 MHz

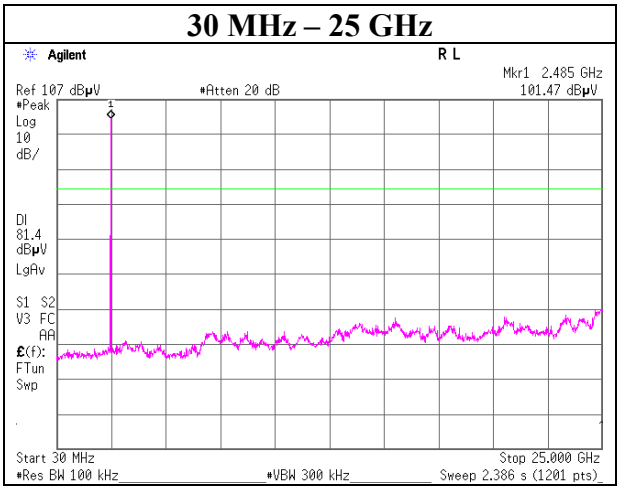
9 kHz – 150 kHz



150 kHz – 30 MHz



30 MHz – 25 GHz



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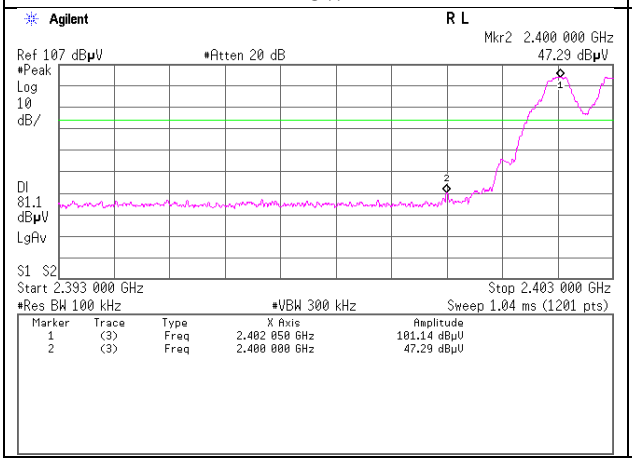
Conducted Emission Band Edge compliance

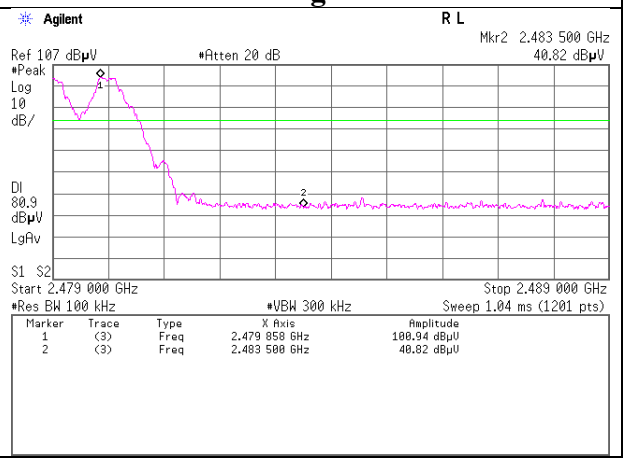
Report No.	12442164S-C-R2
Test place	Shonan EMC Lab. No.1 Measurement Room
Date	August 2, 2018
Temperature / Humidity	25 deg. C / 50 % RH
Engineer	Ishikawa Yosuke
Mode	Tx DH5

Hopping On

Low

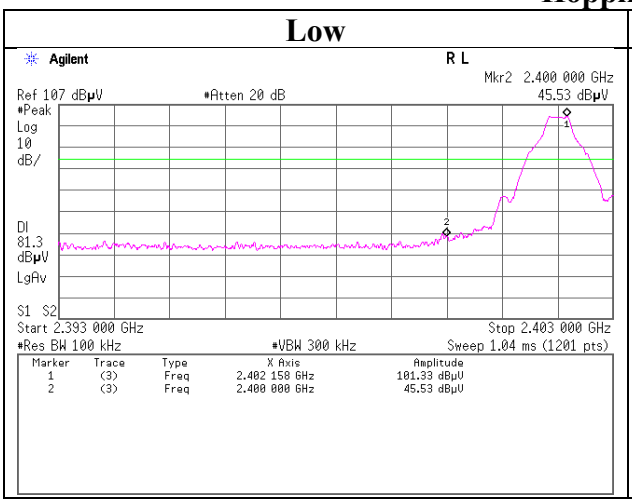


High

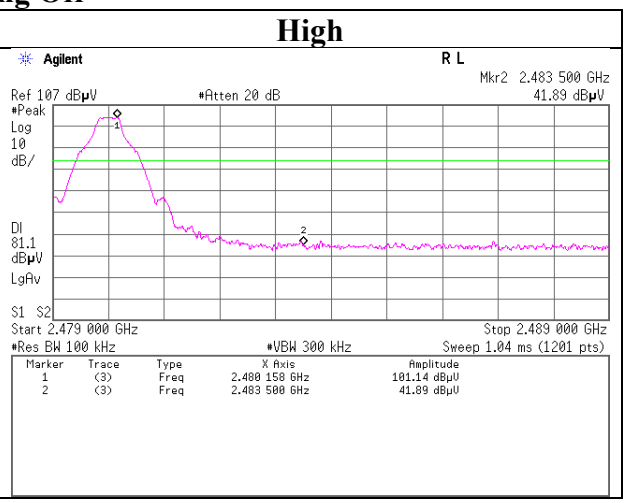


Hopping Off

Low



High

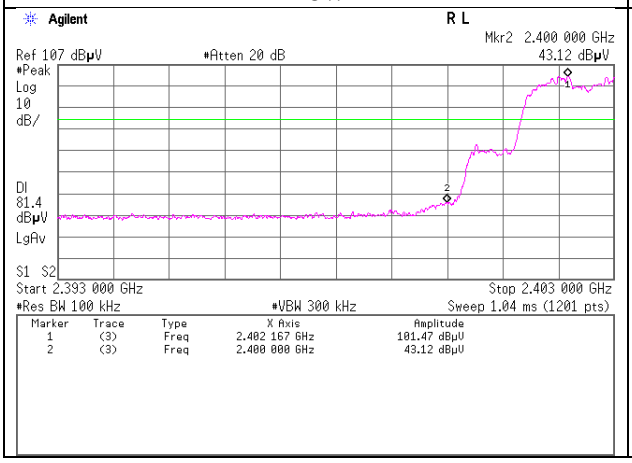


Conducted Emission Band Edge compliance

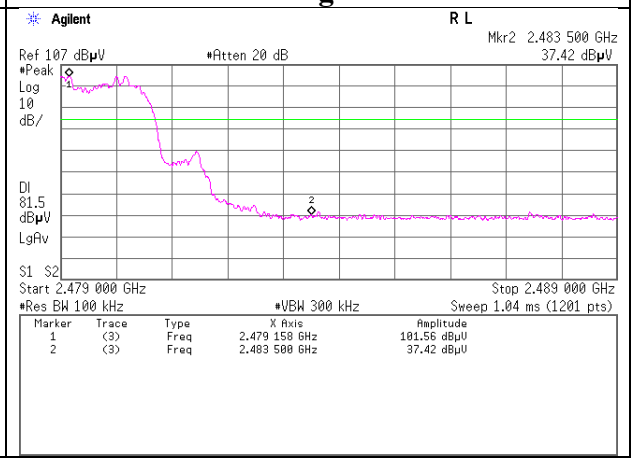
Report No.	12442164S-C-R2
Test place	Shonan EMC Lab. No.6 Shielded Room
Date	September 12, 2018
Temperature / Humidity	23 deg. C / 57 % RH
Engineer	Ishikawa Yosuke
Mode	Tx 3DH5

Hopping On

Low

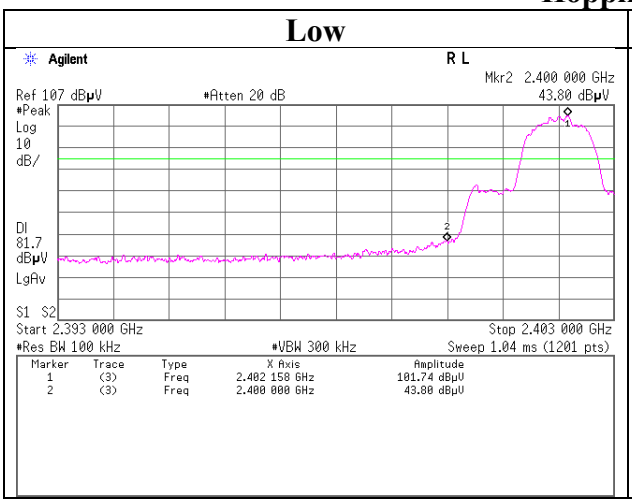


High

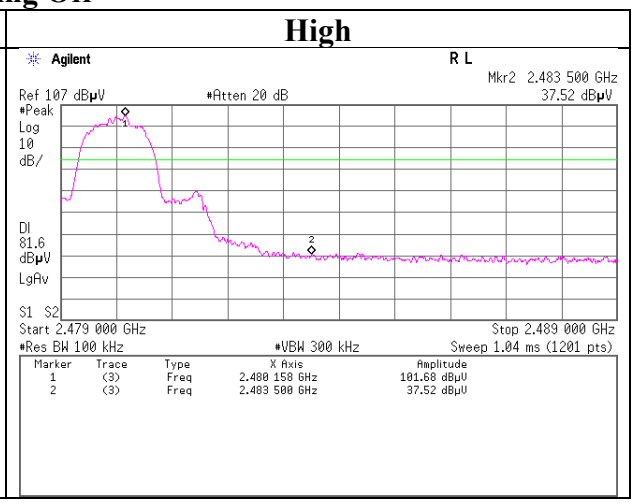


Hopping Off

Low



High



APPENDIX 2: Test instruments

Test Instruments (1/2)

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SRENT-09	Spectrum Analyzer	Agilent	E4440A	MY46186392	AT	2017/11/08 * 12
KSA-08	Spectrum Analyzer	Agilent	E4446A	MY46180525	AT	2017/10/10 * 12
SPM-06	Power Meter	Anritsu	ML2945A	0850009	AT	2018/05/10 * 12
SPSS-03	Power sensor	Anritsu	MA2411B	0917063	AT	2018/05/10 * 12
SPM-07	Power Meter	Agilent	8990B	MY5100272	AT	2018/07/13 * 12
SPSS-04	Power sensor	Agilent	N1923A	MY53260009	AT	2018/07/13 * 12
SCC-G12	Coaxial Cable	Suhner	SUCOFLEX 102	30790/2	AT	2018/03/19 * 12
SAT10-15	Attenuator	Weinschel Corp.	54A-10	83406	AT	2017/12/08 * 12
SAT10-16	Attenuator	Weinschel Corp.	54A-10	83420	AT	2017/12/08 * 12
KTS-08	Digital Tester	SANWA	PC500	7019224	AT	2018/03/05 * 12
SOS-10	Humidity Indicator	A&D	AD-5681	4064561	AT	2017/10/30 * 12
SOS-13	Humidity Indicator	Custom	CTH-202	Q.C.17	AT	2017/12/21 * 12
SAEC-03(SVSWR)	Semi-Anechoic Chamber	TDK	SAEC-03(SVSWR)	3	RE	2018/07/17 * 12
SAEC-02(NSA)	Semi-Anechoic Chamber	TDK	SAEC-02(NSA)	2	RE	2018/05/31 * 12
SAF-05	Pre Amplifier	TOYO Corporation	TPA0118-36	1440490	RE	2018/02/15 * 12
SCC-G43	Coaxial Cable	HUBER+SUHNER	SUCOFLEX 104 E	SN MY 13406/4E	RE	2018/07/10 * 12
SCC-G44	Coaxial Cable	HUBER+SUHNER	SUCOFLEX 104	800070/4A	RE	2018/03/28 * 12
SHA-02	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-726	RE	2018/07/23 * 12
SOS-03	Humidity Indicator	A&D	AD-5681	4063325	RE	2017/10/30 * 12
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	RE	2018/03/05 * 12
SJM-09	Measure	PROMART	SEN1935	-	RE	-
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE,RFI,MF)	-	RE/CE	-
STS-02	Digital Hitester	Hioki	3805-50	080997819	RE	2018/03/08 * 12
SAT10-05	Attenuator(above1 GHz)	Agilent	8493C-010	74864	RE	2017/11/22 * 12
SFL-02	Highpass Filter	MICRO-TRONICS	HPM50111	051	RE	2017/11/16 * 12
SCC-G40	Coaxial Cable	Junkosha	MWX221-01000NFSNMS/B	1612S005	RE	2018/01/29 * 12
SAF-08	Pre Amplifier	TOYO Corporation	HAP18-26W	00000019	RE	2018/03/27 * 12
SHA-04	Horn Antenna	ETS LINDGREN	3160-09	LM9861	RE	2018/07/23 * 12
SCC-G33	Coaxial Cable	Junkosha	MWX241-01000KMSKMS	-	RE	2018/04/20 * 12
SCC-G45	Coaxial Cable	HUBER+SUHNER	SUCOFLEX 102 E	800137/2EA	RE	2018/03/28 * 12
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	2018/06/02 * 12
SBA-03	Biconical Antenna	Schwarzbeck	BBA9106	91032666	RE	2018/06/17 * 12
SLA-07	Logperiodic Antenna	Schwarzbeck	VUSLP9111B	196	RE	2018/06/17 * 12
SAT6-13	Attenuator	JFW	50HF-006N	-	RE	2018/02/09 * 12
SCC-C1/C2/C3/C4/C5/C10/SRSE-03	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/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
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2017/10/30 * 12
SJM-02	Measure	KOMELON	KMC-36	-	RE/CE	-
STS-03	Digital Hitester	Hioki	3805-50	080997823	RE/CE	2017/10/16 * 12
SCC-C9/C10/SRSE-03	Coaxial Cable&RF Selector	Suhner/Suhner/TOYO	RG223U/141PE/NS4906	-/0901-271(RF Selector)	CE	2018/04/09 * 12
SLS-05	LISN	Rohde & Schwarz	ENV216	100516	CE	2018/02/26 * 12
SAT3-10	Attenuator	JFW	50HF-003N	-	CE	2017/08/24 * 12 *1)
SOS-06	Humidity Indicator	A&D	AD-5681	4062118	CE	2017/12/21 * 12

Test Instruments (2/2)

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SAEC-01(NSA)	Semi-Anechoic Chamber	TDK	SAEC-01(NSA)	1	RE	2018/05/29 * 12
SAEC-01(SVSWR)	Semi-Anechoic Chamber	TDK	SAEC-01(SVSWR)	1	RE	2018/07/19 * 12
SAF-04	Pre Amplifier	TOYO Corporation	TPA0118-36	1440489	RE	2018/06/26 * 12
SCC-G05	Coaxial Cable	Junkosha	J12J102207-00	APR-30-15-037	RE	2018/01/29 * 12
SCC-G22	Coaxial Cable	Suhner	SUCOFLEX 104	296199/4	RE	2018/05/11 * 12
SHA-01	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-725	RE	2018/07/23 * 12
SOS-01	Humidity Indicator	A&D	AD-5681	4062555	RE	2017/10/30 * 12
STR-01	Test Receiver	Rohde & Schwarz	ESU40	100093	RE/CE	2018/04/13 * 12
KJM-09	Measure	KOMELON	KMC-36	-	RE/CE	-
STS-01	Digital Hitester	Hioki	3805-50	080997812	RE/CE	2017/10/16 * 12
SFL-18	Highpass Filter	MICRO-TRONICS	HPM50111	119	RE	2018/04/20 * 12
SAF-01	Pre Amplifier	SONOMA	310N	290211	RE	2018/02/16 * 12
KAT6-04	Attenuator	INMET	18N-6dB	-	RE	2017/12/14 * 12
SAT3-09	Attenuator	JFW	50HF-003N	-	RE	2018/08/23 * 12
SBA-01	Biconical Antenna	Schwarzbeck	BBA9106	91032664	RE	2018/06/05 * 12
SCC-A1/A3/A5 /A7/A8/A13/S RSE-01	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE /141PE/NS4906	-/0901-269(RF Selector)	RE	2018/04/12 * 12
SCC-A2/A4/A6 /A7/A8/A13/S RSE-01	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE /141PE/NS4906	-/0901-269(RF Selector)	RE	2018/04/12 * 12
SLA-05	Logperiodic Antenna	Schwarzbeck	VUSLP9111B	193	RE	2018/06/05 * 12
SCC-A12/A13/ SRSE-01	Coaxial Cable&RF Selector	Suhner/Suhner/TOYO	RG223U/141PE/NS4906	-/0901-269(RF Selector)	CE	2018/04/09 * 12
SLS-03	LISN	Rohde & Schwarz	ENV216	100511	CE	2018/02/26 * 12
SAT3-7	Attenuator	JFW	50HF-003N	-	CE	2018/08/23 * 12
SOS-16	Humidity Indicator	Custom	CTH-202	708Q08R	CE	2018/03/27 * 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: CE: Conducted Emission test
RE: Radiated Emission test
AT: Antenna Terminal Conducted test