TEST REPORT

Issued: May 8, 2018

Name and Address of the Customer:	KYOCERA Document Solutions Inc. 2-28, 1-Chome, Tamatsukuri, Chuo-ku, Osaka, 540-8585, Japan
Test Item:	RFID Module
Identification:	2TJA1082
Serial No.:	1, 2
FCC ID:	E522TJA1082
ISED Certification Number:	1059B-2TJA1082
Sample No.:	1
Sample Condition:	Good
Sample Receipt Date:	March 12, 2018
Test Specification:	47 CFR Part 15 Subpart C RSS-Gen Issue 4, RSS-210 Issue 9
Period of Testing:	March 12 – March 19, 2018
Test Result:	PASS

Representative Test Personnel: K. Miyaji (2018-05-08) — K. Miyaji (EMC Section), iNARTE : EMC-003627-NE

Reviewed by: H. Onishi (2018-05-08) — H. Onishi (EMC Section), iNARTE : EMC-003318-NT

Other Aspects:

Abbreviations:

PASS	=	passed
FAIL	=	failed
N/A	=	not applicable

Note:

This Test Report should not be reproduced except in full, without the written approval of Cosmos Corporation.
The test result of this Test Report is based on the tests made for sample provided, and it is not applicable to individual product identical to the sample or similar product.
The judgment of this test report validates the test item only specified in "4. Summary of Test Results".
This test report is not things that be accredited by VLAC regarding the products and also ensured.
Therefore, this report must not be used for advocating them.

Contents

Page

1. Description of the Tested Sample

1.1 Product Description

Product	RFID Module
Model (referred to as the EUT)	2TJA1082
Manufacturer	KYOCERA Document Solutions Inc.
Hardware Version	20180309
Software Version	20180309
Type of the Equipment	☐ Stand-alone ☐ Combined Equipment ☒ Plug-in Radio Device ☐ Other ( )
Transmitter Type	☐ WLAN ☐ Bluetooth (Ver) ☐ ZigBee ☒ RFID ☐ Other ( )
Antenna Type	☒ Integral Antenna ☐ Dedicated External Antenna
Operating Frequency	13.56 MHz
Type of Modulation	ASK
Emission Designator	10K5K1D
Type of Power Source	☐ AC Mains ☐ Dedicated AC Adaptor ☒ DC Voltage ☐ Battery
Input Power Rating	DC 3.3 V / 5 V
Type of Battery (if applicable)	N/A
Thermal Limitation	-20℃ to 50℃

1.2 Antenna Description

Model	Gain	Antenna Type
Un-specified *	-53 dBi	Loop Antenna

Note:

: The type and the gain of all four antennas are the same one. The test was performed with them by the manufacturer's specification.

*: The antenna does not have model name, because the antenna is a part of RF Module PCB.

1.3 EUT Description

Equipment under test is as follow:

Instrument	Model	Serial No.
RFID Module (EUT1) *1	2TJA1082	1
RFID Module (EUT2) *2	2TJA1082	2

Note:

*1: This equipment was used during the following tests;
AC Power Line Conducted Emission, Transmitter Spurious Emission (Radiated) and Field Strength of Fundamental Emission.

*2: This equipment was used during the following tests;
20 dB Bandwidth, Field Strength of Fundamental Emission, Frequency Stability and Occupied Bandwidth.

2. General Information

2.1 Test Methodology

All measurement subject to the present test report is carried out according to the procedures in ANSI C63.10-2013.

2.2 Test Facility

The measurement was carried out at the following facility.

Cosmos Corporation EMC Lab. Oonoki
3571-2 Oonoki, Watarai-cho, Watarai-gun, Mie-ken 516-2102, Japan

- ☒ Semi anechoic Chamber 3 m (COAC3M-01)
- ☒ Shielded Room (COSR-01)
- ☒ Measurement Room

Cosmos Corporation EMC Lab. Oonoki is accredited in accordance with the International Standard ISO/IEC 17025 by the following accreditation bodies and the test facility is registered by the following bodies.

Accreditation: VLAC Accredited Laboratory No. VLAC-039-2
FCC Designation No. JP5182

Registration: ISED Canada Registration No. 3958B

2.3 Traceability

The calibration of measurement equipment used in the test subject to the present report is designed and operated to ensure that the measurement is traceable to national standards of measurement or equivalent abroad.

3. Test Condition (Manufacturer's Specification)

3.1 Mode of Operation

Mode of operation : RFID Operating

Note:
The EUT makes communication emission with the maximum RF power by a special test program.
The module has 4 antennas. This module outputs the power by switching 4 antennas.
However, we measured the only 1 antenna which was selected by manufacturer as worst case.
The test of Field Strength of Fundamental Emission was performed under the following condition:

Voltage: DC 3.3V / 5 V ±15%

The test of Frequency Stability was performed under the following condition:

Temperature: -20℃ to +50℃
Voltage: DC 3.3V / 5 V ±15%

3.2 Additional Equipment

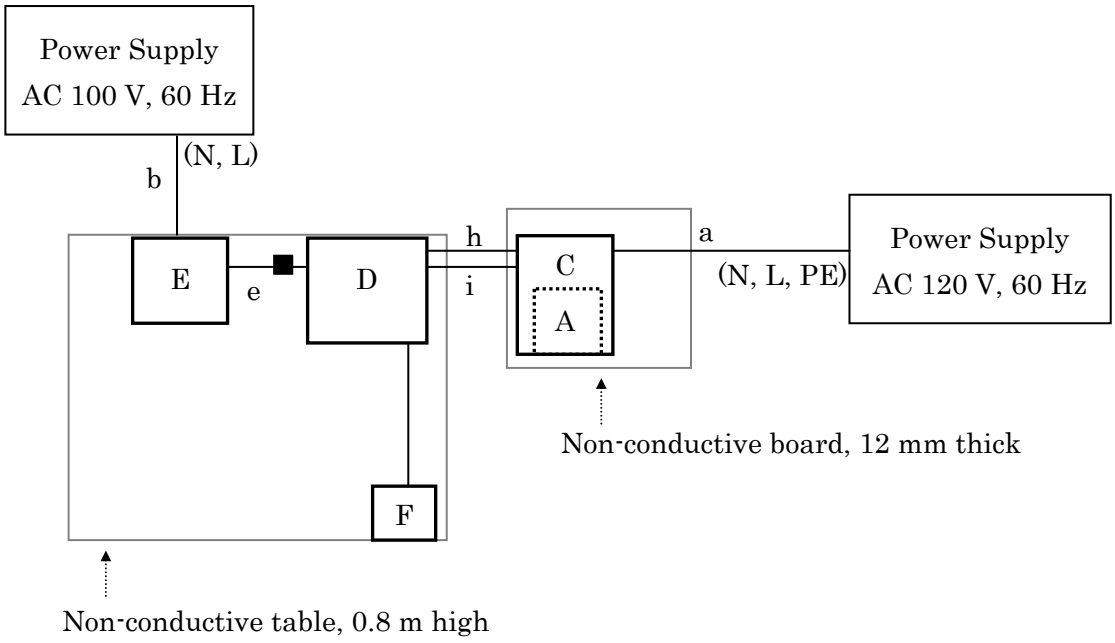
The equipment was tested together with additional peripherals.
The following peripherals were used during the tests:

Equipment	Model	Serial No.	Manufacturer
Multi-Function Printer	TASKalfa 307ci	Z377900014	KYOCERA Document Solutions
Personal Computer	PP17L	CN-0N8719-48643-57F-1500	DELL
AC Adapter	HP-OQ065B83	CN-0N2765-47890-47D-8266	DELL
USB Mouse	M-UAE96	LZ916AC0085	Logicool
DC Power Supply	PAC 55-2	1530037	KIKUSUI ELECTRONICS
Jig	---	---	---

3.3 Configuration

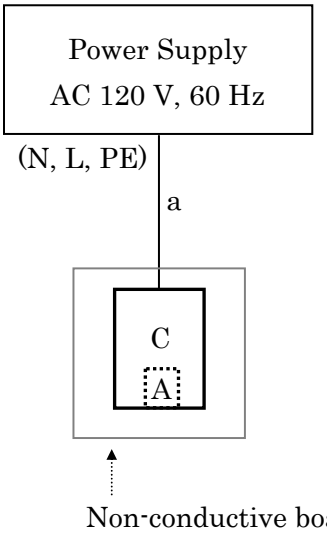
	Equipment	Model		Cable	Length	Shield
A	EUT1 (RFID Module)	2TJA1082 (S/N: 1)	a	AC Power Cord	2.5 m	×
			b	AC Power Cord	0.9 m	×
B	EUT2 (RFID Module)	2TJA1082 (S/N: 2)	c	AC Power Cord	2.0 m	×
			d	AC Power Cord	2.0 m	×
C	Multi-Function Printer	TASKalfa 307ci	e	DC Power Cord	1.9 m	○
			f	DC Power Cord	0.5 m	×
D	Personal Computer	PP17L	g	DC Power Cord	0.4 m	×
E	AC Adapter	HP-OQ065B83	h	LAN Cable	2.0 m	×
F	USB Mouse	M-UAE96	i	USB Cable	2.1 m	○
G	DC Power Supply	PAC 55-2	j	USB Mouse Cable	1.8 m	○
H	Jig	---	k	Jig Cable	0.4 m	×
			l	Jig Cable	0.4 m	×

AC Power Line Conducted Emission

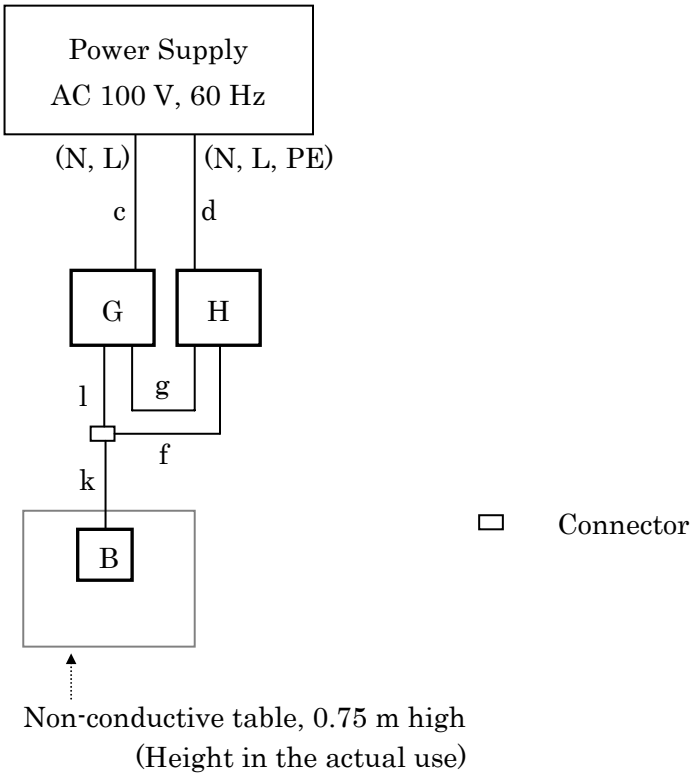


3.3 Configuration (Continued)

Transmitter Spurious Emission (Radiated)
Field Strength of Fundamental Emission (normal voltage)

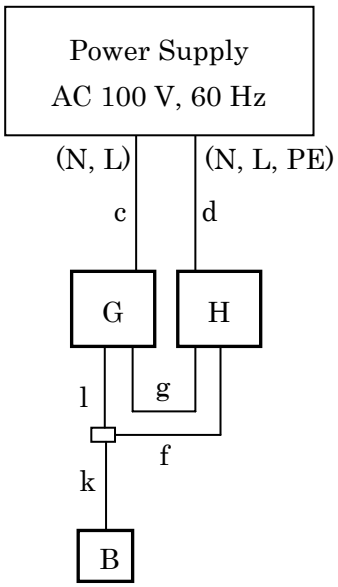


Field Strength of Fundamental Emission (normal and ±15% voltage)



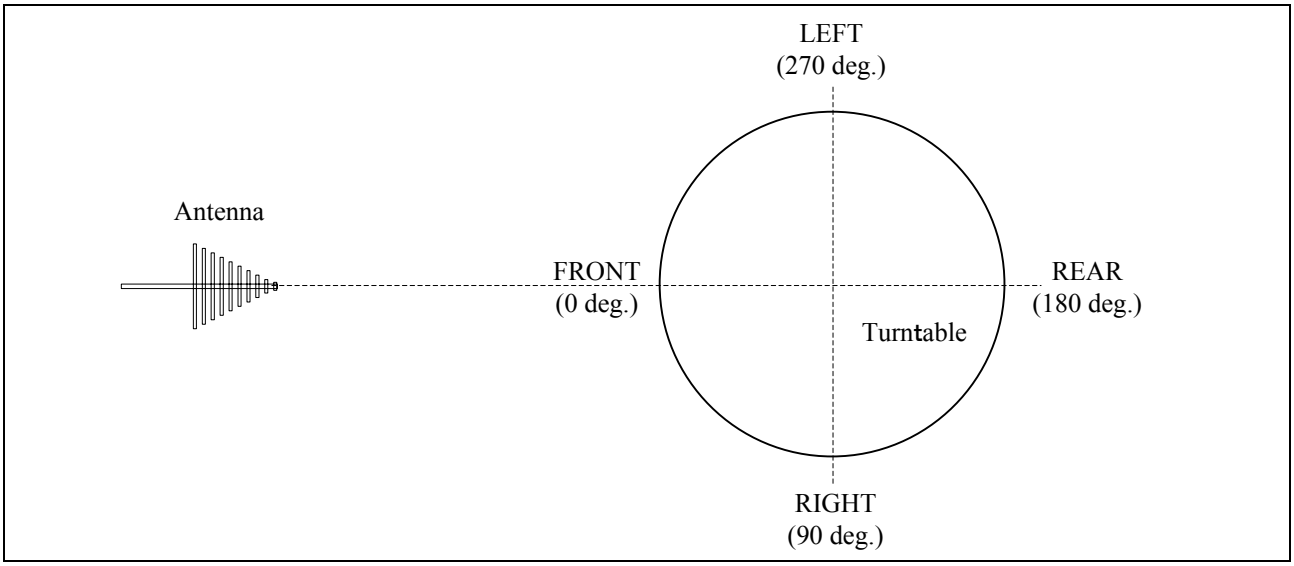
3.3 Configuration (Continued)

20 dB Bandwidth / Frequency Stability / Occupied Bandwidth



Connector

3.4 EUT Angle



4. Summary of Test Results

These test results are the test results of the condition specified with “3. Test Condition”.

FCC Section	IC Section	Test Item	FCC Result	IC Result
15.207	RSS-Gen 8.8	AC Power Line Conducted Emission	PASS	PASS
15.209, 15.225(d)	RSS-Gen 8.9	Transmitter Spurious Emission (Radiated)	PASS	PASS
15.215(c)	---	20 dB Bandwidth	PASS	---
15.225 (a) (b) (c) (d)	RSS-210 B.6	Field Strength of Fundamental Emission	PASS	PASS
15.225(e)	RSS-210 B.6	Frequency Stability	PASS	PASS
---	RSS-Gen Annex A	Occupied Bandwidth	---	PASS
---	RSS-Gen 7.1	Receiver Spurious Emission (Radiated)	---	N/A *

Note:
*: This item does not apply because this device receives some data only while the radio waves are transmitted.

5. Test Result

5.1 AC Power Line Conducted Emission (15.207, RSS-Gen 8.8)

5.1.1 Setting Remarks

The conducted disturbance voltage of AC power line in the frequency range from 150 kHz to 30 MHz was measured in accordance with ANSI C63.10:2013.
The non-conductive board, 12 mm thick, was placed on the reference ground plane, and the EUT was put on the non-conductive board. The used Line Impedance Stabilizing Network (LISN) has a rated impedance of 50 Ω/50 μH as specified in CISPR16-1-2. The test receiver with Quasi Peak and Average detector is in accordance with CISPR 16-1-1. The conducted emission level is calculated by adding Cable Attenuation Factor and Insertion Loss of LISN.

Setting Condition of Test receiver

Frequency range	Detector	RBW
150 kHz to 30 MHz	Quasi Peak	9 kHz
	Average	9 kHz

5.1.2 Limit

Frequency range	Conducted Limit [dBμV]	
	Quasi Peak	Average
150 kHz to 500 kHz	66 to 56 *	56 to 46 *
500 kHz to 5 MHz	56	46
5 MHz to 30 MHz	60	50

Note:
*: Decrease with the logarithm of the frequency.

5.1.3 Test Detail

Result: PASS

Uncertainty of measurement result	:	± 1.98 dB
Date of testing	:	March 14, 2018
Room temperature	:	22℃
Relative humidity	:	41%
Engineer	:	K. Miyaji

Sample Calculation
Result = Reading + c.f
= 43.4 + 10.4
= 53.8

Margin = Limit – Result
= 66.0 – 53.8
= 12.2

Note:
c.f (Correction Factor) = Cable Attenuation Factor + LISN Factor

5.1.3 Test Detail (Continued)

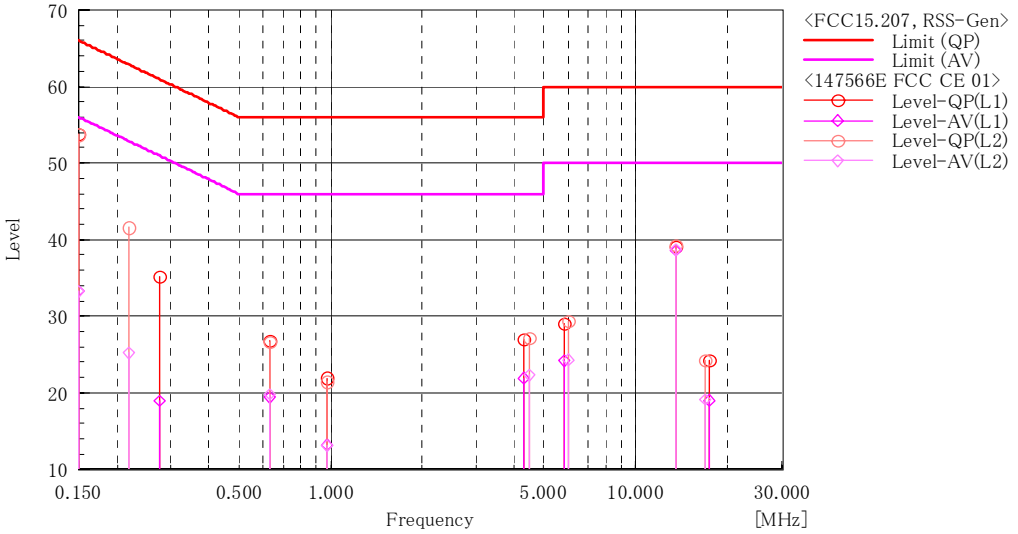
Test Data

Cosmos Corporation
Oonoki Lab.

<<Conducted Emission EP5/CE Ver 5.3.20>>

14 March,2018 15:40
147566E FCC CE 01.dat

Model	: 2TJA1082 / TASKalfa 307ci	Limit	: FCC15.207, RSS-Gen
Serial	: 1 / Z377900014	Mode	: RFID
Operater	: K. Miyaji	Remark	:
Power	: DC 3.3V, 5V / AC 120V, 60Hz	Remark	:
Temp., Humi.	: 22℃, 41%	Remark	: RBW:9kHz



Final Result

--- L1 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c.f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]	Remark
1	0.150	43.4	22.9	10.4	53.8	33.3	66.0	56.0	12.2	22.7	
2	0.276	24.9	8.7	10.2	35.1	18.9	60.9	50.9	25.8	32.0	
3	0.6313	16.6	9.2	10.2	26.8	19.4	56.0	46.0	29.2	26.6	
4	0.972	11.7	3.0	10.2	21.9	13.2	56.0	46.0	34.1	32.8	
5	4.291	16.5	11.4	10.5	27.0	21.9	56.0	46.0	29.0	24.1	
6	5.824	18.3	13.5	10.7	29.0	24.2	60.0	50.0	31.0	25.8	
7	13.5606	27.4	26.9	11.7	39.1	38.6	60.0	50.0	20.9	11.4	
8	17.460	12.1	6.9	12.1	24.2	19.0	60.0	50.0	35.8	31.0	

--- L2 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c.f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]	Remark
1	0.150	43.3	22.8	10.4	53.7	33.2	66.0	56.0	12.3	22.8	
2	0.218	31.3	14.9	10.3	41.6	25.2	62.9	52.9	21.3	27.7	
3	0.6343	16.4	9.6	10.2	26.6	19.8	56.0	46.0	29.4	26.2	
4	0.9783	11.2	2.9	10.2	21.4	13.1	56.0	46.0	34.6	32.9	
5	4.462	16.5	11.7	10.6	27.1	22.3	56.0	46.0	28.9	23.7	
6	6.020	18.6	13.6	10.7	29.3	24.3	60.0	50.0	30.7	25.7	
7	13.5606	27.5	27.0	11.7	39.2	38.7	60.0	50.0	20.8	11.3	
8	16.920	12.1	7.0	12.1	24.2	19.1	60.0	50.0	35.8	30.9	

5.2 Transmitter Spurious Emission (Radiated) (15.209, RSS-Gen 8.9)

5.2.1 Setting Remarks

The electric field strength was measured in accordance with ANSI C63.10-2013, in the frequency range from 9 kHz to 1 GHz (over 10th harmonics) except for the frequency band on which the transmitter is intended to operate.
The test setup was made on the turntable installed in a semi-anechoic chamber.
The non-conductive board, 12 mm thick, was placed on the turntable, and the EUT was put on the non-conductive board. The EUT was measured at 1 m to 4 m height of the antenna above 30 MHz. The turntable was fully rotated. The highest radiation from the equipment was recorded. The measurement above 30 MHz was carried out with both horizontal and vertical antenna polarization. The test receiver with Peak, Quasi Peak and Average detector is in accordance with CISPR 16-1-1.
The measurement was carried out with the measuring distance of 3 m.

Setting Condition of Test receiver

Frequency range	Detector	RBW
9 kHz to 90 kHz	Peak	200 Hz
	Average	200 Hz
90 kHz to 110 kHz	Quasi Peak	200 Hz
110 kHz to 150 kHz	Peak	200 Hz
	Average	200 Hz
150 kHz to 490 kHz	Peak	9 kHz
	Average	9 kHz
490 kHz to 30 MHz	Quasi Peak	9 kHz
30 MHz to 1 GHz	Quasi Peak	120 kHz

5.2.2 Limit

The emission limits shown in the following table are based on measurements employing a CISPR Quasi Peak detector except for the frequency bands 9 kHz to 90 kHz, 110 kHz to 490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an Average detector. The limit on Peak radio frequency emissions is 20 dB above the maximum permitted Average emission limit applicable to the equipment under test.

Frequency range	Field Strength (Distance)			
	[μV/m]		[dBμV/m]	
9 kHz to 490 kHz	2400/F (kHz) 266.6 to 4.89	(300 m)	128.5 to 93.8	(3 m)
490 kHz to 1.705 MHz	24000/F (kHz) 48.9 to 14.0	(30 m)	73.8 to 62.9	(3 m)
1.705 MHz to 30 MHz	30	(30 m)	69.5	(3 m)
30 MHz to 88 MHz	100	(3 m)	40.0	(3 m)
88 MHz to 216 MHz	150	(3 m)	43.5	(3 m)
216 MHz to 960 MHz	200	(3 m)	46.0	(3 m)
Above 960 MHz	500	(3 m)	53.9	(3 m)

5.2.3 Test Detail

Result: PASS

Uncertainty of measurement result	:	± 3.61 dB	
Date of testing	:	March 12, 2018	March 13, 2018
Room temperature	:	20℃	20℃
Relative humidity	:	44%	43%
Engineer	:	K. Miyaji	

5.2.3 Test Detail (Continued)

Sample Calculation
Result = Reading + c.f
= 40.8 + 21.0
= 61.8

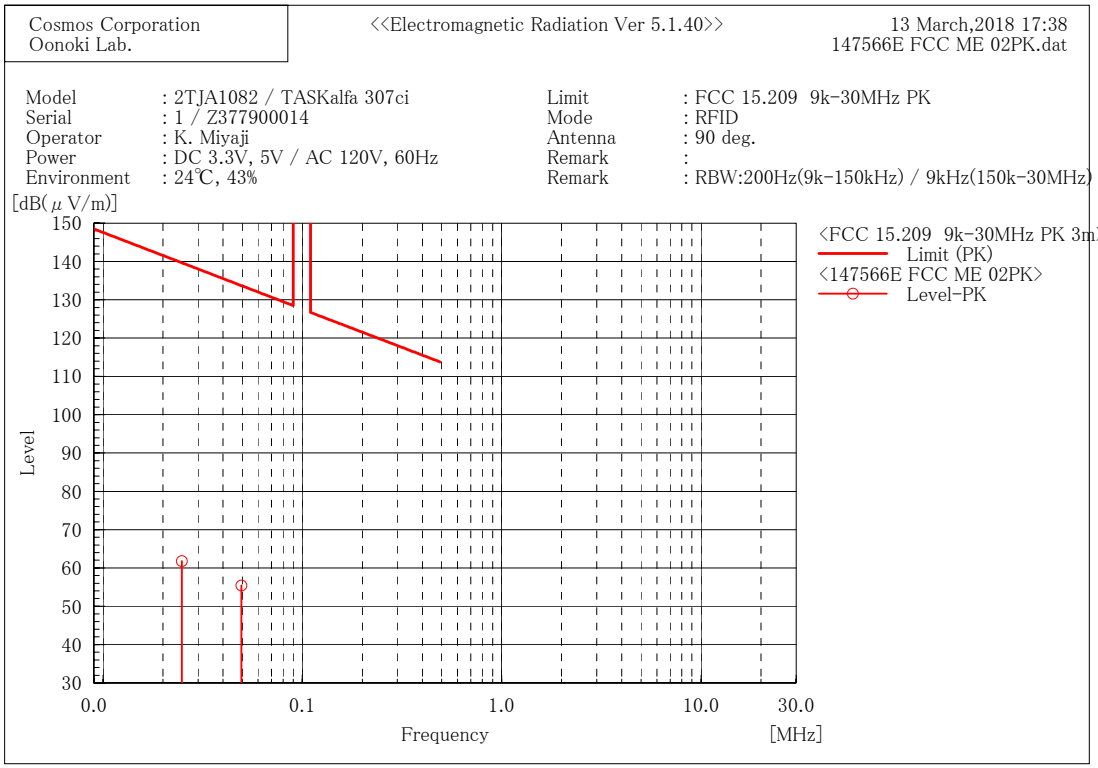
Margin = Limit – Result
= 139.7 – 61.8
= 77.9

Note:
[Below 30 MHz]
c.f (Correction Factor) = Cable Attenuation Factor + Antenna Factor

[Above 30 MHz]
c.f (Correction Factor) = Cable Attenuation Factor + Antenna Factor + Amplifier Gain

<Below 30 MHz>

Worst Test Data (Antenna: 90°, Detector: Peak)



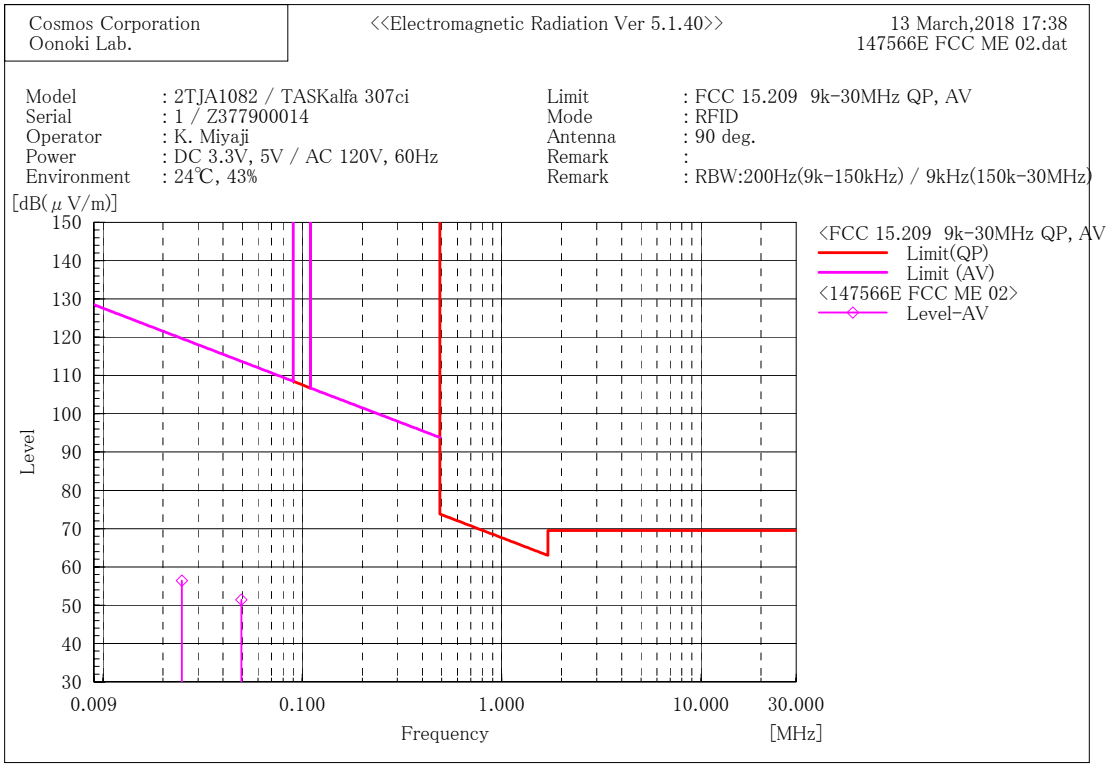
Final Result

No.	Frequency	Reading	c.f	Result	Limit	Margin	Angle	Remark
	[MHz]	[dB(μV)]	[dB(1/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	[°]	
1	0.02487	40.8	21.0	61.8	139.7	77.9	201.0	
2	0.04945	34.6	20.8	55.4	133.7	78.3	197.0	

5.2.3 Test Detail (Continued)

<Below 30 MHz>

Worst Test Data (Antenna: 90°, Detector: Average)



Final Result

No.	Frequency	Reading AV	c.f	Result AV	Limit AV	Margin AV	Angle
	[MHz]	[dB(μV)]	[dB(1/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	[°]
1	0.02487	35.4	21.0	56.4	119.7	63.3	201.0
2	0.04945	30.6	20.8	51.4	113.7	62.3	197.0

5.2.3 Test Detail (Continued)

<Above 30 MHz>

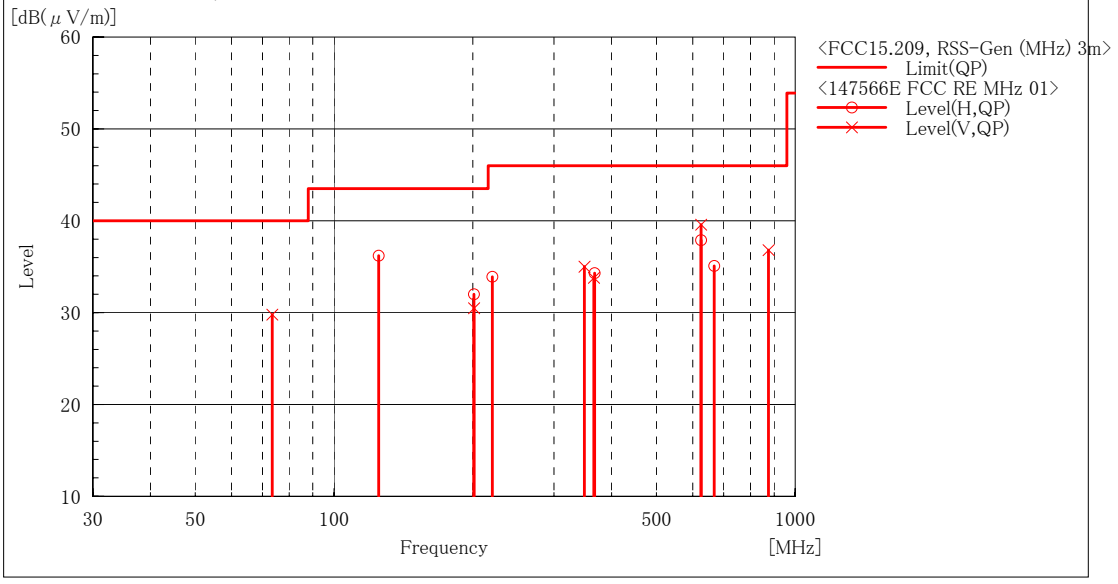
Test Data

Cosmos Corporation
Oonoki Lab.

<<Radiated Emission EP5/RE Ver 5.7.1>>

12 March,2018 15:10
147566E FCC RE MHz 01.dat

Model	: 2TJA1082 / TASKalfa 307ci	Limit	: FCC15.209, RSS-Gen (MHz) 3m
Serial	: 1 / Z377900014	Mode	: RFID
Operator	: K. Miyaji	Remark	:
Power	: AC 120V, 60Hz	Remark	:
Environment	: 20℃, 44%	Remark	: RBW:120kHz



Final Result

--- Horizontal Polarization (QP)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Height [cm]	Angle [°]
1	125.000	48.1	-11.9	36.2	43.5	7.3	253.0	300.0
2	201.220	39.3	-7.3	32.0	43.5	11.5	100.0	279.0
3	220.500	40.4	-6.5	33.9	46.0	12.1	145.0	316.0
4	367.510	39.5	-5.2	34.3	46.0	11.7	193.0	296.0
5	625.000	38.3	-0.4	37.9	46.0	8.1	163.0	326.0
6	667.750	34.8	0.3	35.1	46.0	10.9	108.0	149.0

--- Vertical Polarization (QP)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Height [cm]	Angle [°]
1	73.475	44.2	-14.4	29.8	40.0	10.2	100.0	0.0
2	201.220	37.8	-7.3	30.5	43.5	13.0	100.0	286.0
3	349.120	40.8	-5.8	35.0	46.0	11.0	118.0	159.0
4	365.810	39.1	-5.3	33.8	46.0	12.2	110.0	155.0
5	625.000	40.0	-0.4	39.6	46.0	6.4	137.0	152.0
6	875.000	33.0	3.8	36.8	46.0	9.2	155.0	140.0

5.3 20 dB Bandwidth (15.215(c))

5.3.1 Setting Remarks

The both side of 20 dB down value from peak power were measured by using the spectrum analyzer.
The spectrum analyzer is set as following:

・Resolution Bandwidth	: 1% to 5% of the OBW (not less than 1 kHz)
・Video Bandwidth	: Approx. 3 × RBW or greater
・Detector Mode	: Peak
・Trace Mode	: Max Hold

5.3.2 Limit

Intentional radiators must be designed to ensure that the 20 dB bandwidth of the emission is contained within the frequency band designated in the rule section under which the equipment is operated

5.3.3 Test Detail

Result: PASS

Uncertainty of measurement result	:	±0.013%
Date of testing	:	March 13, 2018
Room temperature	:	24℃
Relative humidity	:	43%
Engineer	:	K. Miyaji

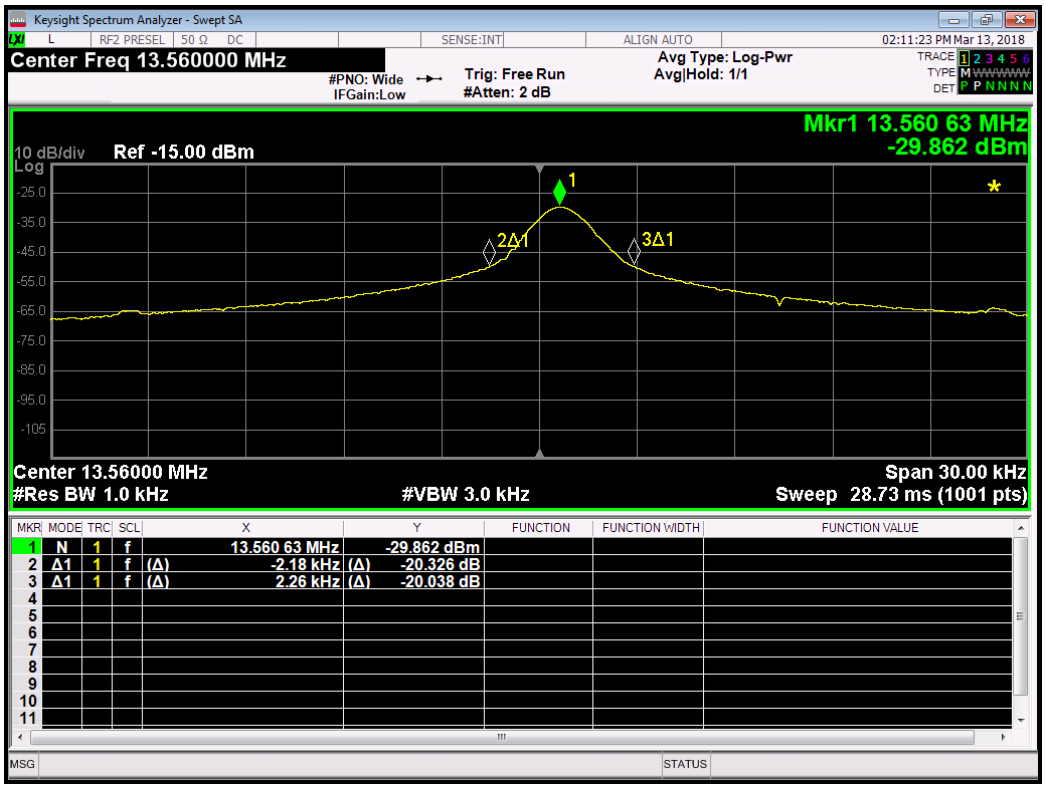
5.3.3 Test Detail (Continued)

Test Data

Measured Bandwidth [kHz]
4.44

	Edge of Bandwidth [MHz]	Limit [MHz]	Margin [kHz]
Lower	13.557	13.41 (Restricted Band)	147
Higher	13.563	14.01	447

Waveform Data



5.4 Field Strength of Fundamental Emission (15.225(a) (b) (c) (d), RSS-210 B.6)

5.4.1 Setting Remarks

The test setup was made in accordance with ANSI C63.10:2013 in a semi-anechoic chamber. The non-conductive board, 12 mm thick, was placed on the turntable, and the EUT was put on the non-conductive board. The turntable was fully rotated. The highest radiation from the equipment was recorded. The measurement was carried out with the measuring distance of 3 m. The test receiver with Quasi Peak detector is in accordance with CISPR 16-1-1. Then the limit of 30 m distance was converted to the limit of 3 m distance with the 40log(30 m/3 m).

5.4.2 Limit

Frequency range	Field Strength (Distance)			
	[μV/m]		[dBμV/m]	
13.553 MHz to 13.567 MHz	15848	(30 m)	123.9	(3 m)
13.410 MHz to 13.553 MHz and 13.567 MHz to 13.710 MHz	334	(30 m)	90.4	(3 m)
13.110 MHz to 13.410 MHz and 13.710 MHz to 14.010 MHz	106	(30 m)	80.5	(3 m)
Outside of 13.110 MHz to 14.010 MHz	30	(30 m)	69.5	(3 m)

5.4.3 Test Detail

Result: PASS

Uncertainty of measurement result	:	± 2.01 dB	
Date of testing	:	March 13, 2018	March 19, 2018
Room temperature	:	24℃	21℃
Relative humidity	:	43%	47%
Engineer	:	K. Miyaji	

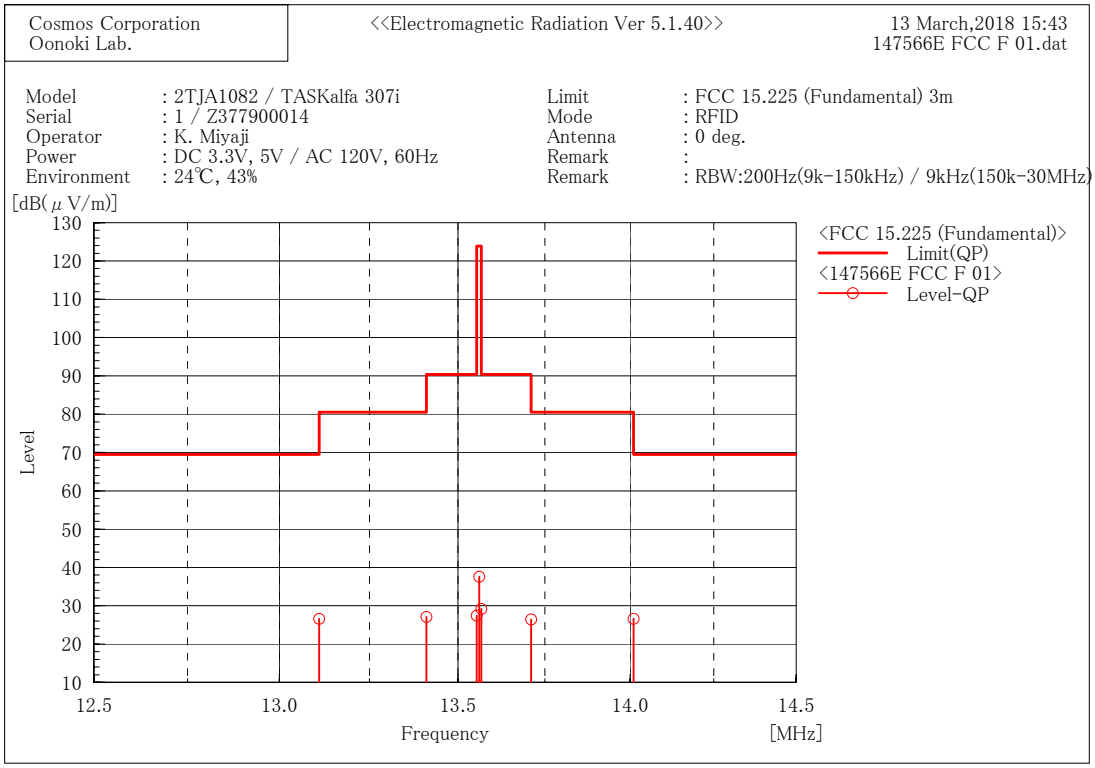
5.3.3 Test Detail (Continued)

Sample Calculation
Result = Reading + c.f
= 4.6 + 22.0
= 26.6

Margin = Limit – Result
= 69.5 – 26.6
= 42.9

Note:
c.f (Correction Factor) = Cable Attenuation Factor + Antenna Factor

[Test data of the Module with the Printer]
Worst Test Data (Antenna: 0°)



Final Result

No.	Frequency [MHz]	Reading [dBμV]	c.f [dB(1/m)]	Result [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Angle [°]
1	13.110	4.6	22.0	26.6	69.5	42.9	335.0
2	13.410	5.0	22.1	27.1	80.5	53.4	335.0
3	13.553	5.3	22.1	27.4	90.4	63.0	335.0
4	13.5606	15.5	22.1	37.6	123.9	86.3	335.0
5	13.567	7.1	22.1	29.2	90.4	61.2	335.0
6	13.710	4.3	22.1	26.4	80.5	54.1	335.0
7	14.010	4.4	22.2	26.6	69.5	42.9	335.0

5.3.3 Test Detail (Continued)

Sample Calculation

Result (3 m) = Reading + c.f
= 31.4 + 22.1
= 53.5

Result (30 m) = Result (3 m) – Conversion Factor
= 53.5 – 40.0
= 13.5

Margin = Limit – Result (30 m)
= 83.9 – 13.5
= 70.4

Note:
c.f (Correction Factor) = Cable Attenuation Factor + Antenna Factor

[Test data of the module only]

Test Data (Frequency Range: 13.553 MHz to 13.567 MHz)

Frequency Range [MHz]	Measurement Frequency [MHz]	Power Supply Voltage [V]	Power Supply Voltage [V]	Antenna Polarization [deg.]	Reading [dBµV]	c.f. [dBS/m]	Result [dBµV/m] (3m)	Conversion Factor [dB]	Result [dBµV/m] (30m)	Limit [dBµV/m]	Margin [dB]
13.553 - 13.567	13.5606	2.805	4.25	90	31.4	22.1	53.5	40.0	13.5	83.9	70.4
	13.5606		5.00	90	32.9	22.1	55.0	40.0	15.0	83.9	68.9
	13.5606		5.75	90	33.9	22.1	56.0	40.0	16.0	83.9	67.9
	13.5606	3.30	4.25	90	31.6	22.1	53.7	40.0	13.7	83.9	70.2
	13.5606		5.00	90	33.1	22.1	55.2	40.0	15.2	83.9	68.7
	13.5606		5.75	90	34.2	22.1	56.3	40.0	16.3	83.9	67.6
	13.5606	3.795	4.25	90	31.7	22.1	53.8	40.0	13.8	83.9	70.1
	13.5606		5.00	90	33.2	22.1	55.3	40.0	15.3	83.9	68.6
	13.5606		5.75	90	34.2	22.1	56.3	40.0	16.3	83.9	67.6

5.3.3 Test Detail (Continued)

Test Data (Frequency Range: 13.410 MHz to 13.553 MHz)

Frequency Range [MHz]	Measurement Frequency [MHz]	Power Supply Voltage [V]	Power Supply Voltage [V]	Antenna Polarization [deg.]	Reading [dBµV]	c.f. [dBS/m]	Result [dBµV/m] (3m)	Conversion Factor [dB]	Result [dBµV/m] (30m)	Limit [dBµV/m]	Margin [dB]
13.41 - 13.553	13.553	2.805	4.25	90	14.2	22.1	36.3	40.0	-3.7	50.4	54.1
	13.553		5.00	90	15.4	22.1	37.5	40.0	-2.5	50.4	52.9
	13.553		5.75	90	16.3	22.1	38.4	40.0	-1.6	50.4	52.0
	13.553	3.30	4.25	90	14.1	22.1	36.2	40.0	-3.8	50.4	54.2
	13.553		5.00	90	15.4	22.1	37.5	40.0	-2.5	50.4	52.9
	13.553		5.75	90	16.2	22.1	38.3	40.0	-1.7	50.4	52.1
	13.553	3.795	4.25	90	14.1	22.1	36.2	40.0	-3.8	50.4	54.2
	13.553		5.00	90	15.3	22.1	37.4	40.0	-2.6	50.4	53.0
	13.553		5.75	90	16.3	22.1	38.4	40.0	-1.6	50.4	52.0

Test Data (Frequency Range: 13.567 MHz to 13.710 MHz)

Frequency Range [MHz]	Measurement Frequency [MHz]	Power Supply Voltage [V]	Power Supply Voltage [V]	Antenna Polarization [deg.]	Reading [dBµV]	c.f. [dBS/m]	Result [dBµV/m] (3m)	Conversion Factor [dB]	Result [dBµV/m] (30m)	Limit [dBµV/m]	Margin [dB]
13.567 - 13.71	13.567	2.805	4.25	90	18.8	22.1	40.9	40.0	0.9	50.4	49.5
	13.567		5.00	90	20.2	22.1	42.3	40.0	2.3	50.4	48.1
	13.567		5.75	90	21.1	22.1	43.2	40.0	3.2	50.4	47.2
	13.567	3.30	4.25	90	19.2	22.1	41.3	40.0	1.3	50.4	49.1
	13.567		5.00	90	20.5	22.1	42.6	40.0	2.6	50.4	47.8
	13.567		5.75	90	21.5	22.1	43.6	40.0	3.6	50.4	46.8
	13.567	3.795	4.25	90	19.4	22.1	41.5	40.0	1.5	50.4	48.9
	13.567		5.00	90	20.8	22.1	42.9	40.0	2.9	50.4	47.5
	13.567		5.75	90	21.6	22.1	43.7	40.0	3.7	50.4	46.7

Test Data (Frequency Range: 13.110 MHz to 13.410 MHz)

Frequency Range [MHz]	Measurement Frequency [MHz]	Power Supply Voltage [V]	Power Supply Voltage [V]	Antenna Polarization [deg.]	Reading [dBµV]	c.f. [dBS/m]	Result [dBµV/m] (3m)	Conversion Factor [dB]	Result [dBµV/m] (30m)	Limit [dBµV/m]	Margin [dB]
13.11 - 13.41	13.41	2.805	4.25	90	5.2	22.1	27.3	40.0	-12.7	40.5	53.2
	13.41		5.00	90	5.2	22.1	27.3	40.0	-12.7	40.5	53.2
	13.41		5.75	90	5.2	22.1	27.3	40.0	-12.7	40.5	53.2
	13.41	3.30	4.25	90	5.2	22.1	27.3	40.0	-12.7	40.5	53.2
	13.41		5.00	90	5.2	22.1	27.3	40.0	-12.7	40.5	53.2
	13.41		5.75	90	5.2	22.1	27.3	40.0	-12.7	40.5	53.2
	13.41	3.795	4.25	90	5.2	22.1	27.3	40.0	-12.7	40.5	53.2
	13.41		5.00	90	5.2	22.1	27.3	40.0	-12.7	40.5	53.2
	13.41		5.75	90	5.2	22.1	27.3	40.0	-12.7	40.5	53.2

Test Data (Frequency Range: 13.710 MHz to 14.010 MHz)

Frequency Range [MHz]	Measurement Frequency [MHz]	Power Supply Voltage [V]	Power Supply Voltage [V]	Antenna Polarization [deg.]	Reading [dBµV]	c.f. [dBS/m]	Result [dBµV/m] (3m)	Conversion Factor [dB]	Result [dBµV/m] (30m)	Limit [dBµV/m]	Margin [dB]
13.71 - 14.01	13.71	2.805	4.25	90	4.8	22.1	26.9	40.0	-13.1	40.5	53.6
	13.71		5.00	90	4.8	22.1	26.9	40.0	-13.1	40.5	53.6
	13.71		5.75	90	4.8	22.1	26.9	40.0	-13.1	40.5	53.6
	13.71	3.30	4.25	90	4.8	22.1	26.9	40.0	-13.1	40.5	53.6
	13.71		5.00	90	4.8	22.1	26.9	40.0	-13.1	40.5	53.6
	13.71		5.75	90	4.8	22.1	26.9	40.0	-13.1	40.5	53.6
	13.71	3.795	4.25	90	4.8	22.1	26.9	40.0	-13.1	40.5	53.6
	13.71		5.00	90	4.8	22.1	26.9	40.0	-13.1	40.5	53.6
	13.71		5.75	90	4.8	22.1	26.9	40.0	-13.1	40.5	53.6

5.3.3 Test Detail (Continued)

Test Data (Frequency Range: 12.660 MHz to 13.110 MHz)

Frequency Range [MHz]	Measurement Frequency [MHz]	Power Supply Voltage [V]	Power Supply Voltage [V]	Antenna Polarization [deg.]	Reading [dBµV]	c.f. [dBS/m]	Result [dBµV/m] (3m)	Conversion Factor [dB]	Result [dBµV/m] (30m)	Limit [dBµV/m]	Margin [dB]
12.66 - 13.11	13.11	2.805	4.25	90	5.0	22.0	27.0	40.0	-13.0	29.5	42.5
	13.11		5.00	90	5.0	22.0	27.0	40.0	-13.0	29.5	42.5
	13.11		5.75	90	5.0	22.0	27.0	40.0	-13.0	29.5	42.5
	13.11	3.30	4.25	90	5.0	22.0	27.0	40.0	-13.0	29.5	42.5
	13.11		5.00	90	5.0	22.0	27.0	40.0	-13.0	29.5	42.5
	13.11		5.75	90	5.0	22.0	27.0	40.0	-13.0	29.5	42.5
	13.11	3.795	4.25	90	5.0	22.0	27.0	40.0	-13.0	29.5	42.5
	13.11		5.00	90	5.0	22.0	27.0	40.0	-13.0	29.5	42.5
	13.11		5.75	90	5.0	22.0	27.0	40.0	-13.0	29.5	42.5

Test Data (Frequency Range: 14.010 MHz to 14.460 MHz)

Frequency Range [MHz]	Measurement Frequency [MHz]	Power Supply Voltage [V]	Power Supply Voltage [V]	Antenna Polarization [deg.]	Reading [dBµV]	c.f. [dBS/m]	Result [dBµV/m] (3m)	Conversion Factor [dB]	Result [dBµV/m] (30m)	Limit [dBµV/m]	Margin [dB]
14.01 - 14.46	14.01	2.805	4.25	90	4.9	22.2	27.1	40.0	-12.9	29.5	42.4
	14.01		5.00	90	4.9	22.2	27.1	40.0	-12.9	29.5	42.4
	14.01		5.75	90	4.9	22.2	27.1	40.0	-12.9	29.5	42.4
	14.01	3.30	4.25	90	4.9	22.2	27.1	40.0	-12.9	29.5	42.4
	14.01		5.00	90	4.9	22.2	27.1	40.0	-12.9	29.5	42.4
	14.01		5.75	90	4.9	22.2	27.1	40.0	-12.9	29.5	42.4
	14.01	3.795	4.25	90	4.9	22.2	27.1	40.0	-12.9	29.5	42.4
	14.01		5.00	90	4.9	22.2	27.1	40.0	-12.9	29.5	42.4
	14.01		5.75	90	4.9	22.2	27.1	40.0	-12.9	29.5	42.4

5.5 Frequency Stability (15.225(e), RSS-210 B.6)

5.5.1 Setting Remarks

The EUT was placed in an environmental test chamber, exposed in extreme temperatures until its temperature is stabilized. The measurement was carried out at every 10℃ from -20℃ to +50℃ in the most common nominal supply voltage and the measurement was carried out at ±15% of rated voltage at 20℃.

5.5.2 Limit

The frequency stability of the carrier signal shall be maintained within ±0.01% of the operating frequency.

5.5.3 Test Detail

Result: PASS

Uncertainty of measurement result	:	±0.10 Hz
Date of testing	:	March 15 and 16, 2018
Room temperature	:	Refer to Test Data
Engineer	:	K. Miyaji

Sample Calculation

Deviation [Hz] = Measured Frequency – Center Frequency
= 13560523 – 13560000
= 523

Deviation [ppm] = |Deviation [Hz]| ÷ Center Frequency × 1000000
= |523| ÷ 13560000 × 1000000
≒ 38.5

Margin = Limit – Deviation [ppm]
= 100 – 38.5
= 61.5

5.5.3 Test Detail (Continued)

Test Data

Temp [℃]	Operation Time	Measured Frequency [Hz]	Deviation [Hz]	Deviation [ppm]	Limit [ppm]	Margin [ppm]
50	Startup	13560523	523	38.5	100	61.5
	2 min	13560520	520	38.4	100	61.6
	5 min	13560519	519	38.3	100	61.7
	10 min	13560519	519	38.2	100	61.8
40	Startup	13560563	563	41.5	100	58.5
	2 min	13560560	560	41.3	100	58.7
	5 min	13560559	559	41.2	100	58.8
	10 min	13560559	559	41.2	100	58.8
30	Startup	13560600	600	44.2	100	55.8
	2 min	13560596	596	44.0	100	56.0
	5 min	13560595	595	43.8	100	56.2
	10 min	13560594	594	43.8	100	56.2
20	Startup	13560647	647	47.7	100	52.3
	2 min	13560645	645	47.6	100	52.4
	5 min	13560644	644	47.5	100	52.5
	10 min	13560642	642	47.4	100	52.6
10	Startup	13560684	684	50.4	100	49.6
	2 min	13560682	682	50.3	100	49.7
	5 min	13560682	682	50.3	100	49.7
	10 min	13560681	681	50.2	100	49.8
0	Startup	13560703	703	51.8	100	48.2
	2 min	13560702	702	51.8	100	48.2
	5 min	13560702	702	51.8	100	48.2
	10 min	13560702	702	51.8	100	48.2
-10	Startup	13560696	696	51.4	100	48.6
	2 min	13560698	698	51.5	100	48.5
	5 min	13560699	699	51.5	100	48.5
	10 min	13560699	699	51.5	100	48.5
-20	Startup	13560657	657	48.4	100	51.6
	2 min	13560662	662	48.8	100	51.2
	5 min	13560663	663	48.9	100	51.1
	10 min	13560664	664	48.9	100	51.1

5.5.3 Test Detail (Continued)

Test Data

Supply Voltage [V]	Supply Voltage [V]	Measured Frequency [Hz]	Deviation [Hz]	Deviation [ppm]	Limit [ppm]	Margin [ppm]
2.805	4.25	13560584	584	43.1	100	56.9
	5.00	13560583	583	43.0	100	57.0
	5.75	13560581	581	42.8	100	57.2
3.300	4.25	13560643	643	47.4	100	52.6
	5.00	13560642	642	47.4	100	52.6
	5.75	13560640	640	47.2	100	52.8
3.795	4.25	13560677	677	49.9	100	50.1
	5.00	13560681	681	50.2	100	49.8
	5.75	13560678	678	50.0	100	50.0

Test Data

Temp [℃]	Supply Voltage [V]	Supply Voltage [V]	Measured Frequency [Hz]	Deviation [Hz]	Deviation [ppm]	Limit [ppm]	Margin [ppm]
50	3.3	5	13560519	-123	9.1	100	90.9
20			13560642	reference value			
-20			13560664	22	1.6	100	98.4
20	2.805	4.25	13560584	-58	4.3	100	95.7
		5.00	13560583	-59	4.4	100	95.6
		5.75	13560581	-61	4.5	100	95.5
	3.300	4.25	13560643	1	0.1	100	99.9
		5.75	13560640	-2	0.1	100	99.9
	3.795	4.25	13560677	35	2.6	100	97.4
		5.00	13560681	39	2.9	100	97.1
		5.75	13560678	36	2.7	100	97.3

5.6 Occupied Bandwidth (RSS-Gen Annex A)

5.6.1 Setting Remarks

Occupied Bandwidth is measured by using 99% Bandwidth measurement function of the spectrum analyzer.
The spectrum analyzer is set as following:

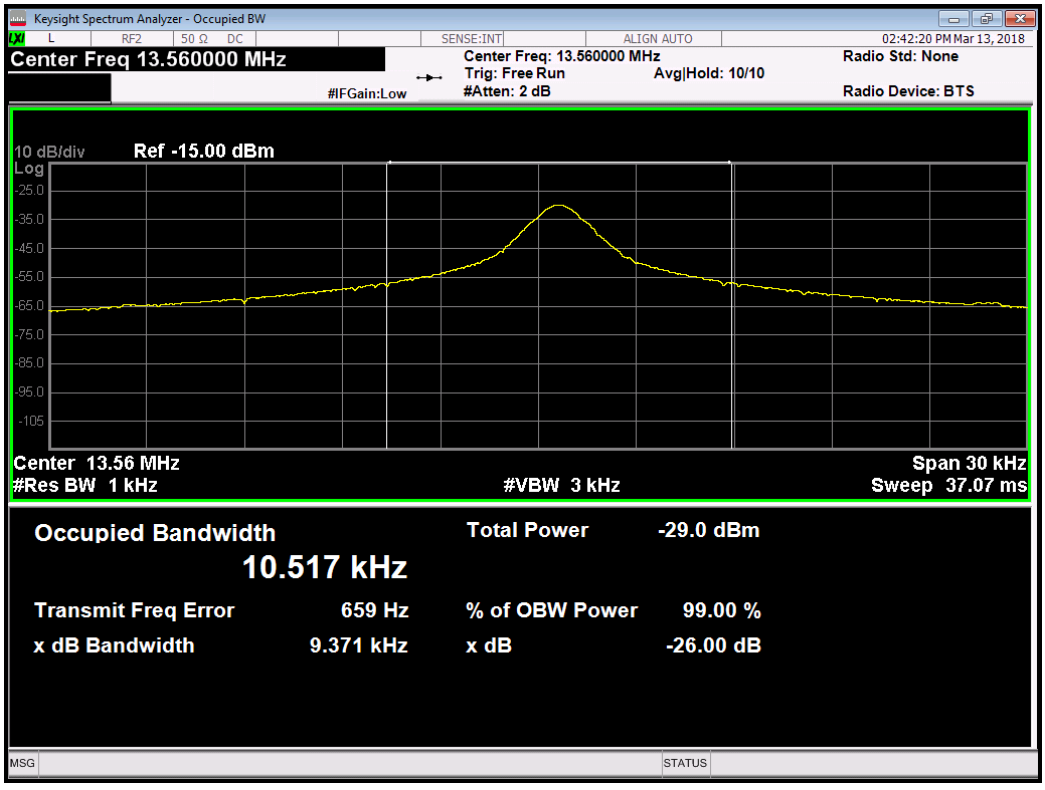
・Resolution Bandwidth	: 1% to 5% of the OBW (not less than 1 kHz)
・Video Bandwidth	: Approx. 3 × RBW or greater
・Detector Mode	: Peak
・Trace Mode	: Max Hold

5.6.2 Test Detail

Result: PASS

Uncertainty of measurement result	:	±0.013%
Date of testing	:	March 13, 2018
Room temperature	:	24℃
Relative humidity	:	43%
Engineer	:	K. Miyaji

Test Data



6. List of Test and Measurement Instruments

AC Power Line Conducted Emission

Instruments	Manufacturer	Model	Serial No.	Calibrated Date/Until
EMI Test Receiver	Agilent Technologies	N9038A	MY54130015	2017/06/06 2018/06/05
Artificial-Mains Network /Highpass Filter /Attenuator 10 dB	Kyoritsu /Kyoritsu /TAMAGAWA	KNW-341C (F) /KFL-007 /CFA-03	8-1659-1 /8-1708-10 /---	2017/06/09 2018/06/08
Artificial-Mains Network /Highpass Filter /Attenuator 10 dB	Kyoritsu /Kyoritsu /TAMAGAWA	KNW-244C (F) /KFL-007 /CFA-03	8-1657-1 /8-1741-1 /---	2017/06/23 2018/06/22
Shielded Room	JSE	COSR-01	---	---
RF Cable RF Selector (9 kHz to 30 MHz)	Fujikura	3D-2W	OC01	2017/03/28 2018/03/27
	SUHNER	RG223/U	OC02 OC04	
	TSJ	RFM-E221	3148	
50 Ω Terminator	TAAMAGAWA	CT-01	(OE00527)	2017/10/03 2018/10/02
Thermometer Hygrometer	EMPEX	TD-8316	(OE00520)	2017/08/04 2018/08/03
Software	TOYO	EP5/CE (ver 5.3.20)	---	---

6. List of Test and Measurement Instruments (Continued)

Transmitter Spurious Emission (Radiated) (Below 30 MHz)
Field Strength of Fundamental Emission

Instruments	Manufacturer	Model	Serial No.	Calibrated Date/Until
EMI Test Receiver	Agilent Technologies	N9038A	MY54130015	2017/06/06 2018/06/05
Loop Antenna (9 kHz to 30 MHz)	SCHAFFNER	HLA6120	1137	2015/11/06 2018/11/05
Anechoic Chamber 3 m	JSE	COAC3M-01	---	2017/04/11 2018/04/10
RF Cable RF Selector (9 kHz to 30 MHz)	Fujikura	5D-2W	OC09	2017/04/13 2018/04/12
	SUHNER	RG223/U	OC10 OC11 OC12	
	TSJ	RFM-E121	03149	
Thermometer Hygrometer	EMPEX	TD-8316	(ME00836S)	2017/10/19 2018/10/18
Software	TOYO	EP5/ME (ver 5.1.40)	---	---

6. List of Test and Measurement Instruments (Continued)

Transmitter Spurious Emission (Radiated) (Above 30 MHz)

Instruments	Manufacturer	Model	Serial No.	Calibrated Date/Until
EMI Test Receiver	Agilent Technologies	N9038A	MY54130015	2017/06/06 2018/06/05
Pre-Amplifier (30 MHz to 1 GHz)	HEWLETT PACKARD	8447D OPT 010	2944A 07891	2017/04/21 2018/04/20
Biconical Antenna (30 MHz to 300 MHz)	SCHWARZBECK	VHBB9124 / BBA9106	9124-311	2016/09/05 2019/09/04
Log-Periodic Antenna (300 MHz to 1 GHz)	SCHWARZBECK	UHALP9108-A	0645	2016/09/05 2019/09/04
Anechoic Chamber 3 m	JSE	COAC3M-01	---	2017/04/11 2018/04/10
Attenuator 3 dB	JFW	50FP-003-H2	---	2017/04/21 2018/04/20
RF Cable RF Selector (30 MHz to 1 GHz)	Fujikura	8D-2W	OC14	2017/04/13 2018/04/12
	SUHNER	RG223/U	OC11	
		RG214/U	OC15 OC16	
		RG400/U	OC17	
	TSJ	RFM-E121	03149	
Thermometer Hygrometer	EMPEX	TD-8316	(ME00836S)	2017/10/19 2018/10/18
Software	TOYO	EP5/RE (ver 5.7.1)	---	---

20 dB Bandwidth / Frequency Stability / Occupied Bandwidth

Instruments	Manufacturer	Model	Serial No.	Calibrated Date/Until
EMI Test Receiver	Agilent Technologies	N9038A	MY54130015	2017/06/06 2018/06/05
Thermostatic Chamber	ESPEC	PU-2KP	14010409	2017/09/21 2018/09/20
Thermometer	SATO KEIRYOKI MFG	PC-5000TRH-Ⅱ	10A03	2017/10/19 2018/10/18

7. Appendix

Refer to separated files for the following appendixes.
Appendix 1: Photographs of the Test Setup
Appendix 2: External Photographs (Host Equipment)

---------- End of Report ----------