TEST REPORT

Issued: November 27, 2015

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:	2NKA0957
Serial No.:	1, 2
FCC ID:	E522NKA0957
IC Certification Number:	1059B-2NKA0957
Sample No.:	1
Sample Receipt Date:	September 7, 2015
Test Specification:	47 CFR Part 15 Subpart C RSS-210 Issue 8, RSS-Gen Issue 4
Period of Testing:	September 7, 2015 - November 24, 2015
Test Result:	PASS

Representative Test Personnel: K. Miyaji (2015-11-27) — K. Miyaji (EMC Dept.), iNARTE : EMC-003627-NE

Reviewed by: H. Onishi (2015-11-27) — H. Onishi (EMC Dept.), 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".

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1. General Information

1.1 Test Methodology

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

1.2 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: A2LA Accredited Laboratory No. 2900.01
VLAC Accredited Laboratory No. VLAC-039-2
FCC Designation No. JP5182

Registration: Industry Canada Registration No. 3958B
Nemko Laboratory Authorisation. No. ELA 621

1.3 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.

2. Description of the Tested Sample

2.1 Product Description

Manufacturer	KYOCERA Document Solutions Inc.
Model (referred to as the EUT)	2NKA0957
Hardware Version	A0957B
Software Version	S2NK_1000.X01.133.bin
Type of the Equipment	☐ Stand-alone ☐ Combined Equipment ☒ Plug-in Radio Device ☐ Other ( )
Transmitter Type	☐ WLAN ☐ Bluetooth ( ) ☐ ZigBee ☒ RFID ☐ Other ( )
Nominal Voltage	DC 3.3/5 V
Type of Modulation	ASK
Emission Designator	6K93K1D
Antenna Type	☒ Integral Antenna ☐ Dedicated External Antenna
Operating Frequency	13.56 MHz
Type of Power Source	☐ AC Mains ☐ Dedicated AC Adaptor ☒ DC Voltage ☐ Battery
Type of Battery (if applicable)	N/A
Thermal Limitation	-20℃ to 50℃

2.2 Antenna Description

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

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

2.3 EUT Description

Equipment under test is as follow:

Instrument	Model	Serial No.	Rating
RFID Module (EUT1)	2NKA0957	1	DC 3.3/5 V
RFID Module (EUT2)	2NKA0957	2	DC 3.3/5 V

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.
"Special test program" is that duty cycle is set 100% for a test,
although it is less than 10% in normal operation.
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 3.3/5 V ±15%

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

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

3.2 Additional Equipment

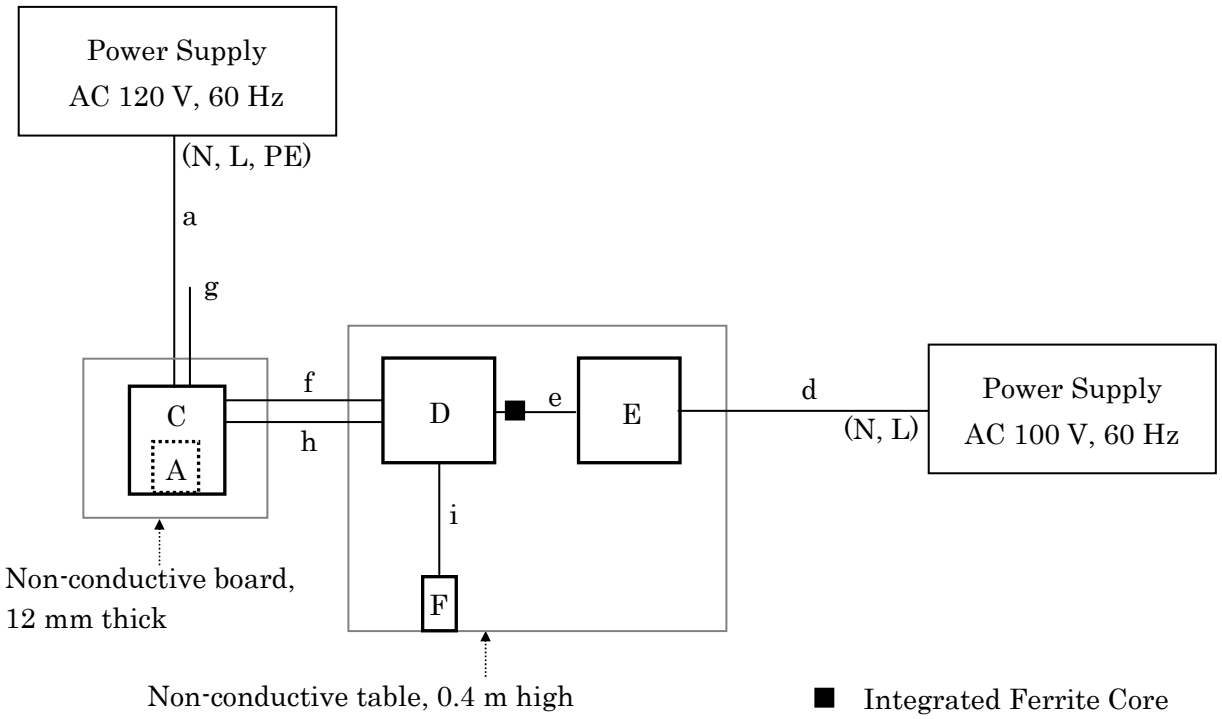
The equipment was tested together with additional peripherals.
The following peripherals were used during the tests:

Instrument	Model	Serial No.	Manufacturer
Multi-Function Printer	TASKalfa 6002i	Z335400004	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-BJ58	LNA30910367	Logitech
Jig	Un-specified	Un-specified	Un-specified

3.3 Configuration

	Instrument	Model		Cable	Length	Shield
A	EUT1 (RFID Module)	2NKA0957 (S/N:1)	a	AC Power Cord	2.5 m	×
			b	AC Power Cord	2.1 m	×
B	EUT2 (RFID Module)	2NKA0957 (S/N:2)	c	AC Power Cord	2.1 m	×
			d	AC Power Cord	0.9 m	×
C	Multi-Function Printer	TASKalfa 6002i	e	DC Power Cord	1.9 m	○
D	Personal Computer	PP17L	f	LAN Cable	2.0 m	×
E	AC Adapter	HP-OQ065B83	g	USB Cable	2.0 m	○
F	USB Mouse	M-BJ58	h	USB Cable	1.8 m	○
G	Jig	Un-specified	i	USB Mouse Cable	1.8 m	○
			j	Jig Cable	0.5 m	×

AC Power Line Conducted Emission



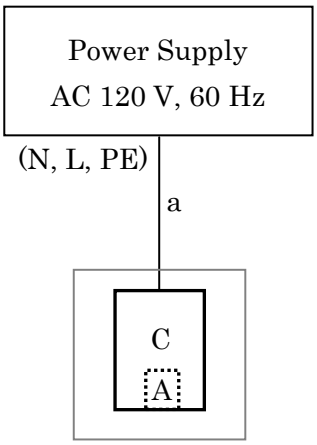
Excess cable arrangement

AC Power Line Conducted Emission

Symbol	Length	Position	Setting
a	0.4 m	Center	Bundle
e	0.35 m	Center	Bundle
f, h, i	0.3 m	Center	Bundle
g	0.35 m	End	Bundle and Hung

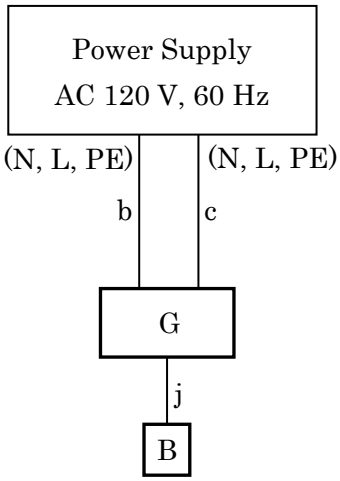
3.3 Configuration (Continued)

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



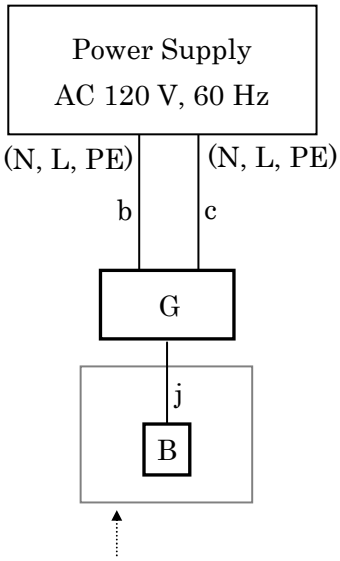
Non-conductive board, 12 mm thick

20 dB Bandwidth / Frequency Stability / Occupied Bandwidth



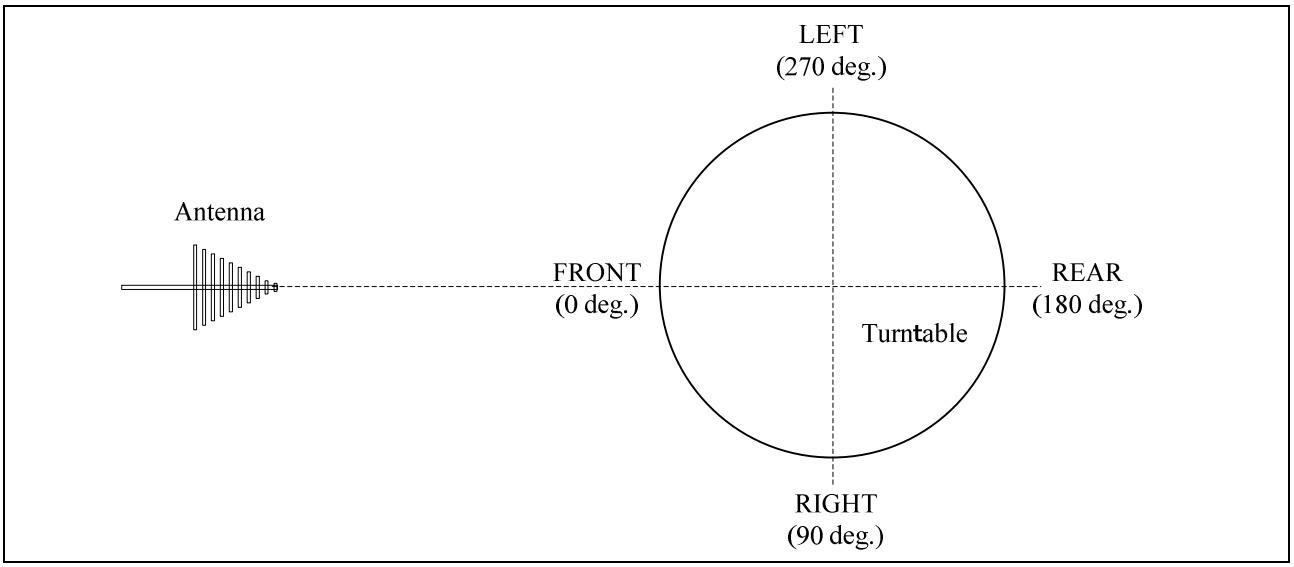
3.3 Configuration (Continued)

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



Non-conductive table, 0.75 m high
(Height in the actual use)

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 A2.6	Field Strength of Fundamental Emission	PASS	PASS
15.225(e)	RSS-210 A2.6	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)

Result: **PASS**

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 test setup was made in accordance with ANSI C63.10:2013 in a shielded room. 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.
Activate the EUT System and run the software prepared for the test.

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

Uncertainty of measurement result	:	±3.45 dB
Date of testing	:	September 8, 2015
Room temperature	:	23℃
Relative humidity	:	45%

Calculation
Result = Reading + c.f
= 32.9 + 10.5
= 43.4

Margin = Limit - Result
= 65.7 - 43.4
= 22.3

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

5.1.3 Test Detail (Continued)

Test Data

********** Cosmos Corporation **********
<<Conducted Emission EP5/CE Ver 5.3.20>>

8 September,2015 11:18
131221E FCC CE 01.dat

Limit : FCC 15.207
Model : 2NKA0957 / TASKalfa 6002i
Serial : 1 / Z335400004
Operater : K. Miyaji
Power : DC 3.3V, 5V / AC 120V, 60Hz
Temp., Humi. : 23 deg., 45%
Mode : RFID
Remark :
Remark :
Remark : RBW:9kHz

****

Final Result

--- L1 Phase ---

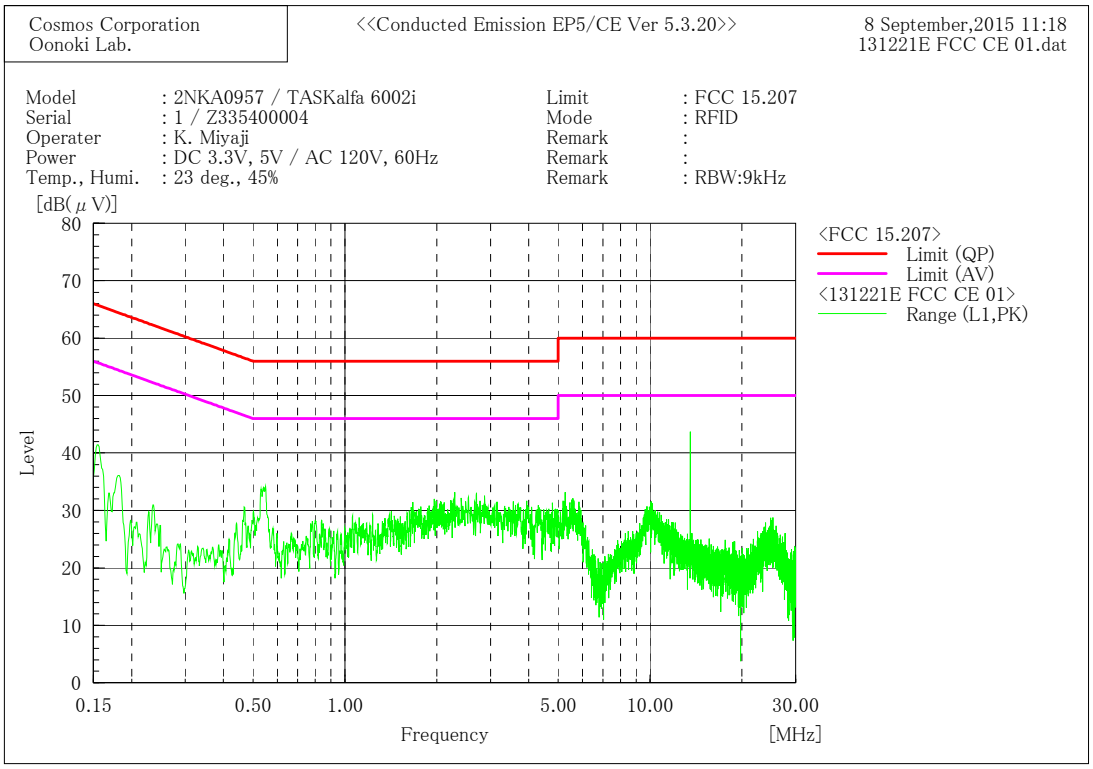
No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading AV [dB(μV)]	c.f [dB]	Result QP [dB(μV)]	Result AV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin AV [dB]
1	0.1555	32.9	24.1	10.5	43.4	34.6	65.7	55.7	22.3	21.1
2	0.5313	25.6	18.2	10.3	35.9	28.5	56.0	46.0	20.1	17.5
3	2.342	21.0	13.4	10.6	31.6	24.0	56.0	46.0	24.4	22.0
4	5.563	18.9	10.7	11.0	29.9	21.7	60.0	50.0	30.1	28.3
5	13.560	32.5	31.5	11.8	44.3	43.3	60.0	50.0	15.7	6.7
6	24.910	16.8	10.0	12.2	29.0	22.2	60.0	50.0	31.0	27.8

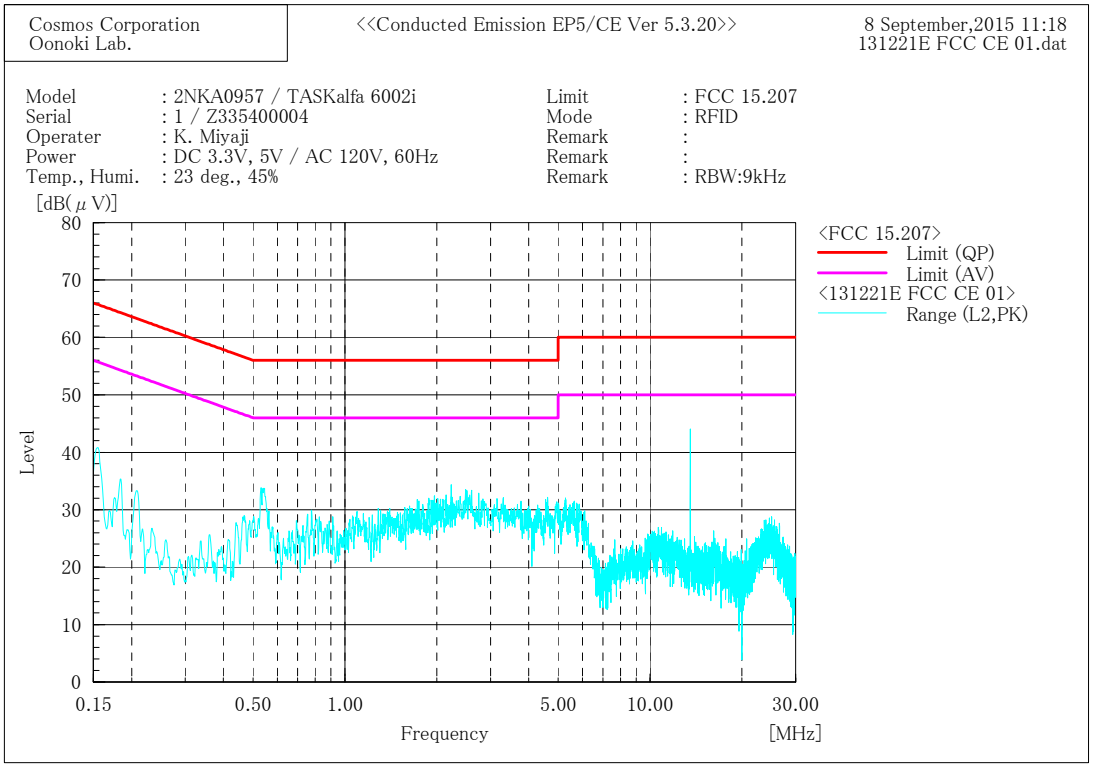
--- L2 Phase ---

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]
1	0.1568	33.2	24.2	10.5	43.7	34.7	65.6	55.6	21.9	20.9
2	0.542	25.2	17.7	10.3	35.5	28.0	56.0	46.0	20.5	18.0
3	2.512	21.1	12.5	10.6	31.7	23.1	56.0	46.0	24.3	22.9
4	5.534	19.3	10.9	11.0	30.3	21.9	60.0	50.0	29.7	28.1
5	13.560	32.7	31.8	11.7	44.4	43.5	60.0	50.0	15.6	6.5
6	24.690	16.8	9.9	12.2	29.0	22.1	60.0	50.0	31.0	27.9

5.1.3 Test Detail (Continued)

Test Data





5.2 Transmitter Spurious Emission (Radiated) (15.209, 15.225(d), RSS-Gen 8.9)

Result: **PASS**

5.2.1 Setting Remarks

In the frequency range from 9 kHz to 1 GHz (over 10th harmonics), the electric field strength was measured in accordance with ANSI C63.10:2013.
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 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 Quasi Peak detector is in accordance with CISPR 16-1-1.
The measurement was carried out with the measuring distance of 3 m. Then the limit of 30 m distance below 30 MHz was converted to the limit of 3 m distance with the 40log(30 m/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

Uncertainty of measurement result	:	±5.08 dB	
Date of testing	:	September 7, 2015	September 8, 2015
Room temperature	:	21℃	22℃
Relative humidity	:	45%	56%

Calculation
Result = Reading + c.f
= 40.6 + (-3.6)
= 37.0

Margin = Limit - Result
= 46.0 - 37.0
= 9.0

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

5.2.3 Test Detail (Continued)

No spurious emission for RF module was found in 9 kHz to 30 MHz.

<Above 30 MHz>

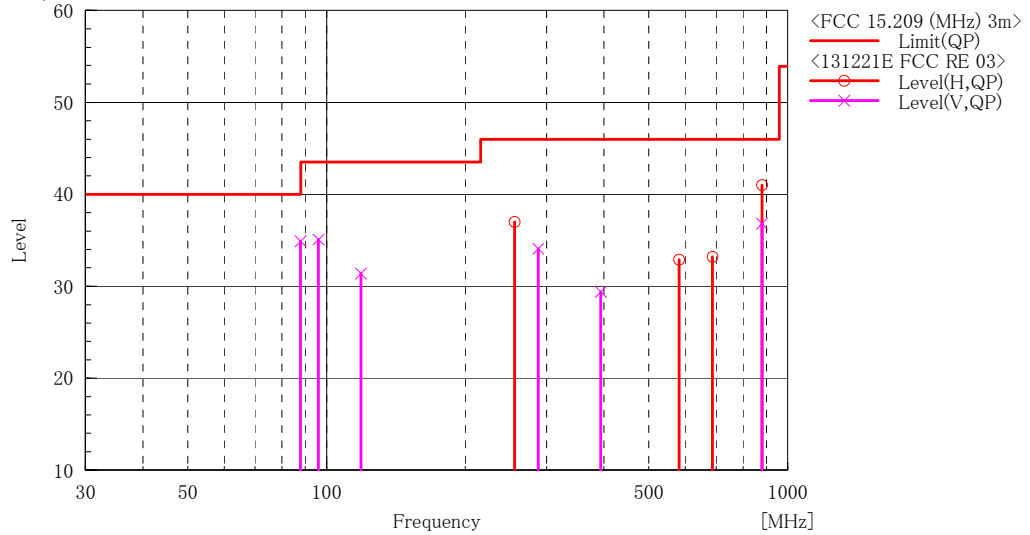
Test Data

Cosmos Corporation
Oonoki Lab.

<<Radiated Emission EP5/RE Ver 5.7.1>>

7 September,2015 11:04
131221E FCC RE 03.dat

Model	: 2NKA0957 / TASKalfa 6002i	Limit	: FCC 15.209 (MHz) 3m
Serial	: 1 / Z335400004	Mode	: RFID
Operator	: K. Miyaji	Remark	:
Power	: DC 3.3V, 5V / AC 120V, 60Hz	Remark	:
Temp, Humid	: 21 deg., 45%	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	255.836	40.6	-3.6	37.0	46.0	9.0	132.0	289.0
2	581.408	34.7	-1.8	32.9	46.0	13.1	123.0	211.0
3	687.626	32.4	0.8	33.2	46.0	12.8	172.0	149.0
4	879.291	37.0	4.0	41.0	46.0	5.0	100.0	122.0

--- 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	87.779	50.3	-15.4	34.9	40.0	5.1	100.0	172.0
2	95.938	48.6	-13.5	35.1	43.5	8.4	100.0	153.0
3	118.688	41.3	-9.9	31.4	43.5	12.1	100.0	174.0
4	287.815	36.0	-1.9	34.1	46.0	11.9	100.0	192.0
5	393.249	34.4	-5.0	29.4	46.0	16.6	121.0	321.0
6	879.295	32.8	4.0	36.8	46.0	9.2	100.0	315.0

5.3 20 dB Bandwidth (15.215(c))

Result: **PASS**

5.3.1 Setting Remarks

The both side of 20 dB down value from peak power were measured by using 20 dB 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	: greater than RBW
・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

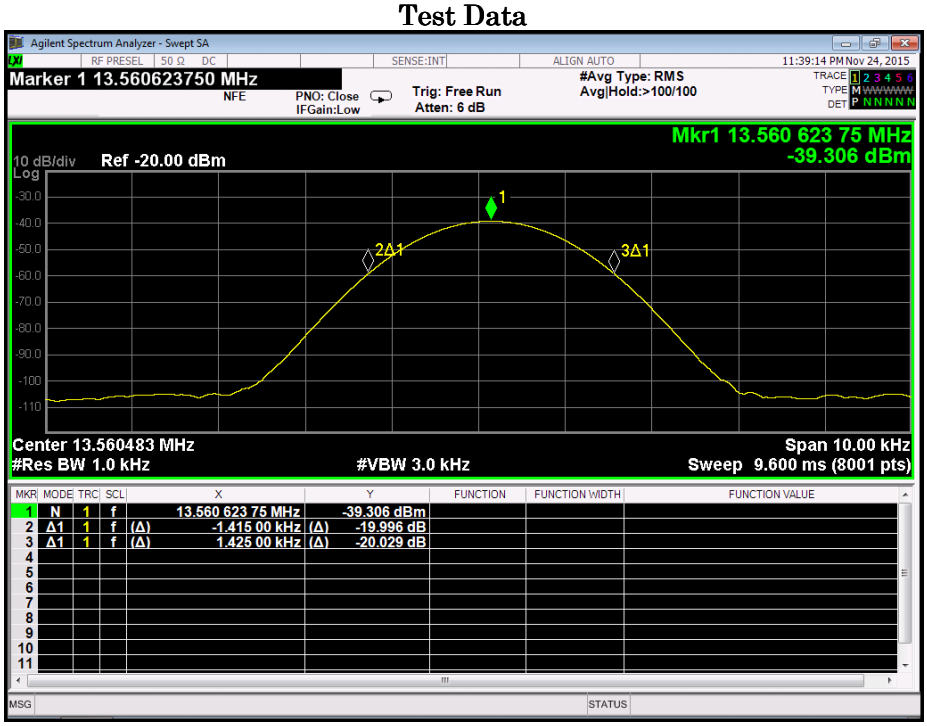
Uncertainty of measurement result	:	±0.011%
Date of testing	:	November 24, 2015
Room temperature	:	22℃
Relative humidity	:	42%

Measured Bandwidth [kHz]
2.9

	Edge of Bandwidth [MHz]	Limit [MHz]	Margin [kHz]
Lower	13.5592	13.11	449
Higher	13.5621	14.01	448

5.3.3 Test Detail (Continued)

Test Data



5.4 Field Strength of Fundamental Emission (15.225(a) (b) (c) (d), RSS-210 A2.6)

Result: **PASS**

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

Uncertainty of measurement result	:	±4.64 dB	
Date of testing	:	September 8, 2015	November 16, 2015
Room temperature	:	22℃	21℃
Relative humidity	:	56%	56%

Calculation

Result = Reading + c.f
= 15.6 + 22.7
= 38.3

Margin = Limit - Result
= 69.5 - 38.3
= 31.2

Result (3 m) = Reading + c.f
= 40.7 + 22.2
= 62.9

Result (30 m) = Result (3 m) - Conversion Factor
= 62.9 - 40.0
= 22.9

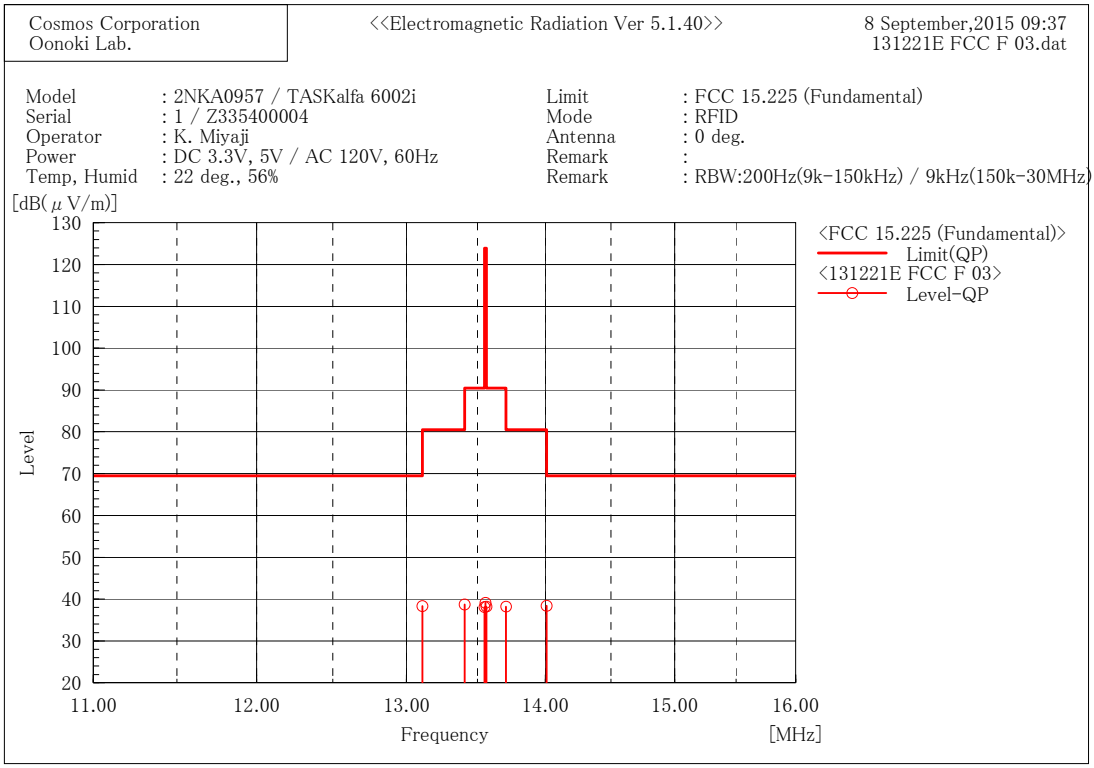
Margin = Limit - Result (30 m)
= 83.9 - 22.9
= 61.0

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

5.4.3 Test Detail (Continued)

[Test data of the module with the printer]

Worst Test Data (Antenna: 0°)



Final Result

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Angle [°]	Remark
1	13.110	15.6	22.7	38.3	69.5	31.2	28.0	
2	13.410	15.8	22.9	38.7	80.5	41.8	28.0	
3	13.553	15.1	23.0	38.1	90.4	52.3	28.0	
4	13.560	16.1	23.0	39.1	123.9	84.8	28.0	
5	13.567	15.2	23.0	38.2	90.4	52.2	28.0	
6	13.710	15.2	23.0	38.2	80.5	42.3	28.0	
7	14.010	15.2	23.2	38.4	69.5	31.1	28.0	

5.4.3 Test Detail (Continued)

[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	13.560	2.805	4.25	90	40.7	22.2	62.9	40.0	22.9	83.9	61.0
	13.560		5.00	90	43.0	22.2	65.2	40.0	25.2	83.9	58.7
	13.560		5.75	90	43.7	22.2	65.9	40.0	25.9	83.9	58.0
	13.560	3.30	4.25	90	41.7	22.2	63.9	40.0	23.9	83.9	60.0
	13.560		5.00	90	43.3	22.2	65.5	40.0	25.5	83.9	58.4
	13.560		5.75	90	40.8	22.2	63.0	40.0	23.0	83.9	60.9
	13.560	3.795	4.25	90	40.8	22.2	63.0	40.0	23.0	83.9	60.9
	13.560		5.00	90	41.7	22.2	63.9	40.0	23.9	83.9	60.0
	13.560		5.75	90	42.0	22.2	64.2	40.0	24.2	83.9	59.7

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	26.4	22.2	48.6	40.0	8.6	50.4	41.8
	13.553		5.00	90	28.7	22.2	50.9	40.0	10.9	50.4	39.5
	13.553		5.75	90	29.4	22.2	51.6	40.0	11.6	50.4	38.8
	13.553	3.30	4.25	90	27.2	22.2	49.4	40.0	9.4	50.4	41.0
	13.553		5.00	90	28.8	22.2	51.0	40.0	11.0	50.4	39.4
	13.553		5.75	90	26.4	22.2	48.6	40.0	8.6	50.4	41.8
	13.553	3.795	4.25	90	26.3	22.2	48.5	40.0	8.5	50.4	41.9
	13.553		5.00	90	27.2	22.2	49.4	40.0	9.4	50.4	41.0
	13.553		5.75	90	27.5	22.2	49.7	40.0	9.7	50.4	40.7

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	29.4	22.2	51.6	40.0	11.6	50.4	38.8
	13.567		5.00	90	31.6	22.2	53.8	40.0	13.8	50.4	36.6
	13.567		5.75	90	32.3	22.2	54.5	40.0	14.5	50.4	35.9
	13.567	3.30	4.25	90	30.5	22.2	52.7	40.0	12.7	50.4	37.7
	13.567		5.00	90	32.1	22.2	54.3	40.0	14.3	50.4	36.1
	13.567		5.75	90	29.7	22.2	51.9	40.0	11.9	50.4	38.5
	13.567	3.795	4.25	90	29.7	22.2	51.9	40.0	11.9	50.4	38.5
	13.567		5.00	90	30.7	22.2	52.9	40.0	12.9	50.4	37.5
	13.567		5.75	90	31.0	22.2	53.2	40.0	13.2	50.4	37.2

5.4.3 Test Detail (Continued)

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	4.8	22.2	27.0	40.0	-13.0	40.5	53.5
	13.41		5.00	90	4.8	22.2	27.0	40.0	-13.0	40.5	53.5
	13.41		5.75	90	4.8	22.2	27.0	40.0	-13.0	40.5	53.5
	13.41	3.30	4.25	90	4.8	22.2	27.0	40.0	-13.0	40.5	53.5
	13.41		5.00	90	4.8	22.2	27.0	40.0	-13.0	40.5	53.5
	13.41		5.75	90	4.8	22.2	27.0	40.0	-13.0	40.5	53.5
	13.41	3.795	4.25	90	4.8	22.2	27.0	40.0	-13.0	40.5	53.5
	13.41		5.00	90	4.8	22.2	27.0	40.0	-13.0	40.5	53.5
	13.41		5.75	90	4.8	22.2	27.0	40.0	-13.0	40.5	53.5

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	22.3	27.1	40.0	-12.9	40.5	53.4
	13.71		5.00	90	4.8	22.3	27.1	40.0	-12.9	40.5	53.4
	13.71		5.75	90	4.8	22.3	27.1	40.0	-12.9	40.5	53.4
	13.71	3.30	4.25	90	4.8	22.3	27.1	40.0	-12.9	40.5	53.4
	13.71		5.00	90	4.8	22.3	27.1	40.0	-12.9	40.5	53.4
	13.71		5.75	90	4.8	22.3	27.1	40.0	-12.9	40.5	53.4
	13.71	3.795	4.25	90	4.8	22.3	27.1	40.0	-12.9	40.5	53.4
	13.71		5.00	90	4.8	22.3	27.1	40.0	-12.9	40.5	53.4
	13.71		5.75	90	4.8	22.3	27.1	40.0	-12.9	40.5	53.4

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	4.8	22.2	27.0	40.0	-13.0	29.5	42.5
	13.11		5.00	90	4.8	22.2	27.0	40.0	-13.0	29.5	42.5
	13.11		5.75	90	4.8	22.2	27.0	40.0	-13.0	29.5	42.5
	13.11	3.30	4.25	90	4.8	22.2	27.0	40.0	-13.0	29.5	42.5
	13.11		5.00	90	4.8	22.2	27.0	40.0	-13.0	29.5	42.5
	13.11		5.75	90	4.8	22.2	27.0	40.0	-13.0	29.5	42.5
	13.11	3.795	4.25	90	4.8	22.2	27.0	40.0	-13.0	29.5	42.5
	13.11		5.00	90	4.8	22.2	27.0	40.0	-13.0	29.5	42.5
	13.11		5.75	90	4.8	22.2	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	4.8	22.3	27.1	40.0	-12.9	29.5	42.4
	14.01		5.00	90	4.8	22.3	27.1	40.0	-12.9	29.5	42.4
	14.01		5.75	90	4.8	22.3	27.1	40.0	-12.9	29.5	42.4
	14.01	3.30	4.25	90	4.8	22.3	27.1	40.0	-12.9	29.5	42.4
	14.01		5.00	90	4.8	22.3	27.1	40.0	-12.9	29.5	42.4
	14.01		5.75	90	4.8	22.3	27.1	40.0	-12.9	29.5	42.4
	14.01	3.795	4.25	90	4.8	22.3	27.1	40.0	-12.9	29.5	42.4
	14.01		5.00	90	4.8	22.3	27.1	40.0	-12.9	29.5	42.4
	14.01		5.75	90	4.8	22.3	27.1	40.0	-12.9	29.5	42.4

5.5 Frequency Stability (15.225(e), RSS-210 A2.6)

Result: **PASS**

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

Uncertainty of measurement result	:	±0.0021 Hz
Date of testing	:	November 18 and 19, 2015
Room temperature	:	Refer to Test Data

Calculation

Deviation [Hz] = Measured Frequency - Center Frequency
= 13560493 - 13560000
= 493

Deviation [ppm] = |Deviation [Hz]| ÷ Center Frequency × 1000000
= |493| ÷ 13560000 × 1000000
≒ 36.4

Margin = Limit - Deviation [ppm]
= 100 - 36.4
= 63.6

5.5.3 Test Detail (Continued)

Test Data

Temp [℃]	Operation Time	Measured Frequency [Hz]	Deviation [Hz]	Deviation [ppm]	Limit [ppm]	Margin [ppm]
50	Startup	13560493	493	36.4	100	63.6
	2 min	13560489	489	36.1	100	63.9
	5 min	13560488	488	36.0	100	64.0
	10 min	13560488	488	36.0	100	64.0
40	Startup	13560541	541	39.9	100	60.1
	2 min	13560536	536	39.5	100	60.5
	5 min	13560535	535	39.5	100	60.5
	10 min	13560535	535	39.5	100	60.5
30	Startup	13560592	592	43.7	100	56.3
	2 min	13560587	587	43.3	100	56.7
	5 min	13560587	587	43.3	100	56.7
	10 min	13560587	587	43.3	100	56.7
20	Startup	13560639	639	47.1	100	52.9
	2 min	13560635	635	46.8	100	53.2
	5 min	13560634	634	46.8	100	53.2
	10 min	13560634	634	46.8	100	53.2
10	Startup	13560285	285	21.0	100	79.0
	2 min	13560677	677	49.9	100	50.1
	5 min	13560677	677	49.9	100	50.1
	10 min	13560677	677	49.9	100	50.1
0	Startup	13560701	701	51.7	100	48.3
	2 min	13560699	699	51.6	100	48.4
	5 min	13560699	699	51.6	100	48.4
	10 min	13560699	699	51.6	100	48.4
-10	Startup	13560695	695	51.3	100	48.7
	2 min	13560697	697	51.4	100	48.6
	5 min	13560696	696	51.3	100	48.7
	10 min	13560697	697	51.4	100	48.6
-20	Startup	13560659	659	48.6	100	51.4
	2 min	13560664	664	49.0	100	51.0
	5 min	13560664	664	49.0	100	51.0
	10 min	13560664	664	49.0	100	51.0

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	13560667	667	49.2	100	50.8
	5.00	13560668	668	49.3	100	50.7
	5.75	13560670	670	49.4	100	50.6
3.300	4.25	13560633	633	46.7	100	53.3
	5.00	13560634	634	46.8	100	53.2
	5.75	13560636	636	46.9	100	53.1
3.795	4.25	13560571	571	42.1	100	57.9
	5.00	13560572	572	42.2	100	57.8
	5.75	13560574	574	42.3	100	57.7

Test Data

Temp [℃]	Supply Voltage [V]	Supply Voltage [V]	Measured Frequency [Hz]	Deviation [Hz]	Deviation [ppm]	Limit [ppm]	Margin [ppm]
50	3.3	5	13560488	-146	10.8	100	89.2
20			13560634	reference value			
-20			13560664	30	2.2	100	97.8
20	2.805	4.25	13560667	33	2.4	100	97.6
		5.00	13560668	34	2.5	100	97.5
		5.75	13560670	35	2.6	100	97.4
	3.300	4.25	13560633	-1	0.1	100	99.9
		5.75	13560636	1	0.1	100	99.9
	3.795	4.25	13560571	-63	4.6	100	95.4
		5.00	13560572	-62	4.6	100	95.4
		5.75	13560574	-61	4.5	100	95.5

5.6 Occupied Bandwidth (RSS-Gen Annex A)

Result: **PASS**

5.6.1 Setting Remarks

EUT directly connects to the spectrum analyzer via calibrated coaxial cable and 10 dB attenuator. The spectrum analyzer is set-up as following;

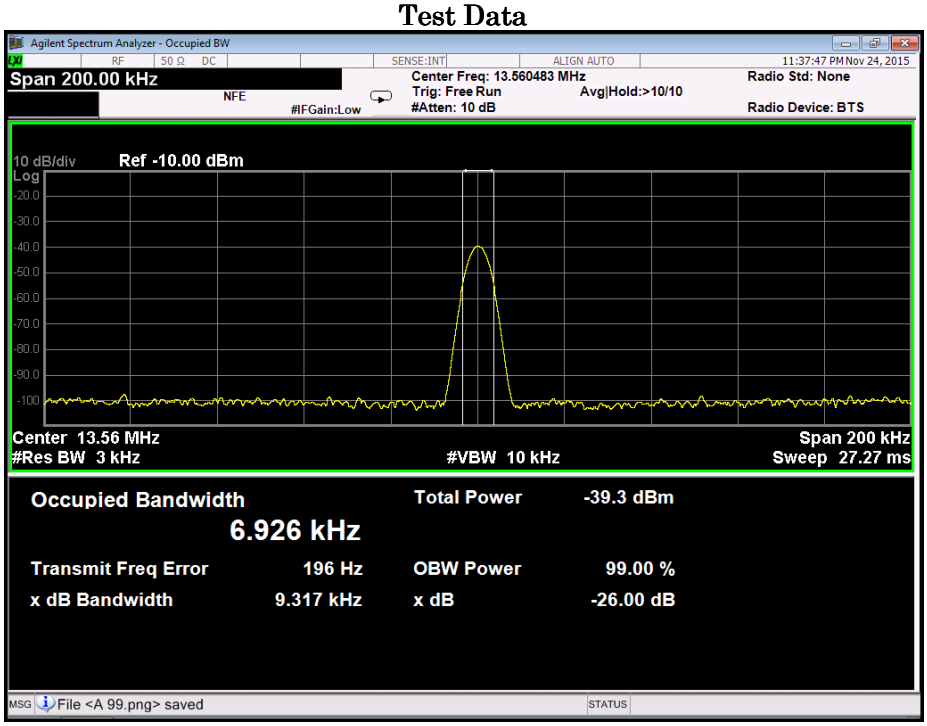
・Resolution Bandwidth	: Approx. 1% of the span
・Video Bandwidth	: 3 × RBW
・Sweep	: Auto
・Detector Mode	: RMS
・Trace Mode	: Max Hold

5.6.2 Test Detail

Uncertainty of measurement result	:	±0.011%
Date of testing	:	November 24, 2015
Room temperature	:	22℃
Relative humidity	:	42%

5.6.2 Test Detail (Continued)

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	2015/06/29 2016/06/28
Artificial-Mains Network /Highpass Filter /Attenuator 10 dB	Kyoritsu /Kyoritsu /TAMAGAWA	KNW-341C (F) /KFL-007 /CFA-03	8-1659-1 /8-1708-10 /---	2015/06/18 2016/06/17
Artificial-Mains Network /Highpass Filter /Attenuator 10 dB	Kyoritsu /Kyoritsu / JFW	KNW-341 F /KFL-007 / 50FP-010-H2	8S-2996-1 /8-1741-2 /---	2015/06/25 2016/06/24
RF Cable RF Selector (9 kHz to 30 MHz)	Fujikura	5D-2W	OC09	2015/05/11 2016/05/10
	SUHNER	RG223/U	OC10 OC11 OC12	
	TSJ	RFM-E121	03149	
50 Ω Terminator	RES-NET MICROWAVE	RCX6BM	---	2015/05/28 2016/05/27
Software	TOYO	EP5/CE (ver 5.4.40)	---	---

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	2015/06/29 2016/06/28
				2015/10/14 2016/10/13
Loop Antenna (9 kHz to 30 MHz)	SCHAFFNER	HLA6120	1137	2014/10/05 2015/10/04
				2015/11/06 2016/11/05
Anechoic Chamber 3 m	JSE	COAC3M-01	---	2015/05/07 2016/05/06
RF Cable RF Selector (9 kHz to 30 MHz)	Fujikura	5D-2W	OC09	2015/05/11 2016/05/10
	SUHNER	RG223/U	OC10 OC11 OC12	
	TSJ	RFM-E121	03149	
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	2015/06/29 2016/06/28
Pre-Amplifier (30 MHz to 1 GHz)	HEWLETT PACKARD	8447D OPT 010	2944A 07891	2015/03/13 2016/03/12
Biconical Antenna (30 MHz to 300 MHz)	SCHWARZBECK	VHBB9124 / BBA9106	9124-311	2015/08/31 2016/08/30
Log-Periodic Antenna (300 MHz to 1 GHz)	SCHWARZBECK	UHALP9108-A	0645	2015/08/31 2016/08/30
Anechoic Chamber 3 m	JSE	COAC3M-01	---	2015/05/07 2016/05/06
Attenuator 3 dB	JFW	50FP-003-H2	---	2015/03/13 2016/03/12
RF Cable RF Selector (30 MHz to 1 GHz)	Fujikura	8D-2W	OC14	2015/05/11 2016/05/10
	SUHNER	RG223/U	OC11	
		RG214/U	OC15 OC16	
		RG400/U	OC17	
	TSJ	RFM-E121	03149	
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	2015/10/14 2016/10/13
Thermostatic Chamber	ESPEC	PU-2KP	14010409	2015/08/07 2016/08/06

7. Appendix

Refer to separated files for the following appendixes.
Appendix 1: Angle of EUT
Appendix 2: Photographs of EUT (RFID Module)
Appendix 3: Photographs of the Test Setup