TEST REPORT

Issued: October 16, 2015

Name and Address of the Customer:	Fuji Machine Mfg. Co., Ltd. 19 Chausuyama, Yamamachi, Chiryu, Aichi, 472-8686 Japan
Test Item:	Reader Writer Module
Identification:	Smart-Reader
Serial No.:	E150610, E150803-3
FCC ID:	2ABSPSMART-RW-UNIT
Sample No.:	1
Sample Receipt Date:	June 10, 2015
Test Specification:	47 CFR Part 15 Subpart C
Period of Testing:	July 14, 2015 - September 4, 2015
Test Result:	PASS

Representative Test Personnel: K. Miyaji (2015-10-16) — K. Miyaji (EMC Dept.), iNARTE : EMC-003627-NE

Reviewed by: H. Onishi (2015-10-16) — 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	Fuji Machine Mfg. Co., Ltd.
Model (referred to as the EUT)	Smart-Reader
Type of the Equipment	☐ Stand-alone ☐ Combined Equipment ☒ Plug-in Radio Device ☐ Other ( )
Transmitter Type	☐ WLAN ☐ Bluetooth ( ) ☐ Zigbee ☒ RFID ☐ Other ( )
Nominal Voltage	DC 5 V
Type of Modulation	ASK
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	0℃ to 55℃

2.2 Antenna Description

Model	Gain	Antenna Type	Remarks
TR3-CA038(16)	-79.9 dBi	Loop Antenna	*

Note:
*: This is the circuit board that displayed 16 lines identical the TR3-CA038 antenna circuit.

2.3 EUT Description

Equipment under test is as follow:

Instrument	Model	Serial No.	Rating
Reader Writer Module (EUT1)	Smart-Reader	E150610	DC 5 V, 165 mA
Reader Writer Module (EUT2)	Smart-Reader	E150803-3	DC 5 V, 165 mA

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 normal operation.
The measurements were carried out using a part of the host equipment because the host equipment is too large for the measurement.
The test of Field Strength of Fundamental Emission was performed under the following condition:

Voltage: DC 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
RFID MODULE-64	---	E150610	Fuji Machine Mfg.
Antenna	TR3-CA038(16)	12001329 *1	TAKAYA
Antenna	TR3-CA038(16)	12003041 *1	TAKAYA
Antenna	TR3-CA038(16)	12003009 *1	TAKAYA
Antenna	TR3-CA038(16)	12003681 *1	TAKAYA
RFID MODULE-64	---	002	Fuji Machine Mfg.
Antenna	TR3-CA038(16)	12003505 *2	TAKAYA
Antenna	TR3-CA038(16)	12003761 *2	TAKAYA
Antenna	TR3-CA038(16)	12003713 *2	TAKAYA
Antenna	TR3-CA038(16)	12003745 *2	TAKAYA
Personal Computer	PP17L	CN-0N8719-48643 -57F-1500	DELL
AC Adapter	HP-OQ065B83	CN-0N2765-47890 -47D-8266	DELL
USB Mouse	AMU1402JP	0605000678	Targus
Access Point	FXA2000-G	CJRKL77000593	CONTEC
AC Adapter	SA115B-05U	0613C	SINO-AMERICAN
Regulated DC Power Supply	PAN60-10A	HC000143	KIKUSUI

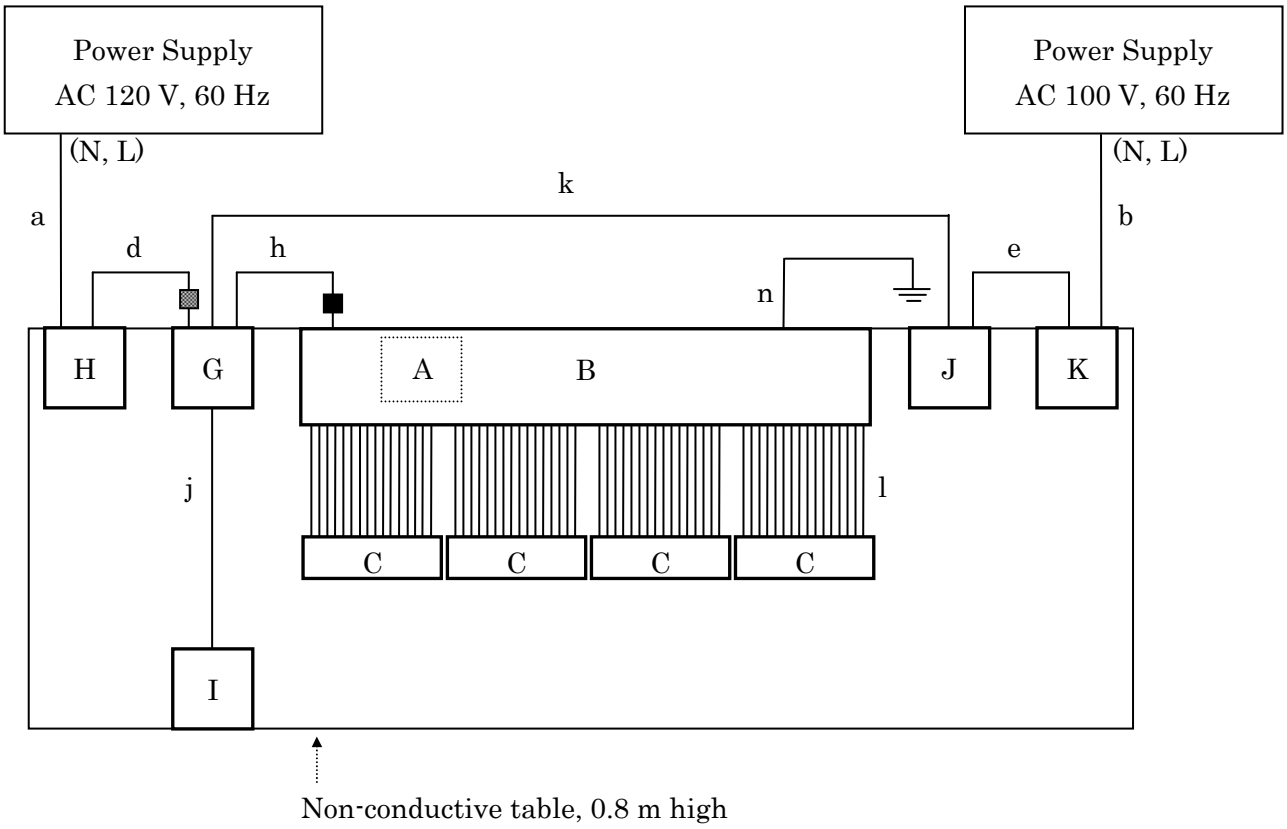
Note:
*1: These were used to the test of AC Power Line Conducted Emission and Transmitter Spurious Emission.
*2: These were used to the test of 20 dB Bandwidth, Field Strength of Fundamental Emission and Frequency Stability.

3.3 Configuration

	Instrument	Model		Cable	Length	Shield
A	EUT 1 (Reader Writer Module)	Smart-Reader (S/N: E150610)	a	AC Power Cord	0.9 m	×
			b	AC Power Cord	1.8 m	×
B	RFID MODULE-64	--- (S/N: E150610)	c	AC Power Cord	3.0 m	×
			d	DC Power Cord	1.9 m	○
C	Antenna	TR3-CA038(16)	e	DC Power Cord	1.9 m	×
D	EUT 2 (Reader Writer Module)	Smart-Reader (S/N: E150803-3)	f	DC Power Cord	0.4 m	×
			g	DC Power Cord	1.8 m	×
E	RFID MODULE-64	--- (S/N: 002)	h	USB Cable	3.0 m	○
			i	USB Cable	3.0 m	○
F	Antenna	TR3-CA038(16)	j	USB Mouse Cable	1.5 m	×
G	Personal Computer	PP17L	k	LAN Cable	2.0 m	×
H	AC Adapter	HP-OQ065B83	l	Antenna Cable (×64)	0.1 m	×
I	USB Mouse	AMU1402JP	m	Antenna Cable (×64)	0.1 m	×
J	Access Point	FXA2000-G	n	Earth Cable	2.9 m	×
K	AC Adapter	SA115B-05U	o	Earth Cable	2.9 m	×
L	Regulated DC Power Supply	PAN60-10A				

3.3 Configuration (Continued)

AC Power Line Conducted Emission



■ Ferrite Core: 2 turn (E04SR241336A, SEIWA ELECTRIC MFG.)
▩ Integrated Ferrite Core

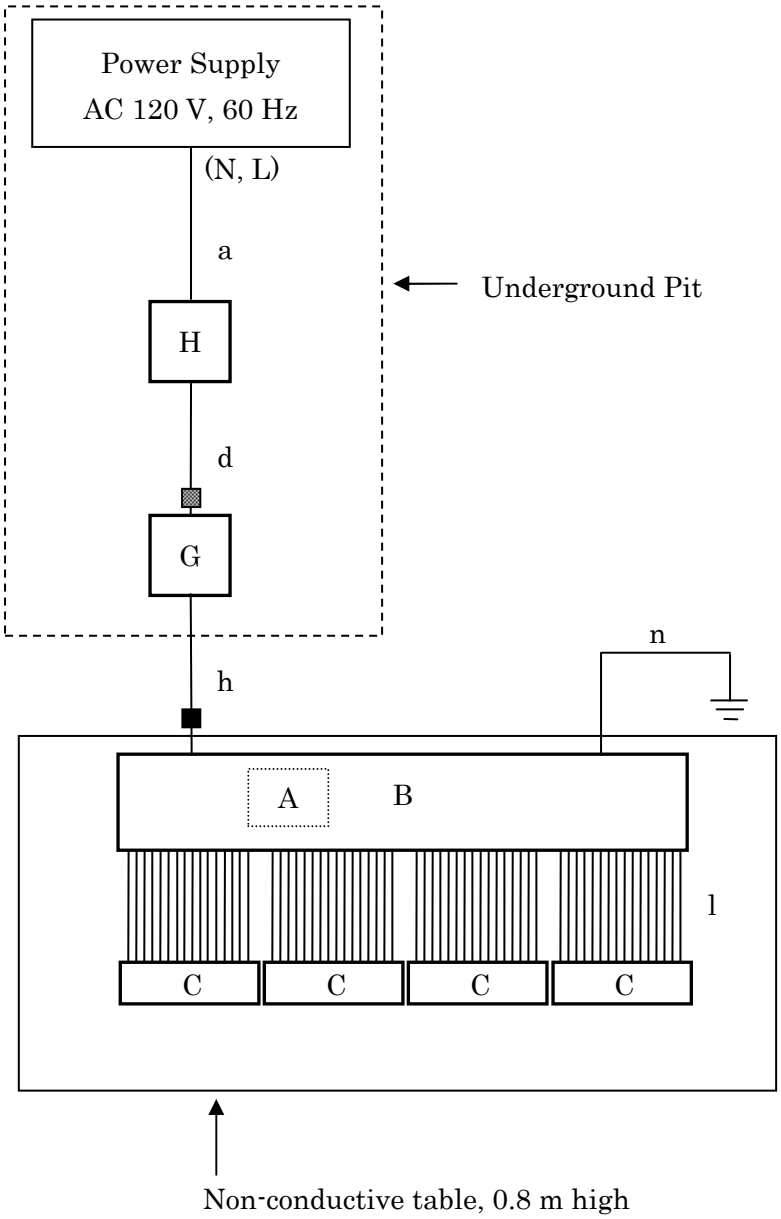
Excess cable arrangement

AC Power Line Conducted Emission

Symbol	Length	Position	Setting
b, n	0.3 m	Center	Bundle
d, h, k	0.3 m	Center	Bundle and Hung
e	0.4 m	Center	Bundle and Hung

3.3 Configuration (Continued)

Transmitter Spurious Emission (Radiated)

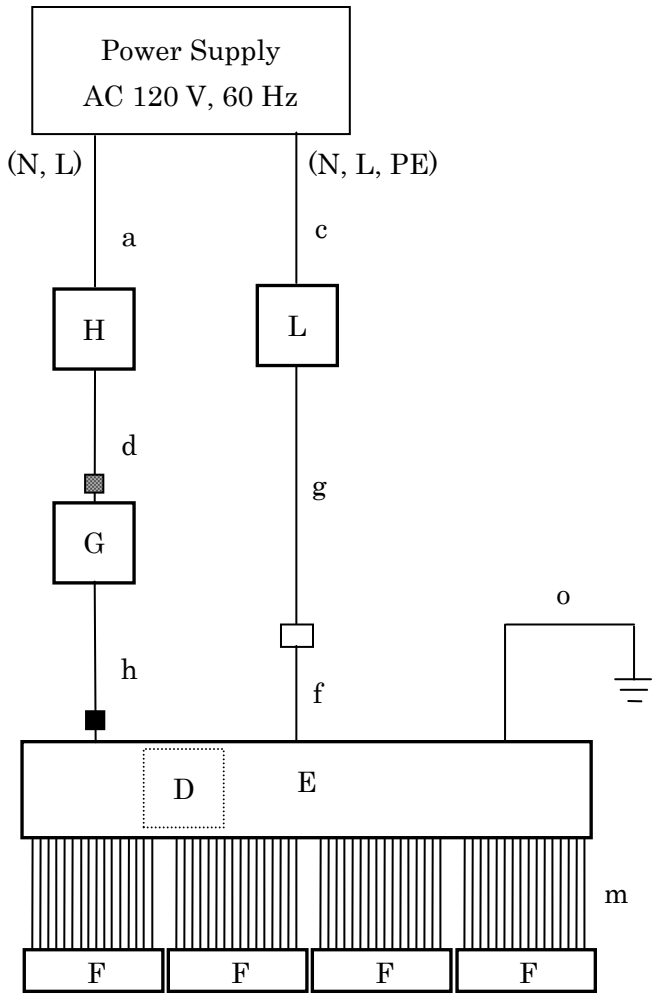


■ Ferrite Core: 2 turn (E04SR241336A, SEIWA ELECTRIC MFG.)

▩ Integrated Ferrite Core

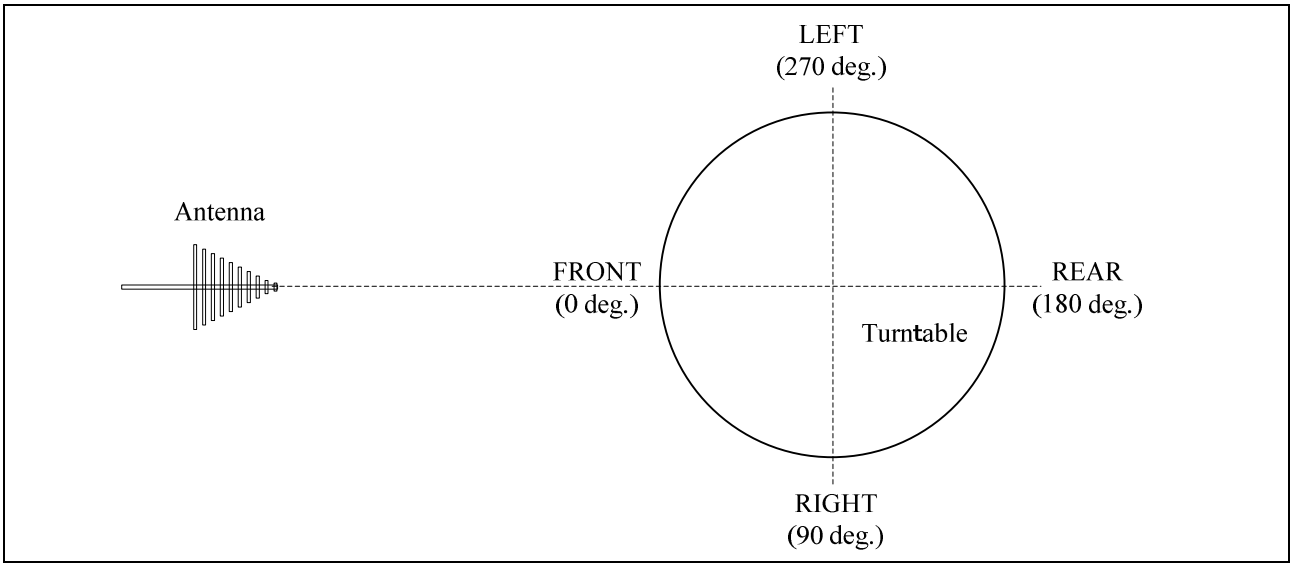
3.3 Configuration (Continued)

Field Strength of Fundamental Emission



□ Terminal Block
■ Ferrite Core: 2 turn (E04SR241336A, SEIWA ELECTRIC MFG.)
▩ Integrated Ferrite Core

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
15.207	RSS-Gen 8.8	AC Power Line Conducted Emission	PASS
15.209, 15.225(d)	RSS-Gen 8.9	Transmitter Spurious Emission (Radiated)	PASS
15.215(c)	---	20 dB Bandwidth	PASS
15.225 (a) (b) (c) (d)	RSS-210 A2.6	Field Strength of Fundamental Emission	PASS
15.225(e)	RSS-210 A2.6	Frequency Stability	PASS
---	RSS-Gen Annex A	Occupied Bandwidth	---
---	RSS-Gen 7.1	Receiver Spurious Emission (Radiated)	---

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 on the table installed in a shielded room. The non-conductive table, 0.8 m high, was placed on the reference ground plane, and the EUT was put on the non-conductive table. 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 4, 2015
Room temperature	:	22℃
Relative humidity	:	50%

Calculation
Result = Reading + c.f
= 39.5 + 10.4
= 49.9

Margin = Limit - Result
= 64.9 - 49.9
= 15.0

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

5.1.3 Test Detail (Continued)

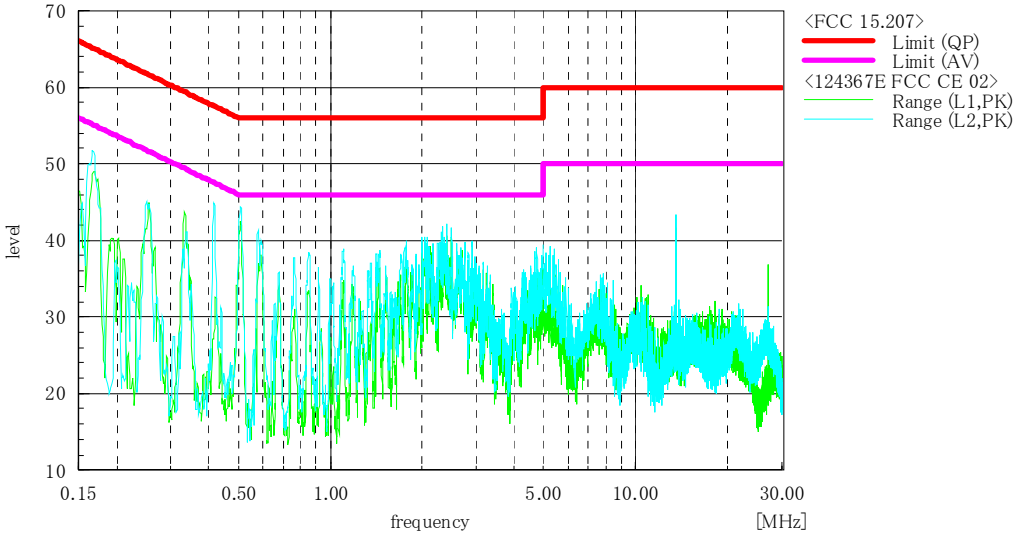
Test Data

Cosmos Corporation
Oonoki Lab.

<<Conducted Emission EP5/CE Ver 5.3.20>>

4 September,2015 16:38
124367E FCC CE 02.dat

Model	: Smart-Reader	Limit	: FCC 15.207
Serial	: E150610	Mode	: RFID 64 Antennas
Operater	: K. Miyaji	Remark	: PC Power:AC 120V, 60Hz
Power	: DC 5V	Remark	:
Temp., Humi.	: 22deg., 50%	Remark	: RBW:9kHz



Final Result

--- L1 Phase ---

No.	Frequency	Reading QP	Reading AV	c.f	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV
	[MHz]	[dB(μV)]	[dB(μV)]	[dB]	[dB(μV)]	[dB(μV)]	[dB(μV)]	[dB(μV)]	[dB]	[dB]
1	0.1706	39.5	35.4	10.4	49.9	45.8	64.9	54.9	15.0	9.1
2	0.5114	31.1	28.7	10.2	41.3	38.9	56.0	46.0	14.7	7.1
3	2.385	26.7	20.6	10.3	37.0	30.9	56.0	46.0	19.0	15.1
4	4.847	21.8	11.9	10.5	32.3	22.4	56.0	46.0	23.7	23.6
5	13.560	31.4	24.6	10.9	42.3	35.5	60.0	50.0	17.7	14.5
6	27.120	18.6	12.0	11.4	30.0	23.4	60.0	50.0	30.0	26.6

--- L2 Phase ---

No.	Frequency	Reading QP	Reading AV	c.f	Result QP	Result AV	Limit QP	Limit AV	Margin QP	Margin AV
	[MHz]	[dB(μV)]	[dB(μV)]	[dB]	[dB(μV)]	[dB(μV)]	[dB(μV)]	[dB(μV)]	[dB]	[dB]
1	0.1698	39.3	35.9	10.4	49.7	46.3	65.0	55.0	15.3	8.7
2	0.5105	33.1	30.7	10.2	43.3	40.9	56.0	46.0	12.7	5.1
3	2.384	26.6	20.6	10.3	36.9	30.9	56.0	46.0	19.1	15.1
4	4.918	24.3	17.6	10.5	34.8	28.1	56.0	46.0	21.2	17.9
5	13.560	31.3	24.5	10.8	42.1	35.3	60.0	50.0	17.9	14.7
6	27.120	19.3	12.8	11.5	30.8	24.3	60.0	50.0	29.2	25.7

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 on the table installed in a semi-anechoic chamber. The non-conductive table, 0.8 m high, was placed on the turntable, and the EUT was put on the non-conductive table. 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	:	July 14, 2015	July 16, 2015
Room temperature	:	21℃	21℃
Relative humidity	:	51%	51%
Date of testing	:	July 17, 2015	August 25, 2015
Room temperature	:	21℃	25 - 26℃
Relative humidity	:	51%	43%

5.2.3 Test Detail (Continued)

Calculation
Result = Reading + c.f
= 18.3 + 22.8
= 41.1

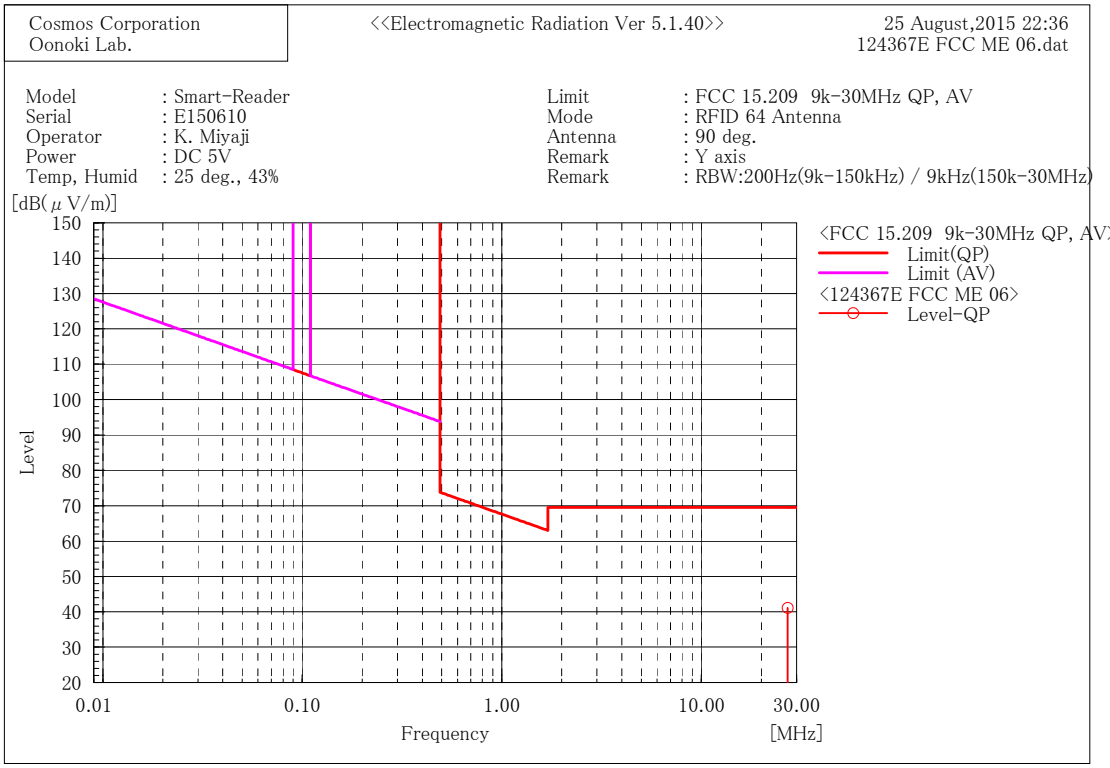
Margin = Limit - Result
= 69.5 - 41.1
= 28.4

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°, Y axis)



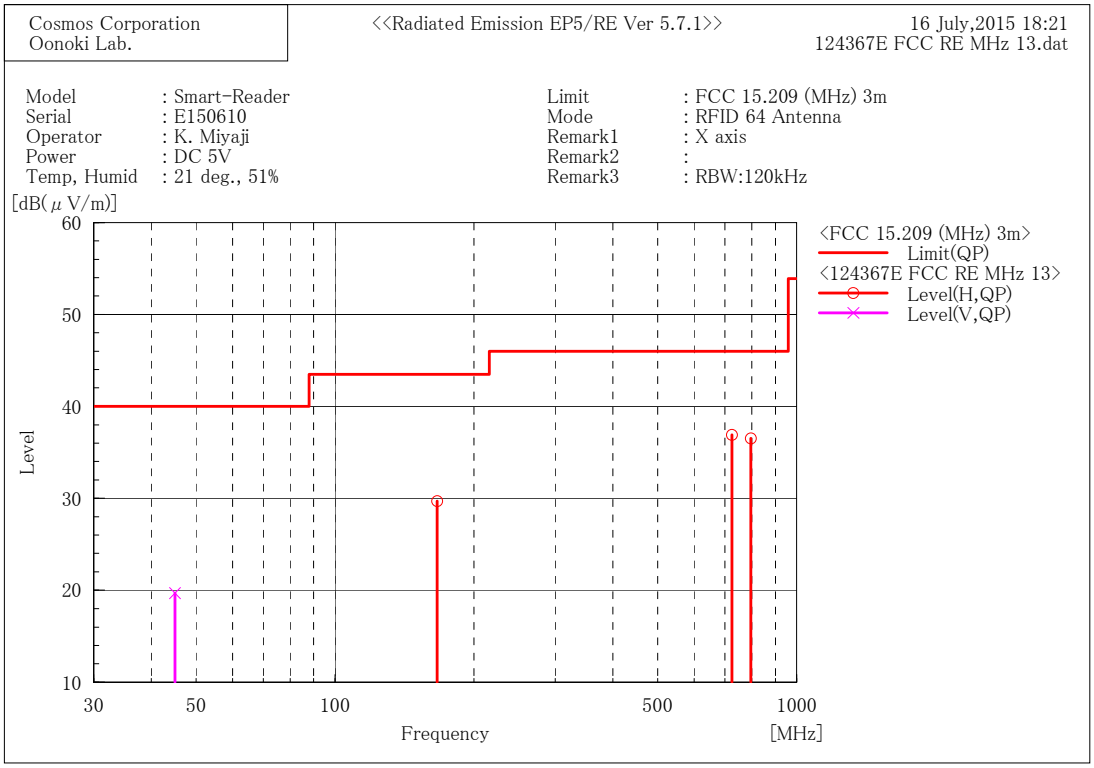
Final Result

No.	Frequency	Reading QP	c.f	Result QP	Limit QP	Margin QP	Angle
	[MHz]	[dB(μV)]	[dB(1/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	[°]
1	27.120	18.3	22.8	41.1	69.5	28.4	215.0

5.2.3 Test Detail (Continued)

<Below 30 MHz>

Worst Test Data (X axis)



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	166.514	39.4	-9.7	29.7	43.5	13.8	194.0	342.0
2	723.867	35.7	1.2	36.9	46.0	9.1	117.0	237.0
3	796.256	34.1	2.4	36.5	46.0	9.5	191.0	247.0

--- 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	45.000	32.8	-13.1	19.7	40.0	20.3	100.0	91.0

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.
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

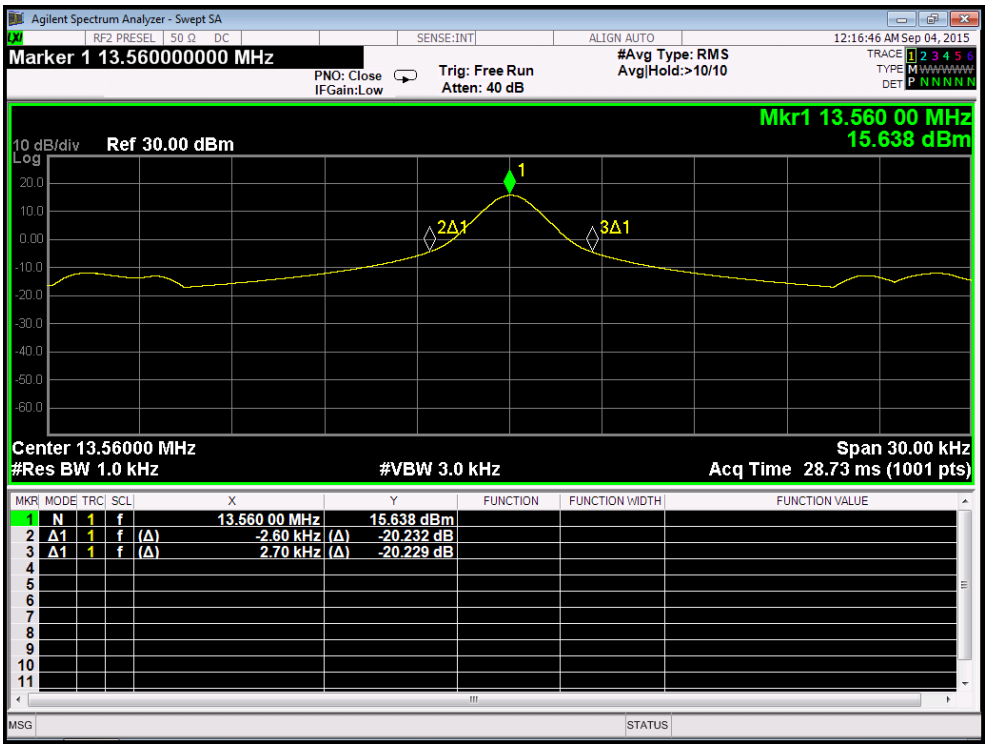
Uncertainty of measurement result	:	±0.011%
Date of testing	:	September 4, 2015
Room temperature	:	25℃
Relative humidity	:	47%

Measured Bandwidth [kHz]
5.3

	Edge of Bandwidth [MHz]	Limit [MHz]	Margin [kHz]
Lower	13.5574	13.01	547
Higher	13.5627	14.01	447

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 on the table installed in a semi-anechoic chamber. The non-conductive table, 0.8 m high, was placed on the turntable, and the EUT was put on the non-conductive table. 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	:	August 27, 2015
Room temperature	:	22℃
Relative humidity	:	36%

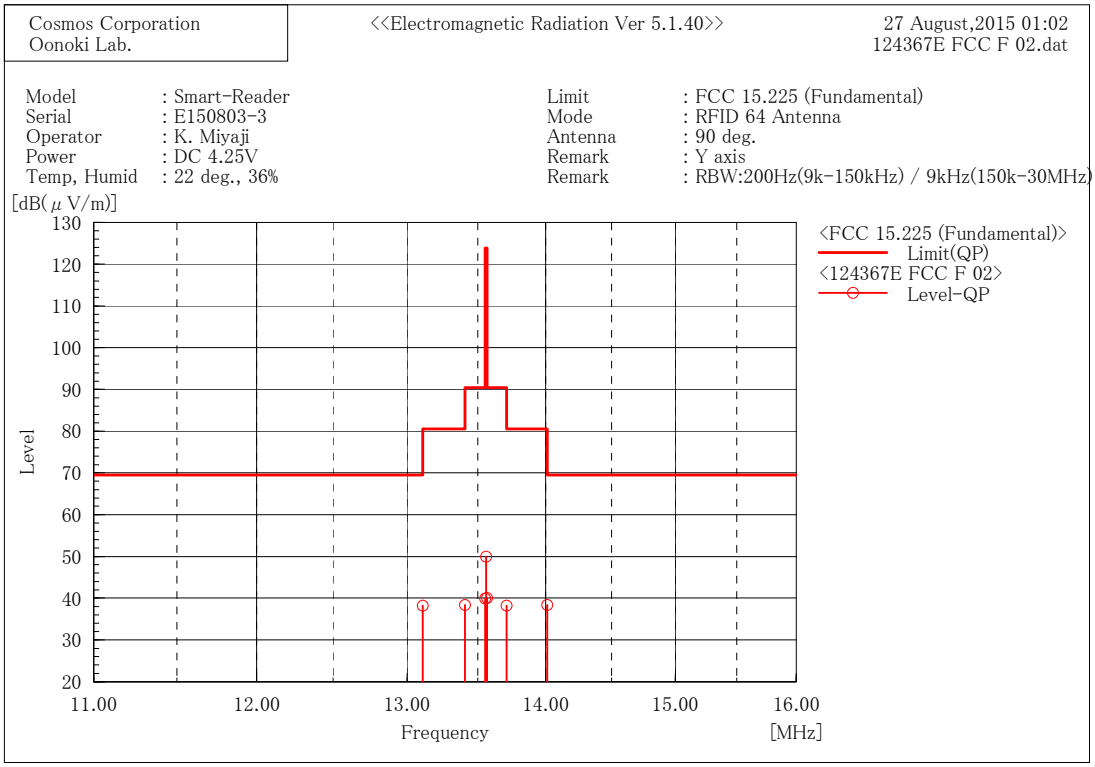
5.4.3 Test Detail (Continued)

Calculation
Result = Reading + c.f
= 15.5 + 22.7
= 38.2

Margin = Limit - Result
= 69.5 - 38.2
= 31.3

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

Test Data (Power Supply: DC 4.25 V)

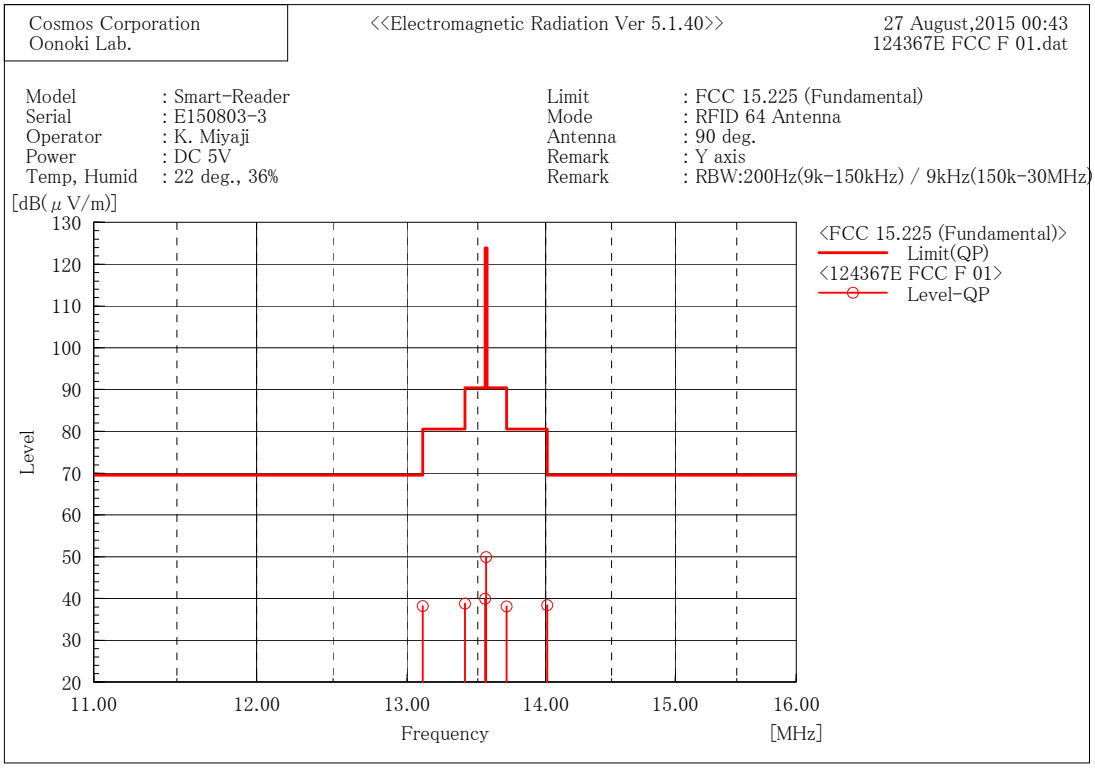


Final Result

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	15.5	22.7	38.2	69.5	31.3	81.0	
2	13.410	15.5	22.9	38.4	80.5	42.1	81.0	
3	13.553	16.9	23.0	39.9	90.4	50.5	81.0	
4	13.560	26.9	23.0	49.9	123.9	74.0	81.0	
5	13.567	17.0	23.0	40.0	90.4	50.4	81.0	
6	13.710	15.2	23.0	38.2	80.5	42.3	81.0	
7	14.010	15.2	23.2	38.4	69.5	31.1	81.0	

5.4.3 Test Detail (Continued)

Test Data (Power Supply: DC 5 V)

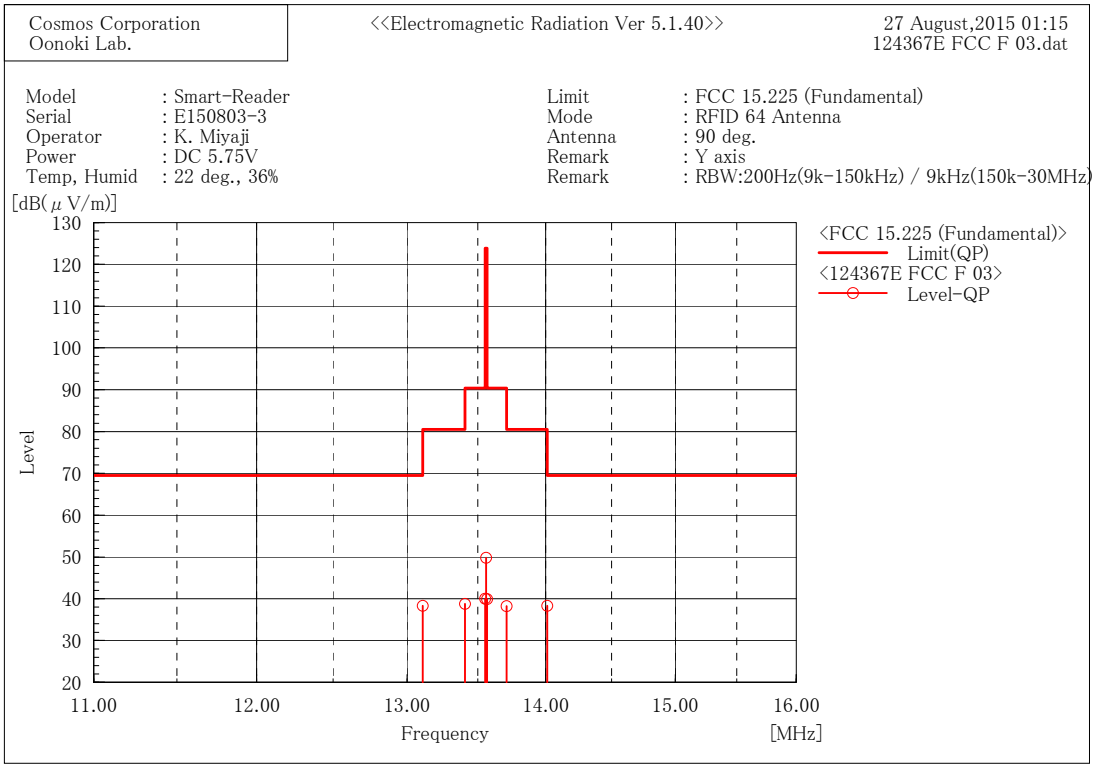


Final Result

No.	Frequency	Reading	c.f	Result	Limit	Margin	Angle	Remark
	[MHz]	[dBμV]	[dB(1/m)]	[dBμV/m]	[dBμV/m]	[dB]	[°]	
1	13.110	15.5	22.7	38.2	69.5	31.3	81.0	
2	13.410	15.9	22.9	38.8	80.5	41.7	81.0	
3	13.553	16.9	23.0	39.9	90.4	50.5	81.0	
4	13.560	26.9	23.0	49.9	123.9	74.0	81.0	
5	13.710	15.1	23.0	38.1	80.5	42.4	81.0	
6	14.010	15.2	23.2	38.4	69.5	31.1	81.0	

5.4.3 Test Detail (Continued)

Test Data (Power Supply: DC 5.75 V)



Final Result

No.	Frequency [MHz]	Reading [dBμV]	c.f [dB(1/m)]	Result [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Angle [°]	Remark
1	13.110	15.6	22.7	38.3	69.5	31.2	81.0	
2	13.410	15.9	22.9	38.8	80.5	41.7	81.0	
3	13.553	17.0	23.0	40.0	90.4	50.4	81.0	
4	13.560	26.8	23.0	49.8	123.9	74.1	81.0	
5	13.567	16.9	23.0	39.9	90.4	50.5	81.0	
6	13.710	15.2	23.0	38.2	80.5	42.3	81.0	
7	14.010	15.1	23.2	38.3	69.5	31.2	81.0	

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	:	August 28, 2015
Room temperature	:	Refer to Test Data

Calculation

Deviation [Hz] = Measured Frequency - Center Frequency
= 13559990 - 1356000
= -10

Deviation [ppm] = Deviation [Hz] ÷ Center Frequency × 1000000
= |-10| ÷ 13560000 × 1000000
≒ 0.7

Margin = Limit - Deviation [ppm]
= 100 - 0.7
= 99.3

5.5.3 Test Detail (Continued)

Test Data

Center Frequency ： 13.56 MHz

Temp [℃]	Operation Time	Measured Frequency [Hz]	Deviation [Hz]	Deviation [ppm]	Limit [ppm]	Margin [ppm]
50	Startup	13559990	-10	0.7	100	99.3
	2 min	13559989	-11	0.8	100	99.2
	5 min	13559989	-11	0.8	100	99.2
	10 min	13559989	-11	0.8	100	99.2
40	Startup	13560002	2	0.1	100	99.9
	2 min	13560000	0	0.0	100	100.0
	5 min	13560000	0	0.0	100	100.0
	10 min	13560000	0	0.0	100	100.0
30	Startup	13560014	14	1.0	100	99.0
	2 min	13560012	12	0.9	100	99.1
	5 min	13560012	12	0.9	100	99.1
	10 min	13560011	11	0.8	100	99.2
20	Startup	13560031	31	2.3	100	97.7
	2 min	13560028	28	2.1	100	97.9
	5 min	13560029	29	2.1	100	97.9
	10 min	13560029	29	2.1	100	97.9
10	Startup	13560042	42	3.1	100	96.9
	2 min	13560041	41	3.0	100	97.0
	5 min	13560041	41	3.0	100	97.0
	10 min	13560041	41	3.0	100	97.0
0	Startup	13560036	36	2.7	100	97.3
	2 min	13560038	38	2.8	100	97.2
	5 min	13560039	39	2.9	100	97.1
	10 min	13560039	39	2.9	100	97.1
-10	Startup	13560010	10	0.7	100	99.3
	2 min	13560015	15	1.1	100	98.9
	5 min	13560015	15	1.1	100	98.9
	10 min	13560016	16	1.2	100	98.8
-20	Startup	13559956	-44	3.2	100	96.8
	2 min	13559963	-37	2.7	100	97.3
	5 min	13559963	-37	2.7	100	97.3
	10 min	13559964	-36	2.7	100	97.3

5.5.3 Test Detail (Continued)

Test Data

Temp [℃]	Supply Voltage [V]	Measured Frequency [Hz]	Deviation [Hz]	Deviation [ppm]	Limit [ppm]	Margin [ppm]
20	4.25	13560020	20	1.5	100	98.5
	5.00	13560029	29	2.1	100	97.9
	5.75	13560034	34	2.5	100	97.5

6. List of Test and Measurement Instruments

AC Power Line Conducted Emission

Instruments	Manufacturer	Model	Serial No.	Calibrated Date/Until
EMI Test Receiver	ROHDE& SCHWARZ	ESCI	100413	2014/11/27 2015/11/26
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
Shielded Room	JSE	COSR-01	---	---
RF Cable RF Selector	Fujikura	3D-2W	OC01	2015/04/06 2016/04/05
	SUHNER	RG223/U	OC02 OC04	
	TSJ	RFM-E221	3148	
50 Ω Terminator	RES-NET MICROWAVE	RCX6BM	---	2015/05/28 2016/05/27
Software	TOYO	EP5/CE (ver5.3.20)	---	---

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
Loop Antenna (9 kHz to 30 MHz)	SCHAFFNER	HLA6120	1137	2014/10/05 2015/10/04
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	2944A07891	2015/03/13 2016/03/12
Biconical Antenna (30 MHz to 300 MHz)	SCHWARZBECK	VHBB9124 / BBA9106	9124-311	2014/08/30 2015/08/29
Log-Periodic Antenna (300 MHz to 1 GHz)	SCHWARZBECK	UHALP9108-A	0645	2014/08/30 2015/08/29
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

Instruments	Manufacturer	Model	Serial No.	Calibrated Date/Until
EMI Test Receiver	Agilent Technologies	N9038A	MY54130015	2015/06/29 2016/06/28
Thermostatic Chamber	ESPEC	PU-2KP	14010409	2015/08/07 2016/08/06

7. Appendix

Refer to separated files for the following appendixes.
Appendix 1: Front view of EUT
Appendix 2: Photographs of the Test Setup