

TEST REPORT

For

IC Card Reader/Writer module

In conformity with

FCC CFR 47 Part15 Subpart C

Model : TN18301 (E)

FCC ID : ORKTN18301E

Report No. : ERY1807Z30R1

Issue Date : July 30, 2018

Prepared for

TOPPAN FORMS CO., LTD.
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Prepared by

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History

Report No.	Date	Revisions	Issued By
ERY1803Z16R1	March 16, 2018	Initial Issue	K. Onishi
ERY1806Z20R1	June 20, 2018	Correction of setup photo (Clause 3.1 and 3.3)	K. Onishi
ERY1807Z30R1	July 30, 2018	Change FCC ID	K. Onishi

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1 General information

1.1 Product description

Test item : IC Card Reader/Writer module
 Manufacturer : TOPPAN FORMS CO., LTD
 Address : 1-7-3, Higashi Shimbashi, Minato-ku, Tokyo, 105-8311, Japan
 Model : TN18301 (E)
 FCC ID : ORKTN18301E
 Serial numbers : P-001 (RF radiated sample), P-003 (RF conducted sample)
 Transmitting Frequency : 13.56 MHz
 Type of Modulation : ASK
 Operating temperature range : -20 to +60 degree C
 Receipt date of EUT : February 15, 2018
 Nominal power source voltages : DC 5.0V

1.2 Test(s) performed/ Summary of test result


Test specification(s) : FCC CFR 47. Part 15 Subpart C (October 1, 2017)
 Test method(s) : ANSI C63.10: 2013
 Test(s) started : February 22, 2018
 Test(s) completed : February 23, 2018
 Purpose of test(s) : Certification for FCC

Summary of test result : Complied

Note: The above judgment is only based on the measurement data and it does not include the measurement uncertainty. Accordingly, the statement below is applied to the test result.

The EUT complies with the limit required in the standard in case that the margin is not less than the measurement uncertainty in the Laboratory.

Compliance of the EUT is more probable than non-compliance is case that the margin is less than the measurement uncertainty in the Laboratory.

Test engineer : 
 K. Onishi
 Wireless testing laboratory

Reviewer : 
 T. Ikegami
 Manager
 Wireless testing laboratory

1.3 Test facility

[Yokohama Laboratory]

Address: 472, Nippa-cho, Kohoku-ku, Yokohama, 223-0057, Japan
TEL: +81-45-534-0645
FAX: +81-45-592-7506

Accredited by National Voluntary Laboratory Accreditation Program (NVLAP) for the emission tests stated in the scope of the certificate under Certificate Number 200780-0

Registered by Innovation, Science and Economic Development Canada (ISED):

The registered facility number is as follows;
Test site (Semi-Anechoic chamber 3m): 6974A-1

Registered by Voluntary Control Council for Interference by Information Technology Equipment (VCCI)

Each registered facility number is as follows;
Test site A-0045

[Kitayamata laboratory]

Address: 3-5-23, Kitayamata, Tsuzuki-ku, Yokohama, 224-0021, Japan
TEL: +81-45-550-3520
FAX: +81-45-592-7506

Accredited by National Voluntary Laboratory Accreditation Program (NVLAP) for the emission tests stated in the scope of the certificate under Certificate Number 200780-0

Registered by Innovation, Science and Economic Development Canada (ISED):

The registered facility number is as follows;
Test site (Semi-Anechoic chamber 3m): 21105-1

Registered by Voluntary Control Council for Interference by Information Technology Equipment (VCCI)

Each registered facility number is as follows;
Test site A-0212

This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.



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1.4 Measurement uncertainty

The treatment of uncertainty is based on the general matters on the definition of uncertainty in “Guide to the expression of uncertainty in measurement (GUM)” published by ISO. The Lab’s uncertainty is determined by referring ETSI TR 100 028-1 V1.4.1 (2001-12).

The uncertainty of the measurement result in the level of confidence of approximately 95% (k=2) is as follows;

Conducted emission (150 kHz - 30 MHz):	± 3.4 dB
Radiated emission (9 kHz - 30 MHz):	± 5.1 dB
Radiated emission (30 MHz - 1000 MHz):	± 5.3 dB

1.5 Summary of test results

Requirements	Section in FCC	Section in this report	Results
Occupied bandwidth	15.215 (c)	2.1	-
Radiated Emissions between 9 kHz to 30 MHz	15.225 (a) - (d)	2.2	Complied
Radiated Emissions between 30 to 1000 MHz	15.209	2.3	Complied
Carrier Frequency Stability	15.225 (e)	2.4	Complied
AC Power Line Conducted Emissions	15.207	2.5	Complied

The field strength of spurious emission was measured in three orthogonal EUT positions (X-Plane, Y- Plane and Z- Plane).

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1.6 Setup of equipment under test (EUT)

1.6.1 Test configuration of EUT

The test configuration of the EUT refers to following Tables.

Table: EUT

No.	Equipment	Model name	S/N	Note
A1	IC Card Reader/Writer module	TN18301 (E)	P-001	For Radiated
A2	IC Card Reader/Writer module	TN18301 (E)	P-003	For Conducted

Table: Support equipment

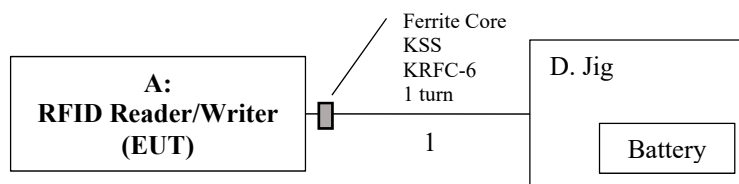
No.	Item	Manufacturer	Model Name	S/N
B	PC	Lenovo	X230	R9-XHKY7
C	AC Adaptor	Lenovo	ADLX65NCT2A	11S45N0323Z1ZLZH31G599
D	Jig	-	-	-

Table: Cable connected to the EUT

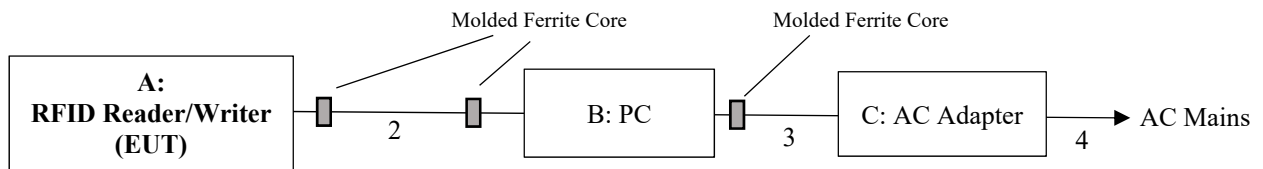
No.	Cable Name	From	To	Shielded	Ferrite	Length [m]
1	USB Cable	A	D	Yes	Yes	0.17
2	USB Cable	A	B	Yes	Yes	1.25
3	DC Cable	B	C	No	Yes	1.70
4	AC Cable	C	AC mains	No	No	1.00

1.6.2 Setup diagram of tested system:

[Configuration 1]



[Configuration 2]



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1.6.3 Operating condition:

Operating mode:

1. No modulation
2. 14443A 106k (ISO/IEC 14443 Type A)
3. 14443B 106k (ISO/IEC 14443 Type B)
4. Felica 212k, 424k (JIS X 6319-4)
5. 15693 26k (ISO/IEC 15693),
6. Active 106k, 212k, 424k (ISO/IEC 18092, 21481)

1.7 Equipment modifications

No modifications have been made to the equipment in order to achieve compliance with the applicable standards described in clause 1.2.

1.8 Deviation from the standard

No deviations from the standards described in clause 1.2.

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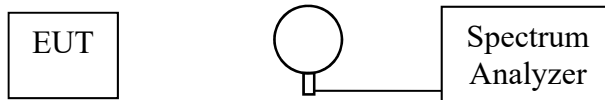
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2 Test procedure and test data

2.1 Occupied Bandwidth (99 %)

Test setup

Test setup is the following drawing. The antenna port of EUT was connected to the spectrum analyzer.



Test procedure

Spectrum analyzer is set as below according to ANSI C63.10 clause 6.9.3

- RBW: 1 to 5 % of OBW
- VBW > 3 x RBW
- Span: OBW x 1.5 to 5
- Trace: Max hold

Limitation

There are no limitations.
 The measurement value is used for the emission designator.

Test equipment used (refer to List of utilized test equipment)

TR06	CL11	LP06			
------	------	------	--	--	--

Test Date

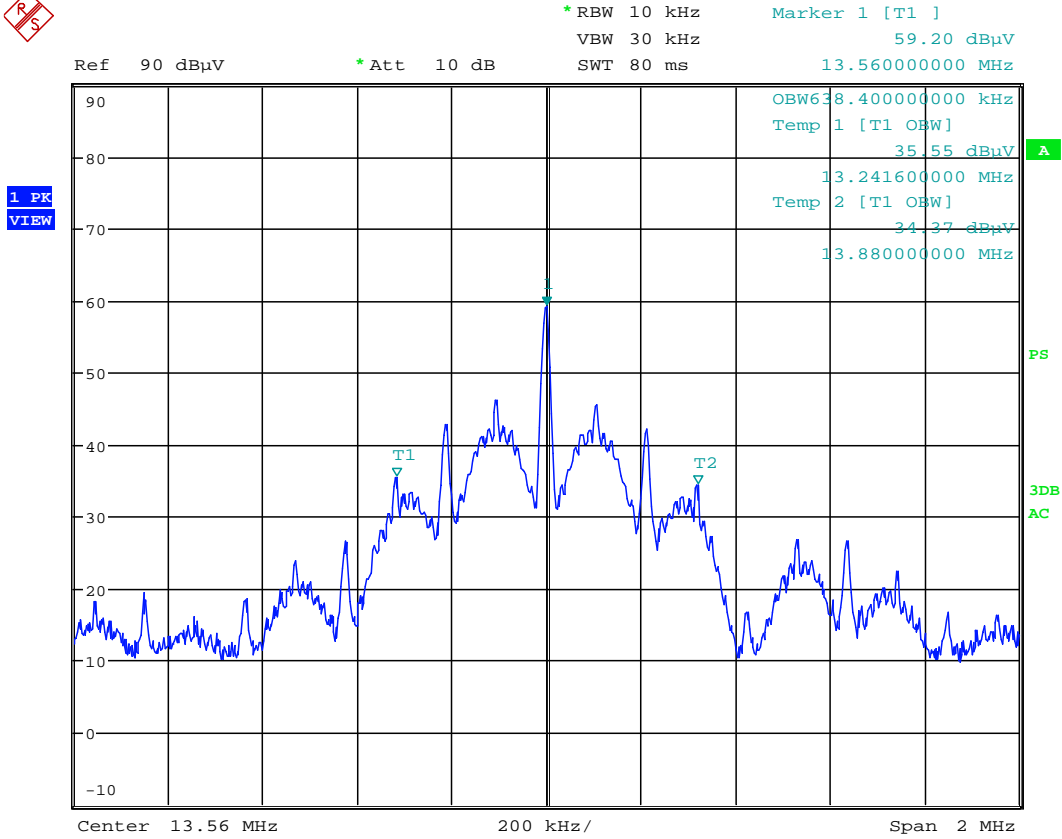
Tested Date: February 22, 2018 Temperature: 18 deg. C
 Humidity: 36 % Atmos. Press: 1022 hPa

Test results

Operating mode	99% Bandwidth [kHz]
Felica 212k	383.2
Felica 424k	580.8
14443A 106k	638.4
14443B 106k	83.52
15693 26k	352.0
Active 106k	614.4
Active 212k	438.4
Active 424k	609.6

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Test data (14443A 106k)

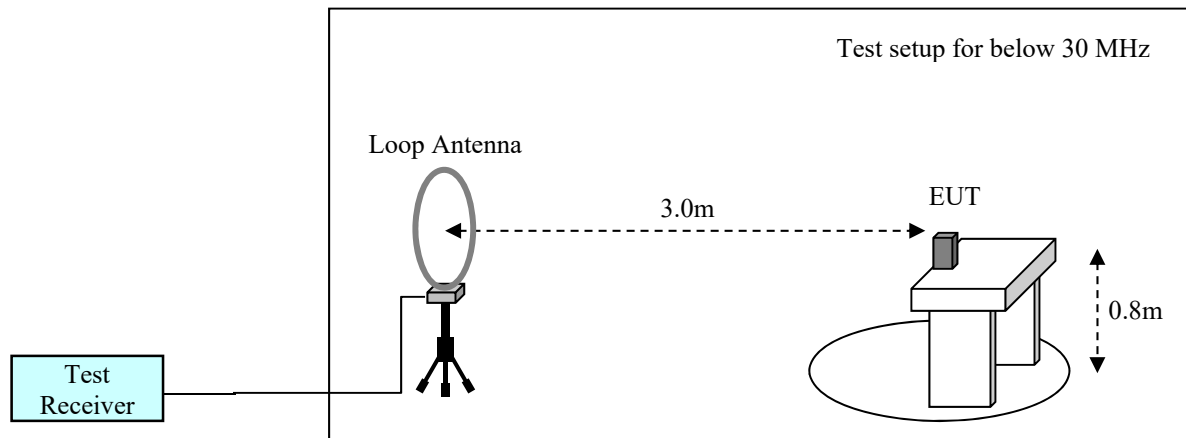
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2.2 Transmitter radiated spurious emissions between 9 kHz to 30 MHz

Test setup

Test setup was implemented according to the method of ANSI C63.10 clause 6.4.



Test procedure

Measurement procedures were implemented according to the method of ANSI C63.10: 2013 clauses 6.4.

The EUT is placed on a non-conducted table which is 0.8m height from a ground plane and the measurement antenna to EUT distance is 3 meters. The turn table is rotated for 360 degrees to determine the maximum emission level. In the frequency range of 9 kHz to 30 MHz, a calibrated loop antenna was positioned with its plane vertical at the distance 3m from the EUT with an extrapolation of corrected distance factor and rotated about its vertical axis for maximum response at each azimuth about the EUT. For certain applications, the loop antenna also needs to be positioned horizontally. The lowest height of the loop antenna shall be 1 m above the ground.

EUT is placed at three different orientations (X, Y and Z axis) in order to find the worst orientation.

The spectrum analyzer and receiver are set to the followings;

Below 30 MHz:

RBW=10 kHz, VBW= 30 kHz, final measurement is carried out with a receiver RBW of 9 kHz (QP)

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Applicable rule and limitation

§15.205: Restricted bands of operation

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
0.490 - 0.510	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(1)

§15.209: General requirements

Frequency (MHz)	Field Strength (uV/m)	Measurement Distance (m)
0.009 - 0.490	2400/F (kHz)	300
0.490 - 1.705	24000/F (kHz)	30
1.705 - 30.0	30	30

In the emission table above, the tighter limit applies at the band edges.

The level of any unwanted emissions from an intentional radiator operating under these general provisions shall not exceed the level of the fundamental emission.

The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz.

Radiated emission limits in the above bands are based on measurements employing an average detector.

§15.225: Operation within the band 13.110 – 14.010 MHz

Frequency (MHz)	Field strength @30m (uV/m)	Field strength @30m (dBuV/m)	Field strength @3m (dBuV/m)
13.110 - 13.410	106	40.5	61.8
13.410 - 13.553	334	50.5	71.8
13.553 - 13.567	15,848	84.0	105.3
13.567 - 13.710	334	50.5	71.8
13.710 - 14.010	106	40.5	61.8

$\text{dBuV/m} = 20 \times \log(\text{uV/m})$, Corrected distance factor (refer to ANSI C63.10 6.4.4.2)

The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the above radiated emission limits in § 15.209.

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Test equipment used (refer to List of utilized test equipment)

AC01	LP06	CL11	TR06	
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Test software used

EMI1 Ver. 5.7

Test results - Complied with requirement.

Test Data

§15.225 (a), (b), (c): Fundamental emission

Operating mode: 14443A 106k (Worst mode)

Test configuration: 1

EUT condition: Y-plane (Maximum condition)

Test site: Yokohama Laboratory

Measurement distance: 3 m

Frequency (MHz)	Reading at 3m (dBuV)	Detector	Corr. Factor (dB)	Result (dBuV/m)	Limit at 3m (dBuV/m)	Margin (dB)	Ant
13.02994	24.5	QP	10.9	35.4	50.9	15.5	90deg
13.34799	44.8	QP	10.8	55.6	61.9	6.3	90deg
13.45405	47.7	QP	10.8	58.5	71.8	13.3	90deg
13.56010	62.0	QP	10.8	72.8	105.3	32.5	90deg
13.66615	47.3	QP	10.8	58.1	71.8	13.7	90deg
13.77201	44.3	QP	10.8	55.1	61.9	6.8	90deg
14.19552	29.0	QP	10.8	39.8	50.9	11.1	90deg

Correction Factor [dB] = Antenna Factor [dB/m] + Cable Loss [dB]

Sample calculation at 13.34799 MHz result as follow:

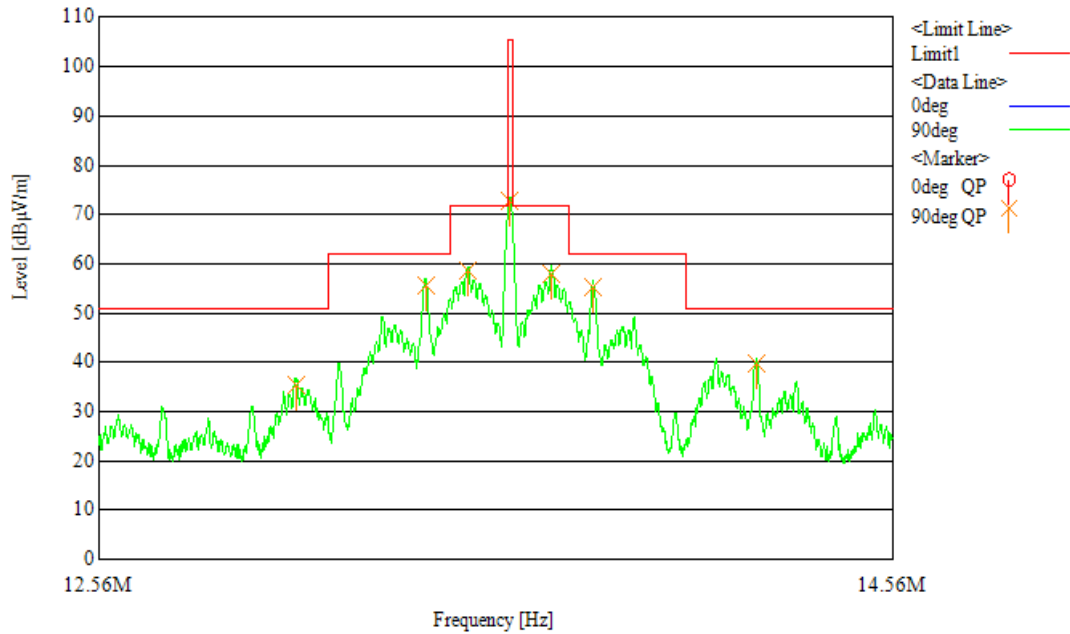
$$\text{Result [dBuV]} = \text{Reading} + \text{C.F} = 44.8 + 10.8 = 55.6 \text{ [dBuV/m]}$$

$$\text{Margin} = \text{Limit} - \text{Result} = 61.9 - 55.6 = 6.3 \text{ [dB]}$$

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Graphical express of test result



Tested Date: February 22, 2018 Temperature: 18 deg. C
 Humidity: 36 % Atmos. Press: 1022 hPa

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§15.225 (d): Harmonics and spurious emission between 9 kHz to 30MHz

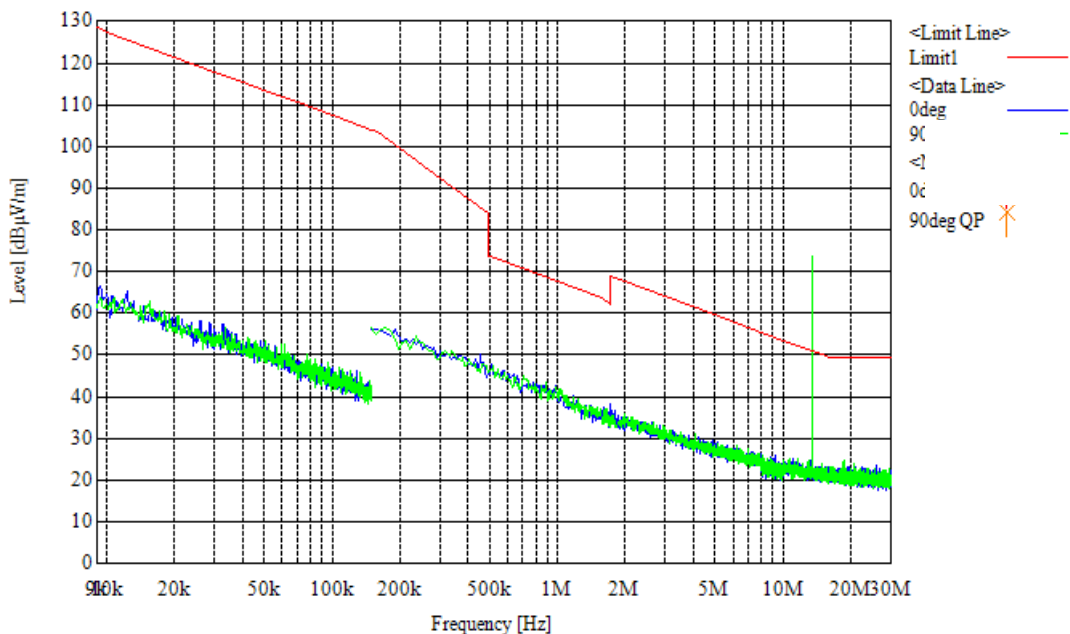
Test configuration: 1
 Test site: Yokohama Laboratory
 Measurement distance: 3 m

Frequency (MHz)	Reading at 3m (dBuV)	Detector (QP/Ave)	Corr. Factor (dB)	Result (dBuV/m)	Limit at 3m (dBuV/m)	Margin (dB)	Ant
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-

Correction Factor [dB] = Antenna Factor [dB/m] + Cable Loss [dB]

There is no spurious emission greater than the noise floor.

Graphical express of test result (9 kHz – 30MHz)



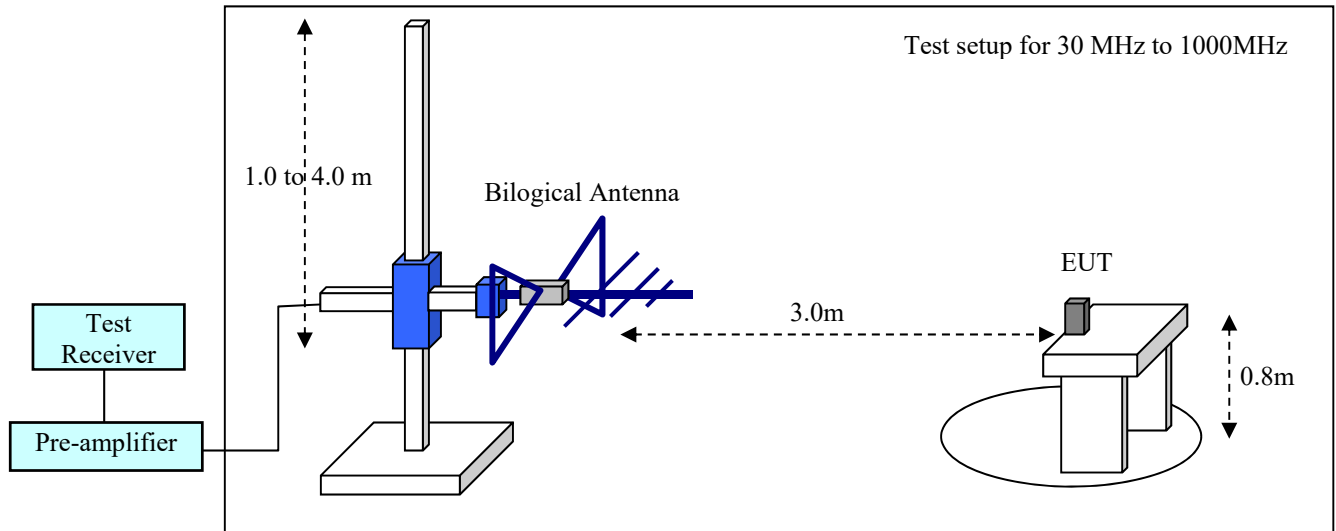
Tested Date: February 22, 2018 Temperature: 18 deg. C
 Humidity: 36 % Atmos. Press: 1022 hPa

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2.3 Transmitter radiated spurious emissions between 30MHz to 1000MHz

Test setup

Test setup was implemented according to the method of ANSI C63.10 clause 6.



Test procedure

Measurement procedures were implemented according to the method of ANSI C63.10: 2013 clauses 6.5.

Exploratory radiated measurements were performed at the measurement distance of 3 meters using broadband antennas and a spectrum analyzer. The EUT was set up in its typical configuration and arrangement, and operated in its various modes.

For each mode of operation required to be tested, the frequency spectrum were monitored. Variations in antenna height between 1 and 4 m, antenna polarization, EUT azimuth, and cable or wire placement (each variable within bounds specified elsewhere) were explored to produce the emission that has the highest amplitude relative to the limit. Based on the exploratory measurement results, the one EUT, cable and wire arrangement, and mode of operation that produces the emission that has the highest amplitude relative to the limit is selected for the final measurement. This investigation was performed with the EUT rotated 360°, the antenna height scanned between 1m and 4m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. EUT was placed at three different orientations (X, Y and Z axis) in order to find the worst orientation.

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Applicable rule and limitation

§15.209: General requirements

Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Measurement Distance (m)	Field Strength (uV/m)	Field Strength (dBuV/m)
30 – 88	3	100	40.0
88 – 216	3	150	43.5
216 – 960	3	200	46.0
Above 960	3	500	53.9

In the emission table above, the tighter limit applies at the band edges.

The level of any unwanted emissions from an intentional radiator operating under these general provisions shall not exceed the level of the fundamental emission.

The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector.

Test equipment used (refer to List of utilized test equipment)

AC01(EM)	CL11	TR06	PR15	BA07			
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Test software used

EMI1 Ver. 5.7

Test results - Complied with requirement.

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Test Data

Operating mode: 15693 26k
 Test configuration: 1
 EUT condition: Y-plane (Maximum condition)
 Test site: Yokohama Laboratory
 Measurement distance: 3 m

§15.225(d) Harmonics and spurious emission between 30MHz to 1000MHz (refer 15.209)

No.	Frequency [MHz]	Reading [dBμV]	Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Ant.
1	108.479	39.7	11.3	7.8	30.2	28.6	43.5	14.9	Hori.
2	135.601	36.1	12.4	8.1	30.2	26.4	43.5	17.1	Hori.
3	162.719	44.3	10.6	8.3	30.2	33.0	43.5	10.5	Hori.
4	189.838	42.3	10.9	8.5	30.2	31.5	43.5	12.0	Hori.
5	216.960	39.1	11.8	8.8	30.2	29.5	46.0	16.5	Hori.
6	230.520	37.5	12.1	8.9	30.2	28.3	46.0	17.7	Hori.

Calculation method

The Correction Factors and RESULT are calculated as followings.

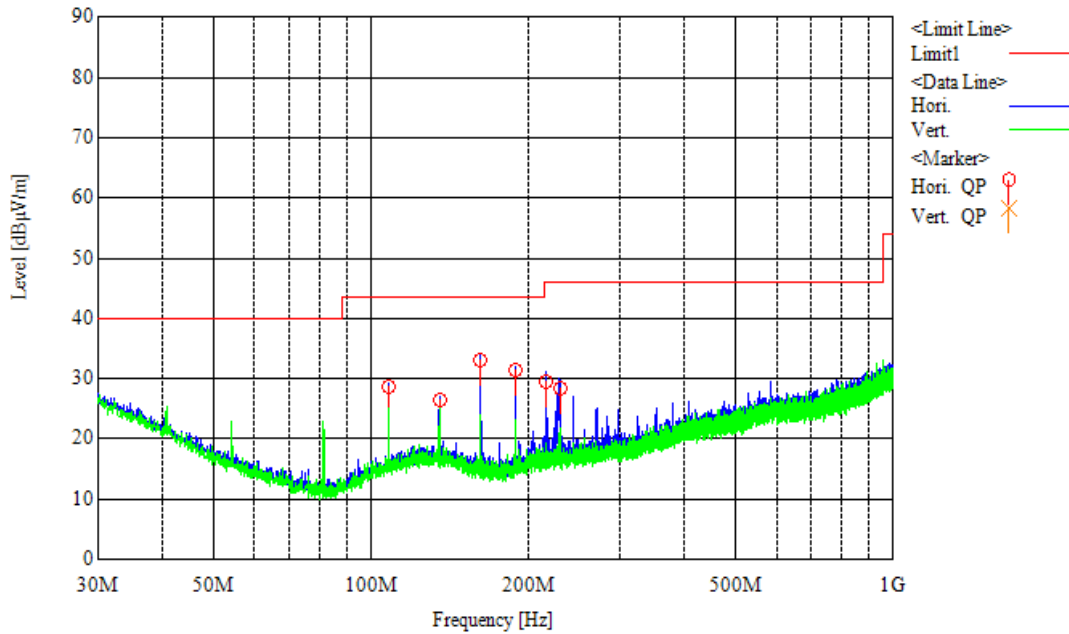
$$\text{Correction Factor [dB/m]} = \text{FACTOR [dB/m]} + \text{CABLE LOSS [dB]} - \text{GAIN [dB]}$$

$$\text{RESULT [dBuV/m]} = \text{READING [dBuV]} + \text{Correction Factor [dB/m]}$$

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Graphical express of test result (30MHz-1000MHz)



Tested Date:	February 22, 2018	Temperature:	18 deg. C
Humidity:	36 %	Atmos. Press:	1022 hPa

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2.4 Frequency stability

Test setup

Test setup was implemented according to the method of ANSI C63.10: 2013 clauses 6.8 “Frequency stability tests”.

Test procedure

Measurement procedures were implemented according to the test method of ANSI C63.10: 2013 clause 6.8.1. Place the de-energized EUT in the temperature test chamber. Supply the EUT with nominal ac voltage, or install a new or fully charged battery in the EUT. An antenna was connected to the antenna output connector of the EUT if possible. The frequency counter was connected to the measurement antenna with a suitable length of coaxial cable. The environmental chamber set to the highest temperature specified in applicable regulation. Allow sufficient time (approximately 30 minutes) for the temperature of the chamber to stabilize. Turn the EUT on and measure the EUT operating frequency at startup, and two, five, and ten minutes after startup. The measurements were performed that the temperature chamber set to reduce the lowest temperature specified in applicable regulation.

Applicable rule and limitation

§15.225 (e): Frequency tolerance

Test items	Variation ranges		Limit
Temperature variations	-20 to +60 degrees C	5.0 +/-5% VDC *	+/-0.01%

Note1: The above operating range is declared by manufacturer.

Test equipment used (refer to List of utilized test equipment)

SA06			
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Test results - Complied with requirement.

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Test Data

Operating mode: No modulation

Temp. (Degrees)	Voltages (V)	Measured Frequency (MHz)				Worst Deviation (%)	Limit (%)
		Start-up	2 min.	5 min.	10 min.		
-20	5.00	13.5599610	13.5599627	13.5599633	13.5599626	-0.0002	+/-0.01
-10	5.00	13.5599955	13.5599996	13.5599999	13.5600001	-0.00003	+/-0.01
0	5.00	13.5600134	13.5600121	13.5600122	13.5600119	+0.00009	+/-0.01
10	5.00	13.5600068	13.5599983	13.5599986	13.5599989	+0.00005	+/-0.01
20	5.25	13.5599756	13.5599583	13.5599596	13.5599611	-0.0003	+/-0.01
	5.00	13.5599572	13.5599579	13.5599598	13.5599621	-0.0003	+/-0.01
	4.75	13.5599782	13.5599632	13.5599646	13.5599662	-0.0002	+/-0.01
30	5.00	13.5599401	13.5599348	13.5599361	13.5599374	-0.0004	+/-0.01
40	5.00	13.5599424	13.5599217	13.5599223	13.5599228	-0.0005	+/-0.01
50	5.00	13.5599200	13.5599226	13.5599232	13.5599230	-0.0005	+/-0.01
60	5.00	13.5599240	13.5599500	13.5599586	13.5599594	-0.0005	+/-0.01

Tested Date: February 23, 2018
 Humidity: 27 %

Temperature: 27 deg. C
 Atmos. Press: 1020 hPa

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2.5 AC power line conducted emissions

Test setup

Test setup was implemented according to the method of ANSI C63.10: 2013 clause 6.2.

Test procedure

Measurement procedures were implemented according to the method of ANSI C63.10: 2013 clauses 6.2 “Standard test method for ac power line conducted emissions from unlicensed wireless devices”.

Exploratory measurements were used the spectrum analyzer to identify the frequency of the emission that has the highest amplitude relative to the limit by operating the EUT in a range of typical modes of operation, cable positions, and with a typical system equipment configuration and arrangement.

Final ac power line conducted emission measurements were performed based on the exploratory tests.

The EUT cable configuration and arrangement and mode of operation that produced the emission with the highest amplitude relative to the limit are selected for the final measurement.

When the measurement value is greater than average limitation the average detection measurements were performed.

Applicable rule and limitation

§15.207 (a): AC power line conducted limits

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency. The lower limit applies at the band edges.

Test equipment used (refer to List of utilized test equipment)

TR06	CL18	LN05				
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Test software used

EMI Ver. 5.7

Test results - Complied with requirement.

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Test Data

Operating mode: Transmission mode

Test configuration: 2

Test site: Yokohama Laboratory

No.	Frequency [MHz]	Reading		C.F. [dB]	Result		Limit		Margin		PHASE
		QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]	
1	0.15255	35.1	17.1	10.2	45.3	27.3	65.9	55.9	20.6	28.6	Va
2	0.16819	33.3	20.0	10.2	43.5	30.2	65.0	55.0	21.5	24.8	Va
3	0.18620	31.1	15.9	10.1	41.2	26.0	64.2	54.2	23.0	28.2	Va
4	13.56029	32.0	31.4	10.3	42.3	41.7	60.0	50.0	17.7	8.3	Va
5	27.12010	34.9	35.0	10.6	45.5	45.6	60.0	50.0	14.5	4.4	Va
6	0.15170	34.9	17.3	10.2	45.1	27.5	65.9	55.9	20.8	28.4	Vb
7	0.17889	31.5	17.3	10.2	41.7	27.5	64.5	54.5	22.8	27.0	Vb
8	0.18926	30.6	16.3	10.2	40.8	26.5	64.1	54.1	23.3	27.6	Vb
9	13.55994	31.5	31.4	10.4	41.9	41.8	60.0	50.0	18.1	8.2	Vb
10	27.11990	34.4	34.5	10.7	45.1	45.2	60.0	50.0	14.9	4.8	Vb

The power line conducted emission voltage is calculated by adding the LISN factor and Cable loss attenuation from the measured reading. The calculation is as follows:

$$\text{Result} = \text{Reading} + \text{C. F}$$

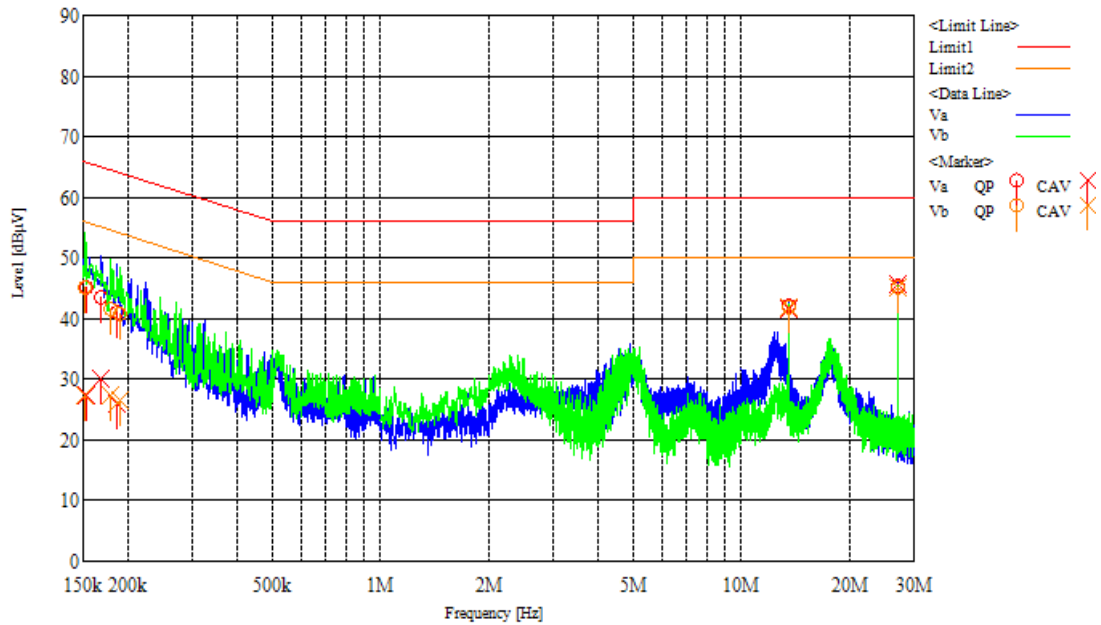
where C.F = LISN Factor + Cable Loss [dB]

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Graphical express of test result (0.15 MHz-30MHz)

AC Power line conducted emission. (With dummy load)



Tested Date: February 23, 2018 Temperature: 27 deg. C
 Humidity: 27 % Atmos. Press: 1020 hPa

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4 List of utilized test equipment/ calibration

RFT ID No.	Kind of Equipment and Precision	Manufacturer	Model No.	Serial Number	Calibration Date	Calibrated until
AC01(EM)	Anechoic Chamber (1st test room)	JSE	203397C	-	2017/04/22	2018/04/30
BA07	Biological Antenna	TESEQ	CBL6143A	26670	2017/12/05	2018/12/31
CL11	Antenna Cable for RE	RFT	-	-	2017/03/22	2018/03/31
CL18	Antenna Cable for CE	RFT	-	-	2017/03/22	2018/03/31
LN05	LISN	Kyoritsu	KNW-407F	8-1773-2	2017/05/25	2018/05/31
LP06	Loop Antenna	ETS-Lindgren	6502	00164299	2017/03/16	2018/03/31
PR21	Pre. Amplifier	Anritsu	MH648A	6200467119	2017/12/04	2018/12/31
TC01	Temperature Chamber	ESPEC	SH-641	92000964	2017/12/15	2018/12/31
TR06	Test Receiver (F/W : 4.73 SP4)	Rohde & Schwarz	ESU26	100002	2017/10/17	2018/10/31
SA06	Spectrum Analyzer (F/W: 4.50 SP4)	Rohde & Schwarz	FSP40	100071	2017/12/05	2018/12/31

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturer's recommendations for utilizing calibration equipment, which is traceable to recognized national standards.

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