TEST REPORT

For

RFID Module

In conformity with

FCC CFR 47 Part15 Subpart C / RSS-210 Issue 9

Model : T-2212C

FCC ID : WSLT-2212

IC ID : 8213A-T2212

Report No. : ERY1709Z13R1

Issue Date : September 13, 2017

Prepared for

YUYAMA Mfg. Co., Ltd
1-2-12, Koudushima, Toyonaka City, Osaka-fu, 561-0843 Japan

Prepared by

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History

Report No.	Date	Revisions	Issued By
ERY1706Z05R1	June 5, 2017	Initial Issue	K. Onishi
ERY1709Z07R1	September 7, 2017	Correct error (page 8) Retest the fundamental emission (page 11)	K. Onishi
ERY1709Z13R1	September 13, 2017	Added test data of RF module (clause 2.2, 2.3)	K. Onishi

1 General information

1.1 Product description

Test item	: RFID Module
Manufacturer	: TSUKASA ELECTRIC CO., LTD
Address	: 87-2, yoshio-cho, Miyakonojo-city, Miyazaki, 885-0006, Japan
Model	: T-2212C
FCC ID	: WSLT-2212
IC ID	: 8213A-T2212
Serial numbers	: 170519-1, 170519-2
Transmitting Frequency	: 13.56 MHz
Type of Modulation	: ASK
Operating temperature range	: -20 to +50 degree C
Receipt date of EUT	: May 10, 2017
Nominal power source voltages	: DC 3.3V

1.2 Test(s) performed/ Summary of test result

Test specification(s)	: FCC CFR 47. Part 15 Subpart C (October 1, 2016) RSS-210 Issue 9, RSS-Gen Issue 4
Test method(s)	: ANSI C63.10: 2013
Test(s) started	: May 9, 2017
Test(s) completed	: September 13, 2017
Purpose of test(s)	: Certification for FCC / ISED
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
K. Onishi
EMC testing Department

Reviewer : T. Karuishi
T. Karuishi
Manager
EMC testing Department

1.3 Test facility

[Yokohama Laboratory]

Address: 472, Nippa-cho, Kohoku-ku, Yokohama, 223-0057, Japan
TEL: +81-45-534-0645
FAX: +81-45-534-0646

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 Industry Canada (IC): 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 Industry Canada (IC): 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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TESTING
NVLAP LAB CODE 200780-0

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): ± 3.3 dB
Radiated emission (30 MHz - 1000 MHz): ± 6.1 dB

1.5 Summary of test results

Requirements	Section in FCC	Section in RSS	Section in this report	Results
Occupied bandwidth	15.215 (c)	RSS-Gen 6.6	2.1	-
Radiated Emissions between 9 kHz to 30 MHz	15.225 (a) - (d)	RSS-210 B6	2.2	Complied
Radiated Emissions between 30 to 1000 MHz	15.209	RSS-Gen 8.9	2.3	Complied
Carrier Frequency Stability	15.225 (e)	RSS-210 B6	2.4	Complied
AC Power Line Conducted Emissions	15.207	RSS-Gen 8.8	2.5	Complied

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

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	RFID Module	T-2212C	170519-1	For Radiated
A2	RFID Module	T-2212C	170519-2	For AC Conducted

Table: Support equipment

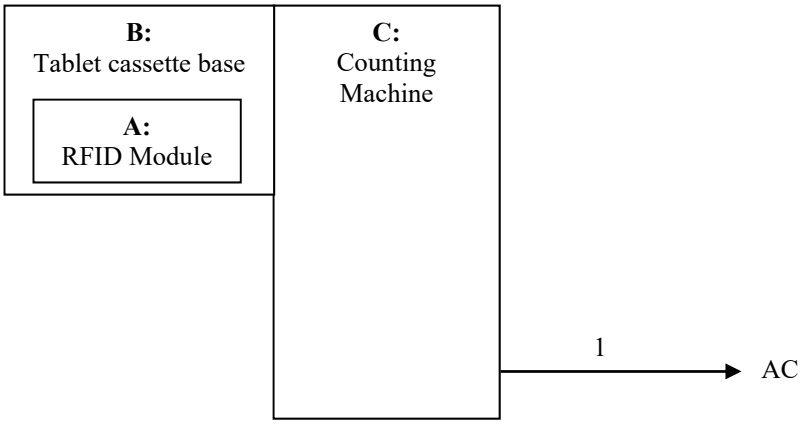
No.	Item	Manufacturer	Model Name	S/N
B	Tablet cassette base	TSUKASA ELECTRIC CO., LTD	TG-F321	-
C	Counting Machine	YUYAMA Mfg. Co., Ltd.	-	-
D	Jig	-	-	-

Table: Cable connected to the EUT

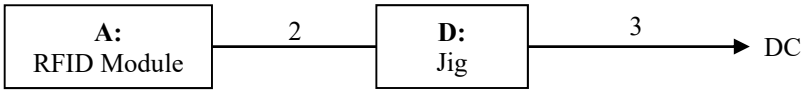
No.	Cable Name	From	To	Shielded	Ferrite	Length [m]
1	AC Cable	C	AC	No	No	1.8
2	Data Cable	A	D	No	No	0.1
3	DC Cable	D	DC	No	No	0.4

1.6.2 Setup diagram of tested system:

[Configuration 1]



[Configuration 2]



1.6.3 Operating condition:

Operating mode:
Transmission mode (Duty cycle 15%)

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

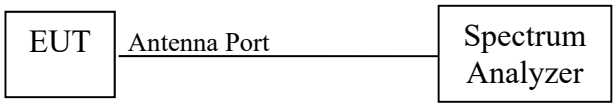
No deviations from the standards described in clause 1.2.

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)

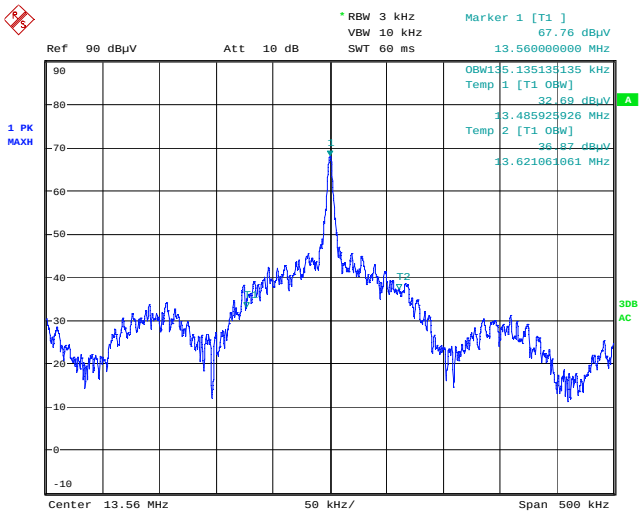
TR05	CL11	LP06			

Test Date

Tested Date:	May 9, 2017	Temperature:	22 degC
Humidity:	42 %	Atmos. Press:	1018 hPa

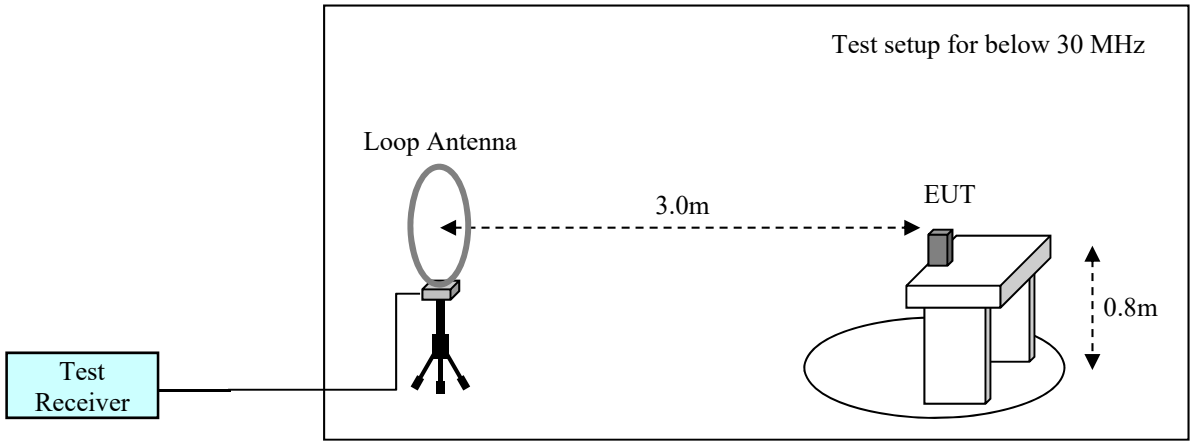
Test results

Transmission Frequency [MHz]	99% Bandwidth [kHz]
13.56	135.14



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)

Applicable rule and limitation

§15.205 / RSS-Gen 8.10 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 / RSS-Gen 8.9 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 / RSS-210 B6 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

dBuV/m = 20 x log (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 / RSS-Gen 8.9.

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

AC01	LP05	CL11	TR06	

Test software used
EMI1 Ver. 5.4

Test results - Complied with requirement.

Test Data

§15.225 (a), (b), (c) / RSS-210 B6 (a), (b), (c) Fundamental emission

Operating mode: Transmission mode
Test configuration: 1
EUT condition: Z-plane (Maximum condition)
Test site: Yokohama Laboratory
Measurement distance: 3 m

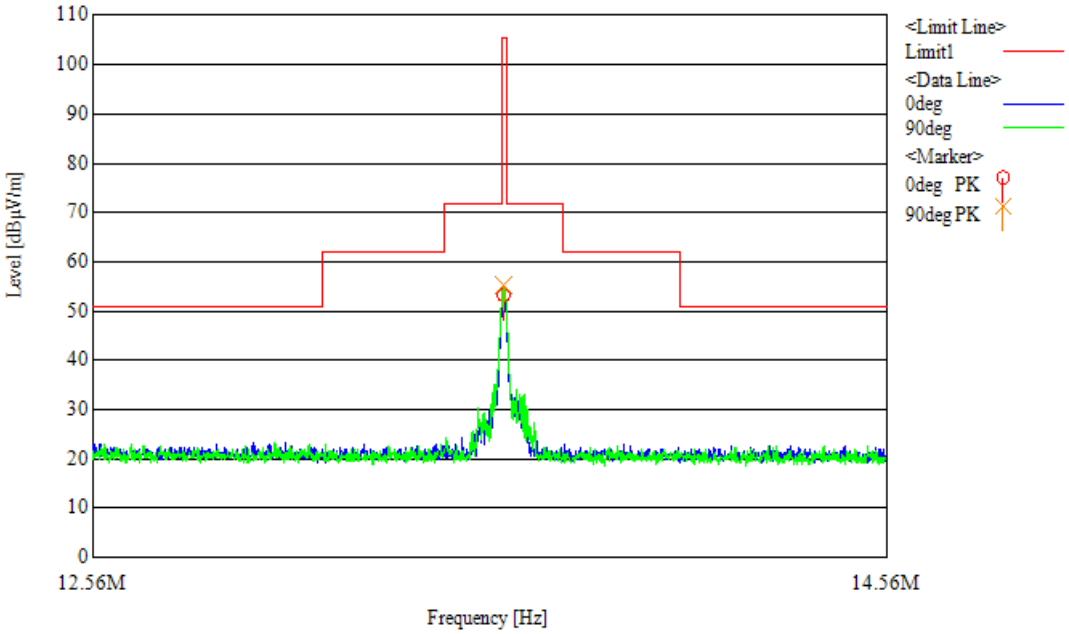
Frequency (MHz)	Reading at 3m (dBuV)	Detector	Corr. Factor (dB)	Result (dBuV/m)	Limit at 3m (dBuV/m)	Margin (dB)	Ant
13.55980	42.4	PK	10.8	53.2	105.3	52.1	0deg
13.55945	**44.4**	**PK**	**10.8**	**55.2**	**105.3**	**50.1**	**90deg**

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

Sample calculation at 13.55945 MHz result as follow:

Result [dBuV] = Reading + C.F = 44.4 + 10.8 = 55.2 [dBuV/m]
Margin = Limit – Result = 105.3 – 55.2 = 50.1 [dB]

Graphical express of test result



Tested Date: September 7, 2017
Humidity: 66 %

Temperature: 19 degree C
Atmos. Press: 1006 hPa

Operating mode: Transmission mode
Test configuration: 2
EUT condition: Z-plane (Maximum condition)
Test site: Yokohama Laboratory
Measurement distance: 3 m

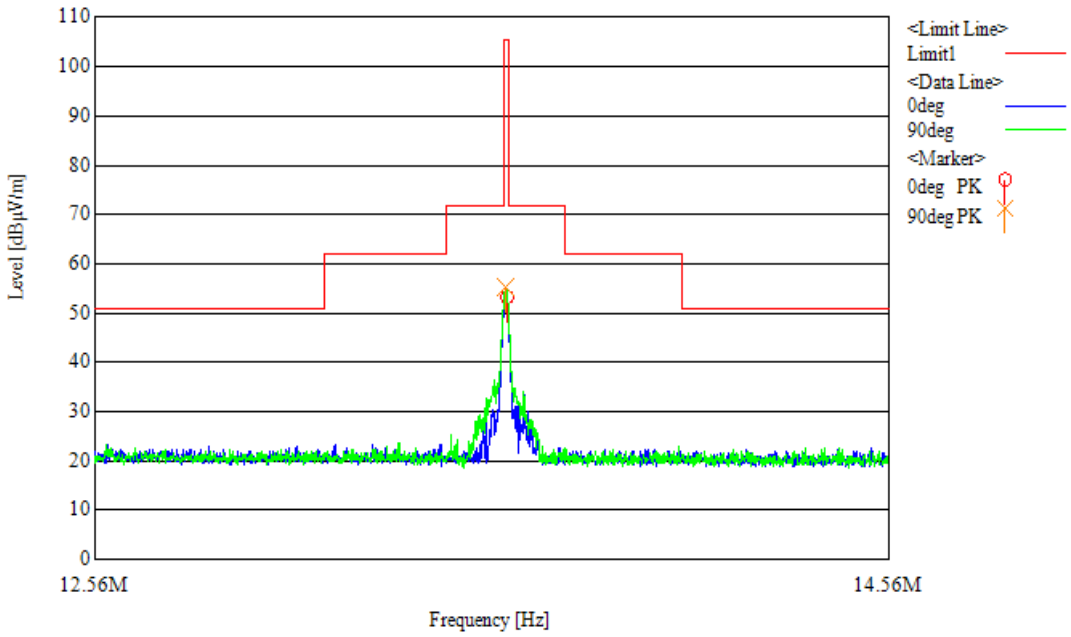
Frequency (MHz)	Reading at 3m (dBuV)	Detector	Corr. Factor (dB)	Result (dBuV/m)	Limit at 3m (dBuV/m)	Margin (dB)	Ant
13.56100	42.4	PK	10.8	53.2	105.3	52.1	0deg
13.56010	**44.5**	**PK**	**10.8**	**55.3**	**105.3**	**50.0**	**90deg**

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

Sample calculation at 13.56010 MHz result as follow:

Result [dBuV] = Reading + C.F = 44.5 + 10.8 = 55.3 [dBuV/m]
Margin = Limit – Result = 105.3 – 55.3 = 50.0 [dB]

Graphical express of test result



Tested Date: September 13, 2017
Humidity: 66 %

Temperature: 20 degree C
Atmos. Press: 1013 hPa

§15.225 (d) / RSS-210 B6 (d) Harmonics and spurious emission between 9 kHz to 30MHz

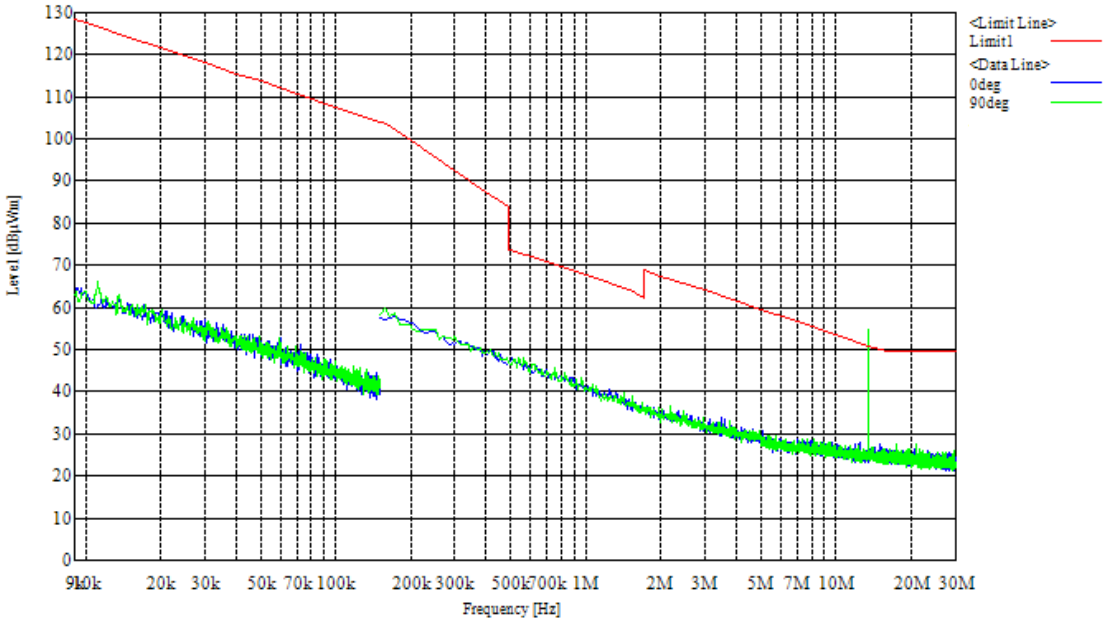
Operating mode: Transmission mode
Test configuration: 1
EUT condition: Z-plane (Maximum condition)
Test site: Yokohama Laboratory
Measurement distance: 3 m

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: May 9, 2017
Humidity: 42 %

Temperature: 22 degree C
Atmos. Press: 1018 hPa

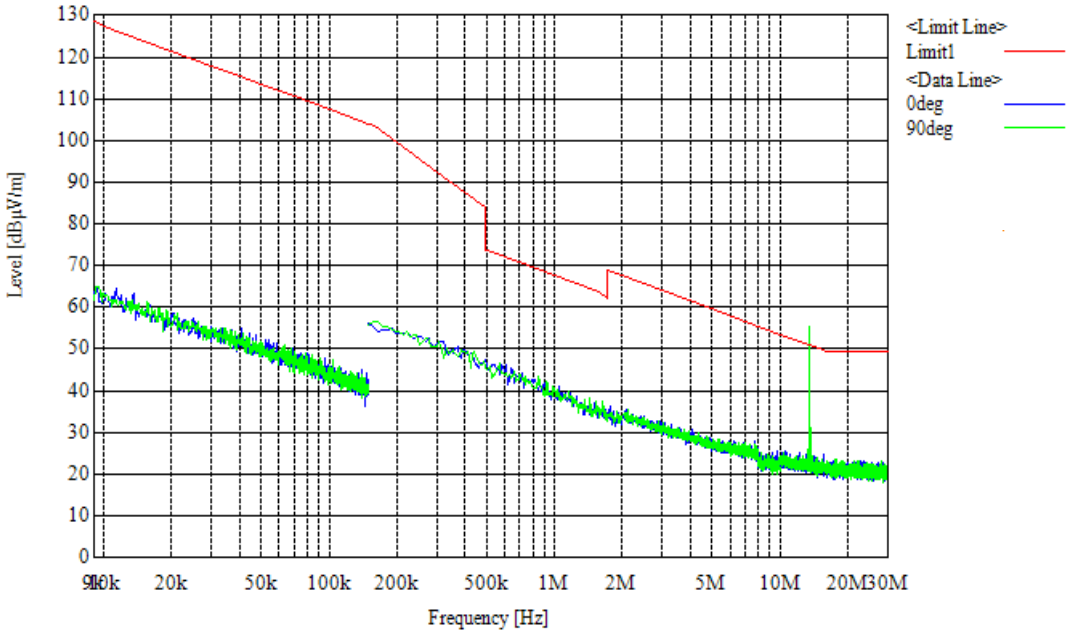
Operating mode: Transmission mode
Test configuration: 2
EUT condition: Z-plane (Maximum condition)
Test site: Yokohama Laboratory
Measurement distance: 3 m

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)

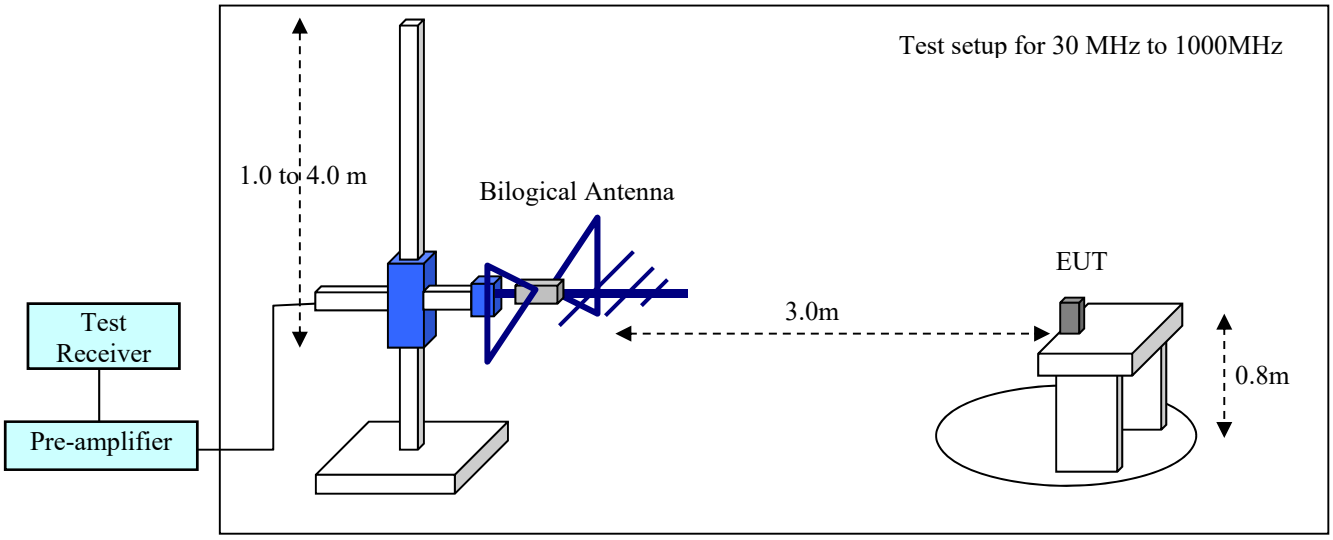


Tested Date: September 13, 2017
Humidity: 66 %

Temperature: 20 degree C
Atmos. Press: 1013 hPa

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.

Applicable rule and limitation

§15.209 / RSS-Gen 8.9 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			

Test software used

EMI1 Ver. 5.4

Test results - Complied with requirement.

Test Data

Tested Date: September 13, 2017

Temperature: 20 degree C
Humidity: 66 %
Atmos. Press: 1013 hPa

Operating mode: Transmission mode
Test configuration: 1
EUT condition: Z-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)

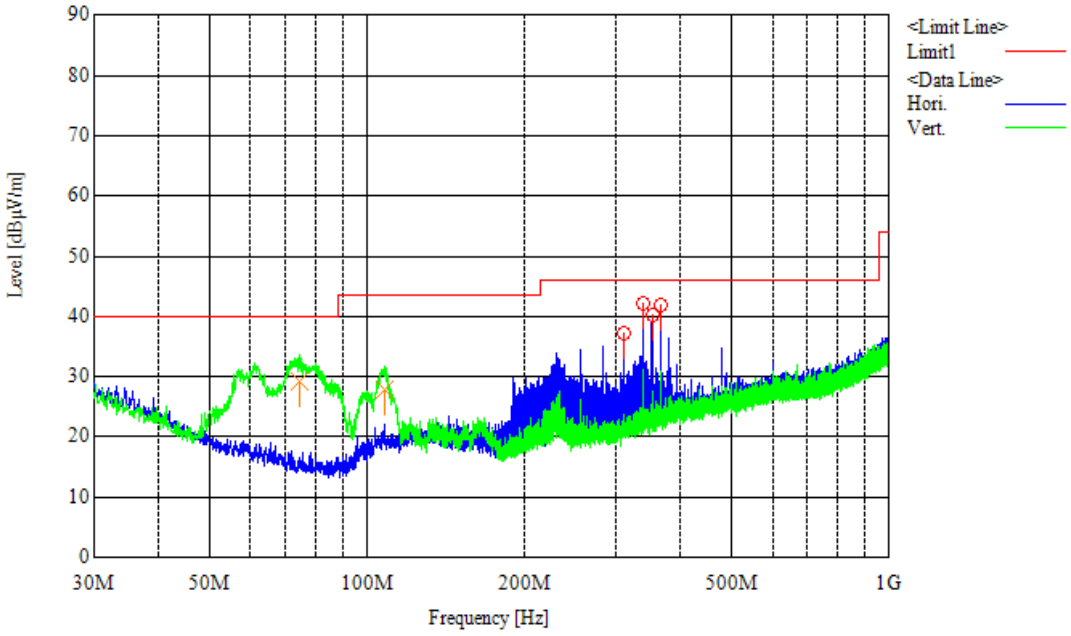
No.	Frequency [MHz]	Reading [dBµV]	Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Ant.
1	311.880	44.1	13.7	9.5	30.2	37.1	46.0	8.9	Hori.
2	**339.001**	**48.0**	**14.6**	**9.7**	**30.2**	**42.1**	**46.0**	**3.9**	**Hori.**
3	352.539	45.7	15.0	9.8	30.2	40.3	46.0	5.7	Hori.
4	366.121	46.9	15.4	9.9	30.2	42.0	46.0	4.0	Hori.
5	74.325	43.6	8.3	7.5	30.3	29.1	40.0	10.9	Vert.
6	108.077	38.8	11.5	7.8	30.2	27.9	43.5	15.6	Vert.

Calculation method

The Correction Factors and RESULT are calculated as followings.

Correction Factor [dB/m] = FACTOR [dB/m] + CABLE LOSS [dB] – GAIN [dB]
RESULT [dBuV/m] = READING [dBuV] + Correction Factor [dB/m]

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



Tested Date: September 13, 2017

Temperature: 20 degree C
Humidity: 66 %
Atmos. Press: 1013 hPa

Operating mode: Transmission mode
Test configuration: 2
EUT condition: X-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)

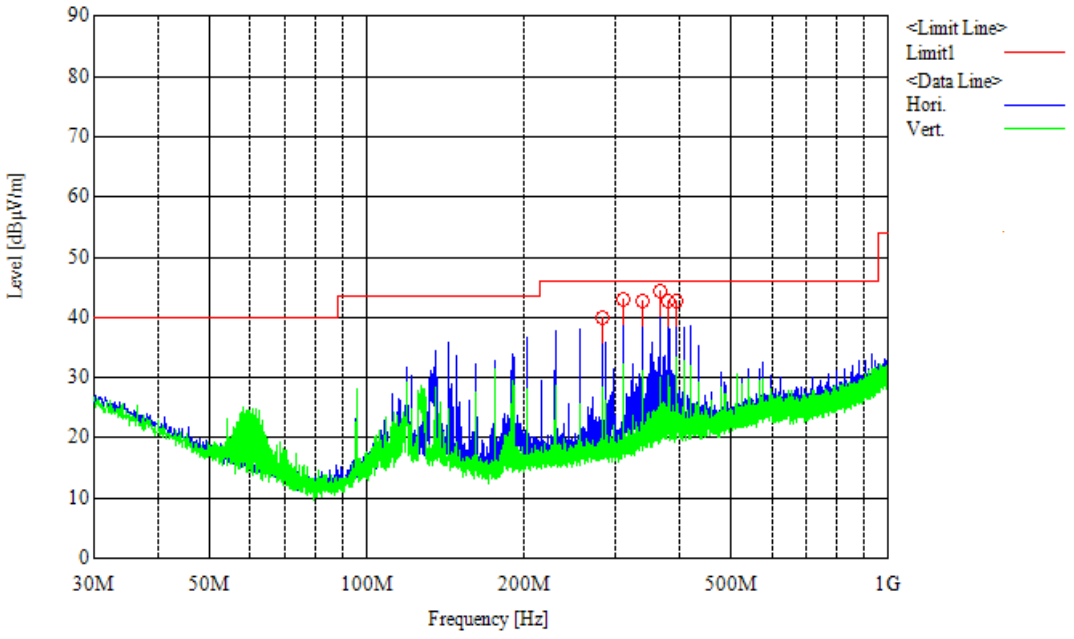
No.	Frequency [MHz]	Reading [dBµV]	Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Ant.
1	284.755	47.8	13.1	9.3	30.2	40.0	46.0	6.0	Hori.
2	311.877	50.1	13.7	9.5	30.2	43.1	46.0	2.9	Hori.
3	338.993	48.6	14.6	9.7	30.2	42.7	46.0	3.3	Hori.
4	**366.127**	**49.4**	**15.4**	**9.9**	**30.2**	**44.5**	**46.0**	**1.5**	**Hori.**
5	379.668	47.2	15.7	10.0	30.3	42.6	46.0	3.4	Hori.
6	393.229	46.8	16.1	10.1	30.3	42.7	46.0	3.3	Hori.

Calculation method

The Correction Factors and RESULT are calculated as followings.

Correction Factor [dB/m] = FACTOR [dB/m] + CABLE LOSS [dB] – GAIN [dB]
RESULT [dBuV/m] = READING [dBuV] + Correction Factor [dB/m]

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



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) / RSS-210 B6: Frequency tolerance

Test items	Variation ranges		Limit
Temperature variations	-20 to +50 degrees C	3.3 +/-10% VDC *	+/-0.01%

Note1: The above operating range is declared by manufacturer.

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

TR06	TC01		

Test results - Complied with requirement.

Test Data
Tested Date: June 2, 2017

Temperature: 22 degree C
Humidity: 55 %
Atmos. Press: 994 hPa

Operating mode: Transmission mode

Temp. (Degrees)	Voltages (V)	Measured Frequency (MHz)				Worst Deviation (%)	Limit (%)
		Start-up	2 min.	5 min.	10 min.		
-20	3.30	**13.5598544**	13.5598572	13.5598564	13.5598572	-0.0011	+/-0.01
-10	3.30	**13.5598976**	13.5598988	13.5598988	13.5598980	-0.0008	+/-0.01
0	3.30	13.5599112	**13.5599104**	13.5599112	**13.5599104**	-0.0007	+/-0.01
10	3.30	13.5599036	**13.5599024**	13.5599032	**13.5599024**	-0.0007	+/-0.01
20	3.63	13.5598904	13.5598888	13.5598892	**13.5598884**	-0.0008	+/-0.01
	3.30	**13.5598800**	13.5598812	13.5598816	13.5598816	-0.0009	+/-0.01
	2.97	13.5598780	13.5598772	**13.5598764**	13.5598772	-0.0009	+/-0.01
30	3.30	13.5598544	13.5598532	13.5598524	**13.5598516**	-0.0011	+/-0.01
40	3.30	**13.5598292**	13.5598300	**13.5598292**	13.5598300	-0.0013	+/-0.01
50	3.30	**13.5598156**	13.5598164	**13.5598156**	13.5598164	**-0.0014**	+/-0.01

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 grater than average limitation the average detection measurements were performed.

Applicable rule and limitation

§15.207 (a) / RSS-Gen 8.8: 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				

Test software used
EMI Ver. 5.2

Test results - Complied with requirement.

Test Data

Tested Date: May 9, 2017

Temperature: 22 degree C
Humidity: 42 %
Atmos. Press: 1018 hPa

Operating mode: Transmission mode

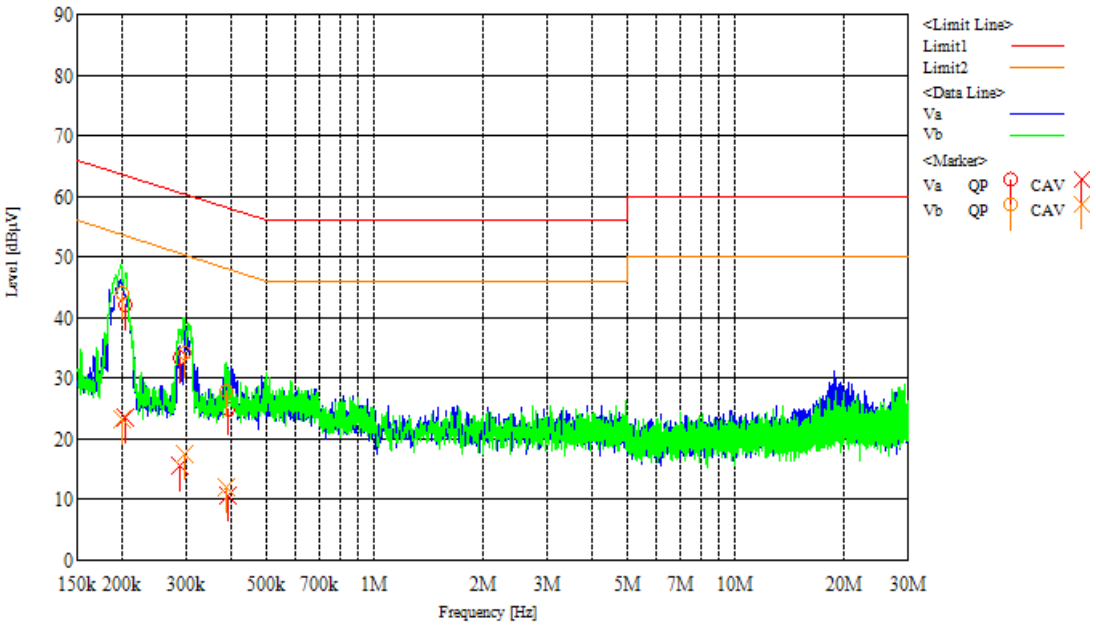
No.	Frequency [MHz]	Reading		C.F. [dB]	Result		Limit		Margin		PHASE
		QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]	
1	0.20420	32.0	13.3	10.2	42.2	23.5	63.4	53.4	21.2	29.9	Va
2	0.28863	23.3	5.6	10.1	33.4	15.7	60.6	50.6	27.2	34.9	Va
3	0.39186	14.7	0.6	10.1	24.8	10.7	58.0	48.0	33.2	37.3	Va
4	**0.19878**	**33.9**	13.2	**10.2**	**44.1**	23.4	**63.7**	53.7	**19.6**	30.3	**Vb**
5	0.29617	24.1	7.3	10.1	34.2	17.4	60.3	50.3	26.1	32.9	Vb
6	0.38693	17.9	2.0	10.1	28.0	12.1	58.1	48.1	30.1	36.0	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:

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

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

AC Power line conducted emission. (With dummy load)



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	Bilogical Antenna	TESEQ	CBL6143A	26670	2016/12/20	2017/12/31
CL11	Antenna Cable for RE	RFT	-	-	2017/03/22	2018/03/31
CL18	Antenna Cable for CE	RFT	-	-	2017/03/22	2018/03/31
LP06	Loop Antenna	ETS-Lindgren	6502	00164299	2017/03/16	2018/03/31
LN05	LISN	Kyoritsu	KNW-407F	8-1773-2	2017/05/25	2018/05/31
PR21	Pre. Amplifier	Anritsu	MH648A	6200467119	2016/12/20	2017/12/31
TR06	Test Receiver (F/W : 3.93 SP2)	Rohde & Schwarz	ESU26	100002	2016/09/29	2017/09/30
TC01	Temperature Chamber	ESPEC	SH-641	92000964	2016/12/09	2017/12/31

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.