

# TEST REPORT

**STANDARD : FCC Part15C  
RSS-210 Issue 9**

| Applicant                                                                                                         | Testing Laboratory                                                                                                                                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
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|                                |                   |
|--------------------------------|-------------------|
| <b>Equipment Type</b>          | Multi ID Scanner  |
| <b>Trademark</b>               | Sankyo            |
| <b>Model(s)</b>                | ISI300-0231       |
| <b>Serial No.</b>              | 7120012           |
| <b>Equipment Authorization</b> | Certification     |
| <b>FCC ID</b>                  | WJ6-ISI300023101A |
| <b>ISED CN and UPN</b>         | 7863A-ISI3000231A |
| <b>Test Result</b>             | Complied          |
| <b>Report Number</b>           | 18010203JNA-001   |
| <b>Original Issue Date</b>     | March 26, 2018    |
| <b>Revised Issue Date</b>      | June 8, 2018      |

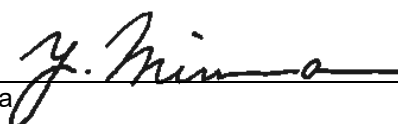
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Approved by

Tested by



Hideaki Kosemura  
[ Reviewer ]



Yoshihide Mimura  
[ Test Engineer ]

*Responsible Party of Test Item (Product)*

|                   |   |
|-------------------|---|
| Responsible Party | : |
| Add.              | : |
| Tel.              | : |
| Fax.              | : |
| Contact Person    | : |

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**APPENDIX PHOTOGRAPHS OF MAXIMUM EMISSION SET-UP**

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**SECTION 1. GENERAL INFORMATION****Test Performed**

|                                   |                                            |
|-----------------------------------|--------------------------------------------|
| <b>EUT Received</b>               | January 22, 2018                           |
| <b>Date of Test</b>               | From January 25, 2018 to February 13, 2018 |
| <b>Standard Applied</b>           | FCC Part15C<br>RSS-210 Issue 9             |
| <b>Test methods</b>               | ANSI C63.10-2013                           |
| <b>Deviation from Standard(s)</b> | None                                       |

**Qualifications of Testing Laboratory**

| <b>Accreditation</b> | <b>Scope</b> | <b>Lab. Code</b> | <b>Remarks</b> |
|----------------------|--------------|------------------|----------------|
| VLAC                 | EMC Testing  | VLAC-008-4       | JAPAN          |
| BSMI                 | EMC Testing  | SL2-IN-E-6007    | TAIWAN         |
| <b>Filing</b>        |              |                  |                |
| VCCI                 | EMC Testing  | A-0128           | JAPAN          |
| FCC                  | EMC Testing  | JP0010           | USA            |
| IC                   | EMC Testing  | 2042O-1          | CANADA         |

**Abbreviations**

|      |                                      |      |                                      |
|------|--------------------------------------|------|--------------------------------------|
| EUT  | Equipment Under Test                 | DoC  | Declaration of Conformity            |
| AMN  | Artificial Mains Network             | ISN  | Impedance Stabilization Network      |
| LISN | Line Impedance Stabilization Network | Q-P  | Quasi-peak                           |
| AMP  | Amplifier                            | AVG  | Average                              |
| ATT  | Attenuator                           | PK   | Peak                                 |
| ANT  | Antenna                              | Cal  | Calibration                          |
| BBA  | Broadband Antenna                    | N/A  | Not applicable or Not available      |
| DIP  | Dipole Antenna                       | LCD  | Liquid-Crystal Display               |
| AE   | Associated Equipment                 | HDMI | High-Definition Multimedia Interface |
| OBW  | Occupied Bandwidth                   |      |                                      |

**Revision Summary**

| <b>Revised Date</b> | <b>Section</b> | <b>Description of Changes</b>            |
|---------------------|----------------|------------------------------------------|
| June 4, 2018        | 7              | The operation explanation was corrected. |
| June 8, 2018        | 9.3.1<br>9.3.2 | The data has been changed.               |

**SECTION 2. SUMMARY OF TEST RESULTS**

See Section9 for the detailed result.

**Emission Tests**

| Standard Applied                            | FCC Part15C (15.207, 15.225, 15.209)<br>RSS-210 Issue 9 (B.6)                                                                    |         |
|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|---------|
| Test Item                                   | Minimum margin                                                                                                                   | Remarks |
| Conducted disturbance<br>at mains terminals | 14.7 dB (0.1500 MHz) [Q-P]<br>IC communication (Upper Antenna) mode                                                              | -       |
| Radiated disturbance<br>(IN band)           | 21.5 dB (13.5530 MHz)<br>IC communication (Upper Antenna) mode                                                                   | -       |
| Radiated disturbance<br>(OUT band)          | 1.2 dB (480.00 MHz)<br>IC communication (Upper Antenna) mode<br><br>1.2 dB (480.00 MHz)<br>IC communication (Lower Antenna) mode | -       |

| Standard Applied    | FCC Part15C (15.225)<br>RSS-210 Issue 9 (B.6) |         |
|---------------------|-----------------------------------------------|---------|
| Test Item           | Result                                        | Remarks |
| Frequency Tolerance | PASS                                          | -       |

| Standard Applied   | FCC Part15C(15.215(c))<br>RSS-Gen Issue 4 (6.6) |          |
|--------------------|-------------------------------------------------|----------|
| Test Item          | Result                                          | Remarks  |
| 20dB OBW<br>99%OBW | N/A                                             | See Note |

Note : None Limit (for reporting purposes only)

**SECTION 3. EQUIPMENT UNDER TEST**

The equipment under test (EUT) consisted of the following apparatus.

**3.1 System Configuration**

| Symbol                                                                                            | Item             | Model No.                                                  | Serial No.   | Manufacturer             | Remarks     |
|---------------------------------------------------------------------------------------------------|------------------|------------------------------------------------------------|--------------|--------------------------|-------------|
| A1                                                                                                | Multi ID Scanner | ISI300-0231                                                | 7120012      | NIDEC SANKYO CORPORATION | -           |
| A2                                                                                                | AC Adapter       | SPU41A-106                                                 | S02185591735 | SINPRO                   | Accessories |
| <b>Rated Power</b> : Multi ID Scanner: DC13 V-16 V<br>AC Adapter: AC100 V-240 V, 47-63 Hz, 0.93 A |                  |                                                            |              |                          |             |
| <b>Supplied Power</b> : AC 120V, 60Hz                                                             |                  |                                                            |              |                          |             |
| <b>Condition of Equipment</b>                                                                     |                  | Production                                                 |              |                          |             |
| <b>Type</b>                                                                                       |                  | Tabletop type                                              |              |                          |             |
| <b>Suppression Devices</b>                                                                        |                  | No Modifications by the laboratory were made to the device |              |                          |             |

**3.2 Port(s)/Connector(s)**

| Port Name | Connector Type | Connector Pin | Remarks |
|-----------|----------------|---------------|---------|
| USB       | USB Type A     | 4 pin         | -       |

**3.3 Highest Frequency Generated / Used**

| Operating Frequency | Operating mode   | Remarks |
|---------------------|------------------|---------|
| 360 MHz             | IC Communication | -       |

**3.4 RFID module specification**

|                              |                                            |
|------------------------------|--------------------------------------------|
| <b>Model No.</b>             | MFRC531                                    |
| <b>Operating Frequency</b>   | 13.56 MHz                                  |
| <b>Number of Channel</b>     | 1 ch (2 places)                            |
| <b>Communication method</b>  | ISO/IEC 14443 Type A, Type B<br>ICAO/ 9301 |
| <b>Modulation Technology</b> | ASK100% and ASK 10%.                       |
| <b>Transfer rate</b>         | 106 / 212 / 424 kbps                       |

**SECTION 4. SUPPORT EQUIPMENT**

The EUT was supported by the following equipment during the test.

| Symbol                 | Item           | Model No.     | Serial No.     | Manufacturer                  | FCC ID |
|------------------------|----------------|---------------|----------------|-------------------------------|--------|
| B                      | Computer       | HSTND-2B07    | CNK74816JH     | HP                            | DoC    |
| C                      | LCD            | HSTNC-014P-SF | JPA70502JS     | HP                            | DoC    |
| D                      | Keyboard       | KB-0316       | BC3480GGAWI5UZ | HP                            | DoC    |
| E                      | Mouse          | M071KC        | 447015302      | DELL                          | DoC    |
| F                      | ID card        | AIC-0164      | 001            | TOPPAN TDK<br>LABEL CO., LTD. | N/A    |
| <b>Supplied Power:</b> |                |               |                |                               |        |
| B, C                   | AC120 V, 60 Hz |               |                |                               |        |

**SECTION 5. USED CABLE(S)**

The following cable(s) was used for the test.

| No. | Name                                   | Length (m) | Shield | Metal Connector | Ferrite Core |
|-----|----------------------------------------|------------|--------|-----------------|--------------|
| 1   | USB cable                              | 2.60       | Yes    | Yes             | Fixed x 2    |
| 2   | Video cable                            | 1.80       | Yes    | Yes             | -            |
| 3   | Keyboard cable                         | 1.80       | Yes    | Yes             | -            |
| 4   | Mouse cable                            | 1.80       | Yes    | Yes             | -            |
| 5   | Power cable for EUT (DC)               | 1.00       | No     | No              | Fixed x 2    |
| 6   | Power cable for EUT (AC: 3 cores)      | 1.80       | No     | No              | -            |
| 7   | Power cable for Computer (AC: 3 cores) | 1.80       | No     | No              | -            |
| 8   | Power cable for LCD (AC: 3 cores)      | 1.80       | No     | No              | -            |

Note :

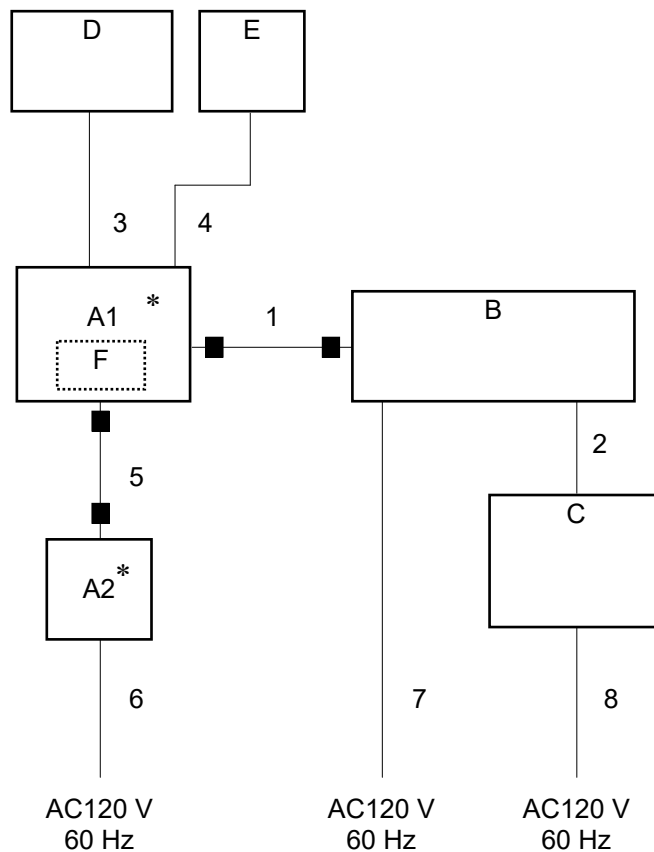
1. No.1 and No.5 cable are supplied together with EUT by the applicant.

## SECTION 6. TEST CONFIGURATION

### 6.1 Conducted disturbance at mains terminals Tests and Radiated disturbance tests

\* : EUT

■ : Ferrite core



The symbols and numbers assigned to the equipments and cables on this diagram correspond to the ones in Sections 3 to 5.

## SECTION 7. OPERATING CONDITION

The test was carried out under the following mode.

This operation mode is the worst.

### 7.1 IC Communication (Upper Antenna) mode

Cycle time for operation: Continuity

- Select the Upper antenna using the test tool
- The method of the modulation are ASK 10%.
- The communication speed is 106 kbps.

The microprocessor unit communicates to RFID via the driver IC MFRC531. At first, the microprocessor unit activates the Upper antenna, and sets ASK 100% modulation. If the microprocessor unit can receive answer to request, the microprocessor unit detects type A RFID. But if the microprocessor unit can not receive answer to request, the microprocessor unit sets ASK 10% modulation after 100msec, and waits for 100msec receiving answer to request. If the microprocessor unit can receive answer to request, the microprocessor unit detects type B RFID.

### 7.2 IC Communication (Lower Antenna) mode

Cycle time for operation: Continuity

- Select the Lower antenna using the test tool
- The method of the modulation are ASK 10%.
- The communication speed is 106 kbps.

The microprocessor unit communicates to RFID via the driver IC MFRC531. At first, the microprocessor unit activates the lower antenna, and sets ASK 100% modulation. If the microprocessor unit can receive answer to request, the microprocessor unit detects type A RFID. But if the microprocessor unit can not receive answer to request, the microprocessor unit sets ASK 10% modulation after 100msec, and waits for 100msec receiving answer to request. If the microprocessor unit can receive answer to request, the microprocessor unit detects type B RFID.

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ISED CN and UPN : 7863A-ISI3000231A

**SECTION 8. UNCERTAINTY**

Traceability to national standard in SI units is ensured with these values.

Compliance with the limits in this standard are determined without in consideration of the measurement uncertainty of the measurement instrumentation.

**8.1 Emission tests**

| EMC Emission tests                                                          |                          |                    |
|-----------------------------------------------------------------------------|--------------------------|--------------------|
| Radiated disturbance at 3m                                                  | U <sub>lab</sub> [k = 2] | U <sub>cispr</sub> |
| 30 MHz – 1000 MHz                                                           | +/- 4.28 dB              | 6.3 dB             |
| Above 1 GHz                                                                 | +/- 4.80 dB              | 5.2 dB             |
| Radiated disturbance at 10m                                                 |                          |                    |
| 30 MHz – 1000 MHz                                                           | +/- 4.81 dB              | 6.3 dB             |
| Radiated disturbance at 30m                                                 |                          |                    |
|                                                                             | N/A                      | Nil                |
| Conducted disturbance at mains terminals                                    |                          |                    |
| 9 kHz – 150 kHz                                                             | +/- 1.77 dB              | 3.8 dB             |
| 150 kHz – 30 MHz                                                            |                          | 3.4 dB             |
| Conducted disturbance at telecommunication ports (ISN)                      |                          |                    |
| 150 kHz – 30 MHz                                                            | +/- 3.11 dB              | 5.0 dB             |
| Conducted disturbance at telecommunication ports (Capacitive Voltage Probe) |                          |                    |
| 150 kHz – 30 MHz                                                            | +/- 3.06 dB              | 3.9 dB             |
| Conducted disturbance at telecommunication ports (Current Probe)            |                          |                    |
| 150 kHz – 30 MHz                                                            | +/- 1.89 dB              | 2.9 dB             |
| Conducted disturbance at terminals                                          |                          |                    |
| 150 kHz – 30 MHz                                                            | +/- 1.77 dB              | 2.9 dB             |
| Disturbance power                                                           |                          |                    |
| 30 MHz – 300 MHz                                                            | +/- 2.49 dB              | 4.5 dB             |

The above expanded instrumentation uncertainty,  $U_{lab}$ , is estimated in accordance with CISPR 16-4-2:2011.

The following uncertainty represents the expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k = 2$ .

Traceability to national standard in SI units is ensured with these values.

Compliance with the limits in this standard are determined without in consideration of the measurement uncertainty of the measurement instrumentation.

| <b>Parameter</b>    | <b><math>U_{lab}</math></b>                                | <b>Limit</b>           |
|---------------------|------------------------------------------------------------|------------------------|
| RF frequency        | $\pm 0.98$ Hz                                              | $\pm 1 \times 10^{-7}$ |
| RF power, conducted | $\pm 0.29$ dB                                              | $\pm 1$ dB             |
| RF power, radiated  | $\pm 5.14$ dB (Below 1 GHz)<br>$\pm 5.03$ dB (Above 1 GHz) | $\pm 6$ dB             |
| Temperature         | $\pm 0.40$ °C                                              | $\pm 1$ °C             |
| Humidity            | $\pm 2$ %                                                  | $\pm 5$ %              |

**SECTION 9. EVALUATION OF TEST RESULTS****9.1 Emission tests****9.1.1 Conducted disturbance at mains terminals**

|                      |                       |
|----------------------|-----------------------|
| <b>Location</b>      | Nagano No.3 Test Site |
| <b>Test Engineer</b> | Yoshihide Mimura      |

**Frequency Range of Measurements**

| <b>Required Measurement Frequency Range</b> | <b>Measured Frequency Range</b> |
|---------------------------------------------|---------------------------------|
| 0.15 – 30 MHz                               | 0.15 – 30 MHz                   |

**Test Procedure**

| <b>Item</b>                              | <b>Document number</b> |
|------------------------------------------|------------------------|
| Conducted disturbance at mains terminals | LEN-RJP-TE003          |

**Setting for the Measuring instruments**

| <b>Instrument</b> | <b>Detector</b> | <b>Resolution Bandwidth</b> | <b>Video Bandwidth</b> |
|-------------------|-----------------|-----------------------------|------------------------|
| Receiver          | Quasi Peak      | 10 kHz                      | N/A                    |
|                   | Average         | 10 kHz                      | N/A                    |

## &lt; Measurement data correction &gt;

Emission Level = Meter Reading + Factor

Margin = Limit- Emission Level

Factor = LISN Factor + Cable Loss + Attenuator

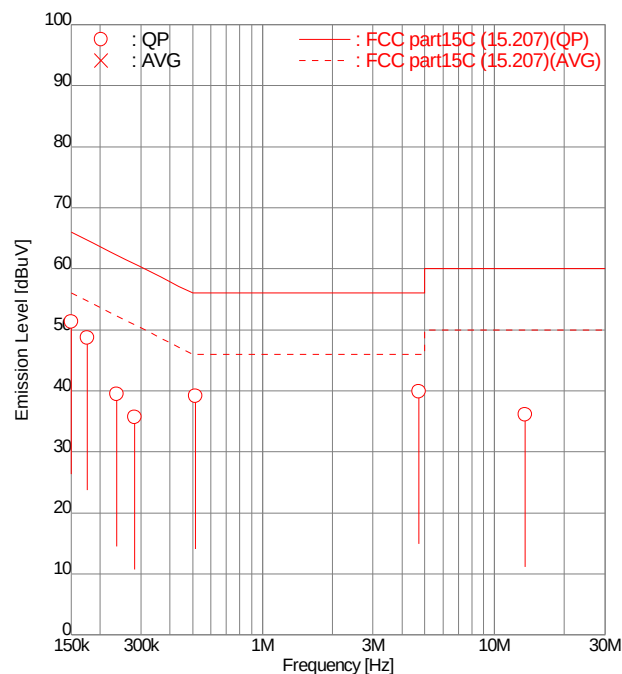
## &lt; Sample Calculations &gt;

Sample @0.1500 MHz (IC Communication (Upper Antenna) mode)

Emission Level = 40.5 [dBuV] + 10.3 [dB] = 50.8 [dBuV]

**Result of Conducted disturbance at mains terminals****9.1.1.1 IC Communication (Upper Antenna) mode****Intertek Japan K.K.****Nagano No.3 Test Site****AC Conducted Emission Test**

APPLICANT : NIDEC SANKYO CORPORATION  
 EUT NAME : Multi ID Scanner  
 MODEL NO. : ISI300-0231  
 SERIAL NO. : 7120012  
 TEST MODE : IC Communication  
 POWER SOURCE : AC120 V, 60 Hz  
 DATE TESTED : Feb 14 2018  
 FILE NO. : -  
 REGULATION : FCC part15C (15.207)  
 TEST METHOD : ANSI C63.10-2013  
 TEMPERATURE : 18.9 [degC]  
 HUMIDITY : 28.0 [%]  
 NOTE : Upper Antenna



ENGINEER : Yoshihide Mimura

| FREQUENCY<br>[No] | MODE<br>[MHz] |    | READING<br>[dBuV] |             | FACTOR<br>[dB] |       | EMISSION<br>[dBuV] |             | LIMIT<br>[dBuV] | MARGIN<br>[dB] |             |
|-------------------|---------------|----|-------------------|-------------|----------------|-------|--------------------|-------------|-----------------|----------------|-------------|
|                   |               |    | Line1             | Line2       | Line1          | Line2 | Line1              | Line2       |                 | Line1          | Line2       |
| 1                 | 0.1500        | QP | 40.5              | <u>41.0</u> | 10.3           | 10.3  | 50.8               | <u>51.3</u> | 66.0            | 15.2           | <u>14.7</u> |
| 2                 | 0.1761        | QP | 38.0              | <u>38.4</u> | 10.3           | 10.3  | 48.3               | <u>48.7</u> | 64.7            | 16.4           | <u>16.0</u> |
| 3                 | 0.2357        | QP | 28.9              | <u>29.2</u> | 10.3           | 10.3  | 39.2               | <u>39.5</u> | 62.2            | 23.0           | <u>22.7</u> |
| 4                 | 0.2809        | QP | 25.4              | <u>25.2</u> | 10.3           | 10.3  | 35.7               | <u>35.5</u> | 60.8            | 25.1           | <u>25.3</u> |
| 5                 | 0.5130        | QP | 27.6              | <u>28.8</u> | 10.3           | 10.3  | 37.9               | <u>39.1</u> | 56.0            | 18.1           | <u>16.9</u> |
| 6                 | 4.7364        | QP | 24.9              | <u>29.4</u> | 10.5           | 10.5  | 35.4               | <u>39.9</u> | 56.0            | 20.6           | <u>16.1</u> |
| 7                 | 13.5596       | QP | <u>25.5</u>       | 25.0        | 10.6           | 10.5  | <u>36.1</u>        | 35.5        | 60.0            | <u>23.9</u>    | 24.5        |

Higher six points are underlined.  
 Other frequencies : Below the FCC part15C (15.207) limit  
 Emission Level = Read + Factor(LISN, Pad, Cable)

emiT 3, 0, 0, 0

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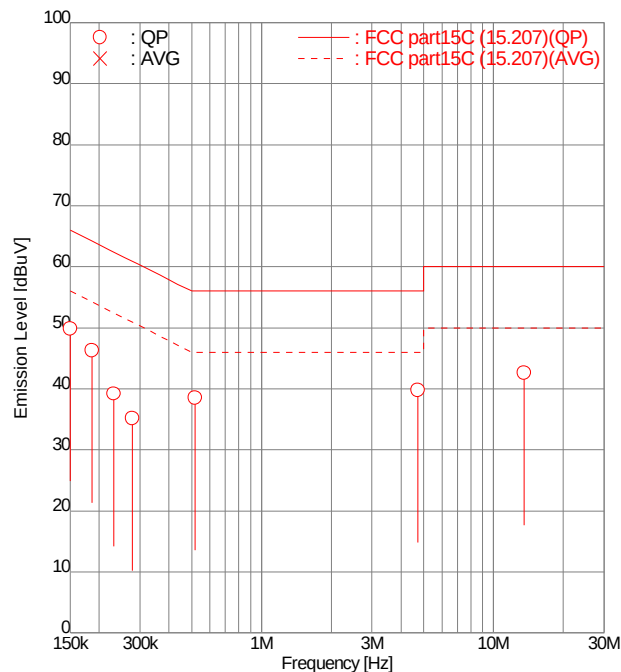
## 9.1.1.2 IC Communication (Lower Antenna) mode

Intertek Japan K.K.

Nagano No.3 Test Site

AC Conducted Emission Test

APPLICANT : NIDEC SANKYO CORPORATION  
 EUT NAME : Multi ID Scanner  
 MODEL NO. : ISI300-0231  
 SERIAL NO. : 7120012  
 TEST MODE : IC Communication  
 POWER SOURCE : AC120 V, 60 Hz  
 DATE TESTED : Feb 14 2018  
 FILE NO. : -  
 REGULATION : FCC part15C (15.207)  
 TEST METHOD : ANSI C63.10-2013  
 TEMPERATURE : 18.9 [degC]  
 HUMIDITY : 28.0 [%]  
 NOTE : Lower Antenna



ENGINEER : Yoshihide Mimura

| FREQUENCY MODE |         |    | READING     |             | FACTOR |       | EMISSION    |             | LIMIT  | MARGIN      |             |
|----------------|---------|----|-------------|-------------|--------|-------|-------------|-------------|--------|-------------|-------------|
| [No]           | [MHz]   |    | [dBuV]      |             | [dB]   |       | [dBuV]      |             | [dBuV] | [dB]        |             |
|                |         |    | Line1       | Line2       | Line1  | Line2 | Line1       | Line2       |        | Line1       | Line2       |
| 1              | 0.1500  | QP | 39.1        | <u>39.6</u> | 10.3   | 10.3  | 49.4        | <u>49.9</u> | 66.0   | 16.6        | <u>16.1</u> |
| 2              | 0.1865  | QP | 35.4        | <u>36.0</u> | 10.3   | 10.3  | 45.7        | <u>46.3</u> | 64.2   | 18.5        | <u>17.9</u> |
| 3              | 0.2307  | QP | <u>28.9</u> | 28.6        | 10.3   | 10.3  | <u>39.2</u> | 38.9        | 62.4   | <u>23.2</u> | 23.5        |
| 4              | 0.2787  | QP | 24.9        | 24.9        | 10.3   | 10.3  | 35.2        | 35.2        | 60.9   | 25.7        | 25.7        |
| 5              | 0.5189  | QP | 26.8        | <u>28.2</u> | 10.3   | 10.3  | 37.1        | <u>38.5</u> | 56.0   | 18.9        | <u>17.5</u> |
| 6              | 4.7311  | QP | 24.6        | <u>29.3</u> | 10.5   | 10.5  | 35.1        | <u>39.8</u> | 56.0   | 20.9        | <u>16.2</u> |
| 7              | 13.5598 | QP | 29.9        | <u>32.1</u> | 10.6   | 10.5  | 40.5        | <u>42.6</u> | 60.0   | 19.5        | <u>17.4</u> |

Higher six points are underlined.

Other frequencies : Below the FCC part15C (15.207) limit

Emission Level = Read + Factor(LISN, Pad, Cable)

**9.1.2 Radiated disturbance (IN band and OUT band)**

|                      |                       |
|----------------------|-----------------------|
| <b>Location</b>      | Nagano No.2 Test Site |
| <b>Test Engineer</b> | Yoshihide Mimura      |

**Frequency Range of Measurements**

| Operating mode   | Required Frequency Range | Measured Frequency Range |
|------------------|--------------------------|--------------------------|
| IC Communication | 0.0090 – 2000 MHz        | 0.0090 – 2000 MHz        |

**Test Procedure**

| Item                 | Document number |
|----------------------|-----------------|
| Radiated disturbance | LEN-RJP-TE003   |

**Setting for the Measuring instruments**

| Frequency [MHz] | Instrument | Detector                                                                                            | Resolution Bandwidth                                | Video Bandwidth |
|-----------------|------------|-----------------------------------------------------------------------------------------------------|-----------------------------------------------------|-----------------|
| 0.009 - 30      | Receiver   | AVG : 0.009 - 0.090 MHz<br>QP : 0.090 - 0.110 MHz<br>AVG : 0.110 - 0.490 MHz<br>QP : 0.490 - 30 MHz | 200 Hz : 0.009 - 0.15 MHz<br>10 kHz : 0.15 – 30 MHz | N/A             |
| 30 – 1000       | Receiver   | Quasi Peak                                                                                          | 120 kHz                                             | N/A             |
| Above 1000      | Receiver   | Peak                                                                                                | 1 MHz                                               | N/A             |
|                 |            | Average                                                                                             | 1 MHz                                               | N/A             |

## &lt; Measurement data correction &gt;

Emission Level = Meter Reading + Factor

Margin = Limit - Emission Level

Factor = Antenna Factor + Cable Loss - Amplifier Gain + Attenuator (+ Distance Conversion Factor)\*

For In band Measurement

\* For other than Standard distance:

Distance Conversion Factor =  $20 \log (\text{Measurement distance} / \text{Standard distance})$

Limit@10m = Limit@Xm +  $40 \log (X / 10)$

X: Standard distance

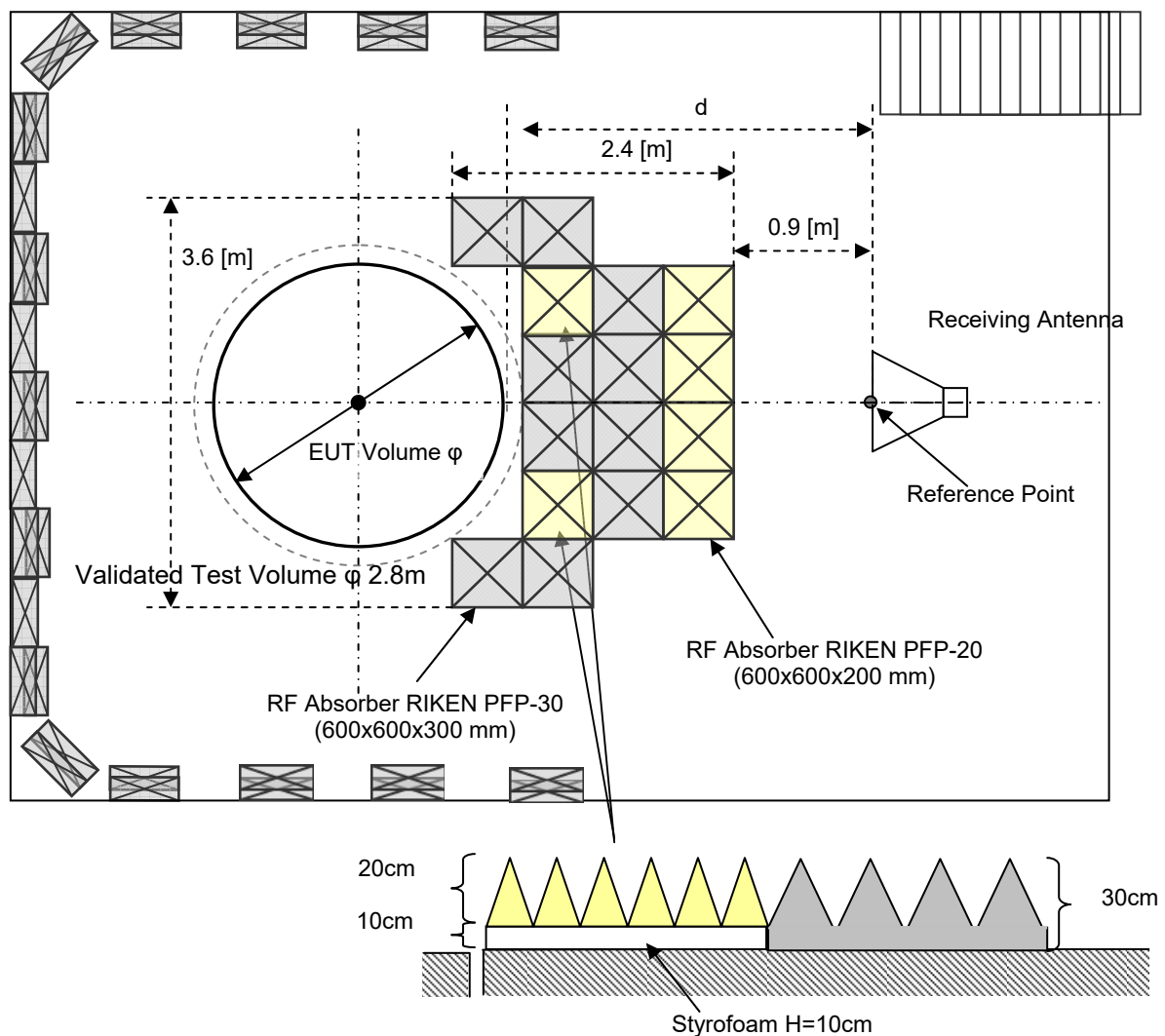
## &lt; Sample Calculations &gt;

Sample @40.68 MHz (IC Communication (Upper Antenna) mode)

Emission Level = 37.4 [dBuV] - 3.1 [dB/m] = 34.3 [dBuV/m]

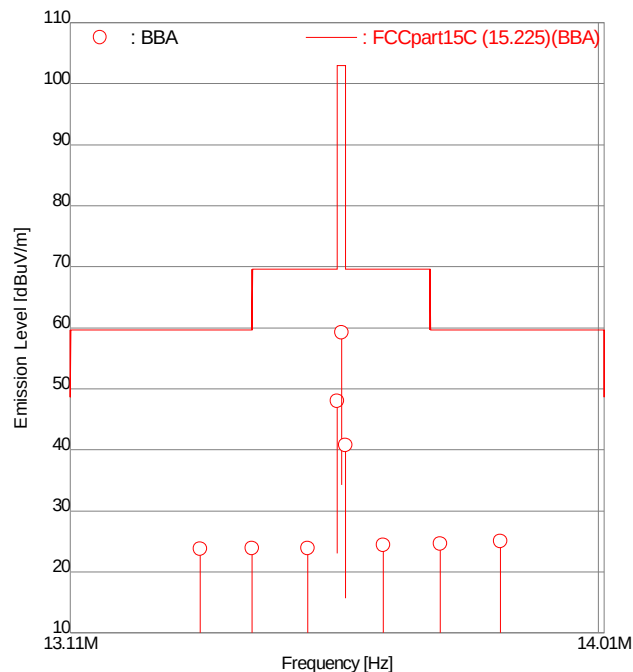
| Operating Condition   | EUT Volume | Frequency Range | Measurement distance |
|-----------------------|------------|-----------------|----------------------|
| IC Communication mode | -          | 0.009 - 30 MHz  | 10.00 m              |
|                       | -          | 30 – 1000 MHz   | 3.00 m               |
|                       | 0.75 m     | Above 1 GHz     | 3.65 m               |

### Absorber placement and Receive Antenna location in Radiated disturbance above 1 GHz



**Result of Radiated disturbances****9.1.2.1 IN band (Upper Antenna)****Intertek Japan K.K.****Nagano No.2 Test Site****Radiated Magnetic Field**

APPLICANT : NIDEC SANKYO CORPORATION  
 EUT NAME : ID Scanner  
 MODEL NO. : ISI300-0231  
 SERIAL NO. : 7120012  
 TEST MODE : IC Communication  
 POWER SOURCE : AC120 V, 60 Hz  
 DATE TESTED : Feb 01 2018  
 FILE NO. : -  
 REGULATION : FCCpart15C (15.225)  
 TEST METHOD : ANSI C63.10-2013  
 DISTANCE : 10.00 [m]  
 TEMPERATURE : 21.0 [degC]  
 HUMIDITY : 25.0 [%]  
 NOTE : Upper Ant.



ENGINEER : Yoshihide Mimura

| FREQUENCY<br>[No] | FREQUENCY<br>[MHz] | READING<br>[dBuV] |      | FACTOR<br>[dB] |      | EMISSION<br>[dBuV/m] |      | LIMIT<br>[dBuV/m] | MARGIN<br>[dB] |      |
|-------------------|--------------------|-------------------|------|----------------|------|----------------------|------|-------------------|----------------|------|
|                   |                    | Hori              | Vert | Hori           | Vert | Hori                 | Vert |                   | Hori           | Vert |
| 1                 | 13.3238            | <u>24.1</u>       | 23.1 | -0.3           | -0.3 | <u>23.8</u>          | 22.8 | 59.6              | <u>35.8</u>    | 36.8 |
| 2                 | 13.4097            | <u>24.2</u>       | 23.1 | -0.3           | -0.3 | <u>23.9</u>          | 22.8 | 59.6              | <u>35.7</u>    | 36.8 |
| 3                 | 13.5028            | <u>24.2</u>       | 23.0 | -0.3           | -0.3 | <u>23.9</u>          | 22.7 | 69.5              | <u>45.6</u>    | 46.8 |
| 4                 | 13.5530            | <u>48.3</u>       | 29.8 | -0.3           | -0.3 | <u>48.0</u>          | 29.5 | 69.5              | <u>21.5</u>    | 40.0 |
| 5                 | 13.5600            | <u>59.5</u>       | 39.5 | -0.3           | -0.3 | <u>59.2</u>          | 39.2 | 103.0             | <u>43.8</u>    | 63.8 |
| 6                 | 13.5670            | <u>41.0</u>       | 25.3 | -0.3           | -0.3 | <u>40.7</u>          | 25.0 | 69.5              | <u>28.8</u>    | 44.5 |
| 7                 | 13.6301            | <u>24.7</u>       | 23.1 | -0.3           | -0.3 | <u>24.4</u>          | 22.8 | 69.5              | <u>45.1</u>    | 46.7 |
| 8                 | 13.7276            | <u>24.9</u>       | 23.1 | -0.3           | -0.3 | <u>24.6</u>          | 22.8 | 59.6              | <u>35.0</u>    | 36.8 |
| 9                 | 13.8312            | <u>25.3</u>       | 23.2 | -0.3           | -0.3 | <u>25.0</u>          | 22.9 | 59.6              | <u>34.6</u>    | 36.7 |

Higher six points are underlined.

Other frequencies : Below the FCCpart15C (15.225) limit

Emission Level = Read + Factor(Antenna,Antenna Pad,Cable,Preamp)

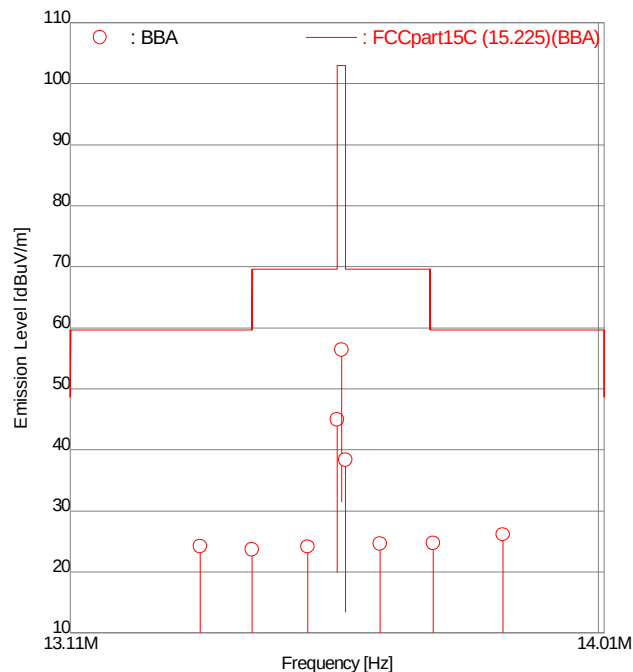
## 9.1.2.2 IN band (Lower Antenna)

Intertek Japan K.K.

Nagano No.2 Test Site

Radiated Magnetic Field

APPLICANT : NIDEC SANKYO CORPORATION  
 EUT NAME : ID Scanner  
 MODEL NO. : ISI300-0231  
 SERIAL NO. : 7120012  
 TEST MODE : IC Communication  
 POWER SOURCE : AC120 V, 60 Hz  
 DATE TESTED : Feb 01 2018  
 FILE NO. : -  
 REGULATION : FCCpart15C (15.225)  
 TEST METHOD : ANSI C63.10-2013  
 DISTANCE : 10.00 [m]  
 TEMPERATURE : 21.0 [degC]  
 HUMIDITY : 25.0 [%]  
 NOTE : Lower Ant.



ENGINEER : Yoshihide Mimura

| FREQUENCY<br>[No] | FREQUENCY<br>[MHz] | READING<br>[dBuV] |      | FACTOR<br>[dB] |      | EMISSION<br>[dBuV/m] |      | LIMIT<br>[dBuV/m] |      | MARGIN<br>[dB] |      |
|-------------------|--------------------|-------------------|------|----------------|------|----------------------|------|-------------------|------|----------------|------|
|                   |                    | Hori              | Vert | Hori           | Vert | Hori                 | Vert | Hori              | Vert | Hori           | Vert |
| 1                 | 13.3238            | <u>24.5</u>       | 23.1 | -0.3           | -0.3 | <u>24.2</u>          | 22.8 | 59.6              |      | <u>35.4</u>    | 36.8 |
| 2                 | 13.4097            | <u>24.0</u>       | 23.0 | -0.3           | -0.3 | <u>23.7</u>          | 22.7 | 59.6              |      | <u>35.9</u>    | 36.9 |
| 3                 | 13.5028            | <u>24.4</u>       | 23.0 | -0.3           | -0.3 | <u>24.1</u>          | 22.7 | 69.5              |      | <u>45.4</u>    | 46.8 |
| 4                 | 13.5530            | <u>45.2</u>       | 26.6 | -0.3           | -0.3 | <u>44.9</u>          | 26.3 | 69.5              |      | <u>24.6</u>    | 43.2 |
| 5                 | 13.5600            | <u>56.7</u>       | 34.7 | -0.3           | -0.3 | <u>56.4</u>          | 34.4 | 103.0             |      | <u>46.6</u>    | 68.6 |
| 6                 | 13.5670            | <u>38.6</u>       | 24.0 | -0.3           | -0.3 | <u>38.3</u>          | 23.7 | 69.5              |      | <u>31.2</u>    | 45.8 |
| 7                 | 13.6250            | <u>24.9</u>       | 23.1 | -0.3           | -0.3 | <u>24.6</u>          | 22.8 | 69.5              |      | <u>44.9</u>    | 46.7 |
| 8                 | 13.7160            | <u>25.0</u>       | 23.2 | -0.3           | -0.3 | <u>24.7</u>          | 22.9 | 59.6              |      | <u>34.9</u>    | 36.7 |
| 9                 | 13.8350            | <u>26.4</u>       | 23.2 | -0.3           | -0.3 | <u>26.1</u>          | 22.9 | 59.6              |      | <u>33.5</u>    | 36.7 |

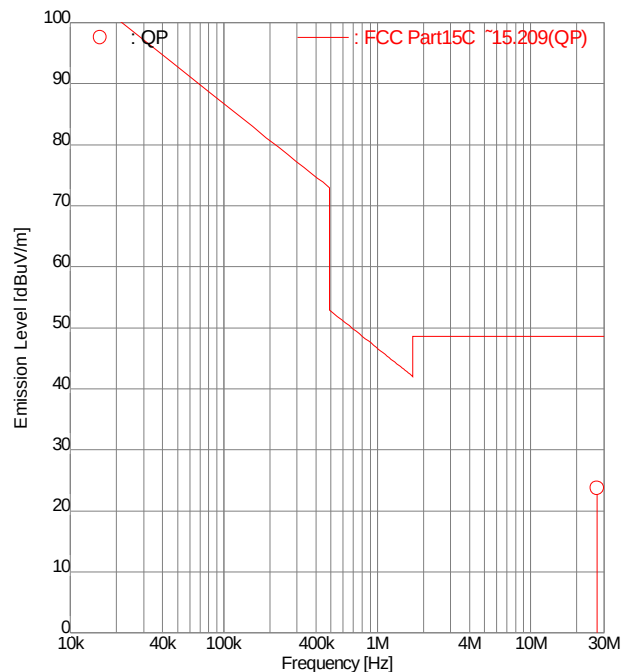
Higher six points are underlined.  
 Other frequencies : Below the FCCpart15C (15.225) limit  
 Emission Level = Read + Factor(Antenna,Antenna Pad,Cable,Preamp)

emiT 3, 0, 0, 0

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**9.1.2.3 Out band****0.009 – 30 MHz (Upper Antenna)****Intertek Japan K.K.****Nagano No.2 Test Site****Radiated Magnetic Field**

APPLICANT : NIDEC SANKYO CORPORATION  
 EUT NAME : Multi ID Scanner  
 MODEL NO. : ISI300-0231  
 SERIAL NO. : 7120012  
 TEST MODE : IC Communication  
 POWER SOURCE : AC120 V, 60 Hz  
 DATE TESTED : Feb 01 2018  
 FILE NO. : -  
 REGULATION : FCC Part15C § 15.209  
 TEST METHOD : ANSI C63.10-2013  
 DISTANCE : 10.00 [m]  
 TEMPERATURE : 21.0 [degC]  
 HUMIDITY : 25.0 [%]  
 NOTE : Upper Antenna



ENGINEER : Yoshihide Mimura

| FREQUENCY<br>[No] | FREQUENCY<br>[MHz] | READING<br>[dBuV] | FACTOR<br>[dB] | EMISSION<br>[dBuV/m] | LIMIT<br>[dBuV/m] | MARGIN<br>[dB] |
|-------------------|--------------------|-------------------|----------------|----------------------|-------------------|----------------|
| 1                 | 27.1200            | <u>23.1</u>       | 0.6            | <u>23.7</u>          | 48.6              | <u>24.9</u>    |

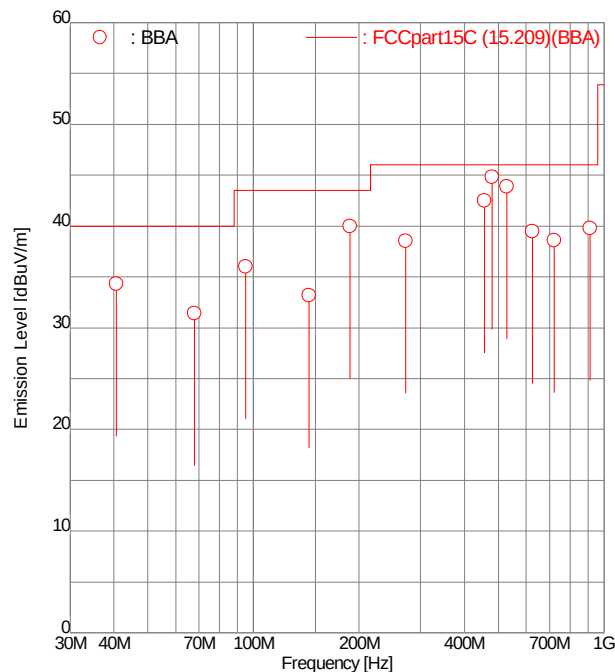
Higher six points are underlined.  
 Other frequencies : Below the FCC Part15C § 15.209 limit  
 Emission Level = Read + Factor(Antenna,Antenna Pad,Cable,Preamp)

emiT 3, 0, 0, 0

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**30 – 1000 MHz****Intertek Japan K.K.****Nagano No.2 Test Site****Spurious Emissions - Radiated Test**

APPLICANT : NIDEC SANKYO CORPORATION  
 EUT NAME : Multi ID Scanner  
 MODEL NO. : ISI300-0231  
 SERIAL NO. : 7120012  
 TEST MODE : IC Communication  
 POWER SOURCE : AC120 V, 60 Hz  
 DATE TESTED : Jan 31 2018  
 FILE NO. : -  
 REGULATION : FCCpart15C (15.209)  
 TEST METHOD : ANSI C63.4:2003  
 DISTANCE : 3.00 [m]  
 TEMPERATURE : 17.6 [degC]  
 HUMIDITY : 36.0 [%]  
 NOTE : Upper Antenna



ENGINEER : Yoshihide Mimura

| FREQUENCY<br>[No] | [MHz]  | READING<br>[dBuV] |             | FACTOR<br>[dB/m] |       | EMISSION<br>[dBuV/m] |             | LIMIT<br>[dBuV/m] | MARGIN<br>[dB] |            |
|-------------------|--------|-------------------|-------------|------------------|-------|----------------------|-------------|-------------------|----------------|------------|
|                   |        | Hori              | Vert        | Hori             | Vert  | Hori                 | Vert        |                   | Hori           | Vert       |
| 1                 | 40.68  | -                 | <u>37.4</u> | -3.1             | -3.1  | -                    | <u>34.3</u> | 40.0              | -              | <u>5.7</u> |
| 2                 | 67.80  | 41.4              | -           | -10.0            | -10.0 | 31.4                 | -           | 40.0              | 8.6            | -          |
| 3                 | 94.92  | 45.0              | 45.2        | -9.2             | -9.2  | 35.8                 | 36.0        | 43.5              | 7.7            | 7.5        |
| 4                 | 144.00 | -                 | 41.5        | -8.3             | -8.3  | -                    | 33.2        | 43.5              | -              | 10.3       |
| 5                 | 188.26 | <u>46.9</u>       | 45.7        | -6.9             | -6.9  | <u>40.0</u>          | 38.8        | 43.5              | <u>3.5</u>     | 4.7        |
| 6                 | 271.19 | 40.9              | -           | -2.4             | -2.4  | 38.5                 | -           | 46.0              | 7.5            | -          |
| 7                 | 456.00 | 39.4              | <u>39.6</u> | 2.9              | 2.9   | 42.3                 | <u>42.5</u> | 46.0              | 3.7            | <u>3.5</u> |
| 8                 | 480.00 | <u>41.4</u>       | 40.5        | 3.4              | 3.4   | <u>44.8</u>          | 43.9        | 46.0              | <u>1.2</u>     | 2.1        |
| 9                 | 528.00 | 37.5              | <u>39.7</u> | 4.2              | 4.2   | 41.7                 | <u>43.9</u> | 46.0              | 4.3            | <u>2.1</u> |
| 10                | 624.00 | -                 | 34.0        | 5.5              | 5.5   | -                    | 39.5        | 46.0              | -              | 6.5        |
| 11                | 720.00 | -                 | 31.5        | 7.1              | 7.1   | -                    | 38.6        | 46.0              | -              | 7.4        |
| 12                | 912.00 | <u>29.3</u>       | 28.4        | 10.5             | 10.5  | <u>39.8</u>          | 38.9        | 46.0              | <u>6.2</u>     | 7.1        |

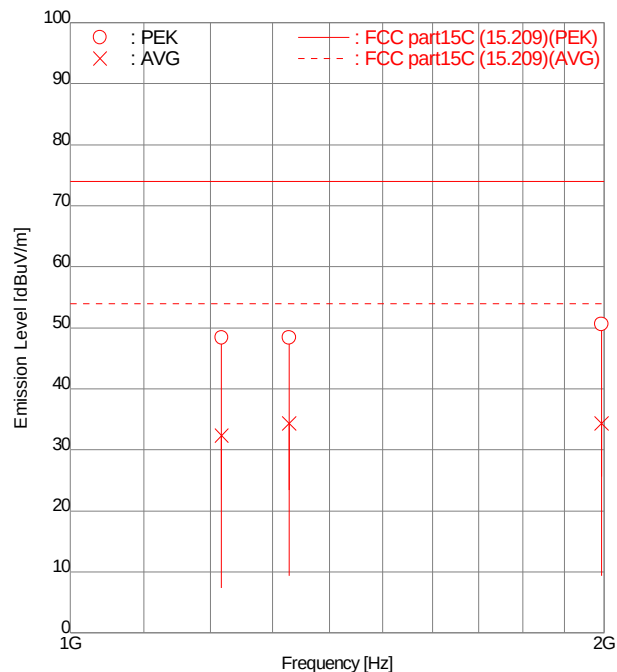
Higher six points are underlined.  
 Other frequencies : Below the FCCpart15C (15.209) limit  
 Emission Level = Read + Factor(Antenna, Antenna Pad, Cable, Preamp)  
 ANT. : Used antenna(BBA = Broadband antenna, DIP = Dipole antenna)

emiT 3, 0, 0, 0

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**1000 – 2000 MHz****Intertek Japan K.K.****Nagano No.2 Test Site****Radiated Electric Field**

APPLICANT : NIDEC SANKYO CORPORATION  
 EUT NAME : Multi ID Scanner  
 MODEL NO. : ISI300-0231  
 SERIAL NO. : 7120012  
 TEST MODE : IC Communication  
 POWER SOURCE : AC120 V, 60 Hz  
 DATE TESTED : Jan 25 2018  
 FILE NO. : -  
 REGULATION : FCC part15C (15.209)  
 TEST METHOD : ANSI C63.10-2013  
 DISTANCE : 3.65 [m]  
 TEMPERATURE : 14.3 [degC]  
 HUMIDITY : 36.0 [%]  
 NOTE : Upper Antenna



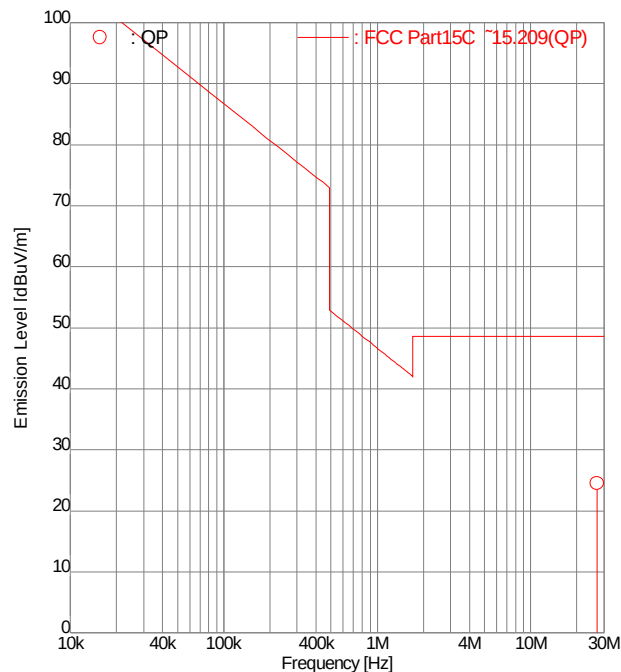
ENGINEER : Yoshihide Mimura

| FREQUENCY<br>[No] | MODE<br>[MHz] |     | READING<br>[dBuV] |             | FACTOR<br>[dB] |      | EMISSION<br>[dBuV/m] |             | LIMIT<br>[dBuV/m] | MARGIN<br>[dB] |             |
|-------------------|---------------|-----|-------------------|-------------|----------------|------|----------------------|-------------|-------------------|----------------|-------------|
|                   |               |     | Hori              | Vert        | Hori           | Vert | Hori                 | Vert        |                   | Hori           | Vert        |
| 1                 | 1217.33       | PEK | -                 | <u>50.6</u> | -2.2           | -2.2 | -                    | <u>48.4</u> | 74.0              | -              | <u>25.6</u> |
| 2                 | 1217.33       | AVG | -                 | <u>34.5</u> | -2.2           | -2.2 | -                    | <u>32.3</u> | 54.0              | -              | <u>21.7</u> |
| 3                 | 1328.97       | PEK | -                 | <u>50.2</u> | -1.8           | -1.8 | -                    | <u>48.4</u> | 74.0              | -              | <u>25.6</u> |
| 4                 | 1328.97       | AVG | -                 | <u>36.1</u> | -1.8           | -1.8 | -                    | <u>34.3</u> | 54.0              | -              | <u>19.7</u> |
| 5                 | 1994.07       | PEK | -                 | <u>51.6</u> | -1.0           | -1.0 | -                    | <u>50.6</u> | 74.0              | -              | <u>23.4</u> |
| 6                 | 1994.07       | AVG | -                 | <u>35.3</u> | -1.0           | -1.0 | -                    | <u>34.3</u> | 54.0              | -              | <u>19.7</u> |

Higher six points are underlined.  
 Other frequencies : Below the FCC part15C (15.209) limit  
 Emission Level=Read+Fact.  
 Fact.=Ant. Fact.+Cable Loss-Amp. Gain+ATT-Dist. Conversion

**9.1.2.4 Out band****0.009 – 30 MHz (Lower Antenna)****Intertek Japan K.K.****Nagano No.2 Test Site****Radiated Magnetic Field**

APPLICANT : NIDEC SANKYO CORPORATION  
 EUT NAME : Multi ID Scanner  
 MODEL NO. : ISI300-0231  
 SERIAL NO. : 7120012  
 TEST MODE : IC Communication  
 POWER SOURCE : AC120 V, 60 Hz  
 DATE TESTED : Feb 01 2018  
 FILE NO. : -  
 REGULATION : FCC Part15C § 15.209  
 TEST METHOD : ANSI C63.10-2013  
 DISTANCE : 10.00 [m]  
 TEMPERATURE : 21.0 [degC]  
 HUMIDITY : 25.0 [%]  
 NOTE : Lower Antenna



ENGINEER : Yoshihide Mimura

| FREQUENCY<br>[No] | FREQUENCY<br>[MHz] | READING<br>[dBuV] | FACTOR<br>[dB] | EMISSION<br>[dBuV/m] | LIMIT<br>[dBuV/m] | MARGIN<br>[dB] |
|-------------------|--------------------|-------------------|----------------|----------------------|-------------------|----------------|
| 1                 | 27.1200            | <u>23.9</u>       | 0.6            | <u>24.5</u>          | 48.6              | <u>24.1</u>    |

Higher six points are underlined.  
 Other frequencies : Below the FCC Part15C § 15.209 limit  
 Emission Level = Read + Factor(Antenna,Antenna Pad,Cable,Preamp)

emiT 3, 0, 0, 0

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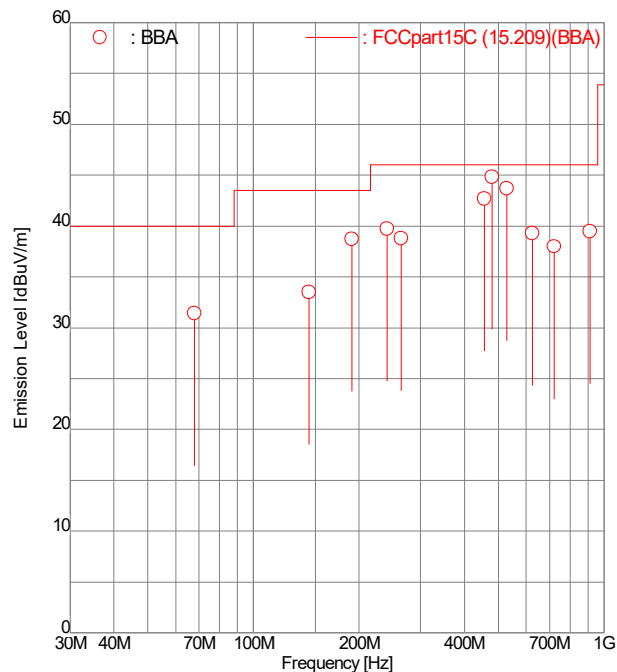
## 30 – 1000 MHz

Intertek Japan K.K.

Nagano No.2 Test Site

Spurious Emissions - Radiated Test

APPLICANT : NIDEC SANKYO CORPORATION  
 EUT NAME : Multi ID Scanner  
 MODEL NO. : ISI300-0231  
 SERIAL NO. : 7120012  
 TEST MODE : IC Communication  
 POWER SOURCE : AC120 V, 60 Hz  
 DATE TESTED : Jan 31 2018  
 FILE NO. : -  
 REGULATION : FCCpart15C (15.209)  
 TEST METHOD : ANSI C63.4:2003  
 DISTANCE : 3.00 [m]  
 TEMPERATURE : 17.6 [degC]  
 HUMIDITY : 36.0 [%]  
 NOTE : Lower Antenna



ENGINEER : Yoshihide Mimura

| FREQUENCY<br>[No] | [MHz]  | READING<br>[dBuV] |             | FACTOR<br>[dB/m] |       | EMISSION<br>[dBuV/m] |             | LIMIT<br>[dBuV/m] | MARGIN<br>[dB] |            |
|-------------------|--------|-------------------|-------------|------------------|-------|----------------------|-------------|-------------------|----------------|------------|
|                   |        | Hori              | Vert        | Hori             | Vert  | Hori                 | Vert        |                   | Hori           | Vert       |
| 1                 | 67.80  | 41.4              | -           | -10.0            | -10.0 | 31.4                 | -           | 40.0              | 8.6            | -          |
| 2                 | 144.00 | -                 | 41.8        | -8.3             | -8.3  | -                    | 33.5        | 43.5              | -              | 10.0       |
| 3                 | 190.85 | <u>45.4</u>       | 44.4        | -6.7             | -6.7  | <u>38.7</u>          | 37.7        | 43.5              | <u>4.8</u>     | 5.8        |
| 4                 | 240.00 | <u>43.4</u>       | -           | -3.7             | -3.7  | <u>39.7</u>          | -           | 46.0              | <u>6.3</u>     | -          |
| 5                 | 264.00 | 41.4              | -           | -2.6             | -2.6  | 38.8                 | -           | 46.0              | 7.2            | -          |
| 6                 | 456.00 | 39.0              | <u>39.8</u> | 2.9              | 2.9   | 41.9                 | <u>42.7</u> | 46.0              | 4.1            | <u>3.3</u> |
| 7                 | 480.00 | <u>41.4</u>       | 40.6        | 3.4              | 3.4   | <u>44.8</u>          | 44.0        | 46.0              | <u>1.2</u>     | 2.0        |
| 8                 | 528.00 | 38.1              | <u>39.5</u> | 4.2              | 4.2   | 42.3                 | <u>43.7</u> | 46.0              | 3.7            | <u>2.3</u> |
| 9                 | 624.00 | -                 | 33.8        | 5.5              | 5.5   | -                    | 39.3        | 46.0              | -              | 6.7        |
| 10                | 720.00 | -                 | 30.9        | 7.1              | 7.1   | -                    | 38.0        | 46.0              | -              | 8.0        |
| 11                | 912.00 | <u>29.0</u>       | -           | 10.5             | 10.5  | <u>39.5</u>          | -           | 46.0              | <u>6.5</u>     | -          |

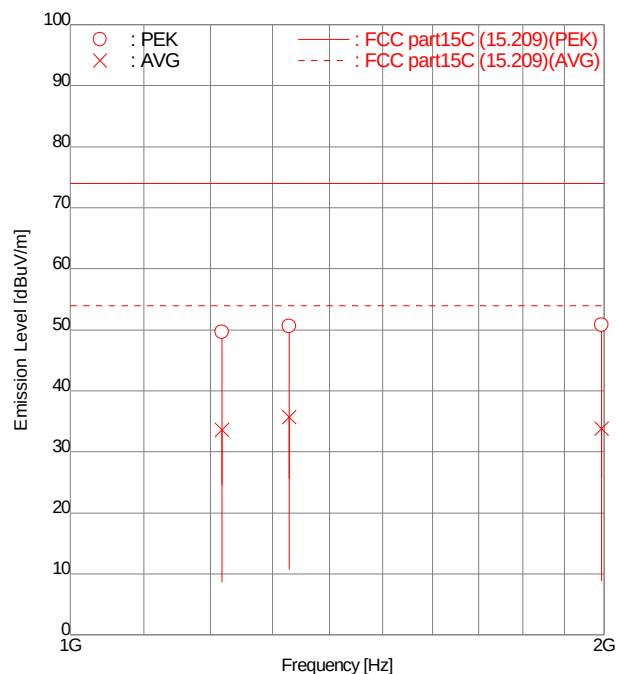
Higher six points are underlined.  
 Other frequencies : Below the FCCpart15C (15.209) limit  
 Emission Level = Read + Factor(Antenna, Antenna Pad, Cable, Preamp)  
 ANT. : Used antenna(BBA = Broadband antenna, DIP = Dipole antenna)

emiT 3, 0, 0, 0

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**1000 – 2000 MHz****Intertek Japan K.K.****Nagano No.2 Test Site****Radiated Electric Field**

APPLICANT : NIDEC SANKYO CORPORATION  
 EUT NAME : Multi ID Scanner  
 MODEL NO. : ISI300-0231  
 SERIAL NO. : 7120012  
 TEST MODE : IC Communication  
 POWER SOURCE : AC120 V, 60 Hz  
 DATE TESTED : Jan 25 2018  
 FILE NO. : -  
 REGULATION : FCC part15C (15.209)  
 TEST METHOD : ANSI C63.10-2013  
 DISTANCE : 3.65 [m]  
 TEMPERATURE : 14.3 [degC]  
 HUMIDITY : 36.0 [%]  
 NOTE : Lower Antenna



ENGINEER : Yoshihide Mimura

| FREQUENCY<br>[No] | MODE<br>[MHz] |     | READING<br>[dBuV] |             | FACTOR<br>[dB] |      | EMISSION<br>[dBuV/m] |             | LIMIT<br>[dBuV/m] | MARGIN<br>[dB] |             |
|-------------------|---------------|-----|-------------------|-------------|----------------|------|----------------------|-------------|-------------------|----------------|-------------|
|                   |               |     | Hori              | Vert        | Hori           | Vert | Hori                 | Vert        |                   | Hori           | Vert        |
| 1                 | 1217.42       | PEK | -                 | <u>51.8</u> | -2.2           | -2.2 | -                    | <u>49.6</u> | 74.0              | -              | <u>24.4</u> |
| 2                 | 1217.42       | AVG | -                 | <u>35.8</u> | -2.2           | -2.2 | -                    | <u>33.6</u> | 54.0              | -              | <u>20.4</u> |
| 3                 | 1329.13       | PEK | -                 | <u>52.4</u> | -1.8           | -1.8 | -                    | <u>50.6</u> | 74.0              | -              | <u>23.4</u> |
| 4                 | 1329.13       | AVG | -                 | <u>37.5</u> | -1.8           | -1.8 | -                    | <u>35.7</u> | 54.0              | -              | <u>18.3</u> |
| 5                 | 1993.53       | PEK | -                 | <u>51.8</u> | -1.0           | -1.0 | -                    | <u>50.8</u> | 74.0              | -              | <u>23.2</u> |
| 6                 | 1993.53       | AVG | -                 | <u>34.8</u> | -1.0           | -1.0 | -                    | <u>33.8</u> | 54.0              | -              | <u>20.2</u> |

Higher six points are underlined.  
 Other frequencies : Below the FCC part15C (15.209) limit  
 Emission Level=Read+Fact.  
 Fact.=Ant. Fact.+Cable Loss-Amp. Gain+ATT-Dist. Conversion

emiT 3, 0, 0, 0

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**9.2 Frequency Tolerance (Temperature Variation and Voltage Variation)**

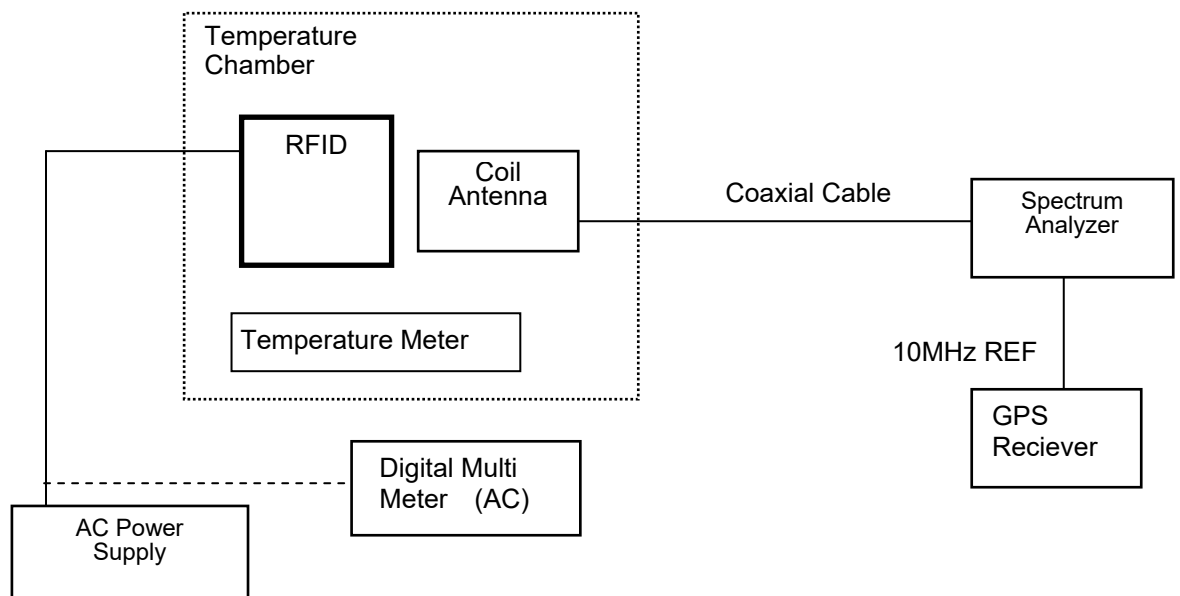
|                       |                  |
|-----------------------|------------------|
| <b>Location</b>       | Kashima No.12    |
| <b>Test date</b>      | March 13, 2018   |
| <b>Test Engineer</b>  | Yoshihide Mimura |
| <b>Test Procedure</b> | LEN-RJP-TE003    |

**Test Procedure****Frequency Tolerance (Temperature Variation)**

1. The EUT and test equipment were set up as shown on the following page.
2. Set the temperature -30 degrees C.
3. Leave the EUT for 1 hour after it became the temperature that was set up.
4. Make the EUT the transmitting.
5. Measure the output frequency. (Startup, 2min, 5min and 10min)
6. Set the temperature -20 degrees C to +50 degrees C.
7. Repeat test procedure 4 to 6

**Frequency Tolerance (Voltage Variation)**

1. The EUT and test equipment (Set the Supply Voltage 100%) were set up as shown on the following page.
2. Set the temperature +20 degrees C.
3. Leave the EUT for 1 hour after it became the temperature that was set up.
4. Make the EUT the transmitting.
5. Measure the output frequency.
6. Set the Supply Voltage 85% and 115%.
7. Repeat test procedure 4 to 6



**Result of Frequency Tolerance (Temperature Variation and Voltage Variation)****9.2.1 Temperature Variation (Upper antenna)**

Reference Frequency: 13.560000 MHz (FCC Stability) /13.559559 MHz (RSS Stability)

| MHz   | Temperature<br><br>(Degree C) | Voltage<br><br>(%) | Frequency<br>(MHz) |           |           |           | Deviation<br>(ppm) |       |        |       |        |       |        |       | Limit<br>(+/-)<br>(ppm) |
|-------|-------------------------------|--------------------|--------------------|-----------|-----------|-----------|--------------------|-------|--------|-------|--------|-------|--------|-------|-------------------------|
|       |                               |                    |                    |           |           |           | StartUP            |       | 2min   |       | 5min   |       | 10min  |       |                         |
|       |                               |                    | StartUP            | 2min      | 5min      | 10min     | FCC                | RSS   | FCC    | RSS   | FCC    | RSS   | FCC    | RSS   |                         |
| 13.56 | -30                           | 100                | 13.559589          | 13.559586 | 13.559583 | 13.559580 | -30.31             | 2.21  | -30.53 | 1.99  | -30.75 | 1.77  | -30.97 | 1.55  | 100.0                   |
|       | -20                           | 100                | 13.559580          | 13.559589 | 13.559592 | 13.559593 | -30.97             | 1.55  | -30.31 | 2.21  | -30.09 | 2.43  | -30.01 | 2.51  | 100.0                   |
|       | -10                           | 100                | 13.559597          | 13.559600 | 13.559602 | 13.559604 | -29.72             | 2.80  | -29.50 | 3.02  | -29.35 | 3.17  | -29.20 | 3.32  | 100.0                   |
|       | 0                             | 100                | 13.559598          | 13.559595 | 13.559594 | 13.559593 | -29.65             | 2.88  | -29.87 | 2.65  | -29.94 | 2.58  | -30.01 | 2.51  | 100.0                   |
|       | 10                            | 100                | 13.559566          | 13.559567 | 13.559569 | 13.559568 | -32.01             | 0.52  | -31.93 | 0.59  | -31.78 | 0.74  | -31.86 | 0.66  | 100.0                   |
|       | 20                            | 100                | 13.559559          | 13.559547 | 13.559542 | 13.559535 | -32.52             | 0.00  | -33.41 | -0.88 | -33.78 | -1.25 | -34.29 | -1.77 | 100.0                   |
|       | 30                            | 100                | 13.559522          | 13.559509 | 13.559502 | 13.559495 | -35.25             | -2.73 | -36.21 | -3.69 | -36.73 | -4.20 | -37.24 | -4.72 | 100.0                   |
|       | 40                            | 100                | 13.559480          | 13.559467 | 13.559459 | 13.559452 | -38.35             | -5.83 | -39.31 | -6.78 | -39.90 | -7.37 | -40.41 | -7.89 | 100.0                   |
|       | 50                            | 100                | 13.559434          | 13.559431 | 13.559429 | 13.559429 | -41.74             | -9.22 | -41.96 | -9.44 | -42.11 | -9.59 | -42.11 | -9.59 | 100.0                   |

**9.2.2 Temperature Variation (Lower antenna)**

Reference Frequency: 13.560000 MHz (FCC Stability) /13.559549 MHz (RSS Stability)

| MHz   | Temperature<br>(Degree C) | Voltage<br>(%) | Frequency<br>(MHz) |           |           |           | Deviation<br>(ppm) |       |        |       |        |       |        |       | Limit<br>(+/-)<br>(ppm) |
|-------|---------------------------|----------------|--------------------|-----------|-----------|-----------|--------------------|-------|--------|-------|--------|-------|--------|-------|-------------------------|
|       |                           |                |                    |           |           |           | StartUP            |       | 2min   |       | 5min   |       | 10min  |       |                         |
|       |                           |                | StartUP            | 2min      | 5min      | 10min     | FCC                | RSS   | FCC    | RSS   | FCC    | RSS   | FCC    | RSS   |                         |
| 13.56 | -30                       | 100            | 13.559580          | 13.559579 | 13.559577 | 13.559575 | -30.97             | 2.29  | -31.05 | 2.21  | -31.19 | 2.06  | -31.34 | 1.92  | 100.0                   |
|       | -20                       | 100            | 13.559582          | 13.559587 | 13.559589 | 13.559590 | -30.83             | 2.43  | -30.46 | 2.80  | -30.31 | 2.95  | -30.24 | 3.02  | 100.0                   |
|       | -10                       | 100            | 13.559593          | 13.559596 | 13.559597 | 13.559597 | -30.01             | 3.24  | -29.79 | 3.47  | -29.72 | 3.54  | -29.72 | 3.54  | 100.0                   |
|       | 0                         | 100            | 13.559592          | 13.559584 | 13.559580 | 13.559578 | -30.09             | 3.17  | -30.68 | 2.58  | -30.97 | 2.29  | -31.12 | 2.14  | 100.0                   |
|       | 10                        | 100            | 13.559569          | 13.559559 | 13.559555 | 13.559553 | -31.78             | 1.47  | -32.52 | 0.74  | -32.82 | 0.44  | -32.96 | 0.29  | 100.0                   |
|       | 20                        | 100            | 13.559549          | 13.559533 | 13.559528 | 13.559524 | -33.26             | 0.00  | -34.44 | -1.18 | -34.81 | -1.55 | -35.10 | -1.84 | 100.0                   |
|       | 30                        | 100            | 13.559522          | 13.559507 | 13.559501 | 13.559497 | -35.25             | -1.99 | -36.36 | -3.10 | -36.80 | -3.54 | -37.09 | -3.83 | 100.0                   |
|       | 40                        | 100            | 13.559495          | 13.559479 | 13.559474 | 13.559470 | -37.24             | -3.98 | -38.42 | -5.16 | -38.79 | -5.53 | -39.09 | -5.83 | 100.0                   |
|       | 50                        | 100            | 13.559426          | 13.559454 | 13.559450 | 13.559448 | -42.33             | -9.07 | -40.27 | -7.01 | -40.56 | -7.30 | -40.71 | -7.45 | 100.0                   |

**9.2.3 Voltage Variation (Upper antenna)**

Reference Frequency: 13.560000 MHz (FCC Stability) /13.5599478 MHz (RSS Stability)

| MHz   | Temperature<br>(Degree C) | Voltage | Frequency<br>(MHz) | Deviation<br>(ppm) |       | Supply Voltage |    | Limit<br>(+/-)<br>(ppm) |
|-------|---------------------------|---------|--------------------|--------------------|-------|----------------|----|-------------------------|
|       |                           |         |                    | FCC                | RSS   |                |    |                         |
| 13.56 | 20                        | Lower   | 13.559474          | -38.79             | -0.29 | 85.00 V        | AC | 100.0                   |
|       |                           | Normal  | 13.559478          | -38.50             | 0.00  | 120.00 V       | AC | 100.0                   |
|       |                           | Upper   | 13.559510          | -36.14             | 2.36  | 276.00 V       | AC | 100.0                   |

Note:

Lower Voltage = 100 V – 15%, Upper Voltage = 240 V + 15%

**9.2.4 Voltage Variation (Lower antenna)**

Reference Frequency: 13.560000 MHz (FCC Stability) /13.559503 MHz (RSS Stability)

| MHz   | Temperature<br>(Degree C) | Voltage | Frequency<br>(MHz) | Deviation<br>(ppm) |       | Supply Voltage |    | Limit<br>(+/-)<br>(ppm) |
|-------|---------------------------|---------|--------------------|--------------------|-------|----------------|----|-------------------------|
|       |                           |         |                    | FCC                | RSS   |                |    |                         |
| 13.56 | 20                        | Lower   | 13.559499          | -36.95             | -0.29 | 85.00 V        | AC | 100.0                   |
|       |                           | Normal  | 13.559503          | -36.65             | 0.00  | 120.00 V       | AC | 100.0                   |
|       |                           | Upper   | 13.559530          | -34.66             | 1.99  | 276.00 V       | AC | 100.0                   |

Note:

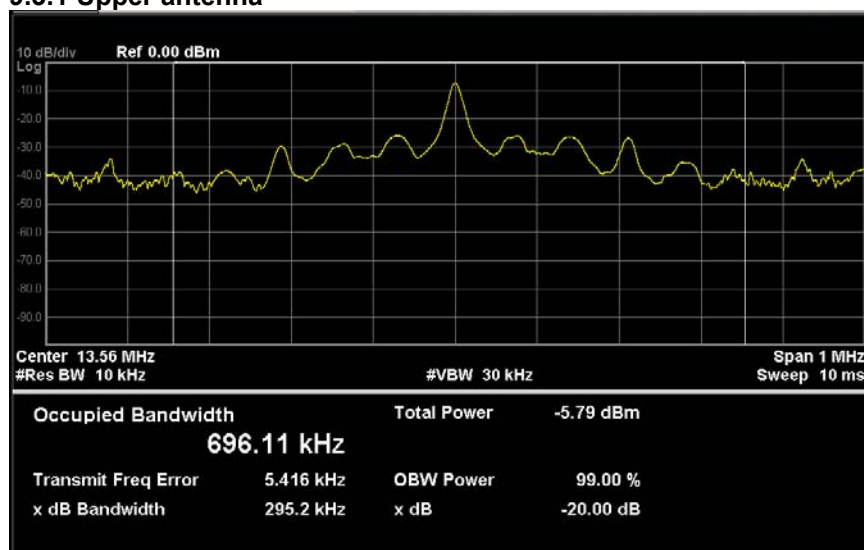
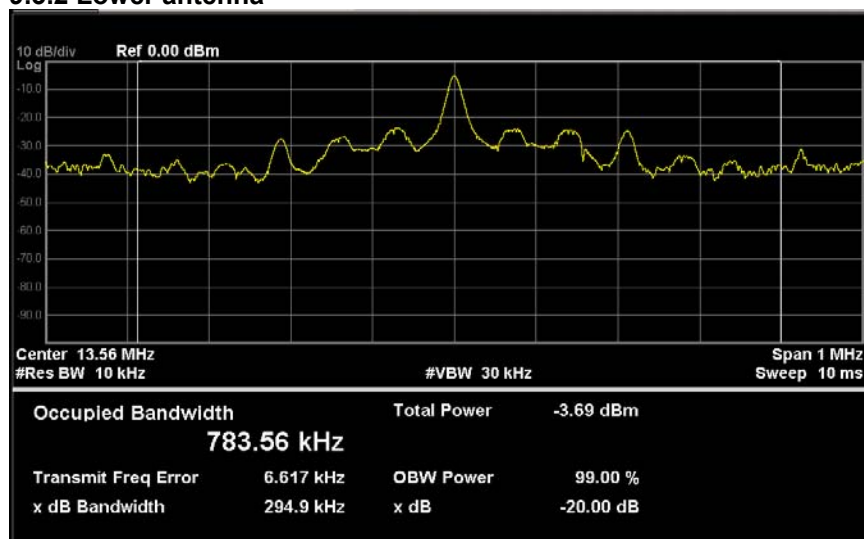
Lower Voltage = 100 V – 15%, Upper Voltage = 240 V + 15%

**9.3 20dB OBW , 99% OBW**

|                       |                  |
|-----------------------|------------------|
| <b>Location</b>       | Kashima No.12    |
| <b>Test date</b>      | February 2, 2018 |
| <b>Test Engineer</b>  | Naohei Murakami  |
| <b>Test Procedure</b> | LEN-RJP-TE003    |

**Test Procedure**

- 1 The EUT and test equipment were set up as shown on the following page.
- 2 Adjust the test instrument for the following setting:  
RBW : 1 % to 5 % of the Necessary bandwidth  
VBW : at least 3 times the RBW  
Detector : Peak  
Sweep Time : Auto  
Trace mode : Max Hold
- 3 Allow trace to fully stabilize.
- 4 Use "Occupied Bandwidth Measurement" function to measure the Occupied Bandwidth.

**9.3.1 Upper antenna****9.3.2 Lower antenna**

**SECTION 10. LIST OF MEASURING INSTRUMENTS**

Test instruments are calibrated according to Quality Manual and Calibration Rules of Intertek Japan K.K.

All measurements equipment used for the measurement is calibrated based on standard.

Each measurement result is traceable to national or international standards.

Antenna used for the measurement is calibrated based on the ANSI C63.5-2006.

| Instrument                                      | Model No.                      | Serial No. | Manufacturer    | Cal. Interval | Effective period |
|-------------------------------------------------|--------------------------------|------------|-----------------|---------------|------------------|
| <b>Conducted disturbance at mains terminals</b> |                                |            |                 |               |                  |
| LISN (EUT)                                      | ESH2-Z5                        | 892377/022 | ROHDE & SCHWARZ | 1 Y           | Aug. 31, 18      |
| 10 dB Attenuator                                | CFA-01                         | CEC052     | TAMAGAWA        |               |                  |
| LISN (Peripheral)                               | ESH3-Z5                        | 844982/001 | ROHDE & SCHWARZ | 1 Y           | Oct. 31, 18      |
| 10 dB Attenuator                                | CFA-01                         | CEC1022    | TAMAGAWA        |               |                  |
| 50 $\Omega$ Termination                         | CT-01                          | CE2012     | TAMAGAWA        | 1 Y           | May. 31, 18      |
| Coaxial cable                                   | 5D-2W(5.5 m)                   | N3C-1      | Intertek        | 1 Y           | Jan. 31, 19      |
| Coaxial cable                                   | 5D-2W(1.6 m)                   | N3C-2      | Intertek        |               |                  |
| Coaxial cable                                   | 5D-2W(0.7 m)                   | N3C-3      | Intertek        |               |                  |
| Coaxial cable                                   | 5D-2W(1.6 m)                   | N3C-4      | Intertek        |               |                  |
| RF Switch                                       | ACX-150-1                      | CE3010     | Intertek        |               |                  |
| Test receiver                                   | ESS<br>(Firmware Version 1.21) | 842123/008 | ROHDE & SCHWARZ | 1 Y           | Mar. 31, 18      |
| <b>Radiated disturbance (9 kHz-1000 MHz)</b>    |                                |            |                 |               |                  |
| Loop Antenna                                    | HFH2-Z2                        | 892665/008 | ROHDE & SCHWARZ | 1 Y           | Apr. 30, 18      |
| Coaxial cable                                   | 3D-2V(15m)                     | CL1        | Intertek        | 1 Y           | Feb. 28, 18      |
| Broad Band antenna                              | LPB-2513/A                     | 1092       | A.R.A.          | 1 Y           | Jul. 31, 18      |
| 6 dB Attenuator                                 | 8491A                          | 36306      | HEWLETT PACKARD |               |                  |
| Step Attenuator                                 | 8494B                          | 2726A13828 | HEWLETT PACKARD | 1 Y           | Jan. 31, 19      |
| Amplifier                                       | 8447D                          | 2727A05048 | HEWLETT PACKARD |               |                  |
| Coaxial cable                                   | 5D-2W(20.0 m)                  | N2R-1      | Intertek        |               |                  |
| Coaxial cable                                   | 5D-2W(3.1 m)                   | N2R-2      | Intertek        |               |                  |
| Coaxial cable                                   | 5D-2W(0.4 m)                   | N2R-3      | Intertek        |               |                  |
| Coaxial cable                                   | 5D-2W(0.4 m)                   | N2R-4      | Intertek        |               |                  |
| Coaxial cable                                   | 5D-2W(0.4 m)                   | N2R-5      | Intertek        |               |                  |
| Coaxial cable                                   | 5D-2W(2.0 m)                   | N2R-6      | Intertek        |               |                  |
| RF Switch                                       | ACX-150-1                      | CE2010     | Intertek        | 1 Y           | Aug. 31, 18      |
| Test receiver                                   | ESS<br>(Firmware Version 1.08) | 845637/001 | ROHDE & SCHWARZ |               |                  |
| Site Attenuation                                | -                              | -          | -               | 1 Y           | May. 31, 18      |

| Instrument                                | Model No.                      | Serial No.         | Manufacturer       | Cal. Interval | Effective period |
|-------------------------------------------|--------------------------------|--------------------|--------------------|---------------|------------------|
| <b>Radiated disturbance (Above 1 GHz)</b> |                                |                    |                    |               |                  |
| Double Ridged antenna                     | BBHA9120D                      | 278                | Schwarzbeck        | 1 Y           | Jun. 30, 18      |
| 6 dB Attenuator                           | SFA-01A 6 dB                   | CEC039             | TAMAGAWA           | 1 Y           | Jul. 31, 18      |
| Amplifier (1-18 GHz)                      | EAU-3018GXA                    | 10315              | ELENA              | 1 Y           | Jul. 31, 18      |
| Coaxial cable                             | S04272B (0.7m)                 | G3<br>(11SMA/0.7N) | SUHNER             | 1 Y           | Apr. 30, 18      |
| Coaxial cable                             | S04272B (8.0m)                 | G5<br>(11SMA/8m)   | SUHNER             | 1 Y           | Sep. 30, 18      |
| Spectrum Analyzer                         | 8563E<br>(ROM revision 960830) | 3650A06436         | HEWLETT<br>PACKARD | 1 Y           | Aug. 31, 18      |
| SVSWR                                     | -                              | -                  | -                  | 1 Y           | Sep. 30, 18      |
| <b>Common</b>                             |                                |                    |                    |               |                  |
| Testing Software                          | emiT (Version 3,0,0,0)         | -                  | -                  | -             | -                |
| <b>Frequency Tolerance</b>                |                                |                    |                    |               |                  |
| Spectrum Analyzer                         | N9000A                         | MY51260520         | Agilent            | 1 Y           | May. 31, 18      |
| Digital Multi Meter                       | 8846A                          | 9642018            | FLUKE              | 1 Y           | Jul. 31, 18      |
| Temperature Chamber                       | PL-3F                          | 5103661            | Tabai              | -             | None             |
| Temperature Meter                         | TR-71nW                        | 52160B67           | T&D                | 1 Y           | Dec. 31, 18      |
| Coil antenna                              | None                           | None               | Intertek Japan     | -             | None             |
| GPS Receiver                              | HP Z3801A                      | 3542A02414         | Hewlett Packard    | -             | None             |
| Coaxial Cable                             | 3D-2V                          | KSR00101           | Daiyu Densen       | -             | Mar. 28, 19      |
| <b>Occupied Bandwidth</b>                 |                                |                    |                    |               |                  |
| Spectrum Analyzer                         | N9030A                         | MY52350520         | Agilent            | 1 Y           | Mar. 31, 18      |

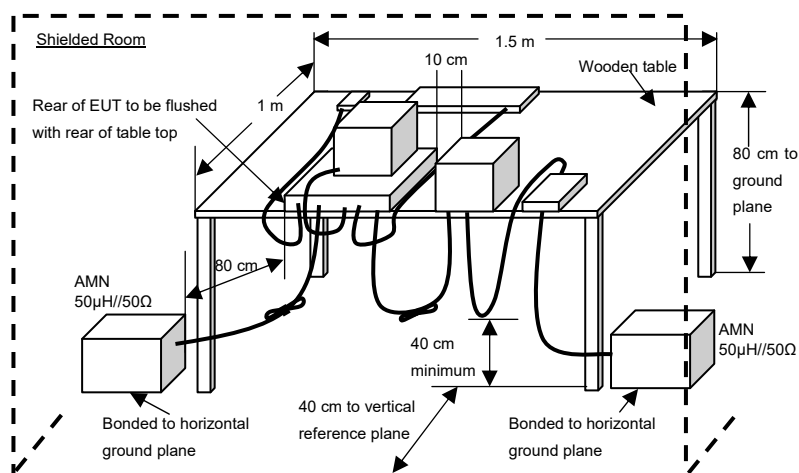
# **ANNEX**

## A. TEST PROCEDURE(S)

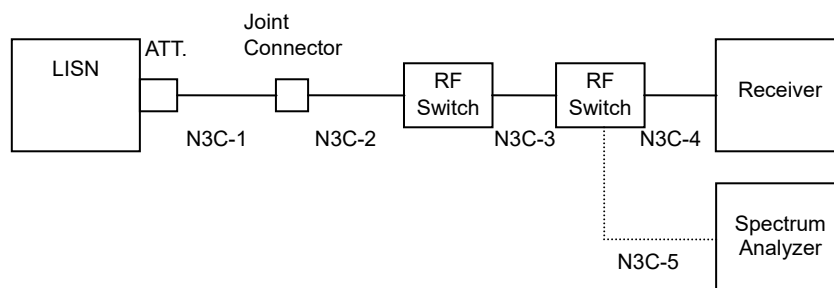
Test was carried out under the following conditions.

### Conducted disturbance at mains terminals

Test setup as per standard



### Diagram of the measuring instruments



### Setting for the instruments

| Frequency [MHz] | Instrument | Detector Function | Resolution Bandwidth | Video Bandwidth |
|-----------------|------------|-------------------|----------------------|-----------------|
| 0.15 – 30       | Receiver   | Quasi Peak        | 10 kHz               | N/A             |
|                 |            | Average           | 10 kHz               | N/A             |

#### [ Preliminary Measurement ]

EUT is tested on all operating conditions.

The spectrum analyzer is controlled by the computer program to sweep the frequency range to be measured, then spectrum chart is plotted out to find the worst emission conditions in operating mode and/or configuration decision for the final test.

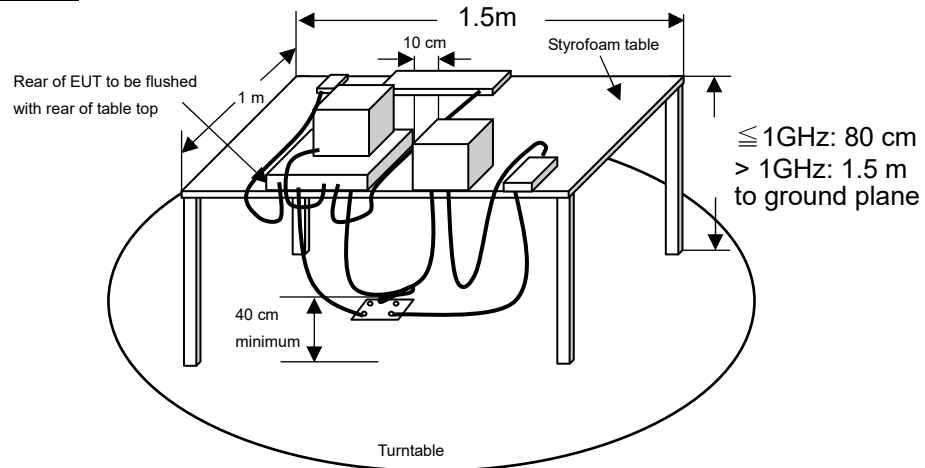
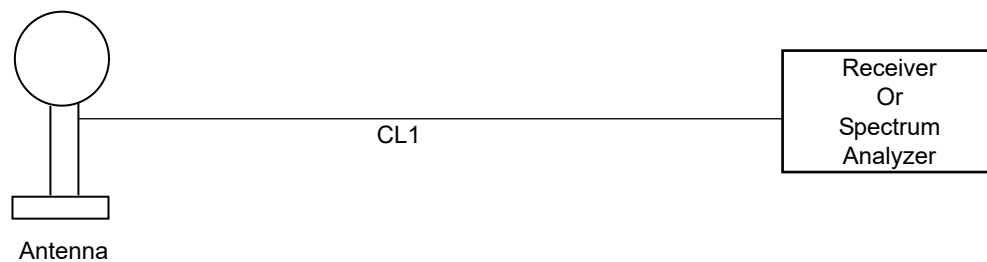
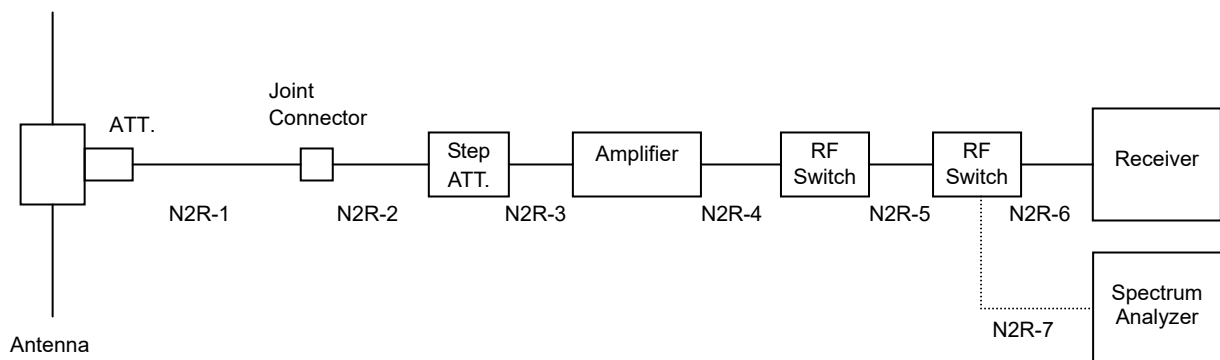
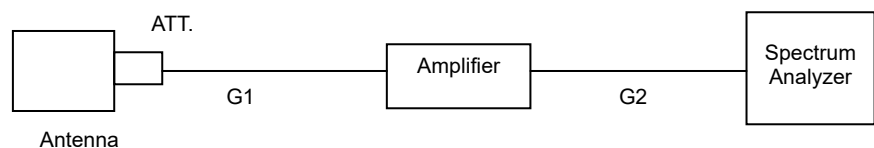
All leads other than safety ground are tested.

#### [ Final Measurement ]

The EUT is operated in the worst emission condition found by the preliminary test.

The equipment and cables are arranged or manipulated within the range of the test standard in the above condition.

At least six highest spectrum are measured in quasi-peak and average (if necessary) using the test receiver.

**Radiated disturbance**Test setup as per standardDiagram of the measuring instruments0.009 – 30MHz30 – 1000 MHzAbove 1GHz

Test was carried out under the following conditions.