

# TEST REPORT

For

**Timing measurement system for sports event**

In conformity with

**FCC CFR 47 Part15C**

**Model:** MTJP-T01-04 (304.22 MHz)  
MTJP-T01-09 (309.92 MHz)  
MTJP-T01-14 (314.28 MHz)

**FCC ID:** ZFQMTJP-T01-04 (304.22 MHz)  
ZFQMTJP-T01-09 (309.92 MHz)  
ZFQMTJP-T01-14 (314.28 MHz)

**Test Item:** Timing measurement system for sports event

**Report No:** RY1104J19R1

**Issue Date:** 19 April, 2011

**Prepared for**

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## History

Report No.	Date	Revisions	Issued By
RY1104J19R1	19 April, 2011	Initial Issue	R. Kojima

## 1 General information

### 1.1 Product description

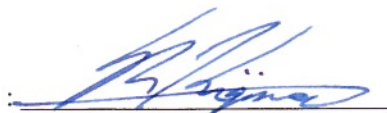
Test item : Timing measurement system for sports event  
Manufacturer : Easten Co., Ltd  
Address : 5335 Toyohira Chino-city Nagano 391-0213 Japan  
Model : MTJP-T01-04 (304.22 MHz)  
: MTJP-T01-09 (309.92 MHz)  
: MTJP-T01-14 (314.28 MHz)  
FCC ID : ZFQMTJP-T01-04 (304.22 MHz)  
: ZFQMTJP-T01-09 (309.92 MHz)  
: ZFQMTJP-T01-14 (314.28 MHz)  
Serial numbers : 41132D (MTJP-T01-04)  
: 511234 (MTJP-T01-09)  
: 611AE9 (MTJP-T01-14)  
Operating Frequency : 304.22 MHz, 309.92 MHz, 314.28 MHz  
Oscillator frequencies : 304.22 MHz, 309.92 MHz, 314.28 MHz  
Type of Modulation : FSK  
Antenna Type : pattern antenna  
Receipt date of EUT : 7 April, 2011  
Nominal power source voltages : DC 3.0V (Battery)

### 1.2 Test(s) performed/ Summary of test result


Test specification(s) : FCC CFR 47. Part 15 (October 1, 2009)  
Test method(s) : ANSI C63.4: 2003  
Test(s) started : 7 April, 2011  
Test(s) completed : 8 April, 2011  
Purpose of test(s) : Grant for Certification of FCC  
  
Summary of test result : Complied

Note: The above judgment is only based on the measurement data and it does not include the measurement uncertainty. Accordingly, the statement below is applied to the test result.  
The EUT complies with the limit required in the standard in case that the margin is not less than the measurement uncertainty in the Laboratory.  
Compliance of the EUT is more probable than non-compliance is case that the margin is less than the measurement uncertainty in the Laboratory.

Test engineer

  
R. Kojima  
EMC testing Department

Reviewer

  
K. Ohnishi  
Manager  
EMC testing Department

### 1.3 Test facility

The Federal Communications Commission has reviewed the technical characteristics of the test facilities at RF Technologies Ltd., located in 472, Nippa-cho, Kohoku-ku, Yokohama, 223-0057, Japan, and has found these test facilities to be in compliance with the requirements of 47 CFR Part 15, section 2.948, per October 1, 2009. The description of the test facilities has been filed under registration number 319924 at the Office of the Federal Communications Commission. The facility has been added to the list of laboratories performing these test services for the public on a fee basis.

The list of all public test facilities is available on the Internet at <http://www.fcc.gov>.

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

Each registered facility number is as follows;

Test site (Semi-Anechoic chamber 3m) R-2393

Test site (Shielded room) C-2617

Registered by Industry Canada (IC): The registered facility number is as follows;

Test site No. 1 (Semi-Anechoic chamber 3m): 6974A-1

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

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.



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 UKAS Publication LAB34: 2002 “The Expression of Uncertainty in EMC Testing” and CISPR16-4-2: 2003 “Uncertainty in EMC Measurements”.

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

Radiated emission (9 kHz - 30 MHz): +/- 2.79dB

Radiated emission (30 MHz - 1000 MHz): +/- 5.90dB

Radiated emission (1 GHz - 18 GHz): +/- 5.77dB

## 1.5 Summary of test results

### 1.5.1 Table of test summary

Requirement of;	Section in FCC15	Result	Section in this report
1.5.1 Occupied Bandwidth (20 dB/99%)	2.1049, 15.231(c)	Complied	2.1
1.5.2 Filed Strength Fundamental Emissions	15.231(b)	Complied	2.2
1.5.3 Transmitter Radiated Spurious Emissions	15.209/15.231(b)	Complied	2.3

## 1.6 Setup of equipment under test (EUT)

### 1.6.1 Test configuration of EUT

#### Equipment(s) under test:

	Item	Manufacturer	Model No.	Serial No.	Remarks
A1	Timing measurement system for sports event	Easten Co., Ltd	MTJP-T01-04	41132D	-
A2	Timing measurement system for sports event	Easten Co., Ltd	MTJP-T01-09	511234	-
A3	Timing measurement system for sports event	Easten Co., Ltd	MTJP-T01-14	611AE9	-
B	Battery	-	-	-	-

#### Support Equipment(s):

	Item	Manufacturer	Model No.	Serial No.

#### Connected cable(s):

No.	Item	Identification (Manu.e.t.c)	Shielded YES / NO	Ferrite Core YES / NO	Connector Type Shielded YES / NO	Length (m)

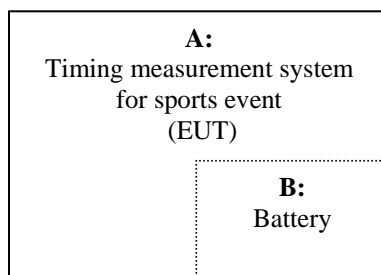
### 1.6.2 Operating condition:

#### Operating mode:

The EUT was tested under the following test mode prepared by the applicant:

- (1-1) FSK modulation, Continuous transmission (304.22 MHz)
- (1-2) FSK modulation, Continuous transmission (309.92 MHz)
- (1-3) FSK modulation, Continuous transmission (314.28 MHz)

### 1.6.3 Setup diagram of tested system:



## **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**

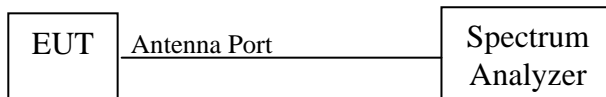
No deviations from the standards described in clause 1.2.

## 2 Test procedure and test data

### 2.1 Occupied Bandwidth (20 dB / 99%)

#### Test setup

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



#### Test procedure

Measurement procedures were implemented according to the method of ANSI C63.4: 2003 clauses 13.1.7. The EUT antenna port connected to the spectrum analyzer. The RBW is set to 10 KHz. The VBW is set to 3 times of the RBW. The sweep time is coupled appropriate.

#### Limitation

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz

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

BA04	CL11	PR03	TR06		
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#### Test results

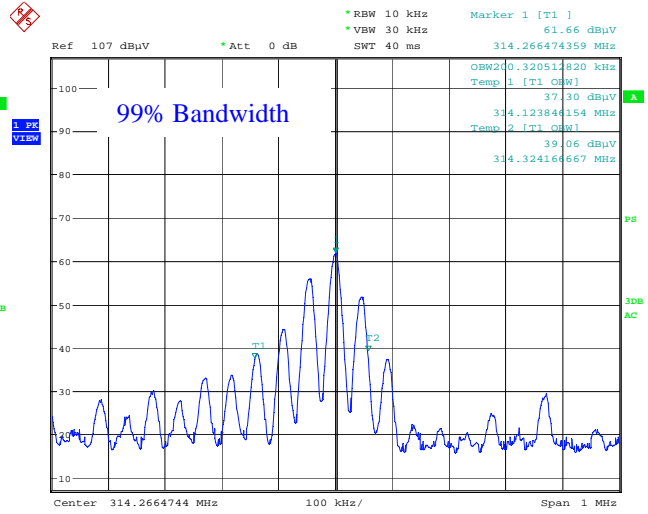
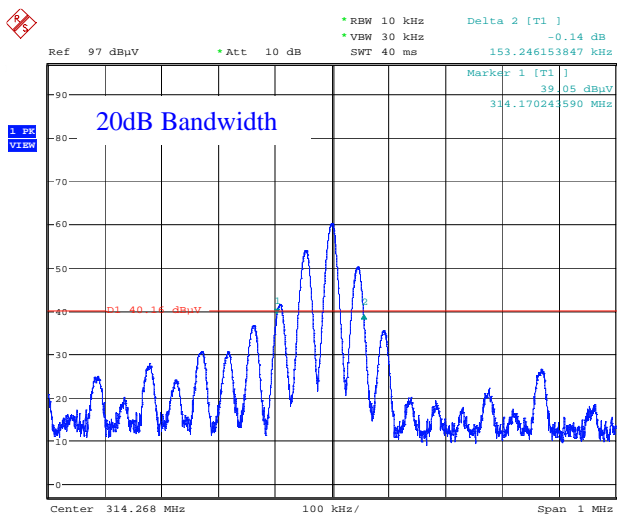
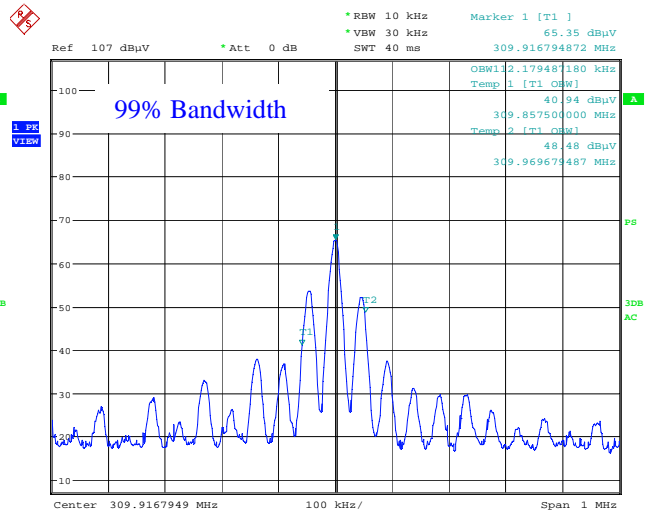
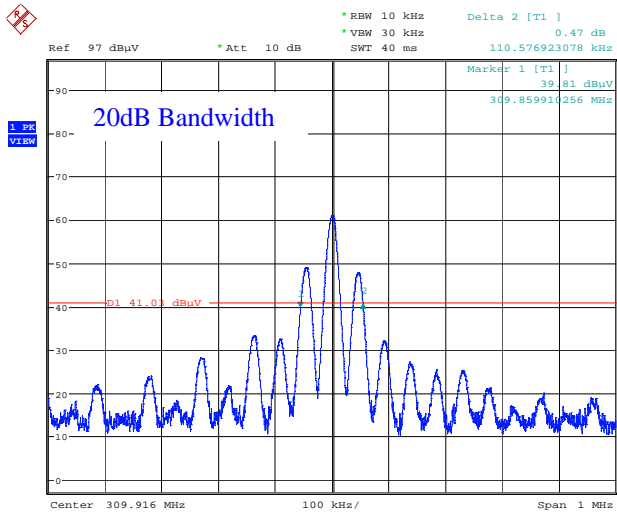
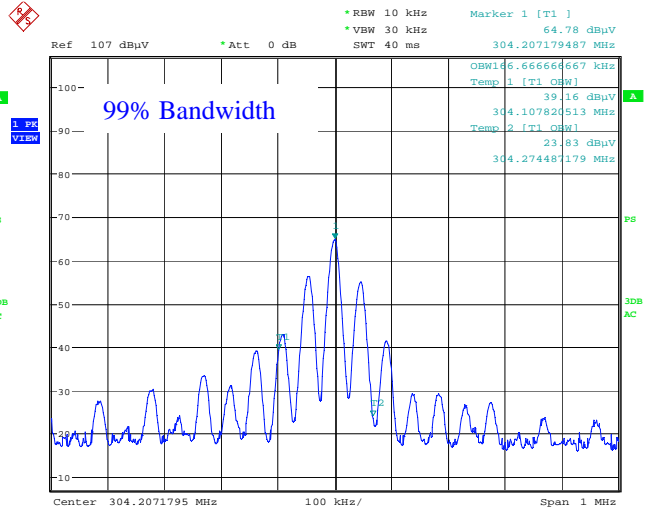
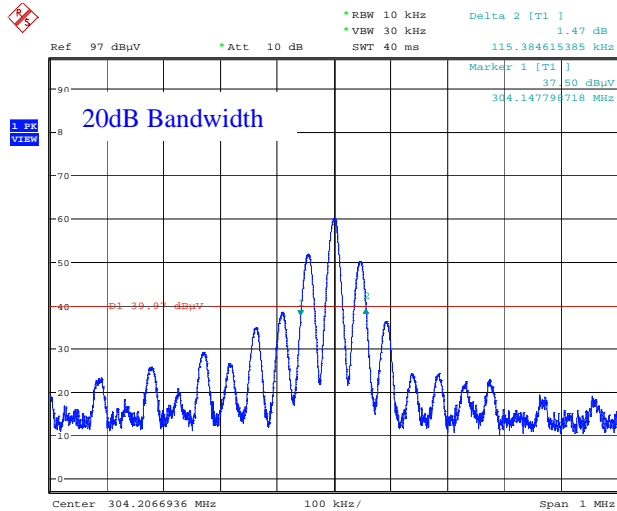
Transmission Freq. [MHz]	Bandwidth [kHz]	
	20dB	Limit
304.22	115.384	760.550
309.92	110.576	774.800
314.28	153.246	785.700

Transmission Freq. [MHz]	99% OBW [kHz]
304.22	166.666
309.92	112.179
314.28	200.320

## Test Data

Tested Date: 7 April, 2011

Temperature: 19 °C  
Humidity: 36 %  
Atmos. Press: 1025 hPa

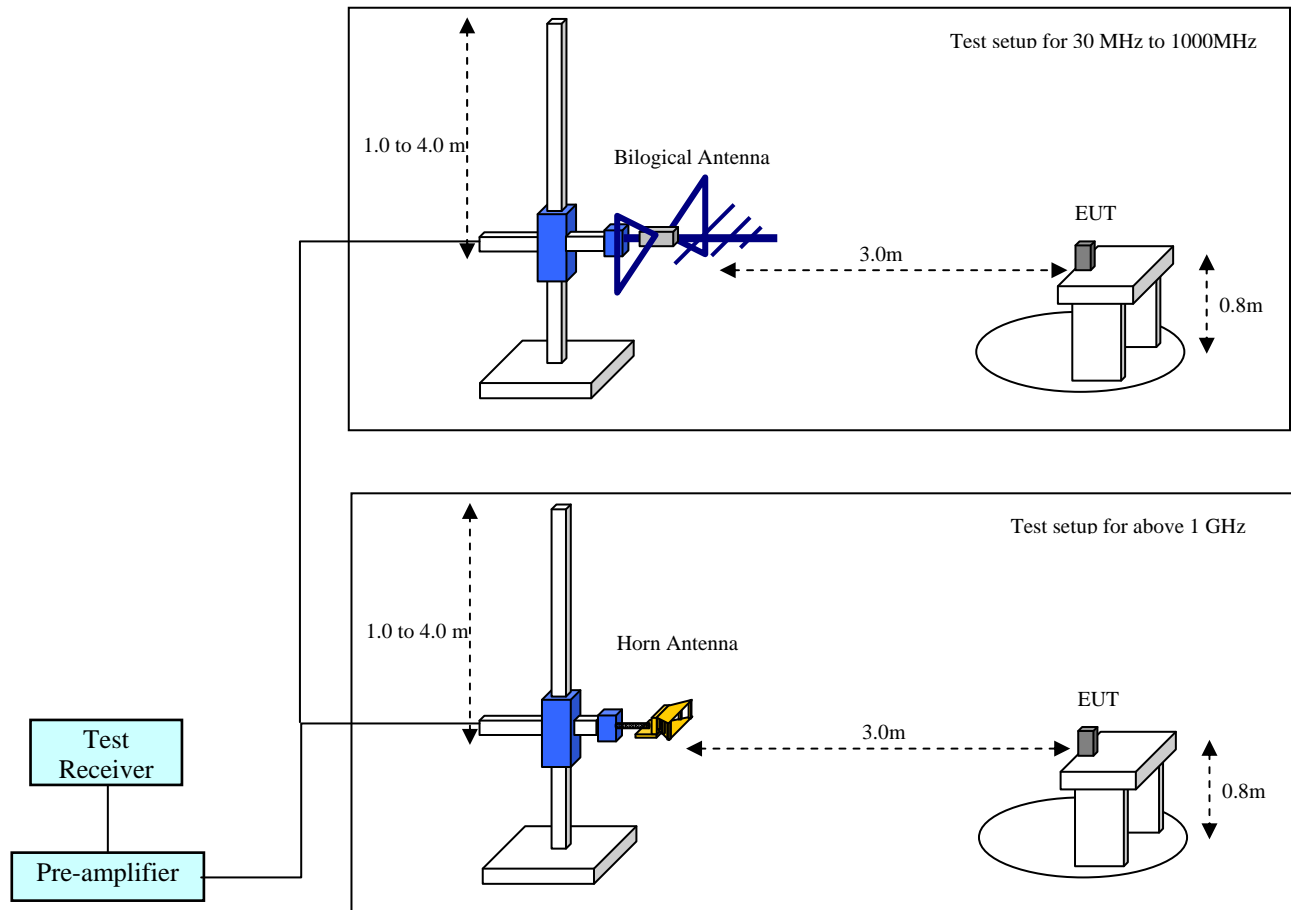




## 2.2 Filed Strength Fundamental Emissions

### Test setup

Test setup was implemented according to the method of ANSI C63.4: 2003 clause 6 “General requirements for EUT equipment arrangements and operation”, clause 8.2 and Annex H.3 “Radiated emission measurements setup”.



### Test procedure

The EUT is placed on a non-conducted table which is 0.8m high 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 above 30 MHz, 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 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;

Between 30 - 1000 MHz: RBW=100 kHz, VBW= 300 kHz  
Final measurement is carried out with a receiver RBW of 120 kHz (QP)

Above 1000 MHz: RBW=100 kHz, VBW= 300 kHz  
Final measurement is carried out with a receiver RBW of 1 MHz (QP)

## Applicable rule and limitation

The below field strength limits are specified at a distance of 3 meters. The tighter limits apply at the band edges.

Fundamental frequency [MHz]	Field strength of fundamental [uV/m]
40.66 - 40.70	2250
70 - 130	1250
130 - 174	1250 - 3750 *1
174 - 260	3750
260 - 470	3750 - 12500 *1
Above 470	12500

Note 1: Linear interpolations

**Test results** - Complied with requirement.

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

BA04	CL11	PR03	TR06
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## Test Data

Tested Date: 7 April, 2011

Temperature: 19 °C  
Humidity: 36 %  
Atmos. Press: 1025 hPa

Operating mode: Continuous Communication (304.22 MHz)

EUT position: X-plane (Maximum position)

Measurement distance: 3 m

No.	Frequency [MHz]	Reading [dBuV]	Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Antenna Polarization
1	304.220	49.3	13.7	9.7	29.7	43.0	74.9	31.9	Vert.
2	<b>304.220</b>	<b>68.3</b>	<b>13.7</b>	<b>9.7</b>	<b>29.7</b>	<b>62.0</b>	<b>74.9</b>	<b>12.9</b>	<b>Hori.</b>

Operating mode: Continuous Communication (309.92 MHz)

EUT position: X-plane (Maximum position)

Measurement distance: 3 m

No.	Frequency [MHz]	Reading [dBuV]	Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Antenna Polarization
1	309.916	50.0	13.9	9.8	29.7	44.0	75.3	31.3	Vert.
2	<b>309.920</b>	<b>69.3</b>	<b>13.9</b>	<b>9.8</b>	<b>29.7</b>	<b>63.3</b>	<b>75.3</b>	<b>12.0</b>	<b>Hori.</b>

Operating mode: Continuous Communication (314.28 MHz)

EUT position: X-plane (Maximum position)

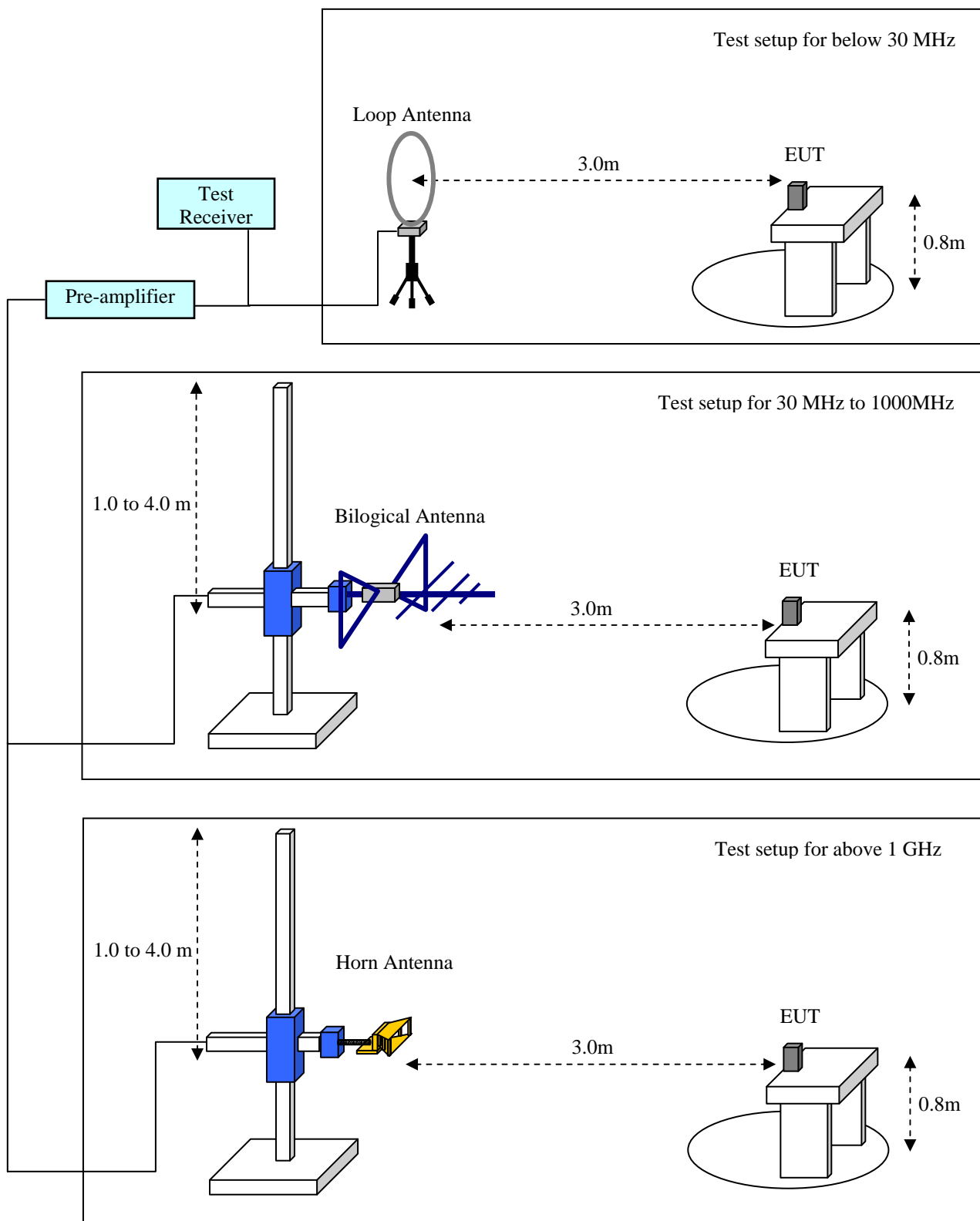
Measurement distance: 3 m

No.	Frequency [MHz]	Reading [dBuV]	Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Antenna Polarization
1	314.268	48.4	14.0	9.8	29.7	42.5	75.5	33.0	Vert.
2	<b>314.267</b>	<b>67.5</b>	<b>14.0</b>	<b>9.8</b>	<b>29.7</b>	<b>61.6</b>	<b>75.5</b>	<b>13.9</b>	<b>Hori.</b>

## 2.3 Transmitter Radiated spurious emissions

### Test setup

Test setup was implemented according to the method of ANSI C63.4: 2003 clause 6 “General requirements for EUT equipment arrangements and operation”, clause 8.2 and Annex H.3 “Radiated emission measurements setup”.



## Test procedure

Measurement procedures were implemented according to the method of ANSI C63.4: 2003 clauses 8.2. 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 center of the loop shall be 1 m above the ground. In the frequency above 30 MHz, 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 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)
Between 30 - 1000 MHz:	RBW=100 kHz, VBW= 300 kHz Final measurement is carried out with a receiver RBW of 120 kHz (QP)
Above 1000 MHz:	RBW=100 kHz, VBW= 300 kHz Final measurement is carried out with a receiver RBW of 1 MHz (PK/AVE)

## Applicable rule and limitation

§15.205 restricted bands of operation

Except as shown in paragraph 15.205 (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

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)

15.205(b) except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

15.209 (a) 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)	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
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

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.

15.231 (e) the below field strength limits are specified at a distance of 3 meters. The tighter limits apply at the band edges.

Fundamental frequency [MHz]	Field strength of spurious emission [uV/m]
40.66 - 40.70	225
70 - 130	125
130 - 174	125 - 375 *1
174 - 260	375
260 - 470	375 - 1250 *1
Above 470	1250

Note 1: Linear interpolations

**Test results - Complied with requirement.**

## Test Data

### 2.3.1 Between 30 – 1000 MHz

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

BA04	CL11	PR03	TR06
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Tested Date: 7 April, 2011

Temperature: 19 °C  
Humidity: 36 %  
Atmos. Press: 1025 hPa

Operating mode: Continuous Communication (304.22 MHz)

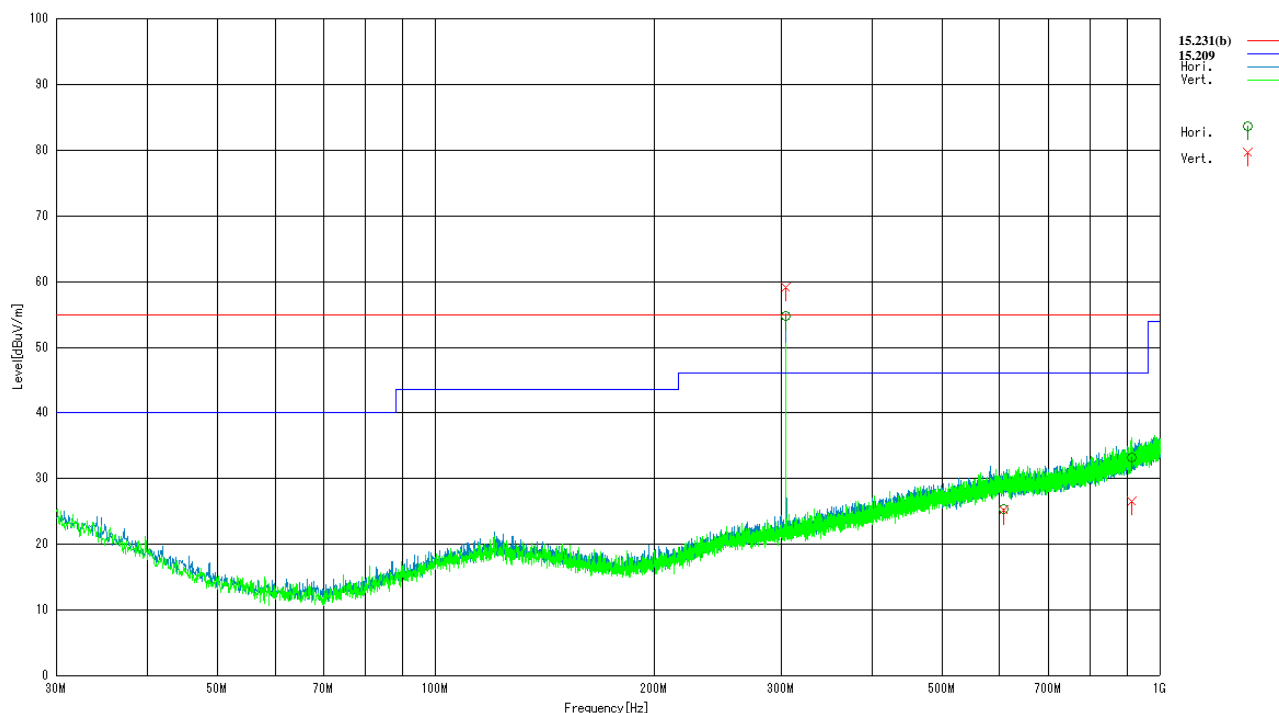
EUT position: Y-plane (Maximum position)

Detector: Quasi-Peak

Measurement distance: 3 m

No.	Frequency [MHz]	Reading [dBUV]	Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBUV/m]	Limit [dBUV/m]	Margin [dB]	Antenna Polarization
1	608.369	24.2	19.3	11.6	29.8	25.3	54.9	29.6	Hori.
2	608.414	24.0	19.3	11.6	29.8	25.1	54.9	29.8	Vert.
3	<b>912.575</b>	<b>27.9</b>	<b>21.1</b>	<b>13.2</b>	<b>29.0</b>	<b>33.2</b>	<b>54.9</b>	<b>21.7</b>	<b>Hori.</b>
4	912.622	21.2	21.1	13.2	29.0	26.5	54.9	28.4	Vert.

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



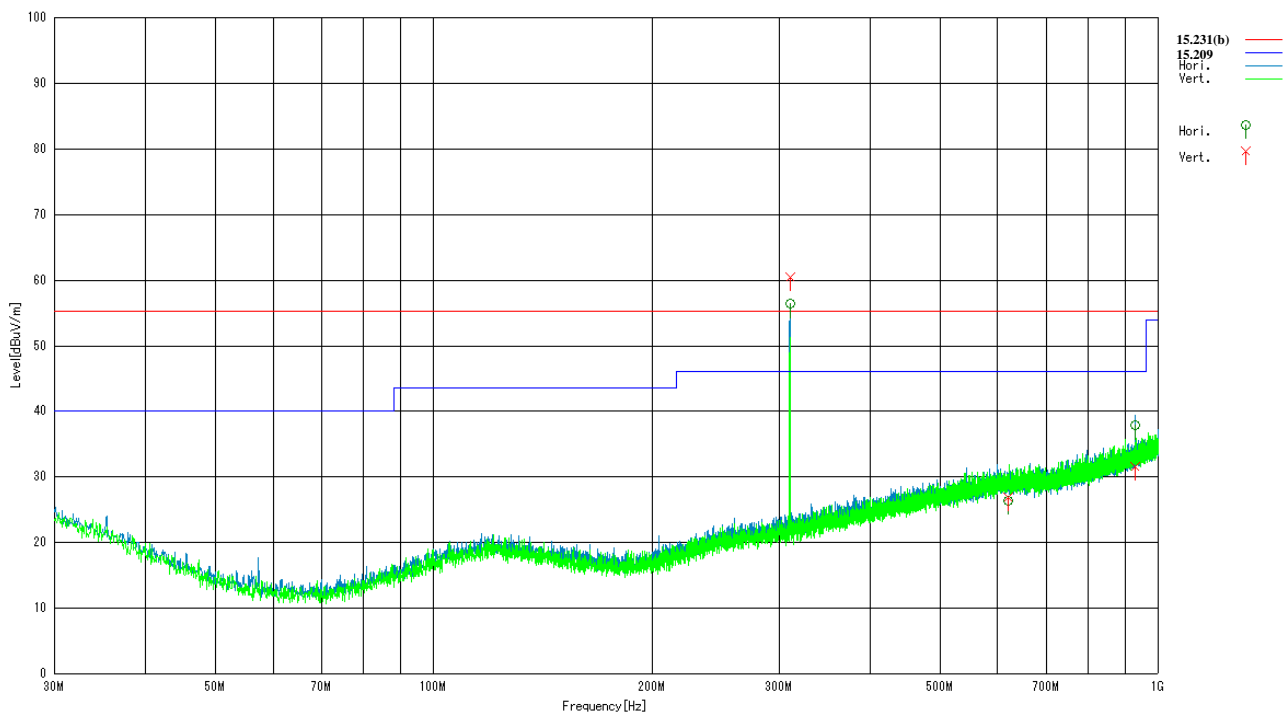
Tested Date: 7 April, 2011

Temperature: 19 °C  
Humidity: 36 %  
Atmos. Press: 1025 hPa

Operating mode: Continuous Communication (309.92 MHz)  
EUT position: Y-plane (Maximum position)  
Detector: Quasi-Peak  
Measurement distance: 3 m

No.	Frequency [MHz]	Reading [dBuV]	Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Antenna Polarization
1	619.833	25.7	19.3	11.7	29.8	26.9	55.3	28.4	Vert.
2	619.833	25.2	19.3	11.7	29.8	26.4	55.3	28.9	Hori.
3	<b>929.703</b>	<b>32.2</b>	<b>21.2</b>	<b>13.3</b>	<b>28.9</b>	<b>37.8</b>	<b>55.3</b>	<b>17.5</b>	<b>Hori.</b>
4	929.703	26.0	21.2	13.3	28.9	31.6	55.3	23.7	Vert.

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



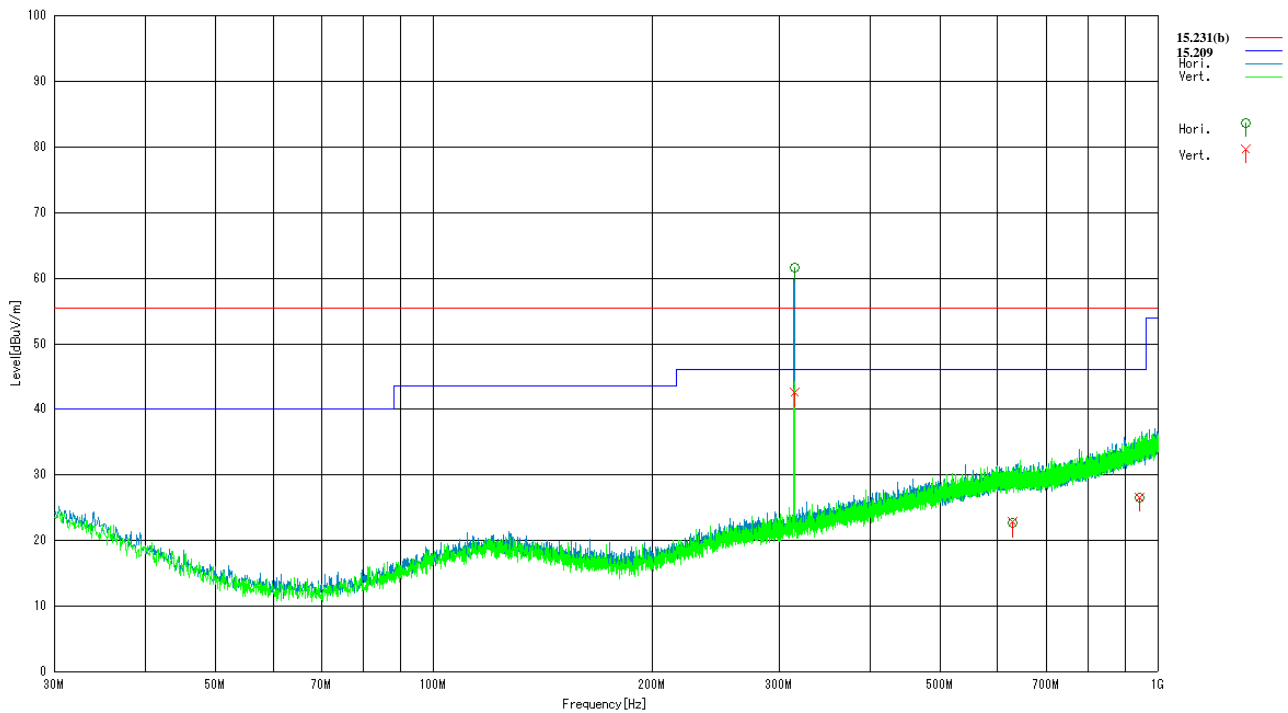
Tested Date: 7 April, 2011

Temperature: 19 °C  
Humidity: 36 %  
Atmos. Press: 1025 hPa

Operating mode: Continuous Communication (314.28 MHz)  
EUT position: X-plane (Maximum position)  
Detector: Quasi-Peak  
Measurement distance: 3 m

No.	Frequency [MHz]	Reading [dBuV]	Factor [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Antenna Polarization
1	628.533	21.5	19.3	11.8	29.8	22.8	55.5	32.7	Vert.
2	628.533	21.3	19.3	11.8	29.8	22.6	55.5	32.9	Hori.
3	942.800	20.8	21.3	13.3	28.8	26.6	55.5	28.9	Hori.
4	942.800	20.8	21.3	13.3	28.8	26.6	55.5	28.9	Vert.

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





## 2.3.2 Above 1000 MHz

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

AC01	CL23	CL24	DH01	PR12	TR06			

### Harmonics and Spurious Emission above 1000 MHz

Tested Date: 8 April, 2011

Temperature: 20 °C  
Humidity: 42 %  
Atmos. Press: 1021 hPa

Operating mode: Continuous Communication (304.22 MHz)

EUT position: Z-plane (Maximum position)

Measurement distance: 3 m

No.	Frequency [MHz]	Reading		C.F. [dB]	Result		Limit		Margin		Polarization
		Peak [dBuV]	Ave [dBuV]		Peak [dBuV]	Ave [dBuV]	Peak [dBuV]	Ave [dBuV]	Peak [dB]	Ave [dB]	
1	1216.880	48.3	35.5	-10.7	37.6	24.8	74.9	54.9	37.3	30.1	Hori.
2	1216.880	48.8	36.9	-10.7	38.1	26.2	74.9	54.9	36.8	28.7	Vert.
<b>3</b>	<b>3042.200</b>	46.2	<b>31.8</b>	<b>-2.5</b>	43.7	<b>29.3</b>	74.9	<b>54.9</b>	31.2	<b>25.6</b>	<b>Hori.</b>
<b>4</b>	<b>3042.200</b>	45.6	<b>31.8</b>	<b>-2.5</b>	43.1	<b>29.3</b>	74.9	<b>54.9</b>	31.8	<b>25.6</b>	<b>Vert.</b>

Operating mode: Continuous Communication (309.92 MHz)

EUT position: Z-plane (Maximum position)

Measurement distance: 3 m

No.	Frequency [MHz]	Reading		C.F. [dB]	Result		Limit		Margin		Polarization
		Peak [dBuV]	Ave [dBuV]		Peak [dBuV]	Ave [dBuV]	Peak [dBuV]	Ave [dBuV]	Peak [dB]	Ave [dB]	
<b>1</b>	<b>1239.605</b>	52.2	<b>42.8</b>	<b>-10.4</b>	41.8	<b>32.4</b>	75.3	<b>55.3</b>	33.5	<b>22.9</b>	<b>Vert.</b>
2	1239.605	49.9	39.5	-10.4	39.5	29.1	75.3	55.3	35.8	26.2	Hori.
3	2479.190	46.8	34.4	-3.8	43.0	30.6	75.3	55.3	32.3	24.7	Vert.
4	2479.190	48.7	36.0	-3.8	44.9	32.2	75.3	55.3	30.4	23.1	Hori.
5	3099.030	45.9	32.2	-1.9	44.0	30.3	75.3	55.3	31.3	25.0	Vert.
6	3099.030	46.0	32.3	-1.9	44.1	30.4	75.3	55.3	31.2	24.9	Hori.

Operating mode: Continuous Communication (314.28 MHz)

EUT position: Z-plane (Maximum position)

Measurement distance: 3 m

No.	Frequency [MHz]	Reading		C.F. [dB]	Result		Limit		Margin		Polarization
		Peak [dBuV]	Ave [dBuV]		Peak [dBuV]	Ave [dBuV]	Peak [dBuV]	Ave [dBuV]	Peak [dB]	Ave [dB]	
1	1257.120	46.3	32.8	-10.3	36.0	22.5	75.5	55.5	39.5	33.0	Hori.
2	1257.120	46.9	32.8	-10.3	36.6	22.5	75.5	55.5	38.9	33.0	Vert.
<b>3</b>	<b>3142.800</b>	46.2	<b>31.9</b>	<b>-1.6</b>	44.6	<b>30.3</b>	75.5	<b>55.5</b>	30.9	<b>25.2</b>	<b>Vert.</b>
<b>4</b>	<b>3142.800</b>	45.5	<b>31.9</b>	<b>-1.6</b>	43.9	<b>30.3</b>	75.5	<b>55.5</b>	31.6	<b>25.2</b>	<b>Hori.</b>

#### 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	-	2010/04/10	2011/04/30
AC01(EG)	Anechoic Chamber (1st test room)	JSE	203397C	-	2010/11/13	2011/11/30
BA04	Biological Antenna	SCHAFFNER	CA2855	2903	2011/01/26	2012/01/31
CL11	Antenna Cable for RE	RFT	-	-	2010/05/24	2011/05/31
CL23	RF Cable 0.5m	SUHNER	SUCOFLEX104PE	48773	2010/06/15	2011/06/30
CL24	RF Cable 5.0m	SUCOFLEX	SF104PE	48775/4PE	2010/06/15	2011/06/30
DH01	DRG Horn Antenna	A.H. Systems	SAS-571	785	2010/01/20	2012/01/31
PR08	Pre. Amplifier	Sonoma Instrument	315	263504	2011/01/12	2012/01/31
PR12	Pre. Amplifier (1-26G)	Agilent Technologies	8449B	3008A02513	2011/01/18	2012/01/31
TR06	Test Receiver (F/W : 3.93 SP2)	Rohde & Schwarz	ESU26	100002	2010/09/02	2011/09/30

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.