Zacta

TEST REPORT

Report number : JPX-TR-16166-0
Issue date : October 17, 2016

The device, as described herewith, was tested pursuant to applicable test procedure and complies with the requirements of;

EN 55022
EN 55024

The test results are traceable to the international or national standards.

Applicant	:	CORE CORPORATION
Equipment under test (EUT)	:	GR-PEACH(FULL)
Model number	:	X28A-M01

Date of test : September 17,26-28, 2016
Test place : TÜV SÜD Zacta Ltd. Yonezawa Testing Center
4149-7 Hachimanpara 5-chome
Yonezawa-shi Yamagata 992-1128 Japan
Phone: +81-238-28-2880 Fax: +81-238-28-2888
Test results : Complied

The results in this report are applicable only to the equipment tested.
This report shall not be re-produced except in full without the written approval of TÜV SÜD Zacta Ltd.
This test 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.

Tested by : Tsuyoshi Okumura, Nobuhiko Iwasawa

Yoshiyuki Takahashi

Approved by :
Eiji Akiba
Lab Manager of EMC Lab

NVLAP TESTING
NVLAP LAB CODE 200306-0

ilac-MRA

Zacta

Table of contents

Zacta

1. Summary of Test

1.1 Purpose of test

It is the original test in order to verify conformance to standards listed in section 1.2.

1.2 Standards

EN 55022:2010
EN 55024:2010

1.2.1 Test Methods

EN 61000-4-2:2009
EN 61000-4-3:2006 + Amendment 1:2008 + Amendment 2:2010
EN 61000-4-4:2012
EN 61000-4-5:2006
EN 61000-4-6:2014
EN 61000-4-8:2010
EN 61000-4-11:2004

1.2.2 Deviation from standards

Test methods listed in section 1.2.1 were used instead of those referenced in EN55024.

Zacta

1.3 List of applied test to the EUT

Test item	Classification of EUT	Test	Result	Comment
Conducted emission at mains port	Class A	Applied	PASS	-
Conducted emission at telecommunication port		Not applied	Not applied	*1
Radiated emission (Below 1GHz)		Applied	PASS	-
Radiated emission (Above 1GHz)		Applied	PASS	-

*1: Conducted emission at telecommunication port is not applied because the EUT is not connected to a public network.

Port	Test item	Performance criterion	Test	Result	Comment
Enclosure	Electrostatic discharge immunity	B	Applied	PASS	*1
	Radio-frequency electromagnetic field immunity	A	Applied	PASS	-
	Power frequency magnetic field immunity	A	Applied	PASS	-
AC power	Electrical fast transient / burst immunity	B	Not applied	Not applied	*2
	Surges immunity	B	Not applied	Not applied	*2
	Conducted disturbances, inducted by radio-frequency field immunity	A	Not applied	Not applied	*2
	Voltage dips immunity	B and C	Not applied	Not applied	*2
	Short interruptions immunity	C	Not applied	Not applied	*2
DC power	Electrical fast transient / burst immunity	B	Not applied	Not applied	*2
	Surges immunity	B	Not applied	Not applied	*2
	Conducted disturbances, inducted by radio-frequency field immunity	A	Not applied	Not applied	*2
Signal ports and telecommunication ports	Electrical fast transient / burst immunity	B	Applied	PASS	-
	Surges immunity	C	Not applied	Not applied	*2
	Conducted disturbances, inducted by radio-frequency field immunity	A	Applied	PASS	-

*1: The coupling plane was only tested, because it is a built-in device, based on the applicant's judgement.
*2: Test is not applied because the EUT has no relevant ports.

1.3.1 Test set up

Table-Top

Zacta

1.4 Performance Criteria

Performance criterion	Operating condition
A	EUT shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer when EUT is used as intended.
B	After the test, EUT shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacturer, when EUT is used as intended.
C	Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions.

1.5 Monitoring of EUT

In order to evaluate the performance of equipment during the test, it is confirmed visually whether the EUT operates as intended.

1.6 Test Plan

All the tests in this test report are performed according to Test plan number: JPX-TR-16172-1.

1.6.1 Deviation from the Test Plan

None

1.7 Modification to the EUT by laboratory

None

2. Equipment Under Test

2.1 General Description of equipment

The EUT is GR-PEACH(FULL).

2.2 EUT information

Applicant	:	CORE CORPORATION Core R&D Center, 11-1, Minamikurokawa, Asao-ku, Kawasaki-shi, Kanagawa 215-0034 Japan Phone: +81-44-989-5128 Fax: +81-44-989-5133
Equipment under test	:	GR-PEACH(FULL)
Trade name	:	CORE
Model number	:	X28A-M01
Serial number	:	N/A
EUT condition	:	Production
Max. frequency	:	400 MHz
Power ratings	:	DC 5V 0.5A (USB Power)
Size	:	(W) 72 × (D) 55 × (H) 20 mm

2.3 Variation of the family model(s)

Not applicable

2.4 Operating mode

[Operation mode]
- i) Power ON
- ii) USB connection
- iii) LAN local connection
- iv) SD read/write

3. Configuration of equipment

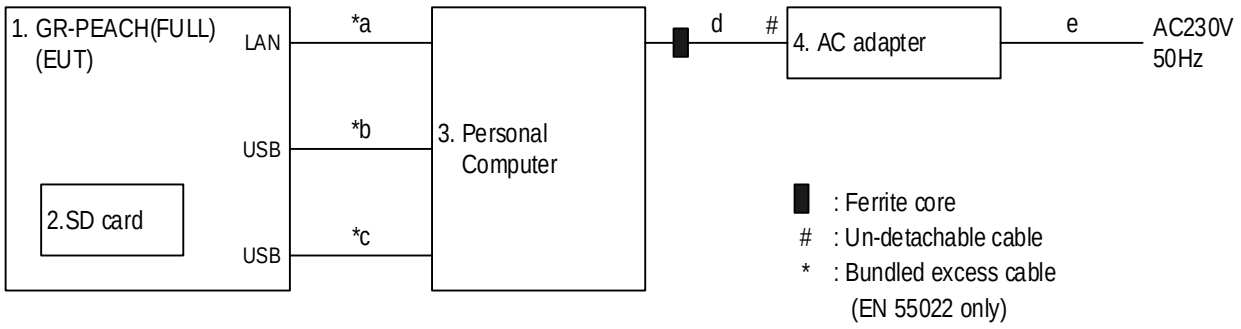
3.1 Equipment(s) used

No.	Equipment	Company	Model No.	Serial No.	Comment
1	GR-PEACH(FULL)	Core	X28A-M01	N/A	EUT
2	SD Card	BUFFALO	N/A	N/A	4GB
3	Personal Computer	TOSHIBA	PR732HA A1RBA71	9D060046H	-
4	AC adapter	TOSHIBA	PA3714U-1ACA	T0613342003532A	-

3.2 Cable(s) used

No.	Cable	Length[m]	Shield	Connector	Comment
a	LAN cable	3.0	No	Plastic	-
b	USB cable	2.0	Yes	Metal	-
c	USB cable	2.0	Yes	Metal	-
d	DC cable	1.8	No	Plastic	-
e	AC power cord	0.9	No	Plastic	-

3.3 System configuration



Note1: Numbers assigned to equipment or cables on this diagram correspond to the list in “3.1 Equipment(s) used” and “3.2 Cable(s) used”.
Note2: One ferrite core of DC cable (No.d) is an accessory of AC adapter (No.4).

4. Conducted emission at mains port test information

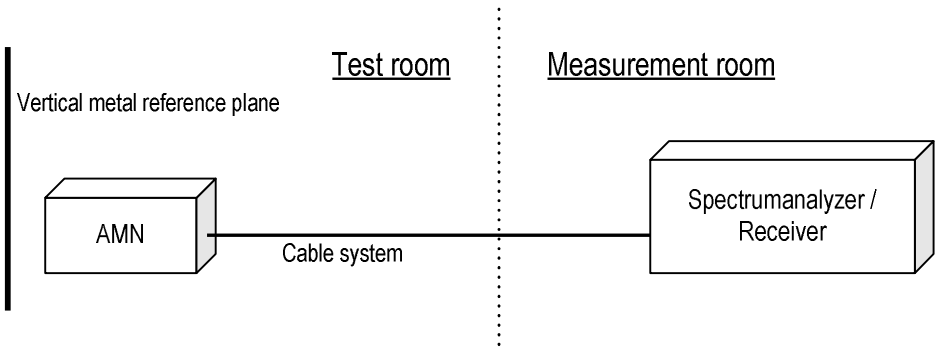
4.1 Measurement procedure

Test was applied by following conditions.

Test method	:	EN 55022
Frequency range	:	0.15MHz to 30MHz
Test place	:	10m Semi-anechoic chamber No.2
EUT was placed on	:	FRP table / (W)2.0m × (D)1.0m × (H)0.8m
Vertical Metal Reference Plane	:	(W)3.0m × (H)2.0m 0.4m away from EUT
Horizontal Metal Reference Plane	:	22.0m × 14.0m
Test receiver setting		
- Detector	:	Quasi-peak, Average
- Bandwidth	:	9kHz

EUT is connected to 50Ω/50μH+5Ω Artificial Mains Network (AMN) which is connected to reference ground plane, and is placed 80cm away from EUT. Excess of AC/DC power cable is bundled in center.
EUT operating mode is selected to emit the maximum noise. Overall frequency range is investigated with spectrum analyzer using peak detector. Maximum emission configuration is determined by manipulating the EUT, interconnecting cables. Sufficient time for EUT and test equipment is provided in order for them to warm up to their normal operating condition. If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits.

- Test configuration



4.2 Calculation method

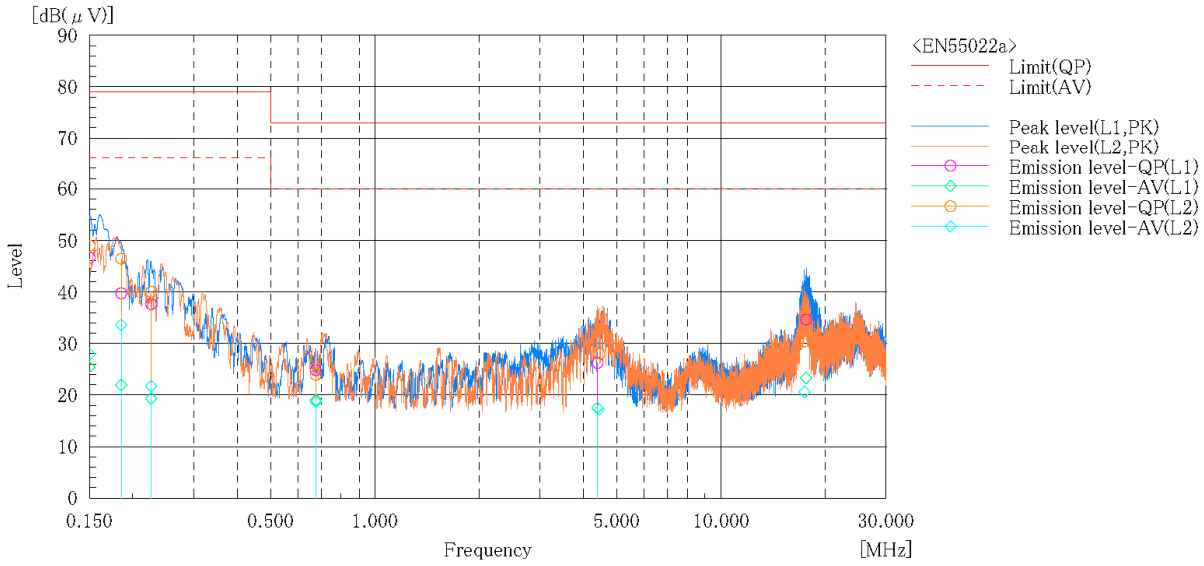
Emission level = Reading + (AMN. factor + Cable system loss)
Margin = Limit – Emission level

4.3 Test data

******* CONDUCTED EMISSION at MAINS PORT *******
[10m Semi-anechoic chamber #2]

TUV SUD Zacta Ltd. | <<DATA Sheet No.1>> | 27 September,2016 23:30

Company name	: CORE CORPORATION	Standard	: EN55022 Class A
EUT	: GR-PEACH(FULL)	Operator	: T.Okumura
Model No.	: X28A-M01	Temp,Hum	: 23.5[℃] 68.8[%]
Serial No.	: N/A	Note1	: U1:BD07010 1516
Test mode	: Operation mode	Note2	:



Final Result

--- L1 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading CAV [dB(μV)]	c.f [dB]	Result QP [dB(μV)]	Result CAV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin CAV [dB]
1	0.150	36.2	15.0	10.4	46.6	25.4	79.0	66.0	32.4	40.6
2	0.185	29.3	11.5	10.4	39.7	21.9	79.0	66.0	39.3	44.1
3	0.226	27.3	9.0	10.3	37.6	19.3	79.0	66.0	41.4	46.7
4	0.675	14.4	8.6	10.4	24.8	19.0	73.0	60.0	48.2	41.0
5	4.400	15.5	6.8	10.7	26.2	17.5	73.0	60.0	46.8	42.5
6	17.600	23.2	11.9	11.4	34.6	23.3	73.0	60.0	38.4	36.7

--- L2 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading CAV [dB(μV)]	c.f [dB]	Result QP [dB(μV)]	Result CAV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin CAV [dB]
1	0.150	38.6	17.5	10.4	49.0	27.9	79.0	66.0	30.0	38.1
2	0.185	36.0	23.2	10.4	46.4	33.6	79.0	66.0	32.6	32.4
3	0.226	29.6	11.3	10.4	40.0	21.7	79.0	66.0	39.0	44.3
4	0.675	13.5	8.3	10.4	23.9	18.7	73.0	60.0	49.1	41.3
5	4.451	17.3	6.5	10.7	28.0	17.2	73.0	60.0	45.0	42.8
6	17.439	19.0	9.2	11.4	30.4	20.6	73.0	60.0	42.6	39.4

Zacta

5. Radiated emission test information (Below 1GHz)

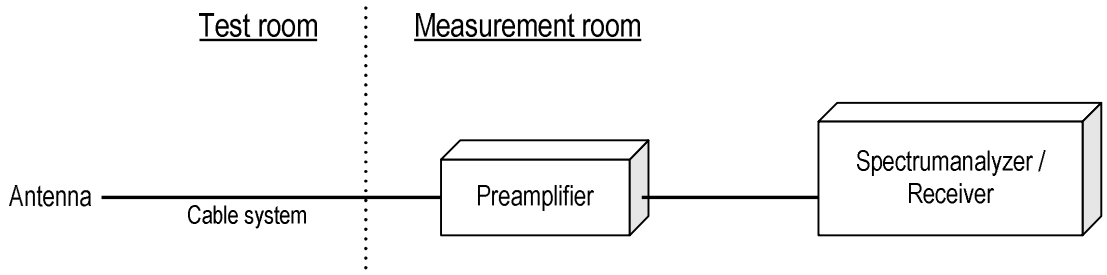
5.1 Measurement procedure

Test was applied by following conditions.

Test method	:	EN 55022
Frequency range	:	30MHz to 1000MHz
Test place	:	10m Semi-anechoic chamber No.2
EUT was placed on	:	FRP table / (W)2.0m × (D)1.0m × (H)0.8m
Antenna distance	:	10m
Test receiver setting		
- Detector	:	Quasi-peak
- Bandwidth	:	120kHz

EUT operating mode is selected to emit the maximum noise. Overall frequency range is investigated with spectrum analyzer using peak detector. Then, emission measurements are performed with test receiver in above setting. In order to find the maximum emissions, antenna is adjusted between 1m to 4m in height and varied its polarization (horizontal and vertical), and EUT azimuth is also varied by rotating turntable 0 to 360 degrees. Sufficient time for EUT, peripherals and test equipment is provided in order for them to warm up to their normal operating condition.

- Test configuration



5.2 Calculation method

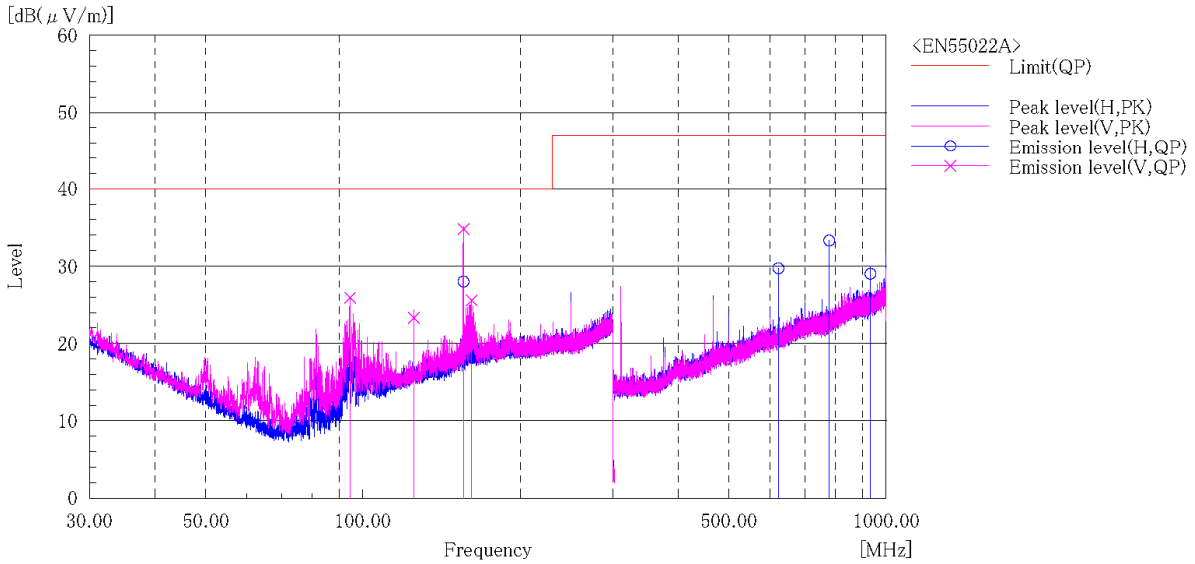
Emission level = Reading + (Ant. factor + Cable system loss – Amp. Gain)
Margin = Limit – Emission level

5.3 Test data

******* RADIATED EMISSION *******
[10m Semi-anechoic chamber #2]

TUV SUD Zacta Ltd. <<DATA Sheet No.1>> 26 September,2016 16:05

Company name	: CORE CORPORATION	Standard	: EN55022 Class A
EUT	: GR-PEACH(FULL)	Operator	: N.Iwasawa
Model No.	: X28A-M01	Temp,Hum	: 22.8[℃] 69.8[%]
Serial No.	: N/A	Note1	: U1:BD07010 1516
Test mode	: Operation mode	Note2	:



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(μV)]	c.f [dB(1/m)]	Result QP [dB(μV/m)]	Limit QP [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [°]
1	94.375	V	39.0	-13.1	25.9	40.0	14.1	100.0	127.0
2	125.000	V	31.9	-8.6	23.3	40.0	16.7	100.0	75.0
3	155.550	V	41.6	-6.8	34.8	40.0	5.2	100.0	143.0
4	155.550	H	34.8	-6.8	28.0	40.0	12.0	400.0	167.0
5	161.136	V	32.0	-6.4	25.6	40.0	14.4	100.0	117.0
6	622.206	H	33.0	-3.3	29.7	47.0	17.3	189.0	83.0
7	777.760	H	34.6	-1.3	33.3	47.0	13.7	127.0	83.0
8	933.313	H	27.6	1.4	29.0	47.0	18.0	109.0	40.0

Zacta

6. Radiated emission test information (Above 1GHz)

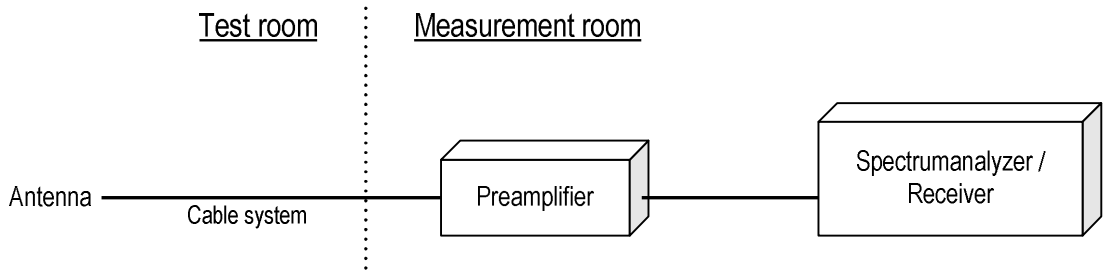
6.1 Measurement procedure

Test was applied by following conditions.

Test method	:	EN 55022
Frequency range	:	1000MHz to 2000MHz
Test place	:	10m Semi-anechoic chamber No.2
EUT was placed on	:	Styrene foam table / (W)2.0m × (D)1.0m × (H) 0.8m
Antenna distance	:	Refer to Note in datasheet for measurements
Test receiver setting		
- Detector	:	Peak, Average
- Bandwidth	:	1MHz
w : The dimension of the line tangent to EUT formed by θ_{3dB} at the measurement distance d	:	$w = 2 \times d \times \tan(0.5 \times \theta_{3dB})$ $w = 1.83$ $\theta_{3dB} = 34°$

Test setups and operation conditions of the EUT are performed the same as those used below 1GHz.
Distance from antenna to EUT is adjusted by test volume. Measurement data in actual measurement distance is adjusted to the value in 3m distance. Refer to 6.2 Calculation methods.
EUT operating mode is selected to emit the maximum noise. Overall frequency range is investigated with spectrum analyzer using peak detector. Then, emission measurements are performed with test receiver in above setting.
Absorbers with 0.3m height are placed on a ground plane between EUT and antenna. Refer to Configuration photographs for location of absorbers.
In order to find the maximum emissions, antenna is adjusted by the height (scan or fixed) calculated from the relation between size and "w" of EUT and varied its polarization (horizontal and vertical) for measurements above 1GHz. Refer to Note in datasheet for height of antenna for measurements above 1GHz, and EUT azimuth is also varied by rotating turntable 0 to 360 degrees. Sufficient time for EUT, peripherals and test equipment is provided in order for them to warm up to their normal operating condition.

- Test configuration



6.2 Calculation method

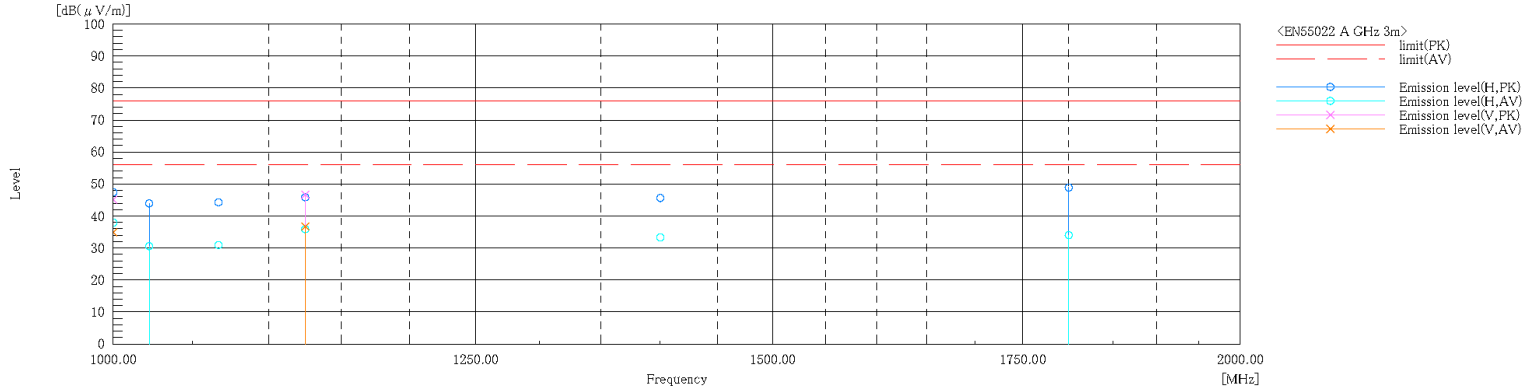
Emission level = Reading + Conversion factor to distance + (Ant. factor + Cable system loss – Amp. Gain)
Margin = Limit – Emission level

Conversion factor to distance [d B(μV)/m] = 20 log (Measurement distance [m] / 3m）
= 20 log (3.8 / 3)
= 2.1

******* RADIATED EMISSION *******
[10m Semi-anechoic chamber #2]

TUV SUD Zacta Ltd. <<DATA Sheet No.1>> 28 September,2016 01:15

Company name	: CORE CORPORATION	Standard	: EN55022 Class A GHz 3m
EUT	: GR-PEACH(FULL)	Operator	: T.Okumura
Model No.	: X28A-M01	Temp,Hum	: 23.5[℃] 68.8[%]
Serial No.	: N/A	Note1	: U1:BD07010 1516
Test mode	: Operation mode	Note2	: Measurement distance:3.8m / Fixed height of antenna:1.0m



Final Result

No.	Frequency [MHz]	(P)	Reading PK [dB(μV)]	Reading AV [dB(μV)]	c.f [dB(1/m)]	Result PK [dB(μV/m)]	Result AV [dB(μV/m)]	Limit PK [dB(μV/m)]	Limit AV [dB(μV/m)]	Margin PK [dB]	Margin AV [dB]	Height [cm]	Angle [°]
1	1000.000	H	46.8	37.3	0.6	47.4	37.9	76.0	56.0	28.6	18.1	100.0	186.0
2	1000.000	V	44.5	34.4	0.6	45.1	35.0	76.0	56.0	30.9	21.0	100.0	228.0
3	1022.200	H	43.2	29.8	0.7	43.9	30.5	76.0	56.0	32.1	25.5	100.0	326.0
4	1066.635	H	43.4	30.0	0.9	44.3	30.9	76.0	56.0	31.7	25.1	100.0	320.0
5	1125.000	H	44.3	34.4	1.5	45.8	35.9	76.0	56.0	30.2	20.1	100.0	197.0
6	1125.000	V	45.1	35.3	1.5	46.6	36.8	76.0	56.0	29.4	19.2	100.0	37.0
7	1400.000	H	42.3	30.0	3.3	45.6	33.3	76.0	56.0	30.4	22.7	100.0	134.0
8	1800.000	H	42.4	27.5	6.5	48.9	34.0	76.0	56.0	27.1	22.0	100.0	140.0

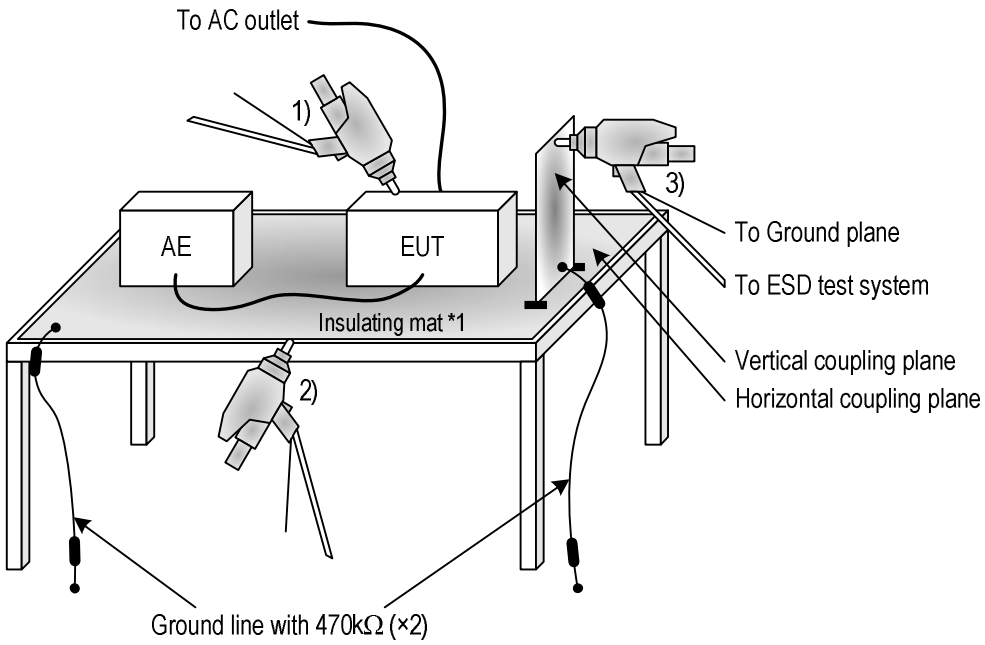
7. Electrostatic discharge immunity

7.1 Applied test condition

Test was applied by following conditions.

Items	Description
Test method	EN 61000-4-2
Performance criterion	B
Test level	Contact discharge : ±2kV, ±4kV Air discharge : ±2kV, ±4kV, ±8kV
Number of discharge	Contact discharge : 25 discharges Air discharge : 10 single discharge
Time interval	1 sec.
Table size	Wooden table / (W)2.0m × (D)1.0m × (H)0.8m
Horizontal coupling plane size	1.6m × 0.8m
Vertical coupling plane size	0.5m × 0.5m

7.2 Sample test setup



☐ 1) Discharge to EUT

☑ 2) Discharge to Horizontal coupling plane

☐ 3) Discharge to Vertical coupling plane

*1: Used it for EUT Installation / Table-top only

Zacta

7.3 Test data

Operating mode : Operation mode
Date of test : September 28, 2016
Test Place : Shielded room No.1
Climatic condition : 26.2ºC 43.7% 985hPa
Test engineer : Yoshiyuki Takahashi

Note: As a result of test performed based on Test plan, EUT passed the test.

[Contact discharge to conductive part]

Discharge Point (Refer to discharge locations)	Result of performance criterion				Test result
	Test voltage 2kV		Test voltage 4kV		
	+	-	+	-	
Horizontal Coupling Plane (Indirect) Front, Right, Back, Left edge	A	A	A	A	PASS

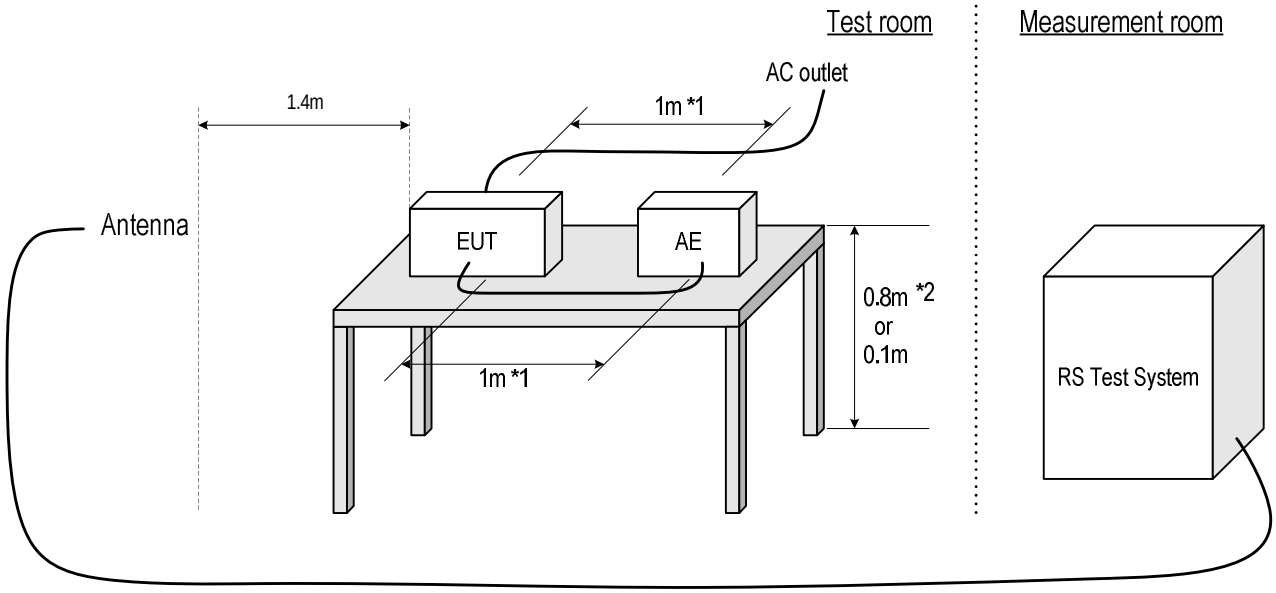
8. Radio-frequency electromagnetic field immunity

8.1 Applied test condition

Test was applied by following conditions.

Items	Description
Test method	EN 61000-4-3
Performance criterion	A
Test level	3V/m
Frequency range	80 MHz to 1000 MHz
Frequency step	1 %
Dwell time	3.0 sec.
Modulation	AM80%　1kHz
EUT direction	Front, Right, Back, Left
Antenna polarity	Horizontal and Vertical
Test distance	1.4m
Antenna height	1.2m
Antenna type	Log periodic antenna

8.2 Sample test setup



*1: Wiring is left exposed to the electromagnetic field for a distance of 1m from the EUT.
Wire is arranged parallel to the uniform area of the field.
*2: EUT Installation / Table-top: 0.8m
EUT Installation / Floor-Standing: 0.1m

8.3 Test data

Operating mode : Operation mode
Date of test : September 17, 2016
Test Place : Small anechoic chamber
Climatic condition : 24.3ºC 49.1% 984hPa
Test engineer : Yoshiyuki Takahashi

Note: As a result of test performed based on Test plan, EUT passed the test.

[80 MHz to 1000 MHz]

EUT direction	Test level (V/m)	Antenna polarity	Result of performance criterion	Test result
Front (0°)	3	Horizontal	A	PASS
		Vertical	A	PASS
Right (90°)	3	Horizontal	A	PASS
		Vertical	A	PASS
Back (180°)	3	Horizontal	A	PASS
		Vertical	A	PASS
Left (270°)	3	Horizontal	A	PASS
		Vertical	A	PASS

9. Electrical fast transient/burst immunity

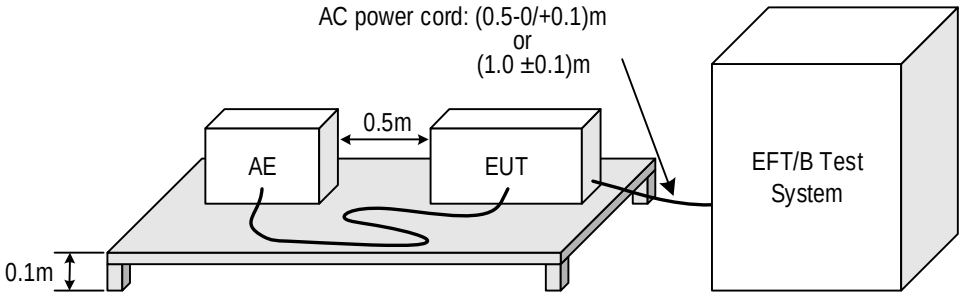
9.1 Applied test condition

Test was applied by following conditions.

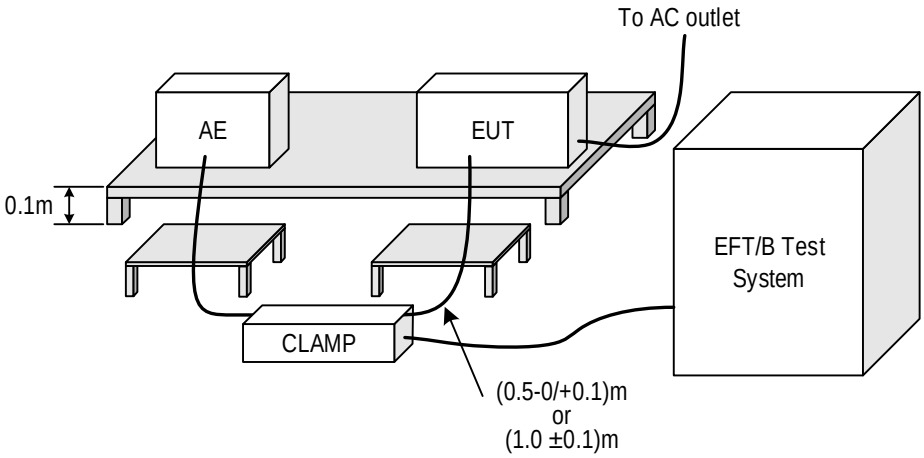
Items	Description
Test method	EN 61000-4-4
Performance criterion	B
Test level	☐ AC power port : ±1.0 kV
	☑ Signal port : ±0.5 kV
	☐ DC power port : ±0.5 kV
Spec. of wave form Rise time of one pulse Impulse duration Repetition frequency Burst duration Burst period	 5 ns 50ns 5 kHz 15 ms 300 ms
Duration	60 sec.

9.2 Sample test setup

Power port



Signal port



9.3 Test data

Operating mode : Operation mode
Date of test : September 28, 2016
Test Place : Shielded room No.1
Climatic condition : 26.2ºC 43.7% 985hPa
Test engineer : Yoshiyuki Takahashi

Note: As a result of test performed based on Test plan, EUT passed the test.

Coupling	Injection method	Test voltage (kV)	Polarity (+ / -)	Result of performance criterion	Test result
Signal port USB	Clamp	0.5	+	A	PASS
			-	A	PASS
Signal port eSATA	Clamp	0.5	+	A	PASS
			-	A	PASS
Signal port LAN	Clamp	0.5	+	A	PASS
			-	B*	PASS

B*: Although connection between the EUT and the PC was disturbed and stopped temporarily, the EUT performed self-recovery.

10. Conducted disturbances, induced by radio-frequency fields immunity

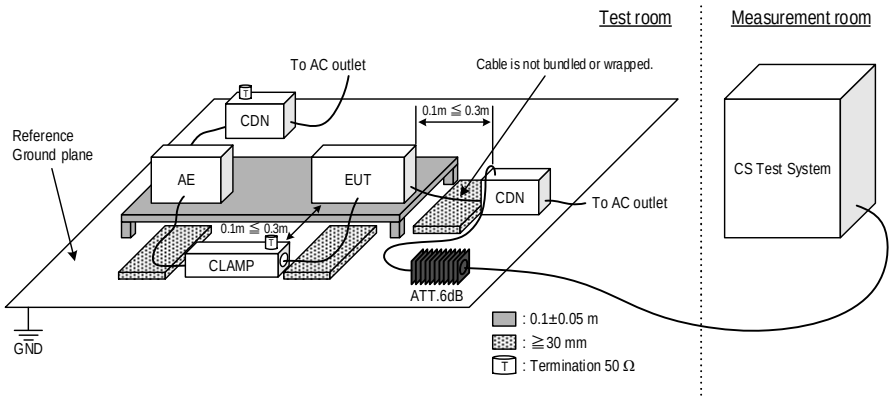
10.1 Applied test condition

Test was applied by following conditions.

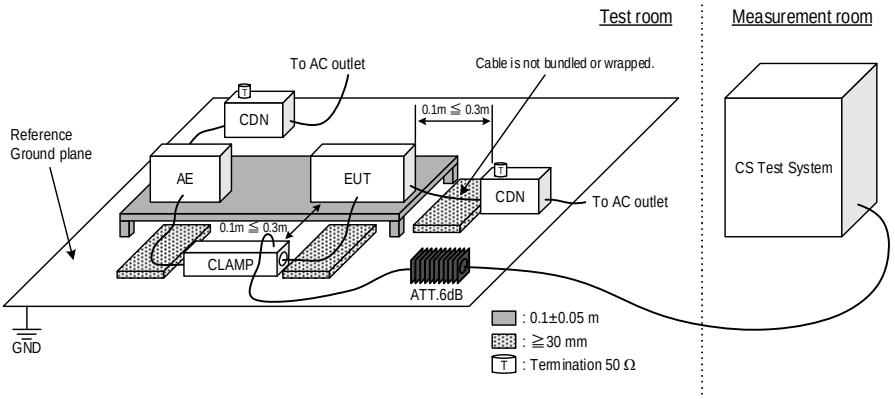
Items	Description
Test method	EN 61000-4-6
Performance criterion	A
Test level	☐ AC power port : 3V (e.m.f.)
	☑ Signal port : 3V (e.m.f.)
	☐ DC power port : 3V (e.m.f.)
Frequency range	0.15MHz to 80MHz
Frequency step	1%
Dwell time	3.0 sec.
Modulation	AM 80% 1kHz
Coupling & decoupling device	CDN-M2 (AC power port): For Peripheral EM clamp (Signal port) CDN (Signal port)

10.2 Sample test setup

Power port



Signal port



10.3 Test data

Operating mode : Operation mode
Date of test : September 17, 2016
Test Place : Small anechoic chamber
Climatic condition : 24.3ºC 49.1% 984hPa
Test engineer : Yoshiyuki Takahashi

Note: As a result of test performed based on Test plan, EUT passed the test.

Test port	Test level (e.m.f.)	Injection method	Result of performance criterion	Test result
Signal port USB	3V	EM clamp	A	PASS
Signal port eSATA	3V	EM clamp	A	PASS
Signal port LAN	3V	CDN	A	PASS

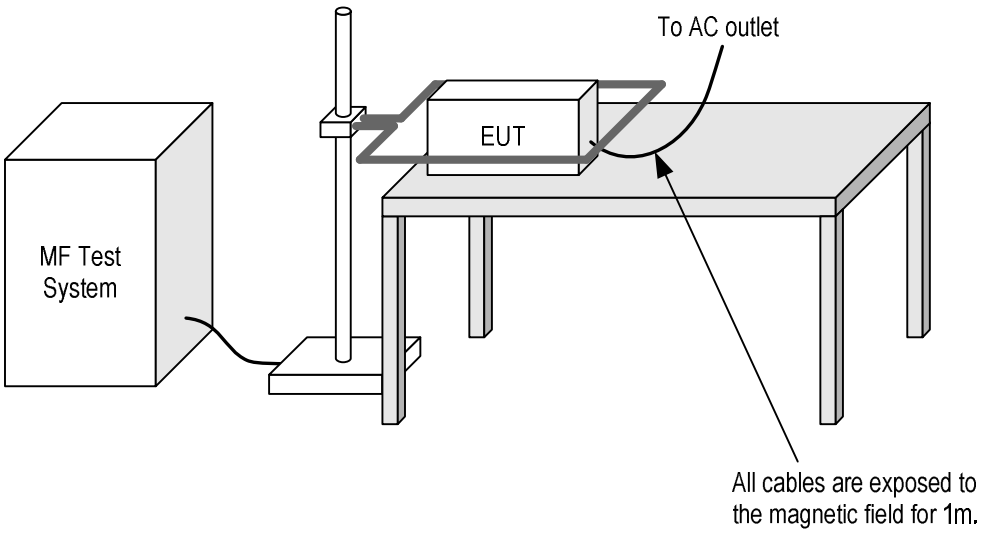
11. Power-frequency magnetic field immunity

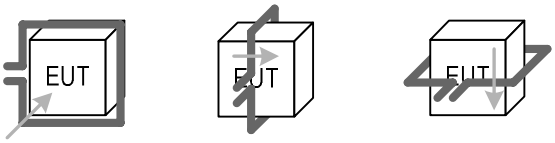
11.1 Applied test condition

Test was applied by following conditions.

Items	Description
Test method	EN 61000-4-8
Performance criterion	A
Test level	1 A/m
Power frequency	50 Hz, 60 Hz
Test duration	1 min.
Induction coil	1m × 1m Square coil

11.2 Sample test setup





11.3 Test data

Operating mode : Operation mode
Date of test : September 28, 2016
Test Place : Shielded room No.1
Climatic condition : 26.2ºC 43.7% 985hPa
Test engineer : Yoshiyuki Takahashi

Note: As a result of test performed based on Test plan, EUT passed the test.

[50Hz]

Test axis	Test level (A/m)	Result of performance criterion	Test result
X axis	1	A	PASS
Y axis	1	A	PASS
Z axis	1	A	PASS

[60Hz]

Test axis	Test level (A/m)	Result of performance criterion	Test result
X axis	1	A	PASS
Y axis	1	A	PASS
Z axis	1	A	PASS

12. Measurement uncertainty

The reported measurement uncertainty is based on a value obtained by multiplying standard uncertainty by coverage factor of k=2, and a level of confidence becomes 95 %.

Item	Parameter	Uncertainty
Conducted Emission, AMN	150kHz to 30MHz	± 3.4 dB
Radiated Emission	30MHz to 1000MHz	± 4.6 dB
Radiated Emission	1GHz to 6GHz	± 4.9 dB
Radiated Immunity test	80MHz to 1GHz	± 2.1 dB
Conducted Immunity test, CDN	150kHz to 80MHz	± 1.4 dB
Conducted Immunity test, EM Clamp	150kHz to 80MHz	± 3.2 dB
Conducted Immunity test, Direct Injection	150kHz to 80MHz	± 3.1 dB

Measurement uncertainty of not listed immunity tests is considered to suffice because requirements of relevant standards are met.

13. Laboratory Information

1. Location
   Name: Yonezawa Testing Center
   Address: 4149-7 Hachimanpara 5-chome Yonezawa-shi Yamagata 992-1128 Japan
   Phone: +81-238-28-2880
   Fax: +81-238-28-2888

2. Accreditation and Registration
   1) NVLAP
      LAB CODE: 200306-0

   2) VLAC
      Accreditation No.: VALC-013

   3) BSMI
      Laboratory Code: SL2-IN-E-6018, SL2-A1-E-6018

   4) FCC

Registration number	Expiration date
540072	2017-2-20

   5) Industry Canada

Site number	Facility	Expiration date
4224A-4	3m Semi-anechoic chamber	2017-12-03
4224A-5	10m Semi-anechoic chamber No.1	2017-12-03
4224A-6	10m Semi-anechoic chamber No.2	2017-01-15

   6) VCCI Council

Registration number	Expiration date
A-0166	2017-07-03

Appendix A. Test equipment

Conducted emission at mains port

Equipment	Company	Model No.	Serial No.	Cal. due	Cal. Date
EMI Receiver	ROHDE&SCHWARZ	ESR7	101187	Sep. 30, 2016	Sep. 17, 2015
Artificial mains network for EUT	Kyoritsu Electrical Works, Ltd.	KNW-242F	8-1973-1	Jun. 30, 2017	Jun. 20, 2016
Attenuator	TME	CFA-01 10dB	N/A(S003)	Jul. 31, 2017	Jul. 19, 2016
50Ω terminator	TDC	TDL-21A	N/A(S021)	Jan. 31, 2017	Jan. 22, 2016
Coaxial cable	FUJIKURA	5D-2W/5m	N/A(S336)	Jan. 31, 2017	Jan. 12, 2016
Microwave Cable	HUBER+SUHNER	SUCOFLEX106/28m	501941/6	Jan. 31, 2017	Jan. 12, 2016
Microwave Cable	HUBER+SUHNER	SUCOFLEX104/2m	MY15570/4	Jan. 31, 2017	Jan. 12, 2016
PC	DELL	OPTIPLEX9010	00186-228-073-851	N/A	N/A
Software	TOYO Corporation	EP5/CE-AJ	0611193/V5.4.011	N/A	N/A

Radiated emission (Below 1GHz)

Equipment	Company	Model No.	Serial No.	Cal. due	Cal. date
EMI Receiver	ROHDE&SCHWARZ	ESR7	101187	Sep. 30, 2016	Sep. 17, 2015
Biconical antenna	Schwarzbeck	VHA9103/BBA9106	2323	Oct. 31, 2016	Oct. 5, 2015
Log periodic antenna	Schwarzbeck	UHALP9108A	0589	Oct. 31, 2016	Oct. 5, 2015
Attenuator	TDC	TAT-43B-03	N/A(S205)	Jun. 30, 2017	Jun. 21, 2016
Attenuator	TME	CFA-01NPJ-6	N/A(S274)	Jun. 30, 2017	Jun. 21, 2016
Microwave Cable	HUBER+SUHNER	SUCOFLEX104/1m	SN MY20467/6	Jan. 31, 2017	Jan. 12, 2016
Microwave Cable	HUBER+SUHNER	SUCOFLEX104/9m	MY23759/4	Jan. 31, 2017	Jan. 21, 2016
Microwave Cable	HUBER+SUHNER	SUCOFLEX106/10m	501944/6	Jan. 31, 2017	Jan. 12, 2016
Microwave Cable	HUBER+SUHNER	SUCOFLEX104/2m	MY15464/4	Jan. 31, 2017	Jan. 12, 2016
Preamplifier	ANRITSU	MH648A	M96257	Jun. 30, 2017	Jun. 20, 2016
PC	DELL	OPTIPLEX9010	00186-228-073-851	N/A	N/A
Software	TOYO Corporation	EP5/RE-AJ	0611193/V5.6.000	N/A	N/A
10m Semi-Anechoic Chamber	TOKIN	10m Semi an-echoic Chamber No.2	N/A(NSA10mΦ5m)	Jan. 31, 2017	Jan. 8, 2016

Radiated emission (Above 1GHz)

Equipment	Company	Model No.	Serial No.	Cal. due	Cal. date
EMI Receiver	ROHDE&SCHWARZ	ESR7	101187	Sep. 30, 2016	Sep. 17, 2015
Preamplifier	TSJ	MLA-001265-A01-30	1245-F0102384	Feb. 28, 2017	Feb. 24, 2016
Double ridged guide antenna	ETS LINDGREN	3117	00143141	Mar. 31, 2017	Mar. 3, 2016
Attenuator	Agilent Technologies	8491B	MY39268632	Feb. 28, 2017	Feb. 24, 2016
Microwave Cable	HUBER+SUHNER	SUCOFLEX104/1m	SN MY20467/6	Jan. 31, 2017	Jan. 12, 2016
Microwave cable	HUBER+SUHNER	SUCOFLEX104/9m	SN MY30038/4	Jan. 31, 2017	Jan. 12, 2016
Microwave Cable	HUBER+SUHNER	SUCOFLEX106/10m	501944/6	Jan. 31, 2017	Jan. 12, 2016
Microwave Cable	HUBER+SUHNER	SUCOFLEX104/2m	MY15570/4	Jan. 31, 2017	Jan. 12, 2016
Absorber	NEC TOKIN	TFA	N/A	N/A	N/A
10m Semi-Anechoic Chamber	TOKIN	10m Semi an-echoic Chamber No.2	N/A(SVSWRΦ3m1-6GHz)	Jan. 31, 2017	Jan. 12, 2016
PC	DELL	OPTIPLEX9010	00186-228-073-851	N/A	N/A
Software	TOYO Corporation	EP5/RE-AJ	0611193/V5.6.000	N/A	N/A
Spectrum analyzer	Agilent Technologies	E4440A	US44302655	May. 31, 2017	May. 27, 2016
Absorber	RIKEN	PFP30	N/A	N/A	N/A

Zacta

Electrostatic discharge immunity

Equipment	Company	Model No.	Serial No.	Cal. due	Cal. Date
ESD simulator	NoiseKen	ESS-2002	ESS0493502	Oct. 31, 2016	Oct. 2, 2015
Horizontal coupling plane	Zacta	N/A	N/A	N/A	N/A

Radio-frequency electromagnetic field immunity

Equipment	Company	Model No.	Serial No.	Cal. due	Cal. Date
Signal generator	ROHDE&SCHWARZ	SMB100A	100341	May. 31, 2017	May. 24, 2016
Log periodic antenna	Schwarzbeck	VULP9118E	901	Dec. 31, 2016	Dec. 21, 2015
Millivolt meter	ROHDE&SCHWARZ	URV5	841771/030	May. 31, 2017	May. 6, 2016
Power sensor	ROHDE&SCHWARZ	NRV-Z5	100681	May. 31, 2017	May. 6, 2016
Power sensor	ROHDE&SCHWARZ	NRV-Z5	100686	May. 31, 2017	May. 6, 2016
Electric field probe	Amplifier Research	FL7006	0326694	Aug. 31, 2017	Aug. 26, 2016
Electric field monitor	Amplifier Research	FM7004	0327186	Aug. 31, 2017	Aug. 26, 2016
Laser Probe Interface	Amplifier Research	FL7000	0326201	Aug. 31, 2017	Aug. 26, 2016
RF Power Amplifier	PRANA	AP32MT255	0802-0844	May. 31, 2017	May. 25, 2016
Dual Directional Coupler	WERLATONE	C3908-727	56196	Oct. 31, 2016	Oct. 20, 2015
Small Semi anechoic Chamber	TOKIN	N/A	N/A(9003)	Apr. 30, 2017	Apr. 30, 2016
Software	TSJ	TEPTO-RS/ANT	Ver.4.8.146	N/A	N/A

Electrical fast transient/burst immunity

Equipment	Company	Model No.	Serial No.	Cal. due	Cal. Date
Ultra compact simulator	EM TEST	UCS500M4	V0550100978	Mar. 31, 2017	Mar. 29, 2016
Capacitive coupling clamp	EM TEST	HFK	N/A(0652)	May. 31, 2017	May. 24, 2016

Conducted disturbances, induced by radio-frequency fields immunity

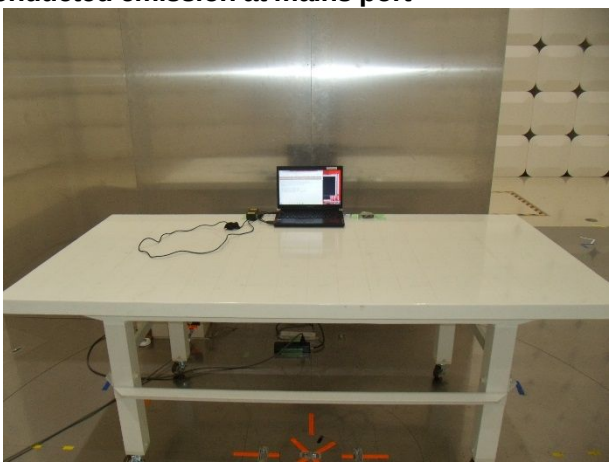
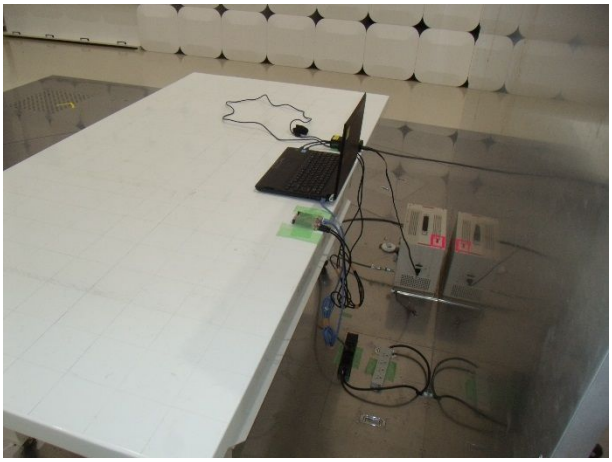
Equipment	Company	Model No.	Serial No.	Cal. due	Cal. Date
Signal generator	ROHDE&SCHWARZ	SMB100A	100341	May. 31, 2017	May. 24, 2016
Millivolt meter	ROHDE&SCHWARZ	URV5	841771/030	May. 31, 2017	May. 6, 2016
Power sensor	ROHDE&SCHWARZ	NRV-Z5	100681	May. 31, 2017	May. 6, 2016
Power sensor	ROHDE&SCHWARZ	NRV-Z5	100686	May. 31, 2017	May. 6, 2016
RF power amplifier	Amplifier Research	250A250A	312909	May. 31, 2017	May. 25, 2016
Directional coupler	WERLATONE	C6021-10	99483	Feb. 28, 2017	Feb. 22, 2016
Attenuator	Weinschel	WA53-6-33	A797	Dec. 31, 2016	Dec. 24, 2015
CDN	Fischer Custom Communication, Inc.	FCC-801-M2/M3	120565	Mar. 31, 2017	Mar. 29, 2016
High Transmission BW CDN	Fischer Custom Communication, Inc.	F-090407-1004-1	112180	Feb. 28, 2017	Feb. 26, 2016
EM injection clamp	FCC	F-203I-A-23mm	160836	Sep. 30, 2017	Sep. 8, 2016
Decoupling clamp	Kyoritsu Electrical Works, Ltd.	KT-20	8-1201-5	Jul. 31, 2017	Jul. 19, 2016
50Ω terminator	HRS	UG-88/U	N/A(S068)	Jun. 30, 2017	Jun. 21, 2016
Software	TSJ	TEPTO-CS2	Ver.1.0.83	N/A	N/A

Power-frequency magnetic field immunity

Equipment	Company	Model No.	Serial No.	Cal. due	Cal. Date
Magnetic field coil	EM TEST	MS100	N/A(1495)	Oct. 31, 2016	Oct. 29, 2015
Current transformer	EM TEST	MC2630	0905-08	Oct. 31, 2016	Oct. 29, 2015
Magnetic field exposure level tester	Narda S.T.S	ELT-400	N-0037	May. 31, 2017	May. 20, 2015
AC power supply	NF Corporation	EPO4000S	9164181	N/A	N/A
AC power supply system	KIKUSUI	PCR500L	GD000957	N/A	N/A

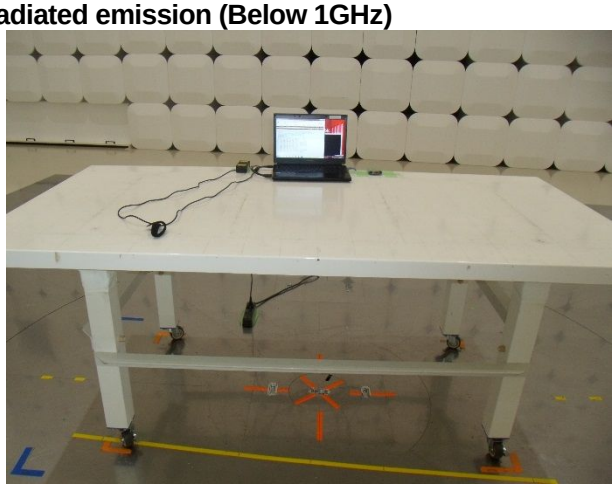
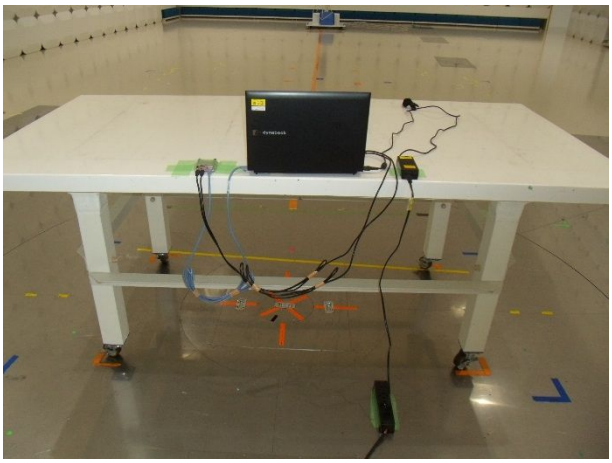
Appendix B. Configuration photographs

Conducted emission at mains port

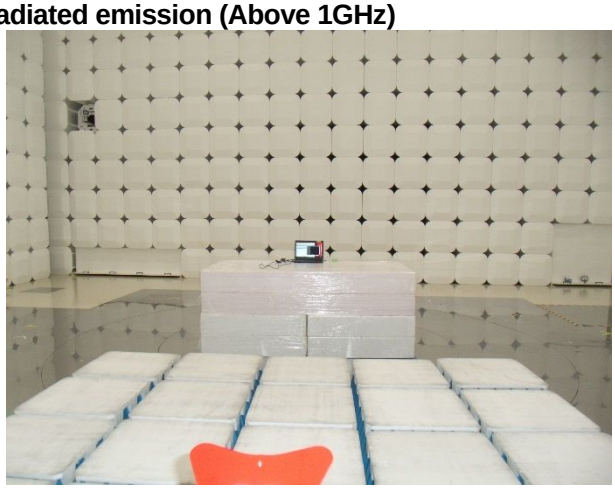
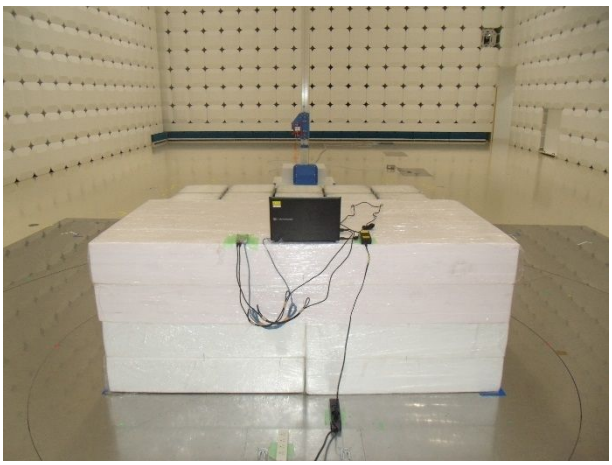
The photographs show maximized emission configuration.

Radiated emission (Below 1GHz)

The photographs show maximized emission configuration.

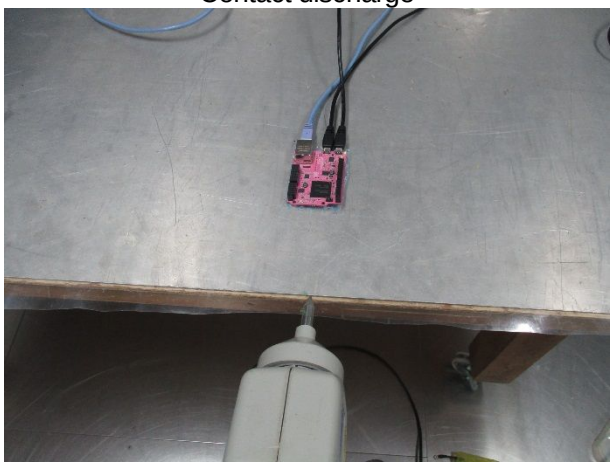
Radiated emission (Above 1GHz)

The photographs show maximized emission configuration.

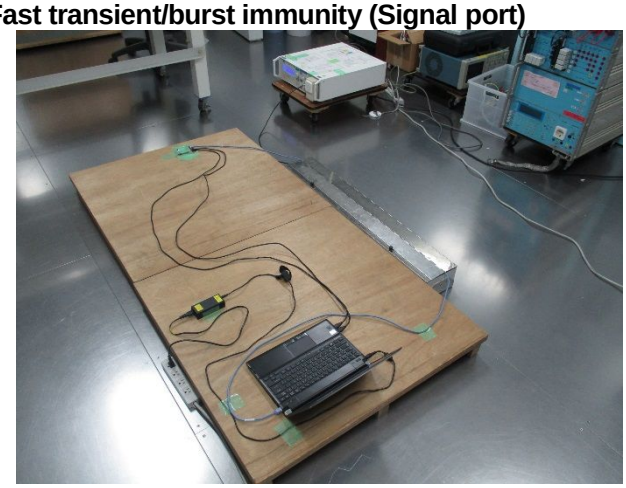
Electrostatic discharge immunity

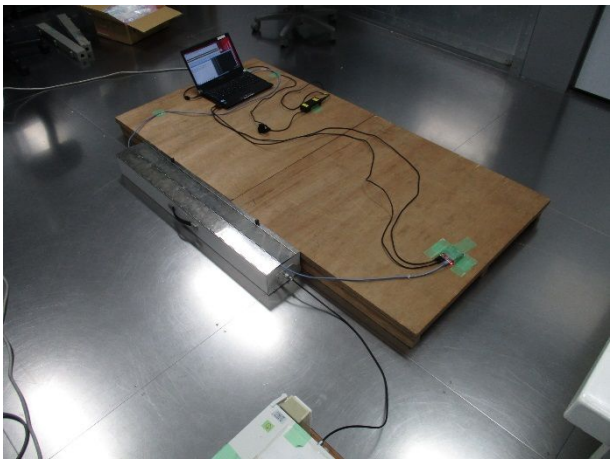
Contact discharge



Radio-frequency electromagnetic field immunity

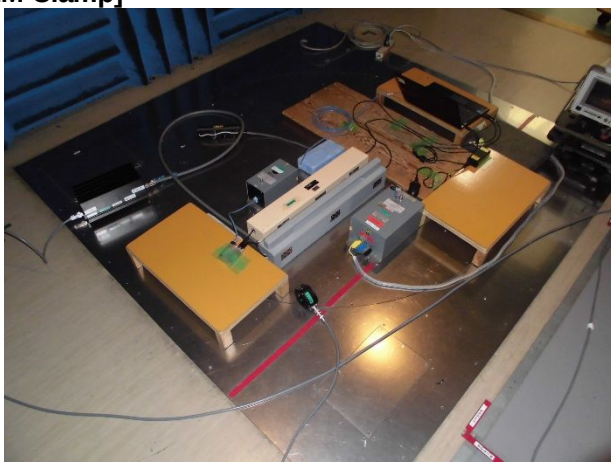
Fast transient/burst immunity (Signal port)



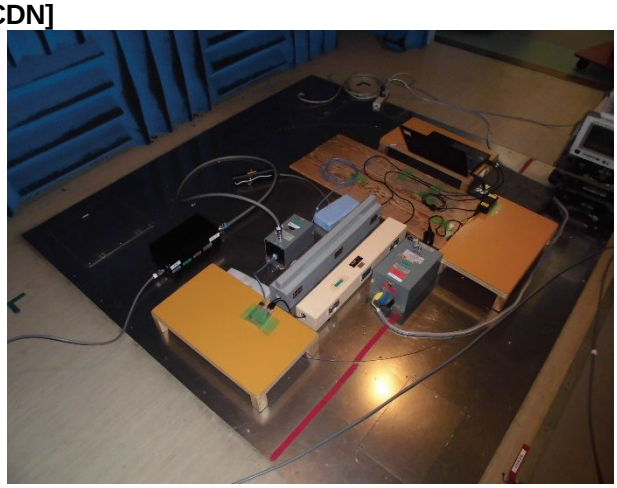
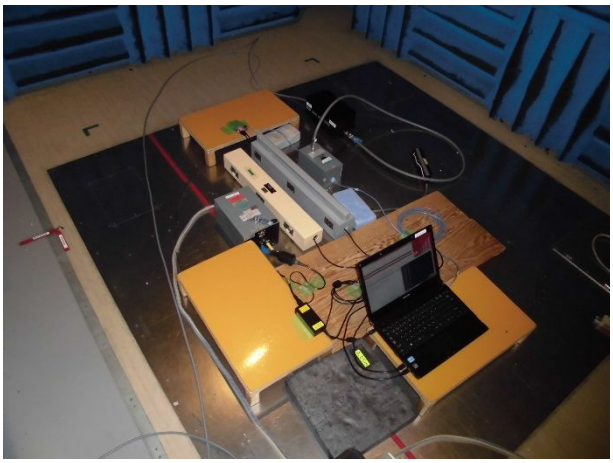


Zacta

Conducted disturbances, induced by radio-frequency fields immunity (Signal port) [EM Clamp]




Conducted disturbances, induced by radio-frequency fields immunity (Signal port) [CDN]

Power-frequency magnetic field immunity