Total 28 pages

EMC TEST REPORT

Test item

: Medical Image Processing Unit

Model No.

: 1012WGB

Order No.

: DTNC1507-03747, DTNC1507-03750

Date of receipt

: 2015-07-28

Test duration

: 2015-08-12 ~ 2015-08-17

Date of Issue

: 2015-09-10

Applicant

: Rayence Co., Ltd.

14, Samsung 1-ro 1-gil, Hwaseong-si, Gyeonggi-do, Korea

Test laboratory

: DT&C Co., Ltd.

42, Yurim-ro, 154beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea 449-935

Test specification

: CAN/CSA CISPR 22-10

ANSI C 63.4:2009 ICES-003:2012

FCC Part 15 Subpart B Class A digital devices

Test environment

: Temperature : (22 ~ 23) °C,

Humidity: (42 ~ 54) % R.H.

Test result

: X Comply

☐ Not Comply

The test results presented in this test report are limited only to the sample supplied by applicant and the use of this test report is inhibited other than its purpose.

This test report shall not be reproduced except in full, without the written approval of DT&C Co., Ltd.

Tested by:

Reviewed by:

Engineer JunHo Park Technical Manager YoungKyu Shin

PRESIDENT OF DT&C Co., Ltd.



CONTENTS

1. General Remarks	3
2. Test Laboratory	3
3. General Information of EUT	4
4. Test Summary	5
4.1 Applied standards and test results	5
4.2 Test environment and conditions	5
5. Test Set-up and operation mode	6
5.1 Principle of Configuration Selection	6
5.2 Test Operation Mode	6
5.3 Support Equipment Used	6
6. Test Results : Emission	7
6.1 Conducted Disturbance	7
6.2 Radiated Disturbance	10
Appendix 1	18
List of Test and Measurement Instruments	18
Appendix 2	20
Photographs of the Test Configurations	20
Appendix 3	24
Photographs of EUT	24
Appendix 4	27
SAMPLE LABEL & LOCATION	27
Appendix 5	28
Report Revision History	28



Total 28 pages

1. General Remarks

This report contains the result of tests performed by:

DT&C Co., Ltd.

Address: 42, Yurim-ro 154beon-gil, Cheoin-Gu, Yongin-Si, Gyeonggi-Do, Korea, 449-935

http://www.dtnc.net

Tel: +82-31-321-2664 Fax: +82-31-321-1664

2. Test Laboratory

DT&C Co., Ltd. has been accredited / filed / authorized by the agencies listed in the following table;

Certificate	Nation	Agency Code		Mark
Accreditation	Korea	KOLAS	393	ISO/IEC 17025
	USA	FCC	KR0034 101842 678747, 596748, 804488, 165783	Accredited 2.948 Listed
O'. F'''	Canada	IC	5740A-1 5740A-2	Registered
Site Filing	Japan	VCCI	C-1427 R-1364, R-3385, R-4076, R-4180, T-1442, G-338, G754, G-815	Registered
0 115 11	Korea	KC	KR0034	Designation
Certification	Germany	TUV	CARAT 13 11 86721 001	ISO/IEC 17025

Quality control in the testing laboratory is implemented as per ISO/IEC 17025 which is the "General requirements for the competent of calibration and testing laboratory".



3. General Information of EUT

Product Name	Medical Image Processing Unit		
Model Name	1012WGB		
Serial No	N/A		
Type of Sample Tested	Pre-Production		
Supplied Power for Test	120 V, 60 Hz		
Rating Power	AC 100-240 V, 47~63 Hz		
Clock Frequency	200 MHz		
Applicant	Rayence Co., Ltd.		
Арріїсані	14, Samsung 1-ro 1-gil, Hwaseong-si, Gyeonggi-do, Korea		
Manufacturer	Rayence Co., Ltd.		
Manufacturer	14, Samsung 1-ro 1-gil, Hwaseong-si, Gyeonggi-do, Korea		
Factory	Rayence Co., Ltd.		
Factory	14, Samsung 1-ro 1-gil, Hwaseong-si, Gyeonggi-do, Korea		

4. Test Summary

4.1 Applied standards and test results

Test Items	Applied Standards	Results
Conducted Disturbance	ANSI C63.4:2009 CAN/CSA CISPR 22-10	С
Radiated Disturbance	ANSI C63.4:2009 CAN/CSA CISPR 22-10	С
C=Comply N/C=Not Comp	ly N/T=Not Tested N/A=Not Applicable	

The data in this test report are traceable to the national or international standards.

4.2 Test environment and conditions

Test Items	Test date	Temp	Humidity
	(YYYY-MM-DD)	(℃)	(% R.H.)
Conducted Disturbance	2015-08-17	23	53
Radiated Disturbance	2015-08-12	23	54
	2015-08-17	22	42

Total 28 pages

5. Test Set-up and operation mode

5.1 Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

5.2 Test Operation Mode

- EUT was scanning image periodically and sending to PC through LAN cable.

5.3 Support Equipment Used

					CABLE			
Unit	Model No.	Serial No.	Manufacturer	Connect type	Length (m)	shield	Backshell	FCC ID
PSE (EUT)	1012WGB	N/A	Rayence Co., Ltd.	-	-	-	-	-
Detector (EUT)	1012WGB	N/A	Rayence Co., Ltd.	-	-	-	-	-
Note PC	110-4103TU	5C92090V98	HP	-	-	-	-	-

NOTE

- See "APPENDIX 2 Photographs" for actual system test setup

Total 28 pages

6. Test Results: Emission

6.1 Conducted Disturbance

6.1.1 Measurement Procedure

In the range of 0.15 MHz to 30 MHz, the conducted disturbance was measured and set-up was made accordance with **ANSI C63.4 and CAN/CSA CISPR 22.**

If the EUT is table top equipment, it was placed on a wooden table with a height of 0.8 m above the reference ground plane and 0.4 m from the conducting wall of the shielded room.

Also if the EUT is floor-standing equipment, it was placed on a non-conducted support with a height up to 0.15 m above the reference ground plane.

Connect the EUT's power source lines to the appropriate power mains / peripherals through the LISN. All the other peripherals are connected to the 2nd LISN, if any.

Unused measuring port of the LISN was resistively terminated by 50 ohm terminator.

The measuring port of the LISN for EUT was connected to spectrum analyzer.

Using conducted emission test software, the emissions were scanned with peak detector mode.

After scanning over the frequency range, suspected emissions were selected to perform final measurement. When performing final measurement, the receiver was used which has Quasi-Peak detector and Average detector.

By varying the configuration of the test sample and the cable routing it was attempted to maximize the emission.

For further description of the configuration refer to the picture of the test set-up.

6.1.2 Limit for Conducted Disturbance

(1) Conducted disturbance at mains ports.

	Limits dB(μV)						
Frequency range (MHz)	Quas	i-peak	Average				
(141112)	Class A	Class B	Class A	Class B			
0.15 to 0.50	79	66 to 56	66	56 to 46			
0.50 to 5	72	56	60	46			
5 to 30	73	60	60	50			
Nets 4 The leavest limit shall comb at the transition for even size							

Note 1 The lower limit shall apply at the transition frequencies.

Note 2 The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

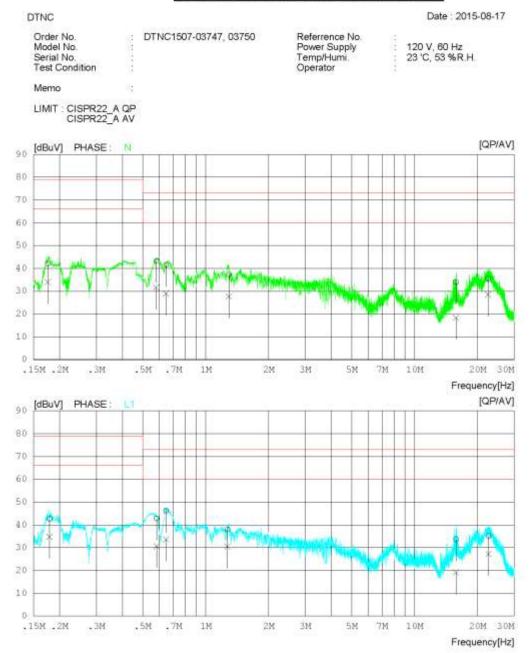
Note) 1. Emission Level = Reading Value + Correction Factor.

- 2. Correction Factor = Cable Loss + Insertion Loss of LISN
- 3. Margin = Limit Emission level

Total 28 pages

Test Result

Results of Conducted Emission



Results of Conducted Emission

Date: 2015-08-17 DTNC

: DTNC1507-03747, 03750 Order No. Model No.

Serial No. Test Condition

Referrence No. Power Supply Temp/Humi. 120 V, 60 Hz 23 'C, 53 %R.H.

Operator

LIMIT : CISPR22_A QP CISPR22_A AV

NC	FREQ	READ		C.FACTOR	RESU		LIM		MAR		PHASE	
	[MHz]	QP [dBuV]	AV [dBuV]	[dB]	QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]		
1	0.17537	32.2	24.0	10.0	42.2	34.0	79.0	66.0	36.8	32.0	N	
2	0.57950	33.2	21.5	10.1	43.3	31.6	73.0	60.0	29.7	28.4	N	
3	0.64573	31.5	18.9	10.1	41.6	29.0	73.0	60.0	31.4	31.0	N	
4	1.29080	27.1	17.5	10.1	37.2	27.6	73.0	60.0	35.8	32.4	N	
5	15.79440	23.5	7.8	10.5	34.0	18.3	73.0	60.0	39.0	41.7	N	
6	22.48400	24.9	17.8	10.6	35.5	28.4	73.0	60.0	37.5	31.6	N	
7	0.17863	32.5	24.6	10.1	42.6	34.7	79.0	66.0	36.4	31.3	L1	
8	0.58247	32.8	20.6	10.0	42.8	30.6	73.0	60.0	30.2	29.4	L1	
9	0.64550	36.2	23.6	10.0	46.2	33.6	73.0	60.0	26.8	26.4	L1	
10	1.27080	27.9	20.4	10.1	38.0	30.5	73.0	60.0	35.0	29.5	L1	
11	15.79160	22.9	8.3	10.8	33.7	19.1	73.0	60.0	39.3	40.9	L1	
12	22.61240	24.1	16.2	11.0	35.1	27.2	73.0	60.0	37.9	32.8	L1	



Total 28 pages

6.2 Radiated Disturbance

6.2.1 Measurement Procedure

The radiated disturbance was measured and set-up was made accordance with ANSI C63.4 and CAN/CSA CISPR 22.

If the EUT is tabletop equipment, it was placed on a wooden table with a height of 0.8 m above the reference ground plane and 3 m or 10 m away from the interference receiving antenna in the **10 m semi-anechoic chamber.**

Also if the EUT is floor-standing equipment, it was placed on a non-conducted support with a height up to 0.15 m above the reference ground plane.

Rotate the EUT from (0 - 360)° and position the receiving antenna at heights from (1 - 4) m above the reference ground plane continuously to determine associated with higher emission levels and record them.

The measurement was made in both the vertical and horizontal polarization, and the maximum value is presented in the report.

For below 1 GHz frequency range, Quasi-Peak detector with 120 kHz RBW was used.

Also Peak and Average detector with 1 MHz RBW were used for above 1 GHz frequency range.

For further description of the configuration refer to the picture of the test set-up.

Total 28 pages

6.2.2 Limit for Radiated Disturbance

- The test frequency range of Radiated Disturbance measurements are listed below.

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 108	1 000
108 – 500	2 000
500 – 1 000	5 000
Above 1 000	5 th harmonic of the highest frequency or 40 GHz, whichever is lower

(1) Limit for Radiated Emission below 1 000 MHz

Frequency range (MHz)	Class A Equipment (10 m distance) Quasi-peak (dBµV/m)	Class B Equipment (3 m distance) Quasi-peak (dBµV/m)
30 to 88	39.1	40
88 to 216	43.5	43.5
216 to 960	46.4	46
960 to 1 000	49.5	54

Note 1 The lower limit shall apply at the transition frequency.

Note 2 Additional provisions may be required for cases where interference occurs.

Note 3 According to 15.109(g), as an alternative to the radiated emission limit shown above, digital devices may be shown to comply with the standards(CISPR), Pub. 22 shown as below.

Frequency range	Class A Equipment (10 m distance)	Class B Equipment (10 m distance)		
(MHz)	Quasi-peak (dBµV/m)	Quasi-peak (dΒμV/m)		
30 to 230	40	30		
230 to 1 000	47	37		

(2) Limits for Radiated Emission above 1 000 MHz at a measuring distance of 3 m

Frequency	Class A E	quipment	Class B Equipment		
(GHz)	Peak (dBµV/m)	Average Peak) (dΒμV/m) (dΒμV/m)		Average (dBµV/m)	
1 to 40	80	60	74	54	

Note) 1. Emission Level = Reading Value + Loss - Gain + Ant Factor

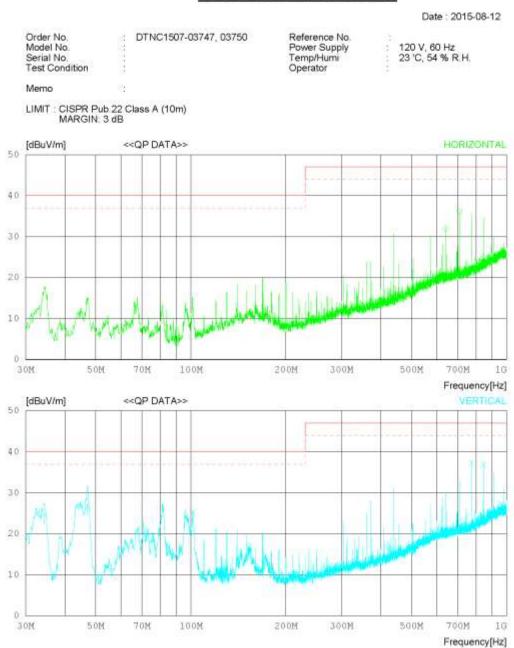
- 2. Margin = Limit Emission level
- 3. Below 6 GHz: Loss = Cable Loss, Gain = Amp Gain, Ant Factor = Antenna Factor
- 4. (6 \sim 18) GHz : Loss = Cable Loss, Ant Factor = Antenna Factor Amp Gain

Total 28 pages

Test Result

< 30 MHz ~ 1 GHz >

RADIATED EMISSION





RADIATED EMISSION

Date: 2015-08-12

Order No. Model No. Serial No. Test Condition DTNC1507-03747, 03750

Reference No. Power Supply Temp/Humi Operator

120 V, 60 Hz 23 °C, 54 % R.H.

Memo

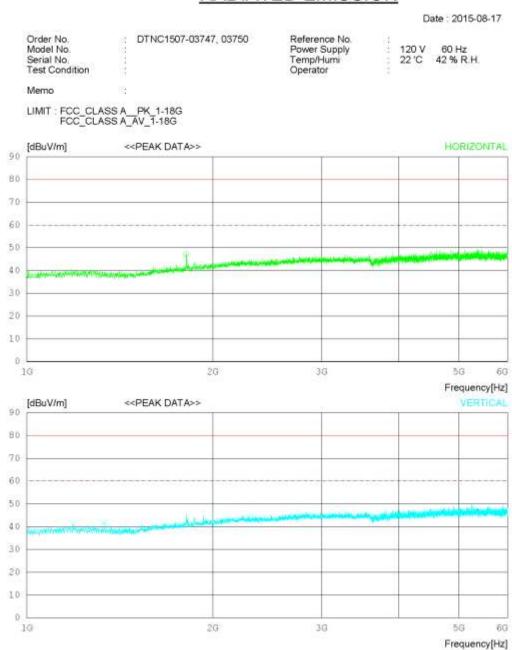
LIMIT : CISPR Pub.22 Class A (10m) MARGIN: 3 dB

No	. FREQ	READING	ANT	LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE
	[MHz]	QP [dBuV]	FACTOR [dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[cm]	[DEG]
	Horizon	tal	-							
1 2	611.265 708.909	35.3 38.7	20.6 21.3	5.9 6.5	29.8 30.3		47.0 47.0	15.0 10.8	102 102	117 130
	Vertical									
3 4 5 6	34.350 47.075 776.255 843.749	42.5 43.5 38.9 36.7	11.6 12.4 22.4 23.2	1.4 1.7 6.9 7.1	30.0 30.9 30.9	5 27.0 3 37.3	40.0 40.0 47.0 47.0	15.2 13.0 9.7 10.3	100 100 300 200	1 190 11 358



< (1 ~ 6) GHz _ Peak >

RADIATED EMISSION





RADIATED EMISSION

Date: 2015-08-17

 Order No.
 DTNC1507-03747, 03750
 Reference No.
 DTNC1507-03747, 03750
 Reference No.
 DTNC1507-03747, 03750
 Reference No.
 DTNC1507-03747, 03750
 Power Supply
 120 V
 60 Hz
 DTNC1507-03747, 03750
 Temp/Humi
 22 °C
 42 % R.H.
 Power Supply
 120 V
 60 Hz
 Power Supply
 120 V

Memo :

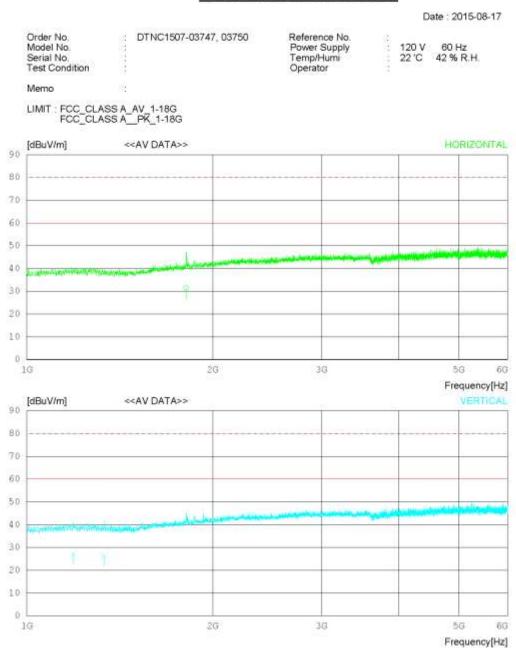
LIMIT: FCC_CLASS A_PK_1-18G FCC_CLASS A_AV_1-18G

No.	FREQ	READING		LOSS	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	TABLE	
	[MHz]	PEAK [dBuV]	FACTOR [dB]	[dB]	[dB]	[dBuV/m]	[dBuV/m	[dB]	[cm]	[DEG]	
	Horizont	al	-								
1	1811.25	0 59.9	30.6	4.5	47.8	47.2	80.0	32.8	100	1	
	Vertical										
2	1188.75 1333.12	0 56.3 5 57.2		3.7	47.8	41.0	80.0	39 38,2	100	358 358	



< (1 ~ 6) GHz _ Average >

RADIATED EMISSION





RADIATED EMISSION

Date: 2015-08-17

 Order No.
 DTNC1507-03747, 03750
 Reference No.
 :

 Model No.
 :
 Power Supply
 : 120 V
 60 Hz

 Serial No.
 :
 Temp/Humi
 : 22 °C
 42 % R.H.

 Test Condition
 :
 Operator
 :

LIMIT: FCC_CLASS A_AV_1-18G FCC_CLASS A__PK_1-18G

kt.o.	mana	DESCRIPTION.	ANT	TONE	GAIN	RESULT	LIMIT	MARGIN	ANTENNA	MIN THE TO	
No.	FREQ	READING		LOSS	CALL	RESULT	PIMIT	DIMEGRA	WHIRMW	TABLE	
	[MHz]	AV [dBuV]	FACTOR [dB]	[dB]	[dB]	[dBuV/m]			[cm]	[DEG]	
	Horizont	al	=								
1 1	1811.250	44.2	30.6	4.5	47.	31.5	60.0	28.5	100	1	
	Vertica:										
	1188.750 1333.125		28.8	3.7	47. 48.		60.0	32.9	100 100	358 358	



Appendix 1

List of Test and Measurement Instruments



To facilitate inclusion on each page of the test equipment used for related tests, each item of test equipment is identified by the Test Laboratory.

1. Conducted Disturbance

Name of Instrument		Model No. Manufacturer		Serial No. Cal. Date		Next Cal. Date
	MEASUREMENT SOFTWARE	EMI-C VER. 2.00.0143	TSJ	N/A	N/A	N/A
\boxtimes	EMI TEST RECEIVER	ESCI	ROHDE & SCHWARZ	100364	2015.02.25	2016.02.25
\boxtimes	LISN	ESH2-Z5	ROHDE & SCHWARZ	828739/006	2014.09.11	2015.09.11

2. Radiated Disturbance

Name of Instrument		Model No.	Manufacturer	Serial No.	Cal. Date	Next Cal. Date
\boxtimes	MEASUREMENT SOFTWARE	EMI-R VER. 2.00.0121	TSJ	N/A	N/A	N/A
\boxtimes	EMI TEST RECEIVER	ESU	ROHDE & SCHWARZ	100538	2015.02.06	2016.02.06
\boxtimes	TRILOG BROAD BAND ANTENNA	VULB9160	SCHWARZBECK	9160-3339	2015.04.14	2017.04.14
\boxtimes	LOW NOISE PRE AMPLIFIER	MLA-100K01-B01-26	TSJ	1252741	2015.02.25	2016.02.25
\boxtimes	HORN ANTENNA	3117	ETS-LINDGREN	00152093	2014.01.30	2016.01.30
\boxtimes	LOW NOISE PRE AMPLIFIER	MLA-100M18-B01-42	TSJ	1872271	2015.05.26	2016.05.26



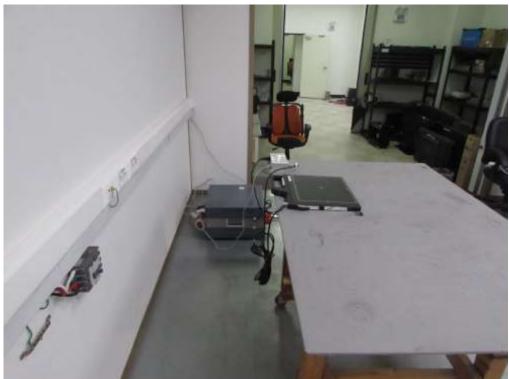
Appendix 2

Photographs of the Test Configurations

- 1. Conducted Disturbance
- 2. Radiated Disturbance

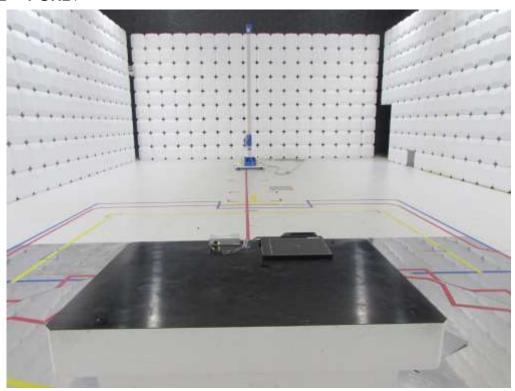
A2-1. Conducted Disturbance

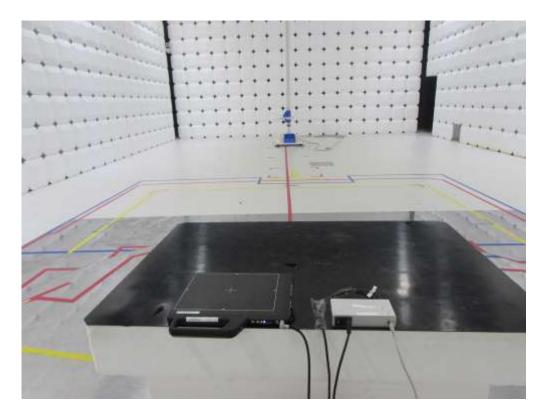




A2-2. Radiated Disturbance

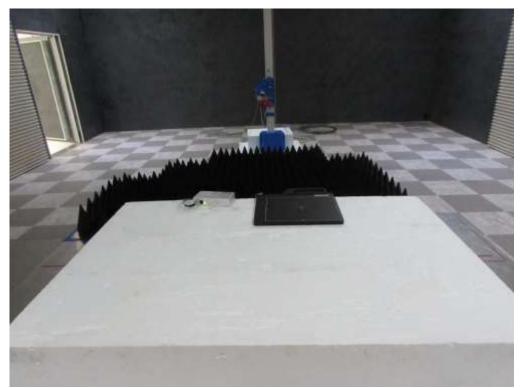
< 30 MHz ~ 1 GHz >

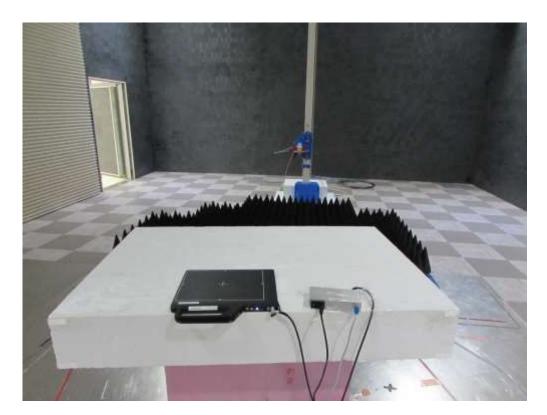






< (1 ~ 6) GHz >







Appendix 3

Photographs of EUT

A3. EUT

1. Front View of Product



2. Rear View of Product



A3. EUT

3. Inside View of Product



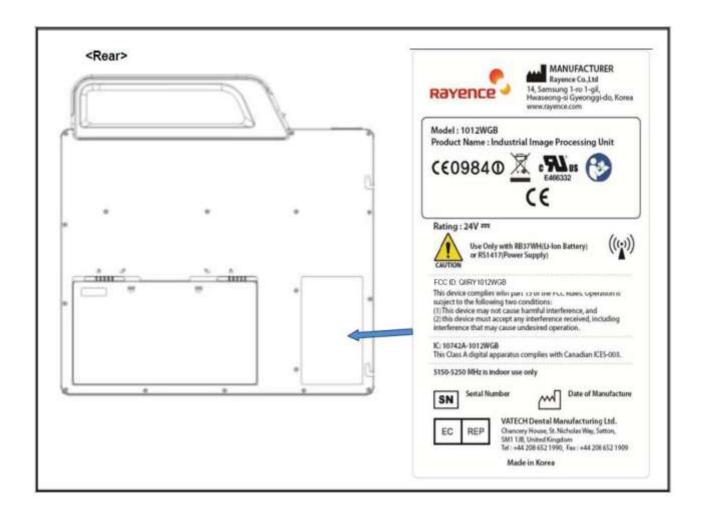
Total 28 pages

Appendix 4

SAMPLE LABEL & LOCATION

LABELLING REQUIREMENTS

The Label shown shall be permanently affixed at a conspicuous location on the device and be readily visible to the user at the time of purchase



- The FCC label shown is representative of the label that will appear on the radio when in production. Other information may also be included on this label.



Appendix 5

Report Revision History

Revision	Description	Description Revised By	
Date	Boompton	Trovided By	Reviewed By
None	Original	N/A	N/A