

FCC COMPLIANCE REPORT

Test report No : EMC-2014/065
Type of Equipment : Digital Satellite Receiver
Model Name : HR54-500
Applicant : HUMAX Co., Ltd
HUMAX Village, 11-4, Sunae-dong, Bundang-gu,
Seongnam city, Gyeonggi-do, Korea
Manufacturer : HUMAX Co., Ltd
(Yubang-dong)2, Yeongmun-ro,
Cheoin-gu Yongin-si, Gyeonggi-do, Korea
Test standards : FCC part 15 subpart B, Class B
FCC ID : O6ZHR54
Classification : DoC

Test Procedure and Items

- AC Power Line Conducted Emissions Measurement: ANSI C63.4-2009
- Antenna Power Measurement: ANSI C63.4-2009
- Radiated Emissions Measurement : ANSI C63.4-2009

Testing Laboratory : EMC Compliance Ltd.

Test result : Complied

The above equipment was tested by EMC compliance Testing Laboratory for compliance with the requirements of FCC Rules and Regulations. The results of testing in this report apply to the product/system which was tested only. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

These results are deemed satisfactory evidence of compliance with ICES-003 of the Canadian Interference-Causing Equipment Regulations.

Date of receipt: 2014. 10. 08

Date of testing: 2014. 11. 14 ~ 11. 20

Issued date: 2014. 11. 21

Tested by:


PARK, GUN-SU

Approved by:


BEAK, JEONG-SOO

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1. Applicant information

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Contact name: Seong Nak Yul

Manufacturer: HUMAX Co., Ltd
Address: (Yubang-dong)2, Yeongmun-ro, Cheoin-gu
Yongin-si, Gyeonggi-do, Korea

2. Laboratory information

Address

EMC compliance Ltd.

480-5 Sin-dong, Yeongtong-gu, Suwon-city, Gyeonggi-do, 443-390, Korea

Telephone Number: 82 70 5008 1021

Facsimile Number: 82 505 299 8311

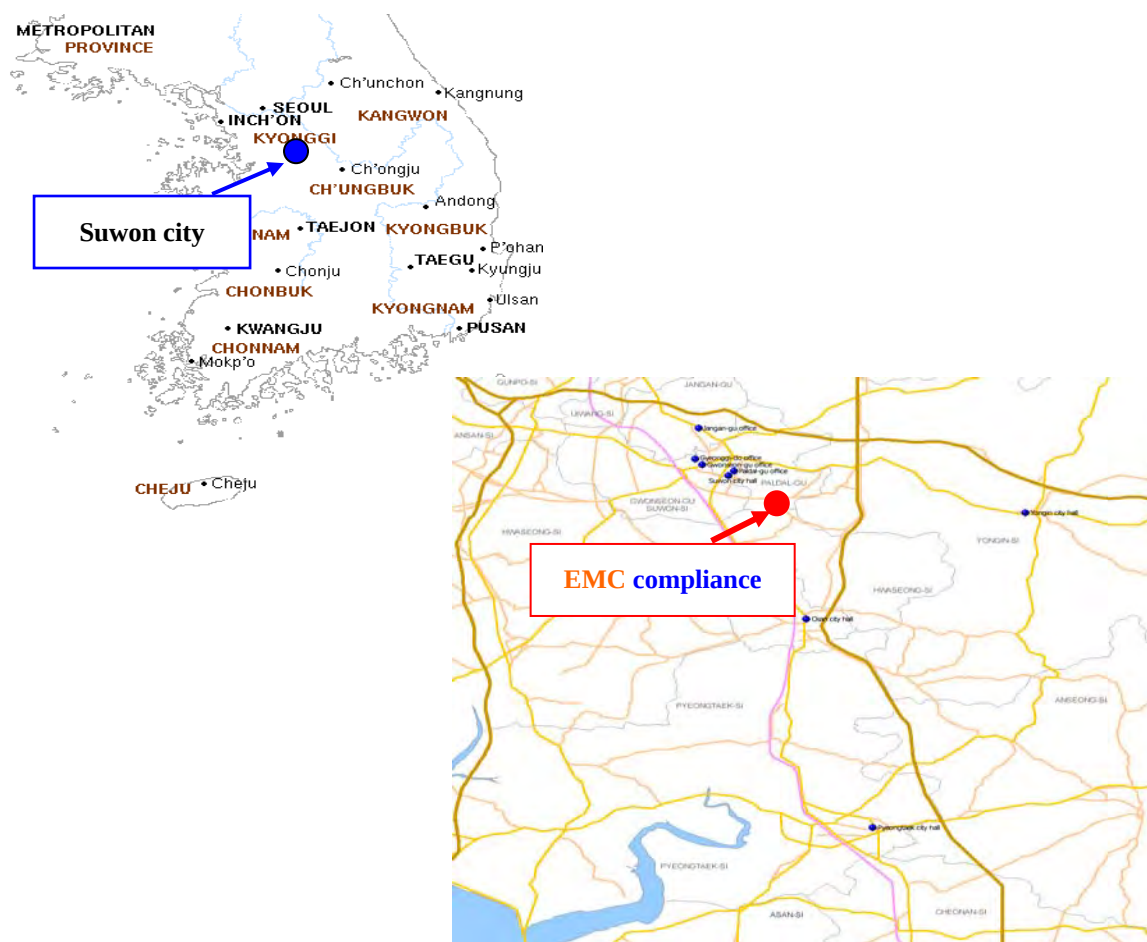
FCC Site Designation No: KR0040, FCC Site Registration No: 687132

VCCI Registration No. : R-3327, G-198, C-3706, T-1849

Industry Canada Registration No.: 8035A

KOLAS NO.: 231

SITE MAP



3. Test system configuration

3.1 Operation environment

	Temperature	Humidity	Pressure
Chamber(10 m)	: 20.4 °C	23.5 % R.H.	-
Shielded room(CE)	: 20.8 °C	25.7 % R.H.	-

Test site

These testing items were performed following locations;

Test item	Test site
Conducted Emission	Shielded Room
Antenna Power Measurement	Shielded Room
Radiated Emission	10 m Chamber

3.2 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC.

The factors contributing to uncertainties are test receiver, cable loss, antenna factor calibration, Antenna directivity, antenna factor variation with height, antenna phase center variation, antenna frequency interpolation, measurement distance variation, site imperfection, mismatch, and system repeatability. Based on CISPR 16-4-2, the measurement uncertainty level with a 95 % confidence level was applied.

Conducted emission measurement (C.L: Approx 95 %, k = 2)		
Shielded Room (CE#1)	9 kHz ~ 150 kHz: ± 3.75 dB	
	150 kHz ~ 30 MHz: ± 3.36 dB	
Shielded Room (CE#2)	9 kHz ~ 150 kHz: ± 3.79 dB	
	150 kHz ~ 30 MHz: ± 3.42 dB	
Radiated Emission measurement (C.L: Approx 95 %, k = 2)		
3 m Chamber	30 MHz ~ 300 MHz	3 m: + 4.94 dB, - 5.06 dB 10 m: + 4.93 dB, - 5.05 dB
	300 MHz ~ 1 000 MHz	3 m: + 4.97 dB, - 5.08 dB 10 m: + 4.84 dB, - 4.96 dB
	1 GHz ~ 6 GHz	3 m: + 6.03 dB, - 6.05 dB
	6 GHz ~ 18 GHz	3 m: + 6.60 dB, - 6.78 dB

4. Description of E.U.T.

4.1 General information

System Resource		
	CPU/MPU/Mainchip	BCM7346
	Flash memory	128MB NOR, 64KB EEPROM
	SDRAM DDR	256MB x 4 DDR3
Tuner & Channel		
Tuner	No of tuners	6 (5 AMC for video)
	Input frequency range	950MHz to 2150MHz
	Input Impedance	75 Ω single ended
	FEC Code Rate	1/2,2/3,3/4,5/6 and 7/8 for DVB-S
		1/2,3/5,2/3,3/4,4/5,5/6,8/9 and 9/10 for DVB-S2 QPSK
		3/5,2/3,3/4,5/6,8/9 and 9/10 for DVB-S2 8PSK
		1/2,2/3 and 6/7 for DirecTV Legacy mode
	Modulation	DVB-S2 - Compliant to MxL568 , DVB-S - Compliant to MxL568
	Symbol rate	NBC Mode : 10, 20~30Msps and DVB-S : 1~45Msps, DirecTV Legacy mode : 20Msps
DSS(QPSK)	Signal level	-15 to -69 dBm
	Modulation	DVB-S, Compliant to MxL568
	Symbol rate	DirecTV Legacy mode : 20Msps
	FEC Code Rate	1/2,2/3 and 6/7 for DirecTV Legacy mode
MoCA	Input frequency range	475 MHz ~ 625 MHz
	Input impedance	75ohm
	TX signal level	under +7dBm
	RX sensitivity	Min PHY Rate = 57 Mbps in conditions of Rx power level - 66.1dBm
	Modulation	OFDM
	Host Interface	TMII(Turbo Media Independent Interface)
Video & Audio		
	Transport Stream	DTVMDB02 Transport Protocol Specification for DIRECTV® Receivers MPEG-2 part 1 (ISO/IEC 13818-1)
	Video Decoding	MPEG-2 part 2 (ISO/IEC 13818-2) Main Profile @ Main Level MPEG-4 part 10 (AVC) Main and High profile Level 4.0
	Video Format	4:3, 16:9
	Video Resolution	HD: 1920x1080p, 1920x1080i, 1280x720p, 720x480p SD : 720x480i
	Audio Decoding	MPEG-1 Part 3 (Layer II, AC-3)
		MPEG-4 Part 3 (HE-AAC), and ATSC A/52A [3, 5, and 12] (Dolby Digital)
		AAC+ (AAC-SBR)
	Audio mode	Single/Dual Mono/Stereo/Joint Stereo
Conditional Access System		
	Embedded CAS	NDS
	Smart card	1 Slot, ISO7816 Compatible
A/V output		

	A/V Mini-DIN	1 composite, 1 component, 2 Audio out(L/R)
User interface		
	Smart card slot (side)	1
	Button (side)	1 reset button
	Display	2 LEDs (blue for power / orange for recording)
Rear panel interface		
	DC Power In (With LED)	Green Power indicator LED
	USB	USB 2.0 Port
	eSATA (w/o power)	1 SATA external connector with 5V power
	HDMI	HDMI Connector (Type A)
	A/V Mini-DIN	1 composite, 1 component, 2 Audio out(L/R)
	S/PDIF	1 S/PDIF(Coax Out)
	Antenna In(For SWM & MoCA)	1 F-Type connector
Power Supply		
	Input voltage	AC 120 VAC $\pm 15\%$, 60Hz
	Type	EPS44
	Power consumption	Operation: TBD Standby: TBD
	Protection	Separate internal fuse & lightning protection
Physical specification		
	Size (W x D x H)	333 x 246 x 46 mm (W x D x H)
	Weight (net)	TBD
	Accessories	External Power Supply, RCU(RC65X), Combo manual

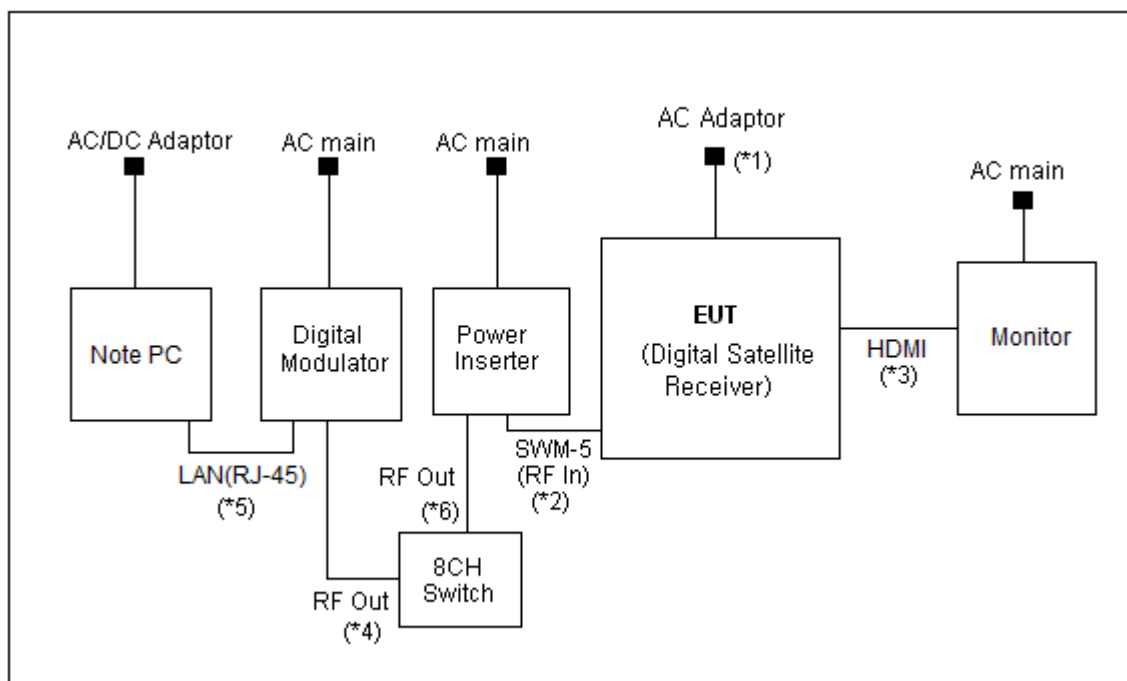
4.2 Product description

Type of product	Digital Satellite Receiver
Model name (Basic)	HR54-500
Model name (Variant)	-
Difference	-
Trade name	-
Serial no	-
Testing voltage	120 V , 60 Hz
Product rating	*AC Adaptor (model name: EPS44R3-16) Input: 120 V , 60 Hz, 1.1 A Output: DC 12 V , 4.0 A
Note	AC/DC adaptor was provided by the manufacturer.

4.3 Auxiliary equipments

Type	Model / Part #	Serial number	Manufacturer
Digital Modulator	DM240	-	RADYNE
8CH Switch	SWM8-Z	-	DIRECTTV
Power Inserter	P129R1-03	P129R1-03	DIRECTTV
Note PC	E8420	-	FUJITSU
Monitor	LU7000	-	-

4.4 Test configuration



Note	Start		End		Cable	
	Name	I/O port	Name	I/O port	Length (m)	Spec.
1	EUT (Digital Satellite Receiver)	Power	AC Adaptor	Power	1.7	Non-Shield
2		SWM-5 (RF In)	Power Inserter	RF Out	2.0	Shield
3		HDMI	Monitor#1	HDMI	1.0	Shield
4	Digital Modulator	RF Out	8CH Switch	RF In	1.0	Shield
5		LAN(RJ-45)	Note PC	LAN(RJ-45)	3.0	Non-Shield
6	8CH Switch	RF Out	Power Inserter	RF In	2.0	Shield

4.5 Operating conditions

The EUT was configured as normal intended use.

Test mode	Normal operation
1	Satellite Receiving mode. (Program: Direct TV test system.exe)

5. Summary of test results

In the above configuration tested, The EUT complied with the requirement of the specification

5.1 Summary of EMI emission test results

FCC Part 15 Subpart B (Class B)

ANSI C63.4 – 2009

Applied	Test items	Test method	Result
☒	Conducted Emission	ANSI C63.4 – 2009	Complied
☒	Antenna Power Measurement	ANSI C63.4 – 2009	Complied
☒	Radiated Emission	ANSI C63.4 – 2009	Complied

6. Test results

6.1 Conducted Emission

Test specification	FCC Part 15, Section 15.107(a), Class B		
Testing voltage	120 V, 60 Hz		
Test facility	Shielded room (CE#2)		
Date	2014. 11. 20		
Temperature (°C)	20.8 °C	Humidity (% R.H.)	25.7 % R.H.
Software Program	EP5/CE Ver 5.4.0(Toyo)		
Remarks	Complied		

6.1.1 Limits of conducted emission measurement

Frequency [MHz]	Class A (dB(μ V))		Class B (dB(μ V))	
	Quasi-peak	Average	Quasi-peak	Average
0.15 ~ 0.5	79	66	66 ~ 56 *	56 ~ 46*
0.5 ~ 5	73	60	56	46
5 ~ 30	73	60	60	50

*The limit decreases linearly with the logarithm of frequency.

6.1.2 Measurement procedure

The measurements were performed in a shielded room. EUT was setup as shown in photograph and placed on a non-metallic table height of 0.8 m above the reference ground plane. The rear of table was located 0.4 m to the vertical conducted plane. EUT was power through the LISN, which was bonded to the ground plane. The LISN power was filtered. Each EUT power lead, except ground (safety) lead was individually connected through a LISN to input power source. EUT signal cables that hung closer than 0.4 m to the Horizontal metal ground 0.3 m ~ 0.4 m long. The power cord was bundles in the center. All peripheral equipment was powered from a sub LISN. The LISN and ISN were positioned 0.8 m from the EUT. Peak and Average detection were used in preliminary testing and Quasi-peak and Average detections were used at final measurement.

6.1.3 Used equipments

Equipment	Model	Serial No.	Makers	Next Cal. Date	Used
Test Receiver	ESCI7	100732	R&S	2015.01.27	☐
Test Receiver	ESCI	100001	R&S	2015.07.14	☐
Test Receiver	ESCI	100710	R&S	2015.10.13	☒
TWO-LINE V-NETWORK	ENV216	101352	R&S	2015.10.13	☒
TWO-LINE V-NETWORK	NNLK8121	8121-472	SCHWARZBECK	2015.06.24	☒

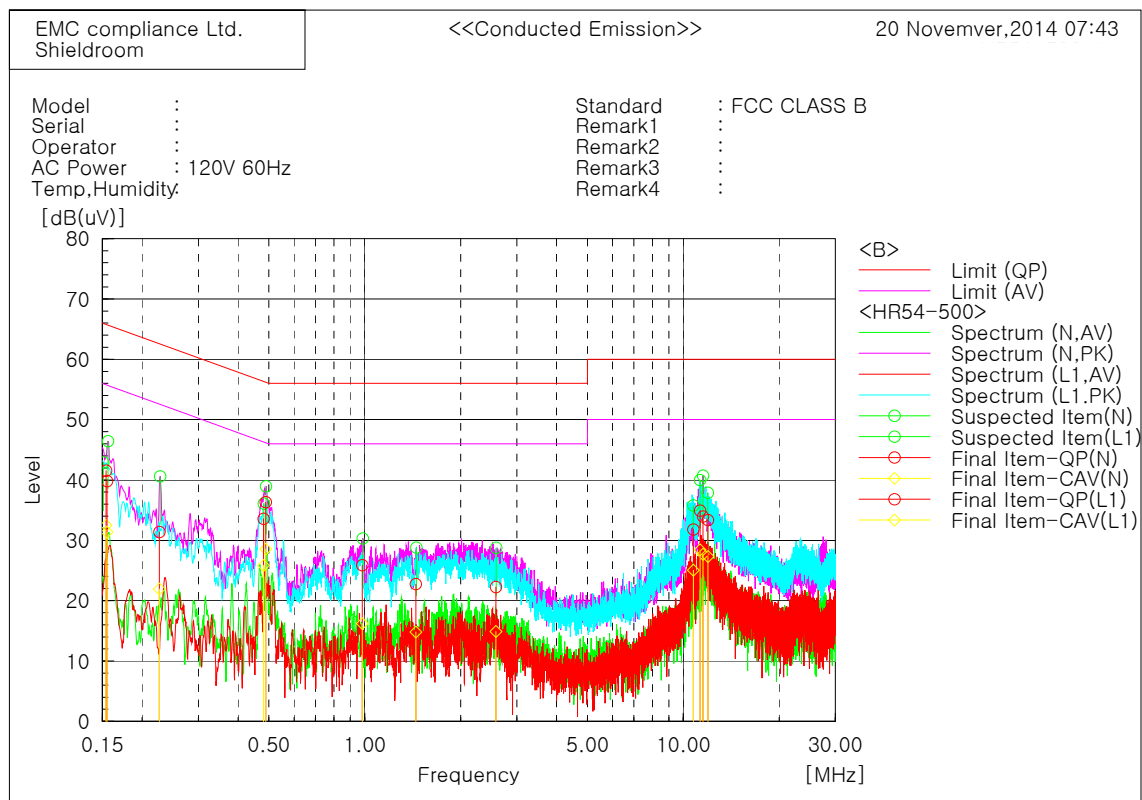
6.1.4 Photographs of test setup

* AC Main



6.1.5 Conducted emission measurement result

* AC Main (HR54-500)



Final Result

--- N Phase ---											
No.	Frequency [MHz]	Reading QP [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB]	Result QP [dB(uV)]	Result CAV [dB(uV)]	Limit QP [dB(uV)]	Limit AV [dB(uV)]	Margin QP [dB]	Margin CAV [dB]	Remark
1	0.15406	31.8	22.7	9.8	41.6	32.5	65.8	55.8	24.2	23.3	
2	0.22662	21.7	12.2	9.7	31.4	21.9	62.6	52.6	31.2	30.7	
3	0.48909	26.4	18.6	9.9	36.3	28.5	56.2	46.2	19.9	17.7	
4	0.98253	16.2	6.5	9.7	25.9	16.2	56.0	46.0	30.1	29.8	
5	10.76411	22.0	15.3	9.8	31.8	25.1	60.0	50.0	28.2	24.9	
6	11.53361	24.1	17.9	9.8	33.9	27.7	60.0	50.0	26.1	22.3	

--- L1 Phase ---											
No.	Frequency [MHz]	Reading QP [dB(uV)]	Reading CAV [dB(uV)]	c.f [dB]	Result QP [dB(uV)]	Result CAV [dB(uV)]	Limit QP [dB(uV)]	Limit AV [dB(uV)]	Margin QP [dB]	Margin CAV [dB]	Remark
1	0.15526	30.0	21.5	9.8	39.8	31.3	65.7	55.7	25.9	24.4	
2	0.48129	23.7	15.9	9.9	33.6	25.8	56.3	46.3	22.7	20.5	
3	1.44772	13.0	5.1	9.7	22.7	14.8	56.0	46.0	33.3	31.2	
4	2.57965	12.6	5.2	9.7	22.3	14.9	56.0	46.0	33.7	31.1	
5	11.28222	25.1	18.6	9.8	34.9	28.4	60.0	50.0	25.1	21.6	
6	11.94805	23.6	17.5	9.8	33.4	27.3	60.0	50.0	26.6	22.7	

6.2 Antenna Power Measurement

Test specification	FCC Part 15, Section 15.111, Class B				
Testing voltage	120 V, 60 Hz				
Test facility	Shielded room (CE#1)				
Date	2014. 11. 20				
Temperature(°C)	20.8 °C	Humidity (% R.H.)	25.7 % R.H.	Pressure (kPa)	102.0 kPa
Remarks	Complied				

6.2.1 Limits of antenna power conducted measurement

Frequency [MHz]	Maximum Field Strength Limit (dB(μV))
30 ~ 960	50.1 (2 nW)

6.2.2 Measurement procedure

The test item can be in deliver on shielding room.

The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 12 mm non-conductive covering to insulate the EUT from the ground plane.

The EUT received AC power source, 120VAC /60 Hz, from the outlet socket under the turntable. All support equipment received power from another socket under the turntable.

With the 75 Ω $\longleftrightarrow$ 50 Ω matching network when the connected coaxial cable of impedance not matching.

The output level of the auxiliary signal generator shall be set to give the value of 60 dB(μV) for FM receiver or 70 dB(μV) for TV and VCR to the input of the frequency-modulation or television receiver (OR video recorder) respectively, on a 75 Ω impedance. An additional amplifier should be insert at the generator output, if necessary.

All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.

The results shall be expressed in the terms of the substitution power in nanowatt (nW), as supplied by the standard signal generator. The specified source impedance of the receiver shall be stated with results.

When measurements are made at the antenna terminals of the equipment under test, an auxiliary signal generator shall be used to feed the equipment under test input with a standard test signal at the receiver tuning frequency (30 MHz to 5000 MHz).

The test mode(s) described in Item 4.5 were scanned during the preliminary test:

After the preliminary scan, we found the test mode described in Item 4.5 producing the highest emission level.

The worst configuration of EUT and cable of the above highest emission level were recorded for reference of the final test

6.2.3 Used equipments

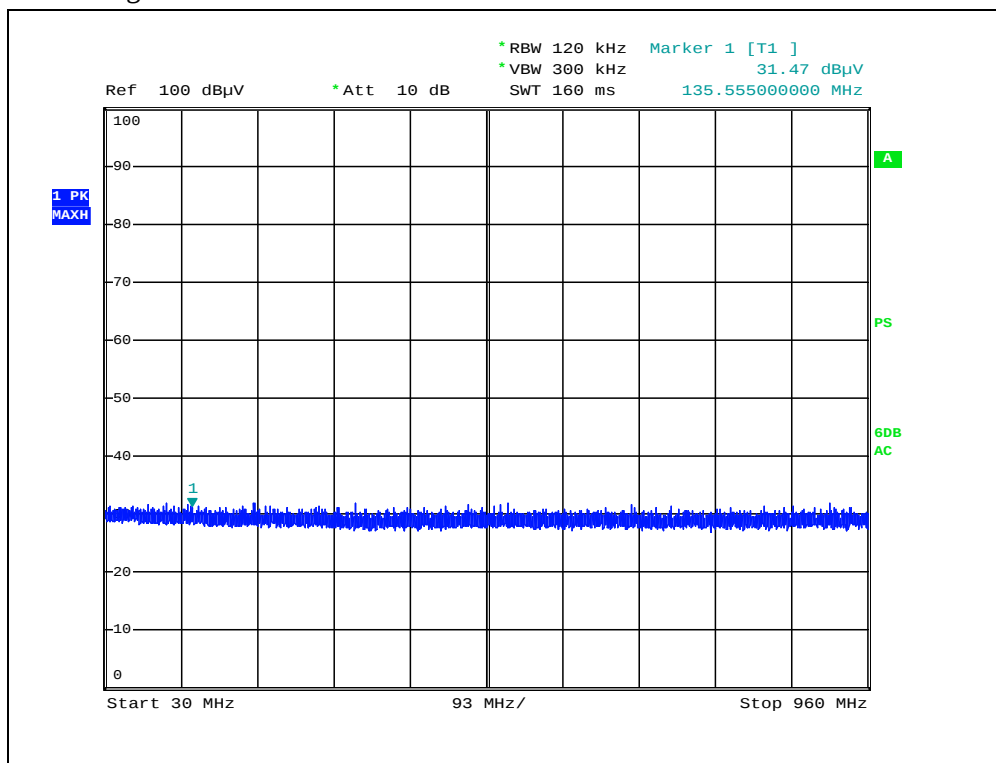
Equipment	Model	Serial No.	Makers	Next Cal. Date	Used
Matching pad	RAM	100714	R&S	2015.06.23	☒
Matching pad	RAM	101640	R&S	2015.04.01	☒
Power splitter	RVZ	100252	R&S	2015.04.02	☒
Test Receiver	ESCI	100001	R&S	2015.07.14	☒

6.2.4 Photographs of test setup



6.2.5 Measurement result

* Satellite receiving mode



Frequency [MHz]	Reading [dBuV]	Correction Factor		Limits [dBuV]	Result [dBuV]	Margin [dB]
		MPL(dB)	Cable			
135.55	31.2	7.50	4.36	51.0	43.10	7.90
398.28	32.0	7.50	4.42	51.0	43.90	7.10
589.86	30.1	7.50	4.50	51.0	42.10	8.90
829.80	30.4	7.50	4.58	51.0	42.50	8.50

*Note: MPL= Matching Pad Loss

6.3 Radiated Emission

Test specification	FCC Part 15, Section 15.109(g), Class B		
Testing voltage	120 V, 60 Hz		
Test facility	3 m Chamber (#F3)		
Test distance	3 m		
Date	2014. 11. 14		
Temperature (°C)	20.4 °C	Humidity (% R.H.)	23.5 % R.H.
Software Program	EP5/RE Ver 4.6.0(Toyo)		
Remarks	Complied		

6.3.1 Limits of radiated emission measurement

Frequency [MHz]	Class A (dB(μ V/m)) @ 10 m	Class B (dB(μ V/m)) @ 3 m
30-88	39	40
88-216	43.5	43.5
216-960	46.4	46
Above 960	49.5	54

* Note- Alternative standard: CISPR, Pub. 22 *

6.3.2 Measurement procedure

The test was done at a 10 m chamber with a quasi-peak detector. EUT was placed on a non-metallic table height of 0.8 m above the reference ground plane. Cables were folded back and forth forming a bundle 0.3 m to 0.4 m long and were hanged at a 0.4 m height to the ground plane.

Cables connected to EUT were fixed to cause maximum emission. Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna was varied in height above the conducting ground plane to obtain the maximum signal strength.

6.3.3 Used equipments

Equipment	Model no.	Serial no.	Makers	Next Cal. Date	Used
Test Receiver	ESR	101078	R&S	2015.02.24	☒
Bi-Log Ant.	VULB9163	552	SCHWARZBECK	2016.05.14	☒
Coaxial Fixed Attenuator	8491A	MY52460424	GILENT	2015.07.23	☒
Amplifier	310N	293004	SONOMA INSTRUMENT	2015.09.25	☒
Antenna Mast	MA4000-EP	303	Innco Systems	-	☒
Turn Table	DT2000S-1t	079	Innco Systems	-	☒
Broadband Preamplifier	BBV9718	9718-233	SCHWARZBECK	2015.03.21	☒
Horn ANT	3115	00086706	ETS	2015.09.01	☒

6.3.4 Sample calculation

The field strength is calculated adding the antenna Factor, cable loss and, Antenna pad adding, subtracting the amplifier gain from the measured reading.

The sample calculation is as follow:

$$\text{Result} = \text{M.R} + \text{C.F}(\text{A.F} + \text{C.L} + 3 \text{ dB Att} - \text{A.G})$$

M.R = Meter Reading

C.F = Correction Factor

A.F = Antenna Factor

C.L = Cable Loss

A.G= Amplifier Gain

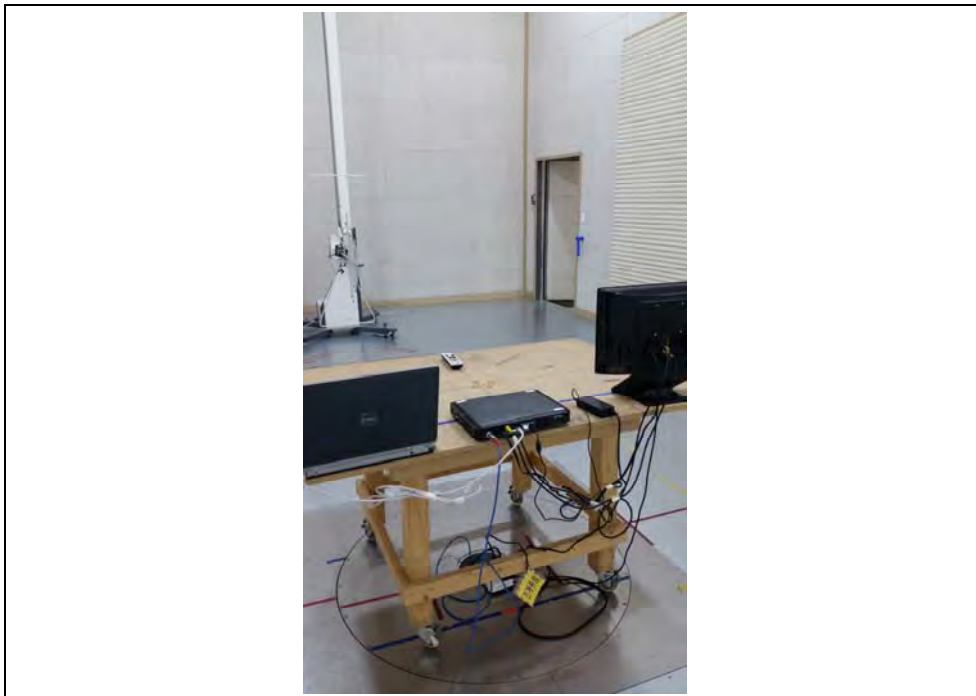
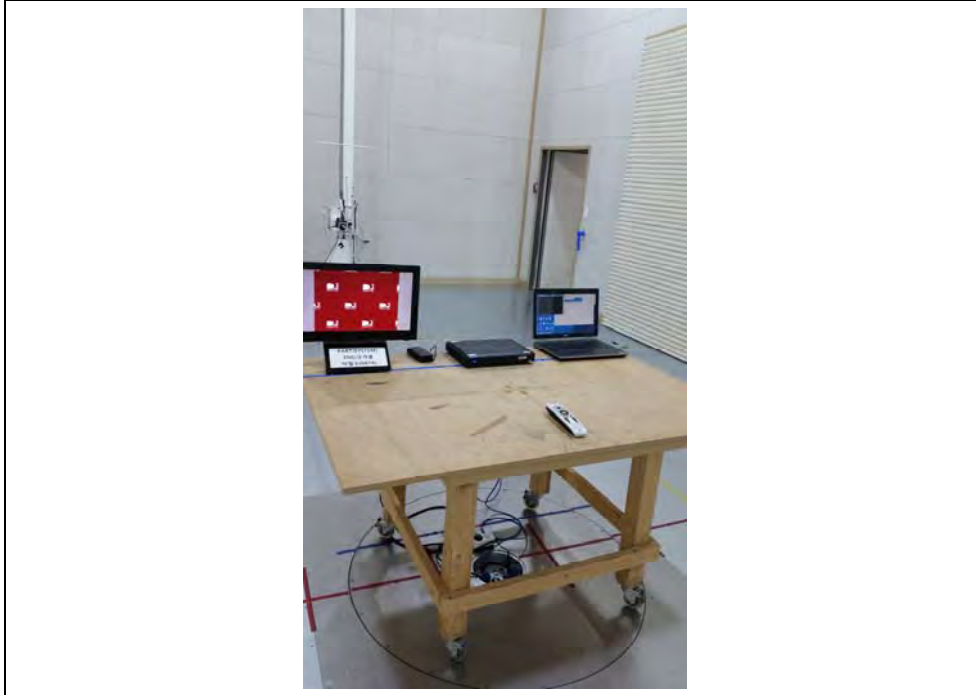
3 dB Att = 3 dB Attenuator

If M.R is 30 dB, A.F 12 dB, C.L 5 dB, 3 dB, A.G 35 dB

The result is $30 + 12 + 5 + 3 - 35 = 15 \text{ dB}(\mu\text{V/m})$

6.3.5 Photographs of test setup

* 30 MHz ~ 1 GHz



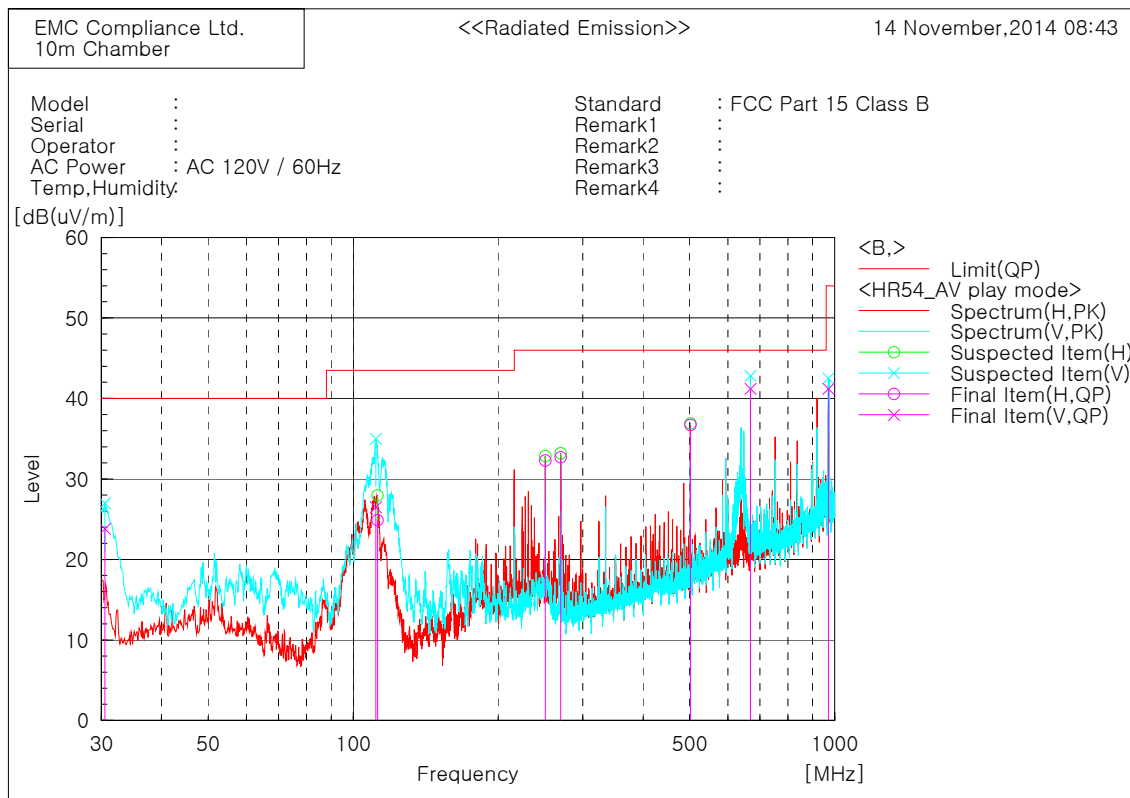
* 1 GHz ~ 6 GHz



6.3.6 Radiated emission measurement result

* Graph and Data

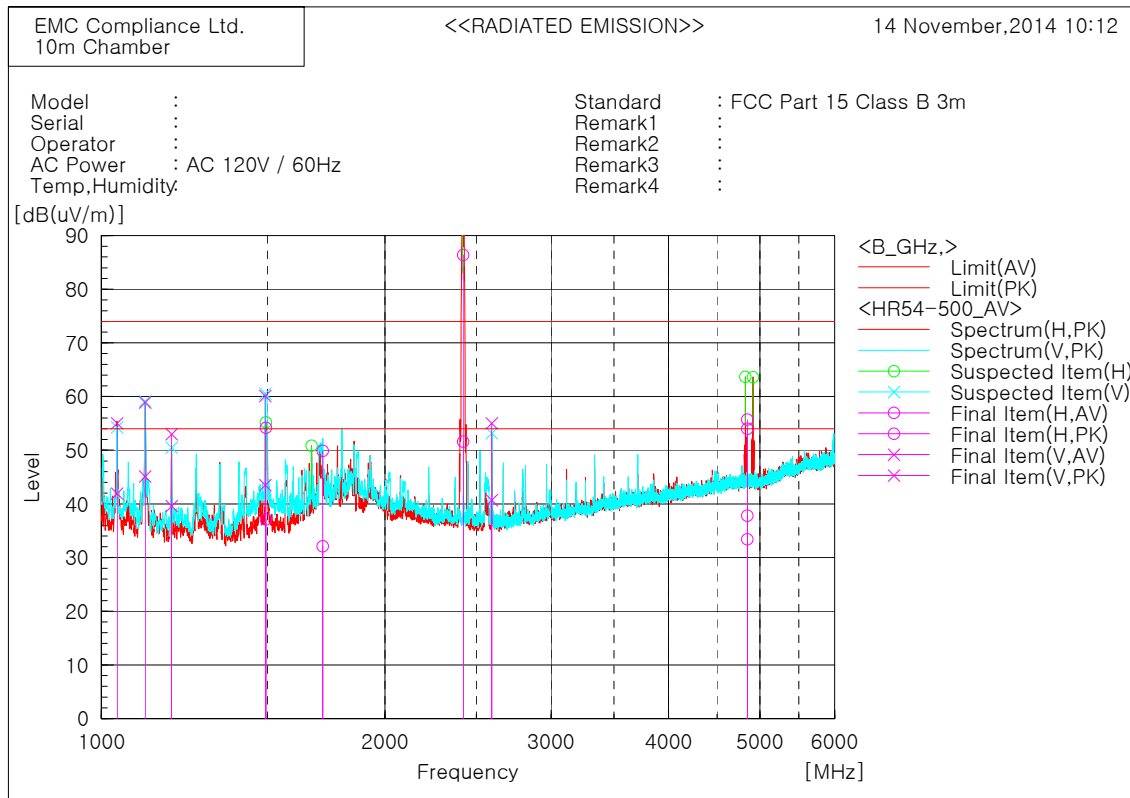
* 30 MHz ~ 1 GHz (HR54-500)_AV Play Mode



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	30.485	V	40.9	-17.1	23.8	40.0	16.2	99.8	124.4	
2	111.480	V	42.1	-15.6	26.5	43.5	17.0	99.8	237.6	
3	112.329	H	40.6	-15.7	24.9	43.5	18.6	400.1	349.4	
4	250.796	H	45.3	-13.0	32.3	46.0	13.7	99.9	113.1	
5	269.954	H	45.1	-12.4	32.7	46.0	13.3	99.9	334.6	
6	501.662	H	43.8	-7.1	36.7	46.0	9.3	202.6	270.6	
7	668.866	V	45.3	-4.1	41.2	46.0	4.8	99.8	17.2	
8	970.536	V	39.6	1.6	41.2	54.0	12.8	99.8	181.7	

* 1 GHz ~ 6 GHz (HR54-500)_AV Play Mode

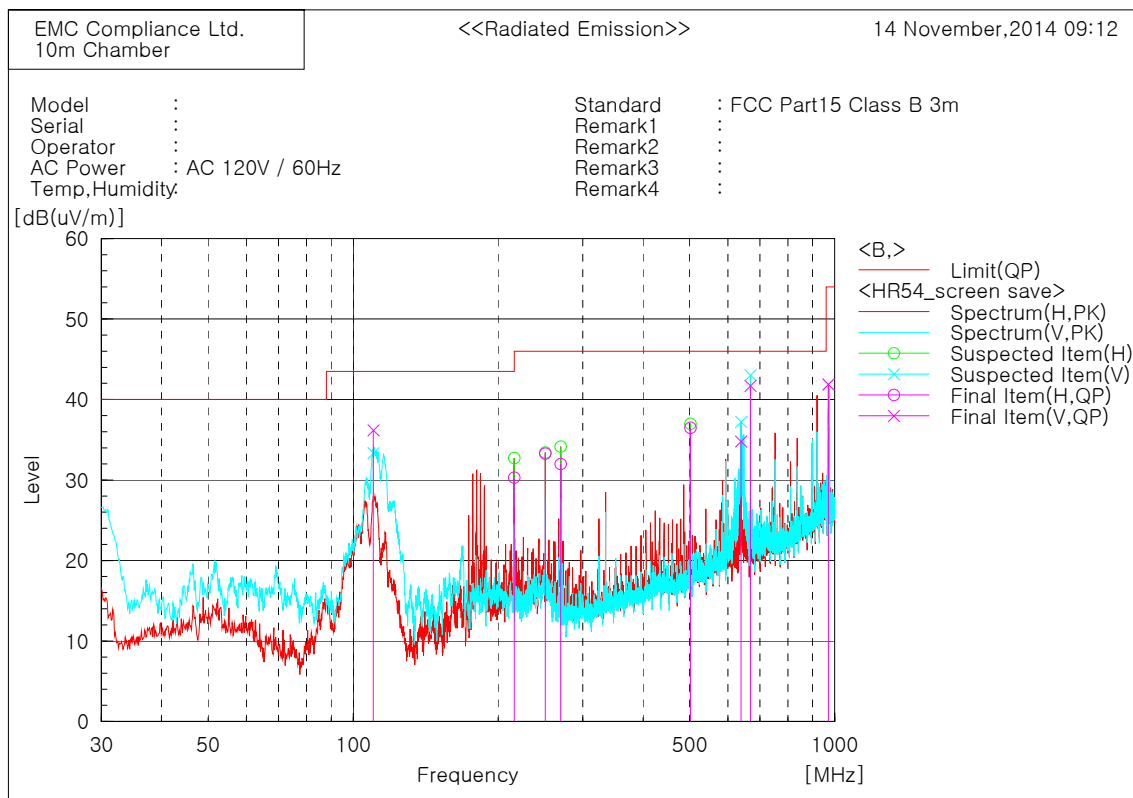


Final Result

No.	Frequency [MHz]	(P)	Reading AV [dB(μV)]	Reading PK [dB(μV)]	c.f [dB(1/m)]	Result AV [dB(μV/m)]	Result PK [dB(μV/m)]	Limit AV [dB(μV/m)]	Limit PK [dB(μV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]	Remark
1	1038.750	V	49.8	62.9	-7.9	41.9	55.0	54.0	74.0	12.1	19.0	99.8	168.9	
2	1112.500	V	52.9	66.7	-7.8	45.1	58.9	54.0	74.0	8.9	15.1	99.8	147.9	
3	1186.875	V	47.2	60.6	-7.6	39.6	53.0	54.0	74.0	14.4	21.0	99.8	151.8	
4	1492.500	V	49.2	65.8	-5.7	43.5	60.1	54.0	74.0	10.5	13.9	99.8	160.3	
5	1494.375	H	42.8	59.9	-5.7	37.1	54.2	54.0	74.0	16.9	19.8	99.8	181.4	
6	1717.232	H	35.0	52.8	-2.9	32.1	49.9	54.0	74.0	21.9	24.1	99.8	130.3	
7	2420.237	H	53.1	87.9	-1.5	51.6	86.4	54.0	74.0	2.4	-12.4	99.8	345.9	
8	2596.250	V	42.2	56.5	-1.5	40.7	55.0	54.0	74.0	13.3	19.0	99.8	173.6	
9	4845.860	H	31.1	47.3	6.7	37.8	54.0	54.0	74.0	16.2	20.0	99.8	345.9	
10	4846.533	H	26.7	49.0	6.7	33.4	55.7	54.0	74.0	20.6	18.3	99.8	345.9	

*Tx Fundamental Frequency: 2420.237 MHz

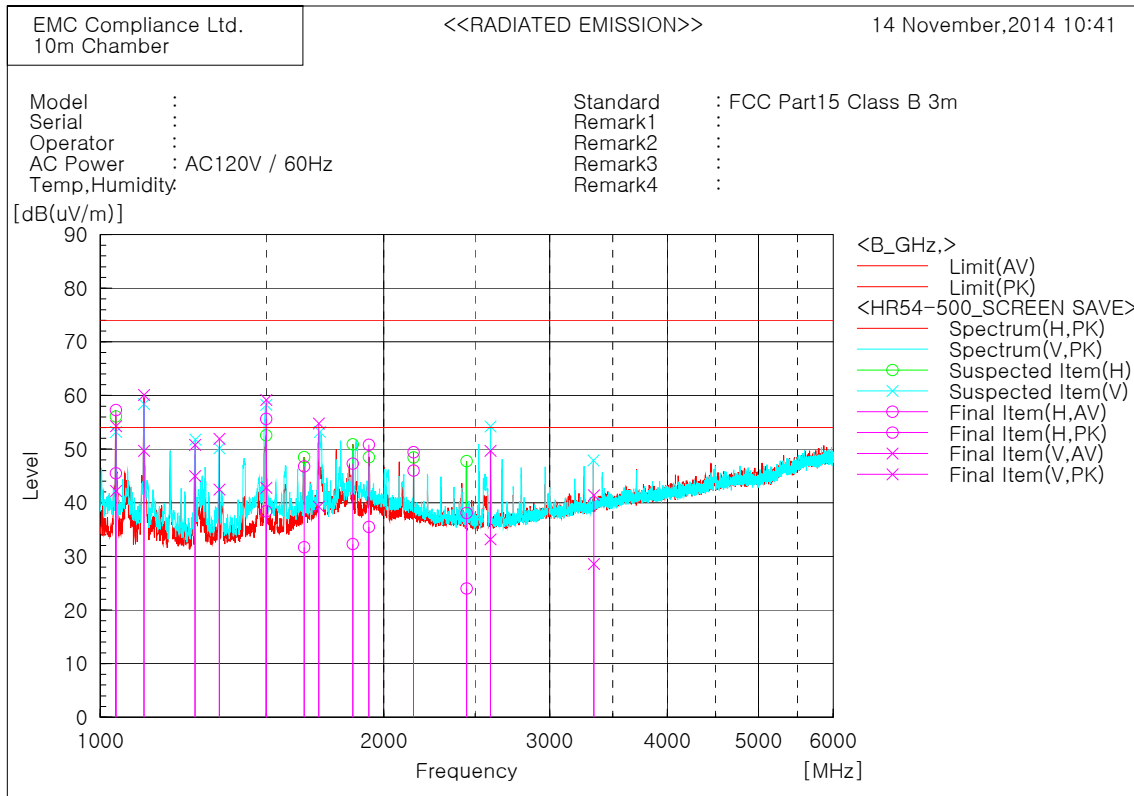
* 30 MHz ~ 1 GHz (HR54-500)_Screen Save Mode



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	110.146	V	51.7	-15.5	36.2	43.5	7.3	99.9	249.8	
2	215.998	H	44.3	-14.0	30.3	43.5	13.2	202.7	89.0	
3	250.796	H	46.3	-13.0	33.3	46.0	12.7	100.0	112.1	
4	269.954	H	44.4	-12.4	32.0	46.0	14.0	100.0	329.8	
5	501.662	H	43.6	-7.1	36.5	46.0	9.5	202.7	271.0	
6	639.039	V	39.1	-4.3	34.8	46.0	11.2	99.9	189.7	
7	668.866	V	45.8	-4.1	41.7	46.0	4.3	99.9	15.5	
8	970.779	V	40.3	1.6	41.9	54.0	12.1	195.9	157.1	

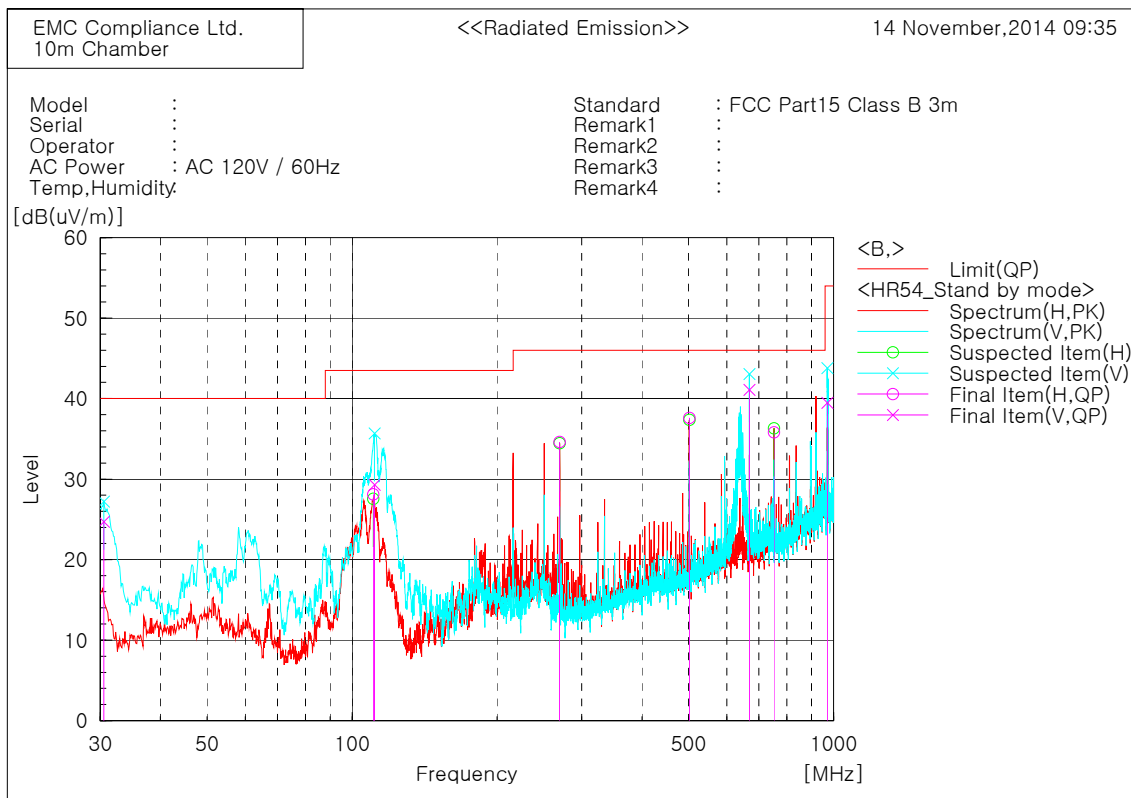
* 1 GHz ~ 6 GHz (HR54-500)_Screen Save Mode



Final Result

No.	Frequency [MHz]	(P)	Reading AV [dB(μV)]	Reading PK [dB(μV)]	c.f [dB(1/m)]	Result AV [dB(μV/m)]	Result PK [dB(μV/m)]	Limit AV [dB(μV/m)]	Limit PK [dB(μV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]	Remark
1	1038.750	H	53.4	65.2	-7.9	45.5	57.3	54.0	74.0	8.5	16.7	99.8	138.9	
2	1038.750	V	50.1	62.2	-7.9	42.2	54.3	54.0	74.0	11.8	19.7	99.8	172.3	
3	1112.500	V	57.5	67.9	-7.8	49.7	60.1	54.0	74.0	4.3	13.9	99.8	189.4	
4	1260.592	V	52.3	58.1	-7.3	45.0	50.8	54.0	74.0	9.0	23.2	99.8	159.7	
5	1337.500	V	49.4	58.8	-6.9	42.5	51.9	54.0	74.0	11.5	22.1	99.8	142.5	
6	1500.000	H	44.0	61.2	-5.6	38.4	55.6	54.0	74.0	15.6	18.4	99.8	182.6	
7	1500.000	V	48.4	64.8	-5.6	42.8	59.2	54.0	74.0	11.2	14.8	99.8	163.7	
8	1646.250	H	35.5	50.6	-3.8	31.7	46.8	54.0	74.0	22.3	27.2	99.8	165.9	
9	1706.419	V	42.3	57.8	-3.0	39.3	54.8	54.0	74.0	14.7	19.2	99.8	151.1	
10	1853.693	H	33.6	48.6	-1.3	32.3	47.3	54.0	74.0	21.7	26.7	99.8	195.8	
11	1928.527	H	36.3	51.6	-0.8	35.5	50.8	54.0	74.0	18.5	23.2	99.8	138.9	
12	2150.975	H	46.8	50.2	-0.8	46.0	49.4	54.0	74.0	8.0	24.6	99.8	204.3	
13	2446.125	H	25.6	39.7	-1.6	24.0	38.1	54.0	74.0	30.0	35.9	99.8	124.8	
14	2595.425	V	34.7	51.2	-1.5	33.2	49.7	54.0	74.0	20.8	24.3	99.8	168.3	
15	3342.524	V	26.5	39.3	2.1	28.6	41.4	54.0	74.0	25.4	32.6	99.8	168.3	

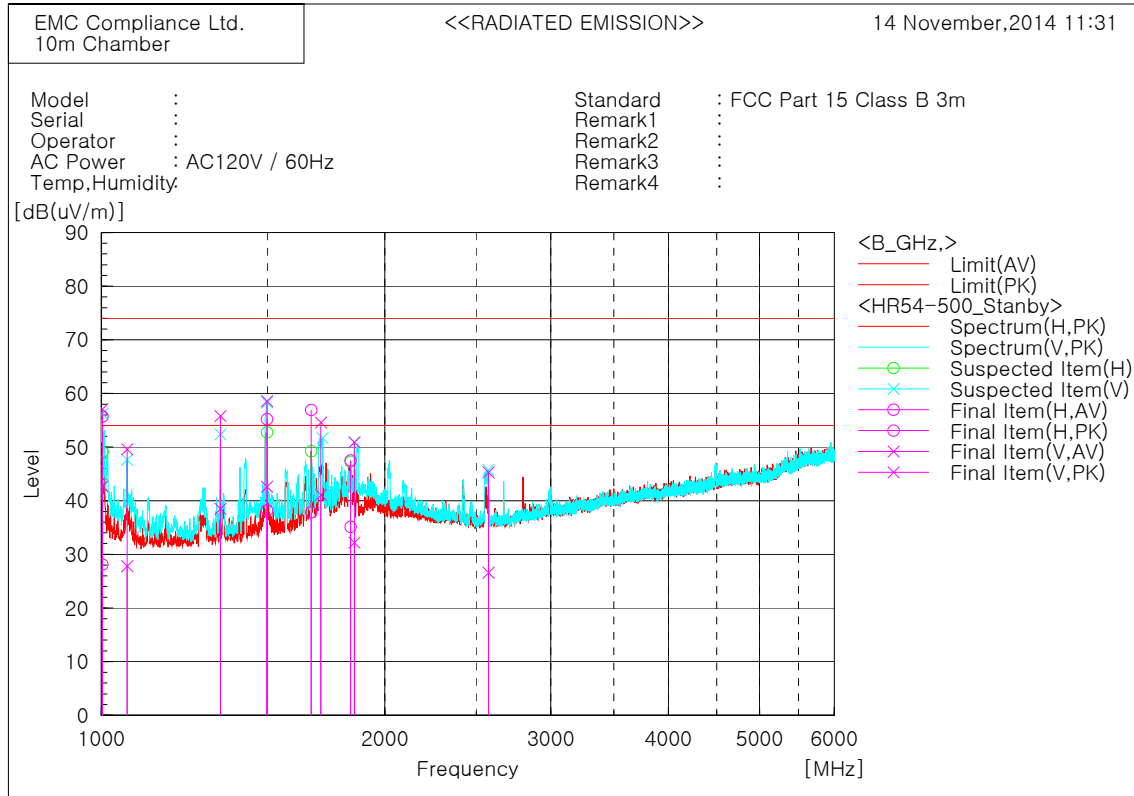
* 30 MHz ~ 1 GHz (HR54-500)_StandBy Mode



Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(uV)]	c.f [dB(1/m)]	Result QP [dB(uV/m)]	Limit QP [dB(uV/m)]	Margin QP [dB]	Height [cm]	Angle [deg]	Remark
1	30.485	V	41.8	-17.1	24.7	40.0	15.3	99.9	119.0	
2	110.631	H	43.7	-15.6	28.1	43.5	15.4	400.1	154.4	
3	111.359	V	44.9	-15.6	29.3	43.5	14.2	99.9	235.0	
4	269.954	H	47.0	-12.4	34.6	46.0	11.4	99.9	215.5	
5	501.662	H	44.7	-7.1	37.6	46.0	8.4	203.3	263.7	
6	668.866	V	45.2	-4.1	41.1	46.0	4.9	99.9	15.8	
7	752.408	H	38.9	-3.1	35.8	46.0	10.2	99.9	183.4	
8	970.536	V	37.9	1.6	39.5	54.0	14.5	99.9	150.3	

* 1 GHz ~ 6 GHz (HR54-500)_StandBy Mode



Final Result

No.	Frequency [MHz]	(P)	Reading AV [dB(uV)]	Reading PK [dB(uV)]	c.f. [dB(1/m)]	Result AV [dB(uV/m)]	Result PK [dB(uV/m)]	Limit AV [dB(uV/m)]	Limit PK [dB(uV/m)]	Margin AV [dB]	Margin PK [dB]	Height [cm]	Angle [deg]	Remark
1	1002.456	H	36.1	63.7	-8.0	28.1	55.7	54.0	74.0	25.9	18.3	99.8	22.3	
2	1002.500	V	50.7	65.1	-8.0	42.7	57.1	54.0	74.0	11.3	16.9	99.8	157.2	
3	1064.888	V	35.7	57.5	-7.9	27.8	49.6	54.0	74.0	26.2	24.4	99.8	131.4	
4	1338.125	V	45.4	62.7	-6.9	38.5	55.8	54.0	74.0	15.5	18.2	99.8	135.4	
5	1499.375	H	48.2	64.2	-5.6	42.6	58.6	54.0	74.0	11.4	15.4	99.8	160.5	
6	1499.375	H	43.8	60.8	-5.6	38.2	55.2	54.0	74.0	15.8	18.8	99.8	180.9	
7	1670.625	H	41.3	60.4	-3.5	37.8	56.9	54.0	74.0	16.2	17.1	99.8	88.5	
8	1710.132	V	44.1	57.6	-3.0	41.1	54.6	54.0	74.0	12.9	19.4	99.8	152.1	
9	1839.375	H	36.6	49.0	-1.5	35.1	47.5	54.0	74.0	18.9	26.5	99.8	151.6	
10	1856.250	V	33.5	52.2	-1.3	32.2	50.9	54.0	74.0	21.8	23.1	99.8	148.8	
11	2576.168	V	28.1	46.8	-1.5	26.6	45.3	54.0	74.0	27.4	28.7	99.8	63.3	

7. E.U.T. photographs

Front View



Rear View



Left View



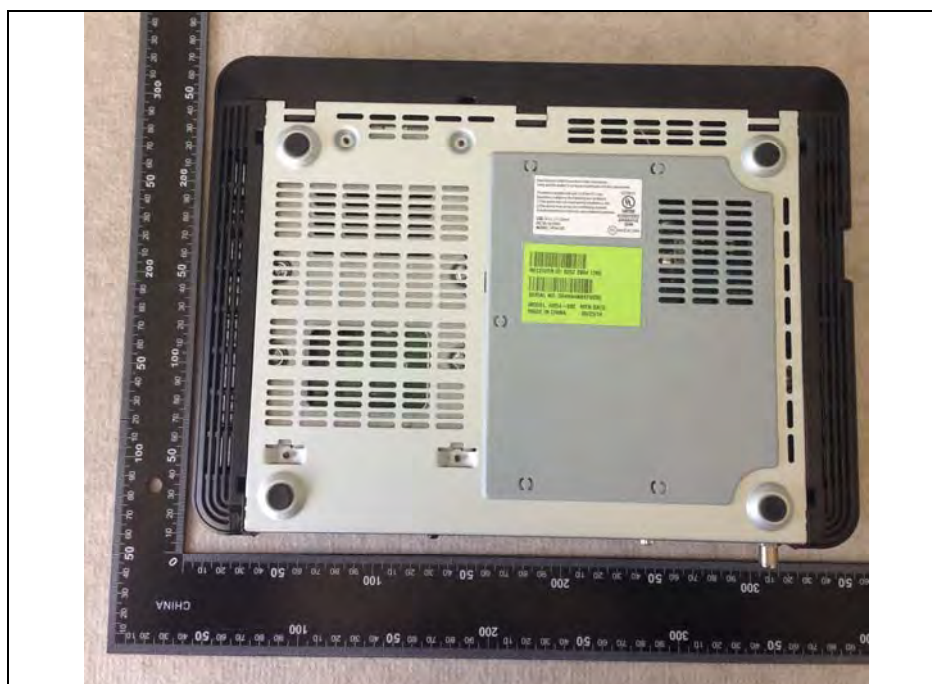
Right View



Top View



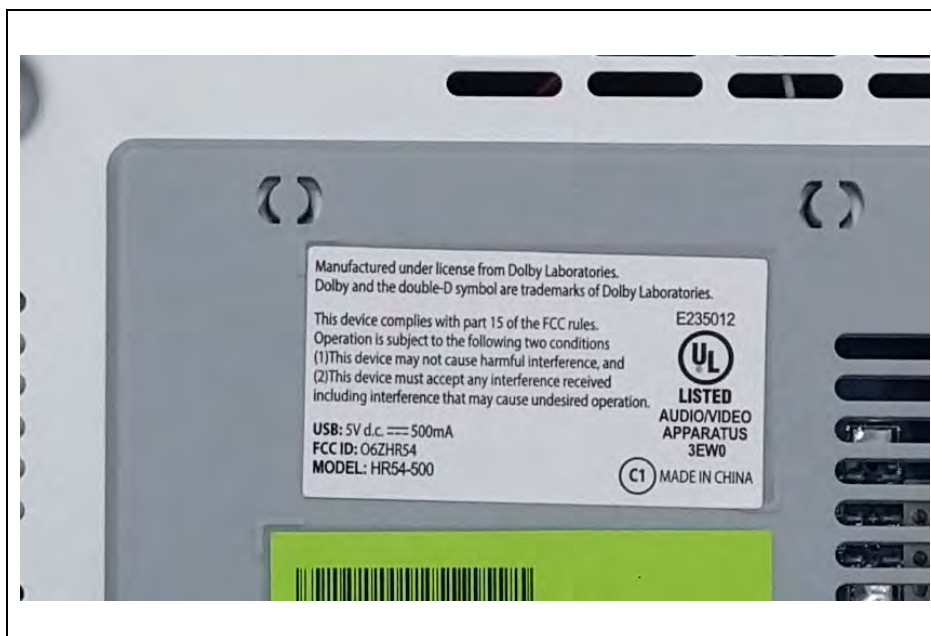
Bottom View



Port



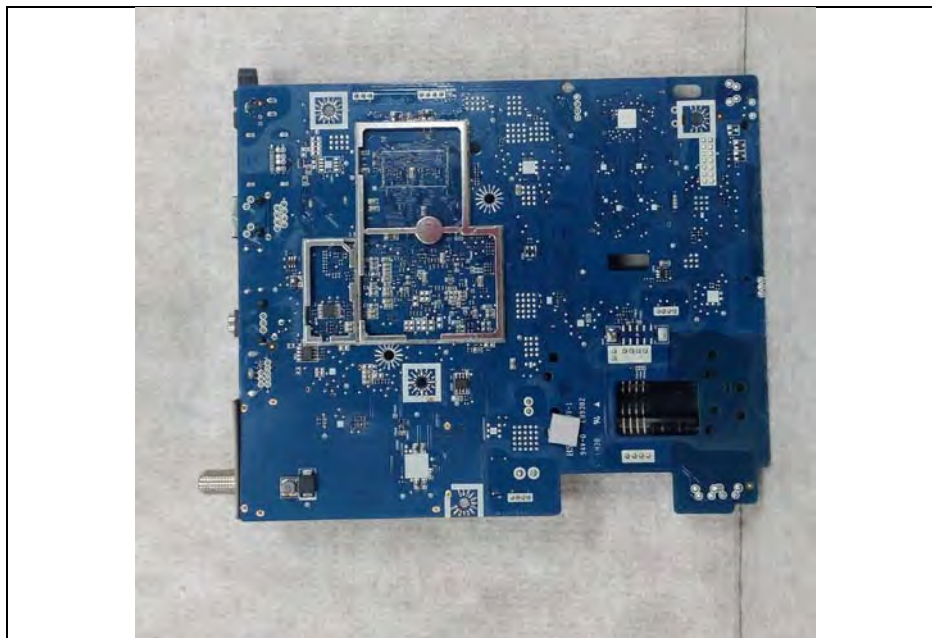
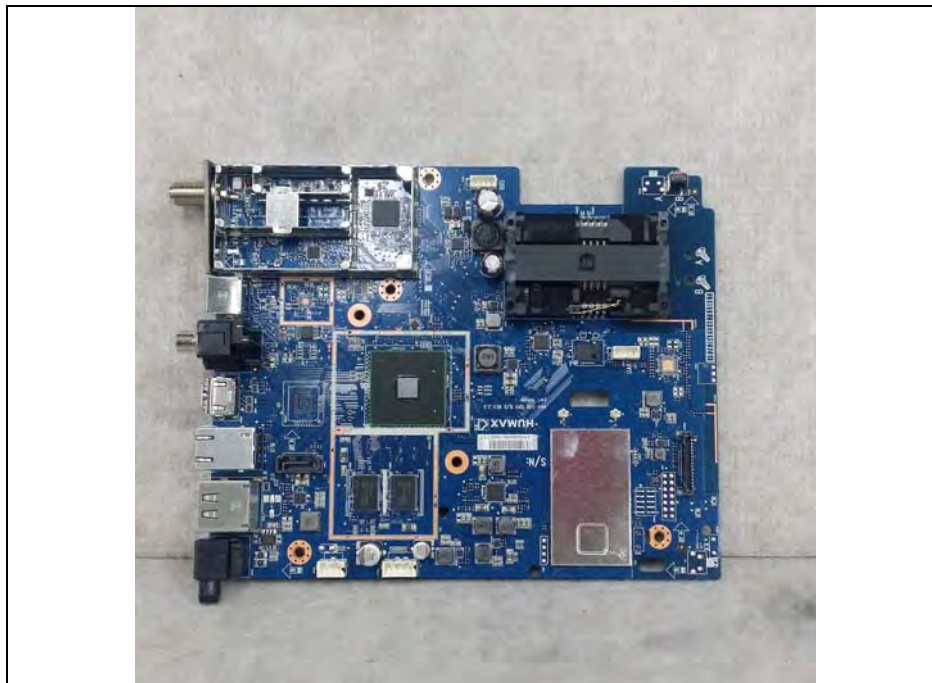
Label



Inside



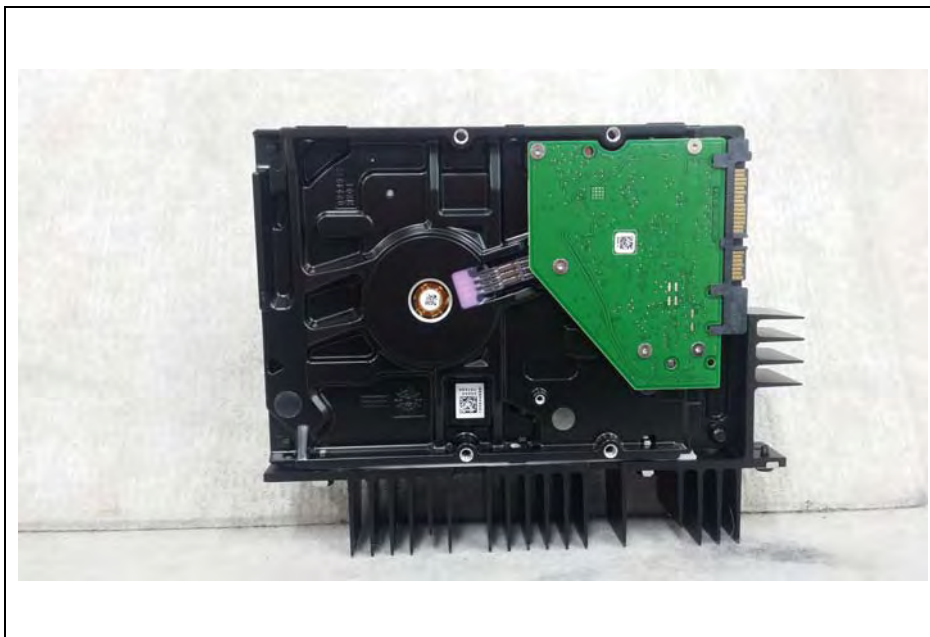
Main Board



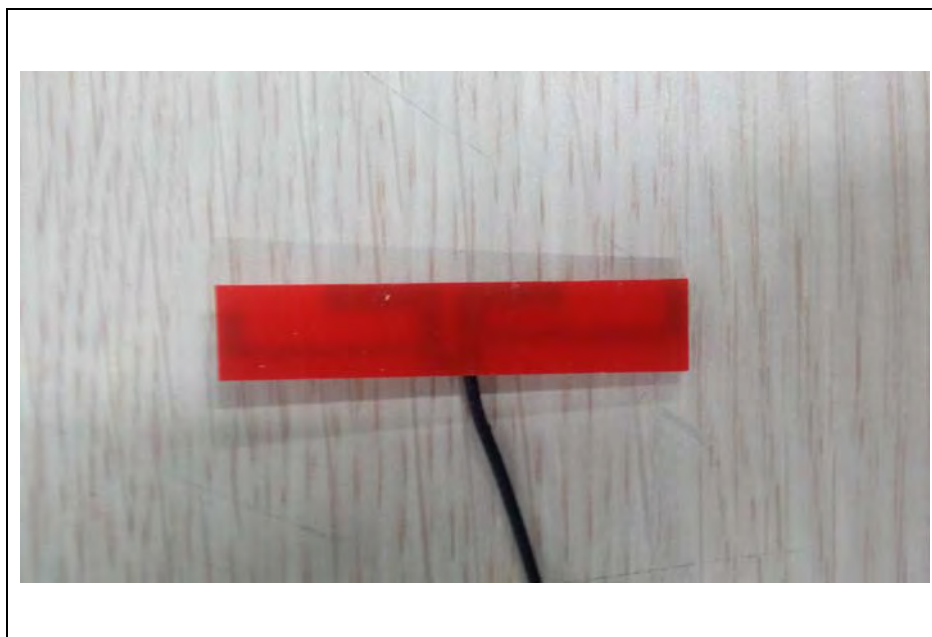
Front Board



HDD (1000GB)



ANT Board (2EA)



AC Adaptor

