Certificate

Issue Date: March 23, 2018
Ref. Report No. ISL-18LE157FBC

Product Name	:	UHD Set-Top Box
Model	:	Air7415B
Brand	:	AirTies
Applicant	:	AirTies Kablosuz Iletisim San. ve Dis Tic. A.S.
Address	:	Mithat Uluunlu Sok. No:23 Esentepe, Sisli, 34394, Istanbul, Turkey
Contact Person	:	Mehmet Unal

We, **International Standards Laboratory Corp.**, hereby certify that:

The device bearing the trade name and model specified above has been shown to comply with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified. (refer to Test Report if any modifications were made for compliance).

Standards:

FCC CFR Title 47 Part 15 Subpart B: 2016 Class B
ANSI C63.4-2014
Section 15.107, 15.109, 15.111, and 15.115
Industry Canada Interference-Causing Equipment Standard ICES-003 Issue 6: 2016 Class B

I attest to the accuracy of data and all measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

International Standards Laboratory Corp.

Bert Chen / Director

☐ **Hsi-Chih LAB**:
No. 65, Gu Dai Keng Street, Hsi-Chih Dist., New Taipei City 221, Taiwan
Tel: 886-2-2646-2550; Fax: 886-2-2646-4641

☐ **Lung-Tan LAB**:
No. 120, Lane 180, Hsin Ho Rd., Lung-Tan Dist., Tao Yuan City 325, Taiwan
Tel: 886-3-407-1718; Fax: 886-3407-1738

Supplier's Declaration of Conformity

This device complies with Part 15 of the FCC Rules. The test result has been shown in the ISL test report with number ISL-18LE157FBC. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Product Name:	UHD Set-Top Box
Model:	Air7415B
Brand:	AirTies
Name of Responsible Party:	AirTies Kablosuz Iletisim San. ve Dis Tic. A.S.
Address of Responsible Party:	Mithat Uluunlu Sok. No:23 Esentepe, Sisli, 34394, Istanbul, Turkey
Contact Person:	Mehmet Unal
Phone No.:	+90-212-318-62-00
Fax No.:	+90-212-318-62-98

We, **AirTies Kablosuz Iletisim San. ve Dis Tic. A.S.***, hereby declare that the equipment bearing the trade name and model number specified above was tested conforming to the applicable FCC Rules under the most accurate measurement standards possible, and that all the necessary steps have been taken and are in force to assure that production units of the same equipment will continue to comply with the Commissions requirements.*

Mehmet Unal
AirTies Kablosuz Iletisim San. ve Dis Tic. A.S.
Issue Date: March 23, 2018

Remarks: 1)The responsible party for Supplier's Declaration of Conformity must be located within the United States, 2) The above is a sample of SDoC, one should modify it to meet remark

TEST REPORT

of

FCC Part 15 Subpart B

Product : **UHD Set-Top Box**

Model(s): **Air7415B**

Brand: **AirTies**

Applicant: **AirTies Kablosuz Iletisim San. ve Dis Tic. A.S.**

Address: **Mithat Uluunlu Sok. No:23 Esentepe, Sisli, 34394, Istanbul, Turkey**

NVLAP LAB CODE 200234-0

Test Performed by:

International Standards Laboratory Corp.
<Lung-Tan LAB>
*Address:
No. 120, Lane 180, Hsin Ho Rd.,
Lung-Tan Dist., Tao Yuan City 325, Taiwan
*Tel: 886-3-407-1718; Fax: 886-3-407-1738

Report No.: **ISL-18LE157FBC**
Issue Date : **March 23, 2018**

This report totally contains 30 pages including cover page and contents page.
Test results given in this report apply only to the specific sample(s) tested and are traceable to national or international standard through calibration of the equipment and evaluating measurement uncertainty herein.
This report must not be used to claim product endorsement by NVLAP, NIST or any other Government agency.

Contents of Report

1. General

1.1 Certification of Accuracy of Test Data

Standards:	FCC CFR Title 47 Part 15 Subpart B: 2016 Class B ANSI C63.4-2014 Section 15.107, 15.109, 15.111, and 15.115 Industry Canada Interference-Causing Equipment Standard ICES-003 Issue 6: 2016	
Equipment Tested:	UHD Set-Top Box	
Model:	Air7415B	
Brand:	AirTies	
Applicant:	AirTies Kablosuz Iletisim San. ve Dis Tic. A.S.	
Sample received Date:	March 9, 2018	
Final test Date:	refer to the date of test data	
Test Site:	International Standards Laboratory Corp. Chamber 02; Chamber 14; Conduction 04	
Test Distance:	3M	
Temperature:	refer to each site test data	
Humidity:	refer to each site test data	
Input power:	Conduction input power:	AC 120V/60Hz
	Radiation input power:	AC 120V/60Hz
Test Result:	PASS	
Report Engineer:	Cheryl Tung	
Test Engineer:	Ray FJ Chiang Ray FJ Chiang	
Approved By:	Angus Chu Angus Chu / Director	

1.2 Summary of Test Result

Emission

Performed Item	Normative Reference	Test Performed	Deviation	Result
Section 15.107 Conducted limits	FCC CFR Title 47 Part 15 Subpart B: 2016, Part 15.107	Yes	No	PASS
Section 15.109 Radiated emission limits	FCC CFR Title 47 Part 15 Subpart B: 2016, Part 15.109	Yes	No	PASS
Section 15.111 Antenna power conduction limits for receivers	FCC CFR Title 47 Part 15 Subpart B: 2016, Part 15.111	N/A	N/A	N/A
Section 15.115 TV interface devices, including cable system terminal devices	FCC CFR Title 47 Part 15 Subpart B: 2016, Part 15.115	N/A	N/A	N/A

1.3 Description of EUT

EUT

Description	UHD Set-Top Box
Condition	Pre-Production
Model	Air7415B
Serial Number	N/A
Highest working frequency	1.9GHz
The radiation test should be tested till	9.5GHz

The devices can be installed inside the EUT are listed below:

Components	Vendor	Description
Adapter	MOSO	MSA-C1000CS12.0-12A-DE
BT module	XAVI	CYW20704
HDMI Cable	XAVI	One (1.5m)
		One (2.0m)
A/V to RCA Cable	XAVI	ONE (1.5m)

The I/O ports of EUT are listed below:

I/O Port Type	Quantity
USB Port	1
A/V Out Port	1
HDMI Port	1
S/PDIF Port(Optical)	1
12VDC Port	1
Ethernet Port(100Mbps/10Mbps)	1

Test configurations:

Configuration	Mode	Voltage
1	USB In + HDMI Output	120V

EMI Noise Source:

Photo	Crystal	Point
EUT-9	54MHz	Y2251

EMI Solution:

Please refer to the technical documents.

1.4 Description of Support Equipment

No	Unit	Model / Serial No.	Brand	Power Cord	FCC ID
1	USB Flash	Nano Flash S/N:N/A	imation	Non-shielded	FCC DOC
2	LCD Monitor	P2416D S/N: NA	DELL	Non-shielded	DOC
3	DTS/Dolby Digital Surround Sound Decoder	DDTS-100 S/N:N/A	CREATIVE	Non-shielded	FCC DOC
4	Notebook Personal Computer	TP00026A S/N:N/A	Lenovo	Non-shielded	FCC DOC
5	Earphone	ST-304 S/N: NA	KOKA	N/A	FCC DOC
6	remote control	N/A	N/A	N/A	FCC DOC

1.5 Software for Controlling Support Unit

Test programs exercising various part of EUT were used. The programs were executed as follows:

1. Receive and transmit packet of NB to the EUT through Ethernet port.
2. Send Audio signal to the DTS/Dolby Digital Surround Sound Decoder through EUT SPDIF (Optical)Out Port.
3. Send Audio signal to Eardphone through DTS/Dolby Digital Surround Sound Decoder Earphone Out Port.
4. Send video and audio signal to the LCD Monitor through EUT HDMI Port.
5. EUT to read and write the USB Flash.
6. Receive and transmit packet of EUT to 300Mbps Wireless Broadband Router through EUT wireless LAN.
7. Repeat the above steps.

	Filename	Issued Date
LAN	PIN	--
Wireless	Telenet.exe	2013/8/22
LCD Monitor	H Pattern	--
USB Flash	H Pattern	--

1.6 I/O Cable Condition of EUT and Support Units

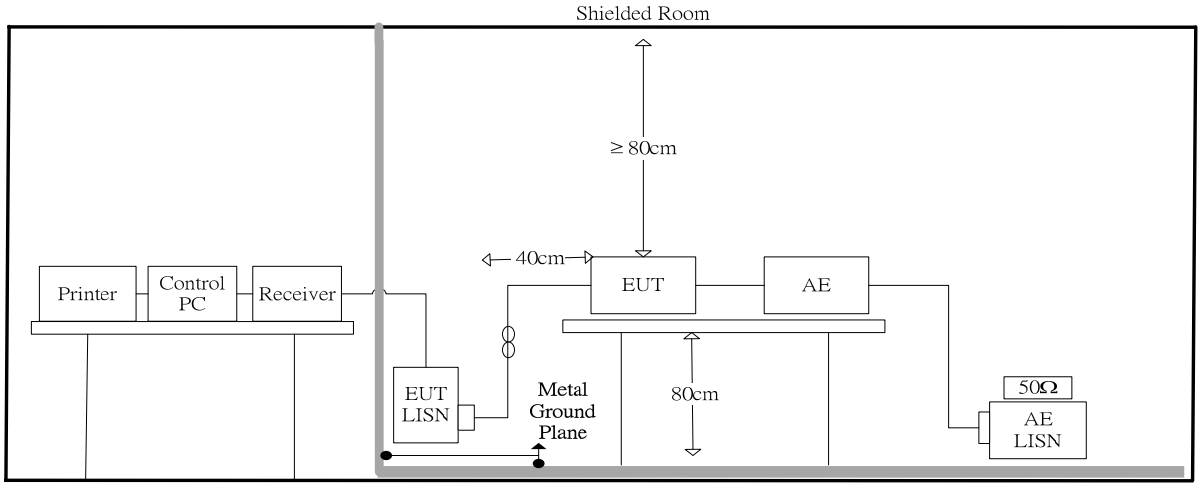
Description	Path	Cable Length	Cable Type
HDMI Cable	EUT HDMI Port to LCD Monitor HDMI Port	2m	Shielded
A/V to RCA Cable:	EUT A/V Out Port to dummy cable	1.8m	Shielded
LAN Data Cable	NB LAN(RJ-45) Port to EUT Ethernet Port	10m	Non-Shielded
Optical Cable	DTS/Dolby Digital Surround Sound Decoder Optical Port to EUT S/PDIF Port(Optical)	0.5m	Non-Shielded
Audio Cable	Earphone to DTS/Dolby Digital Surround Sound Decoder Line Out Port	1.2 m	Non-Shielded
USB Cable	EUT USB Port to USB Flah	1.27m	Shielded
Power Cable	Adapter to EUT 12Vdc Port	1.5m	Non-Shielded

2. Conducted limits

2.1 Test Specification

Please refer to 1.1

2.2 Test Setup



2.3 Test Procedure

The system was set up as described above, with the EMI diagnostic software running. The main power line conducted EMI tests were run on both hot and neutral conductors of the power cord and the results were recorded. The effect of varying the position of the interface cables has been investigated to find the configuration that produces maximum emission.

At the frequencies where the peak values of the emissions were higher than 6dB below the applicable limits, the emissions were also measured with the quasi-peak detectors. At the frequencies where the quasi-peak values of the emissions were higher than 6dB below the applicable average limits, the emissions were also measured with the average detectors.

The highest emissions were analyzed in details by operating the spectrum analyzer in fixed tuned mode to determine the nature of the emissions and to provide information which could be useful in reducing their amplitude.

2.4 EMI Receiver Configuration (for the frequencies tested)

Frequency Range:	150KHz--30MHz
Detector Function:	Quasi-Peak / Average Mode
Resolution Bandwidth:	9KHz

2.5 Limit

Frequency	QP	AV
MHz	dBuV/m	dBuV/m
0.15-0.50	66-56	56-46
0.50-5.0	56	46
5.0-30	60	50
Note: The lower limit shall apply at the transition frequencies		

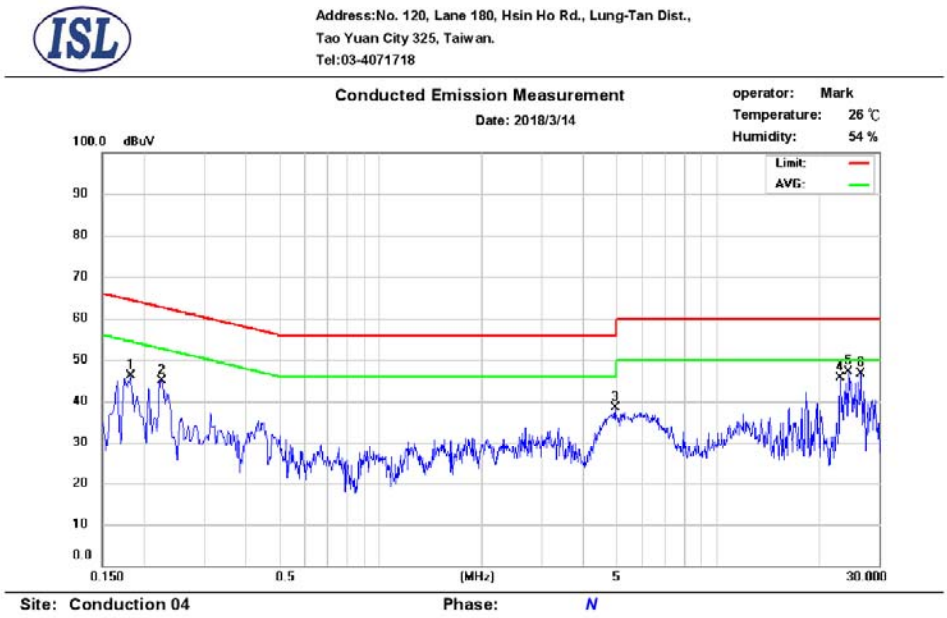
2.6 Conduction Test Data: Configuration 1

- Line

No.	Frequency (MHz)	QP_R (dBuV)	AVG_R (dBuV)	Correct Factor (dB)	QP Emission (dBuV)	QP Limit (dBuV)	QP Margin (dB)	AVG Emission (dBuV)	AVG Limit (dBuV)	AVG Margin (dB)
1	0.182	30.92	20.54	9.93	40.85	64.39	-23.54	30.47	54.39	-23.92
2	0.426	25.20	17.19	9.92	35.12	57.33	-22.21	27.11	47.33	-20.22
3	5.222	21.21	13.49	10.09	31.30	60.00	-28.70	23.58	50.00	-26.42
4	24.530	33.11	27.92	10.33	43.44	60.00	-16.56	38.25	50.00	-11.75
5	25.694	33.86	30.74	10.33	44.19	60.00	-15.81	41.07	50.00	-8.93
6	26.606	33.58	30.38	10.34	43.92	60.00	-16.08	40.72	50.00	-9.28

Note:
Margin = QP/AVG Emission - Limit
QP/AVG Emission = QP_R/AVG_R + Correct Factor
Correct Factor = LISN Loss + Cable Loss
A margin of -8dB means that the emission is 8dB below the limit
The frequency spectrum graph is for final peak graph, and the attached table is for QP/AVG test result.
If peak data can pass, it will be shown in "QP/AVG Correct" column, if not, QP/AVG data will instead.
The CISPR 22 limits would be applied to all FCC Part 15 devices.

- Neutral



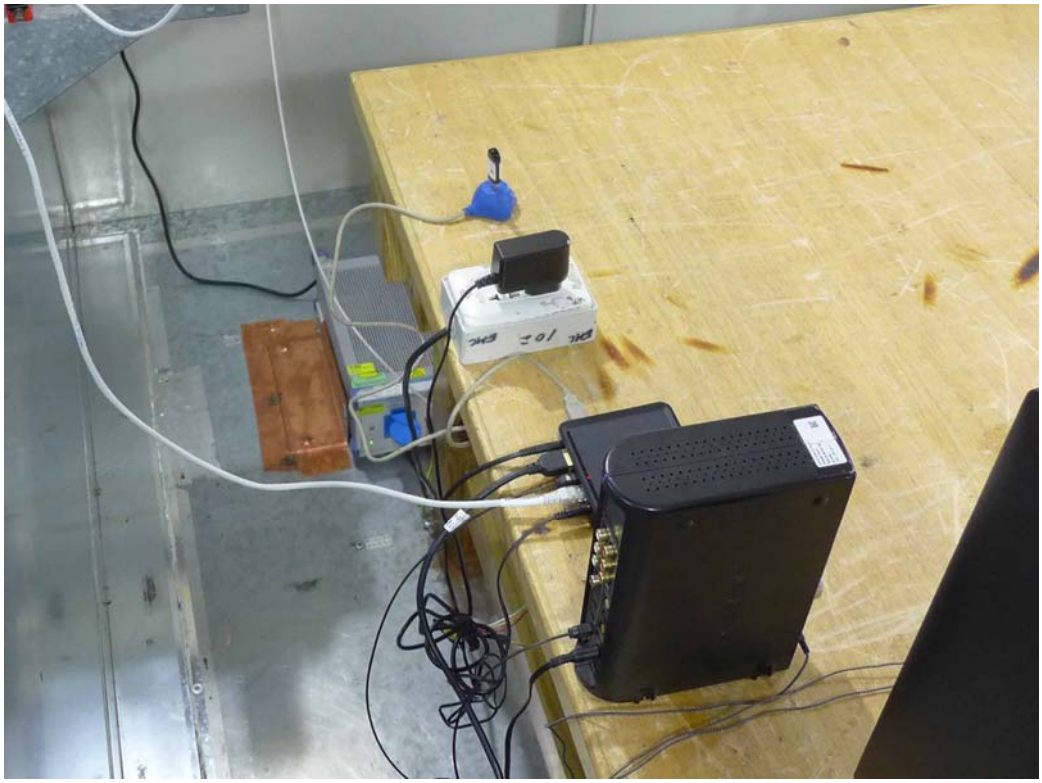
No.	Frequency (MHz)	QP_R (dBuV)	AVG_R (dBuV)	Correct Factor (dB)	QP Emission (dBuV)	QP Limit (dBuV)	QP Margin (dB)	AVG Emission (dBuV)	AVG Limit (dBuV)	AVG Margin (dB)
1	0.182	33.09	17.89	9.30	42.39	64.39	-22.00	27.19	54.39	-27.20
2	0.226	27.99	13.44	9.30	37.29	62.60	-25.31	22.74	52.60	-29.86
3	4.958	22.18	14.70	9.49	31.67	56.00	-24.33	24.19	46.00	-21.81
4	23.126	33.11	26.74	9.90	43.01	60.00	-16.99	36.64	50.00	-13.36
5	24.350	36.27	30.58	9.90	46.17	60.00	-13.83	40.48	50.00	-9.52
6	26.486	35.46	32.34	9.94	45.40	60.00	-14.60	42.28	50.00	-7.72

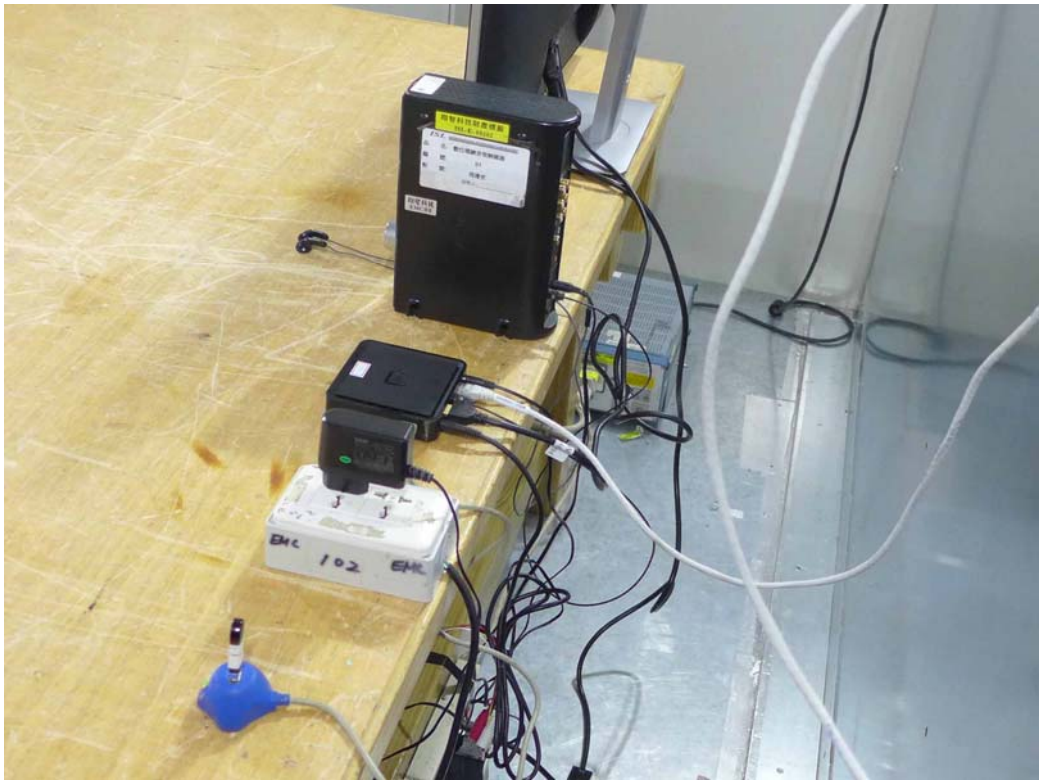
Note:
Margin = QP/AVG Emission - Limit
QP/AVG Emission = QP_R/AVG_R + Correct Factor
Correct Factor = LISN Loss + Cable Loss
A margin of -8dB means that the emission is 8dB below the limit
The frequency spectrum graph is for final peak graph, and the attached table is for QP/AVG test result.
If peak data can pass, it will be shown in “QP/AVG Correct” column, if not, QP/AVG data will instead.
The CISPR 22 limits would be applied to all FCC Part 15 devices.

2.7 Test Setup Photo

Front View

Back View



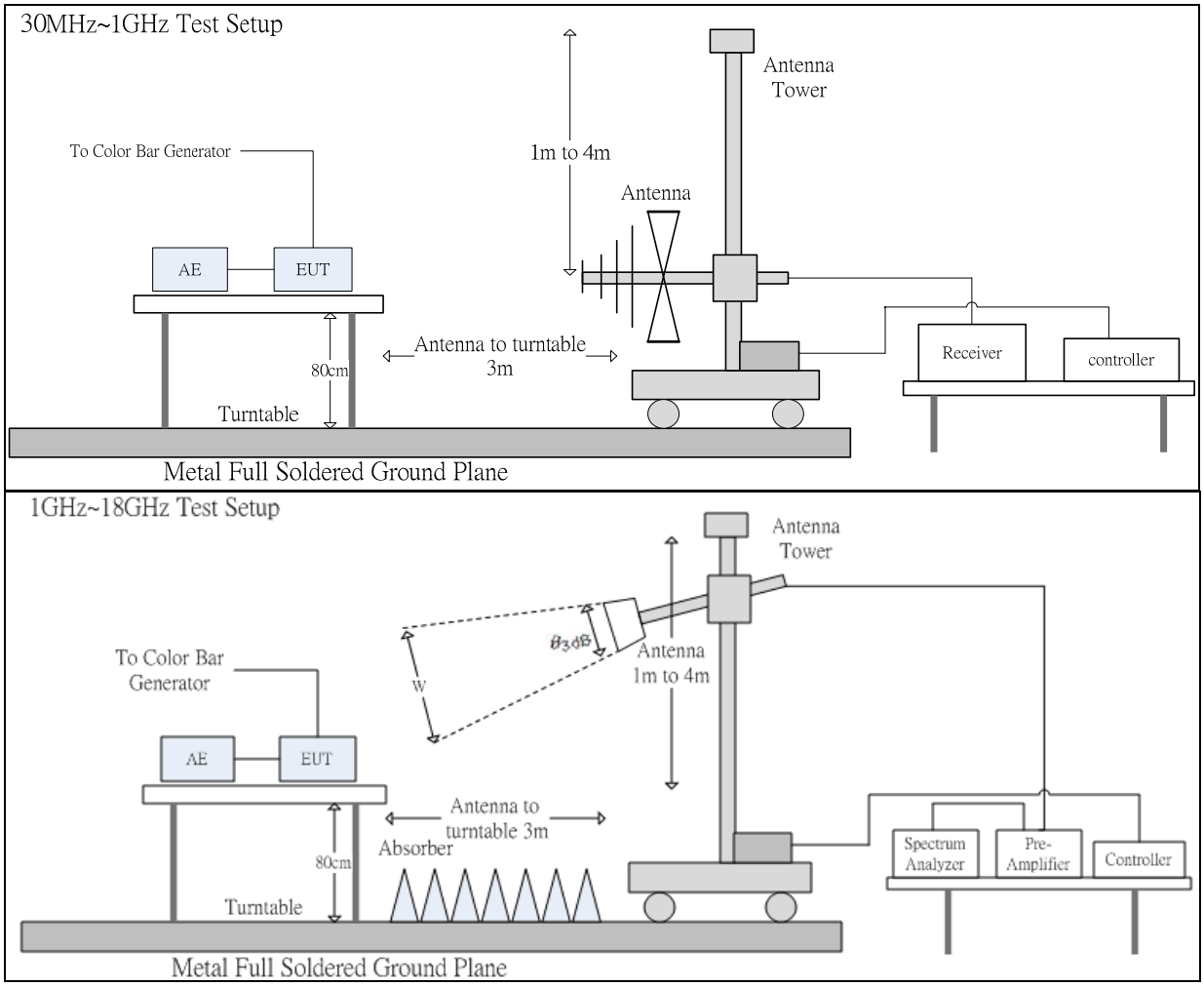


3. Radiated emission limits

3.1 Test Specification

Please refer to 1.1

3.2 Test Setup



The 3dB beam width of the horn antenna used for the test is as shown in the table below.
1GHz~18GHz

Frequency GHz	E-plane	H-plane	$\theta_{3\,dB}$ (min)	d= 3 m w (m)
1	88°	147°	88°	5.79
2	68°	119°	68°	4.04
3	73°	92°	73°	4.44
4	70°	89°	70°	4.20
5	55°	60°	55°	3.12
6	63°	62°	62°	3.60
7	48°	49°	48°	2.67
8	39°	46°	39°	2.12
9	32°	42°	32°	1.72
10	30°	39	30°	1.61

Frequency GHz	E-plane	H-plane	$\theta_{3\,dB}$(min)	d= 3 m
				w (m)
11	32°	35°	32°	1.72
12	35°	32°	35°	1.89
13	34°	31°	31°	1.66
14	32°	27°	27°	1.44
15	36°	26°	26°	1.39
16	40°	28°	28°	1.50
17	43°	26°	26°	1.39
18	41°	22°	22°	1.17

18 GHz~26.5 GHz

Frequency GHz	E-plane	H-plane	$\theta_{3\,dB}$(min)	d= 1 m	d= 3 m
				w (m)	w (m)
18	11.4°	12.7°	11.4°	0.199	0.598
19	10.9°	12.4°	10.9°	0.190	0.572
20	10.8°	12.4°	10.8°	0.189	0.567
21	9.8°	12°	9.8°	0.171	0.514
22	9.7°	11°	9.7°	0.169	0.509
23	10°	11.8°	10°	0.174	0.524
24	9°	11°	9°	0.157	0.472
25	10°	12.3°	10°	0.174	0.524
26	9.9°	11.1°	9.9°	0.173	0.519
26.5	9.4°	11.3°	9.4°	0.164	0.493

26 GHz~40 GHz

Frequency GHz	E-plane	H-plane	$\theta_{3\,dB}$(min)	d= 1 m	d= 3 m
				w (m)	w (m)
26	12°	12.2°	12°	0.210	0.631
27	13°	10.5°	10.5°	0.184	0.551
28	13.2°	12.3°	12.3°	0.216	0.647
29	11.5°	12.8°	11.5°	0.201	0.604
30	12°	8°	8°	0.140	0.420
31	11.5°	10.1°	10.1°	0.177	0.530
32	11.8°	10°	10°	0.175	0.525
33	11.8°	9.5°	9.5°	0.166	0.499
34	11.6°	10°	10°	0.175	0.525
35	10.9°	9.8°	9.8°	0.171	0.514
36	11.8°	8.6°	8.6°	0.150	0.451
37	12.9°	10.5°	10.5°	0.184	0.551
38	12°	10.3°	10.3°	0.180	0.541
39	11.8°	9.8°	9.8°	0.171	0.514
40	12.5°	11.2°	11.2°	0.196	0.588

3.3 Test Procedure

The system was set up as described above, with the EMI diagnostic software running. The maximum emission was measured by varying the height of antenna and then by rotating the turntable. Both polarization of antenna, horizontal and vertical, were measured.

The highest emissions between 30 MHz to 1000 MHz were analyzed in details by operating the spectrum analyzer and/or EMI receiver in quasi-peak mode to determine the precise amplitude of the emissions. While doing so, the interconnecting cables and major parts of the system were moved around, the antenna height was varied between one and four meters, its polarization was varied between vertical and horizontal, and the turntable was slowly rotated, to maximize the emission. The highest emissions of frequency higher than 1000 MHz were analyzed in peak mode and/or average mode to determine the precise amplitude of the emission.

For an unintentional radiator, including a digital device, the spectrum shall be investigated from the lowest radio frequency signal generated or used in the device, without going below the lowest frequency for which a radiated emission limit is specified, up to the frequency shown in the following table:

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705 – 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower

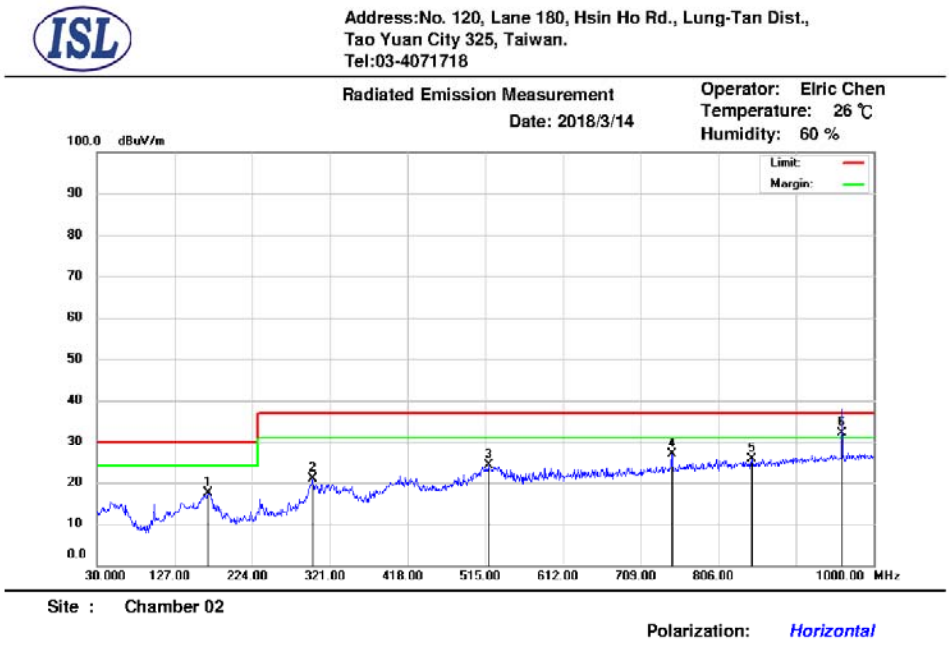
3.4 Spectrum Analyzer /EMI Receiver Configuration (for the frequencies tested)

Frequency Range:	30MHz--1000MHz
Detector Function:	Quasi-Peak Mode
Resolution Bandwidth:	120KHz
Frequency Range:	Above 1000MHz
Detector Function:	Peak/Average Mode
Resolution Bandwidth:	1MHz

3.5 Limit

Frequency		Distance	
MHz	dBuV/m	meter	
30-230	30	10	Under 1GHz test
230-1000	37	10	Under 1GHz test
30-88	40	3	Under 1GHz test
88-216	43.5	3	Under 1GHz test
216-960	46	3	Under 1GHz test
Above 960~40GHz	54 average / 74 peak	3	Above 1GHz test
Note:The lower limit shall apply at the transition frequencies			

3.6 Radiation Test Data: Configuration 1
- Radiated Emissions (Horizontal)



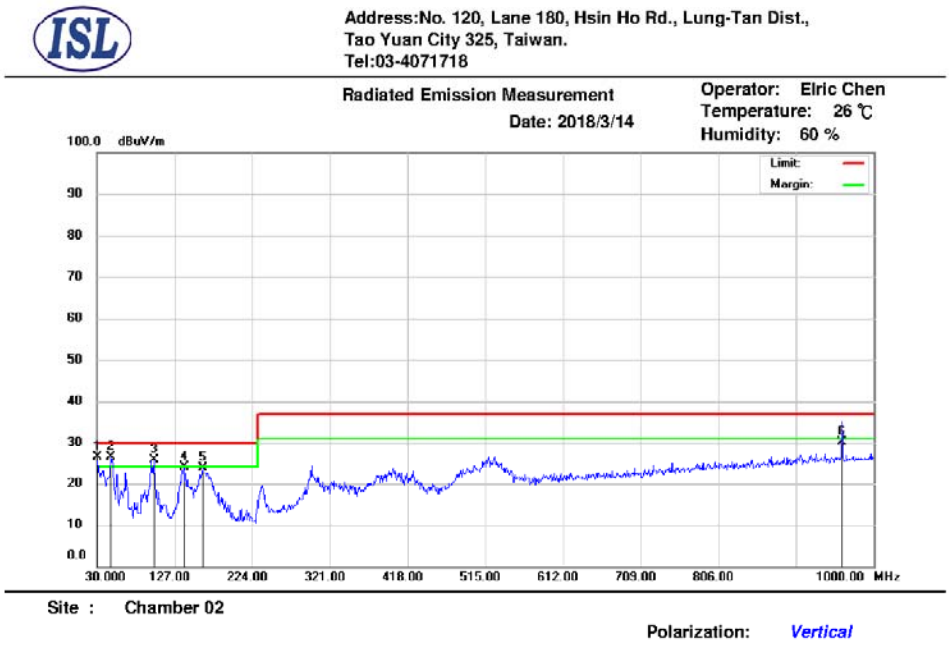
Mk.	Frequency (MHz)	RX_R (dBuV)	Correct Factor(dB/m)	Emission (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant.Pos (cm)	Tab.Pos (deg.)	Detector
1	168.71	33.91	-16.47	17.44	30.00	-12.56	400	66	peak
2	299.66	35.69	-14.87	20.82	37.00	-16.18	300	268	peak
3	518.88	33.93	-9.76	24.17	37.00	-12.83	350	4	peak
4	747.80	32.03	-5.24	26.79	37.00	-10.21	100	203	peak
5	847.71	29.97	-4.23	25.74	37.00	-11.26	100	217	peak
6	960.05	34.66	-2.62	32.04	37.00	-4.96	100	203	QP

* Note:
Margin = Emission – Limit
Emission = Radiated Amplitude + Correct Factor
Correct Factor = Antenna Correction Factor + Cable Loss – Pre-Amplifier Gain
A margin of -8dB means that the emission is 8dB below the limit
Antenna Distance: 10 meters
The CISPR 22 limits would be applied to all FCC Part 15 devices.
Below 1GHz test, if the peak measured value meets the QP limit, it is unnecessary to perform the QP measurement.

Mk.	Frequency (MHz)	RX_R (dBuV)	Correct Factor(dB/m)	Emission (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant.Pos (cm)	Tab.Pos (deg.)	Detector
1	1034.00	65.45	-15.94	49.51	74.00	-24.49	147	190	peak
2	1112.55	61.19	-15.84	45.35	54.00	-8.65	147	322	AVG
3	1119.00	72.02	-15.83	56.19	74.00	-17.81	147	319	peak
4	1476.00	65.36	-15.35	50.01	74.00	-23.99	200	102	peak
5	2275.00	60.41	-10.75	49.66	74.00	-24.34	200	116	peak
6	2598.00	59.67	-10.22	49.45	74.00	-24.55	200	194	peak
7	3567.00	58.19	-9.14	49.05	74.00	-24.95	200	43	peak

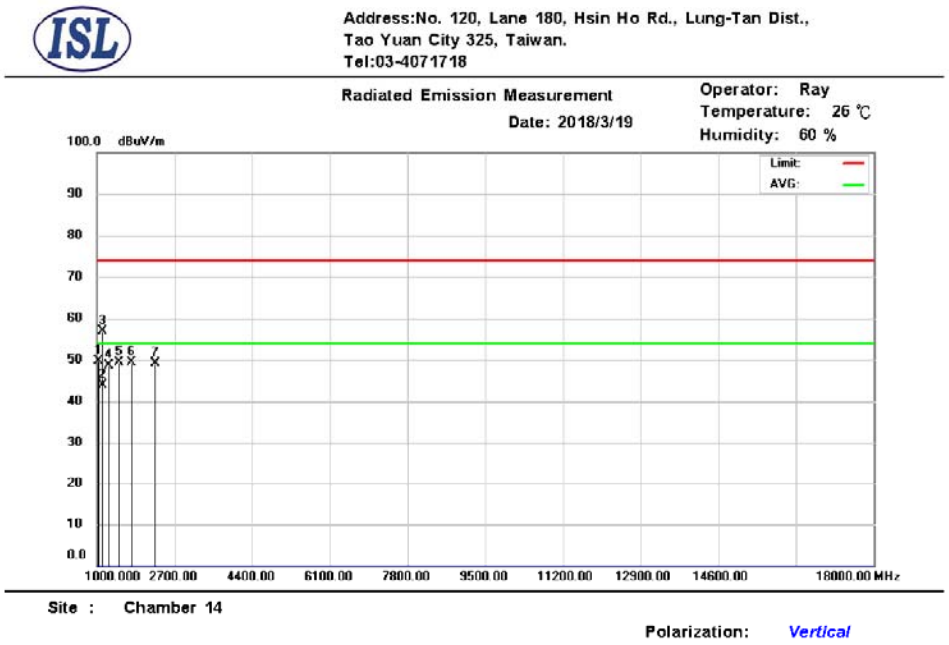
* Note:
Margin = Emission – Limit
Emission = Radiated Amplitude + Correct Factor
Correct Factor = Antenna Correction Factor + Cable Loss – Pre-Amplifier Gain
A margin of -8dB means that the emission is 8dB below the limit
Antenna Distance: 3 meters
Above 1GHz test, if the peak measured value meets the average limit, it is unnecessary to perform the average measurement.

-Radiated Emissions (Vertical)



Mk.	Frequency (MHz)	RX_R (dBuV)	Correct Factor(dB/m)	Emission (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant.Pos (cm)	Tab.Pos (deg.)	Detector
1	30.00	45.29	-18.95	26.34	30.00	-3.66	295	360	peak
2	47.46	43.39	-17.06	26.33	30.00	-3.67	100	136	peak
3	101.78	46.60	-20.89	25.71	30.00	-4.29	100	95	peak
4	138.64	40.87	-16.94	23.93	30.00	-6.07	148	0	peak
5	161.92	39.77	-16.14	23.63	30.00	-6.37	100	138	peak
6	960.11	32.70	-2.62	30.08	37.00	-6.92	100	360	QP

* Note:
Margin = Emission – Limit
Emission = Radiated Amplitude + Correct Factor
Correct Factor = Antenna Correction Factor + Cable Loss – Pre-Amplifier Gain
A margin of -8dB means that the emission is 8dB below the limit
Antenna Distance: 10 meters
The CISPR 22 limits would be applied to all FCC Part 15 devices.
Below 1GHz test, if the peak measured value meets the QP limit, it is unnecessary to perform the QP measurement.

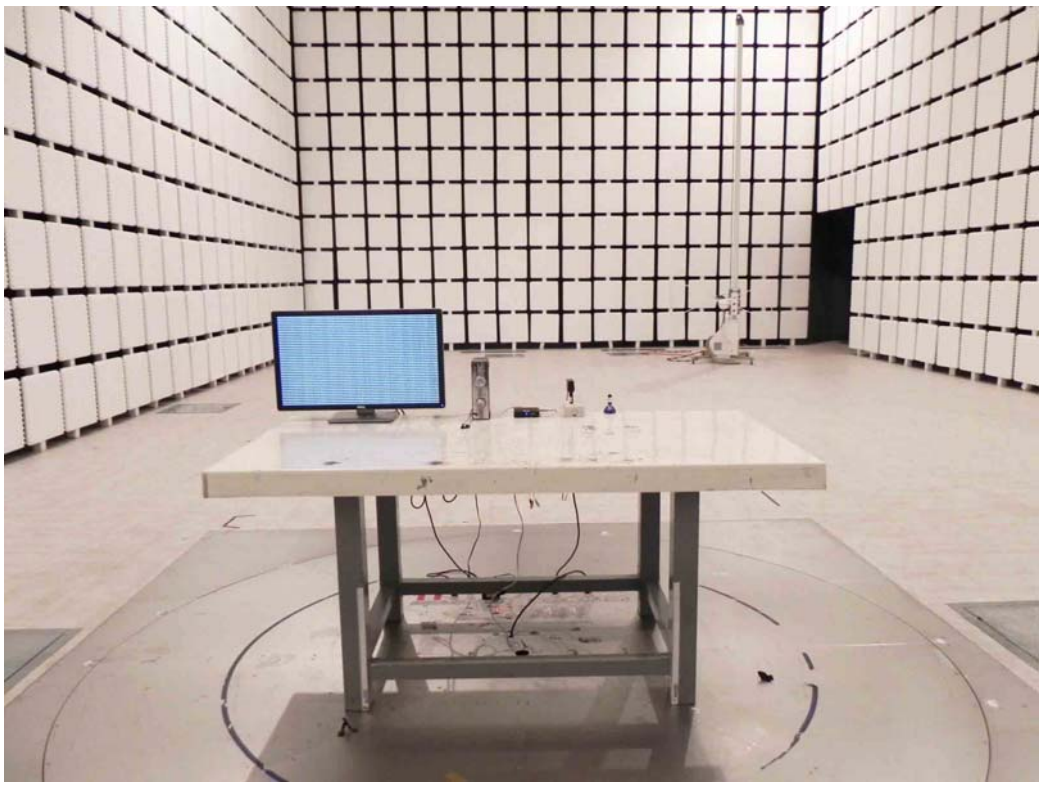


Mk.	Frequency (MHz)	RX_R (dBuV)	Correct Factor(dB/m)	Emission (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Ant.Pos (cm)	Tab.Pos (deg.)	Detector
1	1034.00	65.50	-15.94	49.56	74.00	-24.44	100	75	peak
2	1112.70	59.63	-15.84	43.79	54.00	-10.21	101	241	AVG
3	1119.00	72.66	-15.83	56.83	74.00	-17.17	100	244	peak
4	1255.00	64.26	-15.65	48.61	74.00	-25.39	151	12	peak
5	1476.00	64.83	-15.35	49.48	74.00	-24.52	151	143	peak
6	1765.00	62.40	-13.14	49.26	74.00	-24.74	200	0	peak
7	2275.00	59.93	-10.75	49.18	74.00	-24.82	151	239	peak

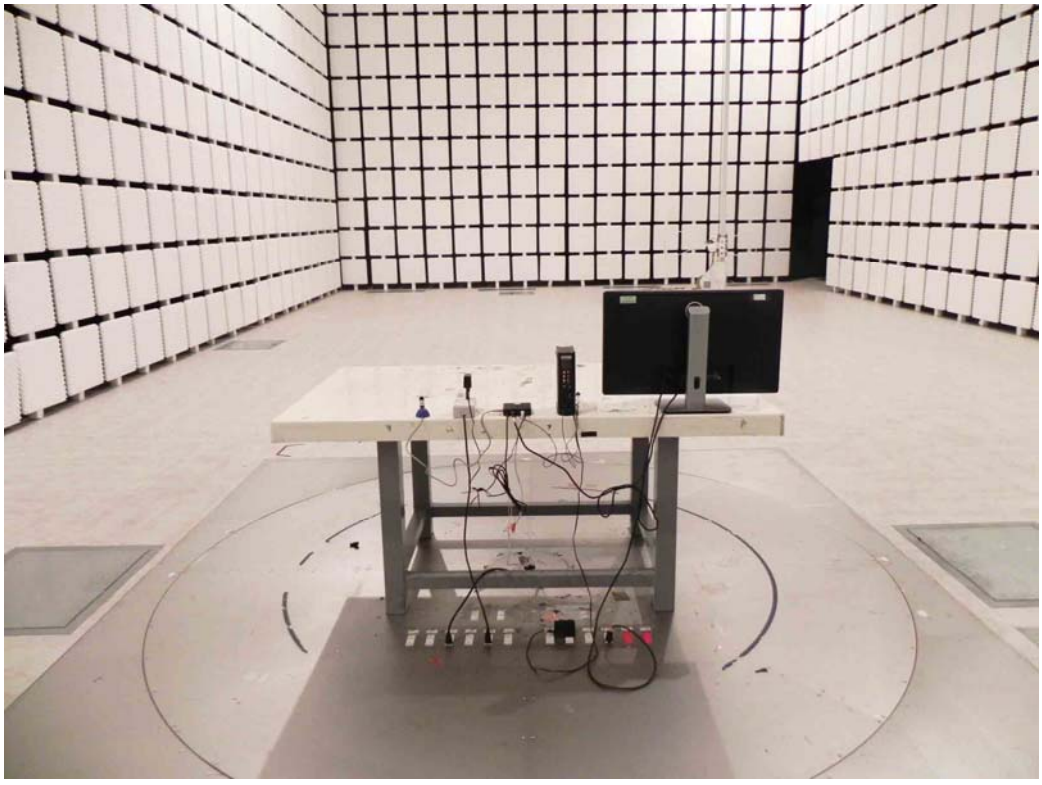
* Note:
Margin = Emission – Limit
Emission = Radiated Amplitude + Correct Factor
Correct Factor = Antenna Correction Factor + Cable Loss – Pre-Amplifier Gain
A margin of -8dB means that the emission is 8dB below the limit
Antenna Distance: 3 meters
Above 1GHz test, if the peak measured value meets the average limit, it is unnecessary to perform the average measurement.

3.7 Test Setup Photo

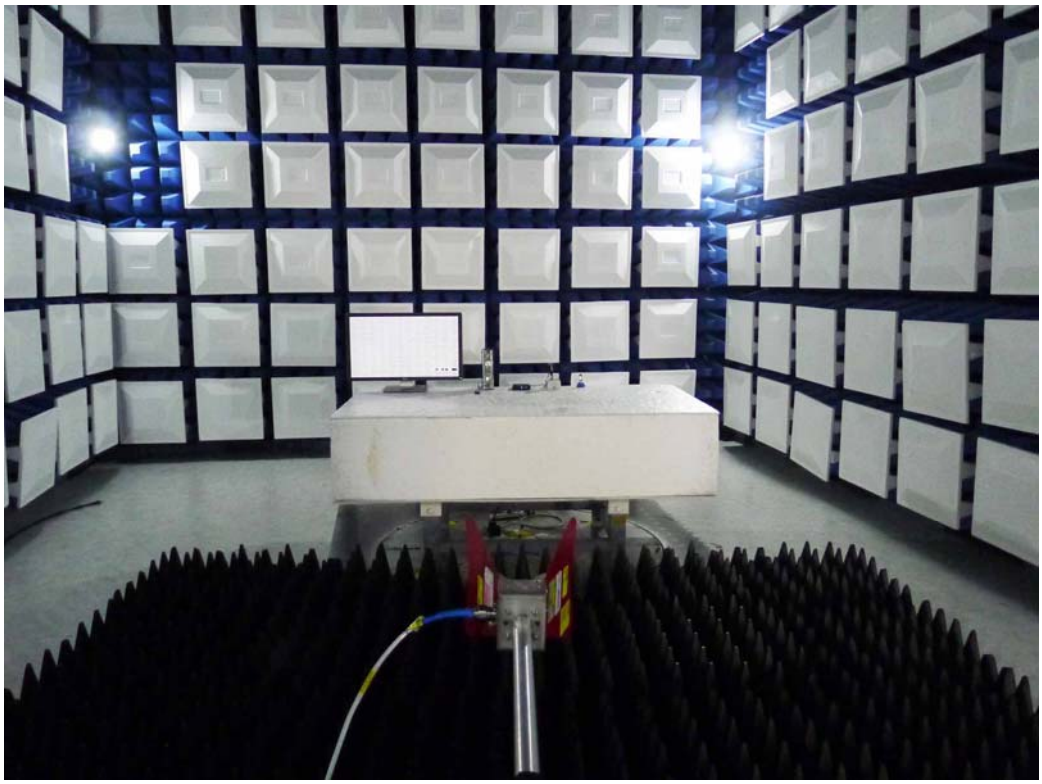
Front View (30MHz~1GHz)



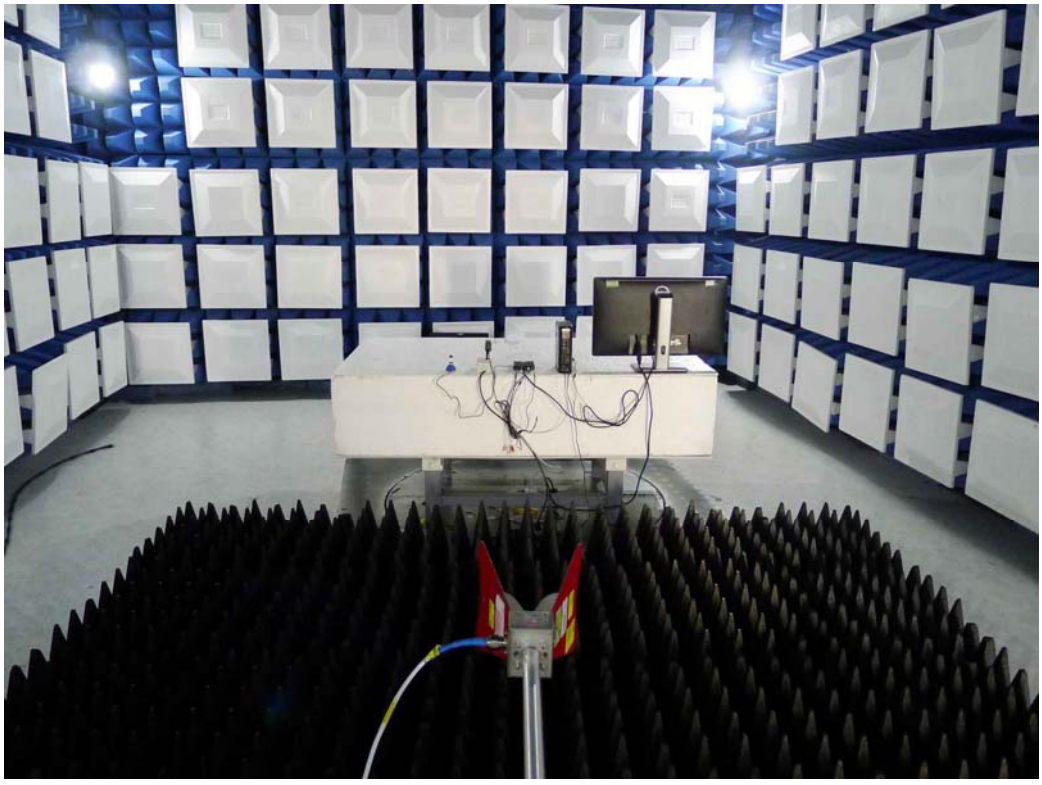
Back View (30MHz~1GHz)



Front View (above 1GHz)



Back View (above 1GHz)

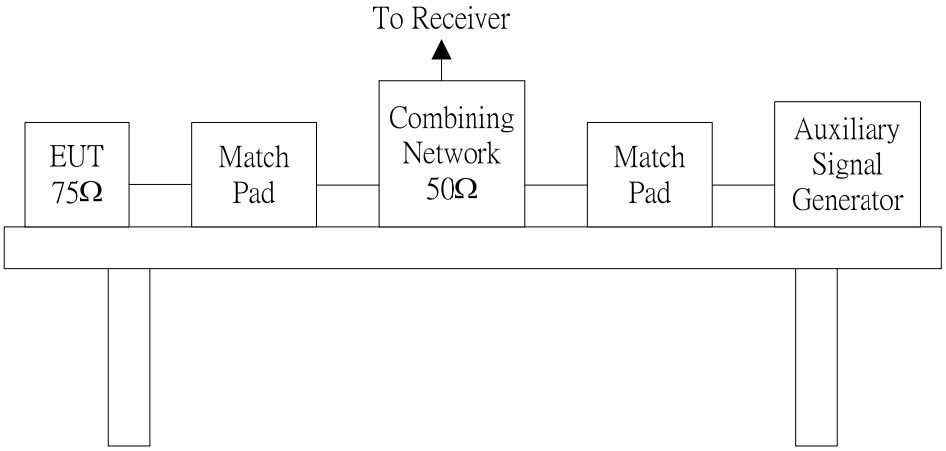


4. Antenna power conduction limits for receivers

4.1 Test Specification

Please refer to 1.1

4.2 Test Setup



4.3 Test Procedure

The output level of the auxiliary signal generator was set to 70dBuV at the EUT antenna terminal with 75 ohms impedance with an unmodulated carrier.
The highest emissions were analyzed in details by operating the spectrum analyzer and/or EMI receiver in quasi-peak mode to determine the precise amplitude of the emissions. The power of EUT was switched off to make sure the emission was not contributed by the auxiliary signal generator. While doing so, the interconnecting cables and major parts of the system were moved around to maximize the emission.

4.4 EMI Receiver Configuration (for the frequencies tested)

Frequency Range:	30MHz-960MHz
Detector Function:	Quasi-Peak Mode
Resolution Bandwidth:	120KHz

4.5 Limit

Frequency		
MHz	nW	dBuV
30-960	2.0	51.8

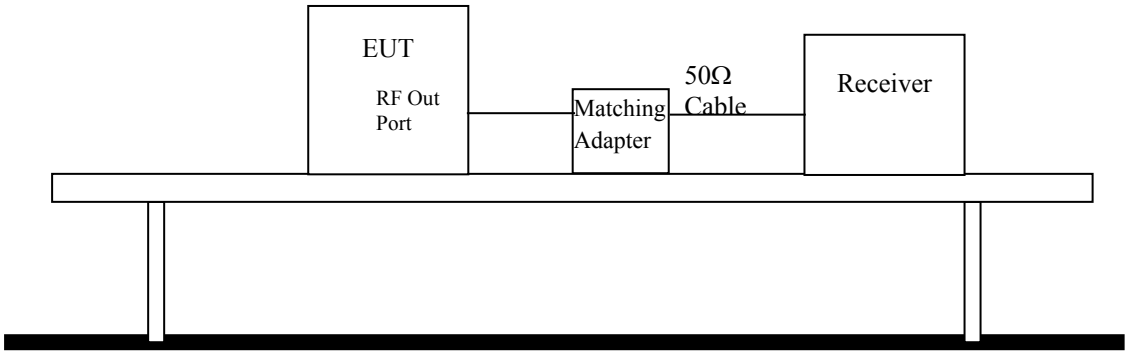
****Remarks: It is not necessary to be tested for this item.**

5. TV interface devices, including cable system terminal devices

5.1 Test Specification

Please refer to 1.1

5.2 Test Setup



5.3 Test Procedure

➢ Output Conducted Output Level:

The EUT and its simulators are placed on a table which is 0.8 meter above ground. The RF output terminal is connected to the spectrum analyzer through the matching adapter with a calibrated 50Ω coaxial cable. The unused input/output terminals are terminated in the proper impedance.

At any RF output terminal, the maximum measured RMS voltage, in microvolts, corresponding to the peak envelope power of the modulated signal during maximum amplitude peaks across a resistance (R in ohms) matching the rated output impedance of the TV interface device.

➢ Output Conducted Spurious Level:

The EUT and its simulators are placed on a table which is 0.8 meter above ground. The RF output terminal is connected to the spectrum analyzer through the matching adapter with a calibrated 50Ω coaxial cable. The unused input/output terminals are terminated in the proper impedance.

At any RF output terminal, the maximum measured RMS voltage, in microvolts, corresponding to the peak envelope power of the modulated signal during maximum amplitude peaks across a resistance (R in ohms) matching the rated output impedance of the TV interface device, of any emission appearing on frequencies removed by more than 4.6MHz below or 7.4MHz above the video carrier frequency on which the TV interface device.

➢ Transfer Switch:

For TV interface Device Switches with Coaxial Connectors:

The EUT and its simulators are placed on a table which is 0.8 meter above ground. Using an impedance-matching device, if necessary, connect a length of coaxial cable between the antenna input port of the switch and the measuring instrument.

5.4 EMI Receiver Configuration (for the frequencies tested)

Frequency Range:	30MHz-960MHz
Detector Function:	Quasi-Peak Mode
Resolution Bandwidth:	120KHz

5.5 Limit

- For a cable system terminal device or a TV interface device used with a master antenna:

Signal	At 75 ohms		At 300 ohms	
	uV	dBuV	uV	dBuV
Video	6000	75.5	12000	81.6
Audio	1342	62.5	2685	68.6

- For all other TV interface devices:

Signal	At 75 ohms		At 300 ohms	
	uV	dBuV	uV	dBuV
Audio	3000	69.5	6000	75.5
Video	671	56.5	1342	62.5

- Output Conducted Spurious Level:

For a cable system terminal device or a TV interface device used with a master antenna:

Signal	At 75 ohms		At 300 ohms	
	uV	dBuV	uV	dBuV
30MHz to more than 4.6MHz below or 7.4MHz above the video carrier	6000	75.5	12000	81.6

For all other TV interface devices:

Signal	At 75 ohms		At 300 ohms	
	uV	dBuV	uV	dBuV
30MHz to more than 4.6MHz below or 7.4MHz above the video carrier	95	39.5	190	45.5

- For all other TV interface devices:

Frequency (MHz)	Limit (dB) (at least)
54MHz to 216MHz	80
216MHz to 550MHz	60
550MHz to 806MHz	55

- For all other TV interface devices:

At 75 ohms		At 300 ohms	
uV	dBuV	uV	dBuV
3	9.5	3	9.5

****Remarks: It is not necessary to be tested for this item.**

6. Appendix

6.1 Appendix A: Test Equipment

6.1.1 Test Equipment List

Location Con04	Equipment Name	Brand	Model	S/N	Last Cal. Date	Next Cal. Date
Conduction 04	LISN 18	ROHDE & SCHWARZ	ENV216	101424	06/01/2017	06/01/2018
Conduction 04	LISN 19	ROHDE & SCHWARZ	ENV216	101425	07/10/2017	07/10/2018
Conduction 04	Conduction 04-3 Cable	WOKEN	CFD 300-NL	conduction 04-3	09/01/2017	09/01/2018
Conduction04	EMI Receiver 16	ROHDE & SCHWARZ	ESCI	101221	11/17/2017	11/17/2018

Location Chamber02	Equipment Name	Brand	Model	S/N	Last Cal. Date	Next Cal. Date
Radiation (Chamber02)	BILOG Antenna 17	Schwarzbeck	Schwarzbeck VULB 9168+EMCI-N-6-05	645	01/07/2018	01/07/2019
Radiation (Chamber02)	Preamplifier 25	EMCI	EMC9135	980295	01/18/2018	01/18/2019
Radiation (Chamber02)	Coaxial Cable Chmb 02-10M-02	EMC	RG214U	Chmb 02-10M-02	09/01//2017	09/01/2018
Radiation (Chamber02)	EMI Receiver 12	ROHDE & SCHWARZ	ESCI	100804	07/10/2017	07/10/2018

Location Chmb14	Equipment Name	Brand	Model	S/N	Last Cal. Date	Next Cal. Date
Rad. Above 1GHz	Spectrum Analyzer 24 (1G~26.5GHz)	Agilent	N9010A	MY49060537	08/10/2017	08/10/2018
Rad. Above 1GHz	Horn Antenna 06 (1G~18G)	ETS	3117	00066665	10/31/2017	10/31/2018
Rad. Above 1GHz(Chamber12)	Preamplifier 13	MITEQ	AFS44-00101800-25-10P-44	1329256	10/26/2017	10/26/2018
Rad. Above 1GHz	Microwave Cable 29	EMC Instruments	EMC104-NM-SM-6000	170107	02/23/2018	02/23/2019

6.1.2 Software for Controlling Spectrum/Receiver and Calculating Test Data

Test Item	Filename	Version
Conduction 02/03	EZ-EMC	ISL-03A2
Conduction 04	EZ-EMC	ISL-25-3A1
Radiation	EZ-EMC	ISL-03A2

6.2 Appendix B: Uncertainty of Measurement

The measurement uncertainty refers to CISPR 16-4-2:2011. The coverage factor k = 2 yields approximately a 95 % level of confidence.

<Conduction 04>
Disturbance voltage at the mains terminals: ±2.88dB
Disturbance voltage at the antenna terminals: ±2.65dB
Disturbance power: ±4.40dB
Disturbance voltage at RF output terminals : ±2.65dB

<Chamber 02 (10M)>
Horizontal
30MHz~200MHz: ±4.38dB
200MHz~1000MHz: ±4.12dB
Vertical
30MHz~200MHz: ±4.57dB
200MHz~1000MHz: ±4.10dB

<Chamber 14 (3M)>
1GHz~18GHz: ±4.38dB

6.3 Appendix C: Photographs of EUT

Please refer to the File of **ISL-*18LE157*P**