TEST REPORT
FOR
SHIELDING EFFECTIVENESS

Report No.: 13-10-MAS-096

Applicant:	XXX
Product:	XXX
Model No.:	XXX
Series No.:	XXX
Manufacturer/supplier:	XXX
Trade Name:	XXX

Date test item received:	2013/10/08
Date test campaign completed:	2013/10/09
Date of issue:	2013/10/11

Total number of pages of this test report: 22 pages

Total number of pages of this test photos: 04 pages

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Laboratory Introduction: Electronics Testing Center, Taiwan is recognized, filed and mutual recognition arrangement as following:

❶ ISO9001: TüV Product Service
❷ ISO/IEC 17025: BSMI, TAF, NCC, NVLAP, CCIBLAC, UL, Compliance
❸ Filing: FCC, Industry Canada, VCCI
❹ MRA: Australia, Hong Kong, New Zealand, Singapore, USA, Japan, Korea, China, APLAC through TAF
❺ FCC Registration Number: 90588, 91094, 91095

CONTENTS

1 TEST REPORT CERTIFICATION

Applicant	: XXX
Address	: XXX
Manufacturer	: XXX
Address	: XXX
EUT	: XXX
Trade Name	: XXX
Model No.	: XXX
Series No.	: XXX
Test Standard	: MIL-STD-285 (Tem Cell Method)

The testing described in this report has been carried out to the best of our knowledge and ability, and our responsibility is limited to the exercise of reasonable care. This certification is not intended to believe the sellers from their legal and/or contractual obligations.

2 GENERAL INFORMATIONS

2.1 Description of EUT:

XXXXXX

2.2 Related Information of EUT:

Length : XXXX±0.1 cm
Width : XXXX±0.1 cm
Thickness : XXXX (±0.001m)

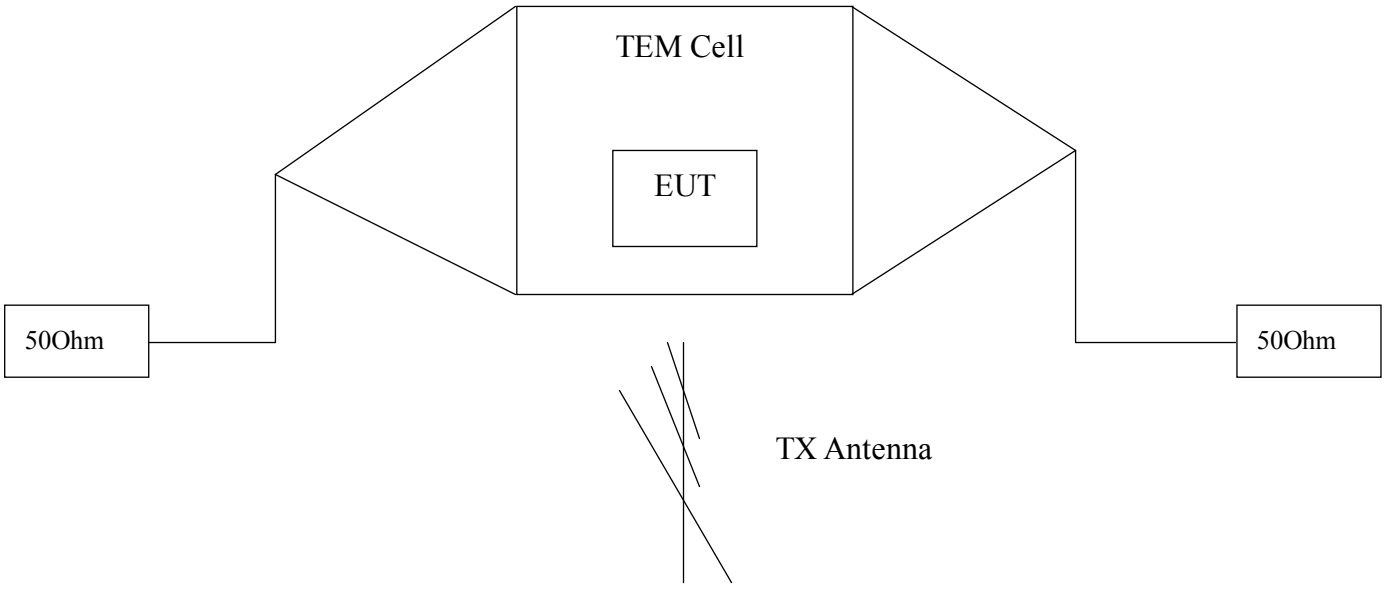
2.3 Tested Configuration:

The EUT connected with the following peripheral devices and interface cables were connected during the measurement:

Product	Manufacturer	Model No.	Serial No.	I/O Cable or Power Cord
Tem Cell	IFI	CC103SEX	SN:K245-0706	
50Ohm Termination	Broadwave	552-036-300	13057102-001	

2.4 Testing Setup Block Diagram:

(1) The distance between TX Antenna and Tem Cell is 100cm. The distance between Field Probe and Tem Cell is 30cm. And the TX Antenna is Vertical polarize.



3 SUMMARY OF TEST RESULTS

3.1 Shielding Effectiveness:

3.1.1 Equation of Shielding Effectiveness

SE=20Log(H0/H1)…(A)

SE=20Log(E0/E1)…(B)

SE=20Log(V0/V1)…(C)

SE=20Log(P0/P1)…(D)

H0-No shielding material when measured magnetic field strength。

H1-With shielding material when measured magnetic field strength。

E0-No shielding material when the measured electric field strength。

E1-With shielding material when the measured electric field strength。

V0-No shielding material measured voltage value。

V1-With shielding material measured voltage value。

P0-No shielding material when measured power value。

P1-With shielding material when measured power value。

3.1.2 Percentage of Shielding Effectiveness

If unit is E, H, V。

Number	dB	Percentage of Shielding Effectiveness	Number	dB	Percentage of Shielding Effectiveness
1.	3	30.000%	11.	50	99.684%
2.	5	44.000%	12.	55	99.822%
3.	10	68.380%	13.	60	99.900%
4.	15	82.220%	14.	65	99.944%
5.	20	90.000%	15.	70	99.968%
6.	25	94.377%	16.	75	99.982%
7.	30	96.838%	17.	80	99.990%
8.	35	98.222%	18.	85	99.994%
9.	40	99.000%	19.	90	99.997%
10.	45	99.438%	20.	95	99.998%

Equation

Example E1=1V/m, E0=100V/m。 The 99V/m electromagnetic wave is shielded。

99/100=99%

$20\text{Log}(E1*10^6)=120\text{dBuV/m}$, $20\text{Log}(E0*10^6)=160\text{dBuV/m}$。

160dBuV/m-120dBuV/m=40dB。

3.1.3 Procedure of Shielding Effectiveness Test

This procedure reference MIL-STD-285, and ASTM D4935-99 and other relevant standards GJB6190。

3.1.4 Measurement uncertainty

(1) Frequency 80 MHz-3.0 GHz, The expanded measure uncertainty U=±5.18dB ,the coverage factor k=2, approximately a 95% level of confidence。

(2) Frequency 3.0 GHz-4.2 GHz, The expanded measure uncertainty U=±4.40dB ,the coverage factor k=2, approximately a 95% level of confidence。

3.1.5 Result Table

80MHz~3GHz. (EUT Panel)

Shielding Effectiveness	(dB)	Frequency
Average (SE)	1.914	80MHz~3GHz
Max (SE)	6.752	1916.10MHz
Min (SE)	0.000	Refer Table

80MHz~3GHz. (General Glass Plate)

Shielding Effectiveness	(dB)	Frequency
Average (SE)	1.528	80MHz~3GHz
Max (SE)	8.484	1973.59MHz
Min (SE)	0.000	Refer Table

4 TEST DATA & RELATED INFORMATIONS

4.1 Shielding Effectiveness:

4.1.1 Shielding Effectiveness Test:

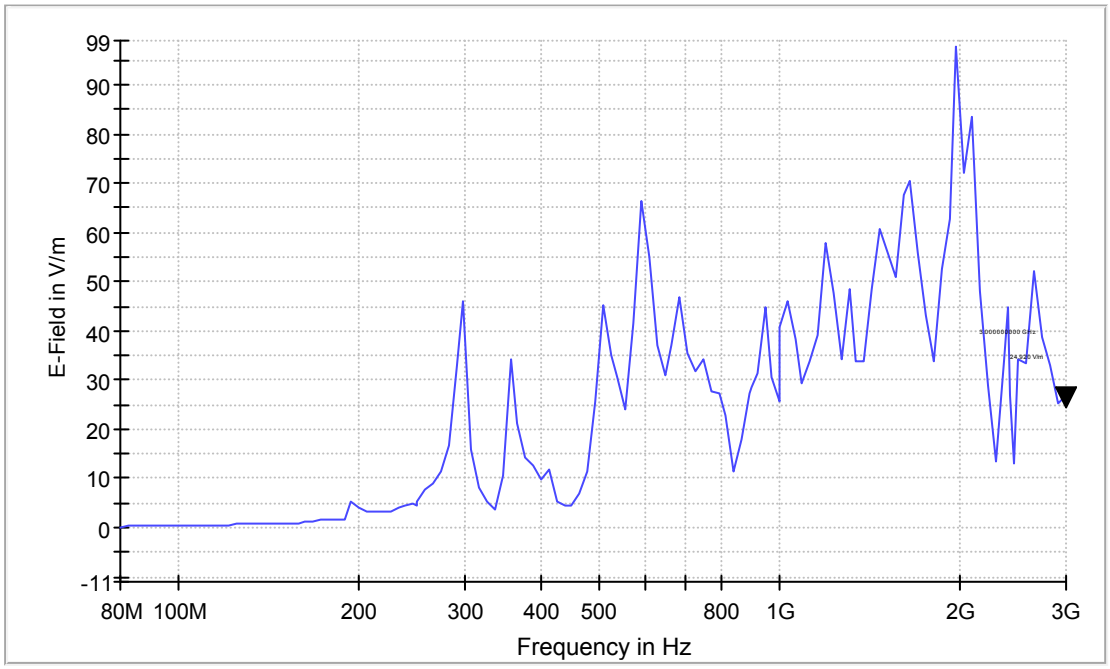
4.1.1.1 Shielding Effectiveness Test Data:

Test Date	Oct. 08, 2013	
Test Specification	Shielding Effectiveness	
Climatic Condition	Ambient Temperature: 25°C Relative Humidity: 60 % RH	
Dimension	L:22.8cm, W:17.7cm, T: Stainless 1.5mm+ Cu 0.05mm	Power Supply : N/A Model Number : N/A
Test Set-up	Shielding Room: Tem Cell	

Test data see the next page.

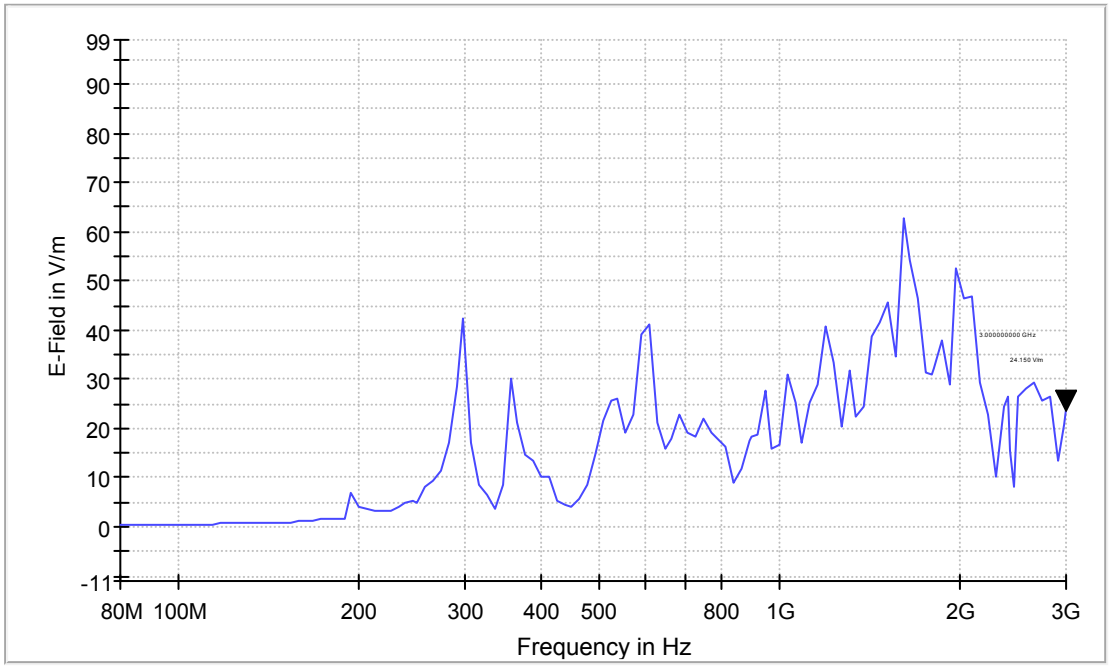
Test 1-E0 (80MHz~3GHz)

E-Field

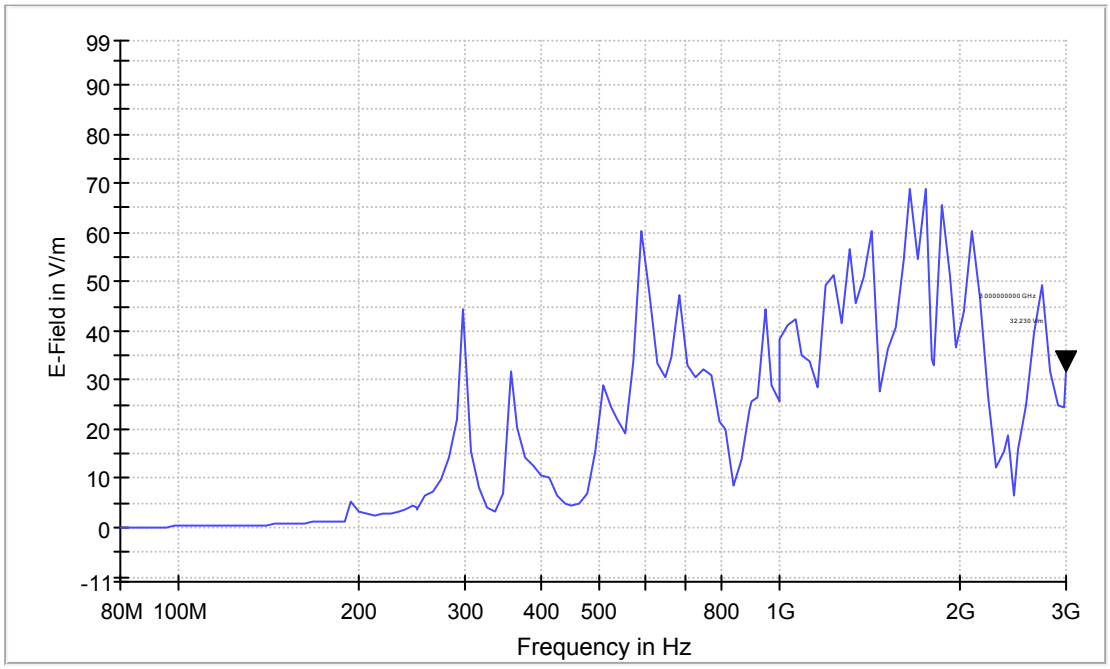


Test 1-E1 (80MHz~3GHz) EUT Panel

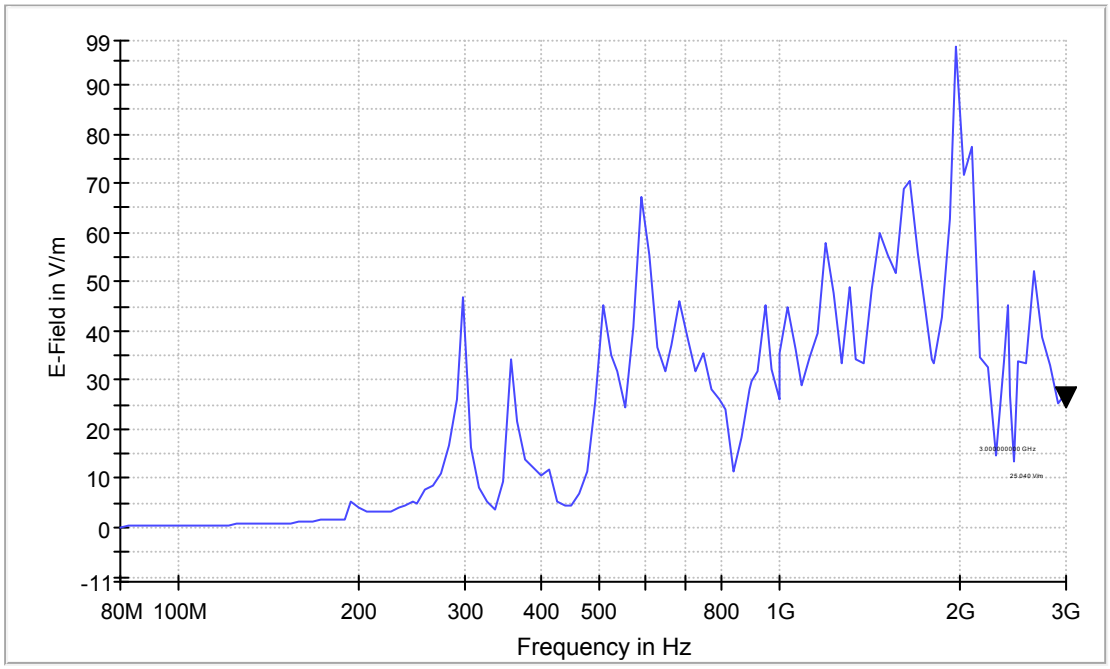
E-Field



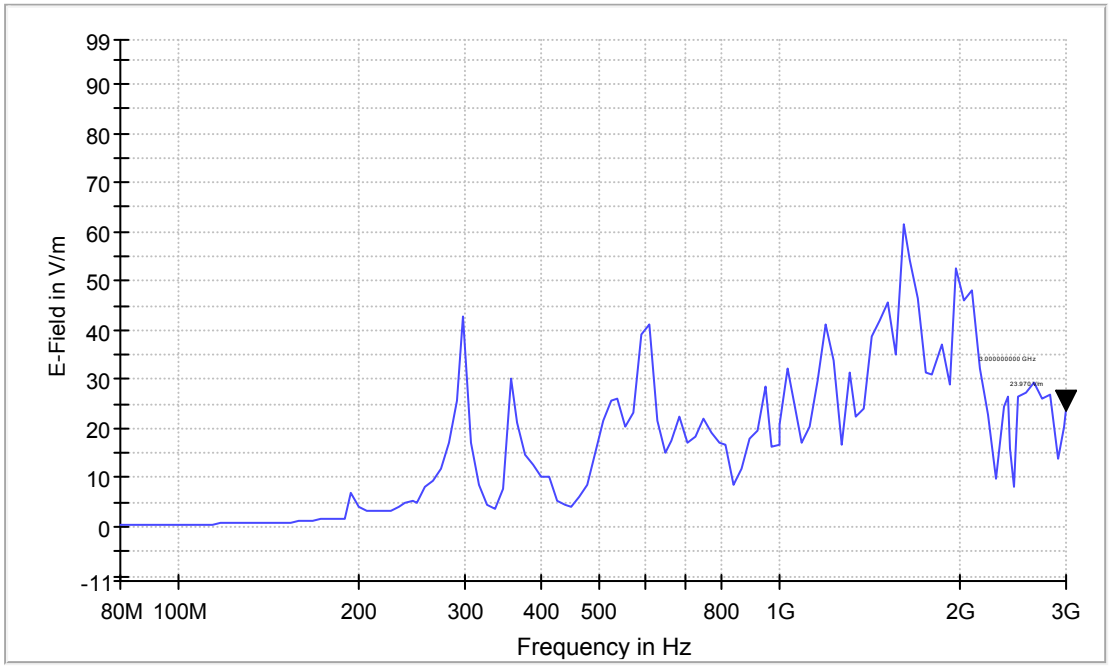
Test 1-E2 (80MHz~3GHz) General Glass Plate



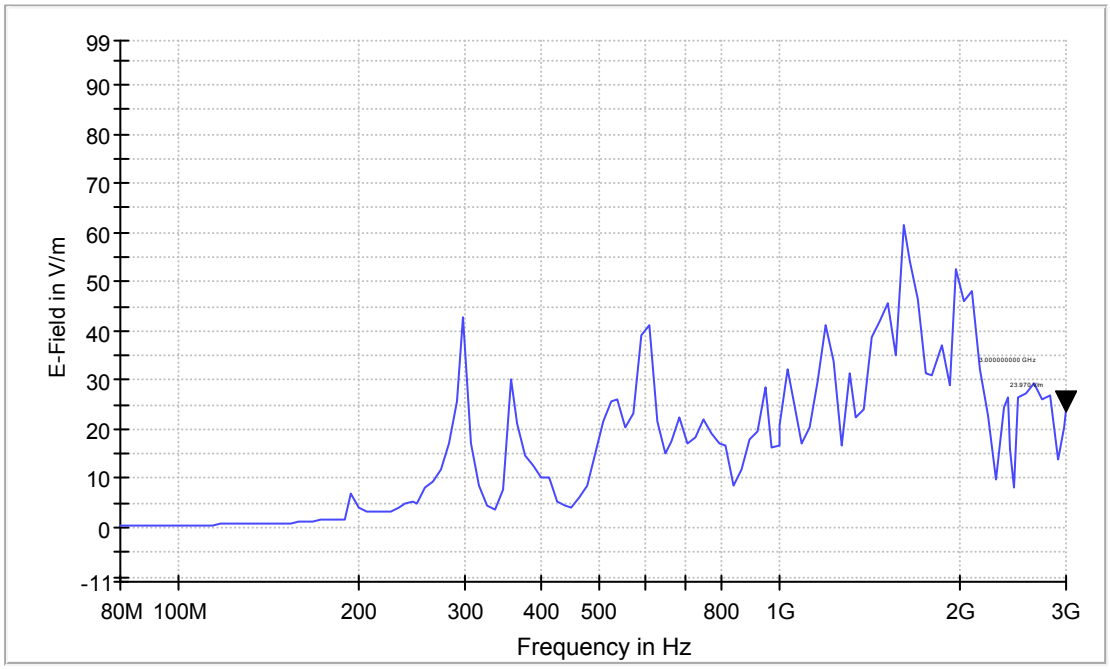
Test 2-E0 (80MHz~3GHz)



Test 2-E1 (80MHz~3GHz) EUT Panel

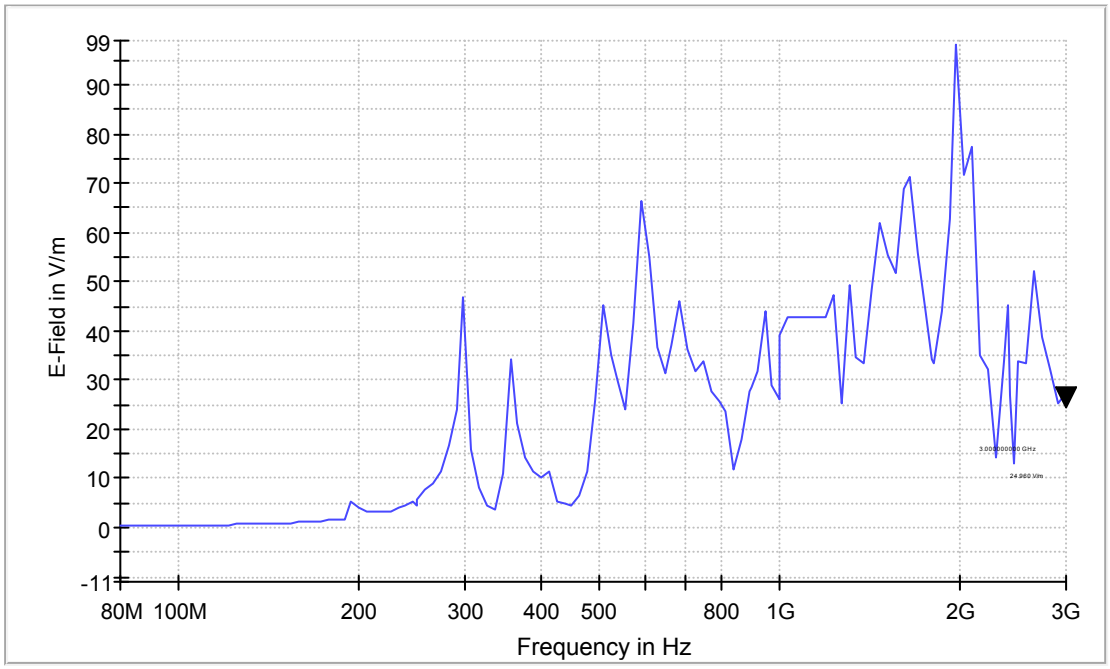


Test 2-E2 (80MHz~3GHz) General Glass Plate



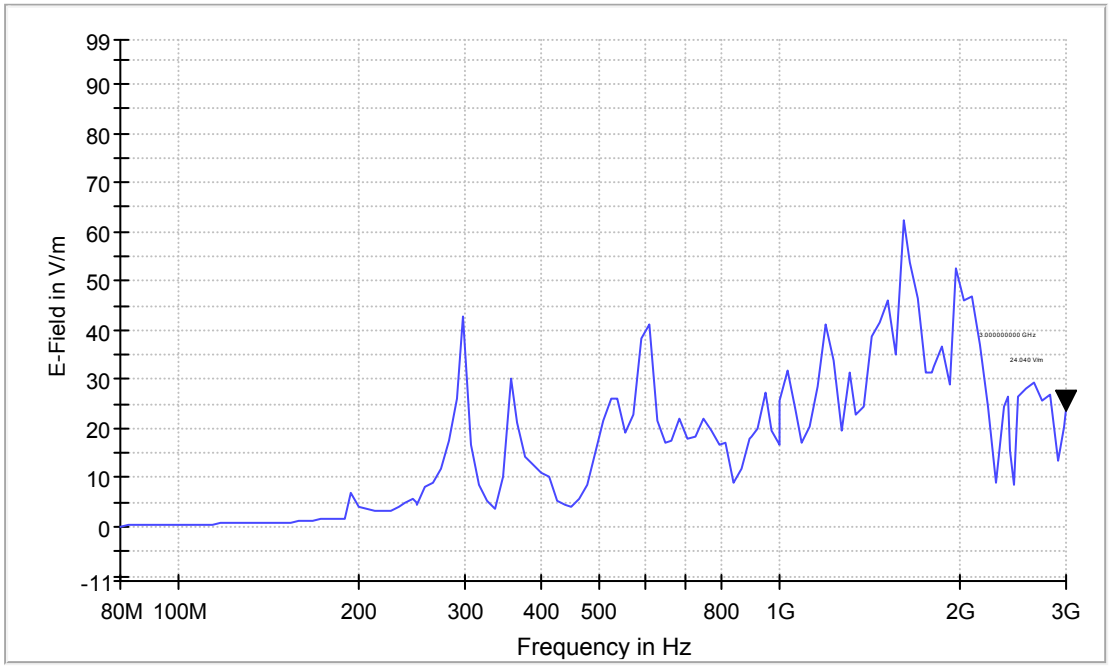
Test 3-E0 (80MHz~3GHz)

E-Field

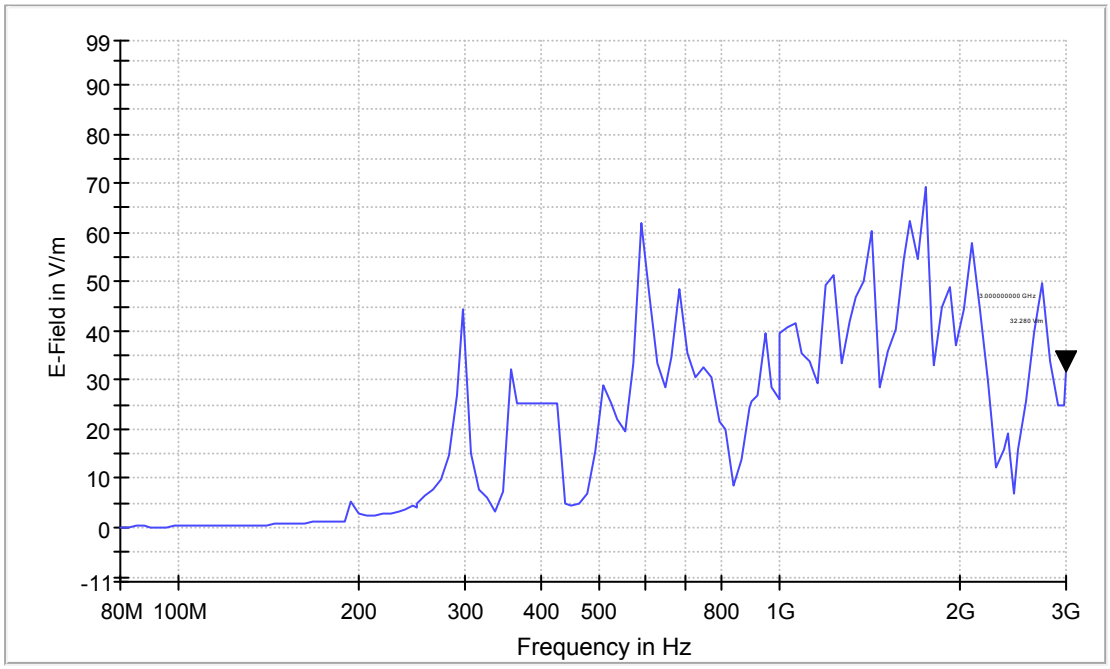


Test 3-E1 (80MHz~3GHz) EUT Panel

E-Field

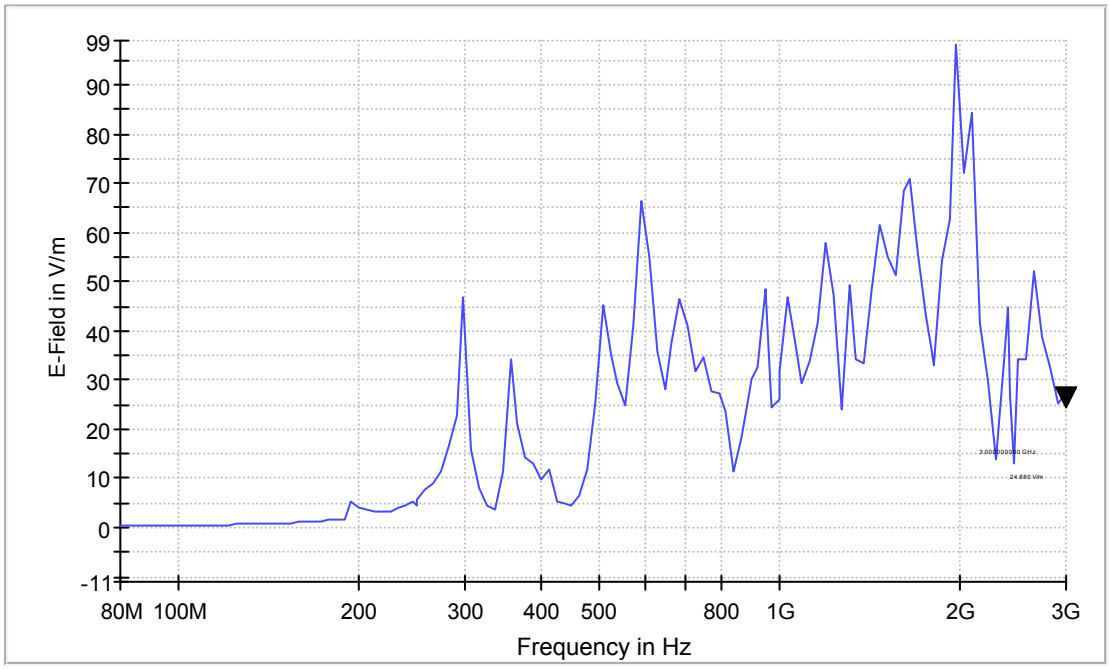


Test 3-E1 (80MHz~3GHz) General Glass Plate



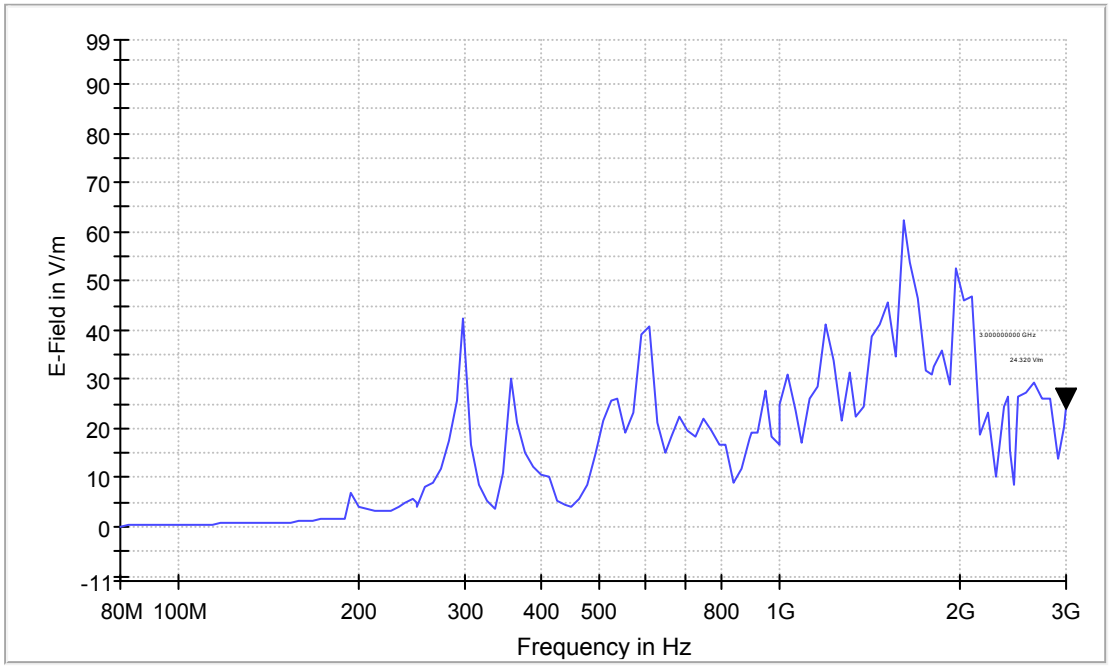
Test 4-E0 (80MHz~3GHz)

E-Field

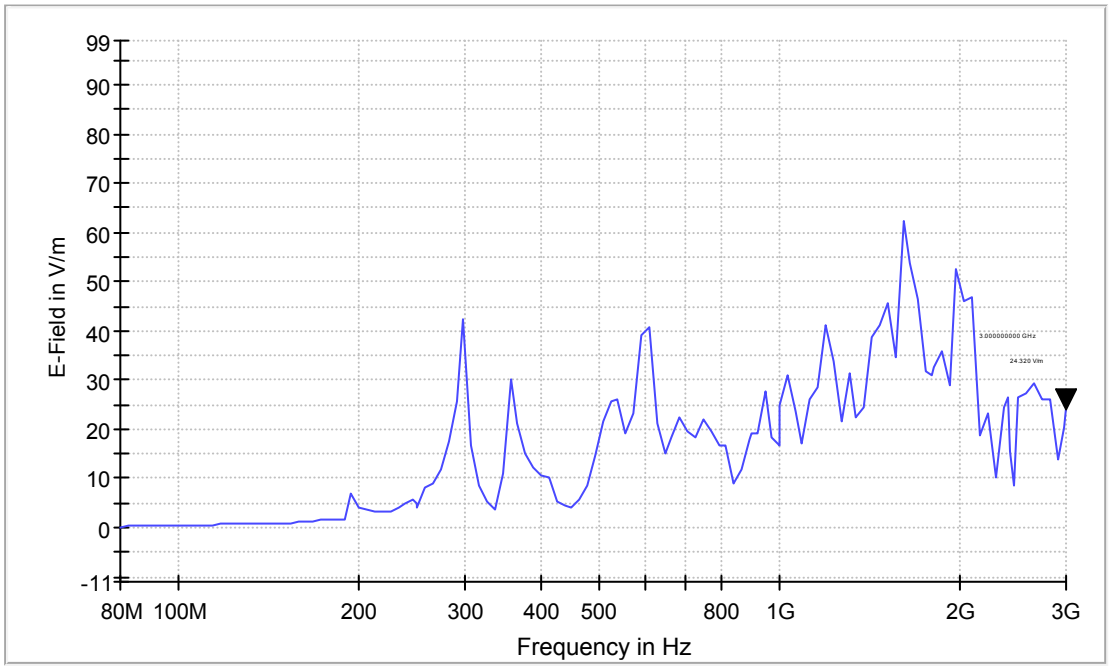


Test 4-E1 (80MHz~3GHz) EUT Panel

E-Field

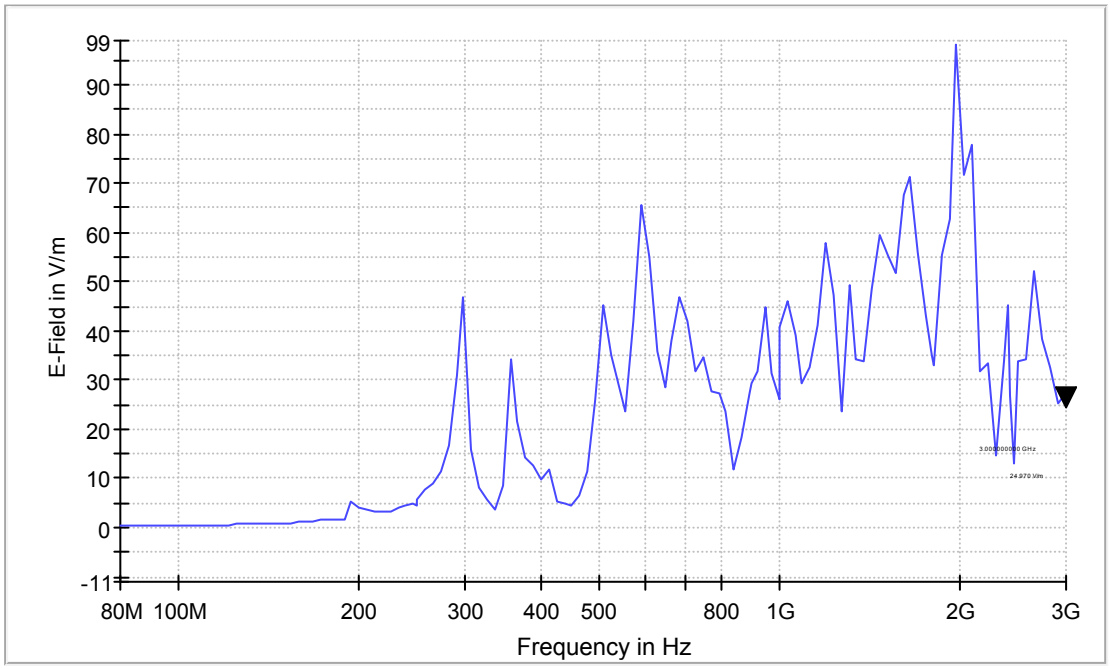


Test 4-E2 (80MHz~3GHz) General Glass Plate



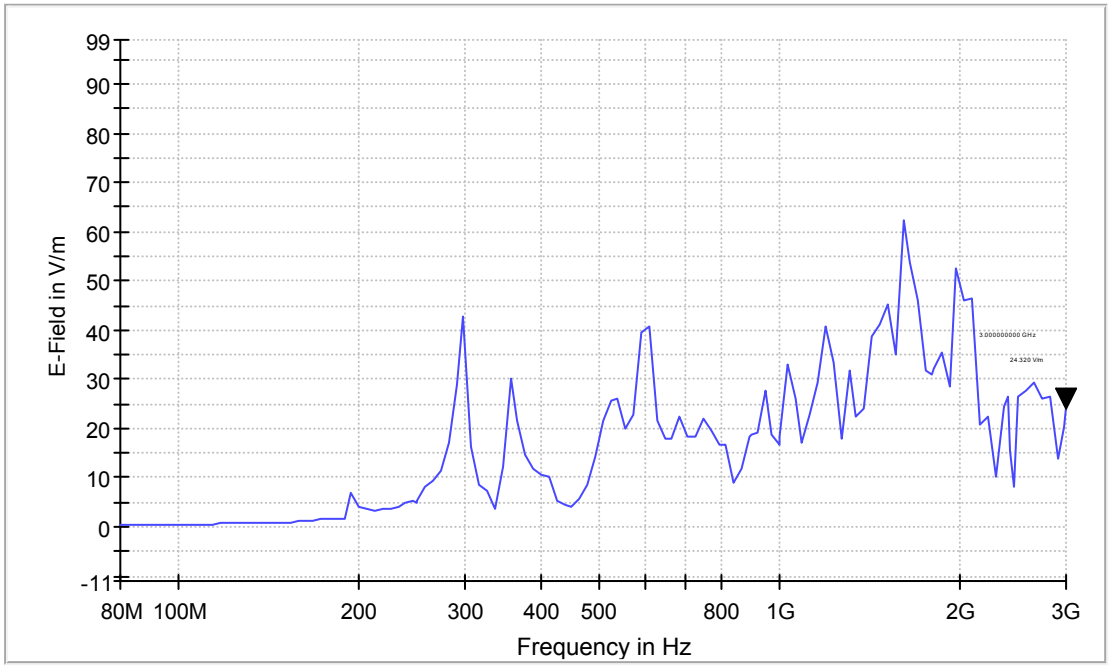
Test 5-E0 (80MHz~3GHz)

E-Field

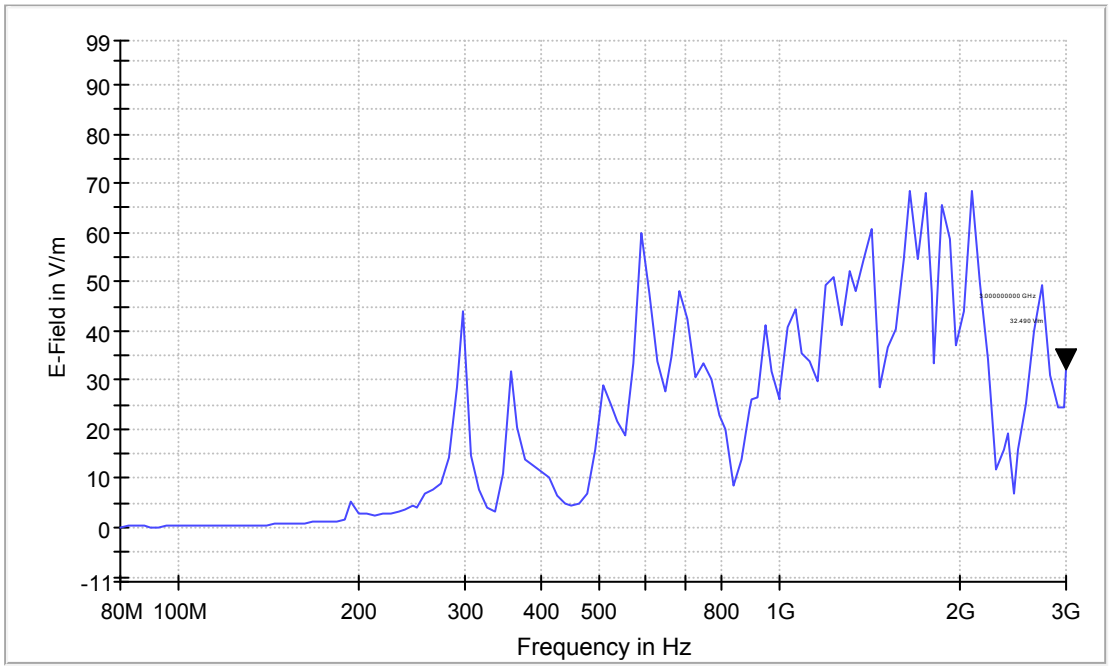


Test 5-E1 (80MHz~3GHz) EUT Panel

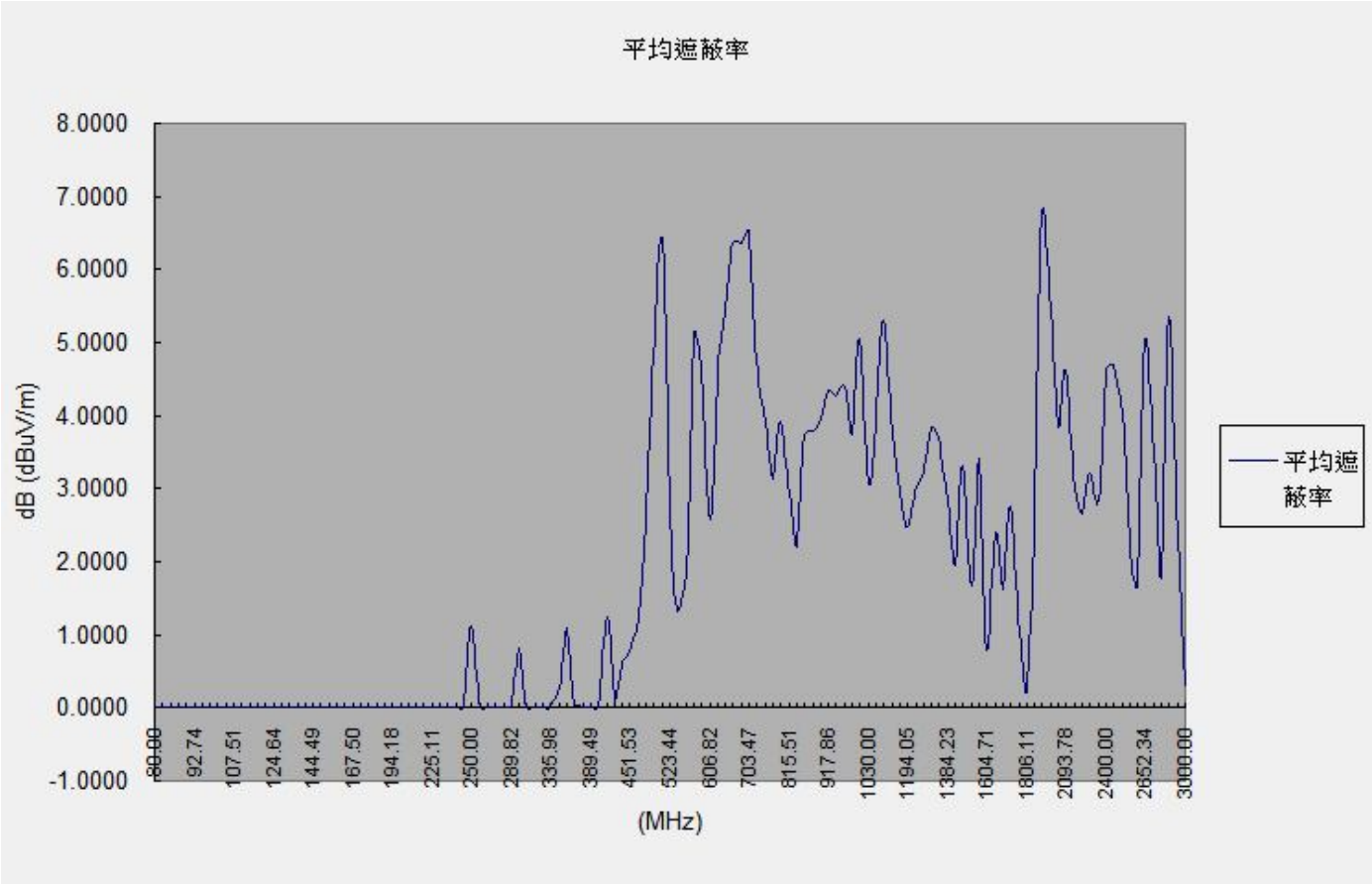
E-Field



Test 5-E2 (80MHz~3GHz) General Glass Plate



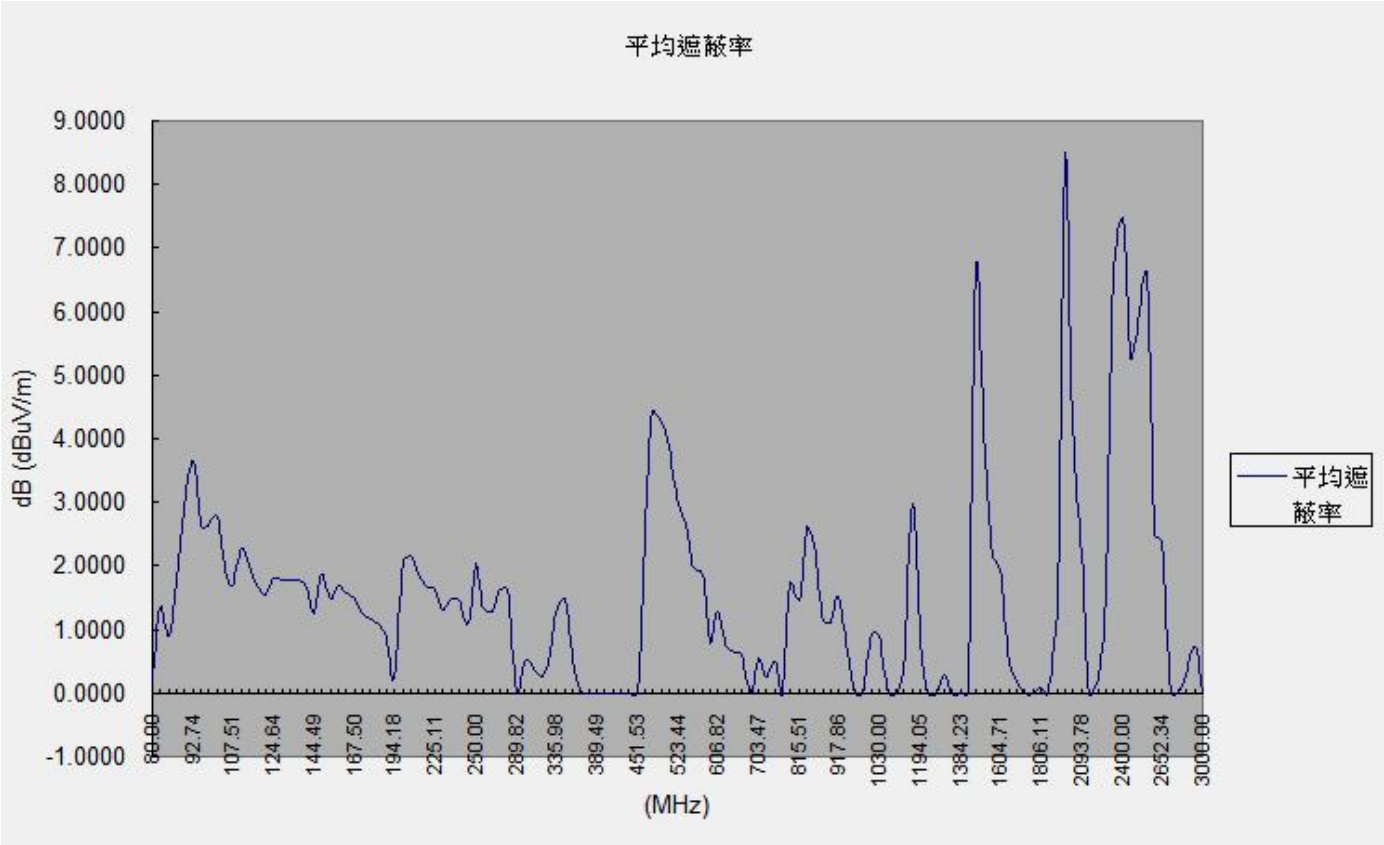
(80MHz~3.0GHz) EUT Panel



(80MHz~3.0GHz) EUT Panel

Num.	Frequency(MHz)	SE(dB)	Num.	Frequency(MHz)	SE(dB)	Num.	Frequency(MHz)	SE(dB)
1	80.00	0.0000	51	335.98	0.0000	101	1384.23	2.8097
2	82.40	0.0000	52	346.06	0.2954	102	1425.76	1.9539
3	84.87	0.0000	53	356.44	1.0937	103	1468.53	3.3031
4	87.42	0.0000	54	367.13	0.0847	104	1512.59	1.6848
5	90.04	0.0000	55	378.15	0.0000	105	1557.97	3.4115
6	92.74	0.0000	56	389.49	0.0000	106	1604.71	0.8000
7	95.52	0.0000	57	401.18	0.0000	107	1652.85	2.3659
8	98.39	0.0000	58	413.21	1.2419	108	1702.43	1.6271
9	101.34	0.0000	59	425.61	0.0970	109	1753.51	2.7620
10	104.38	0.0000	60	438.38	0.6252	110	1800.00	1.0463
11	107.51	0.0000	61	451.53	0.7664	111	1806.11	0.2518
12	110.74	0.0000	62	465.07	1.2525	112	1860.29	2.6528
13	114.06	0.0000	63	479.03	2.5861	113	1916.10	6.7468
14	117.48	0.0000	64	493.40	4.8016	114	1973.59	5.4286
15	121.01	0.0000	65	508.20	6.3956	115	2032.79	3.8291
16	124.64	0.0000	66	523.44	2.6818	116	2093.78	4.6131
17	128.38	0.0000	67	539.15	1.3162	117	2156.59	3.0417
18	132.23	0.0000	68	555.32	1.8670	118	2221.29	2.6680
19	136.19	0.0000	69	571.98	5.0999	119	2287.93	3.2077
20	140.28	0.0000	70	589.14	4.6012	120	2356.57	2.8195
21	144.49	0.0000	71	606.82	2.5897	121	2400.00	4.6367
22	148.82	0.0000	72	625.02	4.6246	122	2427.26	4.7092
23	153.29	0.0000	73	643.77	5.4226	123	2450.00	3.9987
24	157.89	0.0000	74	663.08	6.3564	124	2500.08	2.2089
25	162.62	0.0000	75	682.98	6.3533	125	2575.08	1.7014
26	167.50	0.0000	76	703.47	6.5059	126	2652.34	5.0051
27	172.53	0.0000	77	724.57	4.7795	127	2731.91	3.5062
28	177.70	0.0000	78	746.31	3.8889	128	2813.86	1.7895
29	183.03	0.0000	79	768.70	3.1229	129	2898.28	5.3468
30	188.53	0.0000	80	791.76	3.9266	130	2985.23	2.3100
31	194.18	0.0000	81	815.51	2.9372	131	3000.00	0.2810
32	200.01	0.0000	82	839.97	2.2348	132		
33	206.01	0.0000	83	865.17	3.7392	133		
34	212.19	0.0000	84	891.13	3.7925	134		
35	218.55	0.0000	85	900.00	3.9469	135		
36	225.11	0.0000	86	917.86	4.3571	136		
37	231.86	0.0000	87	945.40	4.2667	137		
38	238.82	0.0000	88	973.76	4.3943	138		
39	245.98	0.0000	89	1000.00	3.7490	139		
40	250.00	0.0000	90	1000.00	5.0489	140		
41	250.00	1.1192	91	1030.00	3.0799	141		
42	257.50	0.0000	92	1060.90	3.9836	142		
43	265.23	0.0000	93	1092.73	5.2961	143		
44	273.18	0.0000	94	1125.51	3.8021	144		
45	281.38	0.0000	95	1159.27	2.9604	145		
46	289.82	0.0280	96	1194.05	2.4838	146		
47	298.51	0.8120	97	1229.87	3.0054	147		
48	307.47	0.0000	98	1266.77	3.2315	148		
49	316.69	0.0000	99	1304.77	3.8529	149		
30	326.19	0.0000	100	1343.92	3.6987	150		

(80MHz~3.0GHz) General Glass Plate



(80MHz~3.0GHz)

Num.	Frequency(MHz)	SE(dB)	Num.	Frequency(MHz)	SE(dB)	Num.	Frequency(MHz)	SE(dB)
1	80.00	0.0971	51	335.98	1.2414	101	1384.23	0.0000
2	82.40	1.3347	52	346.06	1.4585	102	1425.76	0.0000
3	84.87	0.9138	53	356.44	0.5462	103	1468.53	6.6834
4	87.42	1.7673	54	367.13	0.0546	104	1512.59	3.6528
5	90.04	2.8915	55	378.15	0.0000	105	1557.97	2.1488
6	92.74	3.6510	56	389.49	0.0000	106	1604.71	1.9549
7	95.52	2.6347	57	401.18	0.0000	107	1652.85	0.4968
8	98.39	2.6201	58	413.21	0.0000	108	1702.43	0.2064
9	101.34	2.7710	59	425.61	0.0000	109	1753.51	0.0000
10	104.38	1.9390	60	438.38	0.0000	110	1800.00	0.0000
11	107.51	1.6974	61	451.53	0.0000	111	1806.11	0.0923
12	110.74	2.2812	62	465.07	2.6260	112	1860.29	0.0000
13	114.06	1.9977	63	479.03	4.3965	113	1916.10	1.5753
14	117.48	1.6554	64	493.40	4.2676	114	1973.59	8.4842
15	121.01	1.5529	65	508.20	3.8612	115	2032.79	4.2352
16	124.64	1.8076	66	523.44	2.9892	116	2093.78	2.2003
17	128.38	1.7665	67	539.15	2.6571	117	2156.59	0.0000
18	132.23	1.7683	68	555.32	1.9879	118	2221.29	0.2422
19	136.19	1.7869	69	571.98	1.8542	119	2287.93	1.5766
20	140.28	1.6695	70	589.14	0.7837	120	2356.57	6.5981
21	144.49	1.2396	71	606.82	1.2864	121	2400.00	7.4811
22	148.82	1.8708	72	625.02	0.7229	122	2427.26	5.3156
23	153.29	1.4970	73	643.77	0.6452	123	2450.00	5.7686
24	157.89	1.6803	74	663.08	0.6130	124	2500.08	6.5299
25	162.62	1.5795	75	682.98	0.0000	125	2575.08	2.5191
26	167.50	1.4736	76	703.47	0.5640	126	2652.34	2.3917
27	172.53	1.2487	77	724.57	0.2576	127	2731.91	0.0000
28	177.70	1.1606	78	746.31	0.4871	128	2813.86	0.0000
29	183.03	1.0835	79	768.70	0.0000	129	2898.28	0.2830
30	188.53	0.8634	80	791.76	1.7297	130	2985.23	0.7107
31	194.18	0.2177	81	815.51	1.4516	131	3000.00	0.0000
32	200.01	2.0816	82	839.97	2.6069	132		
33	206.01	2.1486	83	865.17	2.3246	133		
34	212.19	1.8960	84	891.13	1.1356	134		
35	218.55	1.6509	85	900.00	1.1108	135		
36	225.11	1.6450	86	917.86	1.5131	136		
37	231.86	1.3043	87	945.40	0.6802	137		
38	238.82	1.4865	88	973.76	0.0000	138		
39	245.98	1.4680	89	1000.00	0.0087	139		
40	250.00	1.1177	90	1000.00	0.9226	140		
41	250.00	2.0442	91	1030.00	0.9124	141		
42	257.50	1.3423	92	1060.90	0.0000	142		
43	265.23	1.2710	93	1092.73	0.0000	143		
44	273.18	1.6394	94	1125.51	0.3115	144		
45	281.38	1.6226	95	1159.27	2.9679	145		
46	289.82	0.0587	96	1194.05	0.8309	146		
47	298.51	0.5000	97	1229.87	0.0000	147		
48	307.47	0.4697	98	1266.77	0.0000	148		
49	316.69	0.2680	99	1304.77	0.2819	149		
30	326.19	0.4255	100	1343.92	0.0000	150		

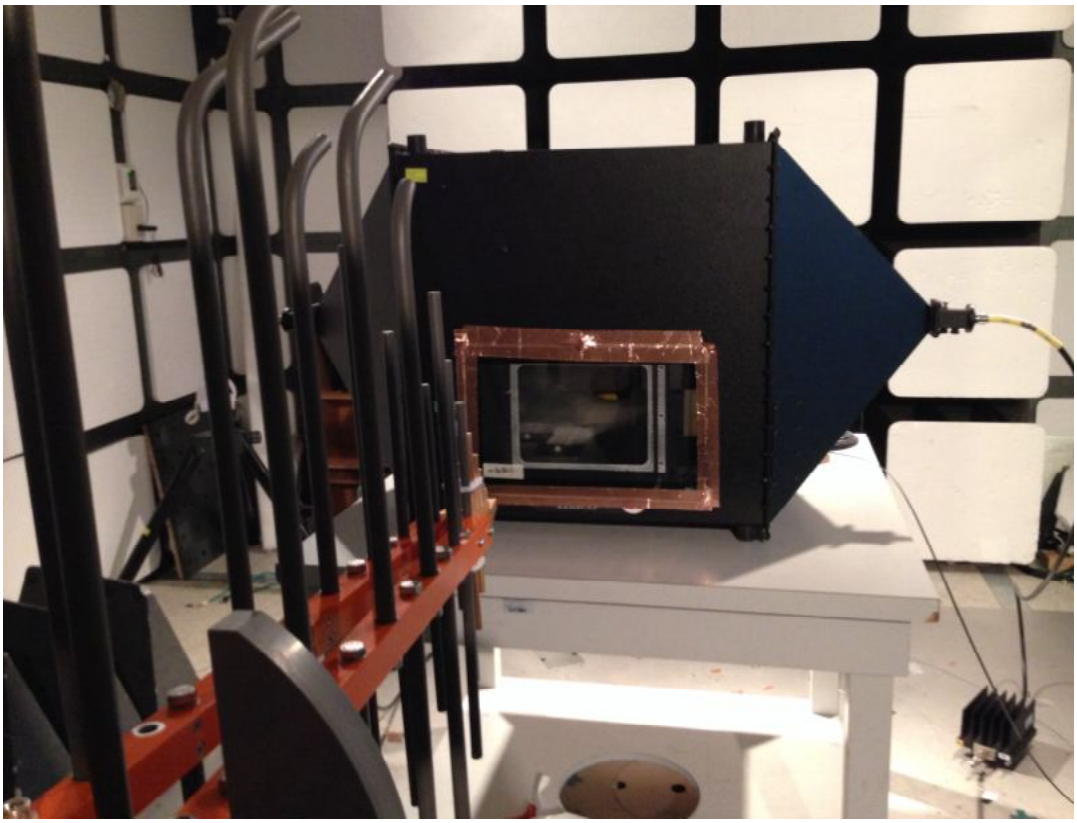
5 EQUIPMENTS LIST FOR TESTING

Item	Name	Manufacturer	Model	Calibration Date	Recommended Recal. Date
1	IMS INTEGR. MEAS. SYSTEM	R&S	IMS	Jul. 11, 2012	Jul. 10, 2014
2	Power Amplifier	AR	250A250AM1	Jul. 10, 2013	Jul. 09, 2014
3	Power Amplifier	R&S	BBA100	Jul. 10, 2013	Jul. 09, 2014
4	Power Amplifier	AR	120S1G4M1	Jul. 10, 2013	Jul. 09, 2014
5	Log Periodic Antenna	AR	AT5080	Jul. 10, 2013	Jul. 09, 2014
6	Isotropic Electric Field Probe	Narda	NBM-520	Jun. 14, 2013	Jun. 13, 2014

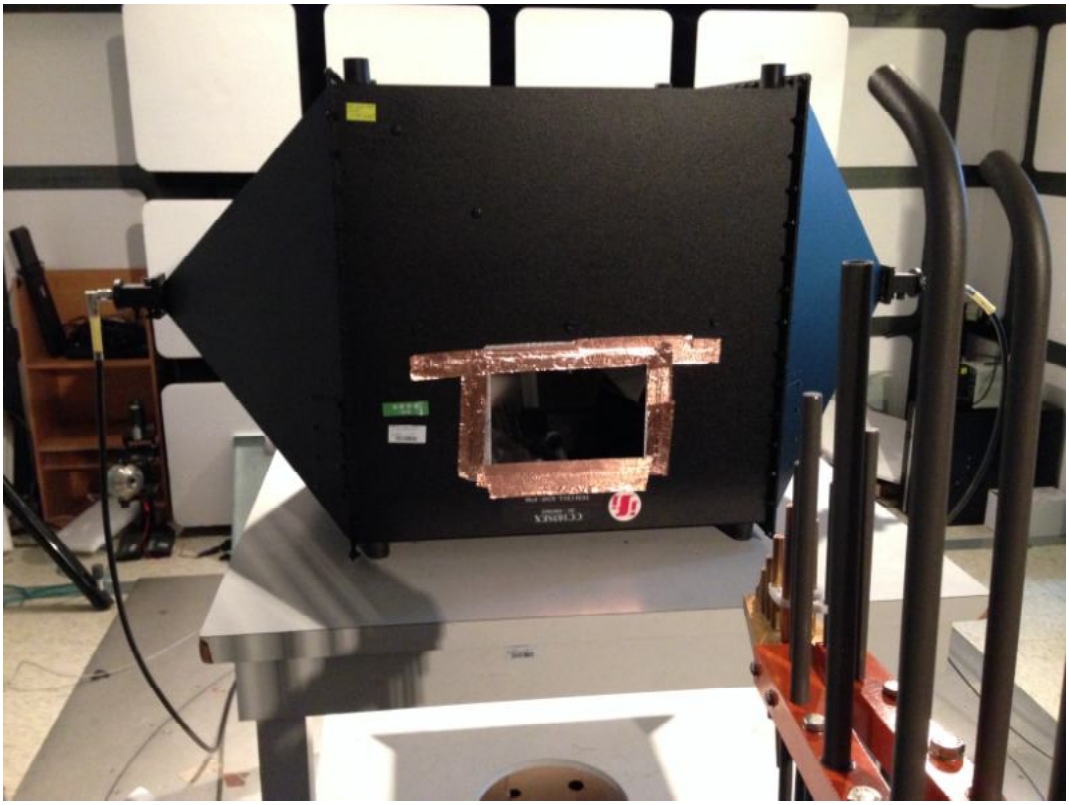
ANNEX A: TEST PHOTOS

1. E0-No shielding material when the measured electric field strength

2. With shielding material when the measured electric field strength (EUT Panel)



3. With shielding material when the measured electric field strength (General Glass Plate)



4. Metal Plate Front View (Length)

5. Metal Plate Front View (Width)

6. Metal Plate Rear View (Length)

7. Metal Plate Rear View (Width)