



EMC TEST REPORT

Applicant : MtM+ Technology Corporation
Address : 8F, 178, MinQuan East Road, Section 3,
: Taipei 10542, Taiwan
Equipment : M905
Model No. : nRF52832
Trade Name : MtM+ Technology

I HEREBY CERTIFY THAT :

The sample was received on Nov. 10, 2017 and the testing was carried out on Nov. 14, 2017 at CerpPASS Technology Corp. The test result refers exclusively to the test presented test model / sample. Without written approval of CerpPASS Technology Corp., the test report shall not be reproduced except in full.

Approved by:

Kero Kuo / EMC & RF Manager

Laboratory Accreditation:



CerpPASS Technology Corporation Test Laboratory



Contents

1. Summary of Test Procedure and Test Results	4
1.1. Applicable Standards	4
2. Test Configuration of Equipment under Test	5
2.1. Feature of Equipment under Test.....	5
2.2. The Difference of EUT	5
2.3. Test Manner	5
2.4. Description of Test System	6
2.5. General Information of Test.....	7
2.6. Measurement Uncertainty	7
3. Test of Conducted Emission	8
4. Test of Radiated Emission	9
4.1. Test Limit.....	9
4.2. Test Procedures	12
4.3. Typical Test Setup	12
4.4. Measurement Equipment.....	13
4.5. Test Result and Data (30MHz ~ 1GHz)	14
4.6. Test Result and Data (1GHz ~ 6GHz).....	16
4.7. Test Photographs (30MHz ~ 1GHz).....	18
4.8. Test Photographs (1GHz ~ 6GHz).....	19
5. Harmonics Test	20
6. Voltage Fluctuations Test	21
7. Electrostatic Discharge Immunity Test	22
7.1. Test Procedure.....	22
7.2. Test Setup for Tests Performed in Laboratory.....	23
7.3. Test Severity Levels	24
7.4. Measurement Equipment.....	24
7.5. Test Result and Data.....	25
7.6. Test Photographs	26
7.7. Test Points.....	27
8. Radio Frequency electromagnetic field immunity test	28
8.1. Test Procedure.....	28
8.2. Test Severity Levels	28
8.3. Measurement Equipment.....	28
8.4. Test Result and Data.....	29
8.5. Test Photographs	30
9. Electrical Fast Transient/ Burst Immunity Test	31
10. Surge Immunity Test	32
11. Conduction Disturbances induced by Radio-Frequency Fields	33
12. Voltage Dips and Voltage Interruptions Immunity Test Setup	34



History of this test report

Report No.	Issue Date	Description
TECL1709052	Nov. 17, 2017	Original



1. Summary of Test Procedure and Test Results

1.1. Applicable Standards

The measurements shown in this test report were made in accordance with the procedures given in EUROPEAN COUNCIL DIRECTIVE 2014/53/EU.

EN 301 489-1 V2.1.1 (2017-02)

EN 301 489-3 V2.1.1 (2017-03)

Test Item	Normative References	Test Result
Conducted Emission	EN 301 489-1 V2.1.1 (2017-02), EN 301 489-3 V2.1.1 (2017-03)	N/A
Radiated Emission	EN 301 489-1 V2.1.1 (2017-02), EN 301 489-3 V2.1.1 (2017-03)	PASS
Harmonics	EN 61000-3-2:2014	N/A
Voltage Fluctuations	EN 61000-3-3:2013	N/A
Electrostatic Discharge Immunity Test (ESD)	EN 61000-4-2:2009	PASS
Radio Frequency electromagnetic field immunity test (RS)	EN 61000-4-3:2006+A1:2008+A2: 2010	PASS
Electrical Fast Transient/ Burst Immunity Test (EFT)	EN 61000-4-4:2012	N/A
Surge Immunity Test	EN 61000-4-5:2014	N/A
Conduction Disturbances induced by Radio-Frequency Fields (CS)	EN 61000-4-6:2014	N/A
Voltage Dips and Voltage Interruptions Immunity Test	EN 61000-4-11:2004	N/A

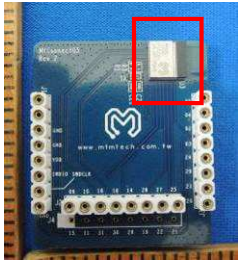
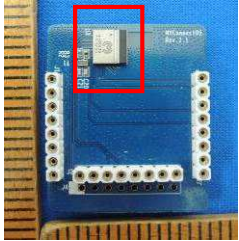
2. Test Configuration of Equipment under Test

2.1. Feature of Equipment under Test

Please refer to the user's manual.

2.2. The Difference of EUT

This model no. can use two kinds of RF Antenna.

Item	RF Chip Position
E1	
E3	

2.3. Test Manner

- During testing, the interface cables and equipment positions were varied according to Europe Standard EN 301489.
- The complete test system included Test Fixture, Smart Phone, Adapter and EUT for EMI test.
- The complete test system included Notebook, Test Fixture, Smart Phone and EUT for EMS test.
- An executive program, "LINK" was executed to transmit and receive data through BT.
- NFC is passive mode.
- The test modes of EMC test as follow:

Radiated Emissions	
Test Mode	Operating Description
1	RF Chip: E1, Link Module
2	RF Chip: E3, Link Module
caused "Test Mode 1" generates the worst case, they were reported as the final data.	
EMS Immunity Test	
Test Mode	Operating Description
1	RF Chip: E1, Link Module
2	RF Chip: E3, Link Module

- The maximum operating frequency is above 108MHz, the test frequency range is from 30MHz to 6GHz.



2.4. Description of Test System

EMI

Device	Manufacturer	Model No.	Description
Test Fixture	N/A	N/A	N/A
Smart Phone	MI	MDE40	N/A
Adapter	AMIGO	AMS47-0501000FU	Data Cable, USB Shielding 1.8m

EMS

Device	Manufacturer	Model No.	Description
Notebook	SONY	PCG-71218P	Power Cable, Non-Shielded, 1.8m
Test Fixture	N/A	N/A	N/A
Smart Phone	MI	MDE40	N/A

Use Cable

Cable	Quantity	Description
Mini USB	1	Non-Shielded, 0.5m



2.5. General Information of Test

<input checked="" type="checkbox"/> Test Site	Cerpass Technology Corporation Test Laboratory Address: No.10, Ln. 2, Lianfu St., Luzhu Dist., Taoyuan City 33848, Taiwan (R.O.C.) Tel:+886-3-3226-888 Fax:+886-3-3226-881 Address: No.68-1, Shihbachongsi, Shihding Township, New Taipei City 223, Taiwan, R.O.C. Tel: +886-2-2663-8582	
	FCC	TW1079, TW1061, 390316, 228391, 641184
	IC	4934E-1, 4934E-2
	VCCI	T-2205 for Telecommunication Test C-4663 for Conducted emission test R-3428, R-4218 for Radiated emission test G-10812, G-10813 for radiated disturbance above 1GHz
<input type="checkbox"/> Test Site	Cerpass Technology (Suzhou) Co.,Ltd Address: No.66,Tangzhuang Road, Suzhou Industrial Park, Jiangsu 215006, China Tel: +86-512-6917-5888 Fax: +86-512-6917-5666	
	FCC	916572, 331395
	IC	7290A-1, 7290A-2
	VCCI	T-1945 for Telecommunication Test C-2919 for Conducted emission test R-2670 for Radiated emission test G-227 for radiated disturbance above 1GHz
Frequency Range Investigated:	Conducted: from 150 kHz to 30 MHz Radiation: from 30 MHz to 6,000 MHz	
Test Distance :	The test distance of radiated emission below 1GHz from antenna to EUT is 10 M. The test distance of radiated emission above 1GHz from antenna to EUT is 3 M.	

2.6. Measurement Uncertainty

Measurement Item	Measurement Frequency	Polarization	Uncertainty
Conducted Emission	9 kHz ~ 30 MHz	LINE / NEUTRAL	± 3.25 dB
Conducted Emission (Telecommunication Port)	9 kHz ~ 30 MHz	N/A	± 4.1 dB
Radiated Emission	30 MHz ~ 1,000 MHz	Vertical / Horizontal	±3.93 dB
	1,000 MHz ~ 6,000 MHz	Vertical / Horizontal	±4.01 dB
	6,000 MHz ~ 18,000 MHz	Vertical / Horizontal	±4.72 dB

The measurement uncertainty will be considered, when test result margin to the limit.



3. Test of Conducted Emission

The EUT is powered from system; this test item is not applicable.



4. Test of Radiated Emission

4.1. Test Limit

The EUT shall meet the limits of below Table when measured at the measuring distance R in accordance with the methods described in European Standard EN 55032. If the reading on the measuring receiver shows fluctuations close to the limit, the reading shall be observed for at least 15 s at each measurement frequency; the highest reading shall be recorded, with the exception of any brief isolated high reading, which shall be ignored.

Table 1 – Required highest frequency for radiated measurement

Highest internal frequency (F_x)	Highest measured frequency
$F_x \leq 108$ MHz	1 GHz
108 MHz < $F_x \leq 500$ MHz	2 GHz
500 MHz < $F_x \leq 1$ GHz	5 GHz
$F_x > 1$ GHz	5 x F_x up to a maximum of 6 GHz
NOTE 1 For FM and TV broadcast receivers, F_x is determined from the highest frequency generated or used excluding the local oscillator and tuned frequencies.	
NOTE 2 F_x is defined in 3.1.19.	

Where the F_x is unknown, the radiated emission measurements shall be performed up to 6 GHz.

Table A.2 – Requirements for radiated emissions at frequencies up to 1 GHz for Class A equipment

Table clause	Frequency range MHz	Measurement		Class A limits dB(μ V/m)
		Distance m	Detector type / bandwidth	OATS / SAC (see Table A.1)
A2.1	30 – 230	10	Quasi Peak / 120 kHz	40
	230 – 1 000			47
A2.2	30 – 230	3		50
	230 – 1 000			57
NOTE Apply only A2.1 or A2.2 across the entire frequency range.				

Table A.3 – Requirements for radiated emissions at frequencies above 1 GHz for Class A equipment

Table clause	Frequency range MHz	Measurement		Class A limits dB(μ V/m)
		Distance m	Detector type / bandwidth	FSOATS (see Table A.1)
A3.1	1 000 – 3 000	3	Average / 1 MHz	56
	3 000 – 6 000			60
A3.2	1 000 – 3 000		Peak / 1 MHz	76
	3 000 – 6 000			80
NOTE Apply A3.1 and A3.2 across the frequency range from 1000 MHz to the highest required frequency of measurement derived from Table 1.				

**Table A.4 – Requirements for radiated emissions at frequencies up to 1 GHz for Class B equipment**

Table clause	Frequency range MHz	Measurement		Class B limits dB(μ V/m)
		Distance m	Detector type / bandwidth	OATS / SAC (see Table A.1)
A4.1	30 – 230	10	Quasi Peak / 120 kHz	30
	230 – 1 000			37
A4.2	30 – 230	3		40
	230 – 1 000			47

NOTE Apply only table clause A4.1 or A4.2 across the entire frequency range.

Table A.5 – Requirements for radiated emissions at frequencies above 1 GHz for Class B equipment

Table clause	Frequency range MHz	Measurement		Class B limits dB(μ V/m)
		Distance m	Detector type / bandwidth	FSOATS (see Table A.1)
A5.1	1 000 – 3 000	3	Average / 1 MHz	50
	3 000 – 6 000			54
A5.2	1 000 – 3 000		Peak / 1 MHz	70
	3 000 – 6 000			74

NOTE Apply A5.1 and A5.2 across the frequency range from 1000 MHz to the highest required frequency of measurement derived from Table 1.

Table A.6 – Requirements for radiated emissions from FM receivers

Table clause	Frequency range MHz	Measurement		Class B limit dB(μ V/m)		
		Distance m	Detector type / bandwidth	Fundamental	Harmonics	
				OATS/SAC (see Table A.1)	OATS/SAC (see Table A.1)	
A6.1	30 – 230	10	Quasi peak / 120 kHz	50	42	
	230 – 300				42	
	300 – 1 000				46	
A6.2	30 – 230	3		Quasi peak / 120 kHz	60	52
	230 – 300					52
	300 – 1 000					56

NOTE 1 Apply only A.6.1 or A.6.2 across the entire frequency range.
NOTE 2 These relaxed limits apply only to emissions at the fundamental and harmonic frequencies of the local oscillator. Signals at all other frequencies shall be compliant with the limits given in Table A.4.

**Table A.12 – Requirements for conducted differential voltage emissions from Class B equipment**

Applicable to						
1.TV broadcast receiver tuner ports (3.1.8) with an accessible connector						
2.RF modulator output ports (3.1.27)						
3.FM broadcast receiver tuner ports (3.1.8) with an accessible connector						
Table clause	Frequency Range MHz	Detector type / bandwidth	Class B limits dB(μ V) 75Ω			Applicability
			Other	Local Oscillator Fundamental	Local Oscillator Harmonics	
A12.1	30 - 950	For frequencies ≤ 1 GHz	46	46	46	See NOTE 1
	950 – 2 150		46	54	54	
A12.2	950 – 2 150	Quasi Peak / 120 kHz	46	54	54	See NOTE 2
A12.3	30 – 300		For frequencies ≥ 1 GHz	46	54	50
	300 – 1 000	52				
A12.4	30 - 300	For frequencies ≥ 1 GHz	46	66	59	See NOTE 4
	300 – 1 000				52	
A12.5	30 - 950	Peak / 1 MHz	46	76	46	See NOTE 5
	950 – 2 150			n/a	54	

NOTE 1 Television receivers (analogue or digital), video recorders and PC TV broadcast receiver tuner cards working in channels between 30 MHz and 1 GHz, and digital audio receivers.

NOTE 2 Tuner units (not the LNB) for satellite signal reception.

NOTE 3 Frequency modulation audio receivers and PC tuner cards.

NOTE 4 Frequency modulation car radios.

NOTE 5 Applicable to EUT2 with RF modulator output ports (for example DVD equipment, video recorders, camcorders and decoders etc.) designed to connect to TV broadcast receiver tuner ports.

NOTE 6 Testing is required at only one EUT supply voltage and frequency.

NOTE 7 The term 'other' refers to all emissions other than the fundamental and the harmonics of the local oscillator.

NOTE 8 The test shall be performed with the device operating at each reception channel.

NOTE 9 The test shall cover the entire frequency range.

4.2. Test Procedures

- a. The EUT was placed on a rotatable table top 0.8 meter above ground.
- b. The EUT was set 3/10 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
- c. The table was rotated 360 degrees to determine the position of the highest radiation.
- d. The antenna is a half wave dipole and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
- e. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
- f. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 6 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 6 dB margin will be repeated one by one using the quasi-peak method and reported.

4.3. Typical Test Setup

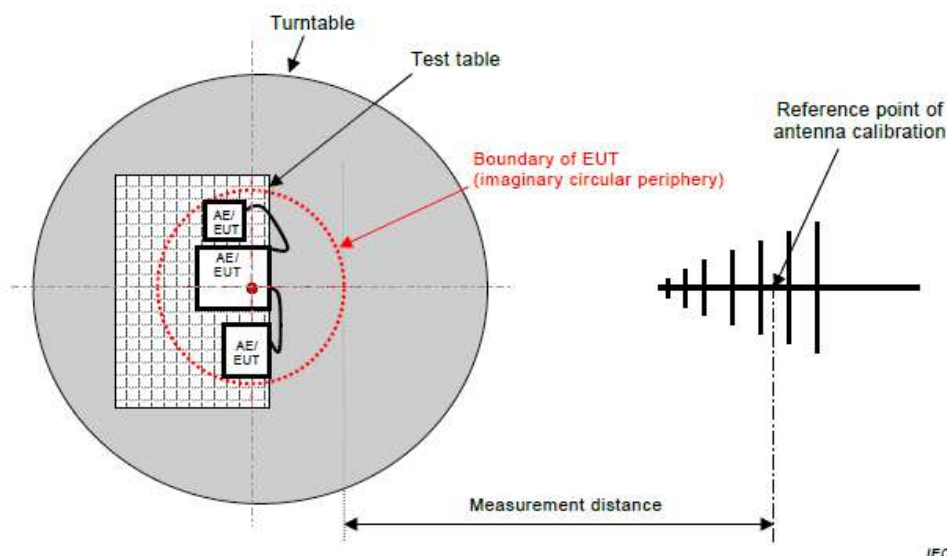
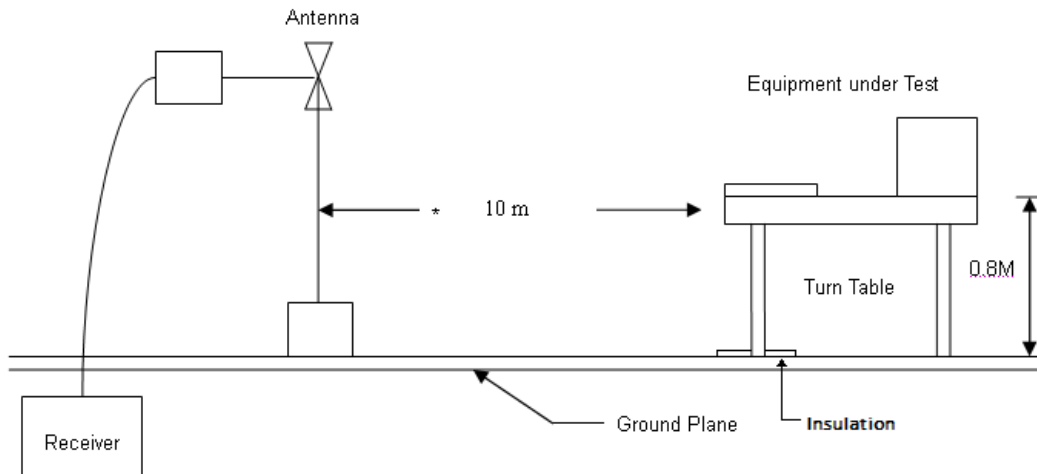
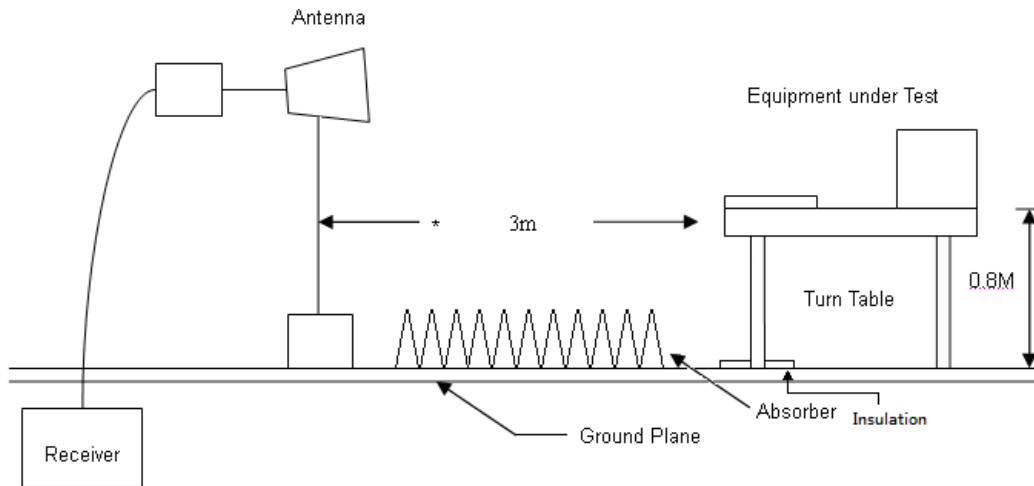


Figure C.1 – Measurement distance

Below 1GHz Test Setup



Above 1GHz Test Setup



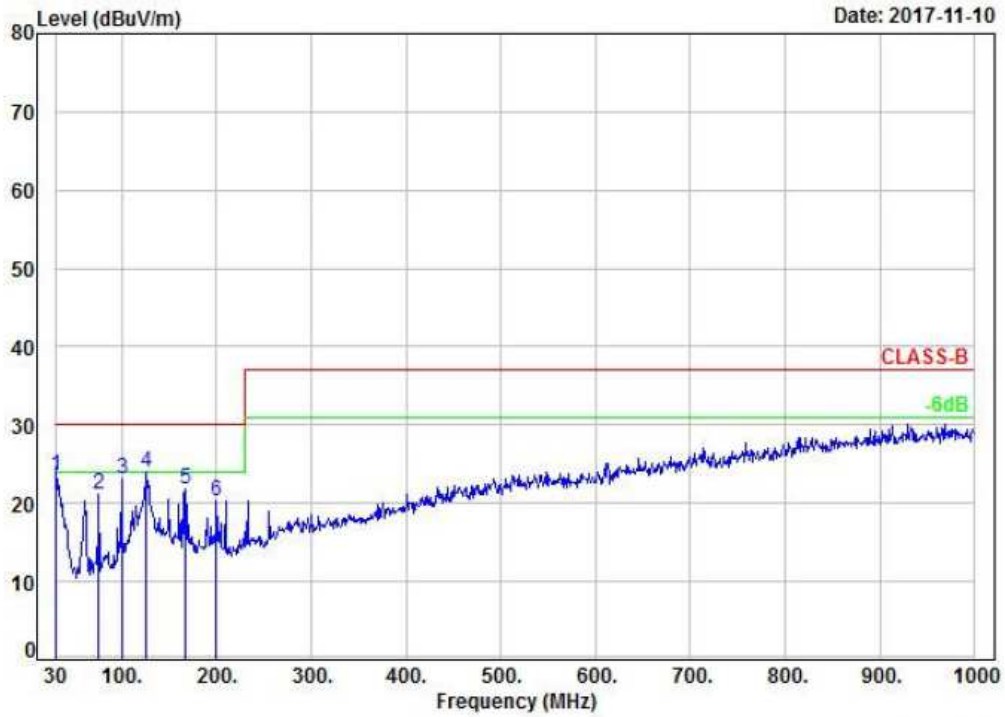
4.4. Measurement Equipment

Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
Bilog Antenna	Sunol	JB1	A020514-1	2017/02/13	2018/02/12
Bilog Antenna	Sunol	JB1	A020514-2	2017/03/15	2018/03/14
EMI Receiver	R&S	ESCI3	101402	2017/02/13	2018/02/12
EMI Receiver	R&S	ESCI7	100963	2017/03/06	2018/03/05
Preamplifier	EM Electronics corp.	EM330	60610	2017/02/25	2018/02/24
Preamplifier	EM Electronics corp.	EM330	60611	2017/02/10	2018/02/09
Horn Antenna	EMCO	3115	31589	2017/02/18	2018/02/17
Spectrum Analyzer	R&S	FSP40	100219	2017/07/01	2018/06/30
Preamplifier	Agilent	8449B	3008A01954	2017/02/09	2018/02/08
Software	E3	AUDIX	Version: 8.14.806b	N/A	N/A



4.5. Test Result and Data (30MHz ~ 1GHz)

Power	: From System	Pol/Phase	: VERTICAL
Test Mode	: Mode 1	Temperature	: 20°C
Test Date	: Nov. 10, 2017	Humidity	: 40%

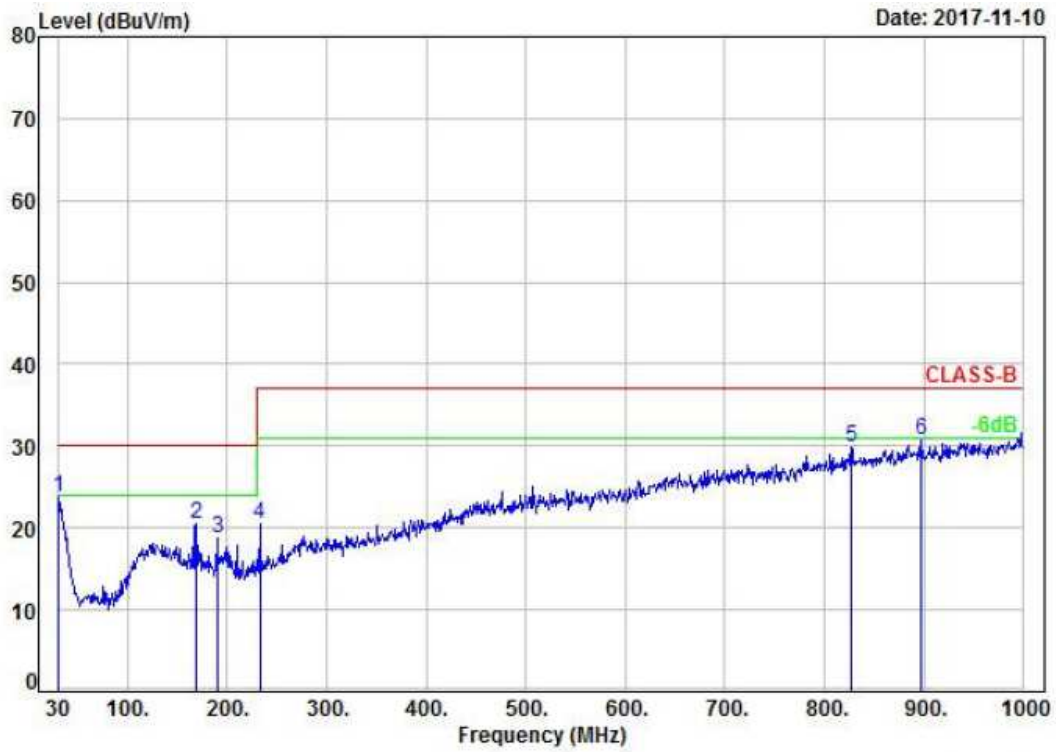


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBUV)	Level (dBUV/m)	Limit (dBUV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	30.20	-2.98	26.55	23.57	30.00	-6.43	QP	100	12	P
2	75.59	-15.86	37.02	21.16	30.00	-8.84	Peak	200	239	P
3	99.84	-13.20	36.21	23.01	30.00	-6.99	Peak	100	153	P
4	126.03	-9.36	33.33	23.97	30.00	-6.03	Peak	100	236	P
5	166.77	-11.22	33.06	21.84	30.00	-8.16	Peak	100	87	P
6	199.75	-10.32	30.69	20.37	30.00	-9.63	Peak	100	61	P

Note: Level = Reading + Factor
Margin = Level – Limit
Factor = Antenna Factor + Cable Loss - Amplifier Factor



Power	: From System	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 1	Temperature	: 20°C
Test Date	: Nov. 10, 2017	Humidity	: 40%



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	30.00	-2.78	26.48	23.70	30.00	-6.30	Peak	400	27	P
2	169.68	-10.85	31.34	20.49	30.00	-9.51	Peak	400	185	P
3	190.05	-11.08	29.82	18.74	30.00	-11.26	Peak	400	260	P
4	232.73	-11.00	31.43	20.43	37.00	-16.57	Peak	200	0	P
5	826.37	2.76	27.05	29.81	37.00	-7.19	Peak	200	153	P
6	897.18	3.97	26.82	30.79	37.00	-6.21	Peak	200	4	P

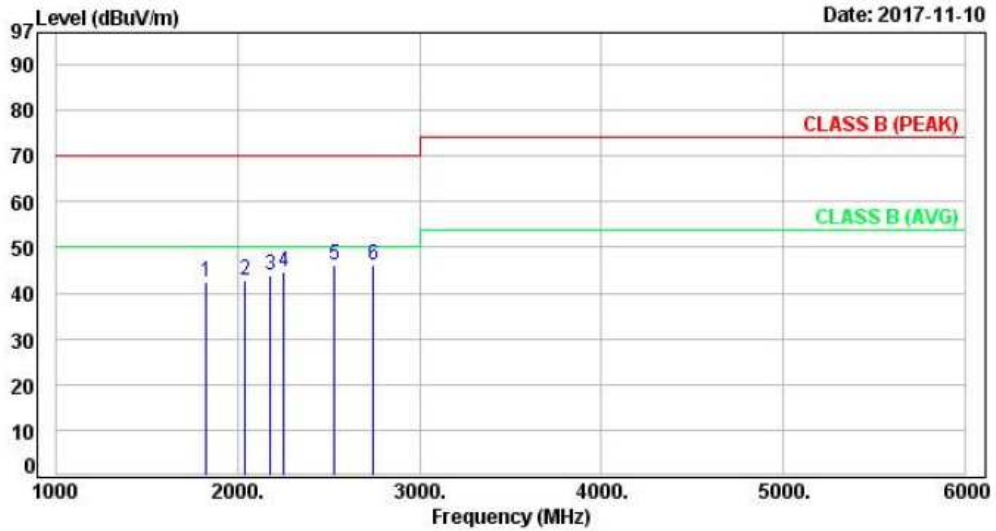
Note: Level = Reading + Factor
 Margin = Level - Limit
 Factor = Antenna Factor + Cable Loss - Amplifier Factor

Test engineer: Peter



4.6. Test Result and Data (1GHz ~ 6GHz)

Power	: From System	Pol/Phase	: VERTICAL
Test Mode	: Mode 1	Temperature	: 20°C
Test Date	: Nov. 10, 2017	Humidity	: 40%

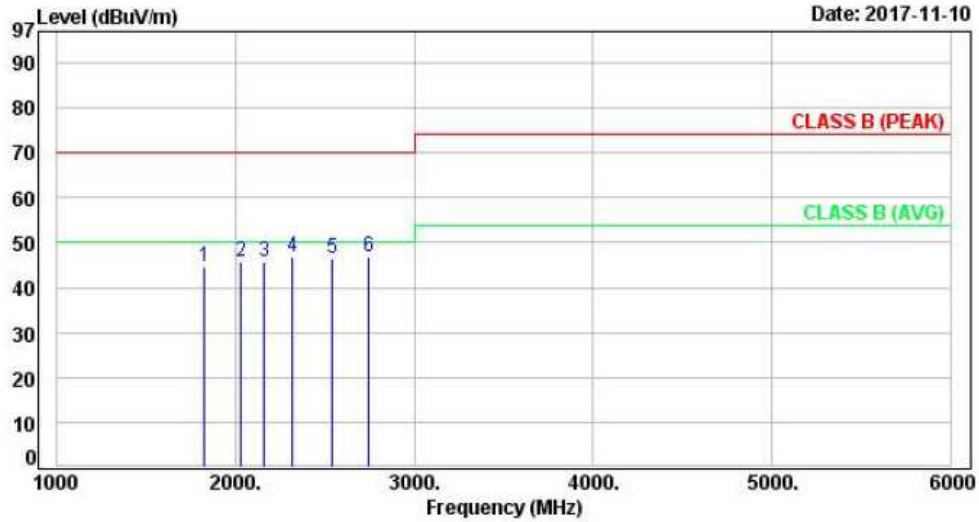


No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	1825.00	-3.38	45.70	42.32	70.00	-27.68	Peak	400	0	P
2	2040.00	-2.00	44.86	42.86	70.00	-27.14	Peak	400	0	P
3	2175.00	-1.52	45.48	43.96	70.00	-26.04	Peak	400	0	P
4	2255.00	-1.22	45.93	44.71	70.00	-25.29	Peak	400	0	P
5	2535.00	-0.16	46.08	45.92	70.00	-24.08	Peak	400	0	P
6	2745.00	0.86	45.35	46.21	70.00	-23.79	Peak	400	0	P

Note: Level = Reading + Factor
Margin = Level – Limit
Factor = Antenna Factor + Cable Loss - Amplifier Factor



Power	: From System	Pol/Phase	: HORIZONTAL
Test Mode	: Mode 1	Temperature	: 20°C
Test Date	: Nov. 10, 2017	Humidity	: 40%



No.	Frequency (MHz)	Factor (dB/m)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg)	P/F
1	1830.00	-3.35	48.03	44.68	70.00	-25.32	Peak	100	0	P
2	2035.00	-2.02	47.58	45.56	70.00	-24.44	Peak	100	0	P
3	2165.00	-1.55	47.27	45.72	70.00	-24.28	Peak	100	0	P
4	2315.00	-1.00	47.78	46.78	70.00	-23.22	Peak	100	0	P
5	2540.00	-0.13	46.51	46.38	70.00	-23.62	Peak	100	0	P
6	2745.00	0.86	46.11	46.97	70.00	-23.03	Peak	100	0	P

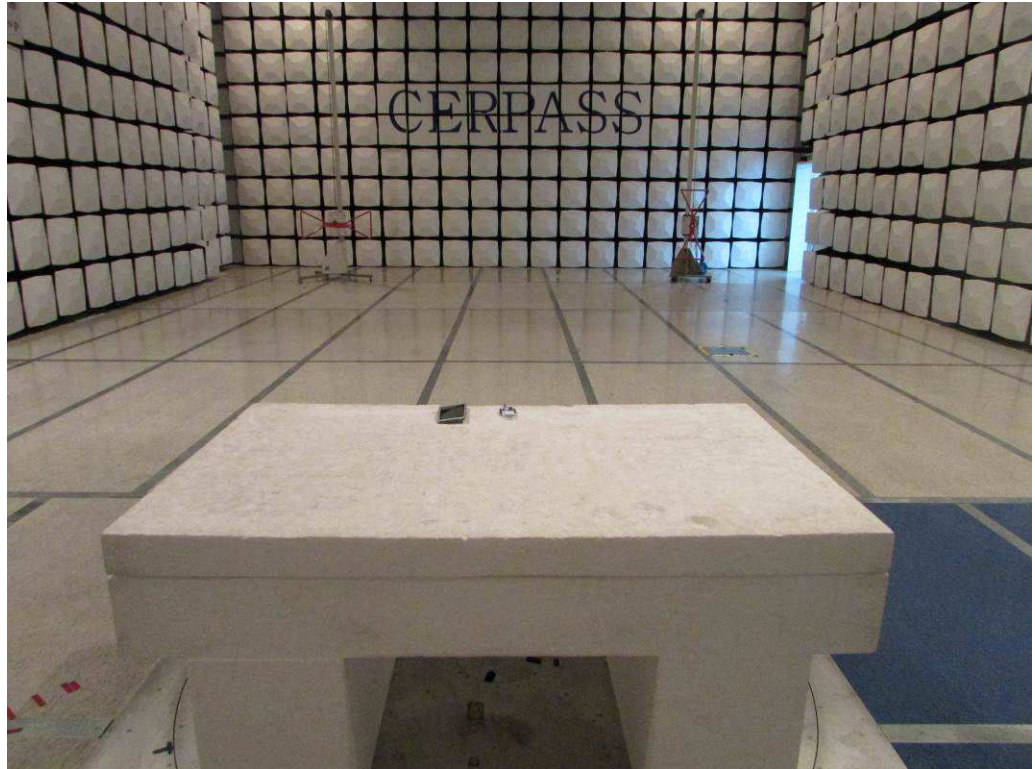
Note: Level = Reading + Factor
 Margin = Level – Limit
 Factor = Antenna Factor + Cable Loss - Amplifier Factor

Test engineer: Peter

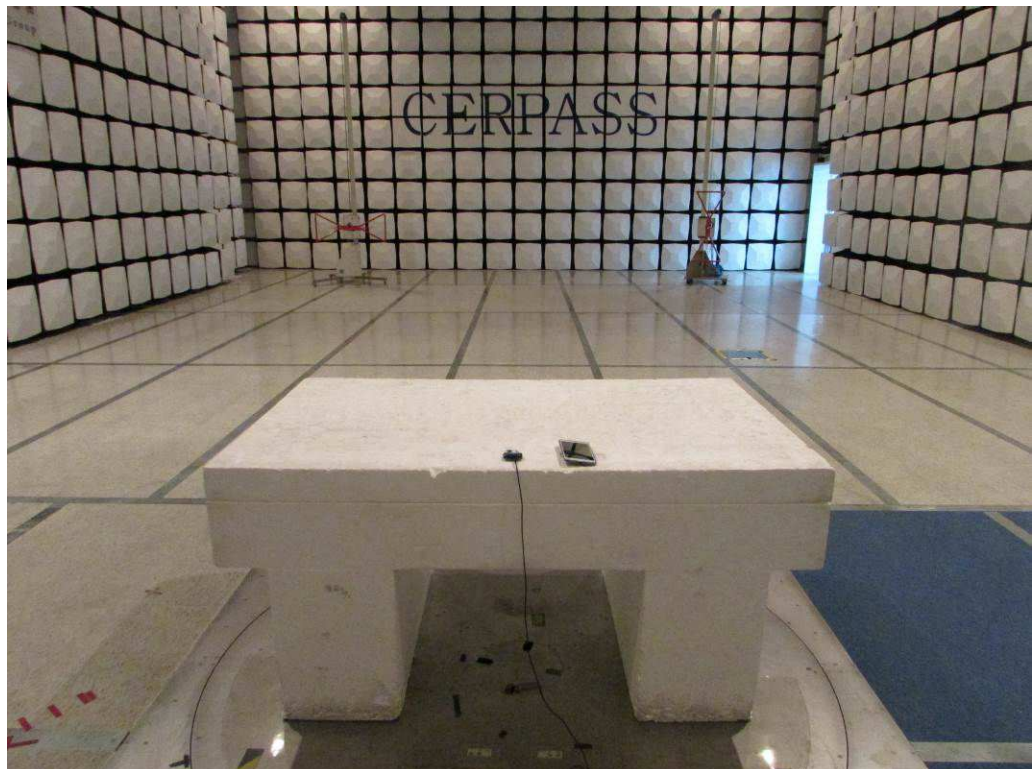


4.7. Test Photographs (30MHz ~ 1GHz)

Front View



Rear View





4.8. Test Photographs (1GHz ~ 6GHz)

Front View



Rear View





5. Harmonics Test

The EUT is powered from system; this test item is not applicable.



6. Voltage Fluctuations Test

The EUT is powered from system; this test item is not applicable.

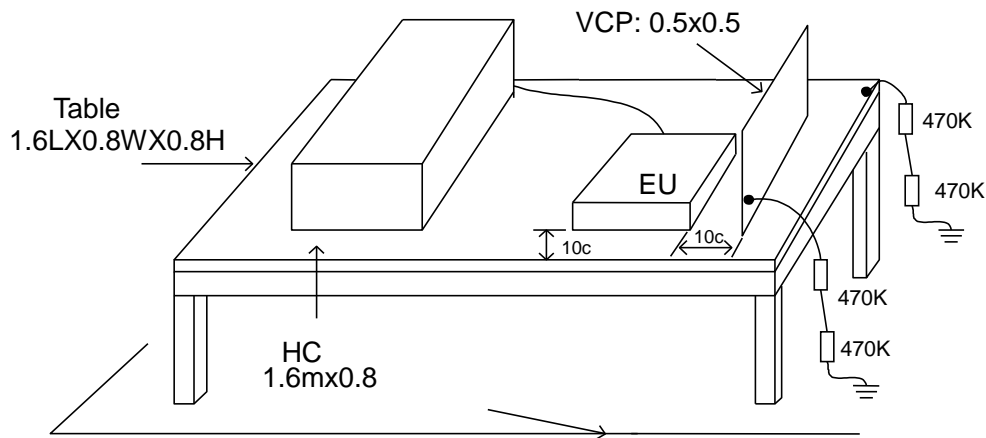


7. Electrostatic Discharge Immunity Test

7.1. Test Procedure

- a. In the case of air discharge testing the climatic conditions shall be within the following ranges:
 - ambient temperature: 15°C to 35°C;
 - relative humidity : 30% to 60%;
 - atmospheric pressure : 86 KPa (860 mbar) to 106 KPa (1060 mbar).
- b. Test programs and software shall be chosen so as to exercise all normal modes of operation of the EUT. The use of special exercising software is encouraged, but permitted only where it can be shown that the EUT is being comprehensively exercised.
- c. The test voltage shall be increased from the minimum to the selected test severity level, in order to determine any threshold of failure. The final severity level should not exceed the product specification value in order to avoid damage to the equipment.
- d. The test shall be performed with both air discharge and contact discharge. On reselected points at least 10 single discharges (in the most sensitive polarity) shall be applied on air discharge. On reselected points at least 25 single discharges (in the most sensitive polarity) shall be applied on contact discharge.
- e. For the time interval between successive single discharges an initial value of one second is recommended. Longer intervals may be necessary to determine whether a system failure has occurred.
- f. In the case of contact discharges, the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.
- g. In the case of painted surface covering a conducting substrate, the following procedure shall be adopted :
 - If the coating is not declared to be an insulating coating by the equipment manufacturer, then the pointed tip of the generator shall penetrate the coating so as to make contact with the conducting substrate.
 - Coating declared as insulating by the manufacturer shall only be submitted to the air discharge.
 - The contact discharge test shall not be applied to such surfaces.
- h. In the case of air discharges, the round discharge tip of the discharge electrode shall be approached as fast as possible (without causing mechanical damage) to touch the EUT . After each discharge, the ESD generator (discharge electrode) shall be removed from the EUT. The generator is then retriggered for a new single discharge. This procedure shall be repeated until the discharges are completed. In the case of an air discharge test, the discharge switch, which is used for contact discharge, shall be closed.

7.2. Test Setup for Tests Performed in Laboratory



The test setup consists of the test generator, EUT and auxiliary instrumentation necessary to perform DIRECT and INDIRECT application of discharges to the EUT as applicable, in the following manner :

- a. CONTACT DISCHARGE to the conductive surfaces and to coupling plane;
- b. AIR DISCHARGE at insulating surfaces.

The preferred test method is that of type tests performed in laboratories and the only accepted method of demonstrating conformance with this standard. The EUT was arranged as closely as possible to arrangement in final installed conditions.

A ground reference plane was provided on the floor of the test site. It was a metallic sheet (copper or aluminum) of 0.25 mm, minimum thickness; other metallic may be used but they shall have at least 0.65 mm thickness. In the CerpPASS Technology Corp., we provided 1 mm thickness stainless steel ground reference plane. The minimum size of the ground reference plane is 2.5 m x 2.5 m, the exact size depending on the dimensions of the EUT. It was connected to the protective grounding system.

The EUT was arranged and connected according to its functional requirements. A distance of 1m minimum was provided between the EUT and the wall of the lab. and any other metallic structure. In cases where this length exceeds the length necessary to apply the discharges to the selected points, the excess length shall, where possible, be placed non-inductively off the ground reference plane and shall not come closer than 0.2m to other conductive parts in the test setup.

Where the EUT is installed on a metal table, the table was connected to the reference plane via a cable with a 470k ohm resistor located at each end, to prevent a build-up of charge. The test setup was consist a wooden table, 0.8m high, standing on the ground reference plane. A HCP, 1.6 m x 0.8 m, was placed on the table. The EUT and cables was isolated from the HCP by an insulating support 0.5 mm thick. The VCP size, 0.5 m x 0.5 m.



7.3. Test Severity Levels

Contact Discharge		Air Discharge	
Level	Test Voltage (KV) of Contact discharge	Level	Test Voltage (KV) of Air Discharge
1	±2	1	±2
2	±4	2	±4
3	±6	3	±8
4	±8	4	±15
X	Specified	X	Specified

Remark: "X" is an open level.

7.4. Measurement Equipment

Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
ESD Simulator	AMETEK	DITO	P1404129910	2017/03/17	2018/03/16



7.5. Test Result and Data

Final Test Result : **PASS**
 Pass performance criteria : TT/TR
 Basic Standard : EN 61000-4-2
 Product Standard : EN 301 489-3
 Test Voltage : $\pm 2 / \pm 4$ KV for contact discharge
 Temperature : 24°C
 Relative Humidity : 42 %
 Atmospheric Pressure : 1007 hPa
 Test Date : Nov. 14, 2017

		Contact Discharge				Air Discharge					
		__ 10 __ times / each				__ 10 __ times / each					
Voltage		2 KV		4 KV		2 KV		4 KV		8 KV	
No.	Point\Polarity	+	-	+	-	+	-	+	-	+	-
	VCP Front	A	A	A	A	---	---	---	---	---	---
	VCP Right	A	A	A	A	---	---	---	---	---	---
	VCP Left	A	A	A	A	---	---	---	---	---	---
	VCP Rear	A	A	A	A	---	---	---	---	---	---
	HCP Front	A	A	A	A	---	---	---	---	---	---
	HCP Right	A	A	A	A	---	---	---	---	---	---
	HCP Left	A	A	A	A	---	---	---	---	---	---
	HCP Rear	A	A	A	A	---	---	---	---	---	---

Note:"A" means the EUT function is normal working during the test.

Test engineer: Kevin

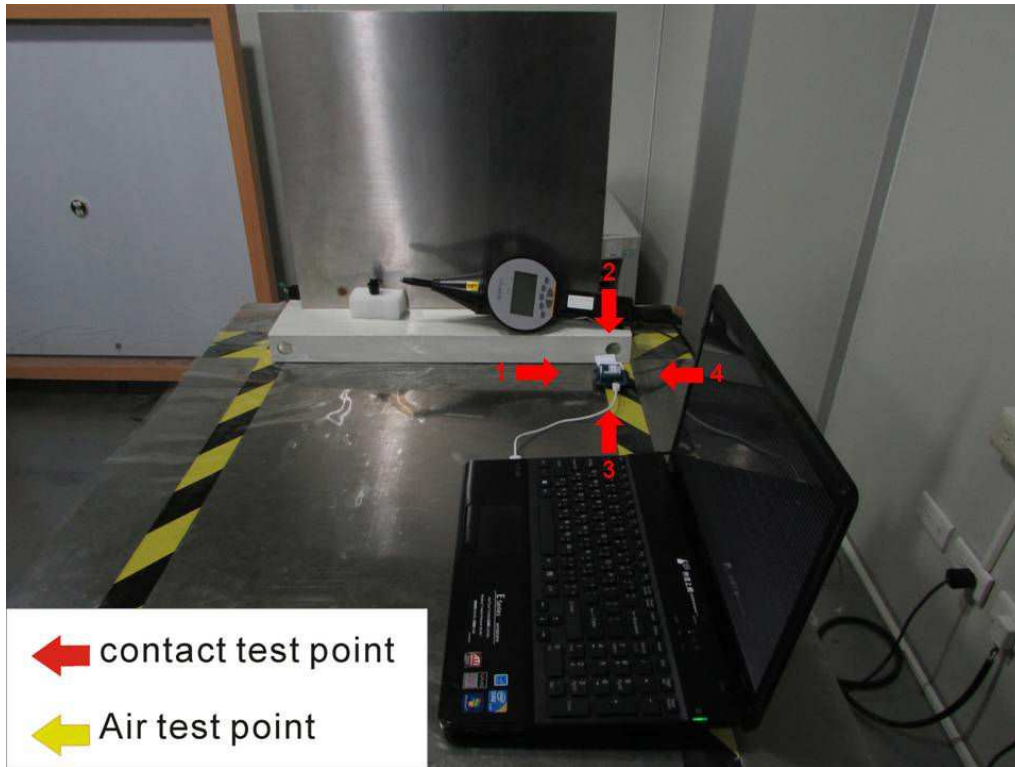


7.6. Test Photographs





7.7. Test Points





8. Radio Frequency electromagnetic field immunity test

8.1. Test Procedure

- The equipment to be tested is placed in the center of the enclosure on a wooden table. The equipment is then connected to power and signal leads according to pertinent installation instructions.
- The antenna which is enabling the complete frequency range of 80-6000 MHz is placed 3m away from the equipment. The required field strength is determined by placing the field strength meter(s) on top of or directly alongside the equipment under test and monitoring the field strength meter via a remote field strength indicator outside the enclosure while adjusting the continuous-wave to the applicable antennae.
- The test is normally performed with the antenna facing the most sensitive side of the EUT. The polarization of the field generated by the bucolical antenna necessitates testing each position twice, once with the antenna positioned vertically and again with the antenna positioned horizontally. The circular polarization of the field from the log-spiral antenna makes a change of position of the antenna unnecessary.
- At each of the above conditions, the frequency range is swept 80-6000 MHz, pausing to adjust the R.F. signal level or to switch oscillators and antenna. The rate of sweep is in the order of 1.5×10^{-3} decades/s. The sensitive frequencies or frequencies of dominant interest may be discretely analyzed.

8.2. Test Severity Levels

Frequency Band : 80-6000 MHz	
Level	Test field strength (V/m)
1	1
2	3
3	10
X	Specified
Remark: "X" is an open class.	

8.3. Measurement Equipment

Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Valid Date
Signal Generator	KEYSIGHT	N5171B	MY53051326	2017/08/30	2018/08/29
Power Meter	Boonton	4231A-01	115902	2017/08/30	2018/08/29
Power Sensor	Boonton	51075A	36586	2017/06/02	2018/06/01
Antenna (80-1GHz)	AR	ALT80M1G	348540	N/A	N/A
Amplifier (80-1GHz)	METEK	80RF 1000-300	1077169	N/A	N/A
Log.-Per Antenna (1-6GHz)	Schwarzbeck	STLP 9149	9149-483	N/A	N/A
Amplifier (1-6GHz)	MILMEGA	AS0860B-50-50	1079233	N/A	N/A



8.4. Test Result and Data

Final Test Result : **PASS**
 Pass performance criteria : CT/CR
 Basic Standard : EN 61000-4-3
 Product Standard : EN 301 489-3
 Frequency Range : 80~6000 MHz
 Temperature : 24°C
 Relative Humidity : 59%
 Atmospheric Pressure : 1007 hPa
 Test Date : Nov. 14, 2017

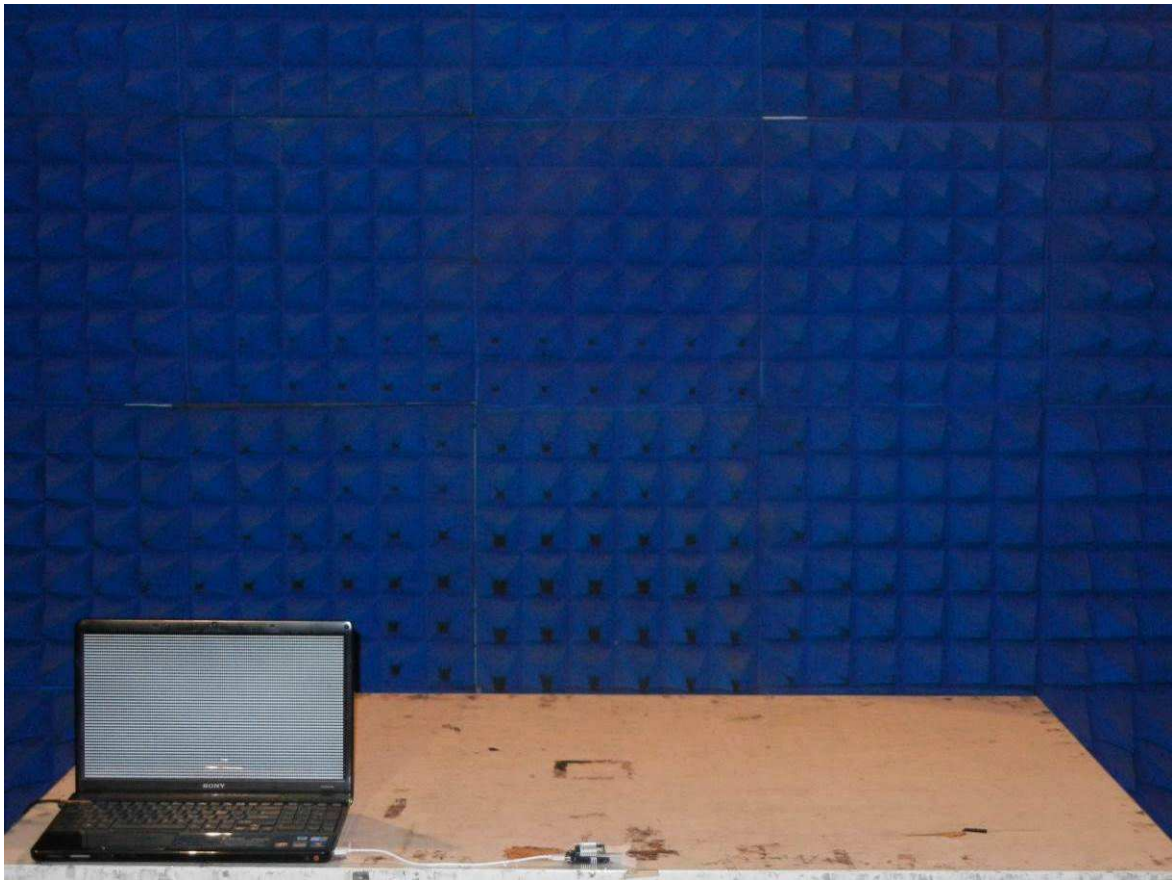
Modulation : AM 80% , 1KHz sine wave, Dwell time: 3 S				
Frequency Step Size : 1 % of preceding frequency value				
Frequency (MHz)	Antenna Polarization	face	Field strength (V/m)	Result
80~6000	Vertical	Front	3	A
80~6000	Vertical	Rear	3	A
80~6000	Vertical	Left	3	A
80~6000	Vertical	Right	3	A
80~6000	Horizontal	Front	3	A
80~6000	Horizontal	Rear	3	A
80~6000	Horizontal	Left	3	A
80~6000	Horizontal	Right	3	A

Note: "A" means the EUT function is normal working during the test.

Test engineer: Kevin



8.5. Test Photographs





9. Electrical Fast Transient/ Burst Immunity Test

The EUT is powered from system; this test item is not applicable.



10. Surge Immunity Test

The EUT is powered from system; this test item is not applicable.



11. Conduction Disturbances induced by Radio-Frequency Fields

The EUT is powered from system; this test item is not applicable.



12. Voltage Dips and Voltage Interruptions Immunity Test Setup

The EUT is powered from system; this test item is not applicable.