

# TEST REPORT

## FCC Part 15 Subpart C §15.249 & §15.207 IC RSS-210 Issue 8 & RSS-Gen Issue 3

MANUFACTURER	APG Cash Drawer 5250 Industrial Blvd NE Minneapolis MN 55421 USA
PRODUCT NAME	510 BluePRO
MODEL NUMBER	510
SERIAL NUMBER TESTED	n/a
DESCRIPTION	BlueTooth cash drawer interface
TEST REPORT NUMBER	NC1407860.1
TEST DATE(S)	02 June - 31 October 2014

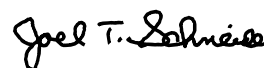
TÜV SÜD America Inc, as an independent testing laboratory, declares that the equipment tested as specified above conforms to the applicable EMC requirements of FCC Part 15 Subpart C §15.249 "Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5875 MHz, and 24.0-24.25 GHz.", §15.207 "Conducted limits" and Industry Canada RSS-210 Issue 8 "Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment", RSS-Gen Issue 3 "General Requirements and Information for the Certification of Radio Apparatus".

It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical characteristics. Any modifications necessary for compliance made during testing on the above mentioned date(s) must be implemented in all production units for compliance to be maintained.

Issue Date: 05 November 2014



Greg S Jakubowski  
EMC Test Engineer



Joel T Schneider  
Senior EMC Engineer

Not Transferable

# EMC TEST REPORT

Test Report No. NC1407860.1 Date of issue: 05 November 2014

Product Name 510 BluePRO

Model 510

Description BlueTooth cash drawer interface

Manufacturer APG Cash Drawer  
5250 Industrial Blvd NE  
Minneapolis MN 55421 USA

Test Result ☒ Positive ☐ Negative

*TÜV SÜD America Inc reports apply only to the specific samples tested under stated test conditions. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. TÜV SÜD America Inc shall have no liability for any deductions, inferences or generalizations drawn by the client or others from TÜV SÜD America Inc issued reports.*

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*TÜV SÜD America Inc and its professional staff hold government and professional organization certifications and are members of AAMI, ACIL, AEA, ANSI, IEEE, NARTE, and VCCI.*

## REVISION RECORD

REVISION	TOTAL NUMBER OF PAGES	DATE	DESCRIPTION
	30	05 November 2014	Initial Release



## DIRECTORY

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### LAB ACCREDITATION:

TÜV SÜD America's New Brighton, Taylors Falls, and Millville Labs maintain A2LA accreditation to ISO/IEC 17025 for the specific tests listed in A2LA Certificate #2955.11 as Electrical Testing Laboratories, and are recognized by the National RRA under Phase I of the APEC Tel MRA, Identification Number US0080. These Labs are located at the following addresses:

Main Location: 1775 Old Highway 8 NW, Suite 104  
New Brighton MN 55112-1891 USA

Satellite Location 1: Oakwood Town Road  
Millville MN 55957-0255 USA

Satellite Location 2: 19333 Wild Mountain Road  
Taylors Falls MN 55084 USA

## EMC TEST REGULATIONS:

The tests were performed according to the following regulations:

FCC Part 15 Subpart C §15.249

FCC Part 15 Subpart C §15.207

IC RSS-210 Issue 8

IC RSS-Gen Issue 3

## ENVIRONMENTAL CONDITIONS IN THE LAB

	<u>Actual</u>
Temperature:	: 22-23°C
Atmospheric pressure	: 99kPa
Relative Humidity	: 45-60%

## POWER SUPPLY UTILIZED

Power supply system : 110V / 60Hz - 24VDC

## TEST EQUIPMENT

All measurement instrumentation is traceable to the National Institute of Standards and Technology and is calibrated according to internal procedure.

## MEASUREMENT UNCERTAINTY

The test system for conducted emissions is defined as the LISN, tuned receiver or spectrum analyzer, and coaxial cable. The test system has a measurement uncertainty of  $\pm 1.8$  dB. The test system for radiated emissions is defined as the antenna, the pre-amplifier, the spectrum analyzer and the coaxial cable. The test system has a measurement uncertainty of  $\pm 4.8$  dB. All measurement instrumentation is traceable to the National Institute of Standards and Technology and is calibrated according to internal procedure.

## SIGN EXPLANATIONS

□ - not applicable

■ - applicable

## Conducted limits

### FCC 15.207(a), RSS-Gen 7.2.4

#### Test summary

The requirements are: ■ - MET □ - NOT MET

Testing was performed in accordance with the test procedure of ANSI C63.4 2009, clause 7.3

Conducted emissions on the 50 Hz and/or 60 Hz power interface of the EUT are measured in the frequency range of 150 kHz to 30 MHz. The measurements are performed using a receiver, which has CISPR characteristic bandwidth (9 kHz resolution bandwidth) and quasi-peak/average detection, and a Line Impedance Stabilization Network (LISN), with 50  $\Omega$ /50  $\mu$ H (CISPR 16) characteristics. Table top equipment is placed on a non-conducting table 80 centimeters above the floor and is positioned 40 centimeters from the vertical ground plane (wall) of the screen room. In some cases, a pre-scan using a spectrum analyzer is initially performed on the units comprising the system under test to locate the highest emissions.

#### Test location

TÜV SÜD America Inc, Taylors Falls, Shield Room 2

#### Test equipment

TUV ID	Model	Manufacturer	Description	Serial	Cal Date	Cal Due
WRLE02534	ESHS-20	Rohde & Schwarz	EMI Receiver 9kHz-30MHz	837055/003	11-Aug-14	11-Aug-15
WRLE10944	FCC-LISN-50-25-2-10	Fischer Custom Comm	LISN	120308	16-Jun-14	16-Jun-15

#### Test limit

Frequency (MHz)	Conducted limit (dB $\mu$ V)	
	Quasi-peak	Average
0.15 – 0.5	66 – 56*	56 – 46*
0.5 – 5	56	46
5 – 30	60	50

\*Decreases with the logarithm of the frequency

#### Test Data

See next page

Emission levels unaffected by change in transmitter channel or modulation

### Measurement summary for limit1: FCC 15.207 Qp (Qp)

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV)	EUT Lead	DELTA1 FCC 15.207 Qp
163.43 kHz	44.03 Qp	0.0 / -0.25 / 0.0 / 0.0	43.78	L1	-21.5
337.37 kHz	37.39 Qp	0.01 / -0.25 / 0.0 / 0.0	37.15	L2	-22.12
190.84 kHz	40.07 Qp	0.0 / -0.25 / 0.0 / 0.0	39.82	L2	-24.18
553.24 kHz	19.43 Qp	0.01 / -0.24 / 0.0 / 0.0	19.2	L1	-36.8
1.047 MHz	17.17 Qp	0.02 / -0.24 / 0.0 / 0.0	16.95	L2	-39.05
13.698 MHz	19.71 Qp	0.26 / -0.07 / 0.0 / 0.0	19.9	L1	-40.1
7.638 MHz	19.67 Qp	0.14 / -0.15 / 0.0 / 0.0	19.66	L2	-40.34
2.469 MHz	13.15 Qp	0.05 / -0.22 / 0.0 / 0.0	12.98	L2	-43.02
5.139 MHz	13.89 Qp	0.1 / -0.18 / 0.0 / 0.0	13.8	L2	-46.2
24.243 MHz	9.87 Qp	0.45 / 0.05 / 0.0 / 0.0	10.37	L1	-49.63

### Measurement summary for limit2: FCC 15.207 Avg (Av)

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV)	EUT Lead	DELTA2 FCC 15.207 Avg
337.37 kHz	28.43 Av	0.01 / -0.25 / 0.0 / 0.0	28.19	L2	-21.08
163.43 kHz	29.49 Av	0.0 / -0.25 / 0.0 / 0.0	29.24	L1	-26.04
190.84 kHz	28.15 Av	0.0 / -0.25 / 0.0 / 0.0	27.9	L1	-26.1
13.698 MHz	15.11 Av	0.26 / -0.07 / 0.0 / 0.0	15.3	L1	-34.7
7.638 MHz	14.79 Av	0.14 / -0.15 / 0.0 / 0.0	14.78	L2	-35.22
553.24 kHz	9.69 Av	0.01 / -0.24 / 0.0 / 0.0	9.46	L1	-36.54
1.047 MHz	9.09 Av	0.02 / -0.24 / 0.0 / 0.0	8.87	L2	-37.13
5.139 MHz	8.77 Av	0.1 / -0.18 / 0.0 / 0.0	8.68	L2	-41.32
2.469 MHz	4.56 Av	0.05 / -0.22 / 0.0 / 0.0	4.39	L2	-41.61
24.243 MHz	4.56 Av	0.45 / 0.05 / 0.0 / 0.0	5.06	L1	-44.94

## Occupied bandwidth

### RSS-Gen 4.6.1

#### Test summary

The requirements are: ■ - MET □ - NOT MET

#### Test location

TÜV SÜD America Inc, Taylors Falls, Large Test Site (Open Area Test Site)

#### Test equipment

TUV ID	Model Number	Manufacturer	Description	Serial Number	Cal Date	Cal Due
WRLE03367	E4440A	Agilent	Spectrum Analyzer	MY42510439	10 Sep 14	10 Sep 15

#### Test limit

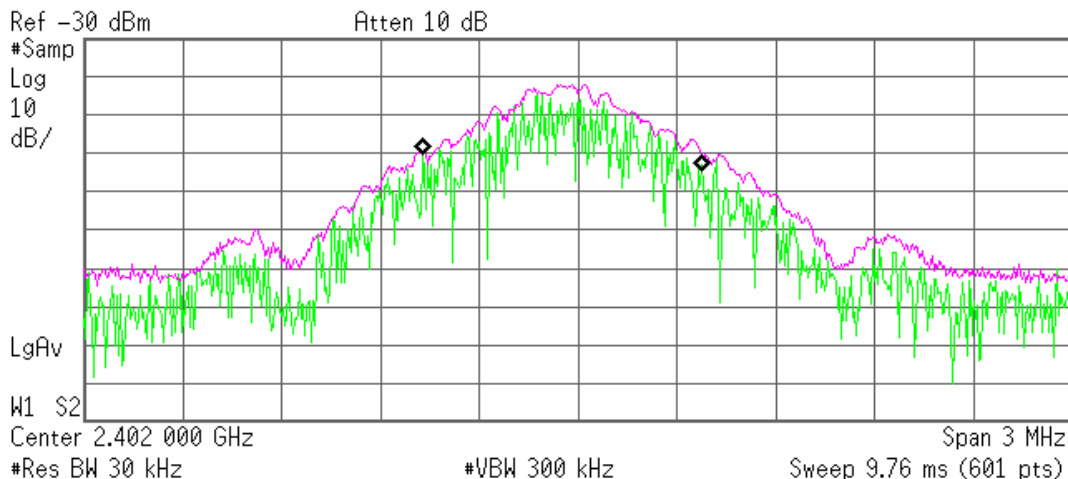
Not specified, maximum is 1.2369 MHz

#### Test data

GFSK, Low channel

✱ Agilent

R T



Occupied Bandwidth

843.1047 kHz

Occ BW % Pwr 99.00 %  
x dB -26.00 dB

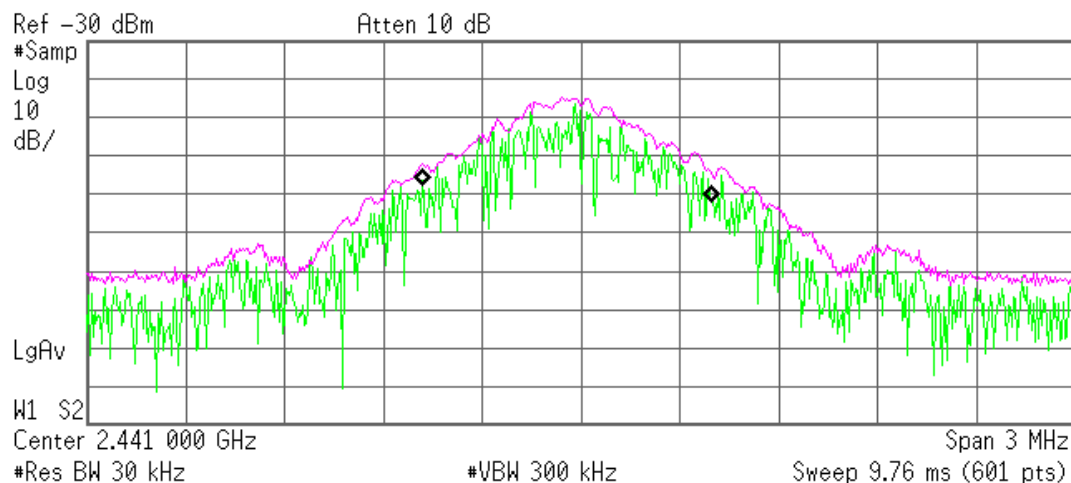
Transmit Freq Error -48.324 kHz  
x dB Bandwidth 1.096 MHz\*



# GFSK, Mid channel

Agilent

R T



**Occupied Bandwidth**  
874.3137 kHz

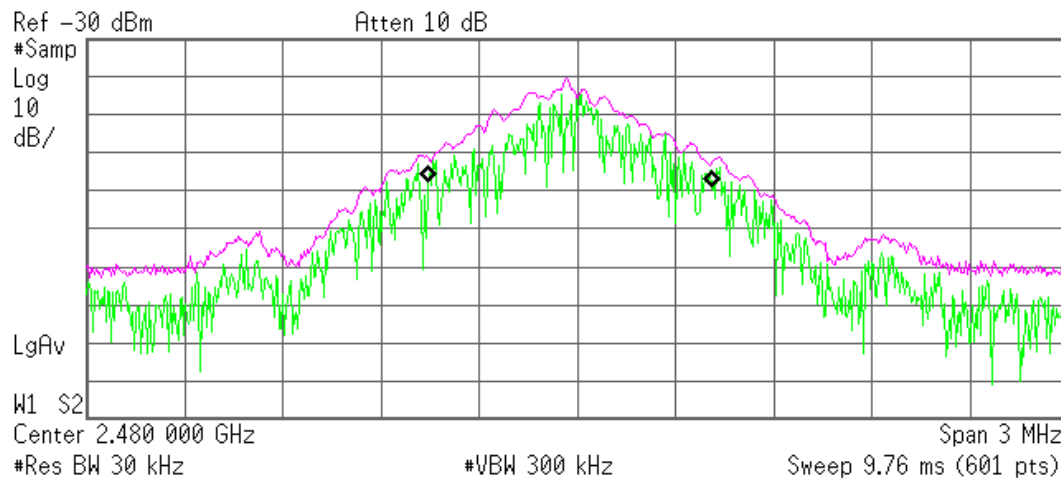
**Occ BW % Pwr** 99.00 %  
**x dB** -26.00 dB

**Transmit Freq Error** -41.345 kHz  
**x dB Bandwidth** 1.096 MHz\*

# GFSK, High channel

Agilent

R T



**Occupied Bandwidth**  
866.0751 kHz

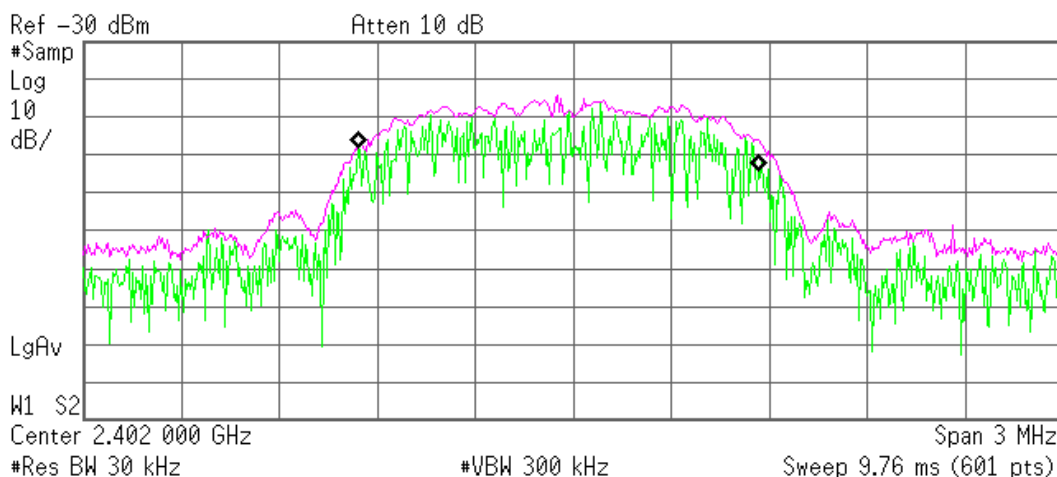
**Occ BW % Pwr** 99.00 %  
**x dB** -26.00 dB

**Transmit Freq Error** -20.929 kHz  
**x dB Bandwidth** 1.124 MHz\*

# 8DPSK, Low channel

Agilent

R T



Occupied Bandwidth

1.2260 MHz

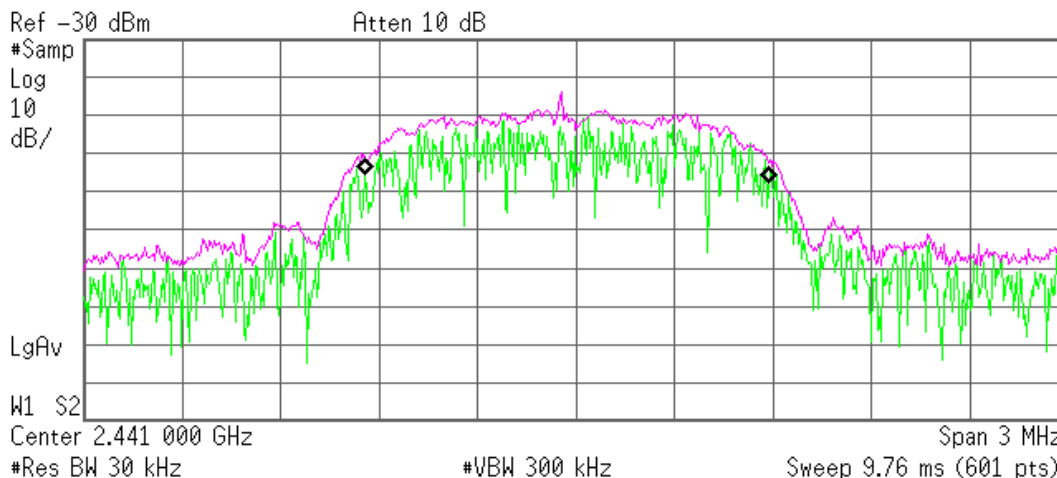
Occ BW % Pwr 99.00 %  
x dB -26.00 dB

Transmit Freq Error -45.829 kHz  
x dB Bandwidth 1.360 MHz\*

# 8DPSK, Mid channel

Agilent

R T



Occupied Bandwidth

1.2316 MHz

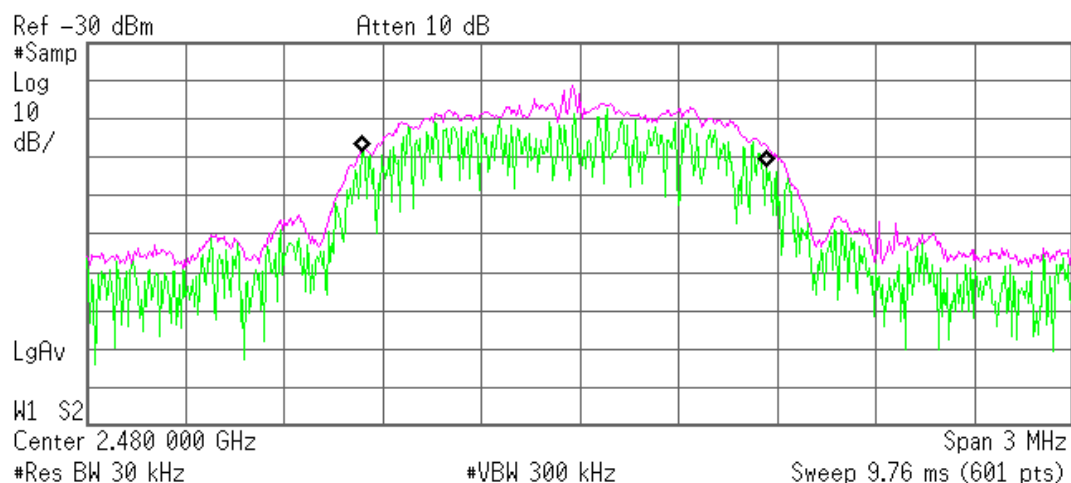
Occ BW % Pwr 99.00 %  
x dB -26.00 dB

Transmit Freq Error -28.922 kHz  
x dB Bandwidth 1.371 MHz\*

# 8DPSK, High channel

Agilent

R T



Occupied Bandwidth

1.2283 MHz

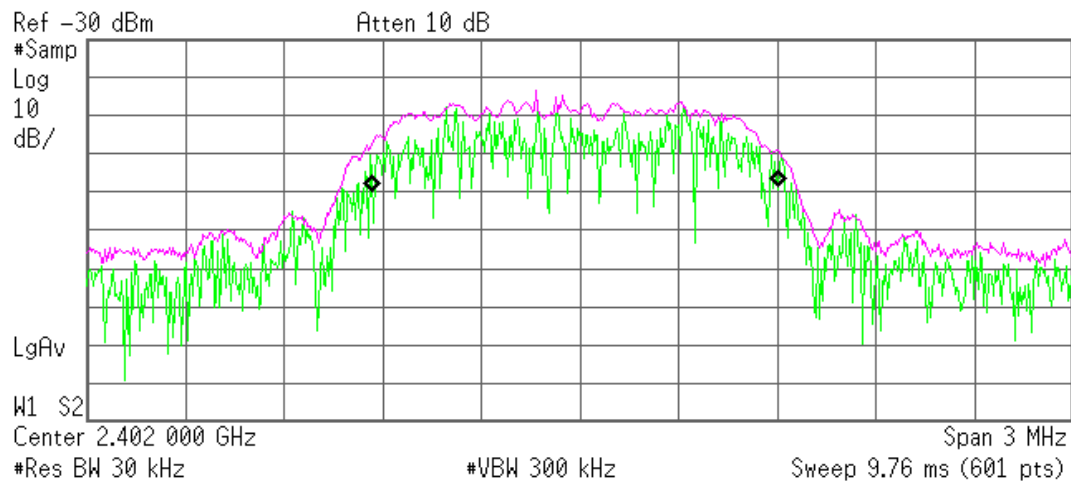
Occ BW % Pwr 99.00 %  
x dB -26.00 dB

Transmit Freq Error -49.234 kHz  
x dB Bandwidth 1.395 MHz\*

# $\pi/4$ -DQPSK, Low channel

Agilent

R T



Occupied Bandwidth

1.2369 MHz

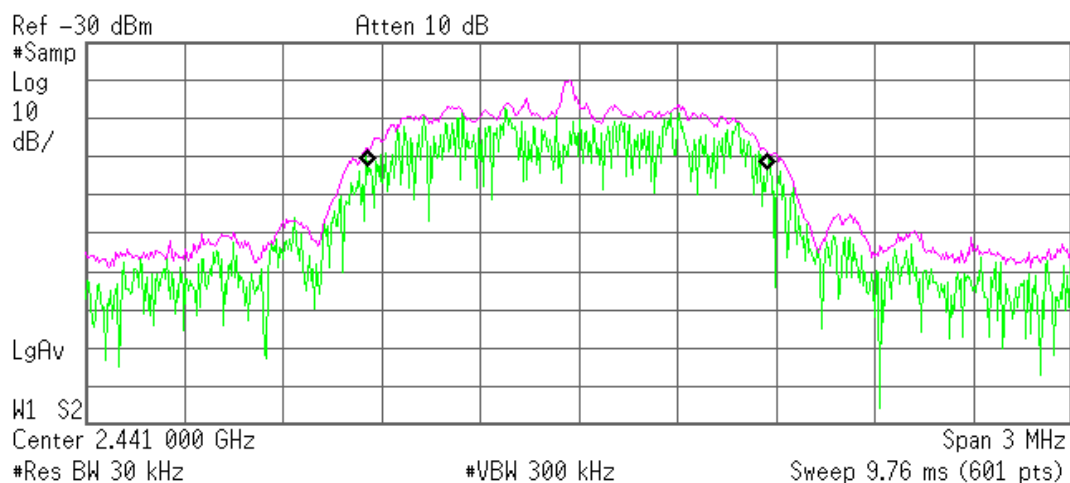
Occ BW % Pwr 99.00 %  
x dB -26.00 dB

Transmit Freq Error -14.674 kHz  
x dB Bandwidth 1.422 MHz\*

$\pi/4$ -DQPSK, Mid channel

 **Agilent**

R T



**Occupied Bandwidth**

1.2183 MHz

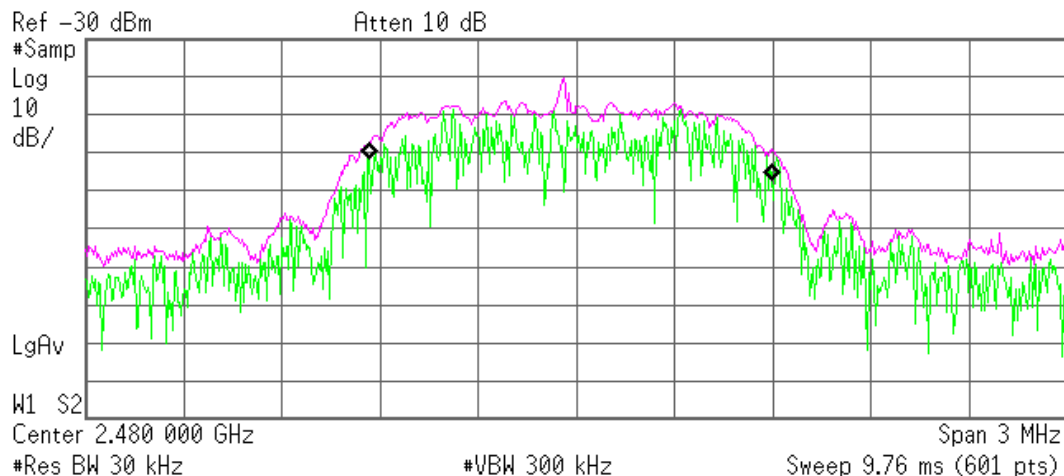
**Occ BW % Pwr** 99.00 %  
**x dB** -26.00 dB

**Transmit Freq Error** -37.539 kHz  
**x dB Bandwidth** 1.391 MHz\*

$\pi/4$ -DQPSK, High channel

 **Agilent**

R T



**Occupied Bandwidth**

1.2355 MHz

**Occ BW % Pwr** 99.00 %  
**x dB** -26.00 dB

**Transmit Freq Error** -17.134 kHz  
**x dB Bandwidth** 1.406 MHz\*

## Field Strength Limits for Fundamental and Harmonics

FCC §15.249(a), IC RSS-210 A2.9(a)

### Test summary

The requirements are: ■ - MET □ - NOT MET

Testing was performed in accordance with the test procedure of ANSI C63.4 2009, clause 8.3

No unwanted emissions exceed the level of the fundamental.

### Test location

TÜV SÜD America Inc, Millville Test Site (Open Area Test Site)

TÜV SÜD America Inc, Taylors Falls, Large Test Site (Open Area Test Site)

### Test distance

0.3 meters (18-25 GHz)

3 meters

### Test equipment

TUV ID	Model	Manufacturer	Description	Serial	Cal Date	Cal Due
OWLE02074	3115	Electro-Mechanics (EMCO)	Ridge Guide Antenna	2504	20-Mar-14	20-Mar-15
WRLE03958	SL18B4020	Phase One Microwave	Preamplifier 1 – 18 GHz	0002	Code B 21-Jan-14	Code B 21-Jan-15
NBLE03196	8566B	Hewlett-Packard	Spectrum Analyzer	2240A01856	31-Jan-14	31-Jan-15
NBLE03195	85662A	Hewlett-Packard	Analyzer Display	2648A13518	31-Jan-14	31-Jan-15
NBLE03367	E4440A	Agilent	Spectrum Analyzer	MY42510439	10-Sep-14	10-Sep-15
WRLE03978	SL26-3010	Phase One Microwave	Amplifier 18-26.5 GHz	0005	Code B 21-Jan-14	Code B 21-Jan-15
WRLE06717	3116	EMCO	Ridge Guide Ant 18-40 GHz	2005	31-Jul-14	31-Jul-15

Cal Code B = Calibration verification performed internally.

### Test limit

Fundamental frequency (MHz)	Field strength of fundamental (mV/m)	Field strength of fundamental (dBμV/m)	Field strength of harmonics (μV/m)	Field strength of harmonics (dBμV/m)
2400-2483.5	50	94	500	54

Field strength limits are specified at a distance of 3 meters, based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

Radiated emissions from the EUT are measured in the frequency range of 30 to 1000 MHz using a spectrum analyzer and appropriate broadband linearly polarized antennas. Measurements between 30 MHz and 1000 MHz are made with a 120 kHz / 6 dB bandwidth and quasi-peak detection and measurements above 1000 MHz are made with a 1 MHz RBW/VBW / 6 dB bandwidth and peak detection, 1 MHz RBW / 10 Hz VBW for average detection. Table top equipment is placed on a non-conductive support 80 cm above the ground plane. Interface cables that are closer than 40 centimeters to the ground plane are bundled in the center in a serpentine fashion so they are at least 40 centimeters from the ground plane. Cables to simulators/testers (if used in this test) are routed through the center of the table and to a screen room located outside the test area. The antenna is positioned 3, 10 or 30 meters horizontally from the EUT. To locate maximum emissions from the test sample the antenna is varied in height from 1 to 4 meters, measurement scans are made with both horizontal and vertical antenna polarizations and the EUT is rotated 360 degrees. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB / decade (inverse linear-distance for field strength measurements).

### Test Data

See next page

**fundamental carrier** Low, mid and high channels

**Measurement summary for limit1: FCC 15.249 Fundamental 3m avg**

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC 15.249 Fundamental 3m av (dB)
2.441 GHz	77.1 Pk	5.92 / 28.41 / 48.82 / 0.0	62.6	H / 1.00 / 316	-31.4*
2.402 GHz	78.5 Pk	5.81 / 28.21 / 48.87 / 0.0	63.64	H / 1.00 / 319	-30.36*
2.48 GHz	77.6 Pk	6.03 / 28.6 / 48.77 / 0.0	63.46	H / 1.00 / 319	-30.54*

\* Peak level vs. average limit

**Measurement summary for limit2: FCC 15.249 Fundamental 3m pk**

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA2 FCC 15.249 Fundamental 3m pk (dB)
2.402 GHz	78.5 Pk	5.81 / 28.21 / 48.87 / 0.0	63.64	H / 1.00 / 319	-50.36
2.48 GHz	77.6 Pk	6.03 / 28.6 / 48.77 / 0.0	63.46	H / 1.00 / 319	-50.54
2.441 GHz	77.1 Pk	5.92 / 28.41 / 48.82 / 0.0	62.6	H / 1.00 / 316	-51.4

**Test Data, harmonics**

Low, mid and high channels

**Measurement summary for limit1: FCC 15.249 harmonics 3m avg**

FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA1 FCC 15.249 harmonics 3m av (dB)
7.44 GHz	55.29 Av	13.76 / 36.59 / 45.85 / -30.7	29.09	V / 1.00 / 195	-24.91
7.323 GHz	53.15 Av	13.72 / 36.45 / 45.84 / -30.7	26.78	V / 1.20 / 326	-27.22
7.206 GHz	51.83 Av	13.67 / 36.09 / 45.82 / -30.7	25.06	V / 1.21 / 352	-28.94
4.96 GHz	55.74 Av	9.69 / 32.94 / 45.8 / -30.7	21.87	V / 1.00 / 160	-32.13
4.882 GHz	51.58 Av	9.55 / 32.78 / 45.91 / -30.7	17.3	V / 1.02 / 208	-36.7
4.804 GHz	50.64 Av	9.41 / 32.68 / 46.01 / -30.7	16.01	V / 1.02 / 190	-37.99
4.808 GHz	50.0 Av	9.41 / 32.68 / 46.01 / -30.7	15.39	V / 1.00 / 190	-38.61

The dwell time per channel of the hopping signals are less than 100 ms

Longest dwell time, per any given channel, using DH1, DH3, or DH5 is 2.89 mS

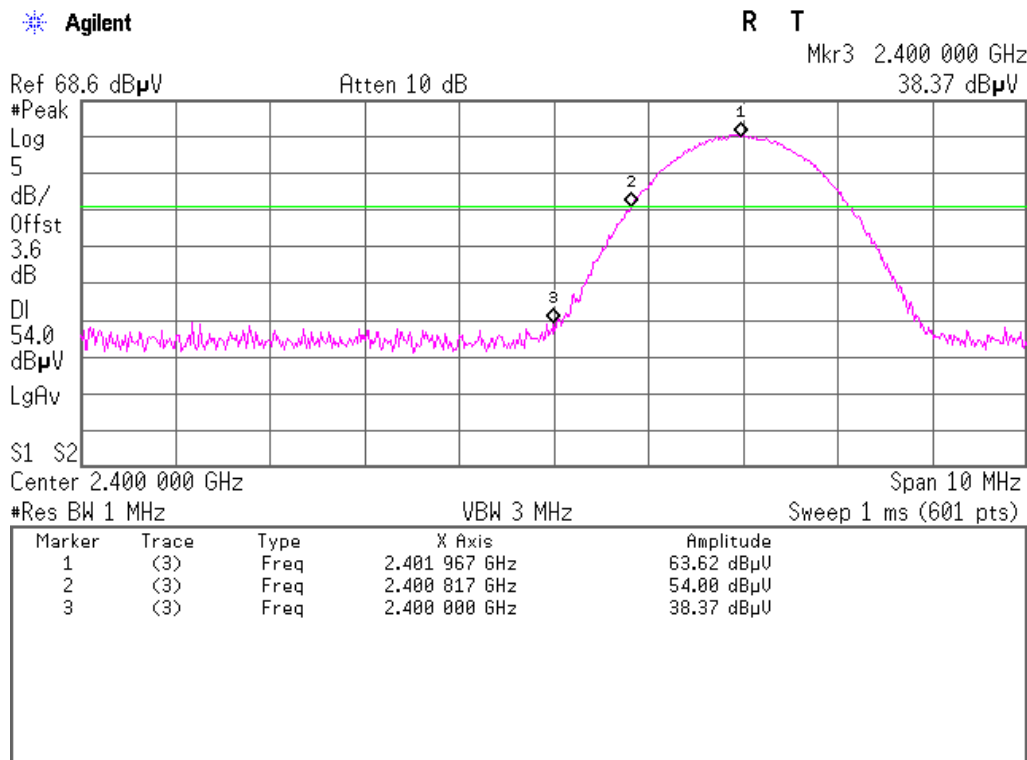
Average levels corrected by 20 x log(2.89/100) or -30.7 dB

**Measurement summary for limit2: FCC 15.249 harmonics 3m pk**

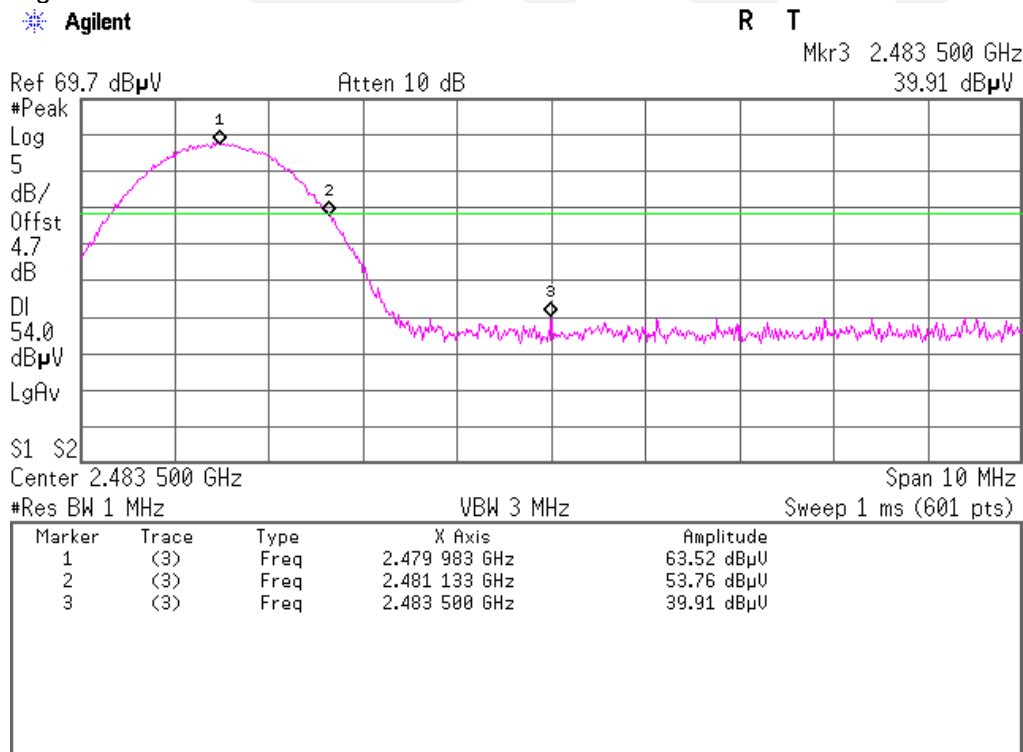
FREQ	LEVEL (dBuV)	CABLE / ANT / PREAMP / ATTEN (dB)	FINAL (dBuV / m)	POL / HGT / AZ (m)(DEG)	DELTA2 FCC 15.249 harmonics 3m pk (dB)
7.44 GHz	59.1 Pk	13.76 / 36.59 / 45.85 / 0.0	63.6	V / 1.00 / 195	-10.4
7.323 GHz	56.95 Pk	13.72 / 36.45 / 45.84 / 0.0	61.28	V / 1.20 / 326	-12.72
7.206 GHz	56.2 Pk	13.67 / 36.09 / 45.82 / 0.0	60.13	V / 1.21 / 352	-13.87
4.96 GHz	58.9 Pk	9.69 / 32.94 / 45.8 / 0.0	55.73	V / 1.00 / 160	-18.27
4.882 GHz	55.7 Pk	9.55 / 32.78 / 45.91 / 0.0	52.12	V / 1.02 / 208	-21.88
4.804 GHz	54.95 Pk	9.41 / 32.68 / 46.01 / 0.0	51.02	V / 1.02 / 190	-22.98
4.808 GHz	53.65 Pk	9.41 / 32.68 / 46.01 / 0.0	49.74	V / 1.00 / 190	-24.26

Bandedge levels measured with 8DPSK modulation (highest fundamental level). Peak level vs. average limit  
With the analyzer offset compensating for a near field measurement instead of OATS, the Y scale = dB $\mu$ V/m at 3m

#### Low channel



#### High channel



## Spurious Radiated Emission

### FCC §15.249(d). RSS-210 A2.9(b)

#### Test summary

The requirements are: ■ - MET □ - NOT MET

Testing was performed in accordance with the test procedure of ANSI C63.4 2009, clause 8.3

#### Test location

TÜV SÜD America Inc, Millville Test Site (Open Area Test Site)

TÜV SÜD America Inc, Taylors Falls, Large Test Site (Open Area Test Site)

#### Test distance

0.3 meters (18-25 GHz)

3 meters

#### Test equipment

TUV ID	Model	Manufacturer	Description	Serial	Cal Date	Cal Due
WRLE03995	EM-6917B	Electro-Metrics	Biconicalog Periodic	151	07-Jul-14	07-Jul-15
OWLE02671	8447D	Hewlett-Packard	Preamplifier	2648A04942	Code B 24-Feb-14	Code B 24-Feb-15
OWLE02074	3115	Electro-Mechanics (EMCO)	Ridge Guide Antenna	2504	20-Mar-14	20-Mar-15
WRLE03958	SL18B4020	Phase One Microwave	Preamplifier 1 – 18 GHz	0002	Code B 21-Jan-14	Code B 21-Jan-15
NBLE03196	8566B	Hewlett-Packard	Spectrum Analyzer	2240A01856	31-Jan-14	31-Jan-15
NBLE03195	85662A	Hewlett-Packard	Analyzer Display	2648A13518	31-Jan-14	31-Jan-15
WRLE02684	85650A	Hewlett-Packard	Quasi-Peak Adapter	2521A01006	06-Aug-14	06-Aug-15
NBLE03367	E4440A	Agilent	Spectrum Analyzer	MY42510439	10-Sep-14	10-Sep-15
WRLE03978	SL26-3010	Phase One Microwave	Amplifier 18-26.5 GHz	0005	Code B 21-Jan-14	Code B 21-Jan-15
WRLE06717	3116	EMCO	Ridge Guide Ant 18-40 GHz	2005	31-Jul-14	31-Jul-15

Cal Code B = Calibration verification performed internally.

#### Test Limit per §15.209

Frequency (MHz)	Field strength (μV/m)	Field strength (dBμV/m)	Measurement distance (m)
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

The emission limits shown above are based on measurements employing a CISPR quasi-peak detector except above 1000 MHz. Radiated emission limits in this band are based on measurements employing an average detector. There also is a limit on the peak level, 20 dB above the maximum permitted average emission limit.

#### Test Data

Scanned 30 – 25000 MHz, all modulations, low, mid, and high channels

No significant spurious emissions detected

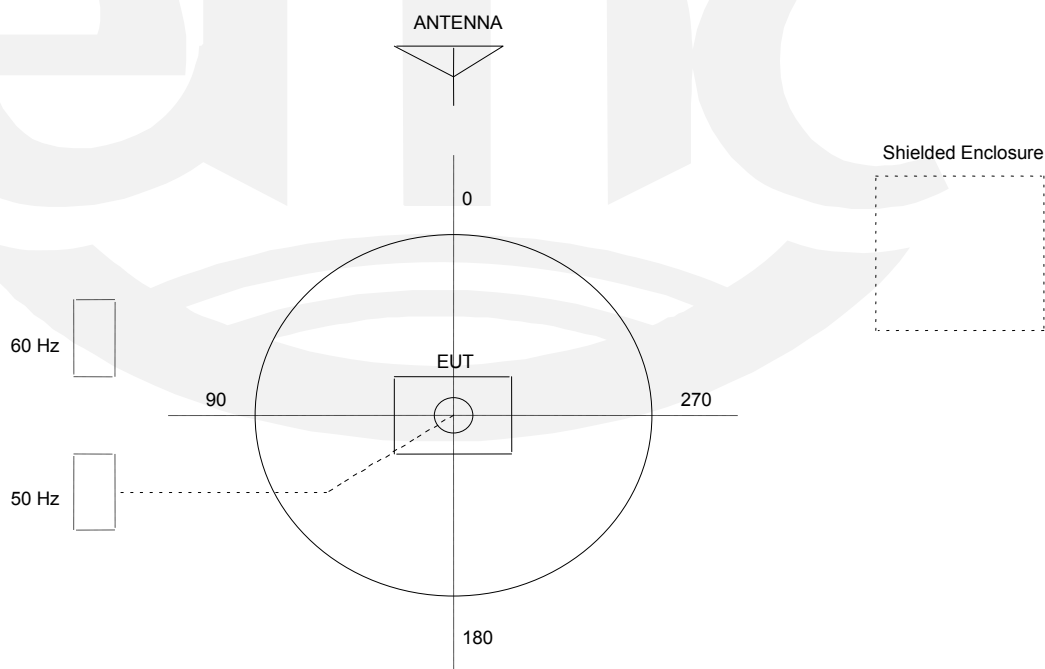


## TEST SETUP FOR EMISSIONS TESTING

TÜV SÜD America Inc, Taylors Falls  
Large Test Site

### Notes:

1. Items shown in dotted lines are located on the floor below the test area. It is 5 meters vertically from the ground floor to the test area.
2. 50 Hz and 60 Hz are power panels for alternating current.
3. The antenna may be positioned horizontally 3 and 10 meters from the center of the turntable.
4. The circle is either a 6.7 meter or 1.2 meter diameter turntable.
5. A ground plane is in the plane of this sheet.
6. The test sample is shown in the azimuthal position representing zero degrees.

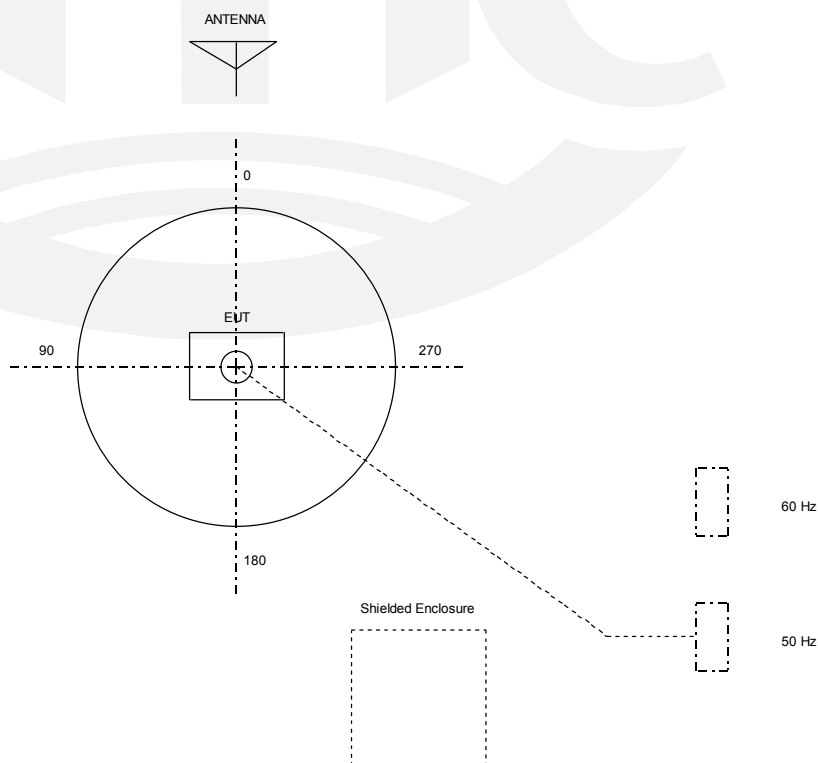


## TEST SETUP FOR EMISSIONS TESTING

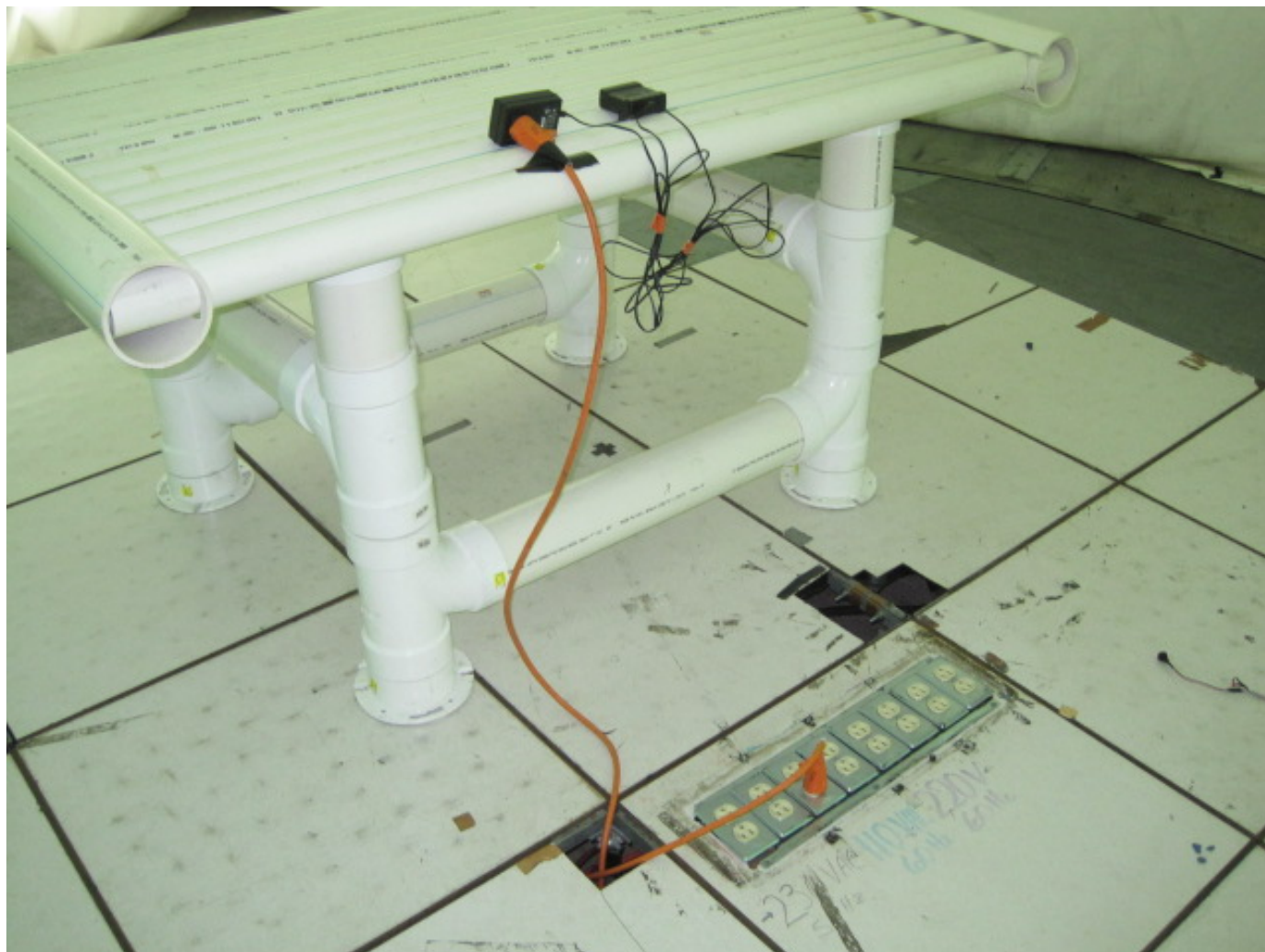
TÜV SÜD America Inc  
Millville Test Site

### Notes:

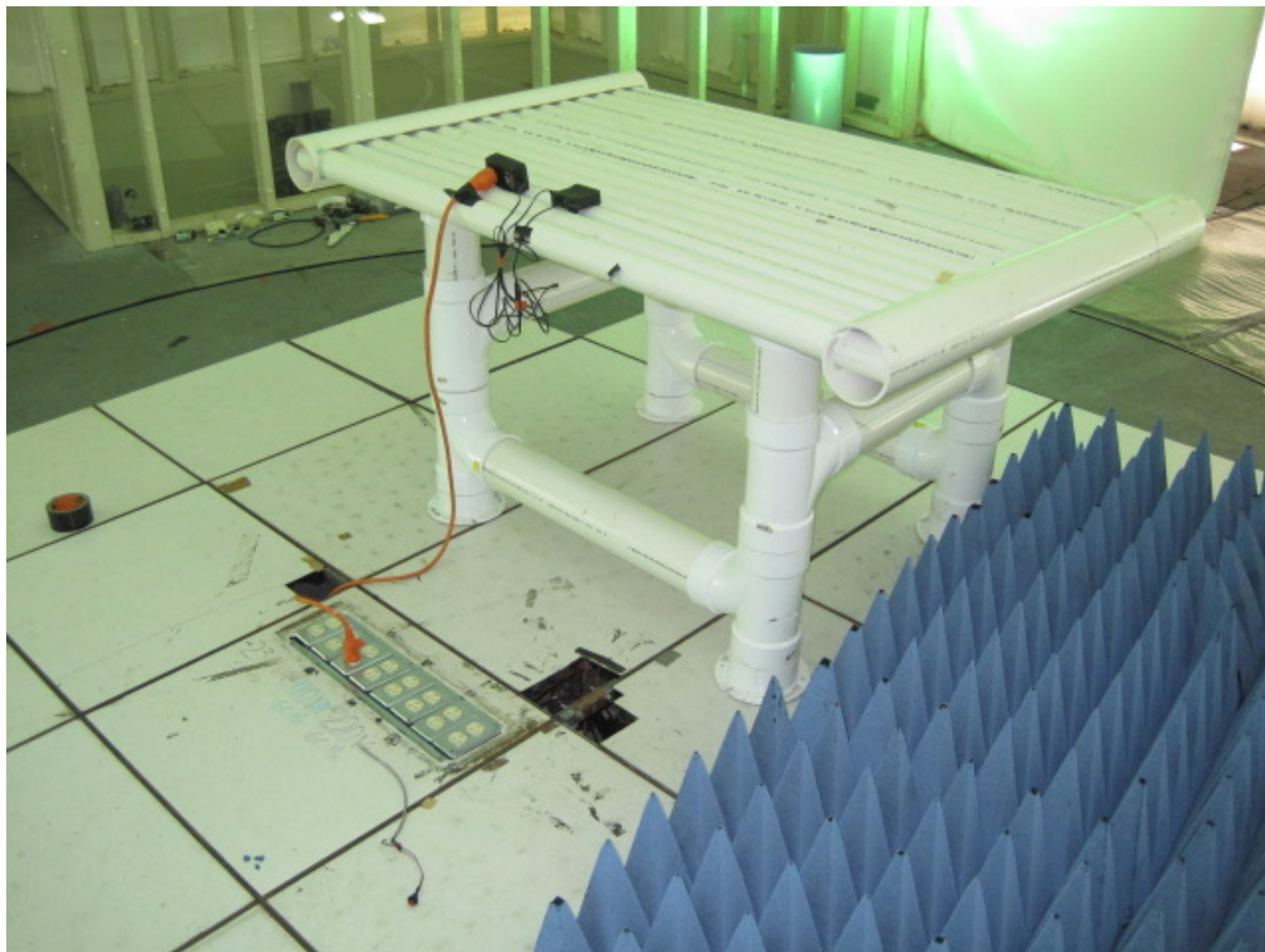
1. Items shown in dotted lines are located on the floor below the test area. It is 5 meters vertically from the ground floor to test area.
2. 50 Hz and 60 Hz are power panels for alternating current.
3. The antenna may be positioned horizontally 3 or 10 meters from the center of the turntable.
4. The circle is a 6.7 meter diameter turntable.
5. A ground plane is in the plane of this sheet.
6. The test sample is shown in the azimuthal position representing zero degrees.



Test-setup photo(s): Radiated emissions 30-1000 MHz

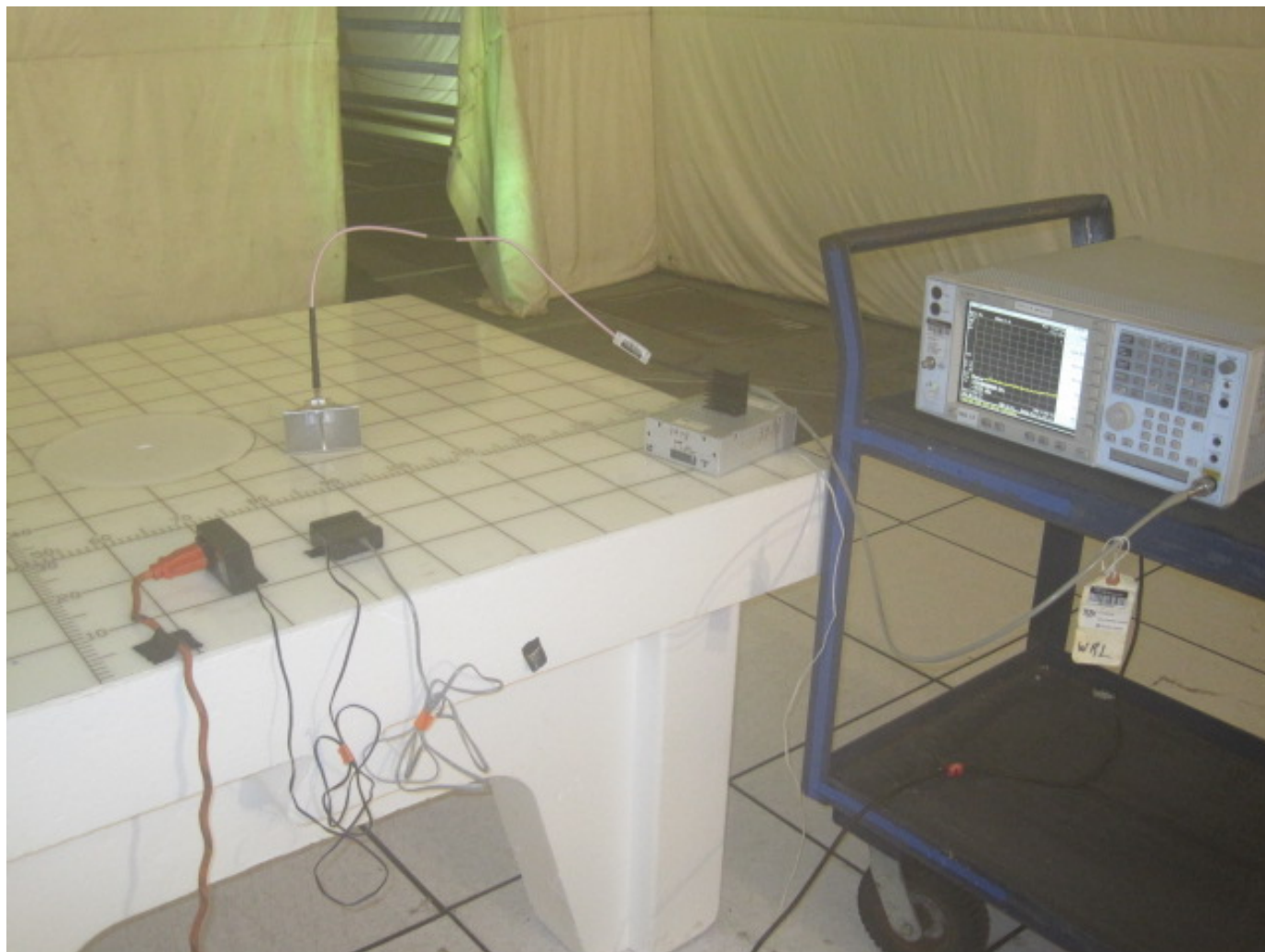


Test-setup photo(s): Radiated emissions above 1 GHz





Test-setup photo(s): Radiated emissions 18 - 25 GHz



Test-setup photo(s): Conducted limits



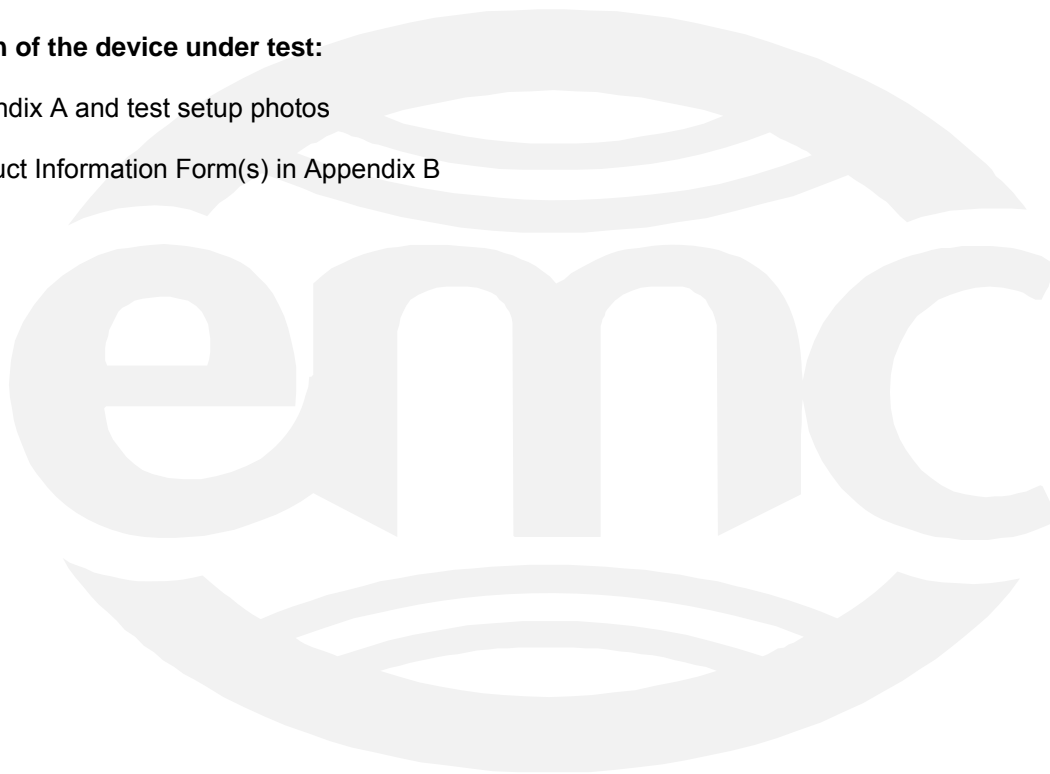
## Equipment Under Test (EUT) Test Operation Mode:

The device under test was operated under the following conditions during testing:

- ☐ - Standby
- ☐ - Test program (customer specific).
- ☐ - Normal operating mode
- ☒ - Test firmware was loaded to the EUT which enables cycling of low, mid, and high channels, 100% duty cycle (modulated) as well as normal hopping operation.

## Configuration of the device under test:

- ☒ - See Appendix A and test setup photos
- ☐ - See Product Information Form(s) in Appendix B



## DEVIATIONS FROM STANDARD:

None.

## GENERAL REMARKS:

None

### Modifications required to pass:

- ☒ None
- ☐ As indicated on the data sheet(s)

### Test Specification Deviations: Additions to or Exclusions from:

- ☒ None
- ☐ As indicated in the Test Plan

## SUMMARY:

The requirements according to the technical regulations are

- ☒ - met and the device under test does fulfill the general approval requirements.
- ☐ - **not** met and the device under test does **not** fulfill the general approval requirements..

EUT Received Date: 2 June 2014  
Condition of EUT: Normal  
Testing Start Date: 2 June 2014  
Testing End Date: 31 October 2014

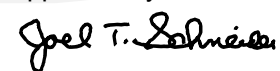
## TÜV SÜD AMERICA INC

Tested by:



Greg S Jakubowski  
EMC Test Engineer

Approved by:



Joel T Schneider  
Senior EMC Engineer



## Appendix A

### Constructional Data Form



## Form



### EMC Test Plan and Constructional Data Form

PLEASE COMPLETE THIS DOCUMENT IN FULL, ENTERING N/A IF THE FIELD IS NOT APPLICABLE. IF TESTING RESULTS IN MODIFICATIONS TO THE EQUIPMENT, PLEASE SUBMIT A REVISED TP/CDF INDICATING THOSE MODIFICATIONS.  
**NOTE: This information will be input into your test report as shown below. Press the F1 key at any time to get HELP for the current field selected.**

Company: APG CASH DRAWER  
Address: 5250 INDUSTRIAL BLVD NE  
MINNEAPOLIS, MN 55421  
Contact: PATRICK VUE Position: ELECTRICAL ENGINEER  
Phone: 763-571-9779 X158 Fax: 763-571-5771  
E-mail Address: pvue@apgcd.com

#### General Equipment Description -- NOTE: This information will be input into your test report as shown below.

EUT Description BlueTooth cash drawer interface  
EUT Name 510 BluePRO  
Model No.: 510 Serial No.: \_\_\_\_\_  
Product Options: \_\_\_\_\_  
Configurations to be tested: \_\_\_\_\_

#### Equipment Modification (If applicable, indicate modifications since EUT was last tested. If modifications are made during this testing, submit revised TP/CDF after testing is complete.)

Modifications since last test: \_\_\_\_\_  
Modifications made during test: \_\_\_\_\_

#### Test Objective(s): Please indicate the tests to be performed, entering the applicable standard(s) where noted.

- |   |   |
|---|---|
| <input type="checkbox"/> EMC Directive 2004/108/EC (EMC)<br>Std: _____  | <input type="checkbox"/> FCC: Class <input checked="" type="checkbox"/> A <input type="checkbox"/> B Part _____ |
| <input type="checkbox"/> Machinery Directive 89/392/EEC (EMC)<br>Std: _____   | <input type="checkbox"/> VCCI: Class <input type="checkbox"/> A <input type="checkbox"/> B                      |
| <input type="checkbox"/> Medical Device Directive 93/42/EEC (EMC)<br>Std: _____                                     | <input type="checkbox"/> BSMI: Class <input type="checkbox"/> A <input type="checkbox"/> B (Separate Report)    |
| <input type="checkbox"/> Vehicle Directive - 2004/104/EC (EMC)<br><input type="checkbox"/> Other Vehicle Std: _____ | <input type="checkbox"/> Canada: Class <input checked="" type="checkbox"/> A <input type="checkbox"/> B         |
| <input type="checkbox"/> FDA Reviewers Guidance for Premarket Notification Submissions (EMC)                        | <input type="checkbox"/> Australia: Class <input type="checkbox"/> A <input type="checkbox"/> B                 |
|   | <input type="checkbox"/> Other: _____   |
|   | <input type="checkbox"/> Ag Directive *2009/64/EC (EMC)   |

#### Third Party Certification (contact TÜV for quote), if applicable (\*Signature on last page required).

- |  |  |
|--|--|
| <input type="checkbox"/> Attestation of Compliance (AoC)*  | <input type="checkbox"/> EMC Certification (used with Octagon Mark)* |
| <input type="checkbox"/> Statement of Compliance (SoC, previously CoC)* - All aspects of the essential requirements were assessed  |  |
| Protection Class (Req'd for AoC, SoC, EMC Cert. N/A for vehicles) <input type="checkbox"/> Class I <input type="checkbox"/> Class II <input type="checkbox"/> Class III<br>(Press F1 when field is selected to show additional information on Protection Class.) |  |
| <input type="checkbox"/> FCC / TCB Certification   | <input type="checkbox"/> Taiwan Certification                        |
| <input type="checkbox"/> Industry Canada / FCB Certification   | <input type="checkbox"/> Korean Certification                        |
| <input type="checkbox"/> e-Mark Certification  |  |

## Form



### EMC Test Plan and Constructional Data Form

#### Attendance

Test will be: ☒ Attended by the customer ☐ Unattended by the customer

#### Failure - Complete this section if testing will not be attended by the customer.

If a failure occurs, TÜV SÜD America should:

- ☐ Call contact listed above, if not available then stop testing. (After hrs phone): \_\_\_\_\_
- ☐ Continue testing to complete test series.
- ☐ Continue testing to define corrective action.
- ☐ Stop testing.

#### EUT Specifications and Requirements

Length: 2.6IN Width: 2.4IN Height: 1IN Weight: 44GRAMS

#### Power Requirements

*Regulations require testing to be performed at typical power ratings in the countries of intended use. (i.e., European power is typically 230 VAC 50 Hz or 400 VAC 50 Hz, single and three phase, respectively)*

Voltage: 120/240VAC (If battery powered, make sure battery life is sufficient to complete testing.)

# of Phases: SINGLE

Current (Amps/phase(max)): 0.8AMP Current (Amps/phase(nominal)): \_\_\_\_\_

Other \_\_\_\_\_

#### Other Special Requirements

#### Typical Installation and/or Operating Environment

(ie. Hospital, Small Business, Industrial/Factory, etc.)  
Restaurants, Retails Stores

#### EUT Power Cable

☐ Permanent OR ☒ Removable Length (in meters): 5FT  
☐ Shielded OR ☒ Unshielded  
☐ Not Applicable

# Form



## EMC Test Plan and Constructional Data Form

EUT Interface Ports and Cables														
Type	Analog	Digital	During Test		Qty	Shielding		Termination	Connector Type	Port Termination	Length tested (in meters)	Removable Permanent		
			Active	Passive		Yes	No					Type	Removable	Permanent
<b>EXAMPLE:</b> RS232	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	2	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Foil over braid	Coaxial	Metallized 9-pin D-Sub	Characteristic Impedance	6	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>

## Form



### EMC Test Plan and Constructional Data Form

#### EUT Software.

Revision Level: 1

Description: Test program sends a signal from PC to BluePRO 510 interface every 5 seconds to trigger BluePRO 510 interface to send a 24VDC pulse to open the cash drawer

**Equipment Under Test (EUT) Operating Modes to be Tested --** list the operating modes to be used during test. It is recommended the equipment be tested while operating in a typical operation mode. FCC testing of personal computers and/or peripherals requires that a simple program generate a complete line of upper case H's. Provide a general description of all software, firmware, and PLD algorithms used in the equipment. List all code modules as described above, with the revision level used during testing. Consult with your TÜV Product Service Representative if additional assistance is required.

1.

2.

3.

**Equipment Under Test (EUT) System Components --** List and describe all components which are part of the EUT. For FCC & Taiwan testing a minimum configuration is required. (ie. Mouse, Printer, Monitor, External Disk Drive, Motherboard, etc)

Description	Model #	Serial #	FCC ID #

# Form



## EMC Test Plan and Constructional Data Form

**Support Equipment** -- List and describe all support equipment which is not part of the EUT. (i.e. peripherals, simulators, etc)  
This information is required for FCC & Taiwan testing.

Description	Model #	Serial #	FCC ID #
HP LAPTOP PROBOOK	4540s	2CE3470VDV	
CASH DRAWER	VB320-BL1416	06075312130684	N/A

### Oscillator Frequencies

Manufacturer	Frequency	Derived Frequency	Component # / Location	Description of Use
NDK	26MHz		XTAL1	External Clock for Microcontroller Chip
ABRACON	32.768KHZ		XTAL2	External Clock for Bluetooth Chip

### Power Supply

Manufacturer	Model #	Serial #	Type
AMIGO	AMS4-2401000FU		<input checked="" type="checkbox"/> Switched-mode: (Frequency) _____ <input type="checkbox"/> Linear <input type="checkbox"/> Other: _____
			<input type="checkbox"/> Switched-mode: (Frequency) _____ <input type="checkbox"/> Linear <input type="checkbox"/> Other: _____

### Power Line Filters

Manufacturer	Model #	Location in EUT

## Form



### EMC Test Plan and Constructional Data Form

#### Critical EMI Components (Capacitors, ferrites, etc.)

Description	Manufacturer	Part # or Value	Qty	Component # / Location

**EMC Critical Detail --** Describe other EMC Design details used to reduce high frequency noise.

PLEASE ENTER NAMES BELOW (INSERT ELECTRONIC SIGNATURE IF POSSIBLE)

#### Authorization (Signature Required if a Third Party Certification is checked on pg 1)

Patrick Vue

3/12/2014

Customer authorization to perform tests  
according to this test plan.

Date

Patrick Vue

3/12/2014

Test Plan/CDF Prepared By (please print)

Date