TEST REPORT

Report Number: HK10120315-1

Application
for
Original Grant of 47 CFR Part 15 Certification

433.92MHz Superheterodyne Receiver - A Doorbell and/or Telephone Ringer Amplifier

FCC ID: RUM-AC20R

Prepared and Checked by:	Approved by:
Koo Wai Ip	Nip Ming Fung, Melvin
Lead Engineer	Supervisor
March 18, 2011	March 18, 2011

Intertek Testing Services Hong Kong Ltd.
2/F., Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong.
Tel: (852) 2173 8888 Fax: (852) 2785 5487 Website: www.hk.intertek-etlsemko.com

GENERAL INFORMATION

Applicant Name:	Geemarc Telecom International Ltd
Applicant Address:	1902 Mass Mutual Tower, 38 Gloucester Road, Wan Chai, Hong Kong.
FCC Specification Standard:	FCC Part 15, October 1, 2009 Edition
FCC ID:	RUM-AC20R
FCC Model(s):	AMPLICALL 20, AMPLICALL 16, AMPLICALL 15, CH-105, CH-215, CH-315, CH-415
Type of EUT:	Superheterodyne Receiver
Description of EUT:	433.92MHz Superheterodyne Receiver - A Doorbell and/or Telephone Ringer Amplifier
Serial Number:	N/A
Sample Receipt Date:	December 09, 2010
Date of Test:	December 22, 2010-March 03, 2011
Report Date:	March 18, 2011
Environmental Conditions:	Temperature: +10 to 40°C Humidity: 10 to 90%

Table of Contents

EXHIBIT 1
TEST RESULTS SUMMARY & STATEMENT OF COMPLIANCE

1.0 Test Results Summary & Statement of Compliance

1.1 Summary of Test Results

Test Items	FCC Part 15 Section	Results	Details see section
Radiated Emission	15.109	Pass	4.2
AC Power Line Conducted Emission	15.107	Pass	4.3

1.2 Statement of Compliance

The equipment under test is found to be complying with the following standard:

FCC Part 15, October 1, 2009 Edition

EXHIBIT 2
GENERAL DESCRIPTION

2.0 General Description

2.1 Product Description

The tested model: AMPLICALL 16 is a Cordless Doorbell Amplifier. It operates at 433.92MHz. EUT is powered by a 100-240VAC to 7.5VDC 600mA AC adaptor and/or 4 x “AA” size 1.5 VDC batteries.

The tested model: AMPLICALL 20 is a Doorbell and Telephone Ringer Amplifier with shaker jack and two RJ11 telephone jacks. It operates at 433.92MHz. EUT is powered by a 100-240VAC to 7.5VDC 600mA AC adaptor and/or 4 x “AA” size 1.5VDC batteries.

The model: AMPLICALL 16 and AMPLICALL 20 are same in RF Module, electronics/electrical designs, and PCB layout. The only differences are: AMPLICALL 16 removes the operation mode (LED/Sound/Ring) switch, ring-tone switch, shaker jack, two RJ11 telephone jacks and the components for the corresponding function.

The models: AMPLICALL 15, CH-105, CH-215, CH315, and CH-415 are same with the tested model: AMPLICALL 16 in electronics/electrical designs, including software & firmware, Construction design/Physical design/Enclosure and PCB layout. The differences are trade name, model number and package configuration for marketing purpose.

The circuit description is attached in the Appendix and saved with filename: descri.pdf.

Connection between the device and the telephone network is accomplished through the use of USOC RJ11C in the 2-wire loop calling central office line.

2.2 Test Methodology

Both AC power line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.4 (2003). Preliminary radiated scans and all radiated measurements were performed in Open Area Test Sites. All Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "**Justification Section**" of this Application.

2.3 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data and conducted data are at Roof Top and 2nd Floor respectively of Intertek Testing Services Hong Kong Ltd., which is located at Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong. This test facility and site measurement data have been fully placed on file with the FCC.

EXHIBIT 3
SYSTEM TEST CONFIGURATION

3.0 System Test Configuration

3.1 Justification

For radiated emissions testing, the equipment under test (EUT) was setup to receive continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, all cables (if any) were manipulated to produce worst case emissions.

The EUT was powered by a 100-240VAC to 7.5VDC 600mA adaptor and/or 4x “AA” size 1.5VDC batteries.

For the measurements, the EUT was attached to a plastic stand if necessary and placed on the wooden turntable. If the EUT attached to peripherals, they were connected and operational to simulate typical use.

The signal was maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization were varied during the search for maximum signal level. The antenna height was varied from 1 to 4 meters. Radiated emissions were taken at three meters unless the signal level was too low for measurement at that distance. If necessary, a pre-amplifier was used and/or the test was conducted at a closer distance.

A typical signal or an unmodulated CW signal at the operating frequency of the EUT has been supplied to the EUT for all measurements. Such a signal is supplied by a signal generator and an antenna in close proximity to the EUT. The signal level is sufficient to stabilize the local oscillator of the EUT.

For receiver radiated measurement, the spectrum analyzer resolution bandwidth was 1MHz for measurement above 1GHz while 100kHz for measurement from 30MHz to 1GHz.

Radiated emission measurement for receiver was performed form 30MHz to 2GHz.

Emission that are directly caused by digital circuits in the transmit path and transmitter portion were measured, and the limit are according to FCC Part 15 Section 15.109.

3.1 Justification - Cont'd

Detector function for radiated emissions is in peak mode.

For AC line conducted emission test, the EUT along with its peripherals were placed on a 1.0m(W)x1.5m(L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane. The EUT was connected to power mains through a line impedance stabilization network (LISN), which provided 50ohm coupling impedance for measuring instrument. The LISN housing, measuring instrument case, reference ground plane, and vertical ground plane were bounded together. The excess power cable between the EUT and the LISN was bundled.

All connecting cables of EUT and peripherals were manipulated to find the maximum emission.

All relevant operation modes have been tested, and the worst case data is included in this report.

3.2 EUT Exercising Software

There was no special software to exercise the device. Once the unit is powered up, it receives the RF signal continuously.

3.3 Details of EUT and Description of Accessories

Details of EUT:

An AC adaptor and/or a battery (provided with the unit) were used to power the device. Their description are listed below.

(1) An AC adaptor (100-240VAC to 7.5VDC 600mA, Model: S006MU0750060) (Supplied by Client)

(2) Operated Battery: 4 x "AA" size 1.5VDC batteries (Supplied by Intertek)

Description of Peripherals:

(1) 1 x Telecommunication cable with RJ11C connectors (1m, unshielded), terminated (Supplied by Intertek)

(2) 1 x 3m Telephone Line (Supplied by Intertek)

(3) Telephone Line Simulator, Model: TLS-5C-01, S/N: 059355 (Supplied by Intertek)

(4) Simple Corded Phone, Model: AS7402 (Supplied by Intertek)

(5) Shaker Unit, Model: HearPlus 55v, Brand: doro (Supplied by Client)

(6) Remote Control Device, Model: AMPLICALL 2, FCC ID:RUM-AC2T (Supplied by Client)

3.4 Measurement Uncertainty

When determining of the test conclusion, the Measurement Uncertainty of test has been considered.

Uncertainty and Compliance - Unless the standard specifically states that measured values are to be extended by the measurement uncertainty in determining compliance, all compliance determinations are based on the actual measured value.

EXHIBIT 4
TEST RESULTS

4.0 **Test Results**

Data is included of the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included.

4.1 Field Strength Calculation

The field strength is calculated by adding the reading on the Spectrum Analyzer to the factors associated with preamplifiers (if any), antennas, cables, pulse desensitization and average factors (when specified limit is in average and measurements are made with peak detectors). A sample calculation is included below.

FS = RA + AF + CF - AG + PD + AV

where FS = Field Strength in dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB
AG = Amplifier Gain in dB
PD = Pulse Desensitization in dB
AV = Average Factor in -dB

In the radiated emission table which follows, the reading shown on the data table may reflects the preamplifier gain. An example of the calculations, where the reading does not reflect the preamplifier gain, follows:

FS = RA + AF + CF - AG + PD +AV

Example
Assume a receiver reading of 62.0 dBμV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted. The pulse desensitization factor of the spectrum analyzer was 0 dB, and the resultant average factor was -10 dB. The net field strength for comparison to the appropriate emission limit is 32 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

RA = 62.0 dBμV
AF = 7.4 dB
CF = 1.6 dB
AG = 29 dB
PD = 0 dB
AV = -10 dB
FS = 62 + 7.4 +1.6 -29 +0 + (-10) = 32 dBμV/m

Level in μV/m = Common Antilogarithm [(32 dBμV/m)/20] = 39.8 μV/m

4.2 Radiated Emissions

4.2.1 Radiated Emission Configuration Photograph

Worst Case Radiated Emission
at

Model AMPLICALL 20: 865.280 MHz

Model AMPLICALL 16: 71.600 MHz

The worst case radiated emission configuration photographs are attached in the Appendix and saved with filename: config photos.pdf

4.2.2 Radiated Emission Data

The data in tables 1-4 list the significant emission frequencies, the limit and the margin of compliance.

Judgement -

Model AMPLICALL 20 – Passed by 5.6 dB margin

Model AMPLICALL 16 – Passed by 6.0 dB margin

Model: AMPLICALL 20
Mode: Receiving

Table 1

Radiated Emissions Data

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-amp (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Limit at 3m (dBµV/m)	Margin (dB)
V	432.640	26.6	16	25.0	35.6	46.0	-10.4
V	865.280	25.4	16	31.0	40.4	46.0	-5.6
V	1297.920	47.1	33	26.1	40.2	54.0	-13.8
V	1730.560	45.8	33	27.2	40.0	54.0	-14.0

NOTES:

1. Peak detector is used for the emission measurement.

2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.

3. Negative value in the margin column shows emission below limit.

4. Horn antenna is used for the emission over 1000MHz.

Model: AMPLICALL 20
Mode: Ringing & Flashing

Table 2

Radiated Emissions Data

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-amp (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Limit at 3m (dBµV/m)	Margin (dB)
V	35.800	39.6	16	10.0	33.6	40.0	-6.4
V	71.600	43.1	16	7.0	34.1	40.0	-5.9
H	107.400	36.3	16	14.0	34.3	43.5	-9.2
H	143.200	35.4	16	14.0	33.4	43.5	-10.1
H	179.000	29.6	16	20.0	33.6	43.5	-9.9
H	214.800	31.6	16	17.0	32.6	43.5	-10.9

NOTES:

1. Peak detector is used for the emission measurement.

2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.

3. Negative value in the margin column shows emission below limit.

4. Horn antenna is used for the emission over 1000MHz.

Model: AMPLICALL 16
Mode: Receiving

Table 3

Radiated Emissions Data

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-amp (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Limit at 3m (dBµV/m)	Margin (dB)
V	432.600	27.5	16	25.0	36.5	46.0	-9.5
V	865.200	24.4	16	31.0	39.4	46.0	-6.6
V	1297.800	47.3	33	26.1	40.4	54.0	-13.6
V	1730.400	46.4	33	27.2	40.6	54.0	-13.4

NOTES:

1. Peak detector is used for the emission measurement.

2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.

3. Negative value in the margin column shows emission below limit.

4. Horn antenna is used for the emission over 1000MHz.

Model: AMPLICALL 16
Mode: Ringing & Flashing

Table 4

Radiated Emissions Data

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-amp (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Limit at 3m (dBµV/m)	Margin (dB)
V	35.800	38.4	16	10.0	32.4	40.0	-7.6
V	71.600	43.0	16	7.0	34.0	40.0	-6.0
H	107.400	36.2	16	14.0	34.2	43.5	-9.3
H	143.200	35.8	16	14.0	33.8	43.5	-9.7
H	179.000	29.6	16	20.0	33.6	43.5	-9.9
H	214.800	32.0	16	17.0	33.0	43.5	-10.5

NOTES:

1. Peak detector is used for the emission measurement.

2. All measurements were made at 3 meters. Radiated emissions not detected at the 3-meter distance were measured at 0.3-meter and an inverse proportional extrapolation was performed to compare the signal level to the 3-meter limit. No other radiated emissions than those reported were detected at a test distance of 0.3-meter.

3. Negative value in the margin column shows emission below limit.

4. Horn antenna is used for the emission over 1000MHz.

4.3 AC Power Line Conducted Emission

[ ] Not applicable – EUT is only powered by battery for operation.

[×] EUT connects to AC power line. Emission Data is listed in following pages.

[ ] Base Unit connects to AC power line and has transmission. Handset connects to AC power line but has no transmission. Emission Data of Base Unit is listed in following pages.

4.3.1 AC Power Line Conducted Emission Configuration Photograph

Worst Case Line-Conducted Configuration
at

Model AMPLICALL 20: 9.272 MHz

Model AMPLICALL 16: 10.334 MHz

The worst case line conducted configuration photographs are attached in the Appendix and saved with filename: config photos.pdf

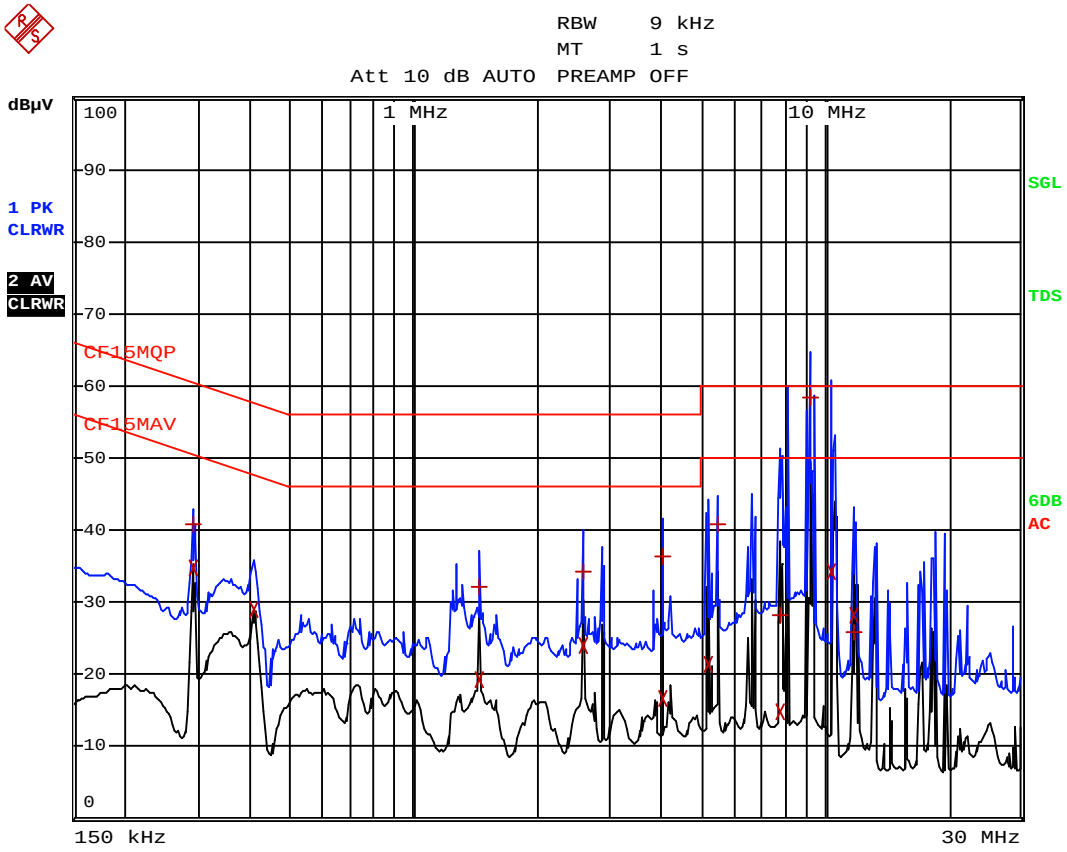
4.3.2 AC Power Line Conducted Emission Data

The plot(s) and data in the following pages list the significant emission frequencies, the limit and the margin of compliance

Model AMPLICALL 20 – Passed by 1.53 dB margin compare with quasi-peak limit

Model AMPLICALL 16 – Passed by 14.35 dB margin compare with quasi-peak limit

Model No.: AMPLICALL 20
Worst Case: LED & Sound Mode (Calling)



Date: 22.DEC.2010 18:39:31

Model No.: AMPLICALL 20
Worst Case: LED & Sound Mode (Calling)

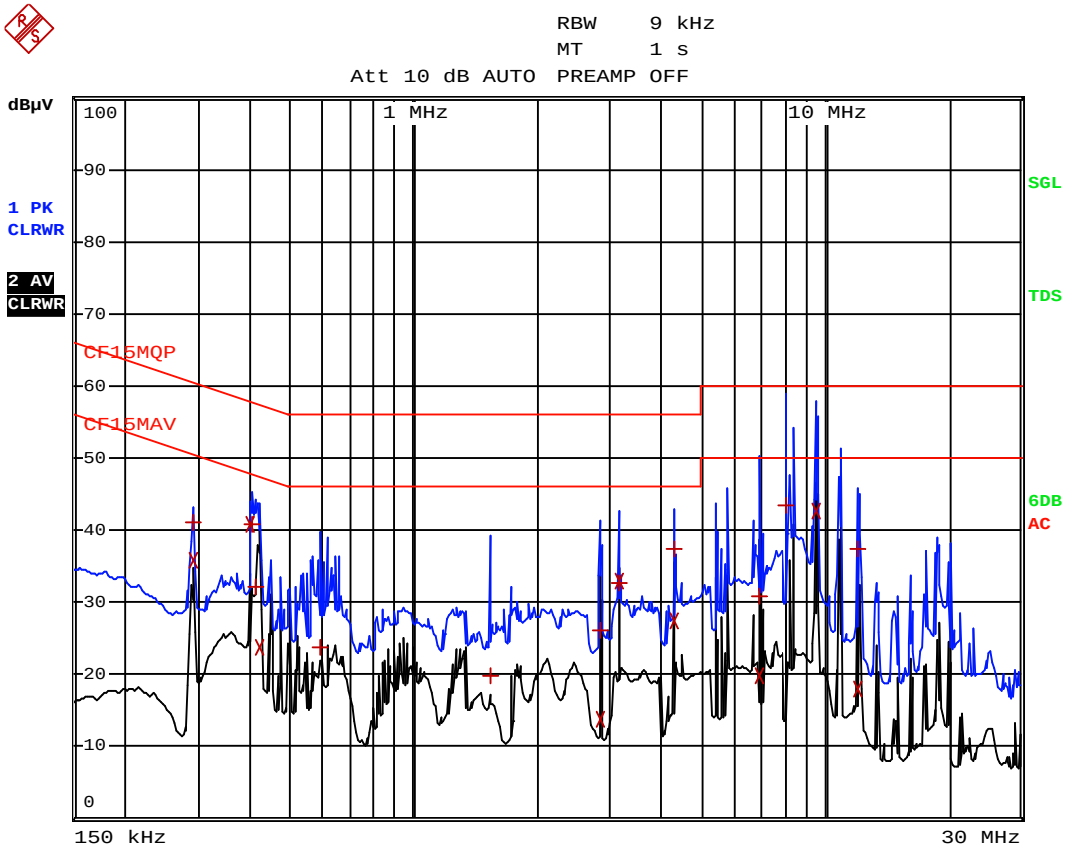
EDIT PEAK LIST (Final Measurement Results)

Trace1: CF15MQP
Trace2: CF15MAV
Trace3: ---

TRACE		FREQUENCY	LEVEL dBµV		DELTA LIMIT dB
2	CISPR Average	289.5 kHz	34.68	L1	-15.85
1	Quasi Peak	289.5 kHz	40.92	N	-19.61
2	CISPR Average	406.5 kHz	28.96	L1	-18.75
1	Quasi Peak	1.446 MHz	32.08	L1	-23.92
2	CISPR Average	1.446 MHz	19.26	L1	-26.73
2	CISPR Average	2.5935 MHz	24.08	N	-21.91
1	Quasi Peak	2.598 MHz	34.34	N	-21.65
1	Quasi Peak	4.0515 MHz	36.27	N	-19.72
2	CISPR Average	4.0515 MHz	16.63	L1	-29.37
2	CISPR Average	5.19 MHz	21.50	L1	-28.49
1	Quasi Peak	5.505 MHz	40.87	L1	-19.12
1	Quasi Peak	7.7955 MHz	28.20	L1	-31.79
2	CISPR Average	7.7955 MHz	14.93	N	-35.06
1	Quasi Peak	9.2715 MHz	58.46	N	-1.53
2	CISPR Average	10.374 MHz	34.35	N	-15.64
1	Quasi Peak	11.8545 MHz	25.76	N	-34.24
2	CISPR Average	11.859 MHz	28.16	L1	-21.83

Date: 22.DEC.2010 18:39:19

Model No.: AMPLICALL 20
Worst Case: Sound & Shaker Model (Calling)



Date: 22.DEC.2010 18:30:08

Model No.: AMPLICALL 20
Worst Case: Sound & Shaker Model (Calling)

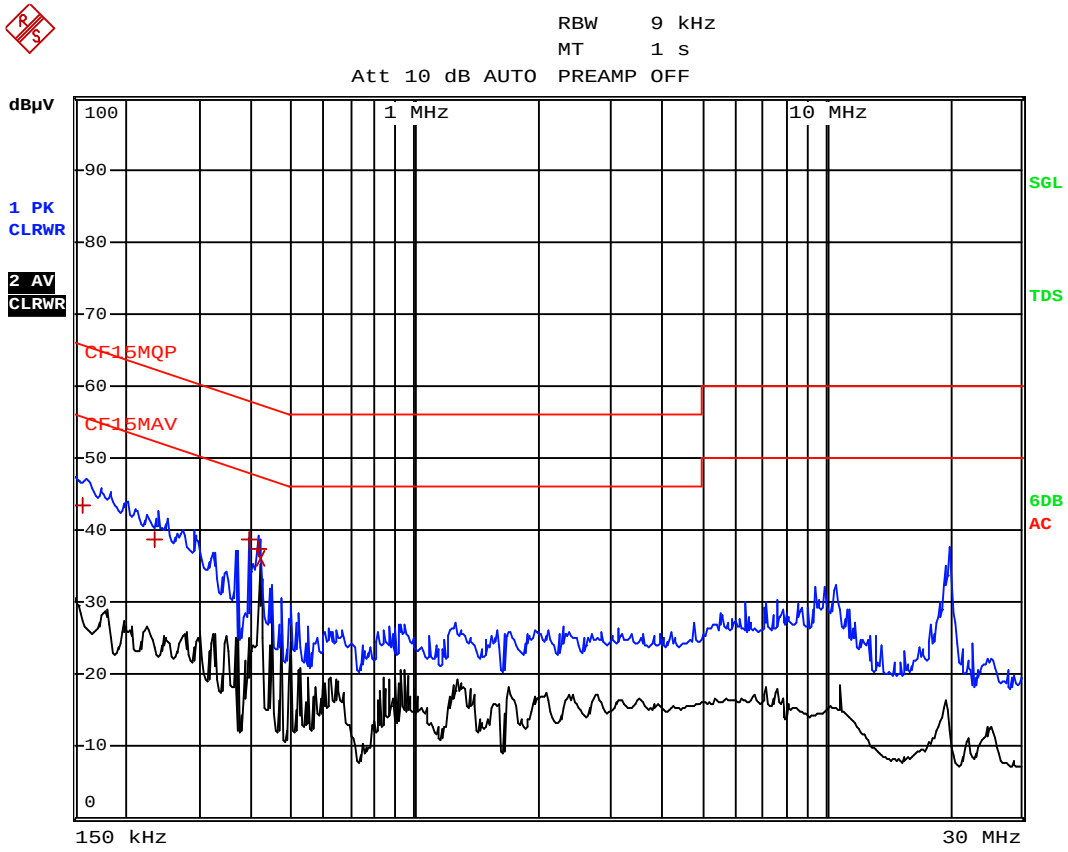
EDIT PEAK LIST (Final Measurement Results)

Trace1: CF15MQP
Trace2: CF15MAV
Trace3: ---

TRACE		FREQUENCY	LEVEL dBµV		DELTA LIMIT dB
2	CISPR Average	289.5 kHz	35.85	N	-14.68
1	Quasi Peak	289.5 kHz	41.02	N	-19.51
2	CISPR Average	397.5 kHz	40.91	L1	-6.99
1	Quasi Peak	402 kHz	40.83	L1	-16.97
1	Quasi Peak	411 kHz	32.03	N	-25.59
2	CISPR Average	420 kHz	23.87	L1	-23.57
1	Quasi Peak	591 kHz	23.80	L1	-32.19
1	Quasi Peak	1.545 MHz	19.70	N	-36.29
1	Quasi Peak	2.859 MHz	26.00	N	-29.99
2	CISPR Average	2.859 MHz	13.75	N	-32.24
2	CISPR Average	3.1785 MHz	33.04	N	-12.95
1	Quasi Peak	3.183 MHz	32.61	N	-23.38
1	Quasi Peak	4.3215 MHz	37.42	L1	-18.57
2	CISPR Average	4.326 MHz	27.43	L1	-18.56
1	Quasi Peak	6.9225 MHz	30.89	L1	-29.10
2	CISPR Average	6.927 MHz	19.94	L1	-30.05
1	Quasi Peak	8.052 MHz	43.34	N	-16.65
2	CISPR Average	9.519 MHz	42.53	N	-7.46
2	CISPR Average	12.1065 MHz	17.93	N	-32.06
1	Quasi Peak	12.111 MHz	37.51	L1	-22.48

Date: 22.DEC.2010 18:29:57

Model No.: AMPLICALL 20
Worst Case: LED & Shaker Mode (Remote)



Date: 22.DEC.2010 18:47:05

Model No.: AMPLICALL 20
Worst Case: LED & Shaker Mode (Remote)

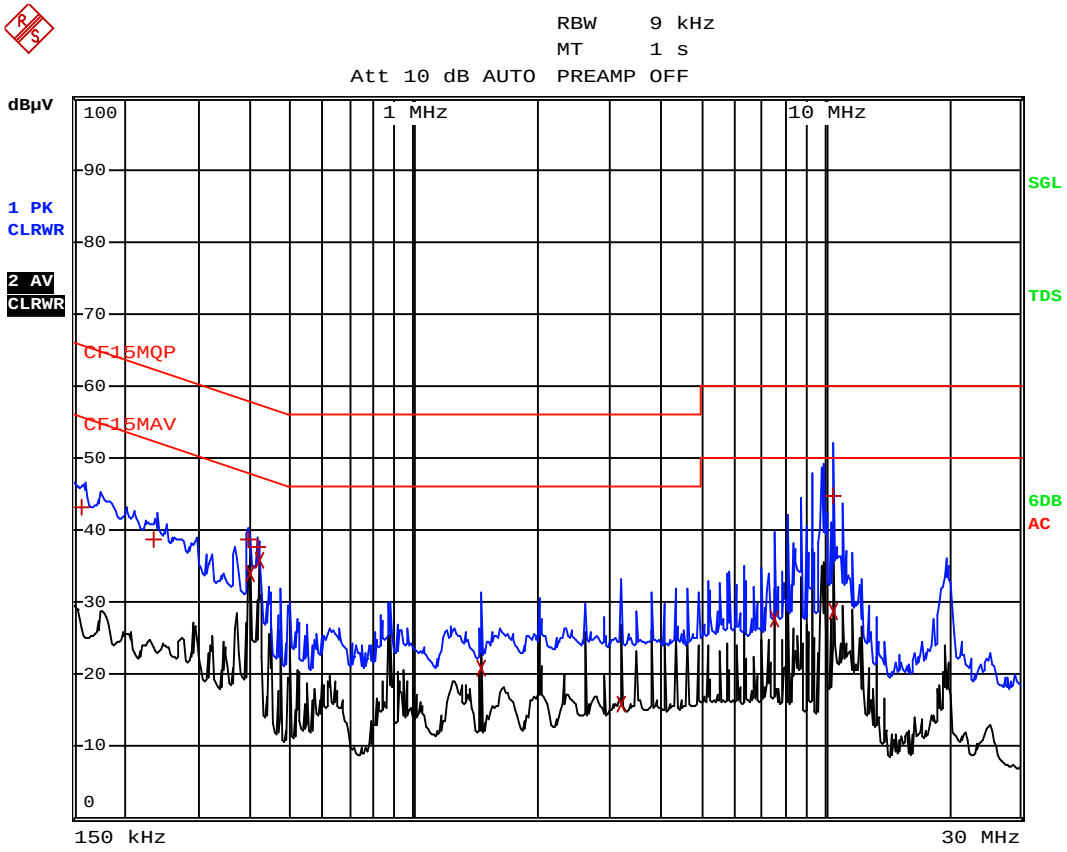
EDIT PEAK LIST (Final Measurement Results)

Trace1: CF15MQP
Trace2: CF15MAV
Trace3: ---

TRACE		FREQUENCY	LEVEL dBµV		DELTA LIMIT dB
1	Quasi Peak	159 kHz	43.35	L1	-22.15
1	Quasi Peak	235.5 kHz	38.59	N	-23.66
1	Quasi Peak	393 kHz	38.71	N	-19.28
1	Quasi Peak	415.5 kHz	37.29	L1	-20.24
2	CISPR Average	420 kHz	36.12	L1	-11.32

Date: 22.DEC.2010 18:46:56

Model No.: AMPLICALL 20
Worst Case: Sound & Shaker Mode (Remote)



Date: 22.DEC.2010 18:51:18

Model No.: AMPLICALL 20
Worst Case: Sound & Shaker Mode (Remote)

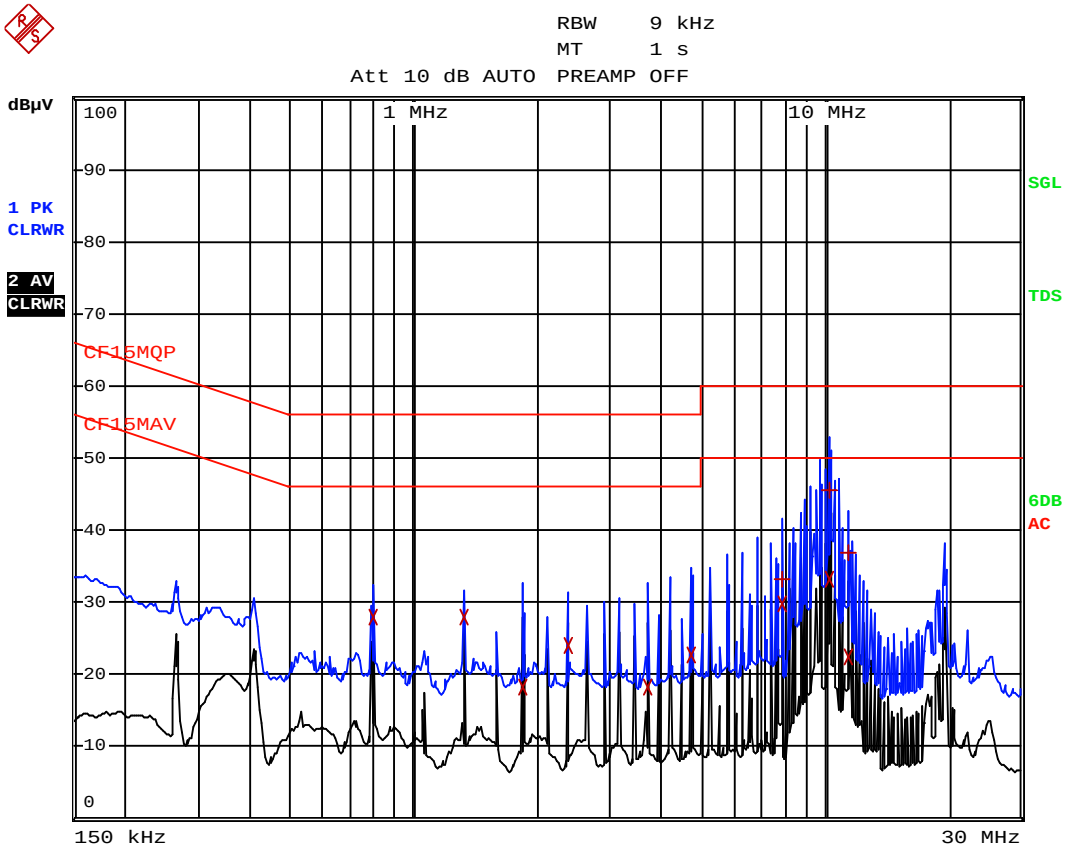
EDIT PEAK LIST (Final Measurement Results)

Trace1: CF15MQP
Trace2: CF15MAV
Trace3: ---

	TRACE	FREQUENCY	LEVEL dBµV		DELTA LIMIT dB
1	Quasi Peak	159 kHz	43.07	N	-22.43
1	Quasi Peak	235.5 kHz	38.61	L1	-23.63
1	Quasi Peak	393 kHz	38.83	N	-19.16
2	CISPR Average	397.5 kHz	33.97	L1	-13.93
1	Quasi Peak	415.5 kHz	37.58	L1	-19.94
2	CISPR Average	420 kHz	35.94	L1	-11.50
2	CISPR Average	1.455 MHz	20.74	N	-25.25
2	CISPR Average	3.201 MHz	15.80	L1	-30.19
2	CISPR Average	7.5795 MHz	27.78	L1	-22.21
2	CISPR Average	10.491 MHz	28.79	N	-21.20
1	Quasi Peak	10.4955 MHz	44.84	N	-15.15

Date: 22.DEC.2010 18:51:08

Model No.: AMPLICALL 16
Worst Case: LED & Sound Mode



Date: 22.DEC.2010 18:58:26

Model No.: AMPLICALL 16
Worst Case: LED & Sound Mode

EDIT PEAK LIST (Final Measurement Results)

Trace1: CF15MQP
Trace2: CF15MAV
Trace3: ---

	TRACE	FREQUENCY	LEVEL dBµV		DELTA LIMIT dB
2	CISPR Average	793.5 kHz	28.07	N	-17.92
2	CISPR Average	1.3245 MHz	27.86	N	-18.13
2	CISPR Average	1.851 MHz	18.35	N	-27.64
2	CISPR Average	2.382 MHz	24.10	L1	-21.89
2	CISPR Average	3.705 MHz	18.18	N	-27.81
2	CISPR Average	4.767 MHz	22.81	L1	-23.19
2	CISPR Average	7.9485 MHz	29.75	N	-20.24
1	Quasi Peak	7.9485 MHz	33.30	N	-26.69
1	Quasi Peak	10.3335 MHz	45.64	N	-14.35
2	CISPR Average	10.3335 MHz	33.26	N	-16.73
1	Quasi Peak	11.3955 MHz	36.81	N	-23.18
2	CISPR Average	11.3955 MHz	22.32	N	-27.67

Date: 22.DEC.2010 18:58:18

EXHIBIT 5
EQUIPMENT LIST

5.0 **Equipment List**

1) Radiated Emissions Test

Equipment	Biconical Antenna	Log Periodic Antenna	Double Ridged Guide Antenna
Registration No.	EW-0954	EW-0446	EW-1015
Manufacturer	EMCO	EMCO	EMCO
Model No.	3104C	3146	3115
Calibration Date	Apr. 14, 2010	Apr. 26, 2010	Feb. 09, 2010
Calibration Due Date	Oct. 14, 2011	Oct. 26, 2011	Aug. 09, 2011

Equipment	EMI Test Receiver	Spectrum Analyzer
Registration No.	EW-2251	EW-2188
Manufacturer	ROHDESCHWARZ	AGILENTTECH
Model No.	ESCI	E4407B
Calibration Date	Oct. 22, 2009	Dec. 25, 2009
Calibration Due Date	Apr. 22, 2011	Dec. 31, 2011

2) Conducted Emissions Test

Equipment	EMI Test Receiver	Artificial Mains	Pulse Limiter
Registration No.	EW-2666	EW-0090	EW-0699
Manufacturer	ROHDESCHWARZ	ROHDESCHWARZ	ROHDESCHWARZ
Model No.	ESCI7	ESH3-Z5	ESH3-Z2
Calibration Date	Oct. 12, 2010	Feb. 05, 2010	Dec. 24, 2009
Calibration Due Date	Oct. 12, 2011	May 05, 2011	Jun. 24, 2011

END OF TEST REPORT