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TEST REPORT

Report No.: 14120026HKG-001

Kidztech Toys Manufacturing Ltd.

**Application
For
Certification
(Original Grant)
(FCC ID: OTM-84171-24G-TX)**

Transmitter

Prepared and Checked by:

Approved by:

A handwritten signature in black ink, appearing to be 'Wong Kwok Yeung'.

**Wong Kwok Yeung, Kenneth
Lead Engineer**

A handwritten signature in black ink, appearing to be 'Chan Chi Hung'.

**Chan Chi Hung, Terry
Supervisor
Date: December 10, 2014**

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Intertek Testing Services Hong Kong Ltd.

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GENERAL INFORMATION

Grantee:	Kidztech Toys Manufacturing Ltd.
Grantee Address:	Room 1201, 12/F., Inter Continental Plaza, 94 Granville Road, Tsim Sha Tsui East, Kowloon, Hong Kong.
Contact Person:	Eric Ho
Tel:	(852) 2721-8868
Fax:	(852) 2721-8838
e-mail:	eric@kidztech.net
Manufacturer:	Shantou Chenghai JinJun Toys Co. Ltd.
Manufacturer Address:	Yongxin Industry Zone, Lianshang, Chenghai, Shantou, China
Brand Name:	N/A
Model:	84171
Additional Model:	84173, 6716384, 5VQBJ
Type of EUT:	Transmitter
Description of EUT:	1/12 RC GT RACER - PORSCHE 911 (84171) RC DODGE CHALLENGER RC FORD COBRA JET RC LAMBORGHINI SUPER TROFEO (84173, 6716384, 5VQBJ)
Serial Number:	N/A
FCC ID:	OTM-84171-24G-TX
Date of Sample Submitted:	December 01, 2014
Date of Test:	December 01, 2014 to December 08, 2014
Report No.:	14120026HKG-001
Report Date:	December 10, 2014
Environmental Conditions:	Temperature: +10 to 40°C Humidity: 10 to 90%



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SUMMARY OF TEST RESULT

TEST SPECIFICATION	REFERENCE	RESULTS
Radiated Emission	15.249	Pass
Radiated Emission on the Bandedge		
Radiated Emission in Restricted Bands	15.205	Pass

The equipment under test is found to be complying with the following standards:
FCC Part 15, October 1, 2013 Edition

- Note: 1. The EUT uses a permanently attached antenna which, in accordance to section 15.203, is considered sufficient to comply with the provisions of this section.
2. Pursuant to FCC part 15 Section 15.215(c), the 20 dB bandwidth of the emission was contained within the frequency band designated (mentioned as above) which the EUT operated. The effects, if any, from frequency sweeping, frequency hopping, other modulation techniques and frequency stability over excepted variations in temperature and supply voltage were considered.



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1.0 **General Description**

1.1 Product Description

The Equipment under test is a 2.4GHz transmitter for a remote control car which operating at 2.4GHz band. The EUT is powered by a 9V battery. After switched on the EUT, the corresponding RC Car can be controlled to moving forward, backward and turn left/right directions.

The operating frequency channels as below;

2406MHz	2415MHz	2425MHz	2435MHz	2445MHz	2455MHz	2465MHz	2474MHz
2407MHz	2417MHz	2426MHz	2436MHz	2446MHz	2456MHz	2466MHz	2405MHz
2408MHz	2418MHz	2427MHz	2437MHz	2447MHz	2457MHz	2467MHz	2440MHz
2409MHz	2419MHz	2428MHz	2438MHz	2449MHz	2458MHz	2468MHz	2475MHz
2410MHz	2420MHz	2429MHz	2439MHz	2450MHz	2459MHz	2469MHz	
2411MHz	2421MHz	2430MHz	2441MHz	2451MHz	2460MHz	2470MHz	
2412MHz	2422MHz	2431MHz	2442MHz	2452MHz	2461MHz	2471MHz	
2413MHz	2423MHz	2433MHz	2443MHz	2453MHz	2462MHz	2472MHz	
2414MHz	2424MHz	2434MHz	2444MHz	2454MHz	2463MHz	2473MHz	

The Model: 84173, 6716384 and 5VQBJ are the same as the Model: 84171 in hardware aspect. The models are different in model number and name only.

Antenna Type: External, Integral

For electronic filing, the brief circuit description is saved with filename: descri.pdf.



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1.2 Related Submittal(s) Grants

This is a single application for certification of a transmitter.

The corresponding receiver (Car unit) for this transmitter is exempted from the Part 15 technical rules per 15.101(b).

1.3 Test Methodology

Radiated emission measurements were performed according to the procedures in ANSI C63.4 (2009). All radiated measurements were performed in 3m Chamber. Preliminary scans were performed in the 3m Chamber only to determine worst case modes. All radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the **“Justification Section”** of this Application.

1.4 Test Facility

The 3m Chamber used to collect the radiated data is located at Workshop No. 3, G/F., World-Wide Industrial Centre, 43-47 Shan Mei Street, Fo Tan, Sha Tin, N.T., Hong Kong. This test facility and site measurement data have been placed on file with the FCC.

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2.0 **System Test Configuration**

2.1 Justification

The system was configured for testing in a typical fashion (as a customer would normally use it), and in the confines as outlined in ANSI C63.4 (2009).

The device was powered by new 1 x 9.0V Alkaline battery.

For maximizing emissions, the EUT was rotated through 360°, the antenna height was varied from 1 meter to 4 meters above the ground plane, and the antenna polarization was changed. This step by step procedure for maximizing emissions led to the data reported in Exhibit 3.0.

The unit was operated standalone and placed in the center of the turntable.

The equipment under test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). The EUT was mounted to a plastic stand if necessary and placed on the wooden turntable, which enabled the engineer to maximize emissions through its placement in the three orthogonal axes.

2.2 EUT Exercising Software

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

2.3 Special Accessories

There are no special accessories necessary for compliance of this product.

2.4 Measurement Uncertainty

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

2.5 Support Equipment List and Description

N/A.

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3.0 Emission 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.

3.1 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any), Average Factor (optional) from the measured reading. The basic equation with a sample calculation is as follows:

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

where

FS = Field Strength in dB μ V/mRA = Receiver Amplitude (including preamplifier) in dB μ V

CF = Cable Attenuation Factor in dB

AF = Antenna Factor in dB

AG = Amplifier Gain in dB

AV = Average Factor in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows:

$$FS = RR + LF$$

where

FS = Field Strength in dB μ V/mRR = RA - AG - AV in dB μ V

LF = CF + AF in dB

Assume a receiver reading of 52.0 dB μ V is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB are added. The amplifier gain of 29 dB and average factor of 5 dB are subtracted, giving a field strength of 27 dB μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

$$RA = 52.0 \text{ dB}\mu\text{V/m}$$

$$AF = 7.4 \text{ dB}$$

$$CF = 1.6 \text{ dB}$$

$$AG = 29.0 \text{ dB}$$

$$AV = 5.0 \text{ dB}$$

$$FS = RR + LF$$

$$FS = 18 + 9 = 27 \text{ dB}\mu\text{V/m}$$

$$RR = 18.0 \text{ dB}\mu\text{V}$$

$$LF = 9.0 \text{ dB}$$

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm } [(27 \text{ dB}\mu\text{V/m})/20] = 22.4 \mu\text{V/m}$$



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3.2 Radiated Emission Configuration Photograph

The worst case in radiated emission was found at 9900.000 MHz

For electronic filing, the worst case radiated emission configuration photographs are saved with filename: radiated photos.pdf.

3.3 Radiated Emission Data

The data on the following page lists the significant emission frequencies, the limit and the margin of compliance. Numbers with a minus sign are below the limit.

Judgment: Passed by 16.2 dB

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Applicant: Kidztech Toys Manufacturing Ltd.

Date of Test: December 08, 2014

Model: 84171

Worst-Case Operating Mode: Transmitting

Table 1
Radiated Emissions
Pursuant to FCC Part 15 Section 15.249 Requirement

Lowest Channel

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Average Factor (dB)	Calculated at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
H	2405.000	83.3	33	29.4	79.7	29.1	50.6	94.0	-43.4
H	2400.000	56.5	33	29.4	52.9	29.1	23.8	54.0	-30.2
V	4810.000	54.3	33	34.9	56.2	29.1	27.1	54.0	-26.9
V	7215.000	50.4	33	37.9	55.3	29.1	26.2	54.0	-27.8
V	9620.000	50.0	33	40.4	57.4	29.1	28.3	54.0	-25.7
V	12025.000	49.0	33	40.5	56.5	29.1	27.4	54.0	-26.6
V	14430.000	47.4	33	40.0	54.4	29.1	25.3	54.0	-28.7

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
H	2405.000	83.3	33	29.4	79.7	114.0	-34.3
H	2400.000	56.5	33	29.4	52.9	74.0	-21.1
V	4810.000	54.3	33	34.9	56.2	74.0	-17.8
V	7215.000	50.4	33	37.9	55.3	74.0	-18.7
V	9620.000	50.0	33	40.4	57.4	74.0	-16.6
V	12025.000	49.0	33	40.5	56.5	74.0	-17.5
V	14430.000	47.4	33	40.0	54.4	74.0	-19.6

NOTES: 1. Peak Detector Data unless otherwise stated.

2. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distances 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 harmonic emissions than those reported were detected at a test distance of 0.3-meter.

3. Negative sign in the column shows value below limit.

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

5. Emission (the row indicated by **bold italic**) within the restricted band meets the requirement of FCC Part 15 Section 15.205.

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Applicant: Kidztech Toys Manufacturing Ltd.

Date of Test: December 08, 2014

Model: 84171

Worst-Case Operating Mode: Transmitting

Table 2
Radiated Emissions
Pursuant to FCC Part 15 Section 15.249 Requirement

Middle Channel

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Average Factor (dB)	Calculated at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
H	2440.000	83.8	33	29.4	80.2	29.1	51.1	94.0	-42.9
V	4880.000	54.8	33	34.9	56.7	29.1	27.6	54.0	-26.4
V	7320.000	50.7	33	37.9	55.6	29.1	26.5	54.0	-27.5
V	9760.000	49.8	33	40.4	57.2	29.1	28.1	54.0	-25.9
V	12200.000	49.1	33	40.5	56.6	29.1	27.5	54.0	-26.5
V	14640.000	50.2	33	38.4	55.6	29.1	26.5	54.0	-27.5

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
H	2440.000	83.8	33	29.4	80.2	114.0	-33.8
V	4880.000	54.8	33	34.9	56.7	74.0	-17.3
V	7320.000	50.7	33	37.9	55.6	74.0	-18.4
V	9760.000	49.8	33	40.4	57.2	74.0	-16.8
V	12200.000	49.1	33	40.5	56.6	74.0	-17.4
V	14640.000	50.2	33	38.4	55.6	74.0	-18.4

NOTES: 1. Peak Detector Data unless otherwise stated.

2. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distances 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 harmonic emissions than those reported were detected at a test distance of 0.3-meter.

3. Negative sign in the column shows value below limit.

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

5. Emission (the row indicated by **bold italic**) within the restricted band meets the requirement of FCC Part 15 Section 15.205.

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Applicant: Kidztech Toys Manufacturing Ltd.

Date of Test: December 08, 2014

Model: 84171

Worst-Case Operating Mode: Transmitting

Table 3
Radiated Emissions
Pursuant to FCC Part 15 Section 15.249 Requirement

Highest Channel

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Average Factor (dB)	Calculated at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
H	2475.000	83.5	33	29.4	79.9	29.1	50.8	94.0	-43.2
H	2483.500	56.4	33	29.4	52.8	29.1	23.7	54.0	-30.3
V	4950.000	54.8	33	34.9	56.7	29.1	27.6	54.0	-26.4
V	7425.000	51.0	33	37.9	55.9	29.1	26.8	54.0	-27.2
V	9900.000	50.4	33	40.4	57.8	29.1	28.7	54.0	-25.3
V	12375.000	49.4	33	40.5	56.9	29.1	27.8	54.0	-26.2
V	14850.000	51.9	33	38.4	57.3	29.1	28.2	54.0	-25.8

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
H	2475.000	83.5	33	29.4	79.9	114.0	-34.1
H	2483.500	56.4	33	29.4	52.8	74.0	-21.2
V	4950.000	54.8	33	34.9	56.7	74.0	-17.3
V	7425.000	51.0	33	37.9	55.9	74.0	-18.1
V	9900.000	50.4	33	40.4	57.8	74.0	-16.2
V	12375.000	49.4	33	40.5	56.9	74.0	-17.1
V	14850.000	51.9	33	38.4	57.3	74.0	-16.7

NOTES: 1. Peak Detector Data unless otherwise stated.

2. All measurements were made at 3 meters. Harmonic emissions not detected at the 3-meter distances 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 harmonic emissions than those reported were detected at a test distance of 0.3-meter.

3. Negative sign in the column shows value below limit.

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

5. Emission (the row indicated by **bold italic**) within the restricted band meets the requirement of FCC Part 15 Section 15.205.



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4.0 **Equipment Photographs**

For electronic filing, the photographs are saved with filename: external photos.pdf and internal photos.pdf.

5.0 **Product Labelling**

For electronics filing, the FCC ID label artwork and the label location are saved with filename: label.pdf.

6.0 **Technical Specifications**

For electronic filing, the block diagram and schematic of the tested EUT are saved with filename: block.pdf and circuit.pdf respectively.

7.0 **Instruction Manual**

For electronic filing, a preliminary copy of the Instruction Manual is saved with filename: manual.pdf.

This manual will be provided to the end-user with each unit sold/leased in the United States.



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8.0 **Miscellaneous Information**

The miscellaneous information includes details of the test procedure and measured bandwidth / calculation of factor such as pulse desensitization and averaging factor (calculation and timing diagram).

8.1 Radiated Emission on the Bandedge

Emissions radiated outside of the specified frequency bands, except harmonics, are attenuated by 50dB below the level of the fundamental or to the general radiated emissions limits in Section 15.209, whichever is the lesser attenuation, which meet the requirement of part 15.249(d).

The result of bandedge emissions can be found on the emission table of page 6 & page 8 of the report.

The resultant field strength meets the general radiated emission limit in Section 15.209, which does not exceed 74dB μ V/m (PK Limit) and 54 dB μ V/m (AV Limit).



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8.2 Discussion of Pulse Desensitization

Pulse desensitivity is not applicable for this device. The effective period (Teff) is approximately 0.32ms for a digital “1” bit which illustrated on technical specification, with a resolution bandwidth (3dB) of 1MHz, so the pulse desensitivity factor is 0dB.

8.3 Calculation of Average Factor

The duty cycle is simply the on-time divided by the period:

The duration of one cycle = 100ms

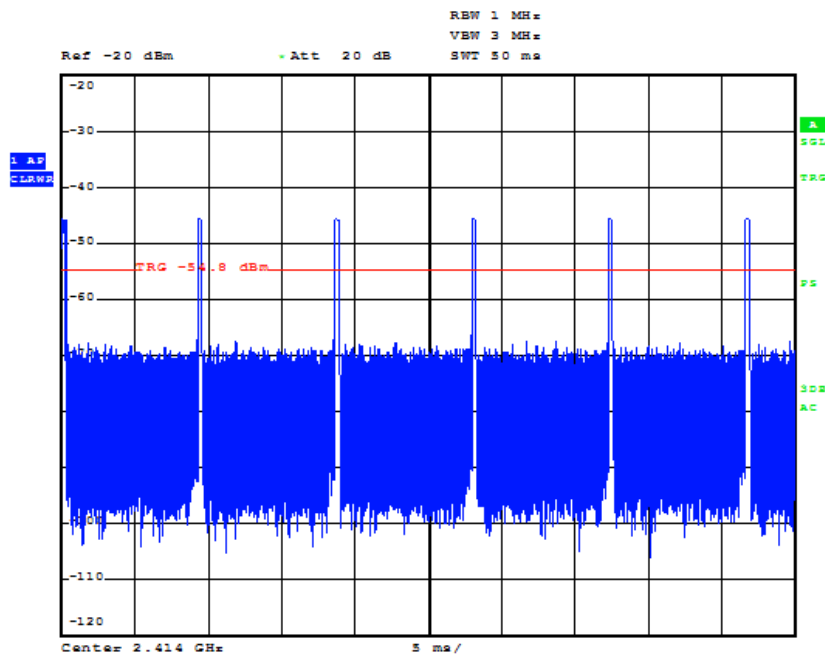
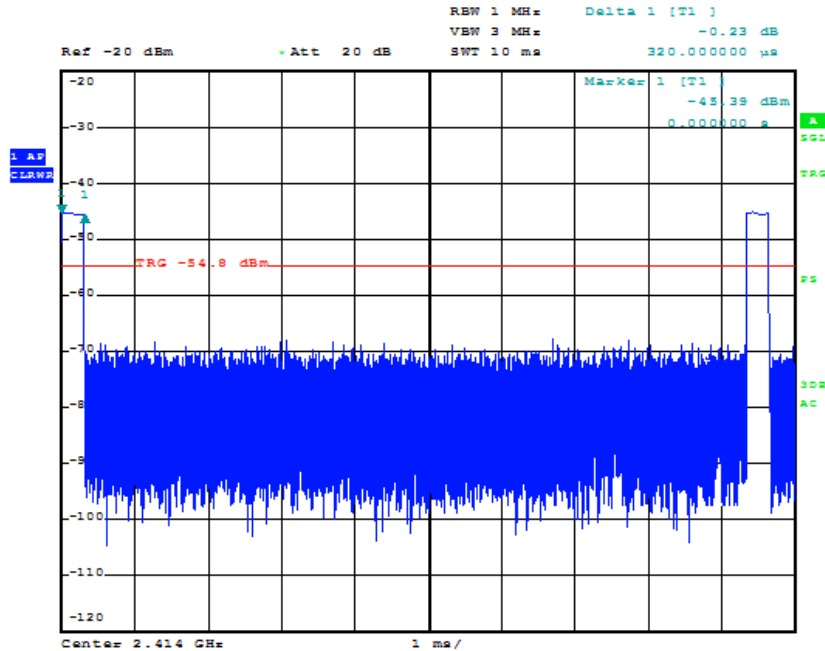
Effective period of the cycle = $11 \times 0.32 = 3.52\text{ms}$

$DC = 3.52 / 100 = 0.0352$

Therefore, the averaging factor is found by $20\log 0.0352 = -29.1\text{dB}$.

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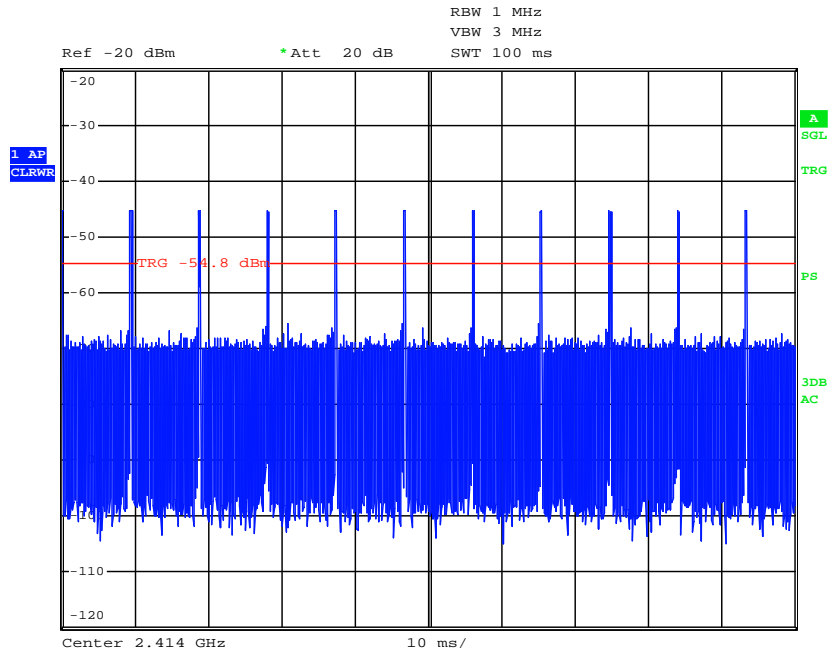




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8.4 Emissions Test Procedures

The following is a description of the test procedure used by Intertek Testing Services Hong Kong Ltd. in the measurements of transmitter operating under the Part 15, Subpart C rules.

The transmitting equipment under test (EUT) is placed on a wooden turntable which is four feet in diameter and approximately one meter in height above the ground plane. During the radiated emissions test, the turntable is rotated and any cables leaving the EUT are manipulated to find the configuration resulting in maximum emissions. The EUT is adjusted through all three orthogonal axis to obtain maximum emission levels. The antenna height and polarization are also varied during the testing to search for maximum signal levels. The height of the antenna is varied from one to four meters.

Detector function for radiated emissions is in peak mode. Average readings, when required, are taken by measuring the duty cycle of the equipment under test and subtracting the corresponding amount in dB from the measured peak readings. A detailed description for the calculation of the average factor can be found in Exhibit 8.3.

The frequency range scanned is from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or 40 GHz, whichever is lower.



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8.4 Emissions Test Procedures (cont'd)

The EUT is warmed up for 15 minutes prior to the test.

AC power to the unit is varied from 85% to 115% nominal and variation in the fundamental emission field strength is recorded. If battery powered, a new, fully charged battery is used.

Conducted measurements were made as described in ANSI C63.4 (2009).

The IF bandwidth used for measurement of radiated signal strength was 100 kHz or greater when frequency is below 1000 MHz. Where pulsed transmissions of short enough pulse duration warrant, a greater bandwidth is selected according to the recommendations of Hewlett Packard Application Note 150-2. A discussion of whether pulse desensitivity is applicable to this unit is included in this report (See Exhibit 8.1). Above 1000 MHz, a resolution bandwidth of 1 MHz is used.

Transmitter measurements are normally conducted at a measurement distance of three meters. However, to assure low enough noise floor in the forbidden bands and above 1 GHz, signals are acquired at a distance of one meter or less. All measurements are extrapolated to three meters using inverse scaling, unless otherwise reported. Measurements taken at a closer distance are so marked.



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9.0 Equipment List

1) Radiated Emissions Test

Equipment	EMI Test Receiver	Biconical Antenna	Log Periodic Antenna
Registration No.	EW-2666	EW-0571	EW-0447
Manufacturer	R&S	EMCO	EMCO
Model No.	ESCI7	3104C	3146
Calibration Date	Jun. 20, 2013	Nov. 01, 2013	Aug. 19, 2013
Calibration Due Date	Dec. 20, 2014	May 01, 2015	Feb. 19, 2015

Equipment	Spectrum Analyzer	Pyramidal Horn Antenna	Double Ridged Guide Antenna
Registration No.	EW-2188	EW-0905	EW-1133
Manufacturer	AGILENTTECH	EMCO	EMCO
Model No.	E4407B	3160-09	3115
Calibration Date	Apr. 16, 2014	Jan. 28, 2014	Apr. 30, 2014
Calibration Due Date	Apr. 16, 2015	Jul. 28, 2015	Oct. 30, 2015

2) Average factor Measurement

Equipment	Spectrum Analyzer
Registration No.	EW-2329
Manufacturer	R&S
Model No.	FSP3
Calibration Date	Jun. 19, 2014
Calibration Due Date	Jun. 19, 2015

END OF TEST REPORT