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HKAS HOKLAS 005 TEST

TEST REPORT

Report No.: 15070911HKG-003

VTech Electronics Limited

Application
For
Certification
(Original Grant)
(FCC ID: G2R-1836)
(IC: 1135D-1836)

Transceiver

Prepared and Checked by:

Wong Kwok Yeung, Kenneth
Lead Engineer

Approved by:

Chan Chi Hung, Terry
Senior Supervisor
Date: August 11, 2015

GENERAL INFORMATION

Grantee:	VTech Electronics Limited
Grantee Address:	23/F., Tai Ping Industrial Center, Block 1, 57 Ting Kok Road, Tai Po, N.T., Hong Kong
Contact Person:	Colbert Tang
Tel:	2680 1201
Fax:	2680 1228
e-mail:	colbert_tang@vtech.com
Manufacturer:	VTech Electronics Limited
Manufacturer Address:	23/F., Tai Ping Industrial Center, Block 1, 57 Ting Kok Road, Tai Po, N.T., Hong Kong
Brand Name:	vtech
Model:	1836
Type of EUT:	Transceiver
Description of EUT:	Learning App TV Console
Serial Number:	N/A
FCC ID / IC:	G2R-1836 / 1135D-1836
Date of Sample Submitted:	July 17, 2015
Date of Test:	July 17, 2015 to August 10, 2015
Report No.:	15070911HKG-003
Report Date:	August 11, 2015
Environmental Conditions:	Temperature: +10 to 40°C Humidity: 10 to 90%

Intertek Testing Services Hong Kong Ltd.
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SUMMARY OF TEST RESULT

TEST SPECIFICATION	REFERENCE	RESULTS
Radiated Emission Radiated Emission on the Bandedge	15.249, 15.209 / RSS-210 A2.9, RSS-210 2.5	Pass
Radiated Emission in Restricted Bands	15.205 / RSS-210 2.2	Pass

The equipment under test is found to be complying with the following standards:
FCC Part 15, October 1, 2014 Edition
RSS-210 Issue 8, December 2010
RSS-Gen Issue 4, December 2014

Note: 1. The EUT uses a permanently attached antenna which, in accordance to section 15.203, is considered sufficient to comply with the pervisions 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 (EUT) 1836 is a Learning App TV Console for children with WiFi connection and 2.4GHz wireless control features – Base Unit.

For 2.4GHz wireless control portion, it operates in the frequency range from 2412MHz to 2475MHz. It receives control signal from the corresponding Remote Controller for game playing.

The EUT is power by an adaptor 120VAC 150mA to 5VDC 1000mA.

The antenna(s) used in the EUT is PCB type antenna

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

1.2 Related Submittal(s) Grants

This is a single application for certification of a transceiver.

The Certification procedure of transceiver for this transceiver (with FCC ID: G2R-2190) is being processed as the same time of this application.

The Declaration of the Conformity procedure of PC Connectivity for this transceiver (with FCC ID: G2R-1836) is being processed as the same time of this application.

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1.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.4 (2009). All radiated measurements were performed in an 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 and conducted measurement facility 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 and IC.

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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 120VAC 60Hz, 150mA, Output: 5VDC 1000mA, Model: SJB0501000VU, Brand: vtech and/or new backup battery: 3V Lithium Battery CR2032 x 1.

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 rear of unit shall be flushed with the rear of the table.

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.

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.

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2.5 Support Equipment List and Description

(1) 8GB Micro SD Card (Provided by Applicant)
(2) Cartridge (Provided by Applicant)
(3) Micro-USB mouse with 1.0m long cable (Provided by Intertek)
(4) HDMI cable of 1.5m(L) with ferrite core (Provided by Applicant)
(5) Mic of 0.9m(L) long (Provided by Applicant)
(6) LCD TV Brand: SONY model: KDL-32W650A (Provided by Intertek)

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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 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
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 dBµV/m
RR = RA - AG - AV in dBµV
LF = CF + AF in dB

Assume a receiver reading of 52.0 dBµV 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 dBµV/m. This value in dBµV/m was converted to its corresponding level in µV/m.

RA = 52.0 dBµV/m
AF = 7.4 dB
CF = 1.6 dB
AG = 29.0 dB
AV = 5.0 dB
FS = RR + LF
FS = 18 + 9 = 27 dBµV/m

RR = 18.0 dBµV
LF = 9.0 dB

Level in µV/m = Common Antilogarithm [(27 dBµV/m)/20] = 22.4 µV/m

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3.2 Radiated Emission Configuration Photograph

The worst case in radiated emission was found at 817.663 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 2.3 dB

3.4 Conducted Emission Configuration Photograph

The worst case in line-conducted emission was found at 0.4515 MHz

For electronic filing, the worst case line-conducted configuration photographs are saved with filename: conducted photo.pdf.

3.5 Conducted Emission Data

For electronic filing, the graph and data table of conducted emission is saved with filename: conducted.pdf.

Judgment: Pass by 10.86 dB

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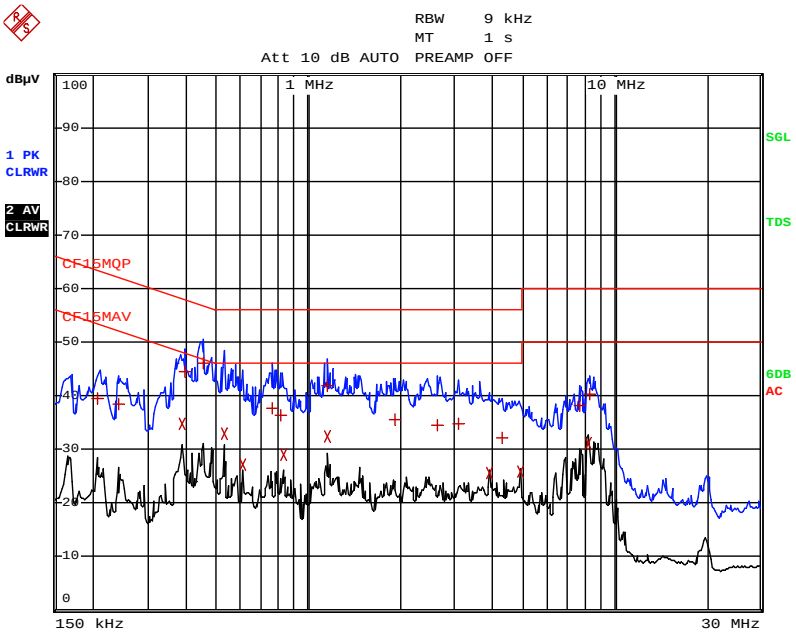
Worst-Case Operating Mode: (WiFi+Remote RF) On and playback mic recorded file from SD card



EDIT PEAK LIST (Final Measurement Results)

Trace1: CF15MQP
Trace2: CF15MAV
Trace3: ---

TRACE		FREQUENCY	LEVEL dBµV		DELTA LIMIT dB
1	Quasi Peak	208.5 kHz	39.58	L1	-23.68
1	Quasi Peak	240 kHz	38.53	L1	-23.56
2	CISPR Average	384 kHz	34.67	N	-13.52
1	Quasi Peak	393 kHz	44.61	L1	-13.38
1	Quasi Peak	451.5 kHz	45.98	L1	-10.86
2	CISPR Average	528 kHz	32.85	N	-13.14
2	CISPR Average	609 kHz	27.21	N	-18.78
1	Quasi Peak	766.5 kHz	37.70	L1	-18.29
1	Quasi Peak	811.5 kHz	36.28	L1	-19.71
2	CISPR Average	834 kHz	29.03	N	-16.96
1	Quasi Peak	1.1535 MHz	41.81	L1	-14.18
2	CISPR Average	1.1535 MHz	32.32	N	-13.67
1	Quasi Peak	1.9185 MHz	35.61	L1	-20.38
1	Quasi Peak	2.652 MHz	34.43	L1	-21.56
1	Quasi Peak	3.102 MHz	34.76	L1	-21.23
2	CISPR Average	3.912 MHz	25.51	N	-20.48
1	Quasi Peak	4.326 MHz	32.19	L1	-23.80
2	CISPR Average	4.9695 MHz	25.98	N	-20.01
1	Quasi Peak	7.6965 MHz	38.24	L1	-21.75
2	CISPR Average	8.268 MHz	31.11	N	-18.88

Note: Measurement Uncertainty is ±4.2dB at a level of confidence of 95%.

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Worst-Case Operating Mode: (WiFi+Remote RF) On and playback mic recorded file from SD card

EDIT PEAK LIST (Final Measurement Results)

Trace1: CF15MQP
Trace2: CF15MAV
Trace3: ---

TRACE		FREQUENCY	LEVEL dBµV		DELTA LIMIT dB
1	Quasi Peak	8.3085 MHz	40.41	L1	-19.58

Note: Measurement Uncertainty is ±4.2dB at a level of confidence of 95%.

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Applicant: VTech Electronics Limited
Model: 1836
Worst-Case Operating Mode: Transmitting

Date of Test: Jul 28 - Aug 10, 2015

Table 1
Radiated Emissions
Pursuant to FCC Part 15 Section 15.249/ RSS-210 A2.9 Requirement

Lowest Channel

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	2412.000	93.4	33	29.4	14.33	75.5	94.0	-18.5
V	2400.000	62.1	33	29.4	14.33	44.2	54.0	-9.8
V	***4824.000***	***55.7***	***33***	***34.9***	***14.33***	***43.3***	***54.0***	***-10.7***
V	***7236.000***	***49.8***	***33***	***37.9***	***14.33***	***40.4***	***54.0***	***-13.6***
V	9648.000	49.1	33	40.4	14.33	42.2	54.0	-11.8
V	***12060.000***	***49.8***	***33***	***40.5***	***14.33***	***43.0***	***54.0***	***-11.0***
V	***14472.000***	***51.5***	***33***	***40.0***	***14.33***	***44.2***	***54.0***	***-9.8***

Polari-zation	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)
V	2412.000	93.4	33	29.4	89.8	114.0	-24.2
V	2400.000	62.1	33	29.4	58.5	74.0	-15.5
V	***4824.000***	***55.7***	***33***	***34.9***	***57.6***	***74.0***	***-16.4***
V	***7236.000***	***49.8***	***33***	***37.9***	***54.7***	***74.0***	***-19.3***
V	9648.000	49.1	33	40.4	56.5	74.0	-17.5
V	***12060.000***	***49.8***	***33***	***40.5***	***57.3***	***74.0***	***-16.7***
V	***14472.000***	***51.5***	***33***	***40.0***	***58.5***	***74.0***	***-15.5***

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 / RSS-210 Section 2.2.
6. Measurement Uncertainty is ±5.3dB at a level of confidence of 95%.

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Applicant: VTech Electronics Limited
Model: 1836
Worst-Case Operating Mode: Transmitting

Date of Test: Jul 28 - Aug 10, 2015

Table 2
Radiated Emissions
Pursuant to FCC Part 15 Section 15.249/ RSS-210 A2.9 Requirement

Middle Channel

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	2445.000	94.3	33	29.4	14.33	76.4	94.0	-17.6
V	***4890.000***	***57.6***	***33***	***34.9***	***14.33***	***45.2***	***54.0***	***-8.8***
V	***7335.000***	***49.5***	***33***	***37.9***	***14.33***	***40.1***	***54.0***	***-13.9***
V	9780.000	49.4	33	40.4	14.33	42.5	54.0	-11.5
V	***12225.000***	***50.2***	***33***	***40.5***	***14.33***	***43.4***	***54.0***	***-10.6***
V	14670.000	53.4	33	38.4	14.33	44.5	54.0	-9.5

Polari-zation	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)
V	2445.000	94.3	33	29.4	90.7	114.0	-23.3
V	***4890.000***	***57.6***	***33***	***34.9***	***59.5***	***74.0***	***-14.5***
V	***7335.000***	***49.5***	***33***	***37.9***	***54.4***	***74.0***	***-19.6***
V	9780.000	49.4	33	40.4	56.8	74.0	-17.2
V	***12225.000***	***50.2***	***33***	***40.5***	***57.7***	***74.0***	***-16.3***
V	14670.000	53.4	33	38.4	58.8	74.0	-15.2

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 / RSS-210 Section 2.2.
6. Measurement Uncertainty is ±5.3dB at a level of confidence of 95%.

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Applicant: VTech Electronics Limited
Model: 1836
Worst-Case Operating Mode: Transmitting

Date of Test: Jul 28 - Aug 10, 2015

Table 3
Radiated Emissions
Pursuant to FCC Part 15 Section 15.249/ RSS-210 A2.9 Requirement

Highest Channel

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	2475.000	94.6	33	29.4	14.33	76.7	94.0	-17.3
V	***2483.500***	***62.8***	***33***	***29.4***	***14.33***	***44.9***	***54.0***	***-9.1***
V	***4950.000***	***58.2***	***33***	***34.9***	***14.33***	***45.8***	***54.0***	***-8.2***
V	***7425.000***	***49.6***	***33***	***37.9***	***14.33***	***40.2***	***54.0***	***-13.8***
V	9900.000	49.3	33	40.4	14.33	42.4	54.0	-11.6
V	***12375.000***	***49.9***	***33***	***40.5***	***14.33***	***43.1***	***54.0***	***-10.9***
V	14850.000	53.2	33	38.4	14.33	44.3	54.0	-9.7

Polari-zation	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)
V	2475.000	94.6	33	29.4	91.0	114.0	-23.0
V	***2483.500***	***62.8***	***33***	***29.4***	***59.2***	***74.0***	***-14.8***
V	***4950.000***	***58.2***	***33***	***34.9***	***60.1***	***74.0***	***-13.9***
V	***7425.000***	***49.6***	***33***	***37.9***	***54.5***	***74.0***	***-19.5***
V	9900.000	49.3	33	40.4	56.7	74.0	-17.3
V	***12375.000***	***49.9***	***33***	***40.5***	***57.4***	***74.0***	***-16.6***
V	14850.000	53.2	33	38.4	58.6	74.0	-15.4

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 / RSS-210 Section 2.2.

6. Measurement Uncertainty is ±5.3dB at a level of confidence of 95%.

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Applicant: VTech Electronics Limited Date of Test: Jul 28 - Aug 10, 2015
Model: 1836
Worst-Case Operating Mode: (WiFi + 2.4GHz RF) On and Play Movie (from SD card)

Table 4
Radiated Emissions
Pursuant to FCC Part 15 Section 15.249/ RSS-210 A2.9 Requirement

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-amp (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Limit at 3m (dBµV/m)	Margin (dB)
V	48.715	29.6	16	11.0	24.6	40.0	-15.4
H	72.922	42.9	16	7.0	33.9	40.0	-6.1
H	81.923	30.2	16	7.0	21.2	40.0	-18.8
H	146.368	25.8	16	14.0	23.8	43.5	-19.7
H	184.520	24.2	16	20.0	28.2	43.5	-15.3
H	***251.206***	***29.9***	***16***	***20.0***	***33.9***	***46.0***	***-12.1***
H	296.087	35.9	16	22.0	41.9	46.0	-4.1
H	347.260	33.1	16	24.0	41.1	46.0	-4.9
H	696.046	25.3	16	30.0	39.3	46.0	-6.7
H	744.180	23.0	16	30.0	37.0	46.0	-9.0
H	817.663	28.7	16	31.0	43.7	46.0	-2.3

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.

6. Measurement Uncertainty is ±5.3dB at a level of confidence of 95%.

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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 and Canada.

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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 / RSS-210 2.5, whichever is the lesser attenuation, which meet the requirement of part 15.249(d) / RSS-210 A2.9.

Lower bandedge

The test data of lower bandedge emission is shown on above table 1 of page 9.

Upper bandedge emission

The test data of upper bandedge emission is shown on above table 3 of page 11.

The resultant field strength meets the general radiated emission limit in Section 15.209, which does not exceed 74 dBμV/m (Peak Limit) and 54 dBμV/m (Average 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 19.2 ms 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

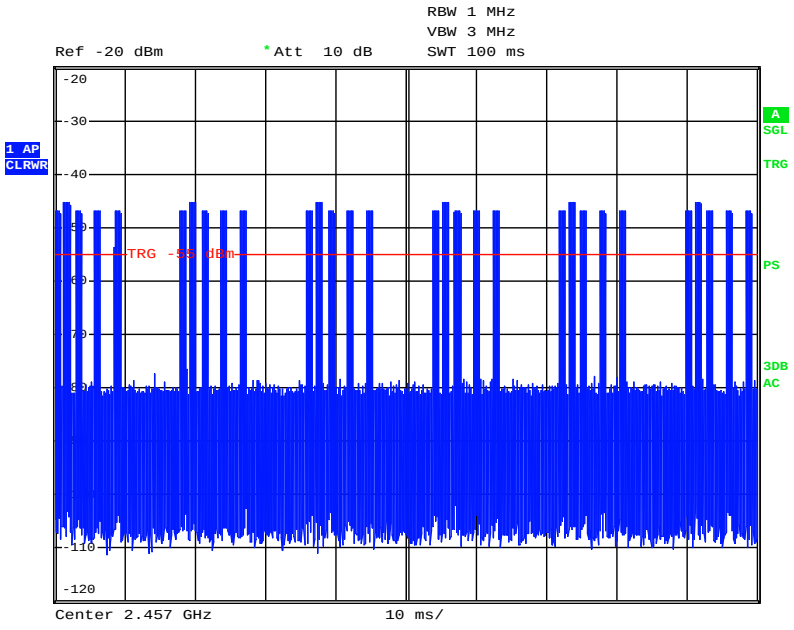
The duty cycle is simply the on-time divided by the period:

The duration of one cycle = 100ms

Effective period of the cycle = 0.16ms x 4 x 5 = 3.2ms
3.2ms x 6 = 19.2 ms

DC = 19.2/100 = 0.192

Therefore, the averaging factor is found by 20log 0.192 = -14.33dB.



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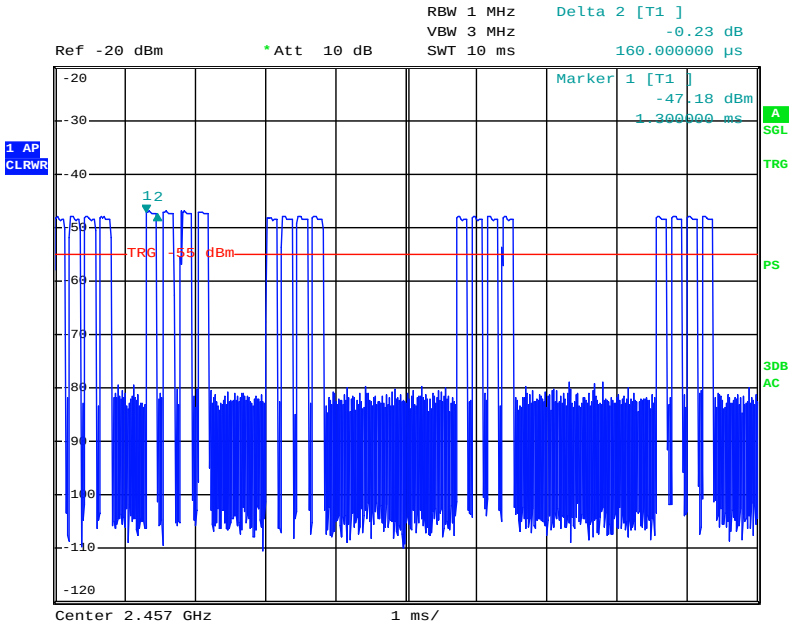
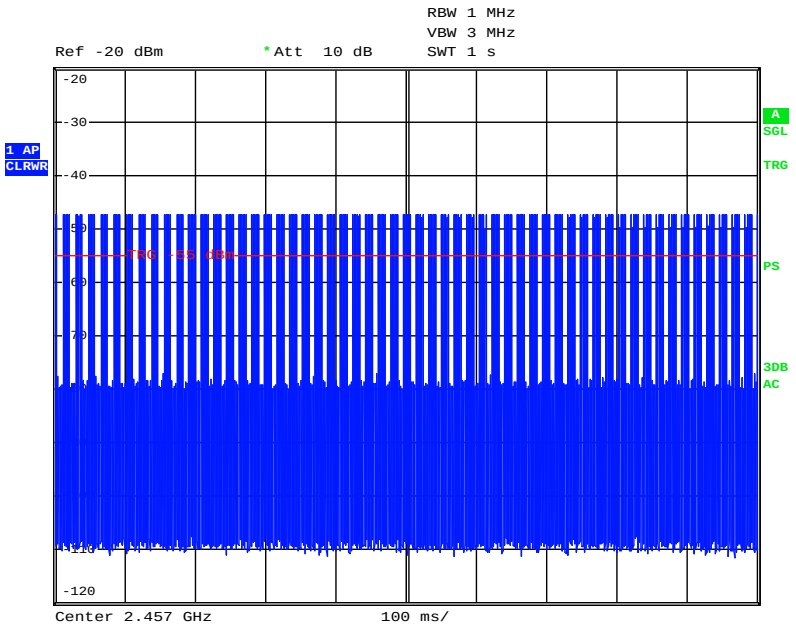
Worst case average factor occurred in normal mode





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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 3 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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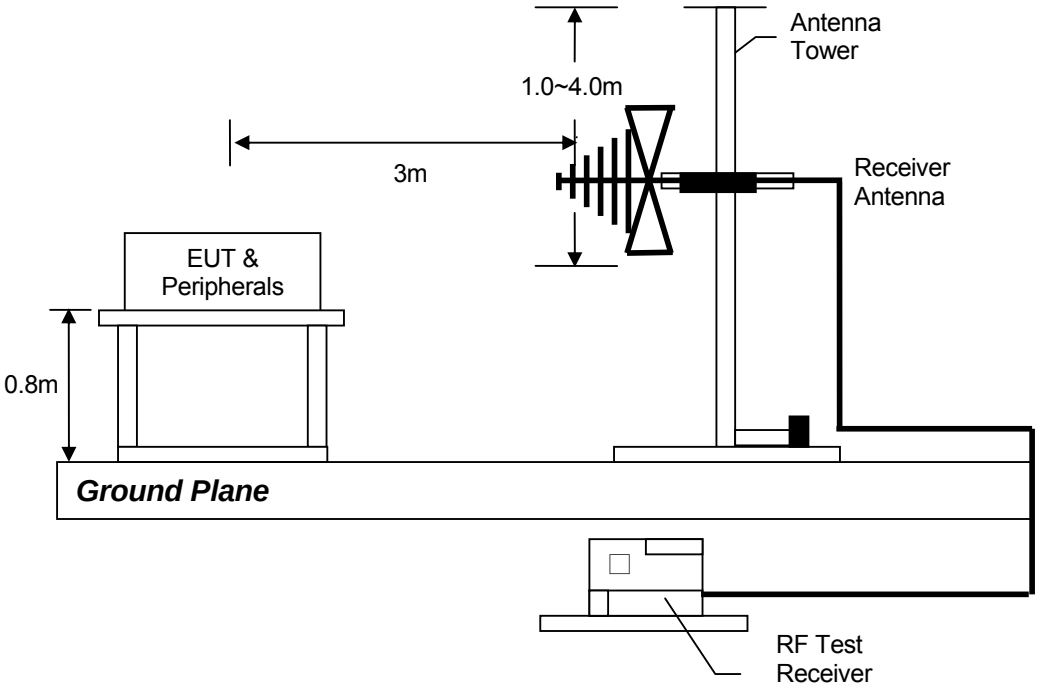
8.4.1 Radiated Emission Test Setup

The figure below shows the test setup, which is utilized to make these measurements.



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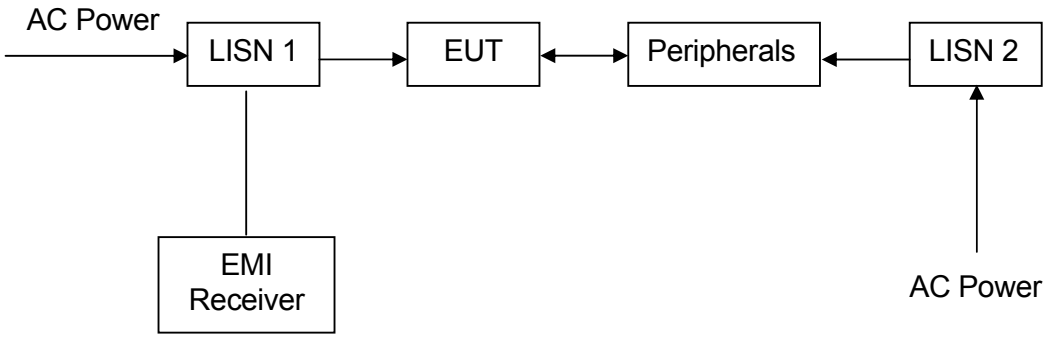
8.4.2 Conducted Emission Test Procedures

For tabletop equipment, the EUT along with its peripherals were placed on a 1.0m(W)×1.5m(L) and 0.8m in height wooden table. For floor-standing equipment, the EUT and all cables were insulated, if required, from the ground plane by up to 12 mm of insulating material. 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 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room. The excess power cable between the EUT and the LISN was bundled.

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

8.4.3 Conducted Emission Test Setup



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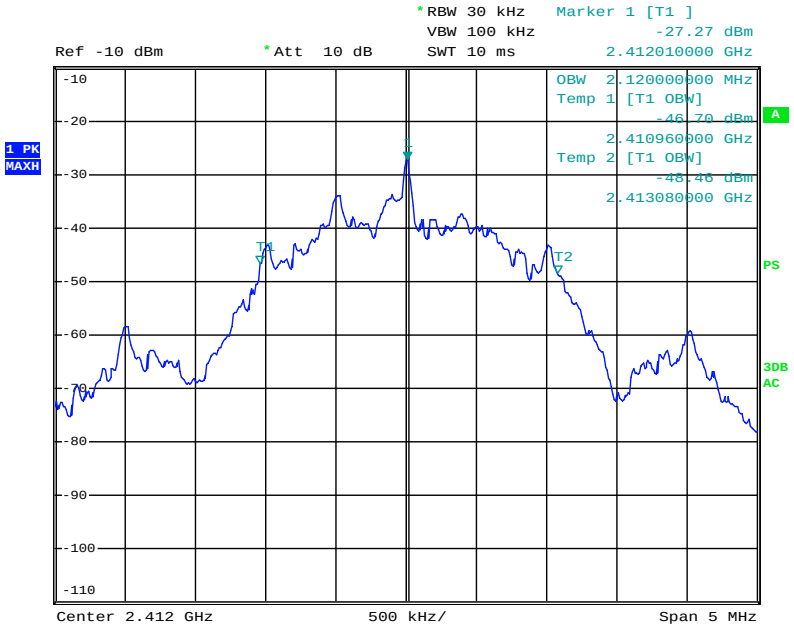
8.5 Occupied Bandwidth

Occupied Bandwidth Results:

	Occupied Bandwidth (MHz)
Low Channel: 2412	2.12
Middle Channel: 2445	2.08
High Channel: 2475	2.09

The worst case is shown as below:



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9.0 Confidentiality Request

For electronic filing, a preliminary copy of the confidentiality request is saved with filename: request.pdf.

10.0 Equipment List

1) Radiated Emissions Test

Equipment	EMI Test Receiver	Biconical Antenna	Spectrum Analyzer
Registration No.	EW-3095	EW-2512	EW-2466
Manufacturer	R&S	EMCO	R&S
Model No.	ESCI	3104C	FSP30
Calibration Date	Oct. 16, 2014	Jan. 22, 2015	Sep. 02, 2014
Calibration Due Date	Oct. 16, 2015	Jul. 22, 2016	Sep. 02, 2015

Equipment	Log Periodic Antenna	Double Ridged Guide Antenna
Registration No.	EW-0447	EW-1133
Manufacturer	EMCO	EMCO
Model No.	3146	3115
Calibration Date	Aug. 19, 2013	Apr. 30, 2014
Calibration Due Date	Feb. 19, 2015	Oct. 30, 2015

2) Conducted Emissions Test

Equipment	LISN	EMI Test Receiver
Registration No.	EW-2501	EW-2251
Manufacturer	R&S	R&S
Model No.	ENV-216	ESCI
Calibration Date	Jan. 15, 2015	Dec. 04, 2014
Calibration Due Date	Jan. 15, 2016	Dec. 04, 2015

3) Occupied Bandwidth & Average Factor Measurement

Equipment	Spectrum Analyzer
Registration No.	EW-2253
Manufacturer	R&S
Model No.	FSP40
Calibration Date	May. 27, 2015
Calibration Due Date	May. 27, 2016

END OF TEST REPORT

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