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TEST REPORT

SCOPE OF WORK
FCC TESTING–TS9030, RAYDANZ

REPORT NUMBER
191126031SZN-004

ISSUE DATE	**[REVISED DATE]**
16 January 2020	[----------]

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TEST REPORT

Intertek Report No.: 191126031SZN-004

TCL entertainment solutions limited

Application
For
Certification

FCC ID: 2ARUDTS9030

3.1 Atmos Sound Bar with Wireless Subwoofer, Wireless Subwoofer

Model: TS9030, RAYDANZ

2.4GHz Transceiver

Report No.: 191126031SZN-004

We hereby certify that the sample of the above item is considered to comply with the requirements of FCC Part 15, Subpart C for Intentional Radiator, mention 47 CFR [10-1-18]

Prepared and Checked by:

Winkey Wang
Sr. Project Engineer

Approved by:

Kidd Yang
Technical Supervisor
Date: 16 January 2020

MEASUREMENT/TECHNICAL REPORT

This report concerns (check one:) Original Grant X Class II Change _____

Equipment Type: DXX - Part 15 Low Power Communication Device Transmitter

Deferred grant requested per 47 CFR 0.457(d)(1)(ii)? Yes _____ No X

If yes, defer until: _____
date

Company Name agrees to notify the Commission by: _____
date
of the intended date of announcement of the product so that the grant can be issued on that date.

Transition Rules Request per 15.37? Yes _____ No X

If no, assumed Part 15, Subpart C for intentional radiator – the new 47 CFR [10-1-18 Edition] provision.

Report prepared by:

Winkey Wang
Intertek Testing Services Shenzhen Ltd. Longhua Branch
101, 201, Building B, No. 308 Wuhe Avenue, Zhangkengjing
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Table of Contents

1.0 Summary of Test Results 4
2.0 General Description 5
2.1 Product Description 5
2.2 Related Submittal(s) Grants 5
2.3 Test Methodology 5
2.4 Test Facility 5
3.0 System Test Configuration 6
3.1 Justification 6
3.2 EUT Exercising Software 6
3.3 Special Accessories 6
3.4 Equipment Modification 6
3.5 Measurement Uncertainty 7
3.6 Support Equipment List and Description 7
4.0 Test Results 8
4.1 Radiated Test Result 8
4.1.1 Field Strength Calculation 8
4.1.2 Radiated Emission Configuration Photograph 9
4.1.3 Radiated Emission 9
4.1.4 Transmitter Spurious Emissions (Radiated) 12
4.2 Conducted Emission at Mains Terminal 16
4.2.1 Conducted Emission Configuration Photograph 16
4.2.2 Conducted Emissions 16
5.0 Equipment Photographs 19
6.0 Product Labelling 19
7.0 Technical Specifications 19
8.0 Instruction Manual 19
9.0 Miscellaneous Information 20
9.1 Bandedge Plot 20
9.2 20dB Bandwidth 22
9.3 Discussion of Pulse Desensitization 23
9.4 Emissions Test Procedures 23
10.0 Test Equipment List 25

1.0 Summary of Test Results

Applicant: TCL entertainment solutions limited
Address: 7/F, building 22E, 22 science park east avenue, Hong Kong science park SHATIN, N.T. , Hong Kong
Manufacturer: TCL entertainment solutions limited
Address: 7/F, building 22E, 22 science park east avenue, Hong Kong science park SHATIN, N.T. , Hong Kong

Model: TS9030

FCC ID: 2ARUDTS9030

Test Specification	Reference	Results
Transmitter Radiated Emission Bandedge	15.249 &15.209 &15.205	Pass
Conducted Emission	15.207	Pass
20dB Bandwidth	15.215(c)	Pass

Notes: The EUT uses an Integral Antenna which in accordance to Section 15.203 is considered sufficient to comply with the provisions of this section.

2.0 General Description

2.1 Product Description

The equipment under test (EUT) is a 3.1 Atmos Sound Bar with Wireless Subwoofer, Wireless Subwoofer with 2.4G transmitter functions operating in 2404.5-2479.5MHz. The EUT is powered by AC 100-240V~ 50/60Hz. For more detail information pls. refer to the user manual.

Antenna Type: Integral antenna
Antenna Gain: 4.25 dBi
Modulation Type: GFSK

The Model: RAYDANZ is the same as the Model: TS9030 in hardware and electrical aspect. The difference in model number and trademark serves as packaging and marketing purpose only.

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

2.2 Related Submittal(s) Grants

This is an application for certification of transceiver for the 3.1 Atmos Sound Bar with Wireless Subwoofer, Wireless Subwoofer which has 2.4G transceiver function. Other digital functions were reported in the verification report: 191126031SZN-001. Bluetooth transceiver function were reported in the test report: 191126031SZN-002. 2.4GHz Wi-Fi transceiver were reported in the test report: 191126031SZN-003. 5GHz Wi-Fi transceiver function were reported in the test report: 191126031SZN-005.

2.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.10 (2013). Radiated emission measurement was performed in semi-anechoic chamber and conducted emission measurement was performed in shield room. For radiated emission measurement, preliminary scans were performed in the semi-anechoic chamber only to determine the 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.

2.4 Test Facility

The Semi-anechoic chamber and shielded room used to collect the radiated data and conducted data are **Intertek Testing Services Shenzhen Ltd. Longhua Branch** and located at 101, 201, Building B, No. 308 Wuhe Avenue, Zhangkengjing Community, GuanHu Subdistrict, LongHua District, Shenzhen. This test facility and site measurement data have been fully placed on file with File Number: CN1188.

3.0 System Test Configuration

3.1 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 C63.10 (2013).

The EUT was powered by AC120V, 60Hz during the test.

For maximizing emissions below 30 MHz, the EUT was rotated through 360°, the centre of the loop antenna was placed 1 meter above the ground, and the antenna polarization was changed. 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 Section 4.

The rear of unit was 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 placed on a turn table, which enabled the engineer to maximize emissions through its placement in the three orthogonal axes.

3.2 EUT Exercising Software

The EUT exercise program (provided by client) used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. The worst case configuration is used in all specified testing.

The parameters of test software setting:
During the test, Channel and power controlling software provided by the applicant was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the application and is going to be fixed on the firmware of the end product.

Test Software: fw_bcm43456c5_ag_mfg V1.0

3.3 Special Accessories

Shielded HDMI Cable

3.4 Equipment Modification

Any modifications installed previous to testing by TCL entertainment solutions limited will be incorporated in each production model sold / leased in the United States.

No modifications were installed by Intertek Testing Services Shenzhen Ltd. Longhua Branch.

3.5 Measurement Uncertainty

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

3.6 Support Equipment List and Description

Description	Manufacturer	Model No.
iPod (Provided by Intertek)	Apple	A1367
Test TV (Provided by Intertek)	SONY	KDL-24EX520
USB Memory (Provided by Intertek)	SanDisk	SDCZ36-002G-P36
Audio Cable (Provided by Intertek)	N/A	Unshielded, Length 120cm
HDMI In Cable (Provided by Intertek)	UGREEN	Unshielded, Length 175cm
HDMI In Cable (Provided by applicant)	Richsound	Shielded, Length 180cm
Detached AC power cord (Provided by applicant)	Richsound	Unshielded, Length 150cm
Optical Cable (Provided by applicant)	Richsound	Unshielded, Length 120cm
Dummy Load (Provided by Intertek)	N/A	75 Ω
Remote control (Provided by applicant)	Provided by applicant	N/A

4.0 Test Results

Data is included worst-case configuration (the configuration which resulted in the highest emission levels).

4.1 Radiated Test Results

A sample calculation, configuration photographs and data tables of the emissions are included.

4.1.1 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 reflect 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

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 = 29.0 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

4.1.2 Radiated Emission Configuration Photograph

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

4.1.3 Radiated Emissions- FCC section 15.209

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. Simultaneous transmission was considered during the test.

Worst Case Radiated Emission

at 179.123000 MHz

Judgement: Passed by 6.1 dB

TEST PERSONNEL:

Sign on file

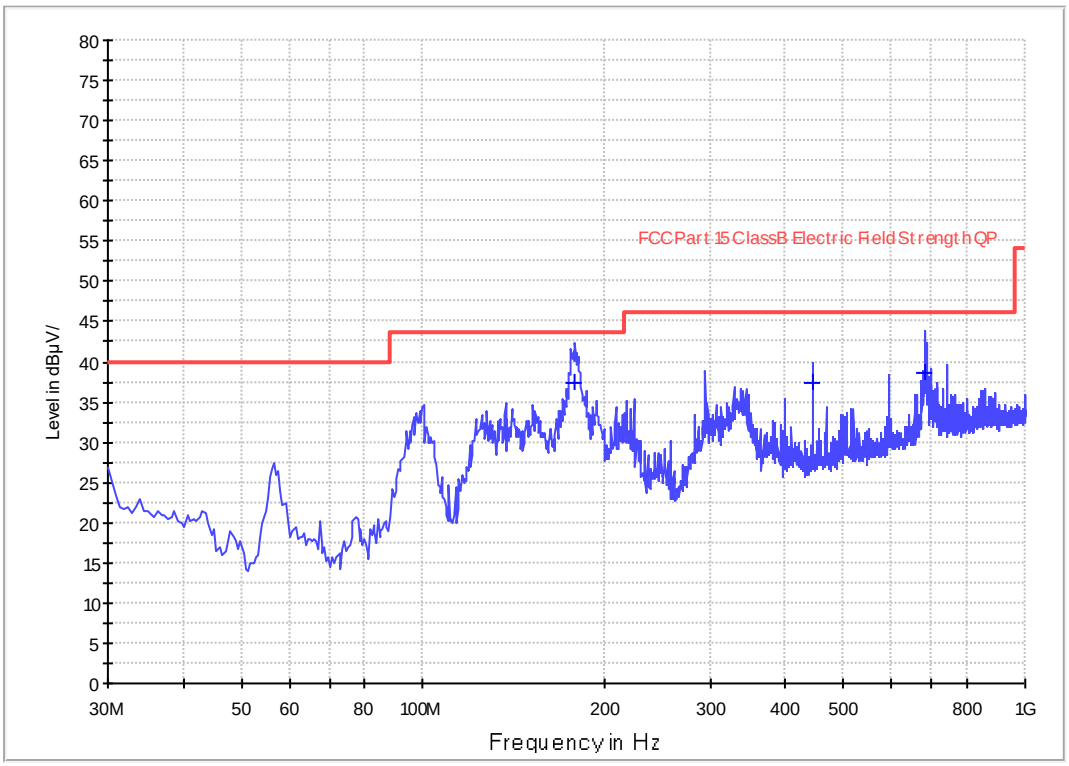
Winkey Wang, Sr. Project Engineer
Typed/Printed Name

January 6, 2020
Date

Applicant: TCL entertainment solutions limited
Date of Test: January 6, 2020
Model:TS9030
Sample: 1/1
Worst-case operating Mode: Transmit
Modulation type: GFSK

ANT Polarity: Horizontal

FCC Part 15

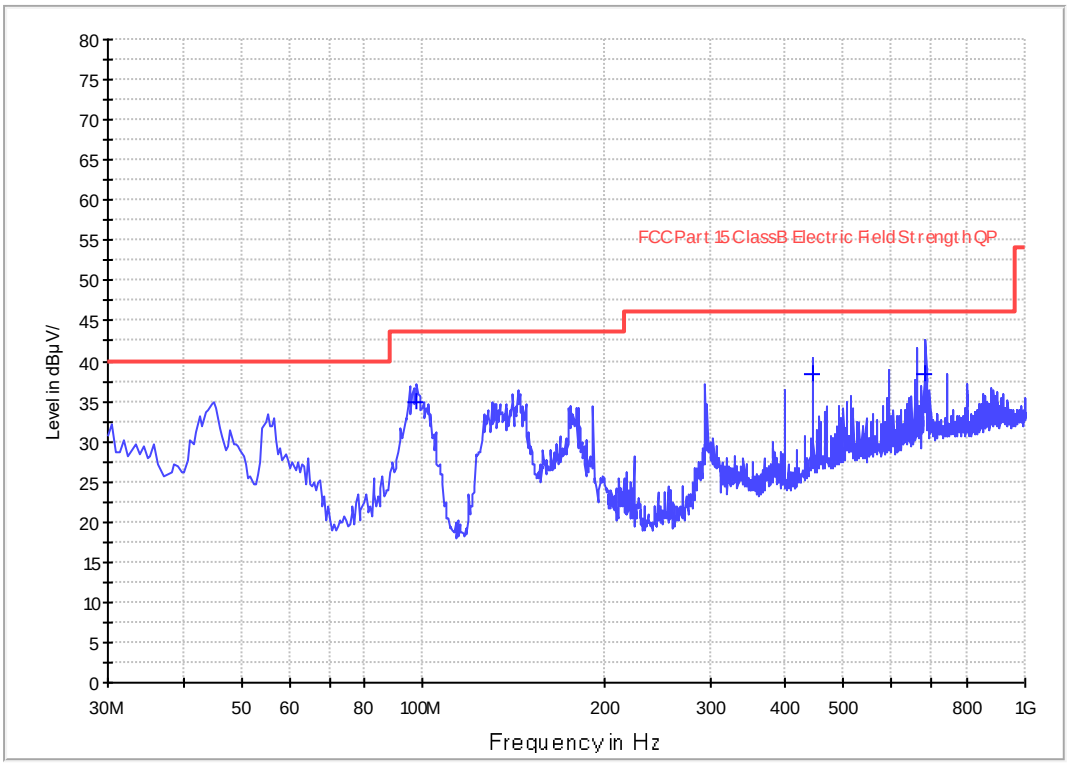


Frequency (MHz)	QuasiPeak (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBuV/m)
179.123000	37.4	1000.0	120.000	0.0	H	12.6	6.1	43.5
445.160000	37.3	1000.0	120.000	0.0	H	21.0	8.7	46.0
682.810000	38.6	1000.0	120.000	0.0	H	26.0	7.4	46.0

Remark:
1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. QuasiPeak (dBµV/m)= Corr. (dB/m)+ Read Level (dBµV)
3. Margin (dB) = Limit Line(dBµV/m) – Level (dBµV/m)

Applicant: TCL entertainment solutions limited
Date of Test: January 6, 2020
Model: TS9030
Sample: 1/1
Worst-case operating Mode: Transmit
Modulation type: GFSK

ANT Polarity: Vertical



Frequency (MHz)	QuasiPeak (dBuV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Polarization	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBuV/m)
97.900000	34.8	1000.0	120.000	0.0	V	10.3	8.7	43.5
445.160000	38.3	1000.0	120.000	0.0	V	21.0	7.7	46.0
684.017250	38.4	1000.0	120.000	0.0	V	26.0	7.6	46.0

Remark:
1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
2. QuasiPeak (dBµV/m)= Corr. (dB/m)+ Read Level (dBµV)
3. Margin (dB) = Limit Line(dBµV/m) – Level (dBµV/m)

4.1.4 Transmitter Spurious Emissions (Radiated) - FCC section 15.209

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.

Worst Case Radiated Emission

at 9778.000 MHz

Judgement: Passed by 7.6 dB

TEST PERSONNEL:

Sign on file

Winkey Wang, Sr. Project Engineer
Typed/Printed Name

January 6, 2020
Date

Applicant: TCL entertainment solutions limited
Date of Test: January 6, 2020
Model: TS9030
Sample: 1/1
Worst-case operating Mode: Transmit (2404.5MHz)
Modulation type: GFSK

Radiated Emissions
(2404.5MHz)

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Vertical	2404.500	87.4	36.7	28.1	78.8	114.0	-35.2
Vertical	4809.000	49.9	36.7	35.5	48.7	74.0	-25.3
Vertical	7213.500	54.9	36.1	36.5	55.3	74.0	-18.7
Vertical	9618.000	52.9	36.2	37.0	53.7	74.0	-20.3

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m	Margin (dB)
Vertical	2404.500	76.5	36.7	28.1	67.9	94.0	-26.1
Vertical	4809.000	41.1	36.7	35.5	39.9	54.0	-14.1
Vertical	7213.500	43.0	36.1	36.5	43.4	54.0	-10.6
Vertical	9618.000	44.2	36.2	37.0	45.0	54.0	-9.0

NOTES:
1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and Average Measurements were made with measurement instrumentation employing an average detector function using a minimum resolution bandwidth of 1 MHz.

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 used for the emission over 1000MHz.

Applicant: TCL entertainment solutions limited
Date of Test: January 6, 2020
Model: TS9030
Sample: 1/1
Worst-case operating Mode: Transmit (2444.5MHz)
Modulation type: GFSK

Radiated Emissions
(2444.5MHz)

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Vertical	2444.500	84.4	36.7	28.1	75.8	114.0	-38.2
Vertical	4889.000	49.4	36.7	35.5	48.2	74.0	-25.8
Vertical	7333.500	53.3	36.1	36.5	53.7	74.0	-20.3
Vertical	9778.000	54.8	36.2	37.0	55.6	74.0	-18.4

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m	Margin (dB)
Vertical	2444.500	74.1	36.7	28.1	65.5	94.0	-28.5
Vertical	4889.000	39.9	36.7	35.5	38.7	54.0	-15.3
Vertical	7333.500	44.9	36.1	36.5	45.3	54.0	-8.7
Vertical	9778.000	45.6	36.2	37.0	46.4	54.0	-7.6

NOTES:
1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and Average Measurements were made with measurement instrumentation employing an average detector function using a minimum resolution bandwidth of 1 MHz.

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 used for the emission over 1000MHz.

Applicant: TCL entertainment solutions limited
Date of Test: January 6, 2020
Model: TS9030
Sample: 1/1
Worst-case operating Mode: Transmit (2479.5MHz)
Modulation type: GFSK

Radiated Emissions
(2479.5MHz)

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Vertical	2479.500	87.6	36.7	28.1	79.0	114.0	-35.0
Vertical	4959.000	49.4	36.7	35.5	48.2	74.0	-25.8
Vertical	7438.500	54.4	36.1	36.5	54.8	74.0	-19.2
Vertical	9918.000	54.1	36.2	37.0	54.9	74.0	-19.1

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m	Margin (dB)
Vertical	2479.500	77.2	36.7	28.1	68.6	94.0	-25.4
Vertical	4959.000	40.5	36.7	35.5	39.3	54.0	-14.7
Vertical	7438.500	45.8	36.1	36.5	46.2	54.0	-7.8
Vertical	9918.000	45.0	36.2	37.0	45.8	54.0	-8.2

NOTES:
1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and Average Measurements were made with measurement instrumentation employing an average detector function using a minimum resolution bandwidth of 1 MHz.

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 used for the emission over 1000MHz.

4.2 Conducted Emission at Mains Terminal

4.2.1 Conducted Emissions Configuration Photograph

For electronic filing, the worst case conducted emission configuration photograph is saved with filename: conducted photos.pdf.

4.2.2 Conducted Emissions

Worst Case Conducted Configuration

at 2.05 MHz

Judgement: Passed by 20.8 dB margin

TEST PERSONNEL:

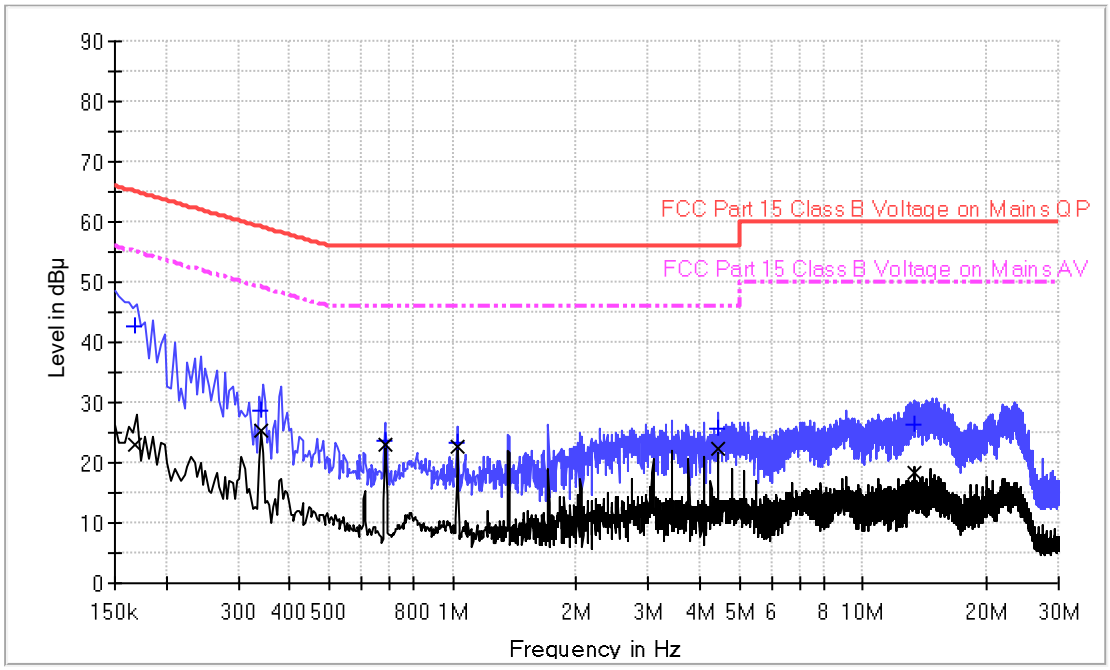
Sign on file

Winkey Wang, Sr. Project Engineer
Typed/Printed Name

January 6, 2020
Date

Applicant: TCL entertainment solutions limited
Date of Test: January 6, 2020
Model: TS9030
Sample: 1/1
Worst-case operating Mode: Transmit
Modulation type: GFSK
Phase: Live

Conducted Emission Test - FCC



Result Table QP

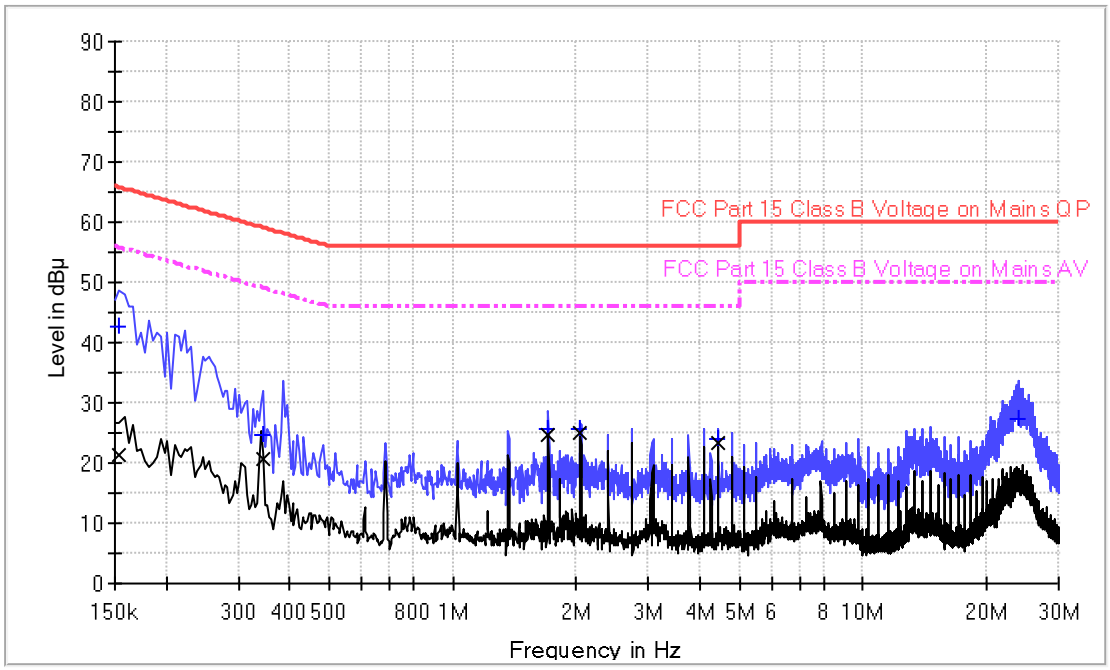
Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.168000	42.6	9.000	L1	9.7	22.5	65.1
0.342000	28.7	9.000	L1	9.7	30.5	59.2
0.682000	23.7	9.000	L1	9.7	32.3	56.0
1.026000	23.5	9.000	L1	9.7	32.5	56.0
4.446000	25.7	9.000	L1	9.8	30.3	56.0
13.382000	26.4	9.000	L1	10.1	33.6	60.0

Result Table AV

Frequency (MHz)	Average (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.168000	23.1	9.000	L1	9.7	32.0	55.1
0.342000	25.4	9.000	L1	9.7	23.8	49.2
0.682000	23.2	9.000	L1	9.7	22.8	46.0
1.026000	22.6	9.000	L1	9.7	23.4	46.0
4.446000	22.3	9.000	L1	9.8	23.7	46.0
13.382000	18.5	9.000	L1	10.1	31.5	50.0

Applicant: TCL entertainment solutions limited
Date of Test: January 6, 2020
Model: TS9030
Sample: 1/1
Worst-case operating Mode: Transmit
Modulation type: GFSK
Phase: Neutral

Conducted Emission Test - FCC



Result Table QP

Frequency (MHz)	QuasiPeak (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.154000	42.7	9.000	N	9.7	23.1	65.8
0.346000	24.6	9.000	N	9.7	34.5	59.1
1.710000	25.5	9.000	N	9.7	30.5	56.0
2.050000	25.7	9.000	N	9.8	30.3	56.0
4.446000	24.1	9.000	N	9.8	31.9	56.0
24.062000	27.5	9.000	N	10.9	32.5	60.0

Result Table AV

Frequency (MHz)	Average (dBuV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)
0.154000	21.4	9.000	N	9.7	34.4	55.8
0.346000	20.5	9.000	N	9.7	28.6	49.1
1.710000	24.8	9.000	N	9.7	21.2	46.0
2.050000	25.2	9.000	N	9.8	20.8	46.0
4.446000	23.3	9.000	N	9.8	22.7	46.0
24.062000	16.3	9.000	N	10.9	33.7	50.0

5.0 Equipment Photographs

For electronic filing, the photographs of the tested EUT are saved with filename: external photos.pdf & internal photos.pdf.

6.0 Product Labelling

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

7.0 Technical Specifications

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

8.0 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.

9.0 Miscellaneous Information

This miscellaneous information includes details of the measured bandedge, the test procedure and calculation of factor such as pulse desensitization.

9.1 Bandedge Plot

The test plots are attached as below. From the plot, the field strength of any emissions outside of the specified frequency band are attenuated to the general radiated emission limits in section 15.209. It fulfils the requirement of 15.249(d).

Peak Measurement

Restricted-band band-edge tests shall be performed as radiated measurements, i.e (Band-edge Plot).

(i) Lower channel 2404.5 MHz:

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Vertical	2400.000	64.8	36.7	28.1	56.2	74.0	-17.8

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m	Margin (dB)
Vertical	2400.000	54.0	36.7	28.1	45.4	54.0	-8.6

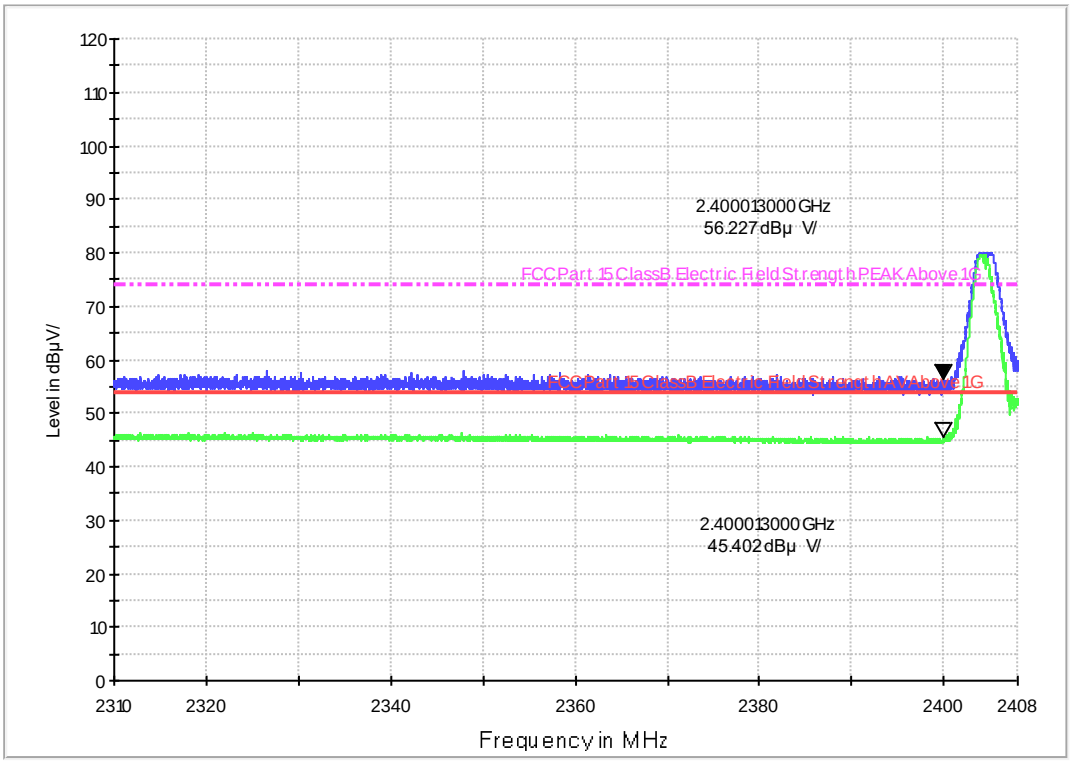
(ii) Upper channel 2479.5 MHz:

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
Vertical	2483.500	62.4	36.8	29.1	54.7	74.0	-19.3

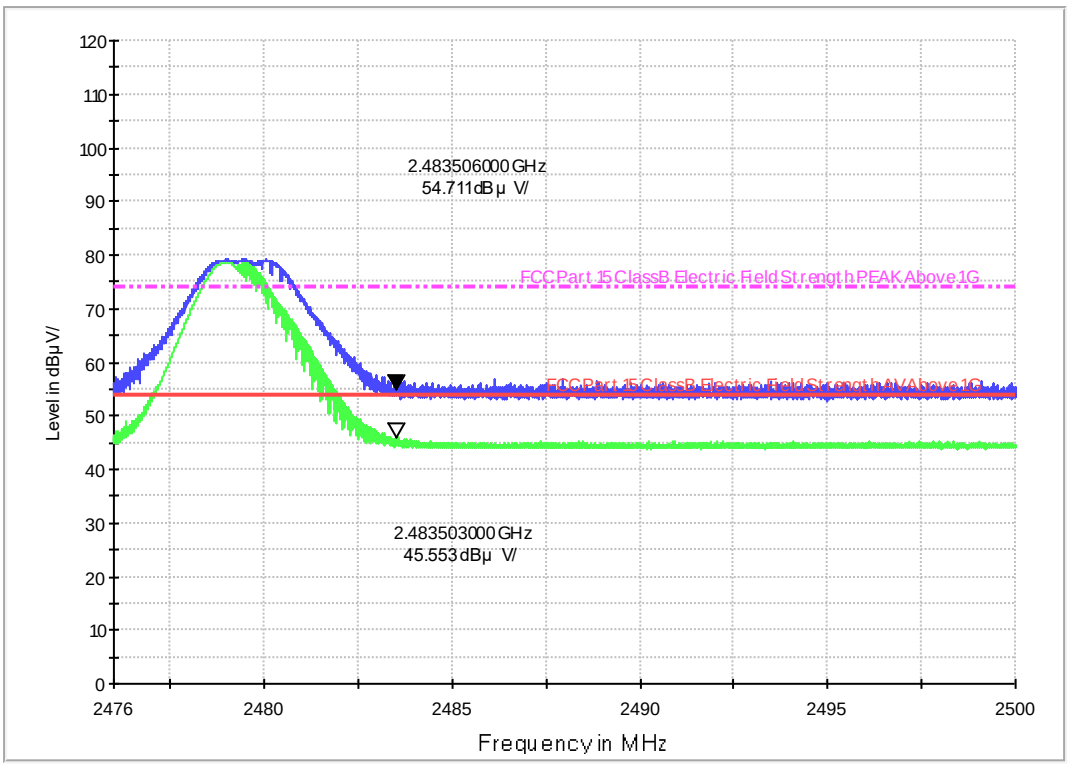
Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Average Limit at 3m (dBµV/m	Margin (dB)
Vertical	2483.500	53.3	36.8	29.1	45.6	54.0	-8.4

The resultant field strength meets the general radiated emission limit in section 15.209, which does not exceed 74dBµv/m (Peak Limit) and 54dBµv/m (Average Limit).

Lowest frequency Channel

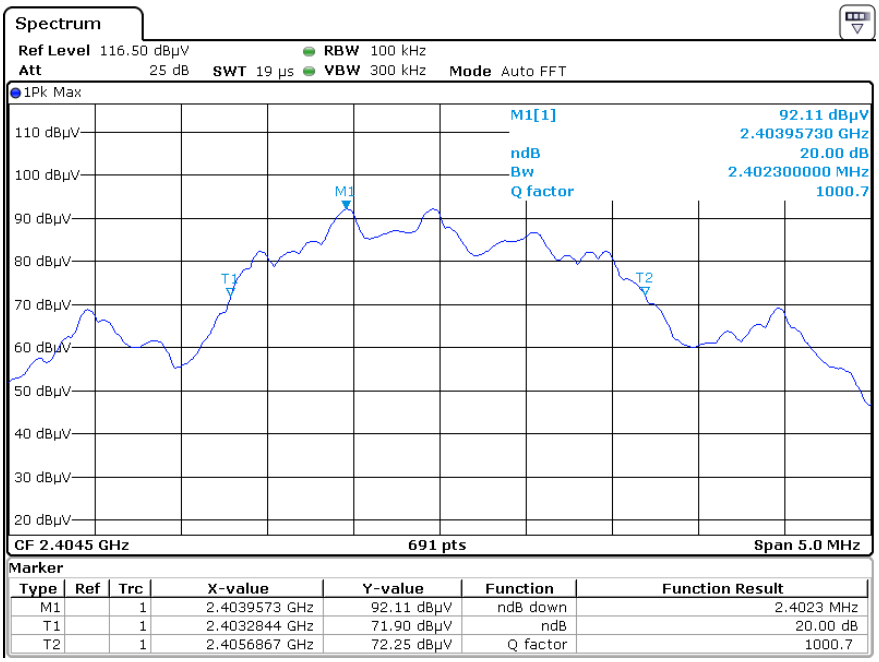


Highest frequency Channel

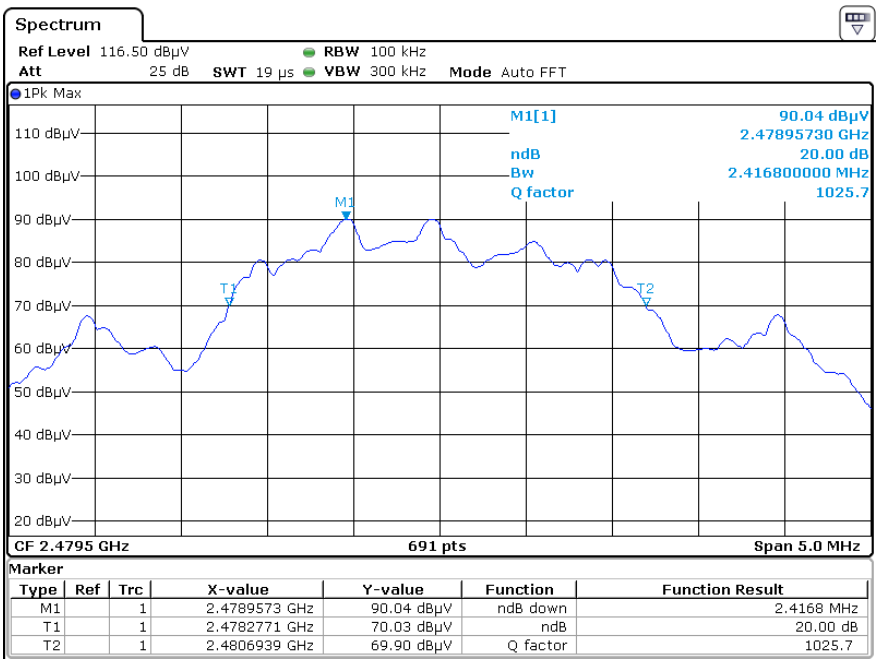


9.2 20dB Bandwidth

Pursuant to FCC part 15 Section 15.215(c), the 20dB 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. The test plots are reported as below.



Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.4039573 GHz	92.11 dBµV	ndB down	2.4023 MHz
T1		1	2.4032844 GHz	71.90 dBµV	ndB	20.00 dB
T2		1	2.4056867 GHz	72.25 dBµV	Q factor	1000.7



Type	Ref	Trc	X-value	Y-value	Function	Function Result
M1		1	2.4789573 GHz	90.04 dBµV	ndB down	2.4168 MHz
T1		1	2.4782771 GHz	70.03 dBµV	ndB	20.00 dB
T2		1	2.4806939 GHz	69.90 dBµV	Q factor	1025.7

9.3 Discussion of Pulse Desensitization

Pulse desensitivity is not applicable for this device since the transmitter transmits the RF signal continuously.

9.4 Emissions Test Procedures

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

The test set-up and procedures described below are designed to meet the requirements of ANSI C63.10 - 2013.

The transmitting equipment under test (EUT) is placed on a styrene turntable which is four feet in diameter and approximately 0.8 meter up to 1GHz and 1.5 meter above 1GHz 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 axes to obtain maximum emission levels. The antenna height and polarization are varied during the testing to search for maximum signal levels.

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 Section 9.4.

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.

Detector function for conducted emissions is in QP & AV mode and IFBW setting is 9 kHz from the frequency band 150 kHz to 30MHz.

9.4 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 are made as described in ANSI C63.10 - 2013.

The IF bandwidth used for measurement of radiated signal strength was 10 kHz for emission below 30 MHz and 120 kHz for emission from 30 MHz to 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 Section 9.3). Above 1000 MHz, a resolution bandwidth of 1 MHz is used, RBW 3MHz used for fundamental emission.

Transmitter measurements are normally conducted at a measurement distance of three meters. However, to assure low enough noise floor in the restricted 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, but those measurements taken at a closer distance are so marked.

10 Test Equipment List

Equipment No.	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due Date
SZ061-12	BiConiLog Antenna	ETS	3142E	00166158	14-Sep-2018	14-Sep-2020
SZ185-01	EMI Receiver	R&S	ESCI	100547	24-Dec-2019	24-Dec-2020
SZ061-08	Horn Antenna	ETS	3115	00092346	24-Aug-2019	24-Aug-2021
SZ061-06	Active Loop Antenna	Electro-Metrics	EM-6876	217	24-May-2019	24-May-2020
SZ056-03	Spectrum Analyzer	R&S	FSP 30	101148	28-May-2019	28-May-2020
SZ056-06	Signal Analyzer	R&S	FSV 40	101101	28-May-2019	28-May-2020
SZ181-04	Preamplifier	Agilent	8449B	3008A02474	05-Jul-2019	05-Jul-2020
SZ188-01	Anechoic Chamber	ETS	RFD-F/A-100	4102	15-Dec-2018	15-Dec-2020
SZ062-02	RF Cable	RADIALL	RG 213U	--	10-Jun-2019	10-Jun-2020
SZ062-05	RF Cable	RADIALL	0.04-26.5GHz	--	10-Jun-2019	10-Jun-2020
SZ062-12	RF Cable	RADIALL	0.04-26.5GHz	--	10-Jun-2019	10-Jun-2020
SZ067-04	Notch Filter	Micro-Tronics	BRM50702-02	--	05-Jun-2018	05-Jun-2020
SZ185-02	EMI Test Receiver	R&S	ESCI	100692	29-Oct-2019	29-Oct-2020
SZ187-01	Two-Line V-Network	R&S	ENV216	100072	29-Oct-2019	29-Oct-2020
SZ187-02	Two-Line V-Network	R&S	ENV216	100073	29-Oct-2019	29-Oct-2020
SZ188-03	Shielding Room	ETS	RFD-100	4100	16-Jan-2017	16-Jan-2020

********** End of Report**********