

Shen Zhen MTC Co., LTD

Application
For
Certification

FCC ID: 2AHVHLG8864

WiFi Module
Brand name: AMTC, LG

Model: TWFP-M601D

2.4GHz WiFi Transceiver Module

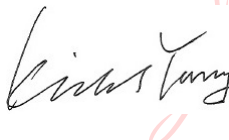
Report No.: 160728012SZN-003

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 [10-1-15]

Prepared and Checked by:

Approved by:

Sign on file

 Digitally signed
by Kidd Yang
Location: Intertek
Testing Services

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Engineer

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Date: August 29, 2016

- The test results reported in this test report shall refer only to the sample actually tested and shall not refer or be deemed to refer to bulk from which such a sample may be said to have been obtained.
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TRF no.: FCC 15C_Tx_b

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MEASUREMENT/TECHNICAL REPORT

WiFi Module

Model: TWFP-M601D

FCC ID: 2AHVHLG8864

This report concerns (check one) Original Grant ☒ Class II Change ☐

Equipment Type: DTS - Part 15 Digital Transmission Systems (WiFi transmitter portion)

Deferred grant requested per 47 CFR 0.457(d)(1)(ii)? Yes ☐ No ☒

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 ☒

If no, assumed Part 15, Subpart C for intentional radiator - the new 47 CFR [10-01-15] Edition] provision.

Report prepared by:

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List of attached file

Exhibit type	File Description	Filename
Test Report	Test Report	report.pdf
Test Setup Photo	Radiated Emission	radiated photos.pdf
Test Setup Photo	Conducted Emission	conducted photos.pdf
External Photo	External Photo	external photos.pdf
Internal Photo	Internal Photo	internal photos.pdf
Block Diagram	Block Diagram	block.pdf
Schematics	Circuit Diagram	circuit.pdf
Operation Description	Technical Description	descri.pdf
ID Label/Location	Label Artwork and Location	label.pdf
User Manual	User Manual	manual.pdf
Cover Letter	Confidentiality Letter	request.pdf
Cover Letter	Letter of Agency	agency.pdf

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EXHIBIT 1

SUMMARY OF TEST RESULTS

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1.0 Summary of Test results

WiFi Module

Model: TWFP-M601D

FCC ID: 2AHVHLG8864

TEST	REFERENCE	RESULTS
Max. Output power	15.247(b)(3)	Pass
6 dB Bandwidth	15.247(a)(2)	Pass
Max. Power Density	15.247(e)	Pass
Out of Band Antenna Conducted Emission	15.247(d)	Pass
Radiated Emission in Restricted Bands	15.247(d)	Pass
AC Conducted Emission	15.207	Pass
Antenna Requirement	15.203	Pass (See Notes)

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.

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EXHIBIT 2

GENERAL DESCRIPTION

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2.0 General Description

2.1 Product Description

The Equipment Under Test (EUT) is a Wifi Module with 4 Antennas. 4 antennas can be used for WiFi 5GHz band and 2.4GHz band. When product operates on SISO mode 802.11b/g/n-HT20/40 mode (2.4G band), only one antenna(Ant1) is used for transmitting according the rationale that the receiver sensitivity has meet internal limit valve. When product operates on MIMO mode (4Tx), Ant1 to Ant4 will transmit simultaneously. The EUT with WiFi function operating at 2412-2462MHz for 802.11b/g/n-HT20, 11 channels with 5MHz channel spacing and 2422-2452MHz for 802.11n-HT40, 7 channels with 5MHz channel spacing. The EUT was powered by adapter AC120V/60Hz. For more detailed features description, please refer to the user's manual.

Type of Modulation: BPSK, QPSK, 16QAM, 64QAM for OFDM. CCK, DQPSK, DBPSK for DSSS.

Antenna Type: Integral Antenna.

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

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2.2 Related Submittal(s) Grants

This is an application for certification of:

DTS- Part 15 Digital Transmission Systems (2.4GHz WiFi transmitter portion)

2.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.10 (2013), KDB 558074v03r05 and KDB 662911 D01 v02r01. 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. All other measurements were made in accordance with the procedures in part 2 of CFR 47.

2.4 Test Facility

The Semi-Anechoic chamber and shield room used to collect the radiated data and conducted data are **Intertek Testing Services Shenzhen Ltd. Kejiyuan Branch** and located at 6F, Block D, Huahan Building, Langshan Road, Nanshan District, Shenzhen, P. R. China. This test facility and site measurement data have been fully placed on file with the FCC (Registration Number: 242492).

EXHIBIT 3
SYSTEM TEST CONFIGURATION

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3.0 System Test Configuration

3.1 Justification

For emissions testing, the equipment under test (EUT) setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, all cables were manipulated to produce worst case emissions. The EUT was powered by adapter AC120V/ 60Hz during the testing. All the data rate of 802.11b/g/n and models with different type were tested and only the worst case was reported.

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

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

All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance. Analyzer resolution is 100 kHz or greater for frequencies below 1000 MHz. The resolution is 1 MHz or greater for frequencies above 1000 MHz. The spurious emissions more than 20 dB below the permissible value are not reported.

Radiated emission measurement were performed 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 to 40 GHz, whichever is lower.

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.

3.3 Special Accessories

N/A

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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.

3.5 Equipment Modification

Any modifications installed previous to testing by Shen Zhen MTC Co., LTD will be incorporated in each production model sold / leased in the United States.

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

3.6 Support Equipment List and Description

This product was tested in the following configuration:

Refer List:

Description	Manufacturer	Model No.
Laptop	HP	Compaq 2510p
Adapter	N/A	GAC-002
HDMI Cable	N/A	1.5m (Unshielded)

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EXHIBIT 4

MEASUREMENT RESULTS

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Applicant: Shen Zhen MTC Co., LTD

Date of Test: August 15, 2016

Model: TWFP-M601D

4.0 Measurement Results

4.1 Maximum Conducted Output Power at Antenna Terminals, FCC Rules 15.247(b)(3):

The antenna power of the EUT was connected to the input of a broadband peak RF power meter. The power meter have a video bandwidth that is greater than DTS bandwidth and utilize a fast-responding diode detector. Power was read directly at the EUT antenna terminals with cable loss added.

For antennas with gains of 6 dBi or less, maximum allowed Transmitter output is 1 watt (+30 dBm). In MIMO (4Tx), $\text{Ant1}+\text{Ant2}+\text{Ant3}+\text{Ant4}$ Directional gain = $G_{\text{ANT}} + 10 \log(N)$ dBi = $-3.5 + 10 \log(4) = 2.5$ dBi, so the Power limit is 30.0dBm (1.0W) for conducted TX power

IEEE 802.11b (Antenna 1, Antenna Gain = -3.5dBi) (CCK, 1Mbps)		
Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2412	17.3	53.7
Middle Channel: 2437	17.4	55.0
High Channel: 2462	17.2	52.5

IEEE 802.11g (Antenna 1, Antenna Gain = -3.5dBi) (16QAM, 6Mbps)		
Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2412	22.2	166.0
Middle Channel: 2437	22.5	177.8
High Channel: 2462	22.4	173.8

IEEE 802.11n-HT20 (Antenna 1, Antenna Gain = -3.5dBi) (16QAM, 6.5Mbps)		
Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2412	23.1	204.2
Middle Channel: 2437	23.3	213.8
High Channel: 2462	23.0	199.5

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IEEE 802.11n-HT40 (Antenna 1, Antenna Gain = -3.5dBi) (64QAM, 13.5Mbps)		
Frequency (MHz)	Output in dBm	Output in mWatt
Low Channel: 2422	22.6	182.0
Middle Channel: 2437	22.4	173.8
High Channel: 2452	22.3	169.8

IEEE 802.11n-HT20 (MIMO, Antenna Gain = -3.5dBi) (16QAM, 6.5Mbps)						
Frequency (MHz)	Output in dBm					Total Output in mWatt
	Ant 1	Ant 2	Ant 3	Ant 4	Total	
Low Channel: 2412	19.5	19.0	19.0	19.5	25.3	337.0
Middle Channel: 2437	19.6	19.6	19.4	19.4	25.5	354.8
High Channel: 2462	19.1	19.0	19.1	19.0	25.1	321.4

IEEE 802.11n-HT40 (MIMO, Antenna Gain = -3.5.0dBi) (64QAM, 13.5Mbps)						
Frequency (MHz)	Output in dBm					Total Output in mWatt
	Ant 1	Ant 2	Ant 3	Ant 4	Total	
Low Channel: 2422	19.2	19.2	19.0	19.0	25.1	325.2
Middle Channel: 2437	19.3	19.3	19.2	19.2	25.3	336.6
High Channel: 2452	19.1	19.2	19.2	19.1	25.2	329.0

Cable loss: 0.5 dB External Attenuation: 0 dB

Cable loss, external attenuation has been included in OFFSET function

EUT max output level = 25.5dBm

For RF Exposure, the information is saved with filename: RF exposure.pdf.

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Applicant: Shen Zhen MTC Co., LTD

Date of Test: August 15, 2016

Model: TWFP-M601D

4.2 Minimum 6 dB RF Bandwidth, FCC Rule 15.247(a)(2):

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RES BW was set to 100 KHz according to FCC KDB 558074. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. A PEAK output reading was taken, a DISPLAY line was drawn 6 dB lower than PEAK level. The 6dB bandwidth was determined from where the channel output spectrum intersected the display line.

Limit: The 6 dB Bandwidth is at least 500 kHz.

IEEE 802.11b (CCK, 1Mbps)(Antenna 1)	
Frequency (MHz)	6 dB Bandwidth (MHz)
2437	10.072

IEEE 802.11g (16QAM, 6Mbps) (Antenna 1)	
Frequency (MHz)	6 dB Bandwidth (MHz)
2437	16.324

IEEE 802.11n-HT20 (16QAM, 6.5Mbps) (Antenna 1)	
Frequency (MHz)	6 dB Bandwidth (MHz)
2437	17.496

IEEE 802.11n-HT40 (64QAM, 13.5Mbps) (Antenna 1)	
Frequency (MHz)	6 dB Bandwidth (MHz)
2437	35.962

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IEEE 802.11n-HT20 (16QAM, 6.5Mbps) (MIMO)	
Frequency (MHz)	6 dB Bandwidth (MHz)
2437	17.366

IEEE 802.11n-HT40 (64QAM, 13.5Mbps) (MIMO)	
Frequency (MHz)	6 dB Bandwidth (MHz)
2437	35.528

Note:

1. Please refer the graph of "6 dB Bandwidth.pdf".
2. For each operating mode, it is not necessary to measure the bandwidth on the high and low channels, as the measured channel bandwidth on the middle channel is at least 150% of the minimum permitted bandwidth.
3. For multiple-input multiple-output (MIMO) systems, it is not necessary to repeat testing on the other chains, as the measured channel bandwidth on testing the middle channel exceeds the minimum permitted bandwidth by more than 50% on one transmit chain.

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Model: TWFP-M601D

4.3 Maximum Power Density Reading, FCC Rule 15.247(e):

The Measurement Procedure PKPSD was set according to the FCC KDB 558074 and KDB662911.

Antenna output of the EUT was coupled directly to spectrum analyzer; if an external attenuator and/or cable was used, these losses are compensated for with the analyzer OFFSET function.

Limit: The Power Density does not exceed 8dBm/3 kHz.

Please refer the graph of "PSD.pdf".

IEEE 802.11b (CCK, 1Mbps)(Antenna 1)	
Frequency (MHz)	Power Density with RBW 100KHz
2412	5.83
2437	6.07
2462	5.48

IEEE 802.11g (16QAM, 6Mbps)(Antenna 1)	
Frequency (MHz)	Power Density with RBW 100KHz
2412	4.04
2437	3.96
2462	3.72

IEEE 802.11n-HT20 (16QAM, 6.5Mbps)(Antenna 1)	
Frequency (MHz)	Power Density with RBW 100KHz
2412	5.12
2437	5.02
2462	4.87

IEEE 802.11n-HT40 (64QAM, 13.5Mbps)(Antenna 1)	
Frequency (MHz)	Power Density with RBW 100KHz
2422	0.78
2437	1.01
2452	0.53

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IEEE 802.11n-HT20 (16QAM, 6.5Mbps)(MIMO)					
Frequency (MHz)	Power Density with RBW 100KHz				Power Density with RBW 3KHz
	Ant1	Ant2	Ant3	Ant4	Total
2412	3.07	3.28	2.71	1.91	-6.44
2437	3.53	2.77	2.77	2.23	-6.36
2462	3.44	2.63	3.16	2.48	-6.26

IEEE 802.11n-HT40 (64QAM, 13.5Mbps)(MIMO)					
Frequency (MHz)	Power Density with RBW 100KHz				Power Density with RBW 3KHz
	Ant1	Ant2	Ant3	Ant4	Total
2422	-0.18	-0.64	-0.82	-0.92	-9.84
2437	-0.48	-1.11	-0.37	-0.93	-9.99
2452	-0.33	-1.04	-0.63	-0.68	-9.87

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Applicant: Shen Zhen MTC Co., LTD

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4.4 Out of Band Conducted Emissions, FCC Rule 15.247(d)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. The Measurement Procedure was set according to the FCC KDB 558074.

All other types of emissions from the EUT shall meet the general limits for radiated frequencies outside the passband.

Refer to the attached test plots for out of band conducted emissions data with rate of 1Mbps for 802.11b, 6Mbps for 802.11g, 6.5Mbps for 802.11n-HT20 and 13.5Mbps for 802.11n-HT40.

The test plots showed all spurious emission up to the tenth harmonic were measured and they were found to be at least 20 dB below the highest level of the desired power in the passband.

Please refer the graph of "Out of Band Conducted Emissions.pdf".

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Applicant: Shen Zhen MTC Co., LTD

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4.5 Out of Band Radiated Emissions (for emissions in 4.4 above that are less than 20dB below carrier), FCC Rule 15.247(d):

For out of band emissions that are close to or that exceed the 20dB attenuation requirement described in the specification, radiated measurements were performed at a 3m separation distance to determine whether these emissions complied with the general radiated emission requirement.

☒ Not required, since all emissions are more than 20dB below fundamental

☐ See attached data sheet

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Applicant: Shen Zhen MTC Co., LTD

Date of Test: August 15, 2016

Model: TWFP-M601D

4.6 Transmitter Radiated Emissions in Restricted Bands, FCC Rule 15.35(b), (c):

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. All measurements were performed with peak detection unless otherwise specified.

The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

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Model: TWFP-M601D

4.7 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.

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

Where FS = Field Strength in dB μ V/m

RA = Receiver Amplitude (including preamplifier) in dB μ V

CF = Cable Attenuation Factor in dB

AF = Antenna Factor in dB

AG = Amplifier Gain in dB

PD = Pulse Desensitization 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:

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

Example

Assume a receiver reading of 62.0 dB μ V 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. The net field strength for comparison to the appropriate emission limit is 42 dB μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

$$RA = 62.0 \text{ dB}\mu\text{V}$$

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

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

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

$$PD = 0 \text{ dB}$$

$$FS = 62 + 7.4 + 1.6 - 29 + 0 = 42 \text{ dB}\mu\text{V/m}$$

$$\text{Level in mV/m} = \text{Common Antilogarithm} [(42 \text{ dB}\mu\text{V/m})/20] = 125.9 \mu\text{V/m}$$

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4.8 Radiated Spurious Emission

Worst Case Radiated Spurious Emission at 40.680MHz is passed by 12.5dB margin.
Simultaneous transmitting was considered during the testing.

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

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Model: TWFP-M601D

Worst Case Operating Mode: 802.11n-HT20 (TX-Channel 01)

Radiated Emissions

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)
Horizontal	30.970	23.4	20.0	17.9	21.3	40.0	-18.7
Horizontal	441.765	38.0	20.0	11.3	29.3	43.5	-14.2
Horizontal	638.220	22.3	20.0	29.7	32.0	46.0	-14.0
Vertical	38.245	31.2	20.0	13.3	24.5	40.0	-15.5
Vertical	40.680	38.9	20.0	8.6	27.5	40.0	-12.5
Vertical	177.925	17.5	20.0	28.0	25.5	46.0	-20.5

- NOTES:
1. Quasi-Peak detector is used except for others 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 value in the margin column shows emission below limit.
 4. All emissions are below the QP limit.

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Applicant: Shen Zhen MTC Co., LTD

Date of Test: August 15, 2016

Model: TWFP-M601D

Worst Case Operating Mode: Antenna 1, 802.11b (TX-Channel 01)

Radiated Emissions

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	*4824.000	54.3	36.1	34.2	52.4	74.0	-21.6
Vertical	*2389.400	44.8	20.0	28.2	53.0	74.0	-21.0

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	*4824.000	36.9	36.1	34.2	35.0	54.0	-19.0
Vertical	*2389.4000	26.1	20.0	28.2	34.3	54.0	-19.7

- NOTES: 1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.
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.
- * Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

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Date of Test: August 15, 2016

Model: TWFP-M601D

Worst Case Operating Mode: Antenna 1, 802.11b (TX-Channel 06)

Radiated Emissions

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	*4874.000	52.5	36.1	34.6	51.0	74.0	-23.0
Vertical	*7311.000	53.1	35.6	37.1	54.6	74.0	-19.4

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	*4874.000	37.0	36.1	34.6	35.5	54.0	-18.5
Vertical	*7311.000	38.7	35.6	37.1	40.2	54.0	-13.8

- NOTES: 1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.
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.
- * Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

TRF no.: FCC 15C_TX_b

FCC ID: 2AHVHLG8864

Report No.: 160728012SZN-003

INTERTEK TESTING SERVICES

Applicant: Shen Zhen MTC Co., LTD

Date of Test: August 15, 2016

Model: TWFP-M601D

Worst Case Operating Mode: Antenna 1, 802.11b (TX-Channel 11)

Radiated Emissions

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	*4924.000	54.3	36.1	34.6	52.8	74.0	-21.2
Vertical	*2483.510	41.4	20.0	28.0	49.4	74.0	-24.6

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	*4924.000	36.8	36.1	34.6	35.3	54.0	-18.7
Vertical	*2483.510	27.6	20.0	28.0	35.6	54.0	-18.4

- NOTES: 1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.
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.
- * Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

TRF no.: FCC 15C_TX_b

FCC ID: 2AHVHLG8864

Report No.: 160728012SZN-003

INTERTEK TESTING SERVICES

Applicant: Shen Zhen MTC Co., LTD

Date of Test: August 15, 2016

Model: TWFP-M601D

Worst Case Operating Mode: Antenna 1, 802.11g (TX-Channel 01)

Radiated Emissions

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	*4824.000	53.6	36.1	34.2	51.7	74.0	-22.3
Vertical	*2390.000	27.6	20.0	28.2	35.8	74.0	-38.2

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	*4824.000	36.8	36.1	34.2	34.9	54.0	-19.1
Vertical	*2390.000	26.0	20.0	28.2	34.2	54.0	-19.8

- NOTES: 1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.
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.
- * Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

TRF no.: FCC 15C_TX_b

FCC ID: 2AHVHLG8864

Report No.: 160728012SZN-003

INTERTEK TESTING SERVICES

Applicant: Shen Zhen MTC Co., LTD

Date of Test: August 15, 2016

Model: TWFP-M601D

Worst Case Operating Mode: Antenna 1, 802.11g (TX-Channel 06)

Radiated Emissions

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	*4874.000	52.1	36.1	34.6	50.6	74.0	-23.4
Vertical	*7311.000	51.7	35.6	37.1	53.2	74.0	-20.8

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	*4874.000	36.3	36.1	34.6	34.8	54.0	-19.2
Vertical	*7311.000	38.1	35.6	37.1	39.6	54.0	-14.4

- NOTES:
1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.
 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.
- * Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

TRF no.: FCC 15C_TX_b

FCC ID: 2AHVHLG8864

Report No.: 160728012SZN-003

INTERTEK TESTING SERVICES

Applicant: Shen Zhen MTC Co., LTD

Date of Test: August 15, 2016

Model: TWFP-M601D

Worst Case Operating Mode: Antenna 1, 802.11g (TX-Channel 11)

Radiated Emissions

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	*4924.000	52.6	36.1	34.6	51.1	74.0	-22.9
Vertical	*2483.520	46.0	20.0	28.0	54.0	74.0	-20.0

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	*4924.000	35.8	36.1	34.6	34.3	54.0	-19.7
Vertical	*2483.520	26.0	20.0	28.0	34.0	54.0	-20.0

- NOTES: 1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.
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.
- * Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

INTERTEK TESTING SERVICES

Applicant: Shen Zhen MTC Co., LTD

Date of Test: August 15, 2016

Model: TWFP-M601D

Worst Case Operating Mode: Antenna 1, 802.11n-HT20 (TX-Channel 01)

Radiated Emissions

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	*4824.000	51.6	36.1	34.2	49.7	74.0	-24.3
Vertical	*2390.000	36.9	20.0	28.2	45.1	74.0	-28.9

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	*4824.000	36.2	36.1	34.2	34.3	54.0	-19.7
Vertical	*2390.000	26.9	20.0	28.2	35.1	54.0	-18.9

- NOTES:
1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.
 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.
- * Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

TRF no.: FCC 15C_TX_b

FCC ID: 2AHVHLG8864

Report No.: 160728012SZN-003

INTERTEK TESTING SERVICES

Applicant: Shen Zhen MTC Co., LTD

Date of Test: August 15, 2016

Model: TWFP-M601D

Worst Case Operating Mode: Antenna 1, 802.11n-HT20 (TX-Channel 06)

Radiated Emissions

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	*4874.000	51.9	36.1	34.2	50.0	74.0	-24.0
Vertical	*7311.000	52.7	35.6	37.1	54.2	74.0	-19.8

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	*4874.000	36.5	36.1	34.2	34.6	54.0	-19.4
Vertical	*7311.000	33.1	35.6	37.1	34.6	54.0	-19.4

- NOTES:
1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.
 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.
- * Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

TRF no.: FCC 15C_TX_b

FCC ID: 2AHVHLG8864

Report No.: 160728012SZN-003

INTERTEK TESTING SERVICES

Applicant: Shen Zhen MTC Co., LTD

Date of Test: August 15, 2016

Model: TWFP-M601D

Worst Case Operating Mode: Antenna 1, 802.11n-HT20 (TX-Channel 11)

Radiated Emissions

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	*4924.000	51.5	36.1	34.6	50.0	74.0	-24.0
Vertical	*2483.534	42.8	20.0	28.0	50.8	74.0	-23.2

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	*4924.000	37.0	36.1	34.6	35.5	54.0	-18.5
Vertical	*2483.534	25.9	20.0	28.0	33.9	54.0	-20.1

- NOTES: 1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.
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.
- * Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

INTERTEK TESTING SERVICES

Applicant: Shen Zhen MTC Co., LTD

Date of Test: August 15, 2016

Model: TWFP-M601D

Worst Case Operating Mode: Antenna 1, 802.11n-HT40 (TX-Channel 03)

Radiated Emissions

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	*4844.000	52.5	36.1	34.2	50.6	74.0	-23.4
Vertical	*2389.452	42.7	20.0	28.2	50.9	74.0	-23.1

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	*4844.000	38.3	36.1	34.2	36.4	54.0	-17.6
Vertical	*2389.452	25.6	20.0	28.2	33.8	54.0	-20.2

- NOTES:
1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.
 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.
- * Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

TRF no.: FCC 15C_TX_b

FCC ID: 2AHVHLG8864

Report No.: 160728012SZN-003

INTERTEK TESTING SERVICES

Applicant: Shen Zhen MTC Co., LTD

Date of Test: August 15, 2016

Model: TWFP-M601D

Worst Case Operating Mode: Antenna 1, 802.11n-HT40 (TX-Channel 06)

Radiated Emissions

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	*4874.000	52.8	36.1	34.2	50.9	74.0	-23.1
Vertical	*7311.000	52.6	35.6	37.1	54.1	74.0	-19.9

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	*4874.000	38.1	36.1	34.2	36.2	54.0	-17.8
Vertical	*7311.000	38.7	35.6	37.1	40.2	54.0	-13.8

- NOTES:
1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.
 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.
- * Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

TRF no.: FCC 15C_TX_b

FCC ID: 2AHVHLG8864

Report No.: 160728012SZN-003

INTERTEK TESTING SERVICES

Applicant: Shen Zhen MTC Co., LTD

Date of Test: August 15, 2016

Model: TWFP-M601D

Worst Case Operating Mode: Antenna 1, 802.11n-HT40 (TX-Channel 09)

Radiated Emissions

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	*4904.000	52.7	36.1	34.6	51.2	74.0	-22.8
Vertical	*2483.510	42.3	20.0	28.0	50.3	74.0	-23.7

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	*4904.000	38.3	36.1	34.6	36.8	54.0	-17.2
Vertical	*2483.510	26.0	20.0	28.0	34.0	54.0	-20.0

- NOTES:
1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.
 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.
- * Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

INTERTEK TESTING SERVICES

Applicant: Shen Zhen MTC Co., LTD

Date of Test: August 15, 2016

Model: TWFP-M601D

Worst Case Operating Mode: MIMO, 802.11n-HT20 (TX-Channel 01)

Radiated Emissions

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	*4824.000	52.2	36.1	34.2	50.3	74.0	-23.7
Vertical	*2389.990	41.8	20.0	28.2	50.0	74.0	-24.0

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	*4824.000	37.8	36.1	34.2	35.9	54.0	-18.1
Vertical	*2389.990	25.6	20.0	28.2	33.8	54.0	-20.2

- NOTES:
1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.
 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.
- * Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

TRF no.: FCC 15C_TX_b

FCC ID: 2AHVHLG8864

Report No.: 160728012SZN-003

INTERTEK TESTING SERVICES

Applicant: Shen Zhen MTC Co., LTD

Date of Test: August 15, 2016

Model: TWFP-M601D

Worst Case Operating Mode: MIMO, 802.11n-HT20 (TX-Channel 06)

Radiated Emissions

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	*4874.000	52.1	36.1	34.2	50.2	74.0	-23.8
Vertical	*7311.000	53.1	35.6	37.1	54.6	74.0	-19.4

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	*4874.000	38.4	36.1	34.2	36.5	54.0	-17.5
Vertical	*7311.000	39.1	35.6	37.1	40.6	54.0	-13.4

- NOTES:
1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.
 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.
- * Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

INTERTEK TESTING SERVICES

Applicant: Shen Zhen MTC Co., LTD

Date of Test: August 15, 2016

Model: TWFP-M601D

Worst Case Operating Mode: MIMO, 802.11n-HT20 (TX-Channel 11)

Radiated Emissions

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	*4924.000	51.8	36.1	34.6	50.3	74.0	-23.7
Vertical	*2483.560	46.8	20.0	28.0	54.8	74.0	-19.2

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	*4924.000	37.0	36.1	34.6	35.5	54.0	-18.5
Vertical	*2483.560	25.8	20.0	28.0	33.8	54.0	-20.2

- NOTES: 1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.
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.
- * Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

INTERTEK TESTING SERVICES

Applicant: Shen Zhen MTC Co., LTD

Date of Test: August 15, 2016

Model: TWFP-M601D

Worst Case Operating Mode: MIMO, 802.11n-HT40 (TX-Channel 03)

Radiated Emissions

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	*4844.000	53.3	36.1	34.2	51.4	74.0	-22.6
Vertical	*2390.000	47.0	20.0	28.2	55.2	74.0	-18.8

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	*4844.000	38.5	36.1	34.2	36.6	54.0	-17.4
Vertical	*2390.000	26.2	20.0	28.2	34.4	54.0	-19.6

- NOTES:
1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.
 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.
- * Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

TRF no.: FCC 15C_TX_b

FCC ID: 2AHVHLG8864

Report No.: 160728012SZN-003

INTERTEK TESTING SERVICES

Applicant: Shen Zhen MTC Co., LTD

Date of Test: August 15, 2016

Model: TWFP-M601D

Worst Case Operating Mode: MIMO, 802.11n-HT40 (TX-Channel 06)

Radiated Emissions

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	*4874.000	53.0	36.1	34.2	51.1	74.0	-22.9
Vertical	*7311.000	52.4	35.6	37.1	53.9	74.0	-20.1

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	*4874.000	38.1	36.1	34.2	36.2	54.0	-17.8
Vertical	*7311.000	39.3	35.6	37.1	40.8	54.0	-13.2

- NOTES: 1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.
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.
- * Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

TRF no.: FCC 15C_TX_b

FCC ID: 2AHVHLG8864

Report No.: 160728012SZN-003

INTERTEK TESTING SERVICES

Applicant: Shen Zhen MTC Co., LTD

Date of Test: August 15, 2016

Model: TWFP-M601D

Worst Case Operating Mode: MIMO, 802.11n-HT40 (TX-Channel 09)

Radiated Emissions

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	*4904.000	53.4	36.1	34.6	51.9	74.0	-22.1
Vertical	*2483.500	47.5	20.0	28.0	55.5	74.0	-18.5

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	*4904.000	38.2	36.1	34.6	36.7	54.0	-17.3
Vertical	*2483.500	26.8	20.0	28.0	34.8	54.0	-19.2

- NOTES: 1. Peak detector is used, RBW=1MHz/VBW=3MHz for peak value and RBW=1MHz / VBW=10Hz for average value.
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.
- * Emission within the restricted band meets the requirement of section 15.205. The corresponding limit as per 15.209 is based on Quasi peak limit for frequencies below 1000 MHz and average limit for frequencies over 1000 MHz. The radio frequency emissions above 1GHz also meet corresponding 20dB permitted peak limit with a peak detector function.

TRF no.: FCC 15C_TX_b

FCC ID: 2AHVHLG8864

Report No.: 160728012SZN-003

INTERTEK TESTING SERVICES

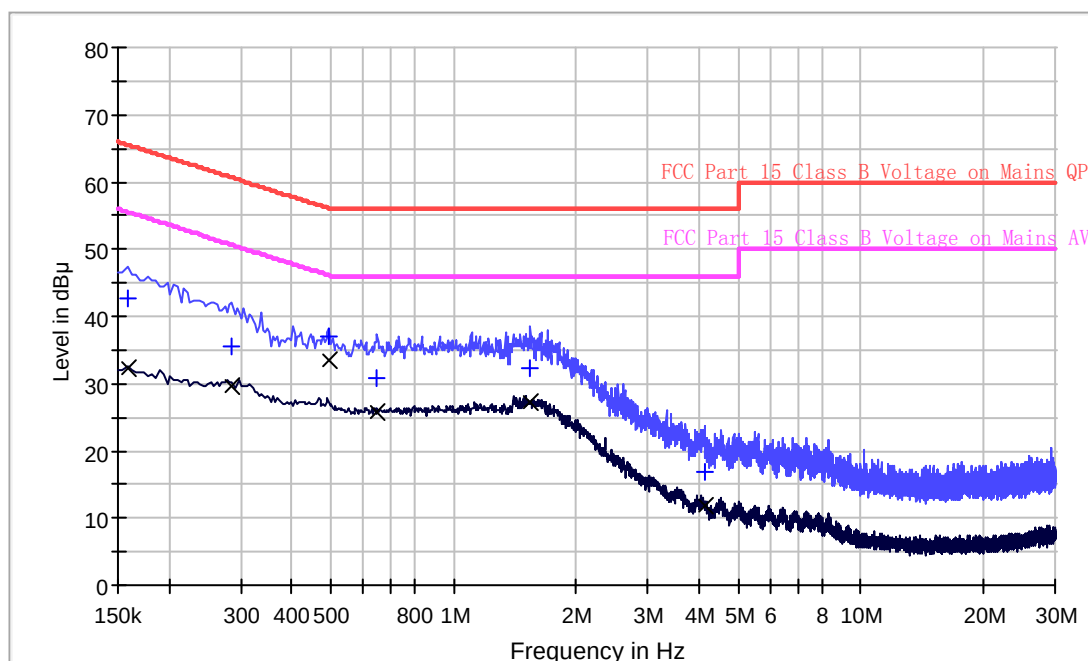
4.9 Conducted Emission

Worst Case Conducted emission at 0.494MHz is Passed by 12.5dB margin

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

INTERTEK TESTING SERVICES

Applicant: Shen Zhen MTC Co., LTD
 Date of Test: August 15, 2016
 Model: TWFP-M601D
 Worst Case Operating Mode: Transmitting
 Line: Live
Conducted Emission Test - FCC



Limit and Margin QP

Frequency (MHz)	QuasiPeak (dB μV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB μV)
0.158	42.5	9.000	L1	9.5	23.1	65.6
0.286	35.6	9.000	L1	9.6	25.0	60.6
0.494	36.9	9.000	L1	9.6	19.2	56.1
0.650	30.8	9.000	L1	9.6	25.2	56.0
1.546	32.2	9.000	L1	9.6	23.8	56.0
4.158	17.0	9.000	L1	9.6	39.0	56.0

Result Table AV

Frequency (MHz)	Average (dB μV)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB μV)
0.158	32.3	9.000	L1	9.5	23.3	55.6
0.286	29.5	9.000	L1	9.6	21.1	50.6
0.494	33.6	9.000	L1	9.6	12.5	46.1
0.650	25.7	9.000	L1	9.6	20.3	46.0
1.546	27.1	9.000	L1	9.6	18.9	46.0
4.158	11.8	9.000	L1	9.6	34.2	46.0

TRF no.: FCC 15C_TX_b
 FCC ID: 2AHVHLG8864
 Report No.: 160728012SZN-003

INTERTEK TESTING SERVICES

Applicant: Shen Zhen MTC Co., LTD

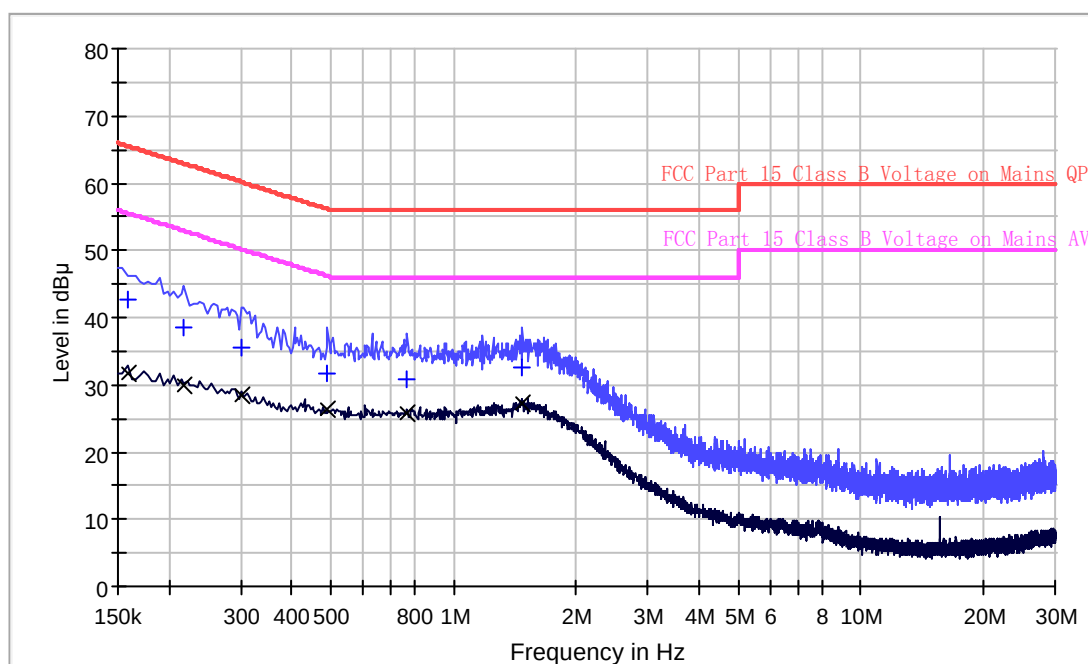
Date of Test: August 15, 2016

Model: TWFP-M601D

Worst Case Operating Mode: Transmitting

Line: Neutral

Conducted Emission Test - FCC



Result Table QP

Frequency (MHz)	QuasiPeak (dB μ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.158	42.6	9.000	N	9.6	23.0	65.6
0.218	38.6	9.000	N	9.6	24.3	62.9
0.302	35.7	9.000	N	9.6	24.5	60.2
0.490	31.8	9.000	N	9.6	24.4	56.2
0.770	30.7	9.000	N	9.6	25.3	56.0
1.478	32.5	9.000	N	9.6	23.5	56.0

Result Table AV

Frequency (MHz)	Average (dB μ V)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.158	31.7	9.000	N	9.6	23.9	55.6
0.218	29.9	9.000	N	9.6	23.0	52.9
0.302	28.3	9.000	N	9.6	21.9	50.2
0.490	26.3	9.000	N	9.6	19.9	46.2
0.770	25.7	9.000	N	9.6	20.3	46.0
1.478	27.3	9.000	N	9.6	18.7	46.0

TRF no.: FCC 15C_TX_b

FCC ID: 2AHVHLG8864

Report No.: 160728012SZN-003

INTERTEK TESTING SERVICES

Applicant: Shen Zhen MTC Co., LTD
Model: TWFP-M601D

4.10 Radiated Emissions from Digital Section of Transceiver, FCC Ref: 15.109

☒ Not required - No digital part

☐ Test results are attached

☐ Included in the separated report.

INTERTEK TESTING SERVICES

Applicant: Shen Zhen MTC Co., LTD
Model: TWFP-M601D

4.11 Transmitter Duty Cycle Calculation and Measurements, FCC Rule 15.35(b), (c)

The EUT antenna output port was connected to the input of the spectrum analyzer. The analyzer center frequency was set to EUT RF channel carrier. The SWEP function on the analyzer was set to ZERO SPAN. The Transmitter ON time was determined from the resultant time-amplitude display:

	See attached spectrum analyzer chart (s) for Transmitter timing
	See Transmitter timing diagram provided by manufacturer
x	Not applicable, duty cycle was not used.

INTERTEK TESTING SERVICES

EXHIBIT 5

EQUIPMENT PHOTOGRAPHS

INTERTEK TESTING SERVICES

5.0 Equipment Photographs

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

INTERTEK TESTING SERVICES

EXHIBIT 6

PRODUCT LABELLING

INTERTEK TESTING SERVICES

6.0 **Product Labeling**

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

INTERTEK TESTING SERVICES

EXHIBIT 7

TECHNICAL SPECIFICATIONS

INTERTEK TESTING SERVICES

7.0 Technical Specifications

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

INTERTEK TESTING SERVICES

EXHIBIT 8

INSTRUCTION MANUAL

INTERTEK TESTING SERVICES

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.

INTERTEK TESTING SERVICES

EXHIBIT 9

CONFIDENTIALITY REQUEST

INTERTEK TESTING SERVICES

9.0 Confidentiality Request

For electronic filing, the confidentiality request of the tested EUT is saved with filename: request.pdf.

INTERTEK TESTING SERVICES

EXHIBIT 10

MISCELLANEOUS INFORMATION

INTERTEK TESTING SERVICES

10.0 **Discussion of Pulse Desensitization**

The determination of pulse desensitivity was made in accordance with Hewlett Packard Application Note 150-2, *Spectrum Analysis ... Pulsed RF*.

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

INTERTEK TESTING SERVICES

EXHIBIT 11

TEST EQUIPMENT LIST

INTERTEK TESTING SERVICES

11.0 Test Equipment List

Equipment No.	Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Due Date
SZ182-02	RF Power Meter	Anritsu	ML2496A	1302005	23-May-2016	23-May-2017
SZ182-02-01	Pulse Power Sensor	Anritsu	MA2411B	1207429	23-May-2016	23-May-2017
SZ070-24	Open Switch and Control Unit with TS8997 option for power measurement test	R&S	OSP120+B157	--	8-Apr-2016	8-Oct-2016
SZ061-12	BiConiLog Antenna	ETS	3142E	00166158	15-Sep-2015	15-Sep-2016
SZ061-06	Active Loop Antenna	Electro-Metrics	EM-6876	217	3-Sep-2015	3-Sep-2016
SZ061-09	Horn Antenna	ETS	3115	00092346	31-Oct-2015	31-Oct-2016
SZ061-07	Pyramidal Horn Antenna	ETS	3160-09	00083067	29-Mar-2016	29-Mar-2017
SZ061-13	Pyramidal Horn Antenna	ETS	3160-10	00084329	03-Sep-2015	03-Sep-2016
SZ185-01	EMI Receiver	R&S	ESCI	100547	23-Jan-2016	23-Jan-2017
SZ056-06	EXA Spectrum Analyzer	R&S	FSV40	101101	2-Jul-2016	2-Jul-2017
SZ181-04	Preamplifier	Agilent	8449B	3008A02474	23-Jan-2016	23-Jan-2017
SZ188-01	Anechoic Chamber	ETS	RFD-F/A-100	4102	16-Apr-2016	16-Apr-2018
SZ062-02	RF Cable	RADIALL	RG 213U	--	30-Jun-2016	30-Dec-2016
SZ062-05	RF Cable	RADIALL	0.04-26.5GHz	--	6-Apr-2016	6-Oct-2016
SZ062-12	RF Cable	RADIALL	0.04-26.5GHz	--	6-Apr-2016	6-Oct-2016
SZ067-04	Notch Filter	Micro-Tronics	BRM50702-02	--	6-Apr-2016	6-Oct-2016
SZ185-02	EMI Test Receiver	R&S	ESCI	100692	23-May-2016	23-May-2017
SZ187-01	Two-Line V-Network	R&S	ENV216	100072	3-Nov-2015	3-Nov-2016
SZ187-02	Two-Line V-Network	R&S	ENV216	100073	3-Nov-2015	3-Nov-2016
SZ188-03	Shielding Room	ETS	RFD-100	4100	1-Jul-2016	1-Jul-2017