

FCC 47 CFR PART 15 SUBPART C

CERTIFICATION TEST REPORT

For

1080P WiFi Video Doorbell

MODEL NUMBER: AD110, AD110-EU, AD110-UK

PROJECT NUMBER: 4788192475

REPORT NUMBER: 4788192475-4

FCC ID: FCC ID: ZZ2-AMC100

ISSUE DATE: Feb. 4, 2018

Prepared for

Amcrest Technologies LLC

Prepared by

UL Verification Services (Guangzhou) Co., Ltd, Song Shan Lake Branch Room 101, Building 10, Innovation Technology Park, Song Shan Lake Hi tech Development Zone, Dongguan, 523808, China Tel: +86 769 33817100 Fax: +86 769 33244054 Website: www.ul.com

Revision History

Rev.	Issue Date	Revisions	Revised By
	2/4/2018	Initial Issue	

Page 2 of 134

TABLE OF CONTENTS

1.	ATT	ESTATION OF TEST RESULTS	1
2.	TES	T METHODOLOGY	5
3.	FAC	CILITIES AND ACCREDITATION	ò
4.	CAL	IBRATION AND UNCERTAINTY	7
4	¹ .1.	MEASURING INSTRUMENT CALIBRATION	7
4	¹ .2.	MEASUREMENT UNCERTAINTY	7
5.	EQU	JIPMENT UNDER TEST	3
5	5.1.	DESCRIPTION OF EUT	8
5	5.2.	MAXIMUM OUTPUT POWER	9
5	5.3.	CHANNEL LIST	9
5	5.4.	TEST CHANNEL CONFIGURATION	9
5	5.5.	THE WORSE CASE POWER SETTING PARAMETER	0
5	5.6.	DESCRIPTION OF AVAILABLE ANTENNAS1	1
5	5.7.	TEST ENVIRONMENT	2
5	5.8.	DESCRIPTION OF TEST SETUP1	3
5	5.9.	MEASURING INSTRUMENT AND SOFTWARE USED14	4
6.	ANT	ENNA PORT TEST RESULTS	5
6	6.1.	ON TIME AND DUTY CYCLE1	5
6	6.2.	6 dB BANDWIDTH16	3
6	6.3.	PEAK CONDUCTED OUTPUT POWER20	6
6	6.4.	POWER SPECTRAL DENSITY	3
6	6.5.	CONDUCTED BANDEDGE AND SPURIOUS EMISSIONS	5
6	6.6. 6.6. 6.6. 6.6. 6.6. 6.6.	RADIATED TEST RESULTS	7723335
7.	AC	POWER LINE CONDUCTED EMISSIONS13 [,]	I
8.	ANT	TENNA REQUIREMENTS134	1

Page 3 of 134

1. ATTESTATION OF TEST RESULTS

Applicant Information

Company Name:	Amcrest Technologies LLC				
Address:	16727 Park Row Dr, Houston, TX 77084				
Manufacturer Information					
Company Name:	Amcrest Technologies LLC				
Address:	16727 Park Row Dr, Houston, TX 77084				
Factory Information					
Company Name: Address:	ZHEJIANG DAHUA VISION TECHNOLOGY CO.,LTD No.1199, Bin'an road, Binjiang District, Hangzhou, P.R.China.				
Company Name: Address:	ZHEJIANG DAHUA ZHILIAN CO.,LTD. No.28, Dongqiao Road, Dongzhou Street, Fuyang District, Hangzhou,P.R.China.				
EUT Description	-				
Product Name	1080P WiFi Video Doorbell				
Model Name	AD110				
Additional No.	AD110-EU, AD110-UK				
Sample Number	1213359-001				
Data of Receipt Sample	Oct. 17, 2017				
Date Tested	Oct. 18, 2017 ~ Feb. 3, 2017				

APPLICABLE STANDARDS

STANDARD

CFR 47 Part 15 Subpart C

TEST RESULTS PASS

Page 4 of 134

	Summary of Test Results					
Clause	Test Items	FCC/IC Rules	Test Results			
1	6db DTS Bandwidth	FCC 15.247 (a) (2)	Complied			
2	Peak Conducted Power	FCC 15.247 (b) (3)	Complied			
3	Power Spectral Density	FCC 15.247 (e)	Complied			
4	Conducted Band edge And Spurious emission	FCC 15.247 (d)	Complied			
5	Radiated Band edges and Spurious emission	FCC 15.247 (d) FCC 15.209 FCC 15.205	Complied			
6	Conducted Emission Test For AC Power Port	FCC 15.207	Complied			
7	Antenna Requirement	FCC 15.203	Complied			

Tested By:

Ven Bucu

Denny Huang Engineer Project Associate Approved By:

Aephenbus

Stephen Guo Laboratory Manage Check By:

Sherman lies

Shawn Wen Laboratory Leader

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC KDB 558074 D01 DTS Meas Guidance v04, , 414788 D01 Radiated Test Site v01, ANSI C63.10-2013, FCC CFR 47 Part 2, FCC CFR 47 Part 15.

3. FACILITIES AND ACCREDITATION

	A2LA (Certificate No.: 4102.01)
	UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch.
	has been assessed and proved to be in compliance with A2LA.
	IAS (Lab Code: TL-702)
	UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch.
	has demonstrated compliance with ISO/IEC Standard 17025:2005,
	General requirements for the competence of testing and calibration
	laboratories
	FCC (FCC Designation No.: CN1187)
	UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch.
A 114 41	Has been recognized to perform compliance testing on equipment subject
Accreditation	to the Commission's Delcaration of Conformity (DoC) and Certification
Certificate	
	IC(Company No.: 21320)
	UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch.
	Industry Canada. The Company Number is 21220
	MCCL (Devictor No C 20040, D 20004, C 20042 and T 20044)
	VCCI (Registration No.: G-20019, R-20004, C-20012 and 1-20011)
	UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch.
	has been assessed and proved to be in compliance with VCCI, the
	Membership No. is 3793.
	Facility Name:
	Chamber D, the VCCI registration No. is G-20019 and R-20004
	Shielding Room B, the VCCI registration No. is C-20012 and T-20011

Note:

- 1. All tests measurement facilities use to collect the measurement data are located at Building 10, Innovation Technology Park, Song Shan Lake Hi tech Development Zone, Dongguan, 523808, China
- The test anechoic chamber in UL Verification Services (Guangzhou) Co., Ltd. Song Shan Lake Branch had been calibrated and compared to the open field sites and the test anechoic chamber is shown to be equivalent to or worst case from the open field site.
- 3. For below 30MHz, lab had performed measurements at test anechoic chamber and comparing to measurements obtained on an open field site. And these measurements below 30MHz had been correlated to measurements performed on an OATS.

Page 6 of 134

UL Verification Services (Guangzhou) Co., Ltd, Song Shan Lake Branch This report shall not be reproduced except in full, without the written approval of UL Verification Services (Guangzhou) Co., Ltd, Song Shan Lake Branch.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Test Item	Uncertainty		
Uncertainty for Conduction emission test	2.90dB		
Uncertainty for Radiation Emission test(include Fundamental emission) (9KHz-30MHz)	2.00dB		
Uncertainty for Radiation Emission test(include Fundamental emission) (30MHz-1GHz)	4.52dB		
Uncertainty for Radiation Emission test	5.04dB(1-6GHz)		
(1GHz to 26GHz)(include Fundamental	5.30dB (6GHz-18Gz)		
emission)	5.23dB (18GHz-26Gz)		
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.			

UL Verification Services (Guangzhou) Co., Ltd, Song Shan Lake Branch This report shall not be reproduced except in full, without the written approval of UL Verification Services (Guangzhou) Co., Ltd, Song Shan Lake Branch.

Page 7 of 134

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

Product Name:	1080P WiFi Video Doorbell		
Model No.:	AD110		
Operating Frequency:	IEEE 802.11b/g/n(HT20): 2412MHz to 2462MHz IEEE 802.11n(HT40): 2422MHz to 2452MHz		
Type of Modulation:	IEEE for 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE for 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE for 802.11n (HT20 and HT40): OFDM (64QAM, 16QAM, QPSK, BPSK)		
Channel Number:	IEEE 802.11b/g, IEEE 802.11n(HT20): 11 Channels IEEE 802.11n(HT40): 7 Channels		
Channels Step:	Channels with 5MHz step		
Sample Type:	Fixed production		
Test power grade:	40 (manufacturer declare)		
Test software of EUT:	Secure CRT (manufacturer declare)		
Antenna Type:	Chip Antenna		
Antenna Gain:	3 dBi		

Remark:

Model No.:

Number:	Name:	Number:	Name:	Number:	Name:
1	AD110	2	AD110-EU	3	AD110-UK

Only the main model AD110 was tested and only the data of this model is shown in this test report. Since

the electrical circuit design, layout, components used and internal wiring were electrically identical for the

above models are the same, the difference only the name of the models.

Note: The definition of identical should be "**electrically identical**". A device will be considered to be electrically identical if no changes are made to the devices' schematics, board layouts, component layouts, chip sets, resistors and all other electrical aspects of the device are identical.

Page 8 of 134

Frequency Range (MHz)	Number of Transmit Chains (NTX)	IEE Std. 802.11	Channel Number	Max PK Conducted Power (dBm)
2400-2483.5	1	IEEE 802.11b	1-11[11]	20.5
2400-2483.5	1	IEEE 802.11g	1-11[11]	19.0
2400-2483.5	1	IEEE 802.11nHT20	1-11[11]	19.0
2400-2483.5	1	IEEE 802.11nHT40	3-7[7]	18.0

5.2. MAXIMUM OUTPUT POWER

5.3. CHANNEL LIST

Channel List for 802.11b/g/n (20 MHz)							
Channel	Frequency (MHz)	Channel	Frequenc y(MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	4	2427	7	2442	10	2457
2	2417	5	2432	8	2447	11	2462
3	2422	6	2437	9	2452		

Channel List for 802.11n (40 MHz)							
Channel	Frequency (MHz)	Channel	Frequenc y(MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
3	2422	5	2432	7	2442	9	2452
4	2427	6	2437	8	2447		

5.4. TEST CHANNEL CONFIGURATION

Test Mode	Test Channel (MHz)
	LCH :CH01 2412
IEEE 802.11b	MCH: CH06 2437
	HCH: CH11 2462
	LCH :CH01 2412
IEEE 802.11g	MCH: CH06 2437
	HCH: CH11 2462
	LCH :CH01 2412
IEEE 802.11n HT20	MCH: CH06 2437
	HCH: CH11 2462
	LCH :CH03 2422
IEEE 802.11n HT40	MCH: CH06 2437
	HCH: CH09 2452

Page 9 of 134

Test Software Version	SecureCRT8.1					
Test Mode	Test Channel	Setting TX Power	Setting data rate (Mbps)			
	LCH	40	CCK_1Mbps			
IEEE 802.11b	MCH	40	CCK_1Mbps			
	HCH	40	CCK_1Mbps			
	LCH	40	NO HT_6Mbps			
IEEE 802.11g	MCH	40	NO HT_6Mbps			
	HCH	40	NO HT_6Mbps			
	LCH	40	HT20_MCS_0_20			
IEEE 802.11n HT20	MCH	40	HT20_MCS_0_20			
	HCH	40	HT20_MCS_0_20			
	LCH	40	HT40+MCS_0_40			
IEEE 802.11n HT40	MCH	40	HT40+MCS_0_40			
	HCH	40	HT40+MCS_0_40			

5.5. THE WORSE CASE POWER SETTING PARAMETER

Page 10 of 134

5.6. DESCRIPTION OF AVAILABLE ANTENNAS

Ant.	Frequency (MHz)	Antenna Type	Antenna Gain (dBi)
1	2400-2483.5	Chip Antenna	3.0

Test Mode	Transmit and Receive Mode	Description
WIFI	⊠1TX, 1RX	Antenna 1 can be used as transmitting/receiving antenna.



Page 11 of 134

5.7. TEST ENVIRONMENT

Environment Parameter	Selected Values During Tests				
Relative Humidity	55 ~ 65%				
Atmospheric Pressure:	1025Pa				
Temperature	TN	23 ~ 28°C			
	VL	N/A			
Voltage :	VN	DC 5.0V			
	VH	N/A			

Note: VL= Lower Extreme Test Voltage VN= Nominal Voltage VH= Upper Extreme Test Voltage TN= Normal Temperature

UL Verification Services (Guangzhou) Co., Ltd, Song Shan Lake Branch This report shall not be reproduced except in full, without the written approval of UL Verification Services (Guangzhou) Co., Ltd, Song Shan Lake Branch.

Page 12 of 134

5.8. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Item	Equipment	Brand Name	Model Name	FCC ID
1	Laptop	ThinkPad	T410	N/A
2	Adapter	Supply by UL EMC Lab	Model:NBS10B050200VUU	N/A

I/O PORT

Cable No	Port	Connector Type	Cable Type	Cable Length(m)	Remarks
1	N/A	N/A	N/A	N/A	N/A

ACCESSORY

Item	Accessory	Brand Name	Model Name	Description
1	N/A	N/A	N/A	N/A

TEST SETUP

The EUT can work in an engineer mode with a software through a table PC.

SETUP DIAGRAM FOR TESTS



Page 13 of 134

	3.3. MEAGORING INGTROMENT AND GOT TWARE GOED								
		Conducted	l Emissi	ons(lr	strument				
Used	Equipment	Manufacturer	Mode	l No.	Serial N	b. Last Cal.	Next Cal.		
\checkmark	EMI Test Receiver	R&S	ESF	२३	101961	Dec.12, 2017	Dec.11, 2018		
	Two-Line V- Network	R&S	ENV	ENV216		Dec.12, 2017	Dec.11, 2018		
V	Artificial Mains Networks	Schwarzbeck	NSLK	8126	812646	5 Dec.12, 2017	Dec.11, 2018		
Used	Des	cription		Manu	ufacturer	Name	Version		
\checkmark	Test Software for C	Conducted distu	rbance		UL	Antenna port	Ver. 7.2		
		Radiated	Emissio	ons(Ins	strument)				
Used	Equipment	Manufacturer	Mode	l No.	Serial N	D. Last Cal.	Next Cal.		
	MXE EMI Receiver	KESIGHT	N903	38A	MY5640 036	⁰ Dec. 12, 2017	Dec. 11, 2018		
V	Hybrid Log Periodic Antenna	TDK	HLP-3	003C	130960	Jan.09, 2016	Jan.09, 2019		
V	Preamplifier	HP	844	7D	2944A09 99	⁰ Dec. 12, 2017	Dec. 11, 2018		
V	EMI Measurement Receiver	R&S	ESR	26	101377	Dec.12, 2017	Dec.11, 2018		
\checkmark	Horn Antenna	TDK	HRN-(0118	130939	Jan. 09, 2016	Jan. 09, 2019		
V	High Gain Horn Antenna	Schwarzbeck	BBHA-	9170	691	Jan.06, 2016	Jan.06, 2019		
V	Preamplifier	TDK	PA-02-	0118	TRS-309 00066	Dec. 12, 2017	Dec. 11, 2018		
V	Preamplifier	TDK	PA-0	2-2	TRS-307 00003	Dec.12, 2017	Dec.11, 2018		
\checkmark	Loop antenna	Schwarzbeck	1519	9B	00008	Mar. 26, 2016	Mar. 26, 2019		
	Band Reject Filter	Wainwright	WRC 2350-2 2483 2533.5-	JV8- 2400- 3.5- -40SS	4	Dec.12, 2017	Dec.11, 2018		
			Softwa	are					
Used	Descr	iption	Ma	Inufact	urer	Name	Version		
\checkmark	Test Software for R	adiated disturba	ince	Farac	k	EZ-EMC	Ver. UL-3A1		
		Oth	ner instr	umen	ts				
Used	Equipment	Manufacturer	Mode	l No.	Serial N	b. Last Cal.	Next Cal.		
V	Spectrum Analyzer	Keysight	N903	30A	MY5541 512	⁰ Dec.12, 2017	Dec.11, 2018		
V	Power Meter	Keysight	N903	31A	MY5541 024	⁶ Dec.12, 2017	Dec.11, 2018		
	Power Sensor	Keysight	N932	23A	MY5544 013	0 Dec.12, 2017	Dec.11, 2018		

5.9. MEASURING INSTRUMENT AND SOFTWARE USED

Page 14 of 134

6. ANTENNA PORT TEST RESULTS

6.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only

PROCEDURE

FCC KDB 558074 Zero-Span Spectrum Analyzer Method

TEST SETUP



RESULTS

Mode	On Time (msec)	Period (msec)	Duty Cycle x (Linear)	Duty Cycle (%)	Duty Cycle Correction Factor (db)	1/T Minimum VBW (KHz)
11B	100	100	1	100	0	0.01
11G	100	100	1	100	0	0.01
11NSISO20	100	100	1	100	0	0.01
11NSISO40	100	100	1	100	0	0.01

Note: Duty Cycle Correction Factor=10log(1/x). Where: x is Duty Cycle(Linear) Where: T is On Time (transmit duration)

UL Verification Services (Guangzhou) Co., Ltd, Song Shan Lake Branch This report shall not be reproduced except in full, without the written approval of UL Verification Services (Guangzhou) Co., Ltd, Song Shan Lake Branch.

Page 15 of 134

DATE: Feb. 4, 2018

ON TIME AND DUTY CYCLE MID CH

Spectrum Analyzer 1 Swept SA	+						Fre	equency v
KEYSIGHT Input: R R L +++ Couplin Align: A	F Input 2 g: DC Correc wto/No RF Freq F	Z: 50 Ω #A ctions: Off Pr Ref: Int (S)	tten: 40 dB eamp: Off	PNO: Fast Gate: Off IF Gain: Low Sig Track: Off	#Avg Type: Pov Trig: Free Run	ver (RMS <mark>1</mark> 2 3 4 5 6 ₩₩₩₩₩₩ Α Α Α Α Α Α	Center Frequer 2.437000000 C	GHz Settings
1 Spectrum	v						Span 0.00000000 Hz	z
-og 13.0		Ret	Level 23.00	asm			Swept Spa Zero Span	an
3.00							Full Spar	n
27.0							Start Freq 2.437000000 (GHz
47.0							Stop Freq 2.437000000 0	GHz
57.0								NE
enter 2.437000000 G es BW 8 MHz	Hz	#Vi	deo BW 8.0	MHz*	Sweep	Span 0 Hz 20.27 ms (8001 pts)	CF Step	
Marker Table	▼ Scale	x	Y	Function	Function Width	Function Value	Auto	
1 2							Freq Offset	
3 4 5							0 Hz X Axis Scale	
6							Log Lin	
1 N C] ? Jan ² 11:0	19, 2018 9:06 AM	\triangle				Signal Track (Span Zoom)	
1G								
Spectrum Analyzer 1 Swept SA	• +						C Fre	equency v 🚬
Couplin	RF Input 2 g: DC Correct wto/No RF Frea P	Z: 50 Ω #A ctions: Off Pr Ref: Int (S)	Atten: 40 dB eamp: Off	PNO: Fast Gate: Off IF Gain: Low	#Avg Type: Pov Trig: Free Run	ver (RMS <mark>1</mark> 2 3 4 5 6 WWWWW	Center Frequer 2.437000000 (ncy Settings GHz
Spectrum				Sig Track: Off		A A A A A A	<u>'</u>	
opocaan	V.						Span	
cale/Div 10 dB	T	Ref	f Level 23.00	dBm			Span 0.00000000 Hz Swept Spa	z
cale/Div 10 dB og 13.0 3.00		Ref	f Level 23.00) dBm			Span 0.00000000 Hz Swept Spa Zero Span Full Spar	z an
coale/Div 10 dB		Rei	f Level 23.00) dBm	e John ya Kanga Kanga John	vite and a second second	Span 0.00000000 H; Swept Spa Zero Span Full Spar Start Freq	z an n
Scale/Div 10 dB		Ref	f Level 23.00	dBm			Span 0.00000000 H2 Swept Spa Zero Span Full Span Start Freq 2.437000000 C Stop Freq	z an n GHz
Scale/Div 10 dB		Ref	f Level 23.00	dBm			Span 0.00000000 H2 Swept Spa Zero Span Full Span Start Freq 2.437000000 C Stop Freq 2.437000000 C	z an n GHz GHz
cale/Div 10 dB	v ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Ref	f Level 23.00) dBm		Span 0 Hz	Span 0.00000000 H2 Swept Spa Zero Span Full Spar Start Freq 2.437000000 C Stop Freq 2.437000000 C AUTO TUR	z an n GHz SHz
cale/Div 10 dB og 3.0 7.00 7.00 7.00 7.0 7.0 7.0 7.0	• •	Ref	f Level 23.00) dBm	Sweep	Span 0 Hz 20.27 ms (8001 pts)	Span 0.00000000 Hz Swept Spa Zero Span Full Spar Full Spar Start Freq 2.437000000 C Stop Freq 2.437000000 C AUTO TUR CF Step 8.000000 MHz 0.145	z an n GHz NE
cale/Div 10 dB .0g	v Hz Scale	Ref	f Level 23.00 deo BW 8.0	e dBm	Sweep	Span 0 Hz 20.27 ms (8001 pts) Function Value	Span 0.00000000 H; Swept Span Full Span Start Freq 2.437000000 C Stop Freq 2.437000000 C AUTO TUN CF Step 8.000000 MHz Auto	z an n GHz SHz
iscale/Div 10 dB .og	v , , , , , , , , , , , , , , , , , , ,	Ref	f Level 23.00 deo BW 8.0	e dBm	Function Width	Span 0 Hz 20.27 ms (8001 pts) Function Value	Span 0.00000000 H2 Swept Span Full Span Start Freq 2.437000000 C Stop Freq 2.437000000 C AUTO TUR CF Step 8.000000 MHz Auto Man Freq Offset 0 Hz	z an
Scale/Div 10 dB 09 13.0 3.00 7.00 7.00 7.0 37.0 </td <td>v scale</td> <td>Ref</td> <td>f Level 23.00 deo BW 8.0</td> <td>9 dBm</td> <td>Function Width</td> <td>Span 0 Hz 20.27 ms (8001 pts) Function Value</td> <td>Span 0.00000000 H2 Swept Span Full Span Start Freq 2.437000000 C Stop Freq 2.437000000 C AUTO TUR CF Step 8.000000 MHz Auto Man Freq Offset 0 Hz X Axis Scale Log</td> <td>z an an</td>	v scale	Ref	f Level 23.00 deo BW 8.0	9 dBm	Function Width	Span 0 Hz 20.27 ms (8001 pts) Function Value	Span 0.00000000 H2 Swept Span Full Span Start Freq 2.437000000 C Stop Freq 2.437000000 C AUTO TUR CF Step 8.000000 MHz Auto Man Freq Offset 0 Hz X Axis Scale Log	z an
Mode Trace 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 1 3 1 4 1 5 5 6 1	Cale	Ret X 19, 2018	f Level 23.00 deo BW 8.0	9 dBm	Function Width	Span 0 Hz 20.27 ms (8001 pts) Function Value	Span 0.00000000 H2 Swept Spa Zero Span Full Spar Start Freq 2.437000000 C Stop Freq 2.437000000 C AUTO TUR CF Step 8.000000 MHz Auto Man Freq Offset 0 Hz X Axis Scale Log Lin Signal Track	z an
iscale/Div 10 dB .og 13.0 3.00 7.00 7.00 37.0 38.0 39.0 30.0 30.0<	FHZ Scale Jan 1	Ref #Vi #Vi	f Level 23.00 deo BW 8.0	dBm a b a a b a b b b b b b b c b c <	Function Width	Span 0 Hz 20.27 ms (8001 pts) Function Value	Span 0.00000000 H2 Swept Span Full Span Start Freq 2.437000000 C Stop Freq 2.437000000 C AUTO TUR CF Step 8.000000 MHz Auto Man Freq Offset 0 Hz X Axis Scale Log Lin Signal Track (Span Zoom)	z an

Page 16 of 134

11NSISO20			
Spectrum Analyzer 1			🛟 Frequency 🔻 🔆
KEYSIGHT Input: RF Input: Z: 50 Ω RL ← Coupling: DC Corrections: Off Align: Auto/No RF Freq Ref: Int (S)	#Atten: 40 dB PNO: Fast Preamp: Off Gate: Off IF Gain: Lov Sig Track: C	#Avg Type: Power (RMS 1 2 3 4 5 6 Trig: Free Run WWWWWW Mf A A A A A A	Center Frequency 2.437000000 GHz
1 Spectrum V			Span 0.00000000 Hz
Scale/Div 10 dB Log 13.0	Ref Level 23.00 dBm		Swept Span Zero Span
3.00 -7.00			Full Span
-17.0			Start Freq 2.437000000 GHz
-37.0			Stop Freq 2.437000000 GHz
-67.0			AUTO TUNE
Center 2.437000000 GHz Res BW 8 MHz	#Video BW 8.0 MHz*	Span 0 Hz Sweep 20.27 ms (8001 pts)	CF Step
5 Marker Table v Mode Trace Scale X	Y Function	Function Width Function Value	Auto
			Freq Offset
3 4 5			X Axis Scale
			Log
H A C D ? Jan 19, 2018 11:23:46 AM			Signal Track (Span Zoom)
11NSISO40			
11NSISO40 Spectrum Analyzer 1			Frequency T
Spectrum Analyzer 1 Swept SA • KEYSIGHT Input: RF Coupling: DC RL Input: Z: 50 Ω Corrections: Off Freq Ref: Int (S)	#Atten: 40 dB PNO: Fast Preamp: Off Gate: Off IF Gain: Lov	#Avg Type: Power (RMS 1 2 3 4 5 6 Trig: Free Run WWWWWW	Frequency Center Frequency Settings
Spectrum Analyzer 1 Swept SA KEYSIGHT Input: RF Coupling: DC Align: Auto/No RF Freq Ref: Int (S) INDECTURE	#Atten: 40 dB PNO: Fast Preamp: Off Gate: Off IF Gain: Lov Sig Track: C	#Avg Type: Power (RMS 1 2 3 4 5 6 Trig: Free Run WWWWWW A A A A A A	Frequency Center Frequency Settings
Spectrum Analyzer 1 Swept SA KEYSIGHT RL Align: Auto/No RF Spectrum Spectrum Spectrum Scale/Div 10 dB	#Atten: 40 dB PNO: Fast Preamp: Off Gate: Off IF Gain: Low Sig Track: C Ref Level 23.00 dBm	#Avg Type: Power (RMS 1 2 3 4 5 6 Trig: Free Run WWWWWW A A A A A A A	Frequency V Settings Center Frequency 2.437000000 GHz Span 0.00000000 Hz Swept Span Zerro Span
Spectrum Analyzer 1 • Swept SA • KEYSIGHT Input: RF RL • Align: Auto/No RF Freq Ref. Int (S) I Spectrum • Scale/Div 10 dB • 13.0 • 13.0 • 1000 • • •	#Atten: 40 dB PNO: Fast Preamp: Off Gate: Off IF Gain: Low Sig Track: C Ref Level 23.00 dBm	#Avg Type: Power (RMS 1 2 3 4 5 6 Trig: Free Run WWWWWW A A A A A A A	Frequency Settings Center Frequency Settings 2.437000000 GHz Settings Span 0.00000000 Hz Swept Span Zero Span Full Span Full Span
Spectrum Analyzer 1 • Swept SA • KEYSIGHT Input: RF RL • Align: Auto/No RF Corrections: Off T Spectrum • Scale/Div 10 dB • 13.00 • -7.00 •	#Atten: 40 dB PNO: Fast Gate: Off IF Gain: Low Sig Track: C Ref Level 23.00 dBm	#Avg Type: Power (RMS 1 2 3 4 5 6 Trig: Free Run wwwwww A A A A A A A A A A A A	Frequency Settings Center Frequency Settings 2.437000000 GHz Settings Span 0.00000000 Hz Swept Span Zero Span Full Span Start Freq 2.437000000 GHz Start Freq
Spectrum Analyzer 1 • Swept SA • KEYSIGHT Input: RF RL • Align: Auto/No RF Corrections: Off Scale/Div 10 dB • 1 Spectrum • 3.00 • -7.00 • -37.0 • -37.0 •	#Atten: 40 dB Preamp: Off IF Gain: Lov Sig Track: C Ref Level 23.00 dBm	#Avg Type: Power (RMS 1 2 3 4 5 6 Trig: Free Run wwwwww A A A A A A A A A A A A	Frequency Settings Center Frequency Settings 2.437000000 GHz Settings Span 0.00000000 Hz Swept Span Zero Span Full Span Start Freq 2.437000000 GHz Start Freq Stop Freq Here
Spectrum Analyzer 1 • Swept SA • KEYSIGHT Input: RF RL • Align: Auto/No RF Corrections: Off T Spectrum • Scale/Div 10 dB • 13.00 • -7.00 • -37.0 •	#Atten: 40 dB Preamp: Off IF Gain: Low Sig Track: C Ref Level 23.00 dBm	#Avg Type: Power (RMS 1 2 3 4 5 6 Trig: Free Run WWWWWW A A A A A A A	Frequency Settings Center Frequency Settings 2.437000000 GHz Settings Span 0.00000000 Hz Swept Span Zero Span Full Span Start Freq 2.437000000 GHz Stop Freq Stop Freq 2.437000000 GHz
Spectrum Analyzer 1 Y Swept SA KEYSIGHT RL → Coupling: DC Corrections: Off Align: Auto/No RF Freq Ref. Int (S) Lyv V Scale/Div 10 dB V Log 0 17.00 0 -7.00 0	#Atten: 40 dB PNO: Fast Gate: Off IF Gain: Control IF Gain: Control Sig Track: Control Ref Level 23.00 dBm Image: Control Image: Control Image: C	#Avg Type: Power (RMS 1 2 3 4 5 6 Trig: Free Run W WWWWW A A A A A A A A A A A A A Span 0 Hz Symeep 20.27 ms (8001 pts)	Frequency Settings Center Frequency Settings 2.437000000 GHz Settings Span 0.00000000 Hz Swept Span Zero Span Full Span Start Freq 2.437000000 GHz Stop Freq Stop Freq 2.437000000 GHz AUTO TUNE CF Step
Spectrum Analyzer 1 ↓ Swept SA ↓ KEYSIGHT Input: RF RL ↓ Oupling: DC Align: Auto/No RF Scale/Div 10 dB Log 13.00 -7.00 -37.0 -37.0 -67.0 Center 2.437000000 GHz Res BW 8 MHz 5 Marker Table	#Atten: 40 dB Preamp: Off IF Gain: Lov Sig Track: C Ref Level 23.00 dBm	#Avg Type: Power (RMS 1 2 3 4 5 6 Trig: Free Run W WWWWW A A A A A A A A A A A A A Span 0 Hz Sveep 20.27 ms (8001 pts)	Frequency Settings Center Frequency Settings 2.437000000 GHz Settings Span 0.00000000 Hz Swept Span Zero Span Full Span Start Freq 2.437000000 GHz Stop Freq Stop Freq 2.437000000 GHz CF Step 8.000000 MHz Auto Auto
Spectrum Analyzer 1 Imput RF Swept SA Imput RF KEYSIGHT Input RF RL Imput RF Align: Auto/No RF Input Z: 50 Ω Scale/Div 10 dB Orrections: Off Log Imput RF 1 Spectrum Imput RF Scale/Div 10 dB Imput RF Log Imput RF 13.0 Imput RF 3.00 Imput RF -7.00 Imput RF -7.00 Imput RF -7.00 Imput RF -7.0 Imput RF <	#Atten: 40 dB Preamp: Off PNO: Fast Gate: Off IF Gain: Lov Sig Track: C Ref Level 23.00 dBm If Gain: Lov Sig Track: C Image: Comparison of the second sec	#Avg Type: Power (RMS 1 2 3 4 5 6 Trig: Free Run W WWWWW A A A A A A A A A A A A A A Span 0 Hz Span 0 Hz Sveep 20.27 ms (8001 pts) Function Width Function Value	Frequency Settings Center Frequency Settings 2.437000000 GHz Settings Span 0.00000000 Hz Swept Span Zero Span Full Span Start Freq 2.437000000 GHz Stop Freq Stop Freq 2.437000000 GHz CF Step 8.000000 MHz Auto Man Freq Offset Man
Spectrum Analyzer 1 Imput RF Swept SA Imput RF KEYSIGHT Input RF RL Imput RF Align: Auto/No RF Input Z: 50 Ω Scale/Div 10 dB Corrections: Off Log 1 1.00 1 27.0 1 -7.00 1 -7.00 1 -7.00 1 -7.00 1 -7.00 1 -7.00 1 -7.00 1 -7.00 1 -7.00 1 -7.00 1 -7.00 1 -7.00 1 -7.0 1 -7.0 1 -7.0 1 -7.0 1 -7.0 1 -7.0 1 -7.0 1 -7.0 1 -7.0 1 -7.0 1 -7.0 1 -7.0 1 -7.0 1 <td< td=""><td>#Atten: 40 dB Preamp: Off PNO: Fast Gate: Off IF Gain: Lov Sig Track: C Ref Level 23.00 dBm IF Gain: Lov Sig Track: C Image: Strate Strate</td><td>#Avg Type: Power (RMS 1 2 3 4 5 6 WWWWWWAAAAAAA AAAAAAA AAAAAAA Span 0 Hz Sweep 20.27 ms (8001 pts)</td><td>Frequency Settings 2.437000000 GHz Settings Span 0.00000000 Hz Swept Span Zero Span Full Span Start Freq 2.437000000 GHz Start Freq Stop Freq 2.437000000 GHz Stop Freq 2.437000000 GHz CF Step 8.000000 MHz Auto Man Freq Offset 0 Hz V Avia October X</td></td<>	#Atten: 40 dB Preamp: Off PNO: Fast Gate: Off IF Gain: Lov Sig Track: C Ref Level 23.00 dBm IF Gain: Lov Sig Track: C Image: Strate	#Avg Type: Power (RMS 1 2 3 4 5 6 WWWWWWAAAAAAA AAAAAAA AAAAAAA Span 0 Hz Sweep 20.27 ms (8001 pts)	Frequency Settings 2.437000000 GHz Settings Span 0.00000000 Hz Swept Span Zero Span Full Span Start Freq 2.437000000 GHz Start Freq Stop Freq 2.437000000 GHz Stop Freq 2.437000000 GHz CF Step 8.000000 MHz Auto Man Freq Offset 0 Hz V Avia October X
11NSISO40 Spectrum Analyzer 1 Swept SA KEYSIGHT Input: RF Coupling: DC Align: AutorNo RF Ispectrum Scale/Div 10 dB Log 130 300 -7.00 <td< td=""><td>#Atten: 40 dB Preamp: Off PNO: Fast Gate: Off IF Gain: Lov Sig Track: C Ref Level 23.00 dBm I I I<td>#Avg Type: Power (RMS 1 2 3 4 5 6 WWWWWWAAAAAAA AAAAAAAAAAAAAAAAAAAAAAA</td><td>Frequency Settings 2.437000000 GHz Settings Span 0.00000000 Hz Swept Span Swept Span Zero Span Full Span Start Freq 2.437000000 GHz Start Freq 2.437000000 GHz Stop Freq 2.437000000 GHz CF Step 8.000000 MHz Auto Man Freq Offset 0 Hz Log Log</td></td></td<>	#Atten: 40 dB Preamp: Off PNO: Fast Gate: Off IF Gain: Lov Sig Track: C Ref Level 23.00 dBm I I I <td>#Avg Type: Power (RMS 1 2 3 4 5 6 WWWWWWAAAAAAA AAAAAAAAAAAAAAAAAAAAAAA</td> <td>Frequency Settings 2.437000000 GHz Settings Span 0.00000000 Hz Swept Span Swept Span Zero Span Full Span Start Freq 2.437000000 GHz Start Freq 2.437000000 GHz Stop Freq 2.437000000 GHz CF Step 8.000000 MHz Auto Man Freq Offset 0 Hz Log Log</td>	#Avg Type: Power (RMS 1 2 3 4 5 6 WWWWWWAAAAAAA AAAAAAAAAAAAAAAAAAAAAAA	Frequency Settings 2.437000000 GHz Settings Span 0.00000000 Hz Swept Span Swept Span Zero Span Full Span Start Freq 2.437000000 GHz Start Freq 2.437000000 GHz Stop Freq 2.437000000 GHz CF Step 8.000000 MHz Auto Man Freq Offset 0 Hz Log Log

Page 17 of 134

REPORT NO: 4788192475-4 FCC ID: ZZ2-AMC100 6.2. 6 dB BANDWIDTH

<u>LIMITS</u>

FCC Part15 (15.247) Subpart C						
Section	Test Item	Limit	Frequency Range (MHz)			
FCC 15.247(a)(2)	6dB Bandwidth	>= 500KHz	2400-2483.5			

TEST PROCEDURE

Refer to FCC KDB 558074, connect the UUT to the spectrum analyser and use the following settings:

Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	For 6 dB Bandwidth :100K For 99% Bandwidth :1% to 5% of the occupied bandwidth
VBW	For 6dB Bandwidth : ≥3 × RBW For 99% Bandwidth : approximately 3×RBW
Trace	Max hold
Sweep	Auto couple

Allow the trace to stabilize and measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

TEST SETUP



Page 18 of 134

RESULTS

Test Mode	Test Channel	6dB bandwidth (MHz)	Result
11B	LCH	10.06	Pass
	MCH	10.04	Pass
	НСН	10.07	Pass
11G	LCH	16.58	Pass
	MCH	16.58	Pass
	НСН	16.58	Pass
11N20SISO	LCH	17.82	Pass
	MCH	17.80	Pass
	НСН	17.81	Pass
11N40SISO	LCH	36.41	Pass
	MCH	36.41	Pass
	НСН	36.44	Pass

UL Verification Services (Guangzhou) Co., Ltd, Song Shan Lake Branch This report shall not be reproduced except in full, without the written approval of UL Verification Services (Guangzhou) Co., Ltd, Song Shan Lake Branch.

Page 19 of 134

Test Graphs





Page 20 of 134

DATE: Feb. 4, 2018





Page 21 of 134





Page 22 of 134





Page 23 of 134

DATE: Feb. 4, 2018





Page 24 of 134





Page 25 of 134

6.3. PEAK CONDUCTED OUTPUT POWER

LIMITS

FCC Part15 (15.247), Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
FCC 15.247(b)(3)	Peak Output Power	1 watt or 30dBm	2400-2483.5

TEST PROCEDURE

Refer to FCC KDB 558074

TEST SETUP



UL Verification Services (Guangzhou) Co., Ltd, Song Shan Lake Branch This report shall not be reproduced except in full, without the written approval of UL Verification Services (Guangzhou) Co., Ltd, Song Shan Lake Branch. FORM NO: 10-SL-F0035

Page 26 of 134

Test Mode	Test Channel	Maximum Peak Conducted Output Power(dBm)	EIRP (dBm)	Result
11B	LCH	19.25	22.25	Pass
	MCH	19.59	22.59	Pass
	НСН	19.77	22.77	Pass
11G	LCH	17.31	20.31	Pass
	MCH	17.96	20.96	Pass
	НСН	18.26	21.26	Pass
11N20SISO	LCH	17.42	20.42	Pass
	MCH	18.09	21.09	Pass
	НСН	18.39	21.39	Pass
11N40SISO	LCH	17.05	20.05	Pass
	MCH	17.33	20.33	Pass
	НСН	17.55	20.55	Pass

RESULTS

Page 27 of 134

6.4. POWER SPECTRAL DENSITY

<u>LIMITS</u>

FCC Part15 (15.247), Subpart C			
Section Test Item Limit Frequency Range (MHz)			
FCC §15.247 (e)	Power Spectral Density	8 dBm in any 3 kHz band	2400-2483.5

TEST PROCEDURE

Refer to FCC KDB 558074, connect the UUT to the spectrum analyser and use the following settings:

Center Frequency	The centre frequency of the channel under test	
Detector	Peak	
RBW	3 kHz ≤ RBW ≤100 kHz	
VBW	≥3 × RBW	
Span	1.5 x DTS bandwidth	
Trace	Max hold	
Sweep time	Auto couple.	

Allow trace to fully stabilize and use the peak marker function to determine the maximum amplitude level within the RBW.

If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

TEST SETUP



Page 28 of 134

RESULTS

Test Mode	Test Channel	Maximum Peak power spectral density (dBm)	Result
11B	LCH	1.679	Pass
	MCH	2.131	Pass
	HCH	2.294	Pass
11G	LCH	-6.631	Pass
	MCH	-5.884	Pass
	HCH	-5.659	Pass
11N20SISO	LCH	-6.413	Pass
	MCH	-5.611	Pass
	HCH	-5.319	Pass
11N40SISO	LCH	-9.859	Pass
	MCH	-9.498	Pass
	НСН	-9.042	Pass

UL Verification Services (Guangzhou) Co., Ltd, Song Shan Lake Branch This report shall not be reproduced except in full, without the written approval of UL Verification Services (Guangzhou) Co., Ltd, Song Shan Lake Branch.

Page 29 of 134

Test Graphs:





Page 30 of 134

DATE: Feb. 4, 2018





Page 31 of 134





Page 32 of 134

DATE: Feb. 4, 2018





UL Verification Services (Guangzhou) Co., Ltd, Song Shan Lake Branch This report shall not be reproduced except in full, without the written approval of UL Verification Services (Guangzhou) Co., Ltd, Song Shan Lake Branch.

Page 33 of 134





Page 34 of 134

DATE: Feb. 4, 2018





Page 35 of 134

6.5. CONDUCTED BANDEDGE AND SPURIOUS EMISSIONS

<u>LIMITS</u>

FCC Part15 (15.247), Subpart C				
Section	Section Test Item Limit			
FCC §15.247 (d)	Conducted Bandedge and Spurious Emissions	at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power		

TEST PROCEDURE

Refer to FCC KDB 558074, connect the UUT to the spectrum analyser and use the following

Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	100K
VBW	≥3 × RBW
Span	1.5 x DTS bandwidth
Trace	Max hold
Sweep time	Auto couple.
a atting a s	

settings:

Use the peak marker function to determine the maximum PSD level.

Span	Set the center frequency and span to encompass frequency range to be measured
Detector	Peak
RBW	100K
VBW	≥3 × RBW
measurement points	≥span/RBW
Trace	Max hold
Sweep time	Auto couple.

Use the peak marker function to determine the maximum amplitude level.

TEST SETUP



Page 36 of 134

Part I :Conducted Bandedge

RESULTS TABLE

Test Mode	Test Channel	Carrier Power[dBm]	Max. Spurious Level [dBm]	Limit [dBm]	Verdict
11B	LCH	6.752	-41.372	-13.25	PASS
11B	НСН	7.362	-40.675	-12.64	PASS
11G	LCH	-3.811	-40.543	-23.81	PASS
11G	НСН	-2.944	-41.035	-22.94	PASS
11N20SISO	LCH	-3.613	-41.044	-23.61	PASS
11N20SISO	НСН	-2.582	-40.813	-22.58	PASS
11N40SISO	LCH	-6.199	-41.653	-26.2	PASS
11N40SISO	HCH	-5.629	-39.764	-25.63	PASS

TEST GRAPHS





Page 38 of 134





Page 39 of 134





Page 40 of 134





Page 41 of 134

Part II :Conducted Emission

Test	Result	Table
------	--------	-------

Test Mode	Channel	Pref(dBm)	Puw(dBm)	Verdict
11B	LCH	6.642	<limit< td=""><td>PASS</td></limit<>	PASS
	MCH	7.13	<limit< td=""><td>PASS</td></limit<>	PASS
	HCH	7.313	<limit< td=""><td>PASS</td></limit<>	PASS
11G	LCH	-3.861	<limit< td=""><td>PASS</td></limit<>	PASS
	MCH	-3.168	<limit< td=""><td>PASS</td></limit<>	PASS
	HCH	-2.882	<limit< td=""><td>PASS</td></limit<>	PASS
11NSISO20	LCH	-3.791	<limit< td=""><td>PASS</td></limit<>	PASS
	MCH	-3.408	<limit< td=""><td>PASS</td></limit<>	PASS
	HCH	-2.923	<limit< td=""><td>PASS</td></limit<>	PASS
11NSISO40	LCH	-6.561	<limit< td=""><td>PASS</td></limit<>	PASS
	MCH	-6.170	<limit< td=""><td>PASS</td></limit<>	PASS
	НСН	-6.034	<limit< td=""><td>PASS</td></limit<>	PASS

UL Verification Services (Guangzhou) Co., Ltd, Song Shan Lake Branch This report shall not be reproduced except in full, without the written approval of UL Verification Services (Guangzhou) Co., Ltd, Song Shan Lake Branch.

Page 42 of 134

Test Mode	Channel	Verdict				
11B	LCH	PASS				

Pref test Plot



Page 43 of 134

REPORT NO: 4788192475-4 FCC ID: ZZ2-AMC100 Puw test Plot

LCH SPURIOUS EMISSION_30MHz~10GHz





LCH SPURIOUS EMISSION 10GHz~26GHz



Page 44 of 134

Test Mode	Channel	Verdict
11B	MCH	PASS

Pref test Plot



Page 45 of 134