



Certificate#5593.01

Report No.: AAEMT/RF/230322-04-01 FCC RADIO TEST REPORT Part 15 subpart E FCC ID: 2AZOI4XL1BTSD

Report Reference No:	AAEMT/RF/230322-04-01
Date of issue:	2023-07-10
Testing Laboratory:	AA Electro Magnetic Test Laboratory Private Limited
Address::	Plot No 174, Udyog Vihar - Phase 4, Sector 18, Gurgaon, Haryana, India
Applicant's name:	HFCL Limited
Address:	Plot no. 38, Institutional Area, Sector 32, Gurgaon -122001
Manufacturer:	HFCL Limited
	Plot no. 38, Institutional Area, Sector 32, Gurgaon -122001
Test specification:	
Test item description:	IO 5 GHz 1000 Mbps UBR with Integrated Antenna (17 dBi) with dying gasp
Trade Mark:	
Model/Type reference:	ion4x11_BTS_d
Ratings:	Input of PoE: 100-240VAC, 50/60Hz, Output of PoE/input of EUT: +48V (PoE),0.315A

Prepared By: (+ signature) Ankur Kumar

Inther

Reviewed & Approved by: (+ signature)

Plot No.174, Udyog Vihar Phase 4, Sector -18, Gurgaon -122016, Haryana, India Contact:0124-4235350, 4145343; e-mail: info @aaemtlabs.com; Website: <u>www.aaemtlabs.com</u> Decision Rule: The result of conformity based on the mentioned standards actual test limits / levels AAEMT/A2LA/TRF/FCC-15E/22_01_REV1





Report No.: AAEMT/RF/230322-04-01

TABLE OF CONTENTS

1.	Summary of test results
2.	General test information
2.1.	Description of EUT
2.2.	Accessories of EUT7
2.3.	Assistant equipment used for test7
3.	Equipment's List for All Test Items
3.1.	Block diagram of EUT configuration for test10
3.2.	Test environment conditions
3.3.	Measurement uncertainty
4.	POWER SPECTRAL DENSITY TEST
4.1.	Block diagram of test setup11
4.2.	Applied procedures / limit
4.3.	Test Procedure
4.4.	Test Result:
5.	26 dB & 99% Emission Bandwidth
5.1.	Block diagram of test setup
5.2.	Applied procedures / limit
5.3.	Test Procedure
5.4.	Test Result
6.	MAXIMUM CONDUCTED OUTPUT POWER
6.1.	Test Result
7.	Band Edges Measurement
7.1.	Test Result
8.	RADIATED EMISSION MEASUREMENT
8.1.	Block diagram of test setup
8.2.	Limit
8.3.	Test Procedure
8.4.	Test result(Below 30MHz)118
9.	Power Line Conducted Emission
9.1.	Block diagram of test setup
2 P a g e	Plot No.174, Udyog Vihar Phase 4, Sector -18, Gurgaon -122016, Haryana, India
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Certificate#5593.01

	Report No.: AAEMT/RF/230322-04-01	
9.2.	Power Line Conducted Emission Limits	
9.3.	Test Procedure	
9.4.	Test Result	
10.	Conducted Spurious Emissions	
11.	Antenna Requirements	161
11.1.	Limit	161
11.2.	EUT ANTENNA	161



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TEST REPORT DECLARE

Applicant	:	HFCL Limited		
Address	:	Plot no. 38, Institutional Area, Sector 32, Gurgaon -122001		
Equipment under Test	:	IO 5 GHz 1000 Mbps UBR with Integrated Antenna (17 dBi) with dying gasp		
Model No	:	ion4xl1_BTS_d		
Trade Mark	•			
Manufacturer	••	HFCL Limited		
Address	:	Plot no. 38, Institutional Area, Sector 32, Gurgaon -122001		

Test Standard Used: FCC Part 15E 15.407

Test procedure used: ANSI C63.10-2013 and KDB 789033 D02 General UNII Test Procedures New Rules

v02r01.

We Declare:

The equipment described above is tested by AA Electro Magnetic Test Laboratory Private Limited and in the configuration tested the equipment complied with the standards specified above. The test results are contained in this test report and AA Electro Magnetic Test Laboratory Private Limited is assumed of full responsibility for the accuracy and completeness of these tests.

After test and evaluation, our opinion is that the equipment provided for test compliance with the requirement of the above FCC standards.

Report No:	AAEMT/RF/230322-04-01		
Date of Test:	Mar 22~June 08, 2023	Date of Report:	July. 10, 2023

Note: This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of AA Electro Magnetic Test Laboratory Private Limited





1. SUMMARY OF TEST RESULTS

The EUT have been tested according to the applicable standards as referenced below.							
FCC Part15 (15.407) , Subpart E							
Description of Test Item	Description of Test Item Standard						
AC Power Line Conducted Emissions	FCC §15.207/ RSS-Gen	PASS					
Spurious Radiated Emissions	FCC §15.209(a), 15.407(b)	PASS					
26 dB and 99% Emission Bandwidth	FCC §15.407(a)	PASS					
Maximum Conducted Output Power	FCC §407(a) (1)	PASS					
Band Edges	FCC §2.1051, §15.407(b)	PASS					
Power Spectral Density	FCC §15.407(a)(1)	PASS					
Spurious Emissions at Antenna Terminals	FCC §2.1051, §15.407(b)	PASS					
Antenna Requirement	FCC §15.203	PASS					

5 | P a g e

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2. GENERAL TEST INFORMATION

2.1. DESCRIPTION OF EUT

EUT Name	:	IO 5 GHz 1000 Mbps UBR with Integrated Antenna (17 dBi) with dying gasp		
Model Number	:	ion4xl1_BTS_d		
Power supply	:	Input of PoE: 100-240VAC, 50Hz, Output of PoE/input of EUT: +48V (PoE),0.315A		
Operation frequency	:	WiFi: 802.11a/n(HT20)/ac(VHT20)/ax(HE20): 5180MHz~5240MHz; 5745MHz~5825MHz 802.11n(HT40)/ac(VHT40)/ax(HE40): 5190MHz~5230MHz; 5755MHz~5795MHz 802.11ac(VHT80)/ax(HE80):5210MHz; 5775MHz		
Modulation	:	802.11a/n: BPSK/QPSK/16QAM/64QAM 802.11ac/ax: BPSK/QPSK/16QAM/64QAM/256QAM/1024QAM		
Data Rate	:	802.11a;6,9,12,18,24,36,48,54Mbps; 802.11a;(VHT20):MCS0-MCS9 802.11a;(VHT40/80):MCS0-MCS9 802.11n(HT20): MCS0 to MCS9; 802.11n(HT40):MCS0-MCS9; 802.11ax(HE20):MCS0-MCS11; 802.11ax(HE40/80):MCS0-MCS11		
Antenna Type	:	17dBi Sector Antenna		
Antenna gain	:	17dBi		
H/W No.	:	C1		
S/W No.	:	1.7.0.0		
Battery	:	N/A		
Date of Receipt	:	Mar. 22, 2023		
Condition of Sample on receipt		Good / Satisfactory / Fit for Testing		
Opinions and Interpretations:		See the specific Note / Annexure if any in the whole /full report.		
Note:		 For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual. Antenna gain and antenna type provided by manufacturer. 		
Note:	:	For 5GHz (Port J1 – Chain 1) is the worst case.		

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	Channel List						
			802.11a/n/a	ac/ax (20MHz	z)		
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	40	5200	44	5220	48	5240
149	5745	153	5765	157	5785	161	5805
165	5825						
			802.11n/ac/	/ax (40MHz)			
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
38	5190	46	5230	151	5755	159	5795
	802.11ac/ax (80MHz)						
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
42	5210	-	-	-	-	155	5775

2.2. ACCESSORIES OF EUT

Description of Accessories	Shielded Type	Ferrite Core	Length
PoE	_	_	-
Injector			

2.3. ASSISTANT EQUIPMENT USED FOR TEST

Description of Assistant equipment	Manufacturer	Model number or Type	EMC Compliance	SN
Laptop	DELL	Latitude 3490	-	5M2Z1W2
DC Power Supply	JUNKE	JK1504K	-	20181126-43

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3. EQUIPMENT'S LIST FOR ALL TEST ITEMS

No	Test Equipment	Manufacturer	Model No	Serial No	Cal. Date	Cal.Due Date
1	Spectrum Analyzer	Rohde and Schwarz	FSP	101163	2022/02/08	2024/02/07
2	Loop antenna	DAZE Beijing	ZN30900C	18052	2021/09/15	2023/09/14
3	Hi power horn antenna	DAZE Beijing	ZN30700	18012	2021/09/15	2023/09/14
4	Hom antenna	DAZE Beijing	ZN30702	18006	2021/09/15	2023/09/14
5	Horn antenna	DAZE Beijing	ZN30703	18005	2021/09/15	2023/09/14
6	Pre amplifier	KELIANDA	LNA-0009295	-	2023/01/13	2024/01/13
7	Pre amplifier	KELIANDA	CF-00218	-	2023/01/13	2024/01/13
8	Biconical Antenna	DAZE Beijing	ZN30505C	17038	2021/09/15	2023/09/14
9	EMI-RECEIVER	Schwarzbeck	FCKL	1528194	2023/01/13	2024/01/13
10	LISN	Kyoritsu	KNW-407	8-1789-5	2023/01/13	2024/01/13
11	Network-LISN	SCHWAR ZBECK	NNBM8125	81251314	2023/01/13	2024/01/13

		SCHWAR				
12	Network-LISN	ZBECK	NNBM8125	81251315	2023/01/13	2024/01/13
		Rohde and			2022/04/14.2	2024/04/42
13	PULSE LIMITER	Schwarz	ESH-Z3	100681	2023/01/13	2024/01/13
14	50Ω Coaxial Switch	DAIWA	1565157	-		
					2023/01/13	2024/01/13
15	50Ω Coaxial Switch	-	-	-	2023/01/13	2024/01/13
					2023/01/13	2024/01/13
	Wireless signal power					
16	meter	DARE!!	RPR3006W	RFSW19022	2023/01/13	2024/01/13
17	Signal Generator	KEYSIGHT	N5181A	512071		
	5				2023/01/13	2024/01/13

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		-				
18	RF Vector Signal Generator	Keysight	N5182B	512094	2023/01/13	2024/01/13
19	Spectrum Analyzer	R&S	FSV-40N	101385	2023/01/13	2024/01/13
20	Radio Communication Tester	R&S	CMW 500	124589	2021/09/15	2023/09/14
21	Signal Generator	R&S	SMP02	837017/004 836593/005	2021/09/15	2023/09/14 2023/01/13
22	DC Power Supply	Guanker	JK15040K	TNC/ET/C/ 0	2023/01/13	2024/01/13
23	Pro. Temp & <u>Humi</u> . Chamber	MENTEK	MHP-150-1C	MAA08112 5	2023/01/13	2024/01/13
24	Attenuators	AGILENT	8494B	-	-	-
25	Attenuators	AGILENT	8495B	-	-	-

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Report No.: AAEMT/RF/230322-04-01

3.1. BLOCK DIAGRAM OF EUT CONFIGURATION FOR TEST



3.2. TEST ENVIRONMENT CONDITIONS

During the measurement the environmental conditions were within the listed ranges:

Temperature range:	21-25°C
Humidity range:	40-75%
Pressure range:	86-106kPa

3.3. MEASUREMENT UNCERTAINTY

No.	Item	Uncertainty
1	Conducted Emission Test	2.70dB
2	Radiated Emission Test	3.09dB
3	RF power, conducted	2.46dB
4	RF power density, conducted	2.24dB
5	Spurious emissions, conducted	2.71dB
6	All emissions, radiated(<1G)	3.08dB
7	All emissions, radiated(>1G)	3.09dB

Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

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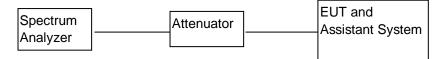
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4. POWER SPECTRAL DENSITY TEST

4.1. BLOCK DIAGRAM OF TEST SETUP



4.2. APPLIED PROCEDURES / LIMIT

According to FCC §15.407(a)(3)

For the band 5.15-5.25 GHz,

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omni directional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725-5.85 GHz

For the band 5.725-5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi..

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Decision Rule: The result of conformity based on the mentioned standards actual test limits / levels





4.3. TEST PROCEDURE

(For devices operating in the bands 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz, the above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in § 15.407(a)(5). For devices operating in the band 5.725-5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 MHz, or 500 kHz, "provided that the measured power is integrated over the full reference bandwidth" to show the total power over the specified measurement bandwidth (i.e., 1 MHz, or 500 kHz). If measurements are performed using a reduced resolution bandwidth (< 1 MHz, or < 500 kHz) and integrated over 1 MHz, or 500 KHz bandwidth, the following adjustments to the procedures apply:

a) Set RBW $\geq 1/T$, where T is defined in section II.B.l.a).

b) Set VBW \geq 3 RBW.

c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10log(500kHz/RBW) to the measured result, whereas RBW (< 500 KHz) is the reduced resolution bandwidth of the spectrum analyzer set during measurement.

d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add 10log(1MHz/RBW) to the measured result, whereas RBW (< 1 MHz) is the reduced resolution bandwidth of spectrum analyzer set during measurement.e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

Note: As a practical matter, it is recommended to use reduced RBW of 100 KHz for the sections 5.c) and 5.d) above, since RBW=100 KHZ is available on nearly all spectrum analyzers.





4.4. TEST RESULT:

CH. No.	Frequency	power density (dBm/MHz)	Limit (dBm/MHz)	Result
		TX 802.11a Mode		
CH36	5180	5.39	6	Pass
CH44	5220	4.59	6	Pass
CH48	5240	5.65	6	Pass
		TX 802.11n20 Mode		
CH36	5180	4.91	6	Pass
CH44	5220	3.99	6	Pass
CH48	5240	4.04	6	Pass
		TX 802.11n40 Mode		
CH38	5190	1.00	6	Pass
CH46	5230	2.00	6	Pass
		TX 802.11ac20 Mode		
CH36	5180	4.48	6	Pass
CH44	5220	3.25	6	Pass
CH48	5240	5.14	6	Pass
		TX 802.11ac40 Mode	-	
CH38	5190	1.07	6	Pass
CH46	5230	0.97	6	Pass
		TX 802.11ac80 Mode		
CH42	5210	0.39	6	Pass
		TX 802.11ax20 Mode	-	
CH36	5180	4.48	6	Pass
CH44	5220	4.84	6	Pass
CH48	5240	4.04	6	Pass
		TX 802.11ax40 Mode		
CH38	5190	1.00	6	Pass
CH46	5230	1.88	6	Pass
		TX 802.11ax80 Mode		
CH42	5210	0.84	6	Pass

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Decision Rule: The result of conformity based on the mentioned standards actual test limits / levels





Report No.: AAEMT/RF/230322-04-01

TEST RE	_	10 AAEW17R17230322-		
CH. No.	Frequency	Limit (dBm/500KHz)	Limit (dBm/500KHz)	Result
		TX 802.11a Mode	<u> </u>	
CH 149	5745	7.30	19	Pass
CH 157	5785	5.17	19	Pass
CH 165	5825	5.61	19	Pass
·		TX 802.11n20 Mode		
CH 149	5745	6.60	19	Pass
CH 157	5785	5.56	19	Pass
CH 165	5825	6.15	19	Pass
		TX 802.11n40 Mode		
CH151	5755	3.85	19	Pass
CH159	5795	2.19	19	Pass
		TX 802.11ac20 Mode		
CH 149	5745	6.34	19	Pass
CH 157	5785	4.84	19	Pass
CH 165	5825	5.05	19	Pass
		TX 802.11ac40 Mode		
CH151	5755	4.06	19	Pass
CH159	5795	1.91	19	Pass
		TX 802.11ac80 Mode		
CH155	5775	0.12	19	Pass
		TX 802.11ax20 Mode		
CH 149	5745	7.96	19	Pass
CH 157	5785	6.55	19	Pass
CH 165	5825	6.35	19	Pass
		TX 802.11ax40 Mode		
CH151	5755	4.13	19	Pass
CH159	5795	3.36	19	Pass
		TX 802.11ax80 Mode		
CH155	5775	1.33	19	Pass

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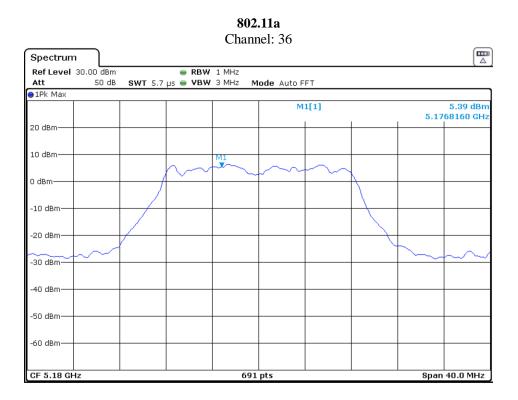
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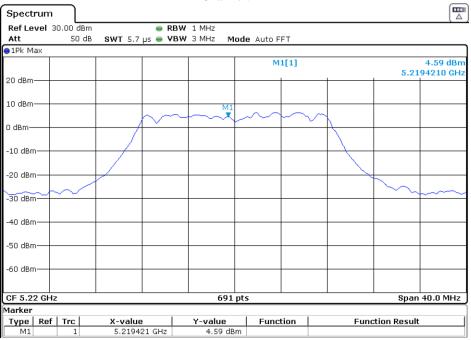




Test plots as followed



Channel: 44

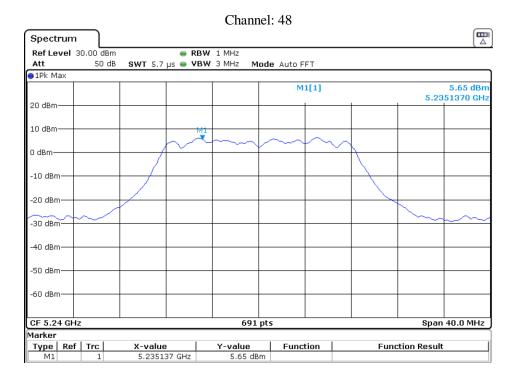


15 | Page

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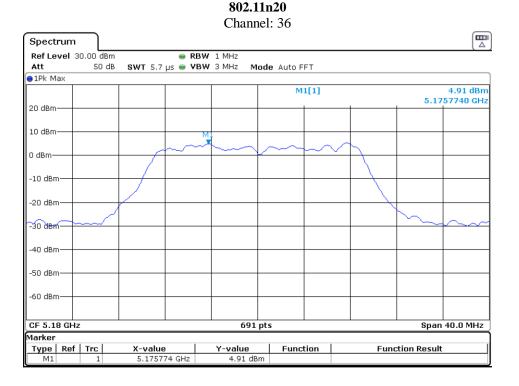




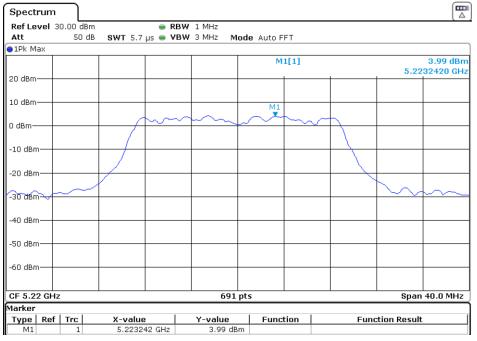
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Channel: 44



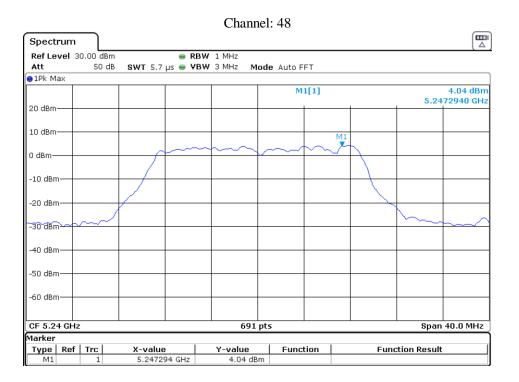
17 | Page

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Decision Rule: The result of conformity based on the mentioned standards actual test limits / levels





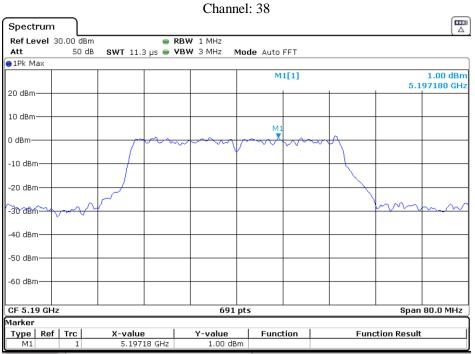


18 | P a g e

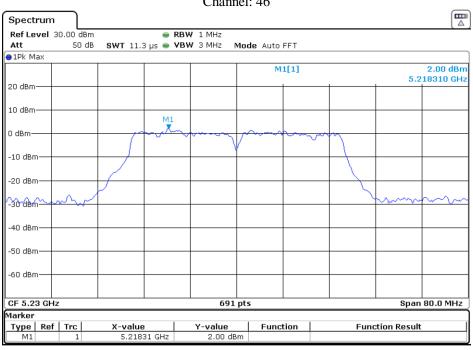
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802.11n40



Channel: 46

19 | Page

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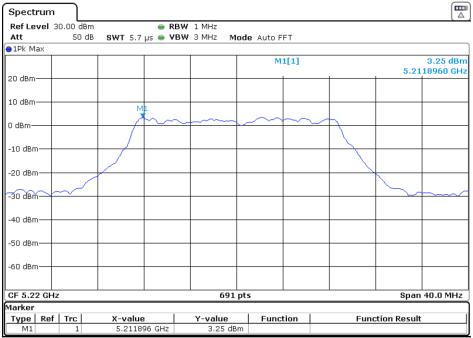




Report No.: AAEMT/RF/230322-04-01 802.11ac20 Channel: 36

				Cham	lei. 30				
Spectrum	,)								
Ref Level	30.00 dBm		RBW	1 MHz					
Att	50 dB	SWT 5.7	µs 🖷 VBW	3 MHz 🛛 🕅	lode Auto F	FT			
●1Pk Max									
					м	1[1]		5.18	4.48 dBm 39940 GHz
20 dBm									
10 dBm					M	1			
0 dBm		$- \wedge$	$\sim\sim$	~~~~	'	<u> </u>			
-10 dBm									
-20 dBm									
-30 dBm	\sim							\sum	
-40 dBm									
-50 dBm									
-60 dBm									
CF 5.18 GF	łz			691	. pts			Span	40.0 MHz
Marker Type Rei	f Trc	X-value	1	Y-value	Func	tion	Fund	tion Result	
M1	1	5.18399		4.48 dE					





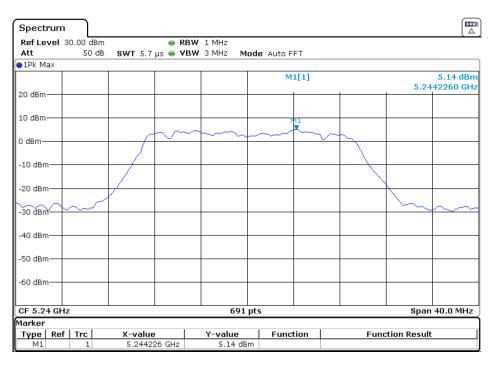
Plot No.174, Udyog Vihar Phase 4, Sector -18, Gurgaon -122016, Haryana, India Contact:0124-4235350, 4145343; e-mail: info @aaemtlabs.com; Website: <u>www.aaemtlabs.com</u>

Decision Rule: The result of conformity based on the mentioned standards actual test limits / levels

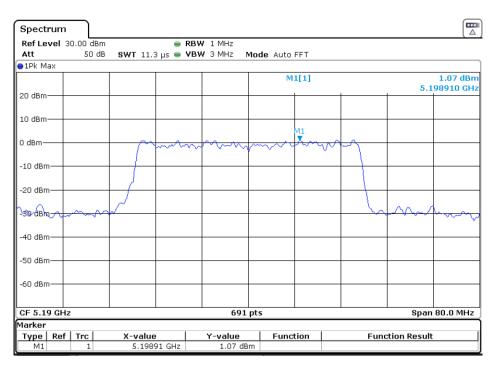




Channel: 48





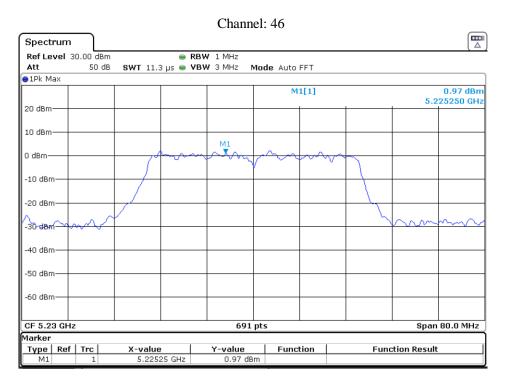


21 | Page

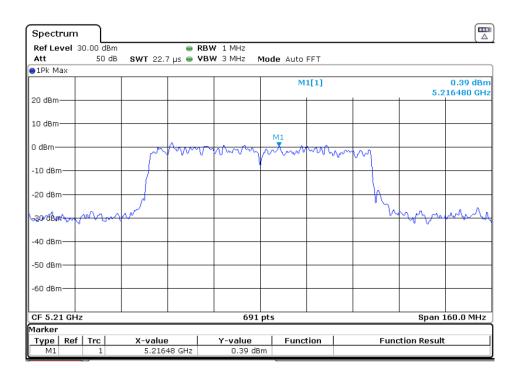
Plot No.174, Udyog Vihar Phase 4, Sector -18, Gurgaon -122016, Haryana, India Contact:0124-4235350, 4145343; e-mail: info @aaemtlabs.com; Website: <u>www.aaemtlabs.com</u> Decision Rule: The result of conformity based on the mentioned standards actual test limits / levels







802.11ac80 Channel: 42



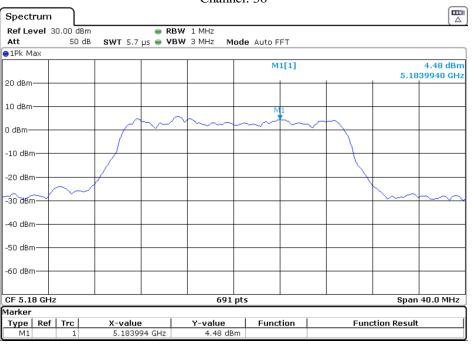
22 | Page

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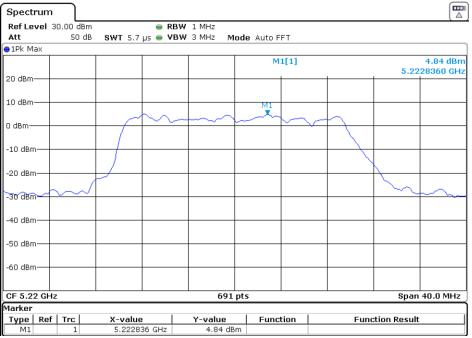












23 | P a g e

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Report No.: AAEMT/RF/230322-04-01 Channel: 48

Spectrum	r)								
Ref Level	30.00 dBm		RBW	1 MHz					
Att	50 dB	SWT 5.7	µs 👄 VBW	3 MHz M	ode Auto F	FT			
😑 1Pk Max									,
					М	1[1]		5.24	4.04 dBm 72940 GHz
20 dBm									
10 dBm						M1			
0 dBm				~~~~	<u> </u>	~~Ž			
-10 dBm									
-20 dBm									
-30 dBm-~~	~~~~							<u> </u>	~~~~
-40 dBm									
-50 dBm									
-60 dBm									
CF 5.24 GF	1-7			691	ntc				40.0 MHz
Marker	12			091	pts			apan	10.0 MHZ
	f Trc	X-value	1	Y-value	Func	tion	Fund	tion Result	1
M1	1	5.24729		4.04 dB					

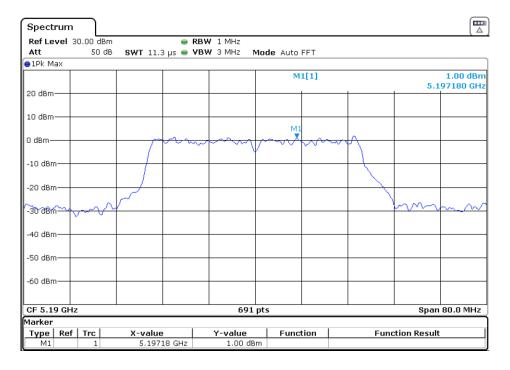
24 | P a g e

Plot No.174, Udyog Vihar Phase 4, Sector -18, Gurgaon -122016, Haryana, India Contact:0124-4235350, 4145343; e-mail: info @aaemtlabs.com; Website: www.aaemtlabs.com Decision Rule: The result of conformity based on the mentioned standards actual test limits / levels

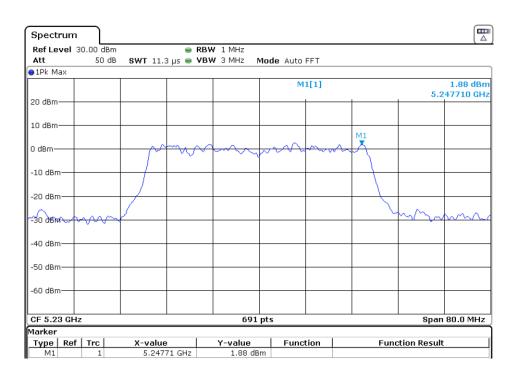




Report No.: AAEMT/RF/230322-04-01 802.11ax40 Channel: 38



Channel: 46



25 | Page

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				Channel	: 42				
Spectrum									
Ref Level 3 Att	30.00 dBm 50 dB	SWT 22.7	RB۱ µs e VB۱	N/1 MHz N/3 MHz N/	1ode Auto	FFT			
⊖1Pk Max									
00.10					М	1[1]		5.1	0.84 dBm L98650 GHz
20 dBm									
10 dBm									
0 dBm		m	-	M1	mm	ww	mm		
-10 dBm					1		+		
-20 dBm									
~30/dt8pn-0/	Jamon	M						mon	www
-40 dBm									
-50 dBm									
-60 dBm									
CF 5.21 GH	z			691	pts			Span	160.0 MHz
Marker									
Type Ref	1 Trc	X-value 5.1986		Y-value 0.84 dB	Func	tion	Fu	nction Result	t l
IMIT		5.1986	IS GHZ	0.84 aB					

802.11ax80 Channel: 42

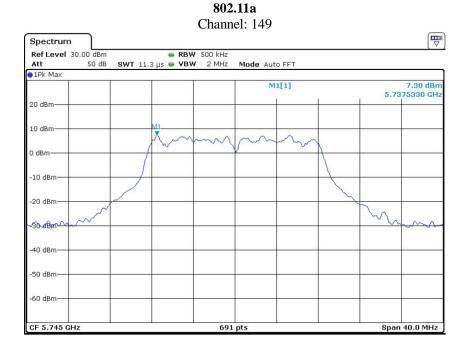
Plot No.174, Udyog Vihar Phase 4, Sector -18, Gurgaon -122016, Haryana, India Contact:0124-4235350, 4145343; e-mail: info @aaemtlabs.com; Website: www.aaemtlabs.com Decision Rule: The result of conformity based on the mentioned standards actual test limits / levels





Report No.: AAEMT/RF/230322-04-01

Test plots as followed:



Channel: 157

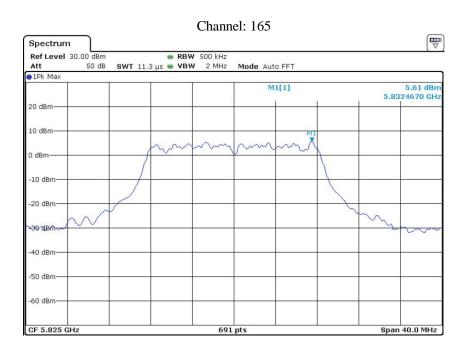


Plot No.174, Udyog Vihar Phase 4, Sector -18, Gurgaon -122016, Haryana, India Contact:0124-4235350, 4145343; e-mail: info @aaemtlabs.com; Website: <u>www.aaemtlabs.com</u> Decision Rule: The result of conformity based on the mentioned standards actual test limits / levels





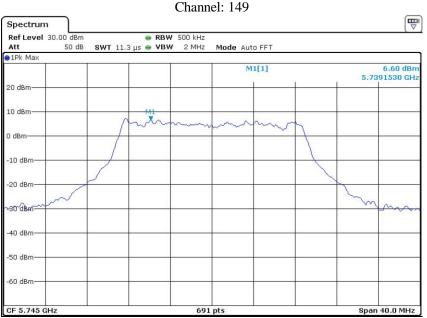
Report No.: AAEMT/RF/230322-04-01



Plot No.174, Udyog Vihar Phase 4, Sector -18, Gurgaon -122016, Haryana, India Contact:0124-4235350, 4145343; e-mail: info @aaemtlabs.com; Website: <u>www.aaemtlabs.com</u> Decision Rule: The result of conformity based on the mentioned standards actual test limits / levels







802.11n20 Channel: 149





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Report No.: AAEMT/RF/230322-04-01

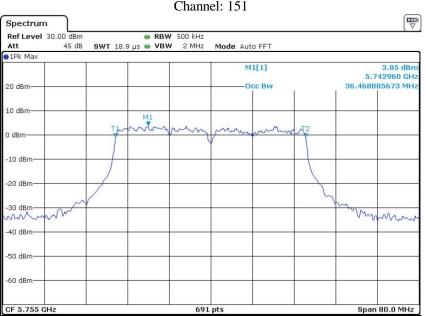
Spectrum]							₩
		 RBW 500 μs VBW 2) kHz MHz Mode Au	ito FFT			
1Pk Max			r	M1[1]		5.92	6.15 dBn 12950 GH
20 dBm						0.02	12950 011
10 dBm							-
) dBm	<u>ſ</u>	m	mm	mm	<u> </u>		
-10 dBm							
20 dBm						S	
30.ABm	~					m	more
40 dBm				_			
50 dBm							
60 dBm							

30 | P a g e

Plot No.174, Udyog Vihar Phase 4, Sector -18, Gurgaon -122016, Haryana, India Contact:0124-4235350, 4145343; e-mail: info @aaemtlabs.com; Website: <u>www.aaemtlabs.com</u> Decision Rule: The result of conformity based on the mentioned standards actual test limits / levels







802.11n40 Channel: 151

Channel: 159

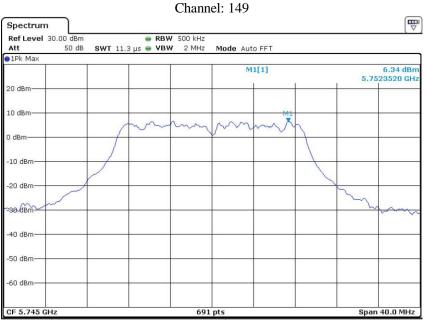
		Ciluin	101. 159			
Spectrum						[₩
Ref Level 30.00 di	3m e	RBW 500 kHz				<u>`</u>
Att 45	dB SWT 18.9 µs 🖷	VBW 2 MHz	Mode Auto FFT			
😑 1Pk Max		1.00				
			M1[1]		2.19 0	dBm
					5.782730	
20 dBm-			Occ Bw		36.468885673	MHz
10 dBm				-	-	-
	M	1				
0 dBm	Thomas	A	man man AAA	m J2		
			V Y	Y		
-10 dBm			Y			
-10 ubin						
-20 dBm						
	N			1	~	
-30 dBm	N			1	A.	_
mmm					manna	m
-40 dBm					· · · · · ·	_
-50 dBm						
-60 dBm						
-00 ubiii						
CF 5.795 GHz	I	69	1 pts	1	Span 80.0 M	IHz

31 | P a g e

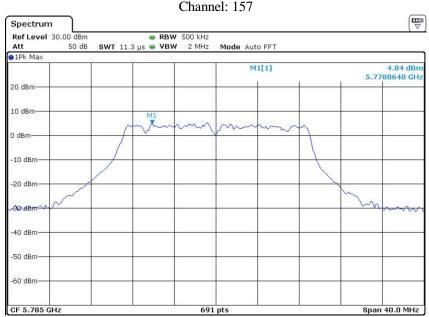
Plot No.174, Udyog Vihar Phase 4, Sector -18, Gurgaon -122016, Haryana, India Contact:0124-4235350, 4145343; e-mail: info @aaemtlabs.com; Website: www.aaemtlabs.com Decision Rule: The result of conformity based on the mentioned standards actual test limits / levels







802.11ac20



Channel: 157

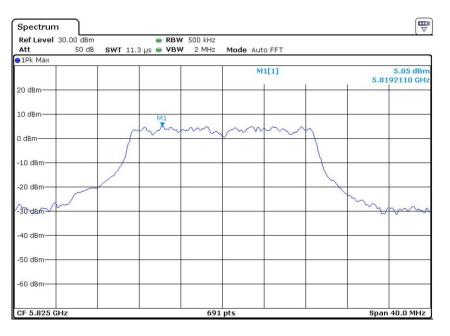
32 | Page

Plot No.174, Udyog Vihar Phase 4, Sector -18, Gurgaon -122016, Haryana, India Contact:0124-4235350, 4145343; e-mail: info @aaemtlabs.com; Website: www.aaemtlabs.com Decision Rule: The result of conformity based on the mentioned standards actual test limits / levels

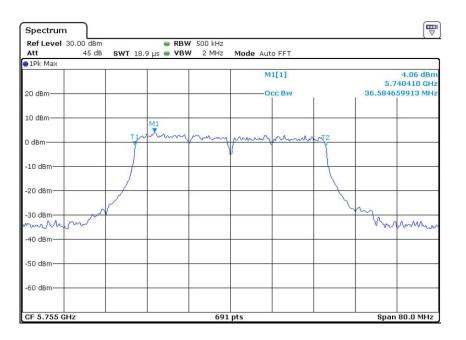




Channel: 165



802.11ac40 Channel: 151

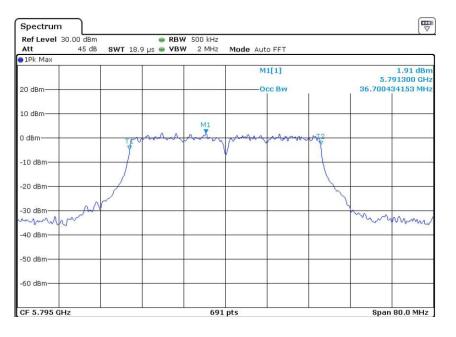


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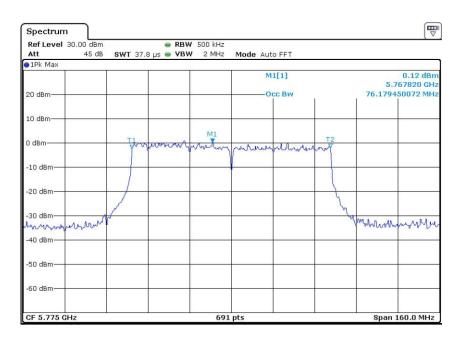




Channel: 159



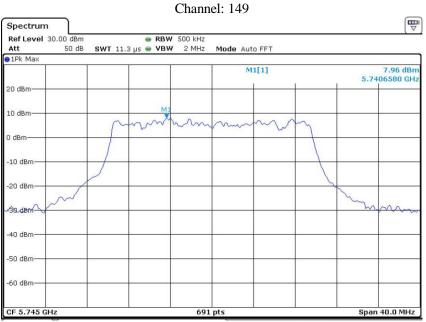
802.11ac80 Channel: 155



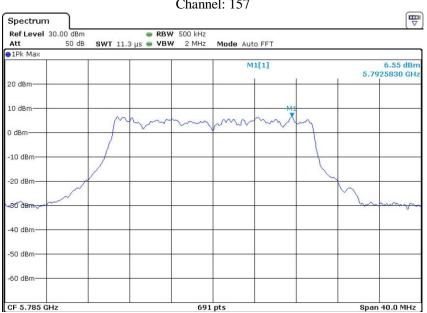
Plot No.174, Udyog Vihar Phase 4, Sector -18, Gurgaon -122016, Haryana, India Contact:0124-4235350, 4145343; e-mail: info @aaemtlabs.com; Website: <u>www.aaemtlabs.com</u> Decision Rule: The result of conformity based on the mentioned standards actual test limits / levels







802.11ax20



Channel: 157

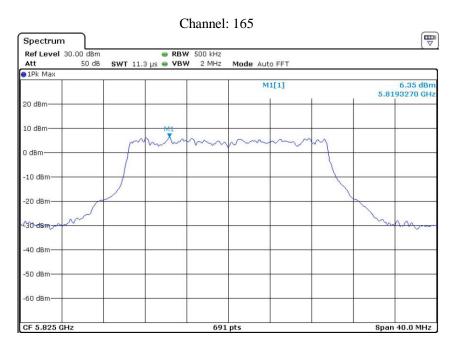
35 | Page

Plot No.174, Udyog Vihar Phase 4, Sector -18, Gurgaon -122016, Haryana, India Contact:0124-4235350, 4145343; e-mail: info @aaemtlabs.com; Website: www.aaemtlabs.com Decision Rule: The result of conformity based on the mentioned standards actual test limits / levels

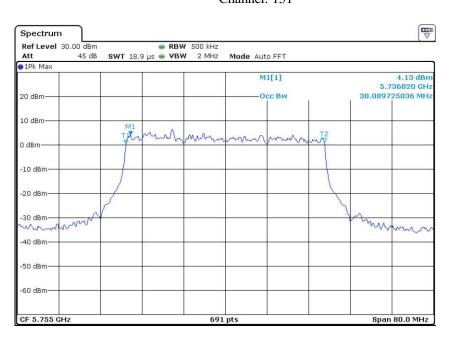




Report No.: AAEMT/RF/230322-04-01



802.11ax40 Channel: 151



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Decision Rule: The result of conformity based on the mentioned standards actual test limits / levels

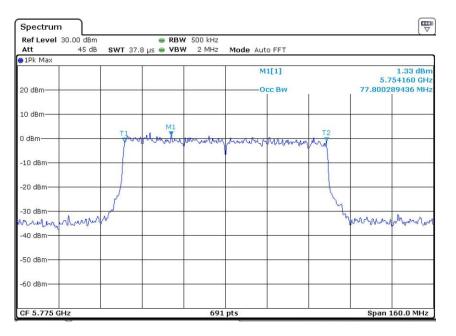




Channel: 159

Ref Level 30.00 dBm	e RBV	¥ 500 kHz				
Att 45 dB			e Auto FFT			
1Pk Max						
20 dBm			M1[1] ——Occ Bw			3.36 dBm 85160 GHz 50796 MHz
10 dBm						
	T1 M1		man			
0 dBm	- Proceeding	harritan	man man			
-10 dBm						
-10 dBm						
-20 dBm						
				7		
-30 dBm					A	3 1/29
monument	¥.				www	howhow
-40 dBm						
-50 dBm	1					с —);
-60 dBm						
CF 5.795 GHz	1	691 pts	1	1	Span	80.0 MHz





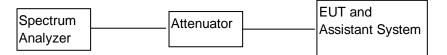
Plot No.174, Udyog Vihar Phase 4, Sector -18, Gurgaon -122016, Haryana, India Contact:0124-4235350, 4145343; e-mail: info @aaemtlabs.com; Website: <u>www.aaemtlabs.com</u> Decision Rule: The result of conformity based on the mentioned standards actual test limits / levels





5. 26 dB & 99% Emission Bandwidth

5.1. BLOCK DIAGRAM OF TEST SETUP



5.2. APPLIED PROCEDURES / LIMIT

The maximum power spectral density is measured as a conducted emission by direct connection of a calibrated test instrument to the equipment under test. If the device cannot be connected directly, alternative techniques acceptable to the Commission may be used. Measurements in the 5.725-5.85 GHz band are made over a reference bandwidth of 500 kHz or the 26 dB emission bandwidth of the device, whichever is less. Measurements in the 5.15-5.25 GHz, 5.25-5.35 GHz, and the 5.47-5.725 GHz bands are made over a bandwidth of 1 MHz or the 26 dB emission bandwidth of the device, whichever is less. A narrower resolution bandwidth can be used, provided that the measured power is integrated over the full reference bandwidth.

5.3. TEST PROCEDURE

- a) Set RBW = approximately 1% of the emission bandwidth.
- b) Set the VBW > RBW.
- c) Detector = Peak.
- d) Trace mode = max hold.

e) Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this

with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

The following procedure shall be used for measuring (99 %) power bandwidth:

- 1. Set center frequency to the nominal EUT channel center frequency.
- 2. Set span = 1.5 times to 5.0 times the OBW.
- 3. Set RBW = 1 % to 5 % of the OBW
- 4. Set VBW \geq 3 \cdot RBW
- 5. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
- 6. Use the 99 % power bandwidth function of the instrument (if available).
- 7. If the instrument does not have a 99 % power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5 % of the total is reached; that frequency is recorded as the upper frequency. The 99% occupied bandwidth is the difference between these two frequencies.

Decision Rule: The result of conformity based on the mentioned standards actual test limits / levels





5.4. TEST RESULT

CH.	Frequency	260	1B Occupied	Bandwidth (N	MHz)	99%	Occupied B	andwidth (M	/IHz)
No.	(MHz)	802.11a	802.11n (HT20)	802.11ac (VHT20)	802.11ax (HE20)	802.11a	802.11n (HT20)	802.11ac (VHT20)	802.11ax (HE20)
36	5180.00	20.434	21.939	22.344	22.576	16.541	17.756	17.800	19.146
44	5220.00	20.897	22.229	22.46	22.179	16.497	17.800	17.800	19.102
48	5240.00	20.666	21.939	22.518	22.46	16.541	17.800	17.843	19.059
CH.	Frequency	6d	B Occupied Bandwidth (MHz)			99%	Occupied B	andwidth (M	/Hz)
No.	(MHz)	802.11a	802.11n (HT20)	802.11ac (VHT20)	802.11ax (HE20)	802.11a	802.11n (HT20)	802.11ac (VHT20)	802.11ax (HE20)
149	5745.00	16.556	17.829	17.829	19.219	16.555	17.829	17.829	19.102
157	5785.00	16.556	17.771	17.829	19.219	16.555	17.829	17.829	19.160
165	5825.00	16.556	17.829	17.829	19.219	16.497	17.771	17.713	19.160

		26dB (Occupied Band	lwidth (MHz)		99% Occupied Bandw	ridth (MHz)	
CH. No.	Frequency (MHz)	802.11 n (HT40)	802.11ac (VHT40)	802.11ax (HE40)	802.11n (HT40)	802.11ac (VHT40)	802.11ax (HE40)	
38	5190.00	41.33	43.30	44.57	36.295	36.468	38.031	
46	5230.00	42.26	43.99	44.11	36.295	36.729	38.031	
		6dB C	ccupied Band	width (MHz)	99% Occupied Bandwidth (MHz)			
CH. No.	Frequency (MHz)	802.11 n (HT40)	802.11ac (VHT40)	802.11ax (HE40)	802.11n (HT40)	802.11ac (VHT40)	802.11ax (HE40)	
151	5755.00	36.64	36.58	38.49	36.700	36.700	38.089	
159	5795.00	36.58	36.53	38.15	36.700	36.700	37.973	

CH.	Engguener	26dB Occupied Band	dwidth (MHz)	99% Occupied B	andwidth (MHz)	
Сп. No.	Frequency (MHz)	802.11ac	802.11ax	802.11ac	802.11ax	
INO.	(IVITIZ)	(VHT80)	(HE80)	(VHT80)	(HE80)	
42	5210.00	87.29	84.28	76.063	77.45	
CU	English	6dB Occupied Band	width (MHz)	99% Occupied Bandwidth (MHz)		
CH. No.	Frequency (MHz)	802.11ac	802.11ax	802.11ac	802.11ax	
INO.	(IVITIZ)	(VHT80)	(HE80)	(VHT80)	(HE80)	
155	5775.00	76.47	77.86	76.410	77.800	

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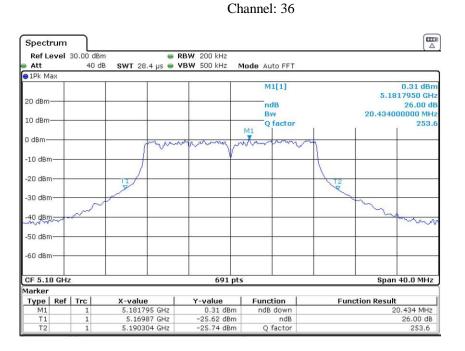
Decision Rule: The result of conformity based on the mentioned standards actual test limits / levels





26dB BW 802.11a

Test plots as followed:



Channel: 44

				Chamler			
Spect	rum						
Ref L	evel 3	30.00 dBn	າ 🖷	RBW 200 kHz			\\
Att		40 di	3 SWT 28.4 µs 🖷 '	BW 500 kHz N	lode Auto FFT		
D1Pk M	ах						
					M1[1]		-2.86 dBn
							5.2156580 GH
20 dBm					ndB		26.00 dt
10 dBm					Bw		20.897000000 MH:
TO OBIU					Q factor		249.0
0 dBm-				MI			
o ubiii-			and more	manna -	mann	AL-	
-10 dBn			/ was	· La · Mu		~]	
10 000	·			1			
-20 dBn							
	с.		T1 /			T2	
-30 dBn	1-		Jon		-	X	~
		N					ma
-40 dBm	1 10	~					man when we a
and have	w.						
-50 dBn	1-						
-60 dBn	1						
CF 5.2	2 GHz		· ·	691 pts			Span 40.0 MHz
/larker							
Туре	Ref	Trc	X-value	Y-value	Function	Funct	ion Result
M1		1	5.215658 GHz	-2.86 dBm	ndB down		20.897 MHz
Τ1		1	5.209407 GHz	-28.83 dBm	ndB		26.00 dB
Т2		1	5.230304 GHz	-28.90 dBm	Q factor		249.6

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Decision Rule: The result of conformity based on the mentioned standards actual test limits / levels



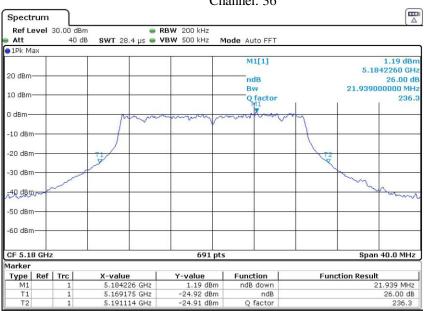


				Channel	: 48		
Spect	rum						
Ref L	evel 3	30.00 dBr	n 🖷 I	RBW 200 kHz			
Att		40 d	B SWT 28.4 µs 🖷 '	VBW 500 kHz M	lode Auto FFT		
●1Pk M	ax						
					M1[1]		-3.64 dBn
20 dBm	_				10		5.2356580 GH
					ndB		26.00 d 20.666000000 MH
10 dBm	_		-		O factor		20.00000000 MH
					Q lactor	T I	200.
0 dBm-	_			MJ		_	
			ma and	marmy in	mann	m	
-10 dBn	n			V	V		
						1	
-20 dBn	n						
			T1			T2	
-30 dBn			~			N N	
10 10-		mond				4	m
-40 dBp	when	4					manne
-50 dBn							
-50 000							
-60 dBn							
CF 5.2	4 GHz			691 pts			Span 40.0 MHz
Marker							
Type	Ref	Trc	X-value	Y-value	Function	Func	tion Result
M1		1	5.235658 GHz	-3.64 dBm	ndB down		20.666 MHz
Τ1		1	5.22958 GHz	-29.74 dBm	ndB		26.00 dB
T2		1	5.250246 GHz	-29.63 dBm	Q factor		253.4

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26dB BW 802.11n20 Channel: 36

Channel: 44

Spectrum						
	30.00 dBm		RBW 200 kHz			<u> </u>
Att	40 dB	SWT 28.4 µs 👄 🕯	VBW 500 kHz N	1ode Auto FFT		
●1Pk Max						
				M1[1]		-2.30 dBm
20 dBm						5.2242260 GHz
20 ubiii				ndB		26.00 dB
10 dBm				Bw		22.229000000 MHz
10 0011				Q factor		235.0
0 dBm				MI		
0 ubm		many men	monorm m	monthing	man	
-10 dBm			Ý			5
-10 000						
-20 dBm						
-20 ubm		TI			T2	
-30 dBm		F			Je .	
-So abiii	~					
-40 dBm						my and the
minerton						- mar
-50 dBm						
00 00.0						
-60 dBm						
CF 5.22 GH	7		691 pts			Span 40.0 MHz
Marker			051 pt.			opun toto mite
	Trc	X-value	Y-value	Function	Eupo	tion Result
M1	1	5.224226 GHz	-2.30 dBm	ndB down	Func	22.229 MHz
T1	1	5.208944 GHz	-28.23 dBm	ndB		26.00 dB
T2	1	5.231172 GHz	-28.40 dBm	Q factor		235.0

Plot No.174, Udyog Vihar Phase 4, Sector -18, Gurgaon -122016, Haryana, India

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Decision Rule: The result of conformity based on the mentioned standards actual test limits / levels





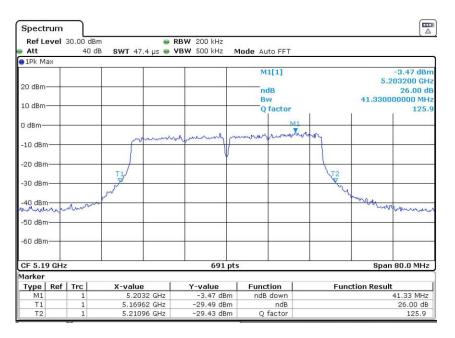
				Chann	el: 48		
Spect	rum						
Ref L	evel	30.00 dBr	m 👄	RBW 200 kHz			
Att		40 d	B SWT 28.4 µs 👄	VBW 500 kHz	Mode Auto FFT		
01Pk M	ах						
					M1[1]		-3.03 dBm
							5.2442260 GH
20 dBm	-				ndB		26.00 dt
					Bw		21.939000000 MH:
10 dBm					Q factor		239.0
- 1-					NIT		
0 dBm-					X		
			man	money	mound	m	
-10 dBn	ד י			1			
-20 dBn	1						
			T1			T2	
-30 dBn	<u>ו</u> וי	1	- market and a second s			2	
		in	-				mana
-#Q.dBn	norm						mon mon
-50 dBn							
-60 dBn							
CF 5.2	4 GHz			691 (ots		Span 40.0 MHz
Marker							
Type	Ref	Trc	X-value	Y-value	Function	Fund	ction Result
M1		1	5.244226 GHz	-3.03 dBr			21.939 MHz
Τ1		1	5.229001 GHz	-29.02 dBr	n ndB		26.00 dB
T2		1	5.250941 GHz	-28.95 dBr	n Q factor		239.0

Plot No.174, Udyog Vihar Phase 4, Sector -18, Gurgaon -122016, Haryana, India Contact:0124-4235350, 4145343; e-mail: info @aaemtlabs.com; Website: <u>www.aaemtlabs.com</u> Decision Rule: The result of conformity based on the mentioned standards actual test limits / levels





26dB BW 802.11n40 Channel: 38



Spectrum Ref Level 30.00 dB RBW 200 kHz 40 dB SWT 47.4 us . VBW 500 kHz Mode Auto FET Att 1Pk Ma M1[1] 6.79 dBn 5.222590 GH 20 dBm ndB 26.00 di 42.26000000 MH: Bw 10 dBm Q factor 123. 0 dBn -10 dBm -20 dBm -30 dBm 40 dBm -50 dBm -60 dBm CF 5.23 GHz 691 pts Span 80.0 MHz Marker Type Ref Trc M1 1 T1 1 X-value Y-value Function **Function Result** .22259 GHz 5.2087 GHz -6.79 dBm -32.74 dBm 42.26 MHz 26.00 dB ndB dow ndB Τ2 5.25096 GHz -32.96 dBm Q factor 123.6

Channel: 46

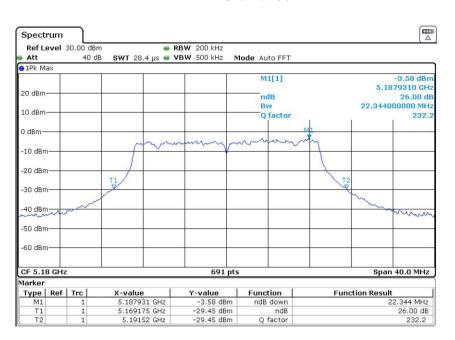
44 | P a g e

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Decision Rule: The result of conformity based on the mentioned standards actual test limits / levels

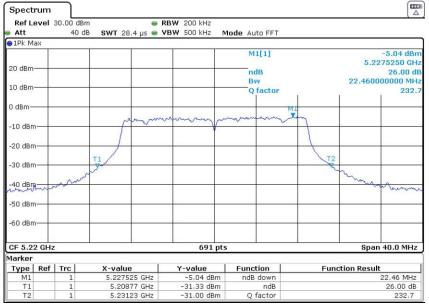






26dB BW 802.11ac20 Channel: 36





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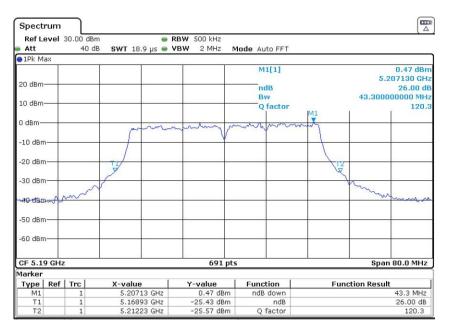
				Channel	1:48		
Spect	um						
Ref L	evel 3	30.00 de	sm 👄 I	RBW 200 kHz			(=
Att		40 (dB SWT 28.4 µs 🖷 '	BW 500 kHz	Hode Auto FFT		
O1Pk M	эх			1.81 E			
					M1[1]		-4.53 dBn
20 dBm	_						5.2357160 GH
20 0011					ndB		26.00 dE
10 dBm					Bw		22.518000000 MHz
					Q factor	ĩ	232.5
0 dBm-	_			141			
			my prove	A mount	mmm	man	
-10 dBm	-			Y			
-20 dBm	-						
			T1 /			T2	
-30 dBm	-	1.00	P	-		1 Pm	
		m				-	man
-40 dBn	un						
-50 dBm							
-50 UBI							
-60 dBm							
00 001							
CF 5.2	ŧ GHz	1		691 pt	5		Span 40.0 MHz
Marker	n (T 1					u na h
Type M1	Ref	1	X-value 5.235716 GHz	Y-value -4.53 dBm	Function ndB down	Func	tion Result 22.518 MHz
T1		1	5.228596 GHz	-30.53 dBm	ndB		22.518 MH2 26.00 dB
T2		1	5.251114 GHz	-30.59 dBm	Q factor	(232.5

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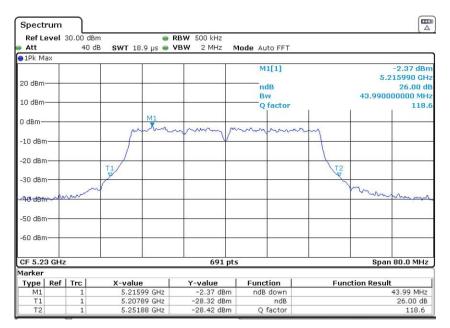




26dB BW 802.11ac40 Channel: 38



Channel: 46



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Decision Rule: The result of conformity based on the mentioned standards actual test limits / levels



AA Electro Magnetic Test Laboratory Private Limited



Report No.: AAEMT/RF/230322-04-01

26dB BW 802.11ac80 Channel: 42

Ref Le	vel 30).00 dBm		RBW 1 MHz				
Att		40 dB	SWT 22.7 µs 👄	VBW 3 MHz Mo	de Auto FFT			
1Pk Ma	<							
					M1[1]			-1.95 dBi
20 dBm—							5.2	44040 GH
20 ubiii—					ndB			26.00 d
10 dBm—					Bw		87.2900	00000 MH
10 0011					Q factor	1	ř.	60
0 dBm—						M1		
o abiii			m m mm	monorm	mon	mon		
-10 dBm-	_		1 mary -					
-20 dBm-	_							-
			TIN			M2		
-30 dBm-	-		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	-		K.	V	-
	n	1					human	N. N. As.A.
-40 dBm-	mun	m la					V	10
-50 dBm-	-					-	-	
-60 dBm-	-							-
CF 5.21	GHz			691 pts		4	Span 1	60.0 MHz
larker								
Type	Ref 1	Trc	X-value	Y-value	Function	Fun	ction Result	
M1		1	5.24404 GHz	-1.95 dBm	ndB down			87.29 MHz
Τ1		1	5.16624 GHz	-28.20 dBm	ndB			26.00 dB
T2		1	5.25353 GHz	-28.12 dBm	Q factor			60.1

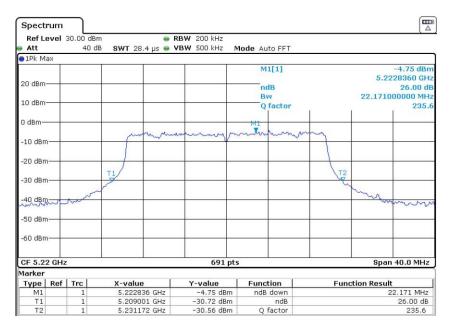
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26dB BW 802.11ax20 Channel: 36 Spectrum Ref Level 30.00 dB 👄 RBW 200 kHz Att 40 dB SWT 28.4 µs 👄 VBW 500 kHz Mode Auto FFT 1Pk Max M1[1] -2.36 dBr 5.1846310 GH 20 dBm 26.00 dt ndB 22.576000000 MH Bw 10 dBm Q factor 229. 0 dBm -10 dBr -20 dBm T1 -30 dBm 40 dBm hum -50 dBm -60 dBm CF 5.18 GHz 691 pts Span 40.0 MHz Marker X-value 5.184631 GHz 5.169175 GHz 5.191751 GHz Y-value -2.36 dBm -28.33 dBm Type Ref Trc Function Function Result 22.576 MHz M1 T1 ndB down ndB 26.00 dB 229.7 -28.28 dBm Q factor

Channel: 44



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Decision Rule: The result of conformity based on the mentioned standards actual test limits / levels





Channel: 48

Att	evela	30.00 dB 40 d			BW 200 kHz BW 500 kHz M	dode Auto FFT			
1Pk M	ах				5.40 Ja				
						M1[1]			-4.57 dBn
20 dBm								5.233	27060 GH
Lo dom					1 1	ndB			26.00 di
10 dBm						Bw		22,46000	0000 MH
						Q factor	Ĩ.	r i	233.
0 dBm-	_		M	1					
			in and	- An mart	A a second in	a anna martina	~~~~		
-10 dBn	n		- (main	~~~~	Long and			·	
-20 dBn	n				+				
			T1/				12		
-30 dBn	n		y				E.		
		~~~	2				the second secon	m no a	
		~~~~					R.	many	man
-49_dB0	m	~~~~					R.	mmon	mahar
-49_dB0	m						- En	munnal	man
- <u>49 dBo</u> -50 dBn	yulu r n	~~~~					E.	munna	man
- <u>49 dBo</u> -50 dBn	yulu r n	- vul					- E.	mman	mAn
- <u>40 dBn</u> -50 dBn -60 dBn									
-40 dBo -50 dBn -60 dBn CF 5.2		~~~~			691 pt:	5			40.0 MHz
- <u>+0</u> dB0 -50 dBn -60 dBn <u>CF 5.2</u> 1arker	yulur n 4 GHz							Span	
-40 dBo -50 dBn -60 dBn CF 5.2 1arker Type		Trc	X-value		Y-value	Function	Func	Span tion Result	40.0 MHz
-30 dBn -40 dBn -50 dBn -60 dBn CF 5.2 1arker Type M1 T1	yulur n 4 GHz		X-value 5.232706 5.22877				Func	Span tion Result	

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26dB BW 802.11ax40 Channel: 38

					lumer. 50	
Spect	rum					ſ
Ref L	evel	30.00 dB	m 🖷 i	RBW 500 kHz		(
Att		40 d		BW 2 MHz	Mode Auto FFT	
D1Pk M	ax					
					M1[1]	1.52 di
20 dBm						5.198680 G
20 aBM					ndB	26.00
10 dBm					Bw	44.570000000 M
10 UBM					Q factor	110
0 dBm-				a state of the	The second	
o abin			human	Marande	and the second	
-10 dBn	n					
	~ I					
-20 dBn	n		T1/	_		12
			7			Y
-30 dBn	n	/				1 Ma
		~~				The second secon
40 dBn	norran	~				man
-50 dBn	n					
-60 dBn						
-60 aBn						
CF 5.1	9 GHz	:		691 pt	s	Span 80.0 MH
Aarker	0-6	Tra	N	Maria Luca	L E	Europhics Downla
Type M1	Ref	Trc 1	X-value 5.19868 GHz	Y-value 1.52 dBm	Function ndB down	Function Result 44.57 MH
T1		1	5.16858 GHz	-24.30 dBm	ndB	44.57 MP 26.00 c
T2		1	5.21315 GHz	-24.56 dBm	Q factor	116.0
	_		CONTRACTOR AND A CONTRACTOR	Constant and the second second		

Channel: 46

Att	evel 30	.00 dBm 40 dB		⊜ RB µs ⊜ VB	W 500 kHz W 2 MHz N∕	lode Auto FFT			
1Pk M	ax				n				
						M1[1]			-1.73 dBn
20 dBm	_				· · · ·	ndB		5.2	25950 GH 26.00 d
						Bw		44 1100	20.00 UI
10 dBm	_				a	Q factor		44.11000	118.
					M1	Q Idetti	1 1	r i	110.
0 dBm–	-								
			m	may	many	munn	my		
-10 dBn	י –								5
-20 dBn			T1				T2		
			7				T2		
-30 dBn	<u> </u>	0						0	
den de -	MARY	n	r -					mon	marina
40 009	nes.								
EO dos									
-50 dBn	<u>ا</u> ر								
									c
-60 dBn	ı——				(01 ====				00.0.001
-60 dBn CF 5.2	ı——				691 pts			Span	80.0 MHz
-60 dBn CF 5.2 1arker	3 GHz	[wo]	V-ualve						80.0 MHz
-60 dBn CF 5.2 1arker Type	3 GHz	[rc	X-value	CH2	Y-value	Function	Func	tion Result	
-50 dBn -60 dBn CF 5.2 Marker Type M1 T1	3 GHz	[rc	X-value 5.2259 5.20785				Func	tion Result	80.0 MHz 44.11 MHz 26.00 dB

51 | P a g e

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