FCC RADIO TEST REPORT
FCC ID: 2ASEF-PMA10

Product： PMA

Trade Mark： N/A

Model Name： PMA1.0

Family Model： N/A

Report No.： S18112901801002

Prepared for

Beijing Roobo Technology Co., Ltd.

Room 5-128, B1, Building C, Galaxy SOHO, Dongcheng District, Beijing, China

Prepared by

Shenzhen NTEK Testing Technology Co., Ltd.
1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street Bao'an District, Shenzhen 518126 P.R. China
Tel.: +86-755-6115 6588
Fax.: +86-755-6115 6599
Website:http://www.ntek.org.cn

TEST RESULT CERTIFICATION

Applicant's name ..... : Beijing Roobo Technology Co., Ltd.

Address ..... : Room 5-128, B1, Building C, Galaxy SOHO, Dongcheng District, Beijing, China

Manufacturer's Name ..... : Beijing Roobo Technology Co., Ltd.

Address ..... : Room 5-128, B1, Building C, Galaxy SOHO, Dongcheng District, Beijing, China

Product description

Product name..... : PMA

Model and/or type reference : PMA1.0

Family Model..... : N/A

Standards ..... : FCC Part15.407

Test procedure ..... ANSI C63.10-2013 and KDB 789033 D02 General UNII Test Procedures New Rules v01r01
FCC KDB 662911 D01 Multiple Transmitter Output v02r01
FCC KDB 662911 D02 MIMO With Cross Polarized Antenna V01
FCC KDB 905462 D02 UNII DFS Compliance Procedures New Rules v02

This device described above has been tested by NTEK, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements/ the Industry Canada requirements.. And it is applicable only to the tested sample identified in the report.

This report shall not be reproduced except in full, without the written approval of NTEK, this document may be altered or revised by NTEK, personnel only, and shall be noted in the revision of the document.

Date of Test .....

Date (s) of performance of tests..... 29 Nov. 2018 ~ 05 Jan. 2019

Date of Issue..... 06 Jan. 2019

Test Result..... **Pass**

Testing Engineer : Loren · Luo

(Loren Luo)

Technical Manager : Jason chen

(Jason Chen)

Authorized Signatory : Sam . Chen

(Sam Chen)

Table of Contents

	Page
1 . SUMMARY OF TEST RESULTS	7
1.1 FACILITIES AND ACCREDITATIONS	8
1.2 MEASUREMENT UNCERTAINTY	8
2 . GENERAL INFORMATION	9
2.1 GENERAL DESCRIPTION OF EUT	9
2.2 DESCRIPTION OF TEST MODES	12
2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED	13
2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)	14
2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS	15
3 . EMC EMISSION TEST	17
3.1 CONDUCTED EMISSION MEASUREMENT	17
3.1.1 APPLICABLE STANDARD	17
3.1.2 CONFORMANCE LIMIT	17
3.1.3 TEST CONFIGURATION	17
3.1.4 TEST PROCEDURE	17
3.2 RADIATED EMISSION MEASUREMENT	22
3.2.1 APPLICABLE STANDARD	22
3.2.2 CONFORMANCE LIMIT	22
3.2.3 MEASURING INSTRUMENTS	22
3.2.4 TEST CONFIGURATION	23
3.2.5 TEST PROCEDURE	24
3.2.6 TEST RESULTS (9KHZ – 30 MHZ)	25
3.2.7 TEST RESULTS (30MHZ – 1GHZ)	26
3.2.8 TEST RESULTS (1GHZ-26GHZ)	34
3.2.9 TEST RESULTS (26GHZ-40GHZ)	38
4 . POWER SPECTRAL DENSITY TEST	46
4.1 APPLIED PROCEDURES / LIMIT	46
4.2 TEST PROCEDURE	47
4.3 DEVIATION FROM STANDARD	47
4.4 TEST SETUP	47
4.5 EUT OPERATION CONDITIONS	47
4.6 TEST RESULTS	48
5 . 26DB & 99% EMISSION BANDWIDTH	64
5.1 APPLIED PROCEDURES / LIMIT	64
5.2 TEST PROCEDURE	64
5.3 EUT OPERATION CONDITIONS	65
5.4 TEST RESULTS	66

Table of Contents

	Page
6 . MINIMUM 6 DB BANDWIDTH	82
6.1 APPLIED PROCEDURES / LIMIT	82
6.2 TEST PROCEDURE	82
6.3 DEVIATION FROM STANDARD	82
6.4 TEST SETUP	82
6.5 EUT OPERATION CONDITIONS	82
6.6 TEST RESULTS	83
7 . MAXIMUM CONDUCTED OUTPUT POWER	87
7.1 PPLIED PROCEDURES / LIMIT	87
7.2 TEST PROCEDURE	87
7.3 DEVIATION FROM STANDARD	89
7.4 TEST SETUP	89
7.5 EUT OPERATION CONDITIONS	89
7.6 TEST RESULTS	90
8 . OUT OF BAND EMISSIONS	94
8.1 APPLICABLE STANDARD	94
8.2 TEST PROCEDURE	94
8.3 DEVIATION FROM STANDARD	94
8.4 TEST SETUP	94
8.5 EUT OPERATION CONDITIONS	95
8.6 TEST RESULTS	96
9.SPURIOUS RF CONDUCTED EMISSIONS	106
9.1CONFORMANCE LIMIT	106
9.2MEASURING INSTRUMENTS	106
9.3TEST SETUP	106
9.4TEST PROCEDURE	106
9.5TEST RESULTS	106
10. FREQUENCY STABILITY MEASUREMENT	119
10.1 LIMIT	119
10.2 TEST PROCEDURES	119
10.3 TEST SETUP LAYOUT	119
10.4 EUT OPERATION DURING TEST	119
10.5 TEST RESULTS	120
11. DYNAMIC FREQUENCY SELECTION(DFS)	132
11.1 APPLICABILITY OF DFS REQUIREMENTS	132
11.2 INTERFERENCE THRESHOLD VALUES, MASTER OR CLIENT INCORPORATING IN-SERVICE MONITORING	132

Table of Contents

Page

11.3 DFS RESPONSE REQUIREMENT VALUES 133
11.4 SHORT PULSE RADAR TEST WAVEFORMS 133
11.5 CALIBRATION SETUP AND DFS TEST RESULTS 134
11.6 CONDUCTED CALIBRATION SETUP 134
11.7 RADAR WAVEFORM CALIBRATION RESULT 135
11.8 IN-SERVICE MONITORING: CHANNEL MOVE TIME, CHANNEL CLOSING TRANSMISSION TIME AND NON-OCCUPANCY PERIOD 137
11.9 RESULT OF CHANNEL MOVE TIME, CHANNEL CLOSING TRANSMISSION TIME AND NON-OCCUPANCY PERIOD FOR CLIENT BEACON TEST 138
12. ANTENNA REQUIREMENT 140
12.1 STANDARD REQUIREMENT 140
12.2 EUT ANTENNA 140

Revision History

Report No.	Version	Description	Issued Date
S18112901801002	Rev.01	Initial issue of report	Jan 06, 2019

1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.407) , Subpart E			
Standard Section	Test Item	Judgment	Remark
15.207	AC Power Line Conducted Emissions	PASS	
15.209(a), 15.407 (b)(1) 15.407 (b)(2) 15.407 (b)(3) 15.407 (b)(4) 15.407 (b)(6)	Spurious Radiated Emissions	PASS	
15.407 (a) 15.1049	26 dB and 99% Emission Bandwidth	PASS	
15.407(e)	Minimum 6 dB bandwidth	PASS	
15.407 (a)	Maximum Conducted Output Power	PASS	
2.1051, 15.407 (b)(1) 15.407 (b)(2) 15.407 (b)(3) 15.407 (b)(4)	Band Edge	PASS	
15.407 (a)	Power Spectral Density	PASS	
2.1051, 15.407(b)	Spurious Emissions at Antenna Terminals	PASS	
15.407(h)	Dynamic Frequency Selection(DFS)	PASS	Subcontract test(note 2)
15.203	Antenna Requirement	PASS	

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report

(2) Subcontracted laboratory information:
Firm Name:
Shenzhen Huatongwei International Inspection Co., Ltd.
Designation Number:CN1181
Test Firm Registration Number: 762235
A2LA Certificate Registration Number : 3902.01

1.1 FACILITIES AND ACCREDITATIONS

FACILITIES

All measurement facilities used to collect the measurement data are located at

1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street, Bao'an District, Shenzhen 518126 P.R. China.

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.10 and CISPR Publication 22.

LABORATORY ACCREDITATIONS AND LISTINGS

Site Description

CNAS-Lab.	:	The Laboratory has been assessed and proved to be in compliance with CNAS-CL01:2006 (identical to ISO/IEC 17025:2005) The Certificate Registration Number is L5516.
IC-Registration		The Certificate Registration Number is 9270A-1.
FCC- Accredited		Test Firm Registration Number: 463705. Designation Number: CN1184
A2LA-Lab.		The Certificate Registration Number is 4298.01 This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 General requirements for the competence of testing and calibration laboratories. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009).
Name of Firm	:	Shenzhen NTEK Testing Technology Co., Ltd.
Site Location	:	1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street, Bao'an District, Shenzhen 518126 P.R. China.

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement y±U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	Conducted Emission Test	±2.80dB
2	RF power, conducted	±0.16dB
3	Spurious emissions, conducted	±0.21dB
4	All emissions, radiated(30MHz~1GHz)	±2.64dB
5	All emissions, radiated(1GHz~6GHz)	±2.40dB
6	All emissions, radiated(＞6GHz)	±2.52dB
7	Temperature	±0.5°C
8	Humidity	±2%

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	PMA	
Trade Mark	N/A	
Model Name	PMA1.0	
FCC ID	2ASEF-PMA1.0	
Product Description	Mode Supported	☒802.11a ☒802.11n(HT20) ☒802.11n(HT40) ☒802.11ac(HT20) ☒802.11ac(HT40) ☒802.11ac(HT80)
	Data Rate	802.11a: 6,9,12,18,24,36,48,54Mbps; 802.11n(HT20/HT40):MCS0-MCS15; 802.11ac(VHT20): NSS1, MCS0-MCS8 802.11ac(VHT40/VHT80):NSS1, MCS0-MCS9
	Modulation	OFDM with BPSK/QPSK/16QAM/64QAM/256QAM
	Operating Frequency Range	☒ U-NII-1: 5150 MHz ~5250MHz ☒ U-NII-2A: 5250MHz~5350MHz ☒ U-NII-2C: 5470MHz~5725MHz ☒ U-NII-3: 5725 MHz ~5825 MHz
	Function:	☐Outdoor AP ☐Indoor AP ☐Fixed P2P ☒Client
	DFS type:	☐master devices ☐Slave devices with radar detection ☒Slave devices without radar detection
	Antenna Type	Antenna A/B:FPCB Antenna
	Antenna Gain	Antenna A/B: 4.76dBi
	Based on the application, features, or specification exhibited in User's Manual, More details of EUT technical specification, please refer to the User's Manual.	
Ratings	DC 12V from Adapter	
Adapter	Model: CYSF20-120200U Input: AC 100~240V 50~60Hz 0.6A Output:12V, 2000mA	
Battery	N/A	
Connecting I/O Port(s)	Please refer to the User's Manual	
HW Version	PMA-MD-V0.5	
SW Version	R100B100D009C00	

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

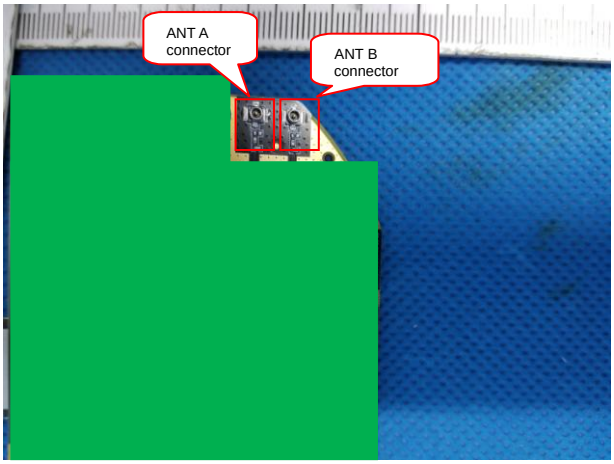
2. Frequency and Channel list:

Band	20MHz		40MHz		80MHz	
	Channel	Frequency	Channel	Frequency	Channel	Frequency
U-NII-1	36	5180 MHz	38	5190 MHz	42	5210 MHz
	40	5200 MHz	46	5230 MHz	-	-
	44	5220 MHz				
	48	5240 MHz				
U-NII-2A	52	5260 MHz	54	5270 MHz	58	5290 MHz
	56	5280 MHz	62	5310 MHz		
	60	5300 MHz				
	64	5320 MHz				
U-NII-2C	100	5500 MHz	102	5510 MHz	106	5530 MHz
	104	5520 MHz	110	5550 MHz	122	5610 MHz
	108	5540 MHz	118	5590 MHz		
	112	5560 MHz	126	5630 MHz		
	116	5580 MHz	134	5670 MHz		
	120	5600 MHz				
	124	5620 MHz				
	128	5640 MHz				
	132	5660 MHz				
	140	5700 MHz				
U-NII-3	149	5745 MHz	151	5755 MHz	155	5775 MHz
	153	5765 MHz	159	5795 MHz		
	157	5785 MHz				
	161	5805 MHz				
	165	5825 MHz				

The EUT has two of antenna. The wireless module is 1x1 Wi-Fi support 802.11b / g / n / ac; The 802.11 n / ac support MIMO.

Tx Antenna

Antenna	Antenna Type	Antenna Gain(dBi)
		5.0G
A(main)	FPCB	4.76
B(aux)	FPCB	4.76



For 5GHz mode, antenna A B are transmitting, May antennas simultaneously transmit.

And the data is recorded for radiated emission, and band edge.

For MIMO mode , Directional gain=[10log(G_A+ G_B)] dbi =7.77dbi in 5.0GHz
802.11n/ac 5GHz has MIMO mode.

Note: G_A means antenna gain for ANT A in Num.
G_B means antenna gain for ANT B in Num.

5G Band:
For IEEE 802.11a mode (1TX, 2RX):
The EUT can support both 1TX and 2RX functions.
For 1TX
Only Chain 1 can be used as transmitting antenna.
Chain 1 and Chain 2 could receive simultaneously.

For IEEE 802.11n mode (1TX/2TX, 2RX):
The EUT can support both 1TX and 2TX functions.
For 1TX
Only Chain 1 can be used as transmitting antenna. When MCS 0~7 enable without TX-Beamforming/STBC. Ant A and Ant B could receive simultaneously.
For 2TX
Both Chain 1 and Chain 2 can be used as transmitting/receiving antenna. When TX-Beamforming/STBC enalbe/MCS 8~15 enable.
Ant A and Ant B could both transmit/receive simultaneously.
Only 2TX function was selected to test and record in the report, the 1TX test results were covered by 2TX Test results.

For IEEE 802.11ac mode (1TX/2TX, 2RX):
The EUT can support both 1TX and 2TX functions.
For 1TX
Only Chain 1 can be used as transmitting antenna. When 1SS MCS 0~9 enable without TX-Beamforming/STBC.
Ant A and Ant B could receive simultaneously.
For 2TX
Both Chain 1 and Chain 2 can be used as transmitting/receiving antenna. When TX-Beamforming/STBC enable/2SS MCS 0~9 enable.
Ant A and Ant B could both transmit/receive simultaneously.
Only 2TX function was selected to test and record in the report, the 1TX test results were covered by 2TX Test results.

2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Test Items	Mode	Data Rate	Channel	Ant
AC Power Line Conducted Emissions	Normal Link	-	-	-
Maximum Conducted Output Power	11a/n(20)/ac(20)	6 Mbps/ MCS0/ VHT1MCS0	36/40/48/52/56/64/100 /120/140/149/157/165	A/B
	11n(40)/ac(40)	MCS0/ VHT1MCS0	38/46/54/62/102/110 /118/134/151/159	A/B
	11ac(80)	MCS0/ VHT1MCS0	42/58/106/122/155	A/B
Power Spectral Density	11a/n(20)/ac(20)	6 Mbps/ MCS0	36/40/48/52/56/64/100 /120/140/149/157/165	A/B
	11n(40)/ac(40)	MCS0	38/46/54/62/102/110 /118/134/151/159	A/B
	11ac(80)	MCS0	42/58/106/122/155	A/B
26 dB and 99% Emission Bandwidth	11a/n(20)/ac(20)	6 Mbps/ MCS0	36/40/48/52/56/64/100 /120/140/149/157/165	A/B
	11n(40)/ac(40)	MCS0	38/46/54/62/102/110 /118/134/151/159	A/B
	11ac(80)	MCS0	42/58/106/122/155	A/B
Minimum 6 dB bandwidth	11a/n(20)/ac(20)	6 Mbps/ MCS0	36/40/48/52/56/64/100 /120/140/149/157/165	A/B
	11n(40)/ac(40)	MCS0	38/46/54/62/102/110 /118/134/151/159	A/B
	11ac(80)	MCS0	42/58/106/122/155	A/B
Radiated Emissions Below 1GHz	Normal Link	-	-	-
Radiated Emissions Above 1GHz	11a/n(20)/ac(20)	6 Mbps/ MCS0	36/40/48/52/56/64/100 /120/140/149/157/165	-
	11n(40)/ac(40)	MCS0	38/46/54/62/102/110 /118/134/151/159	-
	11ac(80)	MCS0	42/58/106/122/155	-
Band Edge Emissions	11a/n(20)/ac(20)	6 Mbps/ MCS0	36/40/48/52/56/64/100 /120/140/149/157/165	A/B
	11n(40)/ac(40)	MCS0	38/46/54/62/102/110 /118/134/151/159	A/B
	11ac(80)	MCS0	42/58/106/122/155	A/B
Dynamic Frequency	11ac(80)	MCS0	58/106	-

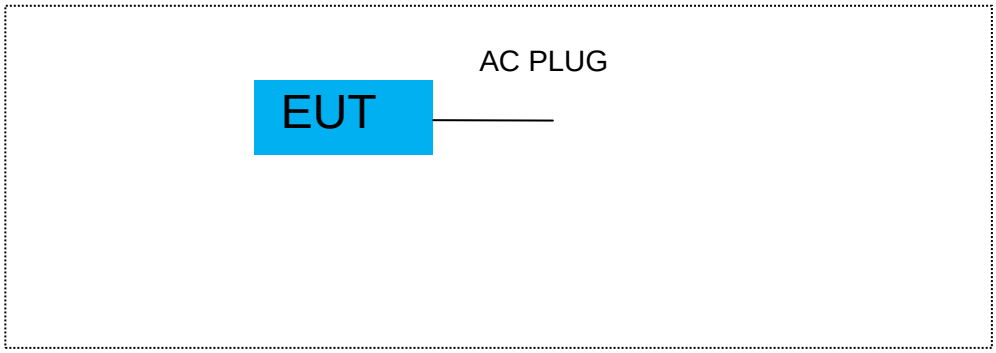
Note:

(1) The measurements are performed at the highest, middle, lowest available channels.

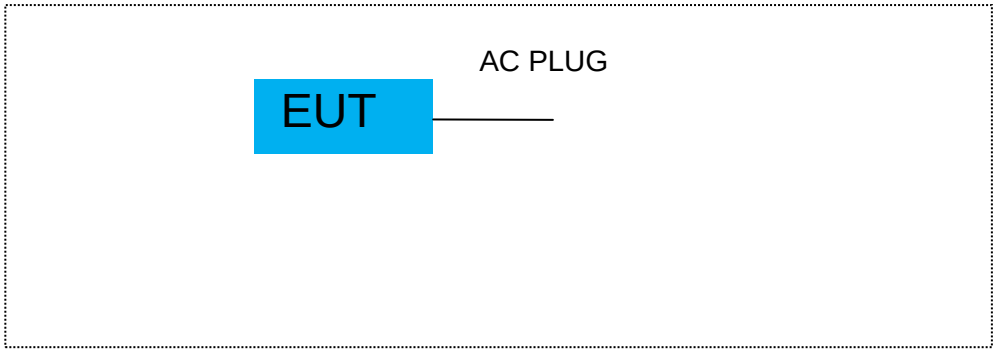
(2) The measurements are performed at all Bit Rate of Transmitter, the worst data was reported

2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

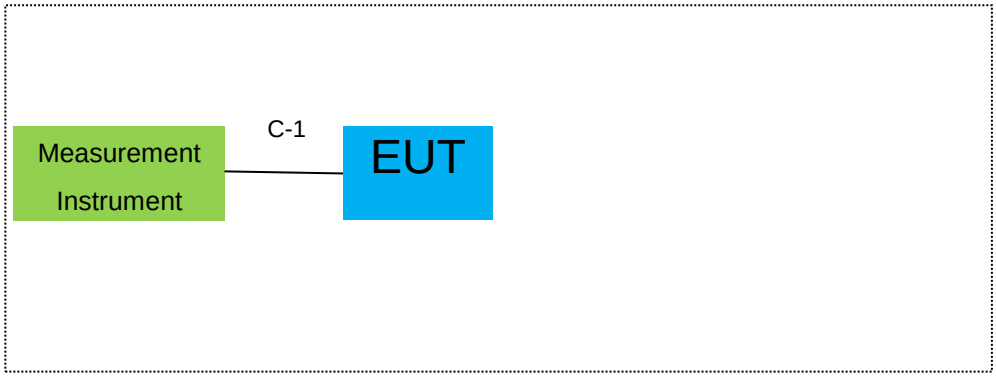
For AC Conducted Emission Mode



For Radiated Test Cases



For Conducted Test Cases



Note:The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.

2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Brand	Model/Type No.	Series No.	Note

Item	Cable Type	Shielded Type	Ferrite Core	Length	Note
C-1	RF Cable	YES	NO	0.1m	

Note:

(1) The support equipment was authorized by Declaration of Confirmation.
(2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.

2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation& Conducted Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Spectrum Analyzer	Aglient	E4407B	MY45108040	2018.05.19	2019.05.18	1 year
2	Spectrum Analyzer	Agilent	N9020A	MY49100060	2018.10.08	2019.10.07	1 year
3	Spectrum Analyzer	R&S	FSV40	101417	2018.10.08	2019.10.07	1 year
4	Test Receiver	R&S	ESPI7	101318	2018.05.19	2019.05.18	1 year
5	Bilog Antenna	TESEQ	CBL6111D	31216	2018.04.08	2019.04.07	1 year
6	50Ω Coaxial Switch	Anritsu	MP59B	6200983705	2018.05.19	2020.05.18	3 year
7	Horn Antenna	EM	EM-AH-10180	2011071402	2018.04.08	2019.04.07	1 year
8	Amplifier	EMC	EMC051835SE	980246	2018.08.05	2019.08.04	1 year
9	Active Loop Antenna	SCHWARZBECK	FMZB 1519 B	055	2018.11.03	2019.11.02	1 year
10	Power Meter	DARE	RPR3006W	15I00041SNO84	2018.08.05	2019.08.04	1 year
11	Test Cable (9KHz-30MHz)	N/A	R-01	N/A	2017.04.21	2020.04.20	3 year
12	Test Cable (30MHz-1GHz)	N/A	R-02	N/A	2017.04.21	2020.04.20	3 year
13	High Test Cable(1G-40GHz)	N/A	R-03	N/A	2017.04.21	2020.04.20	3 year
14	High Test Cable(1G-40GHz)	N/A	R-04	N/A	2017.04.21	2020.04.20	3 year
15	Filter	TRILTHIC	2400MHz	29	2017.04.19	2020.04.18	3 year
16	temporary antenna connector (Note)	NTS	R001	N/A	N/A	N/A	N/A
17	Low Noise Amplifier	B&Z	BZ-P540-550850-452727	16476-11729	2018.04.09	2019.04.08	1 year
18	Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	803	2018.11.03	2019.11.02	1 year

Note:
We will use the temporary antenna connector (soldered on the PCB board) When conducted test
And this temporary antenna connector is listed within the instrument list

AC Conduction Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Test Receiver	R&S	ESCI	101160	2018.05.19	2019.05.18	1 year
2	LISN	R&S	ENV216	101313	2018.04.18	2019.04.19	1 year
3	LISN	SCHWARZBECK	NNLK 8129	8129245	2018.05.19	2019.05.18	1 year
4	50Ω Coaxial Switch	ANRITSU CORP	MP59B	6200983704	2018.05.19	2020.05.18	3 year
5	Test Cable (9KHz-30MHz)	N/A	C01	N/A	2017.04.21	2020.04.20	3 year
6	Test Cable (9KHz-30MHz)	N/A	C02	N/A	2017.04.21	2020.04.20	3 year
7	Test Cable (9KHz-30MHz)	N/A	C03	N/A	2017.04.21	2020.04.20	3 year

Note: Each piece of equipment is scheduled for calibration once a year except the Test Cable& Aux Equipment which is scheduled for calibration every 3 years.

3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

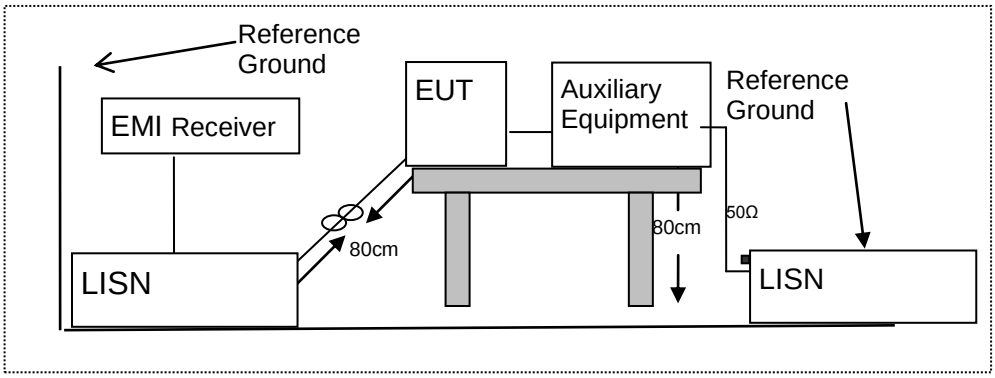
3.1.1 APPLICABLE STANDARD

According to FCC Part 15.207(a) and KDB 174176 D01 Line Conducted FAQ v01r01

3.1.2 CONFORMANCE LIMIT

Frequency(MHz)	Conducted Emission Limit	
	Quasi-peak	Average
0.15-0.5	66-56*	56-46*
0.5-5.0	56	46
5.0-30.0	60	50
Note: 1. *Decreases with the logarithm of the frequency 2. The lower limit shall apply at the transition frequencies 3. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.		

3.1.3 TEST CONFIGURATION



3.1.4 TEST PROCEDURE

According to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 Conducted emissions the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-Peak and average detector mode.

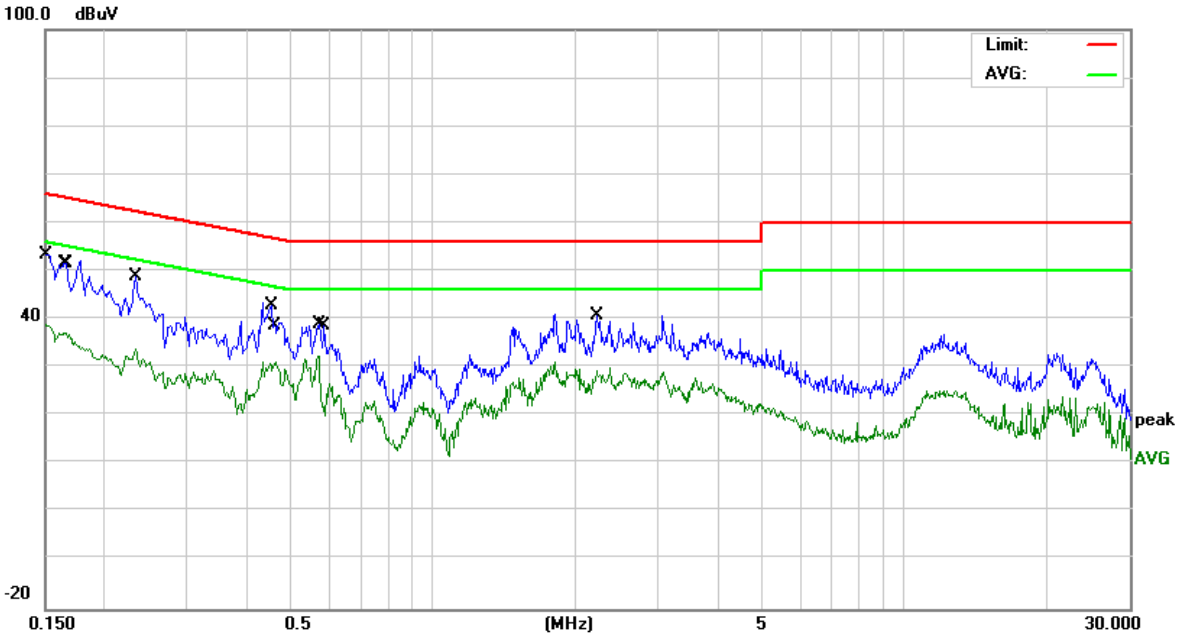
1. The EUT was placed 0.4 meter from the conducting wall of the shielding room.
2. The EUT was placed on a table which is 0.8m above ground plane.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
4. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40cm long.
5. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
6. LISN at least 80 cm from nearest part of EUT chassis.
7. The frequency range from 150KHz to 30MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth(IF bandwidth=9KHz) with Maximum Hold Mode
9. For the actual test configuration, please refer to the related Item –EUT Test Photos.

EUT：	PMA	Model Name. ：	PMA1.0
Temperature：	26 ℃	Relative Humidity：	56%
Pressure：	1010hPa	Phase：	L
Test Voltage ：	DC 12V from Adapter AC 120V/60Hz	Test Mode：	Mode 1

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measure-ment (dBμV)	Limits (dBμV)	Margin (dB)	Remark
0.1500	30.67	9.75	40.42	56.00	-15.58	AVG
0.1524	44.98	9.75	54.73	65.86	-11.13	QP
0.1623	28.99	9.76	38.75	55.34	-16.59	AVG
0.1660	43.27	9.76	53.03	65.15	-12.12	QP
0.2340	37.69	9.76	47.45	62.30	-14.85	QP
0.2340	22.52	9.76	32.28	52.30	-20.02	AVG
0.4500	31.89	9.74	41.63	56.87	-15.24	QP
0.4620	20.39	9.74	30.13	46.66	-16.53	AVG
0.5699	22.04	9.74	31.78	46.00	-14.22	AVG
0.5859	29.51	9.74	39.25	56.00	-16.75	QP
2.2139	28.94	9.78	38.72	56.00	-17.28	QP
2.2139	17.65	9.78	27.43	46.00	-18.57	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.

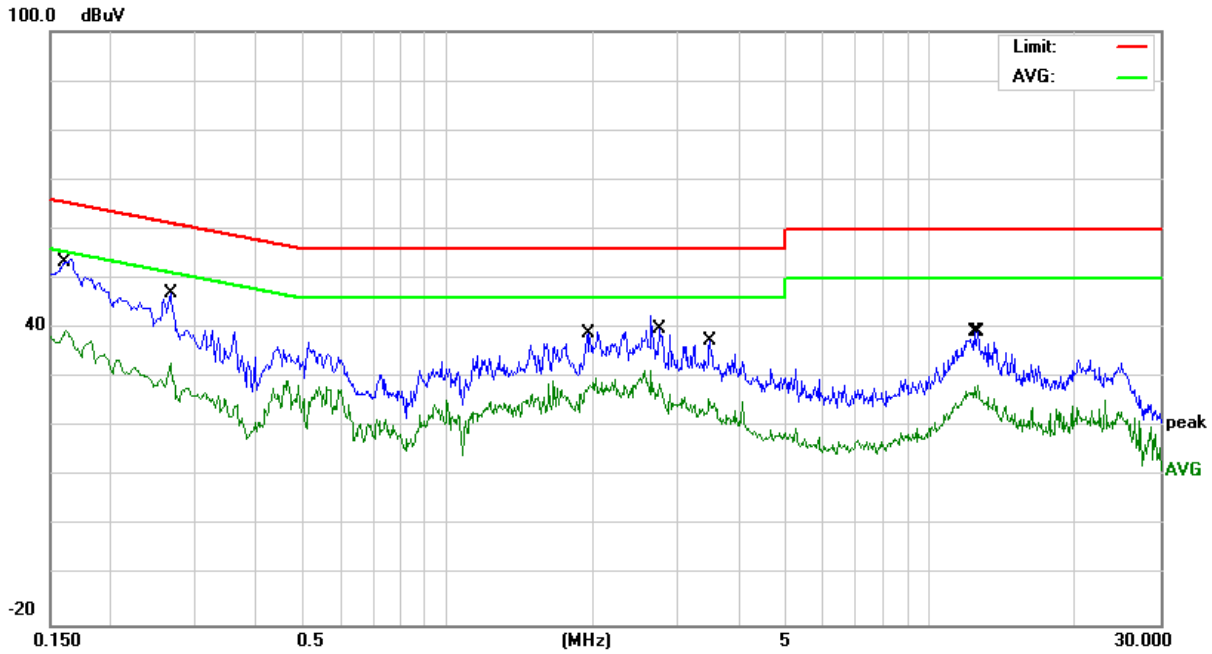


EUT：	PMA	Model Name. ：	PMA1.0
Temperature：	26 ℃	Relative Humidity：	56%
Pressure：	1010hPa	Phase：	N
Test Voltage ：	DC 12V from Adapter AC 120V/60Hz	Test Mode：	Mode 1

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measure-ment (dBμV)	Limits (dBμV)	Margin (dB)	Remark
0.1590	41.88	9.74	51.62	65.51	-13.89	QP
0.1620	27.74	9.73	37.47	55.36	-17.89	AVG
0.2660	35.32	9.74	45.06	61.24	-16.18	QP
0.2660	21.14	9.74	30.88	51.24	-20.36	AVG
1.9499	27.78	9.79	37.57	56.00	-18.43	QP
1.9499	16.77	9.79	26.56	46.00	-19.44	AVG
2.7419	26.98	9.84	36.82	56.00	-19.18	QP
2.7419	16.03	9.84	25.87	46.00	-20.13	AVG
3.4860	16.30	9.89	26.19	46.00	-19.81	AVG
3.4940	27.14	9.89	37.03	56.00	-18.97	QP
12.3698	27.68	10.07	37.75	60.00	-22.25	QP
12.5219	16.23	10.07	26.30	50.00	-23.70	AVG

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.

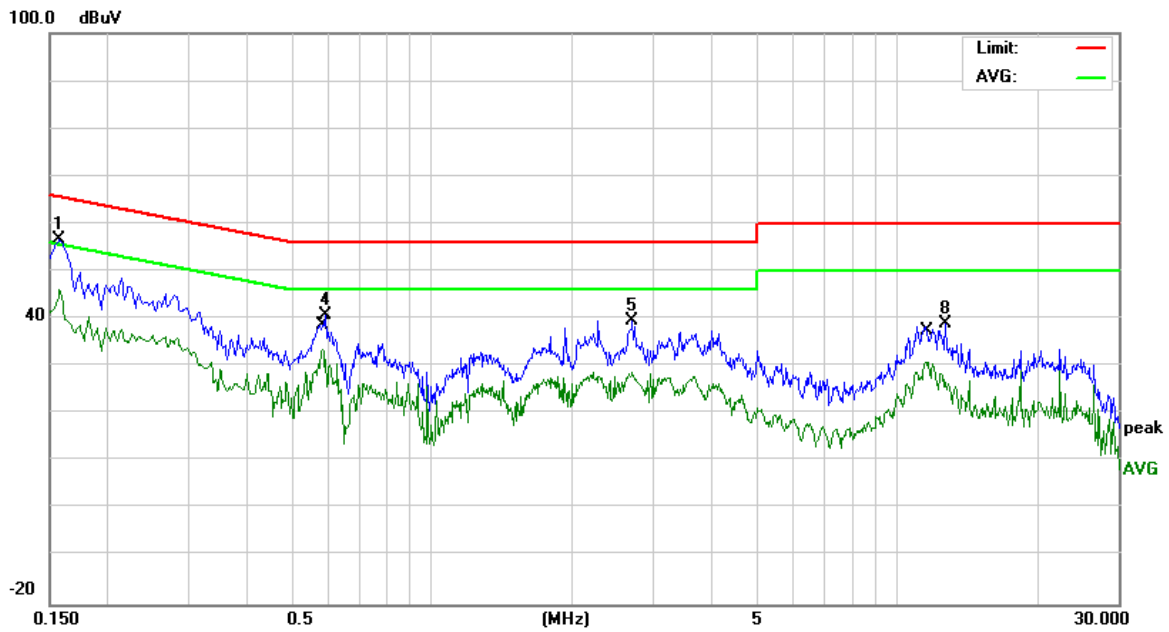


EUT：	PMA	Model Name. ：	PMA1.0
Temperature：	26 ℃	Relative Humidity：	56%
Pressure：	1010hPa	Phase：	L
Test Voltage ：	DC 12V from Adapter AC 240V/60Hz	Test Mode：	Mode 1

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measure-ment (dBμV)	Limits (dBμV)	Margin (dB)	Remark
0.1580	47.02	9.75	56.77	65.56	-8.79	QP
0.1580	36.40	9.75	46.15	55.56	-9.41	AVG
0.5820	23.78	9.74	33.52	46.00	-12.48	AVG
0.5899	30.89	9.74	40.63	56.00	-15.37	QP
2.6940	29.70	9.80	39.50	56.00	-16.50	QP
2.6940	18.98	9.80	28.78	46.00	-17.22	AVG
11.7180	20.88	10.04	30.92	50.00	-19.08	AVG
12.7580	28.77	10.06	38.83	60.00	-21.17	QP

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.

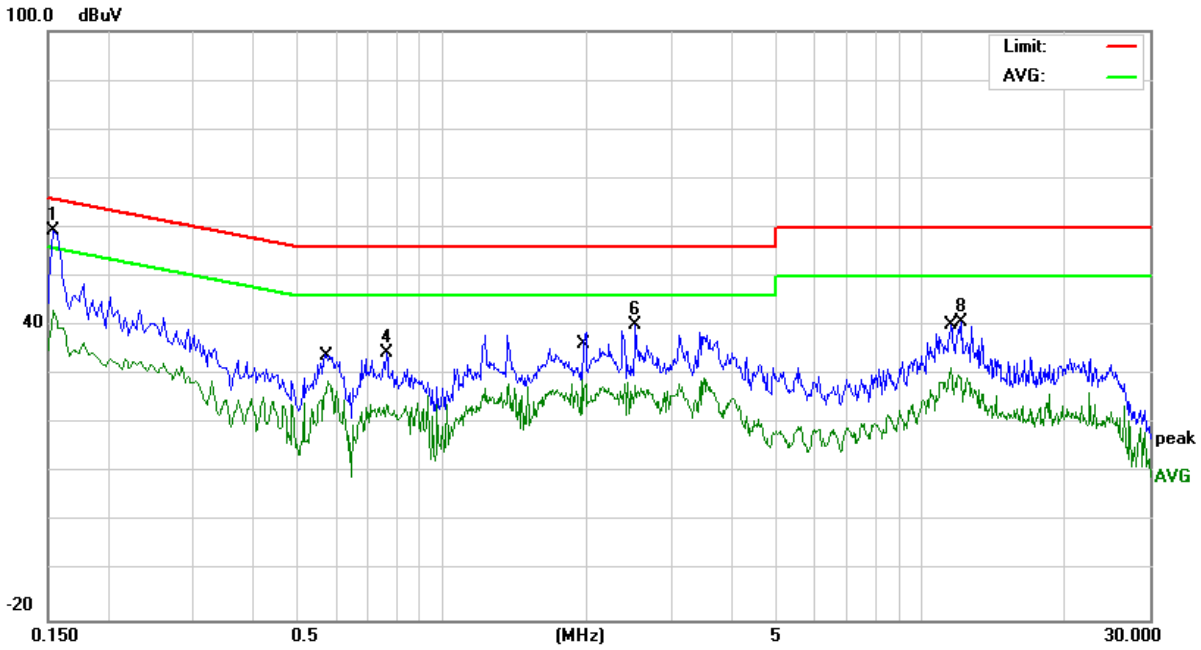


EUT：	PMA	Model Name. ：	PMA1.0
Temperature：	26 ℃	Relative Humidity：	56%
Pressure：	1010hPa	Phase：	N
Test Voltage ：	DC 12V from Adapter AC 240V/60Hz	Test Mode：	Mode 1

Frequency (MHz)	Reading Level (dBμV)	Correct Factor (dB)	Measure-ment (dBμV)	Limits (dBμV)	Margin (dB)	Remark
0.1539	49.58	9.74	59.32	65.78	-6.46	QP
0.1539	33.49	9.74	43.23	55.78	-12.55	AVG
0.5780	19.00	9.75	28.75	46.00	-17.25	AVG
0.7660	24.57	9.75	34.32	56.00	-21.68	QP
1.9540	19.37	9.79	29.16	46.00	-16.84	AVG
2.5300	30.39	9.82	40.21	56.00	-15.79	QP
11.5460	21.34	10.07	31.41	50.00	-18.59	AVG
12.1500	30.72	10.07	40.79	60.00	-19.21	QP

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.



3.2 RADIATED EMISSION MEASUREMENT

3.2.1 APPLICABLE STANDARD

According to FCC Part 15.407(d) and 15.209

3.2.2 CONFORMANCE LIMIT

According to FCC Part 15.407(b)(7): radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).
According to FCC Part15.205, Restricted bands

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
10.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(2)
13.36-13.41			

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Restricted Frequency(MHz)	Field Strength (μV/m)	Field Strength (dBμV/m)	Measurement Distance
0.009~0.490	2400/F(KHz)	20 log (uV/m)	300
0.490~1.705	2400/F(KHz)	20 log (uV/m)	30
1.705~30.0	30	29.5	30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

Limits of Radiated Emission Measurement(Above 1000MHz)

Frequency(MHz)	Class B (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

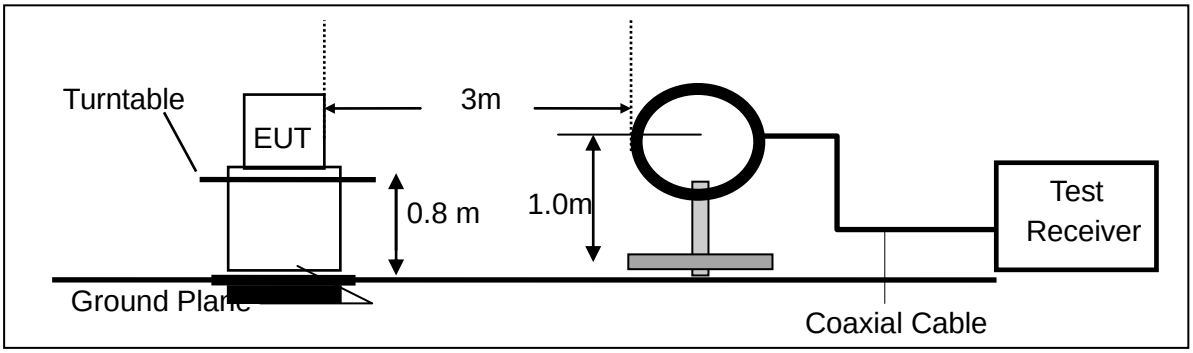
Remark :1. Emission level in dBuV/m=20 log (uV/m)
2. Measurement was performed at an antenna to the closed point of EUT distance of meters.
3. For Frequency 9kHz~30MHz:
Distance extrapolation factor =40log(Specific distance/ test distance)(dB);
Limit line=Specific limits(dBuV) + distance extrapolation factor.
For Frequency above 30MHz:
Distance extrapolation factor =20log(Specific distance/ test distance)(dB);
Limit line=Specific limits(dBuV) + distance extrapolation factor.

3.2.3 MEASURING INSTRUMENTS

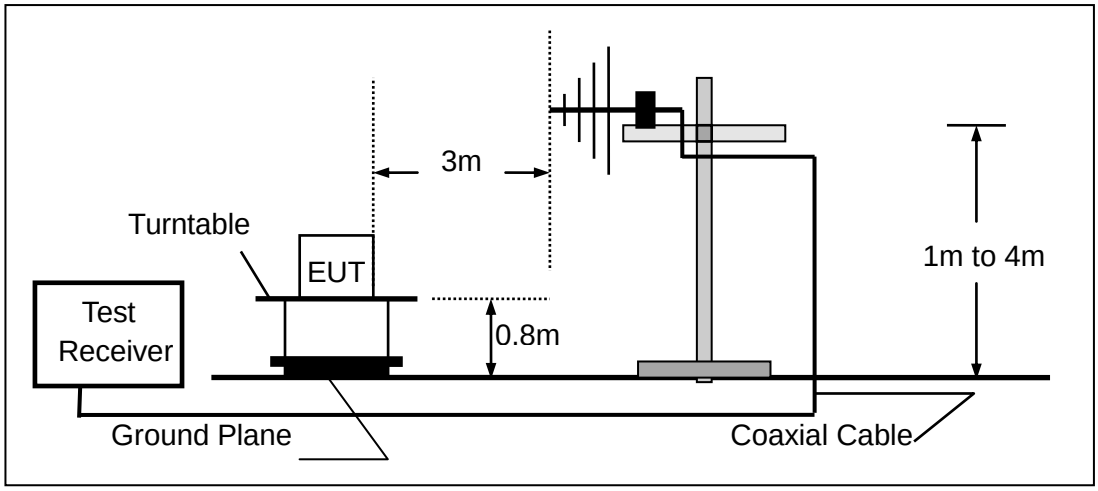
The Measuring equipment is listed in the section 6.3 of this test report.

3.2.4 TEST CONFIGURATION

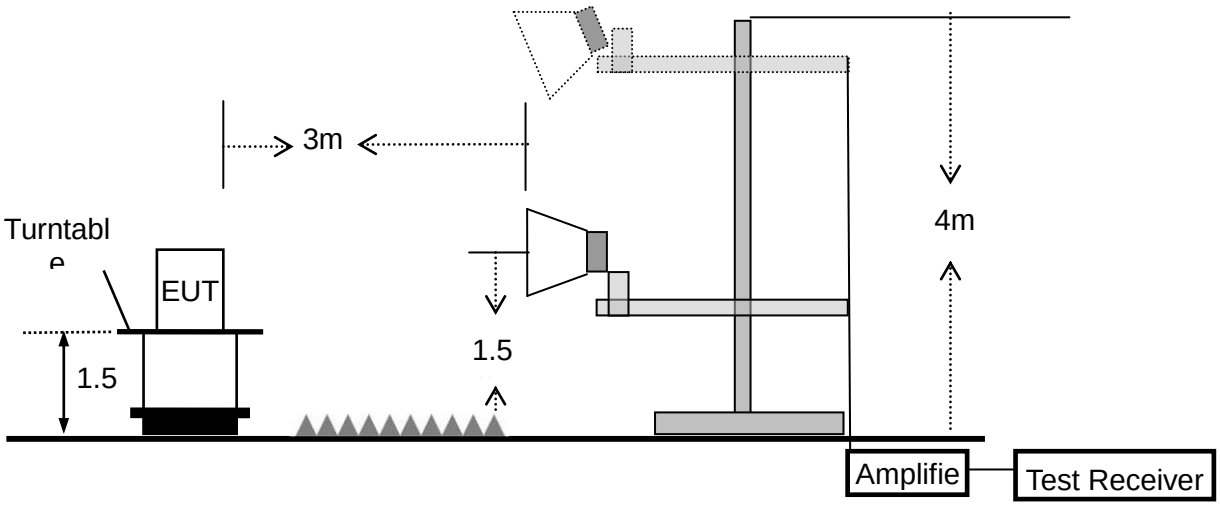
(a) For radiated emissions below 30MHz



(b) For radiated emissions from 30MHz to 1000MHz



(c) For radiated emissions above 1000MHz



3.2.5 TEST PROCEDURE

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4 dB according to the standards: ANSI C63.10-2013. The test distance is 3m.The setup is according to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 and CAN/CSA-CEI/IEC CISPR 22.
This test is required for any spurious emission that falls in a Restricted Band, as defined in Section 15.205.
It must be performed with the highest gain of each type of antenna proposed for use with the EUT.
Use the following spectrum analyzer settings:

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
b. The EUT was placed on the top of a rotating table 0.8 m for below 1GHz and 1.5m for above 1GHz the ground at a 3 meter. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The height of the equipment or of the substitution antenna shall be 0.8 m for below 1GHz and 1.5m for above 1GHz; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

Both horizontal and vertical antenna polarities were tested
and performed pretest to three orthogonal axis. The worst case emissions were reported

During the radiated emission test, the Spectrum Analyzer was set with the following configurations:

Frequency Band (MHz)	Function	Resolution bandwidth	Video Bandwidth
30 to 1000	QP	120 kHz	300 kHz
Above 1000	Peak	1 MHz	1 MHz
	Average	1 MHz	10 Hz

Note: for the frequency ranges below 30 MHz, a narrower RBW is used for these ranges but the measured value should add a RBW correction factor (RBWCF) where RBWCF [dB] =10*lg(100 [kHz]/narrower RBW [kHz]). , the narrower RBW is 1 kHz and RBWCF is 20 dB for the frequency 9 kHz to 150 kHz, and the narrower RBW is 10 kHz and RBWCF is 10 dB for the frequency 150 kHz to 30 MHz.

3.2.6 TEST RESULTS (9KHZ – 30 MHZ)

EUT:	PMA	Model Name. :	PMA1.0
Temperature:	20 ℃	Relative Humidity:	48%
Pressure:	1010 hPa	Test Voltage :	DC 12V
Test Mode :	TX	Polarization :	--

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	N/A
--	--	--	--	N/A

NOTE:

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

3.2.7 TEST RESULTS (30MHZ – 1GHZ)

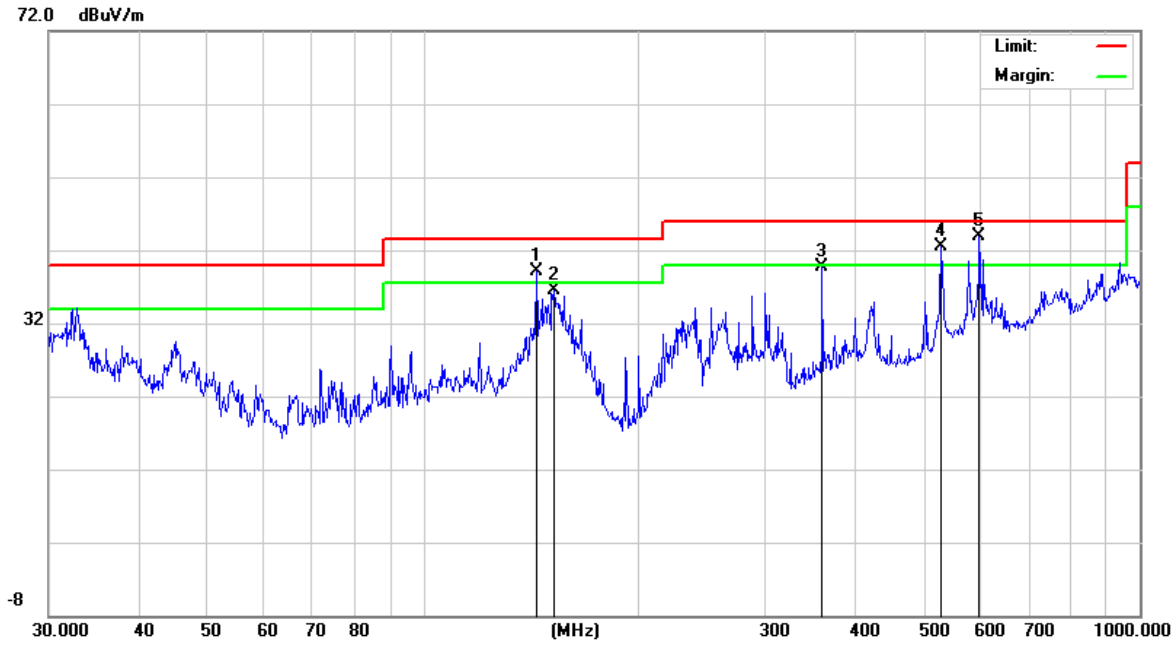
EUT：	PMA	Model Name. ：	PMA1.0
Temperature：	20 ℃	Relative Humidity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 12V
Test Mode ：	TX(5.2G)- 802.11a (High CH)		

All the modulation modes have been tested, and the worst result was report as below:

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
V	143.8295	25.98	13.18	39.16	43.50	-4.34	QP
V	152.1297	23.89	12.66	36.55	43.50	-6.95	QP
V	360.4476	21.81	17.87	39.68	46.00	-6.32	QP
V	528.2458	20.22	22.34	42.56	46.00	-3.44	QP
V	597.2234	20.23	23.76	43.99	46.00	-2.01	QP

Remark:

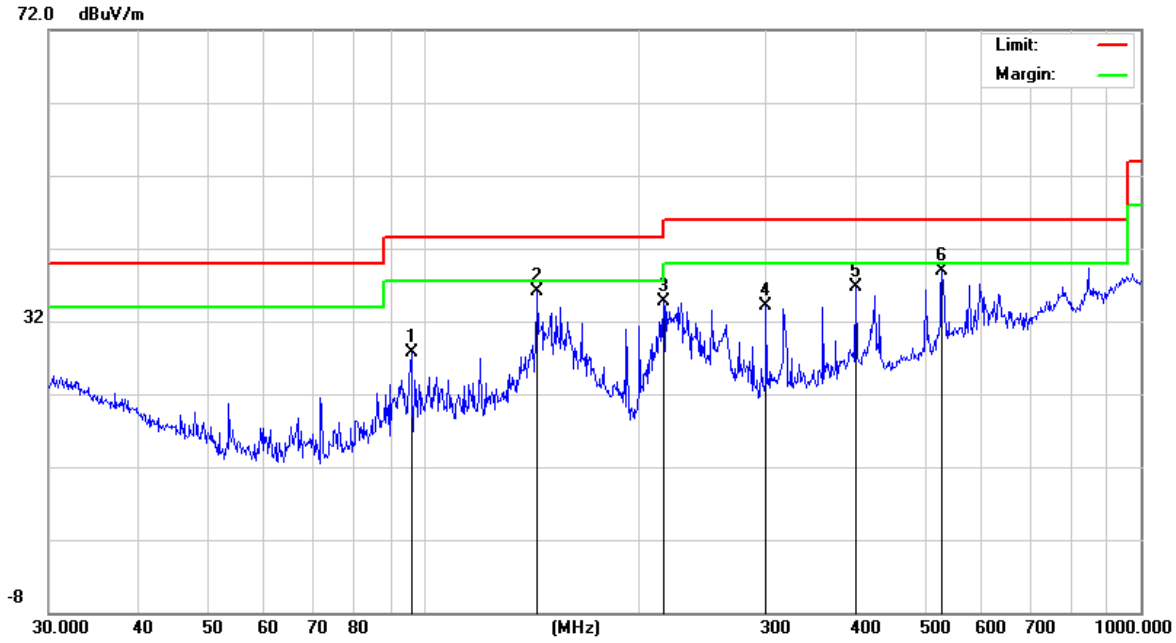
Absolute Level= Reading Level+ Factor, Margin= Absolute Level - Limit



Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
H	96.0986	16.61	11.08	27.69	43.50	-15.81	QP
H	143.8295	22.99	13.18	36.17	43.50	-7.33	QP
H	216.0240	23.53	11.10	34.63	46.00	-11.37	QP
H	300.3673	18.07	16.09	34.16	46.00	-11.84	QP
H	400.4318	16.99	19.64	36.63	46.00	-9.37	QP
H	528.2458	16.53	22.34	38.87	46.00	-7.13	QP

Remark:

Absolute Level= Reading Level+ Factor, Margin= Absolute Level - Limit

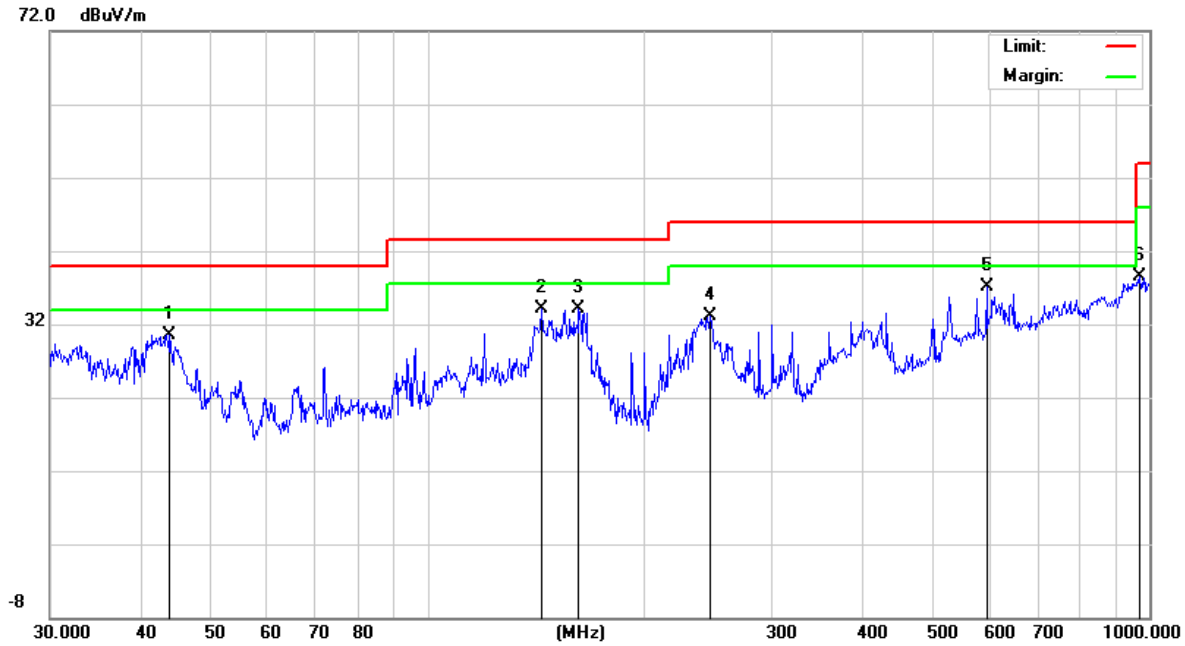


EUT：	PMA	Model Name. ：	PMA1.0
Temperature：	20 ℃	Relative Humidity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 12V
Test Mode ：	TX(5.3G) - 802.11a (High CH)		

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
V	43.9658	18.51	12.04	30.55	40.00	-9.45	QP
V	143.8291	20.90	13.18	34.08	43.50	-9.42	QP
V	162.0414	22.52	11.51	34.03	43.50	-9.47	QP
V	245.9507	18.93	14.18	33.11	46.00	-12.89	QP
V	595.1326	13.52	23.67	37.19	46.00	-8.81	QP
V	968.9338	7.33	31.26	38.59	54.00	-15.41	QP

Remark:

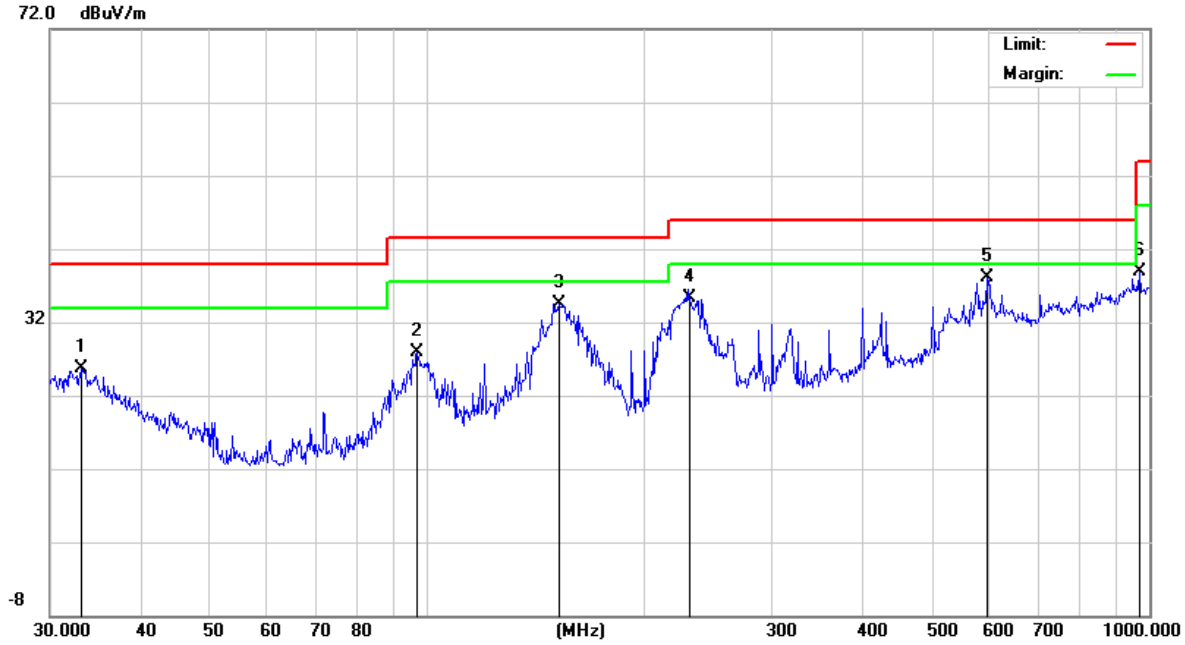
Absolute Level= Reading Level+ Factor, Margin= Absolute Level - Limit



Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
H	33.2111	8.16	17.54	25.70	40.00	-14.30	QP
H	96.7749	16.77	11.15	27.92	43.50	-15.58	QP
H	152.1297	21.83	12.66	34.49	43.50	-9.01	QP
H	230.9068	23.12	12.17	35.29	46.00	-10.71	QP
H	595.1326	14.42	23.67	38.09	46.00	-7.91	QP
H	968.9338	7.57	31.26	38.83	54.00	-15.17	QP

Remark:

Absolute Level= Reading Level+ Factor, Margin= Absolute Level - Limit

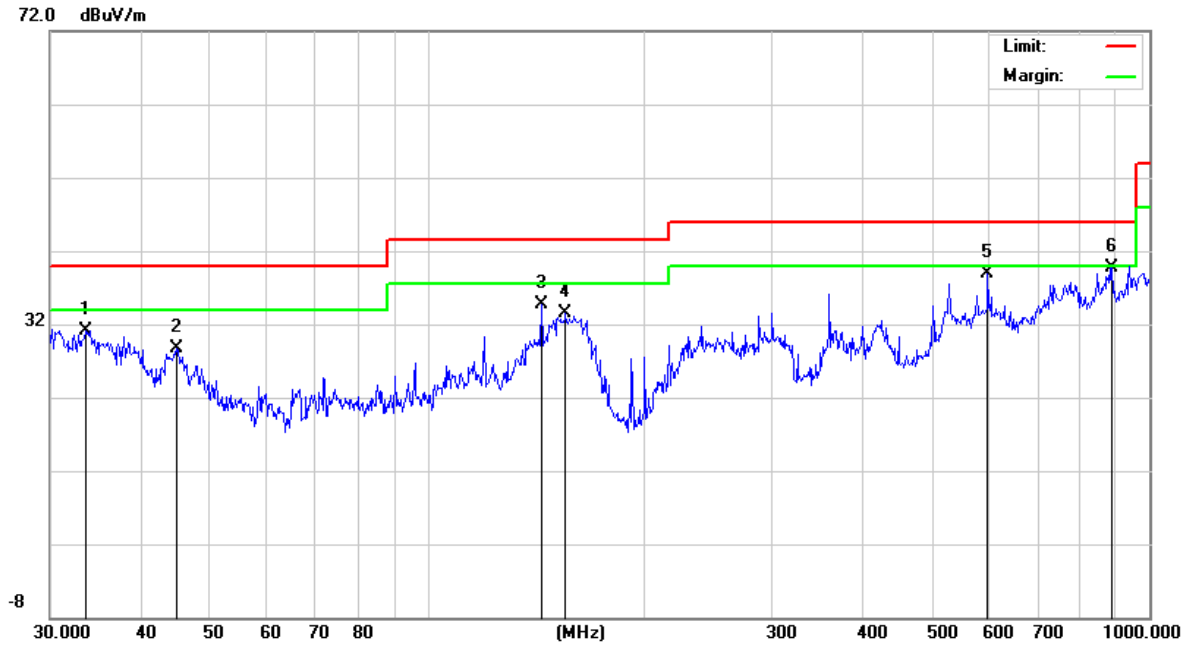


EUT：	PMA	Model Name. ：	PMA1.0
Temperature：	20 ℃	Relative Humidity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 12V
Test Mode ：	TX(5.6G) - 802.11a (High CH)		

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
V	33.6802	13.85	17.29	31.14	40.00	-8.86	QP
V	44.9004	16.94	11.68	28.62	40.00	-11.38	QP
V	143.8292	21.48	13.18	34.66	43.50	-8.84	QP
V	155.3642	21.09	12.45	33.54	43.50	-9.96	QP
V	597.2232	15.23	23.76	38.99	46.00	-7.01	QP
V	887.6099	11.28	28.45	39.73	46.00	-6.27	QP

Remark:

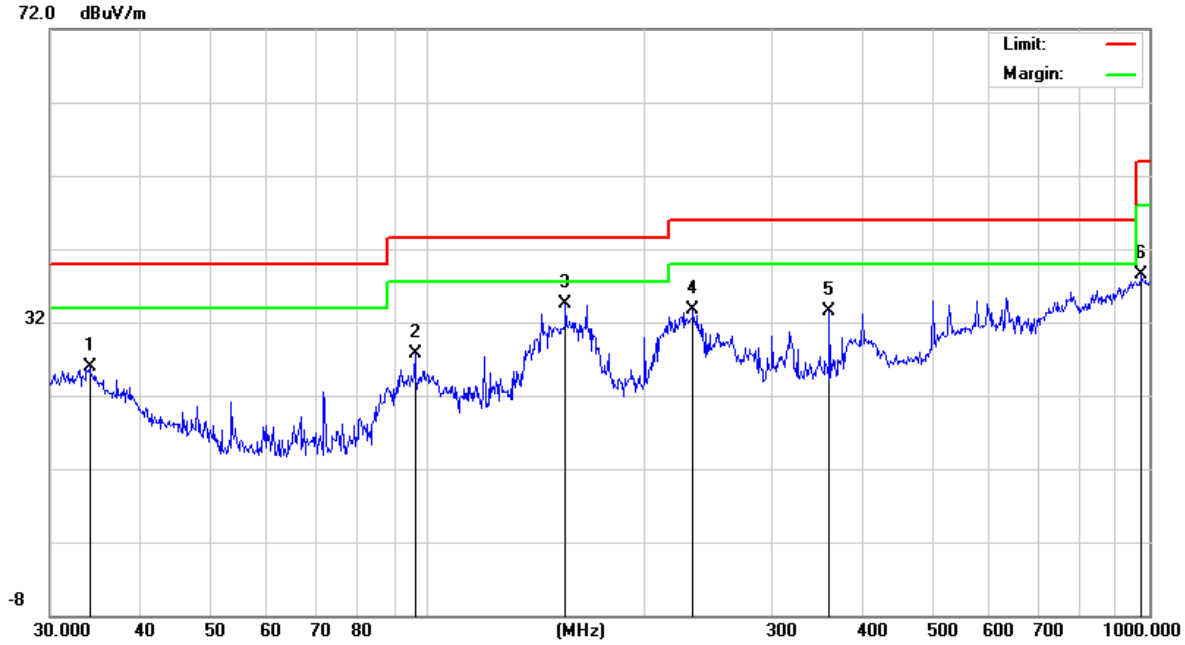
Absolute Level= Reading Level+ Factor, Margin= Absolute Level - Limit



Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
H	34.0363	8.78	17.10	25.88	40.00	-14.12	QP
H	96.0986	16.61	11.08	27.69	43.50	-15.81	QP
H	155.3642	22.01	12.45	34.46	43.50	-9.04	QP
H	233.3487	21.49	12.27	33.76	46.00	-12.24	QP
H	360.4476	15.57	17.87	33.44	46.00	-12.56	QP
H	975.7527	7.47	31.12	38.59	54.00	-15.41	QP

Remark:

Absolute Level= Reading Level+ Factor, Margin= Absolute Level - Limit

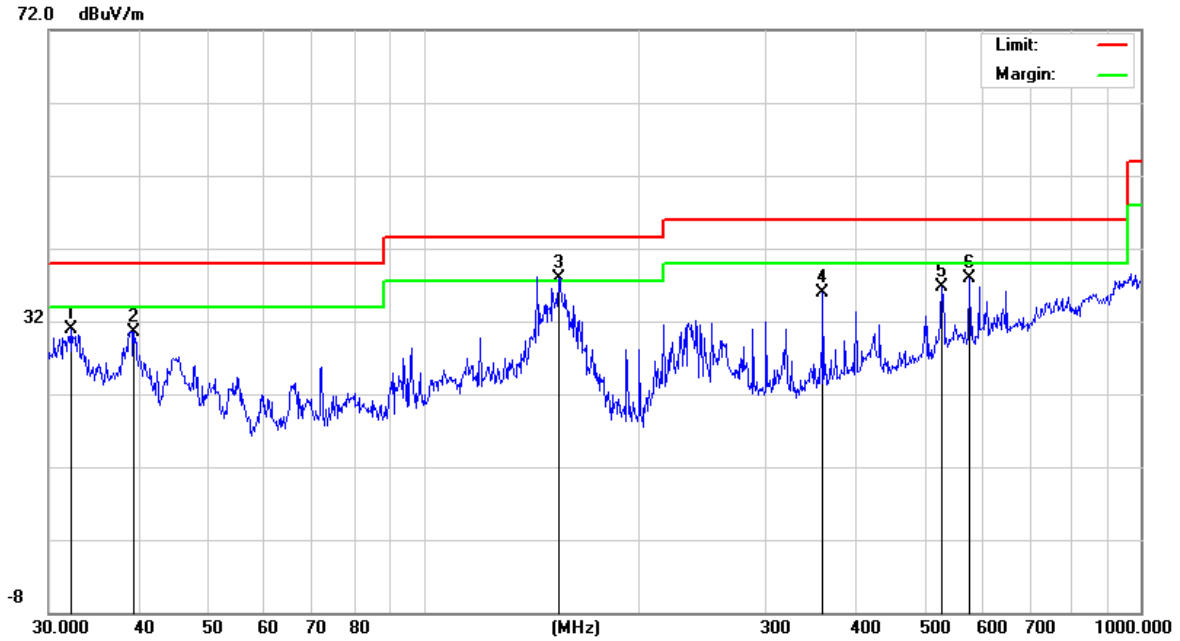


EUT：	PMA	Model Name. ：	PMA1.0
Temperature：	20 ℃	Relative Humidity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 12V
Test Mode ：	TX(5.8G) - 802.11a (High CH)		

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
V	32.1794	12.83	18.10	30.93	40.00	-9.07	QP
V	39.4371	15.91	14.68	30.59	40.00	-9.41	QP
V	154.2786	25.31	12.56	37.87	43.50	-5.63	QP
V	360.4476	18.01	17.87	35.88	46.00	-10.12	QP
V	528.2458	14.43	22.34	36.77	46.00	-9.23	QP
V	576.6443	14.37	23.56	37.93	46.00	-8.07	QP

Remark:

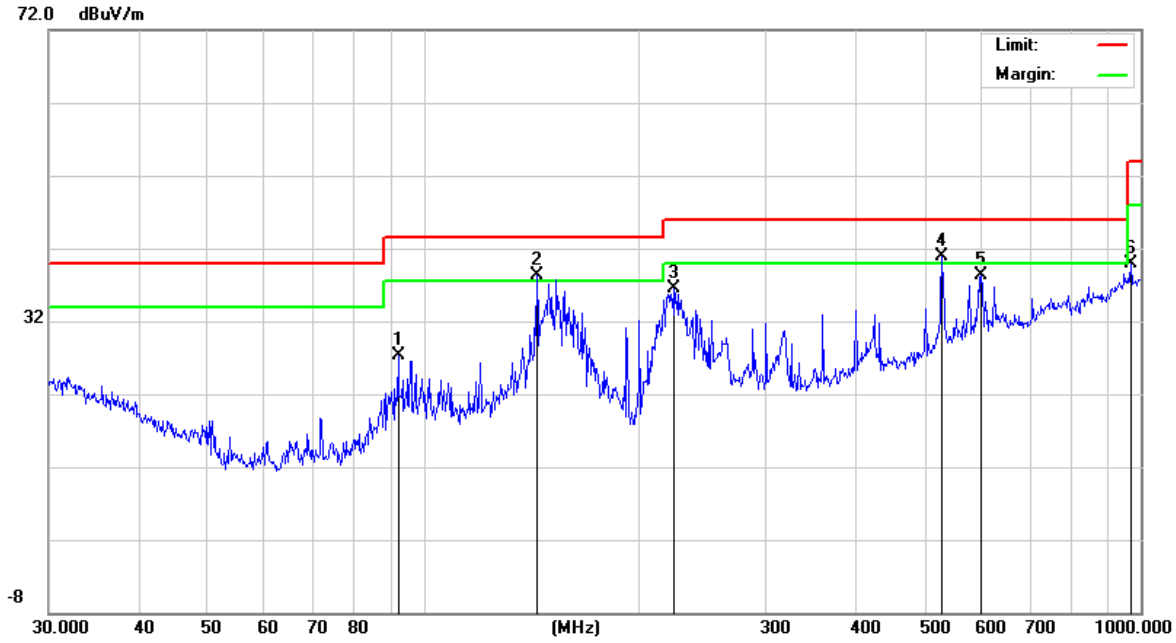
Absolute Level= Reading Level+ Factor, Margin= Absolute Level - Limit



Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
H	92.1388	16.44	10.82	27.26	43.50	-16.24	QP
H	143.8295	25.07	13.18	38.25	43.50	-5.25	QP
H	222.9502	24.46	12.02	36.48	46.00	-9.52	QP
H	528.2458	18.51	22.34	40.85	46.00	-5.15	QP
H	599.3212	14.44	23.83	38.27	46.00	-7.73	QP
H	968.9338	8.57	31.26	39.83	54.00	-14.17	QP

Remark:

Absolute Level= Reading Level+ Factor, Margin= Absolute Level - Limit



3.2.8 TEST RESULTS (1GHz-26GHz)

EUT：	PMA	Model Name. ：	PMA1.0
Temperature：	20 ℃	Relative Humidity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 12V
Test Mode ：	TX(5.2G) - 802.11a _5150~5250MHz		

Polar	Frequency	Meter Reading	Cable loss	Antenna Factor	Preamp Factor	Emission Level	Limits	Margin	Detector Type
(H/V)	(MHz)	(dBuV)	(dB)	dB/m	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Low Channel (5180 MHz)-Above 1G									
Vertical	4434.157	62.22	5.94	35.40	44.00	59.56	74.00	-14.44	Pk
Vertical	4434.157	46.57	5.94	35.40	44.00	43.91	54.00	-10.09	AV
Vertical	10370.362	60.41	8.46	39.75	44.50	64.12	74.00	-9.88	Pk
Vertical	10370.362	42.94	8.46	39.75	44.50	46.65	54.00	-7.35	AV
Vertical	15540.196	61.48	10.12	38.80	44.10	66.3	74.00	-7.7	Pk
Vertical	15540.196	37.56	10.12	38.80	42.70	43.78	54.00	-10.22	AV
Horizontal	4434.521	66.59	5.94	35.18	44.00	63.71	74.00	-10.29	Pk
Horizontal	4434.521	44.11	5.94	35.18	44.00	41.23	54.00	-12.77	AV
Horizontal	10370.623	58.97	8.46	38.71	44.50	61.64	74.00	-12.36	Pk
Horizontal	10370.623	41.03	8.46	38.71	44.50	43.7	54.00	-10.3	AV
Horizontal	10540.865	56.96	10.12	38.38	44.10	61.36	74.00	-12.64	Pk
Horizontal	10540.865	38.88	10.12	38.38	44.10	43.28	54.00	-10.72	AV
middle Channel (5200 MHz)-Above 1G									
Vertical	4592.093	60.25	6.48	36.35	44.05	59.03	74.00	-14.97	Pk
Vertical	4592.093	41.91	6.48	36.35	44.05	40.69	54.00	-13.31	AV
Vertical	10401.424	59.68	8.47	37.88	44.51	61.52	74.00	-12.48	Pk
Vertical	10401.424	42.74	8.47	37.88	44.51	44.58	54.00	-9.42	AV
Vertical	15600.218	56.52	10.12	38.8	44.10	61.34	74.00	-12.66	Pk
Vertical	15600.218	36.64	10.12	38.8	42.70	42.86	54.00	-11.14	AV
Horizontal	4592.691	59.86	6.48	36.37	44.05	58.66	74.00	-15.34	Pk
Horizontal	4592.691	43.11	6.48	36.37	44.05	41.91	54.00	-12.09	AV
Horizontal	10400.114	58.87	8.47	38.64	44.50	61.48	74.00	-12.52	Pk
Horizontal	10400.114	42.24	8.47	38.64	44.50	44.85	54.00	-9.15	AV
Horizontal	15600.187	59.86	10.12	38.38	44.10	64.26	74.00	-9.74	Pk
Horizontal	15600.187	38.78	10.12	38.38	44.10	43.18	54.00	-10.82	AV
High Channel (5240 MHz)-Above 1G									
Vertical	4739.246	61.23	7.10	37.24	43.50	62.07	74.00	-11.93	Pk
Vertical	4739.246	44.41	7.10	37.24	43.50	45.25	54.00	-8.75	AV
Vertical	10480.371	60.52	8.46	37.68	44.50	62.16	74.00	-11.84	Pk
Vertical	10480.371	40.32	8.46	37.68	44.50	41.96	54.00	-12.04	AV
Vertical	15720.359	61.74	10.12	38.8	44.10	66.56	74.00	-7.44	Pk
Vertical	15720.359	39.68	10.12	38.8	42.70	45.9	54.00	-8.1	AV
Horizontal	4739.352	62.24	7.10	37.24	43.50	63.08	74.00	-10.92	Pk
Horizontal	4739.352	43.27	7.10	37.24	43.50	44.11	54.00	-9.89	AV
Horizontal	10481.111	62.57	8.46	38.57	44.50	65.1	74.00	-8.9	Pk
Horizontal	10481.111	43.32	8.46	38.57	44.50	45.85	54.00	-8.15	AV
Horizontal	15720.357	60.74	10.12	38.38	44.10	65.14	74.00	-8.86	Pk
Horizontal	15720.357	42.26	10.12	38.38	44.10	46.66	54.00	-7.34	AV

Note: “802.11a (5G)” mode is the worst mode.

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

EUT：	PMA	Model Name. ：	PMA1.0
Temperature：	20 ℃	Relative Humidity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 12V
Test Mode ：	TX(5.3G) - 802.11a _5250~5350MHz		

Polar	Frequency	Meter Reading	Cable loss	Antenna Factor	Preamp Factor	Emission Level	Limits	Margin	Detector Type
(H/V)	(MHz)	(dBuV)	(dB)	dB/m	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Low Channel (5260 MHz)-Above 1G									
Vertical	4581.35	61.02	5.44	35.40	44.00	57.86	74.00	-16.14	Pk
Vertical	4581.35	42.09	5.74	35.40	44.00	39.24	54.00	-14.76	AV
Vertical	10520.65	62.61	8.26	39.75	44.50	66.13	74.00	-7.87	Pk
Vertical	10520.65	40.41	8.01	39.75	44.50	43.67	54.00	-10.33	AV
Vertical	15780.13	59.80	10.12	38.80	44.10	64.62	74.00	-9.38	Pk
Vertical	15780.13	38.36	9.62	38.80	42.70	44.08	54.00	-9.92	AV
Horizontal	4680.74	62.18	5.57	35.18	44.00	58.93	74.00	-15.07	Pk
Horizontal	4680.74	42.26	5.74	35.18	44.00	39.18	54.00	-14.82	AV
Horizontal	11491.08	56.62	8.38	38.71	44.50	59.21	74.00	-14.79	Pk
Horizontal	11491.08	41.76	8.45	38.71	44.50	44.42	54.00	-9.58	AV
Horizontal	17235.49	55.58	9.88	38.38	44.10	59.74	74.00	-14.26	Pk
Horizontal	17235.49	38.43	9.94	38.38	44.10	42.65	54.00	-11.35	AV
middle Channel (5280 MHz)-Above 1G									
Vertical	4598.38	58.01	6.08	36.35	44.05	56.39	74.00	-17.61	Pk
Vertical	4598.38	41.87	6.39	36.35	44.05	40.56	54.00	-13.44	AV
Vertical	10561.05	57.90	8.28	37.88	44.51	59.55	74.00	-14.45	Pk
Vertical	10561.05	40.78	7.99	37.88	44.51	42.15	54.00	-11.85	AV
Vertical	15841.22	58.39	9.79	38.8	44.10	62.88	74.00	-11.12	Pk
Vertical	15841.22	37.28	9.70	38.8	42.70	43.08	54.00	-10.92	AV
Horizontal	4598.18	57.04	6.11	36.37	44.05	55.47	74.00	-18.53	Pk
Horizontal	4598.18	42.77	6.27	36.37	44.05	41.36	54.00	-12.64	AV
Horizontal	10560.77	59.92	8.33	38.64	44.50	62.39	74.00	-11.61	Pk
Horizontal	10560.77	38.83	8.07	38.64	44.50	41.04	54.00	-12.96	AV
Horizontal	15840.80	57.74	9.99	38.38	44.10	62.01	74.00	-11.99	Pk
Horizontal	15840.80	39.98	9.81	38.38	44.10	44.07	54.00	-9.93	AV
High Channel (5320 MHz)-Above 1G									
Vertical	6038.28	61.22	6.96	37.24	43.50	61.92	74.00	-12.08	Pk
Vertical	6038.28	41.96	7.07	37.24	43.50	42.77	54.00	-11.23	AV
Vertical	10640.29	58.41	8.14	37.68	44.50	59.73	74.00	-14.27	Pk
Vertical	10640.29	39.81	8.35	37.68	44.50	41.34	54.00	-12.66	AV
Vertical	15961.00	59.27	10.11	38.8	44.10	64.08	74.00	-9.92	Pk
Vertical	15961.00	37.52	9.64	38.8	42.70	43.26	54.00	-10.74	AV
Horizontal	6040.41	60.29	7.05	37.24	43.50	61.08	74.00	-12.92	Pk
Horizontal	6040.41	38.31	7.05	37.24	43.50	39.10	54.00	-14.90	AV
Horizontal	10641.11	59.97	8.20	38.57	44.50	62.24	74.00	-11.76	Pk
Horizontal	10641.11	40.77	8.03	38.57	44.50	42.88	54.00	-11.12	AV
Horizontal	15960.63	57.07	9.81	38.38	44.10	61.17	74.00	-12.83	Pk
Horizontal	15960.63	42.11	9.96	38.38	44.10	46.35	54.00	-7.65	AV

Note: “802.11a (5G)” mode is the worst mode.

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

EUT：	PMA	Model Name. ：	PMA1.0
Temperature：	20 ℃	Relative Humidity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 12V
Test Mode ：	TX (5.6G) -- 802.11a _5500~5700MHz		

Polar	Frequency	Meter Reading	Cable loss	Antenna Factor	Preamp Factor	Emission Level	Limits	Margin	Detector Type
(H/V)	(MHz)	(dBuV)	(dB)	dB/m	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Low Channel (5500 MHz)-Above 1G									
Vertical	4693.77	61.07	5.78	35.40	44.00	58.25	74.00	-15.75	Pk
Vertical	4693.77	41.39	5.45	35.40	44.00	38.24	54.00	-15.76	AV
Vertical	11000.76	58.34	8.10	39.75	44.50	61.69	74.00	-12.31	Pk
Vertical	11000.76	40.37	8.40	39.75	44.50	44.02	54.00	-9.98	AV
Vertical	16500.43	49.35	10.11	38.80	44.10	54.16	74.00	-19.84	Pk
Vertical	16500.43	39.10	9.89	38.80	42.70	45.09	54.00	-8.91	AV
Horizontal	4686.21	57.93	5.84	35.18	44.00	54.95	74.00	-19.05	Pk
Horizontal	4686.21	40.23	5.78	35.18	44.00	37.19	54.00	-16.81	AV
Horizontal	11000.73	56.79	8.06	38.71	44.50	59.07	74.00	-14.93	Pk
Horizontal	11000.73	39.52	8.34	38.71	44.50	42.07	54.00	-11.93	AV
Horizontal	16500.72	60.02	10.11	38.38	44.10	64.42	74.00	-9.58	Pk
Horizontal	16500.72	37.91	9.83	38.38	44.10	42.02	54.00	-11.98	AV
middle Channel (5600 MHz)-Above 1G									
Vertical	4533.62	61.30	6.06	36.35	44.05	59.66	74.00	-14.34	Pk
Vertical	4533.62	41.88	6.05	36.35	44.05	40.23	54.00	-13.77	AV
Vertical	11200.13	56.60	8.40	37.88	44.51	58.37	74.00	-15.63	Pk
Vertical	11200.13	40.33	8.07	37.88	44.51	41.77	54.00	-12.23	AV
Vertical	16800.78	59.28	9.67	38.8	44.10	63.65	74.00	-10.35	Pk
Vertical	16800.78	38.74	9.78	38.8	42.70	44.61	54.00	-9.39	AV
Horizontal	4579.37	58.61	6.02	36.37	44.05	56.95	74.00	-17.05	Pk
Horizontal	4579.37	42.06	6.43	36.37	44.05	40.80	54.00	-13.20	AV
Horizontal	11200.13	59.72	8.44	38.64	44.50	62.30	74.00	-11.70	Pk
Horizontal	11200.13	41.73	8.33	38.64	44.50	44.20	54.00	-9.80	AV
Horizontal	16800.90	58.77	9.83	38.38	44.10	62.88	74.00	-11.12	Pk
Horizontal	16800.90	40.24	10.04	38.38	44.10	44.56	54.00	-9.44	AV
High Channel (5700 MHz)-Above 1G									
Vertical	6057.33	60.82	6.88	37.24	43.50	61.44	74.00	-12.56	Pk
Vertical	6057.33	39.60	6.81	37.24	43.50	40.15	54.00	-13.85	AV
Vertical	11400.76	58.47	8.07	37.68	44.50	59.73	74.00	-14.27	Pk
Vertical	11400.76	40.65	8.33	37.68	44.50	42.15	54.00	-11.85	AV
Vertical	17100.64	59.25	9.92	38.8	44.10	63.88	74.00	-10.12	Pk
Vertical	17100.64	38.63	9.87	38.8	42.70	44.60	54.00	-9.40	AV
Horizontal	6045.95	59.12	7.03	37.24	43.50	59.89	74.00	-14.11	Pk
Horizontal	6045.95	39.85	6.93	37.24	43.50	40.52	54.00	-13.48	AV
Horizontal	11400.31	59.30	8.42	38.57	44.50	61.79	74.00	-12.21	Pk
Horizontal	11400.31	39.80	8.43	38.57	44.50	42.31	54.00	-11.69	AV
Horizontal	17100.86	56.21	9.94	38.38	44.10	60.43	74.00	-13.57	Pk
Horizontal	17100.86	40.23	9.68	38.38	44.10	44.18	54.00	-9.82	AV

Note: “802.11a (5G)” mode is the worst mode.

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

EUT：	PMA	Model Name. ：	PMA1.0
Temperature：	20 ℃	Relative Humidity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 12V
Test Mode ：	TX (5.8G) -- 802.11a _5745~5825MHz		

Polar	Frequency	Meter Reading	Cable loss	Antenna Factor	Preamp Factor	Emission Level	Limits	Margin	Detector Type
(H/V)	(MHz)	(dBuV)	(dB)	dB/m	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Low Channel (5745 MHz)-Above 1G									
Vertical	4679.195	59.98	5.94	35.40	44.00	57.32	74.00	-16.68	Pk
Vertical	4679.195	39.64	5.94	35.40	44.00	36.98	54.00	-17.02	AV
Vertical	11490.364	59.58	8.46	39.75	44.50	63.29	74.00	-10.71	Pk
Vertical	11490.364	42.11	8.46	39.75	44.50	45.82	54.00	-8.18	AV
Vertical	17235.101	55.59	10.12	38.80	44.10	60.41	74.00	-13.59	Pk
Vertical	17235.101	38.67	10.12	38.80	42.70	44.89	54.00	-9.11	AV
Horizontal	4679.332	57.94	5.94	35.18	44.00	55.06	74.00	-18.94	Pk
Horizontal	4679.332	44.51	5.94	35.18	44.00	41.63	54.00	-12.37	AV
Horizontal	11490.164	56.68	8.46	38.71	44.50	59.35	74.00	-14.65	Pk
Horizontal	11490.164	40.12	8.46	38.71	44.50	42.79	54.00	-11.21	AV
Horizontal	17235.196	58.65	10.12	38.38	44.10	63.05	74.00	-10.95	Pk
Horizontal	17235.196	42.28	10.12	38.38	44.10	46.68	54.00	-7.32	AV
middle Channel (5785 MHz)-Above 1G									
Vertical	4592.228	59.85	6.48	36.35	44.05	58.63	74.00	-15.37	Pk
Vertical	4592.228	43.32	6.48	36.35	44.05	42.1	54.00	-11.9	AV
Vertical	11570.203	61.15	8.47	37.88	44.51	62.99	74.00	-11.01	Pk
Vertical	11570.203	43.26	8.47	37.88	44.51	45.1	54.00	-8.9	AV
Vertical	17355.147	59.58	10.12	38.8	44.10	64.4	74.00	-9.6	Pk
Vertical	17355.147	42.21	10.12	38.8	42.70	48.43	54.00	-5.57	AV
Horizontal	4592.526	58.65	6.48	36.37	44.05	57.45	74.00	-16.55	Pk
Horizontal	4592.526	43.32	6.48	36.37	44.05	42.12	54.00	-11.88	AV
Horizontal	11570.123	60.02	8.47	38.64	44.50	62.63	74.00	-11.37	Pk
Horizontal	11570.123	42.22	8.47	38.64	44.50	44.83	54.00	-9.17	AV
Horizontal	17355.269	57.59	10.12	38.38	44.10	61.99	74.00	-12.01	Pk
Horizontal	17355.269	42.23	10.12	38.38	44.10	46.63	54.00	-7.37	AV
High Channel (5825 MHz)-Above 1G									
Vertical	6039.199	57.64	7.10	37.24	43.50	58.48	74.00	-15.52	Pk
Vertical	6039.199	42.25	7.10	37.24	43.50	43.09	54.00	-10.91	AV
Vertical	11652.562	58.95	8.46	37.68	44.50	60.59	74.00	-13.41	Pk
Vertical	11652.562	41.12	8.46	37.68	44.50	42.76	54.00	-11.24	AV
Vertical	17473.128	58.55	10.12	38.8	44.10	63.37	74.00	-10.63	Pk
Vertical	17473.128	40.32	10.12	38.8	42.70	46.54	54.00	-7.46	AV
Horizontal	6039.232	59.96	7.10	37.24	43.50	60.8	74.00	-13.2	Pk
Horizontal	6039.232	43.35	7.10	37.24	43.50	44.19	54.00	-9.81	AV
Horizontal	11652.319	52.26	8.46	38.57	44.50	54.79	74.00	-19.21	Pk
Horizontal	11652.319	40.14	8.46	38.57	44.50	42.67	54.00	-11.33	AV
Horizontal	17474.062	57.74	10.12	38.38	44.10	62.14	74.00	-11.86	Pk
Horizontal	17474.062	40.32	10.12	38.38	44.10	44.72	54.00	-9.28	AV

Note: “802.11a (5G)” mode is the worst mode.

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

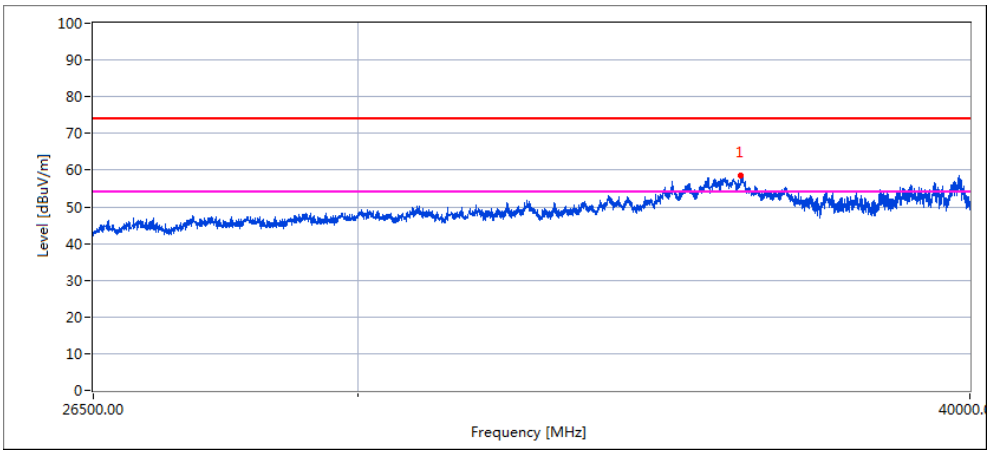
3.2.9 TEST RESULTS (26GHZ-40GHZ)

EUT：	PMA	Model Name. ：	PMA1.0
Temperature：	20 ℃	Relative Humidity：	48%
Pressure：	1010 hPa	Test Voltage ：	DC 12V
Test Mode ：	TX (5.2G)-5150 MHz ~5250MHz TX (5.3G)-5250MHz~5350MHz TX (5.6G)-5470MHz~5725MHz TX (5.8G)-5725 MHz ~5825 MHz		

All the modulation modes have been tested, and the worst result was report as below:

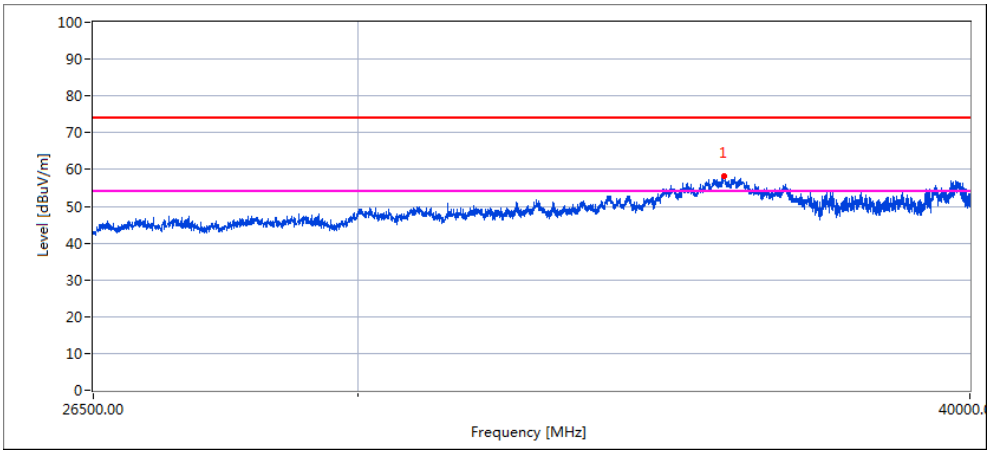
Low Channel (5180 MHz)-Above 1G

Horizontal



Frequency MHz	Pre-scan Level MaxPeak dBuV/m	Final Test Level MaxPeak dBuV/m	Limit MaxPeak dBuV/m	Margin dB
35394.213	58.6	54.3	74.0	19.7
35394.213	46.3	43.5	54.0	10.5

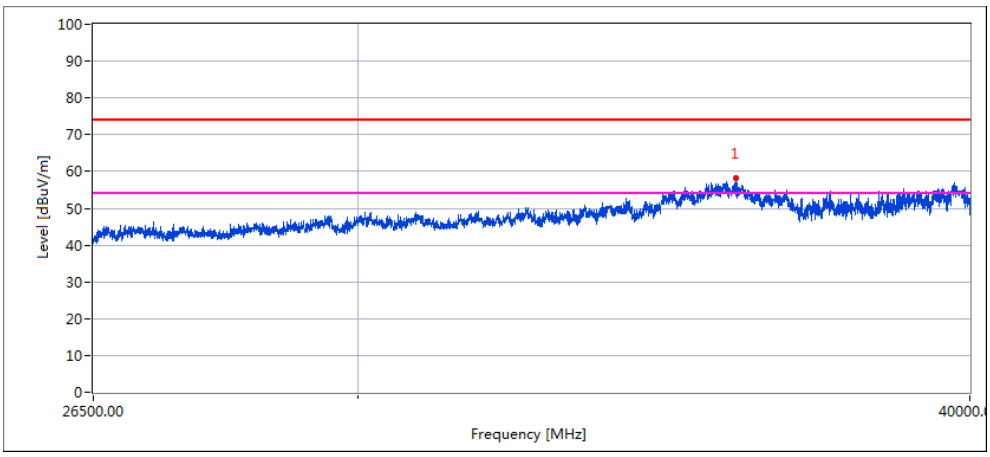
Vertical



Frequency MHz	Pre-scan Level MaxPeak dBuV/m	Final Test Level MaxPeak dBuV/m	Limit MaxPeak dBuV/m	Margin dB
35853.613	58.2	54.6	74.0	19.4
35853.613	43.7	43.1	54.0	10.9

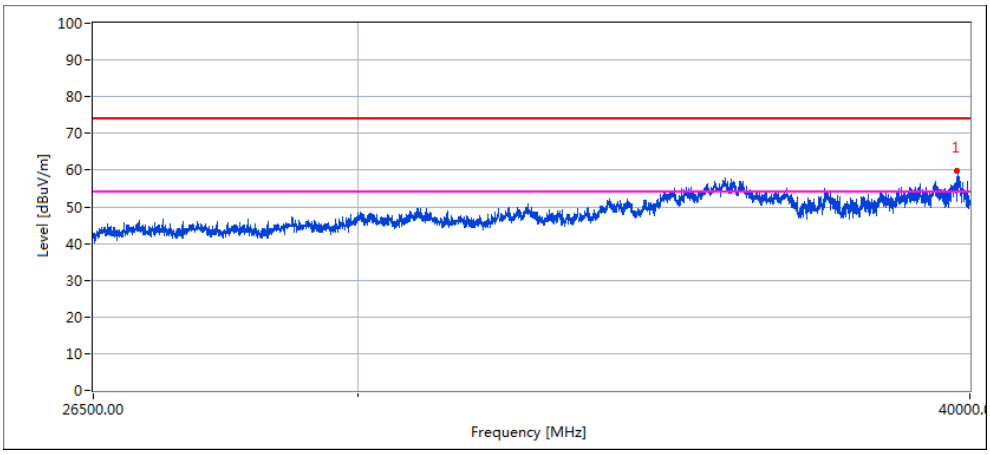
High Channel (5240 MHz)-Above 1G

Horizontal



Frequency MHz	Pre-scan Level MaxPeak dBuV/m	Final Test Level MaxPeak dBuV/m	Limit MaxPeak dBuV/m	Margin dB
35633.241	58.3	55.4	74.0	18.6
35633.241	42.7	42.3	54.0	11.7

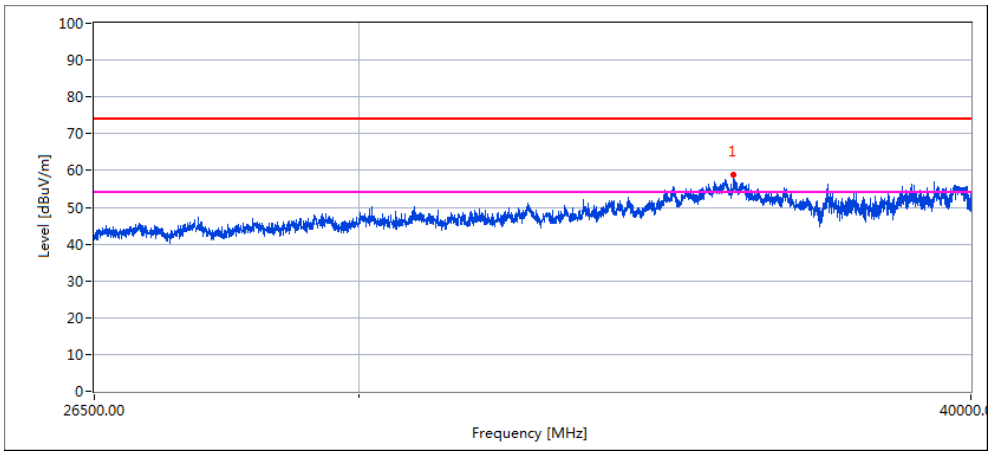
Vertical



Frequency MHz	Pre-scan Level MaxPeak dBuV/m	Final Test Level MaxPeak dBuV/m	Limit MaxPeak dBuV/m	Margin dB
39526.359	58.3	56.3	74.0	17.7
39526.359	43.4	43.3	54.0	10.7

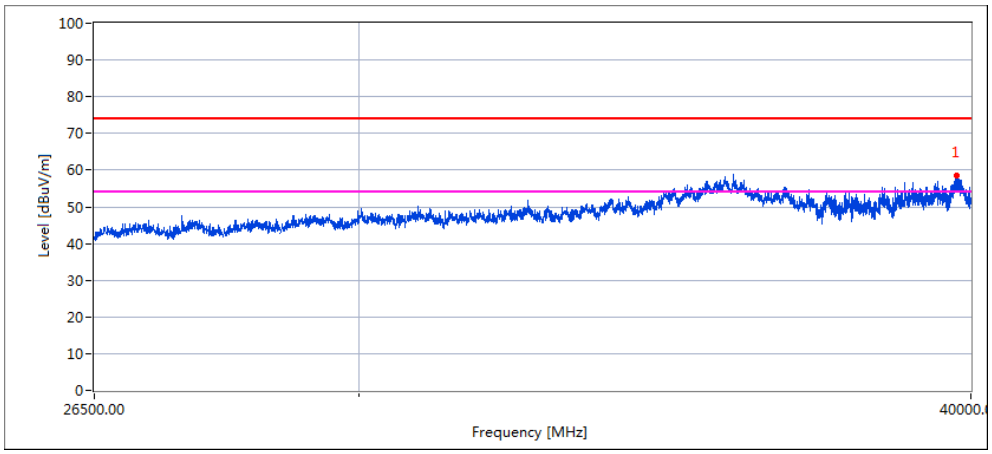
Low Channel (5260 MHz)-Above 1G

Horizontal



Frequency MHz	Pre-scan Level MaxPeak dBuV/m	Final Test Level MaxPeak dBuV/m	Limit MaxPeak dBuV/m	Margin dB
35658.157	58.3	56.1	74.0	17.9
35658.157	43.2	43.2	54.0	10.8

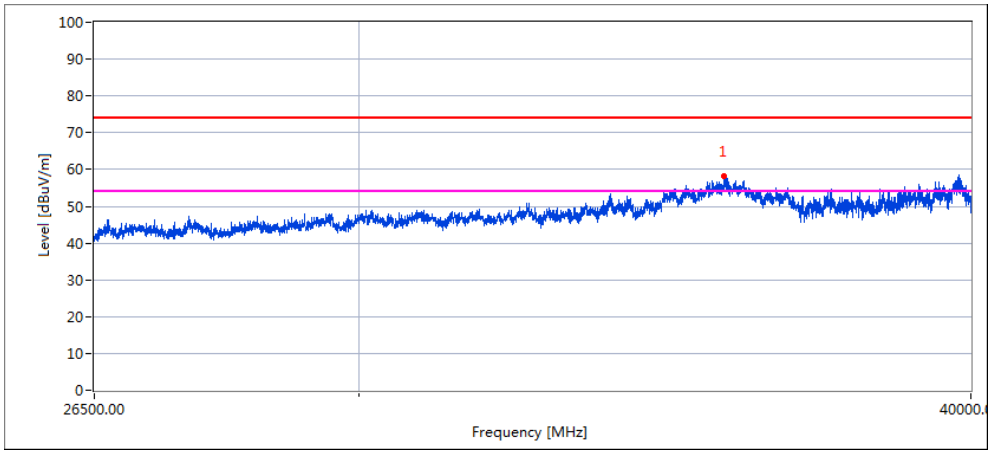
Vertical



Frequency MHz	Pre-scan Level MaxPeak dBuV/m	Final Test Level MaxPeak dBuV/m	Limit MaxPeak dBuV/m	Margin dB
39757.175	58.6	58.2	74.0	15.8
39757.175	42.6	42.7	54.0	11.3

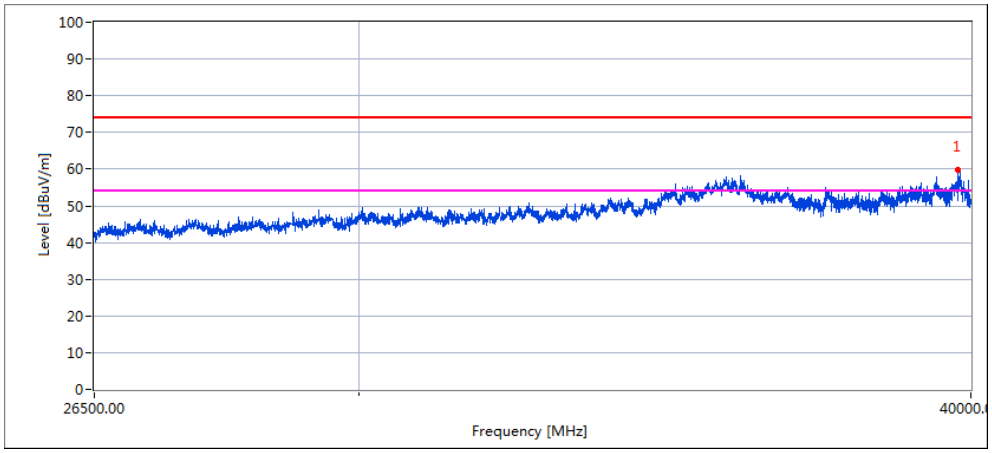
Low Channel (5320 MHz)-Above 1G

Horizontal



Frequency MHz	Pre-scan Level MaxPeak dBuV/m	Final Test Level MaxPeak dBuV/m	Limit MaxPeak dBuV/m	Margin dB
35623.214	58.6	55.8	74.0	18.2
35623.214	43.1	43.3	54.0	10.7

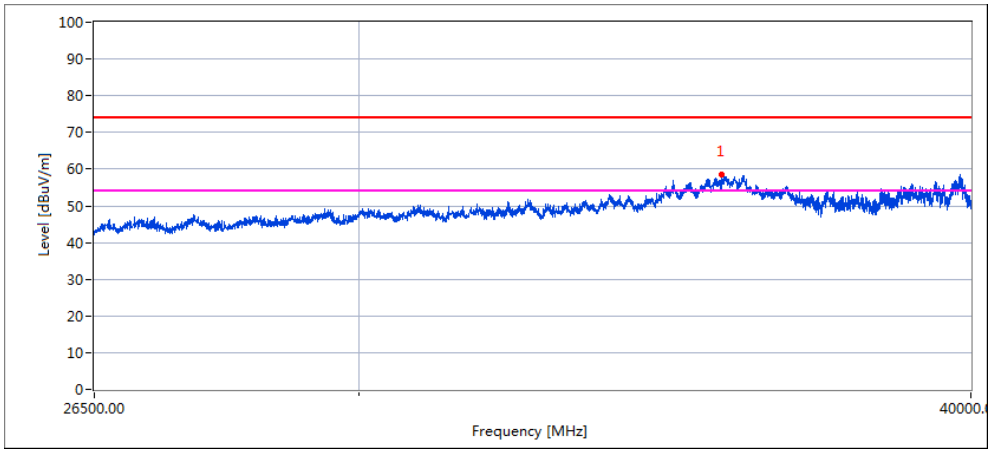
Vertical



Frequency MHz	Pre-scan Level MaxPeak dBuV/m	Final Test Level MaxPeak dBuV/m	Limit MaxPeak dBuV/m	Margin dB
39753.375	59.9	57.5	74.0	16.5
39753.375	44.5	44.6	54.0	9.4

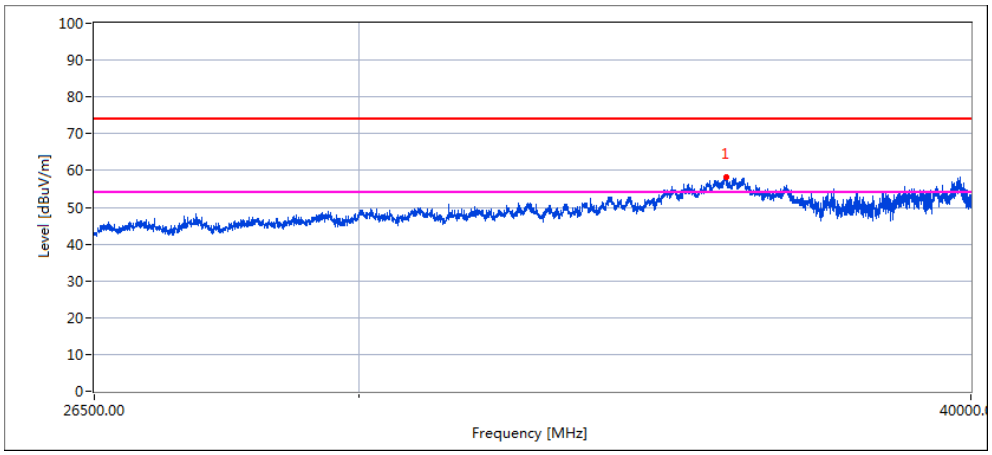
Low Channel (5500 MHz)-Above 1G

Horizontal



Frequency MHz	Pre-scan Level MaxPeak dBuV/m	Final Test Level MaxPeak dBuV/m	Limit MaxPeak dBuV/m	Margin dB
35590.347	58.5	54.2	74.0	19.8
35590.347	43.2	43.2	54.0	10.8

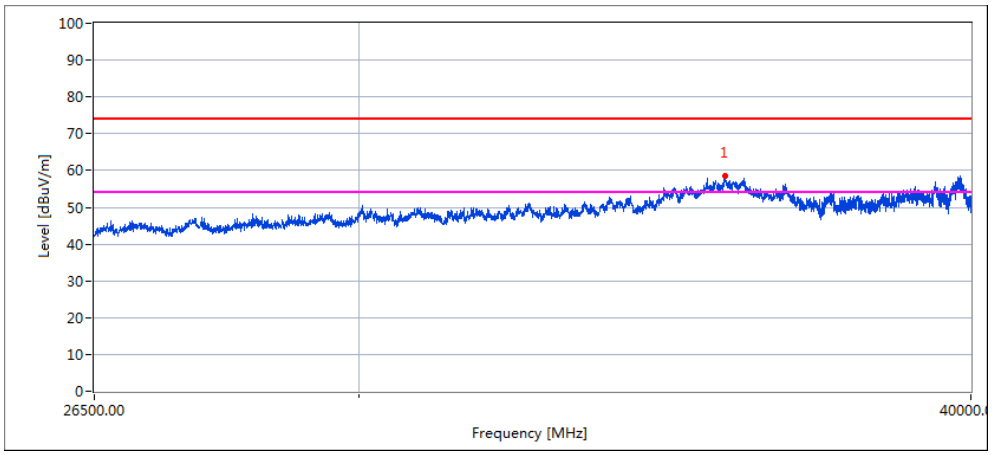
Vertical



Frequency MHz	Pre-scan Level MaxPeak dBuV/m	Final Test Level MaxPeak dBuV/m	Limit MaxPeak dBuV/m	Margin dB
35656.826	58.4	55.9	74.0	18.1
35656.826	43.6	43.6	54.0	10.4

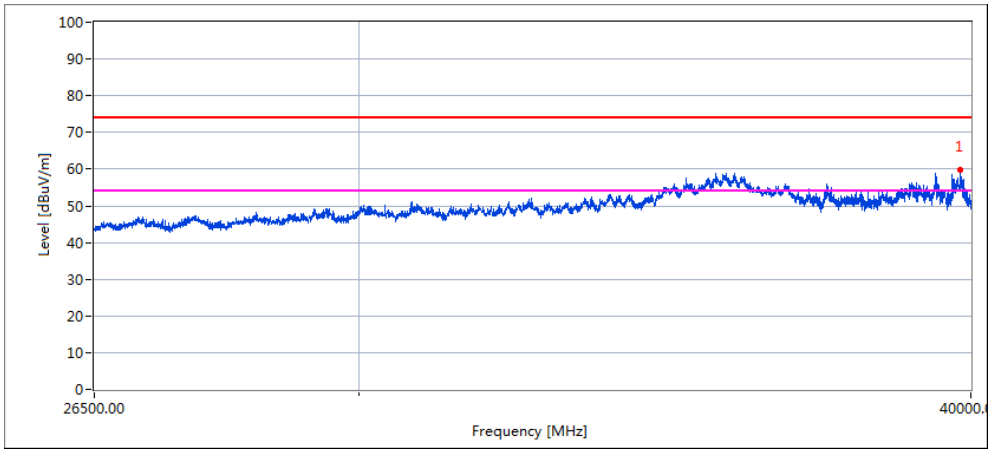
Low Channel (5700 MHz)-Above 1G

Horizontal



Frequency MHz	Pre-scan Level MaxPeak dBuV/m	Final Test Level MaxPeak dBuV/m	Limit MaxPeak dBuV/m	Margin dB
35641.711	58.6	56.1	74.0	17.9
35641.711	42.7	42.7	54.0	11.3

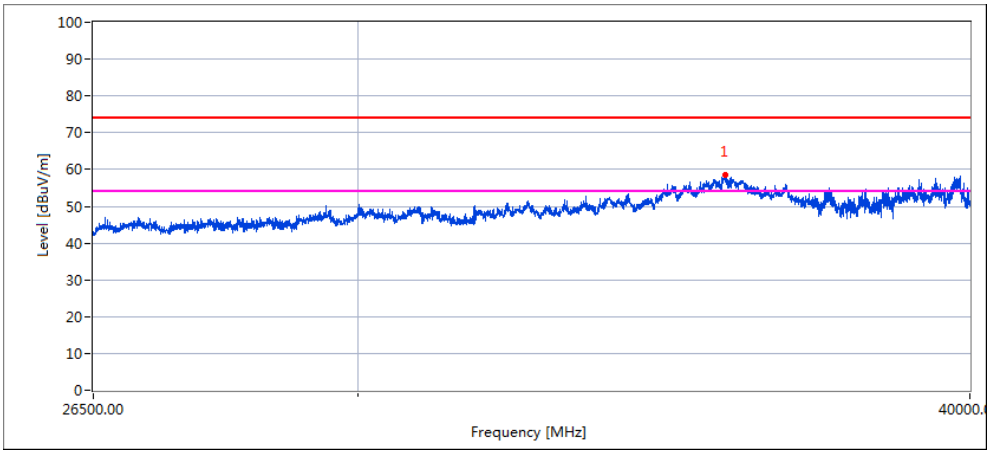
Vertical



Frequency MHz	Pre-scan Level MaxPeak dBuV/m	Final Test Level MaxPeak dBuV/m	Limit MaxPeak dBuV/m	Margin dB
39797.630	59.7	55.4	74.0	18.6
39797.630	43.1	43.3	54.0	10.7

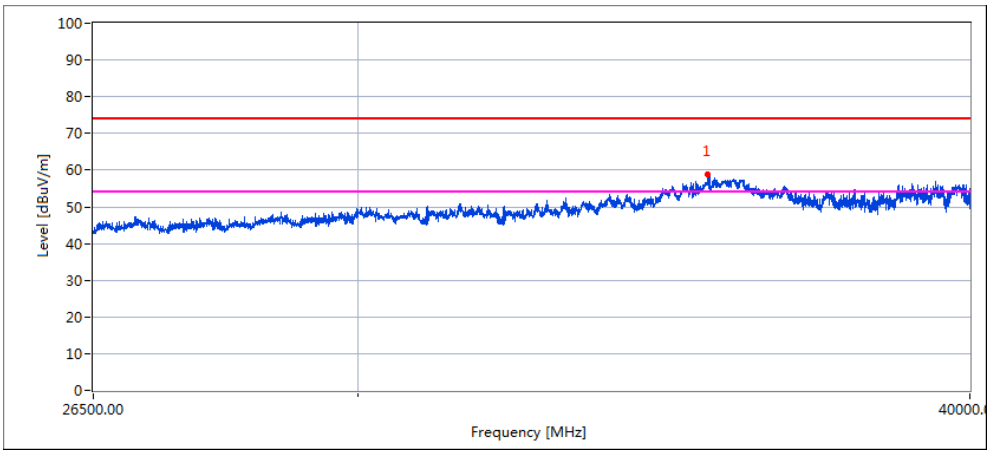
Low Channel (5745 MHz)-Above 1G

Horizontal



Frequency MHz	Pre-scan Level MaxPeak dBuV/m	Final Test Level MaxPeak dBuV/m	Limit MaxPeak dBuV/m	Margin dB
35656.387	58.8	48.4	74.0	25.6
35656.387	43.4	43.2	54.0	10.8

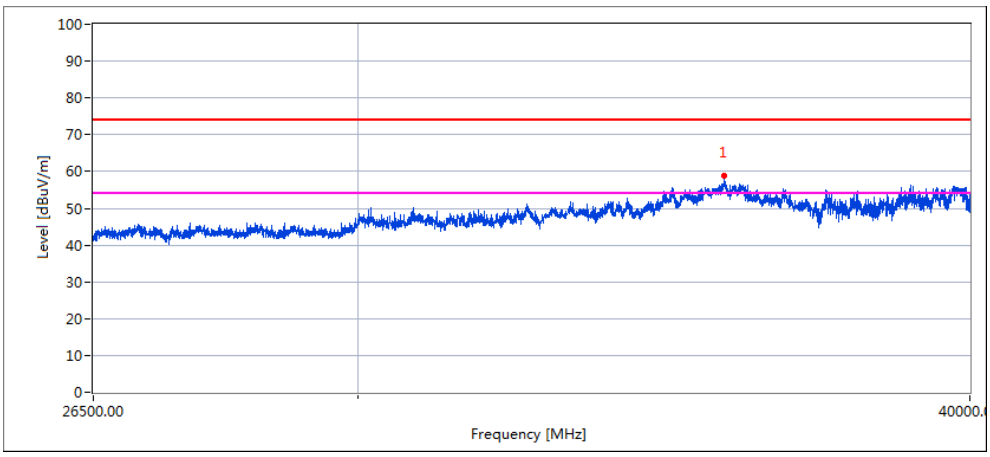
Vertical



Frequency MHz	Pre-scan Level MaxPeak dBuV/m	Final Test Level MaxPeak dBuV/m	Limit MaxPeak dBuV/m	Margin dB
35415.356	58.6	54.3	74.0	19.7
35415.356	42.5	42.2	54.0	11.8

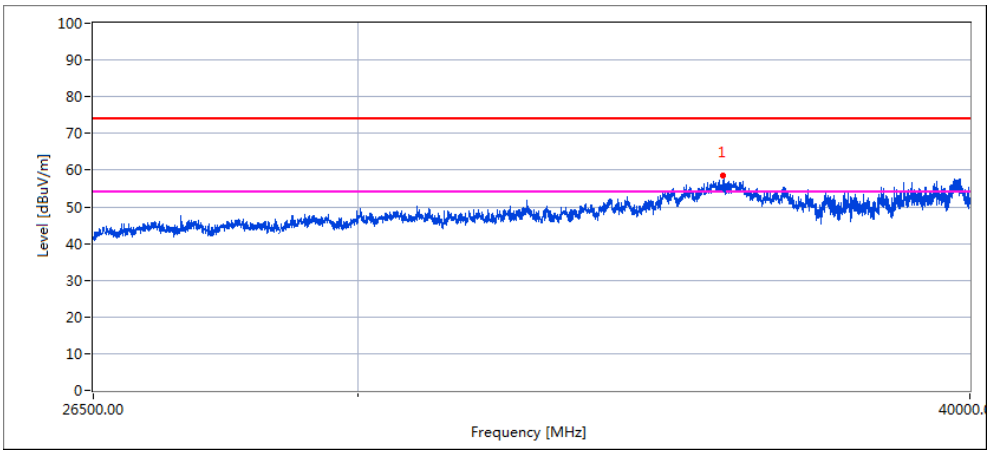
High Channel (5825 MHz)-Above 1G

Horizontal



Frequency MHz	Pre-scan Level MaxPeak dBuV/m	Final Test Level MaxPeak dBuV/m	Limit MaxPeak dBuV/m	Margin dB
35632.225	59.3	56.7	74.0	17.3
35632.225	44.5	43.6	54.0	10.4

Vertical



Frequency MHz	Pre-scan Level MaxPeak dBuV/m	Final Test Level MaxPeak dBuV/m	Limit MaxPeak dBuV/m	Margin dB
35736.263	58.5	58.1	74.0	15.9
35736.263	43.8	43.3	54.0	10.7

4. POWER SPECTRAL DENSITY TEST

4.1 APPLIED PROCEDURES / LIMIT

According to FCC §15.407(a)

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, omnidirectional 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 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 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, 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

(3)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.

,

4.2 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 ≥ 1/T, where T is defined in section II.B.I.a).

b) Set VBW ≥ 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.

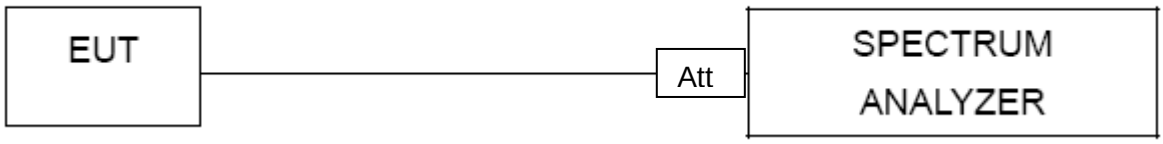
e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

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.

4.3 DEVIATION FROM STANDARD

No deviation.

4.4 TEST SETUP



4.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.1 Unless otherwise a special operating condition is specified in the follows during the testing.

4.6 TEST RESULTS

EUT：	PMA	Model Name. ：	PMA1.0
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1015 hPa	Test Voltage ：	DC 12V
Test Mode ：	TX Frequency Band I (5150-5250MHz)		

Note: A(B) Represent the value of antenna A and B, The worst data is Antenna A ,only shown Antenna A Plot.

EUT has two antennas, and different modes support different transmit mode what describe as Following form:

Mode	Tx/Rx
802.11a	1Tx, 2Rx
802.11n/ac	1Tx /2Tx, 2Rx

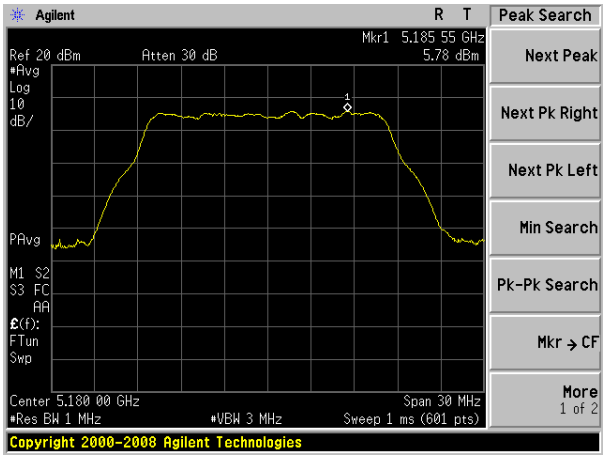
Mode	Frequency (MHz)	Measured Power Density (dBm / MHz)		Total power density (dBm / MHz)		Limit (dBm / MHz)	Result
		ANT A	ANT B	ANT A	ANT B		
802.11 a	5185	5.78	5.59	5.78	5.59	11.00	PASS
	5200	5.50	5.43	5.50	5.43	11.00	PASS
	5240	5.30	5.22	5.30	5.22	11.00	PASS
802.11 n20	5185	3.36	3.17	6.28		9.23	PASS
	5200	3.88	3.55	6.73		9.23	PASS
	5240	3.65	3.37	6.52		9.23	PASS
802.11 n40	5190	1.35	1.26	4.32		9.23	PASS
	5230	0.62	0.47	3.56		9.23	PASS
802.11 AC20	5185	2.42	1.94	5.20		9.23	PASS
	5200	2.38	1.98	5.19		9.23	PASS
	5240	2.84	2.34	5.61		9.23	PASS
802.11 AC40	5190	-1.30	-1.71	1.51		9.23	PASS
	5230	-0.81	-1.15	2.03		9.23	PASS
802.11 AC80	5210	-3.64	-3.77	-0.69		9.23	PASS

Note: 1.Calculate power density= Measured Power Density+10log(1MHz/RBW)

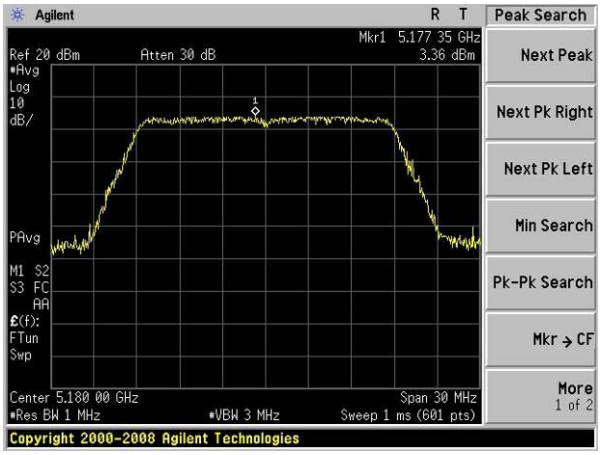
RBW=1MHz

2. For 802.11n/ac 5GHz has MIMO mode. Directional gain=7.77dbi
7.77 dbi>6.0 dbi so power density limit= 11-(7.77-6)=9.23dBm/MHz

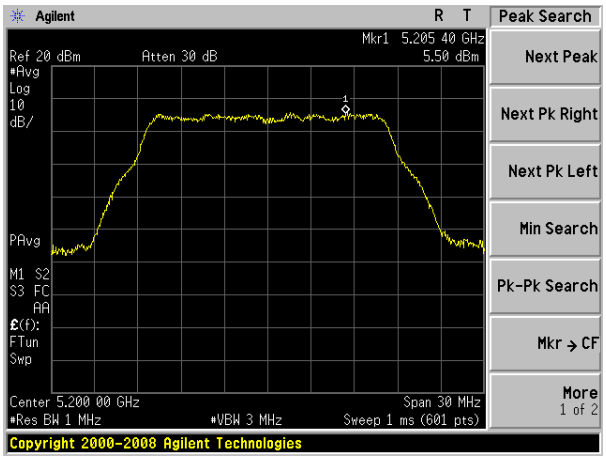
(802.11a) PSD plot on channel 36



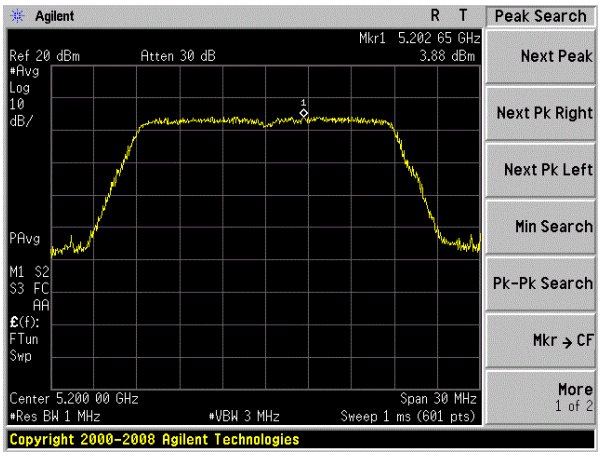
(802.11n20) PSD plot on channel 36



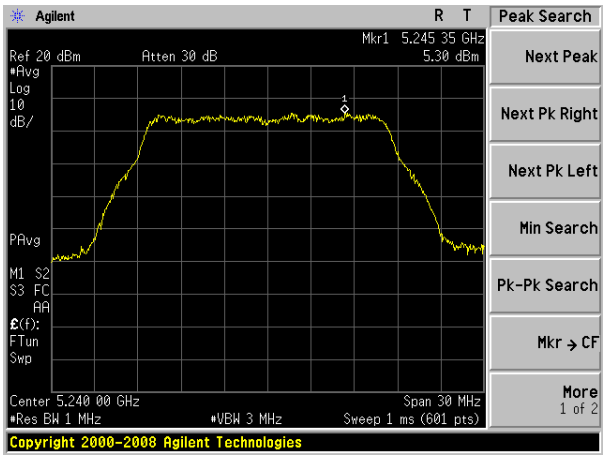
(802.11a) PSD plot on channel 40



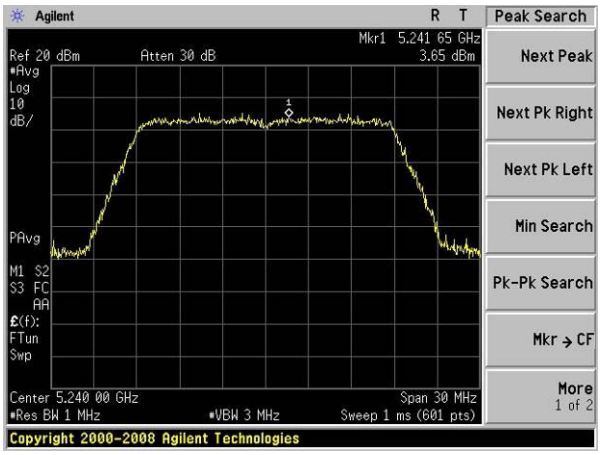
(802.11n20) PSD plot on channel 40



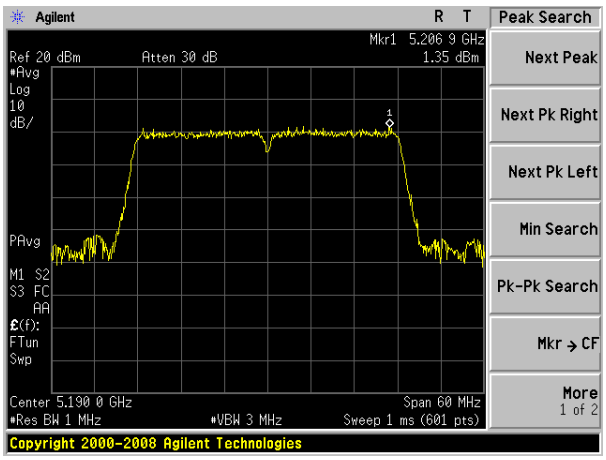
(802.11a) PSD plot on channel 48



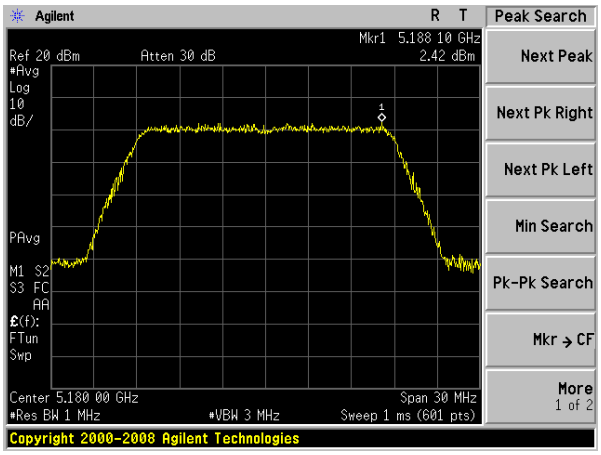
(802.11n20) PSD plot on channel 48



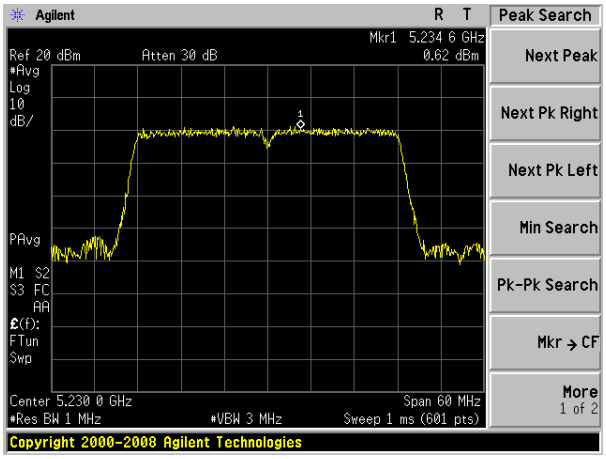
(802.11n40) PSD plot on channel 38



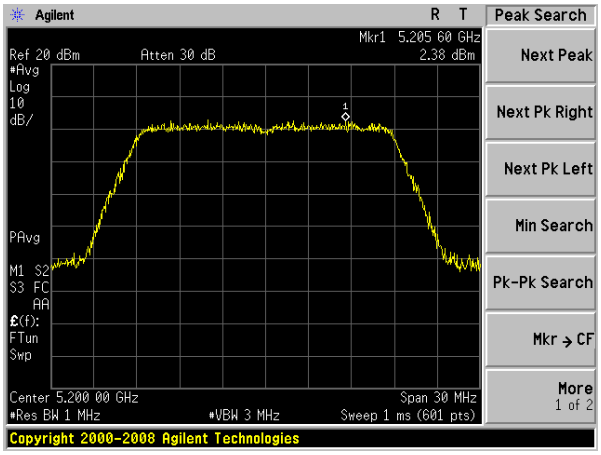
(802.11ac20) PSD plot on channel 36



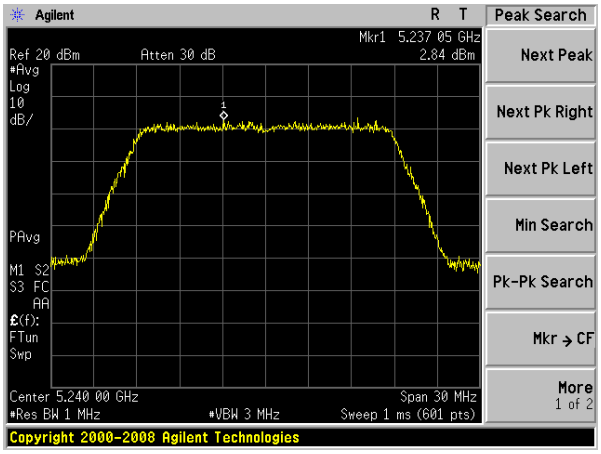
(802.11n40) PSD plot on channel 46



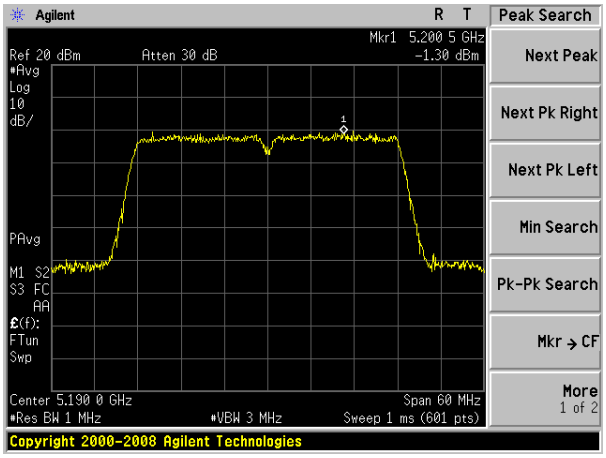
(802.11ac20) PSD plot on channel 40



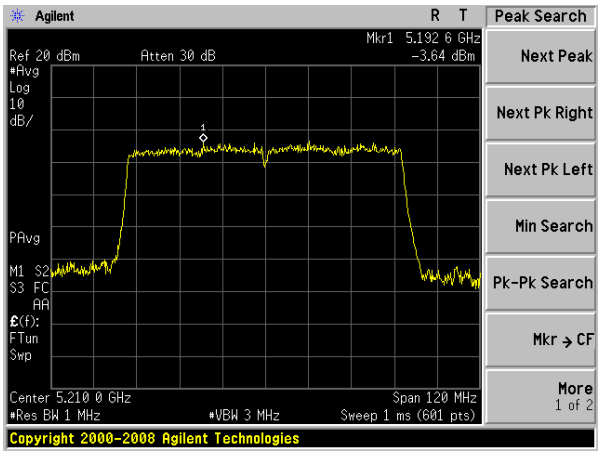
(802.11ac20) PSD plot on channel 48



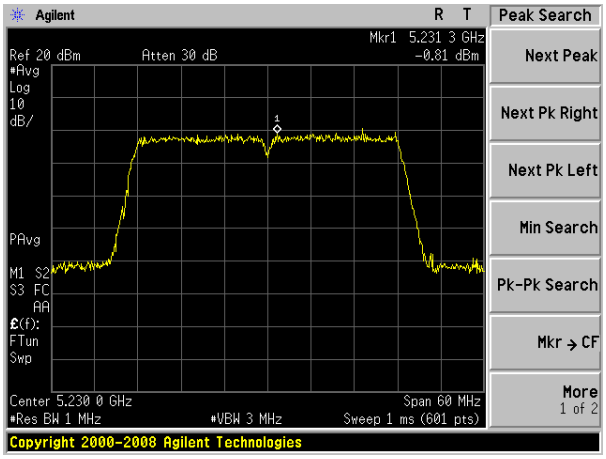
(802.11ac40) PSD plot on channel 38



(802.11ac80) PSD plot on channel 42



(802.11ac40) PSD plot on channel 46



EUT：	PMA	Model Name. ：	PMA1.0
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1015 hPa	Test Voltage ：	DC 12V
Test Mode ：	TX Frequency Band 2A (5250-5350MHz)		

Note: A(B) Represent the value of antenna A and B, The worst data is Antenna A ,only shown Antenna A Plot.

EUT has two antennas, and different modes support different transmit mode what describe as Following form:

Mode	Tx/Rx
802.11a	1Tx, 2Rx
802.11n/ac	1Tx /2Tx, 2Rx

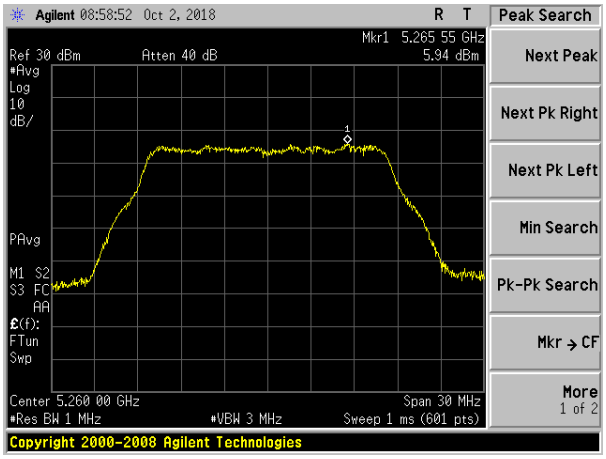
Mode	Frequency (MHz)	Measured Power Density (dBm / MHz)		Total power density (dBm / MHz)		Limit (dBm / MHz)	Result
		ANT A	ANT B	ANT A	ANT B		
802.11 a	5260	5.94	5.84	5.94	5.84	11.00	PASS
	5280	5.78	5.66	5.78	5.66	11.00	PASS
	5320	5.98	5.73	5.98	5.73	11.00	PASS
802.11 n20	5260	4.30	3.94	7.13		9.23	PASS
	5280	4.26	3.35	6.84		9.23	PASS
	5320	4.09	3.51	6.82		9.23	PASS
802.11 n40	5270	1.57	1.22	4.41		9.23	PASS
	5310	0.68	0.13	3.42		9.23	PASS
802.11 AC20	5260	4.58	3.55	7.11		9.23	PASS
	5280	3.83	3.12	6.50		9.23	PASS
	5320	4.35	3.37	6.90		9.23	PASS
802.11 AC40	5270	-0.18	-0.81	2.53		9.23	PASS
	5310	-0.22	-0.72	2.55		9.23	PASS
802.11 AC80	5290	-3.42	-3.84	-0.61		9.23	PASS

Note: 1.Calculate power density= Measured Power Density+10log(1MHz/RBW)

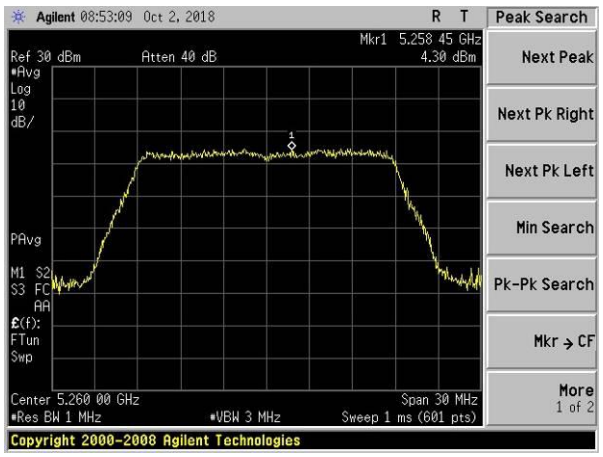
RBW=1MHz

2. For 802.11n/ac 5GHz has MIMO mode. Directional gain=7.77dbi
7.77 dbi>6.0 dbi so power density limit= 11-(7.77-6)=9.23dBm/MHz

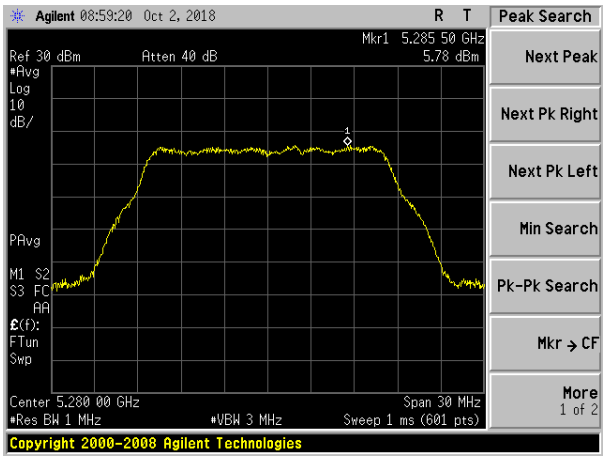
(802.11a) PSD plot on channel 52



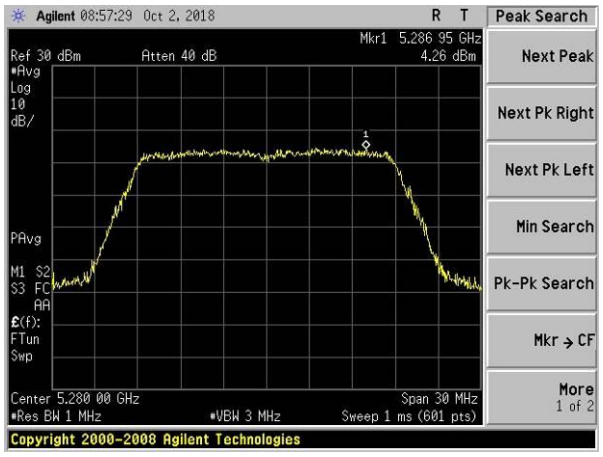
(802.11n20) PSD plot on channel 52



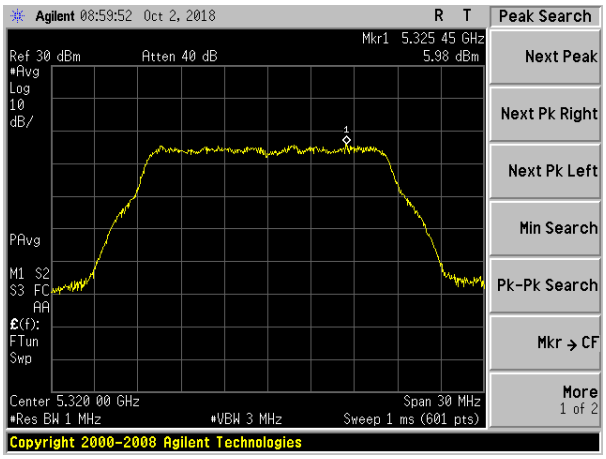
(802.11a) PSD plot on channel 56



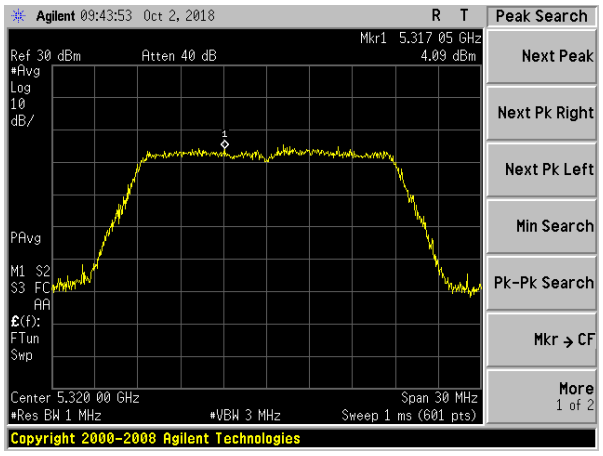
(802.11n20) PSD plot on channel 56



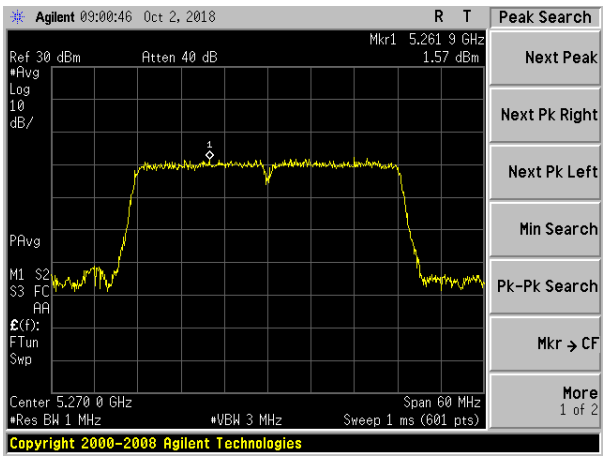
(802.11a) PSD plot on channel 64



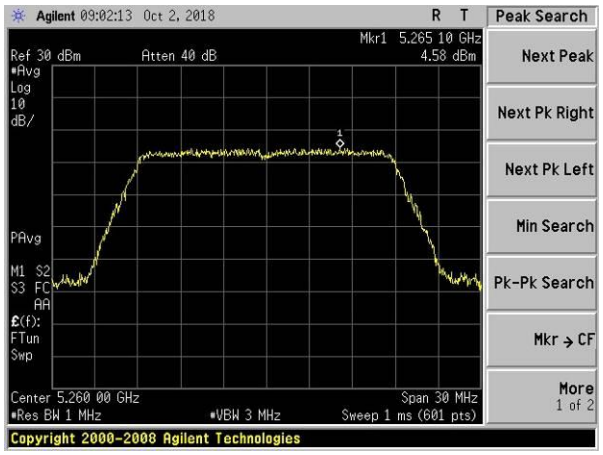
(802.11n20) PSD plot on channel 64



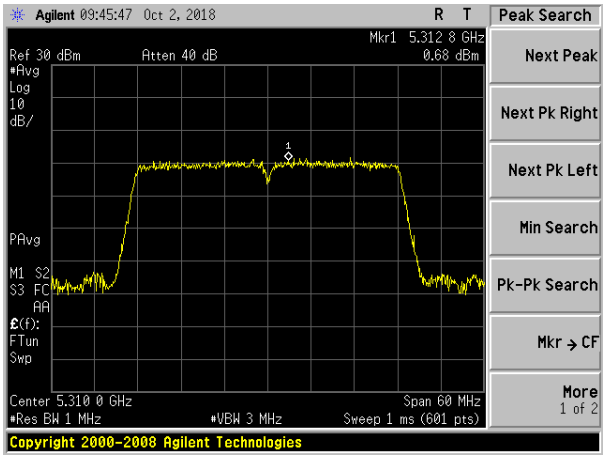
(802.11n40) PSD plot on channel 54



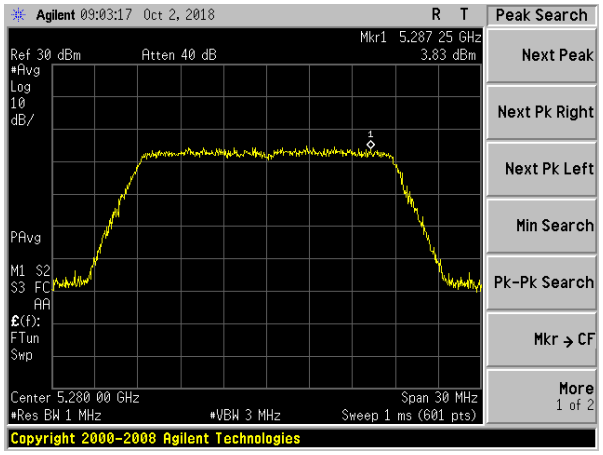
(802.11ac20) PSD plot on channel 52



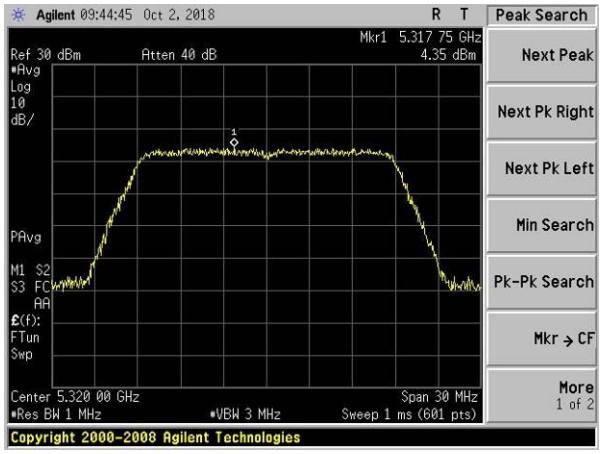
(802.11n40) PSD plot on channel 62



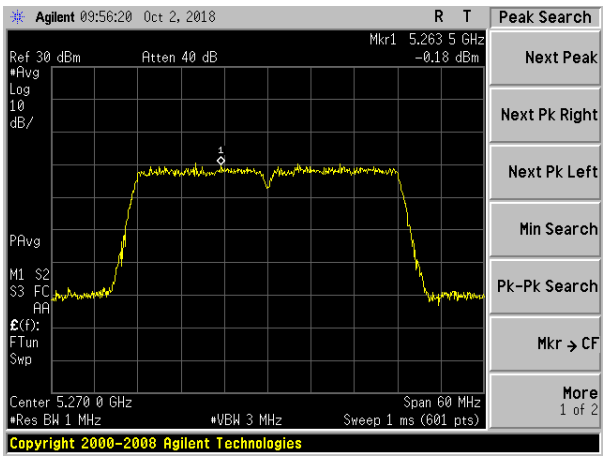
(802.11ac20) PSD plot on channel 56



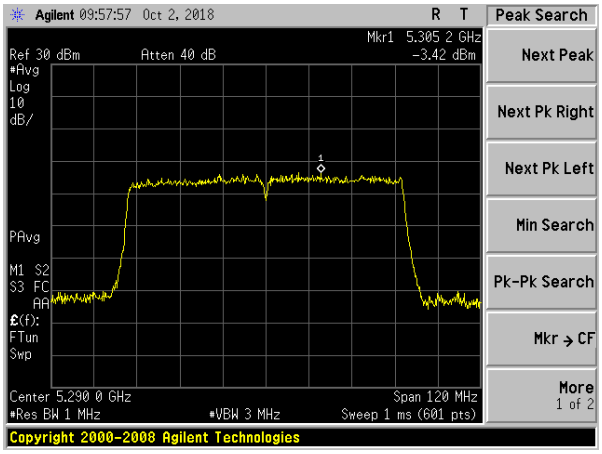
(802.11ac20) PSD plot on channel 64



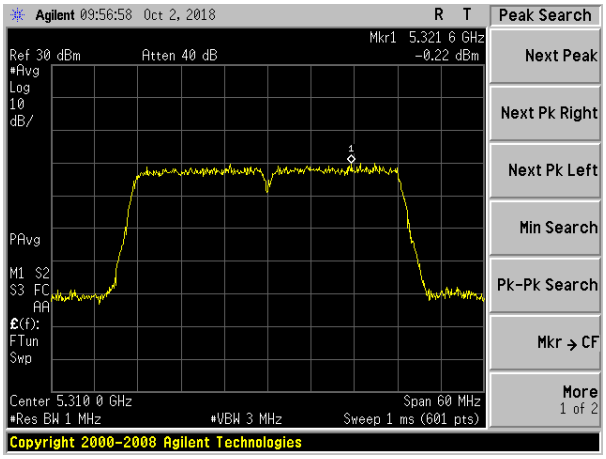
(802.11ac40) PSD plot on channel 54



(802.11ac80) PSD plot on channel 58



(802.11ac40) PSD plot on channel 62



EUT：	PMA	Model Name. ：	PMA1.0
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1015 hPa	Test Voltage ：	DC 12V
Test Mode ：	TX Frequency Band 2C (5470-5725MHz)		

Note: A(B) Represent the value of antenna A and B, The worst data is Antenna A ,only shown Antenna A Plot.

EUT has two antennas, and different modes support different transmit mode what describe as Following form:

Mode	Tx/Rx
802.11a	1Tx, 2Rx
802.11n/ac	1Tx /2Tx, 2Rx

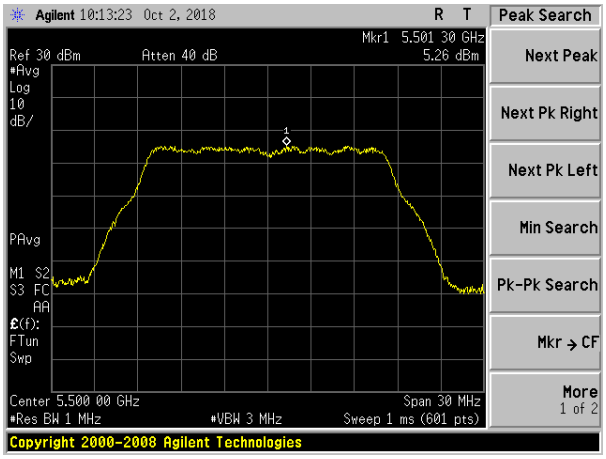
Mode	Frequency (MHz)	Measured Power Density (dBm / MHz)		Total power density (dBm / MHz)		Limit (dBm / MHz)	Result
		ANT A	ANT B	ANT A	ANT B		
802.11 a	5500	5.26	5.11	5.26	5.11	11.00	PASS
	5600	4.90	4.73	4.90	4.73	11.00	PASS
	5700	4.38	4.06	4.38	4.06	11.00	PASS
802.11 n20	5500	4.27	3.34	6.84		9.23	PASS
	5600	4.22	3.06	6.69		9.23	PASS
	5700	4.28	3.11	6.74		9.23	PASS
802.11 n40	5510	3.49	3.01	6.27		9.23	PASS
	5590	1.91	1.41	4.68		9.23	PASS
	5670	1.74	1.07	4.43		9.23	PASS
802.11 AC20	5260	4.03	3.78	6.92		9.23	PASS
	5280	4.06	3.43	6.77		9.23	PASS
	5320	1.96	1.15	4.58		9.23	PASS
802.11 AC40	5500	-0.08	-0.22	2.86		9.23	PASS
	5600	-1.21	-1.76	1.53		9.23	PASS
	5700	-1.74	-1.92	1.18		9.23	PASS
802.11 AC80	5530	-2.18	-2.53	0.66		9.23	PASS

Note: 1.Calculate power density= Measured Power Density+10log(1MHz/RBW)

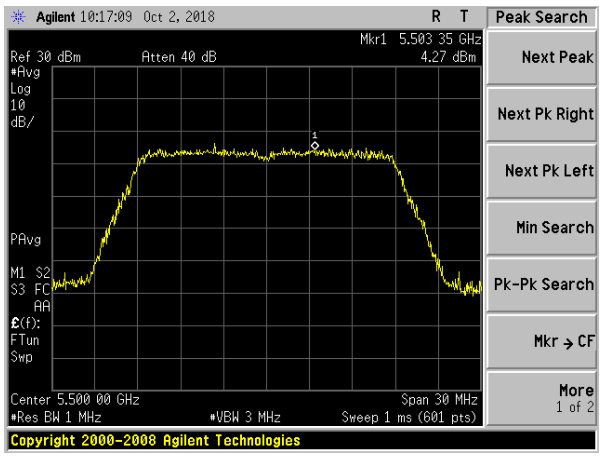
RBW=1MHz

2. For 802.11n/ac 5GHz has MIMO mode. Directional gain=7.77dbi
7.77 dbi>6.0 dbi so power density limit= 11-(7.77-6)=9.23dBm/MHz

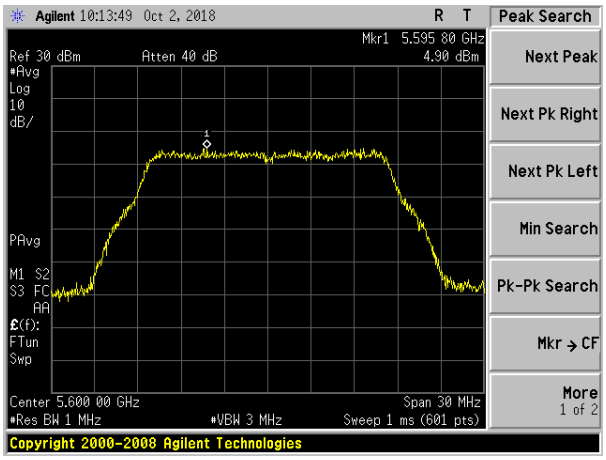
(802.11a) PSD plot on channel 100



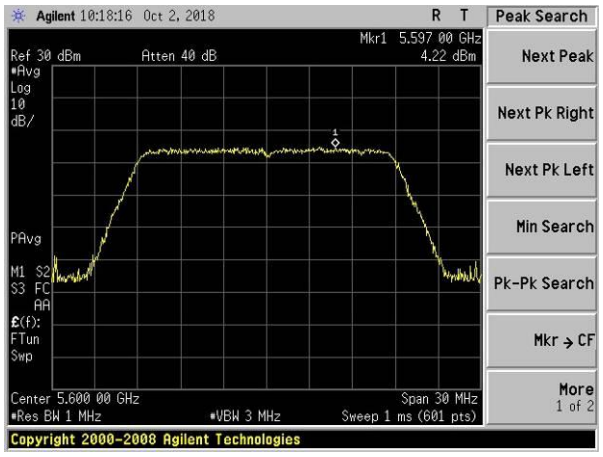
(802.11n20) PSD plot on channel 100



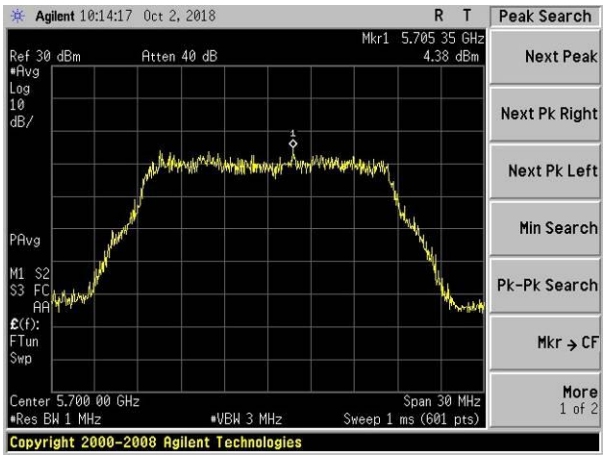
(802.11a) PSD plot on channel 120



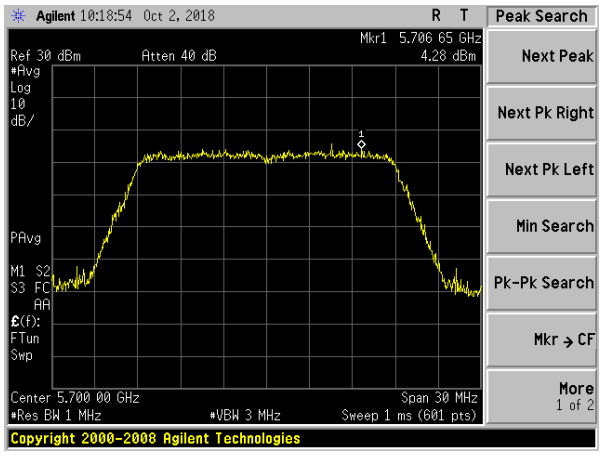
(802.11n20) PSD plot on channel 120



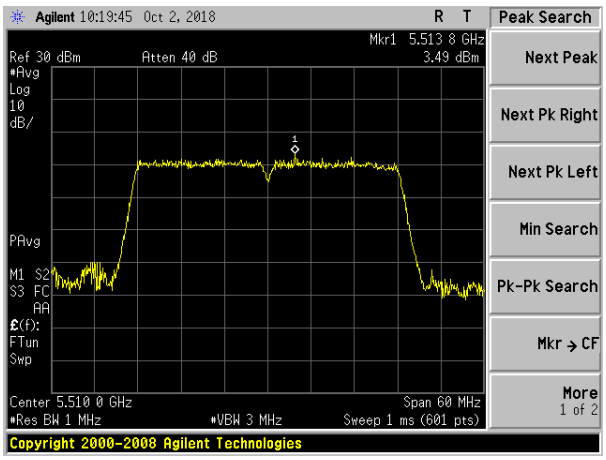
(802.11a) PSD plot on channel 140



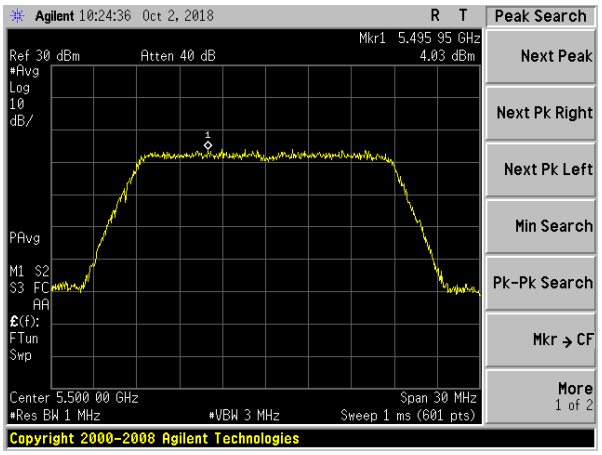
(802.11n20) PSD plot on channel 140



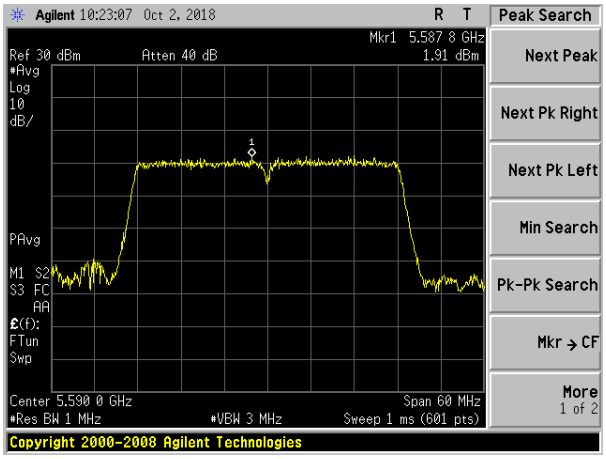
(802.11n40) PSD plot on channel 102



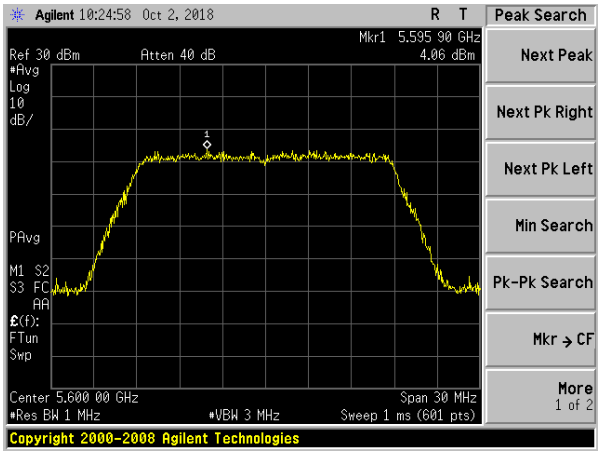
(802.11ac20) PSD plot on channel 100



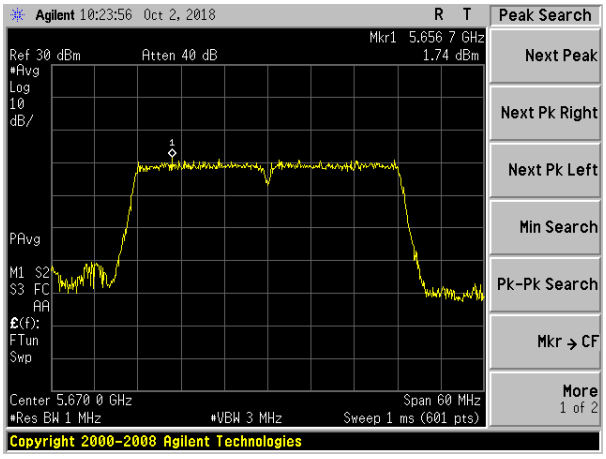
(802.11n40) PSD plot on channel 118



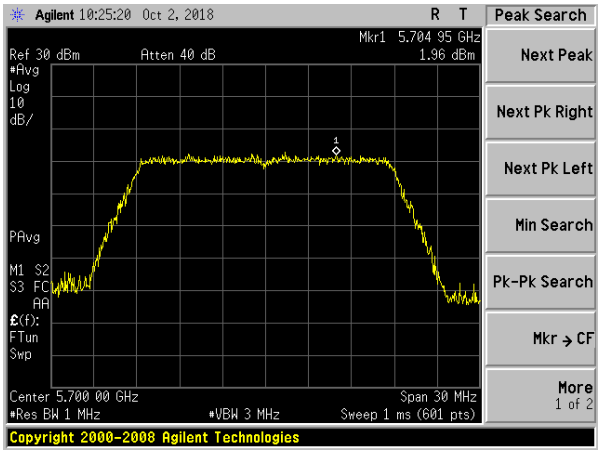
(802.11ac20) PSD plot on channel 120



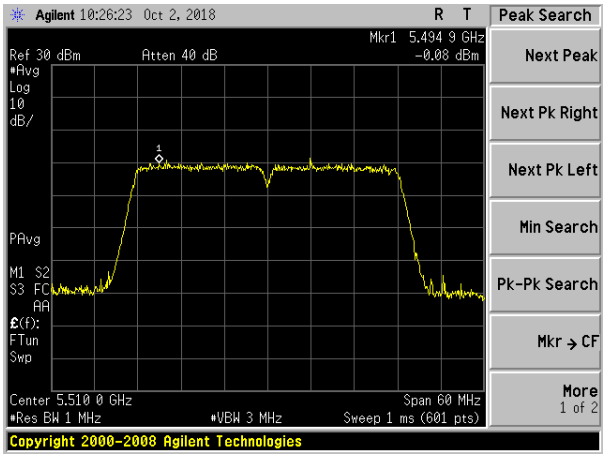
(802.11n40) PSD plot on channel 134



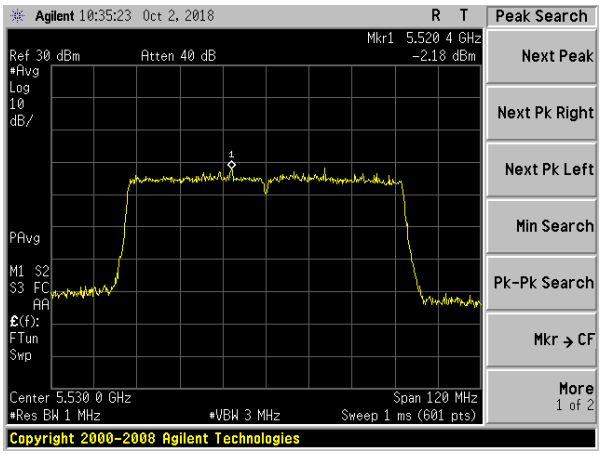
(802.11ac20) PSD plot on channel 140



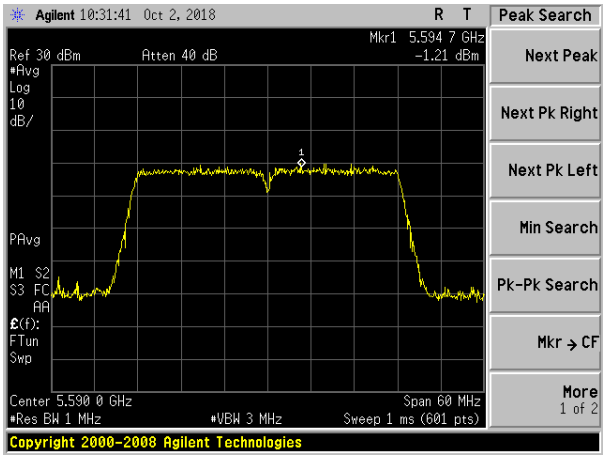
(802.11ac40) PSD plot on channel 102



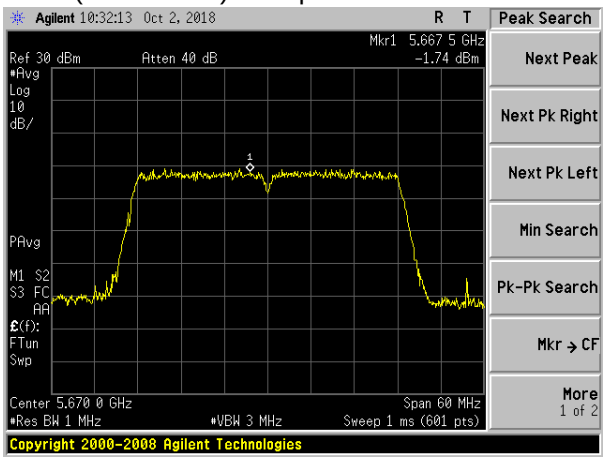
(802.11ac80) PSD plot on channel 106



(802.11ac40) PSD plot on channel 118



(802.11ac40) PSD plot on channel 134



EUT：	PMA	Model Name. ：	PMA1.0
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1015 hPa	Test Voltage ：	DC 12V
Test Mode ：	TX Frequency Band 3 (5745-5825MHz)		

Note: A(B) Represent the value of antenna A and B, The worst data is Antenna A ,only shown Antenna A Plot.

EUT has two antennas, and different modes support different transmit mode what describe as Following form:

Mode	Tx/Rx
802.11a	1Tx, 2Rx
802.11n/ac	1Tx /2Tx, 2Rx

Mode	Frequency (MHz)	Measured Power Density (dBm)		Total power density (dBm)	Calculate power density (dBm)(Note 1)		Limit (dBm)	Result
		ANT A	ANT B		ANT A	ANT B		
802.11 a	5745	8.757	8.661	-	8.67	8.58	30	PASS
	5785	8.938	8.716	-	8.85	8.63	30	PASS
	5825	8.725	8.211	-	8.64	8.13	30	PASS
802.11 n20	5745	7.978	7.538	10.77	10.69		28.23	PASS
	5785	7.518	7.454	10.50	10.41		28.23	PASS
	5825	8.211	7.841	11.04	10.95		28.23	PASS
802.11 n40	5755	5.115	4.667	7.91	7.82		28.23	PASS
	5795	4.679	4.235	7.47	7.39		28.23	PASS
802.11 AC20	5745	8.045	7.818	10.94	10.86		28.23	PASS
	5785	8.060	7.795	10.94	10.85		28.23	PASS
	5825	8.065	7.862	10.97	10.89		28.23	PASS
802.11 AC40	5755	4.747	4.168	7.48	7.39		28.23	PASS
	5795	4.794	4.216	7.52	7.44		28.23	PASS
802.11 AC80	5775	-7.19	-7.22	-4.19	-4.28		28.23	PASS

Note:

(1) Calculate power density= Measured Power Density+10log(500kHz/RBW)= Measured Power Density+(-0.086)
RBW=0.51MHz

(2) For 802.11n/ac 5GHz has MIMO mode. Directional gain=7.77dbi
7.77 dbi>6.0 dbi so power density limit= 30-(7.77-6)=28.23dBm/MHz

(802.11a) PSD plot on channel 149

(802.11n20) PSD plot on channel 149

(802.11a) PSD plot on channel 157

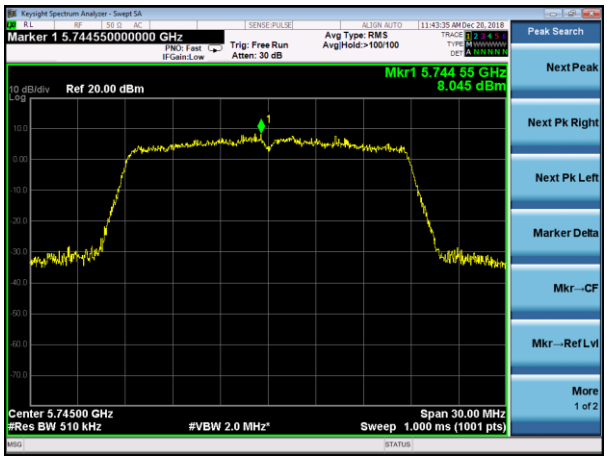
(802.11n20) PSD plot on channel 157

(802.11a) PSD plot on channel 165

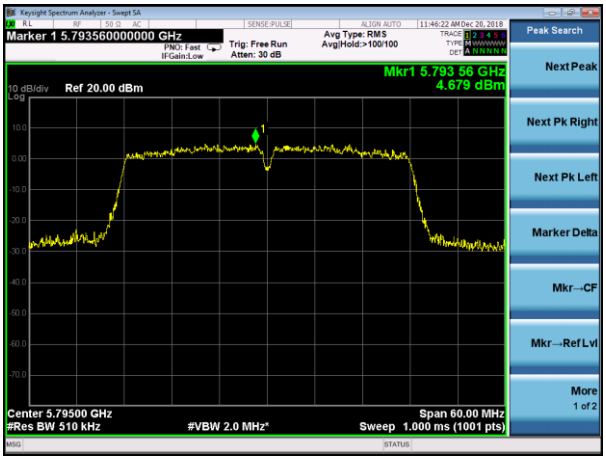
(802.11n20) PSD plot on channel 165

(802.11n40) PSD plot on channel 151

(802.11ac20) PSD plot on channel 149



(802.11n40) PSD plot on channel 159

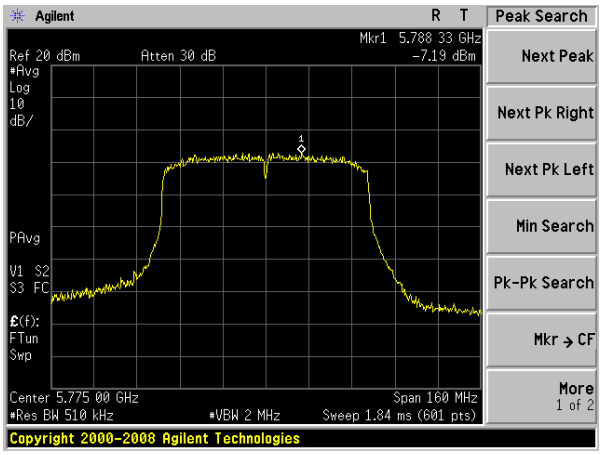


(802.11ac20) PSD plot on channel 157

(802.11ac20) PSD plot on channel 165

(802.11ac40) PSD plot on channel 151

(802.11ac80) PSD plot on channel 155



(802.11ac40) PSD plot on channel 159

5. 26DB & 99% EMISSION BANDWIDTH

5.1 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.

5.2 TEST PROCEDURE

a) Set RBW = approximately 1% of the emission bandwidth.

b) Set the VBW > RBW.

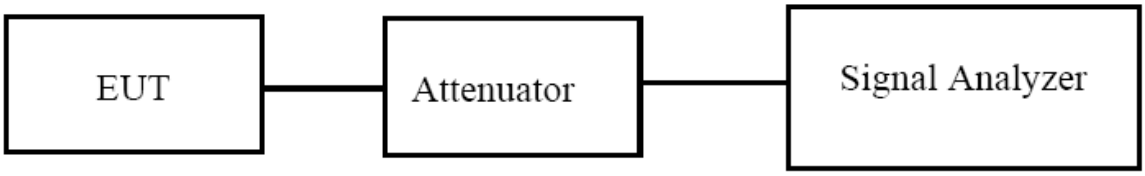
c) Detector = Peak.

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 ≥ 3 · 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.



5.3 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

5.4 TEST RESULTS

EUT：	PMA	Model Name. ：	PMA1.0
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1012 hPa	Test Voltage ：	DC 12V
Test Mode ：	TX Frequency Band I (5150-5250MHz)		

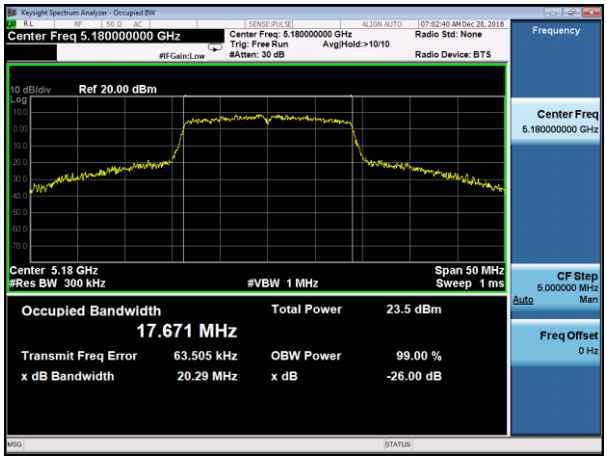
Note: A(B) Represent the value of antenna A and B, The worst data is Antenna A, only shown Antenna A Plot.

Mode	Channel	Frequency (MHz)	99% bandwidth (MHz)	99% bandwidth (MHz)	26dB bandwidth (MHz)	26dB bandwidth (MHz)	Result
			Antenna A	Antenna B	Antenna A	Antenna B	
802.11a	CH36	5180	16.716	16.715	20.24	20.22	Pass
	CH40	5200	16.735	16.724	20.20	20.17	Pass
	CH48	5240	16.634	16.632	20.05	20.04	Pass
802.11 n20	CH36	5180	17.671	17.668	20.29	20.26	Pass
	CH40	5200	17.723	17.721	20.24	20.23	Pass
	CH48	5240	17.682	17.679	19.89	19.84	Pass
802.11 n40	CH 38	5190	35.951	35.861	39.70	39.67	Pass
	CH 46	5230	36.027	35.973	40.67	39.88	Pass
802.11 AC20	CH36	5180	17.605	17.603	19.70	19.64	Pass
	CH40	5200	17.566	17.557	19.55	19.52	Pass
	CH48	5240	17.614	17.573	19.61	19.60	Pass
802.11 AC40	CH 38	5190	35.920	35.878	38.97	38.84	Pass
	CH 46	5230	35.953	35.955	39.00	38.76	Pass
802.11 AC80	CH 42	5210	75.326	75.323	78.56	78.53	Pass

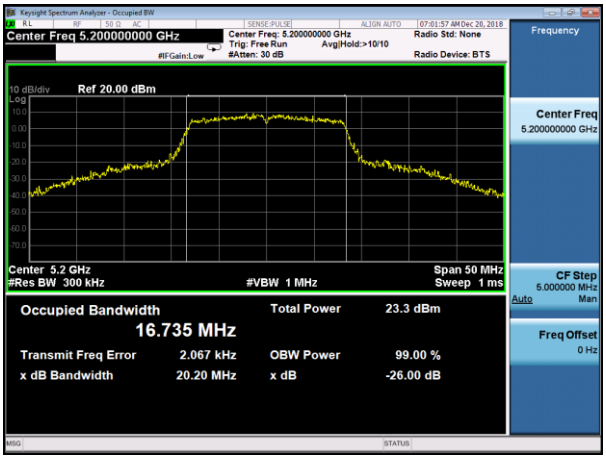
Test plot

(802.11a) -26dB&99%Bandwidth plot on channel 36

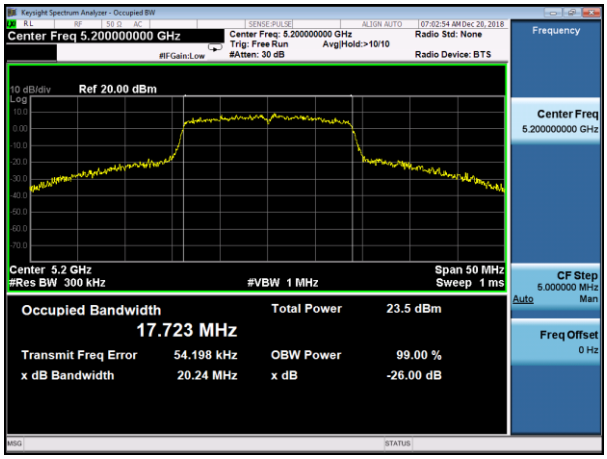
(802.11 n20) -26dB&99%Bandwidth plot on channel 36



(802.11a) -26dB&99%Bandwidth plot on channel 40

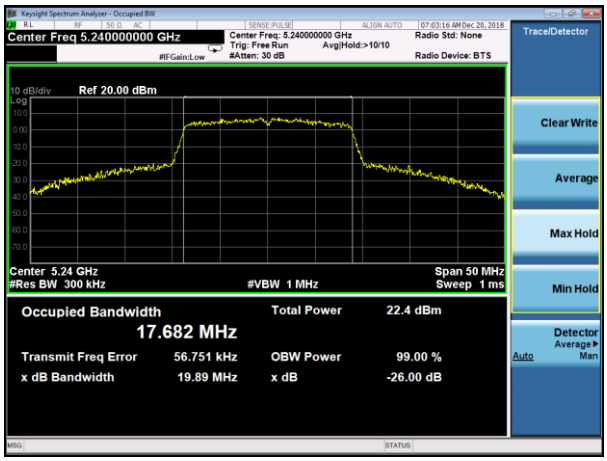


(802.11 n20) -26dB&99%Bandwidth plot on channel 40



(802.11a) -26dB&99%Bandwidth plot on channel 48

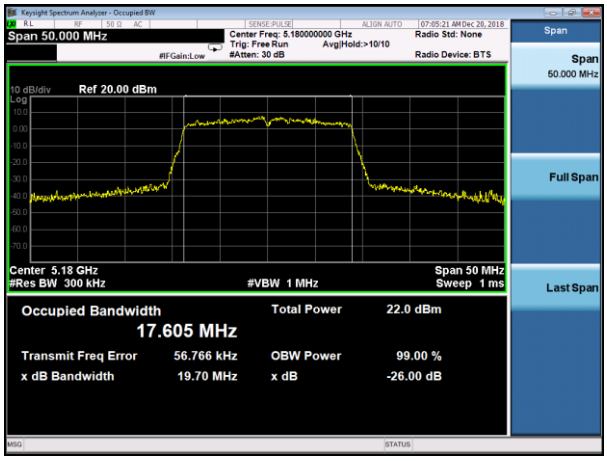
(802.11 n20) -26dB&99%Bandwidth plot on channel 48



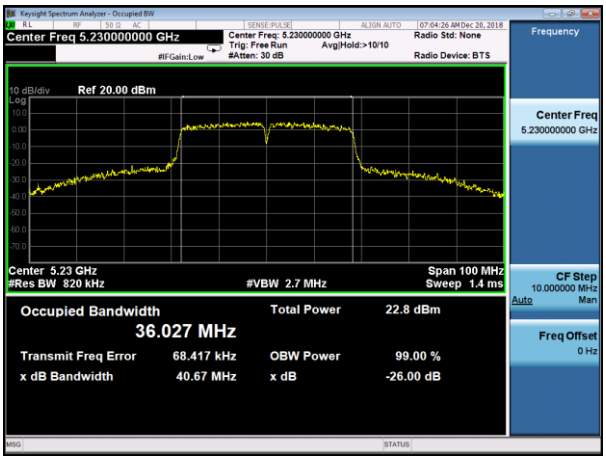
Test plot

(802.11 n40) -26dB&99%Bandwidth plot on channel 38

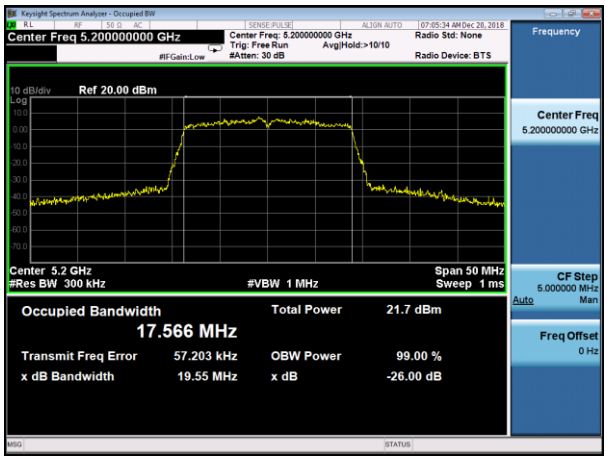
(802.11 AC20) -26dB&99%Bandwidth plot on channel 36



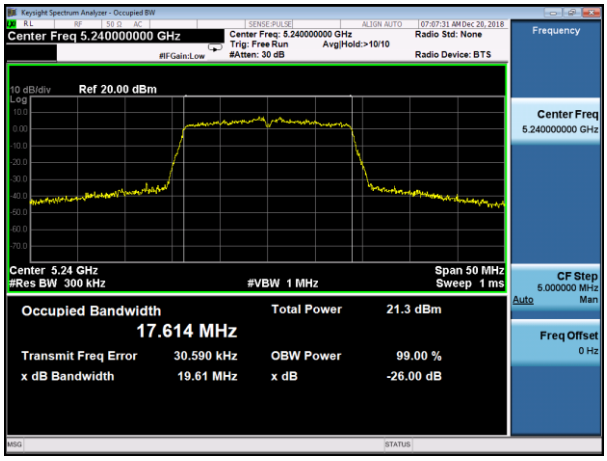
(802.11 n40) -26dB&99%Bandwidth plot on channel 46



(802.11 AC20) -26dB&99%Bandwidth plot on channel 40



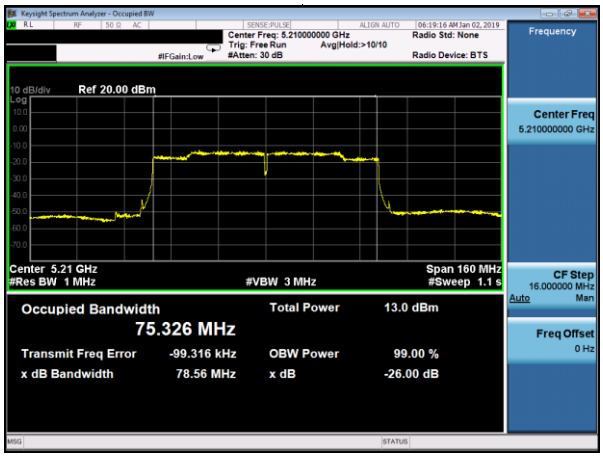
(802.11 AC20) -26dB&99%Bandwidth plot on channel 48



Test plot

(802.11 AC40) -26dB&99%Bandwidth plot on channel 38

(802.11 AC80) -26dB&99%Bandwidth plot on channel 42



(802.11 AC40) -26dB&99%Bandwidth plot on channel 46

EUT：	PMA	Model Name. ：	PMA1.0
Temperature：	25 ℃	Relative Humidity：	56%
Pressure：	1012 hPa	Test Voltage ：	DC 12V
Test Mode ：	TX Frequency Band 2A (5250-5350MHz)		

Note: A(B) Represent the value of antenna A and B, The worst data is Antenna A, only shown Antenna A Plot.

Mode	Channel	Frequency (MHz)	99% bandwidth (MHz)	99% bandwidth (MHz)	26dB bandwidth (MHz)	26dB bandwidth (MHz)	Result
			Antenna A	Antenna B	Antenna A	Antenna B	
802.11a	CH52	5260	16.705	16.703	19.64	19.62	Pass
	CH56	5280	16.594	16.588	19.54	19.53	Pass
	CH64	5320	16.766	16.754	19.76	19.74	Pass
802.11 n20	CH52	5260	17.671	17.670	19.86	19.84	Pass
	CH56	5280	17.670	17.670	19.81	19.80	Pass
	CH64	5320	17.641	17.637	19.64	19.62	Pass
802.11 n40	CH 54	5270	35.902	35.901	39.60	39.60	Pass
	CH 62	5310	35.880	35.881	39.11	39.10	Pass
802.11 ac20	CH52	5260	17.616	17.615	19.50	19.51	Pass
	CH56	5280	17.645	17.644	19.59	19.56	Pass
	CH64	5320	17.594	17.593	19.71	19.70	Pass
802.11 ac40	CH 54	5270	35.946	35.941	38.99	38.98	Pass
	CH 62	5310	35.953	35.952	38.86	38.87	Pass
802.11 AC80	CH 58	5290	75.310	75.311	78.46	78.42	Pass