



RADIO TEST REPORT

Report No.: STS2008285W04

Issued for

Innowi Inc.

3240 Scott Blvd, Santa Clara, CA - 95054

Product Name:	CB_UWA6N4C_47
Brand Name:	Innowi
Model Name:	mBadge
Series Model:	N/A
FCC ID:	2AO2Y-IWCHTB101
Test Standard:	FCC Part 15.407

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TEST RESULT CERTIFICATION

Applicant's Name..... : Innowi Inc.
 Address : 3240 Scott Blvd, Santa Clara, CA - 95054
Manufacturer's Name : Innowi Inc.
 Address : 3240 Scott Blvd, Santa Clara, CA - 95054

Product Description

Product Name..... : CB_UWA6N4C_47
 Brand Name : Innowi
 Model Name : mBadge
 Series Model..... : N/A

Test Standards : FCC Part15.407

Test Procedure..... ANSI C63.10-2013

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

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Date of Test :
 Date of receipt of test item : 24 Aug. 2020
 Date (s) of performance of tests : 24 Aug. 2020 ~ 17 Sept. 2020
 Date of Issue..... : 18 Sept. 2020
 Test Result..... : **Pass**

Testing Engineer : 

 (Chris Chen)

Technical Manager : 

 (Sean she)

Authorized Signatory : 

 (Vita Li)





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Revision History

Rev.	Issue Date	Report NO.	Effect Page	Contents
00	18 Sept. 2020	STS2008285W04	ALL	Initial Issue





1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

§ 15.407, KDB 789033 D02 General U-NII Test Procedures New Rules v02r01

FCC Part 15.407		
FCC standard	Test Item	Results
15.207	AC Conducted Emission	PASS
15.407 (a) /15.407 (e)	26dB/6dB &99% Bandwidth	PASS
15.407(a)	Maximum Conducted Output Power	PASS
15.407(b)/15.205/15.209	Radiated Emission And (bandedge Emissions) Measurement	PASS
15.407(a)	Power Spectral Density	PASS
15.407(c)	Automatically Discontinue Transmission	PASS
15.203/15.204	Antenna Requirement	PASS

NOTE:

- (1) 'N/A' denotes test is not applicable in this Test Report.
- (2) All tests are according to ANSI C63.10-2013.



1.1 TEST FACTORY

SHENZHEN STS TEST SERVICES CO., LTD

Add. : A 1/F, Building B, Zhuoke Science Park, No.190 Chongqing Road, HepingShequ, Fuyong Sub-District, Bao'an District, Shenzhen, Guang Dong, China

FCC test Firm Registration Number: 625569

IC test Firm Registration Number: 12108A

A2LA Certificate No.: 4338.01

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded 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	RF output power, conducted	$\pm 0.68\text{dB}$
2	Unwanted Emissions, conducted	$\pm 2.988\text{dB}$
3	All emissions, radiated 30-1GHz	$\pm 5.6\text{dB}$
4	All emissions, radiated 1G-6GHz	$\pm 5.5\text{dB}$
5	All emissions, radiated >6G	$\pm 5.8\text{dB}$
6	Conducted Emission (9KHz-150KHz)	$\pm 3.37\text{dB}$
7	Conducted Emission (150KHz-30MHz)	$\pm 3.83\text{dB}$



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF THE EUT

Product Name	CB_UWA6N4C_47													
Trade Name	Innowi													
Model Name	mBadge													
Series Model	N/A													
Model Difference	N/A													
Product Description	The EUT is a CB_UWA6N4C_47													
	<table border="1"> <tr> <td rowspan="6">Operation Frequency:</td> <td>IEEE 802.11a/ n(HT20)/ac(VHT20): 5.180GHz-5.240GHz</td> </tr> <tr> <td>IEEE 802.11n(HT40)/ac(VHT40): 5.190GHz-5.230GHz</td> </tr> <tr> <td>IEEE 802.11ac(VHT80): 5.210GHz</td> </tr> <tr> <td>IEEE 802.11a/ n(HT20)/ac(VHT20): 5.260GHz-5.320GHz</td> </tr> <tr> <td>IEEE 802.11 n(HT40)/ac(VHT40): 5.270GHz-5.310GHz</td> </tr> <tr> <td>IEEE 802.11ac(VHT80): 5.290GHz</td> </tr> <tr> <td rowspan="3">IEEE 802.11a/ n(HT20)/ac(VHT20): 5.500GHz-5.700GHz</td> <td>IEEE 802.11 n(HT40)/ac(VHT40): 5.510GHz-5.670GHz</td> </tr> <tr> <td>IEEE 802.11ac(VHT80): 5.530GHz-5.610GHz</td> </tr> <tr> <td>IEEE 802.11a/ n(HT20)/ac(VHT20): 5.745GHz-5.825GHz</td> </tr> <tr> <td rowspan="3">IEEE 802.11a/ n(HT40)/ac(VHT40): 5.755GHz-5.795GHz</td> <td>IEEE 802.11ac(VHT80): 5.775GHz</td> </tr> </table>	Operation Frequency:	IEEE 802.11a/ n(HT20)/ac(VHT20): 5.180GHz-5.240GHz	IEEE 802.11n(HT40)/ac(VHT40): 5.190GHz-5.230GHz	IEEE 802.11ac(VHT80): 5.210GHz	IEEE 802.11a/ n(HT20)/ac(VHT20): 5.260GHz-5.320GHz	IEEE 802.11 n(HT40)/ac(VHT40): 5.270GHz-5.310GHz	IEEE 802.11ac(VHT80): 5.290GHz	IEEE 802.11a/ n(HT20)/ac(VHT20): 5.500GHz-5.700GHz	IEEE 802.11 n(HT40)/ac(VHT40): 5.510GHz-5.670GHz	IEEE 802.11ac(VHT80): 5.530GHz-5.610GHz	IEEE 802.11a/ n(HT20)/ac(VHT20): 5.745GHz-5.825GHz	IEEE 802.11a/ n(HT40)/ac(VHT40): 5.755GHz-5.795GHz	IEEE 802.11ac(VHT80): 5.775GHz
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	<table border="1"> <tr> <td rowspan="3">Modulation Type:</td> <td>802.11a(OFDM): BPSK,QPSK,16-QAM,64-QAM</td> </tr> <tr> <td>802.11n(OFDM): BPSK,QPSK,16-QAM,64-QAM</td> </tr> <tr> <td>802.11ac(OFDM): BPSK,QPSK,16-QAM,64-QAM,256-QAM</td> </tr> </table>	Modulation Type:	802.11a(OFDM): BPSK,QPSK,16-QAM,64-QAM	802.11n(OFDM): BPSK,QPSK,16-QAM,64-QAM	802.11ac(OFDM): BPSK,QPSK,16-QAM,64-QAM,256-QAM									
	Modulation Type:		802.11a(OFDM): BPSK,QPSK,16-QAM,64-QAM											
802.11n(OFDM): BPSK,QPSK,16-QAM,64-QAM														
802.11ac(OFDM): BPSK,QPSK,16-QAM,64-QAM,256-QAM														
Antenna Designation:	Please refer to the Note 3.													
Max.Output Power(Conducted):	16.68 dBm													
More details of EUT technical specification, please refer to the User Manual.														
Test Channel	Please refer to the Note 2.													
Adapter	Input: AC100-240V, 50-60Hz, 0.35A Output: DC 5V, 2A													
Battery	Rated Voltage: 3.85V Charge Limit: 4.4V Capacity: 3930mAh													
Hardware version number	R1.0													
Software version number	N/A													
Connecting I/O Port(s)	Please refer to the Note 1.													



Note

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

2.

Operation Frequency of channel			
5.180GHz-5.240GHz		5.500GHz-5.720GHz	
Channel	Frequency	Channel	Frequency
36	5180	100	5500
38	5190	102	5510
40	5200	104	5520
42	5210	106	5530
44	5220	108	5540
46	5230	110	5550
48	5240	112	5560
		116	5580
		118	5590
5.260GHz-5.320GHz			
Channel	Frequency	120	5600
52	5260	122	5610
54	5270	124	5620
56	5280	126	5630
58	5290	128	5640
60	5300	132	5660
62	5310	134	5670
64	5320	136	5680
		140	5700
5.745GHz-5.825GHz			
Channel	Frequency		
149	5745		
151	5755		
153	5765		
157	5785		
159	5795		
161	5805		
165	5825		

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Carrier Frequency Channel

For 802.11a/n(HT20)/ac(VHT20)			
Channel	Freq.(MHz)	Channel	Freq.(MHz)
36	5180	52	5260
40	5200	60	5300
48	5240	64	5320

For 802.11a/n(HT20)/ac(VHT20)			
Channel	Freq.(MHz)	Channel	Freq.(MHz)
100	5500	149	5745
116	5580	157	5785
140	5700	165	5825



For 802.11 n(HT40)/ac(VHT40)			
Channel	Freq.(MHz)	Channel	Freq.(MHz)
38	5190	54	5270
46	5230	62	5310

For 802.11 n(HT40)/ac(VHT40)			
Channel	Freq.(MHz)	Channel	Freq.(MHz)
102	5510	151	5755
110	5550	159	5795
134	5670		

For 802.11ac (VHT80)			
Channel	Freq.(MHz)	Channel	Freq.(MHz)
42	5210	58	5290

For 802.11ac (VHT80)			
Channel	Freq.(MHz)	Channel	Freq.(MHz)
106	5530	155	5775
122	5610		

3. KDB 662911 D01 Multiple Transmitter Output v02r01

2) Directional Gain Calculations for In-Band Measurements

a) Basic methodology with NANT transmit antennas, each with the same directional gain GANT dBi, being driven by NANT transmitter outputs of equal power. Directional gain is to be computed as follows:

- (i) If any transmit signals are correlated with each other,
Directional gain = GANT + 10 log(NANT) dBi
- (ii) If all transmit signals are completely uncorrelated with each other,
Directional gain = GANT

Antenna number: 2

Antenna A gain : -0.1dBi

Antenna B gain : -0.1dBi

GANT + 10 log(NANT) dBi

MIMO technology Directional gain=-0.1+10log2=2.91dBi

Ant	Brand	Model Name	Ant Type	Connector	Gain (dBi)	NOTE
A	Innowi	mBadge	Ant A: PCB Ant B: PIFA	N/A	Ant A: -0.1 Ant B: -0.1 MIMO: 2.91	WLAN Ant



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.

Worst Mode	Description	Data Rate
Mode 1	TX IEEE 802.11a HT20 CH36&CH40&CH48	6 Mbps
Mode 2	TX IEEE 802.11a HT20 CH52&CH60&CH64	6 Mbps
Mode 3	TX IEEE 802.11a HT20 CH100&CH116&CH140	6 Mbps
Mode 4	TX IEEE 802.11a HT20 CH149&CH157&CH165	6 Mbps
Mode 5	TX IEEE 802.11n HT20 CH36&CH40&CH48	MCS 0
Mode 6	TX IEEE 802.11ac HT20 CH36&CH40&CH48	NSS1 MCS0
Mode 7	TX IEEE 802.11n HT20 CH52&CH60&CH64	MCS 0
Mode 8	TX IEEE 802.11ac HT20 CH52&CH60&CH64	NSS1 MCS0
Mode 9	TX IEEE 802.11n HT20 CH100&CH116&CH140	MCS 0
Mode 10	TX IEEE 802.11ac HT20 CH100&CH116&CH140	NSS1 MCS0
Mode 11	TX IEEE 802.11n HT20 CH149&CH157&CH165	MCS 0
Mode 12	TX IEEE 802.11ac HT20 CH149&CH157&CH165	NSS1 MCS0
Mode 13	TX IEEE 802.11n HT40 CH38&CH46	MCS 0
Mode 14	TX IEEE 802.11ac HT40 CH38&CH46	NSS1 MCS0
Mode 15	TX IEEE 802.11n HT40 CH54 &CH62	MCS 0
Mode 16	TX IEEE 802.11ac HT40 CH54 &CH62	NSS1 MCS0
Mode 17	TX IEEE 802.11n HT40 CH102&CH110&CH134	MCS 0
Mode 18	TX IEEE 802.11ac HT40 CH102&CH110&CH134	NSS1 MCS0
Mode 19	TX IEEE 802.11n HT40 CH151&CH159	MCS 0
Mode 20	TX IEEE 802.11ac HT40 CH151&CH159	NSS1 MCS0
Mode 21	TX IEEE 802.11ac HT80 CH42	NSS1 MCS0
Mode 22	TX IEEE 802.11ac HT80 CH58	NSS1 MCS0
Mode 23	TX IEEE 802.11ac HT80 CH106&122	NSS1 MCS0
Mode 24	TX IEEE 802.11ac HT80 CH155	NSS1 MCS0

- 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.
(3) We have be tested for all avaiable U.S. voltage and frequencies(For 120V,50/60Hz and 240V, 50/60Hz) for which the device is capable of operation.
(4) The battery is fully-charged during the radited and RF conducted test.



AC Conducted Emission

Test Case	
AC Conducted Emission	Mode 25: Keeping TX

2.3 TEST SOFTWARE AND POWER LEVEL

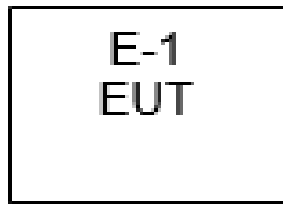
During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level.

RF Function	Type	Mode Or Modulation type	Ant Gain(dBi)	Ant_A Power Class	Ant_B Power Class	Software For Testing
WIFI(5G)	5G WIFI Band1 (5150MHz-5250MHz)	802.11a	Ant A: -0.1 Ant B: -0.1 MIMO: 2.91	13	13	QRCT4
		802.11n(HT20)		13	13	
		802.11n(HT40)		13	13	
		802.11ac(VHT20)		13	13	
		802.11ac(VHT40)		13	13	
		802.11ac(VHT80)		5	5	
WIFI(5G)	5G WIFI Band2 (5250MHz-5350MHz)	802.11a	Ant A: -0.1 Ant B: -0.1 MIMO: 2.91	13	13	QRCT4
		802.11n(HT20)		13	13	
		802.11n(HT40)		13	13	
		802.11ac(VHT20)		13	13	
		802.11ac(VHT40)		13	13	
		802.11ac(VHT80)		5	5	
WIFI(5G)	5G WIFI Band3 (5470MHz-5725MHz)	802.11a	Ant A: -0.1 Ant B: -0.1 MIMO: 2.91	13	13	QRCT4
		802.11n(HT20)		13	13	
		802.11n(HT40)		13	13	
		802.11ac(VHT20)		13	13	
		802.11ac(VHT40)		13	13	
		802.11ac(VHT80)		5	5	

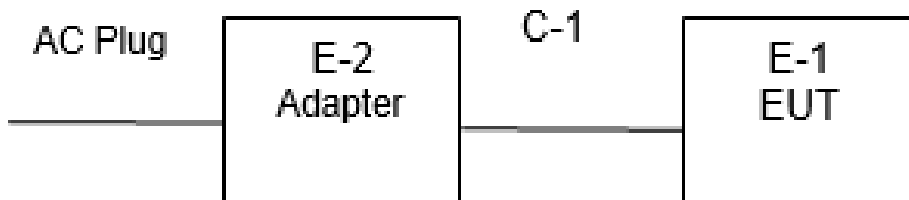
RF Function	Type	Mode Or Modulation type	Ant Gain(dBi)	Ant_A Power Class	Ant_B Power Class	Software For Testing
WIFI(5G)	5G WIFI Band4 (5725MHz-5875MHz)	802.11a	Ant A: -0.1 Ant B: -0.1 MIMO: 2.91	13	13	QRCT4
		802.11n(HT20)		13	13	
		802.11n(HT40)		13	13	
		802.11ac(VHT20)		13	13	
		802.11ac(VHT40)		13	13	
		802.11ac(VHT80)		5	5	

2.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Radiated Spurious Emission Test



Conducted Emission Test





2.5 DESCRIPTION OF NECESSARY ACCESSORIES AND SUPPORT UNITS

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.

Necessary accessories

Item	Equipment	Mfr/Brand	Model/Type No.	Length	Note
E-2	Adapter	N/A	JHD-AP013U-050200BB-B	N/A	N/A
C-1	DC Cable	N/A	N/A	150cm	N/A

Support units

Item	Equipment	Mfr/Brand	Model/Type No.	Length	Note
N/A	N/A	N/A	N/A	N/A	N/A

Note:

- (1) For detachable type I/O cable should be specified the length in cm in 『Length』 column.



2.6 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Test Receiver	R&S	ESCI	101427	2019.10.09	2020.10.08
Signal Analyzer	Agilent	N9020A	MY51110105	2020.03.05	2021.03.04
Active loop Antenna	ZHINAN	ZN30900C	16035	2018.03.11	2021.03.10
Bilog Antenna	TESEQ	CBL6111D	34678	2017.11.02	2020.11.01
Horn Antenna	SCHWARZBECK	BBHA 9120D(1201)	9120D-1343	2018.10.19	2021.10.18
SHF-EHF Horn Antenna (18G-40GHz)	A-INFO	LB-180400-KF	J211020657	2018.03.11	2021.03.10
Pre-Amplifier (0.1M-3GHz)	EM	EM330	060665	2019.10.09	2020.10.08
Pre-Amplifier (1G-18GHz)	SKET	LNPA-01018G-45	SK2018080901	2019.10.12	2020.10.11
Pre-Amplifier (18G-40GHz)	SKET	LNPA-1840-50	SK2018101801	2019.10.12	2020.10.11
Temperature & Humidity	HH660	Mieo	N/A	2019.10.17	2020.10.16
turn table	EM	SC100_1	60531	N/A	N/A
Antenna mast	EM	SC100	N/A	N/A	N/A
Test SW	FARAD	EZ-EMC(Ver.STSLAB-03A1 RE)			

Conduction Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Test Receiver	R&S	ESCI	101427	2019.10.09	2020.10.08
LISN	R&S	ENV216	101242	2019.10.09	2020.10.08
LISN	EMCO	3810/2NM	23625	2019.10.09	2020.10.08
Temperature & Humidity	HH660	Mieo	N/A	2019.10.12	2020.10.11
Test SW	FARAD	EZ-EMC(Ver.STSLAB-03A1 CE)			

RF Connected Test

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
USB RF power sensor	DARE	RPR3006W	15I00041SNO03	2019.10.09	2020.10.08
Signal Analyzer	Agilent	N9020A	MY49100060	2019.10.09	2020.10.08
Temperature & Humidity	HH660	Mieo	N/A	2019.10.12	2020.10.11
Test SW	FARAD	LZ-RF /LzRf-3A3			



3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class B (dBuV)		Standard
	Quasi-peak	Average	
0.15 -0.5	66 - 56 *	56 - 46 *	CISPR
0.50 -5.0	56.00	46.00	CISPR
5.0 -30.0	60.00	50.00	CISPR

0.15 -0.5	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	56.00	46.00	FCC
5.0 -30.0	60.00	50.00	FCC

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of “ * ” marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

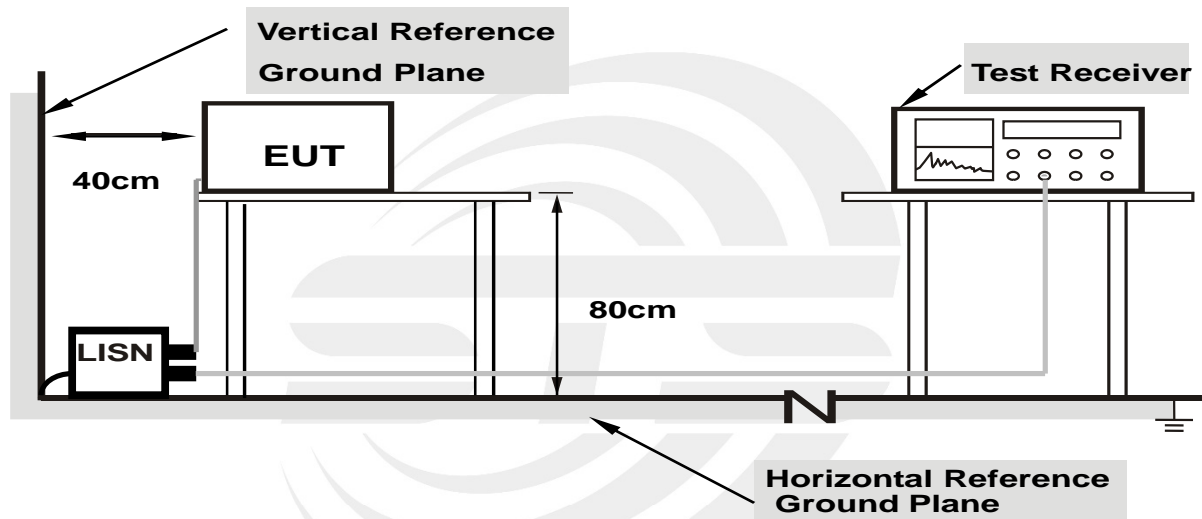
3.1.2 TEST PROCEDURE

- a. The EUT is 0.8 m from the horizontal ground plane and 0.4 m from the vertical ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments are powered from additional LISN(s). The LISN provides 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. 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 40 cm long.
- c. 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.
- d. LISN is at least 80 cm from the nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 DEVIATION FROM TEST STANDARD

No deviation

3.1.4 TEST SETUP



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

3.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.



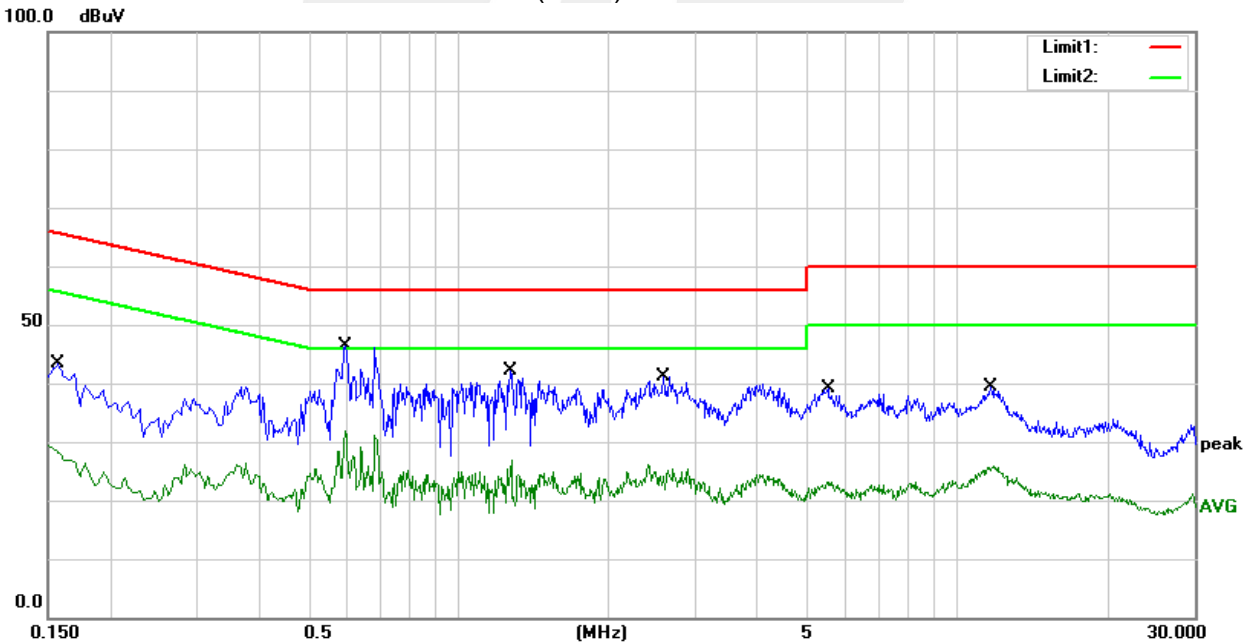
3.1.6 TEST RESULTS

Temperature:	26.9(C)	Relative Humidity:	69%RH
Test Voltage:	AC 120V/60Hz	Phase:	L
Test Mode :	Mode 25		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1580	23.21	20.21	43.42	65.57	-22.15	QP
2	0.1580	8.53	20.21	28.74	55.57	-26.83	AVG
3	0.5940	26.11	20.35	46.46	56.00	-9.54	QP
4	0.5940	11.42	20.35	31.77	46.00	-14.23	AVG
5	1.2700	21.86	20.16	42.02	56.00	-13.98	QP
6	1.2700	6.65	20.16	26.81	46.00	-19.19	AVG
7	2.5860	21.08	20.11	41.19	56.00	-14.81	QP
8	2.5860	5.31	20.11	25.42	46.00	-20.58	AVG
9	5.5220	19.22	19.97	39.19	60.00	-20.81	QP
10	5.5220	3.11	19.97	23.08	50.00	-26.92	AVG
11	11.7420	19.43	19.90	39.33	60.00	-20.67	QP
12	11.7420	5.98	19.90	25.88	50.00	-24.12	AVG

Remark:

1. All readings are Quasi-Peak and Average values
2. Margin = Result (Result =Reading + Factor)–Limit
3. Factor=LISN factor+Cable loss+Limiter (10dB)



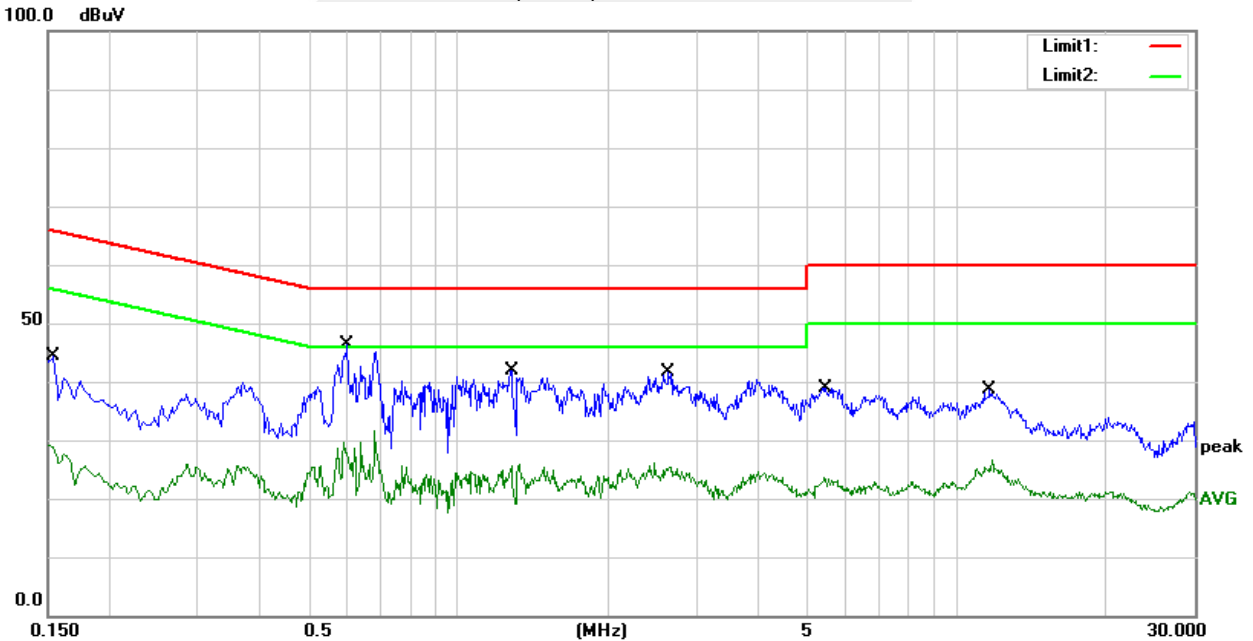


Temperature:	26.9(C)	Relative Humidity:	69%RH
Test Voltage	AC 120V/60Hz	Phase:	N
Test Mode	Mode 25		

No.	Frequency (MHz)	Reading (dBUV)	Correct Factor(dB)	Result (dBUV)	Limit (dBUV)	Margin (dB)	Remark
1	0.1540	24.08	20.20	44.28	65.78	-21.50	QP
2	0.1540	8.80	20.20	29.00	55.78	-26.78	AVG
3	0.5980	25.94	20.35	46.29	56.00	-9.71	QP
4	0.5980	9.20	20.35	29.55	46.00	-16.45	AVG
5	1.2780	21.73	20.16	41.89	56.00	-14.11	QP
6	1.2780	5.67	20.16	25.83	46.00	-20.17	AVG
7	2.6380	21.54	20.11	41.65	56.00	-14.35	QP
8	2.6380	5.28	20.11	25.39	46.00	-20.61	AVG
9	5.4620	19.01	19.98	38.99	60.00	-21.01	QP
10	5.4620	3.66	19.98	23.64	50.00	-26.36	AVG
11	11.6260	18.80	19.90	38.70	60.00	-21.30	QP
12	11.6260	6.61	19.90	26.51	50.00	-23.49	AVG

Remark:

1. All readings are Quasi-Peak and Average values
2. Margin = Result (Result =Reading + Factor) –Limit
3. Factor=LISN factor+Cable loss+Limiter (10dB)



3.2 RADIATED EMISSION AND (BANDEDGE) MEASUREMENT

3.2.1 RADIATED EMISSION LIMITS (Frequency Range 9kHz-1000MHz)

In case the emission fall within the restricted band specified on 15.407(b)7&15.205/209(a), then the limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Class B (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	68.2	54

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15E.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

LIMITS OF RESTRICTED FREQUENCY BANDS

FREQUENCY (MHz)	FREQUENCY (MHz)	FREQUENCY (MHz)	FREQUENCY (GHz)
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
0.495-0.505	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	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	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	Above 38.6
13.36-13.41			

Note: In case the emission radiated emission above 1000MHz fall within the restricted band the restricted frequency bands, the peak limit is 74 dBuV/m.



LIMITS OF EMISSIONS OUTSIDE OF THE FREQUENCY BANDS

Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

- (1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (4) For transmitters operating in the 5.725-5.85 GHz band:
 - (i) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Note: dBuV/m(at 3M) = EIRP(dBm) + 95.3.

Peak Limit = -27dBm/MHz + 95.3 = 68.3 dBuV/m.

Spectrum Parameter	Setting
Attenuation	Auto
Detector	Peak
Start Frequency	1000 MHz(Peak/AV)
Stop Frequency	10th carrier harmonic(Peak/AV)
RB / VB (emission in restricted band)	1 MHz / 1 MHz, AV=1 MHz /3 MHz

For Band edge

Spectrum Parameter	Setting
Detector	Peak
RB / VB (emission in restricted band)	1 MHz / 1 MHz, AV=1 MHz /3 MHz

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~90kHz / RB 200Hz for PK & AV
Start ~ Stop Frequency	90kHz~110kHz / RB 200Hz for QP
Start ~ Stop Frequency	110kHz~490kHz / RB 200Hz for PK & AV
Start ~ Stop Frequency	490kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP



3.2.2 TEST PROCEDURE

- a. The measuring distance at 3 m shall be used for measurements at frequency 0.009MHz up to 1GHz, and above 1GHz.
- b. The EUT was placed on the top of a rotating table 0.8 m (above 1GHz is 1.5 m) above the ground at a 3 m anechoic chamber test site. The table was rotated 360 degree to determine the position of the highest radiation.
- c. The height of the equipment shall be 0.8 m (above 1GHz is 1.5 m); the height of the test antenna shall vary between 1 m to 4 m. Horizontal and vertical polarization 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 QuasiPeak detector mode will be re-measured.
- e. If the Peak Mode measured value is compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and no additional QP Mode measurement was 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.

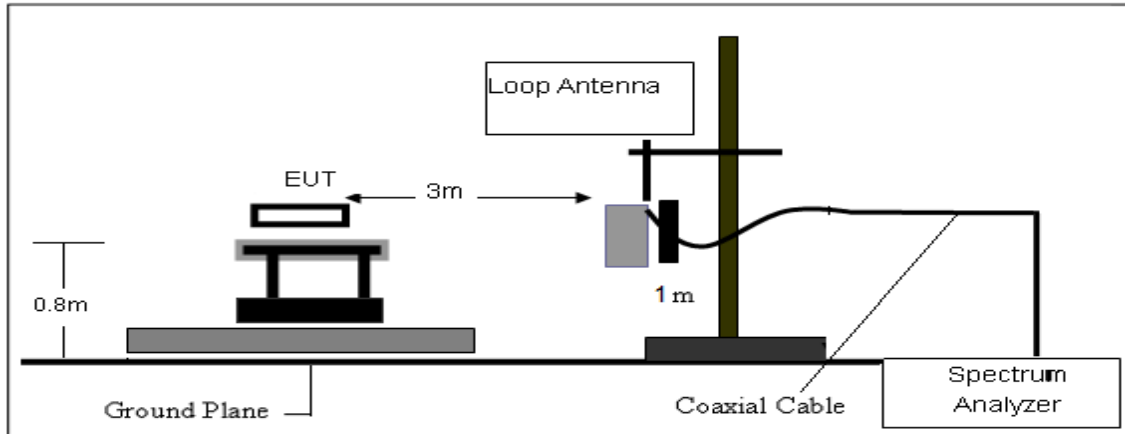
3.2.2 DEVIATION FROM TEST STANDARD

No deviation

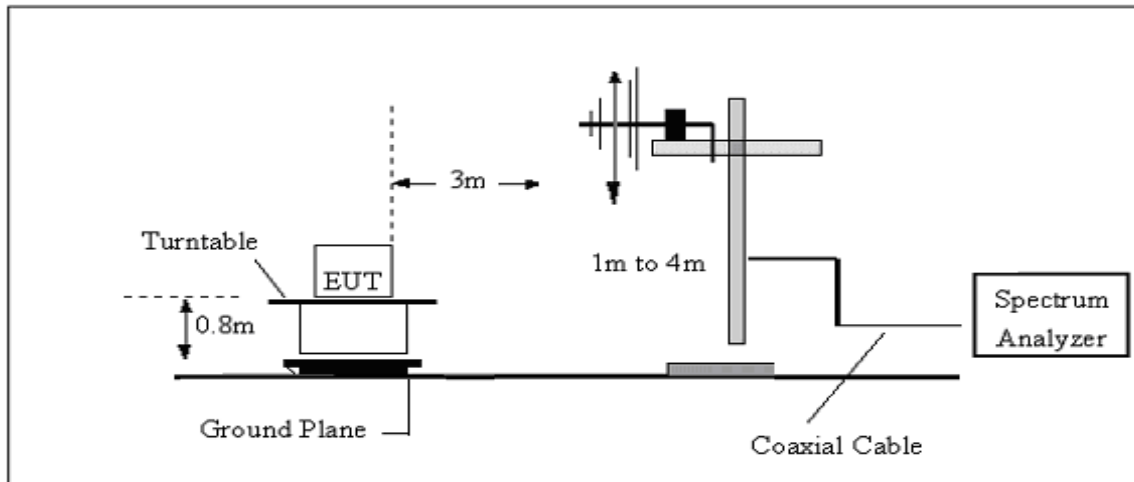


3.2.3 TEST SETUP

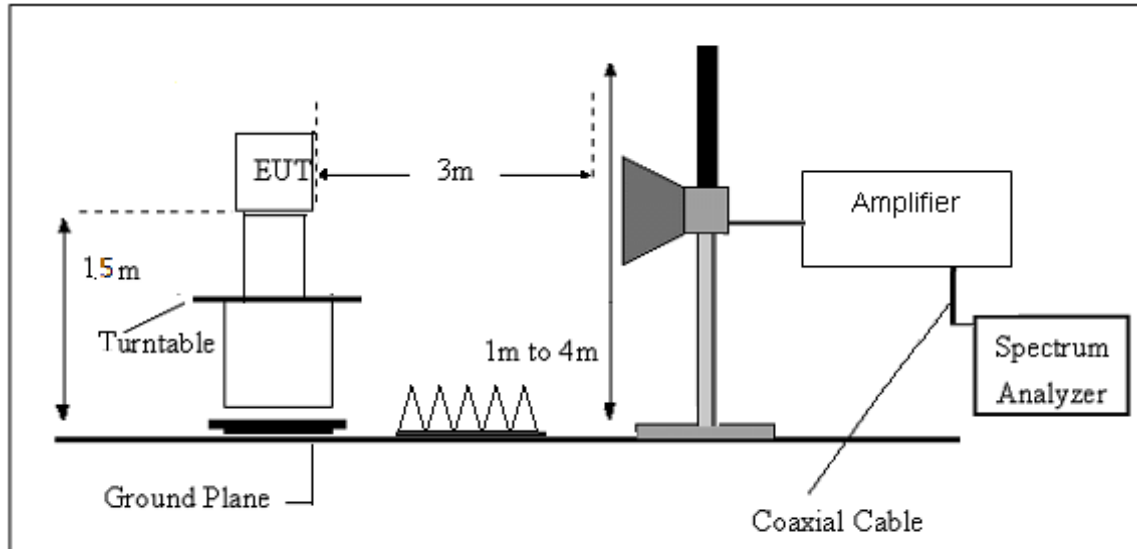
(A) Radiated Emission Test-Up Frequency Below 30MHz



(B) Radiated Emission Test-Up Frequency 30MHz~1GHz



(C) Radiated Emission Test-Up Frequency Above 1GHz





3.2.4 EUT OPERATING 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.

3.2.5 FIELD STRENGTH CALCULATION

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where

FS = Field Strength

CL = Cable Attenuation Factor (Cable Loss)

RA = Reading Amplitude

AG = Amplifier Gain

AF = Antenna Factor

For example

Frequency (MHz)	FS (dB μ V/m)	RA (dB μ V/m)	AF (dB)	CL (dB)	AG (dB)	Factor (dB)
300	40	58.1	12.2	1.6	31.9	-18.1

$$\text{Factor} = \text{AF} + \text{CL} - \text{AG}$$

**3.2.6 TEST RESULTS (Between 9KHz – 30 MHz)**

Temperature:	23.2(C)	Relative Humidity:	61%RH
Test Voltage:	DC 3.85V	Polarization :	--
Test Mode:	TX Mode		

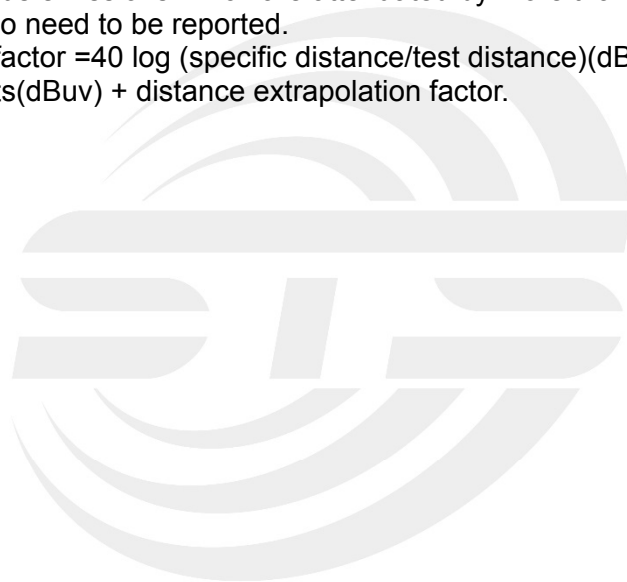
Freq. (MHz)	Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	State P/F
--	--	--	--	PASS
--	--	--	--	PASS

Note:

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

Distance extrapolation factor = $40 \log(\text{specific distance}/\text{test distance})$ (dB);

Limit line = specific limits(dBuV) + distance extrapolation factor.





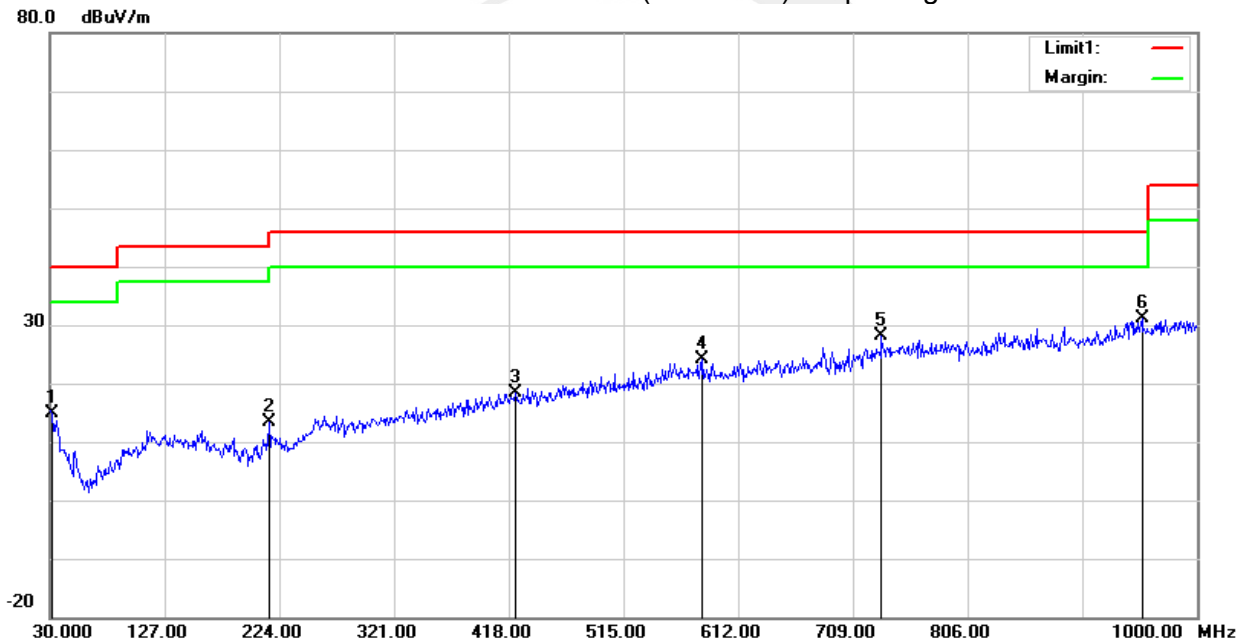
3.2.7 TEST RESULTS (Between 30MHz – 1GHz)

Temperature	23.2(C)	Relative Humidity:	61%RH
Test Voltage	DC 3.85V	Polarization:	Horizontal
Test Mode	Mode 1~24(Mode 17 worst mode)		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	31.9400	28.63	-13.86	14.77	40.00	-25.23	QP
2	215.2700	33.45	-20.17	13.28	43.50	-30.22	QP
3	423.8200	28.50	-10.11	18.39	46.00	-27.61	QP
4	581.9300	29.93	-5.78	24.15	46.00	-21.85	QP
5	733.2500	30.51	-2.35	28.16	46.00	-17.84	QP
6	953.4400	29.36	1.65	31.01	46.00	-14.99	QP

Remark:

1. Margin = Result (Result =Reading + Factor)–Limit
2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain



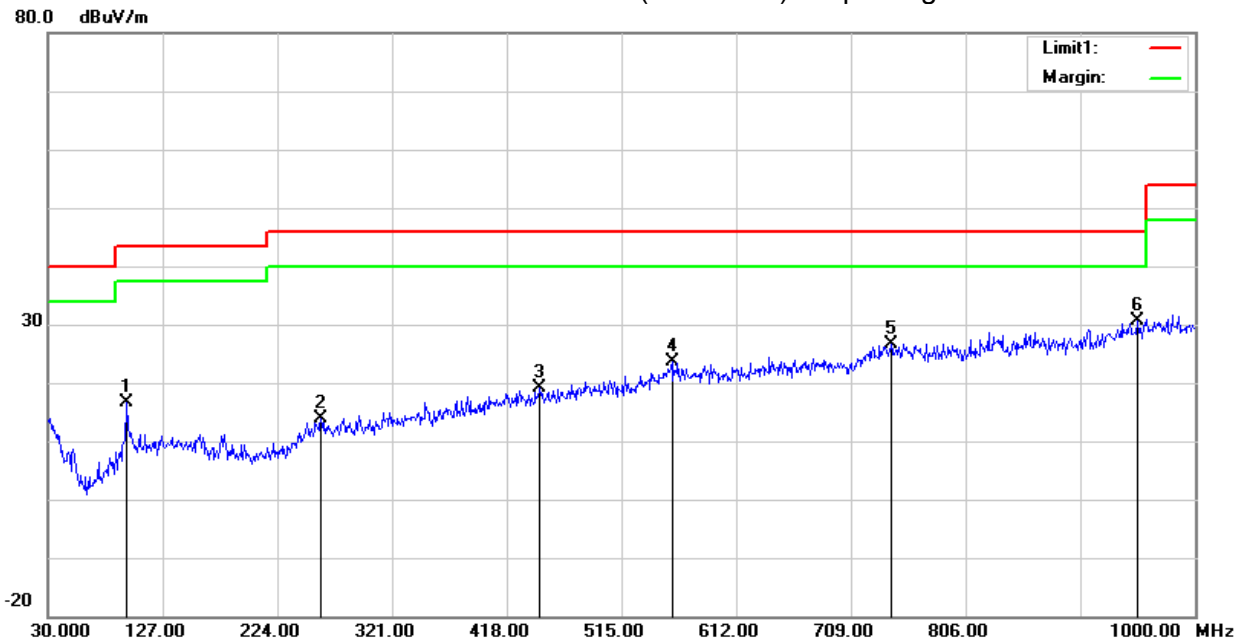


Temperature	23.2(C)	Relative Humidity:	61%RH
Test Voltage	DC 3.85V	Polarization:	Vertical
Test Mode	Mode 1~24(Mode 17 worst mode)		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	96.9300	37.09	-20.57	16.52	43.50	-26.98	QP
2	260.8600	28.69	-14.78	13.91	46.00	-32.09	QP
3	446.1300	29.01	-9.83	19.18	46.00	-26.82	QP
4	557.6800	29.22	-5.55	23.67	46.00	-22.33	QP
5	742.9500	28.83	-2.13	26.70	46.00	-19.30	QP
6	951.5000	29.05	1.62	30.67	46.00	-15.33	QP

Remark:

- Margin = Result (Result =Reading + Factor) –Limit
- Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain





3.2.8 TEST RESULTS (Above 1000 MHz)

Band I 5150-5250MHz

Frequency (MHz)	Reading (dBuV)	Amplifier (dB)	Loss (dB)	Antenna Factor (dB/m)	Orrected Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Comment
Low Channel (802.11n (HT-40)/ 5190 MHz)										
3254.41	44.50	44.70	6.70	28.20	-9.80	34.70	68.20	-33.50	Pk	Vertical
3254.41	41.84	44.70	6.70	28.20	-9.80	32.04	54.00	-21.96	AV	Vertical
3265.21	45.00	44.70	6.70	28.20	-9.80	35.20	68.20	-33.00	Pk	Horizontal
3265.21	40.82	44.70	6.70	28.20	-9.80	31.02	54.00	-22.98	AV	Horizontal
3988.30	40.12	44.20	7.90	29.70	-6.60	33.52	68.20	-34.68	Pk	Vertical
3988.30	35.90	44.20	7.90	29.70	-6.60	29.30	54.00	-24.70	AV	Vertical
3989.40	39.18	44.20	7.90	29.70	-6.60	32.58	68.20	-35.62	Pk	Horizontal
3989.40	37.01	44.20	7.90	29.70	-6.60	30.41	54.00	-23.59	AV	Horizontal
7233.45	37.19	43.50	11.40	35.50	3.40	40.59	68.20	-27.61	Pk	Vertical
7233.45	33.55	43.50	11.40	35.50	3.40	36.95	54.00	-17.05	AV	Vertical
7223.24	37.11	43.50	11.40	35.50	3.40	40.51	68.20	-27.69	Pk	Horizontal
7223.24	34.81	43.50	11.40	35.50	3.40	38.21	54.00	-15.79	AV	Horizontal
10360.26	39.32	44.50	13.80	38.80	8.10	47.42	68.20	-20.78	Pk	Vertical
10360.26	37.05	44.50	13.80	38.80	8.10	45.15	54.00	-8.85	AV	Vertical
10360.26	39.57	44.50	13.80	38.80	8.10	47.67	68.20	-20.53	Pk	Horizontal
10360.26	35.79	44.50	13.80	38.80	8.10	43.89	54.00	-10.11	AV	Horizontal
11027.95	32.74	43.60	14.30	39.50	10.20	42.94	68.20	-25.26	Pk	Vertical
11027.95	30.62	43.60	14.30	39.50	10.20	40.82	54.00	-13.18	AV	Vertical
11030.13	33.49	43.60	14.30	39.50	10.20	43.69	68.20	-24.51	Pk	Horizontal
11030.13	31.17	43.60	14.30	39.50	10.20	41.37	54.00	-12.63	AV	Horizontal
13281.02	32.26	42.60	15.90	38.90	12.20	44.46	68.20	-23.74	Pk	Vertical
13281.02	29.65	42.60	15.90	38.90	12.20	41.85	54.00	-12.15	AV	Vertical
13291.70	32.96	42.60	15.90	38.90	12.20	45.16	68.20	-23.04	Pk	Horizontal
13291.70	29.21	42.60	15.90	38.90	12.20	41.41	54.00	-12.59	AV	Horizontal
High Channel (802.11n (HT-40)/ 5230 MHz)										
3246.92	44.15	44.70	6.70	28.20	-9.80	34.35	68.20	-33.85	Pk	Vertical
3246.92	40.97	44.70	6.70	28.20	-9.80	31.17	54.00	-22.83	AV	Vertical
3252.24	44.45	44.70	6.70	28.20	-9.80	34.65	68.20	-33.55	Pk	Horizontal
3252.24	41.47	44.70	6.70	28.20	-9.80	31.67	54.00	-22.33	AV	Horizontal
3983.08	39.10	44.20	7.90	29.70	-6.60	32.50	68.20	-35.70	Pk	Vertical
3983.08	37.06	44.20	7.90	29.70	-6.60	30.46	54.00	-23.54	AV	Vertical
3989.21	38.71	44.20	7.90	29.70	-6.60	32.11	68.20	-36.09	Pk	Horizontal
3989.21	35.88	44.20	7.90	29.70	-6.60	29.28	54.00	-24.72	AV	Horizontal
7217.32	37.38	43.50	11.40	35.50	3.40	40.78	68.20	-27.42	Pk	Vertical
7217.32	33.62	43.50	11.40	35.50	3.40	37.02	54.00	-16.98	AV	Vertical
7222.21	36.86	43.50	11.40	35.50	3.40	40.26	68.20	-27.94	Pk	Horizontal
7222.21	33.92	43.50	11.40	35.50	3.40	37.32	54.00	-16.68	AV	Horizontal
10480.23	38.96	44.50	13.80	38.80	8.10	47.06	68.20	-21.14	Pk	Vertical
10480.23	36.29	44.50	13.80	38.80	8.10	44.39	54.00	-9.61	AV	Vertical
10480.37	39.21	44.50	13.80	38.80	8.10	47.31	68.20	-20.89	Pk	Horizontal
10480.37	35.93	44.50	13.80	38.80	8.10	44.03	54.00	-9.97	AV	Horizontal
11029.24	33.59	43.60	14.30	39.50	10.20	43.79	68.20	-24.41	Pk	Vertical
11029.24	29.69	43.60	14.30	39.50	10.20	39.89	54.00	-14.11	AV	Vertical
11027.99	33.66	43.60	14.30	39.50	10.20	43.86	68.20	-24.34	Pk	Horizontal
11027.99	30.86	43.60	14.30	39.50	10.20	41.06	54.00	-12.94	AV	Horizontal
13291.63	32.84	42.60	15.90	38.90	12.20	45.04	68.20	-23.16	Pk	Vertical
13291.63	29.83	42.60	15.90	38.90	12.20	42.03	54.00	-11.97	AV	Vertical
13294.35	31.64	42.60	15.90	38.90	12.20	43.84	68.20	-24.36	Pk	Horizontal
13294.35	29.38	42.60	15.90	38.90	12.20	41.58	54.00	-12.42	AV	Horizontal

Remark: 1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

2. Scan with 802.11a,802.11n (HT-20),802.11n (HT-40), 802.11ac (VHT-20),802.11ac (VHT-40), 802.11ac (VHT-80) the worst case is 802.11n (HT-40).

3. The frequency emission of peak points that did not show above the forms are at least 20dB below the limit, the frequency emission is mainly from the environment noise.

4. Pre-scan both the SISO and MIMO mode, only the worst-case results were reported.



Band II 5250-5350MHz

Frequency (MHz)	Reading	Amplifier	Loss	Antenna Factor	Orrected Factor	Emission Level	Limit (dBuV/m)	Margin	Detector	Comment
	(dBuV)	(dB)	(dB)	(dB/m)	(dB)	(dBuV/m)		(dB)		
Low Channel (802.11n (HT-20) 5260 MHz)										
3250.87	44.21	44.70	6.70	28.20	-9.80	34.41	68.20	-33.79	Pk	Vertical
3250.87	42.05	44.70	6.70	28.20	-9.80	32.25	54.00	-21.75	AV	Vertical
3257.44	43.95	44.70	6.70	28.20	-9.80	34.15	68.20	-34.05	Pk	Horizontal
3257.44	42.19	44.70	6.70	28.20	-9.80	32.39	54.00	-21.61	AV	Horizontal
3987.14	39.25	44.20	7.90	29.70	-6.60	32.65	68.20	-35.55	Pk	Vertical
3987.14	35.82	44.20	7.90	29.70	-6.60	29.22	54.00	-24.78	AV	Vertical
3999.96	38.92	44.20	7.90	29.70	-6.60	32.32	68.20	-35.88	Pk	Horizontal
3999.96	36.57	44.20	7.90	29.70	-6.60	29.97	54.00	-24.03	AV	Horizontal
7231.83	36.72	43.50	11.40	35.50	3.40	40.12	68.20	-28.08	Pk	Vertical
7231.83	34.25	43.50	11.40	35.50	3.40	37.65	54.00	-16.35	AV	Vertical
7224.56	37.52	43.50	11.40	35.50	3.40	40.92	68.20	-27.28	Pk	Horizontal
7224.56	33.65	43.50	11.40	35.50	3.40	37.05	54.00	-16.95	AV	Horizontal
10360.38	38.85	44.50	13.80	38.80	8.10	46.95	68.20	-21.25	Pk	Vertical
10360.38	35.75	44.50	13.80	38.80	8.10	43.85	54.00	-10.15	AV	Vertical
10360.17	40.00	44.50	13.80	38.80	8.10	48.10	68.20	-20.10	Pk	Horizontal
10360.17	36.40	44.50	13.80	38.80	8.10	44.50	54.00	-9.50	AV	Horizontal
11030.88	33.00	43.60	14.30	39.50	10.20	43.20	68.20	-25.00	Pk	Vertical
11030.88	29.97	43.60	14.30	39.50	10.20	40.17	54.00	-13.83	AV	Vertical
11035.08	32.86	43.60	14.30	39.50	10.20	43.06	68.20	-25.14	Pk	Horizontal
11035.08	29.92	43.60	14.30	39.50	10.20	40.12	54.00	-13.88	AV	Horizontal
13282.44	32.91	42.60	15.90	38.90	12.20	45.11	68.20	-23.09	Pk	Vertical
13282.44	28.71	42.60	15.90	38.90	12.20	40.91	54.00	-13.09	AV	Vertical
13299.90	32.49	42.60	15.90	38.90	12.20	44.69	68.20	-23.51	Pk	Horizontal
13299.90	29.71	42.60	15.90	38.90	12.20	41.91	54.00	-12.09	AV	Horizontal
Mid Channel (802.11n (HT-20)/ 5300 MHz)										
3251.47	43.84	44.70	6.70	28.20	-9.80	34.04	68.20	-34.16	Pk	Vertical
3251.47	41.43	44.70	6.70	28.20	-9.80	31.63	54.00	-22.37	AV	Vertical
3256.54	44.96	44.70	6.70	28.20	-9.80	35.16	68.20	-33.04	Pk	Horizontal
3256.54	41.46	44.70	6.70	28.20	-9.80	31.66	54.00	-22.34	AV	Horizontal
3995.12	39.98	44.20	7.90	29.70	-6.60	33.38	68.20	-34.82	Pk	Vertical
3995.12	35.70	44.20	7.90	29.70	-6.60	29.10	54.00	-24.90	AV	Vertical
3981.20	38.91	44.20	7.90	29.70	-6.60	32.31	68.20	-35.89	Pk	Horizontal
3981.20	37.09	44.20	7.90	29.70	-6.60	30.49	54.00	-23.51	AV	Horizontal
7226.46	37.33	43.50	11.40	35.50	3.40	40.73	68.20	-27.47	Pk	Vertical
7226.46	33.93	43.50	11.40	35.50	3.40	37.33	54.00	-16.67	AV	Vertical
7236.04	36.95	43.50	11.40	35.50	3.40	40.35	68.20	-27.85	Pk	Horizontal
7236.04	33.92	43.50	11.40	35.50	3.40	37.32	54.00	-16.68	AV	Horizontal
10400.18	40.02	44.50	13.80	38.80	8.10	48.12	68.20	-20.08	Pk	Vertical
10400.18	36.35	44.50	13.80	38.80	8.10	44.45	54.00	-9.55	AV	Vertical
10399.99	39.46	44.50	13.80	38.80	8.10	47.56	68.20	-20.64	Pk	Horizontal
10399.99	35.94	44.50	13.80	38.80	8.10	44.04	54.00	-9.96	AV	Horizontal
11033.49	33.46	43.60	14.30	39.50	10.20	43.66	68.20	-24.54	Pk	Vertical
11033.49	29.88	43.60	14.30	39.50	10.20	40.08	54.00	-13.92	AV	Vertical
11029.62	33.66	43.60	14.30	39.50	10.20	43.86	68.20	-24.34	Pk	Horizontal
11029.62	30.68	43.60	14.30	39.50	10.20	40.88	54.00	-13.12	AV	Horizontal
13281.42	32.45	42.60	15.90	38.90	12.20	44.65	68.20	-23.55	Pk	Vertical
13281.42	29.91	42.60	15.90	38.90	12.20	42.11	54.00	-11.89	AV	Vertical
13289.26	31.69	42.60	15.90	38.90	12.20	43.89	68.20	-24.31	Pk	Horizontal
13289.26	29.97	42.60	15.90	38.90	12.20	42.17	54.00	-11.83	AV	Horizontal



High Channel (802.11n (HT-20)/ 5320 MHz)										
3252.40	44.57	44.70	6.70	28.20	-9.80	34.77	68.20	-33.43	Pk	Vertical
3252.40	41.34	44.70	6.70	28.20	-9.80	31.54	54.00	-22.46	AV	Vertical
3259.85	44.01	44.70	6.70	28.20	-9.80	34.21	68.20	-33.99	Pk	Horizontal
3259.85	42.24	44.70	6.70	28.20	-9.80	32.44	54.00	-21.56	AV	Horizontal
3990.34	39.58	44.20	7.90	29.70	-6.60	32.98	68.20	-35.22	Pk	Vertical
3990.34	35.70	44.20	7.90	29.70	-6.60	29.10	54.00	-24.90	AV	Vertical
3991.64	38.83	44.20	7.90	29.70	-6.60	32.23	68.20	-35.97	Pk	Horizontal
3991.64	36.60	44.20	7.90	29.70	-6.60	30.00	54.00	-24.00	AV	Horizontal
7235.44	37.66	43.50	11.40	35.50	3.40	41.06	68.20	-27.14	Pk	Vertical
7235.44	34.74	43.50	11.40	35.50	3.40	38.14	54.00	-15.86	AV	Vertical
7231.42	37.30	43.50	11.40	35.50	3.40	40.70	68.20	-27.50	Pk	Horizontal
7231.42	33.58	43.50	11.40	35.50	3.40	36.98	54.00	-17.02	AV	Horizontal
10480.07	39.31	44.50	13.80	38.80	8.10	47.41	68.20	-20.79	Pk	Vertical
10480.07	36.74	44.50	13.80	38.80	8.10	44.84	54.00	-9.16	AV	Vertical
10480.11	38.95	44.50	13.80	38.80	8.10	47.05	68.20	-21.15	Pk	Horizontal
10480.11	36.21	44.50	13.80	38.80	8.10	44.31	54.00	-9.69	AV	Horizontal
11025.30	33.00	43.60	14.30	39.50	10.20	43.20	68.20	-25.00	Pk	Vertical
11025.30	30.05	43.60	14.30	39.50	10.20	40.25	54.00	-13.75	AV	Vertical
11035.45	32.98	43.60	14.30	39.50	10.20	43.18	68.20	-25.02	Pk	Horizontal
11035.45	30.76	43.60	14.30	39.50	10.20	40.96	54.00	-13.04	AV	Horizontal
13296.26	32.80	42.60	15.90	38.90	12.20	45.00	68.20	-23.20	Pk	Vertical
13296.26	29.38	42.60	15.90	38.90	12.20	41.58	54.00	-12.42	AV	Vertical
13289.77	32.73	42.60	15.90	38.90	12.20	44.93	68.20	-23.27	Pk	Horizontal
13289.77	29.04	42.60	15.90	38.90	12.20	41.24	54.00	-12.76	AV	Horizontal

Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.
2. Scan with 802.11a,802.11n (HT-20),802.11n (HT-40), 802.11ac (VHT-20),802.11ac (VHT-40), 802.11ac (VHT-80) the worst case is 802.11n (HT-20).
3. The frequency emission of peak points that did not show above the forms are at least 20dB below the limit, the frequency emission is mainly from the environment noise.
4. Pre-scan both the SISO and MIMO mode, only the worst-case results were reported.



Band III 5470-5725MHz

Frequency (MHz)	Reading (dBuV)	Amplifier (dB)	Loss (dB)	Antenna Factor (dB/m)	Orrected Factor (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Comment
Low Channel (802.11n (HT-40)/ 5510 MHz)										
3247.87	44.42	44.70	6.70	28.20	-9.80	34.62	68.20	-33.58	Pk	Vertical
3247.87	41.47	44.70	6.70	28.20	-9.80	31.67	54.00	-22.33	AV	Vertical
3264.57	44.00	44.70	6.70	28.20	-9.80	34.20	68.20	-34.00	Pk	Horizontal
3264.57	41.82	44.70	6.70	28.20	-9.80	32.02	54.00	-21.98	AV	Horizontal
3985.85	39.71	44.20	7.90	29.70	-6.60	33.11	68.20	-35.09	Pk	Vertical
3985.85	37.14	44.20	7.90	29.70	-6.60	30.54	54.00	-23.46	AV	Vertical
3999.62	38.78	44.20	7.90	29.70	-6.60	32.18	68.20	-36.02	Pk	Horizontal
3999.62	36.16	44.20	7.90	29.70	-6.60	29.56	54.00	-24.44	AV	Horizontal
7227.98	37.04	43.50	11.40	35.50	3.40	40.44	68.20	-27.76	Pk	Vertical
7227.98	34.43	43.50	11.40	35.50	3.40	37.83	54.00	-16.17	AV	Vertical
7224.85	37.61	43.50	11.40	35.50	3.40	41.01	68.20	-27.19	Pk	Horizontal
7224.85	34.89	43.50	11.40	35.50	3.40	38.29	54.00	-15.71	AV	Horizontal
10360.03	40.11	44.50	13.80	38.80	8.10	48.21	68.20	-19.99	Pk	Vertical
10360.03	36.45	44.50	13.80	38.80	8.10	44.55	54.00	-9.45	AV	Vertical
10360.21	40.16	44.50	13.80	38.80	8.10	48.26	68.20	-19.94	Pk	Horizontal
10360.21	36.75	44.50	13.80	38.80	8.10	44.85	54.00	-9.15	AV	Horizontal
11030.50	33.51	43.60	14.30	39.50	10.20	43.71	68.20	-24.49	Pk	Vertical
11030.50	30.48	43.60	14.30	39.50	10.20	40.68	54.00	-13.32	AV	Vertical
11023.66	33.10	43.60	14.30	39.50	10.20	43.30	68.20	-24.90	Pk	Horizontal
11023.66	30.69	43.60	14.30	39.50	10.20	40.89	54.00	-13.11	AV	Horizontal
13280.96	31.95	42.60	15.90	38.90	12.20	44.15	68.20	-24.05	Pk	Vertical
13280.96	29.66	42.60	15.90	38.90	12.20	41.86	54.00	-12.14	AV	Vertical
13297.10	31.96	42.60	15.90	38.90	12.20	44.16	68.20	-24.04	Pk	Horizontal
13297.10	28.66	42.60	15.90	38.90	12.20	40.86	54.00	-13.14	AV	Horizontal
Mid Channel (802.11n (HT-40)/ 5550 MHz)										
3246.44	44.13	44.70	6.70	28.20	-9.80	34.33	68.20	-33.87	Pk	Vertical
3246.44	40.97	44.70	6.70	28.20	-9.80	31.17	54.00	-22.83	AV	Vertical
3260.49	44.39	44.70	6.70	28.20	-9.80	34.59	68.20	-33.61	Pk	Horizontal
3260.49	41.02	44.70	6.70	28.20	-9.80	31.22	54.00	-22.78	AV	Horizontal
3989.17	39.08	44.20	7.90	29.70	-6.60	32.48	68.20	-35.72	Pk	Vertical
3989.17	36.61	44.20	7.90	29.70	-6.60	30.01	54.00	-23.99	AV	Vertical
3991.93	39.52	44.20	7.90	29.70	-6.60	32.92	68.20	-35.28	Pk	Horizontal
3991.93	36.27	44.20	7.90	29.70	-6.60	29.67	54.00	-24.33	AV	Horizontal
7221.67	36.59	43.50	11.40	35.50	3.40	39.99	68.20	-28.21	Pk	Vertical
7221.67	34.60	43.50	11.40	35.50	3.40	38.00	54.00	-16.00	AV	Vertical
7216.73	37.33	43.50	11.40	35.50	3.40	40.73	68.20	-27.47	Pk	Horizontal
7216.73	33.94	43.50	11.40	35.50	3.40	37.34	54.00	-16.66	AV	Horizontal
10400.34	39.04	44.50	13.80	38.80	8.10	47.14	68.20	-21.06	Pk	Vertical
10400.34	36.37	44.50	13.80	38.80	8.10	44.47	54.00	-9.53	AV	Vertical
10400.05	39.93	44.50	13.80	38.80	8.10	48.03	68.20	-20.17	Pk	Horizontal
10400.05	36.74	44.50	13.80	38.80	8.10	44.84	54.00	-9.16	AV	Horizontal
11019.39	32.79	43.60	14.30	39.50	10.20	42.99	68.20	-25.21	Pk	Vertical
11019.39	30.20	43.60	14.30	39.50	10.20	40.40	54.00	-13.60	AV	Vertical
11025.94	33.51	43.60	14.30	39.50	10.20	43.71	68.20	-24.49	Pk	Horizontal
11025.94	29.88	43.60	14.30	39.50	10.20	40.08	54.00	-13.92	AV	Horizontal
13291.93	32.45	42.60	15.90	38.90	12.20	44.65	68.20	-23.55	Pk	Vertical
13291.93	28.54	42.60	15.90	38.90	12.20	40.74	54.00	-13.26	AV	Vertical
13285.67	32.79	42.60	15.90	38.90	12.20	44.99	68.20	-23.21	Pk	Horizontal
13285.67	29.09	42.60	15.90	38.90	12.20	41.29	54.00	-12.71	AV	Horizontal



High Channel (802.11n (HT-40)/ 5670 MHz)										
3252.23	44.14	44.70	6.70	28.20	-9.80	34.34	68.20	-33.86	Pk	Vertical
3252.23	41.30	44.70	6.70	28.20	-9.80	31.50	54.00	-22.50	AV	Vertical
3247.87	43.87	44.70	6.70	28.20	-9.80	34.07	68.20	-34.13	Pk	Horizontal
3247.87	41.06	44.70	6.70	28.20	-9.80	31.26	54.00	-22.74	AV	Horizontal
3993.47	38.97	44.20	7.90	29.70	-6.60	32.37	68.20	-35.83	Pk	Vertical
3993.47	36.78	44.20	7.90	29.70	-6.60	30.18	54.00	-23.82	AV	Vertical
3996.76	38.66	44.20	7.90	29.70	-6.60	32.06	68.20	-36.14	Pk	Horizontal
3996.76	36.73	44.20	7.90	29.70	-6.60	30.13	54.00	-23.87	AV	Horizontal
7230.65	37.55	43.50	11.40	35.50	3.40	40.95	68.20	-27.25	Pk	Vertical
7230.65	34.86	43.50	11.40	35.50	3.40	38.26	54.00	-15.74	AV	Vertical
7225.76	37.21	43.50	11.40	35.50	3.40	40.61	68.20	-27.59	Pk	Horizontal
7225.76	33.50	43.50	11.40	35.50	3.40	36.90	54.00	-17.10	AV	Horizontal
10480.36	39.30	44.50	13.80	38.80	8.10	47.40	68.20	-20.80	Pk	Vertical
10480.36	35.85	44.50	13.80	38.80	8.10	43.95	54.00	-10.05	AV	Vertical
10480.14	39.81	44.50	13.80	38.80	8.10	47.91	68.20	-20.29	Pk	Horizontal
10480.14	36.88	44.50	13.80	38.80	8.10	44.98	54.00	-9.02	AV	Horizontal
11034.63	33.96	43.60	14.30	39.50	10.20	44.16	68.20	-24.04	Pk	Vertical
11034.63	29.99	43.60	14.30	39.50	10.20	40.19	54.00	-13.81	AV	Vertical
11016.85	32.73	43.60	14.30	39.50	10.20	42.93	68.20	-25.27	Pk	Horizontal
11016.85	30.48	43.60	14.30	39.50	10.20	40.68	54.00	-13.32	AV	Horizontal
13289.97	32.61	42.60	15.90	38.90	12.20	44.81	68.20	-23.39	Pk	Vertical
13289.97	29.90	42.60	15.90	38.90	12.20	42.10	54.00	-11.90	AV	Vertical
13287.15	32.13	42.60	15.90	38.90	12.20	44.33	68.20	-23.87	Pk	Horizontal
13287.15	28.72	42.60	15.90	38.90	12.20	40.92	54.00	-13.08	AV	Horizontal

Remark:

- Factor = Antenna Factor + Cable Loss – Pre-amplifier.
- Scan with 802.11a,802.11n (HT-20),802.11n (HT-40), 802.11ac (VHT-20),802.11ac (VHT-40), 802.11ac (VHT-80) the worst case is 802.11n (HT-40).
- The frequency emission of peak points that did not show above the forms are at least 20dB below the limit, the frequency emission is mainly from the environment noise.
- Pre-scan both the SISO and MIMO mode, only the worst-case results were reported.



Band IV(5.725-5.850) GHz

Frequency (MHz)	Reading	Amplifier	Loss	Antenna Factor	Orrected Factor	Emission Level	Limit (dBuV/m)	Margin	Detector	Comment
	(dBuV)	(dB)	(dB)	(dB/m)	(dB)	(dBuV/m)		(dB)		
Low Channel (802.11n (HT-40)/ 5755 MHz)										
3258.20	43.78	44.70	6.70	28.20	-9.80	33.98	68.20	-34.22	Pk	Vertical
3258.20	41.69	44.70	6.70	28.20	-9.80	31.89	54.00	-22.11	AV	Vertical
3252.08	44.64	44.70	6.70	28.20	-9.80	34.84	68.20	-33.36	Pk	Horizontal
3252.08	42.02	44.70	6.70	28.20	-9.80	32.22	54.00	-21.78	AV	Horizontal
3995.07	39.41	44.20	7.90	29.70	-6.60	32.81	68.20	-35.39	Pk	Vertical
3995.07	36.56	44.20	7.90	29.70	-6.60	29.96	54.00	-24.04	AV	Vertical
3996.54	39.22	44.20	7.90	29.70	-6.60	32.62	68.20	-35.58	Pk	Horizontal
3996.54	36.95	44.20	7.90	29.70	-6.60	30.35	54.00	-23.65	AV	Horizontal
7235.96	37.14	43.50	11.40	35.50	3.40	40.54	68.20	-27.66	Pk	Vertical
7235.96	34.89	43.50	11.40	35.50	3.40	38.29	54.00	-15.71	AV	Vertical
7234.76	37.44	43.50	11.40	35.50	3.40	40.84	68.20	-27.36	Pk	Horizontal
7234.76	33.48	43.50	11.40	35.50	3.40	36.88	54.00	-17.12	AV	Horizontal
10360.11	39.83	44.50	13.80	38.80	8.10	47.93	68.20	-20.27	Pk	Vertical
10360.11	37.09	44.50	13.80	38.80	8.10	45.19	54.00	-8.81	AV	Vertical
10360.37	39.68	44.50	13.80	38.80	8.10	47.78	68.20	-20.42	Pk	Horizontal
10360.37	35.73	44.50	13.80	38.80	8.10	43.83	54.00	-10.17	AV	Horizontal
11025.50	34.15	43.60	14.30	39.50	10.20	44.35	68.20	-23.85	Pk	Vertical
11025.50	29.82	43.60	14.30	39.50	10.20	40.02	54.00	-13.98	AV	Vertical
11034.19	33.31	43.60	14.30	39.50	10.20	43.51	68.20	-24.69	Pk	Horizontal
11034.19	31.12	43.60	14.30	39.50	10.20	41.32	54.00	-12.68	AV	Horizontal
13299.21	31.71	42.60	15.90	38.90	12.20	43.91	68.20	-24.29	Pk	Vertical
13299.21	28.82	42.60	15.90	38.90	12.20	41.02	54.00	-12.98	AV	Vertical
13281.69	32.19	42.60	15.90	38.90	12.20	44.39	68.20	-23.81	Pk	Horizontal
13281.69	28.91	42.60	15.90	38.90	12.20	41.11	54.00	-12.89	AV	Horizontal
Mid Channel (802.11n (HT-40)/ 5795MHz)										
3247.47	44.07	44.70	6.70	28.20	-9.80	34.27	68.20	-33.93	Pk	Vertical
3247.47	41.07	44.70	6.70	28.20	-9.80	31.27	54.00	-22.73	AV	Vertical
3251.71	45.19	44.70	6.70	28.20	-9.80	35.39	68.20	-32.81	Pk	Horizontal
3251.71	42.24	44.70	6.70	28.20	-9.80	32.44	54.00	-21.56	AV	Horizontal
3981.07	40.01	44.20	7.90	29.70	-6.60	33.41	68.20	-34.79	Pk	Vertical
3981.07	36.86	44.20	7.90	29.70	-6.60	30.26	54.00	-23.74	AV	Vertical
3983.72	39.47	44.20	7.90	29.70	-6.60	32.87	68.20	-35.33	Pk	Horizontal
3983.72	37.06	44.20	7.90	29.70	-6.60	30.46	54.00	-23.54	AV	Horizontal
7228.25	37.80	43.50	11.40	35.50	3.40	41.20	68.20	-27.00	Pk	Vertical
7228.25	34.66	43.50	11.40	35.50	3.40	38.06	54.00	-15.94	AV	Vertical
7230.73	37.59	43.50	11.40	35.50	3.40	40.99	68.20	-27.21	Pk	Horizontal
7230.73	33.68	43.50	11.40	35.50	3.40	37.08	54.00	-16.92	AV	Horizontal
10480.42	38.74	44.50	13.80	38.80	8.10	46.84	68.20	-21.36	Pk	Vertical
10480.42	36.46	44.50	13.80	38.80	8.10	44.56	54.00	-9.44	AV	Vertical
10480.00	39.83	44.50	13.80	38.80	8.10	47.93	68.20	-20.27	Pk	Horizontal
10480.00	36.05	44.50	13.80	38.80	8.10	44.15	54.00	-9.85	AV	Horizontal
11026.13	33.07	43.60	14.30	39.50	10.20	43.27	68.20	-24.93	Pk	Vertical
11026.13	30.52	43.60	14.30	39.50	10.20	40.72	54.00	-13.28	AV	Vertical
11026.46	33.72	43.60	14.30	39.50	10.20	43.92	68.20	-24.28	Pk	Horizontal
11026.46	30.73	43.60	14.30	39.50	10.20	40.93	54.00	-13.07	AV	Horizontal
13287.40	32.01	42.60	15.90	38.90	12.20	44.21	68.20	-23.99	Pk	Vertical
13287.40	28.79	42.60	15.90	38.90	12.20	40.99	54.00	-13.01	AV	Vertical
13288.86	31.90	42.60	15.90	38.90	12.20	44.10	68.20	-24.10	Pk	Horizontal
13288.86	28.89	42.60	15.90	38.90	12.20	41.09	54.00	-12.91	AV	Horizontal

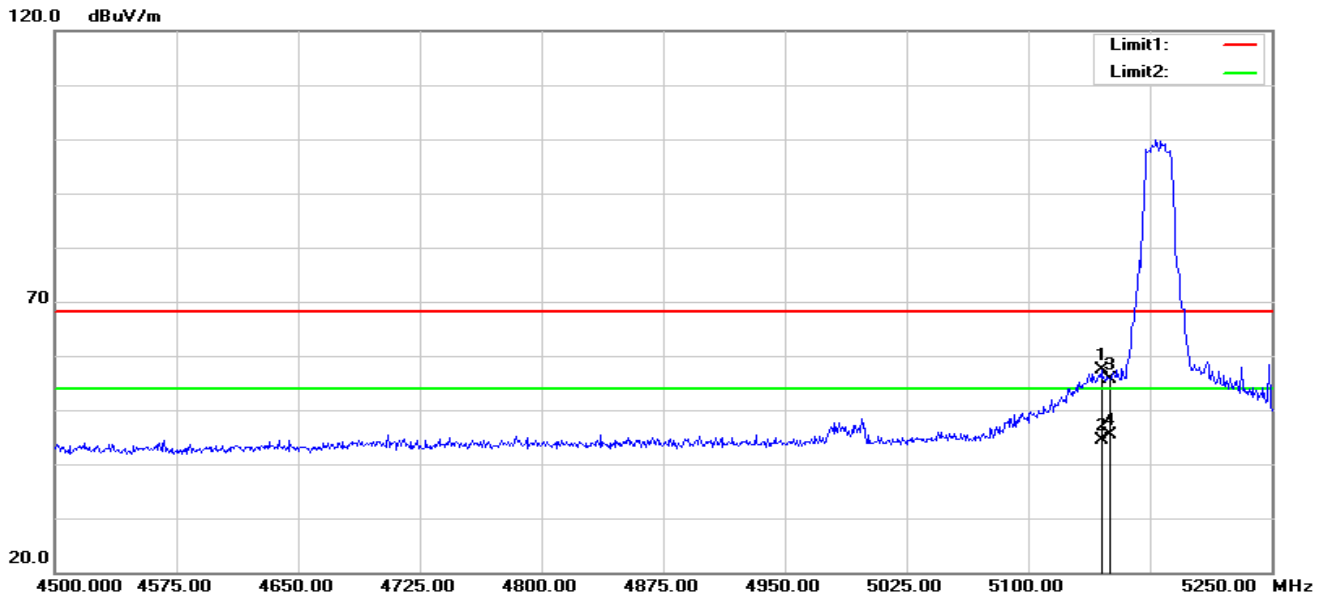
Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.
2. Scan with 802.11a,802.11n (HT-20),802.11n (HT-40), 802.11ac (VHT-20),802.11ac (VHT-40), 802.11ac (VHT-80) the worst case is 802.11n (HT-40).
3. The frequency emission of peak points that did not show above the forms are at least 20dB below the limit, the frequency emission is mainly from the environment noise.
4. Pre-scan both the SISO and MIMO mode, only the worst-case results were reported.

3.2.9 RESTRICTED FREQUENCY BANDS AND BAND EDGE

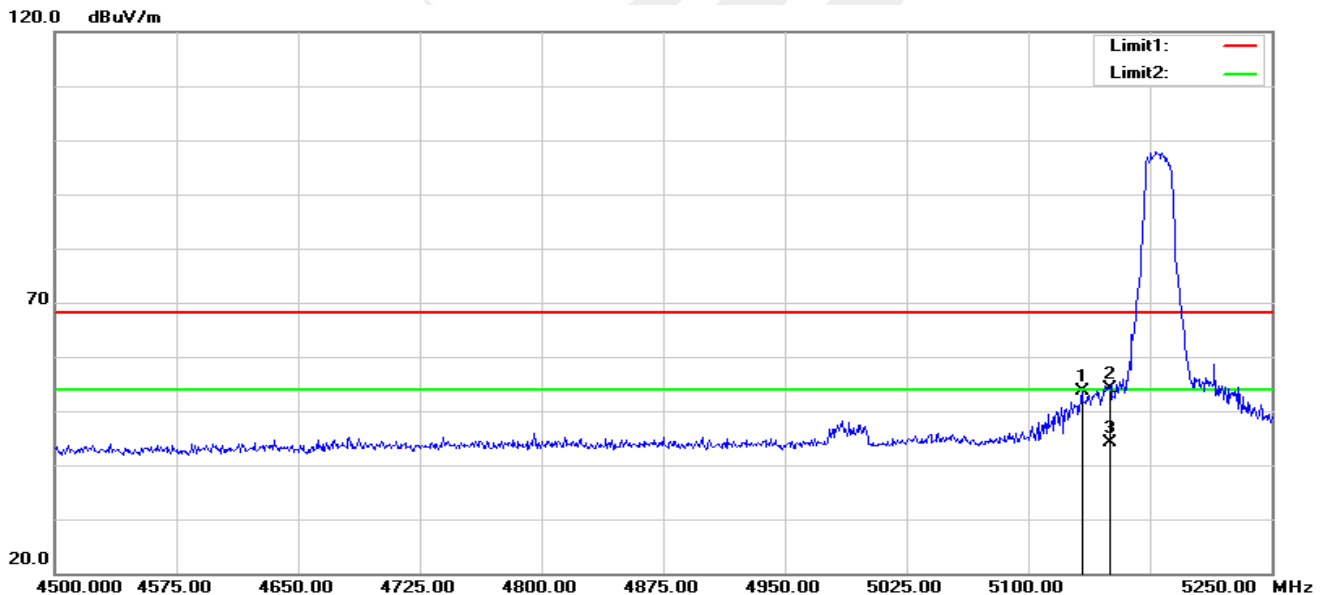
Band I 5150-5250MHz

802.11a-L-H



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5145.000	63.21	-5.73	57.48	68.20	-10.72	peak
2	5145.000	50.09	-5.73	44.36	54.00	-9.64	AVG
3	5150.000	61.43	-5.73	55.70	68.20	-12.50	peak
4	5150.000	51.01	-5.73	45.28	54.00	-8.72	AVG

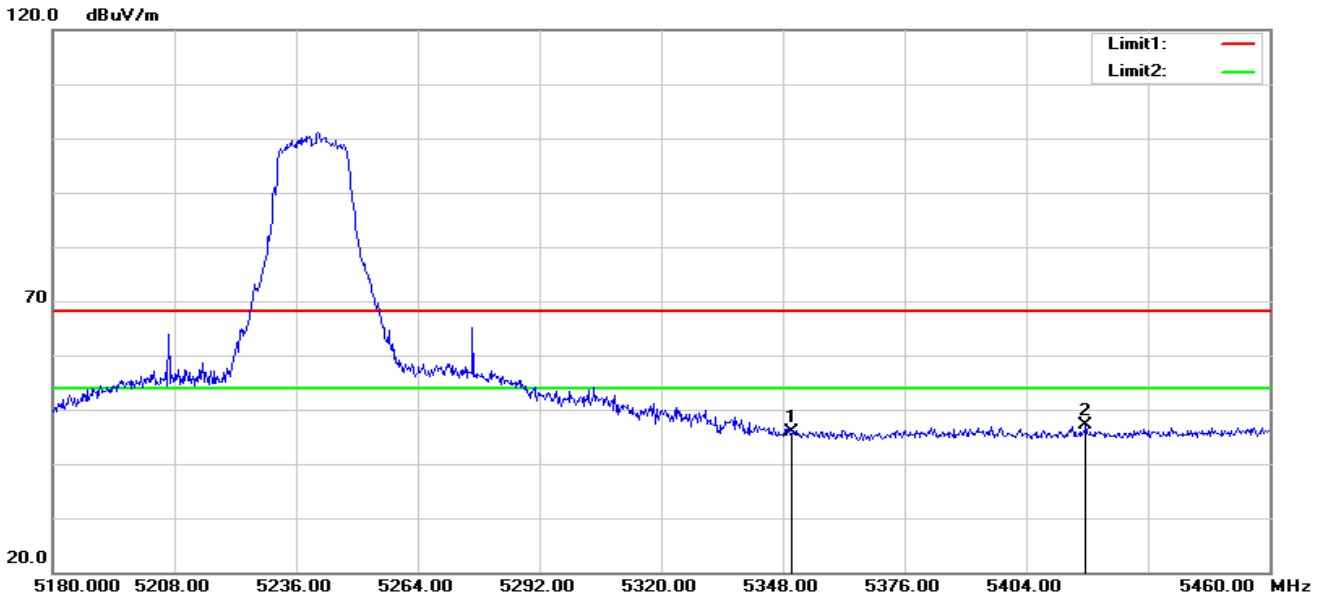
802.11a-L-V



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5133.000	59.46	-5.73	53.73	68.20	-14.47	peak
2	5150.000	59.92	-5.73	54.19	68.20	-14.01	peak
3	5150.000	49.94	-5.73	44.21	54.00	-9.79	AVG

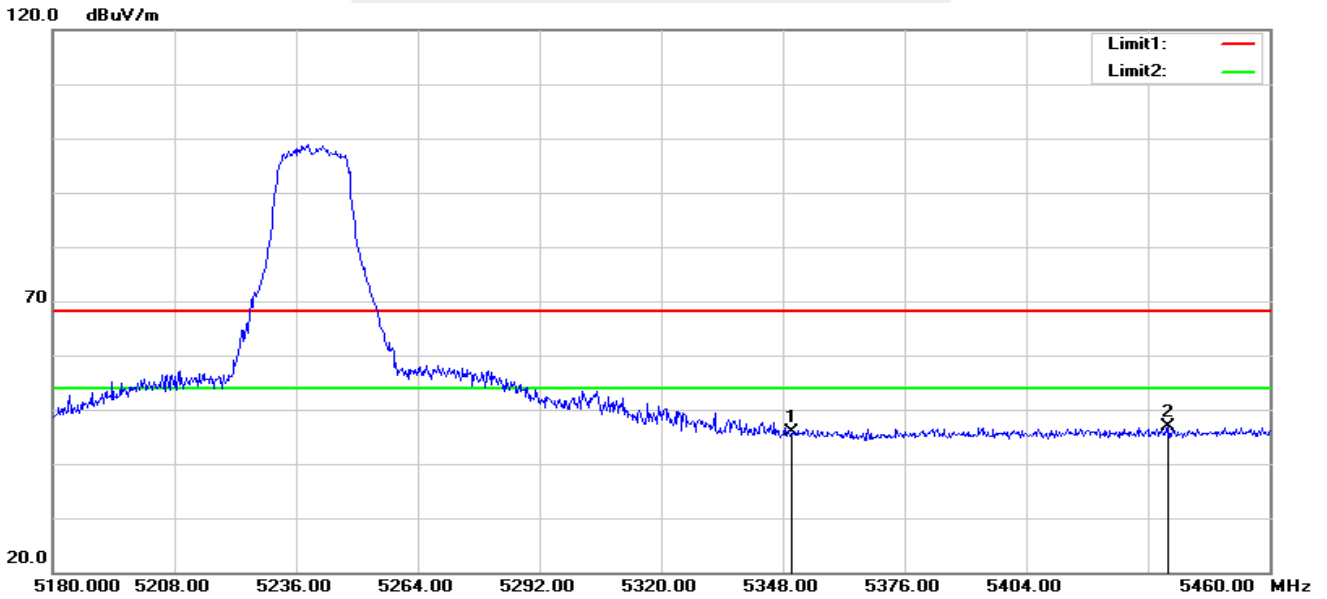


802.11a-H-H



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5350.000	51.04	-5.23	45.81	68.20	-22.39	peak
2	5417.720	52.32	-5.21	47.11	68.20	-21.09	peak

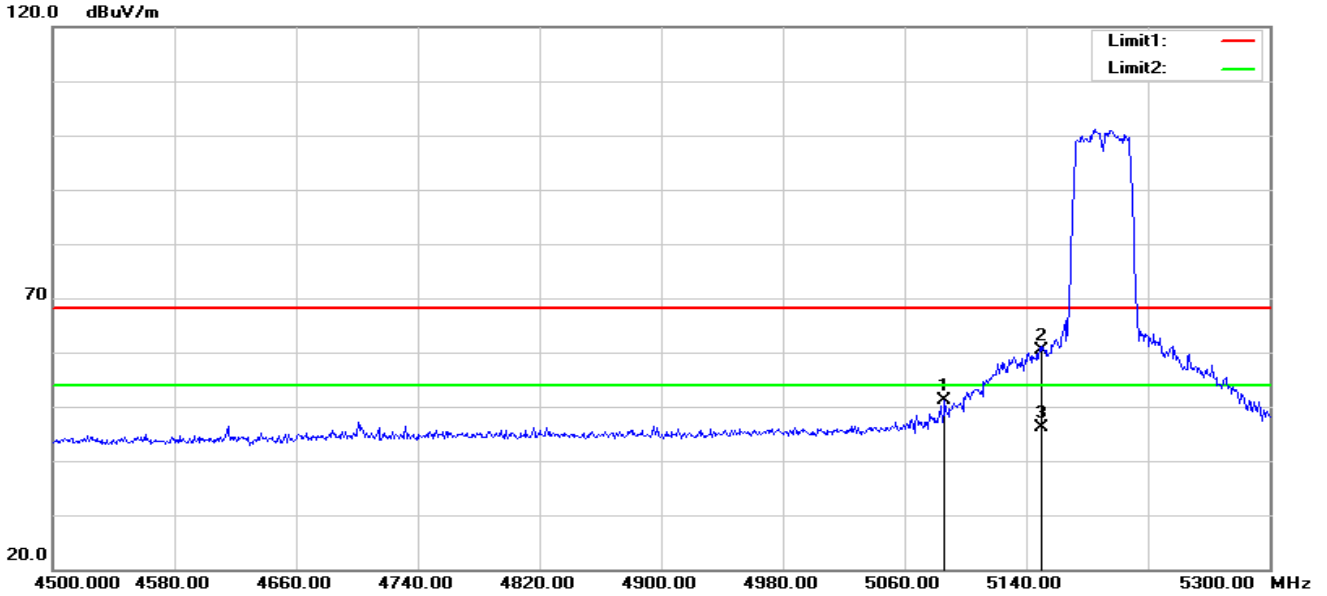
802.11a-H-V



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5350.000	51.16	-5.23	45.93	68.20	-22.27	peak
2	5436.760	51.93	-5.16	46.77	68.20	-21.43	peak

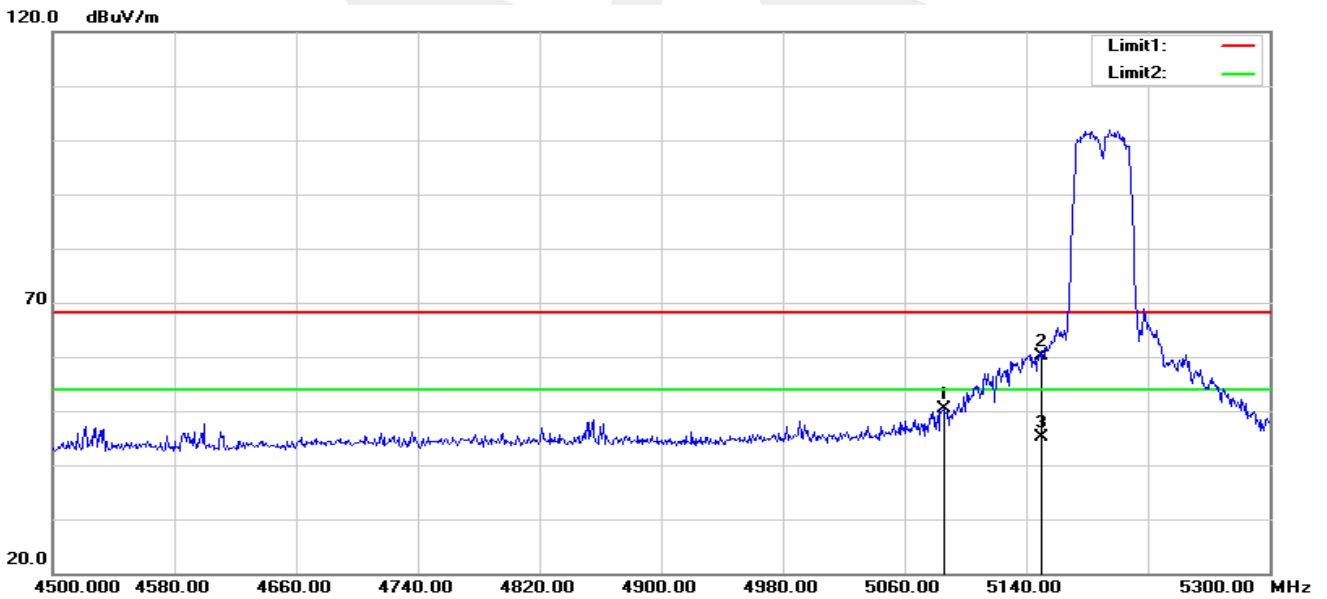


802.11n40-L-H



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5086.400	56.81	-5.80	51.01	68.20	-17.19	peak
2	5150.000	66.21	-5.73	60.48	68.20	-7.72	peak
3	5150.000	51.75	-5.73	46.02	54.00	-7.98	AVG

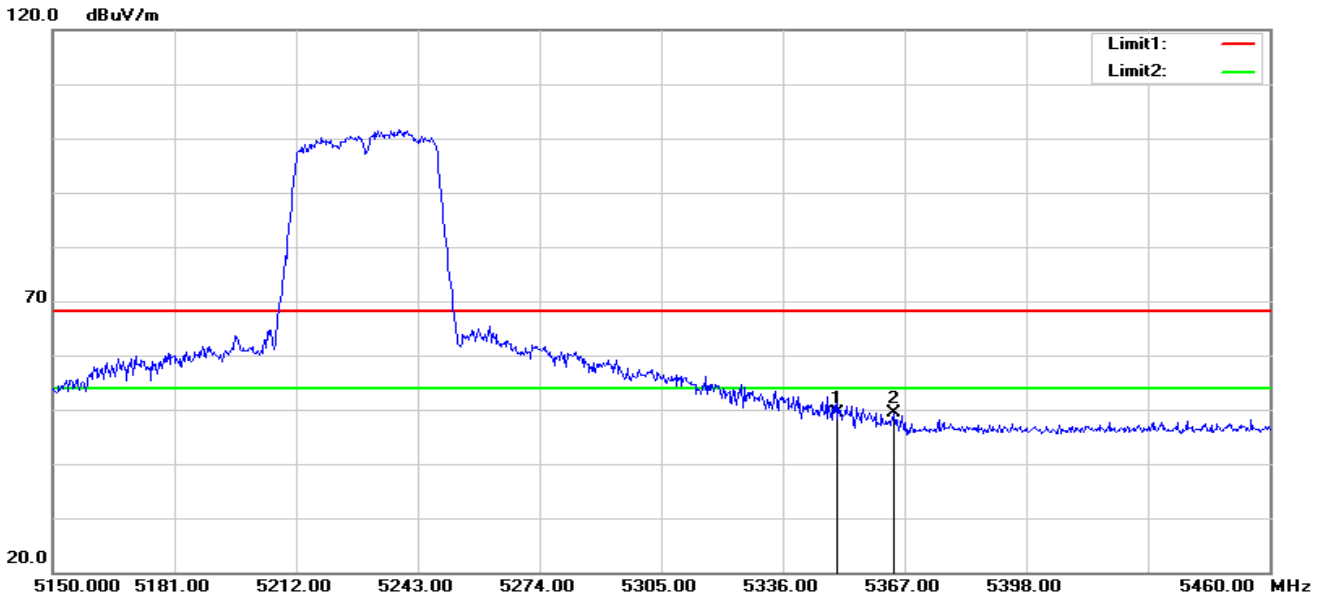
802.11n40-L-V



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5085.600	56.10	-5.80	50.30	68.20	-17.90	peak
2	5150.000	65.87	-5.73	60.14	68.20	-8.06	peak
3	5150.000	50.92	-5.73	45.19	54.00	-8.81	AVG

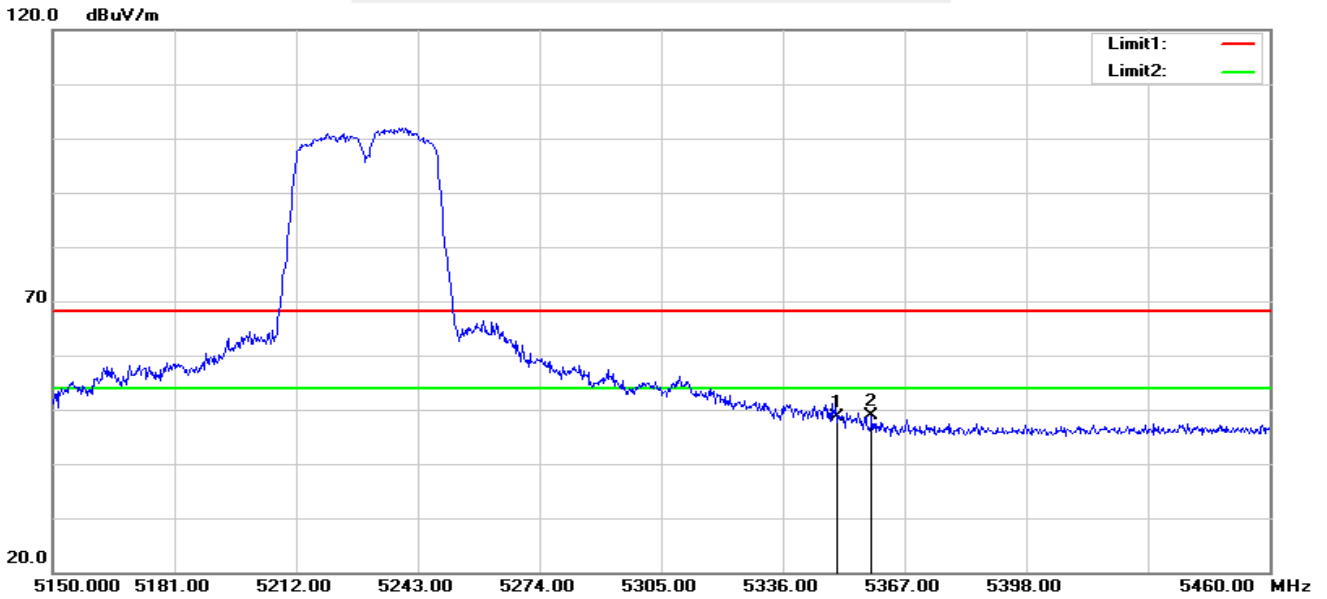


802.11n40-H-H



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5350.000	54.50	-5.23	49.27	68.20	-18.93	peak
2	5364.210	54.73	-5.24	49.49	68.20	-18.71	peak

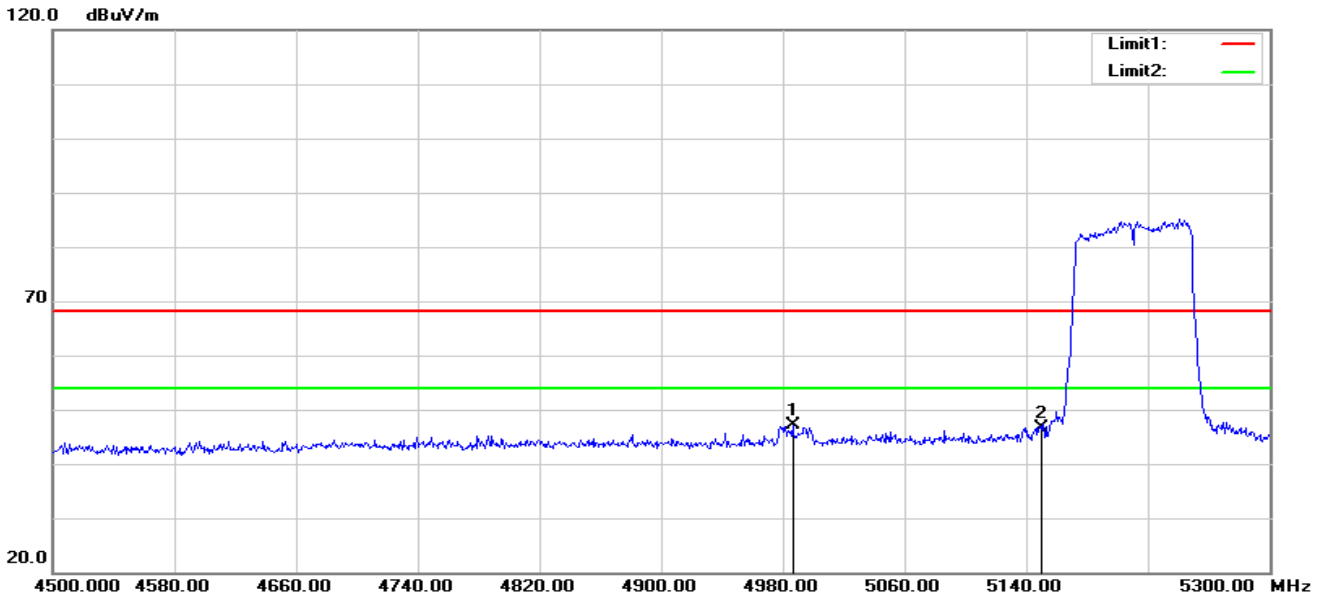
802.11n40-H-V



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5350.000	53.77	-5.23	48.54	68.20	-19.66	peak
2	5358.630	54.06	-5.23	48.83	68.20	-19.37	peak

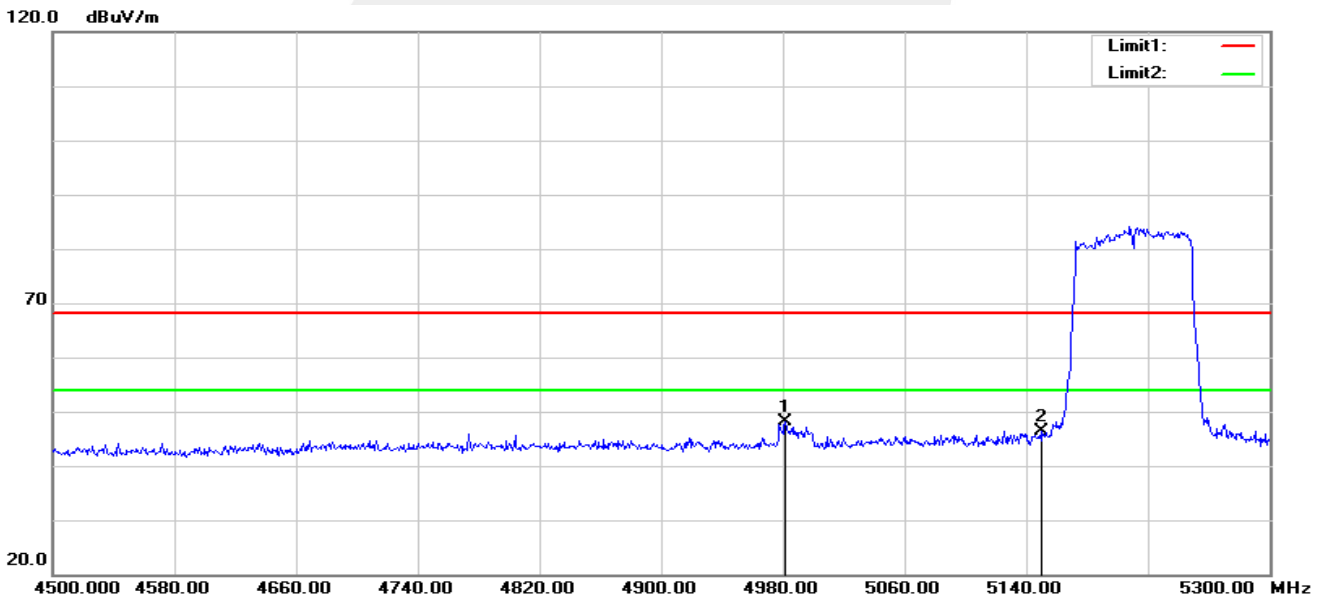


802.11ac80-L-H



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4986.400	53.40	-6.28	47.12	68.20	-21.08	peak
2	5150.000	52.34	-5.73	46.61	68.20	-21.59	peak

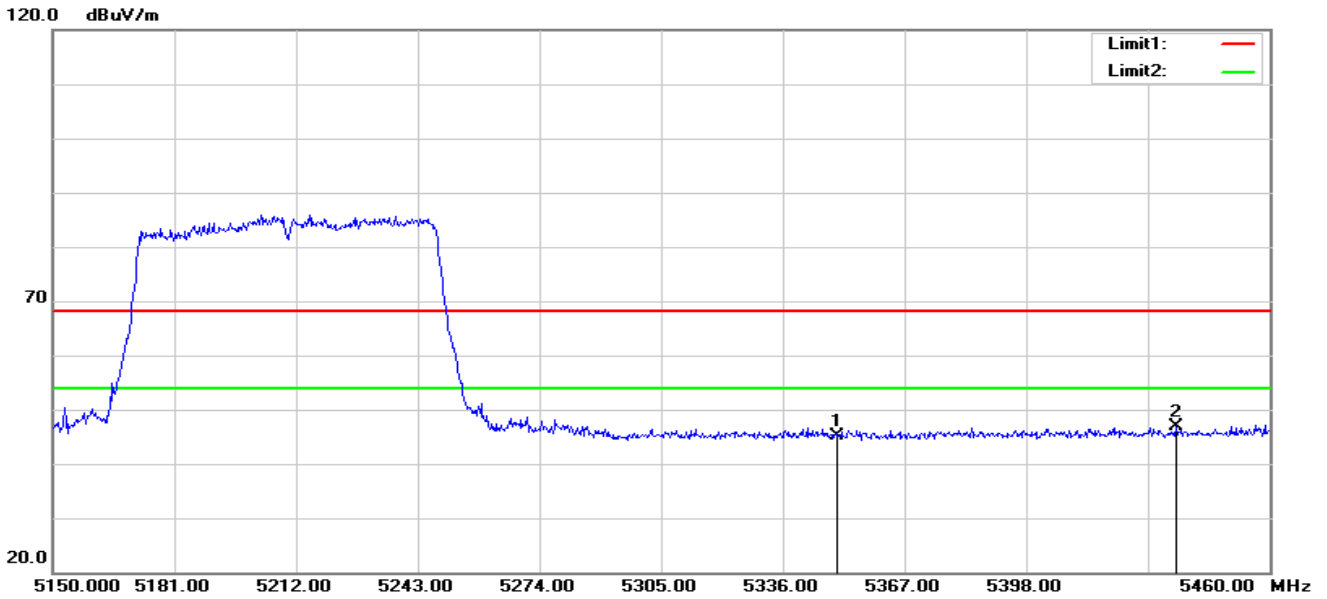
802.11ac80-L-V



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4981.600	54.32	-6.31	48.01	68.20	-20.19	peak
2	5150.000	52.00	-5.73	46.27	68.20	-21.93	peak

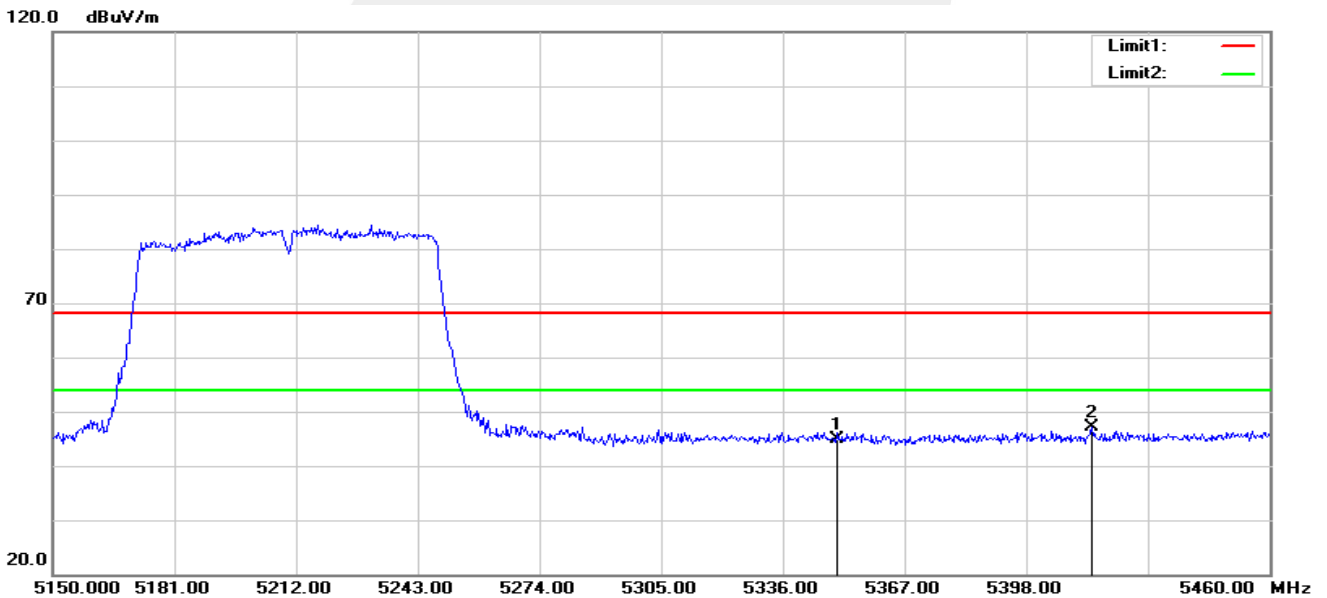


802.11ac80-R-H



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5350.000	50.46	-5.23	45.23	68.20	-22.97	peak
2	5436.130	52.14	-5.17	46.97	68.20	-21.23	peak

802.11ac80-R-V



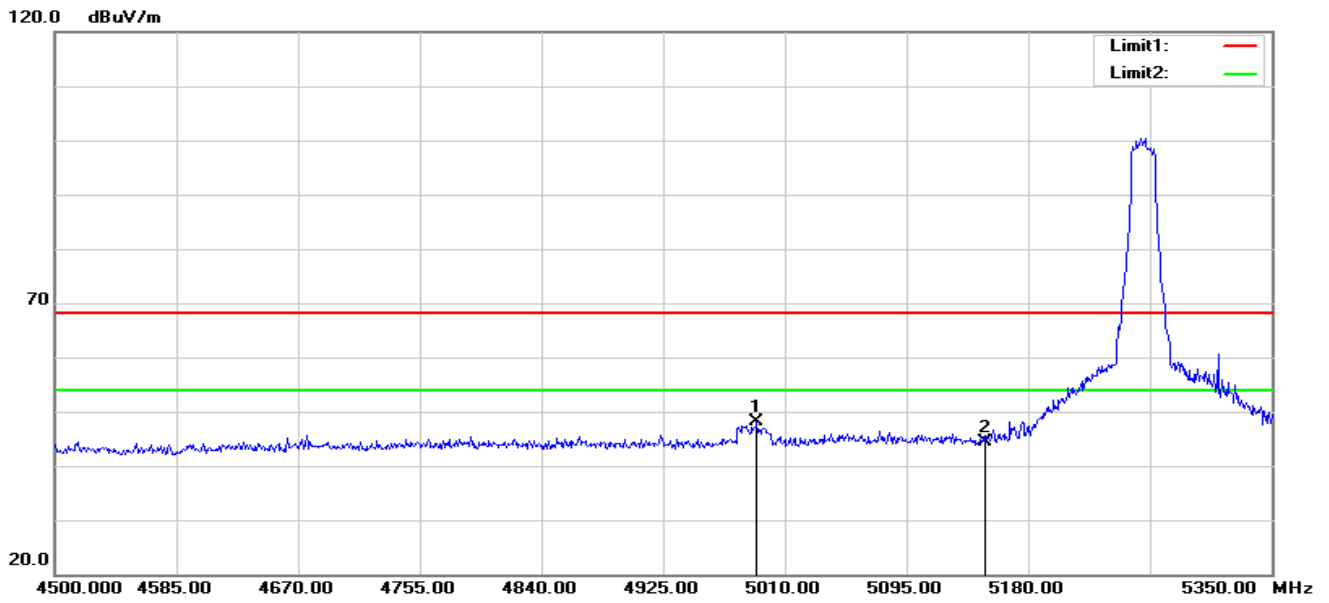
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5350.000	50.11	-5.23	44.88	68.20	-23.32	peak
2	5414.740	52.33	-5.22	47.11	68.20	-21.09	peak

Note: All modes have been tested. Only the worst mode shown in the report.



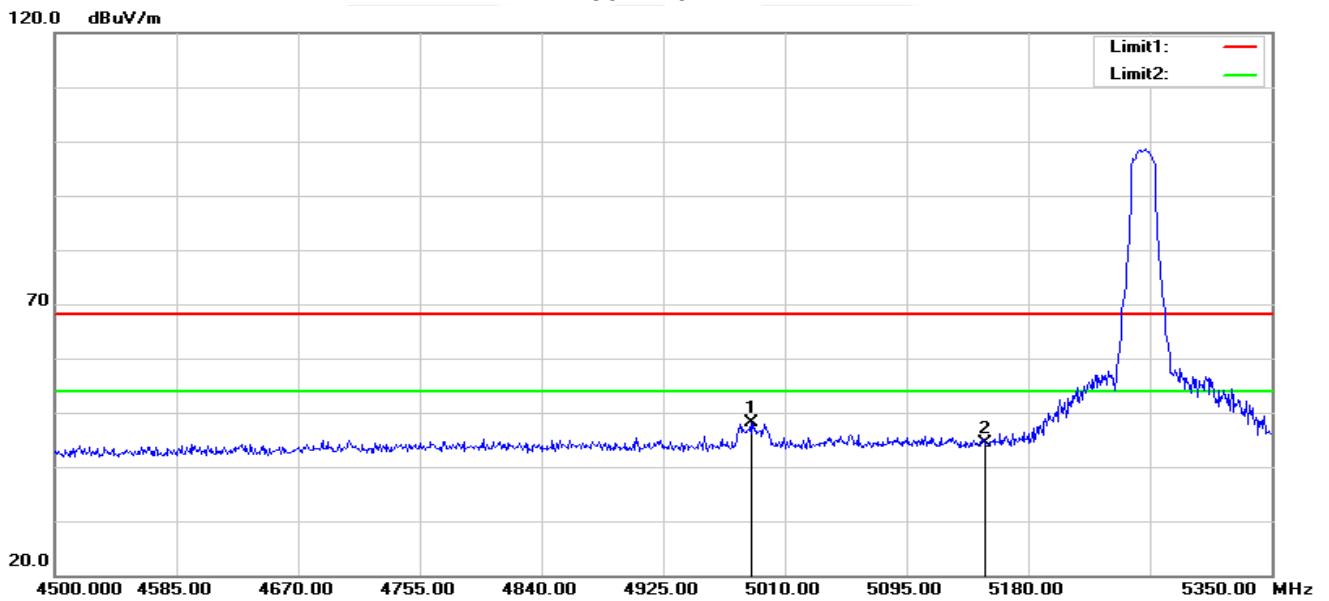
Band II 5250-5350MHz

802.11a-L-H



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4990.450	54.42	-6.25	48.17	68.20	-20.03	peak
2	5150.000	49.99	-5.73	44.26	68.20	-23.94	peak

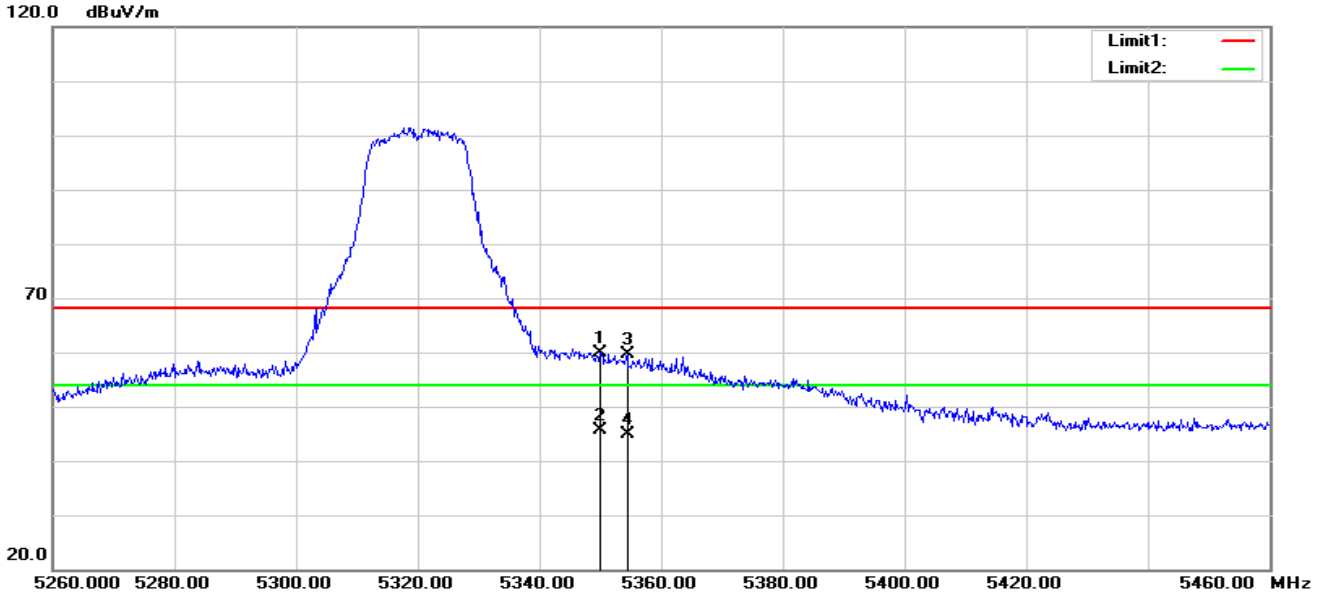
802.11a-L-V



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4986.200	54.50	-6.28	48.22	68.20	-19.98	peak
2	5150.000	50.01	-5.73	44.28	68.20	-23.92	peak

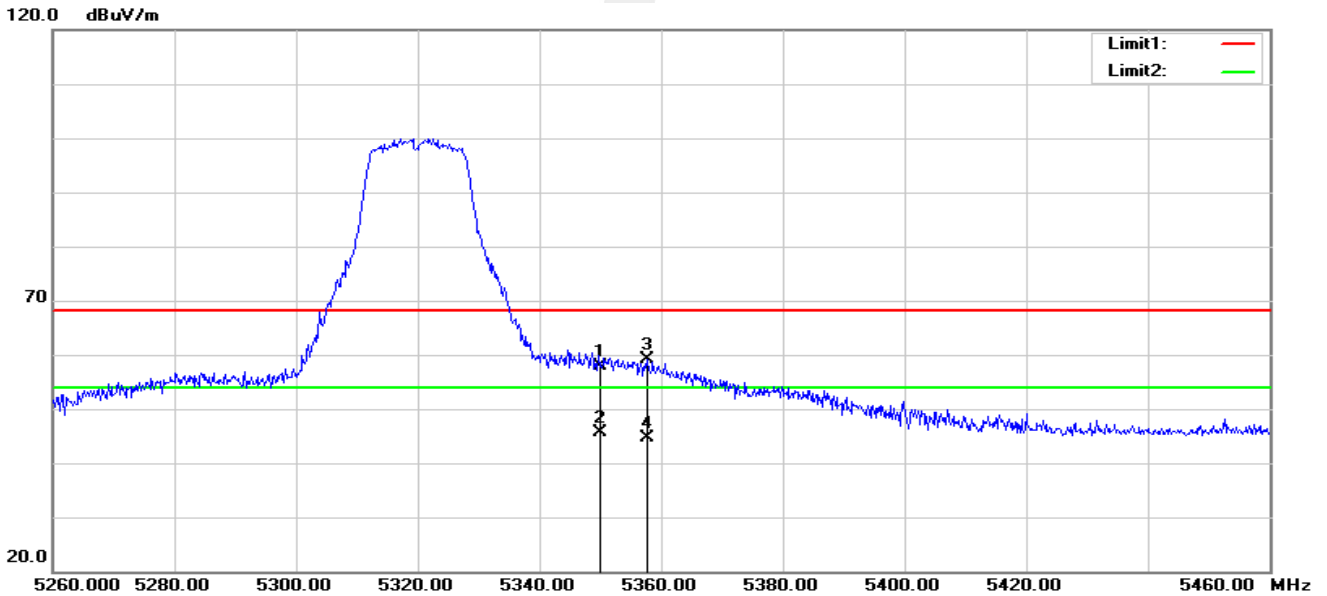


802.11a-H-H



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5350.000	65.15	-5.23	59.92	68.20	-8.28	peak
2	5350.000	50.92	-5.23	45.69	54.00	-8.31	AVG
3	5354.400	64.75	-5.24	59.51	68.20	-8.69	peak
4	5354.400	50.05	-5.24	44.81	54.00	-9.19	AVG

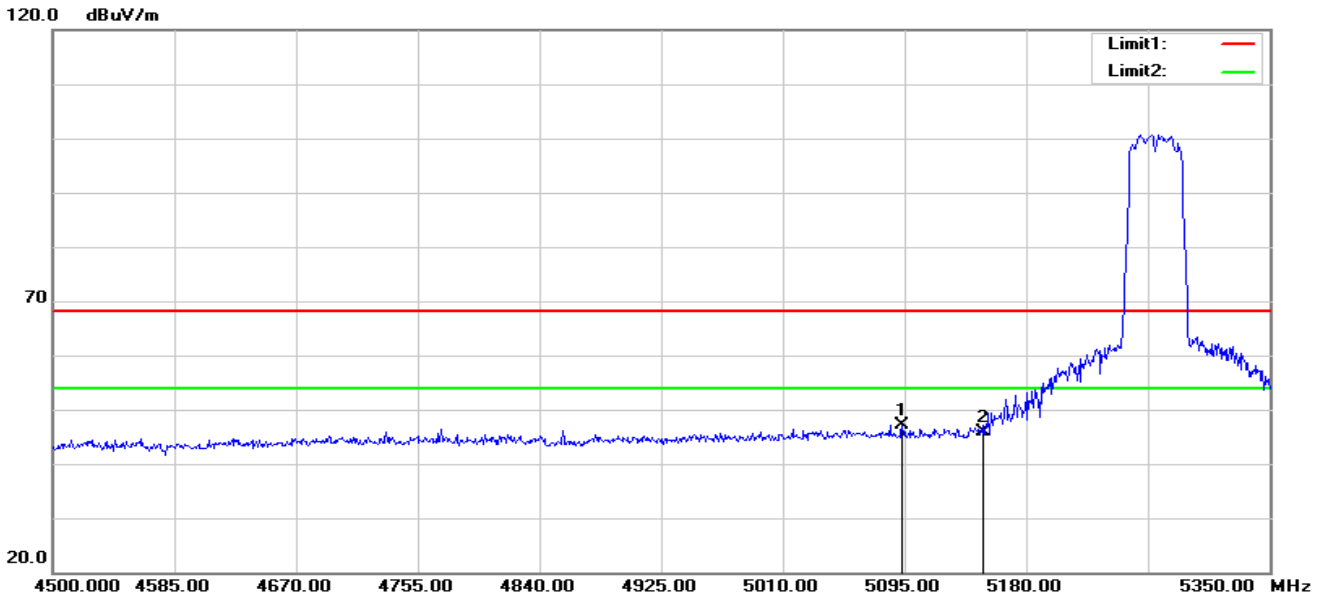
802.11a-H-V



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5350.000	63.11	-5.23	57.88	68.20	-10.32	peak
2	5350.000	50.89	-5.23	45.66	54.00	-8.34	AVG
3	5357.600	64.29	-5.23	59.06	68.20	-9.14	peak
4	5357.600	49.81	-5.23	44.58	54.00	-9.42	AVG

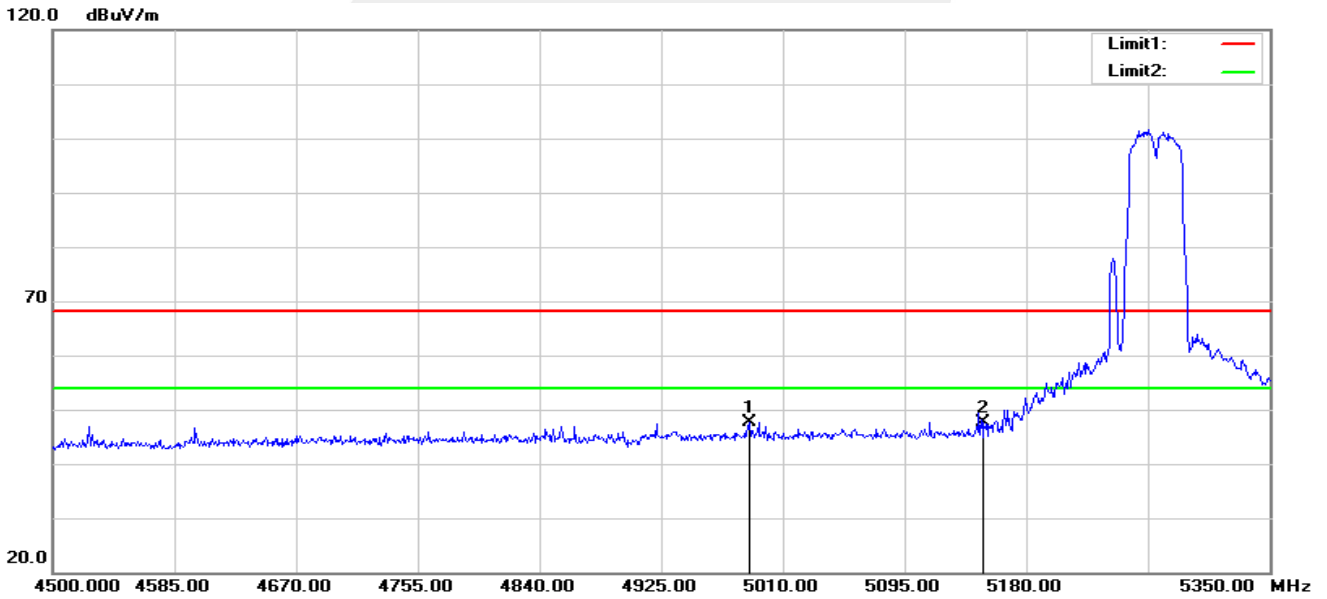


802.11n40-L-H



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5093.300	52.93	-5.77	47.16	68.20	-21.04	peak
2	5150.000	51.62	-5.73	45.89	68.20	-22.31	peak

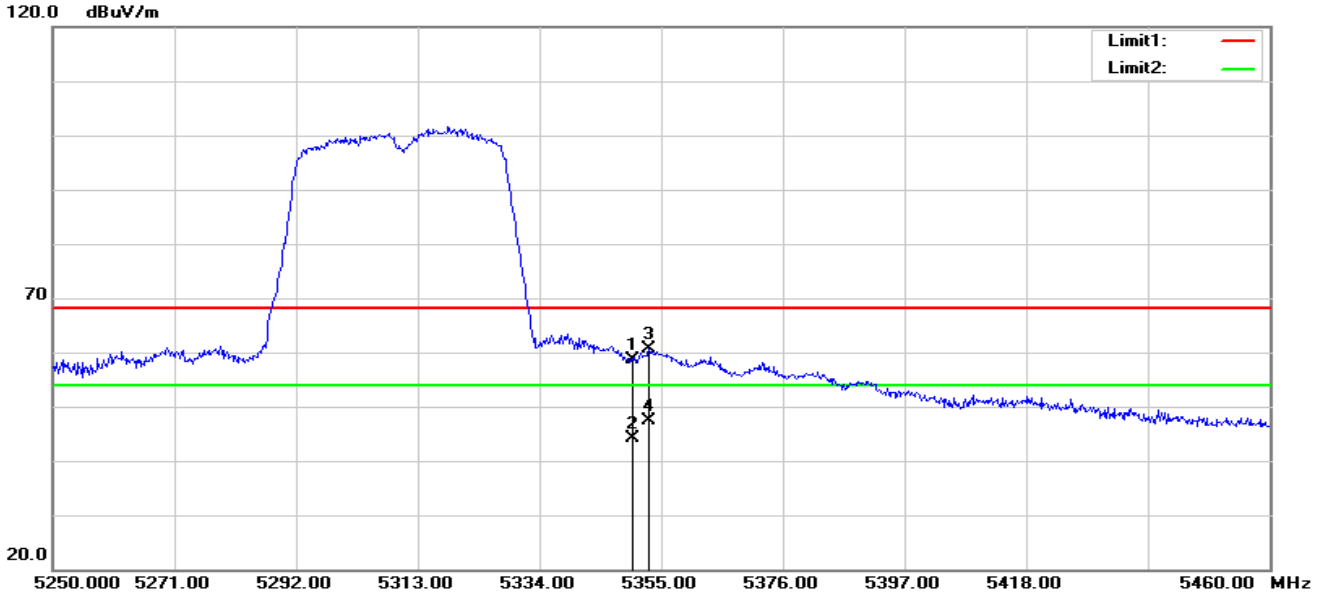
802.11n40-L-V



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4987.050	54.01	-6.28	47.73	68.20	-20.47	peak
2	5150.000	53.25	-5.73	47.52	68.20	-20.68	peak

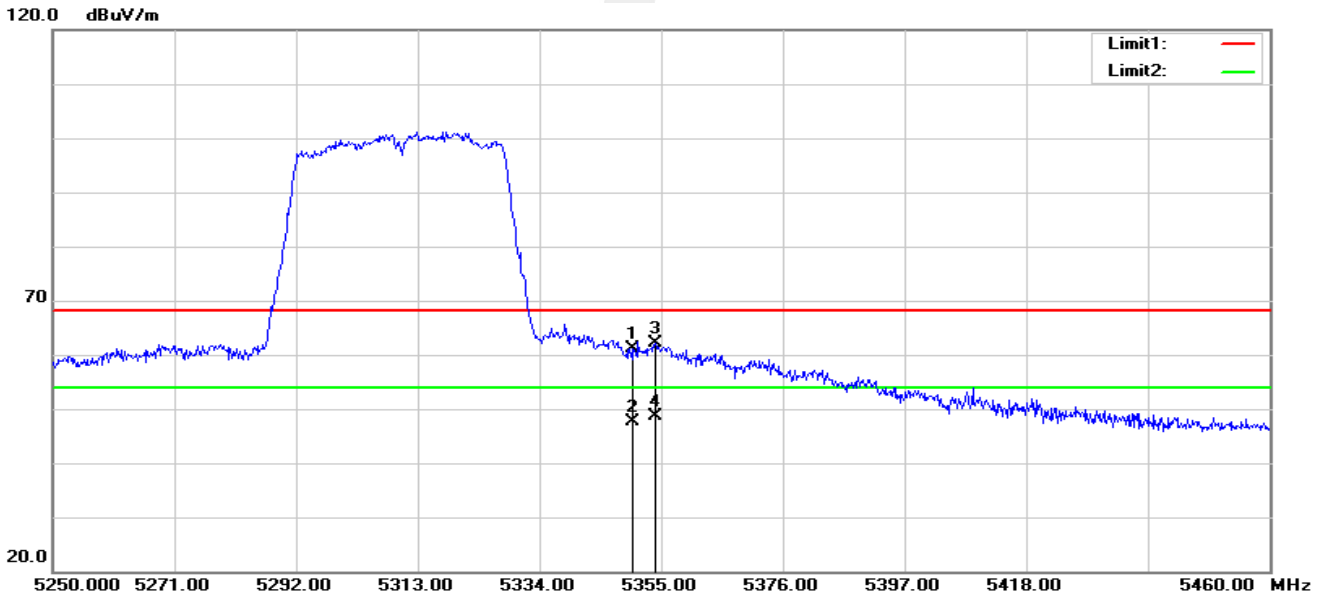


802.11n40-H-H



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5350.000	63.79	-5.23	58.56	68.20	-9.64	peak
2	5350.000	49.46	-5.23	44.23	54.00	-9.77	AVG
3	5352.900	65.92	-5.23	60.69	68.20	-7.51	peak
4	5352.900	52.51	-5.23	47.28	54.00	-6.72	AVG

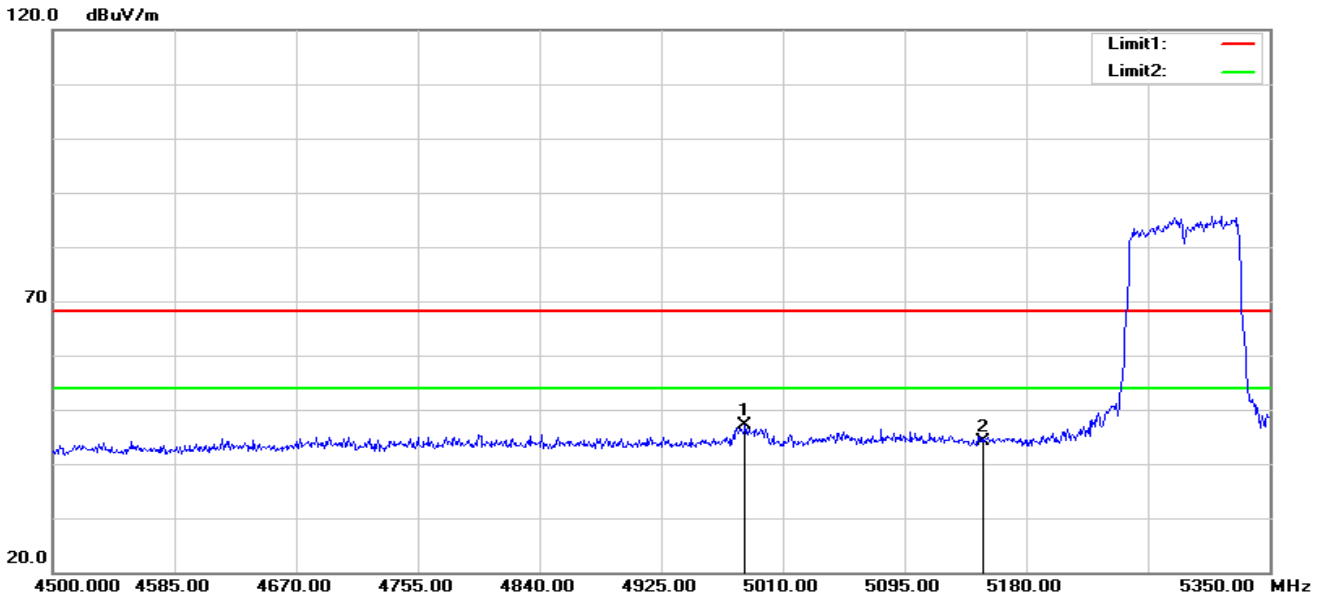
802.11n40-H-V



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5350.000	66.39	-5.23	61.16	68.20	-7.04	peak
2	5350.000	52.76	-5.23	47.53	54.00	-6.47	AVG
3	5353.950	67.25	-5.23	62.02	68.20	-6.18	peak
4	5353.950	53.89	-5.23	48.66	54.00	-5.34	AVG

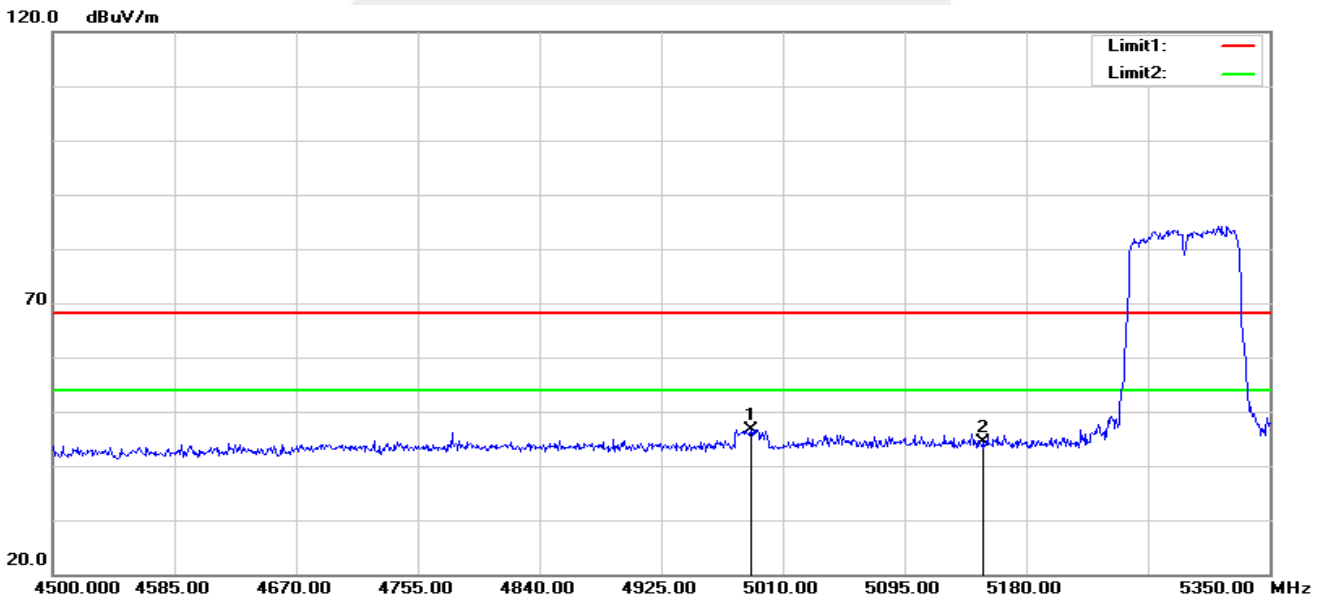


802.11ac80-L-H



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4983.650	53.37	-6.29	47.08	68.20	-21.12	peak
2	5150.000	49.96	-5.73	44.23	68.20	-23.97	peak

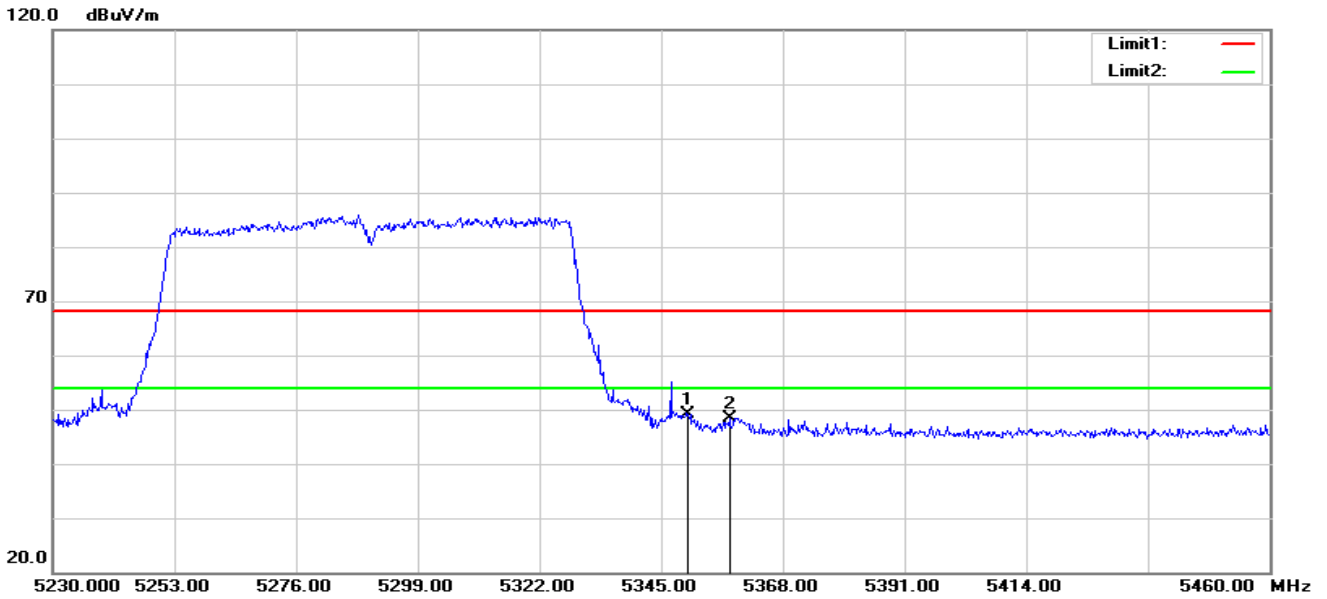
802.11ac80-L-V



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	4987.900	52.93	-6.26	46.67	68.20	-21.53	peak
2	5150.000	50.10	-5.73	44.37	68.20	-23.83	peak

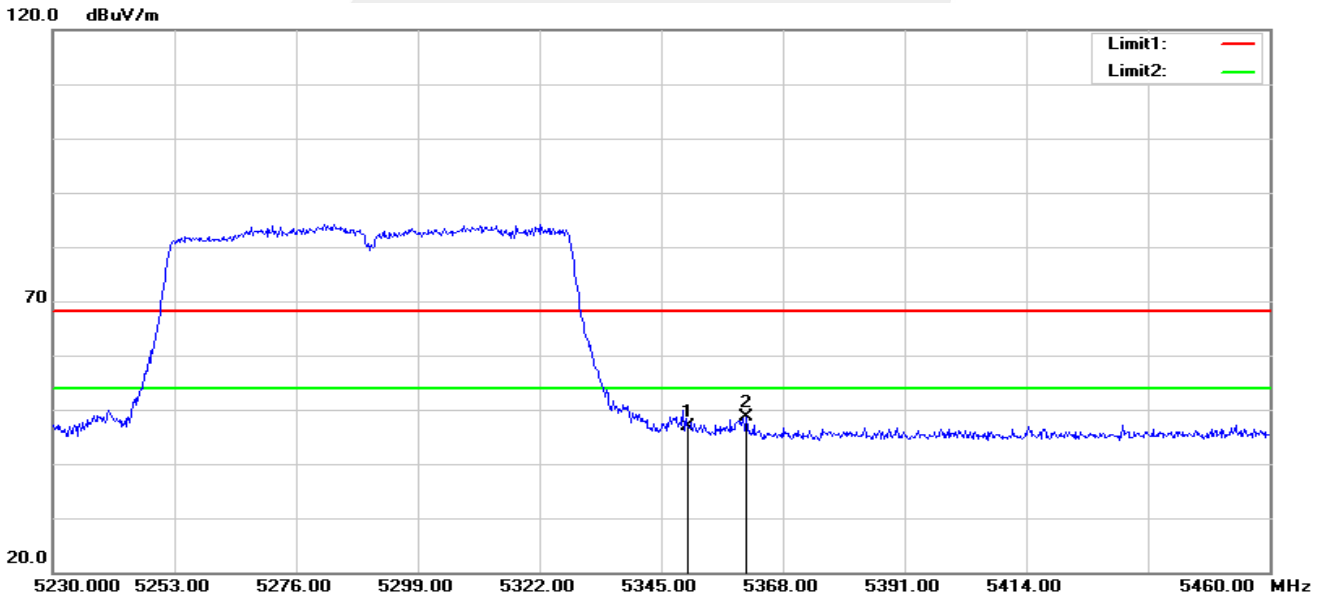


802.11ac80-R-H



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5350.000	54.32	-5.23	49.09	68.20	-19.11	peak
2	5357.880	53.72	-5.23	48.49	68.20	-19.71	peak

802.11ac80-R-V



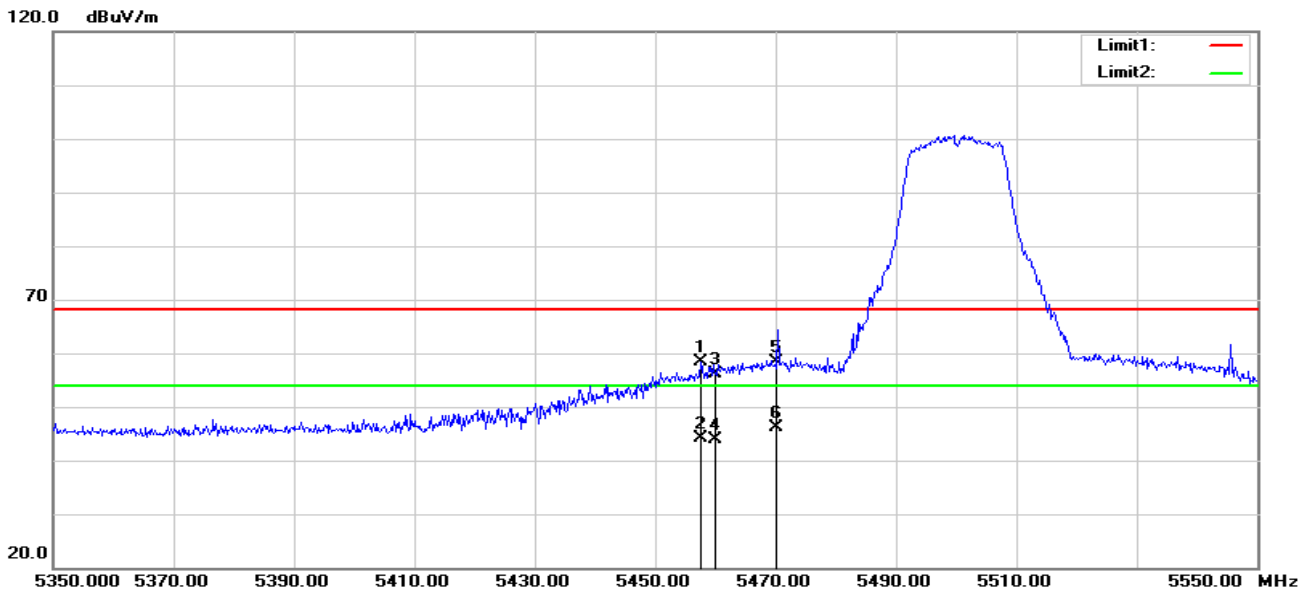
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5350.000	52.14	-5.23	46.91	68.20	-21.29	peak
2	5361.100	53.74	-5.23	48.51	68.20	-19.69	peak

Note: All modes have been tested. Only the worst mode shown in the report.



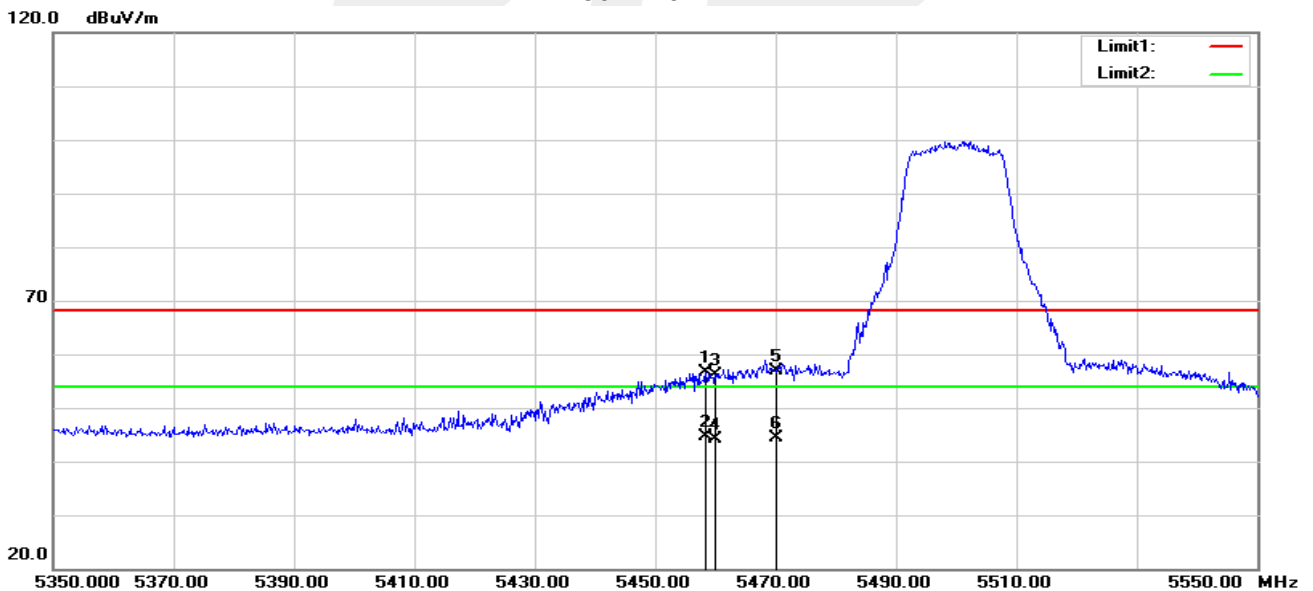
Band III 5470-5725MHz

802.11a-L-H



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5457.600	63.54	-5.11	58.43	68.20	-9.77	peak
2	5457.600	49.23	-5.11	44.12	54.00	-9.88	AVG
3	5460.000	61.22	-5.11	56.11	68.20	-12.09	peak
4	5460.000	48.96	-5.11	43.85	54.00	-10.15	AVG
5	5470.000	63.54	-5.09	58.45	68.20	-9.75	peak
6	5470.000	51.21	-5.09	46.12	54.00	-7.88	AVG

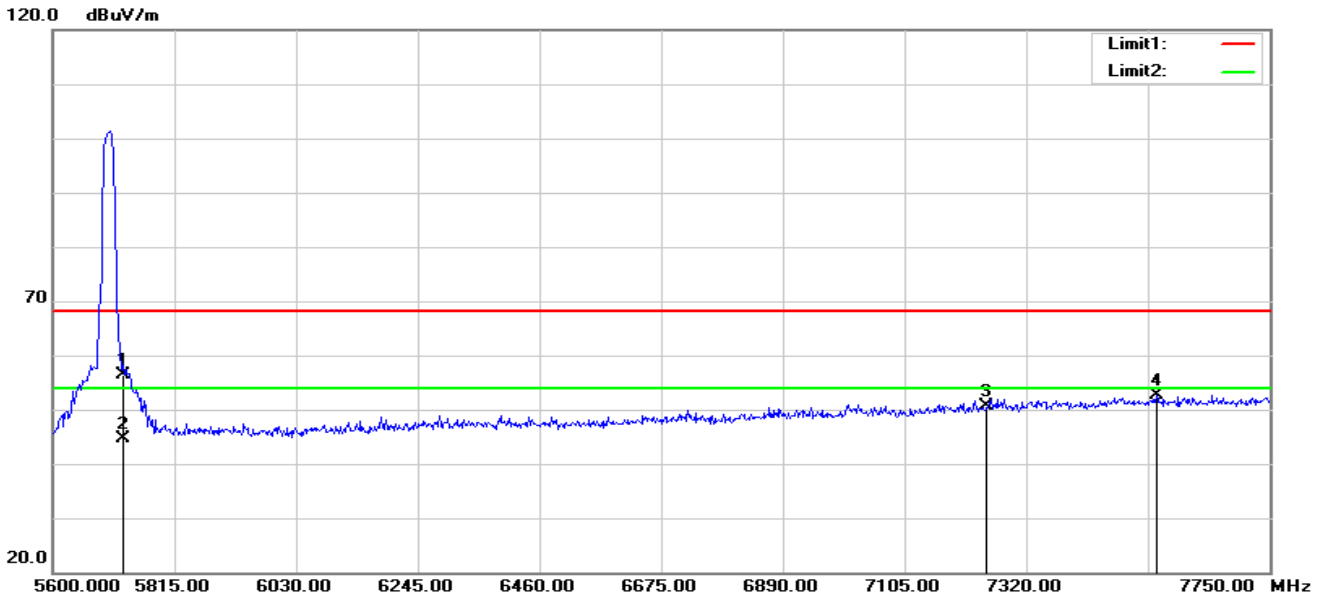
802.11a-L-V



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5458.400	61.77	-5.11	56.66	68.20	-11.54	peak
2	5458.400	49.73	-5.11	44.62	54.00	-9.38	AVG
3	5460.000	61.25	-5.11	56.14	68.20	-12.06	peak
4	5460.000	49.24	-5.11	44.13	54.00	-9.87	AVG
5	5470.000	61.86	-5.09	56.77	68.20	-11.43	peak
6	5470.000	49.44	-5.09	44.35	54.00	-9.65	AVG

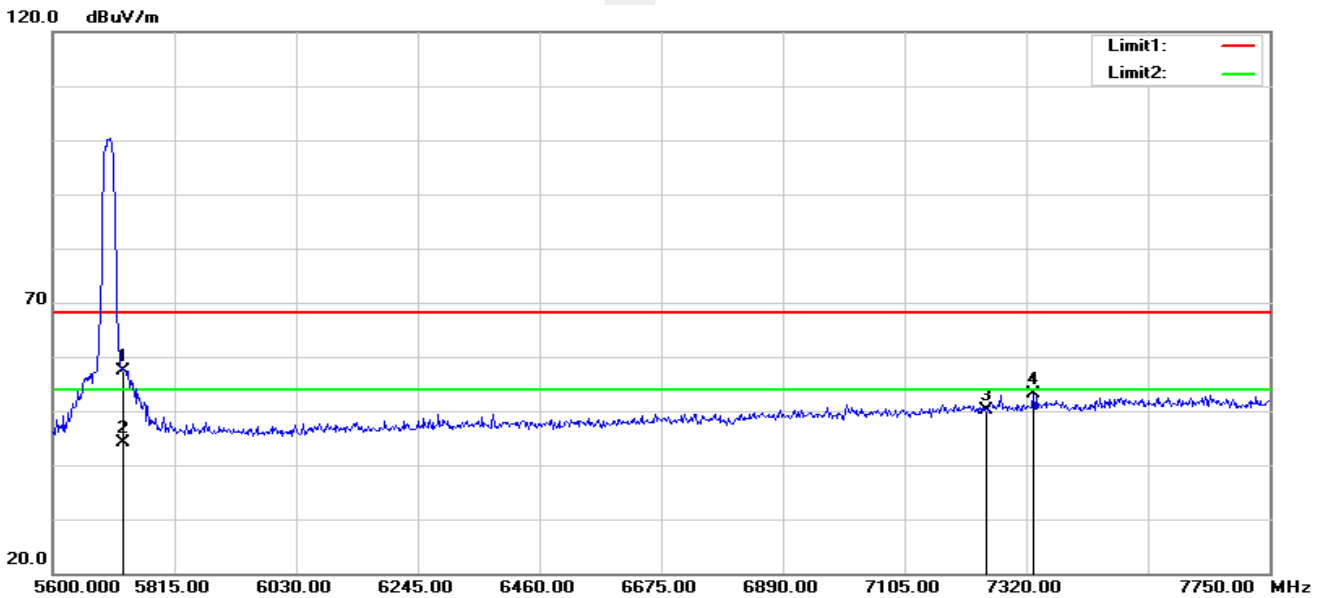


802.11a-H-H



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5725.000	61.06	-4.57	56.49	68.20	-11.71	peak
2	5725.000	49.15	-4.57	44.58	54.00	-9.42	AVG
3	7250.000	49.83	0.72	50.55	68.20	-17.65	peak
4	7550.050	50.94	1.69	52.63	68.20	-15.57	peak

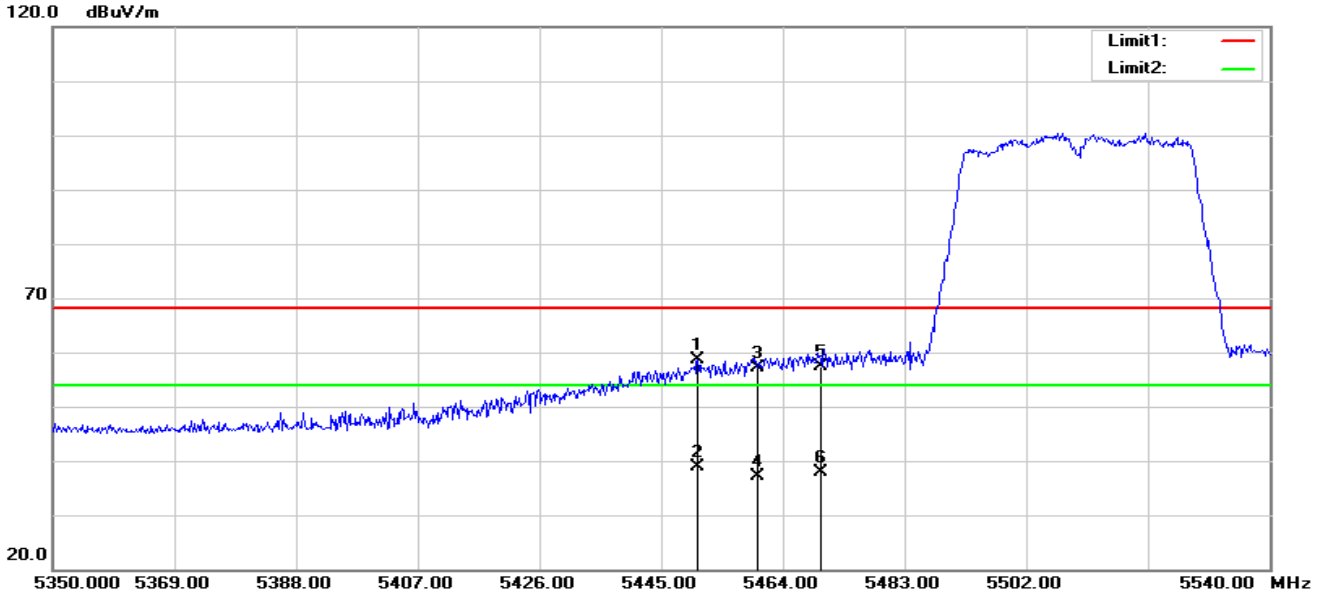
802.11a-H-V



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5725.000	61.95	-4.57	57.38	68.20	-10.82	peak
2	5725.000	48.78	-4.57	44.21	54.00	-9.79	AVG
3	7250.000	49.29	0.72	50.01	68.20	-18.19	peak
4	7332.900	52.14	1.02	53.16	68.20	-15.04	peak

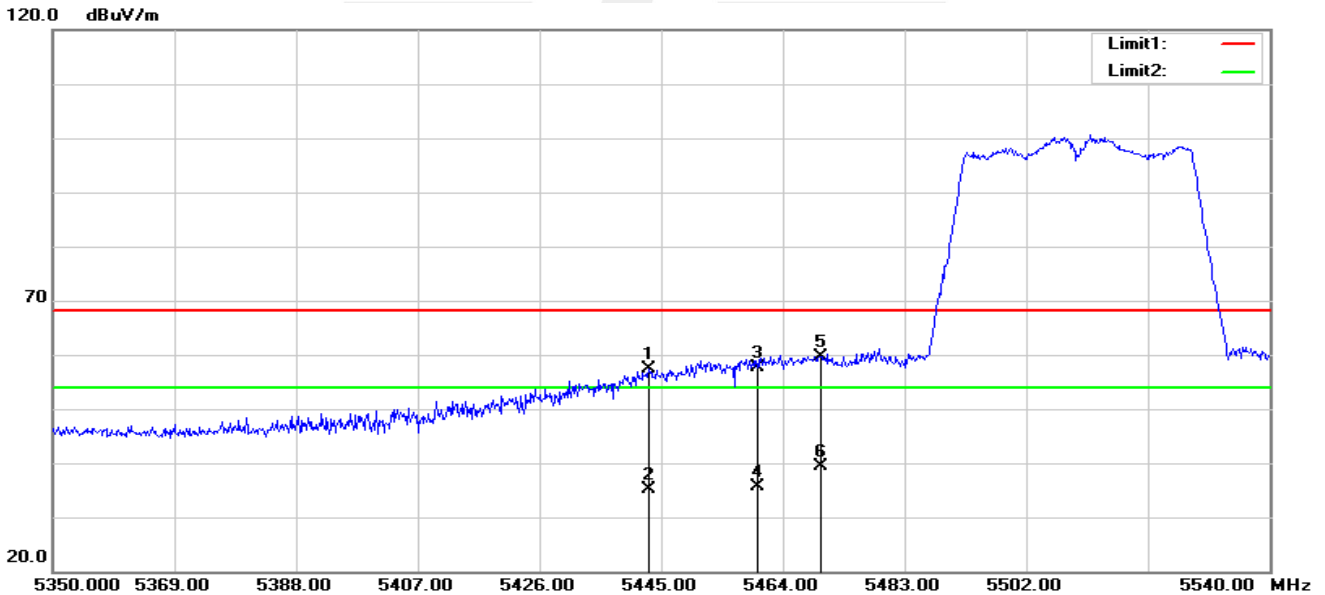


802.11n40-L-H



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5450.700	63.82	-5.13	58.69	68.20	-9.51	peak
2	5450.700	44.08	-5.13	38.95	54.00	-15.05	AVG
3	5460.000	62.24	-5.11	57.13	68.20	-11.07	peak
4	5460.000	42.12	-5.11	37.01	54.00	-16.99	AVG
5	5470.000	62.55	-5.09	57.46	68.20	-10.74	peak
6	5470.000	42.98	-5.09	37.89	54.00	-16.11	AVG

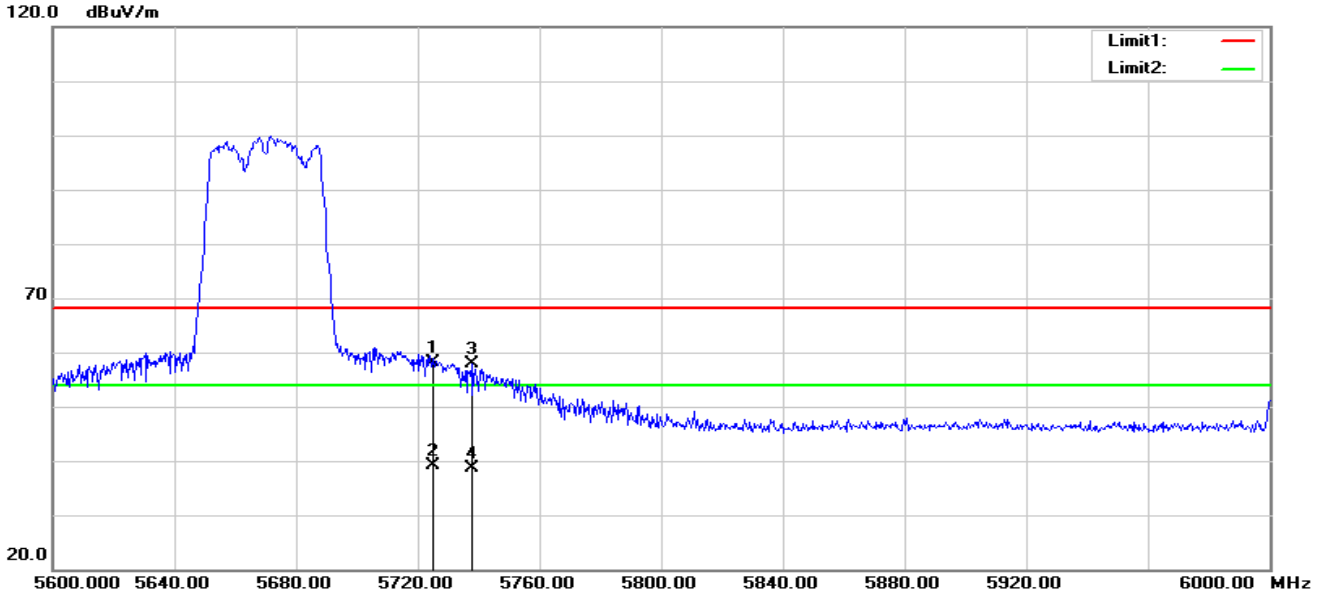
802.11n40-L-V



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5443.100	62.56	-5.16	57.40	68.20	-10.80	peak
2	5443.100	40.18	-5.16	35.02	54.00	-18.98	AVG
3	5460.000	62.85	-5.11	57.74	68.20	-10.46	peak
4	5460.000	40.76	-5.11	35.65	54.00	-18.35	AVG
5	5470.000	64.68	-5.09	59.59	68.20	-8.61	peak
6	5470.000	44.37	-5.09	39.28	54.00	-14.72	AVG

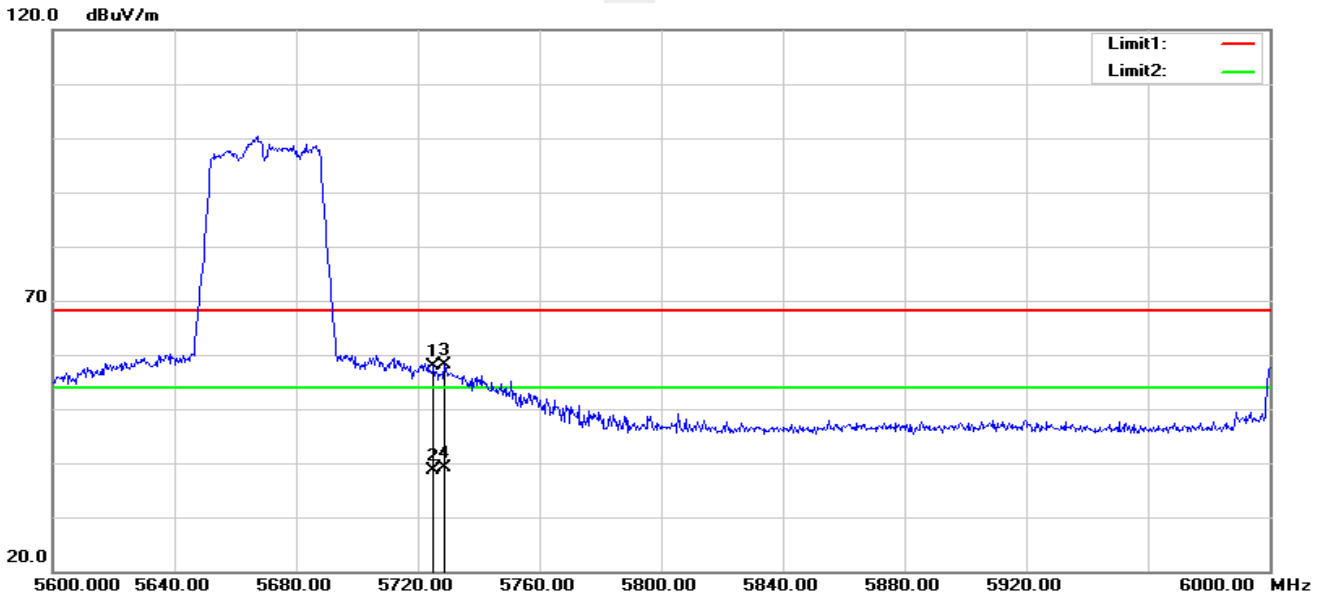


802.11n40-H-H



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5725.000	62.69	-4.57	58.12	68.20	-10.08	peak
2	5725.000	43.63	-4.57	39.06	54.00	-14.94	AVG
3	5737.600	62.41	-4.53	57.88	68.20	-10.32	peak
4	5737.600	43.15	-4.53	38.62	54.00	-15.38	AVG

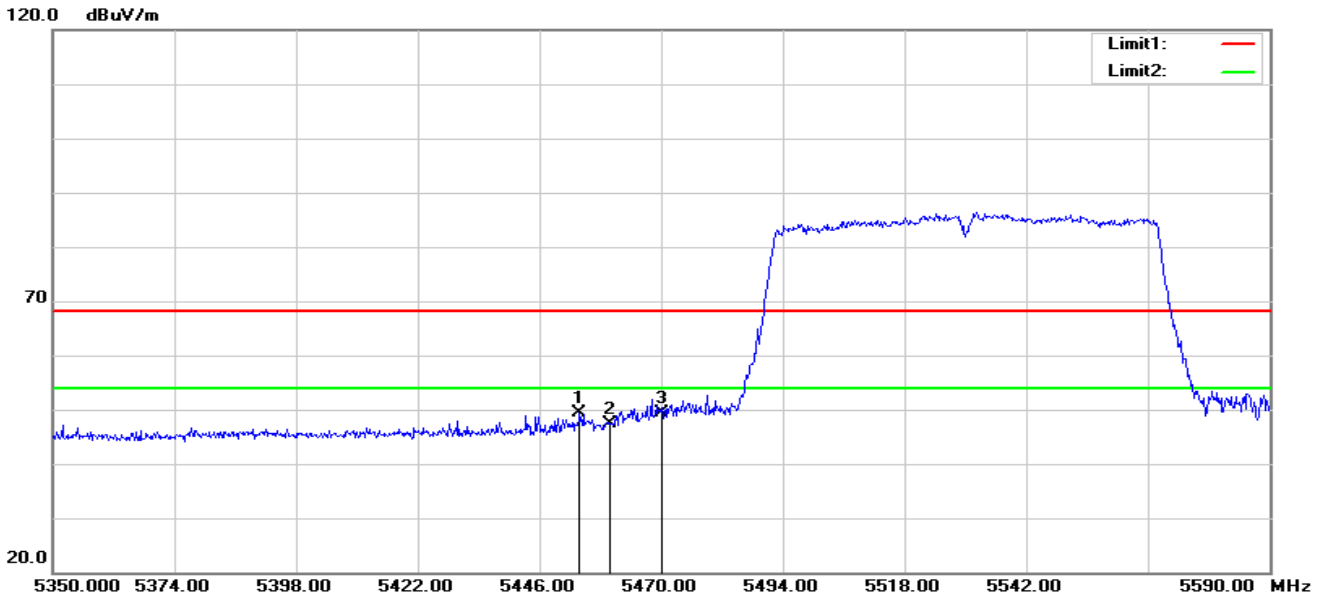
802.11n40-H-V



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5725.000	62.43	-4.57	57.86	68.20	-10.34	peak
2	5725.000	43.22	-4.57	38.65	54.00	-15.35	AVG
3	5728.800	62.75	-4.56	58.19	68.20	-10.01	peak
4	5728.800	43.71	-4.56	39.15	54.00	-14.85	AVG

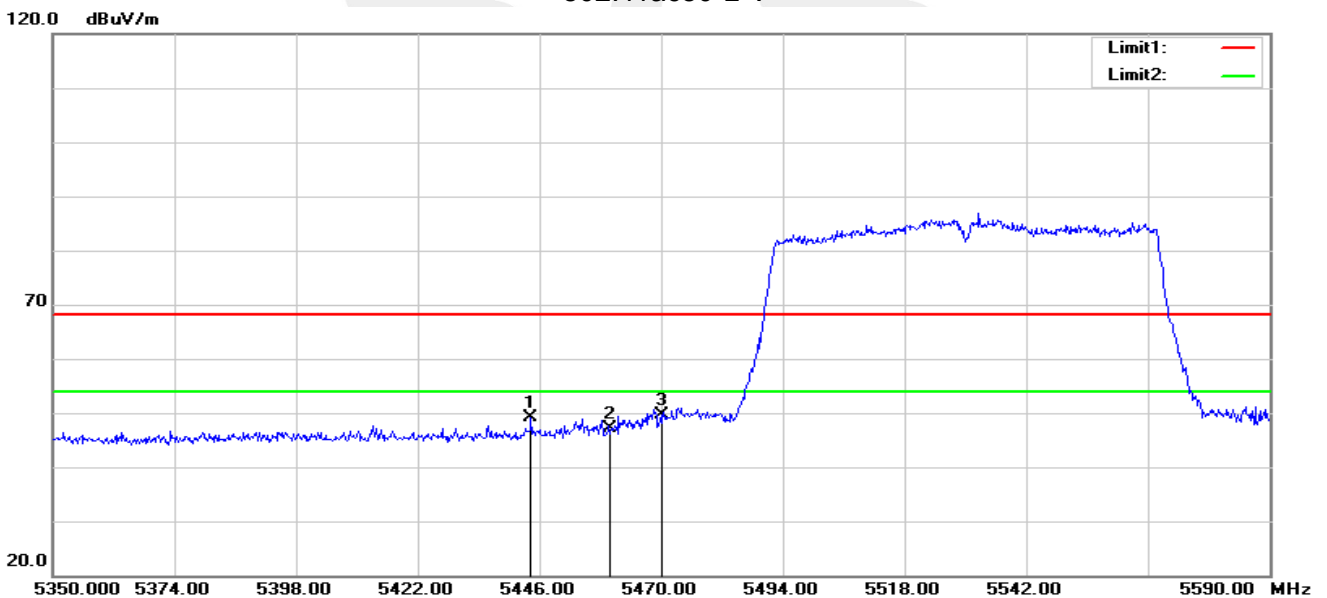


802.11ac80-L-H



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5453.920	54.61	-5.13	49.48	68.20	-18.72	peak
2	5460.000	52.48	-5.11	47.37	68.20	-20.83	peak
3	5470.000	54.47	-5.09	49.38	68.20	-18.82	peak

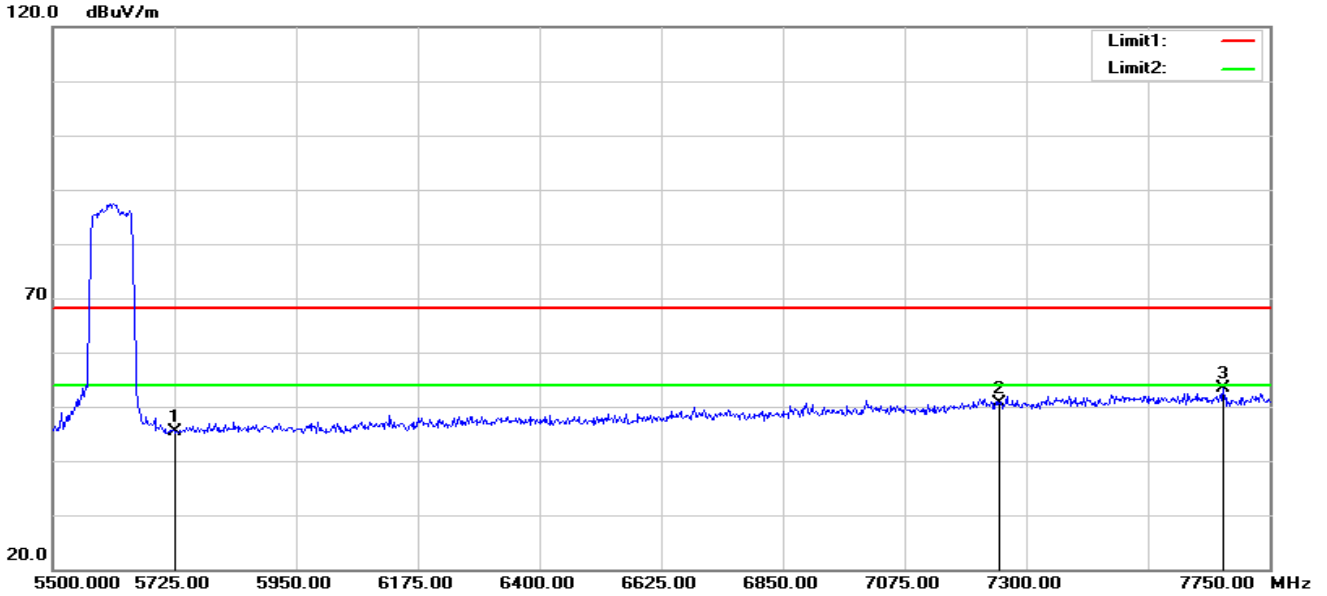
802.11ac80-L-V



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5444.320	54.21	-5.14	49.07	68.20	-19.13	peak
2	5460.000	52.13	-5.11	47.02	68.20	-21.18	peak
3	5470.000	54.63	-5.09	49.54	68.20	-18.66	peak

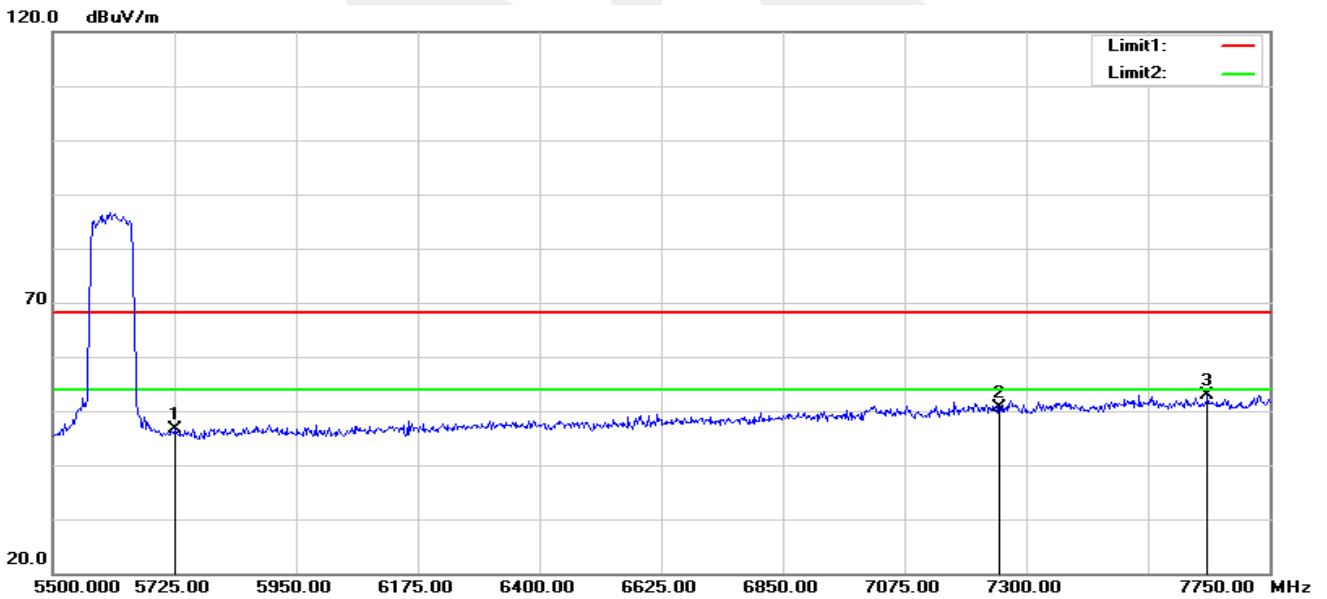


802.11ac80-H-H



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5725.000	50.06	-4.57	45.49	68.20	-22.71	peak
2	7250.000	49.95	0.72	50.67	68.20	-17.53	peak
3	7664.500	51.62	1.81	53.43	68.20	-14.77	peak

802.11ac80-H-V



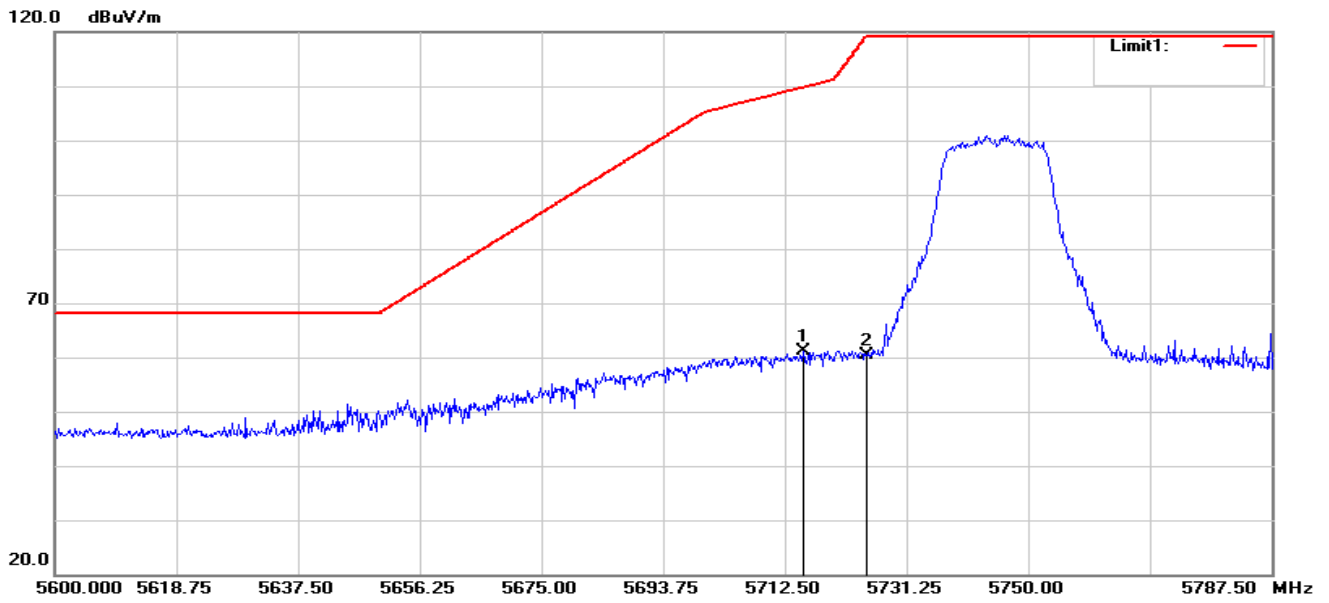
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5725.000	51.21	-4.57	46.64	68.20	-21.56	peak
2	7250.000	49.82	0.72	50.54	68.20	-17.66	peak
3	7635.250	51.11	1.77	52.88	68.20	-15.32	peak

Note: All modes have been tested. Only the worst mode shown in the report.



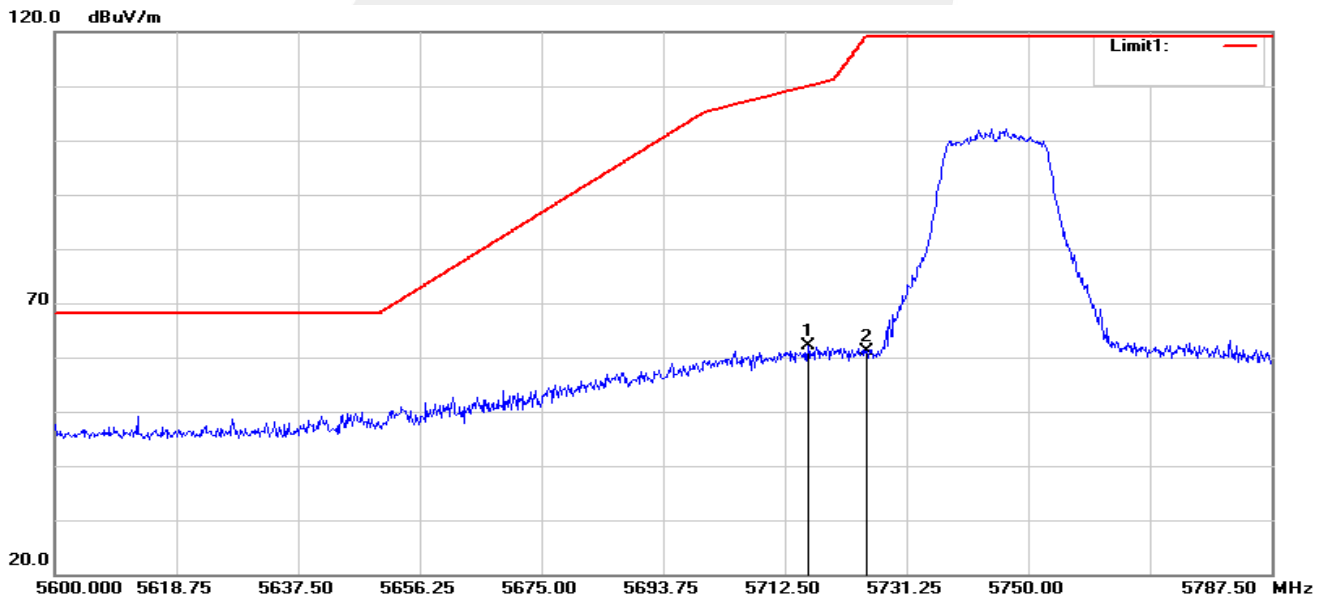
Band IV(5.725-5.85 GHz)

802.11a-L-H



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5715.313	65.74	-4.61	61.13	109.79	-48.66	peak
2	5725.000	64.83	-4.57	60.26	119.20	-58.94	peak

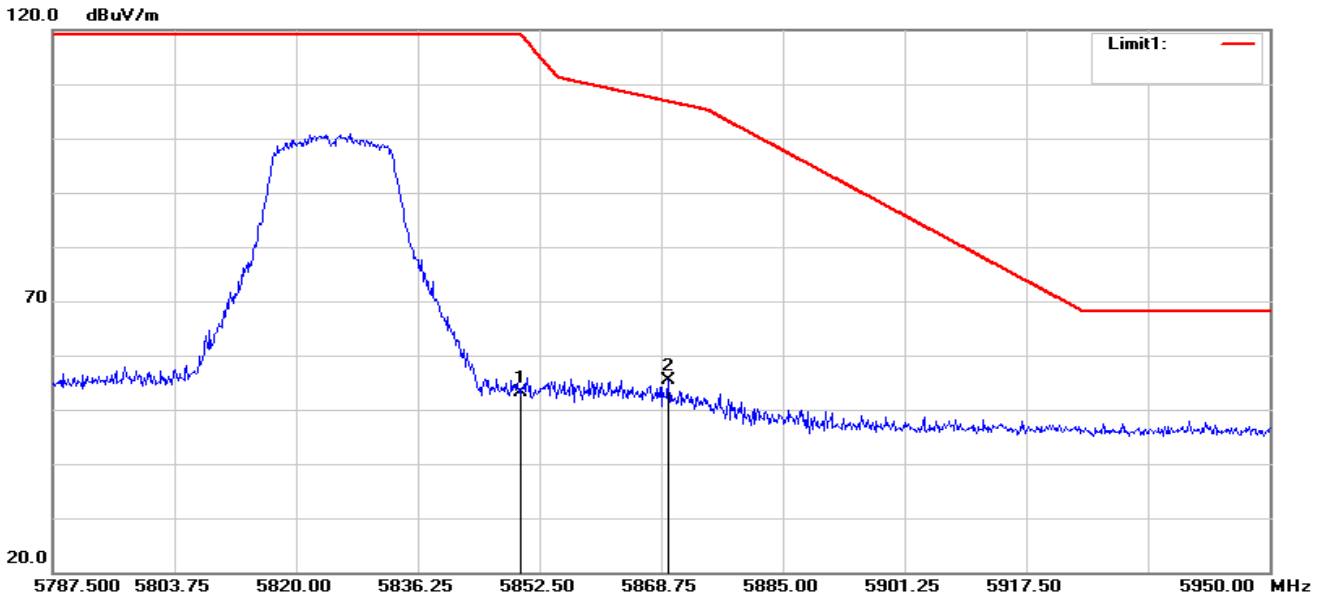
802.11a-L-V



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5716.063	66.69	-4.60	62.09	110.02	-47.93	peak
2	5725.000	65.69	-4.57	61.12	119.20	-58.08	peak

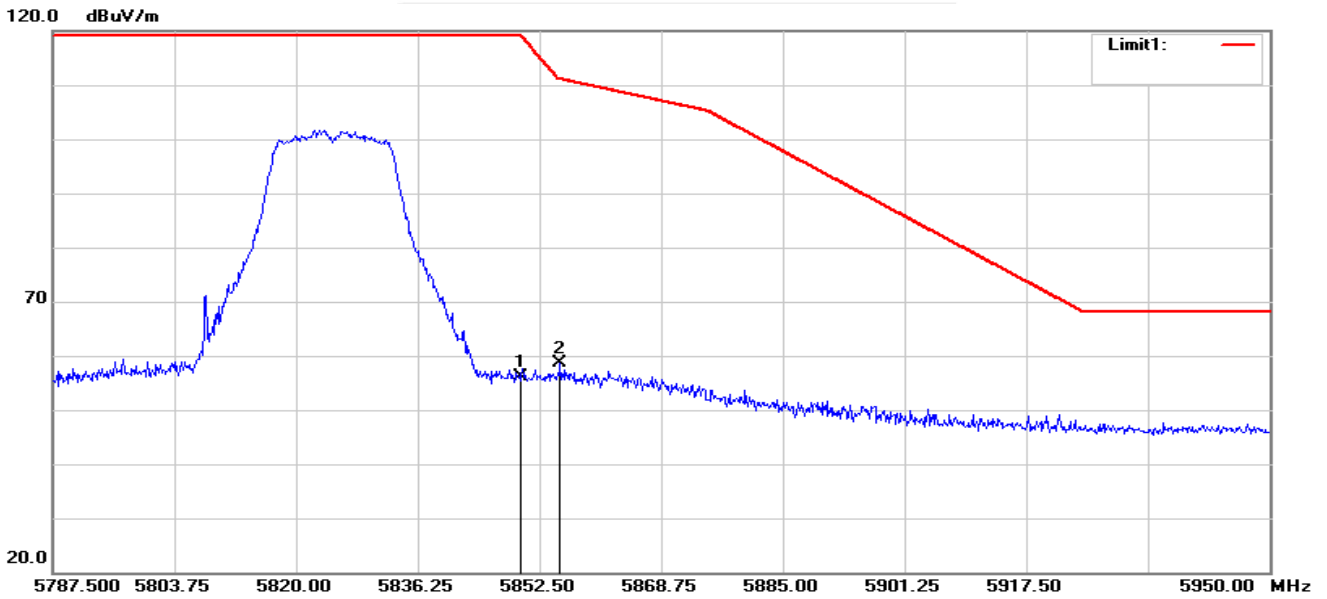


802.11a-H-H



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5850.000	57.16	-4.10	53.06	119.20	-66.14	peak
2	5869.725	59.44	-4.01	55.43	106.78	-51.35	peak

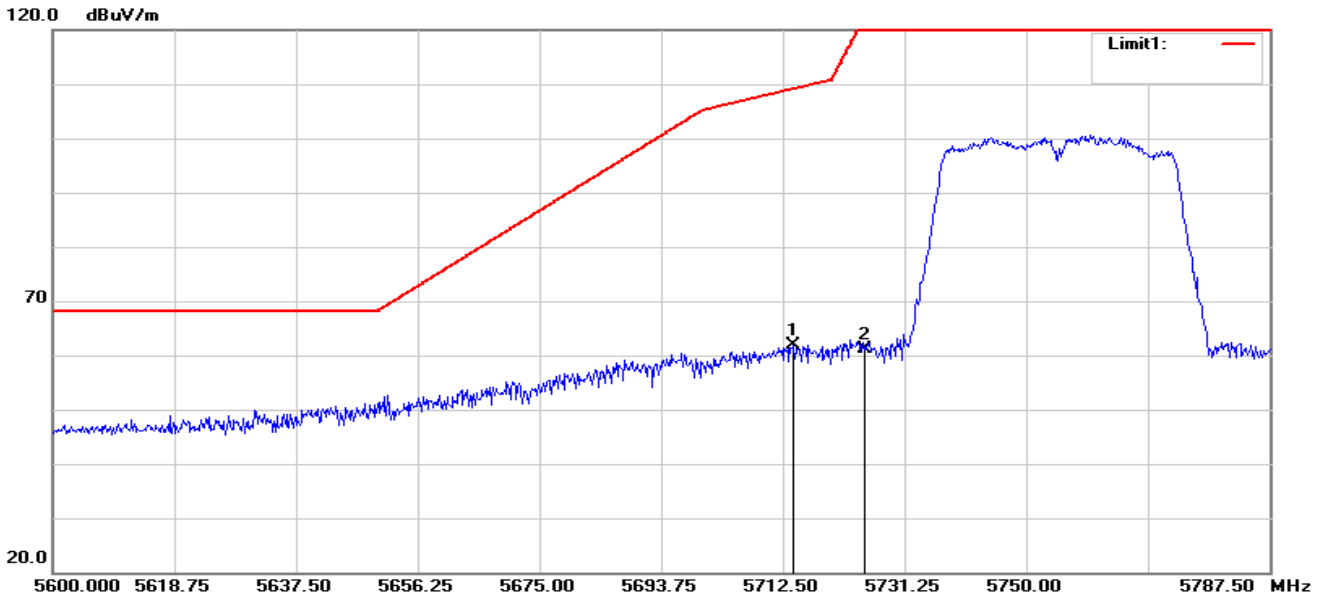
802.11a-H-V



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5850.000	60.31	-4.10	56.21	119.20	-62.99	peak
2	5855.262	62.70	-4.08	58.62	111.12	-52.50	peak

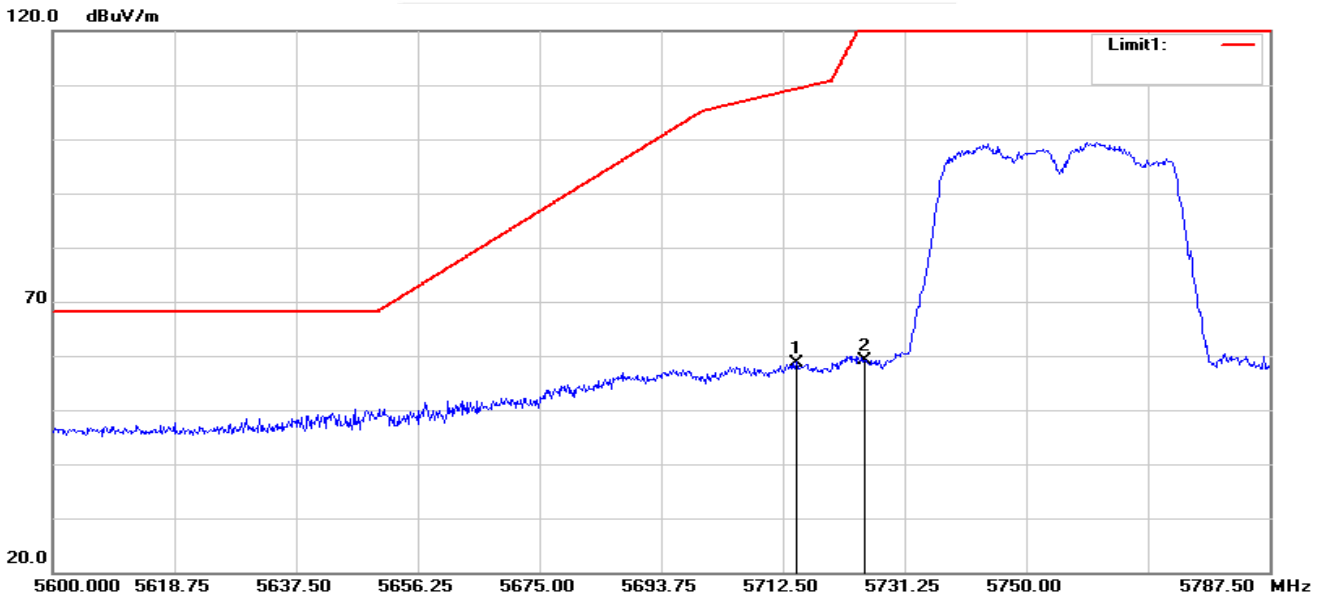


802.11n40-L-H



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5714.188	66.42	-4.61	61.81	109.17	-47.36	peak
2	5725.000	65.81	-4.57	61.24	122.20	-60.96	peak

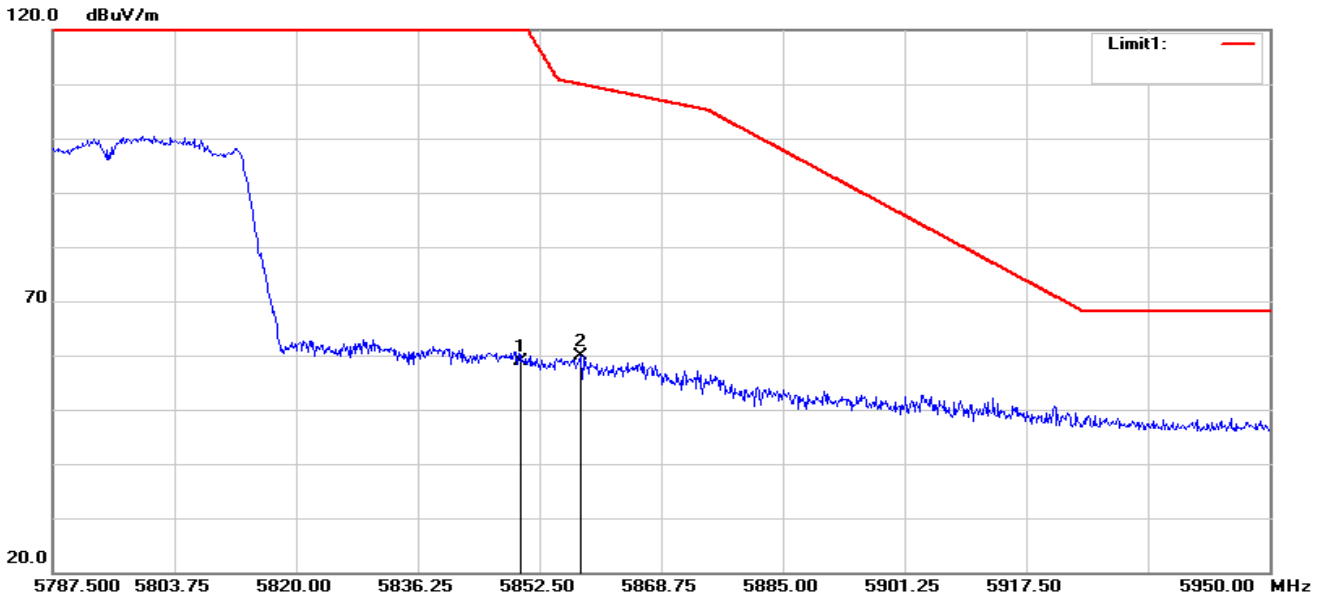
802.11n40-L-V



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5714.563	63.36	-4.61	58.75	109.28	-50.53	peak
2	5725.000	63.72	-4.57	59.15	122.20	-63.05	peak

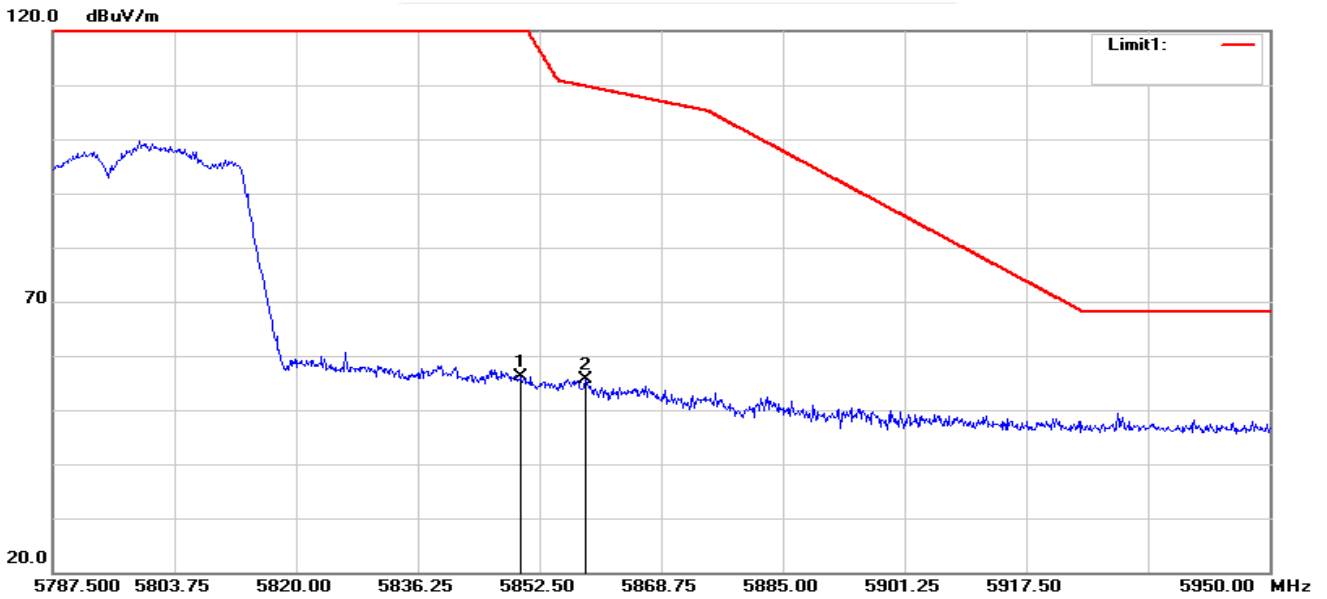


802.11n40-H-H



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5850.000	62.93	-4.10	58.83	122.20	-63.37	peak
2	5858.025	63.88	-4.07	59.81	109.95	-50.14	peak

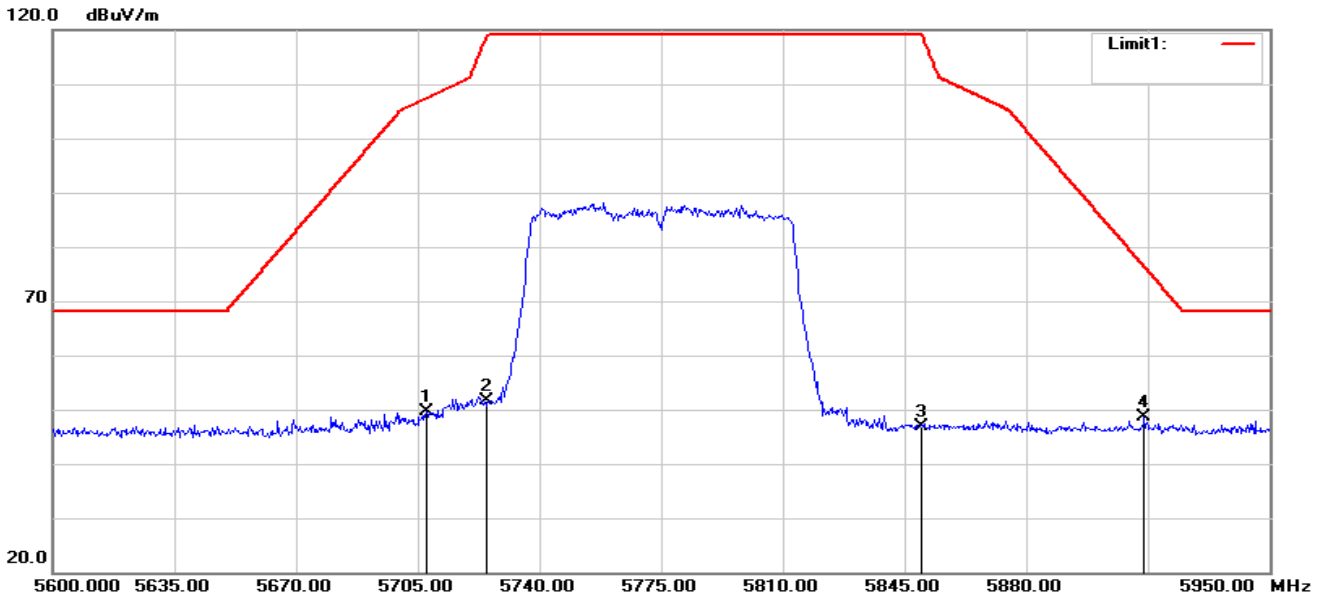
802.11n40-H-V



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5850.000	60.27	-4.10	56.17	122.20	-66.03	peak
2	5858.675	59.73	-4.07	55.66	109.77	-54.11	peak

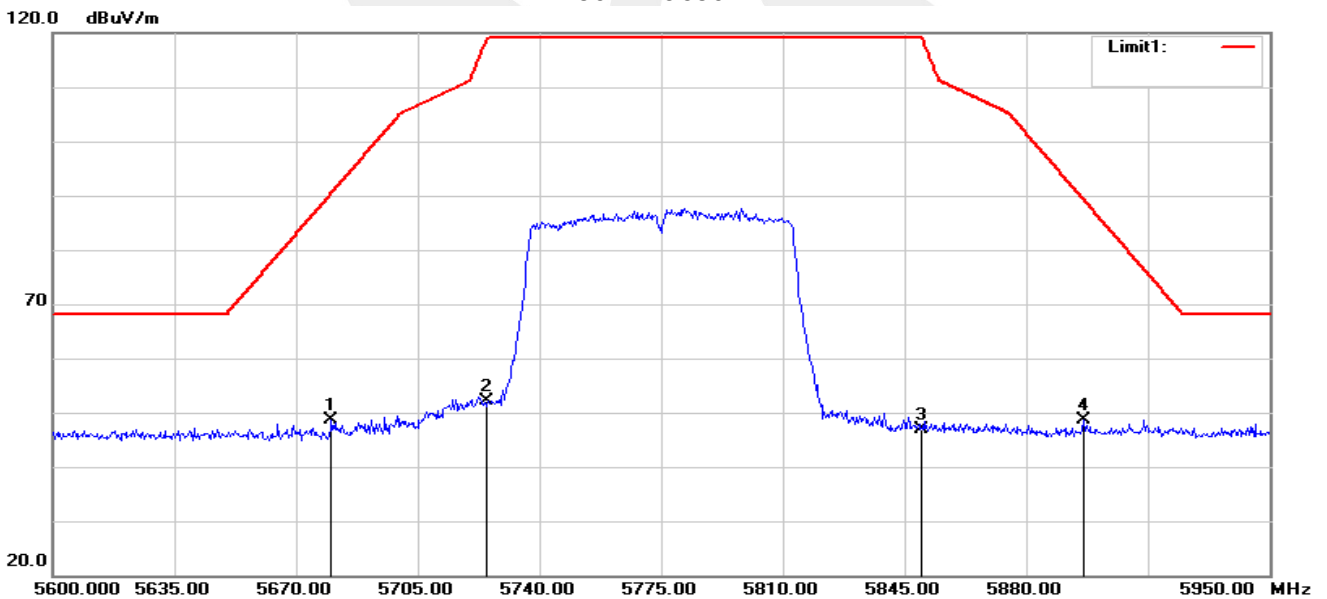


802.11ac80-H



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5707.450	54.37	-4.64	49.73	107.43	-57.70	peak
2	5725.000	56.09	-4.57	51.52	119.20	-67.68	peak
3	5850.000	50.90	-4.10	46.80	119.20	-72.40	peak
4	5913.950	52.43	-3.91	48.52	76.38	-27.86	peak

802.11ac80-V



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5680.150	53.26	-4.67	48.59	90.51	-41.92	peak
2	5725.000	56.59	-4.57	52.02	119.20	-67.18	peak
3	5850.000	50.90	-4.10	46.80	119.20	-72.40	peak
4	5896.450	52.51	-3.90	48.61	89.33	-40.72	peak

Note: All modes have been tested. Only the worst mode shown in the report.



4. POWER SPECTRAL DENSITY TEST

4.1 LIMIT

1. 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.
2. For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, 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.
3. For the band 5.725-5.850 GHz, the peak power spectral density shall not exceed 30 dBm in any 500KHz band. If transmitting antenna directional gain is greater than 6 dBi, both the maximum conducted output power and the peak 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

1. The setting follows Method SA-1 of FCC KDB 789033 D02 General U-NII Test Procedures New Rules v02r01.

For devices operating in the band, 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.I.a).
- b) Set $VBW \geq 3 RBW$.
- c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add $10 \log (500\text{kHz}/RBW)$ to the measured result, whereas $RBW (< 500 \text{ kHz})$ 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 $10 \log (1\text{MHz}/RBW)$ to the measured result, whereas $RBW (< 1 \text{ MHz})$ 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 $RBW=100 \text{ KHZ}$ 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

5150-5250MHz								
Frequency	Direct measurement Ant_A Power Density (dBm)	Direct measurement Ant_B Power Density (dBm)	Duty cycle factor	Final Ant_A Power Density (dBm)	Final Ant_B Power Density (dBm)	Power Density Total (dBm)	Limit (dBm)	Result
802.11a								
5180	1.504	0.811	0.156	1.660	0.967	--	11	PASS
5200	1.975	0.791	0.156	2.131	0.947	--	11	PASS
5240	1.741	0.981	0.156	1.897	1.137	--	11	PASS
802.11n20								
5180	1.483	0.830	0.157	1.640	0.987	4.336	11	PASS
5200	1.113	0.531	0.157	1.270	0.688	3.999	11	PASS
5240	1.258	0.332	0.157	1.415	0.489	3.987	11	PASS
802.11n40								
5190	-1.178	-1.395	0.308	-0.870	-1.087	2.033	11	PASS
5230	-1.516	-1.388	0.308	-1.208	-1.080	1.867	11	PASS
802.11ac20								
5180	1.455	0.580	0.156	1.611	0.736	4.206	11	PASS
5200	1.699	0.342	0.156	1.855	0.498	4.240	11	PASS
5240	1.404	0.436	0.156	1.560	0.592	4.114	11	PASS
802.11ac40								
5190	-1.585	-1.374	0.357	-1.228	-1.017	1.889	11	PASS
5230	-1.107	-1.432	0.357	-0.750	-1.075	2.101	11	PASS
802.11ac80								
5210	-13.400	-13.905	0.657	-12.743	-13.248	-9.978	11	PASS



5250-5350MHz								
Frequency	Direct measurement Ant_A Power Density (dBm)	Direct measurement Ant_B Power Density (dBm)	Duty cycle factor	Final Ant_A Power Density (dBm)	Final Ant_B Power Density (dBm)	Power Density Total (dBm)	Limit (dBm)	Result
802.11a								
5260	1.772	1.097	0.167	1.939	1.264	--	11	PASS
5300	1.839	1.934	0.167	2.006	2.101	--	11	PASS
5320	2.570	2.271	0.167	2.737	2.438	--	11	PASS
802.11n20								
5260	1.471	0.815	0.145	1.616	0.960	4.311	11	PASS
5300	1.700	1.393	0.145	1.845	1.539	4.705	11	PASS
5320	2.264	1.957	0.145	2.409	2.102	5.269	11	PASS
802.11n40								
5270	-1.249	-0.958	0.320	-0.929	-0.638	2.229	11	PASS
5310	-1.234	-0.565	0.320	-0.914	-0.245	2.444	11	PASS
802.11ac20								
5260	1.595	0.691	0.156	1.751	0.847	4.333	11	PASS
5300	1.766	1.225	0.156	1.922	1.381	4.671	11	PASS
5320	2.521	1.901	0.156	2.677	2.057	5.389	11	PASS
802.11ac40								
5270	-0.957	-1.538	0.319	-0.638	-1.219	2.091	11	PASS
5310	-1.313	-0.401	0.319	-0.994	-0.082	2.496	11	PASS
802.11ac80								
5290	-13.177	-14.258	0.643	-12.534	-13.615	-10.031	11	PASS



5470-5725MHz								
Frequency	Direct measurement Ant_A Power Density (dBm)	Direct measurement Ant_B Power Density (dBm)	Duty cycle factor	Final Ant_A Power Density (dBm)	Final Ant_B Power Density (dBm)	Power Density Total (dBm)	Limit (dBm)	Result
802.11a								
5500	2.650	2.768	0.147	2.797	2.915	--	11	PASS
5580	2.734	2.772	0.147	2.881	2.919	--	11	PASS
5700	3.556	2.402	0.147	3.703	2.549	--	11	PASS
802.11n20								
5500	2.074	2.336	0.134	2.208	2.470	5.351	11	PASS
5580	2.680	2.136	0.134	2.814	2.270	5.561	11	PASS
5700	3.404	2.059	0.134	3.538	2.193	5.928	11	PASS
802.11n40								
5510	-0.715	-0.954	0.373	-0.342	-0.581	2.551	11	PASS
5550	-0.446	-0.806	0.373	-0.073	-0.433	2.761	11	PASS
5670	0.421	-0.444	0.373	0.794	-0.071	3.394	11	PASS
802.11ac20								
5500	2.299	2.224	0.167	2.466	2.391	5.439	11	PASS
5580	2.565	2.036	0.167	2.732	2.203	5.486	11	PASS
5700	3.270	2.098	0.167	3.437	2.265	5.901	11	PASS
802.11ac40								
5510	-0.477	-1.179	0.279	-0.198	-0.900	2.475	11	PASS
5550	-0.346	-1.092	0.279	-0.067	-0.813	2.586	11	PASS
5670	0.193	-0.057	0.279	0.472	0.222	3.359	11	PASS
802.11ac80								
5530	-12.049	-12.675	0.628	-11.421	-12.047	-8.713	11	PASS
5610	-12.059	-11.567	0.628	-11.431	-10.939	-8.168	11	PASS



5725-5850MHz										
Frequency	Use RBW 510KHz direct measurement Ant_A Power Density (dBm)	Use RBW 510KHz direct measurement Ant_B Power Density (dBm)	Convert to RBW 500KHz direct measurement Ant_A Power Density (dBm)	Convert to RBW 500KHz direct measurement Ant_B Power Density (dBm)	Duty cycle factor (dB)	Final Ant_A Power Density (dBm)	Final Ant_B Power Density (dBm)	Power Density Total (dBm)	Limit (dBm)	Result
802.11a										
5745	0.070	-0.170	-0.016	-0.256	0.146	0.130	-0.110	--	30	PASS
5785	-0.145	-1.546	-0.231	-1.632	0.146	-0.085	-1.486	--	30	PASS
5825	-0.541	-2.306	-0.627	-2.392	0.146	-0.481	-2.246	--	30	PASS
802.11n20										
5745	0.292	0.012	0.206	-0.074	0.157	0.363	0.083	3.236	30	PASS
5785	-0.603	-2.163	-0.689	-2.249	0.157	-0.532	-2.092	1.768	30	PASS
5825	-0.840	-2.611	-0.926	-2.697	0.157	-0.769	-2.540	1.446	30	PASS
802.11n40										
5755	-2.932	-2.874	-3.018	-2.960	0.345	-2.673	-2.615	0.367	30	PASS
5795	-3.574	-4.291	-3.660	-4.377	0.345	-3.315	-4.032	-0.648	30	PASS
802.11ac20										
5745	0.151	-0.621	0.065	-0.707	0.167	0.232	-0.540	2.873	30	PASS
5785	-0.291	-2.019	-0.377	-2.105	0.167	-0.210	-1.938	2.022	30	PASS
5825	-0.670	-2.617	-0.756	-2.703	0.167	-0.589	-2.536	1.556	30	PASS
802.11ac40										
5755	-2.887	-3.293	-2.973	-3.379	0.343	-2.630	-3.036	0.182	30	PASS
5795	-3.731	-4.452	-3.817	-4.538	0.343	-3.474	-4.195	-0.809	30	PASS
802.11ac80										
5775	-15.311	-15.033	-15.397	-15.119	0.625	-14.772	-14.494	-11.621	30	PASS

Note: 1. RB conversion formula: $10 \cdot \text{LOG}(500\text{KHz}/\text{RBW})$
 2. Test plots see Attachment A.

5. BANDWIDTH MEASUREMENT

5.1 EMISSION BANDWIDTH (EBW) 26 BANDWID PROCEDURES / LIMIT

The following procedure shall be used for measuring 26 bandwidth.

5.1.1 TEST PROCEDURE

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
2. Set RBW = approximately 1% of the emission bandwidth.
3. Set the VBW \geq RBW.
4. Detector = Peak.
5. Trace mode = max hold.
6. Measure the maximum width of the emission that is 26 dB down from the peak 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%.

5.1.2 DEVIATION FROM STANDARD

No deviation.

5.1.3 TEST SETUP



5.1.4 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.

**5.1.5 TEST RESULTS**

Frequency (MHz)	26dB Bandwidth (MHz)	Pass/Fail
802.11a		
5180	22.71	Pass
5200	22.73	Pass
5240	22.68	Pass
802.11n(HT20)		
5180	23.14	Pass
5200	22.68	Pass
5240	22.88	Pass
802.11n(HT40)		
5190	41.19	Pass
5230	42.03	Pass
802.11ac(VHT20)		
5180	24.35	Pass
5200	23.24	Pass
5240	22.92	Pass
802.11ac(VHT40)		
5190	41.21	Pass
5230	41.71	Pass
802.11ac(VHT80)		
5210	82.61	Pass

Frequency (MHz)	26dB Bandwidth (MHz)	Pass/Fail
802.11a		
5260	22.17	Pass
5300	22.75	Pass
5320	22.25	Pass
802.11n(HT20)		
5260	23.60	Pass
5300	23.37	Pass
5320	22.69	Pass
802.11n(HT40)		
5270	41.04	Pass
5310	41.32	Pass
802.11ac(VHT20)		
5260	22.67	Pass
5300	22.77	Pass
5320	23.15	Pass
802.11ac(VHT40)		
5270	41.21	Pass
5310	41.34	Pass
802.11ac(VHT80)		
5290	83.72	Pass



Frequency (MHz)	26dB Bandwidth (MHz)	Pass/Fail
802.11a		
5500	22.45	Pass
5580	22.37	Pass
5700	22.94	Pass
802.11n(HT20)		
5500	22.73	Pass
5580	22.81	Pass
5700	23.02	Pass
802.11n(HT40)		
5510	41.41	Pass
5550	40.75	Pass
5670	41.32	Pass
802.11ac(VHT20)		
5500	23.36	Pass
5580	22.59	Pass
5700	22.73	Pass
802.11ac(VHT40)		
5510	41.25	Pass
5550	41.08	Pass
5670	41.27	Pass
802.11ac(VHT80)		
5530	83.31	Pass
5610	84.03	Pass

Frequency (MHz)	26dB Bandwidth (MHz)	Pass/Fail
802.11a		
5745	22.71	Pass
5785	22.71	Pass
5825	22.19	Pass
802.11n(HT20)		
5745	22.72	Pass
5785	23.73	Pass
5825	23.54	Pass
802.11n(HT40)		
5755	41.61	Pass
5795	41.13	Pass
802.11ac(VHT20)		
5745	23.36	Pass
5785	23.52	Pass
5825	23.26	Pass
802.11ac(VHT40)		
5755	41.25	Pass
5795	41.02	Pass
802.11ac(VHT80)		
5775	83.46	Pass

Note:

1. Antenna A Power > Antenna B Power, Both antenna A and B have been test, Only show the worst data of Antenna A.
2. Test plot see Attachment B.

5.2 OCCUPIED BANDWIDTH (99%) TEST APPLIED PROCEDURES / LIMIT

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

5.2.1 TEST PROCEDURE

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures v02r01.

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.

5.2.2 DEVIATION FROM STANDARD

No deviation.

5.2.3 TEST SETUP



5.2.4 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.

**5.2.5 TEST RESULTS**

Frequency (MHz)	99% Bandwidth (MHz)	Pass/Fail
802.11a		
5180	16.56	Pass
5200	16.58	Pass
5240	16.58	Pass
802.11n(HT20)		
5180	17.73	Pass
5200	17.70	Pass
5240	17.74	Pass
802.11n(HT40)		
5190	36.20	Pass
5230	36.22	Pass
802.11ac(VHT20)		
5180	17.71	Pass
5200	17.74	Pass
5240	17.71	Pass
802.11ac(VHT40)		
5190	36.19	Pass
5230	36.22	Pass
802.11ac(VHT80)		
5210	75.62	Pass

Frequency (MHz)	99% Bandwidth (MHz)	Pass/Fail
802.11a		
5260	16.55	Pass
5300	16.57	Pass
5320	16.54	Pass
802.11n(HT20)		
5260	17.70	Pass
5300	17.73	Pass
5320	17.70	Pass
802.11n(HT40)		
5270	36.19	Pass
5310	36.19	Pass
802.11ac(VHT20)		
5260	17.73	Pass
5300	17.71	Pass
5320	17.73	Pass
802.11ac(VHT40)		
5270	36.21	Pass
5310	36.21	Pass
802.11ac(VHT80)		
5290	75.67	Pass



Frequency (MHz)	99% Bandwidth (MHz)	Pass/Fail
802.11a		
5500	16.55	Pass
5580	16.58	Pass
5700	16.56	Pass
802.11n(HT20)		
5500	17.73	Pass
5580	17.70	Pass
5700	17.71	Pass
802.11n(HT40)		
5510	36.21	Pass
5550	36.19	Pass
5670	36.21	Pass
802.11ac(VHT20)		
5500	17.72	Pass
5580	17.71	Pass
5700	17.72	Pass
802.11ac(VHT40)		
5510	36.18	Pass
5550	36.19	Pass
5670	36.19	Pass
802.11ac(VHT80)		
5530	75.61	Pass
5610	75.70	Pass

Frequency (MHz)	99% Bandwidth (MHz)	Pass/Fail
802.11a		
5745	16.56	Pass
5785	16.58	Pass
5825	16.53	Pass
802.11n(HT20)		
5745	17.72	Pass
5785	17.73	Pass
5825	17.73	Pass
802.11n(HT40)		
5755	36.24	Pass
5795	36.21	Pass
802.11ac(VHT20)		
5745	17.73	Pass
5785	17.72	Pass
5825	17.71	Pass
802.11ac(VHT40)		
5755	36.21	Pass
5795	36.22	Pass
802.11ac(VHT80)		
5775	75.67	Pass

Note:

1. Antenna A Power > Antenna B Power, Both antenna A and B have been test, Only show the worst data of Antenna A.
2. Test plot see Attachment B.

5.3 MINIMUM EMISSION BANDWIDTH(6 DB) PROCEDURES / LIMIT

Section 15.407(e) specifies the minimum 6 dB emission bandwidth of at least 500 KHz for the band 5.725-5.85 GHz. The following procedure shall be used for measuring this bandwidth.

5.3.1 TEST PROCEDURE

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures v02r01.
 - a) Set RBW = 100 kHz.
 - b) Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
 - c) Detector = Peak.
 - d) Trace mode = max hold.
 - e) Sweep = auto couple.
 - f) Allow the trace to stabilize.
 - g) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

5.3.2 DEVIATION FROM STANDARD

No deviation.

5.3.3 TEST SETUP



5.3.4 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.

**5.3.5 TEST RESULTS**

Frequency (MHz)	6dB Bandwidth (MHz)	Pass/Fail
802.11a		
5745	15.33	Pass
5785	16.05	Pass
5825	15.62	Pass
802.11n(HT20)		
5745	15.70	Pass
5785	15.68	Pass
5825	15.02	Pass
802.11n(HT40)		
5755	36.32	Pass
5795	36.32	Pass
802.11ac(VHT20)		
5745	15.13	Pass
5785	15.65	Pass
5825	16.61	Pass
802.11ac(VHT40)		
5755	36.32	Pass
5795	36.03	Pass
802.11ac(VHT80)		
5775	75.38	Pass

Note:

1. Antenna A Power > Antenna B Power, Both antenna A and B have been test, Only show the worst data of Antenna A.
2. Test plot see Attachment C.

6. MAXIMUM CONDUCTED OUTPUT POWER

6.1 LIMIT

For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. 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, If transmitting antennas of directional gain greater than 6 dBi are used.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. If transmitting antennas of directional gain greater than 6 dBi are used.

FCC Part15 (15.407) , Subpart E				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.407(a) (1) (iv)	Peak Output Power	0.25 watt	5150-5250	PASS
		The lesser of 250 mW or 11 dBm + 10 log (26 dB emission bandwidth)	5250-5350 5470-5725	
15.407(a) (3)		1 watt	5725-5825	

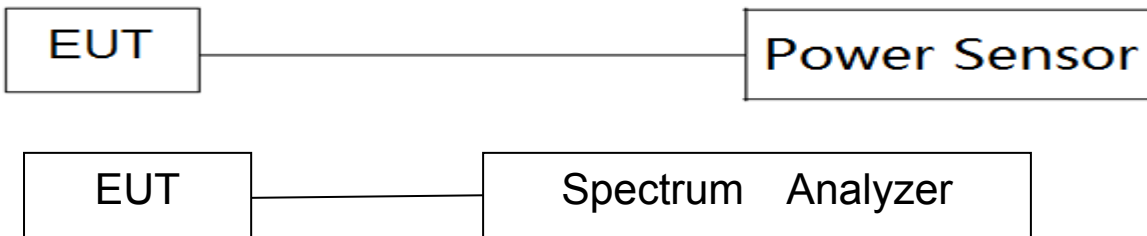
6.2 TEST PROCEDURE

The EUT was directly connected to the Power Sensor&PC

6.3 DEVIATION FROM STANDARD

No deviation.

6.4 TEST SETUP



6.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 5 Unless otherwise a special operating condition is specified in the follows during the testing.



6.6 TEST RESULTS

Band I (5.15-5.25GHz)								
Test Channel	Frequency (MHz)	Direct measurement Ant_A AV Power (dBm)	Direct measurement Ant B_AV Power (dBm)	Duty cycle factor (dB)	Final Ant_A AV Power (dBm)	Final Ant_B AV Power (dBm)	AV Power Total (dBm)	LIMIT (dBm)
802.11a								
36	5180	11.96	11.57	0.156	12.12	11.73	--	23.98
40	5200	12.13	11.59	0.156	12.29	11.75	--	23.98
48	5240	11.91	11.55	0.156	12.07	11.71	--	23.98
802.11n(HT20)								
36	5180	11.85	11.43	0.157	12.01	11.59	14.81	23.98
40	5200	11.96	11.48	0.157	12.12	11.64	14.89	23.98
48	5240	11.80	11.44	0.157	11.96	11.60	14.79	23.98
802.11n(HT40)								
38	5190	11.82	11.51	0.308	12.13	11.82	14.99	23.98
46	5230	12.03	11.49	0.308	12.34	11.80	15.09	23.98
802.11ac(VHT20)								
36	5180	11.83	11.45	0.156	11.99	11.61	14.81	23.98
40	5200	12.00	11.41	0.156	12.16	11.57	14.88	23.98
48	5240	11.79	11.49	0.156	11.95	11.65	14.81	23.98
802.11ac(VHT40)								
38	5190	11.84	11.39	0.357	12.20	11.75	14.99	23.98
46	5230	12.00	11.32	0.357	12.36	11.68	15.04	23.98
802.11ac(VHT80)								
42	5210	9.90	9.58	0.657	10.56	10.24	13.41	23.98



Band II(5.25-5.35GHz)								
Test Channel	Frequency (MHz)	Direct measurement Ant_A AV Power (dBm)	Direct measurement Ant_B_AV Power (dBm)	Duty cycle factor (dB)	Final Ant_A AV Power (dBm)	Final Ant_B AV Power (dBm)	AV Power Total (dBm)	LIMIT (dBm)
802.11a								
52	5260	12.18	11.73	0.167	12.35	11.90	--	23.98
60	5300	12.14	11.80	0.167	12.31	11.97	--	23.98
64	5320	12.62	11.91	0.167	12.79	12.08	--	23.98
802.11n(HT20)								
52	5260	11.99	11.67	0.145	12.14	11.82	14.99	23.98
60	5300	12.01	11.71	0.145	12.16	11.86	15.02	23.98
64	5320	12.48	11.82	0.145	12.63	11.97	15.32	23.98
802.11n(HT40)								
54	5270	12.16	11.57	0.320	12.48	11.89	15.21	23.98
62	5310	11.87	11.76	0.320	12.19	12.08	15.15	23.98
802.11ac(VHT20)								
52	5260	12.00	11.68	0.156	12.16	11.84	15.01	23.98
60	5300	12.03	11.71	0.156	12.19	11.87	15.04	23.98
64	5320	12.45	11.77	0.156	12.61	11.93	15.29	23.98
802.11ac(VHT40)								
54	5270	12.11	11.76	0.319	12.43	12.08	15.27	23.98
62	5310	11.86	11.83	0.319	12.18	12.15	15.17	23.98
802.11ac(VHT80)								
58	5290	10.03	9.74	0.643	10.67	10.38	13.54	23.98



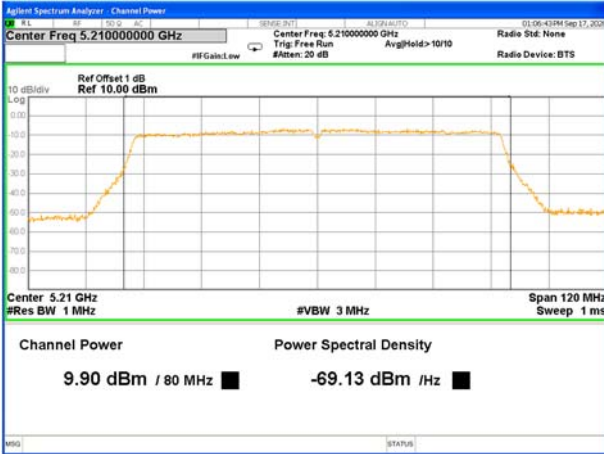


Band III(5.47-5.725GHz)								
Test Channel	Frequency (MHz)	Direct measurement Ant_A AV Power (dBm)	Direct measurement Ant B_AV Power (dBm)	Duty cycle factor (dB)	Final Ant_A AV Power (dBm)	Final Ant_B AV Power (dBm)	AV Power Total (dBm)	LIMIT (dBm)
802.11a								
100	5500	12.51	11.98	0.147	12.66	12.13	--	23.98
116	5580	13.13	12.56	0.147	13.28	12.71	--	23.98
140	5700	13.55	13.13	0.147	13.70	13.28	--	23.98
802.11n(HT20)								
100	5500	12.25	11.76	0.134	12.38	11.89	15.16	23.98
116	5580	12.99	12.40	0.134	13.12	12.53	15.85	23.98
140	5700	13.40	13.00	0.134	13.53	13.13	16.35	23.98
802.11n(HT40)								
102	5510	12.52	11.89	0.373	12.89	12.26	15.60	23.98
110	5550	12.55	12.05	0.373	12.92	12.42	15.69	23.98
134	5670	13.37	13.22	0.373	13.74	13.59	16.68	23.98
802.11ac(VHT20)								
100	5500	12.26	11.71	0.167	12.43	11.88	15.17	23.98
116	5580	12.93	12.42	0.167	13.10	12.59	15.86	23.98
140	5700	13.40	12.96	0.167	13.57	13.13	16.36	23.98
802.11ac(VHT40)								
102	5510	12.51	11.81	0.279	12.79	12.09	15.46	23.98
110	5550	12.56	12.03	0.279	12.84	12.31	15.59	23.98
134	5670	13.40	13.17	0.279	13.68	13.45	16.58	23.98
802.11ac(VHT80)								
106	5530	10.23	9.84	0.628	10.86	10.47	13.68	23.98
122	5610	10.93	10.53	0.628	11.56	11.16	14.37	23.98

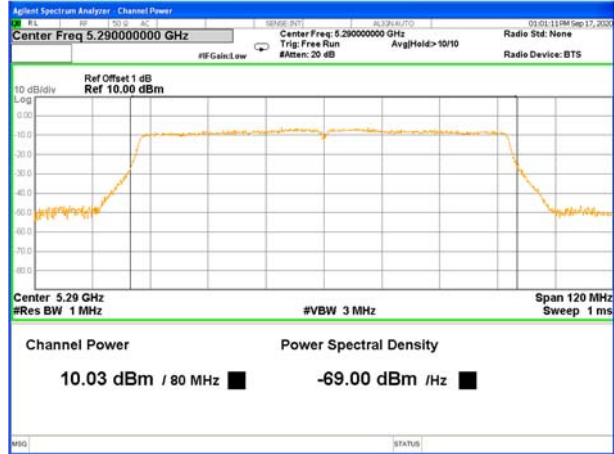


Band IV (5.725-5.85GHz)								
Test Channel	Frequency (MHz)	Direct measurement Ant_A AV Power (dBm)	Direct measurement Ant B_AV Power (dBm)	Duty cycle factor (dB)	Final Ant_A AV Power (dBm)	Final Ant_B AV Power (dBm)	AV Power Total (dBm)	LIMIT (dBm)
802.11a								
149	5745	13.13	12.53	0.146	13.28	12.68	--	30.00
157	5785	12.92	11.61	0.146	13.07	11.76	--	30.00
165	5825	12.37	11.27	0.146	12.52	11.42	--	30.00
802.11n(HT20)								
149	5745	12.97	12.42	0.157	13.13	12.58	15.871	30.00
157	5785	12.82	11.39	0.157	12.98	11.55	15.331	30.00
165	5825	12.18	11.26	0.157	12.34	11.42	14.912	30.00
802.11n(HT40)								
151	5755	13.04	12.38	0.345	13.39	12.73	16.078	30.00
159	5795	12.66	11.39	0.345	13.01	11.74	15.427	30.00
802.11ac(VHT20)								
149	5745	12.98	12.42	0.167	13.15	12.59	15.886	30.00
157	5785	12.83	11.38	0.167	13.00	11.55	15.342	30.00
165	5825	12.13	11.03	0.167	12.30	11.20	14.792	30.00
802.11ac(VHT40)								
151	5755	12.98	12.31	0.343	13.32	12.65	16.012	30.00
159	5795	12.70	11.42	0.343	13.04	11.76	15.461	30.00
802.11ac(VHT80)								
155	5775	10.27	9.98	0.625	10.89	10.60	13.762	30.00

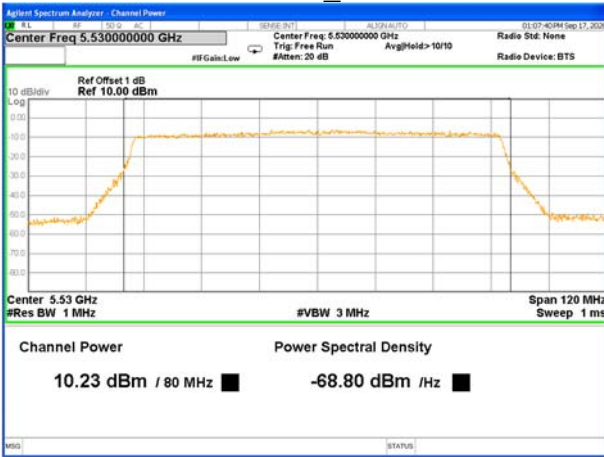




5210MHz_Ant A



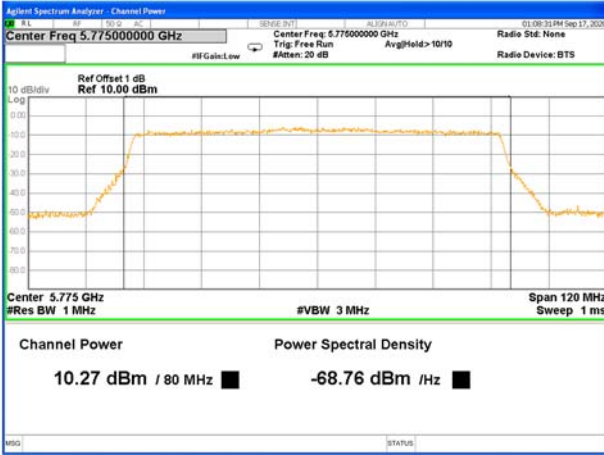
5290MHz_Ant A



5530MHz_Ant A



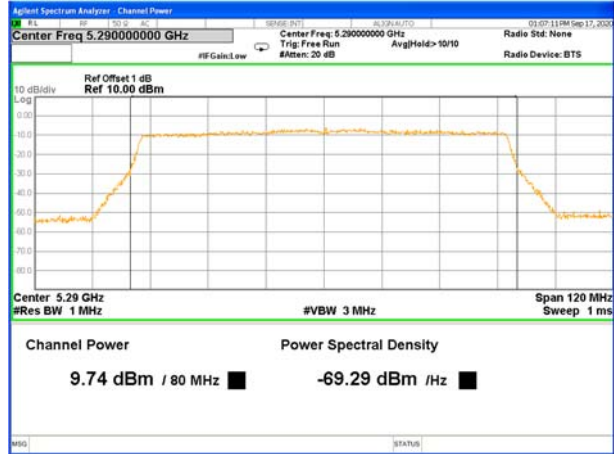
5610MHz_Ant A



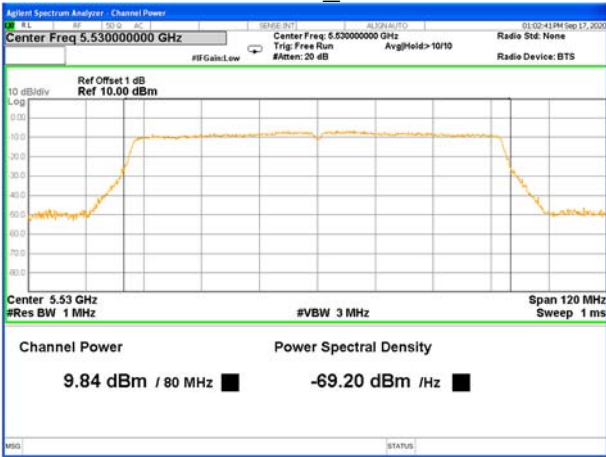
5775MHz_Ant A



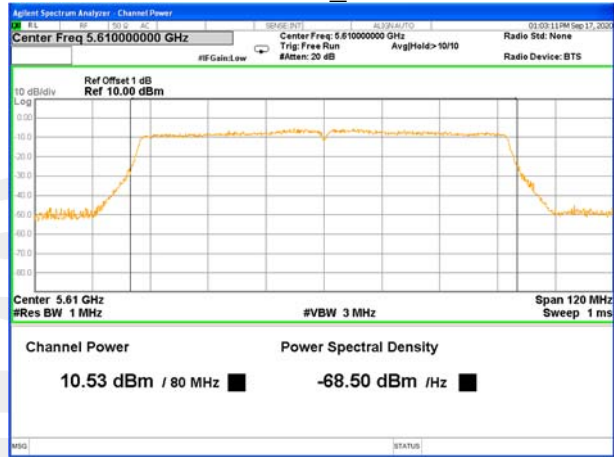
5210MHz_Ant B



5290MHz_Ant B



5530MHz_Ant B



5610MHz_Ant B



5775MHz_Ant B



Duty cycle

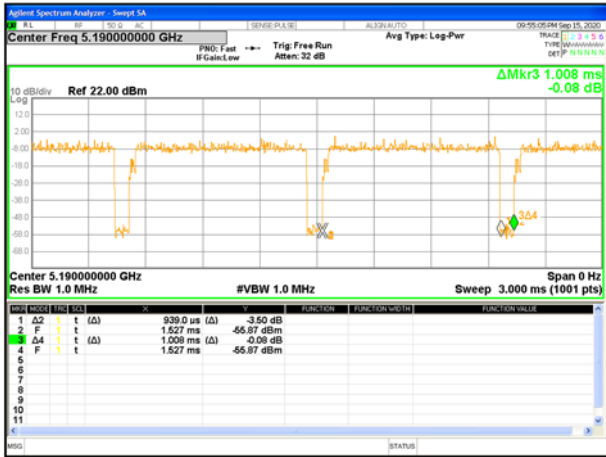
Band1				
Mode	Ton(ms)	Tp(ms)	Duty cycle(%)	Duty factor(dB)
a	2.050	2.125	96.47%	0.156
n20	1.900	1.970	96.45%	0.157
n40	0.939	1.008	93.15%	0.308
ac20	1.910	1.980	96.46%	0.156
ac40	0.945	1.026	92.11%	0.357
ac80	0.460	0.535	85.97%	0.657
Band2				
Mode	Ton(ms)	Tp(ms)	Duty cycle(%)	Duty factor(dB)
a	2.040	2.120	96.23%	0.167
n20	1.910	1.975	96.71%	0.145
n40	0.942	1.014	92.90%	0.320
ac20	1.910	1.980	96.46%	0.156
ac40	0.945	1.017	92.92%	0.319
ac80	0.462	0.535	86.25%	0.643
Band3				
Mode	Ton(ms)	Tp(ms)	Duty cycle(%)	Duty factor(dB)
a	2.040	2.110	96.68%	0.147
n20	1.915	1.975	96.96%	0.134
n40	0.936	1.020	91.76%	0.373
ac20	1.915	1.990	96.23%	0.167
ac40	0.951	1.014	93.79%	0.279
ac80	0.463	0.535	86.54%	0.628
Band4				
Mode	Ton(ms)	Tp(ms)	Duty cycle(%)	Duty factor(dB)
a	2.050	2.120	96.70%	0.146
n20	1.900	1.970	96.45%	0.157
n40	0.942	1.020	92.35%	0.345
ac20	1.915	1.990	96.23%	0.167
ac40	0.948	1.026	92.40%	0.343
ac80	0.466	0.538	86.60%	0.625



Band 1-a20



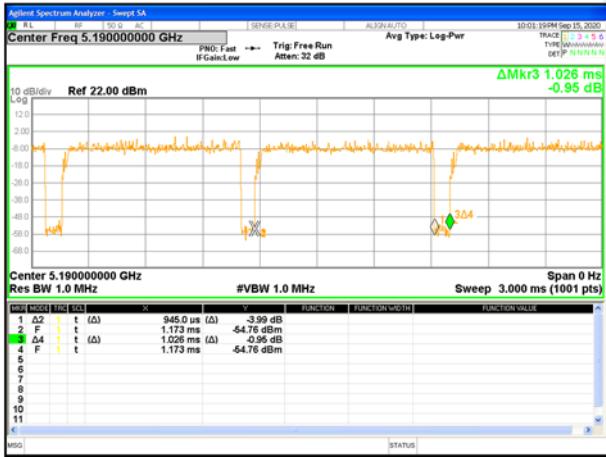
Band 1-n20



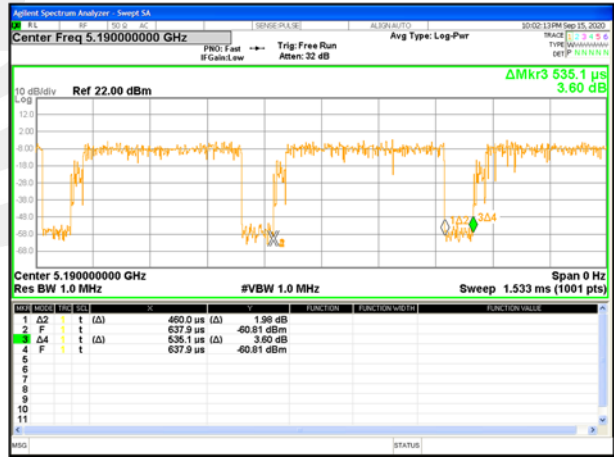
Band 1-n40



Band 1-ac20



Band 1-ac40



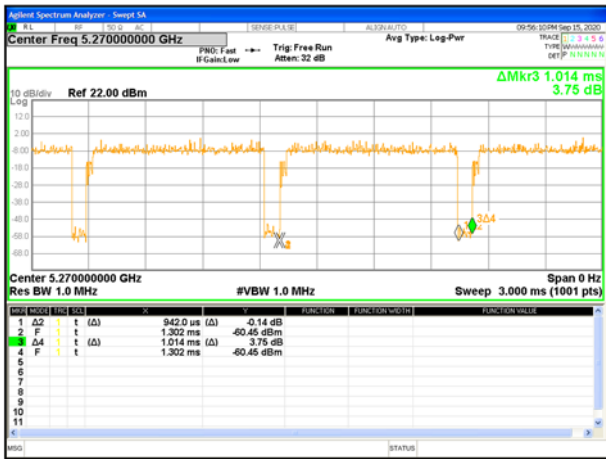
Band 1-ac80



Band 2-a20



Band 2-n20



Band 2-n40



Band 2-ac20



Band 2-ac40



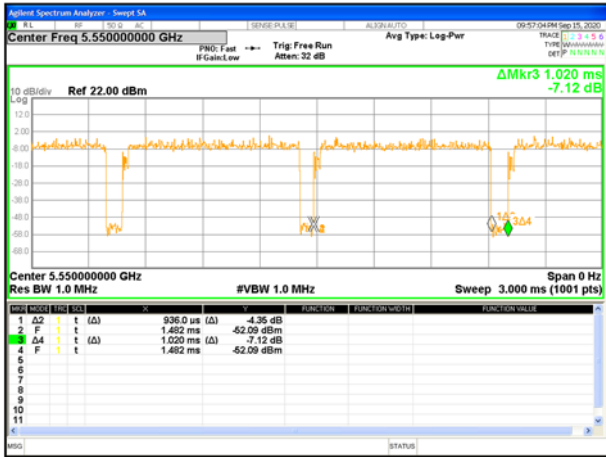
Band 2-ac80



Band 3-a20



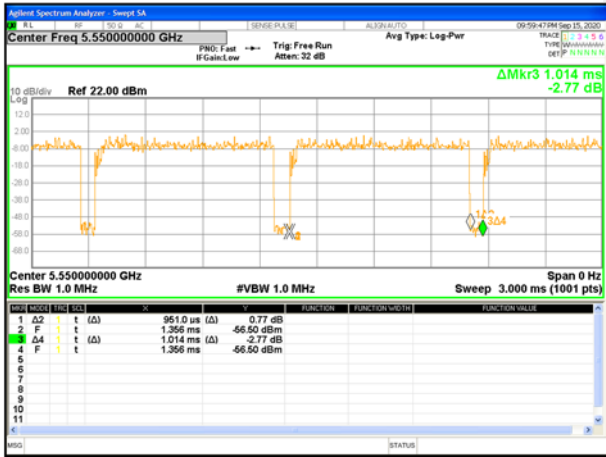
Band 3-n20



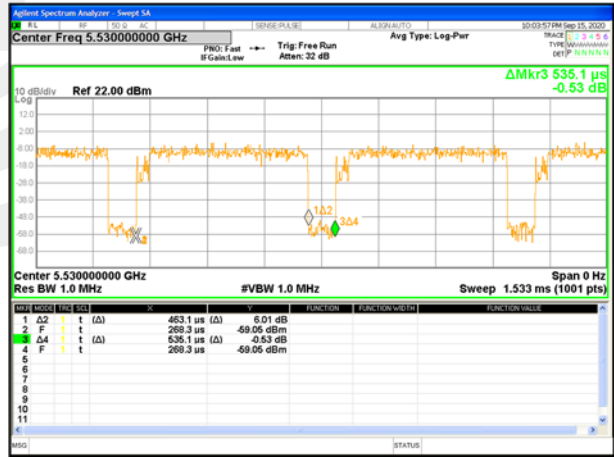
Band 3-n40



Band 3-ac20



Band 3-ac40



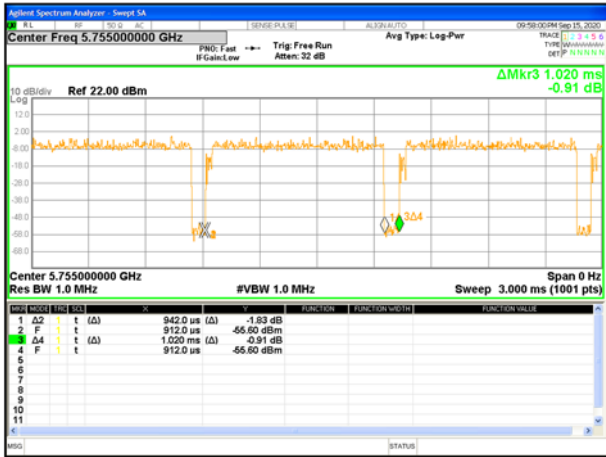
Band 3-ac80



Band 4-a20



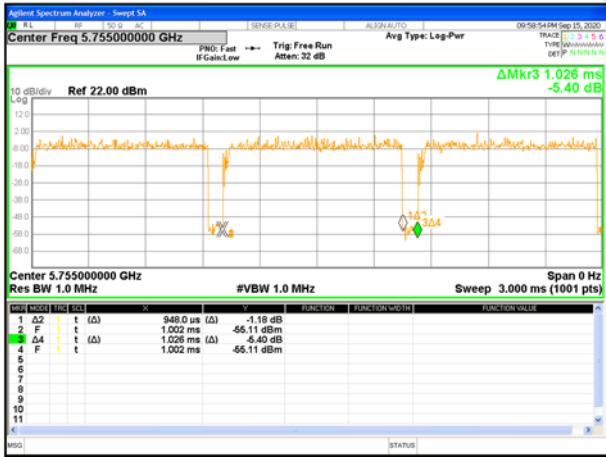
Band 4-n20



Band 4-n40



Band 4-ac20



Band 4-ac40



Band 4-ac80



7. AUTOMATICALLY DISCONTINUE TRANSMISSION

7.1 LIMIT OF AUTOMATICALLY DISCONTINUE TRANSMISSION

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signaling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization to describe how this requirement is met.

7.2 TEST RESULT OF AUTOMATICALLY DISCONTINUE TRANSMISSION

During no any information transmission, the EUT can automatically discontinue transmission and become standby mode for power saving. The EUT can detect the controlling signal of ACK message transmitting from remote device and verify whether it shall resend or discontinue transmission





8. ANTENNA REQUIREMENT

8.1 STANDARD REQUIREMENT

15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

8.2 EUT ANTENNA

The EUT antenna is Ant A is PCB Antenna, Ant B is PIFA Antenna. It comply with the standard requirement.





APPENDIX - PHOTOS OF TEST SETUP

Note: See test photos in setup photo document for the actual connections between Product and support equipment.

※※※※※END OF THE REPORT※※※※※

