FCC REPORT

FCC ID..... :	2AKLL-POLAR3D20
Applicant's name..... :	Zhejiang Flashforge 3D Technology CO., Ltd.
Address.....:	No.518, Xianyuan Road, Jinhua，Zhejiang, China
Manufacturer.....:	Zhejiang Flashforge 3D Technology CO., Ltd.
Address.....:	No.518, Xianyuan Road, Jinhua，Zhejiang, China
Test item description ..... :	POLAR 3D PRINTER
Trade Mark .....:	POLAR3D
Model/Type reference.....:	POLAR 3D 2.0
List Model .....:	POLAR3D20
Standard ..... :	**FCC Part 15.407**
Date of receipt of test sample……..:	May 15 2017
Date of testing……:	May 15 2017 ~ May 31 2017
Date of issue……...:	May 31 2017
Result..... ……...:	**Pass**

Compiled by (position+printed name+signature)..:	File administrators Jack Yu	Jack Yu
Supervised by (position+printed name+signature)..:	Test Engineer Jerry You	Jerry You
Approved by (position+printed name+signature)..:	Manager Can Liu	Can Liu

Testing Laboratory Name ..... :	Shenzhen Asia Test Technology Co.,Ltd.
Address.....:	7 / F, Xinwei Building, Gushu Village, Xixiang Town, Baoan District, Shenzhen, China

Contents

1. TEST STANDARDS AND TEST DESCRIPTION

1.1. Test Standards

The tests were performed according to following standards:

FCC Part 15, Subpart E (Section 15.407)

ANSI C63.10: American National Standard for Testing Unlicensed Wireless Devices

1.2. Test Description

FCC Part 15, Subpart E (Section 15.407)		
15.407(b)(6)&15.207	AC Power Conducted Emission	PASS
15.407(b/1/2/3)(b)(5)	Electric Field Strength Spurious Emissions, 30MHz ~ 40000MHz	PASS
15.407(a/1/2/3)	Peak Transmit Power	PASS
15.407(a/1/2/3)	Peak Power Spectral Density	PASS
15.407(g)	Frequency Stability	PASS

This device support 802.11abgn 2.4g+5g mode. This device is not supported simultaneous transmission(2.4G WIFI+5GWIFI), When used 2,4g wifi, the 5g wifi is unactivated. and vice versa.

2. SUMMARY

2.1. Product Description

Name of EUT	POLAR 3D PRINTER
Model No.:	POLAR 3D 2.0
List Model:	POLAR3D20
Power supply:	DC 12V
Adapter information:	M/N:KPL-065F-VI Input:100-240V~, 50/60Hz, 1.7A Output:12Vdc, 5.42A, 65W
WIFI	
Supported type:	802.11a/b/g/n
Modulation:	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
Operation frequency:	802.11b/802.11g/802.11n(H20): 2412MHz~2462MHz 802.11a: 5.150 ~ 5.250GHz and 5.725 ~ 5.850GHz
Channel number:	802.11b/802.11g/802.11n(H20): 11 802.11a: 20MHz for Normal mode
Channel separation:	802.11b/802.11g/802.11n(H20): 5MHz 802.11a: 20MHz for Normal mode
Antenna type:	Internal Antenna
Antenna gain:	0 dBi

2.2. EUT operation mode

The EUT has been tested under typical operating condition. The Applicant provides command

to control the EUT for staying in continous transmitting and receiving mode for testing.

Frequency band	5150 - 5250 MHz	5250 -5350 MHz	5470-5725 MHz	5725 – 5850
Frequency (ch A)	5180 MHz	--	--	5745 MHz
Frequency (ch B)	5220 MHz	--	--	5785 MHz
Frequency (ch C)	5240 MHz	--	--	5825 MHz
Number of channels	4	--	--	5

2.3. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

● - supplied by the manufacturer

○ - supplied by the lab

○	Power Cable	Length (m) :	/
		Shield :	/
		Detachable :	/
○	Multimeter	Manufacturer :	/
		Model No. :	/

2.4. Test mode applicability and tested channel detail

EUT configure mode	Applicable to				Description
	PLC	RE<1G	RE≥1G	APCM	
--	x	x	x	x	--
Where PLC: Power Line Conducted Emission			RE<1G RE: Radiated Emission below 1GHz		
RE≥1G: Radiated Emission above 1GHz			APCM: Antenna Port Conducted Measurement		

Power Line Conducted Emission Test:

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates(if EUT with antenna diversity architecture).
Following channel(s) was (were) selected for the final test as listed below.

Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11a	1 to 9	3	OFDM	BPSK	6

Radiated Emission Test (Below 1 GHz):

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates (if EUT with antenna diversity architecture).
Following channel(s) was (were) selected for the final test as listed below.

Mode	Available	Tested	Modulation	Modulation	Data Rate

	Channel	Channel	Technology	Type	(Mbps)
802.11a	1 to 9	3	OFDM	BPSK	6

Radiated Emission Test (Above 1 GHz):

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below.

Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11a	1 to 9	1, 4, 5, 9	OFDM	BPSK	6

Bandedge Measurement:

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below.

Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11a	1 to 9	1, 4, 5, 9	OFDM	BPSK	6

Antenna Port Conducted Measurement:

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below.

Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11a	1 to 9	1, 4, 5, 9	OFDM	BPSK	6

3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Shenzhen Asia Test Technology Co.,Ltd.
7 / F, Xinwei Building, Gushu Village, Xixiang Town, Baoan District, Shenzhen, China
FCC Registration No.: 348715
The sites are constructed in conformance with the requirements
of ANSI C63.7, ANSI C63.10:2013 and CISPR Publication 22.

3.2. Environmental conditions

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

Temperature	Normal Temperature:	25°C
	High Temperature:	55°C
	Low Temperature:	-20°C
Voltage	Normal Voltage	DC 12V
	High Voltage	DC 13.2V
	Low Voltage	DC 10.8V
Other	lative Humidity	55 %
	Air Pressure	989 hPa

3.3. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen Asia Test Technology Co.,Ltd. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen Huatongwei laboratory is reported:

Test Items	Measurement Uncertainty	Notes
Frequency stability	25 Hz	(1)
Transmitter power conducted	0.57 dB	(1)
Transmitter power Radiated	2.20 dB	(1)
Conducted spurious emission 9KHz-12.75 GHz	1.60 dB	(1)
Radiated spurious emission 9KHz-12.75 GHz	2.20 dB	(1)
Conducted Emission 9KHz-30MHz	3.39 dB	(1)
Radiated Emission 30~1000MHz	4.24 dB	(1)
Radiated Emissio 1~18GHz	3.54 dB	(1)
Radiated Emissio 18-40GHz	2.86 dB	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

3.4. Equipments Used during the Test

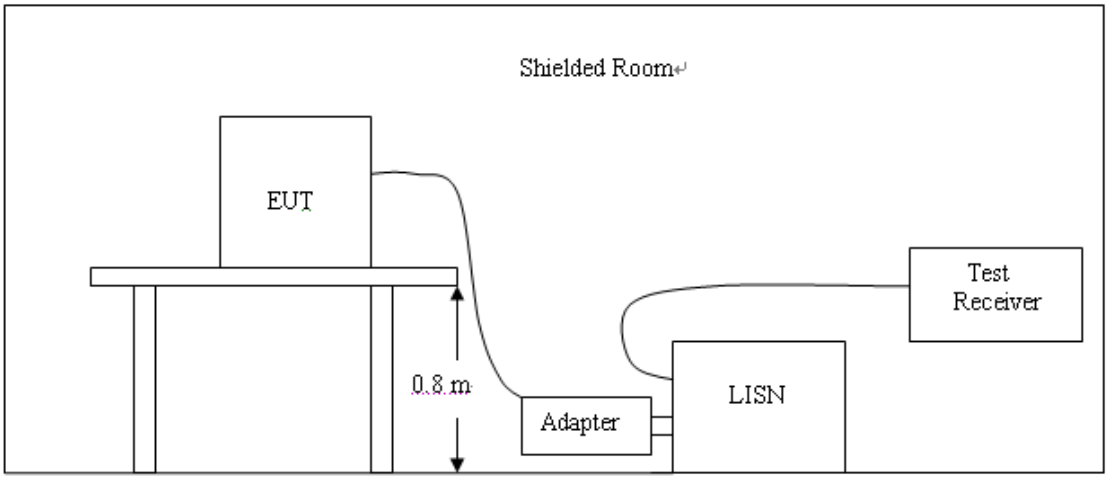
Equipment No.	Instrument	Manufacturer	Model Name	Serial Number	Specification	Cal. Data	due date
1	Semi-anechoic chamber	Changzhou Chengyu	EC3088	N/A	9*6*6m	10/25/2016	10/24/2017
2	Broadband antenna	R&S	VULB 9160	VULB91 60-516	30MHz-1500 MHz	10/25/2016	10/24/2017
3	Horn antenna	R&S	BBHA 9120D	10087	1GHz-18GH z	06/05/2016	10/24/2017
4	Test receiver	R&S	ESCI	101686	9KHz-3GHz	10/25/2016	10/24/2017
5	EMI Measuring Receiver	R&S	ESR	101660	9KHz-40GHz	10/25/2016	10/24/2017
6	Multi-device controller	MF	MF-7868	MF78680 8762	N/A	10/25/2016	10/24/2017
7	Amplifier	EM	EM-30180	060538	1GHz-18GH z	10/25/2016	10/24/2017
8	Amplifier	Schwarzbeck	BBV 9475	BBV 9475-663	1GHz-18GH z	06/05/2016	06/04/2017
9	Spectrum Analyzer	agilent	E4440B	US44300368	1GHz-26.5GH z	06/05/2016	06/04/2017
10	Test receiver	R&S	ESCI	101689	9KHz-3GHz	10/25/2016	10/24/2017
11	LISN	R&S	NSLK8126	8126466	9k-30MHz	10/25/2016	10/24/2017
12	LISN	Narda	L2-16B	5589756	9k-30MHz	10/25/2016	10/24/2017
13	Power Meter	Anritsu	ML2495A	N/A	40MHz	10/25/2016	10/24/2017
14	Power sensor	Anritsu	MA2411B	N/A	40MHz	10/25/2016	10/24/2017
15	Radiated Cable 1#	FUJIKURA	5D-2W	01	30MHz-1GHz	10/25/2016	10/24/2017
16	Radiated Cable 2#	FUJIKURA	10D2W	02	1GHz - 25GHz	10/25/2016	10/24/2017
17	Conducted Cable 1#	FUJIKURA	1D-2W	01	9KHz-30MHz	10/25/2016	10/24/2017
18	SMA Antenna connector	Dosin	Dosin-SMA	N/A	N/A	10/25/2016	10/24/2017

Note: The SMA antenna connector is soldered on the PCB board in order to perform conducted tests and this SMA antenna connector is listed in the equipment list.
The Cal.Interval was one year

4. TEST CONDITIONS AND RESULTS

4.1. AC Power Conducted Emission

TEST CONFIGURATION



TEST PROCEDURE

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10:2013.
2. Support equipment, if needed, was placed as per ANSI C63.10:2013
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10:2013
4. The EUT received DC12V power from the adapter, the adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5. All support equipments received AC power from a second LISN, if any.
6. The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 KHz to 30MHz for emissions in each of the test modes.
8. During the above scans, the emissions were maximized by cable manipulation.

AC Power Conducted Emission Limit

For intentional device, according to § 15.207(a) AC Power Conducted Emission Limits is as following：

Frequency (MHz)	Maximum RF Line Voltage (dBμV)			
	CLASS A		CLASS B	
	Q.P.	Ave.	Q.P.	Ave.
0.15 - 0.50	79	66	66-56*	56-46*
0.50 - 5.00	73	60	56	46
5.00 - 30.0	73	60	60	50

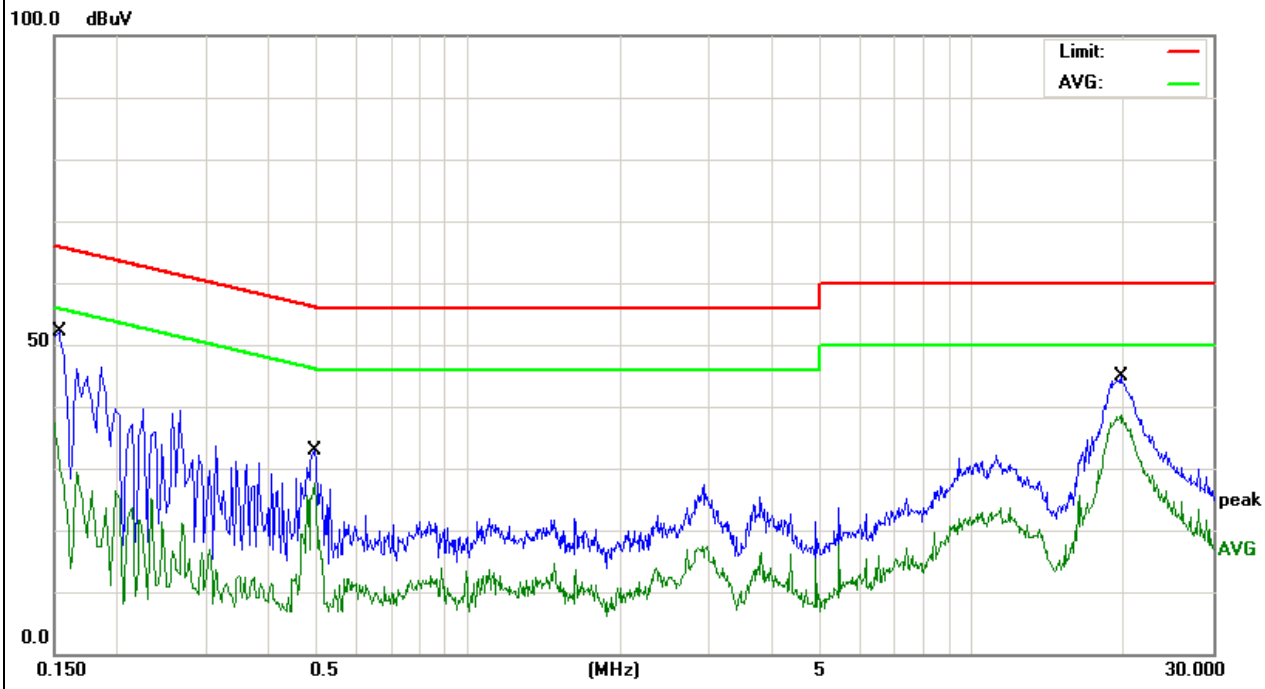
* Decreasing linearly with the logarithm of the frequency

TEST RESULTS

Phase :L

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1500	25.33	11.94	37.27	55.99	-18.72	AVG	
2		0.1539	40.19	11.84	52.03	65.78	-13.75	QP	
3		0.4940	22.97	10.02	32.99	56.10	-23.11	QP	
4		0.4940	17.52	10.02	27.54	46.10	-18.56	AVG	
5		19.7099	33.79	11.05	44.84	60.00	-15.16	QP	
6	*	19.7099	27.57	11.05	38.62	50.00	-11.38	AVG	

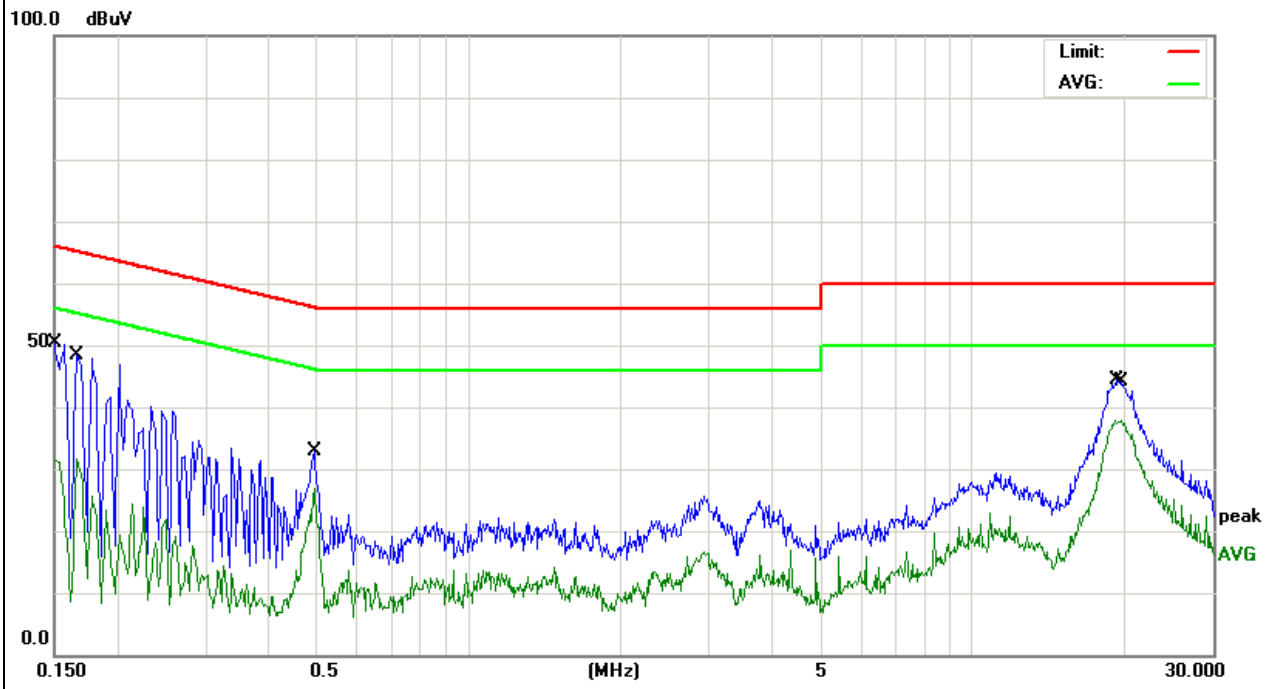
Remark:
Factor = Insertion Loss + Cable Loss.



Phase :N

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1500	38.33	11.94	50.27	65.99	-15.72	QP	
2		0.1660	20.00	11.61	31.61	55.15	-23.54	AVG	
3		0.4940	22.78	10.02	32.80	56.10	-23.30	QP	
4		0.4940	16.82	10.02	26.84	46.10	-19.26	AVG	
5		19.2340	33.39	10.98	44.37	60.00	-15.63	QP	
6	*	19.7979	26.94	11.06	38.00	50.00	-12.00	AVG	

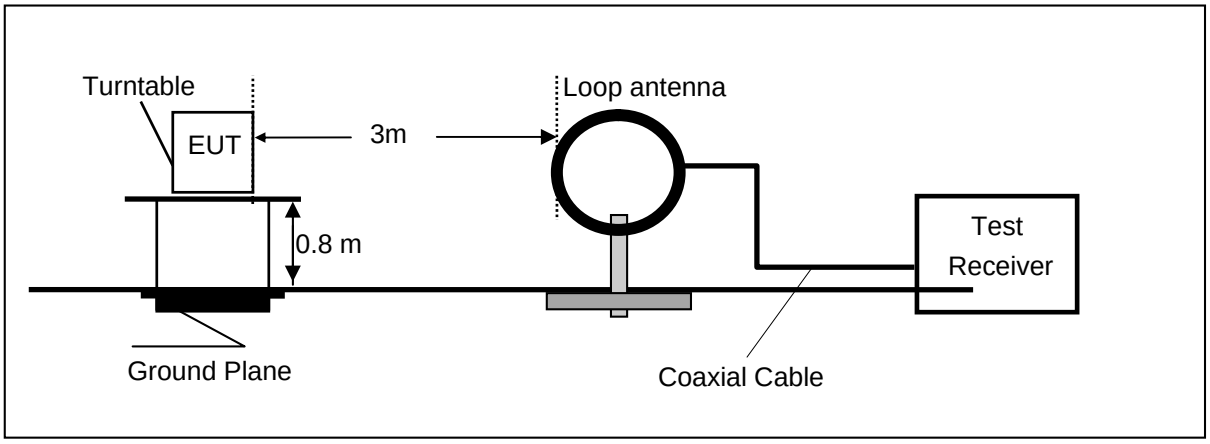
Remark:
Factor = Insertion Loss + Cable Loss.



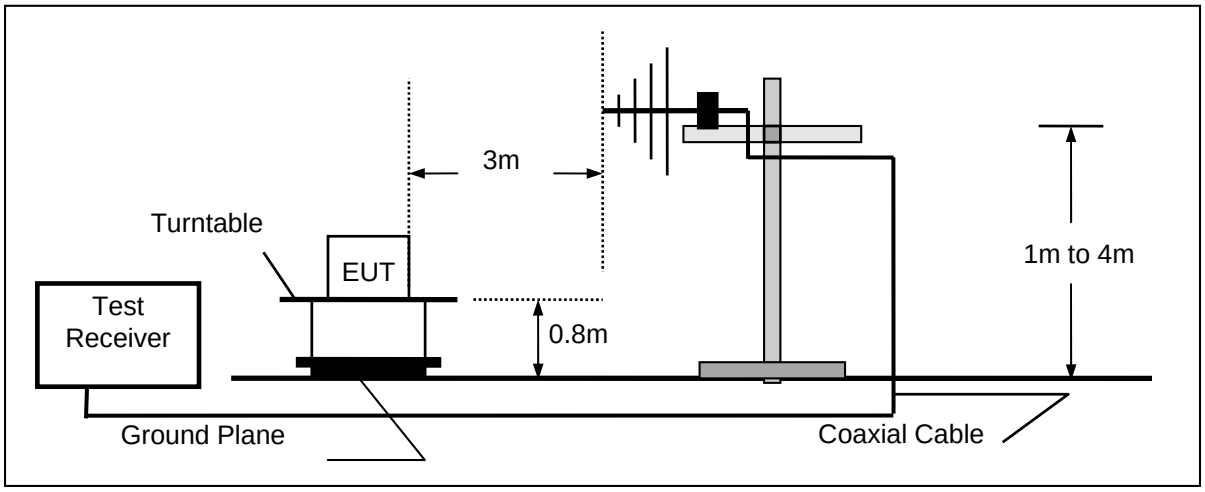
4.2. Radiated Emission

TEST CONFIGURATION

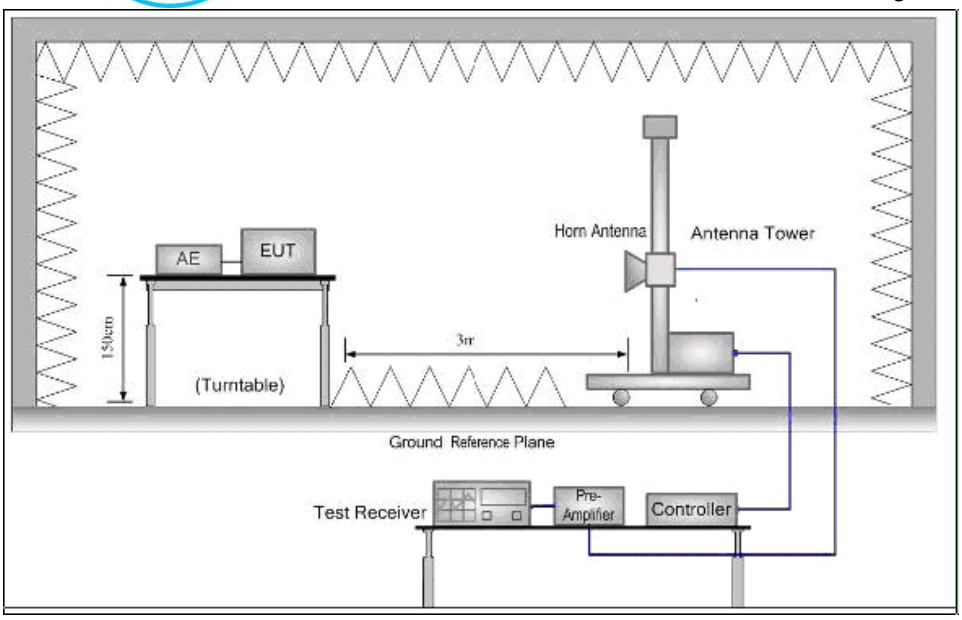
Frequency range 9KHz – 30MHz



Frequency range 30MHz – 1000MHz



Frequency range above 1GHz



TEST PROCEDURE

1. The EUT was placed on a turn table which is 0.8m(1.5m above 1G) above ground plane.
2. Maximum procedure was performed by raising the receiving antenna from 1m to 4m and rotating the turn table from 0℃ to 360℃ to acquire the highest emissions from EUT.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measurements have been completed.

Note: Fro radiated meissiont test above 1GHz:
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported.
Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

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	

RADIATION LIMIT

For intentional device, according to § 15.209(a), the general requirement of field strength of radiated emission from intentional radiators at a distance of 3 meters shall not exceed the following table. According to § 15.247(d), in any 100kHz bandwidth outside the frequency band in which the EUT is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the100kHz bandwidth within the band that contains the highest level of desired power.

The frequency spectrum above 1 GHz for Transmitter was investigated. All emission not reported are much lower than the prescribed limits. Set the RBW=1MHz,VBW=3MHz for Peak Detector while the RBW=1MHz,VBW=10Hz for Average Detector,Readings are both peak and average values.

Frequency (MHz)	Distance (Meters)	Radiated (dBμV/m)	Radiated (μV/m)
0.009-0.49	300	20log(2400/F(KHz))+80	2400/F(KHz)
0.49-1.705	30	20log(24000/F(KHz))+40	24000/F(KHz)
1.705-30	30	20log(30)+40	30
30-88	3	40.0	100
88-216	3	43.5	150
216-960	3	46.0	200
Above 960	3	54.0	500

LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

Frequencies (MHz)	EIRP Limit (dBm)	Equivalent Field Strength at 3m (dBμV/m) *note 3
5150~5250	-27	68.3
5250~5350	-27	68.3

For transmitters operating in the 5.725-5.85 GHz band:
All emissions shall be limited to a level of −27 dBm/MHz(68.2dBuV/m at 3m) at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz(105.2dBuV/m at 3m) 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(110.8dBuV/m at 3m) 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(122.2dBuV/m at 3m) at the band edge.

TEST RESULTS

Remark:

1. The radiated measurement are performed the each test mode and channel (low/mid/high), the datum recorded below is the worst case for all the test mode and channel.
2. ULTRA-BROADBAND ANTENNA for the radiation emission test below 1G.
3. HORN ANTENNA for the radiation emission test above 1G.

For 9KHz to 30MHz

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

Note:

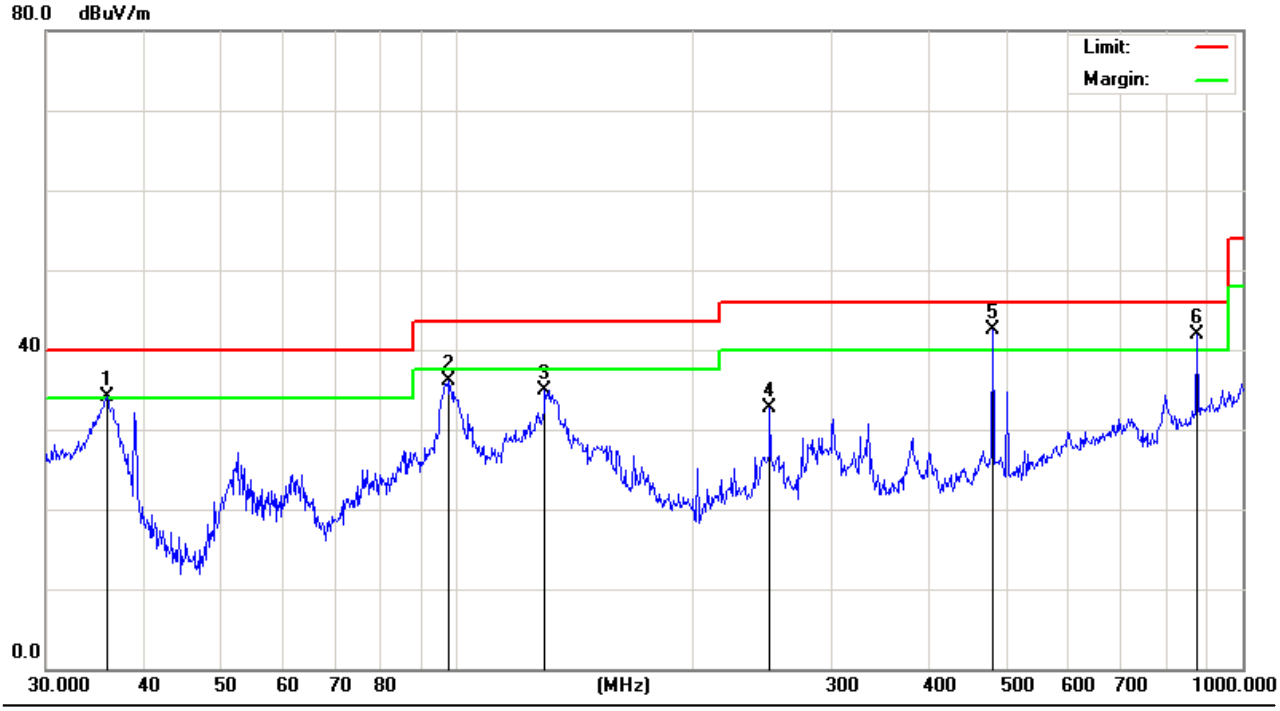
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor =40 log (specific distance/test distance)(dB);

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

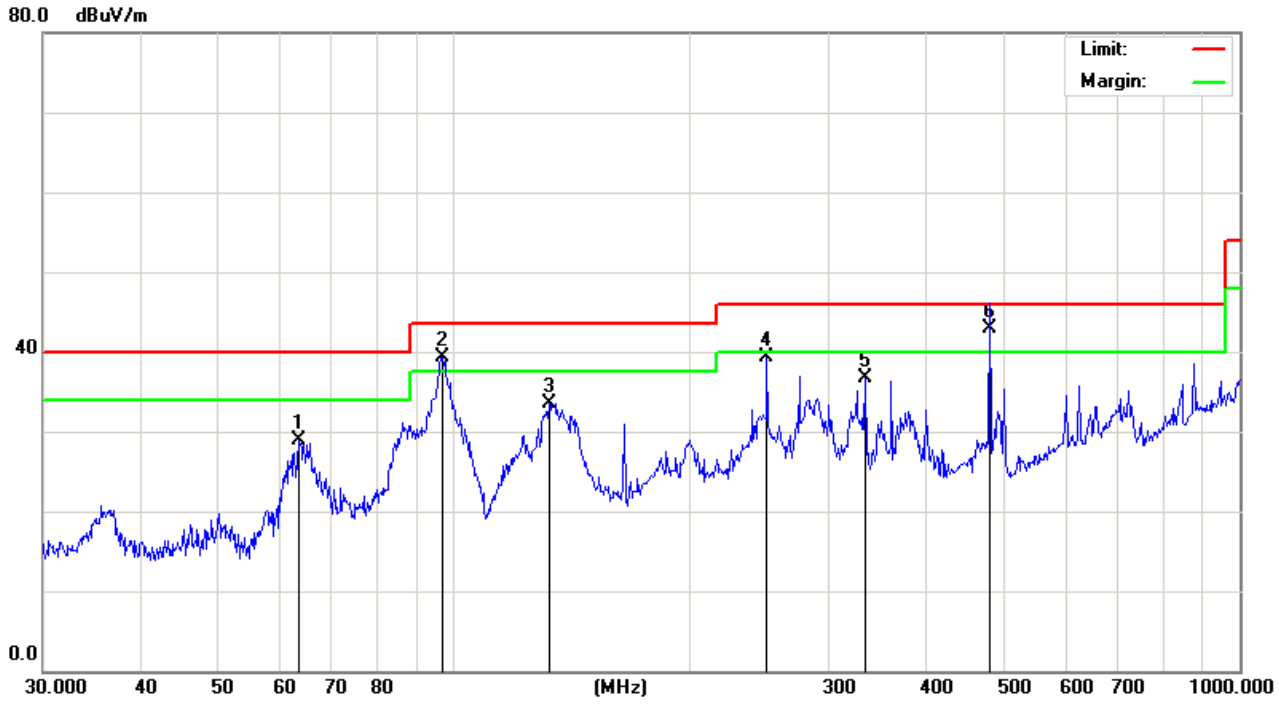
For 30MHz to 1000MHz

Polarization :H



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	!	35.8746	50.89	-16.76	34.13	40.00	-5.87	QP			
2		97.4560	51.78	-15.66	36.12	43.50	-7.38	QP			
3		129.4677	49.93	-14.95	34.98	43.50	-8.52	QP			
4		250.3012	46.26	-13.57	32.69	46.00	-13.31	QP			
5	*	480.5276	48.38	-5.90	42.48	46.00	-3.52	QP			
6	!	875.2470	39.66	2.21	41.87	46.00	-4.13	QP			

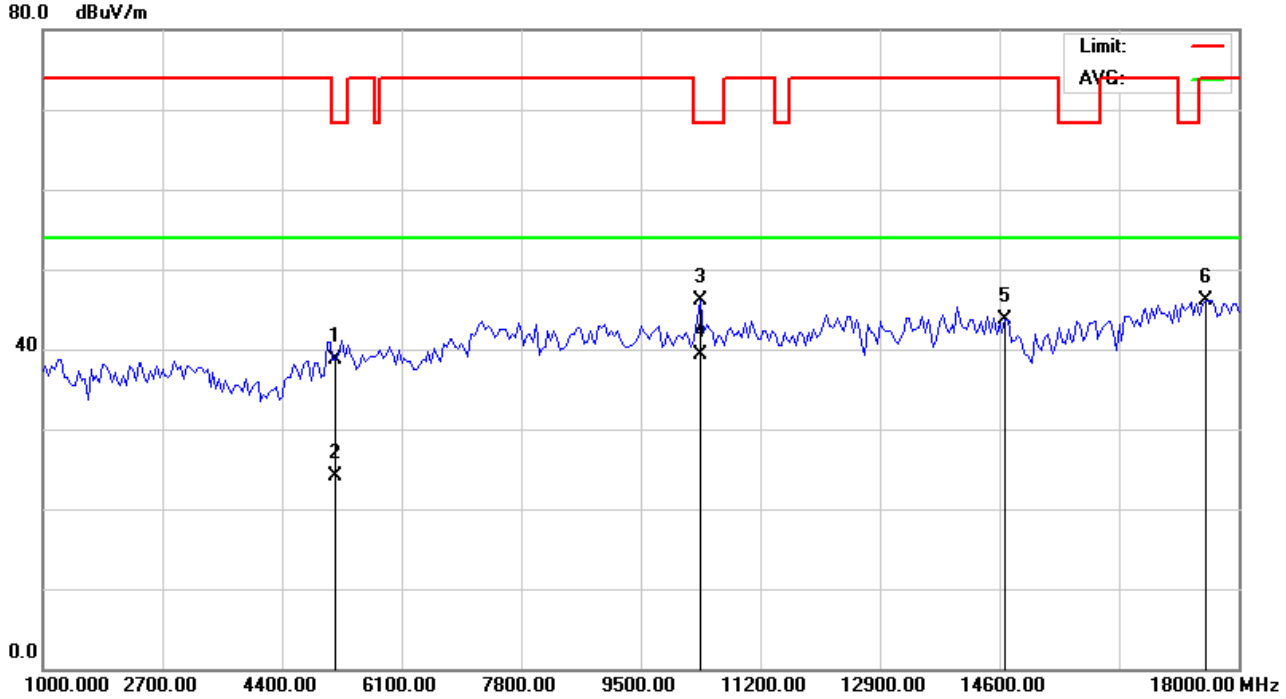
Polarization :V



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		63.5356	46.61	-17.78	28.83	40.00	-11.17	QP			
2	!	96.7749	55.75	-16.35	39.40	43.50	-4.10	QP			
3		132.2206	48.39	-14.84	33.55	43.50	-9.95	QP			
4		250.3012	52.84	-13.57	39.27	46.00	-6.73	QP			
5		333.6867	45.42	-8.66	36.76	46.00	-9.24	QP			
6	*	480.5276	48.90	-5.90	43.00	46.00	-3.00	QP	148	0	

Remark:
1. All readings are Quasi-Peak and Average values.
2. Factor = Antenna Factor + Cable Loss.
3. N/A means All Data have pass Limit

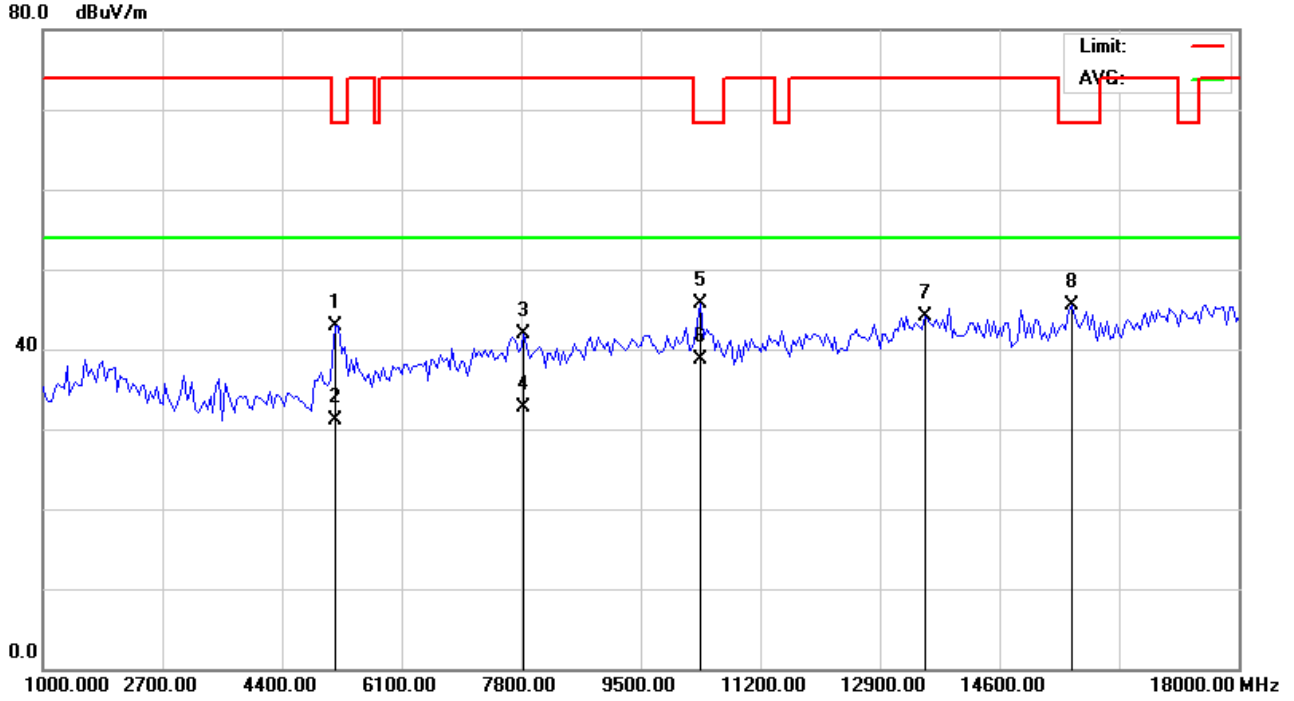
Test mode:	TX 5180 MHz	Polarization:	Horizontal
Frequency range:	1-18GHz	RBW/VBW	Spurious : 1MHz/3MHz for Peak,1MHz/10Hz for Average. non-restricted band: 100KHz/300KHz for Peak.



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		5150.000	42.98	-4.30	38.68	68.30	-29.62	peak			
2		5150.000	28.37	-4.30	24.07	54.00	-29.93	AVG			
3		10360.00	39.44	6.68	46.12	68.30	-22.18	peak			
4	*	10360.00	32.56	6.68	39.24	54.00	-14.76	AVG			
5		14685.00	28.17	15.55	43.72	74.00	-30.28	peak			
6		17532.50	25.76	20.26	46.02	74.00	-27.98	peak			

spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported above 18G.

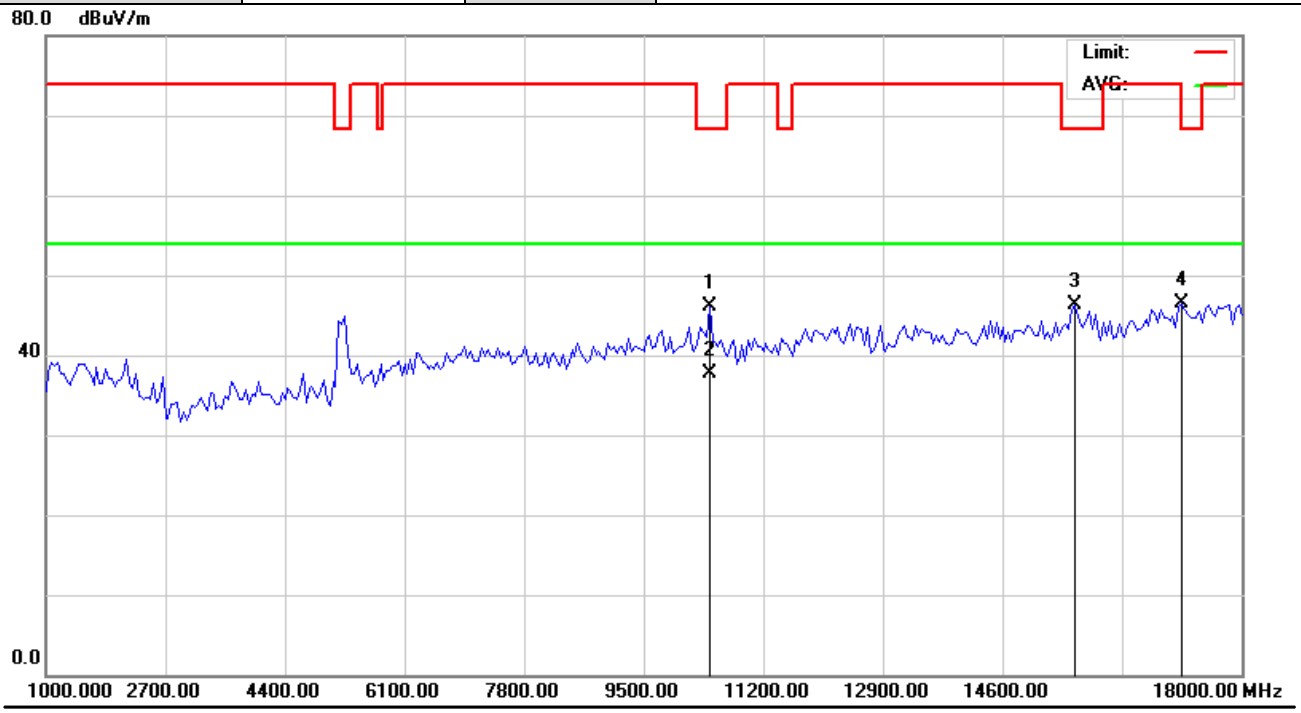
Test mode:	TX 5180 MHz	Polarization:	Vertical
Frequency range:	1-18GHz	RBW/VBW	Spurious : 1MHz/3MHz for Peak,1MHz/10Hz for Average. non-restricted band: 100KHz/300KHz for Peak.



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		5150.000	47.29	-4.30	42.99	68.30	-25.31	peak			
2		5150.000	35.49	-4.30	31.19	54.00	-22.81	AVG			
3		7842.500	41.30	0.57	41.87	74.00	-32.13	peak			
4		7842.500	32.15	0.57	32.72	54.00	-21.28	AVG			
5		10360.00	38.93	6.68	45.61	68.30	-22.69	peak			
6	*	10360.00	32.05	6.68	38.73	54.00	-15.27	AVG			
7		13537.50	29.20	14.87	44.07	74.00	-29.93	peak			
8		15620.00	28.27	17.20	45.47	68.30	-22.83	peak			

spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported above 18G.

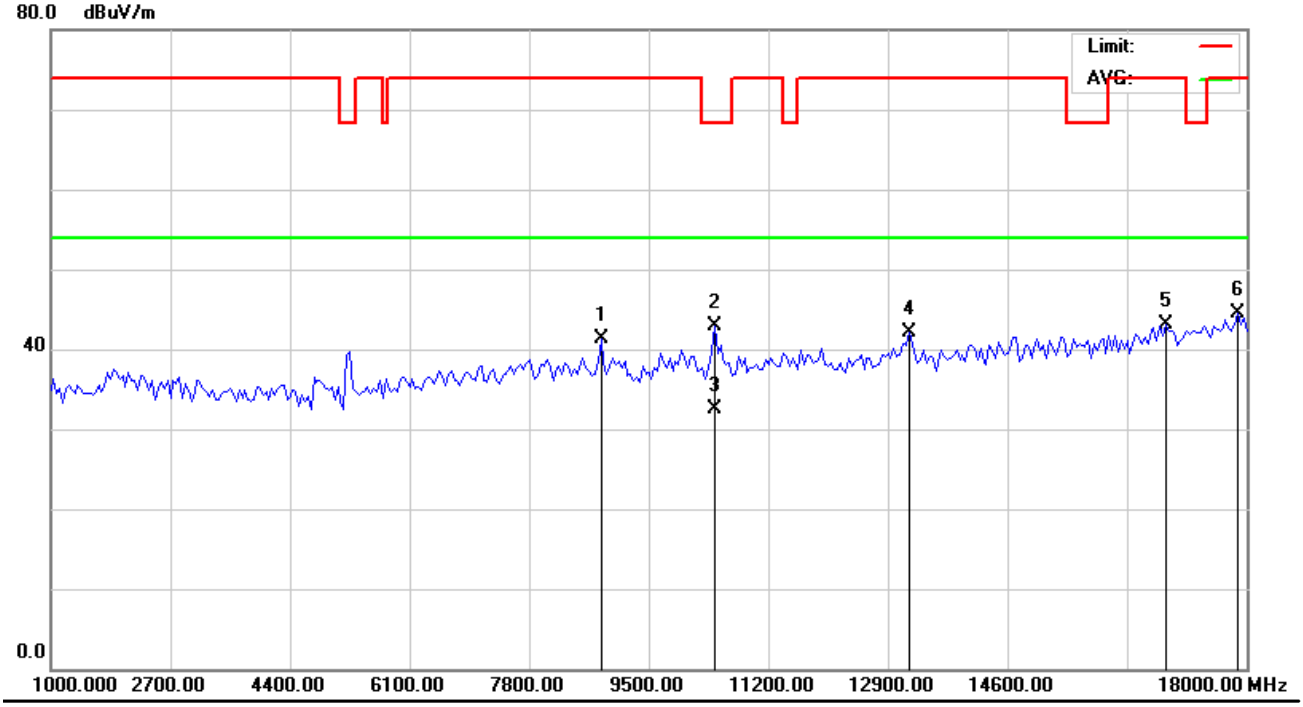
Test mode:	TX 5220 MHz	Polarization:	Horizontal
Frequency range:	1-18GHz	RBW/VBW	Spurious : 1MHz/3MHz for Peak,1MHz/10Hz for Average. non-restricted band: 100KHz/300KHz for Peak.



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		10440.00	39.16	6.92	46.08	68.30	-22.22	peak			
2	*	10440.00	30.86	6.92	37.78	54.00	-16.22	AVG			
3		15620.00	29.03	17.20	46.23	68.30	-22.07	peak			
4		17150.00	26.07	20.36	46.43	74.00	-27.57	peak			

spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported above 18G.

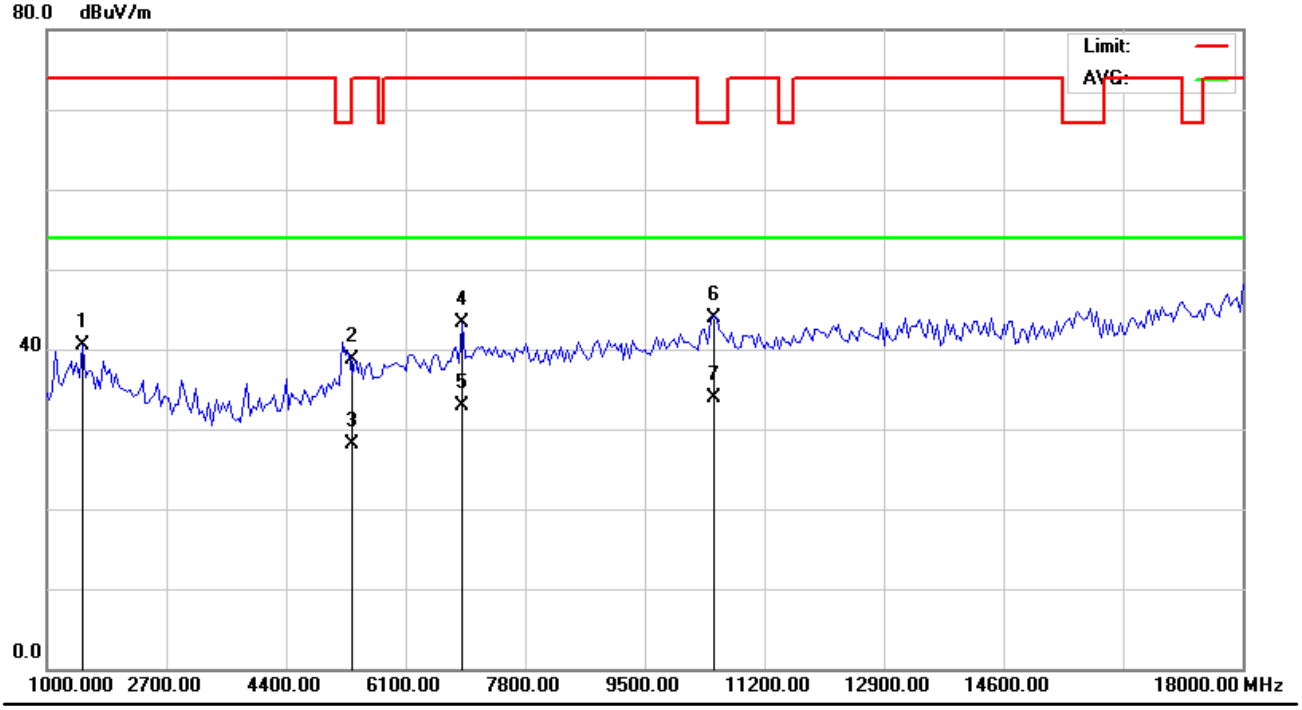
Test mode:	TX 5220 MHz	Polarization:	Vertical
Frequency range:	1-18GHz	RBW/VBW	Spurious : 1MHz/3MHz for Peak,1MHz/10Hz for Average. non-restricted band: 100KHz/300KHz for Peak.



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		8820.000	38.73	2.66	41.39	74.00	-32.61	peak			
2		10440.00	35.93	6.92	42.85	68.30	-25.45	peak			
3	*	10440.00	25.53	6.92	32.45	54.00	-21.55	AVG			
4		13197.50	27.59	14.54	42.13	74.00	-31.87	peak			
5		16852.50	23.03	20.14	43.17	74.00	-30.83	peak			
6		17872.50	23.57	20.88	44.45	74.00	-29.55	peak			

spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported above 18G.

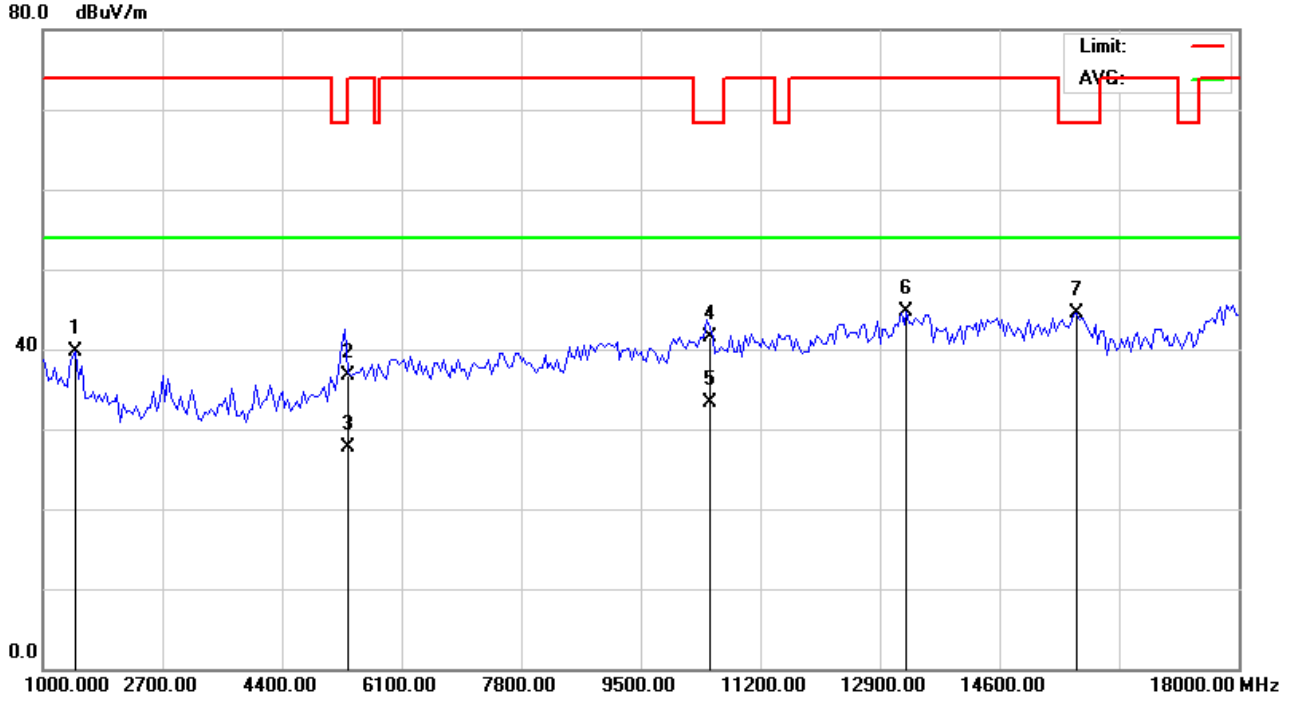
Test mode:	TX 5240 MHz	Polarization:	Horizontal
Frequency range:	1-18GHz	RBW/VBW	Spurious : 1MHz/3MHz for Peak,1MHz/10Hz for Average. non-restricted band: 100KHz/300KHz for Peak.



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		1510.000	50.39	-9.85	40.54	74.00	-33.46	peak			
2		5350.000	42.56	-3.82	38.74	68.30	-29.56	peak			
3		5350.000	31.91	-3.82	28.09	54.00	-25.91	AVG			
4		6907.500	44.50	-1.26	43.24	74.00	-30.76	peak			
5		6907.500	34.12	-1.26	32.86	54.00	-21.14	AVG			
6		10480.00	36.96	7.04	44.00	68.30	-24.30	peak			
7	*	10480.00	26.81	7.04	33.85	54.00	-20.15	AVG			

spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported above 18G.

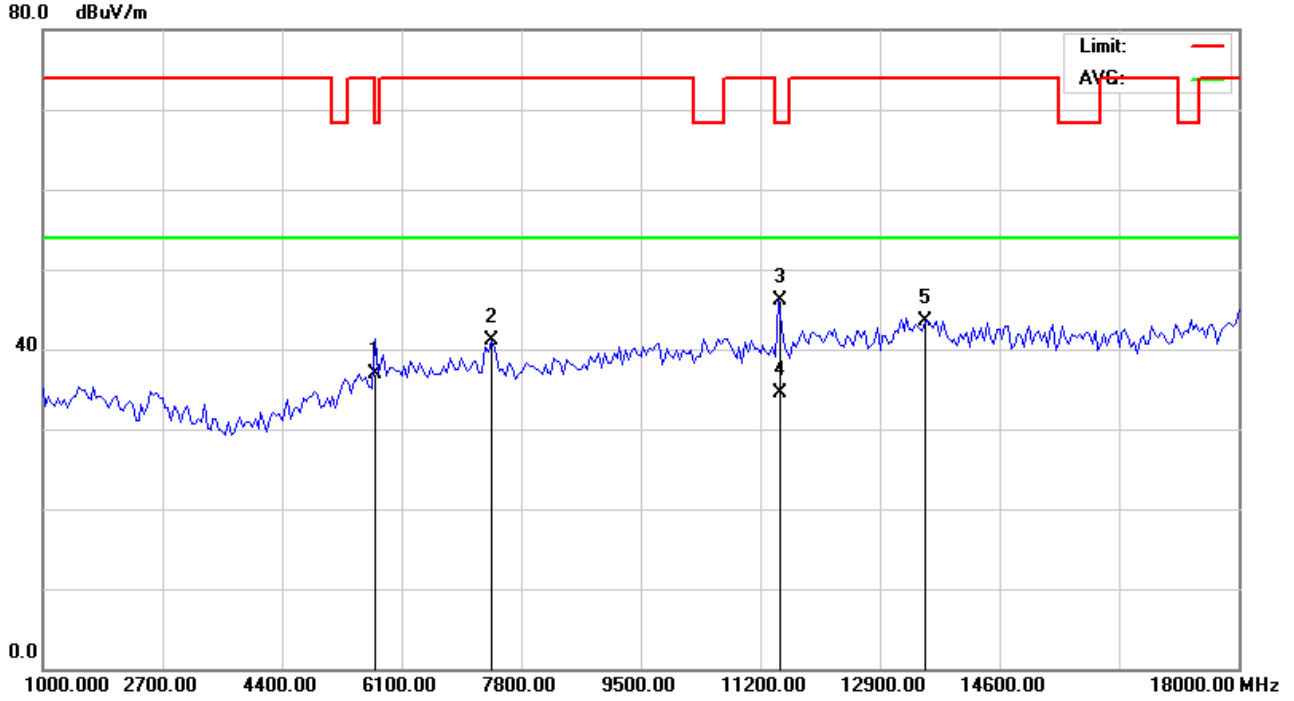
Test mode:	TX 5240 MHz	Polarization:	Vertical
Frequency range:	1-18GHz	RBW/VBW	Spurious : 1MHz/3MHz for Peak,1MHz/10Hz for Average. non-restricted band: 100KHz/300KHz for Peak.



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		1467.500	49.69	-10.00	39.69	74.00	-34.31	peak			
2		5350.000	40.50	-3.82	36.68	68.30	-31.62	peak			
3		5350.000	31.57	-3.82	27.75	54.00	-26.25	AVG			
4		10480.00	34.55	7.04	41.59	68.30	-26.71	peak			
5	*	10480.00	26.24	7.04	33.28	54.00	-20.72	AVG			
6		13282.50	30.01	14.65	44.66	74.00	-29.34	peak			
7		15705.00	27.14	17.34	44.48	68.30	-23.82	peak			

spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported above 18G.

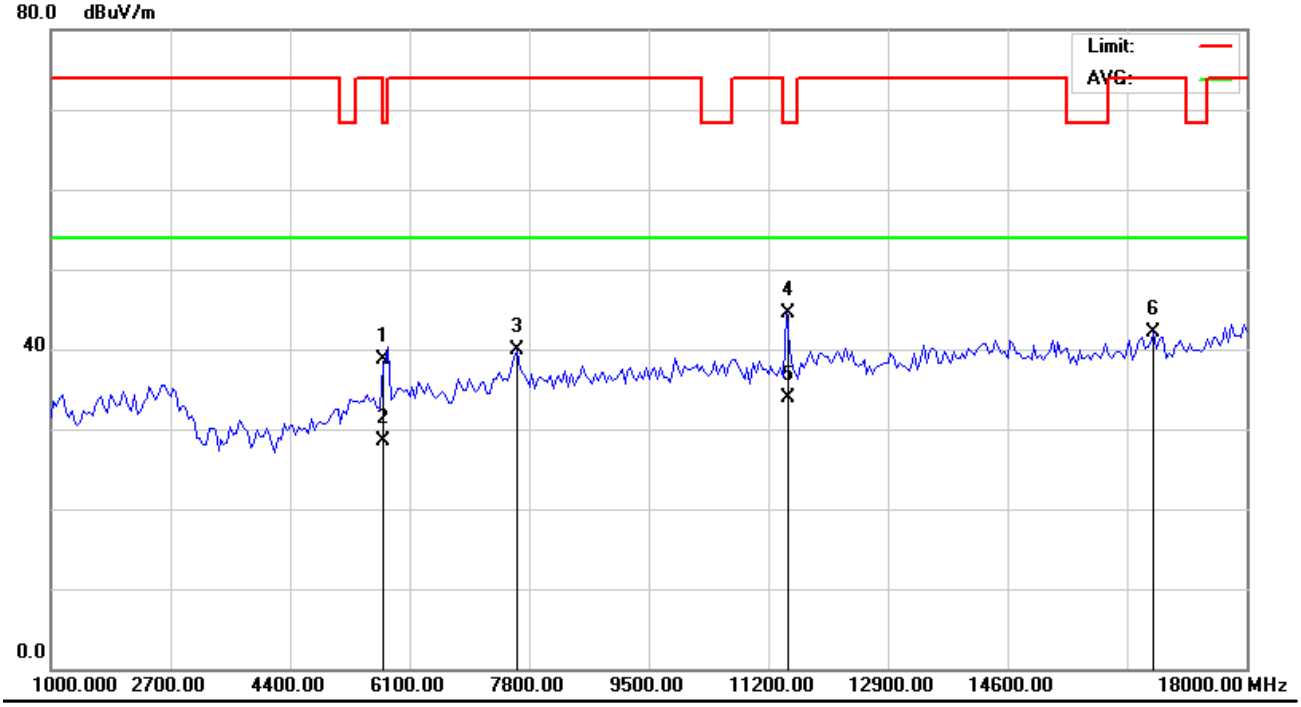
Test mode:	TX 5745 MHz	Polarization:	Horizontal
Frequency range:	1-18GHz	RBW/VBW	Spurious : 1MHz/3MHz for Peak,1MHz/10Hz for Average. non-restricted band: 100KHz/300KHz for Peak.



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		5725.000	39.99	-3.09	36.90	68.30	-31.40	peak			
2		7375.000	41.36	-0.18	41.18	74.00	-32.82	peak			
3		11490.00	35.81	10.27	46.08	68.30	-22.22	peak			
4	*	11490.00	24.21	10.27	34.48	54.00	-19.52	AVG			
5		13537.50	28.71	14.87	43.58	74.00	-30.42	peak			

spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported above 18G.

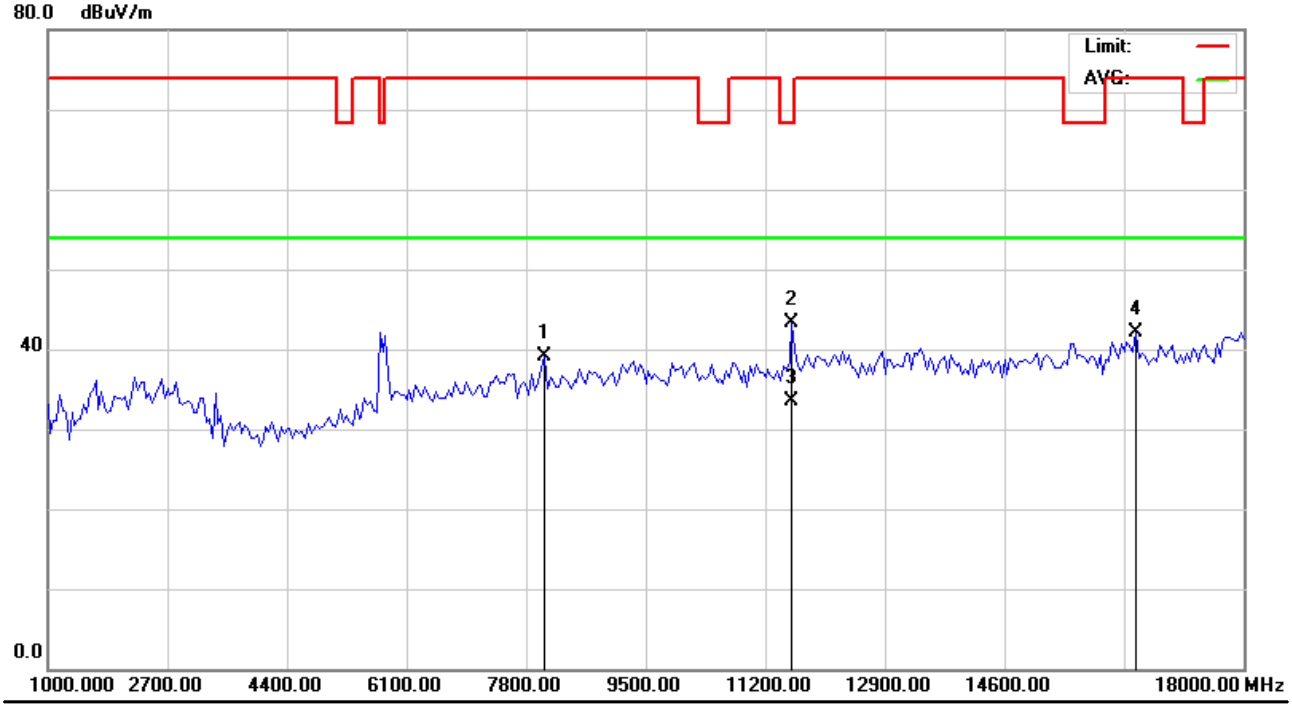
Test mode:	TX 5745 MHz	Polarization:	Vertical
Frequency range:	1-18GHz	RBW/VBW	Spurious : 1MHz/3MHz for Peak,1MHz/10Hz for Average. non-restricted band: 100KHz/300KHz for Peak.



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		5725.000	41.73	-3.09	38.64	68.30	-29.66	peak			
2		5725.000	31.53	-3.09	28.44	54.00	-25.56	AVG			
3		7630.000	39.57	0.29	39.86	74.00	-34.14	peak			
4		11490.00	34.19	10.27	44.46	68.30	-23.84	peak			
5	*	11490.00	23.62	10.27	33.89	54.00	-20.11	AVG			
6		16682.50	22.28	19.88	42.16	74.00	-31.84	peak			

spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported above 18G.

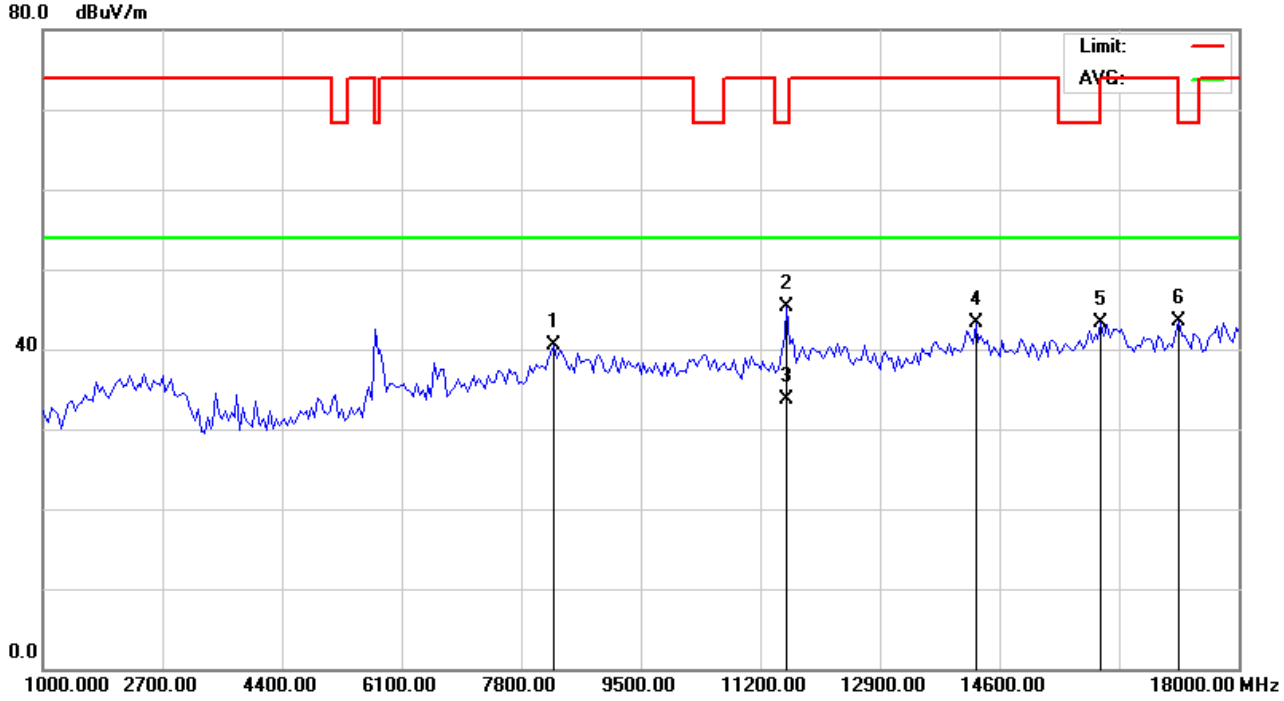
Test mode:	TX 5785 MHz	Polarization:	Horizontal
Frequency range:	1-18GHz	RBW/VBW	Spurious : 1MHz/3MHz for Peak,1MHz/10Hz for Average. non-restricted band: 100KHz/300KHz for Peak.



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		8055.000	38.28	0.83	39.11	74.00	-34.89	peak			
2		11570.00	32.94	10.46	43.40	68.30	-24.90	peak			
3	*	11570.00	22.98	10.46	33.44	54.00	-20.56	AVG			
4		16470.00	22.55	19.46	42.01	74.00	-31.99	peak			

spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported above 18G.

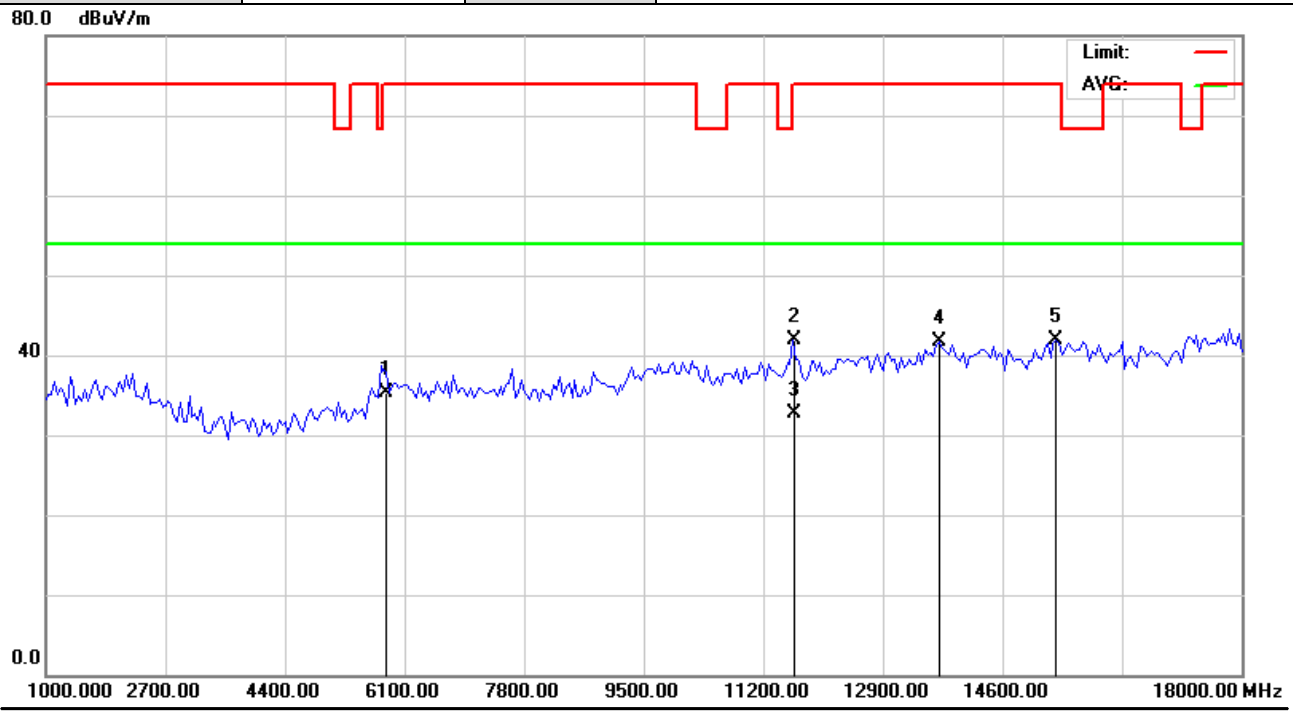
Test mode:	TX 5785 MHz	Polarization:	Vertical
Frequency range:	1-18GHz	RBW/VBW	Spurious : 1MHz/3MHz for Peak,1MHz/10Hz for Average. non-restricted band: 100KHz/300KHz for Peak.



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		8267.500	39.50	1.09	40.59	74.00	-33.41	peak			
2		11570.00	34.94	10.46	45.40	68.30	-22.90	peak			
3	*	11570.00	23.16	10.46	33.62	54.00	-20.38	AVG			
4		14260.00	28.16	15.13	43.29	74.00	-30.71	peak			
5		16045.00	25.44	17.85	43.29	68.30	-25.01	peak			
6		17150.00	23.13	20.36	43.49	74.00	-30.51	peak			

spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported above 18G.

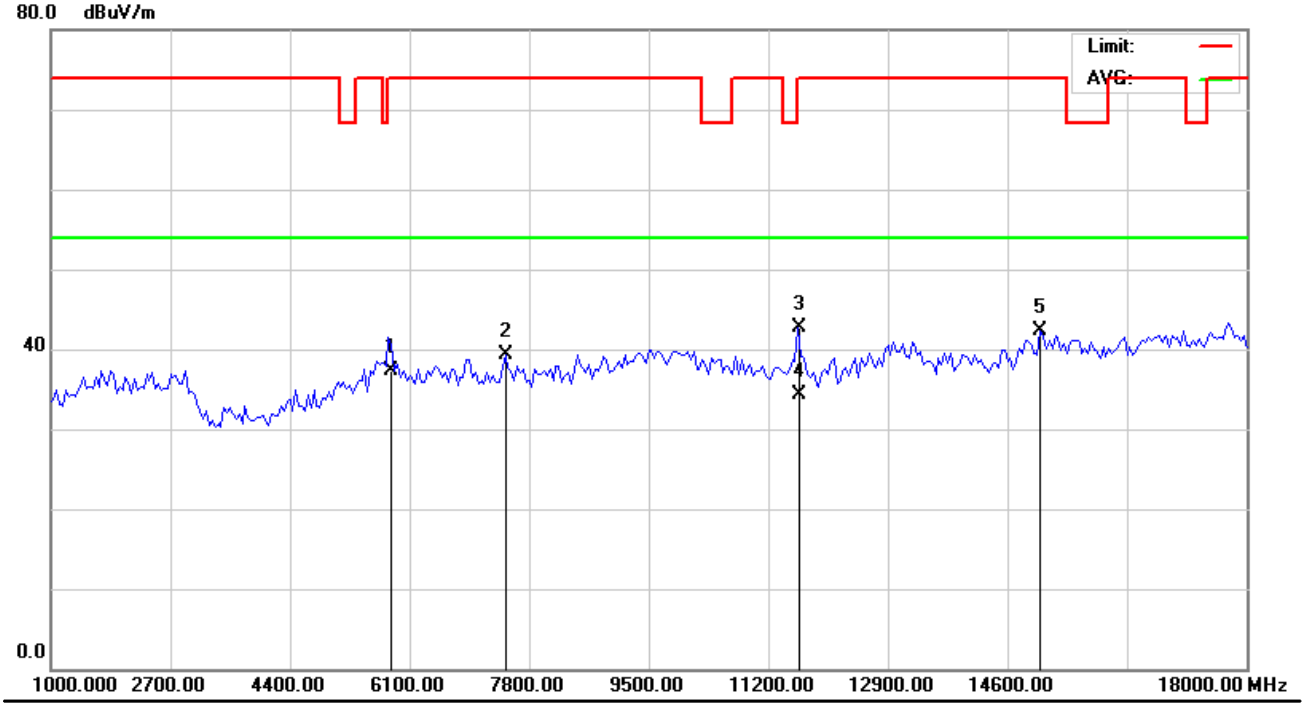
Test mode:	TX 5825 MHz	Polarization:	Horizontal
Frequency range:	1-18GHz	RBW/VBW	Spurious : 1MHz/3MHz for Peak,1MHz/10Hz for Average. non-restricted band: 100KHz/300KHz for Peak.



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		5850.000	38.20	-2.88	35.32	74.00	-38.68	peak			
2		11650.00	31.37	10.62	41.99	68.30	-26.31	peak			
3	*	11650.00	22.14	10.62	32.76	54.00	-21.24	AVG			
4		13707.50	27.13	14.56	41.69	74.00	-32.31	peak			
5		15365.00	25.44	16.45	41.89	74.00	-32.11	peak			

spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported above 18G.

Test mode:	TX 5825 MHz	Polarization:	Vertical
Frequency range:	1-18GHz	RBW/VBW	Spurious : 1MHz/3MHz for Peak,1MHz/10Hz for Average. non-restricted band: 100KHz/300KHz for Peak.



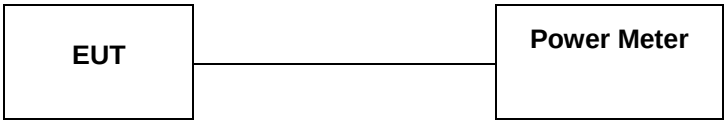
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		5850.000	40.18	-2.88	37.30	74.00	-36.70	peak			
2		7460.000	39.32	0.02	39.34	74.00	-34.66	peak			
3		11650.00	32.12	10.62	42.74	68.30	-25.56	peak			
4	*	11650.00	23.60	10.62	34.22	54.00	-19.78	AVG			
5		15067.50	26.04	16.30	42.34	74.00	-31.66	peak			

spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported above 18G.

REMARKS:
1. Corrected Amplitude level (dBuV/m)=Reading(dBuV)+Factor(dB/m)
2. Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
3. The other emission levels were very low against the limit.
4. Margin value = Limit value- Emission level.
5. For Wireless 802.11a mode at 54Mbps.

4.3. Peak Transmit Power Measurement

TEST CONFIGURATION



TEST PROCEDURE

The EUT was directly connected to the Power Meter and antenna output port as show in the block diagram as TEST CONFIGURATION shows.

LIMIT

Frequency Band	Limit
5.15 – 5.25GHz	The lesser of 250mW (24dBm)
5.725 – 5.825GHz	The lesser of 1W (30dBm)

TEST RESULTS

Remark:We measured output power at difference data rate for each mode and recorded woest case for each mode.

4.3.1 802.11a Test Mode

A. Test Verdict

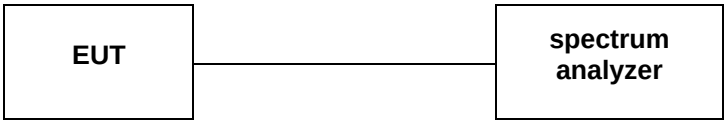
TEST CONDITIONS	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	26dBc Occupied Bandwidth (MHz)	PEAK POWER LIMIT	PASS/FAIL
Tnom=25°C; Vnom =12Vdc	5180	9.53	9.79	20.492	250mW (24dBm)	PASS
	5220	8.45	9.27	20.666		PASS
	5240	8.63	9.36	20.492		PASS

TEST CONDITIONS	CHANNEL FREQUEN CY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	6dBc Occupied Bandwidth (MHz)	PEAK POWER LIMIT	6dBc Occupied Bandwidth LIMIT (kHz)	PASS/ FAIL
Tnom=25 °C; Vnom =12Vdc	5745	6.71	8.27	16.400	1W (30dBm)	500	PASS
	5785	7.18	8.56	16.408			PASS
	5825	6.82	8.34	16.411			PASS

NOTE: The Occupied Bandwidth plot, please refer to the following pages.

4.4. Bandwidth

TEST CONFIGURATION



TEST PROCEDURE

26db bandwidth（5150-5250MHz）
a) Set RBW = approximately 1% of the emission bandwidth.
b) Set the VBW > RBW.
c) Detector = Peak.
d) Trace mode = max hold.
e) Measure the maximum width of the emission that is 26 dB down from the maximum of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

6db bandwidth（5725-5850MHz）
1. The transmitter output (antenna port) was connected to the spectrum analyzer in peak hold mode.
2. The resolution bandwidth of 100 kHz and the video bandwidth of 300 kHz were used.
3. Measured the spectrum width with power higher than 6dB below carrier.

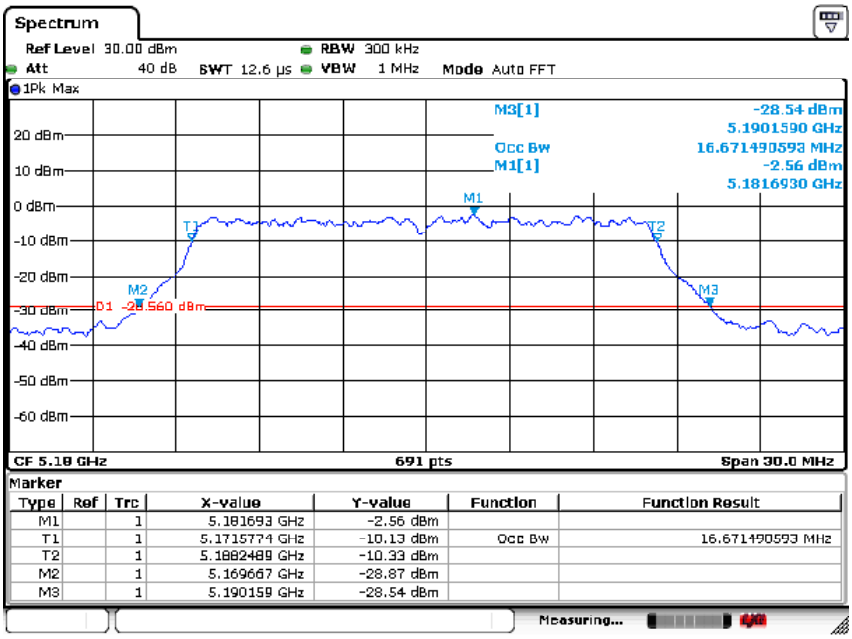
LIMIT

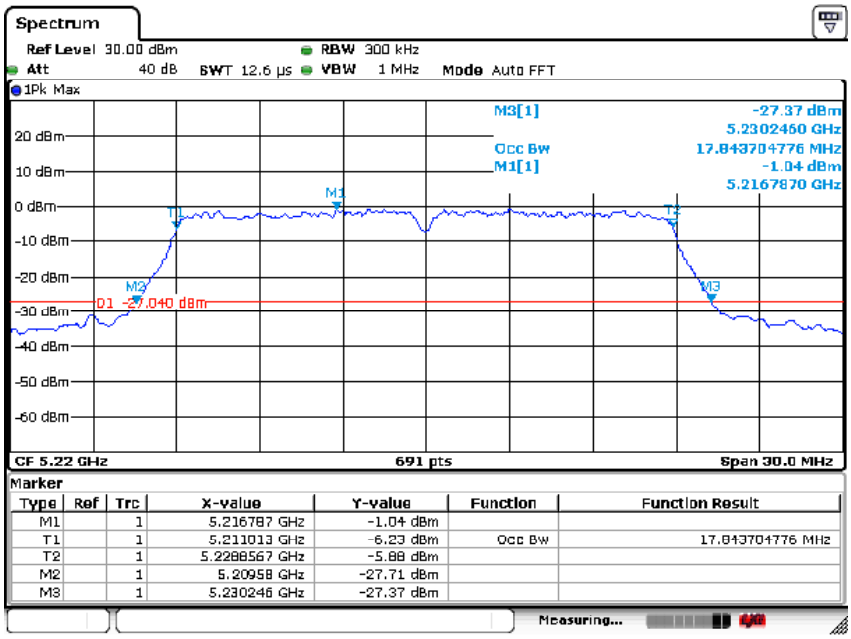
Frequency Band	Limit
5.15 – 5.25GHz	/
5.725 – 5.825GHz	＞500kHz

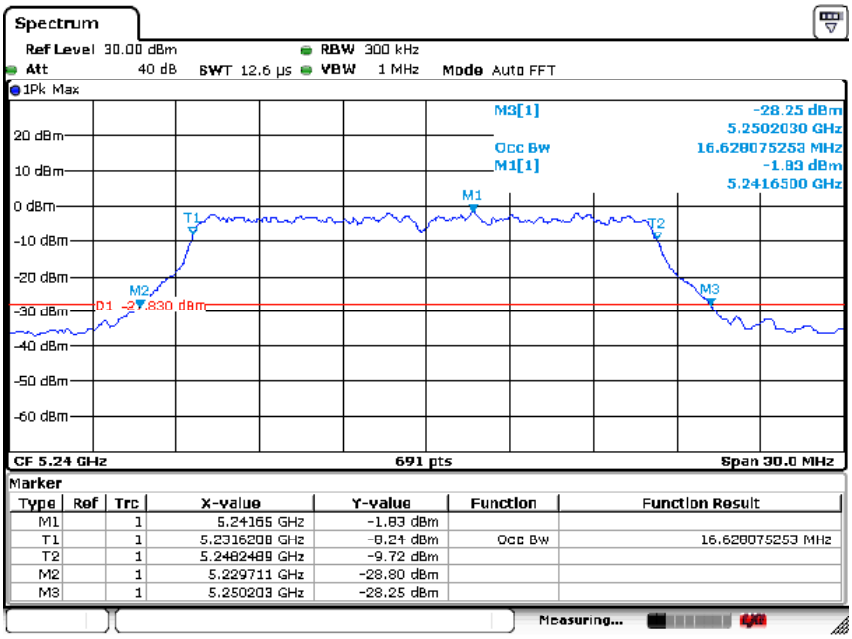
TEST RESULTS

Remark:We measured output power at difference data rate for each mode and recorded woest case for each mode.

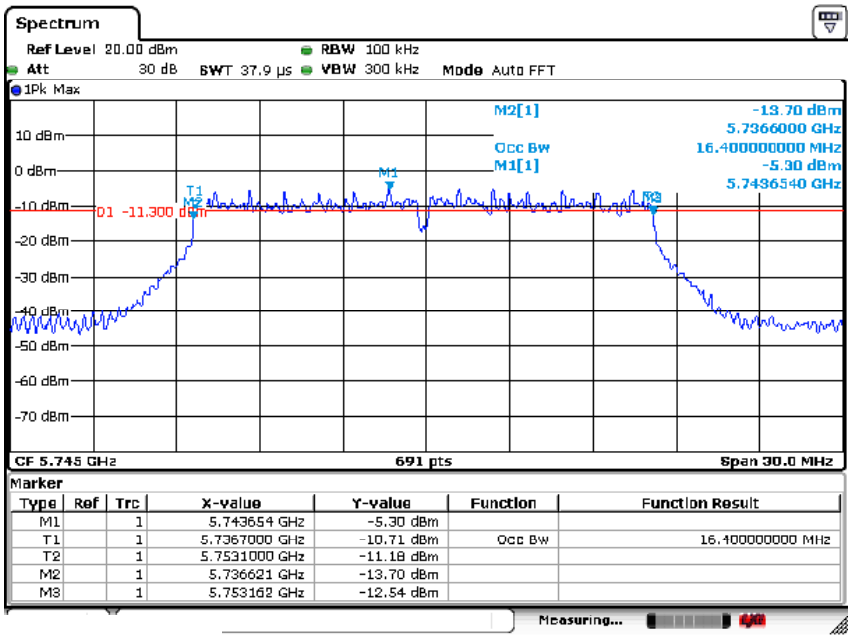
26dB Occupied Bandwidth:

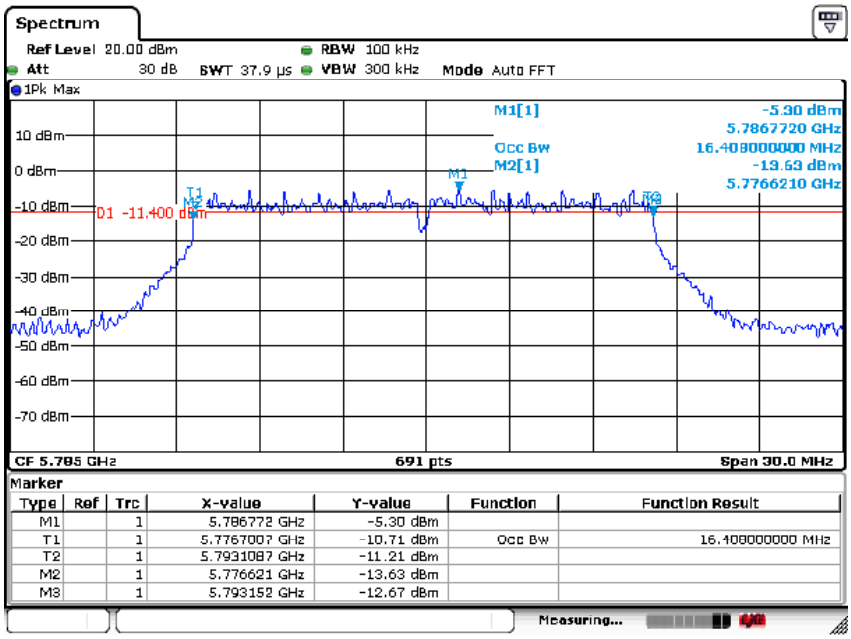


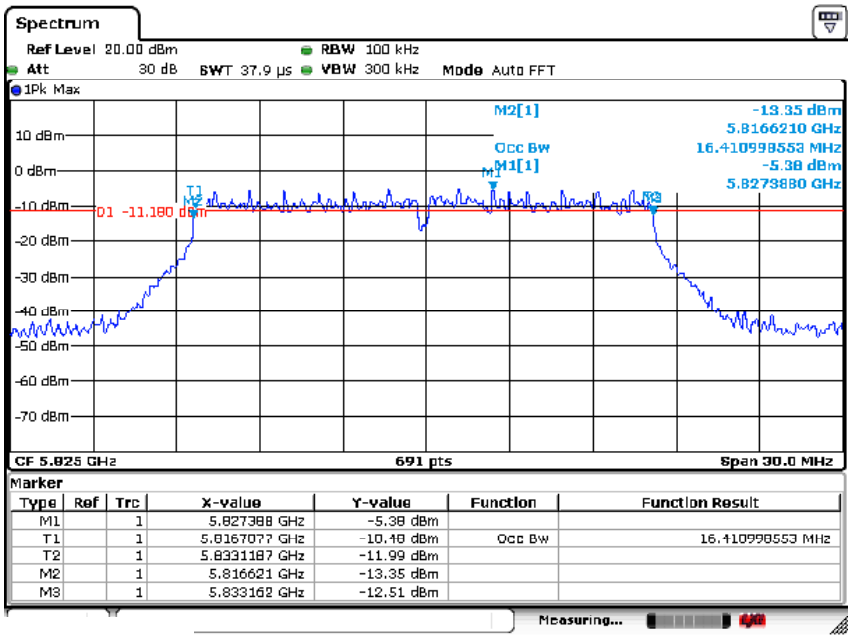




6dB Occupied Bandwidth:

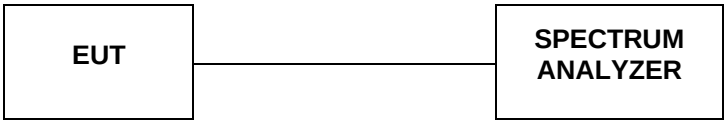



Spectrum
Ref Level 20.00 dBm
RBW 100 kHz
Att 30 dB
SWT 37.9 µs
VBW 300 kHz
Mode Auto FFT
1Pk Max
M1[1]
-5.30 dBm
5.7867720 GHz
Occ Bw
16.408000000 MHz
M2[1]
-13.63 dBm
5.7766210 GHz
D1 -11.400 dBm
CF 5.785 GHz
691 pts
Span 30.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 5.786772 GHz -5.30 dBm
T1 1 5.7767007 GHz -10.71 dBm Occ Bw 16.408000000 MHz
T2 1 5.7931087 GHz -11.21 dBm
M2 1 5.776621 GHz -13.63 dBm
M3 1 5.793152 GHz -12.67 dBm
Measuring...


Spectrum
Ref Level 20.00 dBm
RBW 100 kHz
Att 30 dB
SWT 37.9 µs
VBW 300 kHz
Mode Auto FFT
1Pk Max
M2[1]
-13.35 dBm
5.8166210 GHz
Occ Bw
16.410998553 MHz
M1[1]
-5.38 dBm
5.8273880 GHz
D1 -11.180 dBm
CF 5.825 GHz
691 pts
Span 30.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 5.827388 GHz -5.38 dBm
T1 1 5.8167077 GHz -10.48 dBm Occ Bw 16.410998553 MHz
T2 1 5.8331187 GHz -11.99 dBm
M2 1 5.816621 GHz -13.35 dBm
M3 1 5.833162 GHz -12.51 dBm
Measuring...

4.5. Peak Power Spectral Density Measurement

TEST CONFIGURATION



TEST PROCEDURE

The rules requires “maximum power spectral density” measurements where the intent is to measure the maximum value of the time average of the power spectral density measured during a period of continuous transmission.

1. Create an average power spectrum for the EUT operating mode being tested by following the instructions in section II.E.2. for measuring maximum conducted output power using a spectrum analyzer or EMI receiver: select the appropriate test method (SA-1, SA-2, SA-3, or alternatives to each) and apply it up to, but not including, the step labeled, “Compute power…”. (This procedure is required even if the maximum conducted output power measurement was performed using a power meter, method PM.)
2. Use the peak search function on the instrument to find the peak of the spectrum and record its value.
3. Make the following adjustments to the peak value of the spectrum, if applicable:

a) If Method SA-2 or SA-2 Alternative was used, add 10 log(1/x), where x is the duty cycle, to the peak of the spectrum.

b) If Method SA-3 Alternative was used and the linear mode was used in step II.E.2.g)(viii), add 1 dB to the final result to compensate for the difference between linear averaging and power averaging.

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

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

b) Set VBW $\geqslant$ 3 RBW.

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

d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add 10log(1MHz/RBW) to the measured result, whereas RBW (< 1 MHz) is the reduced resolution bandwidth of spectrum analyzer set during measurement.

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

LIMIT

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

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

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

For 5725~5850MHz

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

TEST RESULTS

4.4.1 802.11a Test Mode

A. Test Verdict

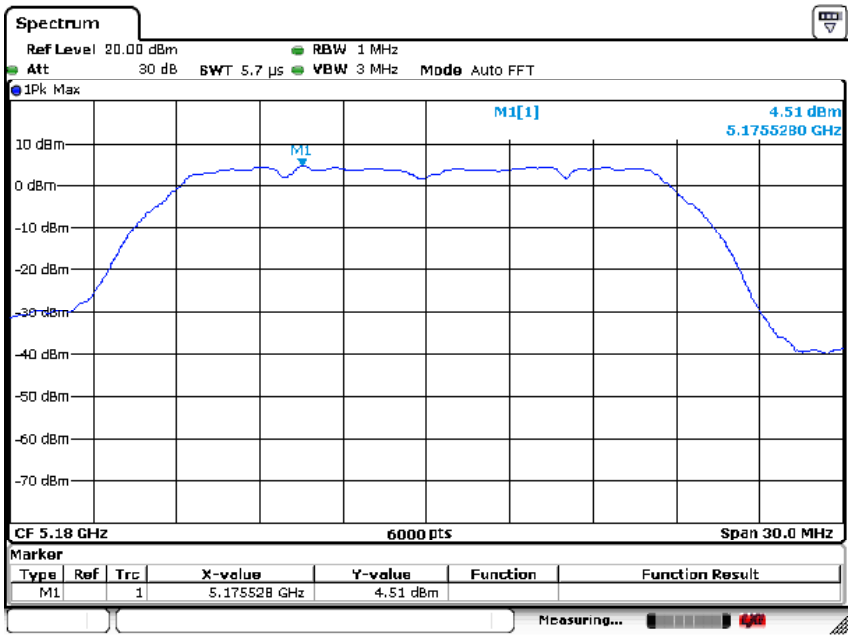
Test Mode	Frequency (MHz)	Measured Conducted PSD (dBm)	ANT. Gain (dB)	Duty Cycle factor (dB)	Report Conducted PSD (dBm)	PSD Limits (dBm)	Verdict
802.11a	5180	4.51	0	0	4.51	17	PASS
	5220	4.95	0	0	4.95	17	PASS
	5240	4.82	0	0	4.82	17	PASS

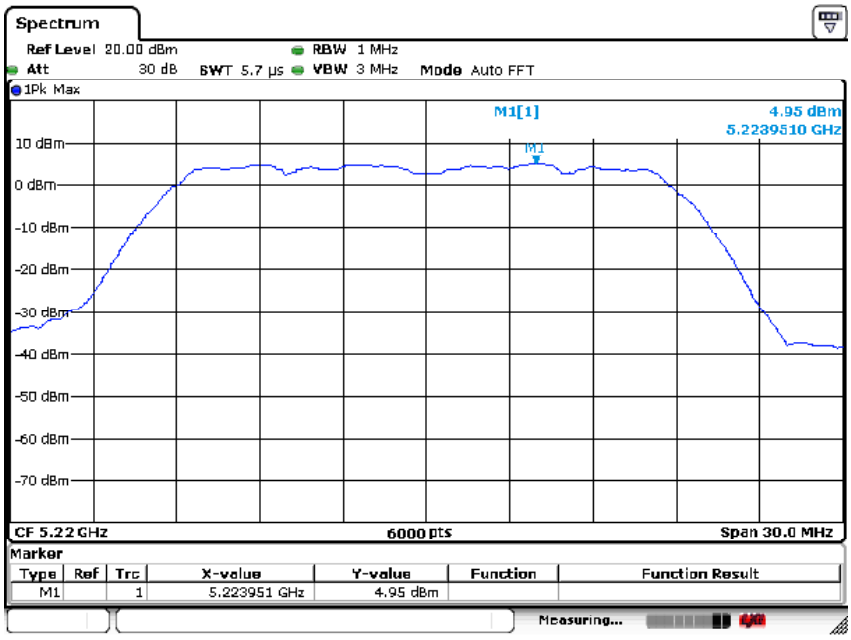
Remark:
1. Measured power spectrum density at difference data rate for each mode and recorded worst case for each mode.
2. Test results including cable loss;
3. Worst case data at 6Mbps at IEEE 802.11a;
4. Report conducted PSD = Measured conducted average power + Duty Cycle factor;
5. Please refer to following test plots;

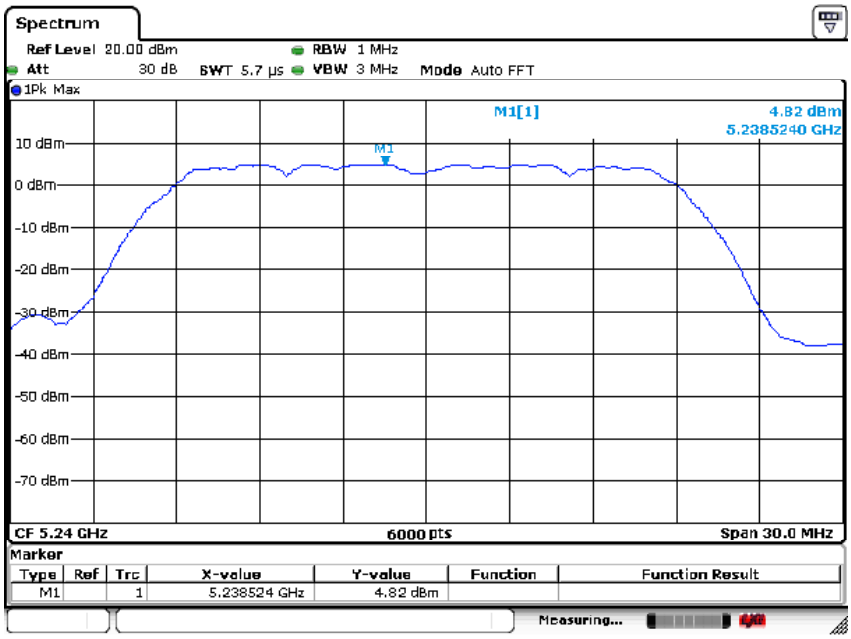
Test Mode	Frequency (MHz)	Measured Conducted PSD PSD (dBm/700KHz)	RBW factor (dB)	Duty Cycle factor (dB)	Report Conducted PSD (dBm/500KHz)	PSD Limits (dBm/500KHz)	Verdict
802.11a	5745	4.15	-1.46	0	2.69	30	PASS
	5785	4.57	-1.46	0	3.11	30	PASS
	5825	4.43	-1.46	0	2.97	30	PASS

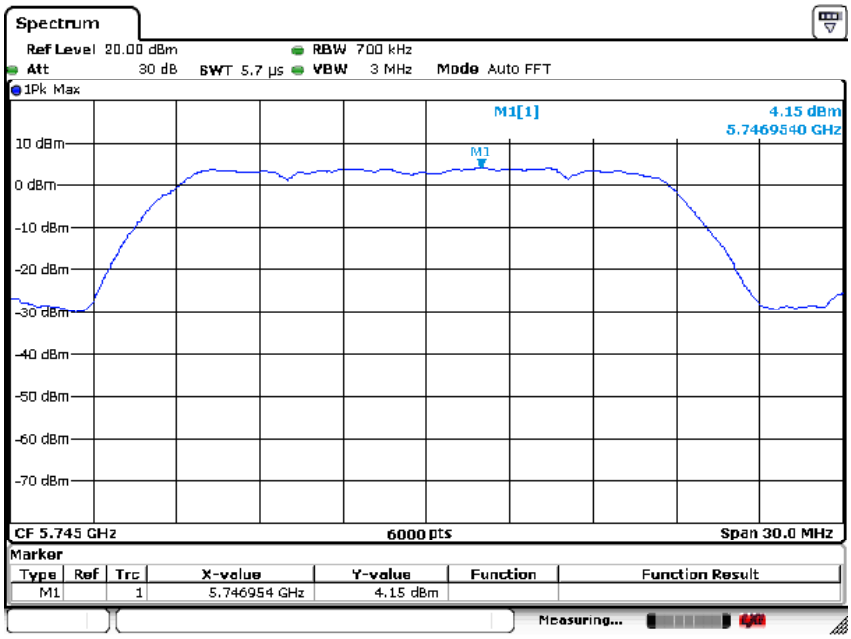
Remark:
1. Measured power spectrum density at difference data rate for each mode and recorded worst case for each mode.
2. Test results including cable loss;
3. Worst case data at 6Mbps at IEEE 802.11a
4. Report conducted PSD = measured conducted PSD + Duty Cycle factor + RBW factor;
5. RBW factor = 10 log (500 KHz / 700 KHz) = -1.46 dB;

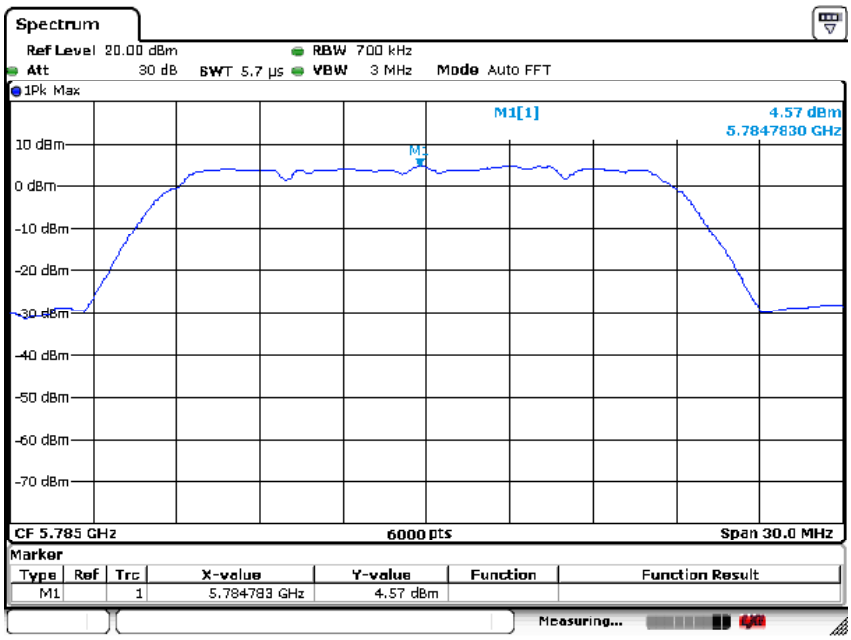
B. Test Plots

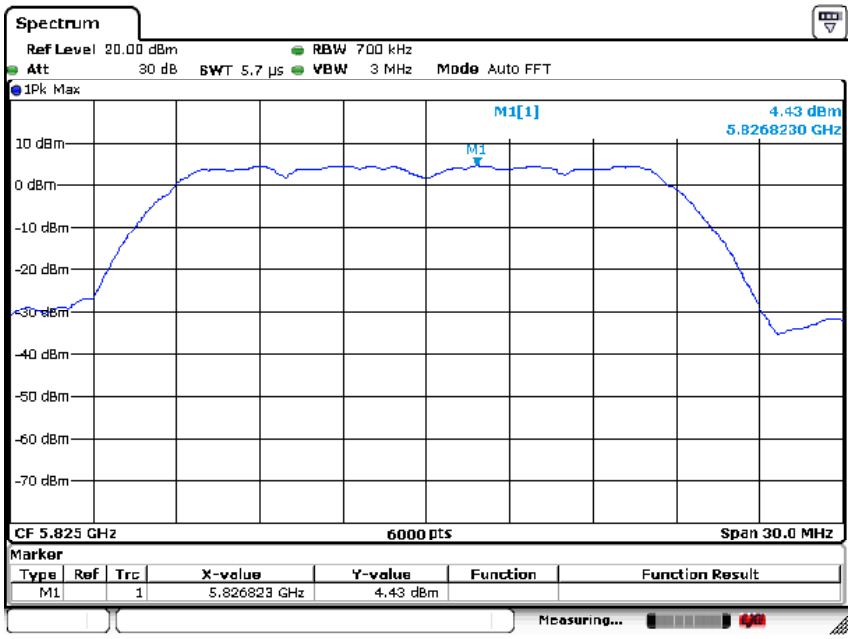

Spectrum
Ref Level 20.00 dBm
RBW 1 MHz
Att 30 dB
SWT 5.7 µs
VBW 3 MHz
Mode Auto FFT
1Pk Max
M1[1]
4.51 dBm
5.1755280 GHz
M1
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 5.18 GHz
6000 pts
Span 30.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 5.175528 GHz 4.51 dBm
Measuring...


Spectrum
Ref Level 20.00 dBm
RBW 1 MHz
Att 30 dB
SWT 5.7 µs
VBW 3 MHz
Mode Auto FFT
1Pk Max
M1[1]
4.95 dBm
5.2239510 GHz
M1
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 5.22 GHz
6000 pts
Span 30.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 5.223951 GHz 4.95 dBm
Measuring...


Spectrum
Ref Level 20.00 dBm
RBW 1 MHz
Att 30 dB
SWT 5.7 µs
VBW 3 MHz
Mode Auto FFT
1Pk Max
M1[1]
4.82 dBm
5.2385240 GHz
M1
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 5.24 GHz
6000 pts
Span 30.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 5.238524 GHz 4.82 dBm
Measuring...


Spectrum
Ref Level 20.00 dBm
RBW 700 kHz
Att 30 dB
SWT 5.7 µs
VBW 3 MHz
Mode Auto FFT
1Pk Max
M1[1]
4.15 dBm
5.7469540 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 5.745 GHz
6000 pts
Span 30.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 5.746954 GHz 4.15 dBm
Measuring...


Spectrum
Ref Level 20.00 dBm
RBW 700 kHz
Att 30 dB
SWT 5.7 µs
VBW 3 MHz
Mode Auto FFT
1Pk Max
M1[1]
4.57 dBm
5.7847830 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 5.785 GHz
6000 pts
Span 30.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 5.784783 GHz 4.57 dBm
Measuring...

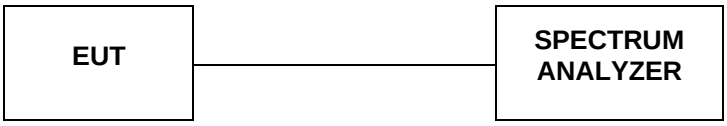

Spectrum
Ref Level 20.00 dBm
RBW 700 kHz
Att 30 dB
SWT 5.7 µs
VBW 3 MHz
Mode Auto FFT
1Pk Max
M1[1]
4.43 dBm
5.8268230 GHz
M1
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
CF 5.825 GHz
6000 pts
Span 30.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 5.826823 GHz 4.43 dBm
Measuring...

4.6. On Time and Duty Cycle

TEST PROCEDURE

1. Set the centre frequency of the spectrum analyzer to the transmitting frequency;
2. Set the span=0MHz, RBW=8MHz, VBW=50MHz, Sweep time=5ms;
3. Detector = peak;
4. Trace mode = Single hold.

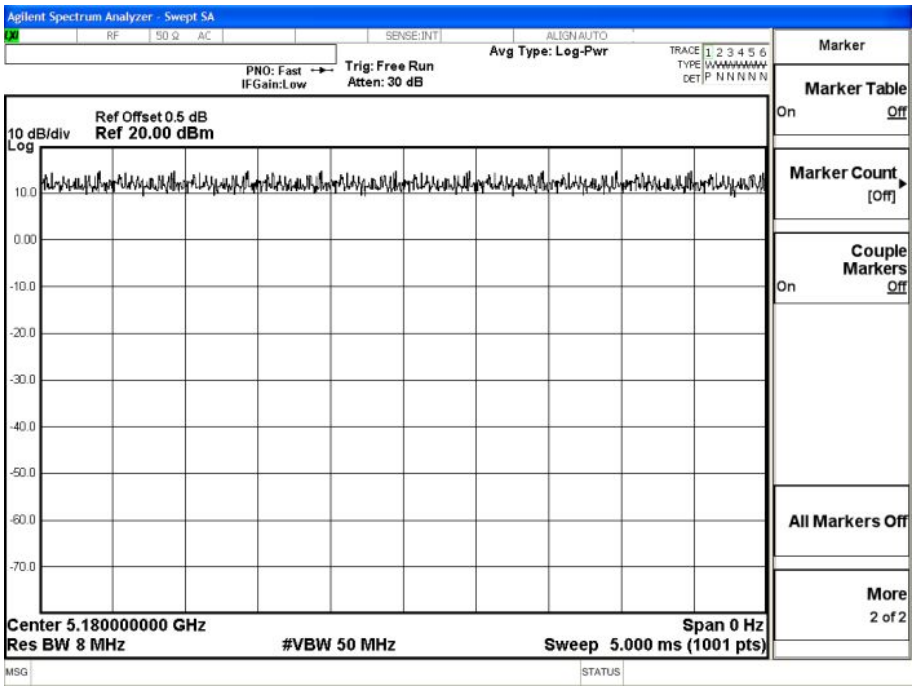
TEST SETUP

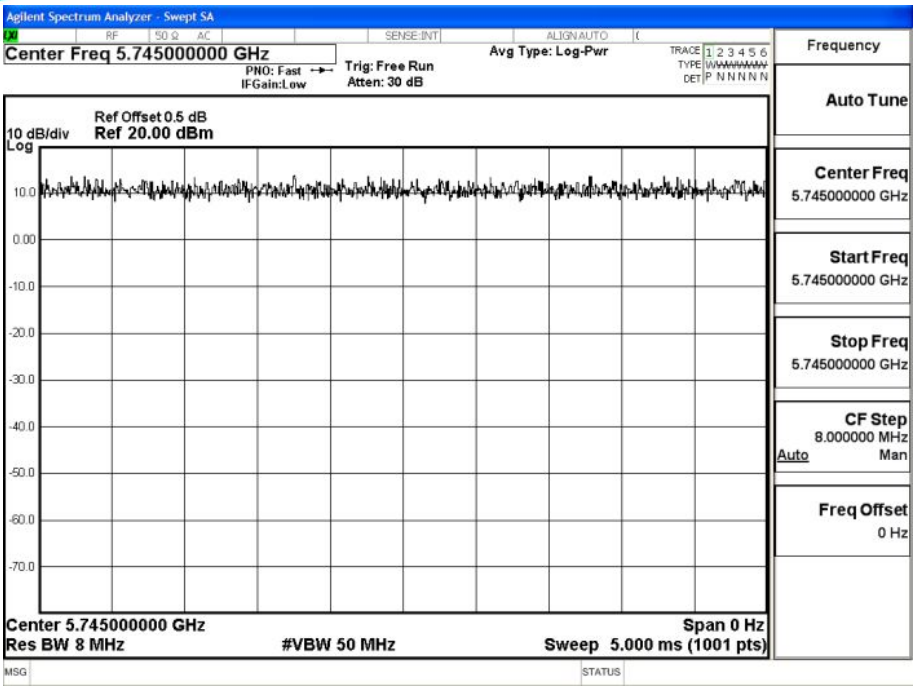


TEST RESULTS

mode	On Time B (ms)	Period (ms)	Duty Cycle x (Linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW(KHz)
802.11a	5.0	5.0	1	100	0	0.01

The EUT was programmed to be in continuously transmitting mode.




Agilent Spectrum Analyzer - Swept SA
Center Freq 5.745000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
TRACE 1 2 3 4 5 6
TYPE WWWWWW
DET P N N N N N
Ref Offset 0.5 dB
10 dB/div
Log
Ref 20.00 dBm
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
Center 5.745000000 GHz
Res BW 8 MHz
#VBW 50 MHz
Span 0 Hz
Sweep 5.000 ms (1001 pts)
MSG
STATUS
Frequency
Auto Tune
Center Freq
5.745000000 GHz
Start Freq
5.745000000 GHz
Stop Freq
5.745000000 GHz
CF Step
8.000000 MHz
Auto
Man
Freq Offset
0 Hz

4.7. Frequency Stability

LIMITS OF FREQUENCY STABILITY MEASUREMENT

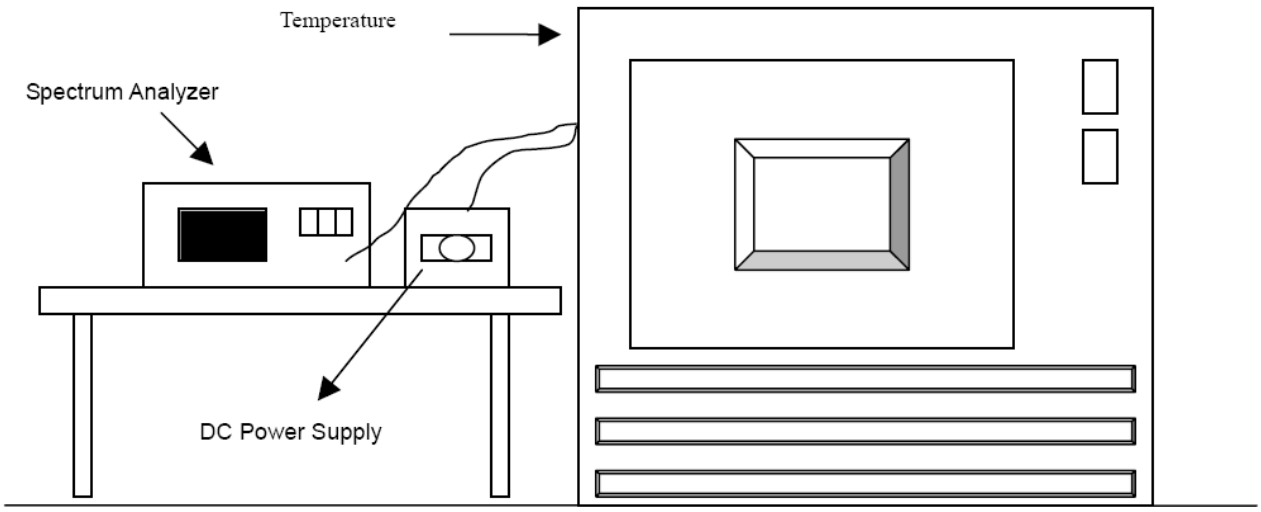
Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

UNII lower band	5150 MHz ⩽ f ⩽ 5250 MHz
UNII middle band	5250 MHz ⩽ f ⩽ 5350 MHz
	5470 MHz ⩽ f ⩽ 5725 MHZ
UNII Upper band	5725 MHz ⩽ f ⩽ 5825 MHz

TEST PROCEDURE

1. The EUT was placed inside temperature chamber and powered and powered by nominal DC voltage.
2. Set EUT as normal operation.
3. Turn the EUT on and couple its output to spectrum.
4. Turn the EUT off and set the chamber to the highest temperature specified.
5. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT and measure the operating frequency.

TEST SETUP



TEST RESULTS

Technical characteristics		5180 MHz	5220 MHz	5240 MHz
25 °C	Vnom	5179.995	5219.949	5239.998
-20 °C	Vmin	5179.957	5219.949	5239.955
	Vmax	5179.977	5219.946	5239.994
50°C	Vmin	5179.908	5219.955	5239.959
	Vmax	5179.936	5219.946	5239.937

Technical characteristics		5745 MHz	5785 MHz	5825 MHz
25 °C	Vmin	5744.947	5784.972	5824.971
-20 °C	Vmin	5744.966	5784.971	5824.936
	Vmax	5744.934	5785.083	5825.034
50°C	Vmin	5745.072	5784.939	5824.976
	Vmax	5744.987	5784.977	5825.042

4.8. Band Edge Compliance of RF Emission

EUT OPERATING CONDITION

The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.

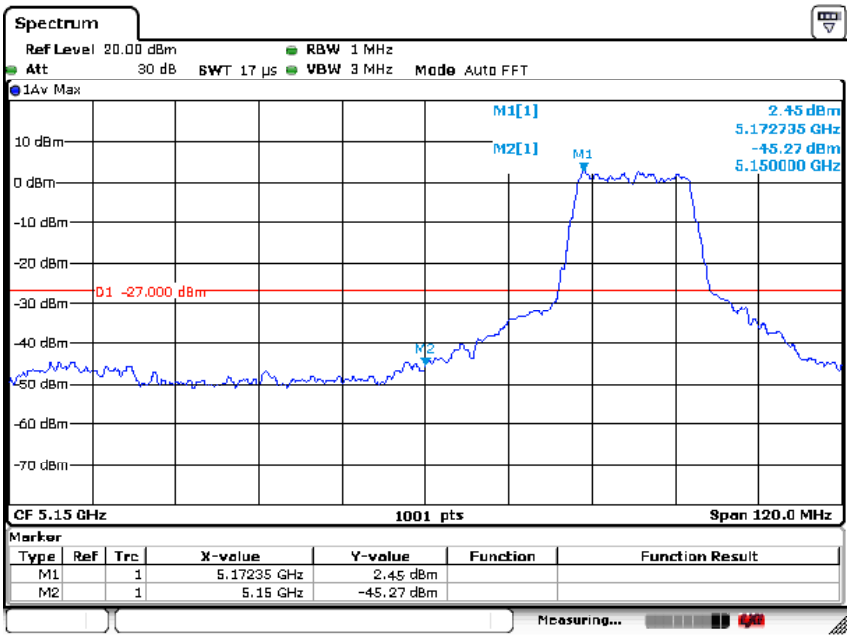
LIMITS

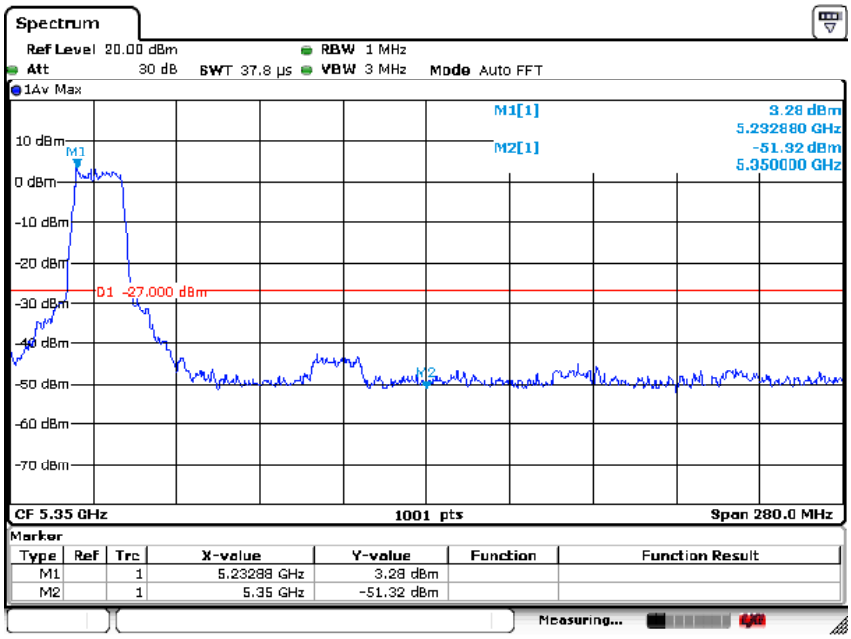
(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(2) For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the 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.

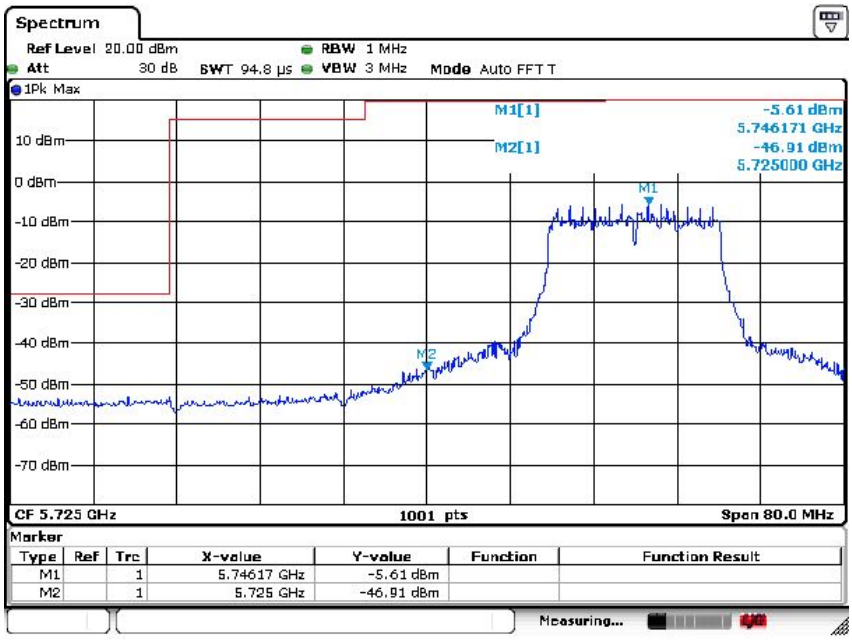
TEST PROCEDURE

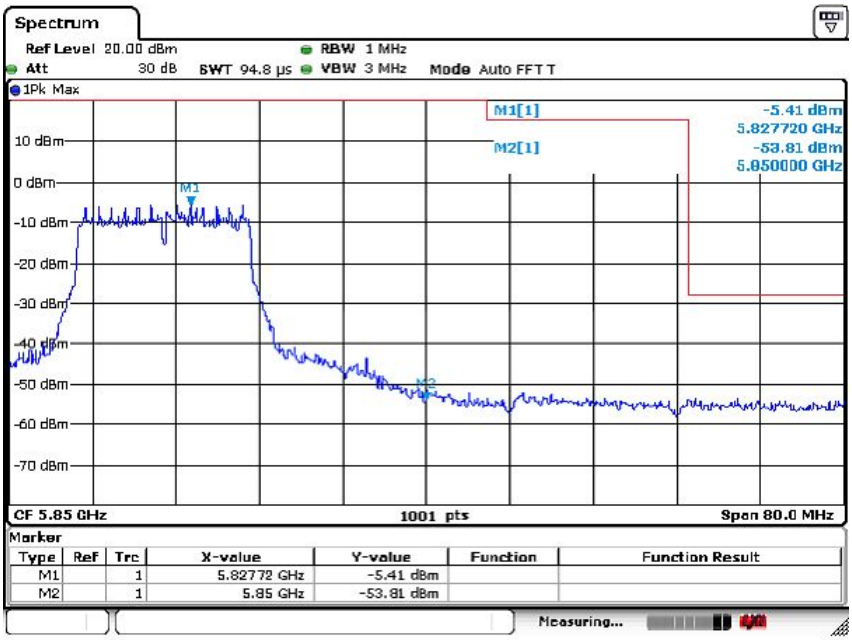
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW of spectrum analyzer to 1 MHz with a convenient frequency span.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.

TEST RESULTS




Spectrum
Ref Level 20.00 dBm
RBW 1 MHz
Att 30 dB
SWT 37.8 µs
VBW 3 MHz
Mode Auto FFT
1Av Max
M1[1]
3.28 dBm
5.232880 GHz
M2[1]
-51.32 dBm
5.350000 GHz
D1 -27.000 dBm
CF 5.35 GHz
1001 pts
Span 280.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 5.23288 GHz 3.28 dBm
M2 1 5.35 GHz -51.32 dBm
Measuring...


Spectrum
Ref Level 20.00 dBm
RBW 1 MHz
Att 30 dB
SWT 94.8 µs
VBW 3 MHz
Mode Auto FFT T
1Pk Max
M1[1]
-5.61 dBm
5.746171 GHz
M2[1]
-46.91 dBm
5.725000 GHz
CF 5.725 GHz
1001 pts
Span 80.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 5.74617 GHz -5.61 dBm
M2 1 5.725 GHz -46.91 dBm
Measuring...


Spectrum
Ref Level 20.00 dBm
RBW 1 MHz
Att 30 dB
SWT 94.8 µs
VBW 3 MHz
Mode Auto FFT T
1Pk Max
M1[1]
-5.41 dBm
5.827720 GHz
M2[1]
-53.81 dBm
5.850000 GHz
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
M1
M2
CF 5.85 GHz
1001 pts
Span 80.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 5.82772 GHz -5.41 dBm
M2 1 5.85 GHz -53.81 dBm
Measuring...

4.9. Antenna Requirement

Standard Applicable

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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:
a. Antenna must be permanently attached to the unit.
b. Antenna must use a unique type of connector to attach to the EUT.
Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.
And according to FCC 47 CFR section 15.247 (b), if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Refer to statement below for compliance

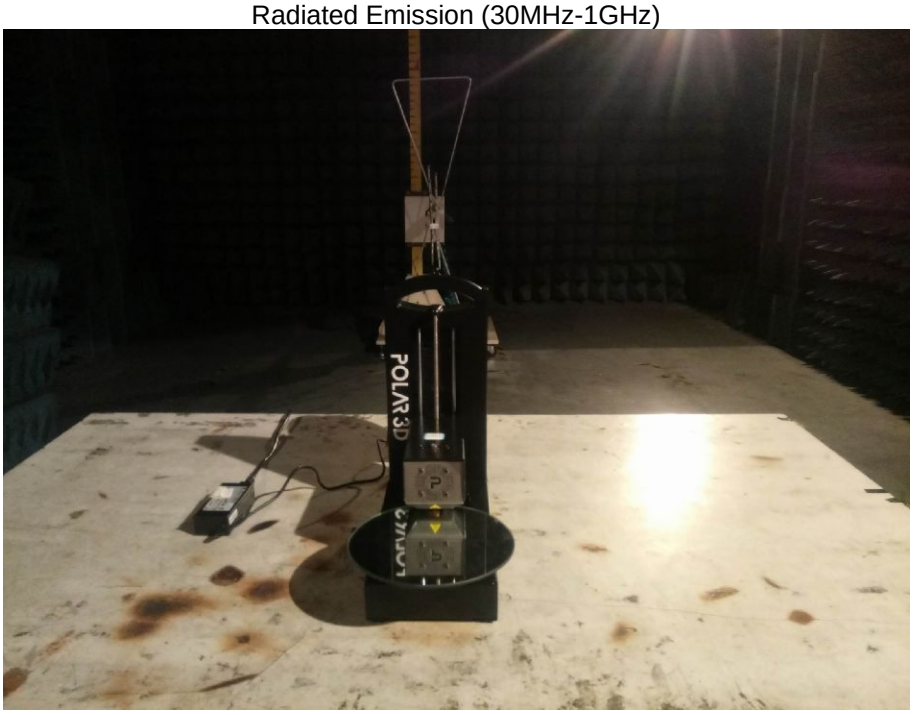
The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

Antenna Connected Construction

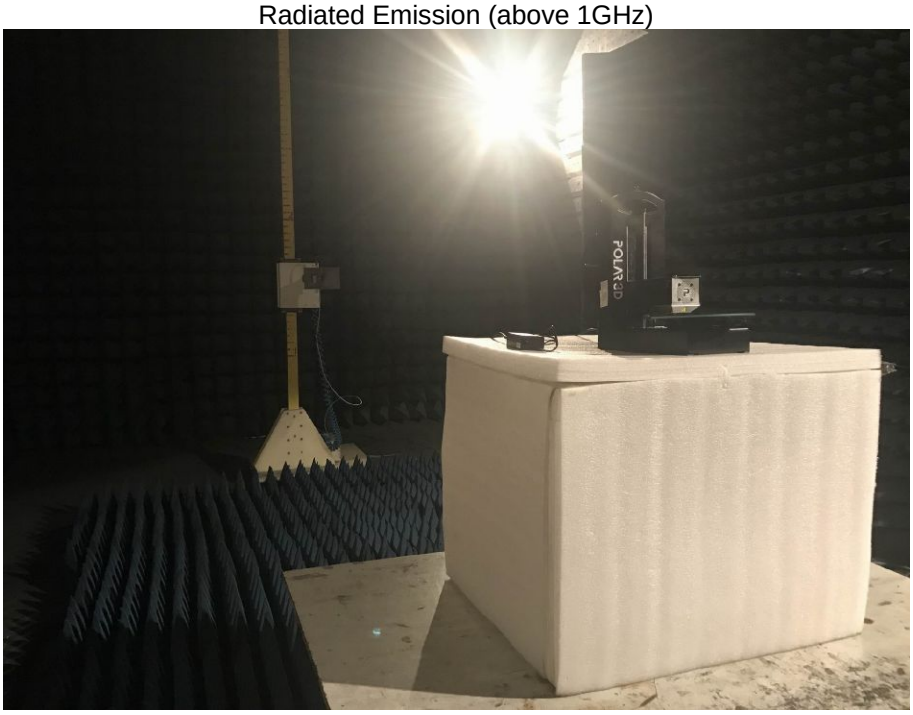
The WLAN antenna is PCB antenna and the maximum antenna gain of WLAN uesed was 0 dBi.
It compliance FCC rule.

5. Test Setup Photos of the EUT

Radiated Emission (30MHz-1GHz)



Radiated Emission (above 1GHz)



Conducted Emission (AC Mains)

6. External and Internal Photos of the EUT

.....End of Report.....