FCC Part 15E Test Report

FCC ID: 2AGZ3S00911

Product Name:	Starry Launch
Trademark:	Starry
Model Name :	S00912 L36104CPWD
Prepared For : Address :	Starry, Inc 38 Chauncy St Ste 200, Boston, MA 02111
Prepared By : Address :	Shenzhen BCTC Testing Co., Ltd. BCTC Building & 1-2F, East of B Building, Pengzhou Industrial, Fuyuan 1st Road, Qiaotou Community, Fuyong Street, Bao'an District, Shenzhen, China
Test Date:	Oct. 18, 2019 – Oct. 22, 2019
Date of Report :	Oct. 23, 2019
Report No.:	BCTC-LH190901198-2E

TEST RESULT CERTIFICATION

Applicant's name ..... : Starry, Inc

Address ..... : 38 Chauncy St Ste 200, Boston, MA 02111

Manufacture's Name..... : ShenZhen Spacetek Technology Co.,Ltd

Address ..... : 3F, NO.2Huafeng first science&technology Park, SanWei, Baoan District ShenZhen, China

Product description

Product name ..... : Starry Launch

Trademark ..... : Starry

Model and/or type reference : S00912
L36104CPWD

Standards ..... : FCC Part15 15.407
ANSI C63.10-2013
KDB 789033 D02 v02r01

This device described above has been tested by BCTC, and 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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Prepared by(Engineer):	Cai Fang Zhong	Cai Fang Zhong
Reviewer(Supervisor):	Eric Yang	Eric Yang
Approved(Manager):	Zero Zhou	Zero Zhou

倍测检测 BCTC APPROVED SHENZHEN BCTC TESTING CO., LTD.

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1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.407) , Subpart E			
Standard Section	Test Item	Judgment	Remark
15.209(a), 15.407 (b)(1) 15.407 (b)(4) 15.407 (b)(6)	Spurious Radiated Emissions	PASS	
2.1051, 15.407(b)	Spurious Emissions at Antenna Terminals	PASS	

NOTE:

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

1.1 TEST FACILITY

Shenzhen BCTC Testing Co., Ltd.
Add. : BCTC Building & 1-2F, East of B Building, Pengzhou Industrial, Fuyuan 1st Road, Qiaotou Community, Fuyong Street, Bao'an District, Shenzhen, China
FCC Test Firm Registration Number: 712850
IC Registered No.: 23583

1.2 MEASUREMENT UNCERTAINTY

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

No.	Item	Uncertainty
1	3m camber Radiated spurious emission(30MHz-1GHz)	U=4.3dB
2	3m chamber Radiated spurious emission(1GHz-18GHz)	U=4.5dB
3	3m chamber Radiated spurious emission(18GHz-40GHz)	U=3.34dB
4	Conducted Adjacent channel power	U=1.38dB
5	Conducted output power uncertainty Above 1G	U=1.576dB
6	Conducted output power uncertainty below 1G	U=1.28dB
7	humidity uncertainty	U=5.3%
8	Temperature uncertainty	U=0.59℃

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	Starry Launch	
Trade Name	Starry	
Model Name	S00912 L36104CPWD	
Model Difference	All the model are the same circuit and RF module, except mod el names	
Product Description	IEEE 802.11 WLAN Mode Supported	☒802.11a/n(20MHz channel bandwidth) ☒802.11n(40MHz channel bandwidth) ☒802.11ac(80MHz channel bandwidth)
	Data Rate	802.11a/n: 6,9,12,18,24,36,48,54Mbps; 802.11n(HT40/HT40):MCS0-MCS15; 802.11ac(HT80):NSS1, MCS0-MCS9
	Modulation	OFDM with BPSK/QPSK/16QAM/64QAM/256QAM for 802.11a/n/ac;
	Operating Frequency Range	☒5150-5250MHz for 802.11a/n(HT20)n(HT40)/ac80; ☒5725-5850 MHz for 802.11a/n(HT20)/n(HT40)/ac80;
	Number of Channels	See Note 2.
	Antenna Type	External antenna
	Antenna Gain	5dBi
	Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification, please refer to the User's Manual.	
Channel List	Please refer to the Note 2.	
Ratings	DC 12V	
Adapter	Model: MKS-1201000S Input: 100-240V~50/60Hz 0.3A Output: 12.0V 1000mA	
Connecting I/O Port(s)	Please refer to the User's Manual	

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
2. Frequency and Channel list for 802.11a/n/ac(20MHz) U-NII-1 (5150-5250MHz):

802.11a/n(20MHz) Carrier Frequency Channel							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
36	5180	44	5220	-	-	-	-
40	5200	48	5240	-	-	-	-

802.11n(40MHz) Carrier Frequency Channel

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
38	5190	-	-	-	-	-	-
46	5230	-	-	-	-	-	-

802.11ac (80MHz) Carrier Frequency Channel	
Channel	Frequency (MHz)
42	5210

Frequency and Channel list for 802.11a/n/ac(20 MHz) U-NII-3 (5725-5850MHz):

802.11a/n(20 MHz) Carrier Frequency Channel							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
149	5745	153	5765	157	5785	161	5805
165	5825	-	-	-	-	-	-

802.11n40MHz Carrier Frequency Channel					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
151	5755	159	5795	-	-

802.11ac 80MHz Carrier Frequency Channel	
Channel	Frequency (MHz)
155	5775

Ant.	Antenna Type	Antenna Gain(dBi)
A	External antenna	5
B	External antenna	5

2.2 DESCRIPTION OF TEST MODES

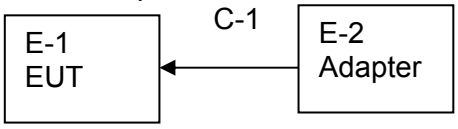
For Radiated Emission	
Final Test Mode	Description
Mode 1	802.11a / n20 CH36/ CH40/ CH 48 802.11a /n 20 CH149/ CH157/ CH 165
Mode 2	802.11n/40 CH38/ CH 46 802.11n40 CH 151 / CH 159
Mode 3	802.11 ac80 CH 42/CH 155
Mode 4	802.11a / n20 CH36/ CH40/ CH 48 802.11a /n20 CH149/ CH157/ CH 165

Note:

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

2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Radiated Spurious EmissionTest



2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

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

	Device Type	Brand	Model	Series No.	Data Cable
E-1	Starry Launch	Starry	S00912	N/A	EUT
E-2	Adapter	N/A	MKS-12010 00S	N/A	EUT

Item	Shielded Type	Ferrite Core	Length	Note
C-1	NO	NO	1.2M	DC cable unshielded

Note:

(1) The support equipment was authorized by Declaration of Confirmation.

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

2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation Test equipment

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Spectrum Analyzer (9kHz-26.5GHz)	Agilent	E4407B	MY45109572	Jun. 13, 2019	Jun. 12, 2020
2	Test Receiver (9kHz-7GHz)	R&S	ESR7	101154	Jun. 13, 2019	Jun. 12, 2020
3	Bilog Antenna (30MHz-3GHz)	SCHWARZBECK	VULB9163	VULB9163-942	Jun. 22, 2019	Jun. 21, 2020
4	Horn Antenna (1GHz-18GHz)	SCHWARZBECK	BBHA9120D	1541	Jun. 22, 2019	Jun. 21, 2020
5	Horn Antenna (18GHz-40GHz)	SCHWARZBECK	BBHA9170	822	Jun. 22, 2019	Jun. 21, 2020
6	Amplifier (9KHz-6GHz)	SCHWARZBECK	BBV9744	9744-0037	Jun. 25, 2019	Jun. 24, 2020
7	Amplifier (0.5GHz-18GHz)	SCHWARZBECK	BBV9718	9718-309	Jun. 25, 2019	Jun. 24, 2020
8	Amplifier (18GHz-40GHz)	MITEQ	TTA1840-35-HG	2034381	Jun. 17, 2019	Jun. 16, 2020
9	Loop Antenna (9KHz-30MHz)	SCHWARZBECK	FMZB1519B	014	Jul. 02, 2019	Jul. 01, 2020
10	RF cables1 (9kHz-30MHz)	Huber+Suhnar	9kHz-30MHz	B1702988-0008	Jun. 25, 2019	Jun. 24, 2020
11	RF cables2 (30MHz-1GHz)	Huber+Suhnar	30MHz-1GHz	1486150	Jun. 25, 2019	Jun. 24, 2020
12	RF cables3 (1GHz-40GHz)	Huber+Suhnar	1GHz-40GHz	1607106	Jun. 25, 2019	Jun. 24, 2020
13	Power Metter	Keysight	E4419	\	Jun. 17, 2019	Jun. 16, 2020
14	Power Sensor (AV)	Keysight	E9 300A	\	Jun. 17, 2019	Jun. 16, 2020
15	Signal Analyzer 20kHz-26.5GHz	KEYSIGHT	N9020A	MY49100060	Jun. 13, 2019	Jun. 12, 2020
16	Spectrum Analyzer 9kHz-40GHz	Aglient	FSP40	100363	Jun. 13, 2019	Jun. 12, 2020
17	D.C. Power Supply	LongWei	TPR-6405D	\	\	\
18	Software	Frad	EZ-EMC	FA-03A2 RE	\	\

3. EMC EMISSION TEST

3.1 RADIATED EMISSION MEASUREMENT

3.2.1 APPLICABLE STANDARD

According to FCC Part 15.407(d) and 15.209

3.2.2 CONFORMANCE LIMIT

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

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

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

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

Limits of Radiated Emission Measurement(Above 1000MHz)

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

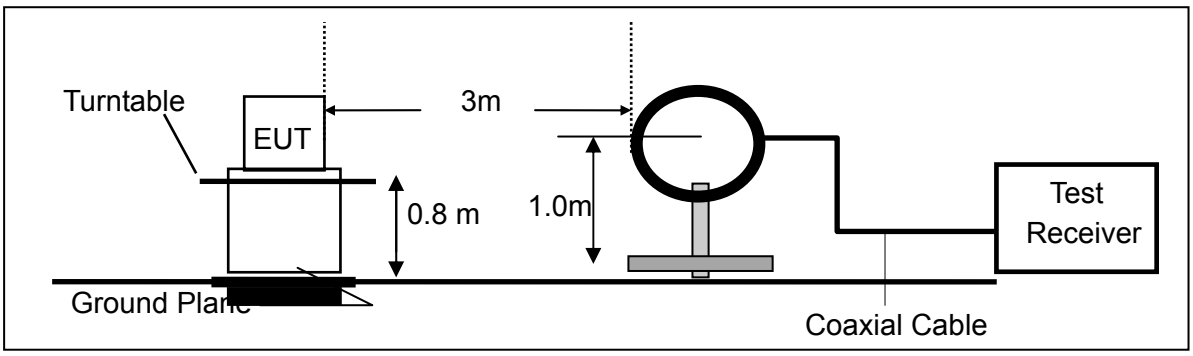
Remark :1. Emission level in dBuV/m=20 log (uV/m)
2. Measurement was performed at an antenna to the closed point of EUT distance of meters.
3. Distance extrapolation factor =40log(Specific distance/ test distance)(dB);
Limit line=Specific limits(dBuV) + distance extrapolation factor.

3.2.3 MEASURING INSTRUMENTS

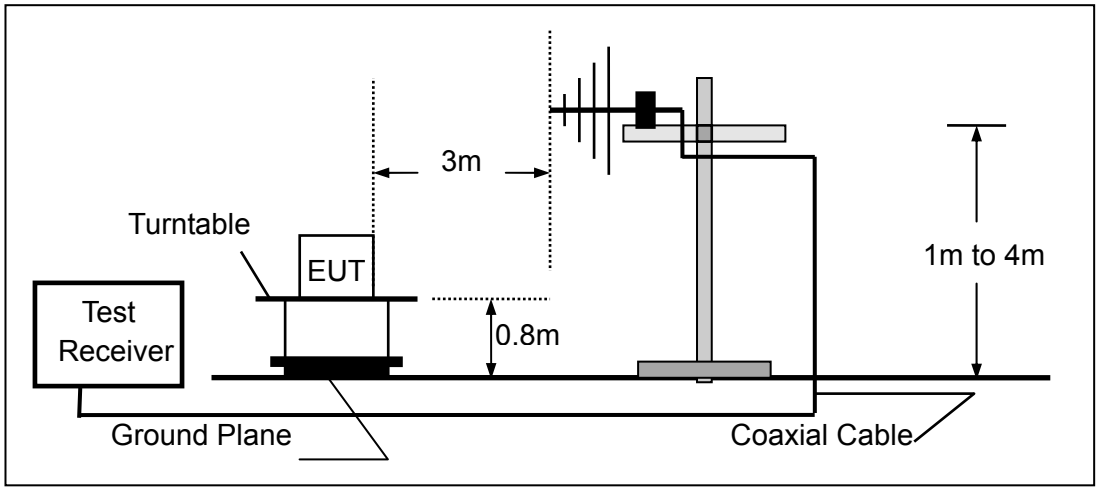
The Measuring equipment is listed in the section 6.3 of this test report.

3.2.4 TEST CONFIGURATION

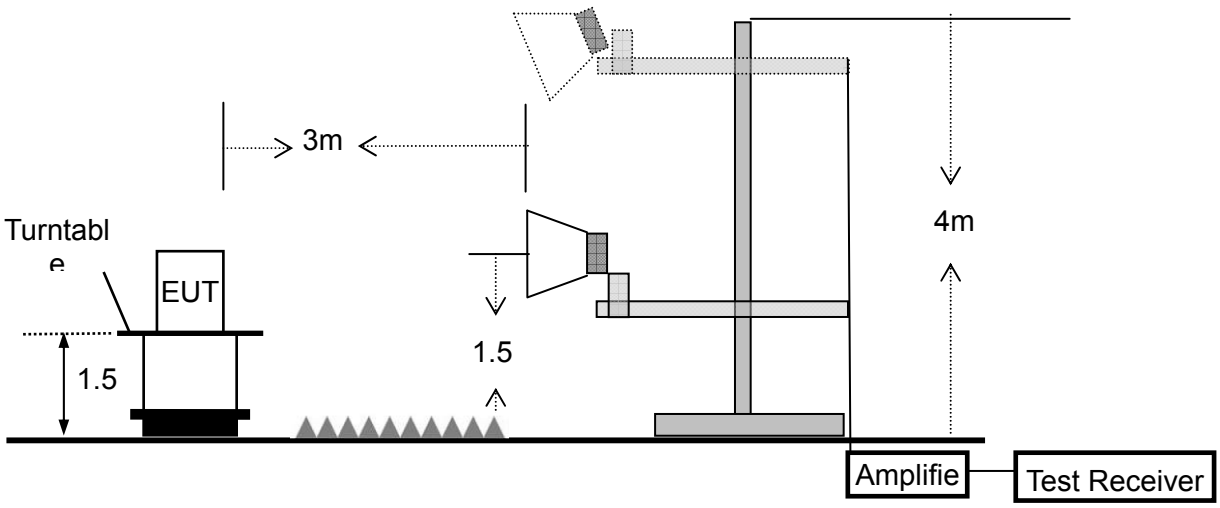
(a)For radiated emissions below 30MHz



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



(c) For radiated emissions above 1000MHz



3.2.5 TEST PROCEDURE

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

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

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

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

Note:

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

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

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

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

3.2.6 TEST RESULTS (9KHZ – 30 MHZ)

Temperature:	26℃	Relative Humidtity:	54%
Pressure:	101kPa	Test Voltage :	DC 12V
Test Mode :	Mode 5	Polarization :	--

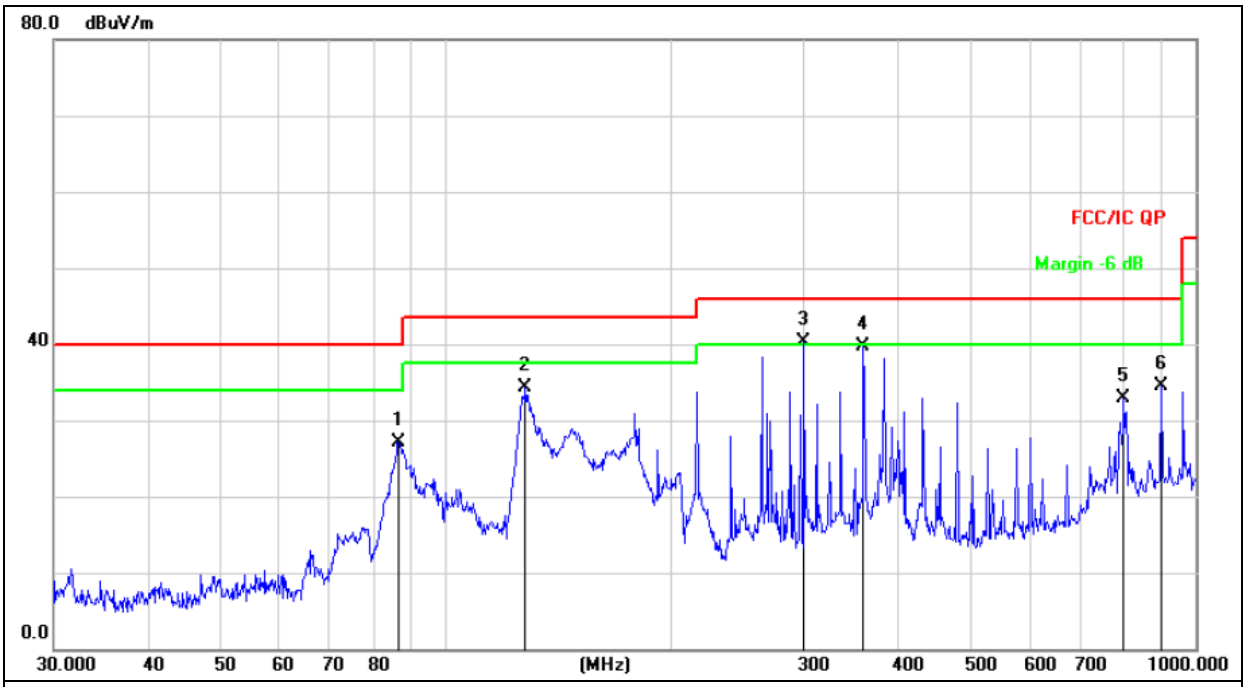
Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	N/A
--	--	--	--	N/A

NOTE:

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
Distance extrapolation factor =40 log (specific distance/test distance)(dB);
Limit line = specific limits(dBuv) + distance extrapolation factor.

3.2.7 TEST RESULTS (30MHZ – 1GHZ)

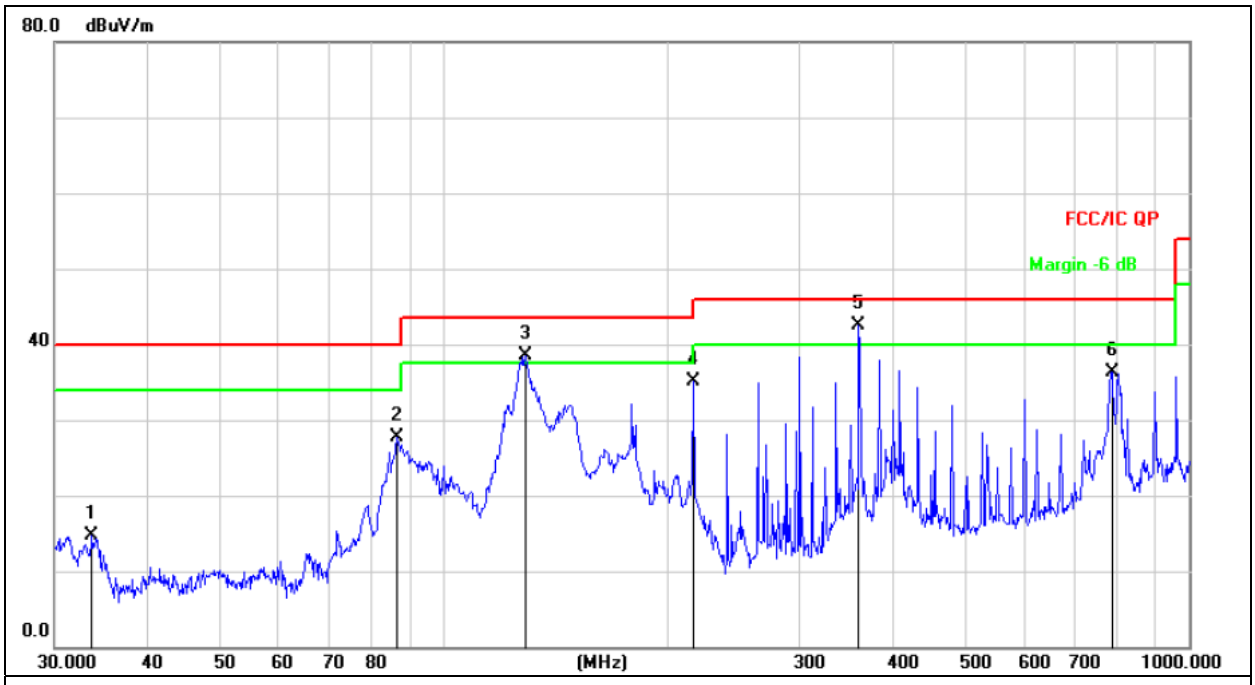
Temperature :	26℃	Relative Humidity :	54%
Pressure :	101 kPa	Polarization :	Horizontal
Test Voltage :	AC 120V/60Hz		
Test Mode :	Mode 5		



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

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		86.5029	45.99	-18.91	27.08	40.00	-12.92	QP
2		127.6645	52.37	-18.06	34.31	43.50	-9.19	QP
3	*	300.3672	53.87	-13.59	40.28	46.00	-5.72	QP
4		360.4476	51.78	-11.99	39.79	46.00	-6.21	QP
5		801.7863	36.51	-3.60	32.91	46.00	-13.09	QP
6		900.1474	36.01	-1.50	34.51	46.00	-11.49	QP

Temperature :	26℃	Relative Humidity :	54%
Pressure :	101kPa	Polarization :	Vertical
Test Voltage :	AC 120V/60Hz		
Test Mode :	Mode 5		



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

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		33.6802	31.25	-16.59	14.66	40.00	-25.34	QP
2		86.5029	46.52	-18.91	27.61	40.00	-12.39	QP
3	!	128.5630	56.66	-18.12	38.54	43.50	-4.96	QP
4		216.0240	51.07	-15.93	35.14	46.00	-10.86	QP
5	*	360.4476	54.55	-11.99	42.56	46.00	-3.44	QP
6		787.8513	40.21	-3.81	36.40	46.00	-9.60	QP

Remark:
Test all the modes and only worst case was reported. The worst mode is U-NII-1 802.11a, Low Channel

3.2.8 TEST RESULTS (1GHz-40GHz)

Test Mode :	TX(5.2G) - 802.11a

Polar	Frequency	Meter Reading	Cable loss	Antenna Factor	Preamp Factor	Emission Level	Limits	Margin	Detector Type
(H/V)	(MHz)	(dBuV)	(dB)	dB/m	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Low Channel (5180 MHz)-Above 1G									
Vertical	4434.157	61.25	5.94	35.40	44.00	58.59	74.00	-15.41	Pk
Vertical	4434.157	46.53	5.94	35.40	44.00	43.87	54.00	-10.13	AV
Vertical	10370.362	59.24	8.46	39.75	44.50	62.95	74.00	-11.05	Pk
Vertical	10370.362	42.92	8.46	39.75	44.50	46.63	54.00	-7.37	AV
Vertical	15540.196	61.58	10.12	38.80	44.10	66.4	74.00	-7.6	Pk
Vertical	15540.196	37.02	10.12	38.80	42.70	43.24	54.00	-10.76	AV
Horizontal	4434.521	66.14	5.94	35.18	44.00	63.26	74.00	-10.74	Pk
Horizontal	4434.521	44.23	5.94	35.18	44.00	41.35	54.00	-12.65	AV
Horizontal	10370.623	58.74	8.46	38.71	44.50	61.41	74.00	-12.59	Pk
Horizontal	10370.623	41.11	8.46	38.71	44.50	43.78	54.00	-10.22	AV
Horizontal	10540.865	56.37	10.12	38.38	44.10	60.77	74.00	-13.23	Pk
Horizontal	10540.865	38.58	10.12	38.38	44.10	42.98	54.00	-11.02	AV
middle Channel (5200 MHz)-Above 1G									
Vertical	4592.093	60.55	6.48	36.35	44.05	59.33	74.00	-14.67	Pk
Vertical	4592.093	41.96	6.48	36.35	44.05	40.74	54.00	-13.26	AV
Vertical	10401.424	59.41	8.47	37.88	44.51	61.25	74.00	-12.75	Pk
Vertical	10401.424	42.27	8.47	37.88	44.51	44.11	54.00	-9.89	AV
Vertical	15600.218	56.51	10.12	38.8	44.10	61.33	74.00	-12.67	Pk
Vertical	15600.218	36.65	10.12	38.8	42.70	42.87	54.00	-11.13	AV
Horizontal	4592.691	59.23	6.48	36.37	44.05	58.03	74.00	-15.97	Pk
Horizontal	4592.691	43.15	6.48	36.37	44.05	41.95	54.00	-12.05	AV
Horizontal	10400.114	58.33	8.47	38.64	44.50	60.94	74.00	-13.06	Pk
Horizontal	10400.114	42.12	8.47	38.64	44.50	44.73	54.00	-9.27	AV
Horizontal	15600.187	59.63	10.12	38.38	44.10	64.03	74.00	-9.97	Pk
Horizontal	15600.187	38.42	10.12	38.38	44.10	42.82	54.00	-11.18	AV
High Channel (5240 MHz)-Above 1G									
Vertical	4739.246	60.25	7.10	37.24	43.50	61.09	74.00	-12.91	Pk
Vertical	4739.246	44.69	7.10	37.24	43.50	45.53	54.00	-8.47	AV
Vertical	10480.371	60.52	8.46	37.68	44.50	62.16	74.00	-11.84	Pk
Vertical	10480.371	40.31	8.46	37.68	44.50	41.95	54.00	-12.05	AV
Vertical	15720.359	61.23	10.12	38.8	44.10	66.05	74.00	-7.95	Pk
Vertical	15720.359	39.41	10.12	38.8	42.70	45.63	54.00	-8.37	AV
Horizontal	4739.352	59.33	7.10	37.24	43.50	60.17	74.00	-13.83	Pk
Horizontal	4739.352	43.21	7.10	37.24	43.50	44.05	54.00	-9.95	AV
Horizontal	10481.111	61.62	8.46	38.57	44.50	64.15	74.00	-9.85	Pk
Horizontal	10481.111	43.45	8.46	38.57	44.50	45.98	54.00	-8.02	AV
Horizontal	15720.357	60.18	10.12	38.38	44.10	64.58	74.00	-9.42	Pk
Horizontal	15720.357	42.23	10.12	38.38	44.10	46.63	54.00	-7.37	AV

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

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

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

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

Test Mode :	TX (5.8G) -- 802.11a

Polar	Frequency	Meter Reading	Cable loss	Antenna Factor	Preamp Factor	Emission Level	Limits	Margin	Detector Type
(H/V)	(MHz)	(dBuV)	(dB)	dB/m	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Low Channel (5745 MHz)-Above 1G									
Vertical	4679.195	59.88	5.94	35.40	44.00	57.22	74.00	-16.78	Pk
Vertical	4679.195	39.45	5.94	35.40	44.00	36.79	54.00	-17.21	AV
Vertical	11490.364	59.36	8.46	39.75	44.50	63.07	74.00	-10.93	Pk
Vertical	11490.364	42.54	8.46	39.75	44.50	46.25	54.00	-7.75	AV
Vertical	17235.101	55.36	10.12	38.80	44.10	60.18	74.00	-13.82	Pk
Vertical	17235.101	38.35	10.12	38.80	42.70	44.57	54.00	-9.43	AV
Horizontal	4679.332	57.64	5.94	35.18	44.00	54.76	74.00	-19.24	Pk
Horizontal	4679.332	44.28	5.94	35.18	44.00	41.4	54.00	-12.6	AV
Horizontal	11490.164	56.51	8.46	38.71	44.50	59.18	74.00	-14.82	Pk
Horizontal	11490.164	40.19	8.46	38.71	44.50	42.86	54.00	-11.14	AV
Horizontal	17235.196	58.52	10.12	38.38	44.10	62.92	74.00	-11.08	Pk
Horizontal	17235.196	42.31	10.12	38.38	44.10	46.71	54.00	-7.29	AV
middle Channel (5785 MHz)-Above 1G									
Vertical	4592.228	59.58	6.48	36.35	44.05	58.36	74.00	-15.64	Pk
Vertical	4592.228	43.37	6.48	36.35	44.05	42.15	54.00	-11.85	AV
Vertical	11570.203	61.05	8.47	37.88	44.51	62.89	74.00	-11.11	Pk
Vertical	11570.203	43.66	8.47	37.88	44.51	45.5	54.00	-8.5	AV
Vertical	17355.147	59.24	10.12	38.8	44.10	64.06	74.00	-9.94	Pk
Vertical	17355.147	42.47	10.12	38.8	42.70	48.69	54.00	-5.31	AV
Horizontal	4592.526	58.61	6.48	36.37	44.05	57.41	74.00	-16.59	Pk
Horizontal	4592.526	43.27	6.48	36.37	44.05	42.07	54.00	-11.93	AV
Horizontal	11570.123	60.18	8.47	38.64	44.50	62.79	74.00	-11.21	Pk
Horizontal	11570.123	42.29	8.47	38.64	44.50	44.9	54.00	-9.1	AV
Horizontal	17355.269	57.62	10.12	38.38	44.10	62.02	74.00	-11.98	Pk
Horizontal	17355.269	42.34	10.12	38.38	44.10	46.74	54.00	-7.26	AV
High Channel (5825 MHz)-Above 1G									
Vertical	6039.199	57.21	7.10	37.24	43.50	58.05	74.00	-15.95	Pk
Vertical	6039.199	42.54	7.10	37.24	43.50	43.38	54.00	-10.62	AV
Vertical	11652.562	58.35	8.46	37.68	44.50	59.99	74.00	-14.01	Pk
Vertical	11652.562	41.19	8.46	37.68	44.50	42.83	54.00	-11.17	AV
Vertical	17473.128	58.54	10.12	38.8	44.10	63.36	74.00	-10.64	Pk
Vertical	17473.128	40.34	10.12	38.8	42.70	46.56	54.00	-7.44	AV
Horizontal	6039.232	59.63	7.10	37.24	43.50	60.47	74.00	-13.53	Pk
Horizontal	6039.232	43.38	7.10	37.24	43.50	44.22	54.00	-9.78	AV
Horizontal	11652.319	52.23	8.46	38.57	44.50	54.76	74.00	-19.24	Pk
Horizontal	11652.319	40.47	8.46	38.57	44.50	43	54.00	-11	AV
Horizontal	17474.062	57.43	10.12	38.38	44.10	61.83	74.00	-12.17	Pk
Horizontal	17474.062	40.15	10.12	38.38	44.10	44.55	54.00	-9.45	AV

Note:"802.11a(5G)" mode is the worst mode. PK value is lower than the Average value limit, So average didn't record.

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value

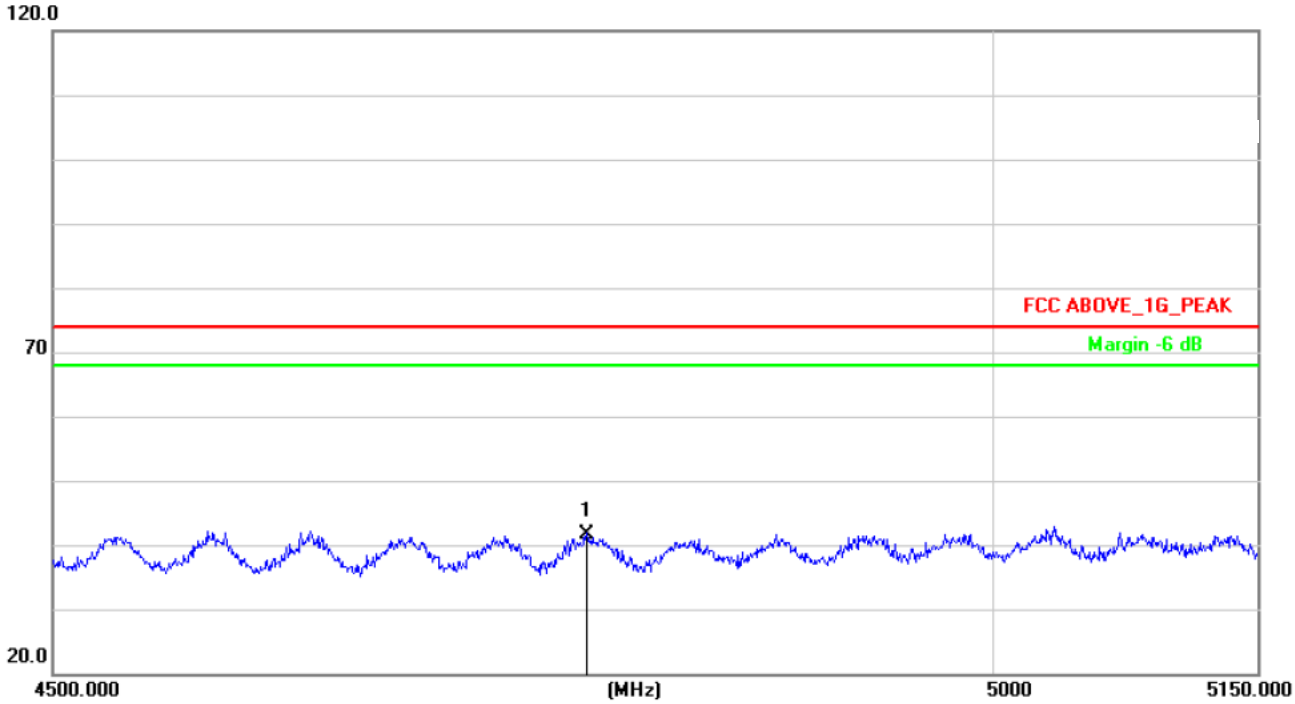
has no need to be reported.

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

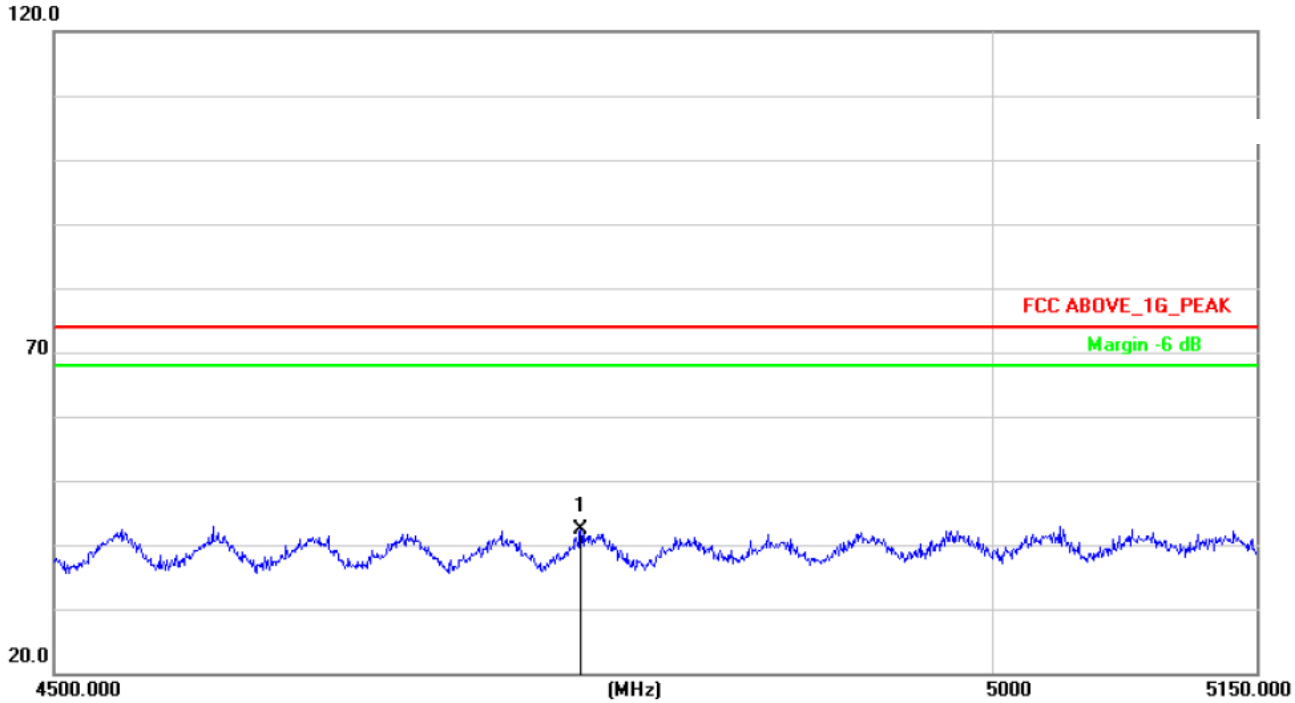
Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

Radiated bandedge

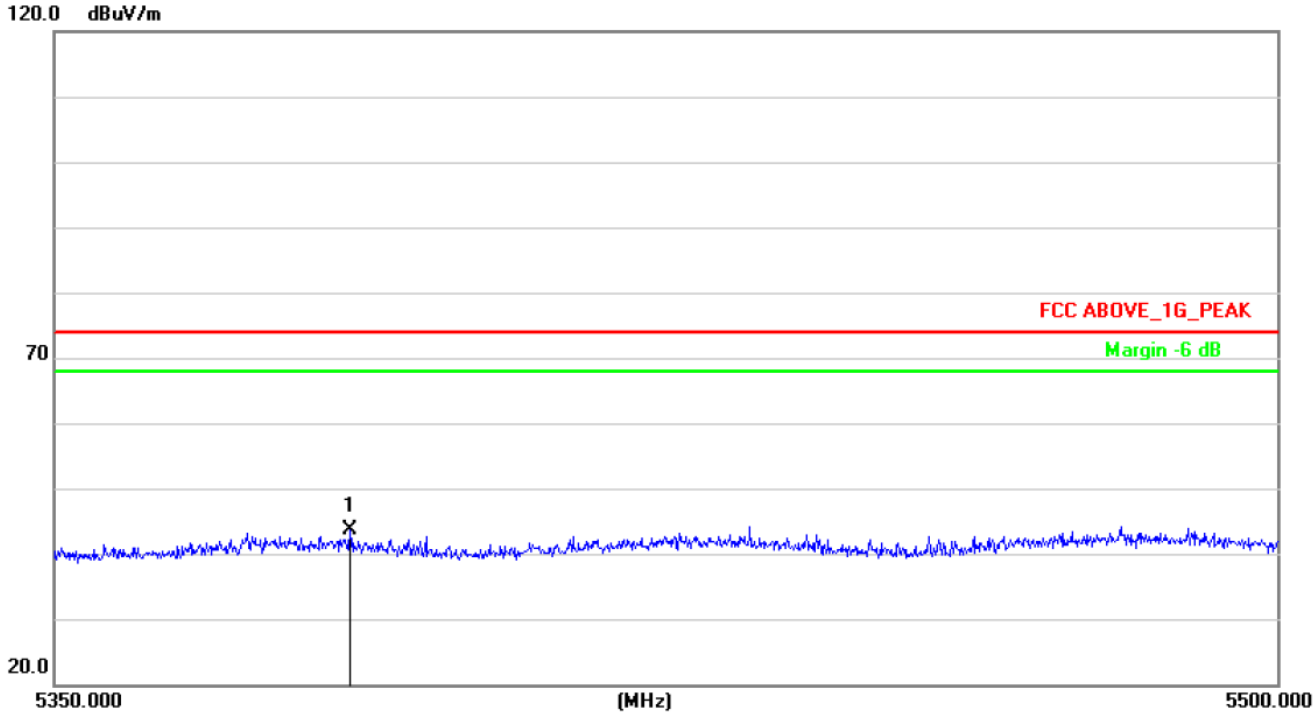
802.11 a
For the frequency band 5150-5250MHz



Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type	Polarization
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		
4776.520	42.42	-0.45	41.97	74.00	-32.03	PK	Horizontal
Remark: Factor = Antenna Factor + Correct Factor. Correct Factor= Cable Loss – Pre-amplifier							

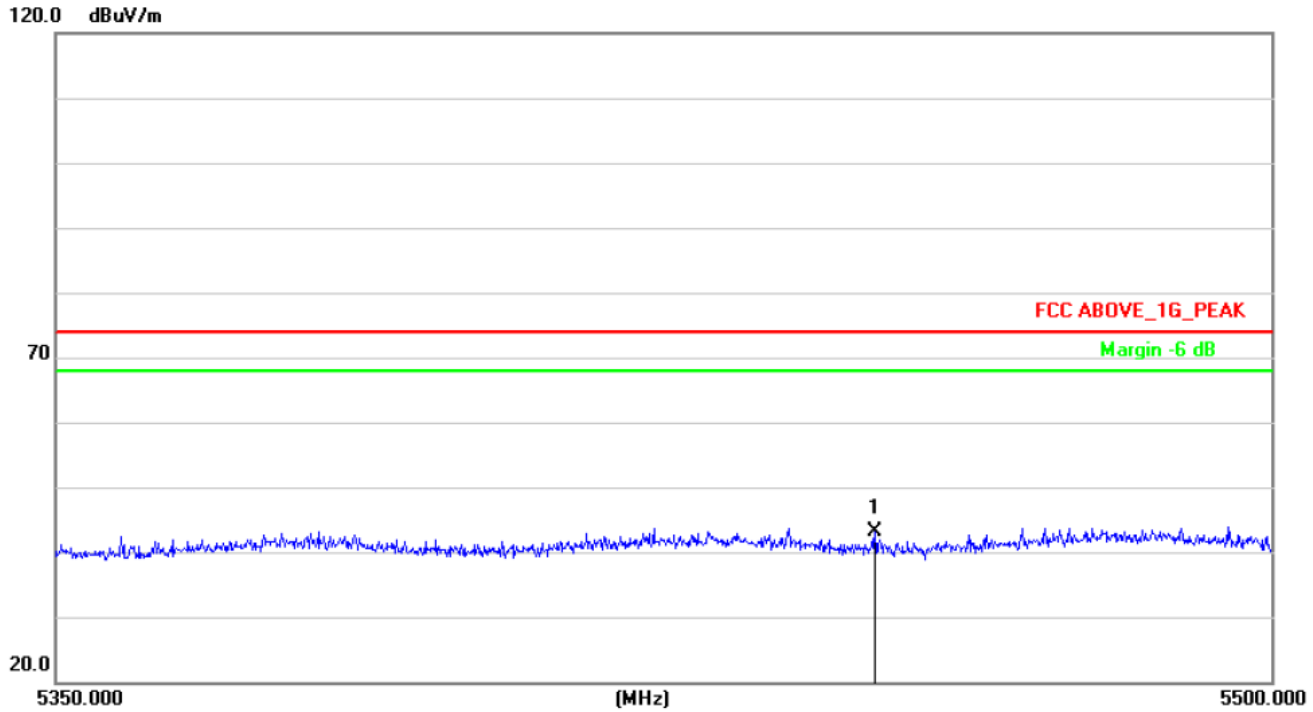


Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type	Polarization
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		
4775.500	42.86	-0.45	42.41	74.00	-31.59	PK	Vertical
Remark: Factor = Antenna Factor + Correct Factor. Correct Factor= Cable Loss – Pre-amplifier							



Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type	Polarization
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		
5390.000	42.52	1.35	43.87	74.00	-30.13	PK	Horizontal

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

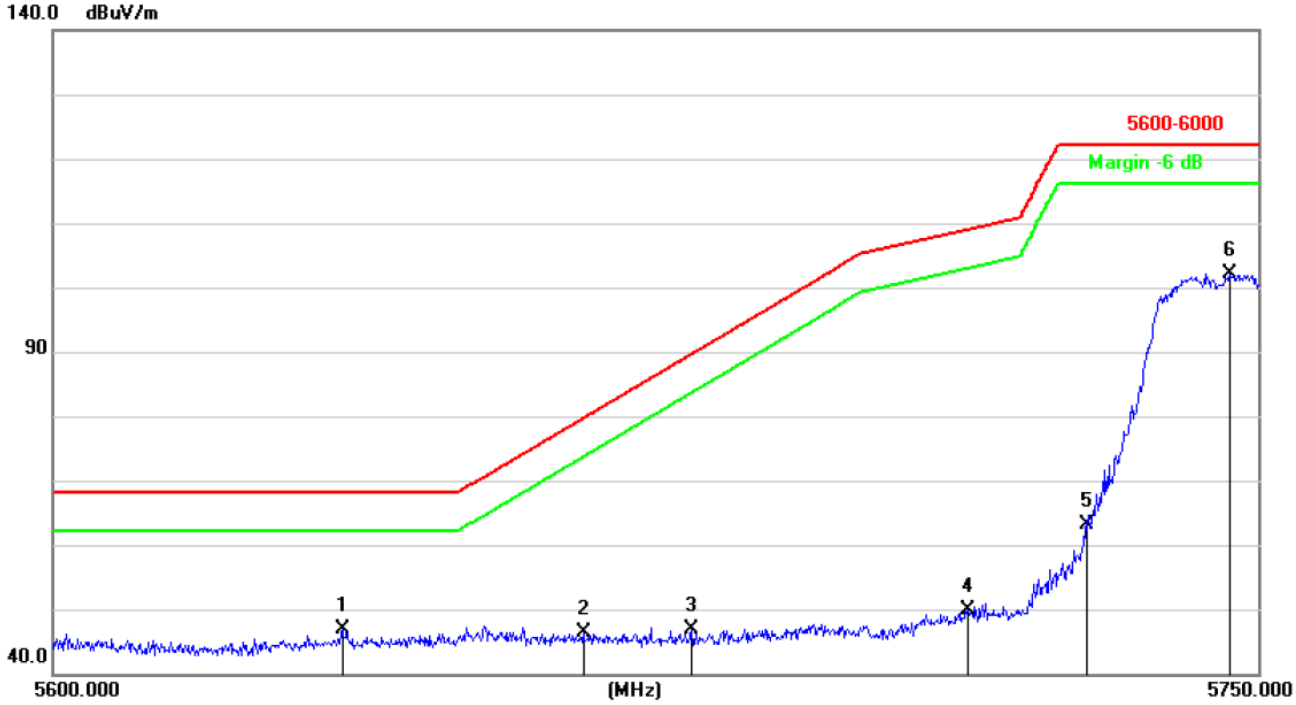


Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type	Polarization
(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		
5449.245	41.53	1.63	42.99	74.00	-31.01	PK	Vertical
Remark: Factor = Antenna Factor + Correct Factor. Correct Factor= Cable Loss – Pre-amplifier							

Note:
1. This EUT was tested in 802.11a/n(HT20), n(HT40), ac80 mode and 802.11a the worst case position data was reported.

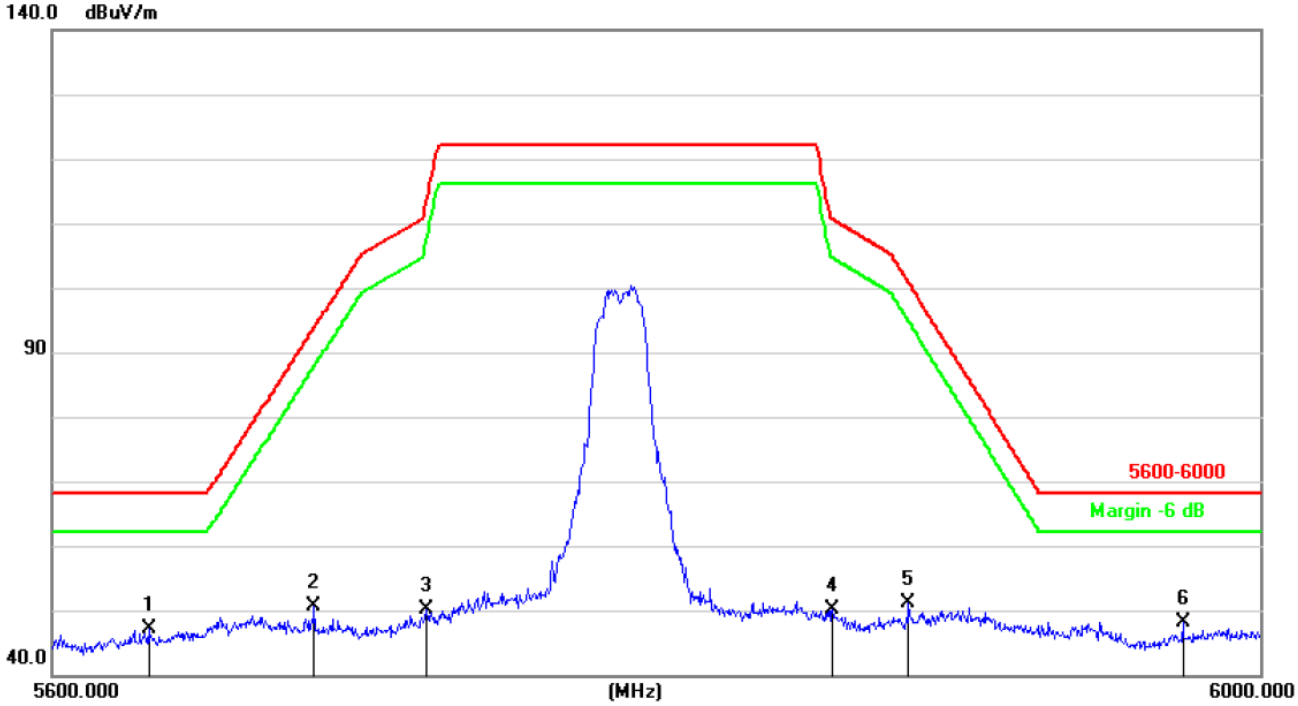
802.11n(HT20)
For the frequency band 5725-5850MHz

Low Channel



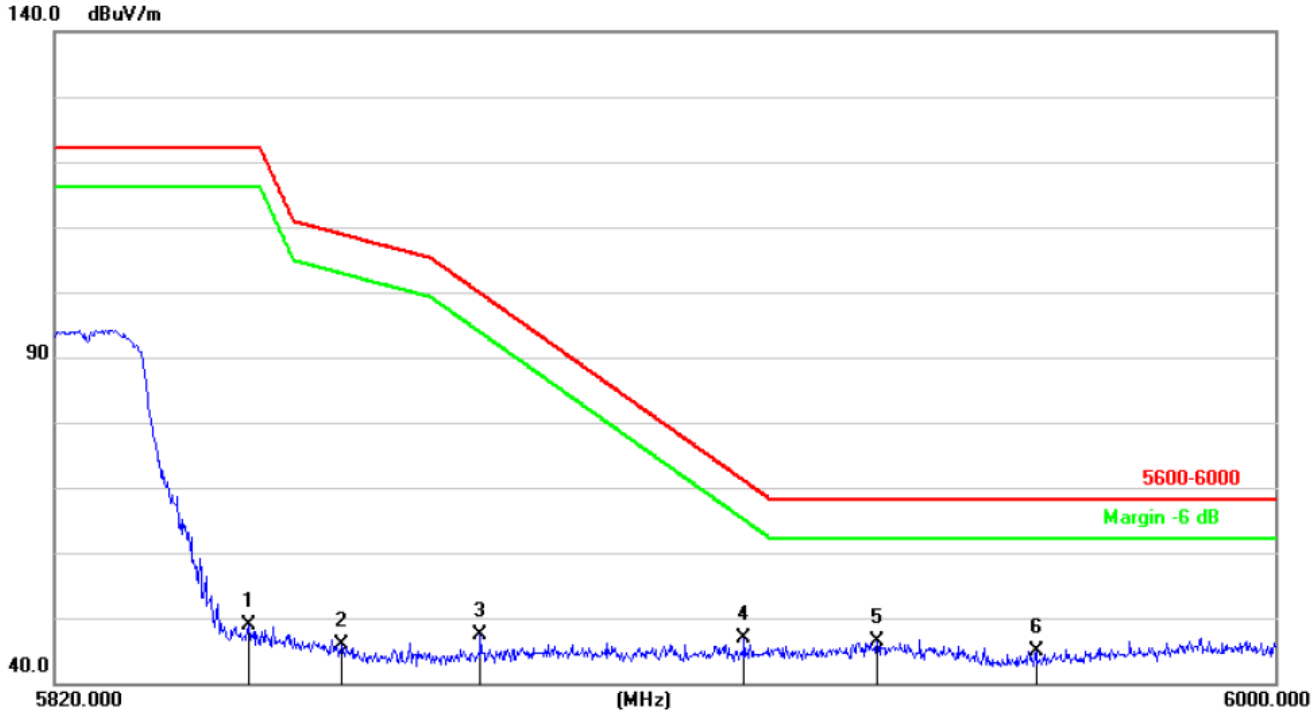
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	5635.700	44.55	2.41	46.96	68.20	-21.24	peak
2	5665.550	43.83	2.54	46.37	79.74	-33.37	peak
3	5679.050	44.38	2.60	46.98	89.74	-42.76	peak
4	5713.550	47.14	2.74	49.88	109.00	-59.12	peak
5	5728.550	60.29	2.81	63.10	122.20	-59.10	peak
6	5746.400	99.15	2.88	102.03	122.20	-20.17	peak

Middle Channel



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5631.200	44.63	2.39	47.02	68.20	-21.18	peak
2	5684.800	47.95	2.62	50.57	93.99	-43.42	peak
3	5721.200	47.41	2.78	50.19	113.54	-63.35	peak
4	5855.600	46.69	3.35	50.04	110.63	-60.59	peak
5	5880.800	47.67	3.45	51.12	100.89	-49.77	peak
6	5973.600	44.18	3.85	48.03	68.20	-20.17	peak

High Channel



No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5848.260	45.52	3.32	48.84	122.20	-73.36	peak
2	5861.940	42.57	3.37	45.94	108.85	-62.91	peak
3	5882.280	43.98	3.46	47.44	99.79	-52.35	peak
4	5921.160	43.16	3.62	46.78	71.03	-24.25	peak
5	5940.780	42.69	3.71	46.40	68.20	-21.80	peak
6	5964.360	41.16	3.81	44.97	68.20	-23.23	peak

Note:
1. This EUT was tested in 802.11a/n(HT20), n(HT40), ac(HT80) mode and 802.11n(HT20) the worst case position data was reported.

4.SPURIOUS RF CONDUCTED EMISSIONS

4.1CONFORMANCE LIMIT

1. Below -20dB of the highest emission level in operating band.
2. Fall in the restricted bands listed in section 15.205. The maximum permitted average field strength is listed in section 15.209.

4.2MEASURING INSTRUMENTS

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

4.3TEST SETUP

Please refer to Section 6.1 of this test report.

4.4TEST PROCEDURE

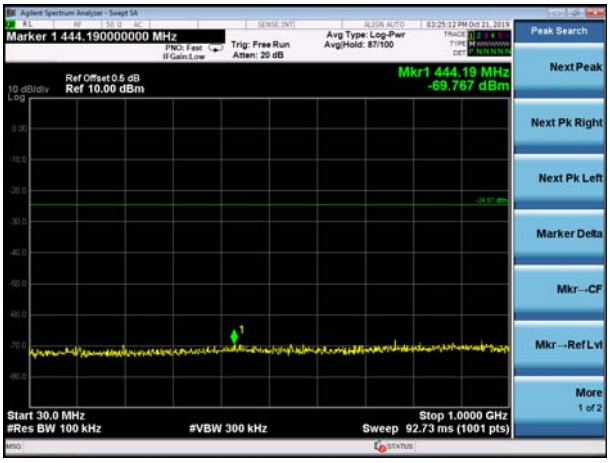
The Spurious RF conducted emissions compliance of RF radiated emission should be measured by following the guidance in ANSI C63.10-2013 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW=100kHz and VBW= 300KHz to measure the peak field strength , and mwasure frequeny range from 9KHz to 26.5GHz.

4.5TEST RESULTS

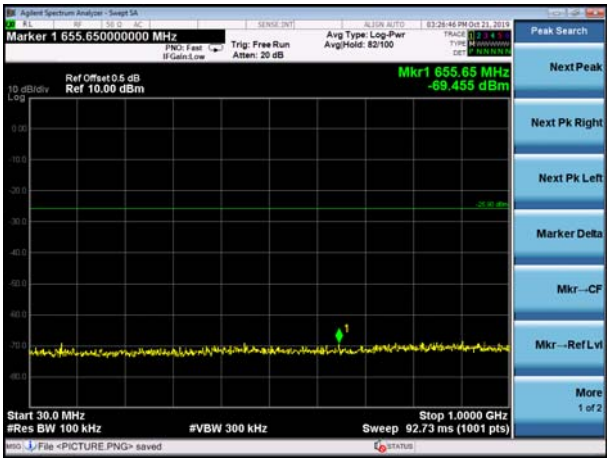
5.2G

Test Plot

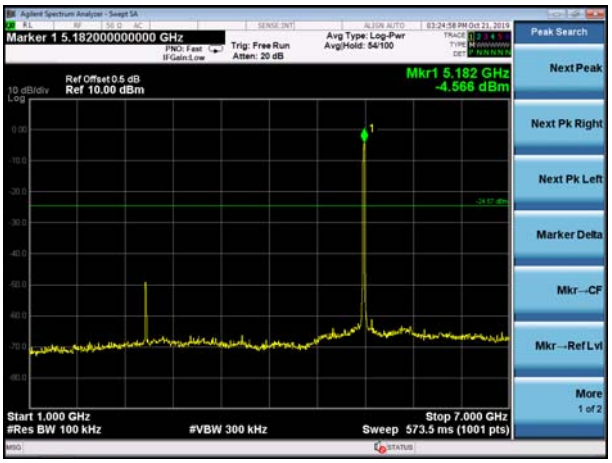
802.11a channel 36



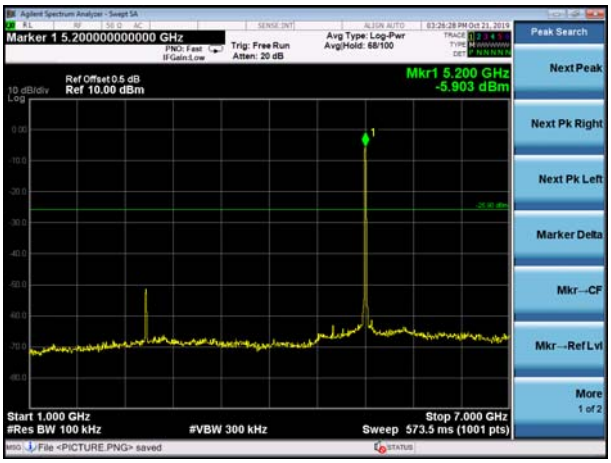
802.11a channel 40



802.11a channel 36



802.11a channel 40

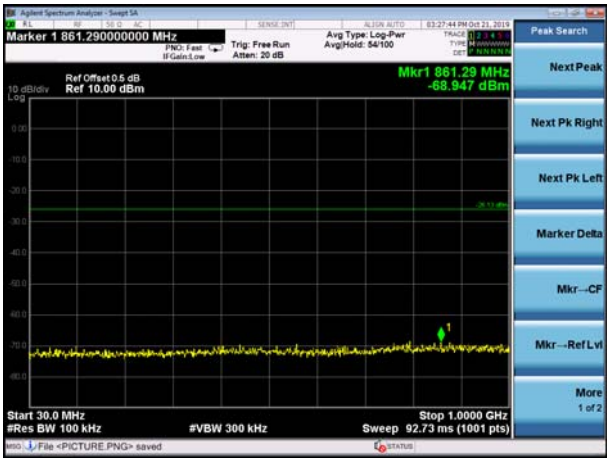


802.11a channel 36

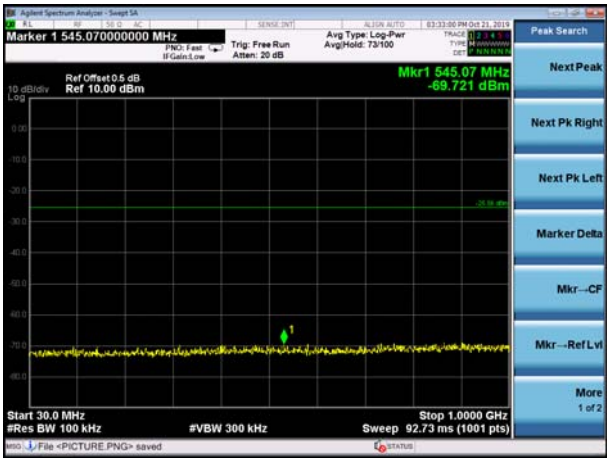
802.11a channel 40

Test Plot

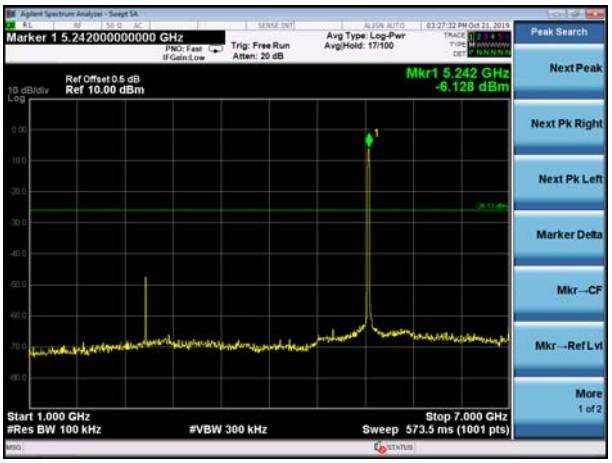
802.11a channel 48



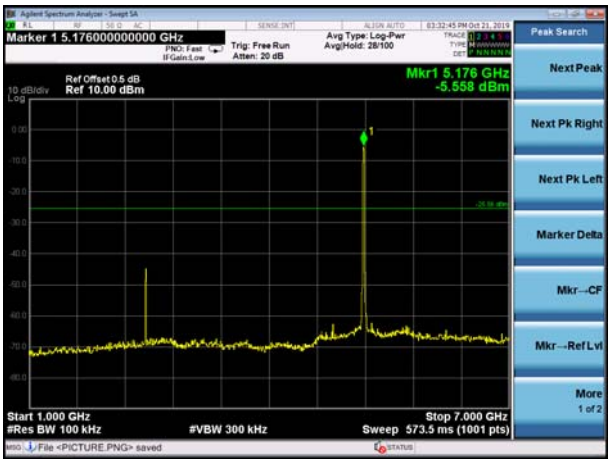
802.11n20 channel 36



802.11a channel 48



802.11n20 channel 36

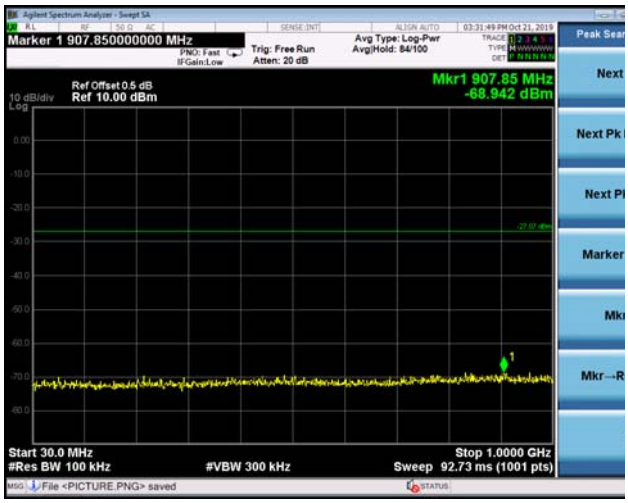


802.11a channel 48

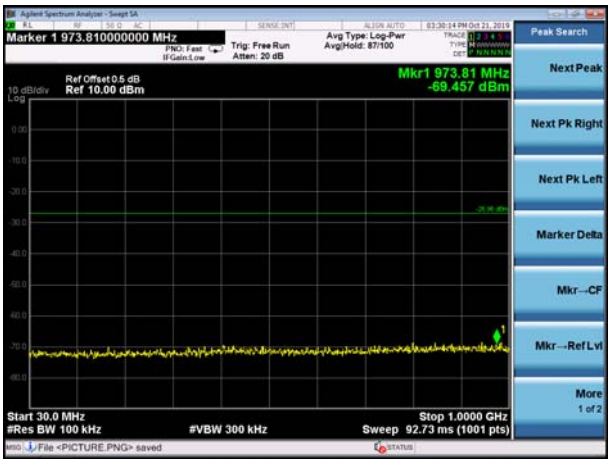
802.11n20 channel 36

Test Plot

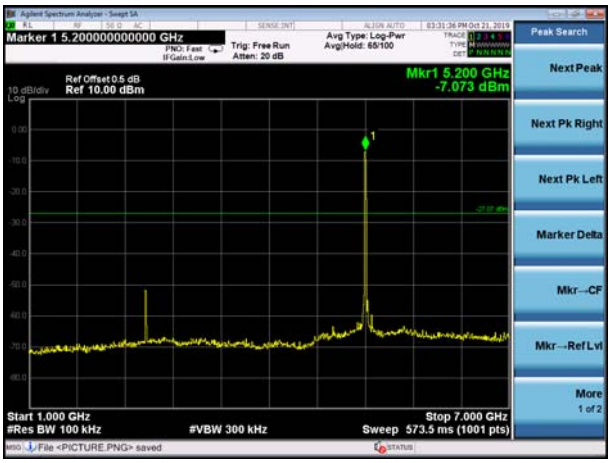
802.11n20 channel 40



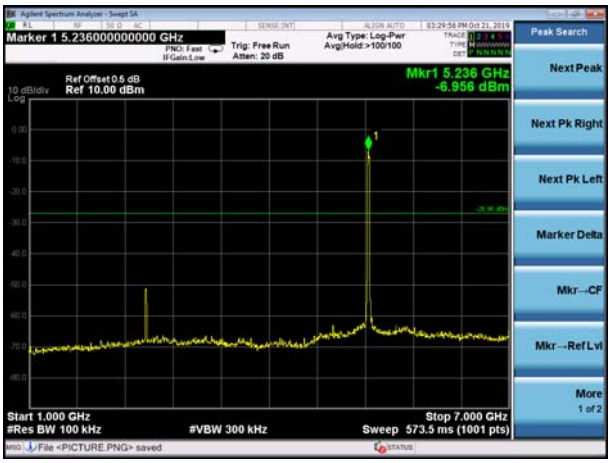
802.11n20 channel 48



802.11n20 channel 40



802.11n20 channel 48

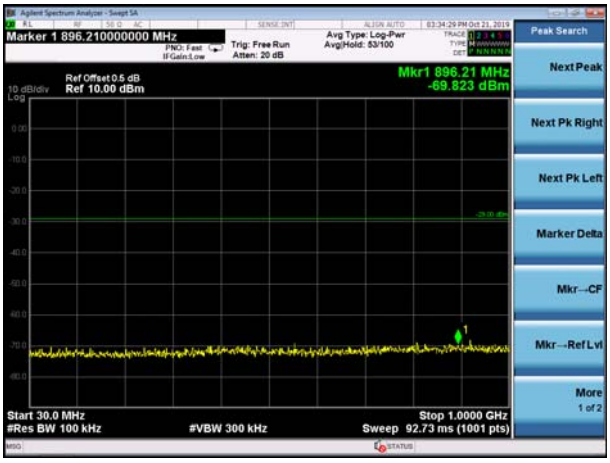


802.11n20 channel 40

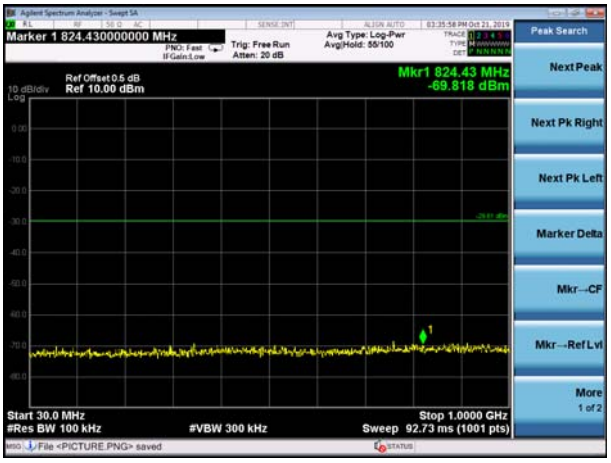
802.11n20 channel 48

Test Plot

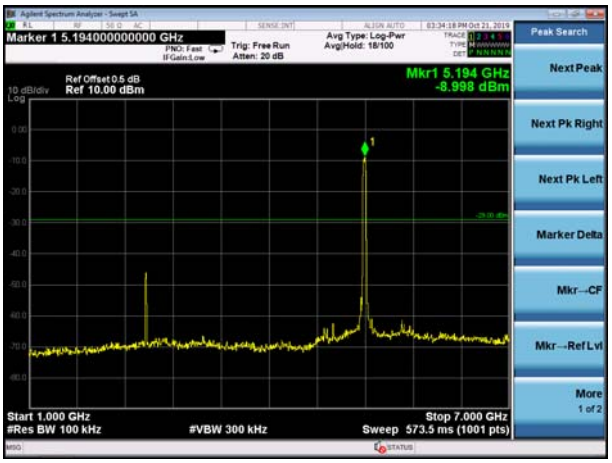
802.11n40 channel 38



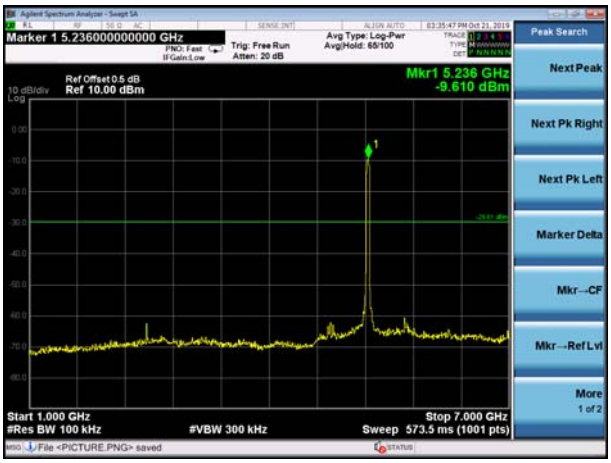
802.11n40 channel 46



802.11n40 channel 38



802.11n40 channel 46

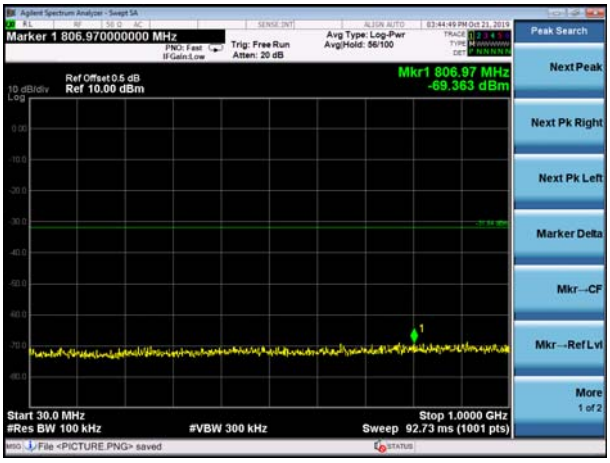


802.11n40 channel 38

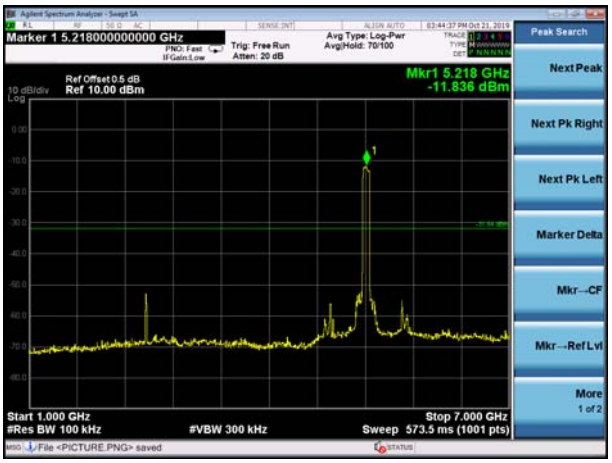
802.11n40 channel 46

Test Plot

802.11ac80 on channel 42



802.11 ac80 on channel 42

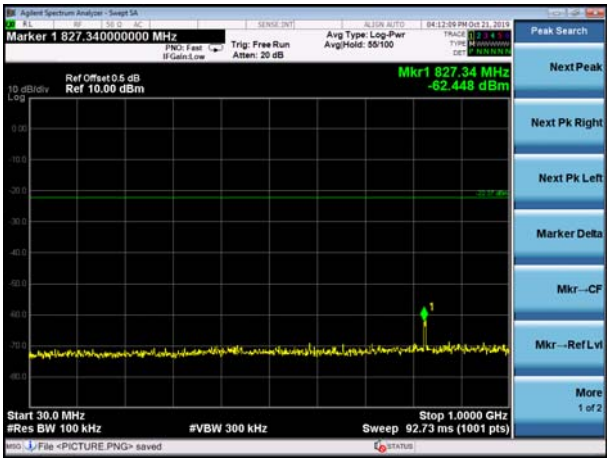


802.11 ac80 on channel 42

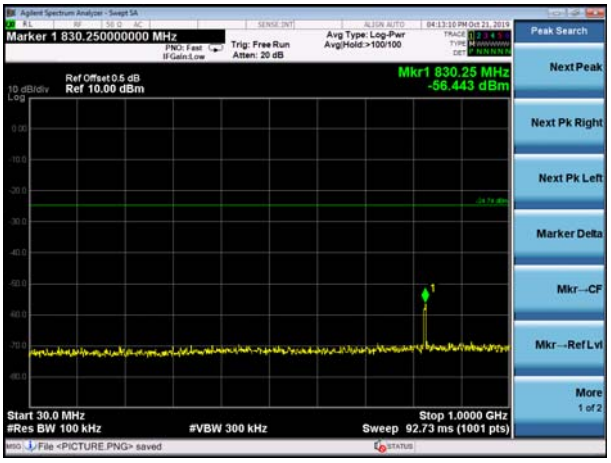
5.8G

Test Plot

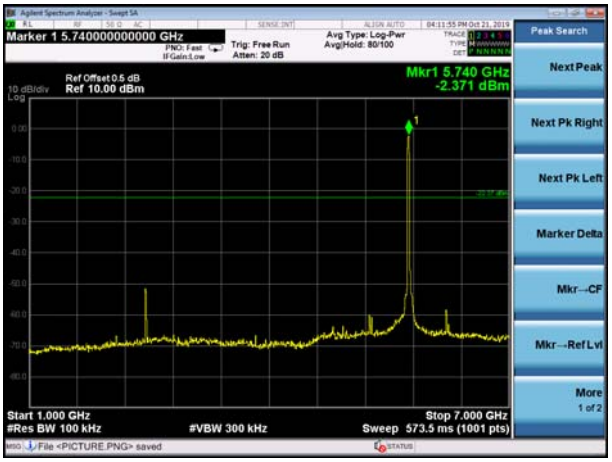
802.11a channel 149



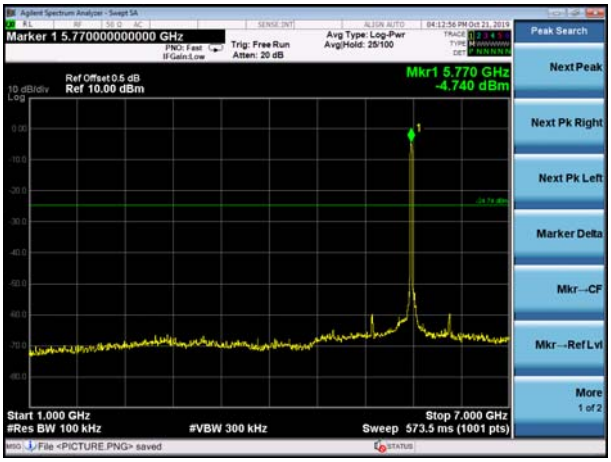
802.11a channel 157



802.11a channel 149



802.11a channel 157

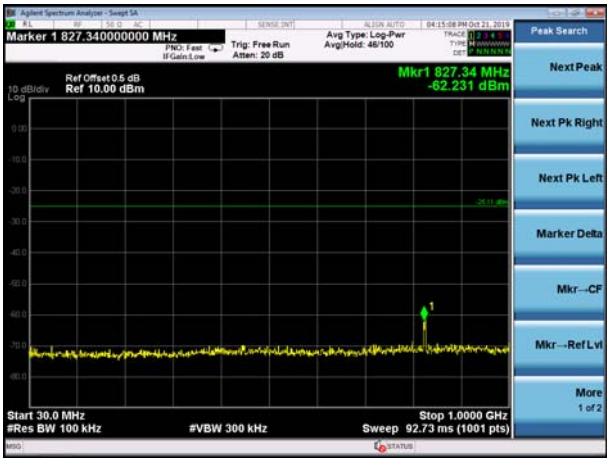


802.11a channel 149

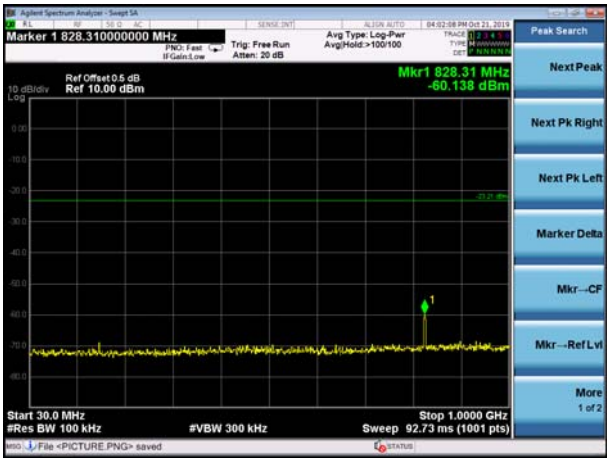
802.11a channel 157

Test Plot

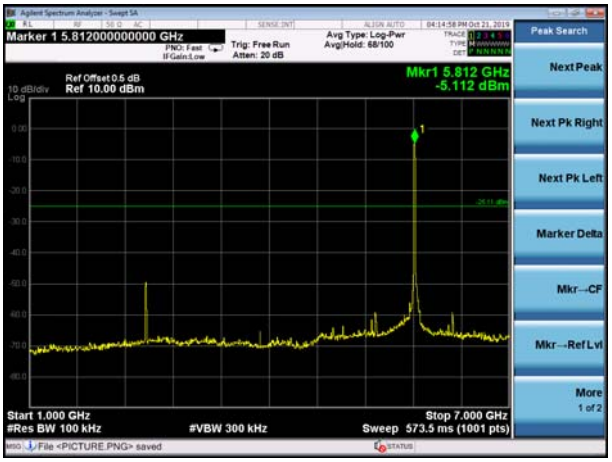
802.11a channel 165



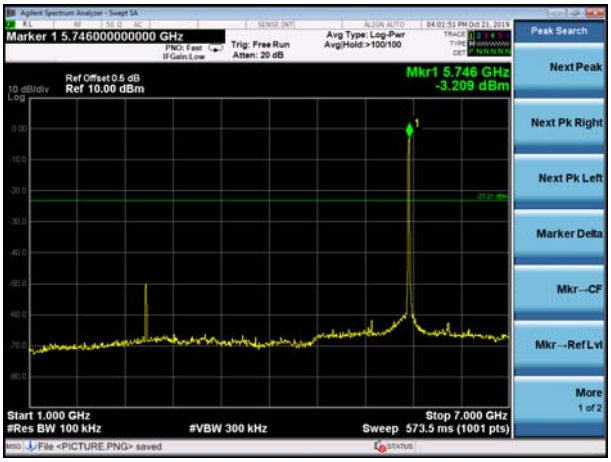
802.11n20 channel 149



802.11a channel 165



802.11n20 channel 149

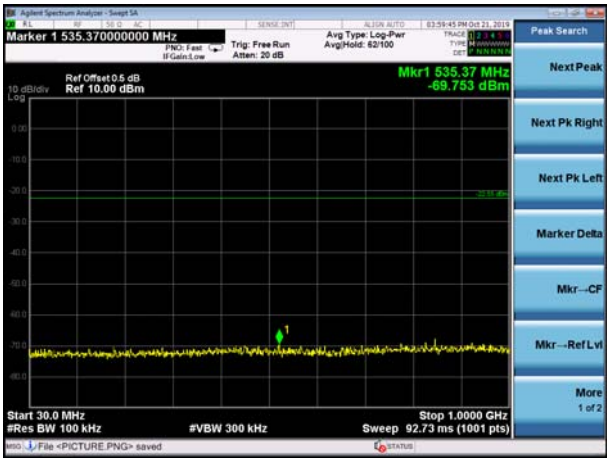


802.11a channel 165

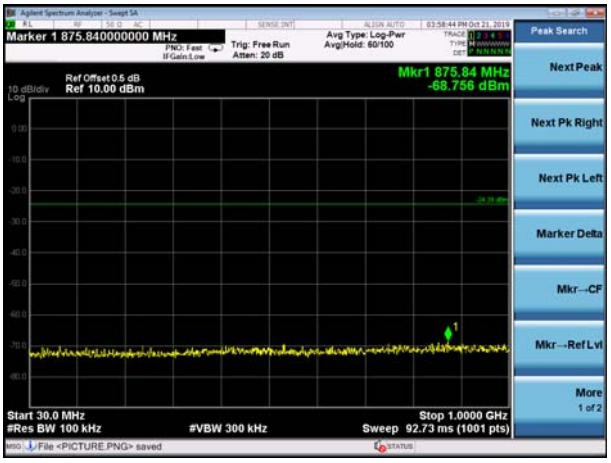
802.11n20 channel 149

Test Plot

802.11n20 channel 157

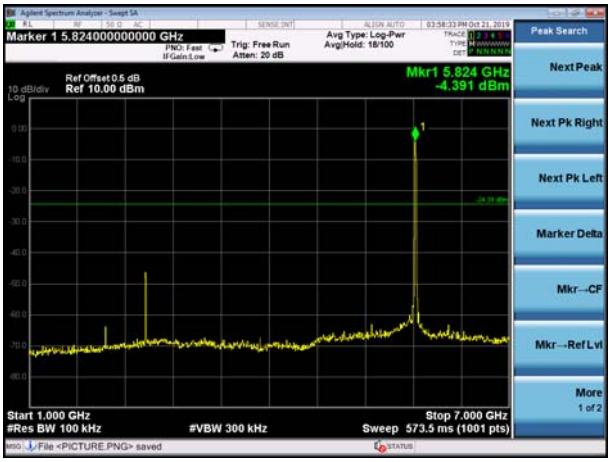


802.11n20 channel 165



802.11n20 channel 157

802.11n20 channel 165

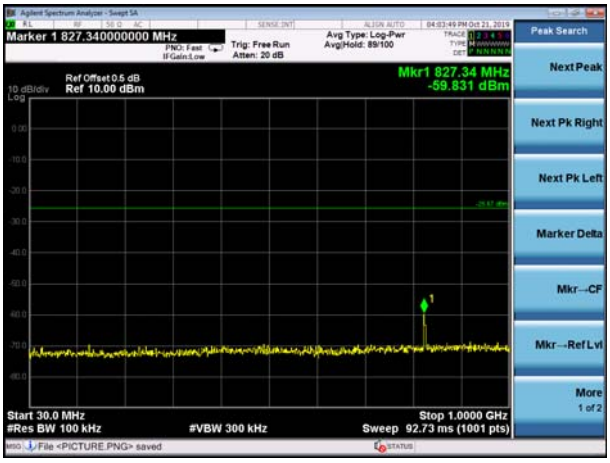


802.11n20 channel 157

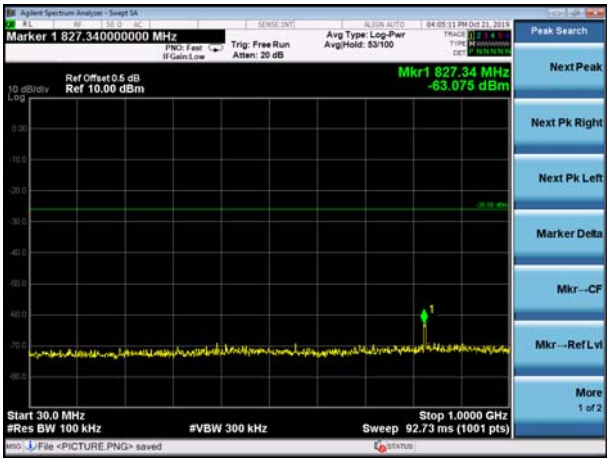
802.11n20 channel 165

Test Plot

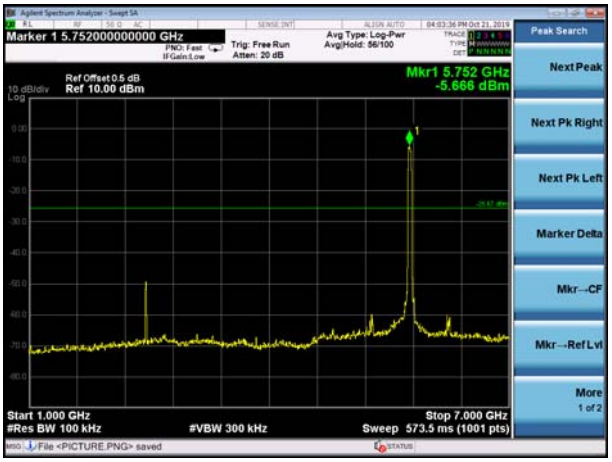
802.11n40 channel 151



802.11n40 channel 159



802.11n40 channel 151



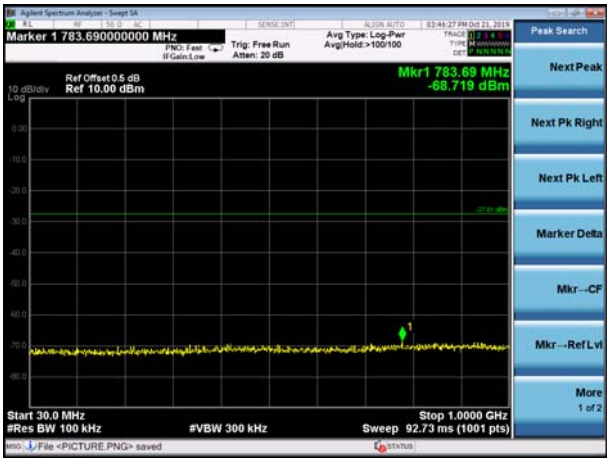
802.11n40 channel 159

802.11n40 channel 151

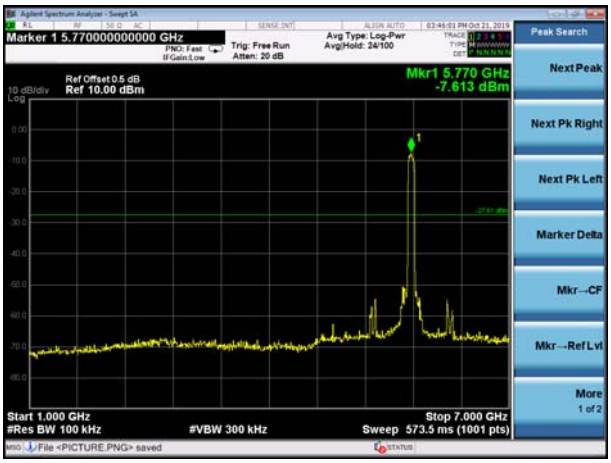
802.11n40 channel 159

Test Plot

802.11ac80 on channel 155



802.11 ac80 on channel 155



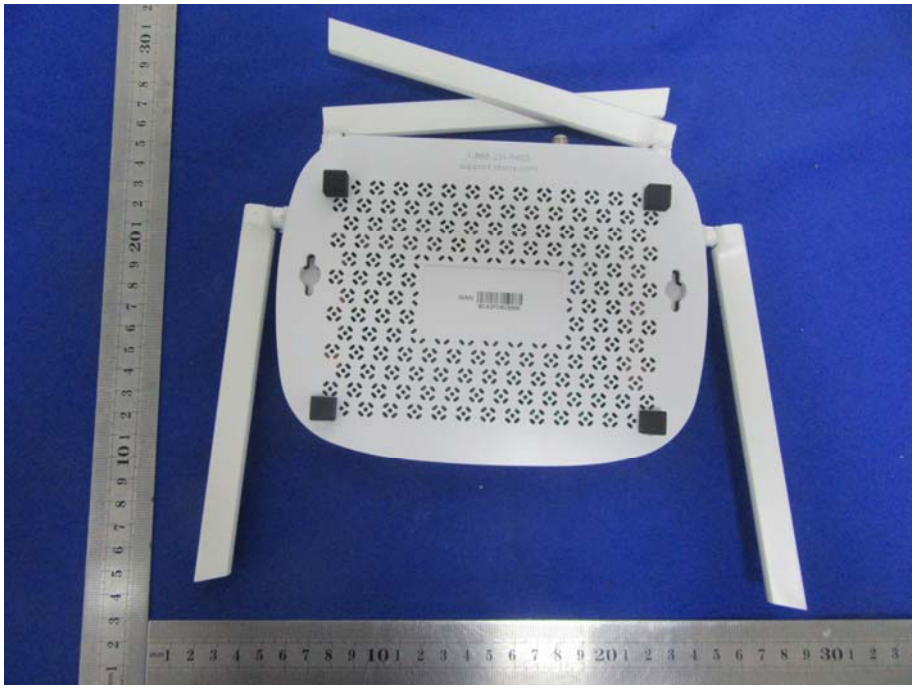
802.11 ac80 on channel 155

5. EUT TEST PHOTO

Radiated Measurement Photos

倍測檢測
BCTC TEST

6. EUT PHOTO



※※※※※ **END OF REPORT** ※※※※※