




FCC Part 15C Test Report

FCC ID:2AE4OGLINT

Product Name:	Remote control
Trademark:	
Model Name :	GLINT 2.0
Prepared For :	Hunan Keyshare Information Technology Co., Ltd
Address :	19th building,Changsha CEC Software Park,No.39 Jianshan Road,High-Tech,Industrial Eatate,Yuelu District, Changsha, Hunan, China
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Test Date:	May 21– May 28, 2016
Date of Report :	May 28, 2016
Report No.:	BCTC-160505810E



VERIFICATION OF COMPLIANCE

Applicant's name.....: Hunan Keyshare Information Technology Co., Ltd

Address.....: 19th building,Changsha CEC Software Park,No.39 Jianshan Road,High-Tech,Industrial Eatate,Yuelu District, Changsha, Hunan, China

Manufacture's Name: Hunan Keyshare Information Technology Co., Ltd

Address.....: 19th building,Changsha CEC Software Park,No.39 Jianshan Road,High-Tech,Industrial Eatate,Yuelu District, Changsha, Hunan, China

Product description

Product name.....: Remote control

Trademark:



Model Name:

GLINT 2.0

FCC Part15.407

Test Standards:

ANSI C63.10-2013

KDB789033 D02 General U-NII Test Procedures New Rules v01r03

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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Test Result : Pass

Testing Engineer :

Eric Yang

Reviewer (Supervisor) :

Jade Yang

Approved & Authorized Signer(Manager) :





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1.TEST SUMMARY

Test Items	Test Requirement	Result
Conducted Emissions	15.207	PASS
Radiated Emissions	15.407(b), 15.209	PASS
26dB bandwidth and 99%dB Bandwidth	15.403(i) 15.407(e)	PASS
Power density	15.407 (a)	PASS
Maximum Peak Output Power	15.407 (a)	PASS
Emissions from out of band	15.407 (b)	PASS
Transmission in case of Absence of Information	15.407(c)	PASS
Frequency Stability	15.407(g)	PASS
Antenna Requirement	15.203	PASS



2.GENERAL PRODUCT INFORMATION

2.1. Product Function

Refer to Technical Construction Form and User Manual.

2.2. Description of Device (EUT)

Product Name:	Remote control
Model No.:	GLINT 2.0
Operation Frequency:	5G:5745-5825 MHz(5G 802.11a/n(HT20)) 2.4G:2404-2480MHz
Channel numbers:	5G:5channels for 5G 802.11a/n(HT20) 2.4G: 77channels
Modulation technology:	5G:Orthogonal Frequency Division Multiplexing(OFDM) 2.4G:DSSS
Data speed (IEEE 802.11g):	6Mbps, 9Mbps, 12Mbps, 18Mbps, 24Mbps, 36Mbps, 48Mbps,54Mbps
Data speed (IEEE 802.11n):	Up to 150Mbps
Antenna Type:	Internal Antenna
Antenna gain:	5G:2dBi for (declare by Applicant) 2.4G:3.0dBi (declare by Applicant)
Adapter	Model: LY012SPS-08010CH Input: AC100-240V~ 50-60Hz 0.35A Output: 8.0V--- 1.0A
Battery:	DC 7.4V 6000mA

Ant.	Brand	Model Name	Antenna Type	Gain (dBi)
1	N/A	SPEH00FP-00-00-A	Internal Antenna	2.0
2	N/A	SPEH00FP-00-00-A	Internal Antenna	2.0

Note: The EUT is 802.11a/n(HT20) support MIMO mode, Directional Gain=2dBi+10log(2)=5.01dBi.



2.3. Test Supporting System

Personal computer

2.4. Independent Operation Modes

The basic operation modes are:

For 802.11a/n(HT20):

1. lowest channel : 5745MHz (Channel 149)
2. middle channel : 5785MHz (Channel 157)
3. highest channel : 5825MHz (Channel 165)

Note: for conducted emission test, we pretest all mode, the worst mode was 802.11a channel 36.

for radiated emissions test, we pretest all mode, the worst mode was 802.11a.

The worst mode's data was recording and show in the test report.

2.5. Test Sites

2.5.1. Test Facilities

Lab Qualifications : FCC Registration No.:187086



2.6. List of Test and Measurement Instruments

Conduction test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Test Receiver	R&S	ESCI	1166.5950K03-101165-ha	2015.08.25	2016.08.24	1 year
2	LISN	R&S	NSLK8126	8126466	2015.08.25	2016.08.24	1 year
3	LISN	R&S	NSLK8126	8126487	2015.08.24	2016.08.23	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264417	2015.06.07	2016.06.06	1 year
5	RF cables	R&S	R204	R20X	2015.06.07	2016.06.06	1 year

Radiation test, Band-edge test and 6db bandwidth test equipment

Item	Kind of equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Spectrum Analyzer	Agilent	E4407B	MY45108040	2015.08.25	2016.08.24	1 year
2	Test Receiver	R&S	ESPI	101318	2015.08.25	2016.08.24	1 year
3	Bilog Antenna	R&S	VULB 9160	VULB9168-438	2015.08.25	2016.08.24	1 year
4	50Ω Coaxial Switch	Anritsu	MP59B	6200264416	2015.06.07	2016.06.06	1 year
5	Spectrum Analyzer	ADVANTEST	R3132	150900201	2015.06.07	2016.06.06	1 year
6	Horn Antenna	SCHWARZBECK	9120D	9120D-1275	2015.08.25	2016.08.24	1 year
7	Horn Ant	Schwarzbeck	BBHA 9170	9170-181	2015.07.06	2016.07.05	1 year
8	Amplifier	R&S	BBV9743	9743-019	2015.08.25	2016.08.24	1 year
9	Loop Antenna	ARA	PLA-1030/B	1029	2015.06.08	2016.06.07	1 year
10	RF cables	R&S	N/A	N/A	2015.07.06	2016.07.05	1 year
11	Power Sensor	R&S	URV5-Z55	161905	2015.07.06	2016.07.05	1 year
12	Power Meter	R&S	NRVS	100696	2015.07.06	2016.07.05	1 year
13	Amplifier	SCHWARZBECK	BBV9718	9718-270	2015.08.25	2016.08.24	1 year
14	Spectrum Analyzer	Agilent	N9010A	MY48030494	2015.07.06	2016.07.05	1 year
15	Test Receiver	R&S	ESU 40	100376	2015.07.06	2016.07.05	1 year

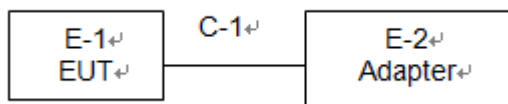
3. TEST SET-UP AND OPERATION MODES

3.1. Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the Operating Instructions.

3.2. Block Diagram of Test Set-up

System Diagram of Connections between EUT and Simulators




(EUT: Remote control)

3.3. Test Operation Mode and Test Software

Test Software:MKU

3.4. Special Accessories and Auxiliary Equipment

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

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	Remote control		GLINT 2.0	N/A	EUT
E-2	Adapter	N/A	LY012SPS-08010CH	N/A	

Item	Shielded Type	Ferrite Core	Length	Note
C1	NO	NO	1.5M	DC cable unshielded

3.5. Countermeasures to Achieve EMC Compliance

None.



4. EMISSION TEST RESULTS

4.1. Conducted Emission Measurement

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

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

Note:

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

The following table is the setting of the receiver

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

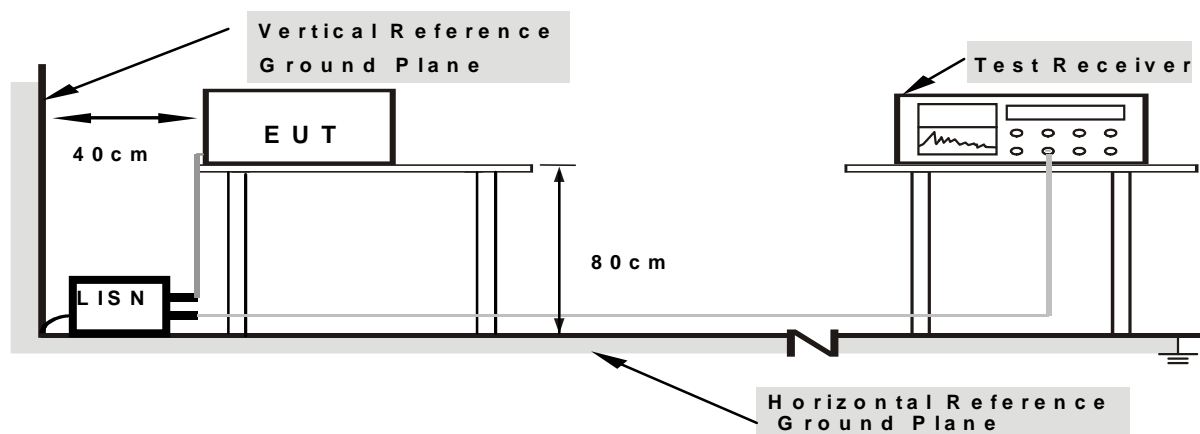
4.1.1. TEST PROCEDURE

- The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.1.2. DEVIATION FROM TEST STANDARD

No deviation

4.1.3. TEST SETUP



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

4.1.4. EUT OPERATING CONDITIONS

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

We pretest all adapter's emission, only the adapter 1's data was worst and the data was recording in the report.

The data only show the worst mode.

If peak level comply with Quasi-Peak limit, then the Quasi-Peak level is deemed to comply with Quasi-Peak limit.

We pretest AC 120V and AC 240V, the worst voltage was AC 120V and the data recording in the report.



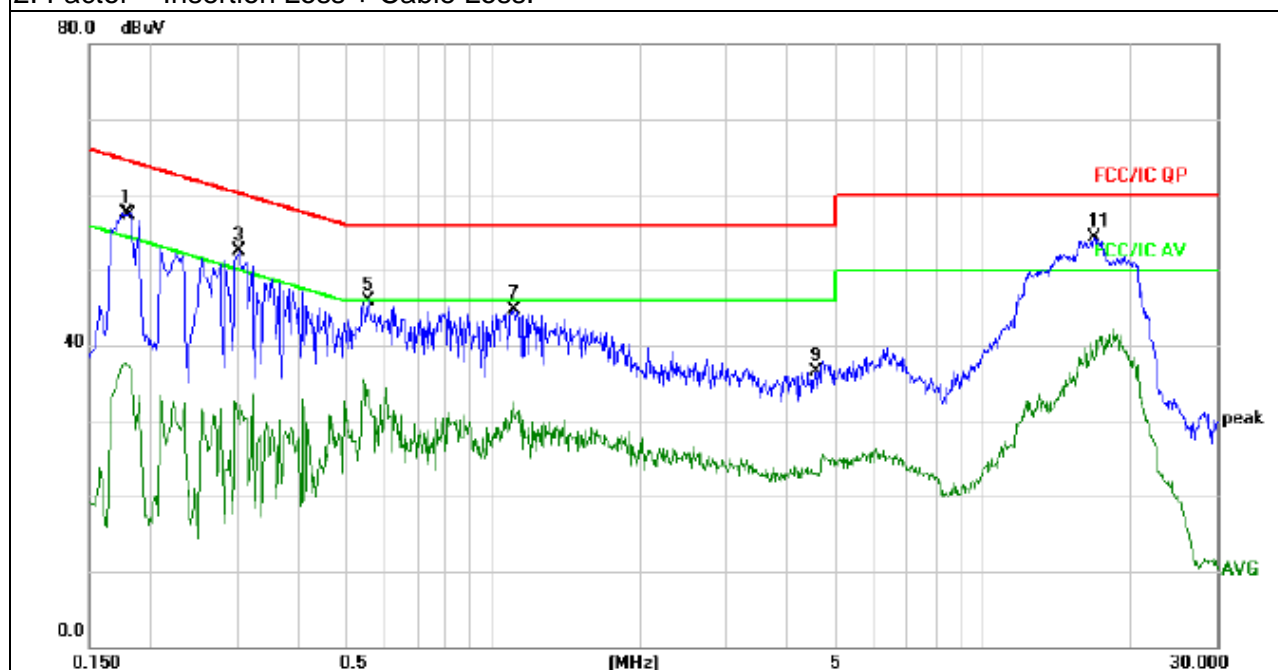
4.1.5. TEST RESULTS

EUT:	Binj-amin 1.0	Model Name :	Binj-amin 1.0
Temperature:	26 °C	Relative Humidity:	54%
Pressure:	1010hPa	Phase :	L
Test Voltage :	DC 8V from adapter input AC 120V/60Hz	Test Mode:	TX Mode

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Detector Type
0.1779	47.47	10.06	57.53	64.58	-7.05	QP
0.1779	27.67	10.06	37.73	54.58	-16.85	AVG
0.3019	42.33	10.09	52.42	60.19	-7.77	QP
0.3019	23.32	10.09	33.41	50.19	-16.78	AVG
0.5580	35.74	10.12	45.86	56.00	-10.14	QP
0.5580	25.29	10.12	35.41	46.00	-10.59	AVG
1.1100	34.51	10.17	44.68	56.00	-11.32	QP
1.1100	22.32	10.17	32.49	46.00	-13.51	AVG
4.5579	26.31	10.15	36.46	56.00	-19.54	QP
4.5579	15.31	10.15	25.46	46.00	-20.54	AVG
16.8538	44.18	10.16	54.34	60.00	-5.66	QP
16.8538	31.97	10.16	42.13	50.00	-7.87	AVG

Remark:

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



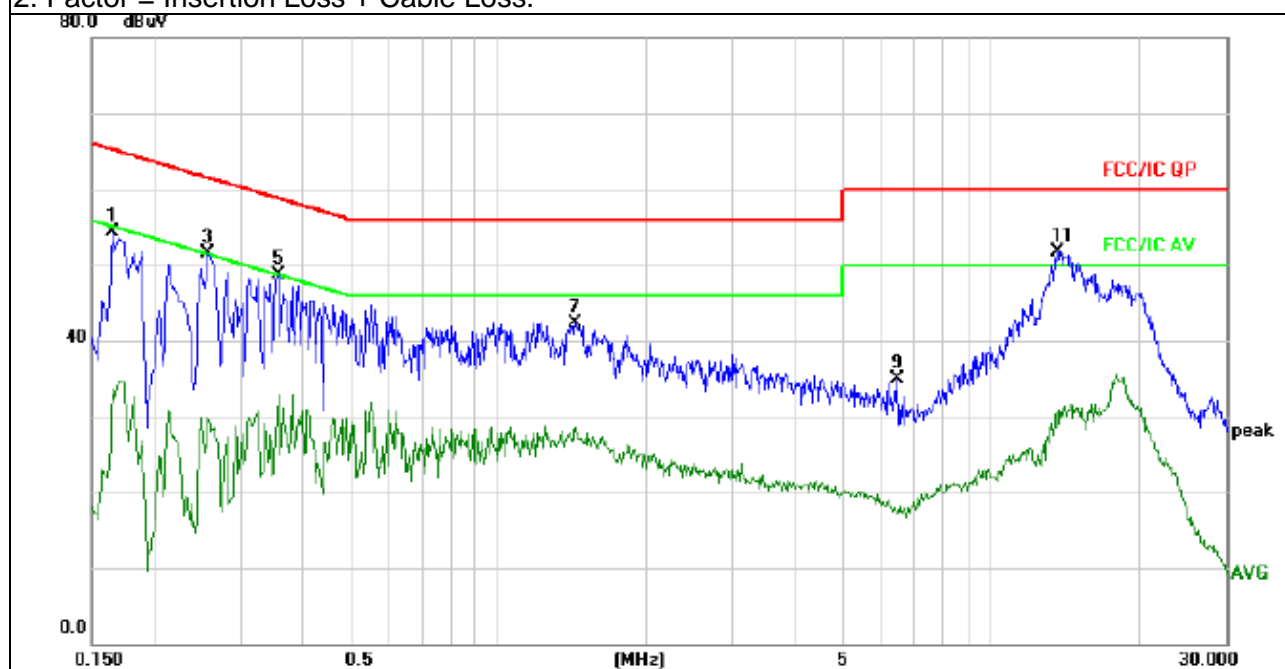


EUT:	Binj-amin 1.0	Model Name :	Binj-amin 1.0
Temperature:	26 °C	Relative Humidity:	54%
Pressure:	1010hPa	Phase :	N
Test Voltage :	DC 8V from adapter input AC 120V/60Hz	Test Mode:	TX Mode

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Detector Type
0.1650	44.29	10.06	54.35	65.20	-10.85	QP
0.1650	24.71	10.06	34.77	55.20	-20.43	AVG
0.2580	41.44	10.08	51.52	61.49	-9.97	QP
0.2580	19.77	10.08	29.85	51.49	-21.64	AVG
0.3579	38.69	10.10	48.79	58.78	-9.99	QP
0.3579	22.82	10.10	32.92	48.78	-15.86	AVG
1.4339	32.19	10.17	42.36	56.00	-13.64	QP
1.4339	18.24	10.17	28.41	46.00	-17.59	AVG
6.4659	24.75	10.09	34.84	60.00	-25.16	QP
6.4659	8.78	10.09	18.87	50.00	-31.13	AVG
13.6578	41.59	10.14	51.73	60.00	-8.27	QP
13.6578	21.59	10.14	31.73	50.00	-18.27	AVG

Remark:

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





4.2. Radiated Emission Measurement

4.2.1. Radiated Emission Limits (Frequency Range 9kHz-1000MHz)

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.

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

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

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

Notes:

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

FREQUENCY RANGE OF RADIATED MEASUREMENT (For unintentional radiators)

Highest frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes (MHz)	Range (MHz)
Below 1.705	30
1.705 – 108	1000
108 – 500	2000
500 – 1000	5000
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower



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

4.2.2. TEST PROCEDURE

- The measuring distance of at 3 m shall be used for measurements at frequency up to 25GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- The EUT was placed on the top of a rotating table 0.8 and 1.5 meters above the ground at a 3 meter semi-chamber test. The table was rotated 360 degrees to determine the position of the highest radiation.
- The height of the equipment or of the substitution antenna shall be 0.8 m; above 1GHz, the height was 1.5m, 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.
- 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.
- 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.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.
- For the radiated emission test above 1GHz:
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.

Note:

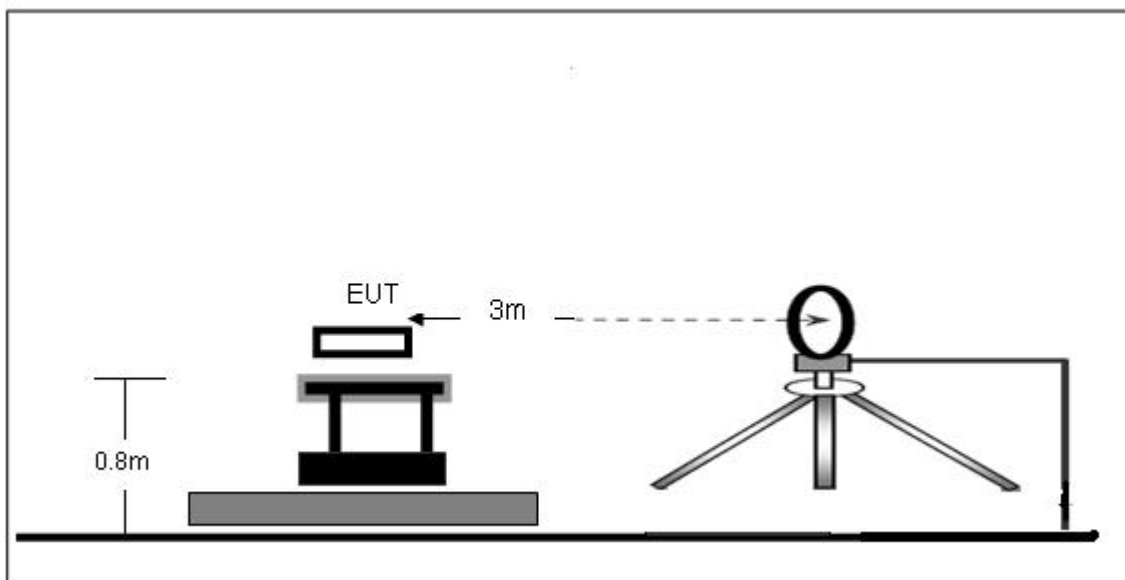
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

4.2.3. DEVIATION FROM TEST STANDARD

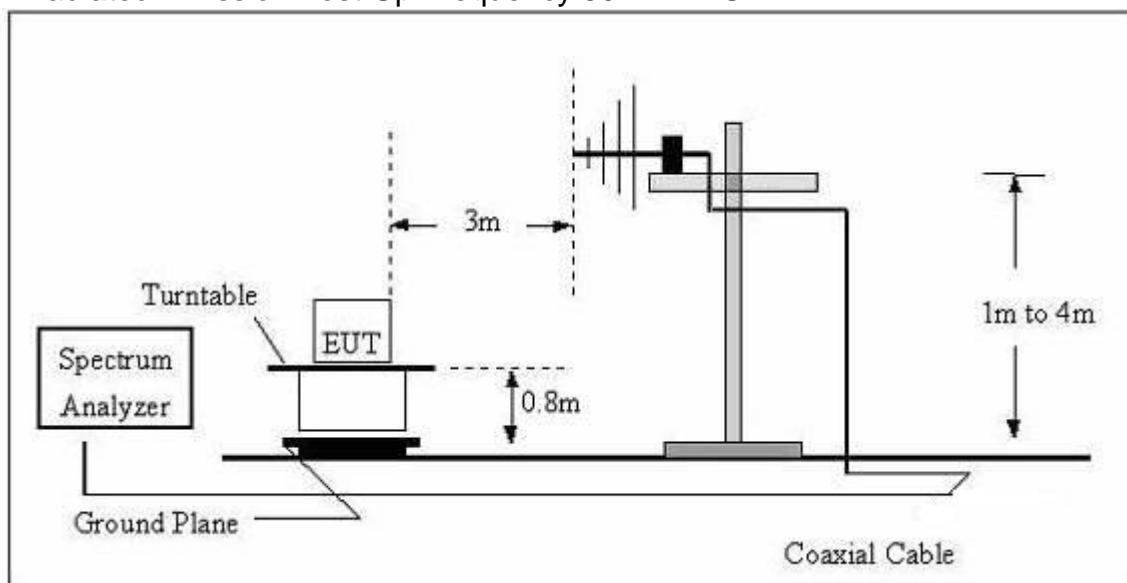
No deviation

4.2.4. TEST SETUP

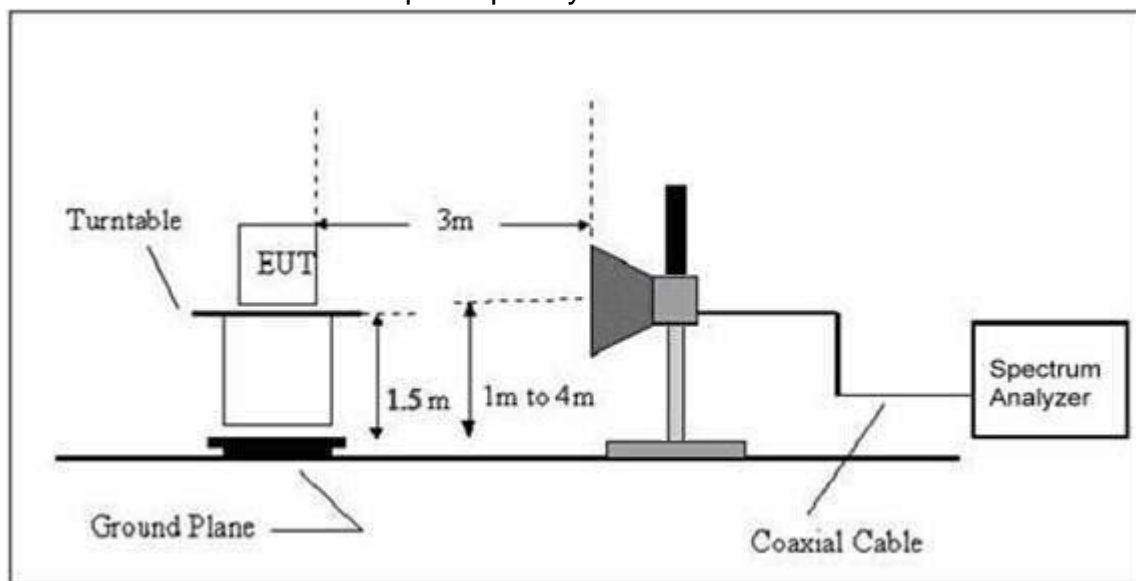
(A) Radiated Emission Test-Up Frequency Below 30MHz



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



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



4.2.5. EUT OPERATING CONDITIONS

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

We pretest all adapter's emission, only the adapter 1's data was worst and the data was recording in the report.

The data only show the worst mode.



Radiated Spurious Emission (Below 30MHz)

EUT :	Remote control	Model Name :	GLINT 2.0
Temperature :	24 °C	Relative Humidity :	48%
Pressure :	1010 hPa	Polarization :	---
Test Voltage :	DC 7.4V from Battery		
Test Mode :	TX		

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

Note:

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

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

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



Radiated Spurious Emission (Between 30MHz – 1GHz)

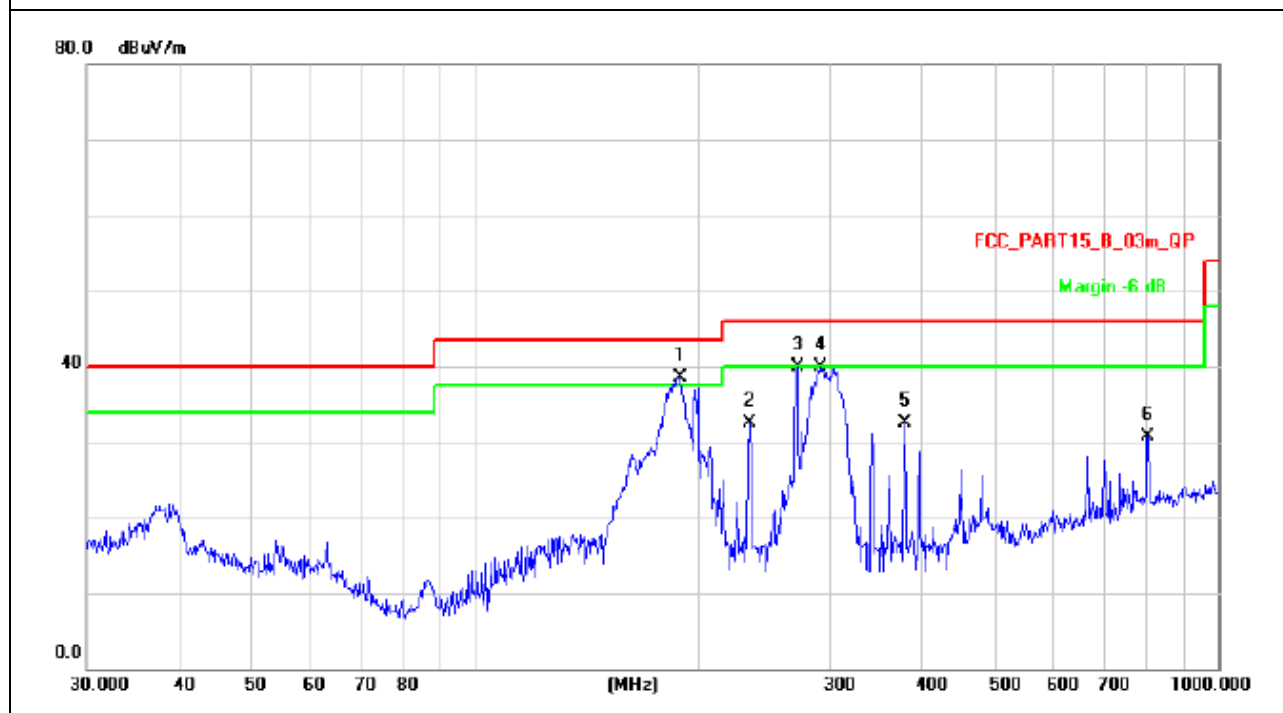
EUT :	Remote control	Model Name :	GLINT 2.0
Temperature :	24 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Polarization :	Horizontal
Test Voltage :	DC 7.4V from Battery		
Test Mode : (Worst)	Link Mode		

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
189.0742	54.06	-15.46	38.60	43.50	-4.90	QP
234.1683	47.23	-14.82	32.41	46.00	-13.59	QP
271.3245	53.42	-13.45	39.97	46.00	-6.03	QP
291.0360	52.77	-12.82	39.95	46.00	-6.05	QP
378.5842	43.18	-10.70	32.48	46.00	-13.52	QP
804.6028	33.13	-2.47	30.66	46.00	-15.34	QP

Remark:

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

Pretest all mode, the data only show the worst mode.





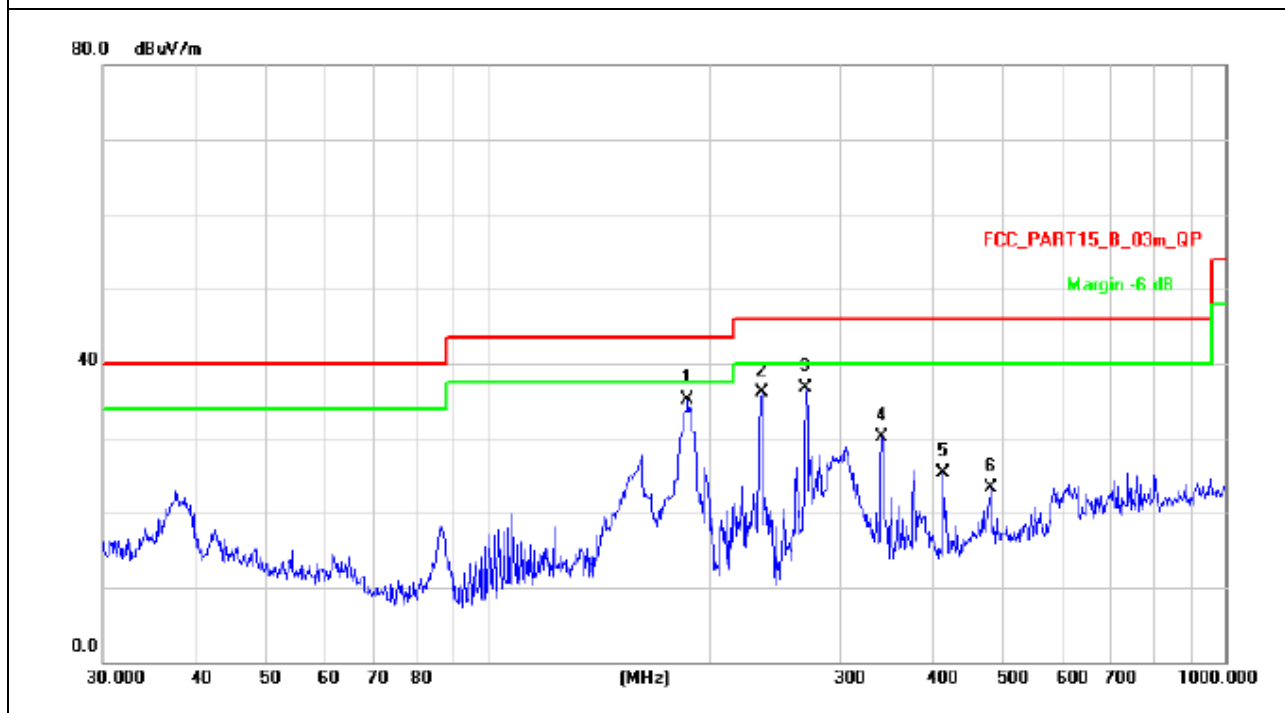
EUT :	Remote control	Model Name :	GLINT 2.0
Temperature :	24 °C	Relative Humidity :	54%
Pressure :	1010 hPa	Polarization :	Vertical
Test Voltage :	DC 7.4V from Battery		
Test Mode : (Worst)	Link Mode		

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type
186.4408	50.25	-15.14	35.11	43.50	-8.39	QP
234.9909	50.89	-14.77	36.12	46.00	-9.88	QP
269.4284	50.21	-13.53	36.68	46.00	-9.32	QP
341.9786	41.54	-11.53	30.01	46.00	-15.99	QP
414.7223	35.18	-9.86	25.32	46.00	-20.68	QP
480.5276	31.73	-8.42	23.31	46.00	-22.69	QP

Remark:

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

Pretest all mode, the data only show the worst mode.





Radiated Spurious Emission (1GHz to 5th harmonics)
802.11a

	Freq.	Receiver Reading	Detector	Polar	Pre-amplifier	Cable Loss	Antenna Factor	Emission Level	Limit	Result
	(MHz)	(dBμV)	(PK/QP/Ave)	(H/V)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	
Lower Channel 5745MHz	11490.00	56.84	PK	H	34.25	6.48	29.46	58.53	74.00	Pass
	11490.00	47.81	Ave	H	33.25	6.48	29.46	50.5	54.00	Pass
	17235.00	58.52	PK	H	34.83	6.96	26.88	57.53	74.00	Pass
	17235.00	47.75	Ave	H	34.83	6.96	26.88	46.76	54.00	Pass
	11490.00	56.5	PK	V	34.25	6.48	29.46	58.19	74.00	Pass
	11490.00	47.64	Ave	V	33.25	6.48	29.46	50.33	54.00	Pass
	17235.00	58.76	PK	V	34.83	6.96	26.88	57.77	74.00	Pass
	17235.00	47.95	Ave	V	34.83	6.96	26.88	46.96	54.00	Pass
Middle Channel 5785MHz	11570.00	57.51	PK	H	33.95	6.89	29.36	59.81	74.00	Pass
	11570.00	48.05	Ave	H	33.95	6.89	29.36	50.35	54.00	Pass
	17355.00	58.12	PK	H	35.25	7.10	27.22	57.19	74.00	Pass
	17355.00	48.52	Ave	H	35.25	7.10	27.22	47.59	54.00	Pass
	11570.00	57.44	PK	V	33.95	6.89	29.36	59.74	74.00	Pass
	11570.00	47.83	Ave	V	33.95	6.89	29.36	50.13	54.00	Pass
	17355.00	59.01	PK	V	35.25	7.10	27.22	58.08	74.00	Pass
	17355.00	47.57	Ave	V	35.25	7.10	27.22	46.64	54.00	Pass
Upper Channel 5825MHz	11650.00	57.12	PK	H	34.35	7.15	30.15	60.07	74.00	Pass
	11650.00	46.04	Ave	H	34.35	7.15	30.15	48.99	54.00	Pass
	17475.00	59.77	PK	H	35.75	7.45	28.54	60.01	74.00	Pass
	17475.00	48.12	Ave	H	35.75	7.45	28.54	48.36	54.00	Pass
	11650.00	58.43	PK	V	34.35	7.15	30.15	61.38	74.00	Pass
	11650.00	46.91	Ave	V	34.35	7.15	30.15	49.86	54.00	Pass
	17475.00	59.21	PK	V	35.75	7.45	28.54	59.45	74.00	Pass
	17475.00	48.24	Ave	V	35.75	7.45	28.54	48.48	54.00	Pass

Remark:

Emission Level = Antenna Factor + Cable Loss – Pre-amplifier.

Margin = Emission Level - Limit

Other harmonics emissions are lower than 20dB below the allowable limit.



802.11n(HT20)

	Freq.	Receiver Reading	Detector	Polar	Pre-amplifier	Cable Loss	Antenna Factor	Emission Level	Limit	Result
	(MHz)	(dBμV)	(PK/QP/Ave)	(H/V)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	
Lower Channel 5745MHz	11490.00	56.97	PK	H	34.26	6.45	29.23	58.39	74.00	Pass
	11490.00	47.47	Ave	H	33.26	6.45	29.23	49.89	54.00	Pass
	17235.00	58.68	PK	H	34.83	6.96	26.88	57.69	74.00	Pass
	17235.00	47.88	Ave	H	34.83	6.96	26.88	46.89	54.00	Pass
	11490.00	56.65	PK	V	34.25	6.48	29.46	58.34	74.00	Pass
	11490.00	46.35	Ave	V	33.25	6.48	29.46	49.04	54.00	Pass
	17235.00	58.92	PK	V	34.83	6.96	26.88	57.93	74.00	Pass
	17235.00	48.07	Ave	V	34.83	6.96	26.88	47.08	54.00	Pass
	11570.00	57.67	PK	H	33.95	6.89	29.36	59.97	74.00	Pass
	11570.00	46.91	Ave	H	33.95	6.89	29.36	49.21	54.00	Pass
Middle Channel 5785MHz	17355.00	58.28	PK	H	35.25	7.10	27.22	57.35	74.00	Pass
	17355.00	48.65	Ave	H	35.25	7.10	27.22	47.72	54.00	Pass
	11570.00	57.6	PK	V	33.95	6.89	29.36	59.9	74.00	Pass
	11570.00	47.46	Ave	V	33.95	6.89	29.36	49.76	54.00	Pass
	17355.00	59.17	PK	V	35.25	7.10	27.22	58.24	74.00	Pass
	17355.00	47.7	Ave	V	35.25	7.10	27.22	46.77	54.00	Pass
	11650.00	58.26	PK	H	34.35	7.15	30.15	61.21	74.00	Pass
	11650.00	46.84	Ave	H	34.35	7.15	30.15	49.79	54.00	Pass
Upper Channel 5825MHz	17475.00	59.93	PK	H	35.75	7.45	28.54	60.17	74.00	Pass
	17475.00	48.12	Ave	H	35.75	7.45	28.54	48.36	54.00	Pass
	11650.00	58.56	PK	V	34.35	7.15	30.15	61.51	74.00	Pass
	11650.00	47.02	Ave	V	34.35	7.15	30.15	49.97	54.00	Pass
	17475.00	59.37	PK	V	35.75	7.45	28.54	59.61	74.00	Pass
	17475.00	48.37	Ave	V	35.75	7.45	28.54	48.61	54.00	Pass

Remark:

Emission Level = Antenna Factor + Cable Loss – Pre-amplifier.

Margin = Emission Level - Limit

Other harmonics emissions are lower than 20dB below the allowable limit.



18-40GHz

802.11a

	Freq.	Receiver Reading	Detector	Polar	Pre-amplifier	Cable Loss	Antenna Factor	Emission Level	Limit	Result
	(MHz)	(dBμV)	(PK/QP/Ave)	(H/V)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	
Lower Channel 5745MHz	214560.00	56.35	PK	H	37.15	10.55	28.12	57.87	74.00	Pass
	21456.00	47.74	Ave	H	37.15	10.55	28.12	49.26	54.00	Pass
	27235.00	57.65	PK	H	37.44	10.84	28.43	59.48	74.00	Pass
	27235.00	46.75	Ave	H	37.44	10.84	28.43	48.58	54.00	Pass
	214560.00	56.47	PK	V	37.15	10.55	28.12	57.99	74.00	Pass
	21456.00	46.35	Ave	V	37.15	10.55	28.12	47.87	54.00	Pass
	27235.00	56.48	PK	V	37.44	10.84	28.43	58.31	74.00	Pass
	27235.00	46.52	Ave	V	37.44	10.84	28.43	48.35	54.00	Pass
Middle Channel 5785MHz	21548.00	57.59	PK	H	37.15	10.89	28.35	59.68	74.00	Pass
	21548.00	46.38	Ave	H	37.15	10.89	28.35	48.47	54.00	Pass
	27395.00	58.27	PK	H	37.44	10.95	28.54	60.32	74.00	Pass
	27395.00	47.63	Ave	H	37.44	10.95	28.54	49.68	54.00	Pass
	21548.00	57.44	PK	V	37.15	10.89	28.35	59.53	74.00	Pass
	21548.00	46.76	Ave	V	37.15	10.89	28.35	48.85	54.00	Pass
	27395.00	59.75	PK	V	37.44	10.95	28.54	61.8	74.00	Pass
	27395.00	47.11	Ave	V	37.44	10.95	28.54	49.16	54.00	Pass
Upper Channel 5825MHz	21750.00	57.65	PK	H	37.29	10.96	28.56	59.88	74.00	Pass
	21750.00	46.32	Ave	H	37.29	10.96	28.56	48.55	54.00	Pass
	27494.00	59.46	PK	H	37.65	11.15	28.75	61.71	74.00	Pass
	27494.00	47.28	Ave	H	37.65	11.15	28.75	49.53	54.00	Pass
	21750.00	58.71	PK	V	37.29	10.96	28.56	60.94	74.00	Pass
	21750.00	47.33	Ave	V	37.29	10.96	28.56	49.56	54.00	Pass
	27494.00	59.29	PK	V	37.65	11.15	28.75	61.54	74.00	Pass
	27494.00	46.89	Ave	V	37.65	11.15	28.75	49.14	54.00	Pass

Remark:

Emission Level = Antenna Factor + Cable Loss – Pre-amplifier.

Margin = Emission Level - Limit

Other harmonics emissions are lower than 20dB below the allowable limit.



802.11n(HT20)

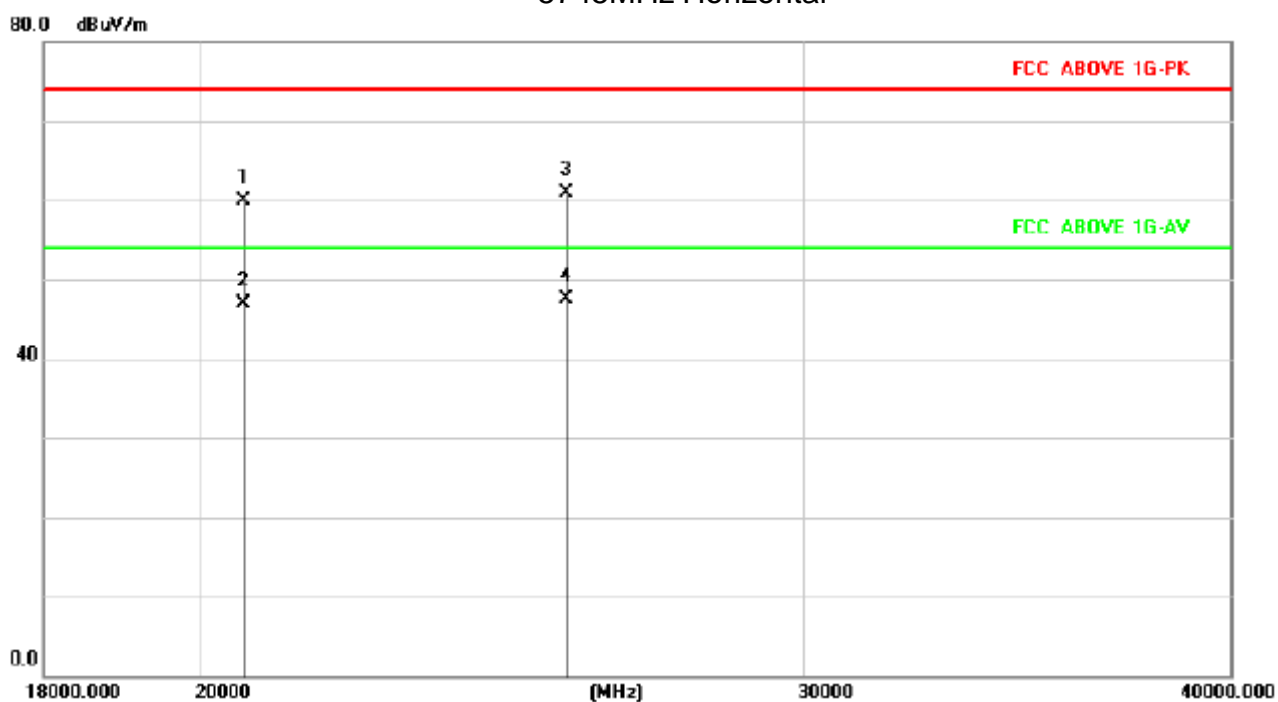
	Freq.	Receiver Reading	Detector	Polar	Pre-amplifier	Cable Loss	Antenna Factor	Emission Level	Limit	Result
	(MHz)	(dBμV)	(PK/QP/Ave)	(H/V)	(dB)	(dB)	(dB)	(dBμV/m)	(dBμV/m)	
Lower Channel 5745MHz	214560.00	56.37	PK	H	37.15	10.55	28.12	57.89	74.00	Pass
	21456.00	47.78	Ave	H	37.15	10.55	28.12	49.3	54.00	Pass
	27235.00	57.62	PK	H	37.44	10.84	28.43	59.45	74.00	Pass
	27235.00	46.48	Ave	H	37.44	10.84	28.43	48.31	54.00	Pass
	214560.00	56.22	PK	V	37.15	10.55	28.12	57.74	74.00	Pass
	21456.00	46.47	Ave	V	37.15	10.55	28.12	47.99	54.00	Pass
	27235.00	57.78	PK	V	37.44	10.84	28.43	59.61	74.00	Pass
	27235.00	47.12	Ave	V	37.44	10.84	28.43	48.95	54.00	Pass
Middle Channel 5785MHz	21548.00	57.45	PK	H	37.15	10.89	28.35	59.54	74.00	Pass
	21548.00	46.39	Ave	H	37.15	10.89	28.35	48.48	54.00	Pass
	27395.00	58.48	PK	H	37.44	10.95	28.54	60.53	74.00	Pass
	27395.00	48.29	Ave	H	37.44	10.95	28.54	50.34	54.00	Pass
	21548.00	57.35	PK	V	37.15	10.89	28.35	59.44	74.00	Pass
	21548.00	47.46	Ave	V	37.15	10.89	28.35	49.55	54.00	Pass
	27395.00	59.57	PK	V	37.44	10.95	28.54	61.62	74.00	Pass
	27395.00	47.33	Ave	V	37.44	10.95	28.54	49.38	54.00	Pass
Upper Channel 5825MHz	21750.00	57.78	PK	H	37.29	10.96	28.56	60.01	74.00	Pass
	21750.00	46.21	Ave	H	37.29	10.96	28.56	48.44	54.00	Pass
	27494.00	59.44	PK	H	37.65	11.15	28.75	61.69	74.00	Pass
	27494.00	47.51	Ave	H	37.65	11.15	28.75	49.76	54.00	Pass
	21750.00	58.35	PK	V	37.29	10.96	28.56	60.58	74.00	Pass
	21750.00	47.22	Ave	V	37.29	10.96	28.56	49.45	54.00	Pass
	27494.00	59.38	PK	V	37.65	11.15	28.75	61.63	74.00	Pass
	27494.00	47.14	Ave	V	37.65	11.15	28.75	49.39	54.00	Pass

Remark:

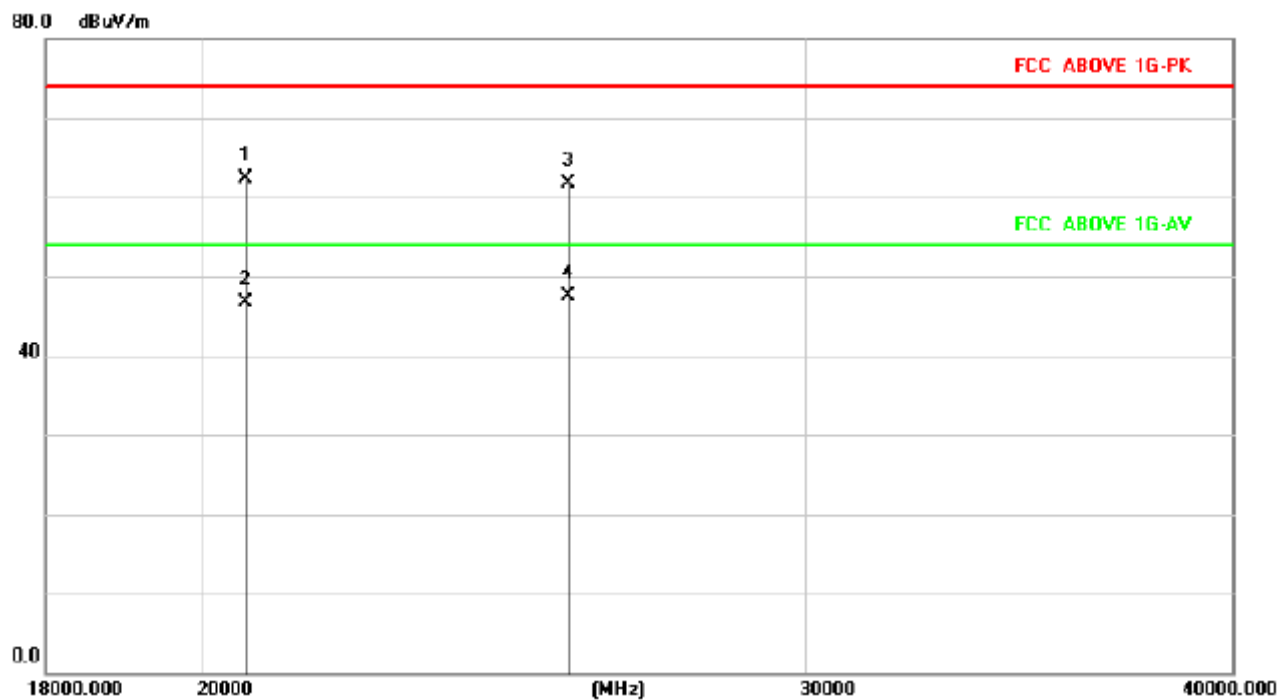
Emission Level = Antenna Factor + Cable Loss – Pre-amplifier.

Margin = Emission Level - Limit

Other harmonics emissions are lower than 20dB below the allowable limit.

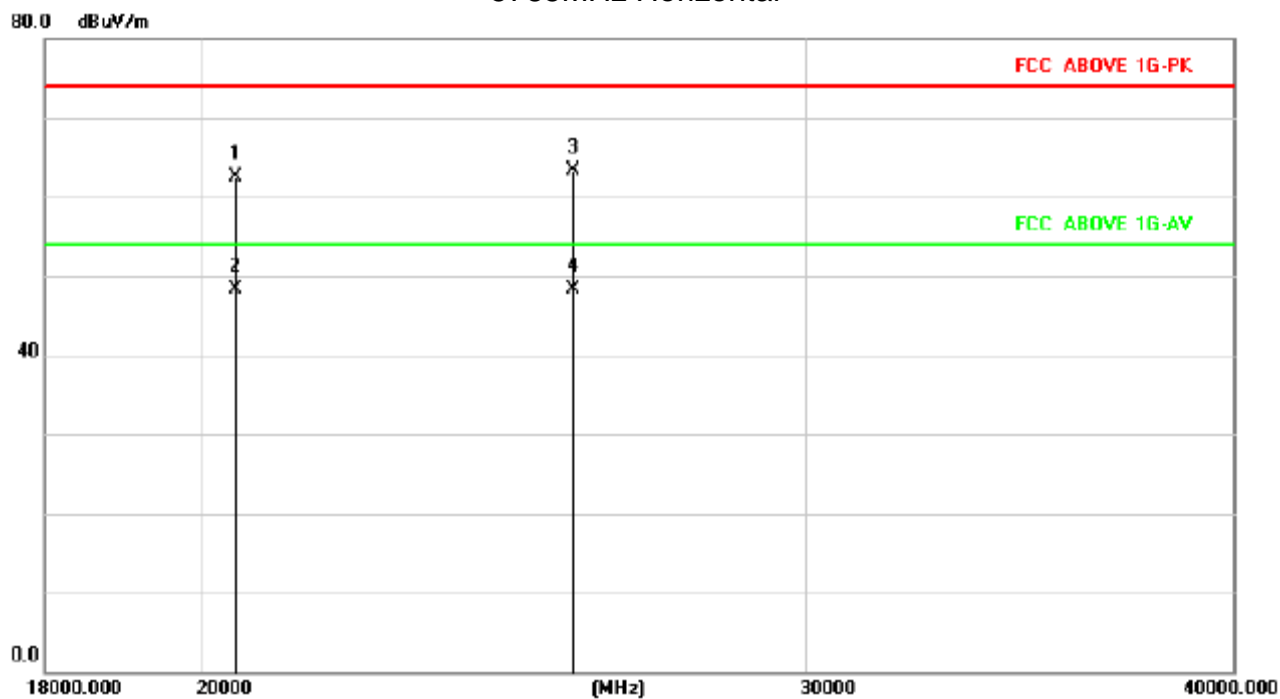
802.11a
5745MHz Horizontal

5745MHz Vertical

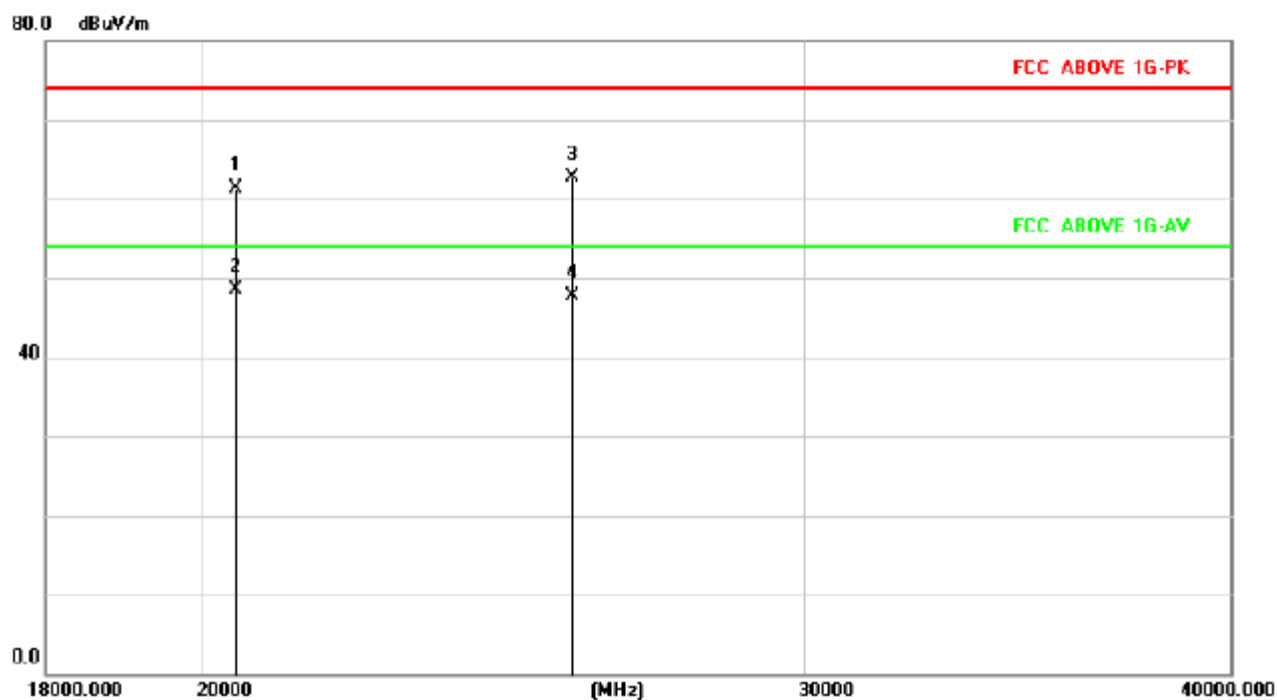




5785MHz Horizontal



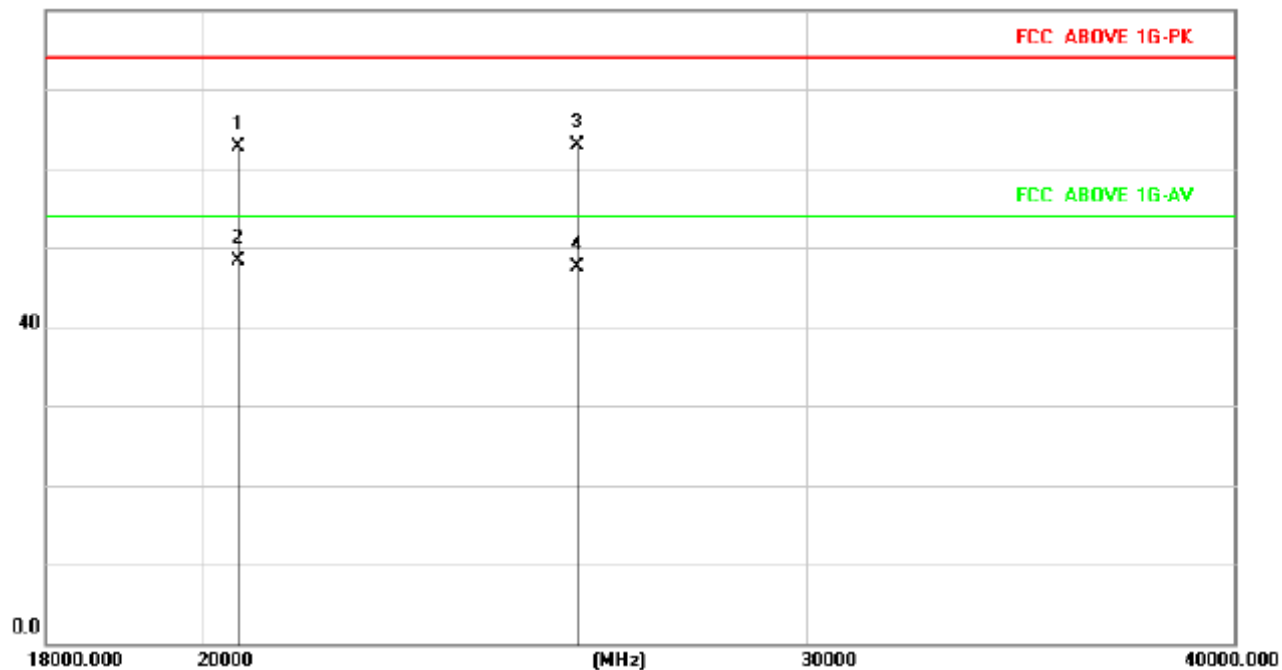
5785MHz Vertical





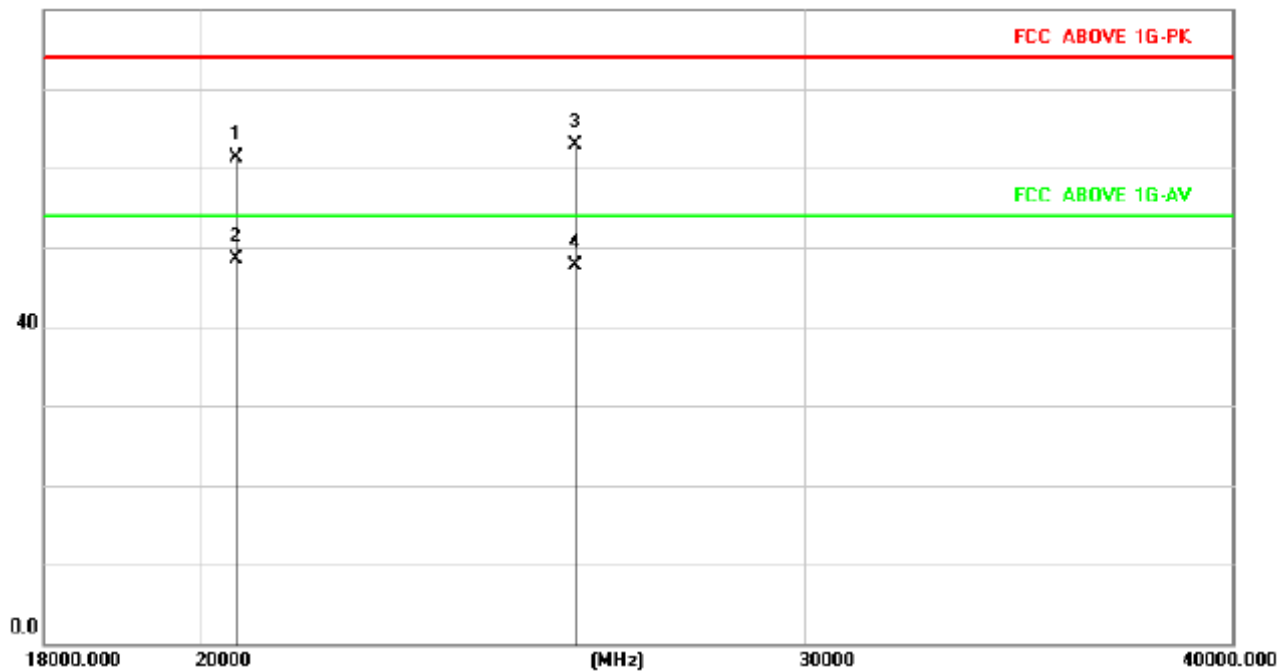
5825MHz Horizontal

80.0 dBuV/m



5825MHz Vertical

80.0 dBuV/m



Note: "802.11a" mode is the worst mode and the data recording in the report.



5. BAND EDGE COMPLIANCE TEST

5.1. 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.
- (4) 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.

5.2. Test setup

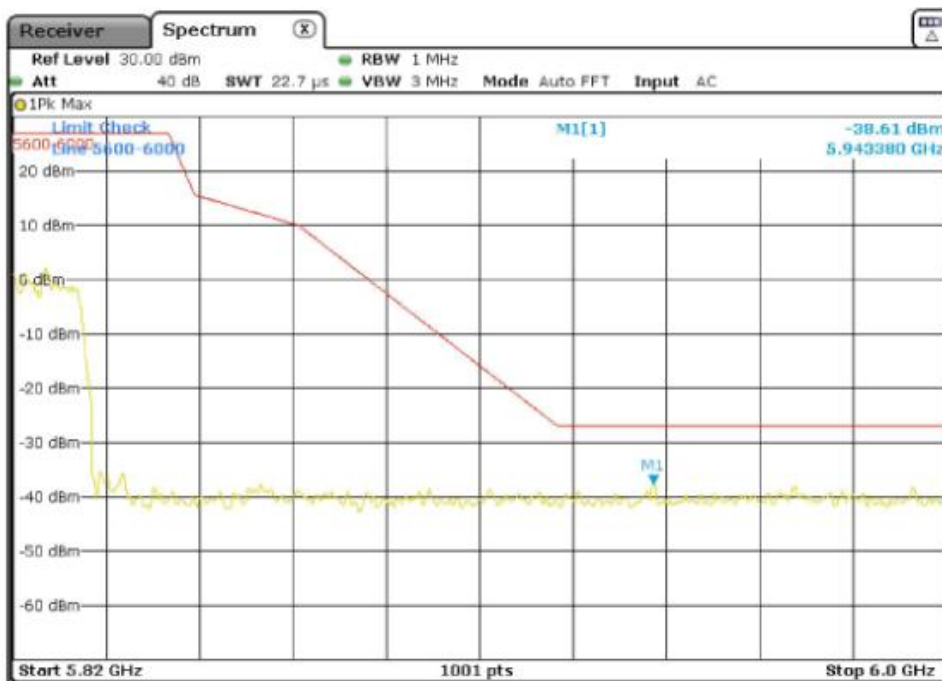
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then 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.
5. Repeat above procedures until all measured frequencies were complete.

5.3. Test Data

Please see data as below:

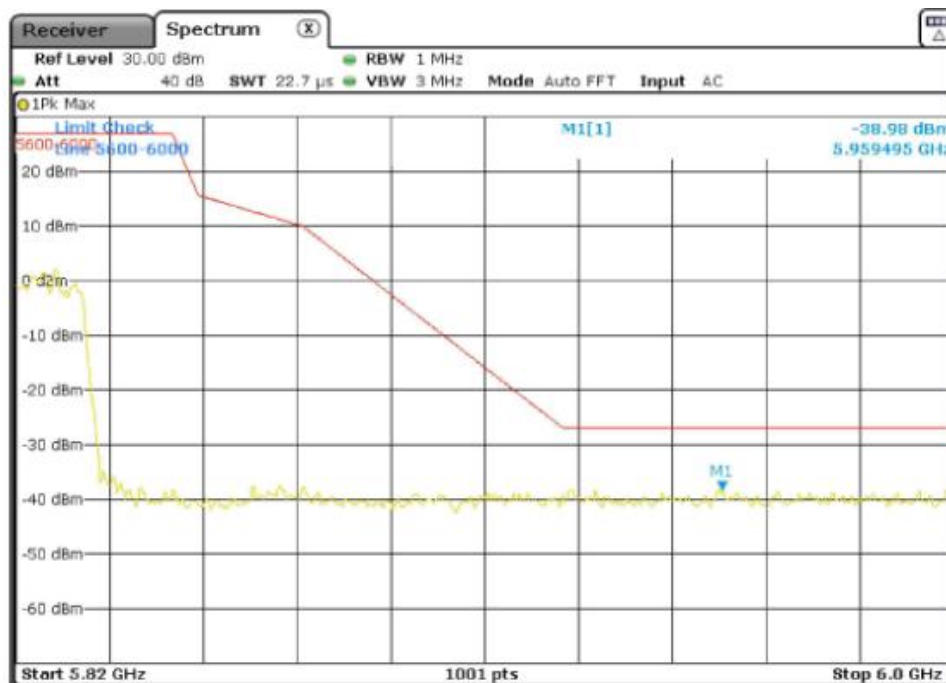


Ant.1
802.11a



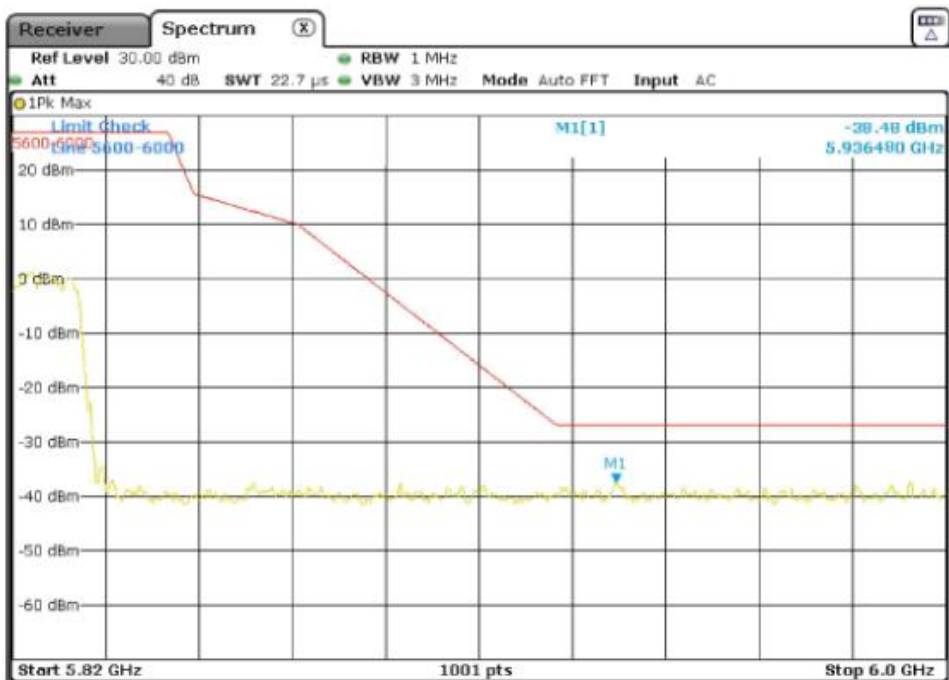


802.11n20



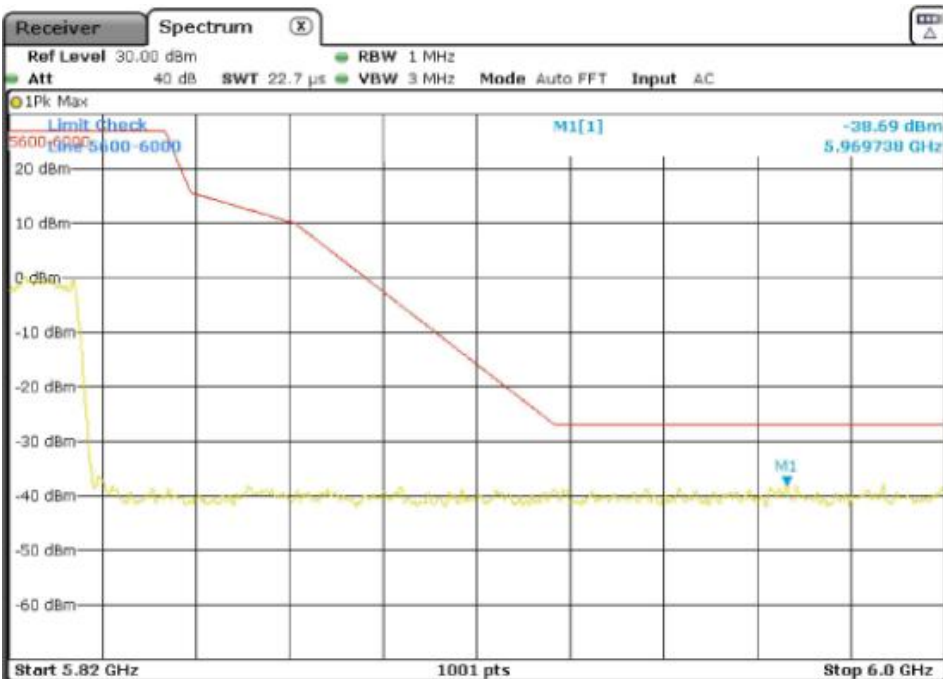


Ant.2
802.11a





802.11n20



6. 26DB AND 99% BANDWIDTH TEST

6.1. Measurement Procedure

The bandwidth at 26 dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating at its maximum power control level, as defined in KDB 789033, at the appropriate frequencies. The spectrum analyzer's bandwidth measurement function is configured to measure the 26 dB bandwidth.

The 26 dB bandwidth is used to determine the conducted power limits.

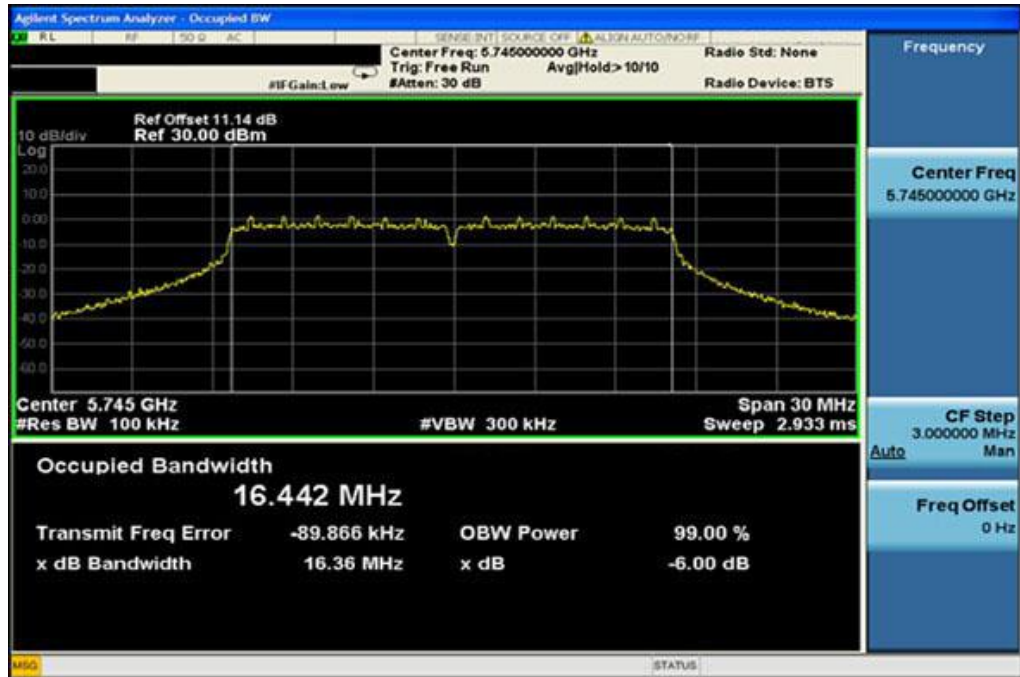
The minimum of 6dB Bandwidth measurement is 0.5 MHz for U-NII-3

	Channel number	Frequency (MHz)	6dB Bandwidth (MHz)		99% Bandwidth (MHz)		Limit (MHz)
			Ant. A	Ant. B	Ant. A	Ant. B	
802.11a	149	5745	16.36	16.31	16.44	16.41	>0.5
	157	5785	16.17	16.36	16.42	16.43	>0.5
	165	5825	16.35	16.34	16.22	16.41	>0.5
802.11n (HT20)	149	5745	17.33	17.03	17.34	17.56	>0.5
	157	5785	17.73	17.24	17.63	17.56	>0.5
	165	5825	17.66	16.98	17.64	17.56	>0.5

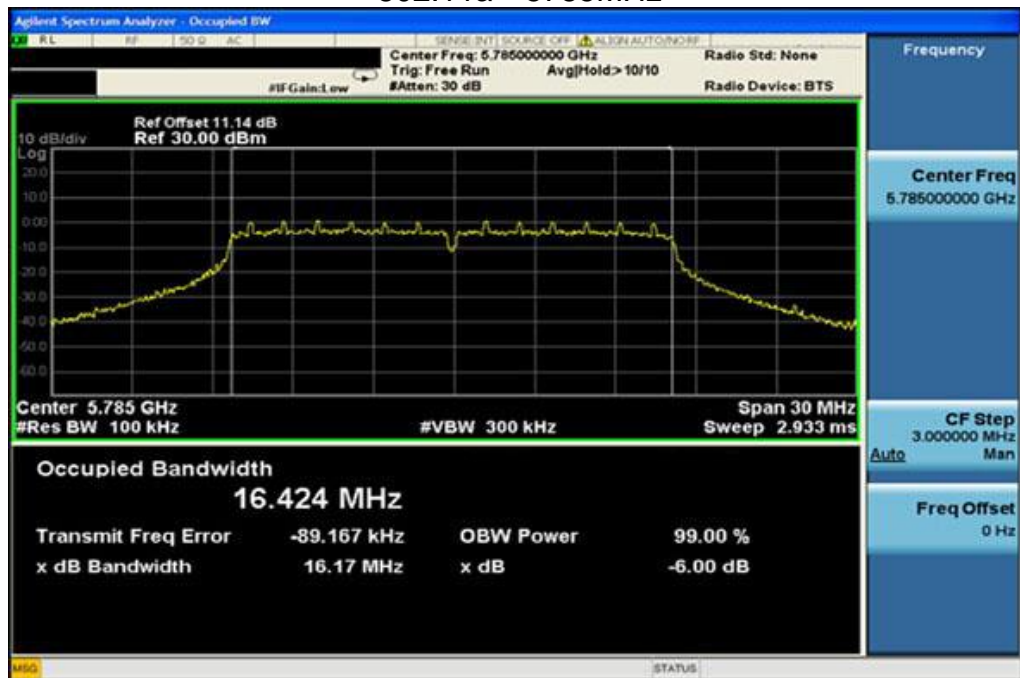


Ant. A

802.11a 5745MHz

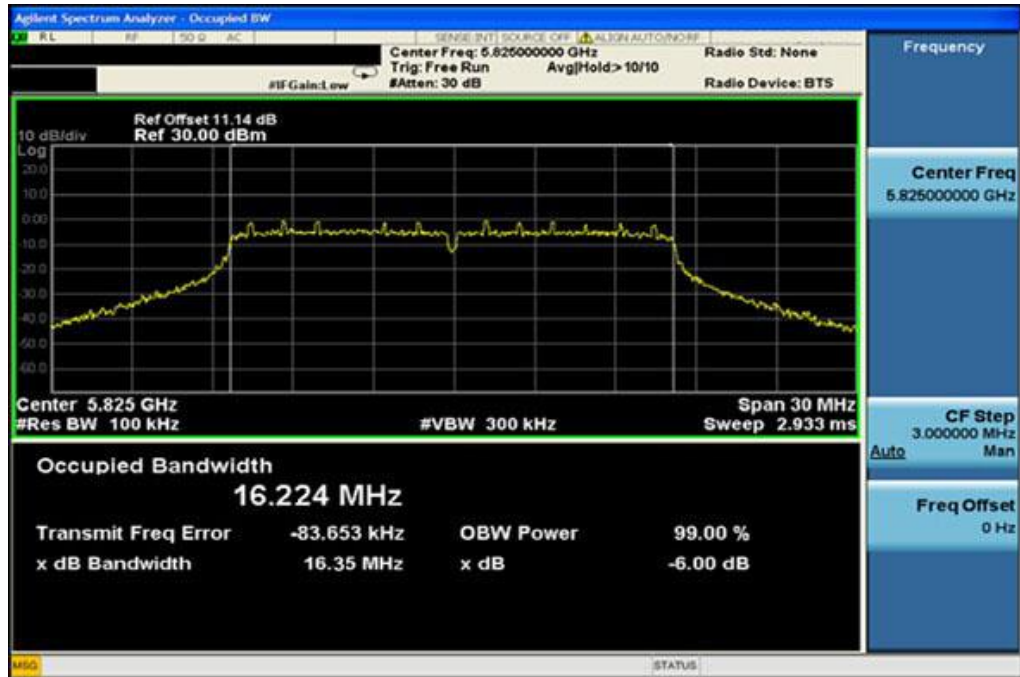


802.11a 5785MHz

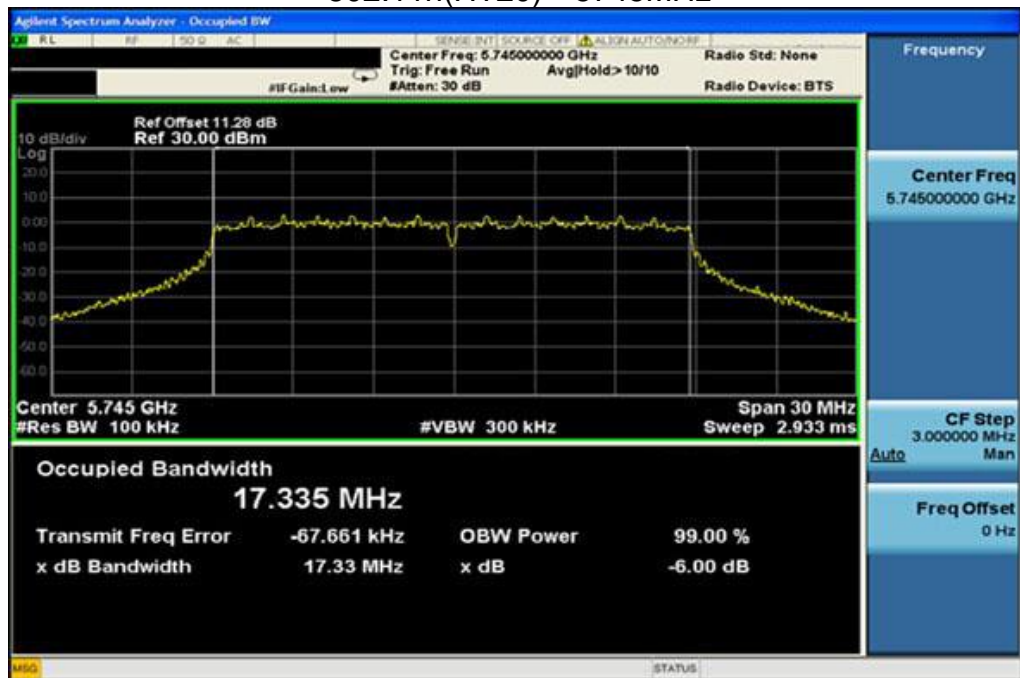




802.11a 5825MHz

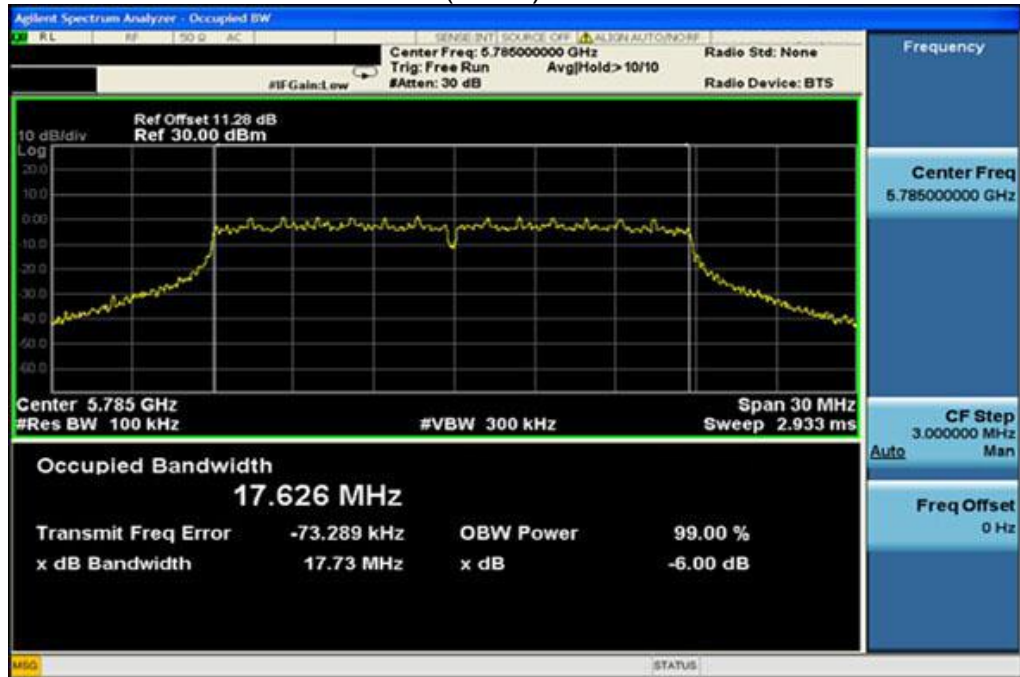


802.11n(HT20) 5745MHz

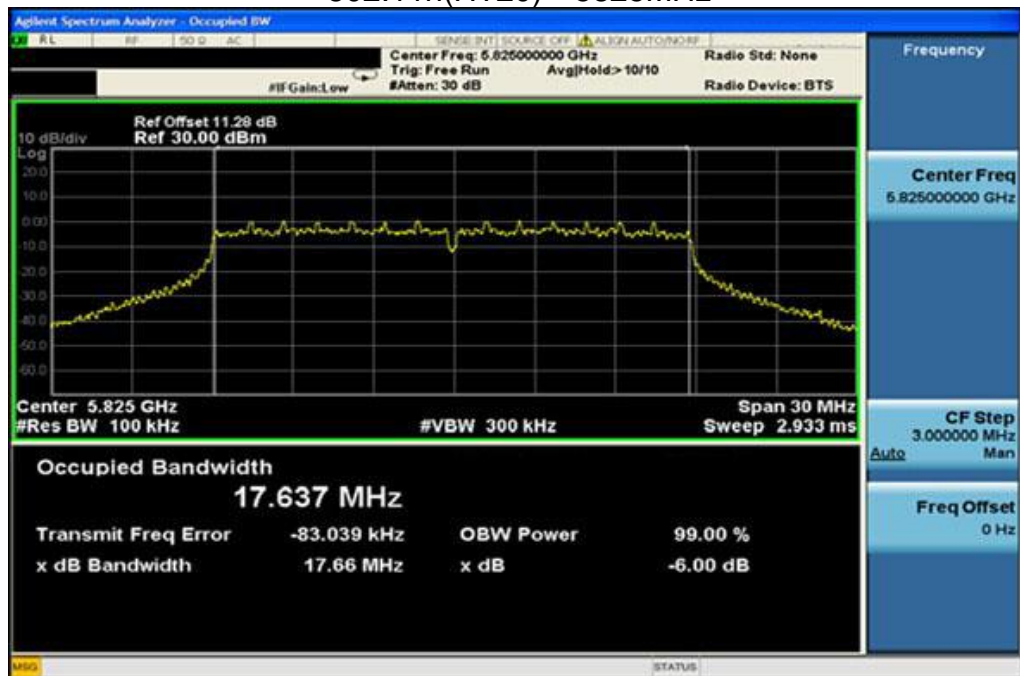




802.11n(HT20) 5785MHz



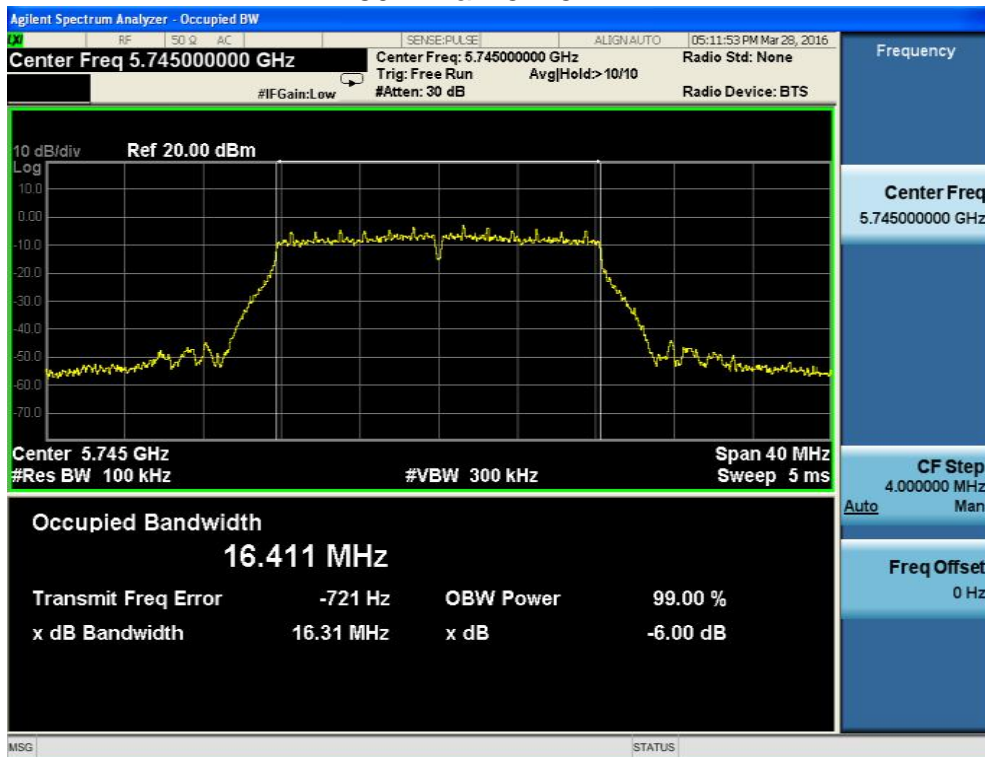
802.11n(HT20) 5825MHz



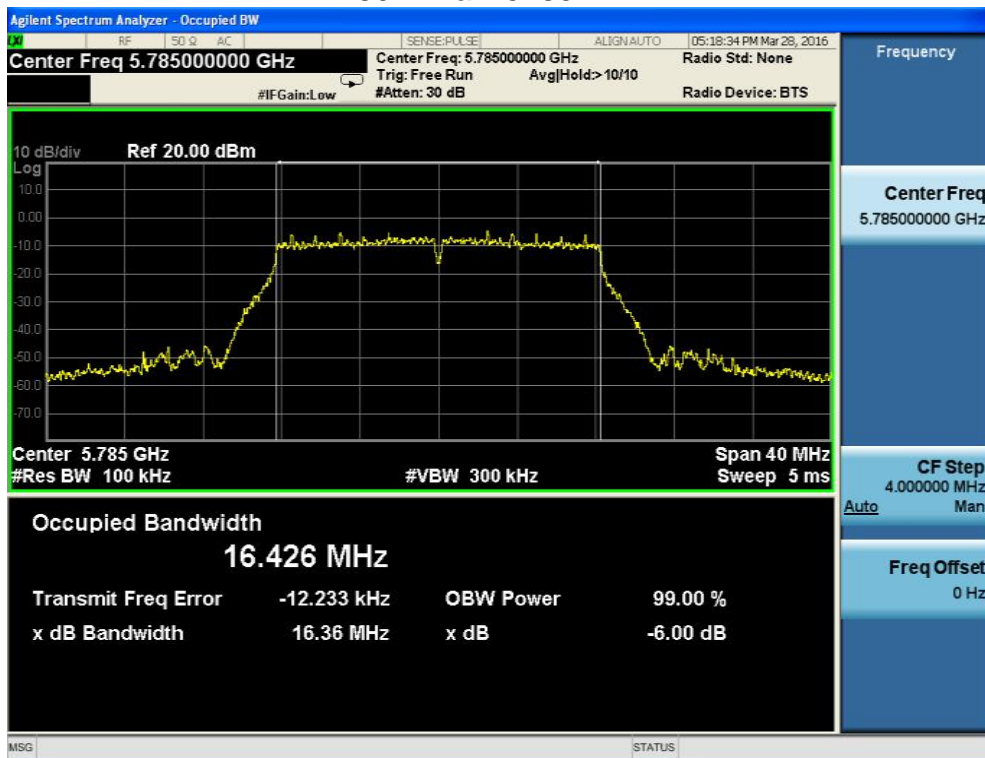


Ant. B

802.11a 5745MHz

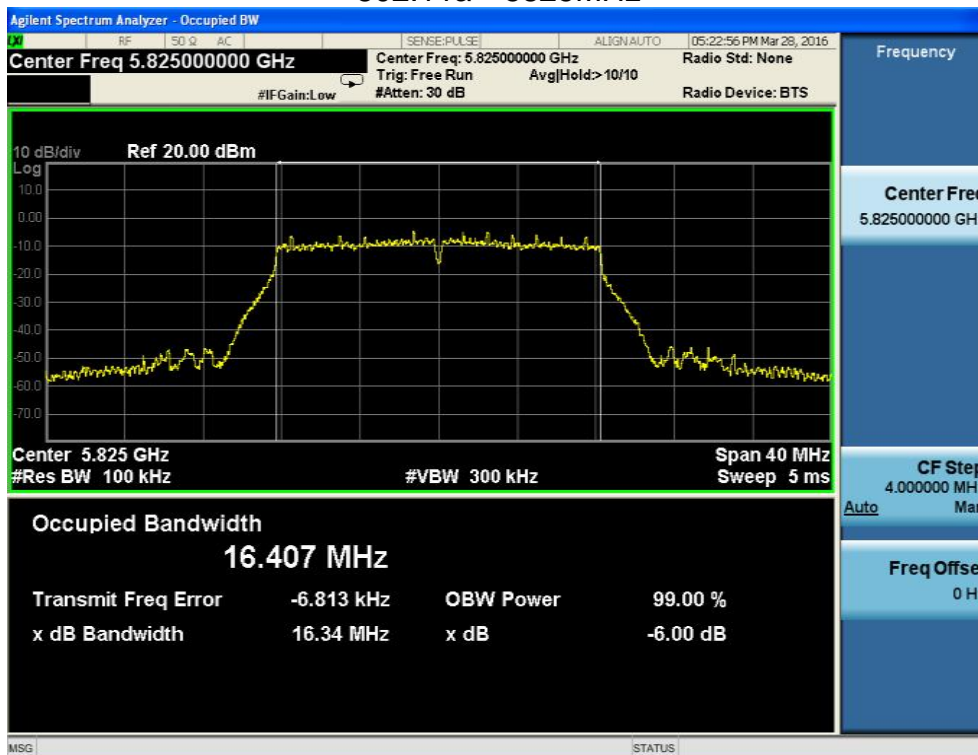


802.11a 5785MHz

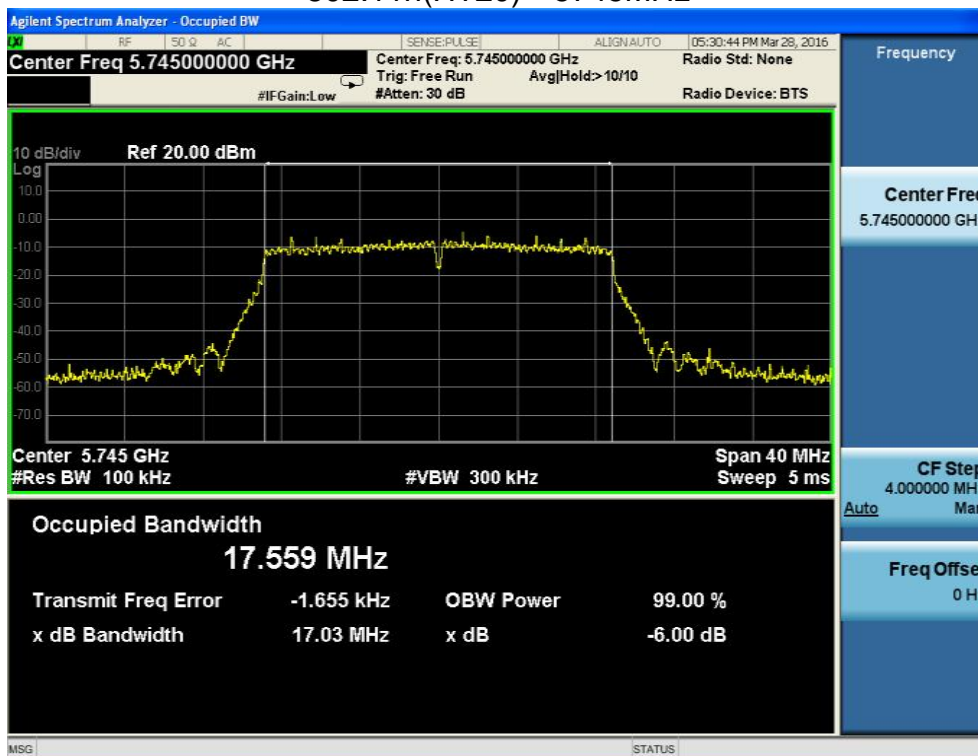




802.11a 5825MHz

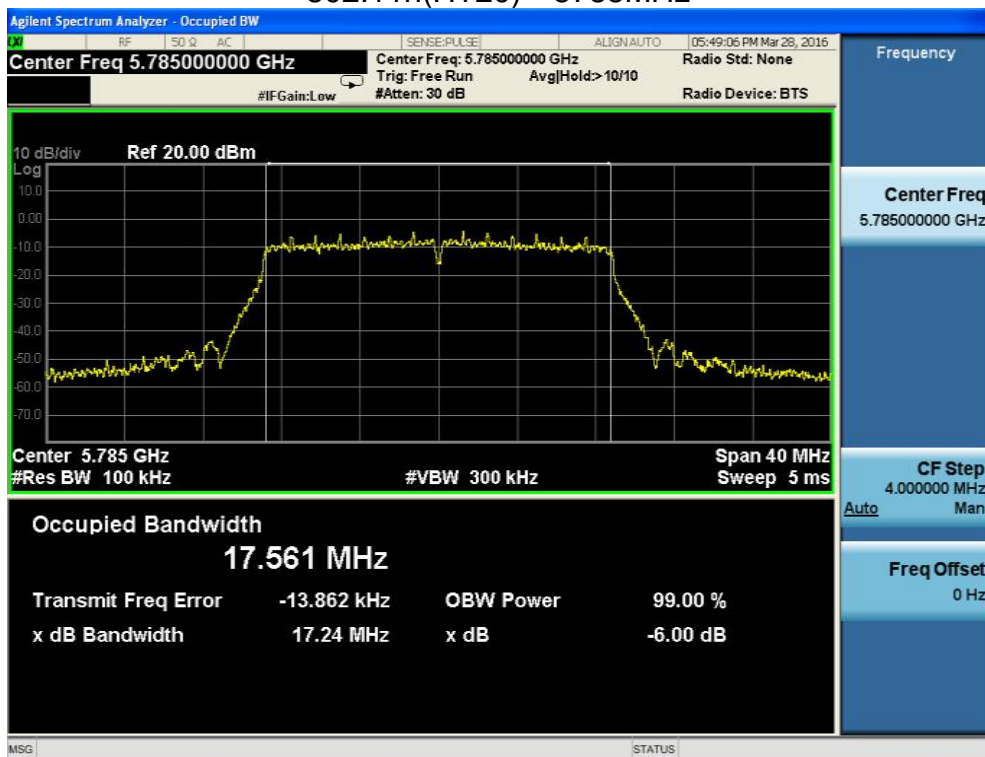


802.11n(HT20) 5745MHz

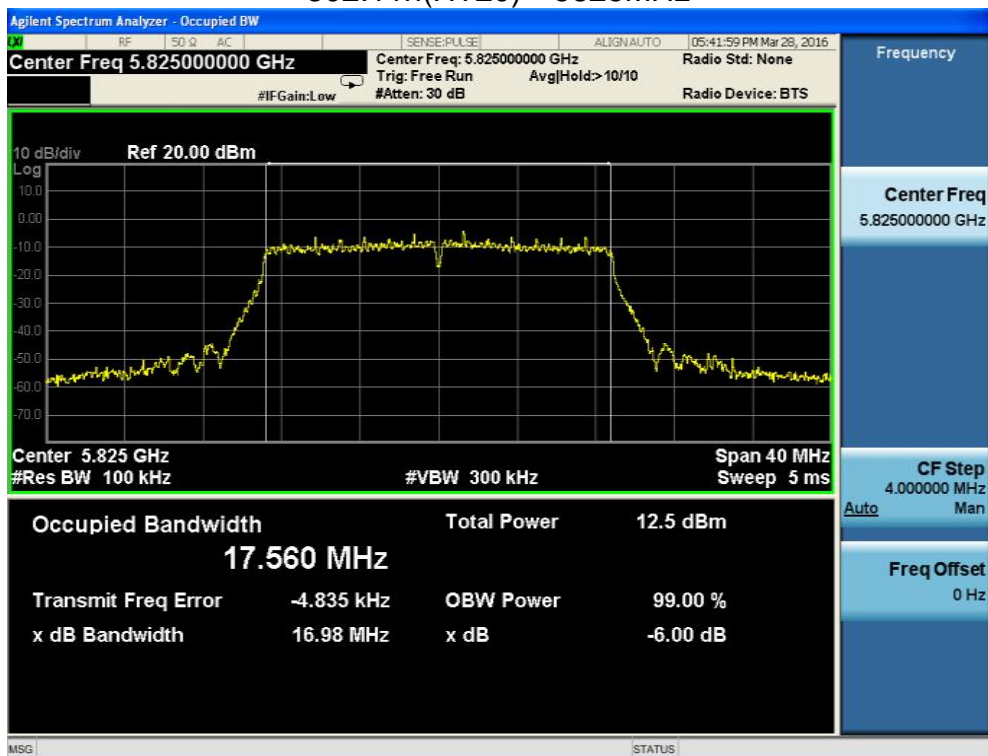




802.11n(HT20) 5785MHz



802.11n(HT20) 5825MHz



7. OUTPUT POWER TEST

7.1. Limits

Band 5.725-5.825GHz:

FCC: For the band 5.725-5.825 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

7.2. Test setup

1. The maximum average conducted output power can be measured using Method PM-G (Measurement using a gated RF average power meter):
2. Measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.
 - a. The Transmitter output (antenna port) was connected to the power meter.
 - b. Turn on the EUT and power meter and then record the power value.
 - c. Repeat above procedures on all channels needed to be tested.

7.3. Test result

	Frequency (MHz)	Average Output Power(dBm)		Average Output Power(mW)		Total Power (dBm)	FCC Limit (dBm)	Result
		Ant. A	Ant. B	Ant. A	Ant. B			
802.11a	5745	2.95	2.77	1.97	1.89	5.87	30.0	Pass
	5785	2.68	2.45	1.85	1.76	5.58	30.0	Pass
	5825	2.59	2.22	1.82	1.67	5.43	30.0	Pass
802.11n (HT20)	5745	2.75	2.56	1.88	1.80	5.66	30.0	Pass
	5785	2.65	2.60	1.84	1.82	5.63	30.0	Pass
	5825	2.27	2.35	1.69	1.72	5.33	30.0	Pass



8. PEAK POWER SPECTRAL DENSITY TEST

8.1. Limits

Band 5.725-5.825GHz:

In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band.

8.2. Test setup

Methods refer to FCC KDB 789033

- 1) Create an average power spectrum for the EUT operating mode being tested by following the instructions in section E)2) for measuring maximum conducted output power using a spectrum analyzer or EMI receiver: select the appropriate test method (SA-3, or alternatives to each) and apply it up to, but not including, the step labeled, "Compute power...".
- 2) Use the peak search function on the instrument to find the peak of the spectrum.
- 3) The result is the PPSD.
- 4) The above procedures make use of 1 MHz resolution bandwidth to satisfy the 1 MHz Measurement bandwidth specified in the 15.407(a)(5). That rule section also permits use of resolution bandwidths less than 1 MHz "provided that the measured power is integrated to show the total power over the measurement bandwidth" (i.e., 1 MHz). If measurements are performed using a reduced resolution bandwidth and integrated over 1 MHz bandwidth

8.3. Test data

Test data as below

	Frequency (MHz)	POWER SPECTRAL DENSITY (dBm)		FCC Limit (dBm)	Result
		Ant. A	Ant. B		
802.11a	5745	1.305	1.256	30.0	Pass
	5785	1.229	1.185	30.0	Pass
	5825	1.393	1.210	30.0	Pass
802.11n (HT20)	5745	-0.969	-1.265	30.0	Pass
	5785	-1.675	-2.018	30.0	Pass
	5825	-0.855	-1.867	30.0	Pass

Note: The data only show the antenna A plots.



802.11a 5745MHz



802.11a 5785MHz





802.11a 5825MHz



802.11n (HT20) 5745MHz



802.11n (HT20) 5785MHz



802.11n (HT20) 5825MHz





9. FREQUENCY STABILITY

9.1. LIMITS

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.

9.2. TEST SETUP

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.
6. Repeat step with the temperature chamber set to the lowest temperature.

9.3. TEST DATA

**Ant. A**

	Test Voltage	Test Temp.	Measured Frequency (MHz)	Spectrum Frequency (MHz)	Δ Frequency (MHz)
802.11a	4.255V	-20℃	5745.000	5745.0343	-0.0343
			5785.000	5785.0362	-0.0362
			5825.000	5825.0344	-0.0344
	3.145V		5745.000	5745.0296	-0.0296
			5785.000	5785.0347	-0.0347
			5825.000	5825.0414	-0.0414
	3.70V	25℃	5745.000	5745.0347	-0.0347
			5785.000	5785.0426	-0.0426
			5825.000	5825.0294	-0.0294
	4.255V	50℃	5745.000	5745.0612	-0.0612
			5785.000	5785.0418	-0.0418
			5825.000	5825.0615	-0.0615
	3.145V		5745.000	5745.0484	-0.0484
			5785.000	5785.0294	-0.0294
			5825.000	5825.0741	-0.0741

Ant. B

	Test Voltage	Test Temp.	Measured Frequency (MHz)	Spectrum Frequency (MHz)	Δ Frequency (MHz)
802.11a	4.255V	-20℃	5745.000	5745.0326	-0.0326
			5785.000	5785.0332	-0.0332
			5825.000	5825.0341	-0.0341
	3.145V		5745.000	5745.0264	-0.0264
			5785.000	5785.0343	-0.0343
			5825.000	5825.0428	-0.0428
	3.70V	25℃	5745.000	5745.0327	-0.0327
			5785.000	5785.0443	-0.0443
			5825.000	5825.0259	-0.0259
	4.255V	50℃	5745.000	5745.0642	-0.0642
			5785.000	5785.0461	-0.0461
			5825.000	5825.0642	-0.0642
	3.145V		5745.000	5745.0453	-0.0453
			5785.000	5785.0263	-0.0263
			5825.000	5825.0748	-0.0748



Ant. A

	Test Voltage	Test Temp.	Measured Frequency (MHz)	Spectrum Frequency (MHz)	Δ Frequency (MHz)
802.11n20	4.255V	-20℃	5745.000	5745.0673	-0.0673
			5785.000	5785.0249	-0.0249
			5825.000	5825.0336	-0.0336
	3.145V		5745.000	5745.0427	-0.0427
			5785.000	5785.0429	-0.0429
			5825.000	5825.0218	-0.0218
	3.70V	25℃	5745.000	5745.0617	-0.0617
			5785.000	5785.0347	-0.0347
			5825.000	5825.0518	-0.0518
	4.255V	50℃	5745.000	5745.0324	-0.0324
			5785.000	5785.0615	-0.0615
			5825.000	5825.0287	-0.0287
	3.145V		5745.000	5745.0388	-0.0388
			5785.000	5785.0268	-0.0268
			5825.000	5825.0337	-0.0337

Ant. B

	Test Voltage	Test Temp.	Measured Frequency (MHz)	Spectrum Frequency (MHz)	Δ Frequency (MHz)
802.11n20	4.255V	-20℃	5745.000	5745.0654	-0.0654
			5785.000	5785.0236	-0.0236
			5825.000	5825.0343	-0.0343
	3.145V		5745.000	5745.0434	-0.0434
			5785.000	5785.0426	-0.0426
			5825.000	5825.0227	-0.0227
	3.70V	25℃	5745.000	5745.0665	-0.0665
			5785.000	5785.0324	-0.0324
			5825.000	5825.0526	-0.0526
	4.255V	50℃	5745.000	5745.0352	-0.0352
			5785.000	5785.0674	-0.0674
			5825.000	5825.0226	-0.0226
	3.145V		5745.000	5745.0357	-0.0357
			5785.000	5785.0253	-0.0253
			5825.000	5825.0362	-0.0362



10. ANTENNA REQUIREMENT

10.1. STANDARD REQUIREMENT

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

10.2. EUT ANTENNA

The EUT antenna is Internal antenna. It complies with the standard requirement.

11. PHOTOGRAPHS OF TEST SET-UP

Radiated Measurement Photos



Radiated Measurement Photos



Conducted Measurement Photos



12. PHOTOGRAPHS OF THE EUT



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