ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART E AND INDUSTRY CANADA RSS 247 REQUIREMENT

OF

FCC Applicant:	Barco NV Barco NV President Kennedypark35, 8500 Kortrijk, Belgium
IC Applicant:	Barco NV Barco NV President Kennedypark35, 8500 Kortrijk, Belgium
Product Name:	ClickShare Button
Brand Name:	Barco
Model No.:	R9861500D01, R9861500D01C
Model Difference:	Difference in cable connector
Report Number:	T190516W02-RP1
FCC ID:	2AAED-R9861500D01
IC:	9393B-R9861500D01
FCC Rule Part:	§15.407, Cat:NII
IC Rule:	RSS-247 issue 2 Feb. 2017
Issue Date:	Aug. 29, 2019
Date of Test:	May 20, 2019 ~ May 25, 2019
Date of EUT Received:	May 20, 2019

Note: *The test Result was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were given in ANSI C63.10: 2013 and compliance standards.*
The test results of this report relate only to the tested sample (EUT) identified in this report.
The test Report of full or partial shall not copy. Without written approval of Compliance Certification Services Inc. (Wugu Laboratory).

Tested By: Hone Hsieh

Hone Hsieh / Engineer

Approved By: Kevin Tsai

Kevin Tsai / Deputy Manager

TAF Testing Laboratory 1309

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Revision History

Report Number	Revision	Description	Effected Page	Issue Date	Revised By
T190516W02-RP1	Rev.00	Initial creation of document	All	Aug. 29, 2019	Elle Chang

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1 GENERAL INFORMATION

1.1 Product Description

Product Name:	ClickShare Button
Brand Name:	Barco
Model No.:	R9861500D01, R9861500D01C
Model Difference:	Difference in cable connector
Hardware Version:	N/A
Software Version:	N/A
Power Supply:	5Vdc from USB port
Modulation type	64QAM, 16QAM, QPSK, BPSK for OFDM 256QAM for OFDM in 802.11ac only
Transition Rate:	802.11 a: 6/9/12/18/24/36/48/54 Mbps 802.11 n_20MHz: 6.5 – 72.2Mbps 802.11 ac_20MHz: 6.5 –86.7Mbps

1.2 Antenna Designation

Antenna Type	Supplier	Antenna Part No.	Freq. (MHz)	Peak Antenna Gain (dBi)
Chip	FR05-S1-NO-1-004	FRACTUS S.A.	5250~5350	**4.9**
			5470~5725	**4.9**

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FCC WLAN 5GHz:

Wi-Fi	Frequency Range	Channels	Avg. Power (dBm)	Modulation Technology
11a_20	5250~5350	4	10.03	OFDM
	5470~5725	12	10.76	
11n_HT / ac_VHT 20M	5250~5350	4	HT: 9.77	
	5470~5725	12	HT: 10.19	

IC WLAN 5GHz:

Wi-Fi	Frequency Range	Channels	Avg. or EIRP	Rated Power(dBm) (Worst Case)	Modulation Technology
11a	5250~5350	4	Avg.	10.03	OFDM
	5470~5725	12	Avg.	10.76	
11n_HT / ac_VHT 20M	5250~5350	4	Avg.	HT: 9.77	
	5470~5725	12	Avg.	HT: 10.19	

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1.3 Test Methodology of Applied Standards

FCC Part 15, Subpart E §15.407

FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

RSS-247 issue 2 Feb. 2017

RSS-Gen. issue 5 Apr. 2018

ANSI C63.10:2013

Note: All test items have been performed and record as per the above standards.

1.4 Test Facility

Compliance Certification Services Inc. Wugu Lab. No.11, Wugong 6th Rd.,

Wugu Dist., New Taipei City 24891, Taiwan. (R.O.C.) (TAF code 1109)

FCC Designation number: TW1309

Canada Registration number: 2324G

1.5 Special Accessories

There are no special accessories used while test was conducted.

1.6 Equipment Modifications

There was no modification incorporated into the EUT.

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2 SYSTEM TEST CONFIGURATION

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

An engineering test mode (software/firmware) that applicant provided was utilized to manipulate the EUT into transmit, selection of the test channel, and modulation scheme.

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is a placed on a table which is 0.8 m above ground plane. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz. The CISPR Quasi-Peak and Average detector mode is employed according to §15.207. The two LISNs provide 50uH/50 ohm of coupling impedance for the measuring instrument. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

2.3.2 Conducted Test (RF)

The active antenna port of the unlicensed wireless device is connected to the spectrum analyzer with attenuator to protect the instrumentation. If a second antenna port is available, it is tested at one operating frequency, with other port(s) appropriately terminated, to verify it has similar output characteristics as the fully tested port.

2.3.3 Radiated Emissions

The EUT is a placed on a turn table. For emissions testing at or below 1 GHz, the table height shall be 0.8 m above the reference ground plane. For emission measurements above 1 GHz, the table height shall be 1.5 m. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made “while keeping the antenna in the ‘cone of radiation’ from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response.” is still within the 3dB illumination BW of the measurement antenna.

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2.4 Measurement Results Explanation

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuation factor between EUT conducted port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly EUT RF output level.

2.5 Configuration of Tested System

Fig. 2-1 Radiated Emission Configuration

Fig.2-3 Conducted Emission (Antenna Port) Configuration

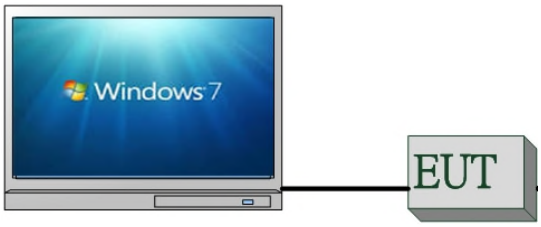

Fig. 2-2 Conducted Emission (AC Power Line) Configuration

Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1	WLAN Test Software	N/A	N/A	N/A	N/A	N/A
2	Notebook	Lenovo	T420	S0012483	Shielded	Un-shielded

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3 SUMMARY OF TEST RESULT

FCC Rules	IC Rules	Description Of Test	Result
§15.207	RSS-Gen §8.8	AC Power Line Conducted Emission	Compliant
§15.403(i) §15.407(e)	RSS-247 §6.2.1~ 4 (1) RSS-Gen §6.7	26 dB & 6dB & 99% Emission Bandwidth	Compliant
§15.407(a)	RSS-247 §6.2.1~ 4 (1)	Maximum Conducted Output Power	Compliant
§15.407(a)	RSS-247 §6.2.1~ 4 (1)	Power Spectral Density	Compliant
§15.205 §15.209 §15.407(b)	RSS-247 §6.2.1~ 4 (2)	Undesirable Radiated Emissions	Compliant
§15.407(c)	RSS-247 §6.4	Transmission in case of Absence of Information	Compliant
§15.407(g)	RSS-Gen §6.11	Frequency Stability	Compliant
§15.203 §15.407(a)	RSS- Gen §6.7 RSS- Gen §8.3	Antenna Requirement	Compliant

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4 DESCRIPTION OF TEST MODES

4.1 Operated in U-NII Bands

Operated band in 5250 MHz ~5350 MHz:

802.11a / n HT20 Mode, 802.11ac VHT20 Mode	
channel	Frequency
52	5260
56	5280
60	5300
64	5320

Operated band in 5470 MHz ~5725 MHz:

802.11a / n HT20 Mode, 802.11ac VHT20 Mode	
Channel	Frequency
100	5500
104	5520
108	5540
112	5560
116	5580
120	5600
124	5620
128	5640
132	5660
136	5680
140	5700

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4.2 The Worst Test Modes and Channel Details

1. The EUT has been tested under operating condition.
2. Test program used to control the EUT for staying in continuous transmitting mode is programmed.
3. Investigation has been done on all the possible configurations for searching the worst case.
   The gevin UE is pre-scanned among below modes.

Modulation	Transmission Chain				Multiple Transmission Spatial
☒ 802.11 a	☒ Ch0	☒ Ch1	☐ Ch2	☐ Ch3	☐ 2TX
☒ 802.11 n	☒ Ch0	☒ Ch1	☐ Ch2	☐ Ch3	☐ MIMO
☒ 802.11 ac	☒ Ch0	☒ Ch1	☐ Ch2	☐ Ch3	☐ MIMO

4. Therefore, below summary is the modes of test configuration that yield the highest reading and generate the highest emission chosen to carry out the relevantly mandatory test items.

RADIATED EMISSION TEST:

RADIATED EMISSION TEST (BELOW 1 GHz)						
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11a	5260~5320	52 to 64	52,60,64	OFDM	6	Ch1
802.11a	5500~5720	100 to 140	100,116,140	OFDM	6	Ch1
RADIATED EMISSION TEST (ABOVE 1 GHz)						
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11a	5260~5320	52 to 64	52,60,64	OFDM	6	Ch1
802.11ac_VHT20				OFDM	MCS0	Ch1
802.11a	5500~5720	100 to 144	100, 116, 140	OFDM	6	Ch1
802.11ac_VHT20				OFDM	MCS0	Ch1

Note:
The field strength of radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for 802.11a/n/ac WLAN Transmitter for channel Low, Mid and High, the worst case E1 position was reported.

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ANTENNA PORT CONDUCTED MEASUREMENT:

CONDUCTED TEST						
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11a	5260~5320	52 to 64	52,60,64	OFDM	6	Ch1
802.11n_HT20				OFDM	MCS0	Ch1
802.11ac_VHT20					MCS0	
802.11a	5500~5700	100 to 140	100,116,140	OFDM	6	Ch1
802.11n_HT20				OFDM	MCS0	Ch1
802.11ac_VHT20					MCS0	

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5 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
AC Powerline Conducted Emission	+/- 1.2575
Emission bandwidth, 20dB bandwidth	+/- 0.0014
RF output power, conducted	+/- 1.14
Power density, conducted	+/- 1.40
3M Semi Anechoic Chamber / 30M~200M	+/- 4.12
3M Semi Anechoic Chamber / 200M~1000M	+/- 4.68
3M Semi Anechoic Chamber / 1G~8G	+/- 5.18
3M Semi Anechoic Chamber / 8G~18G	+/- 5.47
3M Semi Anechoic Chamber / 18G~26G	+/- 3.81
3M Semi Anechoic Chamber / 26G~40G	+/- 3.87

Note:

1. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
2. Determination of compliance is based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

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6 CONDUCTED EMISSION TEST

6.1 Standard Applicable

Frequency range within 150 kHz to 30 MHz shall not exceed the Limit table as below.

Frequency range MHz	Limits dB(uV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50
Note 1.The lower limit shall apply at the transition frequencies 2.The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.		

6.2 Measurement Equipment Used

Conducted Emission Test Site					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
CABLE	EMCI	CFD300-NL	CERF	06/29/2018	06/28/2019
EMI Test Receiver	R&S	ESCI	100064	07/24/2018	07/23/2019
LISN	SCHWARZBECK	NSLK 8127	8127-541	01/31/2019	01/30/2020
LISN	SCHAFFNER	NNB 41	03/10013	02/13/2019	02/12/2020
Software	EZ-EMC(CCS-3A1-CE)				

6.3 EUT Setup

1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.10:2013.
2. The AC/DC Power adaptor of EUT was plug-in LISN. The rear of the EUT and peripherals were placed flushed with the rear of the tabletop.
3. The LISN was connected with 120Vac/60Hz power source.

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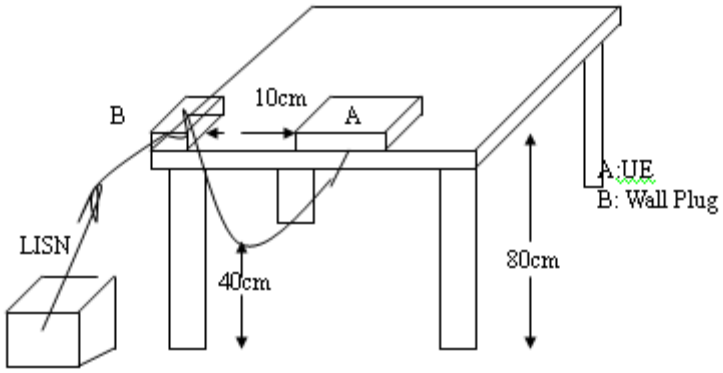
6.4 Test SET-UP



6.5 Measurement Procedure

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all phases of power being supplied by given UE are completed.

6.6 Measurement Result

Note: Refer to next page for measurement data and plots.

Note2: The * reveals the worst-case results that closet to the limit.

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AC POWER LINE CONDUCTED EMISSION TEST DATA

Description:	**Operation**	**Date:**	**2019/5/27**
Line:	**L1**	**Temp.(℃)/Hum.(%):**	**22.7(℃)/69%**
Test Voltage:	**AC 120V/60Hz**	**Test By:**	**Henry**

No.	Frequency	Quasi-Peak reading	Average reading	Correction factor	Quasi-Peak result	Average result	Quasi-Peak limit	Average limit	Quasi-Peak margin	Average margin	Remark
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	
1*	0.1500	52.96	37.83	0.16	53.12	37.99	66.00	56.00	-12.88	-18.01	Pass
2	0.1660	48.85	34.92	0.16	49.01	35.08	65.16	55.16	-16.15	-20.08	Pass
3	0.1820	49.43	33.31	0.15	49.58	33.46	64.39	54.39	-14.81	-20.93	Pass
4	0.1980	43.34	29.48	0.15	43.49	29.63	63.69	53.69	-20.20	-24.06	Pass
5	0.2180	39.74	28.88	0.15	39.89	29.03	62.89	52.89	-23.00	-23.86	Pass
6	3.8900	33.02	21.13	0.27	33.29	21.40	56.00	46.00	-22.71	-24.60	Pass

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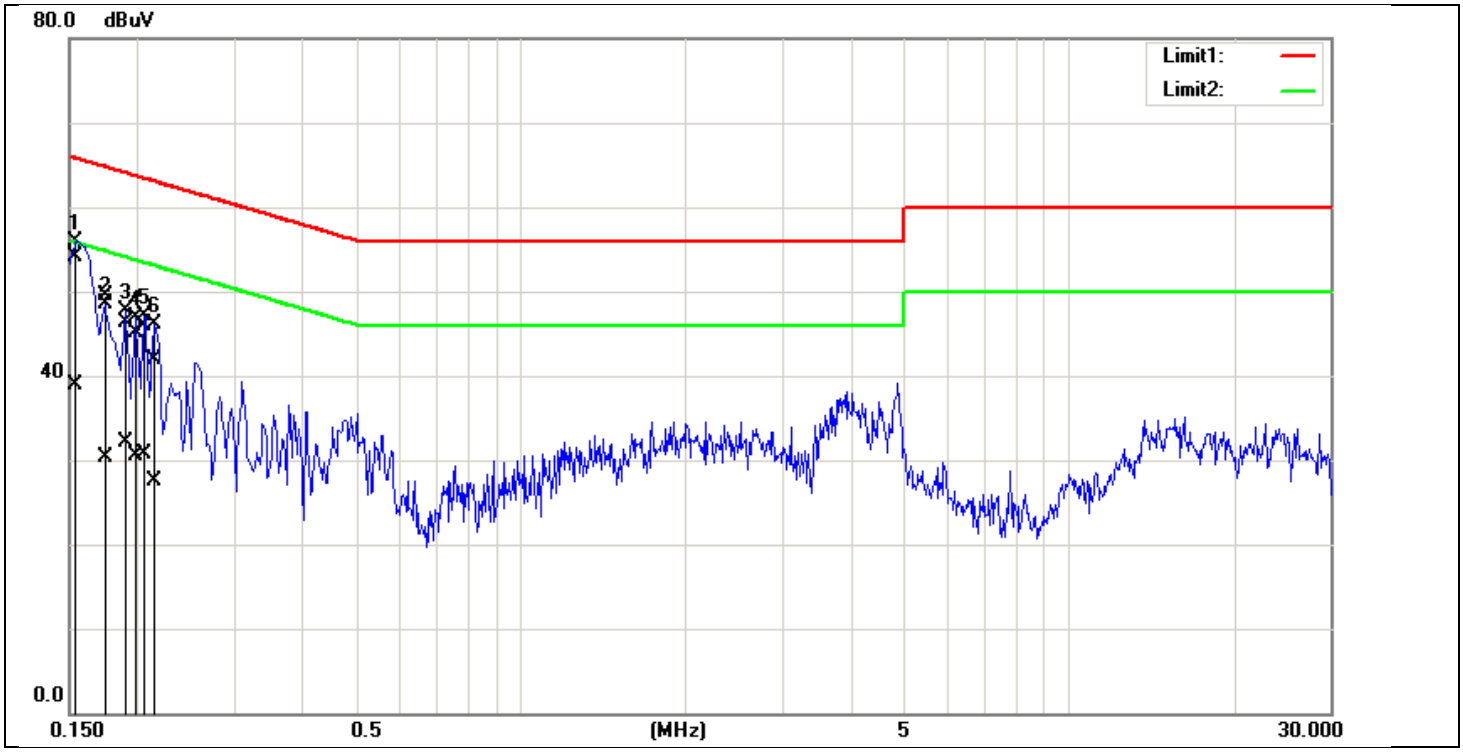
Description:	**Operation**	**Date:**	**2019/5/27**
Line:	**N**	**Temp.(℃)/Hum.(%):**	**22.7(℃)/69%**
Test Voltage:	**AC 120V/60Hz**	**Test By:**	**Henry**



No.	Frequency	Quasi-Peak reading	Average reading	Correction factor	Quasi-Peak result	Average result	Quasi-Peak limit	Average limit	Quasi-Peak margin	Average margin	Remark
	(MHz)	(dBuV)	(dBuV)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dBuV)	(dB)	(dB)	
1*	0.1539	54.02	38.81	0.10	54.12	38.91	65.78	55.79	-11.66	-16.88	Pass
2	0.1740	49.45	30.15	0.10	49.55	30.25	64.76	54.77	-15.21	-24.52	Pass
3	0.1900	46.23	32.00	0.10	46.33	32.10	64.03	54.04	-17.70	-21.94	Pass
4	0.1980	44.99	30.46	0.10	45.09	30.56	63.69	53.69	-18.60	-23.13	Pass
5	0.2060	45.82	30.63	0.10	45.92	30.73	63.36	53.37	-17.44	-22.64	Pass
6	0.2140	41.88	27.35	0.10	41.98	27.45	63.04	53.05	-21.06	-25.60	Pass

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7 DUTY CYCLE TEST SIGNAL

Pre-analysis Check: While conducting average power measurement, duty cycle of each mode shall be checked to ensure its duty cycle in order to compensate for the loss due to insufficient ratio of duty cycle. All duty cycle is pre-scanned, and result as obtained below shows only the most representative ones where duty cycle is conducted as the given transmission with given virtual operation that expresses the percentage.

Formula:

Duty Cycle = Ton / (Ton+Toff)

Measurement Procedure:

1. Set span = Zero
2. RBW = 8MHz
3. VBW = 8MHz,
4. Detector = Peak

Duty Cycle:

Mode	Duty Cycle (%)	Duty Factor (dB) =10*log (1/Duty Cycle)	1/T (kHz)	VBW setting (kHz)
802.11a	100.00	0.00	0.00	0.01
802.11n_20	100.00	0.00	0.00	0.01

Duty Cycle Factor: 10 * log(1/1) = 0
Duty Cycle Factor: 10 * log(1/1) = 0

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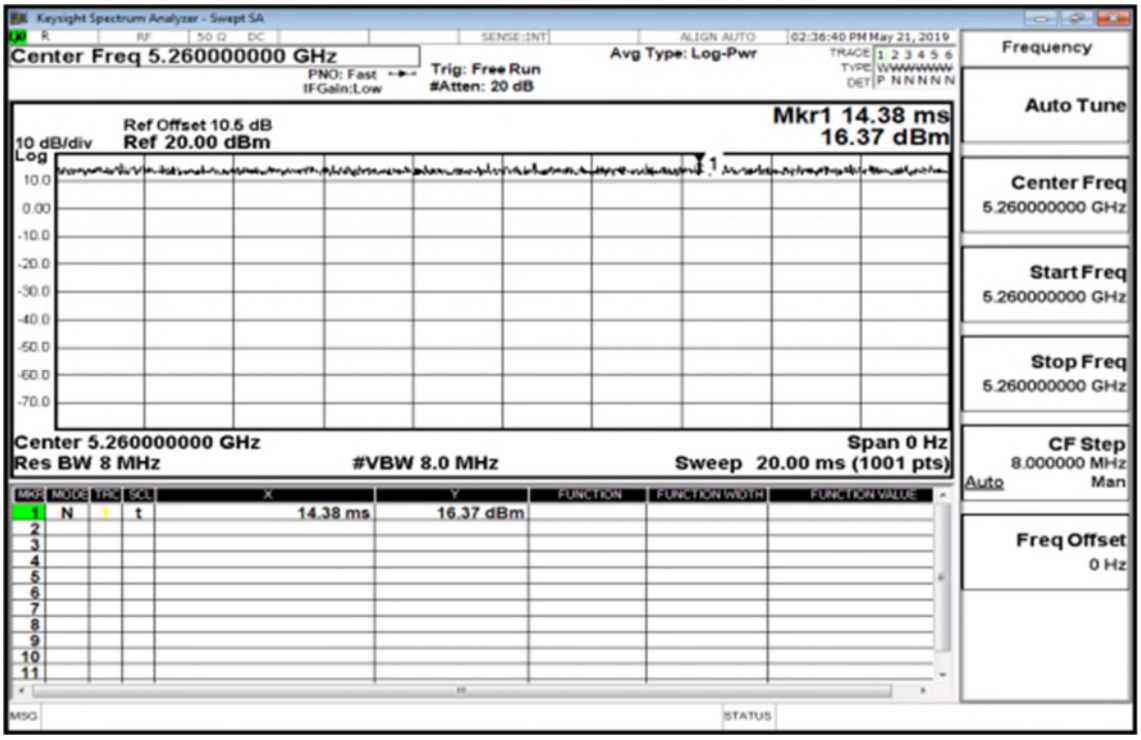
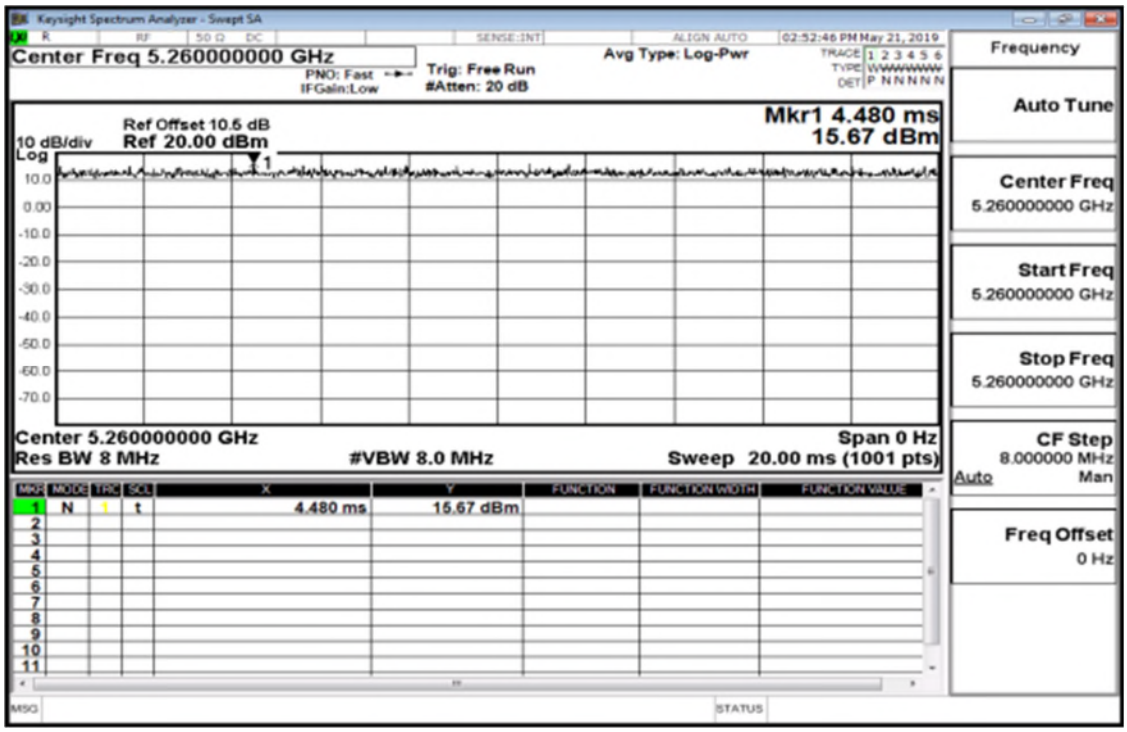
DUTY CYCLE TEST SIGNAL Measurement Result

802.11a



802.11n_HT 20



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8 26DB & 6DB EMISSION BANDWIDTH MEASUREMENT

8.1 Standard Applicable

There is no limit bandwidth for U-NII-1, U-NII-2-A and U-NII-2-C.

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

8.2 Measurement Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules .
3. Remove the antenna from the EUT and then connect a low loss RF cable from the Antenna port to the spectrum analyzer.
   a. 26dB Band width Measurement: Set the spectrum analyzer as 1% of emission BW Sweep=auto, Detector = Peak, Trace Mode = Max Hold, Manually readjust RBW until the RBW/EBW ratio is 1% based on EBW as observed on the result of pre-sequence measurement.
   b. Mark the peak frequency and –26dB (upper and lower) frequency.
4. Repeat the procedures as list above until all test default channels (low, middle, and high) are completed.
5. Minimum Emission Bandwidth for the band 5.725-5.850GHz.
   a. Set the spectrum analyzer as RBW = 100 kHz, VBW = 3*RBW, Span = 30M/50MHz, Detector=Peak, Sweep=auto
   b. Mark the peak frequency and –6dB (upper and lower) frequency.
6. For 99% Bandwidth:

   Set the spectrum analyzer as RBW=1%, VBW = 3*RBW, Span = 30M/50MHz, Detector=Sample, Sweep=auto.
7. Turn on the 99% bandwidth function, max reading.
8. Repeat above procedures until all frequency of interest measured was complete.

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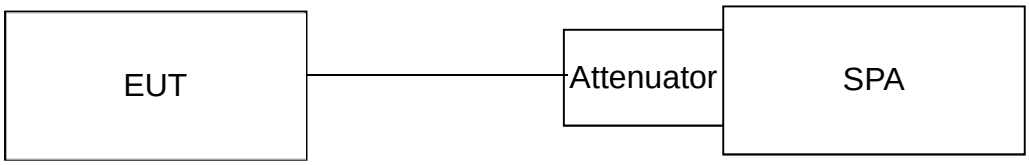
8.3 Measurement Equipment Used

SGS Conducted Room					
Name of Equip-ment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Date**	**Calibration Due**
Spectrum Analyzer	Agilent	N9010A	MY53400256	11/21/2018	11/20/2019
DC Block	PASTERNACK	PE8210	RF29	02/26/2019	02/25/2020
Attenuator	Marvelous	MVE2213-10	RF80	02/26/2019	02/25/2020

8.4 Test Set-up



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8.5 Measurement Result

26dB and 6dB Bandwidth

802.11a_Ch0

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5260	31.41	14.971
5300	31.15	14.935
5320	29.28	14.666
5500	34.64	15.396
5580	34.48	15.376
5700	34.11	15.329

802.11a_Ch1

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5260	36.81	15.660
5300	33.67	15.272
5320	31.26	14.950
5500	32.85	15.165
5580	31.14	14.933
5700	35.61	15.516

802.11n_HT20_Ch0

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5260	33.13	15.202
5300	34.66	15.398
5320	33.71	15.278
5500	36.16	15.582
5580	38.25	15.826
5700	38.18	15.818

802.11n_HT20_Ch1

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5260	35.44	15.495
5300	35.21	15.467
5320	35.13	15.457
5500	35.78	15.536
5580	36.37	15.607
5700	37.38	15.726

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99% Bandwidth

802.11a_Ch0

Frequency (MHz)	99% BW (MHz)	10 Log (B) (dB)
5260	17.268	12.372
5300	17.278	12.375
5320	17.251	12.368
5500	17.181	12.350
5580	17.248	12.367
5700	17.187	12.352

802.11a_Ch1

Frequency (MHz)	99% BW (MHz)	10 Log (B) (dB)
5260	17.265	12.372
5300	17.365	12.397
5320	17.457	12.420
5500	17.181	12.350
5580	17.324	12.386
5700	17.321	12.386

802.11n_HT20_Ch0

Frequency (MHz)	99% BW (MHz)	10 Log (B) (dB)
5260	18.202	12.601
5300	18.245	12.611
5320	18.268	12.617
5500	18.23	12.608
5580	18.062	12.568
5700	18.102	12.577

802.11n_HT20_Ch1

Frequency (MHz)	99% BW (MHz)	10 Log (B) (dB)
5260	18.248	12.612
5300	18.195	12.600
5320	18.318	12.629
5500	18.109	12.579
5580	18.061	12.567
5700	18.065	12.568

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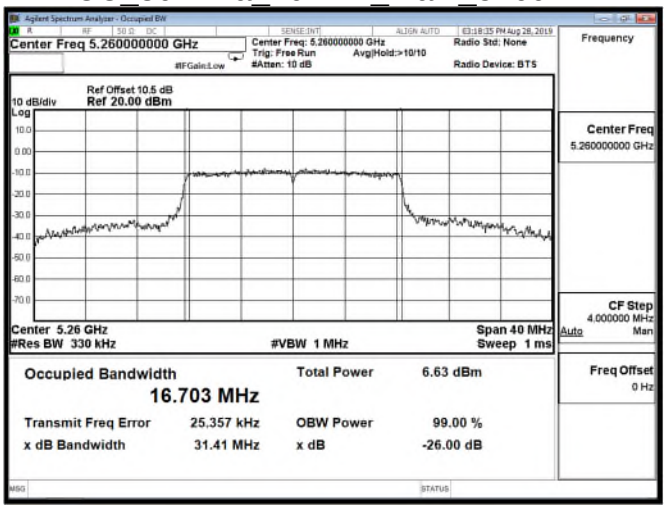
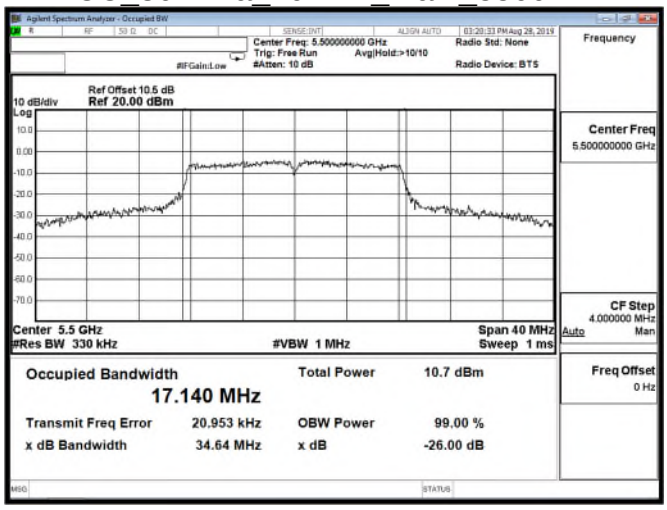
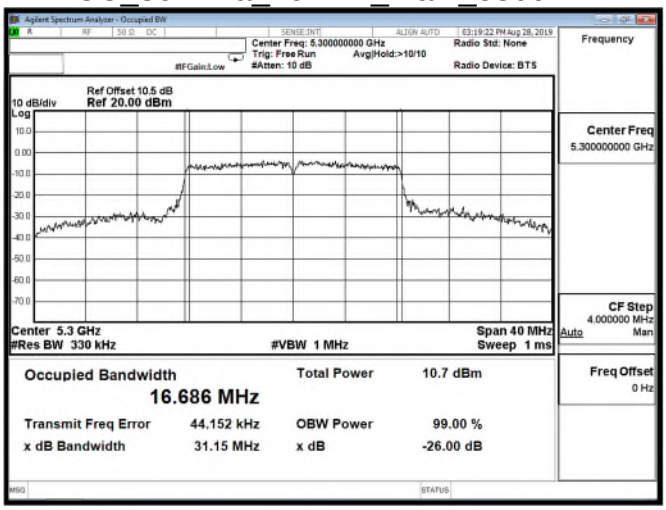


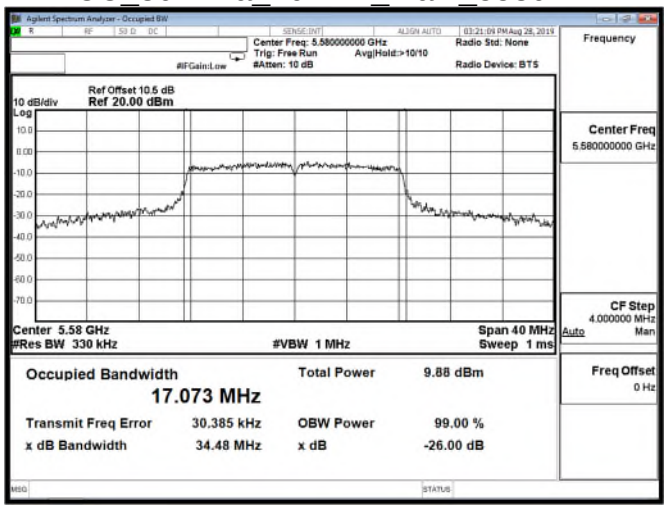
FCC_802.11a_20MHz_Main_5500MHz



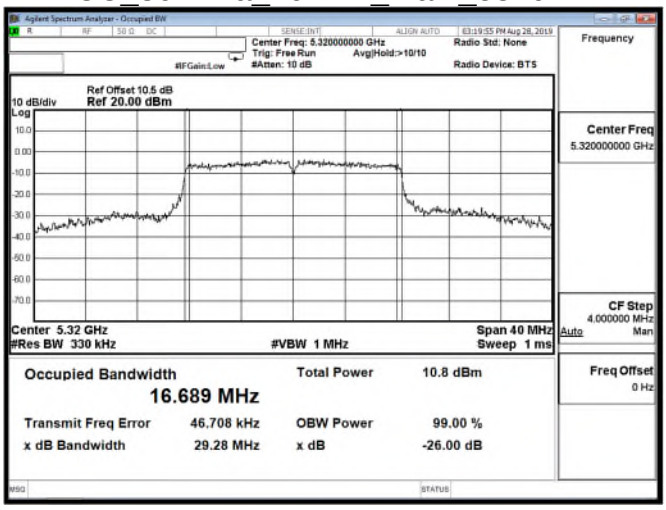
FCC_802.11a_20MHz_Main_5300MHz



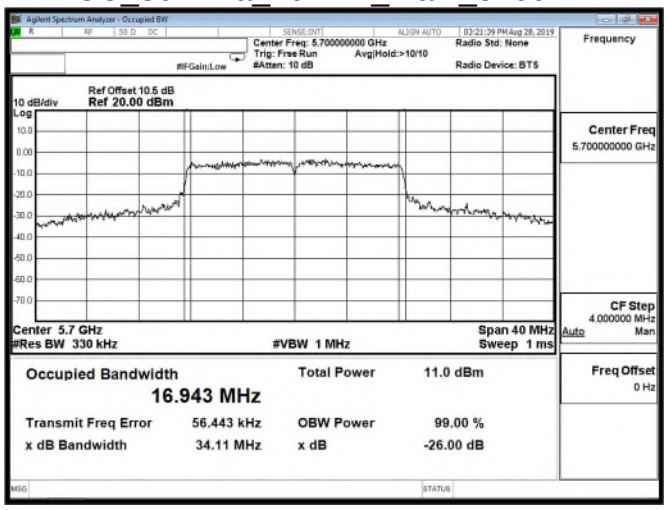
FCC_802.11a_20MHz_Main_5580MHz



FCC_802.11a_20MHz_Main_5320MHz



FCC_802.11a_20MHz_Main_5700MHz



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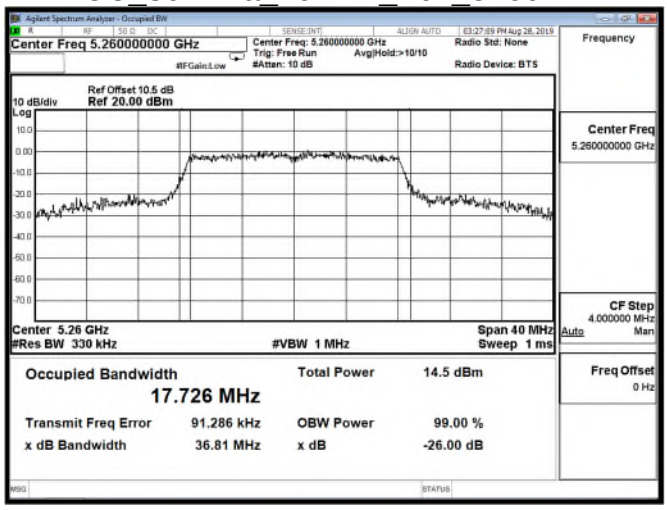
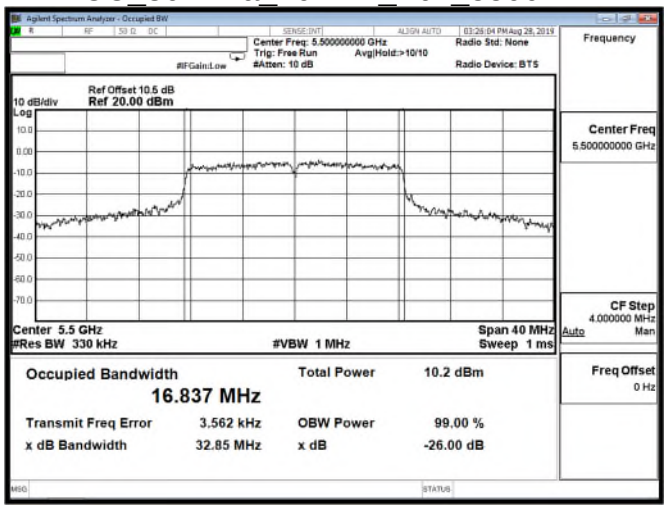
FCC_802.11a_20MHz_Aux_5260MHz



FCC_802.11a_20MHz_Aux_5500MHz



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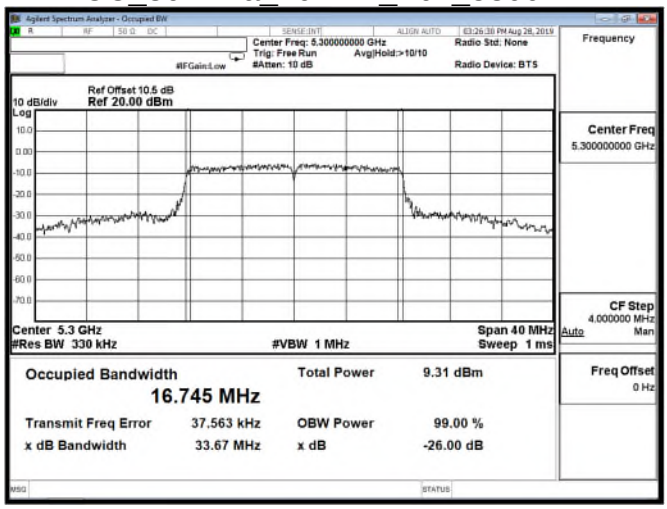
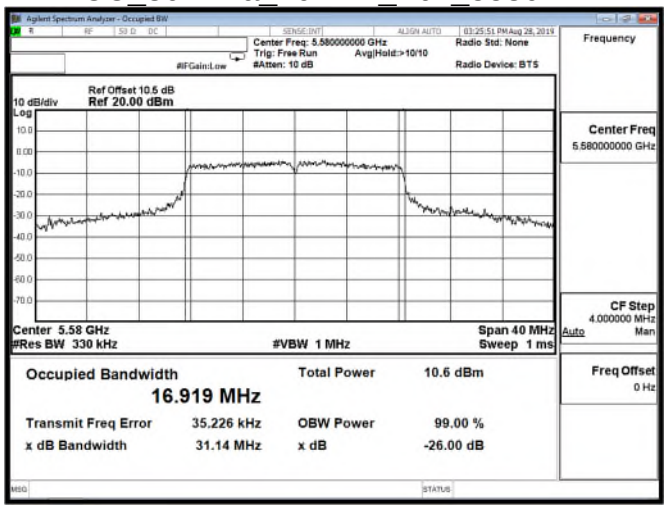


FCC_802.11a_20MHz_Aux_5580MHz



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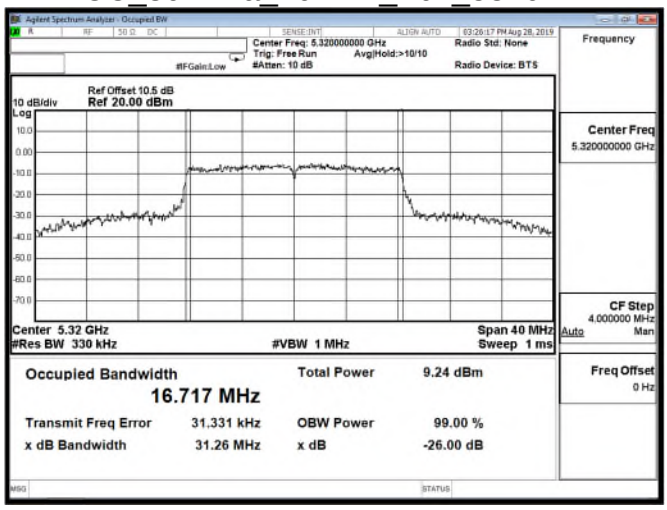
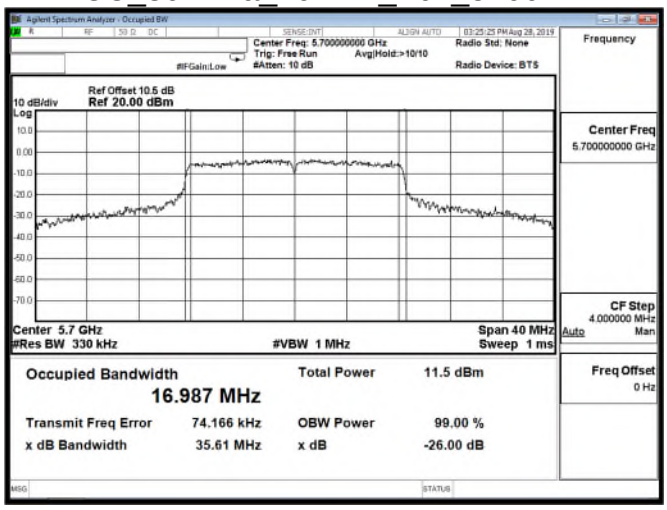


FCC_802.11a_20MHz_Aux_5700MHz



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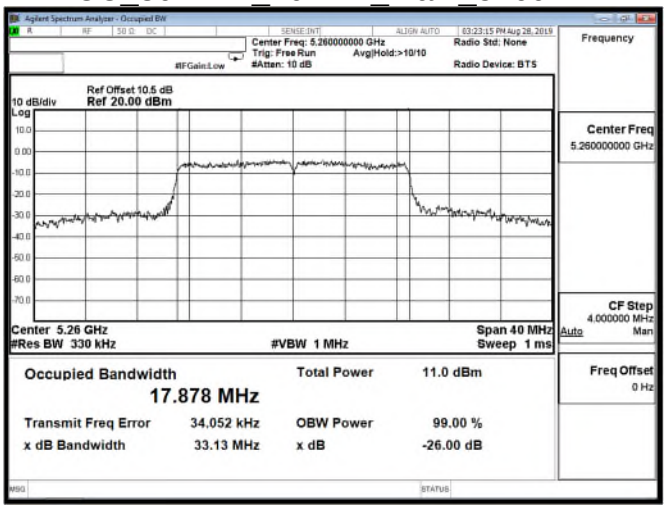
FCC_802.11n_20MHz_Main_5260MHz



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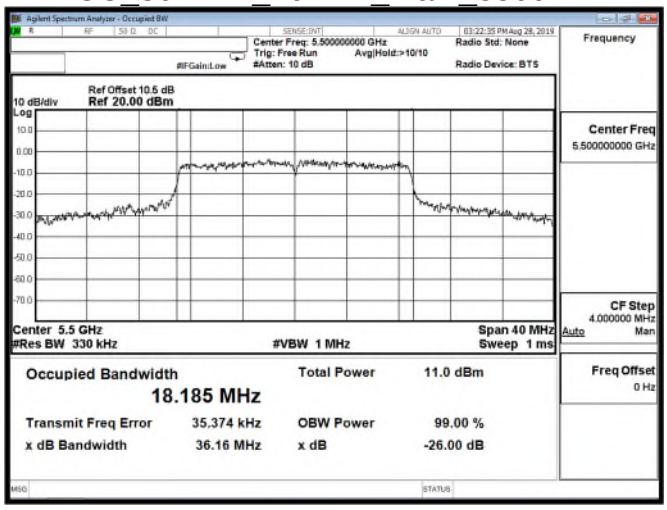
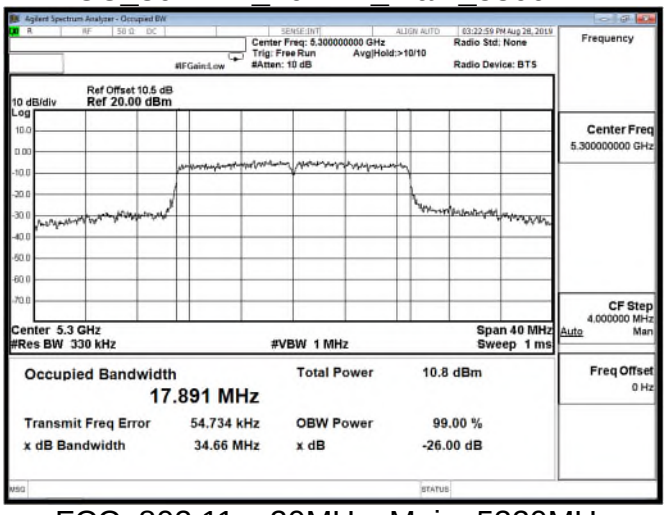


FCC_802.11n_20MHz_Main_5300MHz



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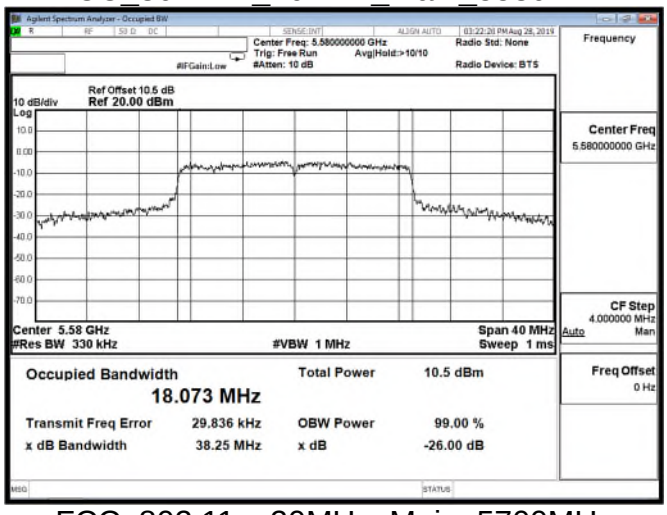

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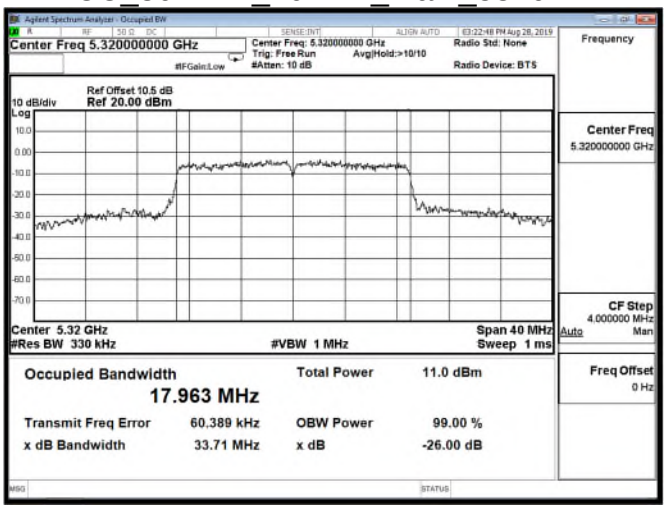

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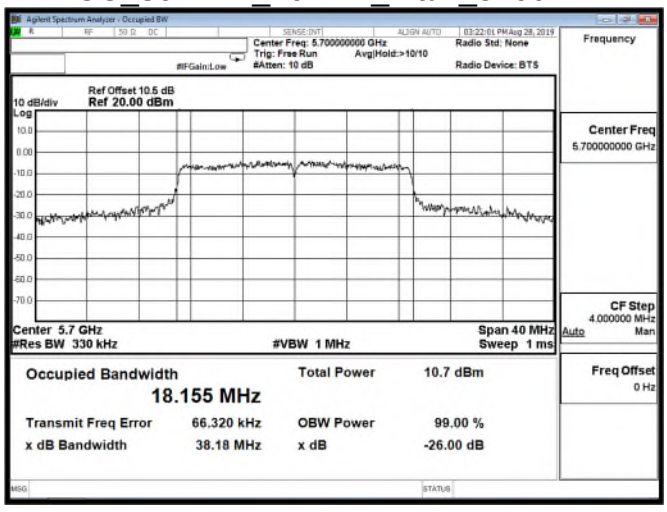

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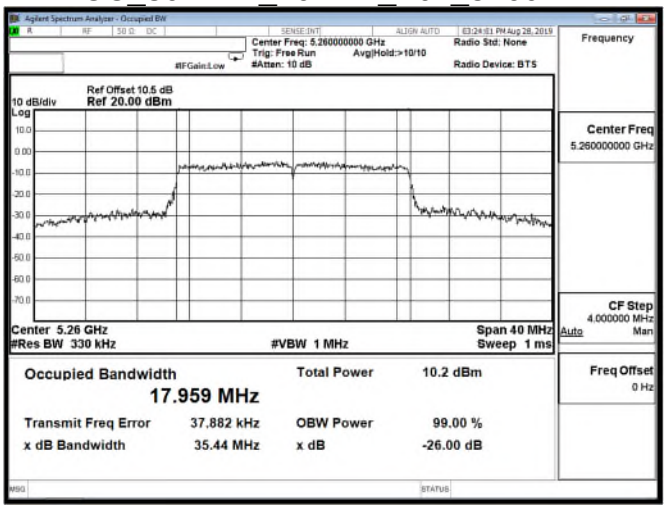
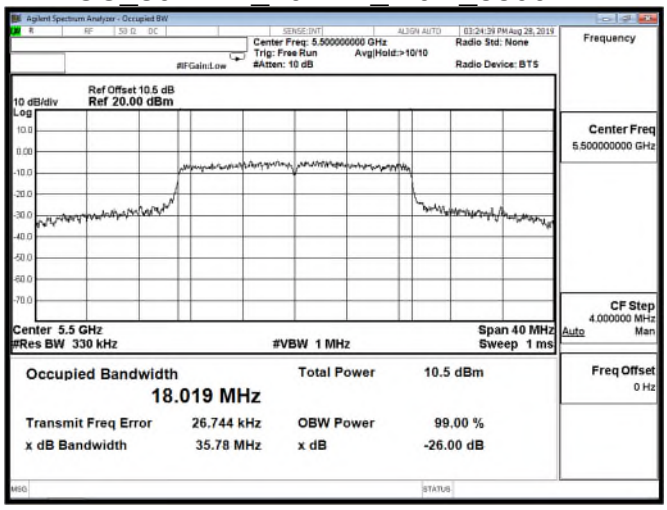
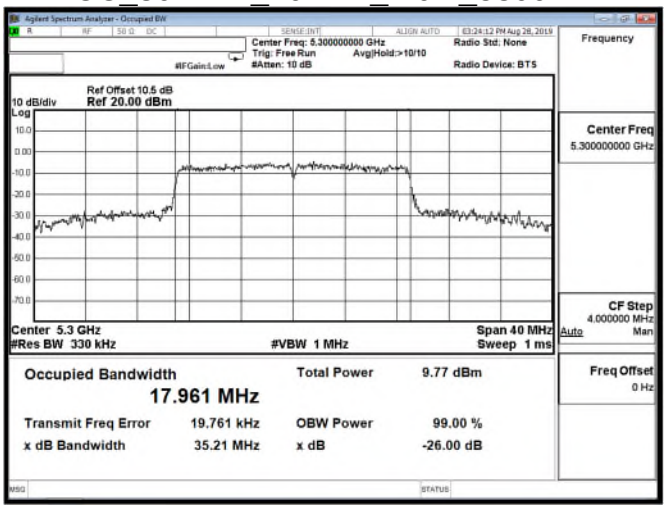
FCC_802.11n_20MHz_Aux_5260MHz



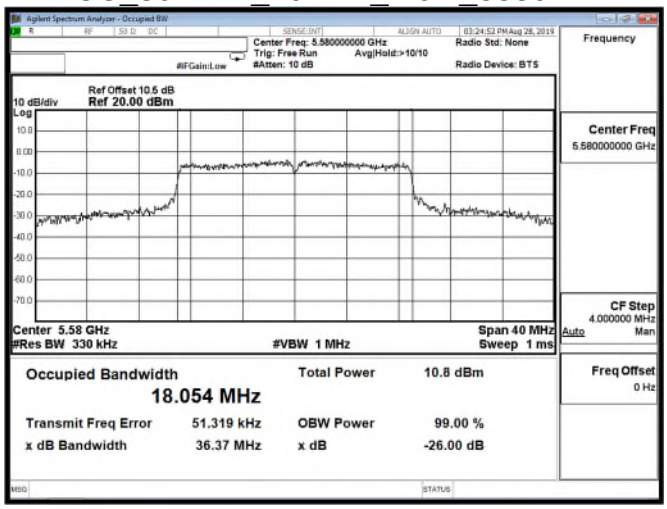
FCC_802.11n_20MHz_Aux_5500MHz



FCC_802.11n_20MHz_Aux_5300MHz



FCC_802.11n_20MHz_Aux_5580MHz



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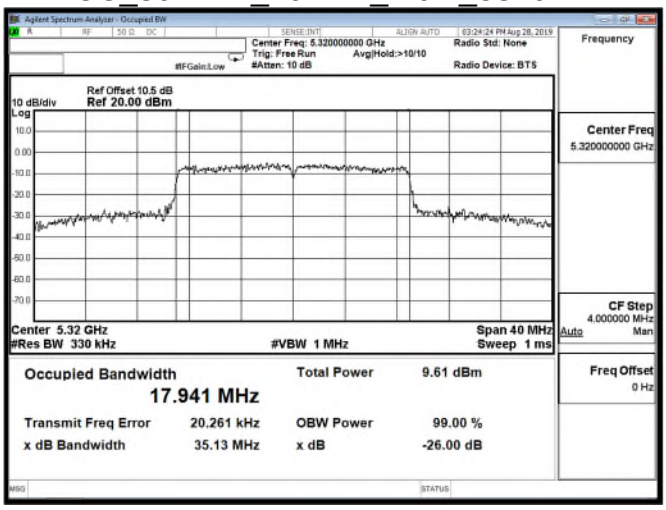
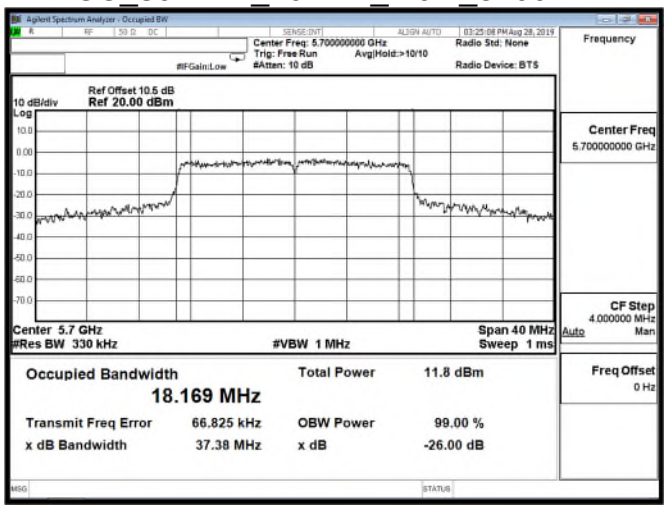


FCC_802.11n_20MHz_Aux_5700MHz



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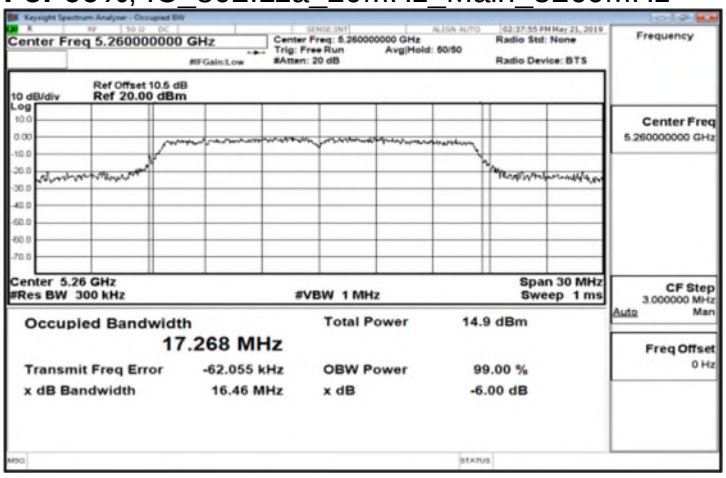
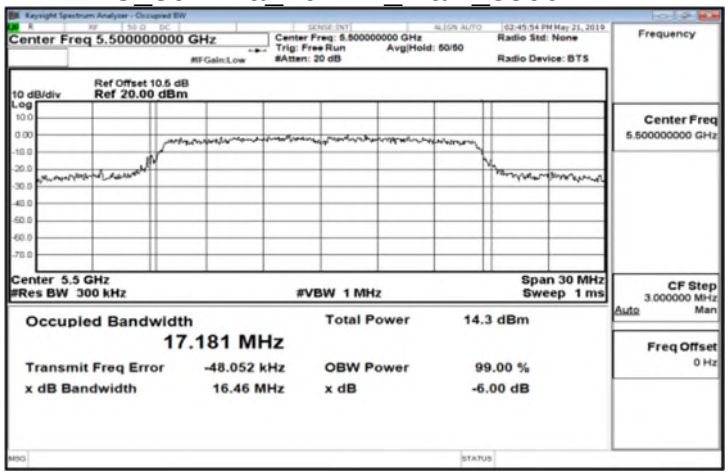
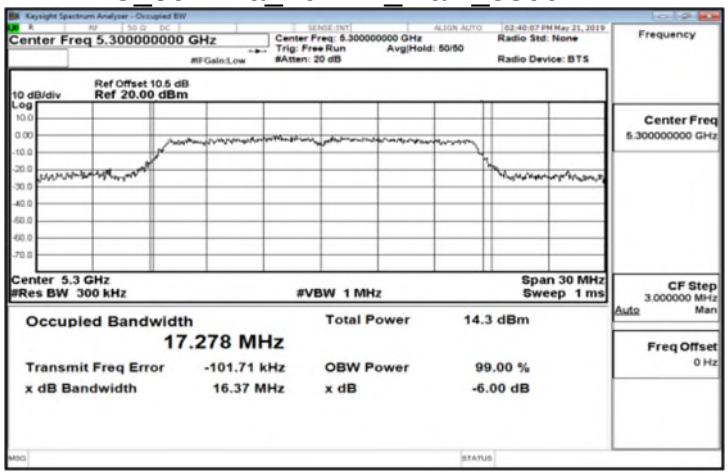
For 99%, IC_802.11a_20MHz_Main_5260MHz



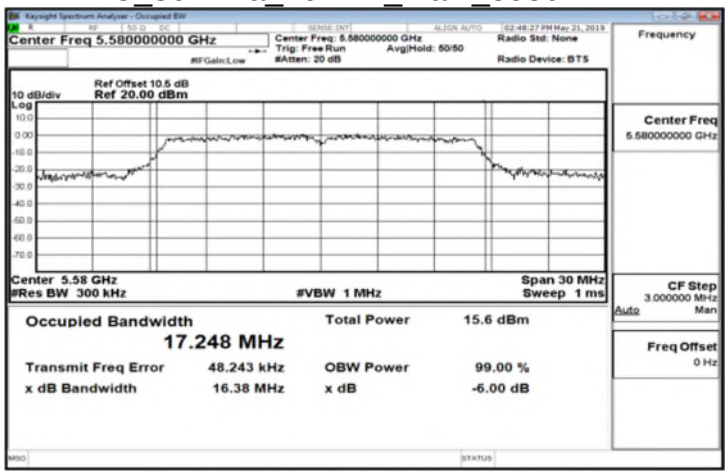
IC_802.11a_20MHz_Main_5500MHz



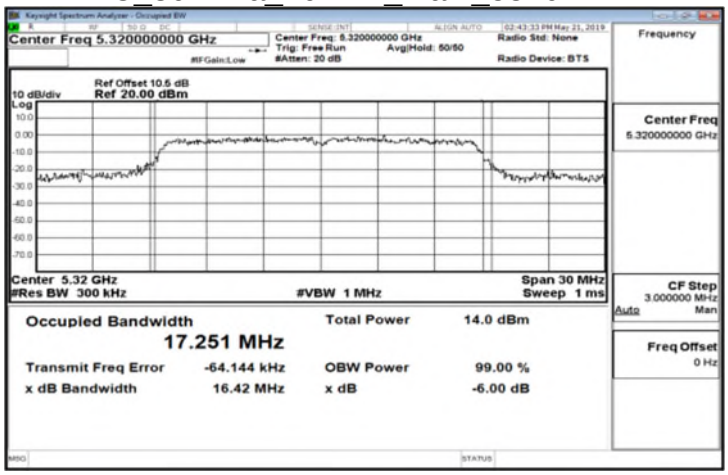
IC_802.11a_20MHz_Main_5300MHz



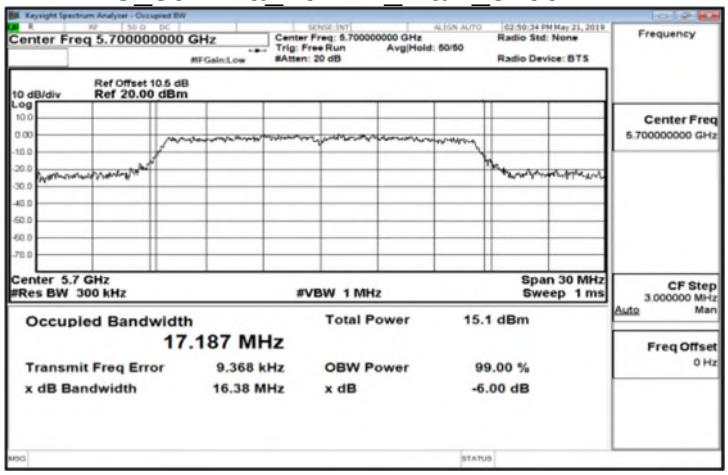
IC_802.11a_20MHz_Main_5580MHz



IC_802.11a_20MHz_Main_5320MHz



IC_802.11a_20MHz_Main_5700MHz



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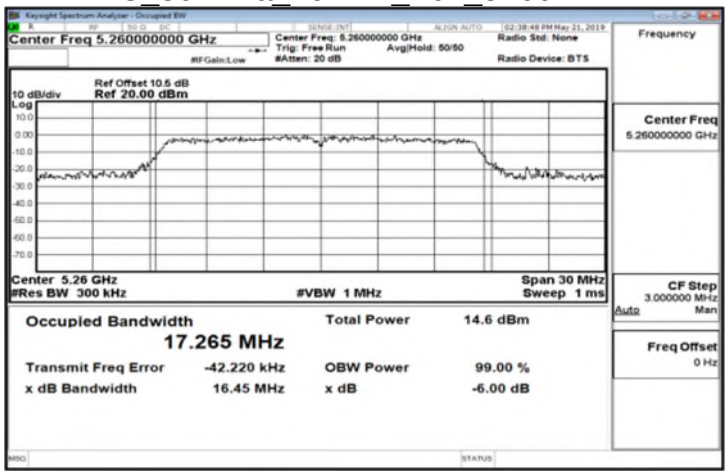
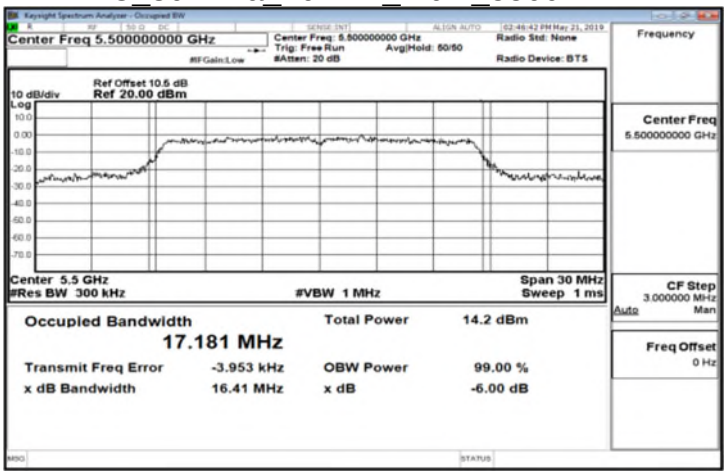
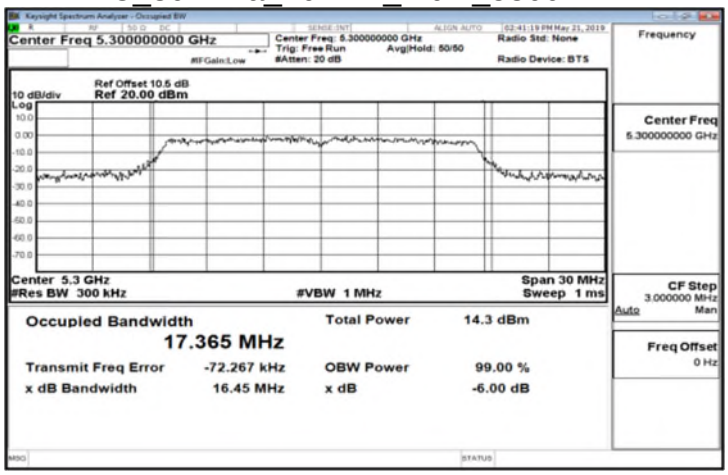
IC_802.11a_20MHz_Aux_5260MHz



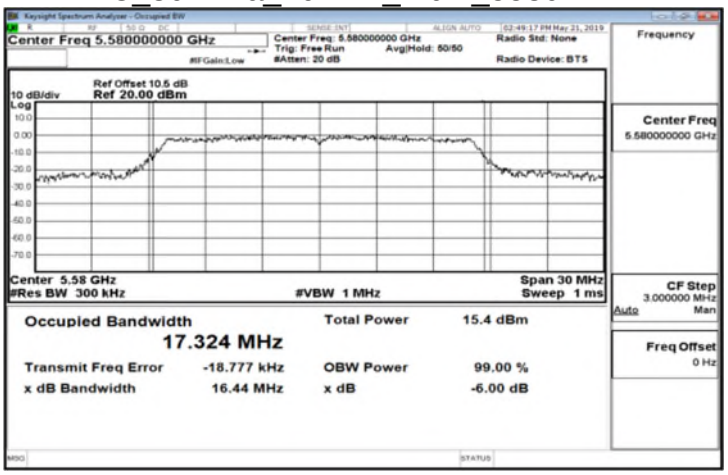
IC_802.11a_20MHz_ Aux _5500MHz



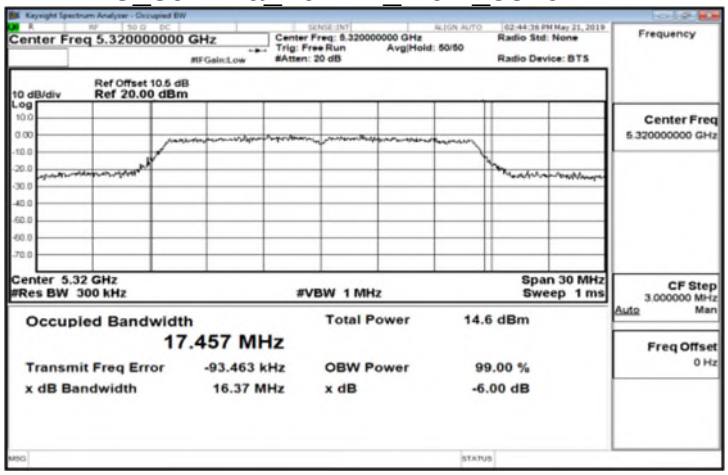
IC_802.11a_20MHz_ Aux _5300MHz



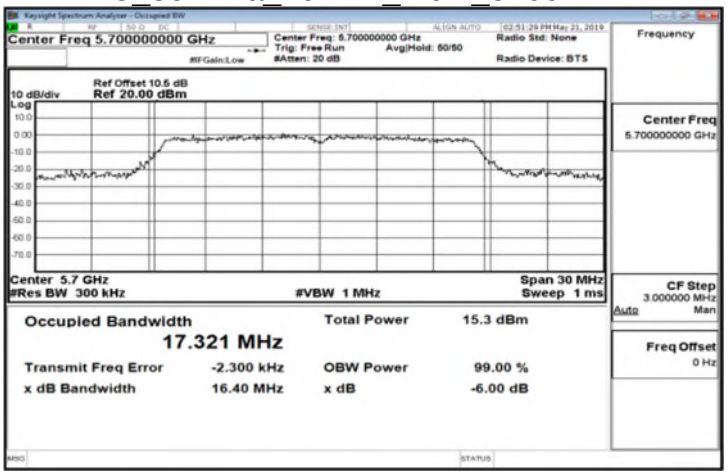
IC_802.11a_20MHz_ Aux _5580MHz



IC_802.11a_20MHz_ Aux _5320MHz



IC_802.11a_20MHz_ Aux _5700MHz



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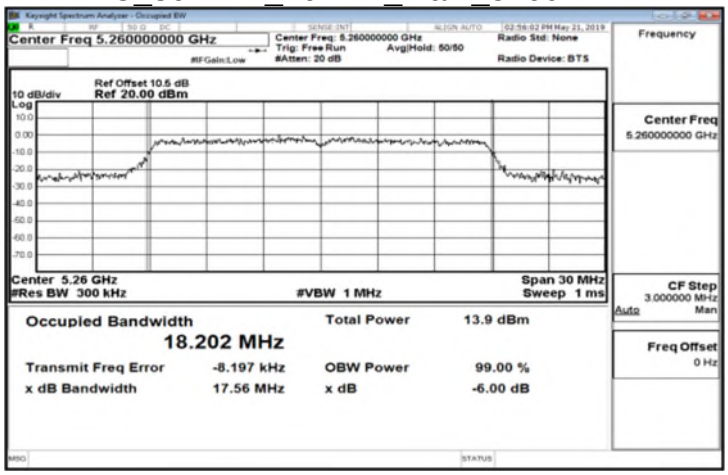
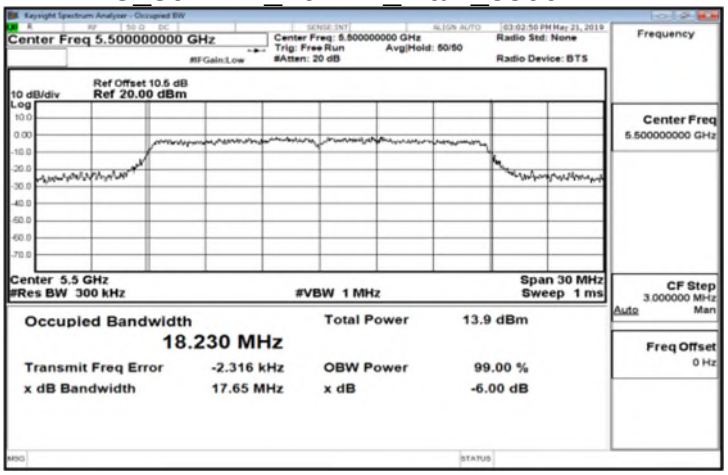
IC_802.11n_20MHz_Main_5260MHz



IC_802.11n_20MHz_Main_5500MHz



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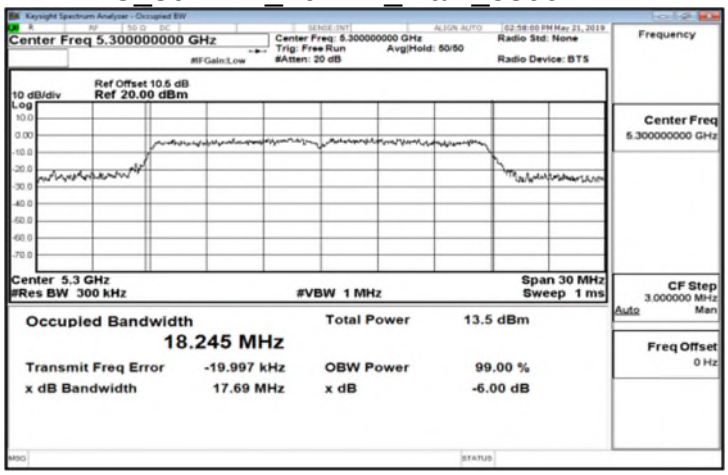
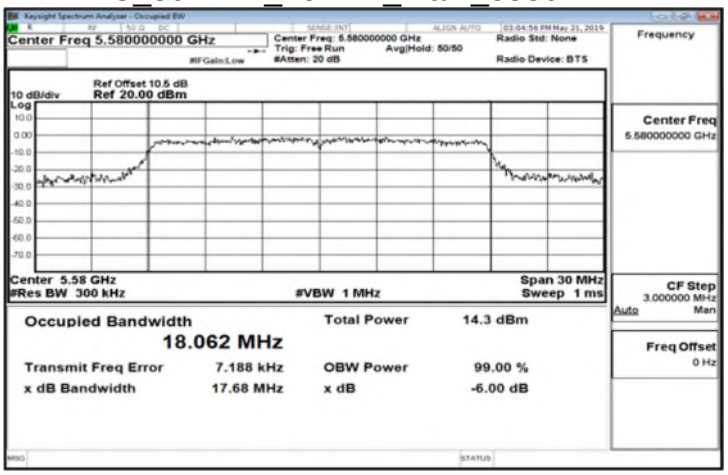


IC_802.11n_20MHz_Main_5580MHz



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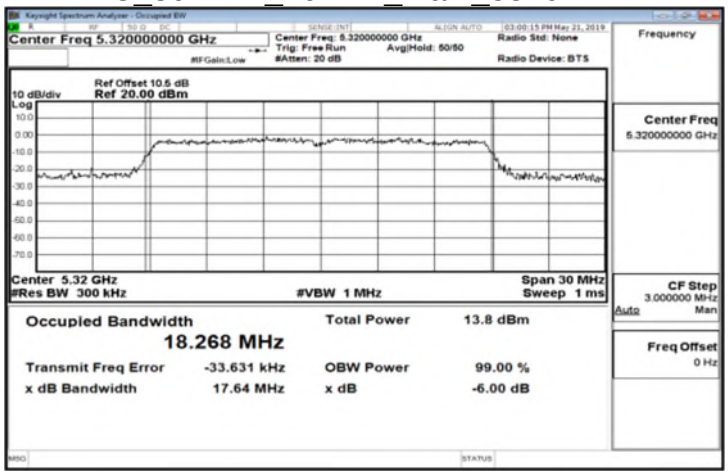

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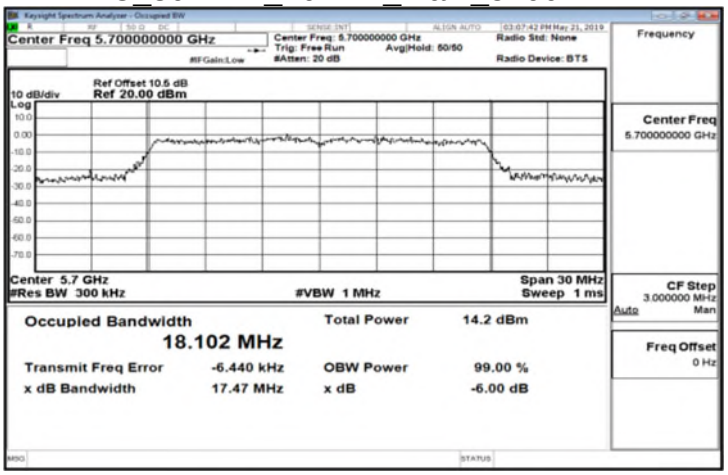

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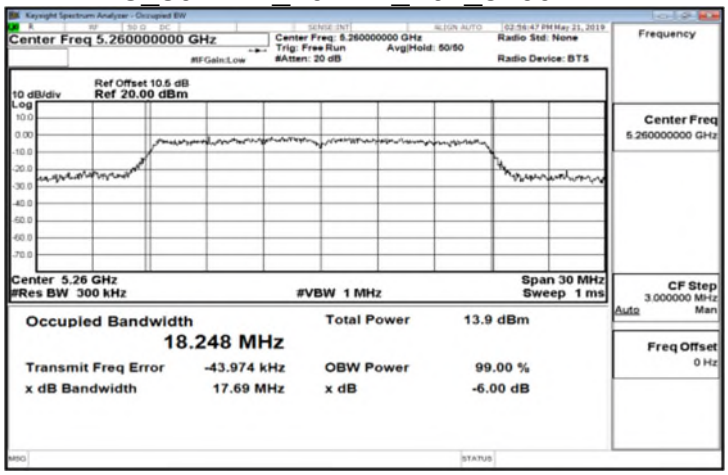
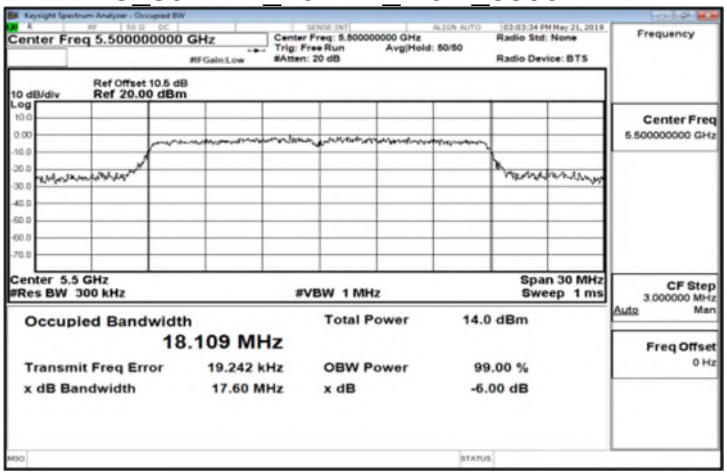
IC_802.11n_20MHz_Aux_5260MHz



IC_802.11n_20MHz_ Aux _5500MHz



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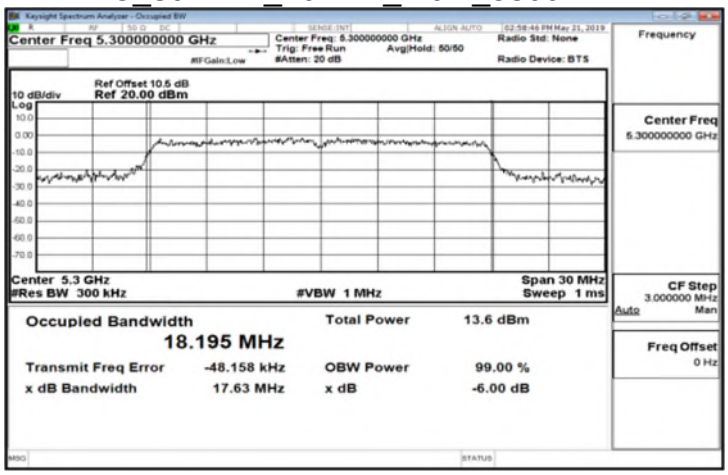

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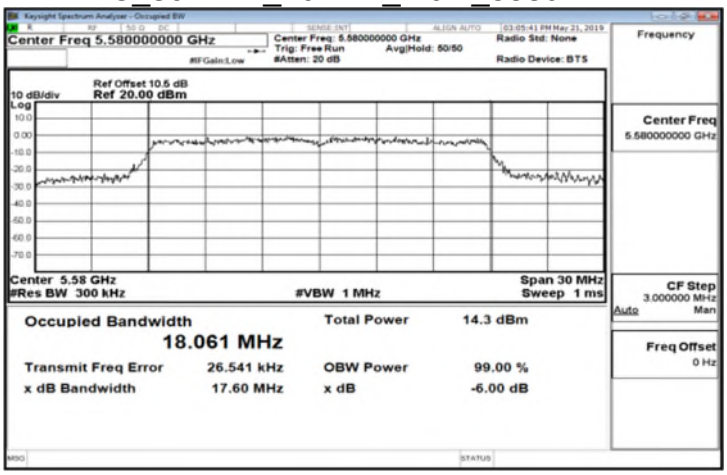
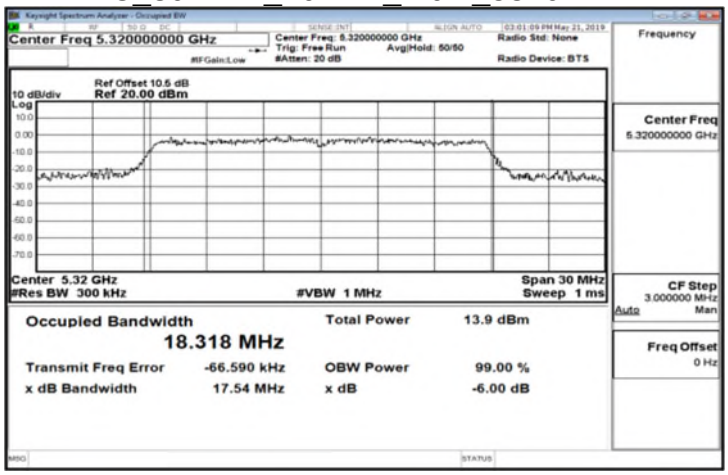
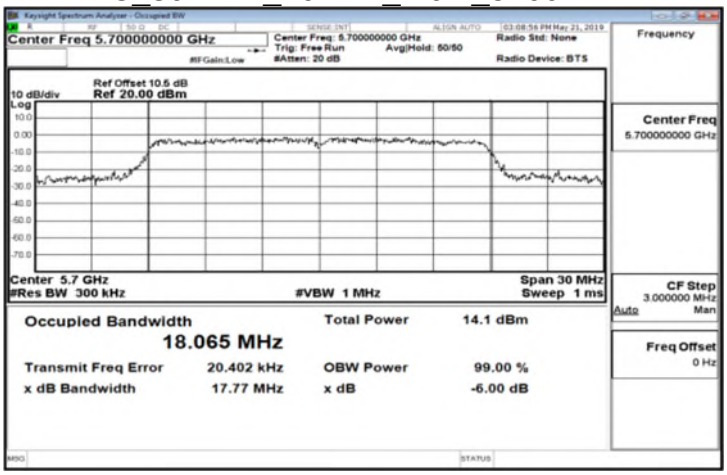


IC_802.11n_20MHz_ Aux _5320MHz



IC_802.11n_20MHz_ Aux _5700MHz



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9 MAXIMUM CONDUCTED OUTPUT POWER MEASUREMENT

9.1 Standard Applicable

FCC

OPERZTION Band	EUT CATEGORY		LIMIT
U-NII-1		Access Point (Master device)	1 Watt(30dBm)
		Fixed point-to-point Access Ponit	1 Watt(30dBm)
		Mobile and portable client device	250mW(23.98dBm)
U-NII-2A	√		250mW(23.98dBm) or 11dBm+10 log B
U-NII-2C	√		250mW(23.98dBm) or 11dBm+10 log B
U-NII-3			1 Watt(30dBm)
If transmitting antennas of directional gain greater than 6 dBi are used, the Maximum transmit power shall be reduced by the amount in dB that the direction-al gain of the antenna exceeds 6 dBi.			

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OPERZTION FREQUENCY BAND	LIMIT
5150~5250 MHz	EIRP shall not exceed 200 mW or 10 + 10 $\log_{10}$B, dBm
5250~5350 MHz	Conducted output power shall not exceed 250 mW or 11 +10 $\log_{10}$B EIRP shall not exceed 1.0 W or 17 + 10 $\log_{10}$B, dBm
5470-5600 MHz and 5650-5725 MHz	Conducted output power shall not exceed 250 mW or 11 +10 $\log_{10}$ B EIRP shall not exceed 1.0 W or 17 + 10 $\log_{10}$B, dBm
5725~5850 MHz	Conducted output power shall not exceed 1 W
For equipment operating in the band ***5725-5850*** MHz, If transmitting antennas of directional gain greater than 6 dBi are used, the Maximum transmit power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.	

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Note:

As per FCC KDB 662911 D01

Unequal antenna gains, with equal transmit powers. For antenna gains given by G1, G2, …, GN dBi.

(i) If transmit signals are correlated, then Directional gain

$= 10 \log[(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2 / N_{ANT}]$ dBi

[Note the “20”s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]

The antenna gain is not grater than 6 dBi. Therefore, reduction of power is not required.

9.2 Measurement Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules .
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter
4. Power Meter is used as the auxiliary test equipment to conduct the output power measurement.
5. Record the max. reading and add 10 log(1/duty cycle).
6. Repeat above procedures until all frequency (low, middle, and high channel) measured were complete.

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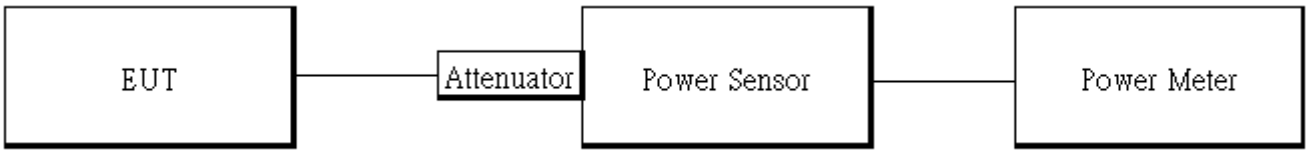
9.3 Measurement Equipment Used

SGS Conducted Room					
Name of Equip-ment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
Power Meter	Anritsu	ML2496A	1326001	08/03/2018	08/02/2019
Power Sensor	Anritsu	MA2411B	1315048	08/03/2018	08/02/2019
Power Sensor	Anritsu	MA2411B	1315049	08/03/2018	08/02/2019
Attenuator	Marvelous	MVE2213-10	RF80	02/26/2019	02/25/2020

9.4 Test Set-up



9.5 Measurement Result

Conducted output power (FCC)

802.11a_Ch0

CH	Frequency (MHz)	Data Rate	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)			RESULT
52	5260	6	**9.38**	8.670	23.98	or 11+10log(B) =	25.77	PASS
60	5300	6	9.34	8.590	23.98	or 11+10log(B) =	25.76	PASS
64	5320	6	9.32	8.551	23.98	or 11+10log(B) =	25.77	PASS
100	5500	6	6.12	4.093	23.98	or 11+10log(B) =	25.77	PASS
116	5580	6	**9.35**	8.610	23.98	or 11+10log(B) =	25.77	PASS
140	5700	6	6.65	4.624	23.98	or 11+10log(B) =	25.77	PASS

802.11a_Ch1

CH	Frequency (MHz)	Data Rate	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)			RESULT
52	5260	6	**10.03**	10.069	23.98	or 11+10log(B) =	25.76	PASS
60	5300	6	9.83	9.616	23.98	or 11+10log(B) =	25.77	PASS
64	5320	6	9.77	9.484	23.98	or 11+10log(B) =	25.77	PASS
100	5500	6	6.31	4.276	23.98	or 11+10log(B) =	25.75	PASS
116	5580	6	**10.76**	11.912	23.98	or 11+10log(B) =	25.76	PASS
140	5700	6	6.98	4.989	23.98	or 11+10log(B) =	25.74	PASS

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802.11n_HT20_Ch0

CH	Frequency (MHz)	Data Rate	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)			RESULT
52	5260	MCS0	**9.62**	9.162	23.98	or 11+10log(B) =	25.77	PASS
60	5300	MCS0	9.58	9.078	23.98	or 11+10log(B) =	25.77	PASS
64	5320	MCS0	9.53	8.974	23.98	or 11+10log(B) =	25.77	PASS
100	5500	MCS0	7.38	5.470	23.98	or 11+10log(B) =	25.77	PASS
116	5580	MCS0	**9.55**	9.016	23.98	or 11+10log(B) =	25.73	PASS
140	5700	MCS0	6.74	4.721	23.98	or 11+10log(B) =	25.76	PASS

802.11n_HT20_Ch1

CH	Frequency (MHz)	Data Rate	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)			RESULT
52	5260	MCS0	**9.77**	9.484	23.98	or 11+10log(B) =	25.77	PASS
60	5300	MCS0	9.73	9.397	23.98	or 11+10log(B) =	25.77	PASS
64	5320	MCS0	9.03	7.998	23.98	or 11+10log(B) =	25.77	PASS
100	5500	MCS0	7.64	5.808	23.98	or 11+10log(B) =	25.77	PASS
116	5580	MCS0	**10.19**	10.447	23.98	or 11+10log(B) =	25.75	PASS
140	5700	MCS0	7.02	5.035	23.98	or 11+10log(B) =	25.77	PASS

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Conducted output power (IC)

802.11a_Ch0

CH	Frequency (MHz)	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)			RESULT
52	5260	**9.38**	**8.670**	23.98	or 11+10log(B) =	23.37	PASS
60	5300	9.34	8.590	23.98	or 11+10log(B) =	23.37	PASS
64	5320	9.32	8.551	23.98	or 11+10log(B) =	23.37	PASS
100	5500	6.12	4.093	23.98	or 11+10log(B) =	23.35	PASS
116	5580	9.35	**8.610**	23.98	or 11+10log(B) =	23.37	PASS
140	5700	6.65	**4.624**	23.98	or 11+10log(B) =	23.35	PASS

802.11a_Ch1

CH	Frequency (MHz)	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)			RESULT
52	5260	**10.03**	10.069	23.98	or 11+10log(B) =	23.37	PASS
60	5300	9.83	9.616	23.98	or 11+10log(B) =	23.40	PASS
64	5320	9.77	9.484	23.98	or 11+10log(B) =	23.42	PASS
100	5500	6.31	4.276	23.98	or 11+10log(B) =	23.35	PASS
116	5580	**10.76**	**11.912**	23.98	or 11+10log(B) =	23.39	PASS
140	5700	**6.98**	**4.989**	23.98	or 11+10log(B) =	23.39	PASS

802.11n_HT20_Ch0

CH	Frequency (MHz)	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)			RESULT
52	5260	**9.62**	**9.162**	23.98	or 11+10log(B) =	23.60	PASS
60	5300	9.58	9.078	23.98	or 11+10log(B) =	23.61	PASS
64	5320	9.53	8.974	23.98	or 11+10log(B) =	23.62	PASS
100	5500	7.38	5.470	23.98	or 11+10log(B) =	23.61	PASS
116	5580	**9.55**	**9.016**	23.98	or 11+10log(B) =	23.57	PASS
140	5700	**6.74**	**4.721**	23.98	or 11+10log(B) =	23.58	PASS

802.11n_HT20_Ch1

CH	Frequency (MHz)	TOTAL POWER (dBm)	TOTAL POWER (mW)	REQUIRED LIMIT (dBm)			RESULT
52	5260	**9.77**	9.484	23.98	or 11+10log(B) =	23.61	PASS
60	5300	9.73	9.397	23.98	or 11+10log(B) =	23.60	PASS
64	5320	9.03	7.998	23.98	or 11+10log(B) =	23.63	PASS
100	5500	7.64	5.808	23.98	or 11+10log(B) =	23.58	PASS
116	5580	**10.19**	**10.447**	23.98	or 11+10log(B) =	23.57	PASS
140	5700	**7.02**	**5.035**	23.98	or 11+10log(B) =	23.57	PASS

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EIRP

802.11a_Ch0

CH	Frequency (MHz)	TOTAL POWER (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)	REQUIRED LIMIT (dBm)			RESULT
52	5260	**9.38**	4.900	**14.28**	**26.792**	30	or 17+10log(B)=	29.37	PASS
60	5300	9.34	4.900	14.24	26.546	30	or 17+10log(B)=	29.37	PASS
64	5320	9.32	4.900	14.22	26.424	30	or 17+10log(B)=	29.37	PASS
100	5500	6.12	4.900	11.02	12.647	30	or 17+10log(B)=	29.35	PASS
116	5580	**9.35**	4.900	**14.25**	**26.607**	30	or 17+10log(B)=	29.37	PASS
140	5700	**6.65**	4.900	**11.55**	**14.289**	30	or 17+10log(B)=	29.35	PASS

802.11a_Ch1

CH	Frequency (MHz)	TOTAL POWER (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)	REQUIRED LIMIT (dBm)			RESULT
52	5260	**10.03**	4.900	**14.93**	**31.117**	30	or 17+10log(B)=	29.37	PASS
60	5300	9.83	4.900	14.73	29.717	30	or 17+10log(B)=	29.40	PASS
64	5320	9.77	4.900	14.67	29.309	30	or 17+10log(B)=	29.42	PASS
100	5500	6.31	4.900	11.21	13.213	30	or 17+10log(B)=	29.35	PASS
116	5580	**10.76**	4.900	**15.66**	**36.813**	30	or 17+10log(B)=	29.39	PASS
140	5700	**6.98**	4.900	**11.88**	**15.417**	30	or 17+10log(B)=	29.39	PASS

802.11n_HT20_Ch0

CH	Frequency (MHz)	TOTAL POWER (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)	REQUIRED LIMIT (dBm)			RESULT
52	5260	**9.62**	4.900	**14.52**	**28.314**	30	or 17+10log(B)=	29.60	PASS
60	5300	9.58	4.900	14.48	28.054	30	or 17+10log(B)=	29.61	PASS
64	5320	9.53	4.900	14.43	27.733	30	or 17+10log(B)=	29.62	PASS
100	5500	7.38	4.900	12.28	16.904	30	or 17+10log(B)=	29.61	PASS
116	5580	**9.55**	4.900	**14.45**	**27.861**	30	or 17+10log(B)=	29.57	PASS
140	5700	**6.74**	4.900	**11.64**	**14.588**	30	or 17+10log(B)=	29.58	PASS

802.11n_HT20_Ch1

CH	Frequency (MHz)	TOTAL POWER (dBm)	Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)	REQUIRED LIMIT (dBm)			RESULT
52	5260	**9.77**	4.900	**14.67**	**29.309**	30	or 17+10log(B)=	29.61	PASS
60	5300	9.73	4.900	14.63	29.040	30	or 17+10log(B)=	29.60	PASS
64	5320	9.03	4.900	13.93	24.717	30	or 17+10log(B)=	29.63	PASS
100	5500	7.64	4.900	12.54	17.947	30	or 17+10log(B)=	29.58	PASS
116	5580	**10.19**	4.900	**15.09**	**32.285**	30	or 17+10log(B)=	29.57	PASS
140	5700	**7.02**	4.900	**11.92**	**15.560**	30	or 17+10log(B)=	29.57	PASS

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10 MAXIMUM POWER SPECTRAL DENSITY

10.1 Standard Applicable

FCC

OPERZTION Band	EUT CATEGORY		LIMIT
U-NII-1		Access Point (Master device)	17dBm/ MHz
		Fixed point-to-point Access Ponit	
		Mobile and portable client device	11dBm/ MHz
U-NII-2A	√		11dBm/ MHz
U-NII-2C	√		11dBm/ MHz
U-NII-3			30dBm/ 500kHz
If transmitting antennas of directional gain greater than 6 dBi are used, the Maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.			

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OPERZTION FREQUENCY BAND	LIMIT
5150~5250 MHz	EIRP spectral density 10 dBm / MHz
5250~5350 MHz	11dBm / MHz
5470-5600 MHz and 5650-5725 MHz	11dBm / MHz
5725~5850 MHz	30dBm / 500 kHz
For equipment operating in the band ***5725-5850*** MHz, If transmitting antennas of directional gain greater than 6 dBi are used, the Maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.	

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Note:

As per FCC KDB 662911 D01

Unequal antenna gains, with equal transmit powers. For antenna gains given by G1, G2, …, GN dBi.

(i) If transmit signals are correlated, then Directional gain

$= 10 \log[(10^{G1/20} + 10^{G2/20} + \ldots + 10^{GN/20})^2 / N_{ANT}]$ dBi

[Note the "20"s in the denominator of each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]

The antenna gain is not grater than 6 dBi. Therefore, reduction of power is not required.

10.2 Measurement Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules .
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to Spectrum.
4. **For U-NII1, U-NII-2A, U-NII-2C Band**:
   Set RBW=1MHz, VBW=3MHz, where span is enough to capture the entire bandwidth, Sweep time = Auto (601 pts), detector = sample, traces 100 sweeps of video averaging. (SA-2 with the omission of procedure x, the integration with 26dB EBW bandwidth)
   For U-NII-3 Band:
   Set RBW=500 kHz, VBW≥ 3RBW, where span is enough to capture the entire bandwidth, Sweep time = Auto (601 pts), detector = sample, traces 100 sweeps of video averaging. (SA-2 with the omission of procedure x, the integration with 26dB EBW bandwidth)
5. User the cursor on spectrum to peak search the highest level of trace
6. Record the max. reading and add 10 log(1/duty cycle).
7. Repeat above procedures until all default test channel (low, middle, and high) was complete.
8. 802.11n MIMO mode: offset is set following "measure and add 10 Log (N)" on spectrum to measure the PSD for MIMO mode. Offset = cable loss + 10 log (N), where N is number of transmitting antenna. N=2 for this given application.

Note: For the test of PSD at MIMO mode, the highest emission of worst case employing Measure and add 10 log (N) technical is reported on this report after the comparison between Main Antenna at single transmitting mode and Aux that yields the higher value. The MIMO transmitting mode produces higher value of outcome

10.3 Measurement Equipment Used

SGS Conducted Room					
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Date**	**Calibration Due**
Spectrum Analyzer	Agilent	N9010A	MY53400256	11/21/2018	11/20/2019
DC Block	PASTERNACK	PE8210	RF29	02/26/2019	02/25/2020
Attenuator	Marvelous	MVE2213-10	RF80	02/26/2019	02/25/2020

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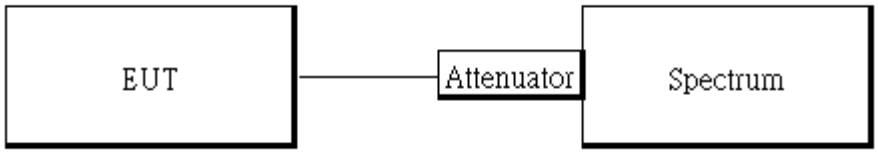
10.4 Test Set-up



10.5 Measurement Result

POWER DENSITY 802.11a MODE_Ch1					
Frequency (MHz)	PSD W/O Duty Factor (dBm)	Duty Factor	PSD With Duty Factor (dBm)	Limit (dBm)	Margin (dB)
5260	-2.69	0.00	-2.69	11	-13.69
5300	-3.47	0.00	-3.47	11	-14.47
5320	-3.82	0.00	-3.82	11	-14.82
5500	-3.67	0.00	-3.67	11	-14.67
5580	-2.74	0.00	-2.74	11	-13.74
5700	-3.00	0.00	-3.00	11	-14.00

POWER DENSITY 802.11n HT20 MODE_Ch1					
Frequency (MHz)	PSD W/O Duty Factor (dBm)	Duty Factor	PSD With Duty Factor (dBm)	Limit (dBm)	Margin (dB)
5260	-3.70	0.00	-3.70	11	-14.70
5300	-4.38	0.00	-4.38	11	-15.38
5320	-4.50	0.00	-4.50	11	-15.50
5500	-4.77	0.00	-4.77	11	-15.77
5580	-3.77	0.00	-3.77	11	-14.77
5700	-3.73	0.00	-3.73	11	-14.73

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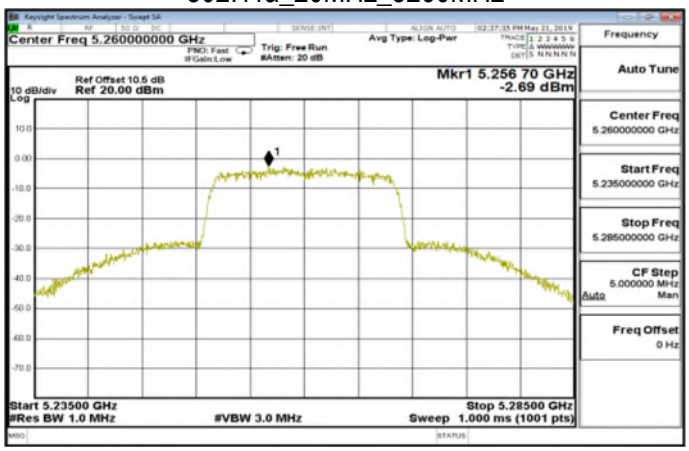
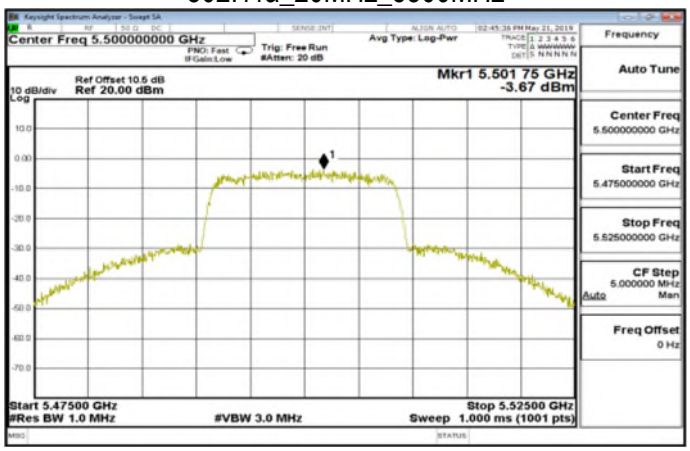
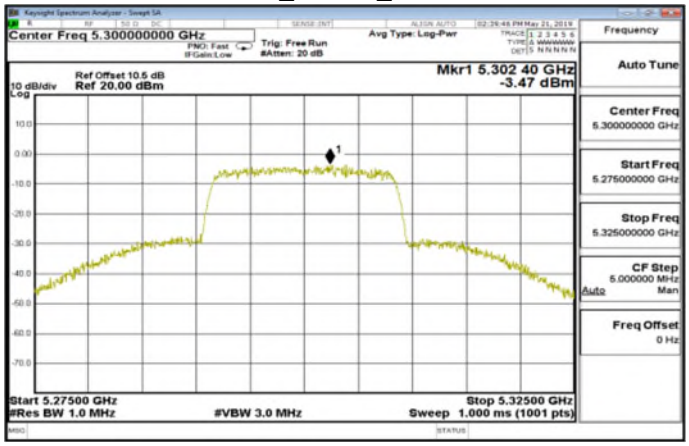
802.11a_20MHz_5260MHz



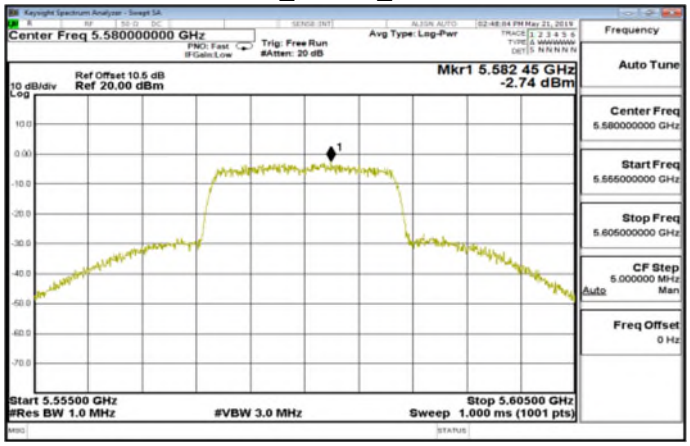
802.11a_20MHz_5500MHz



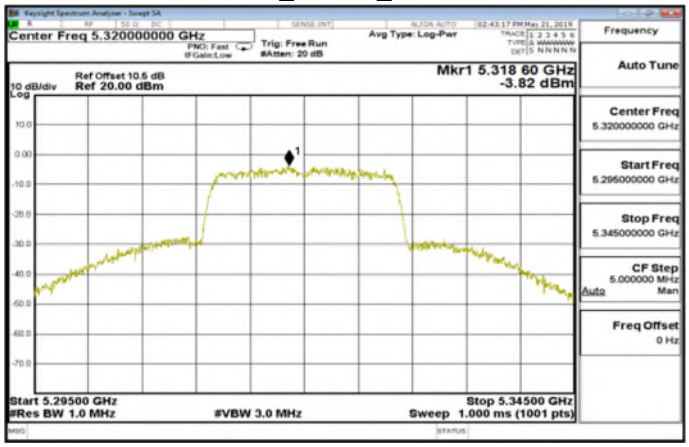
802.11a_20MHz_5300MHz



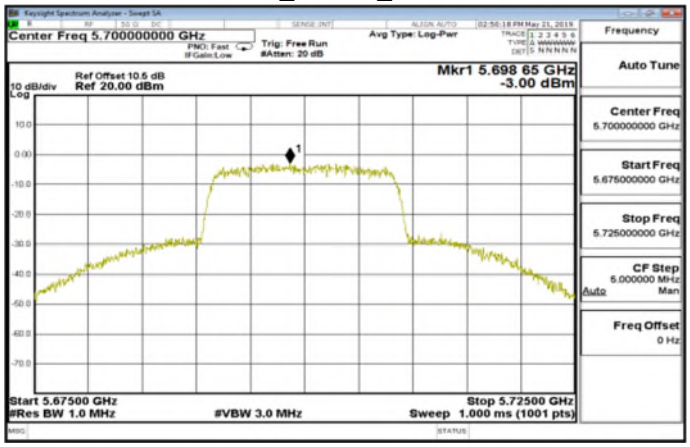
802.11a_20MHz_5580MHz



802.11a_20MHz_5320MHz



802.11a_20MHz_5700MHz



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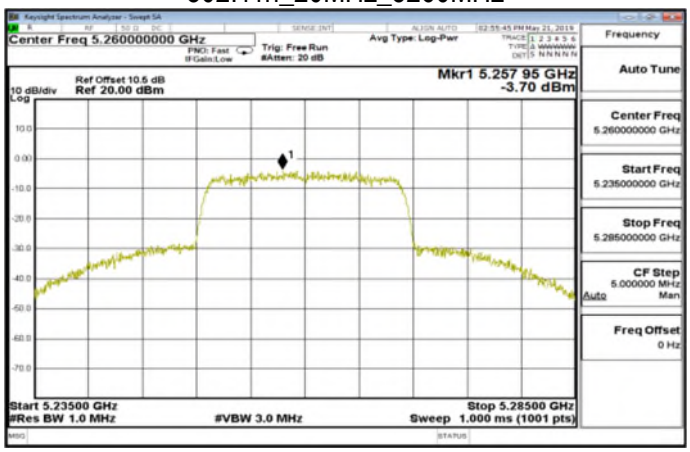
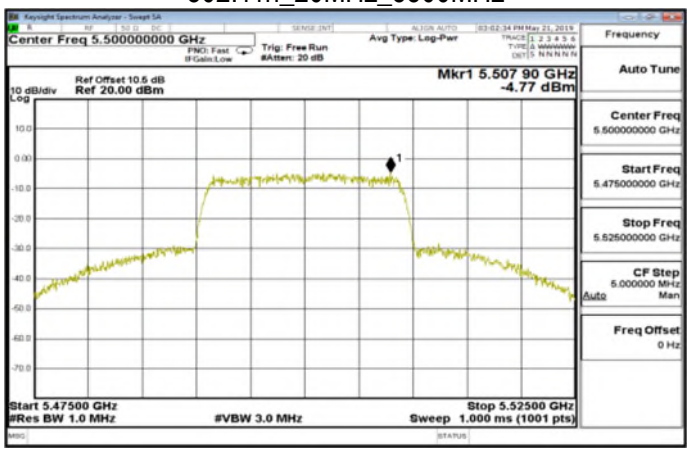
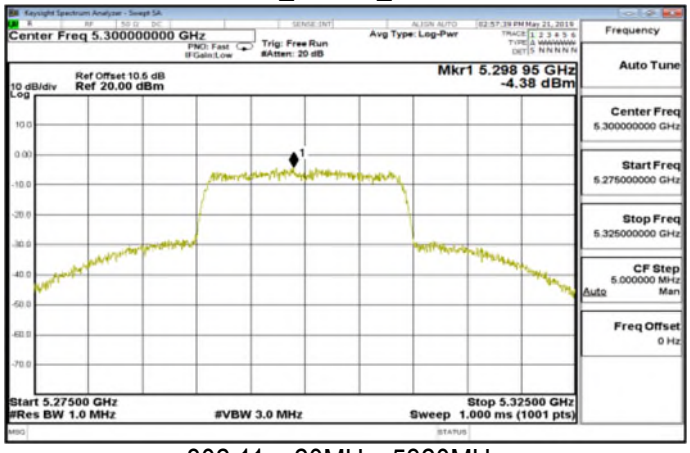
802.11n_20MHz_5260MHz



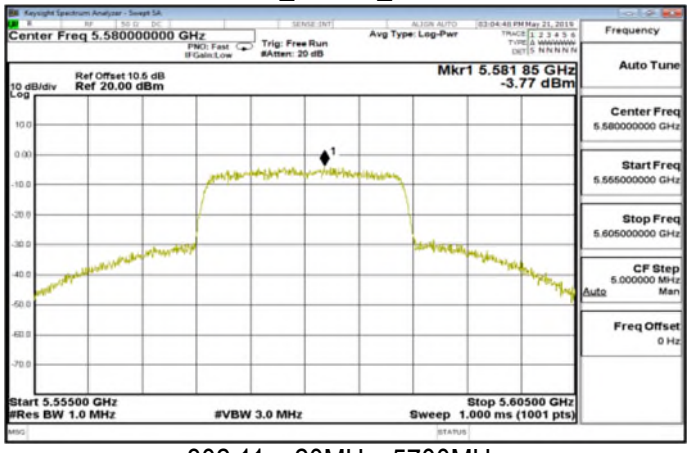
802.11n_20MHz_5500MHz



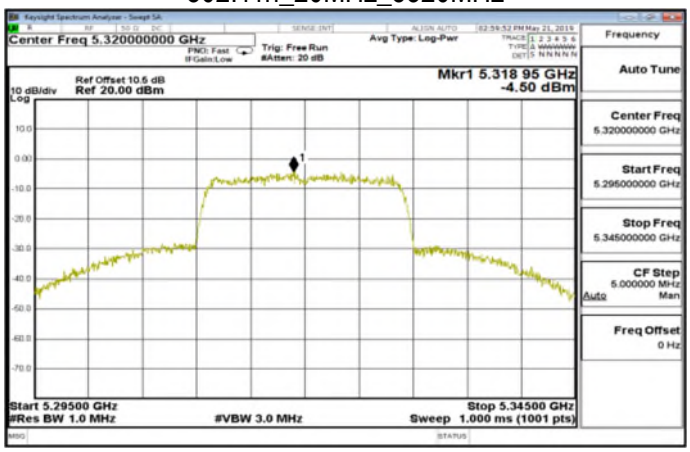
802.11n_20MHz_5300MHz



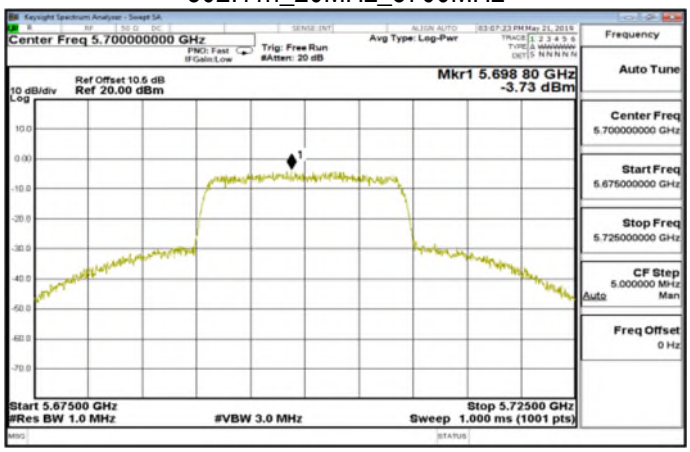
802.11n_20MHz_5580MHz



802.11n_20MHz_5320MHz



802.11n_20MHz_5700MHz



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11 UNDESIRABLE RADIATED EMISSION MEASUREMENT

11.1 Standard Applicable

The maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

1. For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

2. For transmitters operating in the 5.725-5.85 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.

APPLICABLE TO	LIMIT	
FCC KDB 789033 D02 General UNII Test Procedures New Rules	FIELD STRENGTH AT 3m	
	PK: 74 (dBμV/m)	AV 54 (dBμV/m)
APPLICABLE TO	**EIRP LIMIT**	**FIELD STRENGTH AT 3m**
15.407(b)(1) RSS-247 6.2.1.2	PK: -27 (dBm/MHz)	PK: 68.3 (dBμV/m)
15.407(b)(2) RSS-247 6.2.2.2		
15.407(b)(3) RSS-247 6.2.3.2		
15.407(b)(4)(i) RSS-247 6.2.4.2	PK:-27 (dBm/MHz) *1 PK:10 (dBm/MHz) *2 PK:15.6 (dBm/MHz) *3 PK:27 (dBm/MHz) *4	PK: 68.2(dBμV/m) *1 PK:105.2 (dBμV/m) *2 PK: 110.8(dBμV/m) *3 PK:122.2 (dBμV/m) *4
*1 beyond 75 MHz or more above of the bandedge. *2 below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above. *3 below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above. *4 from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.		

EIRP = ((E*d)^2) / 30, where E is the field in V/m, d is the measurement distance (3m), EIRP is the equivalent isotropically radiated power in Watts.

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Unwanted spurious emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table:

Frequency (MHz)	Field strength (microvolts/meter)	Distance (meters)
0.009-0.490	2400/F(KHz)	300
0.490-1.705	24000/F(KHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Note:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBμV/m) = 20 log Emission level (dBμV/m)

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11.2 Measurement Equipment Used

SGS SAC-III					
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Date**	**Calibration Due**
Bilog Antenna	Sunol Sciences	JB3	A030105	07/13/2018	07/12/2019
Cable	HUBER SUHNER	SUCOFLEX 104PEA	25157	02/26/2019	02/25/2020
Cable	HUBER SUHNER	SUCOFLEX 104PEA	20995	02/26/2019	02/25/2020
Digital Thermo-Hygro Meter	WISEWIND	1206	D07	01/30/2019	01/29/2020
double Ridged Guide Horn Antenna	ETC	MCTD 1209	DRH13M02003	08/20/2018	08/19/2019
High Pass Filter	WI	WHKX7.0/18G-8SS	45	02/26/2019	02/25/2020
Horn Antenna	ETS LINDGREN	3116	00026370	12/26/2018	12/25/2019
Loop Antenna	COM-POWER	AL-130	121051	03/22/2019	03/21/2020
Pre-Amplifier	EMEC	EM330	060609	02/26/2019	02/25/2020
Pre-Amplifier	MITEQ	AMF-6F-260400-40-8P	985646	02/26/2019	02/25/2020
Pre-Amplifier	HP	8449B	3008A00965	02/26/2019	02/25/2020
PSA Series Spectrum Analyzer	Agilent	E4446A	MY46180323	05/31/2018	05/30/2019
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R	N.C.R
Turn Table	CCS	CC-T-1F	N/A	N.C.R	N.C.R
Software	e3 V6.11-20180413				

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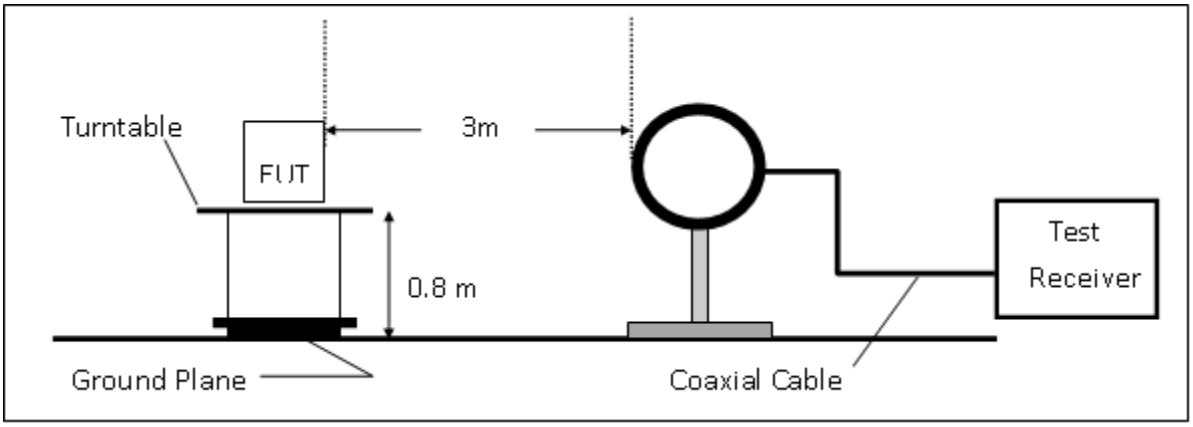
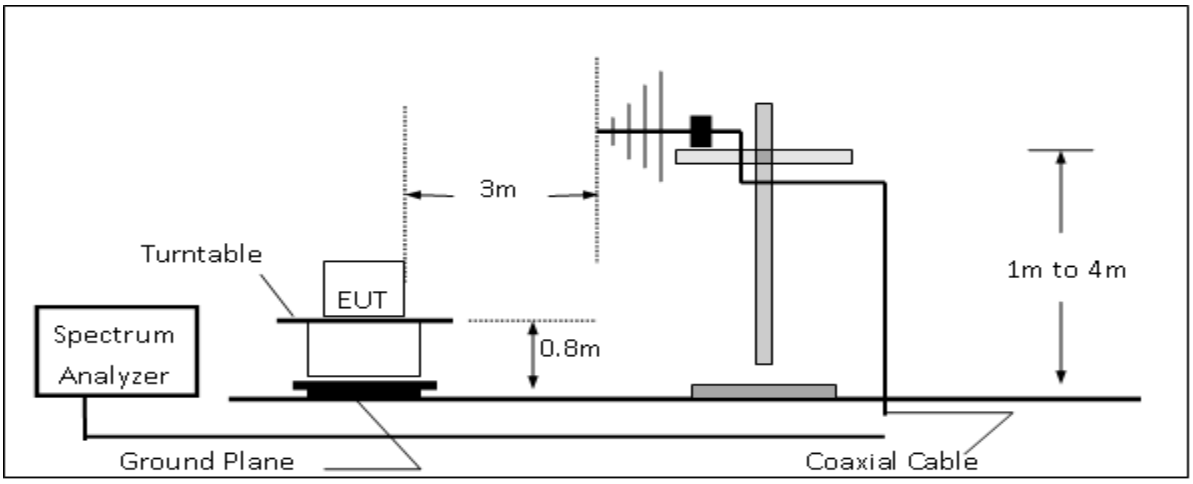
11.3 Test SET-UP

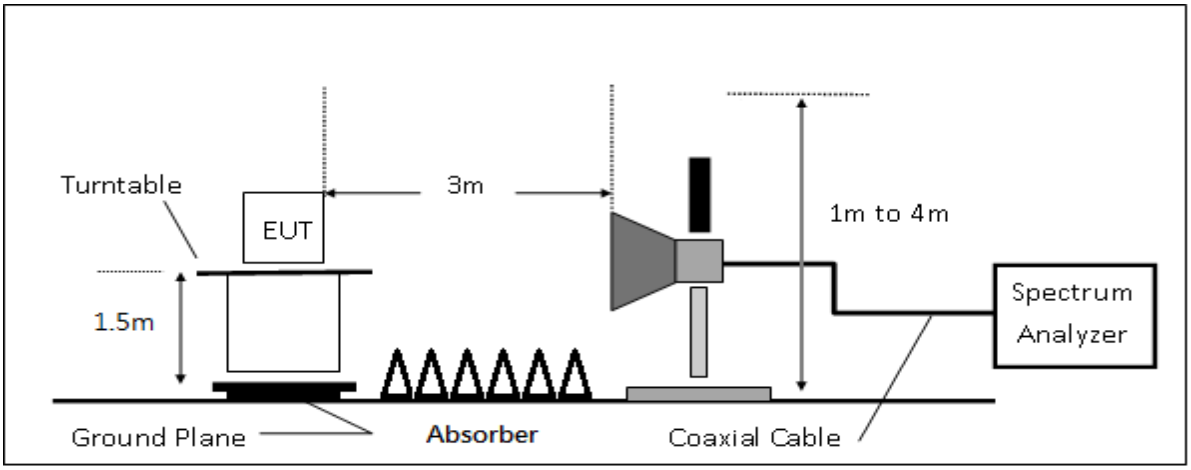
(A) Radiated Emission Test Set-UP Frequency Below 30MHz.



(B) Radiated Emission Test Set-Up, Frequency form 30MHz to 1000MHz



(C) Radiated Emission Test Set-UP Frequency Over 1 GHz



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11.4 Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules .
3. The EUT was placed on a turn table with 0.8m for frequency< 1GHz and 1.5m for frequency> 1GHz above ground plane.
4. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
5. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
6. Set the spectrum analyzer as RBW=120 kHz and VBW=300 kHz for Peak Detector (PK) and Quasi-peak (QP) at frequency below 1 GHz.
7. Set the spectrum analyzer as RBW=1 MHz, VBW=3 MHz for Peak Detector at frequency above 1 GHz.
8. Set the spectrum analyzer as RBW=1 MHz, VBW=10 Hz (Duty cycle > 98%) or VBW ≥ 1/T (Duty cycle < 98%) for Average Detector at frequency above 1 GHz.
9. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
10. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
11. Repeat above procedures until all frequency measured were complete.

11.5 Field Strength Calculation

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

FS = RA + AF + CL - AG

Where	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

Actual FS(dBμV/m) = SPA. Reading level(dBμV) + Factor(dB)

Factor(dB) = Antenna Factor(dBμV/m) + Cable Loss(dB) – Pre_Amplifier Gain(dB)

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11.6 Test Results of Radiated Spurious Emissions form 9 KHz to 30 MHz

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit per 15.31(o) was not reported.

11.7 Measurement Result

Refer to next page for tabular data sheets.

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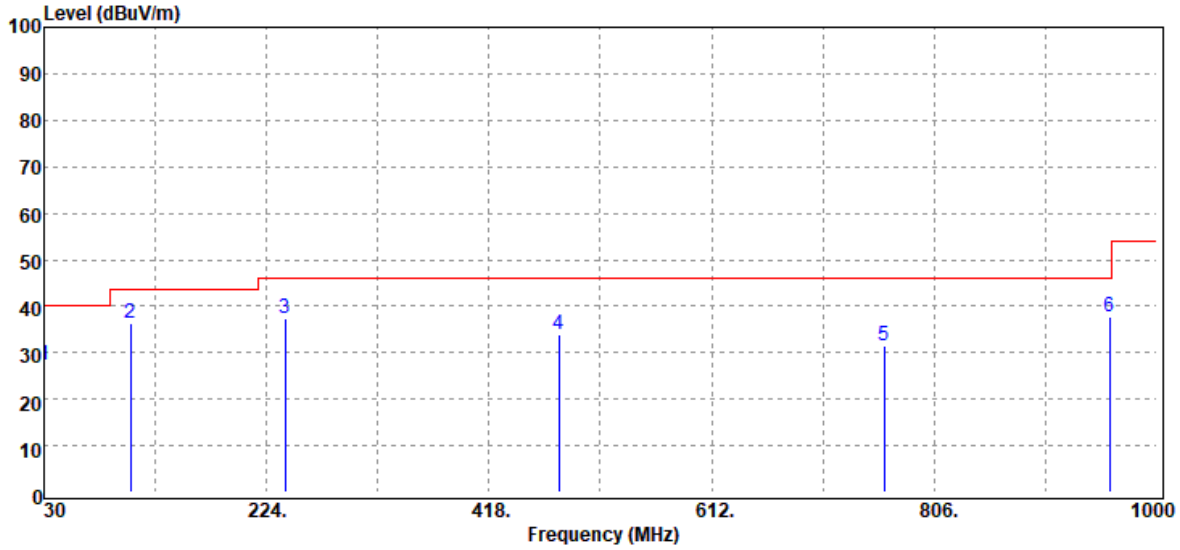
Radiated Spurious Emission Measurement Result

Below 1GHz Worst-Case Data:

Project Number	:T190516W02	Test Date	:2019-05-25
Operation Band	:802.11a/Band2	Temp./Humi.	:20/53.5
Fundamental Frequency	:5300 MHz	Engineer	:Jerry
Operation Mode	:Tx CH Mid	Measurement Antenna Pol.	:VERTICAL
EUT Pol.	:E1 Plan		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
30.00	Peak	28.70	-1.51	27.19	40.00	-12.81
105.66	Peak	47.42	-11.02	36.40	43.50	-7.10
240.49	Peak	47.53	-10.25	37.28	46.00	-8.72
479.11	Peak	36.76	-2.98	33.78	46.00	-12.22
762.35	Peak	29.73	1.75	31.48	46.00	-14.52
959.26	Peak	33.09	4.48	37.57	46.00	-8.43

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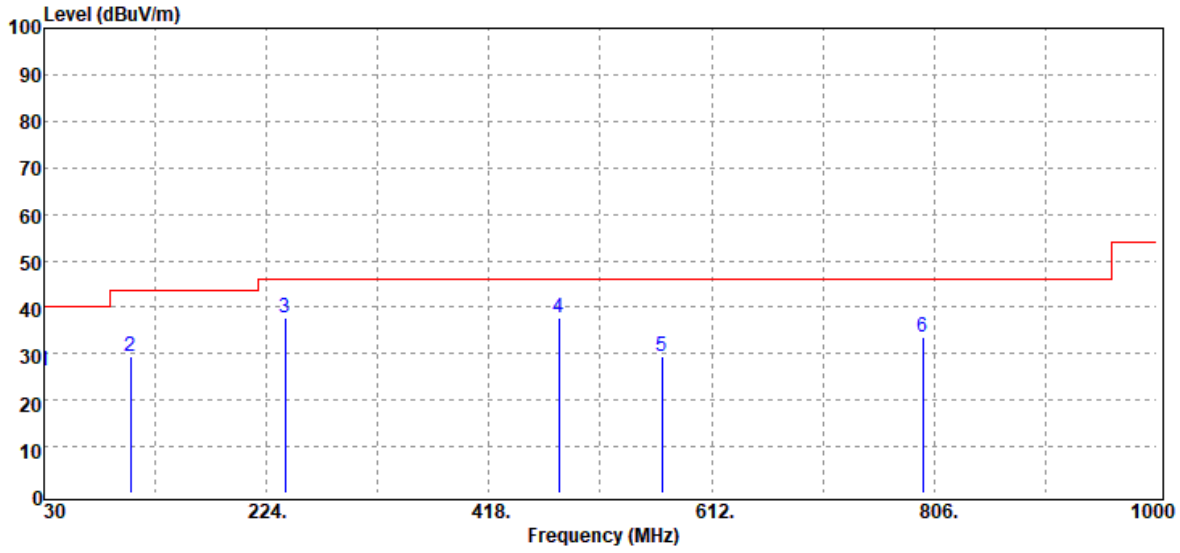
Project Number	:T190516W02	Test Date	:2019-05-25
Operation Band	:802.11a/Band2	Temp./Humi.	:20/53.5
Fundamental Frequency	:5300 MHz	Engineer	:Jerry
Operation Mode	:Tx CH Mid	Measurement Antenna Pol.	:HORIZONTAL
EUT Pol.	:E1 Plan		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
30.00	Peak	27.81	-1.51	26.30	40.00	-13.70
105.66	Peak	40.30	-11.02	29.28	43.50	-14.22
240.49	Peak	47.94	-10.25	37.69	46.00	-8.31
479.11	Peak	40.76	-2.98	37.78	46.00	-8.22
568.35	Peak	31.40	-1.94	29.46	46.00	-16.54
796.30	Peak	32.25	1.47	33.72	46.00	-12.28

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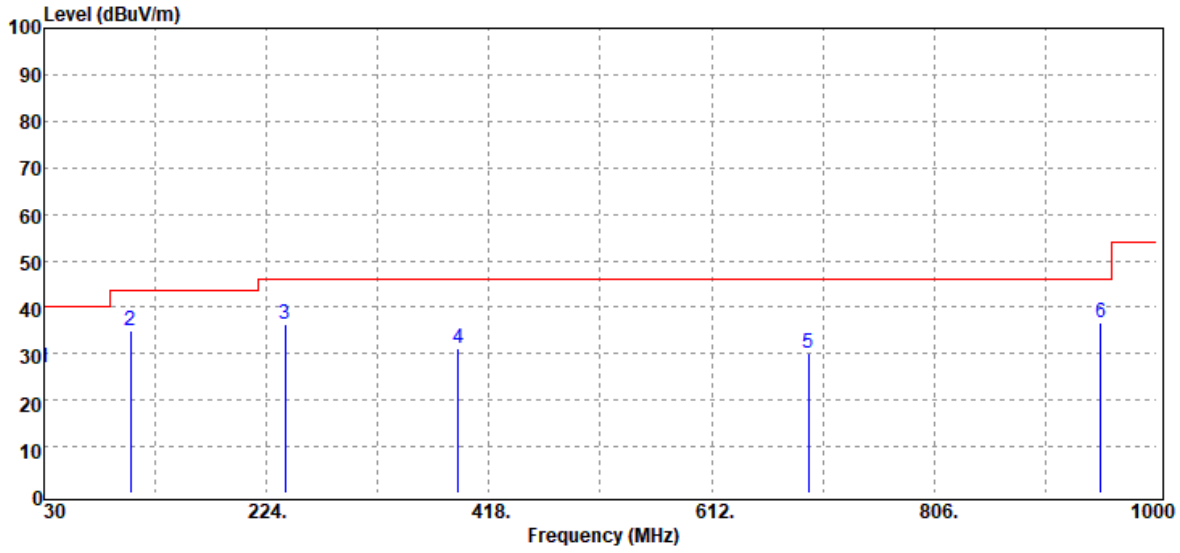
Project Number	:T190516W02	Test Date	:2019-05-25
Operation Band	:802.11a/Band3	Temp./Humi.	:20/53.5
Fundamental Frequency	:5580 MHz	Engineer	:Jerry
Operation Mode	:Tx CH Mid	Measurement Antenna Pol.	:VERTICAL
EUT Pol.	:E1 Plan		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
30.00	Peak	28.66	-1.51	27.15	40.00	-12.85
105.66	Peak	46.05	-11.02	35.03	43.50	-8.47
240.49	Peak	46.46	-10.25	36.21	46.00	-9.79
390.84	Peak	37.03	-5.96	31.07	46.00	-14.93
696.39	Peak	30.18	-0.16	30.02	46.00	-15.98
951.50	Peak	32.48	4.19	36.67	46.00	-9.33

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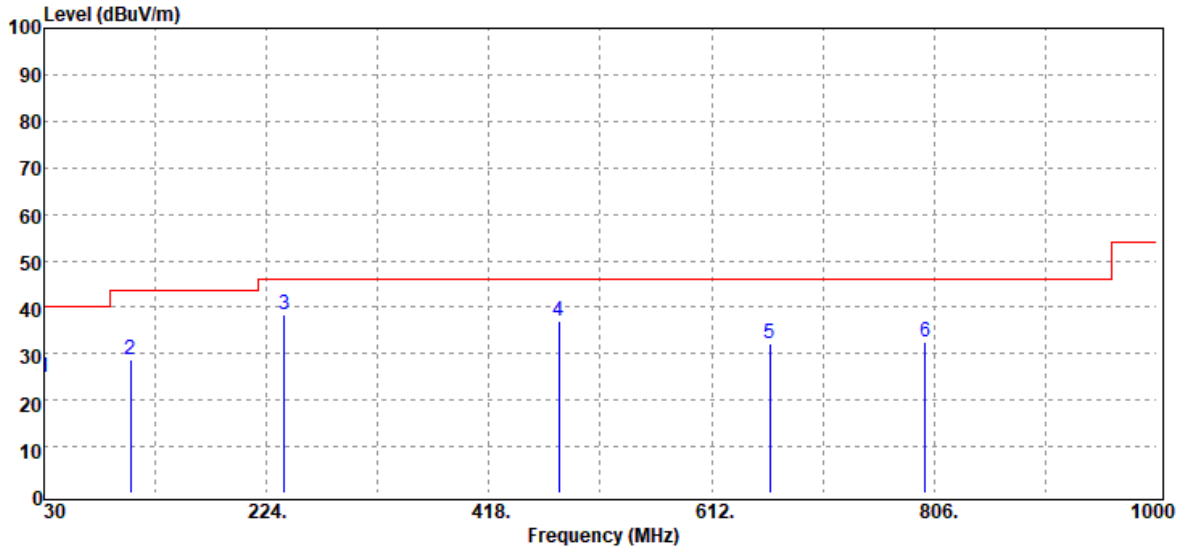
Project Number	:T190516W02	Test Date	:2019-05-25
Operation Band	:802.11a/Band3	Temp./Humi.	:20/53.5
Fundamental Frequency	:5580 MHz	Engineer	:Jerry
Operation Mode	:Tx CH Mid	Measurement Antenna Pol.	:HORIZONTAL
EUT Pol.	:E1 Plan		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
30.00	Peak	26.42	-1.51	24.91	40.00	-15.09
105.66	Peak	39.80	-11.02	28.78	43.50	-14.72
239.52	Peak	48.62	-10.29	38.33	46.00	-7.67
479.11	Peak	39.92	-2.98	36.94	46.00	-9.06
662.44	Peak	32.00	0.01	32.01	46.00	-13.99
798.24	Peak	31.02	1.50	32.52	46.00	-13.48

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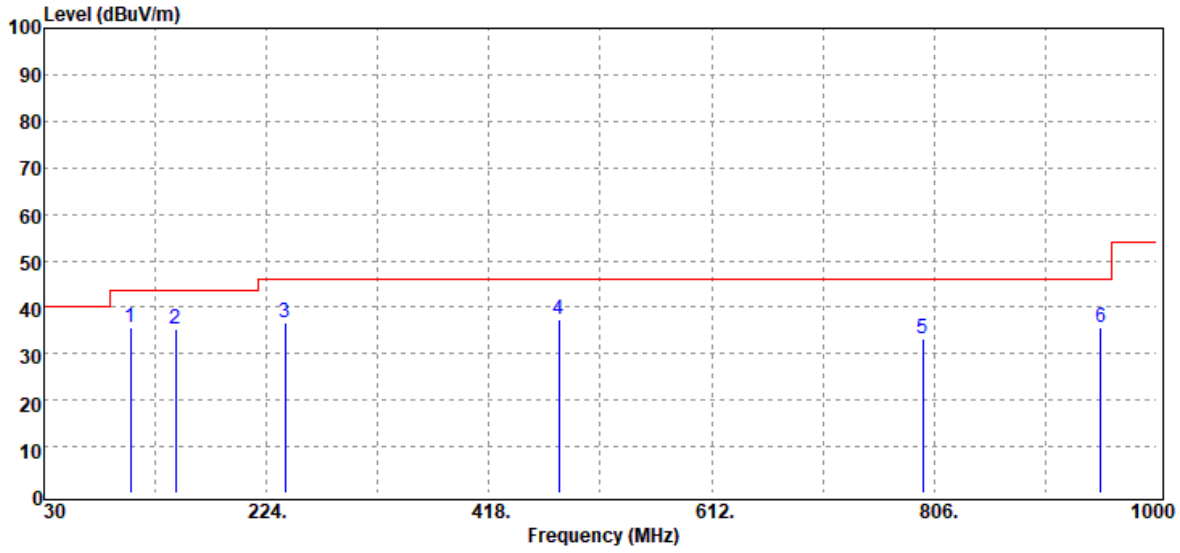
Project Number	:T190516W02	Test Date	:2019-05-25
Operation Band	:802.11n20/Band2	Temp./Humi.	:20/53.5
Fundamental Frequency	:5300 MHz	Engineer	:Jerry
Operation Mode	:Tx CH Mid	Measurement Antenna Pol.	:VERTICAL
EUT Pol.	:E1 Plan		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
105.66	Peak	46.49	-11.02	35.47	43.50	-8.03
144.46	Peak	45.18	-9.92	35.26	43.50	-8.24
240.49	Peak	46.83	-10.25	36.58	46.00	-9.42
479.11	Peak	40.35	-2.98	37.37	46.00	-8.63
796.30	Peak	31.70	1.47	33.17	46.00	-12.83
951.50	Peak	31.36	4.19	35.55	46.00	-10.45

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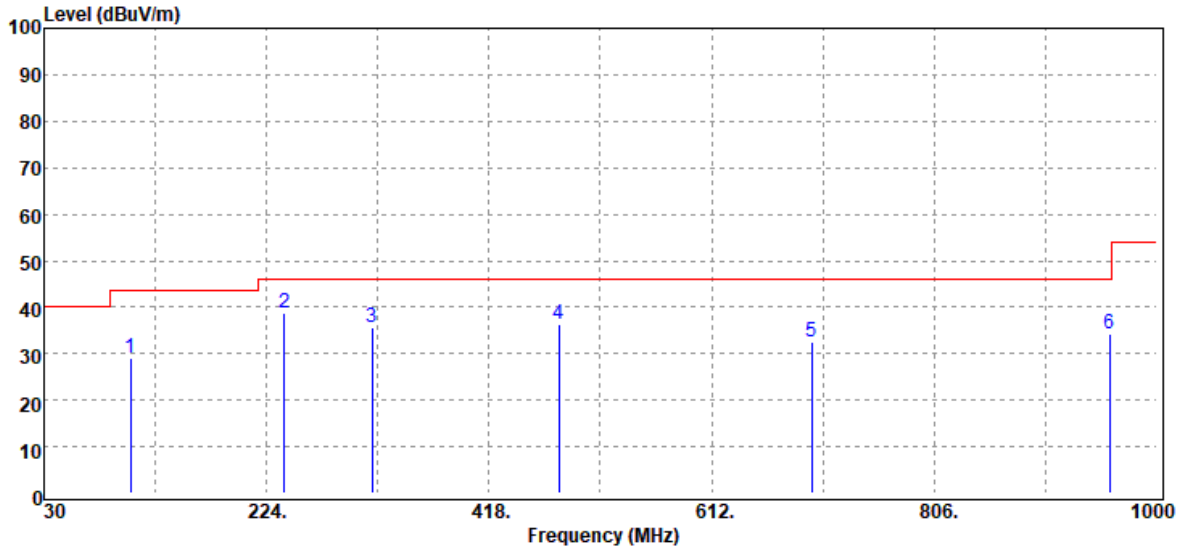
Project Number	:T190516W02	Test Date	:2019-05-25
Operation Band	:802.11n20/Band2	Temp./Humi.	:20/53.5
Fundamental Frequency	:5300 MHz	Engineer	:Jerry
Operation Mode	:Tx CH Mid	Measurement Antenna Pol.	:HORIZONTAL
EUT Pol.	:E1 Plan		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
105.66	Peak	40.00	-11.02	28.98	43.50	-14.52
239.52	Peak	48.94	-10.29	38.65	46.00	-7.35
316.15	Peak	43.25	-7.59	35.66	46.00	-10.34
479.11	Peak	39.16	-2.98	36.18	46.00	-9.82
699.30	Peak	32.63	-0.04	32.59	46.00	-13.41
959.26	Peak	29.92	4.48	34.40	46.00	-11.60

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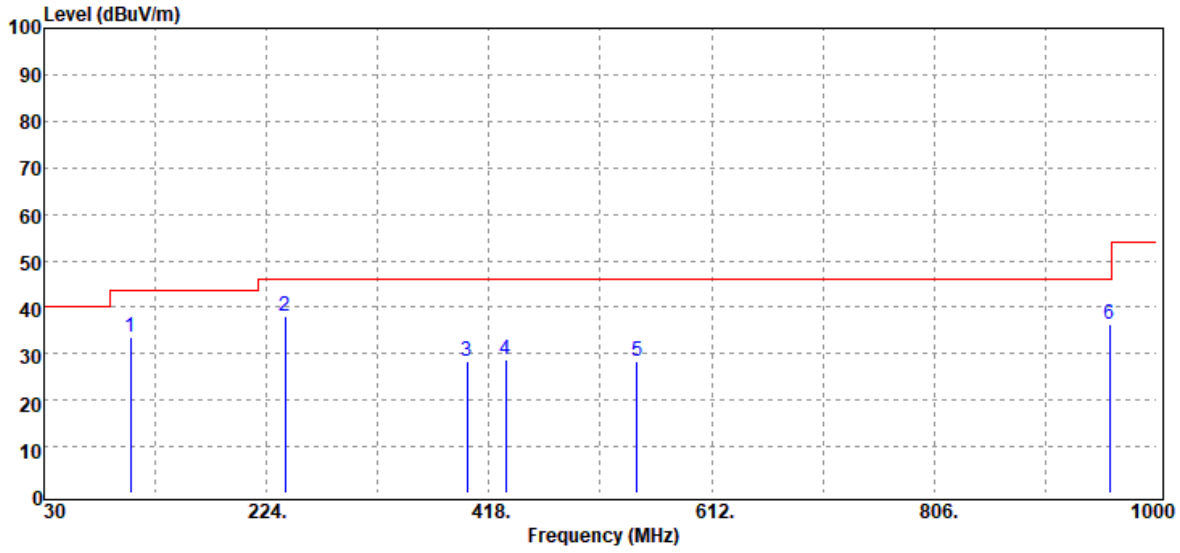
Project Number	:T190516W02	Test Date	:2019-05-25
Operation Band	:802.11n20/Band3	Temp./Humi.	:20/53.5
Fundamental Frequency	:5580 MHz	Engineer	:Jerry
Operation Mode	:Tx CH Mid	Measurement Antenna Pol.	:VERTICAL
EUT Pol.	:E1 Plan		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
105.66	Peak	44.73	-11.02	33.71	43.50	-9.79
240.49	Peak	48.23	-10.25	37.98	46.00	-8.02
398.60	Peak	33.96	-5.65	28.31	46.00	-17.69
432.55	Peak	33.08	-4.32	28.76	46.00	-17.24
547.01	Peak	30.68	-2.25	28.43	46.00	-17.57
959.26	Peak	31.99	4.48	36.47	46.00	-9.53

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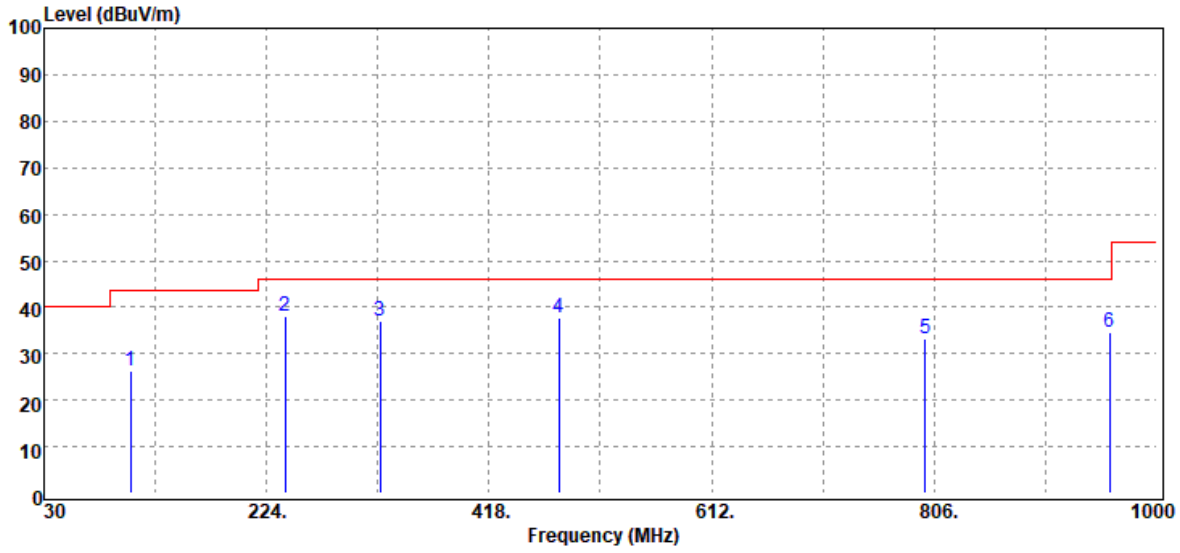
Project Number	:T190516W02	Test Date	:2019-05-25
Operation Band	:802.11n20/Band3	Temp./Humi.	:20/53.5
Fundamental Frequency	:5580 MHz	Engineer	:Jerry
Operation Mode	:Tx CH Mid	Measurement Antenna Pol.	:HORIZONTAL
EUT Pol.	:E1 Plan		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
105.66	Peak	37.48	-11.02	26.46	43.50	-17.04
240.49	Peak	48.15	-10.25	37.90	46.00	-8.10
322.94	Peak	44.52	-7.37	37.15	46.00	-8.85
479.11	Peak	40.79	-2.98	37.81	46.00	-8.19
798.24	Peak	31.60	1.50	33.10	46.00	-12.90
959.26	Peak	30.16	4.48	34.64	46.00	-11.36

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Above 1GHz Worst-Case Data:

Project Number	:T190516W02	Test Date	:2019-05-24
Operation Band	:802.11a/Band2	Temp./Humi.	:20/53.5
Fundamental Frequency	:5260 MHz	Engineer	:Jerry
Operation Mode	:Tx CH Low	Measurement Antenna Pol.	:VERTICAL
EUT Pol.	:E1 Plan		

Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
10520.00	Peak	37.72	15.99	53.71	68.20	-14.49

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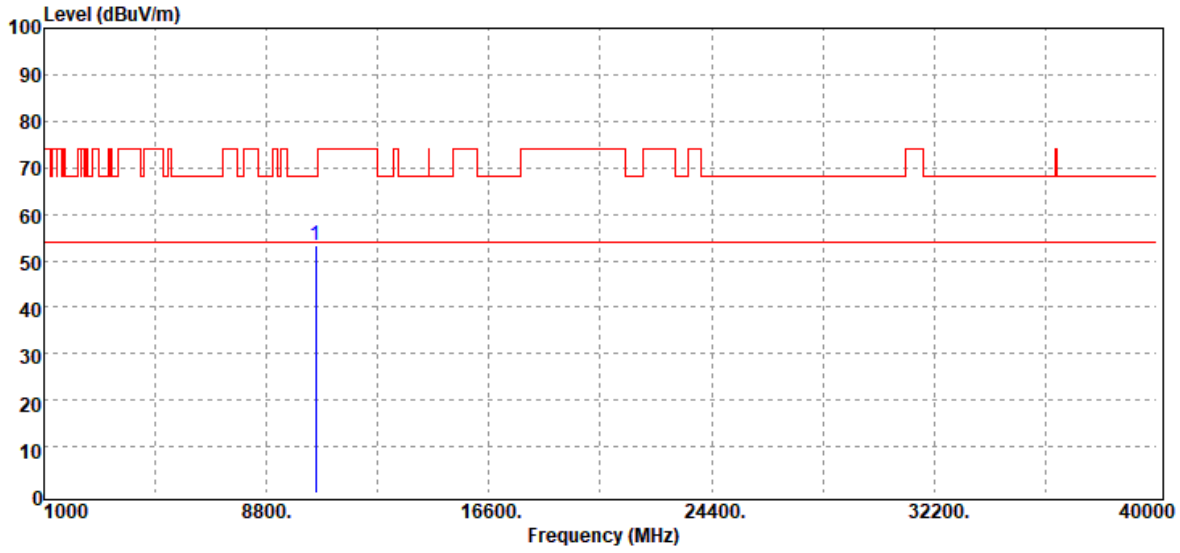
Project Number	:T190516W02	Test Date	:2019-05-24
Operation Band	:802.11a/Band2	Temp./Humi.	:20/53.5
Fundamental Frequency	:5260 MHz	Engineer	:Jerry
Operation Mode	:Tx CH Low	Measurement Antenna Pol.	:HORIZONTAL
EUT Pol.	:E1 Plan		



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
10520.00	Peak	37.28	15.99	53.27	68.20	-14.93

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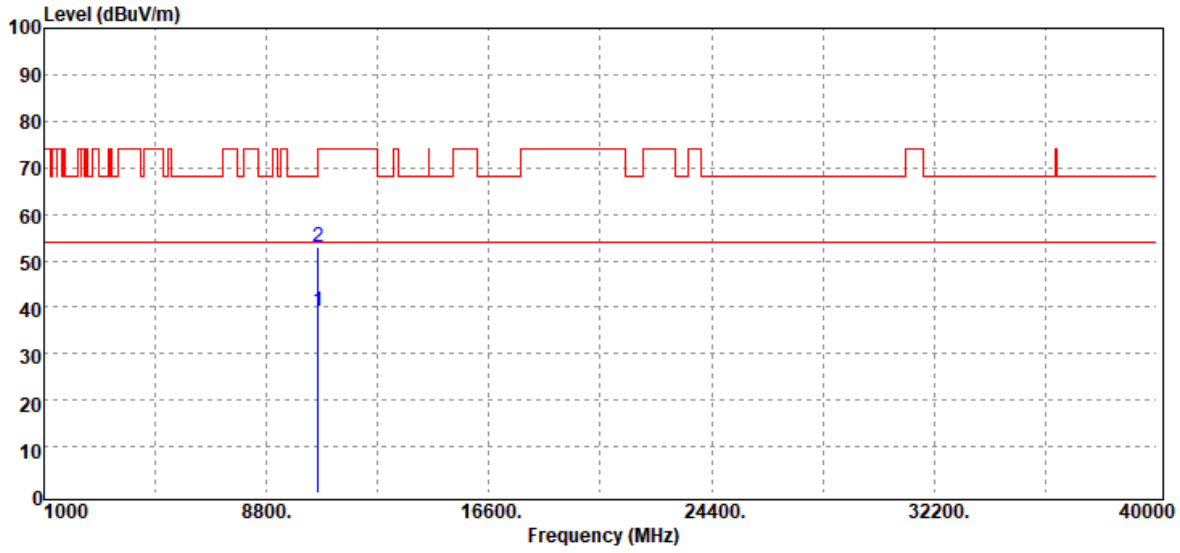
Project Number	:T190516W02	Test Date	:2019-05-24
Operation Band	:802.11a/Band2	Temp./Humi.	:20/53.5
Fundamental Frequency	:5300 MHz	Engineer	:Jerry
Operation Mode	:Tx CH Mid	Measurement Antenna Pol.	:VERTICAL
EUT Pol.	:E1 Plan		



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
10600.00	Average	23.91	15.27	39.18	54.00	-14.82
10600.00	Peak	37.83	15.27	53.10	74.00	-20.90

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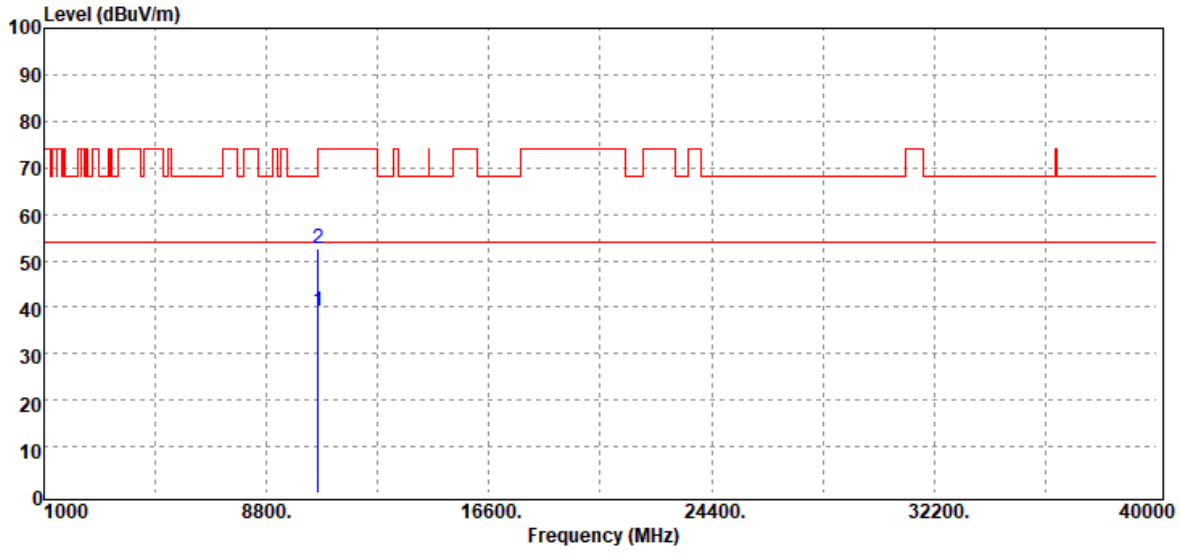
Project Number	:T190516W02	Test Date	:2019-05-24
Operation Band	:802.11a/Band2	Temp./Humi.	:20/53.5
Fundamental Frequency	:5300 MHz	Engineer	:Jerry
Operation Mode	:Tx CH Mid	Measurement Antenna Pol.	:HORIZONTAL
EUT Pol.	:E1 Plan		



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
10600.00	Average	23.71	15.27	38.98	54.00	-15.02
10600.00	Peak	37.39	15.27	52.66	74.00	-21.34

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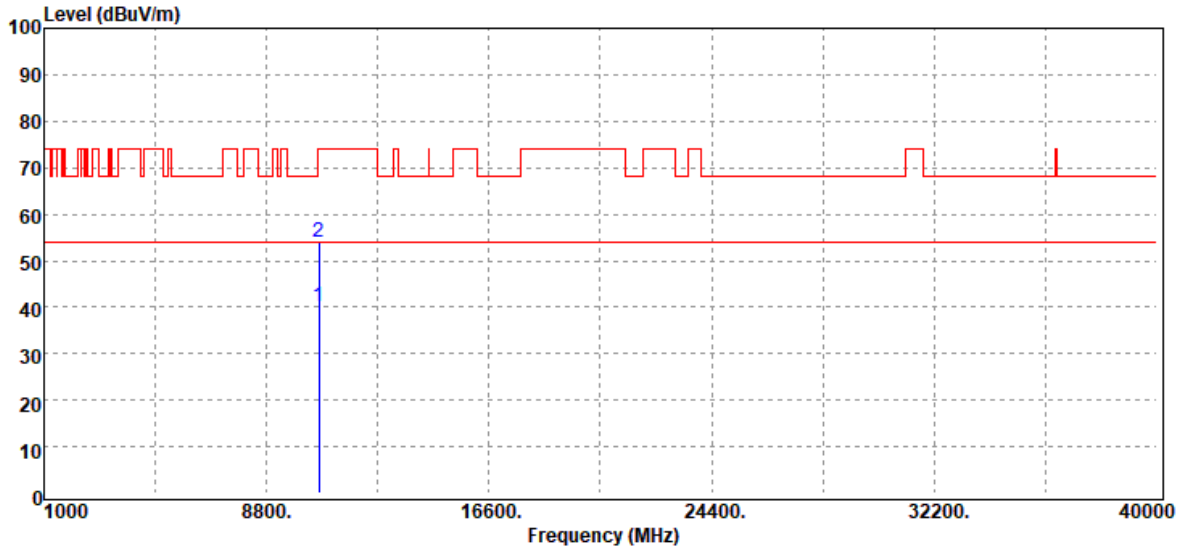
Project Number	:T190516W02	Test Date	:2019-05-24
Operation Band	:802.11a/Band2	Temp./Humi.	:20/53.5
Fundamental Frequency	:5320 MHz	Engineer	:Jerry
Operation Mode	:Tx CH High	Measurement Antenna Pol.	:VERTICAL
EUT Pol.	:E1 Plan		



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
10640.00	Average	24.05	16.05	40.10	54.00	-13.90
10640.00	Peak	37.82	16.05	53.87	74.00	-20.13

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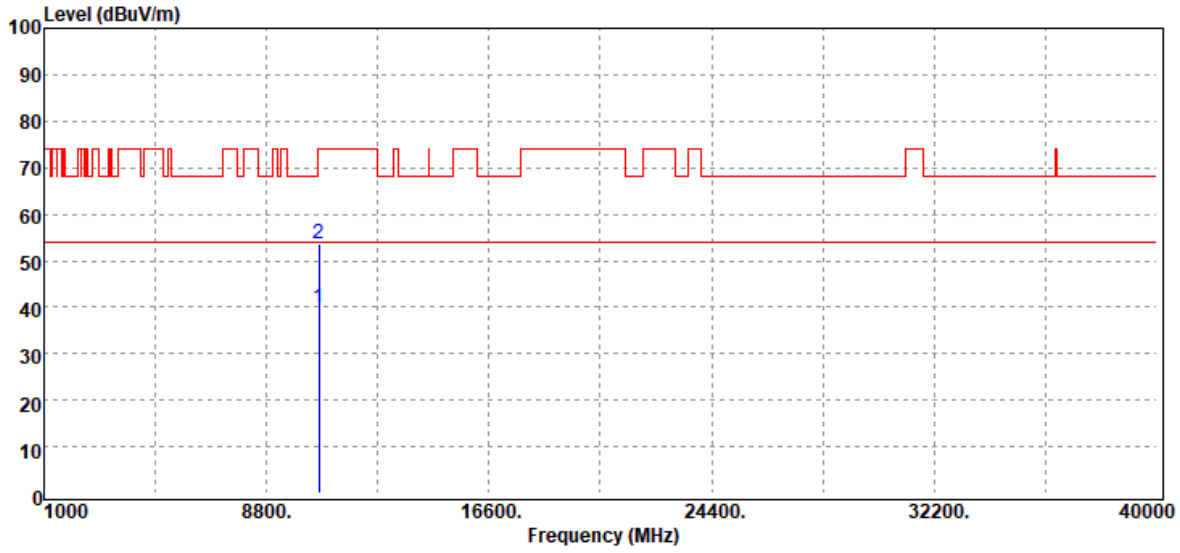
Project Number	:T190516W02	Test Date	:2019-05-24
Operation Band	:802.11a/Band2	Temp./Humi.	:20/53.5
Fundamental Frequency	:5320 MHz	Engineer	:Jerry
Operation Mode	:Tx CH High	Measurement Antenna Pol.	:HORIZONTAL
EUT Pol.	:E1 Plan		



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
10640.00	Average	23.89	16.05	39.94	54.00	-14.06
10640.00	Peak	37.52	16.05	53.57	74.00	-20.43

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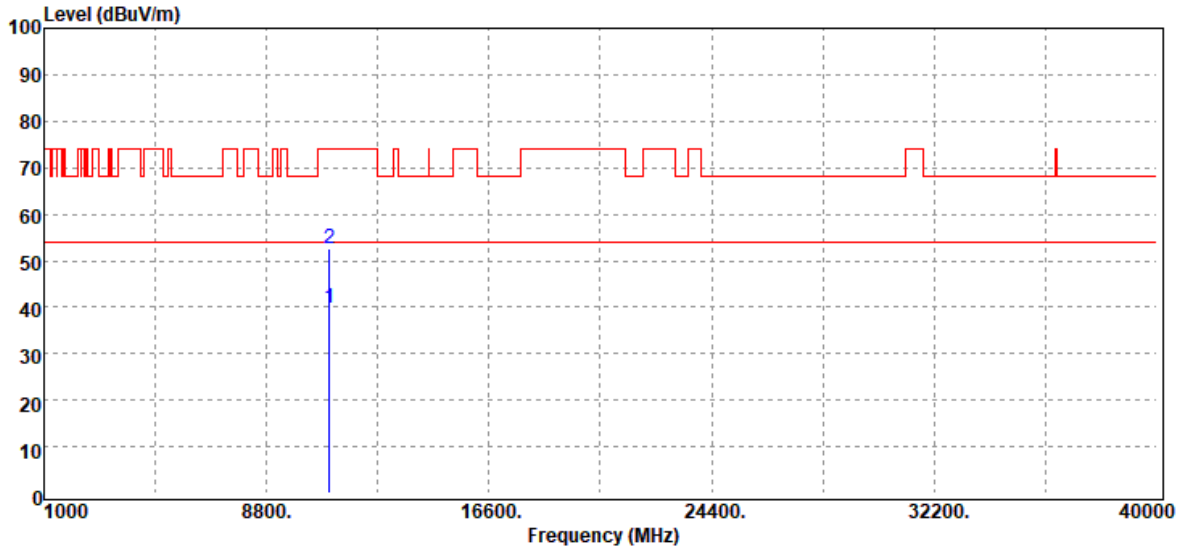
Project Number	:T190516W02	Test Date	:2019-05-24
Operation Band	:802.11a/Band3	Temp./Humi.	:20/53.5
Fundamental Frequency	:5500 MHz	Engineer	:Jerry
Operation Mode	:Tx CH Low	Measurement Antenna Pol.	:VERTICAL
EUT Pol.	:E1 Plan		



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
11000.00	Average	22.25	17.44	39.69	54.00	-14.31
11000.00	Peak	35.28	17.44	52.72	74.00	-21.28

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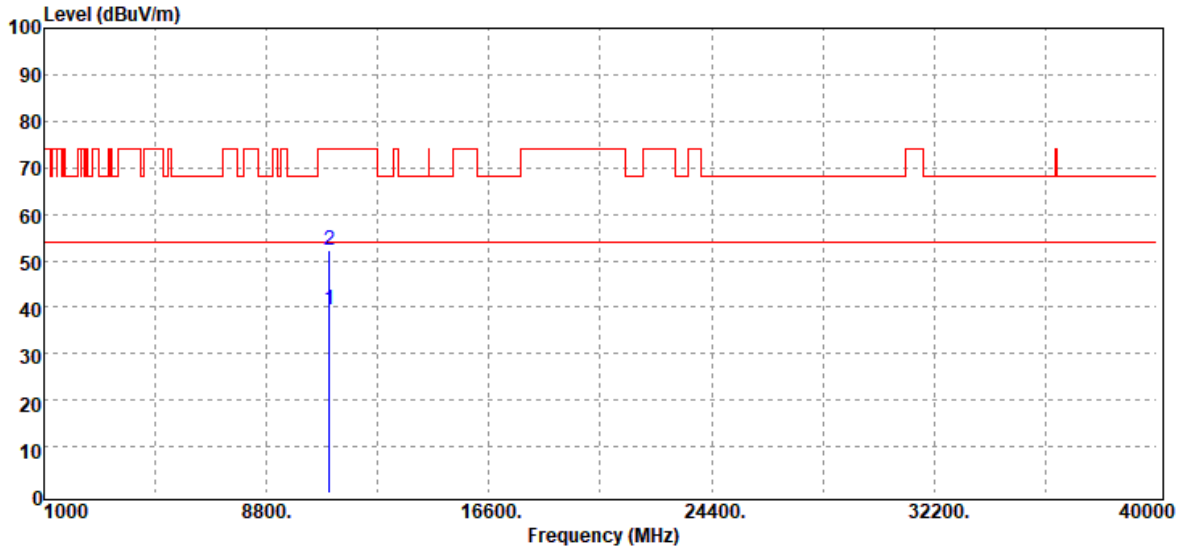
Project Number	:T190516W02	Test Date	:2019-05-24
Operation Band	:802.11a/Band3	Temp./Humi.	:20/53.5
Fundamental Frequency	:5500 MHz	Engineer	:Jerry
Operation Mode	:Tx CH Low	Measurement Antenna Pol.	:HORIZONTAL
EUT Pol.	:E1 Plan		



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
11000.00	Average	21.97	17.44	39.41	54.00	-14.59
11000.00	Peak	34.91	17.44	52.35	74.00	-21.65

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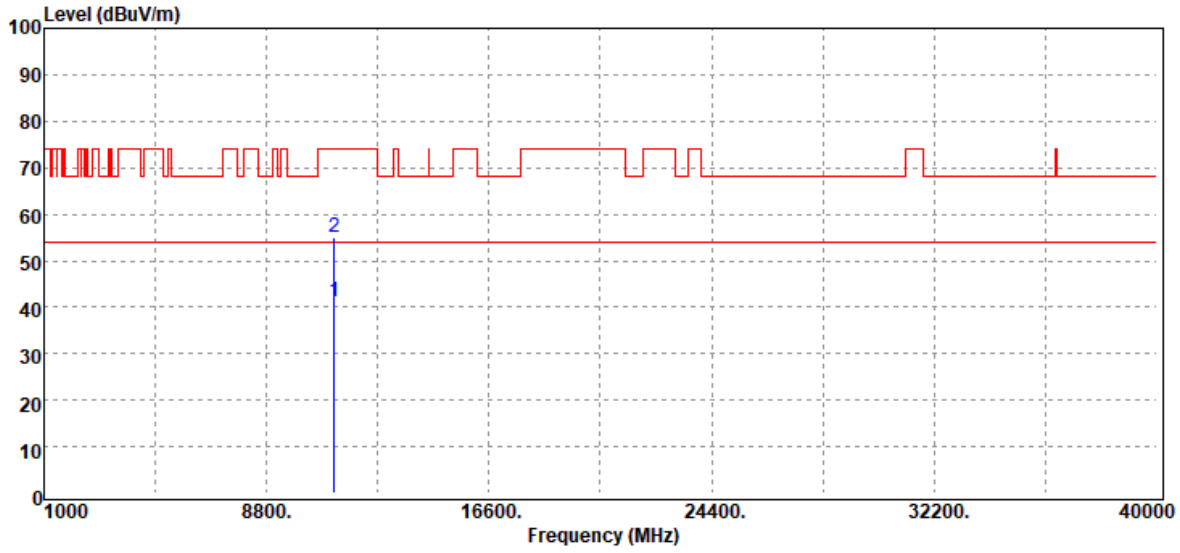
Project Number	:T190516W02	Test Date	:2019-05-24
Operation Band	:802.11a/Band3	Temp./Humi.	:20/53.5
Fundamental Frequency	:5580 MHz	Engineer	:Jerry
Operation Mode	:Tx CH Mid	Measurement Antenna Pol.	:VERTICAL
EUT Pol.	:E1 Plan		



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
11160.00	Average	24.22	16.85	41.07	54.00	-12.93
11160.00	Peak	38.23	16.85	55.08	74.00	-18.92

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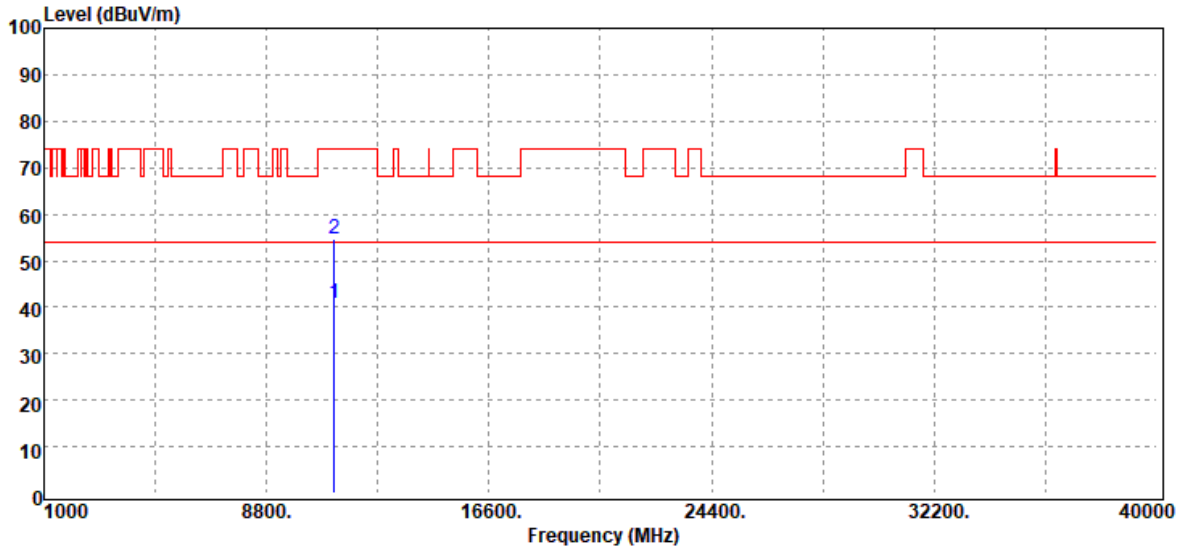
Project Number	:T190516W02	Test Date	:2019-05-24
Operation Band	:802.11a/Band3	Temp./Humi.	:20/53.5
Fundamental Frequency	:5580 MHz	Engineer	:Jerry
Operation Mode	:Tx CH Mid	Measurement Antenna Pol.	:HORIZONTAL
EUT Pol.	:E1 Plan		



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
11160.00	Average	23.98	16.85	40.83	54.00	-13.17
11160.00	Peak	37.93	16.85	54.78	74.00	-19.22

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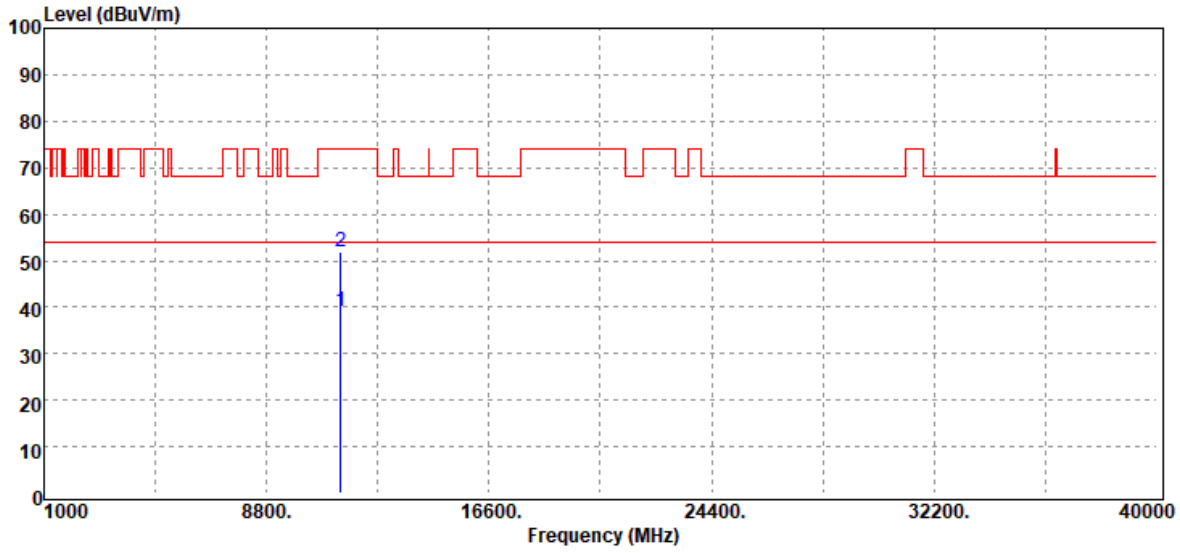
Project Number	:T190516W02	Test Date	:2019-05-24
Operation Band	:802.11a/Band3	Temp./Humi.	:20/53.5
Fundamental Frequency	:5700 MHz	Engineer	:Jerry
Operation Mode	:Tx CH High	Measurement Antenna Pol.	:VERTICAL
EUT Pol.	:E1 Plan		



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
11400.00	Average	22.31	16.89	39.20	54.00	-14.80
11400.00	Peak	35.11	16.89	52.00	74.00	-22.00

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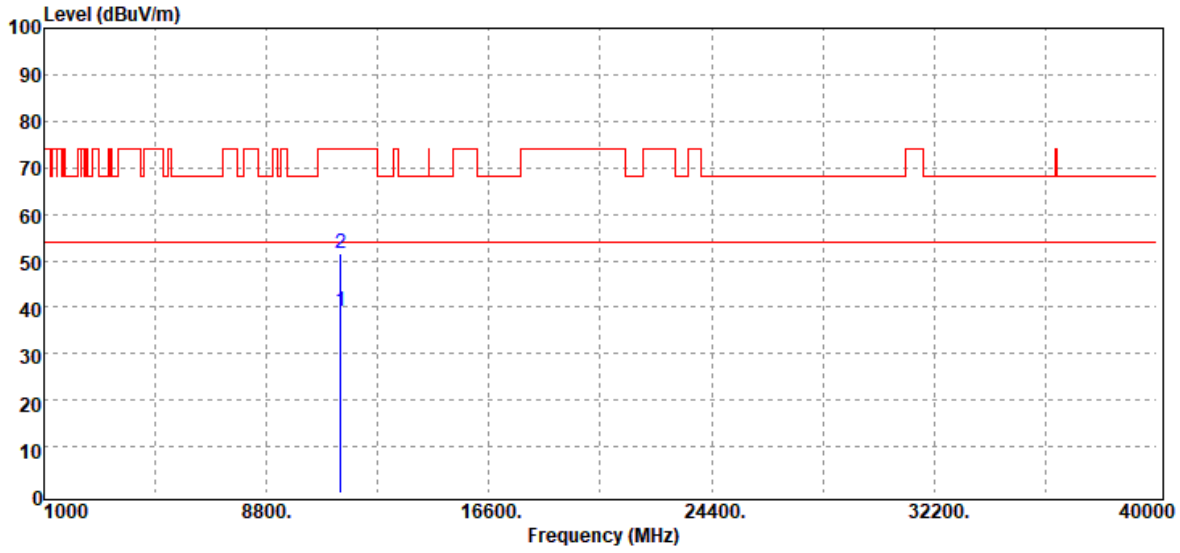
Project Number	:T190516W02	Test Date	:2019-05-24
Operation Band	:802.11a/Band3	Temp./Humi.	:20/53.5
Fundamental Frequency	:5700 MHz	Engineer	:Jerry
Operation Mode	:Tx CH High	Measurement Antenna Pol.	:HORIZONTAL
EUT Pol.	:E1 Plan		



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
11400.00	Average	22.05	16.89	38.94	54.00	-15.06
11400.00	Peak	34.82	16.89	51.71	74.00	-22.29

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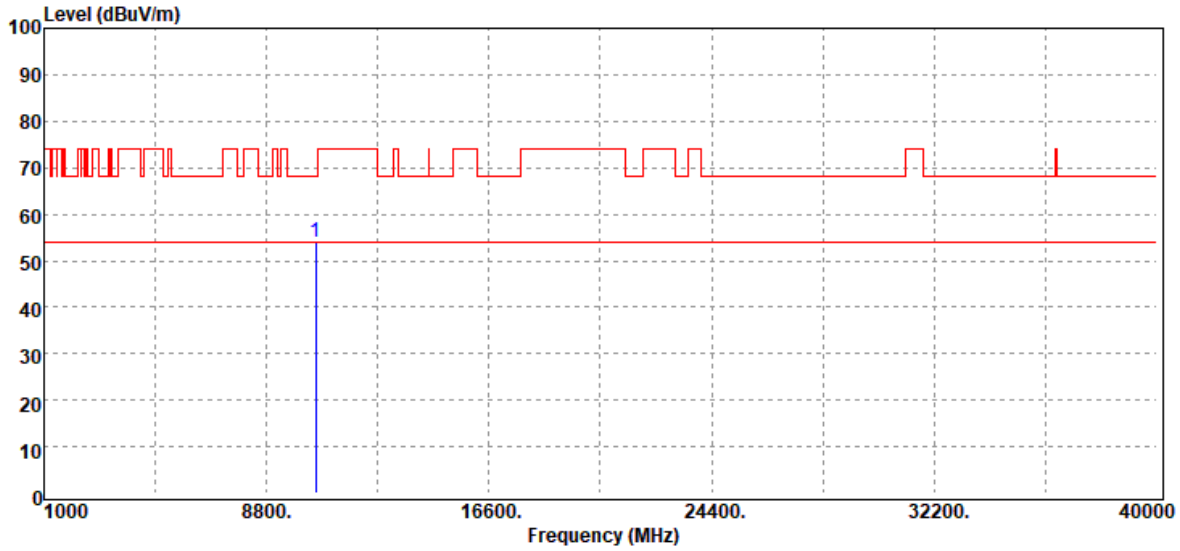
Project Number	:T190516W02	Test Date	:2019-05-24
Operation Band	:802.11n20/Band2	Temp./Humi.	:20/53.5
Fundamental Frequency	:5260 MHz	Engineer	:Jerry
Operation Mode	:Tx CH Low	Measurement Antenna Pol.	:VERTICAL
EUT Pol.	:E1 Plan		



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
10520.00	Peak	37.94	15.99	53.93	68.20	-14.27

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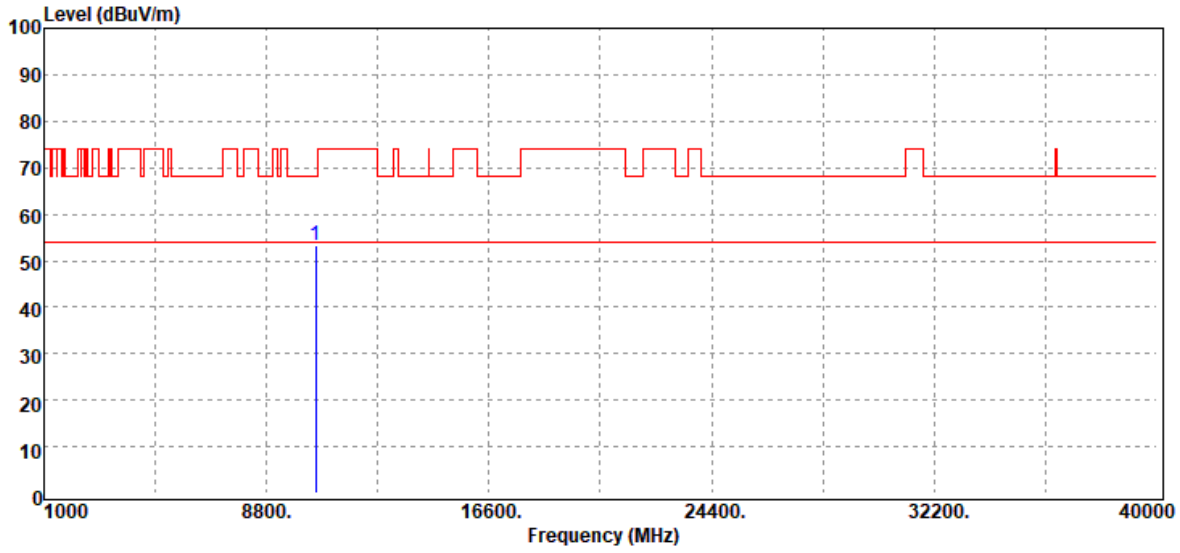
Project Number	:T190516W02	Test Date	:2019-05-24
Operation Band	:802.11n20/Band2	Temp./Humi.	:20/53.5
Fundamental Frequency	:5260 MHz	Engineer	:Jerry
Operation Mode	:Tx CH Low	Measurement Antenna Pol.	:HORIZONTAL
EUT Pol.	:E1 Plan		



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
10520.00	Peak	37.36	15.99	53.35	68.20	-14.85

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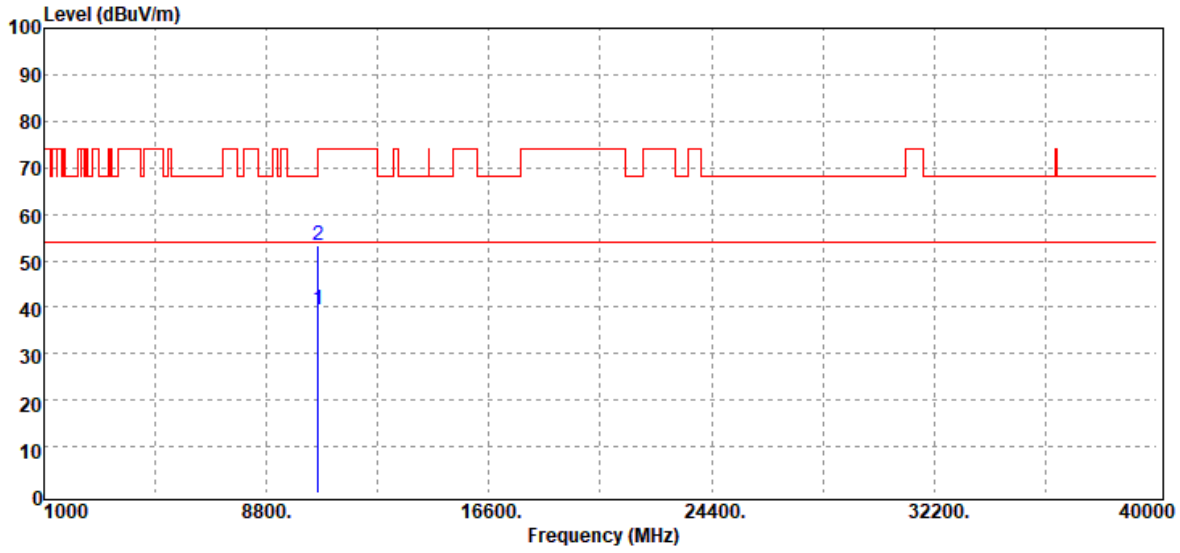
Project Number	:T190516W02	Test Date	:2019-05-24
Operation Band	:802.11n20/Band2	Temp./Humi.	:20/53.5
Fundamental Frequency	:5300 MHz	Engineer	:Jerry
Operation Mode	:Tx CH Mid	Measurement Antenna Pol.	:VERTICAL
EUT Pol.	:E1 Plan		



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
10600.00	Average	24.02	15.27	39.29	54.00	-14.71
10600.00	Peak	37.89	15.27	53.16	74.00	-20.84

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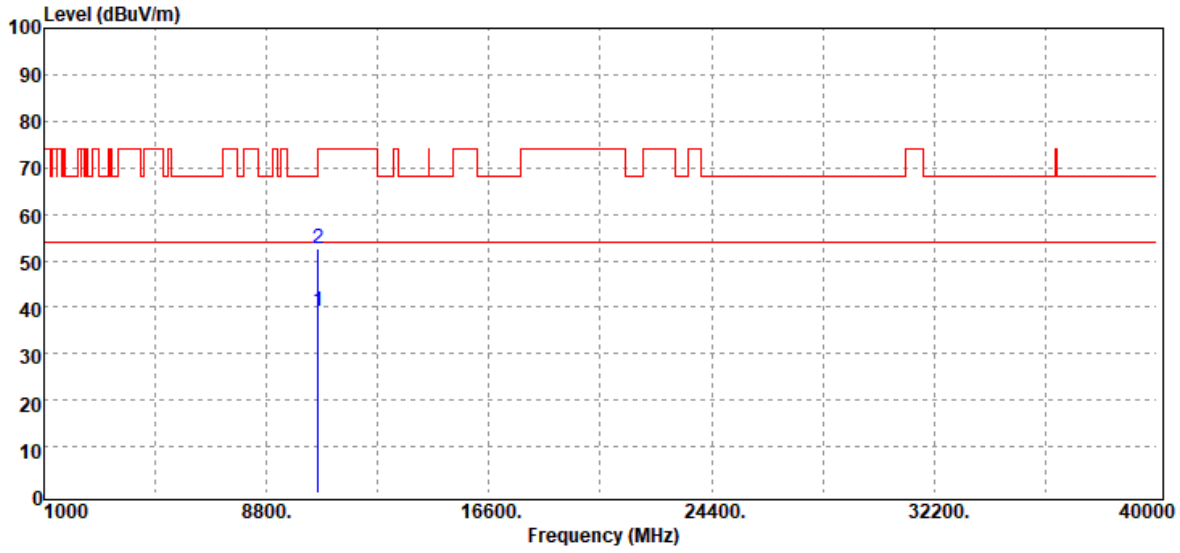
Project Number	:T190516W02	Test Date	:2019-05-24
Operation Band	:802.11n20/Band2	Temp./Humi.	:20/53.5
Fundamental Frequency	:5300 MHz	Engineer	:Jerry
Operation Mode	:Tx CH Mid	Measurement Antenna Pol.	:HORIZONTAL
EUT Pol.	:E1 Plan		



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
10600.00	Average	23.86	15.27	39.13	54.00	-14.87
10600.00	Peak	37.38	15.27	52.65	74.00	-21.35

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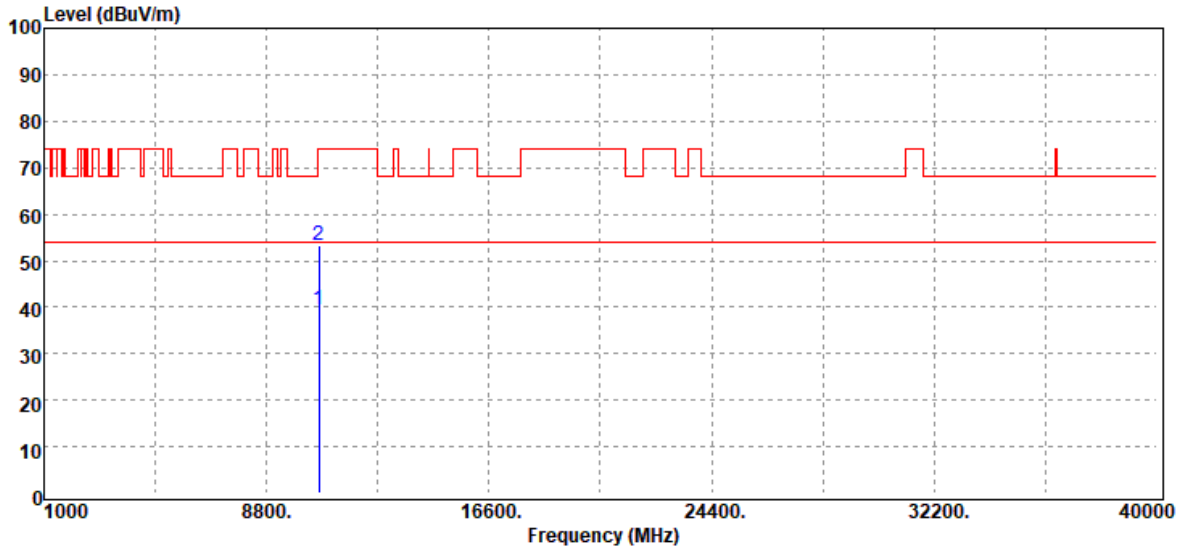
Project Number	:T190516W02	Test Date	:2019-05-24
Operation Band	:802.11n20/Band2	Temp./Humi.	:20/53.5
Fundamental Frequency	:5320 MHz	Engineer	:Jerry
Operation Mode	:Tx CH High	Measurement Antenna Pol.	:VERTICAL
EUT Pol.	:E1 Plan		



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
10640.00	Average	23.52	16.05	39.57	54.00	-14.43
10640.00	Peak	37.31	16.05	53.36	74.00	-20.64

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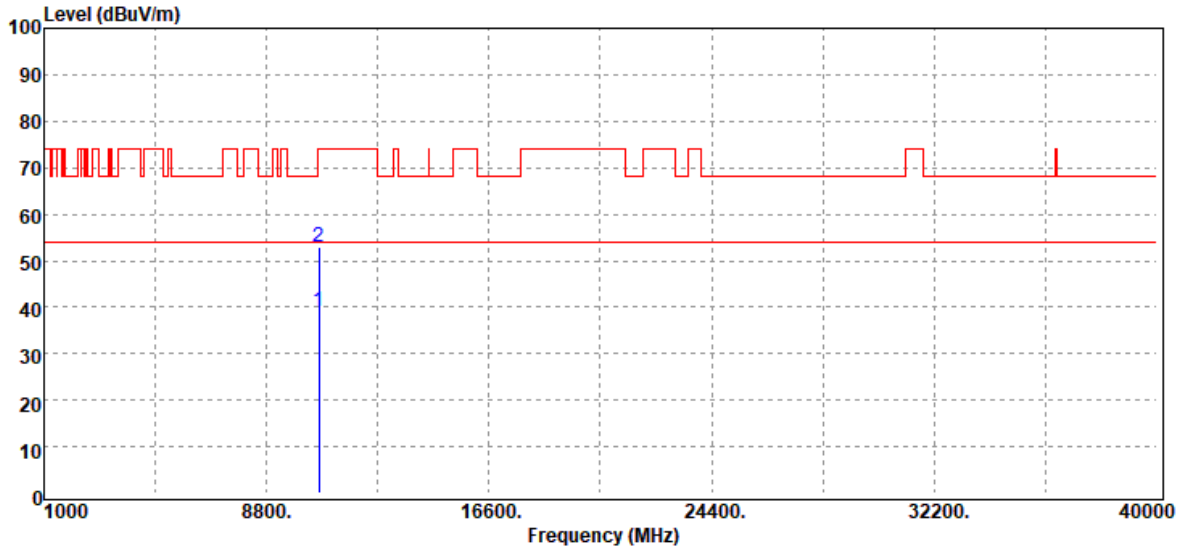
Project Number	:T190516W02	Test Date	:2019-05-24
Operation Band	:802.11n20/Band2	Temp./Humi.	:20/53.5
Fundamental Frequency	:5320 MHz	Engineer	:Jerry
Operation Mode	:Tx CH High	Measurement Antenna Pol.	:HORIZONTAL
EUT Pol.	:E1 Plan		



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
10640.00	Average	23.11	16.05	39.16	54.00	-14.84
10640.00	Peak	36.89	16.05	52.94	74.00	-21.06

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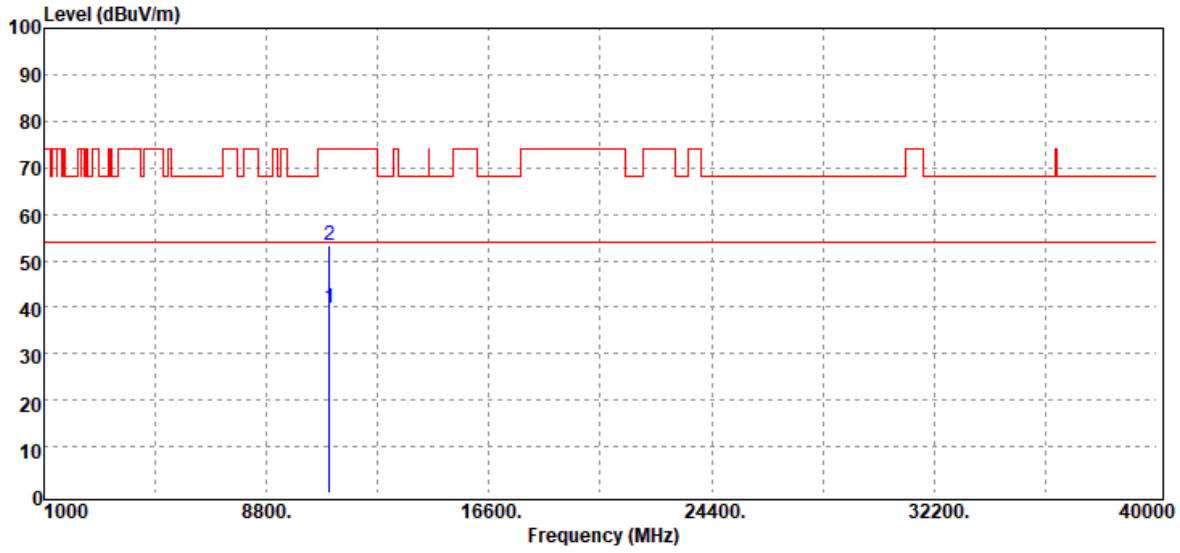
Project Number	:T190516W02	Test Date	:2019-05-24
Operation Band	:802.11n20/Band3	Temp./Humi.	:20/53.5
Fundamental Frequency	:5500 MHz	Engineer	:Jerry
Operation Mode	:Tx CH Low	Measurement Antenna Pol.	:VERTICAL
EUT Pol.	:E1 Plan		



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
11000.00	Average	22.37	17.44	39.81	54.00	-14.19
11000.00	Peak	35.69	17.44	53.13	74.00	-20.87

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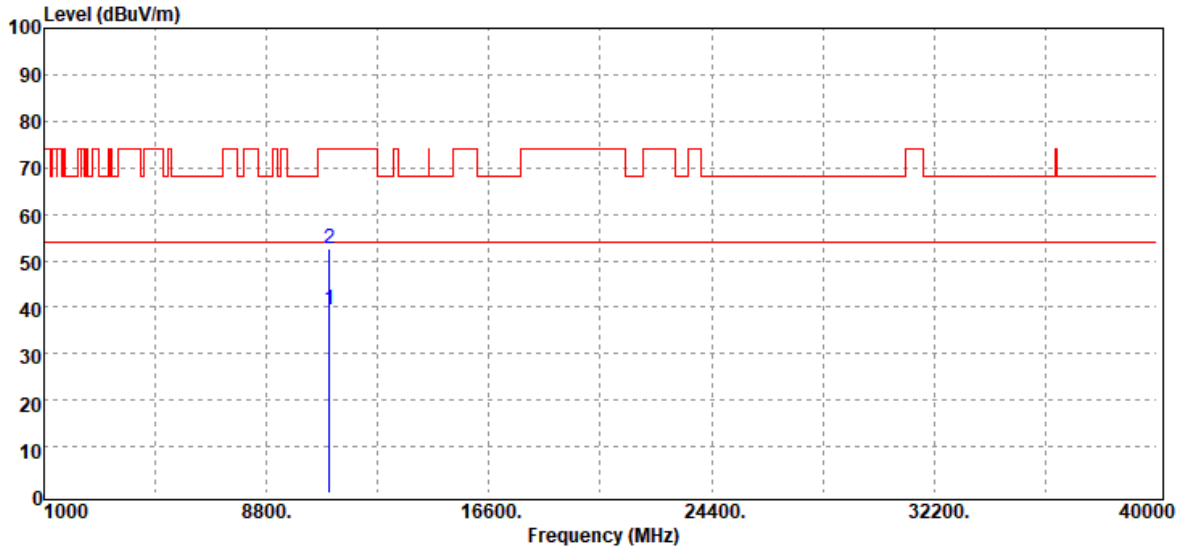
Project Number	:T190516W02	Test Date	:2019-05-24
Operation Band	:802.11n20/Band3	Temp./Humi.	:20/53.5
Fundamental Frequency	:5500 MHz	Engineer	:Jerry
Operation Mode	:Tx CH Low	Measurement Antenna Pol.	:HORIZONTAL
EUT Pol.	:E1 Plan		



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
11000.00	Average	22.09	17.44	39.53	54.00	-14.47
11000.00	Peak	35.02	17.44	52.46	74.00	-21.54

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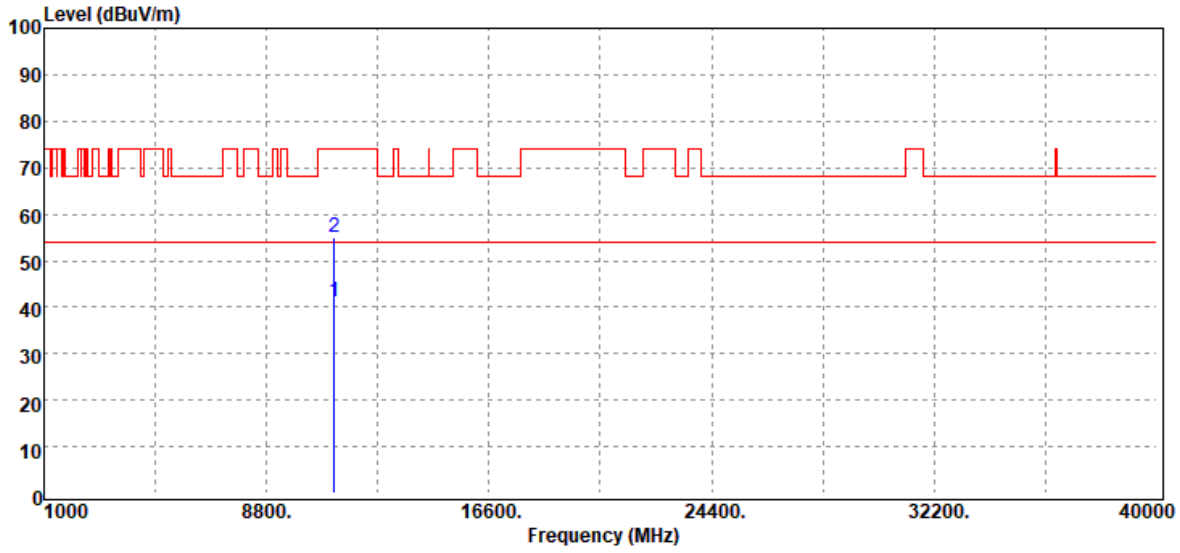
Project Number	:T190516W02	Test Date	:2019-05-24
Operation Band	:802.11n20/Band3	Temp./Humi.	:20/53.5
Fundamental Frequency	:5580 MHz	Engineer	:Jerry
Operation Mode	:Tx CH Mid	Measurement Antenna Pol.	:VERTICAL
EUT Pol.	:E1 Plan		



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
11160.00	Average	24.32	16.85	41.17	54.00	-12.83
11160.00	Peak	38.19	16.85	55.04	74.00	-18.96

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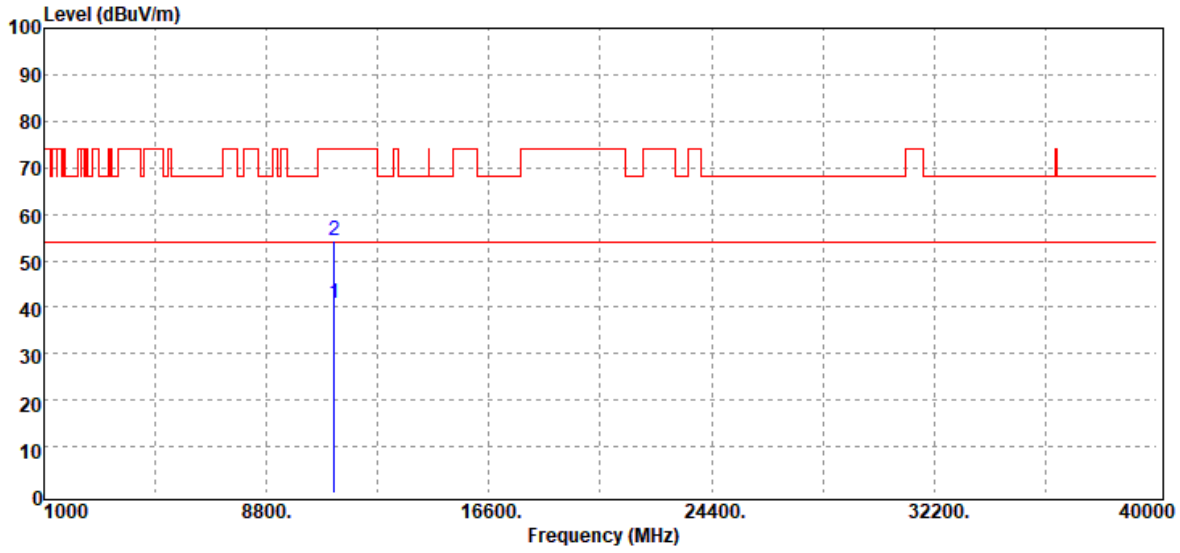
Project Number	:T190516W02	Test Date	:2019-05-24
Operation Band	:802.11n20/Band3	Temp./Humi.	:20/53.5
Fundamental Frequency	:5580 MHz	Engineer	:Jerry
Operation Mode	:Tx CH Mid	Measurement Antenna Pol.	:HORIZONTAL
EUT Pol.	:E1 Plan		



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
11160.00	Average	23.99	16.85	40.84	54.00	-13.16
11160.00	Peak	37.52	16.85	54.37	74.00	-19.63

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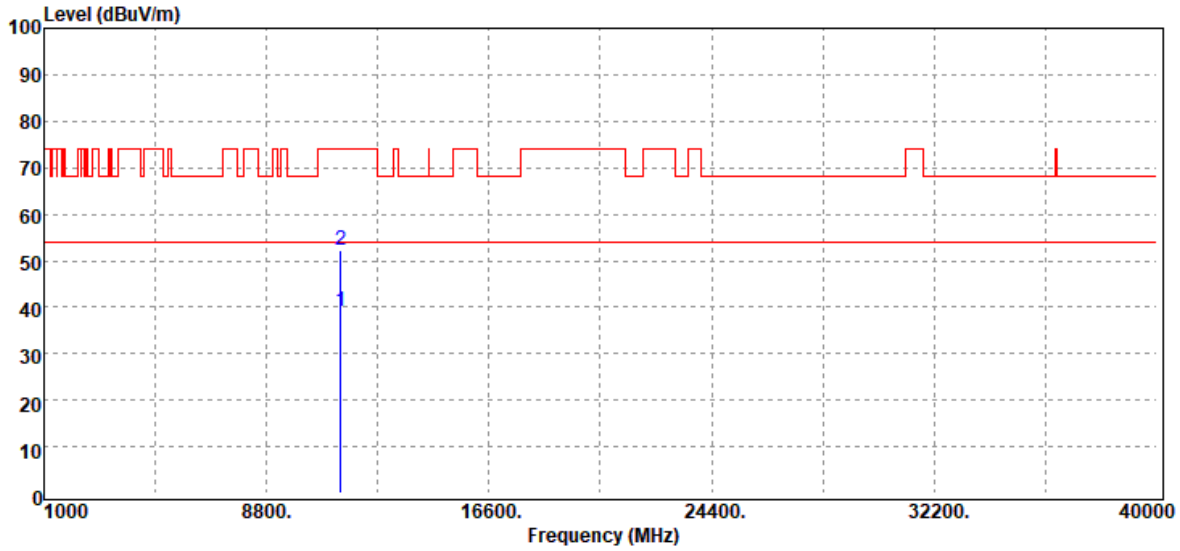
Project Number	:T190516W02	Test Date	:2019-05-24
Operation Band	:802.11n20/Band3	Temp./Humi.	:20/53.5
Fundamental Frequency	:5700 MHz	Engineer	:Jerry
Operation Mode	:Tx CH High	Measurement Antenna Pol.	:VERTICAL
EUT Pol.	:E1 Plan		



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
11400.00	Average	22.36	16.89	39.25	54.00	-14.75
11400.00	Peak	35.32	16.89	52.21	74.00	-21.79

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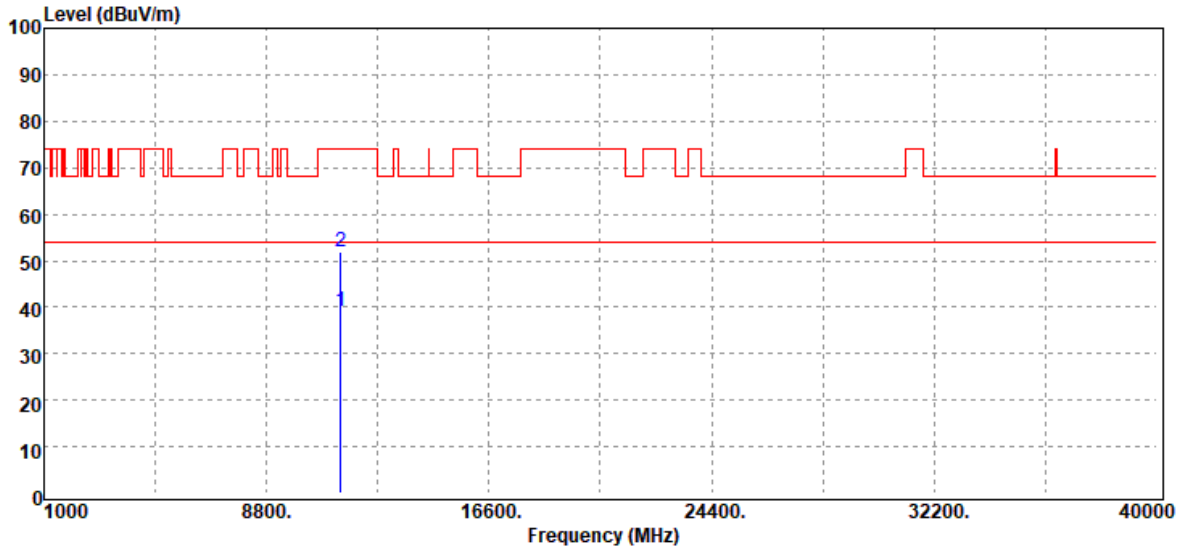
Project Number	:T190516W02	Test Date	:2019-05-24
Operation Band	:802.11n20/Band3	Temp./Humi.	:20/53.5
Fundamental Frequency	:5700 MHz	Engineer	:Jerry
Operation Mode	:Tx CH High	Measurement Antenna Pol.	:HORIZONTAL
EUT Pol.	:E1 Plan		



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
11400.00	Average	22.09	16.89	38.98	54.00	-15.02
11400.00	Peak	35.13	16.89	52.02	74.00	-21.98

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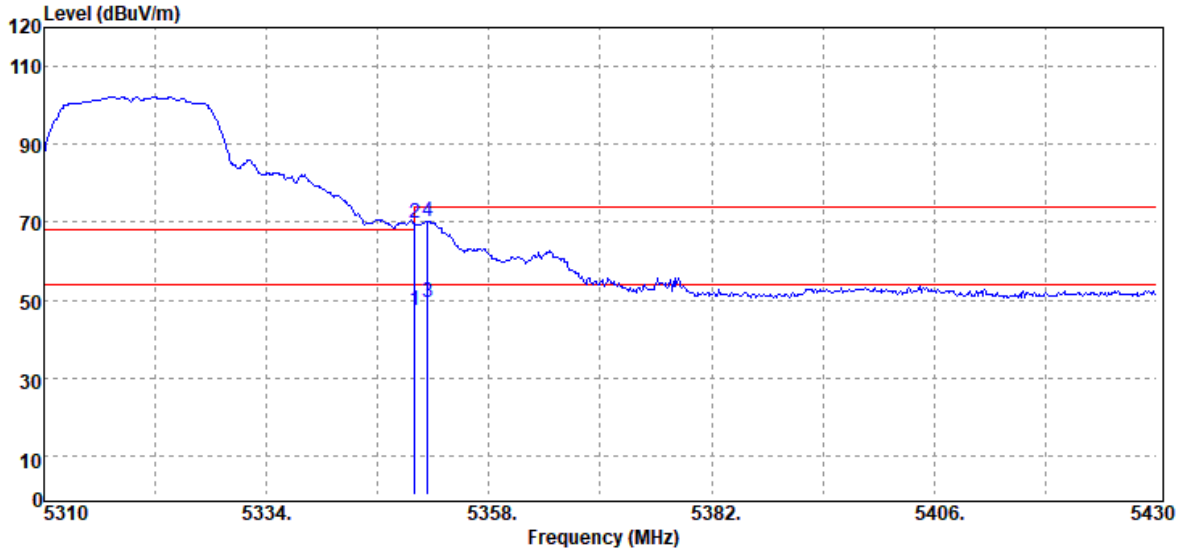
Band edge falling to restricted band

Project Number	:T190516W02	Test Date	:2019-05-24
Operation Band	:802.11a/Band2	Temp./Humi.	:20/53.5
Fundamental Frequency	:5320 MHz	Engineer	:Jerry
Operation Mode	:BE CH High	Measurement Antenna Pol.	:VERTICAL
EUT Pol.	:E1 Plan		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
5350.00	Average	42.01	5.21	47.22	54.00	-6.78
5350.00	Peak	64.58	5.21	69.79	74.00	-4.21
5351.40	Average	44.12	5.22	49.34	54.00	-4.66
5351.40	Peak	64.87	5.22	70.09	74.00	-3.91

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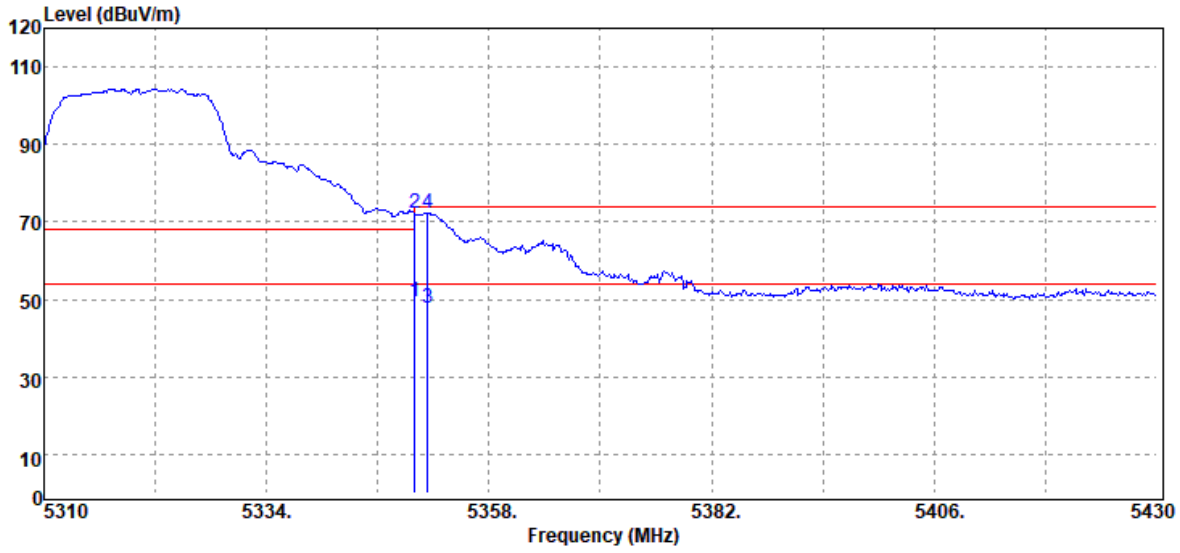
Project Number	:T190516W02	Test Date	:2019-05-24
Operation Band	:802.11a/Band2	Temp./Humi.	:20/53.5
Fundamental Frequency	:5320 MHz	Engineer	:Jerry
Operation Mode	:BE CH High	Measurement Antenna Pol.	:HORIZONTAL
EUT Pol.	:E1 Plan		



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
5350.00	Average	44.03	5.21	49.24	54.00	-4.76
5350.00	Peak	66.84	5.21	72.05	74.00	-1.95
5351.40	Average	42.61	5.22	47.83	54.00	-6.17
5351.40	Peak	67.05	5.22	72.27	74.00	-1.73

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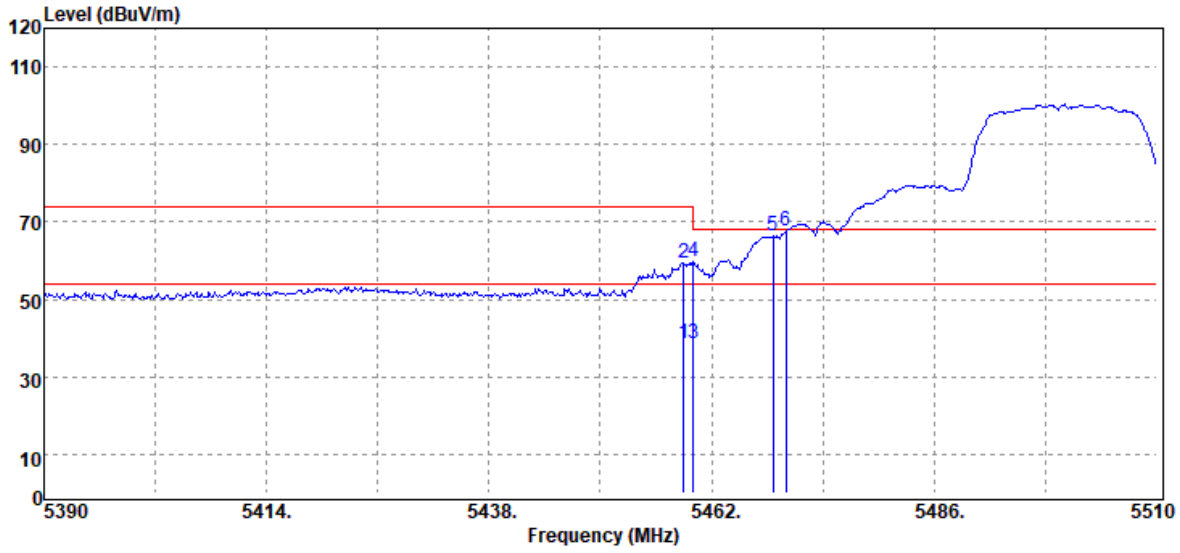
Project Number	:T190516W02	Test Date	:2019-05-24
Operation Band	:802.11a/Band3	Temp./Humi.	:20/53.5
Fundamental Frequency	:5500 MHz	Engineer	:Jerry
Operation Mode	:BE CH Low	Measurement Antenna Pol.	:VERTICAL
EUT Pol.	:E1 Plan		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
5459.00	Average	32.92	5.63	38.55	54.00	-15.45
5459.00	Peak	53.72	5.63	59.35	74.00	-14.65
5460.00	Average	33.04	5.63	38.67	54.00	-15.33
5460.00	Peak	53.99	5.63	59.62	74.00	-14.38
5468.60	Peak	60.60	5.64	66.24	68.20	-1.96
5470.00	Peak	61.87	5.65	67.52	68.20	-0.68

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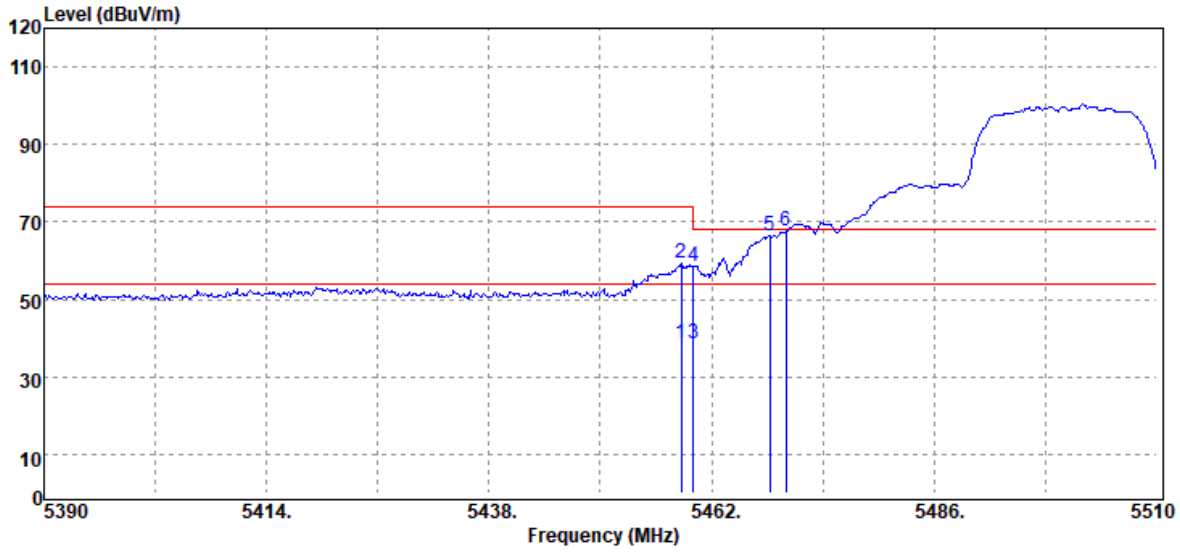
Project Number	:T190516W02	Test Date	:2019-05-24
Operation Band	:802.11a/Band3	Temp./Humi.	:20/53.5
Fundamental Frequency	:5500 MHz	Engineer	:Jerry
Operation Mode	:BE CH Low	Measurement Antenna Pol.	:HORIZONTAL
EUT Pol.	:E1 Plan		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
5458.76	Average	32.90	5.63	38.53	54.00	-15.47
5458.76	Peak	53.58	5.63	59.21	74.00	-14.79
5460.00	Average	33.11	5.63	38.74	54.00	-15.26
5460.00	Peak	53.08	5.63	58.71	74.00	-15.29
5468.24	Peak	60.86	5.64	66.50	68.20	-1.70
5470.00	Peak	61.98	5.65	67.63	68.20	-0.57

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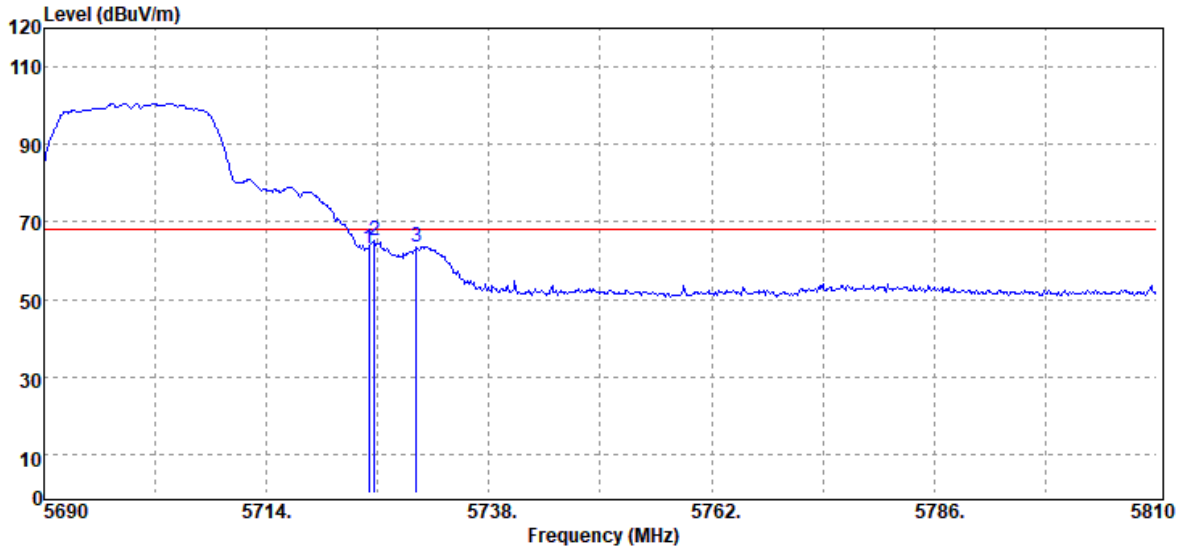
Project Number	:T190516W02	Test Date	:2019-05-24
Operation Band	:802.11a/Band3	Temp./Humi.	:20/53.5
Fundamental Frequency	:5700 MHz	Engineer	:Jerry
Operation Mode	:BE CH High	Measurement Antenna Pol.	:VERTICAL
EUT Pol.	:E1 Plan		



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
5725.00	Peak	56.92	6.34	63.26	68.20	-4.94
5725.64	Peak	58.76	6.34	65.10	68.20	-3.10
5730.20	Peak	57.20	6.34	63.54	68.20	-4.66

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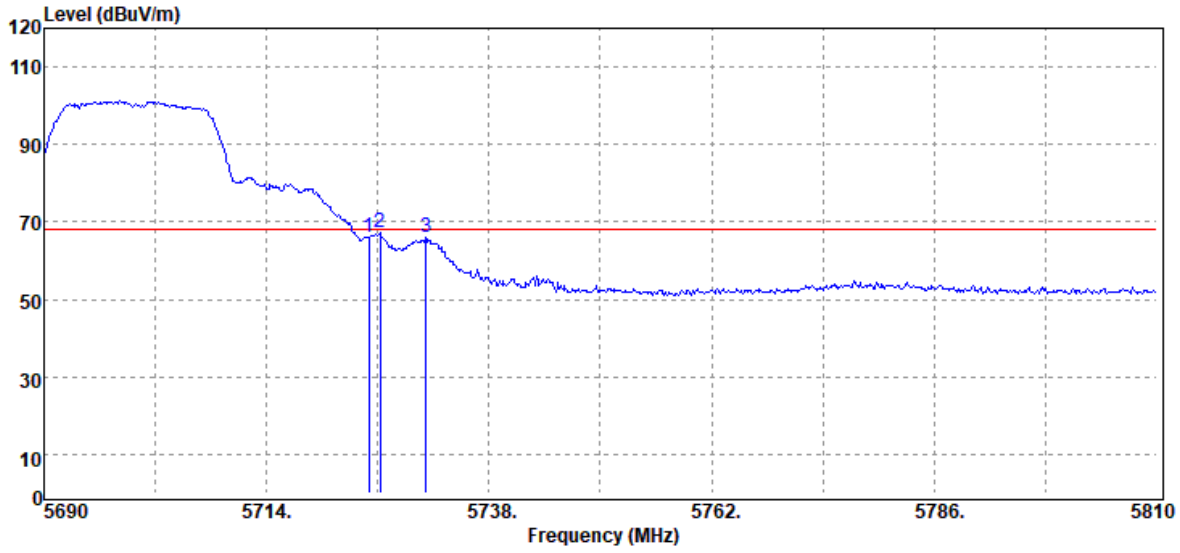
Project Number	:T190516W02	Test Date	:2019-05-24
Operation Band	:802.11a/Band3	Temp./Humi.	:20/53.5
Fundamental Frequency	:5700 MHz	Engineer	:Jerry
Operation Mode	:BE CH High	Measurement Antenna Pol.	:HORIZONTAL
EUT Pol.	:E1 Plan		



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
5725.00	Peak	59.86	6.34	66.20	68.20	-2.00
5726.24	Peak	60.94	6.34	67.28	68.20	-0.92
5731.16	Peak	59.62	6.34	65.96	68.20	-2.24

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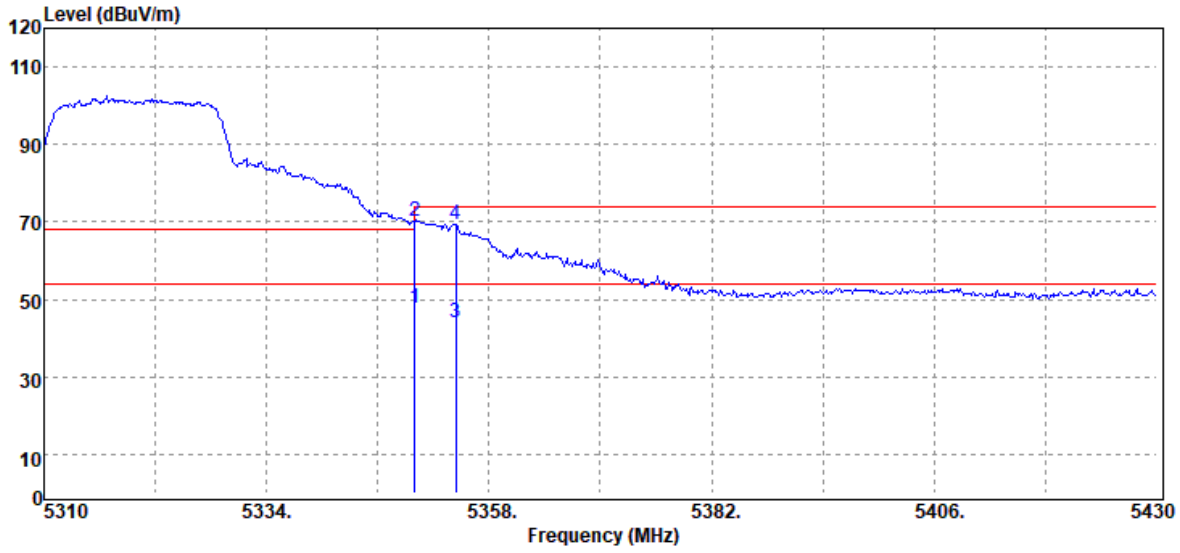
Project Number	:T190516W02	Test Date	:2019-05-24
Operation Band	:802.11n20/Band2	Temp./Humi.	:20/53.5
Fundamental Frequency	:5320 MHz	Engineer	:Jerry
Operation Mode	:BE CH High	Measurement Antenna Pol.	:VERTICAL
EUT Pol.	:E1 Plan		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
5350.00	Average	42.71	5.21	47.92	54.00	-6.08
5350.00	Peak	65.00	5.21	70.21	74.00	-3.79
5354.40	Average	38.96	5.23	44.19	54.00	-9.81
5354.40	Peak	64.15	5.23	69.38	74.00	-4.62

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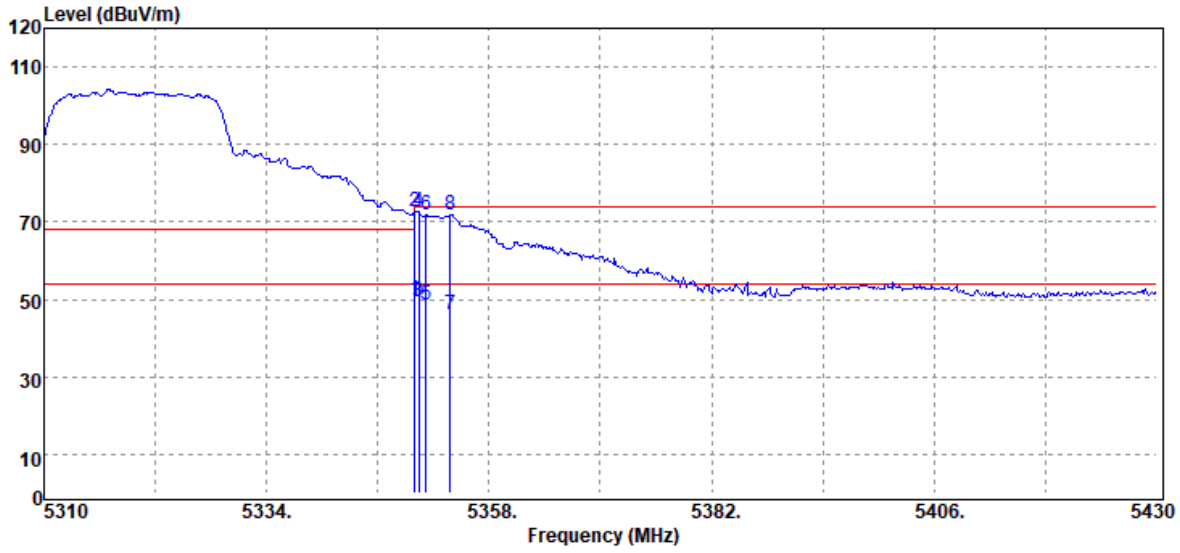
Project Number	:T190516W02	Test Date	:2019-05-24
Operation Band	:802.11n20/Band2	Temp./Humi.	:20/53.5
Fundamental Frequency	:5320 MHz	Engineer	:Jerry
Operation Mode	:BE CH High	Measurement Antenna Pol.	:HORIZONTAL
EUT Pol.	:E1 Plan		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
5350.00	Average	44.53	5.21	49.74	54.00	-4.26
5350.00	Peak	67.37	5.21	72.58	74.00	-1.42
5350.44	Average	44.11	5.22	49.33	54.00	-4.67
5350.44	Peak	67.50	5.22	72.72	74.00	-1.28
5351.16	Average	43.38	5.22	48.60	54.00	-5.40
5351.16	Peak	66.73	5.22	71.95	74.00	-2.05
5353.80	Average	40.69	5.23	45.92	54.00	-8.08
5353.80	Peak	66.57	5.23	71.80	74.00	-2.20

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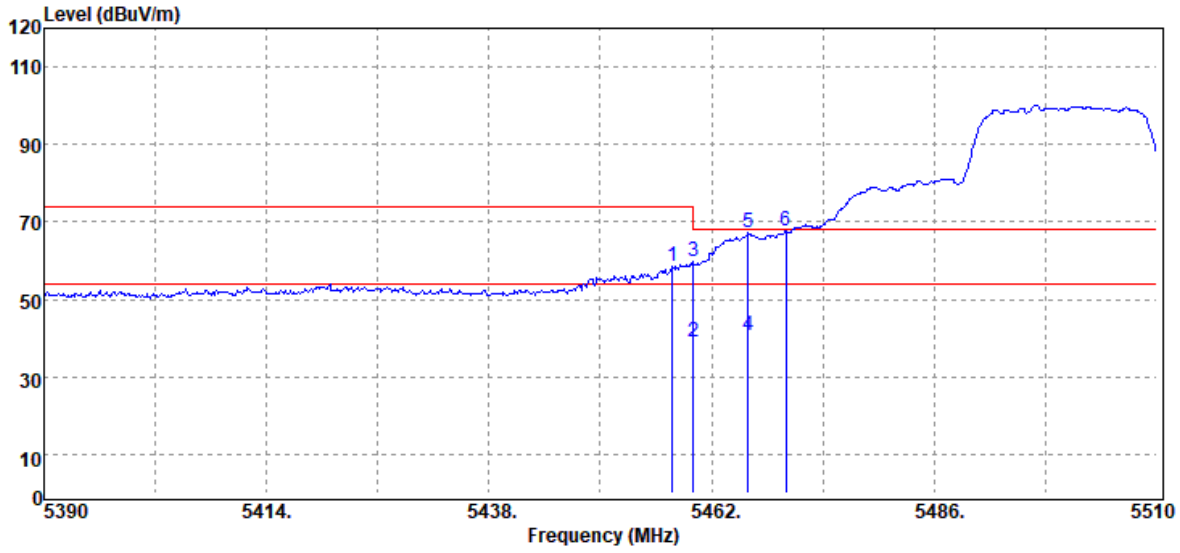
Project Number	:T190516W02	Test Date	:2019-05-24
Operation Band	:802.11n20/Band3	Temp./Humi.	:20/53.5
Fundamental Frequency	:5500 MHz	Engineer	:Jerry
Operation Mode	:BE CH Low	Measurement Antenna Pol.	:HORIZONTAL
EUT Pol.	:E1 Plan		



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
5457.80	Peak	52.99	5.62	58.61	74.00	-15.39
5460.00	Average	33.20	5.63	38.83	54.00	-15.17
5460.00	Peak	54.10	5.63	59.73	74.00	-14.27
5465.96	Average	35.22	5.64	40.86	54.00	-13.14
5465.96	Peak	61.51	5.64	67.15	68.20	-1.05
5470.00	Peak	62.00	5.65	67.65	68.20	-0.55

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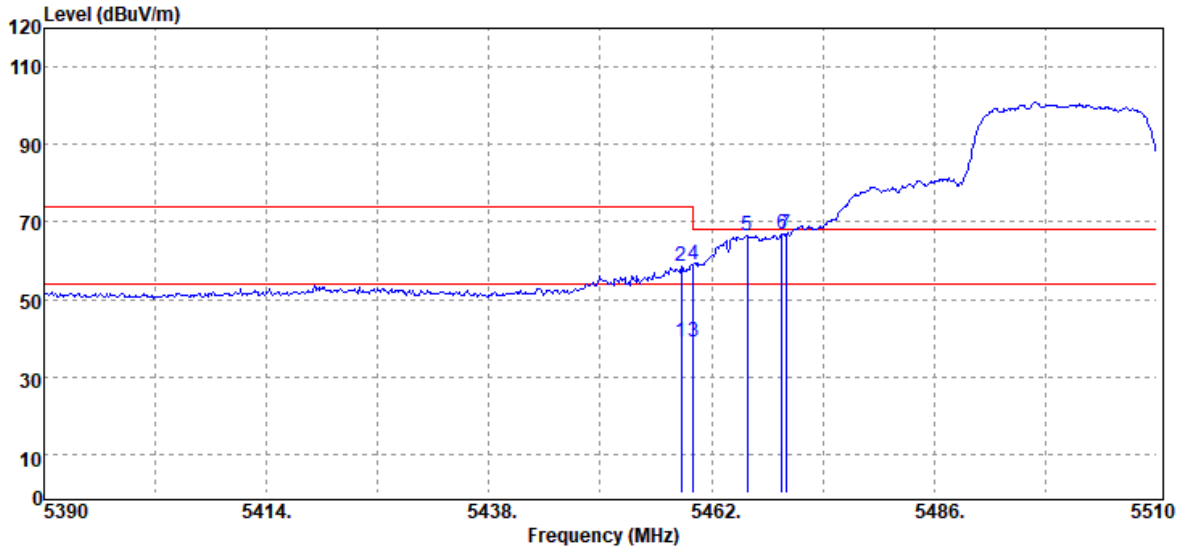
Project Number	:T190516W02	Test Date	:2019-05-24
Operation Band	:802.11n20/Band3	Temp./Humi.	:20/53.5
Fundamental Frequency	:5500 MHz	Engineer	:Jerry
Operation Mode	:BE CH Low	Measurement Antenna Pol.	:VERTICAL
EUT Pol.	:E1 Plan		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dBµV	Factor dB	Actual FS dBµV/m	Limit @3m dBµV/m	Margin dB
5458.76	Average	33.38	5.63	39.01	54.00	-14.99
5458.76	Peak	52.83	5.63	58.46	74.00	-15.54
5460.00	Average	33.52	5.63	39.15	54.00	-14.85
5460.00	Peak	53.48	5.63	59.11	74.00	-14.89
5465.84	Peak	60.99	5.64	66.63	68.20	-1.57
5469.56	Peak	61.21	5.65	66.86	68.20	-1.34
5470.00	Peak	61.24	5.65	66.89	68.20	-1.31

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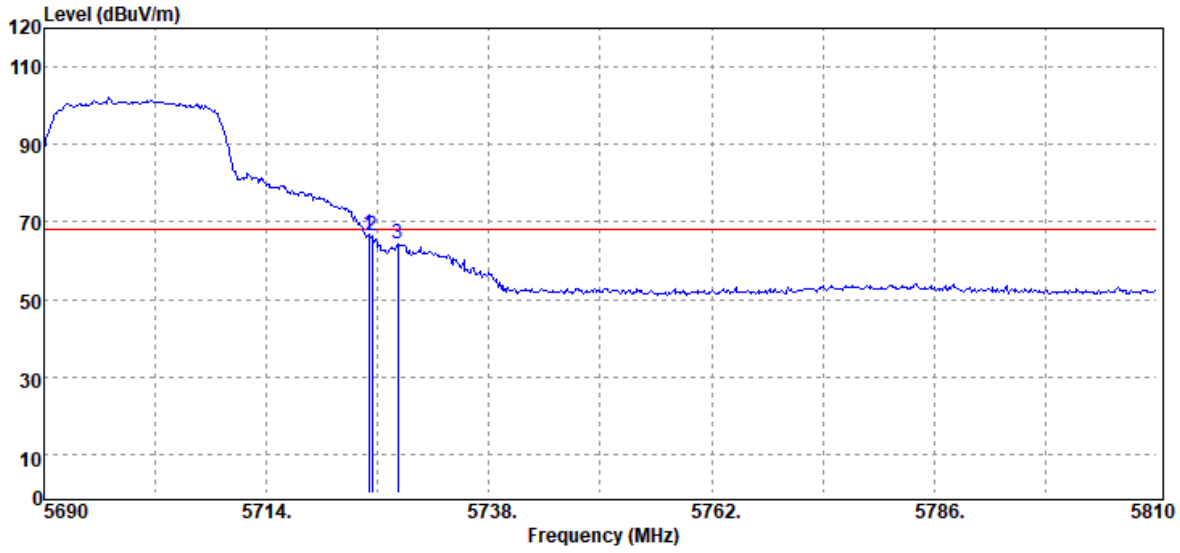
Project Number	:T190516W02	Test Date	:2019-05-24
Operation Band	:802.11n20/Band3	Temp./Humi.	:20/53.5
Fundamental Frequency	:5700 MHz	Engineer	:Jerry
Operation Mode	:BE CH High	Measurement Antenna Pol.	:VERTICAL
EUT Pol.	:E1 Plan		



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
5725.00	Peak	60.40	6.34	66.74	68.20	-1.46
5725.40	Peak	60.17	6.34	66.51	68.20	-1.69
5728.16	Peak	57.91	6.35	64.26	68.20	-3.94

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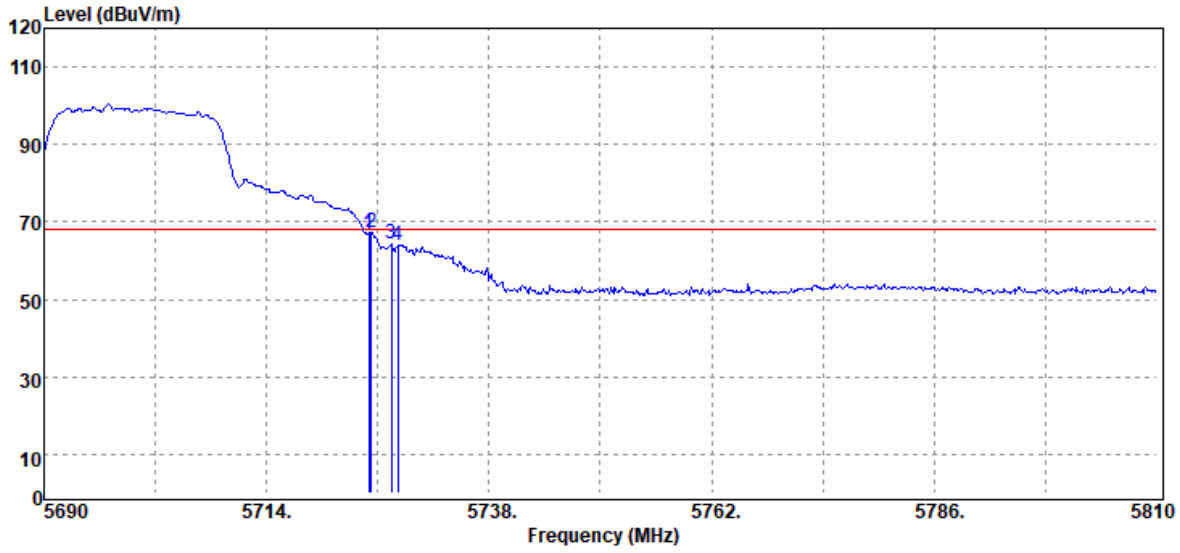
Project Number	:T190516W02	Test Date	:2019-05-24
Operation Band	:802.11n20/Band3	Temp./Humi.	:20/53.5
Fundamental Frequency	:5700 MHz	Engineer	:Jerry
Operation Mode	:BE CH High	Measurement Antenna Pol.	:HORIZONTAL
EUT Pol.	:E1 Plan		



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
5725.00	Peak	60.48	6.34	66.82	68.20	-1.38
5725.28	Peak	60.76	6.34	67.10	68.20	-1.10
5727.44	Peak	57.87	6.34	64.21	68.20	-3.99
5728.16	Peak	57.75	6.35	64.10	68.20	-4.10

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12 TRANSMISSION IN THE ABSENCE OF DATA

12.1 Standard Applicable

According to §15.407(c)

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

12.2 Result

While the EUT is not transmitting any information, the EUT can automatically discontinue transmission and become standby mode for power saving. The EUT can detect the controlling signal of ASK message transmitting from remote device and verify whether it shall resend or discontinue transmission.

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13 FREQUENCY STABILITY

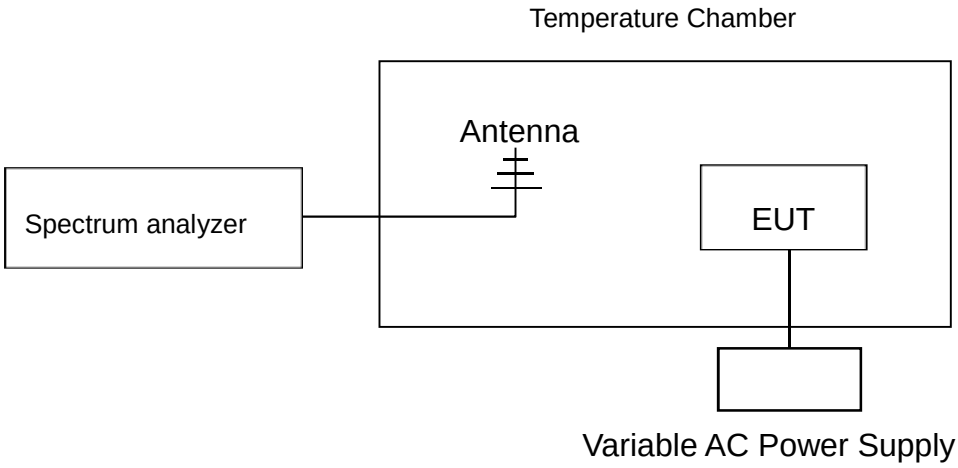
13.1 Standard Applicable

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.

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

13.3 Test SET-UP



13.4 Measurement Equipment Used:

SGS Conducted Room					
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Date**	**Calibration Due**
Spectrum Analyzer	Agilent	N9010A	MY53400256	11/21/2018	11/20/2019
DC Block	PASTERNACK	PE8210	RF29	02/26/2019	02/25/2020
Attenuator	Marvelous	MVE2213-10	RF80	02/26/2019	02/25/2020

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13.5 Measurement Result

N/A, the device only support U-NII-2A & U-NII-2C.

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14 ANTENNA REQUIREMENT

14.1 Standard Applicable

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

According to §15.407, 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.

14.2 Antenna Connected Construction

The antenna is designed as permanently attached and no consideration of replacement. Please see EUT photo for details.

~ End of Report ~

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