

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART E AND INDUSTRY CANADA RSS 247 REQUIREMENT $\sim r$

	OF
FCC Applicant:	Murata Manufacturing Co., Ltd.
	10-1, Higashikotari 1-chome, Nagaokakyo-shi, Kyoto 617-8555
	Japan
IC Applicant:	Murata Manufacturing Co., Ltd.
	10-1, Higashikotari 1-chome, Nagaokakyo-shi, Kyoto 617-8555
	Japan
Product Name:	Communication Module
Brand Name:	MURATA
Model No.:	LBEQ6ZZ1PN
Model Difference:	N/A
FCC ID:	VPYLB1PN
IC:	772C-LB1PN
Report Number:	ER/2018/80101
FCC Rule Part:	§15.407, Cat:NII
IC Rule:	RSS-247 issue 2 Feb. 2017
Issue Date:	Oct. 18, 2018
Date of Test:	Aug. 28, 2018 ~ Oct. 01, 2018
Date of EUT Received:	Aug. 22, 2018

We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. Electronics & Communication Laboratory The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10:2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits.

The test results of this report relate only to the tested sample identified in this report.

EH Tested By: CHUN CHIEH CHEN / Asst. Supervisor Approved By: Jim Chang / Manager





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Revision History

R	eport Number	Revision	Description	Effected Page	Issue Date	Revised By
E	R/2018/80101	Rev.00	Initial creation of docu- ment	All	Oct. 18, 2018	Elle Chang

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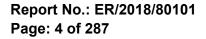
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GENERAL INFORMATION 1

1.1 Product Description

General:

Product Name:	Communication Module	
Brand Name:	MURATA	
Model No.:	LBEQ6ZZ1PN	
Model Difference:	N/A	
Hardware version:	N/A	
Software version:	N/A	
Power Supply:	Typ. 3.3V, Min 3.0V, Max 3.6V from DC power supply	

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FCC WLAN 5GHz:

Wi-Fi	Frequency Range	Channels	Avg. Power (dBm)	Modulation Technology
	5150~5250	4	12.48	
110.20	5250~5350	4	12.51	OFDM
11a_20	5470~5725	12	12.35	
	5725-5850	5	12.42	
	5150~5250	4	HT: 15.83	
11n_HT /	5250~5350	4	HT: 15.63	OFDM
ac_VHT 20M	5470~5725	12	HT: 15.40	
	5725-5850	5	HT: 15.32	
	5150~5250	2	HT: 15.64	
11n_HT /	5250~5350	2	HT: 15.49	OFDM
ac_VHT 40M	5470~5725	6	HT: 15.63	
	5725-5850	2	HT: 15.30	
	5150~5250	1	10.38	
11ac	5250~5350	1	10.56	OFDM
VHT80M	5470~5725	2	12.44	
	5725-5850	1	12.26	
Antenna Designation:		Model No.: G 5150~5250M 5250~5350M 5470~5725M	na, Supplier: Taoglas W.59.3153 Hz Peak Gain: 2.93dl Hz Peak Gain: 2.93dl Hz Peak Gain: 2.93dl Hz Peak Gain: 2.93dl	Bi Bi Bi

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IC WLAN 5GHz:

Wi-Fi	Frequency Range	Channels	Avg. or EIRP	Rated Power(dBm) (Worst Case)	Modulation Technology
	5150~5250	4	EIRP	15.41	
11a	5250~5350	4	Avg.	12.51	
11a	5470~5725	12	Avg.	12.35	OFDM
	5725-5850	5	Avg.	12.42	
	5150~5250	4	EIRP	HT: 21.77	
11n_HT /	5250~5350	4	Avg.	HT: 15.63	
ac_VHT 20M	5470~5725	12	Avg.	HT: 15.40	OFDM
2011	5725-5850	5	Avg.	HT: 15.32	
	5150~5250	2	EIRP	HT: 21.58	
11n_HT /	5250~5350	2	Avg.	HT: 15.49	OFDM
ac_VHT 40M	5470~5725	6	Avg.	HT: 15.63	
	5725-5850	2	Avg.	HT: 15.30	
	5150~5250	1	EIRP	16.32	
11ac	5250~5350	1	Avg.	10.56	OFDM
VHT80M	5470~5725	2	Avg.	12.44	
	5725-5850	1	Avg.	12.26	
Modula	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 - 144.4Mbps 802.11 n_40MHz: 13.5 - 300.0Mbps 802.11 ac_20MHz: 6.5 - 173.3Mbps 802.11 ac_40MHz: 13.5 - 400 .0Mbps 802.11 ac_80MHz: 29.3 - 866.7Mbps					

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1.2 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.

1.3 Test Facility

SGS Taiwan Ltd. Electronics & Communication Laboratory No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan 24803. (TAF code 0513)

FCC Registration Numbers are: 509634 / TW0001

Canada Registration Number: 4620A-4

1.4 Special Accessories

There are no special accessories used while test was conducted.

1.5 Equipment Modifications

There was no modification incorporated into the EUT.

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SYSTEM TEST CONFIGURATION 2

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 as turn 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 50 ohm/ 50uH 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 **Radiated Emissions**

The EUT is a placed on as turn table. For emissions testing at or below 1 GHz, the table height shall be 0.8 m above the reference ground plan. 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.

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.

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Test Tool

ID CO 77

1.1

EUT

22.6



2.5 Configuration of Tested System Fig. 2-1 Radiated Emission Configuration

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

Windows 7

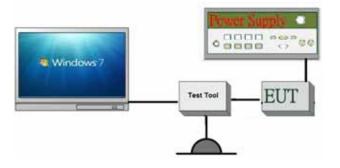


Fig. 2-2 Conducted Emission (AC Power Line) Configuration

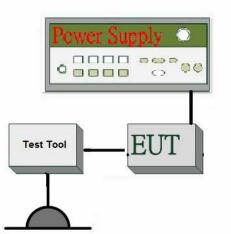


Table 2-1 Equipment Used in Tested System

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	L440	R9-007LAZ	Shielded	Unshielded
3	DC power supply	Agilent	E3634A	MY53180030	N/A	Unshielded
4	Test tool kit	N/A	N/A	N/A	N/A	N/A

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SUMMARY OF TEST RESULT 3

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 §6.6	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
§15.407(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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DESCRIPTION OF TEST MODES 4

4.1 Operated in U-NII Bands

Operated band in 5150 MHz ~5250 MHz:

802.11a / n HT20 Mode, 802.11ac VHT20 Mode		
Channel	Frequency	
36	5180	
40	5200	
44	5220	
48	5240	

802.11 n HT40 Mode, 802.11ac VHT40 Mode		
channel	Frequency	
38	5190	
46	5230	

802.11ac VHT80 Mode	
channel	Frequency
42	5210

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			

802.11 n HT40 Mode, 802.11ac VHT40 Mode				
channel Frequency				
54 5270				
62	5310			

802.11ac \	/HT80 Mode
Channel	Frequency
58	5290

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5690



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				
144	5720				

57 25 WII 12.					
802.11 n HT40 Mode,					
802.11ac VHT40 Mode					
channel	Frequency				
102	5510				
110	5550				
118	5590				
126	5630				
134	5670				
142	5710				

802.11ac VHT80 Mode Frequency channel 5530 106 122 5610

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Operated band in 5745 MHz ~5850 MHz:

802.11a / n HT20 Mode, 802.11ac VHT20 Mode			
Channel	Frequency		
149	5745		
153	5765		
157	5785		
161	5805		

802.11 n HT40 Mode, 802.11ac VHT40 Mode				
channel	Frequency			
151	5755			
159	5795			

802.11ac VHT80 Mode				
channel	Frequency			
155 5775				

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4.2 The Worst Test Modes and Channel Details

- 1. The EUT has been tested under operating condition.
- 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.
- 4. The given UE is pre-scanned among 802.11n and ac modes, and 802.11ac yields the highest reading that generates the highest emission.

RADIATED EMISSION TEST:

SISC)
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RADIATED EMISSION TEST (ABOVE 1 GHz)						
MODE	FREQUENCY	AVAILABLE	TESTED	MODULATION	DATA RATE	ANTENNA
BAND (MHz)	BAND (MHz)	CHANNEL	CHANNEL	MODULATION	(Mbps)	PORT
802.11n_HT40	5190~5230	38 to 46	38,46	OFDM	MCS0	Ch0
802.11ac_VHT80	5210	42	42	OFDM	MCS0	Ch0
802.11n_HT40	5270~5310	54 to 62	54,62	OFDM	MCS0	Ch0

	FREQUENCY BAND (MHz)		TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11ac_VHT20	5500~5720	100 to 144	140	OFDM	MCS0	Ch0
802.11ac_VHT40	5510~5710	102 to 142	102	OFDM	MCS0	Ch0
802.11ac_VHT80	5530~5690	106 to 138	106	OFDM	MCS0	Ch0

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MIMO

RADIATED EMISSION TEST (BELOW 1 GHz)						
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11a	5180~5240	36 to 48	44	OFDM	6	Ch0
802.11a	5260~5320	52 to 64	60	OFDM	6	Ch0
802.11a	5500~5720	100 to 144	116	OFDM	6	Ch0
802.11a	5745~5825	149 to 165	157	OFDM	6	Ch0
	RADI	ATED EMISS	ION TEST (A	BOVE 1 GHz)		
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11a 802.11n_HT20	5180~5240	36 to 48	36,44,48	OFDM OFDM	6 MCS8	Ch0 MIMO
802.11n_HT40	5190~5230	38 to 46	38,46	OFDM	MCS8	MIMO
802.11ac_VHT80	5210	42	42	OFDM	MCS0	MIMO
802.11a	5260~5320	52 to 64	52,60,64	OFDM	6	Ch0
802.11n_HT20	5200~5520	52 10 04	52,00,04	OFDM	MCS8	MIMO
802.11n_HT40	5270~5310	54 to 62	54,62	OFDM	MCS8	MIMO
802.11ac_VHT80	5290	58	58	OFDM	MCS0	MIMO

MODE	FREQUENCY BAND (MHz)		TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
802.11a	5500~5720	100 to 144	100,116,140	OFDM	6	Ch0
802.11n_HT20	5500~5720	100 10 144	100,110,140	OFDM	MCS8	MIMO
802.11n_HT40	5510~5710	102 to 142	102,110,134	OFDM	MCS8	MIMO
802.11ac_VHT80	5530~5610	106 to 122	106,122	OFDM	MCS0	MIMO
802.11a	5745~5825	149 to 165	140 157 165	OFDM	6	Ch0
802.11n_HT20	5745~5625	149 10 105	149,157,165	OFDM	MCS8	MIMO
802.11n_HT40	5755~5795	151 to 159	151,159	OFDM	MCS8	MIMO
802.11ac_VHT80	5775	155	155	OFDM	MCS0	MIMO

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 E2 position was reported.

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ANTENNA PORT CONDUCTED MEASUREMENT:

SISO

CONDUCTED TEST									
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT			
802.11n_HT40 802.11ac_VHT40	5190~5230	38 to 46	38	OFDM	MCS0	Ch0			
802.11ac_VHT80	5210	42	42	OFDM	MCS0	Ch0			
802.11n_HT40 802.11ac_VHT40	5270~5310	54 to 62	62	OFDM	MCS0	Ch0			
802.11n_HT20 802.11ac_VHT20	5500~5700	100 to 140	140	OFDM	MCS0	Ch0			
802.11n_HT40 802.11ac_VHT40	5510~5710	102 to 142	102	OFDM	MCS0	Ch0			
802.11ac_VHT80	5530~5610	106 to 122	106	OFDM	MCS0	Ch0			

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MIMO

		CONDU	CTED TEST				
MODE	FREQUENCY BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT	
802.11a				OFDM	6	Ch0	
802.11n_HT20	5180~5240	36 to 48	36,44,48	OFDM	MCS8	МІМО	
802.11ac_VHT20		0		OFDIVI	MCS0		
802.11n_HT40	5190~5230	38 to 46	38,46	OFDM	MCS8	MIMO	
802.11ac_VHT40	5190~5250	38 10 40	30,40	OFDIVI	MCS0		
802.11ac_VHT80	5210	42	42	OFDM	MCS0	MIMO	
802.11a				OFDM	6	Ch0	
802.11n_HT20	0 5260~5320 52 to 64 52,60,64		52,60,64	OFDM	MCS8	МІМО	
802.11ac_VHT20					MCS0		
802.11n_HT40	5270~5310	5270~5310 54 to 62 54.62	54,62	OFDM	MCS8	МІМО	
802.11ac_VHT40	5270-5510	54 (0 02	54,02		MCS0		
802.11ac_VHT80	5290	58	58	OFDM	MCS0	MIMO	
802.11a				OFDM	6	CH0	
802.11n_HT20	5500~5700	100 to 140	100,116,140	OFDM	MCS8	МІМО	
802.11ac_VHT20					MCS0		
802.11n_HT40	5510~5670	102 to 134	102,110,134	OFDM	MCS8	МІМО	
802.11ac_VHT40	5510 5070	102 10 104	102,110,104		MCS0	WIIWIO	
802.11ac_VHT80	5530~5610	106 to 122	106,122	OFDM	MCS0	MIMO	
802.11a				OFDM	6	Ch0	
802.11n_HT20	5745~5825	149 to 165	149,157,165	OFDM	MCS8	MIMO	
802.11ac_VHT20					MCS0		
802.11n_HT40	5755~5795	151 to 159	151,159	OFDM	MCS8	MIMO	
802.11ac_VHT40					MCS0		
802.11ac_VHT80	5775	155	155	OFDM	MCS0	MIMO	

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MEASUREMENT UNCERTAINTY 5

Test Items	Uncertainty
AC Power Line Conducted Emission	+/- 2.586 dB
26dB & 6dB Emission Bandwidth	+/- 123.36 Hz
The Maximum Output Power Measurement	+/- 0.96 dB
Peak Power Spectral Density Measurement	+/- 1.67 dB
Frequency Stability	+/- 123.36 Hz
Temperature	+/- 0.65 °C
Humidity	+/- 4.6 %
DC / AC Power Source	DC= +/- 0.13%, AC=+/- 0.2%

Radiated Spurious Emission:

	9kHz-30MHz: +/-2.87dB
	30MHz - 180MHz: +/- 3.37dB
Measurement uncertainty	180MHz -417MHz: +/- 3.19dB
(Polarization : Vertical)	0.417GHz-1GHz: +/- 3.19dB
-	1GHz - 18GHz: +/- 4.04dB
	18GHz - 40GHz: +/- 4.04dB

	9kHz-30MHz: +/-2.87dB
	30MHz - 167MHz: +/- 4.22dB
Measurement uncertainty	167MHz -500MHz: +/- 3.44dB
(Polarization : Horizontal)	0.5GHz-1GHz: +/- 3.39dB
	1GHz - 18GHz: +/- 4.08dB
	18GHz - 40GHz: +/- 4.08dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

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CONDUCTED EMISSION TEST 6

6.1 Standard Applicable

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

Frequency range	Limits dB(uV)						
MHz	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	MFR	MODEL	SERIAL	LAST	CAL DUE.				
TYPE		NUMBER	NUMBER	CAL.					
EMI Test Receiver	R&S	ESCI7	100335	2018/02/02	2019/02/01				
DC Power Supply	Anritsu	E3640A	KR93300208	2018/08/15	2019/08/14				
LISN	SCHWARZ- BECK	NSLK 8127	8127-649	2018/05/18	2019/05/17				

6.3 EUT Setup

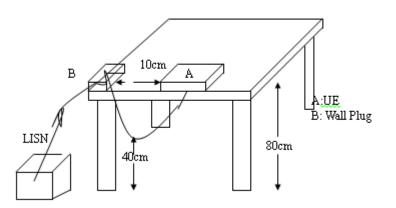
- 1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.10:2013.
- 2. The AC/DC Power adaptor of EUT was plug-in LISN. The rear of the EUT and peripherals were placed flushed with the rear of the tabletop.
- 3. The LISN was connected with 120Vac/60Hz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

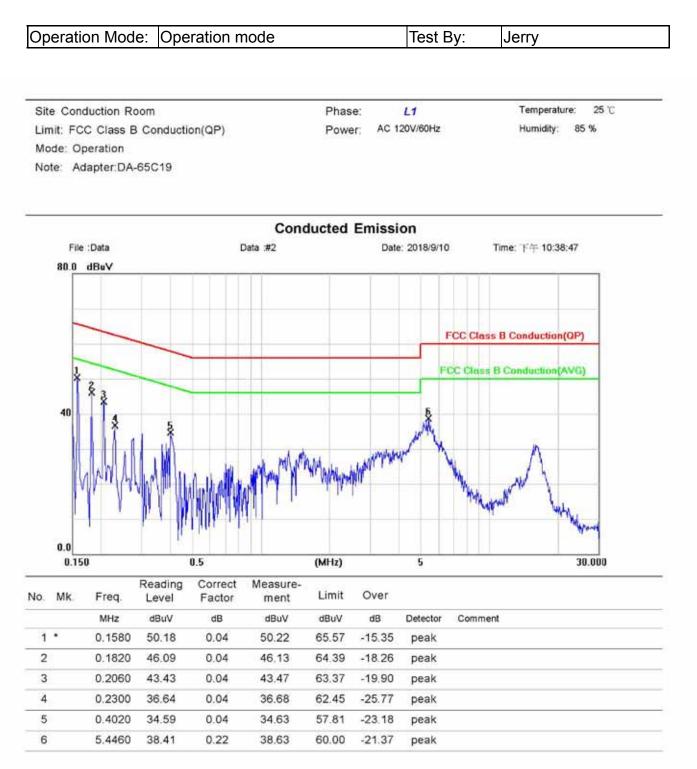
Note: Refer to next page for measurement data and plots. Note2: The * reveals the worst-case results that closet to the limit

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AC POWER LINE CONDUCTED EMISSION TEST DATA

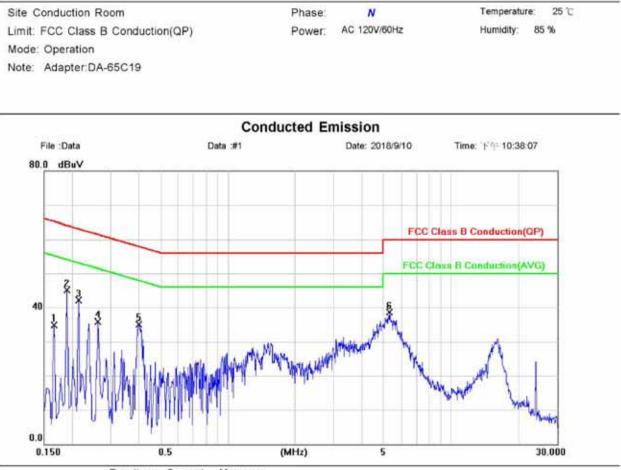


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No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over			
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment	
1		0.1660	34.78	0.04	34.82	65.16	-30.34	peak		
2	•	0.1900	44.99	0.04	45.03	64.04	-19.01	peak		
3		0.2140	42.09	0.04	42.13	63.05	-20.92	peak		
4		0.2620	35.77	0.04	35.81	61.37	-25.56	peak		
5		0.3980	35.15	0.04	35.19	57.90	-22.71	peak		
6		5.3100	38.30	0.21	38.51	60.00	-21.49	peak		

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DUTY CYCLE TEST SIGNAL 7

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:

Duty Cycle (%)	Duty Factor (dB) =10*log(1/Duty Cycle)	1/T (kHz)	VBW setting (kHz)
98.99	0.04	0.48	1.00
97.81	0.10	1.02	2.00
98.97	0.04	0.52	1.00
95.75	0.19	2.02	3.00
97.61	0.11	1.05	2.00
95.56	0.20	2.16	3.00
	(%) 98.99 97.81 98.97 95.75 97.61	Duty Cycle (%) =10*log (1/Duty Cycle) 98.99 0.04 97.81 0.10 98.97 0.04 95.75 0.19 97.61 0.11	Duty Cycle (%) =10*log (1/Duty Cycle) 1/1 (kHz) 98.99 0.04 0.48 97.81 0.10 1.02 98.97 0.04 0.52 95.75 0.19 2.02 97.61 0.11 1.05

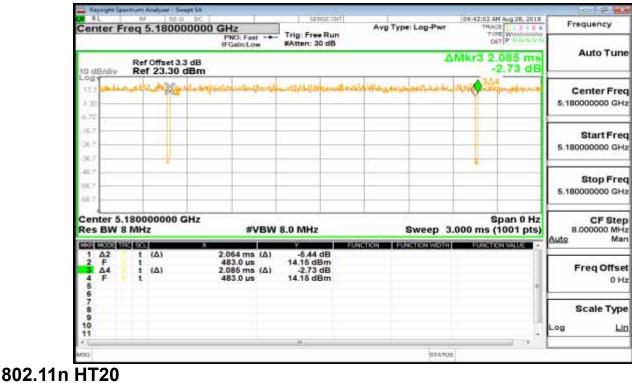
Duty Cycle Factor: $10 * \log(1/0.9899) = 0.04$ Duty Cycle Factor: $10 * \log(1/0.9781) = 0.1$ Duty Cycle Factor: $10 * \log(1/0.9897) = 0.04$ Duty Cycle Factor: $10 * \log(1/0.9575) = 0.19$ Duty Cycle Factor: 10 * log(1/0.9761) = 0.11 Duty Cycle Factor: 10 * log(1/0.9556) = 0.2

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DUTY CYCLE TEST SIGNAL Measurement Result 802.11a



48:14 AM Aug 28, 2018 TRACE 3 4 5 6 10.7 Center Freq 5.180000000 GHz PN0: Fest Frequency Avg Type: Log-Pwr Trig: Free Run #Atten: 30 dB DET P HIN N Auto Tune ΔMkr3 1.006 m Ref Offset 3.3 dB 0.22 dE Ref 23.30 dBm Center Freq 5.180000000 GHz Start Freq 5.180000000 GHz 8 15 Stop Freq w. 5.18000000 GHz Center 5.180000000 GHz Span 0 Hz CF Step Res BW 8 MHz #VBW 8.0 MHz Sweep 2.000 ms (1001 pts) 8.000000 MHz Man Auto 200 2000 FUNCTION FUNCTION WROTH EMPRILITY WALKS 984.0 μs (Δ) 456.0 μs 1.006 ms (Δ) 456.0 μs 97 dB A2 F (Δ) 12.12 dBm 0.22 dB 12.12 dBm Freq Offset A4 F (4) 45 0 Hz Scale Type 89 10 og. Lip STATUS

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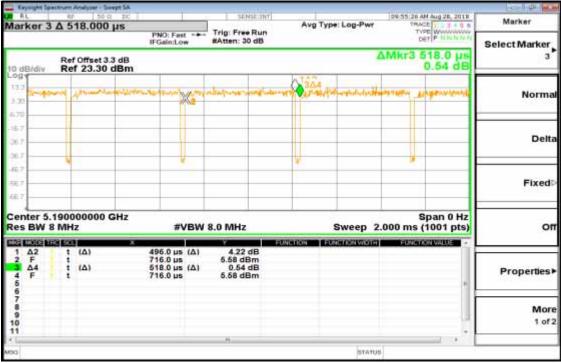
biness only more stated the results and the results and report for the angle of t documents, subject to Terms and Conditions for Electronic Documents at <u>www.sqs.com/terms_e-document.htm</u>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.



802.11ac VHT 20

Keysight Spectrum Analyzer - Swept					0
Center Freq 5.180000	000 GHz	: Free Run	Avg Type: Log-Pwr	D9:50:49 AM Aug 28, 2018 TRACE 1: 2:3 4 5 6 TYPE WWWWWWW DET P 10 10 10 10	Frequency
Ref Offset 3.3 d 10 dB/div Ref 23.30 dB	IFGain:Low #Att	en: 30 dB	۵	Mkr3 1.959 ms 0.81 dB	Auto Tune
133	alin - Mayne - Aleratika an es	an a	10.00 (Contraction of Contraction of	ni-entry - end	Center Free 5.180000000 GH
16.7 26.7 36.7					Start Free 5.180000000 GH
46.7 66.7 66.7					Stop Fre 5.180000000 GH
Center 5.180000000 GH Res BW 8 MHz	z #VBW 8.0 I		Sweep 3.	Span 0 Hz 000 ms (1001 pts)	CF Step 8.000000 MH Auto Ma
$\begin{array}{cccc} 1 & \Delta 2 & t & (\Delta) \\ 2 & F & t \\ 3 & \Delta 4 & t & (\Delta) \\ 4 & F & t \\ 5 \\ \end{array}$	1.938 ms (Δ) 321.0 μs 11. 1.959 ms (Δ)	0.38 dB 01 dBm 0.81 dB 01 dBm			Freq Offse 0 H
7 8 9 10 11					Scale Type
90			STATUS		

802.11n HT 40



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802.11 ac VHT 40

🔤 Keysight Spectrum Analyzer		A REPORT OF THE		STREET AND ADDREED AND	0 0 0
Center Freq 5.190	00000000 GHz PNO: Fast	Trig: Free Run	Avg Type: Log-Pwr	09:58:58 AM Aug 28, 2018 THACE 1 2 3 4 5 6 TYPE WARMANN	Frequency
10 dB/div Ref Offse	IFGain;Low	#Atten: 30 dB	2	Mkr3 975.3 µs 2.64 dB	Auto Tune
133 3.30 6.70	airdenia sayana Xa	ine chilling areas	1-19-0446- 304 April 10	fereine gesticht (Besticht für Antonio	Center Freq 5.190000000 GHz
-15.7 					Start Freq 5.19000000 GHz
46.7			<u>.</u>		Stop Freq 5.190000000 GHz
Center 5.19000000 Res BW 8 MHz		8.0 MHz	Sweep 2.	Span 0 Hz 333 ms (1001 pts)	CF Step 8.000000 MHz Auto Man
1 Δ2 t (Δ) 2 F t 3 Δ4 t (Δ) 4 F t	952.0 μs (Δ) 728.0 μs 976.3 μs (Δ) 728.0 μs	5.03 dB 3.47 dBm 2.64 dB 3.47 dBm			Freq Offset 0 Hz
6 7 8 9 10 11					Scale Type
MBQ		н.	STATUS		

802.11 ac VHT 80

		lyzer - Swept SA						
RL enter F	reg 5.2	50 Q DC	GHz		SENSE:INT	Avg Type: Log-P		
			PNO: Fast IFGain:Lov		Trig: Free Run #Atten: 30 dB		DET P NNNN	4
) dB/div		fset 3.3 dB 3.30 dBm					ΔMkr3 484.5 μs -2.17 dB	Auto Tu
29 3.3 .30 4 10 70	ر پېچىناچ	n.t.m.a.a.	-terophyler	*	entre many a	Ren walt 194	minussi	Center Fr 5.210000000 G
.7 .7								Start Fr 5.210000000 G
7				*				Stop Fr 5.210000000 G
enter 5. es BW 8	8 MHz	0000 GHz	#\	вw	8.0 MHz	Sweep	Span 0 Hz 1.533 ms (1001 pts)	CF St 8.000000 M Auto M
1 Δ2 2 F 3 Δ4 4 F	t (2 t t (2 t	7)	463.1 μs 575.0 μs 484.5 μs 575.0 μs		0.17 dB 0.46 dBm -2.17 dB 0.46 dBm	ACTION FUNCTION W		Freq Offs 0
6 7 8 9								Scale Ty
0					10			Log
3						at	ATUS	

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26DB & 6DB EMISSION BANDWIDTH MEASUREMENT 8

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 Manufacture		Model	Serial Number	Calibration Date	Calibration Due					
Spectrum Analyzer	R&S	FSV-30	101398	2017/10/19	2018/10/18					
DC Power Supply	Anritsu	E3640A	MY52410006	2017/11/28	2018/11/27					
Temperature Chamber	TERCHY	MHG-120LF	911009	2018/05/18	2019/05/17					
Attenuator	Mini-Circuit	BW-S10W2+	2	2018/01/02	2019/01/01					
DC Block	Mini-Circuits	BLK-18-S+	1	2018/01/02	2019/01/01					
Coaxial Cables	N/A	WK CE Cable	N/A	2018/01/02	2019/01/01					
Notebook	Lenovo	L430	R9-WGNK5	N/A	N/A					

8.4 Test Set-up



8.5 Measurement Result

26dB and 6dB Bandwidth

SISO

802.11n _HT40_Ch0

802.11n_HT20_Cf	10		Frequency (MHz)	26dB BW	10 Log (B) (dB)
Frequency (MHz)	26dB BW	10 Log (B) (dB)	5190	(MHz) 38.03	15.801
(11112)	(MHz)		5310	38.12	15.812
5700	19.27	12.849	5510	38.23	15.824

802.11ac _VHT80_Ch0

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5210	79.16	18.985
5290	79.15	18.985

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f (886-2) 2298-0488



MIMO

802.11a_Ch0

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5180	18.63	12.701
5220	18.51	12.674
5240	18.58	12.690
5260	18.69	12.716
5300	18.65	12.707
5320	18.51	12.674
5500	18.61	12.697
5580	18.53	12.679
5700	18.46	12.662
5720(U-NII 2C)	14.76	11.691
5720 (U-NII 3)	4.80	6.812

802.11a_Ch0

Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)	
5745	16.35	12.134	
5785	16.35	12.134	
5825	16.37	12.139	

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802.11n_HT20_Ch0			802.11n_HT20_Ch1			
Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)	Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)	
5180	19.84	12.975	5180	19.83	12.973	
5220	19.90	12.988	5220	19.64	12.932	
5240	20.15	13.043	5240	19.94	12.997	
5260	20.00	13.011	5260	19.98	13.006	
5300	19.83	12.972	5300	19.88	12.984	
5320	19.31	12.858	5320	19.82	12.971	
5500	20.05	13.022	5500	19.56	12.914	
5580	19.77	12.961	5580	19.72	12.949	
5700	19.92	12.992	5700	19.82	12.971	
5720(U-NII 2C)	14.80	11.703	5720(U-NII 2C)	14.96	11.749	
5720 (U-NII 3)	4.76	6.776	5720 (U-NII 3)	4.96	6.955	

802.11n HT20 Ch0

802.11n HT20 Ch1

Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)	Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5745	16.95	12.292	5745	17.58	12.451
5785	17.56	12.445	5785	17.54	12.440
5825	17.59	12.452	5825	17.57	12.448

802.11n _HT40_Ch0

802.11n _HT40_Ch1

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)	Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5190	40.02	16.023	5190	40.51	16.075
5230	40.40	16.064	5230	40.20	16.042
5270	40.07	16.028	5270	40.32	16.055
5310	40.10	16.032	5310	40.16	16.038
5510	39.99	16.019	5510	39.94	16.014
5550	39.91	16.010	5550	40.27	16.050
5670	39.90	16.010	5670	40.80	16.107
5710 (U-NII 2C)	35.00	15.441	5710 (U-NII 2C)	34.84	15.421
5710 (U-NII 3)	5.00	6.990	5710 (U-NII 3)	5.08	7.059

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802.11n_HT40_Ch0			802.11n_HT40_Ch1			
Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)	Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)	
5755	35.59	15.513	5755	35.06	15.448	
5795	34.55	15.385	5795	35.24	15.470	

802.11ac _VHT80_Ch0

802.11ac _VHT80_Ch1

Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)	Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5210	81.64	19.119	5210	81.36	19.104
5290	81.30	19.101	5290	81.09	19.090
5530	81.14	19.092	5530	81.05	19.087
5610	82.31	19.155	5610	81.73	19.124
5690 (U-NII 2C)	75.64	18.788	5690 (U-NII 2C)	75.32	18.769
5690 (U-NII 3)	5.00	6.990	5690 (U-NII 3)	5.80	7.634

802.11ac _VHT80_Ch0

802.11ac _VHT80_Ch1

Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)	Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5775	76.38	18.830	5775	76.37	18.829

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99% Bandwidth

SISO

802.11n _HT40_Ch0

802.11n	HT20	Ch0

Frequency (MHz)	99% BW (MHz)	10 Log (B) (dB)
5700	17.671	12.473

Frequency (MHz)	99% BW (MHz)	10 Log (B) (dB)	
5190	36.051	15.569	
5310	36.048	15.569	
5510	36.029	15.567	

802.11ac _VHT80_Ch0

Frequency (MHz)	99% BW (MHz)	10 Log (B) (dB)	
5210	75.862	18.800	
5290	75.896	18.802	

MIMO

802.11a_Ch0

Frequency (MHz)	99% BW (MHz)	10 Log (B) (dB)
5180	16.660	12.217
5220	16.712	12.230
5240	16.672	12.220
5260	16.680	12.222
5300	16.709	12.230
5320	16.621	12.207
5500	16.685	12.223
5580	16.694	12.226
5700	16.588	12.198
5720(U-NII 2C)	12.600	11.004
5720 (U-NII 3)	4.054	6.079

802.11a_Ch0

Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5745	16.46	12.163
5785	16.34	12.132
5825	16.42	12.154

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302.11n_HT20_0	Ch0		802.11n_HT20_Ch	า1	
Frequency (MHz)	99% BW (MHz)	10 Log (B) (dB)	Frequency (MHz)	99% BW (MHz)	10 Log (B) (dB)
5180	17.664	12.471	5180	17.667	12.472
5220	17.648	12.467	5220	17.656	12.469
5240	17.667	12.472	5240	17.674	12.473
5260	17.672	12.473	5260	17.650	12.467
5300	17.666	12.471	5300	17.647	12.467
5320	17.687	12.477	5320	17.675	12.474
5500	17.635	12.464	5500	17.661	12.470
5580	17.696	12.479	5580	17.652	12.468
5700	17.661	12.470	5700	17.660	12.470
5720(U-NII 2C)	13.370	11.261	5720(U-NII 2C)	13.360	11.258
5720 (U-NII 3)	4.300	6.335	5720 (U-NII 3)	4.297	6.332
302.11n_HT20_(802.11n_HT20_0		
Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)	Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5745	17.63	12.461	5745	17.49	12.429
5785	17.60	12.455	5785	17.58	12.451
5825	17.57	12.449	5825	17.55	12.442
	_Ch0		802.11n _HT40_C	h1	
Frequency (MHz)	99% BW	10 Log (B)	Frequency	99% BW	10 Log (B)
()	(MHz)	(dB)	(MHz)	(MHz)	(dB)
5190	(MHz) 36.025	(dB) 15.566	(MHz) 5190		(dB) 15.570
				(MHz)	. ,
5190	36.025	15.566	5190	(MHz) 36.057	15.570
5190 5230	36.025 36.002	15.566 15.563	5190 5230	(MHz) 36.057 36.085	15.570 15.573
5190 5230 5270	36.025 36.002 36.047	15.566 15.563 15.569	5190 5230 5270	(MHz) 36.057 36.085 36.007	15.570 15.573 15.564
5190 5230 5270 5310	36.025 36.002 36.047 35.985	15.566 15.563 15.569 15.561	5190 5230 5270 5310	(MHz) 36.057 36.085 36.007 36.072	15.570 15.573 15.564 15.572
5190 5230 5270 5310 5510	36.025 36.002 36.047 35.985 36.028	15.566 15.563 15.569 15.561 15.566	5190 5230 5270 5310 5510	(MHz) 36.057 36.085 36.007 36.072 36.040	15.570 15.573 15.564 15.572 15.568
5190 5230 5270 5310 5510 5550	36.025 36.002 36.047 35.985 36.028 36.027	15.566 15.563 15.569 15.561 15.566 15.566	5190 5230 5270 5310 5510 5550	(MHz) 36.057 36.085 36.007 36.072 36.040 36.044	15.570 15.573 15.564 15.572 15.568 15.568

802.11n HT40 Ch0

802.11n HT40 Ch1

002.1111_H140_C	110				
Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)	Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5755	36.01	15.565	5755	36.16	15.583
5795	36.20	15.587	5795	36.23	15.590

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802.11ac _VHT8	30_Ch0		802.11ac _VHT80_Ch1			
Frequency (MHz)	99% BW (MHz)	10 Log (B) (dB)	Frequency (MHz)	99% BW (MHz)	10 Log (B) (dB)	
5210	75.835	18.799	5210	75.870	18.801	
5290	75.923	18.804	5290	75.898	18.802	
5530	75.848	18.799	5530	75.744	18.793	
5610	75.742	18.793	5610	75.927	18.804	
5690(U-NII 2C)	71.057	18.516	5690(U-NII 2C)	71.079	18.517	
5690 (U-NII 3)	4.700	6.721	5690 (U-NII 3)	4.706	6.727	

802.11ac _VHT80_Ch0

802.11ac _VHT80_Ch1

Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)	Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5775	76.56	18.840	5775	76.51	18.837

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SISO FCC 802.11n 20MHz Main 5700MHz FCC 802.11n 40MHz Main 5510MHz RL RF 50 Ω DC SENSE INT enter Freq 5.700000000 GHz Center Freq 5.700 Trig: Free Run 02:59:07 PM Oct 02 Radio Std: None 03:05:17 PM Oct 02, Radio Std: None Center Freq 5.510000000 GHz Center Freq: 5.5100 Trig: Free Run 00 GHz AvgiHold: 50/50 000 GHz AvalHold: 50/50 Radio Device: BTS Radio Device: BTS Ref Offset 10.5 dB Ref 20.00 dBm Ref Offset 10.5 dB Ref 20.00 dBm Center Fre Center Free enter 5.7 GHz Res BW 20 kHz Span 30 MHz Sweep 71.53 ms enter 5.51 GHz Res BW 20 kHz n 50 MH 119.2 m CF Step 5.000000 MH CF Step 3.000000 MHz Spa Sweep #VBW 62 kHz #VBW 62 kHz 19.5 dBm 17.6 dBm Total Power Total Power **Occupied Bandwidth Occupied Bandwidth** 17.610 MHz 36.103 MHz Freq Offse 0 H Freq Offs % of OBW Poy Transmit Freg Error -9.103 kHz % of OBW Powe 99.00 % Transmit Freq Error -5 969 kHz 99.00 % x dB Bandwidth 19.27 MHz x dB -26.00 dB x dB Bandwidth 38.23 MHz x dB -26.00 dB FCC 802.11n 40MHz Main 5190MHz FCC 802.11ac 80MHz Main 5210MHz 03:01:16 PM Oct 02 03:08:23 PM Oc Padio Std: No Center Freq: 5.2100 Trig: Free Run Inter Freq 5.190000000 GHz Frequency enter Freq 5.21000000 GHz 000 GHz Avg|Hold: 50/50 Center Freq: 5. Trig: Free Run 000 GHz Avg|Hold: 50/50 Radio Device: BTS Ref Offset 10.5 dl Ref Offset 10.5 dB Ref 20.00 dBm Center Fre Center Free 5.190000000 GH 5.210000000 GH er 5.19 GHz Span 50 MHz Center 5.21 GHz Res BW 20 kHz CF Step 5.000000 M Span 100 MHz CF Step 10.000000 MH BW 62 kHz /BW 62 kHz Ma Occupied Bandwidth Total Power 18.7 dBm **Occupied Bandwidth** Total Power 16.4 dBm 36.090 MHz 75.837 MHz Freq Offse Freq Offse 0 H -39.190 kHz 0 H -33.143 kHz 99.00 % Transmit Freq Error % of OBW Power 99.00 % Transmit Freq Error % of OBW Power 38.03 MHz 79.16 MHz x dB Bandwidth -26.00 dB dB Bandwidth x dB -26.00 dB x dB FCC 802.11n 40MHz Main 5310MHz FCC 802.11ac 80MHz Main 5290MHz enter Freq 5.310000000 GHz Center Freq Trig: Free R Center Freq 5.290000000 GHz Center Freq Trig: Free R 000 GHz AvaiHold: 50/50 io Device: BTS Radio Device: BTS Ref Offset 10.5 dB Ref_20.00 dBm Ref Offset 10.5 dB Ref 20.00 dBm Center Fre Center Fre r 5 31 GH 50 MH CF Step 10.000000 ML CF Step 5.000000 MHz Man ter 5.29 GHz s BW 20 kHz Span 100 N (eep 238.4 s B #VBW 62 kHz Sw 119.2 #VBW 62 kHz Sv 19.9 dBm Occupied Bandwidth **Occupied Bandwidth** Total Power Total Power 17.2 dBm 36.139 MHz 75.931 MHz Freq Offs Freq Offse Transmit Freq Error -25.466 kHz % of OBW Po 99.00 % oн Transmit Freq Error -156.47 kHz % of OBW Power 99.00 % x dB Bandwidth 38.12 MHz x dB -26.00 dB x dB Bandwidth 79.15 MHz x dB -26.00 dE

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Ref Offset 10.5 dB Ref 20.00 dBm

enter 5.18 GHz Res BW 20 kHz

Occupied Bandwidth

Ref Offset 10.5 d Ref 20.00 dBr

Transmit Freg Error

x dB Bandwidth

er 5.22 GHz

Occupied Bandwidth

Ref Offset 10.5 dB Ref 20.00 dBm

Transmit Freq Error

x dB Bandwidth

r 5 24 GH

Occupied Bandwidth

Transmit Freq Error

x dB Bandwidth

s B

FCC 802.11a 20MHz Main 5260MHz

MIMO FCC 802.11a 20MHz Main 5180MHz Revision Spectrum Analyzer - Occupied Env RL III IS 00 DC Sector Freq 5.180000000 GHz Center Freq 5.1800 Center Freq 5.180000000 GHz Trig: Free Run Trig: Free Run Trig: Free Run



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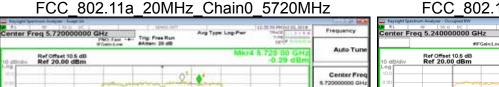
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in an

Cent

x dB Bandwidth



FCC 802.11n 20MHz Main 5240MHz



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-26.00 dB

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x dB Bandwidth

19.83 MHz

x dB

-26.00 dB

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19.90 MHz

x dB

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FCC 802.11n 20MHz AUX1 5320MHz FCC 802.11n 20MHz AUX1 5700MHz Avaight Spectrum Analyzer - Occupied BW RL BU SG DC Center Freq: 5.3200 Top: Freq 5.320000000 GHz Trig: Free Run Trig: Free Run Trig: Free Run 04:20:20 PM Oct 01, Radio Std: None Center Freq: 5.700 Trig: Free Run enter Freq 5.70000000 GHz 00 GHz 000 GHz AvalHold: 50/50 Radio Device: BTS Radio Device: BTS Ref Offset 10.5 dB Ref 20.00 dBm Ref Offset 10.5 dB Ref 20.00 dBm Center Fre Center Free NWW IN enter 5.32 GHz Res BW 220 kHz Span 30 MHz Sweep 1 ms enter 5.7 GHz Res BW 220 kHz Span 30 MHz Sweep 1 ms CF Step 3.000000 MH-CF Step 3.000000 MH #VBW 680 kHz #VBW 680 kHz 17.3 dBm 17.2 dBm Total Power Total Power **Occupied Bandwidth Occupied Bandwidth** 17.618 MHz 17.600 MHz Freq Offse 0 H Freq Offs % of OBW Powe % of OBW Pow Transmit Freg Error -48.512 kHz 99.00 % Transmit Freq Error -38 592 kHz 99.00 % x dB Bandwidth 19.82 MHz x dB -26.00 dB x dB Bandwidth 19.82 MHz x dB -26.00 dB FCC_802.11n_20MHz_AUX1_5500MHz FCC 802.11n 20MHz AUX1 5745MHz 04:22:27 PM Oct 01 Radio Std: None enter Freq 5.745000000 GHz Inter Freq 5.50000000 GHz Frequency Center Freq: 5.745 Trig: Free Run #Atten: 20 dB Center Freq: 5. Trig: Free Run #Atten: 20 dB 00 GHz Avg|Hold: 50/50 000 GHz Avg|Hold: 50/50 Radio Device: BTS Ref Offset 10.5 dB Ref Offset 10.5 dB Center Fre Center Free 5.500000000 GH 5.745000000 GH Tolah Center 5.745 GHz Span 30 MHz er 5.5 GHz BW 220 kHz Span 30 MHz CF Step 3.000000 MP CF Step 3.000000 ML-BW 680 kHz /BW 300 kHz Ma Occupied Bandwidth Total Power 17.2 dBm **Occupied Bandwidth** Total Power 17.8 dBm 17.613 MHz 17.594 MHz Freq Offse Freq Offse OН 0 H -31.327 kHz -39.221 kHz Transmit Freq Error % of OBW Power 99.00 % 99.00 % Transmit Freq Error % of OBW Power 19.56 MHz 17.58 MHz x dB Bandwidth -26.00 dB dB Bandwidth -6.00 dB x dB x dB FCC 802.11n 20MHz AUX1 FCC 802.11n 20MHz AUX1 5580MHz 5785MHz Radio Std: Nore Center Freq: 5.785000000 GHz Trig: Free Run AvalHold: 60/50 enter Freq 5.580000000 GHz Center Freq 5.785000000 GHz Center Freq: 5.5 Trig: Free Run tio Device: BTS dio Device: BTS Ref Offset 10.5 dB Ref 20.00 dBm Ref Offset 10.5 dB Ref 20.00 dBm Center Fre Center Free dah. r 5.58 GH Span 30 MHz 5 785 GH 30 MH CF Step 3.000000 MHz CF Step 3.000000 MHz Man s B #VBW 680 kHz B #VBW 300 kHz Sw 17.9 dBm 17.4 dBm **Occupied Bandwidth** Total Power **Occupied Bandwidth** Total Power 17.606 MHz 17.582 MHz Freq Offse Freq Offs Transmit Freq Error -33.722 kHz % of OBW Po 99.00 % Transmit Freg Error -41.267 kHz % of OBW Po 99.00 % x dB Bandwidth 19.72 MHz x dB -26.00 dB x dB Bandwidth 17.54 MHz x dB -6.00 dB

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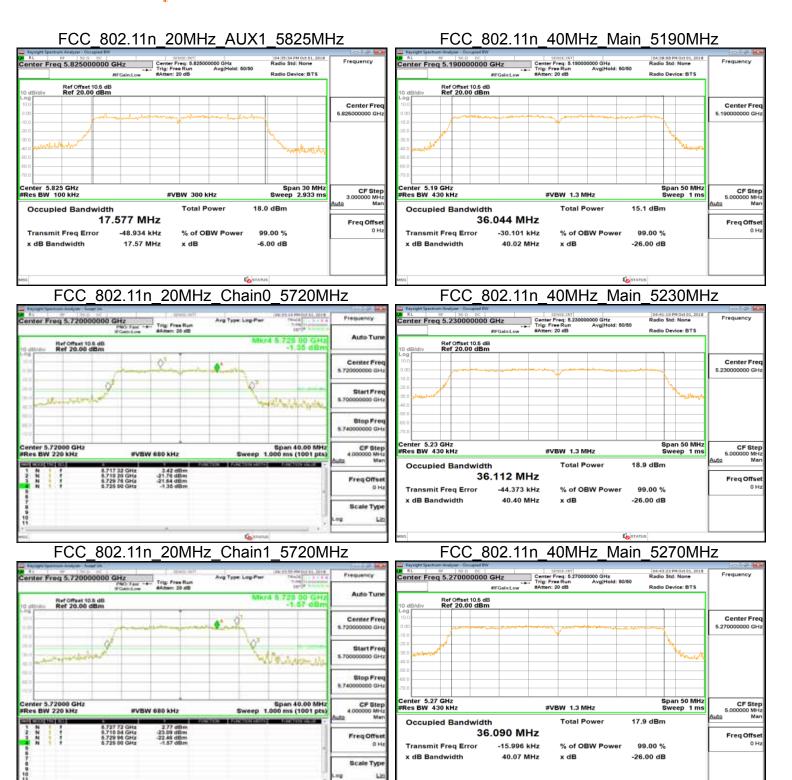
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FCC 802.11n 40MHz AUX1 5190MHz

FCC 802.11n 40MHz AUX1 5310MHz



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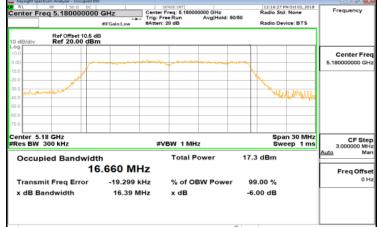
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FCC 802.11ac 80MHz Chain1 5690MHz

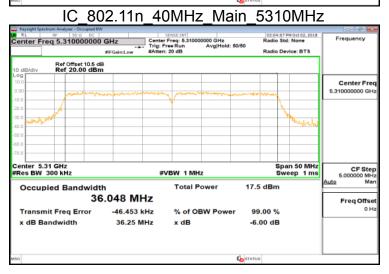


SISO IC 802.11n 20MHz Main 5700MHz



IC 802.11n 40MHz Main 5190MHz





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IC 802.11a 20MHz Main 5500MHz

IC 802.11a 20MHz Main 5260MHz



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