

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

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

	OF			
FCC Applicant:	Honeywell International Inc.			
	9680 Old Bailes Road, Fort Mill, SC 29707, USA			
IC Applicant:	Honeywell International Inc.			
	9680 Old Bailes Road, Fort Mill, SC 29707, USA			
Product Name:	Vehicle Mount Computer			
Brand Name:	Honeywell			
Model No.:	VM1A-L0N			
Model Difference:	N/A			
FCC ID:	HD5-VM1AL0N			
IC:	1693B-VM1AL0N			
Report Number:	ER/2018/90026			
FCC Rule Part:	§15.407, Cat:NII			
IC Rule:	RSS-247 issue 2 Feb. 2017			
Issue Date:	Nov. 08, 2018			
Date of Test:	Sep. 12, 2018 ~ Oct. 02, 2018			
Date of EUT Received:	Sep. 04, 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.

Tested By:

Louis Chen / Sr. Engineer

Approved By:

CHUN; CHIZEH CHUN-CHIEH CHEN / Asst. Supervisor





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Revision History

Report Number	Revision	Description	Effected Page	Issue Date	Revised By
ER/2018/90026	Rev.00	Initial creation of docu- ment	All	Oct. 05, 2018	Elle Chang
ER/2018/90026	Rev. 01	Section 1.1, 11 & 15 & 16	6, 386~389	Nov. 08, 2018	Allen Tsai

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Contents

1	GENERAL INFORMATION	4
2	SYSTEM TEST CONFIGURATION	8
3	SUMMARY OF TEST RESULT	10
4	DESCRIPTION OF TEST MODES	.11
5	MEASUREMENT UNCERTAINTY	15
6	CONDUCTED EMISSION TEST	16
7	DUTY CYCLE TEST SIGNAL	20
8	26dB & 6dB EMISSION BANDWIDTH MEASUREMENT	23
9	MAXIMUM CONDUCTED OUTPUT POWER MEASUREMENT	55
10	MAXIMUM POWER SPECTRAL DENSITY	71
11	UNDESIRABLE RADIATED EMISSION MEASUREMENT	84
12	TRANSMISSION IN THE ABSENCE OF DATA	366
13	FREQUENCY STABILITY	367
14	ANTENNA REQUIREMENT	385

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GENERAL INFORMATION 1

1.1 Product Description

General:

Product Name:	Vehicle Mount Computer				
Brand Name:	Honeywell				
Model No.:	VM1A-L0N	1			
Model Difference:	N/A				
Product HW/SW version:	VM1AL0N / 85.00.00-0322				
Radio HW/SW version:	V1.0 / V5.1.1.28U				
	10.8Vdc from Rechargeable Li-ion Battery or 15Vdc from AC/DC Adapter.				
Power Supply: Battery: Adapter:		Model No.: 163176-0001 Rev C / OVT310L1R00 C, Supplier: TOTEX			
		Model No.: GT-46600-6015-T3, Supplier: GlobTek, Inc.			

FCC WLAN 5GHz:

Wi-Fi	Frequency Range	Channels	Channels Avg. Power (dBm)		
	5150~5250	4	13.95		
110 20	5250~5350	4	20.93	OFDM	
11a_20	5470~5725	12	20.77	OFDIVI	
	5725-5850	5	20.97		
	5150~5250	4	HT: 13.81		
11n_HT /	5250~5350	4	HT: 20.92	OFDM	
ac_VHT 20M	5470~5725	12	HT: 20.77	OFDM	
	5725-5850	5	HT: 21.15		
	5150~5250	2	HT: 13.70		
11n_HT /	11n_H1 / 5250~5350 2 ac VHT		HT: 21.16	OFDM	
40M	5470~5725	6	HT:21.07		
	5725-5850	2	HT: 21.27		
	5150~5250	1	13.21		
11ac	5250~5350	1	9.25		
VHT80M	5470~5725	2	20.56	OFDM	
	5725-5850	1	20.05		

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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	21.96	
11a	5250~5350	4	Avg.	20.93	
Па	5470~5725	12	Avg.	20.77	- OFDM
	5725-5850	5	Avg.	20.97	
	5150~5250	4	EIRP	HT: 21.82	
11n_HT /	5250~5350	4	Avg.	HT: 20.92	
ac_VHT 20M	5470~5725	12	Avg.	HT: 20.77	- OFDM
2011	5725-5850	5	Avg.	HT: 21.15	
	5150~5250		EIRP	HT: 21.71	
11n_HT /	5250~5350	2	Avg.	HT: 21.16	
ac_VHT 40M	5470~5725	6	Avg.	HT: 21.07	- OFDM
5725-5850		2	Avg.	HT: 21.27	
5150~5250		1	EIRP	21.22	
11ac	11ac 5250~5350		Avg.	9.25	- OFDM
VHT80M	5470~5725	2	Avg.	20.56	
	5725-5850	1	Avg.	20.05	
Modula	ation type			PSK, BPSK for OFDM in 802.11ac only	
Transi	tion Rate:	802.11 a: 802.11 n_ 802.11 n_ 802.11 ac 802.11 ac	6/9/12/18/ 20MHz: 6. 40MHz: 13 20MHz: 6 20MHz: 2	24/36/48/54 Mbps 5 – 144.4Mbps 3.5 - 300.0Mbps 5.5 –144.4Mbps 27 – 400 .0Mbps 58.5 – 866.7Mbps	

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Antenna designation

Antenna Type	Supplier	Antenna Part No.	Freq. (MHz)	Transmitter Chain	Peak Antenna Gain (dBi)	MIMO An- tenna Gain (dBi)	Worst An- tenna Gain	
			5150~5250	Ch 0 & Ch 1	5	8.01	V	
	LARSEN	R380500314	5250~5350	Ch 0 & Ch 1	5	8.01	V	
External	LARSEN	K300300314	5470~5725	Ch 0 & Ch 1	5	8.01	V	
External di-pole			5725~5850	Ch 0 & Ch 1	5	8.01	V	
antenna			5150~5250	Ch 0 & Ch 1	2.6	5.61		
	LAIRD	WTS 2450	5250~5350	Ch 0 & Ch 1	2.6	5.61		
			5470~5725	Ch 0 & Ch 1	2.6	5.61		
			5725~5850	Ch 0 & Ch 1	3.4	6.41		
				5150~5250	Ch 0	4.7	7.56	
			5250~5350	Ch 0	4.6	7.66		
			5470~5725 Ch (Ch 0	4.8	7.86		
Internal Printed N// Antenna	Ν/Δ	N/A	5725~5850	Ch 0	4.7	7.08		
	IN/A	N/A	5150~5250	Ch 1	4.4	7.56		
			5250~5350	Ch 1	4.7	7.66		
			5470~5725	Ch 1	4.9	7.86		
			5725~5850	Ch 1	3.4	7.08		

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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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Report No.: ER/2018/90026 Page: 9 of 385

2.5 Configuration of Tested System

Fig. 2-1 Radiated Emission Configuration

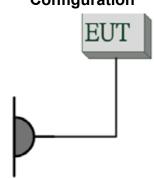


Fig.2-3 Conducted Emission (Antenna Port) Configuration



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

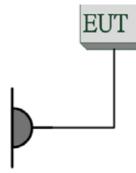


Table 2-1 Equipment Used in Tested System

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

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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 Com	
§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 Frequence				
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 V	/HT80 Mode
Channel	Frequency
58	5290

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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	

802.11 n HT40 Mode, 802.11ac VHT40 Mode		
channel	Frequency	
102	5510	
110	5550	
118	5590	
126	5630	
134	5670	

802.11ac VHT80 Mode		
channel	Frequency	
106	5530	
122	5610	

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	
165	5825	

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 802.11n yields the highest reading that generates the highest emission.

RADIATED EMISSION TEST (BELOW 1 GHz)						
MODE		AVAILABLE	TESTED	MODULATION	DATA RATE	ANTENNA
	BAND (MHz)	CHANNEL	CHANNEL		(Mbps)	PORT
802.11a	5180~5240	36 to 48	36,44,48	OFDM	6	2TX
802.11a	5260~5320	52 to 64	52,60,64	OFDM	6	2TX
802.11a	5500~5720	100 to 140	100,116,140	OFDM	6	2TX
802.11a	5745~5825	149 to 165	149,157,165	OFDM	6	2TX
	RADI	ATED EMISSIO	N TEST (ABO	VE 1 GHz)		
MODE	FREQUENCY	AVAILABLE	TESTED	MODULATION	DATA RATE	ANTENNA
	BAND (MHz)	CHANNEL			(Mbps)	PORT
802.11a	5180~5240	26 to 19	36,44,48	OFDM	6	2TX
802.11n_HT20	5160~5240	36 to 48	30,44,40	OFDM	MCS8	MIMO
802.11n_HT40	5190~5230	38 to 46	38,46	OFDM	MCS8	MIMO
802.11ac_VHT80	5210	42	42	OFDM	VHT0	MIMO
802.11a	5260~5320	52 to 64	52 60 64	OFDM	6	2TX
802.11n_HT20	5200~5520	52 to 64 52,60,64	OFDM	MCS8	MIMO	
802.11n_HT40	5270~5310	54 to 62	54,62	OFDM	MCS8	MIMO
802.11ac_VHT80	5290	58	58	OFDM	VHT0	MIMO

RADIATED EMISSION TEST:

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:

CONDUCTED TEST						
MODE		AVAILABLE	TESTED	MODULATION	DATA RATE	ANTENNA
	BAND (MHz)	CHANNEL	CHANNEL		(Mbps)	PORT
802.11a				OFDM	6	2TX
802.11n_HT20	5180~5240	36 to 48	36,44,48	OFDM	MCS8	MIMO
802.11ac_VHT20				0.2		
802.11n_HT40	5190~5230	38 to 46	38,46	OFDM	MCS8	MIMO
802.11ac_VHT40				0.5514		
802.11ac_VHT80	5210	42	42	OFDM	VHT0	MIMO
802.11a				OFDM	6	2TX
802.11n_HT20	5260~5320	260~5320 52 to 64 52,60,64	OFDM	MCS8	MIMO	
802.11ac_VHT20				0.2	WICCO	NIIIVIO
802.11n_HT40	5270~5310	54 to 62	54,62	OFDM	MCS8	MIMO
802.11ac_VHT40						
802.11ac_VHT80	5290	58	58	OFDM	VHT0	MIMO
802.11a				OFDM	6	2TX
802.11n_HT20	5500~5700	100 to 140	100,116,140	OFDM	MCS8	MIMO
802.11ac_VHT20					MOOO	
802.11n_HT40	5510~5670	102 to 134	102,110,134	OFDM	MCS8	MIMO
802.11ac_VHT40	3310 3010	102 10 104	102,110,104		MOOD	
802.11ac_VHT80	5530~5610	106 to 122	106,122	OFDM	VHT0	MIMO
802.11a				OFDM	6	2TX
802.11n_HT20	5745~5825	149 to 165	149,157,165	OFDM	MCS8	MIMO
802.11ac_VHT20					10000	
802.11n_HT40	5755~5795	151 to 159	151,159	OFDM	MCS8	MIMO
802.11ac_VHT40						
802.11ac_VHT80	5775	155	155	OFDM	VHT0	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:

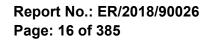
	9kHz-30MHz: +/-2.87dB
	30MHz - 180MHz: +/- 3.37dB
Measurement uncertainty	180MHz -417MHz: +/- 3.19dB
(Polarization : Vertical)	0.417GHz-1GHz: +/- 3.19dB
	1GHz - 18GHz: +/- 4.04dB
	18GHz - 40GHz: +/- 4.04dB

	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 wit	h 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							
TYPE		NUMBER	NUMBER	CAL.			
EMI Test Receiver	R&S	ESCI7	100335	02/02/2018	02/01/2019		
LISN	SCHWARZ- BECK	NSLK 8127	8127-649	05/18/2018	05/17/2019		

6.3 EUT Setup

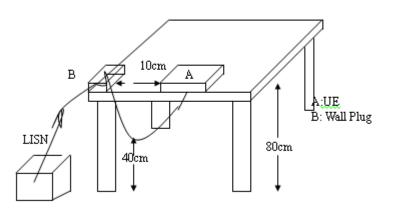
- 1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.10:2013.
- 2. The AC/DC Power adaptor of EUT was plug-in LISN. The rear of the EUT and peripherals were placed flushed with the rear of the tabletop.
- 3. The LISN was connected with 120Vac/60Hz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

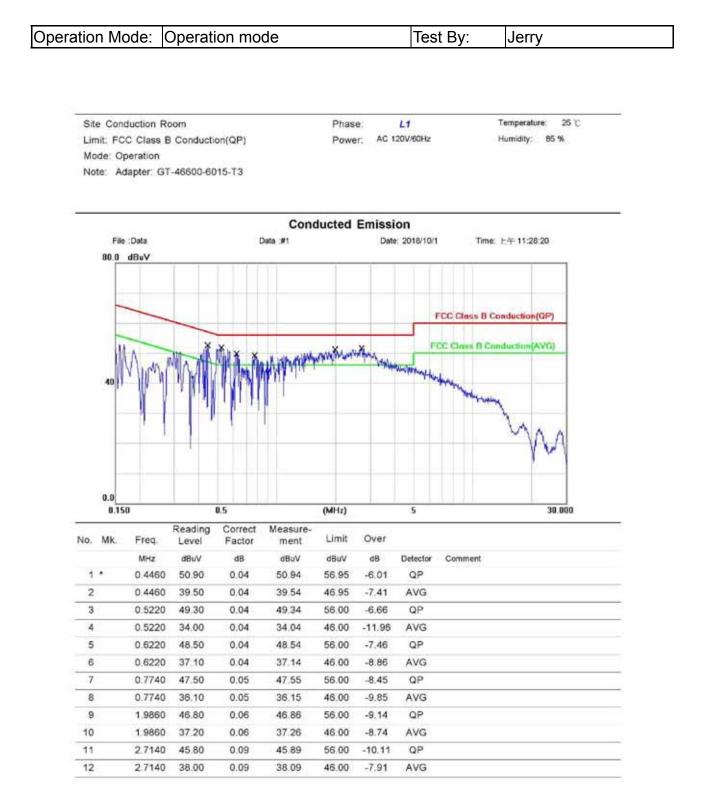
Note: Refer to next page for measurement data and plots. Note2: The * reveals the worst-case results that closet to the limit

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AC POWER LINE CONDUCTED EMISSION TEST DATA



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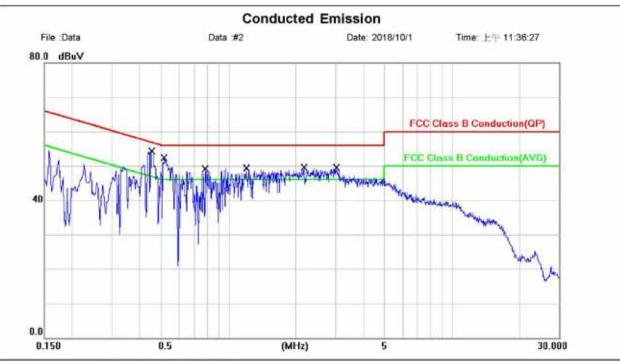
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25 C

Temperature: Site Conduction Room Phase: N Humidity: 85 % AC 120V/60Hz Limit: FCC Class B Conduction(QP) Power: Mode: Operation Note: Adapter: GT-46600-6015-T3



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.4540	53.20	0.04	53.24	56.80	-3.56	QP	
2	•	0.4540	44.50	0.04	44.54	46.80	-2.26	AVG	
3		0.5180	50.10	0.04	50.14	56.00	-5.86	QP	
4		0.5180	42.60	0.04	42.64	46.00	-3.36	AVG	
5		0.7900	44.00	0.05	44.05	56.00	-11.95	QP	
6		0.7900	31,50	0.05	31.55	46.00	-14.45	AVG	
7		1.1980	43.50	0.05	43.55	56.00	-12,45	QP	
8		1.1980	36.00	0.05	36.05	46.00	-9.95	AVG	
9		2.1700	43.10	0.08	43.18	56.00	-12.82	QP	
10		2.1700	37.60	0.08	37.68	46.00	-8.32	AVG	
11		3.0260	42.70	0.11	42.81	56.00	-13,19	QP	
12		3.0260	36.80	0.11	36.91	46.00	-9.09	AVG	

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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:

Mode	Duty Cycle (%)	Duty Factor (dB) =10*log(1/Duty Cycle)	1/T (kHz)	VBW setting (kHz)
802.11a	95.50	0.20	0.48	1.00
802.11n_20	91.90	0.37	1.02	2.00
802.11ac_20	95.38	0.21	0.52	1.00
802.11n_40	84.08	0.75	2.02	3.00
802.11ac_40	91.96	0.36	1.05	2.00
802.11ac_80	84.96	0.71	2.16	3.00

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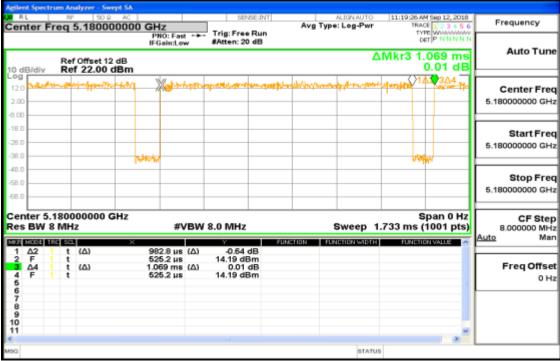
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DUTY CYCLE TEST SIGNAL Measurement Result 802.11a

11:17:52 AM Sep 12, 2018 TRACE 1 2 3 4 5 6 Frequency Center Freq 5.180000000 GHz Avg Type: Log-Pwr Trig:Free Run #Atten:20 dB TYPE PNO: Fast ----IFGain:Low DETP Auto Tune ∆Mkr3 2.160 ms Ref Offset 12 dB Ref 22.00 dBm -0.14 dE 0 dB/di 38 Center Freq 5.18000000 GHz 8.00 18.1 Start Freq 28.1 5.18000000 GHz 38.0 48.1 Stop Freq 58.1 5.180000000 GHz 58.1 Center 5.180000000 GHz Span 0 Hz CF Step Res BW 8 MHz #VBW 8.0 MHz Sweep 5.400 ms (1001 pts) 8.000000 MHz Man Auto INCTION иртн Δ2 F Δ4 1.30 dB 13.96 dBm -0.14 dB 13.96 dBm (∆) 2.063 ms (Δ) 1.539 ms 2.160 ms (Δ) 1.539 ms Freq Offset (**Δ**) 4567 0 Hz 8 9 10 11 STATUS

802.11n HT20



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802.11n <u>HT 40</u>

	NF 50.9 AC		SENSE:INT	ALIGNAUTO	11:20:07 AM Sep 12, 2018	
	15.190000000			Avg Type: Log-Pwr	TRACE 1 2 3 4 5 6	Frequency
10 dB/div R	ef Offset 12 dB	PNO: Fast IFGain:Low	Trig:Free Run ≇Atten:20 dB		ΔMkr3 589.6 μs -1.22 dB	Auto Tun
12.0 2.00 8.00	and discount of the second		eren antalan an a	atom to 102	304 Allow the state of the stat	Center Fre 5.190000000 GH
18.0 28.0 36.0				ettaberta		Start Fre 5.190000000 G
18.0 58.0 58.0						Stop Fr 5.19000000 G
enter 5.190 es BW 8 M		#VBW 1		Sweep	Span 0 Hz 1.467 ms (1001 pts)	CF St 8.000000 M Auto M
1 Δ2 1 2 F 1 3 Δ4 1 4 F 1 5 6 7	t (Δ) t t (Δ) t	495.7 μs (Δ) 547.1 μs 569.6 μs (Δ) 547.1 μs	4.16 dB 6.57 dBm -1.22 dB 6.57 dBm			Freq Offs 0
8 9 10 11					*	

802.11 ac VHT 80



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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.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only

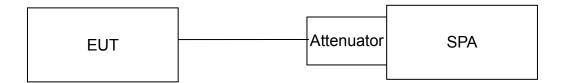
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8.3 Measurement Equipment Used

SGS Conducted Room								
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due			
EXA Spectrum Analyzer	Agilent	N9010A	MY50420195	05/03/2018	05/02/2019			
Attenuator	Mini-Circuit	BW-S10W2+	2	01/02/2018	01/01/2019			
DC Block	Mini-Circuits	BLK-18-S+	1	01/02/2018	01/01/2019			
Coaxial Cables	N/A	WK CE Cable	N/A	01/02/2018	01/01/2019			
Power Meter	Anritsu	ML2496A	1804001	02/01/2018	01/31/2019			
Power Sensor	Anritsu	MA2411B	1726104	02/01/2018	01/31/2019			
Power Sensor	Anritsu	MA2411B	1726107	02/01/2018	01/31/2019			

8.4 Test Set-up



8.5 Measurement Result

26dB and 6dB Bandwidth

802.11a_Ch0			802.11a_Ch1		
Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)	Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5180	21.23	13.269	5180	21.36	13.295
5220	21.11	13.244	5220	21.19	13.262
5240	21.17	13.257	5240	21.29	13.282
5260	30.00	14.771	5260	30.00	14.771
5300	30.00	14.771	5300	30.00	14.771
5320	27.69	14.422	5320	27.49	14.392
5500	24.29	13.854	5500	22.96	13.610
5580	30.00	14.771	5580	30.00	14.771
5700	21.37	13.297	5700	21.50	13.324

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1	802.11a_Ch0			802.11a_Ch1		
	Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)	Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)
	5745	16.36	12.137	5745	16.36	12.139
	5785	16.13	12.075	5785	16.36	12.138
	5825	16.35	12.135	5825	16.33	12.130

802.11n_HT20_Ch0

802.11n_HT20_Ch1

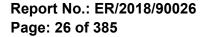
Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)	Frequency (MHz)	26dB BW (MHz)	10 Log (B) (dB)
5180	22.94	13.606	5180	23.51	13.712
5220	22.90	13.599	5220	23.36	13.685
5240	22.90	13.597	5240	22.86	13.590
5260	30.00	14.771	5260	30.00	14.771
5300	30.00	14.771	5300	30.00	14.771
5320	26.77	14.276	5320	26.47	14.228
5500	23.17	13.649	5500	22.79	13.578
5580	30.00	14.771	5580	30.00	14.771
5700	23.14	13.643	5700	23.30	13.674

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	17.35	12.392	5745	17.58	12.450
5785	17.57	12.448	5785	17.57	12.448
5825	17.54	12.441	5825	17.60	12.454

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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	42.18	16.251	5190	41.96	16.228	
5230	42.22	16.255	5230	42.13	16.245	
5270	50.00	16.990	5270	50.00	16.990	
5310	42.06	16.239	5310	41.78	16.209	
5510	42.19	16.252	5510	41.71	16.202	
5550	50.00	16.990	5550	50.00	16.990	
5670	49.44	16.941	5670	49.98	16.988	

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	36.37	15.607	5755	36.36	15.606
5795	36.35	15.605	5795	36.37	15.607

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	84.75	19.281	5210	84.30	19.258
5290	84.31	19.259	5290	84.20	19.253
5530	84.40	19.263	5530	84.56	19.271
5610	100.00	20.000	5610	100.00	20.000

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	75.91	18.803

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99% Bandwidth

802.11a_Ch0			802.11a_Ch1		
Frequency (MHz)	99% BW (MHz)	10 Log (B) (dB)	Frequency (MHz)	99% BW (MHz)	10 Log (B) (dB)
5180	16.765	12.244	5180	16.631	12.209
5220	16.814	12.257	5220	16.617	12.206
5240	16.803	12.254	5240	16.653	12.215
5260	19.460	12.891	5260	19.195	12.832
5300	18.901	12.765	5300	19.135	12.818
5320	16.946	12.291	5320	16.977	12.299
5500	16.840	12.263	5500	16.845	12.265
5580	18.822	12.747	5580	18.797	12.741
5700	16.791	12.251	5700	16.775	12.247

802.11a_Ch0

802.11a_Ch1

Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)	Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)
5745	16.38	12.143	5745	16.49	12.171
5785	16.45	12.161	5785	16.37	12.139
5825	16.41	12.152	5825	16.47	12.167

802.11n_HT20_Ch0

802.11n_HT20_Ch1

Frequency (MHz)	99% BW (MHz)	10 Log (B) (dB)	Frequency (MHz)	99% BW (MHz)	10 Log (B) (dB)
5180	17.956	12.542	5180	18.030	12.560
5220	18.020	12.558	5220	17.998	12.552
5240	17.933	12.537	5240	17.986	12.549
5260	19.675	12.939	5260	19.625	12.928
5300	19.153	12.822	5300	19.293	12.854
5320	18.037	12.562	5320	18.068	12.569
5500	18.018	12.557	5500	18.015	12.556
5580	19.116	12.814	5580	19.196	12.832
5700	17.997	12.552	5700	17.998	12.552

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10 Log (B)

(dB)



802.11n_HT20_Ch0 802.11n_HT20_Ch1 6dB 6dB Frequency 10 Log (B) Frequency BW BW (MHz) (dB) (MHz)

()	(MHz)	(42)	()	(MHz)	(42)
5745	17.73	12.488	5745	17.74	12.490
5785	17.73	12.488	5785	17.76	12.495
5825	17.76	12.493	5825	17.74	12.491

802.11n _HT40_Ch0

802.11n HT40_Ch1

Frequency (MHz)	99% BW (MHz)	10 Log (B) (dB)	Frequency (MHz)	99% BW (MHz)	10 Log (B) (dB)
5190	36.300	15.599	5190	36.324	15.602
5230	36.294	15.598	5230	36.292	15.598
5270	37.776	15.772	5270	37.736	15.768
5310	36.287	15.598	5310	36.281	15.597
5510	36.286	15.597	5510	36.266	15.595
5550	36.925	15.673	5550	36.875	15.667
5670	36.304	15.600	5670	36.342	15.604

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	36.53	15.627	5755	36.48	15.620
5795	36.44	15.616	5795	36.44	15.615

802.11ac VHT80 Ch0

802.11ac VHT80 Ch1

Frequency (MHz)	99% BW (MHz)	10 Log (B) (dB)	Frequency (MHz)	99% BW (MHz)	10 Log (B) (dB)
5210	75.644	18.788	5210	75.684	18.790
5290	75.688	18.790	5290	75.716	18.792
5530	75.693	18.791	5530	75.675	18.790
5610	76.373	18.829	5610	76.361	18.829

802.11ac VHT80 Ch0

802.11ac VHT80 Ch1

i.						
	Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)	Frequency (MHz)	6dB BW (MHz)	10 Log (B) (dB)
	5775	76.46	18.834	5775	76.51	18.837

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FCC_802.11a_20MHz_Main_5180MHz

FCC_802.11a_20MHz_Main_5260MHz



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FCC_802.11a_20MHz_Main_5500MHz

FCC_802.11a_20MHz_Main_5745MHz



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FCC_802.11a_20MHz_AUX1_5180MHz

FCC_802.11a_20MHz_AUX1_5260MHz



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FCC_802.11a_20MHz_AUX1_5500MHz

FCC_802.11a_20MHz_AUX1_5745MHz



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FCC 802.11n 20MHz Main 5180MHz

FCC 802.11n 20MHz Main 5260MHz

Applied Spectrum Analyzer Descripted BV Context Freq Actor Autor Disb Spectrum Disb Spectrum Actor Autor Disb Spectrum Disb Spectrum <thdisb spectrum<="" th=""> Disb Spectrum</thdisb>	Center Freq 5.260000000 GHz Center Freq 5.260000000 GHz Center Freq 5.260000000 GHz Frequency Wir Gall.org File State August State August State Frequency
Ref Offset 14 dB	Ref Offset 14 dB
10 dB/div Ref 30.00 dBm	10 dB/div Ref 30.00 dBm
	2000 Center Freq 2000 Center Freq 5 26000000 GHz 5 26000000 GHz
-20.0	
	-30.0
60.0	-60.0
Center 5.18 GHz Span 30 MHz #Res BW 240 kHz #VBW 680 kHz Sweep 1 ms	CF Step #Res BW 330 kHz #VBW 1 MHz Sweep 1 ms
Occupied Bandwidth Total Power 17.5 dBm	Man Occupied Bandwidth Total Power 25.0 dBm
	req Offset 19.597 MHz Freq Offset
Transmit Freq Error 40.656 kHz OBW Power 99.00 %	^{0 Hz} Transmit Freq Error 393.86 kHz OBW Power 99.00 % ^{0 Hz}
x dB Bandwidth 22.94 MHz x dB -26.00 dB	x dB Bandwidth 30.00 MHz x dB -26.00 dB
FCC_802.11n_20MHz_Main_5220MHz	FCC_802.11n_20MHz_Main_5300MHz
Agilent Spectrum Analyzer - Occupied BW R L IP SO 9 AC SENSE:INT ALIGNAUTO 05:10:51PM Sep 21, 2018 Free	Agilant Spectrum Analyzer - Discupied BW Structure Actionation Objects Fill Fill Compare Text Fill Fill </td
Center Freq 5.220000000 GHz Center Freq 5.22000000 GHz Radio Std: None MFGalact.ov After 20 dB Radio Std: None Radio Std: None Radio Std: None Radio Std: None Radio Std: None	Quency Center Freq 5.300000000 GHz Center Freq: 6.30000000 GHz Radio Std: None Frequency MIFGaincow Akter: 20 dB Radio Device: BTS
Ref Offset 14 dB	Ref Offset 14 dB
10 dB/div Ref 30.00 dBm	10 dB/div Ref 30.00 dBm
	enter Freq 200 100000 GHz 100 5.30000000 GHz 5.30000000 GHz
	0.00
	100 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
-30.0	30.0
	40.0
	60.0
Center 5.22 GHz Span 30 MHz #Res BW 240 kHz #VBW 750 kHz Sweep 1 ms	CF Step #Res BW 330 kHz #VBW 1 MHz Sweep 1 ms
Occupied Bandwidth Total Power 17.5 dBm	Man Occupied Bandwidth Total Power 25.0 dBm
17 997 MU-	req Offset 19.226 MHz Freq Offset
Transmit Freq Error 54.139 kHz OBW Power 99.00 %	^{0 Hz} Transmit Freq Error 268.97 kHz OBW Power 99.00 % ^{0 Hz}
x dB Bandwidth 22.90 MHz x dB -26.00 dB	x dB Bandwidth 30.00 MHz x dB -26.00 dB
NSG STATUS	A190 STATUS
FCC_802.11n_20MHz_Main_5240MHz	FCC_802.11n_20MHz_Main_5320MHz
Adjend Spectrum Analyzer - Occupied BW B RL NF 900 AC SPECIFIC ALIGNAUTO 0512-22PM Sep21, 2018 Center Freq 5.240000000 GHz Center Freq 5.24000000 GHz Radio Std: None Frec	Aglent Spectrum Analyzer Decayled SW QL P 50 A/C SPECENTI ALIG(AUTO 05:17/05149 Sep21, 2018 Quency Center Freq 5.320000000 GHz Center Freq 5.320000000 GHz Radio Std: None Frequency
Trig: Free Run Avg Hold: 50/50 #IFGain:Low #Atten: 20 dB Radio Device: BTS	Trig: Free Run Avg Held: 50/50
Ref Offset 14 dB	Ref Offset 14 dB
10 dB/div Ref 30.00 dBm	nter Freq
	enter Freq 200 200 200 200 200 200 200 200 200 200
20.0	-20.0 www.www.www.www.
80.0	60.0
Center 5.24 GHz Span 30 MHz #Res BW 240 kHz #VBW 750 kHz Sweep 1 ms 3.0 3.0 3.0 3.0	CF Step 00000 MHz CF Step #Res BW Span 30 MHz 240 kHz CF Step 3.00000 MHz
Occupied Bandwidth Total Power 17.9 dBm	Man Occupied Bandwidth Total Power 22.7 dBm
17.882 MHz	reg Offset 17.941 MHz Freg Offset
Transmit Freq Error 48.278 kHz OBW Power 99.00 %	0 Hz Transmit Freq Error 29.898 kHz OBW Power 99.00 %
x dB Bandwidth 22.89 MHz x dB -26.00 dB	x dB Bandwidth 26.77 MHz x dB -26.00 dB
ASG BTATUS	ASG STATUS

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f (886-2) 2298-0488



FCC_802.11n_20MHz_Main_5500MHz

FCC_802.11n_20MHz_Main_5745MHz



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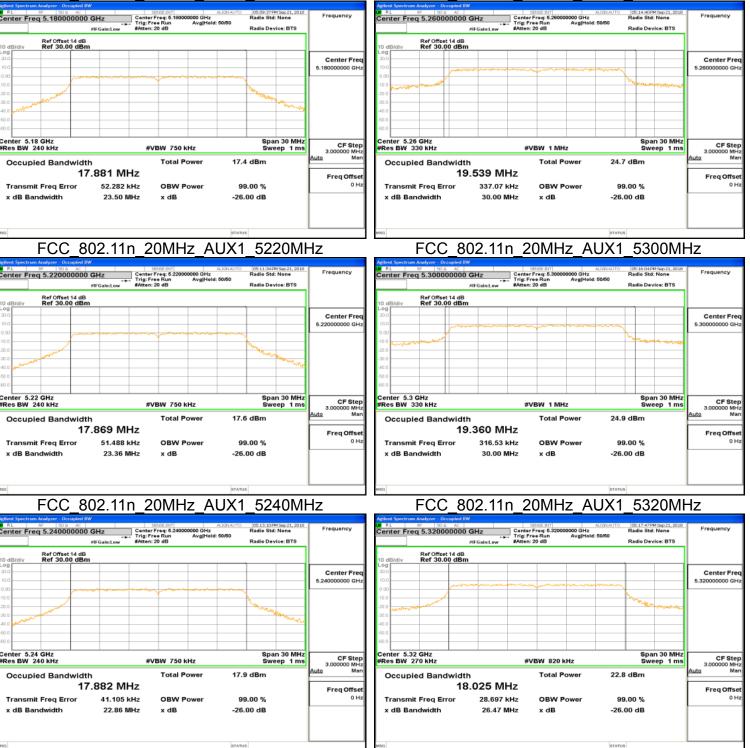
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FCC_802.11n_20MHz_AUX1_5180MHz

FCC_802.11n_20MHz_AUX1_5260MHz



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FCC_802.11n_20MHz_AUX1_5500MHz

FCC_802.11n_20MHz_AUX1_5745MHz



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FCC_802.11n_40MHz_Main_5190MHz

FCC_802.11n_40MHz_Main_5310MHz



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FCC 802.11n 40MHz AUX1 5190MHz



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FCC_802.11n_40MHz_AUX1_5310MHz

FCC_802.11n_40MHz_AUX1_5670MHz



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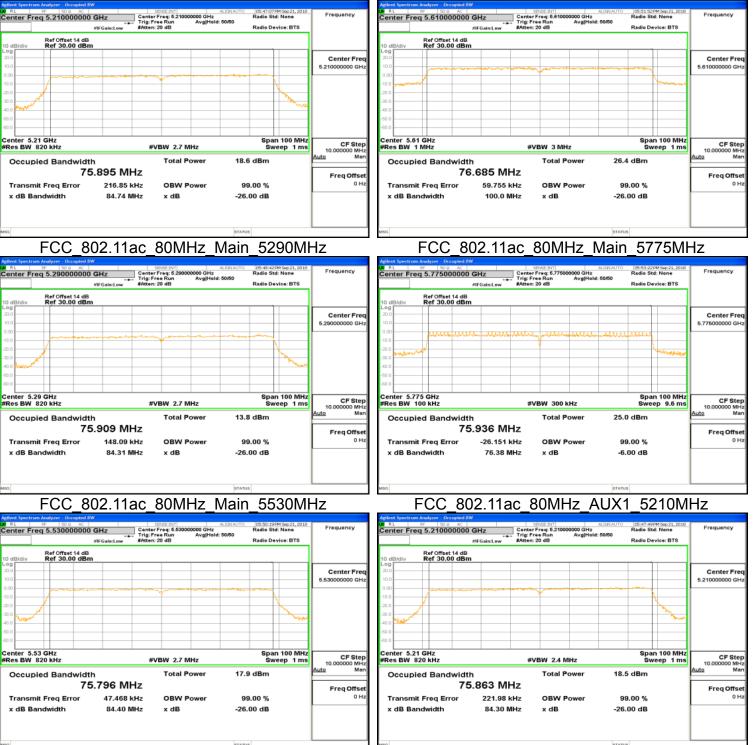
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FCC_802.11ac_80MHz_Main_5210MHz

FCC_802.11ac_80MHz_Main_5610MHz



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f (886-2) 2298-0488



000 GHz Avg|Hold: 50/50 Radio Std: None

Radio Device: BTS

Span 100 MH Sweep 9.6 m

25.2 dBm

99.00 %

-6.00 dB

Center Free 5.775000000 GH

> CF Step 10.000000 MH

> > Freq Offse

OН

FCC 802.11ac 80MHz AUX1 5775MHz

#VBW 300 kHz Total Power

OBW Pov

x dB

enter Freq 5.775000000 GHz

enter 5.775 GHz Res BW 100 kHz

Occupied Bandwidth

Transmit Freq Erro

dB Bandwidth

75.854 MHz

-56.642 kHz

75.91 MHz

Ref Offset 14 dB Ref 30.00 dB

FCC_802.11ac_80MHz_AUX1_5290MHz

RL MP 50 0 AC enter Freq 5.290000000	Trig: F	sense:mt r Freq: 5.290000000 GHz Free Run Avg Hold n: 20 dB	Radio St : 50/50	PM Sep 21, 2018 d: None evice: BTS	Frequency
Ref Offset 14 dB Ref 30.00 dBm					
					Center Fre 5.290000000 GH
0	- angle- and the area and a second				
				No. North	
0.0					
enter 5.29 GHz Res BW 820 kHz	#	VBW 2.4 MHz		n 100 MHz /eep: 1 ms	CF Ste 10.000000 MH
Occupied Bandwidt		Total Power	13.8 dBm		<u>Auto</u> Ma
75	.910 MHz				Freq Offse
Transmit Freq Error	151.95 kHz	OBW Power	99.00 %		он
x dB Bandwidth	84.20 MHz	x dB	-26.00 dB		
			STATUS		

FCC_802.11ac_80MHz_AUX1_5530MHz



FCC_802.11ac_80MHz_AUX1_5610MHz

Agilent Spectrum Analyzer - Occupied B	w	SENSE:INT	ALIGNAUTO	05:52:33PM Sep 21, 2018	
Center Freq 5.61000000	Trig:	er Freq: 5.610000000 GHz Free Run Avg Hol		Radio Std: None	Frequency
Ref Offset 14 dB	in ounicon	n: 20 dB		Radio Device: BTS	
0 dB/div Ref 30.00 dBn	n				
0.0					Center Fre
	and the second sec	an and the second second	- the second		5.61000000 G
.00				-	
0.0					
0.0					
0.0			_		
0.0			-		
0.0					
enter 5.61 GHz Res BW 1 MHz		EVBW 3 MHz		Span 100 MHz Sweep 1 ms	CF Ste
Occupied Bandwidt	h	Total Power	26.4	dBm	10.000000 Mi Auto M
		rotari ottor	20.4		Freq Offs
Transmit Freq Error	71.445 kHz	OBW Power	99	.00 %	0
x dB Bandwidth	100.0 MHz	x dB	-26.	00 dB	
93			STATUS		

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IC 802.11a 20MHz Main 5260MHz

IC_802.11a_20MHz_Main_5180MHz

D4:44:04PMSep2 enter Freq 5.260000000 GHz ter Freq 5.180000000 GHz Center Freq: 5.1800 Trig: Free Run 0000 GHz Avg|Hold: 50/50 Center Freq: 6. Trig: Free Run 00 GHz Avg|Hold: 50/50 Radio Device: BTS Radio Device: BTS Ref Offset 14 dB Ref 30.00 dB Ref Offset 14 dB Ref 30.00 dBr Center Fre Center Free 5.260000000 G enter 5.18 GHz Res BW 300 kHz Span 30 MHz Sweep 1 ms nter 5.26 GH Span 30 MH Sweep 1 m CF Step 3.000000 M CF Step 3.000000 ML #VBW 1 MHz 0 kHz #VBW 1 MHz 17.9 dBm Total Power Total Power 25.0 dBm Occupied Bandwidth Occupied Bandwidth 16.765 MHz 19.460 MHz Freq Offs Freq Offse Transmit Freq Error OBW Power Transmit Freq Erro OBW Pow -29.400 kHz 99.00 % οн 501.07 kHz 99.00 % 0 H x dB Bandwidth 16.46 MHz x dB -6.00 dB dB Bandwidth 16.38 MHz x dB -6.00 dB IC 802.11a 20MHz Main 5220MHz IC 802.11a 20MHz Main 5300MHz D4:47:57 PM Sep 21 Radio Std: None Radio Std: None enter Freq 5.220000000 GHz 00 GHz AvalHeld: 50/50 enter Freq 5.300000000 GHz Center Freq: 5.2 Trig: Free Run 00 GHz AvalHold: 50/50 Center Freq: 5 Trig: Free Run Radio Device: BTS Radio Device: BTS Ref Offset 14 dB Ref 30.00 dBr Ref Offset 14 dB Ref 30.00 dBm Center Fre Center Free 5 2200000 00 GF 5 300000000 G er 5.22 GHz Span 30 MHz enter 5.3 GHz Res BW 300 kHz Span 30 MHz CF Step 3.000000 MHz #VBW 1 MHz CF Step 3.000000 MHz VBW 1 MHz MH Ma M Occupied Bandwidth Total Pow 17.7 dBm Occupied Bandwidth Total Powe 24.9 dBm 16.814 MHz 18.901 MHz Freq Offse Freq Offse он -40.237 kHz 99.00 % 490.18 kHz 99.00 % Transmit Freq Error OBW Power Transmit Freq Error OBW Power x dB Bandwidth 16.43 MHz -6.00 dB x dB Bandwidth 16.43 MHz -6.00 dB x dB x dB IC 802.11a 20MHz Main 5320MHz IC 802.11a 20MHz Main 5240MHz D4:49:41PM Sep 21 Radio Std: None RL MF 50 9 AC nter Freq 5.240000000 GHz 04:56:11PM Sep 21 Radio Std: None 00 GHz AvalHeld: 50/5 Center Freq: 5.3 Trig: Free Run 00 GHz AvalHold Center Freq: 5 Trig: Free Run Radio Device: BTS Radio Device: BTS Ref Offset 14 dE Ref 30.00 dB Ref Offset 14 dB Ref 30.00 dBn Center Fre Center Fre 32000 Span 30 MHz Span 30 MH Sweep 1 m 5.24 GHz 5.32 GH CF Step 3.000000 M CF Step 3.000000 MHz Man #VBW 1 MHz kH: #VBW 1 MHz 18.1 dBm 22.9 dBm Occupied Bandwidth Total Power Occupied Bandwidth Total Power 16.803 MHz 16.946 MHz Freq Offse Freq Offse 99.00 % Transmit Freq Error Transmit Freq Error -46.569 kHz OBW Powe он -20.982 kHz OBW Pov 99.00 % 0 H x dB v dB Bandwidth 16.47 MHz v dB -6.00 dB v dB Bandwidth 16.44 MHz -6.00 dB

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IC 802.11a 20MHz Main 5745MHz

IC_802.11a_20MHz_Main_5500MHz

04:57:58PM Sep 2 enter Freq 5.745000000 GHz ter Freq 5.500000000 GHz Center Freq: 5.60 000 GHz Avg|Hold: 50/50 Center Freq: 5.7450 Trig: Free Run 000 GHz Avg|Hold: 50/50 Radio Device: BTS Radio Device: BTS Ref Offset 14 dB Ref 30.00 dB Ref Offset 14 dB Ref 30.00 dBr Center Fre Center Free 5.745000000 GH; enter 5.5 GHz Res BW 300 kHz Span 30 MHz Sweep 1 ms nter 5.745 GHz es BW 300 kHz Span 30 MH Sweep 1 m CF Step 3.000000 M CF Step 3.000000 ML #VBW 1 MH; #VBW 1 MHz 25.0 dBm Total Power 20.8 dBm Total Power Occupied Bandwidth Occupied Bandwidth 16.840 MHz 17.946 MHz Freq Offs Freq Offse Transmit Freq Error OBW Powe Transmit Freq Error OBW Pow -47.352 kHz 99.00 % οн 105.42 kHz 99.00 % 0 H x dB Bandwidth 16.43 MHz x dB -6.00 dB dB Bandwidth 16.38 MHz x dB -6.00 dB IC 802.11a 20MHz Main 5580MHz IC 802.11a 20MHz Main 5785MHz 04:59:58 PM Sep 21 Radio Std: None 05:05:01PM Sep 21 Radio Std: None enter Freq 5.580000000 GHz 00 GHz AvalHeld: 50/50 enter Freq 5.785000000 GHz Center Freq: 5.7 Trig: Free Run 00 GHz AvalHold: 50/50 Center Freq: 5.0 Trig: Free Run Radio Device: BTS Radio Device: BTS Ref Offset 14 dB Ref 30.00 dBr Ref Offset 14 dB Ref 30.00 dBm Center Fre Center Free 00 GF 5 785000000 G er 5.58 GHz Span 30 MHz Span 30 MHz Center 5.785 GHz #Res BW 300 kHz CF Step 3.000000 MHz #VBW 1 MHz CF Step 3.000000 MHz VBW 1 MHz MH Ma M Occupied Bandwidth Total Pow 24.3 dBm Occupied Bandwidth Total Powe 24.6 dBm 18.822 MHz 17.978 MHz Freq Offse Freq Offs он 312.25 kHz 99.00 % 35.630 kHz Transmit Freq Error OBW Power Transmit Freq Error OBW Power 99.00 % 16.45 MHz x dB Bandwidth 16.50 MHz -6.00 dB x dB Bandwidth -6.00 dB x dB x dB IC 802.11a 20MHz Main 5700MHz IC 802.11a 20MHz Main 5825MHz 05:01:33PM Sep 21 Radio Std: None RL NF 50.9 AC nter Freq 5.700000000 GHz 00 GHz AvgHald 05:07:16PM Sep 21 Radio Std: None 00 GHz AvalHeld: 50/5 Center Freq: 5. Trig: Free Run Center Freq: 5 Trig: Free Run Radio Device: BTS Radio Device: BTS Ref Offset 14 dB Ref 30.00 dB Ref Offset 14 dB Ref 30.00 dBn Center Fre Center Fre 5.7 GHz Span 30 MHz Span 30 MH Sweep 1 m 5.825 GHz CF Step 3.000000 M CF Step 3.000000 MHz Man #VBW 1 MHz #VBW 1 MHz 18.6 dBm 24.5 dBm Occupied Bandwidth Total Power Occupied Bandwidth Total Power 16.791 MHz 17.786 MHz Freq Offse Freq Offse

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99.00 %

-6.00 dB

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OBW Powe

v dB

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Transmit Freq Error

v dB Bandwidth

台灣檢驗科技股份有限公司

-58.771 kHz

16.43 MHz

Transmit Freq Error

v dB Bandwidth

t (886-2) 2299-3279

f (886-2) 2298-0488

www.tw.sgs.com

117.08 kHz

16.4.1 MHz

OBW Pov

x dB

99.00 %

-6.00 dB

0 H

Member of SGS Group



ter Freq 5.180000000 GHz

Ref Offset 14 dB Ref 30.00 dB

enter 5.18 GHz Res BW 300 kHz

Occupied Bandwidth

enter Freq 5.220000000 GHz

Ref Offset 14 dB Ref 30.00 dBr

Transmit Freq Error

x dB Bandwidth

er 5.22 GHz

Occupied Bandwidth

Transmit Freq Error

x dB Bandwidth

IC 802.11a 20MHz AUX1 5260MHz

IC 802.11a 20MHz AUX1 5180MHz

D4:44:35PM Sep 2 Radio Std: None enter Freq 5.260000000 GHz Center Freq: 5.1800 Trig: Free Run 000 GHz Avg|Hold: 50/50 Center Freq: 5 00 GHz Avg|Hold>50/50 Radio Device: BTS Radio Device: BTS Ref Offset 14 dB Ref 30.00 dBr Center Fre Center Free 5.260000000 G Span 30 MHz Sweep 1 ms nter 5.26 GH Span 30 MH Sweep 1 m CF Step 3.000000 M CF Step 3.000000 ML #VBW 1 MHz 0 kHz #VBW 1 MHz 18.3 dBm 24.7 dBm Total Power Total Power Occupied Bandwidth 19.195 MHz 16.631 MHz Freq Offs Freq Offse 11.851 kHz OBW Powe Transmit Freq Erro OBW Pov 99.00 % οн 465.38 kHz 99.00 % 0 H x dB 16.53 MHz x dB -6.00 dB dB Bandwidth 16.45 MHz -6.00 dB IC 802.11a 20MHz AUX1 5220MHz IC 802.11a 20MHz AUX1 5300MHz 04:48:35 PM Sep 21 Radio Std: None Radio Std: None GHz Hold: 50/50 enter Freq 5.300000000 GHz Center Freq: 5. Trig: Free Run 00 GHz AvalHold: 50/50 Radio Device: BTS Radio Device: BTS Ref Offset 14 dB Ref 30.00 dBm Center Fre Center Free 5 2200000 00 GF 5 300000000 G Span 30 MHz enter 5.3 GHz Res BW 300 kHz Span 30 MHz CF Step 3.000000 MHz #VBW 1 MHz CF Step 3.000000 MHz #VBW 1 MHz MH Ma M Total Pow 18.4 dBm Occupied Bandwidth Total Powe 24.7 dBm 16.617 MHz 19.135 MHz Freq Offse Freq Offs он 18.917 kHz 513.17 kHz OBW Power 99.00 % Transmit Freq Error OBW Power 99.00 % 16.45 MHz -6.00 dB x dB Bandwidth 16.43 MHz -6.00 dB x dB x dB

IC 802.11a 20MHz AUX1 5240MHz

RL M 509 AC enter Freq 5.240000000	Trig: F	SENSE:INT r Freq: 5.240000000 GHz free Run Avg Hold: :: 20 dB	ALIONAUTO D4:50:12PM Sep21, 2 Radio Std: None 50/50 Radio Device: BTS	Frequency
dB/div Ref 30.00 dBm	<u> </u>			
				Center Freq 5.240000000 GHz
			manan	
Low water			- Contraction -	- <u>-</u>
nter 5.24 GHz	#	VBW 1 MHz	Span 30 M Sweep 1	CF Step
Occupied Bandwidt		Total Power	18.2 dBm	Auto Man
ransmit Freq Error dB Bandwidth	14.473 kHz 16.47 MHz	OBW Power	99.00 % -6.00 dB	0 Hz
de Bandwidth	16.47 MHZ	x dB	-6.00 dB	
			STATUS	

IC 802.11a 20MHz AUX1 5320MHz 00 GHz Avg|Hold: 50/5 D4:55:45PM Sep 21 Radio Std: None enter Freq 5.320000000 GHz Center Freq: 5 Trig: Free Run Radio Device: BTS Ref Offset 14 dB Ref 30.00 dBn Center Fre .32000 nter 5.32 GHz es BW 300 kHz Span 30 MH Sweep 1 m CF Step 3.000000 M #VBW 1 MHz 23.2 dBm Occupied Bandwidth Total Power 16.977 MHz Freq Offse Transmit Freq Error -19.100 kHz OBW Pov 99.00 % 0 H x dB v dB Bandwidth 16.43 MHz -6.00 dB

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台灣檢驗科技股份有限公司

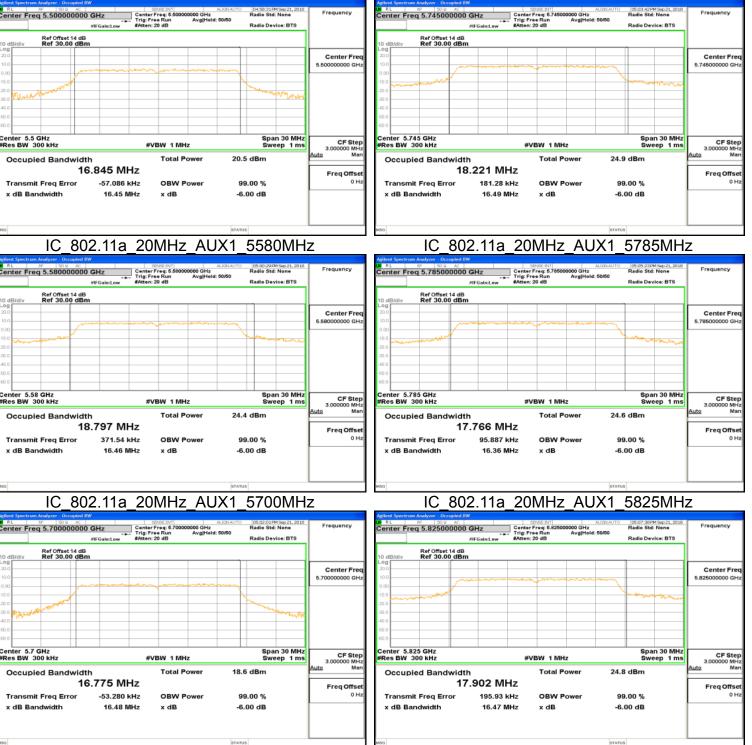
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IC_802.11a_20MHz_AUX1_5500MHz

IC_802.11a_20MHz_AUX1_5745MHz



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IC 802.11n 20MHz Main 5260MHz

IC 802.11n 20MHz Main 5180MHz

05:09:21PM Sep 2 enter Freq 5.260000000 GHz ter Freq 5.180000000 GHz Center Freq 5.180000000 GHz Trig: Freq Run Avg|Hold: 50/50 Center Freq: 6. Trig: Free Run 00 GHz Avg|Hold: 50/50 Radio Device: BTS Radio Device: BTS Ref Offset 14 dB Ref 30.00 dBr Ref Offset 14 dB Ref 30.00 dBn Center Fre Center Free 5.260000000 G enter 5.18 GHz Res BW 300 kHz Span 30 MHz Sween 1 ms nter 5.26 GH Span 30 MH Sweep 1 m CF Step 3.000000 M CF Step 3.000000 ML #VBW 1 MH; 0 kHz #VBW 1 MHz 17.4 dBm 25.1 dBm Total Power Total Power Occupied Bandwidth Occupied Bandwidth 17.956 MHz 19.675 MHz Freq Offs Freq Offse Transmit Freq Error 42.500 kHz OBW Powe Transmit Freq Erro OBW Pow 99.00 % οн 356.01 kHz 99.00 % 0 H x dB Bandwidth 17.71 MHz x dB -6.00 dB dB Bandwidth 17.77 MHz x dB -6.00 dB IC 802.11n 20MHz Main 5220MHz IC 802.11n 20MHz Main 5300MHz 05:11:18PM Sep 21 Radio Std: None 05:15:48 PM Sep 21 Radio Std: None enter Freq 5.220000000 GHz 00 GHz AvalHeld: 50/50 enter Freq 5.300000000 GHz 00 GHz AvalHold: 50/50 Center Freq: 5 Trig: Free Run Center Freq: 5.2 Trig: Free Run Radio Device: BTS Radio Device: BTS Ref Offset 14 dB Ref 30.00 dBr Ref Offset 14 dB Ref 30.00 dBm Center Fre Center Free 5 2200000 00 GF 5 300000000 G er 5.22 GHz Span 30 MHz enter 5.3 GHz Res BW 300 kHz Span 30 MHz CF Step 3.000000 MHz #VBW 1 MHz CF Step 3.000000 MHz #VBW 1 MHz MH Ma M Occupied Bandwidth Total Pow 17.6 dBm Occupied Bandwidth Total Powe 24.9 dBm 18.020 MHz 19.153 MHz Freq Offse Freq Offs он 79.306 kHz 99.00 % 264.87 kHz 99.00 % Transmit Freq Error OBW Power Transmit Freq Error OBW Power 17.79 MHz x dB Bandwidth 17.82 MHz -6.00 dB x dB Bandwidth -6.00 dB x dB x dB IC 802.11n 20MHz Main 5320MHz IC 802.11n 20MHz Main 5240MHz 05:12:52PM Sep 21 Radio Std: None RL MF 50.9 AC 05:17:31PMSep23 nter Freq 5.240000000 GHz 00 GHz AvalHald: 50/5 Center Freq: 5.3 Trig: Free Run 00 GHz AvalHeld: Center Freq: 5 Trig: Free Run Radio Device: BTS Radio Device: BTS Ref Offset 14 dB Ref 30.00 dB Ref Offset 14 dB Ref 30.00 dBn Center Fre Center Fre 32000 Span 30 MH Span 30 MHz 5.24 GHz 5.32 GH CF Step 3.000000 M CF Step 3.000000 MHz Man #VBW 1 MHz kH: #VBW 1 MHz

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17.9 dBm

99.00 %

-6.00 dB

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Total Power

OBW Powe

v dB

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Freq Offse

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Occupied Bandwidth

Transmit Freq Error

v dB Bandwidth

18.037 MHz

26.512 kHz

17.72 MHz

台灣檢驗科技股份有限公司

Occupied Bandwidth

Transmit Freq Error

v dB Bandwidth

17.933 MHz

18.883 kHz

17.78 MHz

t (886-2) 2299-3279

f (886-2) 2298-0488

Member of SGS Group

22.7 dBm

99.00 %

-6.00 dB

Freq Offse

0 H

Total Power

OBW Pov

x dB



IC 802.11n 20MHz Main 5745MHz

IC_802.11n_20MHz_Main_5500MHz

05:18:52PM Sep 2 enter Freq 5.745000000 GHz ter Freq 5.500000000 GHz Center Freq 5.600 Trig: Free Run Center Freq: 5.7450 000 GHz Avg|Hold: 50/50 000 GHz Avg|Hold: 50/50 Radio Device: BTS Radio Device: BTS Ref Offset 14 dB Ref 30.00 dBr Ref Offset 14 dB Ref 30.00 dBr Center Fre Center Free 5.745000000 GH; enter 5.5 GHz Res BW 300 kHz Span 30 MHz Sween 1 ms nter 5.745 GHz es BW 300 kHz Span 30 MH Sweep 1 m CF Step 3.000000 M CF Step 3.000000 ML #VBW 1 MH; #VBW 1 MHz 21.4 dBm Total Power Total Power 24.9 dBm Occupied Bandwidth Occupied Bandwidth 18.018 MHz 18.639 MHz Freq Offse Freq Offse Transmit Freq Error 39.951 kHz OBW Powe Transmit Freq Erro OBW Pow 99.00 % οн 88.879 kHz 99.00 % 0 H x dB Bandwidth 17.75 MHz x dB -6.00 dB dB Bandwidth 17.73 MHz x dB -6.00 dB IC 802.11n 20MHz Main 5580MHz IC 802.11n 20MHz Main 5785MHz 05:20:26 PM Sep 21 Radio Std: None 05:25:12 PM Sep 21 Radio Std: None enter Freq 5.580000000 GHz 00 GHz AvalHeld: 50/50 enter Freq 5.785000000 GHz Center Freq: 5.7 Trig: Free Run 00 GHz AvaiHold: 50/50 Center Freq: 5. Trig: Free Run Radio Device: BTS Radio Device: BTS Ref Offset 14 dB Ref 30.00 dBr Ref Offset 14 dB Ref 30.00 dBm Center Fre Center Free 00 GF 5 785000000 G er 5.58 GHz Center 5.785 GHz Span 30 MHz Span 30 MHz CF Step 3.000000 MHz CF Step 3.000000 MHz #VBW 1 MHz #VBW 1 MHz MH Ma M Occupied Bandwidth Total Pow 24.3 dBm Occupied Bandwidth Total Powe 24.6 dBm 19.116 MHz 18.509 MHz Freq Offse Freq Offse он 187.68 kHz 5.723 kHz 99.00 % 99.00 % Transmit Freq Error OBW Power Transmit Freq Error OBW Power 17.73 MHz x dB Bandwidth 17.76 MHz -6.00 dB x dB Bandwidth -6.00 dB x dB x dB IC 802.11n 20MHz Main 5700MHz IC 802.11n 20MHz Main 5825MHz 05:22:14PM Sep 21 Radio Std: None RL Nº 50.9 AC Center Freq 5.825000000 GHz nter Freq 5.700000000 GHz 05:26:27PM Sep 21 Radio Std: None 00 GHz AvalHeld: 50/5 Center Freq: 5. Trig: Free Run 00 GHz Center Freq: 5 Trig: Free Run Radio Device: BTS Radio Device: BTS Ref Offset 14 dB Ref 30.00 dB Ref Offset 14 dB Ref 30.00 dBn Center Fre Center Fre

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19.8 dBm

99.00 %

-6.00 dB

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5.825 GHz

Transmit Freq Error

v dB Bandwidth

Occupied Bandwidth

18.539 MHz

64.196 kHz

17.76 MHz

台灣檢驗科技股份有限公司

#VBW 1 MHz

v dB

Total Power

OBW Powe

r 5.7 GHz 3W 300 kHz

Transmit Freq Error

v dB Bandwidth

Occupied Bandwidth

17.997 MHz

39.688 kHz

17.87 MHz

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Span 30 MHz

CF Step 3.000000 MHz Man

Freq Offse

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#VBW 1 MHz

Total Power

OBW Pov

x dB

Span 30 MH Sweep 1 m

24.6 dBm

99.00 %

-6.00 dB

CF Step 3.000000 M

Freq Offse

0 H