

ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT

	OF
Product Name:	Embedded wireless module
Brand Name:	Silex
Model No.:	SX-SDMAC-2832S, SX-SDMAC-2832S+
Model Difference:	For market segmentation
FCC ID:	N6C-PMACS
Report No.:	ER/2017/70042
Issue Date:	Jul. 28, 2017
FCC Rule Part:	§15.247, Cat: DTS
Prepared for:	silex technology,Inc 2-3-1Hikaridai,Seika-cho,Souraku-gun,Kyoto 619-0237
Prepared by:	SGS Taiwan Ltd. Electronics & Communication Laboratory No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan 24803
TAF December 1000 1000 1000 1000 1000 1000 1000 10	Note: This report shall not be reproduced except in full, without the written approval of SGS Taiwan Ltd. This document may be altered or revised by SGS Taiwan Ltd. personnel only, and shall be noted in the revision section of the document.

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VERIFICATION OF COMPLIANCE

Applicant:	silex technology,Inc 2-3-1Hikaridai,Seika-cho,Souraku-gun,Kyoto 619-0237
Product Name:	Embedded wireless module
Brand Name:	Silex
Model No.:	SX-SDMAC-2832S, SX-SDMAC-2832S+
Model Difference:	For market segmentation
FCC ID:	N6C-PMACS
Report Number:	ER/2017/70042
Date of test:	Jul. 19, 2017(Conducted), Jul. 04, 2017 ~ Jul. 19, 2017(Radiated)
Date of EUT Received:	Jul. 04, 2017

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.

Test By:	Cooper HSU	Date:	Jul. 28, 2017
Prepared By:	Cooper Hsu/Engineer Allen Tsai	Date:	Jul. 28, 2017
_ Approved By: _	Allen Tsai / Engineer Jim Ch ang	Date:	Jul. 28, 2017

Jim Chang / Asst. Manager

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Revision History

Report Number	Revision	Description	Issue Date
ER/2017/70042	Rev.00	Initial creation of document	Jul. 28, 2017

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GENERAL INFORMATION 1

1.1 Product description

General:

Product Name:	Embedded wireless module	
Brand Name:	Silex	
Model No.:	SX-SDMAC-2832S, SX-SDMAC-2832S+	
Model Difference:	For market segmentation	
Software version:	N/A	
Hardware version:	N/A	
Power Supply:	3.3Vdc from Power supply	

WLAN 2.4GHz:

Wi-Fi 802.11	Frequency Range	Channels	Rated Power (dBm)	Modulation Technology
b			20.56 (Peak) / 17.98 (Avg.)	DSSS
g	2412-2462	11	22.72 (Peak) / 16.47 (Avg.)	OFDM
n_HT20			22.66 (Peak) / 16.25 (Avg.)	OFDM
n_HT40	2422-2452	7	22.91 (Peak) / 16.29 (Avg.)	OFDM
			PSK, DBPSK for DSSS 16QAM, QPSK, BPSK for OFDM	
Transition Rate: 802.11 b: 1/2/5.5/11 Mbps 802.11 g: 6/9/12/18/24/36/48/54 Mbps 802.11 n_20MHz: 6.5 - 72.2Mbps 802.11 n_40MHz: 13.5 - 150.0Mbps				

Antenna Type	Supplier	Antenna Part No.	Freq.	Peak Antenna Gain (dBi)	Worst Antenna Gain
	Molex	146153	2.4GHz	3.25	V
PCB type di-pole	Unictron	AA258 (H2B1PC1A1C)	2.4GHz	2.9	
antenna	Unictron	AA222 (H2B1PD1A1C)	2.4GHz	2.8	
antenna	PFU	PA391-222	2.4GHz	3	

Note: Pre-scanned was done on the above 4 antennas, the 146153 results higher emission at 2.4GHz. Therefore, the completed set of measurement was done on the antenna to be presented on this test report.

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1.2 Test Methodology of Applied Standards

FCC Part 15, Subpart C §15.247

FCC KDB 558074 D01 DTS Meas. Guidance

ANSI C63.10:2013

Note:

All test items have been performed and record as per the above standards. 1.

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

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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2 SYSTEM TEST CONFIGURATION

2.1 EUT Configuration

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

2.2 EUT Exercise

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

2.3 Test Procedure

2.3.1 Conducted Emissions

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

2.4 Measurement Results Explanation Example

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. **Note:**

The spectrum analyzer offset is derived from RF cable loss and attenuator factor. Following shows an offset computation example with cable loss 1dB and 10dB attenuator.

offset = RF cable loss (2dB)+ attenuation factor(10dB)=12dB)

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2.5 Configuration of Tested System

Fig. 2-1 Conducted Emission Configuration



Fig. 2-2 Radiated Emission Configuration



Table 2-1 Equipment Used in Tested System

tem	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1	Notebook	DELL	E5400	3704625136	Shielded	Unshielded
2	Bluetooth Test Software	N/A	N/A	N/A	N/A	N/A

SUMMARY OF TEST RESULTS 3

FCC Rules	Description Of Test	Result
§15.207(a)	AC Power Line Conducted Emission	Compliant
§15.247(b) (3)	Peak Output Power	Compliant
§15.247(a)(2)	6dB & 99% Emission Bandwidth	Compliant
§15.247(d)	Conducted Band Edge and Spurious Emission	Compliant
§15.247(d)	Radiated Band Edge and Spurious Emission	Compliant
§15.247(e)	Power Spectral Density	Compliant
§15.203 §15.247(b)	Antenna Requirement	Compliant

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DESCRIPTION OF TEST MODES 4

4.1 Operated in 2400 ~ 2483.5MHz Band

11 channels are provided for 802.11b, 802.11g and 802.11n HT20

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2412 MHz	7	2442 MHz
2	2417 MHz	8	2447 MHz
3	2422 MHz	9	2452 MHz
4	2427 MHz	10	2457 MHz
5	2432 MHz	11	2462 MHz
6	2437 MHz		

7 channels are provided for 802.11n HT40

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY				
3	2422 MHz	7	2442 MHz				
4	2427 MHz	8	2447 MHz				
5	2432 MHz	9	2452 MHz				
6	2437 MHz						

4.2 The Worst Test Modes and Channel Details

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

RADIATED EMISSION TEST:

RADIATED EMISSION TEST (BELOW 1 GHz)							
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)			
802.11g	1 to 11	1,6,11	OFDM	6			

	RADIATED EMISSION TEST (ABOVE 1 GHz)							
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)				
802.11b	1 to 11	1, 6, 11	DSSS	1				
802.11g	1 to 11	1, 6, 11	OFDM	6				
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	MCS 0				
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	MCS 0				

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Note:

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

ANTENNA PORT CONDUCTED MEASUREMENT:

CONDUCTED TEST							
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)			
802.11b	1 to 11	1, 6, 11	DSSS	1			
802.11g	1 to 11	1, 6, 11	OFDM	6			
802.11n (HT20)	1 to 11	1, 6, 11	OFDM	MCS 0			
802.11n (HT40)	3 to 9	3, 6, 9	OFDM	MCS 0			

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5 MEASUREMENT UNCERTAINTY

Test Items	Uncertainty
AC Power Line Conducted Emission	+/- 2.586 dB
Peak Output Power	+/- 0.84 dB
6dB Bandwidth	+/- 51.33 Hz
100 KHz Bandwidth Of Frequency Band Edges	+/- 0.84 dB
Peak Power Density	+/- 1.3 dB
Temperature	+/- 0.65 °C
Humidity	+/- 4.6 %
DC / AC Power Source	DC= +/- 0.13%, AC= +/- 0.2%

Radiated Spurious Emission:

	9kHz – 30MHz: +/- 2.87 dB
	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: +/- 2.87 dB
	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 150kHz to 30MHz 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 th	e transition frequencies			
2. The limit decreases linearly wit	h the logarithm of the frequency ir	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	100760	05/11/2017	05/10/2018			
LISN	SCHWARZB ECK	NSLK 8127	8127-649	05/22/2017	05/21/2018			
LISN	MESS TEC	FCC-LISN-50/250-2 5-2-01	4034	03/19/2017	03/18/2018			
Coaxial Cables	N/A	WK CE Cable	N/A	11/26/2016	11/25/2017			

6.3 EUT Setup

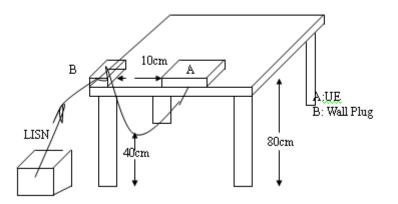
- 1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI 63.10:2013.
- 2. The AC/DC Power adaptor of EUT was plug-in LISN. The EUT was placed flushed with the rear of the table.
- 3. The LISN was connected with 120Vac/60Hz power source.

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6.4 Test SET-UP (Block Diagram of Configuration)



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.

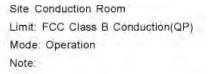
Note2: The * reveals the worst-case results that closet to the limit.

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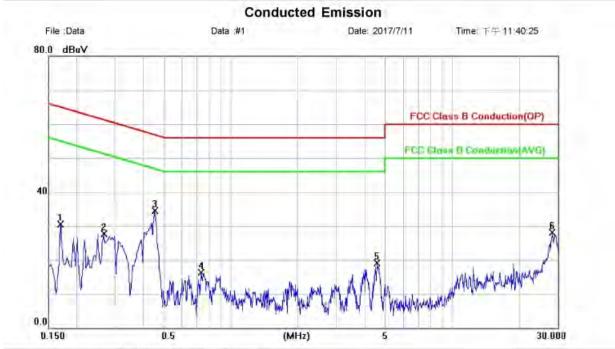


AC POWER LINE CONDUCTED EMISSION TEST DATA



Phase: L1 AC 110V/60Hz Power:

l'emperature: 20 0 Humidity 58 %



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1700	30.32	0.12	30.44	64.96	-34.52	peak	
2		0.2660	27.62	0.12	27.74	61.24	-33.50	peak	
3	*	0.4540	34.46	0.11	34.57	56.80	-22.23	peak	
4	ł	0.7340	16.27	0.12	16.39	56.00	-39,61	peak	
5		4.5500	18.93	0.26	19.19	56.00	-36.81	peak	
6	1 1	28.3780	27.26	0.84	28.10	60.00	-31.90	peak	

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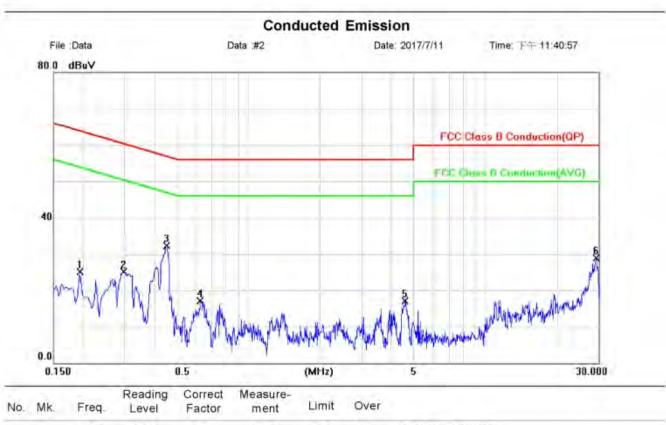
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Site Conduction Room Limit: FCC Class B Conduction(QP) Mode: Operation Note:

Phase: Ν AC 110V/60Hz Power:

l'emperature: 20 0 Humidity: 58 %



No.	Mk.	Freq.	Level	Factor	ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1940	25.08	0.12	25.20	63.86	-38.66	peak	
2		0.2980	25.03	0.12	25.15	60.30	-35.15	peak	
3	•	0.4500	32.28	0.11	32.39	56.88	-24,49	peak	
4		0.6260	17.05	0.11	17.16	56.00	-38.84	peak	
5		4.5820	16.76	0.27	17.03	56.00	-38.97	peak	
6		29.2900	28.00	0.86	28.86	60.00	-31.14	peak	

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DUTY CYCLE OF 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)
802.11b	99.25	0.03
802.11g	95.24	0.21
802.11n_20	95.20	0.21
802.11n_40	89.92	0.46

Duty Cycle Factor: $10 * \log(1/0.9925) = 0.03$ Duty Cycle Factor: $10 * \log(1/0.9524) = 0.21$ Duty Cycle Factor: $10 * \log(1/0.952) = 0.21$

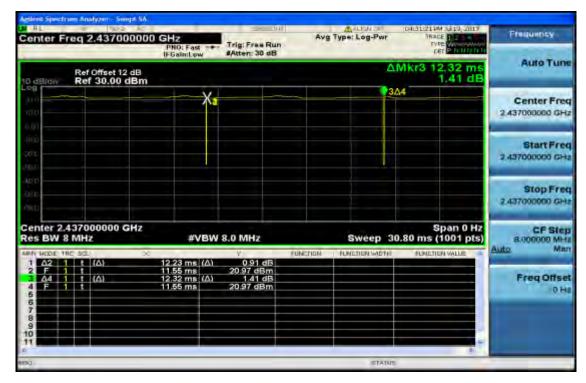
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7.1 DUTY CYCLE TEST SIGNAL Measurement Result

802.11 b



802.11 g

enter	Freq	2.43700	00000 GHz PNO: Fast IFGain:Low		Avg Type: Log-Pwr	105,001,40144,3017,2017 TRACE T 2 2 TVTR Westernoorder CET P to birth to	Frequency
to devai		f Offset 12 of 30.00 c			Δ	Mkr3 2.128 ms 0.49 dB	Auto Tuni
201 201 010	1	Anounitation in	allainear sinal an strain an star a star	X	liferrir feature at the series of the series of the	304 adhrochaite ann an de	Center Free 2.437000000 GH
(0.0 20)x 20.0							Start Free 2.437000000 GH
10 0							Stop Free 2.437000000 GH
enter tes BW		000000 G Iz		BW 8.0 MHz	Sweep 5	Span 0 Hz .333 ms (1001 pts)	CF Ster
		(A)	∞ 2.027 ms	γ (Δ) -0.39 dB	FUNCTION FUNCTION VID 141	FUNCTION WALLS	Auto: Mar
and the second second			2.080 ms 2.128 ms	18.72 dBm (Δ) 0.49 dB			Freq Offse
1 A2 2 F 3 A4	1		-2 000 mm				
1 Δ2 2 F 3 Δ4			2.080 ms	18.72 dBm			OH

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802.11 n_20 MHz



802.11 n_40 MHz

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PEAK OUTPUT POWER MEASUREMENT 8

8.1 Standard Applicable

For systems using digital modulation in the 2400-2483.5 MHz bands, the limit for peak output power is 1Watt.

If the transmitting antenna of directional gain greater than 6dBi are used the peak output power form the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the Antenna exceeds 6dBi.

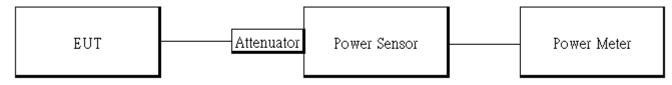
In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of Antenna exceeds 6dBi.

8.2 Measurement Equipment Used

Conducted Emission Test Site								
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.			
ТҮРЕ		NUMBER	NUMBER	CAL.				
Power Meter	Anritsu	ML2495A	1005007	12/15/2016	12/14/2017			
Power Sensor	Anritsu	MA2411B	917032	12/15/2016	12/14/2017			
DC Block	Mini-Circuits	BLK-18-S+	1	01/05/2017	01/04/2018			
Coaxial Cable	HUBER+SUHNER	SUCOFLEX 102	23670/2	01/05/2017	01/04/2018			
Attenuator	Mini-Circuit	BW-S10W2+	2	01/05/2017	01/04/2018			

8.3 Test Set-up

Power Meter:



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8.4 Measurement Procedure

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
- Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter.

Power Meter:

It is used as the auxiliary test equipment to conduct the output power measurement.

4. Record the max. Reading as observed from Spectrum or Power Meter.

8.5 Measurement Result

802.	11b Mai	n				
сн	Freq. (MHz)	Data Rate	Peak Output Power (dBm)	Limit RESU		
1	2412	1	20.56	1 Watt = 30.00 dBm	PASS	
6	2437	1	20.56	1 Watt = 30.00 dBm	PASS	
11	2462	1	20.54	1 Watt = 30.00 dBm	PASS	
802.	11b Mai	n				
СН	Freq. (MHz)	Data Rate	Avg. Output Power (dBm)	Limit	RESULT	
1	2412	1	17.94	1 Watt = 30.00 dBm	PASS	
6	2437	1	17.98	1 Watt = 30.00 dBm	PASS	
11	2462	1	17.88	1 Watt = 30.00 dBm	PASS	

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802.	802.11g Main							
сн	Freq. (MHz)	Data Rate	Peak Output Power (dBm)	Limit RESUL				
1	2412	6	22.69	1 Watt = 30.00 dBm	PASS			
6	2437	6	22.72	1 Watt = 30.00 dBm	PASS			
11	2462	6	22.35	1 Watt = 30.00 dBm	PASS			
802.	11g Mai	n						
сн	Freq. (MHz)	Data Rate	Avg. Output Power (dBm)	Limit	RESULT			
1	2412	6	16.47	1 Watt = 30.00 dBm	PASS			
6	2437	6	16.42	1 Watt = 30.00 dBm	PASS			
11	2462	6	16.29	1 Watt = 30.00 dBm	PASS			

802.	802.11n_HT20M Main						
сн	Freq. (MHz)	Data Rate	Peak Output Power (dBm)	Limit RESULT			
1	2412	MCS0	22.66	1 Watt = 30.00 dBm	PASS		
6	2437	MCS0	22.57	1 Watt = 30.00 dBm	PASS		
11	2462	MCS0	22.34	1 Watt = 30.00 dBm	PASS		
802.	11n_HT	20M Ma	in				
СН	Freq. (MHz)	Data Rate	Avg. Output Power (dBm)	Limit	RESULT		
1	2412	MCS0	16.24	1 Watt = 30.00 dBm	PASS		
6	2437	MCS0	16.25	1 Watt = 30.00 dBm	PASS		
11	2462	MCS0	16.11	1 Watt = 30.00 dBm	PASS		



802.1	802.11n_HT40M Main						
СН	Freq. (MHz)	Data Rate	Peak Output Power (dBm)	Limit RESULT			
3	2422	MCS0	22.49	1 Watt =	30.00	dBm	PASS
6	2437	MC S0	22.91	1 Watt =	30.00	dBm	PASS
9	2452	MCS0	22.64	1 Watt =	30.00	dBm	PASS
802.1	1n_HT40	M Main					
СН	Freq. (MHz)	Data Rate	Max. Avg. Output include tune up tolerance Power (dBm)		Limit		RESULT
3	2422	MCS0	16.20	1 Watt =	30.00	dBm	PASS
6	2437	MC S0	16.29	1 Watt =	30.00	dBm	PASS
9	2452	MCS0	16.05	1 Watt =	30.00	dBm	PASS

Note:

offset 12.00 dB

* Note: The duty cycle factor is compensated to obtain the maximum value of measurement in average.

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6DB BANDWIDTH MEASUREMENT 9

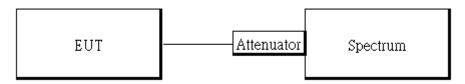
9.1 Standard Applicable

The minimum 6 dB bandwidth shall be at least 500 kHz.

9.2 Measurement Equipment Used

Conducted Emission Test Site								
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.			
TYPE		NUMBER	NUMBER	CAL.				
EXA Spectrum Ana- lyzer	Agilent	N9030A	MY53120760	03/21/2017	03/20/2018			
DC Block	Mini-Circuits	BLK-18-S+	1	01/05/2017	01/04/2018			
Coaxial Cable	HUBER+SUHNER	SUCOFLEX 102	23670/2	01/05/2017	01/04/2018			
Attenuator	Mini-Circuit	BW-S10W2+	2	01/05/2017	01/04/2018			

9.3 Test Set-up



9.4 Measurement Procedure

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
- 3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 4. For 6dB Bandwidth:

Set the spectrum analyzer as RBW = 100 kHz, VBW = 3*RBW, Span = 30M/50MHz, Detector=peak, Sweep=auto.

- 5. 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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9.5 Measurement Result

6dB Bandwidth

802.11b	Main			802.11g	Main		
Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result	Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2412	8069	> 500	PASS	2412	15160	> 500	PASS
2437	8082	> 500	PASS	2437	15160	> 500	PASS
2462	8088	> 500	PASS	2462	15170	> 500	PASS
802.11_	_n_HT20 Ma	in		802.11	_n_HT40 Ma	ain	
Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result	Freq. (MHz)	6dB BW (kHz)	Limit (kHz)	Result
2412	15160	> 500	PASS	2422	35150	> 500	PASS
2437	15170	> 500	PASS	2437	35150	> 500	PASS
2462	15170	> 500	PASS	2452	35140	> 500	PASS

*Refer to next page for plots



802.11b 6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid



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6dB Band Width Test Data CH-High



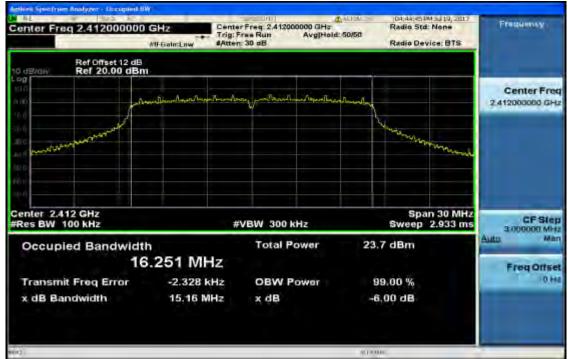
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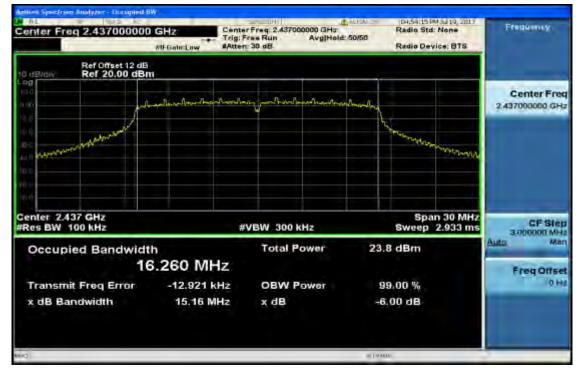
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802.11g 6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid

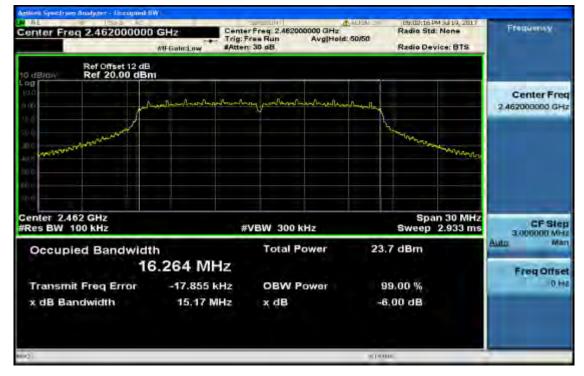


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6dB Band Width Test Data CH-High



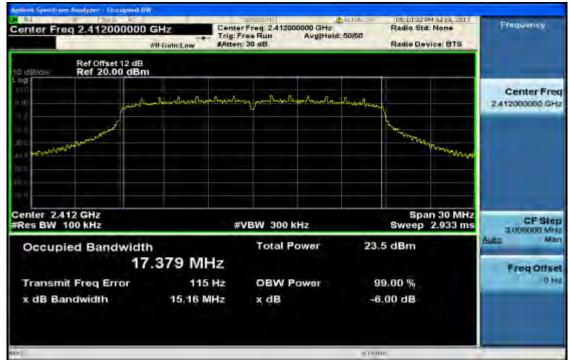
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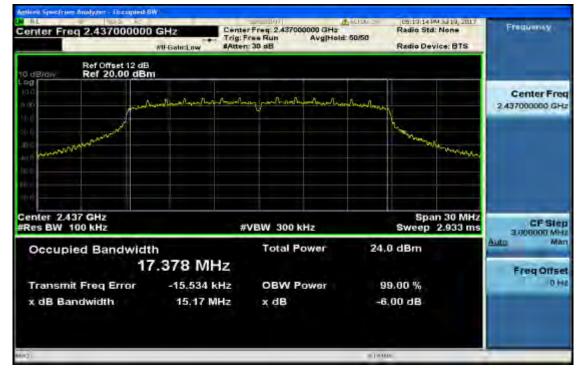
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802.11n HT20M 6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid

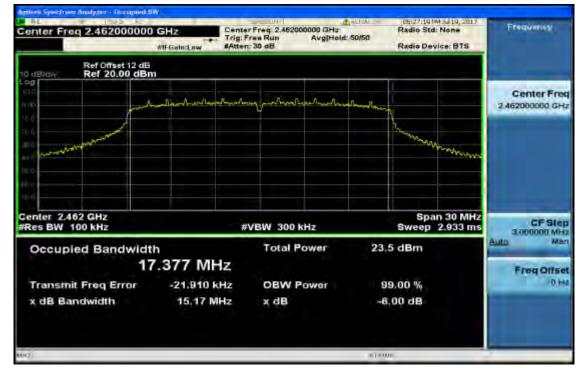


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6dB Band Width Test Data CH-High



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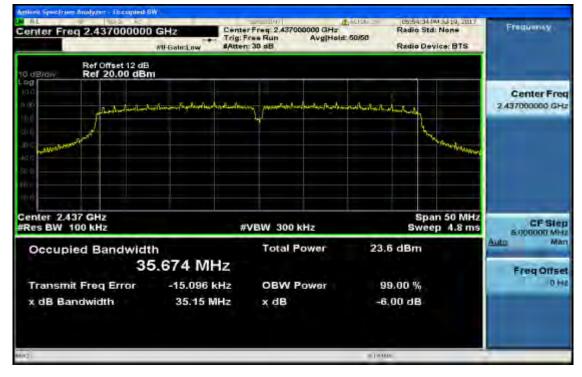
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802.11n HT40M 6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid

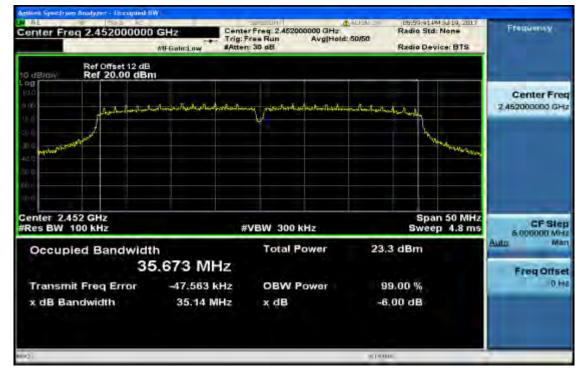


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6dB Band Width Test Data CH-High



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10 CONDUCTED BAND EDGES AND SPURIOUS EMISSION MEASUREMENT

10.1 Standard Applicable

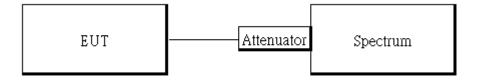
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

10.2 Measurement Equipment Used

Conducted Emission Test Site								
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.			
TYPE		NUMBER	NUMBER	CAL.				
EXA Spectrum Analyzer	Agilent	N9030A	MY53120760	03/21/2017	03/20/2018			
DC Block	Mini-Circuits	BLK-18-S+	1	01/05/2017	01/04/2018			
Coaxial Cable	HUBER+SUHNER	SUCOFLEX 102	23670/2	01/05/2017	01/04/2018			
Attenuator	Mini-Circuit	BW-S10W2+	2	01/05/2017	01/04/2018			

10.3 Test SET-UP



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10.4 Measurement Procedure

Band Edge Limit Calculation:

- 1. Set analyzer center frequency to DTS channel center frequency.
- 2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
- 3. Set the span to 1.5 times the DTS channel bandwidth.
- 4. Set the RBW = 100kHz & VBW = 300 kHz.
- 5. Detector = peak.
- Sweep time = auto couple.
- 7. Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum amplitude level.

Conducted Band Edge:

- To connect Antenna Port of EUT to Spectrum.
- 2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
- 3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 4. Set start to edge frequency, and stop frequency of spectrum analyzer so as to encompass the spectrum to be examined.
- 5. Set the spectrum analyzer as RBW=100 kHz, VBW=300 kHz, Detector = Peak, Sweep = auto
- 6. Mark the highest reading of the emission as the reference level measurement.
- 7. Set DL as the limit = reading on marker 1 20dBm
- 8. Marker on frequency, 2.3999GHz and 2.4836GHz, and examine shall 100 kHz immediately outside the authorized (2400~2483.5) be attenuated by 20dB at least relative to the maximum emission of power.
- Repeat above procedures until all default test channel (low, middle, and high) was complete.

Conducted Spurious Emission:

- 1. To connect Antenna Port of EUT to Spectrum
- 2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
- Set RBW = 100 kHz & VBW= 300 kHz, Detector =Peak, Sweep = Auto.
- 4. Allow trace to fully stabilize.
- 5. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.
- 6. Repeat above procedures until all default test channel measured were complete.

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10.5 Measurement Result

2412

2462

(dBm)

4.23

0.77

Banded	ge Limit 802		Banded	ge Limit 802	
Danueu			Danueu		
Fraguanay	RF Power	Bandedge	Fraguionav	RF Power	Maximum
Frequency (MHz)	Density	Limit	Frequency (MHz)	Density	Limit
(101172)	(dBm)	(dBm)	(101112)	(dBm)	(dBm)
2412	6.60	-13.40	2412	4.20	-15.80
2462	6.29	-13.71	2462	0.60	-19.40
Bandedg	e Limit 802.1	11n20 MODE			
Fraguianay	RF Power	Maximum			
Frequency (MHz)	Density	Limit			
(IVI⊓Z)	(dDm)	(dDm)	Noto		

(dBm)

-15.77

-19.23

Note:

offset

12.00

dB

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802.11b PSD for Band edge Limit (CH-Low)

802.11g PSD for Bandedge Limit(CH-High)



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802.11b **Band Edges Test Data CH-Low**

Band Edges Test Data CH-High Center Freq 2.50000000 GHz

ter Freq 2.3700000	DNO: East 1	rig: Free Run Atten: 30 dB	Avg Type: Log		THE PLAN AND A TO AND A TO A T	Frequency
Ref Offset 12 dB		ALLE OF BE			390 00 GHz 44.44 dBm	Auto Tune
				Je de		Center Freq 2.370000000 GHz
			6 ³	1	Loc	Start Freq 2.310000000 GHa
	s Nam, yaamed yn yw yw de fersjon	a di dadika di fanan di seri di Ker	and and the second s			Stop Freq 2.430000000 GHz
2.31000 GHz BW 100 kHz	#VBW 30		Swe	ep 11.53	2.43000 GHz ms (1001 pts)	CF Step 12,000000 MHz Auto Man
N 1 F 2 N 1 F 2	399 90 GHz	10.03 dBm 14.01 dBm 14.44 dBm	SAEYUN TOQUUUN		CALIFICATIVALLE	Freq Offset 0 Hz
				STATUS		-

Avg Type: Log-Pwr

802.11g **Band Edges Test Data CH-Low**



Band Edges Test Data CH-High



	DET PRODUCTUD			#Atten: 30 dB	IFGain:Low				
Auto Tune	Ref Offset 12 dB Mkr3 2.483 6 GHz № Ref 20.00 dBm ~44.07 dBm					dB/di			
Center Freq 2.500000000 GHz	-10 60 461					'N	and free and	M	
Start Freq 2 450000000 GHz				he Bard Marine Street	an (3	the states			1
Stop Freq 2 55000000 GHz					4.4000000000000000000000000000000000000				
CF Step 10.00000 MHz Auto Man	op 2.55000 GHz 00 ms (1001 pts)	Sweep 9.60	PENETION	/ 300 kHz	#VBW	×	00 GHz 00 kHz		s B
Freq Offset 0 Hz				9.48 dBm -44.41 dBm -44.07 dBm	462 5 GHz 483 5 GHz 483 6 GHz	2,48	1	1	N
-		STATUS							

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Contension of the state of the results shown in this test report ferrer only to the sample(s) tested and such sample(s) are relatined to 90 days only. 除非另有說明,此報告結果僅對測試之樣品負責,同時此樣品僅保留90天。本報告未經本公司書面許可,不可部份複製。 This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <u>www.sgs.com/terms_and_conditions.htm</u> and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at <u>www.sgs.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 Companny'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.

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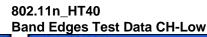
f (886-2) 2298-0488

802.11n HT20 **Band Edges Test Data CH-Low**

2.463 3 GHz 2.483 5 GHz 2.483 6 GHz

5.72 dBm -42 03 dBm -42 29 dBm

SGS



2,457 0 GHz 2,483 5 GHz 2,483 6 GHz

1.99 dBm -39.20 dBm -39.55 dBm

Freq Offs



N 1 F

Freq Offse

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802.11b **Spurious Emission Test Data CH-Low**

enter Freg 1.51500000	D GHz PNO: Fast C Trig: Free Run IFGaint.tow #Atten: 30 dB	Avg Type: Log-Pwr	ID4122:16 IM 14:19, 2017 TRALE 1 2 TABLE TYPE DESCRIPTION	Frequency	
Ref Offset 12 dB		Mkr	1 2.411 9 GHz 8.95 dBm	Auto Tuni	
1000			1 -iti Skalar	Center Fred 1 516000000 GHp	
20.0 2012 /0.0	ta second and the second s			Start Free 30,000000 MHz	
50 0 60 0 70 0				Stop Free 3.00000000 GH	
Start 30 MHz #Res BW 100 kHz w/r, wode 1%c adu co		Sweep 28	Stop 3.000 GHz 3.9 ms (1001 pts)	CF Step 297.000000 MH Auto Mar	
1 N 1 / 2 2 3 4 5 6	2,411 9 GHz 8,95 dBm			Freq Offse 0 He	

Spurious Emission Test Data CH-Mid



Frequency	TRACE DESCRIPTION	Type: Log-Pwr	Run	Trig: Free #Atten: 30	HZ IQ: Fast 😱	000000 G	eq 14.750	nter Fr
Auto Tun	6.335 5 GHz -24.64 dBm	Mkr1					Ref Offset	dBydiy
Center Fre 14,750000000 GH	-10 (0 (20)							
Start Fre 3,00000000 GH	manut	والمراجع المروحان والمروحان	ىلى يەلەيدىنى <u>مە</u> رەر مەرەر يەرىلى	مى مەرىمە يىلى بوتىمە	والمعالية المعالمة الم		-	0
Stop Fre 26.50000000 GH								
CF Ste 2.350000000 GH	Stop 26.50 GHz 246 s (1001 pts)	Sweep 3		300 kHz	#VBW		GHZ 100 kHz	art 3.00 es BW
Auto Ma	FUNCTION VALUE	FUNCTION SADTHE	TENCTION	24.64 dB	GHz	× 26.335		NODE TR
Freq Offse								
		STATUS						

Center F		50000000 GHz PNO: Fast IFGaint ow	Trig: Free Run	Avg	Type: Log-Pwr	D4:22:40 DM 34 10, 2017 TRACE 122 TYPE DET P N 2017	Frequency
o devoiv	Ref Offs Ref 20.				Mki	1 26.335 5 GHz -24.07 dBm	Auto Tune
000 1000 1010 1010						at 95,080	Center Freq 14,75000000 GH;
and			and the second second second		يلتي عميراتيه ولانيت والمتروا	A man the second and a second	Start Freq 3,000000000 GHz
50 0 60 0 77.0							Stop Freq 26.50000000 GHz
Start 3.0 Res BW	0 GHz / 100 kHz	#VI	BW 300 kHz		Sweep	Stop 26.50 GHz 2.246 s (1001 pts)	
NRA MODE	THE SEL	26,335 5 GHz	-24.07 dBm	TUNCTION	FUNCTION WODTH	FUNCTION WALLE	Auto Man
2 3							Freq Offset
4 6 6							

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Spurious Emission Test Data CH-High

802.11g **Spurious Emission Test Data CH-Low**

Frequency	Center Freq 1.515000000 GHz Trig:Fee Run PHO: Fact Trig:Fee Run Atter: 30 dB	Frequency
Auto Tune	Ref Offset 12 dB Mkr1 2,411 9 GHz to dBNaw Ref 20.00 dBm 4.57 dBm	Auto Tune
Center Freq 1.516000000 GHz	1.5	Center Free
Start Freq 30,000000 MHa		Start Free
Stop Freq 3.00000000 GHz		Stop Fre
CF Step 297.000000 MHz Auto Man	Start 30 MHz Stop 3.000 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 283.9 ms (1001 pts) #Res BW 100 kHz Sweep 283.9 ms (1001 pts) Automation	CF Step 7.000000 MH: Mar
Freq Offset 0 Ha	1 N 1 f 2.4119 GHz 4.57 dBm 3 4 4 4 4 4 4 4 4 4 6 7 4 4 4	Freq Offset
	Auto Tune Center Freq 1.516000000 GHz Start Freq 3.00000000 MHz Stop Freq 3.00000000 GHz 247.000000 MHz Auto Man	Frequency Center Freq 1.515000000 GHz (FGain.tow) Trig: Free Run. (FGain.tow) Avg Type: Leg-Per (FGain.tow) Number Ref (FGain.tow) Multiple Ref (FGain.tow) Ref (FGain.tow) <thref (FGain.tow) Ref (FGain.tow)<!--</td--></thref

Aglene Spectrum Analyzer - Swept SA DI RL Conter Freq 14.750000000 GHz PNO: Fag PRO: Fag PR	Frequency	Agliend Spectrum Analyzer - Single SA DATE: Sector	Frequency
Ref Offset 12 dB Mkr1 26.335 5 GHz 10 dB/dW Ref 20.00 dBm -24.14 dBm	Auto Tune	Ref Offset 12 dB Mkr1 26 359 0 GHz 10 dB/dW Ref 20.00 dBm -23.59 dBm	Auto Tune
	Center Freq 14,750000000 GHz	0.00	Center Freq 14,75000000 GHz
300 30	Start Freq 3,000000000 GHz		Start Freq 3,000000000 GHz
	Stop Freq 26 50000000 GHz	300	Stop Freq 26 50000000 GHz
Start 3.00 CHz Stop 26.50 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 2.246 s (1001 pts) wer poct the sci > V subcrist N f 25.335 5 GHz -24.14 dBm function	CF Step 2.350000000 GHz Auto Man	Start 3.00 GHz Stop 26.50 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 2.246 s (1001 pts) wer woot 'NE BC. 0 Y TURCTION N f 25599 0 GHz -2359 dBm	CF Step 2.350000000 GHz Auto Man
N Y 25.355 5 GHz -24.14 dum 2 3 4 5 6 7 7 8 9 10 11	Freq Offset 0 Hz		Freq Offset 0 Ha
A STATUT		e etator	

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Spurious Emission Test Data CH-High

Spurious Emission Test Data CH-Mid

Agilenii Spectrum Analyzer - Swept SA				Agilent Spectre	um Analyzer - Swept S	A.				
Center Freq 1.515000000 GHz PN0: Fast Trig: Free Figure 1 ov	Avg Type: Log-Pwr	(04:99:17 144 30/19) 2017 164CE 1 2 3 4 1740 C6T P Tolure 111	Frequency	Center Fr	req 1.5150000		Trig: Free Run	Avg Type: Log-Pwr	105:00:10:14 (M 34 19, 2017 7640E 112	Frequency
Ref Offset 12 dB 10 dBVdiv Ref 20.00 dBm	M	(r1 2.438 7 GHz 5.39 dBm	Auto Tune	10 dB/div	Ref Offset 12 dB Ref 20.00 dBn			Mk	r1 2.465 4 GHz 5.49 dBm	Auto Tune
			Center Freq 1.516000000 GHz	1000 0.001					21	Center Fred 1.516000000 GHz
			Start Freq 30,000000 MHz	2010 -2010 -4010				and all with the Martine Martin Street and the		Start Fred 30,000000 MHz
			Stop Freq 3.800808000 GHz	50 0	براد فروسة المرغانيسيان مرد	Perili andre andre andre de				Stop Free 3.00000000 GH
Start 30 MHz #Res BW 100 kHz #VBW 300 kHz #W/Y MODE 1115_BCL & Y	FUNCTION FUNCTION SADTH	Stop 3.000 GHz 283.9 ms (1001 pts) FUNCTION VALUE	CF Step 297.000000 MHz Auto Man	Start 30 N #Res BW	100 kHz	×		Sweep 28	Stop 3.000 GHz 83.9 ms (1001 pts) FUNCTION WALLE	CF Step 297.000000 MHz Auto Mar
1 N 1 f 2.4387 GHz 5.39 dB			Freq Offset 0 Hz	1 2 3 4 4 5 5	(2.465 4 GHz	5.49 dBm			Freq Offset 0 Hi
				7 8 9 10 11						
83	ETÁTU	5		(DOM				STATUS		

Agilens Spectrum Analyzer - Swept SA		Agilérei Speectram Analyzer - Swept SA	
Conter Freq 14.750000000 GHz Province Trige Free Run Frointer & Avg Type: Log-Per Trige Free Run Frointer & Atter 30 dB	Frequency	Of RL Image: State S	Frequency
Ref Offset 12 dB Mkr1 26.382 5 GHz 10 dB/div Ref 20.00 dBm -23.30 dBm	Auto Tune	Ref Offset 12 dB Mkr1 25.325 0 GHz 10 dB/div Ref 20.00 dBm -24.44 dBm	Auto Tune
	Center Freq 14,750000000 GHz		Center Fred 14,750000000 GH;
and a second a s	Start Freq 3,000000000 GHz	200 302 405 Jack market for the state of the	Start Fred 3,000000000 GHa
	Stop Freq 26 50000000 GHz		Stop Free 26 50000000 GH
Start 3.00 GHz Stop 26.50 GHz #Res BW 100 kHz #VBW 300 kHz Sweep 2.246 s (1001 pts) www.uccr.wic.sci. > Y runction 1.04108 www.ucc	CF Step 2.350000000 GHz Auto Man	#Res BW 100 kHz #VBW 300 kHz Sweep 2.246 s (1001 pts) www.wode two sdl xx reached in the sdl xx	CF Step 2.35000000 GHz Auto Mar
N 1 1 7 26.382 6 0Hz -23.30 dBm	Freq Offset 0 Hz	N 1 f 25.328.0 GHz	Freq Offset 0 Hi

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802.11n_HT20 **Spurious Emission Test Data CH-Low**

RL enter Freq 1.515000000 GHz PN0: Fast IFGaint.ew	Trig: Free Run #Atten: 30 dB	Avg Type: Log-Pwr	DS:17 Ch194 SJ 19, 2017 NRALE 12 C TYPE A MARKANIN DET PTA MARKANIN	Frequency Auto Turn	
Ref Offset 12 dB 0 dB/div Ref 20.00 dBm		Mik	Mkr1 2.409 0 GHz 5.18 dBm		
00 000 000				Center Free 1,516000000 GH	
00 07 00				Start Fre 30,00000 MH	
				Stop Fre 3 00000000 GH	
tart 30 MHz Res BW 100 kHz #VBI	W 300 kHz Y	Sweep 2	Stop 3.000 GHz 83.9 ms (1001 pts)	CF Ste 297.000000 MH Auto Ma	
N 1 f 24090GHz	5.18 dBm			Freq Offse 0 H	

Spurious Emission Test Data CH-Mid

Center Freq 1.515000000	PNO: Fast	Trig: Free Run #Atten: 30 dB	Avg Type: Log-Pwr	10512405144.0419,2017 TRACE 112,2017 Type 1100000000000000000000000000000000000	Frequency
Ref Offset 12 dB			Mk	r1 2.438 7 GHz 6.49 dBm	Auto Tune
- CG 1000 1.010 - 100					Center Fred 1,516000000 GHz
					Start Free 30,000000 MHz
50 0 60 0 70 1					Stop Free 3.00000000 GH
start 30 MHz Res BW 100 kHz	#VBW :	300 KHz	Sweep 2	Stop 3.000 GHz 83.9 ms (1001 pts)	CF Step 297.000000 MH
	438 7 GHz]	7 TL 6.49 dBm	INCTION FUNCTION SADTHE	FUNCTION WALLE	Auto Mar
23 4 6 5 7 8 9 0					Freq Offsel
x)		-	STATUS		

PNO: Fast	Trig: Free Run #Atten: 30 dB	Avg Type: Log-Pwr	TYPE EFT P RATEPUT	Frequency
		Mkr	1 26,406 0 GHz -23,68 dBm	Auto Tune
				Center Freq 14,750000000 GHz
	المرجعانية المراجع	hand marker and marker		Start Freq 3,00000000 GHz
				Stop Freq 26.50000000 GHz
#VBW			Stop 26.50 GHz 2.246 s (1001 pts)	CF Step 2.350000000 GHz Auto Man
3.406 0 GHz	-23,68 dBm			Freq Offset 0 Hz
		#VBW 300 kHz	Mkr #VBW 300 kH2 Sweep 1 DIALIDIA MEMI	Mkr1 26.406 0 GHz -23.68 dBm -23.68 dBm -23.68 dBm -23.65 dHz -2.24 dbm -2.24 bc -2.24 bc -2.24 bc -2.24 bc -2.24 bc -2.24 bc -2.24 bc -2.25 bc -2.

enter Freg 14.750000000	HZ NO: Fast	Trig: Free Run	Avg Type: Log-Pwr	05:10:06144 34 19, 2017 76ACE 10 TYPE 10	Frequency
Ref Offset 12 dB Ref 20.00 dBm	Galin:Low	#Atten: 30 dB	Mki	1 26,406 0 GHz -23,73 dBm	Auto Tune
					Center Freq 14,75000000 GHz
		الدستية محسطين معاري	the state of the s	- selle 1	Start Freq 3,00000000 GHz
					Stop Freq 26.50000000 GHz
tart 3.00 GHz Res BW 100 kHz			Sweep	Stop 26.50 GHz 2.246 s (1001 pts)	CF Step 2.350000000 GHz Auto Man
1 N 1 f 26.406	0 GHz	-23.73 dBm			Freq Offset 0 Hz
8					

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Spurious Emission Test Data CH-High

enter Freg 1.515000000	GHZ PNO: Fast	Trig: Free Run #Atten: 30 dB	Avg Type: Log-Pwr	IC5134.061M 34 19, 2017 TRACE 1 2 2 4 TYPE NOTIFIT	Frequency
Ref Offset 12 dB Ref 20.00 dBm			MI	1 2.456 5 GHz 3.63 dBm	Auto Tune
001 1011				^ 1	Center Fred 1.516000000 GHp
00 00 01				- 19.31.991	Start Free 30,000000 MHz
1817 1917		dalaman ing panjada	an a	al han an a	Stop Fred 3.00000000 GH
itart 30 MHz Res BW 100 kHz	#VBW	300 KHZ		Stop 3.000 GHz 83.9 ms (1001 pts)	CF Step 297 000000 MH
N PLOE THE SEL CONTRACTOR SECTION AND A CONTRACTOR SECTION AND A CONTRACTOR SECTION AND A CONTRACTOR SECTION AND A CONTRACTOR	156 5 GHz	3.63 dBm	UNITION FUNCTION SOUTH	FUNCTION WALLE	Freq Offset
6					
N)			TAW		. ·

802.11n_HT40 **Spurious Emission Test Data CH-Low**

PNO: Fast Control Trig: Free Run IFGaint.sw #Atten: 30 dB	Avg Type: Log-Pwr	105:53:01144 Jul 19, 2017 TRACE 102 54 TYPE ALCONOMICS DET P TO MINIMUM	Frequency
	Mk	1 2.417 9 GHz 2.08 dBm	Auto Tune
		1	Center Free 1.516000000 GH
	and the second	ata juan	Start Free 30,000000 MH
			Stop Free 3.00000000 GH
#VBW 300 kHz	Sweep 28	Stop 3.000 GHz 3.9 ms (1001 pts)	CF Ster 297.000000 MH
2.417 9 GHz 2.08 dBm	UNITION FUNCTION WADTED	PUNCTION WALLE	Auto Ma
			Freq Offse
	#VEW 300 kH/2	Avg Type: Log-Per PRO: FastTrig: Free Run PRO: FastTrig: Free Run PRO: FastAvg Type: Log-Per Mkt Mkt #VEW 300 kHz V EV 200 kHz V EV EV 200 kHz	Avg Type: Leg-Per This: Frac Run Production

ALE DEPENDENT	TR	Type: Log-Pwr	Ava	Trig: Free R	GHZ PNO: Fast		nter Fre
2 0 GHz .34 dBm	1 26.3	Mkr					
							0 0
	~~~~	-	entring in the	an solar a		~~~,	
(1001 pts)	2.246 s		TENTION	300 kHz	#VBW	kHz	es BW 1
				-24.34 dBm	120 GHz		N 1
	20 GHz 34 dBm 20 GHz (1001 pts)	Cert P Num 1 26.312 0 GHz -24.34 dBm -915 1 -915 1	Type: Log-Per Type: Log-Per Mkr1 26.312 0 GH2 -24.34 dBm 	Avg Type: Log-Pur Mist DC28 Mist	Avg Type: Log-Pur         The Dock           Mkr1 26.510 GHz         -24.34 dBm           Avg Type: Log-Pur         The Dock           Stop 26.50 GHz         Stop 26.50 GHz           1 300 kHz         Stop 22.50 GHz	CHZ         Trig: Free Run #Atten: 30 dB         Avg Type: Log-Por / State         Head of Por / State	Arg Type: Log-Per         Mail: Plog 14, 750000000 CHZ         Mail: Plog 14, 750000000 CHZ         Mail: Plog 14, 7500000000 CHZ         Mail: Plog 14, 75000000000 CHZ         Mail: Plog 14, 75000000000000000000000000000000000000

enter Freg 14.75000000	GHz	res Run	vg Type: Log-Pwr	IDEIDADES PM SU 19, 2017 TRACE DES TYPE TYPE DESCRIPTION	Frequency
Ref Offset 12 dB Ref 20.00 dBm			Mkr	1 26.406 0 GHz -23.96 dBm	Auto Tune
					Center Fred 14,750000000 GH2
		مرد به المحمد المراجع ا			Start Freq 3,00000000 GHz
					Stop Freq 26.50000000 GHz
tart 3.00 GHz Res BW 100 kHz	#VBW 300 kH	PUNCTION		Stop 26.50 GHz 2.246 s (1001 pts) FUNCTION VALUE	CF Step 2 35000000 GHz Auto Man
N 1 f 264	06 0 GHz -23 96	dBm			Freq Offset 0 Hz

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**Spurious Emission Test Data CH-High** 

#### **Spurious Emission Test Data CH-Mid**

ilenii Spectram Analyzer - Swept SA					Agilent Spectrum Analyzer - Si					
enter Freg 1.515000000 GHz PN0: Fa IFGaintu	Avg	g Type: Log-Pwr	1055726244 34 19, 2017 16842 1, 2, 3017 1792 1, 2017 1972 1, 2017	Frequency	Center Freq 1.5150	DOODOO GHZ	Trig: Free Run #Atten: 30 dB	Avg Type: Log-Pwr	DelOSIO IM 34 19, 2017 TRACE 12 20 TYPE DURING	Frequency
Ref Offset 12 dB dBldiv Ref 20.00 dBm		Mkr	1 2.426 8 GHz 2.38 dBm	Auto Tune	Ref Offset 1 10 dB/div Ref 20.00	12 dB ) dBm		Mkr	1 2 456 5 GHz 1.84 dBm	Auto Tuni
10 10			1	Center Freq 1.51600000 GHz	1000 D.100 -100				1	Center Fre 1.516000000 GH
			17/12 db+	Start Freq 30,000000 MHz	200 200				-10 10 251	Start Free 30,000000 MH
				Stop Freq 3.00000000 GHz	50 0					Stop Fre 3 00000000 GH
tart 30 MHz Res BW 100 kHz # M MODE THE BEL 2426 9 GH;	VBW 300 kHz	Sweep 28	Stop 3.000 GHz 3.9 ms (1001 pts) RUNETION WALLE	CF Step 297.000000 MHz Auto Man	Start 30 MHz #Res BW 100 kHz	#VBW 3		Sweep 28	Stop 3.000 GHz 3.9 ms (1001 pts)	CF Ster 297.000000 MH Auto Ma
2 N T 24285011 4 4 5 5 7 8 9	1z 2,30 dBm.			Freq Offset 0 Ha	2 3 4 5 5 7 8 9	2400 9 6112	1.84 05m			Freq Offse 0 H
		STATUS	. 1		10			TAUE	1	

Agtlene Spectrum Analyzer - Seenpt SA		Agileret Spectrum Analyzer - Sempt SA	
RL AUDICS (CONDUCTOR) Conter Freq 14.750000000 GHz PR00: Feature Frainteent Augusta (Conductor) PR00: Feature Frainteent Augusta (Conductor)	Frequency	Center Freq 14.750000000 GHz Trig:Frea Run IFGalitos de Base State	Frequency
10 dB/dw Ref 20.00 dBm -24.43 dBm -24.43 dBm	Auto Tune	Ref Offset 12 dB Mkr1 26.312 0 GHz 10 dB/dW Ref 20.00 dBm -24.34 dBm	Auto Tune
	Center Freq 14,75000000 GHz		Center Freq 14,750000000 GHz
300 372 372 The second	Start Freq 3,000000000 GHz	200 200 200 200 200 200 200 200 200 200	Start Freq 3,000000000 GHa
	Stop Freq 26 50000000 GHz	210 an	Stop Freq 26.50000000 GHz
Start 3.00 GHz #Res BW 100 kHz         Stop 26.50 GHz #VBW 300 kHz         Stop 26.50 GHz Sweep         Stop 26.50 GHz           implicite the deliver of the test of	CF Step 2.350000000 GHz Auto Man	#Res BW 100 kHz #VBW 300 kHz Sweep 2.246 s (1001 pts) why wode the set.	CF Step 2.350000000 GHz Auto Man
N 1 7 26.312 0 GHz 24.43 dBm	Freq Offset 0 Hz	N 1 f 26.312 0 GHz .24.34 dBm 3 4 5 7 8 9	Freq Offset 0 Hz
		10 6 MO) 87408	

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台灣檢驗科技股份有限公司

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# 11 RADIATED BANDEDGE AND SPURIOUS EMISSION MEASUREMENT

## **11.1 Standard Applicable**

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands must also comply with the §15.209 limit as below.

And according to §15.33(a) (1), for an intentional radiator operates below 10GHz, the frequency range of measurements: to the tenth harmonic of the highest fundamental frequency or to 40GHz, whichever is lower.

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

## Note:

- 1. The lower limit shall apply at the transition frequencies.
- 2. Emission level  $(dB\mu V/m) = 20 \log Emission level (dB\mu V/m)$

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## **11.2 Measurement Equipment Used:**

		966 Chambe	r		
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.
TYPE		NUMBER	NUMBER	CAL.	
EMI Test Receiver	R&S	ESCI7	100760	05/11/2017	05/10/2018
Spectrum Analyzer	Agilent	E4446A	MY51100003	04/25/2017	04/24/2018
Loop Antenna	ETS-Lindgren	6502	148045	09/20/2016	09/19/2017
Bilog Antenna	SCHWAZBECK	VULB9168	378	12/19/2016	12/18/2017
Horn Antenna	Schwarzbeck	BBHA9120D	1441	08/01/2016	07/31/2017
Pre-Amplifier	Agilent	8447D	2944A07676	01/05/2017	01/04/2018
Pre-Amplifier	EMC Instruments Corp.	EMC0126530	980038	01/05/2017	01/04/2018
Turn Table	HD	DT420	N/A	N.C.R	N.C.R
Antenna Tower	ChamPro	AM-BS-4500-B	060776-ABS	N.C.R	N.C.R
Controller	ChamPro	EM1000	60776	N.C.R	N.C.R
Low Loss Cable	Huber Suhner	966_RX	9	01/05/2017	01/04/2018
3m Site NSA	SGS	966 chamber	N/A	07/01/2017	06/30/2018
Low Loss Cable	Huber Suhner	966 TX	1	01/05/2017	01/04/2018
Horn Antenna	Schwarzbeck	BBHA9170	184	12/12/2016	12/11/2017
Pre-Amplifier	EMC Instruments Corp.	EMC184045	980135	01/05/2017	01/04/2018

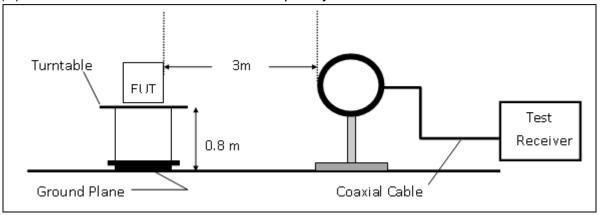
NOTE: N.C.R refers to Not Calibrated Required.

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.

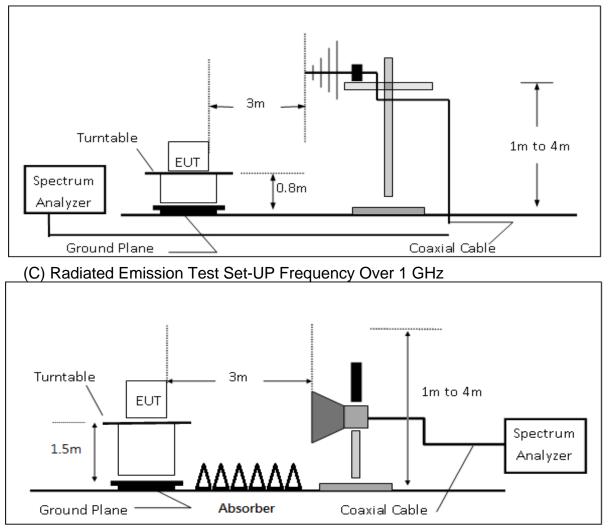


## 11.3 Test SET-UP

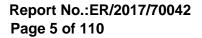
(A) Radiated Emission Test Set-UP Frequency Below 30MHz.



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



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.





## **11.4 Measurement Procedure**

- 1. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
- 2. The EUT was placed on a turn table with 0.8m for frequency< 1GHz and 1.5m for frequency> 1GHz above ground plane.
- 3. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
- 4. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
- 5. When 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.
- 6. Set the spectrum analyzer as RBW=120 kHz and VBW=300 kHz for Peak Detector (PK) and Quasi-peak (QP) at frequency below 1 GHz.
- 7. Set the spectrum analyzer as RBW=1 MHz, VBW=3 MHz for Peak Detector at frequency above 1 GHz.
- 8. Set the spectrum analyzer as RBW=1 MHz, VBW=10 Hz (Duty cycle > 98%) or VBW ≥ 1/T (Duty cycle < 98%) for Average Detector at frequency above 1 GHz.
- 9. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- 10. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- 11. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. On spectrum, change spectrum mode in linear display mode, and reduce VBW = 10Hz if average reading is measured.
- 12. Repeat above procedures until all default test channel measured were complete.

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## **11.5 Field Strength Calculation**

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

## FS = RA + AF + CL - AG

Where	5	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

Actual FS(dB $\mu$ V/m) = SPA. Reading level(dB $\mu$ V) + Factor(dB)

Factor(dB) = Antenna Factor(dB $\mu$ V/m) + Cable Loss(dB) – Pre Amplifier Gain(dB)

### Note :

"F": denotes Fundamental Frequency.; "H": denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

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

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

## 11.7 Measurement Result

Note: Refer to next page spectrum analyzer data chart and tabular data sheets.

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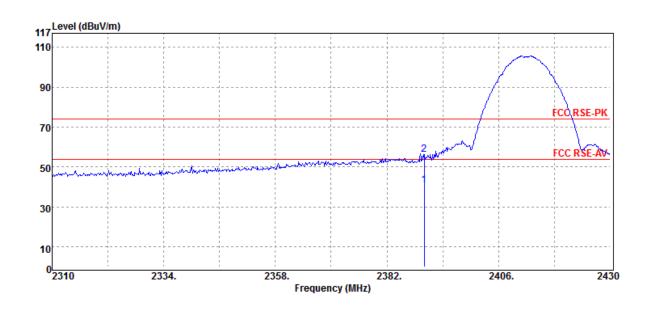
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## **Radiated Band Edge Measurement Result**

Operation Band	:802.11b
Fundamental Frequency	:2412 MHz
Operation Mode	:Bandedge CH LOW
EUT Pol.	:E1 Plane

Test Date :2017-07-05 Temp./Humi. :22 deg_C / 61 RH Engineer :Mike :VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2390.00	Е	Average	42.54	-1.74	40.80	54.00	-13.20
2390.00	Е	Peak	57.88	-1.74	56.14	74.00	-17.86

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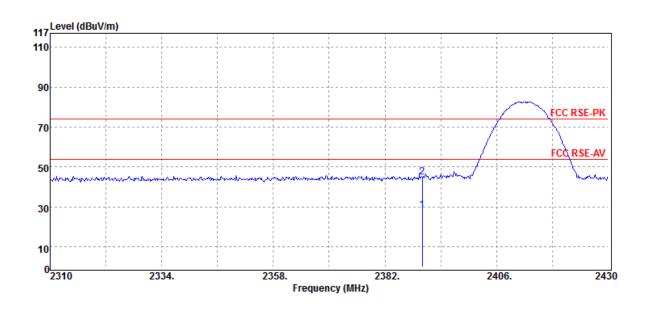
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**Operation Band** :802.11b Fundamental Frequency :2412 MHz **Operation Mode** :Bandedge CH LOW EUT Pol. :E1 Plane

Test Date Temp./Humi. Engineer Measurement Antenna Pol.

:2017-07-05 :22 deg_C / 61 RH :Mike :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2390.00	Е	Average	30.12	-1.74	28.38	54.00	-25.62
2390.00	Е	Peak	46.61	-1.74	44.87	74.00	-29.13

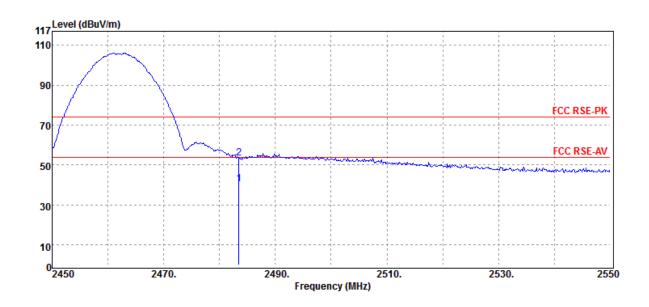
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**Operation Band** :802.11b Fundamental Frequency :2462 MHz **Operation Mode** :Bandedge CH HIGH EUT Pol. :E1 Plane

Test Date :2017-07-05 Temp./Humi. :22 deg_C / 61 RH Engineer :Mike :VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2483.50	Е	Average	42.27	-1.62	40.65	54.00	-13.35
2483.50	Е	Peak	55.19	-1.62	53.57	74.00	-20.43

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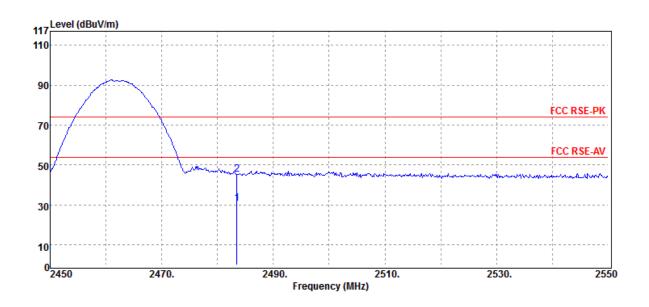
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**Operation Band** :802.11b Fundamental Frequency :2462 MHz **Operation Mode** :Bandedge CH HIGH EUT Pol. :E1 Plane

Test Date Temp./Humi. Engineer :Mike Measurement Antenna Pol.

:2017-07-05 :22 deg_C / 61 RH :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2483.50	Е	Average	32.44	-1.62	30.82	54.00	-23.18
2483.50	Е	Peak	46.86	-1.62	45.24	74.00	-28.76

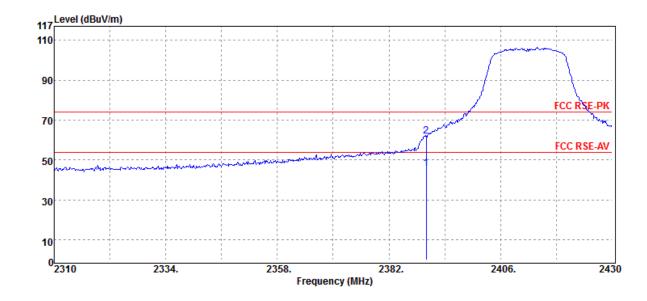
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**Operation Band** :802.11g **Fundamental Frequency** :2412 MHz **Operation Mode** :Bandedge CH LOW EUT Pol. :E1 Plane

Test Date :2017-07-05 Temp./Humi. :22 deg_C / 61 RH Engineer :Mike :VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2390.00	Е	Average	47.30	-1.74	45.56	54.00	-8.44
2390.00	Е	Peak	63.55	-1.74	61.81	74.00	-12.19

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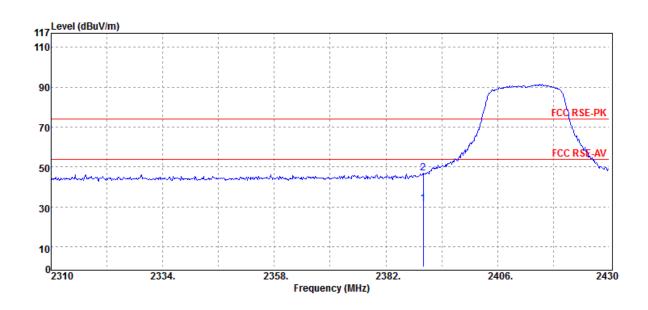
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**Operation Band** :802.11g Fundamental Frequency :2412 MHz **Operation Mode** :Bandedge CH LOW EUT Pol. :E1 Plane

Test Date Temp./Humi. Engineer Measurement Antenna Pol.

:2017-07-05 :22 deg_C / 61 RH :Mike :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2390.00	Е	Average	33.16	-1.74	31.42	54.00	-22.58
2390.00	Е	Peak	48.56	-1.74	46.82	74.00	-27.18

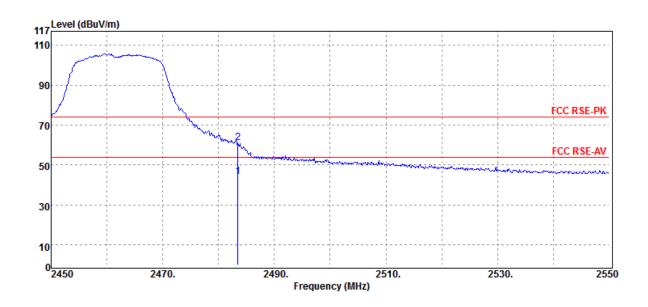
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**Operation Band** :802.11g **Fundamental Frequency** :2462 MHz **Operation Mode** :Bandedge CH HIGH EUT Pol. :E1 Plane

Test Date :2017-07-05 Temp./Humi. :22 deg_C / 61 RH Engineer :Mike :VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2483.50	Е	Average	45.56	-1.62	43.94	54.00	-10.06
2483.50	Е	Peak	62.65	-1.62	61.03	74.00	-12.97

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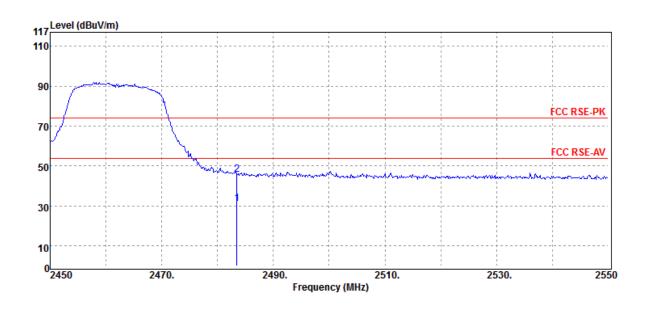
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**Operation Band** :802.11g **Fundamental Frequency** :2462 MHz **Operation Mode** :Bandedge CH HIGH EUT Pol. :E1 Plane

Test Date Temp./Humi. Engineer :Mike Measurement Antenna Pol.

:2017-07-05 :22 deg_C / 61 RH :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2483.50	Е	Average	32.71	-1.62	31.09	54.00	-22.91
2483.50	Е	Peak	47.19	-1.62	45.57	74.00	-28.43

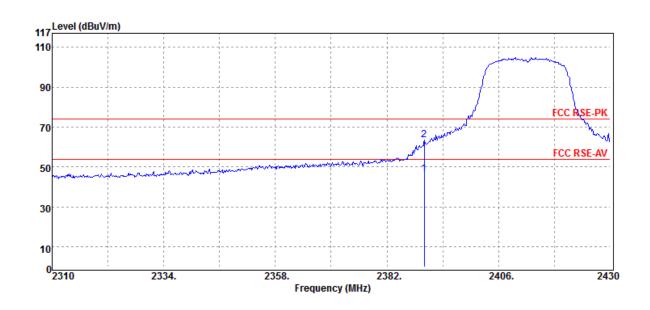
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**Operation Band** :802.11n20 Fundamental Frequency :2412 MHz **Operation Mode** :Bandedge CH LOW EUT Pol. :E1 Plane

Test Date :2017-07-05 Temp./Humi. :22 deg_C / 61 RH Engineer :Mike :VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2390.00	Е	Average	48.26	-1.74	46.52	54.00	-7.48
2390.00	Е	Peak	65.46	-1.74	63.72	74.00	-10.28

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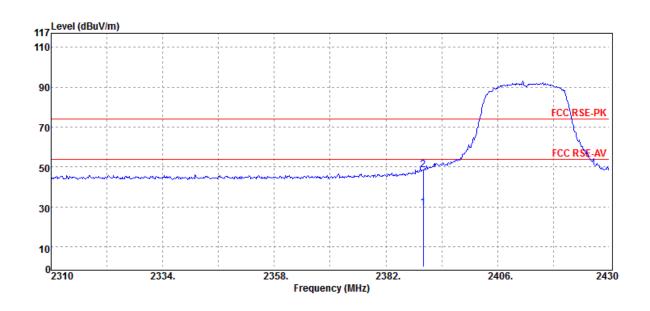
Report No.: ER/2017/70042 Page 16 of 110



**Operation Band** :802.11n20 Fundamental Frequency :2412 MHz **Operation Mode** :Bandedge CH LOW EUT Pol. :E1 Plane

Test Date Temp./Humi. Engineer Measurement Antenna Pol.

:2017-07-05 :22 deg_C / 61 RH :Mike :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2390.00	Е	Average	31.28	-1.74	29.54	54.00	-24.46
2390.00	Е	Peak	50.45	-1.74	48.71	74.00	-25.29

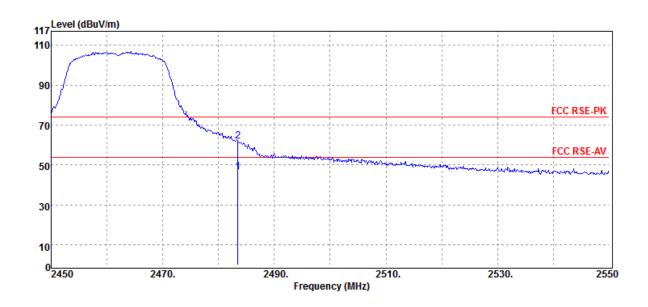
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**Operation Band** :802.11n20 Fundamental Frequency :2462 MHz **Operation Mode** :Bandedge CH HIGH EUT Pol. :E1 Plane

Test Date :2017-07-05 Temp./Humi. :22 deg_C / 61 RH Engineer :Mike :VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2483.50	Е	Average	48.07	-1.62	46.45	54.00	-7.55
2483.50	Е	Peak	63.59	-1.62	61.97	74.00	-12.03

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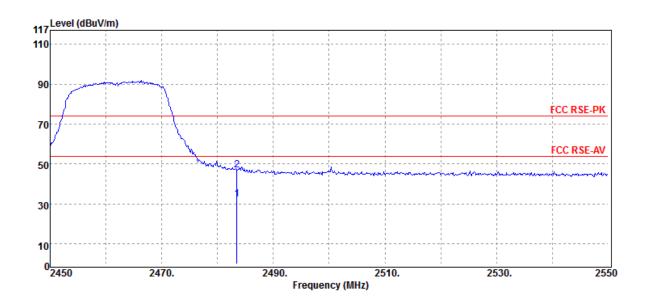
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**Operation Band** :802.11n20 Fundamental Frequency :2462 MHz **Operation Mode** :Bandedge CH HIGH EUT Pol. :E1 Plane

Test Date Temp./Humi. Engineer :Mike Measurement Antenna Pol.

:2017-07-05 :22 deg_C / 61 RH :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2483.50	Е	Average	34.15	-1.62	32.53	54.00	-21.47
2483.50	Е	Peak	48.46	-1.62	46.84	74.00	-27.16

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.

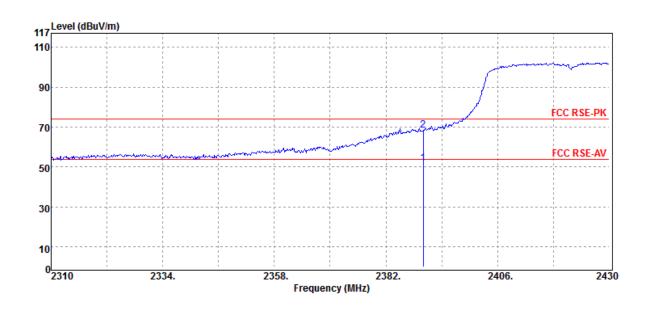
Report No.: ER/2017/70042 Page 19 of 110



**Operation Band** :802.11n40 Fundamental Frequency :2422 MHz **Operation Mode** :Bandedge CH LOW EUT Pol. :E1 Plane

Test Date Temp./Humi. Engineer Measurement Antenna Pol.

:2017-07-05 :21 deg_C / 62 RH :Mike :VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2390.00	Е	Average	53.64	-1.74	51.90	54.00	-2.10
2390.00	Е	Peak	69.99	-1.74	68.25	74.00	-5.75

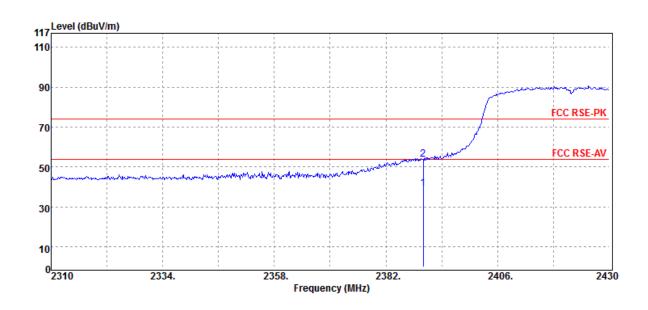
Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.



**Operation Band** :802.11n40 Fundamental Frequency :2422 MHz **Operation Mode** :Bandedge CH LOW EUT Pol. :E1 Plane

Test Date Temp./Humi. Engineer Measurement Antenna Pol.

:2017-07-05 :21 deg_C / 62 RH :Mike :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2390.00	Е	Average	40.95	-1.74	39.21	54.00	-14.79
2390.00	Е	Peak	55.63	-1.74	53.89	74.00	-20.11

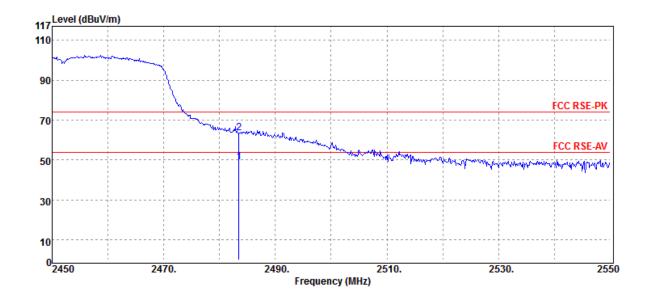
Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

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**Operation Band** :802.11n40 Fundamental Frequency :2422 MHz **Operation Mode** :Bandedge CH HIGH EUT Pol. :E1 Plane

Test Date :2017-07-05 Temp./Humi. :21 deg_C / 62 RH Engineer :Mike :VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2483.50	Е	Average	50.64	-1.62	49.02	54.00	-4.98
2483.50	Е	Peak	65.35	-1.62	63.73	74.00	-10.27

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.

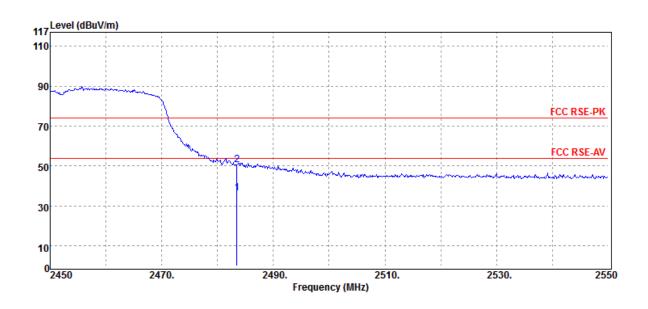
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**Operation Band** :802.11n40 Fundamental Frequency :2422 MHz **Operation Mode** :Bandedge CH HIGH EUT Pol. :E1 Plane

Test Date Temp./Humi. Engineer :Mike Measurement Antenna Pol.

:2017-07-05 :21 deg_C / 62 RH :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2483.50	Е	Average	37.94	-1.62	36.32	54.00	-17.68
2483.50	Е	Peak	52.42	-1.62	50.80	74.00	-23.20

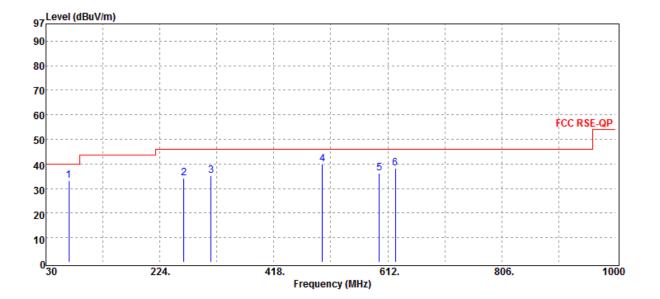
Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.



## **Below 1GHz Worst-Case Data:**

### **Radiated Spurious Emission Measurement Result**

Operation Band	:802.11g	Test Date	:2017-07-19
Fundamental Frequency	:2412 MHz	Temp./Humi.	:22 deg_C / 61 RH
Operation Mode	:Tx CH LOW	Engineer	:Mike
EUT Pol.	:E2 Plane	Measurement Antenna Pol.	:VERTICAL



	Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
			Mode	Reading Level		FS	@3m	
_	MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
	68.80	S	QP	43.32	-9.98	33.34	40.00	-6.66
	264.74	S	Peak	41.39	-7.05	34.34	46.00	-11.66
	311.30	S	Peak	40.54	-5.45	35.09	46.00	-10.91
	500.45	S	Peak	42.56	-2.68	39.88	46.00	-6.12
	597.45	S	Peak	36.53	-0.19	36.34	46.00	-9.66
	624.61	S	Peak	38.01	0.15	38.16	46.00	-7.84

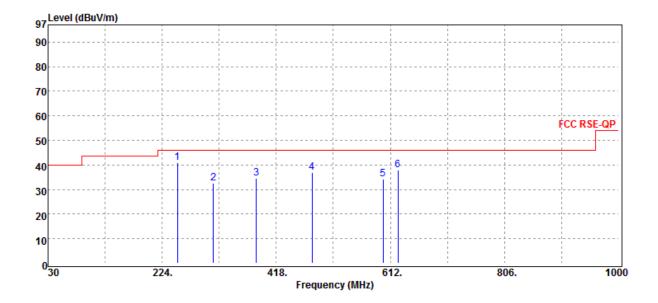
Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.



Operation Band	:802.11g
Fundamental Frequency	:2412 MHz
Operation Mode	:Tx CH LOW
EUT Pol.	:E2 Plane

Test Date Temp./Humi. Engineer Measurement Antenna Pol.

:2017-07-19 :22 deg_C / 61 RH :Mike :HORIZONTAL



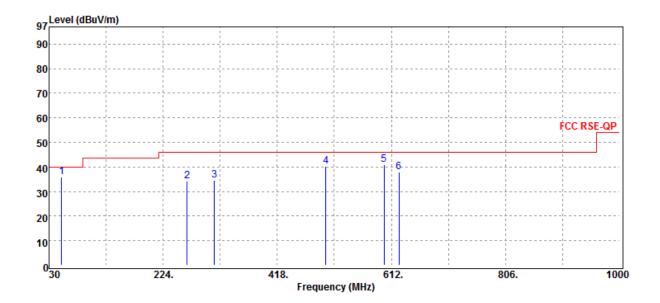
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
250.19	S	Peak	48.75	-7.93	40.82	46.00	-5.18
311.30	S	Peak	37.96	-5.45	32.51	46.00	-13.49
384.05	S	Peak	38.85	-4.35	34.50	46.00	-11.50
479.11	S	Peak	39.18	-2.39	36.79	46.00	-9.21
599.39	S	Peak	34.63	-0.27	34.36	46.00	-11.64
624.61	S	Peak	37.87	0.15	38.02	46.00	-7.98

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.



Operation Band	:802.11g
Fundamental Frequency	:2437 MHz
Operation Mode	:Tx CH MID
EUT Pol.	:E2 Plane

Test Date :2017-07-19 Temp./Humi. :22 deg_C / 61 RH Engineer :Mike :VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
51.34	S	QP	43.75	-7.75	36.00	40.00	-4.00
264.74	S	Peak	41.31	-7.05	34.26	46.00	-11.74
311.30	S	Peak	40.06	-5.45	34.61	46.00	-11.39
500.45	S	Peak	43.12	-2.68	40.44	46.00	-5.56
599.39	S	Peak	41.28	-0.27	41.01	46.00	-4.99
624.61	S	Peak	37.91	0.15	38.06	46.00	-7.94

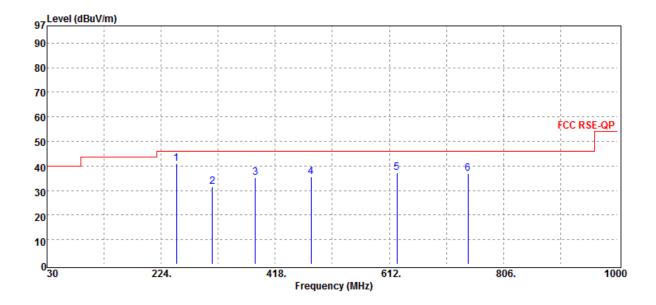
Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.



Operation Band	:802.11g
Fundamental Frequency	:2437 MHz
Operation Mode	:Tx CH MID
EUT Pol.	:E2 Plane

Test Date Temp./Humi. Engineer Measurement Antenna Pol.

:2017-07-19 :22 deg_C / 61 RH :Mike :HORIZONTAL



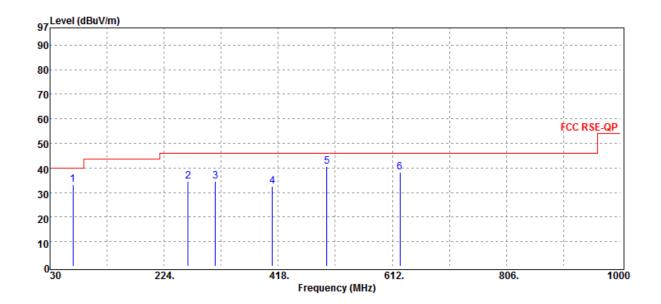
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
250.19	S	Peak	48.94	-7.93	41.01	46.00	-4.99
311.30	S	Peak	37.16	-5.45	31.71	46.00	-14.29
384.05	S	Peak	39.56	-4.35	35.21	46.00	-10.79
479.11	S	Peak	38.07	-2.39	35.68	46.00	-10.32
624.61	S	Peak	37.17	0.15	37.32	46.00	-8.68
745.86	S	Peak	34.51	2.30	36.81	46.00	-9.19

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.



**Operation Band** :802.11g **Fundamental Frequency** :2462 MHz **Operation Mode** :Tx CH HIGH EUT Pol. :E2 Plane

:2017-07-19 Test Date Temp./Humi. :22 deg_C / 61 RH Engineer :Mike :VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
68.80	S	QP	43.29	-9.98	33.31	40.00	-6.69
264.74	S	Peak	41.77	-7.05	34.72	46.00	-11.28
311.30	S	Peak	40.03	-5.45	34.58	46.00	-11.42
408.30	S	Peak	35.93	-3.53	32.40	46.00	-13.60
500.45	S	Peak	43.13	-2.68	40.45	46.00	-5.55
624.61	S	Peak	38.19	0.15	38.34	46.00	-7.66

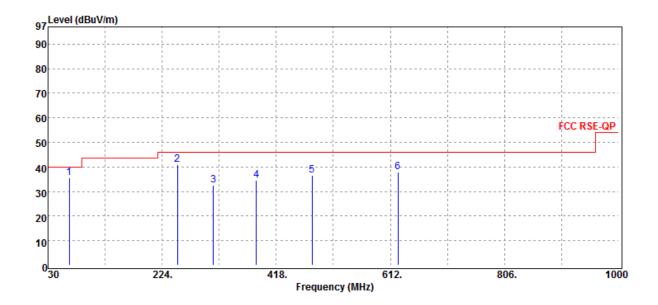
Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.



**Operation Band** :802.11g **Fundamental Frequency** :2462 MHz **Operation Mode** :Tx CH HIGH EUT Pol. :E2 Plane

Test Date Temp./Humi. Engineer :Mike Measurement Antenna Pol.

:2017-07-19 :22 deg_C / 61 RH :HORIZONTAL



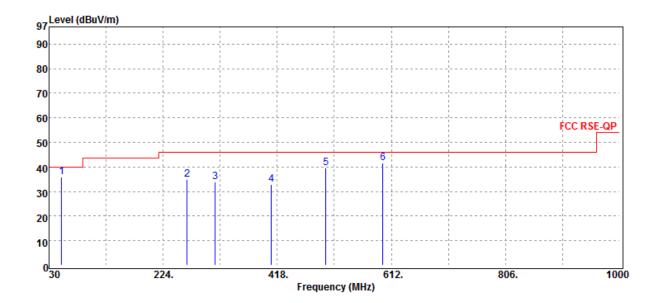
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
65.89	S	Peak	44.86	-9.38	35.48	40.00	-4.52
250.19	S	Peak	48.90	-7.93	40.97	46.00	-5.03
311.30	S	Peak	38.08	-5.45	32.63	46.00	-13.37
384.05	S	Peak	38.91	-4.35	34.56	46.00	-11.44
479.11	S	Peak	39.04	-2.39	36.65	46.00	-9.35
624.61	S	Peak	37.67	0.15	37.82	46.00	-8.18

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.



Operation Band	:802.11n40
Fundamental Frequency	:2422 MHz
Operation Mode	:Tx CH LOW
EUT Pol.	:E2 Plane

Test Date :2017-07-19 Temp./Humi. :22 deg_C / 61 RH Engineer :Mike :VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
51.34	S	QP	43.53	-7.75	35.78	40.00	-4.22
264.74	S	Peak	42.02	-7.05	34.97	46.00	-11.03
312.27	S	Peak	39.46	-5.51	33.95	46.00	-12.05
408.30	S	Peak	36.56	-3.53	33.03	46.00	-12.97
500.45	S	Peak	42.41	-2.68	39.73	46.00	-6.27
597.45	S	Peak	41.89	-0.19	41.70	46.00	-4.30

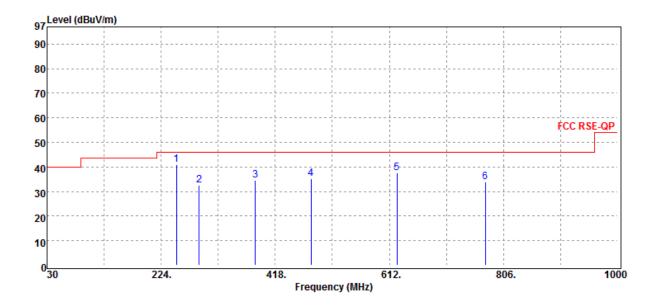
Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.



Operation Band	:802.11n40
Fundamental Frequency	:2422 MHz
Operation Mode	:Tx CH LOW
EUT Pol.	:E2 Plane

Test Date Temp./Humi. Engineer :Mike Measurement Antenna Pol.

:2017-07-19 :22 deg_C / 61 RH :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
250.19	S	Peak	48.91	-7.93	40.98	46.00	-5.02
288.99	S	Peak	38.56	-6.09	32.47	46.00	-13.53
384.05	S	Peak	38.92	-4.35	34.57	46.00	-11.43
479.11	S	Peak	37.53	-2.39	35.14	46.00	-10.86
624.61	S	Peak	37.42	0.15	37.57	46.00	-8.43
774.96	S	Peak	31.09	2.76	33.85	46.00	-12.15

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.

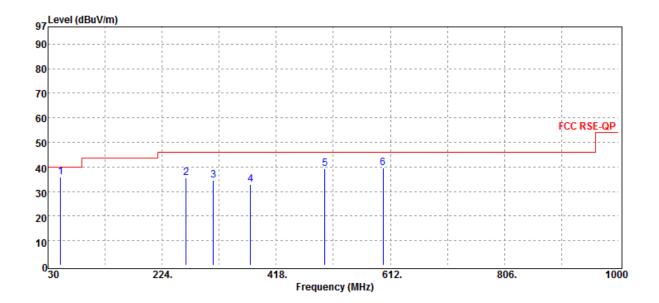
Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only. 除非另有说明,此根告结果僅對測試之樣品負責,同時此樣品僅保留的天。本報告未經本公司書面許可,不可部份複製。 This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at <u>www.sgs.com/terms and conditions.htm</u> and, for elec-tronic format documents, subject to Terms and Conditions for Electronic Documents at <u>www.sgs.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 ap-reparatore of this document is unaveruent is unaveruent to any be prosecuted to the fulle at vertex of the law. pearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

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Operation Band	:802.11n40
Fundamental Frequency	:2437 MHz
Operation Mode	:Tx CH MID
EUT Pol.	:E2 Plane

Test Date :2017-07-19 Temp./Humi. :22 deg_C / 61 RH Engineer :Mike :VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
51.34	S	QP	43.61	-7.75	35.86	40.00	-4.14
264.74	S	Peak	42.57	-7.05	35.52	46.00	-10.48
311.30	S	Peak	40.13	-5.45	34.68	46.00	-11.32
374.35	S	Peak	37.46	-4.54	32.92	46.00	-13.08
500.45	S	Peak	42.01	-2.68	39.33	46.00	-6.67
599.39	S	Peak	39.83	-0.27	39.56	46.00	-6.44

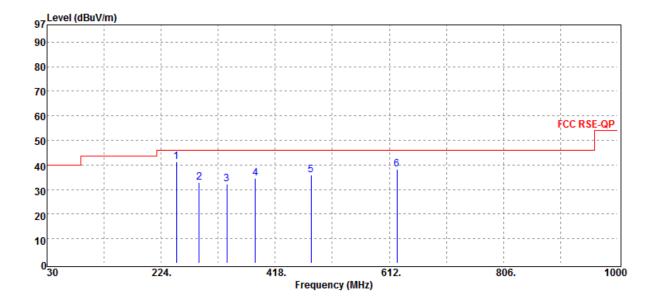
Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.



Operation Band	:802.11n40
Fundamental Frequency	:2437 MHz
Operation Mode	:Tx CH MID
EUT Pol.	:E2 Plane

Test Date Temp./Humi. Engineer :Mike Measurement Antenna Pol.

:2017-07-19 :22 deg_C / 61 RH :HORIZONTAL



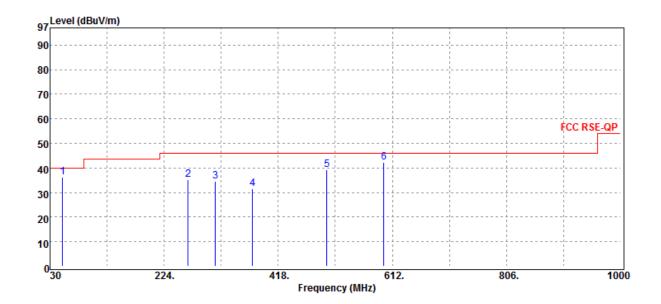
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV∕m	dBµV/m	dB
250.19	S	Peak	49.14	-7.93	41.21	46.00	-4.79
288.99	S	Peak	39.01	-6.09	32.92	46.00	-13.08
335.55	S	Peak	37.47	-5.32	32.15	46.00	-13.85
384.05	S	Peak	38.82	-4.35	34.47	46.00	-11.53
479.11	S	Peak	38.19	-2.39	35.80	46.00	-10.20
624.61	S	Peak	38.09	0.15	38.24	46.00	-7.76

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.



**Operation Band** :802.11n40 **Fundamental Frequency** :2452 MHz **Operation Mode** :Tx CH HIGH EUT Pol. :E2 Plane

:2017-07-19 Test Date Temp./Humi. :22 deg_C / 61 RH Engineer :Mike :VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
51.34	S	QP	43.88	-7.75	36.13	40.00	-3.87
264.74	S	Peak	42.24	-7.05	35.19	46.00	-10.81
311.30	S	Peak	39.86	-5.45	34.41	46.00	-11.59
374.35	S	Peak	36.13	-4.54	31.59	46.00	-14.41
500.45	S	Peak	41.87	-2.68	39.19	46.00	-6.81
597.45	S	Peak	42.42	-0.19	42.23	46.00	-3.77

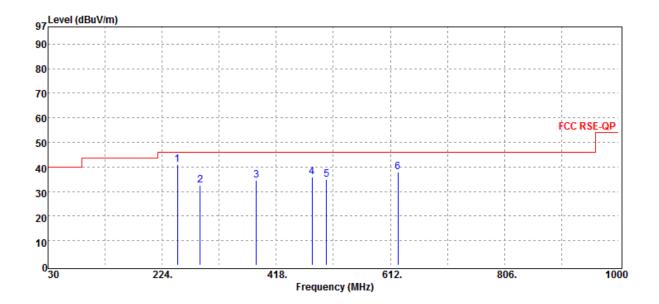
Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.



**Operation Band** :802.11n40 **Fundamental Frequency** :2452 MHz **Operation Mode** :Tx CH HIGH EUT Pol. :E2 Plane

Test Date Temp./Humi. Engineer Measurement Antenna Pol.

:2017-07-19 :22 deg_C / 61 RH :Mike :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
250.19	S	Peak	48.94	-7.93	41.01	46.00	-4.99
288.99	S	Peak	38.67	-6.09	32.58	46.00	-13.42
384.05	S	Peak	39.05	-4.35	34.70	46.00	-11.30
479.11	S	Peak	38.25	-2.39	35.86	46.00	-10.14
503.36	S	Peak	37.17	-2.40	34.77	46.00	-11.23
624.61	S	Peak	37.80	0.15	37.95	46.00	-8.05

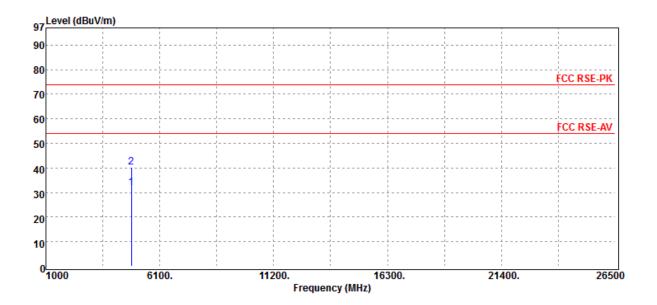
Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.



### Above 1GHz Data:

#### **Radiated Spurious Emission Measurement Result**

Operation Band	:802.11b	Test Date	:2017-07-04
Fundamental Frequency	:2412 MHz	Temp./Humi.	:21 deg_C / 62 RH
Operation Mode	:Tx CH LOW	Engineer	:Mike
EUT Pol.	:E1 Plane	Measurement Antenna Pol.	:VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe	
		Mode	Reading Level		FS	@3m	Margin	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	
4824.00	Н	Average	26.79	4.93	31.72	54.00	-22.28	
4824.00	Н	Peak	35.40	4.93	40.33	74.00	-33.67	

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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Operation Ba Fundamental Operation Mo EUT Pol.	Frequency	:802.11b :2412 MHz :Tx CH LOV :E1 Plane	V	Test Date Temp./Humi. Engineer Measurement Antenna Pol.		:Mike	07-04 g_C / 62 RH ZONTAL
97	BuV/m)						1
90							
80				1 1 1 1 1 1 1 1		FCC RSE-PK	
70							
60						FCC RSE-AV	
50	I I I I I I I I I						
40	2					     	
30		       				       	
20						         	
10							
0 <mark></mark>	610	0.	11200.	16300.	21400.	2650	)0
			Frequency (MH)	Z)			
_							•
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4004.00		A	00 77	4.00	04 70	54.00	00.00
4824.00	Н	Average	26.77	4.93	31.70	54.00	-22.30

Peak

35.57

4.93

40.50

74.00

-33.50



Operation Ba Fundamental Operation Mo EUT Pol.	Frequency	:802.11b :2437 MHz :Tx CH MID :E1 Plane		Test Date Temp./Hu Engineer Measure	umi.	:Mike	J_C / 62 RH
97 Level (dE	BuV/m)						1
90				·			
80						FCC RSE-PK	
70				       			
60				·		FCC RSE-AV	
50				I I I I			
40	2			·			
30							
20							
10							
0 <mark></mark>	610	<b>0.</b>	11200.	16300.	21400.	2650	0
			Frequency (MH	Z)			
<b>F</b>	Nista	Detector	0	Fastan	A	Lingt	0-1-
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	Н	Average	26.60	5.13	31.73	54.00	-22.27
4874.00	Н	Peak	36.19	5.13	41.32	74.00	-32.68



Operation Ba Fundamental Operation Mc EUT Pol.	Frequency	:802.11b :2437 MHz :Tx CH MID :E1 Plane	)	Test Date Temp./Hu Engineer Measure	umi.	:Mike	07-04 g_C / 62 RH ZONTAL
97 Level (df	BuV/m)						1
90							
80						FCC RSE-PK	
70							
60						FCC RSE-AV	
50							
40	2					·	
30						         	
20						       	
10						         	
0	610	0.	11200.	16300.	21400.	2650	0
			Frequency (MH				
_	•••						• •
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	Н	Average	26.57	5.13	31.70	54.00	-22.30
4874.00	Н	Peak	34.85	5.13	39.98	74.00	-34.02



4924.00

Н

Н

peration Bar Indamental peration Mo	Frequency	:802.11b :2462 MHz :Tx CH HIG	н	Test Date Temp./Hu Engineer	umi.	:Mike	J_C / 62 RH
JT Pol.		:E1 Plane		Measurement Antenna Po			CAL
97 Level (dB	uv/m)						
90							
80						FCC RSE-PK	
70	·					FUL KSE-PN	
60						FCC RSE-AV	
50						FCC KSE-AV	
40	2		· · · · · · · · · · · · · · · · · · ·				
30							
20							
10	·					     	
0							
0 <mark>1000</mark>	610	0.	11200. Frequency (MH	16300. z)	21400.	2650	0
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV∕m	dB

28.05

36.11

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Average

Peak

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5.25

5.25

33.30

41.36

54.00

74.00

-20.70

-32.64



4924.00

Н

Н

Operation Ba Fundamental Operation Mo EUT Pol.	Frequency	:802.11b :2462 MHz :Tx CH HIG :E1 Plane	Н	Test Date Temp./Humi. Engineer Measurement Antenna Pol.		:Mike	_C / 62 RH
97	BuV/m)		, ,				
90							
80						FCC RSE-PK	
70							
<b>60</b>						FCC RSE-AV	
<b>50</b>							
40	2						
30							
20							
10							
0		•	44000	40000	24.400	2050	
⁰ 1000	610	0.	11200. Frequency (MH)	16300. ⁽ )	21400.	26500	)
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV∕m c	lBµV∕m	dB

28.08

34.73

Average

Peak

5.25

5.25

33.33

39.98

54.00

74.00

-20.67

-34.02



Н

Operation Ba Fundamental Operation Mo EUT Pol.	Frequency	:802.11g :2412 MHz :Tx CH LOV :E1 Plane	V	Test Date Temp./Humi. Engineer Measurement Antenna Pol.		:Mike	_C / 62 RH
97 Level (dE	BuV/m)						
90							
80							
70						FCC RSE-PK	
60						FCC RSE-AV	
50							
40	2						
30							
20		     		       		       	
10							
0 <mark></mark> 1000	610	0.	11200. Frequency (MHz	16300. )	21400.	2650	0
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4824.00	н	Average	28.28	4.93	33.21	54.00	-20.79

Peak

38.17

4.93

43.10

74.00

-30.90



Н

Operation Ba Fundamental Operation Mo EUT Pol.	Frequency	:802.11g :2412 MHz :Tx CH LOV :E1 Plane	V	Test Date Temp./Humi. Engineer Measurement Antenna Pol.		:Mike	07-10 g_C / 62 RH ZONTAL
97 Level (d	BuV/m)						1
90							
80						FCC RSE-PK	
70							
60						FCC RSE-AV	
50	2		· · · · · · · · · · · · · · · · · · ·				
40				·			
30				·			
20				·		   	
10						 	
0 <mark></mark>	610	0.	11200.	16300.	21400.	2650	
			Frequency (MH				
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4824.00	Н	Average	28.43	4.93	33.36	54.00	-20.64

Peak

39.17

4.93

44.10

74.00

-29.90



Operation Ba Fundamental Operation Mo EUT Pol.	Frequency	:802.11g :2437 MHz :Tx CH MID :E1 Plane	)	Test Date Temp./Hu Engineer Measure	umi.	:Mike	g_C / 62 RH
97 Level (d	BuV/m)						1
90							
80						FCC RSE-PK	
70							
60						FCC RSE-AV	
50							
40	2						
30							
20							
10							
0 <mark></mark>	610	0	11200.	16300.	21400.	2650	]
1000	010		Frequency (MH		21400.	2000	
_		_	_	_			
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	Н	Average	27.47	5.13	32.60	54.00	-21.40
4874.00	Н	Peak	35.45	5.13	40.58	74.00	-33.42

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Operation Ba Fundamental Operation Mc EUT Pol.	Frequency	:802.11g :2437 MHz :Tx CH MID :E1 Plane		Test Date Temp./Hu Engineer Measure	umi.	:Mike	_C / 62 RH
97 Level (dl	BuV/m)						
90							
80				·		FCC RSE-PK	
70							
60				·		FCC RSE-AV	
50							
40	2			 1 1			
30				 1 1			
20							
10							
0	610	0.	11200. Frequency (MH	16300. z)	21400.	26500	)
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	Н	Average	27.18	5.13	32.31	54.00	-21.69
4874.00	Н	Peak	35.67	5.13	40.80	74.00	-33.20



4924.00

Н

Н

peration Ban undamental F peration Mod	Frequency	:802.11g :2462 MHz :Tx CH HIG	Ή	Test Date Temp./Hu Engineer	umi.	:Mike	g_C / 62 RH
JT Pol.		:E1 Plane		Measure	ment Antenna F	ol. :VERTI	CAL
97 Level (dBu	uV/m)	1	i i	i	i i		1
90							
80						FCC RSE-PK	
70						      	
60						FCC RSE-AV	
50				·			
40	2						
30		     				 	
20							
10							
0 <mark></mark>	610	0.	11200. Frequency (N	16300. IHz)	21400.	2650	0
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB

28.03

35.50

Average

Peak

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5.25

5.25

33.28

40.75

54.00

74.00

-20.72

-33.25



4924.00

Н

Н

Operation Ba Fundamenta Operation Mo EUT Pol.	I Frequency	:802.11g :2462 MHz :Tx CH HIG :E1 Plane	Н	Test Date Temp./Humi. Engineer Measurement Antenna Pol.			07-10 g_C / 62 RH ZONTAL
97 Level (d	lBuV/m)						
90				·			
80						FCC RSE-PK	
70							
60			· · · · · · · · · · · · · · · · · · ·		·	FCC RSE-AV	
50				·			
40	2			·			
30							
20				·		       	
10				·		       	
0 1000	610	0	11200.	16300.	21400.	2650	]
1000	010	0.	Frequency		21400.	2050	10
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Leve	el	FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB

Average

Peak

5.25

5.25

28.43

35.47

33.68

40.72

54.00

74.00

-20.32

-33.28



Н

Operation Ba Fundamental Operation Mo EUT Pol.	Frequency	:802.11n20 :2412 MHz :Tx CH LOV :E1 Plane	N	Test Date Temp./Hu Engineer Measure	umi.	:Mike	_C / 62 RH
97	BuV/m)						
90							
80	1 1 1 1			       		     	
70						FCC RSE-PK	
60							
						FCC RSE-AV	
50	2						
40				 I I I			
30							
20				 I I			
10		 				 	
0	610	0.	11200. Frequency (MH	16300. z)	21400.	2650	0
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4824.00	Н	Average	24.80	4.93	29.73	54.00	-24.27

Peak

36.94

4.93

41.87

74.00

-32.13



Н

Operation Ba Fundamental Operation Mo EUT Pol.	Frequency	:802.11n20 :2412 MHz :Tx CH LOV :E1 Plane	V	Test Date Temp./Hu Engineer Measure	umi.	:Mike	07-10 g_C / 62 RH ZONTAL
97 Level (dl	BuV/m)						
90							
80						FCC RSE-PK	
70							
60				1 1 1 1 1		FCC RSE-AV	
50							
40	2						
30							
20							
10							
0	610	0.	11200. Frequency (MH	16300. 2)	21400.	2650	0
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4824.00	н	Average	24.98	4.93	29.91	54.00	-24.09

Peak

36.15

4.93

41.08

74.00

-32.92



Operation Ba Fundamental Operation Mo EUT Pol.	Frequency	:802.11n20 :2437 MHz :Tx CH MID :E1 Plane	)	Test Date Temp./Hu Engineer Measure	umi.	:Mike	9_C / 62 RH
97	BuV/m)						1
90				1 1 1 1			
80						FCC RSE-PK	
70				     			
60						FCC RSE-AV	
50	· · · · · · · · · · · · · · · · · · ·			       			
40	2			1 1 1 1			
30						       	
20				1 1 1 1		       	
10						       	
0 <mark></mark>	610	0.	11200.	16300.	21400.	2650	0
			Frequency (MH	Z)			
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	Н	Average	24.59	5.13	29.72	54.00	-24.28
4874.00	Н	Peak	36.57	5.13	41.70	74.00	-32.30

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Operation Bar Fundamental Operation Mo EUT Pol.	Frequency	:802.11n20 :2437 MHz :Tx CH MID :E1 Plane		Test Date Temp./Hu Engineer Measuren		:Mike	_C / 62 RH
97	uV/m)				, ,	·	
90							
80						FCC RSE-PK	
70							
60						FCC RSE-AV	
50	2						
40						1 1 	
30							
20							
10							
0 <mark></mark> 1000	610	0.	11200. Frequency (MH	16300. z)	21400.	26500	1
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	Н	Average	24.88	5.13	30.01	54.00	-23.99
4874.00	Н	Peak	38.67	5.13	43.80	74.00	-30.20

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4924.00

Н

Н

Operation Ba Fundamental Operation Mo EUT Pol.	Frequency	:802.11n20 :2462 MHz :Tx CH HIG :E1 Plane	iΗ	Test Date Temp./Humi. Engineer Measurement Antenna Pol.		:Mike	<u>_</u> C / 62 RH
97	BuV/m)						1
90				·			
80						FCC RSE-PK	
70				 I I I			
60				· · · · · · · · · · · · · · · · · · ·		FCC RSE-AV	
50	2			·			
40				·			
30				·			
20							
10							
0 <mark></mark> 1000	610	0.	11200. Frequency (MH	16300. z)	21400.	2650	]  0
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB

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Average

Peak

24.49

37.01

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5.25

5.25

29.74

42.26

-24.26

-31.74

54.00

74.00



4924.00

Н

Н

	L
97 Level (dBuV/m)	
90	
80 FCC RSE-PK	
70	
60 FCC RSE-AV	
50	
40 2	
30	
20	
10	
0	
Freq. Note Detector Spectrum Factor Actual Limit Safe	е
Mode Reading Level FS @3m Marg	jin
$\begin{tabular}{lllllllllllllllllllllllllllllllllll$	

24.67

35.70

Average

Peak

5.25

5.25

29.92

40.95

54.00

74.00

-24.08

-33.05



Н

Operation Ba Fundamental Operation Mo EUT Pol.	Frequency	:802.11n40 :2422 MHz :Tx CH LOV :E1 Plane	N	Test Date Temp./Hu Engineer Measure	umi.	:Mike	J_C / 62 RH
97	BuV/m)						
90							
80							
70	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1					FCC RSE-PK	
60	· · · · · · · · · · · · · · · · · · ·						
50	1 1 1 1 					FCC RSE-AV	
40	2						
30						       	
20		     		     		1 1 1 1	
10		     		     		     	
0 ^L 1000	610	0.	11200. Frequency (MH)	16300. z)	21400.	2650	0
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4844.00	Н	Average	24.84	4.97	29.81	54.00	-24.19

Peak

35.83

4.97

40.80

74.00

-33.20



Н

Operation Ba Fundamenta Operation Mo EUT Pol.	I Frequency	:802.11n40 :2422 MHz :Tx CH LOV :E1 Plane	V	Test Date Temp./Hu Engineer Measure	umi.	:Mike	07-10 C / 62 RH CONTAL
97 Level (d	BuV/m)						
90							
80						FCC RSE-PK	
70						FUC RSE-PR	
60						FCC RSE-AV	
50							
40	2						
30							
20	·····					       	
10		     		       		 	
0 <mark></mark>	610	0.	11200. Frequency (MH	16300. z)	21400.	2650	0
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4844.00	Н	Average	25.06	4.97	30.03	54.00	-23.97

Peak

36.92

4.97

41.89

74.00

-32.11



Operation Ba Fundamental Operation Mo EUT Pol.	Frequency	:802.11n40 :2437 MHz :Tx CH MID :E1 Plane		Test Date Temp./Hu Engineer Measurei	umi.	:Mike	9_C / 62 RH
97	BuV/m)						1
90				       			
80			· · · · · · · · · · · · · · · · · · ·			FCC RSE-PK	
70				       			
60				     		FCC RSE-AV	
50			· · · · · · · · · · · · · · · · · · ·	       			
40	2		· · · · · · · · · · · · · · · · · · ·				
30			· · · · · · · · · · · · · · · · · · ·			       	
20		     	· · · · · · · · · · · · · · · · · · ·	       		       	
10						       	
0 <mark></mark>	610	0.	11200.	16300.	21400.	2650	0
			Frequency (MH	Z)			
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	Н	Average	24.43	5.13	29.56	54.00	-24.44
4874.00	Н	Peak	36.12	5.13	41.25	74.00	-32.75



Operation Ba Fundamental Operation Mc EUT Pol.	Frequency	:802.11n40 :2437 MHz :Tx CH MID :E1 Plane		Test Date Temp./Hu Engineer Measure	umi.	:Mike	17-10 _C / 62 RH CONTAL
97 Level (dE	BuV/m)						
90							
80						FCC RSE-PK	
70		· · · · · · · · · · · · · · · · · · ·				CC NJL-T N	
60						FCC RSE-AV	
50							
40	2						
30		       				· · · · · · · · · · · · · · · ·	
20							
10							
0 <mark></mark>	610	0.	11200.	16300.	21400.	2650	0
			Frequency (MH	Z)			
_		5.4.4		<b>-</b> /			<b>o</b> <i>i</i>
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4874.00	Н	Average	24.63	5.13	29.76	54.00	-24.24
4874.00	Н	Peak	35.58	5.13	40.71	74.00	-33.29



4904.00

Н

Н

Operation Ba Fundamental Operation Mo EUT Pol.	Frequency	:802.11n40 :2452 MHz :Tx CH HIG :E1 Plane	Н	Test Date Temp./Hu Engineer Measurer	ımi.	:Mike	_C / 62 RH
97	BuV/m)						
90							
80						FCC RSE-PK	
70			·				
60						FCC RSE-AV	
<b>50</b>							
40	2						
30							
20							
10							
0				10000			
0 <mark>1000</mark>	610	0.	11200. Frequency (MH)	16300. ()	21400.	26500	)
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV∕m c	lBµV∕m	dB

24.45

36.22

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Average

Peak

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5.24

5.24

29.69

41.46

54.00

74.00

-24.31

-32.54



4904.00

Н

Н

peration Ba Indamenta peration M JT Pol.	I Frequency	:802.11n40 :2452 MHz :Tx CH HIG :E1 Plane	Н	Test Date Temp./Hu Engineer Measure	umi.	:Mike	07-10 9_C / 62 RH ZONTAL
97	IBuV/m)						1
90				·			
80						FCC RSE-PK	
70				         			
60				·		FCC RSE-AV	
50				   			
40	2						
30	4			       			
20							
10							
0 <mark>1000</mark>	610	0.	11200. Frequency (MH	16300. z)	21400.	2650	  0
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV∕m o	ḋBµV∕m	dB

24.58

35.95

Average

Peak

5.24

5.24

29.82

41.19

54.00

74.00

-24.18

-32.81



# 12 PEAK POWER SPECTRAL DENSITY

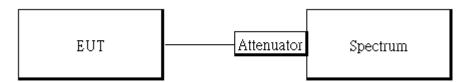
## **12.1 Standard Applicable**

The power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission.

## **12.2 Measurement Equipment Used**

Conducted Emission Test Site										
EQUIPMENT	MFR	MODEL SERIAL		LAST	CAL DUE.					
TYPE		NUMBER	NUMBER	CAL.						
EXA Spectrum Analyzer	Agilent	N9030A	MY53120760	03/21/2017	03/20/2018					
DC Block	Mini-Circuits	BLK-18-S+	1	01/05/2017	01/04/2018					
Coaxial Cable	HUBER+SUHNER	SUCOFLEX 102	23670/2	01/05/2017	01/04/2018					
Attenuator	Mini-Circuit	BW-S10W2+	2	01/05/2017	01/04/2018					

## 12.3 Test Set-up



## 12.4 Measurement Procedure

- 1. Set analyzer center frequency to DTS channel center frequency.
- 2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
- 3. Set the span to 1.5 times the DTS channel bandwidth.
- 4. Set the RBW = 3 kHz & VBW = 10 kHz.
- 5. For defining Restricted Band Edge Limit: Set the RBW = 100kHz & VBW = 300 kHz
- 6. Detector = peak.
- 7. Sweep time = auto couple.
- 8. Trace mode = max hold.
- 9. Allow trace to fully stabilize.
- 10. Use the peak marker function to determine the maximum amplitude level.

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#### **12.5 Measurement Result**

	POWER DENSITY 802.11b									
Freq. (MHz)	PPSD W/O Duty Factor (dBm)	tor Duty Factor (dBm)		Limit (dBm)	Result					
2412	-3.36	0.03	-3.33	8.00	PASS					
2437	-4.03	0.03	-4.00	8.00	PASS					
2462	-4.92 0.03 -4.89		8.00	PASS						
	POWER DENSITY 802.11g									
Freq. (MHz)	PPSD W/O Duty Factor (dBm)	Duty Factor	PPSD With Duty Factor (dBm)	Limit (dBm)	Result					
2412	-9.35	0.21	-9.14	8.00	PASS					
2437	-8.60	0.21	-8.39	8.00	PASS					
2462	-7.22	0.21	-7.01	8.00	PASS					
	POWE		FY 802.11 n H	T20						
Freq. (MHz)	PPSD W/O Duty Factor (dBm)	Duty Factor	PPSD With Duty Factor (dBm)	Limit (dBm)	Result					
2412	-9.23	0.21	-9.02	8.00	PASS					
2437	-8.59	0.21	-8.38	8.00	PASS					
2462	-9.98	0.21	-9.77	8.00	PASS					
	DOW									

POWER DENSITY 802.11n HT40									
Freq. (MHz)	PPSD W/O Duty Factor (dBm)	Duty Factor	PPSD With Duty Factor (dBm)	Limit	Result				
2422	-10.71	0.46	-10.25	8.00	PASS				
2437	-12.74	0.46	-12.28	8.00	PASS				
2452	-12.88	0.46	-12.42	8.00	PASS				

#### Note:

offset 12.00 dB

*Refer to next page for plots

SGS Taiwan Ltd.



## 802.11b **Power Spectral Density Test Plot (CH-Low)**



## **Power Spectral Density Test Plot (CH-Mid)**



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## **Power Spectral Density Test Plot (CH-High)**



# 802.11g





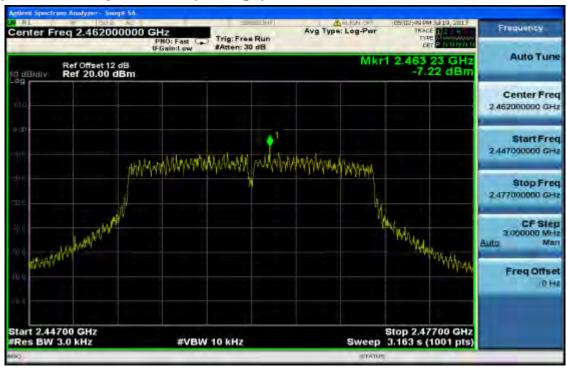
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## **Power Spectral Density Test Plot (CH-Mid)**



#### **Power Spectral Density Test Plot (CH-High)**



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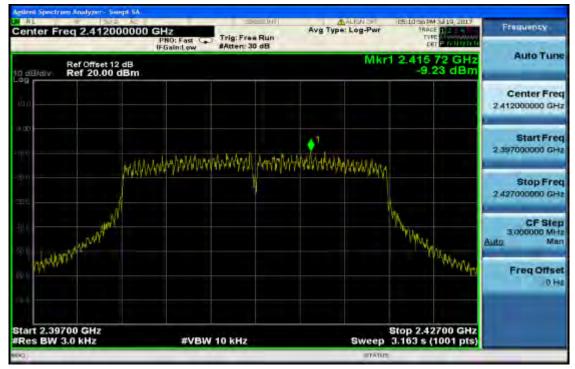
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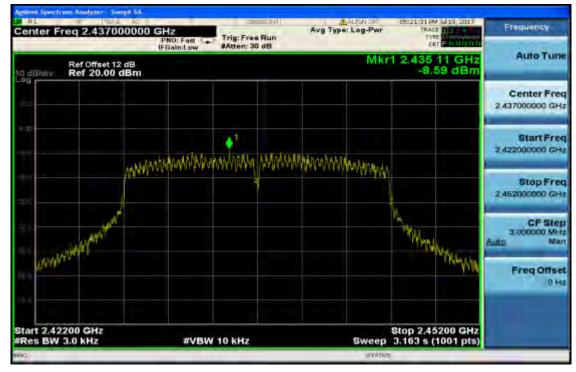


## 802.11n HT20

### **Power Spectral Density Test Plot (CH-Low)**



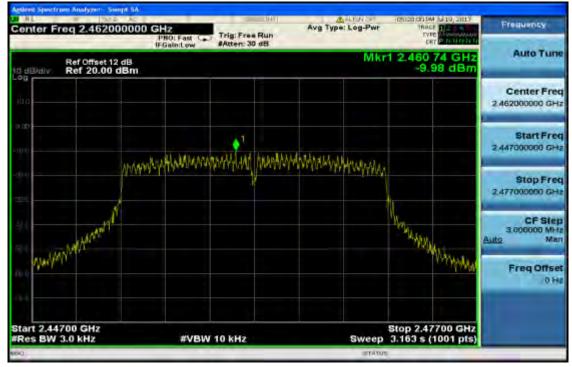
## **Power Spectral Density Test Plot (CH-Mid)**



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## **Power Spectral Density Test Plot (CH-High)**



# 802.11n HT40

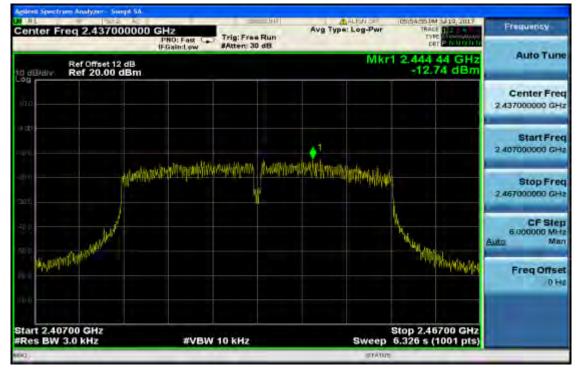
## **Power Spectral Density Test Plot (CH-Low)**



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## **Power Spectral Density Test Plot (CH-Mid)**



## **Power Spectral Density Test Plot (CH-High)**



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# **13 ANTENNA REQUIREMENT**

## **13.1 Standard Applicable**

For intentional device, according to §15.203, an intentional radiator shall be designed to ensure that no antenna other than furnished by the responsible party shall be used with the device. If the transmitting antenna is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi.

## **13.2 Antenna Connected Construction**

An embedded-in antenna design is used.

The antenna connector is designed with unique type RF connector and no consideration of replacement. Please see EUT photo and antenna spec. for details.

~ End of Report ~

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